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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:
10/19/11 – 01/09/12
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Test Report Serial No.:
0Y1112292211.A3L

FCC ID: **A3LGTP7320T**

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

EUT Type: Portable Tablet Computer
Application Type: Certification
FCC Rule Part(s): CFR §2.1093; FCC/OET Bulletin 65 Supplement C [June 2001]
Model(s): GT-P7320T
Test Device Serial No.: Pre-Production [S/N: FI-255-A, CSP^1, CSP^2, #1, #2]

Band & Mode	Tx Frequency	Conducted Power [dBm]	SAR
			1 gm Body (W/kg)
GPRS/EDGE 850	824.20 - 848.80 MHz	29.25	0.85
GPRS/EDGE 1900	1850.20 - 1909.80 MHz	28.88	0.69
WCDMA/HSPA 850	826.40 - 846.60 MHz	22.45	0.76
2.4 GHz WLAN	2412 - 2462 MHz	13.41	N/A
5.8 GHz WLAN	5745 - 5825 MHz	10.17	0.35
5.2 GHz WLAN	5180 - 5240 MHz	10.22	N/A
5.3 GHz WLAN	5260 - 5320 MHz	10.37	
5.5 GHz WLAN	5500 - 5700 MHz	10.14	0.73
Bluetooth	2402 - 2480 MHz	10.34	N/A

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

The wireless portable device has been shown to be electrically equivalent to the device of FCC ID: A3LGTP7320 with respect to GPRS/EDGE 850, GPRS/EDGE 1900, 2.4 GHz WLAN, 5 GHz WLAN and Bluetooth modes. Previous SAR test data for these modes have been incorporated in this report in addition to the new test data for WCDMA/HSPA 850 mode .

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

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

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

Randy Ortanez
President

ACCREDITED
TESTING LABORATORY
CERTIFICATE #2041.01

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1 EQUIPMENT UNDER TEST

1.1 Device Overview

Band & Mode	Tx Frequency
GPRS/EDGE 850	824.20 - 848.80 MHz
GPRS/EDGE 1900	1850.20 - 1909.80 MHz
WCDMA/HSPA 850	826.40 - 846.60 MHz
2.4 GHz WLAN	2412 - 2462 MHz
5.8 GHz WLAN	5745 - 5825 MHz
5.2 GHz WLAN	5180 - 5240 MHz
5.3 GHz WLAN	5260 - 5320 MHz
5.5 GHz WLAN	5500 - 5700 MHz
Bluetooth	2402 - 2480 MHz

1.2 Antenna Locations

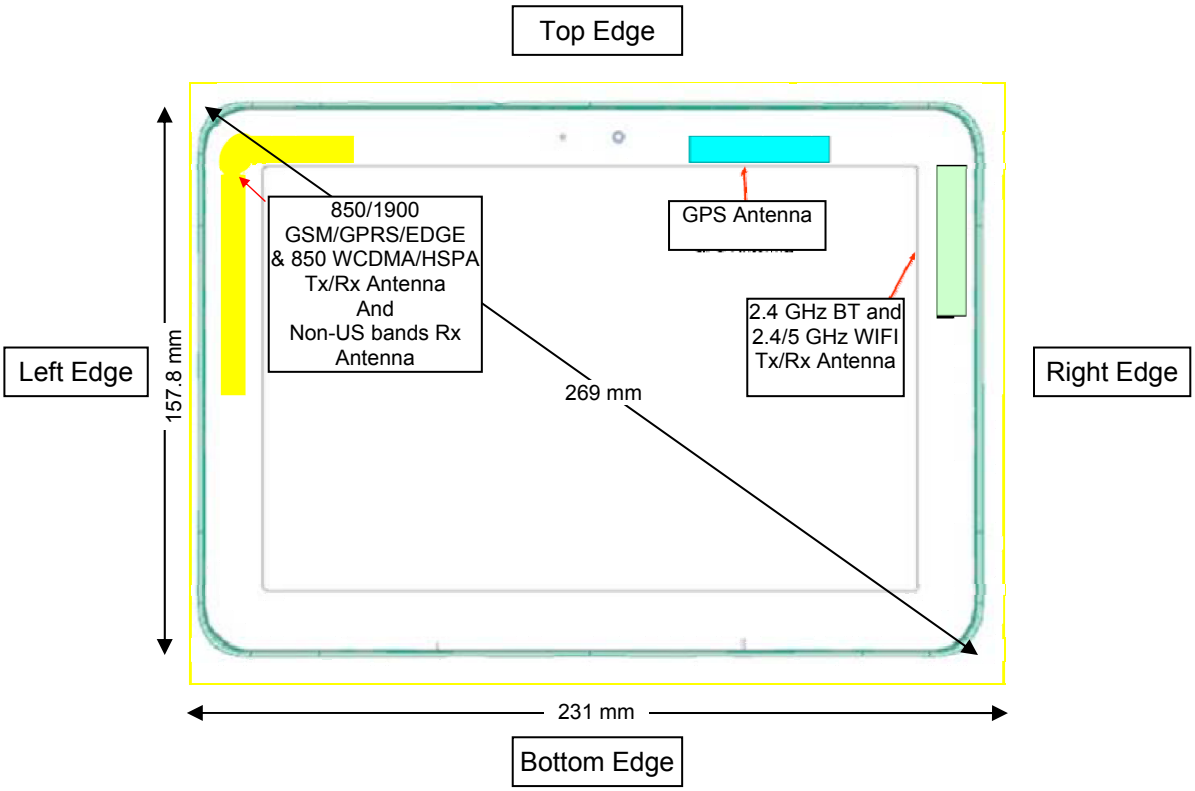

Figure 1-1
Front View of Device

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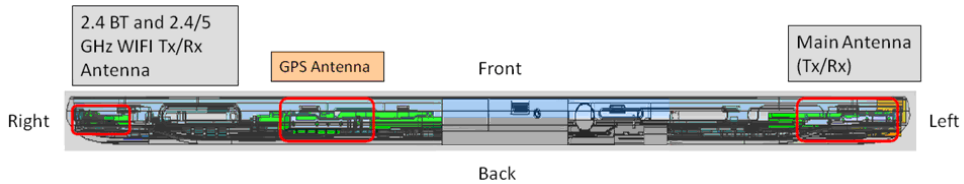

Figure 1-2
Top View of Device

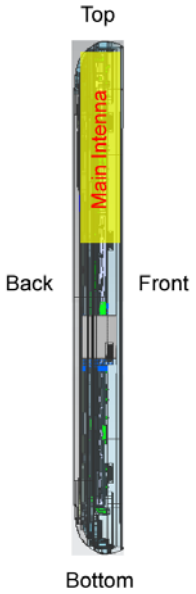

Figure 1-3
Left View of Device

Rear camera is not for video calls but for standard digital functions.

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, SAR tests for Bluetooth (10.814 mW) and IEEE 802.11b, g, and n (21.928 mW) are not required for both back side and edge exposure conditions. Additionally SAR tests for IEEE 802.11a in 5.2 GHz (10.52 mW) and 5.3 GHz (10.89 mW) frequency bands are not required.

Bluetooth and WIFI cannot transmit simultaneously since it shares the same antenna path. 5GHz WIFI cannot transmit simultaneously with the 2G/3G antennas.

(B) GSM/WCDMA Testing

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 are explained in further detail in the technical description for this model.

1.4 Simultaneous Transmission Capabilities

Simultaneous transmissions according to KDB Publication 447498, except for transmissions during network hand-offs, with maximum hand-off duration less than 30 seconds, transmitters are considered to be transmitting simultaneously when there is overlapping transmission. The tablet procedures required by KDB publication 447498 generally do not require separate hotspot mode testing.

Table 1-1
Simultaneous Transmission Scenarios

No.	Simultaneous Transmission Scenarios	Body SAR	Note
1	GPRS/EDGE Data + 2.4 GHz WIFI	Yes	2G Hotspot Only
2	WCDMA + 2.4 GHz WIFI	Yes	3G Hotspot Only
3	GPRS/EDGE Data + 5 GHz WIFI	No	Blocked by S/W
4	WCDMA Data + 5 GHz WIFI	No	Blocked by S/W

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Figure 1-4
Simultaneous Transmission Paths

Per KDB publication 447498 4) b) since the output power of the antenna is ≤ 60/f (GHz), **Bluetooth, 2.4 GHz WIFI, 5.2 and 5.3 GHz WIFI SAR tests are not required** for both back side and edge exposure conditions. No further analysis was necessary to determine if simultaneous transmission cases would exceed the SAR limit. Since SAR measurement was not required for 2.4 GHz BT and WIFI, and 5 GHz WIFI cannot transmit simultaneously with the 2G/3G antennas, the standalone evaluations are sufficient to show compliance for simultaneous transmission scenarios.

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 for more information.

1.6 Samples Used for SAR Testing

Several samples 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. An additional sample was used for WIFI.

Table 1-2
SAR Test Sample Serial Numbers

	GSM 850	GSM 1900	WCDMA 850	5 GHz WIFI
Maximum Power	CSP^1	CSP^1	#2	FI-255-A
Reduced Power	CSP^2	CSP^2	#1	

1.7 FCC Guidance Applied

- FCC OET Supplement C
- IEEE 1528-2003
- FCC KDB 447498 Section 4 (Tablet SAR Considerations)
- April/Oct 2011 TCB Workshop Notes for RF Exposure and Sensors with Power Reduction
- FCC KDB 941225 (2G/3G, Wireless Router)
- FCC KDB 248227 (802.11)
- FCC KDB 865664 (5-6 GHz techniques)

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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. 1-1).

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

Figure 1-1
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]

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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.

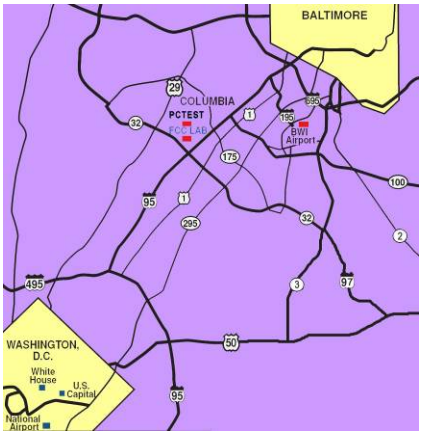

Figure 3-1
Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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

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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

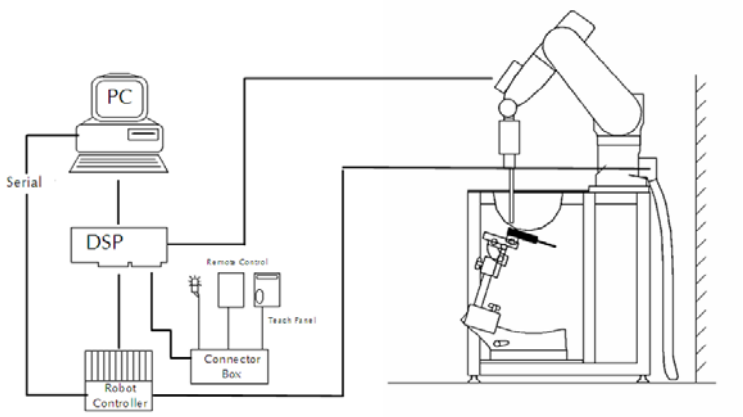

Figure 4-1
SAR Measurement System Setup

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.

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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

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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. 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

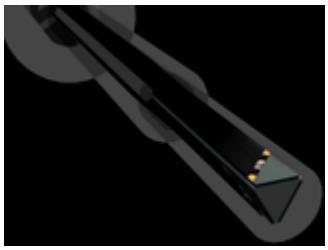

Figure 5-3
Triangular Probe Configuration

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6 PHANTOM AND EQUIVALENT TISSUES

6.1 SAM Phantoms

Figure 6-1
SAM Phantoms

The SAM Twin Phantom V4.0 and V5.0 is 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		
Triton X-100			10.67
Diethylenglycol monohexylether			10.67
Water	53.06	70.17	78.66

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7 DOSIMETRIC ASSESSMENT

7.1 Measurement Procedure

The evaluation was performed using the following procedure:

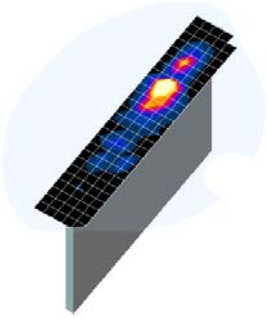

Figure 7-1
Sample SAR Area Scan

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.
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 drift deviated by more than 5%, the SAR test and drift measurements were 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.

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8 FCC RF EXPOSURE LIMITS

8.1 Uncontrolled Environment

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

8.2 Controlled Environment

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

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

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT *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.

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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 (26.9 cm), this device is a tablet.

9.2 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.

9.3 Proximity Sensors Information

The sensor pads are located near the upper half of the device and the left half of the device to cover exposure conditions to the main antenna. The technical description contains information about sensor sizes, coverage areas, and locations. Power reduction levels are provided in Section 9.5.

9.4 Display Orientation Capabilities

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

9.5 Additional SAR Testing for the Back and Top of the Device

Based on the type and implementation of the sensors, 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 the back, top, and left edges of the tablet at 0° to cover direct usage and also at a 60° angle to cover angled usage (see Tables 9-1 through 9-5).

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 is 6 mm for the top and left edges, a conservative distance of 5 mm was tested. Details about sensing mechanism and sensor pad location are included in the technical description.

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

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Table 9-1
Distance from Back of Tablet

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

Please see Figures 9-1 through 9-5 for target power vs. Back-off distance plots for each GPRS multi-slot and WCDMA mode.

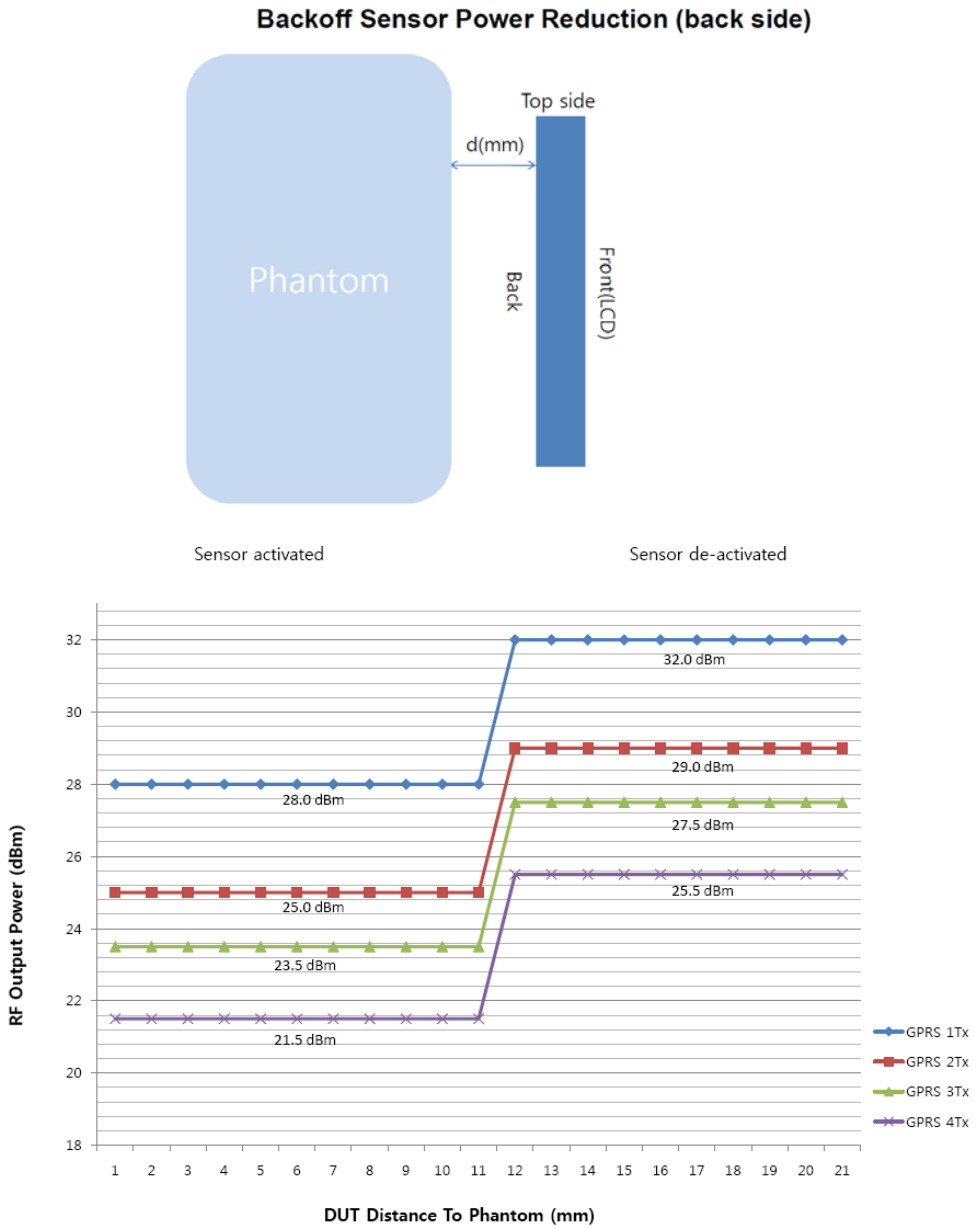

Figure 9-1
GPRS (GMSK) 850 Back off Power Reduction Graph - Back Side

Data in Figure 9-1 demonstrates reduced fixed GPRS (GMSK) 850 power levels at a distance of 11mm and less from the back, as shown in Table 9-1.

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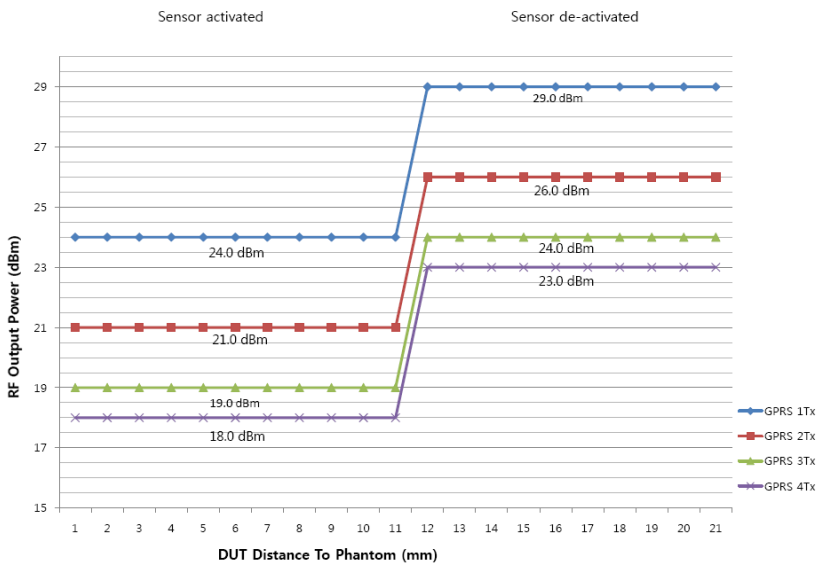

Figure 9-2
GPRS (GMSK) 1900 Back off Power Reduction Graph - Back Side

Data in Figure 9-2 demonstrates reduced fixed GPRS (GMSK) 1900 power levels at a distance of 11mm and less from the back, as shown in Table 9-1.

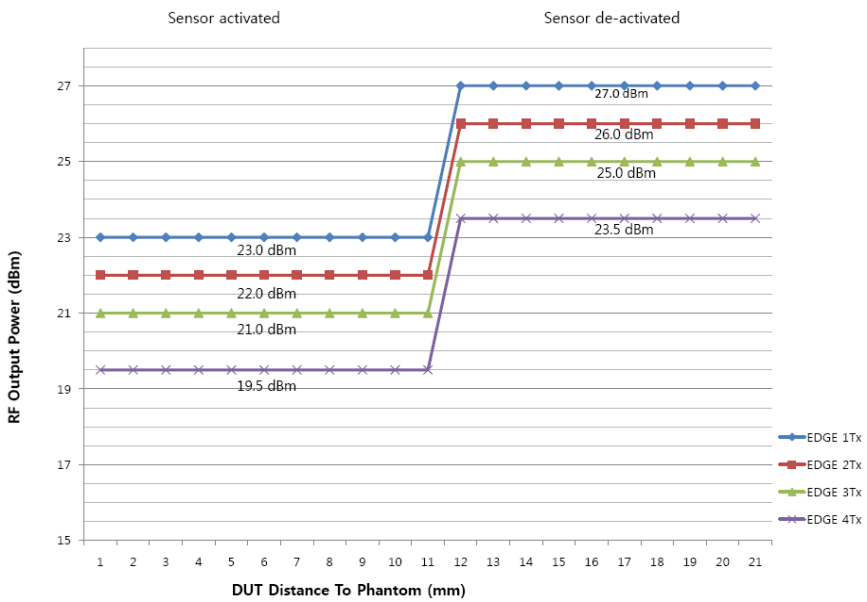

Figure 9-3
EDGE (8-PSK) 850 Back off Power Reduction Graph - Back Side

Data in Figure 9-3 demonstrates reduced fixed EDGE (8-PSK) 850 power levels at a distance of 11mm and less from the back, as shown in Table 9-1.

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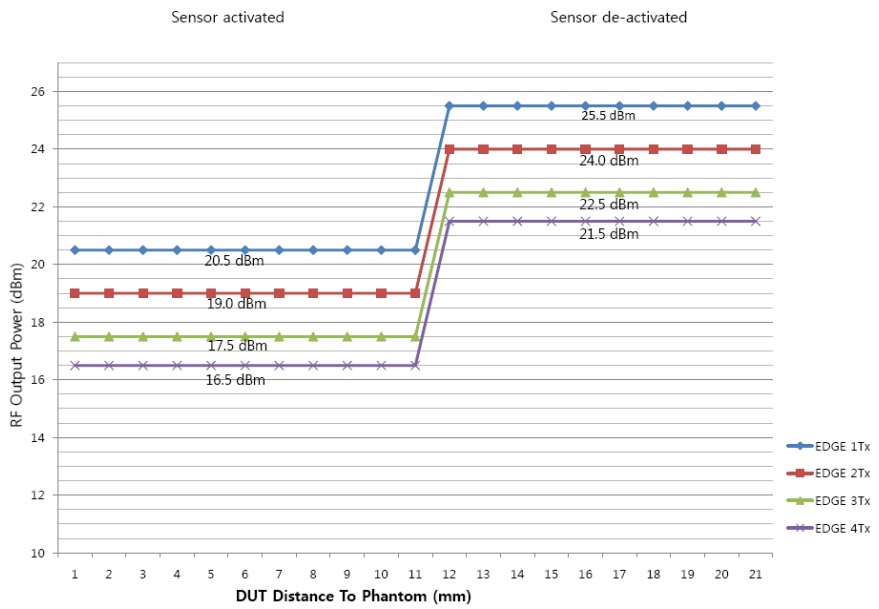

Figure 9-4
EDGE (8-PSK) 1900 Back off Power Reduction Graph - Back Side

Data in Figure 9-4 demonstrates reduced fixed EDGE (8-PSK) 1900 power levels at a distance of 11mm and less from the back, as shown in Table 9-1.

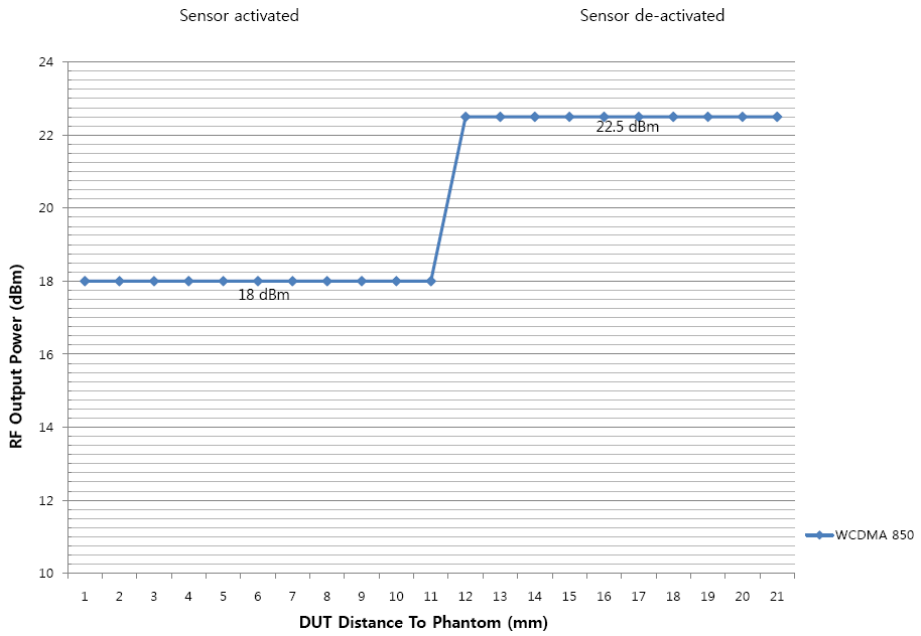

Figure 9-5
WCDMA 850 Back off Power Reduction Graph - Back Side

Data in Figure 9-5 demonstrates reduced fixed WCDMA 850 power levels at a distance of 11mm and less from the back, as shown in Table 9-1.

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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 Figures 9-6 through 9-10 for target power vs. Back-off distance plots for each GPRS multi-slot and WCDMA mode.

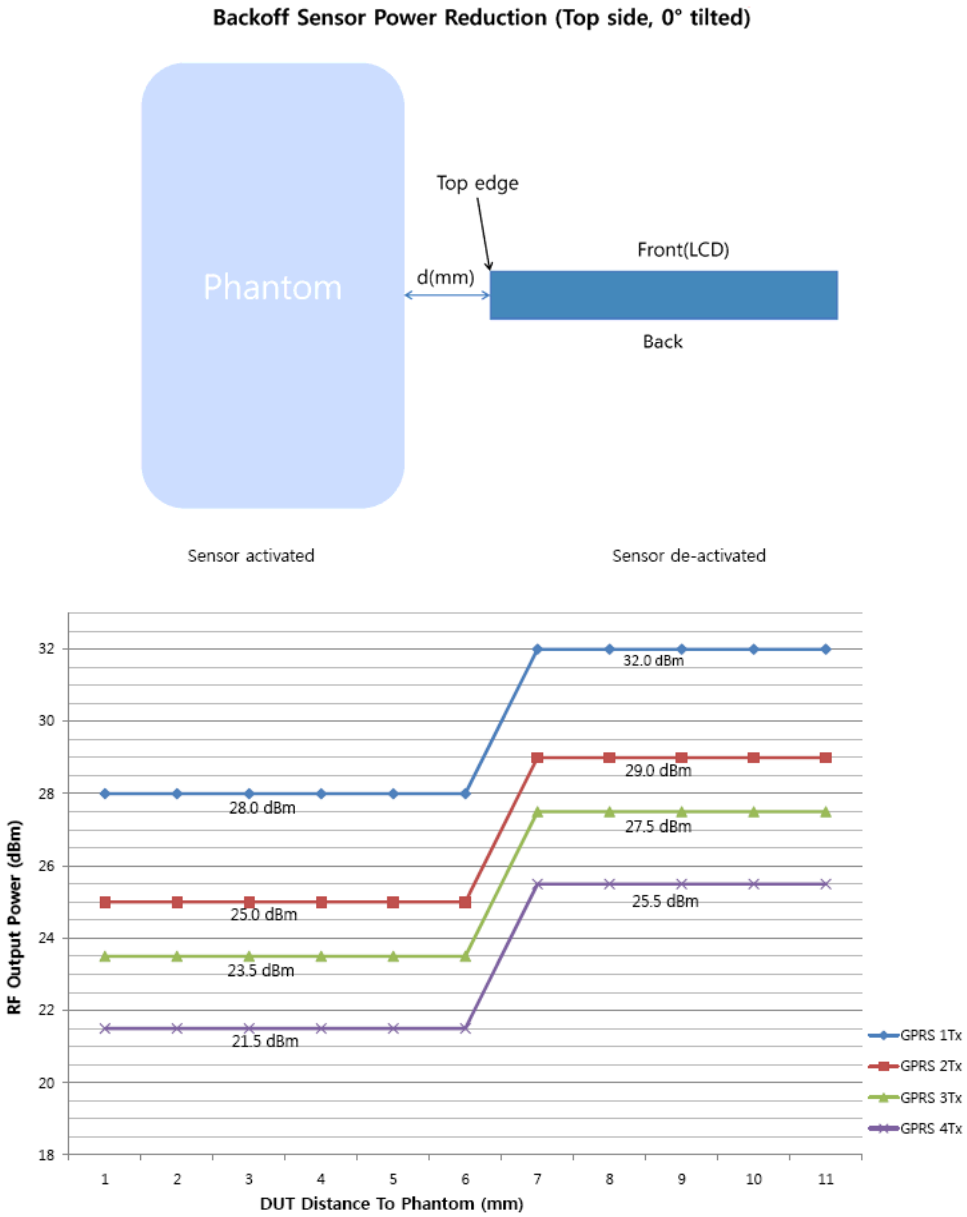

Figure 9-6
GPRS (GMSK) 850 Back off Power Reduction Graph - Top at 0° Angle

Data in Figure 9-6 demonstrates reduced fixed GPRS (GMSK) 850 power levels at a distance of 6 mm and less, from the top edge of the device as shown in Table 9-2.

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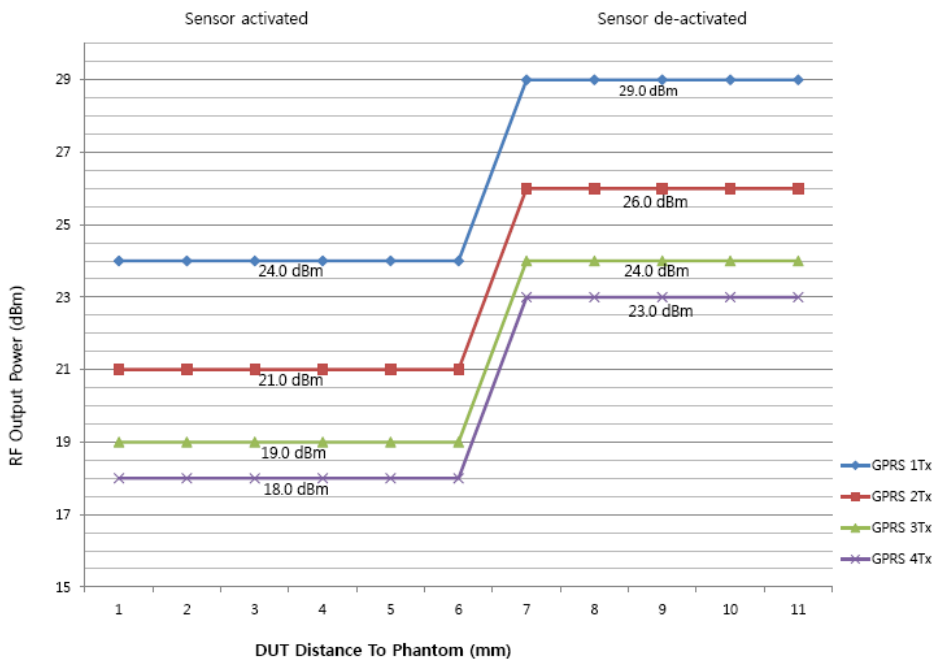

Figure 9-7
GPRS (GMSK) 1900 Back off Power Reduction Graph - Top at 0° Angle

Data in Figure 9-7 demonstrates reduced fixed GPRS (GMSK) 1900 power levels at a distance of 6 mm and less, from the top edge of the device as shown in Table 9-2.

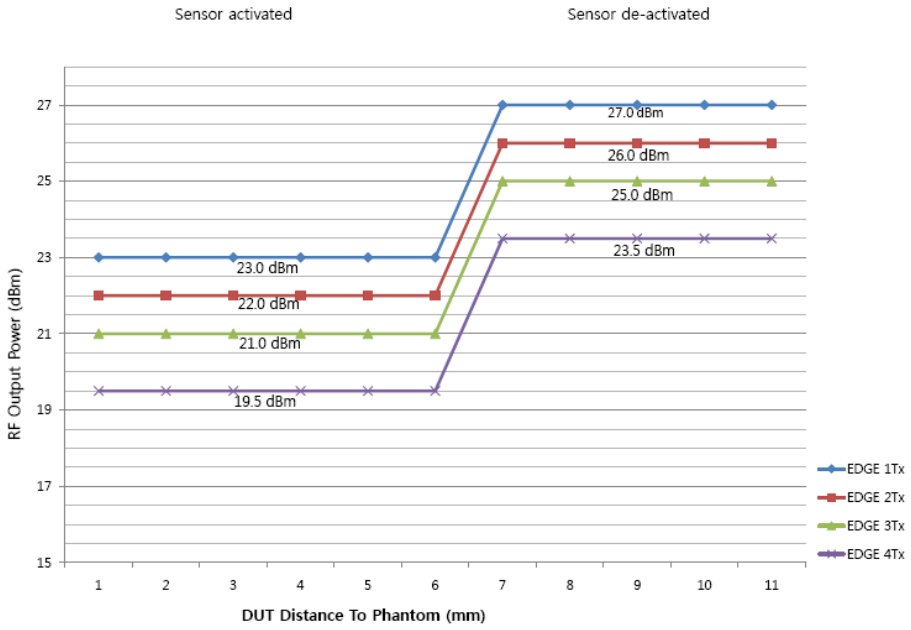

Figure 9-8
EDGE (8-PSK) 850 Back off Power Reduction Graph - Top at 0° Angle

Data in Figure 9-8 demonstrates reduced fixed EDGE (8-PSK) 850 power levels at a distance of 6 mm and less, from the top edge of the device as shown in Table 9-2.

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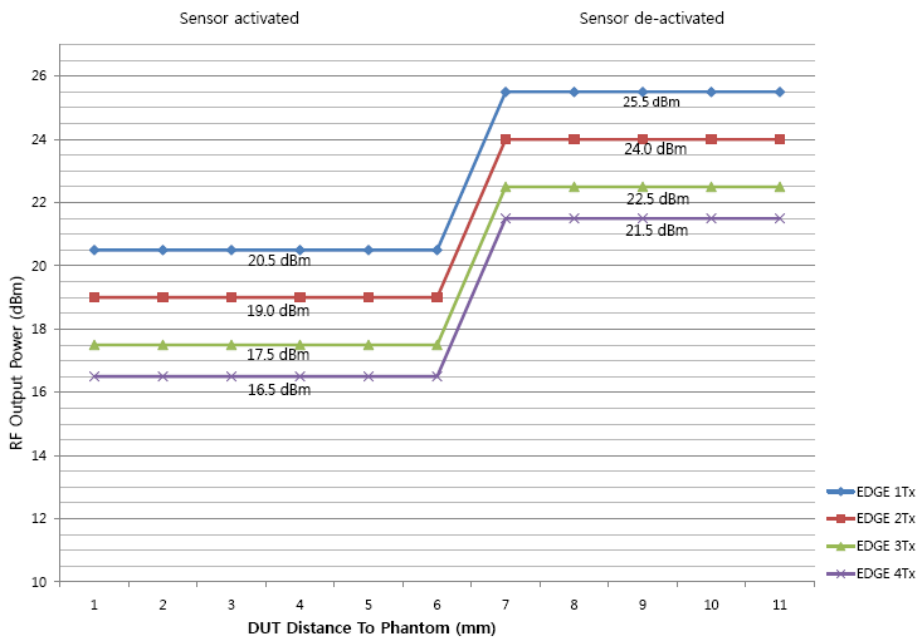

Figure 9-9
EDGE (8-PSK) 1900 Back off Power Reduction Graph - Top at 0° Angle

Data in Figure 9-9 demonstrates reduced fixed EDGE (8-PSK) 1900 power levels at a distance of 6 mm and less, from the top edge of the device as shown in Table 9-2.

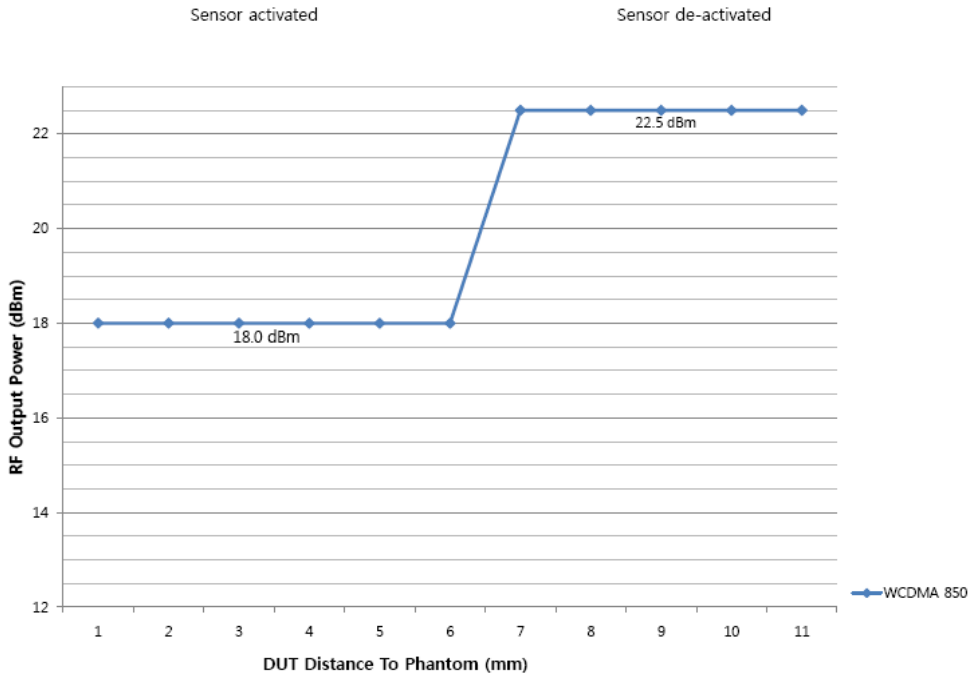

Figure 9-10
WCDMA 850 Back off Power Reduction Graph - Top at 0° Angle

Data in Figure 9-10 demonstrates reduced fixed WCDMA 850 power levels at a distance of 6 mm and less, from the top edge of the device as shown in Table 9-2.

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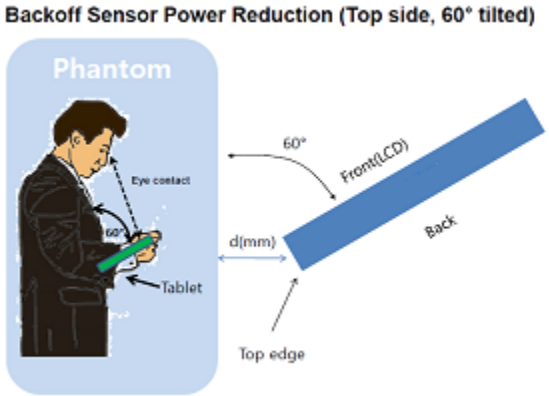
Table 9-3
Distance from Top Edge of Tablet - 60° Angle

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 Figures 9-11 through 9-15 for target power vs. Back-off distance plots for each GPRS multi-slot and WCDMA mode.



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.

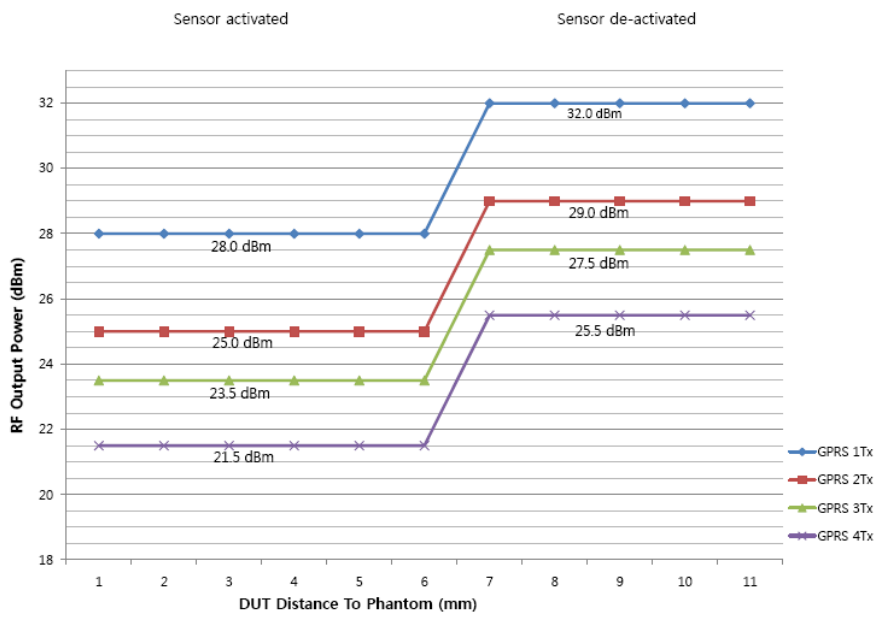


Figure 9-11
GPRS (GMSK) 850 Back off Power Reduction Graph - Top Edge at 60° Angle

Data in Figure 9-11 demonstrates reduced fixed GPRS (GMSK) 850 power levels at a distance of 6 mm and less, from the top edge at a 60 degree angle as shown in Table 9-3.

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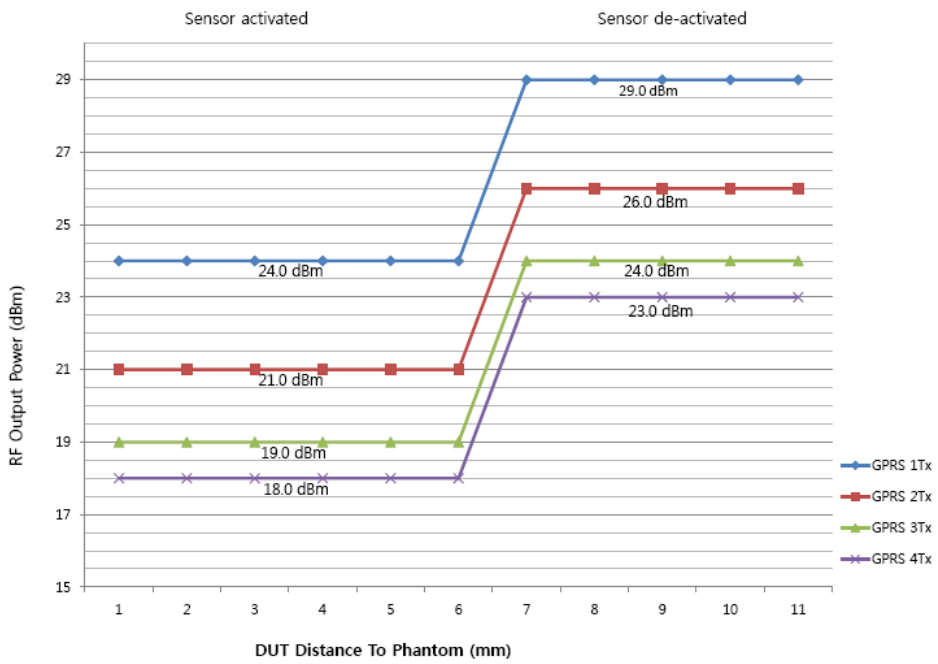

Figure 9-12
GPRS (GMSK) 1900 Back off Power Reduction Graph - Top Edge at 60° Angle

Data in Figure 9-12 demonstrates reduced fixed GPRS (GMSK) 1900 power levels at a distance of 6 mm and less, from the top edge at a 60 degree angle as shown in Table 9-3.

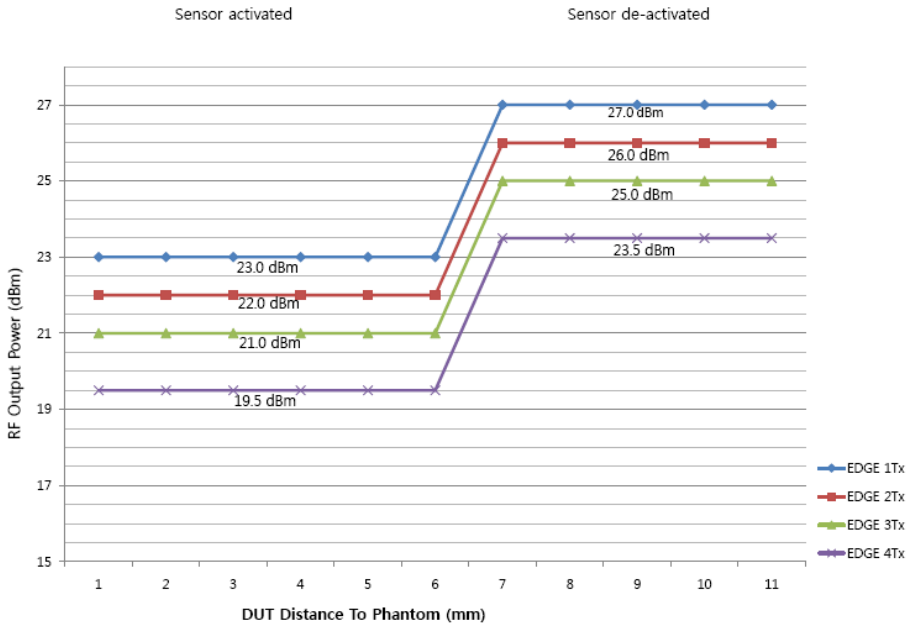

Figure 9-13
EDGE (8-PSK) 850 Back off Power Reduction Graph - Top Edge at 60° Angle

Data in Figure 9-13 demonstrates reduced fixed EDGE (8-PSK) 850 power levels at a distance of 6 mm and less, from the top edge at a 60 degree angle as shown in Table 9-3.

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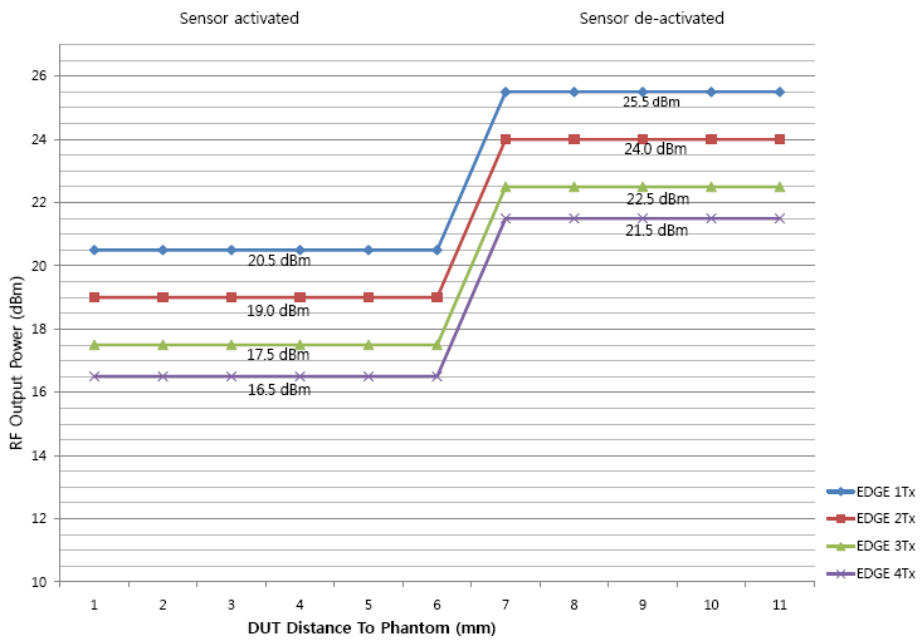

Figure 9-14

EDGE (8-PSK) 1900 Back off Power Reduction Graph - Top Edge at 60° Angle

Data in Figure 9-14 demonstrates reduced fixed EDGE (8-PSK) 1900 power levels at a distance of 6 mm and less, from the top edge at a 60 degree angle as shown in Table 9-3.

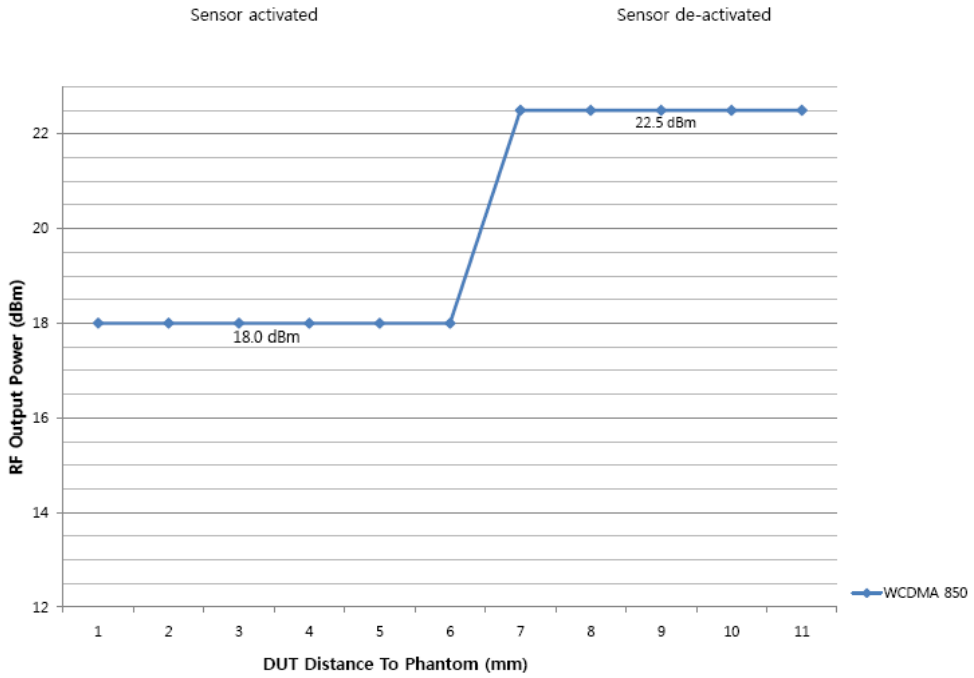

Figure 9-15

WCDMA 850 Back off Power Reduction Graph - Top Edge at 60° Angle

Data in Figure 9-15 demonstrates reduced fixed WCDMA 850 power levels at a distance of 6 mm and less, from the top edge at a 60 degree angle as shown in Table 9-3.

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Backoff Sensor Power Reduction (Left side, 0° tilted)

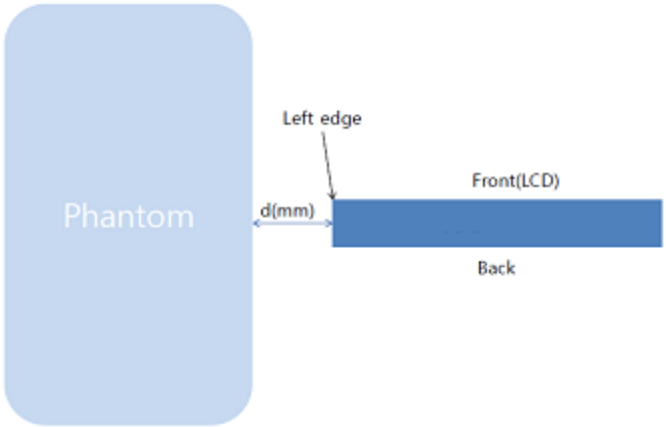

Table 9-4
Distance from Left Edge of Tablet - 0° Angle

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

Please see Figures 9-16 through 9-20 for target power vs. back-off distance plots for each GPRS multi-slot and WCDMA mode.

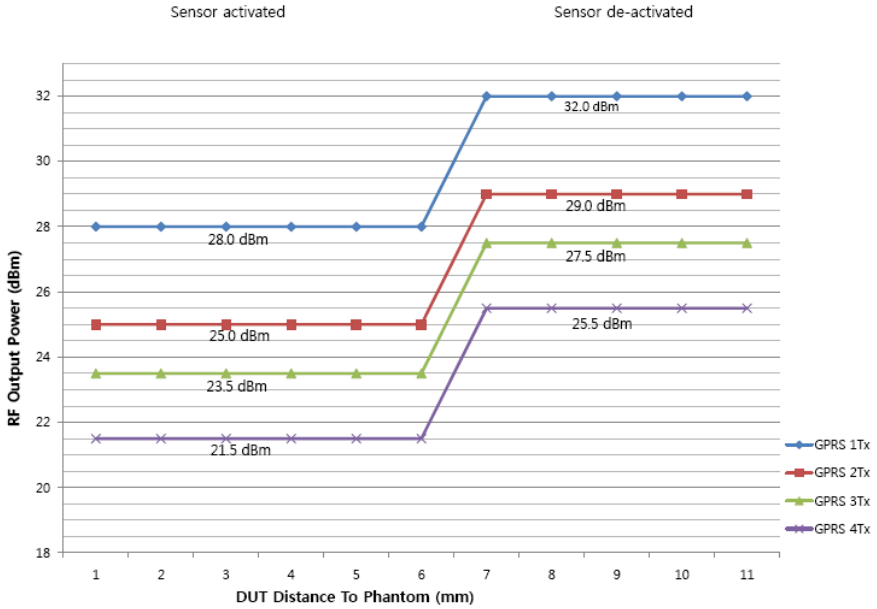

Figure 9-16
GPRS (GMSK) 850 Back off Power Reduction Graph - Left at 0° Angle

Data in Figure 9-16 demonstrates reduced fixed GPRS (GMSK) 850 power levels at a distance of 6 mm and less, from the left edge of the device as shown in Table 9-4.

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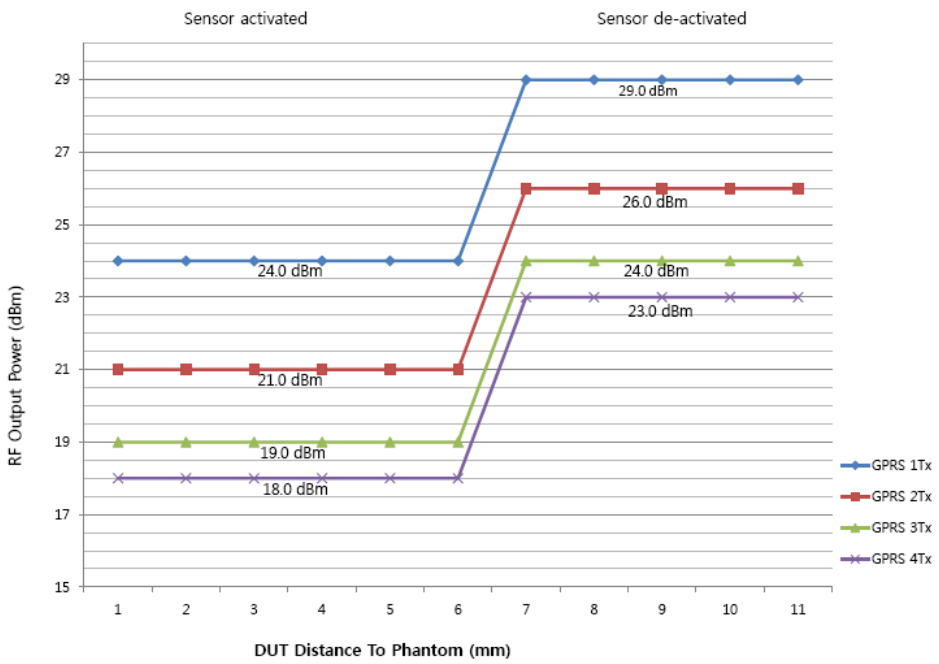

Figure 9-17
GPRS (GMSK) 1900 Back off Power Reduction Graph - Left at 0° Angle

Data in Figure 9-17 demonstrates reduced fixed GPRS (GMSK) 1900 power levels at a distance of 6 mm and less, from the left edge of the device as shown in shown in Table 9-4.

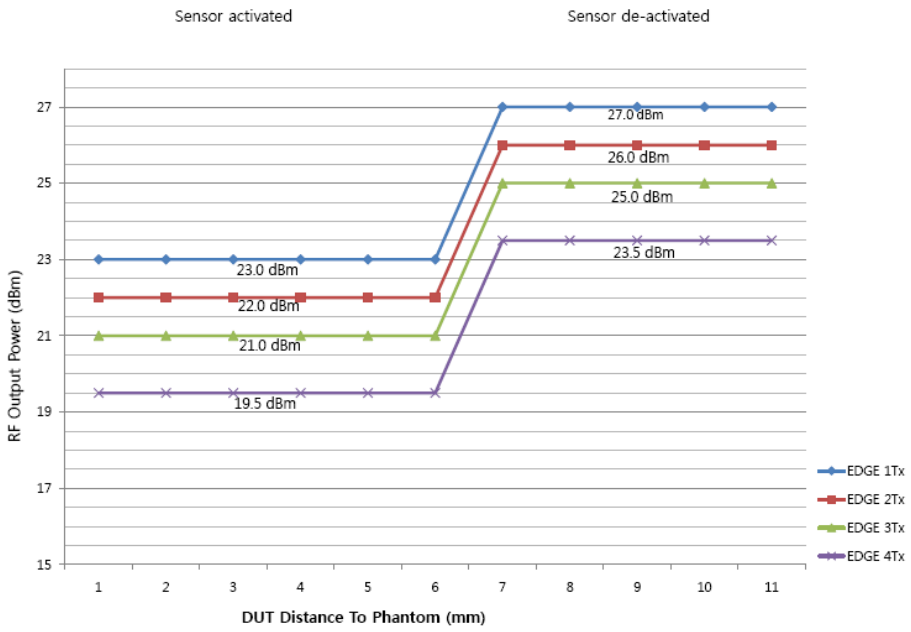

Figure 9-18
EDGE (8-PSK) 850 Back off Power Reduction Graph - Left at 0° Angle

Data in Figure 9-18 demonstrates reduced fixed EDGE (8-PSK) 850 power levels at a distance of 6 mm and less, from the left edge of the device as shown in Table 9-4.

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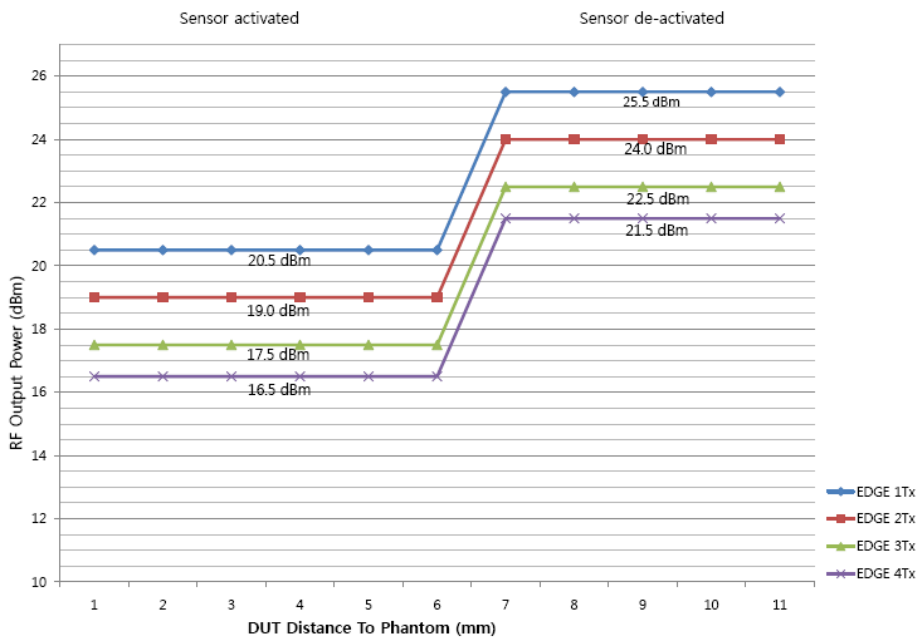

Figure 9-19
EDGE (8-PSK) 1900 Back off Power Reduction Graph - Left at 0° Angle

Data in Figure 9-19 demonstrates reduced fixed EDGE (8-PSK) 1900 power levels at a distance of 6 mm and less, from the left edge of the device as shown in Table 9-4.

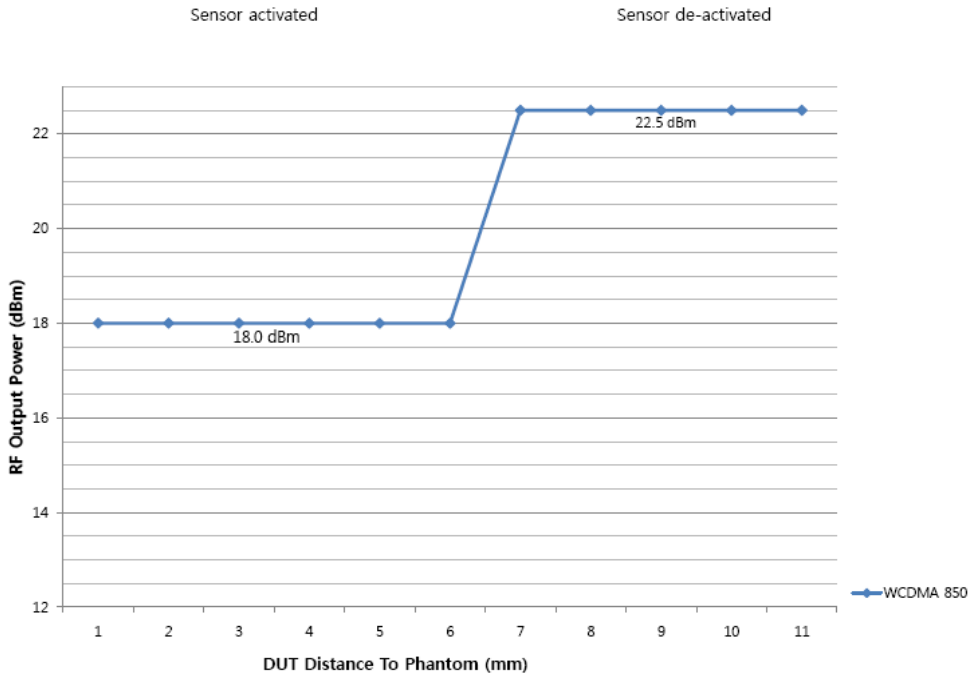

Figure 9-20
WCDMA 850 Back off Power Reduction Graph - Left at 0° Angle

Data in Figure 9-20 demonstrates reduced fixed WCDMA 850 power levels at a distance of 6 mm and less, from the left edge of the device as shown in Table 9-4.

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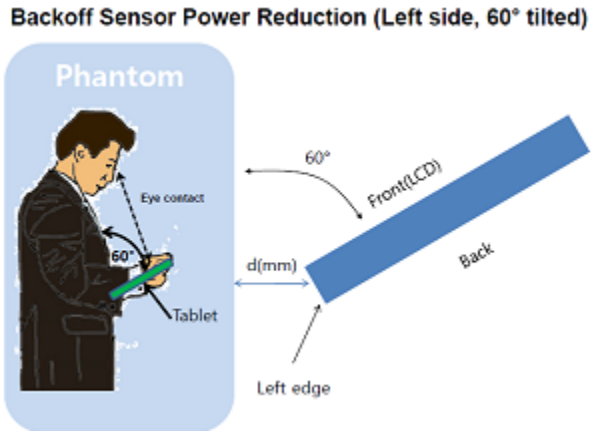
Table 9-5
Distance from Left Edge of Tablet - 60° Angle

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

Please see Figures 9-21 through 9-25 for power vs. back-off distance plots for each GPRS multi-slot and WCDMA mode.



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 left 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.

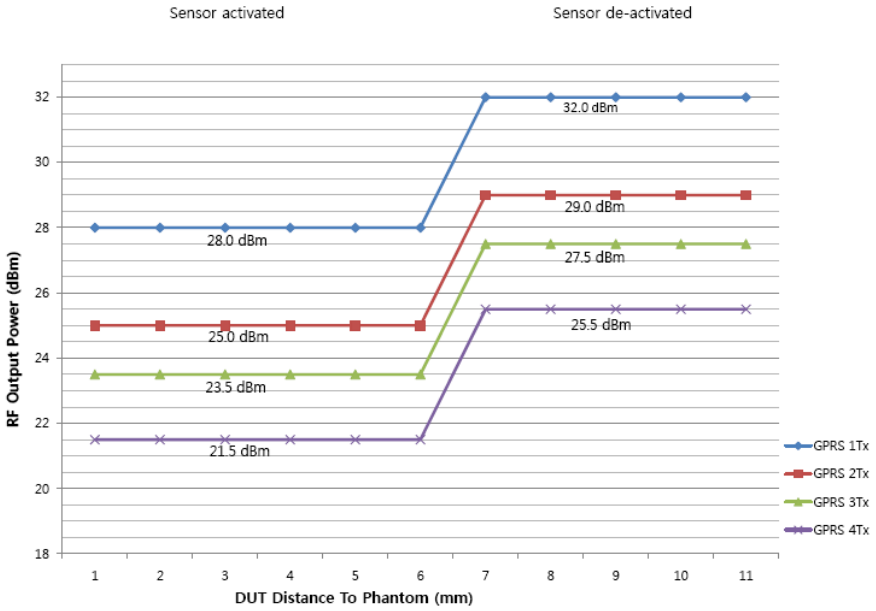


Figure 9-21
GPRS (GMSK) 850 Back off Power Reduction Graph - Left Edge at 60° Angle

Data in Figure 9-21 demonstrates reduced fixed GPRS (GMSK) 850 power levels at a distance of 6 mm and less, from the left edge at a 60 degree angle as shown in Table 9-5.

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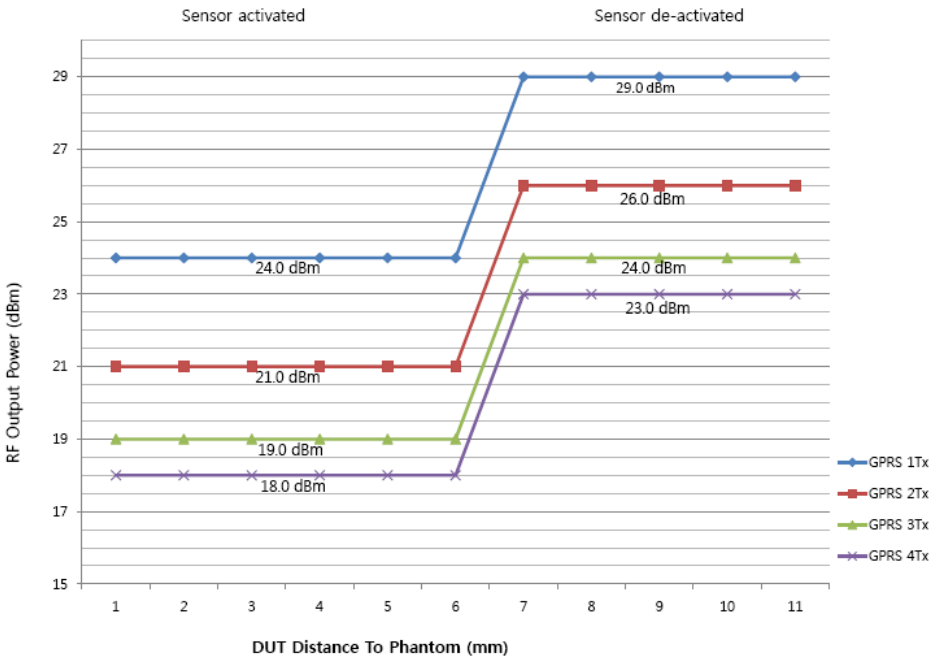

Figure 9-22
GPRS (GMSK) 1900 Back off Power Reduction Graph - Left Edge at 60° Angle

Data in Figure 9-22 demonstrates reduced fixed GPRS (GMSK) 1900 power levels at a distance of 6 mm and less, from the left edge at a 60 degree angle as shown in Table 9-5.

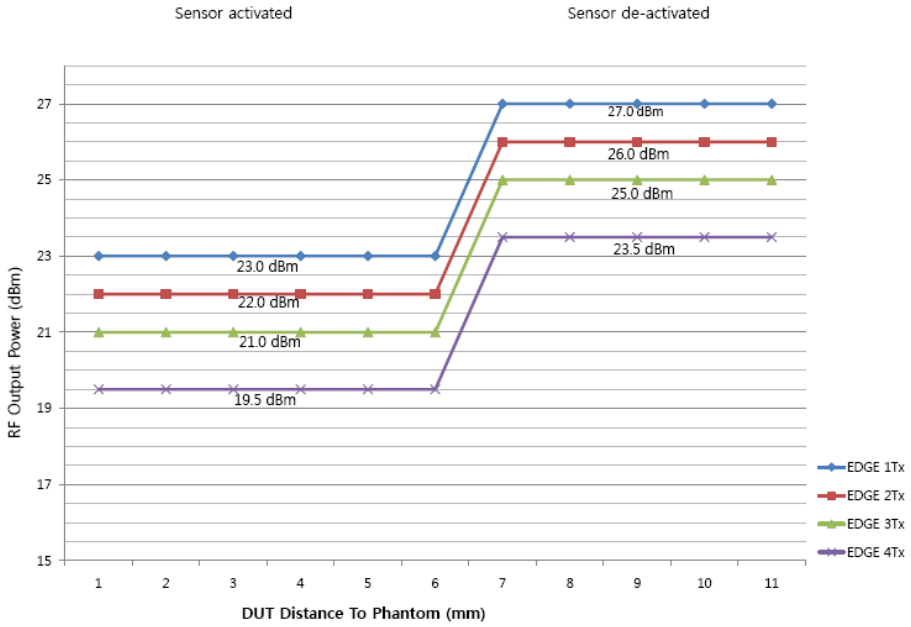

Figure 9-23
EDGE (8-PSK) 850 Back off Power Reduction Graph - Left at 60° Angle

Data in Figure 9-23 demonstrates reduced fixed EDGE (8-PSK) 850 power levels at a distance of 6 mm and less, from the left edge at a 60 degree angle as shown in Table 9-5.

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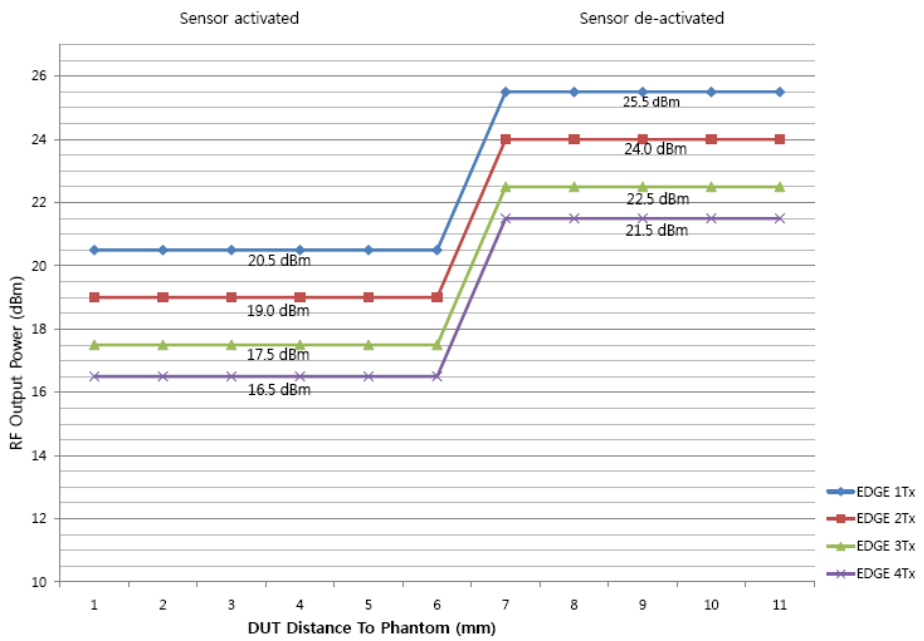

Figure 9-24
EDGE (8-PSK) 1900 Back off Power Reduction Graph - Left at 60° Angle

Data in Figure 9-24 demonstrates reduced fixed EDGE (8-PSK) 1900 power levels at a distance of 6 mm and less, from the left edge at a 60 degree angle as shown in Table 9-5.

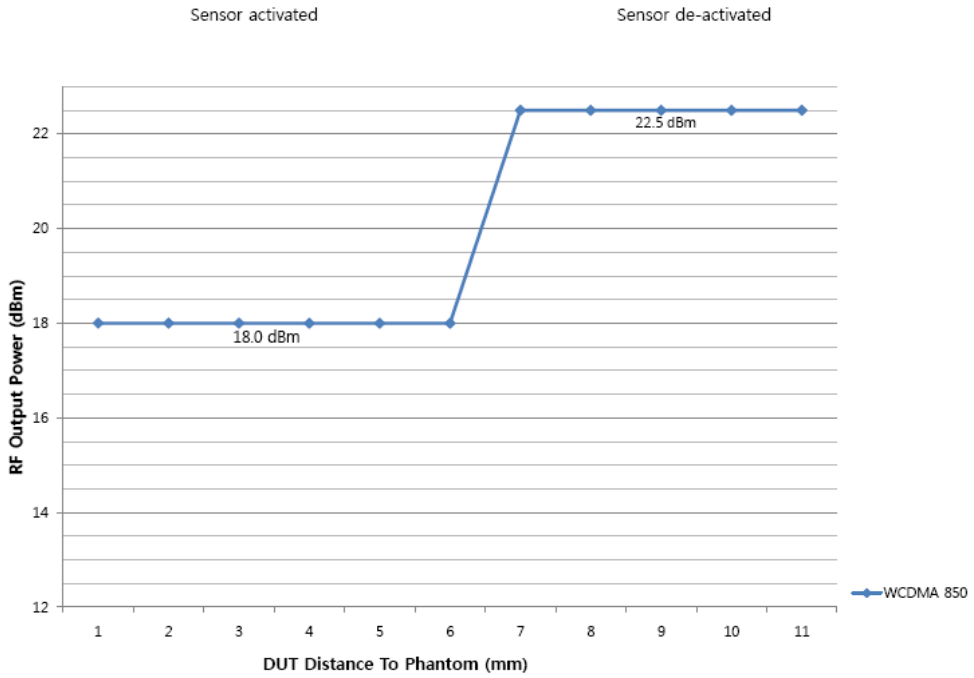

Figure 9-25
WCDMA 850 Back off Power Reduction Graph - Left at 60° Angle

Data in Figure 9-25 demonstrates reduced fixed WCDMA 850 power levels at a distance of 6 mm and less, from the left edge at a 60 degree angle as shown in Table 9-5.

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9.6 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.

Please see Section 1.6 for samples used during testing.

Based on the power-reduction activation vs. distance results for the sensors, the device was tested at 0mm distance from the phantom with the sensor activated and additionally at a conservative 10 mm distance with the sensor de-activated (max power, no power reduction) from the back side; and 5 mm from the top and left edges with the sensor de-activated (max power, no power reduction).

Reduced power samples (tuned to the reduced power levels) were tested to represent SAR data for power back-off sensor active samples. Power reduction on reduced power samples was disabled via software (only available from the manufacturer) to ensure the samples were always transmitting at reduced powers and to confirm reduced power levels.

For the additional SAR measurements with the sensors de-activated when the device is positioned away from the user, SAR evaluation is required without power back-off at 10 mm (from the back) and 5mm (from the top and left edges). Since the device sensor detection mechanism is active at these distances, the sensor 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.

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

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

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 SAR Measurements for Data Devices with Rel 5 HSDPA

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

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

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10.2.4 SAR Measurements for Data Devices with Rel 6 HSUPA

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

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	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 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.

10.3.1 General Device Setup

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

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10.3.2 Frequency Channel Configurations [27]

802.11 a/b/g/n 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 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 10-1
802.11 Test Channels per FCC KDB Publication 248227

Mode		GHz	Channel	Turbo Channel	"Default Test Channels"			
					§15.247		UNII	
					802.11b	802.11g		
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		√			

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

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11 RF CONDUCTED POWERS

11.1 Licensed Transmitter Conducted Powers

11.1.1 GSM Conducted Powers

Table 11-1
Maximum GPRS/EDGE Powers (Representing Proximity Sensor Inactive)

		Maximum Burst-Averaged Output Power							
		GPRS Data (GMSK)				*EDGE Data (8-PSK)*			
Band	**Channel**	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	31.52	**29.17**	**27.68**	25.74	27.00	26.00	24.80	23.40
	190	31.50	**29.25**	**27.70**	25.85	26.90	25.95	24.70	23.35
	251	31.65	**29.20**	**27.45**	25.65	26.85	25.85	24.60	23.30
PCS	512	**28.75**	**26.10**	**24.16**	**22.72**	25.80	24.20	22.50	21.70
	661	**28.88**	**25.92**	**24.22**	**22.95**	25.75	24.15	22.45	21.75
	810	**28.55**	**25.82**	**24.19**	**22.99**	25.85	24.10	22.50	21.60
		Calculated Maximum Frame-Averaged Output Power							
		GPRS/EDGE Data (GMSK)				*EDGE Data (8-PSK)*			
Band	**Channel**	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	22.49	**23.15**	**23.42**	22.73	17.97	19.98	20.54	20.39
	190	22.47	**23.23**	**23.44**	22.84	17.87	19.93	20.44	20.34
	251	22.62	**23.18**	**23.19**	22.64	17.82	19.83	20.34	20.29
PCS	512	**19.72**	**20.08**	**19.90**	**19.71**	16.77	18.18	18.24	18.69
	661	**19.85**	**19.90**	**19.96**	**19.94**	16.72	18.13	18.19	18.74
	810	**19.52**	**19.80**	**19.93**	**19.98**	16.82	18.08	18.24	18.59

Notes:

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

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Table 11-2
Reduced GPRS Powers (Representing Proximity Sensor Active)

		Maximum Burst-Averaged Output Power							
		GPRS Data (GMSK)				*EDGE Data (8-PSK)*			
Band	**Channel**	**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	27.52	**25.38**	**23.81**	21.60	23.20	22.15	21.00	19.30
	190	27.58	**25.18**	**23.90**	21.69	23.15	22.10	20.90	19.40
	251	27.64	**25.29**	**23.80**	21.63	23.20	22.20	21.10	19.70
PCS	512	**23.68**	**20.88**	**19.07**	**17.66**	20.80	18.70	17.10	16.85
	661	**23.88**	**21.11**	**19.05**	**18.19**	20.80	18.85	17.05	16.75
	810	**23.77**	**21.00**	**19.09**	**18.05**	20.75	18.85	17.00	16.50
		Calculated Maximum Frame-Averaged Output Power							
		GPRS/EDGE Data (GMSK)				*EDGE Data (8-PSK)*			
Band	**Channel**	**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	18.49	**19.36**	**19.55**	18.59	14.17	16.13	16.74	16.29
	190	18.55	**19.16**	**19.64**	18.68	14.12	16.08	16.64	16.39
	251	18.61	**19.27**	**19.54**	18.62	14.17	16.18	16.84	16.69
PCS	512	**14.65**	**14.86**	**14.81**	**14.65**	11.77	12.68	12.84	13.84
	661	**14.85**	**15.09**	**14.79**	**15.18**	11.77	12.83	12.79	13.74
	810	**14.74**	**14.98**	**14.83**	**15.04**	11.72	12.83	12.74	13.49

Notes:

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. The bolded GPRS/EDGE modes were required for SAR testing according to the highest frame averaged output power per KDB publication 941225 D03.
3. GPRS (GMSK) output powers were measured with CS1. EDGE (8-PSK) powers were measured with MCS7.

GSM Class: C (data only, not capable of voice)
GPRS Multislot class: 12 (max 4 Tx Uplink slots)
EDGE Multislot class: 12 (max 4 Tx Uplink slots)
DTM Multislot Class: N/A

Table 11-3
GPRS Summary of Power Reduction due to Proximity Sensor

		Target Maximum Burst-Averaged Output Power [dBm]							
		GPRS Data (GMSK)				*EDGE Data (8-PSK)*			
Band	**Proximity Sensor State**	**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**
GSM 850	Inactive	32.00	29.00	27.50	25.50	27.00	26.00	25.00	23.50
	Active	28.00	25.00	23.50	21.50	23.00	22.00	21.00	19.50
GSM 1900	Inactive	29.00	26.00	24.00	23.00	25.50	24.00	22.50	21.50
	Active	24.00	21.00	19.00	18.00	20.50	19.00	17.50	16.50

Note: All GPRS/EDGE Multi-slot configurations reduced to the above target powers.

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11.1.2 WCDMA Conducted Powers

Table 11-4
Maximum WCDMA Powers (Representing Proximity Sensor Inactive)

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			βc	βd	MPR
			4132	4183	4233			
99	WCDMA	12.2 kbps RMC	22.34	**22.45**	22.43	-	-	-
6	HSDPA	Subtest 1	22.27	22.35	22.42	2	15	0
6		Subtest 2	22.47	22.44	**22.52**	11	15	0
6		Subtest 3	21.88	21.97	22.05	15	8	0.5
6		Subtest 4	21.87	21.90	22.02	15	4	0.5
6	HSUPA	Subtest 1	21.87	21.64	**22.14**	10	15	0
6		Subtest 2	20.91	20.90	20.96	6	15	2
6		Subtest 3	20.97	21.06	21.47	15	9	1
6		Subtest 4	21.09	20.99	21.30	2	15	2
6		Subtest 5	21.88	21.74	22.12	14	15	0

Table 11-5
Reduced WCDMA Powers (Representing Proximity Sensor Active)

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			βc	βd	MPR
			4132	4183	4233			
99	WCDMA	12.2 kbps RMC	18.07	**18.12**	18.00	-	-	-
6	HSDPA	Subtest 1	17.97	**18.09**	18.01	2	15	0
6		Subtest 2	18.04	18.08	18.05	11	15	0
6		Subtest 3	17.53	17.60	17.52	15	8	0.5
6		Subtest 4	17.57	17.62	17.52	15	4	0.5
6	HSUPA	Subtest 1	17.66	17.58	17.70	10	15	0
6		Subtest 2	16.60	16.67	16.64	6	15	2
6		Subtest 3	16.75	16.84	16.56	15	9	1
6		Subtest 4	16.75	16.75	16.80	2	15	2
6		Subtest 5	17.70	17.67	**17.73**	14	15	0

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

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 are explained in further detail in the technical description for this model.

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 11-6
WCDMA Summary of Power Reduction due to Proximity Sensor

Mode	Proximity Sensor State	Target Maximum Average Output Power [dBm]
WCDMA 850	Inactive	22.50
	Active	18.00

Figure 11-1
Power Measurement Setup

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11.2 WLAN Conducted Powers

Table 11-7
IEEE 802.11b Average RF Power

Mode	Freq	Channel	Conducted Power [dBm]			
			Data Rate [Mbps]			
	[MHz]		1	2	5.5	11
802.11b	2412	1	12.98	12.96	12.97	12.95
802.11b	2437	6	13.31	13.30	13.28	13.34
802.11b	2462	11	13.33	13.32	13.38	13.41

Table 11-8
IEEE 802.11g Average RF Power

Mode	Freq	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6	9	12	18	24	36	48	54
802.11g	2412	1	13.00	12.95	12.91	12.97	12.94	12.87	12.95	12.90
802.11g	2437	6	13.25	13.24	13.22	13.22	13.28	13.21	13.24	13.28
802.11g	2462	11	13.37	13.31	13.39	13.35	13.34	13.31	13.35	13.31

Table 11-9
IEEE 802.11n Average RF Power

Mode	Freq	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6.5	13	20	26	39	52	58	65
802.11n	2412	1	12.91	12.83	12.83	12.79	12.82	12.87	12.90	12.75
802.11n	2437	6	13.23	13.18	13.13	13.19	13.20	13.18	13.18	13.14
802.11n	2462	11	13.32	13.31	13.29	13.20	13.25	13.19	13.24	13.22

Table 11-10
IEEE 802.11a Average RF Power

Mode	Freq	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6	9	12	18	24	36	48	54
802.11a	*5180*	*36*	9.96	9.99	9.95	9.98	10.03	10.11	10.08	10.13
802.11a	5200	40	10.09	10.05	10.03	10.08	10.03	10.10	10.01	10.16
802.11a	5220	44	10.03	10.07	10.04	10.05	10.01	10.11	10.13	10.22
802.11a	*5240*	*48*	10.08	10.04	10.01	10.03	10.01	10.14	10.13	10.18
802.11a	*5260*	*52*	10.12	10.19	10.31	10.24	10.34	10.22	10.29	10.35
802.11a	5280	56	10.35	10.24	10.29	10.24	10.29	10.30	10.20	10.31
802.11a	5300	60	10.31	10.29	10.21	10.25	10.21	10.27	10.28	10.33
802.11a	*5320*	*64*	10.23	10.24	10.19	10.30	10.31	10.25	10.23	10.37
802.11a	5500	100	10.13	10.10	10.12	10.03	10.09	10.18	10.14	10.24
802.11a	*5520*	*104*	**10.14**	10.09	10.23	10.19	10.08	10.10	10.18	10.22
802.11a	5540	108	10.12	10.13	10.09	10.04	9.91	10.13	10.18	10.25
802.11a	5560	112	**10.09**	10.03	10.11	10.14	10.09	10.04	10.04	10.11
802.11a	*5580*	*116*	10.07	10.04	10.10	10.18	10.11	10.15	10.13	10.18
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	**10.05**	10.00	10.01	10.02	10.03	10.09	10.04	10.11
802.11a	*5680*	*136*	10.02	10.00	10.05	9.94	10.01	10.06	10.11	10.12
802.11a	5700	140	10.03	10.06	10.09	10.04	10.04	10.18	10.06	10.23
802.11a	*5745*	*149*	**10.17**	10.15	10.19	10.19	10.29	10.23	10.18	10.24
802.11a	5765	153	10.15	10.19	10.24	10.21	10.28	10.20	10.23	10.21
802.11a	*5785*	*157*	10.15	10.20	10.13	10.25	10.25	10.23	10.32	10.31
802.11a	*5805*	*161*	10.12	10.23	10.29	10.21	10.21	10.27	10.33	10.27
802.11a	5825	165	10.16	10.19	10.12	10.20	10.25	10.24	10.20	10.17

Per FCC KDB Publication 443999 and RSS-210 A9.2(3), transmission on channels which overlap the 5600-5650 MHz is prohibited as a client. This device does not transmit any beacons or initiate any transmissions in 5.3 and 5.5 GHz Band. Default channels per KDB Publication 248227 are italicized.

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Table 11-11
IEEE 802.11n Average RF Power

Mode	Freq	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6.5	13	20	26	39	52	58	65
802.11n	*5180*	*36*	9.86	9.88	9.75	9.84	9.87	9.86	10.01	9.92
802.11n	5200	40	9.92	9.83	9.92	9.93	9.98	9.97	10.01	10.04
802.11n	5220	44	9.93	10.03	10.04	9.95	9.90	10.02	9.91	9.94
802.11n	*5240*	*48*	10.05	10.01	10.02	9.98	10.04	10.15	10.13	10.18
802.11n	*5260*	*52*	10.03	10.05	10.03	9.99	9.96	10.07	10.03	10.09
802.11n	5280	56	10.08	10.04	10.12	10.08	10.03	10.00	10.03	10.16
802.11n	5300	60	10.11	10.05	10.18	10.09	10.01	10.09	10.04	10.12
802.11n	*5320*	*64*	10.09	10.23	10.20	10.10	10.15	10.20	10.18	10.23
802.11n	5500	100	10.08	10.04	10.18	10.21	10.14	10.13	10.19	10.18
802.11n	*5520*	*104*	10.06	10.03	10.09	10.15	10.11	10.21	10.18	10.19
802.11n	5540	108	10.06	10.08	10.13	10.19	10.15	10.09	10.15	10.16
802.11n	5560	112	10.08	10.03	10.13	10.13	10.09	10.15	10.13	10.14
802.11n	*5580*	*116*	10.09	10.08	10.01	10.05	10.03	10.11	10.11	10.15
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	10.23	10.14	10.21	10.23	10.14	10.12	10.14	10.31
802.11n	*5680*	*136*	10.18	10.14	10.21	10.16	10.23	10.26	10.24	10.34
802.11n	5700	140	10.20	10.31	10.31	10.28	10.29	10.23	10.25	10.33
802.11n	*5745*	*149*	10.11	10.13	10.19	10.04	10.09	10.07	10.11	10.14
802.11n	5765	153	10.04	10.04	10.09	10.08	10.15	10.04	10.14	10.10
802.11n	*5785*	*157*	10.07	10.19	10.14	10.18	10.09	10.03	10.22	10.18
802.11n	*5805*	*161*	9.95	10.04	10.13	10.05	10.09	10.14	10.18	10.08
802.11n	5825	165	10.01	10.09	10.03	9.94	10.05	10.03	10.04	10.08

Per FCC KDB Publication 443999 and RSS-210 A9.2(3), transmission on channels which overlap the 5600-5650 MHz is prohibited as a client. This device does not transmit any beacons or initiate any transmissions in 5.3 and 5.5 GHz Bands. Default channels per KDB Publication 248227 are italicized.

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 modes, according to KDB 447498 1. b), SAR testing for IEEE802.11a in the 5.2 and 5.3 GHz frequency bands was not required because the maximum average output power was not greater than 60/f.
- Justification for reduced test configurations for 5GHz 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.
- 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 and the 1g averaged SAR is <0.8 W/kg, SAR testing on other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.
- The bolded configurations above were tested for SAR.
- There is no power reduction for WIFI.

Figure 11-2
Power Measurement Setup

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12 SYSTEM VERIFICATION

12.1 Tissue Verification

Table 12-1
Measured Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (C˚)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
10/25/2011	835B	22.5	820	0.971	54.78	**0.97**	**55.28**	*0.21%*	*-0.91%*
			835	0.981	54.82	**0.97**	**55.20**	*1.13%*	*-0.69%*
			850	0.997	54.65	**0.99**	**55.15**	*0.91%*	*-0.91%*
12/27/2011	835B	21.0	820	0.978	56.07	**0.97**	**55.28**	*0.93%*	*1.42%*
			835	0.991	55.80	**0.97**	**55.20**	*2.16%*	*1.09%*
			850	1.007	55.81	**0.99**	**55.15**	*1.92%*	*1.19%*
01/03/2012	835B	20.4	820	0.966	55.15	**0.97**	**55.28**	*-0.31%*	*-0.24%*
			835	0.984	54.98	**0.97**	**55.20**	*1.44%*	*-0.40%*
			850	0.996	54.70	**0.99**	**55.15**	*0.81%*	*-0.82%*
01/09/2012	835B	20.2	820	0.967	53.76	**0.97**	**55.28**	*-0.21%*	*-2.76%*
			835	0.985	53.47	**0.97**	**55.20**	*1.55%*	*-3.13%*
			850	0.998	53.40	**0.99**	**55.15**	*1.01%*	*-3.18%*
10/24/2011	1900B	22.8	1850	1.519	51.36	**1.52**	**53.30**	*-0.07%*	*-3.64%*
			1880	1.552	51.33	**1.52**	**53.30**	*2.11%*	*-3.70%*
			1910	1.587	51.18	**1.52**	**53.30**	*4.41%*	*-3.98%*
10/19/2011	5200B-5800B	23.0	5500	5.483	47.69	**5.65**	**48.58**	*-2.96%*	*-1.83%*
			5520	5.488	47.82	**5.67**	**48.55**	*-3.26%*	*-1.51%*
			5560	5.565	47.59	**5.72**	**48.50**	*-2.71%*	*-1.87%*
			5660	5.710	47.50	**5.84**	**48.36**	*-2.18%*	*-1.78%*
			5745	5.800	47.38	**5.94**	**48.25**	*-2.29%*	*-1.80%*
			5800	5.913	47.35	**6.00**	**48.20**	*-1.45%*	*-1.76%*

Table 12-2
Measured Tissue Properties for Vertex Testing

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (C˚)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
11/11/2011	835B	23.5	820	0.958	54.30	**0.97**	**55.28**	*-1.14%*	*-1.78%*
			835	0.978	54.22	**0.97**	**55.20**	*0.82%*	*-1.78%*
			850	0.996	53.96	**0.99**	**55.15**	*0.81%*	*-2.16%*
01/03/2012	835B	20.4	820	0.966	55.15	**0.97**	**55.28**	*-0.31%*	*-0.24%*
			835	0.984	54.98	**0.97**	**55.20**	*1.44%*	*-0.40%*
			850	0.996	54.70	**0.99**	**55.15**	*0.81%*	*-0.82%*
11/10/2011	1900B	23.8	1850	1.452	52.73	**1.52**	**53.30**	*-4.47%*	*-1.07%*
			1880	1.486	52.66	**1.52**	**53.30**	*-2.24%*	*-1.20%*
			1910	1.516	52.56	**1.52**	**53.30**	*-0.26%*	*-1.39%*

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.

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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):

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

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 12-3
System Verification Results

System Verification TARGET & MEASURED											
Date:	**Amb. Temp (°C)**	**Liquid Temp (°C)**	**Input Power (W)**	**Tissue Frequency (MHz)**	**Dipole SN**	**Probe SN**	**Tissue Type**	**Measured SAR_{1g} (W/kg)**	**1 W Target SAR_{1g} (W/kg)**	**1 W Normalized SAR_{1g} (W/kg)**	**Deviation (%)**
10/25/2011	23.8	21.9	0.100	835	4d047	3258	Body	0.973	9.850	9.730	-1.22%
12/27/2011	24.3	22.6	0.100	835	4d047	3258	Body	1.01	9.850	10.100	2.54%
01/03/2012	21.4	20.0	0.100	835	4d047	3258	Body	1.03	9.850	10.300	4.57%
01/09/2012	20.2	20.0	0.100	835	4d119	3258	Body	0.983	9.540	9.830	3.04%
10/24/2011	23.1	21.8	0.100	1900	502	3209	Body	4.36	41.100	43.600	6.08%
10/19/2011	23.7	22.4	0.100	5500	1057	3561	Body	8.37	84.400	83.700	-0.83%
10/19/2011	23.5	22.6	0.100	5800	1057	3561	Body	7.93	75.000	79.300	5.73%

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Table 12-4
System Verification Results for Vertex SAR Tests

System Verification TARGET & MEASURED											
Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Tissue Frequency (MHz)	Dipole SN	Probe SN	Tissue Type	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	Deviation (%)
11/11/2011	23.6	22.0	0.100	835	4d047	3258	Body	0.979	9.850	9.790	-0.61%
01/03/2012	21.4	20.0	0.100	835	4d047	3258	Body	1.03	9.850	10.300	4.57%
11/10/2011	24.3	22.8	0.040	1900	502	3561	Body	1.62	41.100	40.500	-1.46%

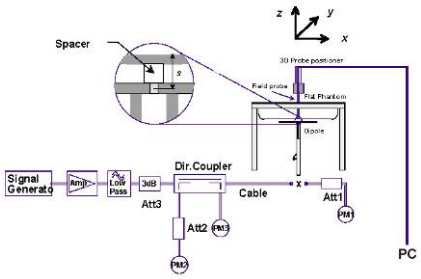

Figure 12-1
System Verification Setup Diagram

Figure 12-2
System Verification Setup Photo

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13 SAR DATA SUMMARY

Table 13-1
GPRS/WCDMA Body SAR Results

MEASUREMENT RESULTS											
FREQUENCY		Mode	Service	Target Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Serial Number	# of GPRS Slots	Side	SAR (1g)
MHz	Ch.										(W/kg)
836.60	190	GSM 850	GPRS	25.00	25.18	-0.04	0.0 cm	CSP^2	2	back*	0.799
824.20	128	GSM 850	GPRS	23.50	23.81	-0.19	0.0 cm	CSP^2	3	back*	**0.850**
836.60	190	GSM 850	GPRS	23.50	23.90	0.15	0.0 cm	CSP^2	3	back*	0.847
848.80	251	GSM 850	GPRS	23.50	23.80	-0.02	0.0 cm	CSP^2	3	back*	0.826
836.60	190	GSM 850	GPRS	29.00	29.25	-0.01	1.0 cm	CSP^1	2	back	0.701
824.20	128	GSM 850	GPRS	27.50	27.68	-0.12	1.0 cm	CSP^1	3	back	0.711
836.60	190	GSM 850	GPRS	27.50	27.70	-0.02	1.0 cm	CSP^1	3	back	0.816
848.80	251	GSM 850	GPRS	27.50	27.45	0.17	1.0 cm	CSP^1	3	back	0.786
836.60	190	GSM 850	GPRS	23.50	23.90	-0.10	0.0 cm	CSP^2	3	top*	0.319
836.60	190	GSM 850	GPRS	27.50	27.70	0.14	0.5 cm	CSP^1	3	top	0.427
836.60	190	GSM 850	GPRS	23.50	23.90	-0.10	0.0 cm	CSP^2	3	left*	0.366
836.60	190	GSM 850	GPRS	27.50	27.70	0.12	0.5 cm	CSP^1	3	left	0.649
836.60	4183	WCDMA 850	RMC	18.00	18.12	-0.01	0.0 cm	#1	N/A	back*	0.728
836.60	4183	WCDMA 850	RMC	22.50	22.45	0.01	1.0 cm	#2	N/A	back	**0.758**
836.60	4183	WCDMA 850	RMC	18.00	18.12	0.12	0.0 cm	#1	N/A	top*	0.250
836.60	4183	WCDMA 850	RMC	22.50	22.45	0.07	0.5 cm	#2	N/A	top	0.396
836.60	4183	WCDMA 850	RMC	18.00	18.12	-0.04	0.0 cm	#1	N/A	left*	0.345
836.60	4183	WCDMA 850	RMC	22.50	22.45	-0.12	0.5 cm	#2	N/A	left	0.571
1880.00	661	GSM 1900	GPRS	24.00	23.88	0.07	0.0 cm	CSP^2	1	back*	0.682
1880.00	661	GSM 1900	GPRS	21.00	21.11	-0.03	0.0 cm	CSP^2	2	back*	0.663
1880.00	661	GSM 1900	GPRS	19.00	19.05	0.14	0.0 cm	CSP^2	3	back*	**0.693**
1880.00	661	GSM 1900	GPRS	18.00	18.19	-0.18	0.0 cm	CSP^2	4	back*	0.665
1880.00	661	GSM 1900	GPRS	29.00	28.88	0.08	1.0 cm	CSP^1	1	back	0.307
1880.00	661	GSM 1900	GPRS	26.00	25.92	-0.03	1.0 cm	CSP^1	2	back	0.292
1880.00	661	GSM 1900	GPRS	24.00	24.22	-0.15	1.0 cm	CSP^1	3	back	0.264
1880.00	661	GSM 1900	GPRS	23.00	22.95	0.14	1.0 cm	CSP^1	4	back	0.282
1880.00	661	GSM 1900	GPRS	19.00	19.05	0.03	0.0 cm	CSP^2	3	top*	0.114
1880.00	661	GSM 1900	GPRS	29.00	28.88	0.05	0.5 cm	CSP^1	1	top	0.135
1880.00	661	GSM 1900	GPRS	19.00	19.05	-0.05	0.0 cm	CSP^2	3	left*	0.247
1880.00	661	GSM 1900	GPRS	29.00	28.88	-0.05	0.5 cm	CSP^1	1	left	0.239
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							**Body 1.6 W/kg (mW/g) averaged over 1 gram**				

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Notes for Table 13-1:

1. The test data reported are the worst-case SAR values 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. Per KDB publication 447498 4) b) i) the back side is required to be tested touching the flat phantom for regular sized tablets.
3. 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.
4. Tissue parameters and temperatures are listed on the SAR plots.
5. Batteries are fully charged for all readings.
6. Liquid tissue depth was at least 15.0 cm.
7. Per KDB 447498 D01 1) e) i), when the SAR procedures require multiple channels to be tested and the 1-g SAR for the highest output channel is less than 0.8 W/kg, the other channels are not required.
8. Justification for reduced GPRS test configurations per KDB Publication 941225 D03: The source-based time-averaged output power was evaluated for all multi-slot operations. In addition to the worst-case reported, all source-based time-averaged powers within 10% of the worst-case were additionally included in the evaluation.
9. Asterisk (*) denotes power reduction activated.
10. 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 and left edges were tested for SAR at maximum output power with the power reduction deactivated. See Section 9.5 for more details.
11. WCDMA mode in Body SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.
12. 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.

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Table 13-2
WLAN 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)
5745	149	IEEE 802.11a	OFDM	10.17	-0.09	0.0 cm	FI-255-A	6	back	**0.348**
5745	149	IEEE 802.11a	OFDM	10.17	-0.06	0.0 cm	FI-255-A	6	top	0.071
5745	149	IEEE 802.11a	OFDM	10.17	-0.06	0.0 cm	FI-255-A	6	right	0.312
5520	104	IEEE 802.11a	OFDM	10.14	-0.07	0.0 cm	FI-255-A	6	back	0.617
5560	112	IEEE 802.11a	OFDM	10.09	-0.05	0.0 cm	FI-255-A	6	back	0.561
5660	132	IEEE 802.11a	OFDM	10.05	-0.06	0.0 cm	FI-255-A	6	back	0.456
5520	104	IEEE 802.11a	OFDM	10.14	-0.03	0.0 cm	FI-255-A	6	top	0.097
5520	104	IEEE 802.11a	OFDM	10.14	0.00	0.0 cm	FI-255-A	6	right	**0.729**
5560	112	IEEE 802.11a	OFDM	10.09	0.05	0.0 cm	FI-255-A	6	right	0.556
5660	132	IEEE 802.11a	OFDM	10.05	0.06	0.0 cm	FI-255-A	6	right	0.494
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						**Body 1.6 W/kg (mW/g)** averaged over 1 gram				

1. The test data reported are the worst-case SAR values 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. Per KDB Pub. 448498 4) b) i) the back side is required to be tested touching the flat phantom.
3. This device is capable of multiple display orientations supporting both portrait and landscape positions. Therefore per KDB Pub. 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 Pub. 447498 4) b) ii) (2), for each antenna, SAR is only required for the edge with the most conservative exposure condition.
4. Batteries are fully charged for all readings.
5. Tissue parameters and temperatures are listed on the SAR plots.
6. Liquid tissue depth is was at least 15.0 cm.
7. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes: Highest average RF output power channel for the lowest data rate were selected for SAR evaluation as the default channel. Other IEEE 802.11 modes (including 802.11n and higher data rates) were not investigated since the average output powers were not greater than 0.25 dB than that of the tested channel in the lowest data rate IEEE 802.11a modes.
8. 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.
9. There is no power reduction for WIFI.
10. 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.
11. There is no power reduction for WIFI.

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14 VERTEX SAR TESTS

In accordance with recent instructions received from the FCC regarding similar corner antenna configurations, the proximity sensor coverage for the top-left corner of the tablet was assessed for appropriate coverage and SAR. Please find below SAR results with the tablet touching at the top-left corner vertex at maximum output powers.

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Serial Number	# of GPRS Slots	Side	SAR (1g)
MHz	Ch.									(W/kg)
836.60	190	GSM 850	GPRS	27.70	-0.11	0.0 cm	CSP^1	3	Vertex, 45°	0.508
1880.00	661	GSM 1900	GPRS	28.88	-0.13	0.0 cm	CSP^1	1	Vertex, 45°	0.232
836.60	4183	WCDMA 850	RMC	22.45	0.17	0.0 cm	#2	N/A	Vertex, 45°	0.422
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram				

Notes:

1. The test data reported are the worst-case SAR value with the position set at a 45° angle to the flat phantom. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001].
2. Tissue parameters and temperatures are listed on the SAR plots.
3. Batteries are fully charged for all readings.
4. Liquid tissue depth was at least 15.0 cm.
5. 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).
6. Justification for reduced GPRS test configurations per KDB Publication 941225 D03: The source-based time-averaged output power was evaluated for all multi-slot operations. In addition to the worst-case reported, all source-based time-averaged powers within 10% of the worst-case were additionally included in the evaluation.
7. WCDMA mode 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.
8. 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.

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15 EQUIPMENT LIST

Applicable for 10/19/11 - 10/25/11

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	N/A		N/A	N/A
Pasternack	PE2209-10	Bidirectional Coupler	N/A		N/A	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	11/11/2010	Annual	11/11/2011	836371/0079
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
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	N/A		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	N/A		N/A	R8979500903
Narda	4772-3	Attenuator (3dB)	N/A		N/A	9406
Narda	BW-S3W2	Attenuator (3dB)	N/A		N/A	120
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/5/2011	Annual	8/5/2012	112347
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	N/A		N/A	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	N/A		N/A	N/A

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Applicable for 11/10/11 - 11/11/11

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Anritsu	MA2481A	PowerSensor	2/7/2011	Annual	2/7/2012	5318
Anritsu	MA2481A	PowerSensor	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
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	1070030
Anritsu	MA2481A	PowerSensor	2/7/2011	Annual	2/7/2012	5821
Anritsu	MA2481A	PowerSensor	2/7/2011	Annual	2/7/2012	8013
Anritsu	MA2481A	PowerSensor	2/7/2011	Annual	2/7/2012	5605
Anritsu	MA2481A	PowerSensor	2/7/2011	Annual	2/7/2012	2400
Agilent	E5515C	Wireless Communications Test Set	2/8/2011	Annual	2/8/2012	GB45360985
SPEAG	D835V2	835 MHz SAR Dipole	2/9/2011	Annual	2/9/2012	4d047
SPEAG	D1900V2	1900 MHz SAR Dipole	2/17/2011	Annual	2/17/2012	502
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/21/2011	Annual	2/21/2012	649
VWR	36034 158	Wall Mounted Thermometer	2/26/2010	Biennial	2/25/2012	101536273
Agilent	8648D	Signal Generator	4/5/2011	Annual	4/5/2012	3629U00687
Rohde & Schwarz	SMIQ03B	Signal Generator	4/6/2011	Annual	4/6/2012	DE27259
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/8/2011	Annual	4/8/2012	MY45470194
SPEAG	ES3DV3	SAR Probe	4/8/2011	Annual	4/8/2012	3258
Rohde & Schwarz	CMU200	Base Station Simulator	4/19/2011	Annual	4/19/2012	107826
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/20/2011	Annual	4/20/2012	665
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/21/2011	Annual	4/21/2012	JP38020182
Agilent	E5515C	Wireless Communications Tester	4/21/2011	Annual	4/21/2012	US41140256
VWR	36934-158	Wall-Mounted Thermometer	5/26/2010	Biennial	5/25/2012	101718589
Rohde & Schwarz	CMU200	Base Station Simulator	6/1/2011	Annual	6/1/2012	833855/0010
Agilent	E5515C	Wireless Communications Test Set	7/6/2011	Annual	7/6/2012	GB41450275
Agilent	E5515C	Wireless Communications Test Set	7/6/2011	Annual	7/6/2012	GB43304447
SPEAG	EX3DV4	SAR Probe	7/27/2011	Annual	7/27/2012	3561
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/5/2011	Annual	8/5/2012	112347
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/25/2011	Annual	8/25/2012	100976
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/7/2011	Annual	10/7/2012	103962
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/10/2011	Annual	10/10/2012	3613A00315
Agilent	E5515C	Wireless Communications Test Set	10/10/2011	Annual	10/10/2012	GB46110872
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
VWR	36034 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	1/21/2011	Biennial	1/21/2013	111286454
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	3/15/2013	111391601
Rohde & Schwarz	NRVD	Dual Channel Power Meter	4/8/2011	Biennial	4/8/2013	101695
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	N/A		N/A	N/A
Pasternack	PE2209-10	Bidirectional Coupler	N/A		N/A	N/A
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	N/A		N/A	N/A
MiniCircuits	SLP-2400+	Low Pass Filter	N/A		N/A	R8979500903
Narda	4772-3	Attenuator (3dB)	N/A		N/A	9406
Narda	BW-S3W2	Attenuator (3dB)	N/A		N/A	120
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	N/A		N/A	N/A
Mini Circuits	NLP 1200+	Low Pass Filter DC to 1000 MHz	N/A		N/A	N/A

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Applicable for 12/27/11 – 1/9/12:

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	8648D	Signal Generator	4/5/2011	Annual	4/5/2012	3629U00687
Agilent	E5515C	Wireless Communications Test Set	7/6/2011	Annual	7/6/2012	GB41450275
Agilent	E5515C	Wireless Communications Test Set	7/6/2011	Annual	7/6/2012	GB43304447
Agilent	E5515C	Wireless Communications Test Set	2/8/2011	Annual	2/8/2012	GB45360985
Agilent	E5515C	Wireless Communications Test Set	10/10/2011	Annual	10/10/2012	GB46110872
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/21/2011	Annual	4/21/2012	JP38020182
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/8/2011	Annual	4/8/2012	MY45470194
Agilent	E5515C	Wireless Communications Tester	4/21/2011	Annual	4/21/2012	US41140256
Amplifier Research	5S1G4	5W, 800MHz-4.2GHz	N/A		N/A	21910
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	2400
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	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5605
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	MA2411B	Pulse Sensor	10/13/2011	Annual	10/13/2012	1027293
Anritsu	ML2495A	Power Meter	10/13/2011	Annual	10/13/2012	1039008
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	1070030
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	1190013
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	98150041
Anritsu	MT8820C	Radio Communication Tester	11/11/2011	Annual	11/11/2012	6200901190
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331322
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331323
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331330
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331332
Control Company	61220-416	Long-Stem Thermometer	3/16/2011	Biennial	3/16/2013	111391601
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/12/2011	Annual	10/12/2012	1833460
Gigatronics	8651A	Universal Power Meter	10/12/2011	Annual	10/12/2012	8650319
Index SAR	IXTL-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
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	N/A		N/A	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	N/A		N/A	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	N/A		N/A	N/A
Narda	BW-S3W2	Attenuator (3dB)	N/A		N/A	120
Narda	4772-3	Attenuator (3dB)	N/A		N/A	9406
Pasternack	PE2208-6	Bidirectional Coupler	N/A		N/A	N/A
Pasternack	PE2209-10	Bidirectional Coupler	N/A		N/A	N/A
Rohde & Schwarz	NRVD	Dual Channel Power Meter	4/8/2011	Biennial	4/8/2013	101695
Rohde & Schwarz	CMU200	Base Station Simulator	4/19/2011	Annual	4/19/2012	107826
Rohde & Schwarz	CMU200	Base Station Simulator	6/1/2011	Annual	6/1/2012	833855/0010
Rohde & Schwarz	SMIQ03B	Signal Generator	4/6/2011	Annual	4/6/2012	DE27259
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/21/2011	Annual	2/21/2012	649
SPEAG	ES3DV3	SAR Probe	4/8/2011	Annual	4/8/2012	3258
SPEAG	D835V2	835 MHz SAR Dipole	2/9/2011	Annual	2/9/2012	4d047
SPEAG	D835V2	835 MHz SAR Dipole	12/21/2011	Annual	12/21/2012	4d119
VWR	36934-158	Wall-Mounted Thermometer	2/26/2010	Biennial	2/26/2012	101536273
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	111286445
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286454
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286460

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16 MEASUREMENT UNCERTAINTIES

Applicable for frequencies less than 3000 MHz.

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	**IEEE 1528 Sec.**	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i 1gm**	**c_i 10 gms**	**1gm u_i (± %)**	**10gms u_i (± %)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	6.0	N	1	1.0	1.0	6.0	6.0	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	1.0	1.0	1.3	1.3	∞
Boundary Effect	E.2.3	0.4	N	1	1.0	1.0	0.4	0.4	∞
Linearity	E.2.4	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	E.2.5	5.1	N	1	1.0	1.0	5.1	5.1	∞
Readout Electronics	E.2.6	1.0	N	1	1.0	1.0	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	E.6.3	2.9	R	1.73	1.0	1.0	1.7	1.7	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1.0	1.0	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	6.0	N	1	1.0	1.0	6.0	6.0	287
Device Holder Uncertainty	E.4.1	3.32	R	1.73	1.0	1.0	1.9	1.9	∞
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	3.8	N	1	0.64	0.43	2.4	1.6	6
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Liquid Permittivity - measurement uncertainty	E.3.3	4.5	N	1	0.60	0.49	2.7	2.2	6
Combined Standard Uncertainty (k=1)			RSS				12.1	11.7	299
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				24.2	23.5	

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

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Applicable for frequencies up to 6 GHz.

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	**IEEE 1528 Sec.**	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i 1gm**	**c_i 10 gms**	**1gm u_i (± %)**	**10gms u_i (± %)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	6.55	N	1	1.0	1.0	6.6	6.6	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	1.0	1.0	1.3	1.3	∞
Boundary Effect	E.2.3	0.4	N	1	1.0	1.0	0.4	0.4	∞
Linearity	E.2.4	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	E.2.5	5.1	N	1	1.0	1.0	5.1	5.1	∞
Readout Electronics	E.2.6	1.0	N	1	1.0	1.0	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	E.6.3	2.9	R	1.73	1.0	1.0	1.7	1.7	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1.0	1.0	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	6.0	N	1	1.0	1.0	6.0	6.0	287
Device Holder Uncertainty	E.4.1	3.32	R	1.73	1.0	1.0	1.9	1.9	∞
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	3.8	N	1	0.64	0.43	2.4	1.6	6
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Liquid Permittivity - measurement uncertainty	E.3.3	4.5	N	1	0.60	0.49	2.7	2.2	6
Combined Standard Uncertainty (k=1)			RSS				12.4	12.0	299
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				24.7	24.0	

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

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17 CONCLUSION

17.1 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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18 REFERENCES

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[5] Federal Communications Commission, OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01), Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, June 2001.

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APPENDIX A: SAR TEST DATA

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PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: CSP^2

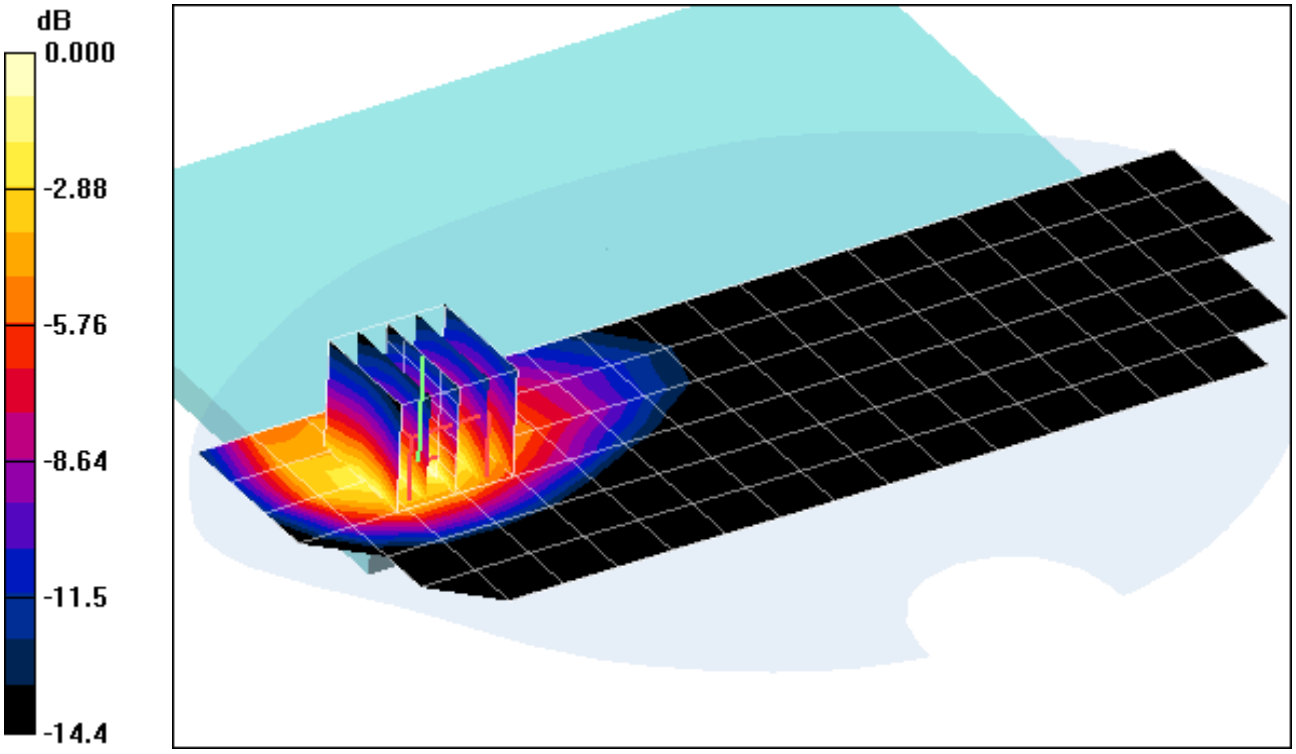
Communication System: GSM850 GPRS; 3 Tx slots; Frequency: 824.2 MHz;Duty Cycle: 1:2.76
Medium: 835 Body Medium parameters used (interpolated):
f = 824.2 MHz; σ = 0.974 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space 0.0 cm

Test Date: 10-25-2011; Ambient Temp: 23.8 °C; Tissue Temp: 21.9 °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, Low.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 = 32.0 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 1.61 W/kg
SAR(1 g) = 0.850 mW/g; SAR(10 g) = 0.461 mW/g



0 dB = 0.945mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: CSP^1

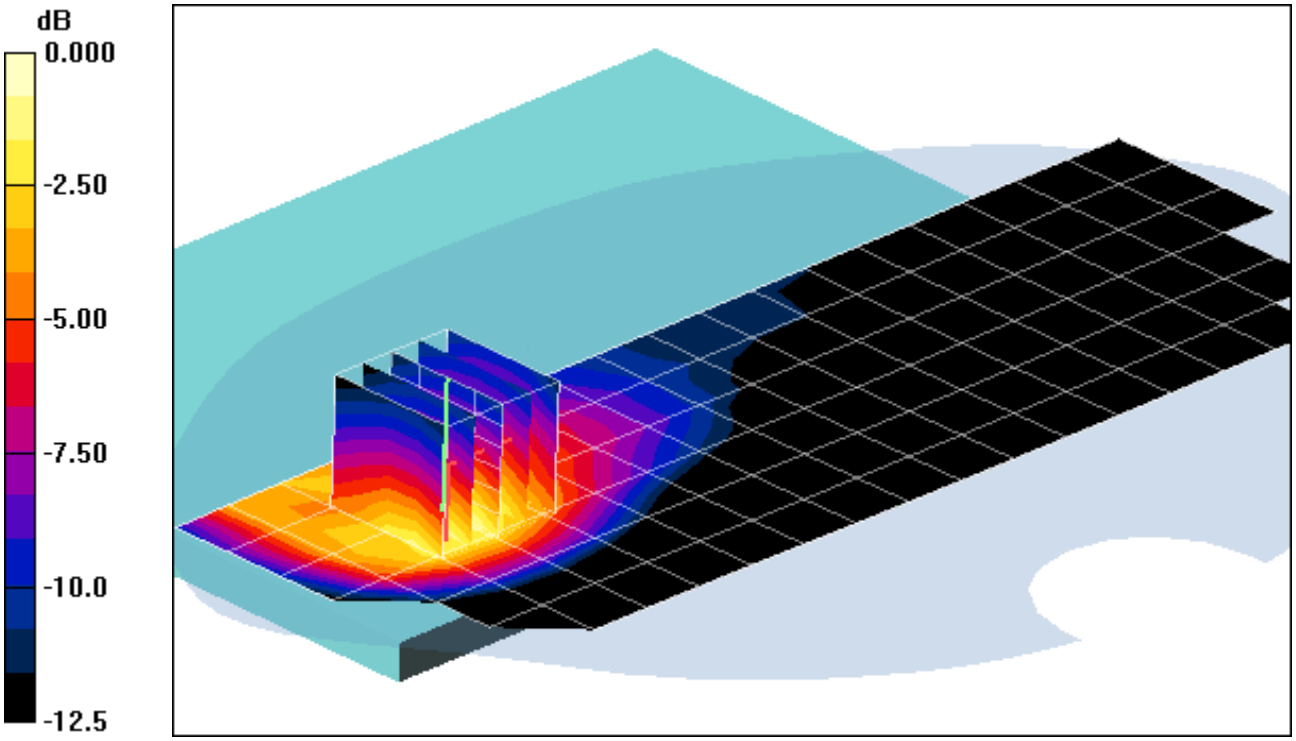
Communication System: GSM850 GPRS; 3 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:2.76
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.983 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-25-2011; Ambient Temp: 23.8 °C; Tissue Temp: 21.9 °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 = 30.4 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 0.816 mW/g; SAR(10 g) = 0.506 mW/g



0 dB = 0.894mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: CSP^2

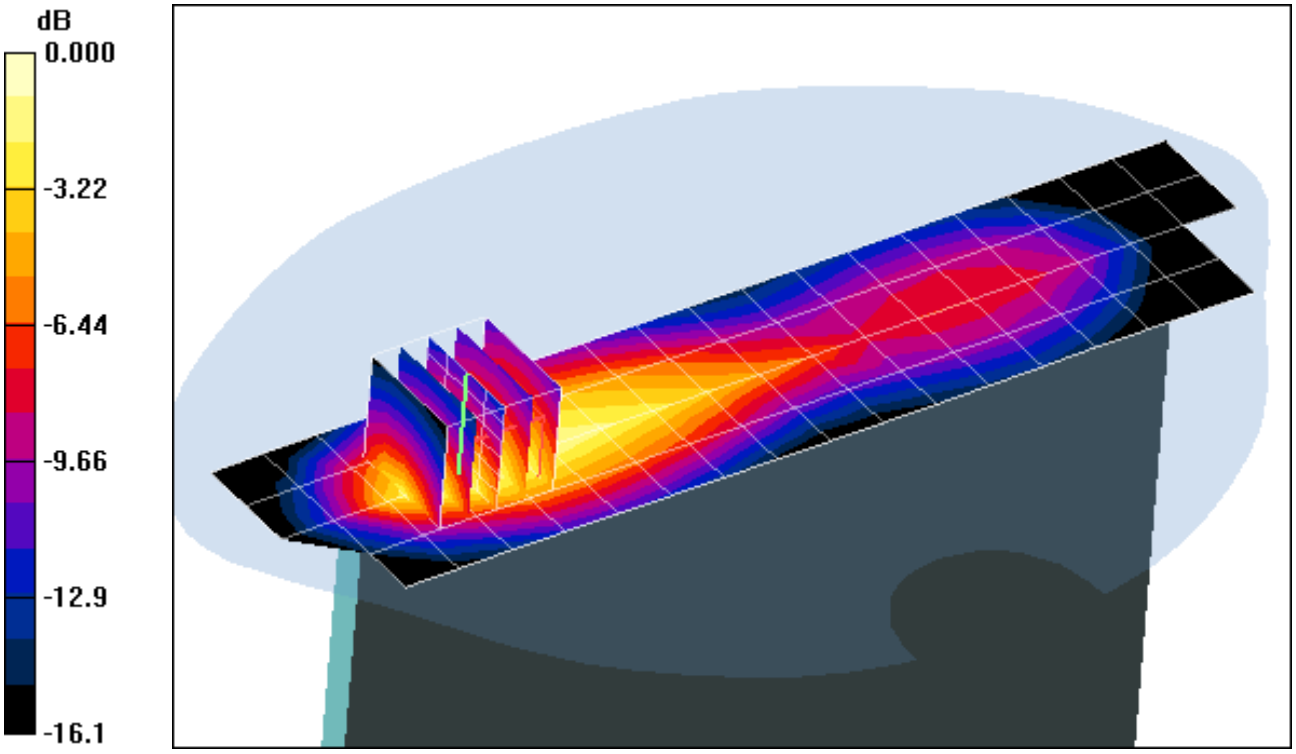
Communication System: GSM850 GPRS; 3 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:2.76
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.983 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-25-2011; Ambient Temp: 23.8 °C; Tissue Temp: 21.9 °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 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 = 19.0 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.621 W/kg
SAR(1 g) = 0.319 mW/g; SAR(10 g) = 0.183 mW/g



0 dB = 0.358mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: CSP^1

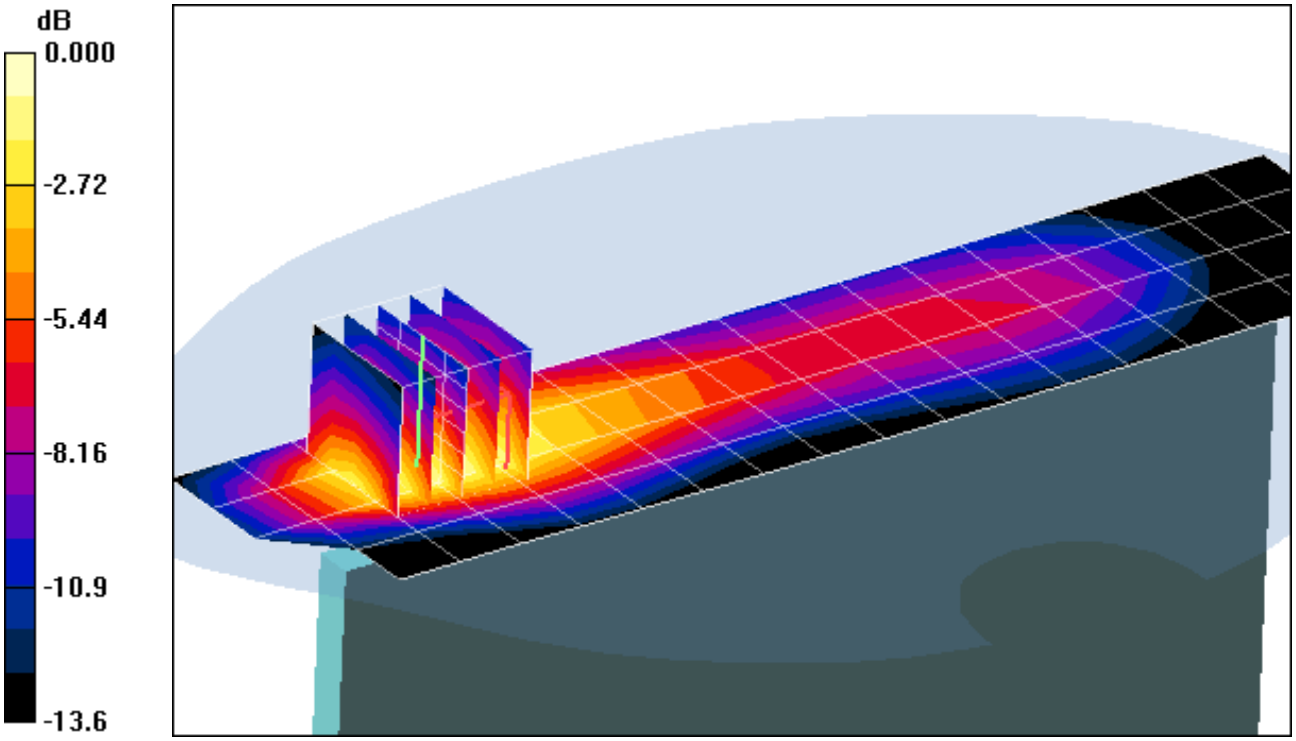
Communication System: GSM850 GPRS; 3 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:2.76
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.983 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.5 cm

Test Date: 10-25-2011; Ambient Temp: 23.8 °C; Tissue Temp: 21.9 °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 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 = 20.1 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.728 W/kg
SAR(1 g) = 0.427 mW/g; SAR(10 g) = 0.263 mW/g



0 dB = 0.468mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: CSP^2

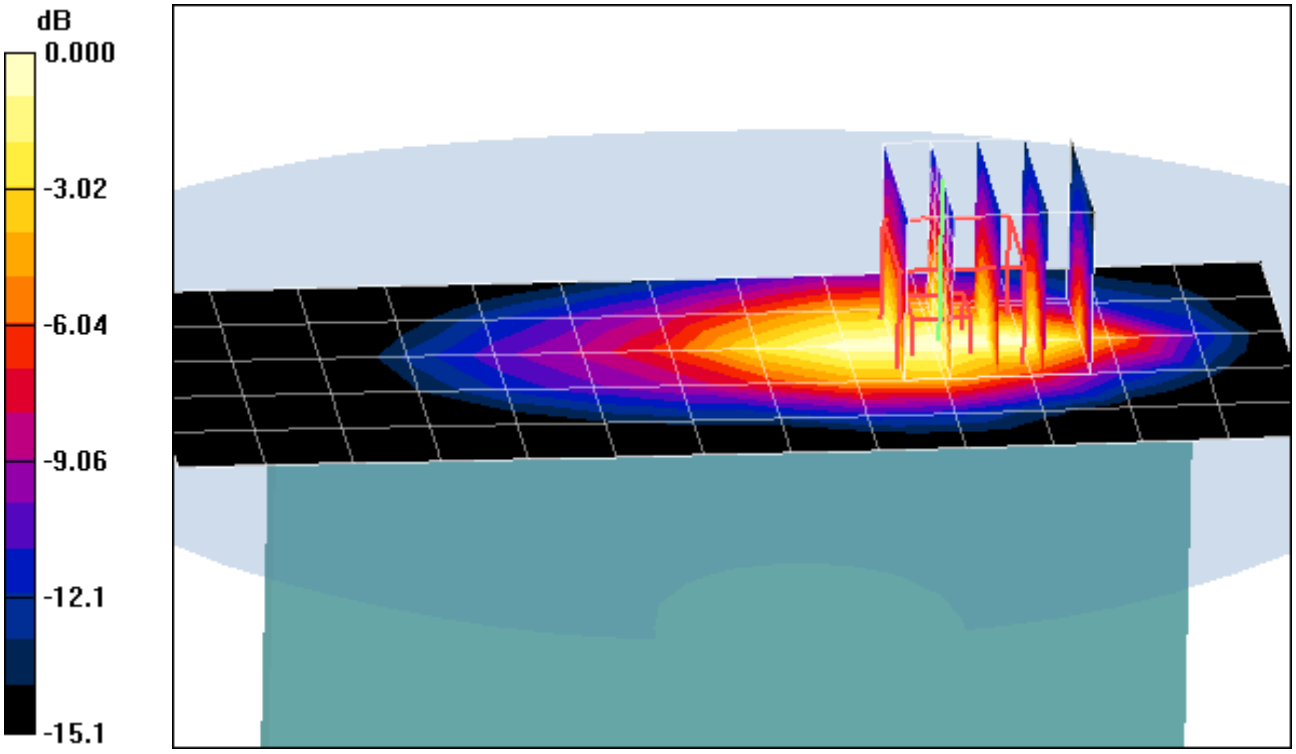
Communication System: GSM850 GPRS; 3 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:2.76
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.983 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-25-2011; Ambient Temp: 23.8 °C; Tissue Temp: 21.9 °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, Left Edge, Mid.ch, 3 Tx Slots

Area Scan (6x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.9 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.607 W/kg
SAR(1 g) = 0.366 mW/g; SAR(10 g) = 0.204 mW/g



0 dB = 0.426mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: CSP^1

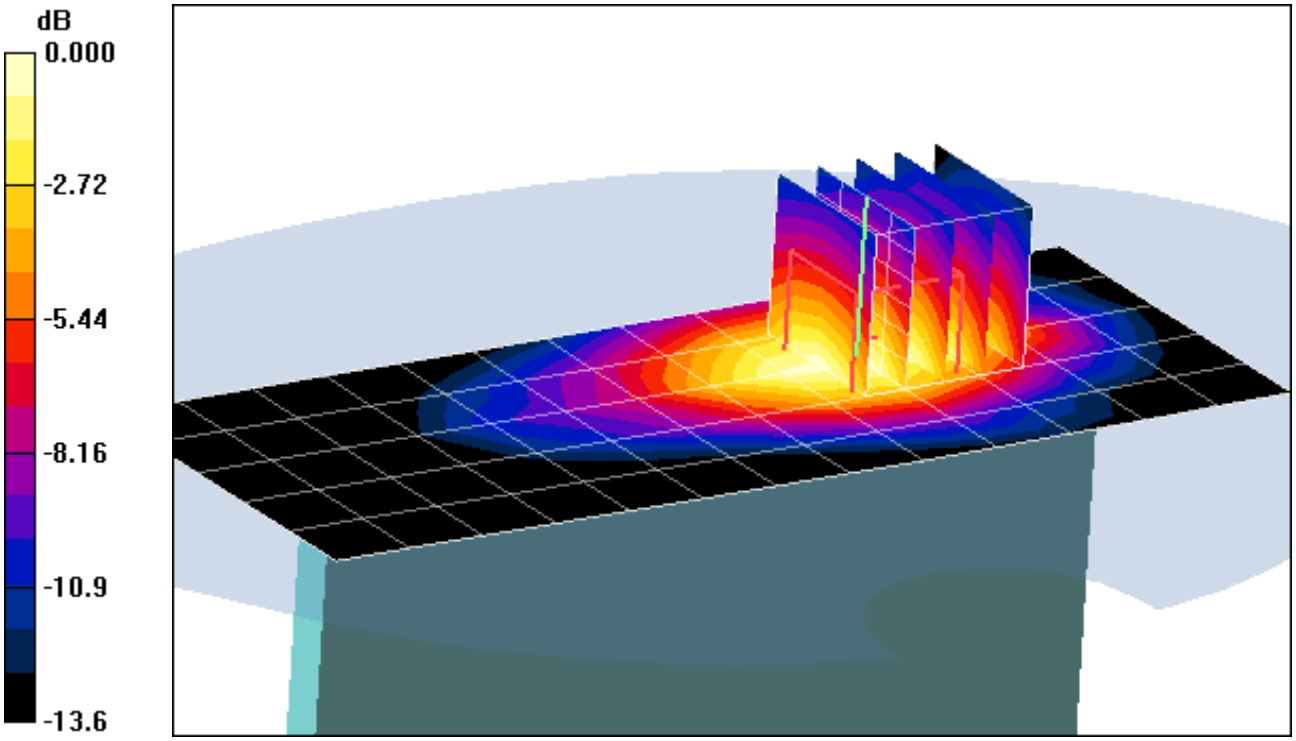
Communication System: GSM850 GPRS; 3 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:2.76
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.983 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.5 cm

Test Date: 10-25-2011; Ambient Temp: 23.8 °C; Tissue Temp: 21.9 °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, Left Edge, Mid.ch, 3 Tx Slots

Area Scan (6x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.2 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.649 mW/g; SAR(10 g) = 0.398 mW/g



0 dB = 0.703mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: CSP^1

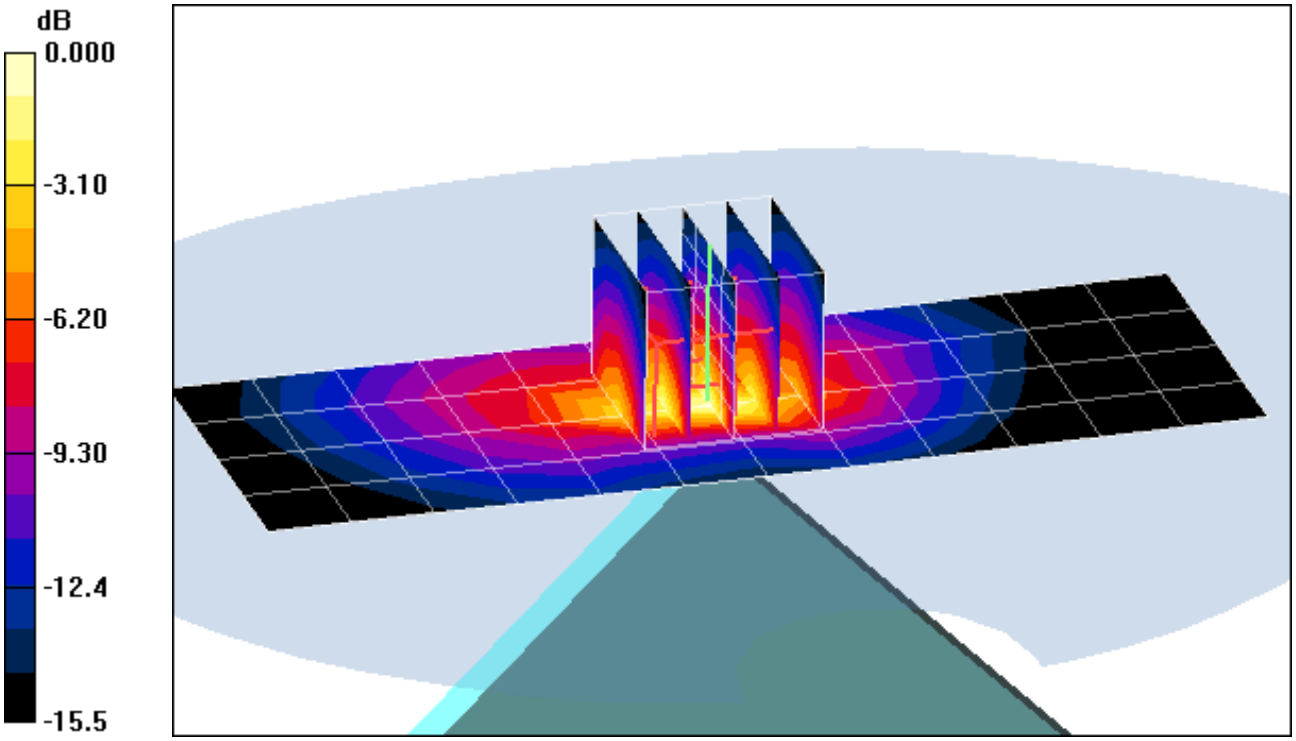
Communication System: GSM850 GPRS; 3 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:2.76
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.98 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 11-11-2011; Ambient Temp: 23.6°C; Tissue Temp: 22.0°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, Vertex, Mid.ch, 3 Tx Slots

Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.9 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.508 mW/g; SAR(10 g) = 0.227 mW/g



0 dB = 0.636mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: #1

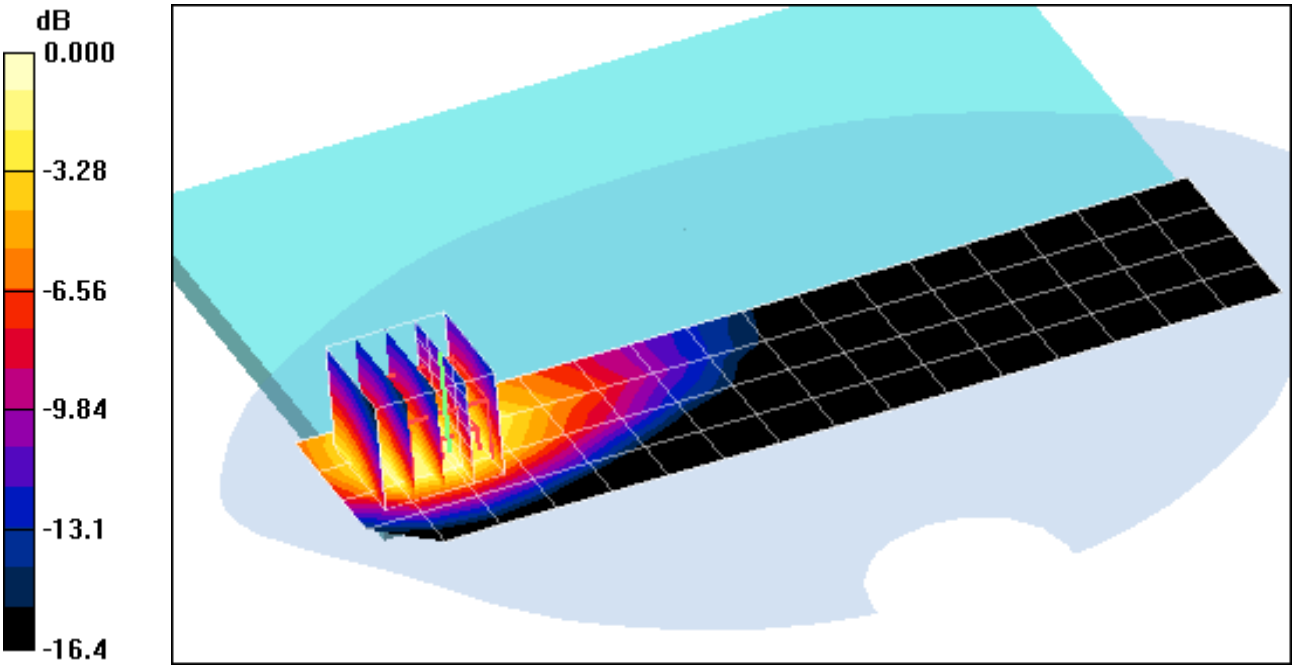
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.993 mho/m; ε_r = 55.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-27-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.6 °C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Mode: WCDMA 850, Body SAR, Back 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 = 25.3 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.728 mW/g; SAR(10 g) = 0.391 mW/g



0 dB = 0.815mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: #2

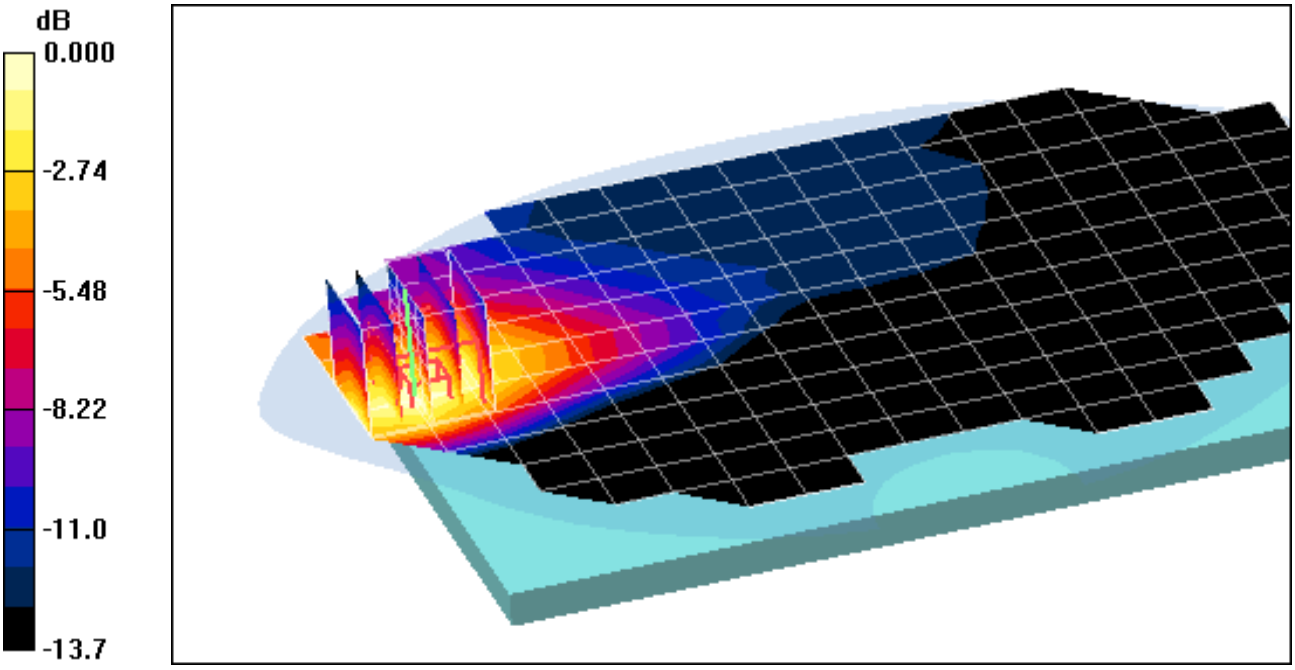
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.985 mho/m; ε_r = 54.95; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 01-03-2012; Ambient Temp: 21.4 ° C; Tissue Temp: 20.0 °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 172

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

Area Scan (13x18x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.0 V/m; Power Drift = 0.011 dB
Peak SAR (extrapolated) = 1.20 W/kg
SAR(1 g) = 0.758 mW/g; SAR(10 g) = 0.464 mW/g



0 dB = 0.827mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: #1

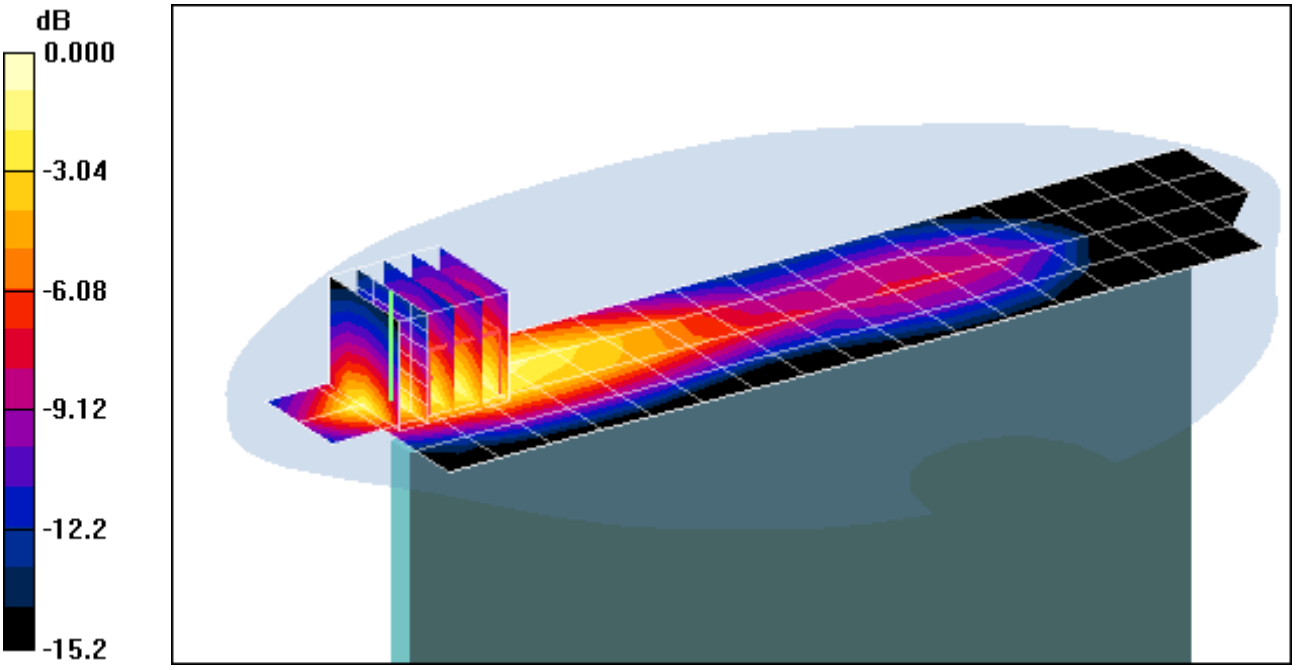
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.986 mho/m; ε_r = 53.46; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-09-2012; Ambient Temp: 20.2 ° C; Tissue Temp: 20.0 °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 172

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

Area Scan (19x5x1): 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 = 0.115 dB
Peak SAR (extrapolated) = 0.485 W/kg
SAR(1 g) = 0.250 mW/g; SAR(10 g) = 0.144 mW/g



0 dB = 0.280mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: #2

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.986 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3

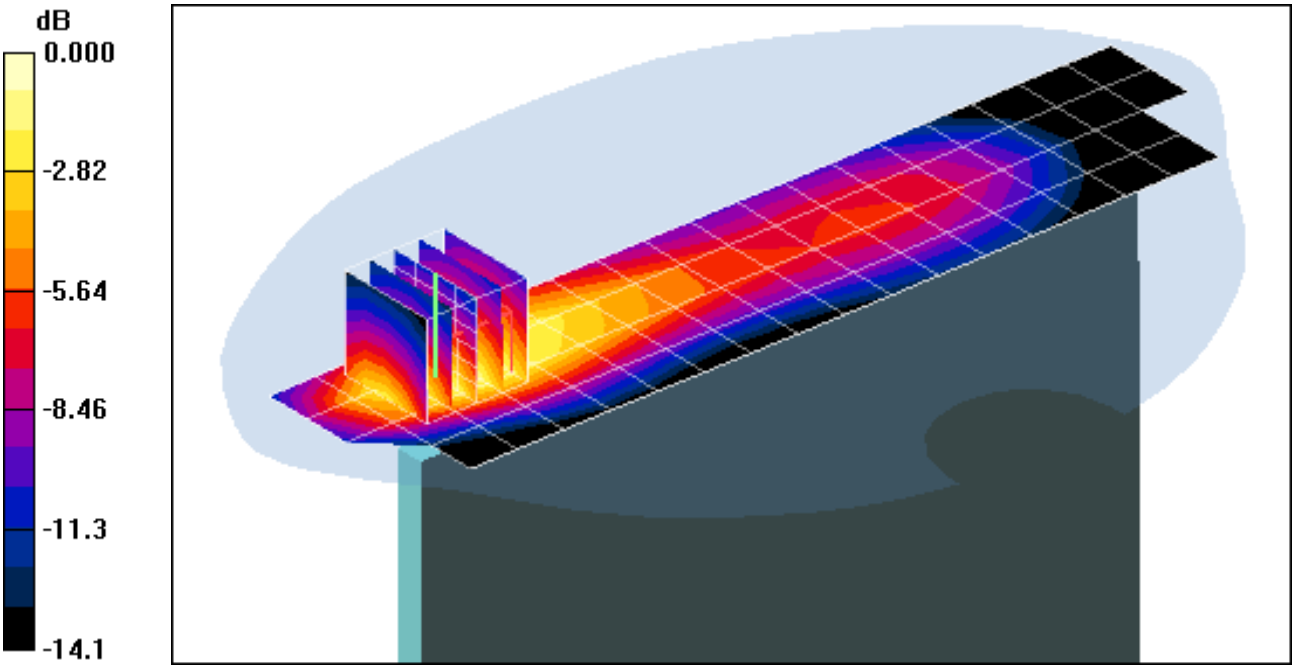
Phantom section: Flat Section; Space: 0.5 cm

Test Date: 01-09-2012; Ambient Temp: 20.2 ° C; Tissue Temp: 20.0 °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 172

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 = 20.3 V/m; Power Drift = 0.066 dB
Peak SAR (extrapolated) = 0.663 W/kg
SAR(1 g) = 0.396 mW/g; SAR(10 g) = 0.241 mW/g



0 dB = 0.432mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: #1

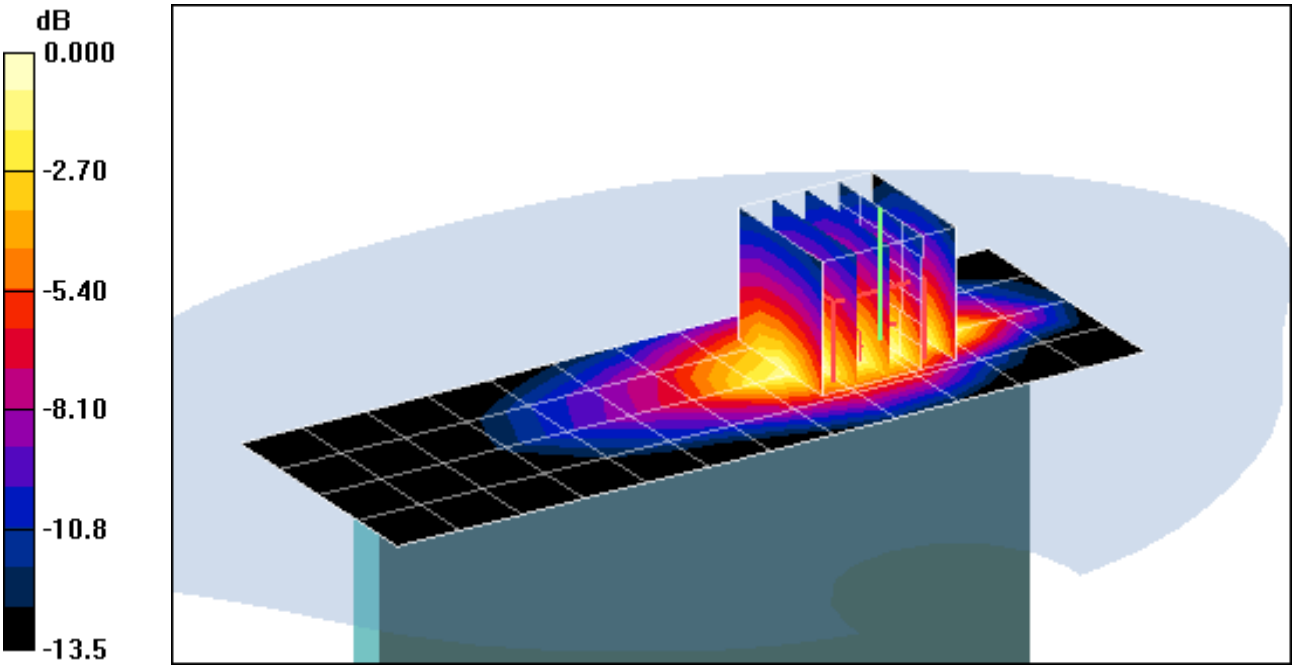
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.993 mho/m; ε_r = 55.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 12-27-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.6 °C

Probe: ES3DV3 - SN3258; ConvF(6.12, 6.12, 6.12); Calibrated: 4/8/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/21/2011
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.7 V/m; Power Drift = -0.037 dB
Peak SAR (extrapolated) = 0.582 W/kg
SAR(1 g) = 0.345 mW/g; SAR(10 g) = 0.203 mW/g



0 dB = 0.389mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: #2

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.985 mho/m; ε_r = 55; ρ = 1000 kg/m^3

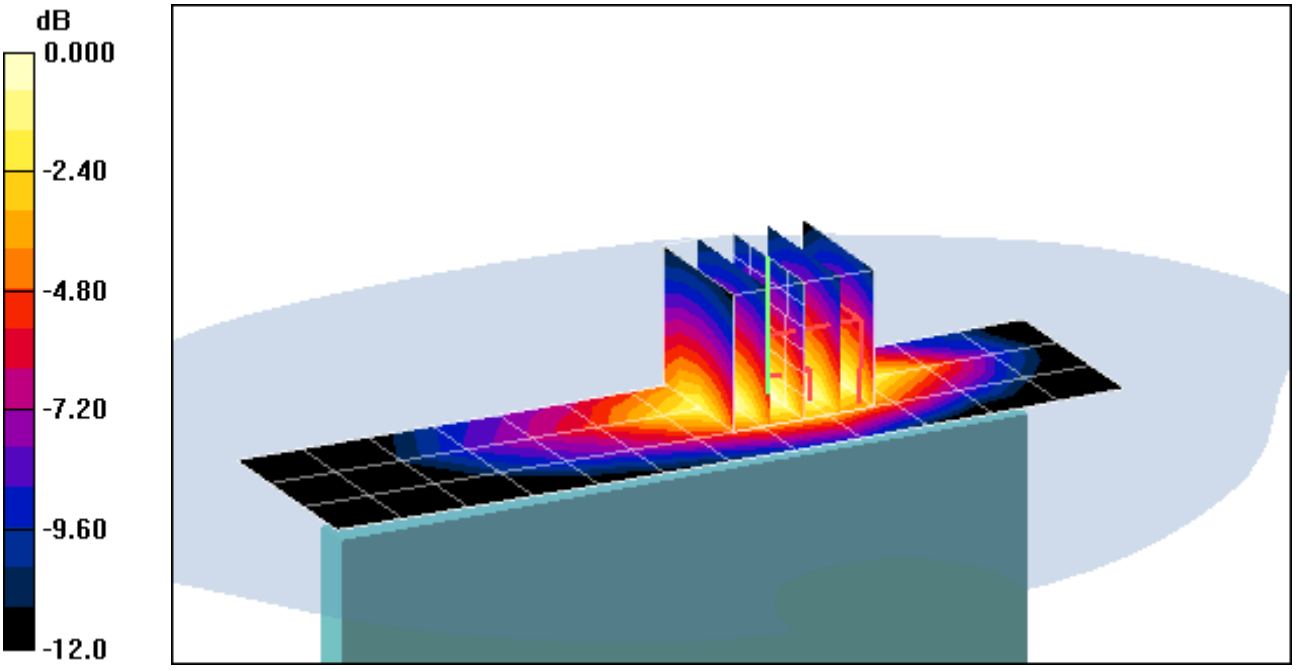
Phantom section: Flat Section; Space: 0.5 cm

Test Date: 01-03-2012; Ambient Temp: 21.4 ° C; Tissue Temp: 20.0 °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 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Area Scan (4x13x1): 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 = -0.117 dB
Peak SAR (extrapolated) = 0.910 W/kg
SAR(1 g) = 0.571 mW/g; SAR(10 g) = 0.358 mW/g



0 dB = 0.625mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: #2

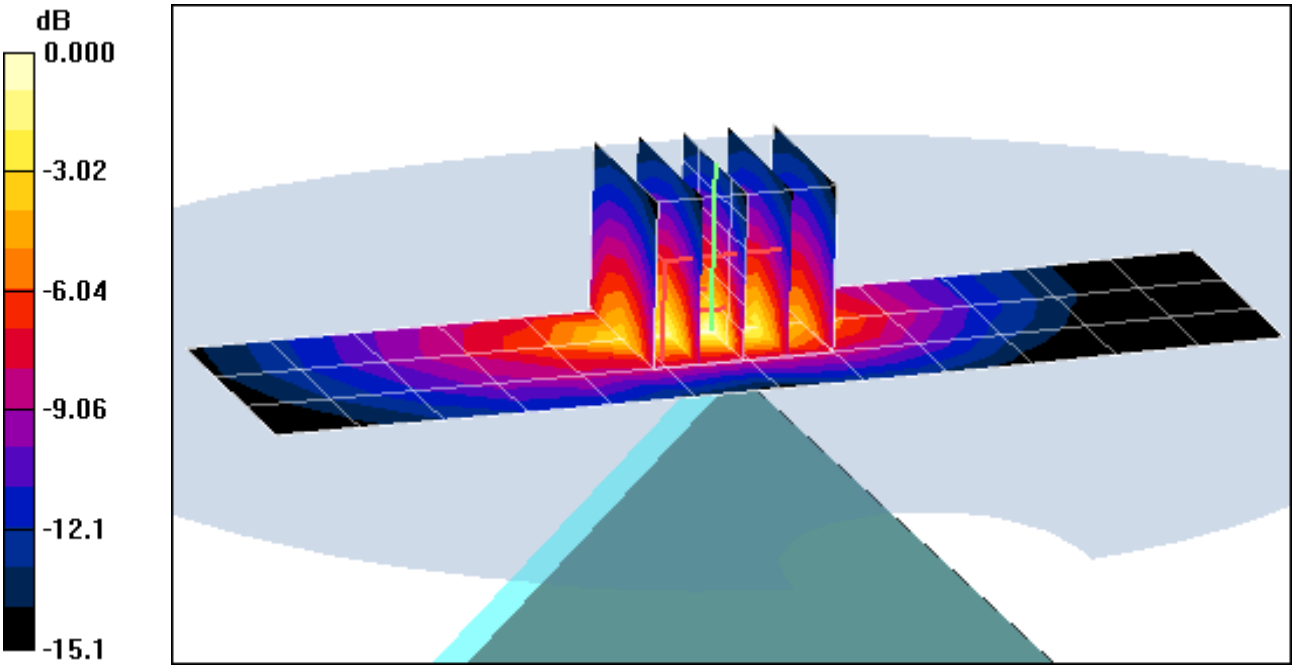
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.985 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 01-03-2012; Ambient Temp: 21.4 ° C; Tissue Temp: 20.0 °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 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Area Scan (4x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.33 V/m; Power Drift = 0.165 dB
Peak SAR (extrapolated) = 0.959 W/kg
SAR(1 g) = 0.422 mW/g; SAR(10 g) = 0.194 mW/g



0 dB = 0.522mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: CSP^2

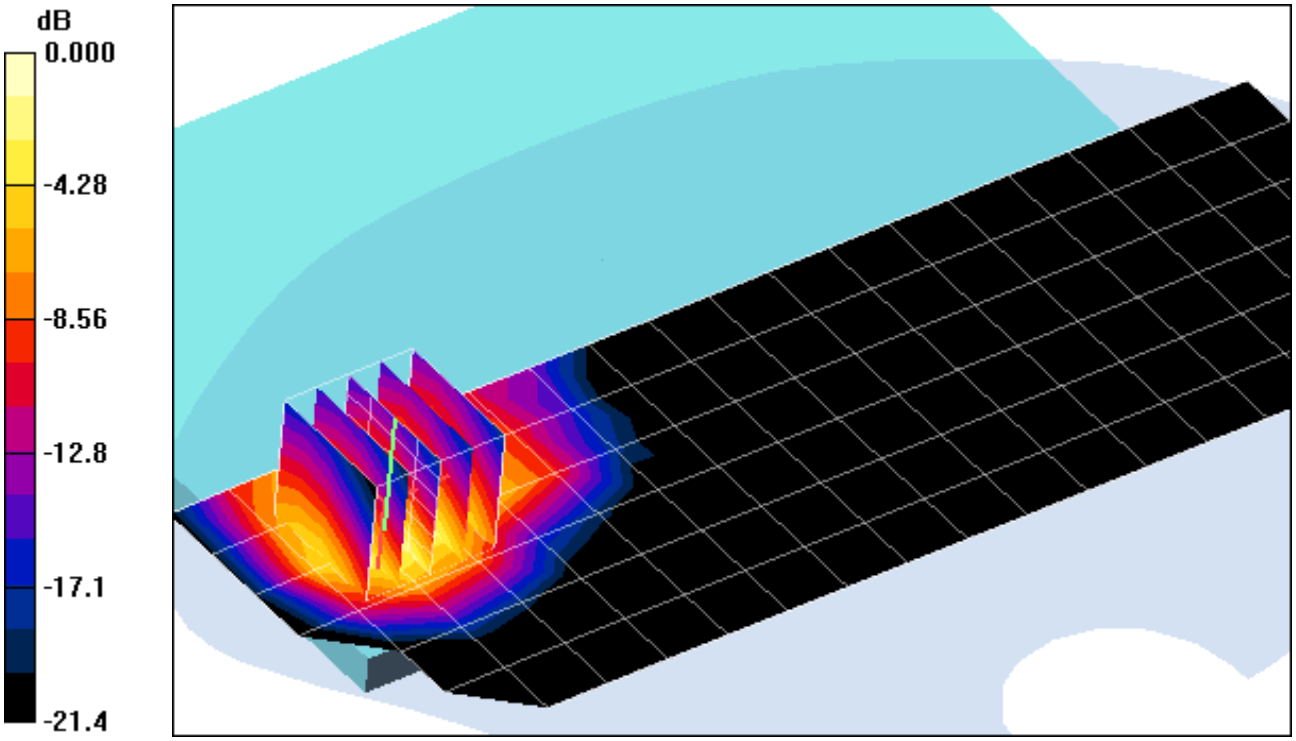
Communication System: GSM1900 GPRS; 3 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:2.76
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.55 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-24-2011; Ambient Temp: 23.1°C; Tissue Temp: 21.8°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, 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 = 0.522 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.693 mW/g; SAR(10 g) = 0.363 mW/g



0 dB = 0.791mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: CSP^1

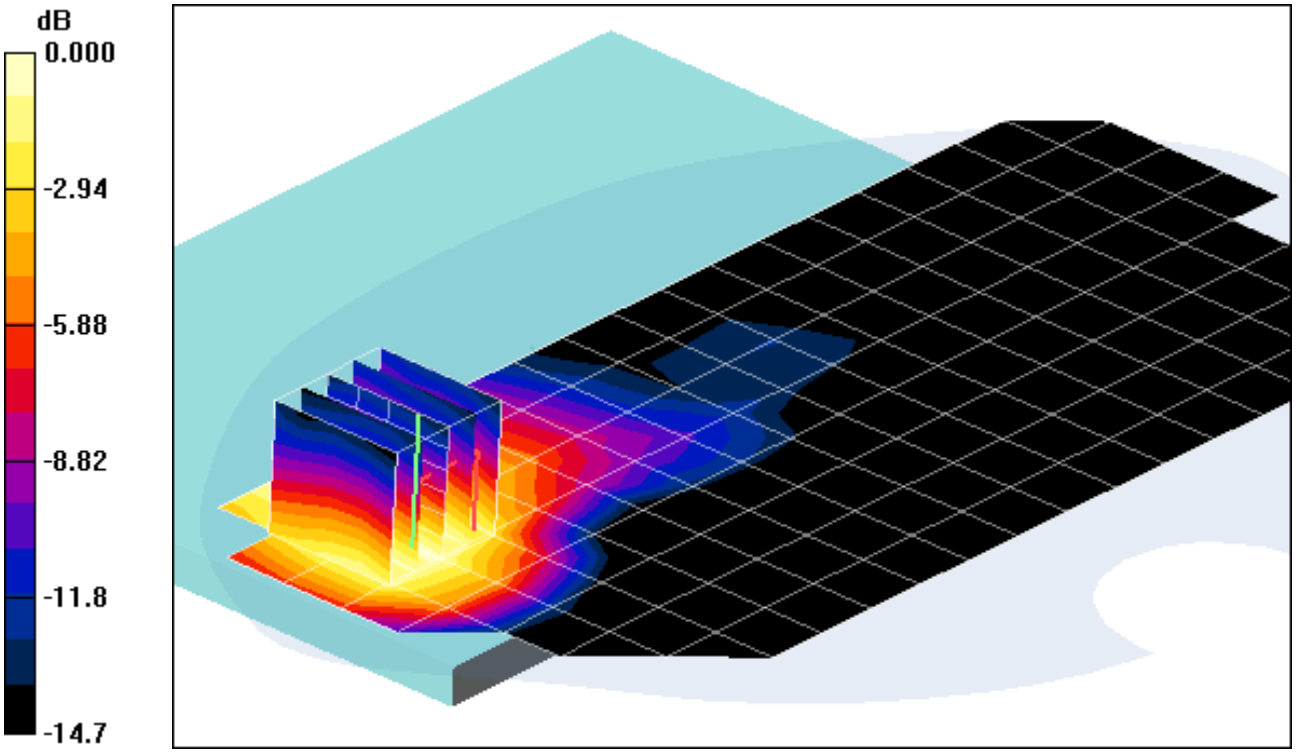
Communication System: GSM1900 GPRS; 1 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.55 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 23.1°C; Tissue Temp: 21.8°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, 1 Tx Slots

Area Scan (9x19x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.5 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.506 W/kg
SAR(1 g) = 0.307 mW/g; SAR(10 g) = 0.189 mW/g



0 dB = 0.326mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: CSP^2

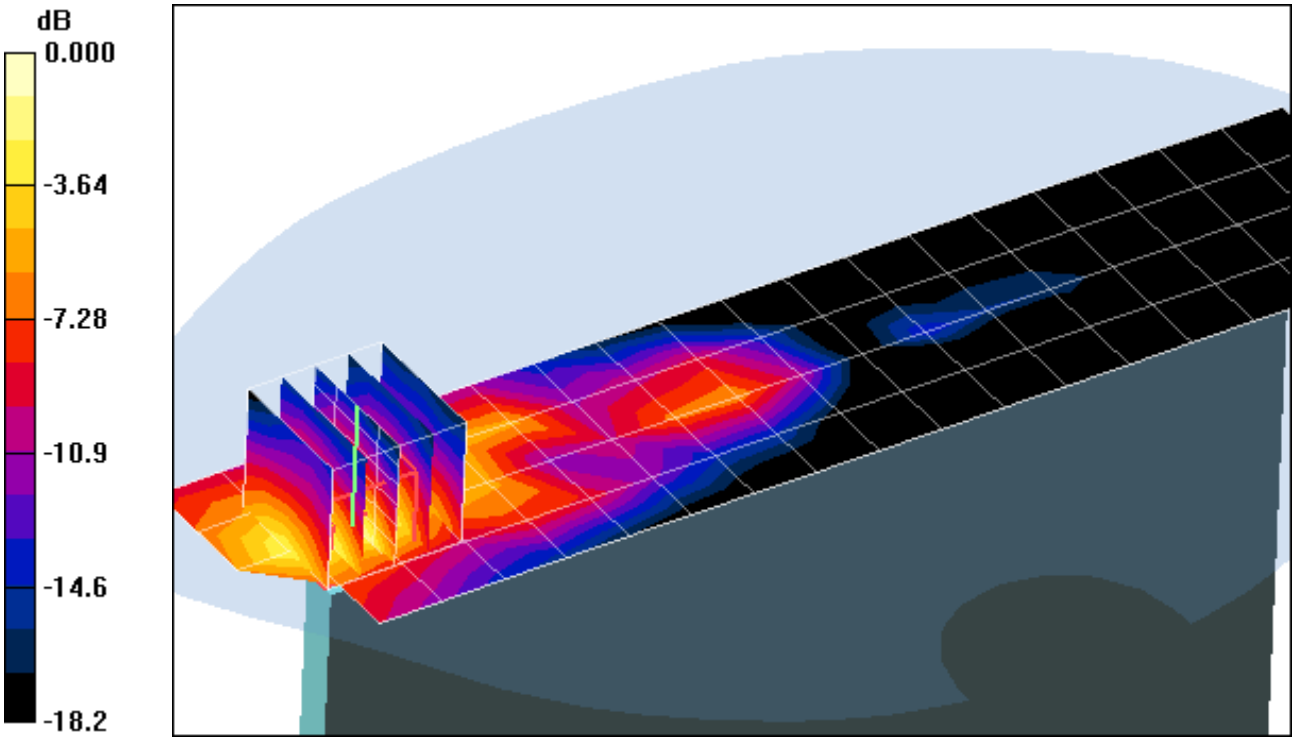
Communication System: GSM1900 GPRS; 3 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:2.76
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.55 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-24-2011; Ambient Temp: 23.1°C; Tissue Temp: 21.8°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 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 = 9.25 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.222 W/kg
SAR(1 g) = 0.114 mW/g; SAR(10 g) = 0.055 mW/g



0 dB = 0.132mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: CSP^1

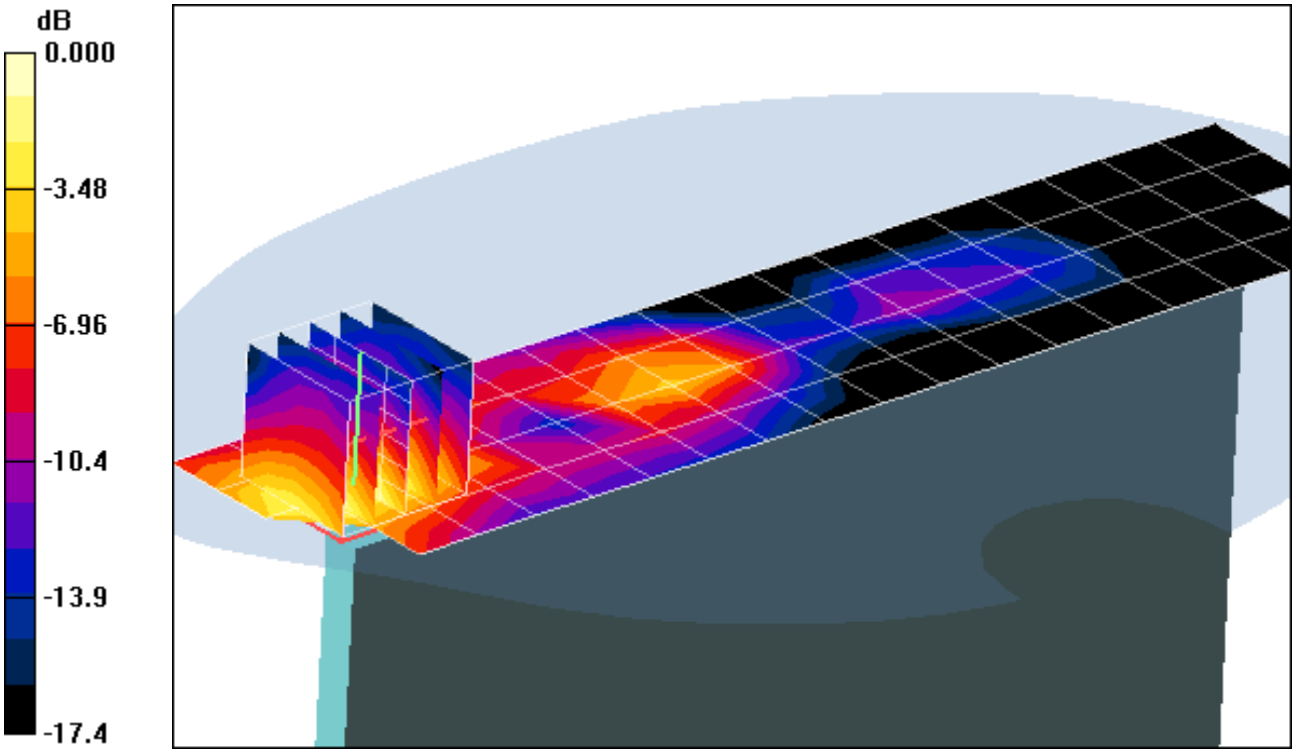
Communication System: GSM1900 GPRS; 1 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.55 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.5 cm

Test Date: 10-24-2011; Ambient Temp: 23.1°C; Tissue Temp: 21.8°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 Edge, Mid.ch, 1 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 = 9.34 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.245 W/kg
SAR(1 g) = 0.135 mW/g; SAR(10 g) = 0.071 mW/g



0 dB = 0.151mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: CSP^2

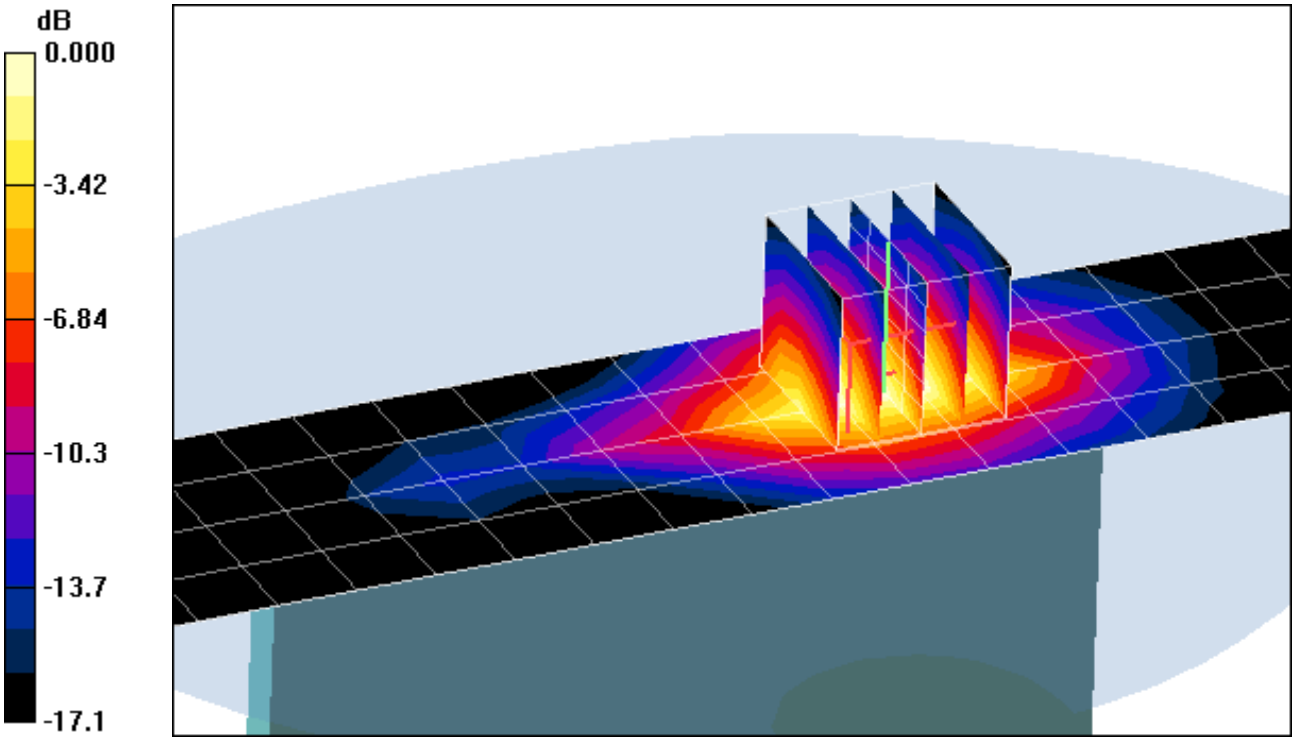
Communication System: GSM1900 GPRS; 3 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:2.76
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.55 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-24-2011; Ambient Temp: 23.1°C; Tissue Temp: 21.8°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, Left 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 = 13.3 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.444 W/kg
SAR(1 g) = 0.247 mW/g; SAR(10 g) = 0.130 mW/g



0 dB = 0.284mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: CSP^1

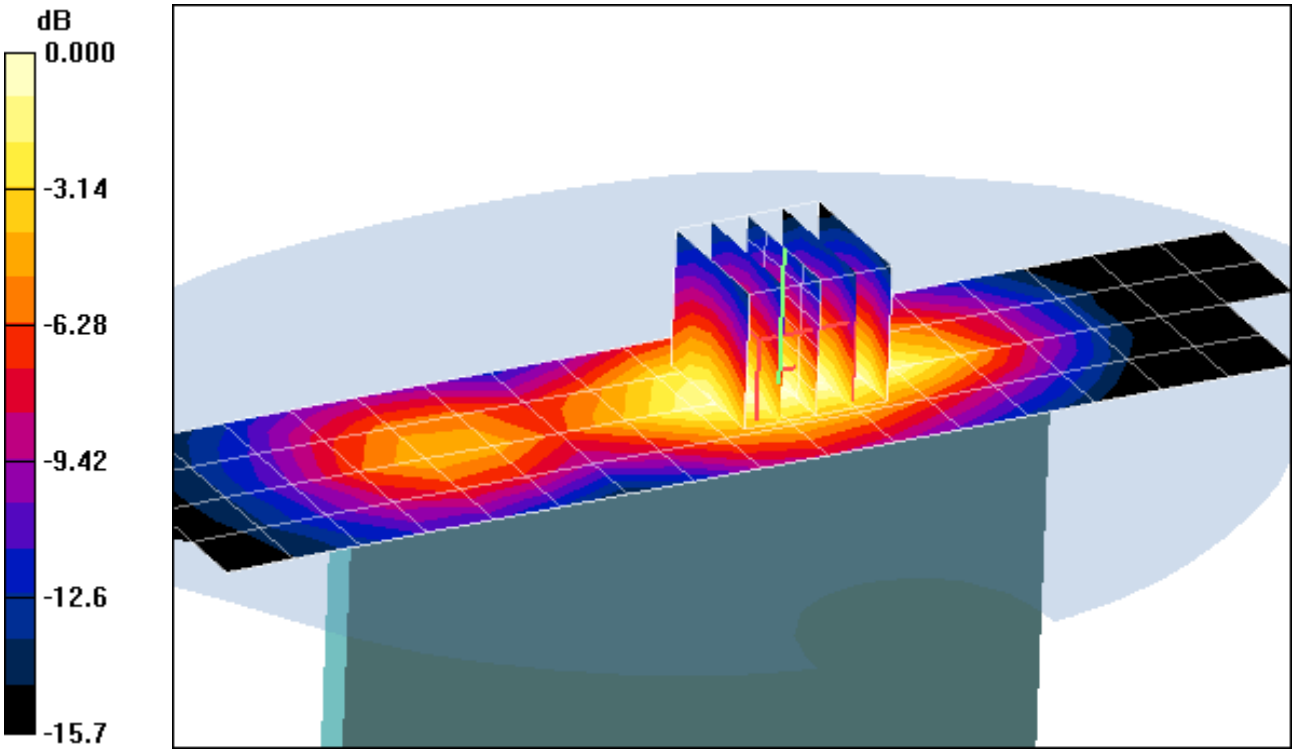
Communication System: GSM1900 GPRS; 1 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.55 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.5 cm

Test Date: 10-24-2011; Ambient Temp: 23.1°C; Tissue Temp: 21.8°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, Left Edge, Mid.ch, 1 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 = 13.3 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.389 W/kg
SAR(1 g) = 0.239 mW/g; SAR(10 g) = 0.142 mW/g



0 dB = 0.262mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: CSP^1

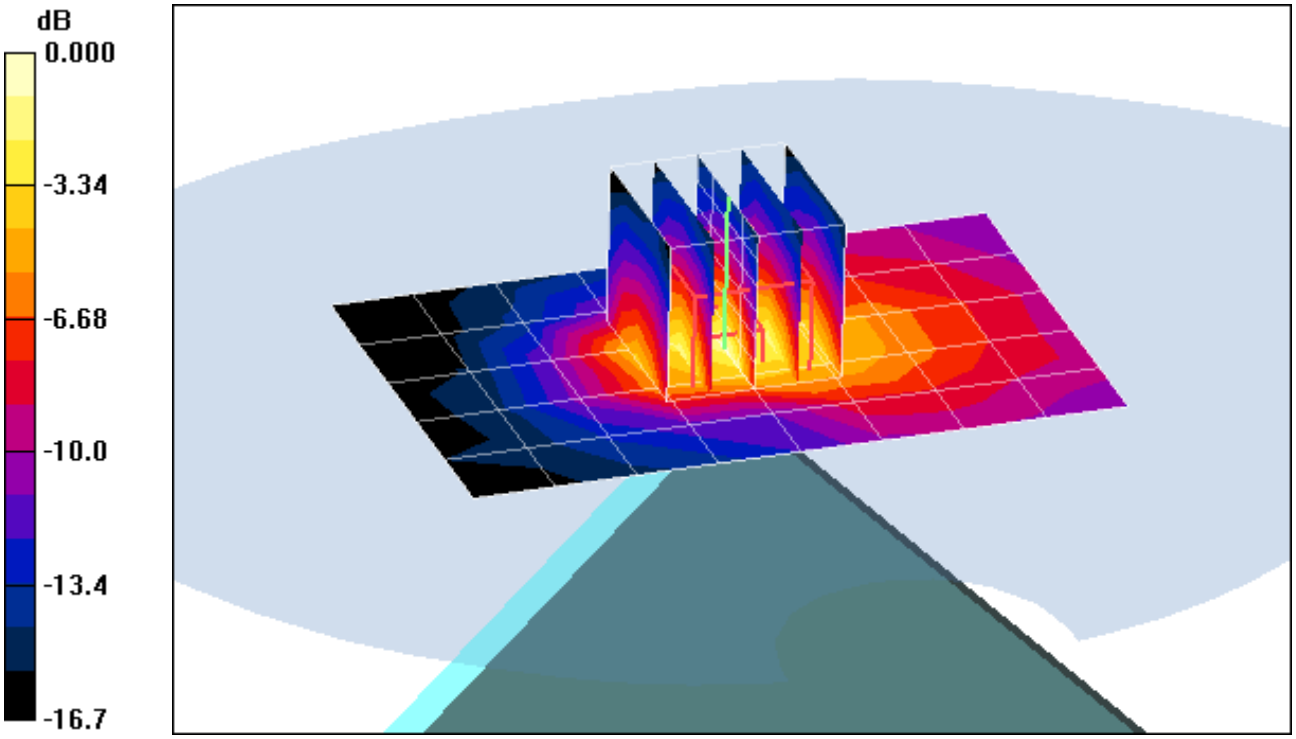
Communication System: GSM1900 GPRS; 1 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.49 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 11-10-2011; Ambient Temp: 24.3°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN3561; ConvF(6.58, 6.58, 6.58); Calibrated: 7/27/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.2 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.473 W/kg
SAR(1 g) = 0.232 mW/g; SAR(10 g) = 0.109 mW/g



0 dB = 0.281mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: FI-255-A

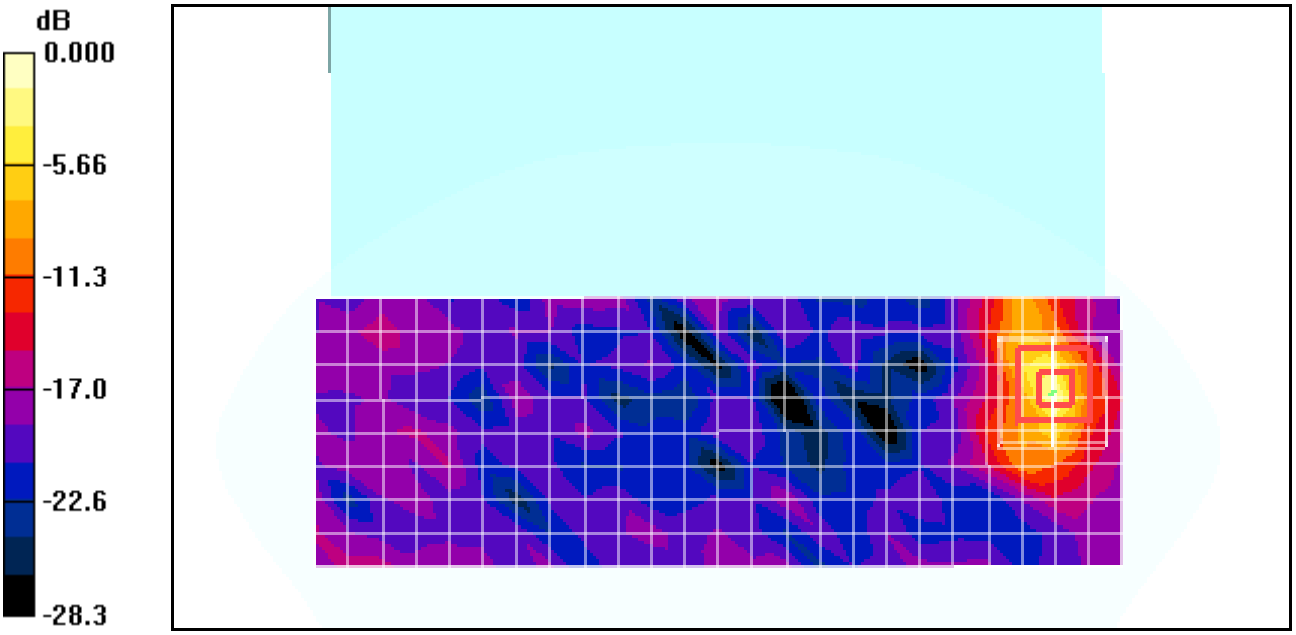
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5520 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body; Medium parameters used:
f = 5520 MHz; σ = 5.488 mho/m; ε_r = 47.82; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-19-2011; Ambient Temp: 23.7°C; Tissue Temp: 22.4°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 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Mode: WLAN 802.11a 5.5 GHz, Back side, Ch 104, 6 Mbps

Area Scan (9x25x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 15.8 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 3.28 W/kg
SAR(1 g) = 0.617 mW/g; SAR(10 g) = 0.168 mW/g



0 dB = 1.72mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: FI-255-A

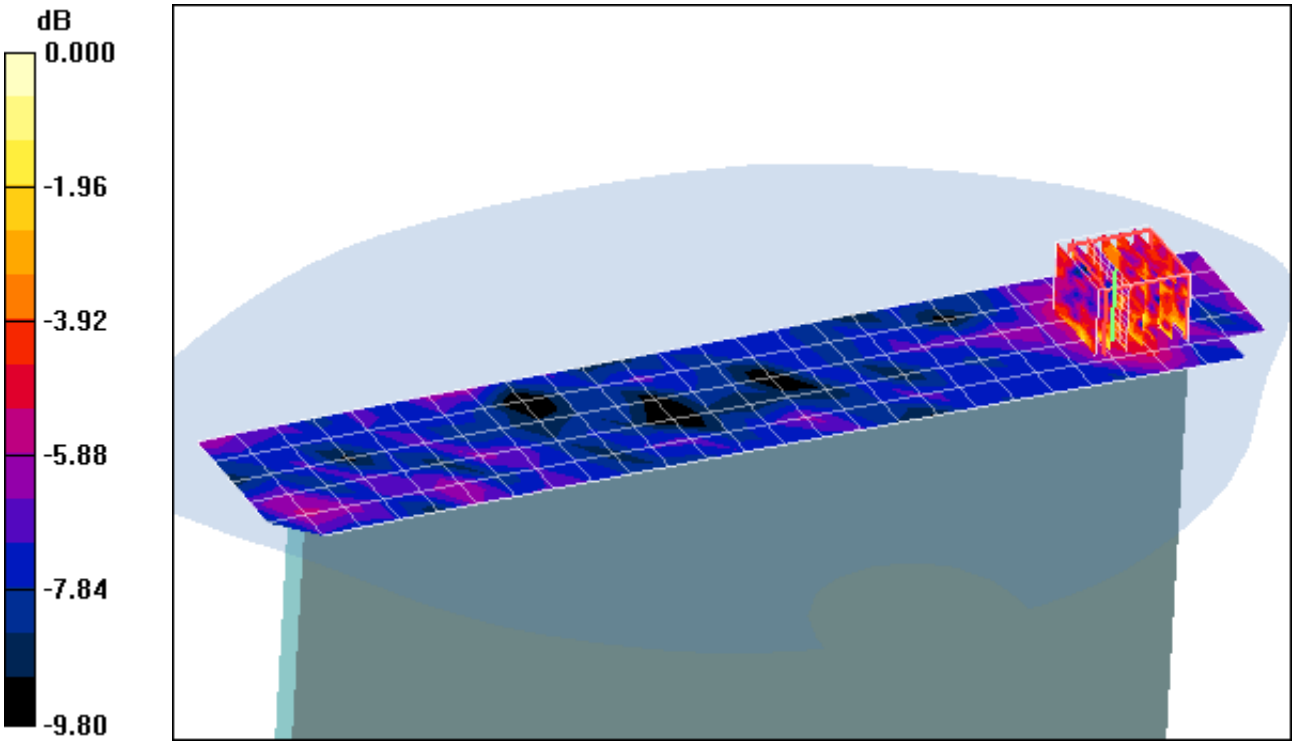
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5520 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5520 MHz; σ = 5.488 mho/m; ε_r = 47.82; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-19-2011; Ambient Temp: 23.7 °C; Tissue Temp: 22.4 °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

Mode: WLAN 802.11a 5.5 GHz, Top edge, Ch 104, 6 Mbps

Area Scan (6x27x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 4.50 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.239 W/kg
SAR(1 g) = 0.097 mW/g; SAR(10 g) = 0.064 mW/g



0 dB = 0.142mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7320T; Type: Portable Tablet Computer; Serial: FI-255-A

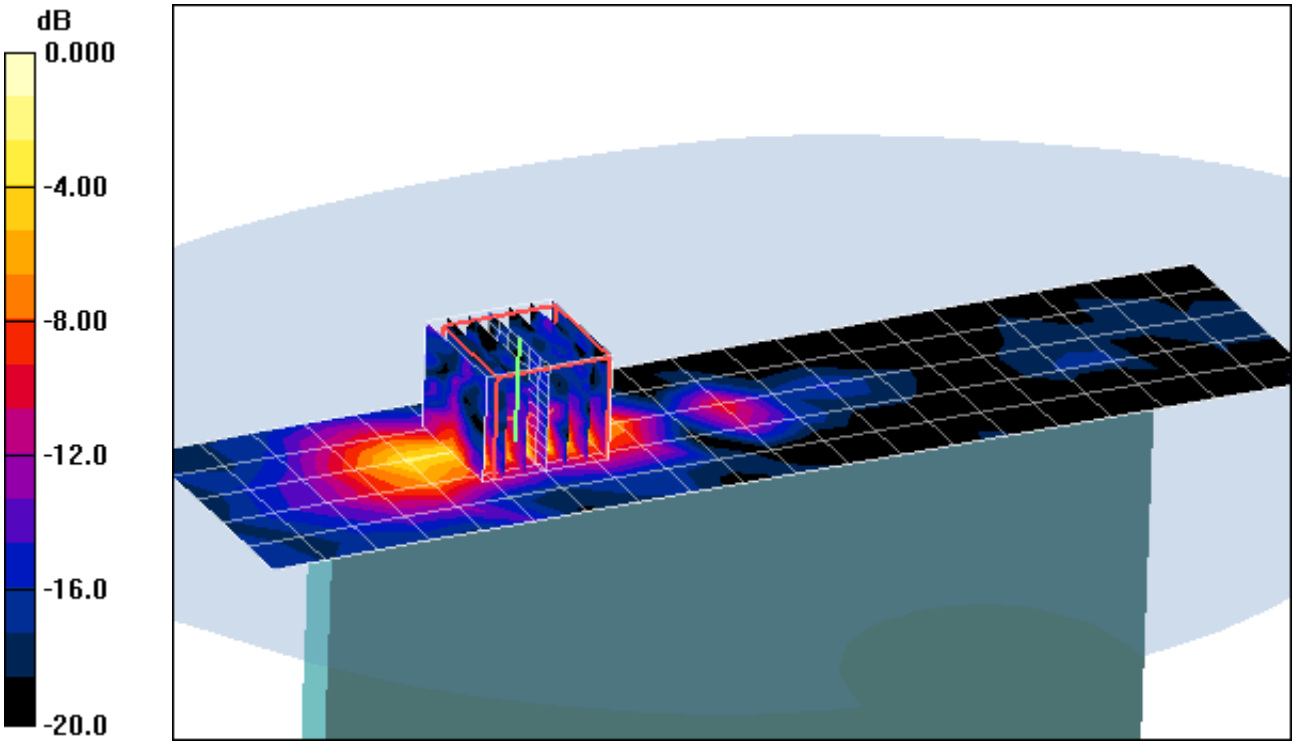
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5520 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5520 MHz; σ = 5.488 mho/m; ε_r = 47.82; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-19-2011; Ambient Temp: 23.7 °C; Tissue Temp: 22.4 °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

Mode: WLAN 802.11a 5.5 GHz, Right edge, Ch 104, 6 Mbps

Area Scan (6x21x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 16.2 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 4.87 W/kg
SAR(1 g) = 0.729 mW/g; SAR(10 g) = 0.189 mW/g



0 dB = 1.74mW/g

APPENDIX B: DIPOLE VALIDATION

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

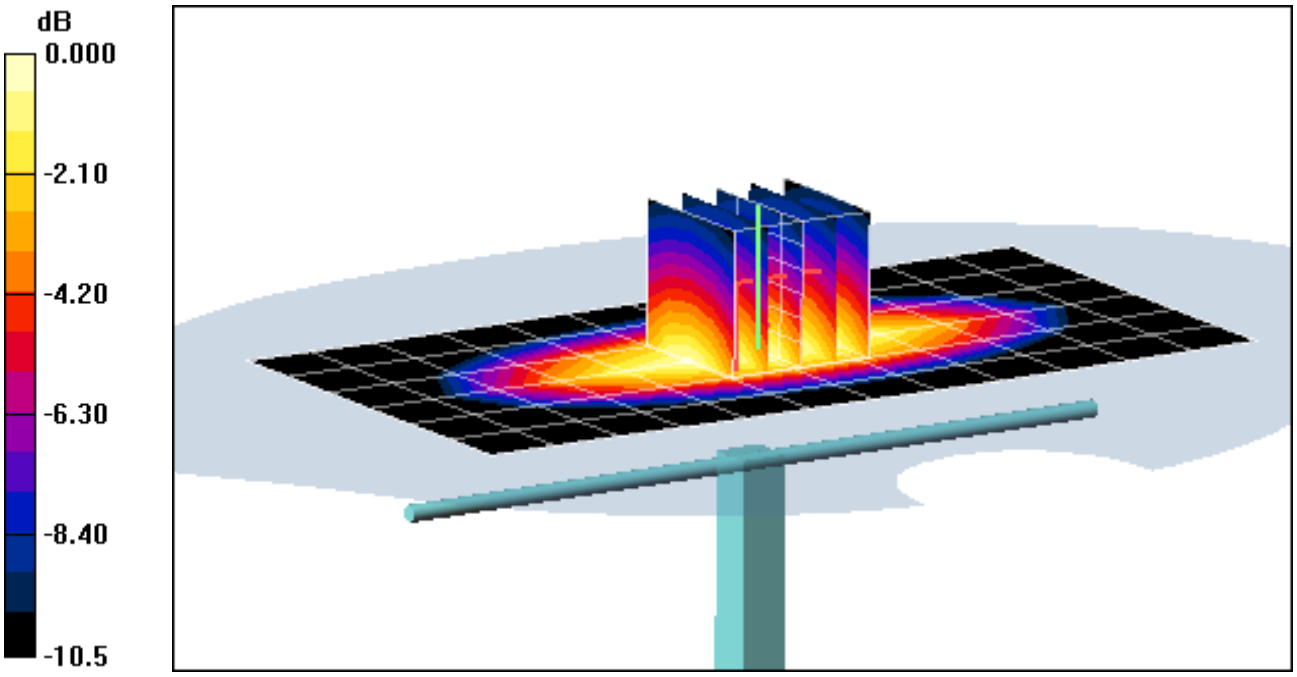
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.981 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-25-2011; Ambient Temp: 23.8 °C; Tissue Temp: 21.9 °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) = 0.635 mW/g
Deviation = -1.22 %



0 dB = 1.05mW/g

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

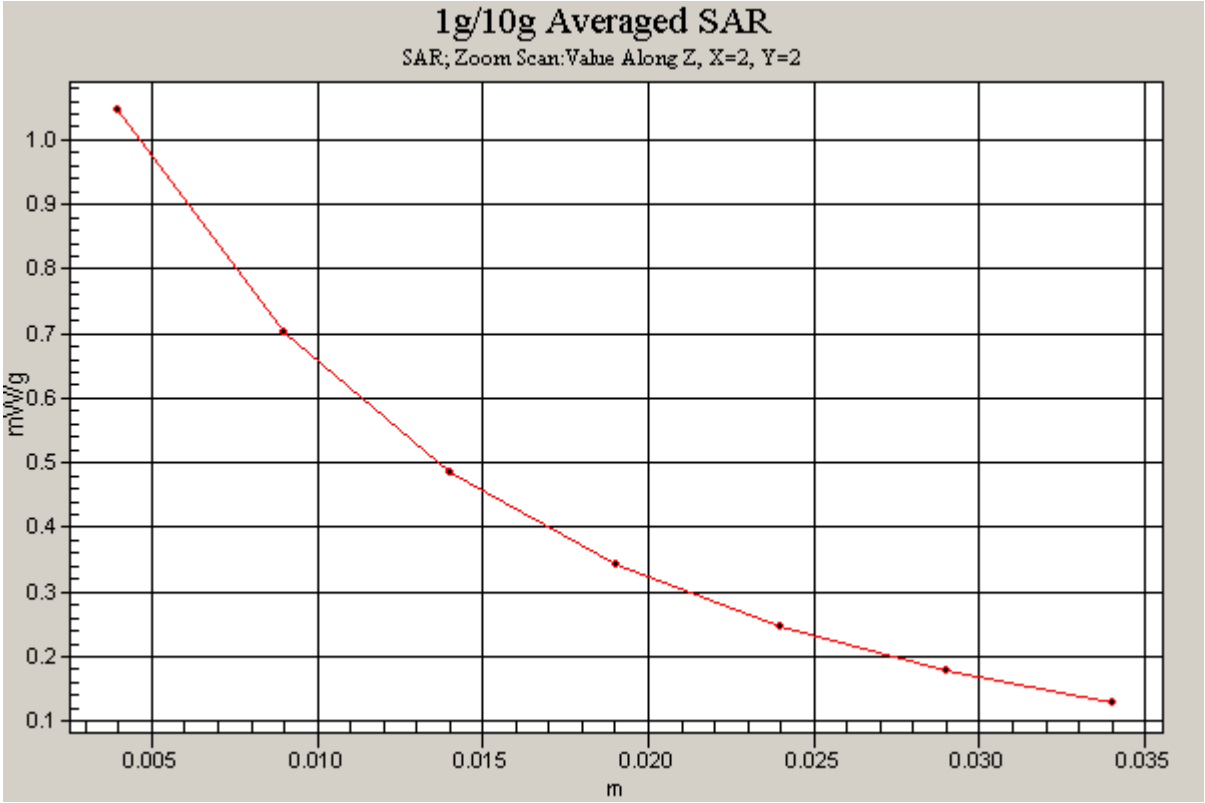
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.981 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-25-2011; Ambient Temp: 23.8 °C; Tissue Temp: 21.9 °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) = 0.635 mW/g
Deviation = -1.22 %



PCTEST ENGINEERING LABORATORY, INC.

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

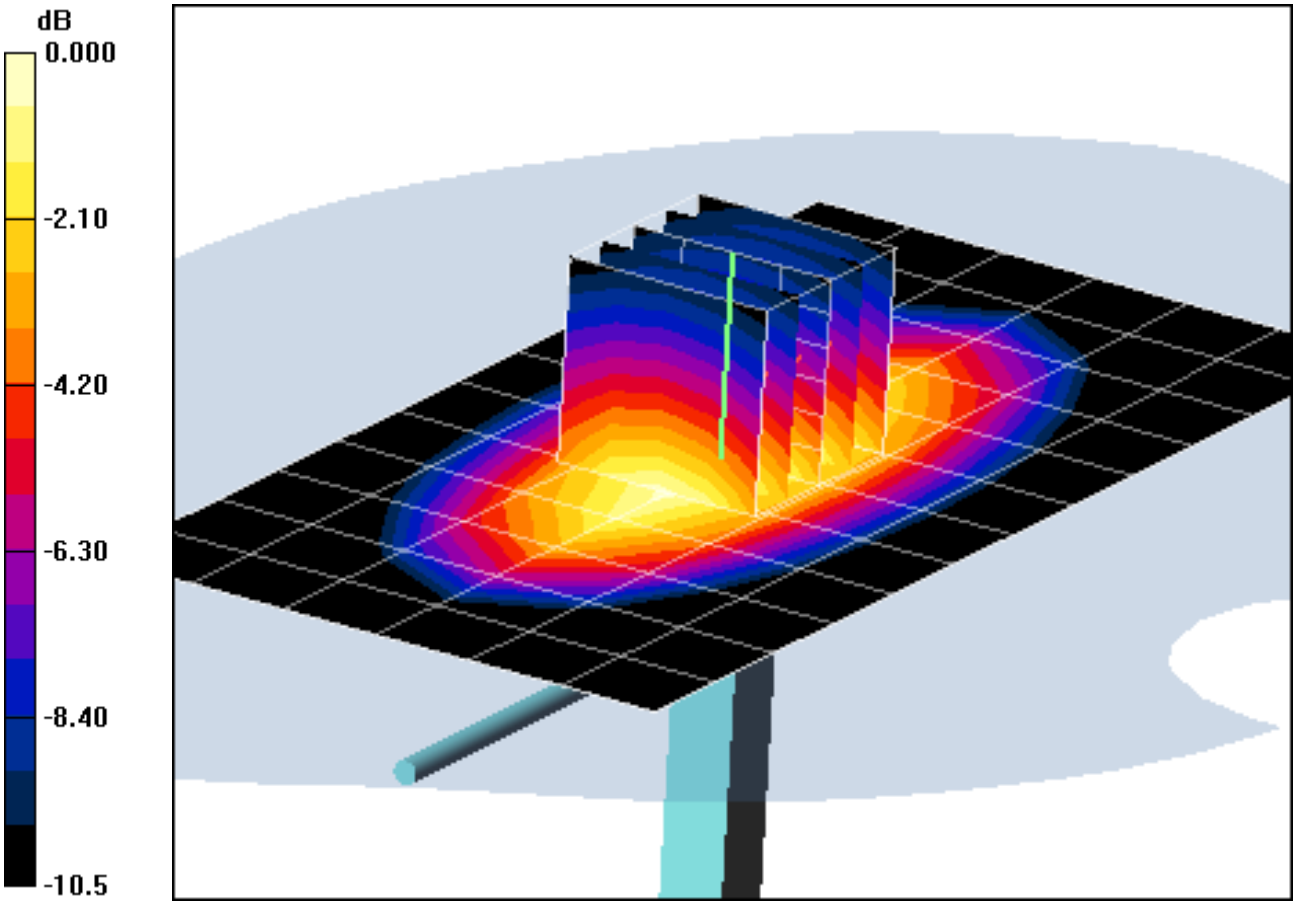
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.978 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-11-2011; Ambient Temp: 23.6°C; Tissue Temp: 22.0°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) = 0.979 mW/g; SAR(10 g) = 0.637 mW/g
Deviation = -0.61 %



0 dB = 1.06mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

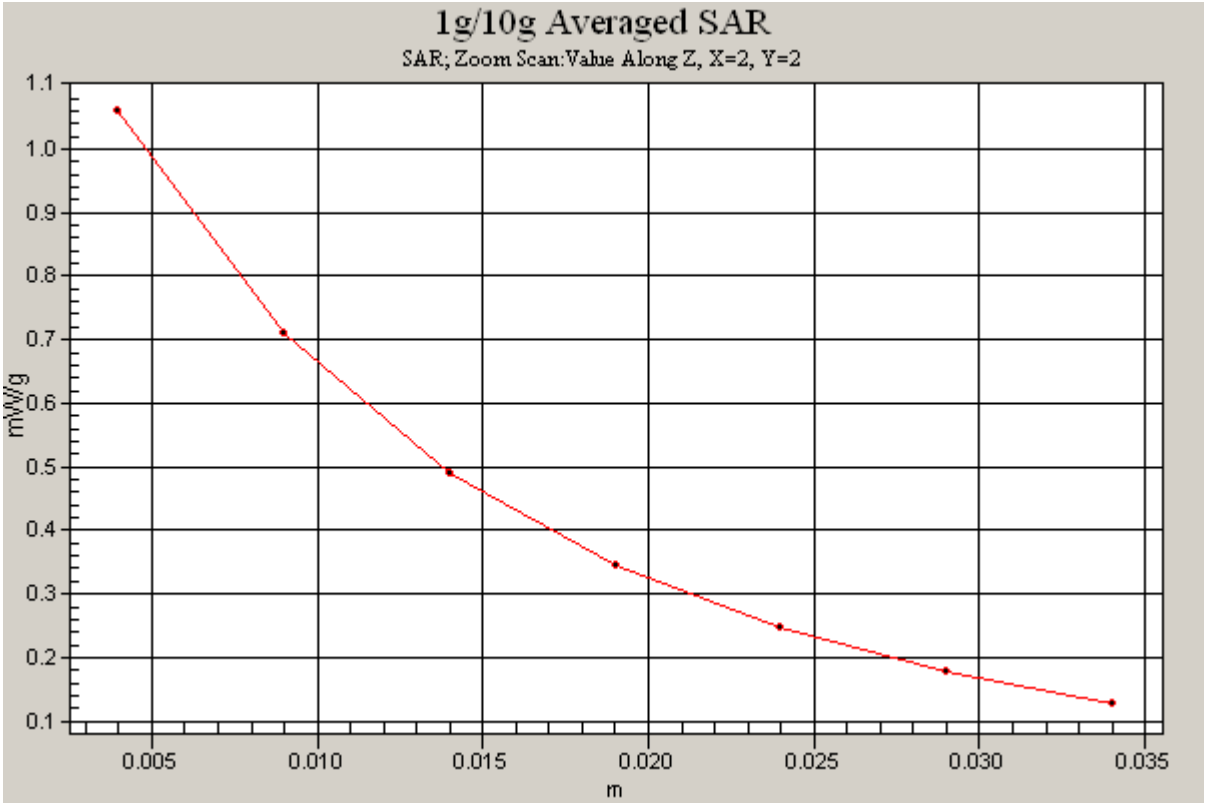
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.978 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-11-2011; Ambient Temp: 23.6°C; Tissue Temp: 22.0°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) = 0.979 mW/g; SAR(10 g) = 0.637 mW/g
Deviation = -0.61 %



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

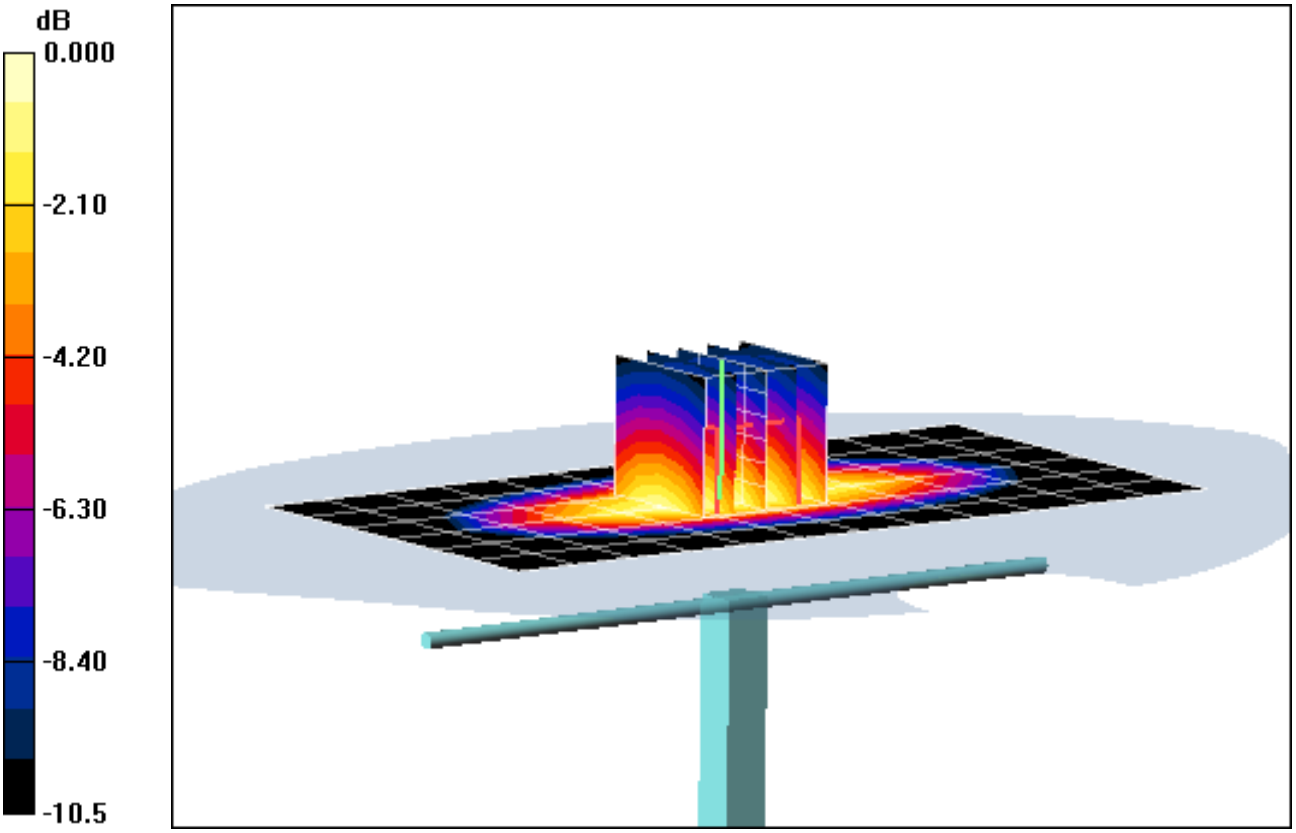
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.991 mho/m; ε_r = 55.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-27-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.6 °C

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

835MHz System Verification

Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.660 mW/g
Deviation = 2.54 %



0 dB = 1.10mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

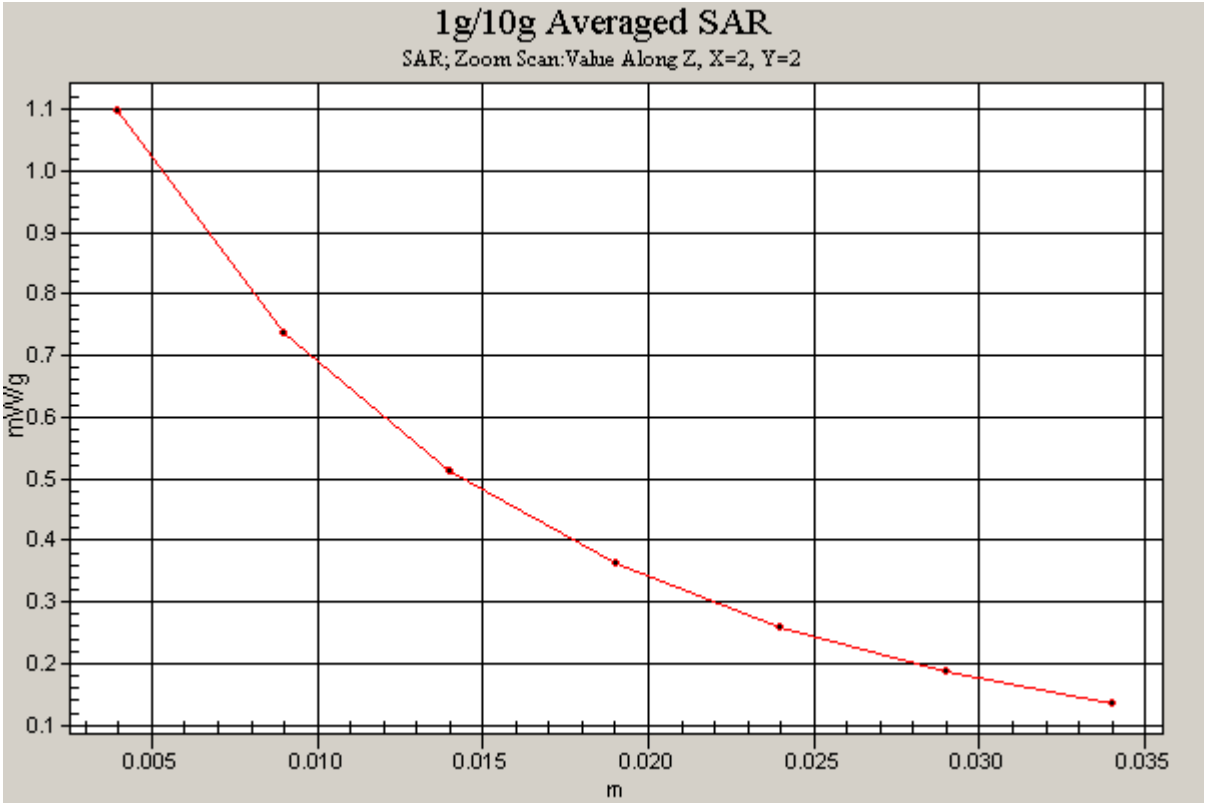
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.991 mho/m; ε_r = 55.8; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-27-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.6 °C

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

835MHz System Verification

Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.660 mW/g
Deviation = 2.54 %



PCTEST ENGINEERING LABORATORY, INC.

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

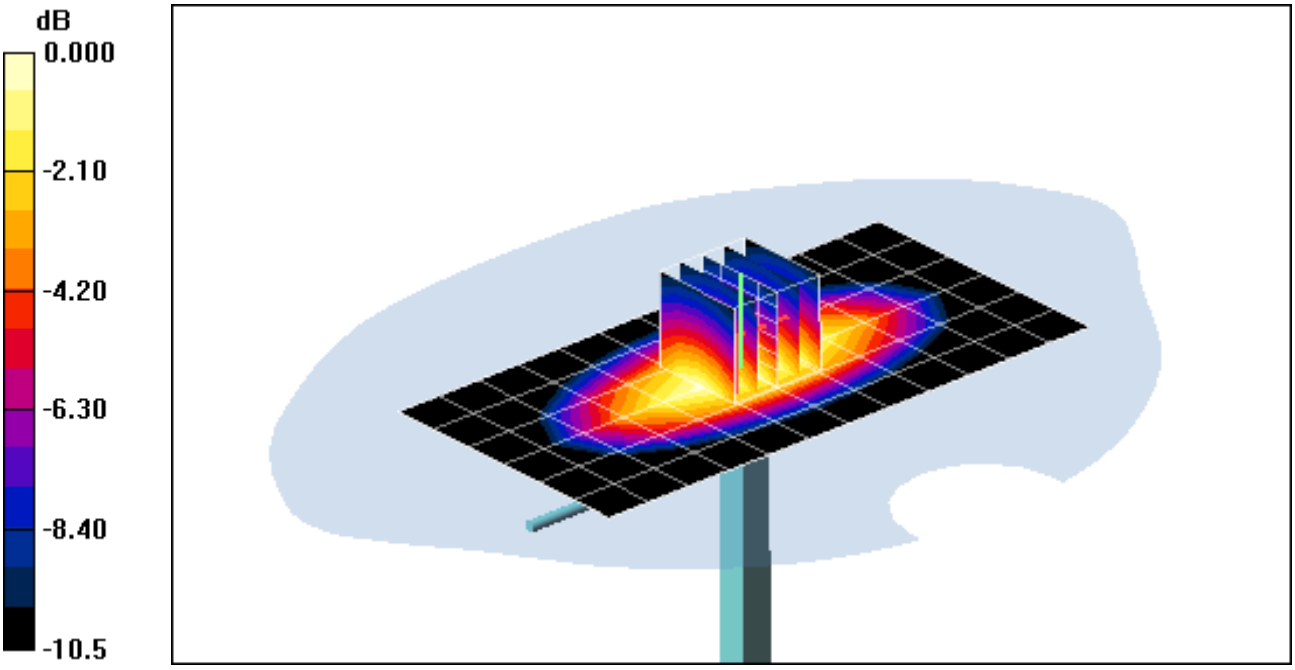
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.984 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-03-2011; Ambient Temp: 21.4 °C; Tissue Temp: 20.0 °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 172

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) = 1.03 mW/g; SAR(10 g) = 0.678 mW/g
Deviation = 4.57 %



0 dB = 1.11mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

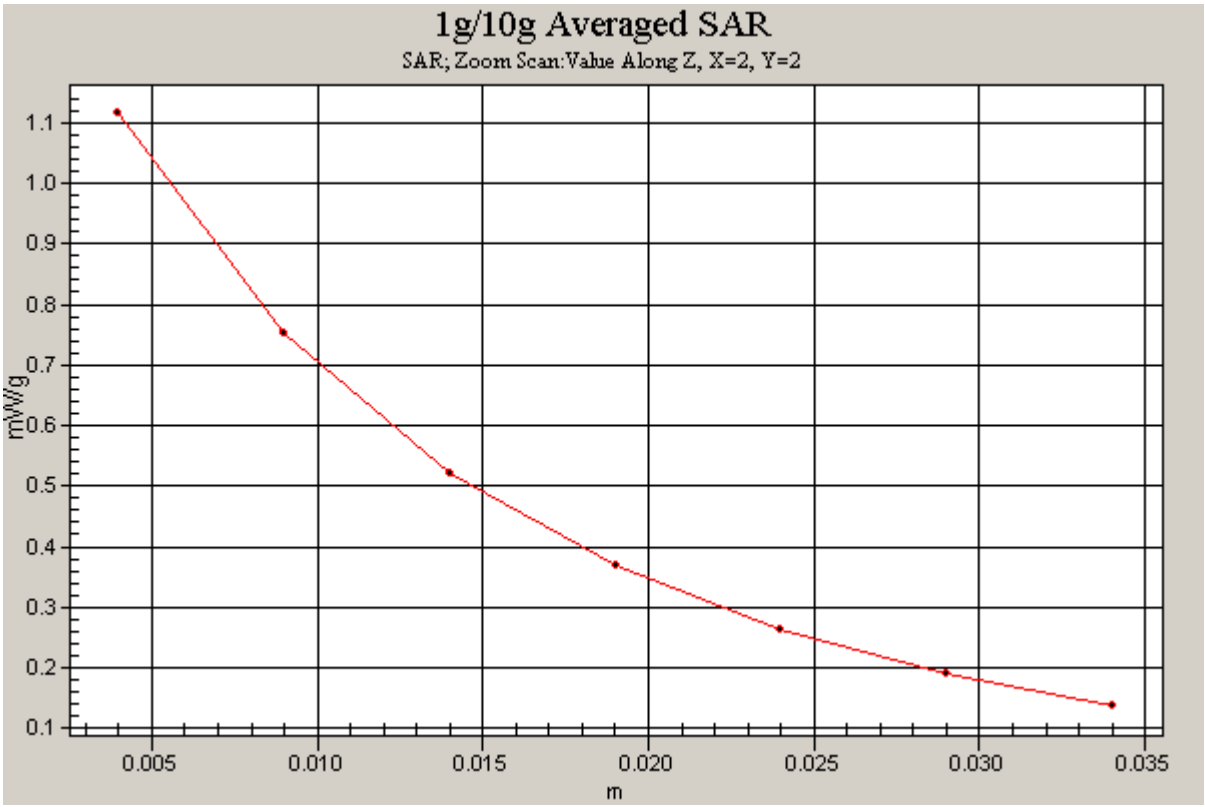
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.984 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-03-2011; Ambient Temp: 21.4 °C; Tissue Temp: 20.0 °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 172

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) = 1.03 mW/g; SAR(10 g) = 0.678 mW/g
Deviation = 4.57 %



PCTEST ENGINEERING LABORATORY, INC.

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

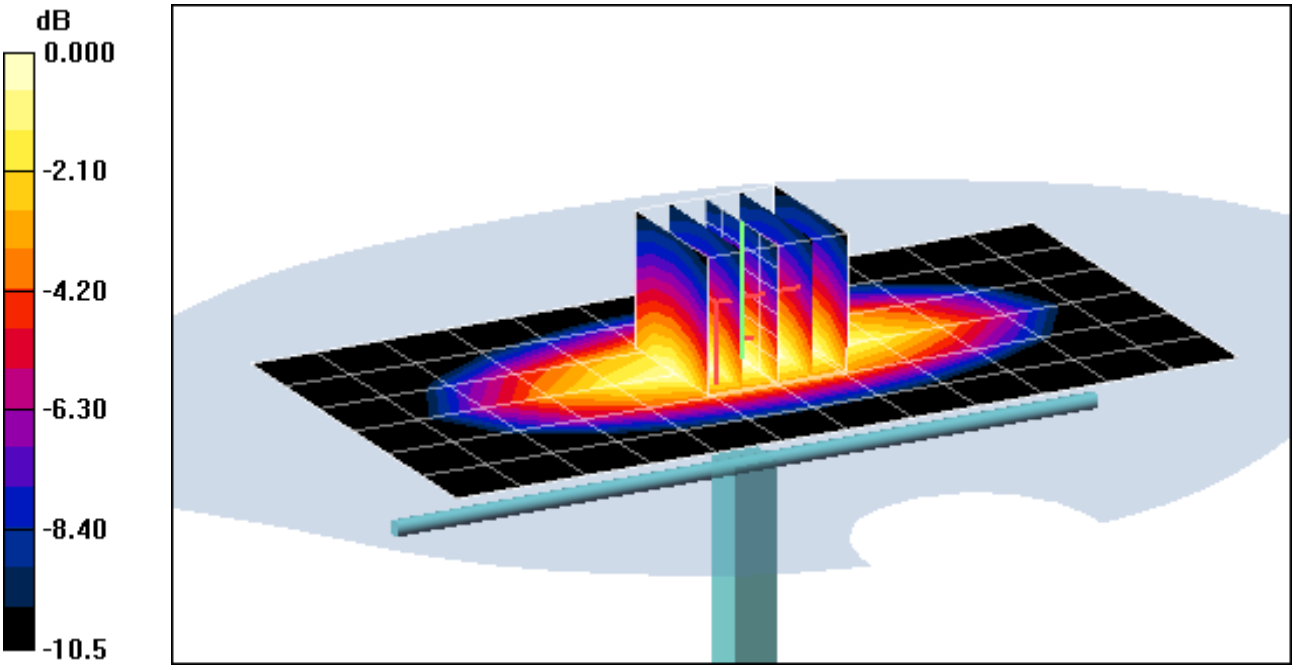
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.985 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-09-2011; Ambient Temp: 20.2 °C; Tissue Temp: 20.0 °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 172

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) = 0.983 mW/g; SAR(10 g) = 0.641 mW/g
Deviation = 3.04 %



0 dB = 1.06mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

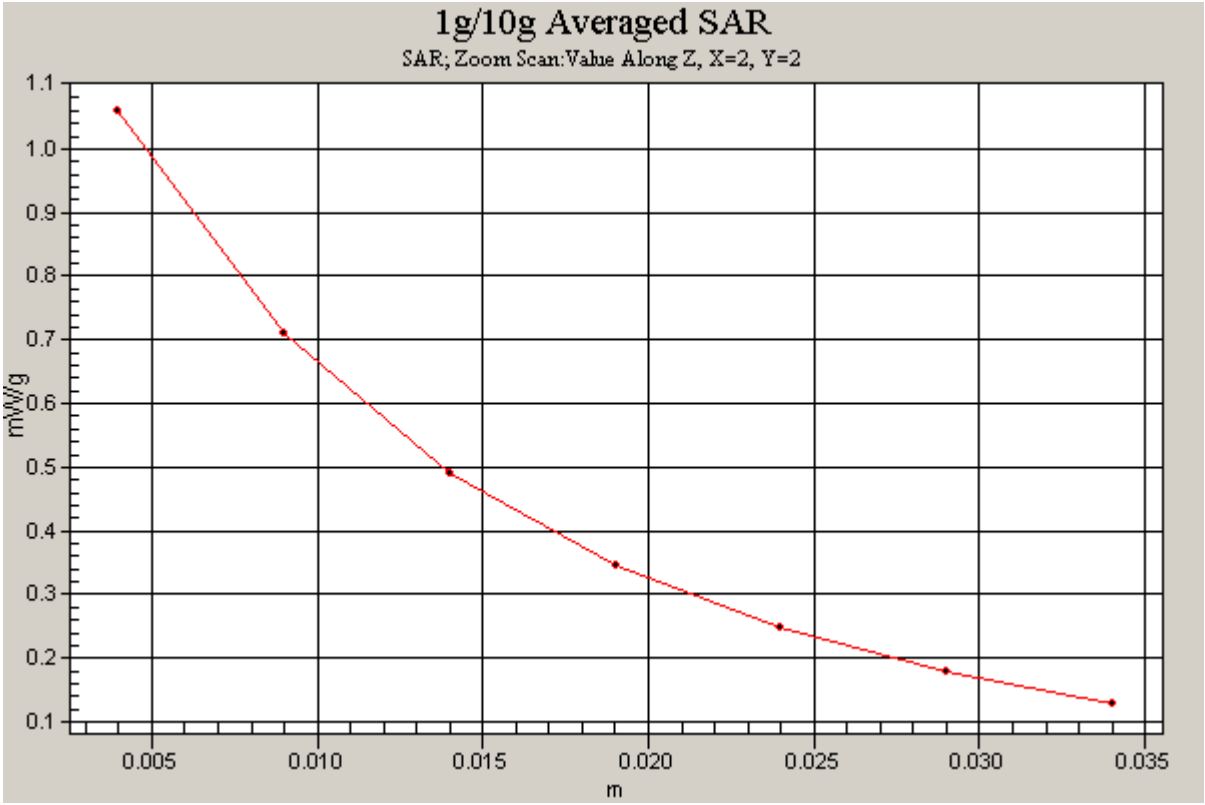
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.985 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 01-09-2011; Ambient Temp: 20.2 °C; Tissue Temp: 20.0 °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 172

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) = 0.983 mW/g; SAR(10 g) = 0.641 mW/g
Deviation = 3.04 %



PCTEST ENGINEERING LABORATORY, INC.

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

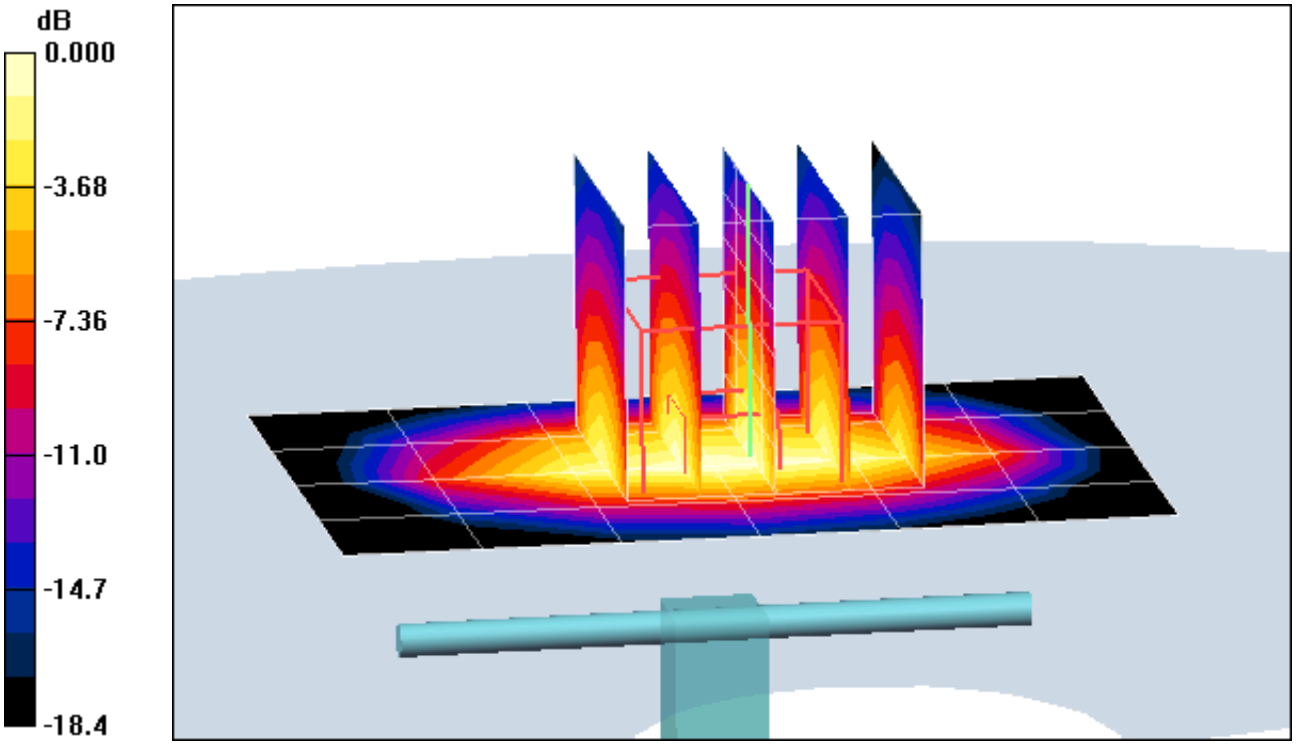
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.58 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 23.1°C; Tissue Temp: 21.8°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) = 4.36 mW/g; SAR(10 g) = 2.3 mW/g
Deviation = 6.08%



0 dB = 4.87mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

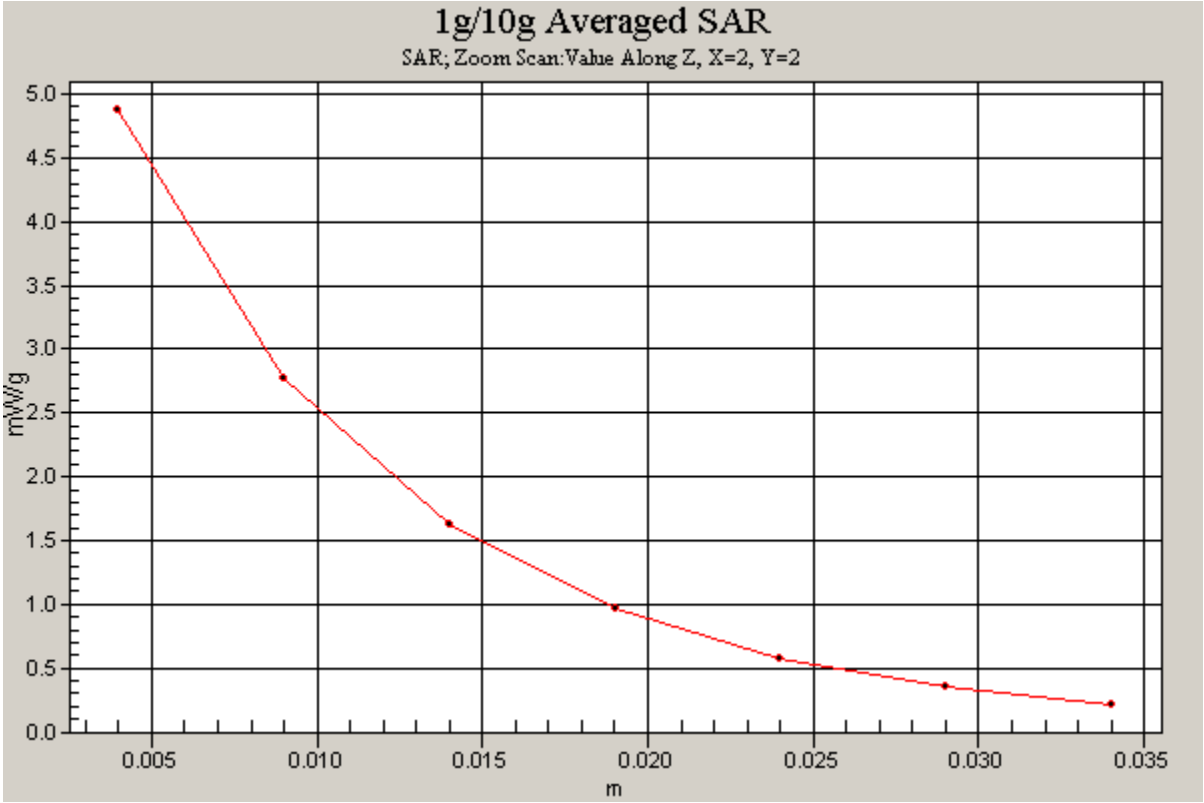
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.58 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-24-2011; Ambient Temp: 23.1°C; Tissue Temp: 21.8°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) = 4.36 mW/g; SAR(10 g) = 2.3 mW/g
Deviation = 6.08%



PCTEST ENGINEERING LABORATORY, INC.

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

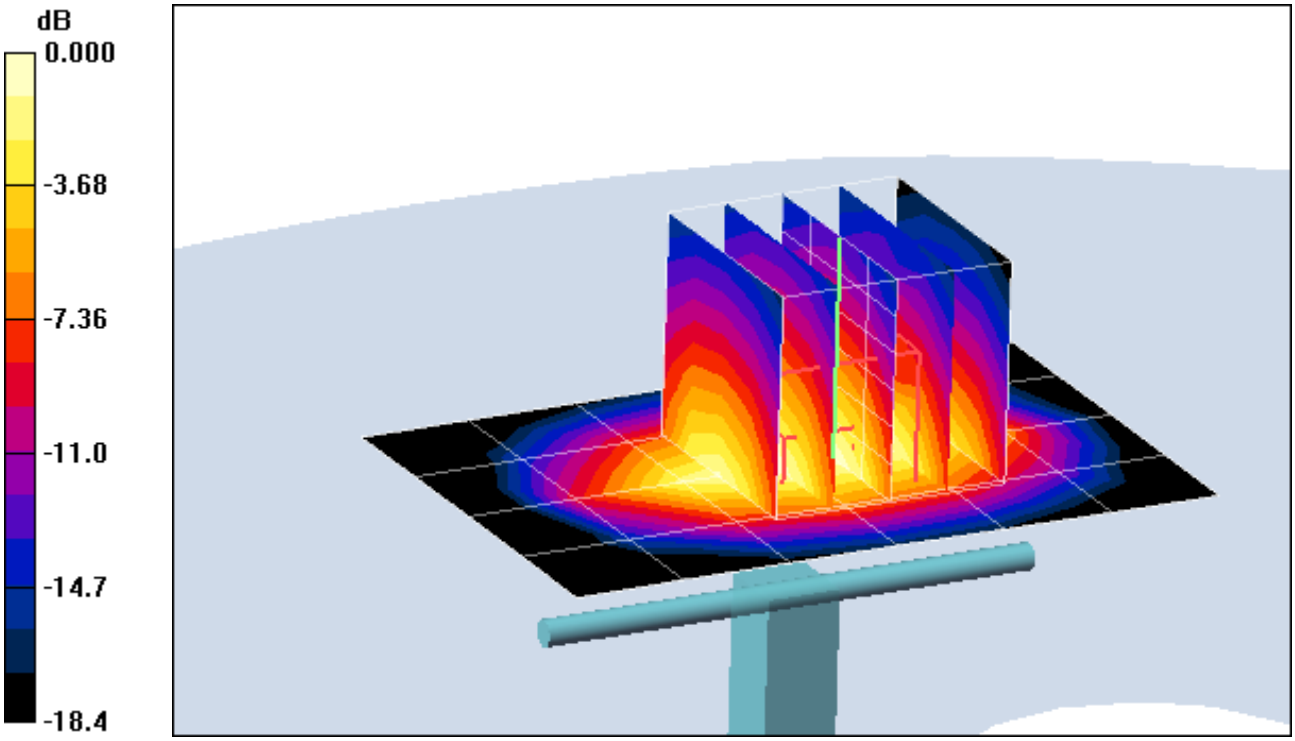
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.51 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-10-2011; Ambient Temp: 24.3°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN3561; ConvF(6.58, 6.58, 6.58); Calibrated: 7/27/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

1900MHz System Verification

Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 16 dBm (40 mW)
SAR(1 g) = 1.62 mW/g; SAR(10 g) = 0.831 mW/g
Deviation = -1.46%



0 dB = 1.79mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

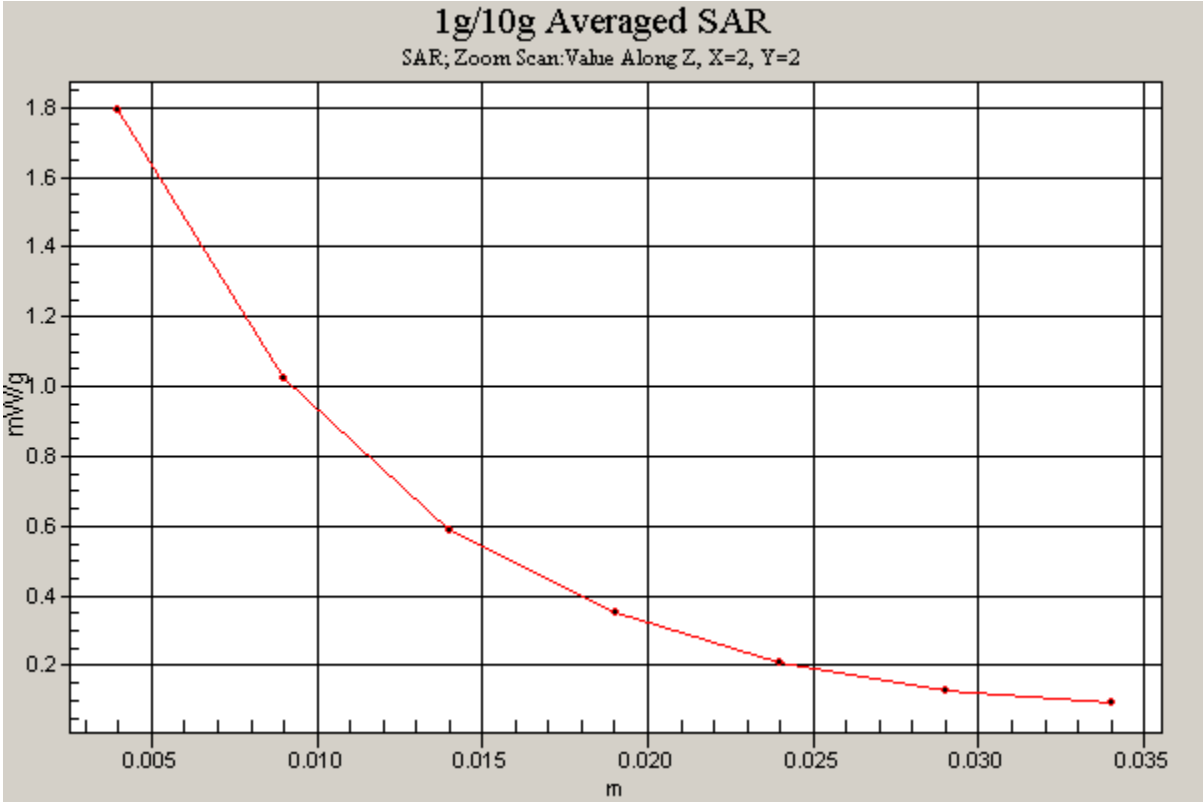
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.51 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-10-2011; Ambient Temp: 24.3°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN3561; ConvF(6.58, 6.58, 6.58); Calibrated: 7/27/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/20/2011
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

1900MHz System Verification

Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 16 dBm (40 mW)
SAR(1 g) = 1.62 mW/g; SAR(10 g) = 0.831 mW/g
Deviation = -1.46%



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

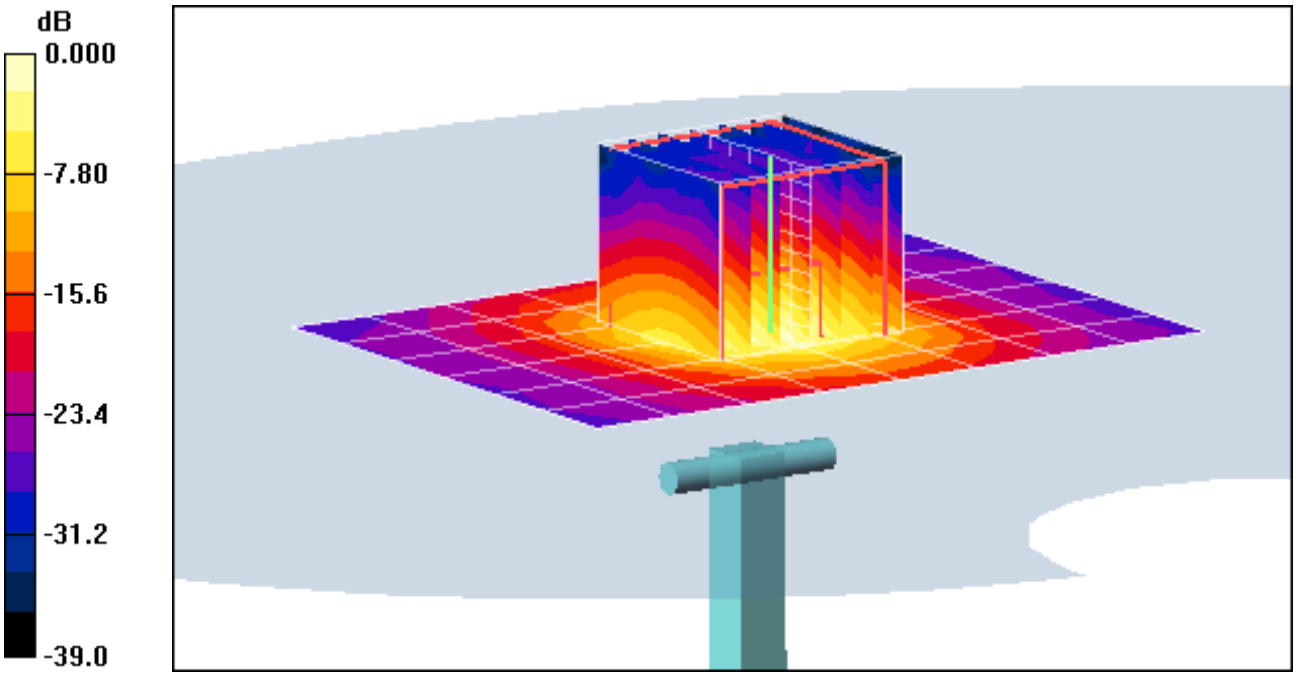
Communication System: CW; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5500 MHz; σ = 5.483 mho/m; ε_r = 47.69; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-19-2011; Ambient Temp: 23.7 °C; Tissue Temp: 22.4 °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) = 8.37 mW/g; SAR(10 g) = 2.29 mW/g
Deviation = -0.83 %



0 dB = 17.0mW/g

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

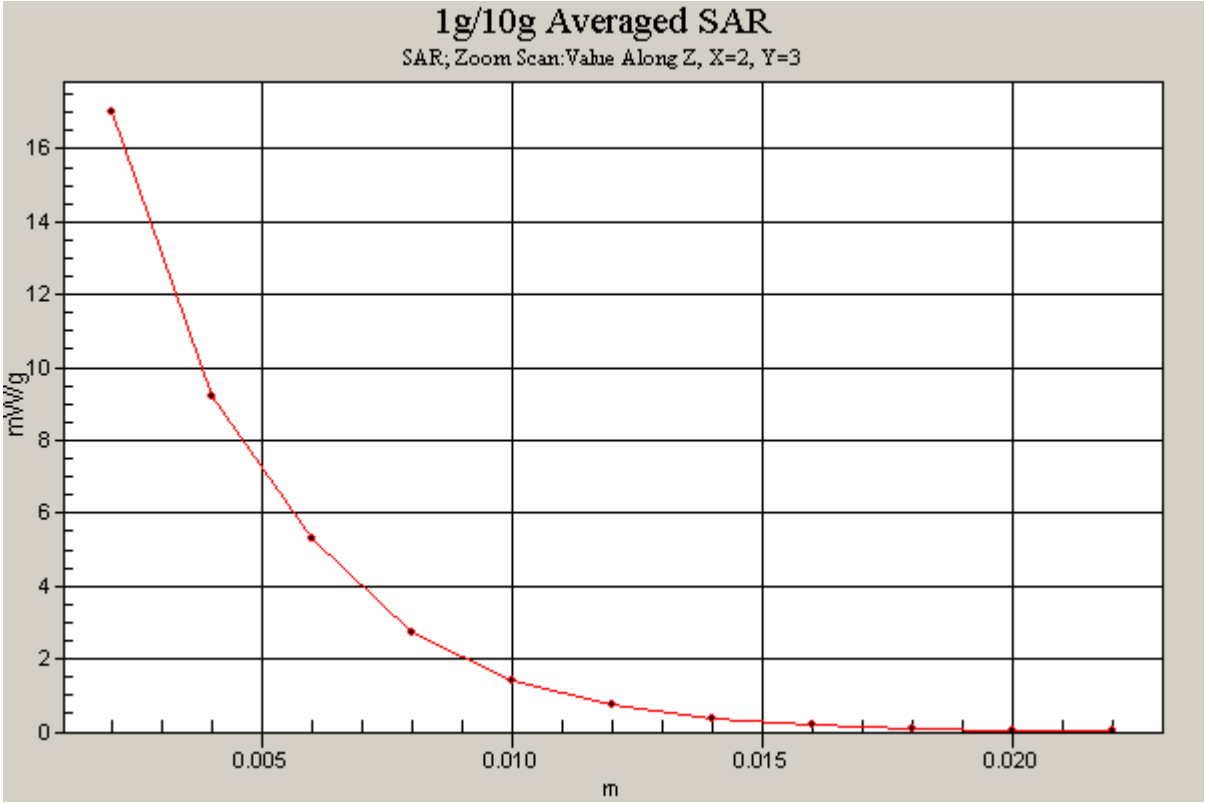
Communication System: CW; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5500 MHz; σ = 5.483 mho/m; ε_r = 47.69; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-19-2011; Ambient Temp: 23.7 °C; Tissue Temp: 22.4 °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) = 8.37 mW/g; SAR(10 g) = 2.29 mW/g
Deviation = -0.83 %



PCTEST ENGINEERING LABORATORY, INC.

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

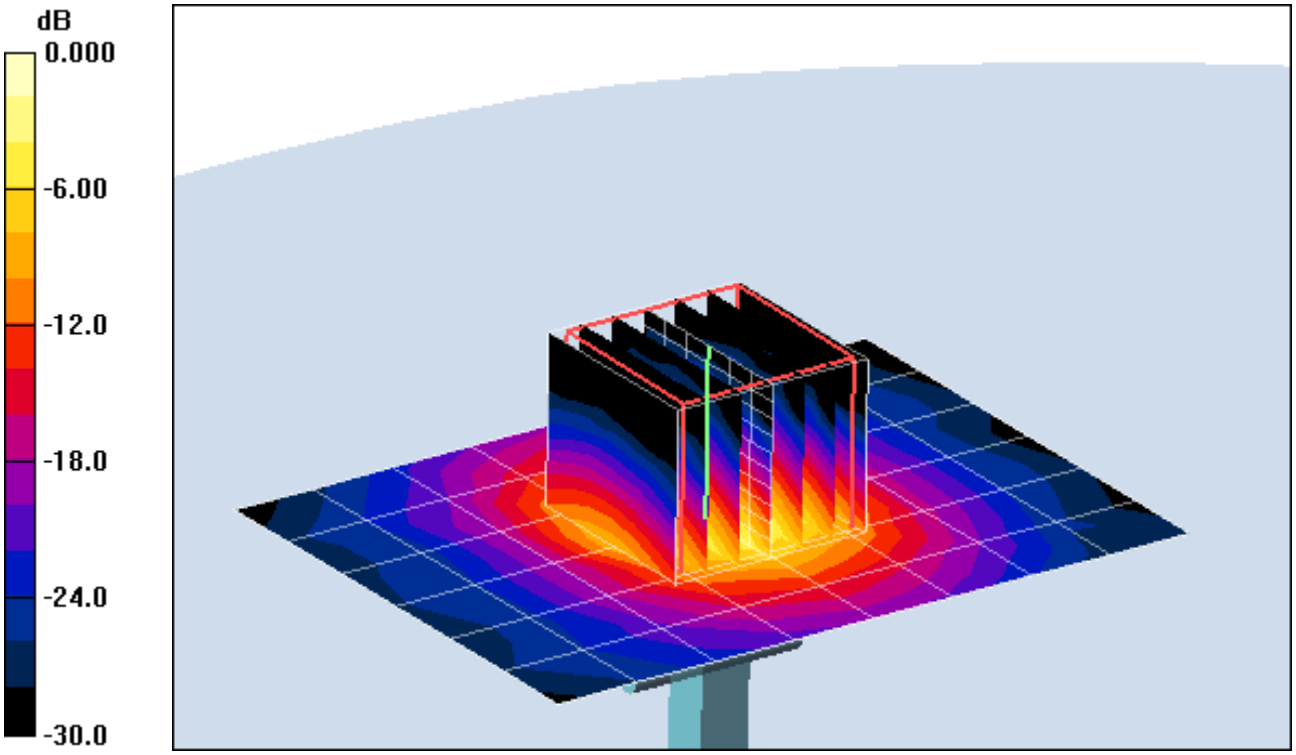
Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5800 MHz; σ = 5.913 mho/m; ε_r = 47.35; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-19-2011; Ambient Temp: 23.5 °C; Tissue Temp: 22.6 °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 dBm (100 mW)
SAR(1 g) = 7.93 mW/g; SAR(10 g) = 2.29 mW/g
Deviation = 5.73%



0 dB = 18.4mW/g

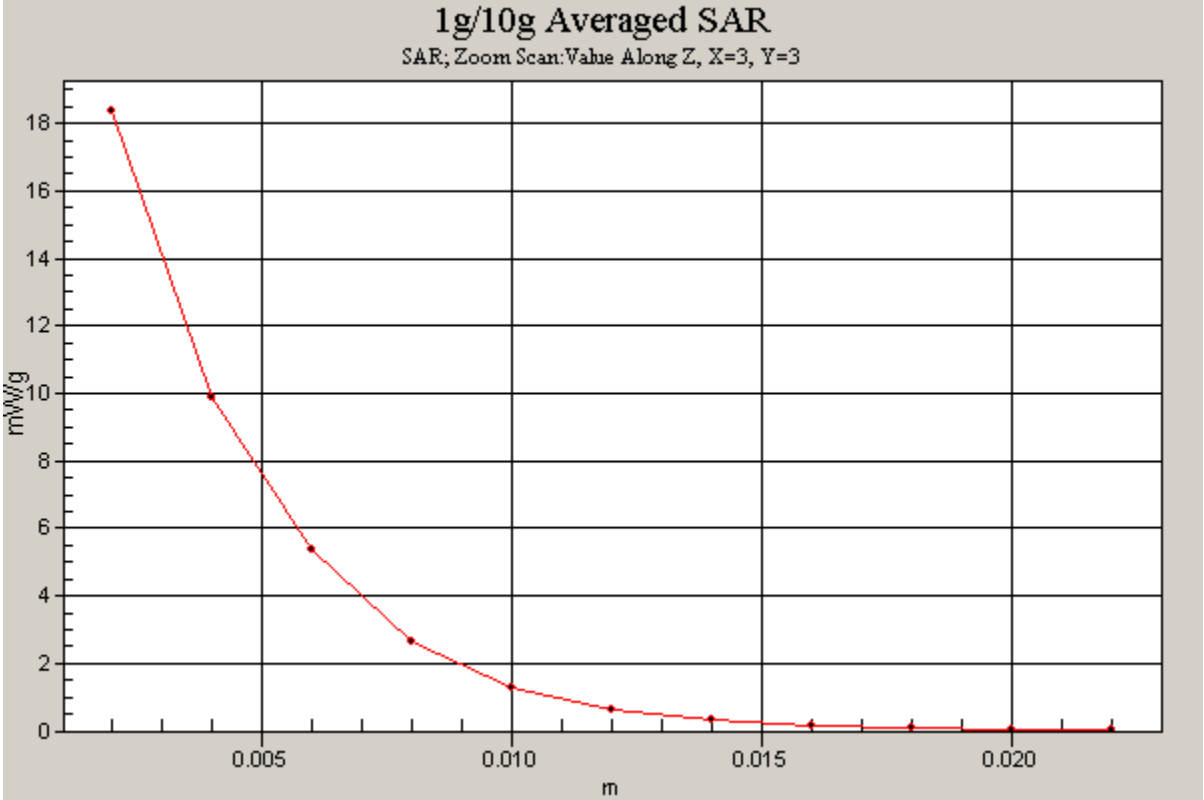
PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5800 MHz; σ = 5.913 mho/m; ε_r = 47.35; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-19-2011; Ambient Temp: 23.5 °C; Tissue Temp: 22.6 °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 dBm (100 mW)
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