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SAR COMPLIANCE EVALUATION REPORT

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

Date of Testing:
12/12/11 - 1/19/12
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Test Report Serial No.:
0Y1112152155.A3L

FCC ID: **A3LGTN8000**

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

EUT Type: Portable Tablet Computer
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model(s): GT-N8000

Band & Mode	Tx Frequency	Conducted Power [dBm]	SAR
			1 gm Body (W/kg)
GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	32.49	0.59
WCDMA/HSPA 850	826.40 - 846.60 MHz	22.39	0.48
GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	29.48	1.10
WCDMA/HSPA 1900	1852.4 - 1907.6 MHz	20.41	1.04
2.4 GHz WLAN	2412 - 2462 MHz	13.03	N/A
5.8 GHz WLAN	5745 - 5825 MHz	11.28	0.83
5.2 GHz WLAN	5180 - 5240 MHz	10.75	0.66
5.3 GHz WLAN	5260 - 5320 MHz	11.33	0.79
5.5 GHz WLAN	5500 - 5700 MHz	11.06	0.81
Bluetooth	2402 - 2480 MHz	8.11	N/A

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

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

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

Randy Ortanez
President

ACCREDITED
TESTING LABORATORY
CERTIFICATE #2041.01

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1 EQUIPMENT UNDER TEST

1.1 Device Overview

Technology	Band & Mode	Tx Frequency
GSM/GPRS	Cell GSM/GPRS/EDGE	824.20 - 848.80 MHz
	PCS GSM/GPRS/EDGE	1850.2 - 1909.8 MHz
WCDMA	WCDMA Band II	1852.4 - 1907.6 MHz
	WCDMA Band V	826.40 - 846.60 MHz
WIFI	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

1.2 Antenna Locations

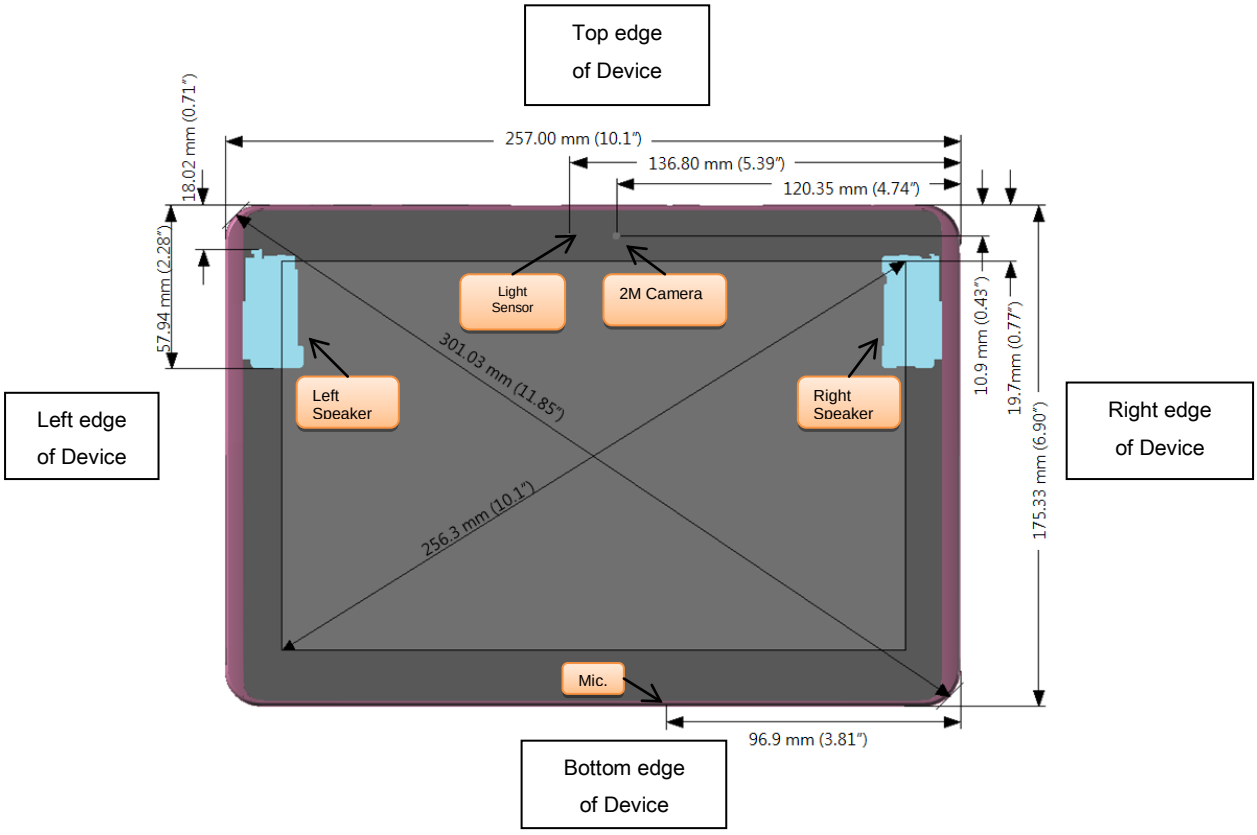


Figure 1-1
Front View of Device

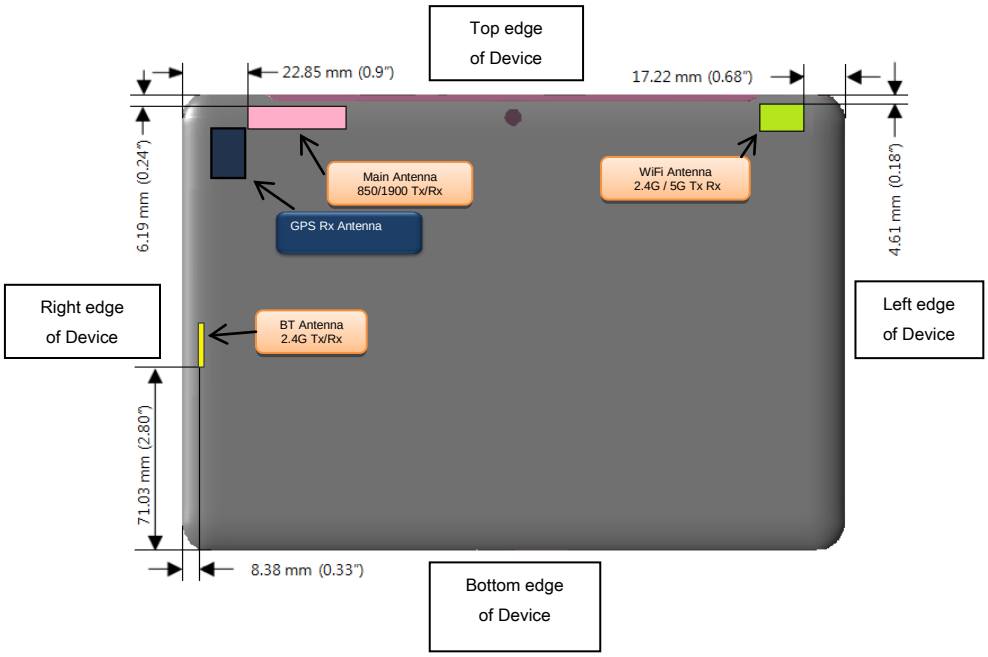


Figure 1-2
Back View of Device

1.3 Device Exclusions Applicable for SAR Testing

(A) WIFI/BT Testing

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 6.471 mW. Also, 2.4 GHz WIFI SAR was not required since the maximum conducted power is 20.09 mW < 60/f.

(B) HSPA Test Considerations for SAR Testing

Since the SAR test setup for HSPA is typically problematic due to static ETFCI and AG requirements for the duration of the SAR test, as long as the maximum average output power for WCDMA and HSPA are similar, testing in WCDMA mode is performed, which also facilitates the exclusion of HSPA testing. HSPA testing was excluded based on the conducted power measurement and SAR results according to KDB 941225 Publication. HSPA+ operations are in the downlink only.

1.4 Simultaneous Transmission Capabilities

This device contains multiple transmitters that may operate simultaneously and therefore, require a simultaneous transmission analysis according to KDB Publication 447498 4) b) iii) procedures. The tablet procedures required by KDB Publication 447498 generally do not require separate hotspot mode testing.

2.4 GHz and 5 GHz WIFI cannot transmit simultaneously since it shares the same circuit path and are switched by the radio. Bluetooth can transmit simultaneously with all other antennas.

5 GHz WIFI cannot transmit simultaneously with the 2G/3G antennas. Therefore there is no simultaneous transmission with 5 GHz WIFI.

Since standalone Bluetooth SAR tests and 2.4 GHz WIFI SAR tests were not required, no further analysis was necessary to determine if simultaneous transmission cases would exceed the SAR limit.

1.5 Power Reduction for SAR

Proximity Sensors were utilized in the device for SAR purposes. April/October 2011 TCB Workshop Notes regarding Power reduction using proximity sensors were used for guidance for SAR Testing. See Section 9.3 for more information.

1.6 Samples Used for SAR Testing

Three samples with identical hardware were used to facilitate SAR testing only. For maximum power samples, power reduction was disabled via software (only available from the manufacturer) 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

	GSM/GPRS and WCDMA	5 GHZ WIFI
Maximum Power	#4	#2
Reduced Power	#3	

1.7 FCC Guidance Applied

- FCC OET Supplement C
- IEEE 1528-2003
- FCC KDB 941225
- FCC KDB 447498 Section 4 (Tablet SAR Considerations)
- April/Oct 2011 TCB Workshop Notes for RF Exposure and Sensors with Power Reduction
- FCC KDB 248227 (802.11 SAR considerations)
- FCC KDB 865664 (5-6 GHz SAR measurement techniques)

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 Fig. 2-1).

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

Figure 2-1
SAR Mathematical Equation

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

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

where:

σ = conductivity of the tissue-simulating material (S/m)
ρ = mass density of the tissue-simulating material (kg/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 TEST SITE LOCATION

3.1 INTRODUCTION

The map at the right shows the location of the PCTEST LABORATORY in Columbia, Maryland. It is in proximity to the FCC Laboratory, the Baltimore-Washington International (BWI) airport, the city of Baltimore and Washington, DC.

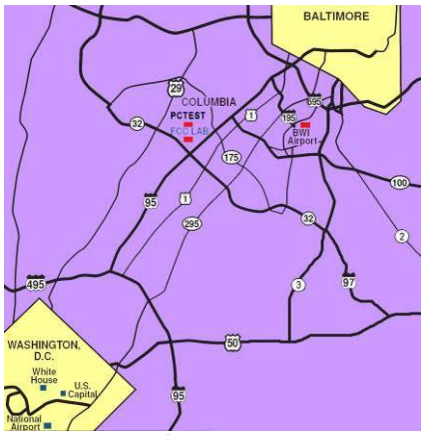


Figure 3-1
Map of the Greater Baltimore and Metropolitan Washington, D.C. area

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49' 38" W longitude. The facility is 1.5 miles north of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 on January 27, 2006 and Industry Canada.

3.2 Test Facility / Accreditations:

Measurements were performed at an independent accredited PCTEST Engineering Lab located in Columbia, MD 21045, U.S.A.

- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing-Aid Compatibility (HAC), Battery Safety, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (IC-2451).
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and all Industry Canada Standards (RSS).

- PCTEST facility is an IC registered (IC-2451) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS and CDMA, and EvDO mobile phones.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO Data, CDMA 1xRTT Data

4 SAR MEASUREMENT SETUP

4.1 Robotic System

Measurements are performed using the DASY4 automated dosimetric assessment system. The DASY4 is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of a high precision robotics system (Staubli), robot controller, desktop computer, near-field probe, probe alignment sensor, and the SAM phantom containing the head or body equivalent material. The robot is a six-axis industrial robot, performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Figure 4-1).

4.2 System Hardware

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and a remote control used to drive the robot motors. The PC consists of the SAR Measurement Software DASY4, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit that performs the signal amplification, signal multiplexing, A/D conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal from the DAE and transfers data to the PC card.

4.3 System Electronics

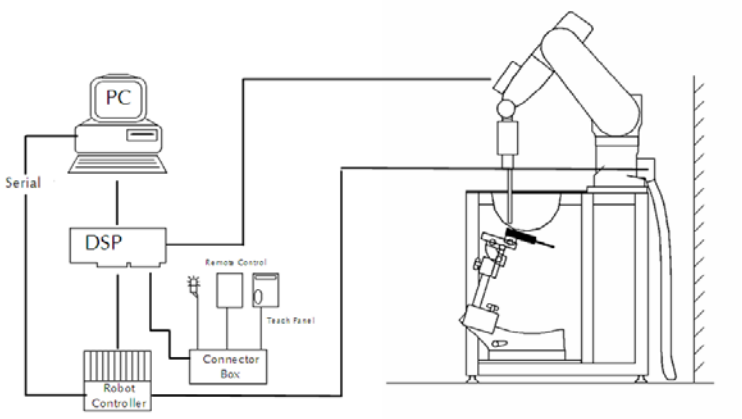


Figure 4-1
SAR Measurement System Setup

The DAE consists of a highly sensitive electrometer-grade auto-zeroing preamplifier, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

4.4 Automated Test System Specifications

Test Software:	SPEAG DASY4 version 4.7 Measurement Software
Robot:	Stäubli Unimation Corp. Robot RX60L
Repeatability:	0.02 mm
No. of Axes:	6

Data Acquisition Electronic System (DAE)

Data Converter

Features:	Signal Amplifier, multiplexer, A/D converter & control logic
Software:	SEMCAD software
Connecting Lines:	Optical Downlink for data and status info Optical upload for commands and clock

PC Interface Card

Function:	Link to DAE 16-bit A/D converter for surface detection system Two Serial & Ethernet link to robotics Direct emergency stop output for robot

Phantom

Type:	SAM Twin Phantom (V4.0 and V5.0)
Shell Material:	Composite
Thickness:	2.0 ± 0.2 mm

Figure 4-2
SAR Measurement System

5 DASY E-FIELD PROBE SYSTEM

5.1 Probe Measurement System

Figure 5-1
SAR System

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration (see Figure 5-3) and optimized for dosimetric evaluation [9]. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multi-fiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2nd order curve fitting (see Figure 6-1). The approach is stopped at reaching the maximum.

5.2 Probe Specifications

Model(s):	ES3DV2, ES3DV3, EX3DV4
Frequency Range:	10 MHz – 6.0 GHz (EX3DV4) 10 MHz – 4 GHz (ES3DV3)
Calibration:	In head and body simulating tissue at Frequencies from 300 up to 6000MHz
Linearity:	± 0.2 dB (30 MHz to 6 GHz) for EX3DV4 ± 0.2 dB (30 MHz to 4 GHz) for ES3DV3
Dynamic Range:	10 mW/kg – 100 W/kg
Probe Length:	330 mm
Probe Tip Length:	20 mm
Body Diameter:	12 mm
Tip Diameter:	2.5 mm (3.9mm for ES3DV3)
Tip-Center:	1 mm (2.0 mm for ES3DV3)
Application:	SAR Dosimetry Testing Compliance tests of mobile phones Dosimetry in strong gradient fields

Figure 5-2
Near-Field Probe

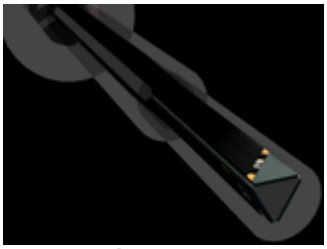


Figure 5-3
Triangular Probe Configuration

6 PHANTOM AND EQUIVALENT TISSUES

6.1 SAM Phantoms

Figure 6-1
SAM Phantoms

The SAM Twin Phantoms V4.0 and V5.0 are constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to represent the 90th percentile of the population [12][13]. The phantom enables the dosimetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

6.2 Tissue Simulating Mixture Characterization

Figure 6-2
SAM Phantom with Simulating Tissue

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

Table 6-1
Composition of the Tissue Equivalent Matter

Frequency (MHz)	835	1900	5200-5800
Tissue	Body	Body	Body
Ingredients (% by weight)			
Bactericide	0.1		
DGBE		29.44	
HEC	1		
NaCl	0.94	0.39	
Sucrose	44.9		
Polysorbate (Tween) 80			20
Water	53.06	70.17	80

7 DOSIMETRIC ASSESSMENT & PHANTOM SPECS

7.1 Measurement Procedure

The evaluation was performed using the following procedure:

1. The SAR distribution area was ensured to cover the entire dimension of the body phantom area with the DUT positioned against the phantom. The horizontal grid resolution was 15mm x 15mm for up to 3 GHz frequencies. The horizontal grid resolution was 10mm x 10mm for 5-6 GHz frequencies per KDB 865664 pub.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during testing the 1 gram cube. This fixed point was measured and used as a reference value.

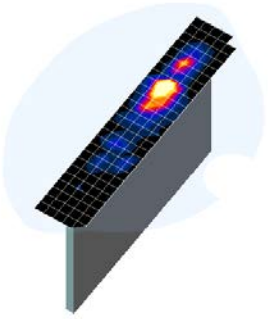


Figure 7-1
Sample SAR Area Scan

3. Based on the area scan data, the area of the maximum absorption was determined by spline interpolation. Around this point, a fine resolution volume scan, "zoom scan," was assessed. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual for more details):
   a. The data was extrapolated to the surface of the outer-shell of the phantom. The combined distance extrapolated was the combined distance from the center of the diodes from the tip of the probe housing plus the distance between the phantom outer 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 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 value deviated by more than 5%, the evaluation was repeated.

7.2 5 GHz SAR Testing Considerations per KDB 865664 publication

For 5 GHz testing, finer resolution Area scans were performed as specified by FCC SAR Measurement Requirements for 3 – 6 GHz, KDB pub 865664. The 5 GHz Area Scan requires a minimum resolution of 10mm on the x and y axis for each grid measurement point.

For 5 GHz testing finer resolution zoom scans were performed as specified by FCC SAR Measurement Requirements for 3 – 6 GHz, KDB pub 865664. The 5 GHz zoom scan requires a minimum volume of 24mm x 24mm x 20mm and 7 x 7 x 11 points.

8 FCC RF EXPOSURE LIMITS

8.1 Uncontrolled Environment

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

8.2 Controlled Environment

CONTROLLED ENVIRONMENTS are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table 8-1
SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT *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.

9 SAR TABLET TESTING

9.1 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.

Per KDB Publication 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 Publication 447498 4) b) ii) (2), for each antenna, SAR is only required for the edge with the most conservative exposure condition.

Since the diagonal dimension of the device is more than 20 cm (30.1 cm), this device is a tablet (not a mini-tablet).

9.2 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. 4) b) ii) (2), for each antenna, SAR is only required for the edge with the most conservative exposure condition.

9.3 Proximity Sensor Information

The sensor pad is located near the top half of the device to cover exposure conditions to the main antenna. The technical description contains information about sensor size and location. Power reduction levels are provided in Table 10-3 and Table 10-6.

9.4 Additional SAR Testing Due to Proximity Sensors

Based on the type and implementation of the sensor, April 2011 FCC-TCB conference notes requires sensor information regarding: (1) additional SAR evaluation at a conservative distance from the device where power reduction is de-activated and (2) reliability sensor activation data. Reliability sensor activation data is provided for both the back side and top edge of the tablet at 0° to cover direct usage and also at 60° to cover angled usage (See Table 9-3.)

Since the back-off sensor activation distance for back is 11 mm, a conservative distance of 10 mm was tested for the back side. Since the back-off sensor activation distance was 6 mm for the top edge, a conservative distance of 5 mm was tested. Details about sensing mechanism and sensor pad location are included in the technical description.

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

Table 9-1
Distance from Back of Tablet

Distance in mm	9	10	11	12	13	14
Condition of Sensor with respect to the back of the device	on	on	on	off	off	off

Please see Figure 9-1 through Figure 9-6 for measured max power and reduced power distance plots for each GSM/GPRS/EDGE multi-slot and WCDMA mode.

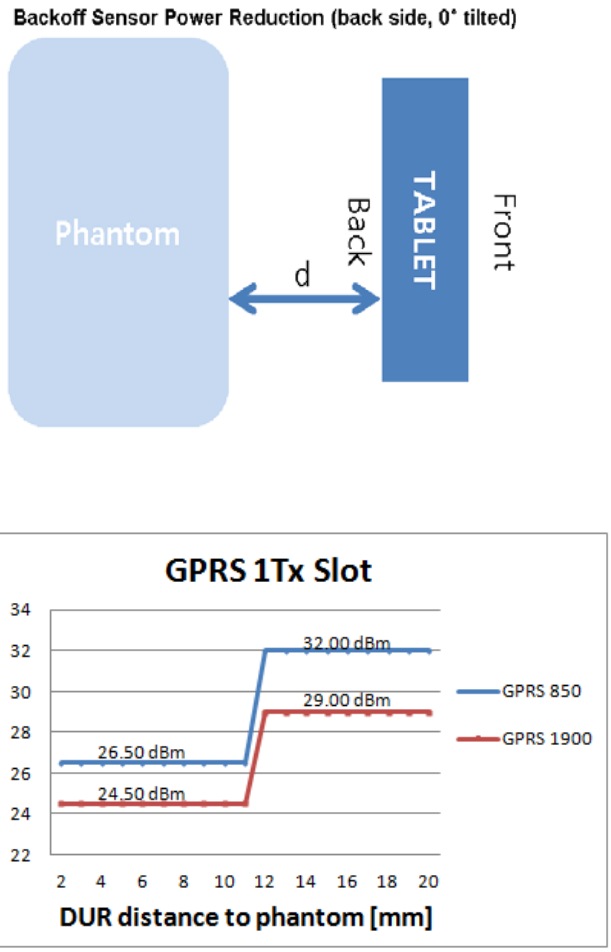


Figure 9-1
GSM 850 and 1900 Back off Power Reduction Graph - Back side

Note: GSM voice applies the same target power levels as GPRS 1 Tx slot. GSM/GPRS 1 Tx reduction levels are shown in Section 10.3.

Data in Figure 9-1 demonstrates reduced fixed GPRS (GMSK) power levels at a distance of 11mm and less from the back, as shown in Table 9-1.

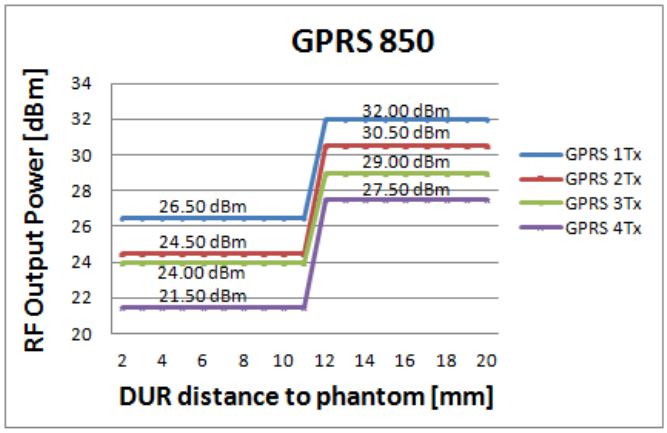


Figure 9-2
GPRS (GMSK) 850 Back off Power Reduction Graph - Back side

Data in Figure 9-2 demonstrates reduced fixed GPRS (GMSK) power levels at a distance of 11mm and less from the back, as shown in Table 9-1.

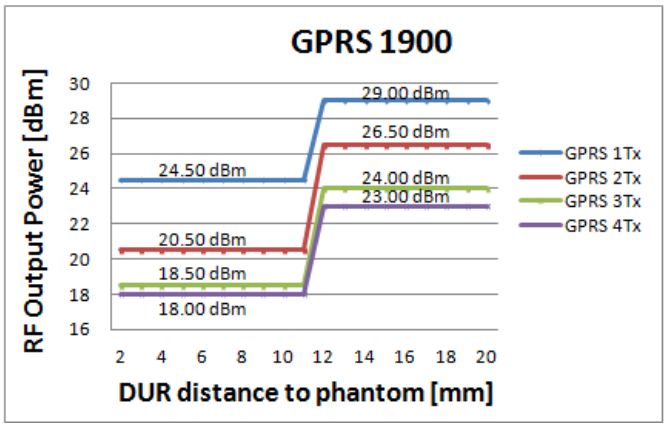


Figure 9-3
GPRS (GMSK) 1900 Back off Power Reduction Graph - Back side

Data in Figure 9-3 demonstrates reduced fixed GPRS (GMSK) power levels at a distance of 11mm and less from the back, as shown in Table 9-1.

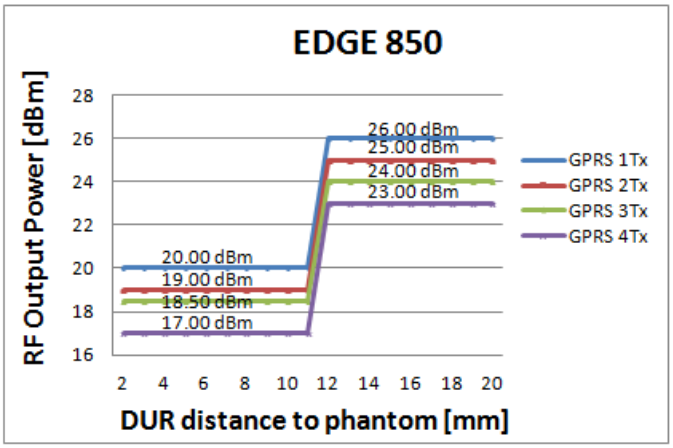


Figure 9-4
EDGE (8-PSK) 850 Back off Power Reduction Graph - Back side

Data in Figure 9-4 demonstrates reduced fixed EDGE (8-PSK) power levels at a distance of 11mm and less from the back, as shown in Table 9-1.

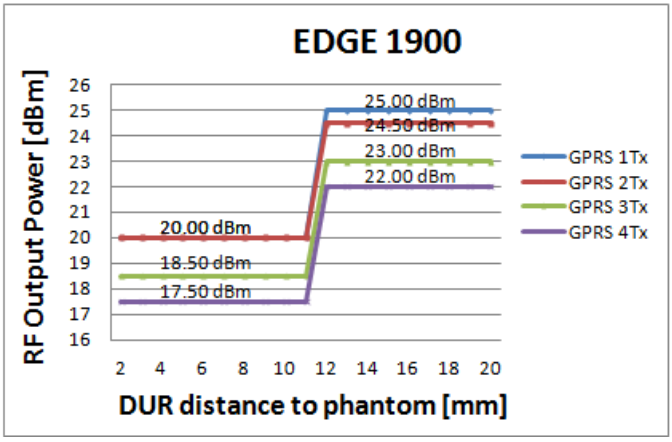
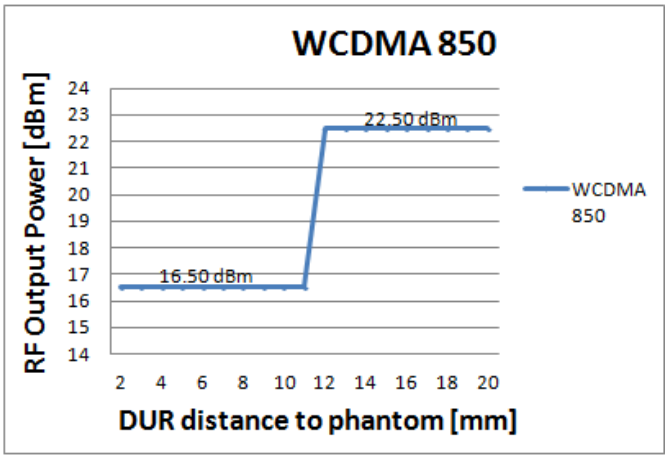


Figure 9-5
EDGE (8-PSK) 1900 Back off Power Reduction Graph - Back side

Data in Figure 9-5 demonstrates reduced fixed EDGE (8-PSK) power levels at a distance of 11mm and less from the back, as shown in Table 9-1.



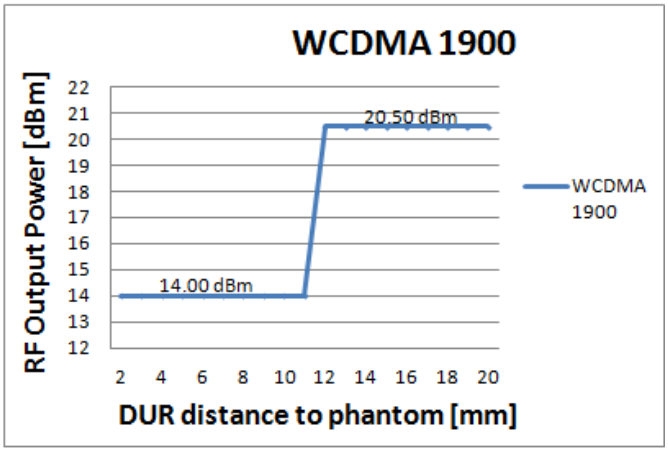


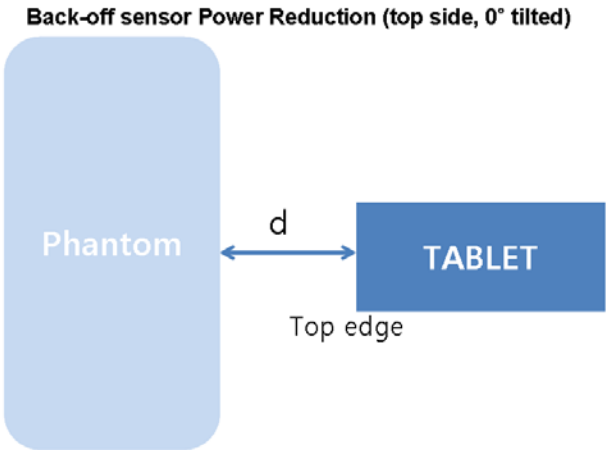
Figure 9-6
WCDMA 850/1900 Back off Power Reduction Graph - Back Side

Data in Figure 9-6 demonstrates reduced fixed WCDMA power levels at a distance of 11mm and less from the back, as shown in Table 9-1.

Table 9-2
Distance from Top Edge of Tablet - 0° Angle

distance in mm	5	6	7	8	9	10
Condition of Sensor in the top edge of the device	on	on	off	off	off	off

Please see Figure 9-7 through Figure 9-12 for measured max power and reduced power distance plots for each GSM/GPRS/EDGE multi-slot and WCDMA mode.



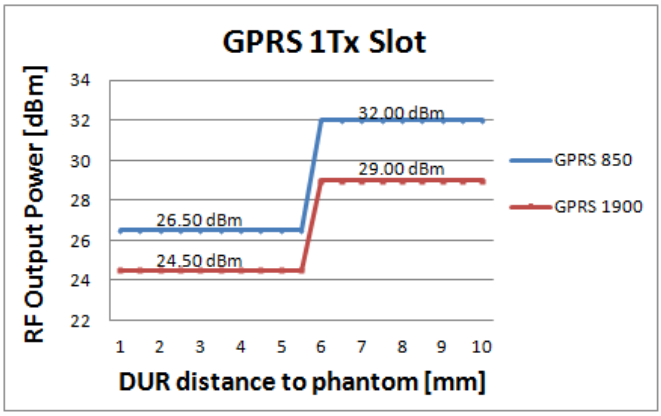


Figure 9-7
GSM 850/1900 Back off Power Reduction Graph - Top Edge at 0° Angle

Note: GSM voice applies the same target power levels as GPRS 1 Tx slot. GSM/GPRS 1 Tx reduction levels are shown in Section 10.3.

Data in Figure 9-7 demonstrates reduced fixed GPRS (GMSK) power levels at a distance of 6mm and less from the top edge, as shown in Table 9-2.

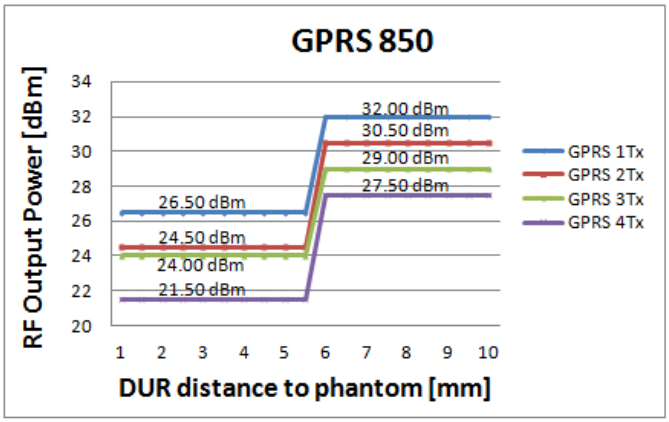


Figure 9-8
GPRS (GMSK) 850 Back off Power Reduction Graph - Top Edge at 0° Angle

Data in Figure 9-8 demonstrates reduced fixed GPRS (GMSK) power levels at a distance of 6mm and less from the top edge, as shown in Table 9-2.

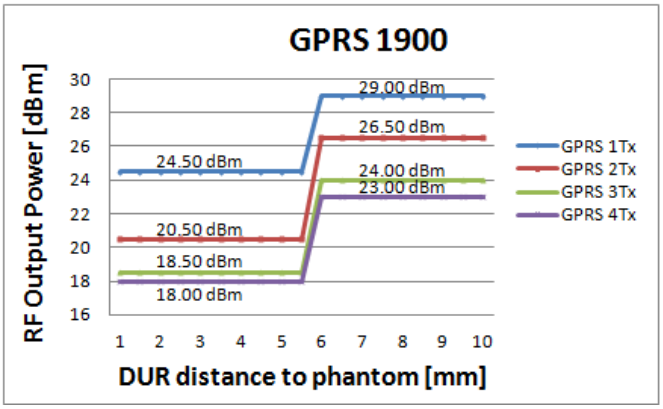


Figure 9-9
GPRS (GMSK) 1900 Back off Power Reduction Graph - Top Edge at 0° Angle

Data in Figure 9-9 demonstrates reduced fixed GPRS (GMSK) power levels at a distance of 6mm and less from the top edge, as shown in Table 9-2.

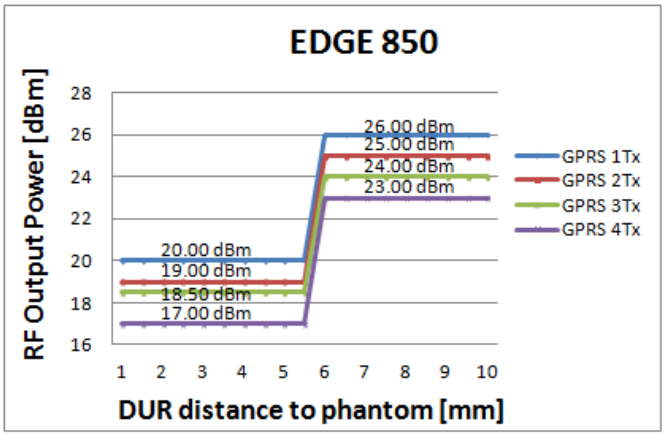


Figure 9-10
EDGE (8-PSK) 850 Back off Power Reduction Graph - Top Edge at 0° Angle

Data in Figure 9-10 demonstrates reduced fixed EDGE (8-PSK) power levels at a distance of 6mm and less from the top edge, as shown in Table 9-2.

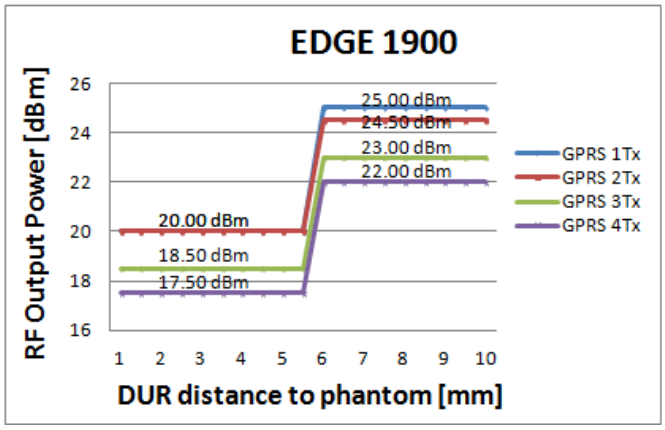
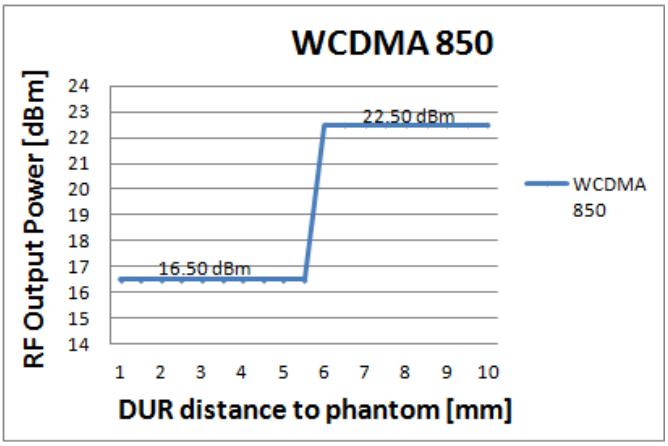


Figure 9-11
EDGE (8-PSK) 1900 Back off Power Reduction Graph - Top Edge at 0° Angle

Data in Figure 9-11 demonstrates reduced fixed EDGE (8-PSK) power levels at a distance of 6mm and less from the top edge, as shown in Table 9-2.



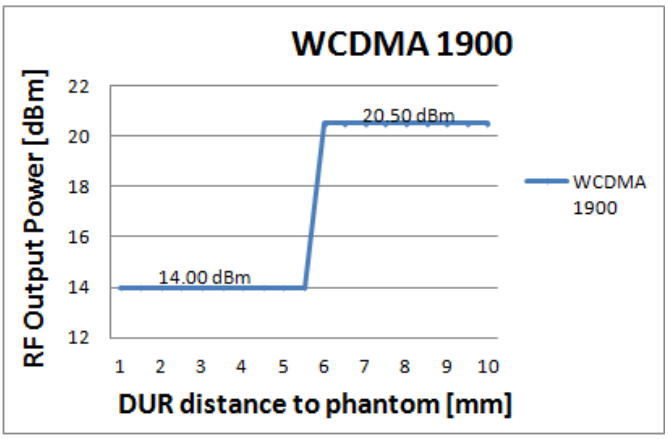


Figure 9-12
WCDMA 850/1900 Back off Power Reduction Graph - Top Edge at 0° Angle

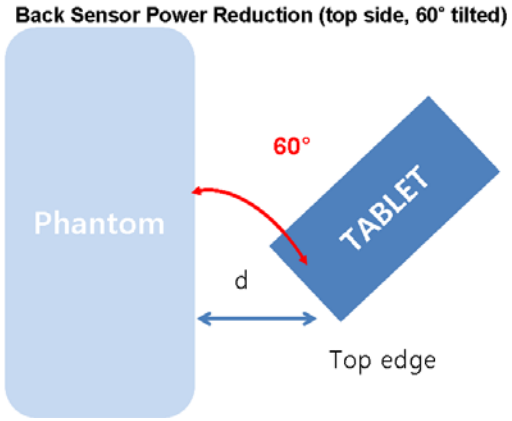
Data in Figure 9-12 demonstrates reduced fixed WCDMA power levels at a distance of 6mm and less from the top edge, as shown in Table 9-2.

Table 9-3
Distance from Top Edge of Tablet - 60° Angle

distance in mm	5	6	7	8	9	10
Condition of Sensor in the top edge of the device	on	on	off	off	off	off

Please see Figure 9-13 through Figure 9-18 for measured max power and reduced power distance plots for each GSM/GPRS/EDGE multi-slot and WCDMA mode.

Note: Angle mentioned for top edge description is the perpendicular angle.



Above figure represents “60 degrees” between the screen face and phantom face.
Please note that the 60 degree angle tilt has been used to identify proximity sensor coverage for the top edge, since this angle is consistent with device use conditions and sensor implementation according to the manufacturer. All relevant directions of coverage, as described in the April 2011 TCB workshop slides, have been considered in order to determine the worst case activation and deactivation test distances.

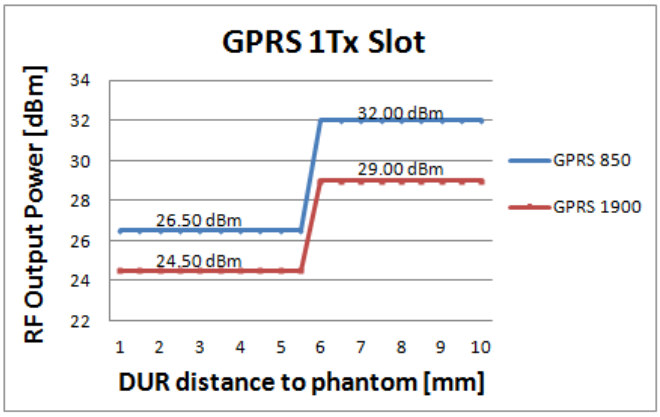


Figure 9-13
GSM 850/1900 Back off Power Reduction Graph - Top Edge at 60° Angle

Note: GSM voice applies the same target power levels as GPRS 1 Tx slot. GSM/GPRS 1 Tx reduction levels are shown in Section 10.3.

Data in Figure 9-13 demonstrates reduced fixed GPRS (GMSK) power levels at a distance of 6mm and less from the top, as shown in Table 9-3.

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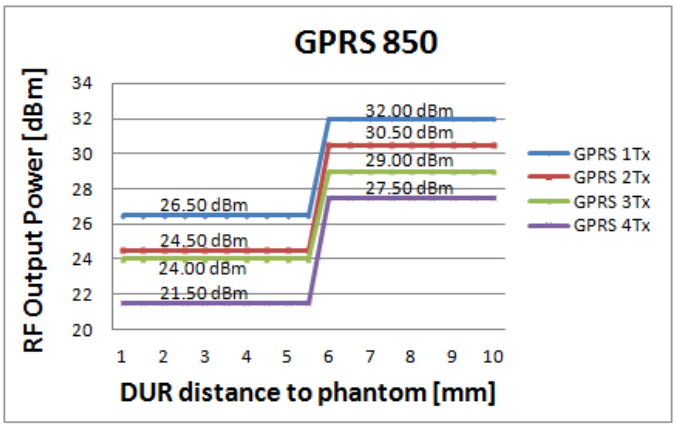


Figure 9-14
GPRS (GMSK) 850 Back off Power Reduction Graph - Top Edge at 60° Angle

Data in Figure 9-14 demonstrates reduced fixed GPRS (GMSK) power levels at a distance of 6mm and less from the top, as shown in Table 9-3.

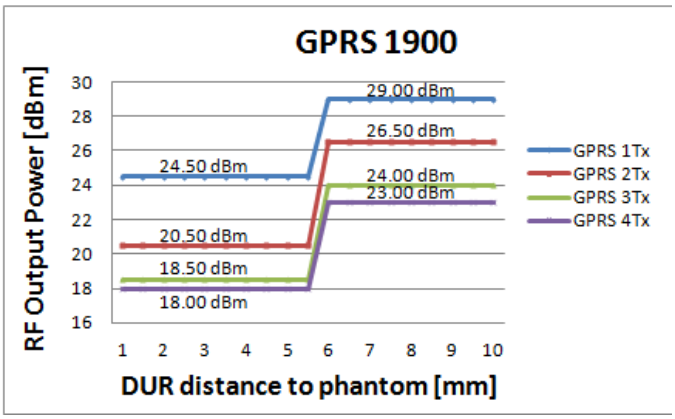


Figure 9-15
GPRS (GMSK) 1900 Back off Power Reduction Graph - Top Edge at 60° Angle

Data in Figure 9-15 demonstrates a demonstrates reduced fixed GPRS (GMSK) power levels at a distance of 6mm and less from the top, as shown in Table 9-3.

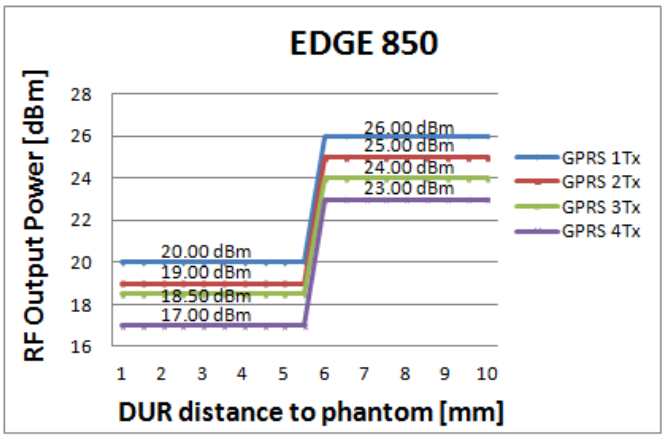


Figure 9-16
EDGE (8-PSK) 850 Back off Power Reduction Graph - Top Edge at 0° Angle

Data in Figure 9-16 demonstrates reduced fixed EDGE (8-PSK) power levels at a distance of 6mm and less from the top edge, as shown in Table 9-3.

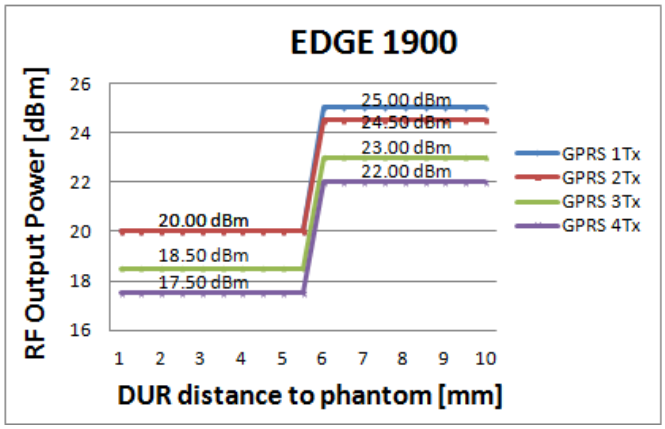
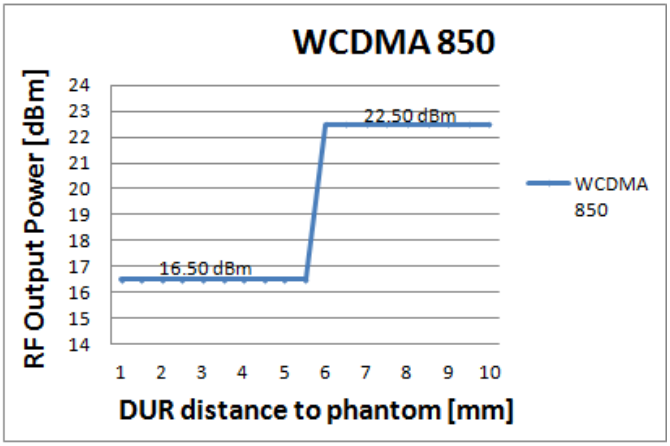


Figure 9-17
EDGE (8-PSK) 1900 Back off Power Reduction Graph - Top Edge at 0° Angle

Data in Figure 9-17 demonstrates reduced fixed EDGE (8-PSK) power levels at a distance of 6mm and less from the top edge, as shown in Table 9-3.



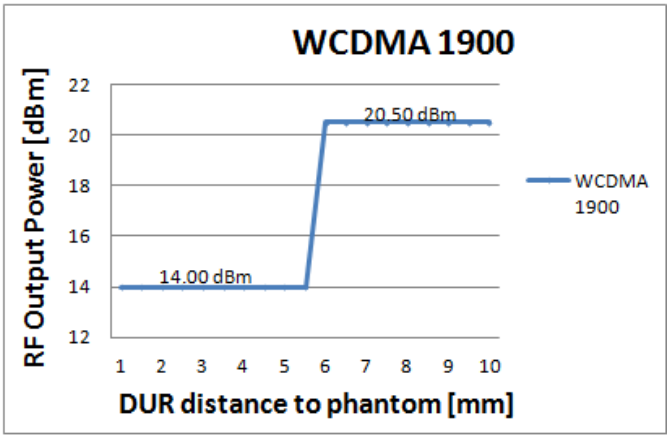


Figure 9-18
WCDMA 850/1900 Back off Power Reduction Graph - Top Edge at 60° Angle

Data in Figure 9-18 demonstrates reduced fixed WCDMA power levels at a distance of 6mm and less from the top, as shown in Table 9-3.

9.5 Method of SAR measurement with Power Reduction

This tablet was tested in accordance with April 2011 TCB workshop notes for proximity sensor and power reduction.

Based on the power-reduction activation vs. distance results for the sensors, the samples representative of the device with the sensors activated (reduced power) was tested for SAR at 0 mm. For the additional SAR measurements with the sensors de-activated (max power, no power reduction) when the device is positioned away from the user, SAR evaluation is required at 10 mm (from the back) and 5mm (from the top edge) distances 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.

10 FCC 3G MEASUREMENT PROCEDURES

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

10.1 Procedures Used to Establish RF Signal for SAR

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. 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

10.2 SAR Measurement Conditions for WCDMA per FCC KDB Pub. 941225

10.2.1 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) is 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.

10.2.2 Body SAR Measurements

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

10.2.3 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.

10.2.4 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.

10.3 RF Conducted Powers

10.3.1 GSM/GPRS/EDGE

Table 10-1
Maximum GSM/GPRS/EDGE Powers (Representing Proximity Sensor Inactive)

		Maximum Burst-Averaged Output Power								
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
Cellular	128	32.48	32.30	30.90	**29.40**	27.90	26.30	25.33	24.35	23.35
	190	32.49	32.35	30.95	**29.42**	27.89	26.35	25.36	24.40	23.40
	251	32.47	32.36	30.95	**29.43**	27.90	26.35	25.35	24.38	23.41
PCS	512	29.29	29.15	**26.78**	24.43	23.20	24.87	24.78	22.96	22.00
	661	29.48	29.20	**26.80**	24.40	23.17	24.90	24.80	22.95	21.96
	810	29.31	29.36	**26.87**	24.50	23.25	25.05	24.95	23.10	22.13

		Calculated Maximum Frame-Averaged Output Power								
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
Cellular	128	23.45	23.27	24.88	**25.14**	24.89	17.27	19.31	20.09	20.34
	190	23.46	23.32	24.93	**25.16**	24.88	17.32	19.34	20.14	20.39
	251	23.44	23.33	24.93	**25.17**	24.89	17.32	19.33	20.12	20.40
PCS	512	20.26	20.12	**20.76**	20.17	20.19	15.84	18.76	18.70	18.99
	661	20.45	20.17	**20.78**	20.14	20.16	15.87	18.78	18.69	18.95
	810	20.28	20.33	**20.85**	20.24	20.24	16.02	18.93	18.84	19.12

Table 10-2
Reduced GSM/GPRS/EDGE Powers (Representing Proximity Sensor Active)

		Maximum Burst-Averaged Output Power								
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
Cellular	128	26.03	25.71	24.20	**23.47**	21.31	19.93	18.51	18.08	16.87
	190	26.57	26.25	24.74	**24.02**	21.85	20.47	19.05	18.62	17.42
	251	26.62	26.30	24.79	**24.07**	21.90	20.49	19.10	18.67	17.47
PCS	512	24.73	**24.77**	20.70	18.77	17.96	20.45	20.22	18.57	17.57
	661	24.81	**24.85**	20.78	18.85	18.04	20.49	20.30	18.65	17.65
	810	24.69	**24.73**	20.66	18.73	17.92	20.41	20.18	18.53	17.53

		Calculated Maximum Frame-Averaged Output Power								
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
Cellular	128	17.00	16.68	18.18	**19.21**	18.30	10.90	12.49	13.82	13.86
	190	17.54	17.22	18.72	**19.76**	18.84	11.44	13.03	14.36	14.41
	251	17.59	17.27	18.77	**19.81**	18.89	11.46	13.08	14.41	14.46
PCS	512	15.70	**15.74**	14.68	14.51	14.95	11.42	14.20	14.31	14.56
	661	15.78	**15.82**	14.76	14.59	15.02	11.46	14.28	14.39	14.64
	810	15.66	**15.70**	14.64	14.47	14.90	11.38	14.16	14.27	14.52

Notes:

- Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
- The bolded GPRS/EDGE modes were selected according to the highest frame-averaged output power table according to KDB 941225 D03.
- GPRS/EDGE (GMSK) output powers were measured with CS1. EDGE (8-PSK) powers were measured with MCS7 on the Base Station Simulator.

GSM Class: B
GPRS Multislot class: 33 (max 4 Tx Uplink slots)
EDGE Multislot class: 33 (max 4 Tx Uplink slots)
DTM Multislot Class: N/A

Table 10-3
GSM/GPRS/EDGE Power Reduction Summary due to the Proximity Sensor

		Maximum Burst-Averaged Output Power								
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Sensor State**	**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**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
Cellular	Inactive	**32.0**	**32.0**	**30.5**	**29.0**	**27.5**	**26.0**	**25.0**	**24.0**	**23.0**
	Active	26.5	26.5	24.5	24.0	21.5	20.0	19.0	18.5	17.0
PCS	Inactive	**29.0**	**29.0**	**26.5**	**24.0**	**23.0**	**25.0**	**24.5**	**23.0**	**22.0**
	Active	24.5	24.5	20.5	18.5	18.0	20.0	20.0	18.5	17.5

10.3.2 HSPA Conducted Powers

Table 10-4
Maximum WCDMA Powers (Representing Proximity Sensor Inactive)

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			PCS Band [dBm]			βc	βd	MPR [dB]
			4132	4183	4233	9262	9400	9538			
99	WCDMA	12.2 kbps RMC	**22.51**	22.39	22.31	**20.41**	20.35	20.32	-	-	-
99		12.2 kbps AMR	22.22	22.23	22.15	20.20	20.11	20.27	-	-	-
6	HSDPA	Subtest 1	**22.56**	22.32	22.26	**20.33**	20.24	20.23	2	15	0
6		Subtest 2	22.34	22.03	22.11	20.02	19.96	19.94	11	15	0
6		Subtest 3	22.11	21.85	21.78	19.70	19.61	19.64	15	8	0.5
6		Subtest 4	21.84	21.60	21.55	19.64	19.60	19.55	15	4	0.5
6	HSUPA	Subtest 1	**21.91**	21.65	21.63	19.78	**19.86**	19.78	10	15	0
6		Subtest 2	20.37	20.25	20.30	18.54	18.63	18.62	6	15	2
6		Subtest 3	21.54	21.28	21.23	19.33	19.41	19.35	15	9	1
6		Subtest 4	20.76	20.52	20.53	18.67	18.85	18.81	2	15	2
6		Subtest 5	21.64	21.44	21.35	19.53	19.60	19.54	14	15	0

Table 10-5
Reduced WCDMA Powers (Representing Proximity Sensor Active)

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			PCS Band [dBm]			βc	βd	MPR [dB]
			4132	4183	4233	9262	9400	9538			
99	WCDMA	12.2 kbps RMC	16.64	16.21	16.81	**14.23**	14.05	14.06	-	-	-
99		12.2 kbps AMR	16.57	16.22	**16.82**	13.97	13.77	13.78	-	-	-
6	HSDPA	Subtest 1	16.75	16.30	**17.00**	**14.20**	13.96	14.09	2	15	0
6		Subtest 2	16.57	15.98	16.74	13.67	13.56	13.31	11	15	0
6		Subtest 3	16.31	15.80	16.53	13.30	13.37	13.06	15	8	0.5
6		Subtest 4	15.96	15.47	16.16	13.08	13.12	12.80	15	4	0.5
6	HSUPA	Subtest 1	16.52	16.04	16.76	**13.26**	13.09	13.06	10	15	0
6		Subtest 2	14.45	14.01	14.55	11.49	11.53	11.29	6	15	2
6		Subtest 3	15.43	15.01	15.62	12.57	12.67	12.34	15	9	1
6		Subtest 4	14.70	14.27	14.82	11.69	11.80	11.59	2	15	2
6		Subtest 5	16.83	16.29	**16.99**	13.11	12.91	12.93	14	15	0

This device is only capable of HSUPA in the uplink (QPSK in the uplink), but is capable of HSPA+ in the downlink. Information about the uplink and downlink capabilities is explained in further detail in the technical description for this model.

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

It is expected by the manufacturer that MPR for some 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. Detailed information is included in the operational description explaining how the MPR is applied for this model.

Table 10-6
WCMDA Power Reduction Summary due to the Proximity Sensor

Mode / Band	Proximity Sensor State	Modulated Average (in dBm)		
		3GPP Rel 99	3GPP Rel 5	3GPP Rel 6
WCDMA Band 2 (1900 MHz)	Inactive	**20.5**		
	Active	14.0		
WCDMA Band 5 (850 MHz)	Inactive	**22.5**		
	Active	16.5		

Figure 10-1
Power Measurement Setup

11 SAR TESTING WITH IEEE 802.11 TRANSMITTERS

Per FCC KDB 248227 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.

11.1 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.

11.2 Frequency Channel Configurations [27]

802.11 a/b/g/n and 5GHz operating modes are tested independently according to the service requirements in each frequency band. 802.11 b/g/n modes are tested on channels 1, 6 and 11. 802.11a/n is tested for UNII operations on channels 36 and 48 in the 5.15-5.25 GHz band; channels 52 and 64 in the 5.25-5.35 GHz band; channels 104, 116, 124 and 136 in the 5.470-5.725 GHz band; and channels 149 and 161 in the 5.8 GHz band. When 5.8 GHz §15.247 is also available, channels 149, 157 and 165 should be tested instead of the UNII channels. These are referred to as the “default test channels”. For 2.4 GHz, 802.11g/n modes were evaluated only if the output power was 0.25 dB higher than the 802.11b mode. For 5 GHz, 802.11n modes were evaluated only if the output power was 0.25 dB higher than the 802.11a mode.

Table 11-1
802.11 Test Channels per FCC Requirements

Mode		GHz	Channel	Turbo Channel	“Default Test Channels” §15.247 802.11b	§15.247 802.11g	UNII	
802.11 b/g		2.412	1		√	∇		
		2.437	6	6	√	∇		
		2.462	11		√	∇		
802.11a	UNII	5.18	36				√	
		5.20	40	42 (5.21 GHz)				*
		5.22	44					*
		5.24	48	50 (5.25 GHz)			√	
		5.26	52				√	
		5.28	56	58 (5.29 GHz)				*
		5.30	60					*
		5.32	64				√	
		5.500	100	Unknown				*
		5.520	104				√	
		5.540	108					*
		5.560	112					*
		5.580	116				√	
		5.600	120					*
		5.620	124				√	
		5.640	128					*
		5.660	132					*
		5.680	136				√	
		5.700	140					*
	UNII or §15.247	5.745	149		√		√	
		5.765	153	152 (5.76 GHz)		*		*
		5.785	157		√			*
		5.805	161	160 (5.80 GHz)		*	√	
	§15.247	5.825	165		√			

Table 11-2
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	12.60	12.42	12.42	12.40
802.11b	2437	6	11.72	11.86	11.76	11.85
802.11b	2462	11	11.90	11.88	11.87	11.89

Table 11-3
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	12.93	12.94	12.96	12.99	12.94	12.86	12.95	12.89
802.11g	2437	6	12.48	12.49	12.44	12.51	12.43	12.41	12.46	12.37
802.11g	2462	11	13.03	13.01	12.95	12.96	12.89	12.85	12.89	12.87

Table 11-4
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	11.80	11.69	11.79	11.73	11.74	11.79	11.66	11.80
802.11n	2437	6	11.15	11.28	11.34	11.38	11.36	11.27	11.36	11.33
802.11n	2462	11	11.93	11.73	11.92	11.95	11.95	11.88	11.92	11.90

Table 11-5
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	10.35	10.48	10.45	10.53	10.42	10.31	10.22	10.32
802.11a	5200	40	10.71	10.71	10.66	10.64	10.71	10.56	10.46	10.61
802.11a	5220	44	10.45	10.46	10.43	10.49	10.38	10.31	10.32	10.33
802.11a	5240	48	10.75	10.71	10.63	10.77	10.67	10.62	10.75	10.62
802.11a	5260	52	10.51	10.45	10.51	10.52	10.42	10.48	10.32	10.29
802.11a	5280	56	10.68	10.51	10.40	10.55	10.46	10.34	10.42	10.48
802.11a	5300	60	10.83	10.95	11.08	11.03	11.04	10.98	11.00	10.93
802.11a	5320	64	11.33	11.43	11.47	11.44	11.38	11.33	11.43	11.37
802.11a	5500	100	10.14	10.06	10.13	10.12	9.52	9.54	10.25	10.17
802.11a	5520	104	11.06	10.74	10.77	10.96	10.92	10.83	10.84	10.94
802.11a	5540	108	10.81	10.68	10.60	10.69	10.58	10.65	10.70	10.56
802.11a	5560	112	10.73	10.73	10.70	10.69	10.69	10.77	10.76	10.77
802.11a	5580	116	10.96	10.94	10.92	10.91	10.82	10.83	10.84	10.85
802.11a	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5660	132	10.78	10.60	10.66	10.74	10.71	10.75	10.58	10.65
802.11a	5680	136	10.45	10.58	10.59	10.63	10.55	10.52	10.64	10.45
802.11a	5700	140	10.64	10.56	10.59	10.58	10.55	10.50	10.63	10.61
802.11a	5745	149	11.27	11.12	11.11	11.33	11.27	11.12	11.25	11.19
802.11a	5765	153	11.28	11.24	11.20	11.37	11.26	11.14	11.27	11.19
802.11a	5785	157	11.20	11.26	11.18	11.23	11.06	11.05	11.14	11.12
802.11a	5805	161	11.09	11.13	11.15	11.30	11.20	11.16	11.19	11.15
802.11a	5825	165	11.20	11.19	11.02	11.23	10.67	10.62	11.20	11.14

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

Table 11-6
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	5180	36	9.29	9.00	9.02	9.47	9.46	9.45	9.44	9.47
802.11n	5200	40	9.52	9.42	9.55	9.56	9.55	9.56	9.61	9.52
802.11n	5220	44	9.30	9.21	9.36	9.27	9.32	9.29	9.35	9.30
802.11n	5240	48	9.39	9.29	9.34	9.34	9.41	9.42	9.50	9.45
802.11n	5260	52	9.34	9.27	9.33	9.32	9.34	9.32	9.37	9.32
802.11n	5280	56	9.44	9.48	9.54	9.55	9.40	9.41	9.11	9.12
802.11n	5300	60	9.80	9.78	9.86	9.80	9.35	9.40	9.38	9.40
802.11n	5320	64	9.65	9.62	9.72	9.73	9.68	9.69	9.76	9.73
802.11n	5500	100	9.35	9.22	9.33	9.30	9.27	9.28	9.37	9.36
802.11n	5520	104	9.30	9.28	9.33	9.34	9.41	9.38	9.35	9.28
802.11n	5540	108	9.31	9.30	9.29	9.25	9.21	9.19	9.13	9.20
802.11n	5560	112	9.32	9.25	9.35	9.33	9.35	9.29	9.39	9.29
802.11n	5580	116	9.68	9.65	9.75	9.87	9.75	9.74	9.76	9.76
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	9.31	9.23	9.38	9.32	9.35	9.32	9.28	9.25
802.11n	5680	136	9.28	9.20	9.33	9.33	9.32	9.31	9.41	9.29
802.11n	5700	140	9.33	9.24	9.38	9.40	9.36	9.51	9.47	9.38
802.11n	5745	149	9.71	9.65	9.73	9.74	9.79	9.75	9.85	9.48
802.11n	5765	153	9.60	9.61	9.76	9.78	9.75	9.75	9.78	9.71
802.11n	5785	157	10.05	10.03	10.02	10.16	10.09	10.15	10.07	10.00
802.11n	5805	161	10.07	10.03	10.17	10.10	10.09	10.11	10.11	10.02
802.11n	5825	165	10.07	9.91	10.05	10.08	10.08	10.13	10.03	10.02

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

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

- For 2.4 GHz modes, according to KDB 447498 1. b) SAR testing was not required because the maximum average output power was not greater than 60/f.
- For 5 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11a were selected for SAR evaluation. 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) 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.
- Per FCC Publication 248227 D01 when the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is >1.6 W/kg or the 1g averaged SAR is >0.8 W/kg, SAR testing was also performed in the other default or corresponding required test channels.
- The underlined data rate and channel above were tested for SAR.
- There is no power reduction for WIFI.

Figure 11-1
Power Measurement Setup

12 SYSTEM VERIFICATION

12.1 Tissue Verification

Table 12-1
Measured Tissue Properties

Tissue Type	Calibrated for Tests Performed on:	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
835B	12/19/2011	22.2	820	0.965	54.89	0.969	55.284	-0.41%	-0.71%
			835	0.979	54.79	0.970	55.200	0.93%	-0.74%
			850	0.993	54.69	0.988	55.154	0.51%	-0.84%
835B	01/19/2012	21.9	820	0.963	54.41	0.969	55.284	-0.62%	-1.58%
			835	0.981	54.22	0.970	55.200	1.13%	-1.78%
			850	0.996	54.10	0.988	55.154	0.81%	-1.91%
1900B	12/15/2011	20.6	1850	1.501	53.19	1.520	53.300	-1.25%	-0.21%
			1880	1.542	53.04	1.520	53.300	1.45%	-0.49%
			1910	1.574	52.82	1.520	53.300	3.55%	-0.90%
1900B	01/19/2012	20.6	1850	1.501	53.19	1.520	53.300	-1.25%	-0.21%
			1880	1.542	53.04	1.520	53.300	1.45%	-0.49%
			1910	1.574	52.82	1.520	53.300	3.55%	-0.90%
5200B - 5800B	12/12/2011	20.7	5200	5.328	47.80	5.299	49.014	0.55%	-2.48%
			5240	5.425	47.58	5.346	48.933	1.48%	-2.77%
			5280	5.453	47.46	5.393	48.879	1.11%	-2.90%
			5300	5.484	47.44	5.416	48.851	1.26%	-2.89%
			5320	5.481	47.30	5.439	48.607	0.77%	-2.69%
			5500	5.779	46.87	5.650	48.580	2.28%	-3.52%
			5520	5.825	46.89	5.673	48.553	2.68%	-3.43%
			5580	5.974	46.78	5.743	48.471	4.02%	-3.49%
			5660	6.085	46.40	5.837	48.363	4.25%	-4.06%
			5765	6.228	46.18	5.959	48.220	4.51%	-4.23%
			5785	6.255	46.13	5.982	48.242	4.56%	-4.38%
			5800	6.297	46.03	6.000	48.200	4.95%	-4.50%
			5825	6.314	45.98	6.029	48.132	4.73%	-4.47%

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

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.

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

12.2 Measurement Procedure for Tissue verification

1) The network analyzer and probe system was configured and calibrated.
2) The probe was immersed in the sample which was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
3) The complex admittance with respect to the probe aperture was measured

4) The complex relative permittivity , for example from the below equation (Pournaropoulos and Misra):

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

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 $j = \sqrt{-1}$.

12.3 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 12-2
System Verification Results

System Verification TARGET & MEASURED											
Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Dipole SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	Deviation (%)
835	Body	12/19/2011	21.6	20.5	0.100	4d047	3258	0.991	9.850	9.910	0.61%
835	Body	01/19/2012	21.6	19.9	0.100	4d119	3258	0.973	9.540	9.730	1.99%
1900	Body	12/15/2011	21.4	21.3	0.100	502	3209	4.38	41.100	43.800	6.57%
1900	Body	01/19/2012	21.9	20.3	0.100	502	3209	4.3	41.100	43.000	4.62%
5200	Body	12/12/2011	21.3	19.6	0.100	1057	3561	8.25	77.700	82.500	6.18%
5500	Body	12/12/2011	21.5	19.8	0.100	1057	3561	8.54	84.400	85.400	1.18%
5800	Body	12/12/2011	21.8	20.3	0.100	1057	3561	7.64	75.000	76.400	1.87%

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.

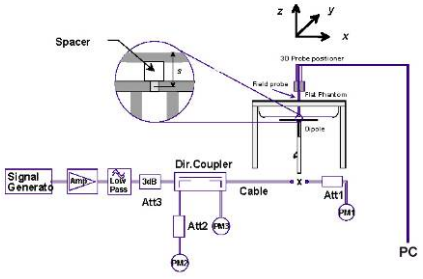


Figure 12-1
System Verification Setup Diagram

Figure 12-2
System Verification Setup Photo

13 SAR DATA SUMMARY

13.1 Body SAR Data

Table 13-1
GSM Voice Body SAR Results

MEASUREMENT RESULTS											
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Target Power [dBm]	Spacing	Serial Number	# of GSM Slots	Side	SAR (1g)
MHz	Ch.										(W/kg)
836.60	190	GSM 850	GSM	26.57	0.13	26.5	0.0 cm	3	1	back*	0.424
836.60	190	GSM 850	GSM	32.49	-0.05	32.0	1.0 cm	4	1	back	0.189
836.60	190	GSM 850	GSM	26.57	0.09	26.5	0.0 cm	3	1	top*	0.163
836.60	190	GSM 850	GSM	32.49	0.02	32.0	0.5 cm	4	1	top	0.188
836.60	190	GSM 850	GSM	32.49	0.22	32.0	0.0 cm	4	1	right	0.112
1850.20	512	GSM 1900	GSM	24.73	0.00	24.5	0.0 cm	3	1	back*	1.040
1880.00	661	GSM 1900	GSM	24.81	-0.04	24.5	0.0 cm	3	1	back*	1.090
1909.80	810	GSM 1900	GSM	24.69	-0.03	24.5	0.0 cm	3	1	back*	1.050
1880.00	661	GSM 1900	GSM	29.48	0.02	29.0	1.0 cm	4	1	back	0.393
1880.00	661	GSM 1900	GSM	24.81	-0.01	24.5	0.0 cm	3	1	top*	0.609
1880.00	661	GSM 1900	GSM	29.48	0.05	29.0	0.5 cm	4	1	top	0.706
1880.00	661	GSM 1900	GSM	29.48	0.03	29.0	0.0 cm	4	1	right	0.067
ANSI / IEEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Body** **1.6 W/kg (mW/g)** averaged over 1 gram				

Table 13-2
GPRS Body SAR Results

MEASUREMENT RESULTS											
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Target Power [dBm]	Spacing	Serial Number	# of GPRS Slots	Side	SAR (1g)
MHz	Ch.										(W/kg)
836.60	190	GSM 850	GPRS	24.02	-0.08	24.0	0.0 cm	3	3	back*	0.588
836.60	190	GSM 850	GPRS	29.42	-0.06	29.0	1.0 cm	4	3	back	0.288
836.60	190	GSM 850	GPRS	24.02	0.01	24.0	0.0 cm	3	3	top*	0.238
836.60	190	GSM 850	GPRS	29.42	0.03	29.0	0.5 cm	4	3	top	0.305
836.60	190	GSM 850	GPRS	29.42	-0.10	29.0	0.0 cm	4	3	right	0.175
1850.20	512	GSM 1900	GPRS	24.77	0.04	24.5	0.0 cm	3	1	back*	1.100
1880.00	661	GSM 1900	GPRS	24.85	-0.02	25.5	0.0 cm	3	1	back*	1.070
1909.80	810	GSM 1900	GPRS	24.73	0.03	24.5	0.0 cm	3	1	back*	1.080
1880.00	661	GSM 1900	GPRS	26.80	-0.08	26.5	1.0 cm	4	2	back	0.485
1880.00	661	GSM 1900	GPRS	24.85	-0.05	24.5	0.0 cm	3	1	top*	0.605
1850.20	512	GSM 1900	GPRS	26.78	0.10	26.5	0.5 cm	4	2	top	0.847
1880.00	661	GSM 1900	GPRS	26.80	-0.01	26.5	0.5 cm	4	2	top	0.808
1909.80	810	GSM 1900	GPRS	26.87	0.01	26.5	0.5 cm	4	2	top	0.887
1880.00	661	GSM 1900	GPRS	26.80	0.05	26.5	0.0 cm	4	2	right	0.067
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram				

Table 13-3
WCDMA Body SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Target Power [dBm]	Spacing	Serial Number	Side	SAR (1g)
MHz	Ch.									(W/kg)
846.60	4233	WCDMA 850	RMC	16.81	-0.03	16.5	0.0 cm	3	back*	0.418
836.60	4183	WCDMA 850	RMC	22.39	-0.06	22.5	1.0 cm	4	back	0.271
846.60	4233	WCDMA 850	RMC	16.81	0.03	16.5	0.0 cm	3	top*	0.476
836.60	4183	WCDMA 850	RMC	22.39	-0.11	22.5	0.5 cm	4	top	0.263
836.60	4183	WCDMA 850	RMC	22.39	0.19	22.5	0.0 cm	4	right	0.160
1852.40	9262	WCDMA 1900	RMC	14.23	0.20	14.0	0.0 cm	3	back*	1.040
1880.00	9400	WCDMA 1900	RMC	14.05	0.01	14.0	0.0 cm	3	back*	0.999
1907.60	9538	WCDMA 1900	RMC	14.06	0.03	14.0	0.0 cm	3	back*	1.000
1880.00	9400	WCDMA 1900	RMC	20.35	-0.16	20.5	1.0 cm	4	back	0.532
1880.00	9400	WCDMA 1900	RMC	14.05	0.05	14.0	0.0 cm	3	top*	0.492
1852.40	9262	WCDMA 1900	RMC	20.41	0.05	20.5	0.5 cm	4	top	0.998
1880.00	9400	WCDMA 1900	RMC	20.35	0.04	20.5	0.5 cm	4	top	0.926
1907.60	9538	WCDMA 1900	RMC	20.32	0.06	20.5	0.5 cm	4	top	0.924
1880.00	9400	WCDMA 1900	RMC	20.35	-0.03	20.5	0.0 cm	4	right	0.080
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**							**Body** **1.6 W/kg (mW/g)** averaged over 1 gram			

Table 13-4
5 GHz Body SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Serial Number	Data Rate (Mbps)	Side	SAR (1g)
MHz	Ch.									(W/kg)
5765	153	IEEE 802.11a	OFDM	11.28	0.21	0.0 cm	2	6	back	0.709
5785	157	IEEE 802.11a	OFDM	11.20	0.10	0.0 cm	2	6	back	0.554
5825	165	IEEE 802.11a	OFDM	11.20	0.15	0.0 cm	2	6	back	0.705
5765	153	IEEE 802.11a	OFDM	11.28	-0.12	0.0 cm	2	6	top	0.669
5785	157	IEEE 802.11a	OFDM	11.20	0.13	0.0 cm	2	6	top	0.827
5825	165	IEEE 802.11a	OFDM	11.20	0.01	0.0 cm	2	6	top	0.720
5765	153	IEEE 802.11a	OFDM	11.28	0.11	0.0 cm	2	6	left	0.045
5200	40	IEEE 802.11a	OFDM	10.71	0.13	0.0 cm	2	6	back	0.478
5240	48	IEEE 802.11a	OFDM	10.75	0.05	0.0 cm	2	6	back	0.504
5200	40	IEEE 802.11a	OFDM	10.71	-0.01	0.0 cm	2	6	top	0.642
5240	48	IEEE 802.11a	OFDM	10.75	0.08	0.0 cm	2	6	top	0.661
5240	48	IEEE 802.11a	OFDM	10.75	0.11	0.0 cm	2	6	left	0.037
5280	56	IEEE 802.11a	OFDM	10.68	0.00	0.0 cm	2	6	back	0.489
5320	64	IEEE 802.11a	OFDM	11.33	0.20	0.0 cm	2	6	back	0.627
5280	56	IEEE 802.11a	OFDM	10.68	-0.04	0.0 cm	2	6	top	0.619
5320	64	IEEE 802.11a	OFDM	11.33	0.21	0.0 cm	2	6	top	0.791
5320	64	IEEE 802.11a	OFDM	11.33	0.02	0.0 cm	2	6	left	0.046
5520	104	IEEE 802.11a	OFDM	11.06	0.13	0.0 cm	2	6	back	0.578
5580	116	IEEE 802.11a	OFDM	10.96	0.14	0.0 cm	2	6	back	0.666
5660	132	IEEE 802.11a	OFDM	10.78	0.18	0.0 cm	2	6	back	0.681
5520	104	IEEE 802.11a	OFDM	11.06	0.12	0.0 cm	2	6	top	0.638
5580	116	IEEE 802.11a	OFDM	10.96	0.12	0.0 cm	2	6	top	0.687
5660	132	IEEE 802.11a	OFDM	10.78	0.04	0.0 cm	2	6	top	0.808
5520	104	IEEE 802.11a	OFDM	11.06	-0.06	0.0 cm	2	6	left	0.035
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						**Body 1.6 W/kg (mW/g) averaged over 1 gram**				

13.2 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. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001].
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.
5. 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, DAE and probe as the SAR tests in the same time period.
6. Asterisk (*) denotes power reduction activated.
7. Per KDB publication 447498 4) b) i) the back side is required to be tested touching the flat phantom.
8. This device is capable of multiple display orientations supporting both portrait and landscape positions. Therefore per KDB publication 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 publication 447498 4) b) ii) (2), for each antenna, SAR is only required for the edge with the most conservative exposure condition.

GSM Notes:

1. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (June 2001) and Public Notice DA-02-1438, if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
2. Justification for reduced test configurations per KDB Publication 941225 D03: The source-based time-averaged output power was evaluated for all multi-slot operations. In addition to the worst-case reported, all source-based time-averaged powers within 4% of the worst-case were additionally included in the evaluation.
3. Per April 2011 TCB-FCC Workshop Notes, in addition to the 0 mm test distance required for tablet devices under KDB 447498, a conservative additional test distance of 10 mm from the back and 5 mm from the top edge were tested for SAR at maximum output power with the sensor deactivated. See Section 9.4 for more details.
4. This device does not use an antenna located on the corner of the device, therefore vertex SAR was not measured

WCDMA Notes:

1. WCDMA mode was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01. HSPA SAR for the body 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 October 2010 TCB Workshop, the mid. channel may be used as a default test channel when the output power deviation across the channels is <0.5 dB, otherwise the maximum output power must be used. If the SAR measured at for each test configuration for the default channel is at least 3.0 dB lower than the SAR limit, testing at the other channels is optional for such test configuration(s).
3. Per April 2011 TCB-FCC Workshop Notes, in addition to the 0 mm test distance required for tablet devices under KDB 447498, a conservative additional test distance of 10 mm from the back and 5 mm from the top edge were tested for SAR at maximum output power with the sensor deactivated. See Section 9.4 for more details.
4. This device does not use an antenna located on the corner of the device, therefore vertex SAR was not measured.

WLAN Notes:

1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Workshop Notes: 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) 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.
2. There is no power reduction for WIFI.
3. Per FCC Publication 248227 D01 when the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is >1.6 W/kg or the 1g averaged SAR is >0.8 W/kg, SAR testing was also performed in the other default or corresponding required test channels.
4. For 2.4 GHz modes, according to KDB 447498 4) b), SAR testing was not required because the maximum average output power was not greater than 60/f.

14 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/10/2011	Annual	10/10/2012	3613A00315
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/21/2011	Annual	4/21/2012	JP38020182
Agilent	E5515C	Wireless Communications Test Set	10/10/2011	Annual	10/10/2012	GB46110872
Agilent	E5515C	Wireless Communications Test Set	7/6/2011	Annual	7/6/2012	GB41450275
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/8/2011	Annual	4/8/2012	MY45470194
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/12/2011	Annual	10/12/2012	1833460
Gigatronics	8651A	Universal Power Meter	10/12/2011	Annual	10/12/2012	8650319
Index SAR	IXTL-010	Dielectric Measurement Kit	N/A		N/A	N/A
Index SAR	IXTL-030	30MM TEM line for 6 GHz	N/A		N/A	N/A
Pasternack	PE2208-6	Bidirectional Coupler	CBT		N/A	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT		N/A	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	6/1/2011	Annual	6/1/2012	833855/0010
Rohde & Schwarz	CMU200	Base Station Simulator	4/19/2011	Annual	4/19/2012	107826
Rohde & Schwarz	NRVD	Dual Channel Power Meter	4/8/2011	Biennial	4/8/2013	101695
SPEAG	D1900V2	1900 MHz SAR Dipole	2/17/2011	Annual	2/17/2012	502
SPEAG	D5GHzV2	5 GHz SAR Dipole	2/11/2011	Annual	2/11/2012	1057
SPEAG	D835V2	835 MHz SAR Dipole	2/9/2011	Annual	2/9/2012	4d047
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/20/2011	Annual	4/20/2012	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/21/2011	Annual	2/21/2012	649
SPEAG	EX3DV4	SAR Probe	7/27/2011	Annual	7/27/2012	3561
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/19/2011	Annual	5/19/2012	859
SPEAG	ES3DV3	SAR Probe	4/18/2011	Annual	4/18/2012	3209
Rohde & Schwarz	SMIQ03B	Signal Generator	4/6/2011	Annual	4/6/2012	DE27259
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5318
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5442
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	1190013
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	98150041
Agilent	8648D	Signal Generator	4/5/2011	Annual	4/5/2012	3629U00687
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	1070030
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5821
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	8013
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5605
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	2400
Agilent	E5515C	Wireless Communications Test Set	7/6/2011	Annual	7/6/2012	GB43304447
Agilent	E5515C	Wireless Communications Tester	4/21/2011	Annual	4/21/2012	US41140256
Anritsu	MA2411B	Pulse Sensor	10/13/2011	Annual	10/13/2012	1027293
Anritsu	ML2495A	Power Meter	10/13/2011	Annual	10/13/2012	1039008
Amplifier Research	5S1G4	5W, 800MHz-4.2GHz	N/A		N/A	21910
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT		N/A	N/A
Agilent	E5515C	Wireless Communications Test Set	2/8/2011	Annual	2/8/2012	GB45360985
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/7/2011	Annual	10/7/2012	103962
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331322
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331323
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331330
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331332
Control Company	61220-416	Long-Stem Thermometer	3/16/2011	Biennial	3/16/2013	111391601
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286445
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286460
VWR	36934-158	Wall-Mounted Thermometer	5/26/2010	Biennial	5/26/2012	101718589
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286454
VWR	36934-158	Wall-Mounted Thermometer	2/26/2010	Biennial	2/26/2012	101536273
SPEAG	ES3DV3	SAR Probe	4/8/2011	Annual	4/8/2012	3258
MiniCircuits	SLP-2400+	Low Pass Filter	CBT		N/A	R8979500903
Narda	4772-3	Attenuator (3dB)	CBT		N/A	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT		N/A	120
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT		N/A	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT		N/A	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/8/2011	Annual	7/8/2012	1272
SPEAG	D1900V2	1900 MHz SAR Dipole	7/11/2011	Annual	7/11/2012	5d141
SPEAG	D835V2	835 MHz SAR Dipole	12/21/2011	Annual	12/21/2012	4d119
MiniCircuits	VLF-6000+	Low Pass Filter	CBT			N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT			N/A

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

15 MEASUREMENT UNCERTAINTIES

Applicable for frequencies less than 3 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	6.0	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 5-6 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

16 CONCLUSION

16.1 Measurement Conclusion

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

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

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APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 3

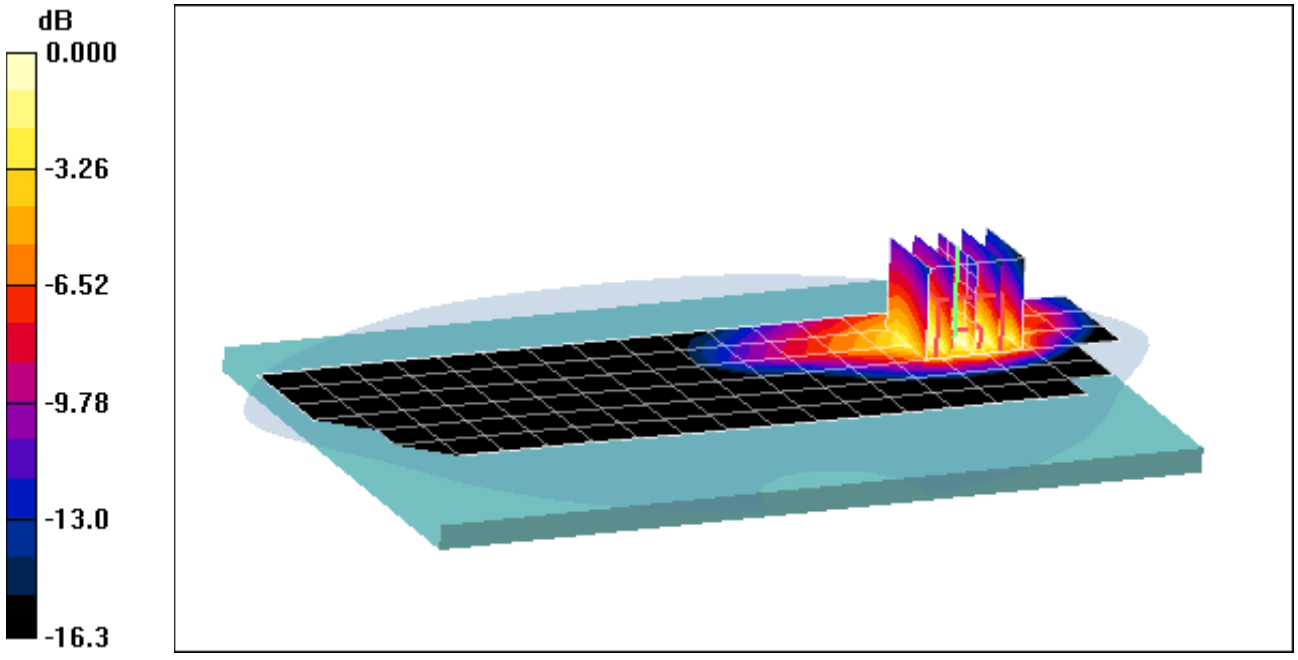
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.983 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-19-2012; Ambient Temp: 21.6°C; Tissue Temp: 19.9°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GSM 850, Body SAR, Back Side, Mid.ch

Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.7 V/m; Power Drift = 0.132 dB
Peak SAR (extrapolated) = 0.794 W/kg
SAR(1 g) = 0.424 mW/g; SAR(10 g) = 0.235 mW/g



0 dB = 0.448mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

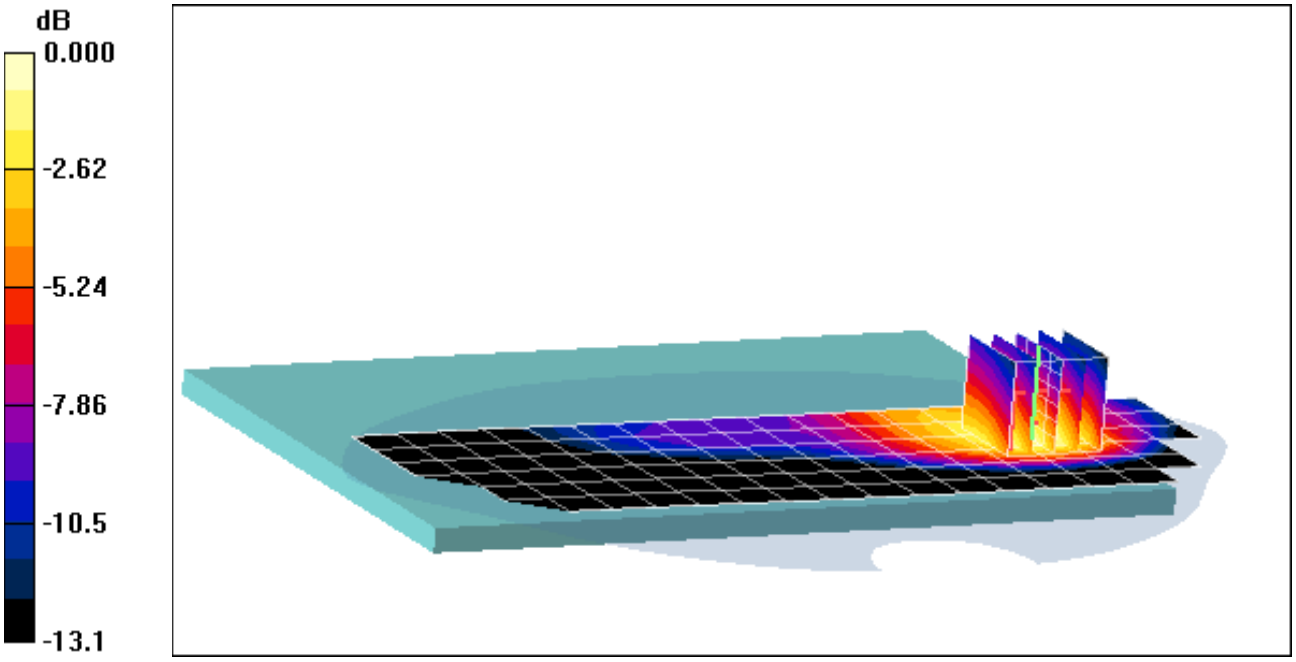
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.98$ mho/m; $\varepsilon_r = 54.8$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 12-19-2011; Ambient Temp: 21.6°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.4 V/m; Power Drift = -0.046 dB
Peak SAR (extrapolated) = 0.291 W/kg
SAR(1 g) = 0.189 mW/g; SAR(10 g) = 0.118 mW/g



0 dB = 0.206mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 3

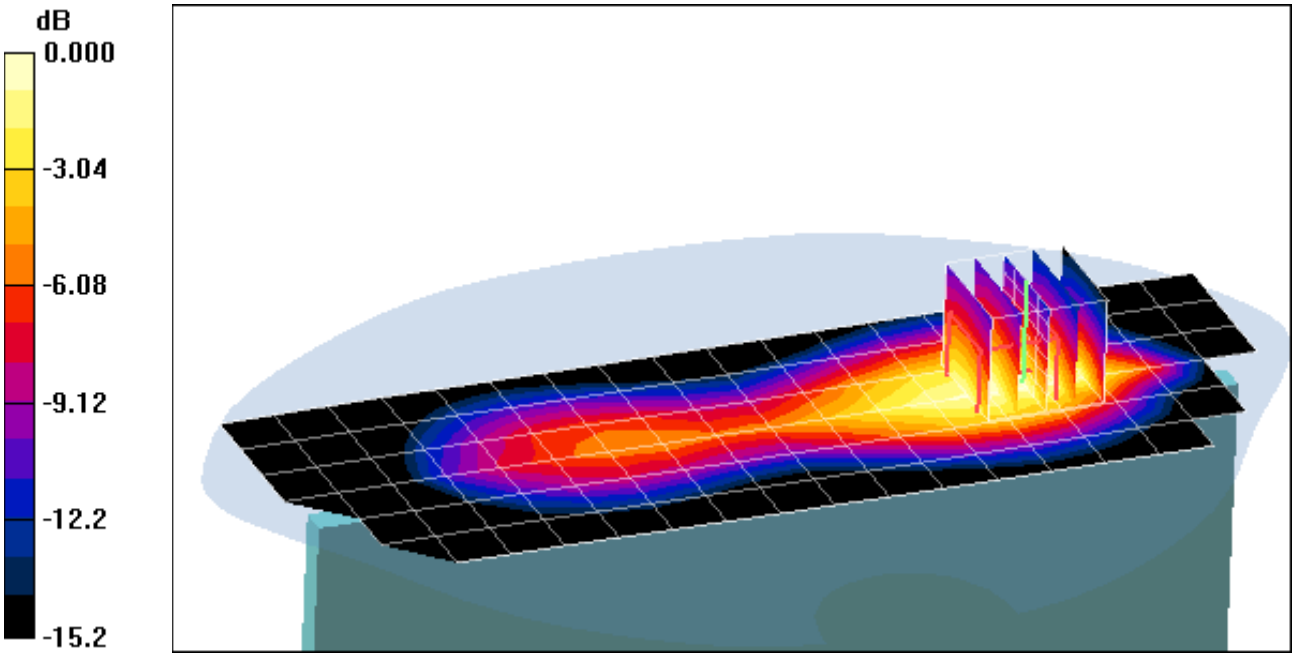
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.983 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-19-2012; Ambient Temp: 21.6°C; Tissue Temp: 19.9°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GSM 850, Body SAR, Top Side, Mid.ch

Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.5 V/m; Power Drift = 0.088 dB
Peak SAR (extrapolated) = 0.278 W/kg
SAR(1 g) = 0.163 mW/g; SAR(10 g) = 0.098 mW/g



0 dB = 0.183mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

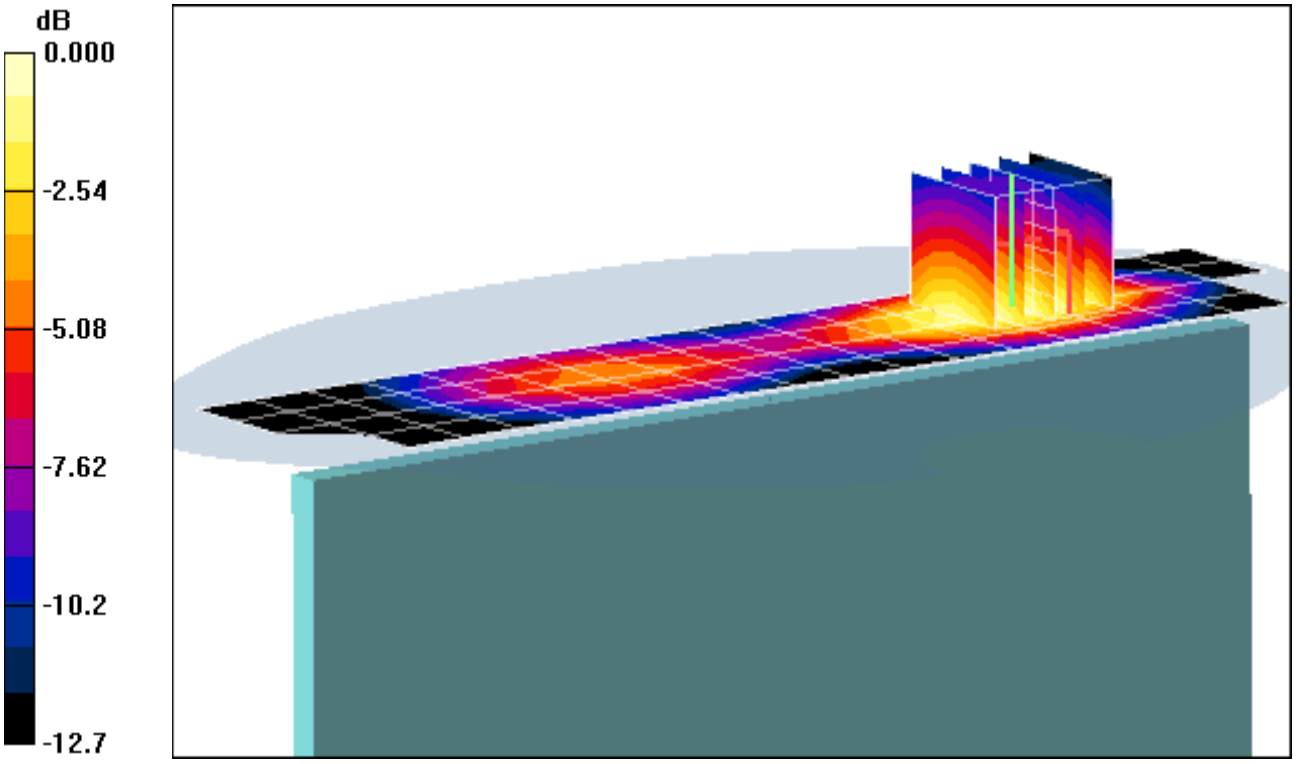
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.98 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.5 cm

Test Date: 12-19-2011; Ambient Temp: 21.6 °C; Tissue Temp: 20.5 °C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GSM 850, Body SAR, Top Edge, Mid.ch

Area Scan (5x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.1 V/m; Power Drift = 0.018 dB
Peak SAR (extrapolated) = 0.286 W/kg
SAR(1 g) = 0.188 mW/g; SAR(10 g) = 0.121 mW/g



0 dB = 0.202mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

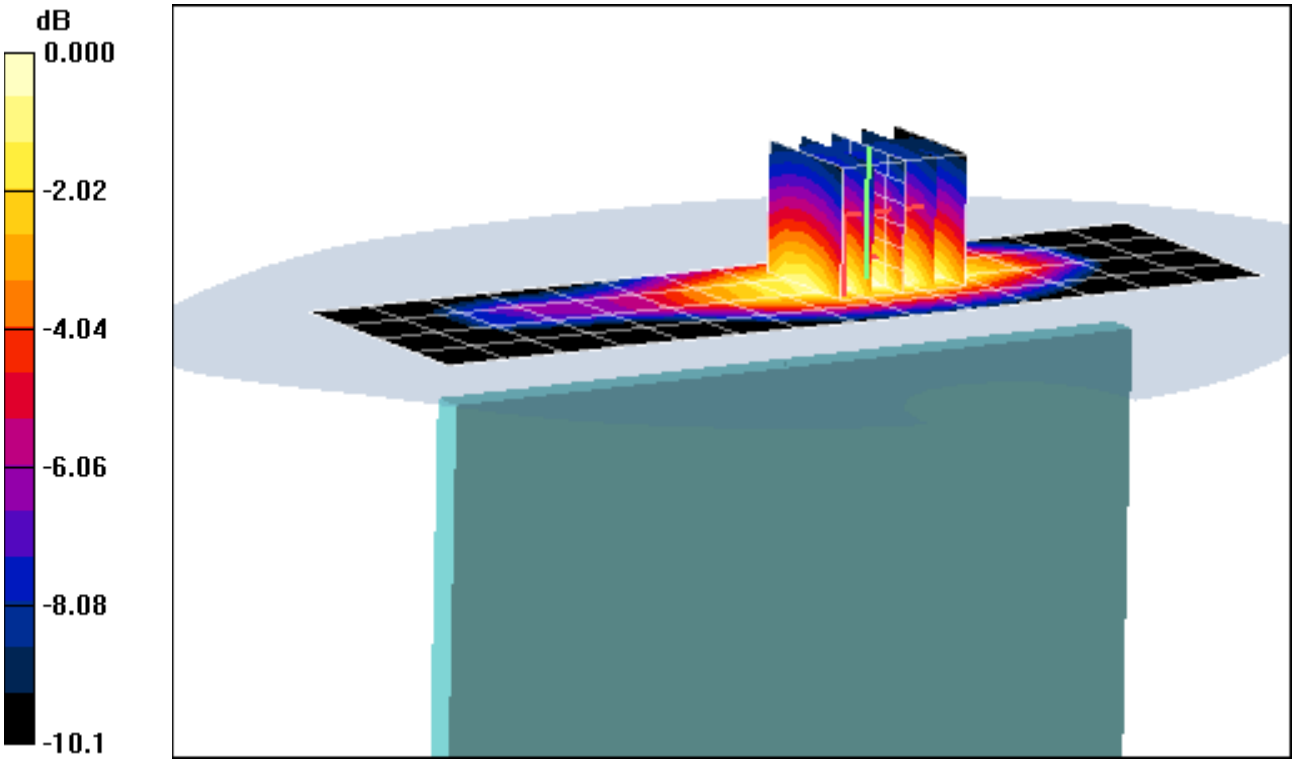
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.98$ mho/m; $\varepsilon_r = 54.8$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-19-2011; Ambient Temp: 21.6 °C; Tissue Temp: 20.5 °C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GSM 850, Body SAR, Right Edge, Mid.ch

Area Scan (5x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.6 V/m; Power Drift = 0.216 dB
Peak SAR (extrapolated) = 0.163 W/kg
SAR(1 g) = 0.112 mW/g; SAR(10 g) = 0.076 mW/g



0 dB = 0.121mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 3

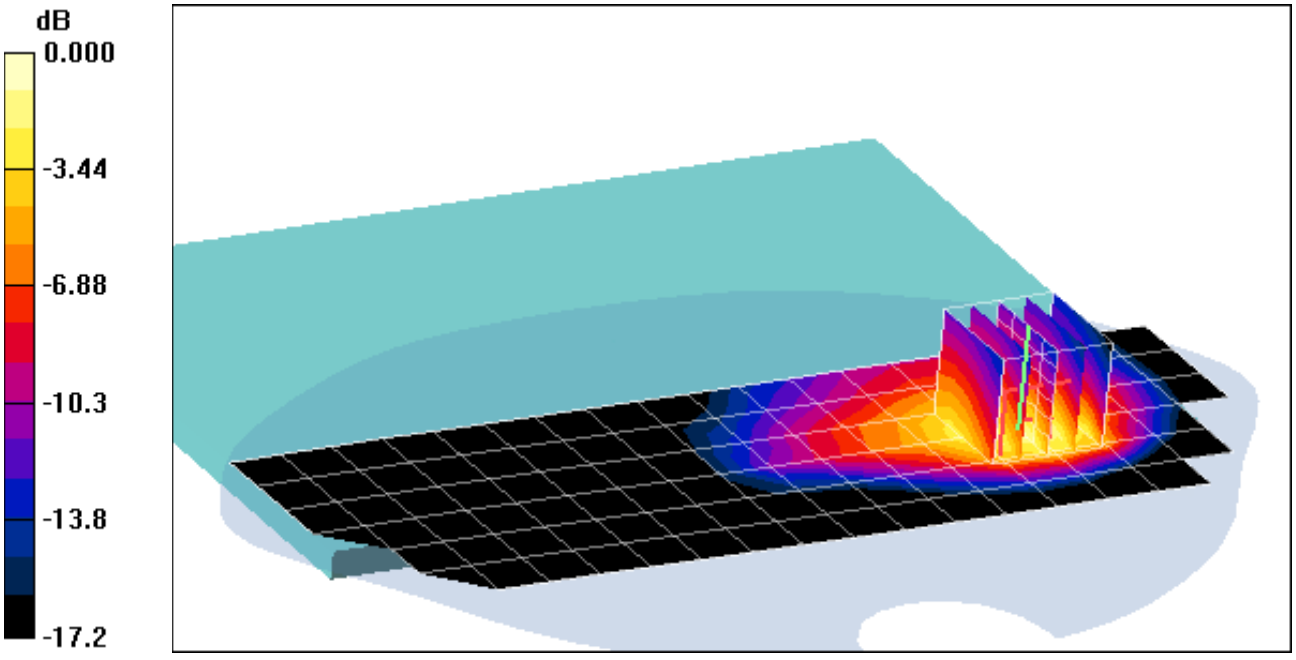
Communication System: GSM850 GPRS; 3 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:2.76
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.983$ mho/m; $\varepsilon_r = 54.2$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-19-2012; Ambient Temp: 21.6°C; Tissue Temp: 19.9°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GPRS 850, Body SAR, Back side, Mid.ch, 3 Tx Slots

Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.1 V/m; Power Drift = -0.079 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.588 mW/g; SAR(10 g) = 0.325 mW/g



0 dB = 0.675mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

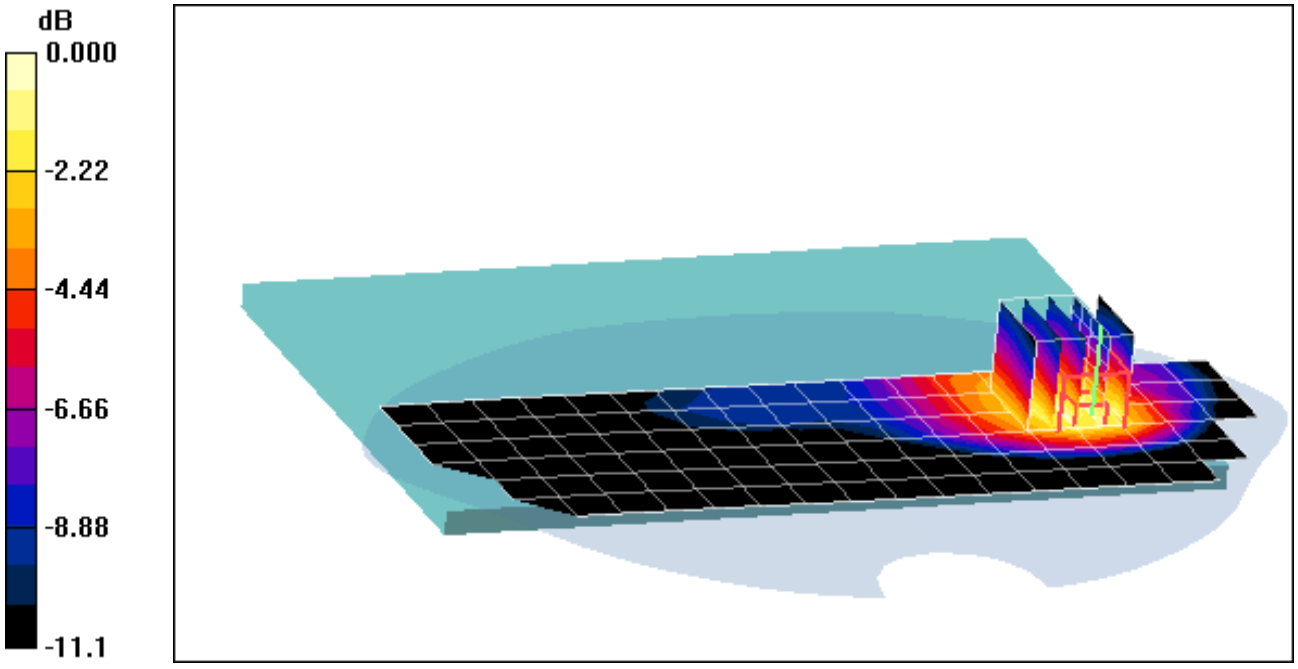
Communication System: GSM850 GPRS; 3 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.76
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.98 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-19-2011; Ambient Temp: 21.6°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GPRS 850, Body SAR, Back side, Mid.ch, 3 Tx Slots

Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.7 V/m; Power Drift = -0.061 dB
Peak SAR (extrapolated) = 0.435 W/kg
SAR(1 g) = 0.288 mW/g; SAR(10 g) = 0.183 mW/g



0 dB = 0.314mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; 3

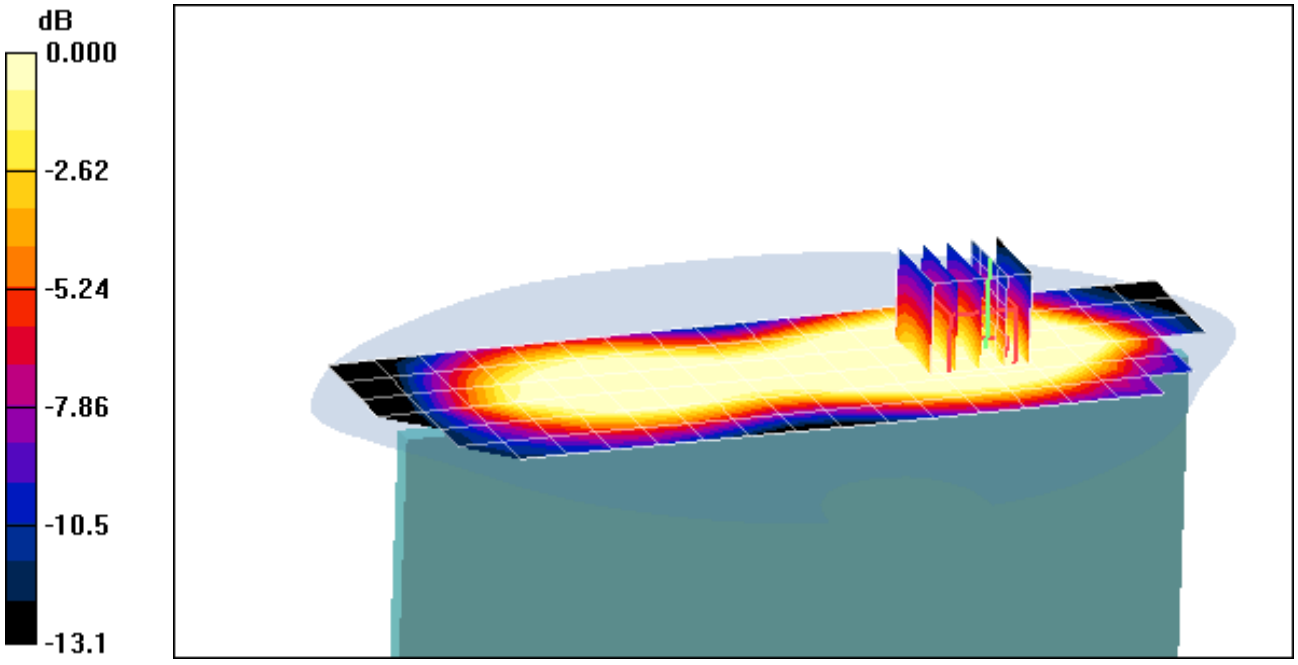
Communication System: GSM850 GPRS; 3 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:2.76
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.983$ mho/m; $\varepsilon_r = 54.2$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-19-2011; Ambient Temp: 21.6°C; Tissue Temp: 19.9°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GPRS 850, Body SAR, Top side, Mid.ch, 3 Tx Slots

Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.6 V/m; Power Drift = 0.005 dB
Peak SAR (extrapolated) = 0.404 W/kg
SAR(1 g) = 0.238 mW/g; SAR(10 g) = 0.146 mW/g



0 dB = 0.265mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

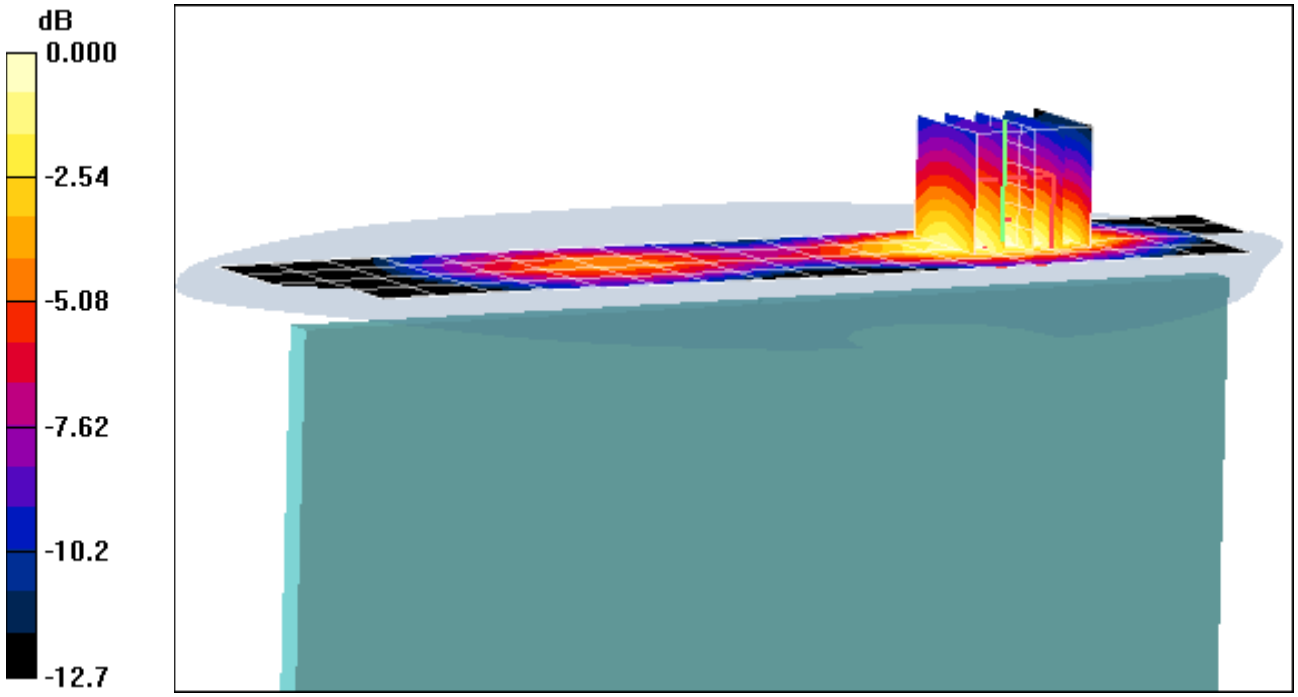
Communication System: GSM850 GPRS; 3 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:2.76
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.98$ mho/m; $\varepsilon_r = 54.8$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.5 cm

Test Date: 12-19-2011; Ambient Temp: 21.6 °C; Tissue Temp: 20.5 °C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GPRS 850, Body SAR, Top Edge, Mid.ch, 3 Tx Slots

Area Scan (5x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.9 V/m; Power Drift = 0.031 dB
Peak SAR (extrapolated) = 0.464 W/kg
SAR(1 g) = 0.305 mW/g; SAR(10 g) = 0.197 mW/g



0 dB = 0.328mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

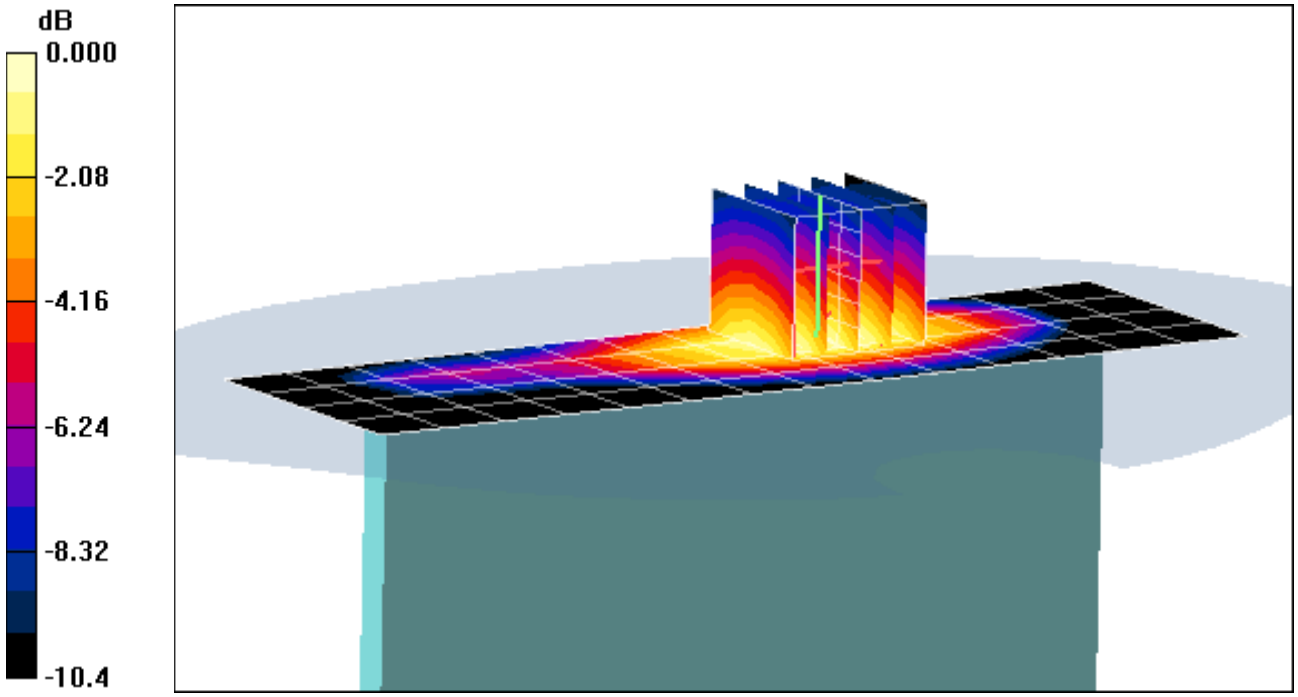
Communication System: GSM850 GPRS; 3 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:2.76
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.98$ mho/m; $\varepsilon_r = 54.8$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-19-2011; Ambient Temp: 21.6 °C; Tissue Temp: 20.5 °C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GPRS 850, Body SAR, Right Edge, Mid.ch, 3 Tx Slots

Area Scan (5x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.1 V/m; Power Drift = -0.099 dB
Peak SAR (extrapolated) = 0.253 W/kg
SAR(1 g) = 0.175 mW/g; SAR(10 g) = 0.117 mW/g



0 dB = 0.188mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 3

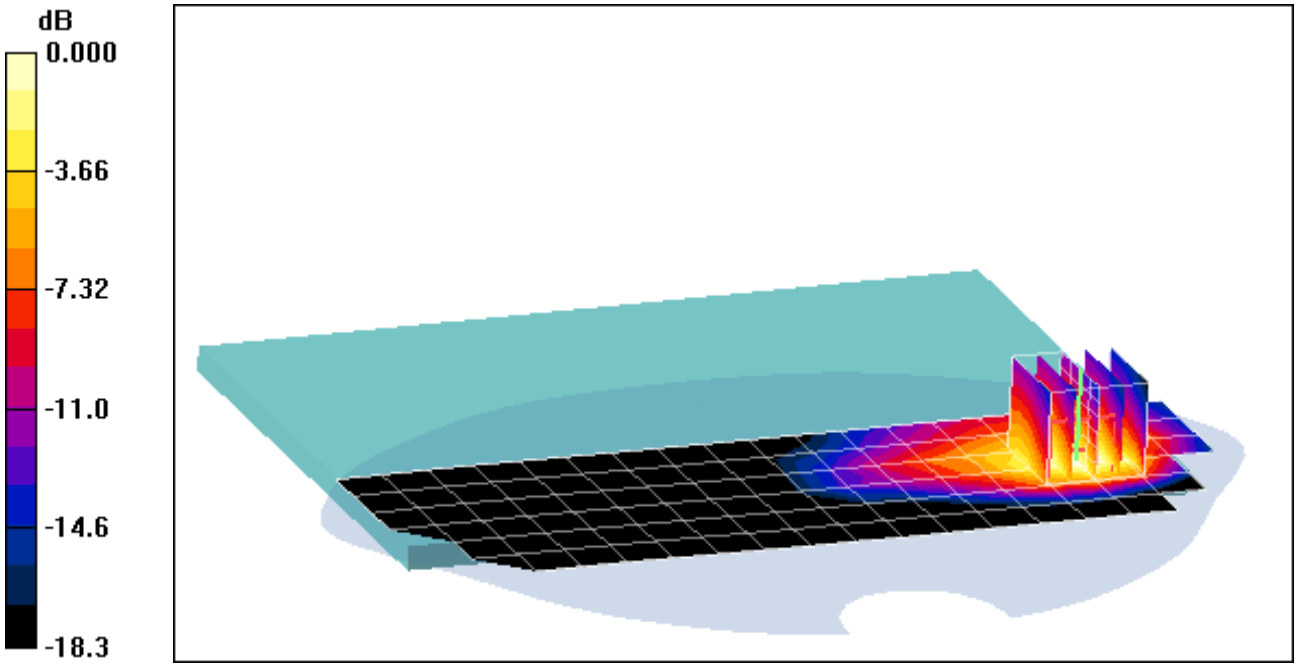
Communication System: WCDMA850; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: 835 BodyMedium parameters used (interpolated):
$f = 846.6$ MHz; $\sigma = 0.993$ mho/m; $\varepsilon_r = 54.1$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-19-2012; Ambient Temp: 21.6°C; Tissue Temp: 19.9°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm
/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.0 V/m; Power Drift = -0.026 dB
Peak SAR (extrapolated) = 0.770 W/kg
SAR(1 g) = 0.418 mW/g; SAR(10 g) = 0.228 mW/g



0 dB = 0.474mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

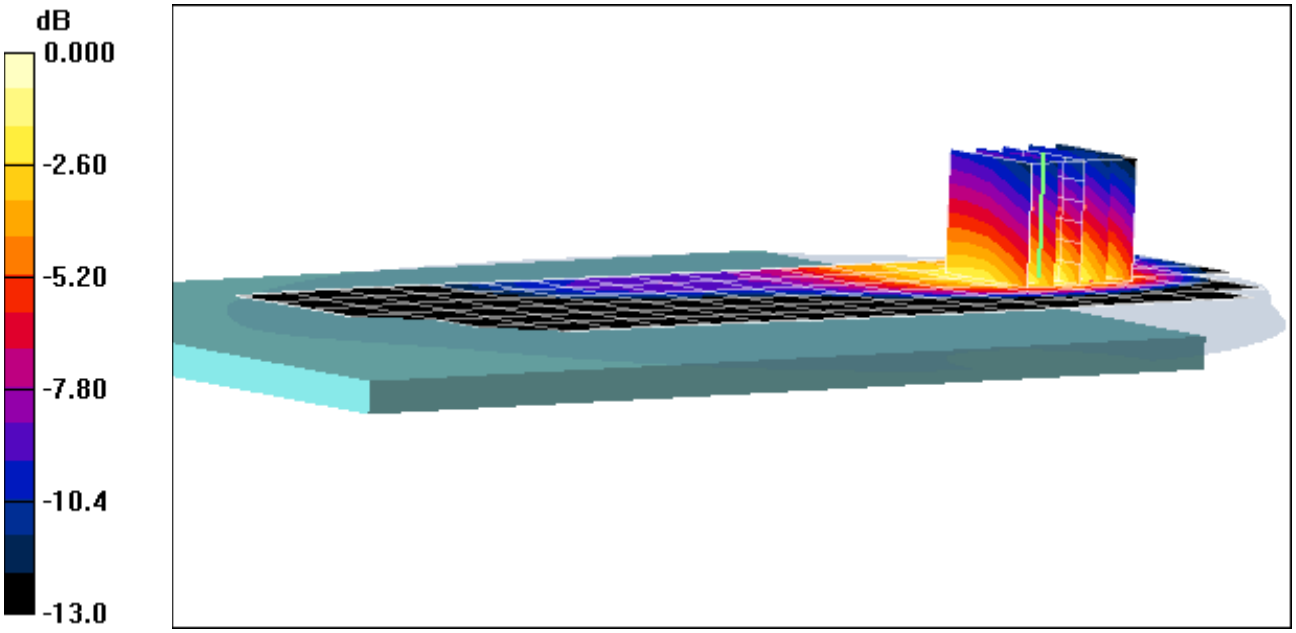
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.98 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-19-2011; Ambient Temp: 21.6 °C; Tissue Temp: 20.5 °C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.0 V/m; Power Drift = -0.062 dB
Peak SAR (extrapolated) = 0.417 W/kg
SAR(1 g) = 0.271 mW/g; SAR(10 g) = 0.168 mW/g



0 dB = 0.295mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 3

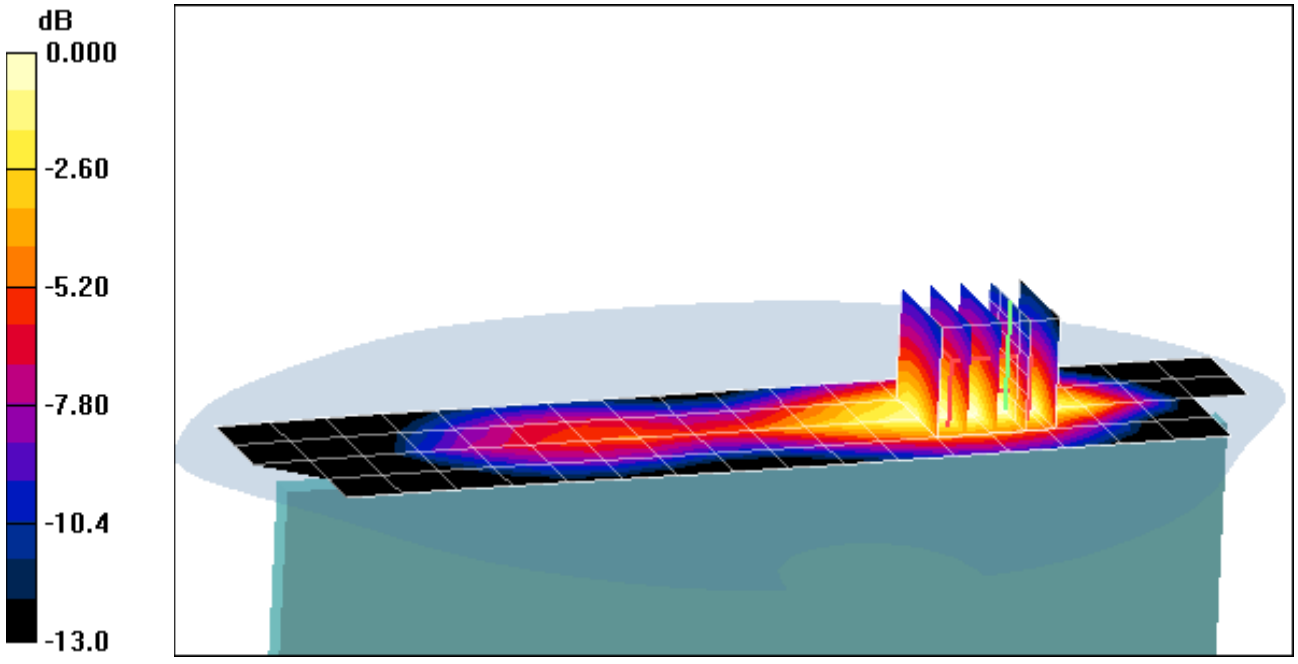
Communication System: WCDMA850; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 846.6$ MHz; $\sigma = 0.993$ mho/m; $\varepsilon_r = 54.1$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-19-2011; Ambient Temp: 21.6°C; Tissue Temp: 19.9°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WCDMA 850, Body SAR, Top Edge, High.ch

Area Scan (5x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.3 V/m; Power Drift = 0.026 dB
Peak SAR (extrapolated) = 0.814 W/kg
SAR(1 g) = 0.476 mW/g; SAR(10 g) = 0.287 mW/g



0 dB = 0.501mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

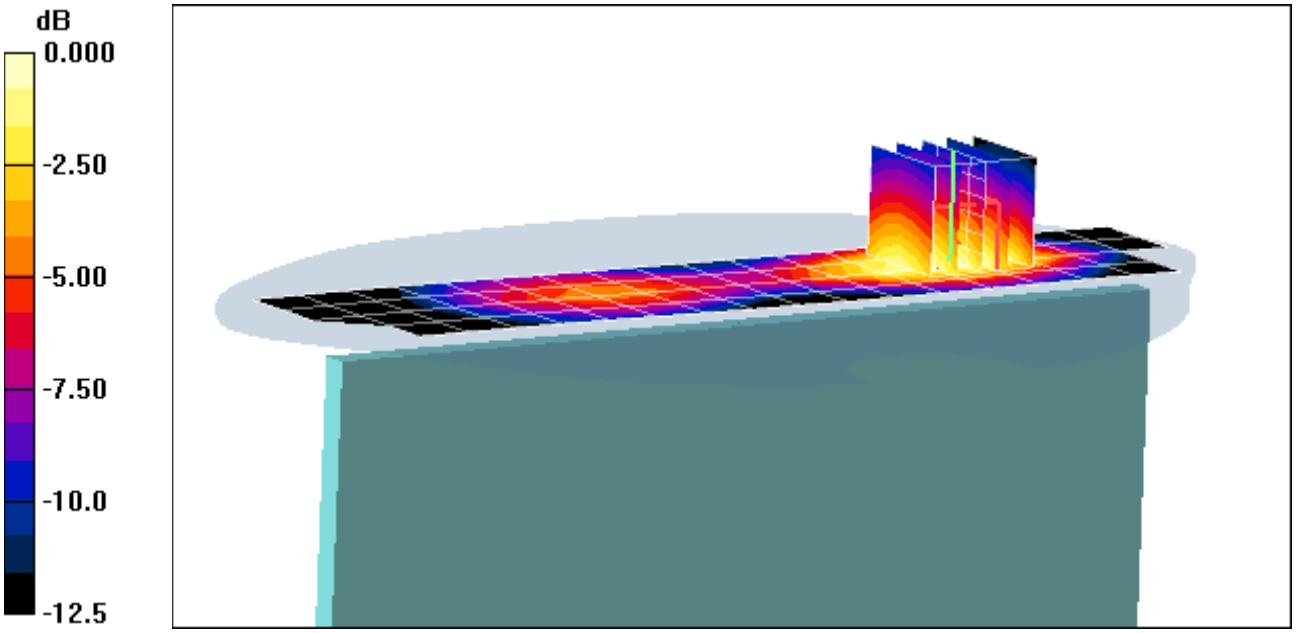
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.98 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.5 cm

Test Date: 12-19-2011; Ambient Temp: 21.6 °C; Tissue Temp: 20.5 °C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Area Scan (5x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.6 V/m; Power Drift = -0.105 dB
Peak SAR (extrapolated) = 0.400 W/kg
SAR(1 g) = 0.263 mW/g; SAR(10 g) = 0.169 mW/g



0 dB = 0.284mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

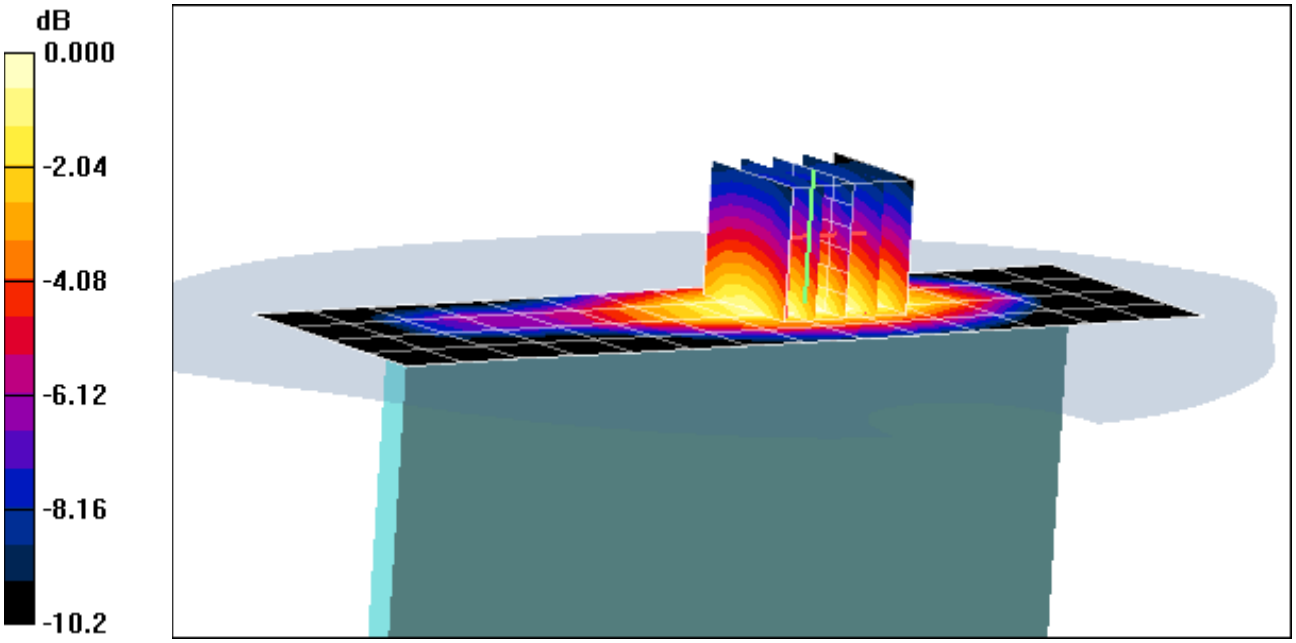
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.98 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-19-2011; Ambient Temp: 21.6 °C; Tissue Temp: 20.5 °C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Area Scan (5x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.6 V/m; Power Drift = 0.189 dB
Peak SAR (extrapolated) = 0.230 W/kg
SAR(1 g) = 0.160 mW/g; SAR(10 g) = 0.107 mW/g



0 dB = 0.171mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 3

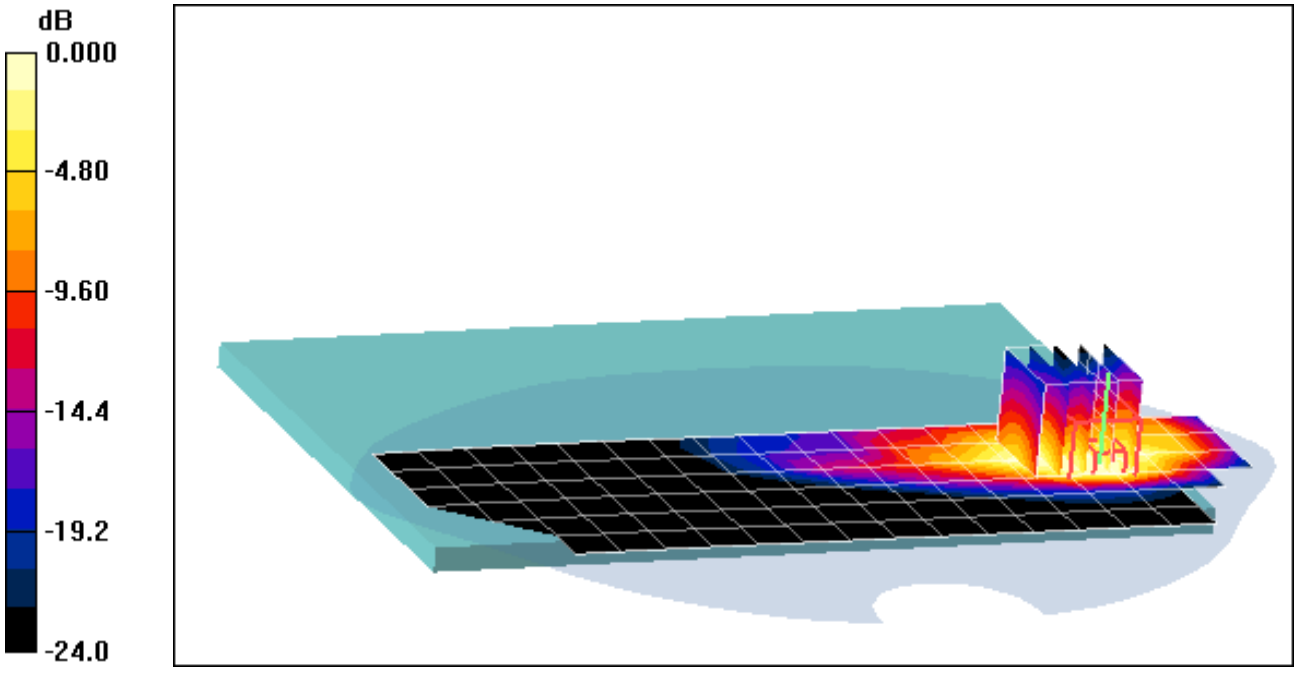
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.54 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-19-2011; Ambient Temp: 21.9°C; Tissue Temp: 20.3°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 4.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.0 V/m; Power Drift = -0.042 dB
Peak SAR (extrapolated) = 2.21 W/kg
SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.468 mW/g



0 dB = 1.42mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

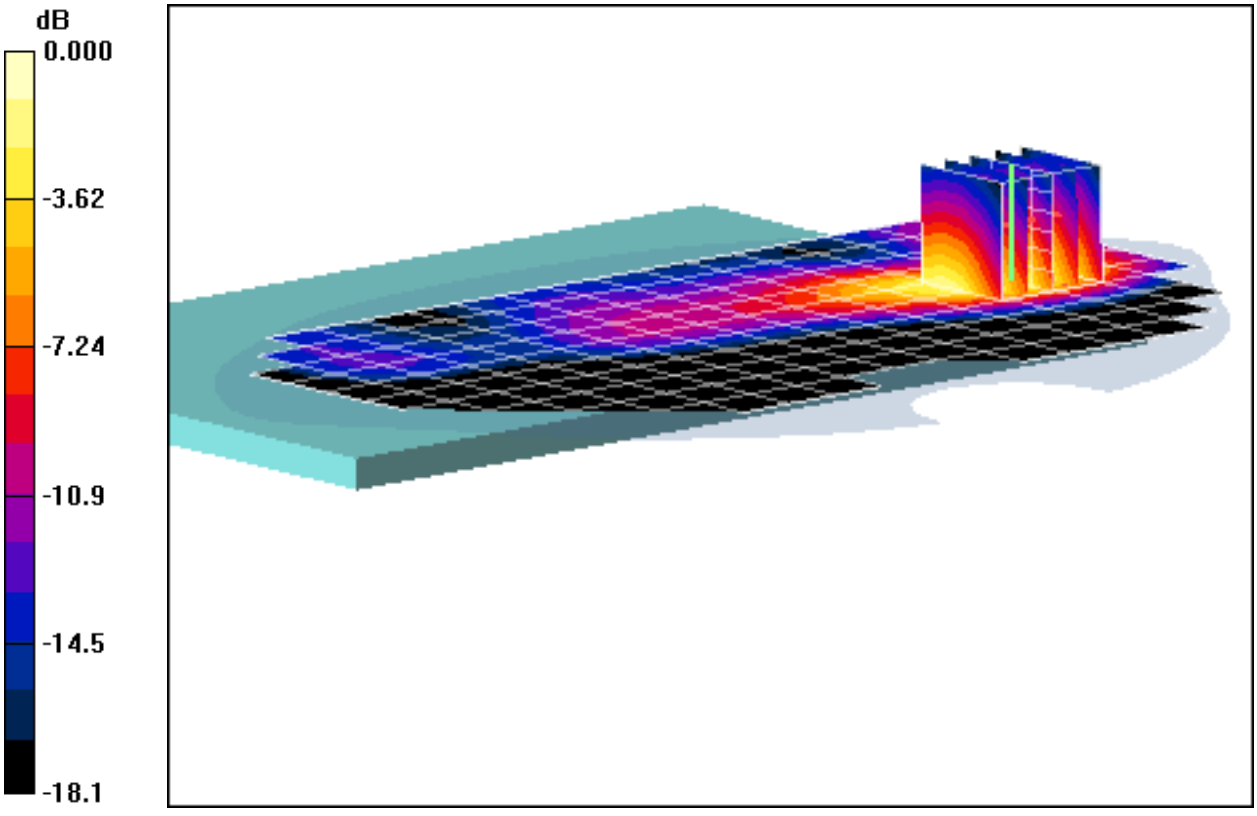
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-15-2011; Ambient Temp: 21.4 °C; Tissue Temp: 21.3 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Area Scan (11x18x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.8 V/m; Power Drift = 0.017 dB
Peak SAR (extrapolated) = 0.743 W/kg
SAR(1 g) = 0.393 mW/g; SAR(10 g) = 0.198 mW/g



0 dB = 0.419mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 3

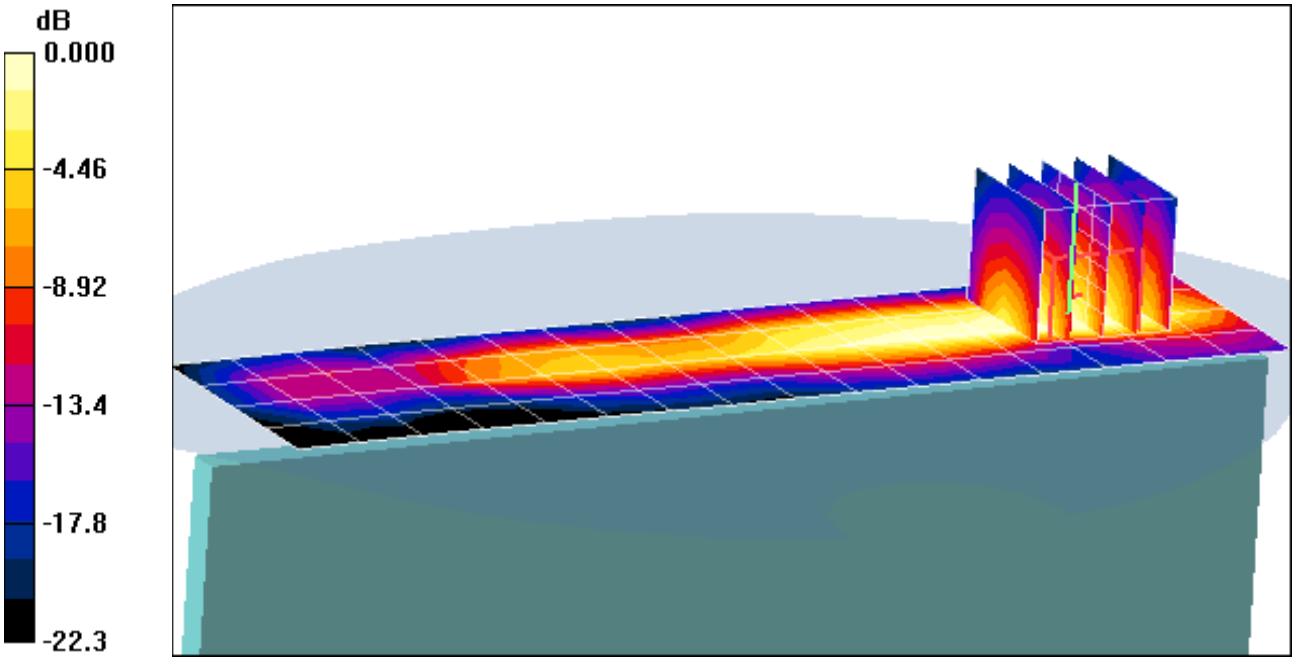
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.54 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-19-2012; Ambient Temp: 21.9°C; Tissue Temp: 20.3°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 4.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GSM 1900, Body SAR, Top side, Mid.ch

Area Scan (5x17x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.0 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 1.28 W/kg
SAR(1 g) = 0.609 mW/g; SAR(10 g) = 0.264 mW/g



0 dB = 0.726mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

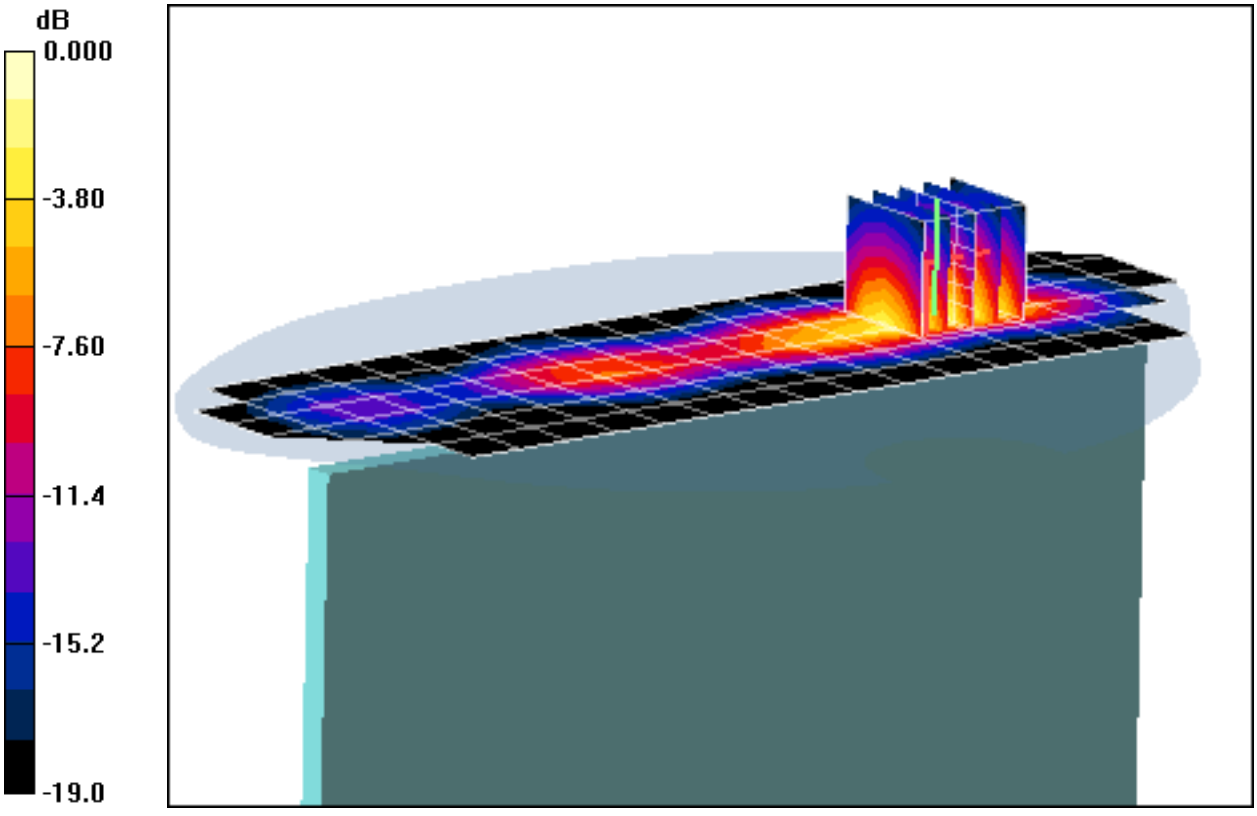
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.5 cm

Test Date: 12-15-2011; Ambient Temp: 21.4 °C; Tissue Temp: 21.3 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GSM1900, Body SAR, Top side, Mid.ch

Area Scan (7x20x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.0 V/m; Power Drift = 0.052 dB
Peak SAR (extrapolated) = 1.37 W/kg
SAR(1 g) = 0.706 mW/g; SAR(10 g) = 0.335 mW/g



0 dB = 0.812mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

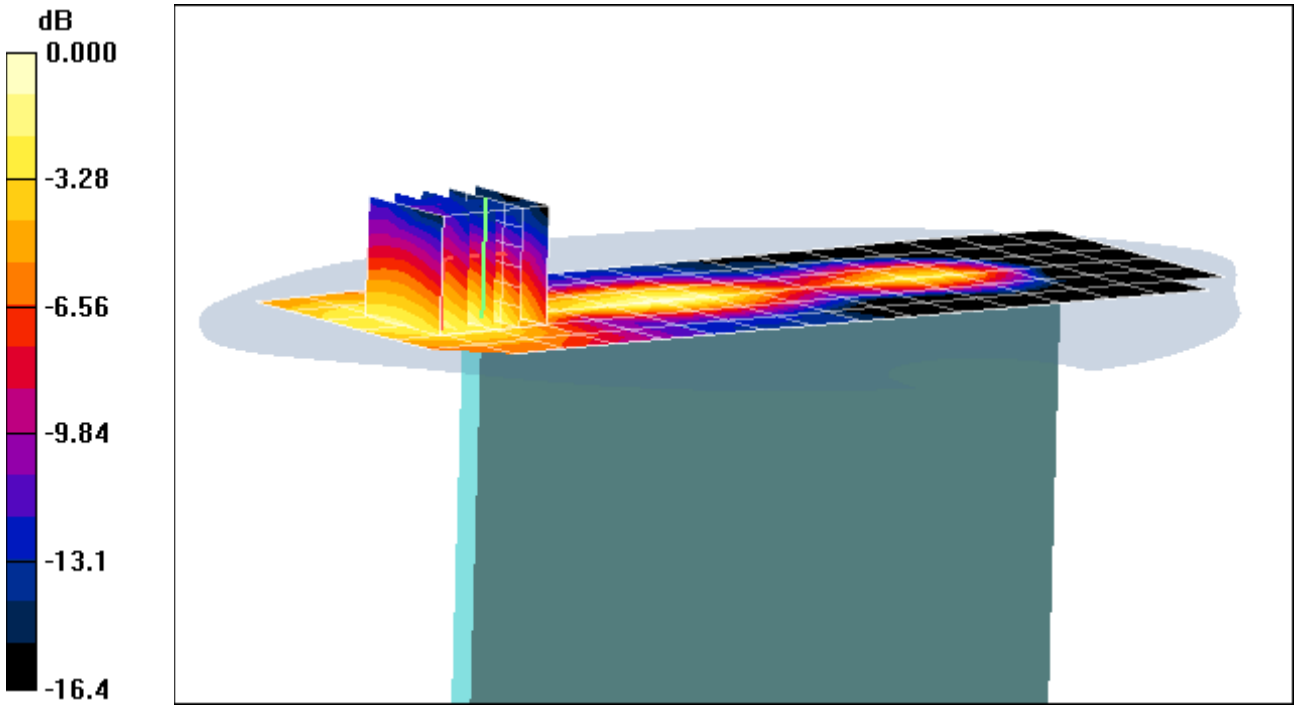
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-15-2011; Ambient Temp: 21.4 °C; Tissue Temp: 21.3 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GSM1900, Body SAR, Right side, Mid.ch

Area Scan (7x17x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.80 V/m; Power Drift = 0.029 dB
Peak SAR (extrapolated) = 0.116 W/kg
SAR(1 g) = 0.067 mW/g; SAR(10 g) = 0.038 mW/g



0 dB = 0.073mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 3

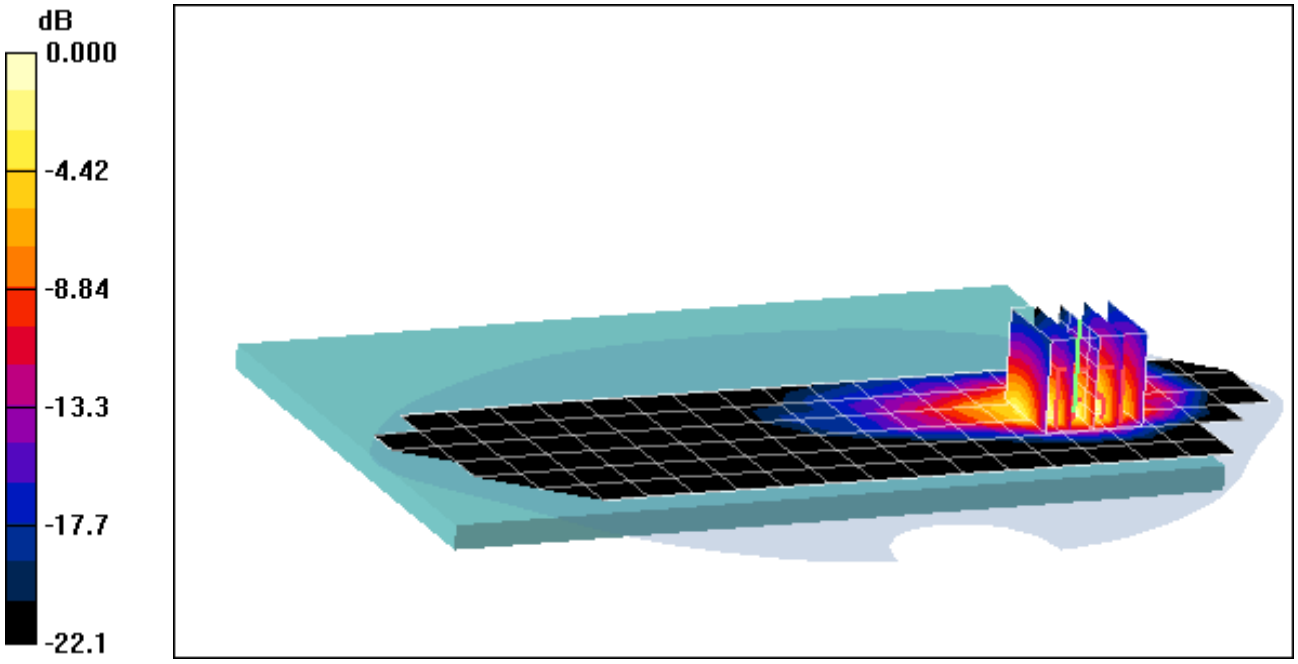
Communication System: GSM1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: 1900 Body Medium parameters used:
f = 1850.2MHz; σ = 1.501 mho/m; ε_r = 53.19; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-19-2012; Ambient Temp: 21.9°C; Tissue Temp: 20.3°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 4.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GPRS 1900, Body SAR, Back side, Low.ch, 1 Tx Slots

Area Scan (7x20x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.8 V/m; Power Drift = 0.041 dB
Peak SAR (extrapolated) = 2.37 W/kg
SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.475 mW/g



0 dB = 1.44mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

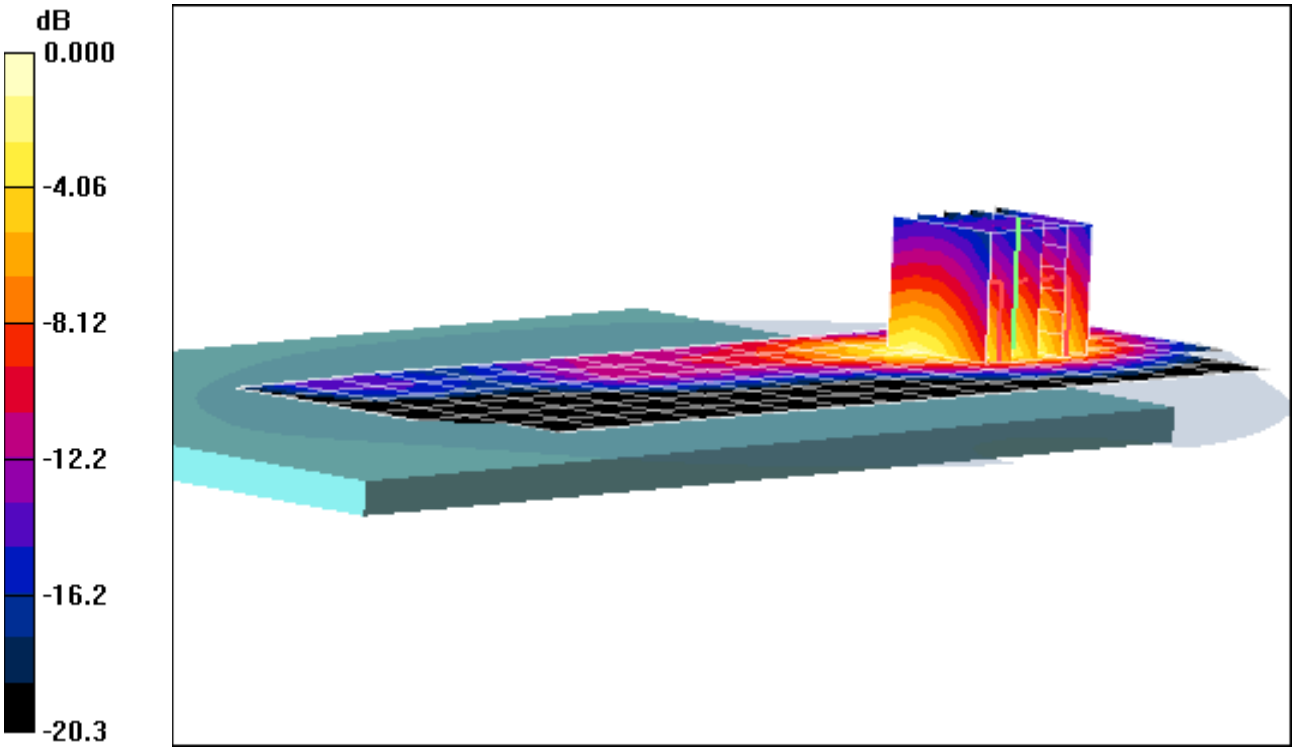
Communication System: GSM1900 GPRS; 2 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-15-2011; Ambient Temp: 21.4 °C; Tissue Temp: 21.3 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Area Scan (7x18x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.3 V/m; Power Drift = -0.079 dB
Peak SAR (extrapolated) = 0.917 W/kg
SAR(1 g) = 0.485 mW/g; SAR(10 g) = 0.248 mW/g



0 dB = 0.550mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 3

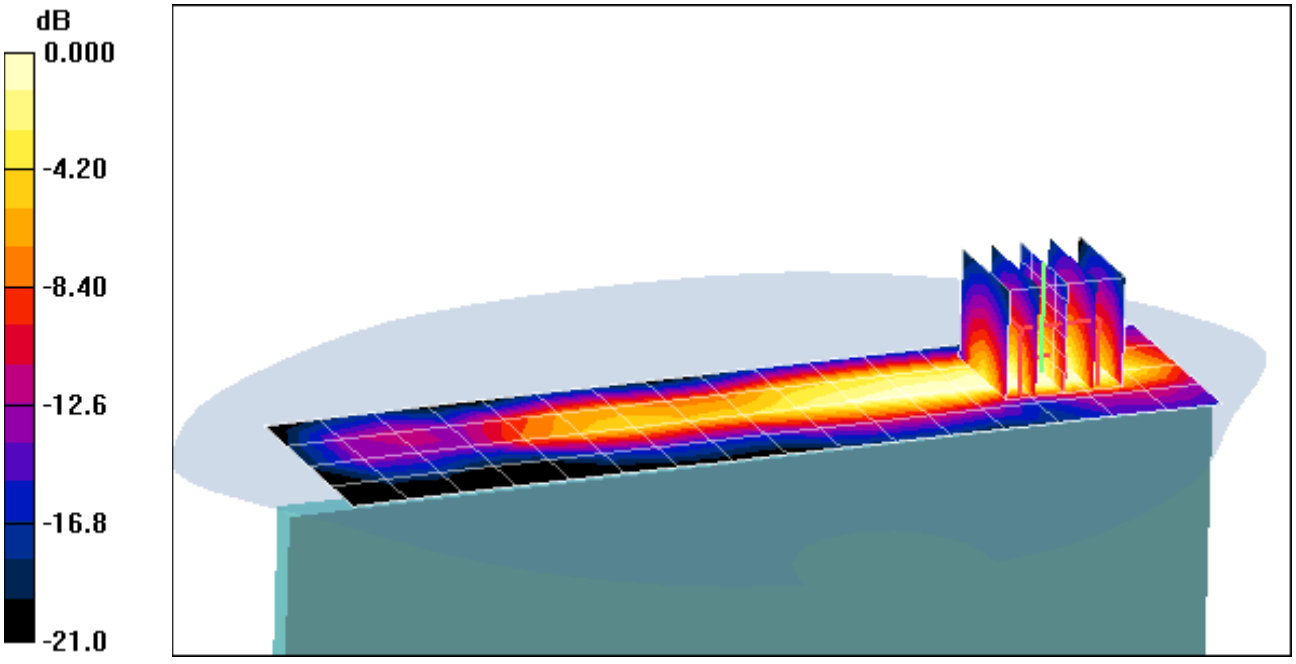
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.54 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-19-2012; Ambient Temp: 21.9°C; Tissue Temp: 20.3°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 4.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GPRS 1900, Body SAR, Top side, Mid.ch, 1 Tx Slots

Area Scan (5x17x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.9 V/m; Power Drift = -0.051 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.605 mW/g; SAR(10 g) = 0.256 mW/g



0 dB = 0.716mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

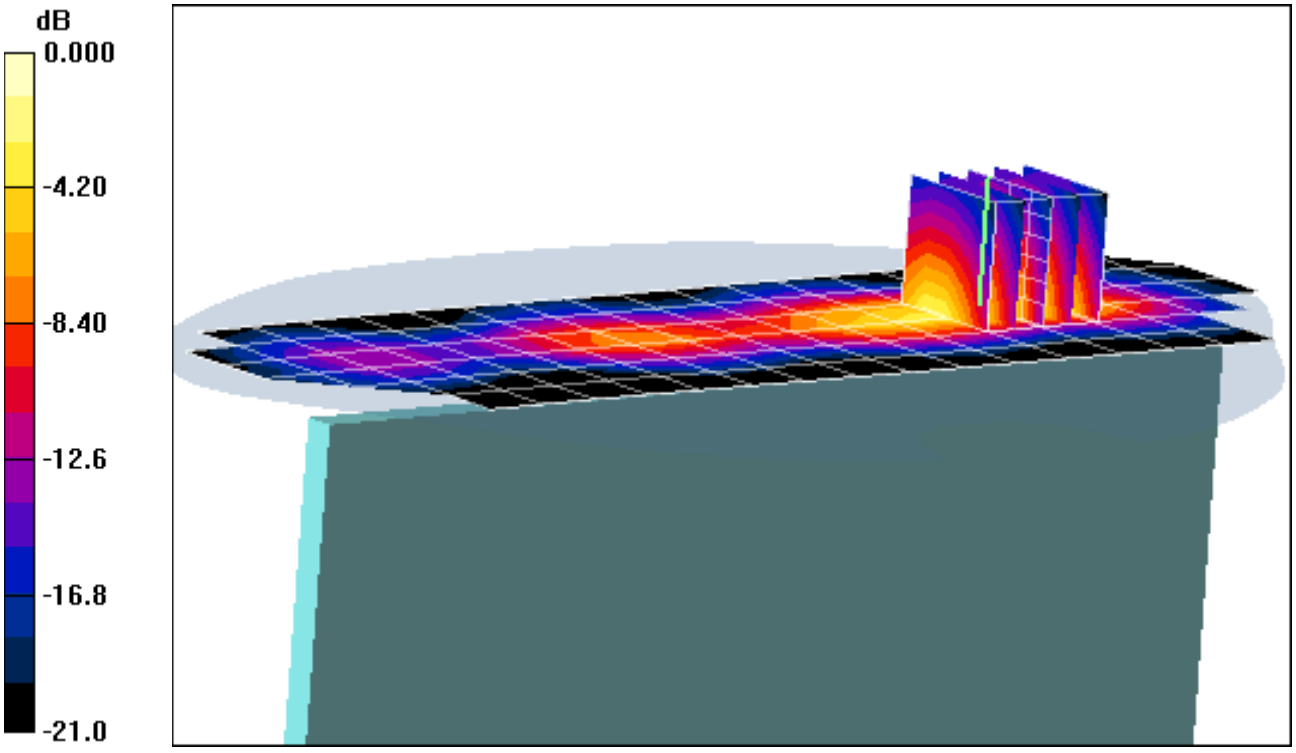
Communication System: GSM1900 GPRS; 2 Tx slots; Frequency: 1909.8 MHz;Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1910 MHz; σ = 1.568 mho/m; ε_r = 51.16; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.5 cm

Test Date: 12-15-2011; Ambient Temp: 21.4 °C; Tissue Temp: 21.3 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Area Scan (7x20x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.9 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 1.84 W/kg
SAR(1 g) = 0.887 mW/g; SAR(10 g) = 0.398 mW/g



0 dB = 0.866mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

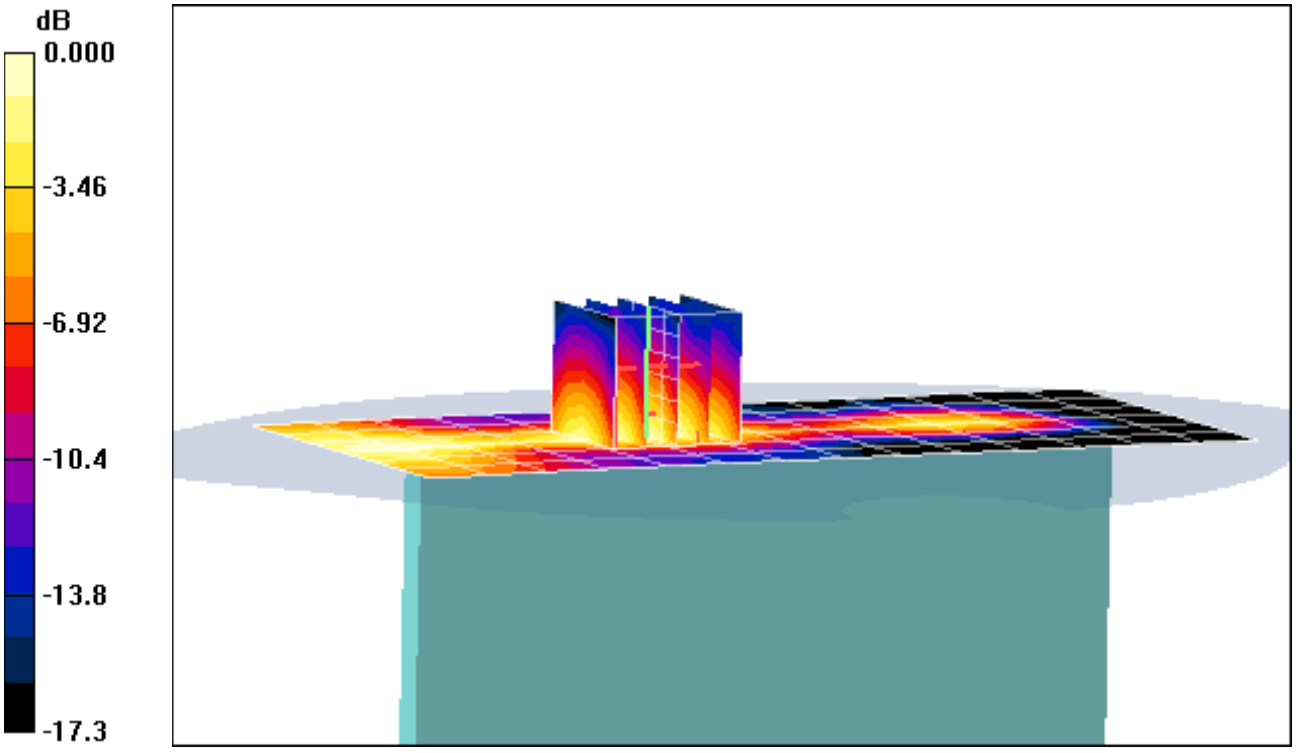
Communication System: GSM1900 GPRS; 2 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-15-2011; Ambient Temp: 21.4 °C; Tissue Temp: 21.3 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: GPRS 1900, Body SAR, Right side, Mid.ch, 2 Tx Slots

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.08 V/m; Power Drift = 0.048 dB
Peak SAR (extrapolated) = 0.119 W/kg
SAR(1 g) = 0.067 mW/g; SAR(10 g) = 0.037 mW/g



0 dB = 0.075mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 3

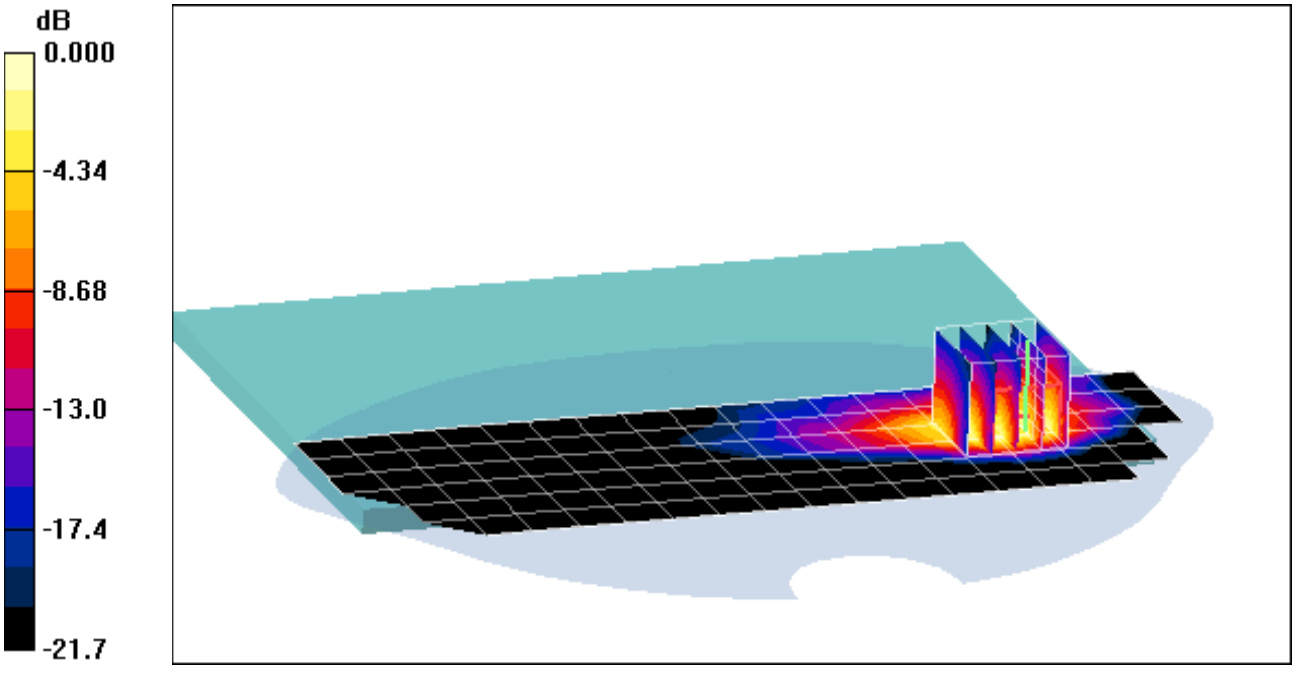
Communication System: WCDMA1900; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1852.4 MHz; σ = 1.5 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-19-2012; Ambient Temp: 21.9°C; Tissue Temp: 20.3°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 4.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.6 V/m; Power Drift = 0.203 dB
Peak SAR (extrapolated) = 2.33 W/kg
SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.445 mW/g



0 dB = 1.26mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

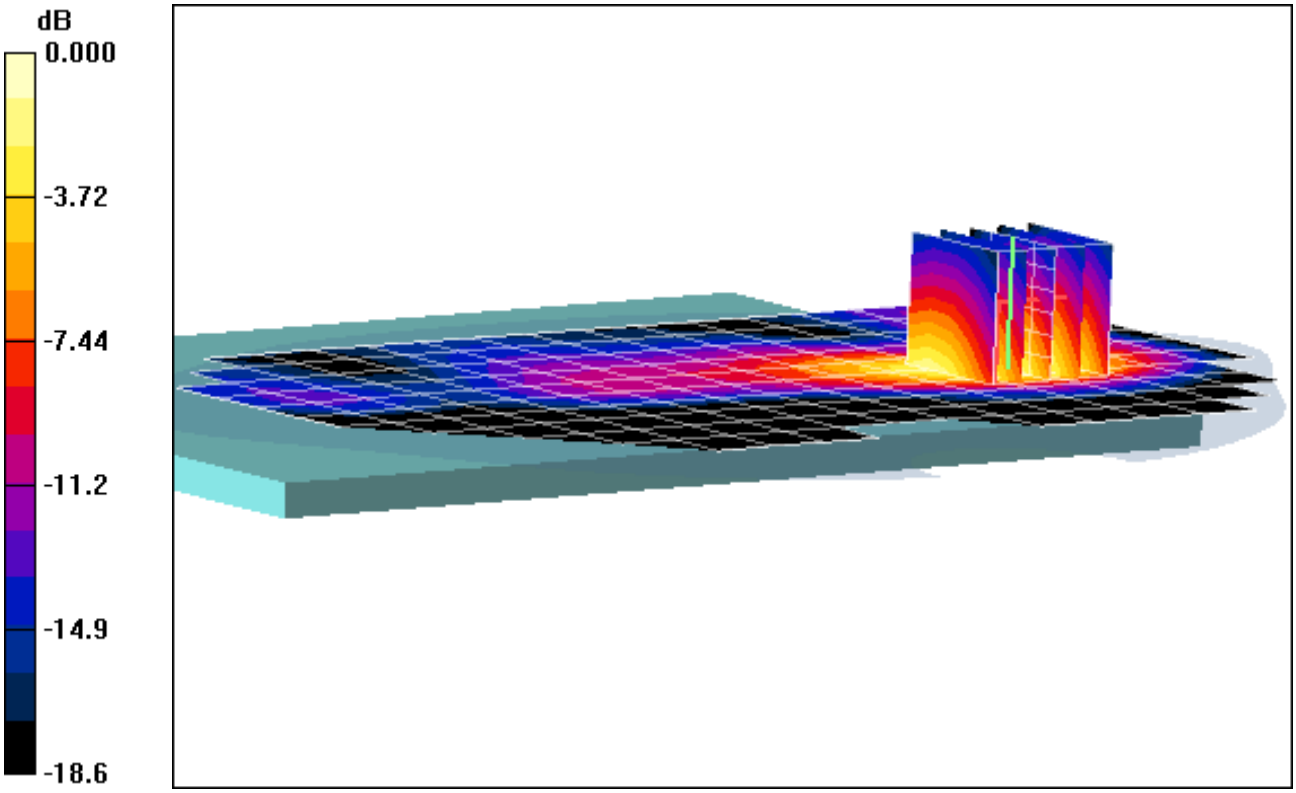
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-15-2011; Ambient Temp: 21.4 °C; Tissue Temp: 21.3 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WCDMA1900, Body SAR, Back side, Mid.ch

Area Scan (11x18x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.34 V/m; Power Drift = -0.161 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.532 mW/g; SAR(10 g) = 0.267 mW/g



0 dB = 0.572mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 3

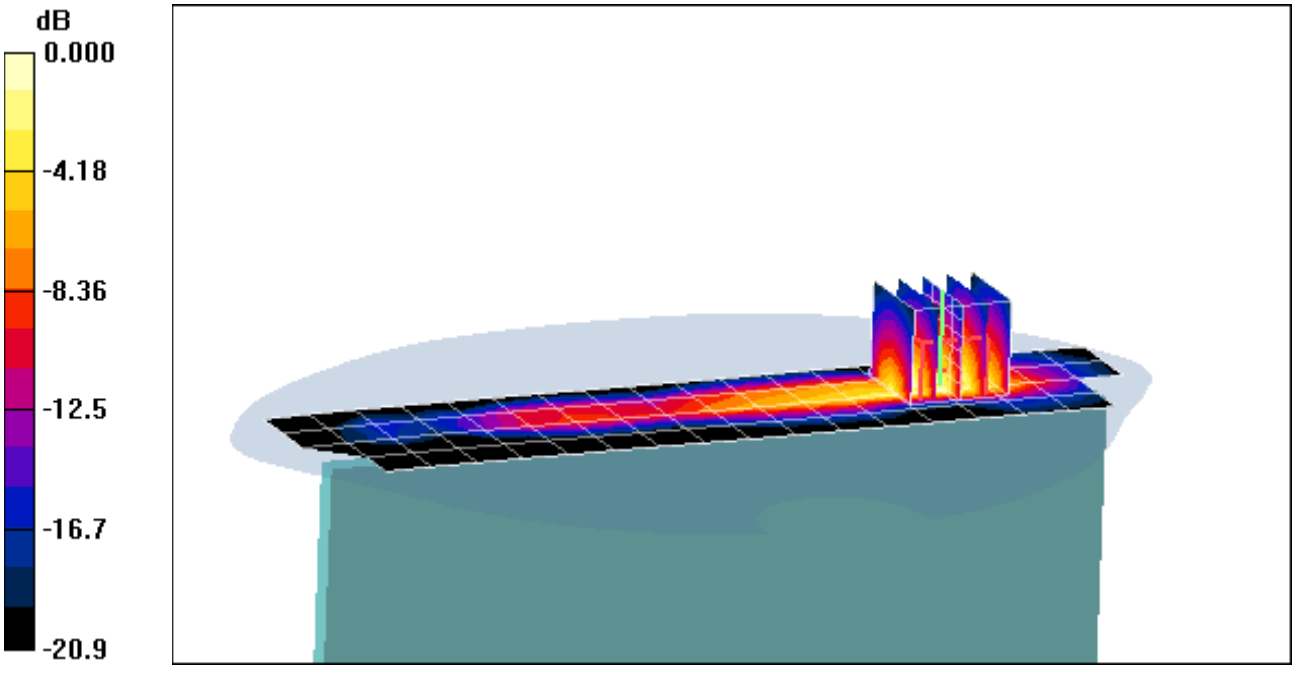
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.54 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-19-2012; Ambient Temp: 21.9°C; Tissue Temp: 20.3°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 4.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Area Scan (5x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.0 V/m; Power Drift = 0.046 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.492 mW/g; SAR(10 g) = 0.207 mW/g



0 dB = 0.580mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

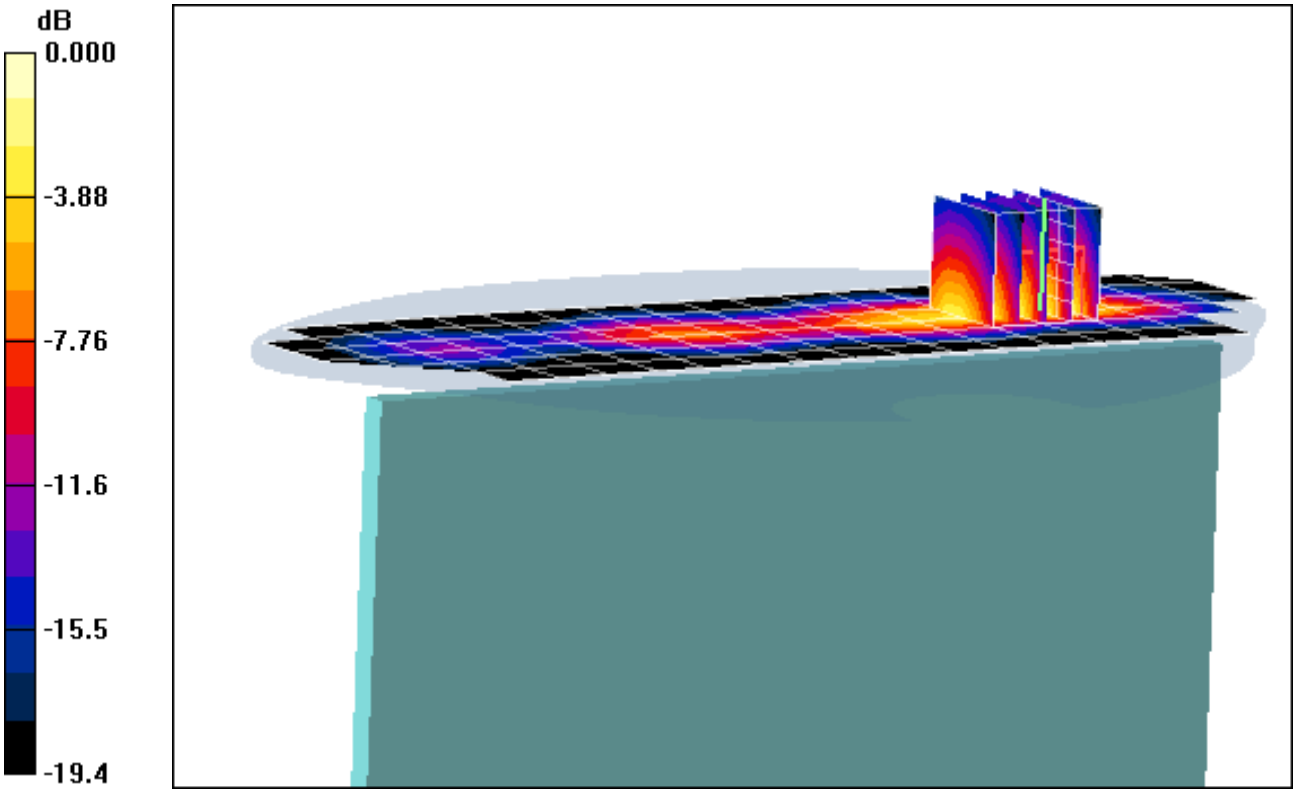
Communication System: WCDMA1900; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1852.4 MHz; σ = 1.51 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.5 cm

Test Date: 12-15-2011; Ambient Temp: 21.4 °C; Tissue Temp: 21.3 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WCDMA1900, Body SAR, Top side, Low.ch

Area Scan (7x20x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.5 V/m; Power Drift = 0.049 dB
Peak SAR (extrapolated) = 2.02 W/kg
SAR(1 g) = 0.998 mW/g; SAR(10 g) = 0.457 mW/g



0 dB = 0.966mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 4

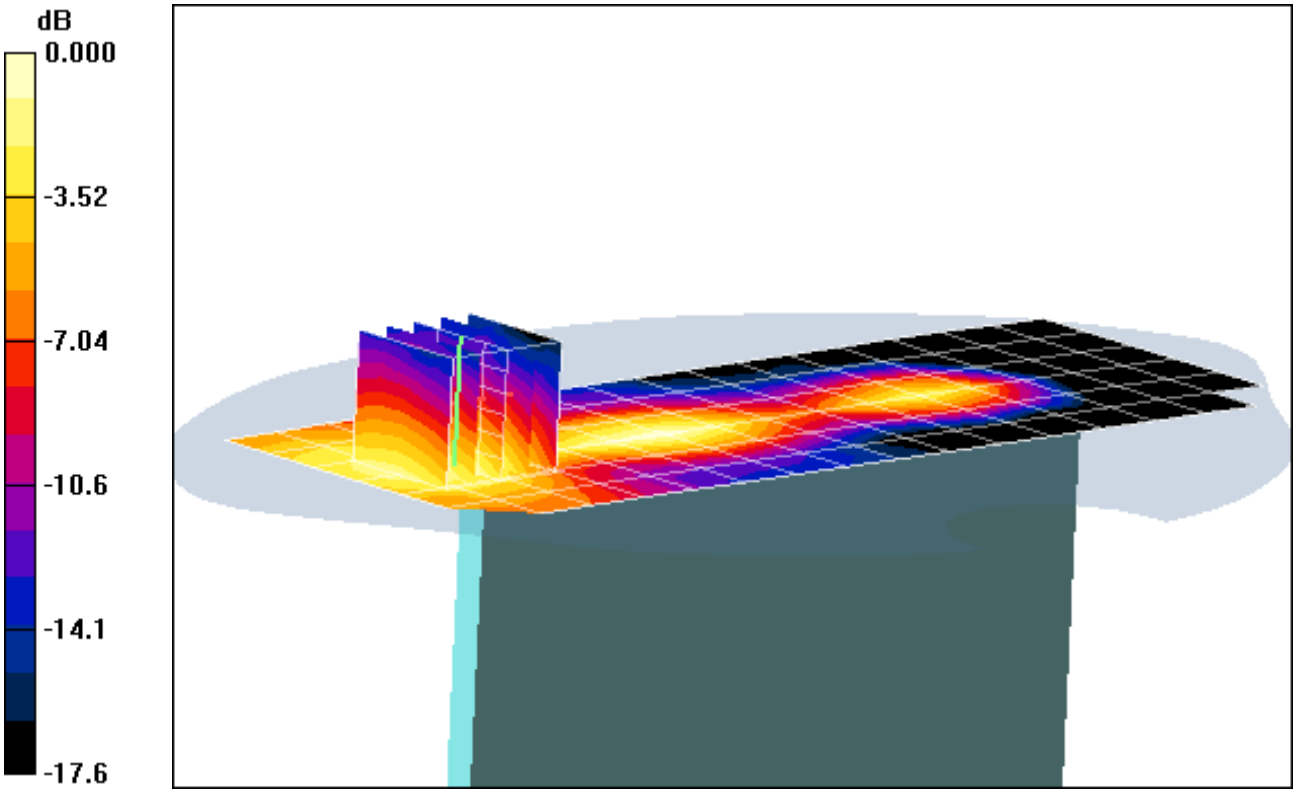
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-15-2011; Ambient Temp: 21.4 °C; Tissue Temp: 21.3 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: WCDMA 1900, Body SAR, Right side, Mid ch

Area Scan (7x17x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.73 V/m; Power Drift = -0.026 dB
Peak SAR (extrapolated) = 0.138 W/kg
SAR(1 g) = 0.080 mW/g; SAR(10 g) = 0.046 mW/g



0 dB = 0.089mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 2

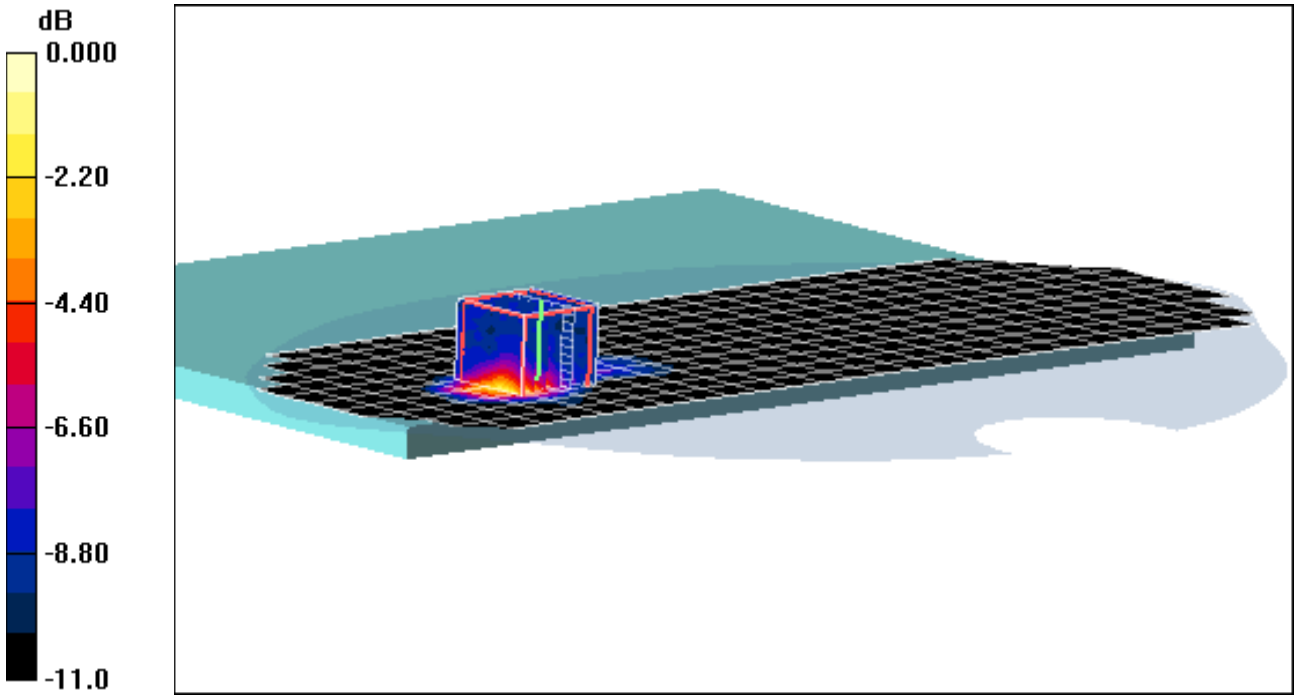
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5765 MHz;Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
f = 5765 MHz; σ = 6.228 mho/m; ε_r = 46.18; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-12-2011; Ambient Temp: 21.8 °C; Tissue Temp: 20.3 °C

Probe: EX3DV4 - SN3561; ConvF(3.34, 3.34, 3.34); Calibrated: 7/27/2011
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: IEEE 802.11a, 5.8 GHz, Body SAR, Ch 153, 6 Mbps, Back Side

Area Scan (11x29x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 10.5 V/m; Power Drift = 0.210 dB
Peak SAR (extrapolated) = 4.88 W/kg
SAR(1 g) = 0.709 mW/g; SAR(10 g) = 0.326 mW/g



0 dB = 1.40mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 2

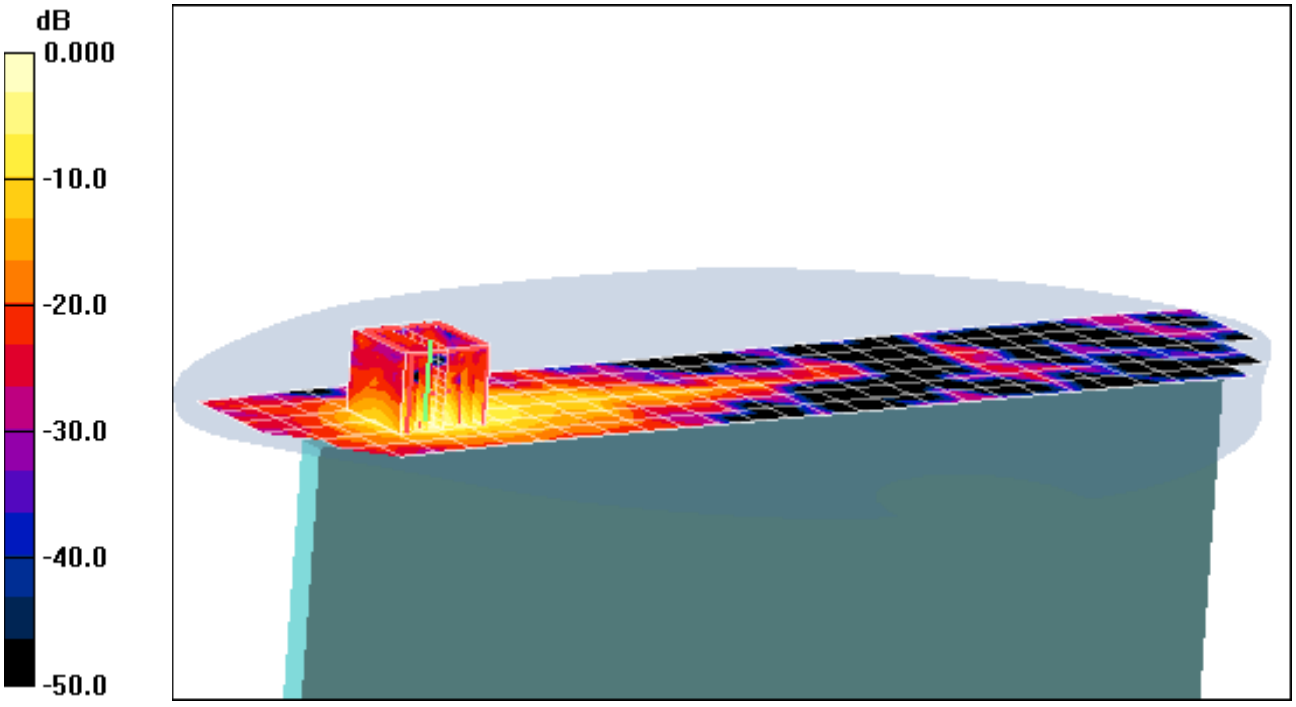
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz;Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
f = 5785 MHz; σ = 6.255 mho/m; ε_r = 46.13; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-12-2011; Ambient Temp: 21.8 °C; Tissue Temp: 20.3 °C

Probe: EX3DV4 - SN3561; ConvF(3.34, 3.34, 3.34); Calibrated: 7/27/2011
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: IEEE 802.11a, 5.8 GHz, Body SAR, Ch 157, 6 Mbps, Top Side

Area Scan (7x29x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 11.7 V/m; Power Drift = 0.126 dB
Peak SAR (extrapolated) = 4.58 W/kg
SAR(1 g) = 0.827 mW/g; SAR(10 g) = 0.200 mW/g



0 dB = 1.87mW/g

DUT: A3LGTN8000; Type: Portable Tablet Computer; Serial: 2

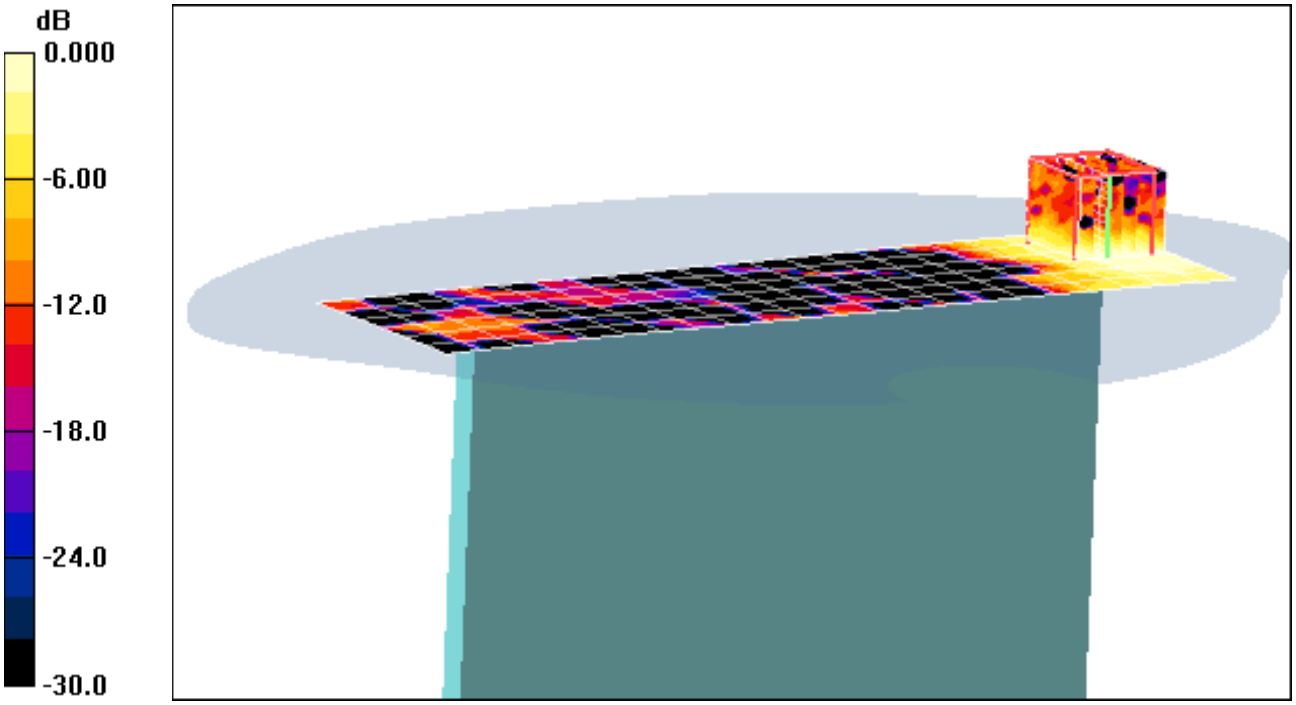
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
f = 5320 MHz; σ = 5.481 mho/m; ε_r = 47.30; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-12-2011; Ambient Temp: 21.3 °C; Tissue Temp: 19.6 °C

Probe: EX3DV4 - SN3561; ConvF(3.49, 3.49, 3.49); Calibrated: 7/27/2011
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mode: IEEE 802.11a, 5.3 GHz, Body SAR, Ch 64, 6 Mbps, Left Edge

Area Scan (7x23x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.90 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.221 W/kg
SAR(1 g) = 0.046 mW/g; SAR(10 g) = 0.020 mW/g



0 dB = 0.087mW/g

APPENDIX B: DIPOLE VALIDATION

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047

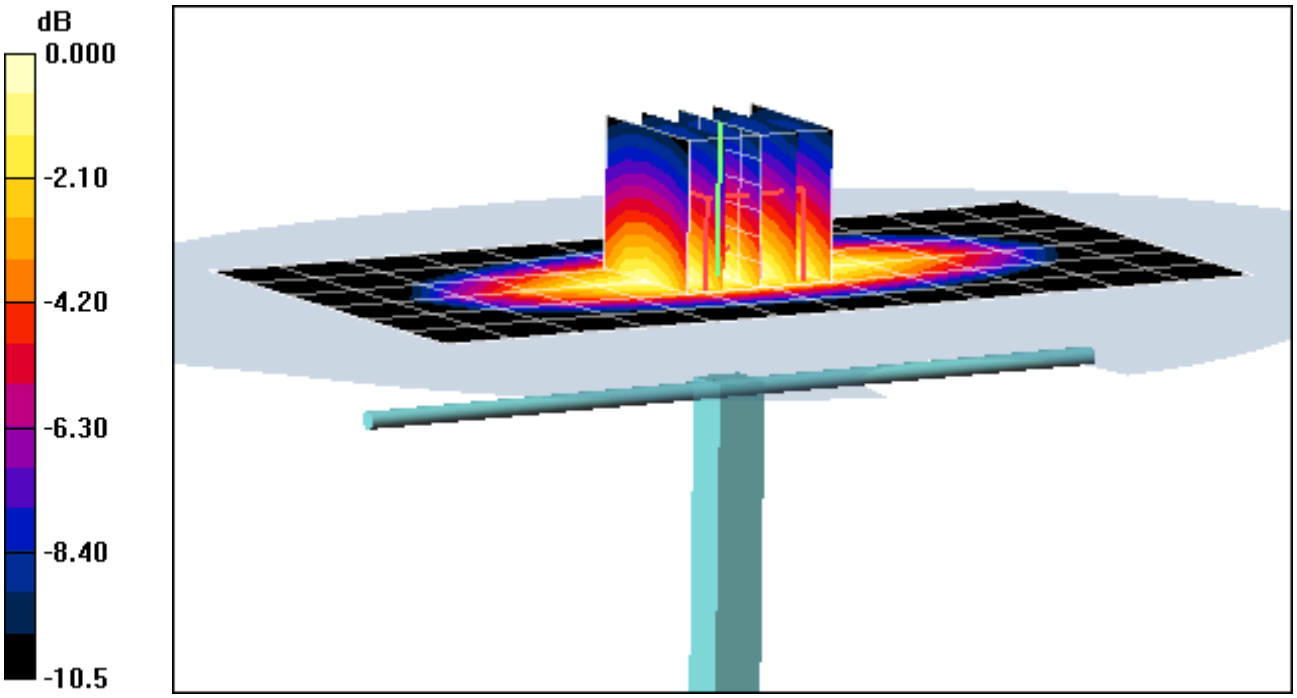
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.979 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-19-2011; Ambient Temp: 21.6 °C; Tissue Temp: 20.5 °C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

835MHz System Verification

Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 0.991 mW/g; SAR(10 g) = 0.645 mW/g
Deviation = 0.61 %



0 dB = 1.07mW/g

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d047

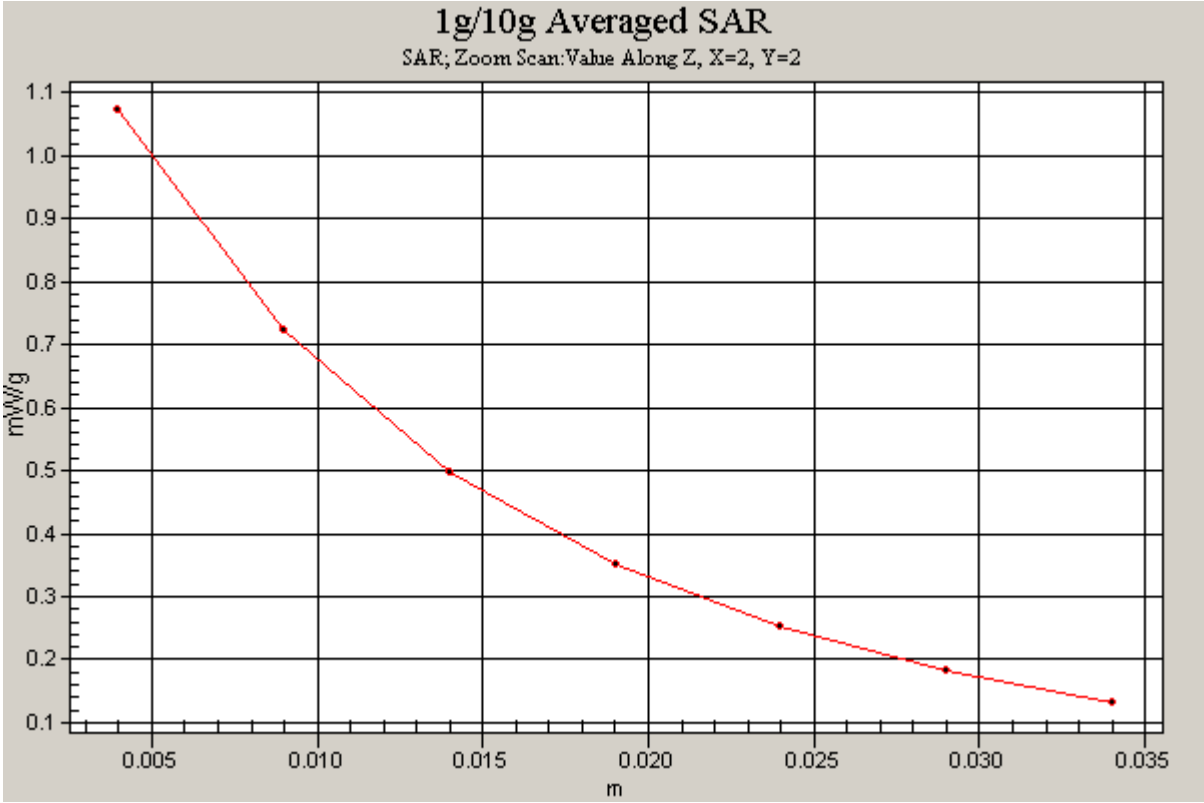
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.979 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-19-2011; Ambient Temp: 21.6 °C; Tissue Temp: 20.5 °C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

835MHz System Verification

Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 0.991 mW/g; SAR(10 g) = 0.645 mW/g
Deviation = 0.61 %



DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119

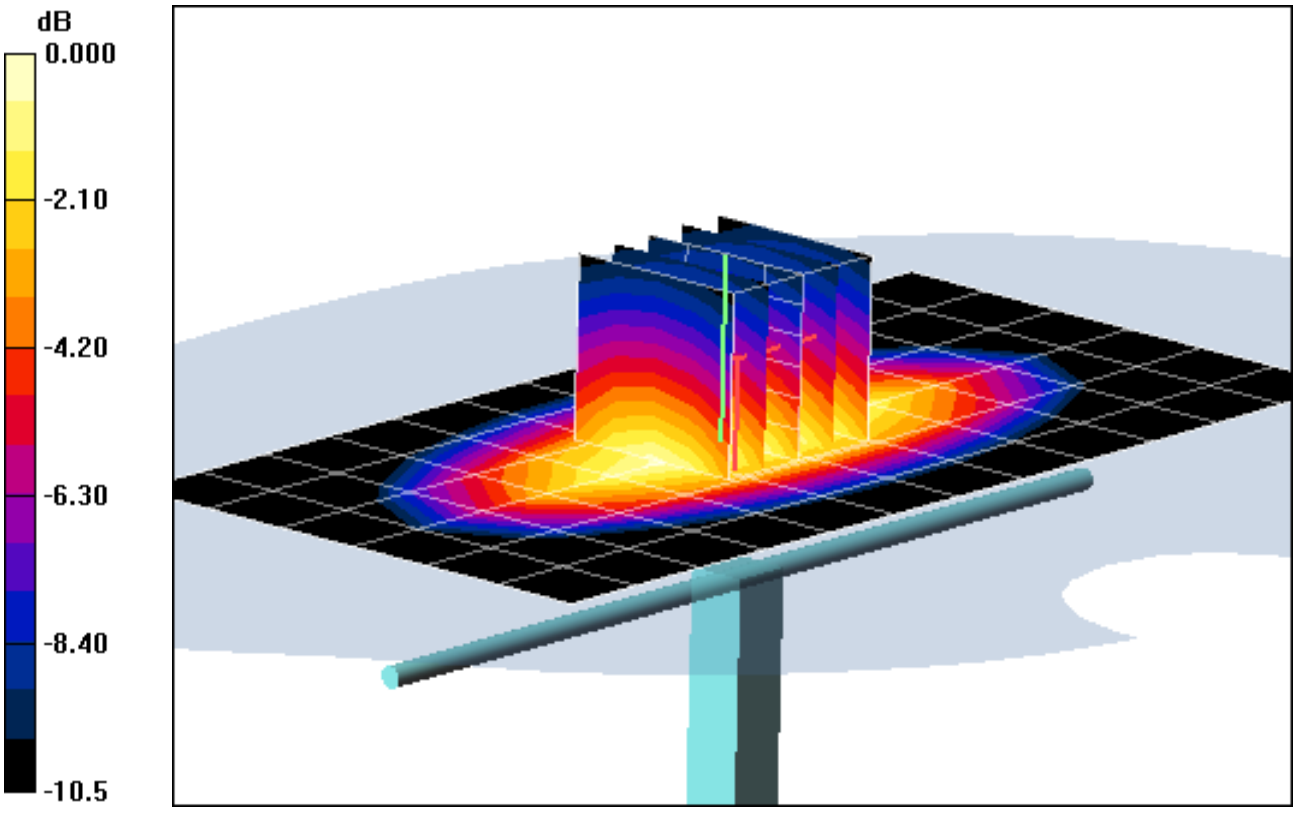
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.981 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-19-2012; Ambient Temp: 21.6°C; Tissue Temp: 19.9°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

835MHz System Verification

Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 0.973 mW/g; SAR(10 g) = 0.636 mW/g
Deviation = 1.99 %



0 dB = 1.05mW/g

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119

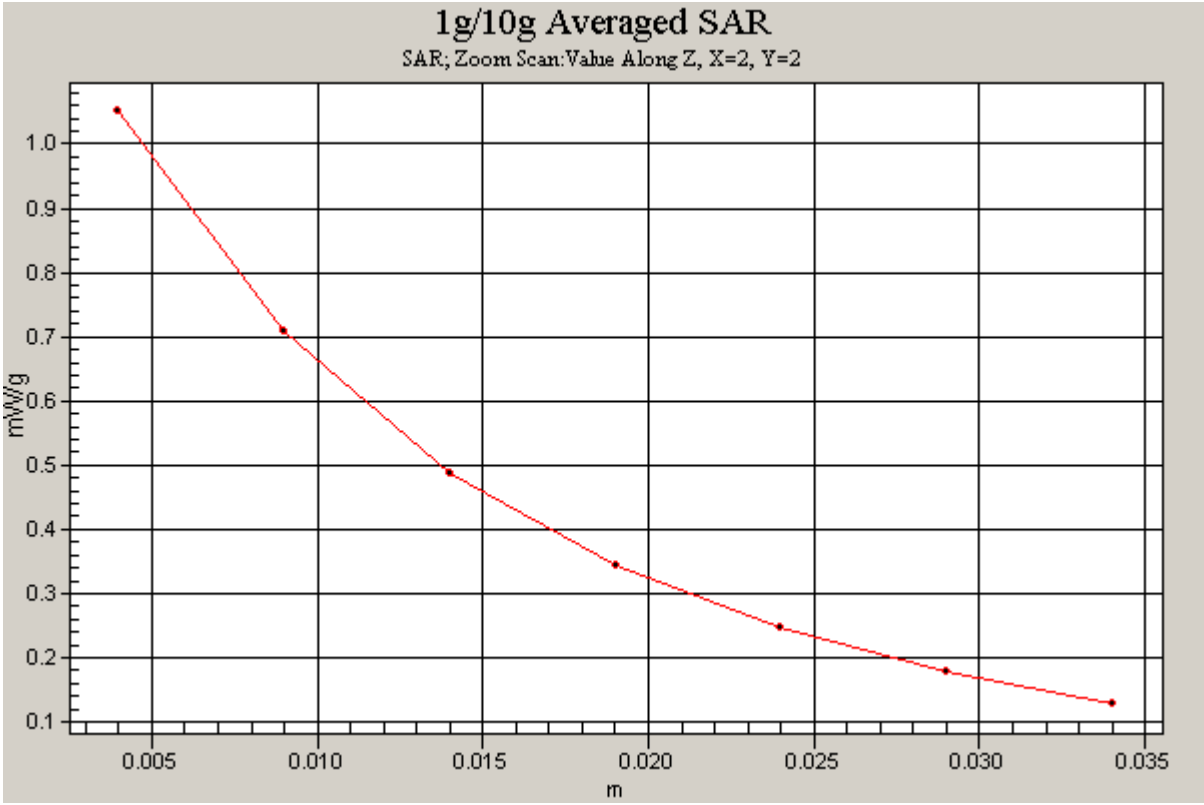
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.981 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-19-2012; Ambient Temp: 21.6°C; Tissue Temp: 19.9°C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

835MHz System Verification

Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 0.973 mW/g; SAR(10 g) = 0.636 mW/g
Deviation = 1.99 %



DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 502

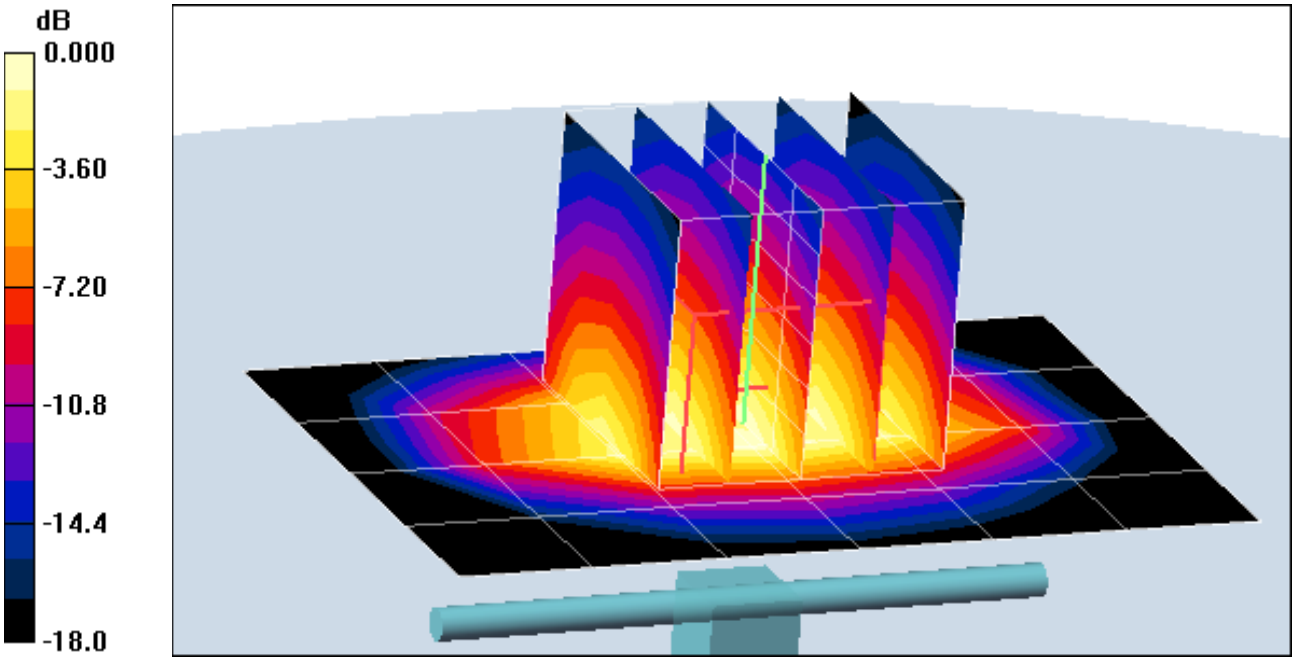
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.56 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-15-2011; Ambient Temp: 21.4°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

1900MHz System Verification

Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20 dBm (100 mW)
SAR(1 g) = 4.38 mW/g; SAR(10 g) = 2.29 mW/g
Deviation = 6.57 %



0 dB = 4.91mW/g

DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 502

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.56 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

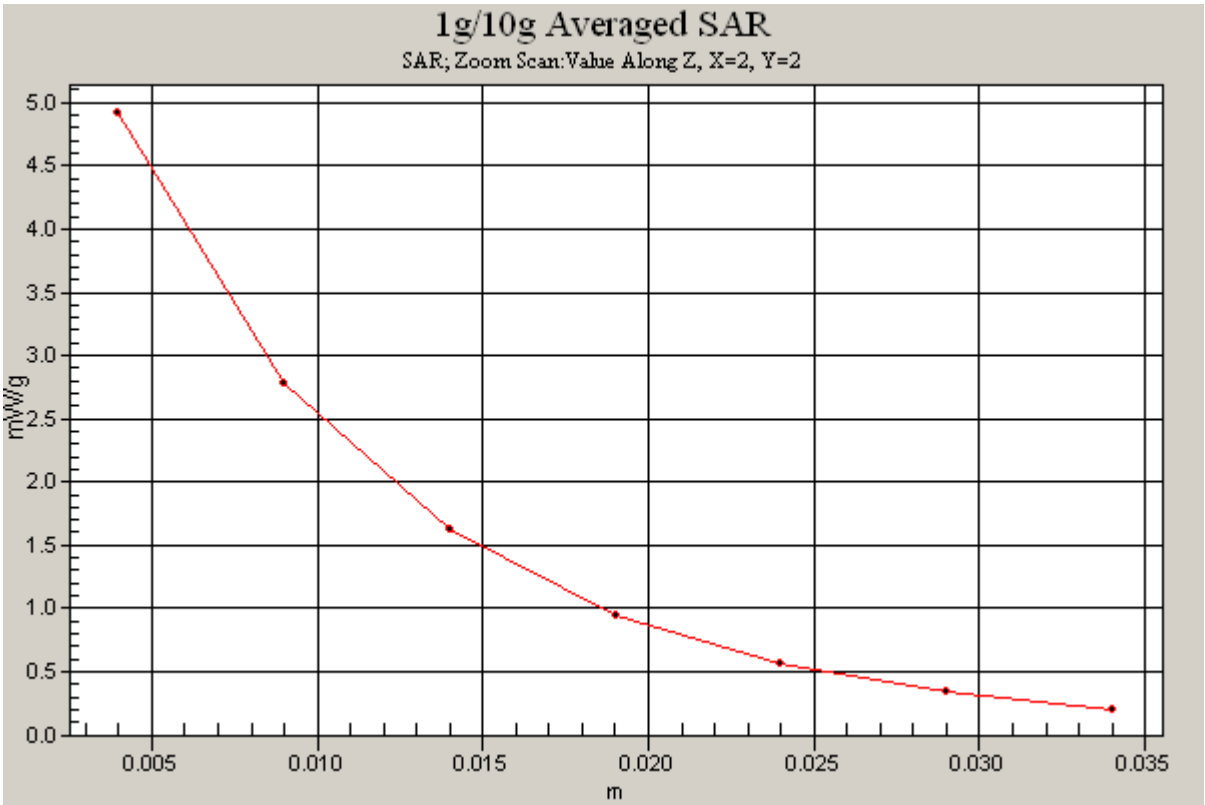
Test Date: 12-15-2011; Ambient Temp: 21.4°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

1900MHz System Verification

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

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20 dBm (100 mW)
SAR(1 g) = 4.38 mW/g; SAR(10 g) = 2.29 mW/g
Deviation = 6.57%



DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 502

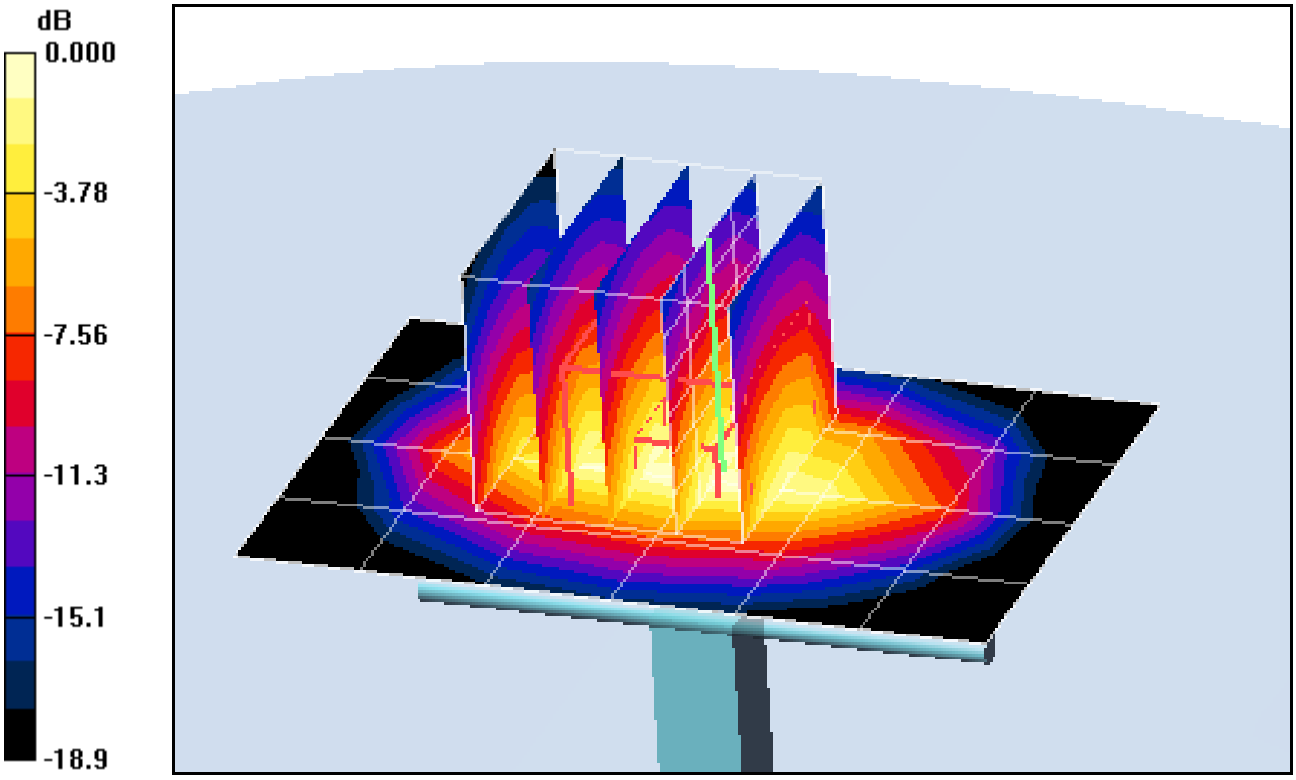
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.56 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2012; Ambient Temp: 21.9°C; Tissue Temp: 20.3°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

1900MHz System Verification

Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power: 20.0 dBm (100 mW)
SAR(1 g) = 4.3 mW/g; SAR(10 g) = 2.25 mW/g
Deviation: 4.62%



0 dB = 4.77mW/g

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 502

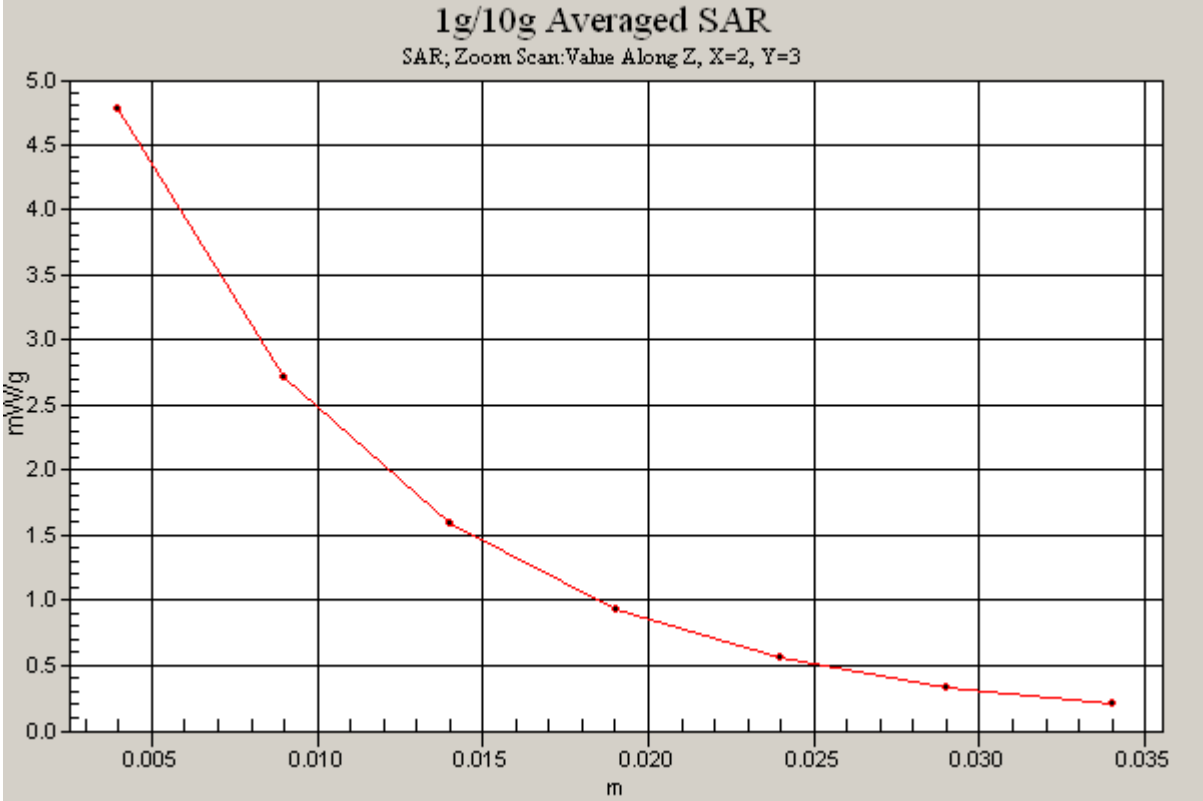
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.56 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-19-2012; Ambient Temp: 21.9°C; Tissue Temp: 20.3°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn859; Calibrated: 5/19/2011
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

1900MHz System Verification

Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power: 20.0 dBm (100 mW)
SAR(1 g) = 4.3 mW/g; SAR(10 g) = 2.25 mW/g
Deviation: 4.62%



PCTEST ENGINEERING LABORATORY, INC.

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

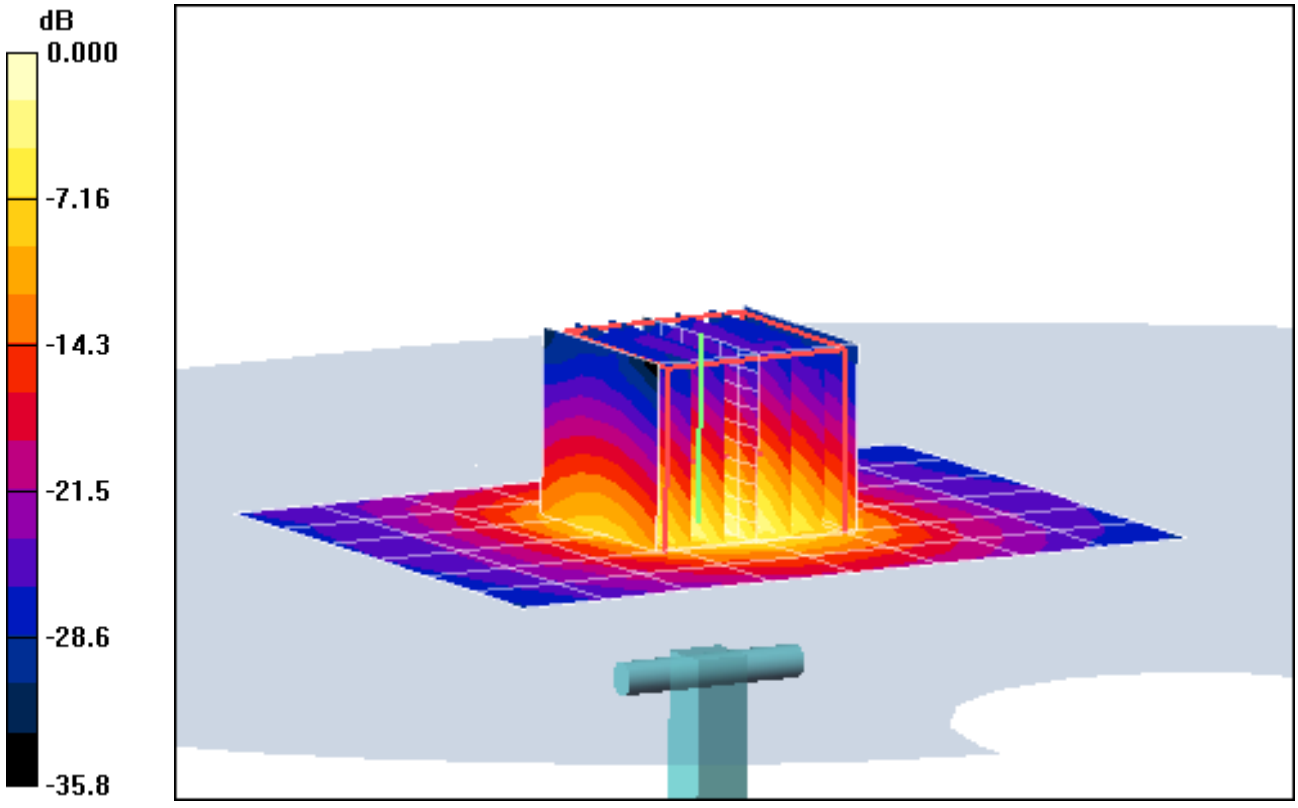
Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
f = 5200 MHz; σ = 5.328 mho/m; ε_r = 47.80; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-12-2011; Ambient Temp: 21.3 °C; Tissue Temp: 19.6 °C

Probe: EX3DV4 - SN3561; ConvF(3.7, 3.7, 3.7); Calibrated: 7/27/2011
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

5200MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 8.25 mW/g; SAR(10 g) = 2.31 mW/g
Deviation = 6.18 %



0 dB = 16.6mW/g

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

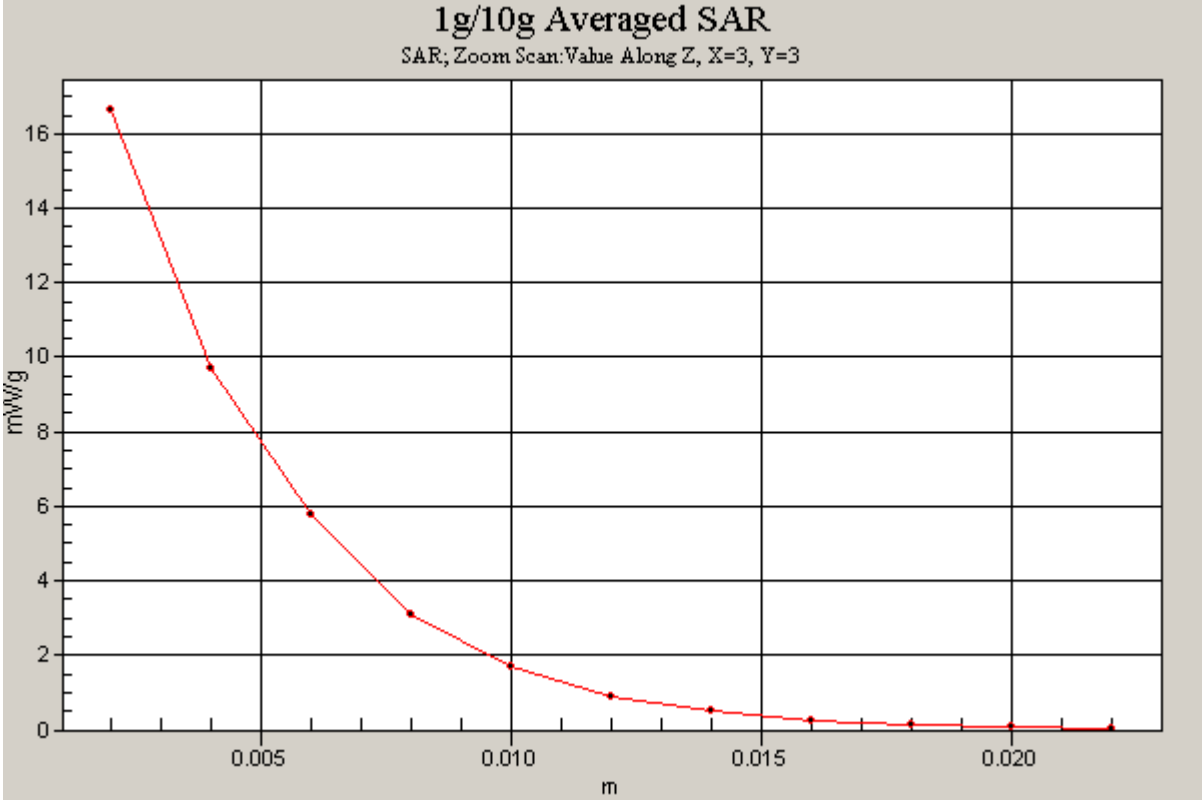
Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
f = 5200 MHz; σ = 5.328 mho/m; ε_r = 47.80; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-12-2011; Ambient Temp: 21.3 °C; Tissue Temp: 19.6 °C

Probe: EX3DV4 - SN3561; ConvF(3.7, 3.7, 3.7); Calibrated: 7/27/2011
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

5200MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 8.25 mW/g; SAR(10 g) = 2.31 mW/g
Deviation = 6.18 %



PCTEST ENGINEERING LABORATORY, INC.

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

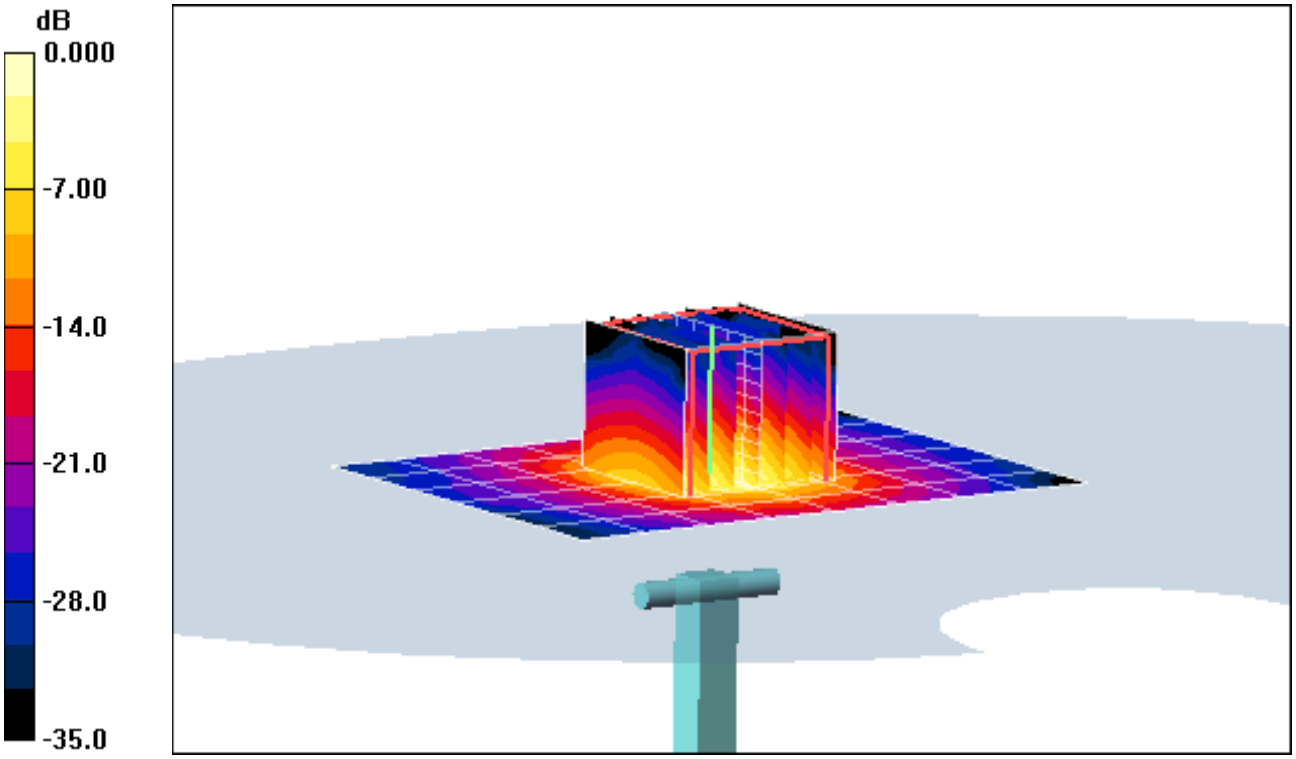
Communication System: CW; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
f = 5500 MHz; σ = 5.779 mho/m; ε_r = 46.87; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-12-2011; Ambient Temp: 21.5 °C; Tissue Temp: 19.8 °C

Probe: EX3DV4 - SN3561; ConvF(3.28, 3.28, 3.28); Calibrated: 7/27/2011
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

5500MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 8.54 mW/g; SAR(10 g) = 2.35 mW/g
Deviation = 1.18 %



0 dB = 17.8mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

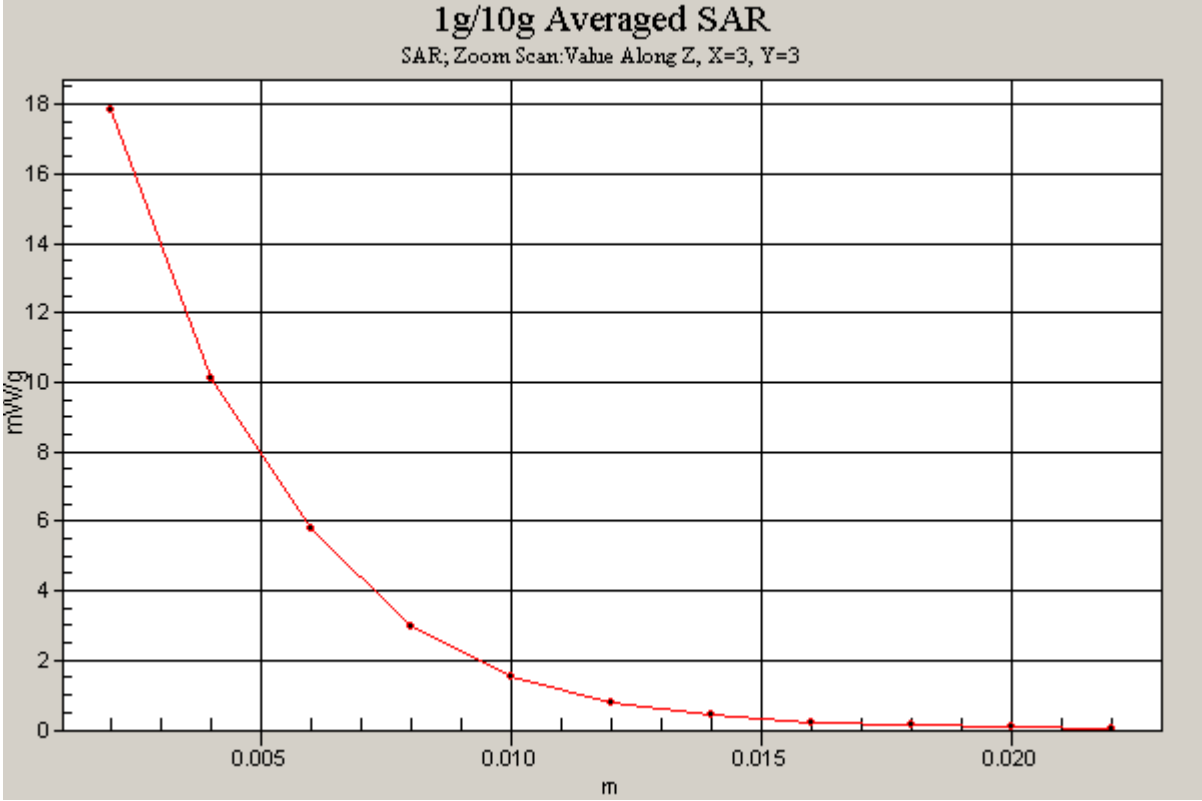
Communication System: CW; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
f = 5500 MHz; σ = 5.779 mho/m; ε_r = 46.87; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-12-2011; Ambient Temp: 21.5 °C; Tissue Temp: 19.8 °C

Probe: EX3DV4 - SN3561; ConvF(3.28, 3.28, 3.28); Calibrated: 7/27/2011
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

5500MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 8.54 mW/g; SAR(10 g) = 2.35 mW/g
Deviation = 1.18 %



PCTEST ENGINEERING LABORATORY, INC.

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

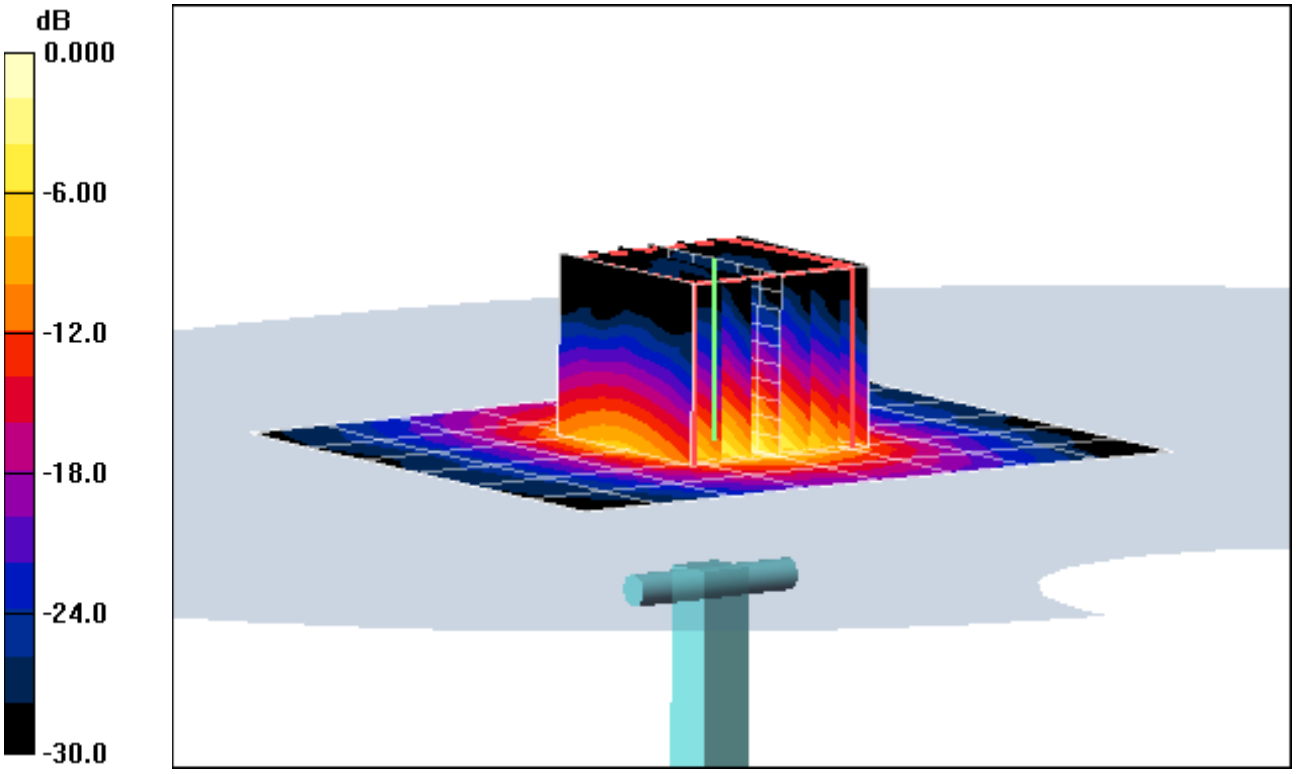
Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
f = 5800 MHz; σ = 6.297 mho/m; ε_r = 46.03; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-12-2011; Ambient Temp: 21.8 °C; Tissue Temp: 20.3 °C

Probe: EX3DV4 - SN3561; ConvF(3.34, 3.34, 3.34); Calibrated: 7/27/2011
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

5800MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 7.64 mW/g; SAR(10 g) = 2.13 mW/g
Deviation = 1.87 %



0 dB = 16.1mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5GHz Body Medium parameters used:
f = 5800 MHz; σ = 6.297 mho/m; ε_r = 46.03; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-12-2011; Ambient Temp: 21.8 °C; Tissue Temp: 20.3 °C

Probe: EX3DV4 - SN3561; ConvF(3.34, 3.34, 3.34); Calibrated: 7/27/2011
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

5800MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 7.64 mW/g; SAR(10 g) = 2.13 mW/g
Deviation = 1.87 %