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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:
10/23/12 - 11/06/12
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
0Y1210221528-R1.A3L

FCC ID: **A3LSHVE230L**

APPLICANT: **SAMSUNG ELECTRONICS CO., LTD.**

DUT Type: Portable Tablet
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model(s): SHV-E230L

Band & Mode	Tx Frequency	Conducted Power [dBm]	SAR
			1 gm Body (W/kg)
GSM/GPRS 1900	1850.20 - 1909.80 MHz	24.31	0.50
UMTS 1900	1852.4 - 1907.6 MHz	22.57	0.86
2.4 GHz WLAN	2412 - 2462 MHz	11.89	0.69
5.8 GHz WLAN	5745 - 5825 MHz	12.89	0.26
5.2 GHz WLAN	5180 - 5240 MHz	12.58	0.59
5.3 GHz WLAN	5260 - 5320 MHz	12.67	0.63
5.5 GHz WLAN	5500 - 5700 MHz	12.83	0.57
Bluetooth	2402 - 2480 MHz	10.76	N/A
Simultaneous SAR per KDB 690783 D01:			1.55

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

This revised Test Report (S/N: 0Y1210221528-R1.A3L) supersedes and replaces the previously issued test report on the same subject DUT for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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

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

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

Randy Ortanez
President

ACCREDITED
TESTING LABORATORY
CERTIFICATE #2041.01

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Tx Frequency
GSM/GPRS 1900	1850.20 - 1909.80 MHz
UMTS 1900	1852.4 - 1907.6 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

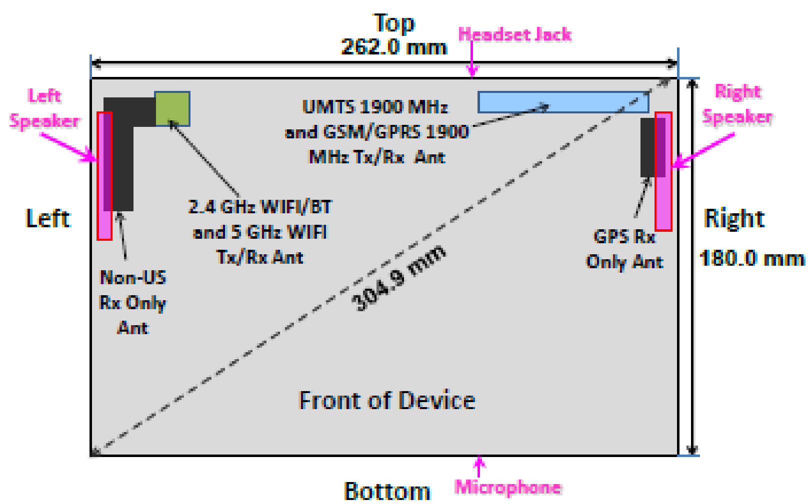

Figure 1-1
DUT Antenna Locations

1.3 SAR Test Exclusions Applied

(A) WIFI/BT

2.4 GHz and 5 GHz WIFI and Bluetooth share the same antenna path and cannot transmit simultaneously.

The separation between the main antenna and the Bluetooth/WLAN antenna is 155.2 mm.
RF Conducted Power of Bluetooth Tx is 11.91 mW (Please refer to the EMC DSS Report for a full set of Bluetooth conducted powers).

Per KDB Publication 447498 4) b), SAR is not required when the average output power is less than 60/f(GHz). Therefore, **Bluetooth SAR was not required** since the maximum conducted power of Bluetooth Tx is 11.91 mW. 2.4 GHz WLAN SAR was also not required but additionally tested and included per the applicant.

(B) Licensed Transmitter(s)

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

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

This model does not support Simultaneous Voice and Data for the licensed transmitter in any modes except in UMTS. When the user utilizes multiple services in UMTS 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.

1.4 Power Reduction for SAR

Proximity Sensors were utilized in the device for SAR purposes. April/October 2011 TCB Workshop Notes and KDB 616217 D04 v01 procedures regarding power reduction using power sensors were used for guidance for SAR Testing. See Appendix E Document for more information.

1.5 Guidance Applied

- FCC KDB 941225 (2G/3G)
- FCC KDB 248227 (802.11)
- FCC KDB 865664 (5 GHz)
- FCC KDB 447498 Section 4 (Tablet SAR Considerations, Simultaneous SAR)
- April/October 2011 TCB Workshop Notes for RF Exposure and Sensors with Power Reduction
- FCC KDB 616217 D04 v01 (Power Reduction)

1.6 Samples Used for SAR Testing

Three samples with identical hardware, which are within operational tolerances expected for production units, were used to facilitate SAR testing only. For maximum power samples, power reduction was disabled via software (only available to the manufacturer - end user cannot disable power reduction) to ensure the device was always transmitting at maximum power when testing at a conservative distance. All reduced power samples were tuned to the reduced power levels. Power reduction was disabled via software (only available from the manufacturer) on this device to ensure the device was always transmitting at reduced power and to confirm reduced power levels.

Table 1-1
SAR Test Sample Serial Numbers

Sample	Modes
102212-1	GSM/GPRS/UMTS Max. 1900 MHz, 802.11a
102212-3	802.11b
102212-4	GSM/GPRS/UMTS Reduced 1900 MHz

2 INTRODUCTION

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

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

2.1 SAR Definition

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

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)	1900	2450	5200-5800
Tissue	Body	Body	Body
Ingredients (% by weight)			
DGBE	29.44	26.7	
NaCl	0.39	0.1	
Polysorbate (Tween) 80			20
Water	70.17	73.2	80

4 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.

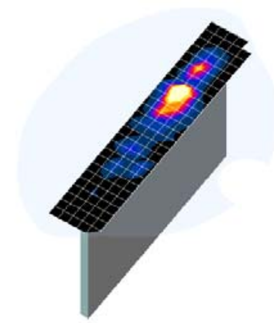

Figure 4-1
Sample SAR Area Scan

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.

5 FCC RF EXPOSURE LIMITS

5.1 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.

5.2 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 5-1
SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT *General Population* (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT *Occupational* (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.

6 FCC MEASUREMENT PROCEDURES

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

6.1 Procedures Used to Establish RF Signal for SAR

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

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

6.2 SAR Measurement Conditions for UMTS

6.2.1 Output Power Verification

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

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in section 5.2 of 3GPP TS 34.121 (release 5), using the appropriate RMC with TPC (transmit power control) set to all “1s”. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH) are tabulated in the test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations is identified.

6.2.2 Body SAR Measurements

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

6.2.3 Procedures Used to Establish RF Signal for SAR HSDPA Data Devices

The following procedures are applicable to HSDPA data devices operating under 3GPP Release 5. Body exposure conditions are typically applicable to these devices, including handsets and data modems operating in various electronic devices. HSDPA operates in conjunction with WCDMA and requires an active DPCCH. The default test configuration is to measure SAR in WCDMA without HSDPA, with an established radio link between the DUT and a communication test set with 12.2 kbps RMC mode configured in Test Loop Mode 1; and tested with HSDPA with FRC and a 12.2 kbps RMC using the highest SAR configuration in WCDMA. SAR is selectively confirmed for other physical channel configurations according to output power, exposure conditions and device operating capabilities. Maximum output power is verified according to 3GPP TS 23.121 (Release 5) and SAR must be measured according to these maximum output conditions.

6.2.4 SAR Measurement Conditions for HSUPA Data Devices

SAR for body exposure configurations are measured according to the ‘Body SAR Measurements’ procedures in the ‘WCDMA Handsets’ section of the KDB 941225 D01 FCC 3G document. In addition, Body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least ¼ dB higher of that measured without HSPA in 12.2 kbps RMC mode or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.2 kbps RMC without HSPA. When VOIP is applicable for head exposure, SAR is not required when the maximum output of each RF channel with HSPA is less than ¼ dB higher than that measured using 12.2 kbps RMC; otherwise, the same HSPA configuration used for body measurements should be used to test for head exposure.

Due to inner loop power control requirements in HSPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and EDCH configurations for HSPA should be configured according to the β values indicated below as well as other applicable procedures described in the ‘WCDMA Handset’ and ‘Release 5 HSDPA Data Devices’ sections of the FCC 3G document.

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

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.

Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

6.3 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.

6.3.1 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.

6.3.2 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 then 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.

7 SAR TABLET TESTING

7.1 SAR Testing for Tablet per KDB Publication 447498 Section 4

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

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

Since the diagonal dimension of the device is more than 20 cm (30.49 cm), this device is a tablet.

7.2 Proximity Sensor Information

The technical description contains information about sensor size and locations. Power reduction levels are provided in Section 8 (Conducted Powers).

KDB 616217 D04 v01 was used as a guideline for selecting SAR test distances for this device. Since the back-off sensor activation distance for back is 12 mm, a conservative distance of 11 mm was tested for the back side at maximum power. Since the back-off sensor activation distance for top edge is 10 mm, a conservative distance of 9 mm was tested for the top edge at maximum power. Details about sensing mechanism and sensor pad location are included in the technical description. Sensor triggering distance data can be found in Appendix E.

The sensor is designed to support sufficient detection range and sensitivity to cover regions of the sensors in all applicable directions since the sensor entirely covers the antenna.

7.3 Display Orientation Capabilities

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

7.4 Method of SAR Measurement with Power Reduction

This tablet was tested in accordance with KDB 616217 D04 v01 and April/Oct 2011 TCB workshop notes for proximity sensor and power reduction.

Based on the power-reduction activation vs. distance results for the sensors, the sample representative of the device with the sensor activated (reduced power S/N: 102212-4) was tested for SAR at 0 mm for back side. For the additional SAR measurements with the sensor de-activated (max power, no power reduction S/N: 102212-1) when the device is positioned away from the user, SAR evaluation is required at 11 mm (from the back side) distance from the phantom and at 9 mm (from the top edge) distance from the phantom. Since the device sensor detection mechanism is active at these distances, the power reduction was disabled via manufacturer test software, and the device was placed in maximum power transmit mode with a base station simulator under the tissue equivalent liquid- filled flat phantom at the required distances for testing.

8 RF CONDUCTED POWERS

8.1 GSM/GPRS Conducted Powers

Table 8-1
Maximum GSM/GPRS Powers (Representing Proximity Sensor Inactive)

		Maximum Burst-Averaged Output Power				
		Voice	*GPRS Data (GMSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**
PCS	512	29.83	29.85	27.48	25.32	**24.44**
	661	29.76	29.77	27.20	25.23	**24.31**
	810	29.63	29.66	27.14	25.14	**24.35**
		Calculated Maximum Frame-Averaged Output Power				
		Voice	*GPRS Data (GMSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**
PCS	512	20.80	20.82	21.46	21.06	**21.43**
	661	20.73	20.74	21.18	20.97	**21.30**
	810	20.60	20.63	21.12	20.88	**21.34**

Table 8-2
Reduced GSM/GPRS Powers (Representing Proximity Sensor Active)

		Maximum Burst-Averaged Output Power				
		Voice	*GPRS Data (GMSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**
PCS	512	22.90	22.89	21.30	**19.76**	18.44
	661	22.95	22.87	21.38	**19.86**	18.45
	810	22.95	22.96	21.31	**19.73**	18.43
		Calculated Maximum Frame-Averaged Output Power				
		Voice	*GPRS Data (GMSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**
PCS	512	13.87	13.86	15.28	**15.50**	15.43
	661	13.92	13.84	15.36	**15.60**	15.44
	810	13.92	13.93	15.29	**15.47**	15.42

Notes:

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. The bolded GPRS modes were selected according to the highest frame-averaged output power table according to KDB 941225 D03.
3. CS1 coding scheme was used in GPRS output power measurements and SAR Testing as a condition where GMSK modulation was ensured. It was investigated that CS1 – CS4 settings do not have any impact on the output levels in the GPRS modes.

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

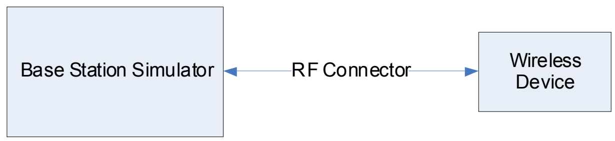

Figure 8-1
Power Measurement Setup

Table 8-3
GPRS Power Reduction Summary due to the Proximity Sensor

Mode / Band	Proximity Sensor State	Voice (dBm)	Burst Average GMSK (dBm)			
		1 Tx Slot	*1 Tx Slot*	*2 Tx Slots*	*3 Tx Slots*	*4 Tx Slots*
GSM/GPRS 1900 MHz	**Inactive**	**29.5**	**29.5**	**27.0**	**25.0**	**24.0**
	Active	22.5	22.5	21.0	19.5	18.5

8.2 UMTS Conducted Powers

Table 8-4
Maximum UMTS Powers (Representing Proximity Sensor Inactive)

3GPP Release Version	Mode	3GPP 34.121 Subtest	PCS Band [dBm]			3GPP MPR [dB]
			9262	9400	9538	
99	WCDMA	12.2 kbps RMC	22.66	22.57	22.33	-
99		12.2 kbps AMR	22.63	22.47	22.38	-
6	HSDPA	Subtest 1	21.70	21.59	21.46	0
6		Subtest 2	21.81	21.60	21.40	0
6		Subtest 3	21.22	21.06	21.04	0.5
6		Subtest 4	21.32	21.09	21.12	0.5
6	HSUPA	Subtest 1	21.49	21.35	21.27	0
6		Subtest 2	20.81	20.71	20.49	2
6		Subtest 3	20.51	19.75	20.42	1
6		Subtest 4	21.10	20.90	20.74	2
6		Subtest 5	21.41	21.04	20.57	0

Table 8-5
Reduced UMTS Powers (Representing Proximity Sensor Active)

3GPP Release Version	Mode	3GPP 34.121 Subtest	PCS Band [dBm]			3GPP MPR [dB]
			9262	9400	9538	
99	WCDMA	12.2 kbps RMC	13.66	13.72	13.47	-
99		12.2 kbps AMR	13.69	13.78	13.39	-
6	HSDPA	Subtest 1	12.90	12.95	12.20	0
6		Subtest 2	12.16	12.99	12.27	0
6		Subtest 3	11.50	12.48	11.77	0.5
6		Subtest 4	12.19	12.25	11.82	0.5
6	HSUPA	Subtest 1	12.03	12.08	11.85	0
6		Subtest 2	11.63	11.70	11.25	2
6		Subtest 3	10.90	11.63	10.69	1
6		Subtest 4	11.92	12.17	12.40	2
6		Subtest 5	12.40	12.42	11.23	0

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

It is expected by the manufacturer that MPR for some HSUPA subtests may be up to 1 dB more than specified by 3GPP, but also as low as 0 dB according to the chipset implementation in this model.

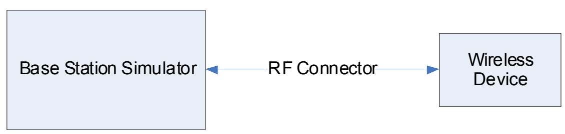

Figure 8-2
Power Measurement Setup

Table 8-6
UMTS Power Reduction Summary due to the Proximity Sensor

Mode / Band	Proximity Sensor State	Modulated Average (dBm)		
		3GPP Rel 99	*HSDPA*	*HSUPA*
UMTS Band 2 (1900 MHz)	**Inactive**	**22.5**	**21.5**	**21.0**
	Active	13.5	12.5	12.0

8.3 WLAN Conducted Powers

Table 8-7
IEEE 802.11b Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]			
			Data Rate [Mbps]			
			1	2	5.5	11
802.11b	2412	1	**11.89**	11.98	12.05	11.99
802.11b	2437	6	11.47	11.45	11.51	11.45
802.11b	2462	11	11.66	11.66	11.73	11.66

Table 8-8
IEEE 802.11g Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm] Data Rate [Mbps]							
			6	**9**	**12**	**18**	**24**	**36**	**48**	**54**
802.11g	2412	1	11.59	11.60	11.58	11.56	11.62	11.57	11.63	11.63
802.11g	2437	6	11.18	11.13	11.16	11.15	11.15	11.13	11.10	11.15
802.11g	2462	11	11.33	11.33	11.31	11.27	11.34	11.32	11.28	11.26

Table 8-9
IEEE 802.11n Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm] Data Rate [Mbps]							
			6.5	13	20	26	39	52	58	65
802.11n	2412	1	8.85	9.00	8.96	9.60	9.05	8.97	9.00	8.99
802.11n	2437	6	8.53	8.61	8.56	8.60	8.54	8.57	8.55	8.57
802.11n	2462	11	8.56	8.63	8.64	8.62	8.57	8.64	8.63	8.64

Table 8-10
IEEE 802.11a Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm] Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11a	**5180**	36	12.30	12.26	12.33	12.35	12.35	12.40	12.36	12.45
802.11a	5200	40	**12.38**	12.36	12.36	12.23	12.37	12.46	12.54	12.62
802.11a	5220	44	12.53	12.53	12.58	12.52	12.58	12.50	12.64	12.61
802.11a	**5240**	48	**12.58**	12.53	12.53	12.67	12.52	12.49	12.59	12.58
802.11a	**5260**	52	12.57	12.60	12.68	12.52	12.57	12.62	12.60	12.66
802.11a	5280	56	**12.67**	12.68	12.63	12.63	12.62	12.60	12.71	12.72
802.11a	5300	60	12.62	12.65	12.66	12.65	12.65	12.76	12.68	12.70
802.11a	**5320**	64	**12.65**	12.69	12.69	12.65	12.77	12.78	12.76	12.73
802.11a	5500	100	12.49	12.48	12.51	12.48	12.55	12.56	12.59	12.58
802.11a	**5520**	104	12.55	12.51	12.53	12.54	12.48	12.59	12.62	12.55
802.11a	5540	108	**12.60**	12.53	12.57	12.59	12.56	12.57	12.59	12.61
802.11a	5560	112	12.59	12.62	12.65	12.64	12.65	12.67	12.62	12.69
802.11a	**5580**	116	12.64	12.61	12.66	12.67	12.67	12.66	12.68	12.72
802.11a	5660	132	**12.75**	12.69	12.75	12.80	12.73	12.80	12.86	12.87
802.11a	**5680**	136	12.77	12.74	12.80	12.82	12.76	12.90	12.85	12.79
802.11a	5700	140	**12.83**	12.85	12.79	12.79	12.87	12.86	12.88	12.93
802.11a	**5745**	149	12.83	12.87	12.82	12.87	12.88	12.90	12.97	12.93
802.11a	5765	153	12.82	12.82	12.89	12.83	12.83	12.91	12.93	12.92
802.11a	**5785**	157	12.81	12.82	12.85	12.85	12.86	12.85	12.88	12.82
802.11a	**5805**	161	12.86	12.81	12.77	12.91	12.85	12.89	12.89	12.94
802.11a	5825	165	**12.89**	12.85	12.80	12.90	12.87	12.86	12.87	12.92

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 Band.

Table 8-11
IEEE 802.11n (20 MHz Bandwidth) Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	20	26	39	52	58	65
802.11n	**5180**	36	11.66	11.69	11.64	11.62	11.72	11.71	11.70	11.79
802.11n	5200	40	11.68	11.60	11.69	11.65	11.71	11.68	11.68	11.72
802.11n	5220	44	11.68	11.66	11.61	11.70	11.68	11.70	11.72	11.67
802.11n	**5240**	48	11.71	11.61	11.67	11.69	11.75	11.71	11.72	11.76
802.11n	**5260**	52	11.66	11.68	11.73	11.70	11.72	11.77	11.75	11.82
802.11n	5280	56	11.77	11.75	11.74	11.75	11.78	11.86	11.80	11.78
802.11n	5300	60	11.81	11.82	11.81	11.83	11.85	11.78	11.81	11.80
802.11n	**5320**	64	11.79	11.81	11.81	11.82	11.86	11.92	11.83	11.85
802.11n	5500	100	11.64	11.61	11.66	11.63	11.64	11.66	11.74	11.63
802.11n	**5520**	104	11.75	11.67	11.65	11.75	11.74	11.68	11.72	11.70
802.11n	5540	108	11.65	11.62	11.69	11.68	11.80	11.82	11.83	11.73
802.11n	5560	112	11.72	11.71	11.74	11.74	11.75	11.77	11.80	11.79
802.11n	**5580**	116	11.73	11.72	11.74	11.87	11.86	11.86	11.85	11.85
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	11.81	11.80	11.91	11.83	11.88	11.91	11.94	11.91
802.11n	**5680**	136	11.96	11.95	11.91	11.96	11.98	11.95	11.96	11.92
802.11n	5700	140	11.92	11.89	12.03	11.90	11.93	12.03	11.91	12.09
802.11n	**5745**	149	11.93	11.94	11.96	11.99	11.99	11.94	12.06	12.00
802.11n	5765	153	12.02	11.93	12.03	12.07	11.99	12.00	12.02	12.05
802.11n	**5785**	157	11.91	11.98	12.08	12.09	12.02	11.98	11.97	12.00
802.11n	**5805**	161	11.89	11.98	11.96	11.95	11.96	12.03	12.00	12.02
802.11n	5825	165	11.95	12.15	12.04	12.01	12.04	11.96	12.14	11.97

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.

Table 8-12
IEEE 802.11n (40 MHz Bandwidth) Average RF Power

Mode	Freq [MHz]	Channel	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	10.81	10.85	10.83	10.81	10.82	10.84	10.87	10.90
802.11n	5230	46	10.74	10.90	11.12	11.01	10.90	10.85	10.86	10.82
802.11n	5270	54	10.77	10.88	10.91	10.96	10.86	10.87	10.92	10.97
802.11n	5310	62	11.02	11.03	10.90	10.90	10.92	10.99	11.03	11.02
802.11n	5510	102	10.75	10.72	10.81	10.89	10.78	10.74	10.87	10.70
802.11n	5550	110	10.71	10.77	10.87	10.92	10.84	10.89	10.86	11.01
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	10.90	11.11	11.05	11.13	10.96	11.08	11.13	11.01
802.11n	5755	151	11.10	11.13	11.06	11.02	11.15	11.11	11.22	11.15
802.11n	5795	159	11.10	11.05	11.15	11.09	11.28	11.12	11.11	11.13

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) 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 20 MHz Bandwidth and 40 MHz Bandwidth) 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.
- When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the 1g averaged SAR is <0.8 W/kg, SAR testing on other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.
- The bolded data rate and channel above were tested for SAR.

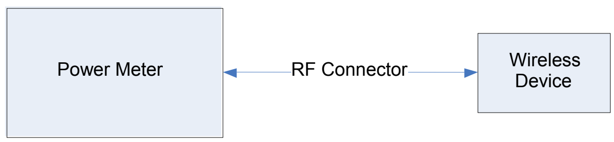

Figure 8-3
Power Measurement Setup

9 SYSTEM VERIFICATION

9.1 Tissue Verification

Table 9-1
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
10/23/2012	1900B	22.1	1850	1.491	52.58	1.520	53.300	-1.91%	-1.35%
			1880	1.539	52.39	1.520	53.300	1.25%	-1.71%
			1910	1.595	52.34	1.520	53.300	4.93%	-1.80%
10/31/2012	2450B	22.7	2401	1.966	52.01	1.903	52.765	3.31%	-1.43%
			2450	2.044	51.82	1.950	52.700	4.82%	-1.67%
			2499	2.099	51.68	2.019	52.638	3.96%	-1.82%
11/06/2012	5200B-5800B	21.2	5200	5.322	47.46	5.299	49.014	0.43%	-3.17%
			5240	5.385	47.34	5.346	48.933	0.73%	-3.26%
			5280	5.453	47.24	5.393	48.879	1.11%	-3.35%
			5320	5.512	47.16	5.439	48.607	1.34%	-2.98%
			5500	5.771	46.67	5.650	48.580	2.14%	-3.93%
			5540	5.835	46.59	5.696	48.526	2.44%	-3.99%
			5660	6.023	46.27	5.837	48.363	3.19%	-4.33%
			5700	6.086	46.21	5.880	48.275	3.50%	-4.28%
			5800	6.236	45.94	6.000	48.200	3.93%	-4.69%
			5825	6.276	45.90	6.029	48.132	4.10%	-4.64%

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

The above measured tissue parameters were used in the DASY software to perform interpolation via the DASY software to determine actual dielectric parameters at the test frequencies (per IEEE 1528 6.6.1.2).

Probe calibration used within ±100 MHz of the test frequency in either 5.725 - 5.85 or 5.47-5.725 GHz is acceptable per KDB Publication 865664 since the design of the SAR probe supports the extended frequency, provided the DASY software version recommended is used for the tests, and the expanded calibration uncertainty (k=2) is less than or equal to 15% (See SAR probe calibration certificate for this information). The dielectric and conductivities measured are within 10% and 5% respectively of the target parameters specified in Supplement C 01-01.

9.2 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):

$$Y = \frac{j2\omega\varepsilon_r\varepsilon_0}{[\ln(b/a)]^2}\int_a^b\int_a^b\int_0^\pi \cos\phi' \frac{\exp[-j\omega r(\mu_0\varepsilon_r'\varepsilon_0)^{1/2}]}{r} d\phi' d\rho' d\rho$$

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 $j = \sqrt{-1}$.

9.3 Test System Verification

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

Table 9-2
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}**	**Deviation (%)**
1900	Body	10/23/2012	23.0	21.2	0.100	5d148	3213	4.06	39.100	40.600	3.84%
2450	Body	10/31/2012	21.2	21.0	0.100	797	3209	5.38	50.800	53.800	5.91%
5200	Body	11/06/2012	21.0	20.4	0.040	1057	3589	2.99	73.400	74.750	1.84%
5500	Body	11/06/2012	21.4	20.5	0.040	1057	3589	3.1	78.900	77.500	-1.77%
5800	Body	11/06/2012	21.5	20.7	0.040	1057	3589	2.99	74.300	74.750	0.61%

Note: Per KDB Publication 865664, when a reference dipole is not defined within ±100MHz of the test frequency, the system verification may be conducted within ± 200 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.

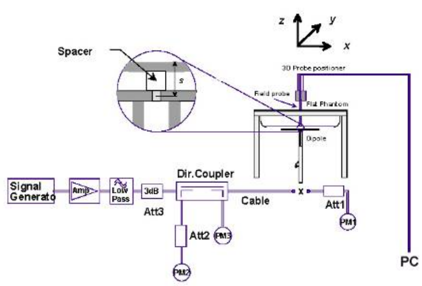

Figure 9-1
System Verification Setup Diagram

Figure 9-2
System Verification Setup Photo

10 SAR DATA SUMMARY

10.1 Standalone Body SAR Data

Table 10-1
Licensed Transmitter Body SAR Data

MEASUREMENT RESULTS											
FREQUENCY		Mode	Service	Conducted Power [dBm]	Target Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of GPRS Slots	Side	SAR (1g)
MHz	Ch.										(W/kg)
1880.00	661	GSM 1900	GPRS	24.31	24.00	-0.04	1.1 cm	102212-1	4	back	0.498
1880.00	661	GSM 1900	GPRS	24.31	24.00	-0.04	0.9 cm	102212-1	4	top	0.321
1880.00	661	GSM 1900	GPRS	24.31	24.00	-0.09	0.0 cm	102212-1	4	right	0.135
1880.00	661	GSM 1900	GPRS	19.86	19.50	0.01	0.0 cm	102212-4	3	back*	0.496
1880.00	661	GSM 1900	GPRS	19.86	19.50	0.03	0.0 cm	102212-4	3	top*	0.232
1880.00	9400	WCDMA 1900	RMC	22.57	22.50	0.08	1.1 cm	102212-1	N/A	back	0.787
1880.00	9400	WCDMA 1900	RMC	22.57	22.50	0.00	0.9 cm	102212-1	N/A	top	0.738
1880.00	9400	WCDMA 1900	RMC	22.57	22.50	0.04	0.0 cm	102212-1	N/A	right	0.308
1852.40	9262	WCDMA 1900	RMC	13.66	13.50	0.02	0.0 cm	102212-4	N/A	back*	0.620
1880.00	9400	WCDMA 1900	RMC	13.72	13.50	-0.04	0.0 cm	102212-4	N/A	back*	0.862
1907.60	9538	WCDMA 1900	RMC	13.47	13.50	0.03	0.0 cm	102212-4	N/A	back*	0.705
1880.00	9400	WCDMA 1900	RMC	13.72	13.50	-0.01	0.0 cm	102212-4	N/A	top*	0.382
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: Asterisk (*) denotes power reduction activated.

Table 10-2
WLAN Body SAR Data

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	SAR (1g)
MHz	Ch.									(W/kg)
2412	1	IEEE 802.11b	DSSS	11.89	0.12	0.0 cm	102212-3	1	back	0.692
2412	1	IEEE 802.11b	DSSS	11.89	0.01	0.0 cm	102212-3	1	top	0.237
2412	1	IEEE 802.11b	DSSS	11.89	0.00	0.0 cm	102212-3	1	left	0.080
5825	165	IEEE 802.11a	OFDM	12.89	0.18	0.0 cm	102212-1	6	back	0.260
5825	165	IEEE 802.11a	OFDM	12.89	0.14	0.0 cm	102212-1	6	top	0.224
5825	165	IEEE 802.11a	OFDM	12.89	-0.21	0.0 cm	102212-1	6	left	0.020
5240	48	IEEE 802.11a	OFDM	12.58	0.16	0.0 cm	102212-1	6	back	0.338
5200	40	IEEE 802.11a	OFDM	12.38	-0.05	0.0 cm	102212-1	6	top	0.506
5240	48	IEEE 802.11a	OFDM	12.58	-0.02	0.0 cm	102212-1	6	top	0.587
5240	48	IEEE 802.11a	OFDM	12.58	0.14	0.0 cm	102212-1	6	left	0.059
5280	56	IEEE 802.11a	OFDM	12.67	0.10	0.0 cm	102212-1	6	back	0.366
5320	64	IEEE 802.11a	OFDM	12.65	0.16	0.0 cm	102212-1	6	back	0.396
5280	56	IEEE 802.11a	OFDM	12.67	-0.03	0.0 cm	102212-1	6	top	0.579
5320	64	IEEE 802.11a	OFDM	12.65	-0.12	0.0 cm	102212-1	6	top	0.627
5280	56	IEEE 802.11a	OFDM	12.67	0.12	0.0 cm	102212-1	6	left	0.072
5540	108	IEEE 802.11a	OFDM	12.60	0.16	0.0 cm	102212-1	6	back	0.573
5660	132	IEEE 802.11a	OFDM	12.75	0.04	0.0 cm	102212-1	6	back	0.490
5700	140	IEEE 802.11a	OFDM	12.83	0.14	0.0 cm	102212-1	6	back	0.366
5700	140	IEEE 802.11a	OFDM	12.83	0.00	0.0 cm	102212-1	6	top	0.369
5700	140	IEEE 802.11a	OFDM	12.83	0.11	0.0 cm	102212-1	6	left	0.012
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram				

10.2 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR value with the position of the device configured for SAR testing according to KDB 447498 Section 4.
2. Batteries are fully charged for all readings.
3. Tissue parameters and temperatures are listed on the SAR plots.
4. Liquid tissue depth was at least 15.0 cm. To confirm the proper SAR liquid depth, the z-axis plots from the system verifications were included since the system verifications were performed using the same liquid, probe and DAE as the SAR tests in the same time period.
5. 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.
6. Per KDB Publication 447498 4) b) i) the back side are required to be tested touching the flat phantom for large sized tablet devices.
7. This device is capable of multiple display orientations supporting both portrait and landscape positions. Therefore per KDB 447498 4) b) ii) (2), SAR testing applies for the top and right edges for licensed transmitters and top and left tablet edges for WLAN with antennas located within 5 cm of each tablet edge closest to the user. According to KDB 447498 4) b) ii) (2), for each antenna, SAR is required for the edge with the most conservative exposure condition.
8. Asterisk (*) denotes power reduction activated.
9. The measured SAR when extrapolated to the maximum tune-up power tolerance levels remains compliant for all operating configurations.

GSM Test Notes:

1. Justification for reduced test configurations per KDB Publication 941225 D03: The source-based time-averaged output power was evaluated for all multi-slot operations. The slot with the highest time- average output power was selected for SAR evaluation.
2. Per April 2011 TCB-FCC Workshop Notes, in addition to the 0 mm test distance required for tablet devices under KDB 447498, conservative additional test distances of 11 mm from the back side and 9 mm from the top edge were tested for SAR at maximum output power with the sensor deactivated. See Appendix E for more details.
3. GSM voice mode is limited to speaker or headset operations only. Therefore per KDB 616217, additional SAR testing for this type of voice use is not required.
4. Per KDB 447498 and Public Notice DA-02-1438, if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

UMTS Notes:

1. UMTS mode in Body SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.
2. Per April 2011 TCB-FCC Workshop Notes, in addition to the 0 mm test distance required for tablet devices under KDB 447498, conservative additional test distances of 11 mm from the back side and 9 mm from the top edge were tested for SAR at maximum output power with the sensor deactivated. See Appendix E for more details.
3. Per KDB 447498 and Public Notice DA-02-1438, if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

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 20 MHz Bandwidth and 40 MHz Bandwidth) 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. WLAN transmission was verified using an uncalibrated spectrum analyzer.
4. Since the maximum extrapolated peak SAR of the zoom scan for the maximum output channel was >1.6 W/kg for some 5 GHz WLAN channels, the other default test channels in the band were additionally tested using the lowest data rate.
5. There is no power reduction for WLAN.

11 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

11.1 Simultaneous Transmission Introduction

Per KDB Publication 447498, standalone Bluetooth SAR tests were not required. Standalone SAR tests for WLAN were required. See Section 1.3A for more information.

Possible simultaneous transmissions for this device were numerically summed using standalone SAR data and are shown in the following tables.

11.2 Body Simultaneous Transmission Analysis

Table 11-1
Simultaneous Transmission Scenario 2.4 GHz WLAN (Body at 0.0 cm)

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.496	0.692	**1.188**
	Top	0.232	0.237	0.469
	Bottom	-	-	0.000
	Right	0.135	-	0.135
	Left	-	0.080	0.080
Simult Tx	**Configuration**	**WCDMA 1900 SAR (W/kg)**	**2.4 GHz WLAN SAR (W/kg)**	**Σ SAR (W/kg)**
Body SAR	Back	0.862	0.692	**1.554**
	Top	0.382	0.237	0.619
	Bottom	-	-	0.000
	Right	0.308	-	0.308
	Left	-	0.080	0.080

Note:
1. "-" indicates configurations that were not required per KDB Publication 447498.
2. Per KDB 616217, GSM voice SAR testing was not additionally required since voice is limited to speaker or headset operations only. Therefore GPRS data additionally represents GSM voice with respect to simultaneous transmission scenarios.
3. The measured SAR when extrapolated to the maximum tune-up power tolerance levels remains compliant for all operating configurations.

Table 11-2
Simultaneous Transmission Scenario 5 GHz WLAN (Body at 0.0 cm)

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.496	0.573	**1.069**
	Top	0.232	0.627	0.859
	Bottom	-	-	0.000
	Right	0.135	-	0.135
	Left	-	0.072	0.072

Simult Tx	Configuration	WCDMA 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.862	0.573	**1.435**
	Top	0.382	0.627	1.009
	Bottom	-	-	0.000
	Right	0.308	-	0.308
	Left	-	0.072	0.072

Note:
1. "-" indicates configurations that were not required per KDB Publication 447498.
2. Per KDB 616217, GSM voice SAR testing was not additionally required since voice is limited to speaker or headset operations only. For the GPRS mode above, the calculated frame-averaged powers are higher than those of the corresponding GSM mode. Therefore, GPRS mode is a more conservative measure of SAR than GSM mode and is used to determine simultaneous SAR exclusion.
3. The measured SAR when extrapolated to the maximum tune-up power tolerance levels remains compliant for all operating configurations.

Table 11-3
Simultaneous Transmission Scenario WLAN (Back Side at 1.1 cm)

Configuration	Mode	2G/3G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Back Side	GSM 1900	0.498	<0.692	<1.190
Back Side	WCDMA 1900	0.787	<0.692	**<1.479**
Configuration	Mode	2G/3G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Back Side	GSM 1900	0.498	<0.573	<1.071
Back Side	WCDMA 1900	0.787	<0.573	**<1.360**

Note:
1. For SAR calculations at 1.1 cm, WLAN SAR values for 0.0 cm were used since the 0.0 cm test distance for WLAN was more conservative.
2. "<" denotes that the 0.0 cm WLAN SAR values were used for summation purposes.
3. The measured SAR when extrapolated to the maximum tune-up power tolerance levels remains compliant for all operating configurations.
4. Per KDB 616217, GSM voice SAR testing was not additionally required since voice is limited to speaker or headset operations only. For the GPRS mode above, the calculated frame-averaged powers are higher than those of the corresponding GSM mode. Therefore, GPRS mode is a more conservative measure of SAR than GSM mode and is used to determine simultaneous SAR exclusion and confirmed that simultaneous SAR measurements were not required.

Table 11-4
Simultaneous Transmission Scenario WLAN (Top Edge at 0.9 cm)

Configuration	Mode	2G/3G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Top Edge	GSM 1900	0.321	<0.237	<0.558
Top Edge	WCDMA 1900	0.738	<0.237	**<0.975**
Configuration	Mode	2G/3G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Top Edge	GSM 1900	0.321	<0.627	<0.948
Top Edge	WCDMA 1900	0.738	<0.627	**<1.365**

Note:
1. For SAR calculations at 0.9 cm, WLAN SAR values for 0.0 cm were used since the 0.0 cm test distance for WLAN was more conservative.
2. "<" denotes that the 0.0 cm WLAN SAR values were used for summation purposes.
3. Per KDB 616217, GSM voice SAR testing was not additionally required since voice is limited to speaker or headset operations only. For the GPRS mode above, the calculated frame-averaged powers are higher than those of the corresponding GSM mode. Therefore, GPRS mode is a more conservative measure of SAR than GSM mode and is used to determine simultaneous SAR exclusion and confirmed that simultaneous SAR measurements were not required.

11.3 Conclusion

The above numerical summed SAR is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit. No volumetric SAR summation is required per FCC KDB Publication 447498. It was confirmed that all standalone and simultaneous transmission scenarios remain compliant when scaled to the maximum output power levels.

12 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
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	8648D	(9kHz-4GHz) Signal Generator	10/10/2012	Annual	10/10/2013	3613A00315
Agilent	85047A	S-Parameter Test Set	N/A	N/A	N/A	2904A00579
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	CBT	N/A	CBT	3051A00187
Amplifier Research	5S1G4	5W, 800MHz-4.2GHz	CBT	N/A	CBT	21910
Anritsu	MT8820C	Radio Communication Tester	11/11/2011	Annual	11/11/2012	6200901190
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	MA24106A	USB Power Sensor	8/22/2012	Annual	8/22/2013	1231538
Anritsu	MA24106A	USB Power Sensor	8/22/2012	Annual	8/22/2013	1231535
Anritsu	ML2438A	Power Meter	10/11/2012	Annual	10/11/2013	1070030
Anritsu	MA2411B	Pulse Sensor	9/19/2012	Annual	9/19/2013	1027293
Anritsu	ML2495A	Power Meter	10/11/2012	Annual	10/11/2013	1039008
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M1S5A00-009
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/10/2012	Annual	10/10/2013	1833460
Gigatronics	8651A	Universal Power Meter	10/10/2012	Annual	10/10/2013	8650319
Intelligent Weighing	PD-3000	Electronic Balance	6/29/2012	Annual	6/29/2013	120405017
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
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	Power Attenuator	CBT	N/A	CBT	1226
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
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
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
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/19/2012	Annual	1/19/2013	1057
SPEAG	D2450V2	2450 MHz SAR Dipole	1/24/2012	Annual	1/24/2013	797
SPEAG	EX3DV4	SAR Probe	1/27/2012	Annual	1/27/2013	3589
SPEAG	D1900V2	1900 MHz SAR Dipole	2/8/2012	Annual	2/8/2013	5d148
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/20/2012	Annual	2/20/2013	649
SPEAG	ES3DV3	SAR Probe	3/16/2012	Annual	3/16/2013	3209
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/24/2012	Annual	8/24/2013	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/19/2012	Annual	4/19/2013	665
SPEAG	ES3DV3	SAR Probe	4/24/2012	Annual	4/24/2013	3213
SPEAG	DAK-3.5	Dielectic Assessment Kit	6/19/2012	Annual	6/19/2013	1070
Tektronix	RSA-6114A	Real Time Spectrum Analyzer	4/5/2012	Annual	4/5/2013	B010177
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286445
VWR	62344-925	Mini-Thermometer	10/24/2011	Biennial	10/24/2013	111886430
VWR	23226-658	Long Stem Thermometer	3/30/2012	Biennial	3/30/2014	122179874

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, attenuator, coupler, amplifier 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.

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_i 1gm**	**c_i 10 gms**	**1gm u_i (± %)**	**10gms u_i (± %)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	6.0	N	1	1.0	1.0	6.0	6.0	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	1.0	1.0	1.3	1.3	∞
Boundary Effect	E.2.3	0.4	N	1	1.0	1.0	0.4	0.4	∞
Linearity	E.2.4	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	E.2.5	5.1	N	1	1.0	1.0	5.1	5.1	∞
Readout Electronics	E.2.6	1.0	N	1	1.0	1.0	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	E.6.3	2.9	R	1.73	1.0	1.0	1.7	1.7	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1.0	1.0	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	6.0	N	1	1.0	1.0	6.0	6.0	287
Device Holder Uncertainty	E.4.1	3.32	R	1.73	1.0	1.0	1.9	1.9	∞
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	3.8	N	1	0.64	0.43	2.4	1.6	6
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Liquid Permittivity - measurement uncertainty	E.3.3	4.5	N	1	0.60	0.49	2.7	2.2	6
Combined Standard Uncertainty (k=1)			RSS				12.1	11.7	299
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				24.2	23.5	

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

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	299
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				24.7	24.0	

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

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: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-1

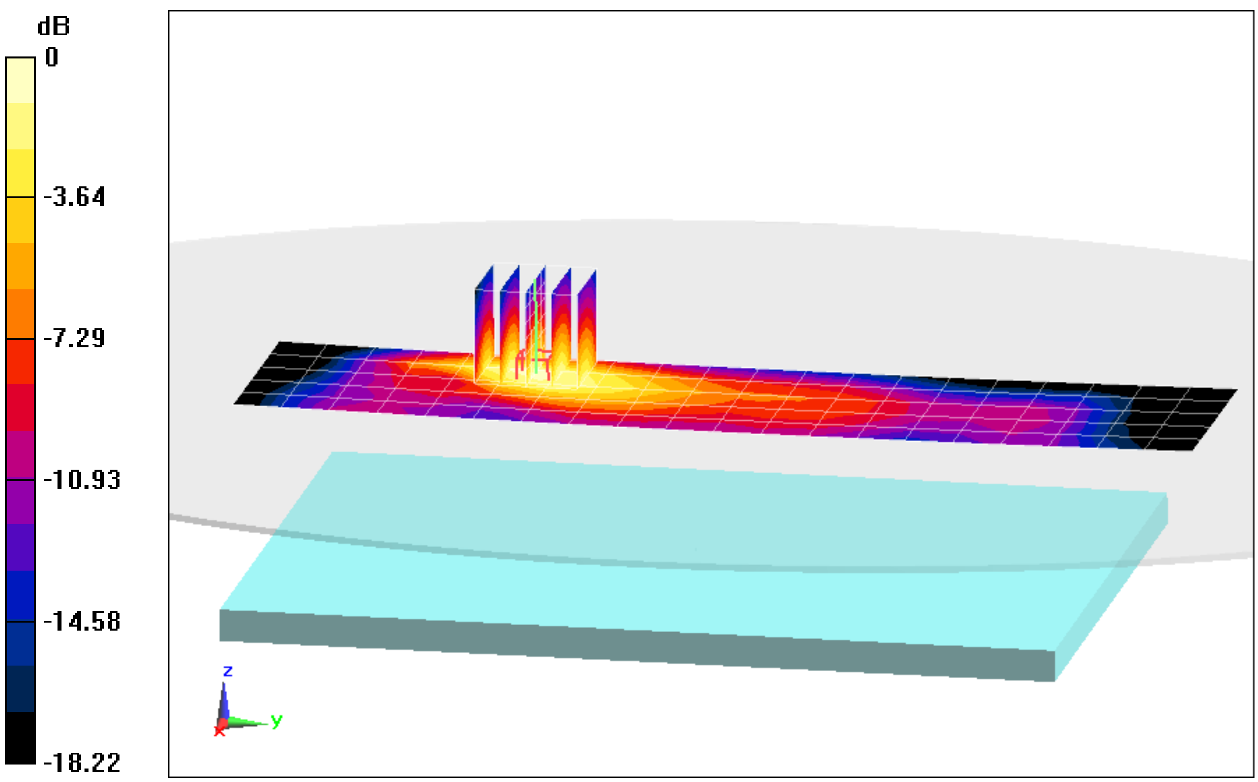
Communication System: GSM GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076
Medium: 1900 Body Medium parameters used:
$f = 1880$ MHz; $\sigma = 1.539$ mho/m; $\varepsilon_r = 52.39$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.1 cm

Test Date: 10-23-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3213; ConvF(4.5, 4.5, 4.5); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: ELI v5.0 Door; Type: QDOVA002BB; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (3);SEMCAD X Version 14.6.7 (6848)

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

Area Scan (6x21x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.226 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.894 W/kg
SAR(1 g) = 0.498 W/kg



0 dB = 0.554 W/kg = -2.56 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-1

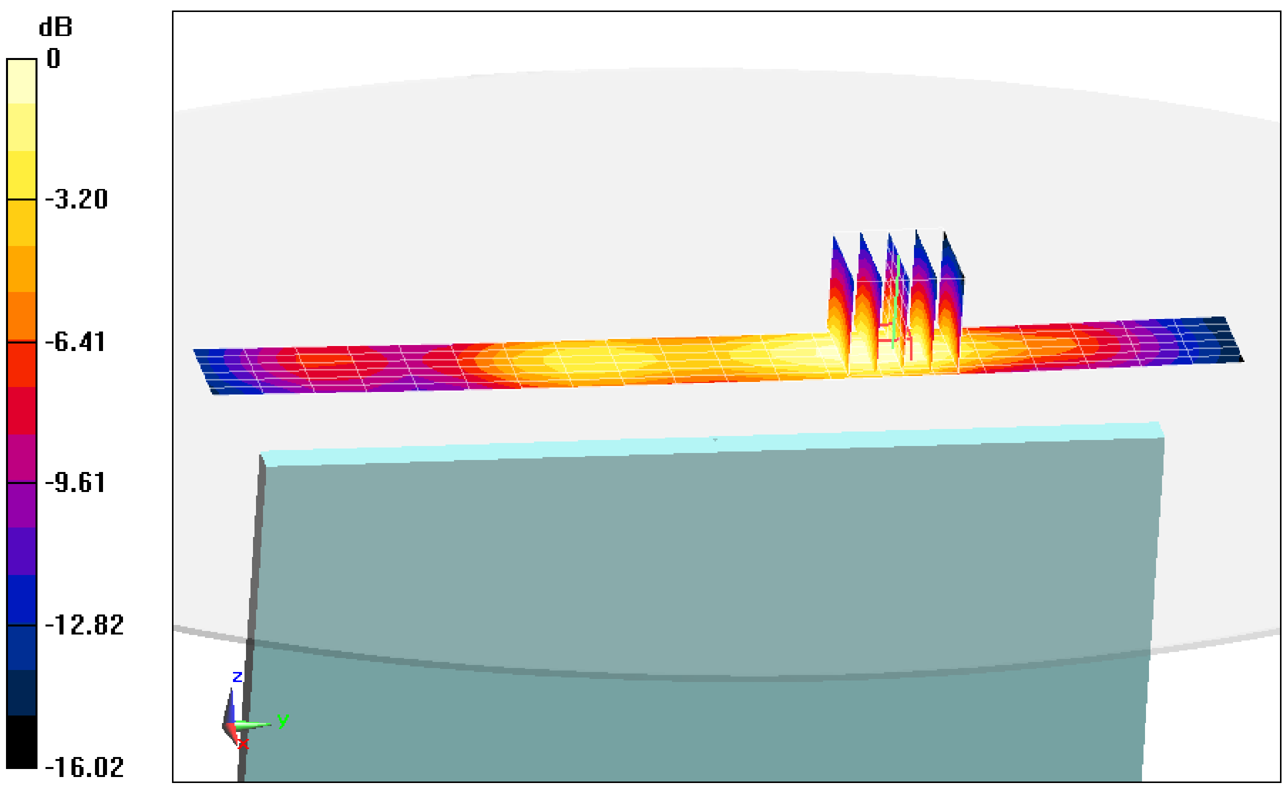
Communication System: GSM GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.539 mho/m; ε_r = 52.39; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.9 cm

Test Date: 10-23-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3213; ConvF(4.5, 4.5, 4.5); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: ELI v5.0 Door; Type: QDOVA002BB; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (3);SEMCAD X Version 14.6.7 (6848)

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

Area Scan (7x21x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.219 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.527 W/kg
SAR(1 g) = 0.321 W/kg



0 dB = 0.351 W/kg = -4.55 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-1

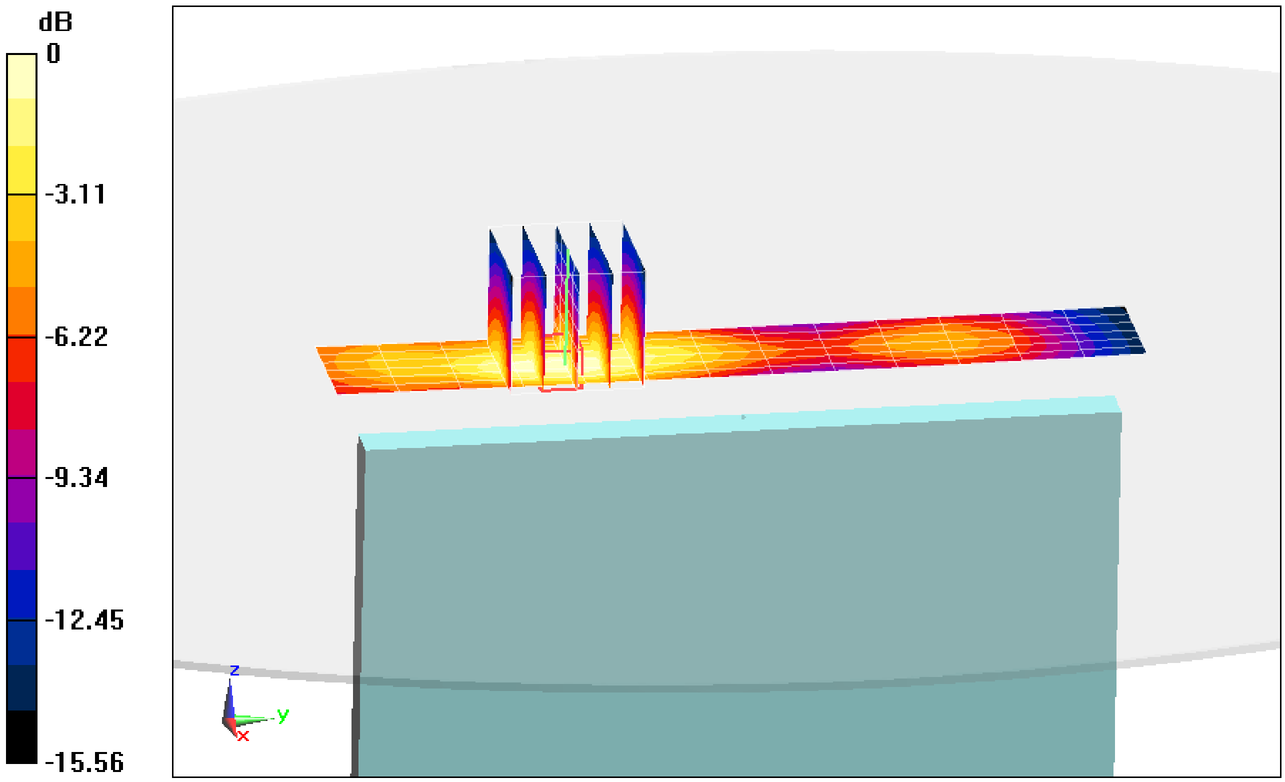
Communication System: GSM GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.539 mho/m; ε_r = 52.39; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-23-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3213; ConvF(4.5, 4.5, 4.5); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: ELI v5.0 Door; Type: QDOVA002BB; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (3);SEMCAD X Version 14.6.7 (6848)

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

Area Scan (7x14x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.035 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.242 W/kg
SAR(1 g) = 0.135 W/kg



0 dB = 0.153 W/kg = -8.15 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-4

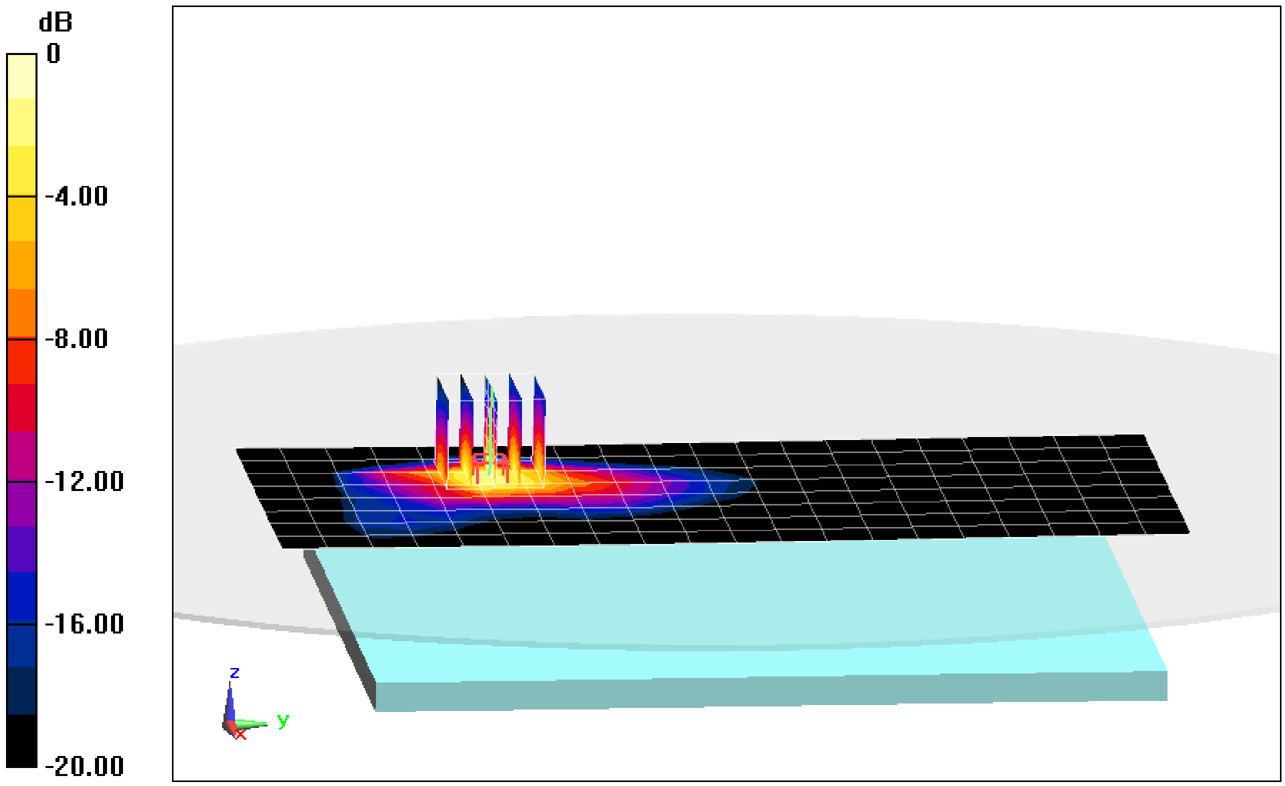
Communication System: GSM GPRS; 3 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.76
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.539 mho/m; ε_r = 52.39; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-23-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3213; ConvF(4.5, 4.5, 4.5); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: ELI v5.0 Door; Type: QDOVA002BB; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (3);SEMCAD X Version 14.6.7 (6848)

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

Area Scan (9x21x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.830 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.496 W/kg



0 dB = 0.573 W/kg = -2.42 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-4

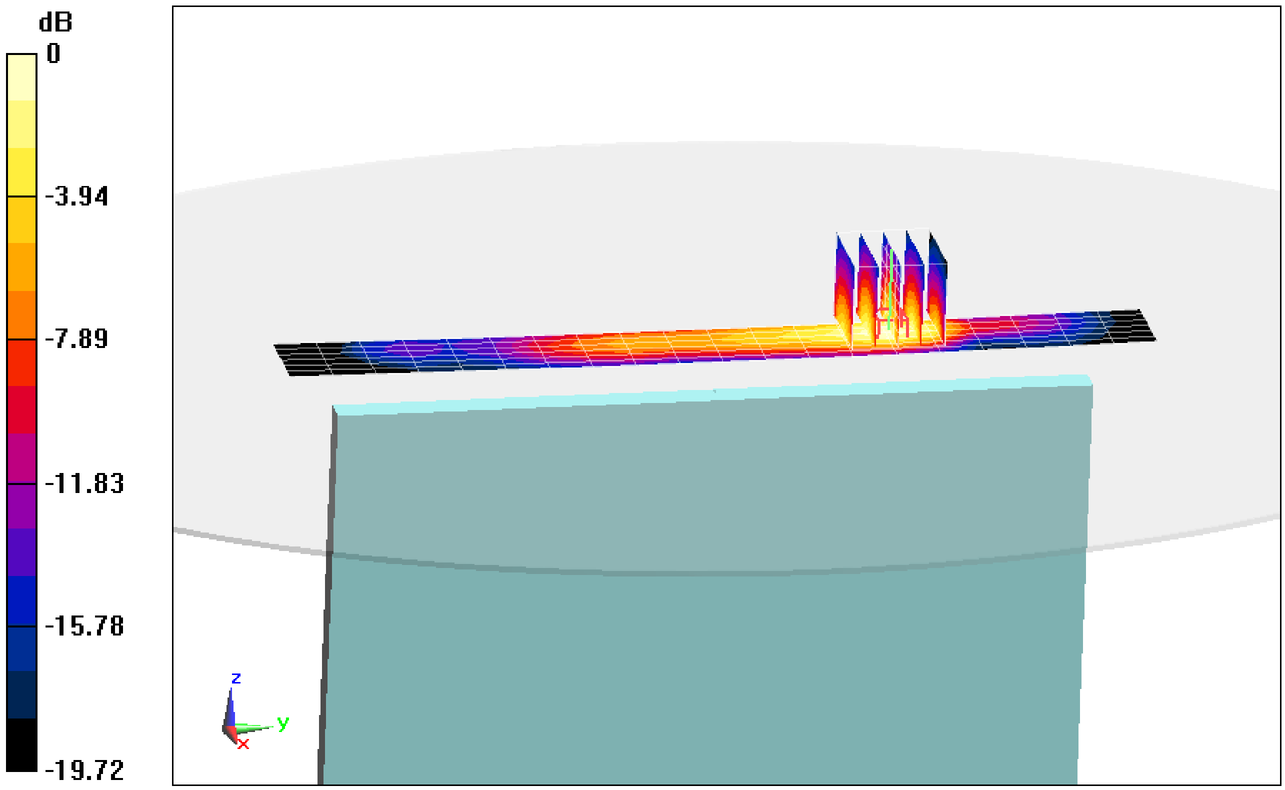
Communication System: GSM GPRS; 3 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.76
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.539 mho/m; ε_r = 52.39; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-23-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3213; ConvF(4.5, 4.5, 4.5); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: ELI v5.0 Door; Type: QDOVA002BB; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (3);SEMCAD X Version 14.6.7 (6848)

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

Area Scan (7x21x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.352 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.450 W/kg
SAR(1 g) = 0.232 W/kg



0 dB = 0.267 W/kg = -5.73 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-1

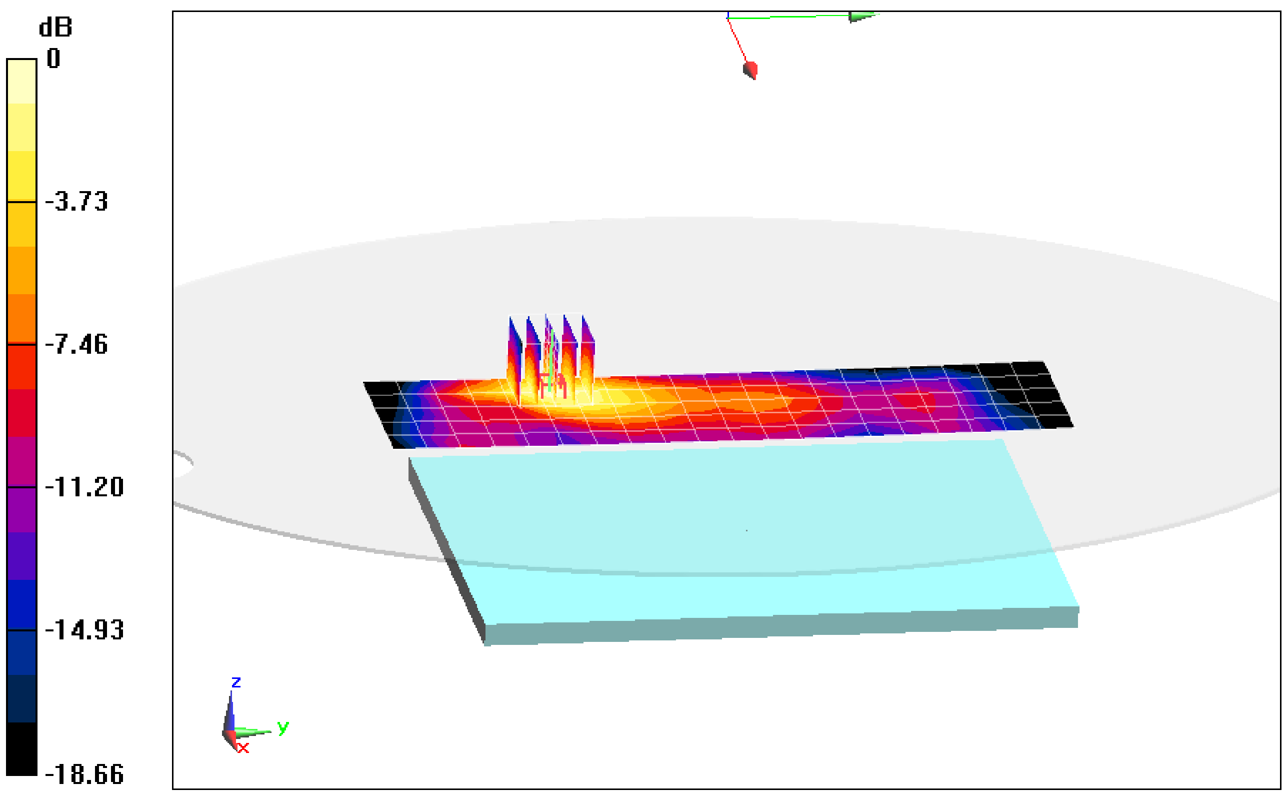
Communication System: WCDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.539 mho/m; ε_r = 52.39; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.1 cm

Test Date: 10-23-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3213; ConvF(4.5, 4.5, 4.5); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: ELI v5.0 Door; Type: QDOVA002BB; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (3);SEMCAD X Version 14.6.7 (6848)

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

Area Scan (6x21x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.308 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 0.787 W/kg



0 dB = 0.876 W/kg = -0.57 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-1

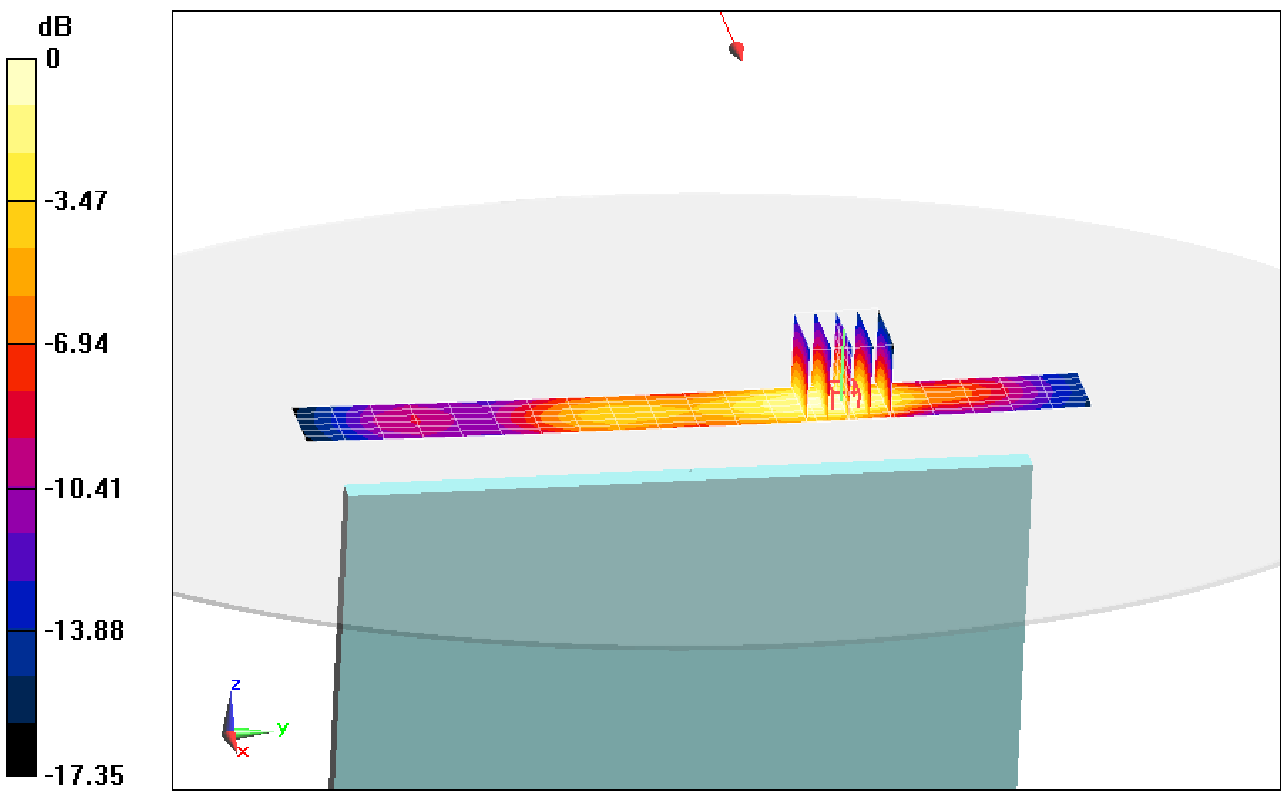
Communication System: WCDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; $\sigma = 1.539$ mho/m; $\varepsilon_r = 52.39$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.9 cm

Test Date: 10-23-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3213; ConvF(4.5, 4.5, 4.5); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: ELI v5.0 Door; Type: QDOVA002BB; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (3);SEMCAD X Version 14.6.7 (6848)

Mode: WCDMA 1900, Body SAR, Top Edge, Mid.ch

Area Scan (7x21x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.363 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.738 W/kg



0 dB = 0.819 W/kg = -0.87 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-1

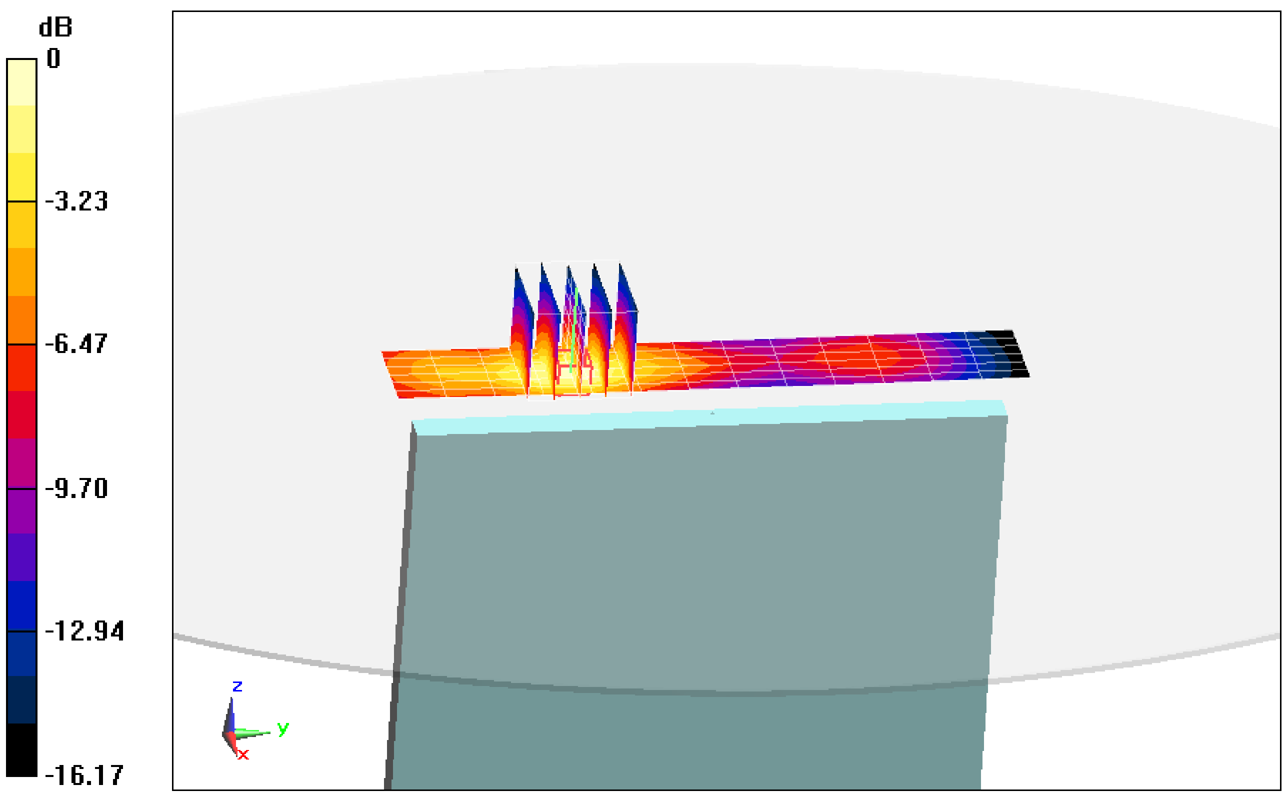
Communication System: WCDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.539 mho/m; ε_r = 52.39; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-23-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3213; ConvF(4.5, 4.5, 4.5); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: ELI v5.0 Door; Type: QDOVA002BB; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (3);SEMCAD X Version 14.6.7 (6848)

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

Area Scan (7x14x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.004 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.577 W/kg
SAR(1 g) = 0.308 W/kg



0 dB = 0.351 W/kg = -4.55 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-4

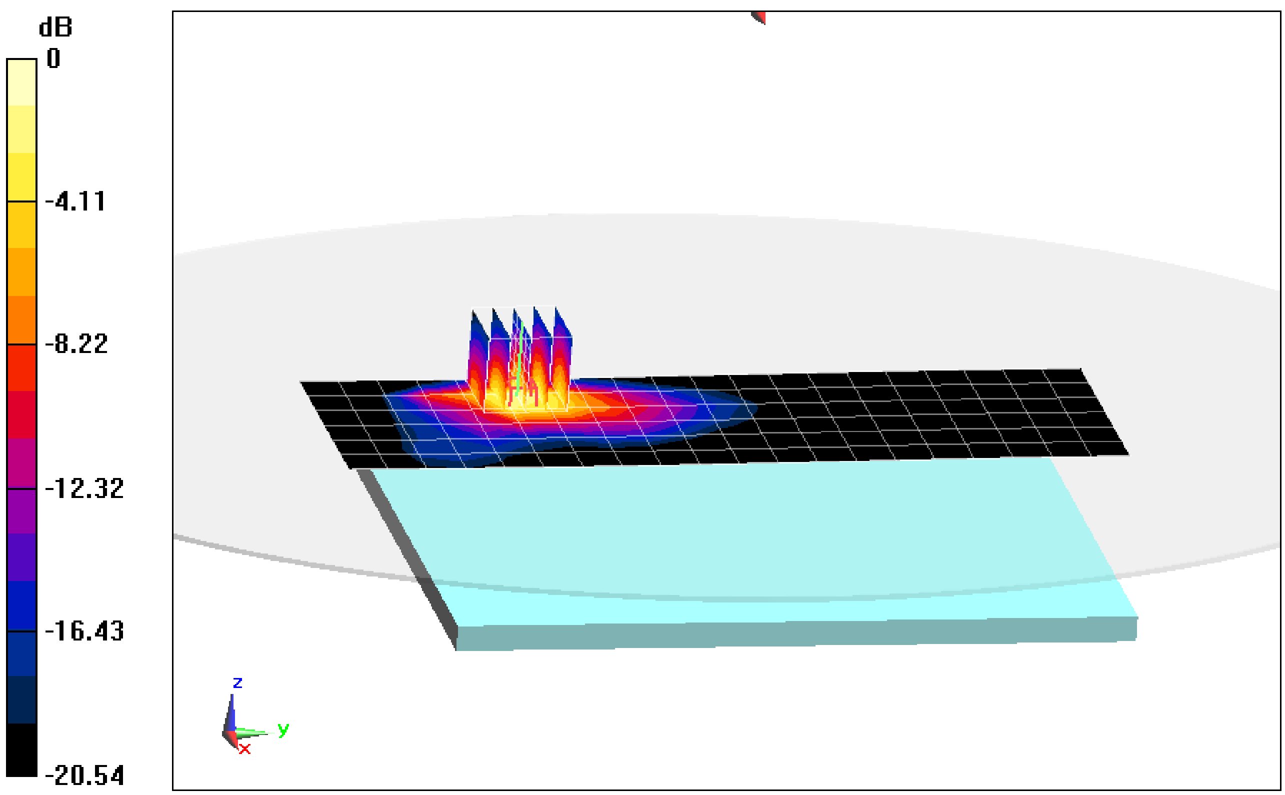
Communication System: WCDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
$f = 1880$ MHz; $\sigma = 1.539$ mho/m; $\varepsilon_r = 52.39$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-23-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3213; ConvF(4.5, 4.5, 4.5); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: ELI v5.0 Door; Type: QDOVA002BB; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (3);SEMCAD X Version 14.6.7 (6848)

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

Area Scan (7x21x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.968 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.93 W/kg
SAR(1 g) = 0.862 W/kg



0 dB = 0.994 W/kg = -0.03 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-4

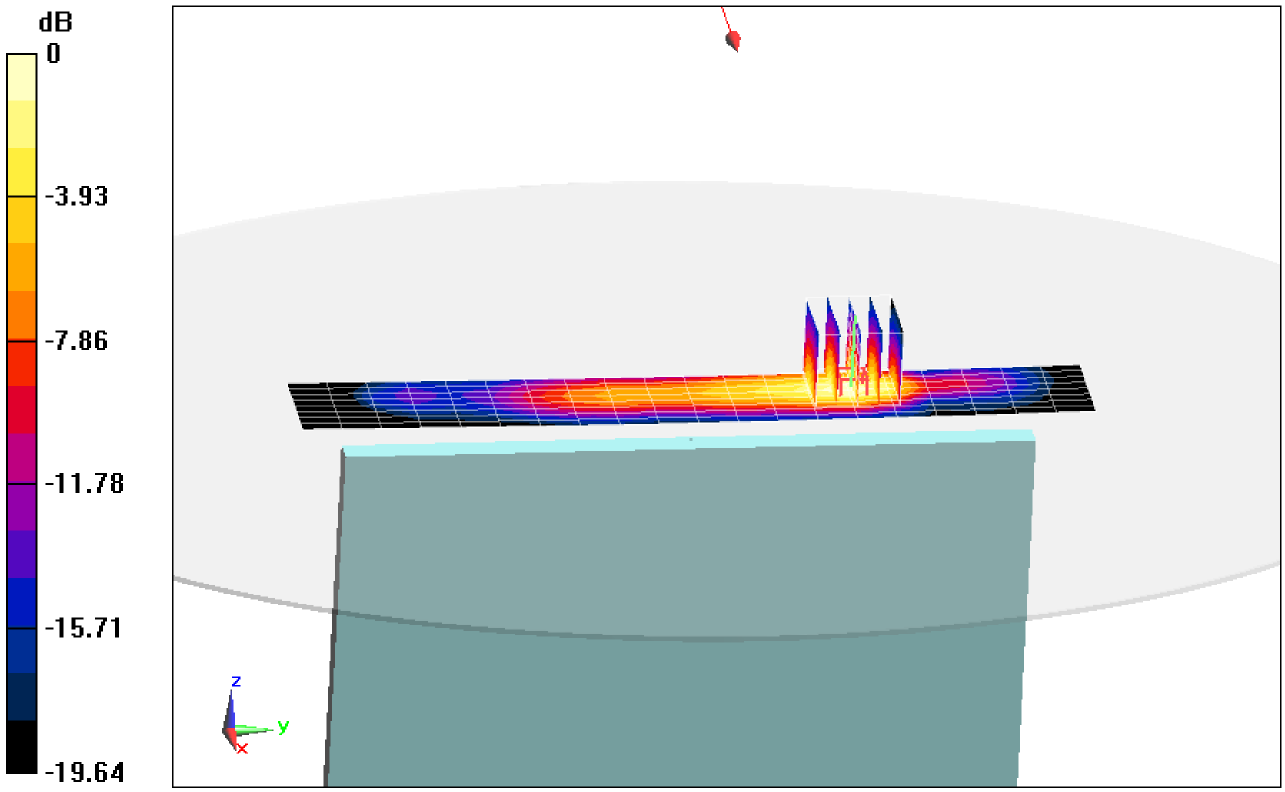
Communication System: WCDMA; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.539 mho/m; ε_r = 52.39; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-23-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3213; ConvF(4.5, 4.5, 4.5); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: ELI v5.0 Door; Type: QDOVA002BB; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (3);SEMCAD X Version 14.6.7 (6848)

Mode: WCDMA 1900, Body SAR, Top Edge, Mid.ch

Area Scan (9x21x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.243 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.741 W/kg
SAR(1 g) = 0.382 W/kg



0 dB = 0.441 W/kg = -3.56 dBW/kg

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-3

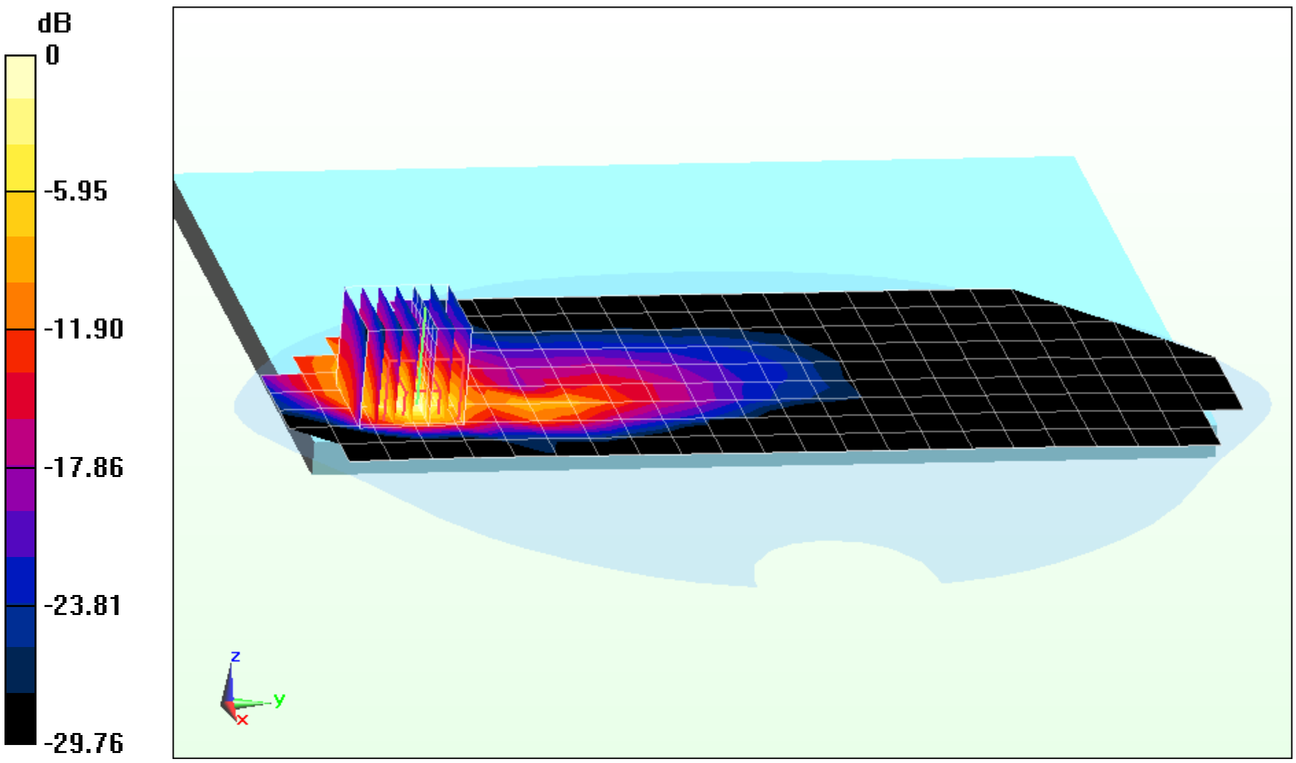
Communication System: IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2412 MHz; σ = 1.984 mho/m; ε_r = 51.967; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-31-2012; Ambient Temp: 21.2°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3209; ConvF(4.23, 4.23, 4.23); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.7 (6848)

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

Area Scan (10x26x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.479 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 2.45 W/kg
SAR(1 g) = 0.692 W/kg; SAR(10 g) = 0.231 W/kg



0 dB = 1.11 W/kg = 0.45 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-3

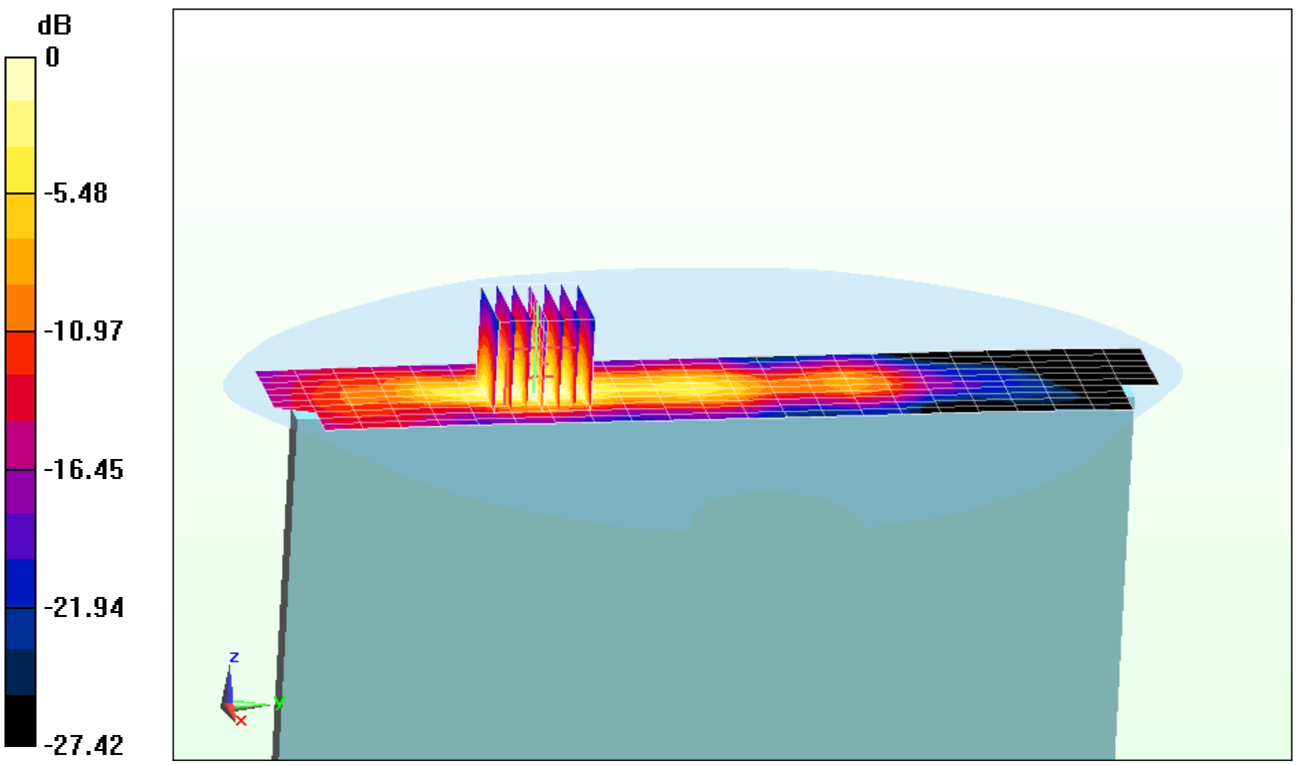
Communication System: IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2412 MHz; σ = 1.984 mho/m; ε_r = 51.967; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-31-2012; Ambient Temp: 21.2°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3209; ConvF(4.23, 4.23, 4.23); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.7 (6848)

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

Area Scan (11x26x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.938 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.511 W/kg
SAR(1 g) = 0.237 W/kg; SAR(10 g) = 0.104 W/kg



0 dB = 0.313 W/kg = -5.04 dBW/kg

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-3

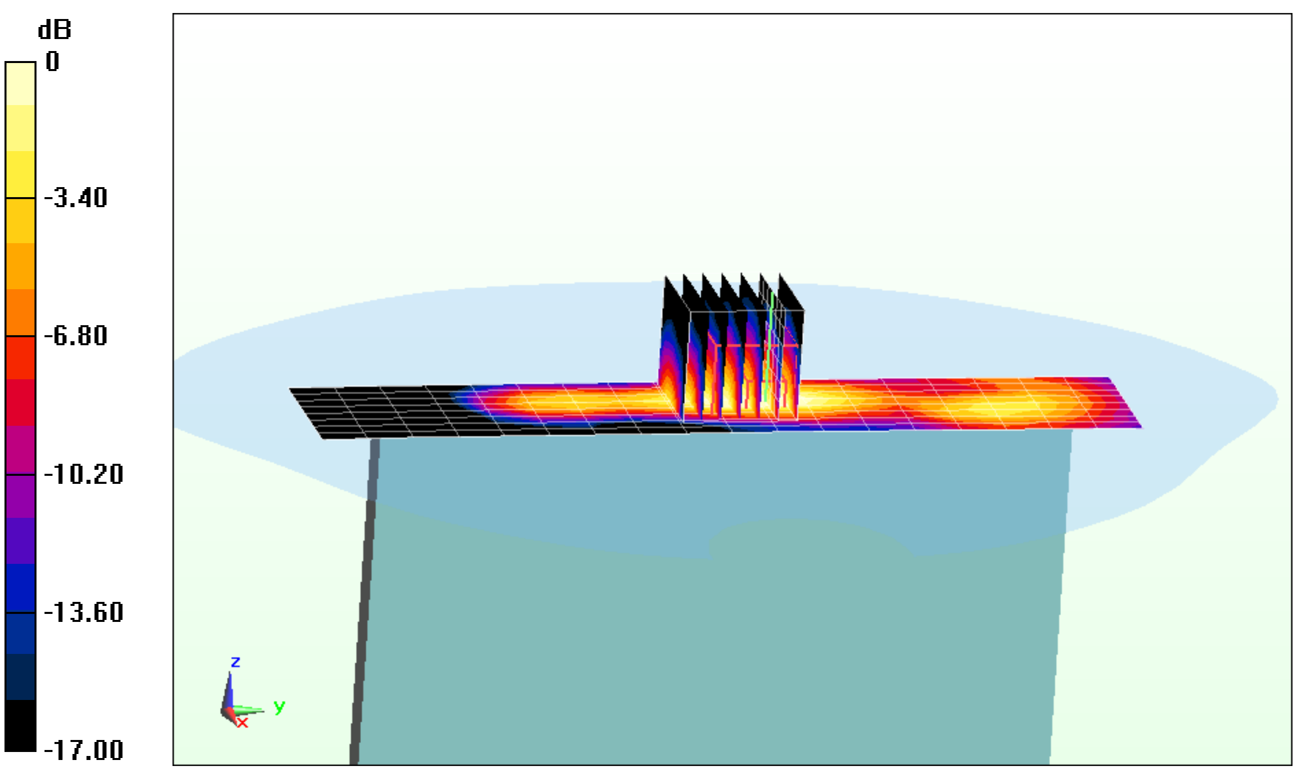
Communication System: IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2412 MHz; σ = 1.984 mho/m; εr = 51.967; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-31-2012; Ambient Temp: 21.2°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3209; ConvF(4.23, 4.23, 4.23); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.7 (6848)

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

Area Scan (9x19x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.589 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.180 W/kg
SAR(1 g) = 0.080 W/kg; SAR(10 g) = 0.037 W/kg



0 dB = 0.109 W/kg = -9.63 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-1

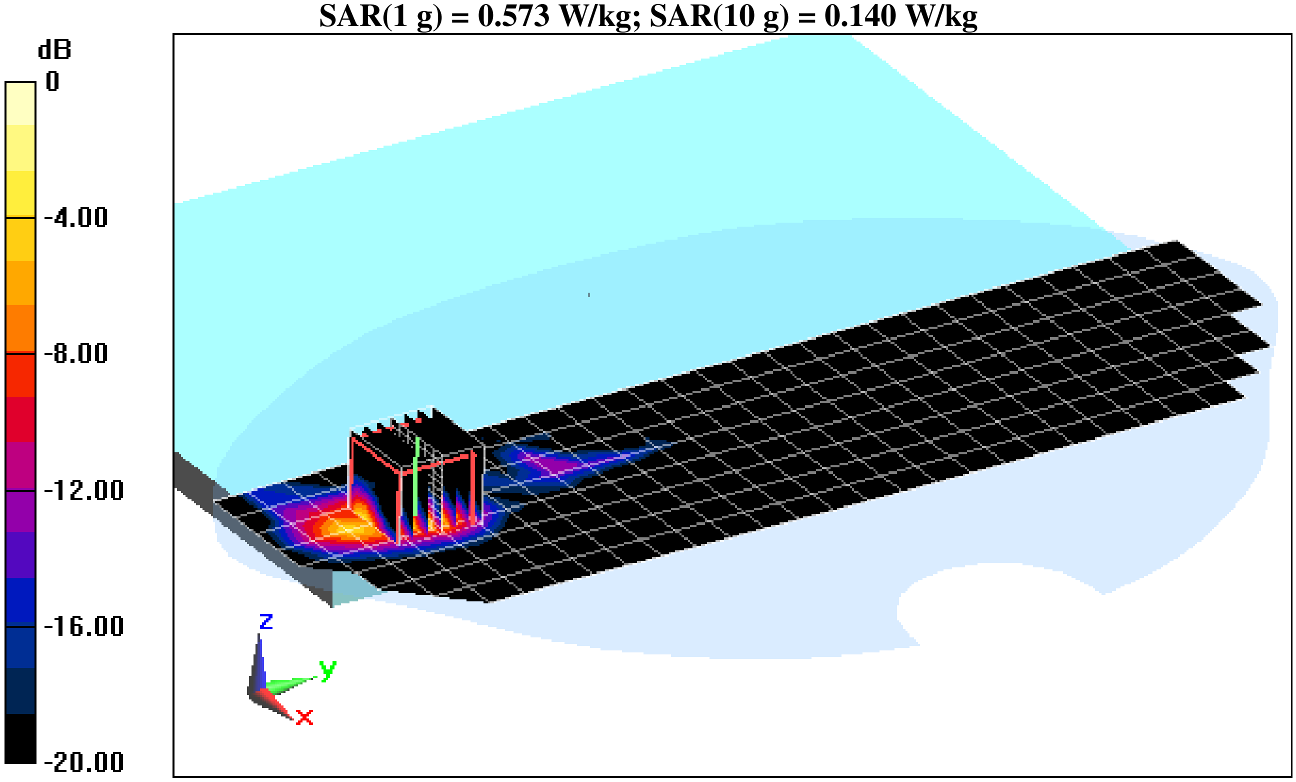
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5540 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
$f = 5540$ MHz; $\sigma = 5.835$ mho/m; $\varepsilon_r = 46.59$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 11-06-2012; Ambient Temp: 21.4°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3589; ConvF(3.4, 3.4, 3.4); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11a, 5.5 GHz, Body SAR, Ch 108, 6 Mbps, Back Side

Area Scan (9x31x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 11.648 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 2.56 W/kg
SAR(1 g) = 0.573 W/kg; SAR(10 g) = 0.140 W/kg



0 dB = 1.30 W/kg = 1.14 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-1

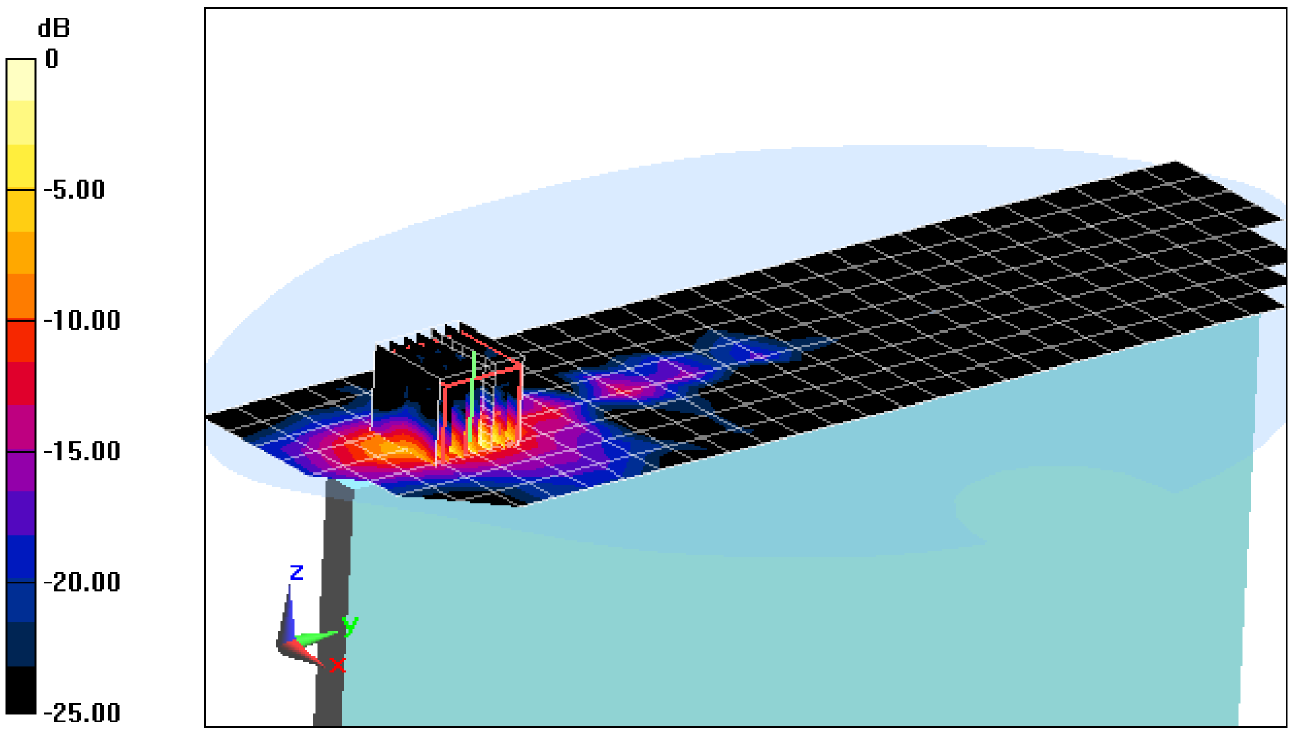
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5320 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5320 MHz; σ = 5.512 mho/m; ε_r = 47.16; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 11-06-2012; Ambient Temp: 21.0°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN3589; ConvF(3.72, 3.72, 3.72); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11a, 5.3 GHz, Body SAR, Ch 64, 6 Mbps, Top Side

Area Scan (9x31x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 9.310 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 2.70 W/kg
SAR(1 g) = 0.627 W/kg; SAR(10 g) = 0.140 W/kg



0 dB = 1.49 W/kg = 1.73 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSHVE230L; Type: Portable Tablet; Serial: 102212-1

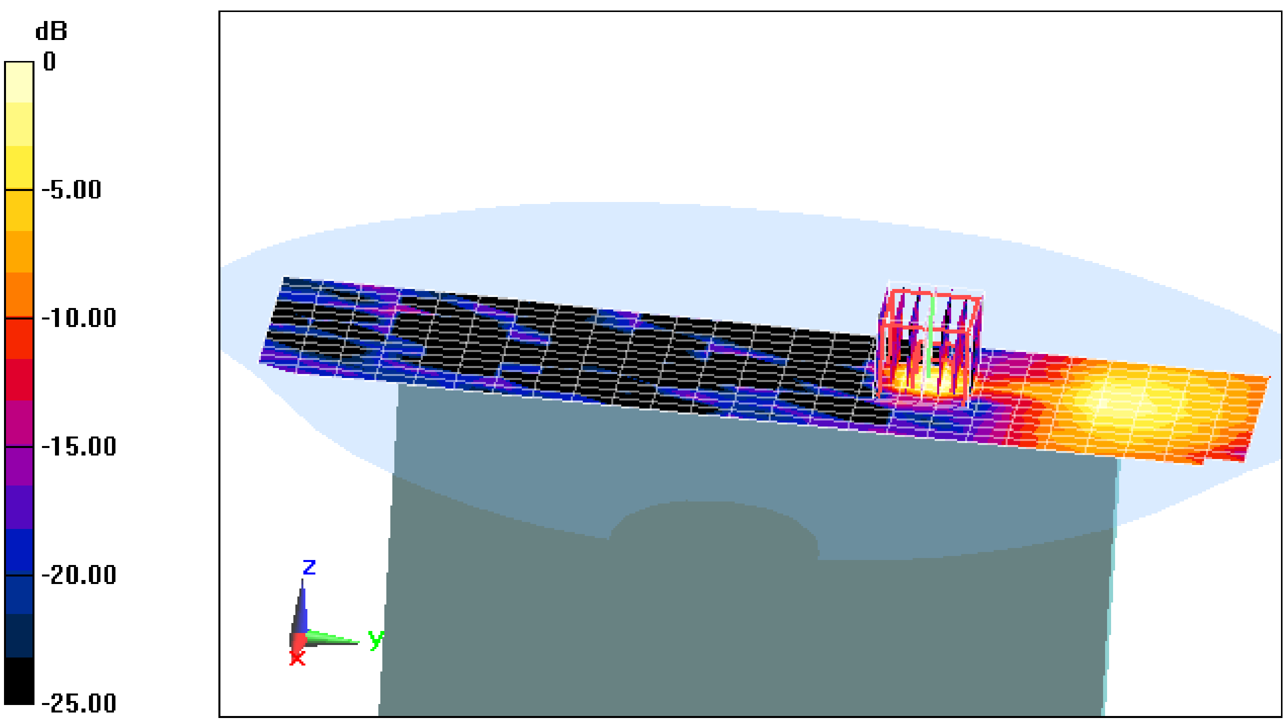
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5280 MHz; Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
f = 5280 MHz; σ = 5.453 mho/m; ε_r = 47.24; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 11-06-2012; Ambient Temp: 21.0°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN3589; ConvF(3.72, 3.72, 3.72); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11a, 5.3 GHz, Body SAR, Ch 56, 6 Mbps, Left Side

Area Scan (13x26x1): Measurement grid: dx=5mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.965 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.359 W/kg
SAR(1 g) = 0.072 W/kg; SAR(10 g) = 0.016 W/kg



0 dB = 0.162 W/kg = -7.90 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

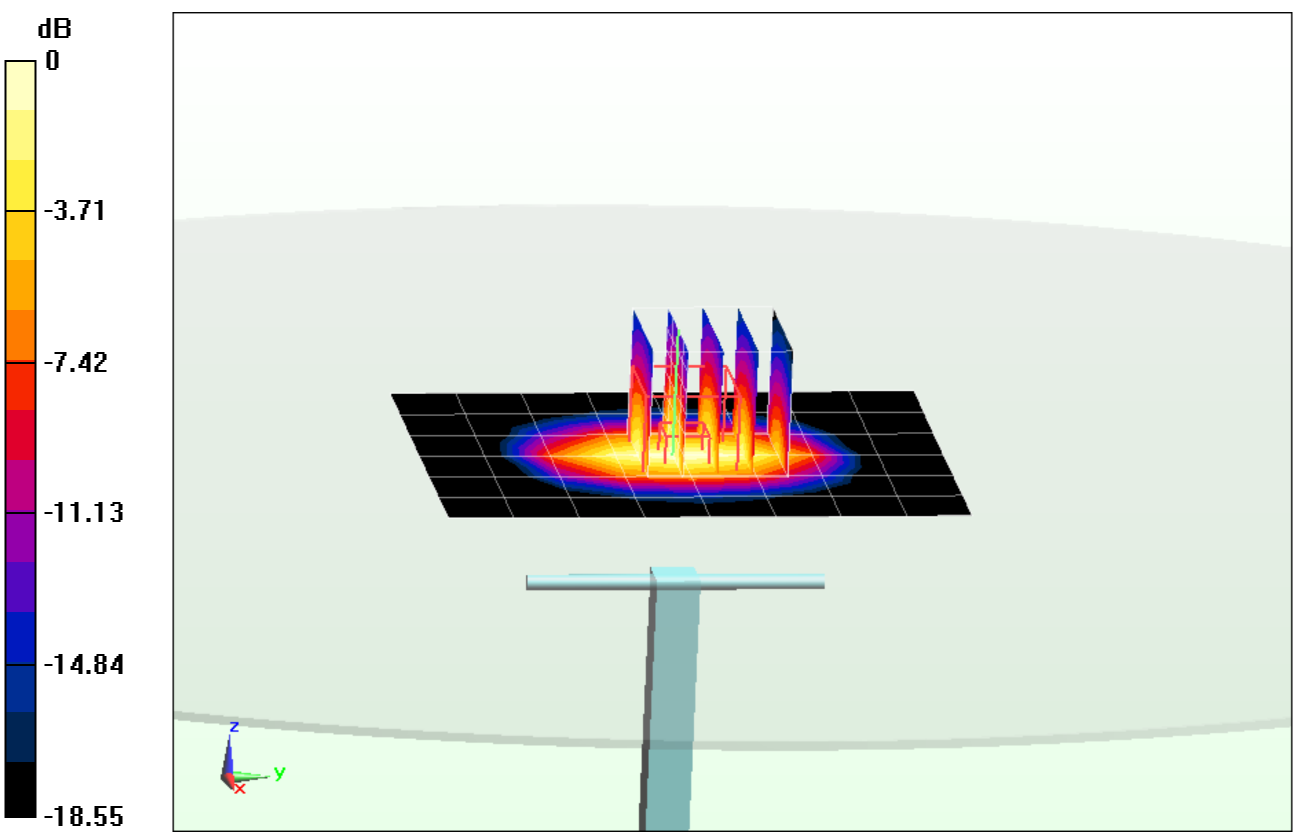
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.576 mho/m; ε_r = 52.357; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-23-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3213; ConvF(4.5, 4.5, 4.5); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: ELI v5.0 Door; Type: QDOVA002BB; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (3);SEMCAD X Version 14.6.7 (6848)

1900 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 7.356 mW/g
SAR(1 g) = 4.06 mW/g; SAR(10 g) = 2.12 mW/g
Deviation = 3.84%



0 dB = 4.53 mW/g = 13.12 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

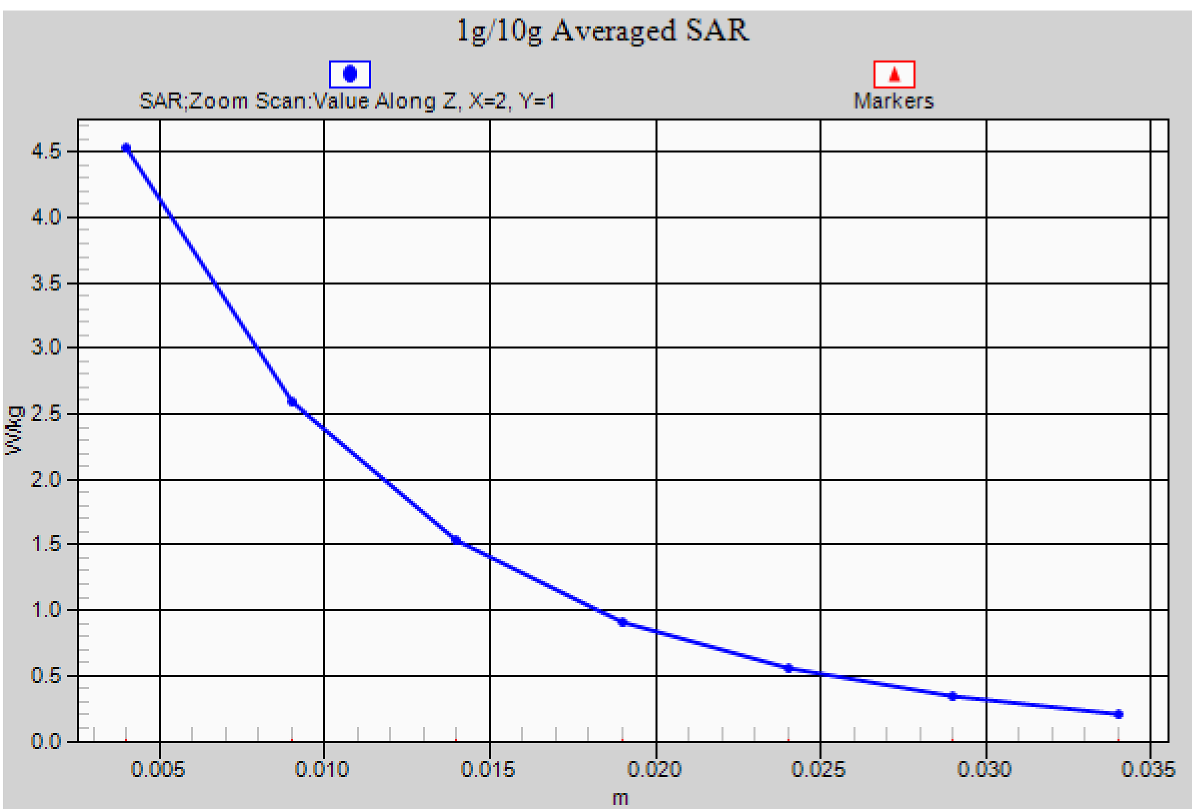
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.576 mho/m; ε_r = 52.357; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-23-2012; Ambient Temp: 23.0°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3213; ConvF(4.5, 4.5, 4.5); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: ELI v5.0 Door; Type: QDOVA002BB; Serial: TP-1158
Measurement SW: DASY52, Version 52.8 (3);SEMCAD X Version 14.6.7 (6848)

1900 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 7.356 mW/g
SAR(1 g) = 4.06 mW/g; SAR(10 g) = 2.12 mW/g
Deviation = 3.84%



PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 797

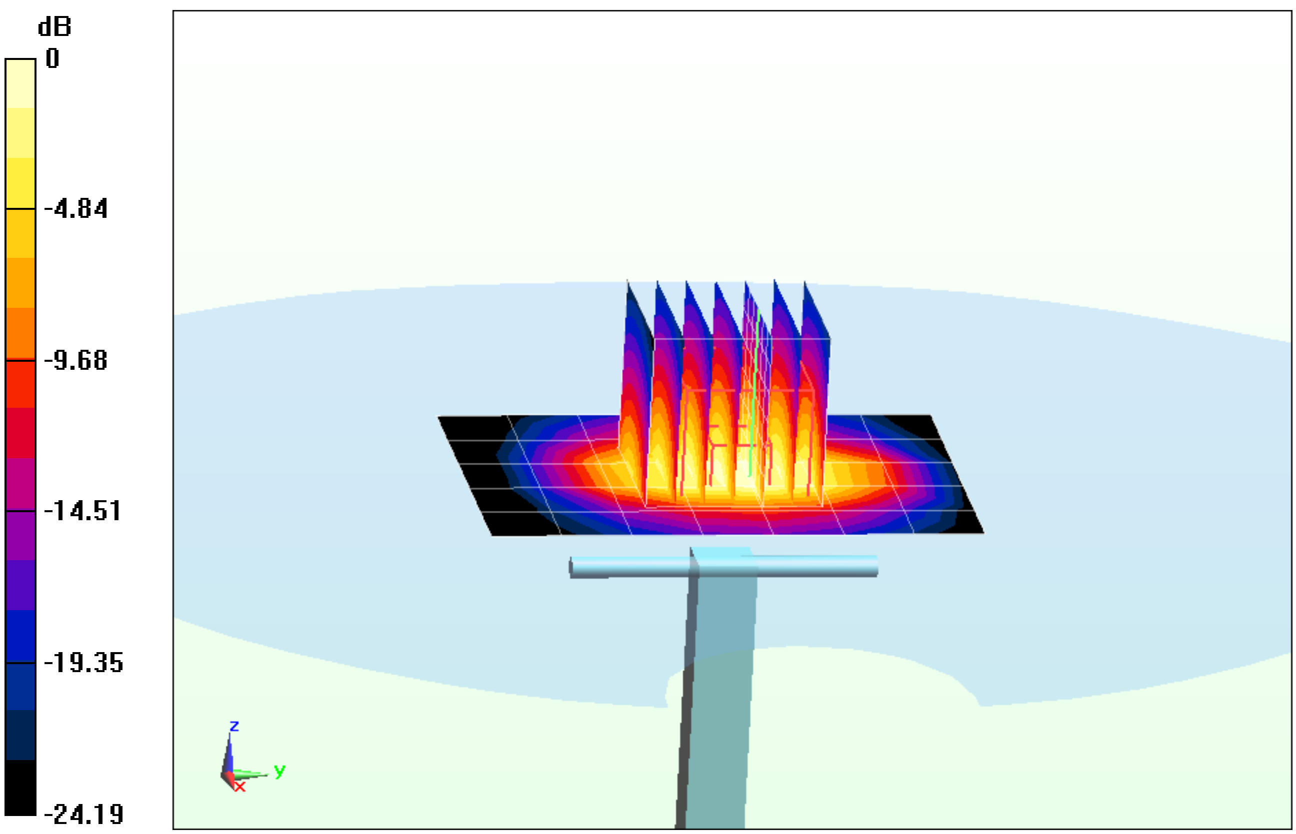
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; $\sigma = 2.044$ mho/m; $\varepsilon_r = 51.82$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-31-2012; Ambient Temp: 21.2°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3209; ConvF(4.23, 4.23, 4.23); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.7 (6848)

2450 MHz System Verification

Area Scan (6x8x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 11.824 mW/g
SAR(1 g) = 5.38 mW/g; SAR(10 g) = 2.44 mW
Deviation = 5.91%



0 dB = 7.02 mW/g = 16.93 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 797

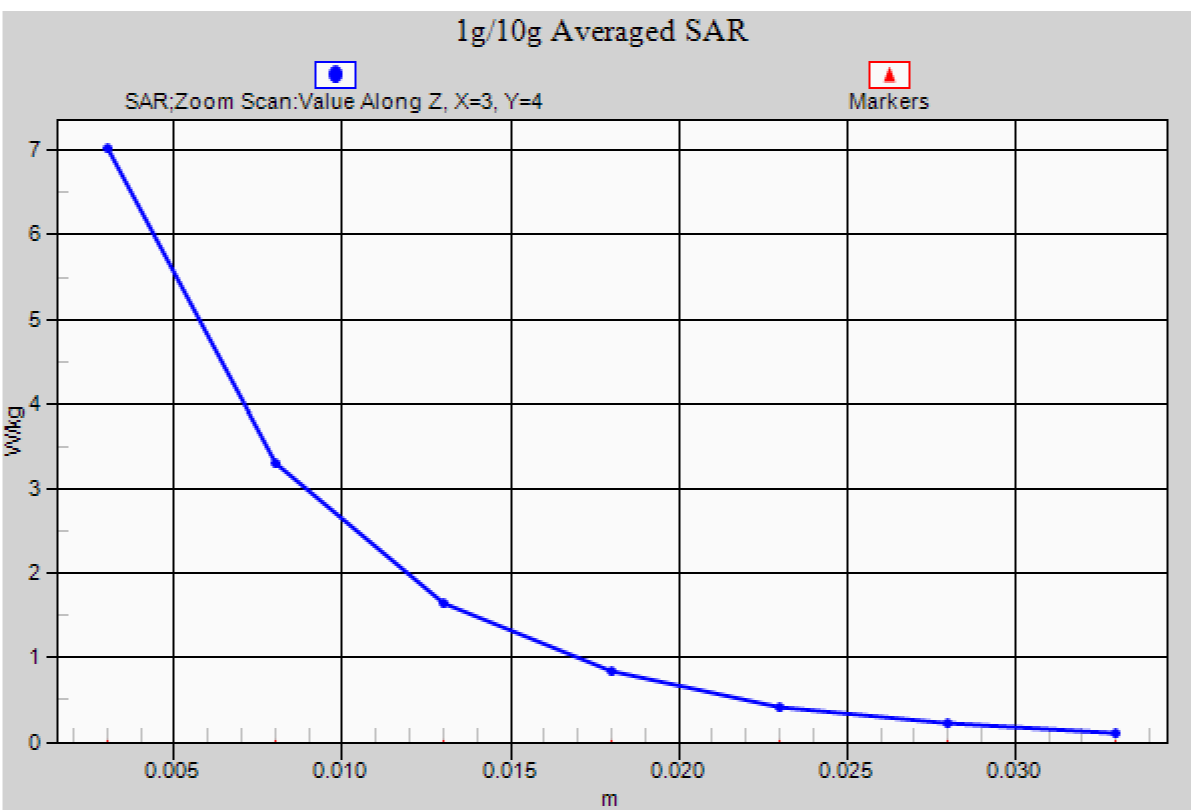
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.044 mho/m; ε_r = 51.82; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-31-2012; Ambient Temp: 21.2°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3209; ConvF(4.23, 4.23, 4.23); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.7 (6848)

2450 MHz System Verification

Area Scan (6x8x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 11.824 mW/g
SAR(1 g) = 5.38 mW/g; SAR(10 g) = 2.44 mW
Deviation = 5.91%



PCTEST ENGINEERING LABORATORY, INC.

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

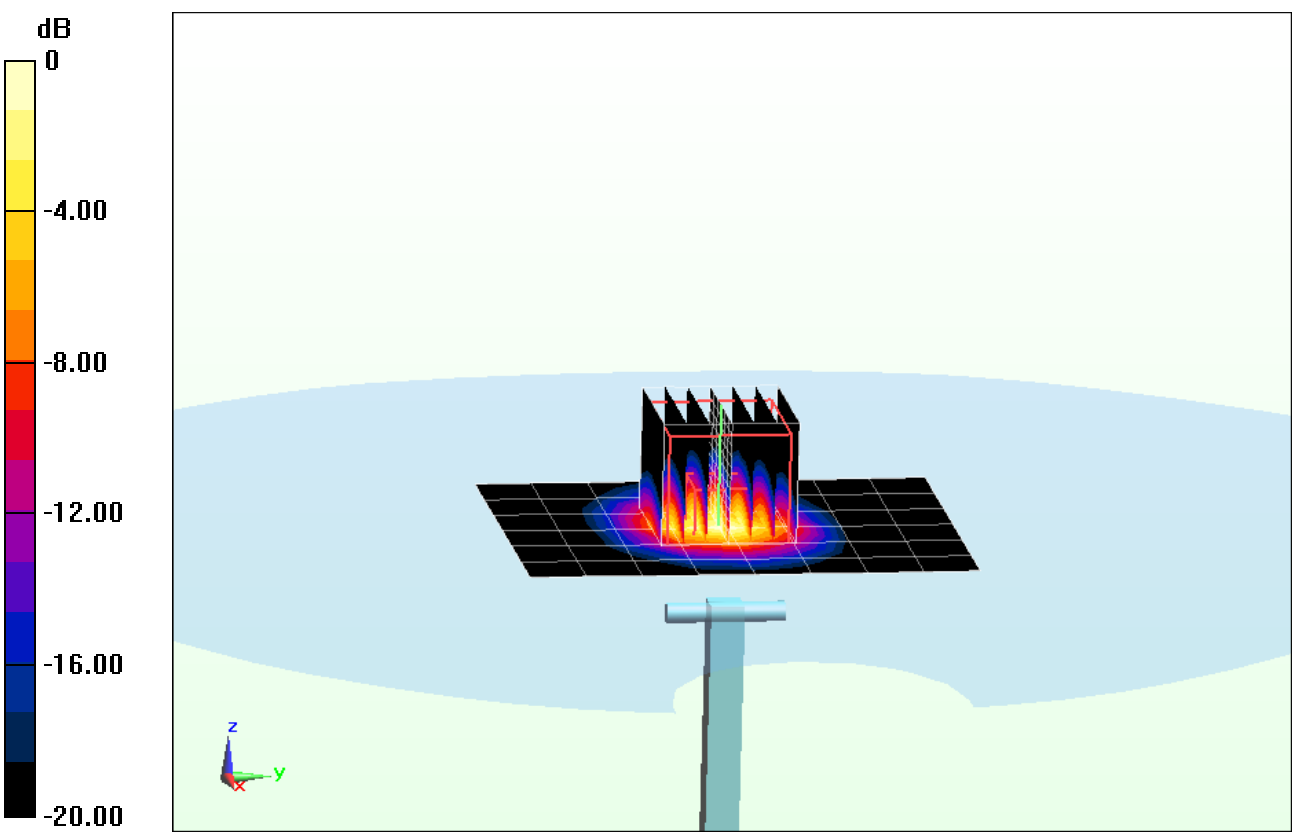
Communication System: CW; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: 5000 Body Medium parameters used:
f = 5200 MHz; σ = 5.322 mho/m; ε_r = 47.46; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-06-2012; Ambient Temp: 21.0°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN3589; ConvF(3.92, 3.92, 3.92); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5200 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 16.0 dBm (40 mW)
Peak SAR (extrapolated) = 12.192 mW/g
SAR(1 g) = 2.99 mW/g; SAR(10 g) = 0.824 mW/g
Deviation = 1.84%



0 dB = 6.27 mW/g = 15.95 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

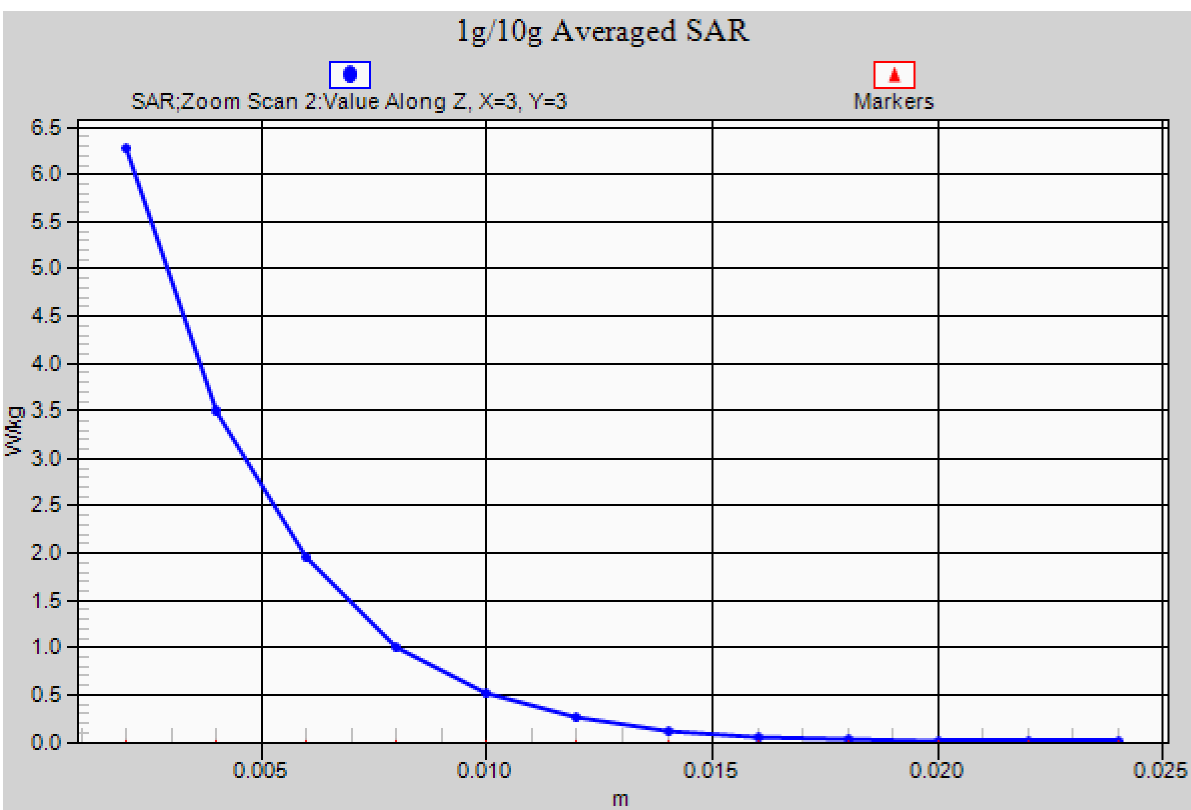
Communication System: CW; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: 5000 Body Medium parameters used:
f = 5200 MHz; σ = 5.322 mho/m; ε_r = 47.46; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-06-2012; Ambient Temp: 21.0°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN3589; ConvF(3.92, 3.92, 3.92); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5200 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 16.0 dBm (40 mW)
Peak SAR (extrapolated) = 12.192 mW/g
SAR(1 g) = 2.99 mW/g; SAR(10 g) = 0.824 mW/g
Deviation = 1.84%



PCTEST ENGINEERING LABORATORY, INC.

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

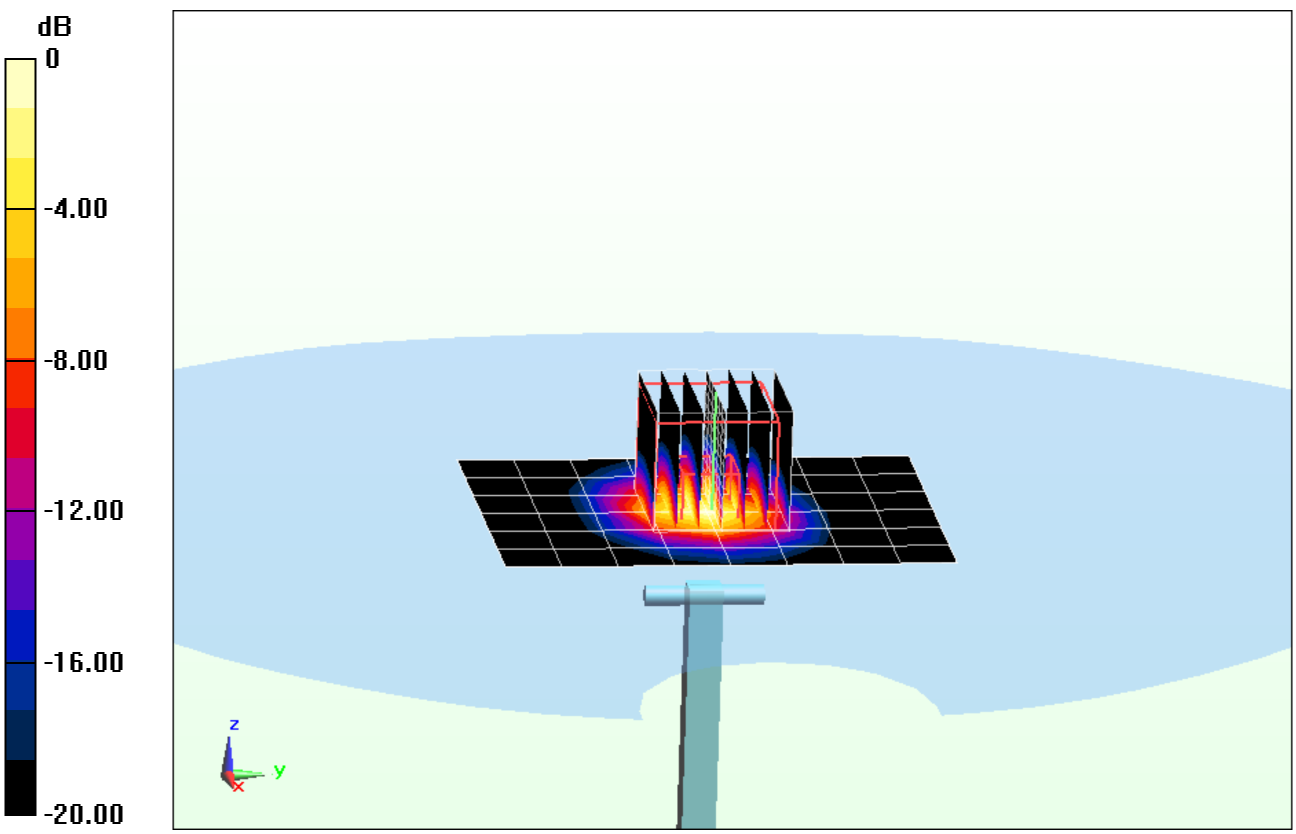
Communication System: CW; Frequency: 5500 MHz; Duty Cycle: 1:1
Medium: 5000 Body Medium parameters used:
f = 5500 MHz; σ = 5.771 mho/m; ε_r = 46.67; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-06-2012; Ambient Temp: 21.4°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3589; ConvF(3.4, 3.4, 3.4); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5500 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12): Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 16.0 dBm (40 mW)
Peak SAR (extrapolated) = 13.267 mW/g
SAR(1 g) = 3.1 mW/g; SAR(10 g) = 0.840 mW/g
Deviation = -1.77%



0 dB = 6.50 mW/g = 16.26 dB mW/g

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

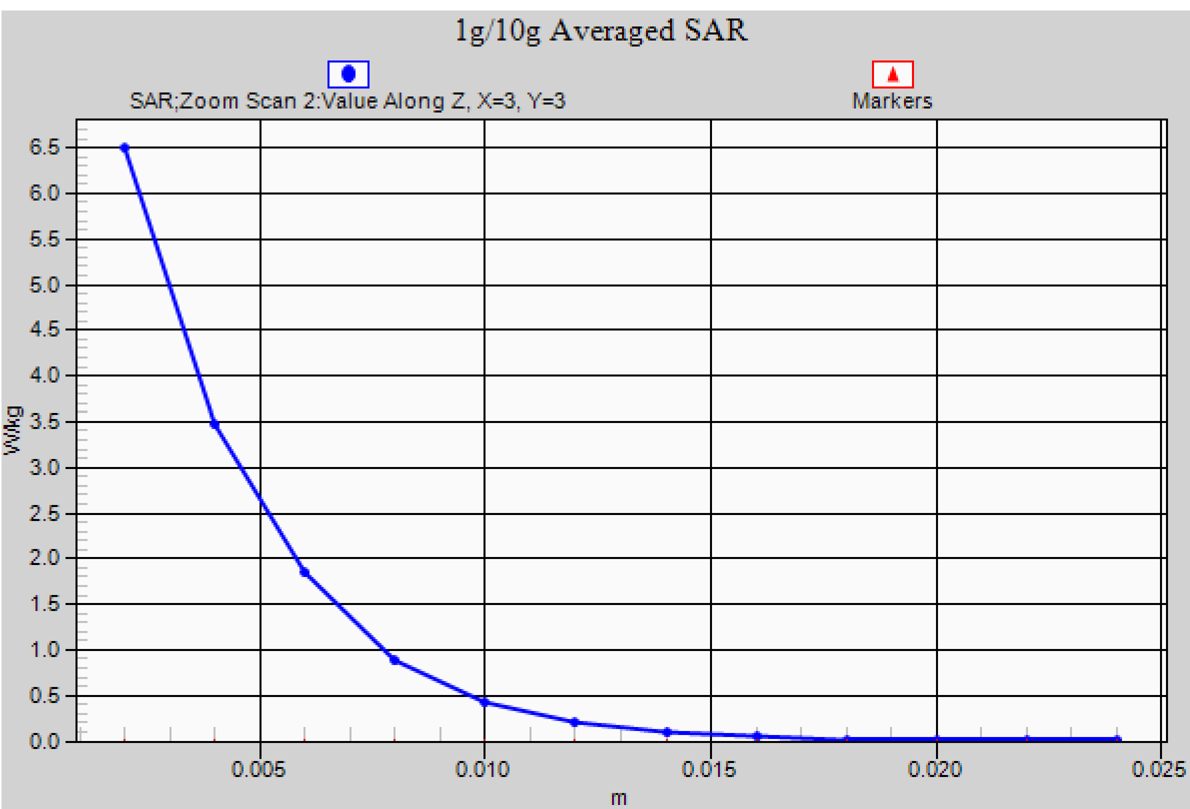
Communication System: CW; Frequency: 5500 MHz; Duty Cycle: 1:1
Medium: 5000 Body Medium parameters used:
f = 5500 MHz; $\sigma = 5.771$ mho/m; $\varepsilon_r = 46.67$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-06-2012; Ambient Temp: 21.4°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3589; ConvF(3.4, 3.4, 3.4); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5500 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12): Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 16.0 dBm (40 mW)
Peak SAR (extrapolated) = 13.267 mW/g
SAR(1 g) = 3.1 mW/g; SAR(10 g) = 0.840 mW/g
Deviation = -1.77%



PCTEST ENGINEERING LABORATORY, INC.

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

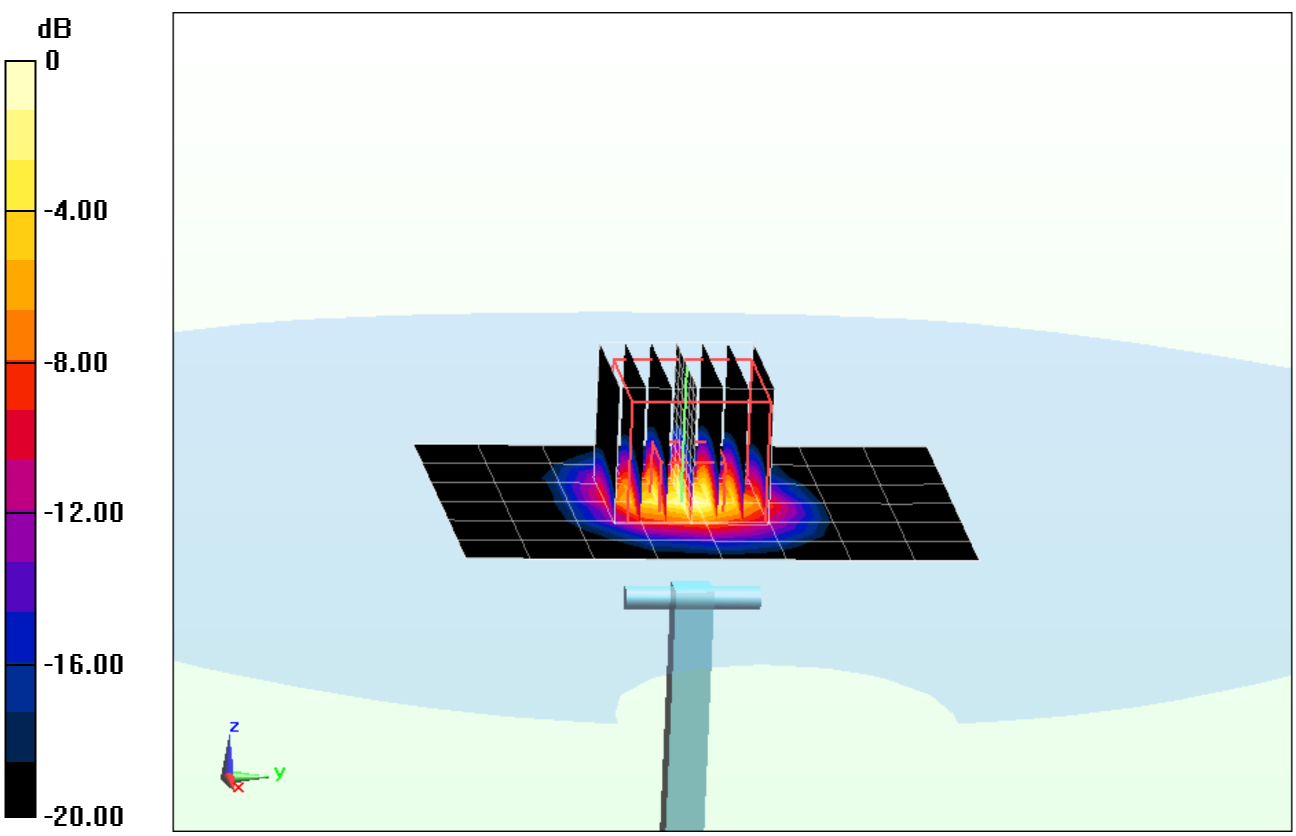
Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: 5000 Body Medium parameters used:
f = 5800 MHz; σ = 6.236 mho/m; ε_r = 45.94; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-06-2012; Ambient Temp: 21.5°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN3589; ConvF(3.59, 3.59, 3.59); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5800 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 16.0 dBm (40 mW)
Peak SAR (extrapolated) = 13.808 mW/g
SAR(1 g) = 2.99 mW/g; SAR(10 g) = 0.802 mW/g
Deviation = 0.61%



0 dB = 6.66 mW/g = 16.47 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: 5000 Body Medium parameters used:
f = 5800 MHz; σ = 6.236 mho/m; ε_r = 45.94; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-06-2012; Ambient Temp: 21.5°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN3589; ConvF(3.59, 3.59, 3.59); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5800 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 16.0 dBm (40 mW)
Peak SAR (extrapolated) = 13.808 mW/g
SAR(1 g) = 2.99 mW/g; SAR(10 g) = 0.802 mW/g
Deviation = 0.61%