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SAR EVALUATION REPORT

Applicant Name:
LG Electronics MobileComm USA, Inc.
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States

Date of Testing:
09/21/12 - 10/10/12
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Document Serial No.:
0Y1209201375-R3.ZNF

FCC ID: **ZNFE971**

APPLICANT: **LG ELECTRONICS MOBILECOMM USA, INC.**

DUT Type:	Portable Handset
Application Type:	Class II Permissive Change
FCC Rule Part(s):	CFR §2.1093
Model(s):	E971, LGE971, LG-E971
Permissive Change(s):	See FCC Change Document
Date of Original Certification:	10/18/2012

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	33.65	0.50	0.92	0.92
WCDMA/HSPA 850	826.40 - 846.60 MHz	24.11	0.44	0.75	0.84
GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	30.38	0.41	0.73	0.73
WCDMA/HSPA 1900	1852.4 - 1907.6 MHz	24.10	0.55	1.01	1.01
LTE Band 17	706.5 - 713.5 MHz	24.64	0.25	0.49	0.49
LTE Band 7	2502.5 - 2567.5 MHz	23.48	0.37	1.23	1.23
2.4 GHz WLAN	2412 - 2462 MHz	17.24	0.15	0.15	0.15
5.8 GHz WLAN	5745 - 5825 MHz	14.48	0.05	0.08	
5.2 GHz WLAN	5180 - 5240 MHz	14.23	0.12	0.17	
5.3 GHz WLAN	5260 - 5320 MHz	14.06	0.13	0.16	
5.5 GHz WLAN	5500 - 5700 MHz	14.84	0.09	0.21	
Bluetooth	2402 - 2480 MHz	9.04	N/A		
Simultaneous SAR per KDB 690783 D01:			0.70	1.44	1.38

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

This revised Test Report (S/N: 0Y1209201375-R2.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) and dispose of it accordingly.

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

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

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

Randy Ortanez
President

ACCREDITED
TESTING LABORATORY
CERTIFICATE #2041.01

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Tx Frequency
GSM/GPRS/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 7	2502.5 - 2567.5 MHz
2.4 GHz WLAN	2412 - 2462 MHz
5.8 GHz WLAN	5745 - 5825 MHz
5.2 GHz WLAN	5180 - 5240 MHz
5.3 GHz WLAN	5260 - 5320 MHz
5.5 GHz WLAN	5500 - 5700 MHz
Bluetooth	2402 - 2480 MHz
NFC	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.

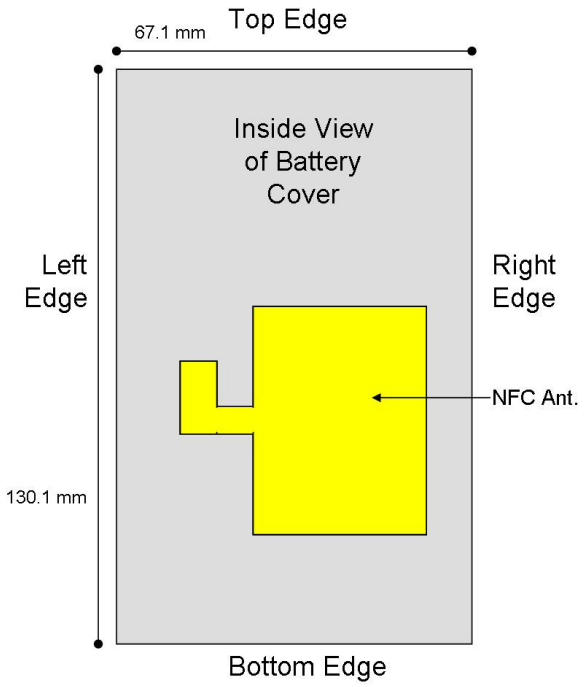


Figure 1-1
NFC Antenna Locations

1.3 DUT Antenna Locations

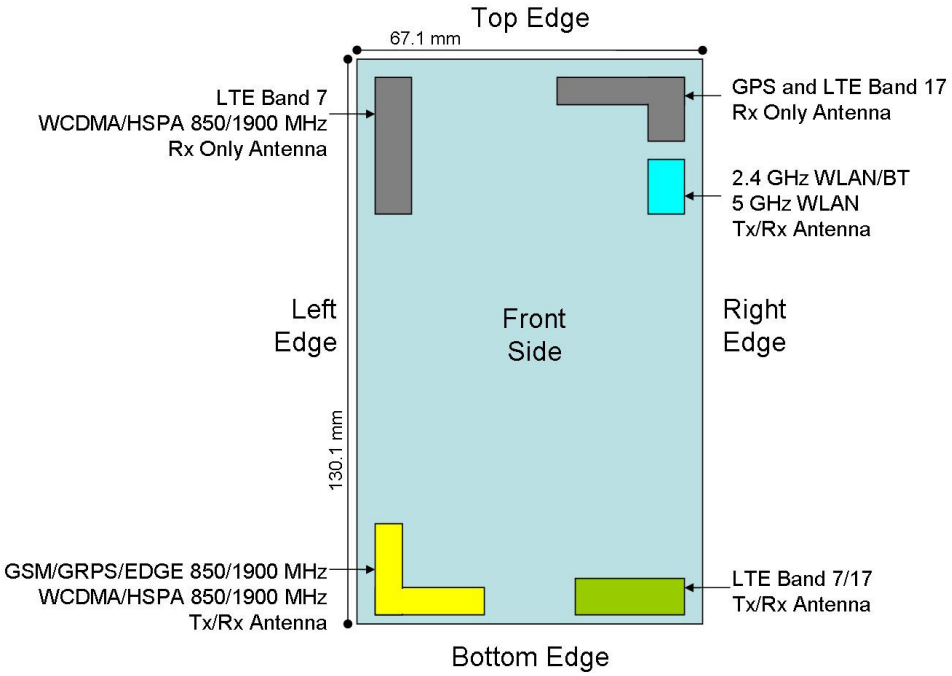


Figure 1-2
DUT Antenna Locations

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	No	Yes
WCDMA 850	Yes	Yes	No	Yes	No	Yes
GPRS 1900	Yes	Yes	No	Yes	No	Yes
WCDMA 1900	Yes	Yes	No	Yes	No	Yes
LTE Band 17	Yes	Yes	No	Yes	Yes	No
LTE Band 7	Yes	Yes	No	Yes	Yes	No
2.4 GHz WLAN	Yes	Yes	Yes	No	Yes	No

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. When the wireless router mode is enabled, all 5 GHz bands are disabled. Therefore 5 GHz WIFI is not considered in this section.

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
Possible Simultaneous Transmission Scenarios Transmission Supported by DUT

No.	Capable TX Configration	Head SAR	Body Worn SAR	Hotspot SAR	Note
1	GSM Voice + WiFi 2.4Ghz	Yes	Yes	N/A	
2	GSM Voice + WiFi 5Ghz	Yes	Yes	N/A	
3	GPRS/EDGE + WiFi 2.4Ghz	Yes	Yes	Yes	2.4 GHz Hotspot
4	WCDMA + WiFi 2.4Ghz	Yes	Yes	Yes	2.4 GHz Hotspot
5	WCDMA + WiFi 5Ghz	Yes	Yes	No	
6	LTE + WiFi 2.4Ghz	Yes	Yes	Yes	2.4 GHz Hotspot
7	GPRS/EDGE + WiFi 5Ghz	No	No	No	Not supported by SW
8	LTE + WiFi 5Ghz	No	No	No	Not supported by SW
9	GSM Voice + LTE	No	No	No	Not supported by HW
10	GSM GPRS/EDGE +LTE	No	No	No	Not supported by HW
11	WCDMA + LTE	No	No	No	Not supported by HW
12	GSM Voice + LTE + WiFi 2.4 Ghz	No	No	No	Not supported by HW
13	GSM Voice + LTE + WiFi 5 Ghz	No	No	No	Not supported by HW
14	GSM GPRS/EDGE + LTE + WiFi 2.4 Ghz	No	No	No	Not supported by HW
15	GSM GPRS/EDGE + LTE + WiFi 5 Ghz	No	No	No	Not supported by HW
16	WCDMA + LTE+ WiFi 2.4Ghz	No	No	No	Not supported by HW
17	WCDMA + LTE+ WiFi 5 Ghz	No	No	No	Not supported by HW

1. WiFi 2.4Ghz Hotpsot is supported, WiFi 5Ghz Hotspot is not supported.
2. LTE, WCDMA data, GPRS/EDGE Hotspot is supported.
3. VoIP is supported in GPRS, LTE and WCDMA (e.g. 3rd part VoIP and VoLTE)
4. Bluetooth and WiFi can not transmit simultaneously since they share the same chip.
5. GSM, WCDMA and LTE can not transmit simultaneously since they share the same chip.

1.5 Samples Used for SAR Testing

Several samples were used to facilitate SAR testing. 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.

Mode	GSM 850/1900 MHz WCDMA 850/1900 MHz	2.4 GHz WLAN	5 GHz WLAN	LTE Band 17	LTE Band 7
Serial No.	3G SAR 1 3G SAR 2	3G SAR 1 LTE SAR 1	LTE SAR 2	LTE SAR 26	LTE SAR 25

1.6 SAR Test Exclusions Applied

(A) WIFI/BT

Since Wireless Router operations are not allowed by the chipset firmware using 5 GHz WIFI, only 2.4 GHz WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations in KDB 941225 D06.

The separation between the GSM/WCDMA and the Bluetooth/WLAN antennas is 83.3 mm.

The separation between the LTE B7/17 and the Bluetooth/WLAN antennas is 77.5 mm.

Maximum RF Conducted Power of Bluetooth Tx is 8.017 mW (Please refer to the EMC DSS Report for a full set of Bluetooth conducted powers).

2.4 GHz and 5 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.

This device supports 20 MHz and 40 MHz Bandwidths for IEEE 802.11n for 5 GHz WIFI only. 802.11n was not evaluated for SAR since the average output power of 20 MHz and 40 MHz bandwidths was not more than 0.25 dB higher than the average output power of 802.11a.

The permissive changes are not applicable to FCC Part Rule 15 transmitter within the DUT. Therefore, the RF conducted powers for FCC Part Rule 15 from original filing (RF Exposure Technical Report S/N: 0Y1208081132-R2.ZNF) were incorporated (used) for current application.

(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.

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.

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.

1.7 Power Reduction for SAR

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

1.8 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)
- FCC KDB 865664 (5 GHz)

2 LTE CHECKLIST PER KDB 941225 D05

KDB 941225 Pub LTE Information				
KDB 941225 Section	**FCC ID**	**ZNFE971**		
	Form Factor	Handset		
1)	Frequency Range of each LTE transmission band	Band 17: 706.5 - 713.5 MHz		
		Band 7: 2502.5 - 2567.5 MHz		
2)	Channel Bandwidths	Band 17: 5 MHz, 10 MHz		
		Band 7: 5 MHz, 10 MHz, 15 MHz, 20 MHz		
3)	Channel Numbers and Frequencies (MHz)	Low	Mid	High
	Band 17, 5 MHz BW	706.5 MHz (23755)	710 MHz (23790)	713.5 MHz (23825)
	Band 17, 10 MHz BW	709 MHz (23780)	710 MHz (23790)	711 MHz (23800)
	Band 7, 5 MHz BW	2502.5 MHz (20775)	2535.0 MHz (21100)	2567.5 MHz (21425)
	Band 7, 10 MHz BW	2505.0 MHz (20800)	2535.0 MHz (21100)	2565.0 MHz (21400)
	Band 7, 15 MHz BW	2507.5 MHz (20825)	2535.0 MHz (21100)	2562.5 MHz (21375)
	Band 7, 20 MHz BW	2510.0 MHz (20850)	2535.0 MHz (21100)	2560.0 MHz (21350)
4)(a)	UE Category	UE category 3		
(b)	Modulations Supported in UL	QPSK, 16QAM		
	LTE Transmitter and Antenna Implementation	GSM/GPRS/EDGE/UMTS/LTE share the same transmission path		
5)	Description of LTE Tx and Ant. Implementation	1 LTE Band 7/17 Tx/Rx Antenna 1 LTE Band 7 Rx Only Antenna 1 LTE Band 17 Rx Only Antenna		
6)	LTE Voice available?	Yes		
	Hotspot with LTE+WIFI	Yes		
	Hotspot with LTE+WIFI active with Voice sessions?	No		
7)	LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	N/A		
	A-MPR (Additional MPR) disabled for SAR Testing?	Yes		
8)	Conducted power Table provided for 1RB (low and high offset), 50% RB (centered), 100% RB	Yes		
9-10)	Non-LTE US Wireless Operating Modes/Band	RF Output Power	RF Exposure Configurations	
	GSM/GPRS/EDGE 850 MHz	See page 1		
	UMTS 850 MHz			
	GSM/GPRS/EDGE 1900 MHz			
	UMTS 1900 MHz			
	Bluetooth			
	2.4 GHz WLAN			
	5 GHz WLAN			
11)	Simultaneous Tx Conditions (Voice and Data Configurations)	See section 1.4		
12)	Power Reduction used for SAR Compliance?	No		
13)	Describe Power Reduction (LTE Modes)	N/A		
14)	SAR Test Plan	N/A		
15)	SAR test data	N/A		

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

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

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)	750	750	835	835	1900	1900	2400 - 2600	2400 - 2600	5200-5800	5200-5800
Tissue	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Ingredients (% by weight)										
Bactericide	See next page	See next page	0.1	0.1						
DGBE					44.92	29.44	7.99	26.7		
HEC			1	1						
NaCl			1.45	0.94	0.18	0.39	0.16	0.1		
Sucrose			57	44.9						
Triton X-100							19.97		17.24	
Diethylenglycol monohexylether									17.24	
Polysorbate (Tween) 80										20
Water			40.45	53.06	54.9	70.17	71.88	73.2	65.52	80

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

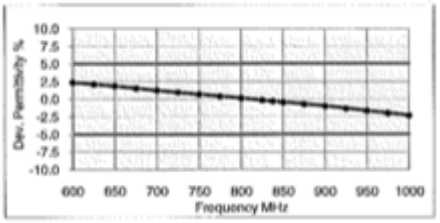
Ambient Condition	22°C ; 30% humidity
TSL Temperature	22°C
Test Date	8-Jun-11

Additional Information

TSL Density	1.212 g/cm³
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



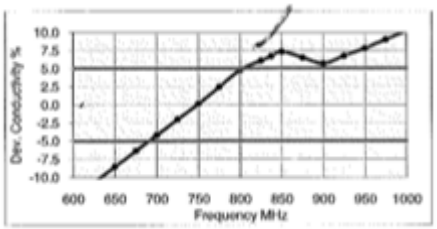


Figure 4-3
750MHz Body Tissue Equivalent Matter

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

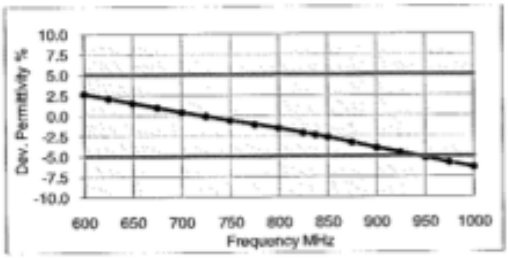
Ambient Condition	22°C ; 30% humidity
TSL Temperature	22°C
Test Date	8-Jun-11

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



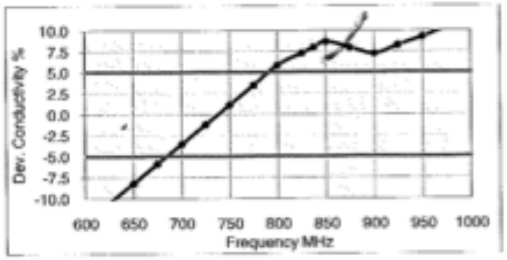


Figure 4-4
750MHz Head Tissue Equivalent Matter

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.

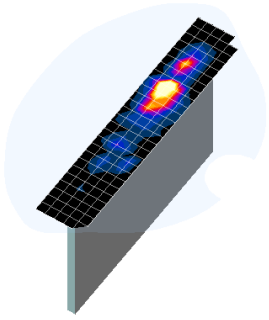


Figure 5-1
Sample SAR Area Scan

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

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].

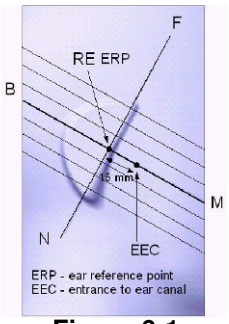


Figure 6-1
Close-Up Side view of ERP

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 and SAR Test Setup Photo 12). 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 its 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.

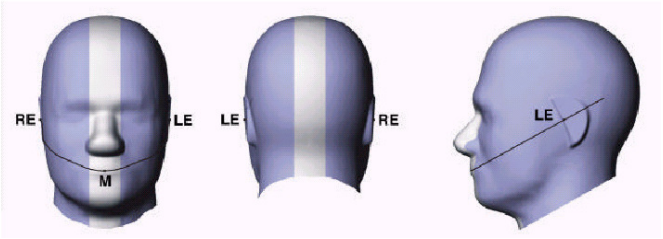


Figure 6-2
Front, back and side view of SAM Twin Phantom

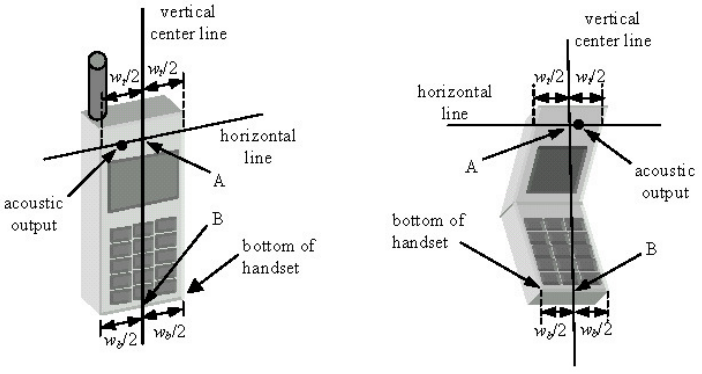


Figure 6-3
Handset Vertical Center & Horizontal Line Reference Points

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 ε = 3 and loss tangent δ = 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.

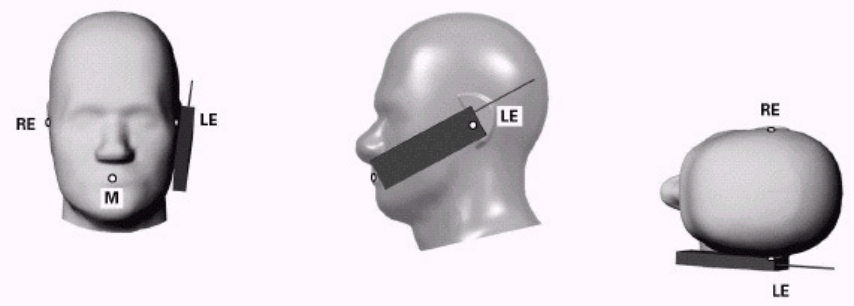


Figure 7-1 Front, Side and Top View of Cheek/Touch Position

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 15 degree.
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).

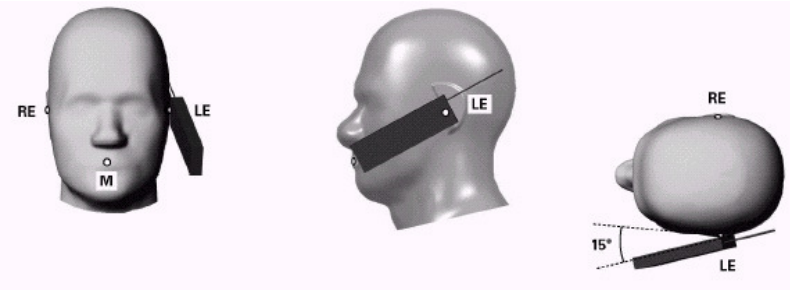


Figure 7-2 Front, Side and Top View of Ear/15º Tilt Position

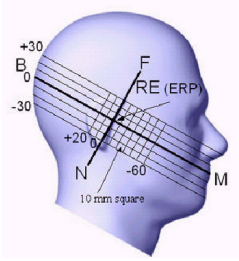


Figure 7-3
Side view w/ relevant markings

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.

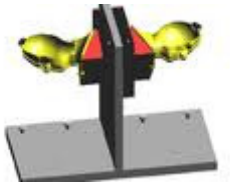


Figure 7-5 Twin SAM Chin20

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 $\leq$ 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 βc=9 and βd=15, and power offset parameters of ΔACK= ΔNACK =5 and ΔCQI=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.

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.
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 a/b/g/n transmitters. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 for more details.

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.

For 5 GHz, the highest average RF output power channel across the default test channels at the lowest data rate was selected for SAR evaluation in 802.11a. When the adjacent channels are higher in power then the default channels, these “required channels” were considered instead of the default channels for SAR testing. 802.11n modes and higher data rates for 802.11a/n were evaluated only if the respective mode was 0.25 dB or higher than the 802.11a mode.

If the maximum extrapolated peak SAR of the zoom scan for the highest output channel was less than 1.6 W/kg or if the 1g averaged SAR was less than 0.8 W/kg, SAR testing was not required for the other test channels in the band. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.

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**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
Cellular	128	33.48	33.57	**31.56**	28.57	27.30	27.38	27.31	22.48	21.44
	190	33.65	33.70	**31.50**	28.89	27.55	27.42	27.31	22.47	21.43
	251	33.22	33.29	**31.27**	28.70	27.40	27.47	27.34	22.56	21.52
PCS	512	30.24	30.45	**28.36**	25.57	24.35	26.25	26.37	21.62	20.32
	661	30.38	30.36	**28.57**	25.60	24.33	26.38	26.44	21.62	20.44
	810	30.62	30.62	**28.52**	25.62	24.48	26.49	26.55	21.78	20.48

		Calculated Maximum Frame-Averaged Output Power								
		Voice	*GPRS/EDGE Data (GMSK)*				*EDGE Data (8-PSK)*			
Band	**Channel**	**GSM [dBm] CS (1 Slot)**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**GPRS [dBm] 3 Tx Slot**	**GPRS [dBm] 4 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**	**EDGE [dBm] 3 Tx Slot**	**EDGE [dBm] 4 Tx Slot**
Cellular	128	24.45	24.54	**25.54**	24.31	24.29	18.35	21.29	18.22	18.43
	190	24.62	24.67	**25.48**	24.63	24.54	18.39	21.29	18.21	18.42
	251	24.19	24.26	**25.25**	24.44	24.39	18.44	21.32	18.30	18.51
PCS	512	21.21	21.42	**22.34**	21.31	21.34	17.22	20.35	17.36	17.31
	661	21.35	21.33	**22.55**	21.34	21.32	17.35	20.42	17.36	17.43
	810	21.59	21.59	**22.50**	21.36	21.47	17.46	20.53	17.52	17.47

Note:

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. The bolded GPRS modes were selected according to the highest frame-averaged output power table according to KDB 941225 D03.
3. CS1 coding scheme was used in GPRS output power measurements and SAR Testing, as a condition where GMSK modulation was ensured. It was investigated that CS1 - CS4 settings do not have any impact on the output levels in the GPRS modes.
4. MCS7 coding scheme was used to measure the output powers for EDGE since It was investigated that choosing MCS7 coding scheme will ensure 8-PSK modulation, MCS levels that produce 8PSK modulation do not have an impact on output power.

GSM Class: B
GPRS Multislot class: 12 (max 4 Tx Uplink slots)
EDGE Multislot class: 12 (max 4Tx 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]			3GPP MPR [dB]
			4132	4183	4233	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	24.11	24.06	24.02	24.01	24.10	23.96	-
99		12.2 kbps AMR	24.10	24.01	24.11	23.96	24.08	23.83	-
6	HSDPA	Subtest 1	24.13	24.05	24.08	23.93	24.01	23.93	0
6		Subtest 2	24.00	24.04	24.02	23.89	23.98	23.92	0
6		Subtest 3	23.47	23.55	23.51	23.40	23.48	23.50	0.5
6		Subtest 4	23.37	23.41	23.62	23.36	23.51	23.38	0.5
6	HSUPA	Subtest 1	23.81	23.75	23.60	23.47	23.82	23.26	0
6		Subtest 2	22.57	22.47	22.57	22.23	22.36	22.12	2
6		Subtest 3	22.96	22.67	22.77	22.75	22.94	22.83	1
6		Subtest 4	22.78	22.60	22.67	22.63	22.33	22.79	2
6		Subtest 5	23.82	23.47	23.78	23.59	23.44	23.50	0
8	DC-HSDPA	Subtest 1	23.89	23.92	23.87	23.60	23.70	23.64	0
8		Subtest 2	23.86	23.93	23.89	23.58	23.64	23.61	0
8		Subtest 3	23.41	23.45	23.48	23.07	23.02	23.12	0.5
8		Subtest 4	23.44	23.48	23.45	23.10	23.03	23.18	0.5

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 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.

DC-HSDPA Considerations:

- 3GPP Specification 34.121-1 Release 8 Ver 8.10.0 was used for DC-HSDPA guidance
- H-Set 12 (QPSK) was confirmed to be used during DC-HSDPA measurements
- Measured maximum output powers for DC-HSDPA were not greater than ¼ dB higher than the WCDMA 12.2 kbps RMC maximum output and as a result, SAR is not required for DC-HSDPA
- The DUT supports UE category 24 for HSDPA

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	24.20	0	0
	706.5	23755	5	QPSK	1	24	24.23	0	0
	706.5	23755	5	QPSK	12	6	23.37	1	0-1
	706.5	23755	5	QPSK	25	0	23.06	1	0-1
	706.5	23755	5	16-QAM	1	0	23.13	1	0-1
	706.5	23755	5	16-QAM	1	24	23.20	1	0-1
	706.5	23755	5	16-QAM	12	6	22.44	2	0-2
	706.5	23755	5	16-QAM	25	0	22.25	2	0-2
Mid	710.0	23790	5	QPSK	1	0	24.46	0	0
	710.0	23790	5	QPSK	1	24	24.29	0	0
	710.0	23790	5	QPSK	12	6	23.35	1	0-1
	710.0	23790	5	QPSK	25	0	23.17	1	0-1
	710.0	23790	5	16-QAM	1	0	23.40	1	0-1
	710.0	23790	5	16-QAM	1	24	23.19	1	0-1
	710.0	23790	5	16-QAM	12	6	22.35	2	0-2
	710.0	23790	5	16-QAM	25	0	22.21	2	0-2
High	713.5	23825	5	QPSK	1	0	24.58	0	0
	713.5	23825	5	QPSK	1	24	24.46	0	0
	713.5	23825	5	QPSK	12	6	23.36	1	0-1
	713.5	23825	5	QPSK	25	0	23.16	1	0-1
	713.5	23825	5	16-QAM	1	0	23.51	1	0-1
	713.5	23825	5	16-QAM	1	24	23.38	1	0-1
	713.5	23825	5	16-QAM	12	6	22.28	2	0-2
	713.5	23825	5	16-QAM	25	0	22.27	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	23.95	0	0
	709	23780	10	QPSK	1	49	24.30	0	0
	709	23780	10	QPSK	25	12	23.37	1	0-1
	709	23780	10	QPSK	50	0	23.13	1	0-1
	709	23780	10	16QAM	1	0	22.99	1	0-1
	709	23780	10	16QAM	1	49	23.24	1	0-1
	709	23780	10	16QAM	25	12	22.48	2	0-2
	709	23780	10	16QAM	50	0	22.24	2	0-2
Mid	710.0	23790	10	QPSK	1	0	24.16	0	0
	710.0	23790	10	QPSK	1	49	24.45	0	0
	710.0	23790	10	QPSK	25	12	**23.28**	1	0-1
	710.0	23790	10	QPSK	50	0	23.17	1	0-1
	710.0	23790	10	16QAM	1	0	22.95	1	0-1
	710.0	23790	10	16QAM	1	49	23.20	1	0-1
	710.0	23790	10	16QAM	25	12	**22.47**	2	0-2
	710.0	23790	10	16QAM	50	0	22.18	2	0-2
High	711	23800	10	QPSK	1	0	**24.64**	0	0
	711	23800	10	QPSK	1	49	**24.42**	0	0
	711	23800	10	QPSK	25	12	23.37	1	0-1
	711	23800	10	QPSK	50	0	23.25	1	0-1
	711	23800	10	16QAM	1	0	**23.40**	1	0-1
	711	23800	10	16QAM	1	49	**23.24**	1	0-1
	711	23800	10	16QAM	25	12	22.54	2	0-2
	711	23800	10	16QAM	50	0	22.24	2	0-2

Notes:
1. Please reference Section 9.3.3 for LTE testing requirements per FCC KDB 941225 D05.
2. The bolded powers were tested for SAR.

10.3.2 LTE Band 7

Table 10-3
LTE Band 7 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	2502.5	20775	5	QPSK	1	0	23.62	0	0
	2502.5	20775	5	QPSK	1	24	23.47	0	0
	2502.5	20775	5	QPSK	12	6	22.36	1	0-1
	2502.5	20775	5	QPSK	25	0	22.30	1	0-1
	2502.5	20775	5	16-QAM	1	0	22.23	1	0-1
	2502.5	20775	5	16-QAM	1	24	22.04	1	0-1
	2502.5	20775	5	16-QAM	12	6	21.35	2	0-2
	2502.5	20775	5	16-QAM	25	0	21.30	2	0-2
Mid	2535.0	21100	5	QPSK	1	0	23.64	0	0
	2535.0	21100	5	QPSK	1	24	23.57	0	0
	2535.0	21100	5	QPSK	12	6	22.58	1	0-1
	2535.0	21100	5	QPSK	25	0	22.50	1	0-1
	2535.0	21100	5	16-QAM	1	0	22.28	1	0-1
	2535.0	21100	5	16-QAM	1	24	22.21	1	0-1
	2535.0	21100	5	16-QAM	12	6	21.54	2	0-2
	2535.0	21100	5	16-QAM	25	0	21.47	2	0-2
High	2567.5	21425	5	QPSK	1	0	23.43	0	0
	2567.5	21425	5	QPSK	1	24	22.99	0	0
	2567.5	21425	5	QPSK	12	6	22.40	1	0-1
	2567.5	21425	5	QPSK	25	0	22.28	1	0-1
	2567.5	21425	5	16-QAM	1	0	22.26	1	0-1
	2567.5	21425	5	16-QAM	1	24	21.89	1	0-1
	2567.5	21425	5	16-QAM	12	6	21.34	2	0-2
	2567.5	21425	5	16-QAM	25	0	21.31	2	0-2

Table 10-4
LTE Band 7 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	2505	20800	10	QPSK	1	0	23.51	0	0
	2505	20800	10	QPSK	1	49	23.51	0	0
	2505	20800	10	QPSK	25	12	22.25	1	0-1
	2505	20800	10	QPSK	50	0	22.15	1	0-1
	2505	20800	10	16QAM	1	0	22.01	1	0-1
	2505	20800	10	16QAM	1	49	22.06	1	0-1
	2505	20800	10	16QAM	25	12	21.41	2	0-2
	2505	20800	10	16QAM	50	0	21.15	2	0-2
Mid	2535.0	21100	10	QPSK	1	0	23.32	0	0
	2535.0	21100	10	QPSK	1	49	23.58	0	0
	2535.0	21100	10	QPSK	25	12	22.44	1	0-1
	2535.0	21100	10	QPSK	50	0	22.35	1	0-1
	2535.0	21100	10	16QAM	1	0	22.37	1	0-1
	2535.0	21100	10	16QAM	1	49	22.45	1	0-1
	2535.0	21100	10	16QAM	25	12	21.48	2	0-2
	2535.0	21100	10	16QAM	50	0	21.35	2	0-2
High	2565	21400	10	QPSK	1	0	23.52	0	0
	2565	21400	10	QPSK	1	49	23.08	0	0
	2565	21400	10	QPSK	25	12	22.36	1	0-1
	2565	21400	10	QPSK	50	0	22.28	1	0-1
	2565	21400	10	16QAM	1	0	22.20	1	0-1
	2565	21400	10	16QAM	1	49	22.22	1	0-1
	2565	21400	10	16QAM	25	12	21.53	2	0-2
	2565	21400	10	16QAM	50	0	21.27	2	0-2

Table 10-5
LTE Band 7 Conducted Powers - 15 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	2507.5	20825	15	QPSK	1	0	23.50	0	0
	2507.5	20825	15	QPSK	1	74	23.52	0	0
	2507.5	20825	15	QPSK	36	18	22.21	1	0-1
	2507.5	20825	15	QPSK	75	0	22.14	1	0-1
	2507.5	20825	15	16QAM	1	0	22.21	1	0-1
	2507.5	20825	15	16QAM	1	74	22.29	1	0-1
	2507.5	20825	15	16QAM	36	18	21.26	2	0-2
	2507.5	20825	15	16QAM	75	0	21.18	2	0-2
Mid	2535.0	21100	15	QPSK	1	0	23.57	0	0
	2535.0	21100	15	QPSK	1	74	23.60	0	0
	2535.0	21100	15	QPSK	36	18	22.36	1	0-1
	2535.0	21100	15	QPSK	75	0	22.33	1	0-1
	2535.0	21100	15	16QAM	1	0	22.18	1	0-1
	2535.0	21100	15	16QAM	1	74	22.08	1	0-1
	2535.0	21100	15	16QAM	36	18	21.42	2	0-2
	2535.0	21100	15	16QAM	75	0	21.29	2	0-2
High	2562.5	21375	15	QPSK	1	0	23.61	0	0
	2562.5	21375	15	QPSK	1	74	23.10	0	0
	2562.5	21375	15	QPSK	36	18	22.38	1	0-1
	2562.5	21375	15	QPSK	75	0	22.29	1	0-1
	2562.5	21375	15	16QAM	1	0	22.21	1	0-1
	2562.5	21375	15	16QAM	1	74	21.90	1	0-1
	2562.5	21375	15	16QAM	36	18	21.32	2	0-2
	2562.5	21375	15	16QAM	75	0	21.30	2	0-2

Table 10-6
LTE Band 7 Conducted Powers - 20 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	Target MPR [dB]	MPR Allowed per 3GPP [dB]
Low	2510	20850	20	QPSK	1	0	23.35	0	0
	2510	20850	20	QPSK	1	99	23.45	0	0
	2510	20850	20	QPSK	50	25	22.22	1	0-1
	2510	20850	20	QPSK	100	0	22.25	1	0-1
	2510	20850	20	16QAM	1	0	22.24	1	0-1
	2510	20850	20	16QAM	1	99	22.23	1	0-1
	2510	20850	20	16QAM	50	25	21.25	2	0-2
	2510	20850	20	16QAM	100	0	21.18	2	0-2
Mid	2535.0	21100	20	QPSK	1	0	**23.48**	0	0
	2535.0	21100	20	QPSK	1	99	**23.39**	0	0
	2535.0	21100	20	QPSK	50	25	**22.36**	1	0-1
	2535.0	21100	20	QPSK	100	0	22.31	1	0-1
	2535.0	21100	20	16QAM	1	0	22.24	1	0-1
	2535.0	21100	20	16QAM	1	99	22.24	1	0-1
	2535.0	21100	20	16QAM	50	25	**21.34**	2	0-2
	2535.0	21100	20	16QAM	100	0	21.29	2	0-2
High	2560	21350	20	QPSK	1	0	23.21	0	0
	2560	21350	20	QPSK	1	99	23.06	0	0
	2560	21350	20	QPSK	50	25	22.38	1	0-1
	2560	21350	20	QPSK	100	0	22.36	1	0-1
	2560	21350	20	16QAM	1	0	**22.60**	1	0-1
	2560	21350	20	16QAM	1	99	**22.54**	1	0-1
	2560	21350	20	16QAM	50	25	21.41	2	0-2
	2560	21350	20	16QAM	100	0	21.40	2	0-2

Notes:

3. Please reference Section 9.3.3 for LTE testing requirements per FCC KDB 941225 D05.
4. The bolded powers were tested for SAR.

Figure 10-3
Power Measurement Setup

10.4 WLAN Conducted Powers

Table 10-7
IEEE 802.11b Average RF Power

Mode	Freq	Channel	Conducted Power [dBm]			
			Data Rate [Mbps]			
	[MHz]		**1**	**2**	**5.5**	**11**
802.11b	2412	1	15.89	16.01	15.83	16.15
802.11b	2437	6	16.54	16.46	16.66	16.63
802.11b	2462	11	**17.24**	16.86	16.73	16.73

Table 10-8
IEEE 802.11g Average RF Power

Mode	Freq	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		**6**	**9**	**12**	**18**	**24**	**36**	**48**	**54**
802.11g	2412	1	12.87	12.96	12.95	12.83	12.52	12.80	12.83	12.67
802.11g	2437	6	12.75	13.14	12.78	13.19	13.14	13.23	13.18	12.72
802.11g	2462	11	12.98	12.95	12.99	12.98	12.97	12.76	12.74	12.69

Table 10-9
IEEE 802.11n Average RF Power

Mode	Freq	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6.5	13	20	26	39	52	58	65
802.11n	2412	1	11.83	11.85	11.75	11.79	11.72	11.77	11.46	11.77
802.11n	2437	6	12.10	12.08	12.08	12.06	12.07	11.96	12.06	11.92
802.11n	2462	11	11.79	11.79	11.77	11.68	11.68	11.75	11.74	11.20

Table 10-10
IEEE 802.11a Average RF Power

Mode	Freq	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6	9	12	18	24	36	48	54
802.11a	5180	36*	13.99	13.89	13.92	14.01	14.04	14.08	13.74	13.70
802.11a	5200	40	**14.23**	14.27	14.25	14.10	14.19	14.29	14.26	14.29
802.11a	5220	44	14.17	14.23	13.97	14.25	14.22	13.95	13.82	13.86
802.11a	5240	48*	14.20	14.18	14.19	14.14	14.27	14.38	13.93	13.98
802.11a	5260	52*	**14.06**	14.13	14.08	14.04	13.99	14.07	13.59	13.76
802.11a	5280	56	13.96	14.08	14.03	13.90	13.96	13.99	14.05	13.97
802.11a	5300	60	13.80	13.91	13.94	13.84	13.91	13.95	13.92	13.96
802.11a	5320	64*	14.00	13.98	13.96	14.01	14.05	14.04	13.71	13.69
802.11a	5500	100	14.63	14.65	14.66	14.48	14.59	14.66	14.39	14.36
802.11a	5520	104*	14.33	14.34	14.32	14.36	14.40	14.47	14.47	14.51
802.11a	5540	108	14.45	14.46	14.43	14.23	14.20	14.22	14.26	14.30
802.11a	5560	112	**14.84**	14.83	14.86	14.84	14.88	14.99	14.91	15.01
802.11a	5580	116*	14.59	14.57	14.56	14.62	14.65	14.71	14.69	14.67
802.11a	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5660	132	14.50	14.21	14.38	14.41	14.02	14.26	14.16	14.19
802.11a	5680	136*	14.78	14.83	14.85	14.88	14.84	14.85	14.75	14.54
802.11a	5700	140	14.75	14.77	14.73	14.81	14.79	14.84	14.89	14.91
802.11a	5745	149*	14.02	14.08	14.11	14.15	13.71	13.95	13.77	13.79
802.11a	5765	153	14.40	14.38	14.36	14.36	14.44	14.41	14.48	14.51
802.11a	5785	157*	14.35	14.55	14.29	14.33	14.31	14.42	14.45	14.49
802.11a	5805	161*	**14.48**	14.24	14.46	14.34	14.35	14.21	14.25	14.28
802.11a	5825	165	14.14	14.22	14.24	14.20	14.03	14.16	14.07	14.10

Per FCC KDB Publication 443999 and RSS-210 A9.2(3), transmission on channels which overlap the 5600-5650 MHz is prohibited as a client. This device does not transmit any beacons or initiate any transmissions in 5.3 and 5.5 GHz Band. (*) – indicates default channels per KDB Publication 248227. When the adjacent channels are higher in power then the default channels, these “required channels” are considered instead of the default channels for SAR testing.

Table 10-11
IEEE 802.11n (20 MHz Bandwidth) Average RF Power

Mode	Freq	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		6.5	13	20	26	39	52	58	65
802.11n	5180	36*	13.17	13.21	13.24	12.72	12.83	12.69	12.74	12.71
802.11n	5200	40	13.10	12.81	12.89	12.92	12.98	12.97	13.00	13.06
802.11n	5220	44	12.93	12.93	12.53	12.80	12.64	12.66	12.70	12.78
802.11n	5240	48*	12.81	12.85	12.73	12.65	12.71	12.47	12.63	12.61
802.11n	5260	52*	13.01	13.22	13.23	13.12	12.96	12.53	12.79	12.81
802.11n	5280	56	13.06	13.01	13.09	13.00	13.10	12.65	12.74	12.80
802.11n	5300	60	12.89	12.84	12.88	12.90	13.04	13.12	13.11	13.03
802.11n	5320	64*	13.02	13.04	12.96	12.78	12.77	12.83	12.82	12.86
802.11n	5500	100	12.44	12.55	12.43	12.54	12.56	12.38	12.30	12.33
802.11n	5520	104*	12.28	12.28	12.30	12.37	12.39	12.39	12.41	12.45
802.11n	5540	108	13.48	13.56	13.55	13.51	13.43	13.26	13.29	13.34
802.11n	5560	112	13.79	13.77	13.41	13.51	13.45	13.47	13.48	13.55
802.11n	5580	116*	13.08	13.42	13.41	13.17	13.19	13.18	13.24	13.22
802.11a	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5660	132	13.43	13.54	13.48	13.56	13.59	13.51	13.65	13.41
802.11n	5680	136*	13.30	13.33	13.40	13.36	13.26	13.03	13.34	13.30
802.11n	5700	140	13.10	13.16	13.26	13.28	13.35	13.35	13.33	13.32
802.11n	5745	149*	12.85	12.84	12.88	12.82	12.82	12.82	12.84	12.83
802.11n	5765	153	13.32	13.21	13.26	13.24	13.30	13.18	13.03	13.05
802.11n	5785	157*	13.28	13.16	13.03	13.13	12.94	13.15	13.09	13.14
802.11n	5805	161*	13.05	13.00	13.02	12.84	12.91	12.97	12.93	13.01
802.11n	5825	165	13.03	13.08	13.07	12.98	12.83	12.84	12.82	12.87

Per FCC KDB Publication 443999 and RSS-210 A9.2(3), transmission on channels which overlap the 5600-5650 MHz is prohibited as a client. This device does not transmit any beacons or initiate any transmissions in 5.3 and 5.5 GHz Bands. (*) – indicates default channels per KDB Publication 248227. When the adjacent channels are higher in power then the default channels, these “required channels” are considered instead of the default channels for SAR testing.

Table 10-12
IEEE 802.11n (40 MHz Bandwidth) Average RF Power

Mode	Freq	Channel	802.11n (40MHz Bandwidth) Conducted Power [dBm]							
			Data Rate [Mbps]							
	[MHz]		13.5/15	27/30	40.5/45	54/60	81/90	108/120	121.5/135	135/150
802.11n	5190	38	11.96	11.98	11.82	11.63	11.69	11.58	11.79	11.75
802.11n	5230	46	11.89	11.79	11.94	11.66	11.67	11.85	11.84	11.68
802.11n	5270	54	11.98	11.81	11.75	11.79	11.84	11.86	11.82	11.72
802.11n	5310	62	11.78	11.76	11.74	11.73	11.84	11.62	11.67	11.66
802.11n	5510	102	12.30	12.36	12.30	12.38	12.39	12.35	12.38	12.36
802.11n	5550	110	12.48	12.40	12.47	12.46	12.35	12.40	12.47	12.43
802.11n	5590	118	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5630	126	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5670	134	12.47	12.45	12.36	12.34	12.36	12.34	12.30	12.36
802.11n	5755	151	12.43	12.40	12.45	12.41	12.36	12.34	12.47	12.50
802.11n	5795	159	12.47	12.47	12.45	12.49	12.50	12.34	12.38	12.30

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

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

- For 2.4 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11b were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
- For 5 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11a were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n 20MHz and 40MHz Bandwidths) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
- When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the 1g averaged SAR is <0.8 W/kg, SAR testing on other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.
- The bolded data rate and channel above were tested for SAR.

Figure 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
10/09/2012	750H	22.1	710	0.844	42.59	0.887	42.113	-4.85%	1.13%
			725	0.878	42.35	0.888	42.033	-1.13%	0.75%
			740	0.872	42.04	0.889	41.953	-1.91%	0.21%
			755	0.896	41.74	0.891	41.876	0.56%	-0.32%
09/21/2012	835H	23.2	820	0.874	41.36	0.898	41.571	-2.67%	-0.51%
			835	0.890	41.25	0.900	41.500	-1.11%	-0.60%
			850	0.916	41.23	0.916	41.500	0.00%	-0.65%
09/25/2012	835H	22.4	820	0.897	43.22	0.898	41.571	-0.11%	3.97%
			835	0.902	42.64	0.900	41.500	0.22%	2.75%
			850	0.928	42.34	0.916	41.500	1.31%	2.02%
09/21/2012	1900H	22.5	1850	1.402	40.23	1.400	40.000	0.14%	0.57%
			1880	1.420	39.97	1.400	40.000	1.43%	-0.08%
			1910	1.457	39.88	1.400	40.000	4.07%	-0.30%
09/26/2012	2450H	23.2	2401	1.809	38.00	1.758	39.298	2.90%	-3.30%
			2450	1.867	37.83	1.800	39.200	3.72%	-3.49%
			2499	1.924	37.62	1.852	39.135	3.89%	-3.87%
10/09/2012	2600H	22.8	2500	1.931	38.38	1.853	39.133	4.21%	-1.92%
			2550	1.993	38.14	1.907	39.067	4.51%	-2.37%
			2600	2.048	37.95	1.960	39.000	4.49%	-2.69%
09/24/2012	5200H-5800H	22.1	5200	4.430	35.82	4.660	36.000	-4.94%	-0.50%
			5260	4.618	36.11	4.720	35.940	-2.16%	0.47%
			5500	4.788	35.35	4.965	35.650	-3.56%	-0.84%
			5560	4.870	35.91	5.028	35.560	-3.14%	0.98%
			5800	5.181	35.45	5.270	35.300	-1.69%	0.42%
			5805	5.172	35.43	5.275	35.295	-1.95%	0.38%
10/10/2012	750B	22.1	710	0.916	55.98	0.960	55.687	-4.58%	0.53%
			725	0.937	55.93	0.961	55.629	-2.50%	0.54%
			740	0.943	55.84	0.963	55.570	-2.08%	0.49%
			755	0.975	55.56	0.964	55.512	1.14%	0.09%
09/24/2012	835B	22.1	820	0.980	53.58	0.969	55.284	1.14%	-3.08%
			835	0.988	53.51	0.970	55.200	1.86%	-3.06%
			850	1.014	53.45	0.988	55.154	2.63%	-3.09%
09/24/2012	1900B	21.8	1850	1.484	51.47	1.520	53.300	-2.37%	-3.43%
			1880	1.527	51.35	1.520	53.300	0.46%	-3.66%
			1910	1.556	51.21	1.520	53.300	2.37%	-3.92%
09/26/2012	2450B	21.7	2401	1.961	51.59	1.903	52.765	3.05%	-2.23%
			2450	2.045	51.47	1.950	52.700	4.87%	-2.33%
			2499	2.081	51.39	2.019	52.638	3.07%	-2.37%
10/09/2012	2600B	22.9	2500	2.120	52.59	2.021	52.636	4.90%	-0.09%
			2550	2.190	52.42	2.092	52.573	4.68%	-0.29%
			2600	2.260	52.19	2.163	52.509	4.48%	-0.61%
09/26/2012	5200B-5800B	23.4	5200	5.349	49.25	5.299	49.014	0.94%	0.48%
			5260	5.369	48.89	5.369	48.906	0.00%	-0.03%
			5500	5.708	48.75	5.650	48.580	1.03%	0.35%
			5560	5.798	48.38	5.720	48.499	1.36%	-0.25%
			5800	6.097	47.97	6.000	48.200	1.62%	-0.48%
			5805	6.112	47.96	6.005	48.166	1.78%	-0.43%

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.

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

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 ε' can be calculated from the below equation (Pournaropoulos and Misra):

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

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

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	10/09/2012	23.4	21.5	0.100	1054	3213	0.875	8.520	8.750	2.70%
835	Head	09/21/2012	24.9	23.0	0.100	4d047	3213	0.958	9.410	9.580	1.81%
835	Head	09/25/2012	24.3	22.9	0.100	4d047	3213	0.939	9.410	9.390	-0.21%
1900	Head	09/21/2012	21.9	21.3	0.100	5d149	3263	3.73	39.300	37.300	-5.09%
2450	Head	09/26/2012	24.5	23.6	0.040	797	3209	2.23	52.100	55.750	7.01%
2600	Head	10/09/2012	23.9	22.6	0.040	1004	3209	2.34	57.000	58.500	2.63%
5200	Head	09/24/2012	22.7	22.3	0.100	1057	3589	7.92	79.100	79.200	0.13%
5500	Head	09/24/2012	22.8	22.4	0.100	1057	3589	8.46	84.900	84.600	-0.35%
5800	Head	09/24/2012	22.8	22.5	0.100	1057	3589	8.05	79.500	80.500	1.26%
750	Body	10/10/2012	24.4	22.3	0.100	1054	3213	0.888	8.840	8.880	0.45%
835	Body	09/24/2012	23.7	22.2	0.100	4d119	3022	0.999	9.560	9.990	4.50%
1900	Body	09/24/2012	21.4	20.5	0.100	5d149	3287	3.74	39.300	37.400	-4.83%
2450	Body	09/26/2012	21.3	21.2	0.100	882	3287	5.47	50.300	54.700	8.75%
2600	Body	10/09/2012	21.2	21.0	0.100	1004	3209	5.83	54.700	58.300	6.58%
5200	Body	09/26/2012	24.7	23.5	0.100	1057	3589	7.78	73.400	77.800	5.99%
5500	Body	09/26/2012	24.8	23.6	0.100	1057	3589	8.43	78.900	84.300	6.84%
5800	Body	09/26/2012	24.7	23.6	0.100	1057	3589	7.48	74.300	74.800	0.67%

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

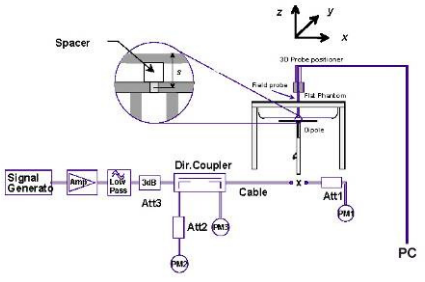


Figure 11-1
System Verification Setup Diagram

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	Service	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	# of Time Slots	SAR (1g)
MHz	Ch.									(W/kg)
836.60	190	GSM 850	GSM	33.65	-0.15	Right	Cheek	3G SAR 1	1	0.340
836.60	190	GSM 850	GSM	33.65	0.12	Right	Tilt	3G SAR 1	1	0.227
836.60	190	GSM 850	GSM	33.65	0.00	Left	Cheek	3G SAR 1	1	0.445
836.60	190	GSM 850	GSM	33.65	0.00	Left	Tilt	3G SAR 1	1	0.234
836.60	190	GSM 850	GPRS	31.50	-0.08	Right	Cheek	3G SAR 1	2	0.398
836.60	190	GSM 850	GPRS	31.50	-0.18	Right	Tilt	3G SAR 1	2	0.238
836.60	190	GSM 850	GPRS	31.50	-0.01	Left	Cheek	3G SAR 1	2	**0.497**
836.60	190	GSM 850	GPRS	31.50	-0.04	Left	Tilt	3G SAR 1	2	0.248
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	24.06	0.01	Right	Cheek	3G SAR 1	0.347
836.60	4183	WCDMA 850	24.06	0.03	Right	Tilt	3G SAR 1	0.244
836.60	4183	WCDMA 850	24.06	-0.08	Left	Cheek	3G SAR 1	**0.442**
836.60	4183	WCDMA 850	24.06	-0.02	Left	Tilt	3G SAR 1	0.251
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	Service	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	# of Time Slots	SAR (1g)
MHz	Ch.									(W/kg)
1880.00	661	GSM 1900	GSM	30.38	-0.10	Right	Cheek	3G SAR 1	1	0.207
1880.00	661	GSM 1900	GSM	30.38	0.00	Right	Tilt	3G SAR 1	1	0.101
1880.00	661	GSM 1900	GSM	30.38	-0.03	Left	Cheek	3G SAR 1	1	0.329
1880.00	661	GSM 1900	GSM	30.38	0.05	Left	Tilt	3G SAR 1	1	0.090
1880.00	661	GSM 1900	GPRS	28.57	0.10	Right	Cheek	3G SAR 1	2	0.253
1880.00	661	GSM 1900	GPRS	28.57	-0.04	Right	Tilt	3G SAR 1	2	0.129
1880.00	661	GSM 1900	GPRS	28.57	-0.03	Left	Cheek	3G SAR 1	2	**0.408**
1880.00	661	GSM 1900	GPRS	28.57	0.07	Left	Tilt	3G SAR 1	2	0.111
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	24.10	-0.02	Right	Cheek	3G SAR 1	0.373
1880.00	9400	WCDMA 1900	24.10	0.01	Right	Tilt	3G SAR 1	0.197
1880.00	9400	WCDMA 1900	24.10	-0.10	Left	Cheek	3G SAR 1	**0.545**
1880.00	9400	WCDMA 1900	24.10	0.03	Left	Tilt	3G SAR 1	0.156
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	23.28	-0.06	1	Right	Cheek	QPSK	25	12	LTE SAR 26	0.180
711.00	23800	High	LTE Band 17	10	24.64	0.01	0	Right	Cheek	QPSK	1	0	LTE SAR 26	**0.246**
711.00	23800	High	LTE Band 17	10	24.42	0.06	0	Right	Cheek	QPSK	1	49	LTE SAR 26	0.186
710.00	23790	Mid	LTE Band 17	10	22.47	0.07	2	Right	Cheek	16 QAM	25	12	LTE SAR 26	0.141
711.00	23800	High	LTE Band 17	10	23.40	-0.07	1	Right	Cheek	16 QAM	1	0	LTE SAR 26	0.189
711.00	23800	High	LTE Band 17	10	23.24	-0.08	1	Right	Cheek	16 QAM	1	49	LTE SAR 26	0.149
710.00	23790	Mid	LTE Band 17	10	23.28	-0.02	1	Right	Tilt	QPSK	25	12	LTE SAR 26	0.098
711.00	23800	High	LTE Band 17	10	24.64	0.15	0	Right	Tilt	QPSK	1	0	LTE SAR 26	**0.143**
711.00	23800	High	LTE Band 17	10	24.42	-0.01	0	Right	Tilt	QPSK	1	49	LTE SAR 26	0.121
710.00	23790	Mid	LTE Band 17	10	22.47	0.10	2	Right	Tilt	16 QAM	25	12	LTE SAR 26	0.080
711.00	23800	High	LTE Band 17	10	23.40	0.19	1	Right	Tilt	16 QAM	1	0	LTE SAR 26	0.120
711.00	23800	High	LTE Band 17	10	23.24	0.15	1	Right	Tilt	16 QAM	1	49	LTE SAR 26	0.100
710.00	23790	Mid	LTE Band 17	10	23.28	0.06	1	Left	Cheek	QPSK	25	12	LTE SAR 26	0.125
711.00	23800	High	LTE Band 17	10	24.64	0.02	0	Left	Cheek	QPSK	1	0	LTE SAR 26	**0.179**
711.00	23800	High	LTE Band 17	10	24.42	-0.06	0	Left	Cheek	QPSK	1	49	LTE SAR 26	0.144
710.00	23790	Mid	LTE Band 17	10	22.47	0.08	2	Left	Cheek	16 QAM	25	12	LTE SAR 26	0.098
711.00	23800	High	LTE Band 17	10	23.40	0.13	1	Left	Cheek	16 QAM	1	0	LTE SAR 26	0.144
711.00	23800	High	LTE Band 17	10	23.24	0.11	1	Left	Cheek	16 QAM	1	49	LTE SAR 26	0.114
710.00	23790	Mid	LTE Band 17	10	23.28	0.05	1	Left	Tilt	QPSK	25	12	LTE SAR 26	0.076
711.00	23800	High	LTE Band 17	10	24.64	0.09	0	Left	Tilt	QPSK	1	0	LTE SAR 26	**0.104**
711.00	23800	High	LTE Band 17	10	24.42	0.20	0	Left	Tilt	QPSK	1	49	LTE SAR 26	0.100
710.00	23790	Mid	LTE Band 17	10	22.47	0.08	2	Left	Tilt	16 QAM	25	12	LTE SAR 26	0.061
711.00	23800	High	LTE Band 17	10	23.40	0.03	1	Left	Tilt	16 QAM	1	0	LTE SAR 26	0.082
711.00	23800	High	LTE Band 17	10	23.24	0.16	1	Left	Tilt	16 QAM	1	49	LTE SAR 26	0.077
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram						

Per FCC KDB 941225 D05 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, thus high channel was tested for QPSK 1RB configurations.

Per FCC KDB 941225 D05 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, thus high channel was tested for 16QAM 1RB configurations.

Table 12-6
LTE Band 7 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)
2535.00	21100	Mid	LTE Band 7	20	22.36	0.05	1	Right	Cheek	QPSK	50	25	LTE SAR 25	0.210
2535.00	21100	Mid	LTE Band 7	20	23.48	-0.02	0	Right	Cheek	QPSK	1	0	LTE SAR 25	**0.332**
2535.00	21100	Mid	LTE Band 7	20	23.39	0.02	0	Right	Cheek	QPSK	1	99	LTE SAR 25	0.326
2535.00	21100	Mid	LTE Band 7	20	21.34	0.05	2	Right	Cheek	16 QAM	50	25	LTE SAR 25	0.171
2560.00	21350	High	LTE Band 7	20	22.60	-0.06	1	Right	Cheek	16 QAM	1	0	LTE SAR 25	0.207
2560.00	21350	High	LTE Band 7	20	22.54	0.09	1	Right	Cheek	16 QAM	1	99	LTE SAR 25	0.205
2535.00	21100	Mid	LTE Band 7	20	22.36	-0.07	1	Right	Tilt	QPSK	50	25	LTE SAR 25	0.139
2535.00	21100	Mid	LTE Band 7	20	23.48	0.02	0	Right	Tilt	QPSK	1	0	LTE SAR 25	**0.197**
2535.00	21100	Mid	LTE Band 7	20	23.39	-0.21	0	Right	Tilt	QPSK	1	99	LTE SAR 25	0.185
2535.00	21100	Mid	LTE Band 7	20	21.34	0.05	2	Right	Tilt	16 QAM	50	25	LTE SAR 25	0.110
2560.00	21350	High	LTE Band 7	20	22.60	0.06	1	Right	Tilt	16 QAM	1	0	LTE SAR 25	0.131
2560.00	21350	High	LTE Band 7	20	22.54	-0.01	1	Right	Tilt	16 QAM	1	99	LTE SAR 25	0.119
2535.00	21100	Mid	LTE Band 7	20	22.36	-0.03	1	Left	Cheek	QPSK	50	25	LTE SAR 25	0.276
2535.00	21100	Mid	LTE Band 7	20	23.48	-0.06	0	Left	Cheek	QPSK	1	0	LTE SAR 25	**0.373**
2535.00	21100	Mid	LTE Band 7	20	23.39	0.06	0	Left	Cheek	QPSK	1	99	LTE SAR 25	0.352
2535.00	21100	Mid	LTE Band 7	20	21.34	0.18	2	Left	Cheek	16 QAM	50	25	LTE SAR 25	0.210
2560.00	21350	High	LTE Band 7	20	22.60	-0.04	1	Left	Cheek	16 QAM	1	0	LTE SAR 25	0.262
2560.00	21350	High	LTE Band 7	20	22.54	0.03	1	Left	Cheek	16 QAM	1	99	LTE SAR 25	0.225
2535.00	21100	Mid	LTE Band 7	20	22.36	0.01	1	Left	Tilt	QPSK	50	25	LTE SAR 25	0.098
2535.00	21100	Mid	LTE Band 7	20	23.48	-0.05	0	Left	Tilt	QPSK	1	0	LTE SAR 25	**0.148**
2535.00	21100	Mid	LTE Band 7	20	23.39	0.14	0	Left	Tilt	QPSK	1	99	LTE SAR 25	0.148
2535.00	21100	Mid	LTE Band 7	20	21.34	0.07	2	Left	Tilt	16 QAM	50	25	LTE SAR 25	0.077
2560.00	21350	High	LTE Band 7	20	22.60	-0.14	1	Left	Tilt	16 QAM	1	0	LTE SAR 25	0.095
2560.00	21350	High	LTE Band 7	20	22.54	-0.12	1	Left	Tilt	16 QAM	1	99	LTE SAR 25	0.106
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram					

Per FCC KDB 941225 D05 Page 4, 4) B) and Page 5 footnote 9, QPSK and 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 QPSK or 16 QAM respectively, thus middle channel was tested for QPSK and high channel was tested for 16QAM 1RB configurations.

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)
2462	11	IEEE 802.11b	DSSS	17.24	0.06	Right	Cheek	LTE SAR 1	1	0.052
2462	11	IEEE 802.11b	DSSS	17.24	0.11	Right	Tilt	LTE SAR 1	1	0.020
2462	11	IEEE 802.11b	DSSS	17.24	-0.03	Left	Cheek	LTE SAR 1	1	**0.153**
2462	11	IEEE 802.11b	DSSS	17.24	0.06	Left	Tilt	LTE SAR 1	1	0.040
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 12-8
5.8 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)
5805	161	IEEE 802.11a	OFDM	14.48	-0.20	Right	Cheek	LTE SAR 2	6	0.001
5805	161	IEEE 802.11a	OFDM	14.48	0.00	Right	Tilt	LTE SAR 2	6	0.000
5805	161	IEEE 802.11a	OFDM	14.48	-0.14	Left	Cheek	LTE SAR 2	6	**0.050**
5805	161	IEEE 802.11a	OFDM	14.48	0.14	Left	Tilt	LTE SAR 2	6	0.006
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 12-9
5.2 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)
5200	40	IEEE 802.11a	OFDM	14.23	-0.18	Right	Cheek	LTE SAR 2	6	0.040
5200	40	IEEE 802.11a	OFDM	14.23	-0.21	Right	Tilt	LTE SAR 2	6	0.023
5200	40	IEEE 802.11a	OFDM	14.23	-0.18	Left	Cheek	LTE SAR 2	6	**0.121**
5200	40	IEEE 802.11a	OFDM	14.23	-0.12	Left	Tilt	LTE SAR 2	6	0.038
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 12-10
5.3 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)
5260	52	IEEE 802.11a	OFDM	14.06	-0.11	Right	Cheek	LTE SAR 2	6	0.081
5260	52	IEEE 802.11a	OFDM	14.06	-0.16	Right	Tilt	LTE SAR 2	6	0.069
5260	52	IEEE 802.11a	OFDM	14.06	-0.16	Left	Cheek	LTE SAR 2	6	**0.131**
5260	52	IEEE 802.11a	OFDM	14.06	-0.13	Left	Tilt	LTE SAR 2	6	0.078
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 12-11
5.5 - 5.7 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)
5560	112	IEEE 802.11a	OFDM	14.84	-0.17	Right	Cheek	LTE SAR 2	6	0.038
5560	112	IEEE 802.11a	OFDM	14.84	-0.13	Right	Tilt	LTE SAR 2	6	0.040
5560	112	IEEE 802.11a	OFDM	14.84	-0.11	Left	Cheek	LTE SAR 2	6	**0.085**
5560	112	IEEE 802.11a	OFDM	14.84	0.09	Left	Tilt	LTE SAR 2	6	0.059
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 12-12
2G/3G 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	33.65	0.00	1.0 cm	3G SAR 2	1	back	0.608
824.20	128	GSM 850	GPRS	31.56	-0.03	1.0 cm	3G SAR 2	2	back	0.775
836.60	190	GSM 850	GPRS	31.50	0.21	1.0 cm	3G SAR 2	2	back	0.922
848.80	251	GSM 850	GPRS	31.27	-0.04	1.0 cm	3G SAR 2	2	back	0.902
836.60	4183	WCDMA 850	RMC	24.06	-0.03	1.0 cm	3G SAR 2	N/A	back	0.749
1880.00	661	GSM 1900	GSM	30.38	-0.04	1.0 cm	3G SAR 1	1	back	0.559
1880.00	661	GSM 1900	GPRS	28.57	-0.05	1.0 cm	3G SAR 1	2	back	0.726
1852.40	9262	WCDMA 1900	RMC	24.01	0.01	1.0 cm	3G SAR 1	N/A	back	1.010
1880.00	9400	WCDMA 1900	RMC	24.10	-0.05	1.0 cm	3G SAR 1	N/A	back	1.000
1907.60	9538	WCDMA 1900	RMC	23.96	-0.04	1.0 cm	3G SAR 1	N/A	back	1.010
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: When the reported SAR measured for 1 cm air-gap without headset cable is >1.2 W/kg, the highest reported SAR configuration for the mode and band should be repeated with headset attached, per past FCC guidance. Since the measured SAR was not >1.2 W/kg, GPRS and WCDMA hotspot data for the back side configuration additionally shows body-worn compliance. GSM voice modes were evaluated for SAR using headset cable.

Table 12-13
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	Headset	Side	SAR (1g)
MHz	Ch.														(W/kg)
710.00	23790	Mid	LTE Band 17	10	23.28	-0.10	1	LTE SAR 26	QPSK	25	12	1.0 cm	No	back	0.320
711.00	23800	High	LTE Band 17	10	24.64	-0.05	0	LTE SAR 26	QPSK	1	0	1.0 cm	No	back	**0.485**
711.00	23800	High	LTE Band 17	10	24.42	0.01	0	LTE SAR 26	QPSK	1	49	1.0 cm	No	back	0.354
710.00	23790	Mid	LTE Band 17	10	22.47	0.02	2	LTE SAR 26	16 QAM	25	12	1.0 cm	No	back	0.254
711.00	23800	High	LTE Band 17	10	23.40	-0.01	1	LTE SAR 26	16 QAM	1	0	1.0 cm	No	back	0.351
711.00	23800	High	LTE Band 17	10	23.24	0.10	1	LTE SAR 26	16 QAM	1	49	1.0 cm	No	back	0.259
2510.00	20805	Low	LTE Band 7	20	22.22	-0.03	1	LTE SAR 25	QPSK	50	25	1.0 cm	No	back	0.886
2535.00	21100	Mid	LTE Band 7	20	22.36	0.04	1	LTE SAR 25	QPSK	50	25	1.0 cm	No	back	0.884
2560.00	21350	High	LTE Band 7	20	22.38	-0.07	1	LTE SAR 25	QPSK	50	25	1.0 cm	No	back	0.887
2535.00	21100	Mid	LTE Band 7	20	23.48	-0.14	0	LTE SAR 25	QPSK	1	0	1.0 cm	No	back	**1.230**
2535.00	21100	Mid	LTE Band 7	20	23.48	-0.02	0	LTE SAR 25	QPSK	1	0	1.0 cm	Yes	back	1.170
2535.00	21100	Mid	LTE Band 7	20	23.39	0.02	0	LTE SAR 25	QPSK	1	99	1.0 cm	No	back	1.160
2560.00	21350	High	LTE Band 7	20	21.41	0.00	2	LTE SAR 25	16 QAM	50	25	1.0 cm	No	back	0.780
2560.00	21350	High	LTE Band 7	20	22.60	0.02	1	LTE SAR 25	16 QAM	1	0	1.0 cm	No	back	0.878
2560.00	21350	High	LTE Band 7	20	22.54	0.09	1	LTE SAR 25	16 QAM	1	99	1.0 cm	No	back	0.804
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Per FCC KDB 941225 D05 Page 4, 4) B) and Page 5 footnote 9, QPSK and 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 QPSK or 16 QAM respectively, thus middle channel was tested for QPSK and high channel was tested for 16QAM 1RB configurations.

Per FCC KDB 941225 D05, 50% RB allocation for 16QAM should be tested on the channel of highest SAR for QPSK 50% RB allocation. Therefore, LTE Band 7 16QAM 50% RB allocation was tested at high channel.

For LTE mode, since the measured SAR was >1.2 W/kg for LTE Band 7 QPSK 1 RB, 0 offset back side configuration, separate body-worn accessory data was measured with a headset cable. Since the measured SAR is <1.2 W/kg for other configurations, separate body-worn accessory data measured with a headset cable is not required, per FCC Guidance

Table 12-14
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	17.24	0.01	1.0 cm	3G SAR 1	1	back	**0.154**
5805	161	IEEE 802.11a	OFDM	14.48	-0.16	1.0 cm	LTE SAR 2	6	back	0.082
5200	40	IEEE 802.11a	OFDM	14.23	-0.12	1.0 cm	LTE SAR 2	6	back	0.166
5260	52	IEEE 802.11a	OFDM	14.06	-0.10	1.0 cm	LTE SAR 2	6	back	0.164
5560	112	IEEE 802.11a	OFDM	14.84	-0.14	1.0 cm	LTE SAR 2	6	back	**0.208**
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: When the reported SAR measured for 1 cm air-gap without headset cable is >1.2 W/kg, the highest reported SAR configuration for the mode and band should be repeated with headset attached, per past FCC guidance. Since the measured SAR was not >1.2 W/kg, IEEE802.11b hotspot data for the back side configuration additionally shows body-worn compliance.

12.3 Standalone Wireless Router SAR Data

Table 12-15
Licensed 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)
824.20	128	GSM 850	GPRS	31.56	-0.03	1.0 cm	3G SAR 2	2	back	0.775
836.60	190	GSM 850	GPRS	31.50	0.21	1.0 cm	3G SAR 2	2	back	**0.922**
848.80	251	GSM 850	GPRS	31.27	-0.04	1.0 cm	3G SAR 2	2	back	0.902
836.60	190	GSM 850	GPRS	31.50	-0.04	1.0 cm	3G SAR 2	2	front	0.592
836.60	190	GSM 850	GPRS	31.50	-0.05	1.0 cm	3G SAR 2	2	bottom	0.172
824.20	128	GSM 850	GPRS	31.56	-0.03	1.0 cm	3G SAR 2	2	left	0.756
836.60	190	GSM 850	GPRS	31.50	-0.20	1.0 cm	3G SAR 2	2	left	0.883
848.80	251	GSM 850	GPRS	31.27	-0.08	1.0 cm	3G SAR 2	2	left	0.812
836.60	4183	WCDMA 850	RMC	24.06	-0.03	1.0 cm	3G SAR 2	N/A	back	0.749
836.60	4183	WCDMA 850	RMC	24.06	0.02	1.0 cm	3G SAR 2	N/A	front	0.581
836.60	4183	WCDMA 850	RMC	24.06	-0.08	1.0 cm	3G SAR 2	N/A	bottom	0.216
826.40	4132	WCDMA 850	RMC	24.11	0.01	1.0 cm	3G SAR 2	N/A	left	0.754
836.60	4183	WCDMA 850	RMC	24.06	0.03	1.0 cm	3G SAR 2	N/A	left	**0.841**
846.60	4233	WCDMA 850	RMC	24.02	-0.11	1.0 cm	3G SAR 2	N/A	left	0.736
1880.00	661	GSM 1900	GPRS	28.57	-0.05	1.0 cm	3G SAR 1	2	back	**0.726**
1880.00	661	GSM 1900	GPRS	28.57	0.01	1.0 cm	3G SAR 1	2	front	0.487
1880.00	661	GSM 1900	GPRS	28.57	-0.09	1.0 cm	3G SAR 1	2	bottom	0.353
1880.00	661	GSM 1900	GPRS	28.57	-0.01	1.0 cm	3G SAR 1	2	left	0.331
1852.40	9262	WCDMA 1900	RMC	24.01	0.01	1.0 cm	3G SAR 1	N/A	back	**1.010**
1880.00	9400	WCDMA 1900	RMC	24.10	-0.05	1.0 cm	3G SAR 1	N/A	back	1.000
1907.60	9538	WCDMA 1900	RMC	23.96	-0.04	1.0 cm	3G SAR 1	N/A	back	**1.010**
1880.00	9400	WCDMA 1900	RMC	24.10	-0.04	1.0 cm	3G SAR 1	N/A	front	0.729
1880.00	9400	WCDMA 1900	RMC	24.10	-0.01	1.0 cm	3G SAR 1	N/A	bottom	0.488
1880.00	9400	WCDMA 1900	RMC	24.10	0.14	1.0 cm	3G SAR 1	N/A	left	0.493
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 12-16
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.													(W/kg)
710.00	23790	Mid	LTE Band 17	10	23.28	-0.10	1	LTE SAR 26	QPSK	25	12	1.0 cm	back	0.320
711.00	23800	High	LTE Band 17	10	24.64	-0.05	0	LTE SAR 26	QPSK	1	0	1.0 cm	back	**0.485**
711.00	23800	High	LTE Band 17	10	24.42	0.01	0	LTE SAR 26	QPSK	1	49	1.0 cm	back	0.354
710.00	23790	Mid	LTE Band 17	10	22.47	0.02	2	LTE SAR 26	16 QAM	25	12	1.0 cm	back	0.254
711.00	23800	High	LTE Band 17	10	23.40	-0.01	1	LTE SAR 26	16 QAM	1	0	1.0 cm	back	0.351
711.00	23800	High	LTE Band 17	10	23.24	0.10	1	LTE SAR 26	16 QAM	1	49	1.0 cm	back	0.259
710.00	23790	Mid	LTE Band 17	10	23.28	0.00	1	LTE SAR 26	QPSK	25	12	1.0 cm	front	0.200
711.00	23800	High	LTE Band 17	10	24.64	-0.09	0	LTE SAR 26	QPSK	1	0	1.0 cm	front	**0.297**
711.00	23800	High	LTE Band 17	10	24.42	0.01	0	LTE SAR 26	QPSK	1	49	1.0 cm	front	0.220
710.00	23790	Mid	LTE Band 17	10	22.47	0.05	2	LTE SAR 26	16 QAM	25	12	1.0 cm	front	0.159
711.00	23800	High	LTE Band 17	10	23.40	-0.05	1	LTE SAR 26	16 QAM	1	0	1.0 cm	front	0.221
711.00	23800	High	LTE Band 17	10	23.24	0.04	1	LTE SAR 26	16 QAM	1	49	1.0 cm	front	0.164
710.00	23790	Mid	LTE Band 17	10	23.28	-0.04	1	LTE SAR 26	QPSK	25	12	1.0 cm	bottom	0.084
711.00	23800	High	LTE Band 17	10	24.64	-0.15	0	LTE SAR 26	QPSK	1	0	1.0 cm	bottom	**0.117**
711.00	23800	High	LTE Band 17	10	24.42	-0.11	0	LTE SAR 26	QPSK	1	49	1.0 cm	bottom	0.094
710.00	23790	Mid	LTE Band 17	10	22.47	0.04	2	LTE SAR 26	16 QAM	25	12	1.0 cm	bottom	0.069
711.00	23800	High	LTE Band 17	10	23.40	0.07	1	LTE SAR 26	16 QAM	1	0	1.0 cm	bottom	0.094
711.00	23800	High	LTE Band 17	10	23.24	0.05	1	LTE SAR 26	16 QAM	1	49	1.0 cm	bottom	0.082
710.00	23790	Mid	LTE Band 17	10	23.28	-0.09	1	LTE SAR 26	QPSK	25	12	1.0 cm	right	0.261
711.00	23800	High	LTE Band 17	10	24.64	-0.04	0	LTE SAR 26	QPSK	1	0	1.0 cm	right	**0.404**
711.00	23800	High	LTE Band 17	10	24.42	0.06	0	LTE SAR 26	QPSK	1	49	1.0 cm	right	0.293
710.00	23790	Mid	LTE Band 17	10	22.47	0.00	2	LTE SAR 26	16 QAM	25	12	1.0 cm	right	0.215
711.00	23800	High	LTE Band 17	10	23.40	-0.19	1	LTE SAR 26	16 QAM	1	0	1.0 cm	right	0.316
711.00	23800	High	LTE Band 17	10	23.24	-0.08	1	LTE SAR 26	16 QAM	1	49	1.0 cm	right	0.240
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram					

Per FCC KDB 941225 D05 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, thus high channel was tested for QPSK 1RB configurations.

Per FCC KDB 941225 D05 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, thus high channel was tested to 16QAM 1RB configurations.

Table 12-17
LTE Band 7 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)
2510.00	20850	Low	LTE Band 7	20	22.22	-0.03	1	LTE SAR 25	QPSK	50	25	1.0 cm	back	0.886
2535.00	21100	Mid	LTE Band 7	20	22.36	0.04	1	LTE SAR 25	QPSK	50	25	1.0 cm	back	0.884
2560.00	21350	High	LTE Band 7	20	22.38	-0.07	1	LTE SAR 25	QPSK	50	25	1.0 cm	back	0.887
2535.00	21100	Mid	LTE Band 7	20	23.48	-0.14	0	LTE SAR 25	QPSK	1	0	1.0 cm	back	**1.230**
2535.00	21100	Mid	LTE Band 7	20	23.39	0.02	0	LTE SAR 25	QPSK	1	99	1.0 cm	back	1.160
2560.00	21350	High	LTE Band 7	20	21.41	0.00	2	LTE SAR 25	16 QAM	50	25	1.0 cm	back	0.780
2560.00	21350	High	LTE Band 7	20	22.60	0.02	1	LTE SAR 25	16 QAM	1	0	1.0 cm	back	0.878
2560.00	21350	High	LTE Band 7	20	22.54	0.09	1	LTE SAR 25	16 QAM	1	99	1.0 cm	back	0.804
2535.00	21100	Mid	LTE Band 7	20	22.36	0.01	1	LTE SAR 25	QPSK	50	25	1.0 cm	front	0.326
2535.00	21100	Mid	LTE Band 7	20	23.48	0.11	0	LTE SAR 25	QPSK	1	0	1.0 cm	front	0.441
2535.00	21100	Mid	LTE Band 7	20	23.39	0.11	0	LTE SAR 25	QPSK	1	99	1.0 cm	front	0.232
2535.00	21100	Mid	LTE Band 7	20	21.34	0.00	2	LTE SAR 25	16 QAM	50	25	1.0 cm	front	0.441
2560.00	21350	High	LTE Band 7	20	22.60	0.15	1	LTE SAR 25	16 QAM	1	0	1.0 cm	front	**0.538**
2560.00	21350	High	LTE Band 7	20	22.54	-0.10	1	LTE SAR 25	16 QAM	1	99	1.0 cm	front	0.506
2535.00	21100	Mid	LTE Band 7	20	22.36	0.16	1	LTE SAR 25	QPSK	50	25	1.0 cm	bottom	0.336
2535.00	21100	Mid	LTE Band 7	20	23.48	-0.01	0	LTE SAR 25	QPSK	1	0	1.0 cm	bottom	**0.500**
2535.00	21100	Mid	LTE Band 7	20	23.39	0.05	0	LTE SAR 25	QPSK	1	99	1.0 cm	bottom	0.443
2535.00	21100	Mid	LTE Band 7	20	21.34	0.05	2	LTE SAR 25	16 QAM	50	25	1.0 cm	bottom	0.270
2560.00	21350	High	LTE Band 7	20	22.60	0.01	1	LTE SAR 25	16 QAM	1	0	1.0 cm	bottom	0.365
2560.00	21350	High	LTE Band 7	20	22.54	-0.03	1	LTE SAR 25	16 QAM	1	99	1.0 cm	bottom	0.330
2535.00	21100	Mid	LTE Band 7	20	22.36	-0.02	1	LTE SAR 25	QPSK	50	25	1.0 cm	right	0.258
2535.00	21100	Mid	LTE Band 7	20	23.48	0.05	0	LTE SAR 25	QPSK	1	0	1.0 cm	right	**0.358**
2535.00	21100	Mid	LTE Band 7	20	23.39	0.06	0	LTE SAR 25	QPSK	1	99	1.0 cm	right	0.341
2535.00	21100	Mid	LTE Band 7	20	21.34	-0.02	2	LTE SAR 25	16 QAM	50	25	1.0 cm	right	0.262
2560.00	21350	High	LTE Band 7	20	22.60	0.08	1	LTE SAR 25	16 QAM	1	0	1.0 cm	right	0.267
2560.00	21350	High	LTE Band 7	20	22.54	0.01	1	LTE SAR 25	16 QAM	1	99	1.0 cm	right	0.270
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram					

Per FCC KDB 941225 D05 Page 4, 4) B) and Page 5 footnote 9, QPSK and 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 QPSK or 16 QAM respectively, thus middle channel was tested for QPSK and high channel was tested for 16QAM 1RB configurations.

Per 941225 D05, 16QAM 50% RB should be tested with channel of highest QPSK 50% RB SAR. For the case of LTE Band 7 back side, high channel should be tested for 16 QAM 50% because the highest SAR 0.887 W/kg was measured on high channel for QPSK 50% RB.

Table 12-18
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	17.24	0.01	1.0 cm	3G SAR 1	1	back	**0.154**
2462	11	IEEE 802.11b	DSSS	17.24	0.05	1.0 cm	3G SAR 1	1	front	0.025
2462	11	IEEE 802.11b	DSSS	17.24	0.04	1.0 cm	3G SAR 1	1	top	0.023
2462	11	IEEE 802.11b	DSSS	17.24	-0.06	1.0 cm	3G SAR 1	1	right	0.097
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 considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
8. The measured standalone SAR, when extrapolated to the maximum tune-up power tolerance levels, remains compliant for all operating configurations.

GSM Test Notes:

1. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR using headphones.
2. Per FCC guidance, GPRS Data Mode is additionally required for body-worn configuration. When the measured SAR is <1.2 W/kg, separate body-worn accessory data measured with a headset cable is not required. 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. The highest time-average power configuration was evaluated for SAR.
4. GPRS mode was additionally evaluated for head SAR to support SAR compliance for VoIP transmission scenarios.

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. It was confirmed that HSPA levels using E-MPR will not operate at a levels greater than the RMC power levels. There is no E-MPR for RMC conditions.
2. When the measured SAR is <1.2 W/kg, separate body-worn accessory data measured with a headset cable is not required, per FCC Guidance. Therefore, the hotspot data for the back side configuration additionally shows body-worn compliance at the same distance.
3. Measured maximum output powers for DC-HSDPA were not greater than ¼ dB higher than the WCDMA 12.2 kbps RMC maximum output and as a result, SAR is not required for DC-HSDPA.

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. When the measured SAR is <1.2 W/kg, separate body-worn accessory data measured with a headset cable is not required, per FCC Guidance. Therefore, the hotspot data for the back side configuration additionally shows body-worn compliance at the same distance.
5. Since the measured SAR was >1.2 W/kg for LTE Band 7 QPSK 1 RB, 0 offset, separate body-worn accessory data was measured with a headset cable. Since the measured SAR was <1.2 W/kg for other configurations, separate body-worn accessory data measured with a headset cable is not required, per FCC Guidance. Therefore, the hotspot data for the back side configuration additionally shows body-worn compliance at the same distance.
6. When the reported SAR measured for 1 cm air-gap without headset cable is >1.2 W/kg, the highest reported SAR configuration for the mode and band should be repeated with headset attached, per past FCC guidance. Since the measured SAR was not >1.2 W/kg, LTE hotspot data for the back side configuration additionally shows body-worn compliance.

WLAN Notes:

1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes for 2.4 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11b. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
2. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes for 5 GHz WIFI: Highest average RF output power channel

for the lowest data rate was selected for SAR evaluation in 802.11a. Other IEEE 802.11 modes (including 802.11n 20MHz and 40MHz Bandwidths) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.

3. When Hotspot is enabled, all 5 GHz bands are disabled.
4. WLAN transmission was verified using an uncalibrated spectrum analyzer.
5. 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.
6. Since the measured SAR is <1.2 W/kg, separate body-worn accessory data measured with a headset cable is not required, per FCC Guidance. Therefore, the hotspot data for the back side configuration additionally shows body-worn compliance at the same distance.
7. IEEE 802.11a was evaluated for SAR at maximum output power levels to address worst case standalone SAR conditions and was evaluated for all possible simultaneous transmission combinations with 5 GHz WLAN.

Hotspot Notes:

1. Top Edge and Right Edge for the GSM/WCDMA transmitter was 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 Edge and Left Edge for the LTE B7/17 transmitter was 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 and Left 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 802.11a/b/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
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·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	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

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 indicated in Table 1-2 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 1.6(A) for more information.

13.3 Head SAR Simultaneous Transmission Analysis

Table 13-1
Simultaneous Transmission Scenario:
Licensed Transmitter + 2.4 GHz WiFi (Held to Ear)

Simult Tx	Configuration	GSM 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.340	0.052	0.392
	Right Tilt	0.227	0.020	0.247
	Left Cheek	0.445	0.153	**0.598**
	Left Tilt	0.234	0.040	0.274

Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.398	0.052	0.450
	Right Tilt	0.238	0.020	0.258
	Left Cheek	0.497	0.153	**0.650**
	Left Tilt	0.248	0.040	0.288

Simult Tx	Configuration	WCDMA 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.347	0.052	0.399
	Right Tilt	0.244	0.020	0.264
	Left Cheek	0.442	0.153	**0.595**
	Left Tilt	0.251	0.040	0.291

Simult Tx	Configuration	GSM 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.207	0.052	0.259
	Right Tilt	0.101	0.020	0.121
	Left Cheek	0.329	0.153	**0.482**
	Left Tilt	0.090	0.040	0.130

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.253	0.052	0.305
	Right Tilt	0.129	0.020	0.149
	Left Cheek	0.408	0.153	**0.561**
	Left Tilt	0.111	0.040	0.151

Simult Tx	Configuration	WCDMA 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.373	0.052	0.425
	Right Tilt	0.197	0.020	0.217
	Left Cheek	0.545	0.153	**0.698**
	Left Tilt	0.156	0.040	0.196

Simult Tx	Configuration	LTE Band 17 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.246	0.052	0.298
	Right Tilt	0.143	0.020	0.163
	Left Cheek	0.179	0.153	**0.332**
	Left Tilt	0.104	0.040	0.144

Simult Tx	Configuration	LTE Band 7 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.332	0.052	0.384
	Right Tilt	0.197	0.020	0.217
	Left Cheek	0.373	0.153	**0.526**
	Left Tilt	0.148	0.040	0.188

Table 13-2
Simultaneous Transmission Scenario:
Licensed Transmitter + 5 GHz WiFi (Held to Ear)

Simult Tx	Configuration	GSM 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.340	0.081	0.421
	Right Tilt	0.227	0.069	0.296
	Left Cheek	0.445	0.131	**0.576**
	Left Tilt	0.234	0.078	0.312

Simult Tx	Configuration	WCDMA 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.347	0.081	0.428
	Right Tilt	0.244	0.069	0.313
	Left Cheek	0.442	0.131	**0.573**
	Left Tilt	0.251	0.078	0.329

Simult Tx	Configuration	GSM 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.207	0.081	0.288
	Right Tilt	0.101	0.069	0.170
	Left Cheek	0.329	0.131	**0.460**
	Left Tilt	0.090	0.078	0.168

Simult Tx	Configuration	WCDMA 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.373	0.081	0.454
	Right Tilt	0.197	0.069	0.266
	Left Cheek	0.545	0.131	**0.676**
	Left Tilt	0.156	0.078	0.234

13.4 Body-Worn Simultaneous Transmission Analysis

Table 13-3
Simultaneous Transmission Scenario:
Licensed Transmitter + 2.4 GHz WiFi (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	0.608	0.154	0.762
Back Side	GPRS 850	0.922	0.154	1.076
Back Side	WCDMA 850	0.749	0.154	0.903
Back Side	GSM 1900	0.559	0.154	0.713
Back Side	GPRS 1900	0.726	0.154	0.880
Back Side	WCDMA 1900	1.010	0.154	**1.164**

Configuration	Mode	LTE SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Back Side	LTE Band 17	0.485	0.154	0.639
Back Side	LTE Band 7	1.230	0.154	**1.384**

Table 13-4
Simultaneous Transmission Scenario:
Licensed Transmitter + 5 GHz WiFi (Body-Worn at 1.0 cm)

Configuration	Mode	2G/3G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Back Side	GSM 850	0.608	0.208	0.816
Back Side	WCDMA 850	0.749	0.208	0.957
Back Side	GSM 1900	0.559	0.208	0.767
Back Side	WCDMA 1900	1.010	0.208	**1.218**

13.5 Hotspot SAR Simultaneous Transmission Analysis

Table 13-5
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	0.922	0.154	**1.076**
	Front	0.592	0.025	0.617
	Top	-	0.023	0.023
	Bottom	0.172	-	0.172
	Right	-	0.097	0.097
	Left	0.883	-	0.883

Simult Tx	Configuration	WCDMA 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.749	0.154	**0.903**
	Front	0.581	0.025	0.606
	Top	-	0.023	0.023
	Bottom	0.216	-	0.216
	Right	-	0.097	0.097
	Left	0.841	-	0.841

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.726	0.154	**0.880**
	Front	0.487	0.025	0.512
	Top	-	0.023	0.023
	Bottom	0.353	-	0.353
	Right	-	0.097	0.097
	Left	0.331	-	0.331

Simult Tx	Configuration	WCDMA 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	1.010	0.154	**1.164**
	Front	0.729	0.025	0.754
	Top	-	0.023	0.023
	Bottom	0.488	-	0.488
	Right	-	0.097	0.097
	Left	0.493	-	0.493

Simult Tx	Configuration	LTE Band 17 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.485	0.154	**0.639**
	Front	0.297	0.025	0.322
	Top	-	0.023	0.023
	Bottom	0.117	-	0.117
	Right	0.404	0.097	0.501
	Left	-	-	0.000

Simult Tx	Configuration	LTE Band 7 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	1.230	0.154	**1.384**
	Front	0.538	0.025	0.563
	Top	-	0.023	0.023
	Bottom	0.500	-	0.500
	Right	0.358	0.097	0.455
	Left	-	-	0.000

Note: Per FCC KDB Publication 941225 D06, the edges with antennas more than 2.5 cm are not required to be evaluated for SAR ("-"). The above tables represent a portable hotspot condition.

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. It was confirmed that all other simultaneous transmission scenarios for all configurations remain compliant when extrapolated to the maximum tune up power level.

14 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	85047A	S-Parameter Test Set	N/A	N/A	N/A	2904A00579
Agilent	85070E	Dielectric Probe Kit	3/8/2012	Annual	3/8/2013	MY44300633
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	8648D	Signal Generator	4/3/2012	Annual	4/3/2013	3629U00687
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/4/2012	Annual	4/4/2013	JP38020182
Agilent	8753E	(30kHz-6GHz) Network Analyzer	4/3/2012	Annual	4/3/2013	US37390350
Agilent	E5515C	Wireless Communications Test Set	2/14/2012	Annual	2/14/2013	GB43163447
Agilent	E5515C	Wireless Communications Test Set	2/9/2012	Annual	2/9/2013	GB43460554
Agilent	E5515C	Wireless Communications Tester	4/4/2012	Annual	4/4/2013	US41140256
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/5/2012	Annual	4/5/2013	MY45470194
Amplifier Research	5S1G4	5W, 800MHz-4.2GHz	CBT	N/A	CBT	21910
Anritsu	MA24106A	USB Power Sensor	8/22/2012	Annual	8/22/2013	1231535
Anritsu	MA24106A	USB Power Sensor	8/22/2012	Annual	8/22/2013	1231538
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	2400
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	MA2481A	Power Sensor	4/5/2012	Annual	4/5/2013	5605
Anritsu	ML2438A	Power Meter	2/14/2012	Annual	2/14/2013	1190013
Anritsu	ML2438A	Power Meter	2/14/2012	Annual	2/14/2013	98150041
Anritsu	MT8820C	Radio Communication Tester	11/11/2011	Annual	11/11/2012	6200901190
COMTech	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M1S5A00-009
Control Company	36934-158	Wall-Mounted Thermometer	1/4/2012	Biennial	1/4/2014	122014488
Control Company	36934-158	Wall-Mounted Thermometer	1/4/2012	Biennial	1/4/2014	122014497
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331322
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331323
Intelligent Weigh	PD-3000	Electronic Balance	3/27/2012	Annual	3/27/2013	11081534
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Rohde & Schwarz	CMU200	Base Station Simulator	5/22/2012	Annual	5/22/2013	109892
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	11/30/2011	Annual	11/30/2012	101699
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	3/5/2012	Annual	3/5/2013	102060
Rohde & Schwarz	NRVD	Dual Channel Power Meter	4/8/2011	Biennial	4/8/2013	101695
Rohde & Schwarz	SMIQ03B	Signal Generator	4/5/2012	Annual	4/5/2013	DE27259
Seekonk	NC-100	Torque Wrench (8" lb)	11/29/2011	Triennial	11/29/2014	21053
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
SPEAG	D1900V2	1900 MHz SAR Dipole	2/22/2012	Annual	2/22/2013	5d149
SPEAG	D2450V2	2450 MHz SAR Dipole	1/24/2012	Annual	1/24/2013	797
SPEAG	D2450V2	2450 MHz SAR Dipole	2/7/2012	Annual	2/7/2013	882
SPEAG	D2600V2	2600 MHz SAR Dipole	4/25/2012	Annual	4/25/2013	1004
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/19/2012	Annual	1/19/2013	1057
SPEAG	D750V3	750 MHz Dipole	2/9/2012	Annual	2/9/2013	1054
SPEAG	D835V2	835 MHz SAR Dipole	1/25/2012	Annual	1/25/2013	4d047
SPEAG	D835V2	835 MHz SAR Dipole	4/20/2012	Annual	4/20/2013	4d119
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/20/2012	Annual	2/20/2013	649
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/19/2012	Annual	4/19/2013	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/18/2012	Annual	1/18/2013	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/24/2012	Annual	8/24/2013	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/12/2012	Annual	4/12/2013	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/7/2012	Annual	5/7/2013	1334
SPEAG	ES3DV2	SAR Probe	8/28/2012	Annual	8/28/2013	3022
SPEAG	ES3DV3	SAR Probe	3/16/2012	Annual	3/16/2013	3209
SPEAG	ES3DV3	SAR Probe	4/24/2012	Annual	4/24/2013	3213
SPEAG	ES3DV3	SAR Probe	5/18/2012	Annual	5/18/2013	3263
SPEAG	ES3DV3	SAR Probe	2/7/2012	Annual	2/7/2013	3287
SPEAG	EX3DV4	SAR Probe	1/27/2012	Annual	1/27/2013	3589
Tektronix	RSA-6114A	Real Time Spectrum Analyzer	4/5/2012	Annual	4/5/2013	B010177
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286445
VWR	62344-925	Mini-Thermometer	10/24/2011	Biennial	10/24/2013	111886441

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

15 MEASUREMENT UNCERTAINTIES

Applicable for frequencies less than 3000 MHz.

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

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

Applicable for frequencies up to 6 GHz.

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

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

16 CONCLUSION

16.1 Measurement Conclusion

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

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

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APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 26

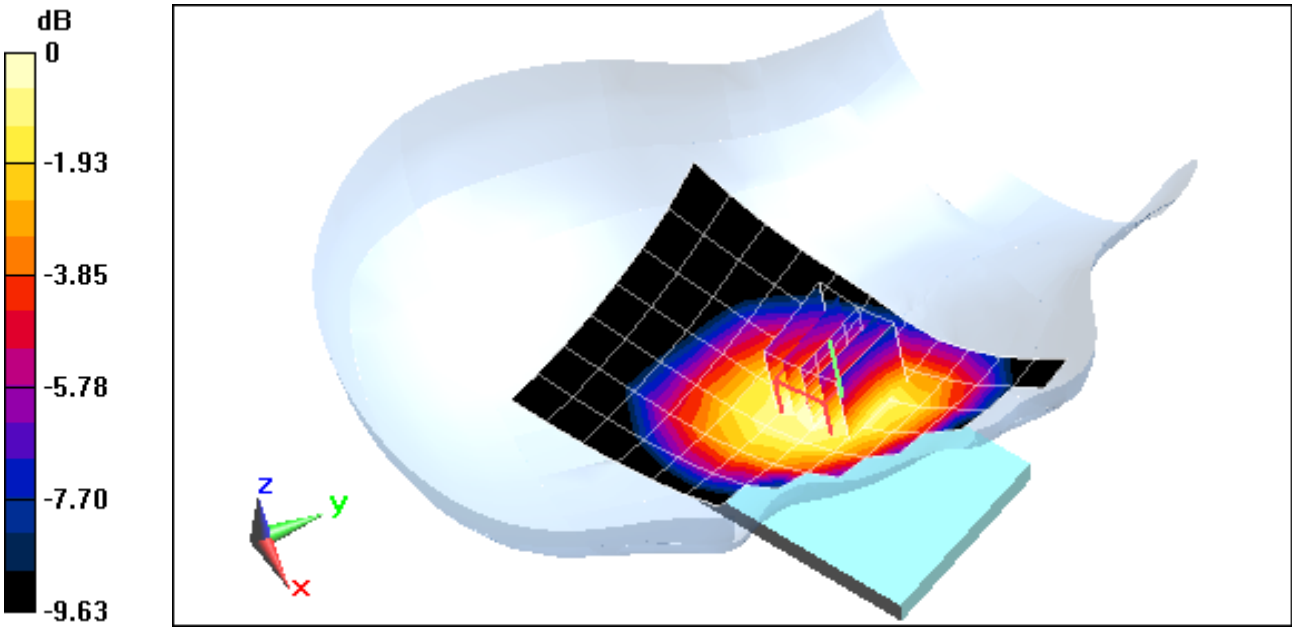
Communication System: LTE Band 17; Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 740 Head Medium parameters used (interpolated):
f = 711 MHz; σ = 0.846 mho/m; ε_r = 42.574; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 10-09-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3213; ConvF(6.32, 6.32, 6.32); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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

Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.170 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.317 mW/g
SAR(1 g) = 0.246 mW/g; SAR(10 g) = 0.186 mW/g



0 dB = 0.257 mW/g = -11.80 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 26

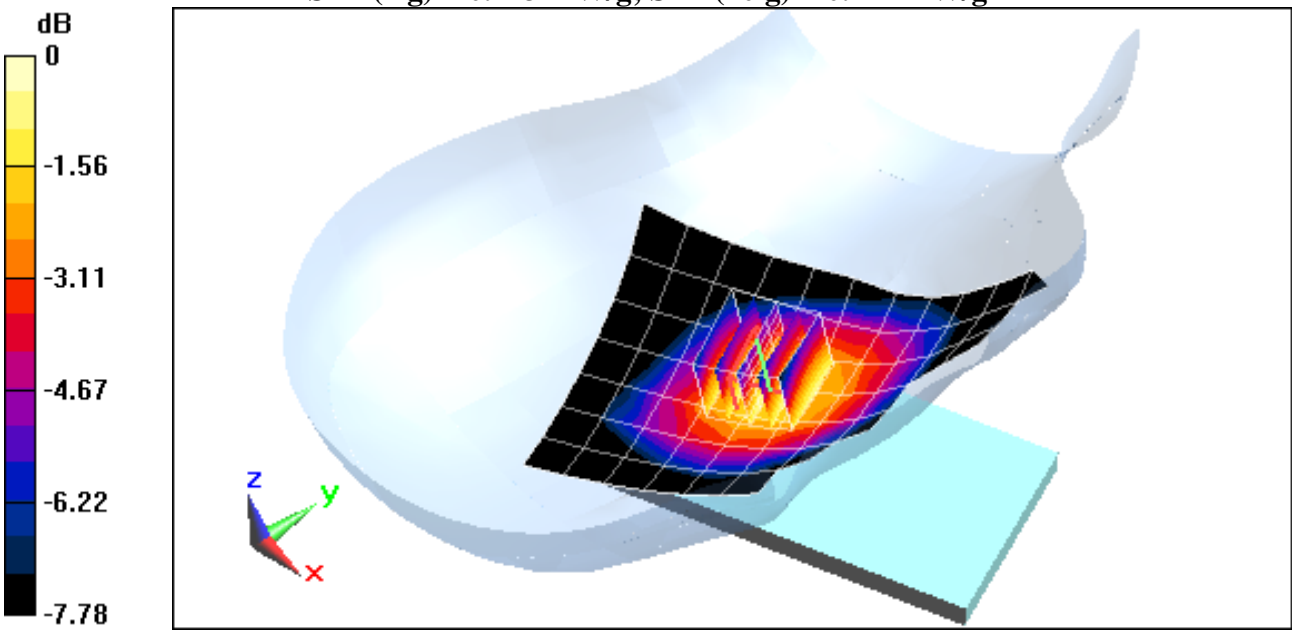
Communication System: LTE Band 17; Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 740 Head, Medium parameters used (interpolated):
f = 711 MHz; σ = 0.846 mho/m; ε_r = 42.574; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 10-09-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3213; ConvF(6.32, 6.32, 6.32); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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

Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.500 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.166 mW/g
SAR(1 g) = 0.143 mW/g; SAR(10 g) = 0.114 mW/g



0 dB = 0.149 mW/g = -16.54 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 26

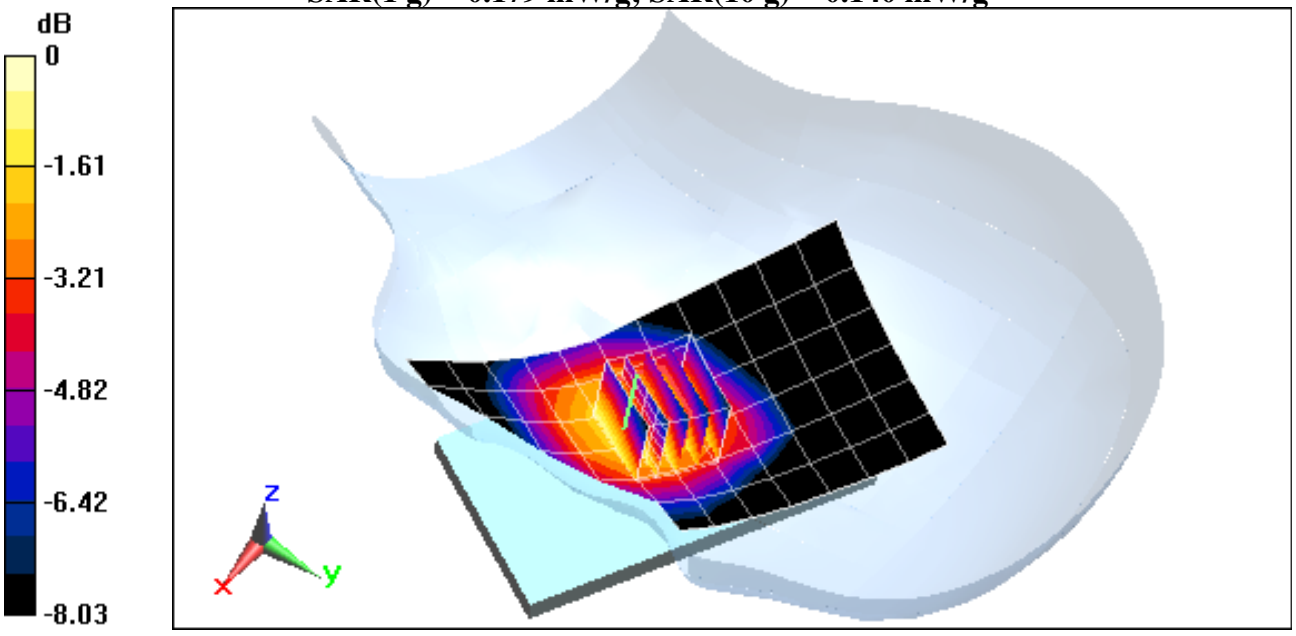
Communication System: LTE Band 17; Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 740 Head, Medium parameters used (interpolated):
f = 711 MHz; σ = 0.846 mho/m; ε_r = 42.574; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 10-09-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3213; ConvF(6.32, 6.32, 6.32); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.375 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.212 mW/g
SAR(1 g) = 0.179 mW/g; SAR(10 g) = 0.140 mW/g



0 dB = 0.185 mW/g = -14.66 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 26

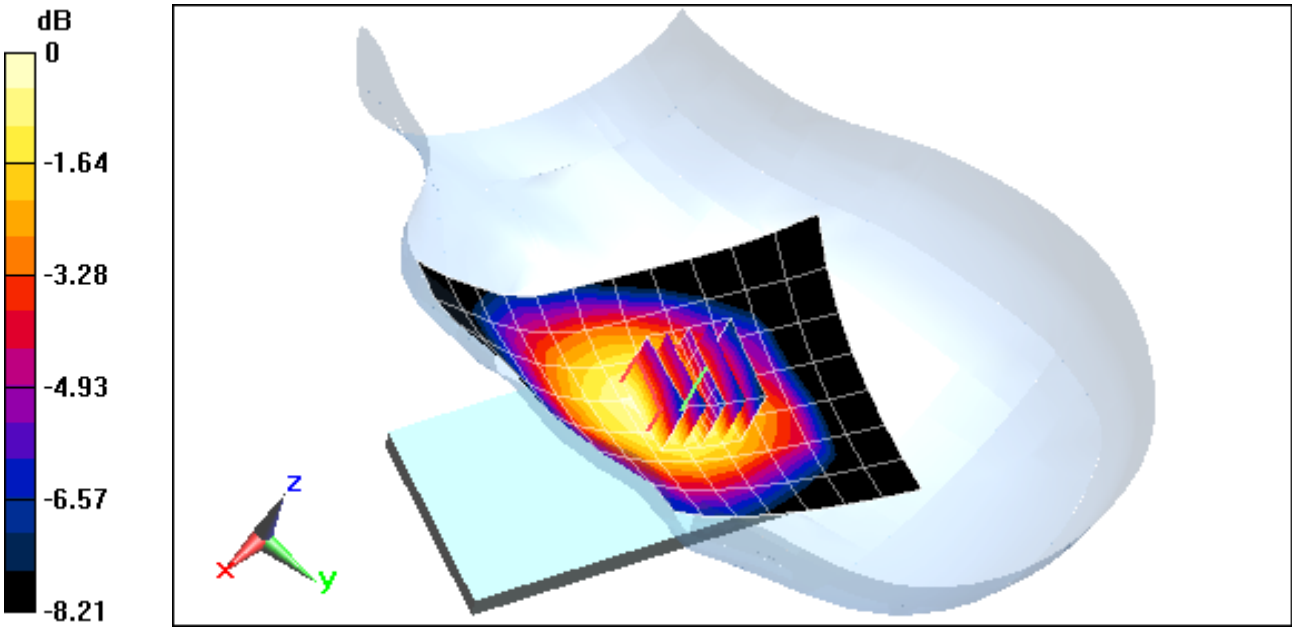
Communication System: LTE Band 17; Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 740 Head Medium parameters used (interpolated):
f = 711 MHz; σ = 0.846 mho/m; ε_r = 42.574; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 10-09-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3213; ConvF(6.32, 6.32, 6.32); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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

Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.388 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.124 mW/g
SAR(1 g) = 0.104 mW/g; SAR(10 g) = 0.082 mW/g



0 dB = 0.109 mW/g = -19.25 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

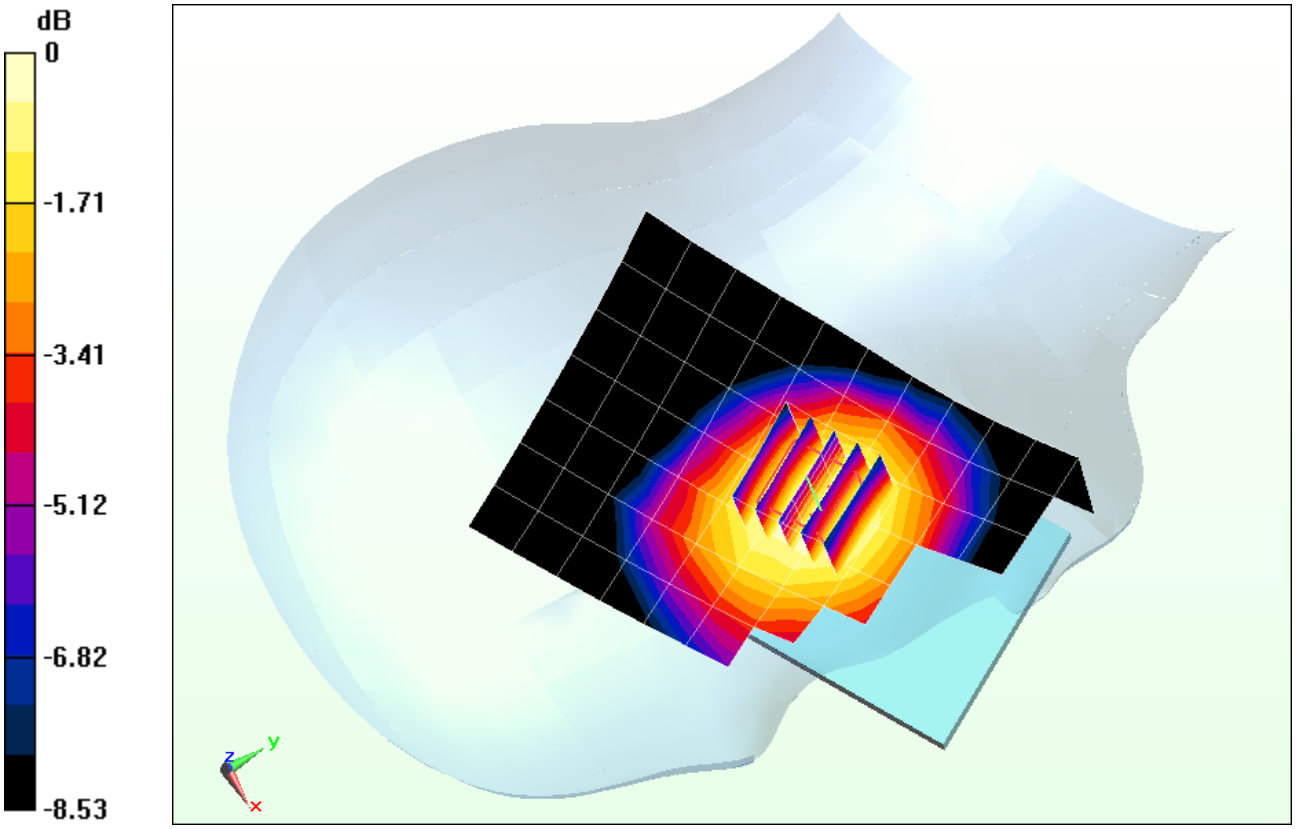
Communication System: GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium: 835 Head; Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.905$ mho/m; $\varepsilon_r = 42.608$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 09-25-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3213; ConvF(6.07, 6.07, 6.07); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

Mode: GPRS 850, Right Head, Cheek, Mid.ch, 2Tx Slots

Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.722 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.476 mW/g
SAR(1 g) = 0.398 mW/g; SAR(10 g) = 0.306 mW/g



0 dB = 0.420 mW/g = -7.54 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

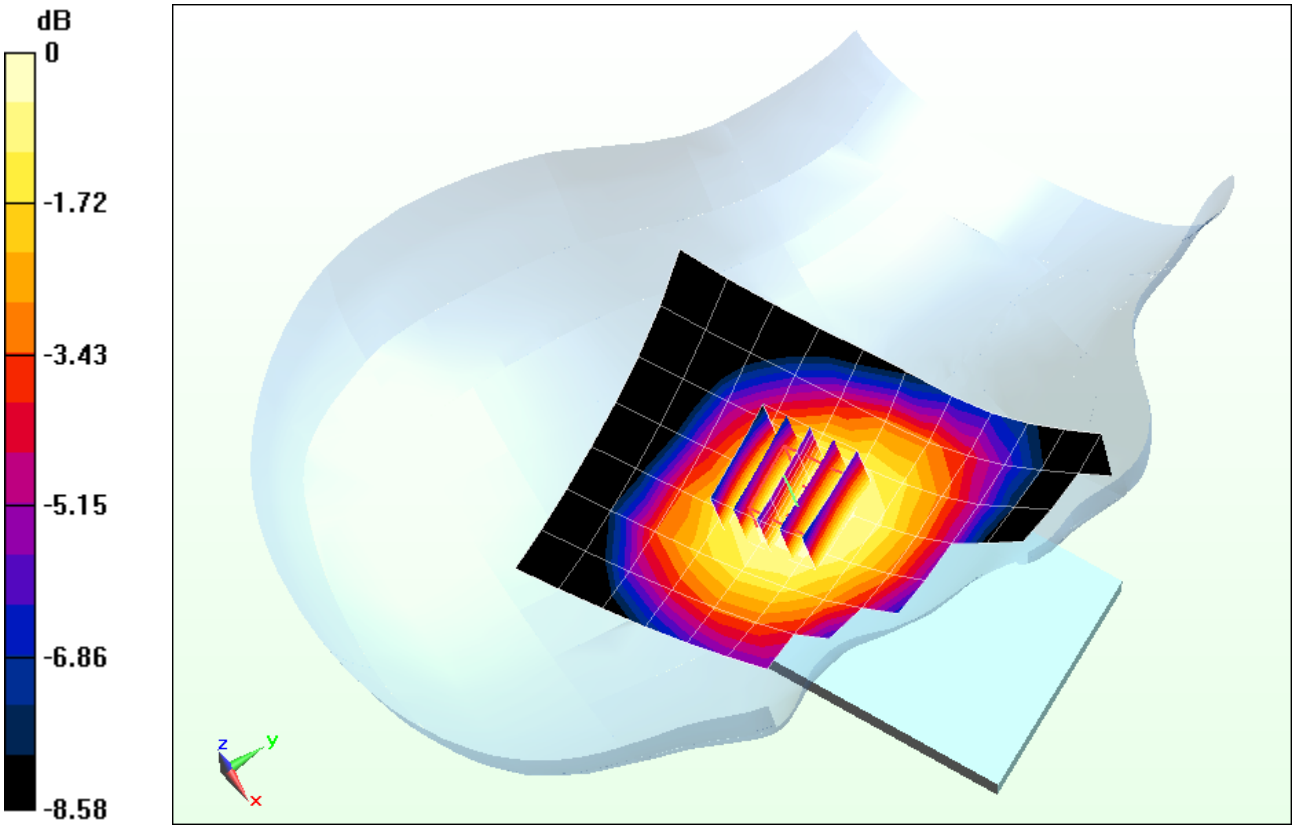
Communication System: GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium: 835 Head; Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.905$ mho/m; $\varepsilon_r = 42.608$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 09-25-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3213; ConvF(6.07, 6.07, 6.07); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

Mode: GPRS 850, Right Head, Tilt, Mid.ch, 2 Tx Slots

Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.667 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.282 mW/g
SAR(1 g) = 0.238 mW/g; SAR(10 g) = 0.186 mW/g



0 dB = 0.248 mW/g = -12.11 dB mW/g

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DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

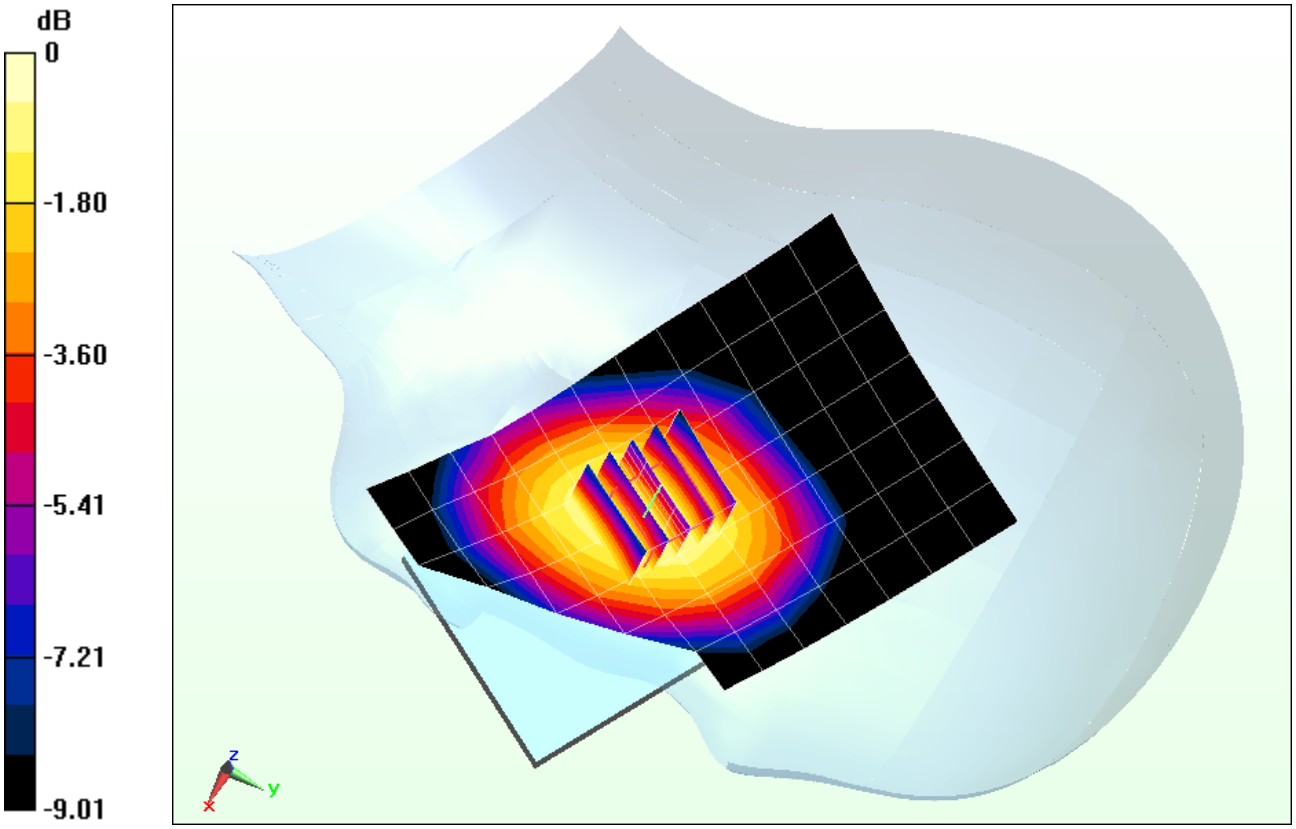
Communication System: GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium: 835 Head; Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.905$ mho/m; $\varepsilon_r = 42.608$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 09-25-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3213; ConvF(6.07, 6.07, 6.07); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

Mode: GPRS 850, Left Head, Cheek, Mid.ch, 2 Tx Slots

Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.167 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.621 mW/g
SAR(1 g) = 0.497 mW/g; SAR(10 g) = 0.383 mW/g



0 dB = 0.522 mW/g = -5.65 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

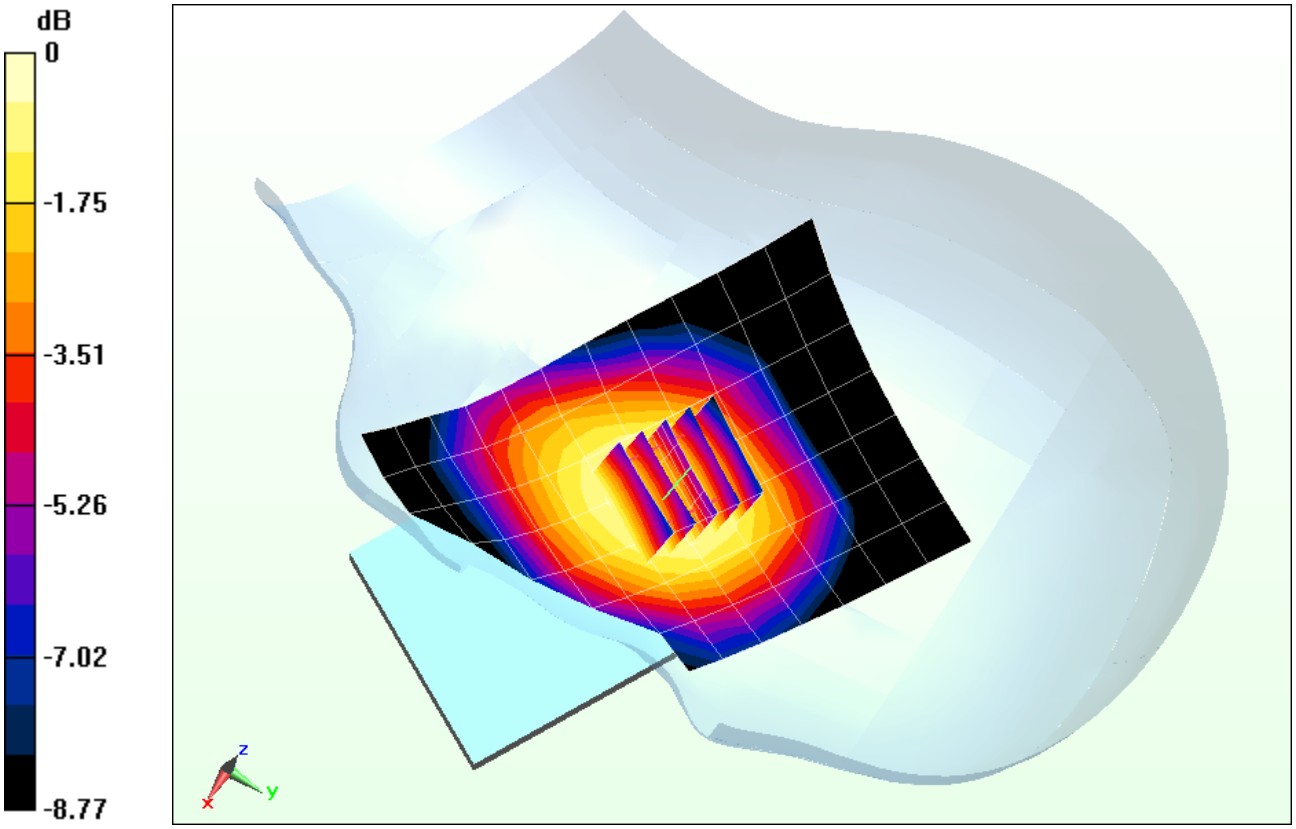
Communication System: GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium: 835 Head; Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.905$ mho/m; $\varepsilon_r = 42.608$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 09-25-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3213; ConvF(6.07, 6.07, 6.07); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

Mode: GPRS 850, Left Head, Tilt, Mid.ch, 2 Tx slots

Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.961 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.302 mW/g
SAR(1 g) = 0.248 mW/g; SAR(10 g) = 0.193 mW/g



0 dB = 0.258 mW/g = -11.77 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

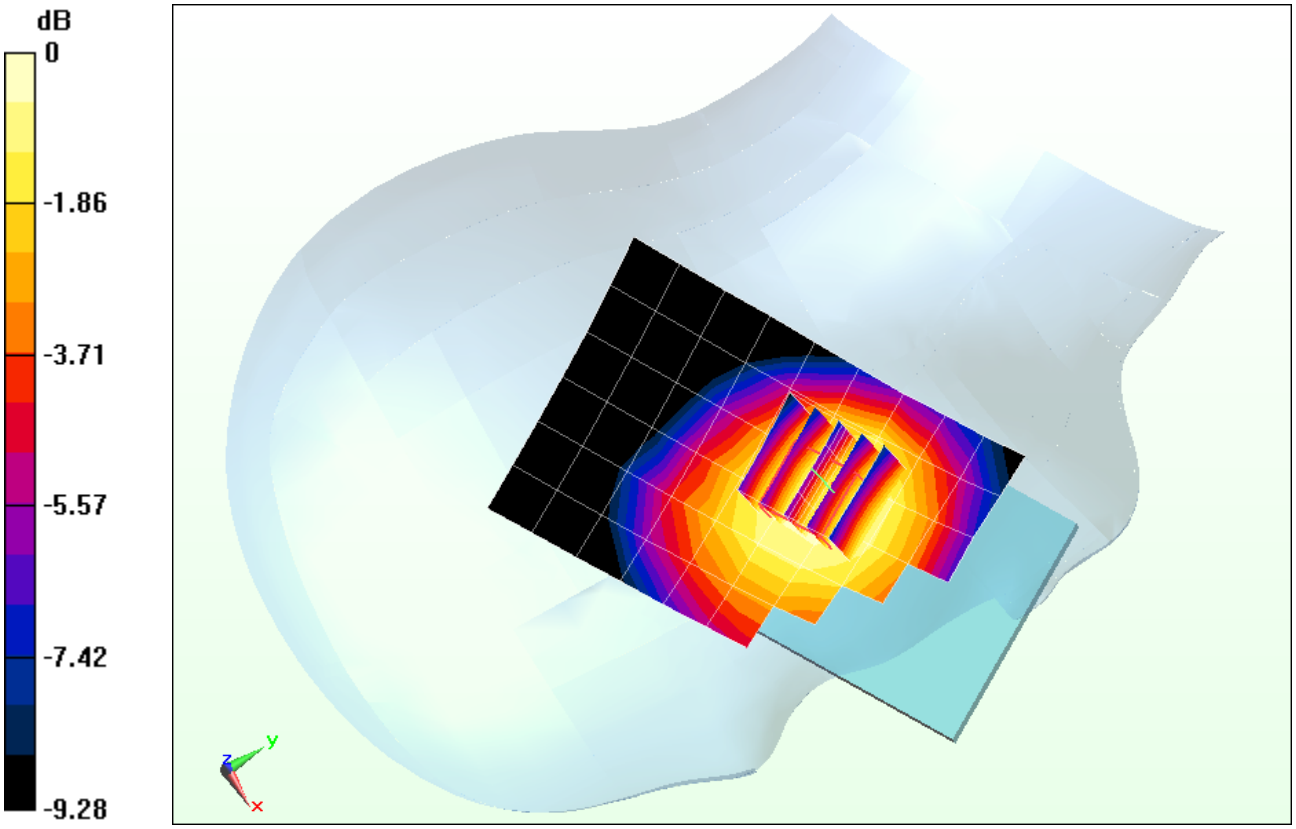
Communication System: WCDMA; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.893$ mho/m; $\varepsilon_r = 41.248$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 09-21-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3213; ConvF(6.07, 6.07, 6.07); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 850, Right Head, Cheek, 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 = 20.052 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.419 mW/g
SAR(1 g) = 0.347 mW/g; SAR(10 g) = 0.265 mW/g



0 dB = 0.361 mW/g = -8.85 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

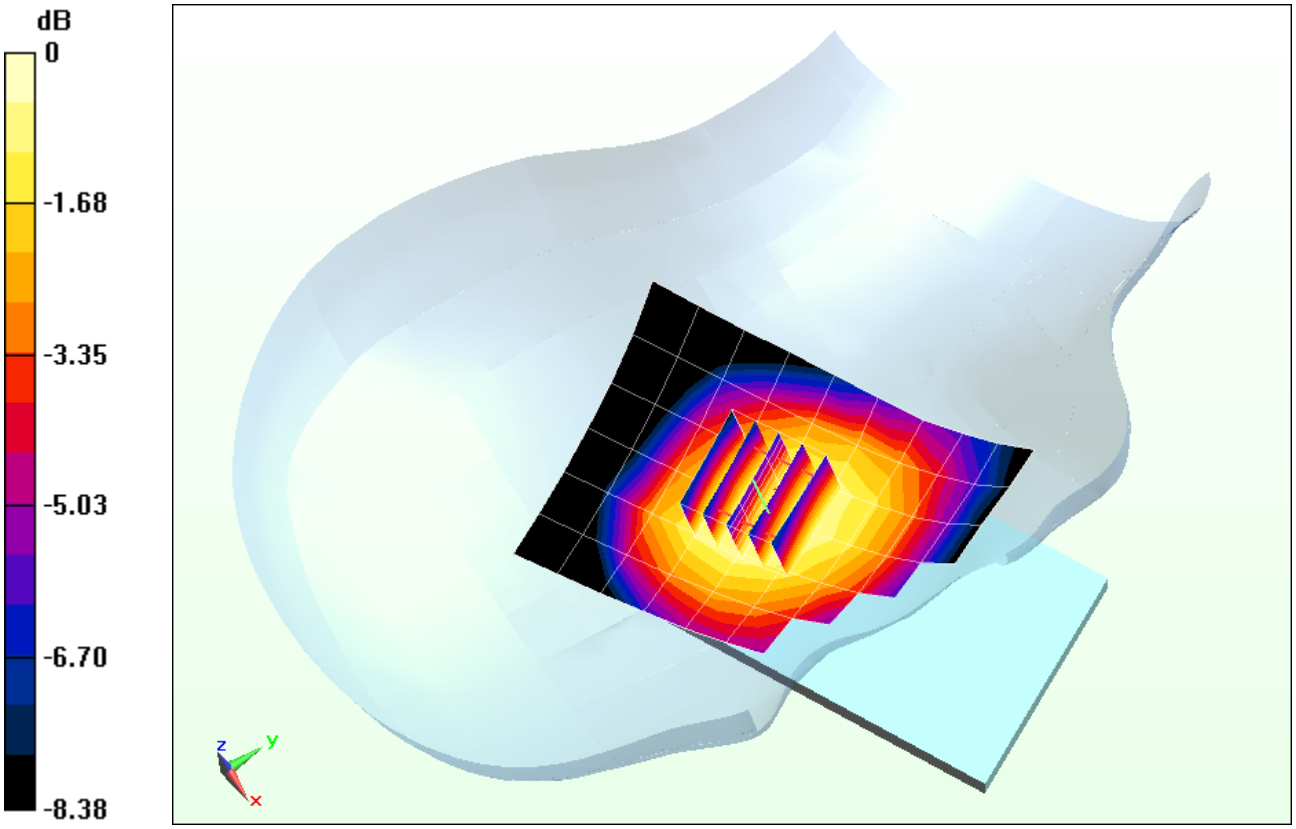
Communication System: WCDMA; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.893$ mho/m; $\varepsilon_r = 41.248$; $\rho = 1000$ kg/m^3
Phantom section: Right Section

Test Date: 09-21-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3213; ConvF(6.07, 6.07, 6.07); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (1);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 = 17.219 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.294 mW/g
SAR(1 g) = 0.244 mW/g; SAR(10 g) = 0.188 mW/g



0 dB = 0.256 mW/g = -11.84 dB mW/g

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DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

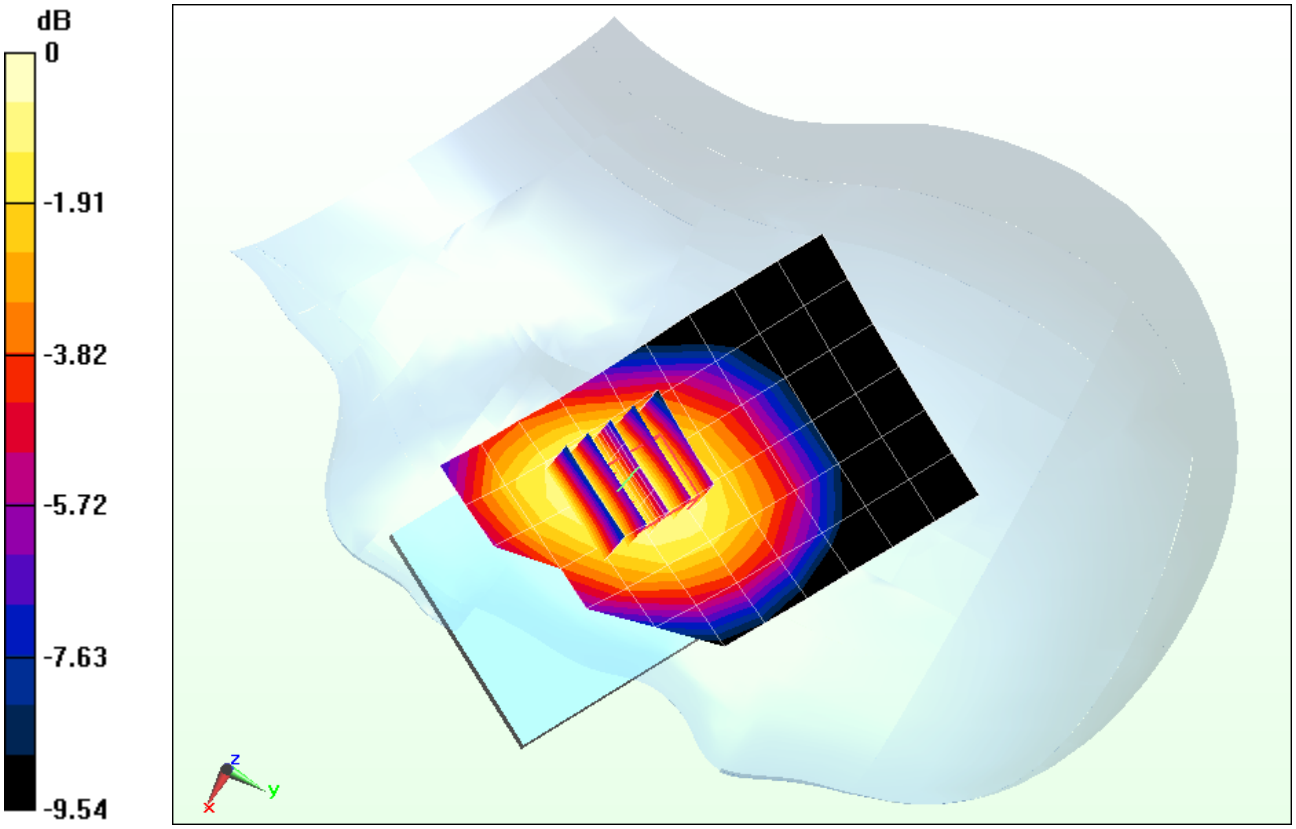
Communication System: WCDMA; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.893$ mho/m; $\varepsilon_r = 41.248$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 09-21-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3213; ConvF(6.07, 6.07, 6.07); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 850, Left Head, Cheek, 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 = 23.169 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.561 mW/g
SAR(1 g) = 0.442 mW/g; SAR(10 g) = 0.335 mW/g



0 dB = 0.466 mW/g = -6.63 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

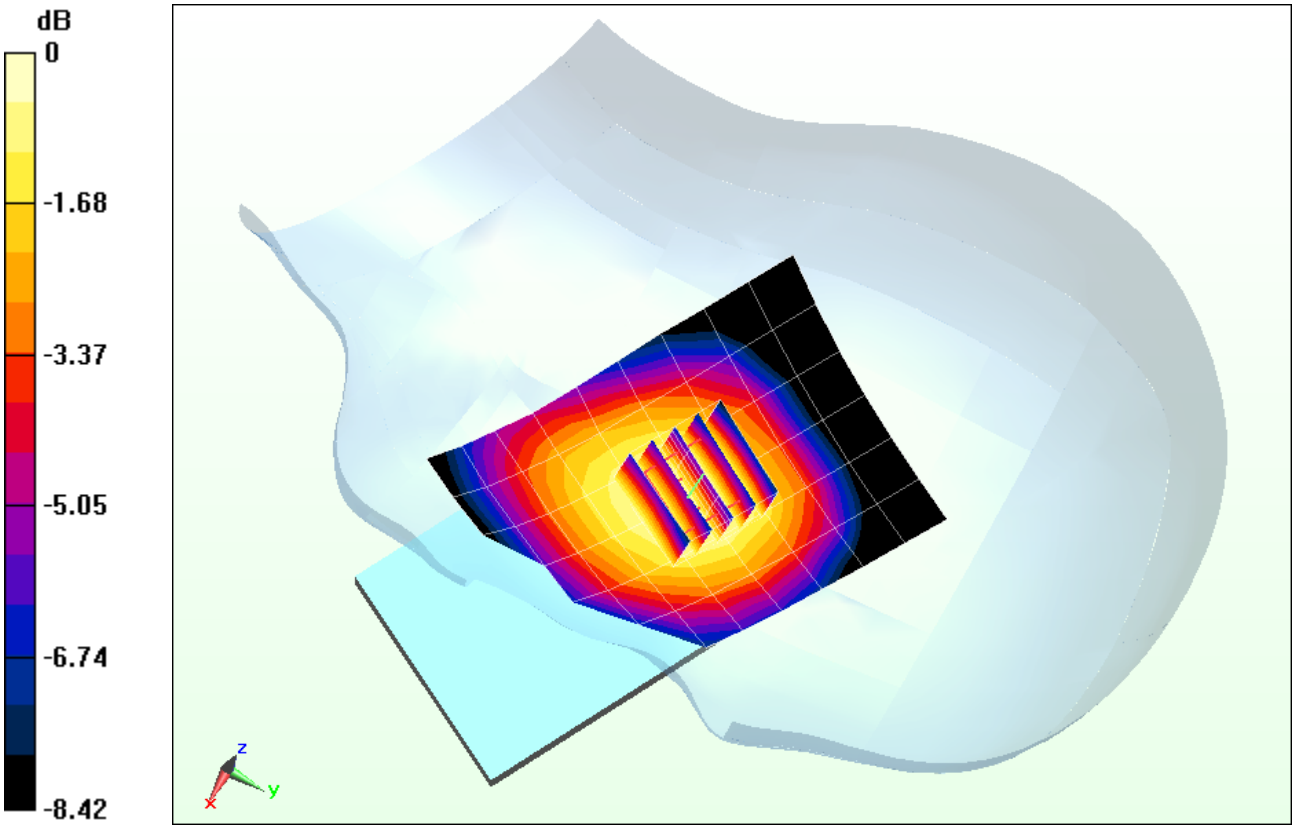
Communication System: WCDMA; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used (interpolated):
$f = 836.6$ MHz; $\sigma = 0.893$ mho/m; $\varepsilon_r = 41.248$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 09-21-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3213; ConvF(6.07, 6.07, 6.07); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 850, Left 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 = 17.505 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.303 mW/g
SAR(1 g) = 0.251 mW/g; SAR(10 g) = 0.194 mW/g



0 dB = 0.265 mW/g = -11.54 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

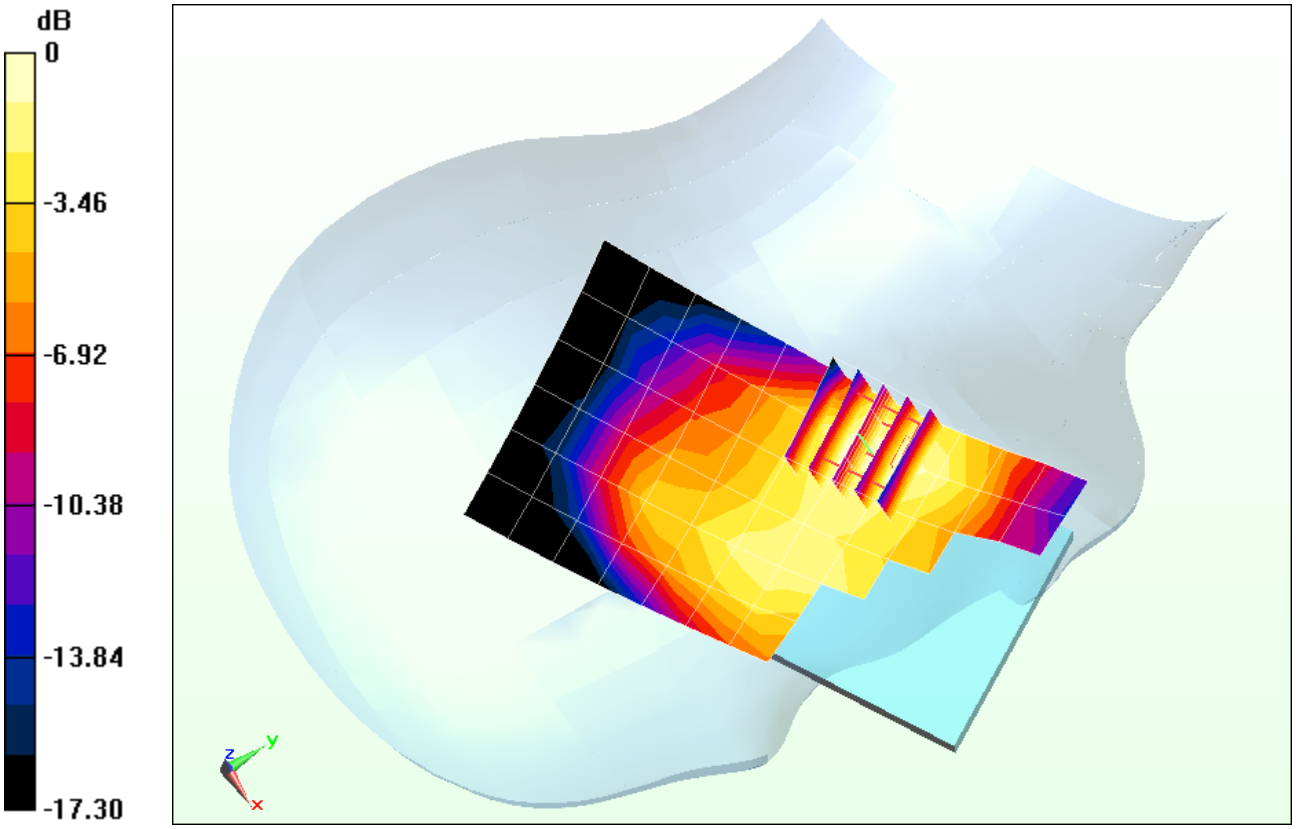
Communication System: GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium: 1900 Head; Medium parameters used:
f = 1880 MHz; σ = 1.42 mho/m; ε_r = 39.97; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-21-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3263; ConvF(5.09, 5.09, 5.09); Calibrated: 5/18/2012;
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 (1);SEMCAD X Version 14.6.5 (6469)

Mode: GPRS 1900, Right Head, Cheek, Mid.ch, 2 Tx slots

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.791 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.392 mW/g
SAR(1 g) = 0.253 mW/g; SAR(10 g) = 0.158 mW/g



0 dB = 0.263 mW/g = -11.60 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

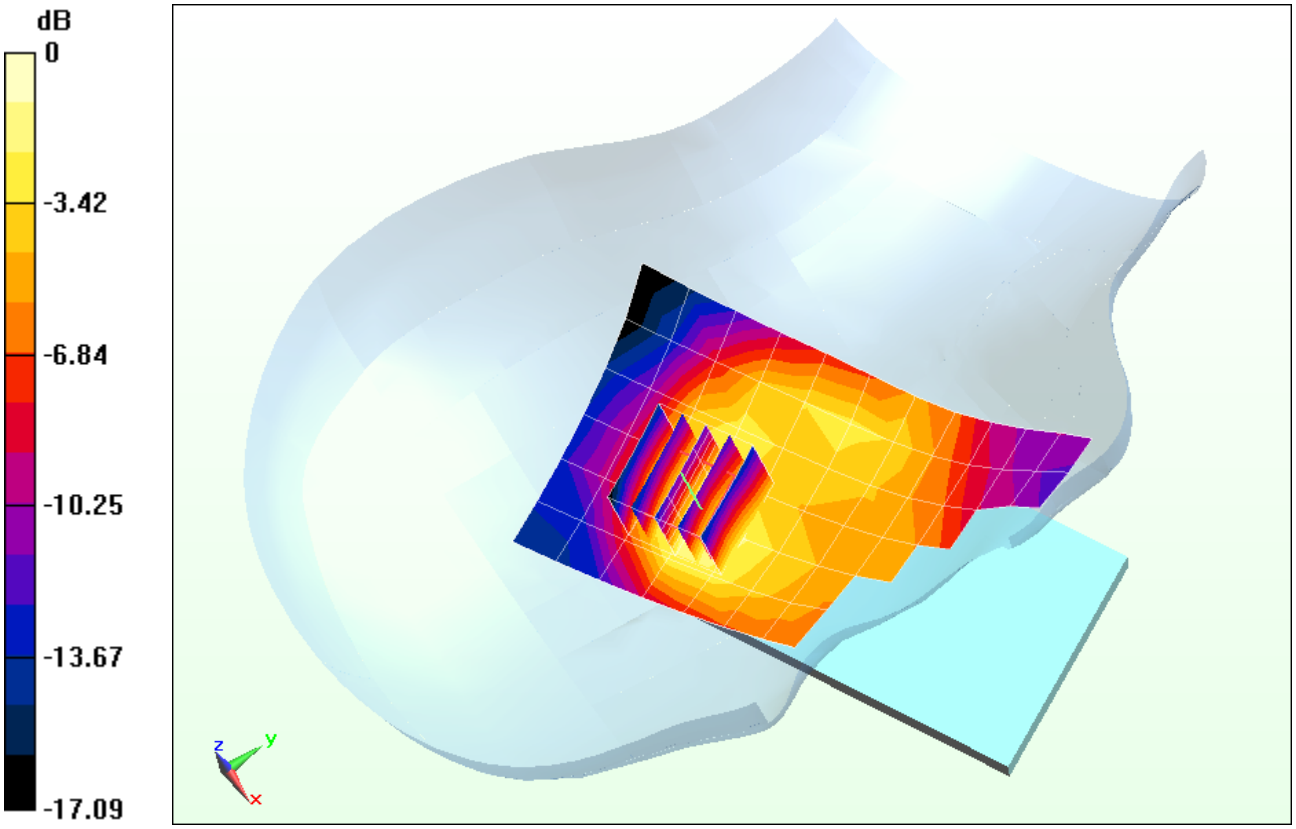
Communication System: GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium: 1900 Head; Medium parameters used:
f = 1880 MHz; σ = 1.42 mho/m; ε_r = 39.97; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-21-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3263; ConvF(5.09, 5.09, 5.09); Calibrated: 5/18/2012;
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 (1);SEMCAD X Version 14.6.5 (6469)

Mode: GPRS 1900, Right Head, Tilt, Mid.ch, 2 Tx slots

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.121 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.213 mW/g
SAR(1 g) = 0.129 mW/g; SAR(10 g) = 0.074 mW/g



0 dB = 0.135 mW/g = -17.39 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

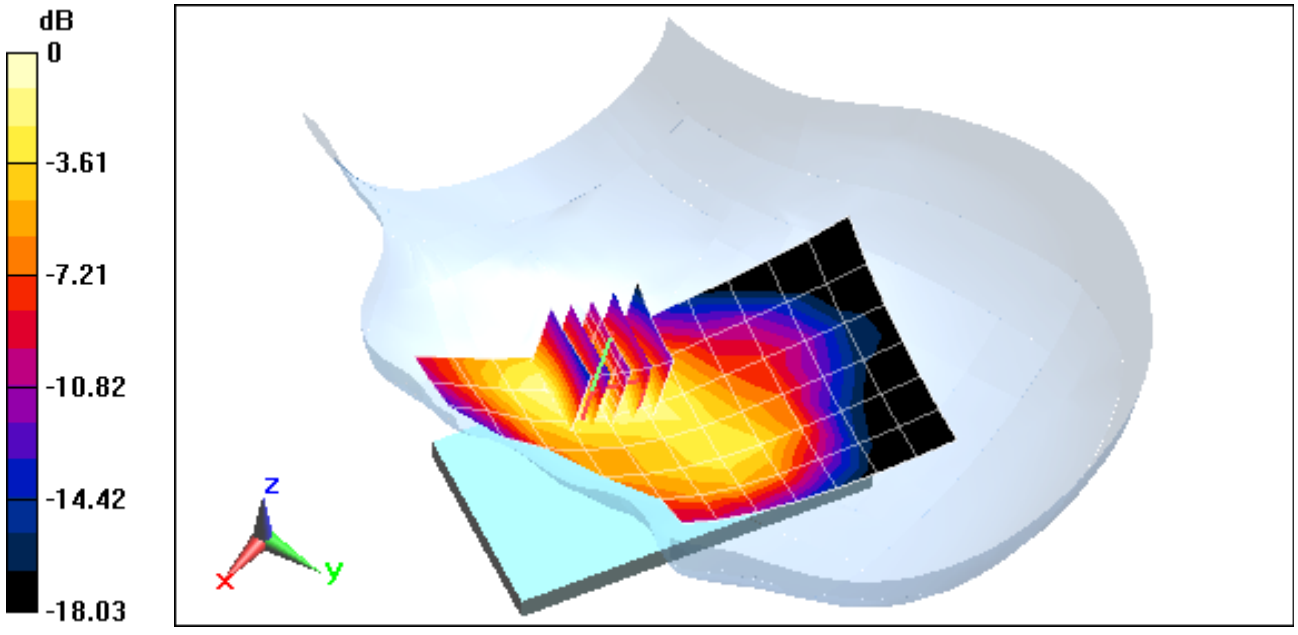
Communication System: GSM GPRS; 2 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.42 mho/m; ε_r = 39.97; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-21-2012; Ambient Temp: 21.9°C; Tissue Temp: 23.5°C

Probe: ES3DV3 - SN3263; ConvF(5.09, 5.09, 5.09); Calibrated: 5/18/2012;
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 (1); SEMCAD X Version 14.6.5 (6469)

Mode: GPRS 1900, Left Head, Cheek, Mid.ch, 2 Tx slots

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.914 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.649 mW/g
SAR(1 g) = 0.408 mW/g; SAR(10 g) = 0.250 mW/g



0 dB = 0.442 mW/g = -7.09 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

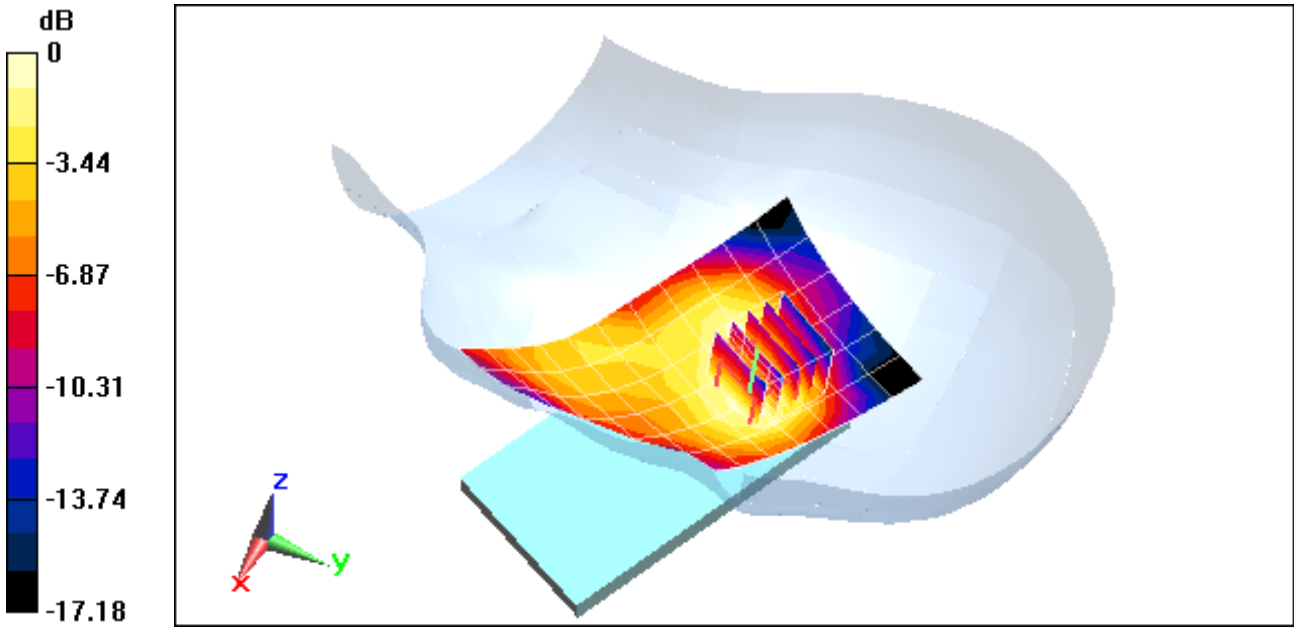
Communication System: GSM GPRS; 2 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium: 1900 Head Medium parameters used
f = 1880 MHz; σ = 1.42 mho/m; ε_r = 39.97; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-21-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3263; ConvF(5.09, 5.09, 5.09); Calibrated: 5/18/2012;
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 (1); SEMCAD X Version 14.6.5 (6469)

Mode: GPRS 1900, Left Head, Tilt, Mid.ch, 2 Tx slots

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.284 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.168 mW/g
SAR(1 g) = 0.111 mW/g; SAR(10 g) = 0.072 mW/g



0 dB = 0.116 mW/g = -18.71 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

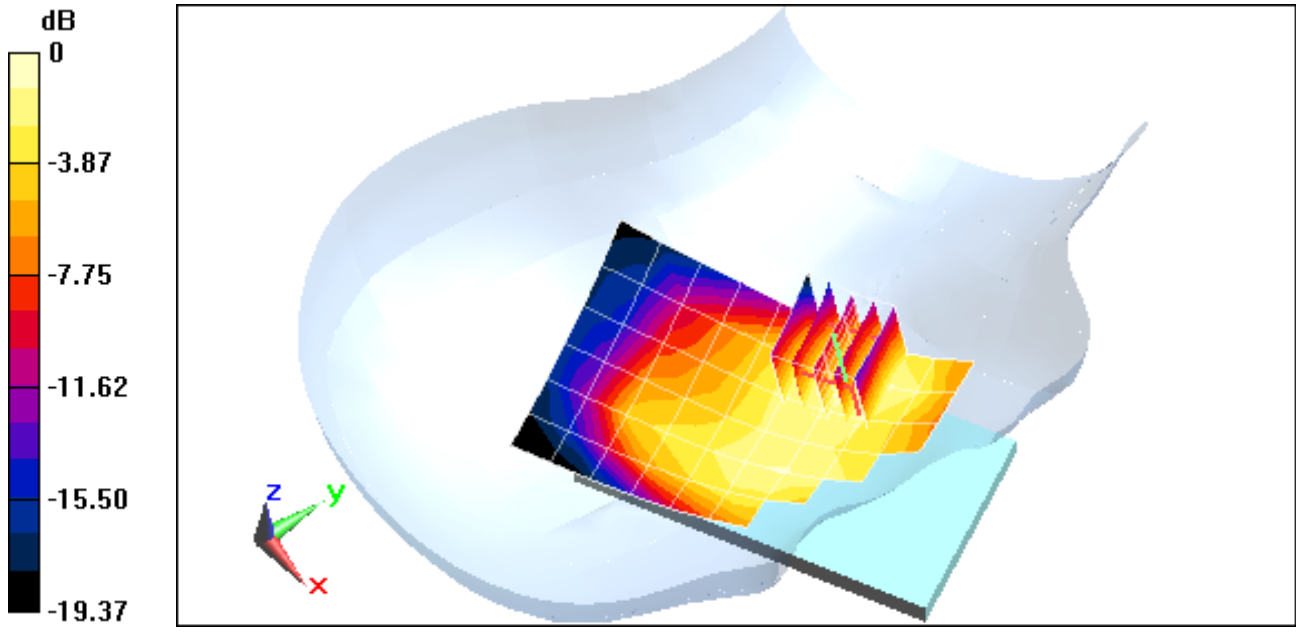
Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.42 mho/m; ε_r = 39.97; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-21-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3263; ConvF(5.09, 5.09, 5.09); Calibrated: 5/18/2012;
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 (1); SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 1900, Right Head, Cheek, 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 = 17.264 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.565 mW/g
SAR(1 g) = 0.373 mW/g; SAR(10 g) = 0.237 mW/g



0 dB = 0.402 mW/g = -7.92 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

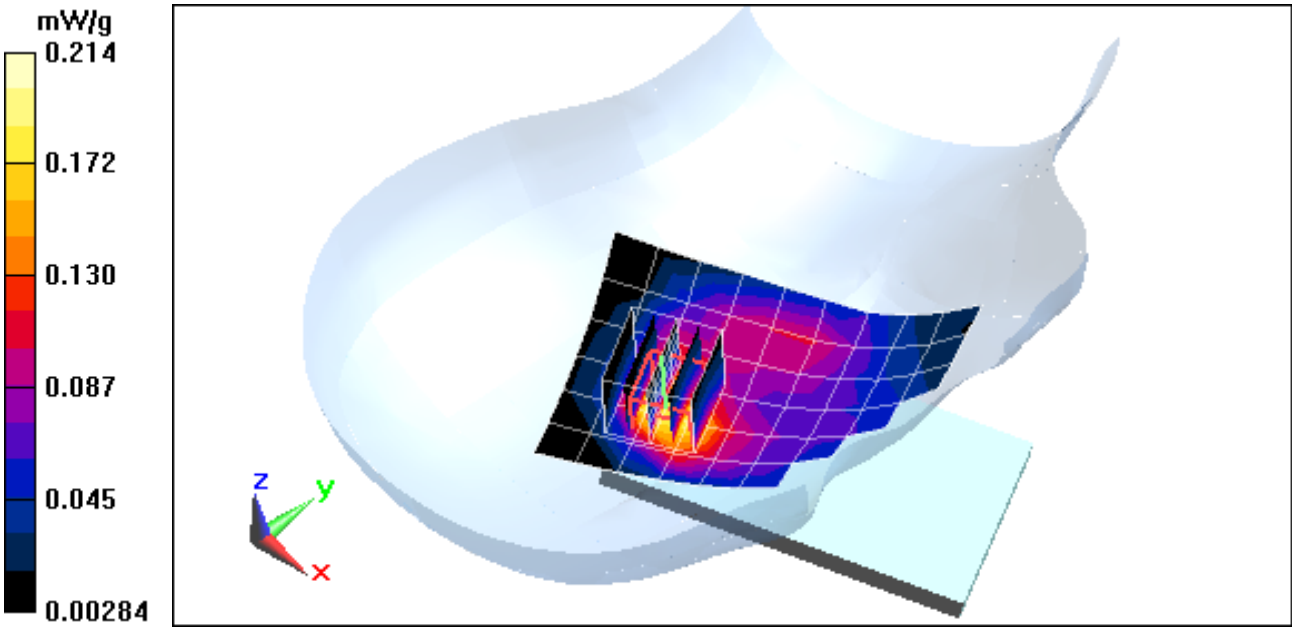
Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.42 mho/m; ε_r = 39.97; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-21-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3263; ConvF(5.09, 5.09, 5.09); Calibrated: 5/18/2012;
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 (1); SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 1900, 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 = 11.467 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.332 mW/g
SAR(1 g) = 0.197 mW/g; SAR(10 g) = 0.114 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

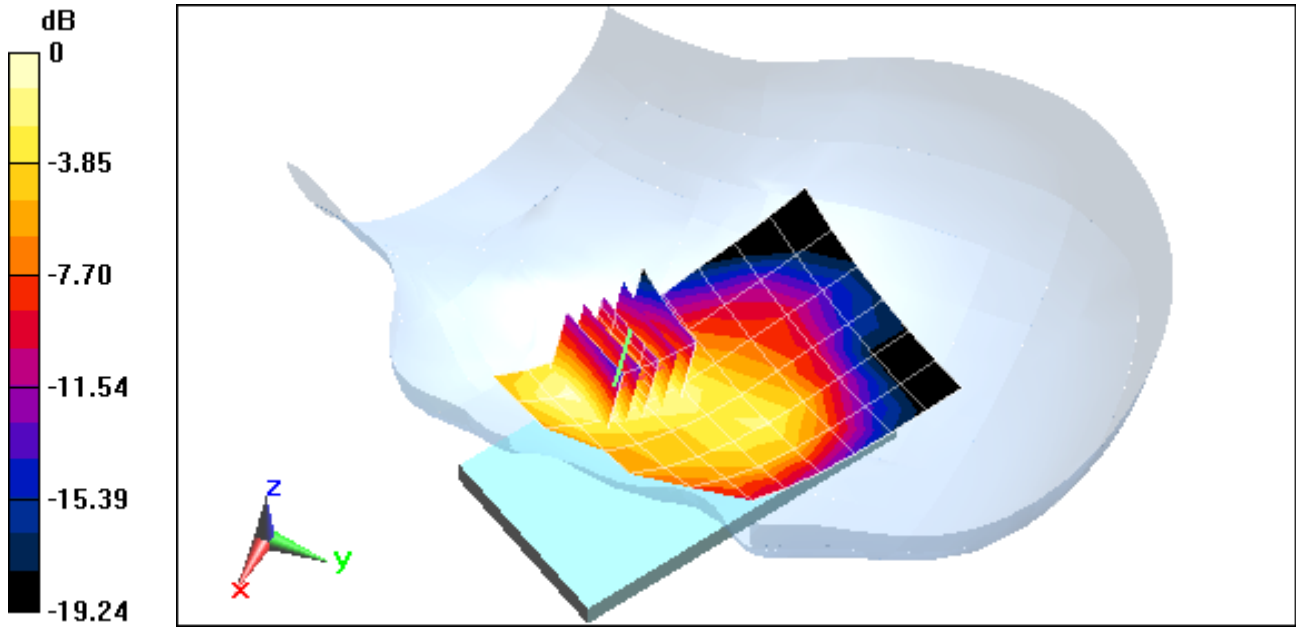
Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.42 mho/m; ε_r = 39.97; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-21-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3263; ConvF(5.09, 5.09, 5.09); Calibrated: 5/18/2012;
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 (1); SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 1900, Left Head, Cheek, 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 = 20.614 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.845 mW/g
SAR(1 g) = 0.545 mW/g; SAR(10 g) = 0.339 mW/g



0 dB = 0.587 mW/g = -4.63 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

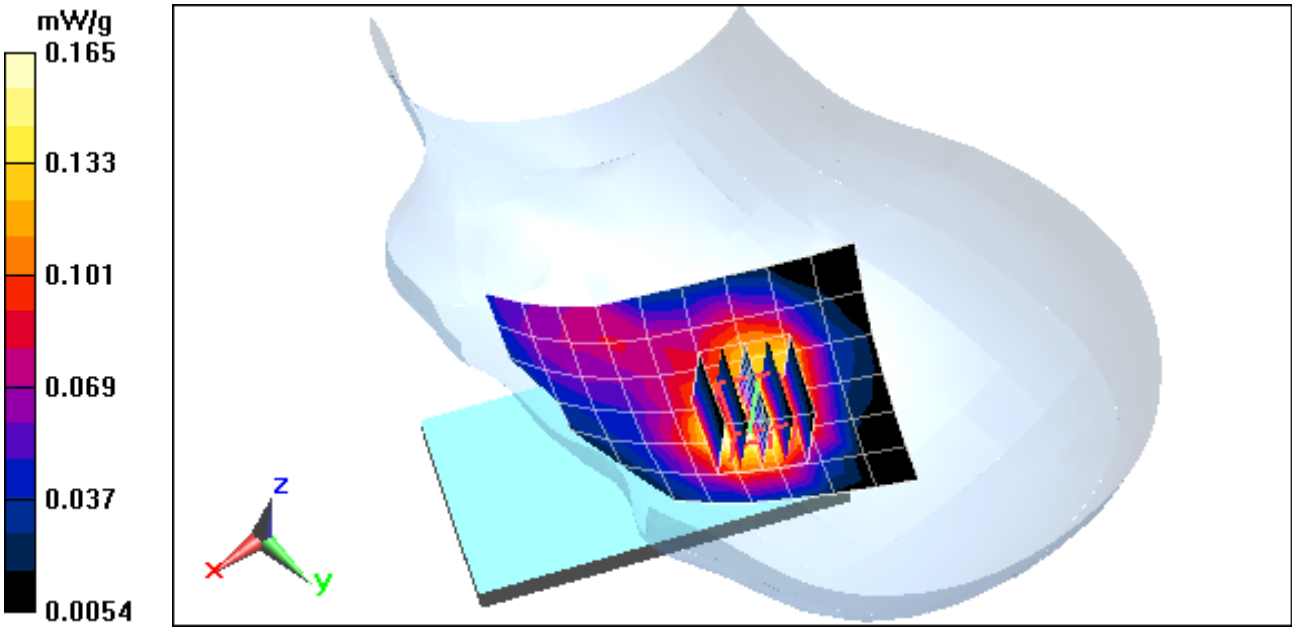
Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used:
f = 1880 MHz; σ = 1.42 mho/m; ε_r = 39.97; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-21-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3263; ConvF(5.09, 5.09, 5.09); Calibrated: 5/18/2012;
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 (1); SEMCAD X Version 14.6.5 (6469)

Mode: WCDMA 1900, Left 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 = 10.867 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.235 mW/g
SAR(1 g) = 0.156 mW/g; SAR(10 g) = 0.101 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 1

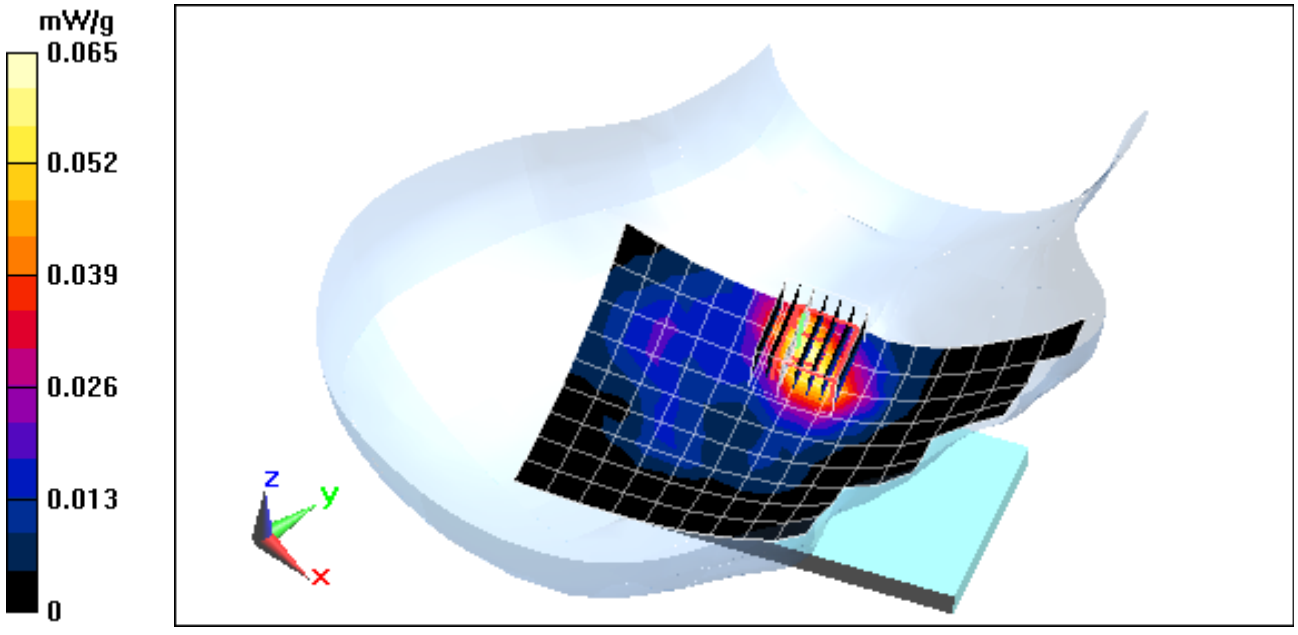
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; σ = 1.881 mho/m; ε_r = 37.779; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-26-2012; Ambient Temp: 24.5°C; Tissue Temp: 23.6°C

Probe: ES3DV3 - SN3209; ConvF(4.46, 4.46, 4.46); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.559 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.104 mW/g
SAR(1 g) = 0.052 mW/g; SAR(10 g) = 0.027 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 1

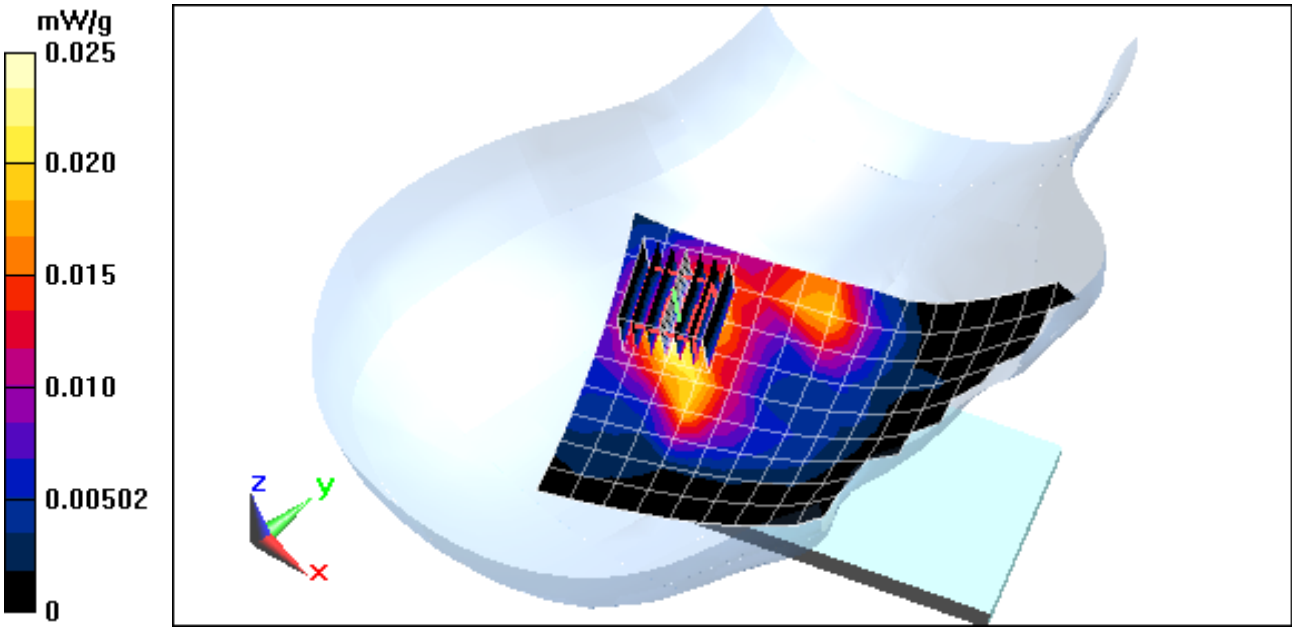
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; σ = 1.881 mho/m; ε_r = 37.779; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-26-2012; Ambient Temp: 24.5°C; Tissue Temp: 23.6°C

Probe: ES3DV3 - SN3209; ConvF(4.46, 4.46, 4.46); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
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 (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.465 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.037 mW/g
SAR(1 g) = 0.020 mW/g; SAR(10 g) = 0.011 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 1

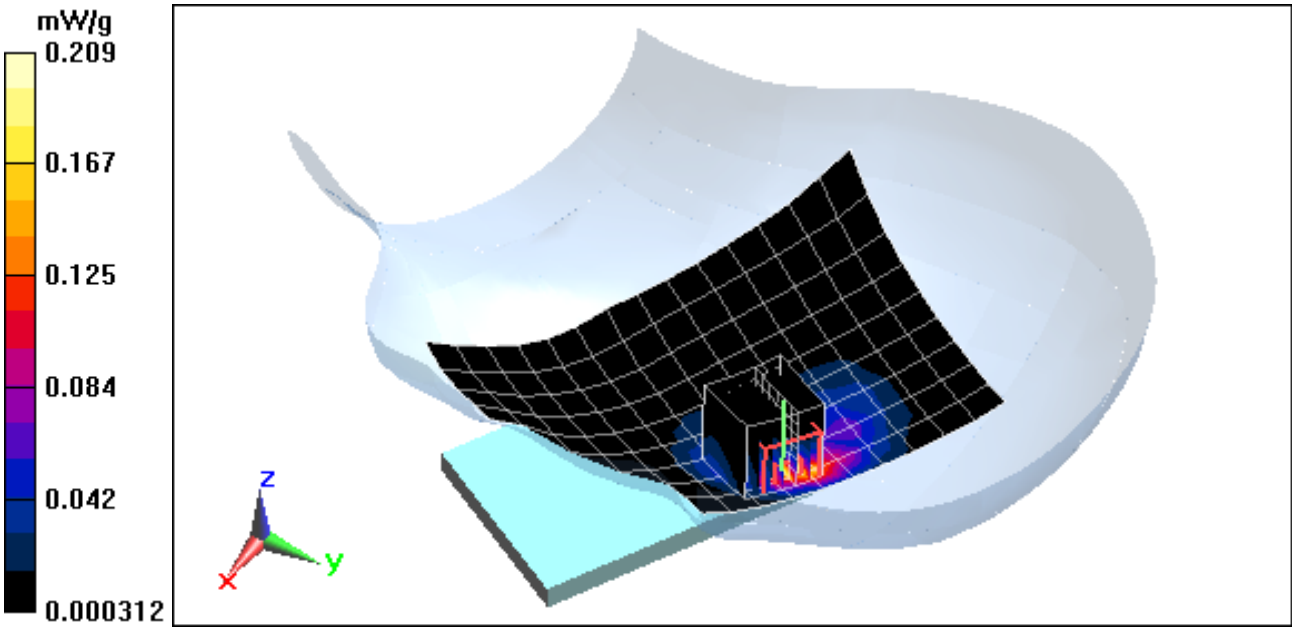
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; σ = 1.881 mho/m; ε_r = 37.779; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-26-2012; Ambient Temp: 24.5°C; Tissue Temp: 23.6°C

Probe: ES3DV3 - SN3209; ConvF(4.46, 4.46, 4.46); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11b, Left Head, Cheek, 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 = 9.551 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.421 mW/g
SAR(1 g) = 0.153 mW/g; SAR(10 g) = 0.067 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 1

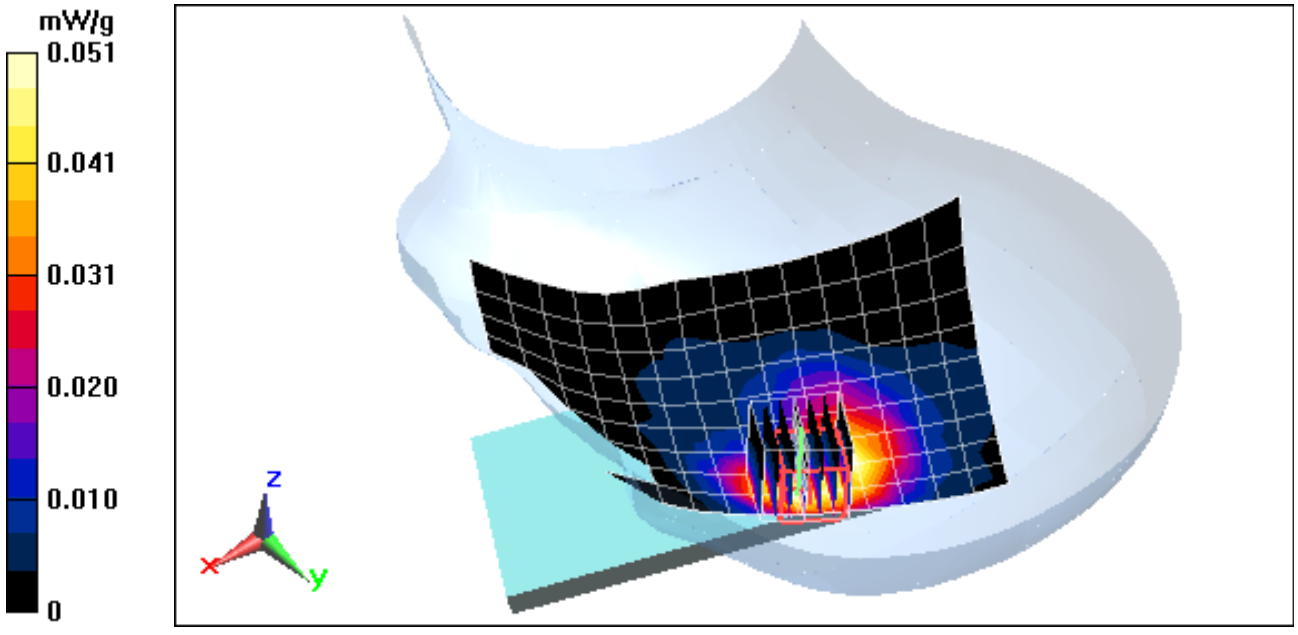
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
f = 2462 MHz; σ = 1.881 mho/m; ε_r = 37.779; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-26-2012; Ambient Temp: 24.5°C; Tissue Temp: 23.6°C

Probe: ES3DV3 - SN3209; ConvF(4.46, 4.46, 4.46); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
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 = 4.999 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.081 mW/g
SAR(1 g) = 0.040 mW/g; SAR(10 g) = 0.021 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 25

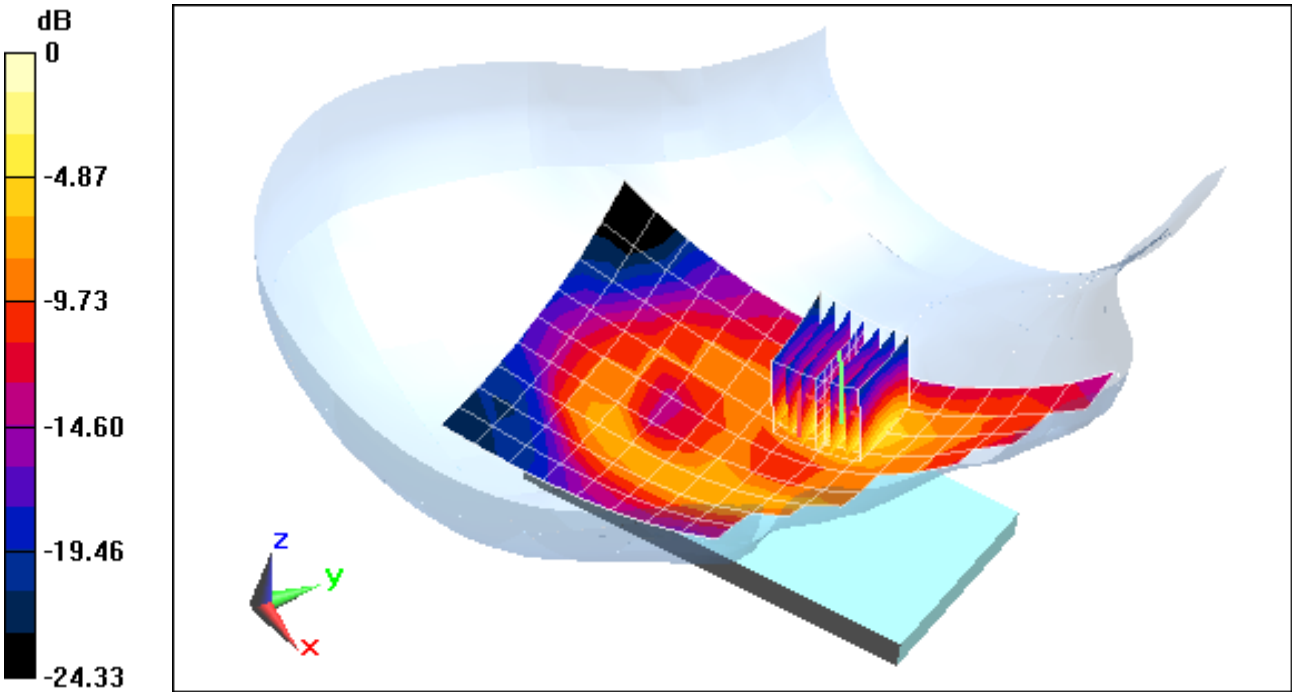
Communication System: LTE Band 7; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium: 2600 Head Medium parameters used (interpolated):
f = 2535 MHz; σ = 1.974 mho/m; ε_r = 38.212; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 10-09-2012; Ambient Temp: 23.9°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.3, 4.3, 4.3); Calibrated: 3/16/2012;
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: LTE Band 7, Right Head, Cheek, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.422 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.605 mW/g
SAR(1 g) = 0.332 mW/g; SAR(10 g) = 0.169 mW/g



0 dB = 0.600 mW/g = -4.44 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 25

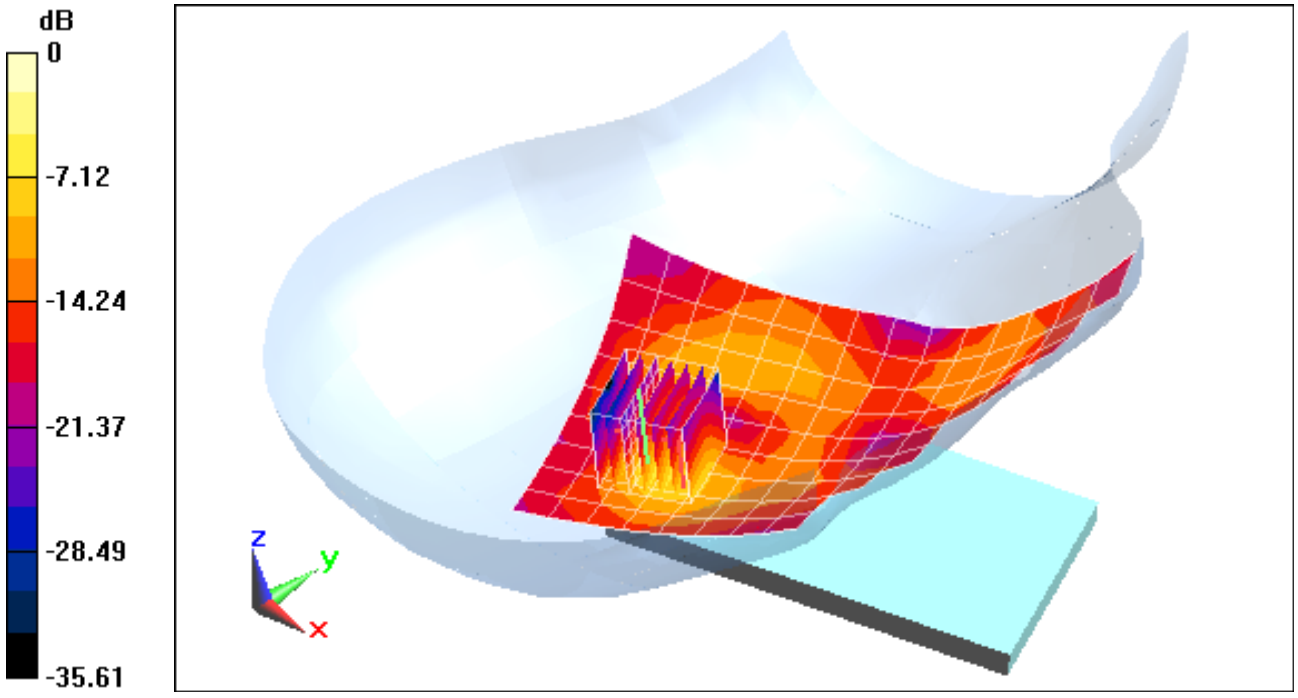
Communication System: LTE Band 7; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium: 2600 Head, Medium parameters used (interpolated):
f = 2535 MHz; σ = 1.974 mho/m; ε_r = 38.212; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 10-09-2012; Ambient Temp: 23.9°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.3, 4.3, 4.3); Calibrated: 3/16/2012;
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: LTE Band 7, Right Head, Tilt, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.507 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.403 mW/g
SAR(1 g) = 0.197 mW/g; SAR(10 g) = 0.094 mW/g



0 dB = 0.600 mW/g = -4.44 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 25

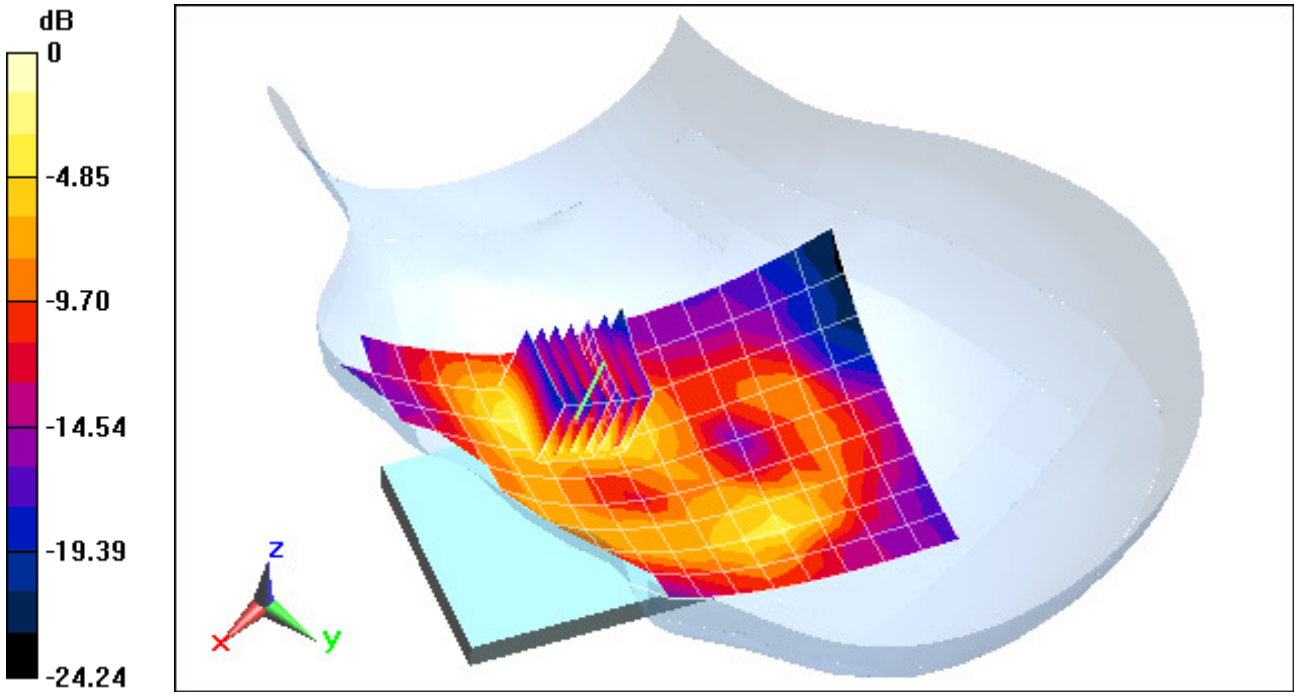
Communication System: LTE Band 7; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium: 2600 Head Medium parameters used (interpolated):
f = 2535 MHz; σ = 1.974 mho/m; ε_r = 38.212; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 10-09-2012; Ambient Temp: 23.9°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.3, 4.3, 4.3); Calibrated: 3/16/2012;
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: LTE Band 7, Left Head, Cheek, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.038 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.691 mW/g
SAR(1 g) = 0.373 mW/g; SAR(10 g) = 0.189 mW/g



0 dB = 0.469 mW/g = -6.58 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 25

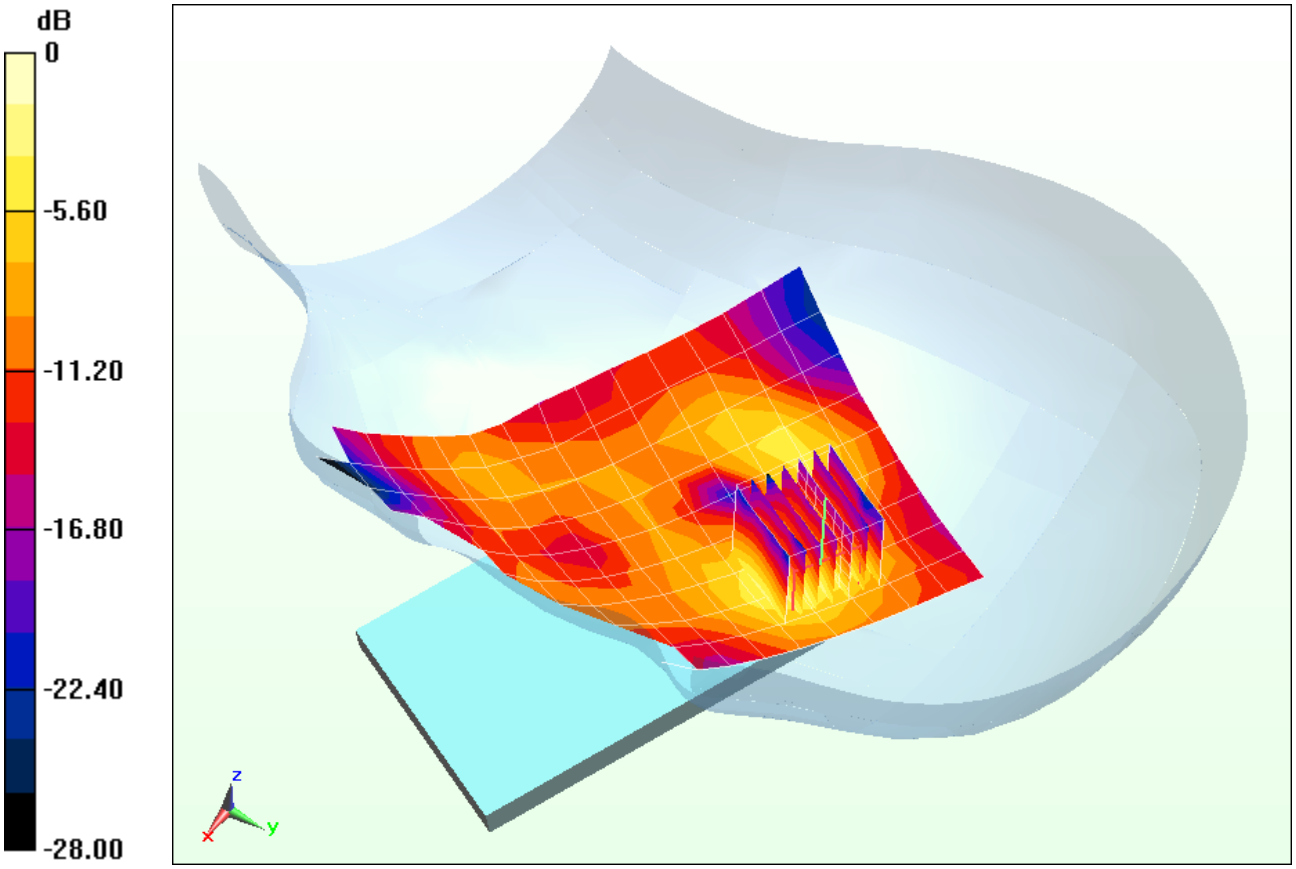
Communication System: LTE BAND 7; Frequency: 2535 MHz; Duty Cycle: 1:1
Medium: 2600 Head; Medium parameters used (interpolated):
$f = 2535$ MHz; $\sigma = 1.974$ mho/m; $\varepsilon_r = 38.212$; $\rho = 1000$ kg/m^3
Phantom section: Left Section

Test Date: 10-09-2012; Ambient Temp: 23.9°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.3, 4.3, 4.3); Calibrated: 3/16/2012;
Sensor-Surface: 4mm (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: LTE Band 7, Left Head, Tilt, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x17x1): Measurement grid: dx = 12mm, dy = 12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.264 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.280 W/kg
SAR(1 g) = 0.148 W/kg; SAR(10 g) = 0.076 W/kg



0 dB = 0.190 W/kg = -7.21 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 2

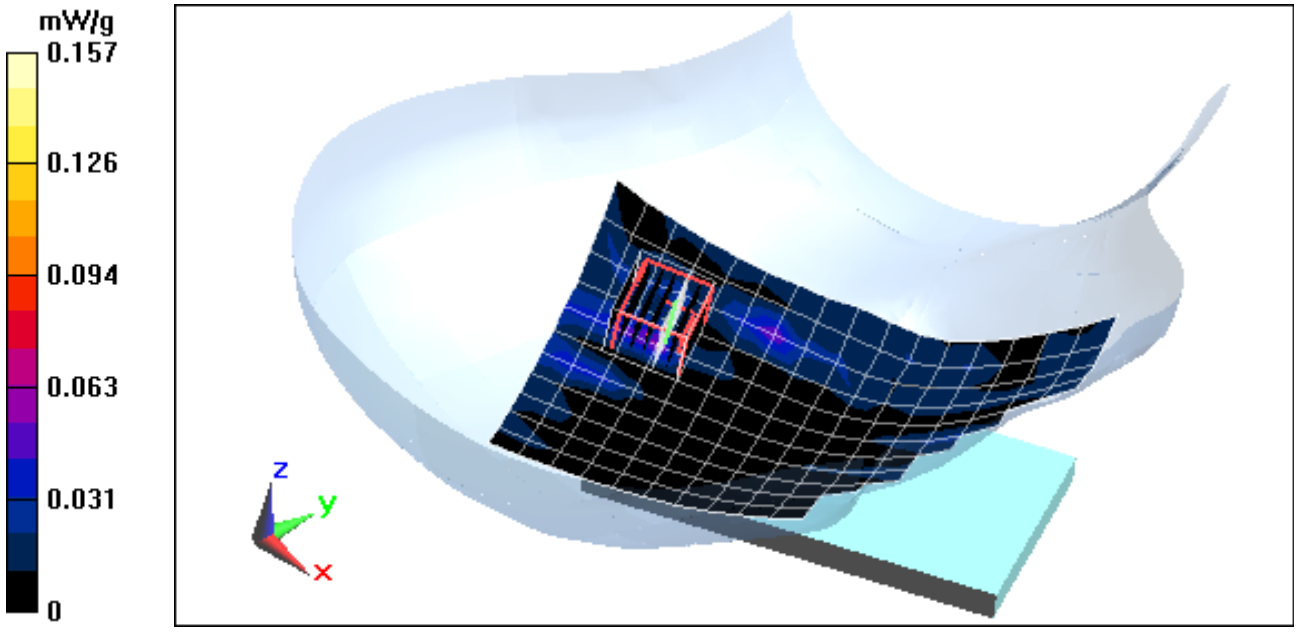
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: 5GHz Head, Medium parameters used:
f = 5260 MHz; σ = 4.618 mho/m; ε_r = 36.11; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-24-2012; Ambient Temp: 22.7°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3589; ConvF(4.36, 4.36, 4.36); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Mode: IEEE 802.11a 5.3 GHz, Right Head, Cheek, Ch 52, 6 Mbps

Area Scan (12x17x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 4.005 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.233 mW/g
SAR(1 g) = 0.081 mW/g; SAR(10 g) = 0.020 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 2

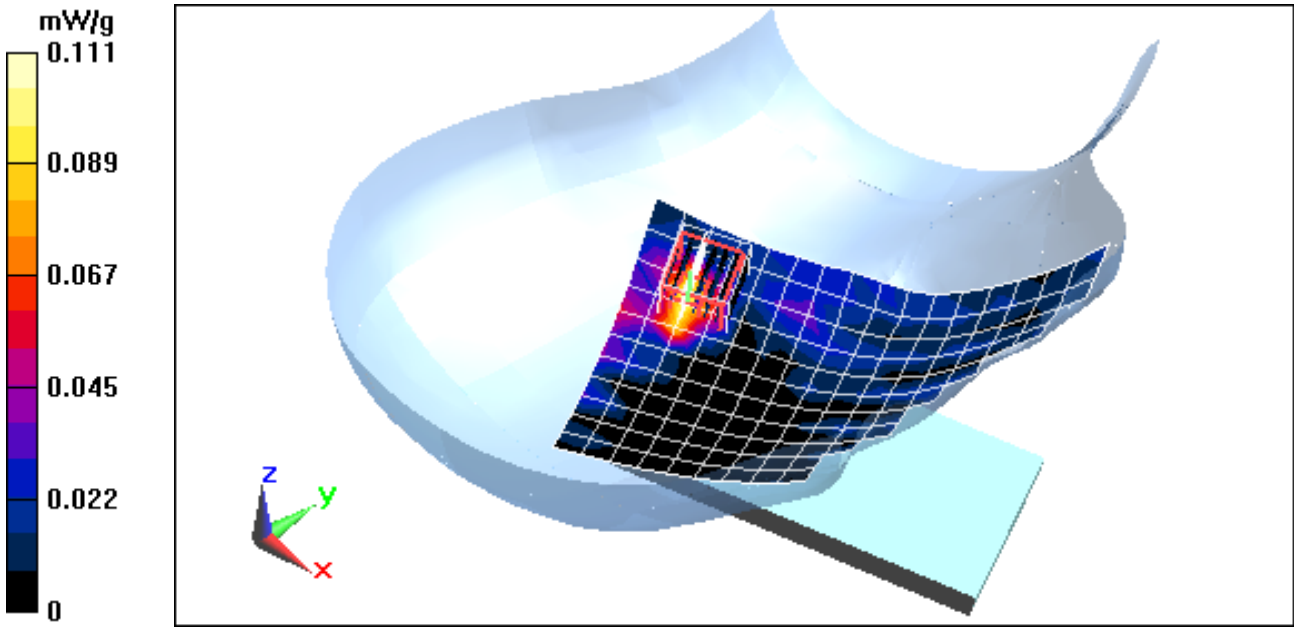
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: 5GHz Head Medium parameters used:
f = 5260 MHz; σ = 4.618 mho/m; ε_r = 36.11; ρ = 1000 kg/m^3
Phantom section: Right Section

Test Date: 09-24-2012; Ambient Temp: 22.7°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3589; ConvF(4.36, 4.36, 4.36); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
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 802.11a 5.3 GHz, Right Head, Tilt, Ch 52, 6 Mbps

Area Scan (12x17x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.864 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.151 mW/g
SAR(1 g) = 0.069 mW/g; SAR(10 g) = 0.020 mW/g



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 2

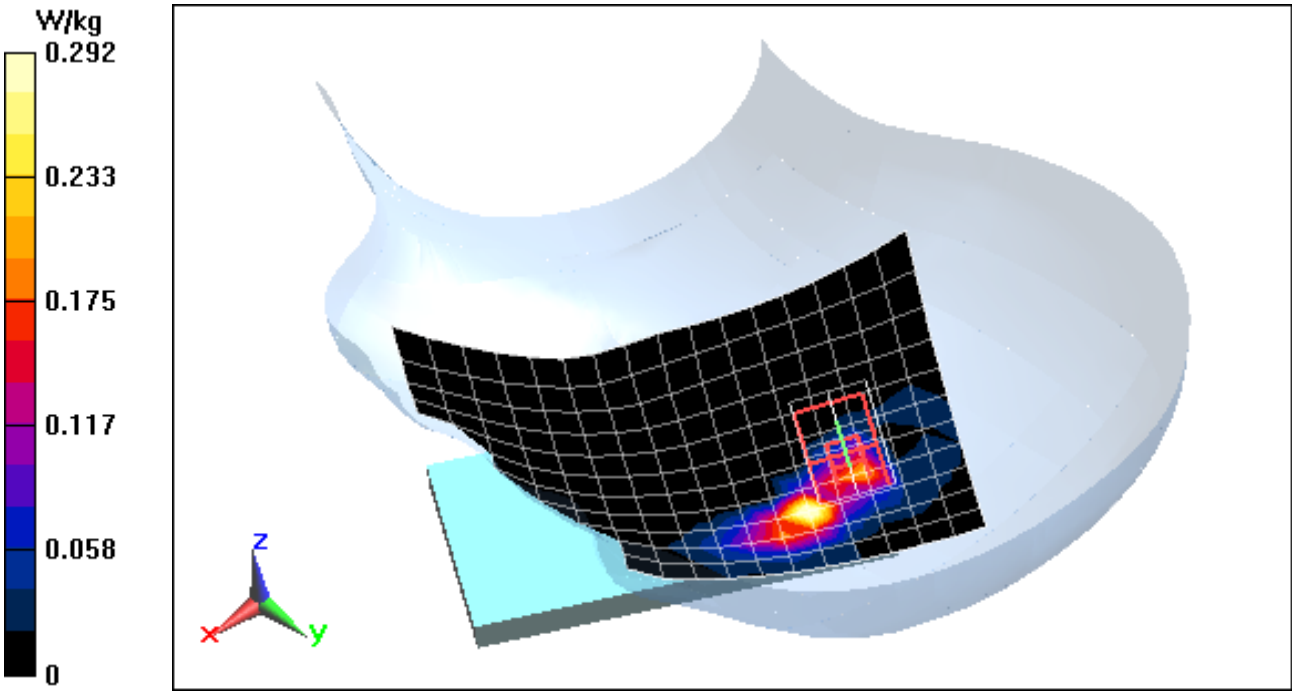
Communication System: IEEE 802.11a 5.3 GHz Band; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: 5GHz Head Medium parameters used:
f = 5260 MHz; σ = 4.618 mho/m; ε_r = 36.11; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-24-2012; Ambient Temp: 22.7°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3589; ConvF(4.36, 4.36, 4.36); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.7 (6848)

Mode: IEEE 802.11a, 5.3 GHz Left Head, Cheek, Ch 52, 6 Mbps

Area Scan (12x17x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 6.296 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.455 W/kg
SAR(1 g) = 0.131 W/kg; SAR(10 g) = 0.029 W/kg



DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 2

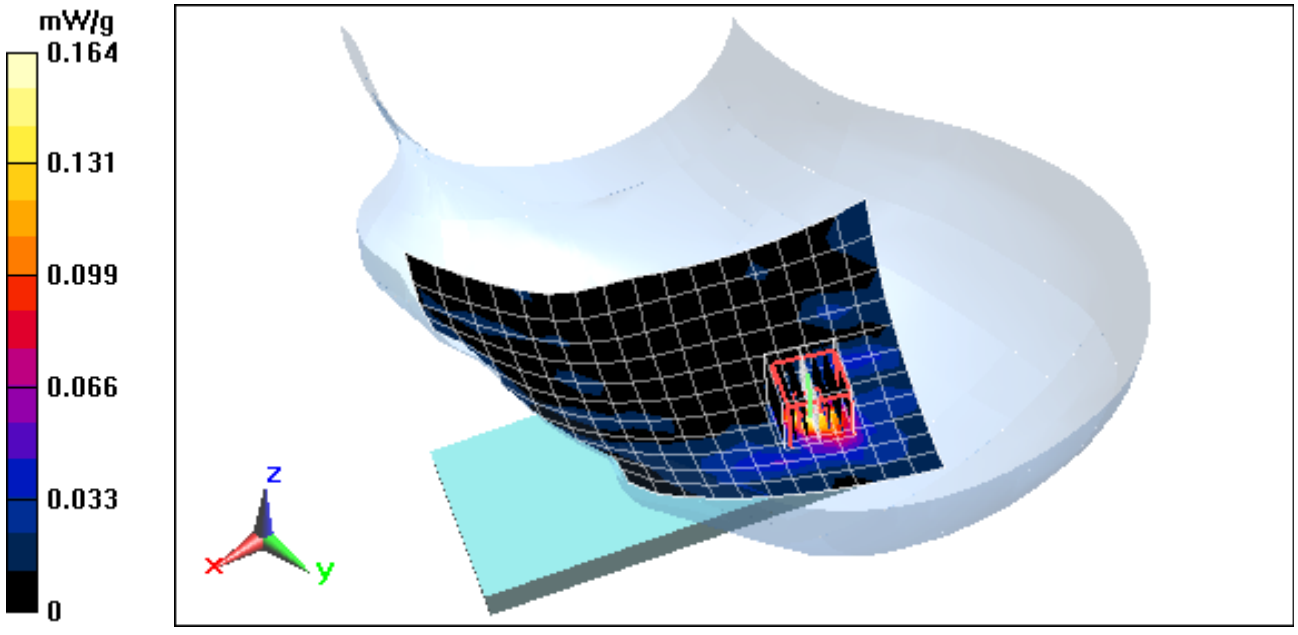
Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: 5GHz Head Medium parameters used:
f = 5260 MHz; σ = 4.618 mho/m; ε_r = 36.11; ρ = 1000 kg/m^3
Phantom section: Left Section

Test Date: 09-24-2012; Ambient Temp: 22.7°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3589; ConvF(4.36, 4.36, 4.36); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
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 802.11a, 5.3 GHz Left Head, Tilt, Ch 52, 6 Mbps

Area Scan (12x17x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 4.589 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.346 mW/g
SAR(1 g) = 0.078 mW/g; SAR(10 g) = 0.017 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 26

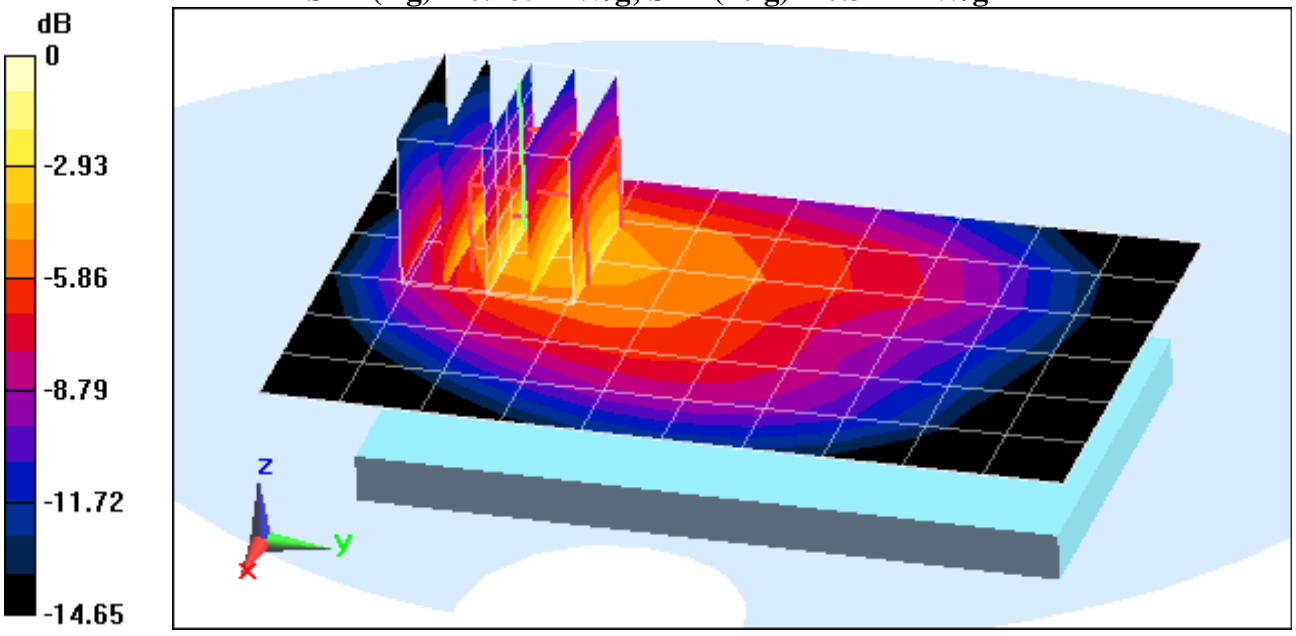
Communication System: LTE Band 17; Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 740 Body, Medium parameters used (interpolated):
f = 711 MHz; σ = 0.917 mho/m; ε_r = 55.977; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-10-2012; Ambient Temp: 24.4°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3213; ConvF(6.19, 6.19, 6.19); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Front; Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.718 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.855 mW/g
SAR(1 g) = 0.485 mW/g; SAR(10 g) = 0.321 mW/g



0 dB = 0.800 mW/g = -1.94 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 26

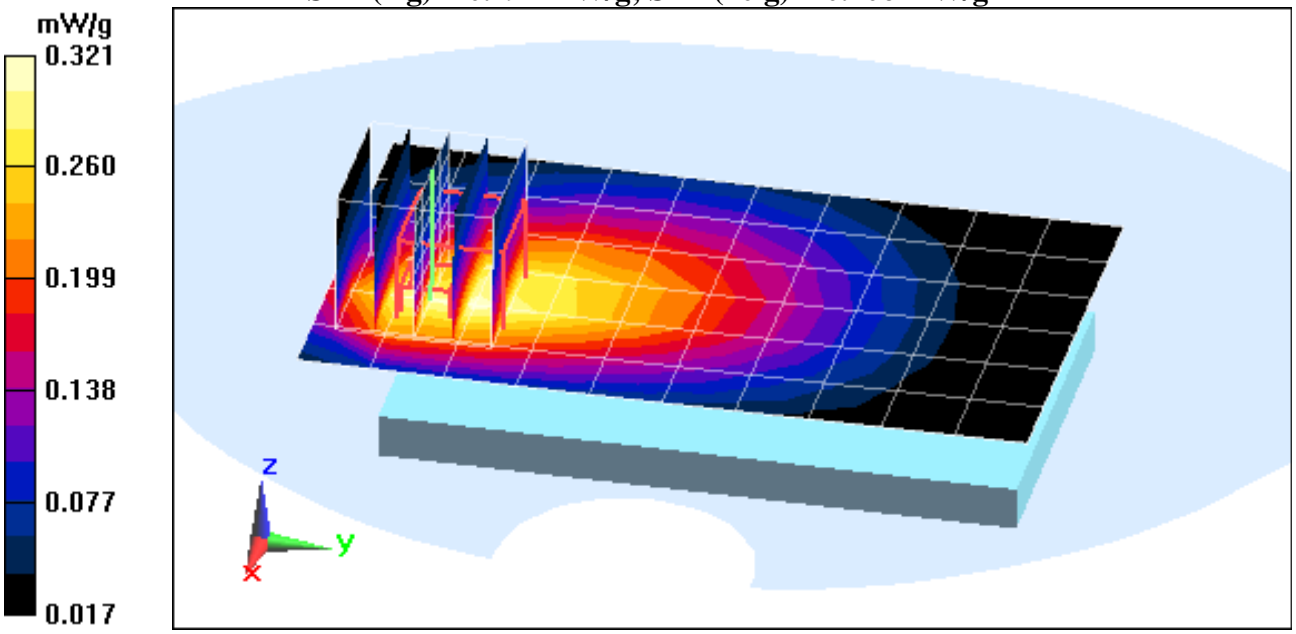
Communication System: LTE Band 17; Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 740 Body Medium parameters used (interpolated):
f = 711 MHz; σ = 0.917 mho/m; ε_r = 55.977; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-10-2012; Ambient Temp: 24.4°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3213; ConvF(6.19, 6.19, 6.19); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Front; Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.980 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.452 mW/g
SAR(1 g) = 0.297 mW/g; SAR(10 g) = 0.206 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 26

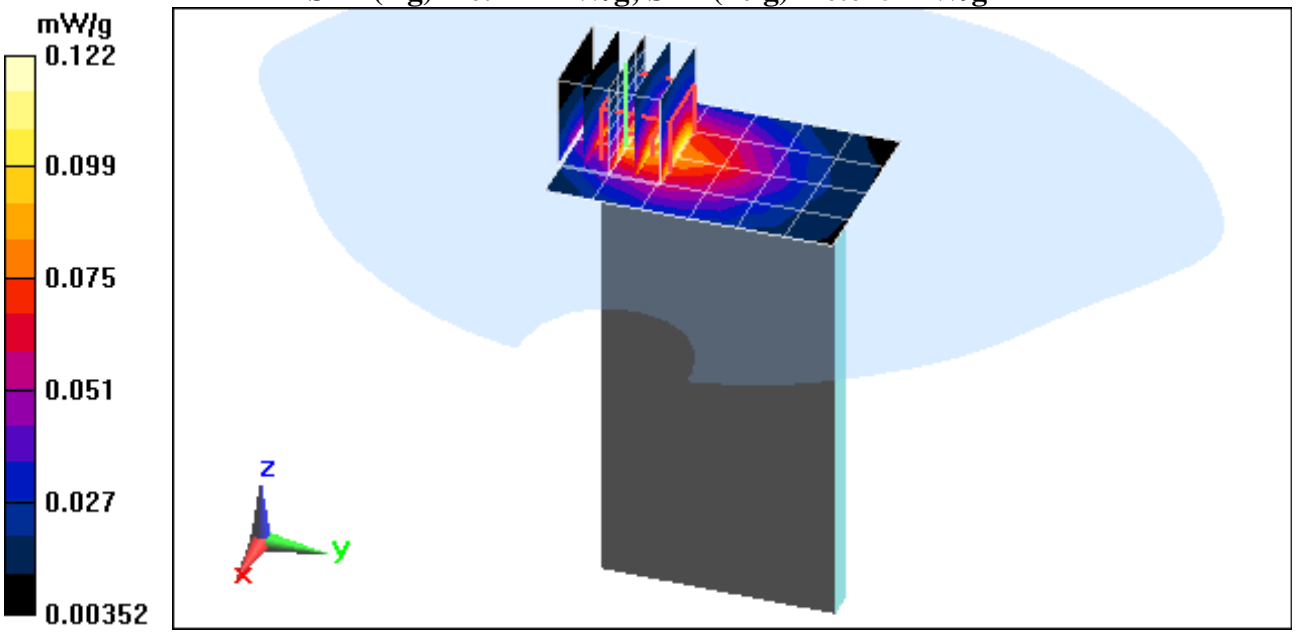
Communication System: LTE Band 17; Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 740 Body, Medium parameters used (interpolated):
f = 711 MHz; σ = 0.917 mho/m; ε_r = 55.977; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-10-2012; Ambient Temp: 24.4°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3213; ConvF(6.19, 6.19, 6.19); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Front; Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Mode: LTE Band 17, Body SAR, Bottom Edge, High.ch,
10 MHz Bandwidth, 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 = 10.486 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.207 mW/g
SAR(1 g) = 0.117 mW/g; SAR(10 g) = 0.075 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 26

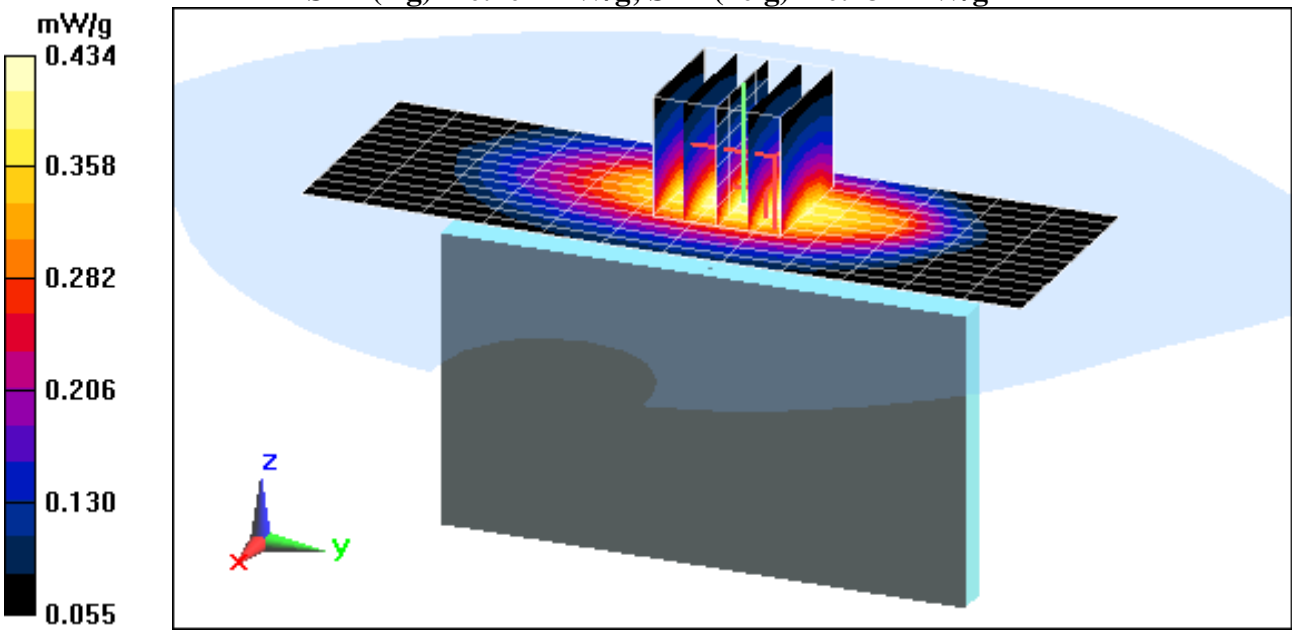
Communication System: LTE Band 17; Frequency: 711 MHz;Duty Cycle: 1:1
Medium: 740 Body Medium parameters used (interpolated):
f = 711 MHz; σ = 0.917 mho/m; ε_r = 55.977; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-10-2012; Ambient Temp: 24.4°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3213; ConvF(6.19, 6.19, 6.19); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Front; Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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

Area Scan (13x13x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.970 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.550 mW/g
SAR(1 g) = 0.404 mW/g; SAR(10 g) = 0.282 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 2

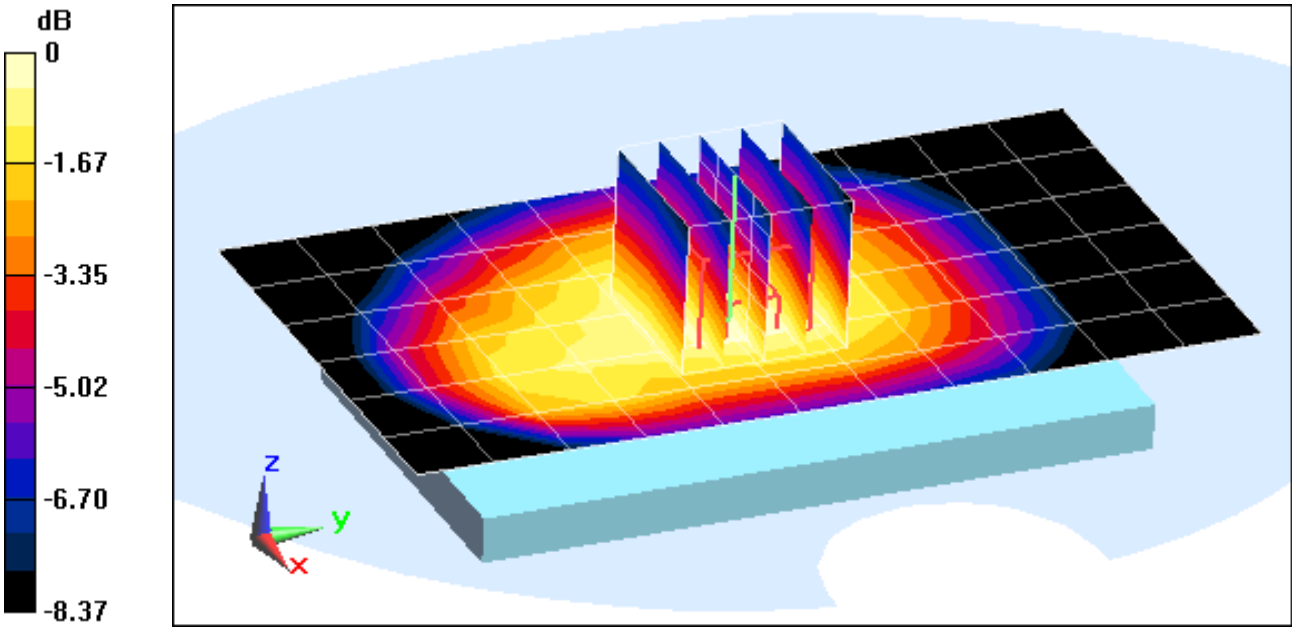
Communication System: GSM850 GPRS; 2 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.991 mho/m; ε_r = 53.504; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.02, 6.02, 6.02); Calibrated: 8/28/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.762 V/m; Power Drift = 0.21 dB
Peak SAR (extrapolated) = 1.174 mW/g
SAR(1 g) = 0.922 mW/g; SAR(10 g) = 0.697 mW/g



0 dB = 0.970 mW/g = -0.26 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 2

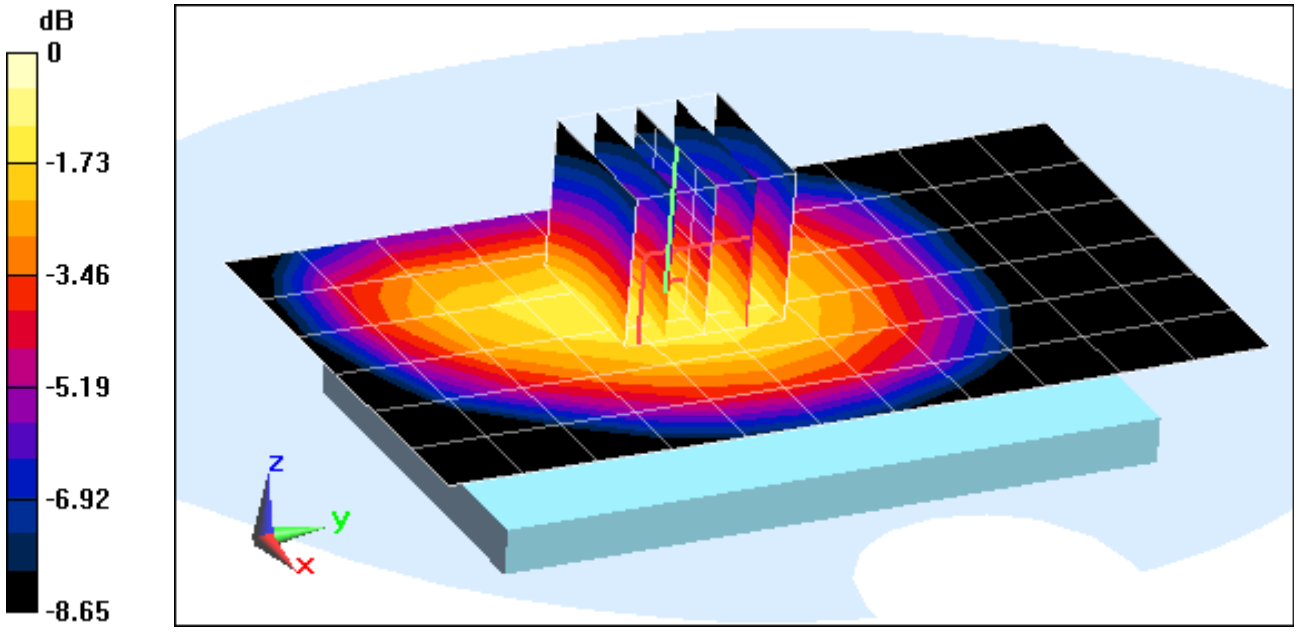
Communication System: GSM 850 GPRS; 2 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.991 mho/m; ε_r = 53.504; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.02, 6.02, 6.02); Calibrated: 8/28/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.912 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.746 mW/g
SAR(1 g) = 0.592 mW/g; SAR(10 g) = 0.453 mW/g



0 dB = 0.800 mW/g = -1.94 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 2

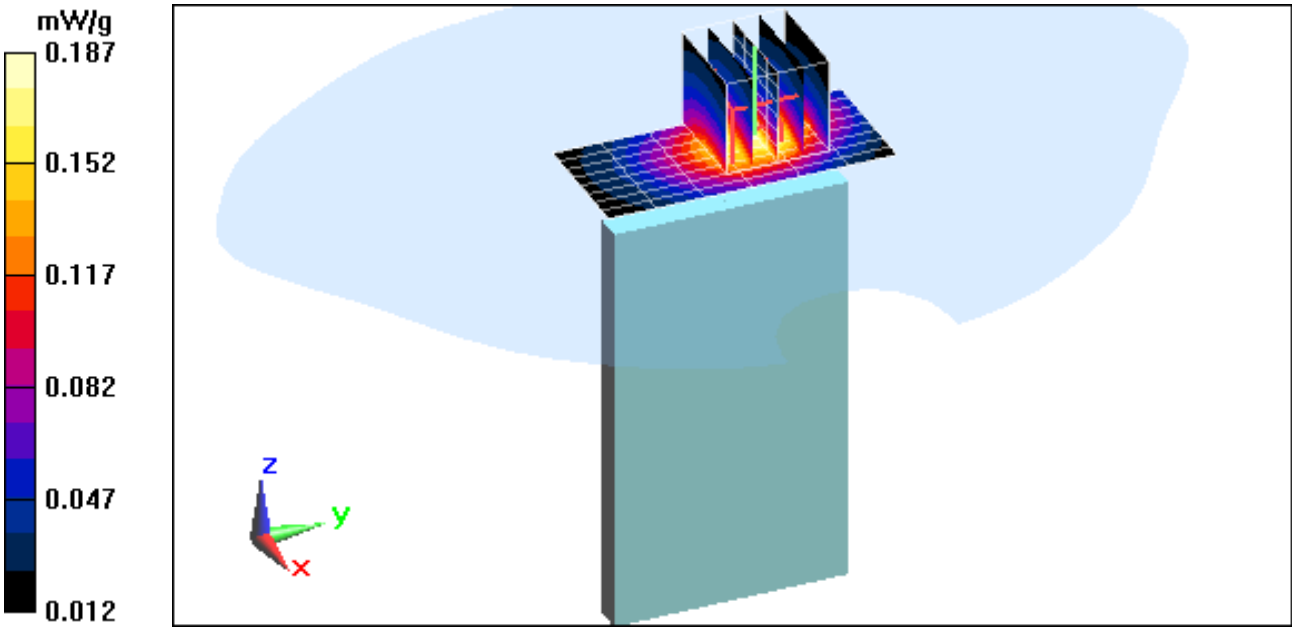
Communication System: GSM 850 GPRS; 2 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.991 mho/m; ε_r = 53.504; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.02, 6.02, 6.02); Calibrated: 8/28/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (9x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.904 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.246 mW/g
SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.112 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 2

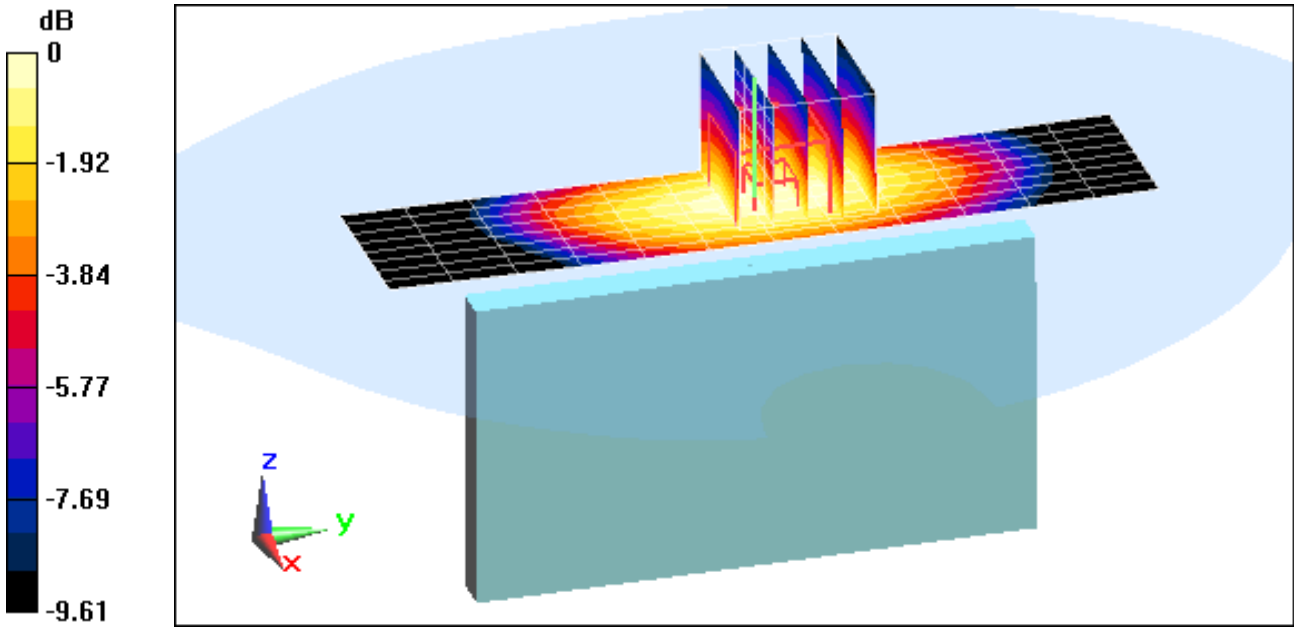
Communication System: GSM 850 GPRS; 2 Tx slots; Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.991 mho/m; ε_r = 53.504; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.02, 6.02, 6.02); Calibrated: 8/28/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (9x13x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.660 V/m; Power Drift = -0.20 dB
Peak SAR (extrapolated) = 1.234 mW/g
SAR(1 g) = 0.883 mW/g; SAR(10 g) = 0.610 mW/g



0 dB = 0.941 mW/g = -0.53 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 2

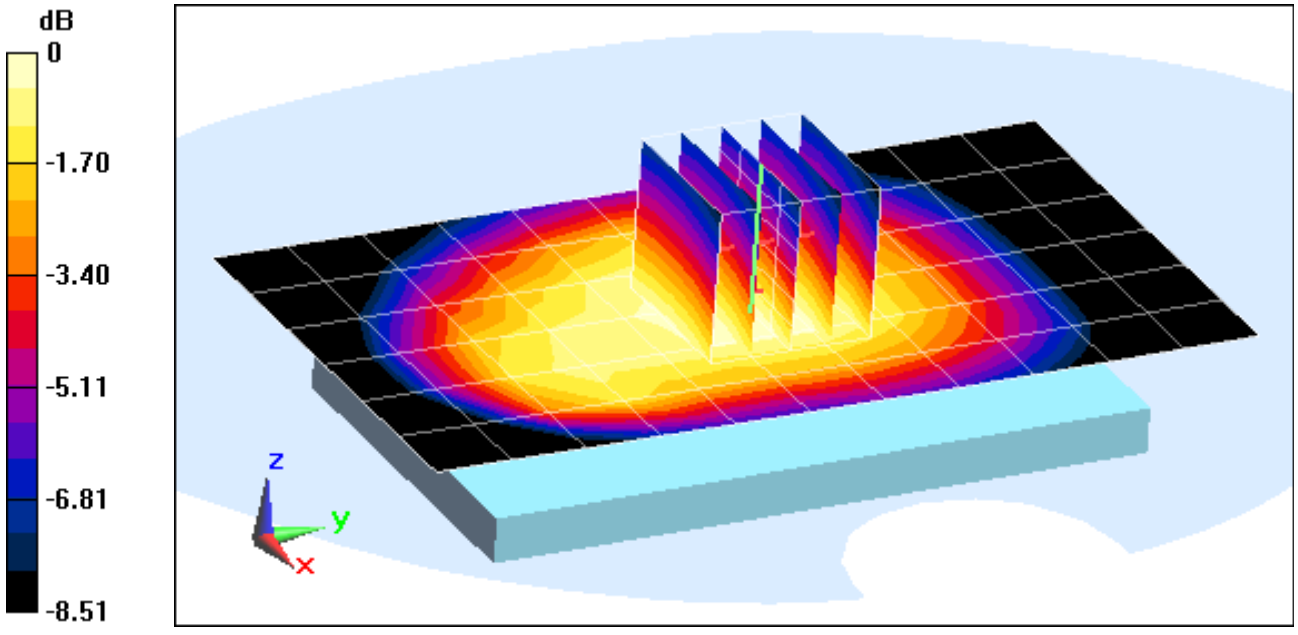
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.991 mho/m; ε_r = 53.504; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.02, 6.02, 6.02); Calibrated: 8/28/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.381 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.953 mW/g
SAR(1 g) = 0.749 mW/g; SAR(10 g) = 0.567 mW/g



0 dB = 0.788 mW/g = -2.07 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 2

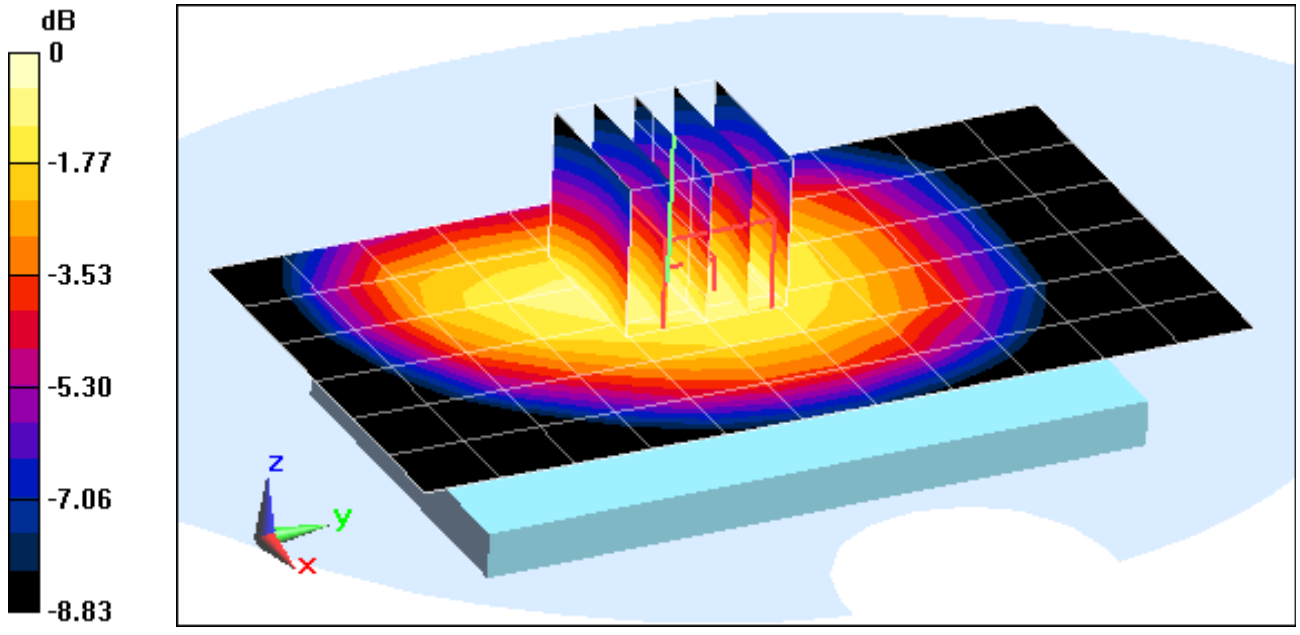
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.991 mho/m; ε_r = 53.504; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.02, 6.02, 6.02); Calibrated: 8/28/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.974 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.728 mW/g
SAR(1 g) = 0.581 mW/g; SAR(10 g) = 0.445 mW/g



0 dB = 0.700 mW/g = -3.10 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 2

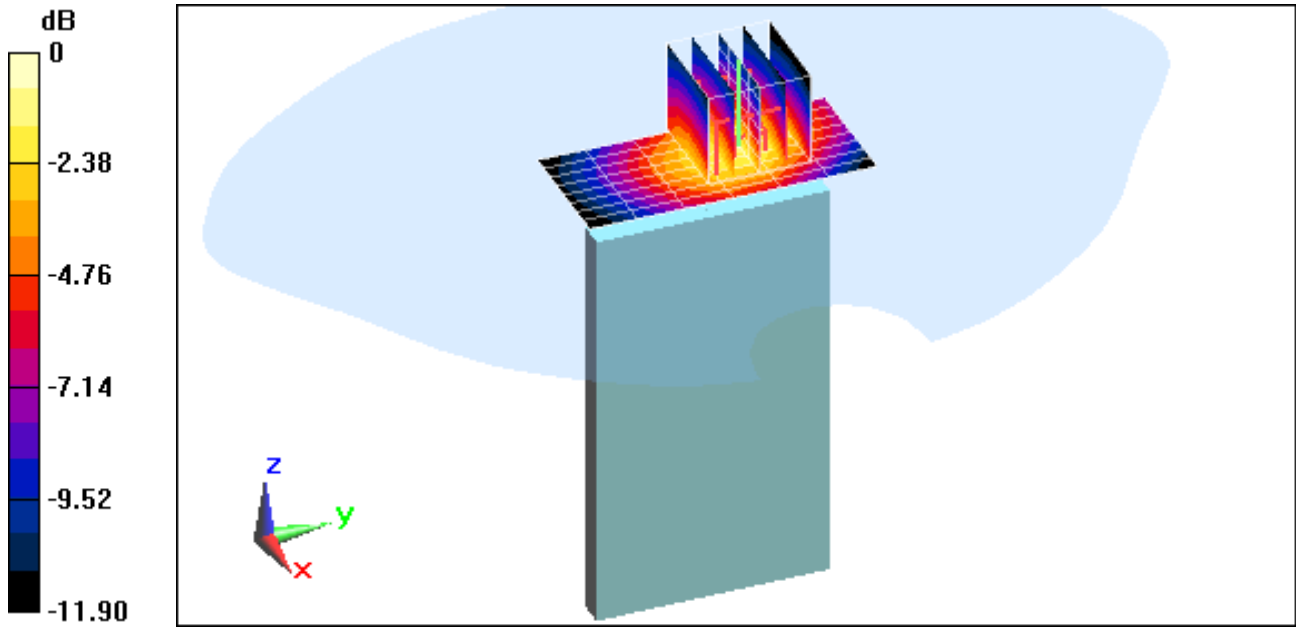
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.991 mho/m; ε_r = 53.504; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.02, 6.02, 6.02); Calibrated: 8/28/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (9x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.636 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.313 mW/g
SAR(1 g) = 0.216 mW/g; SAR(10 g) = 0.141 mW/g



0 dB = 0.300 mW/g = -10.46 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 2

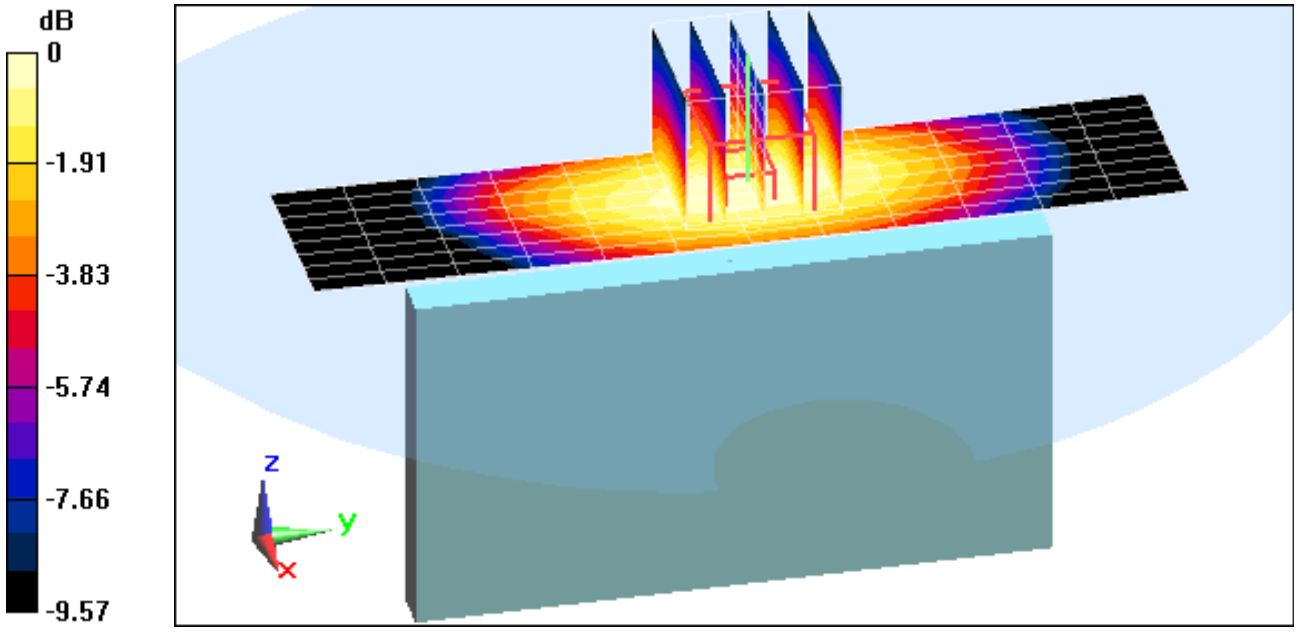
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 0.991 mho/m; ε_r = 53.504; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.02, 6.02, 6.02); Calibrated: 8/28/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (9x13x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.148 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.175 mW/g
SAR(1 g) = 0.841 mW/g; SAR(10 g) = 0.581 mW/g



0 dB = 0.896 mW/g = -0.95 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

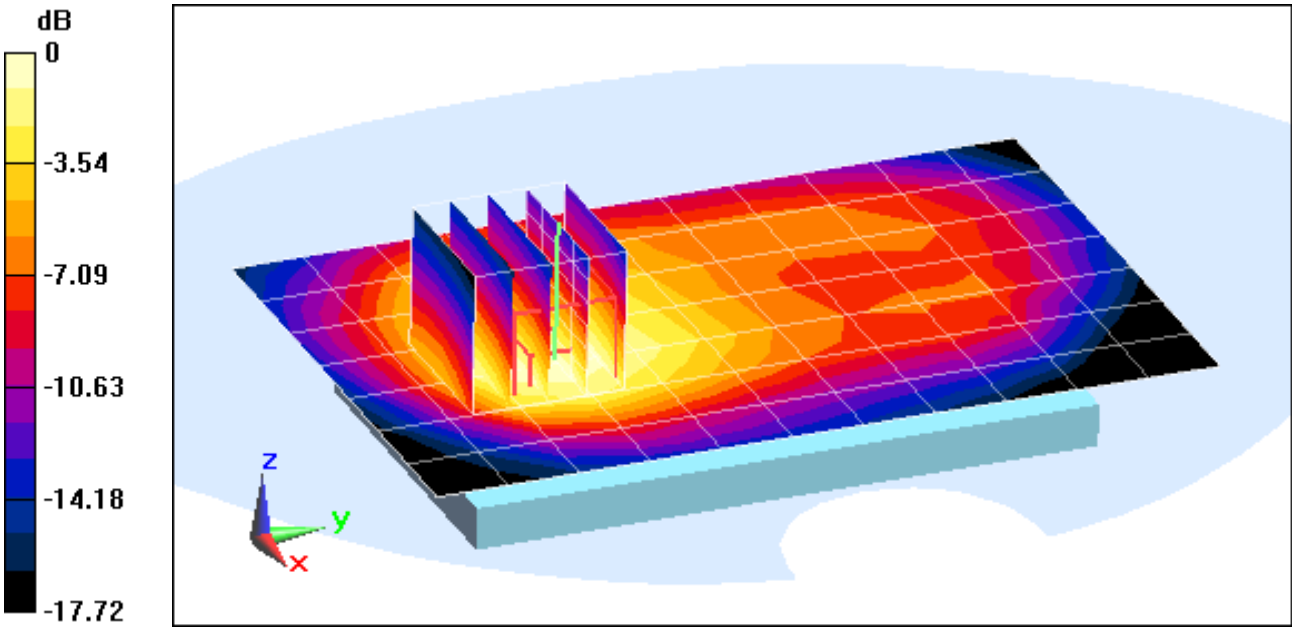
Communication System: GSM GPRS; 2 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.527 mho/m; ε_r = 51.35; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 21.4°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3287; ConvF(4.76, 4.76, 4.76); 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 (1); 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 = 23.022 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.259 mW/g
SAR(1 g) = 0.726 mW/g; SAR(10 g) = 0.428 mW/g



0 dB = 0.757 mW/g = -2.42 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

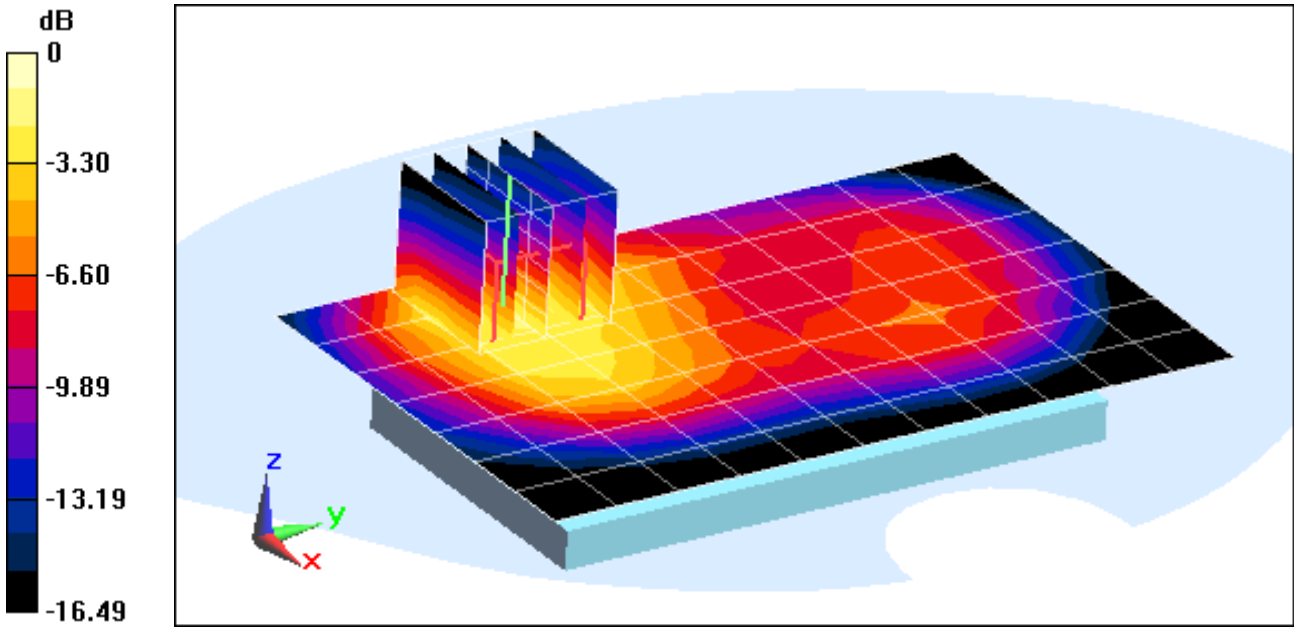
Communication System: GSM GPRS; 2 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.527 mho/m; ε_r = 51.35; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 21.4°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3287; ConvF(4.76, 4.76, 4.76); 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 (1); 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 = 18.936 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.873 mW/g
SAR(1 g) = 0.487 mW/g; SAR(10 g) = 0.284 mW/g



0 dB = 0.700 mW/g = -3.10 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

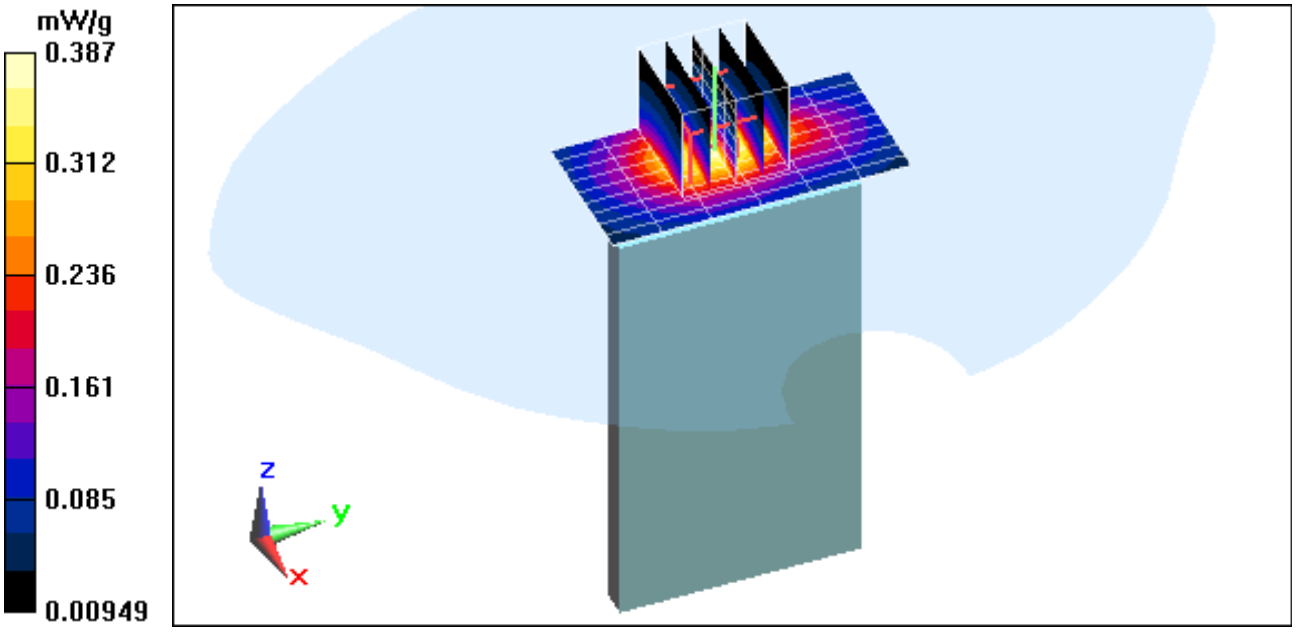
Communication System: GSM GPRS; 2 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.527 mho/m; ε_r = 51.35; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 21.4°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3287; ConvF(4.76, 4.76, 4.76); 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 (1); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.090 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.581 mW/g
SAR(1 g) = 0.353 mW/g; SAR(10 g) = 0.206 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

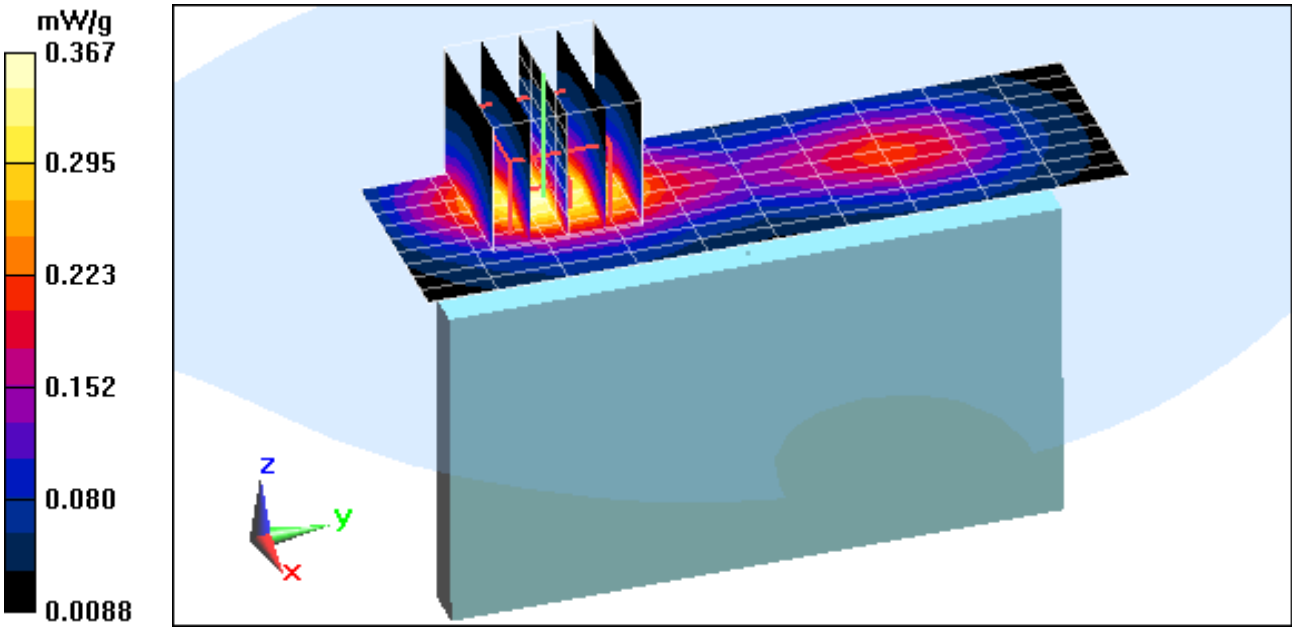
Communication System: GSM GPRS; 2 Tx slots; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.527 mho/m; ε_r = 51.35; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 21.4°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3287; ConvF(4.76, 4.76, 4.76); 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 (1); SEMCAD X Version 14.6.5 (6469)

Mode; GPRS 1900, Body SAR, Left Edge, Mid.ch, 2 Tx Slots

Area Scan (10x11x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.715 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.534 mW/g
SAR(1 g) = 0.331 mW/g; SAR(10 g) = 0.192 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

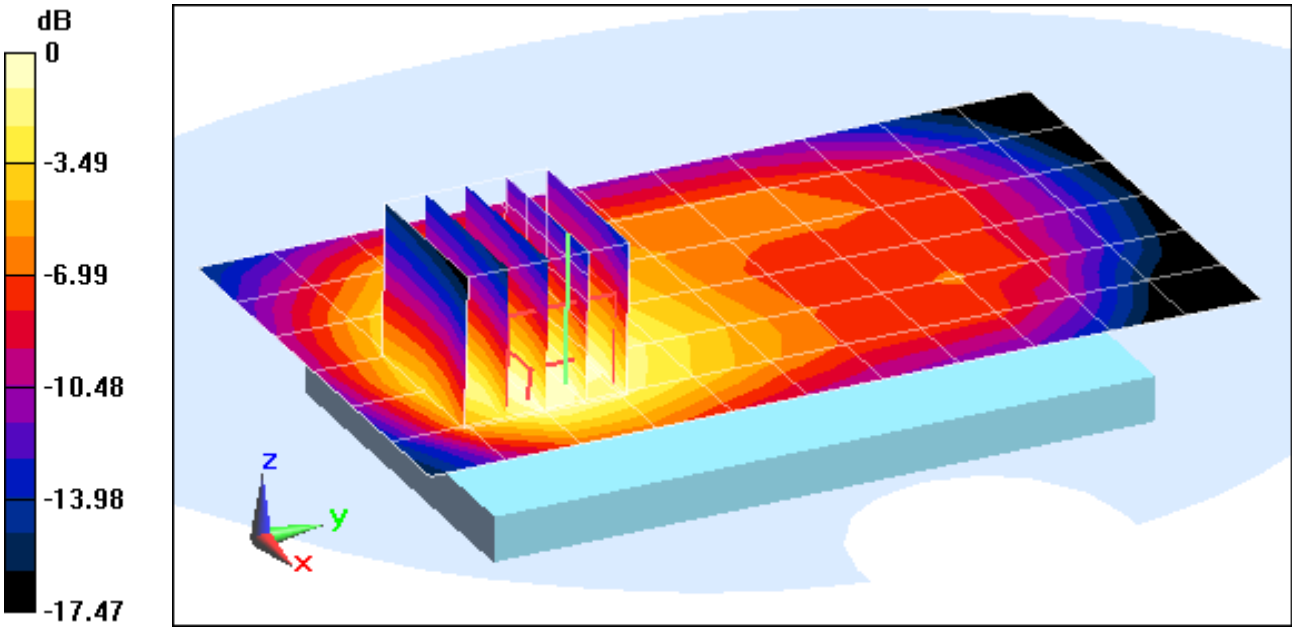
Communication System: WCDMA; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: 1900 Body, Medium parameters used (interpolated):
f = 1907.6 MHz; σ = 1.554 mho/m; ε_r = 51.221; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 21.4°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3287; ConvF(4.76, 4.76, 4.76); 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 (1); SEMCAD X Version 14.6.5 (6469)

Mode; WCDMA 1900, Body SAR, Back side, High.ch

Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.947 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.721 mW/g
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.608 mW/g



0 dB = 1.06 mW/g = 0.51 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

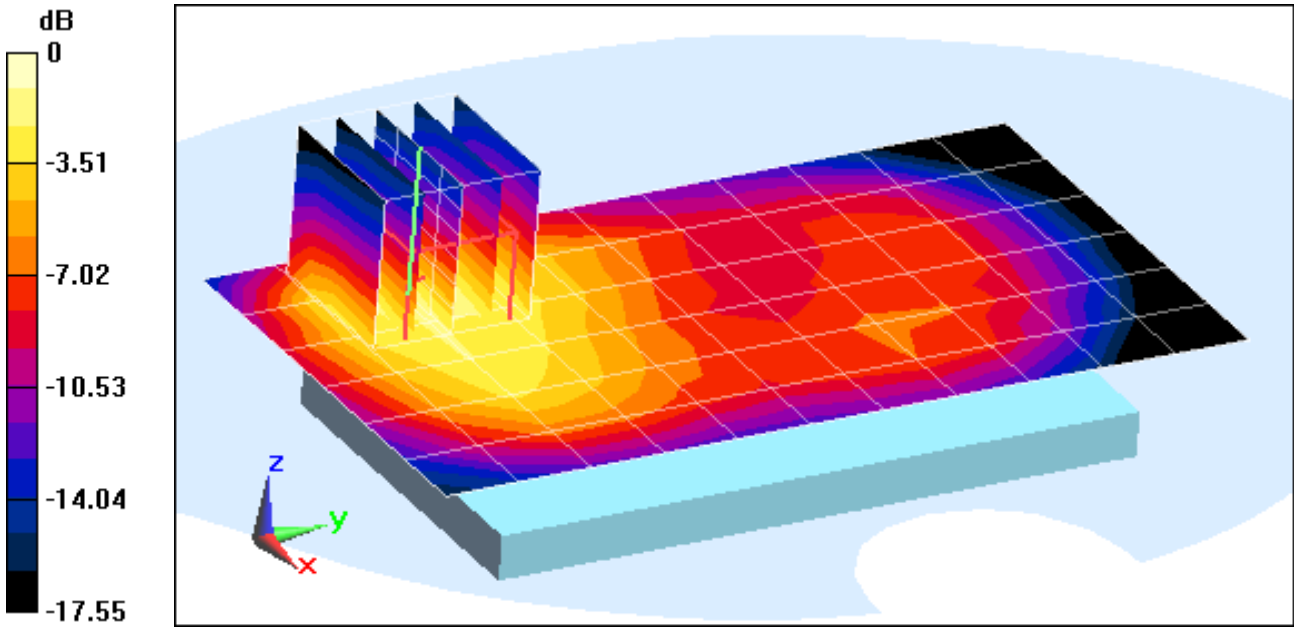
Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.527 mho/m; ε_r = 51.35; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 21.4°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3287; ConvF(4.76, 4.76, 4.76); 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 (1); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.776 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.336 mW/g
SAR(1 g) = 0.729 mW/g; SAR(10 g) = 0.413 mW/g



0 dB = 1.00 mW/g = 0.00 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

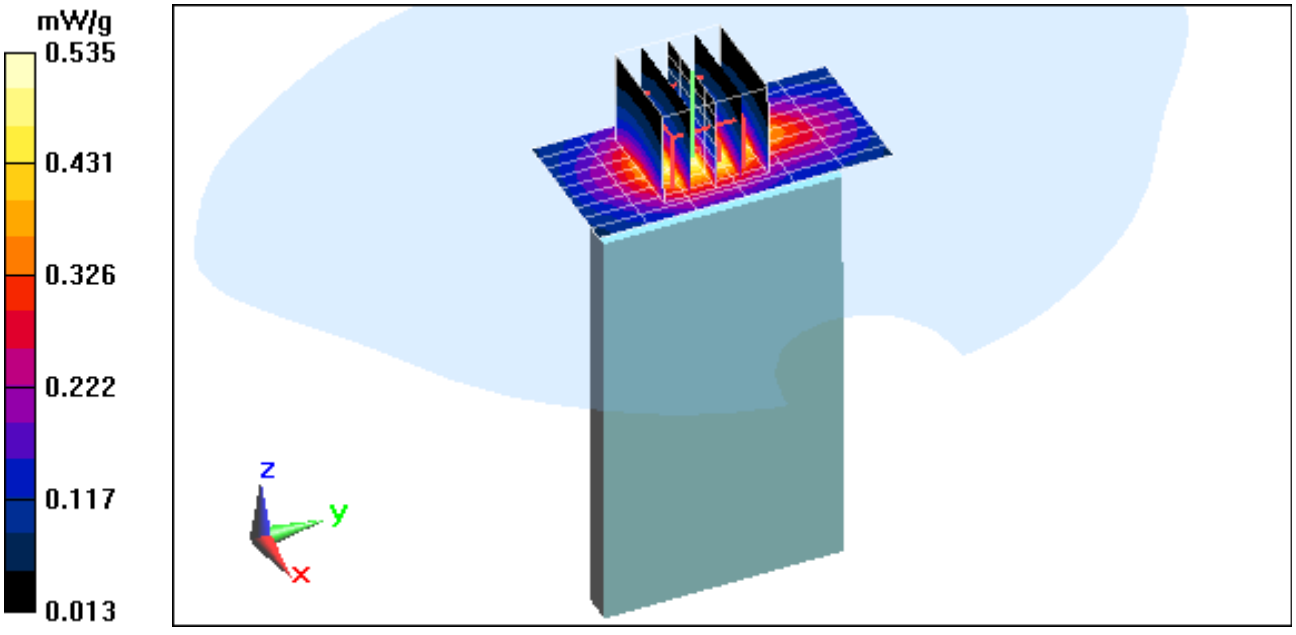
Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.527 mho/m; ε_r = 51.35; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 21.4°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3287; ConvF(4.76, 4.76, 4.76); 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 (1); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.084 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.804 mW/g
SAR(1 g) = 0.488 mW/g; SAR(10 g) = 0.285 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

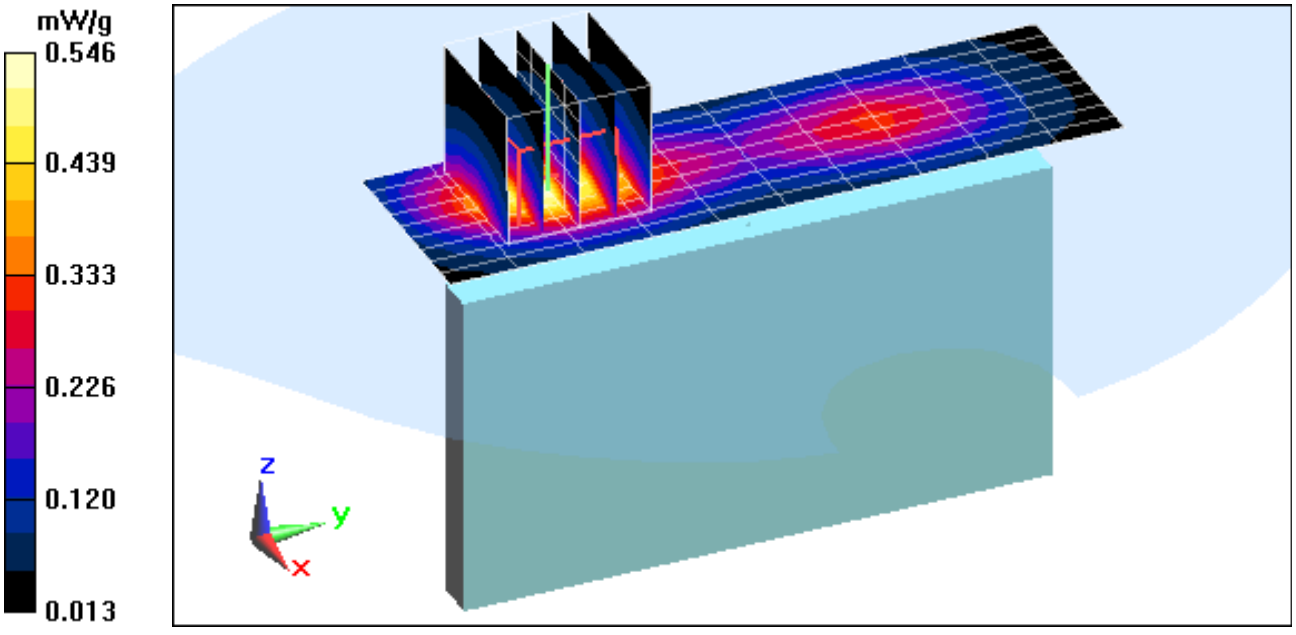
Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used:
f = 1880 MHz; σ = 1.527 mho/m; ε_r = 51.35; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 21.4°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3287; ConvF(4.76, 4.76, 4.76); 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 (1); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (10x11x1): Measurement grid: dx=5mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.987 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.799 mW/g
SAR(1 g) = 0.493 mW/g; SAR(10 g) = 0.285 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

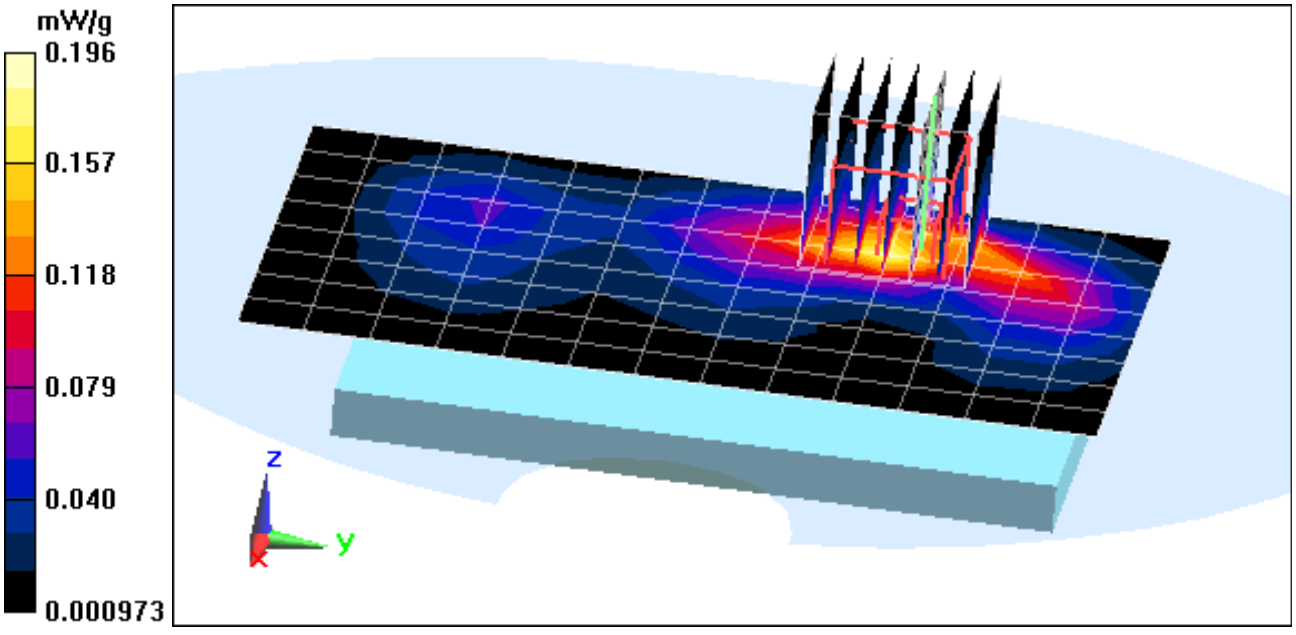
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2462 MHz; σ = 2.054 mho/m; ε_r = 51.45; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2012; Ambient Temp: 21.3°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3287; ConvF(4.28, 4.28, 4.28); Calibrated: 2/7/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687
Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (9x14x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.850 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.329 mW/g
SAR(1 g) = 0.154 mW/g; SAR(10 g) = 0.075 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

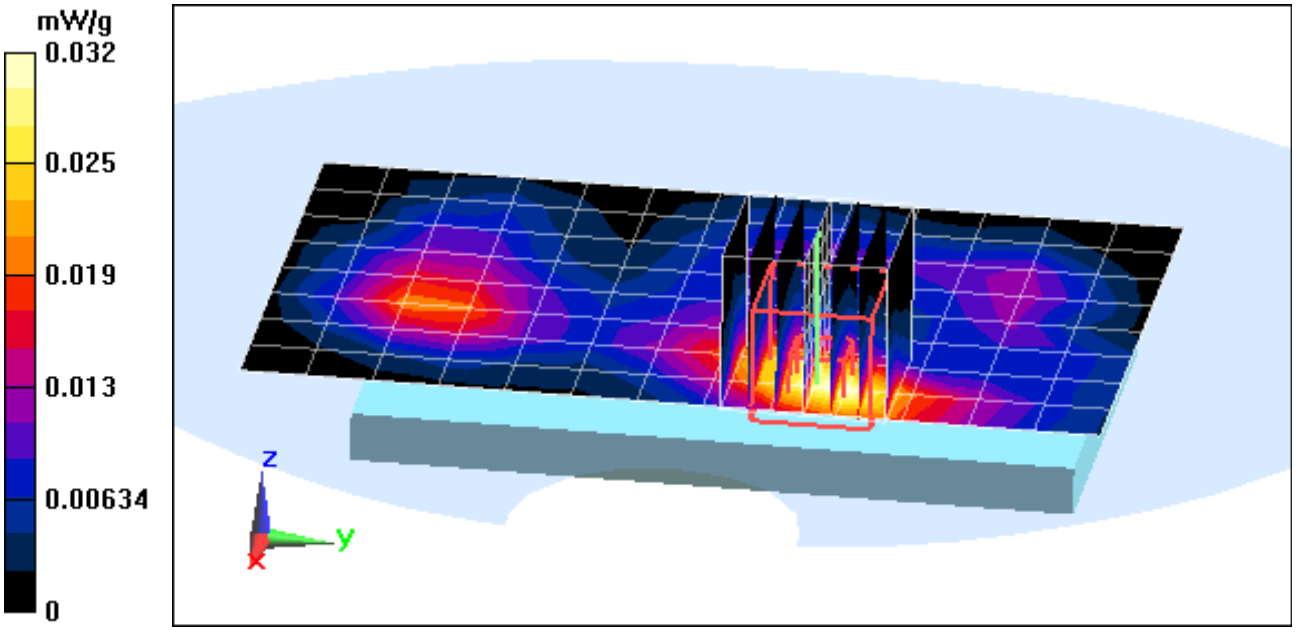
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2462 MHz; σ = 2.054 mho/m; ε_r = 51.45; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2012; Ambient Temp: 21.3°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3287; ConvF(4.28, 4.28, 4.28); Calibrated: 2/7/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687
Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (9x14x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.539 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.053 mW/g
SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.013 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

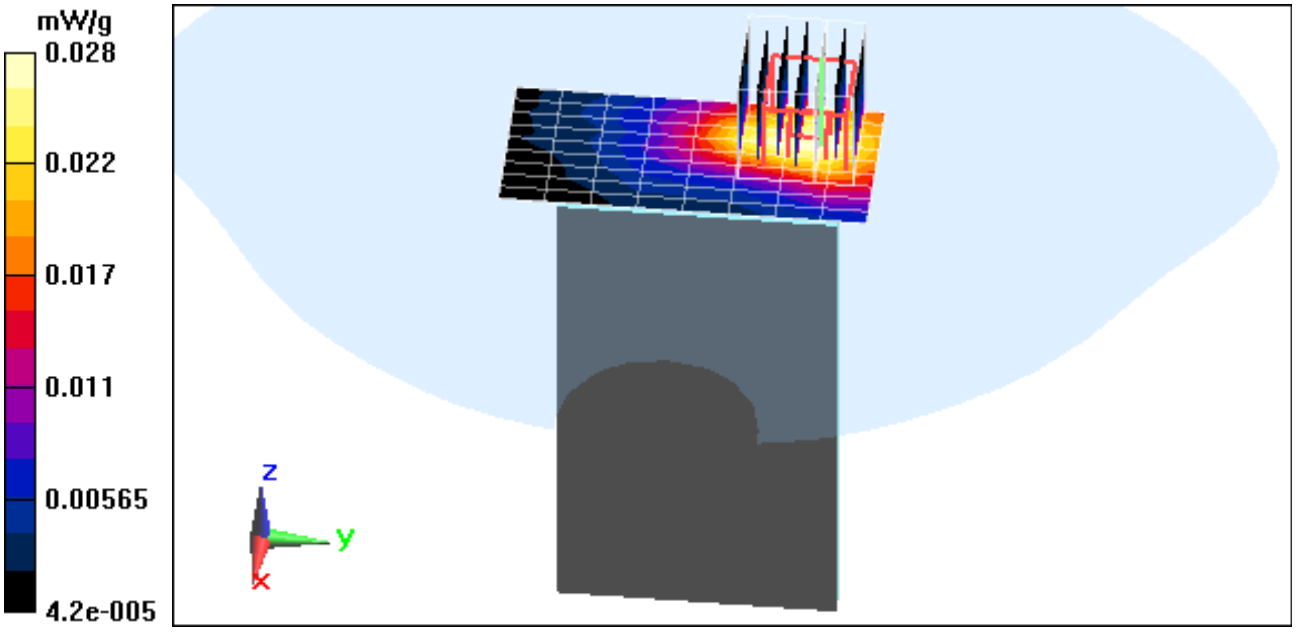
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2462 MHz; σ = 2.054 mho/m; ε_r = 51.45; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2012; Ambient Temp: 21.3°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3287; ConvF(4.28, 4.28, 4.28); Calibrated: 2/7/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687
Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (10x9x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.503 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.043 mW/g
SAR(1 g) = 0.023 mW/g; SAR(10 g) = 0.012 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: 3G SAR 1

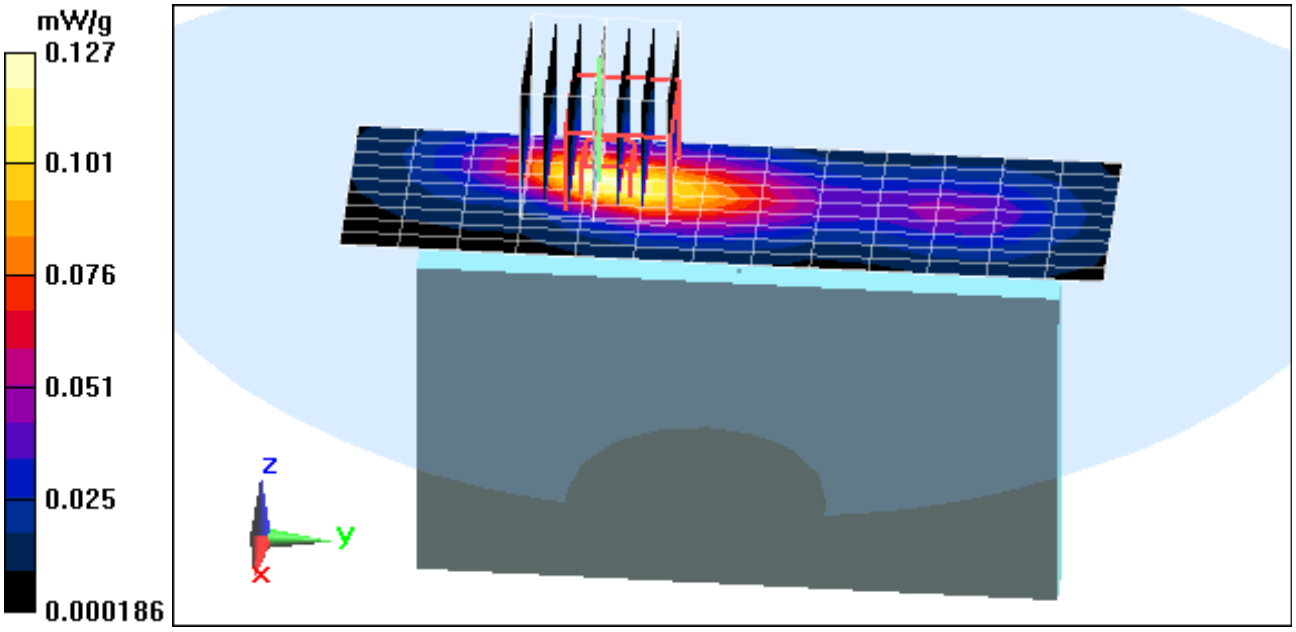
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used (interpolated):
f = 2462 MHz; σ = 2.054 mho/m; ε_r = 51.45; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2012; Ambient Temp: 21.3°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3287; ConvF(4.28, 4.28, 4.28); Calibrated: 2/7/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687
Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

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

Area Scan (10x14x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.339 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.208 mW/g
SAR(1 g) = 0.097 mW/g; SAR(10 g) = 0.047 mW/g



DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 25

Communication System: LTE Band 7; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium: 2600 Muscle Medium parameters used (interpolated):
f = 2535 MHz; σ = 2.169 mho/m; ε_r = 52.471; ρ = 1000 kg/m^3

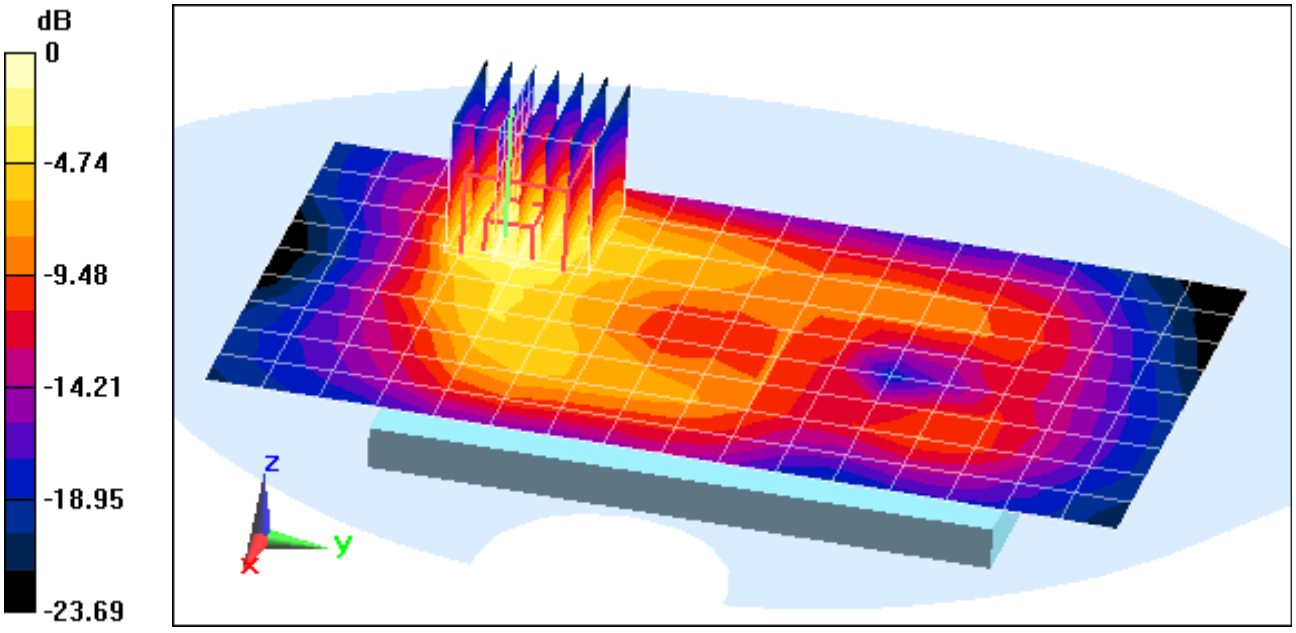
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-09-2012; Ambient Temp: 21.2°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3209; ConvF(4.02, 4.02, 4.02); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 7, Body SAR, Back side, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.230 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 2.843 mW/g
SAR(1 g) = 1.23 mW/g; SAR(10 g) = 0.559 mW/g



0 dB = 1.59 mW/g = 4.03 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 25

Communication System: LTE Band 7; Frequency: 2560 MHz;Duty Cycle: 1:1
Medium: 2600 Muscle, Medium parameters used (interpolated):
f = 2560 MHz; σ = 2.204 mho/m; ε_r = 52.374; ρ = 1000 kg/m^3

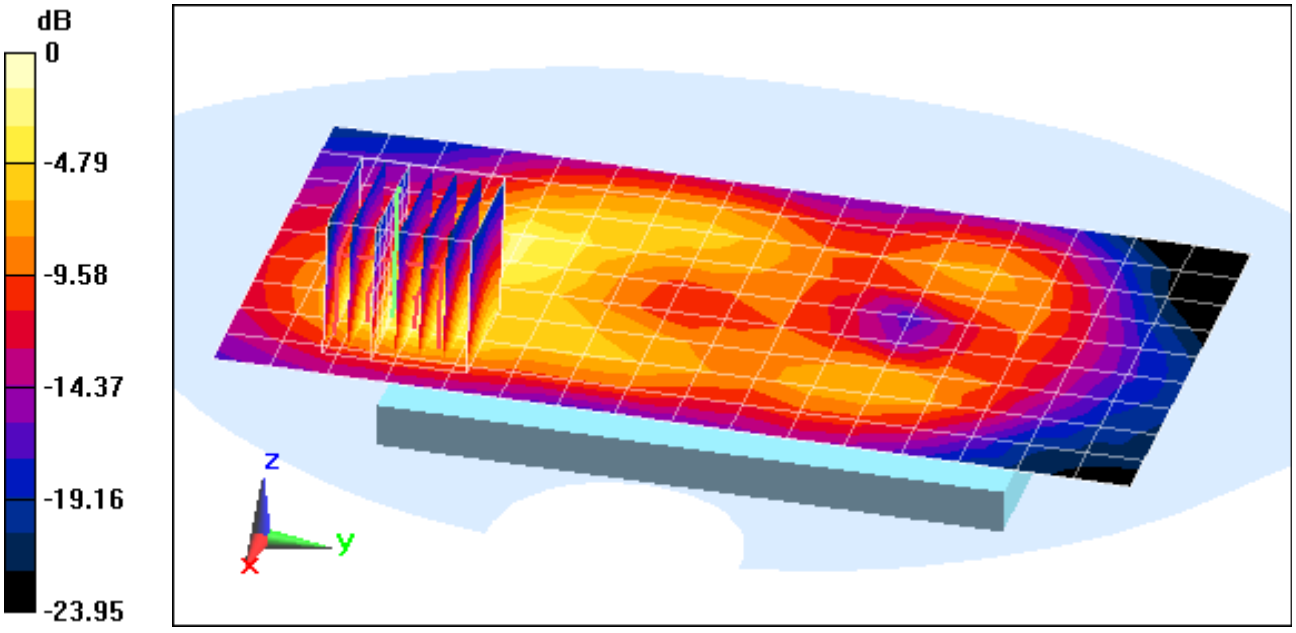
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-09-2012; Ambient Temp: 21.2°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3209; ConvF(4.02, 4.02, 4.02); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 7, Body SAR, Front side, High.ch,
20 MHz Bandwidth, 16QAM, 1 RB, 0 RB Offset

Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.525 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 1.264 mW/g
SAR(1 g) = 0.538 mW/g; SAR(10 g) = 0.246 mW/g



0 dB = 0.696 mW/g = -3.15 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 25

Communication System: LTE Band 7; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium: 2600 Muscle Medium parameters used (interpolated):
f = 2535 MHz; σ = 2.169 mho/m; ε_r = 52.471; ρ = 1000 kg/m^3

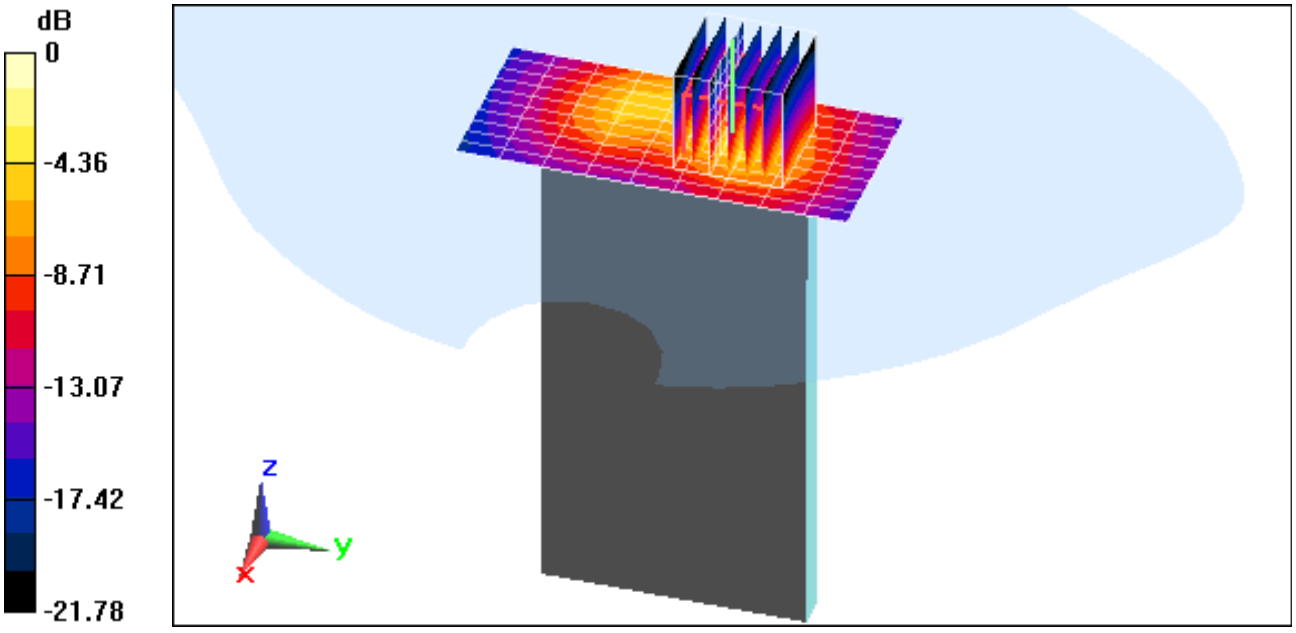
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-09-2012; Ambient Temp: 21.2°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3209; ConvF(4.02, 4.02, 4.02); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 7, Body SAR, Bottom Edge, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (11x10x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.654 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.027 mW/g
SAR(1 g) = 0.500 mW/g; SAR(10 g) = 0.267 mW/g



0 dB = 1.20 mW/g = 1.58 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 25

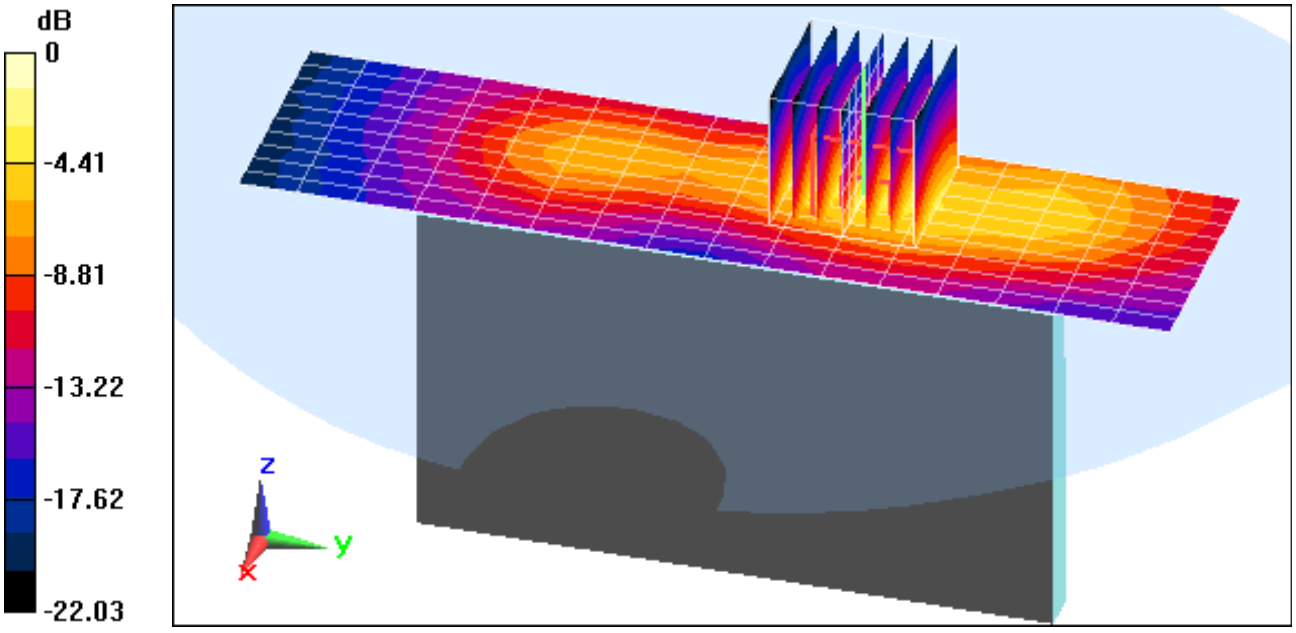
Communication System: LTE Band 7; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium: 2600 Muscle Medium parameters used (interpolated):
f = 2535 MHz; σ = 2.169 mho/m; ε_r = 52.471; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-09-2012; Ambient Temp: 21.2°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3209; ConvF(4.02, 4.02, 4.02); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

Mode: LTE Band 7, Body SAR, Right Edge, Mid.ch,
20 MHz Bandwidth, QPSK, 50 RB, 25 RB Offset

Area Scan (11x17x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.490 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.751 mW/g
SAR(1 g) = 0.358 mW/g; SAR(10 g) = 0.187 mW/g



0 dB = 0.750 mW/g = -2.50 dB mW/g

DUT: ZNFE971; Type: Portable Handset; Serial: LTE SAR 2

Communication System: IEEE 802.11a 5.5 GHz Band; Frequency: 5560 MHz;Duty Cycle: 1:1
Medium: 5GHz Body, Medium parameters used:
f = 5560 MHz; σ = 5.798 mho/m; ε_r = 48.38; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

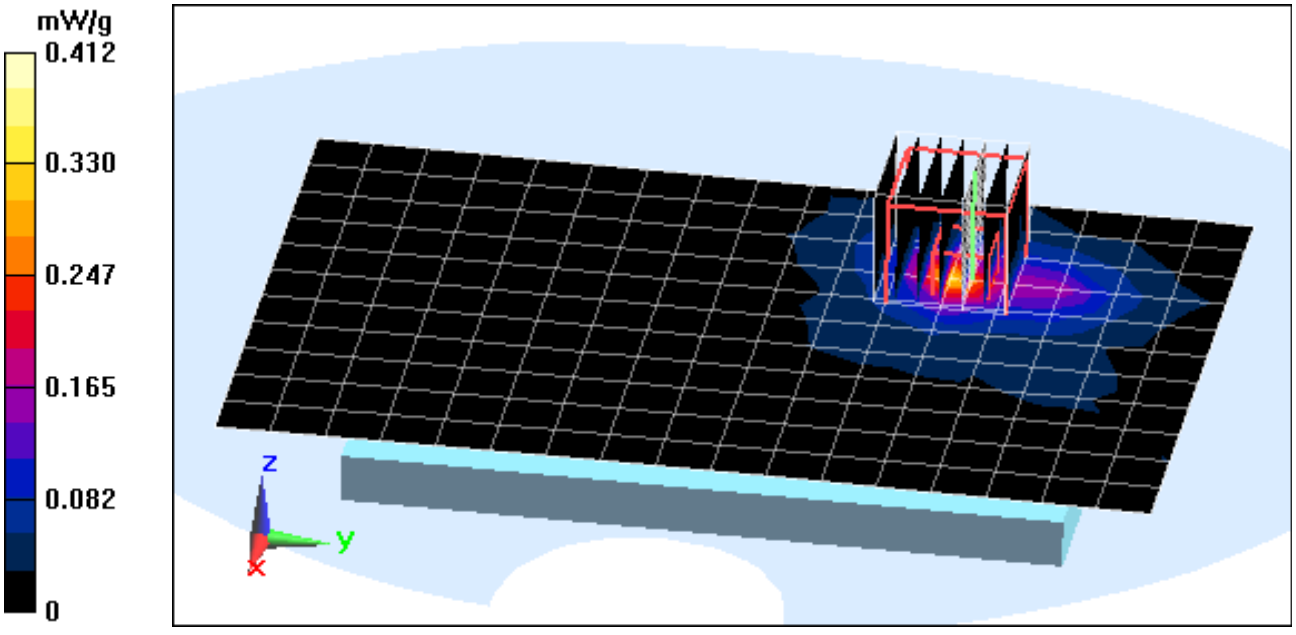
Test Date: 09-26-2012; Ambient Temp: 24.8°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3589; ConvF(3.25, 3.25, 3.25); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
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: IEEE 802.11a, 5.5 GHz, Body SAR, Ch 112, 6 Mbps, Back Side

Area Scan (12x18x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 6.399 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.803 mW/g
SAR(1 g) = 0.208 mW/g; SAR(10 g) = 0.066 mW/g



APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

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

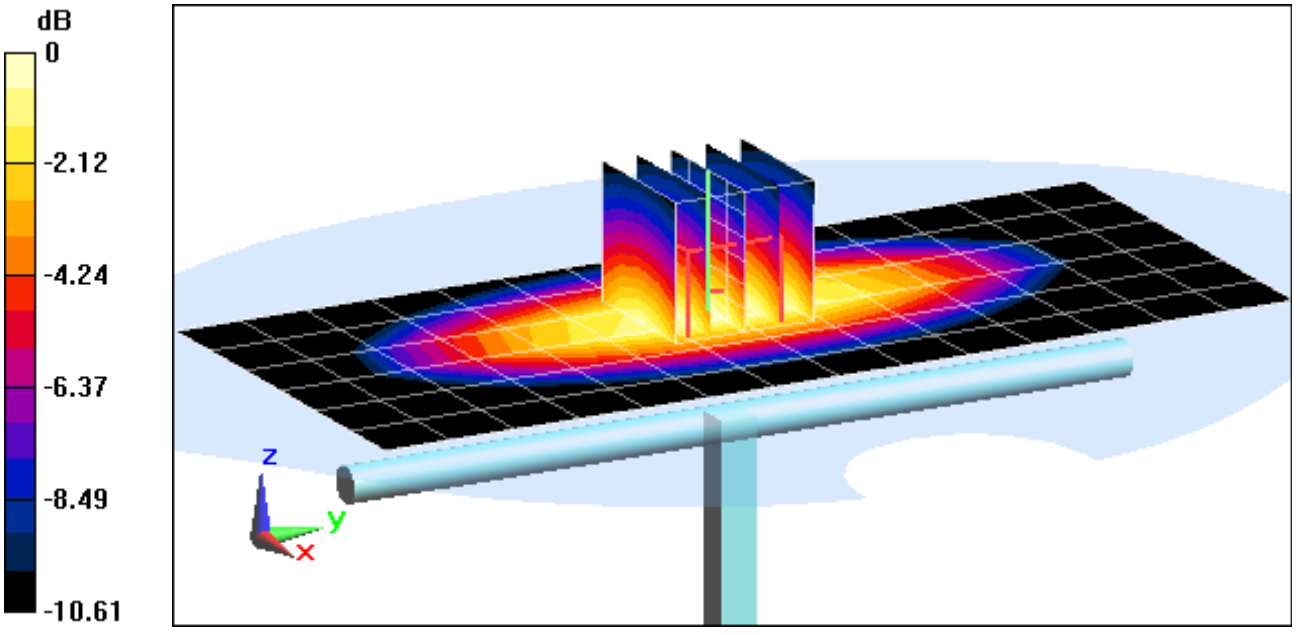
Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: 740 Head Medium parameters used (interpolated):
f = 750 MHz; σ = 0.888 mho/m; ε_r = 41.84; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-09-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3213; ConvF(6.32, 6.32, 6.32); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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)
Peak SAR (extrapolated) = 1.306 mW/g
SAR(1 g) = 0.875 mW/g; SAR(10 g) = 0.571 mW/g
Deviation = 2.70%



0 dB = 0.946 mW/g = -0.48 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

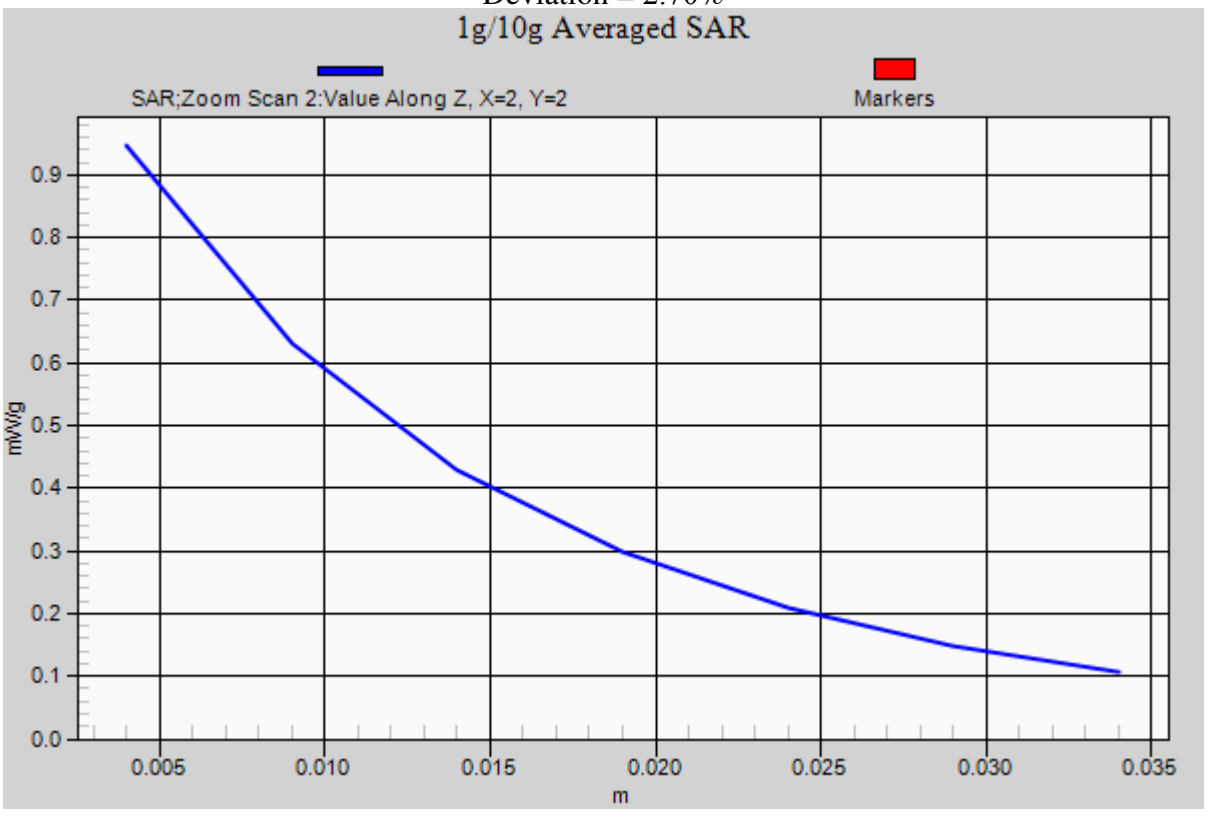
Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: 740 Head Medium parameters used (interpolated):
f = 750 MHz; σ = 0.888 mho/m; ε_r = 41.84; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-09-2012; Ambient Temp: 23.4°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3213; ConvF(6.32, 6.32, 6.32); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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)
Peak SAR (extrapolated) = 1.306 mW/g
SAR(1 g) = 0.875 mW/g; SAR(10 g) = 0.571 mW/g
Deviation = 2.70%



PCTEST ENGINEERING LABORATORY, INC.

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

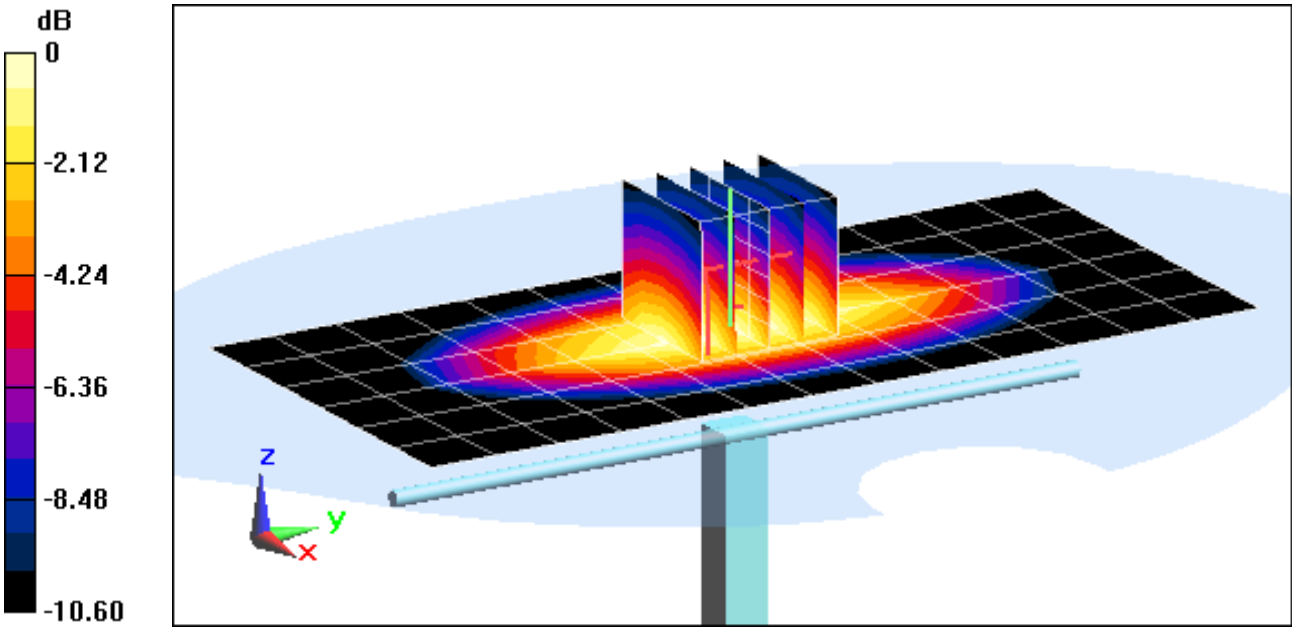
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; σ = 0.89 mho/m; ε_r = 41.25; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-21-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3213; ConvF(6.07, 6.07, 6.07); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

835 MHz System Verification

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 1.408 mW/g
SAR(1 g) = 0.958 mW/g; SAR(10 g) = 0.626 mW/g
Deviation = 1.81%



0 dB = 1.04 mW/g = 0.34 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

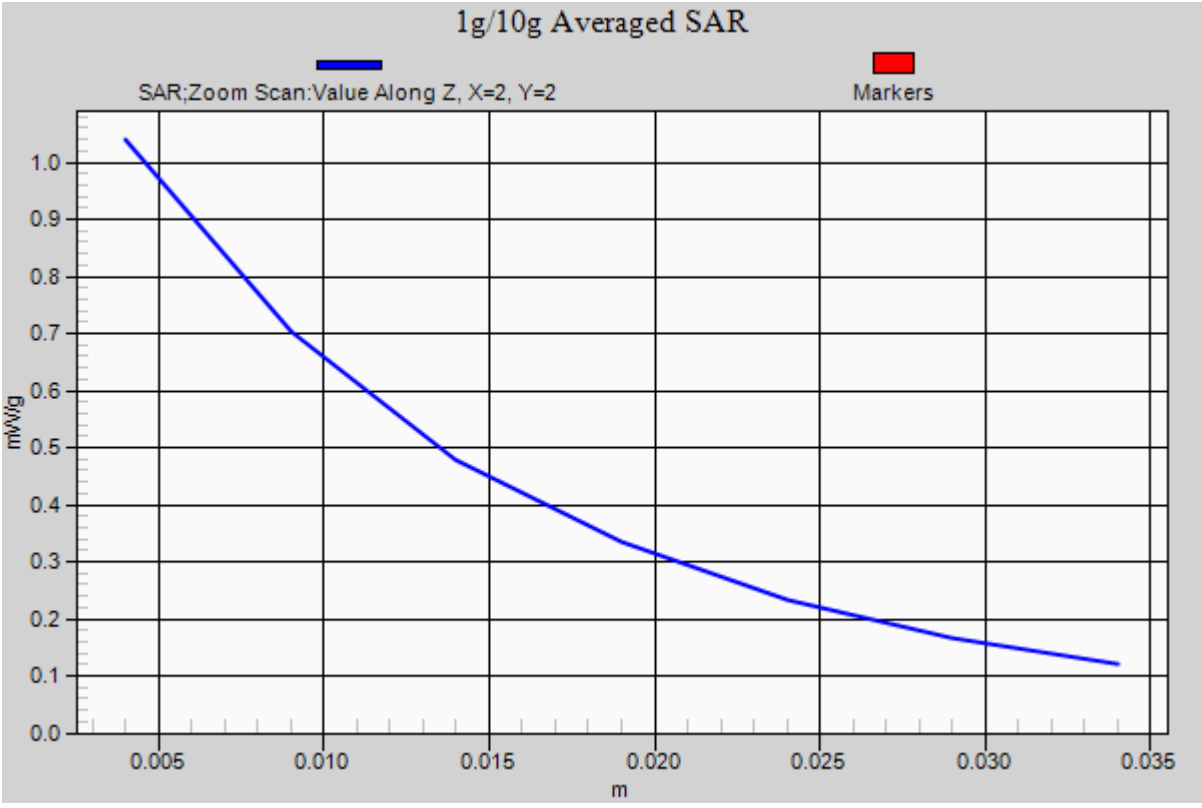
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Head Medium parameters used:
f = 835 MHz; σ = 0.89 mho/m; ε_r = 41.25; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-21-2012; Ambient Temp: 24.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3213; ConvF(6.07, 6.07, 6.07); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

835 MHz System Verification

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 1.408 mW/g
SAR(1 g) = 0.958 mW/g; SAR(10 g) = 0.626 mW/g
Deviation = 1.81%



PCTEST ENGINEERING LABORATORY, INC.

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

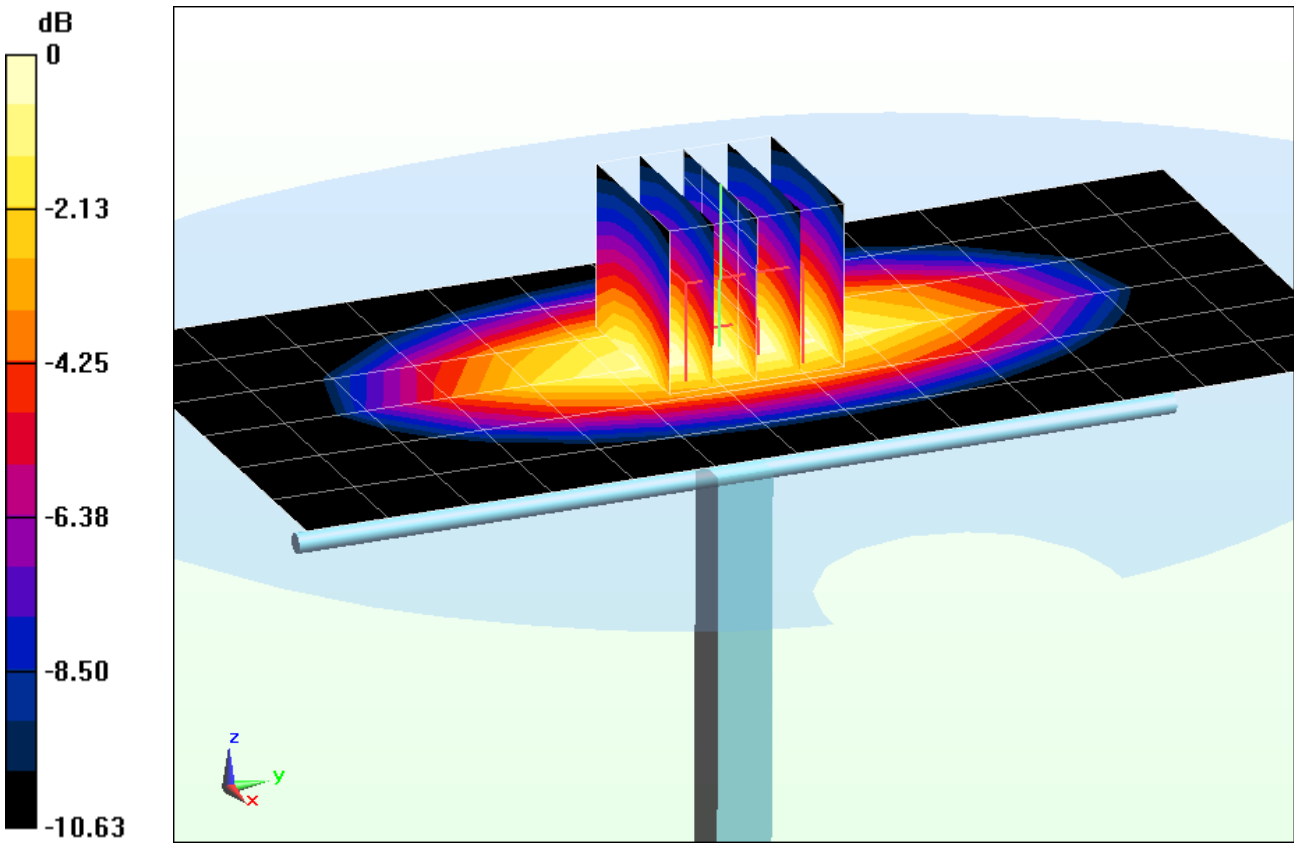
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used:
f = 835 MHz; σ = 0.902 mho/m; ε_r = 42.64; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-25-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3213; ConvF(6.07, 6.07, 6.07); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

835 MHz System Verification

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 1.387 mW/g
SAR(1 g) = 0.939 mW/g; SAR(10 g) = 0.612 mW/g
Deviation = -0.21%



0 dB = 1.02 mW/g = 0.17 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

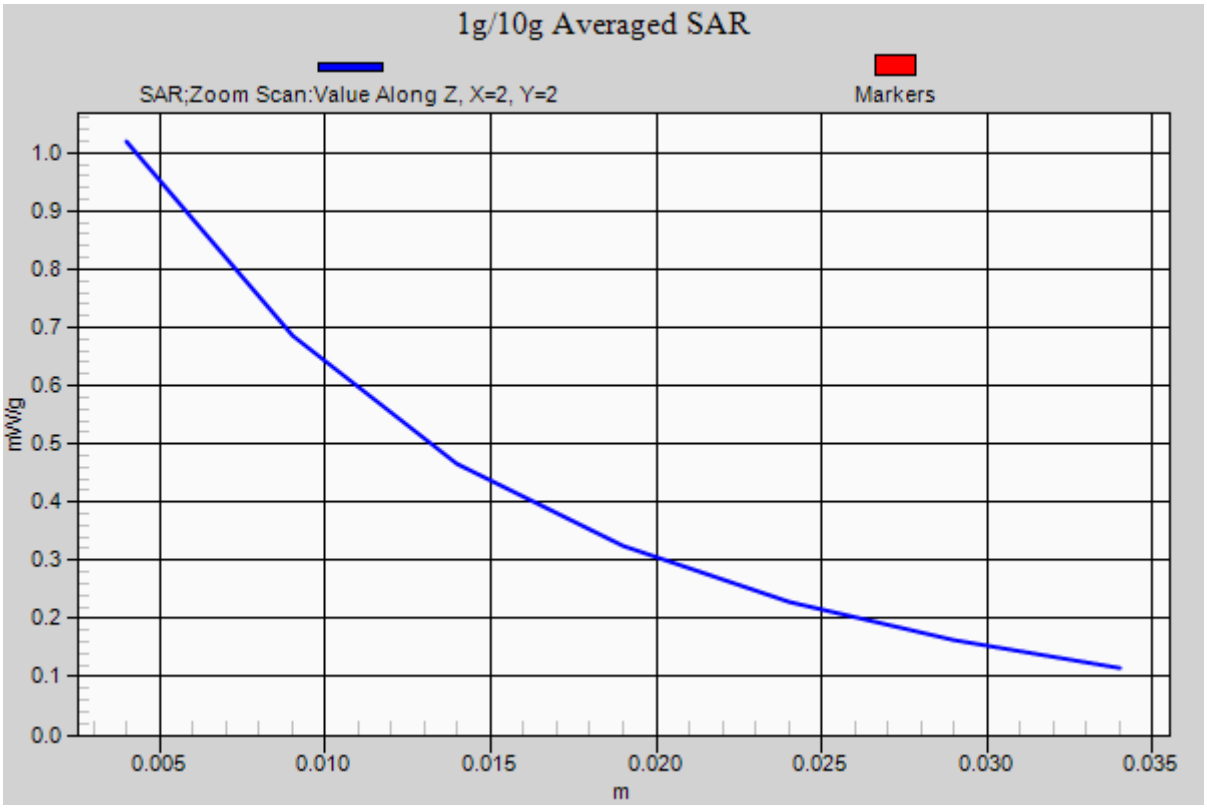
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 Head; Medium parameters used:
f = 835 MHz; σ = 0.902 mho/m; ε_r = 42.64; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-25-2012; Ambient Temp: 24.3°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3213; ConvF(6.07, 6.07, 6.07); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Right; Type: QD000P40CD; Serial: 1686
Measurement SW: DASY52, Version 52.8 (1);SEMCAD X Version 14.6.5 (6469)

835 MHz System Verification

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 1.387 mW/g
SAR(1 g) = 0.939 mW/g; SAR(10 g) = 0.612 mW/g
Deviation = -0.21%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

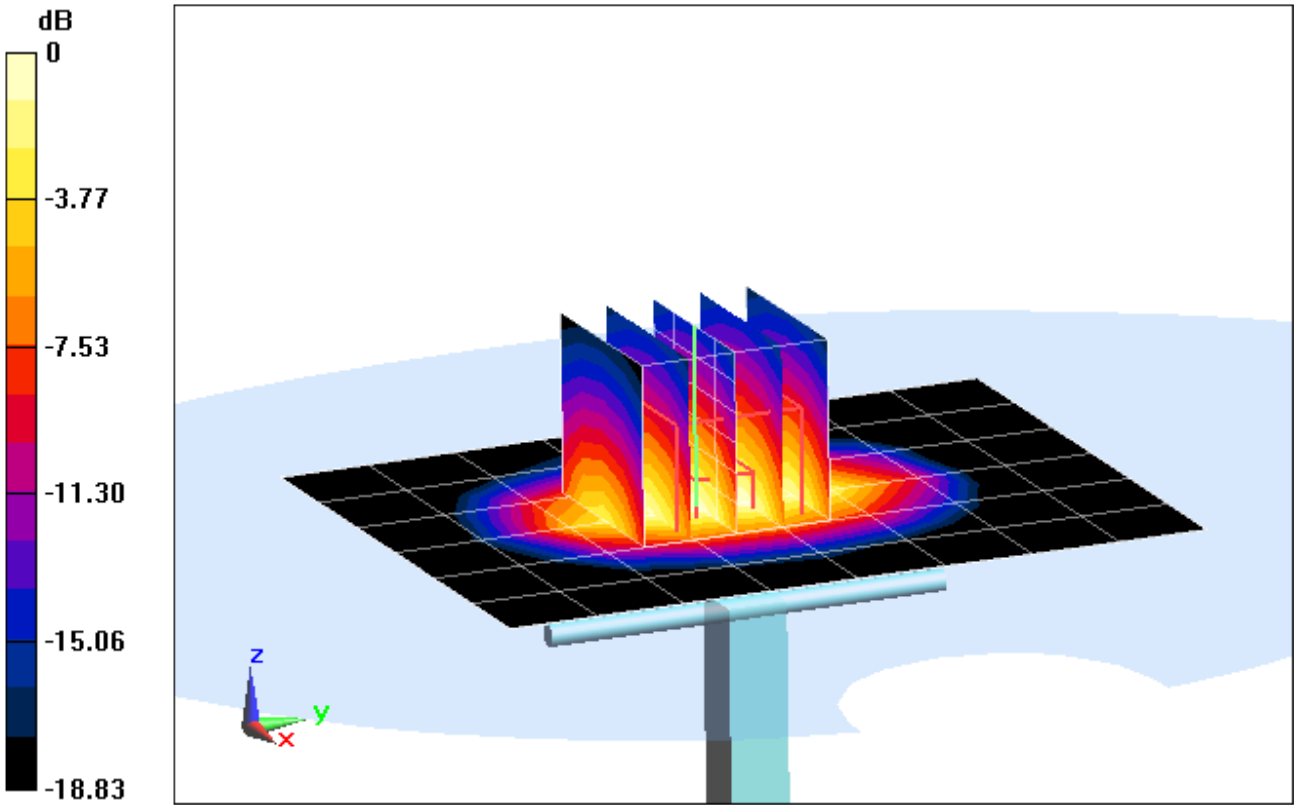
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.445 mho/m; ε_r = 39.91; ρ = 1000 kg/m^3
Phantom section: Flat Section : Space: 1.0 cm

Test Date: 09-21-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3263; ConvF(5.09, 5.09, 5.09); Calibrated: 5/18/2012;
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 (1);SEMCAD X Version 14.6.5 (6469)

1900 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 7.075 mW/g
SAR(1 g) = 3.73 mW/g; SAR(10 g) = 1.92 mW/g
Deviation = -5.09 %



0 dB = 4.14 mW/g = 12.34 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

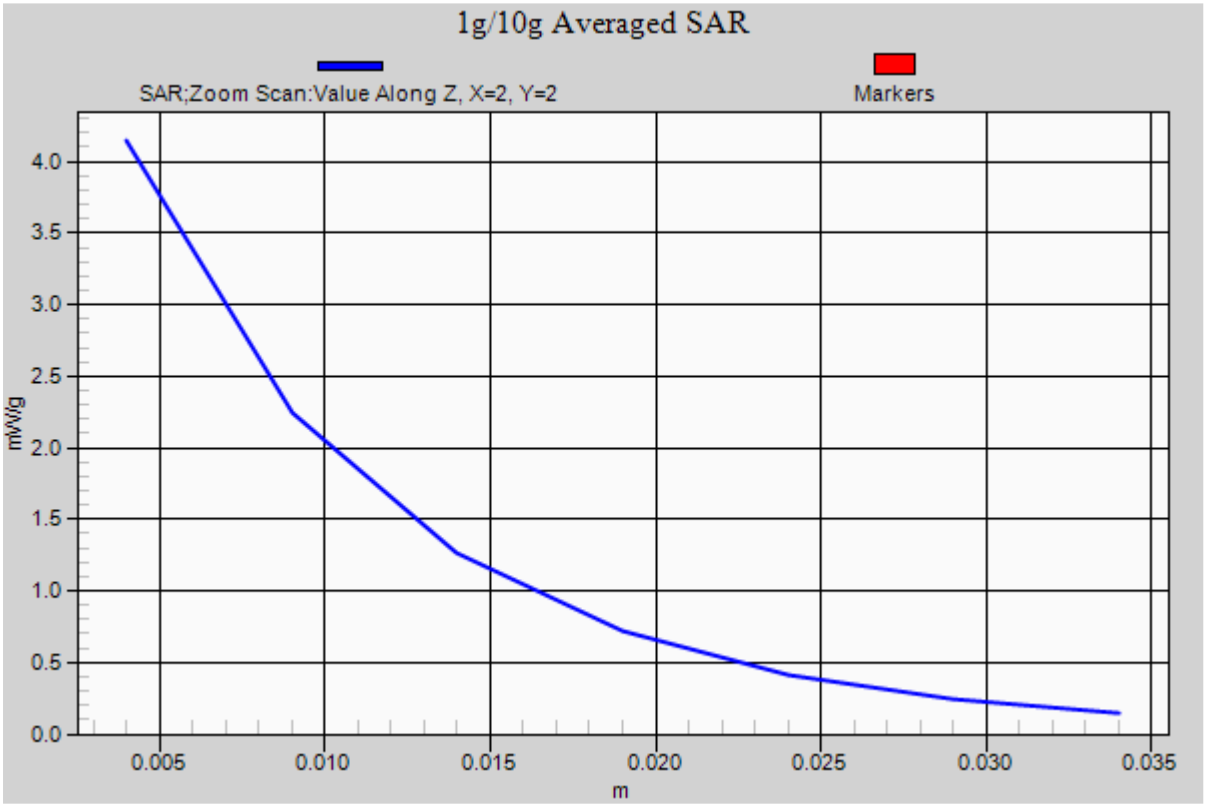
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Head Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.445 mho/m; ε_r = 39.91; ρ = 1000 kg/m^3
Phantom section: Flat Section : Space: 1.0 cm

Test Date: 09-21-2012; Ambient Temp: 21.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3263; ConvF(5.09, 5.09, 5.09); Calibrated: 5/18/2012;
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 (1);SEMCAD X Version 14.6.5 (6469)

1900 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 7.075 mW/g
SAR(1 g) = 3.73 mW/g; SAR(10 g) = 1.92 mW/g
Deviation = -5.09 %



PCTEST ENGINEERING LABORATORY, INC.

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

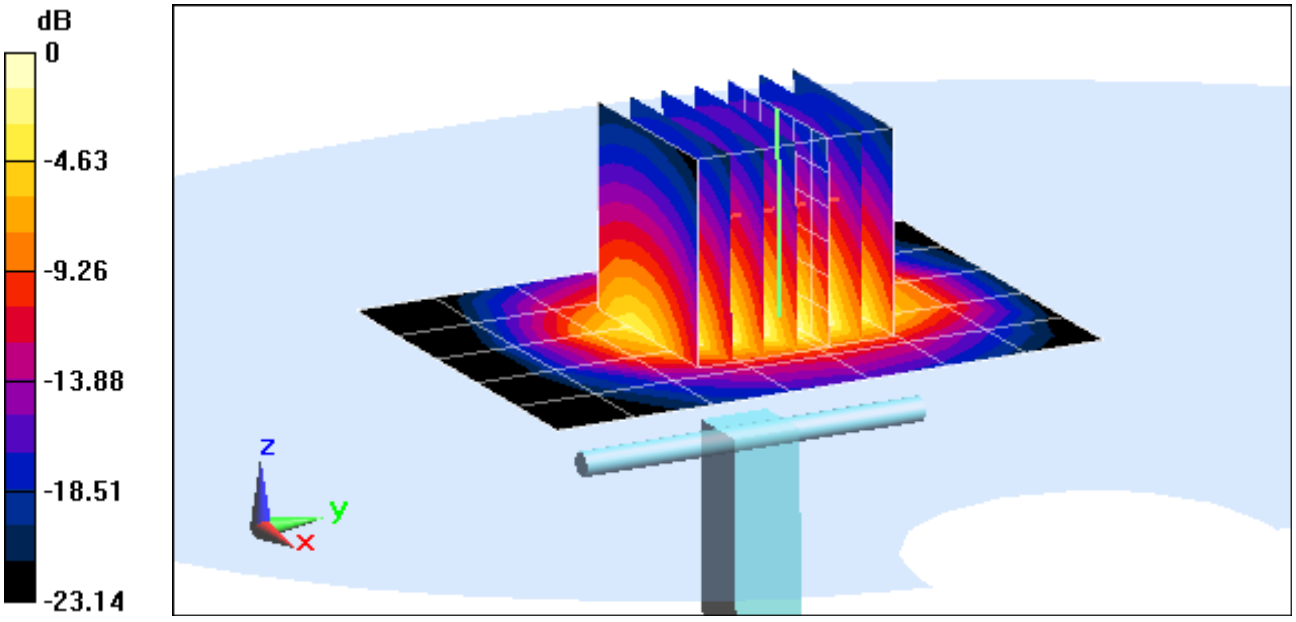
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.867 mho/m; ε_r = 37.83; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2012; Ambient Temp: 24.5°C; Tissue Temp: 23.6°C

Probe: ES3DV3 - SN3209; ConvF(4.46, 4.46, 4.46); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

2450 MHz System Verification

Area Scan (6x8x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 16.0 dBm (40.0 mW)
Peak SAR (extrapolated) = 4.479 mW/g
SAR(1 g) = 2.23 mW/g; SAR(10 g) = 1.04 mW/g
Deviation = 7.01%



0 dB = 2.77 mW/g = 8.85 dB mW/g

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

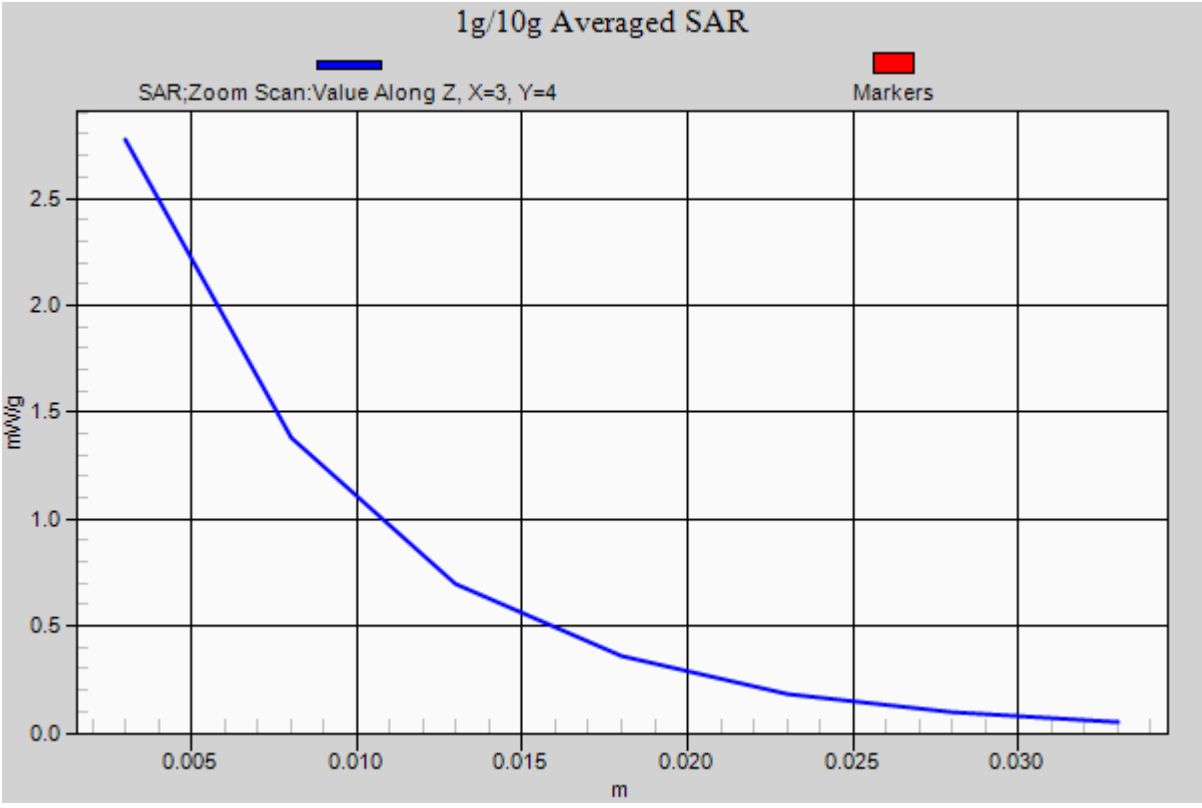
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used:
f = 2450 MHz; σ = 1.867 mho/m; ε_r = 37.83; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2012; Ambient Temp: 24.5°C; Tissue Temp: 23.6°C

Probe: ES3DV3 - SN3209; ConvF(4.46, 4.46, 4.46); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

2450 MHz System Verification

Area Scan (6x8x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 16.0 dBm (40.0 mW)
Peak SAR (extrapolated) = 4.479 mW/g
SAR(1 g) = 2.23 mW/g; SAR(10 g) = 1.04 mW/g
Deviation = 7.01%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1004

Communication System: CW; Frequency: 2600 MHz;Duty Cycle: 1:1

Medium: 2600 Head Medium parameters used:

f = 2600 MHz; σ = 2.048 mho/m; ε_r = 37.95; ρ = 1000 kg/m^3

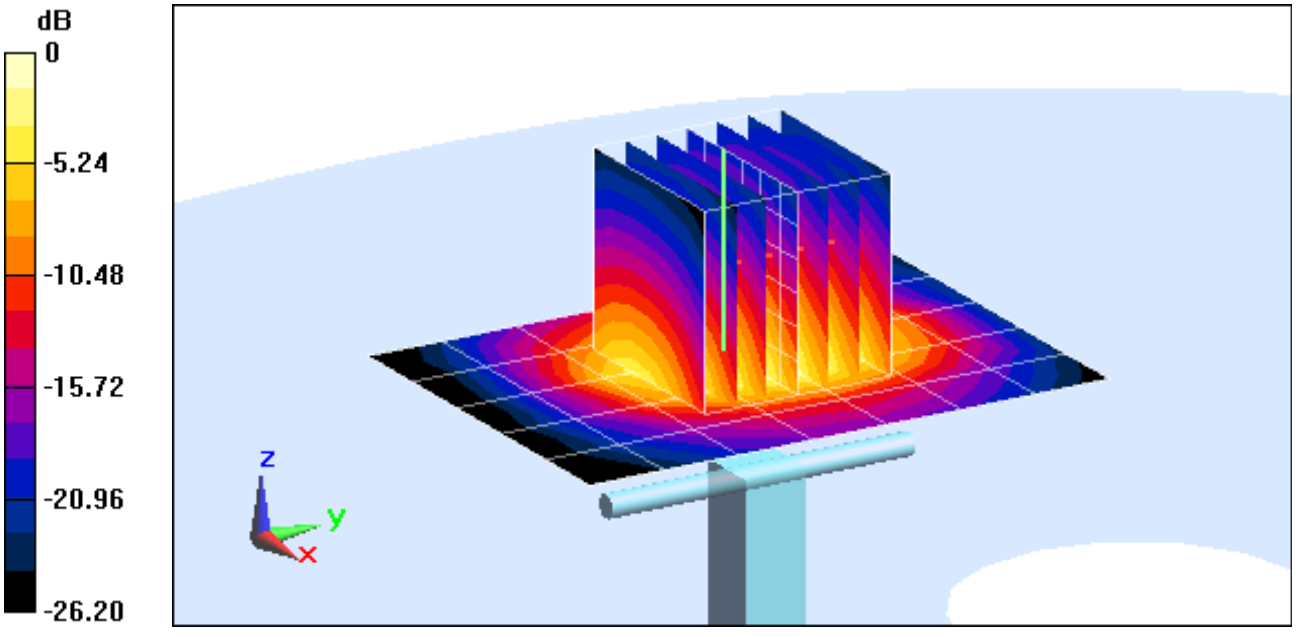
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 10-09-2012; Ambient Temp: 23.9°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.3, 4.3, 4.3); Calibrated: 3/16/2012;
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)

2600 MHz System Verification

Area Scan (6x8x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 16.0 dBm (40 mW)
Peak SAR (extrapolated) = 5.052 mW/g
SAR(1 g) = 2.34 mW/g; SAR(10 g) = 1.05 mW/g
Deviation = 2.63%



0 dB = 2.98 mW/g = 9.48 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1004

Communication System: CW; Frequency: 2600 MHz;Duty Cycle: 1:1

Medium: 2600 Head Medium parameters used:

f = 2600 MHz; σ = 2.048 mho/m; ε_r = 37.95; ρ = 1000 kg/m^3

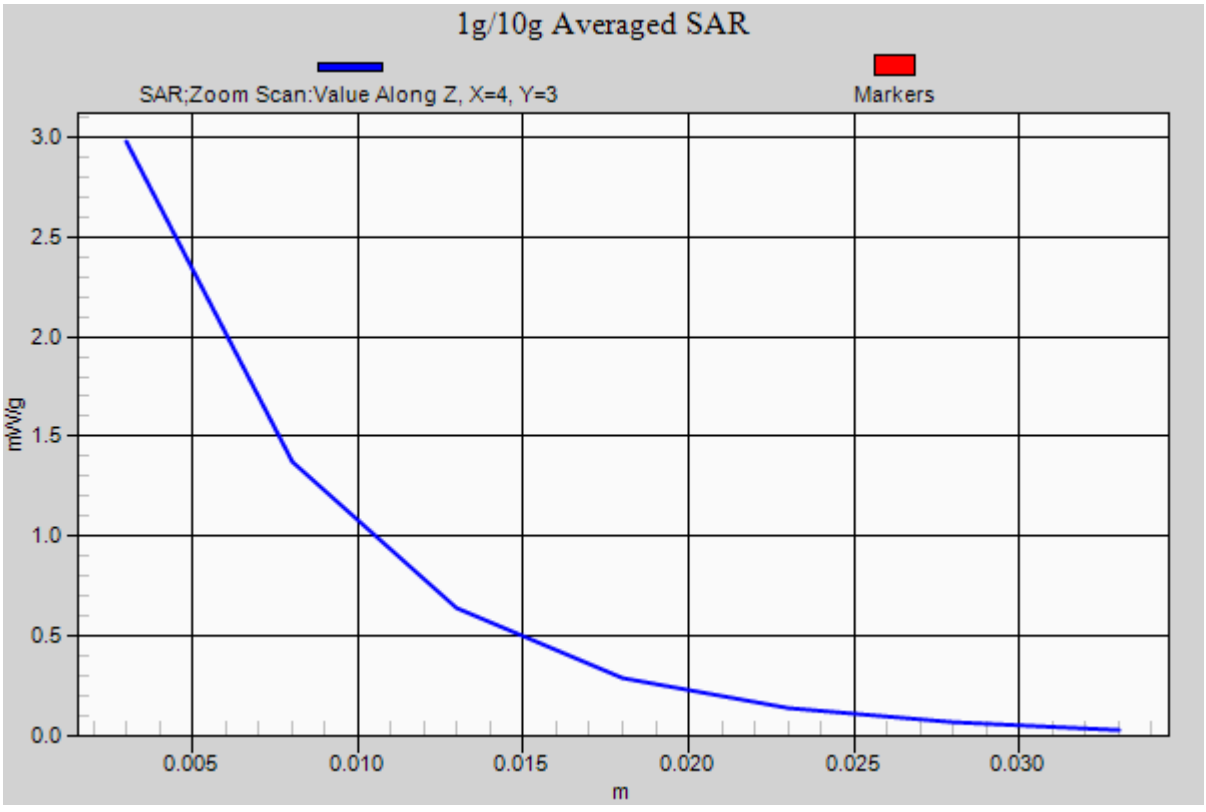
Phantom section: Flat Section: Space: 1.0 cm

Test Date: 10-09-2012; Ambient Temp: 23.9°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3209; ConvF(4.3, 4.3, 4.3); Calibrated: 3/16/2012;
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)

2600 MHz System Verification

Area Scan (6x8x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 16.0 dBm (40 mW)
Peak SAR (extrapolated) = 5.052 mW/g
SAR(1 g) = 2.34 mW/g; SAR(10 g) = 1.05 mW/g
Deviation = 2.63%



PCTEST ENGINEERING LABORATORY, INC.

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

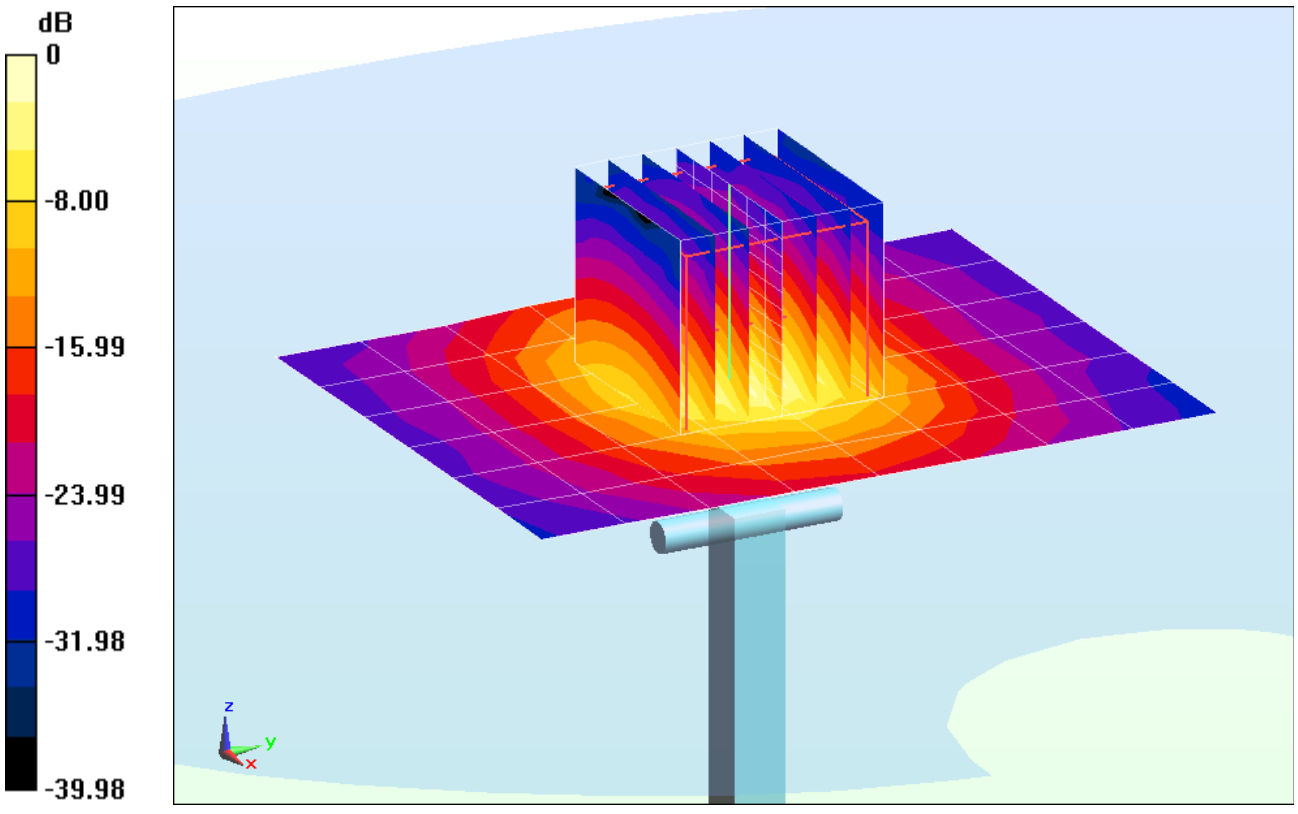
Communication System: CW; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: 5GHz Head; Medium parameters used:
f = 5200 MHz; σ = 4.43 mho/m; ε_r = 35.82; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 22.7°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3589; ConvF(4.59, 4.59, 4.59); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5200 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 34.513 mW/g
SAR(1 g) = 7.92 mW/g; SAR(10 g) = 2.26 mW/g
Deviation = 0.13%



0 dB = 16.3 mW/g = 24.24 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

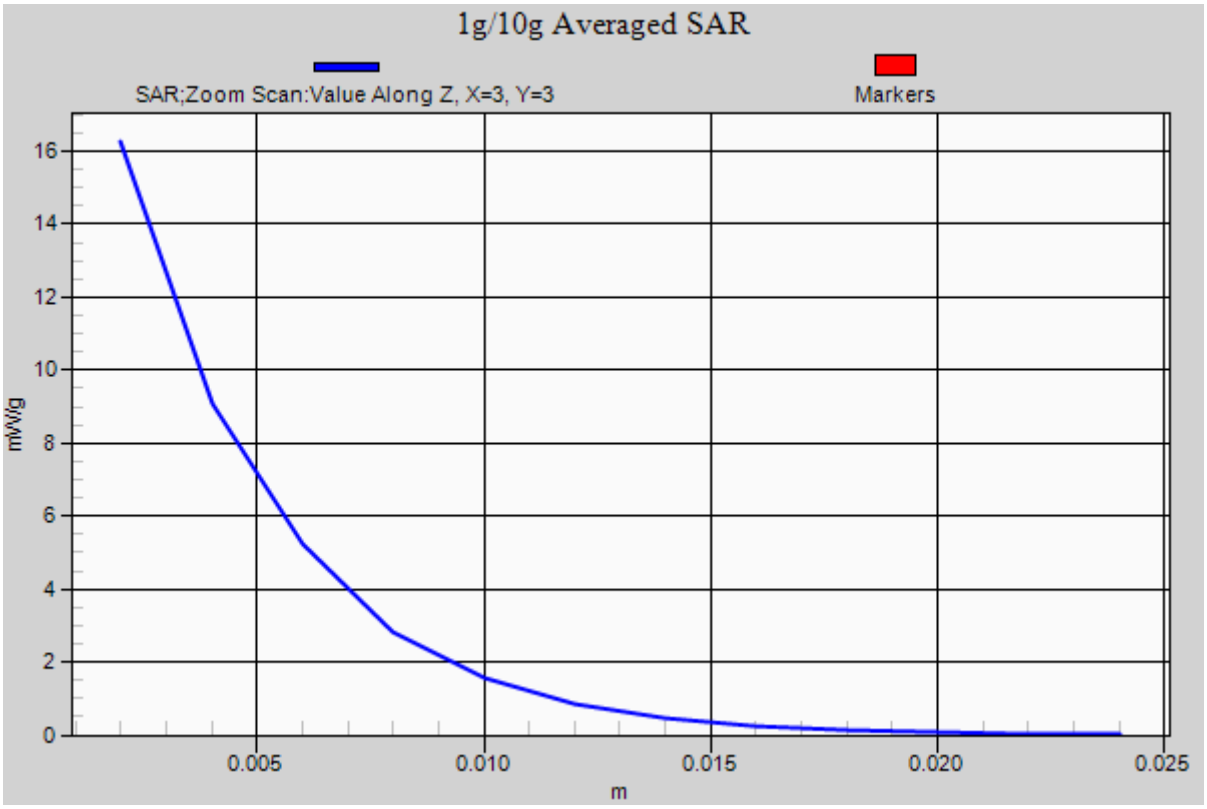
Communication System: CW; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: 5GHz Head; Medium parameters used:
f = 5200 MHz; σ = 4.43 mho/m; ε_r = 35.82; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 22.7°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3589; ConvF(4.59, 4.59, 4.59); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5200 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 34.513 mW/g
SAR(1 g) = 7.92 mW/g; SAR(10 g) = 2.26 mW/g
Deviation = 0.13%



PCTEST ENGINEERING LABORATORY, INC.

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

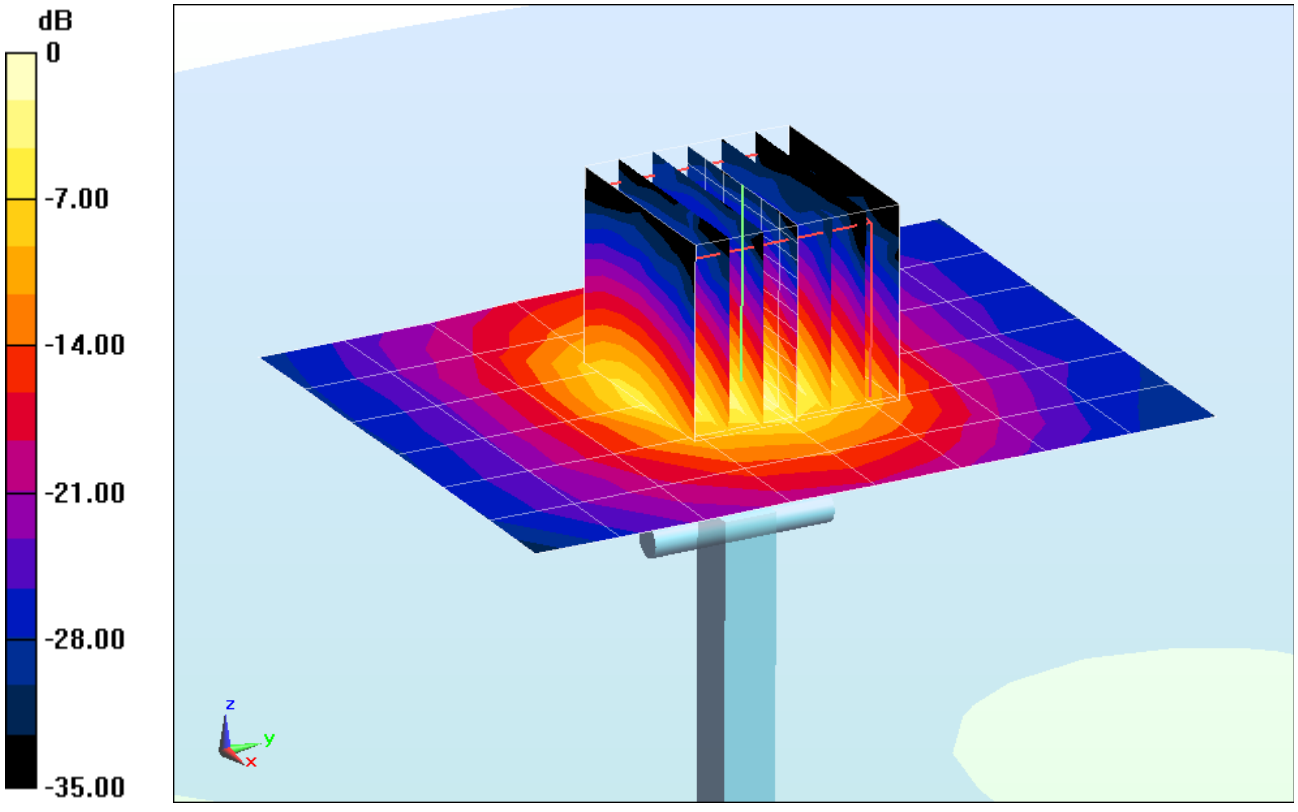
Communication System: CW; Frequency: 5500 MHz; Duty Cycle: 1:1
Medium: 5GHz Head; Medium parameters used:
f = 5500 MHz; σ = 4.788 mho/m; ε_r = 35.35; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 22.8°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN3589; ConvF(4.33, 4.33, 4.33); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5500 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 40.358 mW/g
SAR(1 g) = 8.46 mW/g; SAR(10 g) = 2.35 mW/g
Deviation = -0.35%



0 dB = 17.1 mW/g = 24.66 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

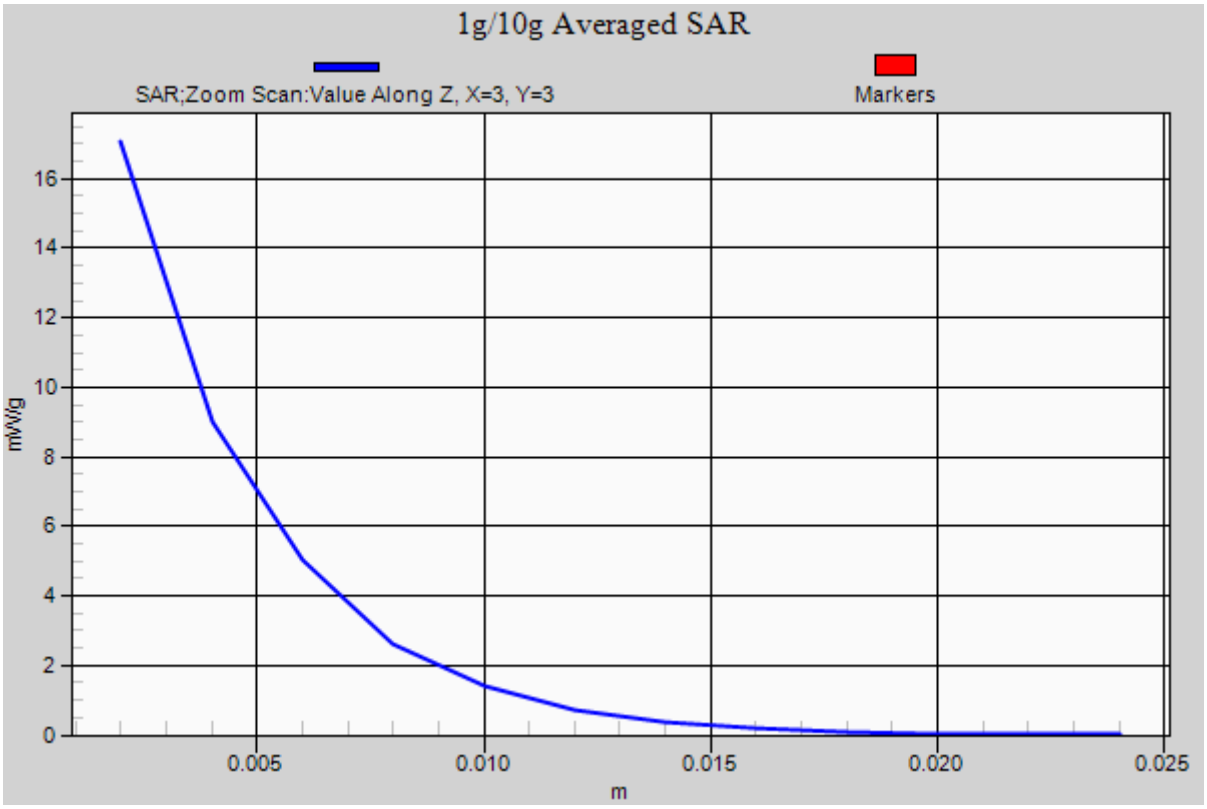
Communication System: CW; Frequency: 5500 MHz; Duty Cycle: 1:1
Medium: 5GHz Head; Medium parameters used:
f = 5500 MHz; σ = 4.788 mho/m; ε_r = 35.35; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 22.8°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN3589; ConvF(4.33, 4.33, 4.33); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5500 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 40.358 mW/g
SAR(1 g) = 8.46 mW/g; SAR(10 g) = 2.35 mW/g
Deviation = -0.35%



PCTEST ENGINEERING LABORATORY, INC.

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

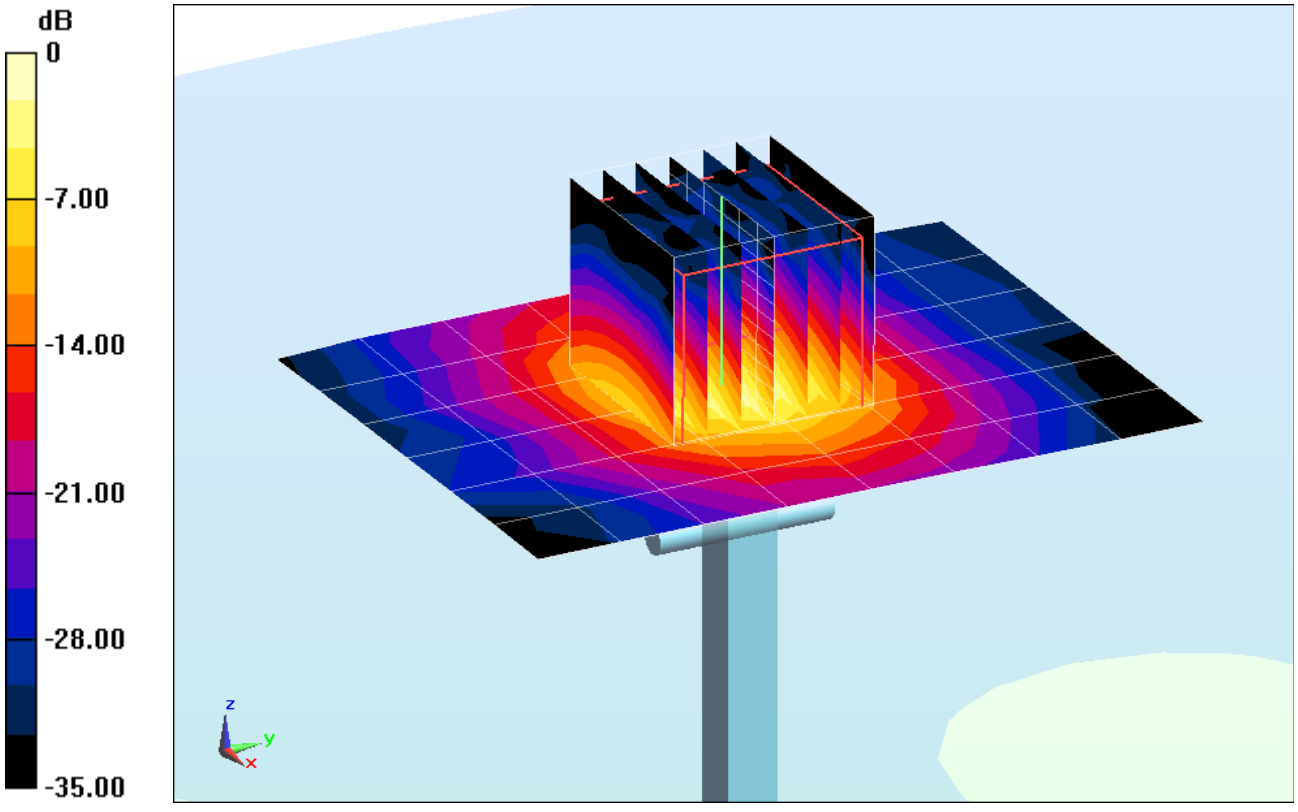
Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: 5GHz Head; Medium parameters used:
f = 5800 MHz; σ = 5.181 mho/m; ε_r = 35.45; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 22.8°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3589; ConvF(4.05, 4.05, 4.05); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5800 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 39.364 mW/g
SAR(1 g) = 8.05 mW/g; SAR(10 g) = 2.24 mW/g
Deviation = 1.26%



0 dB = 16.9 mW/g = 24.56 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

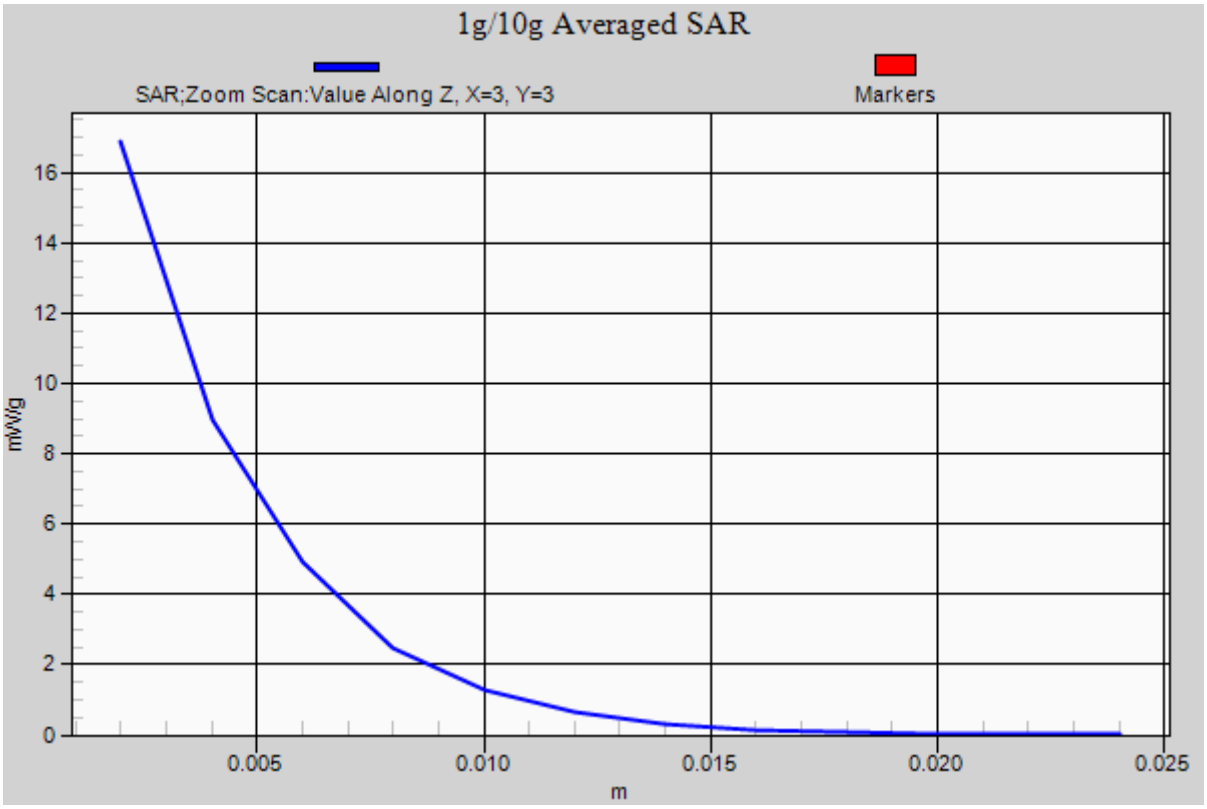
Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: 5GHz Head; Medium parameters used:
f = 5800 MHz; σ = 5.181 mho/m; ε_r = 35.45; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 22.8°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3589; ConvF(4.05, 4.05, 4.05); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1114
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5800 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 39.364 mW/g
SAR(1 g) = 8.05 mW/g; SAR(10 g) = 2.24 mW/g
Deviation = 1.26%



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 = 0.964 mho/m; ε_r = 55.653; ρ = 1000 kg/m^3

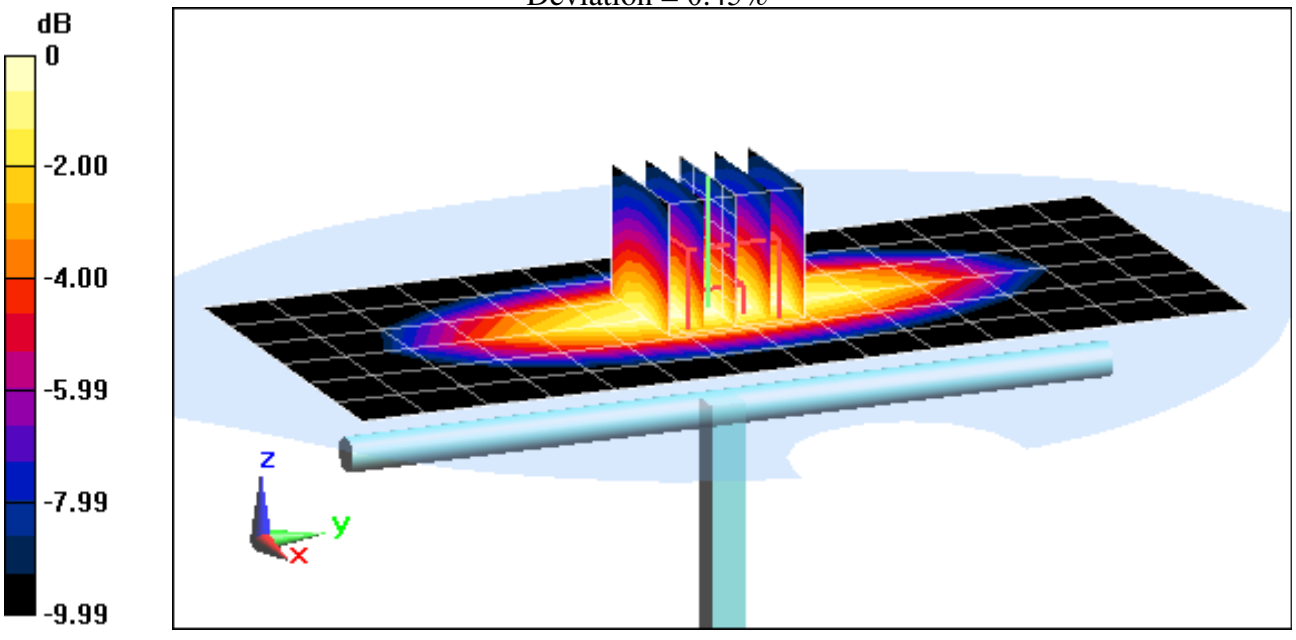
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-10-2012; Ambient Temp: 24.4°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3213; ConvF(6.19, 6.19, 6.19); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Front; Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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)
Peak SAR (extrapolated) = 1.271 mW/g
SAR(1 g) = 0.888 mW/g; SAR(10 g) = 0.592 mW/g
Deviation = 0.45%



0 dB = 0.958 mW/g = -0.37 dB mW/g

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 = 0.964 mho/m; ε_r = 55.653; ρ = 1000 kg/m^3

Phantom section: Flat Section; Space: 1.5 cm

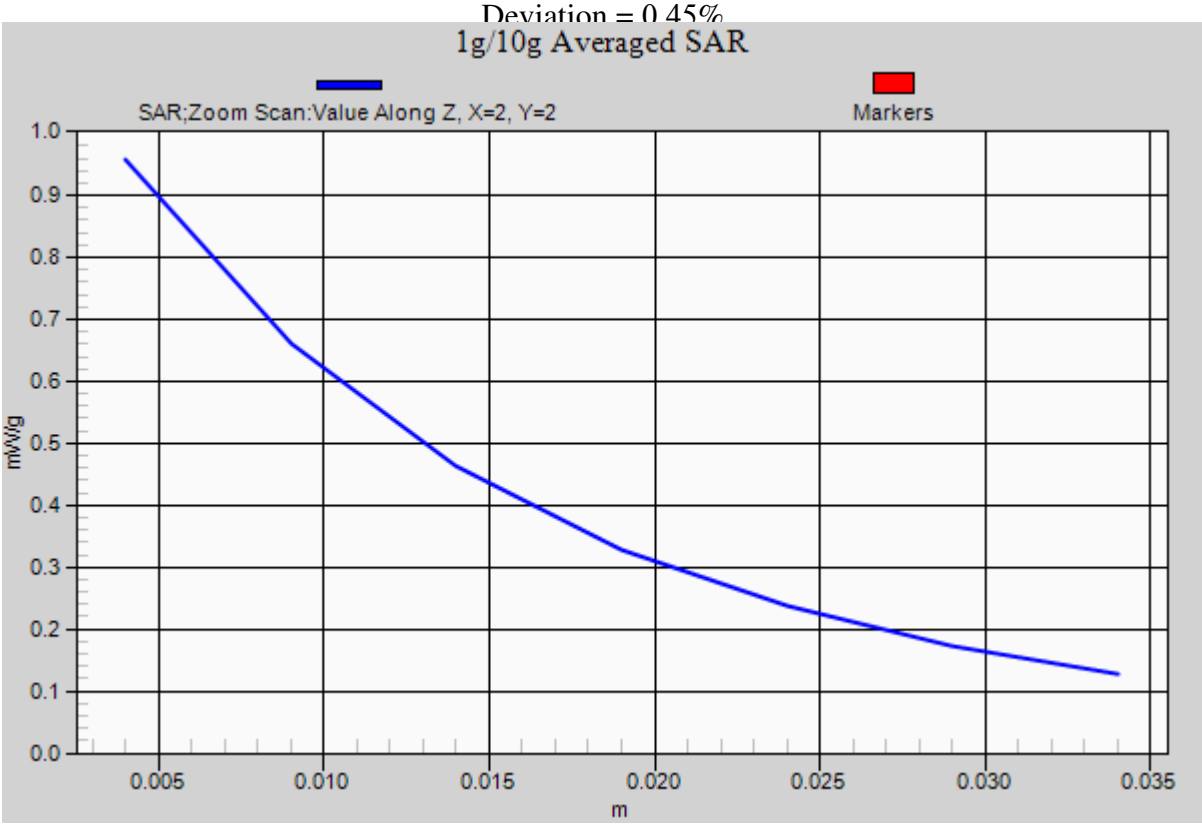
Test Date: 10-10-2012; Ambient Temp: 24.4°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3213; ConvF(6.19, 6.19, 6.19); Calibrated: 4/24/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1334; Calibrated: 5/7/2012
Phantom: SAM Front; Type: SAM; Serial: 1715
Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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)
Peak SAR (extrapolated) = 1.271 mW/g
SAR(1 g) = 0.888 mW/g; SAR(10 g) = 0.592 mW/g

Deviation = 0.45%



PCTEST ENGINEERING LABORATORY, INC.

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

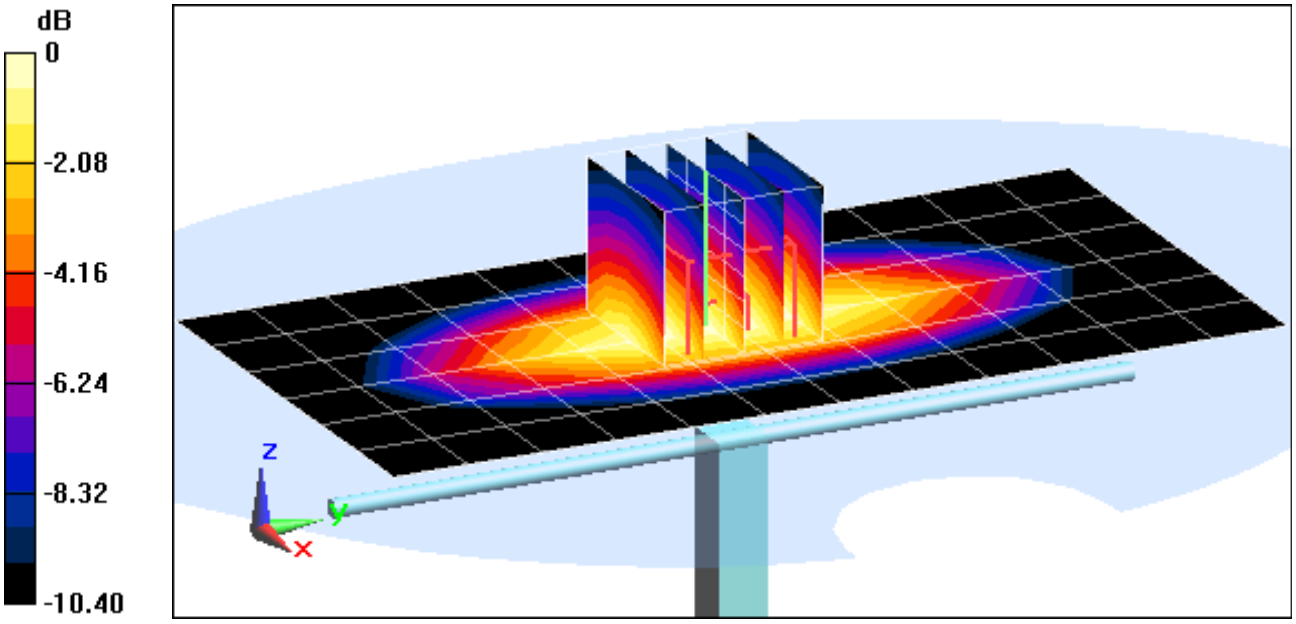
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.988 mho/m; ε_r = 53.51; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-24-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.02, 6.02, 6.02); Calibrated: 8/28/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

835 MHz 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)
Peak SAR (extrapolated) = 1.454 mW/g
SAR(1 g) = 0.999 mW/g; SAR(10 g) = 0.658 mW/g
Deviation = 4.50%



0 dB = 1.08 mW/g = 0.67 dB mW/g

PCTEST ENGINEERING LABORATORY, INC.

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

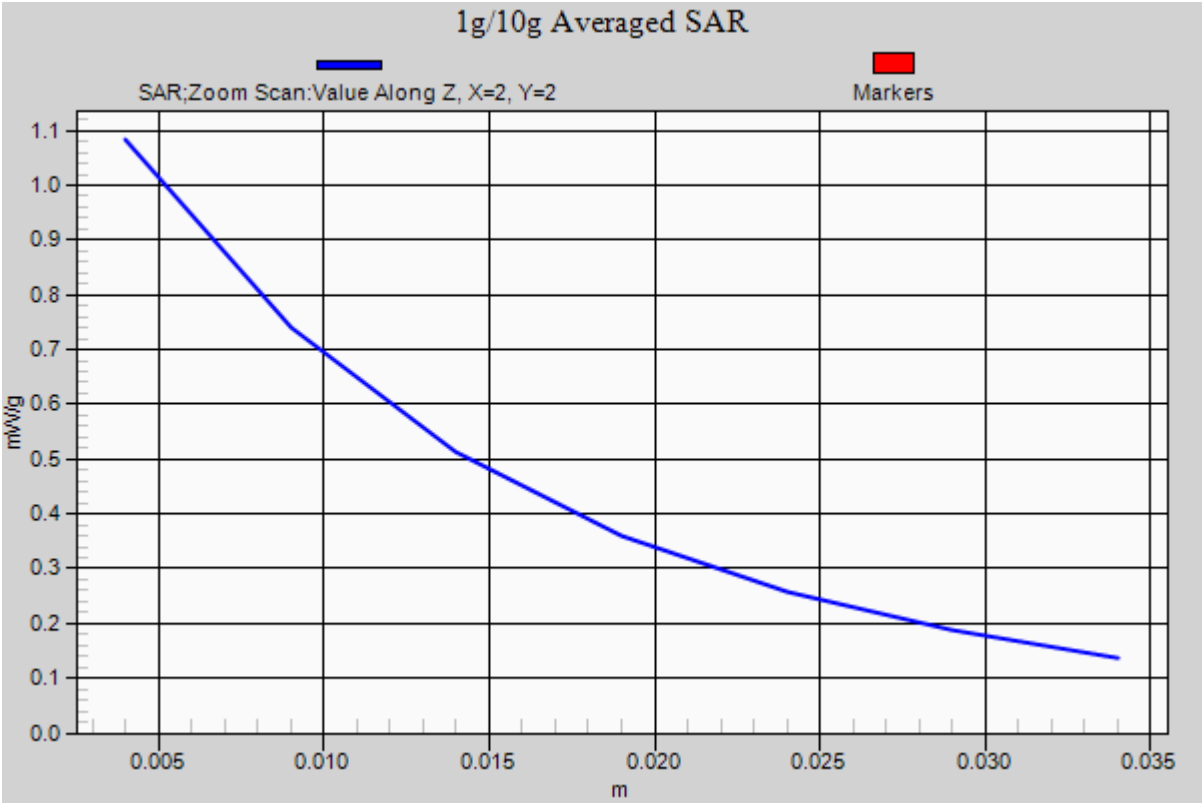
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: 835 Body Medium parameters used:
f = 835 MHz; σ = 0.988 mho/m; ε_r = 53.51; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 09-24-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.2°C

Probe: ES3DV2 - SN3022; ConvF(6.02, 6.02, 6.02); Calibrated: 8/28/2012;
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1322; Calibrated: 8/24/2012
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

835 MHz 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)
Peak SAR (extrapolated) = 1.454 mW/g
SAR(1 g) = 0.999 mW/g; SAR(10 g) = 0.658 mW/g
Deviation = 4.50%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

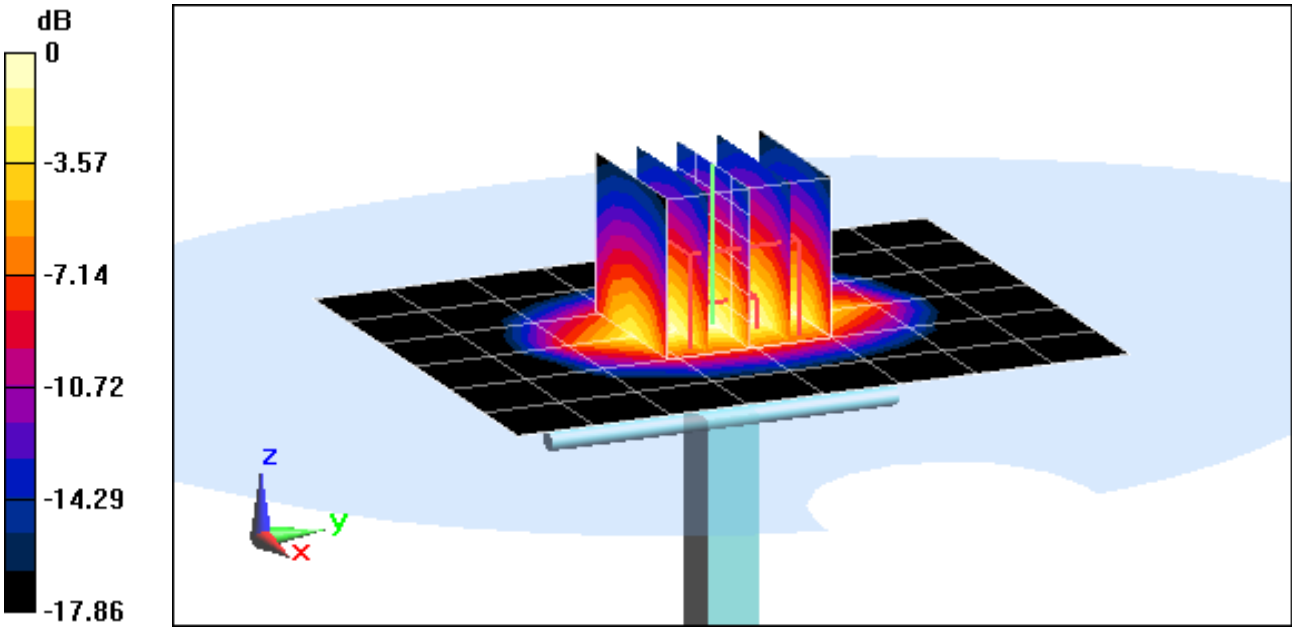
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.546 mho/m; ε_r = 51.257; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 21.4°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3287; ConvF(4.76, 4.76, 4.76); 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 (1); SEMCAD X Version 14.6.5 (6469)

1900 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 6.749 mW/g
SAR(1 g) = 3.74 mW/g; SAR(10 g) = 1.94 mW/g
Deviation = -4.83%



0 dB = 4.22 mW/g = 12.51 dB mW/g

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

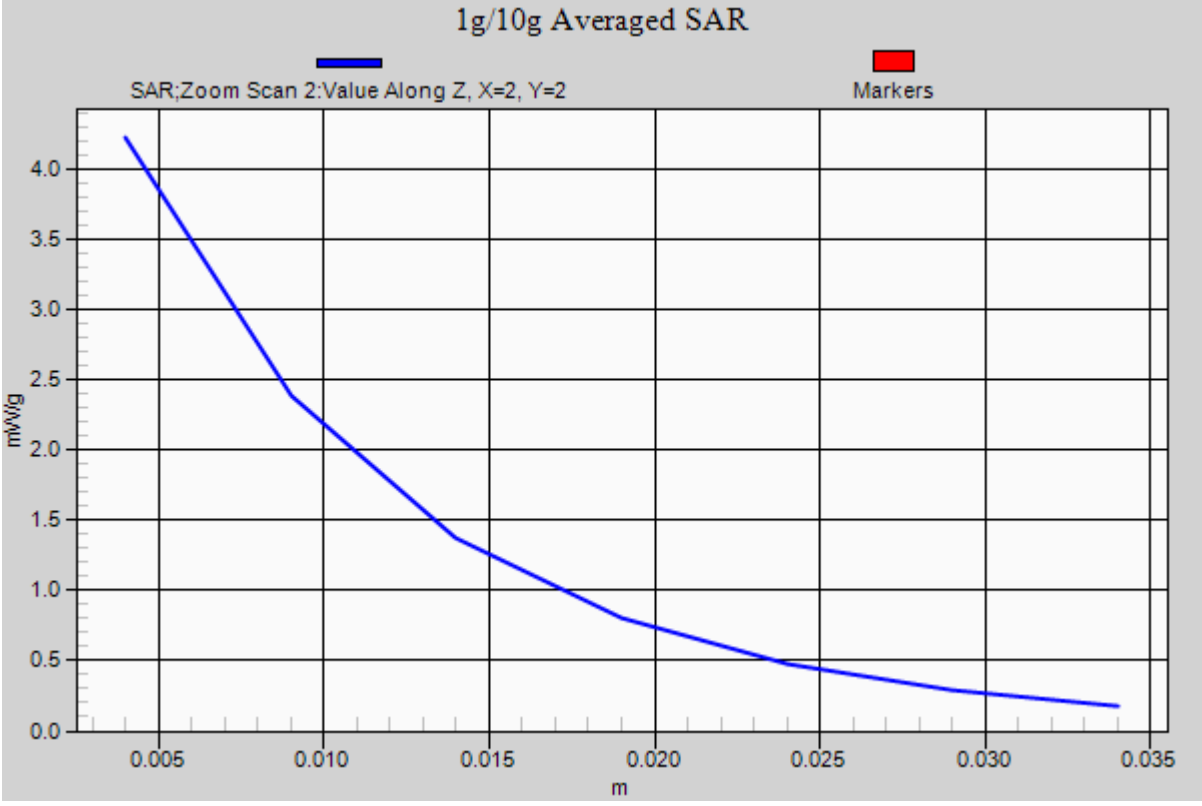
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.546 mho/m; ε_r = 51.257; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-24-2012; Ambient Temp: 21.4°C; Tissue Temp: 20.5°C

Probe: ES3DV3 - SN3287; ConvF(4.76, 4.76, 4.76); 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 (1); SEMCAD X Version 14.6.5 (6469)

1900 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 6.749 mW/g
SAR(1 g) = 3.74 mW/g; SAR(10 g) = 1.94 mW/g
Deviation = -4.83%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 882

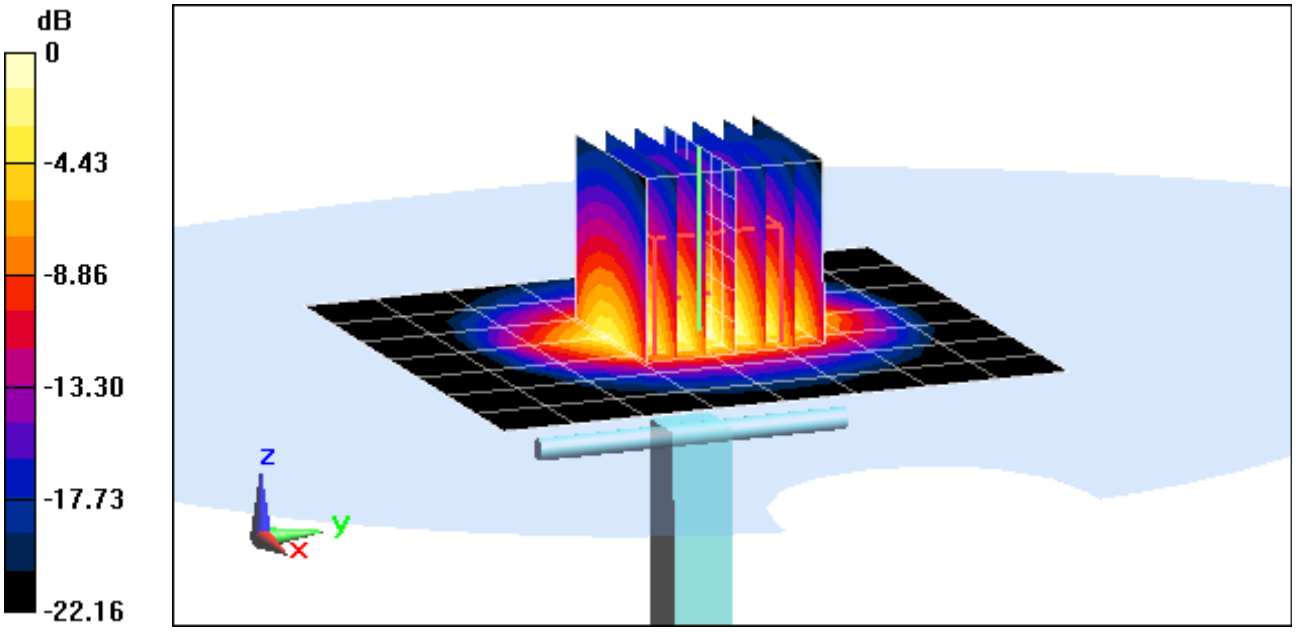
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.045 mho/m; ε_r = 51.47; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2012; Ambient Temp: 21.3°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3287; ConvF(4.28, 4.28, 4.28); Calibrated: 2/7/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687
Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

2450 MHz System Verification

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 11.693 mW/g
SAR(1 g) = 5.47 mW/g; SAR(10 g) = 2.51 mW/g
Deviation = 8.75%



0 dB = 7.18 mW/g = 17.12 dB mW/g

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 882

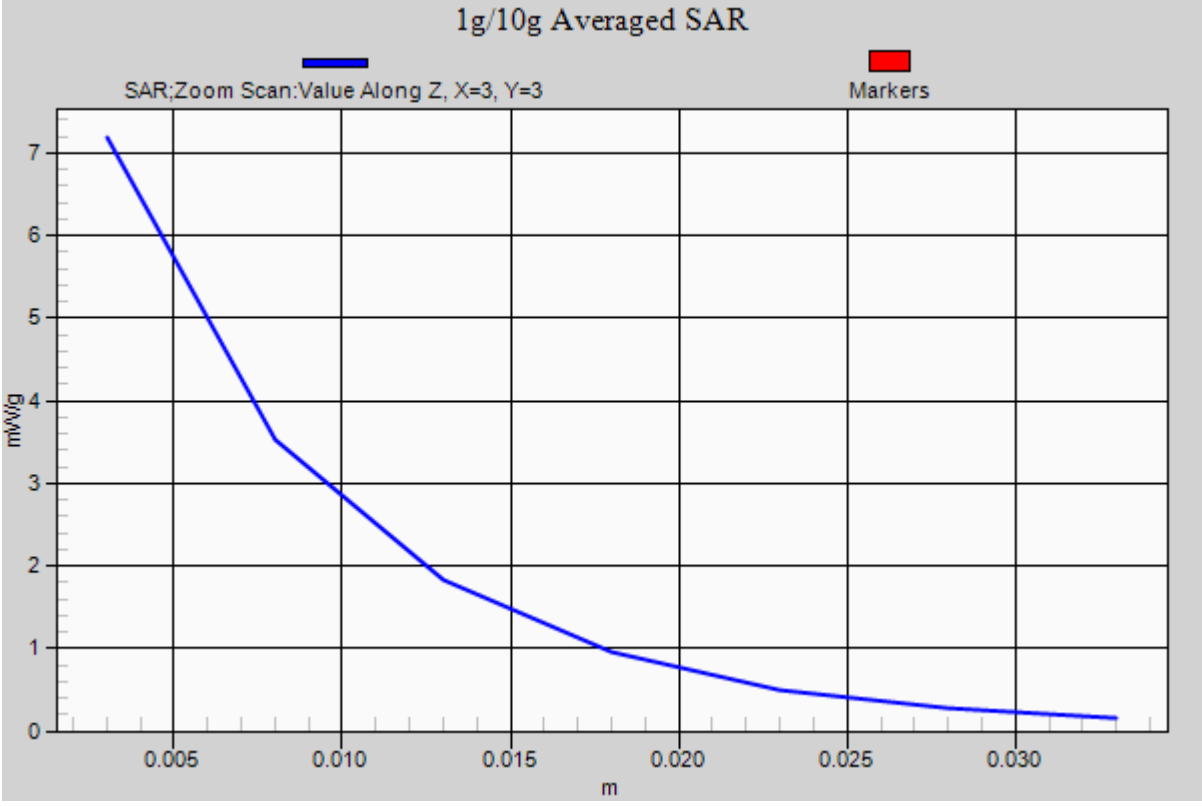
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: 2450 Body Medium parameters used:
f = 2450 MHz; σ = 2.045 mho/m; ε_r = 51.47; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2012; Ambient Temp: 21.3°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3287; ConvF(4.28, 4.28, 4.28); Calibrated: 2/7/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 2/20/2012
Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687
Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

2450 MHz System Verification

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 11.693 mW/g
SAR(1 g) = 5.47 mW/g; SAR(10 g) = 2.51 mW/g
Deviation = 8.75%



DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1004

Communication System: CW; Frequency: 2600 MHz;Duty Cycle: 1:1

Medium: 2600 Body Medium parameters used:

f = 2600 MHz; σ = 2.26 mho/m; ε_r = 52.19; ρ = 1000 kg/m^3

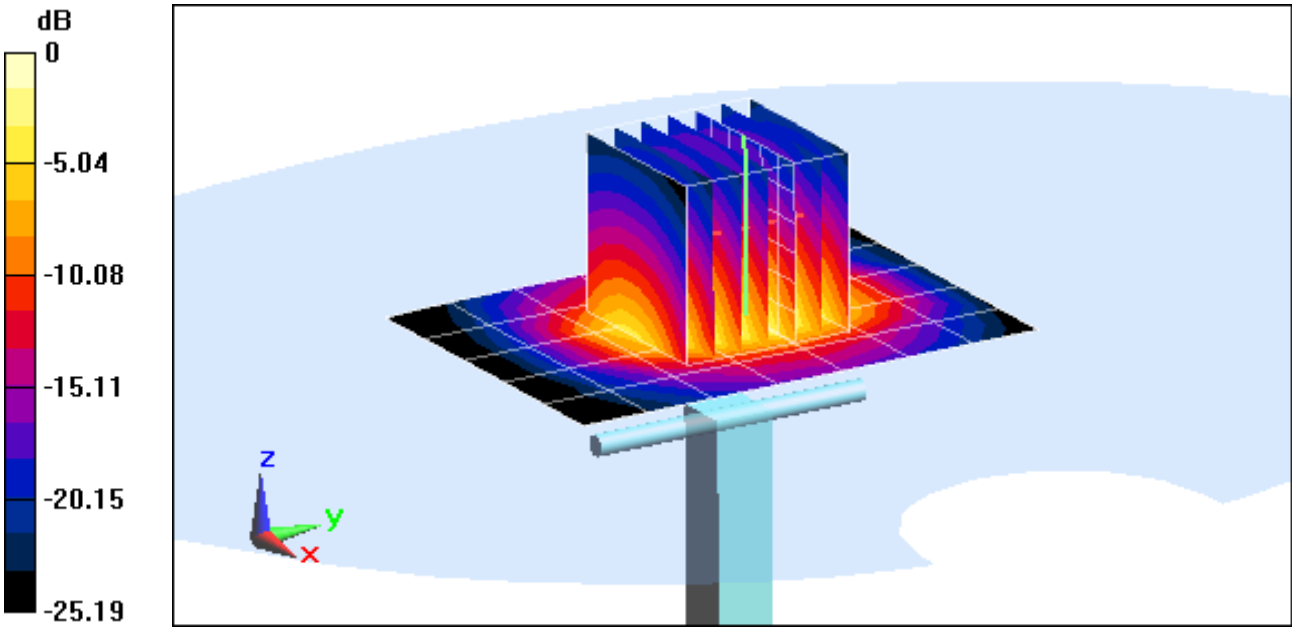
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-09-2012; Ambient Temp: 21.2°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3209; ConvF(4.02, 4.02, 4.02); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

2600 MHz System Verification

Area Scan (6x8x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 13.434 mW/g
SAR(1 g) = 5.83 mW/g; SAR(10 g) = 2.55 mW/g
Deviation = 6.58%



0 dB = 7.54 mW/g = 17.55 dB mW/g

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1004

Communication System: CW; Frequency: 2600 MHz;Duty Cycle: 1:1

Medium: 2600 Body Medium parameters used:

f = 2600 MHz; σ = 2.26 mho/m; ε_r = 52.19; ρ = 1000 kg/m^3

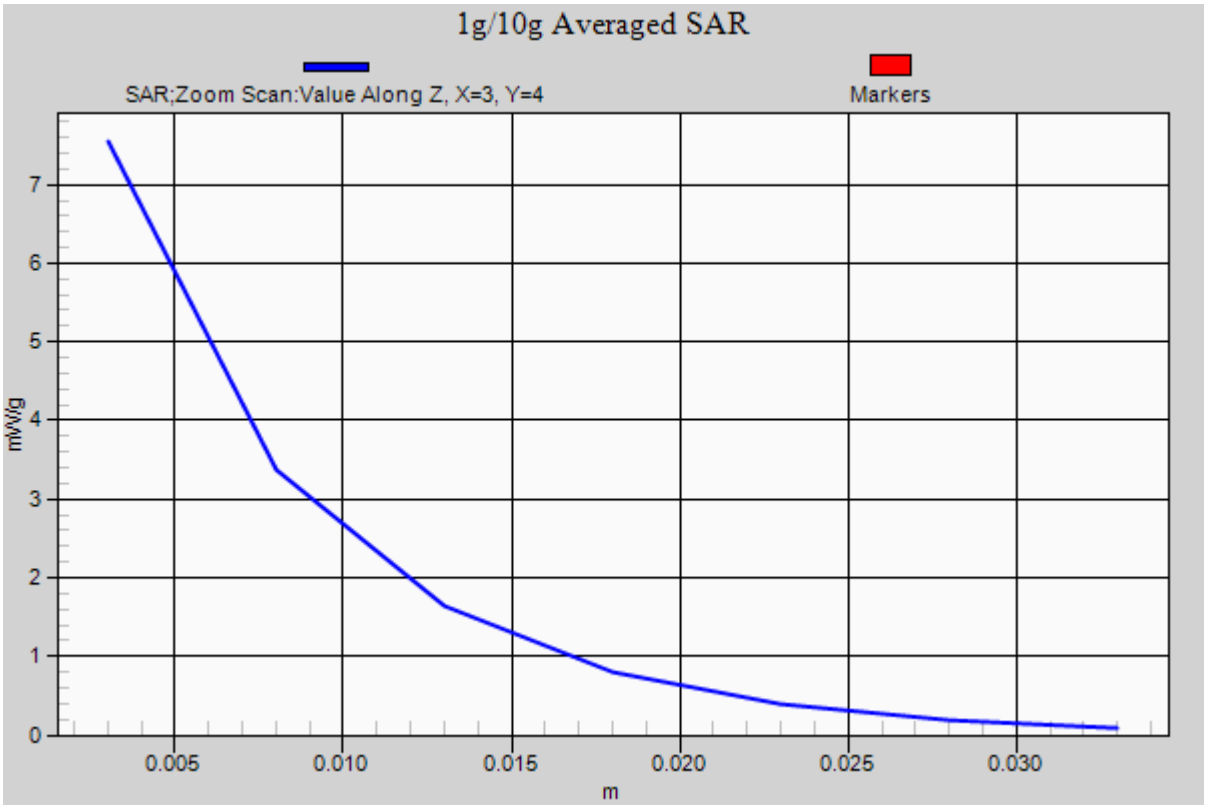
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-09-2012; Ambient Temp: 21.2°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3209; ConvF(4.02, 4.02, 4.02); Calibrated: 3/16/2012;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 4/19/2012
Phantom: SAM with CRP; Type: SAM; Serial: TP1375
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

2600 MHz System Verification

Area Scan (6x8x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Input Power: 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 13.434 mW/g
SAR(1 g) = 5.83 mW/g; SAR(10 g) = 2.55 mW/g
Deviation = 6.58%



PCTEST ENGINEERING LABORATORY, INC.

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

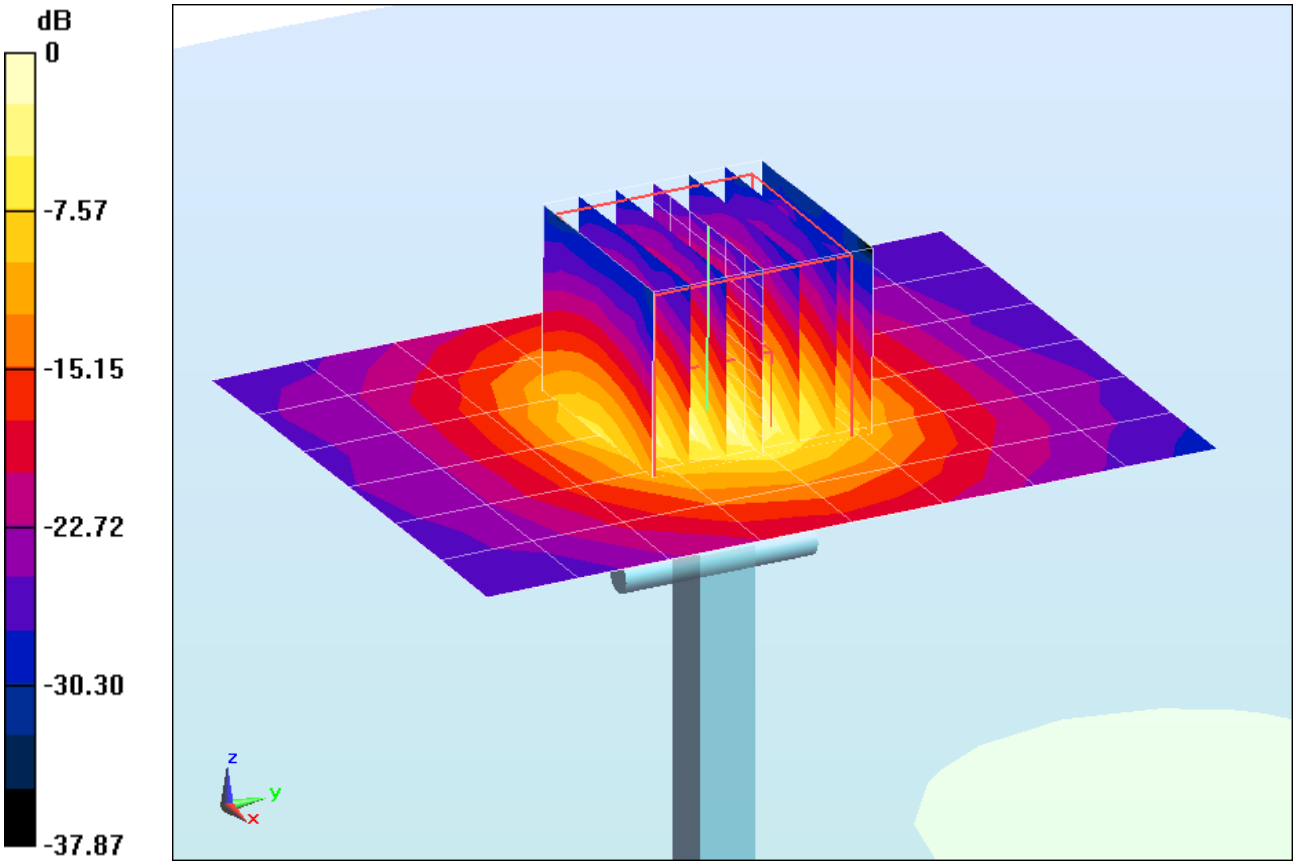
Communication System: CW; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: 5GHz Body; Medium parameters used:
f = 5200 MHz; σ = 5.349 mho/m; ε_r = 49.25; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.5°C

Probe: EX3DV4 - SN3589; ConvF(3.92, 3.92, 3.92); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5200 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 34.469 mW/g
SAR(1 g) = 7.78 mW/g; SAR(10 g) = 2.18 mW/g
Deviation = 5.99%



0 dB = 16.1 mW/g = 24.14 dB mW/g

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

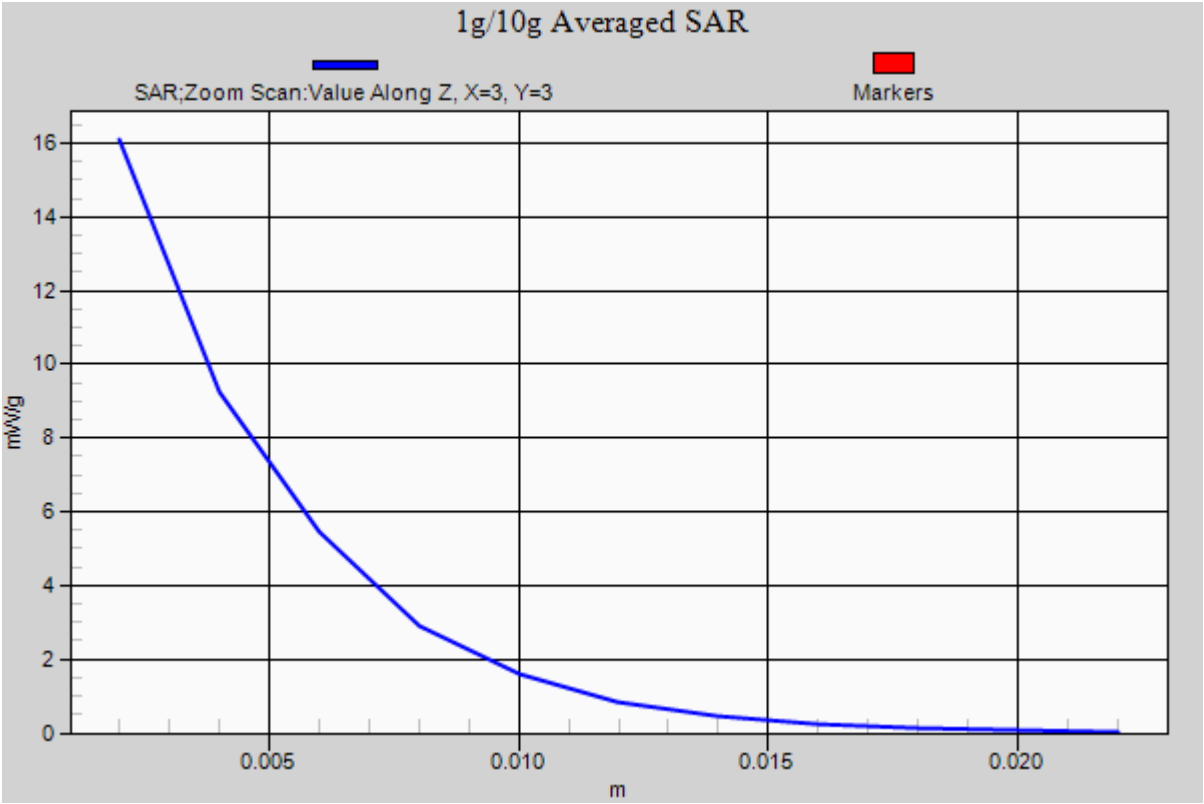
Communication System: CW; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: 5GHz Body; Medium parameters used:
f = 5200 MHz; σ = 5.349 mho/m; ε_r = 49.25; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.5°C

Probe: EX3DV4 - SN3589; ConvF(3.92, 3.92, 3.92); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5200 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 34.469 mW/g
SAR(1 g) = 7.78 mW/g; SAR(10 g) = 2.18 mW/g
Deviation = 5.99%



PCTEST ENGINEERING LABORATORY, INC.

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

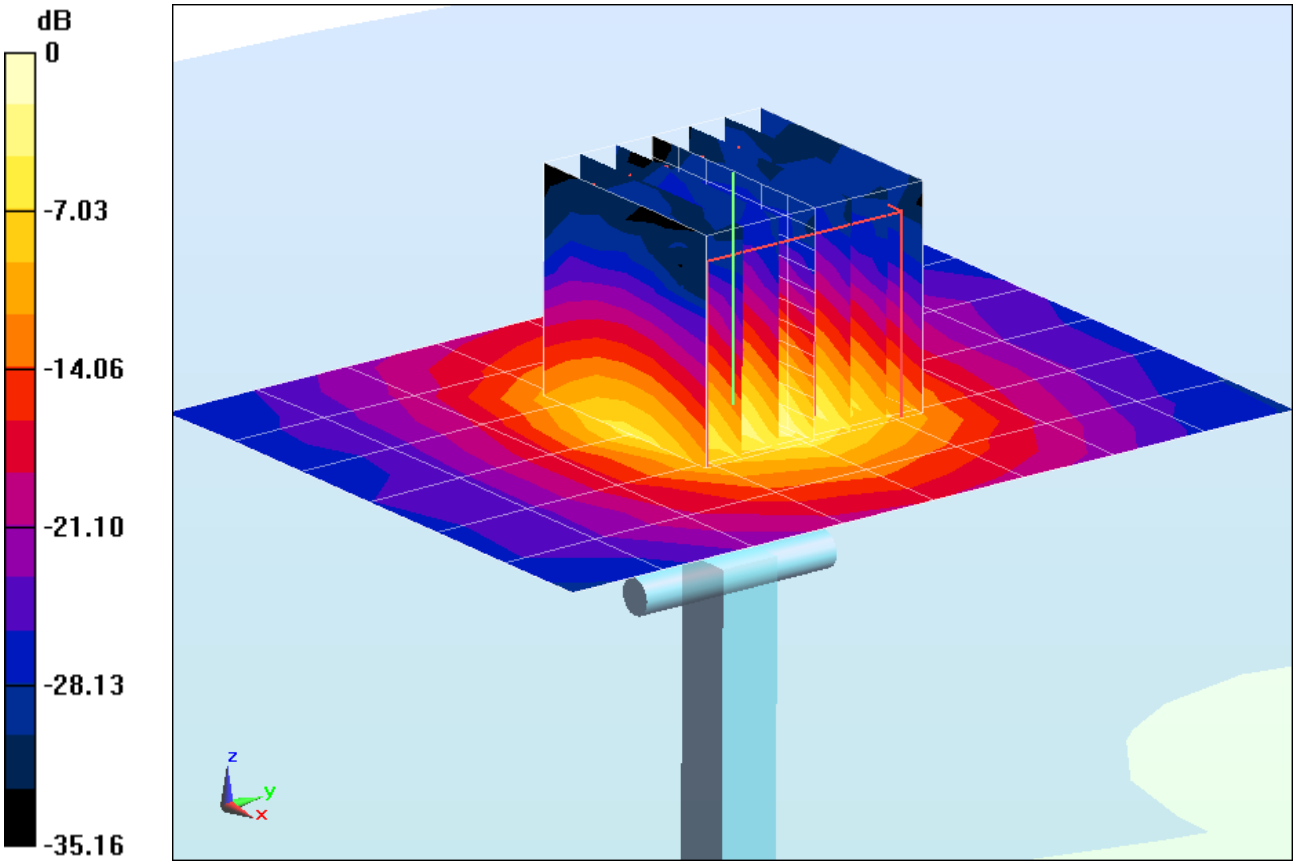
Communication System: CW; Frequency: 5500 MHz; Duty Cycle: 1:1
Medium: 5GHz Body; Medium parameters used:
f = 5500 MHz; σ = 5.708 mho/m; ε_r = 48.75; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2012; Ambient Temp: 24.8°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3589; ConvF(3.4, 3.4, 3.4); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5500 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 39.911 mW/g
SAR(1 g) = 8.43 mW/g; SAR(10 g) = 2.29 mW/g
Deviation = 6.84%



0 dB = 16.9 mW/g = 24.56 dB mW/g

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Medium: 5GHz Body; Medium parameters used:
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Probe: EX3DV4 - SN3589; ConvF(3.4, 3.4, 3.4); Calibrated: 1/27/2012;
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Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5500 MHz System Verification

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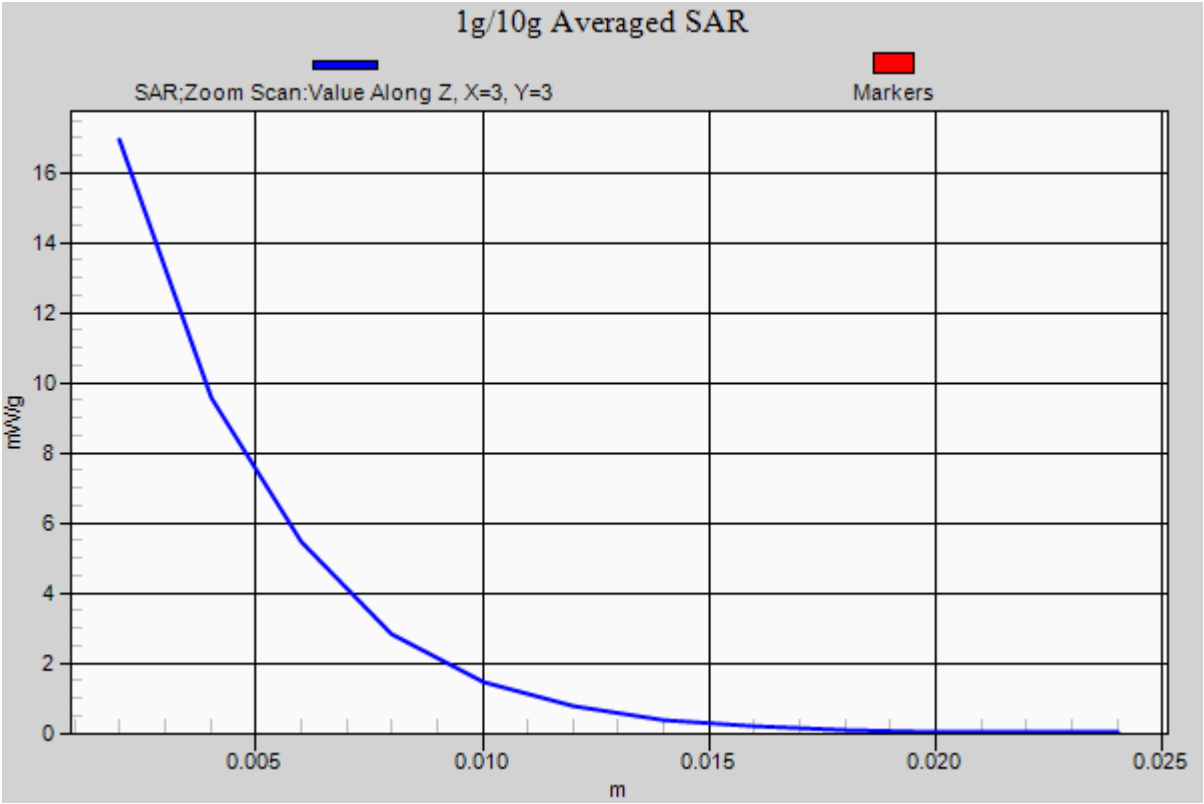
Peak SAR (extrapolated) = 39.911 mW/g
SAR(1 g) = 8.43 mW/g; SAR(10 g) = 2.29 mW/g
Deviation = 6.84%



PCTEST ENGINEERING LABORATORY, INC.

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

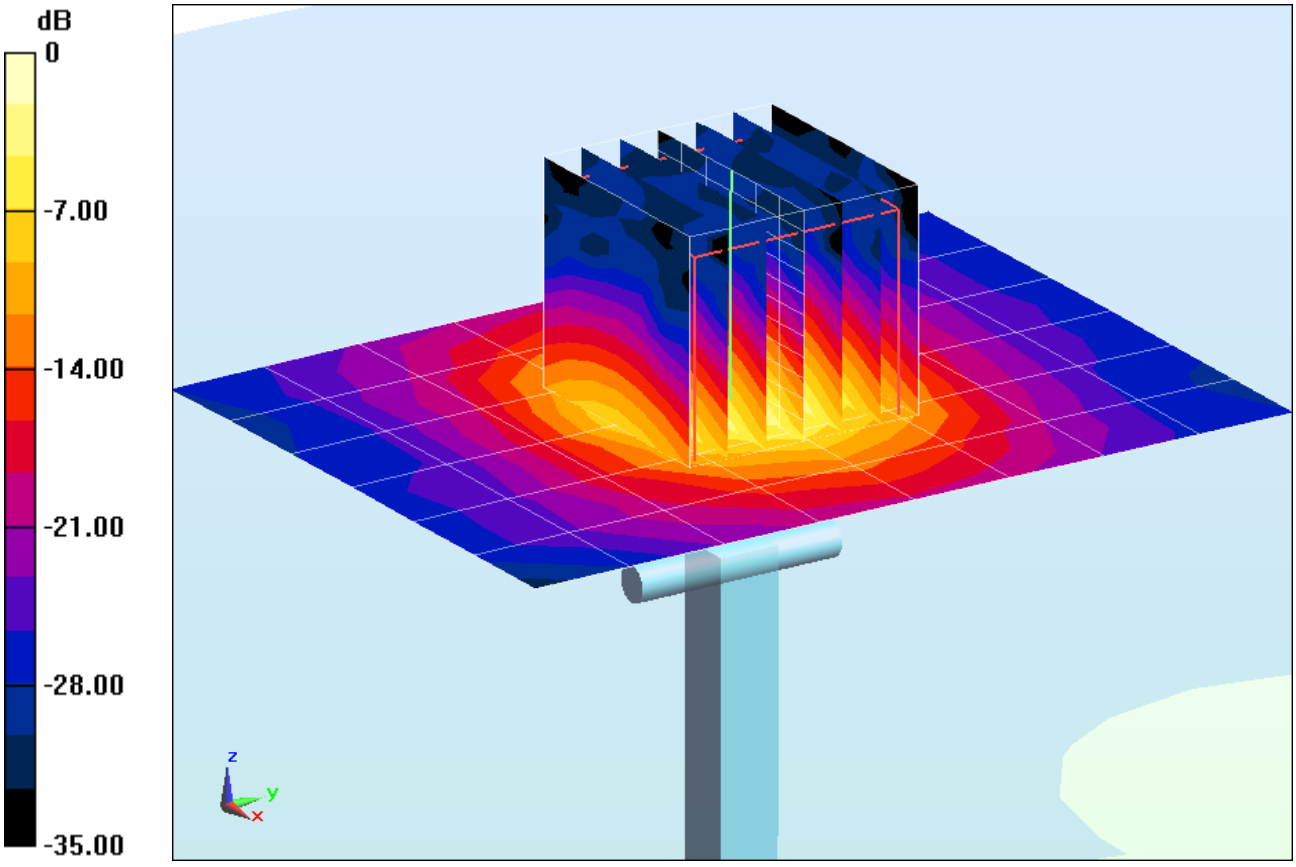
Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: 5GHz Body; Medium parameters used:
f = 5800 MHz; σ = 6.097 mho/m; ε_r = 47.97; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3589; ConvF(3.59, 3.59, 3.59); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5800 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 34.852 mW/g
SAR(1 g) = 7.48 mW/g; SAR(10 g) = 2.05 mW/g
Deviation = 0.67%



0 dB = 16.2 mW/g = 24.19 dB mW/g

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

Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: 5GHz Body; Medium parameters used:
f = 5800 MHz; σ = 6.097 mho/m; ε_r = 47.97; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 09-26-2012; Ambient Temp: 24.7°C; Tissue Temp: 23.6°C

Probe: EX3DV4 - SN3589; ConvF(3.59, 3.59, 3.59); Calibrated: 1/27/2012;
Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1272; Calibrated: 1/18/2012
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80);SEMCAD X Version 14.6.5 (6469)

5800 MHz System Verification

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Input Power = 20.0 dBm (100 mW)
Peak SAR (extrapolated) = 34.852 mW/g
SAR(1 g) = 7.48 mW/g; SAR(10 g) = 2.05 mW/g
Deviation = 0.67%