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SAR EVALUATION REPORT

Applicant Name:
LG Electronics MobileComm U.S.A., Inc.
1000 Sylvan Avenue,
Englewood Cliffs, NJ 07632
USA

Date of Testing:
06/04/12 - 06/12/12
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
0Y1206040774-R1.ZNF

FCC ID: **ZNFP870**

APPLICANT: **LG ELECTRONICS MOBILECOMM U.S.A., INC.**

DUT Type: Portable Handset
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model(s): LG-P870, LGP870, P870

Band & Mode	Tx Frequency	Conducted Power [dBm]	SAR		
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)
GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	32.75	0.29	0.77	0.77
WCDMA/HSPA 850	826.40 - 846.60 MHz	23.42	0.32	0.64	0.64
GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	29.90	0.22	0.36	0.36
WCDMA/HSPA 1900	1852.4 - 1907.6 MHz	23.34	0.44	0.64	0.64
LTE Band 17	706.5 - 713.5 MHz	24.19	0.30	0.58	0.58
LTE Band 4 (AWS)	1712.5 - 1752.5 MHz	23.54	0.56	0.36	0.36
2.4 GHz WLAN	2412 - 2462 MHz	14.72	0.74	0.34	0.34
Bluetooth	2402 - 2480 MHz	11.63	N/A		
Simultaneous SAR per KDB 690783 D01:			1.29	0.99	1.11

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

This 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.

Note: This revised Test Report (S/N: 0Y1206040774-R1.ZNF) 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 (S/N: 0Y1206040774.ZNF) and dispose of it accordingly.

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

Randy Ortanez
President

ACCREDITED
TESTING LABORATORY
CERTIFICATE #2041.01

T A B L E   O F   C O N T E N T S

1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Tx Frequency
GSM/GPRS/EDGE 850	824.20 - 848.80 MHz
WCDMA/HSPA 850	826.40 - 846.60 MHz
GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz
WCDMA/HSPA 1900	1852.4 - 1907.6 MHz
LTE Band 17	706.5 - 713.5 MHz
LTE Band 4 (AWS)	1712.5 - 1752.5 MHz
2.4 GHz WLAN	2412 - 2462 MHz
Bluetooth	2402 - 2480 MHz
NFC - FCC Rule Part 15C	13.56 MHz

1.2 Near Field Communications (NFC) Antenna

This DUT has NFC operations. The NFC antenna is integrated into the standard battery cover and will be the only battery cover available from the manufacturer for this model. Therefore all SAR tests were performed with the standard battery cover which already integrates the NFC antenna.

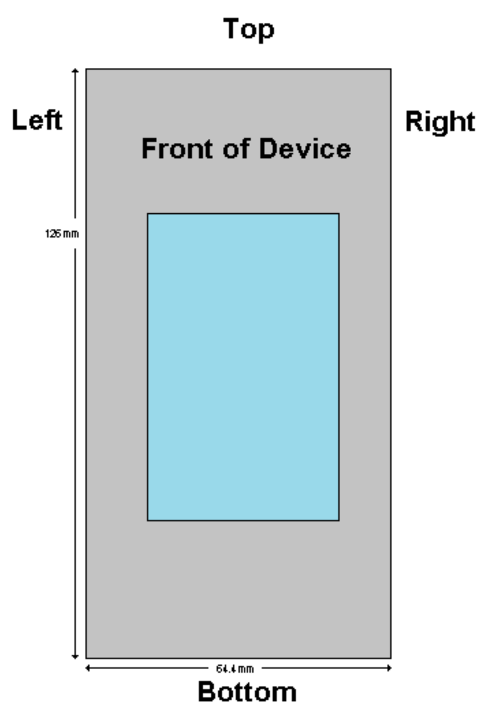
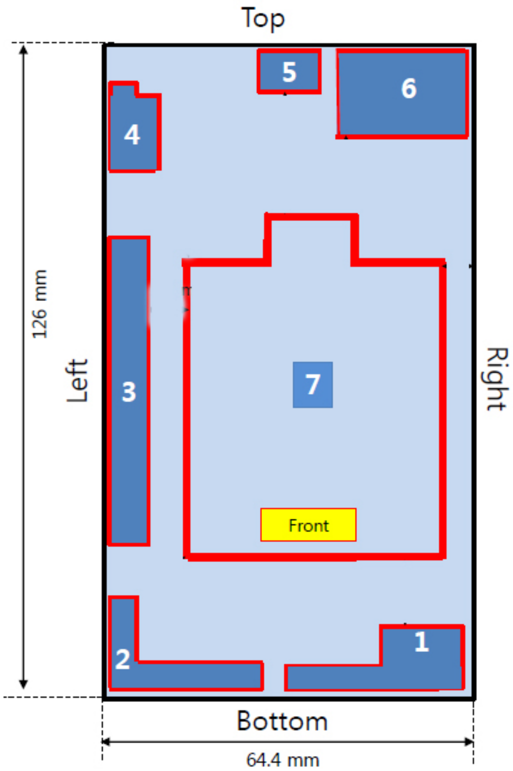


Figure 1-1
NFC Antenna Locations

1.3 DUT Antenna Locations



Antenna	Mode	Band
①	GSM	G850 Tx, Rx
	GSM	EGSM Tx, Rx
	(Non-US) GSM	GSM1800 Tx, Rx
	GSM	GSM1900 Tx, Rx
	(Non-US)WCDMA	WCDMA Band 1 Tx, Rx
	WCDMA	WCDMA Band 2 Tx, Rx
	WCDMA	WCDMA Band 5 Tx, Rx
	LTE	LTE Band 4 Tx, Rx
②	LTE	B17 Tx, Rx
③	LTE	B17 2nd Rx
④	WCDMA	WCDMA Band 2 2nd Rx
	LTE	B4 2nd Rx
⑤	Bluetooth	2.4GHz
	Wi-Fi	2.4GHz
⑥	WCDMA	WCDMA Band 5 2nd Rx
	GPS	1575.42MHz
⑦	NFC Antenna	

Figure 1-2
DUT Antenna Locations

Table 1-1
Mobile Hotspot Sides for SAR Testing

Mobile Hotspot Sides for SAR Testing						
Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850	Yes	Yes	No	Yes	Yes	No
WCDMA 850	Yes	Yes	No	Yes	Yes	No
GPRS 1900	Yes	Yes	No	Yes	Yes	No
WCDMA 1900	Yes	Yes	No	Yes	Yes	No
LTE Band 17	Yes	Yes	No	Yes	No	Yes
LTE Band 4 (AWS)	Yes	Yes	No	Yes	Yes	No
2.4 GHz WLAN	Yes	Yes	Yes	No	Yes	Yes

Note: Particular DUT edges were not required to be evaluated for Wireless Router SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06 guidance, page 2. The antenna document shows the distances between the transmit antennas and the edges of the device.

1.4 Simultaneous Transmission Capabilities

According to KDB 648474, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 1-3 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

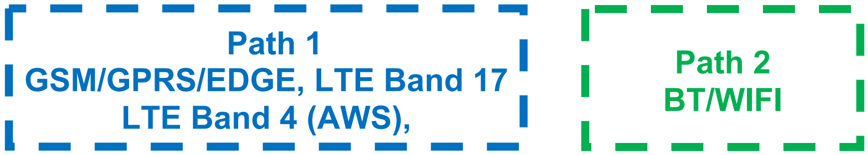


Figure 1-3
Simultaneous Transmission Paths

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to KDB 447498 3) procedures.

Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configurations	Head	Body-Worn Accessory	Hot Spot	Note
		IEEE 1528, Supp C	Supp C	FCC KDB 941225 D06 edges/sides	
1	GSM 850/1900 MHz Voice + WiFi 2.4GHz	Yes	10mm	No	-
2	WCDMA 850/1900 MHz Voice + WiFi 2.4GHz	Yes	10mm	No	-
3	GPRS/EDGE 850/1900 MHz Data + WIFI 2.4 GHz	No	-	Yes	-
4	WCDMA/HSPA 850/1900 MHz Data + WIFI 2.4 GHz	Yes**	10mm**	Yes**	-
5	LTE Band 4/17 LTE Data + WIFI 2.4 GHz	Yes*	10mm*	Yes	-
6	GSM 850/1900 MHz Voice + LTE Band 4/17 Data	No	-	No	-
7	WCDMA 850/1900 MHz Voice + LTE Band 4/17 Data	No	-	No	-
8	GPRS/EDGE 850/1900 MHz Data + LTE Band 4/17 Data	No	-	No	-
9	WCDMA/HSPA 850/1900 MHz Data + LTE Band 4/17 Data	No	-	No	-
10	GSM 850/1900 MHz Voice + WiFi 2.4GHz + LTE Band 4/17 Data	No	-	No	-
11	WCDMA 850/1900 MHz Voice + WiFi 2.4GHz + LTE Band 4/17 Data	No	-	No	-
12	GPRS/EDGE 850/1900 MHz Data + WIFI 2.4 GHz + LTE Band 4/17 Data	No	-	No	-
13	WCDMA/HSPA 850/1900 MHz Data + WIFI 2.4 GHz + LTE Band 4/17 Data	No	-	No	-

Note: The 850/1900 GSM/GPRS/EDGE/WCDMA/HSPA and LTE Band 4 antenna and the LTE Band 17 antenna share a switch and cannot transmit simultaneously.

(*) = For VOIP 3rd party applications possibly installed and used by end-user
(**) = When the user utilizes multiple services in WCDMA 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the WCDMA+WLAN scenario also represents the WCDMA Voice/DATA + WLAN Hotspot scenario.

1.5 SAR Test Exclusions Applied

(A) WIFI/BT

The separation between the GSM/GPRS/EDGE/WCDMA/LTE B4 antenna and the Bluetooth and WLAN antennas is 100 mm. The separation between the LTE B17 antenna and the Bluetooth and WLAN antennas is 98 mm. RF Conducted Power of Bluetooth Tx is 14.555 mW. (Please refer to the EMC DSS Report for a full set of Bluetooth conducted powers)

2.4 GHz WIFI and Bluetooth share the same antenna path and cannot transmit simultaneously. Per KDB Publication 648474, **Bluetooth SAR was not required** based on the maximum conducted power, the Bluetooth/WLAN to main antenna separation distance and Body-SAR of the main antenna.

(B) Licensed Transmitter(s)

This model does not support Simultaneous Voice and Data for the licensed transmitter in any modes except in WCDMA that allows Multi-RAB transmissions that share voice and data operations on a single physical channel.

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

Simultaneous Voice and LTE data ("SVLTE") cannot transmit simultaneously since they utilize the same transmission path as illustrated in **Figure 1-3**.

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

When the user utilizes multiple services in WCDMA 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the WCDMA+WLAN scenario also represents the WCDMA Voice/DATA + WLAN Hotspot scenario.

LTE SAR for the lower BWs was not tested since the maximum average output power of all channels and configurations was not more than 0.5 dB higher than the highest bandwidth; and LTE SAR for the highest BW was less than 1.45 W/kg for all configurations according to FCC KDB 941225 D05.

1.6 Power Reduction for SAR

There is no power reduction for any band/mode implemented in this device for SAR purposes.

1.7 Guidance Applied

- FCC OET Bulletin 65 Supplement C [June 2001]
- IEEE 1528-2003
- FCC KDB 941225 (2G/3G/4G and Hotspot)
- FCC KDB 248227 (802.11)
- FCC KDB 648474 (Simultaneous)

1.8 Samples Used for SAR Testing

Several samples with identical hardware were used to facilitate SAR testing only.

Table 1-3
SAR Test Sample Serial Numbers

Band	LTE Band 17	LTE Band 4	GSM/GPRS/EDGE and WCDMA	2.4 GHz WLAN
Serial Number	2	3	11	15

LTE Checklist according to KDB 941225

Based on *3GPP/LTE Permit-But-Ask and SAR Guidance*

#	Description	Parameter
1	Identify the operating frequency range of each LTE transmission band used by the device	Band17 : 706.5 to 713.5 MHz Band4 : 1712.5 to 1752.5 MHz
2	Identify the channel bandwidths used in each frequency band; 1.4, 3, 5, 10, 15, 20 MHz etc	Band17 : 5MHz , 10MHz Band4 : 5MHz, 10MHz
3	Identify the high, middle and low (H, M, L) channel numbers and frequencies in each LTE frequency band	LTE Band 4 1) Low channel - Bandwidth: 5MHz Ch No.: 19975 Frequency: 1712.5MHz - Bandwidth: 10MHz Ch No.: 20000 Frequency: 1715.0MHz 2) Middle channel - Bandwidth: 5MHz Ch No.: 20175 Frequency: 1732.5MHz - Bandwidth: 10MHz Ch No.: 20175 Frequency: 1732.5MHz 3) High channel - Bandwidth: 5MHz Ch No.: 20375 Frequency: 1752.5MHz - Bandwidth: 10MHz Ch No.: 20350 Frequency: 1750.0MHz LTE Band17 1) Low channel - Bandwidth: 5MHz Ch No.: 23755 Frequency: 706.5MHz - Bandwidth: 10MHz Ch No.: 23780 Frequency: 709.0MHz 2) Middle channel - Bandwidth: 5MHz Ch No.: 23790 Frequency: 710MHz - Bandwidth: 10MHz Ch No.: 23790 Frequency: 710MHz 3) High channel - Bandwidth: 5MHz Ch No.: 23825 Frequency: 713.5MHz - Bandwidth: 10MHz Ch No.: 23800 Frequency: 711.0MHz
4	Specify the UE category and uplink modulations used	UE Category: 3 Uplink modulation: QPSK, 16QAM
5	Descriptions of the LTE transmitter and antenna implementation & identify whether it is a standalone transmitter operating independently of other wireless transmitters in the device or sharing hardware components and/or antenna(s) with other transmitters etc	This model(P870) has the same HW and transmission path for GSM/WCDMA/LTE.
6	Identify the LTE voice/data requirements in each operating mode and exposure condition with respect to head and body test configurations,	* Exposure conditions 1) Body SAR is required because LTE hotspot is supported. - Hotspot SAR: Front/Back/Right Edge/Left Edge/Bottom Edge/Top Edge is required

	antenna locations, handset flip-cover or slide positions, antenna diversity conditions etc	* For details, please refer to the antenna document. 2) Head SAR is required because LTE VOIP application is supported
7	Identify if Maximum Power Reduction (MPR) is optional or mandatory, i.e. built-in by design: a) only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards b) A-MPR (additional MPR) must be disabled	MPR is mandatory. * Target MPR(5/10 MHz) - QPSK 1RB 0offset: 0dB, QPSK 1RB 49offset: 0dB :BW 10MHz - QPSK 1RB 0offset: 0dB, QPSK 1RB 24offset: 0dB :BW 5MHz - 16QAM 1RB 0offset: 1dB, 16QAM 1RB 49offset: 1dB :BW 10MHz - 16QAM 1RB 0offset: 1dB, 16QAM 1RB 24offset: 1dB :BW 5MHz - QPSK 25RB 12offset: 1dB, 16QAM 25RB 12offset: 2dB :BW 10MHz - QPSK 12RB 6offset: 1dB, 16QAM 12RB 6offset: 2dB :BW 5MHz - QPSK 50RB 0offset: 1dB, 16QAM 50RB 0offset: 2dB :BW 10MHz - QPSK 25RB 0offset: 1dB, 16QAM 25RB 0offset: 2dB :BW 5MHz A-MPR is always disabled during the SAR testing.
8	Include the maximum average conducted output power measured on the required test channels for each channel bandwidth and UL modulation used in each frequency band: a) with 1 RB allocated at the upper edge of a channel b) with 1 RB allocated at the lower edge of a channel c) using 50% RB allocation centered within a channel d) using 100% RB allocation	Please see the conducted power table in Section 10.3.
9	Identify all other U.S. wireless operating modes (3G, Wi-Fi, WiMax, Bluetooth etc), device/exposure configurations (head and body, antenna and handset flip-cover or slide positions, antenna diversity conditions etc.) and frequency bands used for these modes	* Supported band & Exposure conditions See Page 1
10	Include the maximum average conducted output power measured for the other wireless modes and frequency bands	Please find the conducted power table in Section 10.
11	Identify the simultaneous transmission conditions for the voice and data configurations supported by all wireless modes, device configurations and frequency bands, for the head and body exposure conditions and device operating configurations (handset flip or cover positions, antenna diversity conditions etc.)	* Simultaneous transmission conditions See Table 1-2.
12	When power reduction is applied to certain wireless modes to satisfy SAR compliance for simultaneous transmission conditions, other equipment certification or operating requirements, include the maximum average conducted output power	No power reduction applied

	measured in each power reduction mode applicable to the simultaneous voice/data transmission configurations for such wireless configurations and frequency bands; and also include details of the power reduction implementation and measurement setup	
13	Include descriptions of the test equipment, test software, built-in test firmware etc. required to support testing the device when power reduction is applied to one or more transmitters/antennas for simultaneous voice/data transmission	No power reduction applied
14	When appropriate, include a SAR test plan proposal with respect to the above	No power reduction applied
15	If applicable, include preliminary SAR test data and/or supporting information in laboratory testing inquiries to address specific issues and concerns or for requesting further test reduction considerations appropriate for the device; for example, simultaneous transmission configurations	No power reduction applied

3 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.

3.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 3-1).

Equation 3-1
SAR Mathematical Equation

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

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

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

where:

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

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

4 SAR MEASUREMENT SETUP

4.1 Automated SAR Measurement System

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

Figure 4-1
SAR Measurement System

Figure 4-2
Near-Field Probe

Table 4-1
Composition of the Tissue Equivalent Matter

Frequency (MHz)	835	835	1750	1750	1900	1900	2450	2450
Tissue	Head	Body	Head	Body	Head	Body	Head	Body
Ingredients (% by weight)								
Bactericide	0.1	0.1						
DGBE			47	31	44.92	29.44	7.99	26.7
HEC	1	1						
NaCl	1.45	0.94	0.4	0.2	0.18	0.39	0.16	0.1
Sucrose	57	44.9						
Triton X-100							19.97	
Water	40.45	53.06	52.6	68.8	54.9	70.17	71.88	73.2

See next page for 750 MHz Tissue Composition

Table 4-2
Composition of 750 MHz Head and Body Tissue Equivalent Matter

2 Composition / Information on ingredients

The Item is composed of the following ingredients:

H_2O	Water, 35 – 58%
Sucrose	Sugar, white, refined, 40 – 60%
NaCl	Sodium Chloride, 0 – 6%
Hydroxyethyl-cellulose	Medium Viscosity (CAS# 9004-62-0), <0.3%
Preventol-D7	Preservative: aqueous preparation, (CAS# 55965-84-9), containing 5-chloro-2-methyl-3(2H)-isothiazolone and 2-methyyl-3(2H)-isothiazolone, 0.1 – 0.7% Relevant for safety; Refer to the respective Safety Data Sheet*.

Note: 750MHz liquid recipes are proprietary SPEAG. Since the composition is approximate to the actual liquids utilized, the manufacturer tissue-equivalent liquid data sheets are provided below.

Measurement Certificate / Material Test

Item Name	**Body Tissue Simulating Liquid (MSL 750)**
Product No.	SL AAM 075 AA (Charge: 110606-1)
Manufacturer	SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated OCP probe (type DAK).

Target Parameters

Target parameters as defined in the IEEE 1528 and IEC 62209 compliance standards.

Test Condition

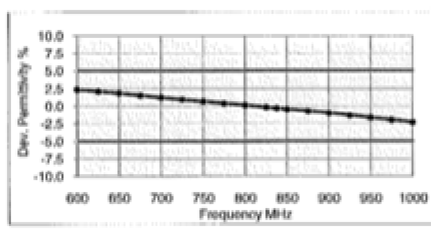
Ambient Condition	22°C ; 30% humidity
TSL Temperature	22°C
Test Date	8-Jun-11

Additional Information

TSL Density	1.212 g/cm^3
TSL Heat-capacity	3.006 kJ/(kg*K)

Results

	Measured			Target		Diff.to Target [%]	
f [MHz]	HP-e'	HP-e"	sigma	eps	sigma	Δ-eps	Δ-sigma
600	57.4	24.88	0.83	56.1	0.95	2.4	-12.7
625	57.2	24.53	0.85	56.0	0.95	2.1	-10.6
650	57.0	24.18	0.87	55.9	0.96	1.8	-8.5
675	56.7	23.90	0.90	55.8	0.96	1.5	-6.3
700	56.4	23.61	0.92	55.7	0.96	1.2	-4.2
725	56.2	23.37	0.94	55.6	0.96	0.9	-2.0
750	**55.9**	**23.12**	**0.96**	**55.5**	**0.96**	**0.7**	**0.1**
775	55.7	22.95	0.99	55.4	0.97	0.4	2.5
800	55.4	22.78	1.01	55.3	0.97	0.1	4.8
825	55.2	22.61	1.04	55.2	0.98	-0.2	6.1
838	55.0	22.52	1.05	55.2	0.98	-0.3	6.7
850	54.9	22.44	1.06	55.2	0.99	-0.4	7.3
875	54.7	22.30	1.09	55.1	1.02	-0.7	6.5
900	54.5	22.17	1.11	55.0	1.05	-1.0	5.7
925	54.2	22.05	1.13	55.0	1.06	-1.3	6.8
950	54.0	21.94	1.16	54.9	1.08	-1.7	7.8
975	53.8	21.85	1.18	54.9	1.09	-2.0	9.0
1000	53.6	21.75	1.21	54.8	1.10	-2.3	10.2



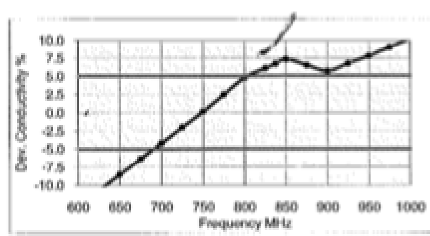


Figure 4-3
750MHz Body Tissue Equivalent Matter

Measurement Certificate / Material Test

Item Name	**Head Tissue Simulating Liquid (HSL 750)**
Product No.	SL AAH 075 (Charge: 110601-1)
Manufacturer	SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated OCP probe (type DAK).

Target Parameters

Target parameters as defined in the IEEE 1528 and IEC 62209 compliance standards.

Test Condition

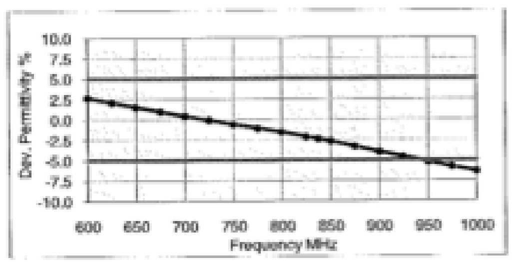
Ambient Condition	22°C ; 30% humidity
TSL Temperature	22°C
Test Date	8-Jun-11

Additional Information

TSL Density	1.284 g/cm^3
TSL Heat-capacity	2.701 kJ/(kg*K)

Results

	Measured			Target		Diff.to Target [%]	
f [MHz]	HP-e'	HP-e"	sigma	eps	sigma	Δ-eps	Δ-sigma
600	43.9	23.01	0.77	42.7	0.88	2.7	-12.9
625	43.5	22.75	0.79	42.6	0.88	2.1	-10.5
650	43.1	22.49	0.81	42.5	0.89	1.5	-8.2
675	42.7	22.26	0.84	42.3	0.89	1.0	-5.9
700	42.4	22.03	0.86	42.2	0.89	0.4	-3.5
725	42.0	21.84	0.88	42.1	0.89	-0.1	-1.2
750	**41.7**	**21.65**	**0.90**	**41.9**	**0.89**	**-0.6**	**1.1**
775	41.4	21.50	0.93	41.8	0.90	-1.1	3.5
800	41.0	21.34	0.95	41.7	0.90	-1.6	5.9
825	40.7	21.19	0.97	41.6	0.91	-2.1	7.3
838	40.5	21.12	0.98	41.5	0.91	-2.4	8.0
850	40.4	21.05	1.00	41.5	0.92	-2.7	8.6
875	40.1	20.91	1.02	41.5	0.94	-3.3	7.9
900	39.8	20.77	1.04	41.5	0.97	-4.0	7.2
925	39.6	20.66	1.06	41.5	0.98	-4.6	8.2
950	39.3	20.55	1.09	41.4	0.99	-5.2	9.2
975	39.0	20.44	1.11	41.4	1.00	-5.8	10.3
1000	38.7	20.32	1.13	41.3	1.01	-6.4	11.4



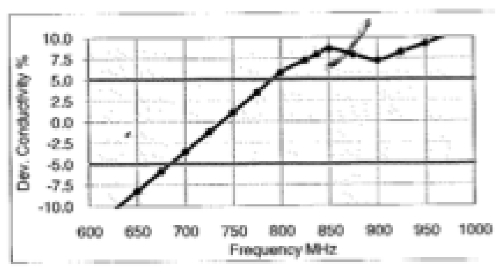


Figure 4-4
750MHz Head Tissue Equivalent Matter

5 DOSIMETRIC ASSESSMENT

5.1 Measurement Procedure

The evaluation was performed using the following procedure:

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head interface and the horizontal grid resolution was 15mm and 15mm for frequencies < 3 GHz in the x and y directions respectively. When applicable, for frequencies above 3 GHz, a 10 mm by 10 mm resolution was used.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1 gram cube evaluation. SAR at this fixed point was measured and used as a reference value.

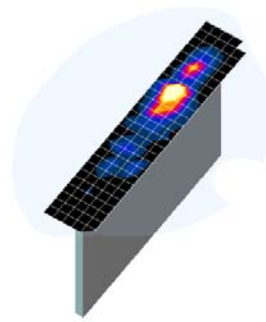


Figure 5-1
Sample SAR Area Scan

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

6 DEFINITION OF REFERENCE POINTS

6.1 EAR REFERENCE POINT

Figure 6-2 shows the front, back and side views of the SAM Twin Phantom. The point “M” is the reference point for the center of the mouth, “LE” is the left ear reference point (ERP), and “RE” is the right ERP. The ERP is 15mm posterior to the entrance to the ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 6-1. The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front) is perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (see Figure 6-2). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning [5].

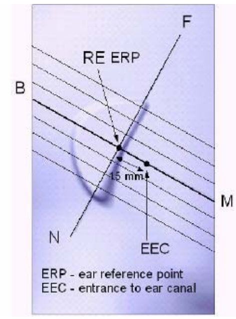


Figure 6-1
Close-Up Side view of ERP

6.2 HANDSET REFERENCE POINTS

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the “test device reference point” located along the “vertical centerline” on the front of the device aligned to the “ear reference point” (See Figure 6-3). The “test device reference point” was than located at the same level as the center of the ear reference point. The test device was positioned so that the “vertical centerline” was bisecting the front surface of the handset at it’s top and bottom edges, positioning the “ear reference point” on the outer surface of the both the left and right head phantoms on the ear reference point.

Figure 6-2
Front, back and side view of SAM Twin Phantom

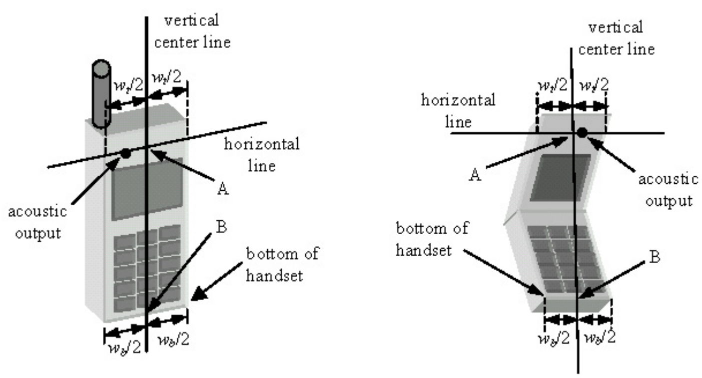


Figure 6-3
Handset Vertical Center & Horizontal Line Reference Points

7 TEST CONFIGURATION POSITIONS FOR HANDSETS

7.1 Device Holder

The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity $\varepsilon = 3$ and loss tangent $\delta = 0.02$.

7.2 Positioning for Cheek/Touch

1. The test device was positioned with the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 7-1), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom.

Figure 7-1 Front, Side and Top View of Cheek/Touch Position

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the ear.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the plane normal to MB-NF including the line MB (reference plane).
4. The phone was then rotated around the vertical centerline until the phone (horizontal line) was symmetrical was respect to the line NF.
5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, the handset was rotated about the line NF until any point on the handset made contact with a phantom point below the ear (cheek) (See Figure 7-2).

7.3 Positioning for Ear / 15º Tilt

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

1. While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15degree.
2. The phone was then rotated around the horizontal line by 15 degree.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the phone touches the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. The tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 7-2).

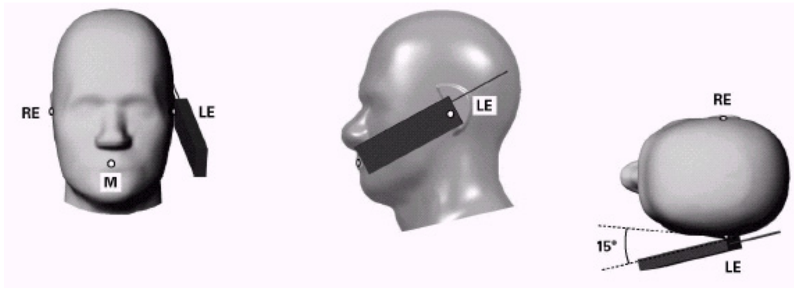


Figure 7-2 Front, Side and Top View of Ear/15º Tilt Position

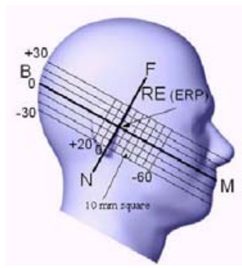


Figure 7-3
Side view w/ relevant markings

Figure 7-4 Body SAR Sample Photo
(Not Actual EUT)

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

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

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document publication 648474. The SAR required in these regions of SAM should be measured using a flat phantom. **Rectangular shaped phones** should be positioned with its bottom edge positioned from the flat phantom with the same distance provided by the cheek touching position using SAM. The ear reference point (ERP, as defined for SAM) of the phone should be positioned ½ cm from the flat phantom shell. **Clam-shell phones** should be positioned with the hinge against a smooth edge of the flat phantom where the upper half of the phone is unfolded and extended beyond the phantom side wall. The lower half of the phone is secured in the test device holder at a fixed distance below the flat phantom determined by the minimum separation along the lower edge of the phone in the cheek touching position using SAM. Any case with substantial variation in separation distance along the lower edge of a clam shell is discussed with the FCC for best-to-use methodology.

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

Figure 7-5 Twin SAM Chin20

7.5 Body-Worn Accessory Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 7-4). A device with a headset output is tested with a headset connected to the device.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

7.6 Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive internet connectivity through simultaneous transmission of WIFI in conjunction with a separate licensed transmitter. The FCC has provided guidance in KDB Publication 941225 D06 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device with antennas 2.5 cm or closer to the edge of the device, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. Therefore, SAR must be evaluated for each frequency transmission and mode separately and summed with the WIFI transmitter according to KDB 648474 publication procedures. The "Portable Hotspot" feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.

8 FCC RF EXPOSURE LIMITS

8.1 Uncontrolled Environment

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

8.2 Controlled Environment

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

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

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

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

9 FCC MEASUREMENT PROCEDURES

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

9.1 Procedures Used to Establish RF Signal for SAR

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

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

9.2 SAR Measurement Conditions for WCDMA

9.2.1 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”.

9.2.2 Head SAR Measurements for Handsets

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all “1s”. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than 0.25 dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4 kbps SRB (signaling radio bearer) using the exposure configuration that resulted in the highest SAR for that RF channel in the 12.2 kbps RMC mode.

9.2.3 Body SAR Measurements

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

9.2.4 SAR Measurements for Handsets with Rel 5 HSDPA

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

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

9.2.5 SAR Measurements for Handsets with Rel 6 HSUPA

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

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

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

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.
Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

9.3 SAR Measurement Conditions for LTE

LTE modes were tested according to FCC KDB 941225 D05 publication. Please see notes following SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 was used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing.

9.3.1 MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1. See Section 10.3 for MPR targets.

9.3.2 A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

9.3.3 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05:

a. Per Page 4, 3) A), QPSK with 50% RB is required for the highest bandwidth.
b. Per Page 4, footnote 2, when the maximum output power across high, mid., and low channels is < 0.5 dB, mid channel is tested. Low and high channel SAR tests are not required for QPSK, 50% RB allocation when the SAR is < 0.8 W/kg. When there are less than 3 channels required based on the size of the band and bandwidth of the signal, the channel with the maximum output power was tested.
c. Per Page 4, 3) B), QPSK with 1 RB for both channel edges are required for the highest bandwidth.
d. Per Page 4, footnote 6, QPSK 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation when the average output power of the 1 RB allocation was > 0.5 dB higher than the 50% RB allocation for QPSK. Otherwise, SAR tests are performed on the channel that produced the highest SAR for QPSK with 50% RB. 1 RB low and high offset configurations are considered together for a single channel selection.
e. Per Page 4, 3) B), I), when the SAR for QPSK 1 RB allocation tests is <1.45 W/kg, testing on the other channels is not required.
f. Per Page 4, 4) A), 16QAM with 50% RB is required for the highest bandwidth on the channel with the highest measured SAR for QPSK with 50% RB allocation.
g. Per Page 4, 4) A), I), when the SAR for 16 QAM, 50 % allocation tests is <1.45 W/kg, testing on the other channels is not required.
h. Per Page 4, 4) B) and Page 5 footnote 9, 16QAM with 1RB for both channel edges are required for the highest bandwidth on the highest output power channel for the 1 RB allocation when the average output power of the 1 RB allocation is >0.5 dB higher than the 50% allocation for 16 QAM. Otherwise, SAR tests are performed on the channel that produced the highest SAR for 16 QAM with 50% RB. 1 RB low and high offset configurations are considered together for a single channel selection.
i. Per Page 5, 4) B), I), when the SAR for 16 QAM 1 RB allocation tests is <1.45 W/kg, testing on the other channels is not required.
j. Per Page 4, 4), A) I) and Page 5, 4), A)I, 100% RB Allocation is not required to be tested when the SAR is not > 1.45 W/kg for the highest bandwidth.
k. Per Page 5, 5) B) I), smaller bandwidths are not required to be tested when SAR is not > 1.45 W/kg for the highest bandwidth and the maximum average output power of the smaller bandwidths across all channels and configurations is not more than 0.5 dB higher than the higher bandwidths.

9.4 SAR Testing with 802.11 Transmitters

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

9.4.1 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.

9.4.2 Frequency Channel Configurations [27]

For 2.4 GHz, the highest average RF output power channel between the low, mid and high channel at the lowest data rate was selected for SAR evaluation in 802.11b mode. 802.11g/n modes and higher data rates for 802.11b were additionally evaluated for SAR if the output power of the respective mode was 0.25 dB or higher than the powers of the SAR configurations tested in the 802.11b mode.

If the maximum extrapolated peak SAR of the zoom scan for the highest output channel was less than 1.6 W/kg or if the 1g averaged SAR was less than 0.8 W/kg, SAR testing was not required for the other test channels in the band.

10 RF CONDUCTED POWERS

10.1 GSM Conducted Powers

		Maximum Burst-Averaged Output Power				
		Voice	GPRS/EDGE Data (GMSK)		EDGE Data (8-PSK)	
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot
Cellular	128	32.80	32.82	**31.18**	26.65	25.69
	190	32.75	32.78	**31.10**	26.57	25.61
	251	32.65	32.66	**31.02**	26.44	25.52
PCS	512	30.00	30.05	**28.00**	25.40	23.69
	661	29.90	29.93	**27.91**	25.23	23.61
	810	29.85	29.90	**28.00**	25.15	23.56
		Calculated Maximum Frame-Averaged Output Power				
		Voice	GPRS/EDGE Data (GMSK)		EDGE Data (8-PSK)	
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot
Cellular	128	23.77	23.79	**25.16**	17.62	19.67
	190	23.72	23.75	**25.08**	17.54	19.59
	251	23.62	23.63	**25.00**	17.41	19.50
PCS	512	20.97	21.02	**21.98**	16.37	17.67
	661	20.87	20.90	**21.89**	16.20	17.59
	810	20.82	20.87	**21.98**	16.12	17.54

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 modes were selected according to the highest frame-averaged output power table according to KDB 941225 D03.

CS1 coding scheme was used in GPRS output power measurements and SAR Testing, as a condition where GMSK modulation was ensured. Investigation has shown that CS1 - CS4 settings do not have any impact on the output levels in the GPRS modes.

MCS7 coding scheme was used to measure the output powers for EDGE since investigation has shown that choosing MCS7 coding scheme will ensure 8-PSK modulation and that MCS levels that produce 8-PSK modulation do not have any impact on the output power levels.

GSM Class: B
GPRS Multislot class: 10 (max 2 Tx Uplink slots)
EDGE Multislot class: 10 (max 2 Tx Uplink slots)
DTM Multislot Class: N/A

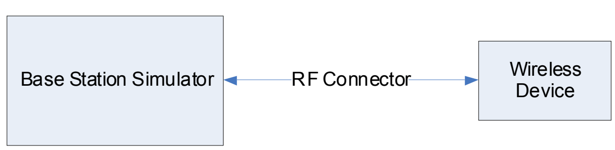


Figure 10-1
Power Measurement Setup

10.2 HSPA Conducted Powers

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			PCS Band [dBm]			MPR [dB]
			4132	4183	4233	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	23.47	23.42	23.50	23.40	23.34	23.25	-
99		12.2 kbps AMR	23.52	23.45	23.57	23.45	23.35	23.23	-
6	HSDPA	Subtest 1	23.32	23.34	23.37	23.47	23.41	23.25	0
6		Subtest 2	23.31	23.40	23.48	23.51	23.42	23.29	0
6		Subtest 3	22.82	22.84	22.98	23.02	23.00	22.82	0.5
6		Subtest 4	22.84	22.92	23.12	23.07	23.04	22.94	0.5
6	HSUPA	Subtest 1	22.82	23.12	23.03	22.83	23.17	23.07	0
6		Subtest 2	21.59	21.50	21.63	21.69	21.68	21.64	2
6		Subtest 3	22.20	22.21	22.18	22.16	22.12	21.98	1
6		Subtest 4	21.69	21.66	21.69	21.69	21.62	21.66	2
6		Subtest 5	22.78	23.22	23.04	22.76	23.30	22.84	0

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

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.

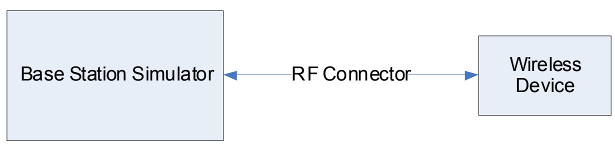


Figure 10-2
Power Measurement Setup

10.3 LTE Conducted Powers

10.3.1 LTE Band 17

Table 10-1
LTE Band 17 Conducted Powers - 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	706.5	23755	5	QPSK	1	0	23.90	0	0
	706.5	23755	5	QPSK	1	24	23.82	0	0
	706.5	23755	5	QPSK	12	6	23.00	1	0-1
	706.5	23755	5	QPSK	25	0	23.03	1	0-1
	706.5	23755	5	16-QAM	1	0	23.11	1	0-1
	706.5	23755	5	16-QAM	1	24	23.20	1	0-1
	706.5	23755	5	16-QAM	12	6	22.05	2	0-2
	706.5	23755	5	16-QAM	25	0	22.10	2	0-2
Mid	710.0	23790	5	QPSK	1	0	24.15	0	0
	710.0	23790	5	QPSK	1	24	23.92	0	0
	710.0	23790	5	QPSK	12	6	22.98	1	0-1
	710.0	23790	5	QPSK	25	0	23.13	1	0-1
	710.0	23790	5	16-QAM	1	0	23.13	1	0-1
	710.0	23790	5	16-QAM	1	24	23.07	1	0-1
	710.0	23790	5	16-QAM	12	6	22.05	2	0-2
	710.0	23790	5	16-QAM	25	0	22.15	2	0-2
High	713.5	23825	5	QPSK	1	0	23.80	0	0
	713.5	23825	5	QPSK	1	24	23.80	0	0
	713.5	23825	5	QPSK	12	6	23.00	1	0-1
	713.5	23825	5	QPSK	25	0	23.03	1	0-1
	713.5	23825	5	16-QAM	1	0	23.15	1	0-1
	713.5	23825	5	16-QAM	1	24	23.00	1	0-1
	713.5	23825	5	16-QAM	12	6	21.92	2	0-2
	713.5	23825	5	16-QAM	25	0	22.02	2	0-2

Table 10-2
LTE Band 17 Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	709	23780	10	QPSK	1	0	24.03	0	0
	709	23780	10	QPSK	1	49	24.00	0	0
	709	23780	10	QPSK	25	12	23.13	1	0-1
	709	23780	10	QPSK	50	0	23.20	1	0-1
	709	23780	10	16QAM	1	0	22.93	1	0-1
	709	23780	10	16QAM	1	49	22.95	1	0-1
	709	23780	10	16QAM	25	12	22.10	2	0-2
	709	23780	10	16QAM	50	0	21.90	2	0-2
Mid	710.0	23790	10	QPSK	1	0	24.00	0	0
	710.0	23790	10	QPSK	1	49	23.97	0	0
	710.0	23790	10	QPSK	25	12	**22.98**	1	0-1
	710.0	23790	10	QPSK	50	0	23.07	1	0-1
	710.0	23790	10	16QAM	1	0	22.90	1	0-1
	710.0	23790	10	16QAM	1	49	23.00	1	0-1
	710.0	23790	10	16QAM	25	12	**22.01**	2	0-2
	710.0	23790	10	16QAM	50	0	22.00	2	0-2
High	711	23800	10	QPSK	1	0	**24.19**	0	0
	711	23800	10	QPSK	1	49	**24.17**	0	0
	711	23800	10	QPSK	25	12	23.00	1	0-1
	711	23800	10	QPSK	50	0	22.91	1	0-1
	711	23800	10	16QAM	1	0	**23.17**	1	0-1
	711	23800	10	16QAM	1	49	**23.12**	1	0-1
	711	23800	10	16QAM	25	12	22.15	2	0-2
	711	23800	10	16QAM	50	0	22.10	2	0-2

10.3.2 LTE Band 4 (AWS)

Table 10-3
LTE Band 4 (AWS) Conducted Powers - 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1712.5	19975	5	QPSK	1	0	23.33	0	0
	1712.5	19975	5	QPSK	1	24	23.35	0	0
	1712.5	19975	5	QPSK	12	6	22.41	1	0-1
	1712.5	19975	5	QPSK	25	0	22.43	1	0-1
	1712.5	19975	5	16-QAM	1	0	22.46	1	0-1
	1712.5	19975	5	16-QAM	1	24	22.51	1	0-1
	1712.5	19975	5	16-QAM	12	6	21.63	2	0-2
	1712.5	19975	5	16-QAM	25	0	21.45	2	0-2
Mid	1732.5	20175	5	QPSK	1	0	23.55	0	0
	1732.5	20175	5	QPSK	1	24	23.50	0	0
	1732.5	20175	5	QPSK	12	6	22.55	1	0-1
	1732.5	20175	5	QPSK	25	0	22.60	1	0-1
	1732.5	20175	5	16-QAM	1	0	22.53	1	0-1
	1732.5	20175	5	16-QAM	1	24	22.50	1	0-1
	1732.5	20175	5	16-QAM	12	6	21.56	2	0-2
	1732.5	20175	5	16-QAM	25	0	21.64	2	0-2
High	1752.5	20375	5	QPSK	1	0	23.41	0	0
	1752.5	20375	5	QPSK	1	24	23.30	0	0
	1752.5	20375	5	QPSK	12	6	22.37	1	0-1
	1752.5	20375	5	QPSK	25	0	22.45	1	0-1
	1752.5	20375	5	16-QAM	1	0	22.60	1	0-1
	1752.5	20375	5	16-QAM	1	24	22.42	1	0-1
	1752.5	20375	5	16-QAM	12	6	21.31	2	0-2
	1752.5	20375	5	16-QAM	25	0	21.53	2	0-2

Table 10-4
LTE Band 4 (AWS) Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	1715	20000	10	QPSK	1	0	23.32	0	0
	1715	20000	10	QPSK	1	49	23.54	0	0
	1715	20000	10	QPSK	25	12	22.40	1	0-1
	1715	20000	10	QPSK	50	0	22.54	1	0-1
	1715	20000	10	16QAM	1	0	22.40	1	0-1
	1715	20000	10	16QAM	1	49	22.53	1	0-1
	1715	20000	10	16QAM	25	12	21.70	2	0-2
	1715	20000	10	16QAM	50	0	21.50	2	0-2
Mid	1732.5	20175	10	QPSK	1	0	**23.54**	0	0
	1732.5	20175	10	QPSK	1	49	**23.37**	0	0
	1732.5	20175	10	QPSK	25	12	**22.55**	1	0-1
	1732.5	20175	10	QPSK	50	0	22.56	1	0-1
	1732.5	20175	10	16QAM	1	0	**22.64**	1	0-1
	1732.5	20175	10	16QAM	1	49	**22.48**	1	0-1
	1732.5	20175	10	16QAM	25	12	**21.41**	2	0-2
	1732.5	20175	10	16QAM	50	0	21.45	2	0-2
High	1750	20350	10	QPSK	1	0	23.39	0	0
	1750	20350	10	QPSK	1	49	23.34	0	0
	1750	20350	10	QPSK	25	12	22.46	1	0-1
	1750	20350	10	QPSK	50	0	22.45	1	0-1
	1750	20350	10	16QAM	1	0	22.41	1	0-1
	1750	20350	10	16QAM	1	49	22.23	1	0-1
	1750	20350	10	16QAM	25	12	21.20	2	0-2
	1750	20350	10	16QAM	50	0	21.38	2	0-2

10.3.3 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05:

1) Per Page 4, 3) A), QPSK with 50% RB is required for the highest bandwidth.
2) Per Page 4, footnote 2, when the maximum output power across high, mid., and low channels is < 0.5 dB, mid channel is tested. Low and high channel SAR tests are not required for QPSK, 50% RB allocation when the SAR is < 0.8 W/kg. When there are less than 3 channels based on the size of the band and bandwidth of the signal, the channel with the other channels are tested.
3) Per Page 4, 3) B), QPSK with 1 RB for both channel edges are required for the highest bandwidth.
4) Per Page 4, footnote 6, QPSK 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation when the average output power of the 1 RB allocations were > 0.5 dB higher than the 50% RB allocation for QPSK. Otherwise, SAR tests are performed on the channel that produced the highest SAR for QPSK with 50% RB. 1 RB low and high offset configurations are considered together for a single channel selection.
5) Per Page 4, 3) B), I), when the SAR for QPSK 1 RB allocation tests is <1.45 W/kg, testing on the other channels is not required.
6) Per Page 4, 4) A), 16QAM with 50% RB is required for the highest bandwidth on the channel with the highest measured SAR for QPSK with 50% RB allocation.
7) Per Page 4, 4) A), I), when the SAR for 16 QAM, 50 % allocation tests is <1.45 W/kg, testing on the other channels is not required.
8) Per Page 4, 4) B) and Page 5 footnote 9, 16QAM with 1RB for both channel edges are required for the highest bandwidth on the highest output power channel for the 1 RB allocation when the average output power of the 1 RB allocation is >0.5 dB higher than the 50% allocation for 16 QAM. Otherwise, SAR tests are performed on the channel that produced the highest SAR for 16 QAM with 50% RB. 1 RB low and high offset configurations are considered together for a single channel selection.
9) Per Page 5, 4) B), I), when the SAR for 16 QAM 1 RB allocation tests is <1.45 W/kg, testing on the other channels is not required.
10) Per Page 4, 4), A) I) and Page 5, 4), A),I), 100% RB Allocation is not required to be tested when the SAR is not > 1.45 W/kg for the highest bandwidth.
11) Per Page 5, 5) B) I), smaller bandwidths are not required to be tested when SAR is not > 1.45 W/kg for the highest bandwidth and the maximum average output power of the smaller bandwidths across all channels and configurations is not more than 0.5 dB higher than the higher bandwidths
12) The configurations required for SAR testing are bolded in the above tables.

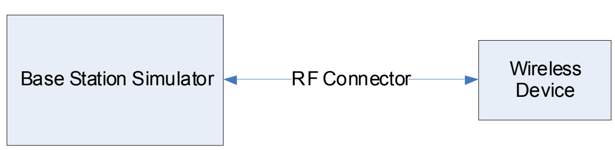


Figure 10-3
Power Measurement Setup

10.4 WLAN Conducted Powers

Table 10-5
IEEE 802.11b Average RF Power

Freq [MHz]	Channel	Data Rate [Mbps]	Average Power (dBm)
2412	1	1	14.05
		2	14.02
		5.5	13.73
		11	13.91
2437	6	1	14.69
		2	14.84
		5.5	14.83
		11	14.77
2462	11	**1**	**14.72**
		2	14.74
		5.5	14.6
		11	14.74

Table 10-6
IEEE 802.11g Average RF Power

Freq [MHz]	Channel	Data Rate [Mbps]	Average Power (dBm)
2412	1	6	11.73
		9	11.59
		12	10.37
		18	9.76
		24	11.84
		36	10.23
		48	10.49
		54	11.13
2437	6	6	11.88
		9	11.40
		12	10.66
		18	9.94
		24	11.93
		36	10.52
		48	10.54
		54	11.11
2462	11	6	11.83
		9	11.56
		12	10.35
		18	9.78
		24	12.04
		36	10.51
		48	10.79
		54	11.28

Table 10-7
IEEE 802.11n Average RF Power

Freq [MHz]	Channel	Data Rate [Mbps]	Average Power (dBm)
2412	1	6.5/7.2	9.91
		13/14.40	10.25
		19.5/21.70	9.54
		26/28.90	9.04
		29/43.3	8.74
		52/57.80	10.36
		58.50/65	11.07
		65/72.2	10.35
2437	6	6.5/7.2	10.09
		13/14.40	10.11
		19.5/21.70	9.38
		26/28.90	9.03
		29/43.3	9.07
		52/57.80	10.26
		58.50/65	10.68
		65/72.2	10.91
2462	11	6.5/7.2	9.89
		13/14.40	10.01
		19.5/21.70	9.03
		26/28.90	8.74
		29/43.3	8.40
		52/57.80	10.47
		58.50/65	10.91
		65/72.2	10.98

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

- For 2.4 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11b were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
- When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the 1g averaged SAR is <0.8 W/kg, SAR testing on other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.
- The bolded data rate and channel above were tested for SAR.

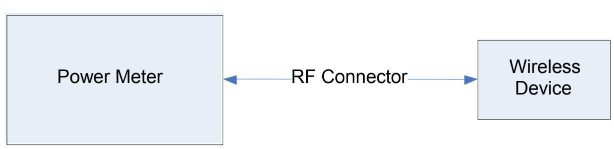


Figure 10-4
Power Measurement Setup

11 SYSTEM VERIFICATION

11.1 Tissue Verification

Table 11-1
Measured Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (C°)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
6/12/2012	750H	21.1	695	0.847	41.24	0.885	42.273	-4.29%	-2.44%
			710	0.859	40.98	0.886	42.193	-3.05%	-2.87%
			725	0.876	40.79	0.888	42.033	-1.35%	-2.96%
			740	0.891	40.57	0.889	41.953	0.22%	-3.30%
			755	0.905	40.33	0.891	41.876	1.57%	-3.69%
6/7/2012	835H	22.8	820	0.903	41.70	0.898	41.571	0.56%	0.31%
			835	0.919	41.49	0.900	41.500	2.11%	-0.02%
			850	0.935	41.35	0.916	41.500	2.07%	-0.36%
6/7/2012	1750H	23.3	1710	1.358	39.25	1.348	40.136	0.74%	-2.21%
			1750	1.397	39.07	1.370	40.100	1.97%	-2.57%
			1790	1.435	38.91	1.394	40.020	2.94%	-2.77%
6/5/2012	1900H	24.3	1850	1.399	38.65	1.400	40.000	-0.07%	-3.38%
			1880	1.425	38.60	1.400	40.000	1.79%	-3.50%
			1910	1.459	38.48	1.400	40.000	4.21%	-3.80%
6/4/2012	2450H	24.3	2401	1.825	40.53	1.758	39.298	3.81%	3.14%
			2450	1.885	40.36	1.800	39.200	4.72%	2.96%
			2499	1.942	40.13	1.852	39.135	4.86%	2.54%
6/7/2012	750B	23.3	695	0.923	55.14	0.957	55.985	-3.55%	-1.51%
			710	0.939	54.98	0.958	55.901	-1.98%	-1.65%
			725	0.953	54.79	0.960	55.817	-0.73%	-1.84%
			740	0.968	54.66	0.961	55.733	0.73%	-1.93%
			755	0.981	54.45	0.963	55.649	1.87%	-2.15%
6/7/2012	835B	21.9	820	0.984	53.18	0.969	55.284	1.55%	-3.81%
			835	0.998	53.05	0.970	55.200	2.89%	-3.89%
			850	1.013	52.92	0.988	55.154	2.53%	-4.05%
6/7/2012	1750B	23.0	1710	1.481	51.43	1.460	53.540	1.44%	-3.94%
			1750	1.532	51.16	1.490	53.430	2.82%	-4.25%
			1790	1.566	51.07	1.510	53.330	3.71%	-4.24%
6/5/2012	1900B	23.4	1850	1.492	51.30	1.520	53.300	-1.84%	-3.75%
			1880	1.522	51.21	1.520	53.300	0.13%	-3.92%
			1910	1.556	51.10	1.520	53.300	2.37%	-4.13%
6/5/2012	2450B	22.9	2401	1.964	54.56	1.903	52.765	3.21%	3.40%
			2450	2.027	54.42	1.950	52.700	3.95%	3.26%
			2499	2.090	54.29	2.019	52.638	3.52%	3.14%

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

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

11.2 Measurement Procedure for Tissue verification

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

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

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

11.3 Test System Verification

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

Table 11-2
System Verification Results

System Verification TARGET & MEASURED												
Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Dipole SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	Deviation (%)
750	Head	06/12/2012	21.9	21.6	0.100	1046	3561	0.815	8.400	8.150	-2.98%
835	Head	06/07/2012	23.1	22.4	0.100	4d119	3258	0.991	9.420	9.910	5.20%
1750	Head	06/07/2012	23.6	22.8	0.100	1008	3209	3.72	36.400	37.200	2.20%
1900	Head	06/05/2012	22.8	21.4	0.100	5d080	3209	4.1	39.900	41.000	2.76%
2450	Head	06/04/2012	22.3	22.4	0.100	719	3209	5.53	53.800	55.300	2.79%
750	Body	06/07/2012	22.2	21.4	0.063	1054	3288	0.551	8.840	8.746	-1.06%
835	Body	06/07/2012	23.1	22.2	0.100	4d119	3258	1.02	9.560	10.200	6.69%
1750	Body	06/07/2012	24.3	22.6	0.100	1008	3209	3.95	37.400	39.500	5.61%
1900	Body	06/05/2012	23.4	21.9	0.100	5d080	3209	4.26	40.900	42.600	4.16%
2450	Body	06/05/2012	23.8	21.2	0.040	719	3022	1.96	51.300	49.000	-4.48%

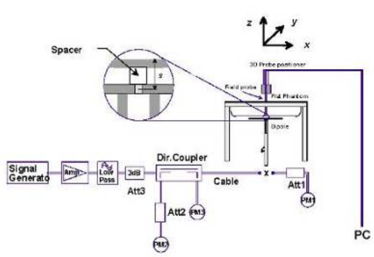


Figure 11-1
System Verification Setup Diagram

Figure 11-2
System Verification Setup Photo

12 SAR DATA SUMMARY

12.1 Standalone Head SAR Data

Table 12-1
GSM 850 Head SAR Results

MEASUREMENT RESULTS								
FREQUENCY		Mode/Band	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	SAR (1g)
MHz	Ch.							(W/kg)
836.60	190	GSM 850	32.75	0.00	Right	Touch	11	**0.285**
836.60	190	GSM 850	32.75	0.00	Right	Tilt	11	0.165
836.60	190	GSM 850	32.75	0.11	Left	Touch	11	0.237
836.60	190	GSM 850	32.75	0.05	Left	Tilt	11	0.133
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**Head 1.6 W/kg (mW/g)** averaged over 1 gram			

Table 12-2
WCDMA 850 Head SAR Results

MEASUREMENT RESULTS								
FREQUENCY		Mode/Band	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	SAR (1g)
MHz	Ch.							(W/kg)
836.60	4183	WCDMA 850	23.42	0.14	Right	Touch	11	**0.320**
836.60	4183	WCDMA 850	23.42	0.02	Right	Tilt	11	0.188
836.60	4183	WCDMA 850	23.42	0.03	Left	Touch	11	0.265
836.60	4183	WCDMA 850	23.42	0.06	Left	Tilt	11	0.157
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**Head 1.6 W/kg (mW/g)** averaged over 1 gram			

Table 12-3
GSM 1900 Head SAR Results

MEASUREMENT RESULTS								
FREQUENCY		Mode/Band	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	SAR (1g)
MHz	Ch.							(W/kg)
1880.00	661	GSM 1900	29.90	-0.01	Right	Touch	11	**0.216**
1880.00	661	GSM 1900	29.90	-0.01	Right	Tilt	11	0.103
1880.00	661	GSM 1900	29.90	-0.04	Left	Touch	11	0.147
1880.00	661	GSM 1900	29.90	-0.12	Left	Tilt	11	0.098
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					Head 1.6 W/kg (mW/g) averaged over 1 gram			

Table 12-4
WCDMA 1900 Head SAR Results

MEASUREMENT RESULTS								
FREQUENCY		Mode	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	SAR (1g)
MHz	Ch.							(W/kg)
1880.00	9400	WCDMA 1900	23.34	0.00	Right	Touch	11	**0.441**
1880.00	9400	WCDMA 1900	23.34	0.15	Right	Tilt	11	0.204
1880.00	9400	WCDMA 1900	23.34	-0.01	Left	Touch	11	0.276
1880.00	9400	WCDMA 1900	23.34	0.06	Left	Tilt	11	0.174
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					Head 1.6 W/kg (mW/g) averaged over 1 gram			

Table 12-5
LTE Band 17 Head SAR Results

MEASUREMENT RESULTS															
FREQUENCY			Mode	Bandwidth [MHz]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	# of RB	RB Offset	Device Serial Number	SAR (1g)
MHz	Ch.													(W/kg)
710.00	23790	Mid	LTE Band 17	10	22.98	-0.03	1	Right	Touch	QPSK	25	12	2	0.213
711.00	23800	High	LTE Band 17	10	24.19	-0.02	0	Right	Touch	QPSK	1	0	2	0.254
711.00	23800	High	LTE Band 17	10	24.17	0.13	0	Right	Touch	QPSK	1	49	2	0.189
710.00	23790	Mid	LTE Band 17	10	22.01	0.10	2	Right	Touch	16 QAM	25	12	2	0.183
711.00	23800	High	LTE Band 17	10	23.17	-0.12	1	Right	Touch	16 QAM	1	0	2	0.193
711.00	23800	High	LTE Band 17	10	23.12	-0.13	1	Right	Touch	16 QAM	1	49	2	0.138
710.00	23790	Mid	LTE Band 17	10	22.98	-0.03	1	Right	Tilt	QPSK	25	12	2	0.100
711.00	23800	High	LTE Band 17	10	24.19	-0.04	0	Right	Tilt	QPSK	1	0	2	0.125
711.00	23800	High	LTE Band 17	10	24.17	0.05	0	Right	Tilt	QPSK	1	49	2	0.087
710.00	23790	Mid	LTE Band 17	10	22.01	0.15	2	Right	Tilt	16 QAM	25	12	2	0.083
711.00	23800	High	LTE Band 17	10	23.17	0.00	1	Right	Tilt	16 QAM	1	0	2	0.097
711.00	23800	High	LTE Band 17	10	23.12	0.00	1	Right	Tilt	16 QAM	1	49	2	0.067
710.00	23790	Mid	LTE Band 17	10	22.98	-0.01	1	Left	Touch	QPSK	25	12	2	0.245
711.00	23800	High	LTE Band 17	10	24.19	0.14	0	Left	Touch	QPSK	1	0	2	**0.301**
711.00	23800	High	LTE Band 17	10	24.17	0.14	0	Left	Touch	QPSK	1	49	2	0.231
710.00	23790	Mid	LTE Band 17	10	22.01	-0.13	2	Left	Touch	16 QAM	25	12	2	0.239
711.00	23800	High	LTE Band 17	10	23.17	0.05	1	Left	Touch	16 QAM	1	0	2	0.233
711.00	23800	High	LTE Band 17	10	23.12	-0.01	1	Left	Touch	16 QAM	1	49	2	0.180
710.00	23790	Mid	LTE Band 17	10	22.98	-0.03	1	Left	Tilt	QPSK	25	12	2	0.100
711.00	23800	High	LTE Band 17	10	24.19	-0.05	0	Left	Tilt	QPSK	1	0	2	0.139
711.00	23800	High	LTE Band 17	10	24.17	-0.16	0	Left	Tilt	QPSK	1	49	2	0.098
710.00	23790	Mid	LTE Band 17	10	22.01	0.15	2	Left	Tilt	16 QAM	25	12	2	0.079
711.00	23800	High	LTE Band 17	10	23.17	-0.07	1	Left	Tilt	16 QAM	1	0	2	0.093
711.00	23800	High	LTE Band 17	10	23.12	-0.08	1	Left	Tilt	16 QAM	1	49	2	0.070
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**								**Head** **1.6 W/kg (mW/g)** averaged over 1 gram						

Note: FCC KDB 941225 D05 Per Page 4, footnote 6, QPSK 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation when the average output power of the 1 RB allocation was > 0.5 dB higher than the 50% RB allocation for QPSK. Therefore, high channel was tested for QPSK and 16 QAM SAR tests with 1 RB for LTE Band 17

Table 12-6
LTE Band 4 (AWS) Head SAR Results

MEASUREMENT RESULTS															
FREQUENCY			Mode	Bandwidth [MHz]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	# of RB	RB Offset	Device Serial Number	SAR (1g)
MHz	Ch.													(W/kg)
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.55	0.05	1	Right	Touch	QPSK	25	12	3	0.433
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.54	-0.05	0	Right	Touch	QPSK	1	0	3	**0.557**
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.37	0.08	0	Right	Touch	QPSK	1	49	3	0.523
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.41	0.00	2	Right	Touch	16 QAM	25	12	3	0.389
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.64	-0.08	1	Right	Touch	16 QAM	1	0	3	0.421
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.48	-0.02	1	Right	Touch	16 QAM	1	49	3	0.395
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.55	0.12	1	Right	Tilt	QPSK	25	12	3	0.223
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.54	0.14	0	Right	Tilt	QPSK	1	0	3	0.287
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.37	0.17	0	Right	Tilt	QPSK	1	49	3	0.265
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.41	-0.12	2	Right	Tilt	16 QAM	25	12	3	0.201
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.64	0.19	1	Right	Tilt	16 QAM	1	0	3	0.222
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.48	0.19	1	Right	Tilt	16 QAM	1	49	3	0.258
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.55	0.04	1	Left	Touch	QPSK	25	12	3	0.204
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.54	-0.04	0	Left	Touch	QPSK	1	0	3	0.264
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.37	-0.02	0	Left	Touch	QPSK	1	49	3	0.249
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.41	0.03	2	Left	Touch	16 QAM	25	12	3	0.154
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.64	-0.11	1	Left	Touch	16 QAM	1	0	3	0.182
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.48	-0.16	1	Left	Touch	16 QAM	1	49	3	0.221
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.55	0.02	1	Left	Tilt	QPSK	25	12	3	0.209
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.54	0.00	0	Left	Tilt	QPSK	1	0	3	0.259
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.37	-0.05	0	Left	Tilt	QPSK	1	49	3	0.262
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.41	-0.12	2	Left	Tilt	16 QAM	25	12	3	0.159
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.64	-0.08	1	Left	Tilt	16 QAM	1	0	3	0.209
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.48	0.13	1	Left	Tilt	16 QAM	1	49	3	0.194
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram						

Table 12-7
2.4 GHz WLAN Head SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	SAR (1g)
MHz	Ch.									(W/kg)
2412	1	IEEE 802.11b	DSSS	14.05	0.08	Right	Touch	15	1	0.163
2437	6	IEEE 802.11b	DSSS	14.69	-0.10	Right	Touch	15	1	0.411
2462	11	IEEE 802.11b	DSSS	14.72	-0.02	Right	Touch	15	1	**0.735**
2462	11	IEEE 802.11b	DSSS	14.72	-0.01	Right	Tilt	15	1	0.704
2462	11	IEEE 802.11b	DSSS	14.72	0.02	Left	Touch	15	1	0.638
2462	11	IEEE 802.11b	DSSS	14.72	0.00	Left	Tilt	15	1	0.554
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Head 1.6 W/kg (mW/g) averaged over 1 gram				

12.2 Standalone Body-Worn SAR Data

Table 12-8
GSM/WCDMA Transmitter Body-Worn SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Side	SAR (1g)
MHz	Ch.									(W/kg)
836.60	190	GSM 850	GSM	32.75	0.02	1.0 cm	11	1	back	0.462
836.60	190	GSM 850	GPRS	31.10	0.01	1.0 cm	11	2	back	0.770
836.60	4183	WCDMA 850	RMC	23.42	-0.04	1.0 cm	11	N/A	back	0.643
1880.00	661	GSM 1900	GSM	29.90	0.03	1.0 cm	11	1	back	0.267
1880.00	661	GSM 1900	GPRS	27.91	0.04	1.0 cm	11	2	back	0.356
1880.00	9400	WCDMA 1900	RMC	23.34	0.03	1.0 cm	11	N/A	back	0.636
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram				

Hotspot back side SAR Data was also used for supporting body-worn-accessory compliance per FCC KDB Publication 941225 D06

Table 12-9
LTE Body-Worn SAR Results

MEASUREMENT RESULTS														
FREQUENCY			Mode	Bandwidth [MHz]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	# of RB	RB Offset	Spacing	Side	SAR (1g)
MHz	Ch.													(W/kg)
710.00	23790	Mid	LTE Band 17	10	22.98	-0.04	1	2	QPSK	25	12	1.0 cm	back	0.452
711.00	23800	High	LTE Band 17	10	24.19	-0.05	0	2	QPSK	1	0	1.0 cm	back	**0.580**
711.00	23800	High	LTE Band 17	10	24.17	-0.15	0	2	QPSK	1	49	1.0 cm	back	0.453
710.00	23790	Mid	LTE Band 17	10	22.01	0.03	2	2	16 QAM	25	12	1.0 cm	back	0.385
711.00	23800	High	LTE Band 17	10	23.17	0.00	1	2	16 QAM	1	0	1.0 cm	back	0.446
711.00	23800	High	LTE Band 17	10	23.12	-0.01	1	2	16 QAM	1	49	1.0 cm	back	0.361
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.55	-0.04	1	3	QPSK	25	12	1.0 cm	back	0.291
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.54	0.00	0	3	QPSK	1	0	1.0 cm	back	**0.360**
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.37	0.12	0	3	QPSK	1	49	1.0 cm	back	0.348
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.41	-0.02	2	3	16 QAM	25	12	1.0 cm	back	0.249
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.64	0.02	1	3	16 QAM	1	0	1.0 cm	back	0.307
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.48	0.09	1	3	16 QAM	1	49	1.0 cm	back	0.304
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram						

Hotspot back side SAR Data was also used for supporting body-worn-accessory compliance per FCC KDB Publication 941225 D06

Note: FCC KDB 941225 D05 Per Page 4, footnote 6, QPSK 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation when the average output power of the 1 RB allocation was > 0.5 dB higher than the 50% RB allocation for QPSK. Therefore, high channel was tested for QPSK and 16 QAM SAR tests with 1 RB for LTE Band 17

Table 12-10
WLAN Body-Worn SAR Results

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	SAR (1g)
MHz	Ch.									(W/kg)
2462	11	IEEE 802.11b	DSSS	14.72	0.01	1.0 cm	15	1	back	0.342
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram				

Hotspot back side SAR Data was also used for supporting body-worn-accessory compliance per FCC KDB Publication 941225 D06

12.3 Standalone Wireless Router SAR Data

Table 12-11
GSM/WCDMA Transmitter Hotspot SAR Data

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of GPRS Slots	Side	SAR (1g)
MHz	Ch.									(W/kg)
836.60	190	GSM 850	GPRS	31.10	0.01	1.0 cm	11	2	back	**0.770**
836.60	190	GSM 850	GPRS	31.10	-0.07	1.0 cm	11	2	front	0.511
836.60	190	GSM 850	GPRS	31.10	-0.10	1.0 cm	11	2	bottom	0.209
836.60	190	GSM 850	GPRS	31.10	0.00	1.0 cm	11	2	right	0.600
836.60	4183	WCDMA 850	RMC	23.42	-0.04	1.0 cm	11	N/A	back	**0.643**
836.60	4183	WCDMA 850	RMC	23.42	0.01	1.0 cm	11	N/A	front	0.421
836.60	4183	WCDMA 850	RMC	23.42	0.08	1.0 cm	11	N/A	bottom	0.170
836.60	4183	WCDMA 850	RMC	23.42	-0.12	1.0 cm	11	N/A	right	0.477
1880.00	661	GSM 1900	GPRS	27.91	0.04	1.0 cm	11	2	back	**0.356**
1880.00	661	GSM 1900	GPRS	27.91	-0.10	1.0 cm	11	2	front	0.338
1880.00	661	GSM 1900	GPRS	27.91	0.13	1.0 cm	11	2	bottom	0.323
1880.00	661	GSM 1900	GPRS	27.91	0.19	1.0 cm	11	2	right	0.148
1880.00	9400	WCDMA 1900	RMC	23.34	0.03	1.0 cm	11	N/A	back	**0.636**
1880.00	9400	WCDMA 1900	RMC	23.34	-0.05	1.0 cm	11	N/A	front	0.615
1880.00	9400	WCDMA 1900	RMC	23.34	0.08	1.0 cm	11	N/A	bottom	0.545
1880.00	9400	WCDMA 1900	RMC	23.34	0.15	1.0 cm	11	N/A	right	0.263
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram			

Table 12-12
LTE Band 17 Hotspot SAR Data

MEASUREMENT RESULTS															
FREQUENCY			Mode	Bandwidth [MHz]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	# of RB	RB Offset	Spacing	Side	SAR (1g)
MHz	Ch.	High												(W/kg)
710.00	23790	Mid	LTE Band 17	10	22.98	-0.04	1	2	QPSK	25	12	1.0 cm	back	0.452
711.00	23800	High	LTE Band 17	10	24.19	-0.05	0	2	QPSK	1	0	1.0 cm	back	**0.580**
711.00	23800	High	LTE Band 17	10	24.17	-0.15	0	2	QPSK	1	49	1.0 cm	back	0.453
710.00	23790	Mid	LTE Band 17	10	22.01	0.03	2	2	16 QAM	25	12	1.0 cm	back	0.385
711.00	23800	High	LTE Band 17	10	23.17	0.00	1	2	16 QAM	1	0	1.0 cm	back	0.446
711.00	23800	High	LTE Band 17	10	23.12	-0.01	1	2	16 QAM	1	49	1.0 cm	back	0.361
710.00	23790	Mid	LTE Band 17	10	22.98	0.01	1	2	QPSK	25	12	1.0 cm	front	0.255
711.00	23800	High	LTE Band 17	10	24.19	0.07	0	2	QPSK	1	0	1.0 cm	front	0.355
711.00	23800	High	LTE Band 17	10	24.17	0.03	0	2	QPSK	1	49	1.0 cm	front	0.257
710.00	23790	Mid	LTE Band 17	10	22.01	0.10	2	2	16 QAM	25	12	1.0 cm	front	0.228
711.00	23800	High	LTE Band 17	10	23.17	-0.16	1	2	16 QAM	1	0	1.0 cm	front	0.287
711.00	23800	High	LTE Band 17	10	23.12	-0.08	1	2	16 QAM	1	49	1.0 cm	front	0.217
710.00	23790	Mid	LTE Band 17	10	22.98	0.04	1	2	QPSK	25	12	1.0 cm	bottom	0.133
711.00	23800	High	LTE Band 17	10	24.19	-0.04	0	2	QPSK	1	0	1.0 cm	bottom	0.155
711.00	23800	High	LTE Band 17	10	24.17	-0.12	0	2	QPSK	1	49	1.0 cm	bottom	0.151
710.00	23790	Mid	LTE Band 17	10	22.01	0.04	2	2	16 QAM	25	12	1.0 cm	bottom	0.100
711.00	23800	High	LTE Band 17	10	23.17	0.13	1	2	16 QAM	1	0	1.0 cm	bottom	0.098
711.00	23800	High	LTE Band 17	10	23.12	0.11	1	2	16 QAM	1	49	1.0 cm	bottom	0.115
710.00	23790	Mid	LTE Band 17	10	22.98	-0.05	1	2	QPSK	25	12	1.0 cm	left	0.117
711.00	23800	High	LTE Band 17	10	24.19	0.03	0	2	QPSK	1	0	1.0 cm	left	0.125
711.00	23800	High	LTE Band 17	10	24.17	0.04	0	2	QPSK	1	49	1.0 cm	left	0.134
710.00	23790	Mid	LTE Band 17	10	22.01	0.00	2	2	16 QAM	25	12	1.0 cm	left	0.099
711.00	23800	High	LTE Band 17	10	23.17	0.01	1	2	16 QAM	1	0	1.0 cm	left	0.099
711.00	23800	High	LTE Band 17	10	23.12	-0.11	1	2	16 QAM	1	49	1.0 cm	left	0.117
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram						

Note: FCC KDB 941225 D05 Per Page 4, footnote 6, QPSK 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation when the average output power of the 1 RB allocation was > 0.5 dB higher than the 50% RB allocation for QPSK. Therefore, high channel was tested for QPSK and 16 QAM SAR tests with 1 RB for LTE Band 17

Table 12-13
LTE Band 4 (AWS) Hotspot SAR Data

MEASUREMENT RESULTS														
FREQUENCY			Mode	Bandwidth [MHz]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	# of RB	RB Offset	Spacing	Side	SAR (1g)
MHz	Ch.													(W/kg)
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.55	-0.04	1	3	QPSK	25	12	1.0 cm	back	0.291
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.54	0.00	0	3	QPSK	1	0	1.0 cm	back	**0.360**
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.37	0.12	0	3	QPSK	1	49	1.0 cm	back	0.348
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.41	-0.02	2	3	16 QAM	25	12	1.0 cm	back	0.249
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.64	0.02	0	3	16 QAM	1	0	1.0 cm	back	0.307
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.48	0.09	0	3	16 QAM	1	49	1.0 cm	back	0.304
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.55	0.17	1	3	QPSK	25	12	1.0 cm	front	0.207
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.54	-0.01	0	3	QPSK	1	0	1.0 cm	front	0.257
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.37	0.00	0	3	QPSK	1	49	1.0 cm	front	0.252
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.41	0.15	2	3	16 QAM	25	12	1.0 cm	front	0.174
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.64	0.07	0	3	16 QAM	1	0	1.0 cm	front	0.217
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.48	0.07	0	3	16 QAM	1	49	1.0 cm	front	0.220
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.55	0.13	1	3	QPSK	25	12	1.0 cm	bottom	0.122
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.54	-0.12	0	3	QPSK	1	0	1.0 cm	bottom	0.151
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.37	-0.14	0	3	QPSK	1	49	1.0 cm	bottom	0.141
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.41	0.02	2	3	16 QAM	25	12	1.0 cm	bottom	0.110
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.64	-0.13	0	3	16 QAM	1	0	1.0 cm	bottom	0.131
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.48	0.00	0	3	16 QAM	1	49	1.0 cm	bottom	0.134
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.55	0.13	1	3	QPSK	25	12	1.0 cm	right	0.078
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.54	0.13	0	3	QPSK	1	0	1.0 cm	right	0.098
1732.50	20175	Mid	LTE Band 4 (AWS)	10	23.37	0.11	0	3	QPSK	1	49	1.0 cm	right	0.094
1732.50	20175	Mid	LTE Band 4 (AWS)	10	21.41	0.09	2	3	16 QAM	25	12	1.0 cm	right	0.071
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.64	0.13	0	3	16 QAM	1	0	1.0 cm	right	0.080
1732.50	20175	Mid	LTE Band 4 (AWS)	10	22.48	0.09	0	3	16 QAM	1	49	1.0 cm	right	0.073
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram						

Table 12-14
WLAN Hotspot SAR Data

MEASUREMENT RESULTS										
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	SAR (1g)
MHz	Ch.									(W/kg)
2462	11	IEEE 802.11b	DSSS	14.72	0.01	1.0 cm	15	1	back	**0.342**
2462	11	IEEE 802.11b	DSSS	14.72	-0.01	1.0 cm	15	1	front	0.157
2462	11	IEEE 802.11b	DSSS	14.72	-0.01	1.0 cm	15	1	top	0.179
2462	11	IEEE 802.11b	DSSS	14.72	0.14	1.0 cm	15	1	right	0.017
2462	11	IEEE 802.11b	DSSS	14.72	0.01	1.0 cm	15	1	left	0.077
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram				

12.4 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001].
2. Batteries are fully charged for all readings. The standard battery was used.
3. Tissue parameters and temperatures are listed on the SAR plots.
4. Liquid tissue depth was at least 15.0 cm. To confirm the proper SAR liquid depth, the z-axis plots from the system verifications were included since the system verifications were performed using the same liquid, probe and DAE as the SAR tests in the same time period.
5. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
6. Per FCC/OET Bulletin 65 Supplement C and Public Notice DA-02-1438, if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
7. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was tested because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.

GSM Test Notes:

1. Body-Worn accessory testing is typically associated with voice operations. Therefore body-worn SAR testing was additionally performed in GSM voice mode. GPRS Data mode is covered in the Hotspot SAR Testing at the same test distance
2. Per FCC KDB Publication 941225 D06, when the same wireless modes and device transmission configurations are required for body-worn accessories and hotspot mode (GPRS), it is not necessary to additionally test body-worn accessory SAR for the same device orientation. Therefore, the hotspot data for the back side configuration additionally shows body-worn compliance at the same distance.
3. Justification for reduced test configurations per KDB Publication 941225 D03: The source-based time-averaged output power was evaluated for all multi-slot operations and the worst case reported was evaluated for SAR.

WCDMA Notes:

1. WCDMA mode in Body SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.
2. Per FCC KDB Publication 941225 D06, when the same wireless modes and device transmission configurations are required for body-worn accessories and hotspot mode, it is not necessary to additionally test body-worn accessory SAR for the same device orientation. Therefore, the hotspot data for the back side configuration additionally shows body-worn compliance at the same distance.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Test Considerations for LTE handsets and Data Modems KDB 941225 D05 Publication and were evaluated independently of position. General test procedures can be found in Section 9.3.3.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator.

4. Per FCC KDB Publication 941225 D06, when the same wireless modes and device transmission configurations are required for body-worn accessories and hotspot mode, it is not necessary to additionally test body-worn accessory SAR for the same device orientation. Therefore, the hotspot data for the back side configuration additionally shows body-worn compliance at the same distance.
5. LTE Band 4 (AWS) SAR was measured with a probe calibrated at 1750 MHz and is valid for measuring SAR from ± 50 MHz. The 1750MHz specific liquid was verified with specific probe calibration factors as required per FCC KDB Publication 450824 D01.

WLAN Notes:

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

Hotspot Notes:

1. Top and Left Edges for the GSM/GPRS/EDGE, WCDMA, LTE Band 4 Antenna were not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 guidance (see Section 1.3).
2. Top and Right Edges for the LTE Band 17 Antenna were not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 guidance (see Section 1.3).
3. Bottom Edge for the WLAN transmitter was not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 (see Section 1.3).
4. During SAR Testing for the Wireless Router conditions per KDB 941225 D06, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 7.6.)

13 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

13.1 Introduction

The following procedures adopted from “FCC SAR Considerations for Cell Phones with Multiple Transmitters” FCC KDB Publication 648474 are applicable to handsets with built-in unlicensed transmitters such as 802.11b/g/n and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

13.2 FCC Power Tables & Conditions

	2.45	5.15 - 5.35	5.47 - 5.85	GHz
P_{Ref}	12	6	5	mW
Device output power should be rounded to the nearest mW to compare with values specified in this table.				

Figure 13-1
Output Power Thresholds for Unlicensed Transmitters

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	Routine evaluation required	SAR not required: Unlicensed only ○ when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antennas Licensed & Unlicensed ○ when the sum of the 1-g SAR is < 1.6 W/kg for all simultaneous transmitting antennas ○ when SAR to peak location separation ratio of simultaneous transmitting antenna pair is < 0.3 SAR required: Licensed & Unlicensed antenna pairs with SAR to peak location separation ratio ≥ 0.3; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply
Unlicensed Transmitters	When there is no simultaneous transmission – ○ output ≤ 60/f: SAR not required ○ output > 60/f: stand-alone SAR required When there is simultaneous transmission – Stand-alone SAR not required when ○ output ≤ $2 \cdot P_{Ref}$ and antenna is ≥ 5.0 cm from other antennas ○ output ≤ P_{Ref} and antenna is ≥ 2.5 cm from other antennas ○ output ≤ P_{Ref} and antenna is < 2.5 cm from other antennas, each with either output power ≤ P_{Ref} or 1-g SAR < 1.2 W/kg Otherwise stand-alone SAR is required When stand-alone SAR is required ○ test SAR on highest output channel for each wireless mode and exposure condition ○ if SAR for highest output channel is > 50% of SAR limit, evaluate all channels according to normal procedures	

Figure 13-2
SAR Evaluation Requirements for Multiple Transmitter Handsets

According to Figure 13-1 and Figure 13-2, simultaneous transmission analysis of SAR may be required for this device for the licensed and unlicensed transmitters. Possible simultaneous transmissions for this device were numerically summed using stand-alone SAR data and are shown in the following tables.

Per KDB Publication 648474, standalone Bluetooth SAR tests were not required. Standalone SAR tests for WLAN were required. See Section 1.5(A) for more information.

13.3 Head SAR Simultaneous Transmission Analysis

Table 13-1
Simultaneous Transmission Scenario (Held to Ear)

Simult Tx	Configuration	GSM 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GSM 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.285	0.735	**1.020**	Head SAR	Right Cheek	0.216	0.735	**0.951**
	Right Tilt	0.165	0.704	0.869		Right Tilt	0.103	0.704	0.807
	Left Cheek	0.237	0.638	0.875		Left Cheek	0.147	0.638	0.785
	Left Tilt	0.133	0.554	0.687		Left Tilt	0.098	0.554	0.652
Simult Tx	Configuration	WCDMA 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	WCDMA 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.320	0.735	**1.055**	Head SAR	Right Cheek	0.441	0.735	**1.176**
	Right Tilt	0.188	0.704	0.892		Right Tilt	0.204	0.704	0.908
	Left Cheek	0.265	0.638	0.903		Left Cheek	0.276	0.638	0.914
	Left Tilt	0.157	0.554	0.711		Left Tilt	0.174	0.554	0.728
Simult Tx	Configuration	LTE Band 17 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.254	0.735	**0.989**	Head SAR	Right Cheek	0.557	0.735	**1.292**
	Right Tilt	0.125	0.704	0.829		Right Tilt	0.287	0.704	0.991
	Left Cheek	0.301	0.638	0.939		Left Cheek	0.264	0.638	0.902
	Left Tilt	0.139	0.554	0.693		Left Tilt	0.262	0.554	0.816

13.4 Body-Worn Simultaneous Transmission Analysis

Table 13-2
Simultaneous Transmission Scenario (Body-Worn at 1.0 cm)

Configuration	Mode	2G/3G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Back Side	GSM 850	0.462	0.342	0.804
Back Side	WCDMA 850	0.643	0.342	**0.985**
Back Side	GSM 1900	0.267	0.342	0.609
Back Side	WCDMA 1900	0.636	0.342	0.978
Configuration	Mode	LTE SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Back Side	LTE Band 17	0.580	0.342	**0.922**
Back Side	LTE Band 4 (AWS)	0.360	0.342	0.702

13.5 Hotspot SAR Simultaneous Transmission Analysis

Table 13-3
Simultaneous Transmission Scenario (Hotspot at 1.0 cm)

Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.770	0.342	**1.112**
	Front	0.511	0.157	0.668
	Top	-	0.179	0.179
	Bottom	0.209	-	0.209
	Right	0.600	0.017	0.617
	Left	-	0.077	0.077

Simult Tx	Configuration	WCDMA 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.643	0.342	**0.985**
	Front	0.421	0.157	0.578
	Top	-	0.179	0.179
	Bottom	0.170	-	0.170
	Right	0.477	0.017	0.494
	Left	-	0.077	0.077

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.356	0.342	**0.698**
	Front	0.338	0.157	0.495
	Top	-	0.179	0.179
	Bottom	0.323	-	0.323
	Right	0.148	0.017	0.165
	Left	-	0.077	0.077

Simult Tx	Configuration	WCDMA 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.636	0.342	**0.978**
	Front	0.615	0.157	0.772
	Top	-	0.179	0.179
	Bottom	0.545	-	0.545
	Right	0.263	0.017	0.280
	Left	-	0.077	0.077

Simult Tx	Configuration	LTE Band 17 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.580	0.342	**0.922**
	Front	0.355	0.157	0.512
	Top	-	0.179	0.179
	Bottom	0.155	-	0.155
	Right	-	0.017	0.017
	Left	0.134	0.077	0.211

Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.360	0.342	**0.702**
	Front	0.257	0.157	0.414
	Top	-	0.179	0.179
	Bottom	0.151	-	0.151
	Right	0.098	0.017	0.115
	Left	-	0.077	0.077

Note: Per FCC KDB Publication 941225 D06, the edges with antennas more than 2.5 cm are not required to be evaluated for SAR (“-“).

13.6 Simultaneous Transmission Conclusion

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

14 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/10/2011	Annual	10/10/2012	3613A00315
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/4/2012	Annual	4/4/2013	JP38020182
Agilent	E5515C	Wireless Communications Test Set	10/10/2011	Annual	10/10/2012	GB46110872
Agilent	E5515C	Wireless Communications Test Set	10/20/2011	Annual	10/20/2012	GB46310798
Agilent	E5515C	Wireless Communications Test Set	10/14/2011	Annual	10/14/2012	GB41450275
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/5/2012	Annual	4/5/2013	MY45470194
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/12/2011	Annual	10/12/2012	1833460
Gigatronics	8651A	Universal Power Meter	10/12/2011	Annual	10/12/2012	8650319
Rohde & Schwarz	NRVD	Dual Channel Power Meter	4/8/2011	Biennial	4/8/2013	101695
SPEAG	D1765V2	1765 MHz SAR Dipole	5/18/2012	Annual	5/18/2013	1008
SPEAG	D1900V2	1900 MHz SAR Dipole	7/22/2011	Annual	7/22/2012	5d080
SPEAG	D2450V2	2450 MHz SAR Dipole	8/19/2011	Annual	8/19/2012	719
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/20/2012	Annual	2/20/2013	649
SPEAG	EX3DV4	SAR Probe	7/27/2011	Annual	7/27/2012	3561
Tektronix	RSA-6114A	Real Time Spectrum Analyzer	4/5/2012	Annual	4/5/2013	B010177
SPEAG	ES3DV3	SAR Probe	3/16/2012	Annual	3/16/2013	3209
Rohde & Schwarz	SMIQ03B	Signal Generator	4/5/2012	Annual	4/5/2013	DE27259
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/25/2011	Annual	8/25/2012	100976
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	5318
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	5442
Anritsu	ML2438A	Power Meter	2/14/2012	Annual	2/14/2013	1190013
Anritsu	ML2438A	Power Meter	2/14/2012	Annual	2/14/2013	98150041
Agilent	8648D	Signal Generator	4/3/2012	Annual	4/3/2013	3629U00687
Anritsu	ML2438A	Power Meter	10/13/2011	Annual	10/13/2012	1070030
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	5821
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	8013
Anritsu	MA2481A	Power Sensor	4/5/2012	Annual	4/5/2013	5605
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	2400
Agilent	E5515C	Wireless Communications Test Set	2/14/2012	Annual	2/14/2013	GB43304447
Agilent	E5515C	Wireless Communications Tester	4/4/2012	Annual	4/4/2013	US41140256
Anritsu	MA2411B	Pulse Sensor	10/13/2011	Annual	10/13/2012	1027293
Anritsu	ML2495A	Power Meter	10/13/2011	Annual	10/13/2012	1039008
Amplifier Research	5S1G4	5W, 800MHz-4.2GHz	CBT	N/A	CBT	21910
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Agilent	E5515C	Wireless Communications Test Set	2/12/2012	Annual	2/12/2013	GB45360985
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/7/2011	Annual	10/7/2012	103962
SPEAG	ES3DV3	SAR Probe	2/21/2012	Annual	2/21/2013	3258
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/5/2011	Annual	8/5/2012	112347
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Agilent	E5515C	Wireless Communications Test Set	2/14/2012	Annual	2/14/2013	GB43163447
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/3/2012	Annual	4/3/2013	US37390350
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/18/2012	Annual	1/18/2013	1272
SPEAG	D835V2	835 MHz SAR Dipole	4/20/2012	Annual	4/20/2013	4d119
SPEAG	D750V3	750 MHz Dipole	10/27/2011	Annual	10/27/2012	1046
Agilent	85070E	Dielectric Probe Kit	3/8/2012	Annual	3/8/2013	MY44300633
Anritsu	MT8820C	Radio Communication Tester	11/11/2011	Annual	11/11/2012	6200901190
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Seekonk	NC-100	Torque Wrench (8" lb)	11/29/2011	Triennial	11/29/2014	21053
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	11/30/2011	Annual	11/30/2012	101699
Agilent	E5515C	Wireless Communications Test Set	2/9/2012	Annual	2/9/2013	GB43460554
Speag	DAK-3.5	Dielectric Assessment Kit	12/1/2011	Annual	12/1/2012	1031
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	3/5/2012	Annual	3/5/2013	102060
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
Intelligent Weigh	PD-3000	Electronic Balance	3/27/2012	Annual	3/27/2013	11081534
Control Company	36934-158	Wall-Mounted Thermometer	1/4/2012	Biennial	1/4/2014	122014488
Control Company	61220-416	Long-Stem Thermometer	10/12/2011	Biennial	10/12/2013	111860844
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/15/2012	Annual	2/15/2013	1323
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
SPEAG	ES3DV3	SAR Probe	40946	Annual	41312	3288
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/12/2012	Annual	4/12/2013	1333
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Agilent	85047A	S-Parameter Test Set	N/A	N/A	N/A	2904A00579
SPEAG	D750V3	750 MHz Dipole	2/9/2012	Annual	2/9/2013	1054
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M1S5A00-009
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/19/2012	Annual	4/19/2013	665
SPEAG	ES3DV2	SAR Probe	8/25/2011	Annual	8/25/2012	3022

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

15 MEASUREMENT UNCERTAINTIES

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

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

16 CONCLUSION

16.1 Measurement Conclusion

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

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

17 REFERENCES

[1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation, Aug. 1996.

[2] ANSI/IEEE C95.1-2005, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, 2006.

[3] ANSI/IEEE C95.1-1992, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, Sept. 1992.

[4] ANSI/IEEE C95.3-2002, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave, New York: IEEE, December 2002.

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

[6] IEEE Standards Coordinating Committee 34 – IEEE Std. 1528-2003, Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices.

[7] NCRP, National Council on Radiation Protection and Measurements, Biological Effects and Exposure Criteria for RadioFrequency Electromagnetic Fields, NCRP Report No. 86, 1986. Reprinted Feb. 1995.

[8] T. Schmid, O. Egger, N. Kuster, Automated E-field scanning system for dosimetric assessments, IEEE Transaction on Microwave Theory and Techniques, vol. 44, Jan. 1996, pp. 105-113.

[9] K. Pokovic, T. Schmid, N. Kuster, Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies, ICECOM97, Oct. 1997, pp. 120-124.

[10] K. Pokovic, T. Schmid, and N. Kuster, E-field Probe with improved isotropy in brain simulating liquids, Proceedings of the ELMAR, Zadar, Croatia, June 23-25, 1996, pp. 172-175.

[11] Schmid & Partner Engineering AG, Application Note: Data Storage and Evaluation, June 1998, p2.

[12] V. Hombach, K. Meier, M. Burkhardt, E. Kuhn, N. Kuster, The Dependence of EM Energy Absorption upon Human Head Modeling at 900 MHz, IEEE Transaction on Microwave Theory and Techniques, vol. 44 no. 10, Oct. 1996, pp. 1865-1873.

[13] N. Kuster and Q. Balzano, Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300MHz, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.

[14] G. Hartsgrove, A. Kraszewski, A. Surowiec, Simulated Biological Materials for Electromagnetic Radiation Absorption Studies, University of Ottawa, Bioelectromagnetics, Canada: 1987, pp. 29-36.

[15] Q. Balzano, O. Garay, T. Manning Jr., Electromagnetic Energy Exposure of Simulated Users of Portable Cellular Telephones, IEEE Transactions on Vehicular Technology, vol. 44, no.3, Aug. 1995.

[16] W. Gander, Computermathematick, Birkhaeuser, Basel, 1992.

[17] W.H. Press, S.A. Teukolsky, W.T. Vetterling, and B.P. Flannery, Numerical Recipes in C, The Art of Scientific Computing, Second edition, Cambridge University Press, 1992.

[18] Federal Communications Commission, OET Bulletin 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields. Supplement C, Dec. 1997.

[19] N. Kuster, R. Kastle, T. Schmid, Dosimetric evaluation of mobile communications equipment with known precision, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.

[20] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), Human Exposure to Electromagnetic Fields High-frequency: 10kHz-300GHz, Jan. 1995.

[21] Prof. Dr. Niels Kuster, ETH, Eidgenössische Technische Hoschschule Zürich, Dosimetric Evaluation of the Cellular Phone.

[22] IEC 62209-1, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz), Feb. 2005.

[23] Industry Canada RSS-102 Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) Issue 4, March 2010.

[24] Health Canada Safety Code 6 Limits of Human Exposure to Radio Frequency Electromagnetic Fields in the Frequency Range from 3 kHz – 300 GHz, 2009

[25] FCC Public Notice DA-02-1438. Office of Engineering and Technology Announces a Transition Period for the Phantom Requirements of Supplement C to OET Bulletin 65, June 19, 2002

[26] FCC SAR Measurement Procedures for 3G Devices KDB Publication 941225

[27] SAR Measurement procedures for IEEE 802.11a/b/g KDB Publication 248227

[28] FCC SAR Considerations for Handsets with Multiple Transmitters and Antennas, KDB Publication 648474

[29] FCC Application Note for SAR Probe Calibration and System Verification Consideration for Measurements at 150 MHz – 3 GHz, KDB Publication 450824

[30] FCC SAR Evaluation Considerations for Laptop Computers with Antennas Built-in on Display Screens, KDB Publication 616217

[31] FCC SAR Measurement Requirements for 3 – 6 GHz, KDB Publication 865664

[32] FCC Mobile Portable RF Exposure Procedure, KDB Publication 447498

[33] FCC SAR Procedures for Dongle Transmitters, KDB Publication 447498

[34] Anexo à Resolução No. 533, de 10 de Septembro de 2009.

[35] FCC SAR Test Considerations for LTE Handsets and Data Modems, KDB Publication 941225.

[36] IEC 62209-2, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz), Mar. 2010.

[37] FCC Hot Spot SAR v01, KDB Publication 941225 D06.

APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 2

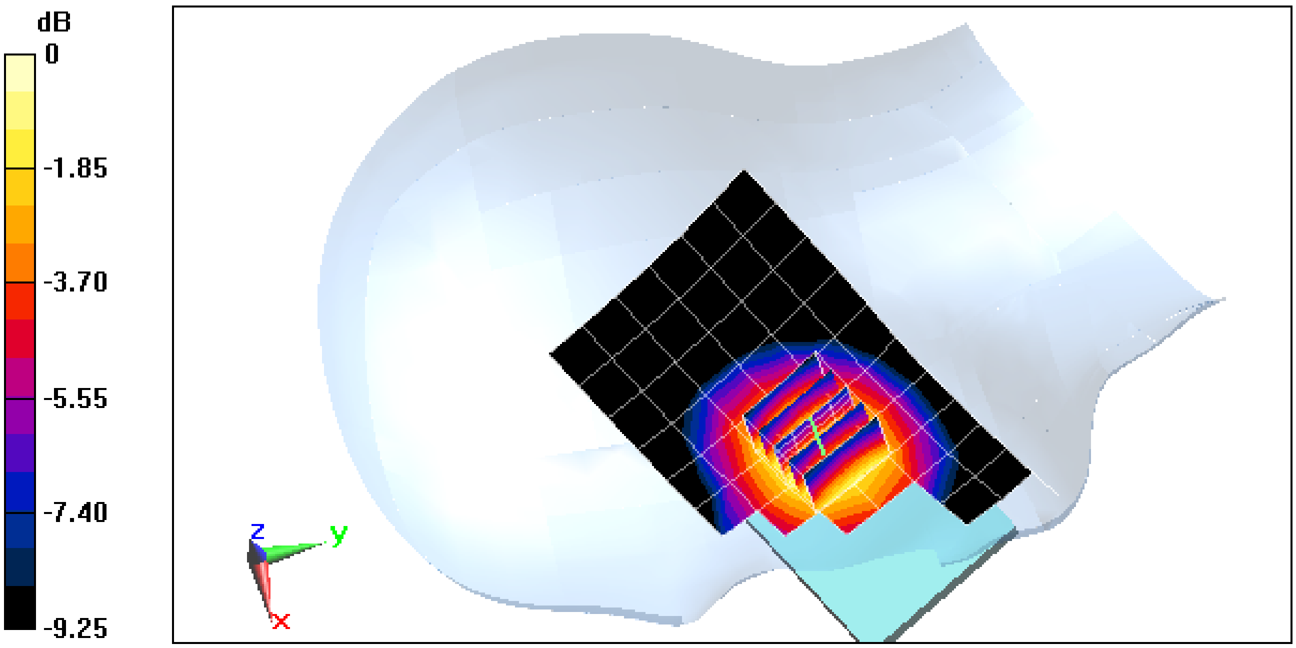
Communication System: LTE BAND 17; Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 710 Head Medium parameters used (interpolated):
f = 711 MHz; σ = 0.86 mho/m; ε_r = 40.967; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-12-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN3561; ConvF(8.38, 8.38, 8.38); Calibrated: 7/27/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 4/12/2012
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 17, Right Head, Touch, High.ch,
10 MHz Bandwidth, QPSK, 1 RB, RB Offset 0

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.110 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.3140
SAR(1 g) = 0.254 mW/g; SAR(10 g) = 0.190 mW/g



0 dB = 0.270mW/g = -11.37 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 2

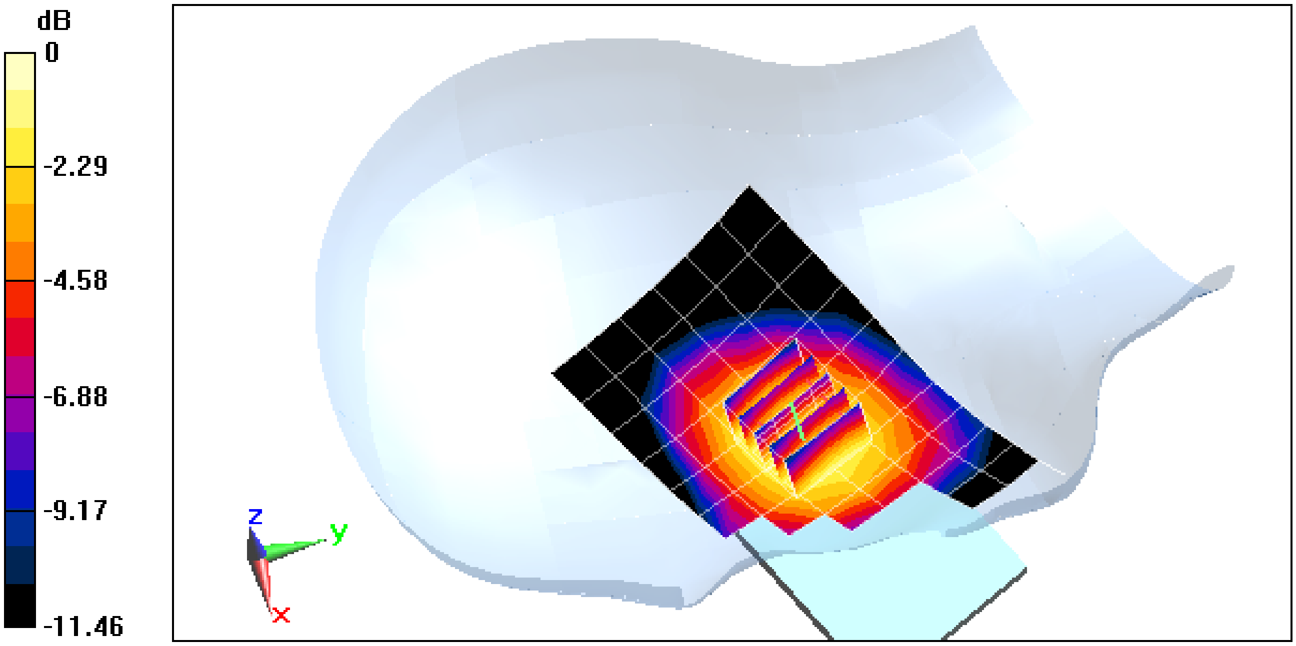
Communication System: LTE BAND 17; Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 710 Head Medium parameters used (interpolated):
f = 711 MHz; σ = 0.86 mho/m; ε_r = 40.967; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-12-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN3561; ConvF(8.38, 8.38, 8.38); Calibrated: 7/27/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 4/12/2012
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 17, Right Head, Tilt, High.ch,
10 MHz Bandwidth, QPSK, 1 RB, RB Offset 0

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.552 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.1550
SAR(1 g) = 0.125 mW/g; SAR(10 g) = 0.093 mW/g



0 dB = 0.130mW/g = -17.72 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 2

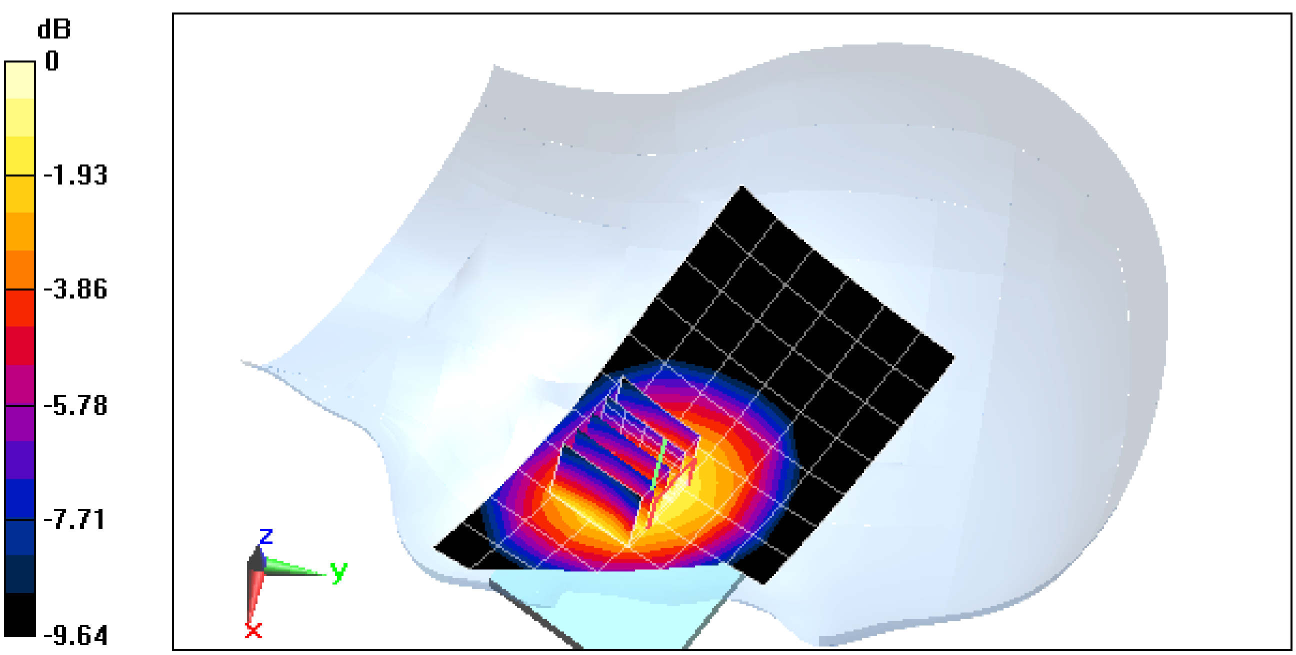
Communication System: LTE BAND 17; Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 710 Head Medium parameters used (interpolated):
$f = 711$ MHz; $\sigma = 0.86$ mho/m; $\varepsilon_r = 40.967$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 06-12-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN3561; ConvF(8.38, 8.38, 8.38); Calibrated: 7/27/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 4/12/2012
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 17, Left Head, Touch, High.ch,
10 MHz Bandwidth, QPSK, 1 RB, RB Offset 0

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.156 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.4090
SAR(1 g) = 0.301 mW/g; SAR(10 g) = 0.224 mW/g



0 dB = 0.310mW/g = -10.17 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 2

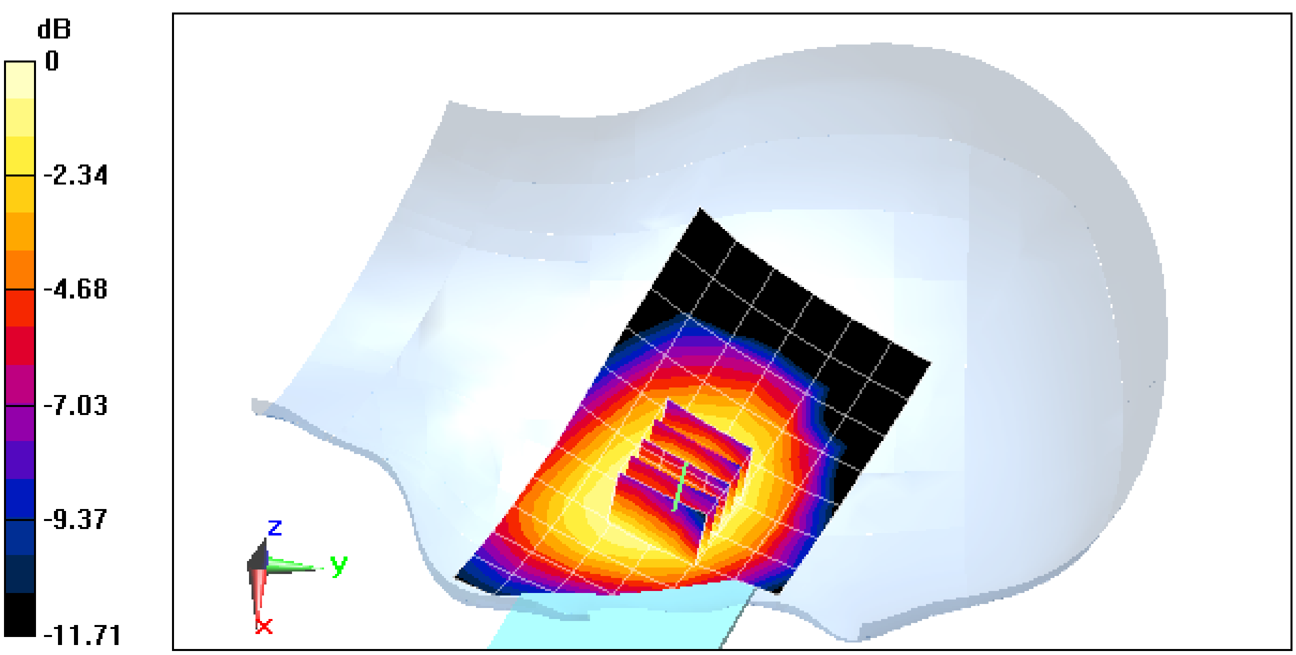
Communication System: LTE BAND 17; Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 710 Head Medium parameters used (interpolated):
f = 711 MHz; σ = 0.86 mho/m; ε_r = 40.967; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-12-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN3561; ConvF(8.38, 8.38, 8.38); Calibrated: 7/27/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 4/12/2012
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 17, Left Head, Tilt, High.ch,
10 MHz Bandwidth, QPSK, 1 RB, RB Offset 0

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.115 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.1760
SAR(1 g) = 0.139 mW/g; SAR(10 g) = 0.104 mW/g



0 dB = 0.100mW/g = -20.00 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

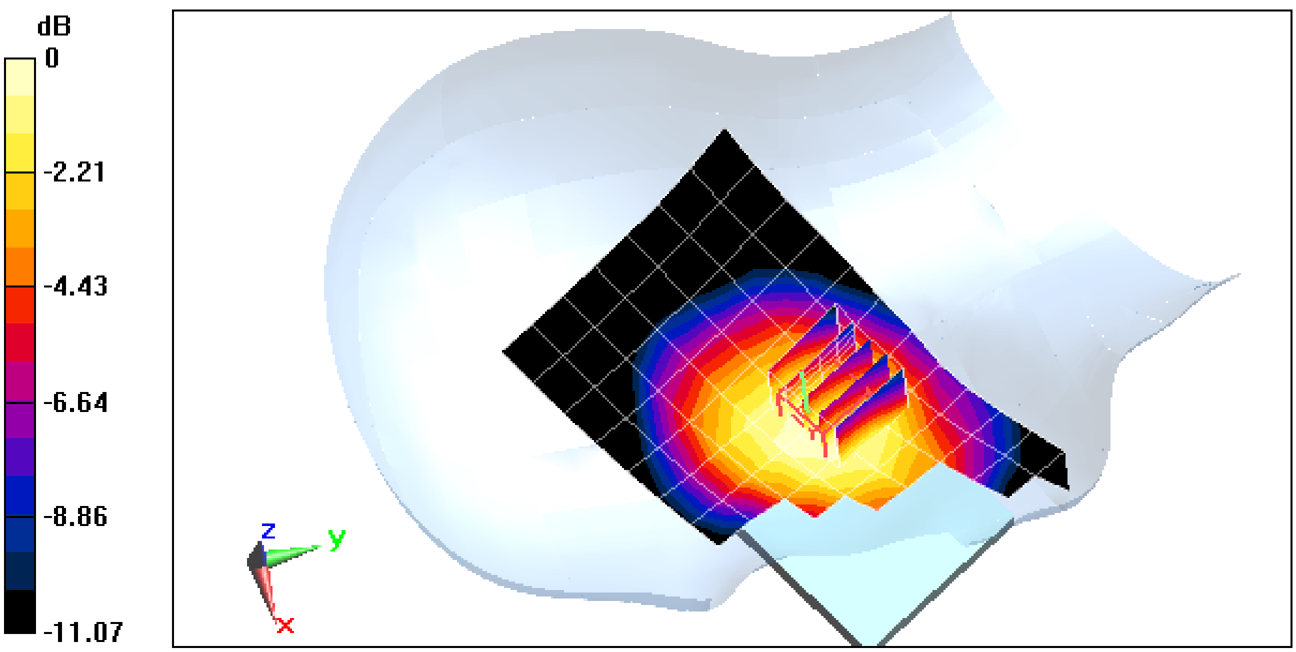
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: 835 Head Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.921 mho/m; ε_r = 41.475; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: GSM 850, Right Head, Touch, Mid.ch

Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.284 V/m; Power Drift = 0.001 dB
Peak SAR (extrapolated) = 0.3710
SAR(1 g) = 0.285 mW/g; SAR(10 g) = 0.217 mW/g



0 dB = 0.290mW/g = -10.75 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

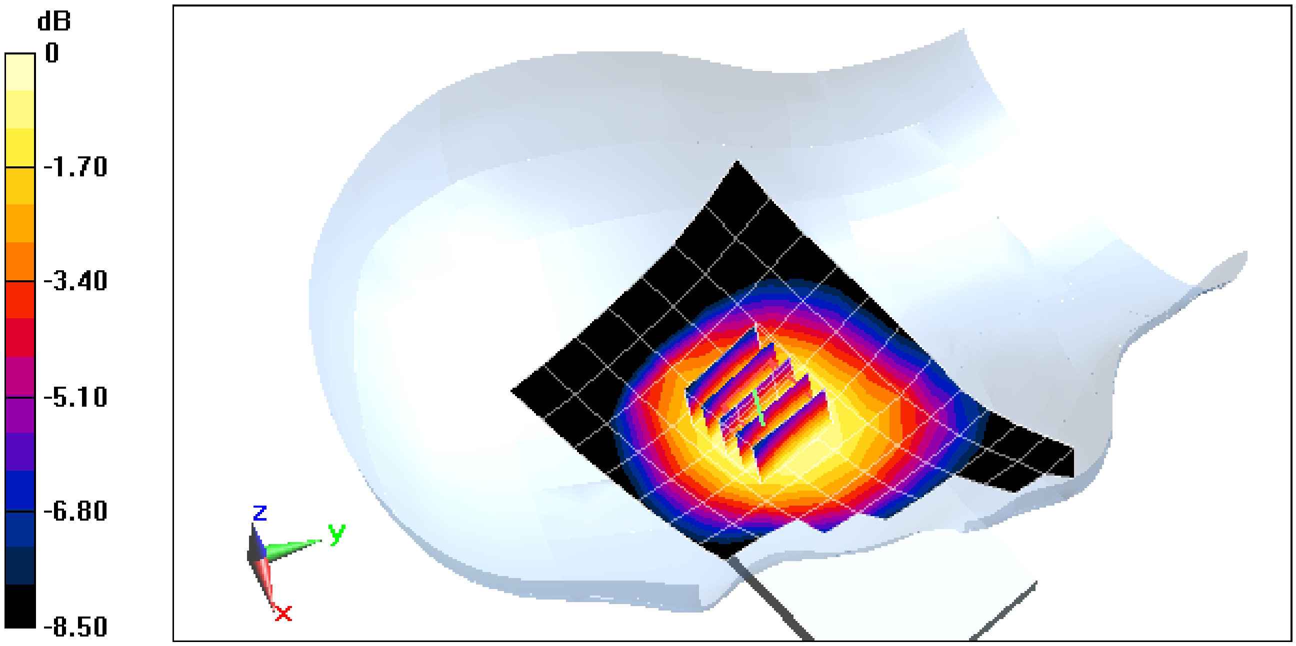
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: 835 Head Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.921 mho/m; ε_r = 41.475; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: GSM 850, Right Head, Tilt, Mid.ch

Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.579 V/m; Power Drift = 0.0033 dB
Peak SAR (extrapolated) = 0.1950
SAR(1 g) = 0.165 mW/g; SAR(10 g) = 0.129 mW/g



0 dB = 0.170mW/g = -15.39 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

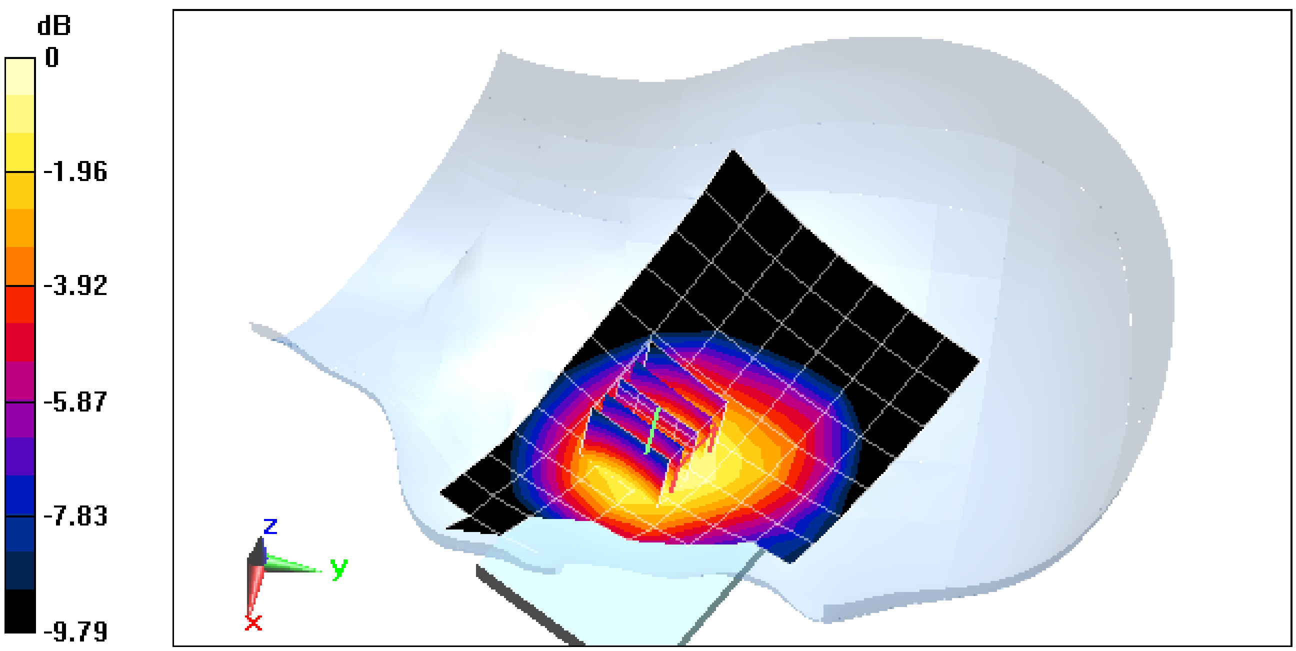
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: 835 Head Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.921$ mho/m; $\varepsilon_r = 41.475$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, Version 4.7 (80) ; SEMCAD X Version 14.6.5 (6469)

Mode: GSM 850, Left Head, Touch, Mid.ch

Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.420 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.2960
SAR(1 g) = 0.237 mW/g; SAR(10 g) = 0.178 mW/g



0 dB = 0.250mW/g = -12.04 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

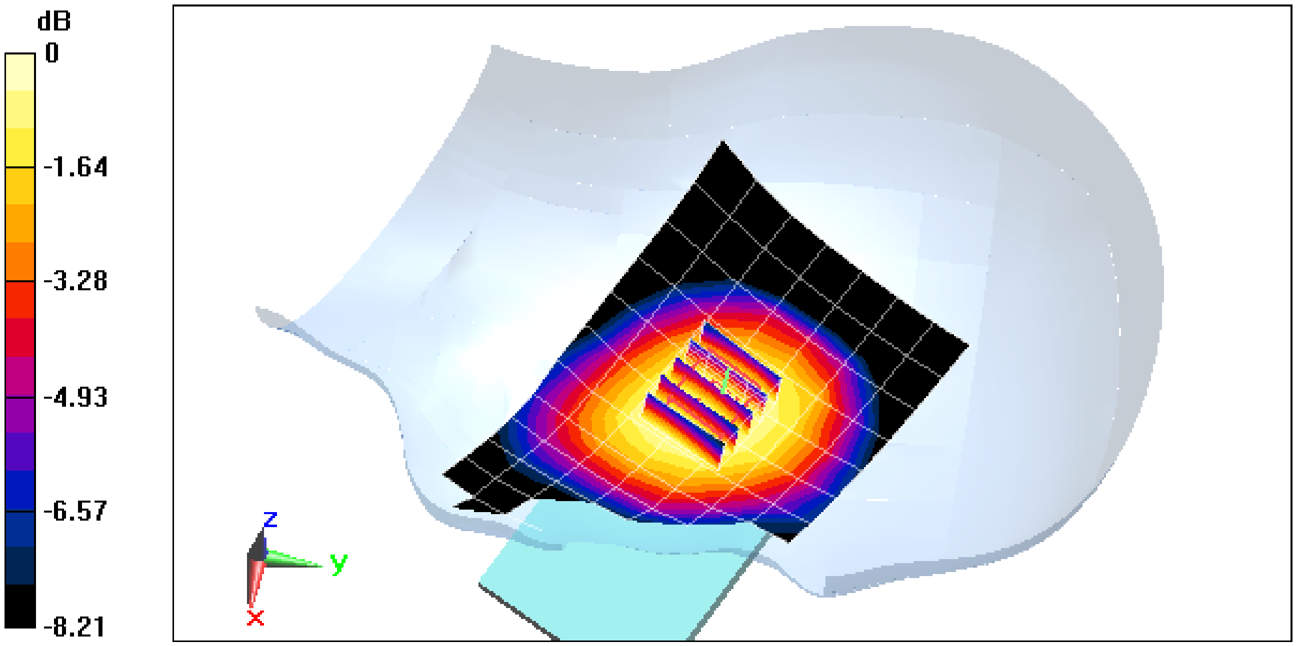
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: 835 Head Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.921 mho/m; ε_r = 41.475; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: GSM 850, Left Head, Tilt, Mid.ch

Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.333 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.1570
SAR(1 g) = 0.133 mW/g; SAR(10 g) = 0.106 mW/g



0 dB = 0.140mW/g = -17.08 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

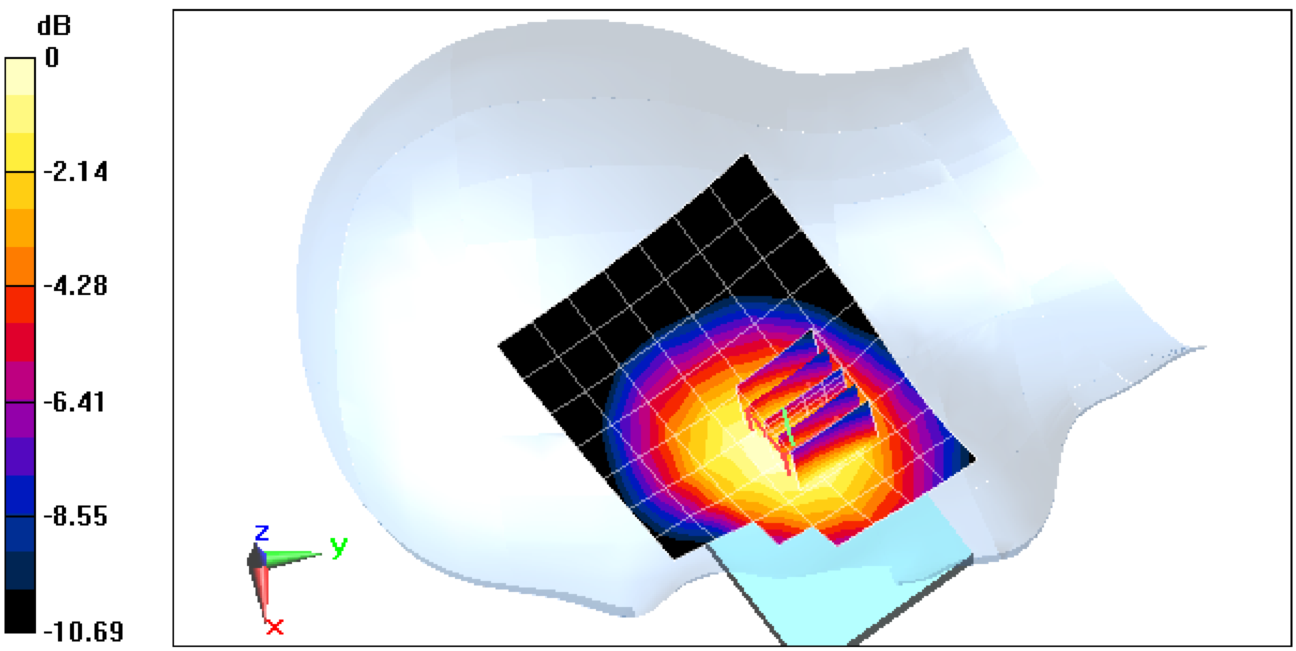
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.921 mho/m; ε_r = 41.475; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 850, Right Head, Touch, Mid.ch

Area Scan (8x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.971 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.4290
SAR(1 g) = 0.320 mW/g; SAR(10 g) = 0.238 mW/g



0 dB = 0.330mW/g = -9.63 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

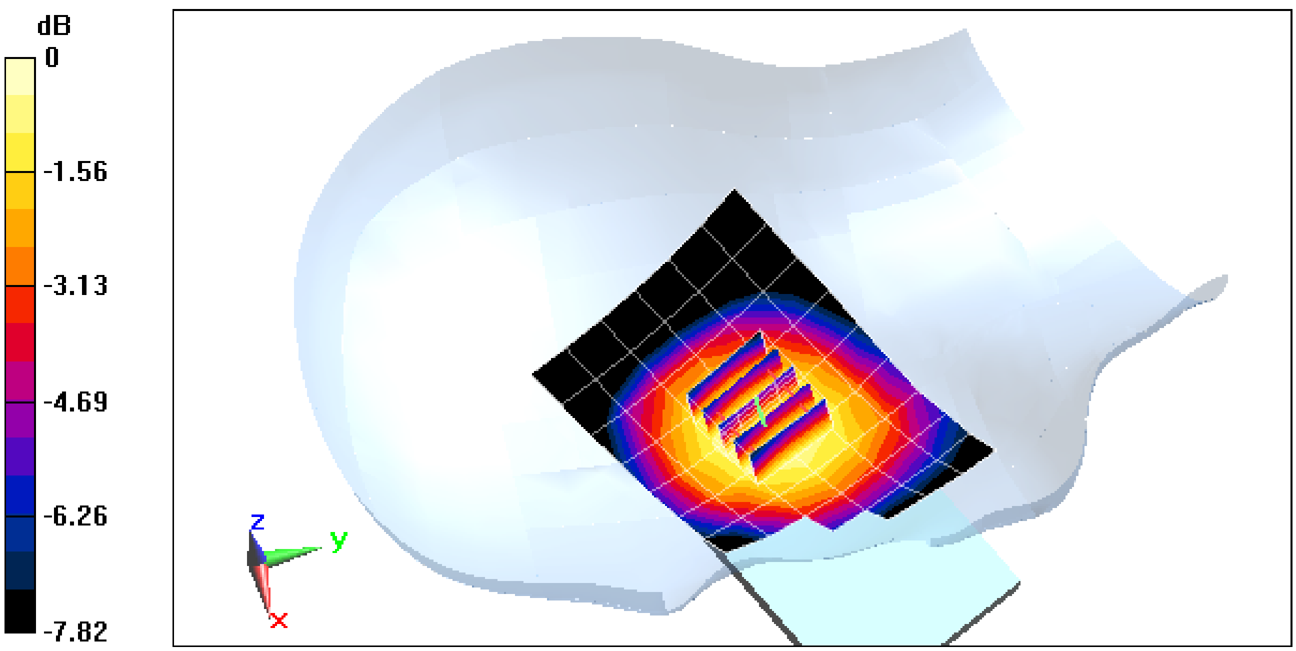
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.921 mho/m; ε_r = 41.475; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 850, Right Head, Tilt, Mid.ch

Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.744 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.2180
SAR(1 g) = 0.188 mW/g; SAR(10 g) = 0.149 mW/g



0 dB = 0.200mW/g = -13.98 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

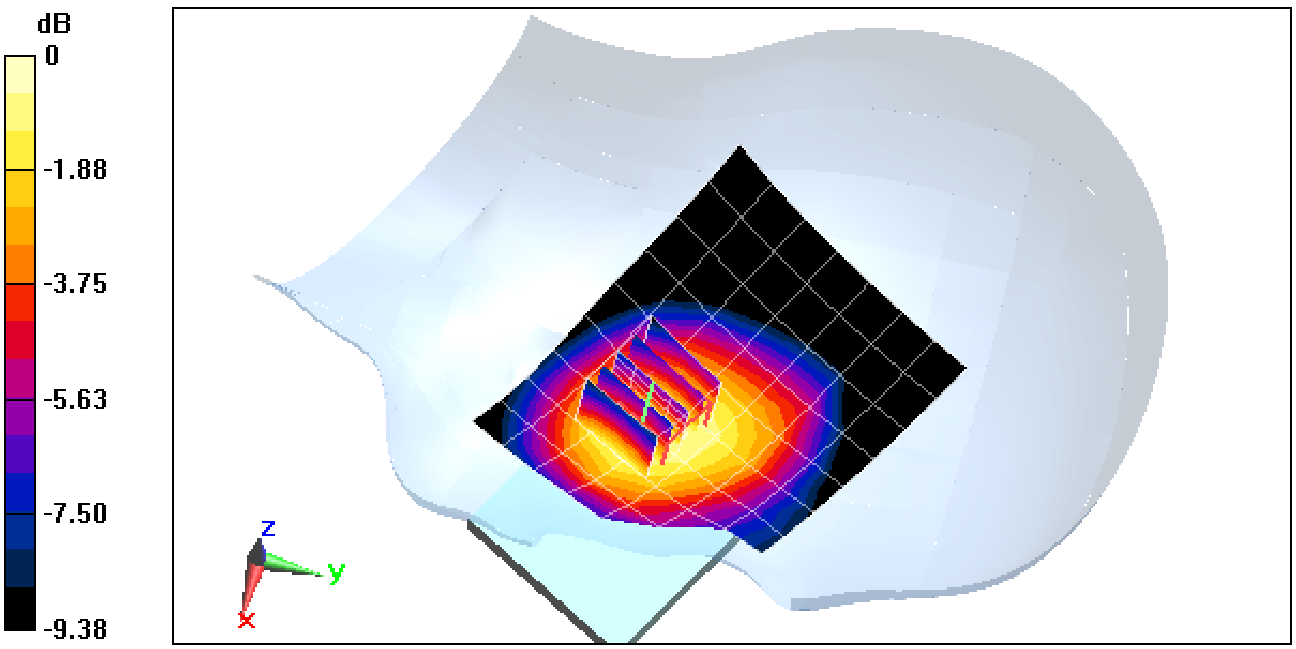
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.921 mho/m; ε_r = 41.475; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 850, Left Head, Touch, Mid.ch

Area Scan (8x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.526 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.3160
SAR(1 g) = 0.265 mW/g; SAR(10 g) = 0.202 mW/g



0 dB = 0.280mW/g = -11.06 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

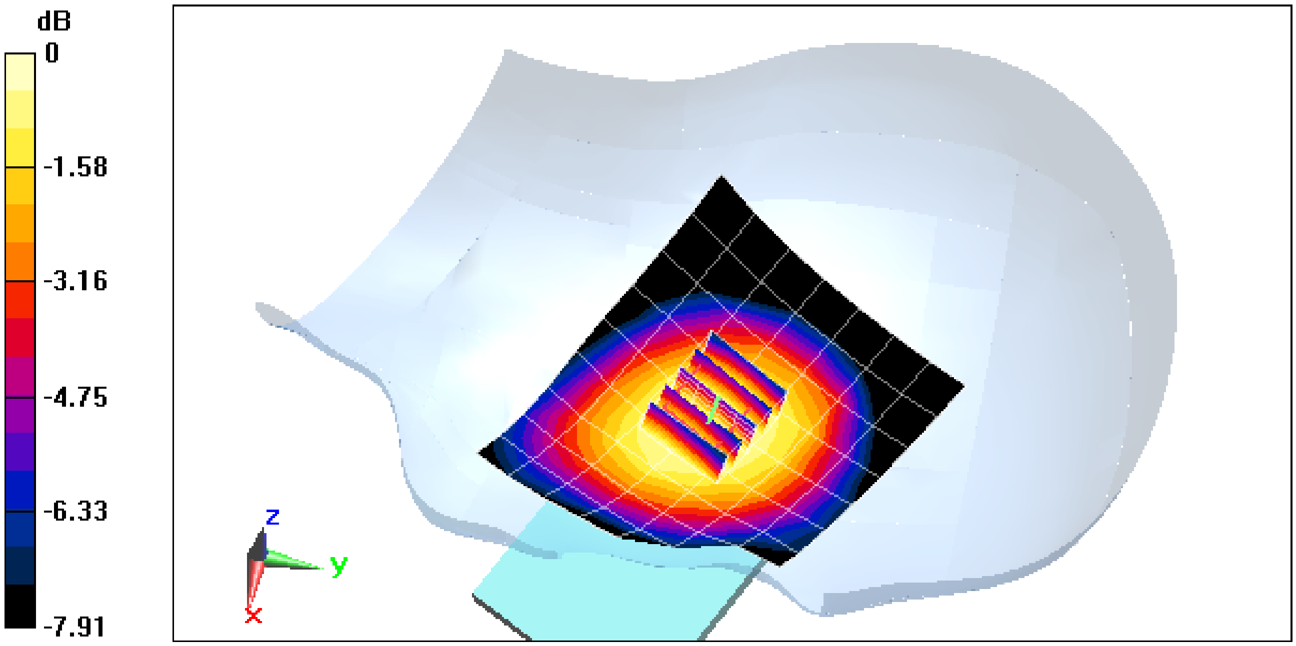
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.921 mho/m; ε_r = 41.475; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 850, Left Head, Tilt, Mid.ch

Area Scan (8x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.380 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.1830
SAR(1 g) = 0.157 mW/g; SAR(10 g) = 0.124 mW/g



0 dB = 0.160mW/g = -15.92 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 3

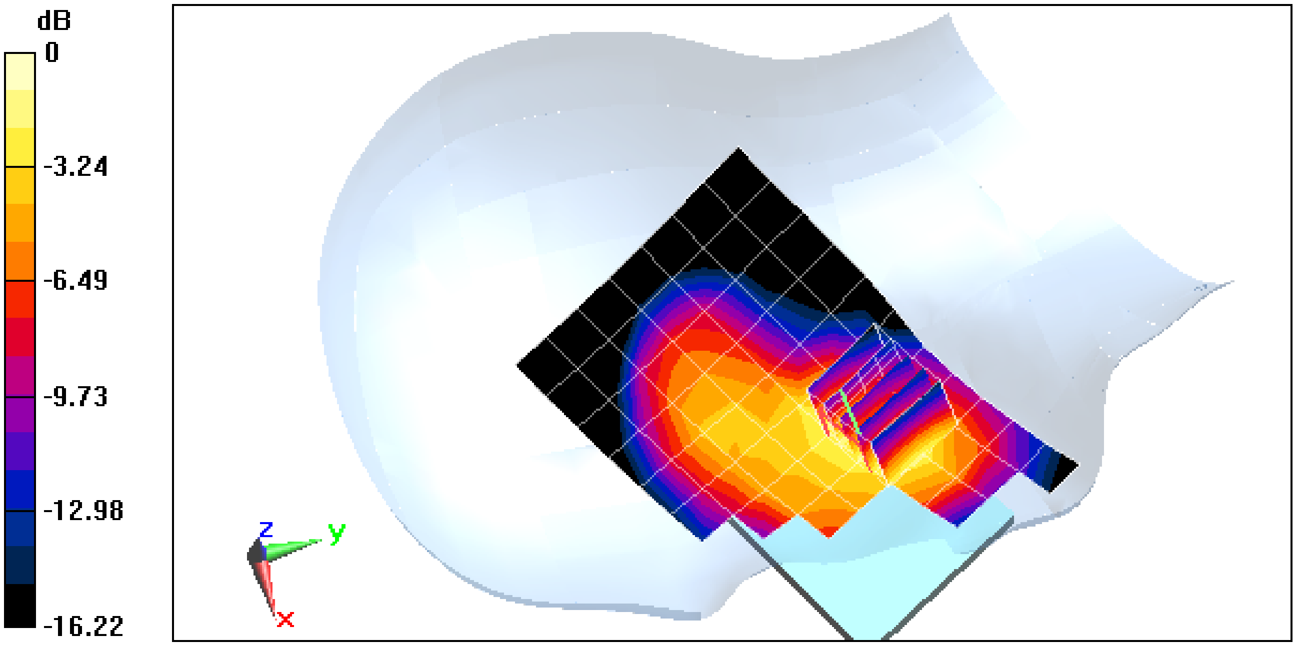
Communication System: LTE RF; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
$f = 1732.5$ MHz; $\sigma = 1.38$ mho/m; $\varepsilon_r = 39.149$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 06-07-2012; Ambient Temp: 23.6°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3209; ConvF(5.26, 5.26, 5.26); Calibrated: 3/16/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 4 (AWS), Right Head, Touch, Mid.ch, QPSK, 10 MHz Bandwidth, 1 RB, 0 RB Offset

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.832 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.8740
SAR(1 g) = 0.557 mW/g; SAR(10 g) = 0.336 mW/g



0 dB = 0.580mW/g = -4.73 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 3

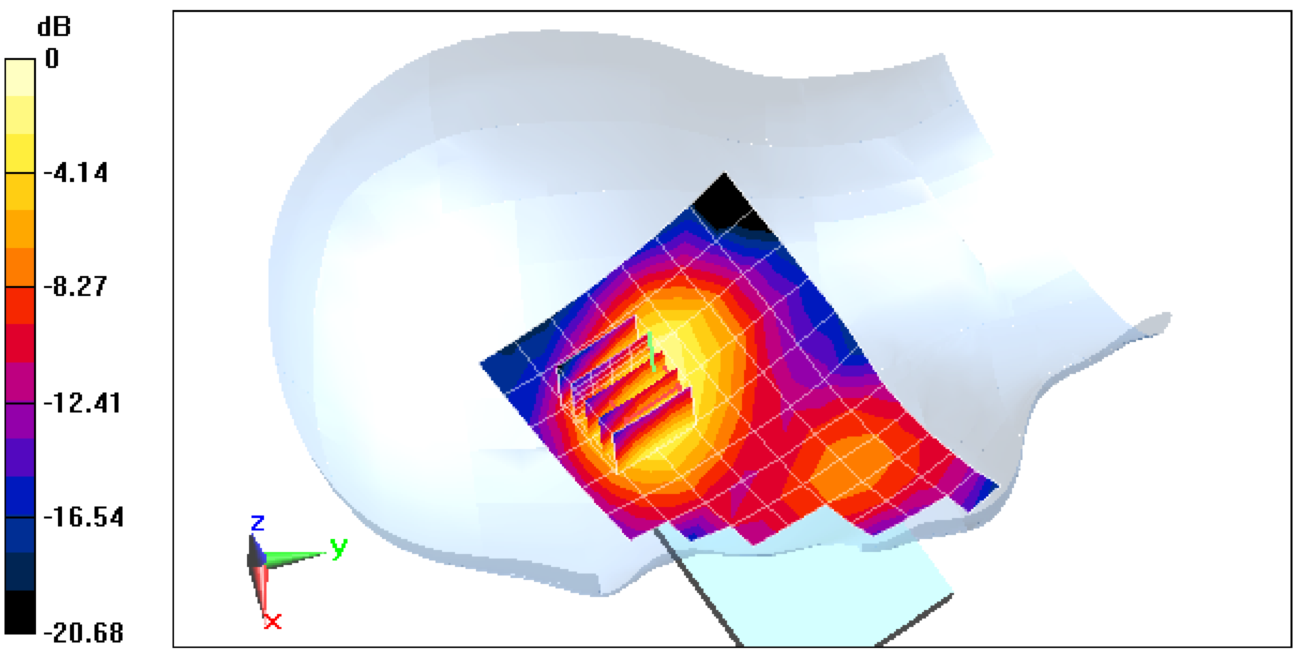
Communication System: LTE RF; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
$f = 1732.5$ MHz; $\sigma = 1.38$ mho/m; $\varepsilon_r = 39.149$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 06-07-2012; Ambient Temp: 23.6°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3209; ConvF(5.26, 5.26, 5.26); Calibrated: 3/16/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 4 (AWS), Right Head, Tilt, Mid.ch, QPSK, 10 MHz Bandwidth, 1 RB, 0 RB Offset

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.783 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.4270
SAR(1 g) = 0.287 mW/g; SAR(10 g) = 0.183 mW/g



0 dB = 0.310mW/g = -10.17 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 3

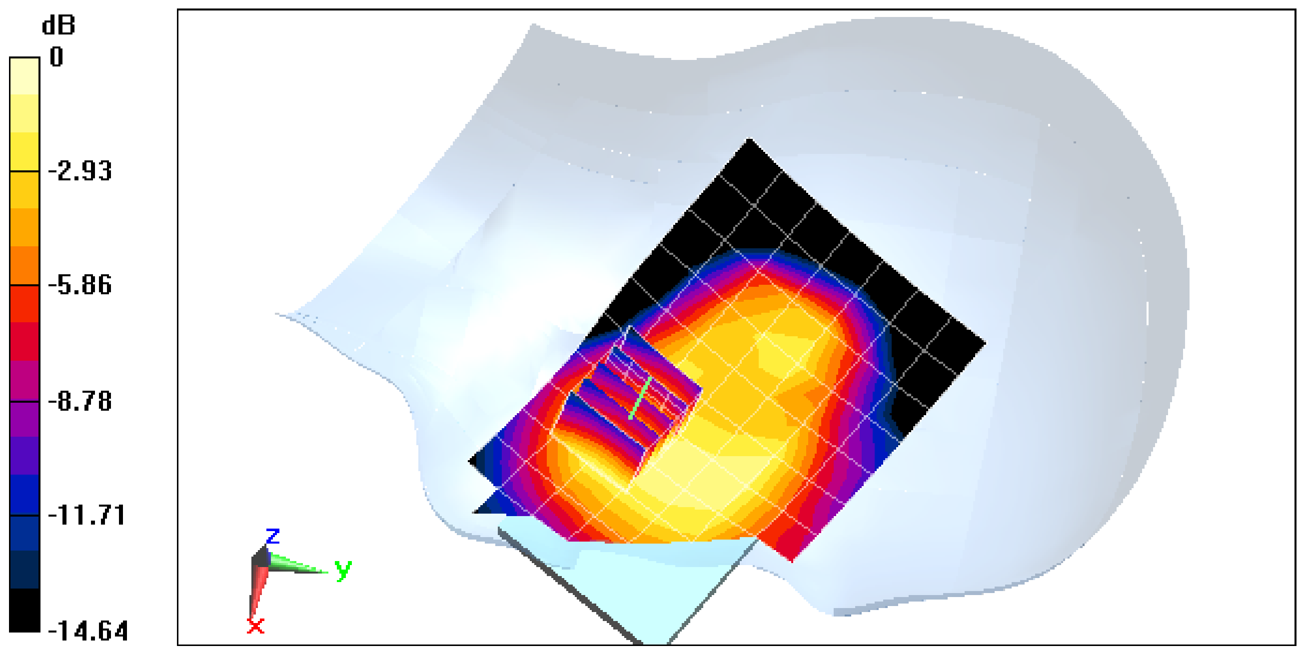
Communication System: LTE RF; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
$f = 1732.5$ MHz; $\sigma = 1.38$ mho/m; $\varepsilon_r = 39.149$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 06-07-2012; Ambient Temp: 23.6°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3209; ConvF(5.26, 5.26, 5.26); Calibrated: 3/16/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 4 (AWS), Left Head, Touch, Mid.ch, QPSK, 10 MHz Bandwidth, 1 RB, 0 RB Offset

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.934 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.3880
SAR(1 g) = 0.264 mW/g; SAR(10 g) = 0.177 mW/g



0 dB = 0.280mW/g = -11.06 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 3

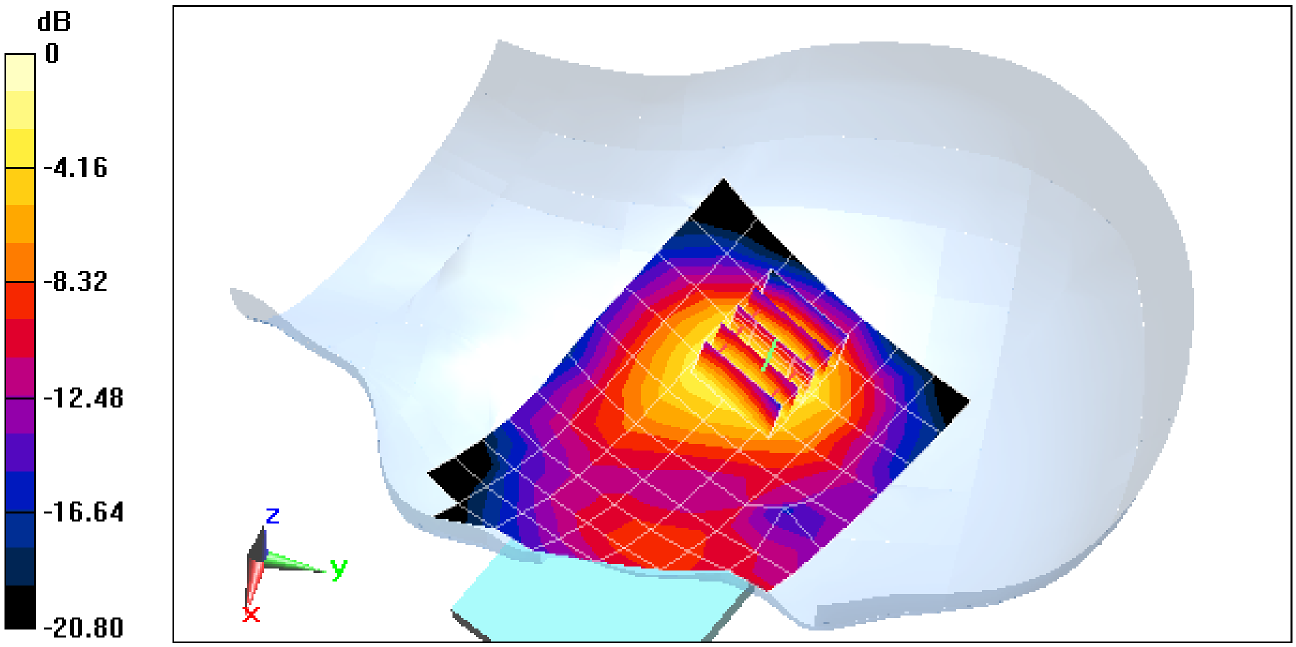
Communication System: LTE RF; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.38 mho/m; ε_r = 39.149; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-07-2012; Ambient Temp: 23.6°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3209; ConvF(5.26, 5.26, 5.26); Calibrated: 3/16/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 4 (AWS), Left Head, Tilt, Mid.ch, QPSK, 10 MHz Bandwidth, 1 RB, 49 RB Offset

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.499 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.4100
SAR(1 g) = 0.262 mW/g; SAR(10 g) = 0.158 mW/g



0 dB = 0.290mW/g = -10.75 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

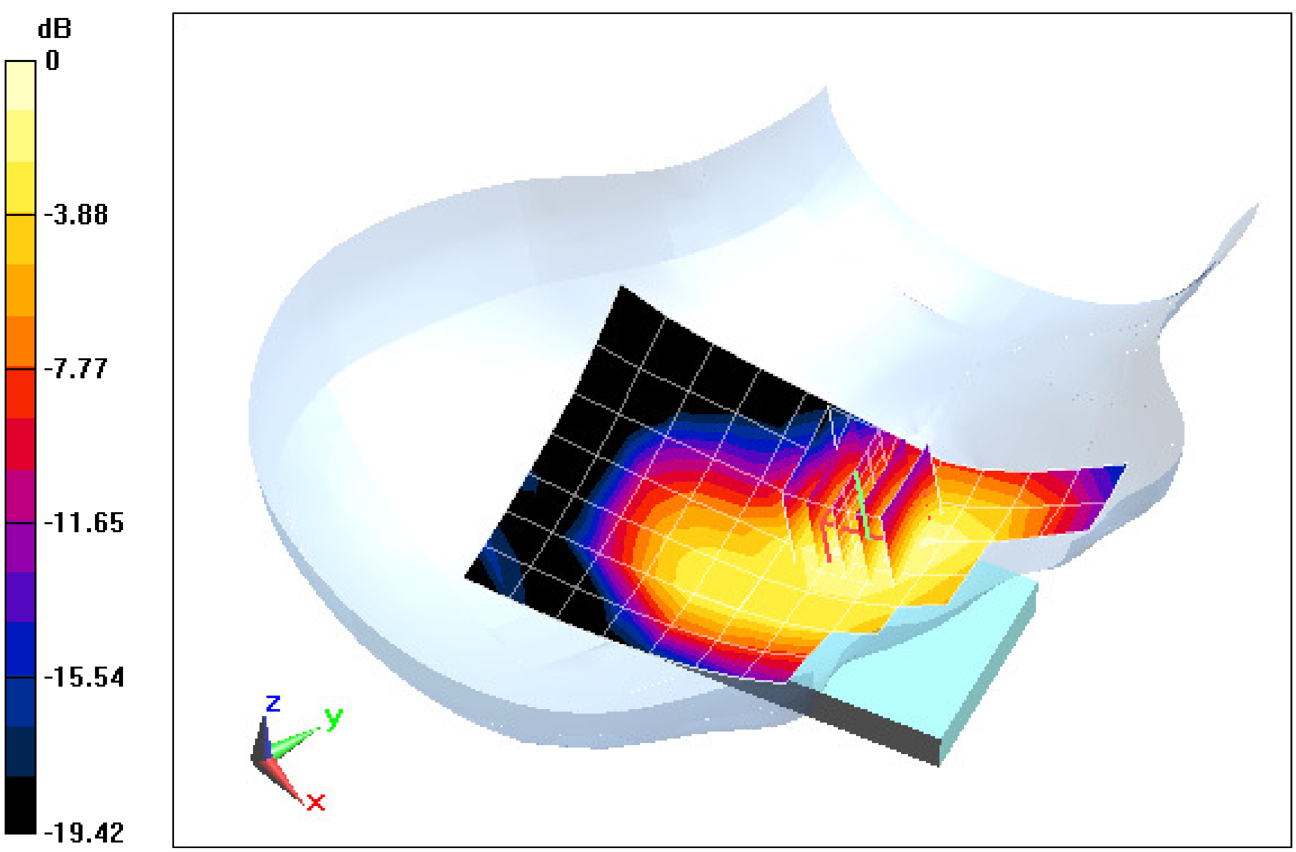
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.425 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-05-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: GSM 1900, Right Head, Touch, Mid.ch

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.946 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.339 mW/g
SAR(1 g) = 0.216 mW/g; SAR(10 g) = 0.133 mW/g



0 dB = 0.232 mW/g = -12.69 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

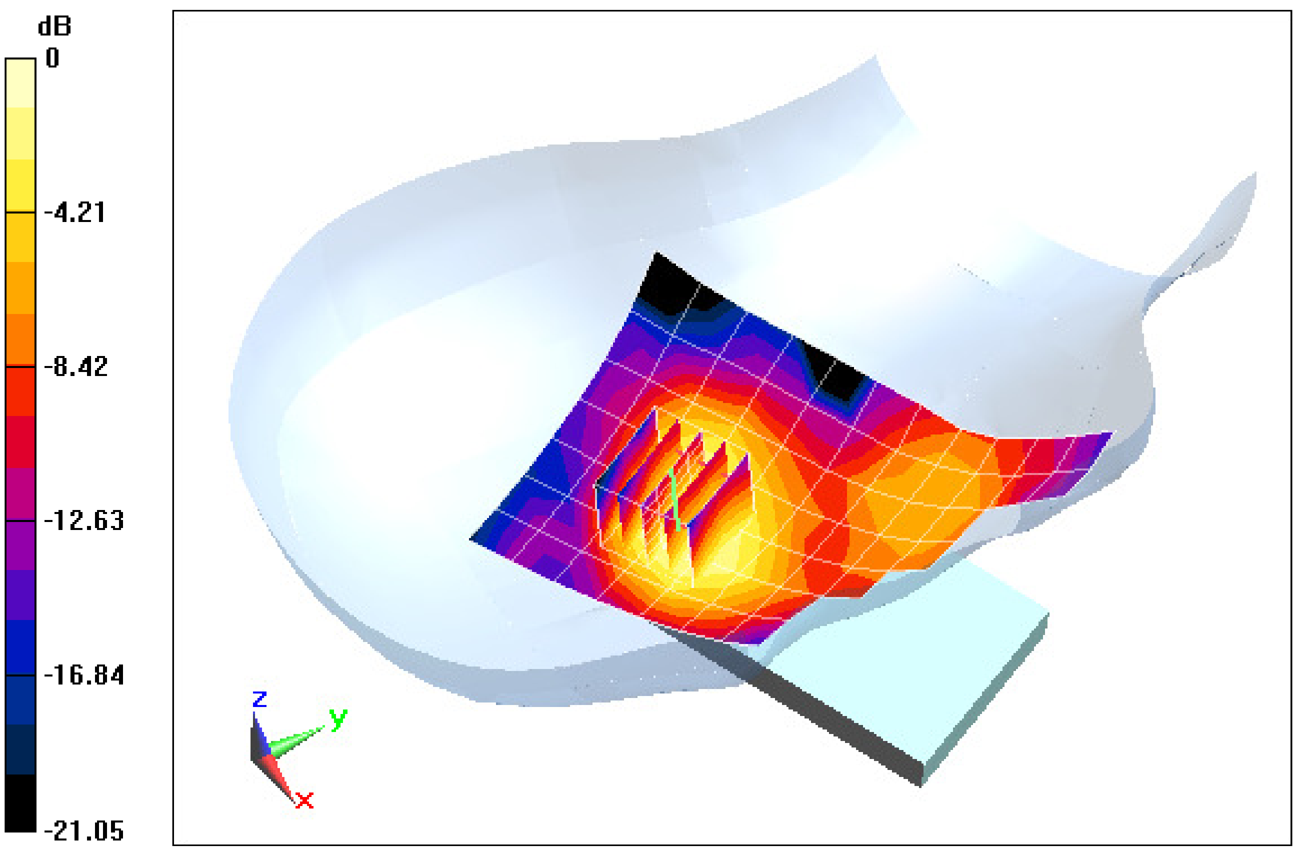
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.425 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-05-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: GSM 1900, Right Head, Tilt, Mid.ch

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.723 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.154 mW/g
SAR(1 g) = 0.103 mW/g; SAR(10 g) = 0.065 mW/g



0 dB = 0.111 mW/g = -19.09 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

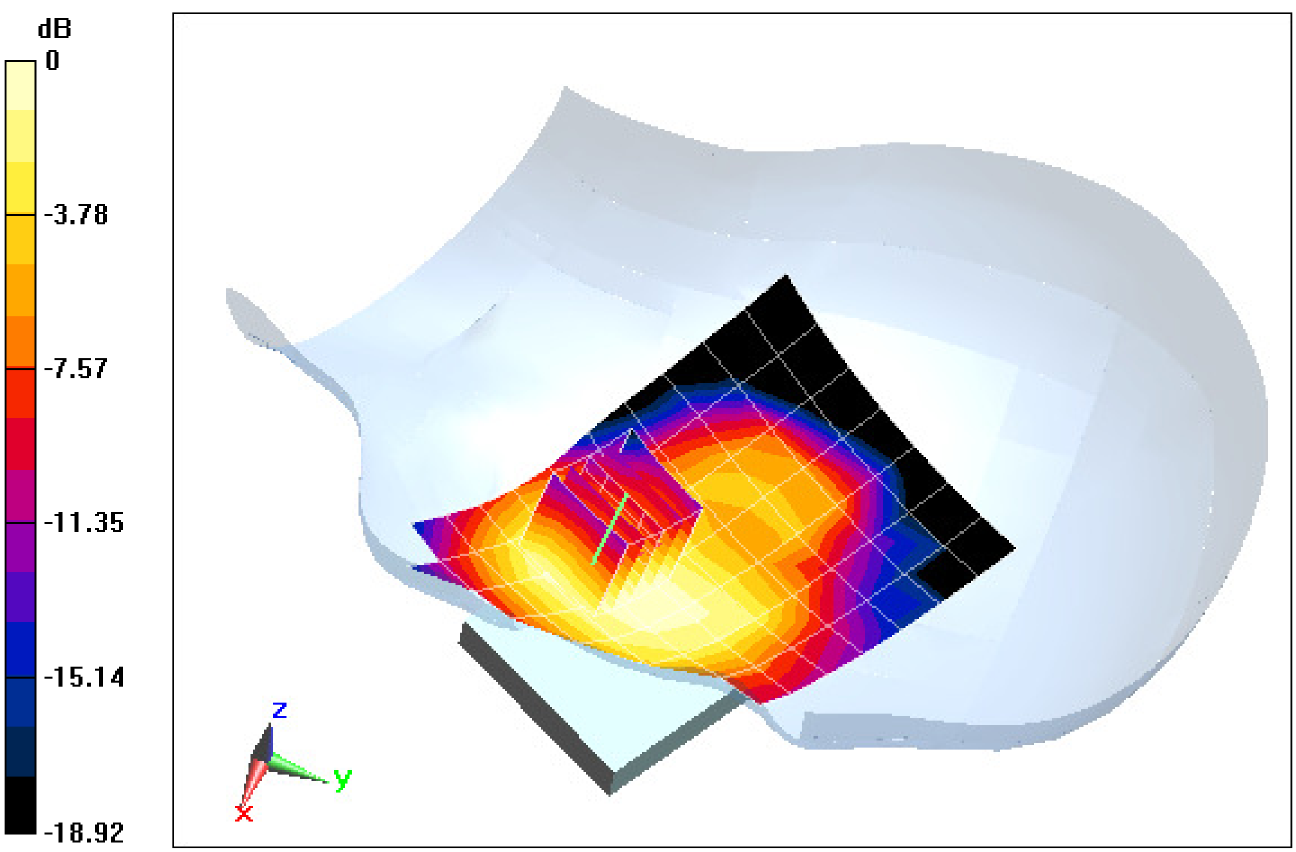
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.425 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-05-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: GSM 1900, Left Head, Touch, Mid.ch

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.475 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.212 mW/g
SAR(1 g) = 0.147 mW/g; SAR(10 g) = 0.098 mW/g



0 dB = 0.154 mW/g = -16.25 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

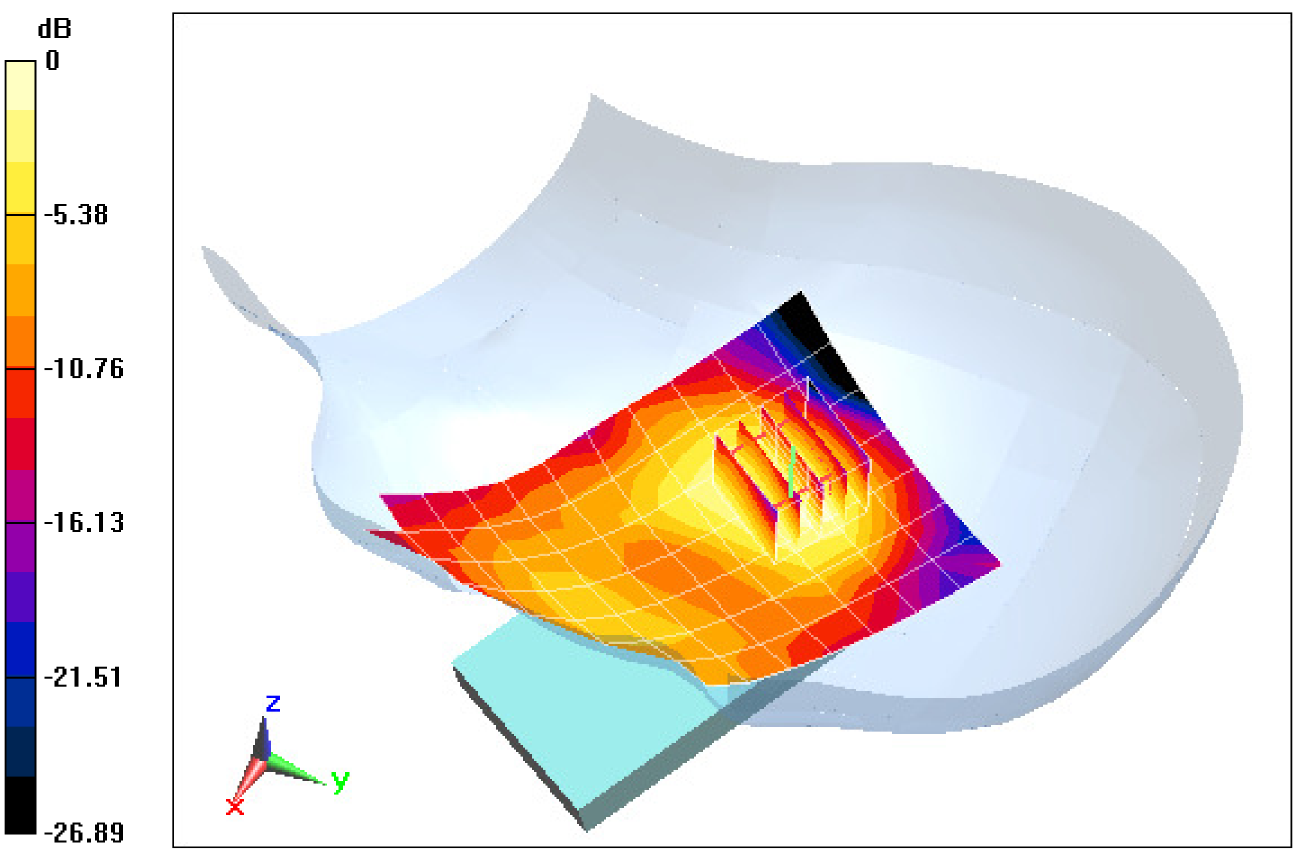
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.425 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-05-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: GSM 1900, Left Head, Tilt, Mid.ch

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.185 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.156 mW/g
SAR(1 g) = 0.098 mW/g; SAR(10 g) = 0.058 mW/g



0 dB = 0.107 mW/g = -19.41 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

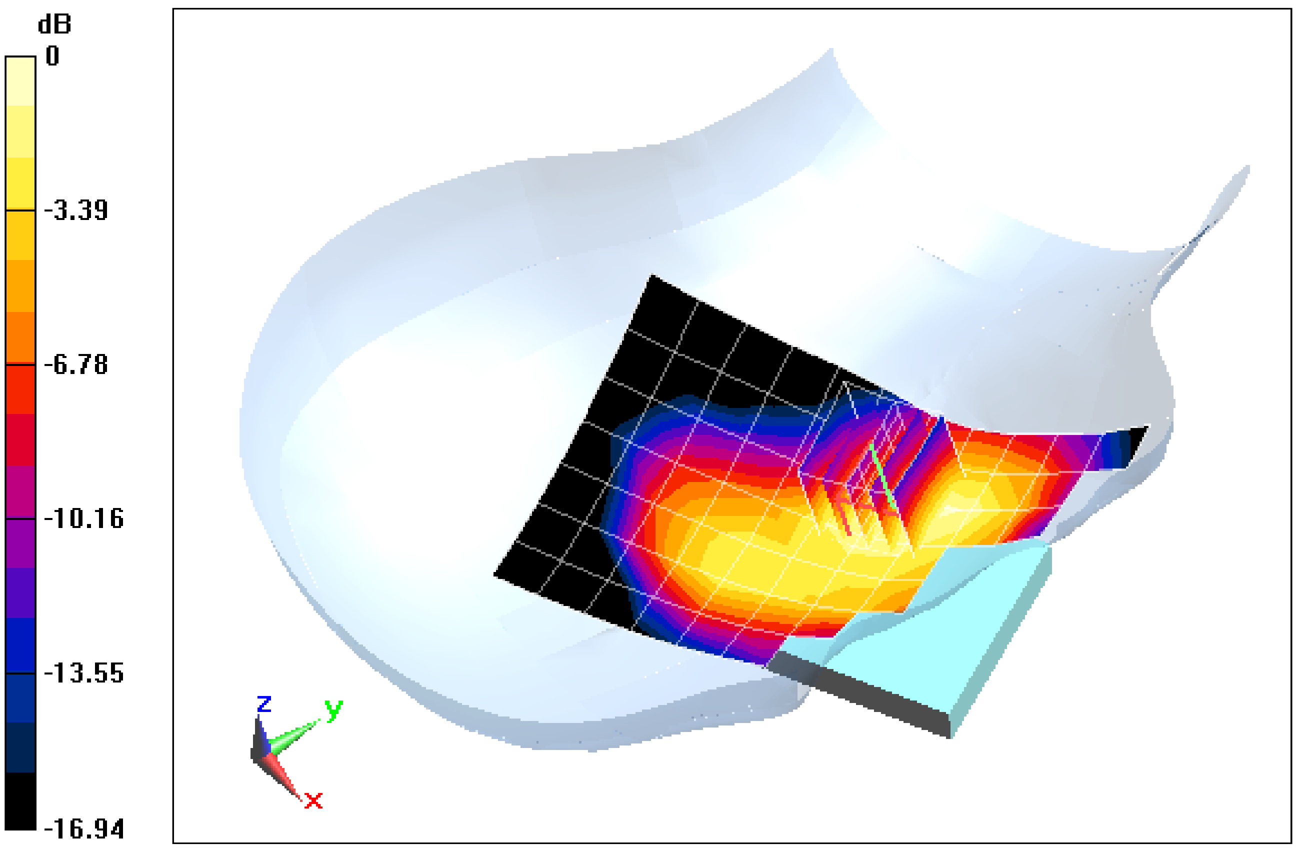
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.425 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-05-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 1900, Right Head, Touch, Mid.ch

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.001 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.686 mW/g
SAR(1 g) = 0.441 mW/g; SAR(10 g) = 0.272 mW/g



0 dB = 0.482 mW/g = -6.34 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

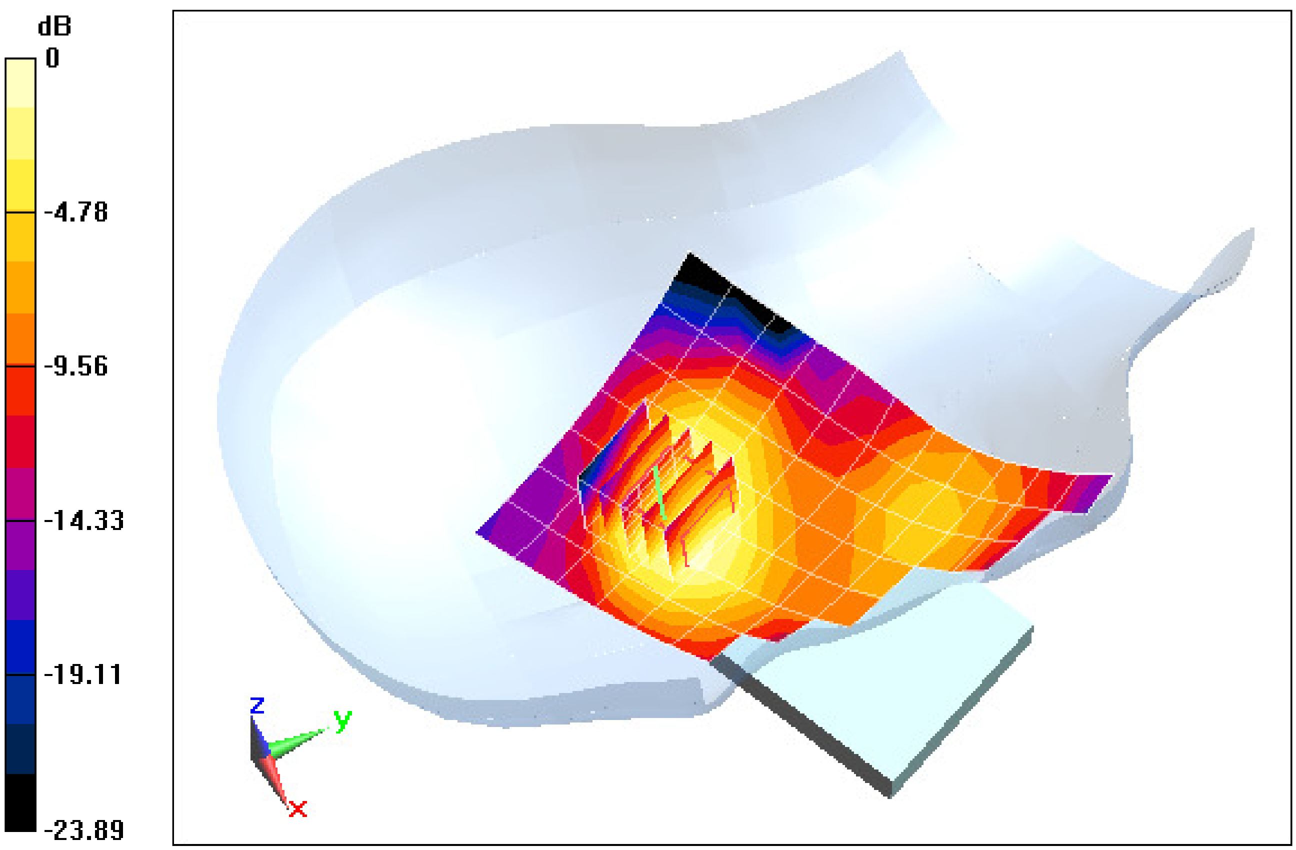
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.425 mho/m; ϵ_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-05-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 1900, Right Head, Tilt, Mid.ch

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.878 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.303 mW/g
SAR(1 g) = 0.204 mW/g; SAR(10 g) = 0.129 mW/g



0 dB = 0.218 mW/g = -13.23 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

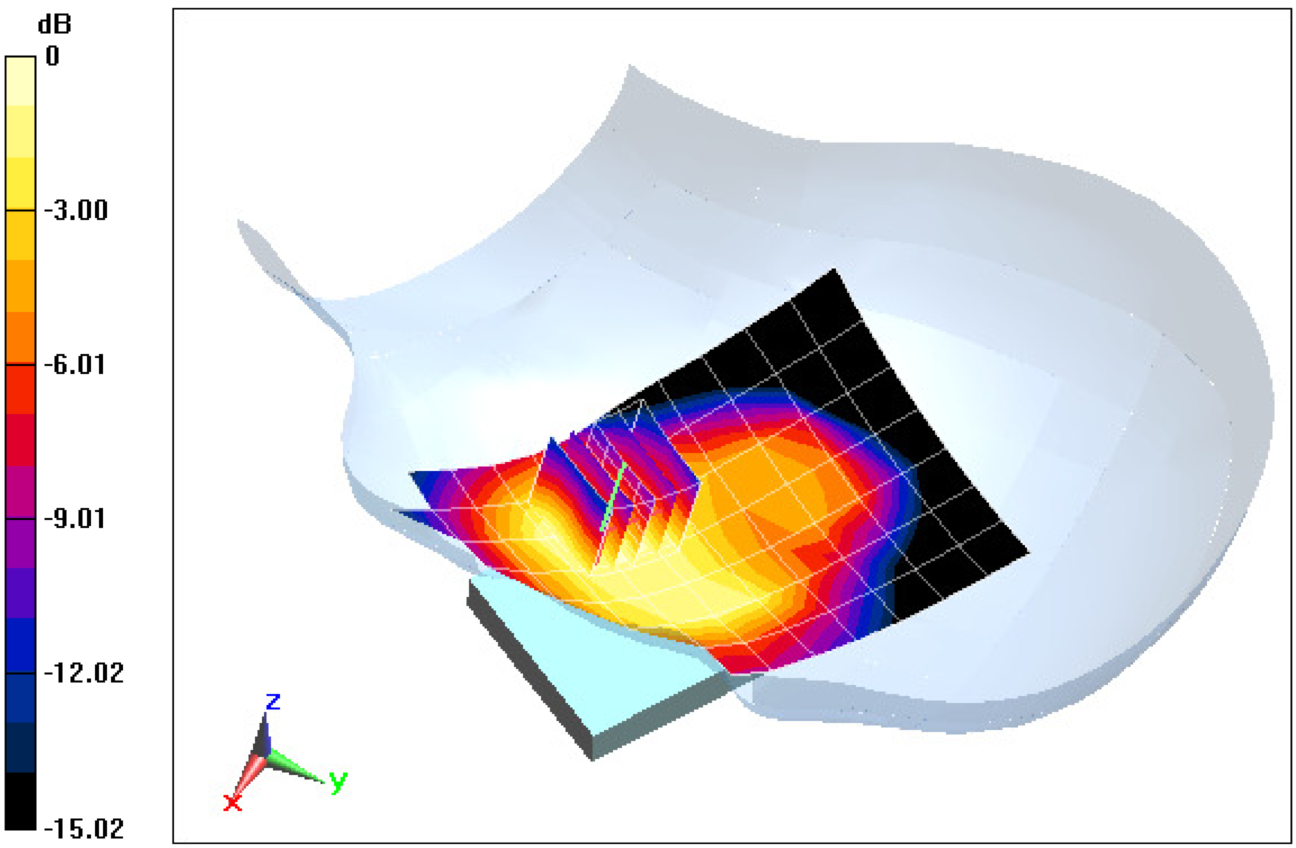
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.425 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-05-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 1900, Left Head, Touch, Mid.ch

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.445 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.407 mW/g
SAR(1 g) = 0.276 mW/g; SAR(10 g) = 0.181 mW/g



0 dB = 0.292 mW/g = -10.69 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

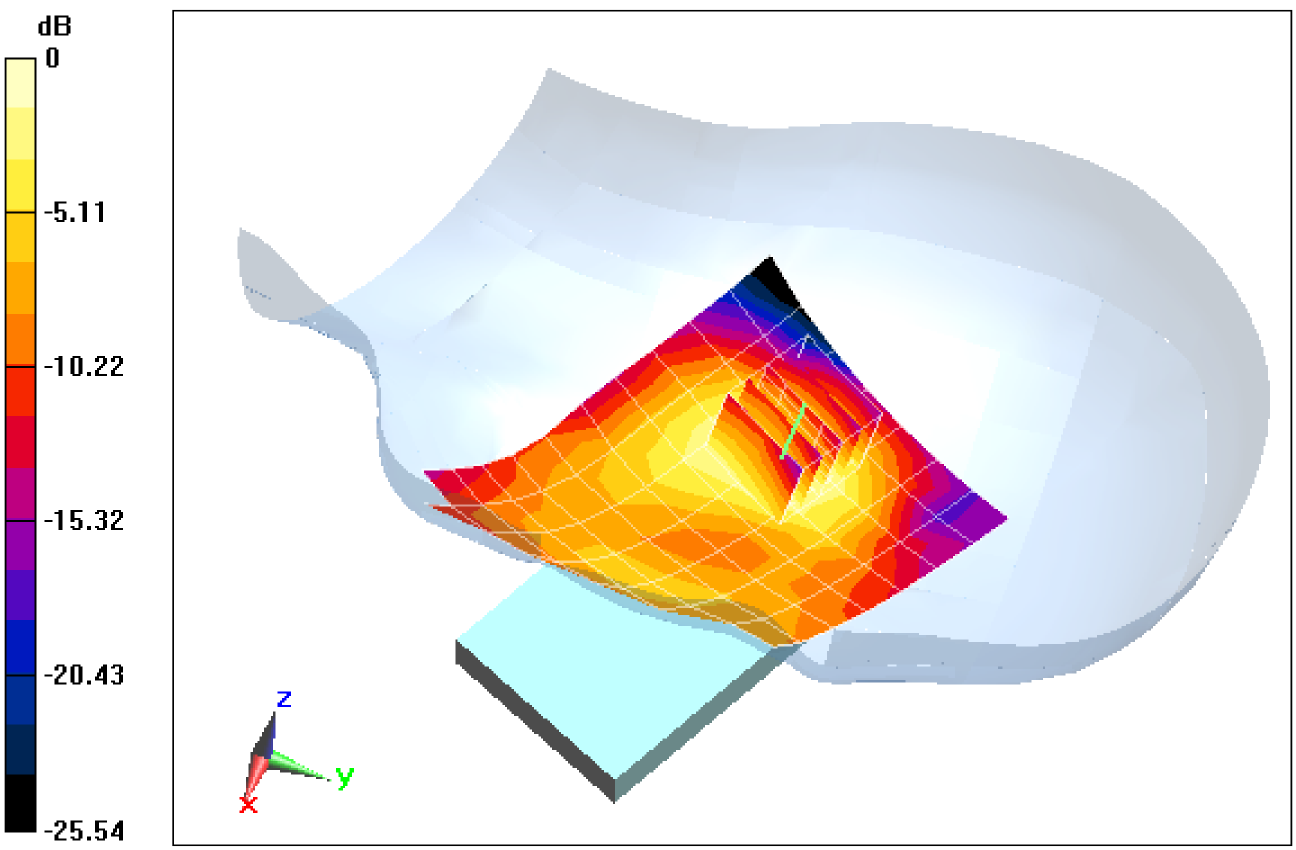
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.425 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-05-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 1900, Left Head, Tilt, Mid.ch

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.865 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.278 mW/g
SAR(1 g) = 0.174 mW/g; SAR(10 g) = 0.104 mW/g



0 dB = 0.191 mW/g = -14.38 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 15

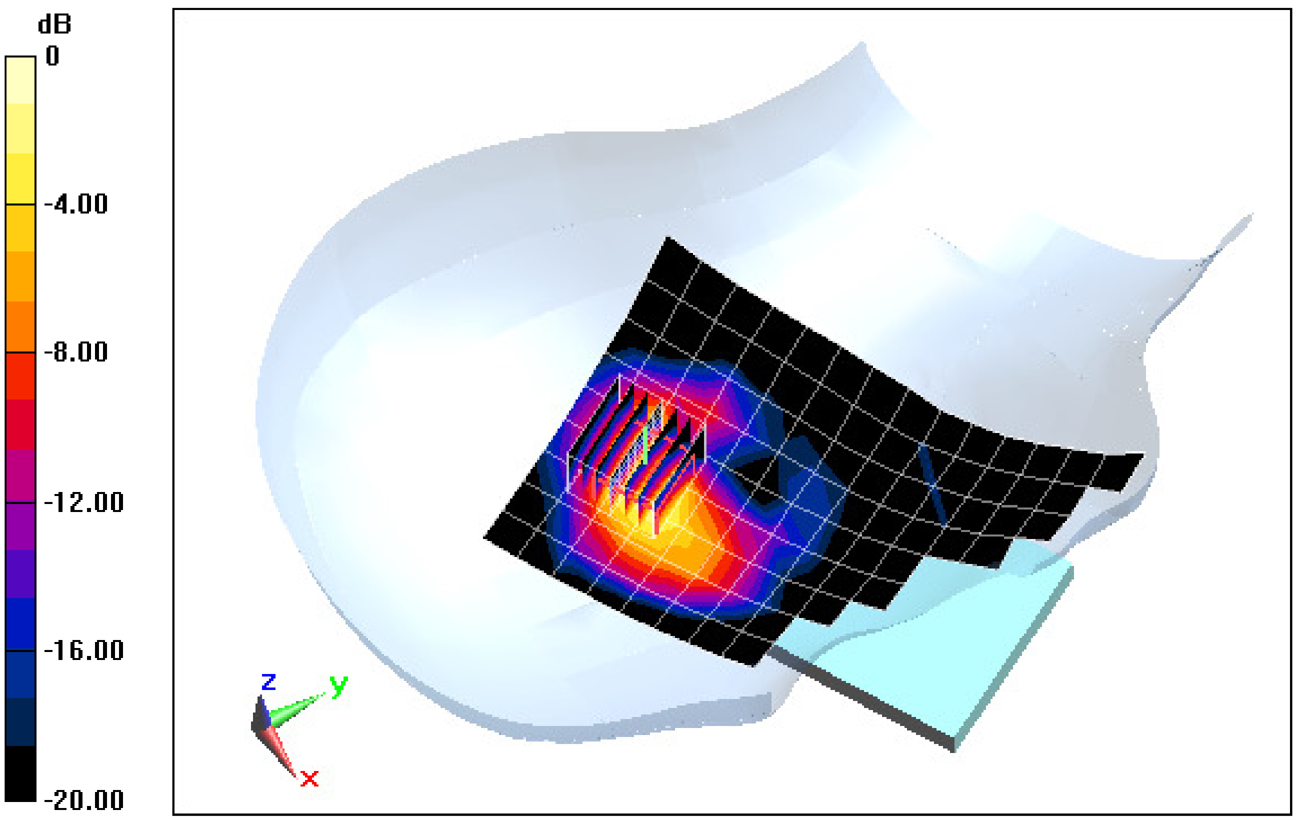
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; σ = 1.899 mho/m; ε_r = 40.304; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-04-2012; Ambient Temp: 22.3°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3209; ConvF(4.46, 4.46, 4.46); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11b, Right Head, Touch, Ch 11, 1 Mbps

Area Scan (10x15x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.595 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.664 mW/g
SAR(1 g) = 0.735 mW/g; SAR(10 g) = 0.325 mW/g



0 dB = 0.993 mW/g = -0.06 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 15

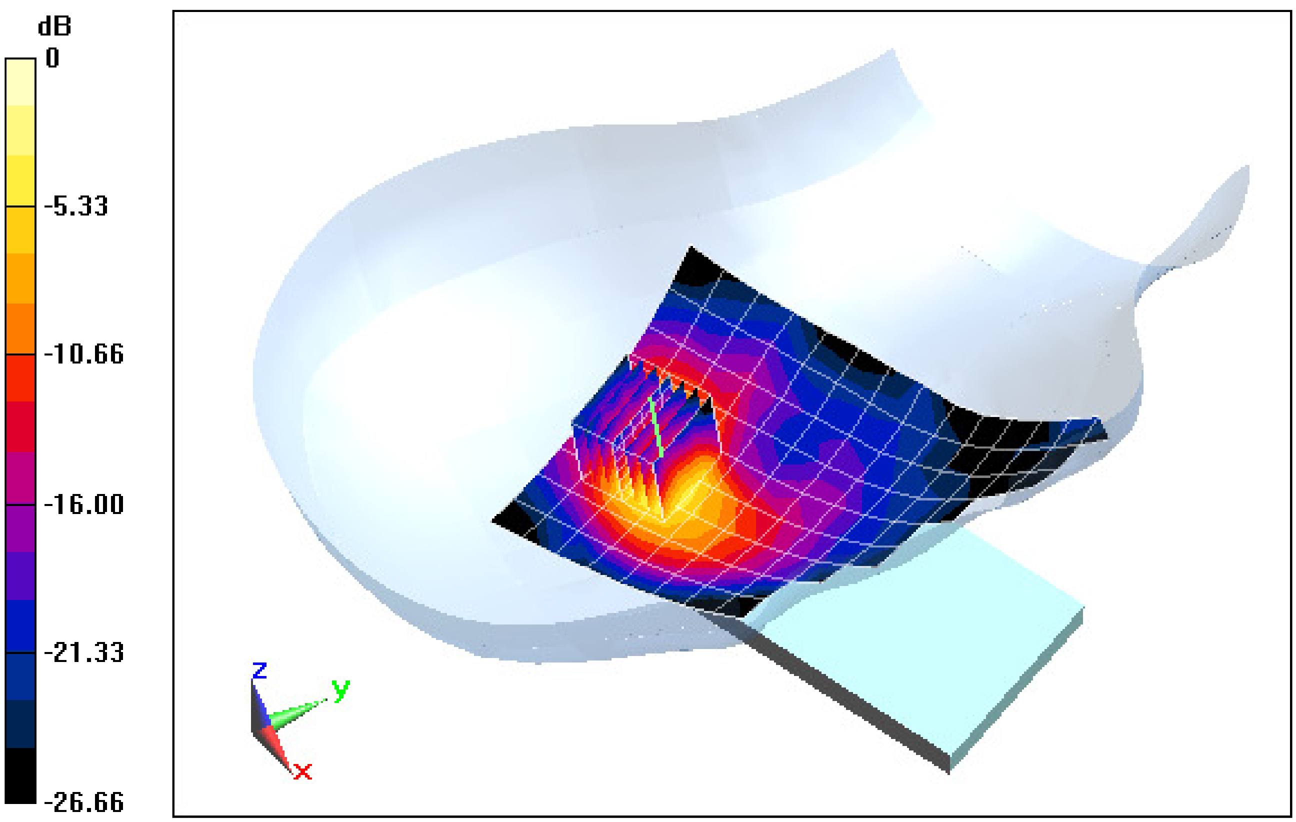
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; σ = 1.899 mho/m; ε_r = 40.304; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 06-04-2012; Ambient Temp: 22.3°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3209; ConvF(4.46, 4.46, 4.46); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11b, Right Head, Tilt, Ch 11, 1 Mbps

Area Scan (10x15x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.062 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.538 mW/g
SAR(1 g) = 0.704 mW/g; SAR(10 g) = 0.306 mW/g



0 dB = 0.962 mW/g = -0.34 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 15

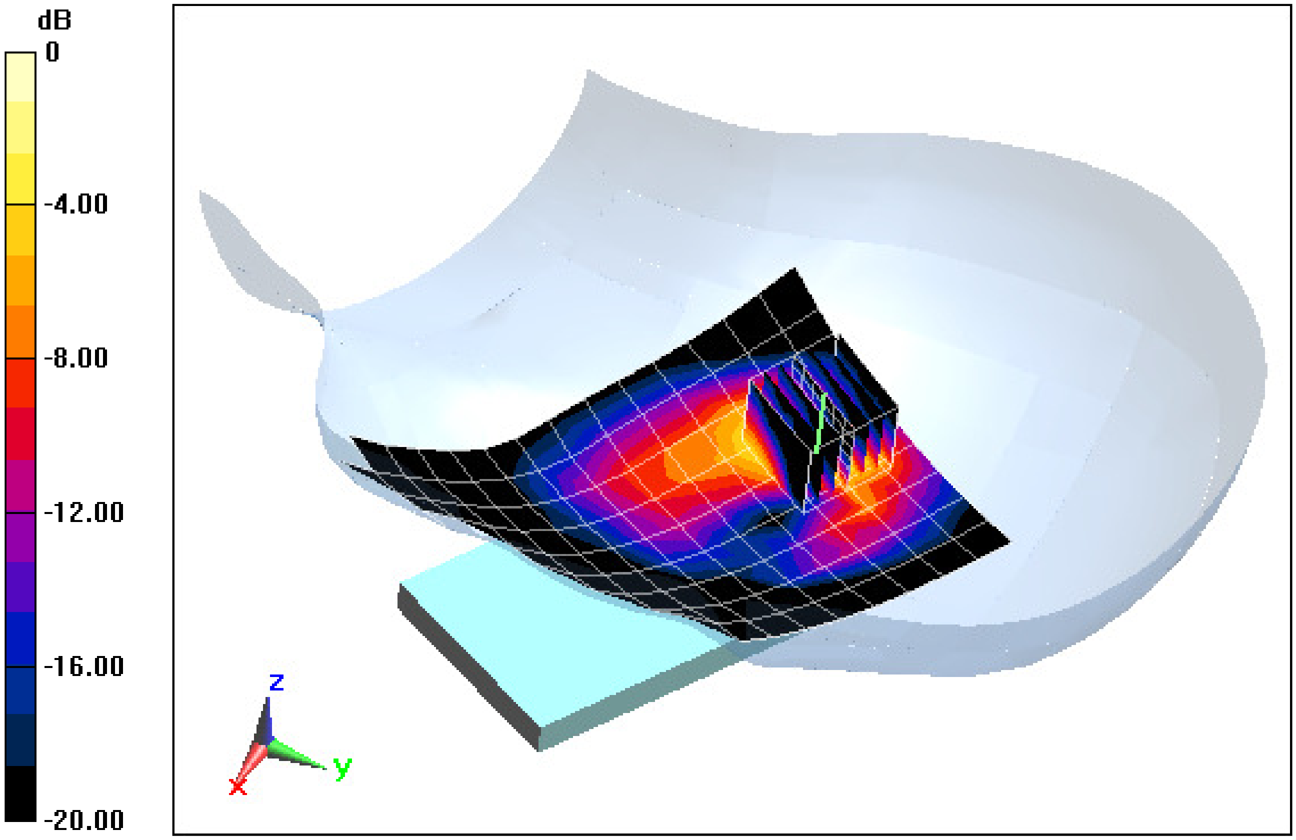
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; σ = 1.899 mho/m; ε_r = 40.304; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-04-2012; Ambient Temp: 22.3°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3209; ConvF(4.46, 4.46, 4.46); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11b, Left Head, Touch, Ch 11, 1 Mbps

Area Scan (10x15x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.491 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.552 mW/g
SAR(1 g) = 0.638 mW/g; SAR(10 g) = 0.263 mW/g



0 dB = 0.879 mW/g = -1.12 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 15

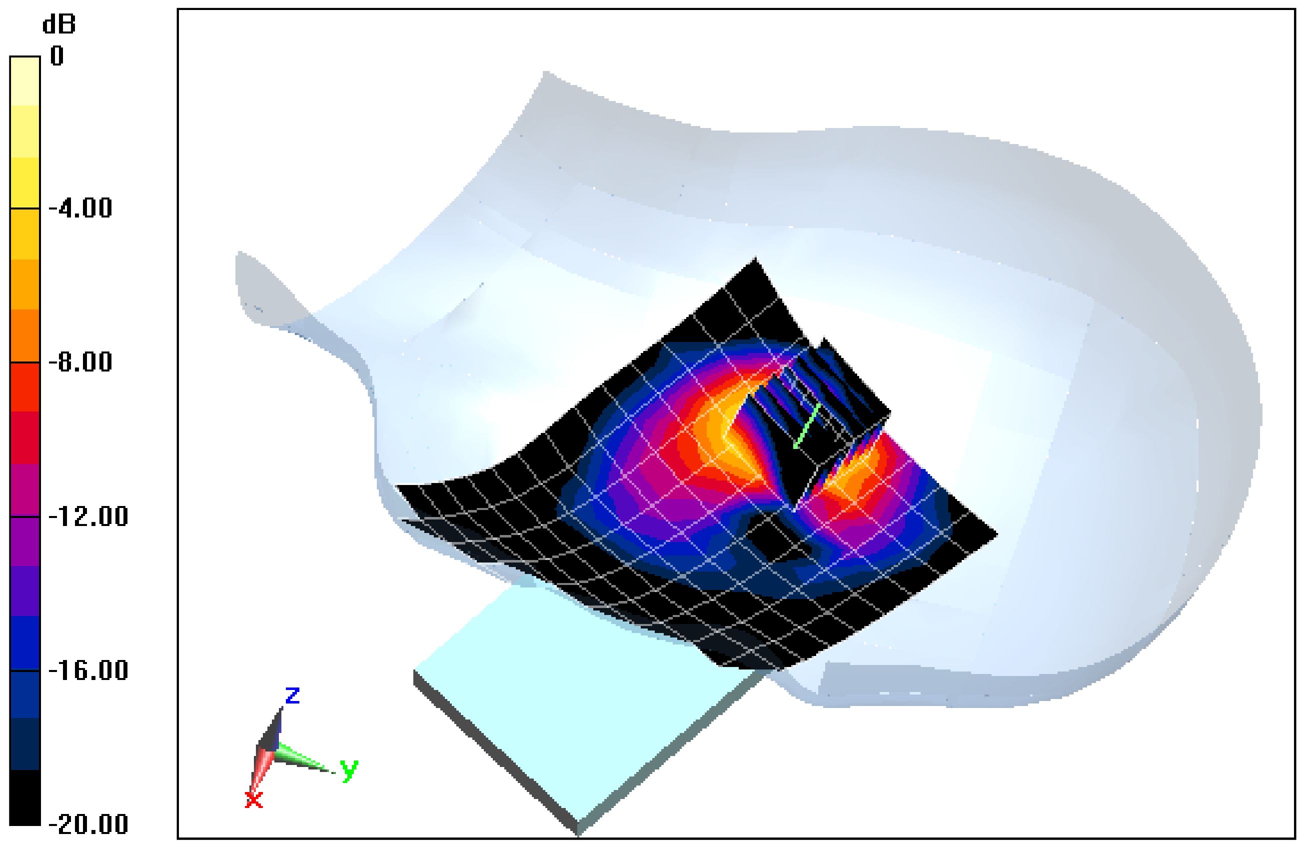
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; σ = 1.899 mho/m; ε_r = 40.304; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 06-04-2012; Ambient Temp: 22.3°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3209; ConvF(4.46, 4.46, 4.46); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11b, Left Head, Tilt, Ch 11, 1 Mbps

Area Scan (10x15x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.972 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 1.285 mW/g
SAR(1 g) = 0.554 mW/g; SAR(10 g) = 0.237 mW/g



0 dB = 0.741 mW/g = -2.60 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 2

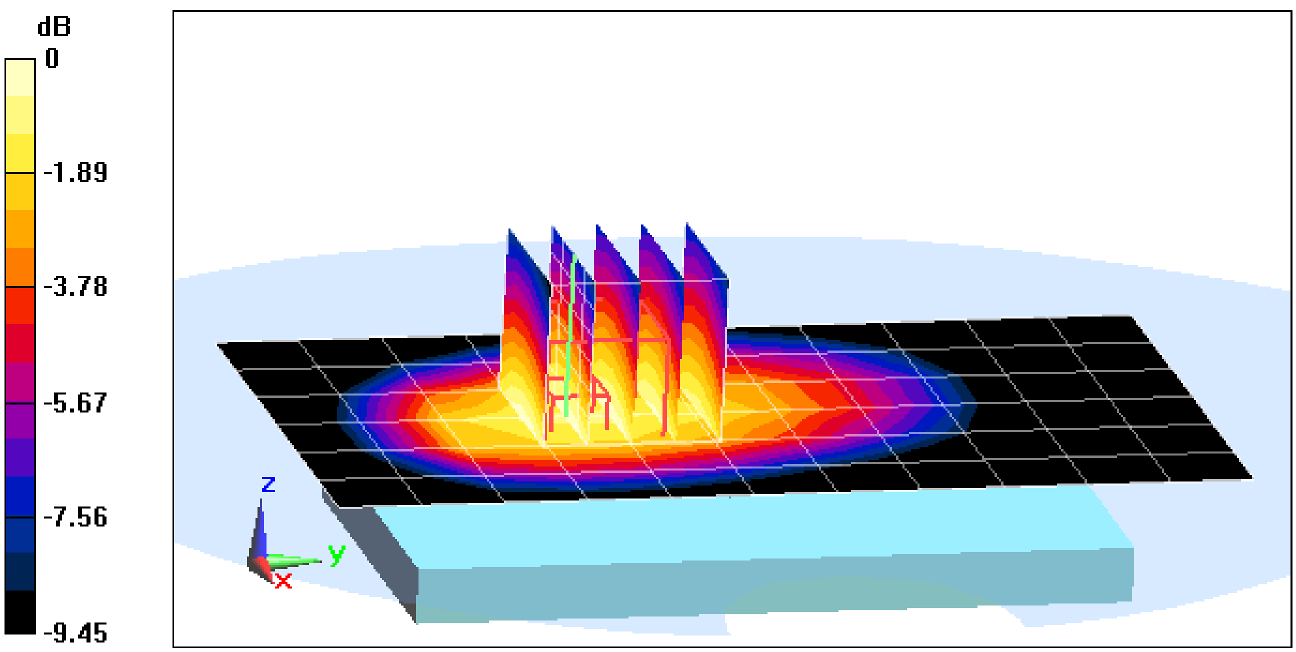
Communication System: LTE Band 17, Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 740 Body Medium parameters used (interpolated):
f = 711 MHz; σ = 0.94 mho/m; ε_r = 54.967; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 22.2°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3288; ConvF(6.34, 6.34, 6.34); Calibrated: 2/7/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.65 (6469)

Mode: LTE Band 17, Body SAR, Back side, High.ch, QPSK, 10 MHz Bandwidth, 1 RB, 0 RB Offset

Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.824 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.7360
SAR(1 g) = 0.580 mW/g; SAR(10 g) = 0.431 mW/g



0 dB = 0.610mW/g = -4.29 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 2

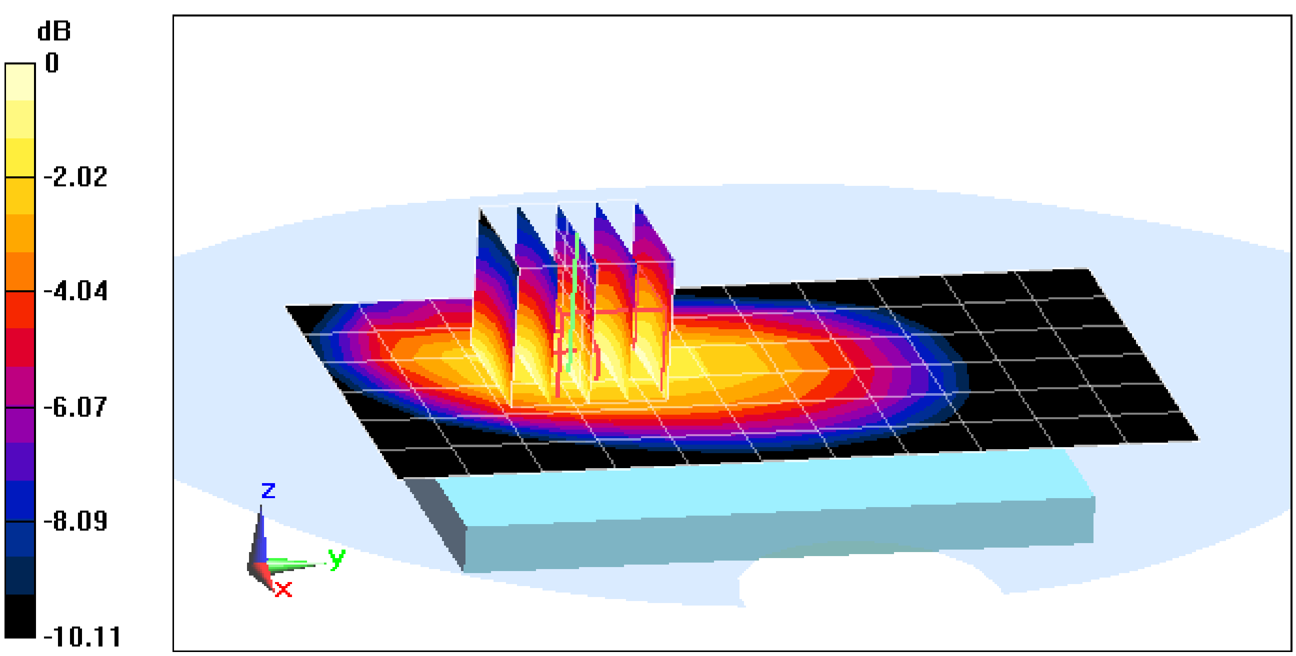
Communication System: LTE Band 17, Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 740 Body Medium parameters used (interpolated):
f = 711 MHz; σ = 0.94 mho/m; ε_r = 54.967; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 22.2°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3288; ConvF(6.34, 6.34, 6.34); Calibrated: 2/7/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 17, Body SAR, Front side, High.ch, QPSK, 10Mhz Bandwidth, 1 RB, 0 RB Offset

Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.901 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.4850
SAR(1 g) = 0.355 mW/g; SAR(10 g) = 0.264 mW/g



0 dB = 0.380mW/g = -8.40 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 2

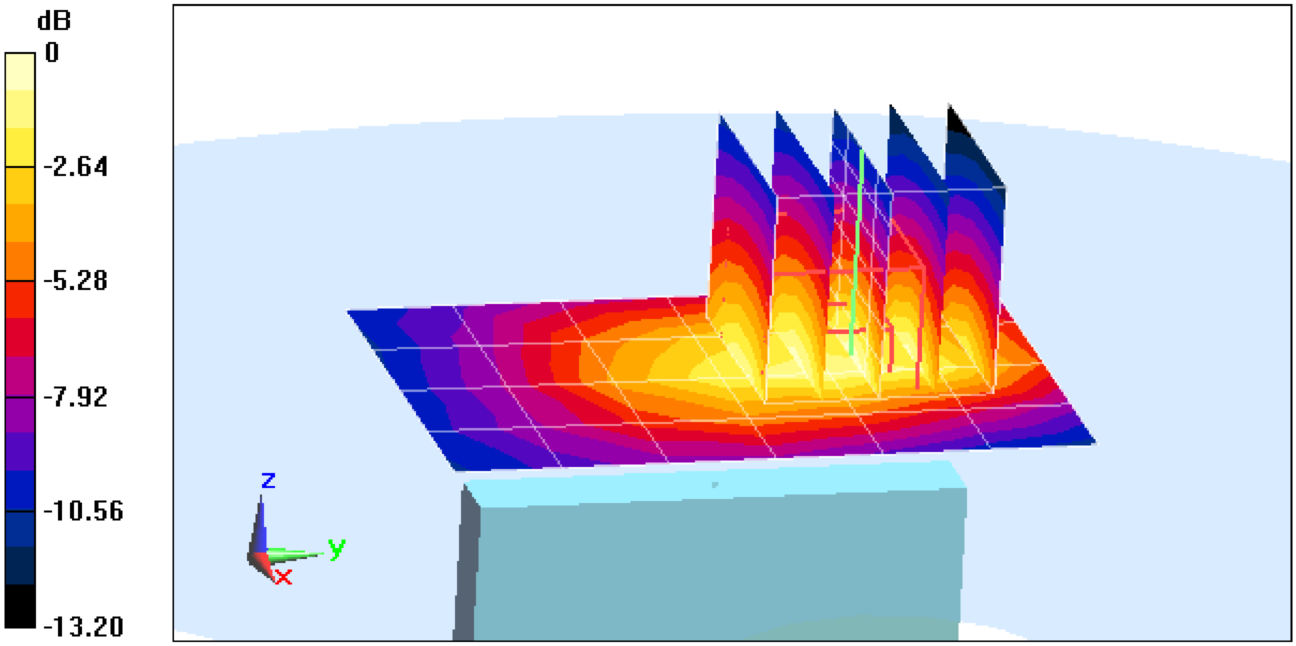
Communication System: LTE Band 17, Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 740 Body Medium parameters used (interpolated):
f = 711 MHz; σ = 0.94 mho/m; ε_r = 54.967; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 22.2°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3288; ConvF(6.34, 6.34, 6.34); Calibrated: 2/7/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 17, Body SAR, Bottom Edge, High.ch, QPSK, 10 MHz Bandwidth, 1 RB, 0 RB Offset

Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.084 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.2600
SAR(1 g) = 0.155 mW/g; SAR(10 g) = 0.094 mW/g



0 dB = 0.170mW/g = -15.39 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 2

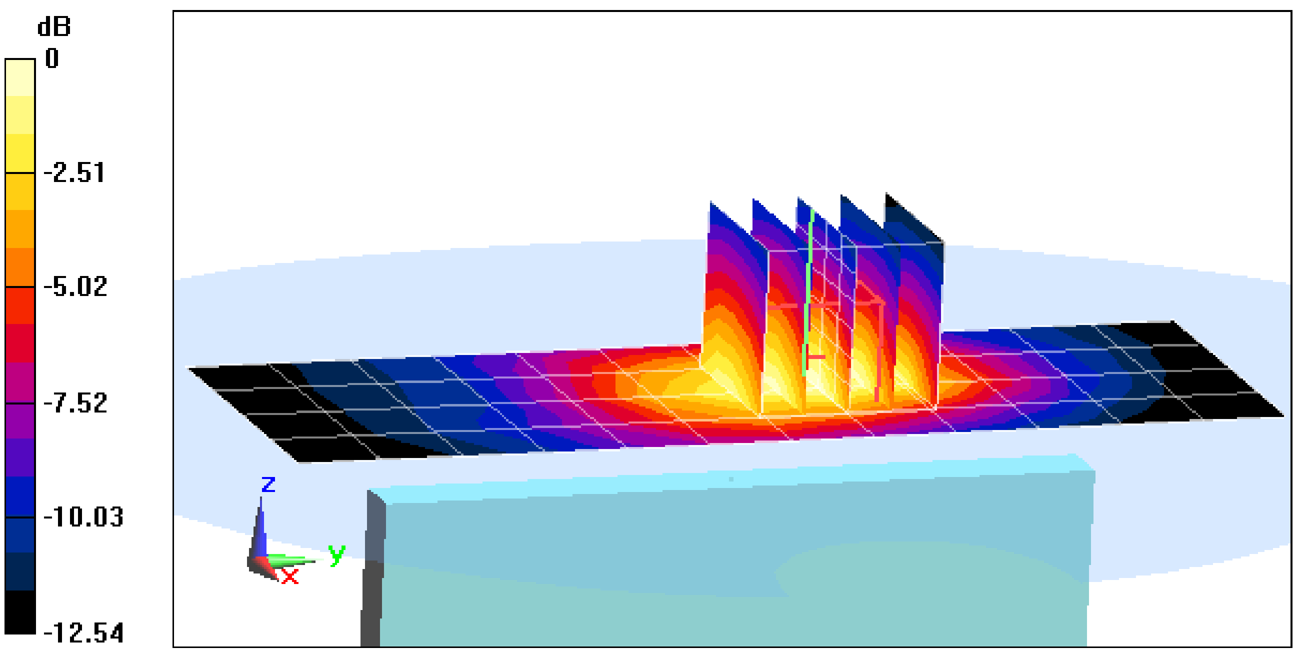
Communication System: LTE Band 17, Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 740 Body Medium parameters used (interpolated):
f = 711 MHz; σ = 0.94 mho/m; ε_r = 54.967; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 22.2°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3288; ConvF(6.34, 6.34, 6.34); Calibrated: 2/7/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 17, Body SAR, Left Edge, High.ch, QPSK, 10 MHz Bandwidth, 1 RB, 49 RB Offset

Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.449 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.2130
SAR(1 g) = 0.134 mW/g; SAR(10 g) = 0.084 mW/g



0 dB = 0.140mW/g = -17.08 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

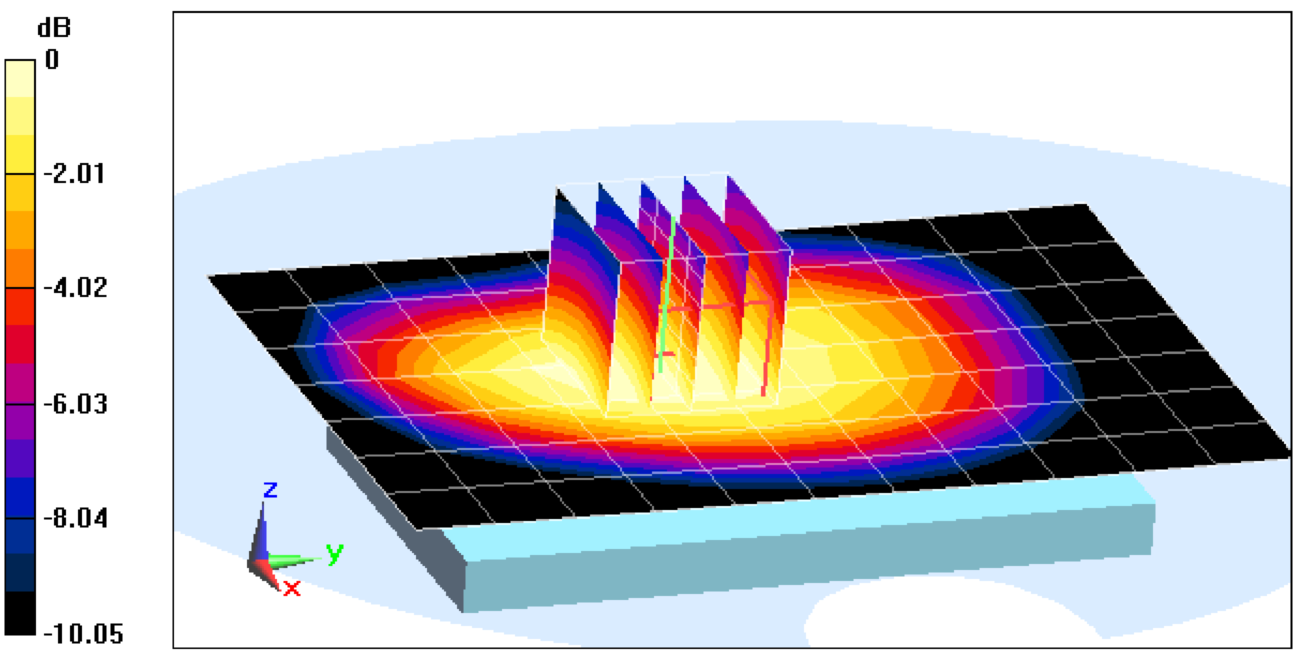
Communication System: GSM850 GPRS; 2 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1 mho/m; ε_r = 53.036; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.336 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.9700
SAR(1 g) = 0.770 mW/g; SAR(10 g) = 0.583 mW/g



0 dB = 0.810mW/g = -1.83 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

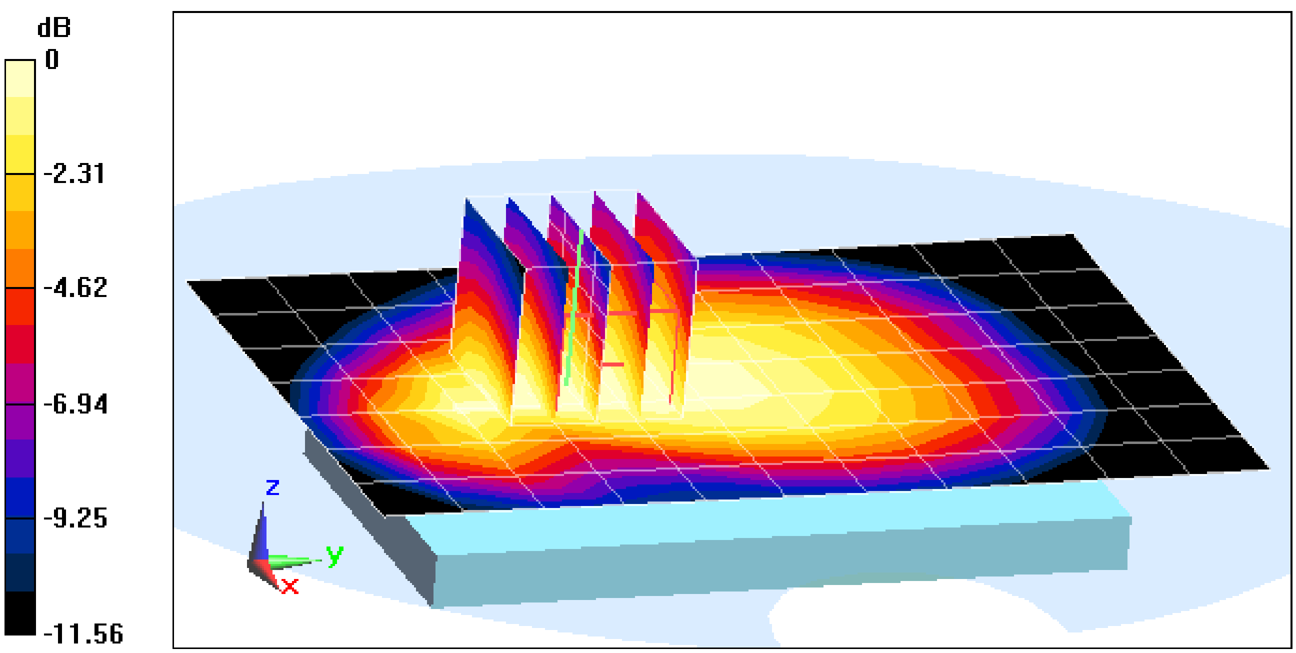
Communication System: GSM 850 GPRS; 2 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 1$ mho/m; $\varepsilon_r = 53.036$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.079 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.7190
SAR(1 g) = 0.511 mW/g; SAR(10 g) = 0.376 mW/g



0 dB = 0.540mW/g = -5.35 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

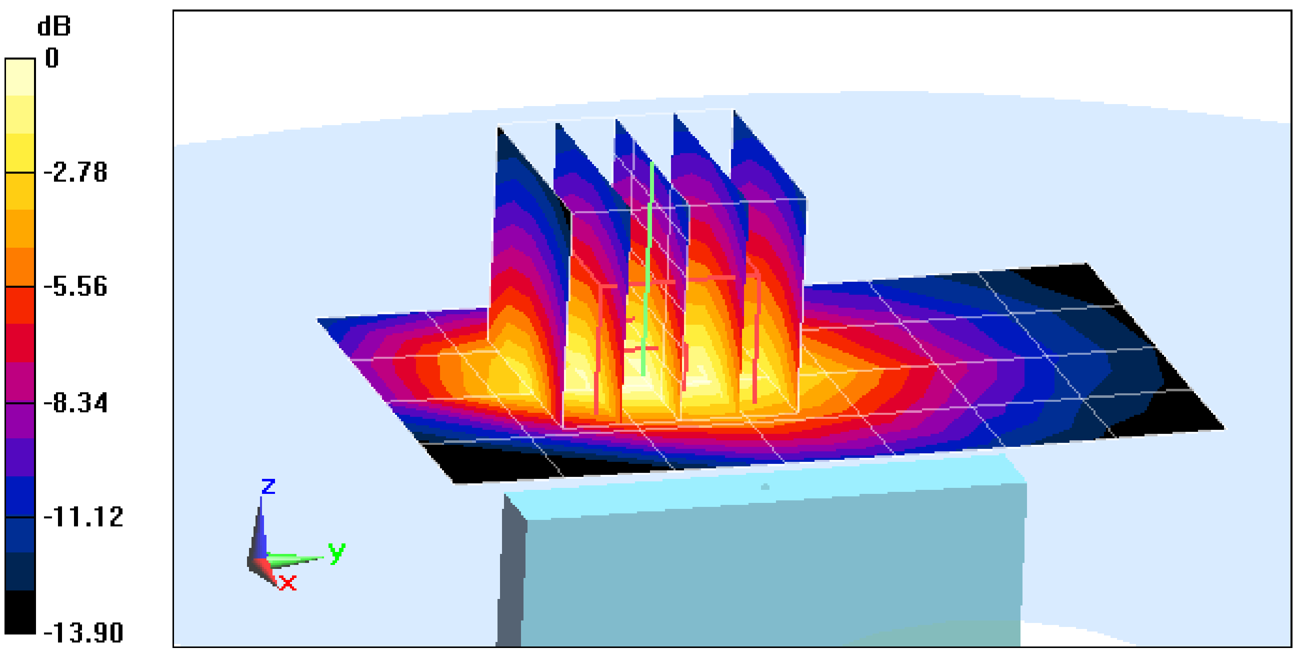
Communication System: GSM 850 GPRS; 2 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1 mho/m; ε_r = 53.036; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: GPRS 850, Body SAR, Bottom Edge, Mid.ch, 2 Tx Slots

Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.660 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.3420
SAR(1 g) = 0.209 mW/g; SAR(10 g) = 0.122 mW/g



0 dB = 0.230mW/g = -12.77 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

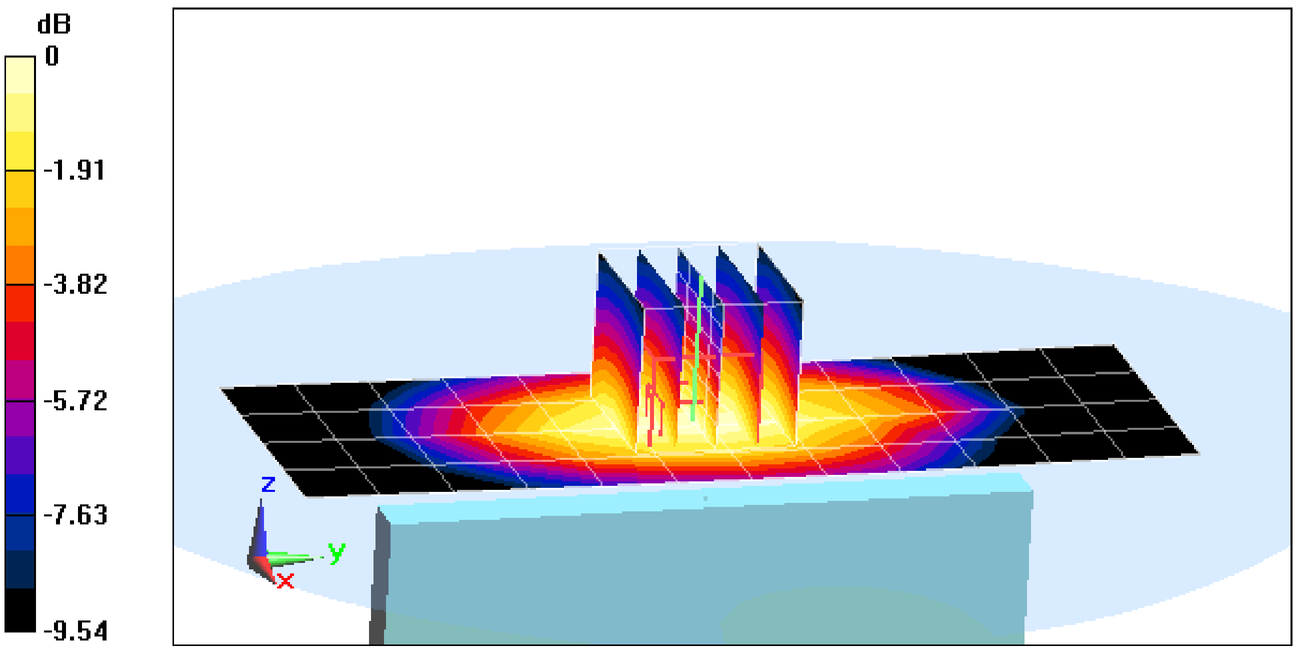
Communication System: GSM 850 GPRS; 2 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1 mho/m; ε_r = 53.036; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: GPRS 850, Body SAR, Right Edge, Mid.ch, 2 Tx Slots

Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.563 V/m; Power Drift = 6.8e-006 dB
Peak SAR (extrapolated) = 0.8350
SAR(1 g) = 0.600 mW/g; SAR(10 g) = 0.414 mW/g



0 dB = 0.640mW/g = -3.88 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

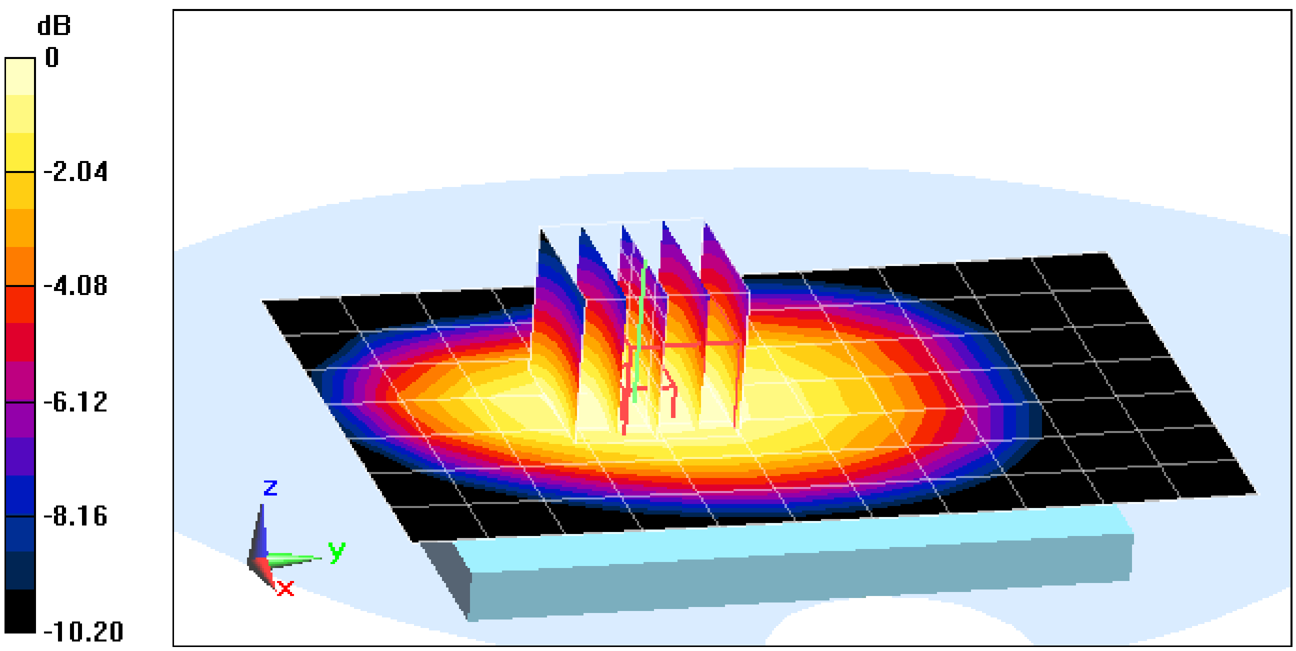
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1 mho/m; ε_r = 53.036; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.974 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.8020
SAR(1 g) = 0.643 mW/g; SAR(10 g) = 0.487 mW/g



0 dB = 0.680mW/g = -3.35 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

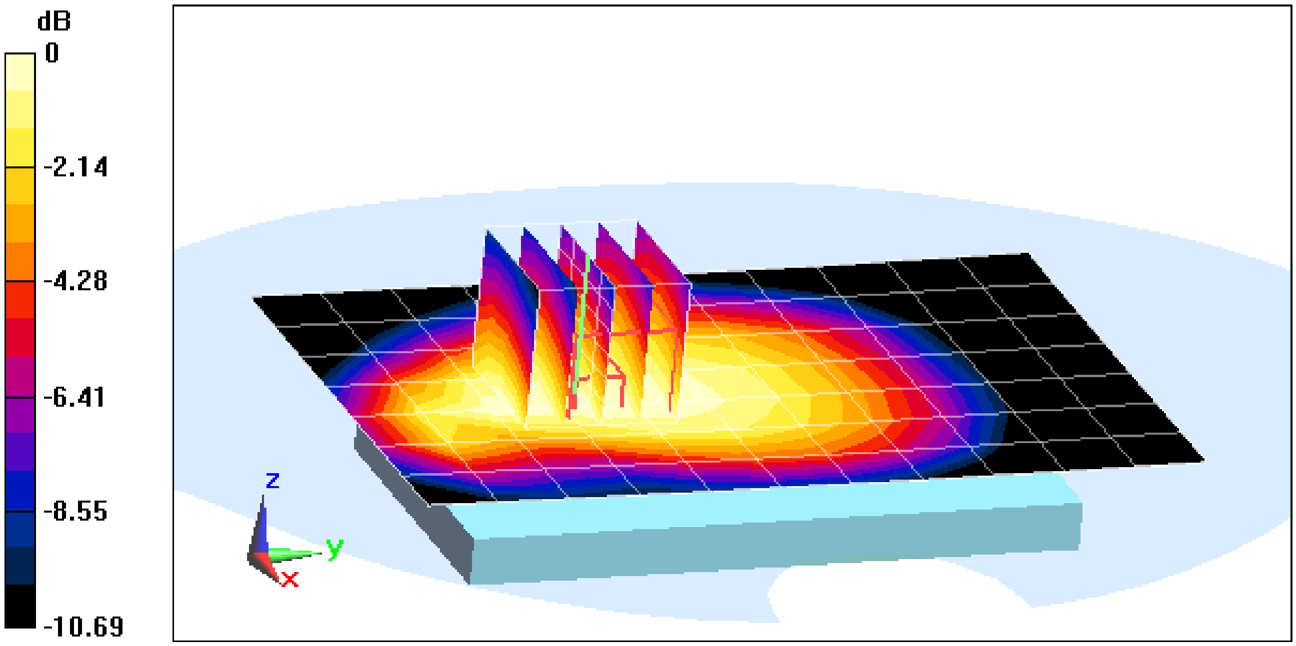
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1 mho/m; ε_r = 53.036; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.068 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.5630
SAR(1 g) = 0.421 mW/g; SAR(10 g) = 0.318 mW/g



0 dB = 0.440mW/g = -7.13 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

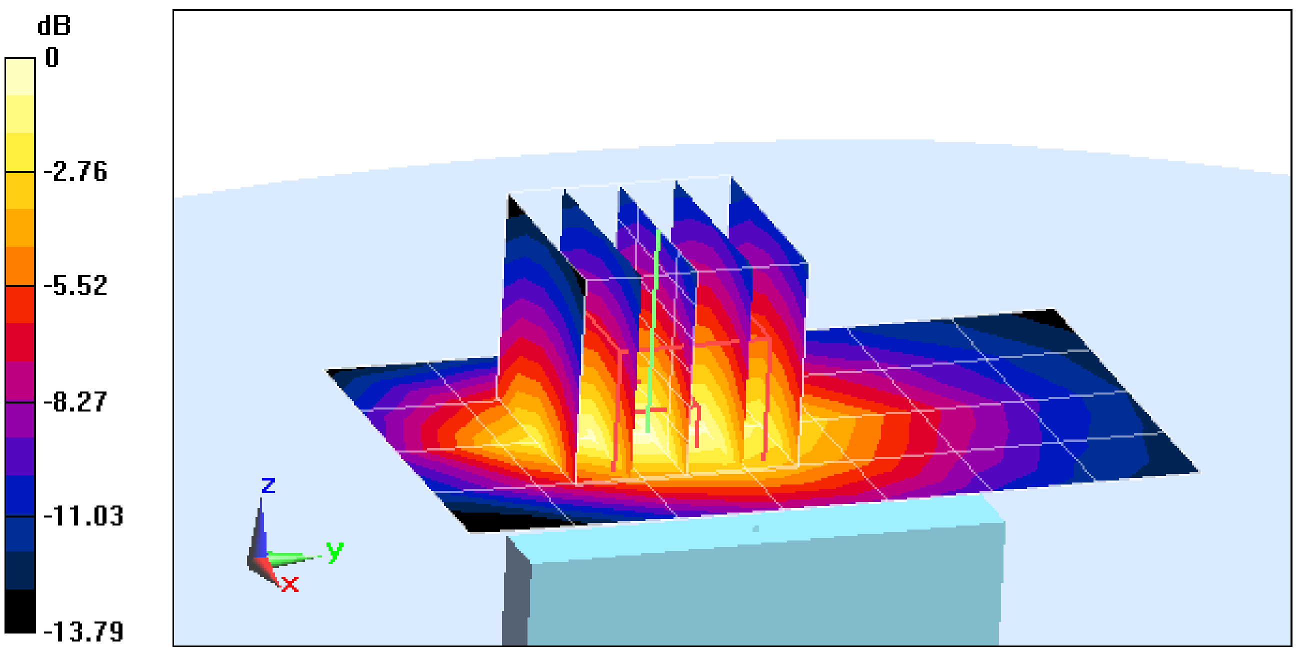
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1 mho/m; ε_r = 53.036; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.512 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.2800
SAR(1 g) = 0.170 mW/g; SAR(10 g) = 0.100 mW/g



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

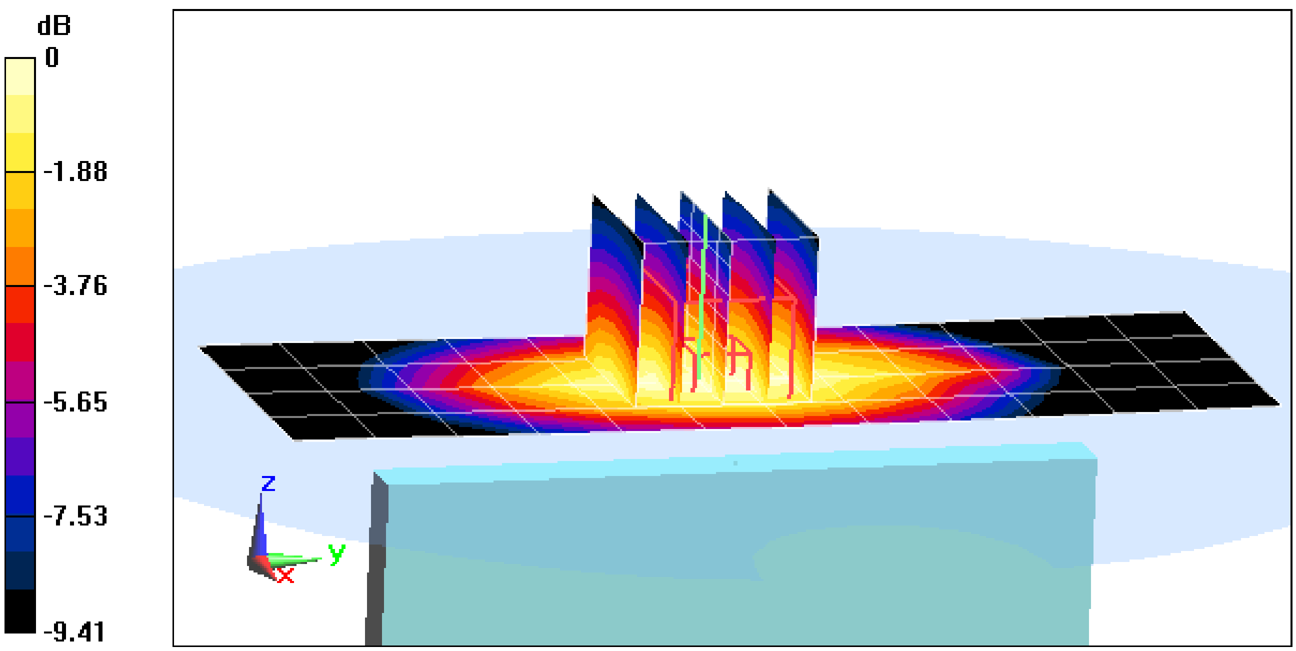
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 1$ mho/m; $\varepsilon_r = 53.036$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.191 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.6620
SAR(1 g) = 0.477 mW/g; SAR(10 g) = 0.331 mW/g



0 dB = 0.510mW/g = -5.85 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 3

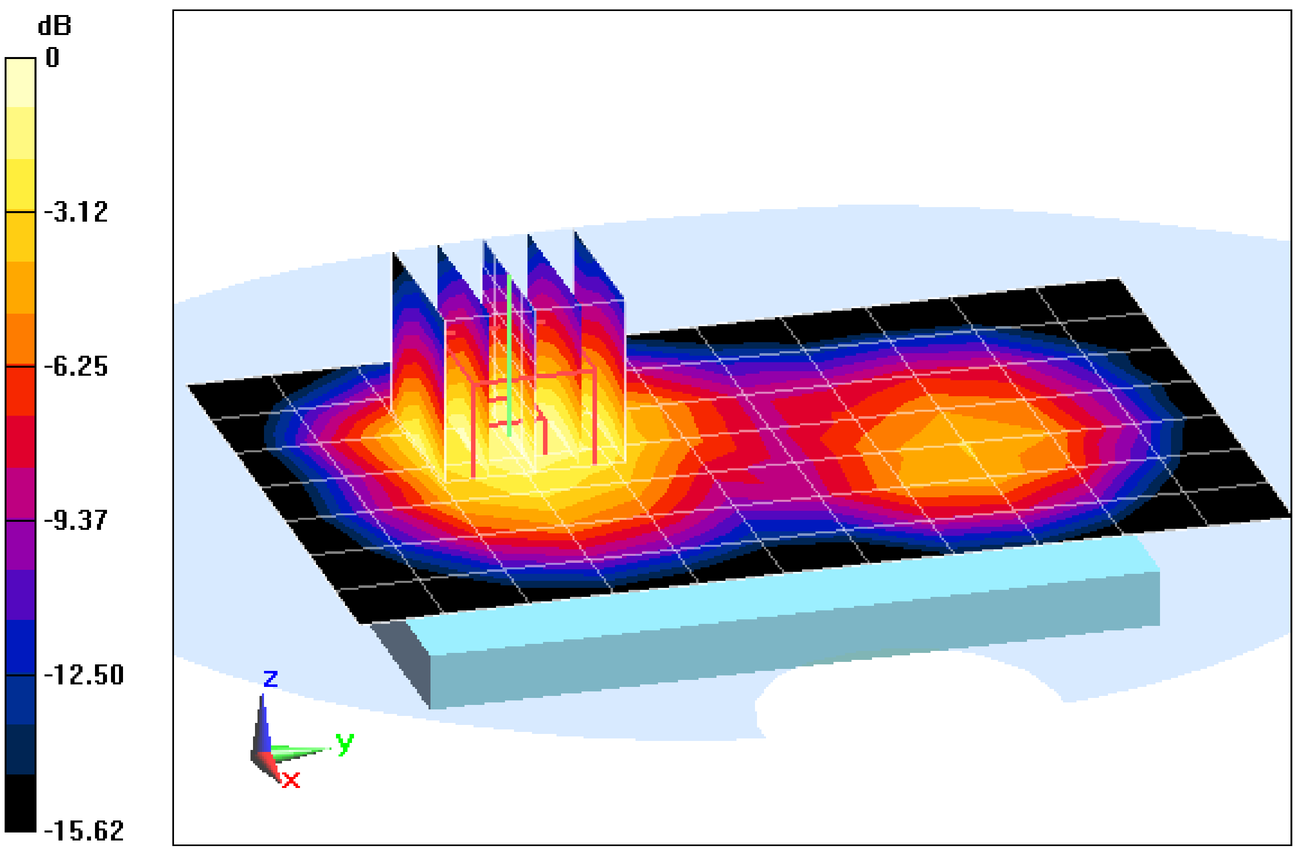
Communication System: LTE RF; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
$f = 1732.5$ MHz; $\sigma = 1.51$ mho/m; $\varepsilon_r = 51.278$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.83, 4.83, 4.83); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 4 (AWS), Body SAR, Back side, Mid.ch
10 MHz BW, QPSK, 1 RB, 0 RB Offset

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.377 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.550 mW/g
SAR(1 g) = 0.360 mW/g; SAR(10 g) = 0.225 mW/g



0 dB = 0.386 mW/g = -8.27 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 3

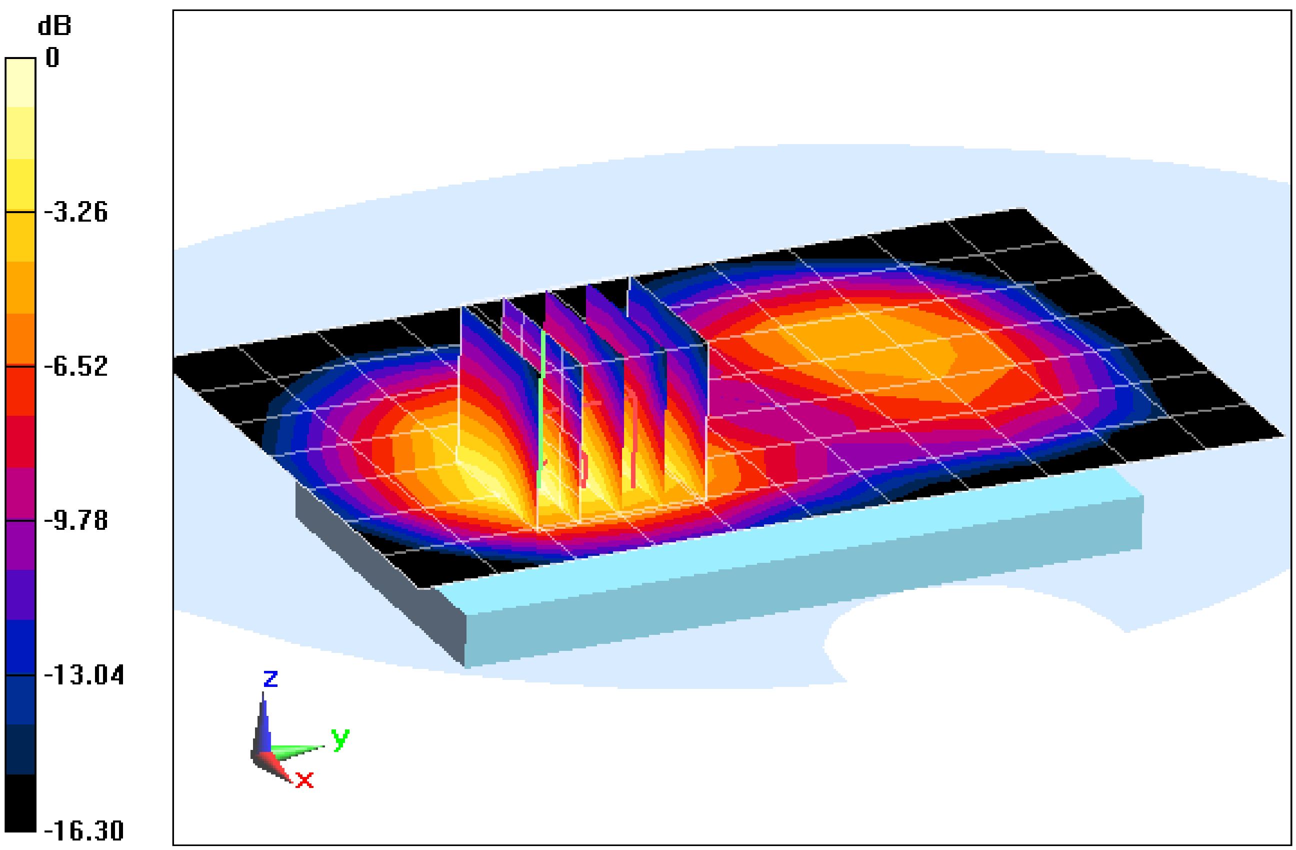
Communication System: LTE RF; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.51 mho/m; ε_r = 51.278; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.83, 4.83, 4.83); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 4 (AWS), Body SAR, Front side, Mid.ch
10 MHz BW, QPSK, 1 RB, 0 RB Offset

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.414 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.405 mW/g
SAR(1 g) = 0.257 mW/g; SAR(10 g) = 0.158 mW/g



0 dB = 0.278 mW/g = -11.12 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 3

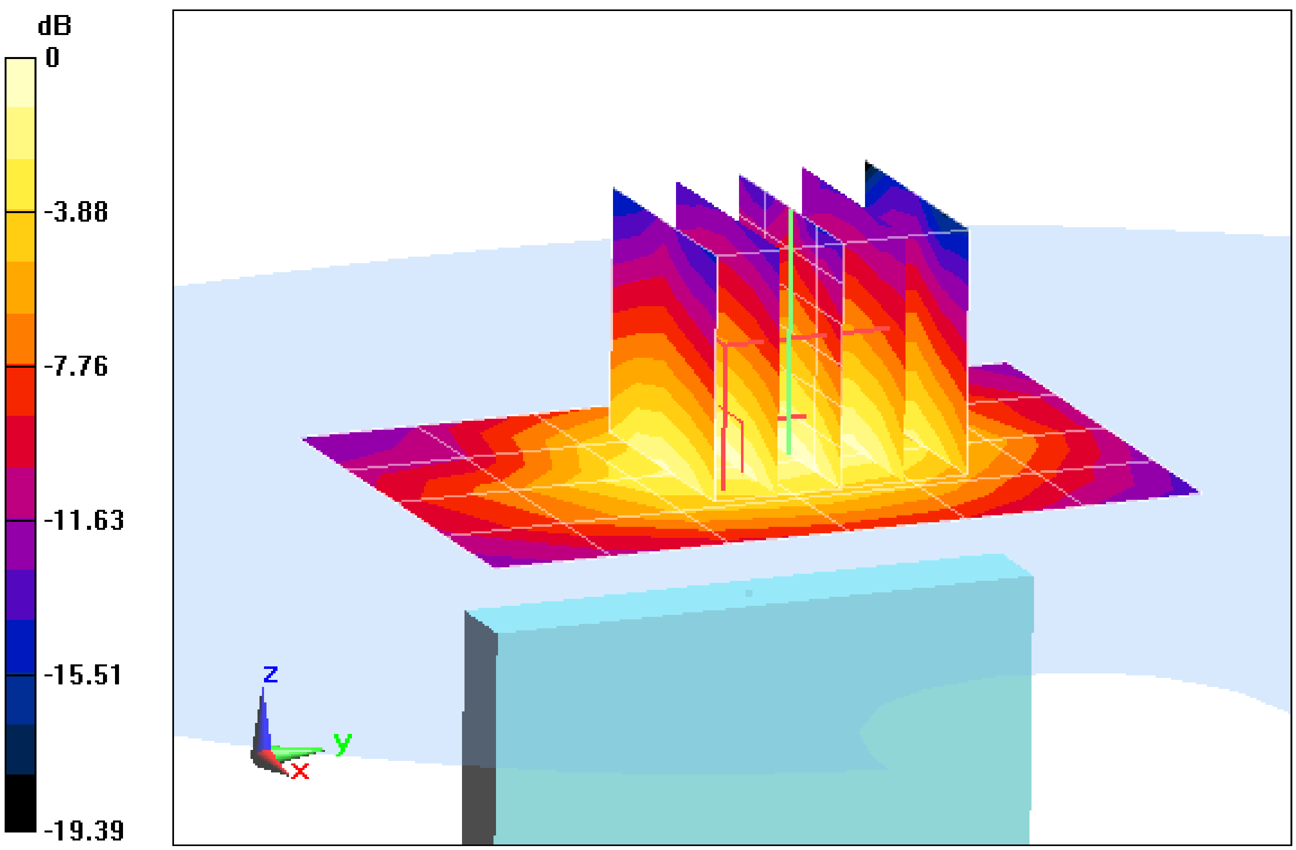
Communication System: LTE RF; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.51 mho/m; ε_r = 51.278; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.83, 4.83, 4.83); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 4 (AWS), Body SAR, Bottom Edge, Mid.ch
10 MHz BW, QPSK, 1 RB, 0 RB Offset

Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.636 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.244 mW/g
SAR(1 g) = 0.151 mW/g; SAR(10 g) = 0.090 mW/g



0 dB = 0.164 mW/g = -15.70 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 3

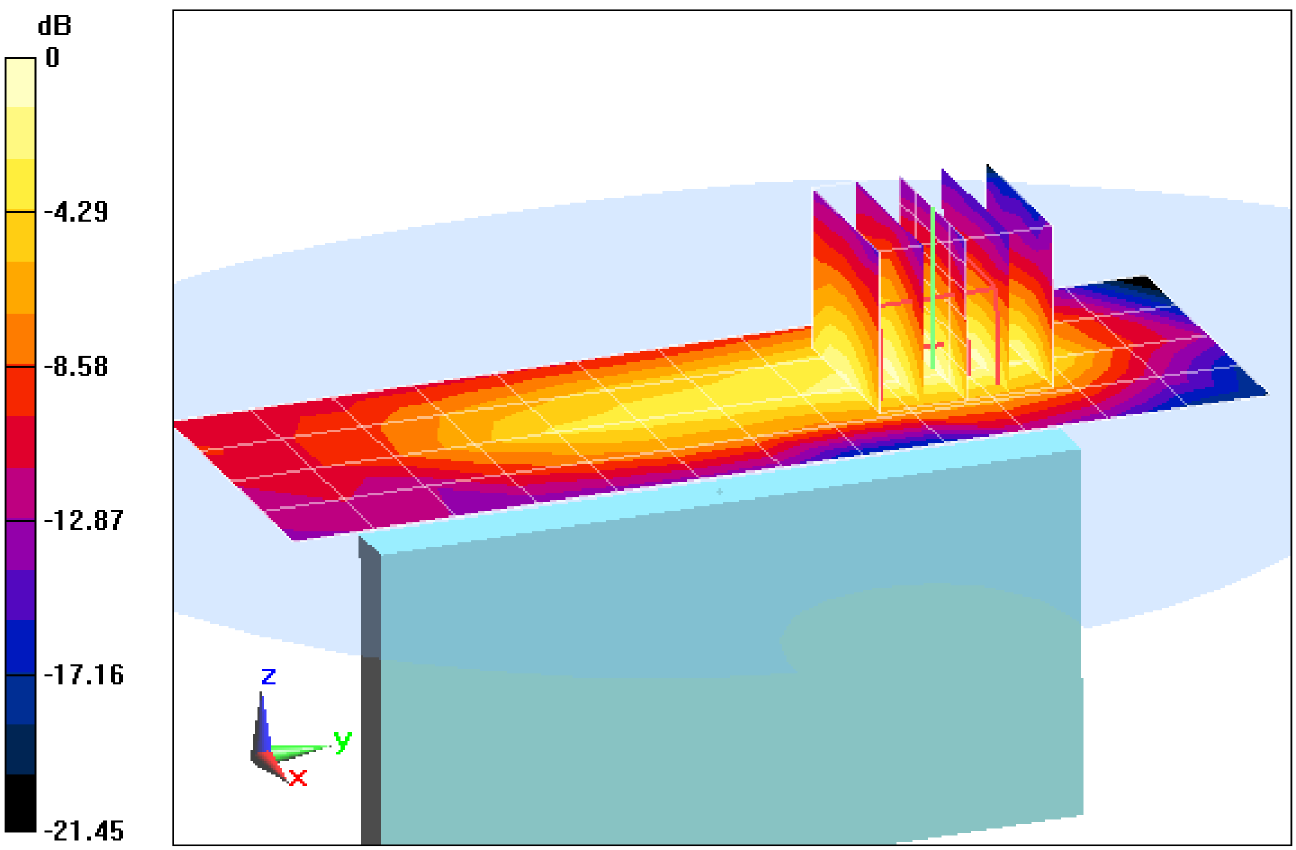
Communication System: LTE RF; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used (interpolated):
f = 1732.5 MHz; σ = 1.51 mho/m; ε_r = 51.278; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.83, 4.83, 4.83); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode:LTE Band 4 (AWS), Body SAR, Right Edge, Mid.ch
10 MHz BW, QPSK, 1 RB, 0 RB Offset

Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.217 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.167 mW/g
SAR(1 g) = 0.098 mW/g; SAR(10 g) = 0.056 mW/g



0 dB = 0.108 mW/g = -19.33 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

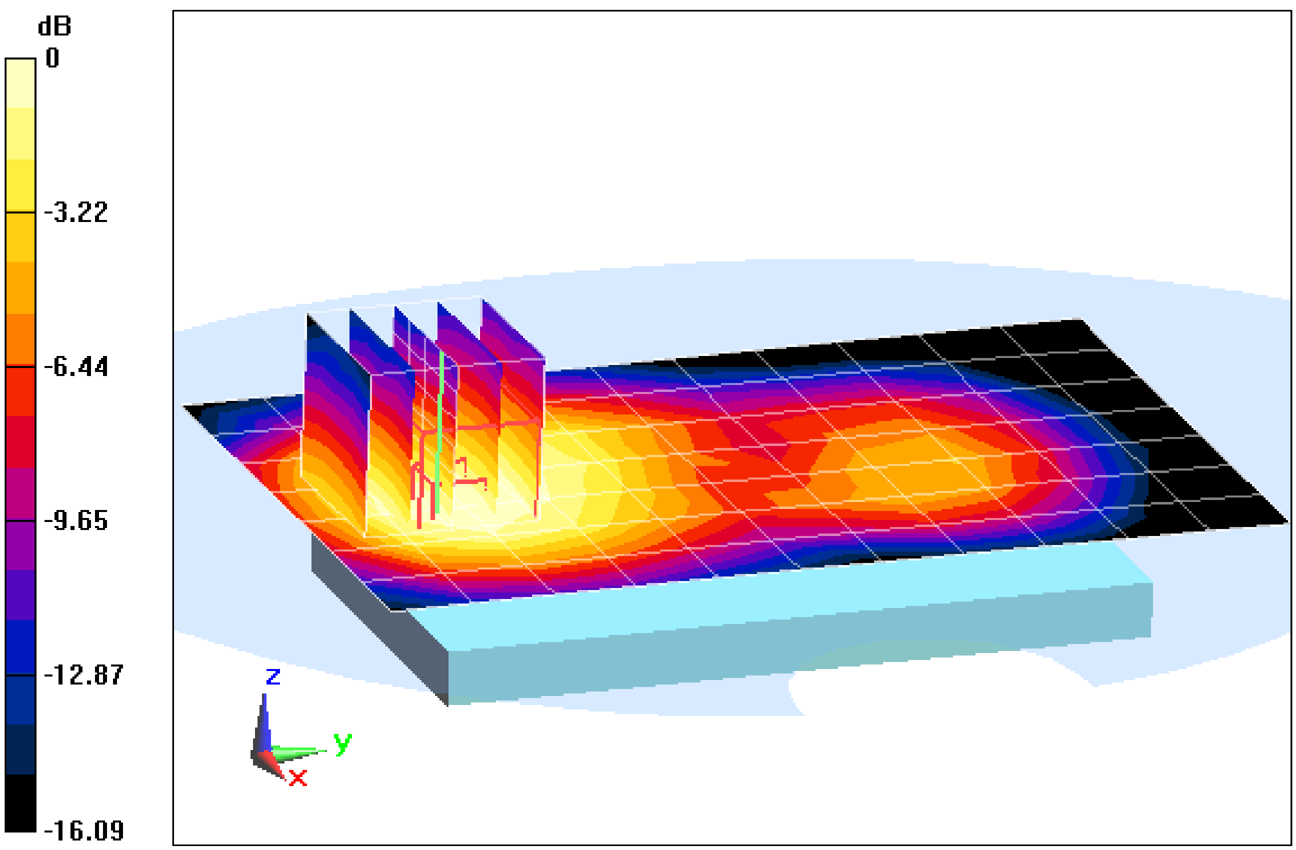
Communication System: GSM1900 GPRS; 2 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.522 mho/m; ε_r = 51.21; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

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

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.974 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.547 mW/g
SAR(1 g) = 0.356 mW/g; SAR(10 g) = 0.231 mW/g



0 dB = 0.373 mW/g = -8.57 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

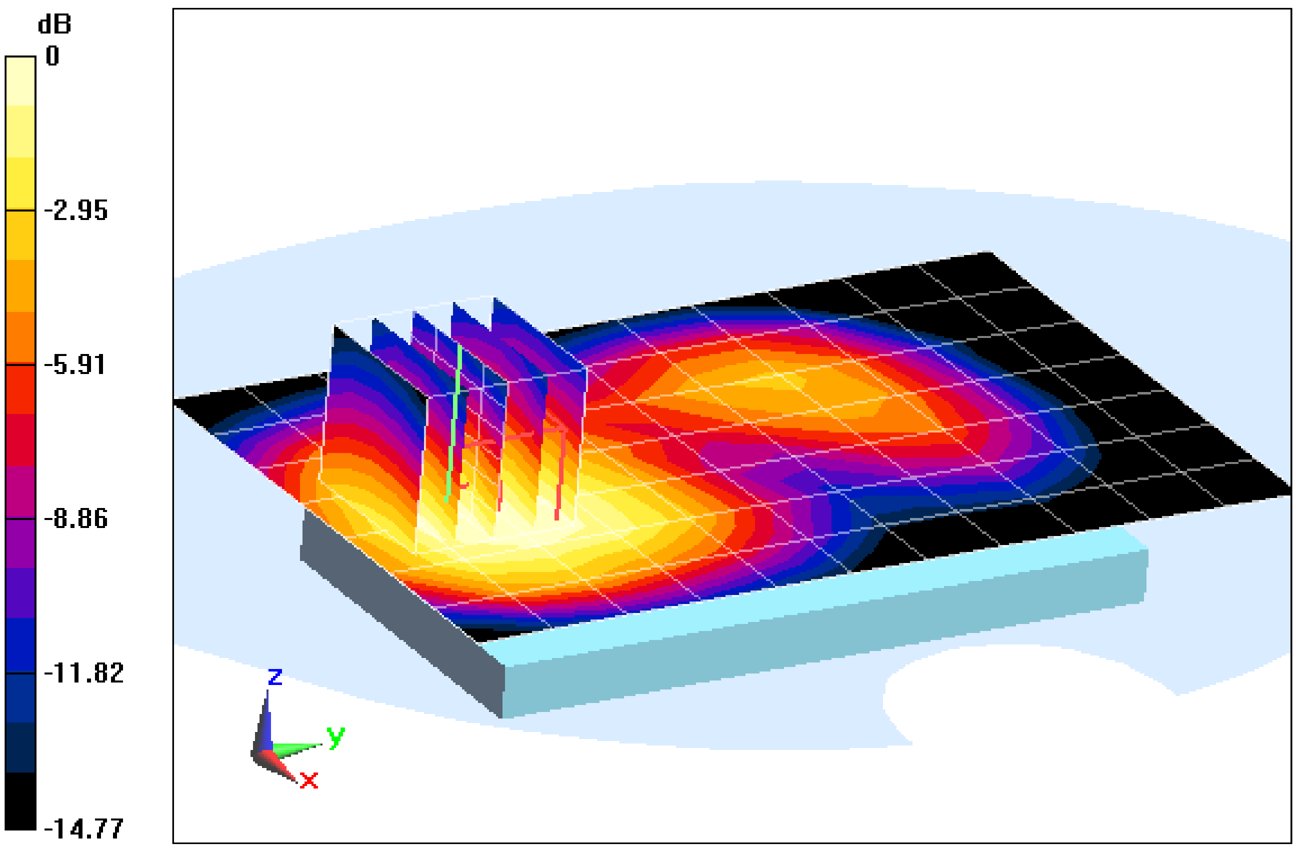
Communication System: GSM1900 GPRS; 2 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.522 mho/m; ε_r = 51.21; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

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

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.543 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.512 mW/g
SAR(1 g) = 0.338 mW/g; SAR(10 g) = 0.217 mW/g



0 dB = 0.363 mW/g = -8.80 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

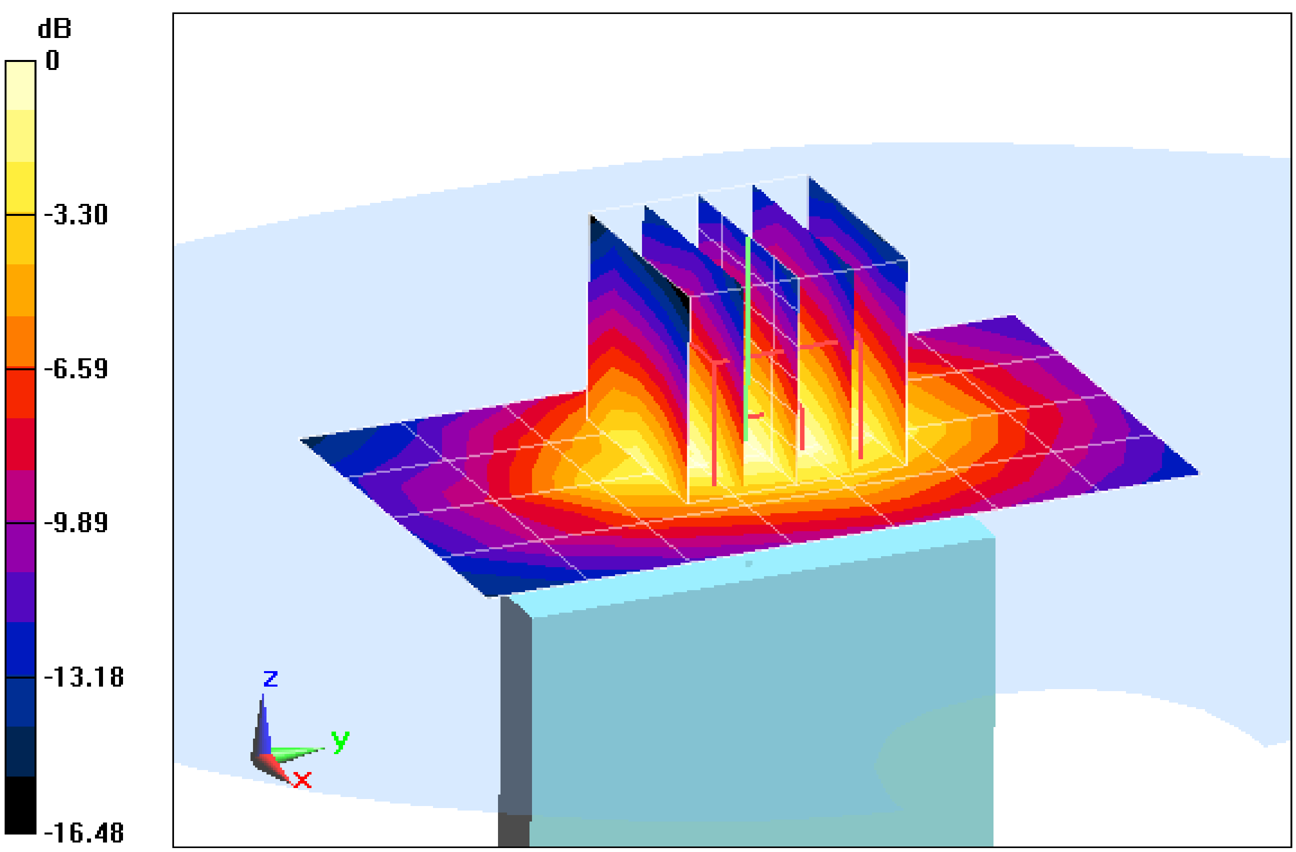
Communication System: GSM1900 GPRS; 2 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.522 mho/m; ε_r = 51.21; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

Mode: GPRS 1900, Body SAR, Bottom Edge, Mid.ch, 2 Tx Slots

Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.905 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.521 mW/g
SAR(1 g) = 0.323 mW/g; SAR(10 g) = 0.190 mW/g



0 dB = 0.354 mW/g = -9.02 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

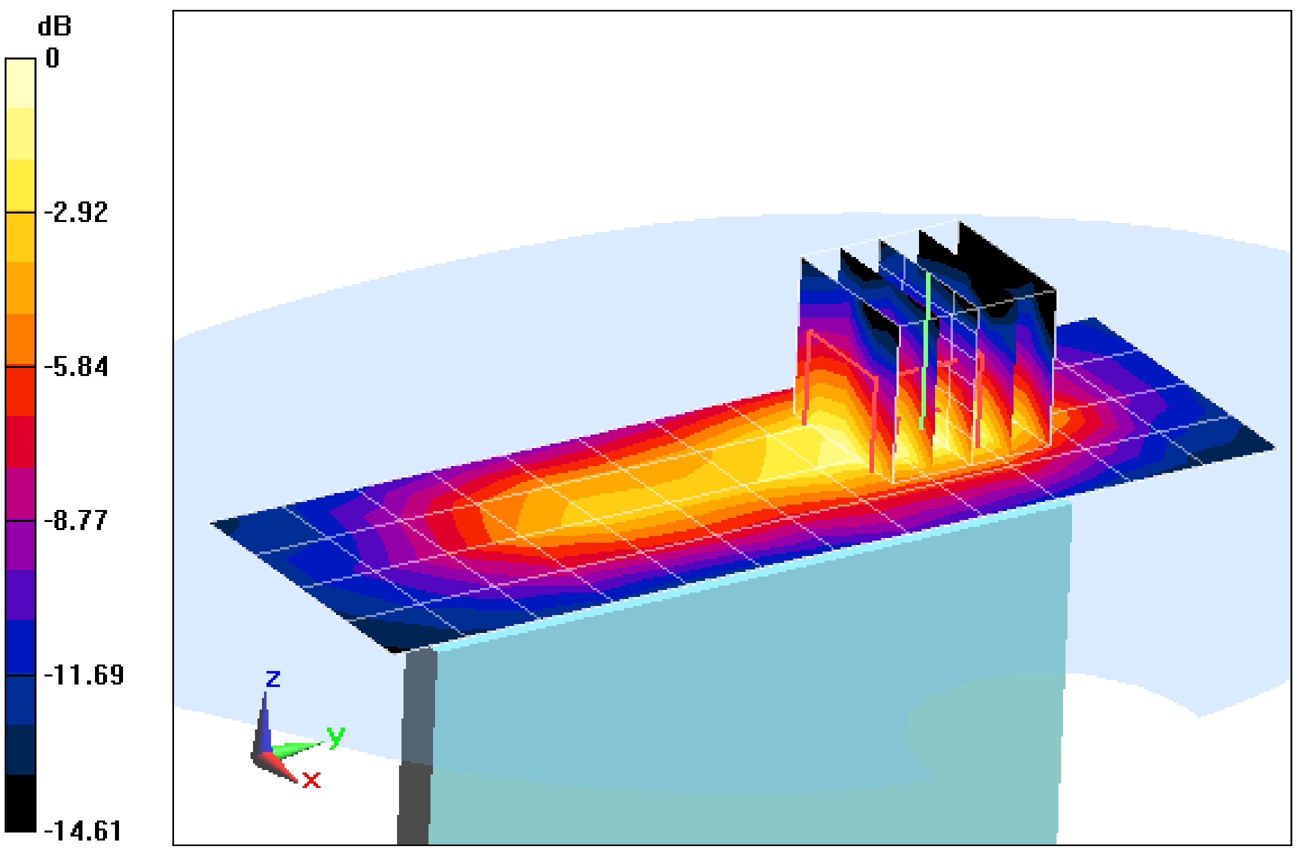
Communication System: GSM1900 GPRS; 2 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.522 mho/m; ε_r = 51.21; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

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

Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.741 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.254 mW/g
SAR(1 g) = 0.148 mW/g; SAR(10 g) = 0.083 mW/g



0 dB = 0.161 mW/g = -15.86 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

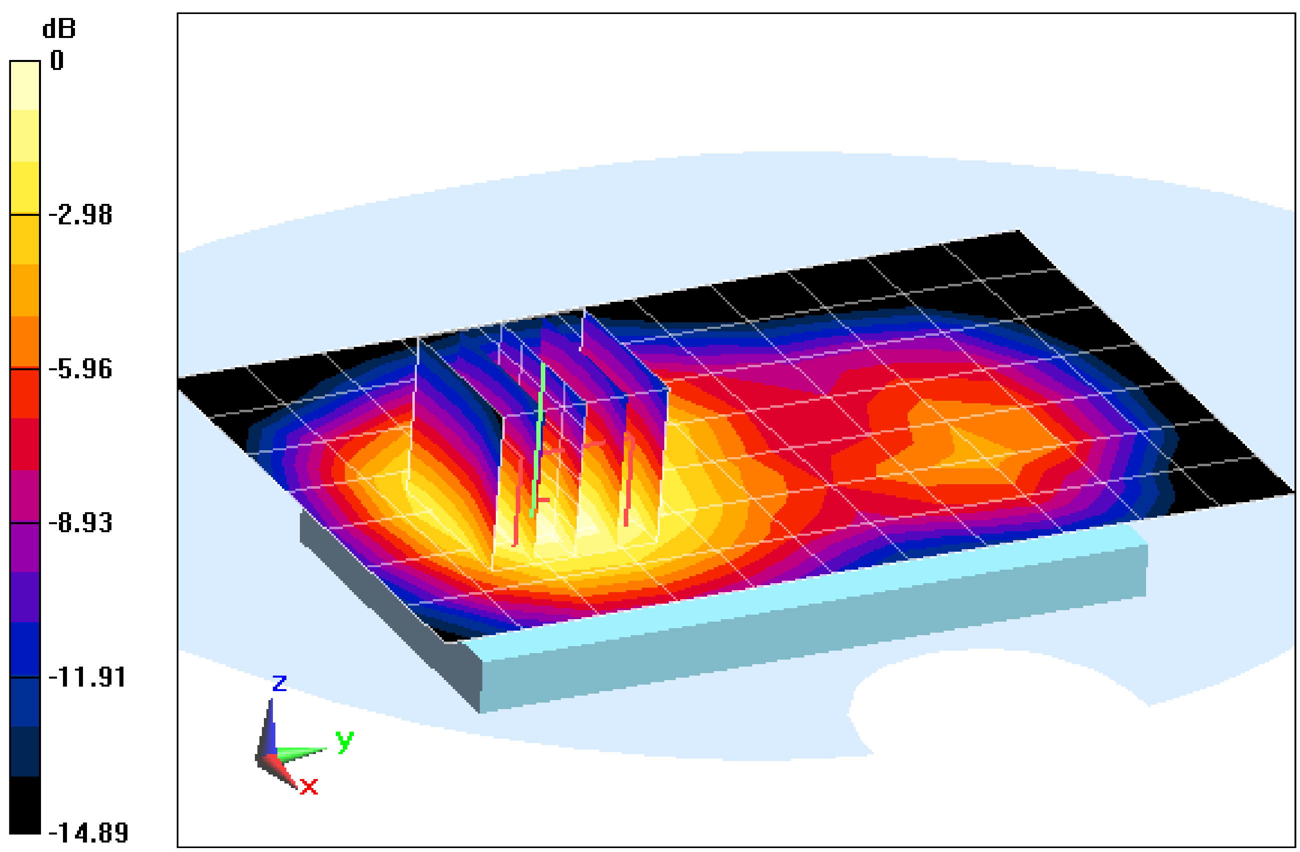
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.522 mho/m; ε_r = 51.21; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

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

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.730 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.979 mW/g
SAR(1 g) = 0.636 mW/g; SAR(10 g) = 0.415 mW/g



0 dB = 0.679 mW/g = -3.36 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

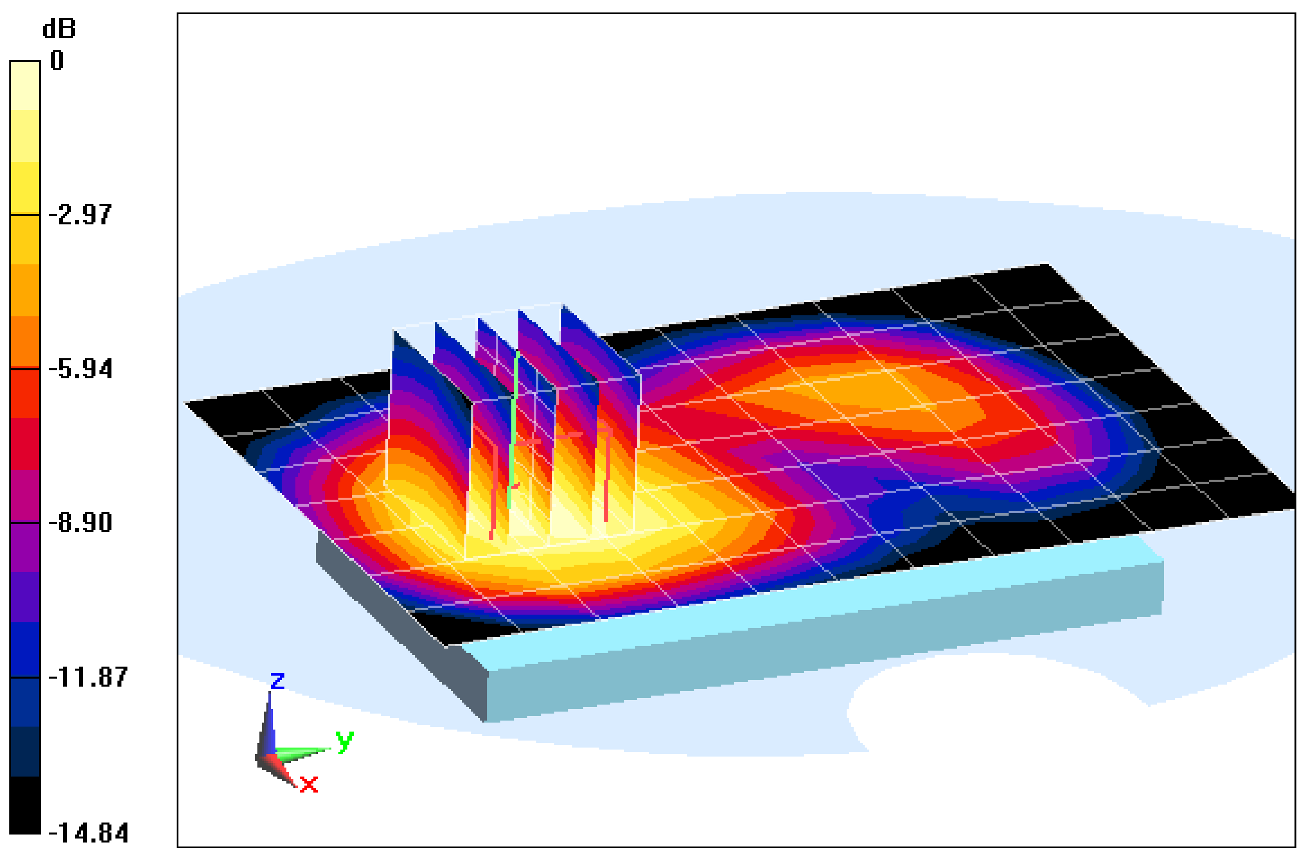
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.522 mho/m; ε_r = 51.21; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

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

Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.894 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.934 mW/g
SAR(1 g) = 0.615 mW/g; SAR(10 g) = 0.393 mW/g



0 dB = 0.660 mW/g = -3.61 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

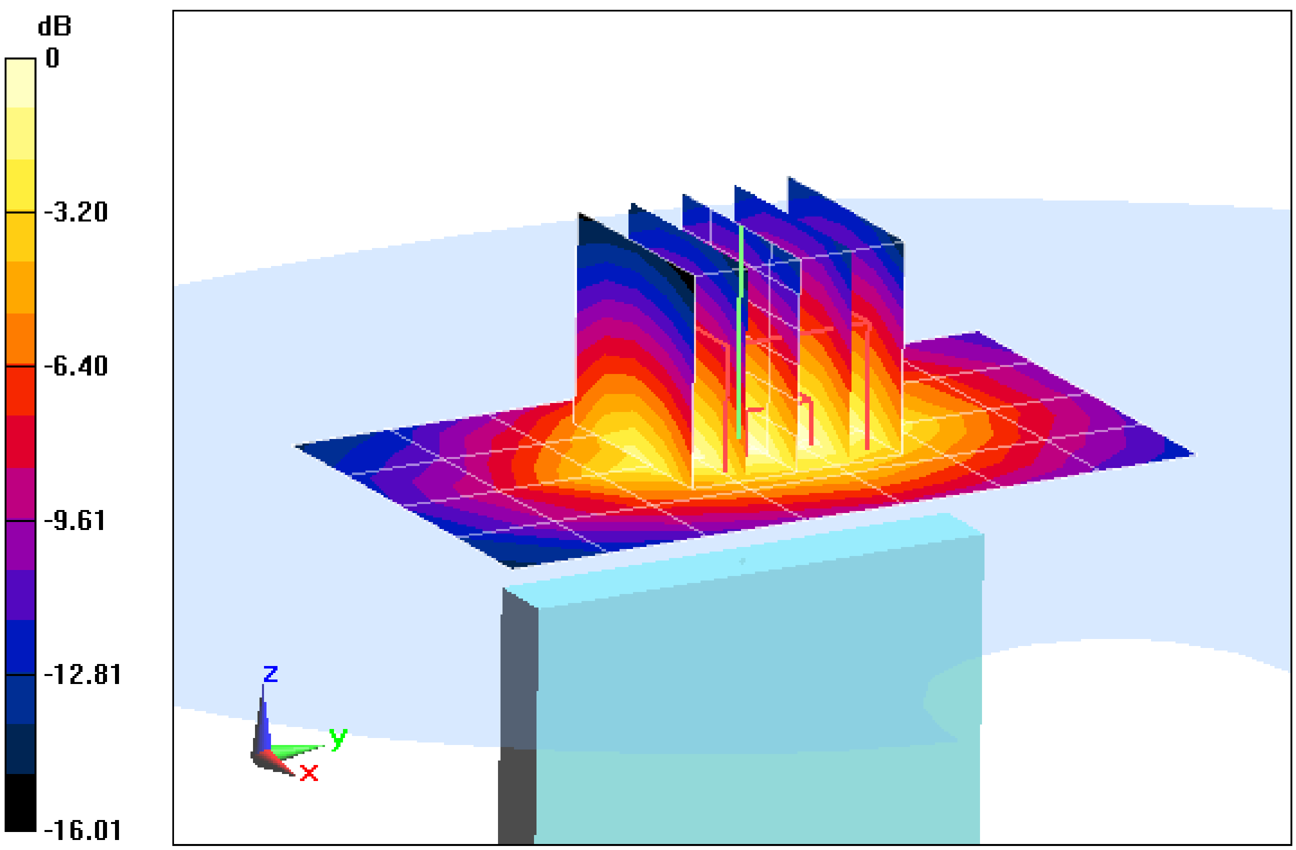
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.522 mho/m; ε_r = 51.21; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

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

Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.653 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.879 mW/g
SAR(1 g) = 0.545 mW/g; SAR(10 g) = 0.322 mW/g



0 dB = 0.592 mW/g = -4.55 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 11

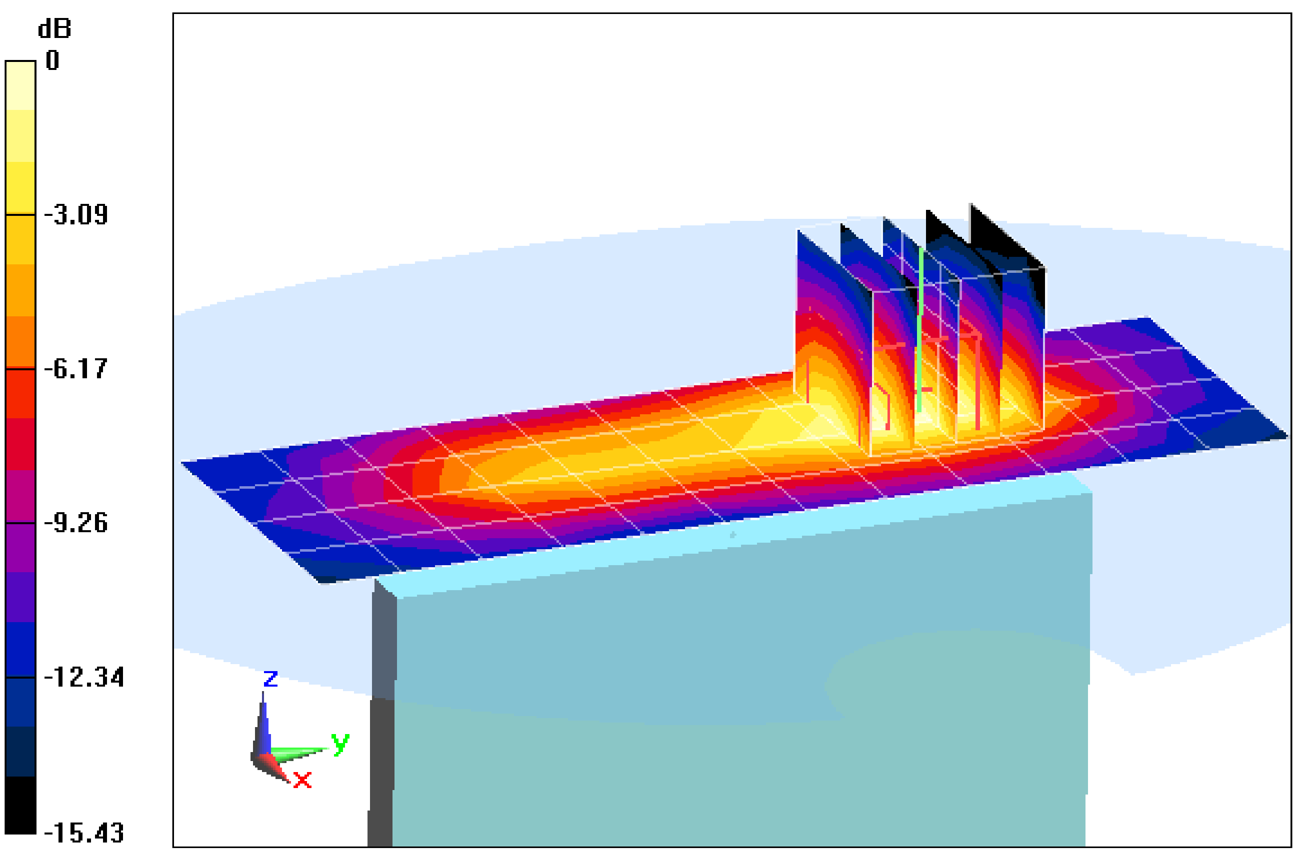
Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.522 mho/m; ε_r = 51.21; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

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

Area Scan (5x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.341 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.448 mW/g
SAR(1 g) = 0.263 mW/g; SAR(10 g) = 0.149 mW/g



0 dB = 0.292 mW/g = -10.69 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 15

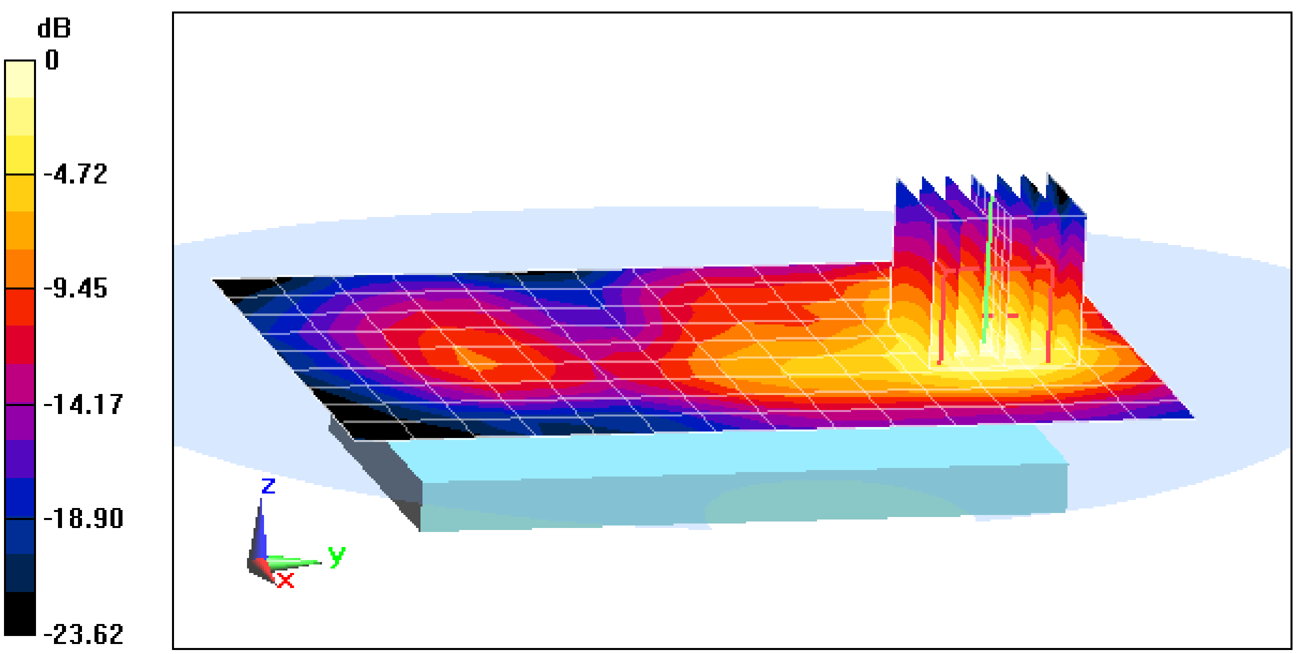
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2462 MHz; σ = 2.042 mho/m; ε_r = 54.388; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.8°C; Tissue Temp: 21.2°C

Probe: ES3DV2 - SN3022; ConvF(4.01, 4.01, 4.01); Calibrated: 8/25/2011
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11b, Body SAR, Ch 11, 1 Mbps, Back Side

Area Scan (10x15x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.115 V/m; Power Drift = 0.0075 dB
Peak SAR (extrapolated) = 0.7030
SAR(1 g) = 0.342 mW/g; SAR(10 g) = 0.171 mW/g



0 dB = 0.430mW/g = -7.33 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 15

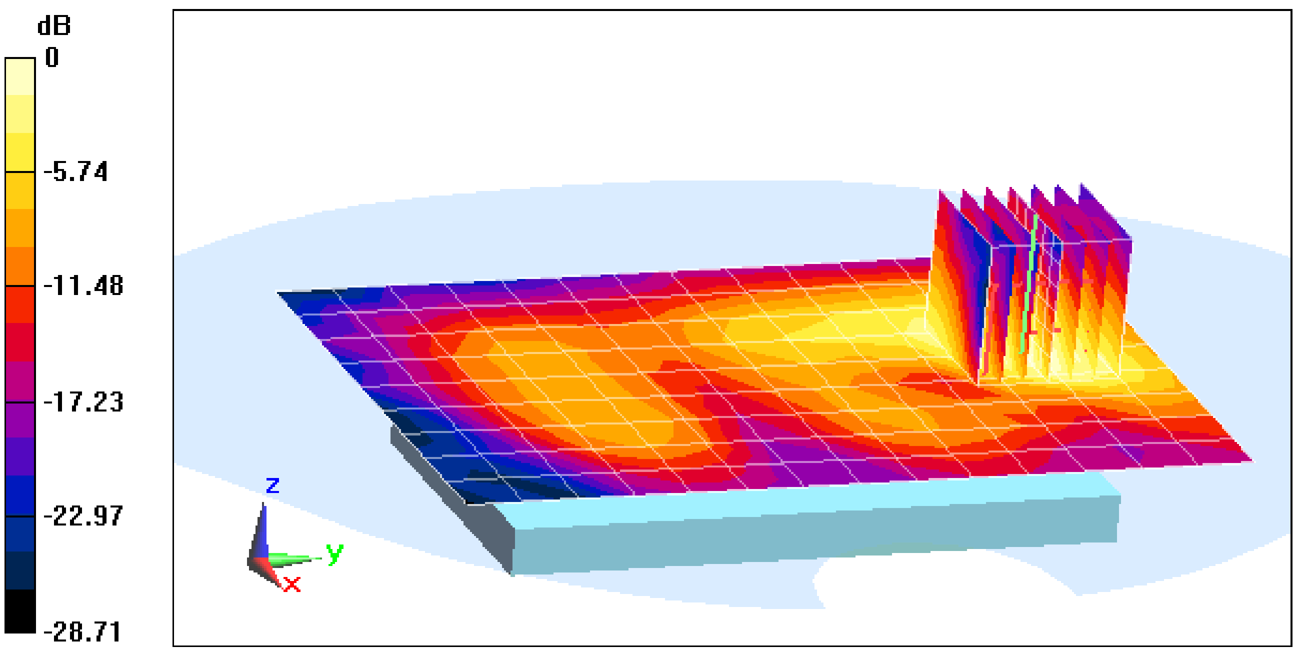
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2462 MHz; σ = 2.042 mho/m; ε_r = 54.388; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.8°C; Tissue Temp: 21.2°C

Probe: ES3DV2 - SN3022; ConvF(4.01, 4.01, 4.01); Calibrated: 8/25/2011
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11b, Body SAR, Ch 11, 1 Mbps, Front Side

Area Scan (10x15x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.191 V/m; Power Drift = -0.0055 dB
Peak SAR (extrapolated) = 0.3220
SAR(1 g) = 0.157 mW/g; SAR(10 g) = 0.076 mW/g



0 dB = 0.200mW/g = -13.98 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 15

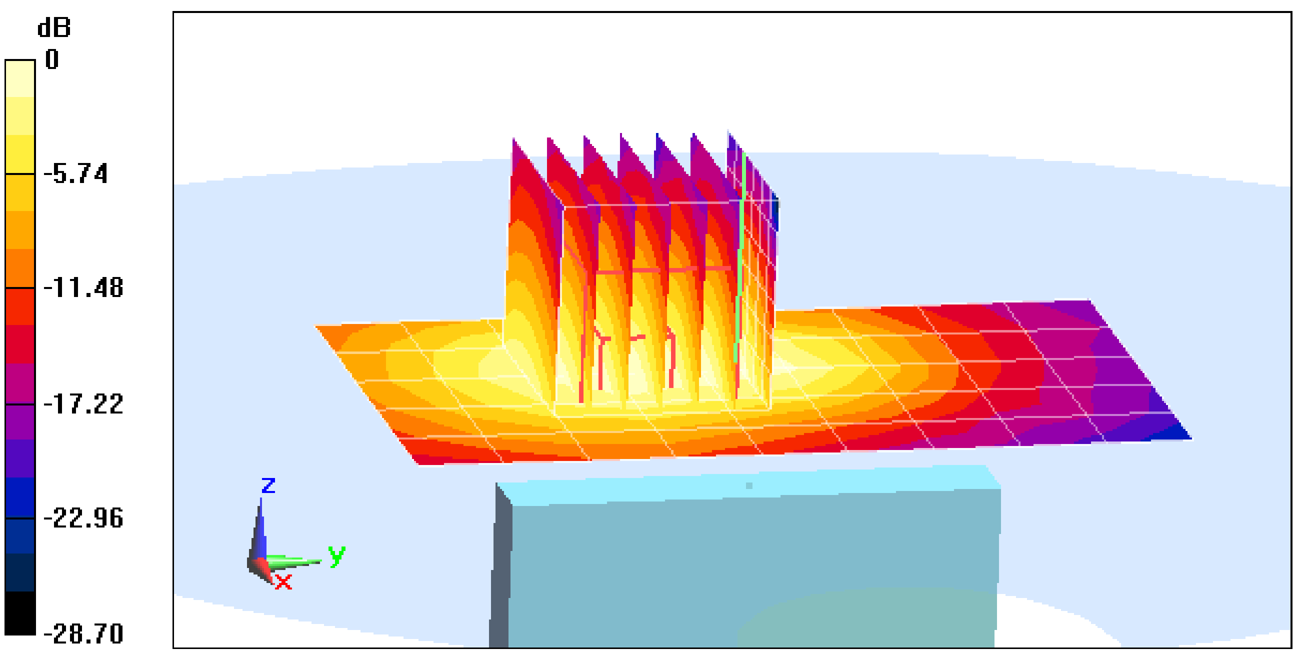
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2462 MHz; σ = 2.042 mho/m; ε_r = 54.388; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.8°C; Tissue Temp: 21.2°C

Probe: ES3DV2 - SN3022; ConvF(4.01, 4.01, 4.01); Calibrated: 8/25/2011
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11b, Body SAR, Ch 11, 1 Mbps, Top Edge

Area Scan (6x10x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.090 V/m; Power Drift = -0.0055 dB
Peak SAR (extrapolated) = 0.3640
SAR(1 g) = 0.179 mW/g; SAR(10 g) = 0.093 mW/g



0 dB = 0.220mW/g = -13.15 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 15

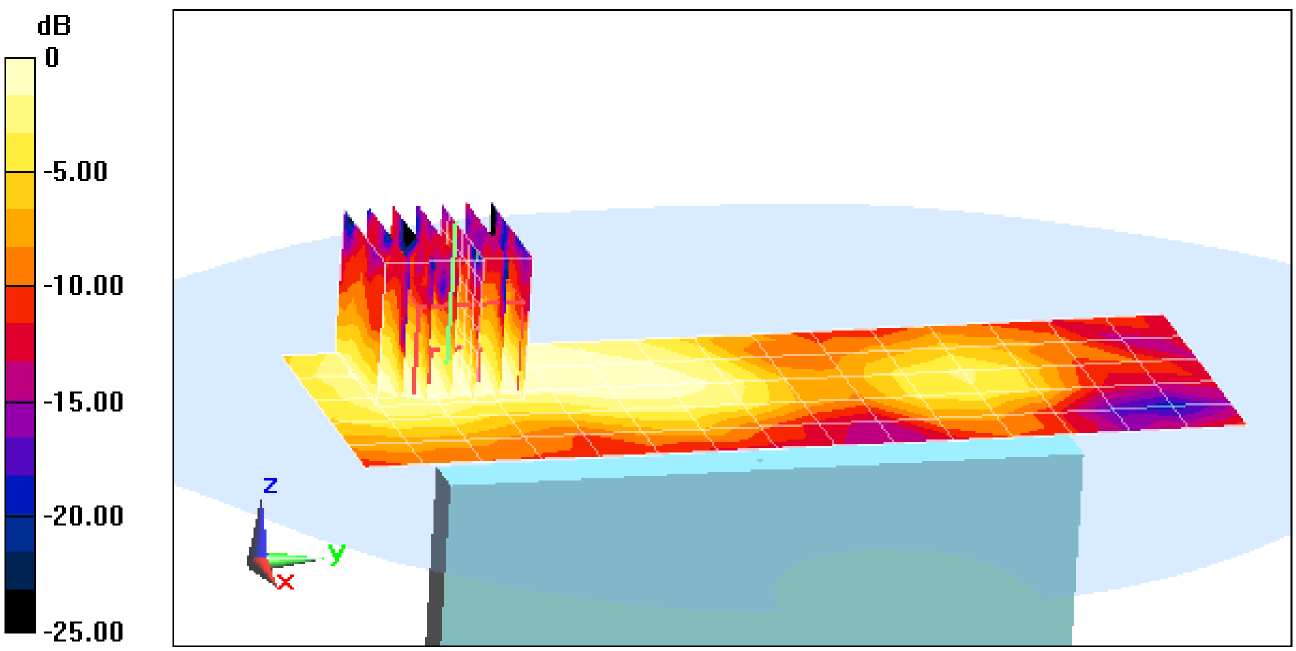
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2462 MHz; σ = 2.042 mho/m; ε_r = 54.388; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.8°C; Tissue Temp: 21.2°C

Probe: ES3DV2 - SN3022; ConvF(4.01, 4.01, 4.01); Calibrated: 8/25/2011
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11b, Body SAR, Ch 11, 1 Mbps, Right Edge

Area Scan (6x16x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.949 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.0320
SAR(1 g) = 0.017 mW/g; SAR(10 g) = 0.00948 mW/g



0 dB = 0.020mW/g = -33.98 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFP870; Type: Portable Handset; Serial: 15

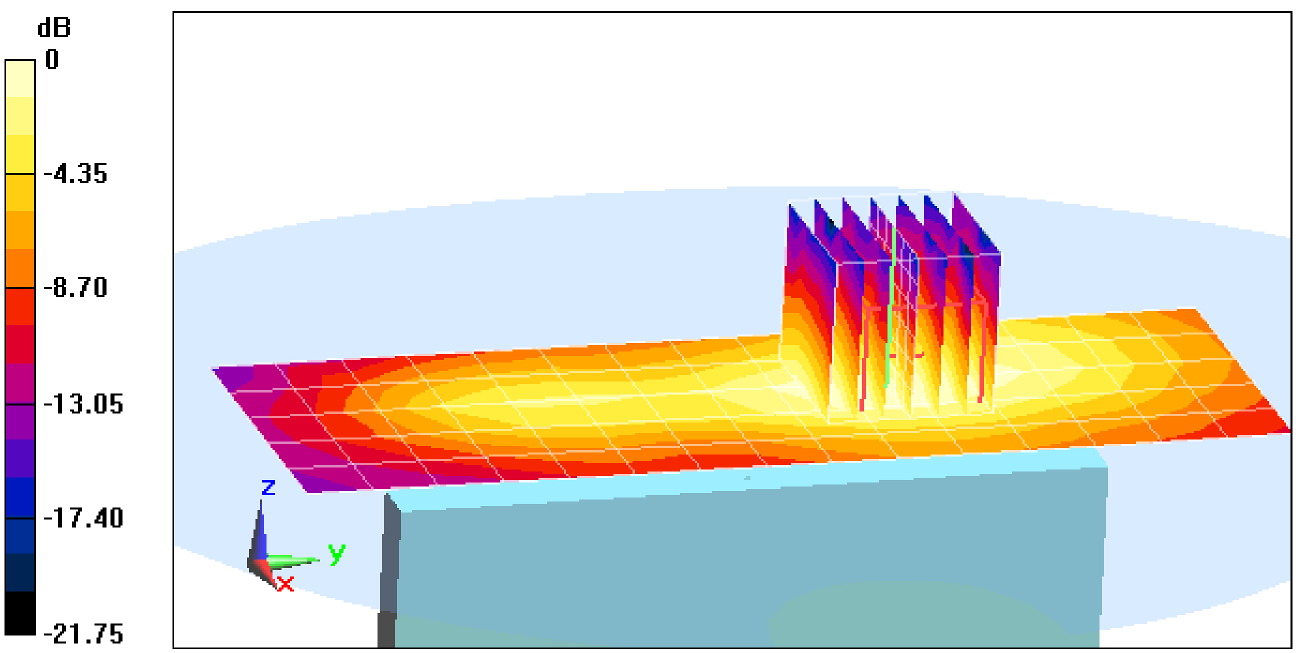
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2462 MHz; σ = 2.042 mho/m; ε_r = 54.388; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.8°C; Tissue Temp: 21.2°C

Probe: ES3DV2 - SN3022; ConvF(4.01, 4.01, 4.01); Calibrated: 8/25/2011
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11b, Body SAR, Ch 11, 1 Mbps, Left Edge

Area Scan (6x16x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.453 V/m; Power Drift = 0.0066 dB
Peak SAR (extrapolated) = 0.1410
SAR(1 g) = 0.077 mW/g; SAR(10 g) = 0.043 mW/g



0 dB = 0.090mW/g = -20.92 dB mW/g

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1046

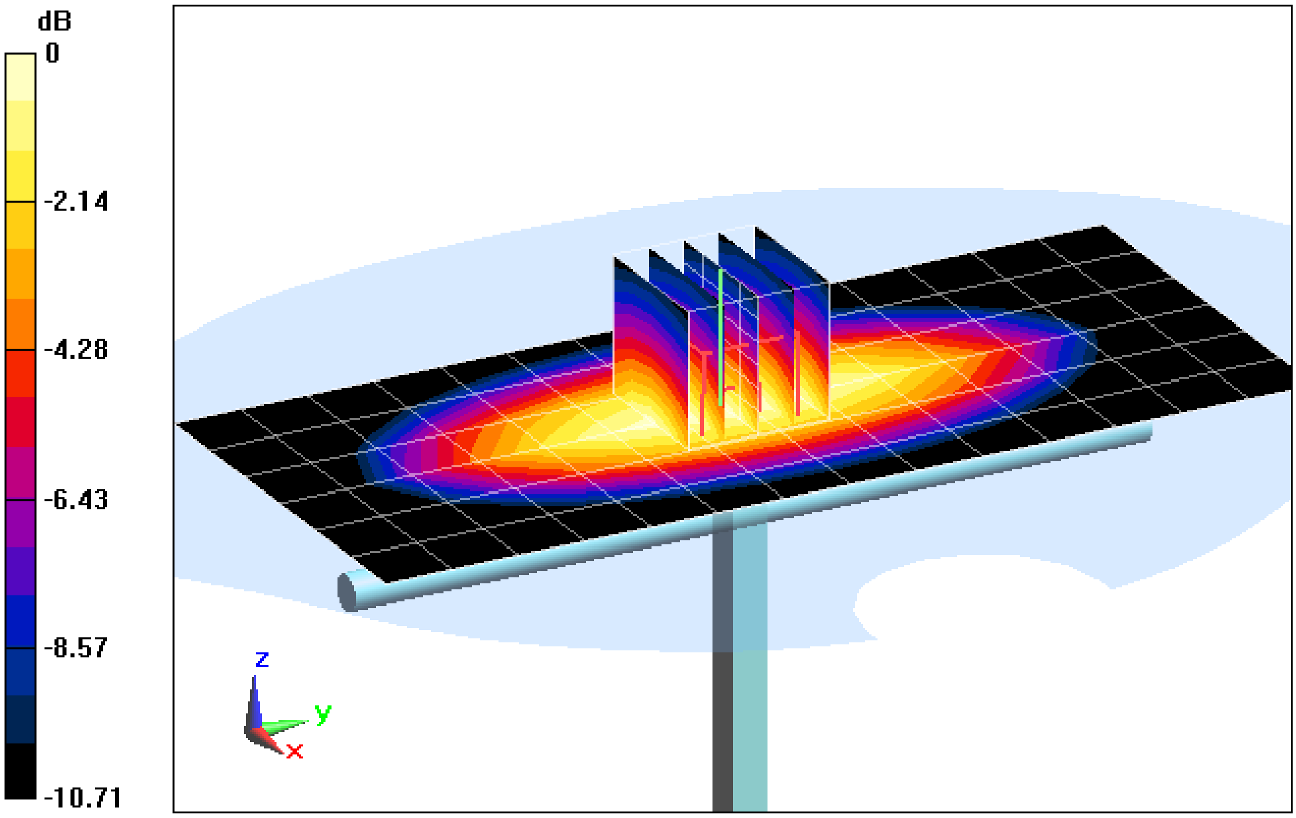
Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 740 Head; Medium parameters used (interpolated):
f = 750 MHz; σ = 0.9 mho/m; ε_r = 40.41; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-12-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN3561; ConvF(8.38, 8.38, 8.38); Calibrated: 7/27/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 4/12/2012
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (0);SEMCAD X Version 14.6.5 (4989)

750 MHz System Verification

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 0.815 mW/g; SAR(10 g) = 0.532 mW/g
Deviation = -2.98 %



0 dB = 0.880mW/g = -1.11 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1046

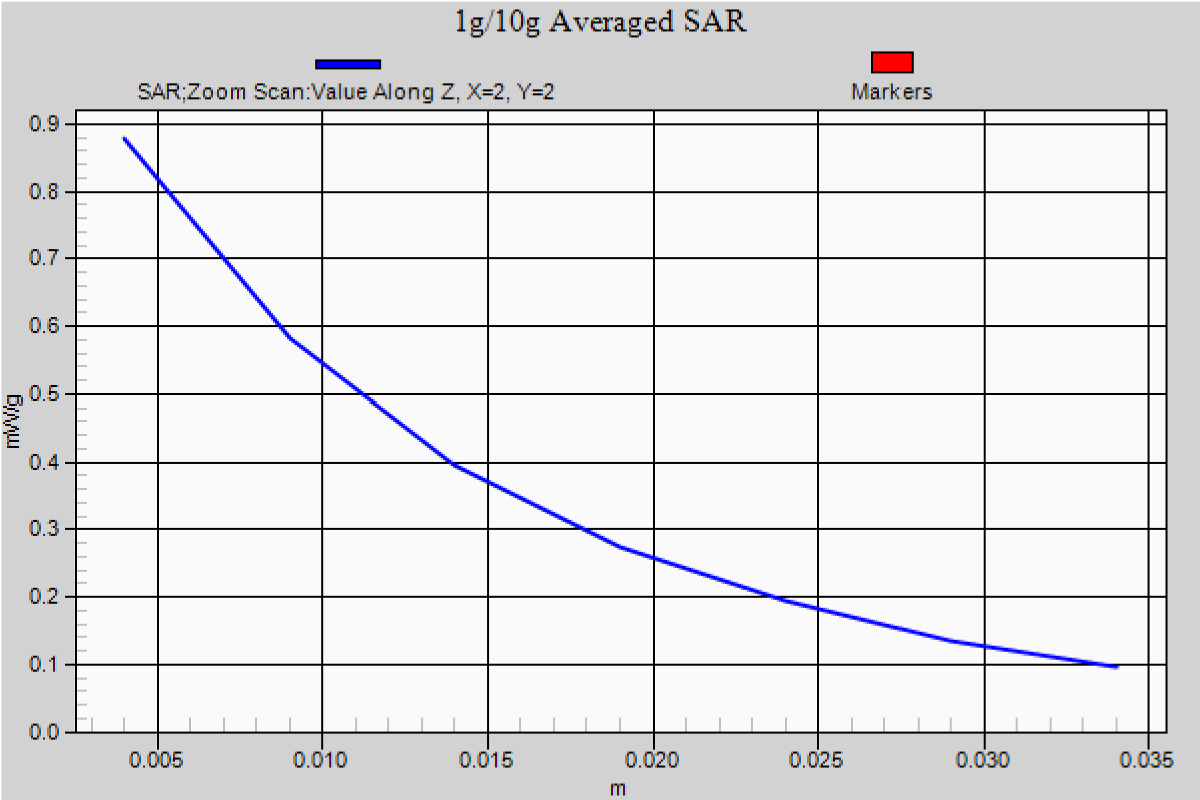
Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 740 Head; Medium parameters used (interpolated):
f = 750 MHz; σ = 0.9 mho/m; ε_r = 40.41; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-12-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN3561; ConvF(8.38, 8.38, 8.38); Calibrated: 7/27/2011
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1333; Calibrated: 4/12/2012
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647
Measurement SW: DASY52, Version 52.8 (0);SEMCAD X Version 14.6.5 (4989)

750 MHz System Verification

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 0.815 mW/g; SAR(10 g) = 0.532 mW/g
Deviation = -2.98 %



PCTEST ENGINEERING LABORATORY, INC.

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

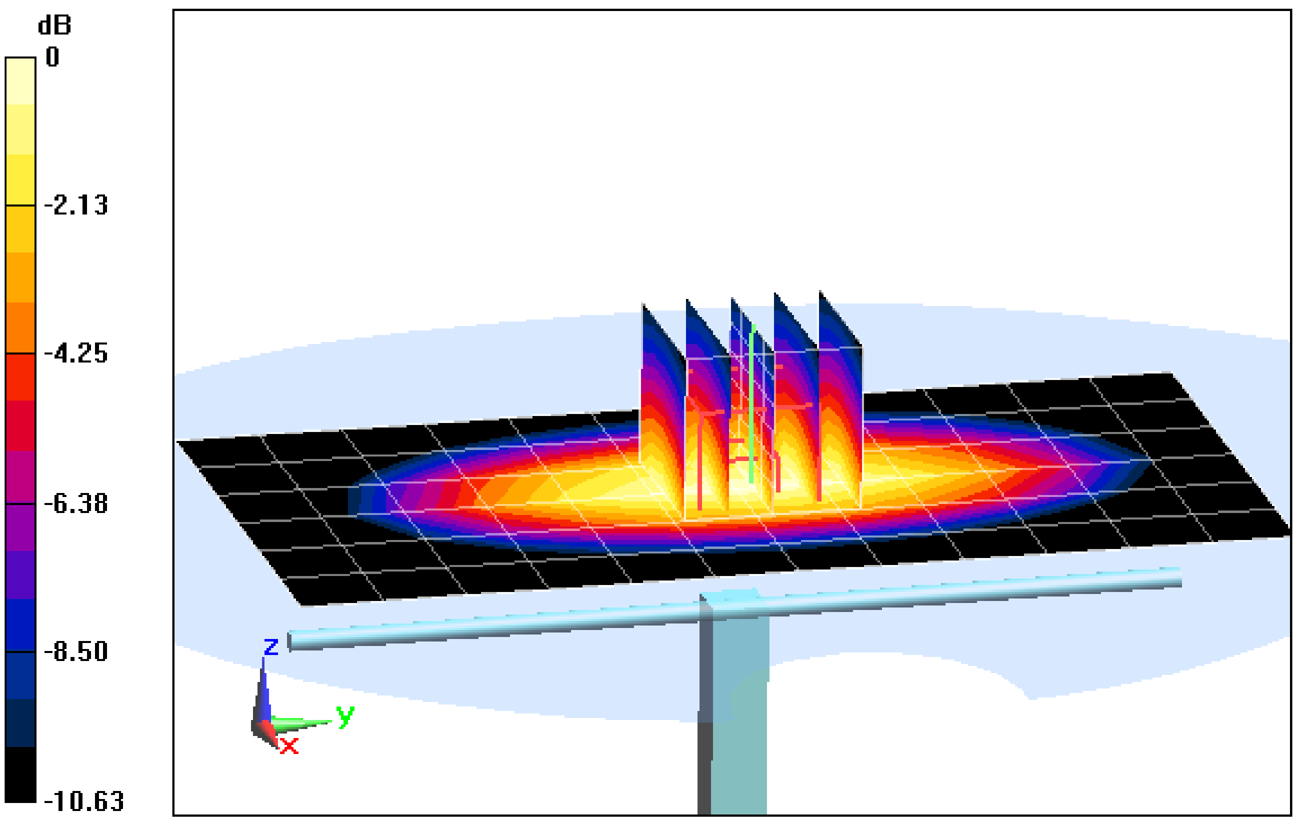
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; σ = 0.919 mho/m; ε_r = 41.49; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (4989)

835MHz System Verification

Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20 dBm (100 mW)
SAR(1 g) = 0.991 mW/g; SAR(10 g) = 0.646 mW/g
Deviation = 5.20%



0 dB = 1.07 mW/g = 0.59 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

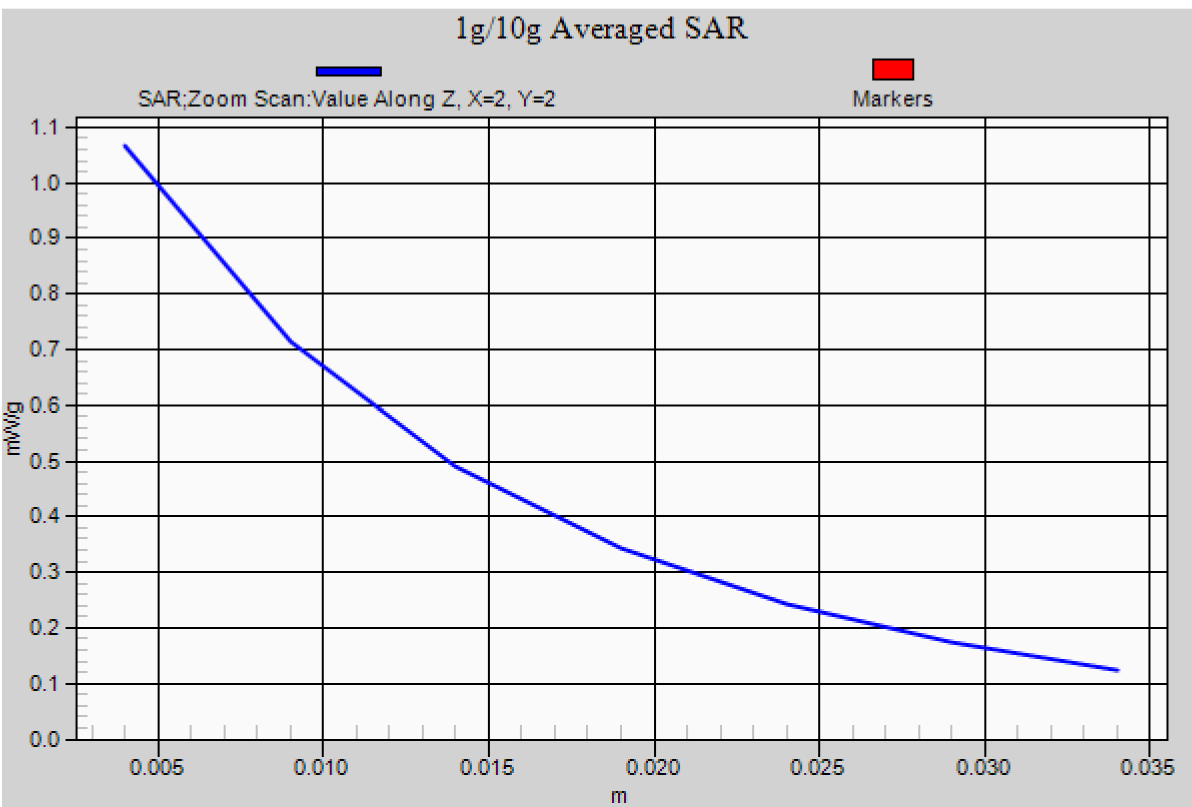
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; σ = 0.919 mho/m; ε_r = 41.49; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (4989)

835MHz System Verification

Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20 dBm (100 mW)
SAR(1 g) = 0.991 mW/g; SAR(10 g) = 0.646 mW/g
Deviation = 5.20%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1008

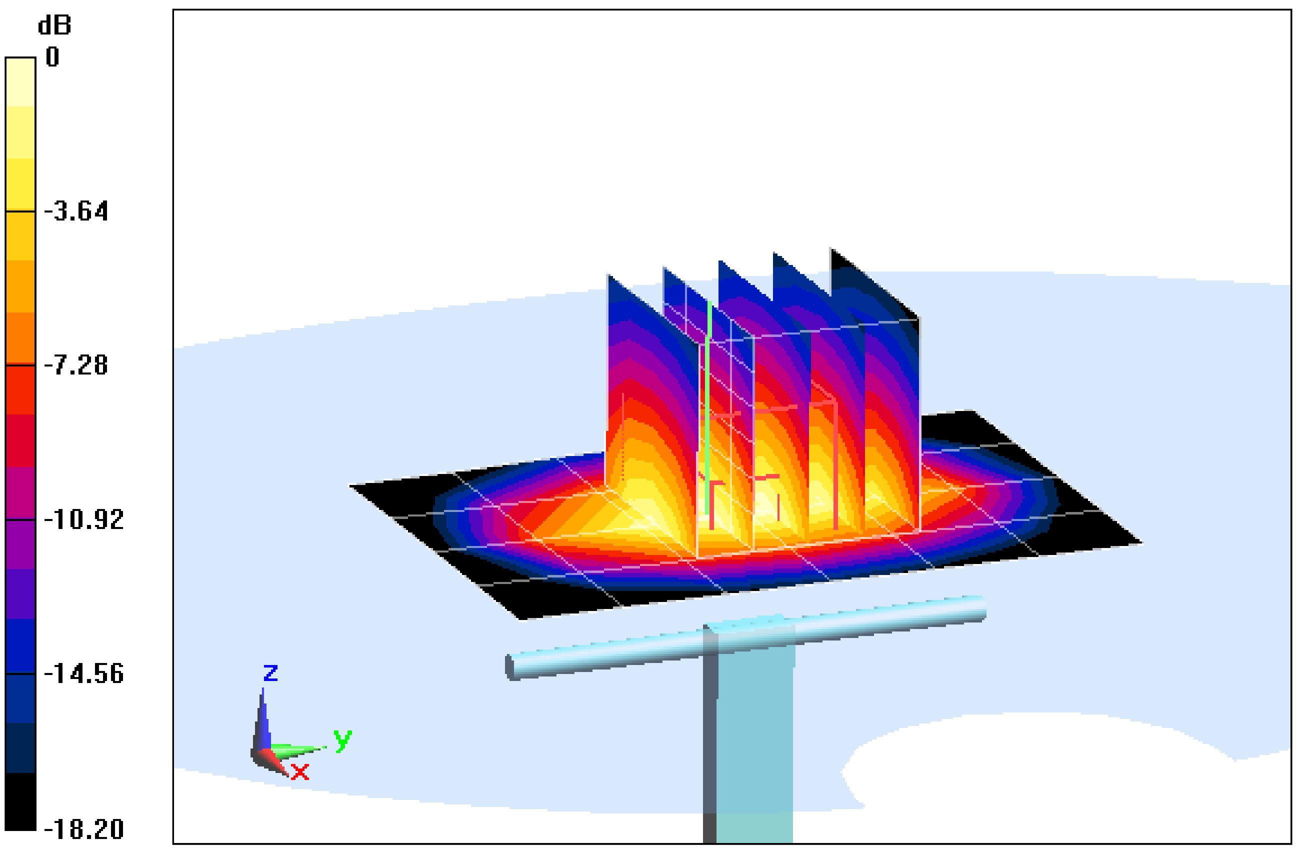
Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used:
f = 1750 MHz; σ = 1.397 mho/m; ε_r = 39.07; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 23.6°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3209; ConvF(5.26, 5.26, 5.26); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (4989)

1750 MHz 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) = 3.72 mW/g; SAR(10 g) = 1.95 mW/g
Deviation = 2.20%



0 dB = 4.12 mW/g = 12.30 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1008

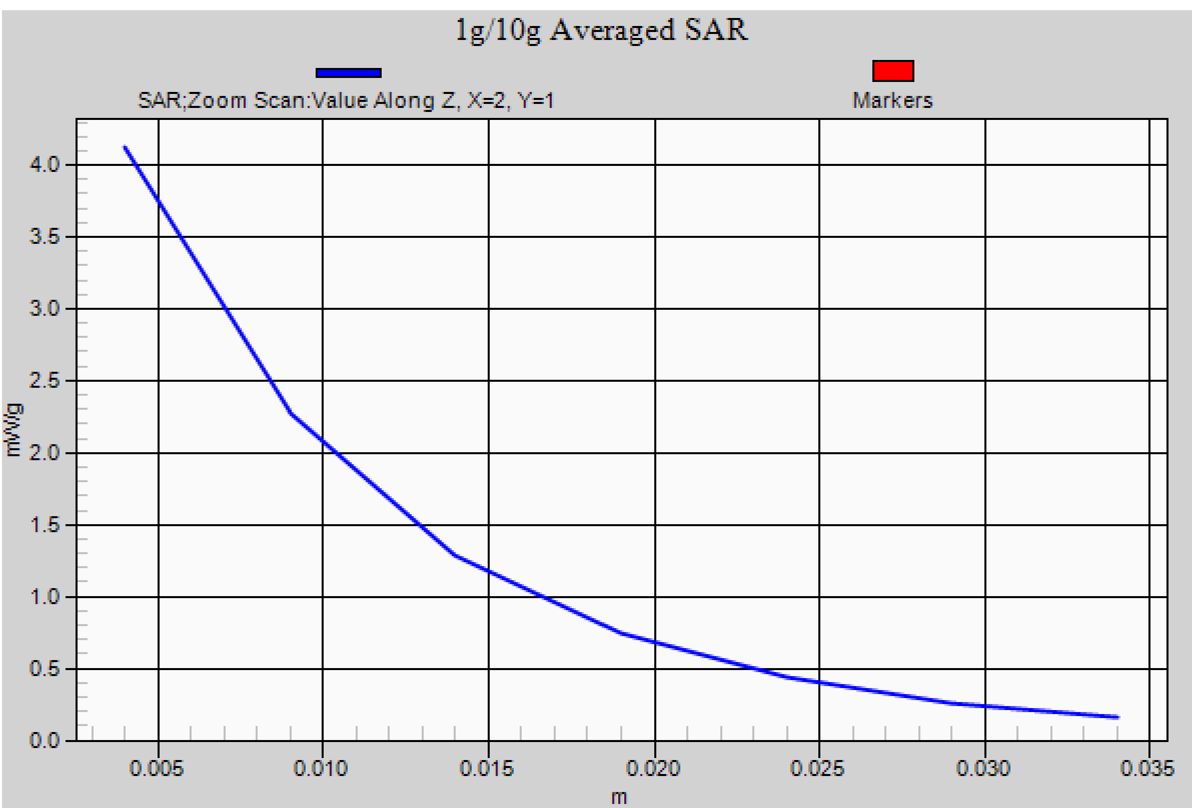
Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: 1750 Head Medium parameters used:
f = 1750 MHz; σ = 1.397 mho/m; ε_r = 39.07; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 23.6°C; Tissue Temp: 22.8°C

Probe: ES3DV3 - SN3209; ConvF(5.26, 5.26, 5.26); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (4989)

1750 MHz 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) = 3.72 mW/g; SAR(10 g) = 1.95 mW/g
Deviation = 2.20%



PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

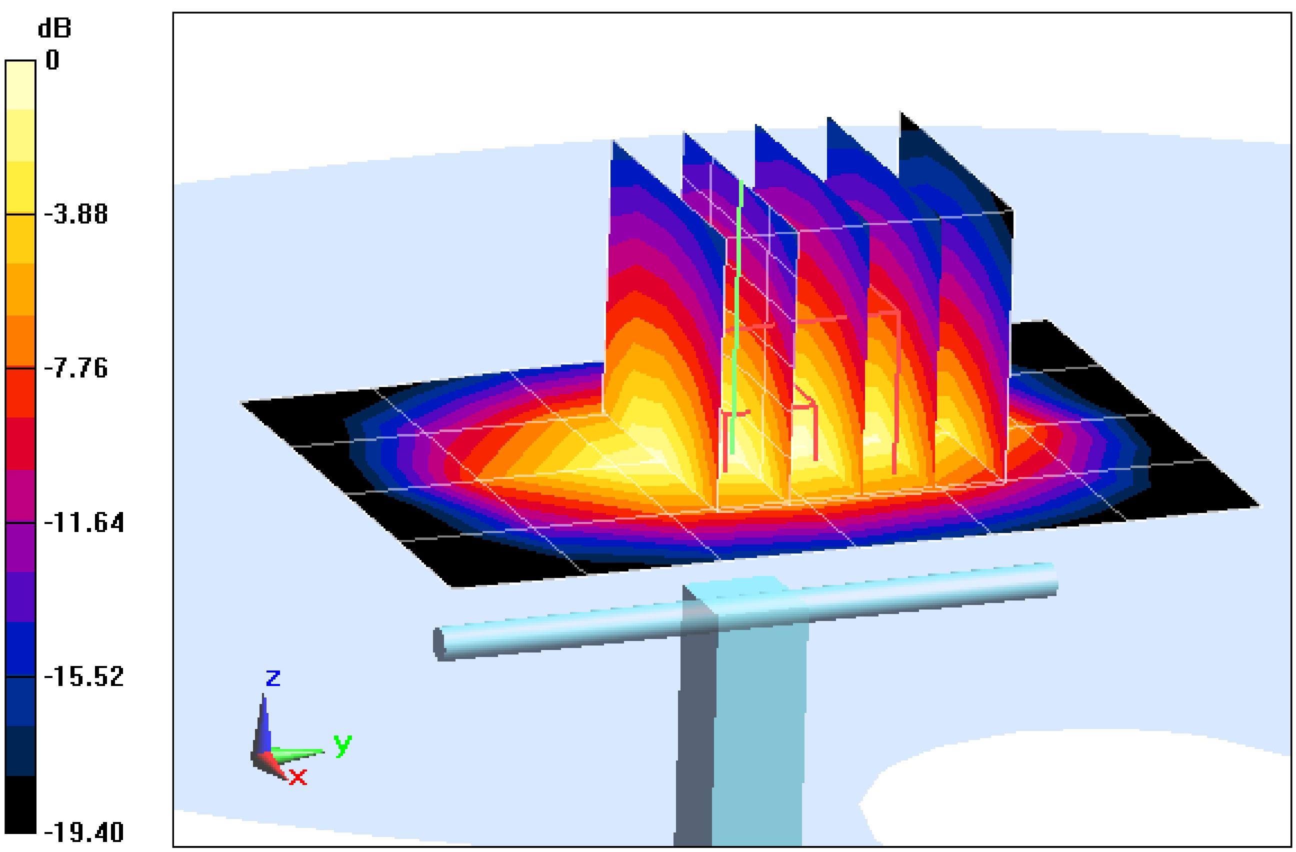
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.448 mho/m; ε_r = 38.52; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (4989)

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) = 4.1 mW/g; SAR(10 g) = 2.13 mW/g
Deviation = 2.76%



0 dB = 4.51 mW/g = 13.08 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

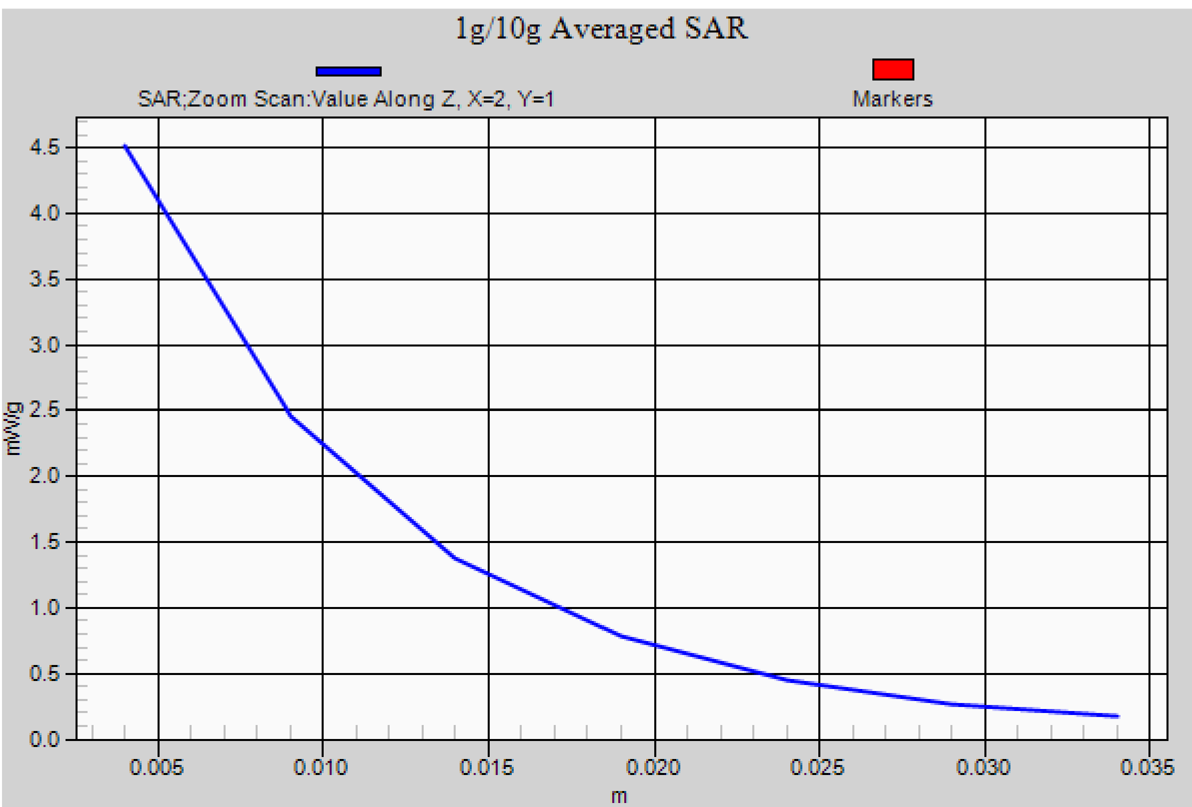
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.448 mho/m; ε_r = 38.52; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (4989)

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) = 4.1 mW/g; SAR(10 g) = 2.13 mW/g
Deviation = 2.76%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

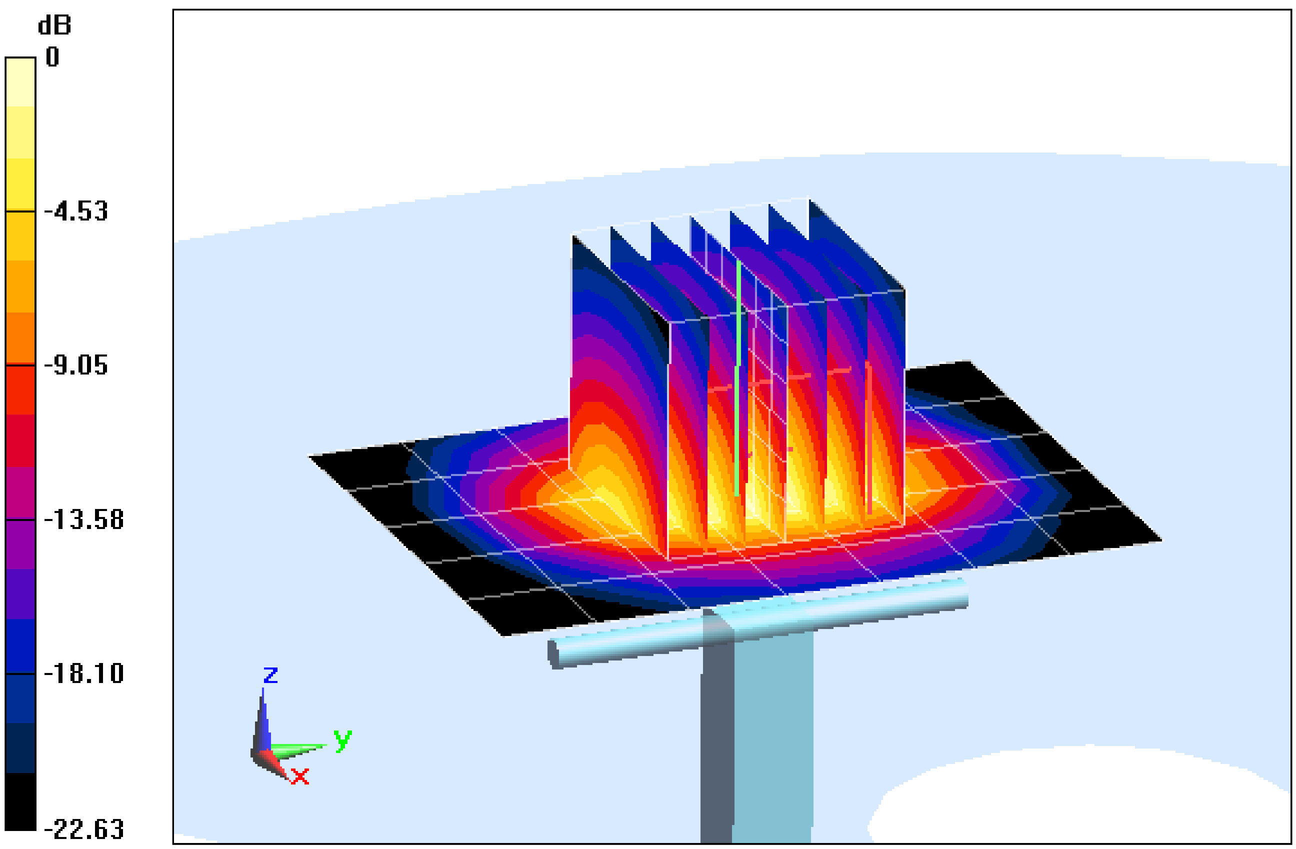
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.885 mho/m; ε_r = 40.36; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-04-2012; Ambient Temp: 22.3°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3209; ConvF(4.46, 4.46, 4.46); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (4989)

2450MHz System Verification

Area Scan (6x8x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 20 dB (100 mW)
SAR(1 g) = 5.53 mW/g; SAR(10 g) = 2.57 mW/g
Deviation = 2.79%



0 dB = 7.20 mW/g = 17.15 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719

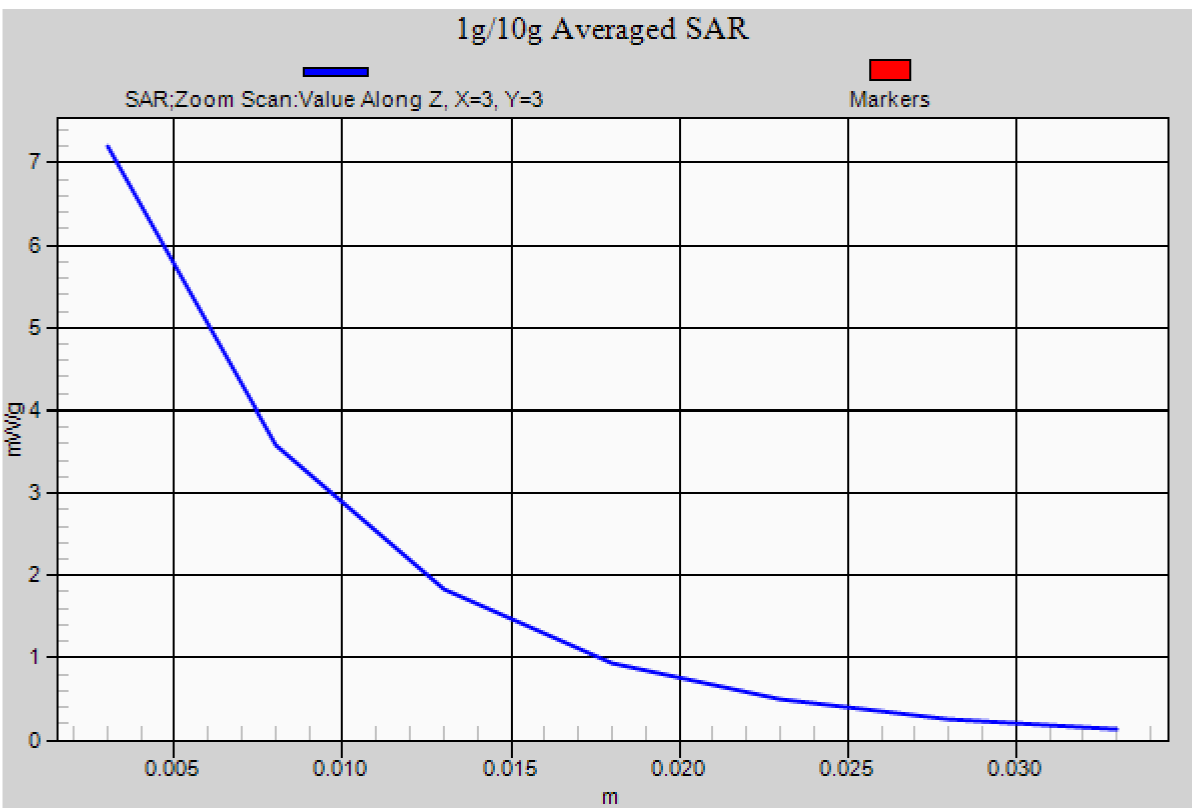
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; $\sigma = 1.885$ mho/m; $\varepsilon_r = 40.36$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-04-2012; Ambient Temp: 22.3°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3209; ConvF(4.46, 4.46, 4.46); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (4989)

2450MHz System Verification

Area Scan (6x8x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 20 dB (100 mW)
SAR(1 g) = 5.53 mW/g; SAR(10 g) = 2.57 mW/g
Deviation = 2.79%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1054

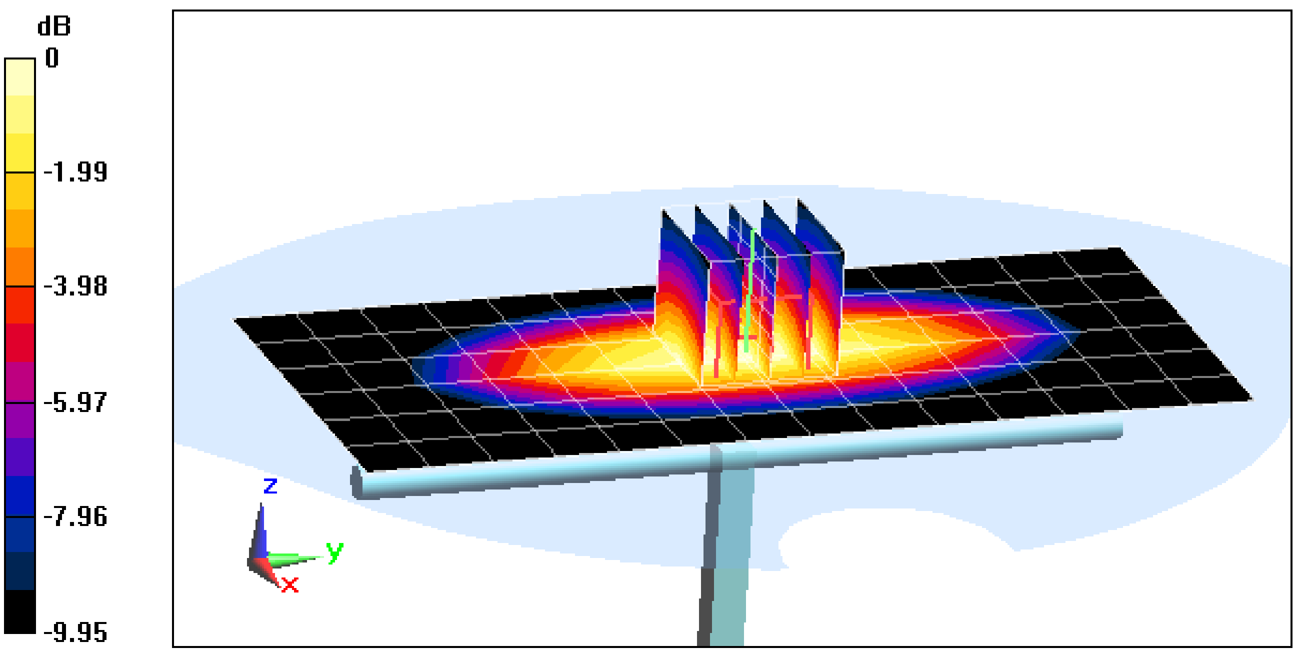
Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: 740 Body Medium parameters used (interpolated):
f = 750 MHz; σ = 0.977 mho/m; ε_r = 54.52; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-07-2012; Ambient Temp: 22.2°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3288; ConvF(6.34, 6.34, 6.34); Calibrated: 2/7/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.5 (4989)

750 MHz System Verification

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 18.0 dBm (63 mW)
SAR(1 g) = 0.551 mW/g; SAR(10 g) = 0.366 mW/g
Deviation = -1.06 %



0 dB = 0.590mW/g = -4.58 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1054

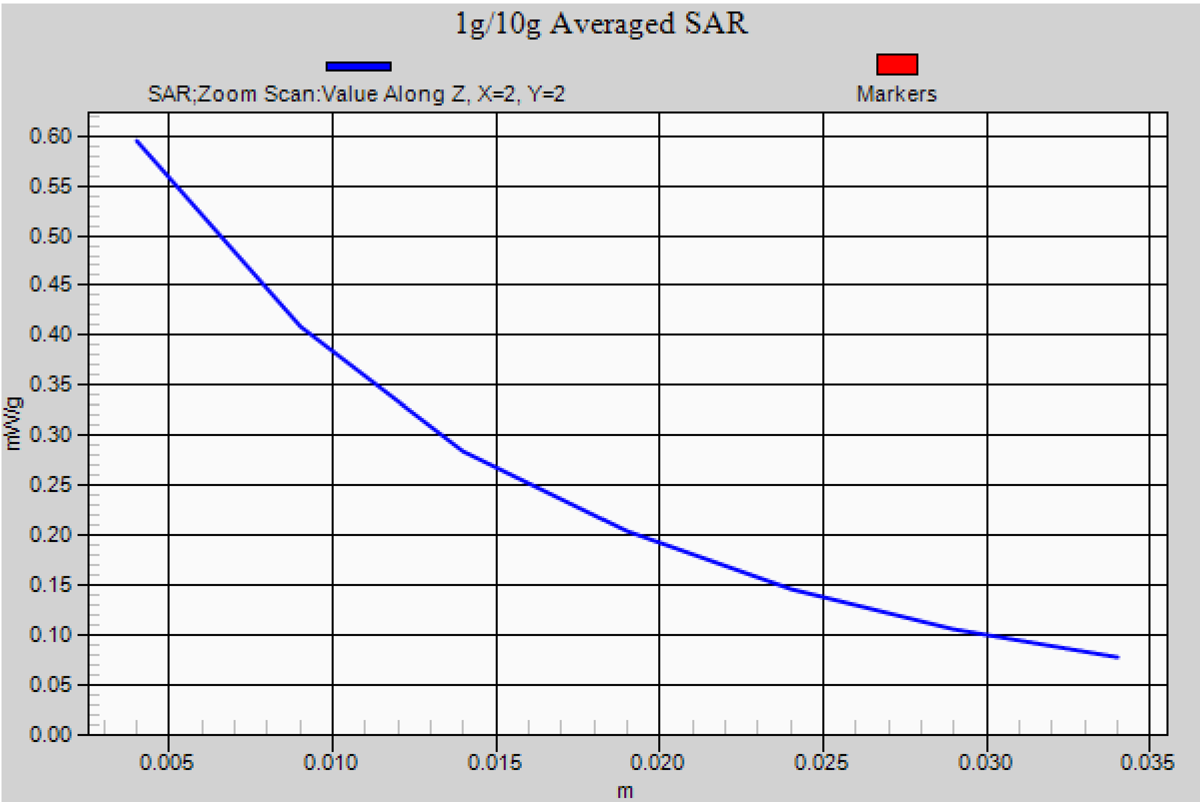
Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: 740 Body Medium parameters used (interpolated):
f = 750 MHz; σ = 0.977 mho/m; ε_r = 54.52; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-07-2012; Ambient Temp: 22.2°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3288; ConvF(6.34, 6.34, 6.34); Calibrated: 2/7/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646
Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.5 (4989)

750 MHz System Verification

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 18.0 dBm (63 mW)
SAR(1 g) = 0.551 mW/g; SAR(10 g) = 0.366 mW/g
Deviation = -1.06 %



PCTEST ENGINEERING LABORATORY, INC.

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

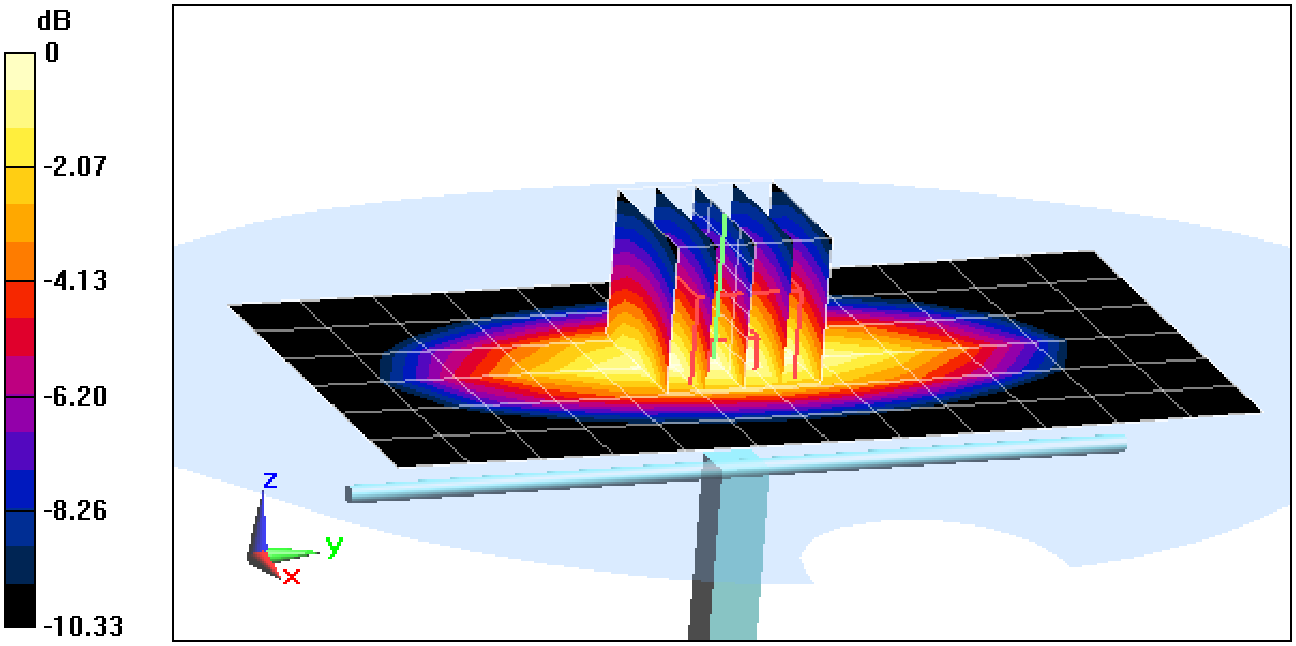
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.998 mho/m; ε_r = 53.05; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (4989)

835MHz System Verification

Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.675 mW/g
Deviation = 6.69 %



0 dB = 1.110mW/g = 0.91 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

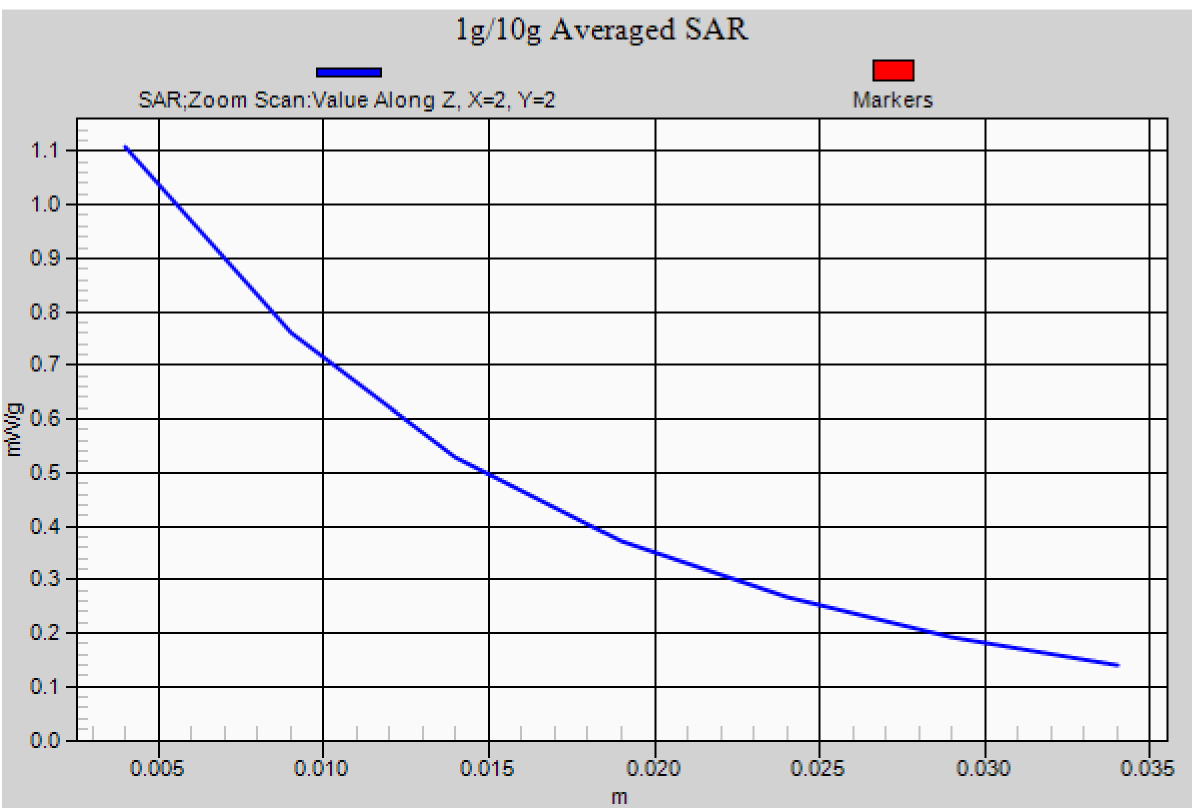
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.998 mho/m; ε_r = 53.05; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-07-2012; Ambient Temp: 23.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (4989)

835MHz System Verification

Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.675 mW/g
Deviation = 6.69 %



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1008

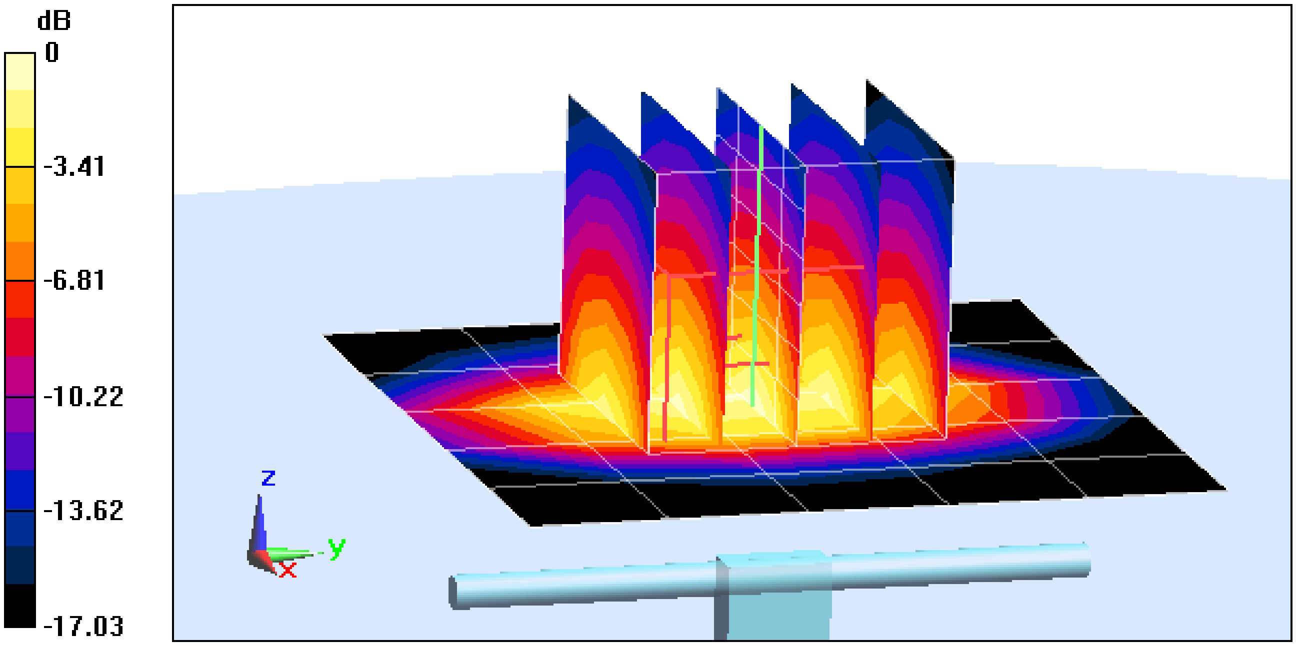
Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used:
f = 1750 MHz; σ = 1.532 mho/m; ε_r = 51.16; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.83, 4.83, 4.83); Calibrated: 3/16/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (4989)

1750 MHz System Verification

Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 3.95 mW/g; SAR(10 g) = 2.09 mW/g
Deviation = 5.61 %



0 dB = 4.460mW/g = 12.99 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1008

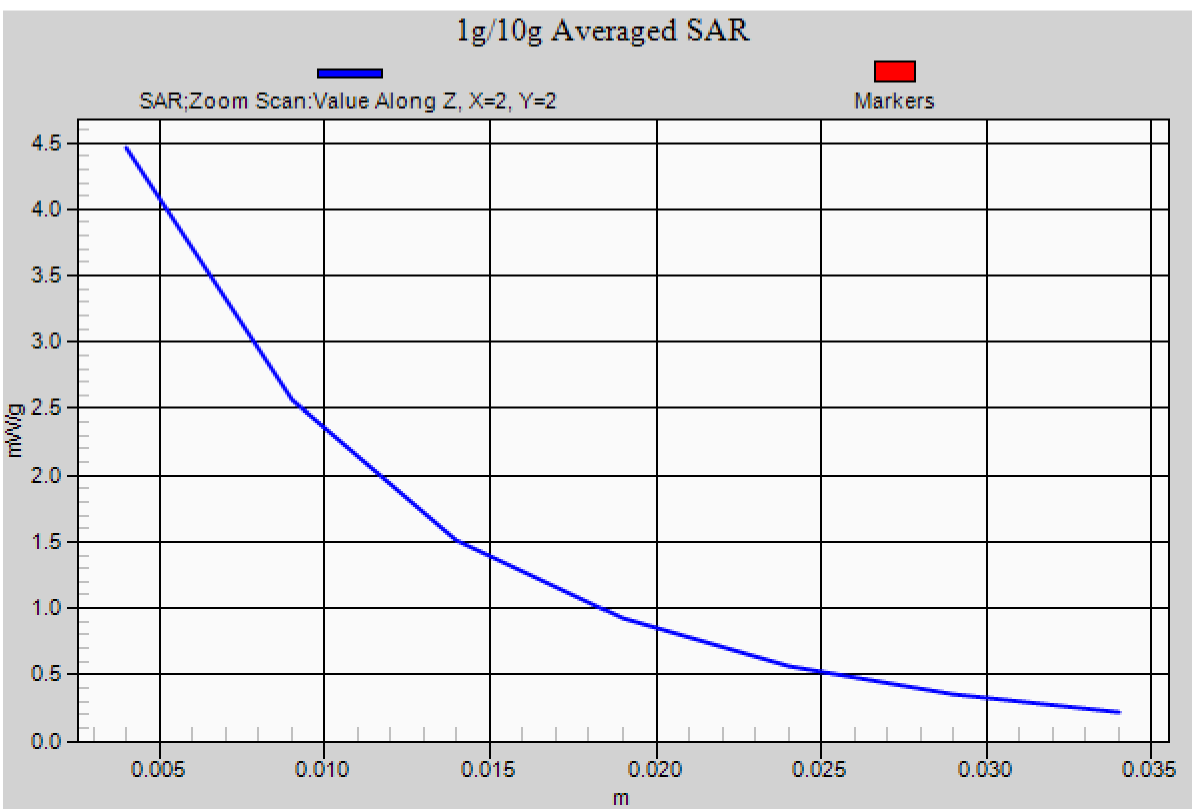
Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: 1750 Body Medium parameters used:
f = 1750 MHz; σ = 1.532 mho/m; ε_r = 51.16; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-07-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.83, 4.83, 4.83); Calibrated: 3/16/2012
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (4989)

1750 MHz System Verification

Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
SAR(1 g) = 3.95 mW/g; SAR(10 g) = 2.09 mW/g
Deviation = 5.61 %



PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

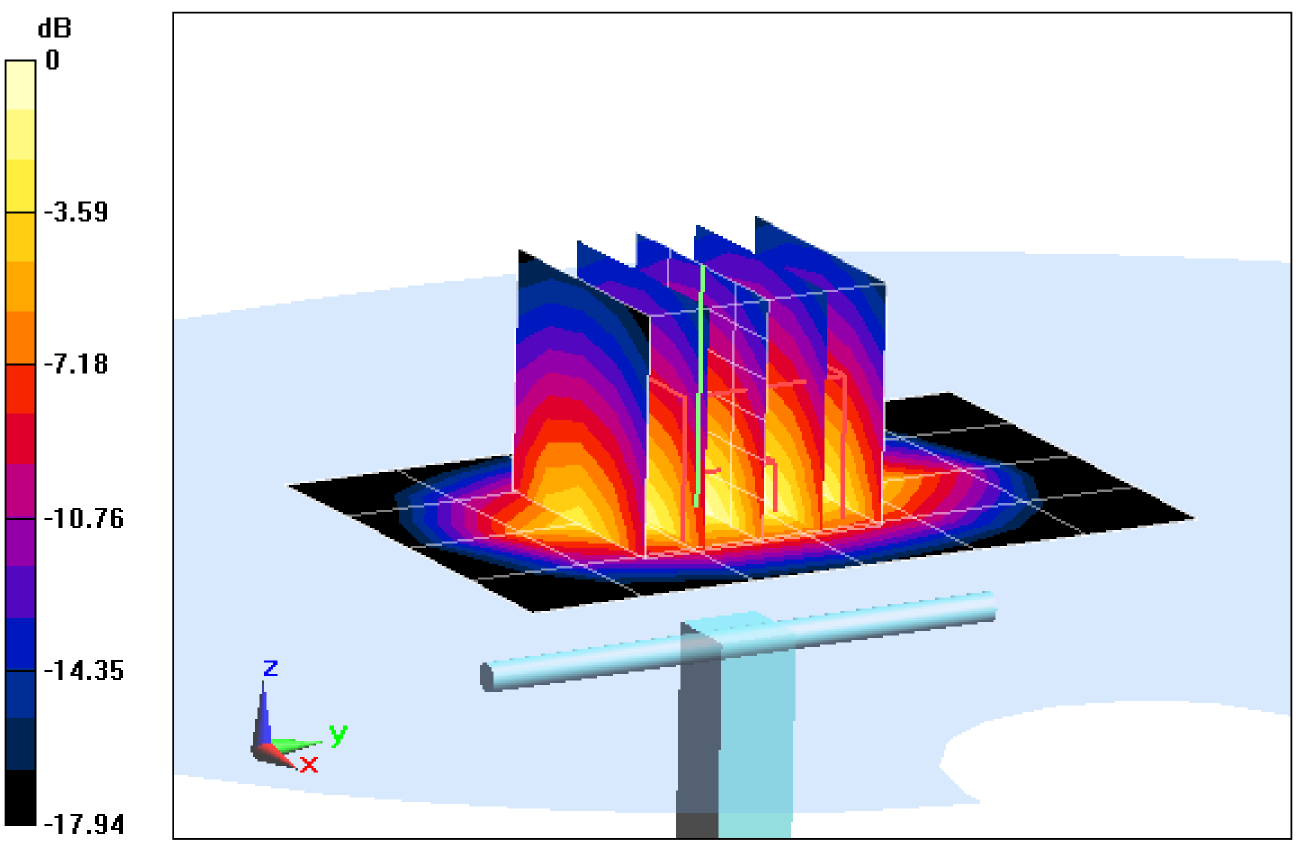
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.545 mho/m; ε_r = 51.137; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (4989)

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) = 4.26 mW/g; SAR(10 g) = 2.21 mW/g
Deviation = 4.16%



0 dB = 4.77 mW/g = 13.57 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

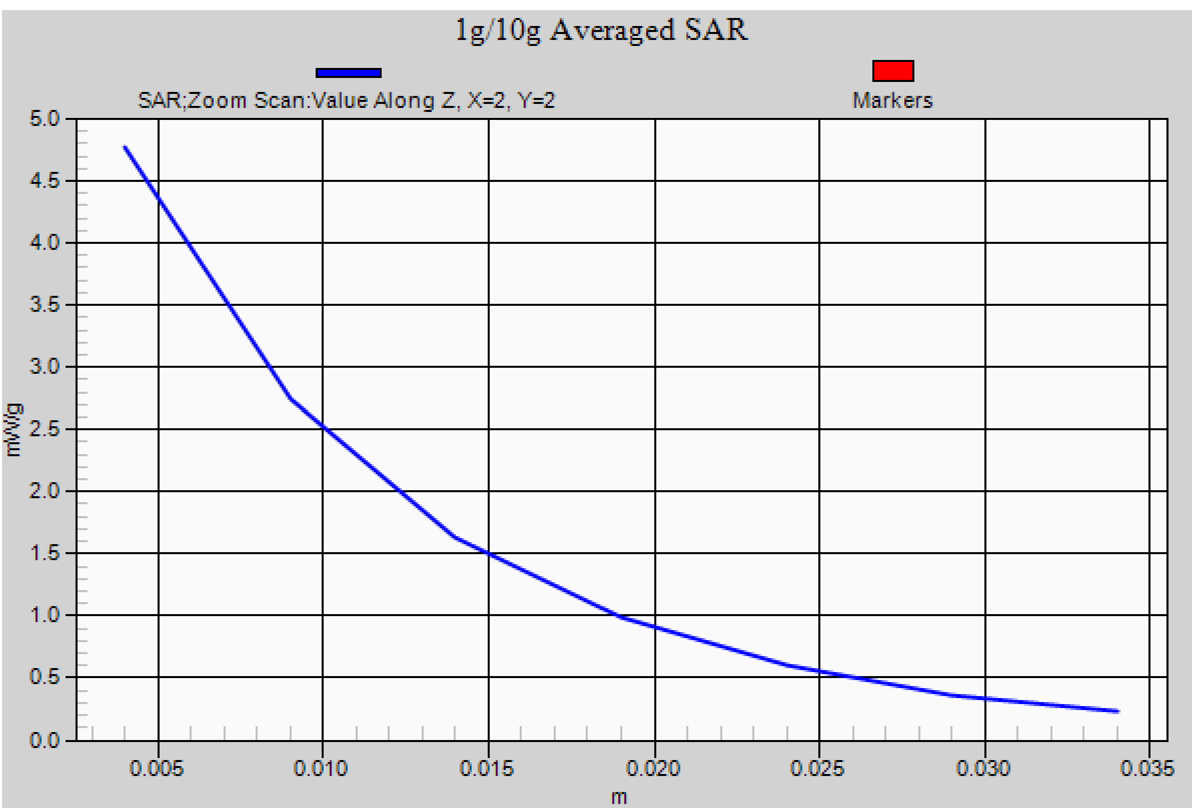
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
$f = 1900$ MHz; $\sigma = 1.545$ mho/m; $\varepsilon_r = 51.137$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1323; Calibrated: 2/15/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (4989)

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) = 4.26 mW/g; SAR(10 g) = 2.21 mW/g
Deviation = 4.16%



PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 719

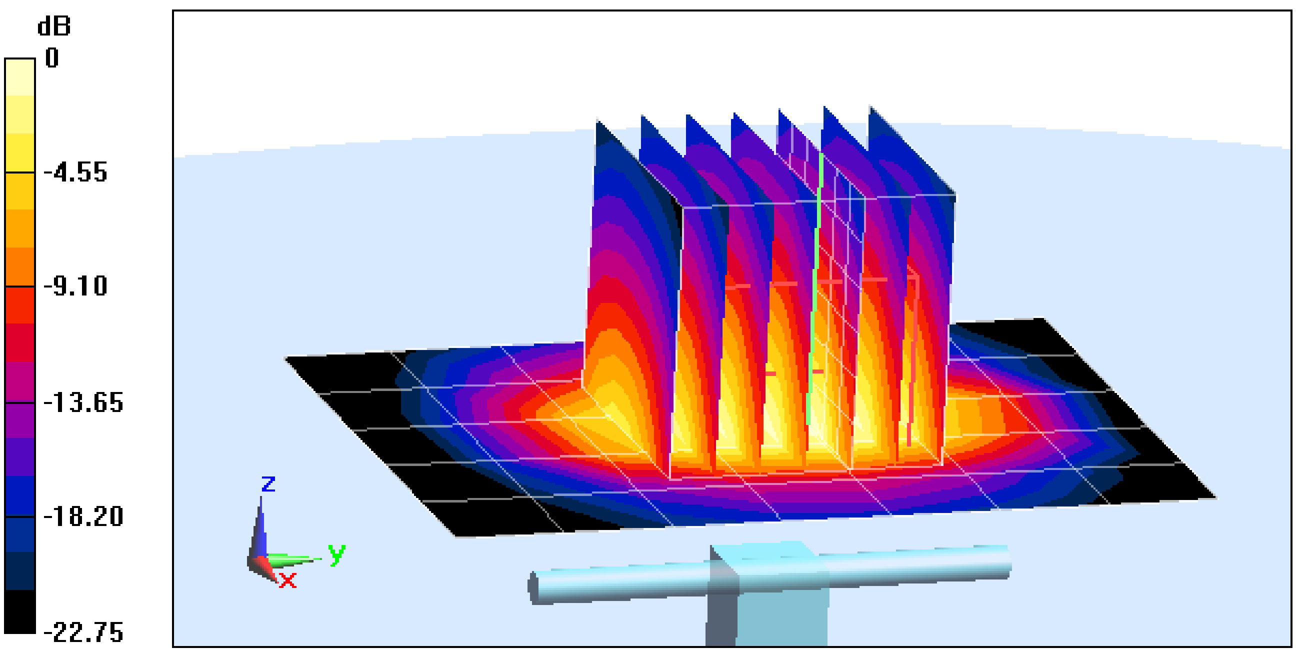
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.027 mho/m; ε_r = 54.42; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.8°C; Tissue Temp: 21.2°C

Probe: ES3DV2 - SN3022; ConvF(4.01, 4.01, 4.01); Calibrated: 8/25/2011
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (4989)

2450MHz System Verification

Area Scan (6x8x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 16.0 dBm (40 mW)
SAR(1 g) = 1.96 mW/g; SAR(10 g) = 0.925 mW/g
Deviation = -4.48 %



0 dB = 2.450mW/g = 7.78 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 2450 MHz; Type: D2450V2; Serial: 719

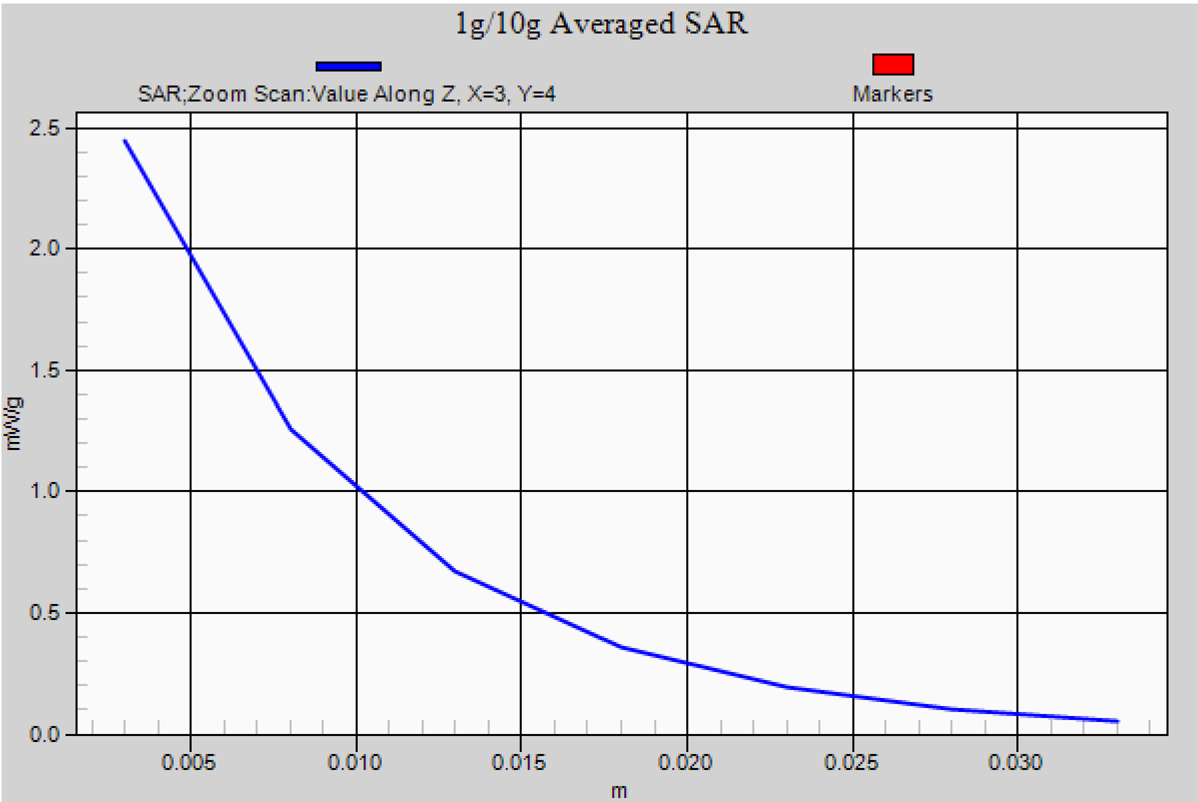
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.027 mho/m; ε_r = 54.42; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2012; Ambient Temp: 23.8°C; Tissue Temp: 21.2°C

Probe: ES3DV2 - SN3022; ConvF(4.01, 4.01, 4.01); Calibrated: 8/25/2011
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM Sub Dasy B; Type: SAM 5.0; Serial: TP-1626
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (4989)

2450MHz System Verification

Area Scan (6x8x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 16.0 dBm (40 mW)
SAR(1 g) = 1.96 mW/g; SAR(10 g) = 0.925 mW/g
Deviation = -4.48 %



APPENDIX C: PROBE CALIBRATION

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS) — **Accreditation No.: SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Client PC Test — **Certificate No: D1900V2-5d080_Jul11**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d080
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 22, 2011

✓KOK
9/6/11

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	D. Iliev
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 22, 2011

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.1 ± 6 %	1.42 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**39.9 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.26 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.9 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.3 ± 6 %	1.53 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.3 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**40.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.38 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.4 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.5 Ω + 8.0 jΩ
Return Loss	- 21.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.7 Ω + 7.1 jΩ
Return Loss	- 21.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.192 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	June 28, 2006

DASY5 Validation Report for Head TSL

Date: 20.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

~~**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d080**~~

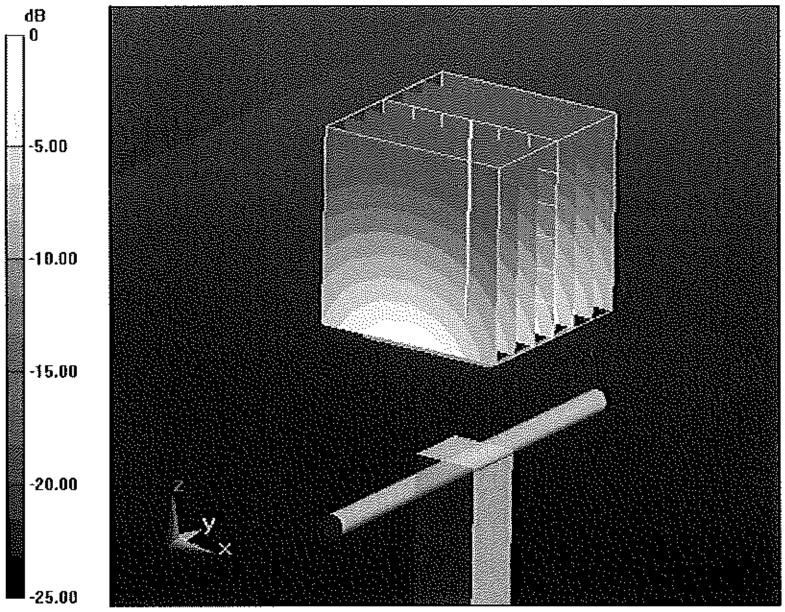
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; $\sigma = 1.42$ mho/m; $\varepsilon_r = 39.1$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

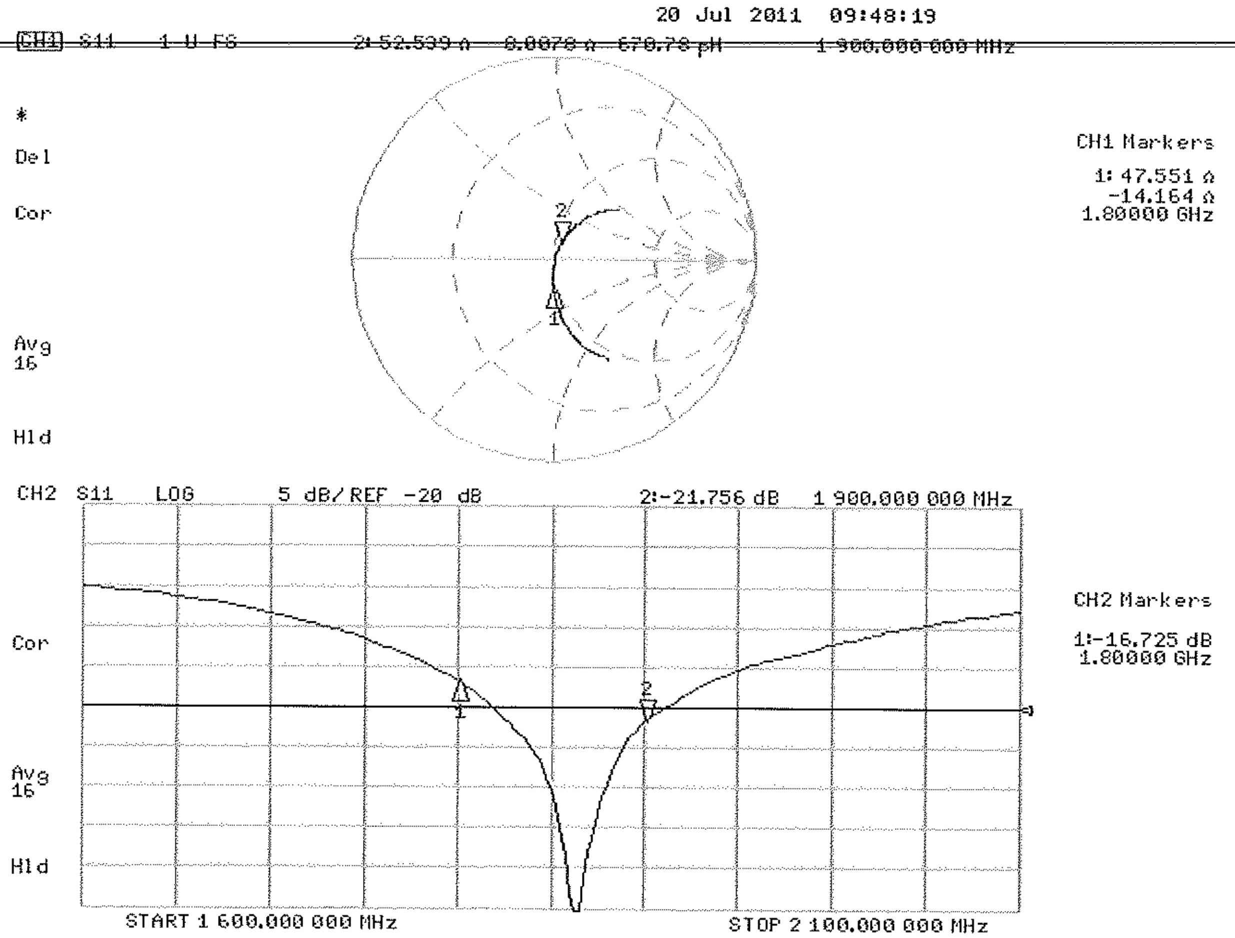
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.443 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 18.442 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.26 mW/g
Maximum value of SAR (measured) = 12.731 mW/g



0 dB = 12.730mW/g

Impedance Measurement Plot for Head TSL



Date: 22.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

~~**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d080**~~

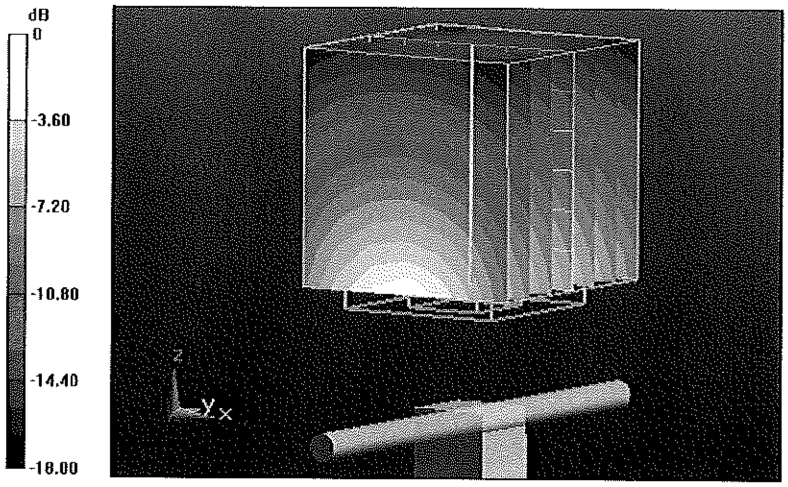
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.53 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

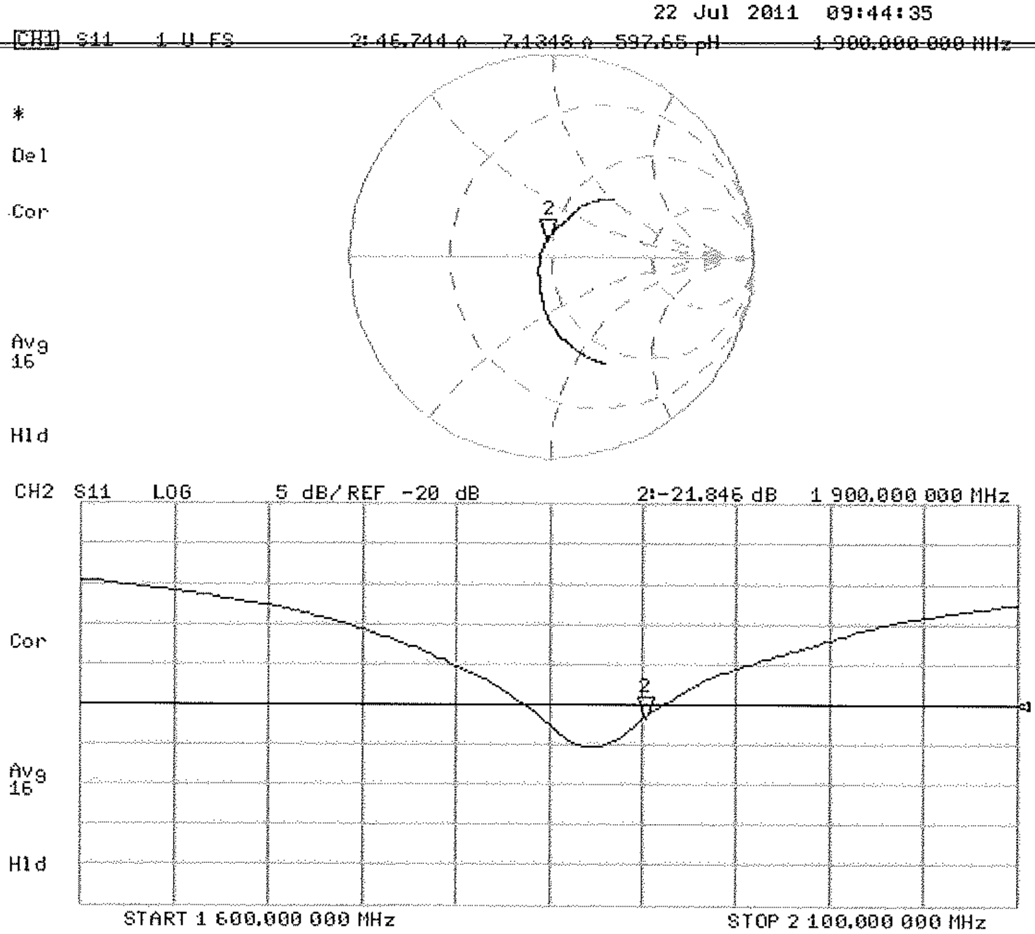
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.049 V/m; Power Drift = 0.0018 dB
Peak SAR (extrapolated) = 18.160 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.38 mW/g
Maximum value of SAR (measured) = 13.017 mW/g



0 dB = 13.020mW/g

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS) Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Client **PC Test** Certificate No: **D2450V2-719_Aug11**

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 719
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 19, 2011

✓KOK
9/6/11

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 22, 2011

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.4 ± 6 %	1.85 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.7 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**53.8 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.35 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**25.2 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 6 %	2.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.1 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**51.3 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.07 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**24.1 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.2 Ω + 3.6 jΩ
Return Loss	- 26.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.6 Ω + 4.3 jΩ
Return Loss	- 27.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.149 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 10, 2002

DASY5 Validation Report for Head TSL

Date: 18.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

~~DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 719~~

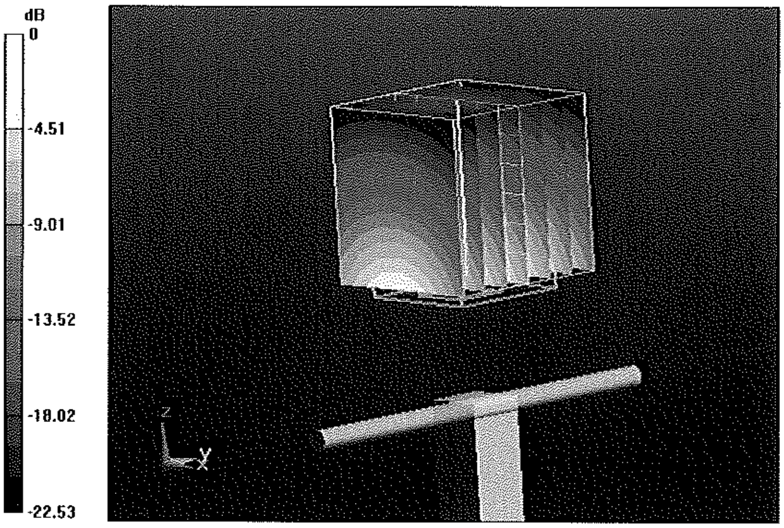
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.85 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

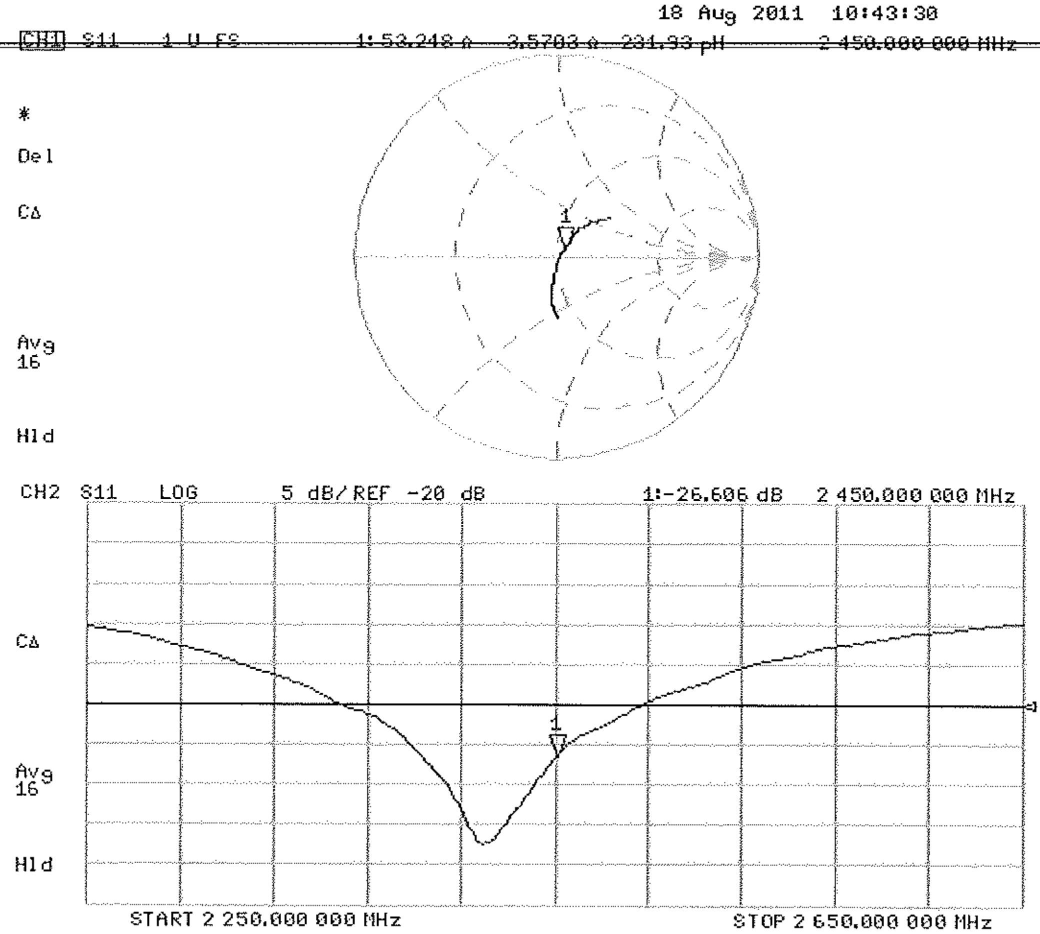
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.4 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 28.234 W/kg
SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.35 mW/g
Maximum value of SAR (measured) = 17.657 mW/g



0 dB = 17.660mW/g

Impedance Measurement Plot for Head TSL



Date: 19.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

~~**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 719**~~

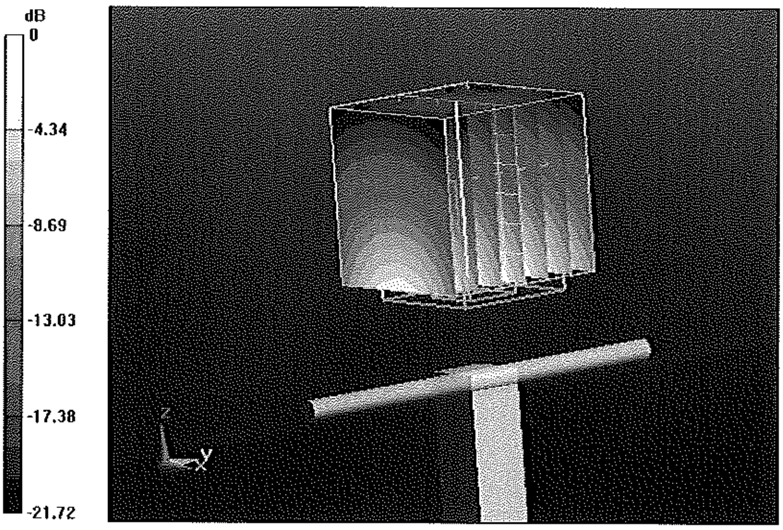
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.02 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.948 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.876 W/kg
SAR(1 g) = 13.1 mW/g; SAR(10 g) = 6.07 mW/g
Maximum value of SAR (measured) = 17.309 mW/g



0 dB = 17.310mW/g

Impedance Measurement Plot for Body TSL