



SAR COMPLIANCE EVALUATION REPORT

Applicant Name:

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

Date of Testing:

05/12/11 and 08/10/2011 - 08/16/2011

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Test Report Serial No.:

0Y1107261296-R1.A3L

FCC ID:

A3LGTP7300B

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-P7300B

Test Device Serial No.:

Pre-Production [S/N: FI-177-E, FI-177-F, C4F123F08582A4E]

Band & Mode	Tx Frequency	Conducted Power [dBm]	SAR
			1 gm Body (W/kg)
GPRS/EDGE 850	824.20 - 848.80 MHz	29.75	0.60
GPRS/EDGE 1900	1850.20 - 1909.80 MHz	27.36	0.75
WCDMA/HSPA 850	826.40 - 846.60 MHz	22.08	0.41
WCDMA/HSPA 1900	1852.4 - 1907.6 MHz	22.22	0.98
2.4 GHz WLAN	2412 - 2462 MHz	10.46	N/A
5.2 GHz WLAN	5180 - 5240 MHz	12.22	0.60
5.3 GHz WLAN	5260 - 5320 MHz	12.20	0.61
5.5 GHz WLAN	5500 - 5700 MHz	12.31	0.60
5.8 GHz WLAN	5745 - 5825 MHz	11.50	0.56
Bluetooth	2402 - 2480 MHz	10.28	N/A

Note: This revised Test Report (S/N: 0Y1107261296-R1.A3L) supersedes and replaces the previously issued test report on the same subject EUT for the same type of testing as indicated. Please discard or destroy the previously issued test report and dispose of it accordingly.

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

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

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


Randy Ortanez
President



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1 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.

1.1 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/m³)
- E = Total RMS electric field strength (V/m)

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

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2 TEST SITE LOCATION

2.1 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.

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.

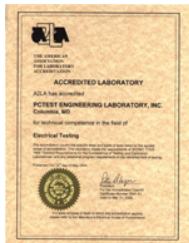


Figure 2-1

Map of the Greater Baltimore and Metropolitan Washington, D.C. area

2.2 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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3 SAR MEASUREMENT SETUP

3.1 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 3-1).

3.2 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.

3.3 System Electronics

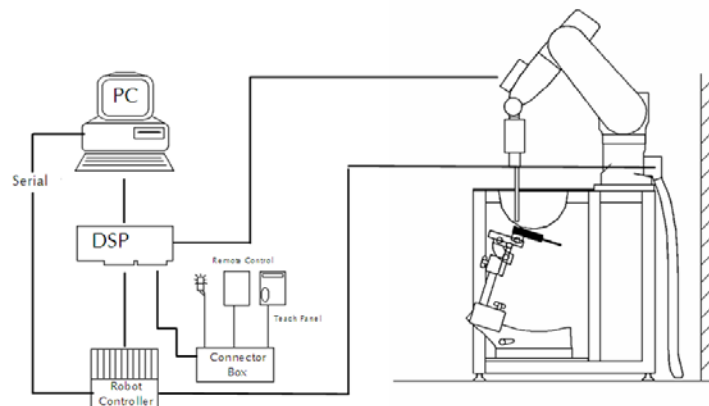


Figure 3-1
SAR Measurement System Setup

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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3.4 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)
Shell Material: Composite
Thickness: 2.0 ± 0.2 mm



Figure 3-2
SAR Measurement System

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4.1 Probe Measurement System



**Figure 4-1
SAR System**

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration (see Figure 4-3) and optimized for dosimetric evaluation [9]. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multi-fiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the

maximum using a 2nd order curve fitting (see Figure 5-1). The approach is stopped at reaching the maximum.

4.2 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 4-2
Near-Field Probe**



**Figure 4-3
Triangular Probe
Configuration**

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PROBE CALIBRATION PROCESS

5.1 Dosimetric Assessment Procedure

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm²) using an RF Signal generator, TEM cell, and RF Power Meter.

5.2 Free Space Assessment

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/cm².

5.3 Temperature Assessment

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated head tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C \frac{\Delta T}{\Delta t}$$

where:

Δt = exposure time (30 seconds),
 C = heat capacity of tissue (brain or muscle),
 ΔT = temperature increase due to RF exposure.

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

where:

σ = simulated tissue conductivity,
 ρ = Tissue density (1.25 g/cm³ for brain tissue)

SAR is proportional to $\Delta T/\Delta t$, the initial rate of tissue heating, before thermal diffusion takes place. The electric field in the simulated tissue can be used to estimate SAR by equating the thermally derived SAR to that with the E- field component.

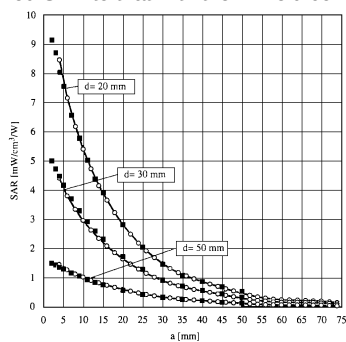


Figure 5-1 E-Field and Temperature measurements at 900MHz [9]

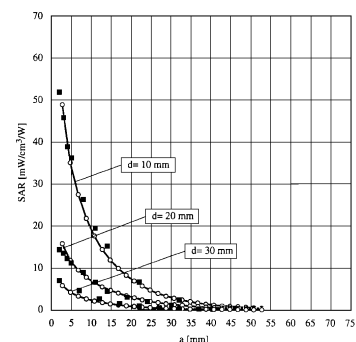


Figure 5-2 E-Field and temperature measurements at 1.9GHz [9]

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6 PHANTOM AND EQUIVALENT TISSUES

6.1 SAM Phantoms



Figure 6-1
SAM Phantoms

The SAM Twin Phantom V4.0 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

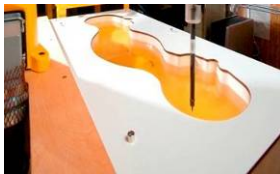


Figure 6-2
SAM Phantom with
Simulating Tissue

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 & PHANTOM SPECS

7.1 Measurement Procedure

The evaluation was performed using the following procedure:

1. The SAR distribution at the exposed side of the head was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm x 15mm.
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 volume of 32mm x 32mm x 30mm (fine resolution volume scan, zoom scan) was assessed by measuring 5 x 5 x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual for more details):
 - a. The data was extrapolated to the surface of the outer-shell of the phantom. The combined distance extrapolated was the combined distance from the center of the dipoles 2.7mm away from the tip of the probe housing plus the 1.2 mm distance between the surface and the lowest measuring point. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
 - b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
 - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete. If the value deviated by more than 5%, the evaluation was repeated.
5. For 5 GHz testing finer resolution zoom scans were preformed 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.

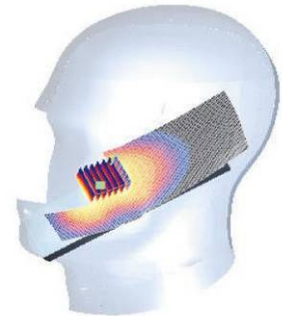


Figure 7-1
Sample SAR Area Scan

7.2 Specific Anthropomorphic Mannequin (SAM) Specifications

The phantom for handset SAR assessment testing is a low-loss dielectric shell, with shape and dimensions derived from the anthropometric data of the 90th percentile adult male head dimensions as tabulated by the US Army. The SAM Twin Phantom shell is bisected along the mid-sagittal plane into right and left halves (see Figure 7-2). The perimeter sidewalls of each phantom halves are extended to allow filling with liquid to a depth that is sufficient to minimize reflections from the upper surface. The liquid depth is maintained at a minimum depth of 15 cm.



Figure 7-2
SAM Twin Phantom Shell

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8 FCC RF EXPOSURE LIMITS

8.1 Uncontrolled Environment

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

8.2 Controlled Environment

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

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

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT <i>General Population</i> (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT <i>Occupational</i> (W/kg) or (mW/g)
SPATIAL PEAK SAR Brain	1.6	8.0
SPATIAL AVERAGE SAR Whole Body	0.08	0.4
SPATIAL PEAK SAR Hands, Feet, Ankles, Wrists	4.0	20

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

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ANTENNA LOCATIONS AND KEY FEATURES

9.1 Antenna and Key Feature Information

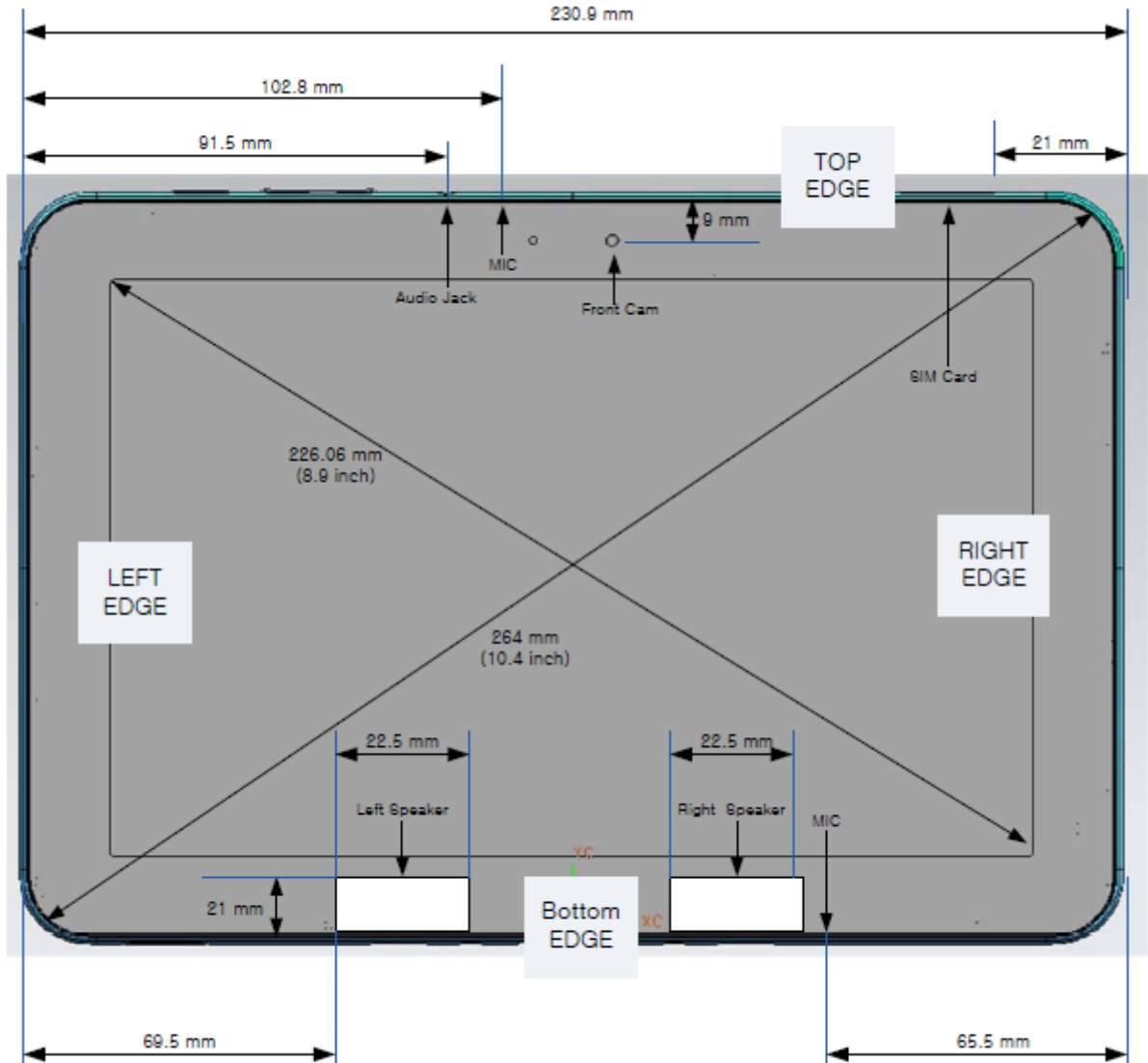


Figure 1. Front View of Device

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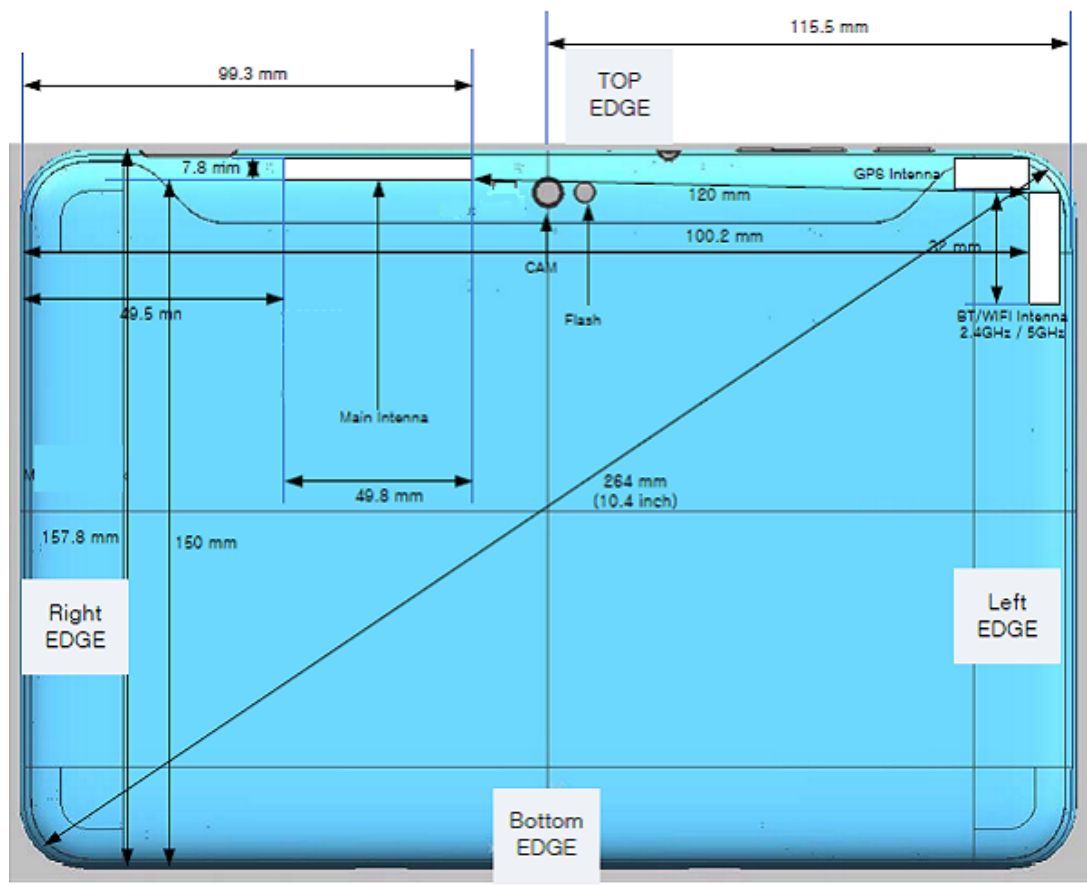


Figure 9-2
Back View of Device

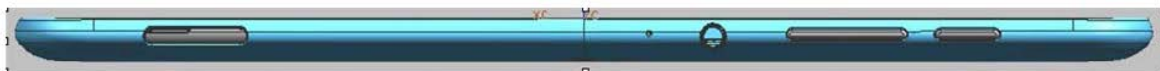


Figure 9-3
Top View of Device

The operational description contains information about designs including sensor size and location.
Note: Rear camera is not for video calls but for standard digital functions.

9.2 Proximity Sensor Information

The sensor pad is located near the upper half of the device to cover exposure conditions to the main antenna. The technical description contains information about sensor size and location. Power reduction levels are provided in Section 10.4.

9.3 Display Orientation Capabilities

This device is capable of multiple display orientations supporting both portrait and landscape positions. Therefore per KDB 447498 4) b) ii) (2), SAR testing applies for the tablet edges with antennas located within 5 cm of each tablet edge closest to the user (with KDB 616217 applied to edges with antennas located ≥ 5 cm from 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.

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10 SAR TESTING CONSIDERATIONS & FCC KDB INQUIRIES

10.1 Tablet Testing for SAR

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.

10.2 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.

10.3 SAR Testing for Tablet per KDB Publication 447498 Section 4

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 (with KDB Publication 616217 applied to edges with antennas located ≥ 5 cm from 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.

Table 10-1 SAR Requirement Table per KDB pub 616217 D01

Antenna Output Power (mW)	$\leq 60/f_{\text{(GHz)}}$	$> 60/f_{\text{(GHz)}}$
Individual Transmitter or Antenna	SAR not required	Antenna-to-user distance – $\geq (5 + \frac{1}{2} \cdot n)$ cm: test SAR on highest output channel only $< (5 + \frac{1}{2} \cdot n)$ cm: test SAR according to normal procedures
Simultaneous Transmitting Antennas	SAR not required: antenna-to-antenna or antenna-to-person distance ≥ 5 cm	SAR not required: antenna-to-antenna $\geq (5 + \frac{1}{2} \cdot n_x + \frac{1}{2} \cdot n_y)$ and antenna-to-person $\geq (5 + \frac{1}{2} \cdot n_x)$ cm
	SAR not required: when $\sum (SAR_{\text{ig}}) < \text{SAR limit}$, antenna-to-antenna distances > 5 cm and antenna-to-user distance > 5 cm if output $> 60/f$	
	otherwise, test antenna(s) using highest SAR configuration for the individual transmitter/antenna	

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Table 10-2
Distance Thresholds calculations KDB Publication 616217

Mode	Freq (GHz)	Power (dBm)	P = Power (mW)	60/f	n = P/60/f-1	distance thres (5+1/2n)
GPRS 850	0.824	23.78	238.78	72.80	2.28	6.14
GPRS 1900	1.850	21.58	143.88	32.43	3.44	6.72
WCDMA 850	0.826	22.08	161.44	72.60	1.22	5.61
WCDMA 1900	1.908	22.22	166.72	31.45	4.30	7.15
WIFI a	5.180	12.22	12.40	11.58	0.07	5.04
	5.260	12.20	16.60	11.41	0.45	5.23
	5.500	12.31	17.02	10.91	0.56	5.28
	5.805	11.50	14.13	10.34	0.37	5.18

Note: GPRS powers represent highest frame-averaged power

According to KDB publication 616217 and the antenna distances from the user to the edges of the device, WWAN antenna is required to be tested for SAR for the back side, top edge and right edge for GPRS/WCDMA. The WLAN antenna for 5 GHz is required to be tested for SAR for the back, top and left edges of the device.

Per KDB publication 447498 4) b) since the output power of the antenna (10.666 mW) is $\leq 60/f$ (GHz), Bluetooth and WLAN 2.4 GHz SAR is not required for both back side and edge exposure conditions.

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

Based on the type and implementation of the sensor, April 2011 FCC-TCB conference notes requires sensor information regarding: (1) additional SAR evaluation at a conservative distance from the device where power reduction is de-activated, and (2) reliability sensor activation data. Reliability sensor activation data is provided for both the back and top edge of the tablet at 0° to cover direct usage and also at 45° to cover angled usage (See Table 10-3, Table 10-4 and Table 10-5).

Since the back-off sensor activation distance for back was 11 mm, a conservative distance of 10 mm was tested for the back side. Since the back-off sensor activation distance at 45° was 6 mm for the top edge, a conservative distance of 5 mm was tested. Details about sensing mechanism and sensor pad location are included in the technical description.

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

Table 10-3
Distance from Back of Tablet

distance in mm	9	10	11	12	13	14
Condition of Sensor in the back of the device	on	on	on	off	off	off

Please see Figure 10-1 through Figure 10-3 for Power vs. back-off distance plots for each GPRS multi-slot and WCDMA mode.

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Backoff Sensor Power Reduction (back side)

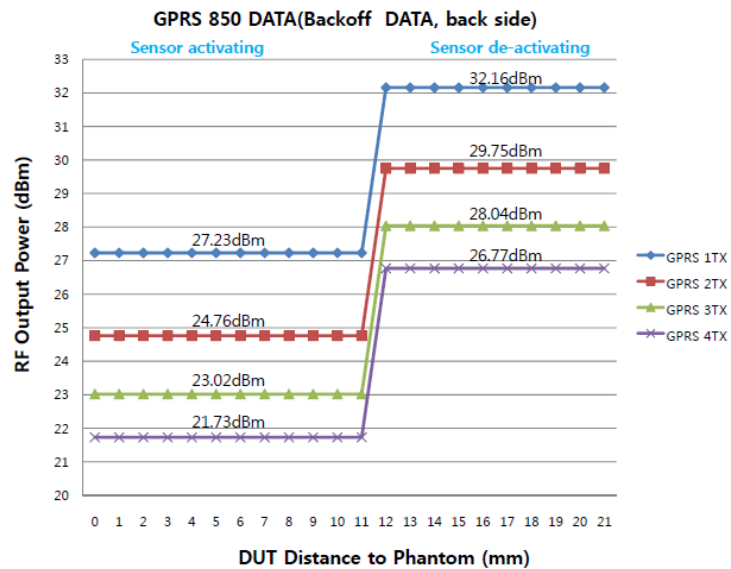
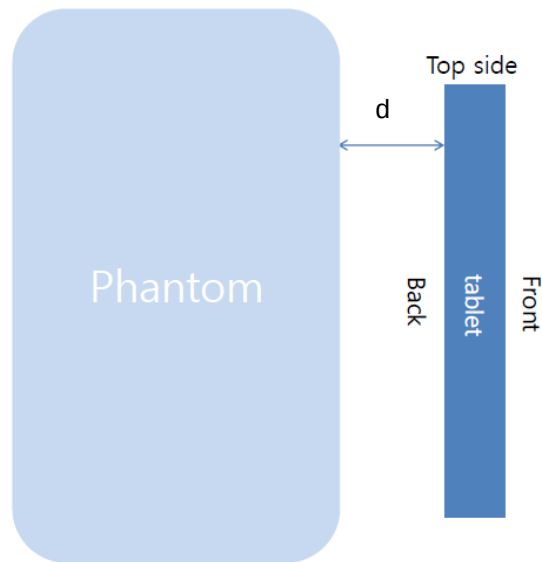


Figure 10-1

GPRS/EDGE (GMSK) 850 Back off Power Reduction Graph - Back Side

Data in Figure 10-1 demonstrates a power reduction of 5 dB for each multi-transmit slot mode at a back-off distance of 11mm, as shown in Table 10-3.

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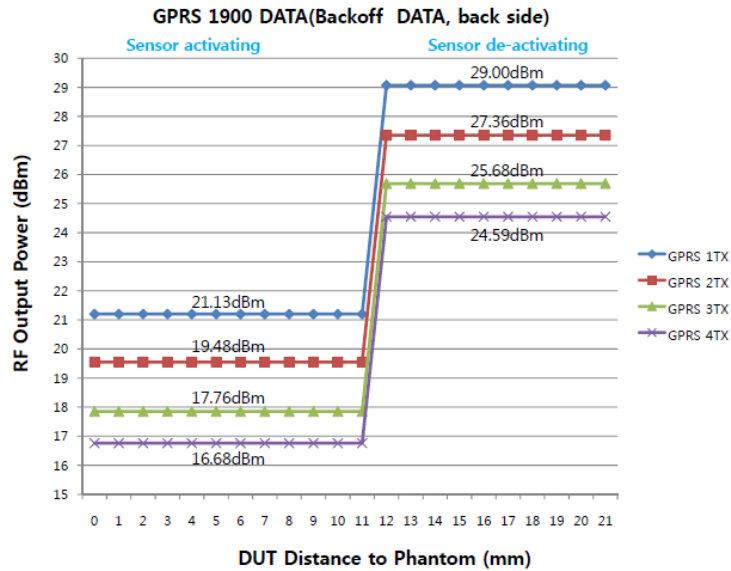


Figure 10-2
GPRS/EDGE (GMSK) 1900 Back off Power Reduction Graph - Back Side

Data in Figure 10-2 demonstrates a power reduction of 8 dB for each multi-Transmit slot mode at a back-off distance of 11 mm, as shown in Table 10-3

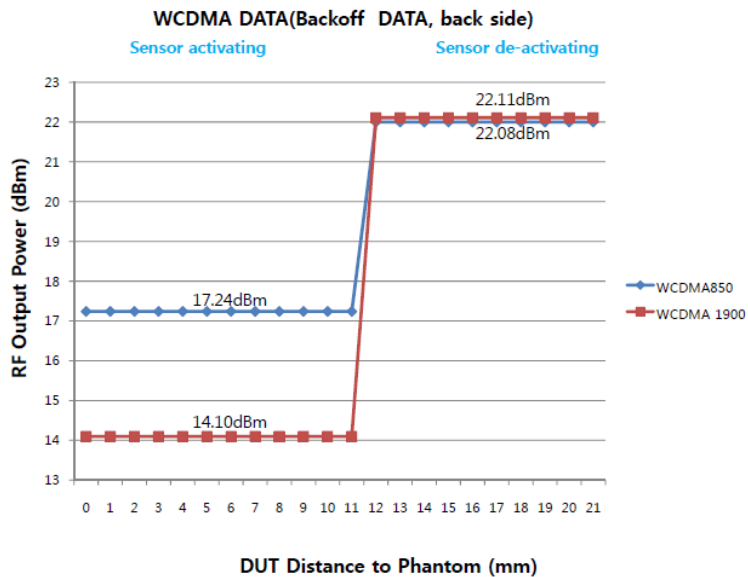


Figure 10-3
WCDMA Back off Power Reduction Graph - Back Side

Data in Figure 10-3 demonstrates a power reduction of 5 dB for WCDMA 850, and a reduction of 8 dB for WCDMA 1900 at a back-off distance of 11 mm, as shown in Table 10-3.

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Table 10-4
Distance from Top Edge of Tablet - 0° Angle

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

Please see Figure 10.4 through Figure 10-6 for power vs. back-off distance plots for each GPRS multislot and WCDMA mode.

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

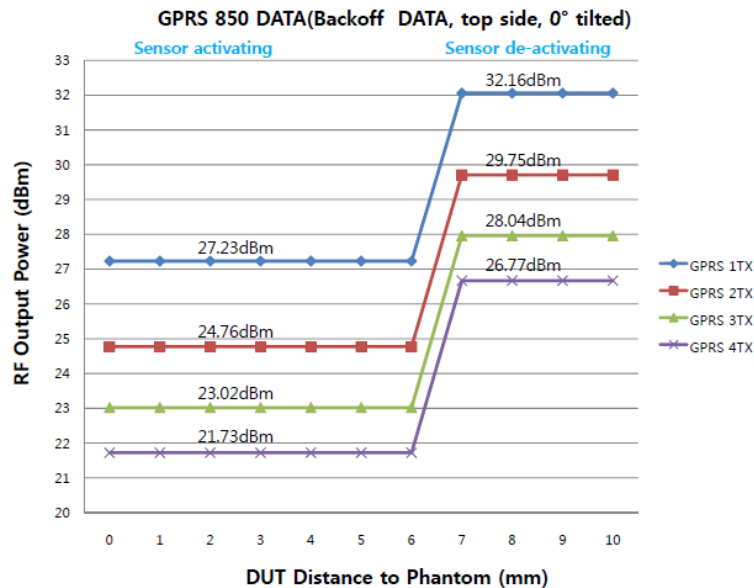
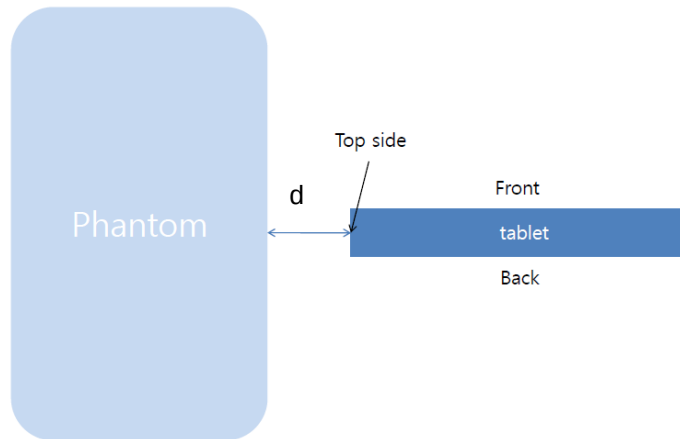


Figure 10-4

GPRS/EDGE (GMSK) 850 Backoff Power Reduction Graph - Top edge at 0° Angle

Data in Figure 10-4 demonstrates a power reduction of 5 dB for each multi-transmit slot mode at back-off distance of 6 mm, as shown in Table 10-4.

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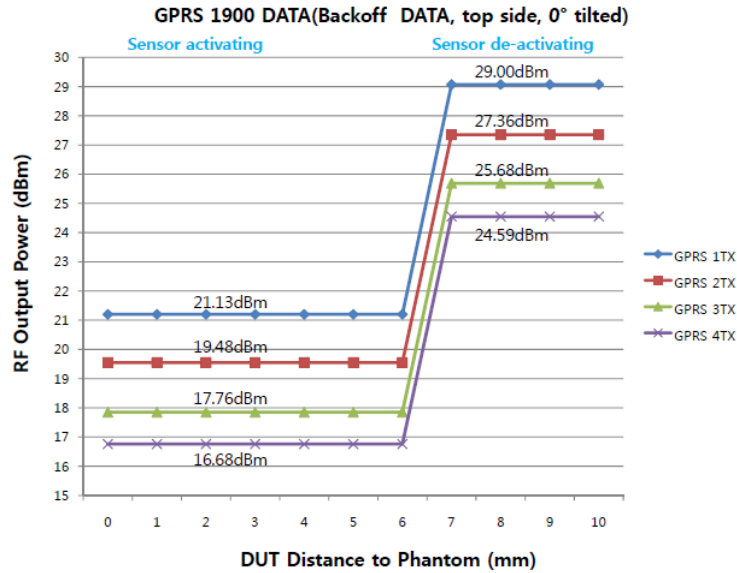


Figure 10-5

GPRS/EDGE (GMSK) 1900 Back off Power Reduction Graph - top Edge at 0° Angle

Data in Figure 10-5 demonstrates a power reduction of 8 dB for each multi-transmit slot mode at a back-off distance of 6 mm, as shown in Table 10-4.

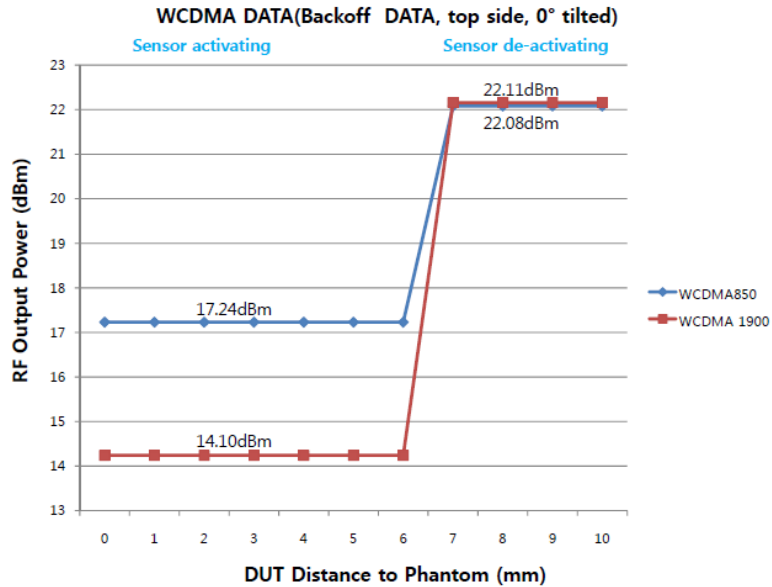


Figure 10-6

WCDMA Back off Power Reduction graph - Top 0° Angle

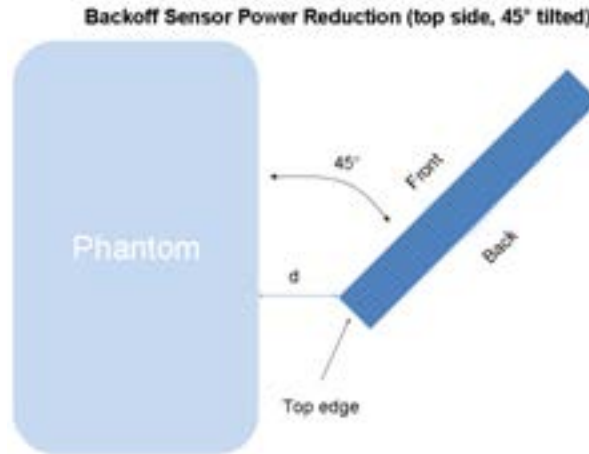
Data in Figure 10-6 demonstrates a power reduction of 5 dB for WCDMA 850, and a reduction of 8 dB for WCDMA 1900 mode at a back-off distance of 6 mm, as shown in Table 10-4.

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Table 10-5
Distance from Top Edge of Tablet - 45° Angle

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

Please See Figure 10-7 through Figure 10-9 for power vs. back-off distance plots for each GPRS multislot and WCDMA mode.



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

Above figure represents "45 degrees" between the screen face and phantom face.

Please note that the 45 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. 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.

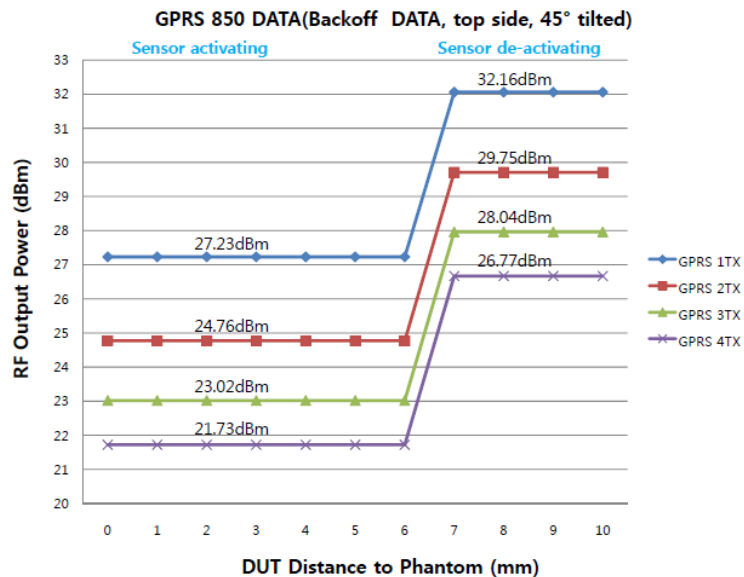


Figure 10-7

GPRS/EDGE (GMSK) 850 Back off Power Reduction Graph - 45° Angle

Data in Figure 10-7 demonstrates a power reduction of 5 dB for each multi-transmit slot mode at a back-off distance of 6 mm, as shown in Table 10-5.

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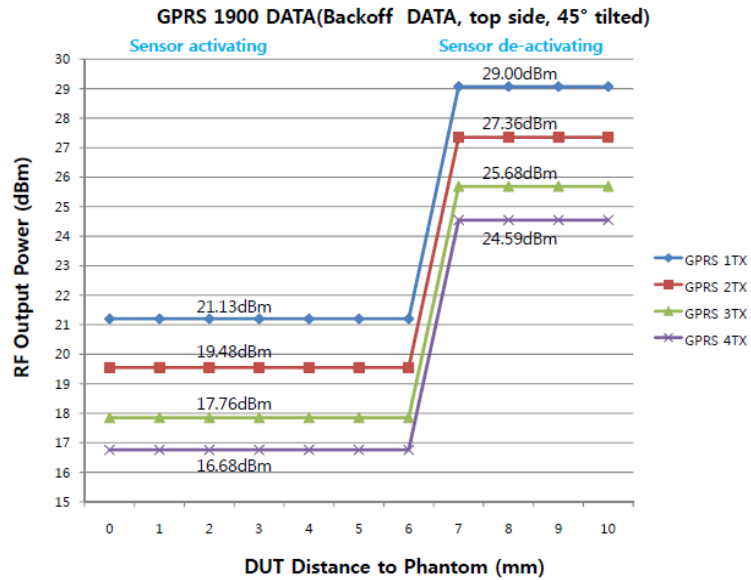


Figure 10-8

GPRS/EDGE (GMSK) 1900 Back off Power Reduction Graph - Back at 45° Angle

Data in Figure 10-8 demonstrates a power reduction of 8 dB for each multi-transmit slot mode at a back-off distance of 6 mm, as shown in Table 10-5.

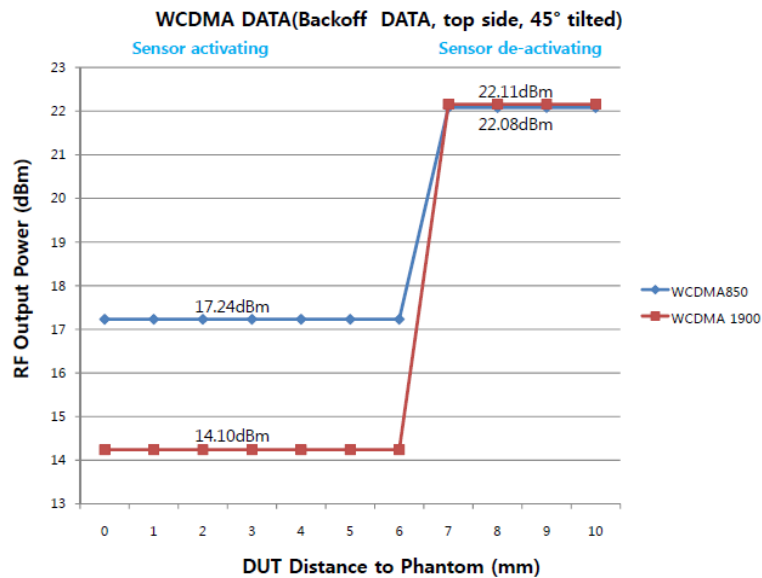


Figure 10-9

WCDMA Back off Power Reduction Graph - Back at 45° Angle

Data in Figure 10-9 demonstrates a power reduction of 5 dB for WCDMA 850, and a reduction of 8 dB for WCDMA 1900 mode at a back-off distance of 6 mm, as shown in Table 10-5.

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10.5 Method of SAR measurement with Power Reduction

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

Based on the power-reduction activation vs. distance results for the sensors, the 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 edge.

To test SAR with power back-off sensor active while touching (using FI-177-F), the device was placed in maximum power transmit mode with a base station simulator. The device was then positioned to touching position under the tissue equivalent liquid-filled flat phantom, to activate the proximity sensors.

For the additional SAR measurements with the sensors de-activated when the device is positioned away from the user (using FI-177-E), SAR is needed to be evaluated without power back-off at 10 mm (from the back) and 5mm (from the top edge). Since the device sensor detection mechanism is active at these distances, the sensor had to be disabled via manufacturer test software for SAR test purposes. The device was then placed in maximum power transmit mode with a base station simulator under the tissue equivalent liquid-filled flat phantom at a distance of 10 mm for the back and 5 mm for the top edge with the sensor deactivated (via manufacturer test software) and then tested at maximum power.

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11 FCC 3G MEASUREMENT PROCEDURES

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

11.1 Procedures Used to Establish RF Signal for SAR

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

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

11.2 SAR Measurement Conditions for UMTS per FCC KDB Publication 941225

11.2.1 Output Power Verification

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

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

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

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

11.2.3 SAR Measurement Conditions for HSUPA Data Devices

SAR for body exposure configurations are measured according to the 'Body SAR Measurements' procedures in the 'WCDMA Handsets' section of the KDB 941225 D01 FCC 3G document. In

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

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

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

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

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{1e}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

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

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

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

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

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11.3 RF Conducted Powers

11.3.1 GSM Conducted Powers

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

		Maximum Burst-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	32.15	29.77	28.01	26.81	27.14	24.63	24.18	23.69
	190	32.16	29.75	28.04	26.77	27.11	24.61	24.19	23.70
	251	32.17	29.76	28.03	26.75	27.10	24.74	24.18	23.73
PCS	512	28.99	27.33	25.66	24.54	26.17	23.74	23.24	22.71
	661	29.00	27.36	25.68	24.59	26.14	23.76	23.25	22.76
	810	28.96	27.34	25.66	24.59	26.15	23.77	23.28	22.74
		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	23.12	23.75	23.75	23.80	18.11	18.61	19.92	20.68
	190	23.13	23.73	23.78	23.76	18.08	18.59	19.93	20.69
	251	23.14	23.74	23.77	23.74	18.07	18.72	19.92	20.72
PCS	512	19.96	21.31	21.40	21.53	17.14	17.72	18.98	19.70
	661	19.97	21.34	21.42	21.58	17.11	17.74	18.99	19.75
	810	19.93	21.32	21.40	21.58	17.12	17.75	19.02	19.73

Note: Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots. The bolded GPRS/EDGE modes were selected according to the highest frame-averaged output power table according to KDB 941225 D03.

GPRS/EDGE (GMSK) output powers were measured with CS1. EDGE (8-PSK) powers were measured with MCS7.

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

		Maximum Burst-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	27.21	24.71	22.99	21.67	21.97	19.47	18.97	18.55
	190	27.23	24.76	23.02	21.73	21.96	19.51	19.03	18.60
	251	27.25	24.83	23.05	21.76	21.96	19.61	19.07	18.64
PCS	512	21.23	19.59	17.87	16.75	17.91	15.95	15.34	14.58
	661	21.13	19.48	17.76	16.68	17.82	15.91	15.25	14.48
	810	21.24	19.59	17.91	16.85	18.05	16.06	15.39	14.56
		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	18.18	18.69	18.73	18.66	12.94	13.45	14.71	15.54
	190	18.20	18.74	18.76	18.72	12.93	13.49	14.77	15.59
	251	18.22	18.81	18.79	18.75	12.93	13.59	14.81	15.63
PCS	512	12.20	13.57	13.61	13.74	8.88	9.93	11.08	11.57
	661	12.10	13.46	13.50	13.67	8.79	9.89	10.99	11.47
	810	12.21	13.57	13.65	13.84	9.02	10.04	11.13	11.55

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

GSM Class: C (data only, not capable of voice)
GPRS Multislot class: 33 (max 4 Tx Uplink slots)
EDGE Multislot class: 33 (max 4Tx Uplink slots)
DTM Multislot Class: N/A

11.1 Summary of Power Reduction due to Proximity Sensor

Table 11-3
Power Reduction Summary

		Maximum Burst-Averaged Output Power								Target
		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	4.94	5.06	5.02	5.14	5.17	5.16	5.21	5.14	5.00
	190	4.93	4.99	5.02	5.04	5.15	5.10	5.16	5.10	5.00
	251	4.92	4.93	4.98	4.99	5.14	5.13	5.11	5.09	5.00
PCS	512	7.76	7.74	7.79	7.79	8.26	7.79	7.90	8.13	8.00
	661	7.87	7.88	7.92	7.91	8.32	7.85	8.00	8.28	8.00
	810	7.72	7.75	7.75	7.74	8.10	7.71	7.89	8.18	8.00

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11.1.1 HSPA Conducted Powers

Table 11-4
Maximum WCDMA Powers (Proximity Sensor inactive)

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			PCS Band [dBm]			β_c	β_d	MPR
			4132	4183	4233	9262	9400	9538			
99	WCDMA	12.2 kbps RMC	22.20	22.08	22.04	22.14	22.11	22.22	-	-	-
6	HSDPA	Subtest 1	22.31	22.12	22.10	22.09	22.02	22.13	2	15	0
6		Subtest 2	22.41	22.19	22.19	22.20	22.11	22.19	11	15	0
6		Subtest 3	21.91	21.73	21.68	21.24	21.22	21.20	15	8	0.5
6		Subtest 4	21.63	21.38	21.37	20.94	20.88	20.92	15	4	0.5
6	HSUPA	Subtest 1	21.57	21.39	21.37	21.39	21.39	21.34	10	15	0
6		Subtest 2	20.40	20.21	20.20	19.71	19.71	19.82	6	15	2
6		Subtest 3	21.18	21.03	21.01	20.33	20.27	20.32	15	9	1
6		Subtest 4	20.99	20.78	20.77	19.93	19.90	19.99	2	15	2
6		Subtest 5	22.02	21.88	21.96	21.36	21.42	21.57	14	15	0

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

Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			PCS Band [dBm]			β_c	β_d	MPR
		4132	4183	4233	9262	9400	9538			
WCDMA	12.2 kbps RMC	17.31	17.24	17.14	14.38	14.10	14.23	-	-	-
HSDPA	Subtest 1	17.31	17.26	17.17	14.40	14.01	14.10	2	15	0
	Subtest 2	17.06	17.01	16.94	14.18	13.85	14.01	11	15	0
	Subtest 3	16.79	16.72	16.65	13.94	13.63	13.69	15	8	0.5
	Subtest 4	16.56	16.49	16.39	13.63	13.38	13.48	15	4	0.5
HSUPA	Subtest 1	17.03	16.99	16.93	14.22	13.89	13.91	10	15	0
	Subtest 2	15.28	15.17	15.15	12.43	12.05	12.20	6	15	2
	Subtest 3	16.06	16.01	15.92	12.91	12.63	12.64	15	9	1
	Subtest 4	15.72	15.64	15.54	13.59	13.30	13.68	2	15	2
	Subtest 5	17.28	17.23	17.17	14.35	14.03	14.14	14	15	0

This device does not support WCDMA Voice.

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.

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

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



Figure 11-1
Power Measurement Setup

11.2 Summary of Power Reduction due to Proximity Sensor

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			Target	PCS Band [dBm]			Target
			4132	4183	4233		9262	9400	9538	
99	WCDMA	12.2 kbps RMC	4.89	4.84	4.90	5	7.76	8.01	7.99	8
6	HSDPA	Subtest 1	5.00	4.86	4.93	5	7.69	8.01	8.03	8
6		Subtest 2	5.35	5.18	5.25	5	8.02	8.26	8.18	8
6		Subtest 3	5.12	5.01	5.03	5	7.30	7.59	7.51	8
6		Subtest 4	5.07	4.89	4.98	5	7.31	7.50	7.44	8
6	HSUPA	Subtest 1	4.54	4.40	4.44	5	7.17	7.50	7.43	8
6		Subtest 2	5.12	5.04	5.05	5	7.28	7.66	7.62	8
6		Subtest 3	5.12	5.02	5.09	5	7.42	7.64	7.68	8
6		Subtest 4	5.27	5.14	5.23	5	6.34	6.60	6.31	8
6		Subtest 5	4.74	4.65	4.79	5	7.01	7.39	7.43	8

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12 SAR TESTING WITH IEEE 802.11 TRANSMITTERS

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

12.1 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.

12.2 Frequency Channel Configurations [27]

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

Table 12-1
802.11 Test Channels per FCC Requirements

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

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Table 12-2
IEEE 802.11b Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]			
			Data Rate [Mbps]			
			1	2	5.5	11
802.11b	2412	1	6.65	6.68	6.54	6.75
802.11b	2437	6	6.42	6.59	6.58	6.40
802.11b	2462	11	6.29	6.38	6.17	6.10

Table 12-3
IEEE 802.11g Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11g	2412	1	10.46	9.64	9.57	9.53	9.55	9.91	9.73	9.65
802.11g	2437	6	9.63	9.67	9.47	9.31	9.70	9.82	9.79	9.59
802.11g	2462	11	9.71	9.50	9.48	9.32	9.63	9.32	9.77	9.34

Table 12-4
IEEE 802.11n Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	20	26	39	52	58	65
802.11n	2412	1	9.55	9.68	9.48	9.92	9.83	9.64	10.01	9.48
802.11n	2437	6	9.80	9.47	9.51	9.53	9.63	9.30	9.55	9.46
802.11n	2462	11	9.42	9.44	9.47	9.36	9.31	9.37	9.22	8.87

Table 12-5
IEEE 802.11a Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11a	5180	36	12.22	12.27	12.21	12.22	12.28	12.30	12.40	12.47
802.11a	5200	40	12.20	12.15	12.25	12.30	12.31	12.35	12.42	12.32
802.11a	5220	44	12.15	12.15	12.20	12.25	12.23	12.22	12.27	12.32
802.11a	5240	48	12.20	12.15	12.18	12.20	12.12	12.25	12.40	12.33
802.11a	5260	52	12.20	12.10	12.15	12.20	12.10	12.15	12.30	12.22
802.11a	5280	56	12.05	12.11	12.05	12.18	12.16	12.25	12.22	12.15
802.11a	5300	60	12.20	12.05	12.10	12.22	12.12	12.20	12.25	12.15
802.11a	5320	64	12.15	12.20	12.19	12.15	12.14	12.05	12.10	12.20
802.11a	5500	100	12.02	12.01	12.10	12.15	12.01	12.02	12.15	12.15
802.11a	5520	104	12.05	12.10	11.96	12.05	12.15	12.03	12.15	12.20
802.11a	5540	108	12.10	12.12	11.98	12.20	12.12	12.00	12.12	12.14
802.11a	5560	112	12.05	12.15	12.05	12.25	12.15	12.11	12.25	12.22
802.11a	5580	116	12.09	12.20	12.07	12.13	12.05	12.15	12.15	12.18
802.11a	5660	132	12.25	12.11	12.25	12.28	12.30	12.25	12.30	12.15
802.11a	5680	136	12.31	12.35	12.31	12.35	12.30	12.20	12.28	12.35
802.11a	5700	140	12.15	12.20	12.25	12.35	12.31	12.30	12.30	12.39
802.11a	5745	149	11.25	11.40	11.31	11.40	11.35	11.30	11.40	11.34
802.11a	5765	153	11.25	11.20	11.15	11.31	11.36	11.40	11.50	11.50
802.11a	5785	157	11.35	11.30	11.40	11.50	11.45	11.30	11.45	11.45
802.11a	5805	161	11.50	11.48	11.35	11.45	11.50	11.50	11.40	11.48
802.11a	5825	165	11.25	11.02	10.95	10.90	11.01	11.01	10.95	10.91

Table 12-6
IEEE 802.11n Average RF Power

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	20	26	39	52	58	65
802.11n	5180	36	12.06	12.20	12.18	12.05	12.20	12.30	12.30	12.41
802.11n	5200	40	12.15	12.02	12.25	12.24	12.20	12.25	12.30	12.40
802.11n	5220	44	12.10	12.02	12.15	12.15	12.30	12.40	12.50	12.30
802.11n	5240	48	12.20	12.07	12.20	12.11	12.24	12.20	12.22	12.26
802.11n	5260	52	12.10	12.00	12.30	12.29	12.20	12.22	12.20	12.26
802.11n	5280	56	12.00	11.95	12.06	12.20	12.20	12.22	12.20	12.20
802.11n	5300	60	12.00	12.00	12.10	12.10	12.15	12.28	12.30	12.25
802.11n	5320	64	12.00	11.90	12.01	12.01	12.25	12.30	12.20	12.20
802.11n	5500	100	11.95	12.00	12.07	12.12	12.11	12.20	12.15	12.03
802.11n	5520	104	11.97	11.82	12.05	12.10	12.20	12.15	12.10	12.20
802.11n	5540	108	11.90	11.96	12.15	12.09	12.17	12.10	12.15	12.10
802.11n	5560	112	12.00	11.94	12.12	12.11	12.15	12.14	12.25	12.25
802.11n	5580	116	12.10	12.05	12.20	12.15	12.25	12.20	12.15	12.18
802.11n	5660	132	12.20	12.15	12.32	12.30	12.30	12.22	12.29	12.35
802.11n	5680	136	12.15	12.22	12.20	12.27	12.35	12.31	12.40	12.24
802.11n	5700	140	12.17	12.20	12.38	12.38	12.30	12.29	12.30	12.40
802.11n	5745	149	11.07	11.16	11.10	11.12	11.35	11.32	11.29	11.31
802.11n	5765	153	11.10	11.20	11.12	11.20	11.26	11.34	11.42	11.40
802.11n	5785	157	11.01	11.26	11.23	11.25	11.40	11.26	11.31	11.26
802.11n	5805	161	11.20	11.22	11.26	11.33	11.42	11.45	11.40	11.50
802.11n	5825	165	10.86	10.80	10.83	10.88	11.00	11.00	10.81	10.85

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

- Per KDB 447498 4) b) since the output power of the antenna is $\leq 60/f$ (GHz), IEEE 802.11 b/g/n SAR is not required.
- For 5 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11a were selected for SAR evaluation. IEEE 802.11 n modes were not investigated since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11a mode.
- The underlined data rate and channel above were tested for SAR.
- Per the manufacturer's UNII DFS report, this device does not transmit any beacons or initiate any transmissions in the 5500-5700 MHz Band.

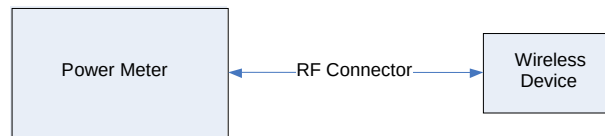


Figure 12-1
Power Measurement Setup

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13 SYSTEM VERIFICATION

13.1 Tissue Verification

Table 13-1
Measured Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	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
08/10/2011	835B	820	0.931	53.14	0.97	55.28	-3.92%	-3.88%
		835	0.927	52.97	0.97	55.20	-4.43%	-4.04%
		850	0.943	53.85	0.99	55.15	-4.55%	-2.36%
08/10/2011	1900B	1850	1.456	51.89	1.52	53.30	-4.21%	-2.65%
		1880	1.486	51.77	1.52	53.30	-2.24%	-2.87%
		1910	1.527	51.67	1.52	53.30	0.46%	-3.06%
08/16/2011	1900B	1850	1.467	51.34	1.52	53.30	-3.49%	-3.68%
		1880	1.490	51.36	1.52	53.30	-1.97%	-3.64%
		1910	1.499	51.05	1.52	53.30	-1.38%	-4.22%
05/12/2011	5200B-5800B	5170	5.399	48.50	5.26	49.06	2.56%	-1.13%
		5210	5.466	48.20	5.31	49.00	2.92%	-1.63%
		5250	5.481	48.22	5.36	48.95	2.30%	-1.48%
		5270	5.523	48.32	5.38	48.92	2.64%	-1.22%
		5310	5.618	47.97	5.43	48.87	3.50%	-1.83%
		5350	5.697	48.06	5.47	48.81	4.15%	-1.54%
		5470	5.831	47.70	5.62	48.65	3.85%	-1.95%
		5510	5.923	47.69	5.66	48.59	4.63%	-1.86%
		5550	5.940	47.55	5.71	48.54	4.06%	-2.04%
		5570	5.984	47.46	5.73	48.51	4.41%	-2.17%
		5610	6.029	47.46	5.78	48.46	4.34%	-2.06%
		5650	6.090	47.23	5.83	48.40	4.55%	-2.43%
		5670	6.117	47.35	5.85	48.38	4.60%	-2.12%
		5710	6.143	47.29	5.90	48.32	4.21%	-2.14%
		5750	6.219	47.15	5.94	48.27	4.66%	-2.32%
		5770	6.234	47.28	5.97	48.24	4.51%	-1.99%
		5810	6.292	47.10	6.01	48.19	4.66%	-2.25%
		5850	6.347	46.97	6.06	48.13	4.77%	-2.41%

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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13.2 Measurement Procedure for Tissue verification

- 1) The network analyzer and probe system was configured and calibrated.
- 2) The probe was immersed in the sample which was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
- 3) The complex admittance with respect to the probe aperture was measured
- 4) The complex relative permittivity , for example from the below equation (Pournaropoulos and Misra):

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

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

13.3 Test System Verification

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

Table 13-2
System Verification Results

System Verification TARGET & MEASURED											
Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Tissue Frequency (MHz)	Probe SN	Dipole SN	Tissue Type	Measured SAR _{1g} (W/kg)	1 W Target SAR _{1g} (W/kg)	1 W Normalized SAR _{1g} (W/kg)	Deviation (%)
08/10/2011	24.3	22.7	0.250	835	3258	4d047	Body	2.43	9.850	9.720	-1.32%
08/10/2011	23.1	22.2	0.100	1900	3209	502	Body	4.28	41.100	42.800	4.14%
08/16/2011	23.3	22.0	0.100	1900	3209	502	Body	4.45	41.100	44.500	8.27%
05/12/2011	24.3	22.7	0.025	5200	3550	1057	Body	1.99	77.700	79.600	2.45%
05/12/2011	24.5	22.8	0.025	5500	3550	1057	Body	2.1	84.400	84.000	-0.47%
05/12/2011	24.4	22.6	0.025	5800	3550	1057	Body	1.93	75.000	77.200	2.93%

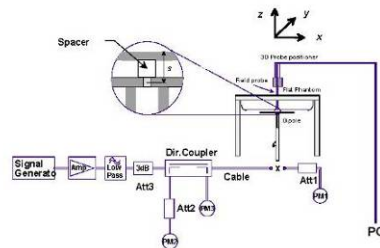


Figure 13-1
System Verification Setup Diagram



Figure 13-2
System Verification Setup Photo

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

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14 SAR DATA SUMMARY

Table 14-1
GPRS Body SAR Results

MEASUREMENT RESULTS											
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Power Reduction [dB]	Spacing	Serial Number	# of GPRS Slots	Side	SAR (1g)
MHz	Ch.										(W/kg)
836.60	190	GSM 850	GPRS	24.76	0.00	5	0.0 cm	FI-177-F	2	back*	0.600
836.60	190	GSM 850	GPRS	23.02	0.00	5	0.0 cm	FI-177-F	3	back*	0.584
836.60	190	GSM 850	GPRS	21.73	0.03	5	0.0 cm	FI-177-F	4	back*	0.588
836.60	190	GSM 850	GPRS	29.75	-0.03	0	1.0 cm	FI-177-E	2	back	0.339
836.60	190	GSM 850	GPRS	28.04	0.09	0	1.0 cm	FI-177-E	3	back	0.357
836.60	190	GSM 850	GPRS	26.77	0.06	0	1.0 cm	FI-177-E	4	back	0.360
836.60	190	GSM 850	GPRS	24.76	-0.06	5	0.0 cm	FI-177-F	2	top*	0.338*
836.60	190	GSM 850	GPRS	29.75	0.07	0	0.5 cm	FI-177-E	4	top	0.339
836.60	190	GSM 850	GPRS	26.77	-0.01	0	0.0 cm	FI-177-E	4	right	0.163
1880.00	661	GSM 1900	GPRS	19.48	-0.01	8	0.0 cm	FI-177-F	2	back*	0.395
1880.00	661	GSM 1900	GPRS	17.76	-0.06	8	0.0 cm	FI-177-F	3	back*	0.397
1880.00	661	GSM 1900	GPRS	16.68	0.09	8	0.0 cm	FI-177-F	4	back*	0.405
1880.00	661	GSM 1900	GPRS	27.36	-0.04	0	1.0 cm	FI-177-E	2	back	0.727
1880.00	661	GSM 1900	GPRS	25.68	-0.01	0	1.0 cm	FI-177-E	3	back	0.722
1880.00	661	GSM 1900	GPRS	24.59	0.01	0	1.0 cm	FI-177-E	4	back	0.750
1880.00	661	GSM 1900	GPRS	16.68	0.04	8	0.0 cm	FI-177-F	4	top*	0.146
1880.00	661	GSM 1900	GPRS	24.59	0.00	0	0.5 cm	FI-177-E	4	top	0.645
1880.00	661	GSM 1900	GPRS	24.59	0.06	0	0.0 cm	FI-177-E	4	right	0.311
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:

- The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001]
- Per KDB publication 447498 4) b) i) the back side is required to be tested touching the flat phantom.
- 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 (with KDB publication 616217 applied to edges with antennas located ≥ 5 cm from 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.
- All modes of operation were investigated, and worst-case results are reported.
- Tissue parameters and temperatures are listed on the SAR plots.
- Batteries are fully charged for all readings.
- Liquid tissue depth was at least 15.0 cm.
- Justification for reduced test configurations per KDB Publication 941225 D03: The source-based time-averaged output power was evaluated for all multi-slot operations. In addition to the worst-case reported, all source-based time-averaged powers within 10% of the worst-case were additionally included in the evaluation.
- Justification for reduced test configurations: Per KDB publication 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.
- Asterisk (*) denotes power reduction activated.
- 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 were tested for SAR at maximum output power with the sensors deactivated. See Section 10.4 for more details.

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Table 14-2
WCDMA Body SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Power Reduction [dB]	Spacing	Serial Number	Side	SAR (1g)
MHz	Ch.									(W/kg)
836.60	4183	WCDMA 850	RMC	17.24	0.00	5	0.0 cm	FI-177-F	back*	0.408
836.60	4183	WCDMA 850	RMC	22.08	0.00	0	1.0 cm	FI-177-E	back	0.265
836.60	4183	WCDMA 850	RMC	17.24	0.06	5	0.0 cm	FI-177-F	top*	0.229
836.60	4183	WCDMA 850	RMC	22.08	-0.04	0	0.5 cm	FI-177-E	top	0.262
836.60	4183	WCDMA 850	RMC	22.08	-0.04	0	0.0 cm	FI-177-E	right	0.131
1880.00	9400	WCDMA 1900	RMC	14.10	0.00	8	0.0 cm	FI-177-F	back*	0.524
1852.40	9262	WCDMA 1900	RMC	22.14	0.00	0	1.0 cm	FI-177-E	back	0.963
1880.00	9400	WCDMA 1900	RMC	22.11	0.02	0	1.0 cm	FI-177-E	back	0.927
1907.60	9538	WCDMA 1900	RMC	22.22	0.00	0	1.0 cm	FI-177-E	back	0.966
1880.00	9400	WCDMA 1900	RMC	14.10	-0.04	8	0.0 cm	FI-177-F	top*	0.157
1852.40	9262	WCDMA 1900	RMC	22.14	0.00	0	0.5 cm	FI-177-E	top	0.893
1880.00	9400	WCDMA 1900	RMC	22.11	-0.01	0	0.5 cm	FI-177-E	top	0.844
1907.60	9538	WCDMA 1900	RMC	22.22	-0.01	0	0.5 cm	FI-177-E	top	0.981
1880.00	9400	WCDMA 1900	RMC	22.11	0.00	0	0.0 cm	FI-177-E	right	0.368
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:

- The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001]
- Per KDB publication 447498 4) b) i) the back side is required to be tested touching the flat phantom.
- 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 (with KDB publication 616217 applied to edges with antennas located ≥ 5 cm from 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.
- All modes of operation were investigated, and worst-case results are reported.
- Tissue parameters and temperatures are listed on the SAR plots.
- Batteries are fully charged for all readings.
- Liquid tissue depth was at least 15.0 cm.
- WCDMA mode was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01. HSPA SAR for the body was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.
- Justification for reduced test configurations: Per KDB publication 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.
- Asterisk (*) denotes power reduction activated.
- 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 were tested for SAR at maximum output power with the sensors deactivated. See Section 10.4 for more details.

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Table 14-3
5 GHz Body SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Serial Number	Data Rate (Mbps)	Side	SAR (1g)
MHz	Ch.									(W/kg)
5180	36	IEEE 802.11a	OFDM	12.22	0.06	0.0 cm	C4F123F08582A4E	6	back	0.588
5180	36	IEEE 802.11a	OFDM	12.22	-0.08	0.0 cm	C4F123F08582A4E	6	top	0.056
5180	36	IEEE 802.11a	OFDM	12.22	0.07	0.0 cm	C4F123F08582A4E	6	left	0.511
5300	60	IEEE 802.11a	OFDM	12.20	0.03	0.0 cm	C4F123F08582A4E	6	back	0.609
5300	60	IEEE 802.11a	OFDM	12.20	0.00	0.0 cm	C4F123F08582A4E	6	top	0.075
5300	60	IEEE 802.11a	OFDM	12.20	0.08	0.0 cm	C4F123F08582A4E	6	left	0.514
5680	136	IEEE 802.11a	OFDM	12.31	0.10	0.0 cm	C4F123F08582A4E	6	back	0.599
5680	136	IEEE 802.11a	OFDM	12.31	0.08	0.0 cm	C4F123F08582A4E	6	top	0.065
5680	136	IEEE 802.11a	OFDM	12.31	-0.08	0.0 cm	C4F123F08582A4E	6	left	0.500
5805	161	IEEE 802.11a	OFDM	11.50	0.06	0.0 cm	C4F123F08582A4E	6	back	0.555
5805	161	IEEE 802.11a	OFDM	11.50	0.07	0.0 cm	C4F123F08582A4E	6	top	0.057
5805	161	IEEE 802.11a	OFDM	11.50	-0.06	0.0 cm	C4F123F08582A4E	6	left	0.454
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:

- The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001].
- Per KDB Pub. 448498 4) b) i) the back side is required to be tested touching the flat phantom.
- 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 (with KDB Pub. 616217 applied to edges with antennas located ≥ 5 cm from 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.
- All modes of operation were investigated, and worst-case results are reported.
- Batteries are fully charged for all readings.
- Tissue parameters and temperatures are listed on the SAR plots.
- Liquid tissue depth is was at least 15.0 cm.
- Device was tested using a fixed spacing.
- 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. 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 corresponding channel in the lowest data rate IEEE 802.11a modes.
- WLAN transmission was verified using a spectrum analyzer.
- There is no power reduction for WIFI.
- Per the manufacturer all samples are electrically identical for WLAN.

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15 SIMULTANEOUS TRANSMISSION ANALYSIS

15.1 Simultaneous Transmission Information

This device contains multiple transmitters that may operate simultaneously and therefore, require a simultaneous transmission analysis according to KDB publication 447498 4) b) iii) procedures (See Section 10.3). The tablet procedures required by KDB publication 447498 generally do not require separate hotspot mode testing.

Bluetooth and WIFI cannot transmit simultaneously since it shares the same circuit path and are switched by the radio.

Per KDB publication 447498 4) b) since the output power of the antenna is $\leq 60/f$ (GHz), Bluetooth and WLAN 2.4 SAR are not required for both back side and edge exposure conditions.

5GHz WIFI cannot transmit simultaneously with the 2G/3G antenna.

15.2 Simultaneous Transmission Analysis

Based on the output power, antenna separation distance and the Body SAR of the dominant transmitter, a stand-alone test WLAN is not required.

Table 15-1
Simultaneous Transmission Scenario 0.0 cm

Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	SPLS Ratio	Simultaneous Transmission (with Volume Scan) SAR (W/kg)
Body SAR	Back	0.600	-	0.600	N/A	N/A
	Top	0.338	-	0.338	N/A	N/A
	Bottom	-	-	0.000	N/A	N/A
	Right	0.163	-	0.163	N/A	N/A
	Left	-	-	0.000	N/A	N/A
Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	SPLS Ratio	Simultaneous Transmission (with Volume Scan) SAR (W/kg)
Body SAR	Back	0.405	-	0.405	N/A	N/A
	Top	0.146	-	0.146	N/A	N/A
	Bottom	-	-	0.000	N/A	N/A
	Right	0.311	-	0.311	N/A	N/A
	Left	-	-	0.000	N/A	N/A

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Simult Tx	Configuration	WCDMA 850 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	SPLS Ratio	Simultaneous Transmission (with Volume Scan) SAR (W/kg)
Body SAR	Back	0.408	-	0.408	N/A	N/A
	Top	0.229	-	0.229	N/A	N/A
	Bottom	-	-	0.000	N/A	N/A
	Right	0.131	-	0.131	N/A	N/A
	Left	-	-	0.000	N/A	N/A
Simult Tx	Configuration	WCDMA 1900 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	SPLS Ratio	Simultaneous Transmission (with Volume Scan) SAR (W/kg)
Body SAR	Back	0.524	-	0.524	N/A	N/A
	Top	0.157	-	0.157	N/A	N/A
	Bottom	-	-	0.000	N/A	N/A
	Right	0.368	-	0.368	N/A	N/A
	Left	-	-	0.000	N/A	N/A

Note:

- Per Table 10-2, the edges with antennas more than the threshold distance are not required to be evaluated for SAR (“-”).
- SAR for WLAN 2.4 GHz is not required per KDB publication 447498 4) b) since the output power of the antenna is $\leq 60/f$ (GHz)

Table 15-2
Simultaneous Transmission Scenario 1.0/0.5 cm

Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	SPLS Ratio	Simultaneous Transmission (with Volume Scan) SAR (W/kg)
Body SAR	Back at 1.0 cm	0.360	-	0.36	N/A	N/A
	Top at 0.5 cm	0.339	-	0.339	N/A	N/A
Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	SPLS Ratio	Simultaneous Transmission (with Volume Scan) SAR (W/kg)
Body SAR	Back at 1.0 cm	0.750	-	0.75	N/A	N/A
	Top at 0.5 cm	0.645	-	0.645	N/A	N/A
Simult Tx	Configuration	WCDMA 850 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	SPLS Ratio	Simultaneous Transmission (with Volume Scan) SAR (W/kg)
Body SAR	Back at 1.0 cm	0.265	-	0.265	N/A	N/A
	Top at 0.5 cm	0.262	-	0.262	N/A	N/A
Simult Tx	Configuration	WCDMA 1900 SAR (W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	SPLS Ratio	Simultaneous Transmission (with Volume Scan) SAR (W/kg)
Body SAR	Back at 1.0 cm	0.966	-	0.966	N/A	N/A
	Top at 0.5 cm	0.981	-	0.981	N/A	N/A

Note:

- SAR for WLAN 2.4 GHz is not required per KDB publication 447498 4) b) since the output power of the antenna is $\leq 60/f$ (GHz)

15.3 Simultaneous Transmission Conclusion

The above numerical summed SAR was below the SAR limit. The above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit. Therefore, no volumetric SAR summation per FCC KDB Publication 648474 is required.

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16 EQUIPMENT LIST

Valid for 05/12/11

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	85070B	Dielectric Probe Kit	8/22/2010	Annual	8/22/2011	US33020316
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/13/2010	Annual	10/13/2011	3613A00315
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/21/2011	Annual	4/21/2012	JP38020182
Agilent	E5515C	Wireless Communications Test Set	10/11/2010	Annual	10/11/2011	GB46110872
Agilent	E5515C	Wireless Communications Test Set	10/8/2010	Annual	10/8/2011	GB46310798
Agilent	E5515C	Wireless Communications Test Set	8/13/2010	Annual	8/13/2011	GB41450275
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/8/2011	Annual	4/8/2012	MY45470194
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/11/2010	Annual	10/11/2011	1833460
Gigatronics	8651A	Universal Power Meter	10/11/2010	Annual	10/11/2011	8650319
Rohde & Schwarz	CMU200	Base Station Simulator	11/11/2010	Annual	11/11/2011	836371/0079
Rohde & Schwarz	CMU200	Base Station Simulator	6/21/2010	Annual	6/21/2011	833855/0010
Rohde & Schwarz	NRVD	Dual Channel Power Meter	4/8/2011	Biennial	4/8/2013	101695
SPEAG	D1450V2	1450 MHz SAR Dipole	5/20/2009	Biennial	5/20/2011	1025
SPEAG	D1765V2	1765 MHz SAR Dipole	5/19/2009	Biennial	5/19/2011	1008
SPEAG	D1900V2	1900 MHz SAR Dipole	2/17/2011	Annual	2/17/2012	502
SPEAG	D1900V2	1900 MHz SAR Dipole	8/18/2009	Biennial	8/18/2011	5d080
SPEAG	D2450V2	2450 MHz SAR Dipole	8/27/2009	Biennial	8/27/2011	719
SPEAG	D2450V2	2450 MHz SAR Dipole	2/8/2011	Annual	2/8/2012	797
SPEAG	D2600V2	2600 MHz SAR Dipole	4/15/2011	Biennial	4/15/2013	1004
SPEAG	D5GHzV2	5 GHz SAR Dipole	8/19/2009	Biennial	8/19/2011	1007
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	D835V2	835 MHz SAR Dipole	8/24/2009	Biennial	8/24/2011	4d026
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/20/2011	Annual	4/20/2012	665
SPEAG	EX3DV4	SAR Probe	2/14/2011	Annual	2/14/2012	3550
SPEAG	D750V3	750 MHz Dipole	2/14/2011	Annual	2/14/2012	1003
Rohde & Schwarz	SMIQ03B	Signal Generator	4/6/2011	Annual	4/6/2012	DE27259
SPEAG	D1640V2	1640 MHz Dipole	8/17/2010	Biennial	8/17/2012	321
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/30/2010	Annual	8/30/2011	100976
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5318
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5442
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	1190013
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	98150041
Agilent	8648D	Signal Generator	4/5/2011	Annual	4/5/2012	3629U00687
Anritsu	ML2438A	Power Meter	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	2400
Agilent	E5515C	Wireless Communications Test Set	8/13/2010	Annual	8/13/2011	GB43304447
Agilent	E5515C	Wireless Communications Tester	4/21/2011	Annual	4/21/2012	US41140256
Agilent	E5515C	Wireless Communications Test Set	2/8/2011	Annual	2/8/2012	GB45360985
Speag	D3700V2	3700 MHz SAR Dipole	2/16/2011	Annual	2/16/2012	1002
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	3/11/2011	Annual	3/11/2012	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

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Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	85070B	Dielectric Probe Kit	8/22/2010	Annual	8/22/2011	US33020316
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/13/2010	Annual	10/13/2011	3613A00315
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/21/2011	Annual	4/21/2012	JP38020182
Agilent	E5515C	Wireless Communications Test Set	10/11/2010	Annual	10/11/2011	GB46110872
Agilent	E5515C	Wireless Communications Test Set	10/8/2010	Annual	10/8/2011	GB46310798
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	10/11/2010	Annual	10/11/2011	1833460
Gigatronics	8651A	Universal Power Meter	10/11/2010	Annual	10/11/2011	8650319
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	D1765V2	1765 MHz SAR Dipole	6/16/2011	Annual	6/16/2012	1008
SPEAG	D1900V2	1900 MHz SAR Dipole	2/17/2011	Annual	2/17/2012	502
SPEAG	D1900V2	1900 MHz SAR Dipole	8/18/2009	Biennial	8/18/2011	5d080
SPEAG	D2450V2	2450 MHz SAR Dipole	8/27/2009	Biennial	8/27/2011	719
SPEAG	D2450V2	2450 MHz SAR Dipole	2/8/2011	Annual	2/8/2012	797
SPEAG	D2600V2	2600 MHz SAR Dipole	4/15/2011	Annual	4/15/2012	1004
SPEAG	D5GHzV2	5 GHz SAR Dipole	8/19/2009	Biennial	8/19/2011	1007
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	D835V2	835 MHz SAR Dipole	8/24/2009	Biennial	8/24/2011	4d026
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/17/2011	Annual	3/17/2012	704
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/21/2011	Annual	2/21/2012	649
SPEAG	D750V3	750 MHz Dipole	2/14/2011	Annual	2/14/2012	1003
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
SPEAG	D1640V2	1640 MHz Dipole	8/17/2010	Annual	8/17/2011	321
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/30/2010	Annual	8/30/2011	100976
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5318
Anritsu	MA2481A	Power Sensor	2/7/2011	Annual	2/7/2012	5442
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	1190013
Anritsu	ML2438A	Power Meter	2/7/2011	Annual	2/7/2012	98150041
Agilent	8648D	Signal Generator	4/5/2011	Annual	4/5/2012	3629U00687
Anritsu	ML2438A	Power Meter	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	551G4	5W, 800MHz-4.2GHz	N/A			21910
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	N/A			N/A
Agilent	E5515C	Wireless Communications Test Set	2/8/2011	Annual	2/8/2012	GB45360985
SPEAG	D3700V2	3700 MHz SAR Dipole	2/16/2011	Annual	2/16/2012	1002
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	3/11/2011	Annual	3/11/2012	103962
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331322
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331323
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331330
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331332
Control Company	61220-416	Long-Stem Thermometer	3/16/2011	Biennial	3/16/2013	111391601
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286445
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286460
VWR	36934-158	Wall-Mounted Thermometer	5/26/2010	Biennial	5/26/2012	101718589
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286454
VWR	36934-158	Wall-Mounted Thermometer	2/26/2010	Biennial	2/26/2012	101536273
SPEAG	ES3DV3	SAR Probe	4/8/2011	Annual	4/8/2012	3258
SPEAG	D1750V2	1750 MHz SAR Dipole	5/24/2011	Annual	5/24/2012	1051
MiniCircuits	SLP-2400+	Low Pass Filter	N/A			R8979500903
Narda	4772-3	Attenuator (3dB)	N/A			9406
Narda	BW-S3W2	Attenuator (3dB)	N/A			120
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/5/2011	Annual	8/5/2012	112347

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17 MEASUREMENT UNCERTAINTIES

Applicable for 750 – 3000 MHz.

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

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

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

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

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18 CONCLUSION

18.1 Measurement Conclusion

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

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

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APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-F

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

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.929 \text{ mho/m}$; $\epsilon_r = 53.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 08-10-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.7 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

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

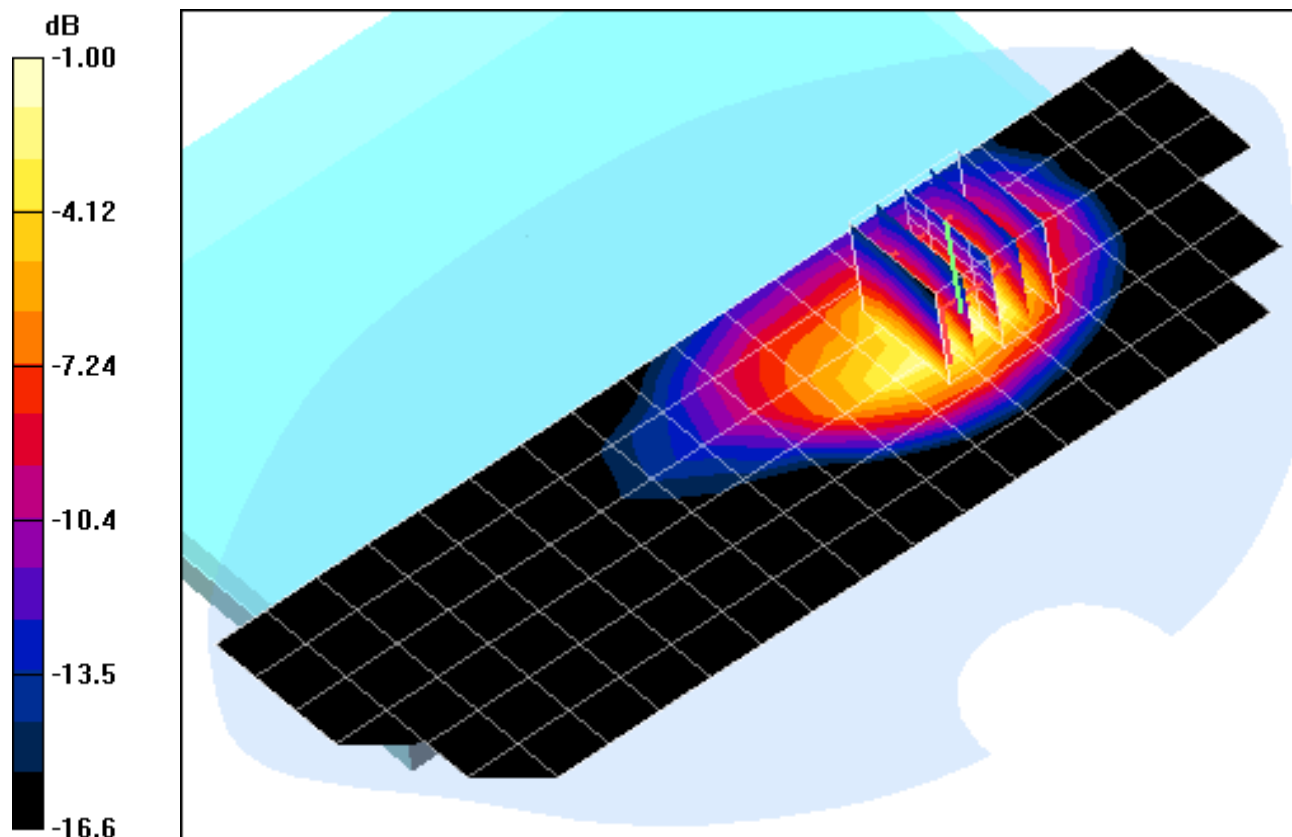
Area Scan (7x19x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 27.6 V/m

Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.600 mW/g; SAR(10 g) = 0.305 mW/g



0 dB = 0.685mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-F

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

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.929 \text{ mho/m}$; $\epsilon_r = 53.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 08-10-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.7 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

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

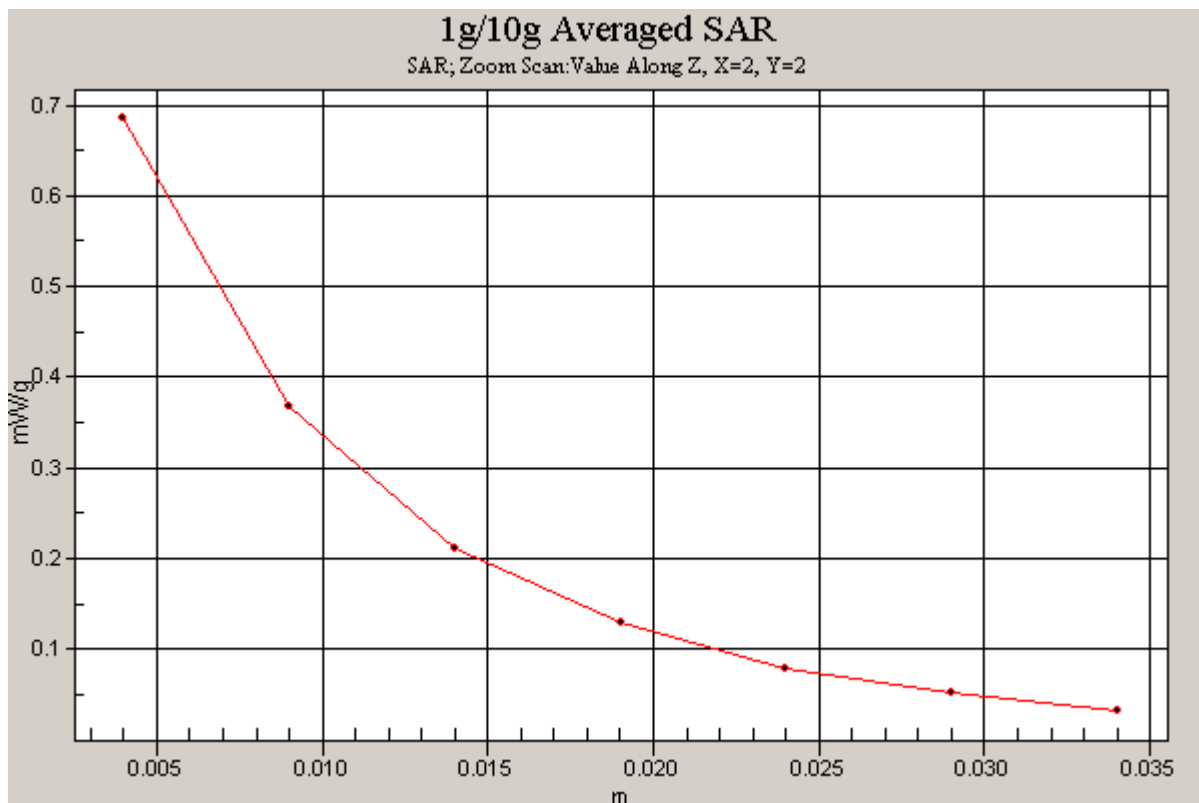
Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 27.6 V/m

Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.600 mW/g; SAR(10 g) = 0.305 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-E

Communication System: GSM850 GPRS; 4 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.076

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.929 \text{ mho/m}$; $\epsilon_r = 53.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-10-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.7 °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, 4 Tx Slots

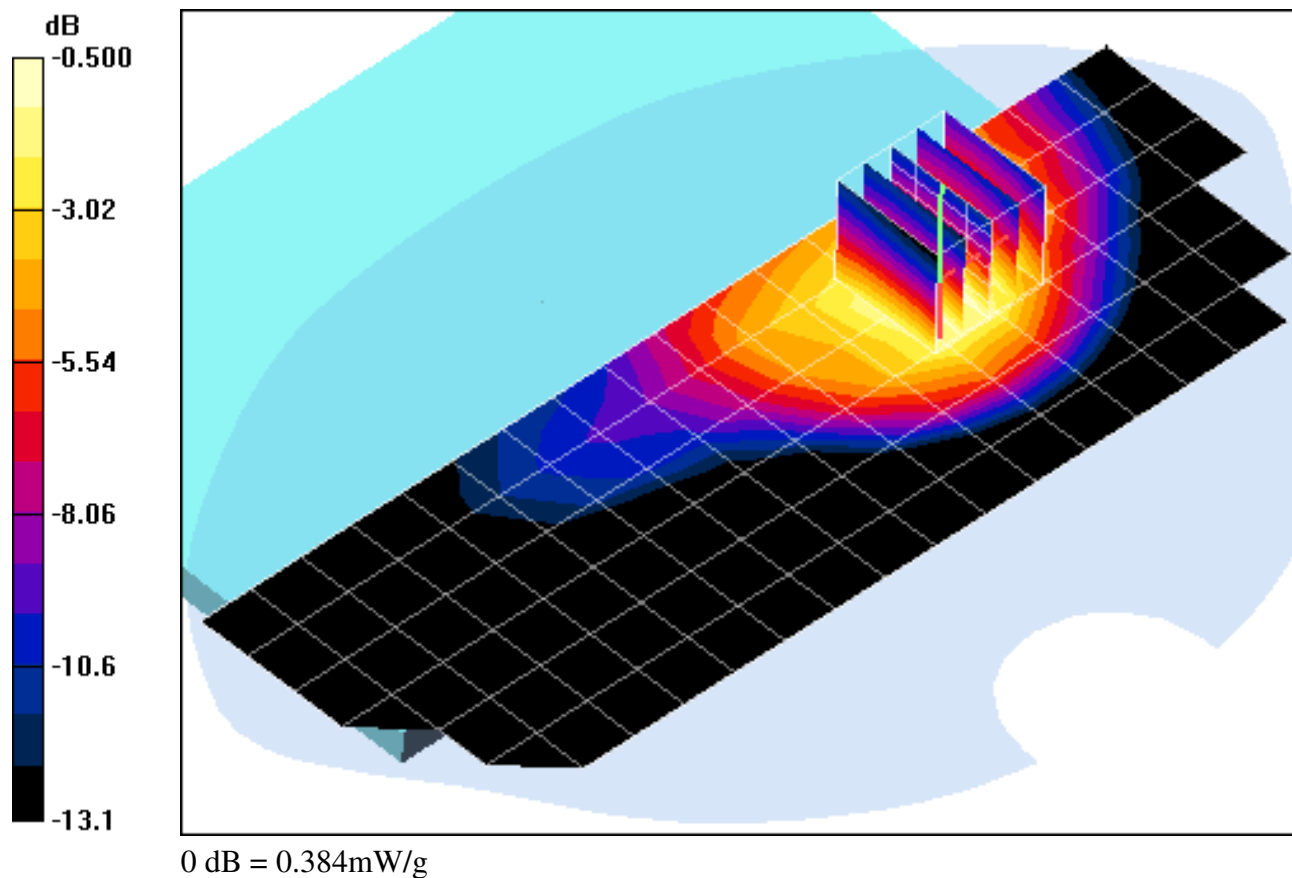
Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 20.5 V/m

Peak SAR (extrapolated) = 0.592 W/kg

SAR(1 g) = 0.360 mW/g; SAR(10 g) = 0.218 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-F

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

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.929 \text{ mho/m}$; $\epsilon_r = 53.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 08-10-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.7 °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, 2 Tx Slots

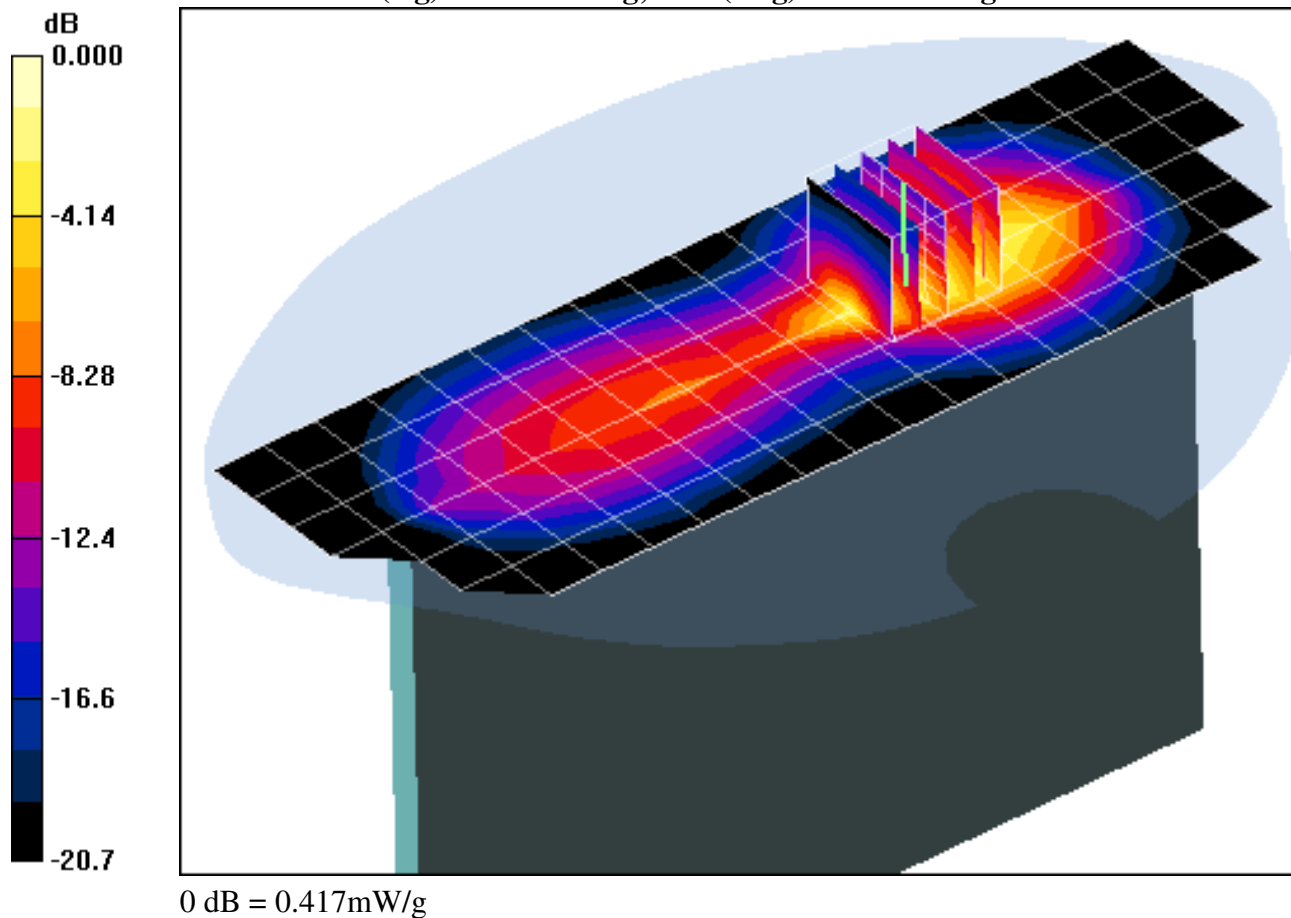
Area Scan (7x19x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 21.4 V/m

Peak SAR (extrapolated) = 0.837 W/kg

SAR(1 g) = 0.338 mW/g; SAR(10 g) = 0.168 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-E

Communication System: GSM850 GPRS; 4 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.076

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.929 \text{ mho/m}$; $\epsilon_r = 53.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.5 cm

Test Date: 08-10-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.7 °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, 4 Tx Slots

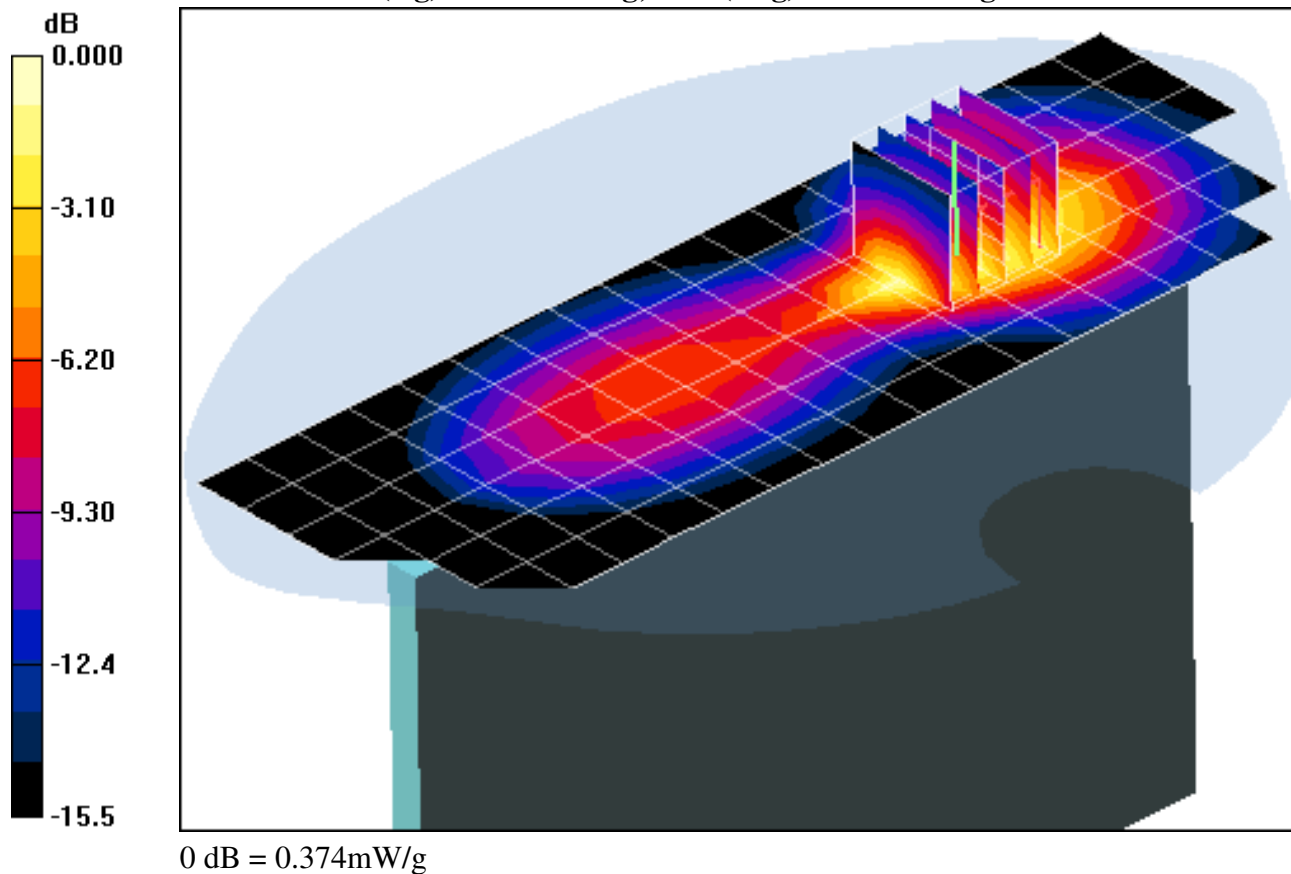
Area Scan (7x19x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 19.7 V/m

Peak SAR (extrapolated) = 0.611 W/kg

SAR(1 g) = 0.339 mW/g; SAR(10 g) = 0.199 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-E

Communication System: GSM850 GPRS; 4 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.076

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.929 \text{ mho/m}$; $\epsilon_r = 53.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 08-10-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.7 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

Mode: GPRS 850, Body SAR, Right Edge, Mid.ch, 4 Tx Slots

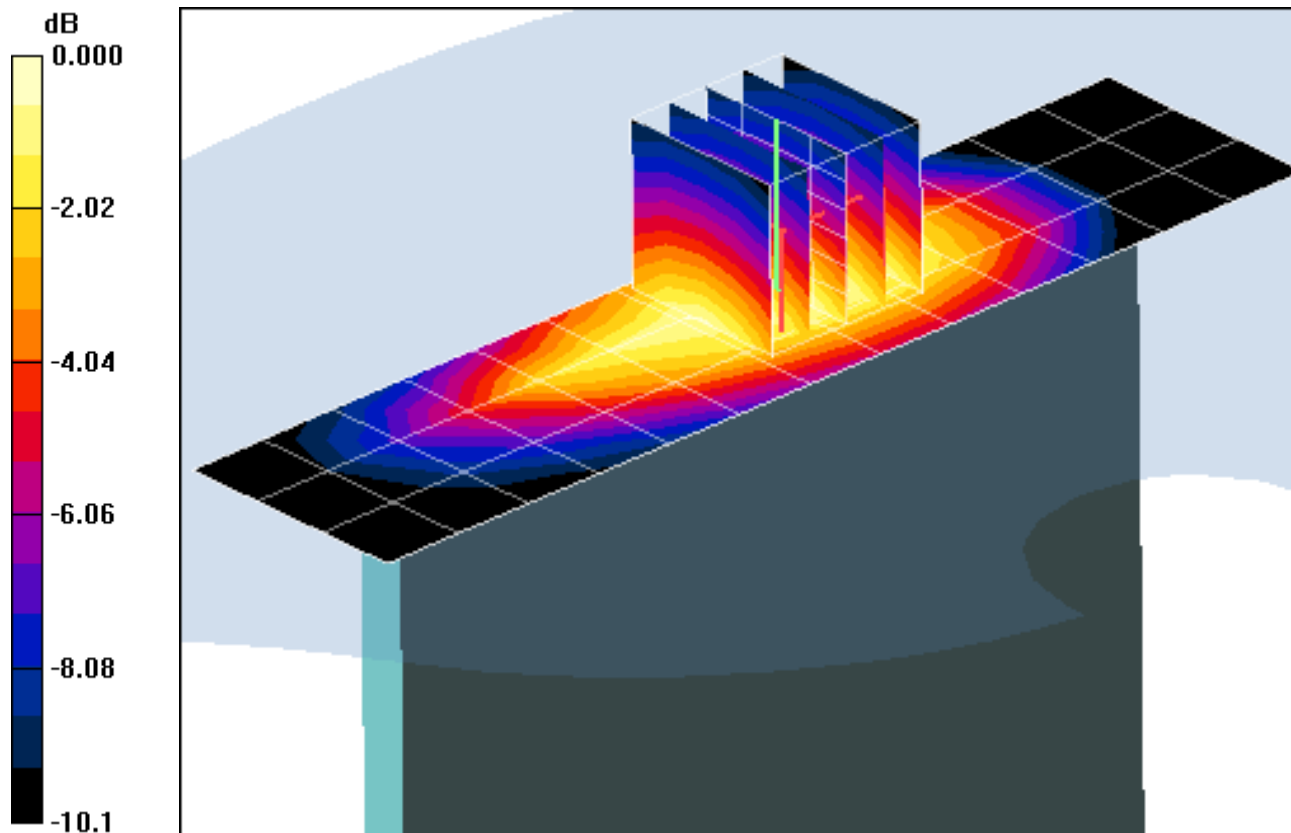
Area Scan (4x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 14.1 V/m

Peak SAR (extrapolated) = 0.236 W/kg

SAR(1 g) = 0.163 mW/g; SAR(10 g) = 0.110 mW/g



0 dB = 0.175mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-F

Communication System: GSM1900 GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076

Medium: 1900 Body; Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.49 \text{ mho/m}$; $\epsilon_r = 51.36$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 08-16-2011; Ambient Temp: 23.3 ° C; Tissue Temp: 22.0 ° C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/17/2011

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

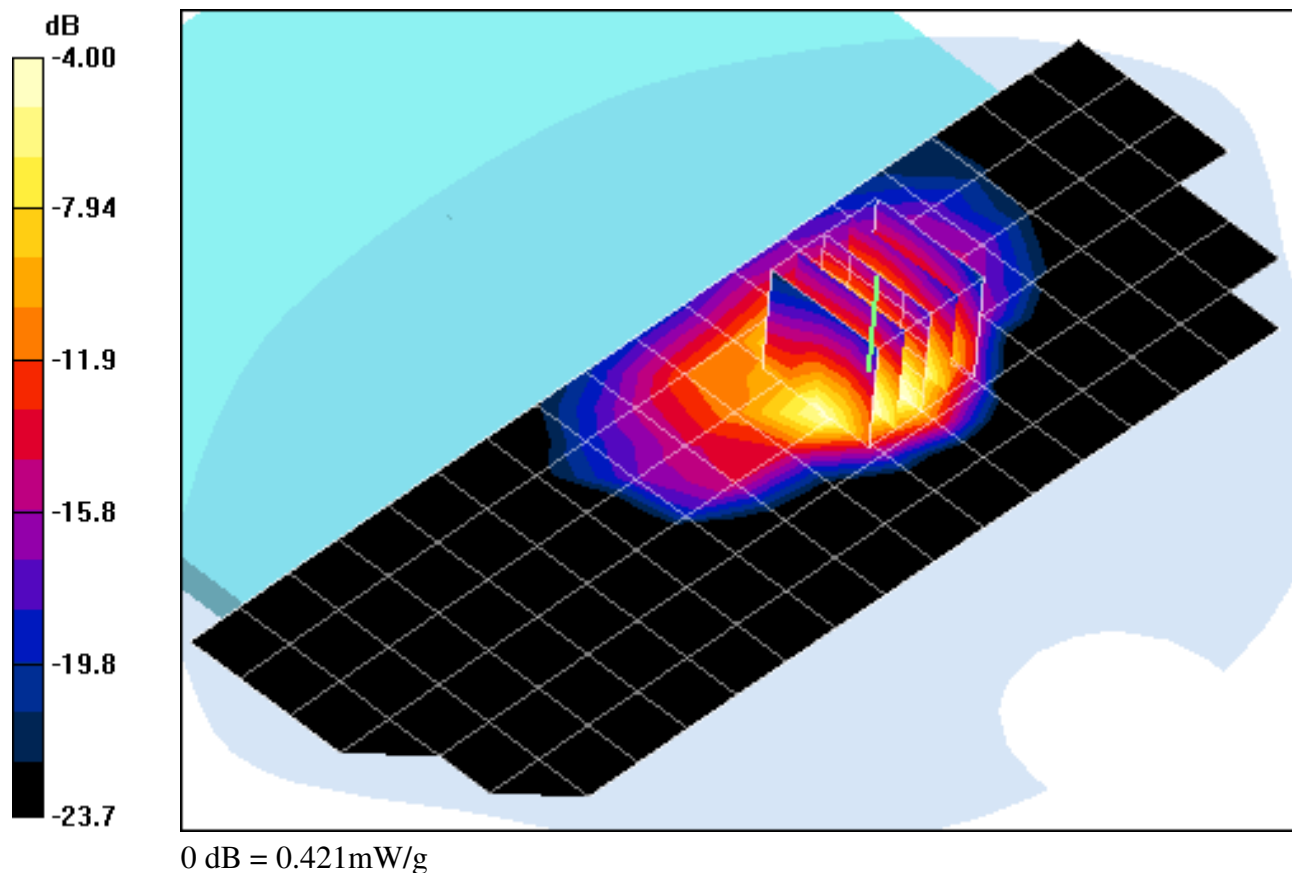
Area Scan (7x19x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 17.1 V/m

Peak SAR (extrapolated) = 0.976 W/kg

SAR(1 g) = 0.405 mW/g; SAR(10 g) = 0.176 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-E

Communication System: GSM1900 GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.49 \text{ mho/m}$; $\epsilon_r = 51.36$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-10-2011; Ambient Temp: 23.1 °C ; Tissue Temp: 22.2 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/17/2011

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

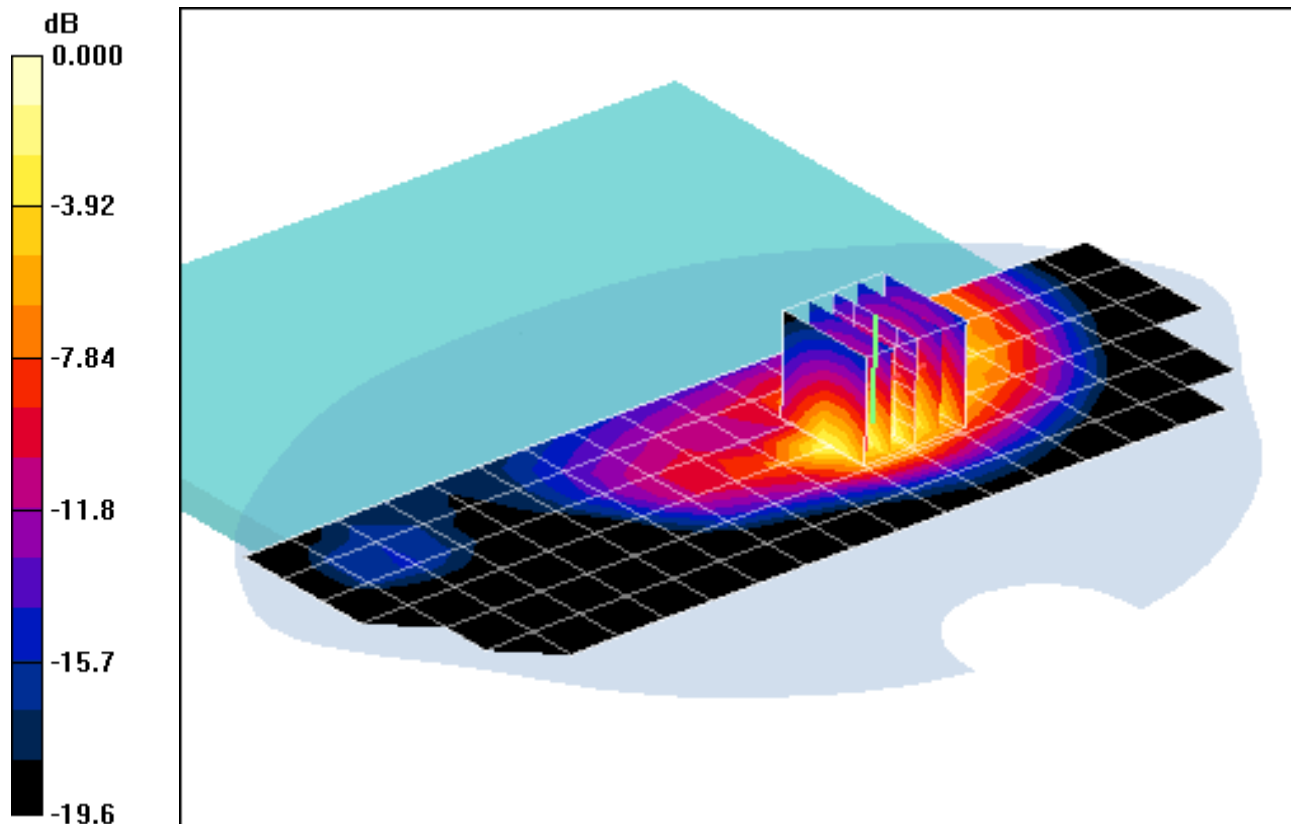
Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 24.2 V/m

Peak SAR (extrapolated) = 1.37 W/kg

SAR(1 g) = 0.750 mW/g; SAR(10 g) = 0.392 mW/g



0 dB = 0.845mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-F

Communication System: GSM1900 GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.49 \text{ mho/m}$; $\epsilon_r = 51.36$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 08-10-2011; Ambient Temp: 23.1 °C ; Tissue Temp: 22.2 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/17/2011

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

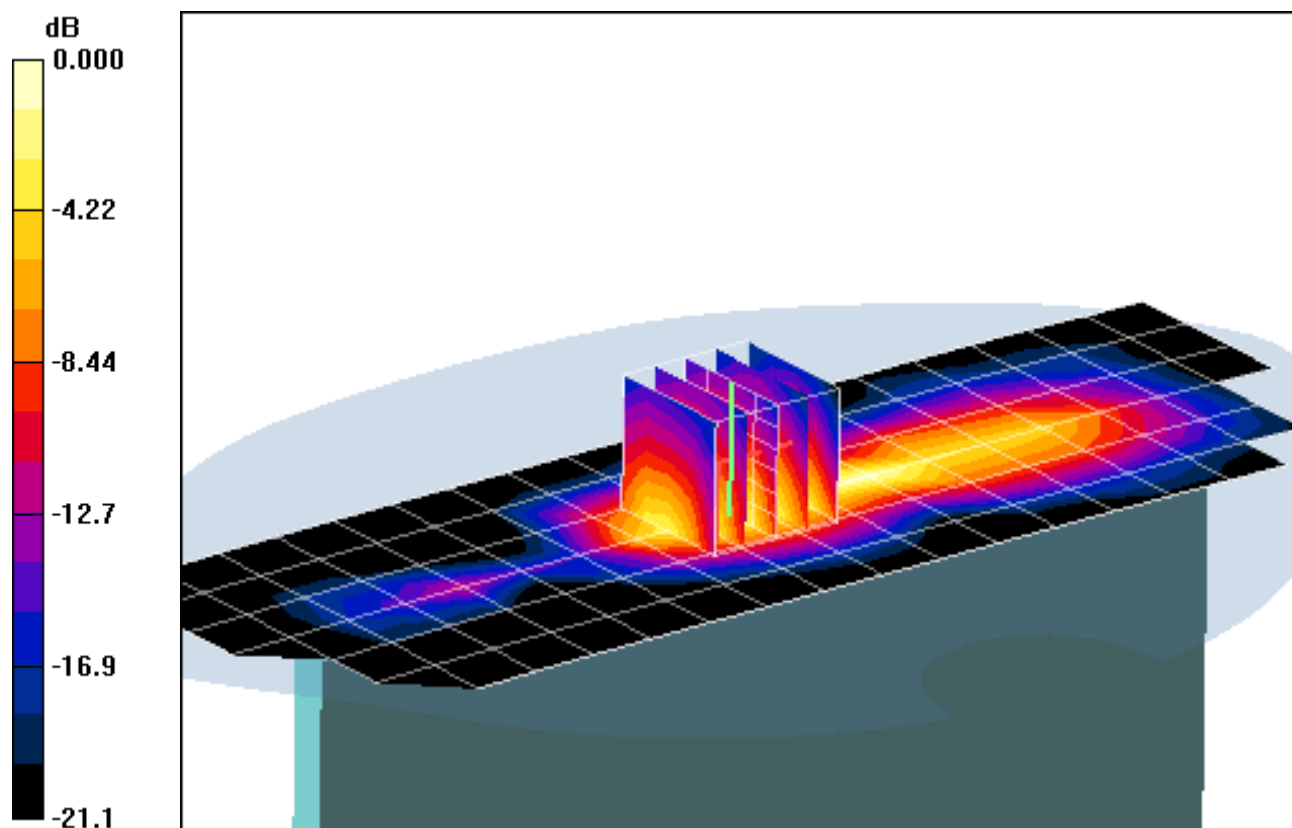
Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 10.6 V/m

Peak SAR (extrapolated) = 0.283 W/kg

SAR(1 g) = 0.146 mW/g; SAR(10 g) = 0.071 mW/g



0 dB = 0.168mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-E

Communication System: GSM1900 GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.49 \text{ mho/m}$; $\epsilon_r = 51.36$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.5 cm

Test Date: 08-16-2011; Ambient Temp: 23.3 °C ; Tissue Temp: 22.0 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/17/2011

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

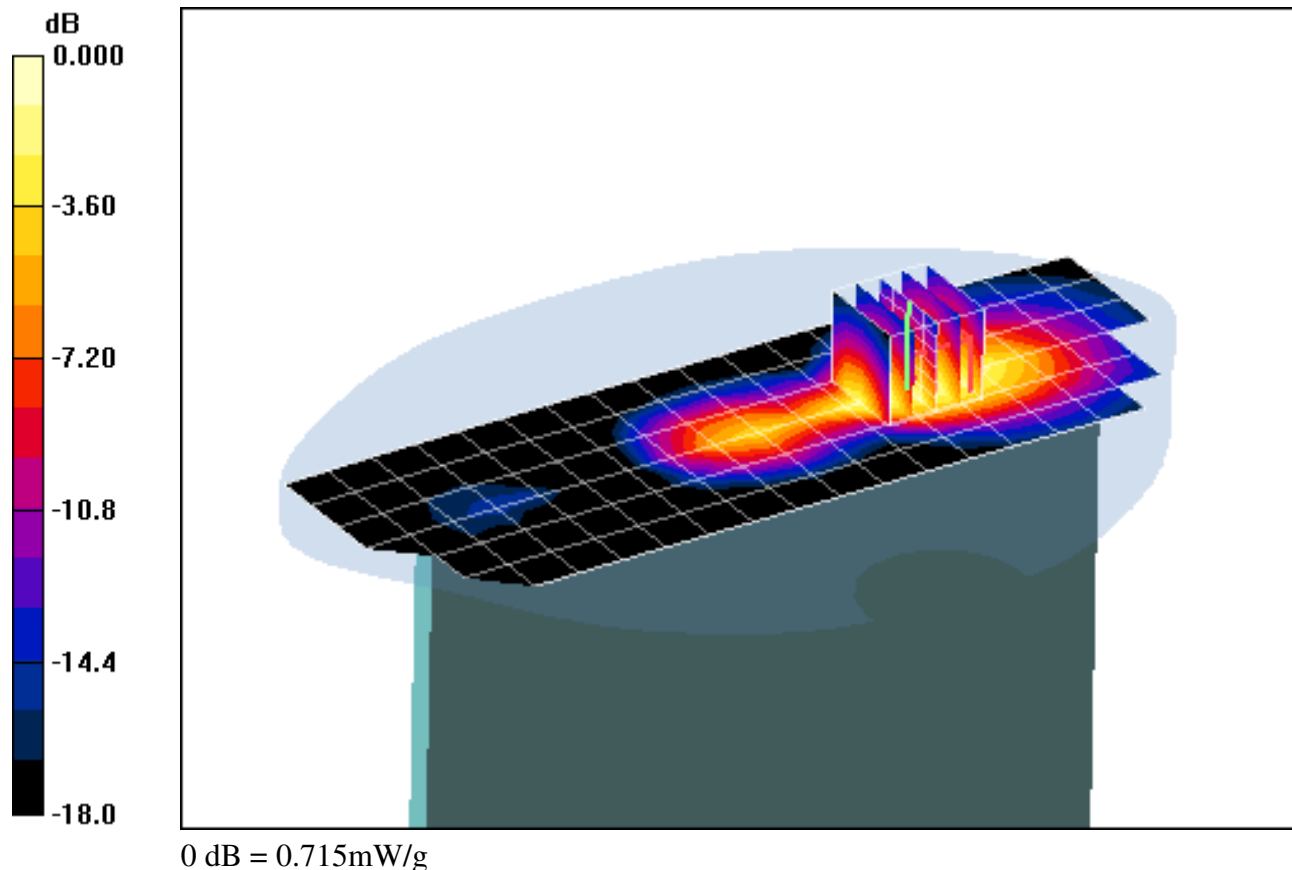
Area Scan (7x19x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 22.3 V/m

Peak SAR (extrapolated) = 1.12 W/kg

SAR(1 g) = 0.645 mW/g; SAR(10 g) = 0.363 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-E

Communication System: GSM1900 GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.49 \text{ mho/m}$; $\epsilon_r = 51.36$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 08-16-2011; Ambient Temp: 23.3 °C ; Tissue Temp: 22.0 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/17/2011

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

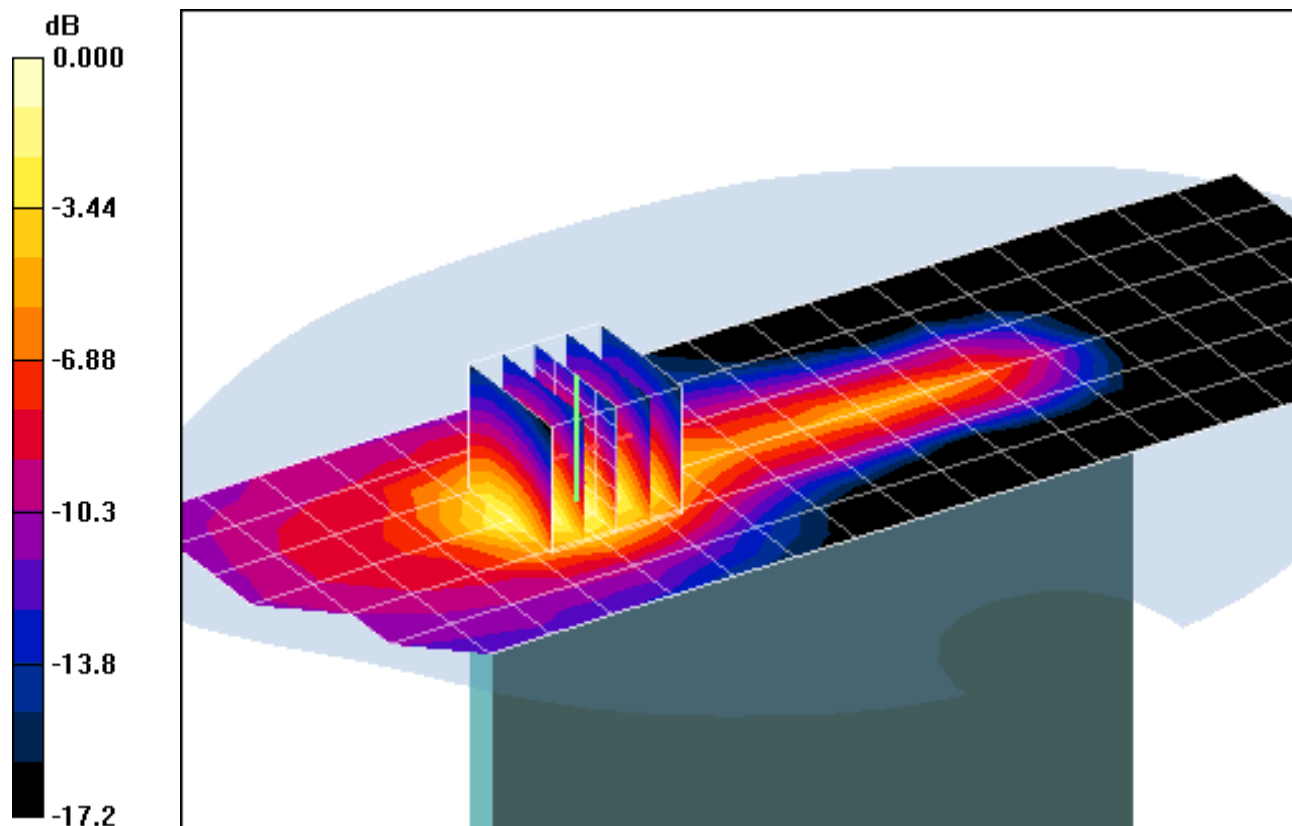
Area Scan (7x19x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 6.64 V/m

Peak SAR (extrapolated) = 0.527 W/kg

SAR(1 g) = 0.311 mW/g; SAR(10 g) = 0.170 mW/g



0 dB = 0.343mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-F

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

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.929 \text{ mho/m}$; $\epsilon_r = 53.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 08-10-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.7 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

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

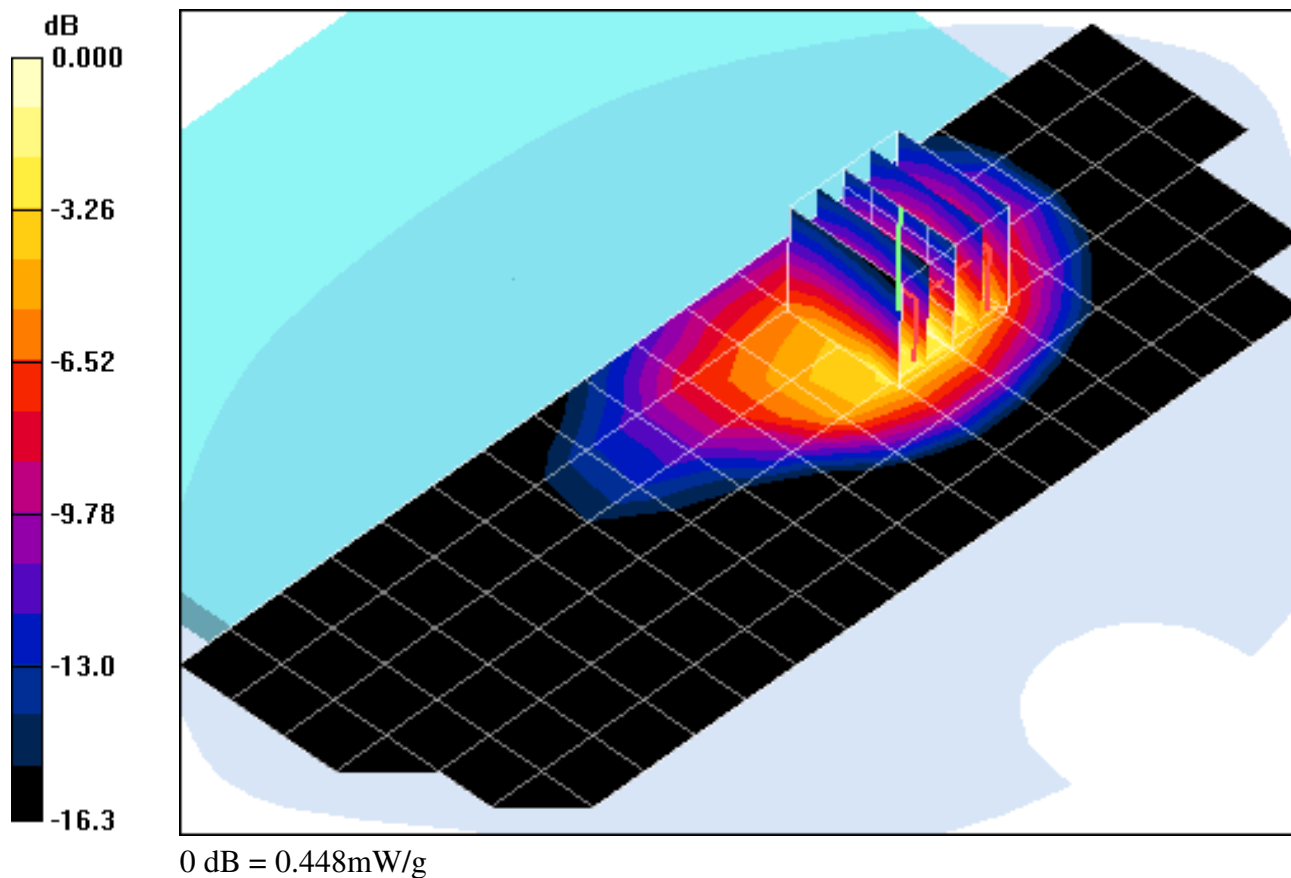
Area Scan (7x21x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 6.23 V/m

Peak SAR (extrapolated) = 0.819 W/kg

SAR(1 g) = 0.408 mW/g; SAR(10 g) = 0.211 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-E

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

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.929 \text{ mho/m}$; $\epsilon_r = 53.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-10-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.7 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

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

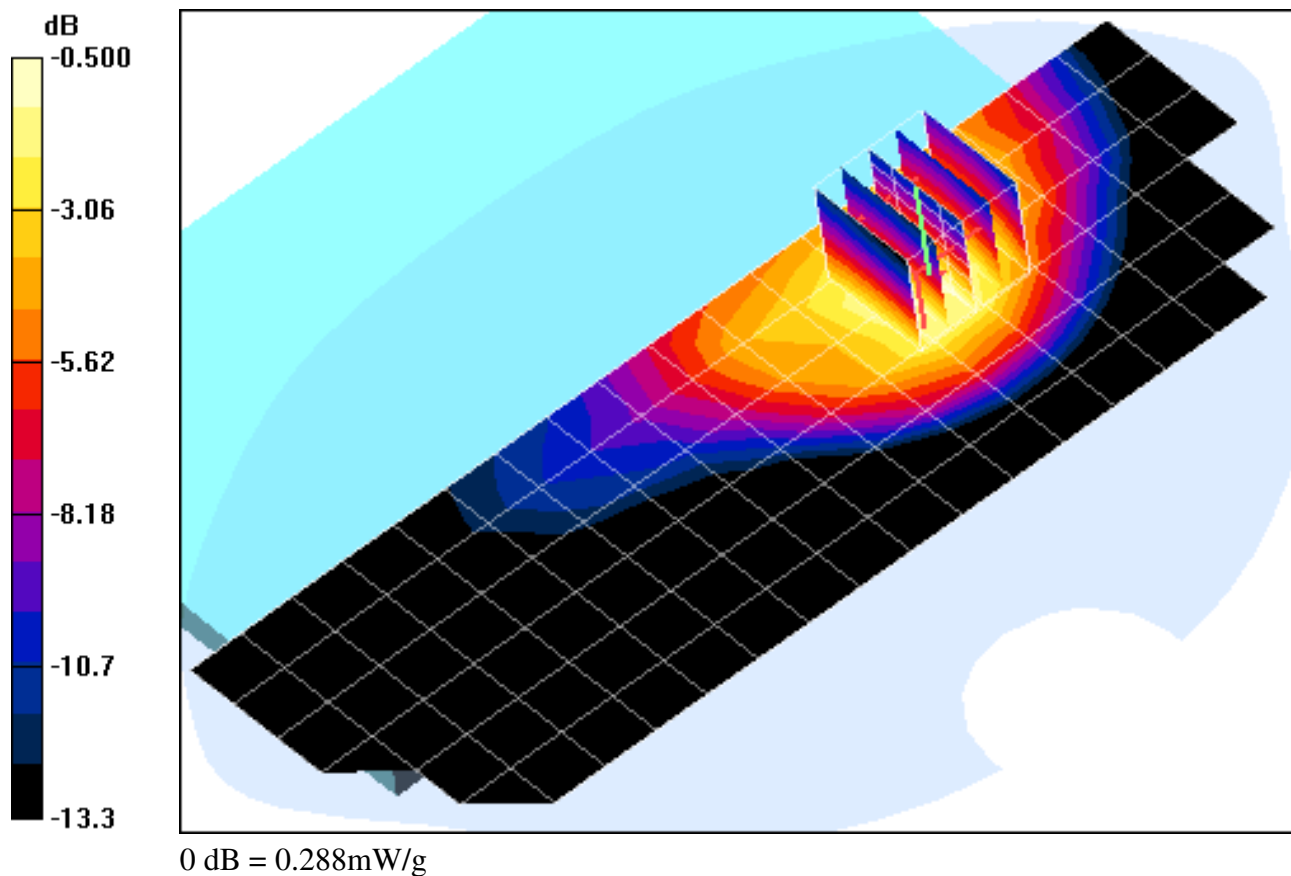
Area Scan (7x21x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 17.4 V/m

Peak SAR (extrapolated) = 0.434 W/kg

SAR(1 g) = 0.265 mW/g; SAR(10 g) = 0.160 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-F

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

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.929 \text{ mho/m}$; $\epsilon_r = 53.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 08-10-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.7 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

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

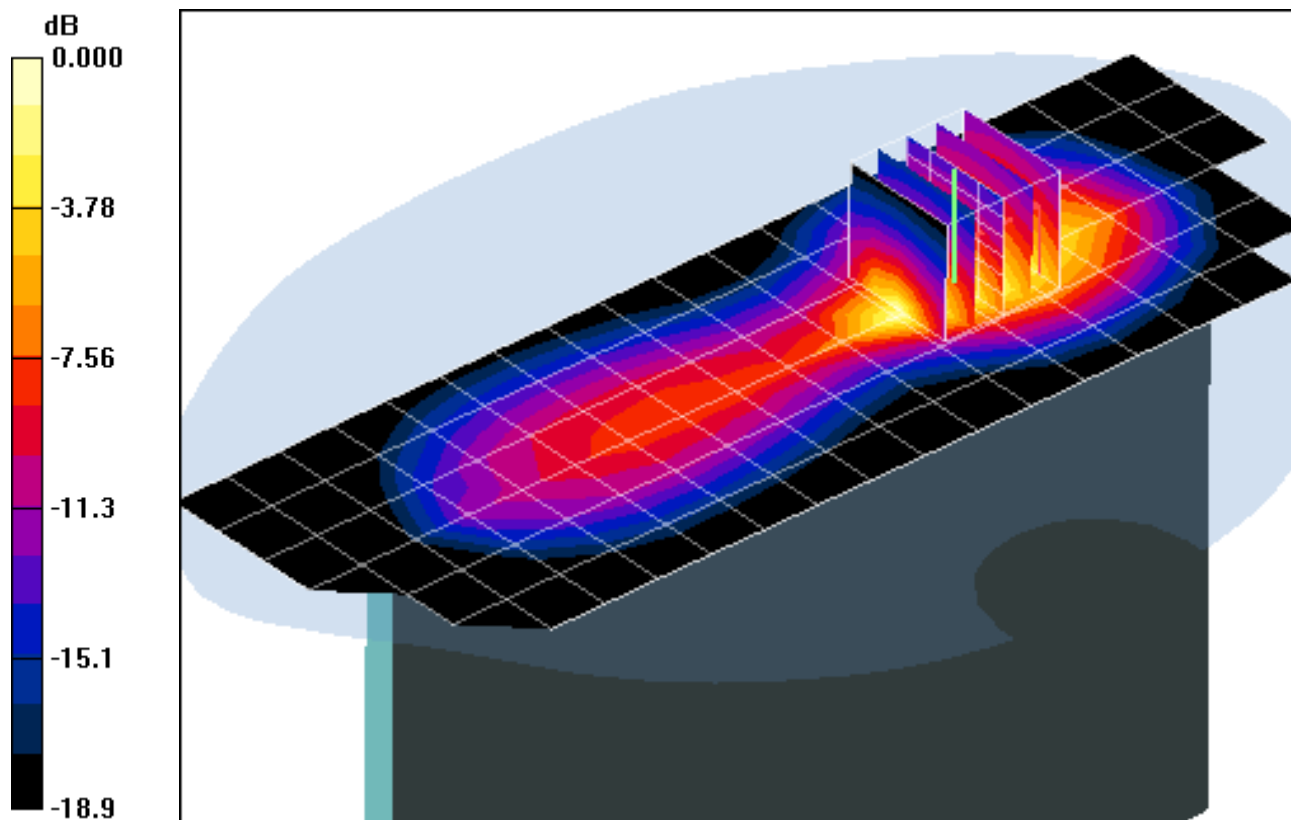
Area Scan (7x19x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 6.80 V/m

Peak SAR (extrapolated) = 0.544 W/kg

SAR(1 g) = 0.229 mW/g; SAR(10 g) = 0.115 mW/g



0 dB = 0.277mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-E

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

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.929 \text{ mho/m}$; $\epsilon_r = 53.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.5 cm

Test Date: 08-10-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.7 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

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

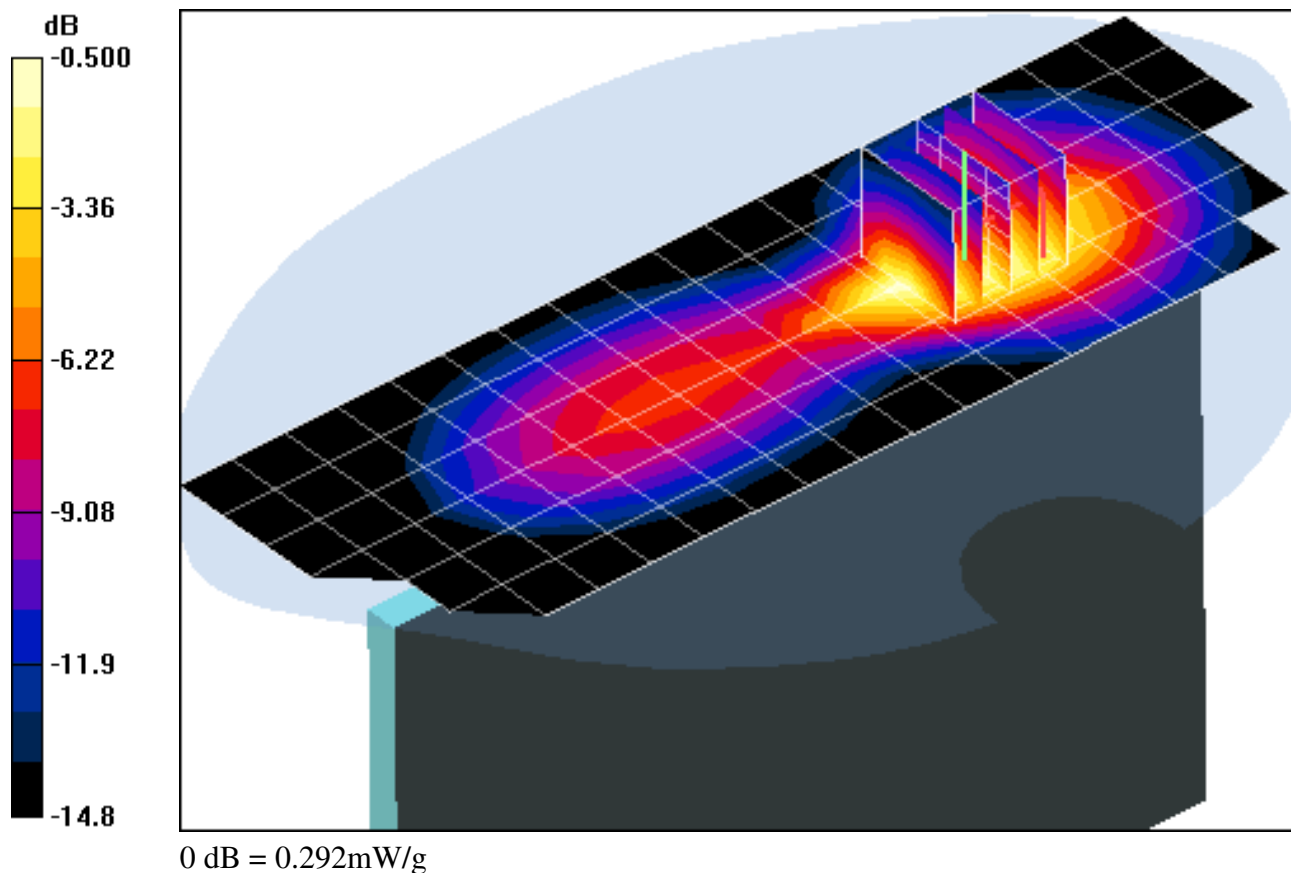
Area Scan (7x19x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 17.3 V/m

Peak SAR (extrapolated) = 0.468 W/kg

SAR(1 g) = 0.262 mW/g; SAR(10 g) = 0.154 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-E

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

Medium: 835 Body; Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.929 \text{ mho/m}$; $\epsilon_r = 53.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 08-10-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.7 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

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

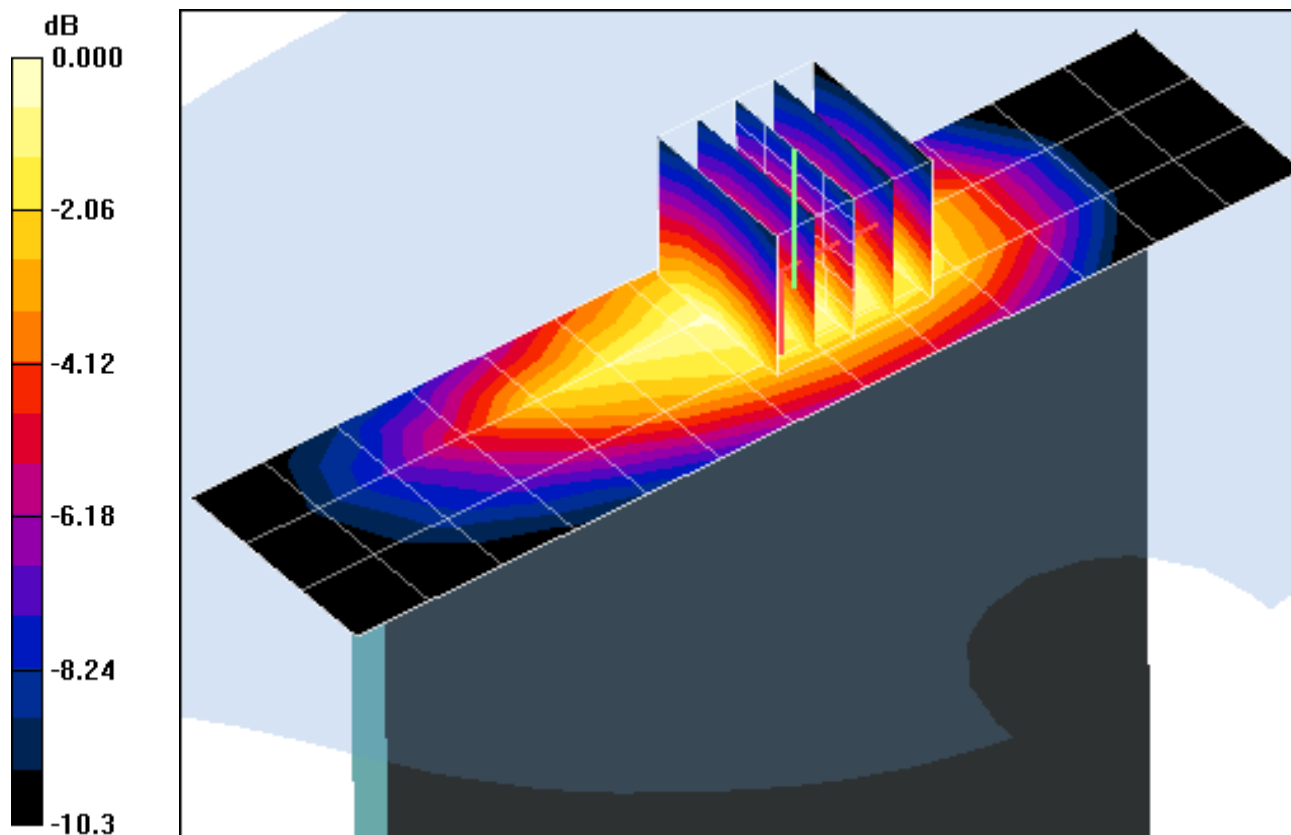
Area Scan (4x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 12.2 V/m

Peak SAR (extrapolated) = 0.190 W/kg

SAR(1 g) = 0.131 mW/g; SAR(10 g) = 0.088 mW/g



0 dB = 0.141mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-F

Communication System: WCDMA1900; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.49 \text{ mho/m}$; $\epsilon_r = 51.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 08-10-2011; Ambient Temp: 23.1 °C ; Tissue Temp: 22.2 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/17/2011

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

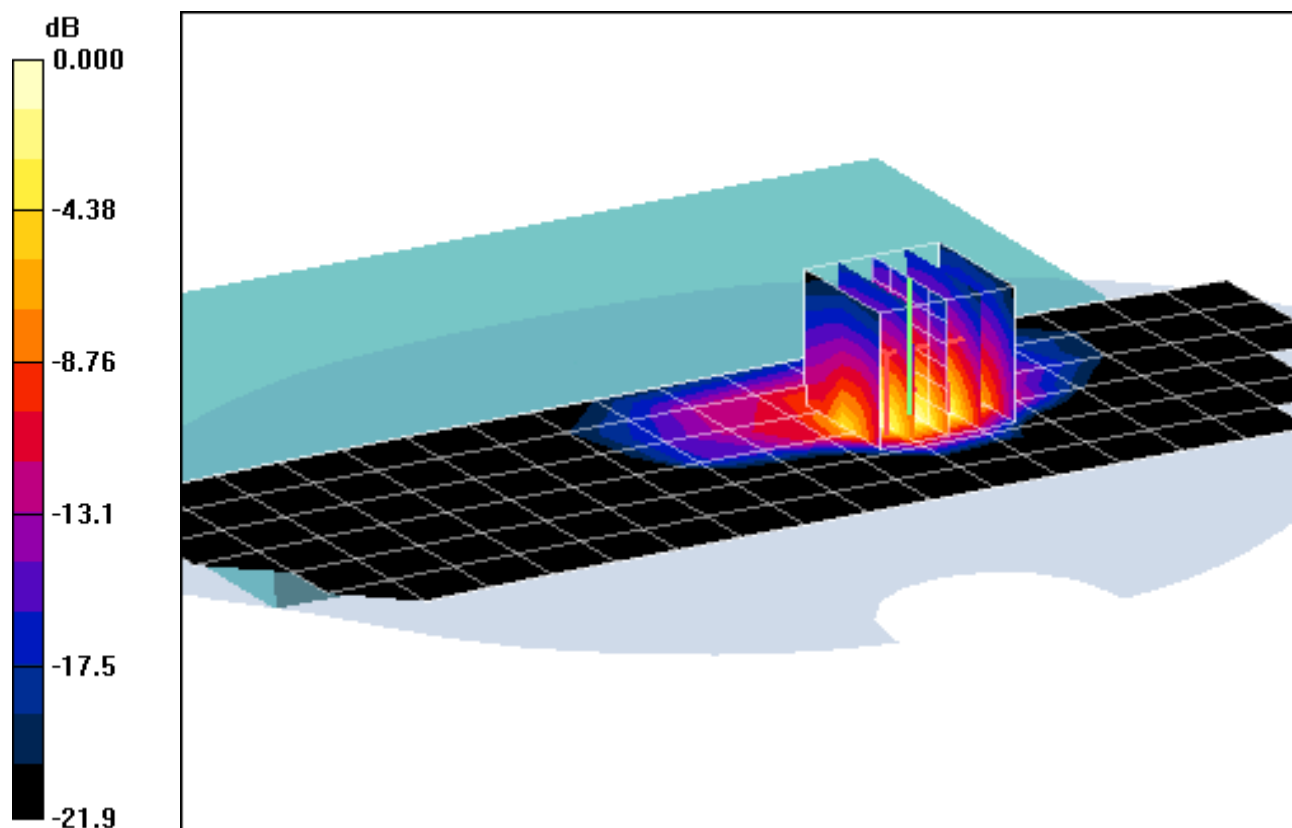
Area Scan (7x21x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 3.59 V/m

Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.524 mW/g; SAR(10 g) = 0.224 mW/g



0 dB = 0.570mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-E

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1907.6 \text{ MHz}$; $\sigma = 1.52 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.0 cm

Test Date: 08-10-2011; Ambient Temp: 23.1 °C ; Tissue Temp: 22.2 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/17/2011

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

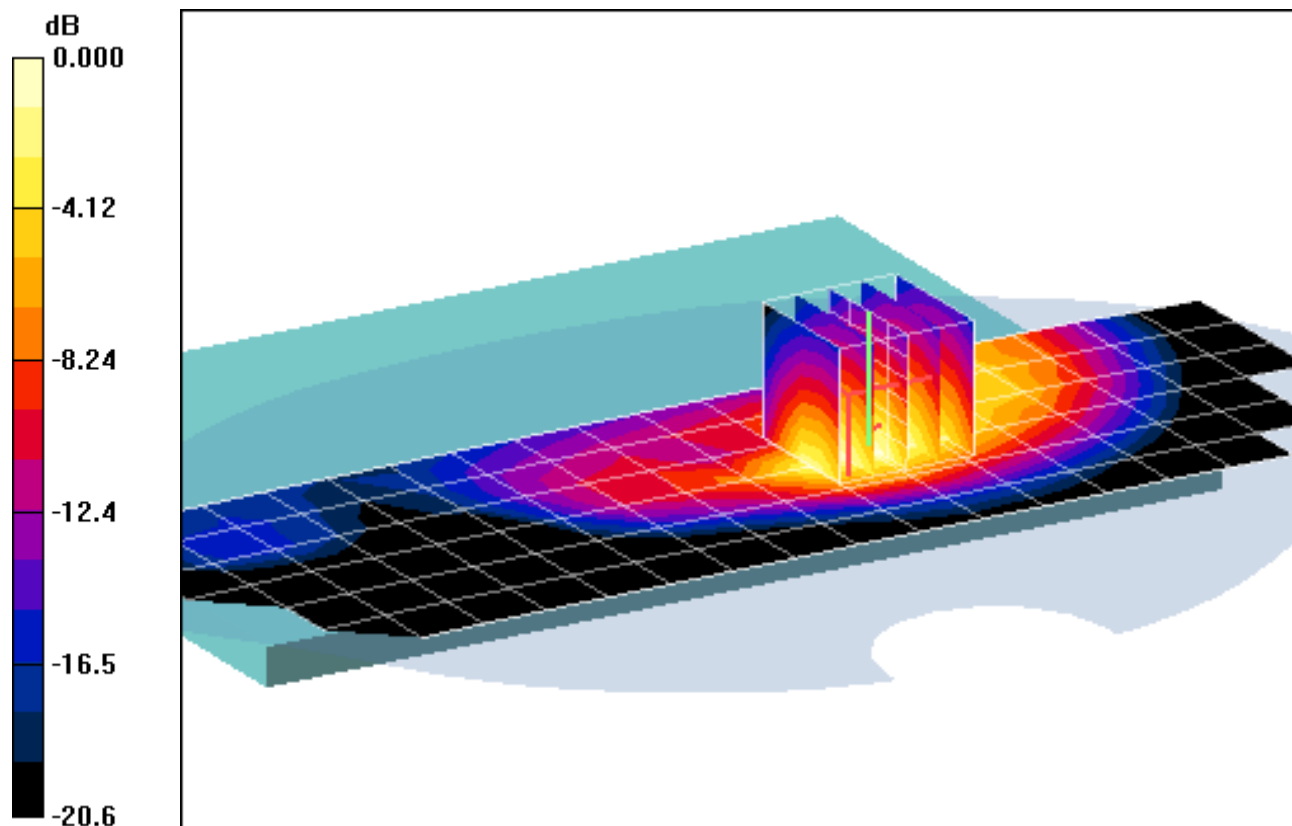
Area Scan (7x21x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 27.1 V/m

Peak SAR (extrapolated) = 1.77 W/kg

SAR(1 g) = 0.966 mW/g; SAR(10 g) = 0.504 mW/g



0 dB = 1.08mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-F

Communication System: WCDMA1900; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.49 \text{ mho/m}$; $\epsilon_r = 51.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 08-10-2011; Ambient Temp: 23.1 °C ; Tissue Temp: 22.2 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/17/2011

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

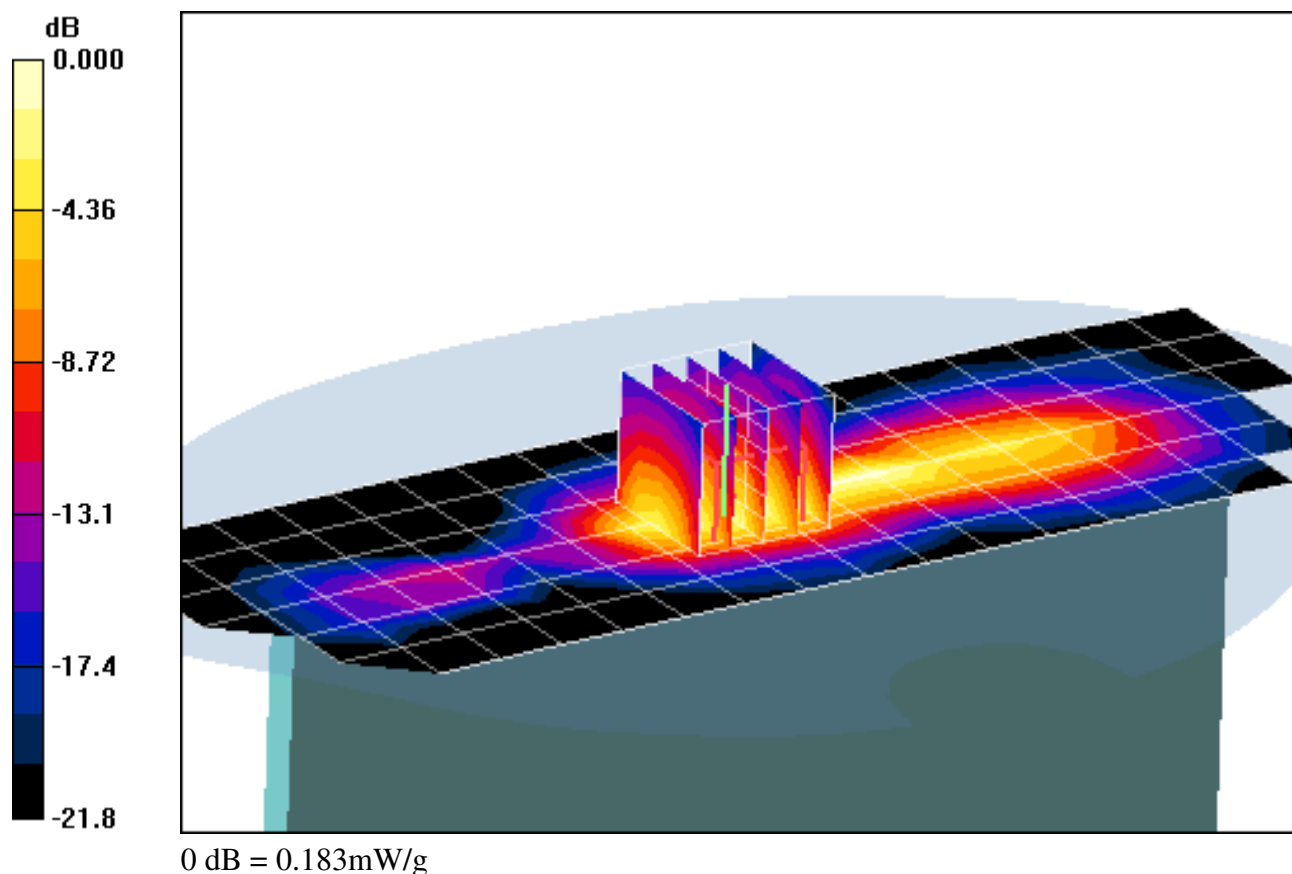
Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 10.6 V/m

Peak SAR (extrapolated) = 0.291 W/kg

SAR(1 g) = 0.157 mW/g; SAR(10 g) = 0.077 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-E

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1907.6 \text{ MHz}$; $\sigma = 1.52 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 0.5 cm

Test Date: 08-10-2011; Ambient Temp: 23.1 °C ; Tissue Temp: 22.2 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/17/2011

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

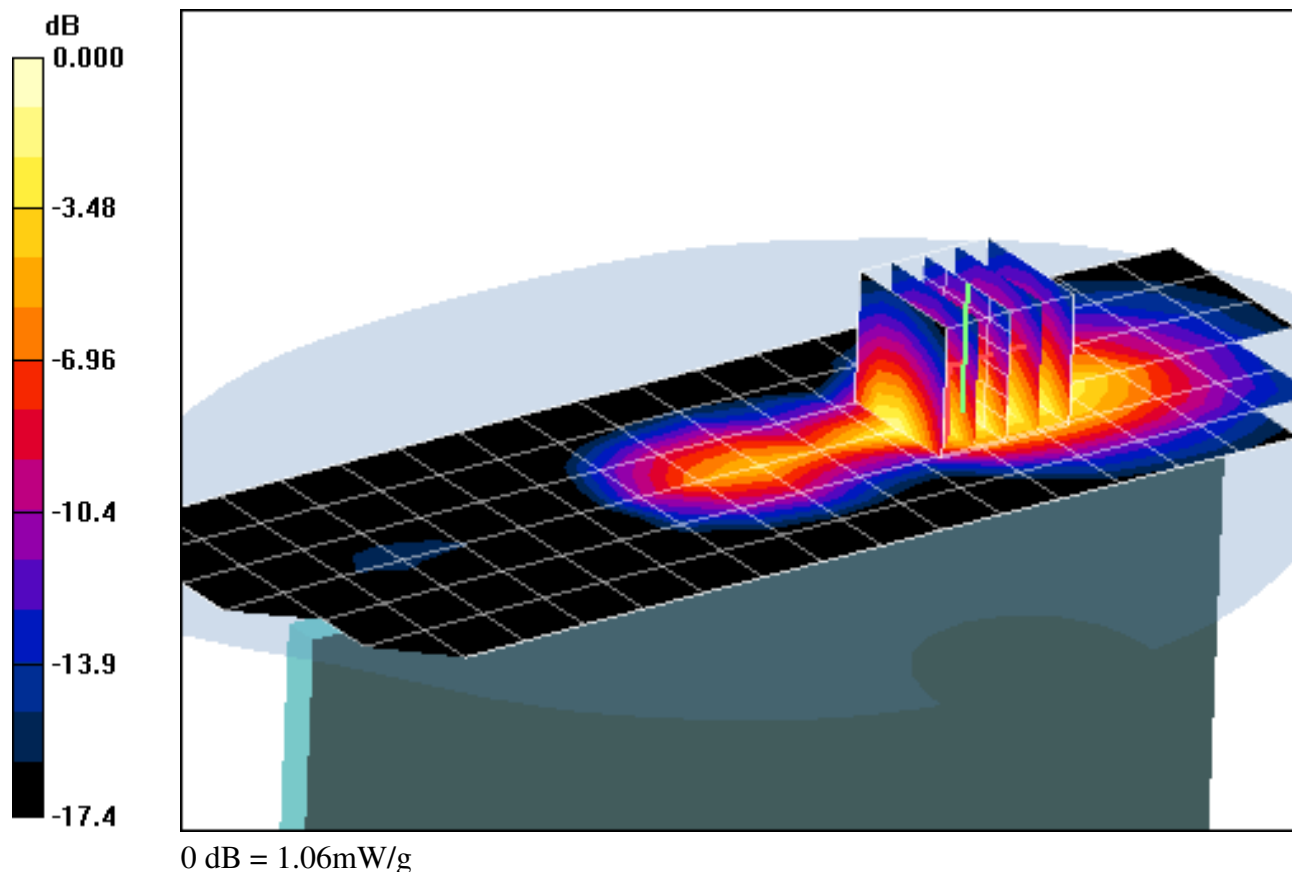
Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 21.0 V/m

Peak SAR (extrapolated) = 1.78 W/kg

SAR(1 g) = 0.981 mW/g; SAR(10 g) = 0.527 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-E

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1907.6 \text{ MHz}$; $\sigma = 1.52 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 0.5 cm

Test Date: 08-10-2011; Ambient Temp: 23.1 °C ; Tissue Temp: 22.2 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/17/2011

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

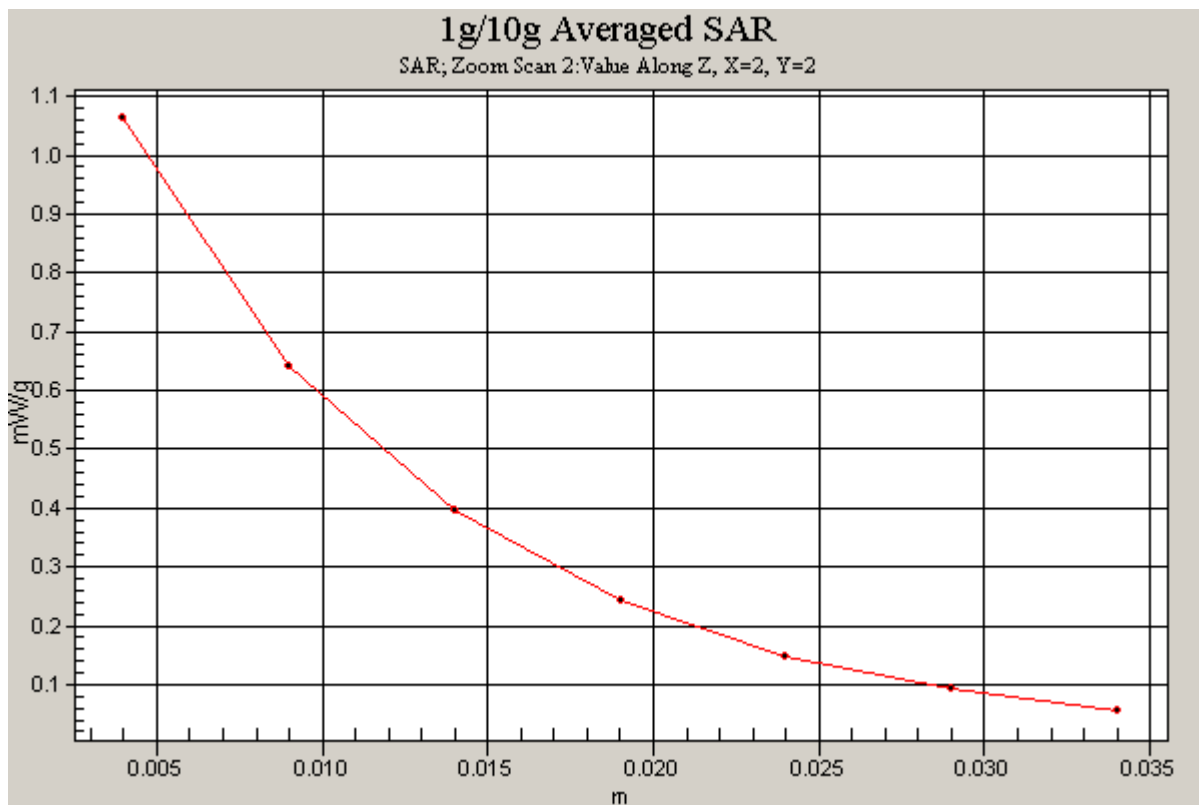
Area Scan (7x19x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 21.0 V/m

Peak SAR (extrapolated) = 1.78 W/kg

SAR(1 g) = 0.981 mW/g; SAR(10 g) = 0.527 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: FI-177-E

Communication System: WCDMA1900; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.49 \text{ mho/m}$; $\epsilon_r = 51.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 0.0 cm

Test Date: 08-10-2011; Ambient Temp: 23.1 °C ; Tissue Temp: 22.2 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/17/2011

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

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

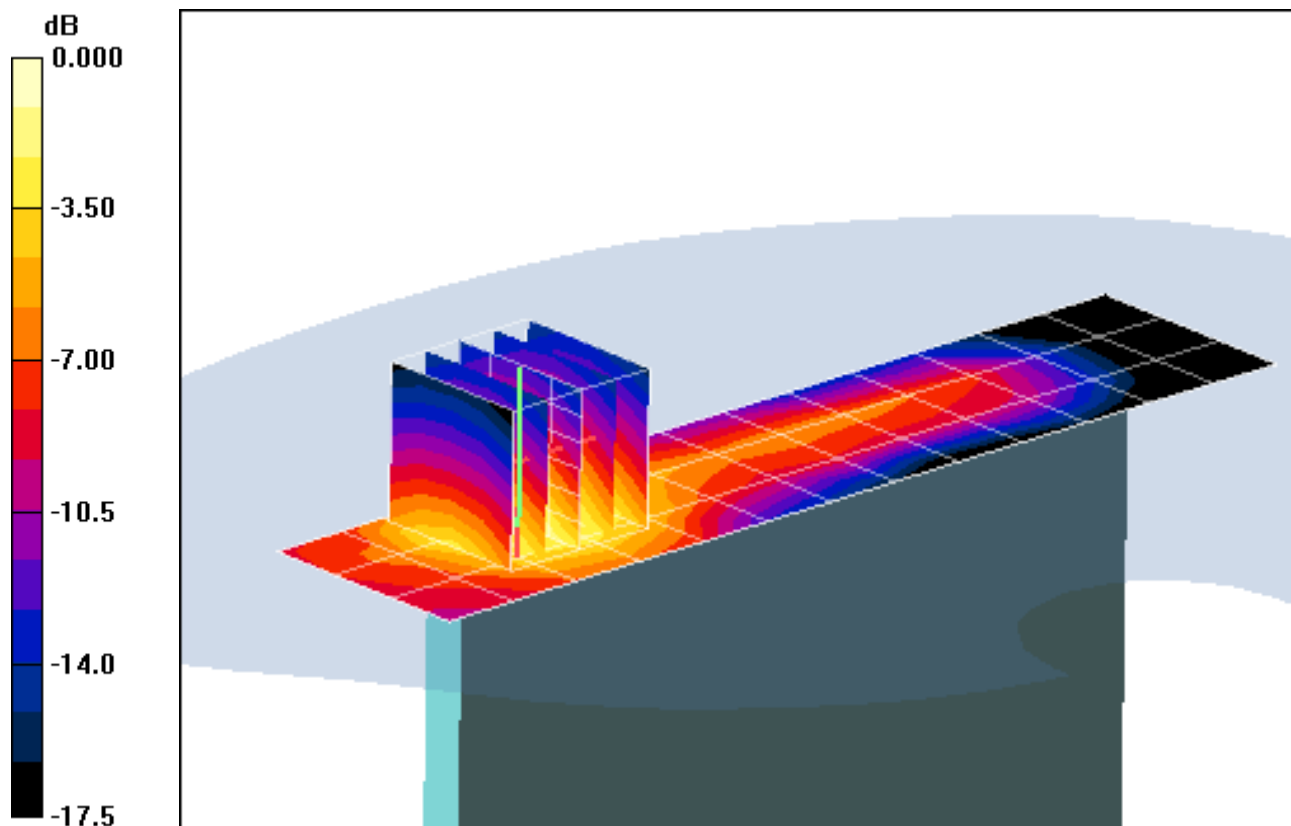
Area Scan (4x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 9.00 V/m

Peak SAR (extrapolated) = 0.610 W/kg

SAR(1 g) = 0.368 mW/g; SAR(10 g) = 0.203 mW/g



0 dB = 0.421mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300; Type: Portable Tablet Computer; Serial: C4F123F08582A4E

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5300 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):

$f = 5300 \text{ MHz}$; $\sigma = 5.59 \text{ mho/m}$; $\epsilon_r = 48.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-12-2011; Ambient Temp: 24.3C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN3550; ConvF(3.31, 3.31, 3.31); Calibrated: 2/14/2011

Sensor-Surface: 2mm (Mechanical Surface Detection)

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

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

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

Mode: IEEE 802.11a 5.3 GHz, Ch 60, 6 Mbps, Back Side

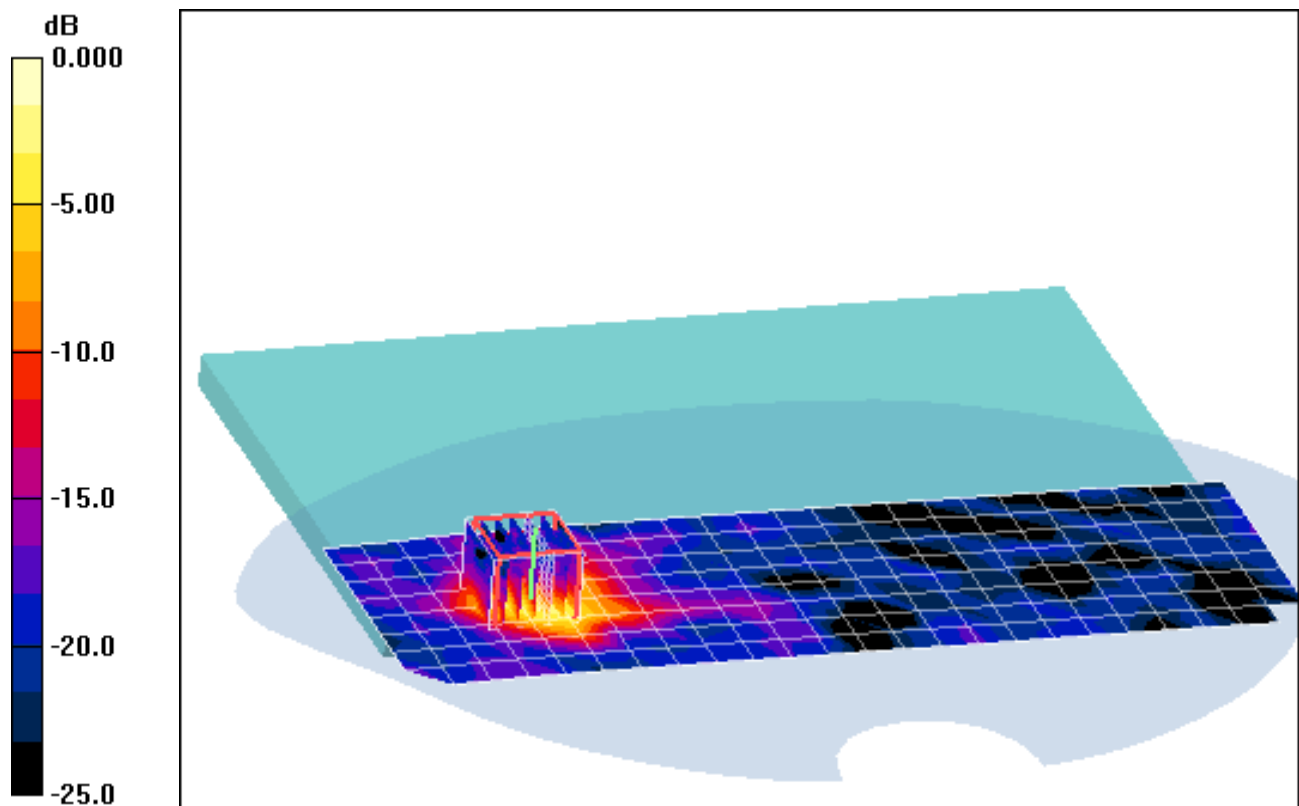
Area Scan (9x25x1): Measurement grid: dx=10mm, dy=10mm

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

Reference Value = 12.0 V/m

Peak SAR (extrapolated) = 3.02 W/kg

SAR(1 g) = 0.609 mW/g; SAR(10 g) = 0.205 mW/g



0 dB = 1.43mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300; Type: Portable Tablet Computer; Serial: C4F123F08582A4E

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5300 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):

$$f = 5300 \text{ MHz}; \sigma = 5.59 \text{ mho/m}; \epsilon_r = 48.1; \rho = 1000 \text{ kg/m}^3$$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-12-2011; Ambient Temp: 24.3C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN3550; ConvF(3.31, 3.31, 3.31); Calibrated: 2/14/2011

Sensor-Surface: 2mm (Mechanical Surface Detection)

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

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

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

Mode: IEEE 802.11a 5.3 GHz, Ch 60, 6 Mbps, Back Side

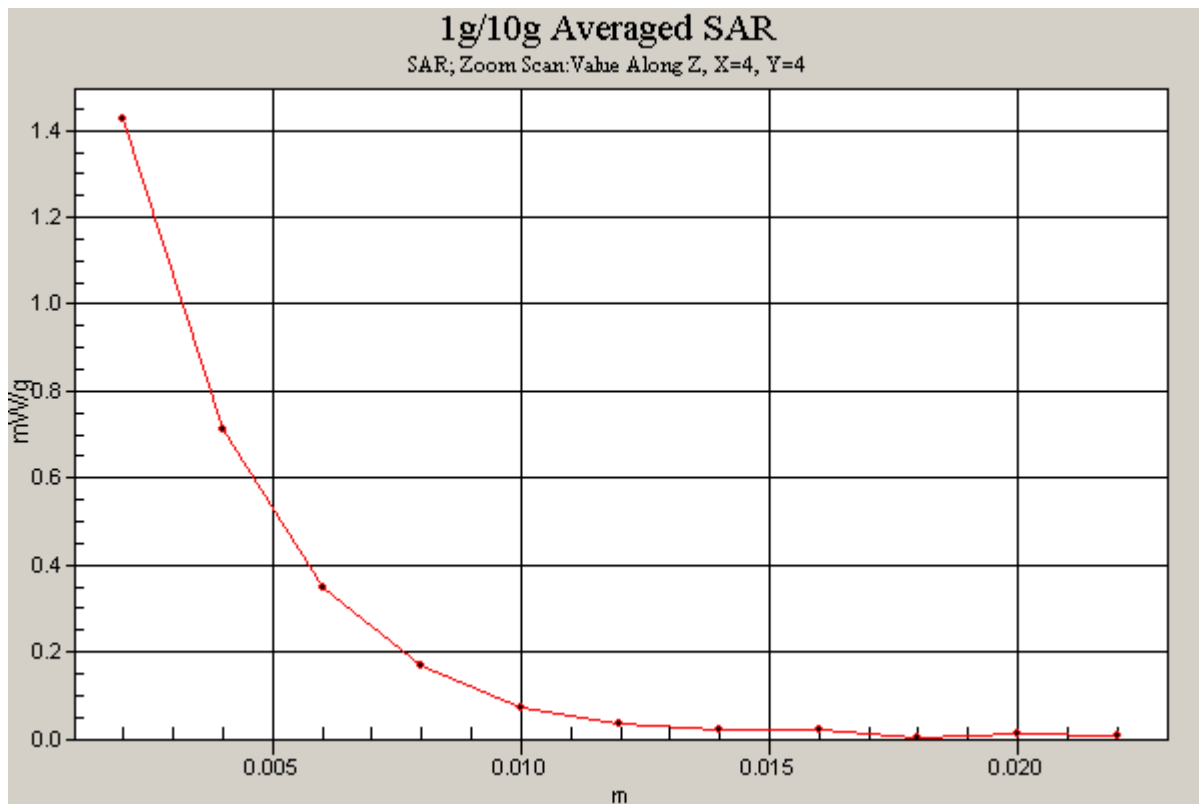
Area Scan (9x25x1): Measurement grid: dx=10mm, dy=10mm

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

Reference Value = 12.0 V/m

Peak SAR (extrapolated) = 3.02 W/kg

SAR(1 g) = 0.609 mW/g; SAR(10 g) = 0.205 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300; Type: Portable Tablet Computer; Serial: C4F123F08582A4E

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5300 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):

$f = 5300 \text{ MHz}$; $\sigma = 5.59 \text{ mho/m}$; $\epsilon_r = 48.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-12-2011; Ambient Temp: 24.3C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN3550; ConvF(3.31, 3.31, 3.31); Calibrated: 2/14/2011

Sensor-Surface: 2mm (Mechanical Surface Detection)

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

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

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

Mode: IEEE 802.11a 5.3 GHz, Ch 60, 6 Mbps, Top Edge

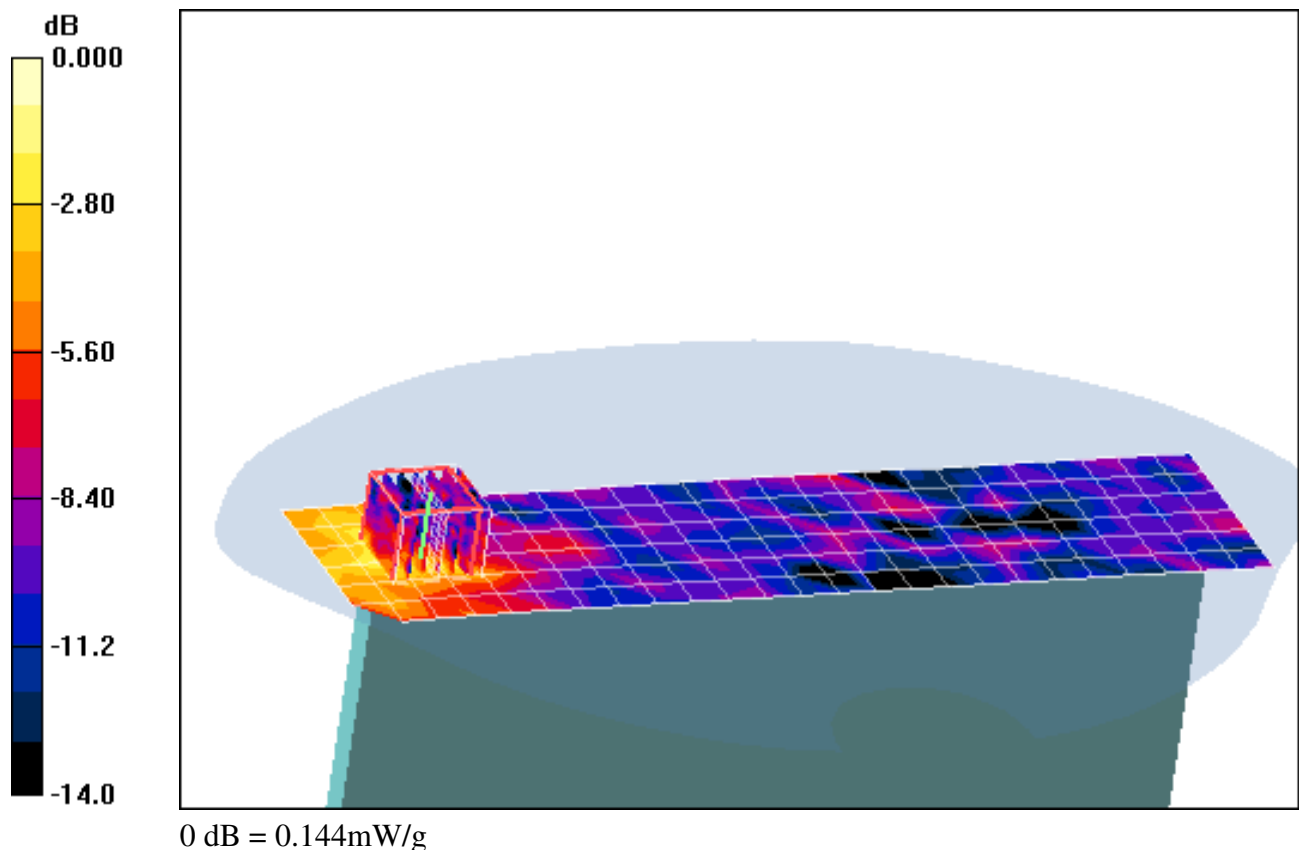
Area Scan (7x26x1): Measurement grid: dx=10mm, dy=10mm

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

Reference Value = 4.35 V/m

Peak SAR (extrapolated) = 0.238 W/kg

SAR(1 g) = 0.075 mW/g; SAR(10 g) = 0.035 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LGTP7300B; Type: Portable Tablet Computer; Serial: C4F123F08582A4E

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5300 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used (interpolated):

$f = 5300 \text{ MHz}$; $\sigma = 5.59 \text{ mho/m}$; $\epsilon_r = 48.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-12-2011; Ambient Temp: 24.3°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN3550; ConvF(3.31, 3.31, 3.31); Calibrated: 2/14/2011

Sensor-Surface: 2mm (Mechanical Surface Detection)

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

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

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

Mode: IEEE 802.11a 5.3 GHz, Ch 60, 6 Mbps, Left Edge

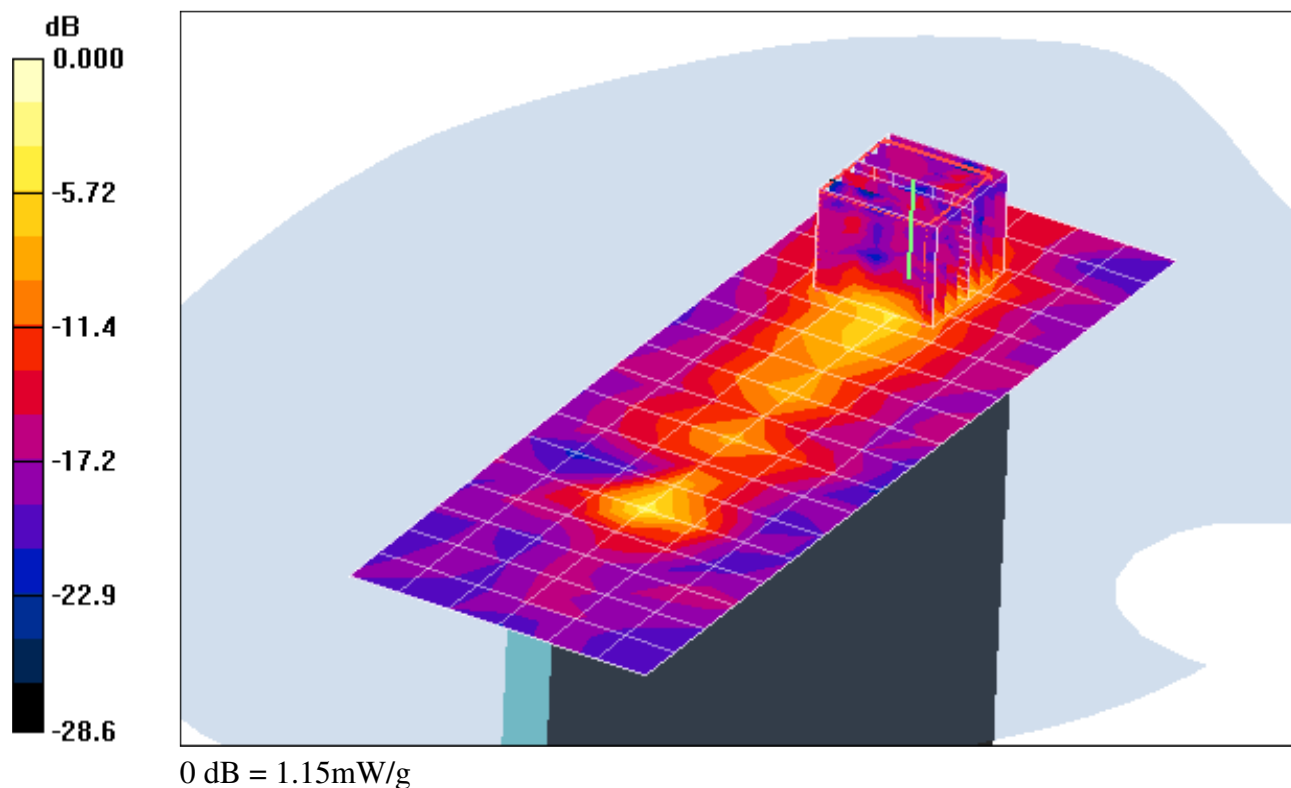
Area Scan (7x19x1): Measurement grid: dx=10mm, dy=10mm

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

Reference Value = 12.9 V/m

Peak SAR (extrapolated) = 2.69 W/kg

SAR(1 g) = 0.514 mW/g; SAR(10 g) = 0.123 mW/g



APPENDIX B: DIPOLE VALIDATION

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:

$f = 835 \text{ MHz}$; $\sigma = 0.927 \text{ mho/m}$; $\epsilon_r = 53$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 08-10-2011; Ambient Temp: 24.3 °C; Tissue Temp: 22.7 °C

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

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

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

835MHz System Verification

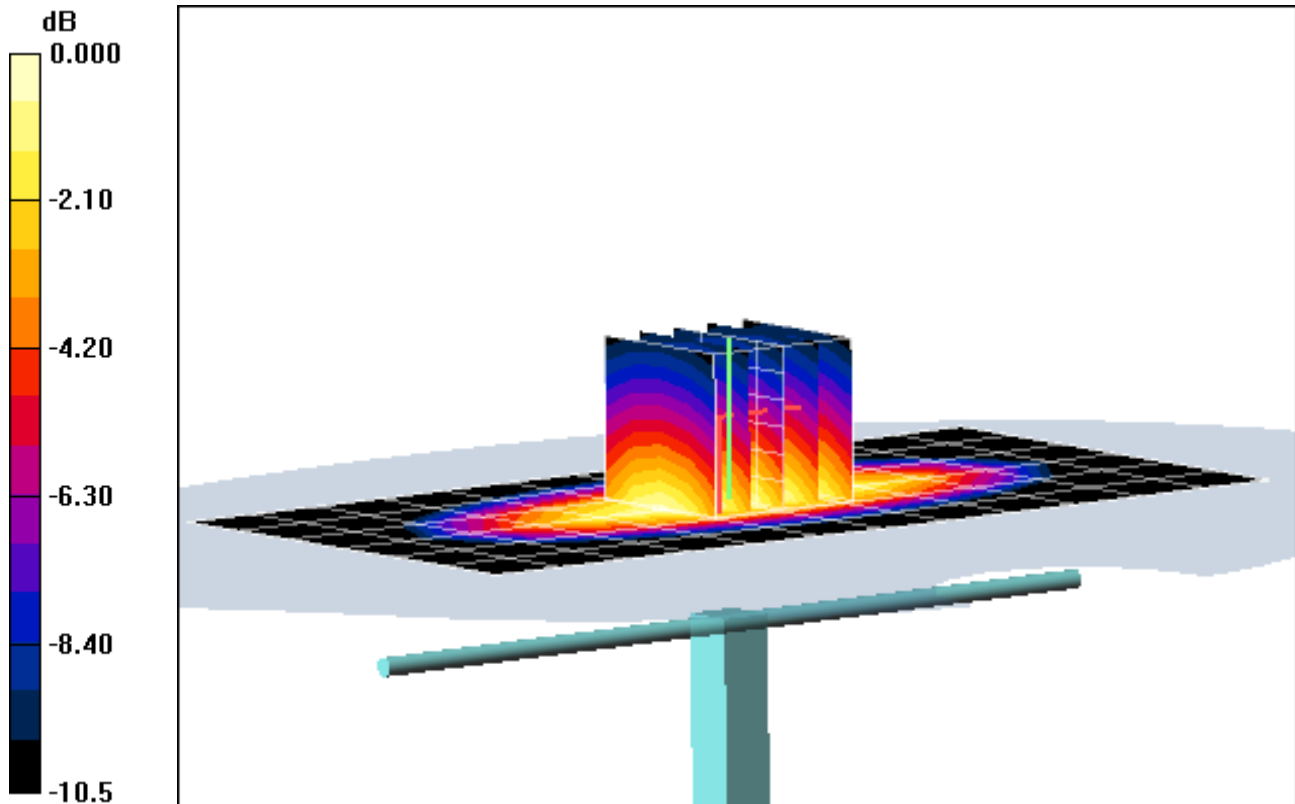
Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Input Power = 24 dBm (250 mW)

SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.59 mW/g

Deviation = -1.32 %



0 dB = 2.63mW/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):

$f = 1900 \text{ MHz}$; $\sigma = 1.51 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space 1.0

Test Date: 08-10-2011; Ambient Temp: 23.1 °C; Tissue Temp: 22.2 °C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/17/2011

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

1900MHz System Verification

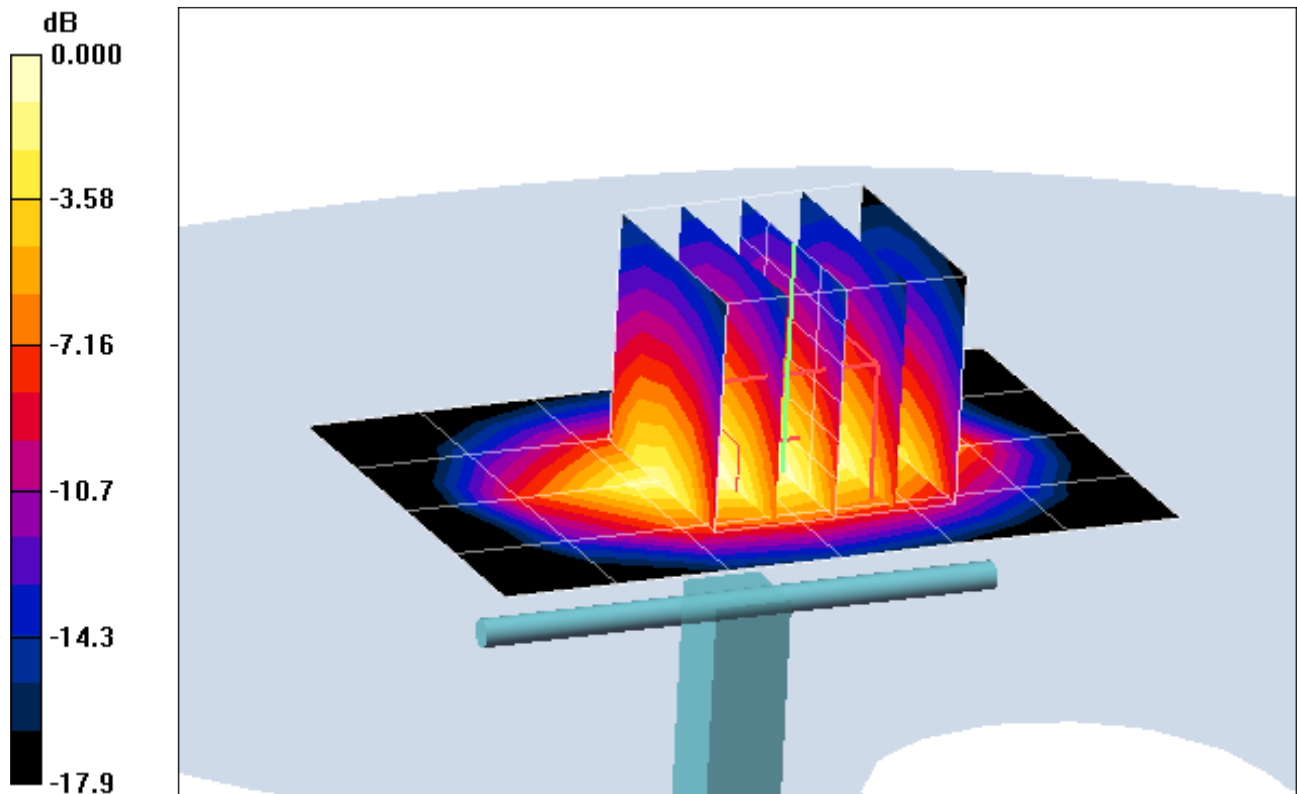
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm

SAR(1 g) = 4.28 mW/g; SAR(10 g) = 2.21 mW/g

Deviation = 4.14%



0 dB = 4.76mW/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):

$f = 1900 \text{ MHz}$; $\sigma = 1.496 \text{ mho/m}$; $\epsilon_r = 51.15$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-16-2011; Ambient Temp: 23.3°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3209; ConvF(4.48, 4.48, 4.48); Calibrated: 4/18/2011

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn704; Calibrated: 3/17/2011

Phantom: SAM with CRP; Type: SAM; Serial: TP1375

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

1900MHz System Verification

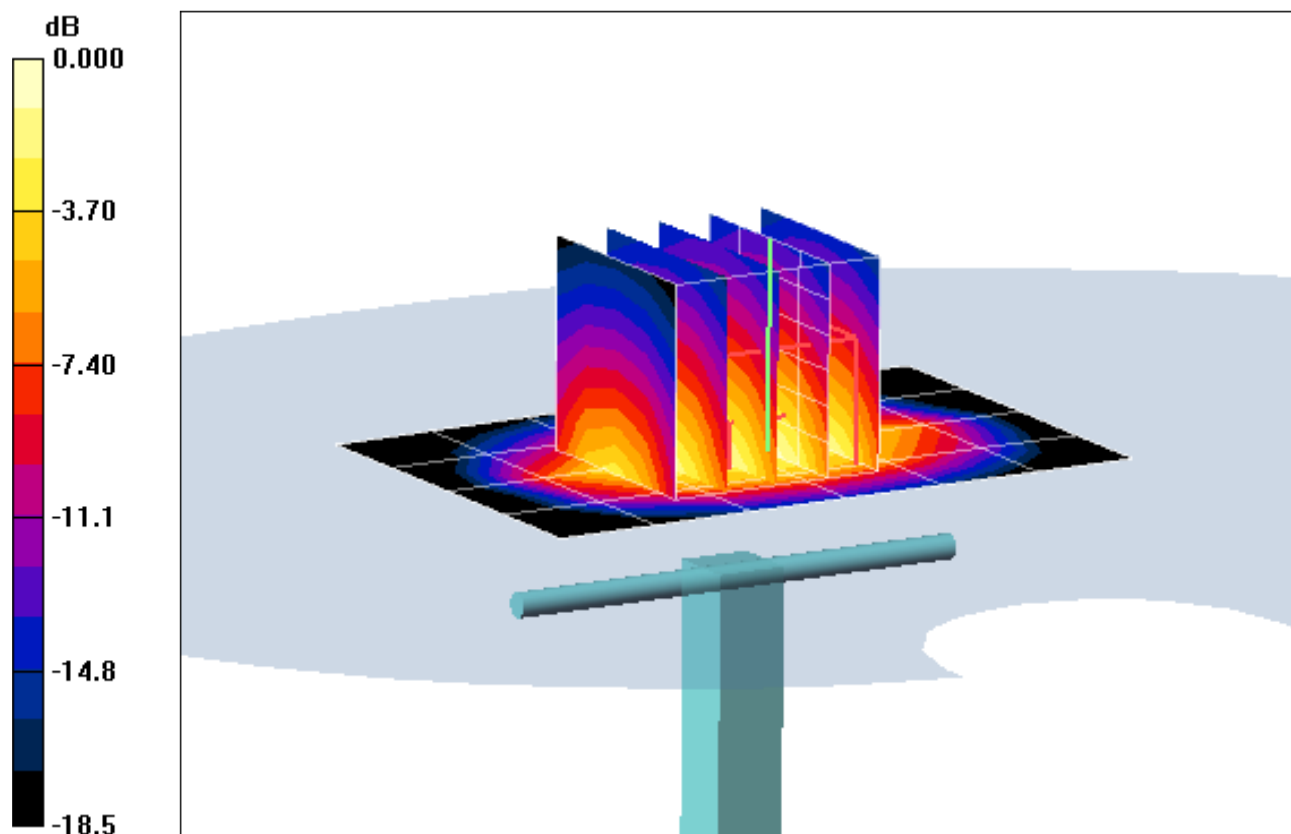
Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

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

Input power = 20 dBm (100 mW)

SAR(1 g) = 4.45 mW/g; SAR(10 g) = 2.31 mW/g

Deviation = 8.27%



0 dB = 4.89mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Body Medium parameters used (interpolated):

$f = 5200 \text{ MHz}$; $\sigma = 5.45 \text{ mho/m}$; $\epsilon_r = 48.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-12-2011; Ambient Temp: 24.3° C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN3550; ConvF(3.58, 3.58, 3.58); Calibrated: 2/14/2011

Sensor-Surface: 2mm (Mechanical Surface Detection)

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

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

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

5200MHz System Verification

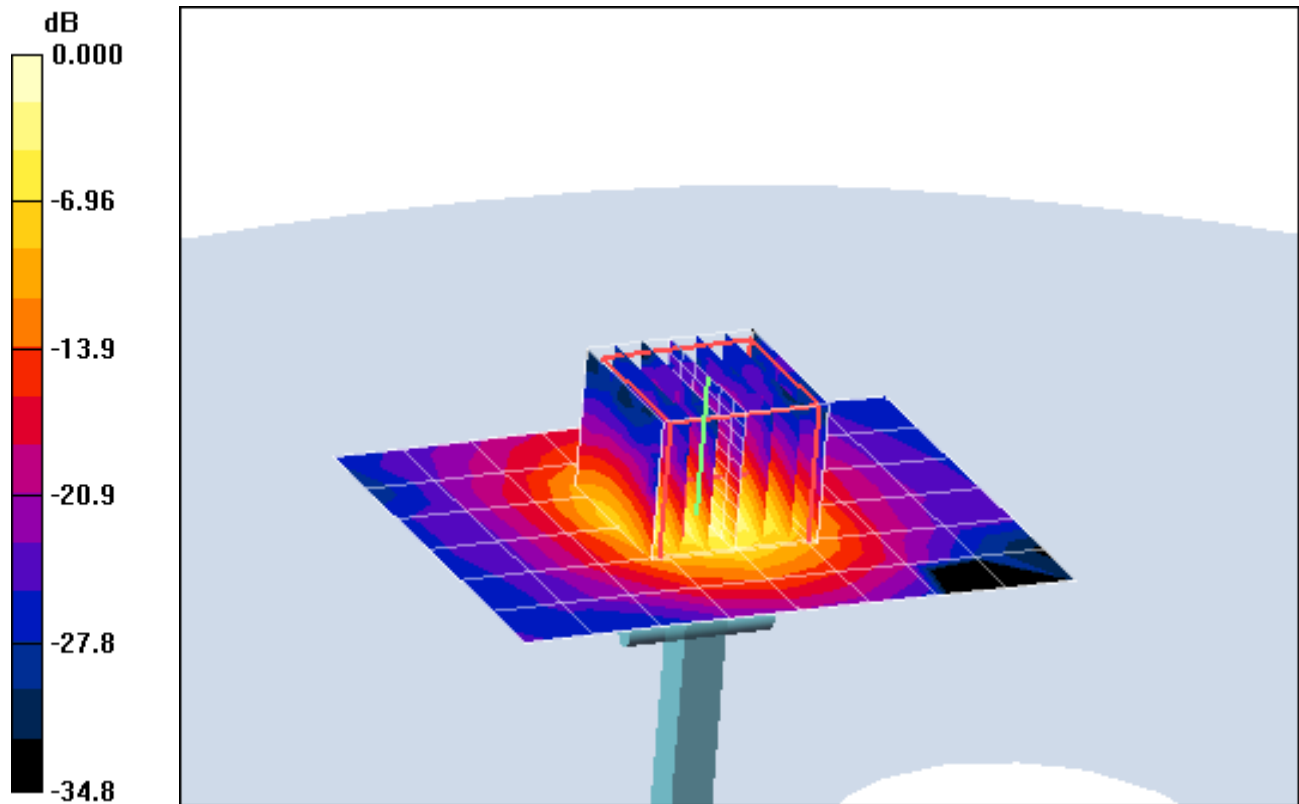
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

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

Input Power = 14.0 dBm (25 mW)

SAR(1 g) = 1.99 mW/g; SAR(10 g) = 0.554 mW/g

Deviation = 2.45 %



0 dB = 4.30mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Body Medium parameters used (interpolated):

$f = 5500 \text{ MHz}$; $\sigma = 5.9 \text{ mho/m}$; $\epsilon_r = 47.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-12-2011; Ambient Temp: 24.5° C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN3550; ConvF(3.21, 3.21, 3.21); Calibrated: 2/14/2011

Sensor-Surface: 2mm (Mechanical Surface Detection)

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

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

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

5500MHz System Verification

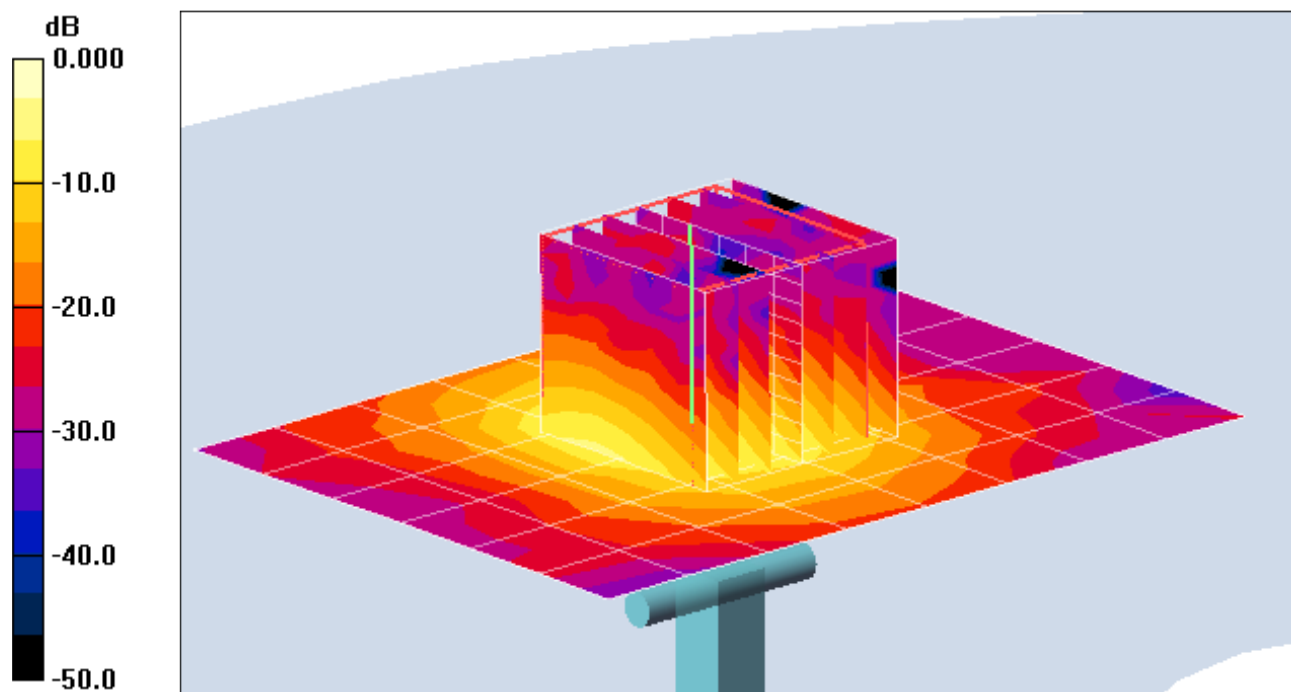
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

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

Input Power = 14.0 dBm (25 mW)

SAR(1 g) = 2.1 mW/g; SAR(10 g) = 0.560 mW/g

Deviation = -0.47 %



0 dB = 4.26mW/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 (interpolated):

$f = 5800 \text{ MHz}$; $\sigma = 6.28 \text{ mho/m}$; $\epsilon_r = 47.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-12-2011; Ambient Temp: 24.4° C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN3550; ConvF(3.29, 3.29, 3.29); Calibrated: 2/14/2011

Sensor-Surface: 2mm (Mechanical Surface Detection)

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

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

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

5800MHz System Verification

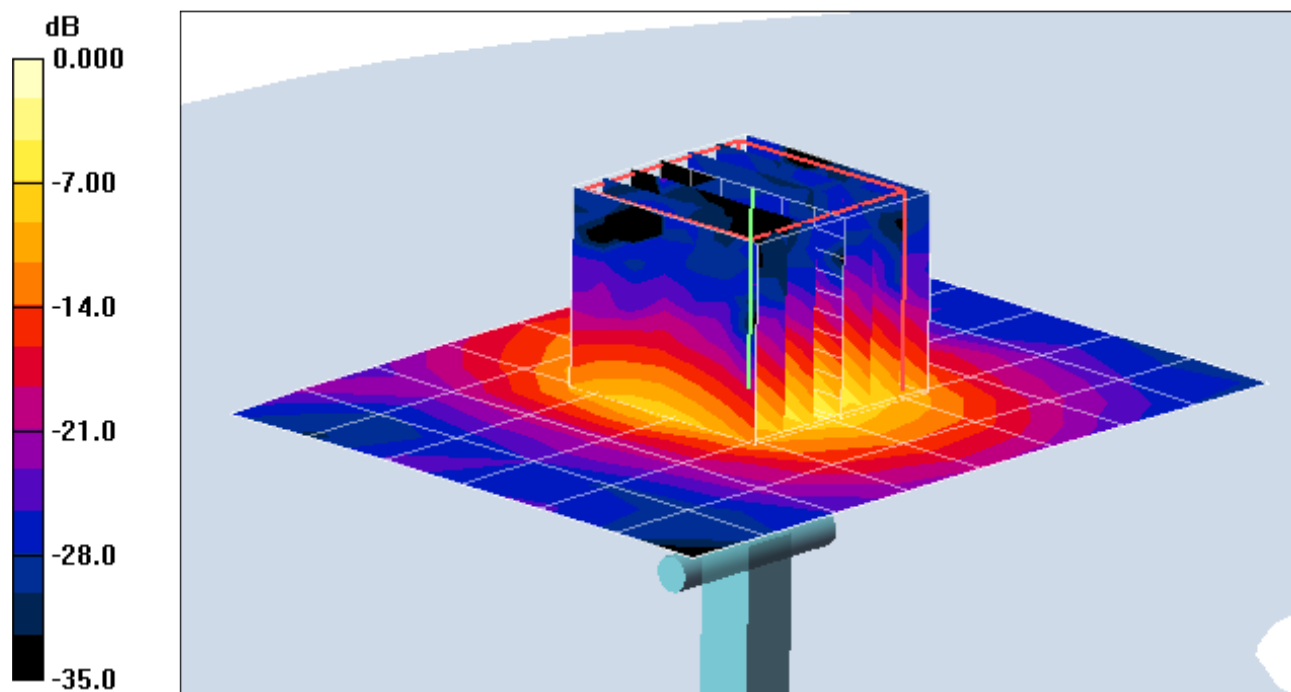
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

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

Input Power = 14 dBm (25 mW)

SAR(1 g) = 1.93 mW/g; SAR(10 g) = 0.530 mW/g

Deviation = 2.93 %



0 dB = 4.09mW/g