



## SAR EVALUATION REPORT

**Applicant Name:**

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

**Date of Testing:**

06/05/12 - 06/15/12

**Test Site/Location:**

PCTEST Lab, Columbia, MD, USA

**Document Serial No.:**

OY1206040771.ZNF

**FCC ID:**

**ZNFLS970**

**APPLICANT:**

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

**DUT Type:**

Portable Handset

**Application Type:**

Certification

**FCC Rule Part(s):**

CFR §2.1093

**Model(s):**

LG-LS970, LGLS970, LS970

Band & Mode	Tx Frequency	Conducted Power [dBm]	SAR		
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)
Cell. CDMA/EVDO- FCC Rule Part 90S	817.90 - 823.10 MHz	25.08	0.62	1.01	1.02
Cell. CDMA/EVDO- FCC Rule Part 22H	824.70 - 848.31 MHz	25.13	0.49	1.07	1.13
PCS CDMA/EVDO- FCC Rule Part 24E	1851.25 - 1908.75 MHz	25.20	0.45	1.27	1.27
LTE Band 25 (PCS)- FCC Rule Part 24E	1852.5 - 1912.5 MHz	23.39	1.01	0.35	0.35
2.4 GHz WLAN- FCC Rule Part 15C	2412 - 2462 MHz	16.64	0.05	0.09	0.09
5.8 GHz WLAN- FCC Rule Part 15C	5745 - 5825 MHz	12.88	0.00	0.00	
5.2 GHz WLAN- FCC Rule Part 15E	5180 - 5240 MHz	12.96	0.00	0.00	
5.3 GHz WLAN- FCC Rule Part 15E	5260 - 5320 MHz	12.97	0.00	0.00	
5.5 GHz WLAN- FCC Rule Part 15E	5500 - 5700 MHz	12.65	0.00	0.00	
Bluetooth - FCC Rule Part 15C	2402 - 2480 MHz	8.11	N/A		
<b>Simultaneous SAR per KDB 690783 D01:</b>			1.55	1.51	1.51


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.

The manufacturer has confirmed that the model(s) have the same physical, mechanical and thermal characteristics.



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



<b>FCC ID:</b> ZNFLS970		<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> OY1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 1 of 52

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

1	DEVICE UNDER TEST .....	3
2	LTE CHECKLIST PER KDB 941225 D05 .....	7
3	INTRODUCTION .....	8
4	SAR MEASUREMENT SETUP .....	9
5	DOSIMETRIC ASSESSMENT .....	10
6	DEFINITION OF REFERENCE POINTS .....	11
7	TEST CONFIGURATION POSITIONS FOR HANDSETS .....	12
8	FCC RF EXPOSURE LIMITS.....	15
9	FCC MEASUREMENT PROCEDURES.....	16
10	STANDALONE RF CONDUCTED POWERS .....	20
11	LTE POWER REDUCTION .....	25
12	SYSTEM VERIFICATION.....	27
13	SAR DATA SUMMARY .....	30
14	FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS.....	39
15	EQUIPMENT LIST.....	47
16	MEASUREMENT UNCERTAINTIES .....	48
17	CONCLUSION.....	50
18	REFERENCES .....	51

<b>FCC ID:</b> ZNFLS970		<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 2 of 52

# 1 DEVICE UNDER TEST

## 1.1 Device Overview

Band & Mode	Tx Frequency
Cell. CDMA/EVDO- FCC Rule Part 90S	817.90 - 823.10 MHz
Cell. CDMA/EVDO- FCC Rule Part 22H	824.70 - 848.31 MHz
PCS CDMA/EVDO- FCC Rule Part 24E	1851.25 - 1908.75 MHz
LTE Band 25 (PCS)- FCC Rule Part 24E	1852.5 - 1912.5 MHz
2.4 GHz WLAN- FCC Rule Part 15C	2412 - 2462 MHz
5.8 GHz WLAN- FCC Rule Part 15C	5745 - 5825 MHz
5.2 GHz WLAN- FCC Rule Part 15E	5180 - 5240 MHz
5.3 GHz WLAN- FCC Rule Part 15E	5260 - 5320 MHz
5.5 GHz WLAN- FCC Rule Part 15E	5500 - 5700 MHz
Bluetooth - FCC Rule Part 15C	2402 - 2480 MHz
NFC - FCC Rule Part 15C	13.56 MHz

## 1.2 Near Field Communications (NFC) Antenna

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

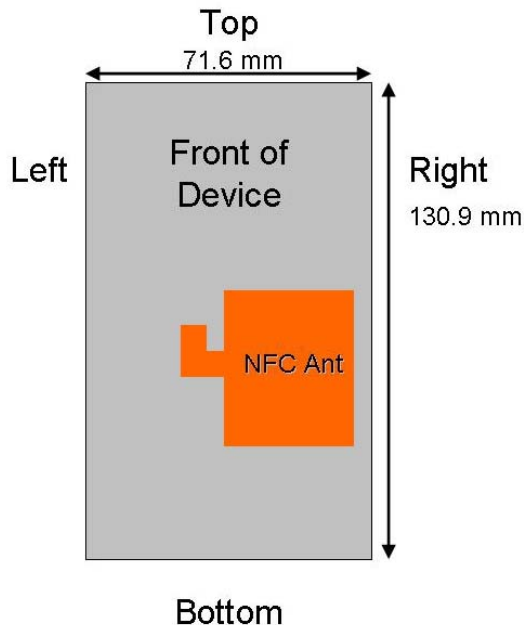




Figure 1-1  
NFC Antenna Location

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	SAR EVALUATION REPORT	 <b>LG</b>	Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 3 of 52

## 1.3 DUT Antenna Locations

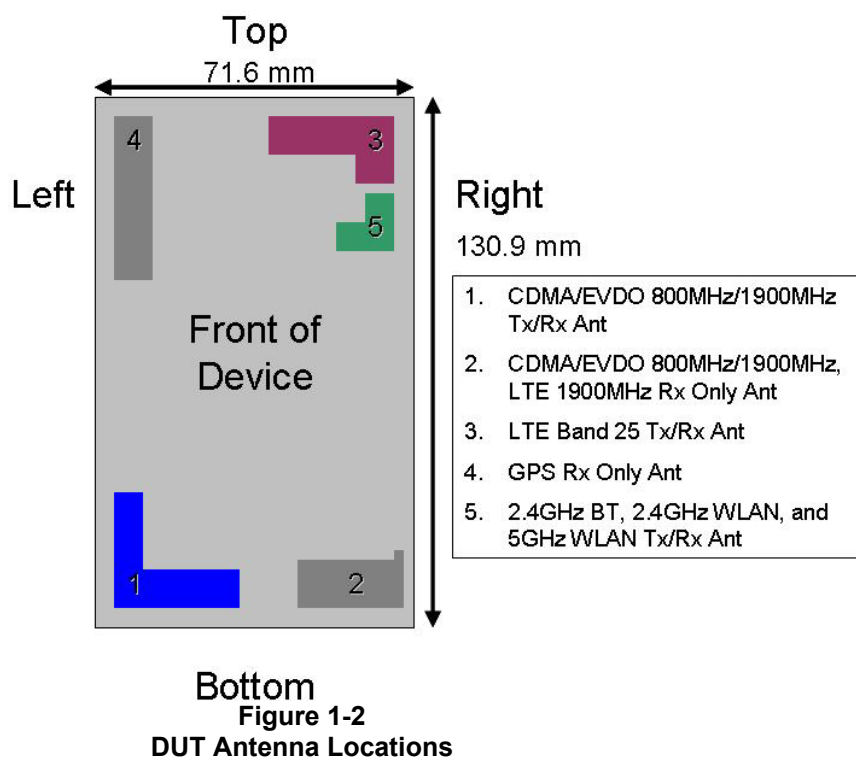


Table 1-1  
Mobile Hotspot Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
Cell. 1x CDMA/EVDO - FCC Rule Part 90S	Yes	Yes	No	Yes	No	Yes
Cell. 1x CDMA/EVDO - FCC Rule Part 22H	Yes	Yes	No	Yes	No	Yes
PCS 1x CDMA/EVDO - FCC Rule Part 24E	Yes	Yes	No	Yes	No	Yes
LTE Band 25 (PCS) - FCC Rule Part 24E	Yes	Yes	Yes	No	Yes	No
2.4 GHz WLAN - FCC Rule Part 15C	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 Power Reduction for SAR

This device uses power reduction mechanisms for LTE during SVLTE (voice + LTE data) operation, but power reduction was not required for SAR compliance. See Section 11 for more details.

FCC ID: ZNFLS970	PCTEST ENGINEERING LABORATORY, INC.	SAR EVALUATION REPORT	LG	Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 4 of 52

## 1.5 Simultaneous Transmission Capabilities

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



Figure 1-3  
Simultaneous Transmission Paths

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

Table 1-2  
Simultaneous Transmission Scenarios Supported by DUT

No.	Capable TX Configuration	Head SAR	Body SAR	Hotspot SAR	Note
1	CDMA BC0 Voice + 2.4GHz WiFi Data	Yes	Yes	No	
2	CDMA BC1 Voice + 2.4GHz WiFi Data	Yes	Yes	No	
3	CDMA BC10 Voice + 2.4GHz WiFi Data	Yes	Yes	No	
4	CDMA BC0 Voice + 5GHz WiFi Data	Yes	Yes	No	
5	CDMA BC1 Voice + 5GHz WiFi Data	Yes	Yes	No	
6	CDMA BC10 Voice + 5GHz WiFi Data	Yes	Yes	No	
7	CDMA BC0 1xData/EVDO + 2.4GHz WiFi Data	No	No	Yes	CDMA Hotspot
8	CDMA BC1 1xData/EVDO + 2.4GHz WiFi Data	No	No	Yes	CDMA Hotspot
9	CDMA BC10 1xData/EVDO + 2.4GHz WiFi Data	No	No	Yes	CDMA Hotspot
10	LTE B25 Data + 2.4GHz WiFi Data	No	No	Yes	LTE Hotspot
11	CDMA BC0 Voice + LTE B25 Data	Yes	Yes	No	SVLTE
12	CDMA BC1 Voice + LTE B25 Data	Yes	Yes	No	SVLTE
13	CDMA BC10 Voice + LTE B25 Data	Yes	Yes	No	SVLTE
14	CDMA BC0 Voice + LTE B25 Data + 2.4GHz WiFi Data	Yes	Yes	Yes	WiFi Hotspot (SVLTE)
15	CDMA BC1 Voice + LTE B25 Data + 2.4GHz WiFi Data	Yes	Yes	Yes	WiFi Hotspot (SVLTE)
16	CDMA BC10 Voice + LTE B25 Data + 2.4GHz WiFi	Yes	Yes	Yes	WiFi Hotspot (SVLTE)

\* The simultaneous transmission between BT and WiFi is not supported.

\* The simultaneous transmission between CDMA 1xdata/EVDO and LTE data is not supported.



\* SVLTE are supported only. (SVDO is not supported.)

\* 1x Advanced capability for CDMA BC0/BC1/BC10 is supported.

\* LTE VoIP is supported.

\* Maximum output power will be used for SAR compliance.

\* Hotspot for 5GHz WiFi is not supported.

FCC ID: ZNFLS970	 PCTEST ENGINEERING LABORATORY, INC.	SAR EVALUATION REPORT	 LG	Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 5 of 52

## 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 distance between the CDMA/EVDO antenna and the Bluetooth/WLAN antenna is 87.6 mm. The separation distance between the LTE and Bluetooth/WLAN antenna is 0.3 mm. RF Conducted Power of Bluetooth Tx is 6.467 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.

### (B) Licensed Transmitter(s)

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 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)
- April 2012 TCB Workshop Notes (Simultaneous)
- FCC KDB 865664 (5 GHz)
- October 2011 TCB Workshop Notes (1x Advanced)

## 1.8 Samples Used for SAR Testing

Several samples with identical hardware were used to facilitate SAR testing. The manufacturer has confirmed that the samples tested have the same physical, mechanical, and thermal characteristics and are within operational tolerances expected for production units.



	Cell. CDMA/EVDO	PCS CDMA/EVDO	LTE Band 25 (PCS)	2.4GHz WLAN	5GHz WLAN
Head	245	245	242	257	242
Body	245	260	242	242	242

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 6 of 52

## 2

## LTE CHECKLIST PER KDB 941225 D05

KDB 941225 Pub LTE Information				
KDB 941225 Section	FCC ID	ZNFLS970		
	Form Factor	Portable Handset		
1)	Frequency Range of each LTE transmission band	BAND 25: frequency range - 1852.5 MHz to 1912.5 MHz		
2)	Channel Bandwidths	Channel Bandwidth is 5, 10 MHz		
3)	Channel Numbers and Frequencies (MHz)	Low	Mid	High
	LTE Band 25, BW 5MHz	1852.5MHz (26065)	1882.5 MHz (26365)	1912.5 MHz (26665)
	LTE Band 25, BW 10Mhz	1855 MHz(26090)	1882.5 MHz(26365)	1910 MHz(26640)
4)(a)	UE Category	3		
(b)	Modulations Supported in UL	QPSK, 16QAM		
	LTE Transmitter and Antenna Implementation	CDMA/EVDO and LTE do not share the same transmitter		
5)	Description of LTE Tx and Ant. Implementation	1 Main TX/RX Ant and 1 Diversity RX Ant		
6)	LTE Voice available?	No		
	Hotspot with LTE+WIFI	Yes		
	Hotspot with LTE+WIFI active with 1XVoice sessions?	Yes		
7)	LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	Yes		
	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	
	850 MHz CDMA - FCC Rule Part 90S	See Page 1		
	850 MHz CDMA - FCC Rule Part 22H			
	1900 MHz CDMA - FCC Rule Part 24E			
	2.4GHz WI-FI - FCC Rule Part 15C			
	2.4GHz Bluetooth - FCC Rule Part 15C			
	5GHz WI-FI - FCC Rule Parts 15C & 15E			
11)	Simultaneous Tx Conditions (Voice and Data Configurations)	See Section 1.5		
12)	Power Reduction used for SAR Compliance?	No		
13)	Describe Power Reduction (LTE Modes)	See Section 11		
14)	SAR Test Plan	N/A		
15)	SAR test data, preliminary	N/A		

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset	Page 7 of 52	

### 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 ( $\rho$ ). 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:

- $\sigma$  = conductivity of the tissue-simulating material (S/m)
- $\rho$  = mass density of the tissue-simulating material (kg/m<sup>3</sup>)
- 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]

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 8 of 52



## 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](http://www.speag.com) for more information about the specification of the SAR assessment system.





**Figure 4-1**  
**SAR Measurement System**



**Figure 4-2**  
**Near-Field Probe**

**Table 4-1**  
**Composition of the Tissue Equivalent Matter**

Frequency (MHz)	835	835	1900	1900	2450	2450	5200-5800	5200-5800
Tissue	Head	Body	Head	Body	Head	Body	Head	Body
Ingredients (% by weight)								
Bactericide	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 monoheylether							17.24	
Polysorbate (Tween) 80								20
Water	40.45	53.06	54.9	70.17	71.88	73.2	65.52	80

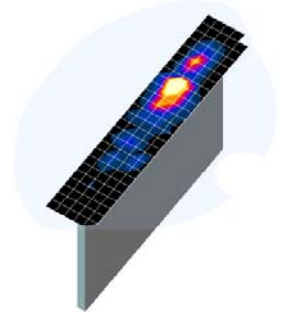
FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>	 <b>LG</b>	<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 9 of 52

## 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.
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.



**Figure 5-1**  
**Sample SAR Area Scan**

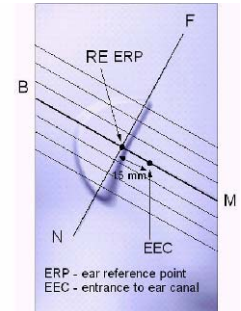
FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 10 of 52

## 6

## DEFINITION OF REFERENCE POINTS

### 6.1 EAR REFERENCE POINT

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



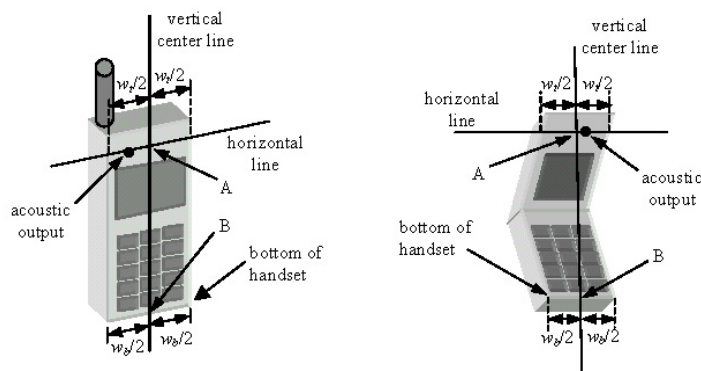
**Figure 6-1**  
Close-Up Side view  
of ERP

### 6.2 HANDSET REFERENCE POINTS



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



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



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

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>	 <b>LG</b>	<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 11 of 52

## 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  $\epsilon = 3$  and loss tangent  $\delta = 0.02$ .

### 7.2 Positioning for Cheek/Touch

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

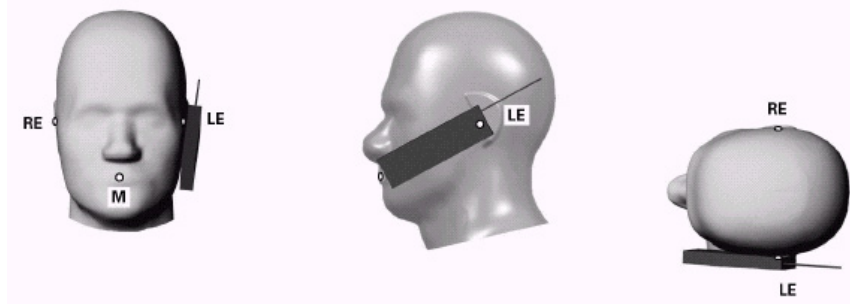




Figure 7-1 Front, Side and Top View of Cheek/Touch Position

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the ear.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the plane normal to MB-NF including the line MB (reference plane).
4. The phone was then rotated around the vertical centerline until the phone (horizontal line) was symmetrical with 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 / 15° Tilt

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

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

FCC ID: ZNFLS970	 PCTEST ENGINEERING LABORATORY, INC.	SAR EVALUATION REPORT	 LG	Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 12 of 52

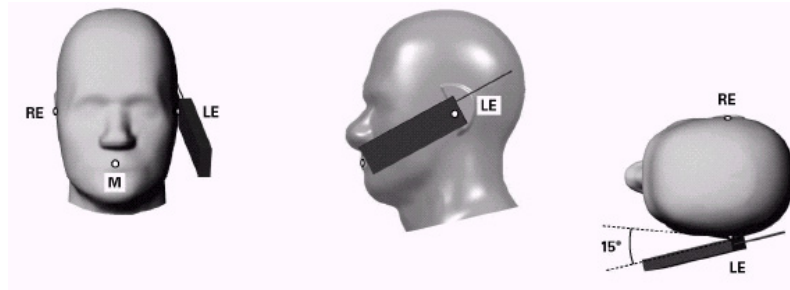


Figure 7-2 Front, Side and Top View of Ear/15° Tilt Position

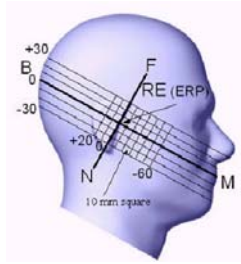


Figure 7-3  
Side view w/ relevant markings



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.

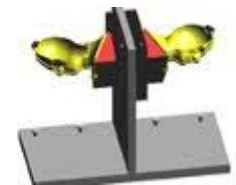




Figure 7-5 Twin SAM  
Chin20

## 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.

FCC ID: ZNFLS970	 PCTEST ENGINEERING LABORATORY, INC.	SAR EVALUATION REPORT	 LG	Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 13 of 52

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 ( $L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$ ) 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.

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 14 of 52



## 8 FCC RF EXPOSURE LIMITS

### 8.1 Uncontrolled Environment

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



### 8.2 Controlled Environment

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

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

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

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

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 15 of 52

## 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 CDMA2000

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

#### 9.2.1 Output Power Verification

See 3GPP2 C.S0011/TIA-98-E as recommended by "SAR Measurement Procedures for 3G Devices" v02, October 2007. Maximum output power is verified on the High, Middle and Low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. SO55 tests were measured with power control bits in the "All Up" condition.

1. If the mobile station (MS) supports Reverse TCH RC 1 and Forward TCH RC 1, set up a call using Fundamental Channel Test Mode 1 (RC=1/1) with 9600 bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1, Table 9-1 parameters were applied.
3. If the MS supports the RC 3 Reverse FCH, RC3 Reverse SCH<sub>0</sub> and demodulation of RC 3,4, or 5, set up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9600 bps Fundamental Channel and 9600 bps SCH0 data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2, Table 9-2 was applied.
5. FCHs were configured at full rate for maximum SAR with "All Up" power control bits.

**Table 9-1**  
**Parameters for Max. Power for RC1**



Parameter	Units	Value
$I_{or}$	dBm/1.23 MHz	-104
$\frac{Pilot E_c}{I_{or}}$	dB	-7
$\frac{Traffic E_c}{I_{or}}$	dB	-7.4

**Table 9-2**  
**Parameters for Max. Power for RC3**

Parameter	Units	Value
$I_{or}$	dBm/1.23 MHz	-86
$\frac{Pilot E_c}{I_{or}}$	dB	-7
$\frac{Traffic E_c}{I_{or}}$	dB	-7.4

#### 9.2.2 CDMA2000 1x Advanced

This device additionally supports 1x Advanced. Conducted powers were measured using SO75 with RC8 on the uplink and RC11 on the downlink per Oct 2011 TCB Workshop notes. Smart blanking was disabled for all measurements. The EUT was configured with forward power control Mode 000 and reverse power control at 400 bps. Conducted powers were measured on an Agilent 8960 Series 10

FCC ID: ZNFLS970		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 16 of 52



Wireless Communications Test Set, Model E5515C using the CDMA2000 1x Advanced application, Option E1962B-410.

Based on the maximum output power measured for 1x Advanced, SAR would have to be evaluated for 1x advanced if the maximum output for 1x Advanced is more than 0.25 dB higher than the maximum measured for 1x. Also, if the measured SAR in any 1x mode exposure conditions (head, body etc.) is larger than 1.2 W/kg, the highest of those configurations above 1.2 W/kg for each exposure condition in 1x Advanced has to be repeated. All measured SAR in 1x mode higher than 1.5 W/kg must be repeated for 1x Advanced.

### 9.2.3 Head SAR Measurements

SAR for head exposure configurations is measured in RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55. SAR for RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1 using the exposure configuration that results in the highest SAR for that channel in RC3.

### 9.2.4 Body SAR Measurements

SAR for body exposure configurations is measured in RC3 with the DUT configured to transmit at full rate on FCH with all other code channels disabled using TDSO / SO32. SAR for multiple code channels (FCH + SCH<sub>n</sub>) is not required when the maximum average output of each RF channel is less than ¼ dB higher than that measured with FCH only. Otherwise, SAR is measured on the maximum output channel (FCH + SCH<sub>n</sub>) with FCH at full rate and SCH<sub>0</sub> enabled at 9600 bps using the exposure configuration that results in the highest SAR for that channel with FCH only. When multiple code channels are enabled, the DUT output may shift by more than 0.5 dB and lead to higher SAR drifts and SCH dropouts. Body SAR was measured using TDSO / SO32 with power control bits in the “All Up”



Body SAR in RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1; with Loopback Service Option SO55, at full rate, using the body exposure configuration that results in the highest SAR for that channel in RC3.

### 9.2.5 Handsets with EVDO

For handsets with Ev-Do capabilities, when the maximum average output of each channel in Rev. 0 is less than ¼ dB higher than that measured in RC3 (1x RTT), body SAR for EV-DO is not required. Otherwise, SAR for Rev. 0 is measured on the maximum output channel at 153.6 kbps using the body exposure configuration that results in the highest SAR for that channel in RC3. SAR for Rev. A is not required when the maximum average output of each channel is less than that measured in Rev. 0 or less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel for Rev. A using a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 Physical Layer configurations. A Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots would be configured in the downlink for both Rev. 0 and Rev. A.

### 9.2.6 Body SAR Measurements for EVDO Hotspot

Hotspot Body SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 per KDB Publication 941225 D01 procedures for “1x Ev-Do data Devices”. SAR for Subtype 2 Physical layer configurations is not required for Rev. A when the maximum average output of each RF channels is less than that measured in Subtype 0/1 Physical layer configurations. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for the RF channels in Rev. 0. The AT is tested with

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 17 of 52

a Reverse Data Channel rate of 153.6 kbps in Subtype 0/1 Physical Layer configurations; and a Reverse Data Channel payload size of 4096 bits and Termination Target of 16 slots in Subtype 2 Physical Layer configurations. Both FTAP and FETAP are configured with a Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots. AT power control should be in "All Bits Up" conditions for TAP/ETAP

SAR is not required for 1x RTT for Ev-Do devices that also support 1x RTT voice and/or data operations, when the maximum average output of each channel is less than 1/4 dB higher than that measured in Subtype 0/1 Physical Layer configurations for Rev. 0. Otherwise, CDMA "Body-SAR Measurement" procedures for "CDMA 2000 1x Handsets" were applied.

### 9.3 SAR Measurement Conditions for LTE

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

#### 9.3.1 MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1. See Section 10.2 for MPR targets.



#### 9.3.2 A-MPR

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

#### 9.3.3 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05:

- a. Per Page 4, 3) A), QPSK with 50% RB is required for the highest bandwidth.
- b. Per Page 4, footnote 2, when the maximum output power across high, mid., and low channels is < 0.5 dB, mid channel is tested. Low and high channel SAR tests are not required for QPSK, 50% RB allocation when the SAR is < 0.8 W/kg. When there are less than 3 channels required based on the size of the band and bandwidth of the signal, the channel with the maximum output power was tested.
- c. Per Page 4, 3) B), QPSK with 1 RB for both channel edges are required for the highest bandwidth.
- d. Per Page 4, footnote 6, QPSK 1 RB allocation SAR tests were performed on the highest output power channel for the RB allocation when the average output power of the 1 RB allocation was > 0.5 dB higher than the 50% RB allocation for QPSK. Otherwise, SAR tests are performed on the channel that produced the highest SAR for QPSK with 50% RB.
- 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

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 18 of 52

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.

- 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 than 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.

FCC ID: ZNFLS970		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 19 of 52

## 10 STANDALONE RF CONDUCTED POWERS

### 10.1 Standalone CDMA Conducted Powers

Band	Channel	Frequency	SO55 [dBm]	SO55 [dBm]	SO75 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]	1x EvDO Rev. A [dBm]
	F-RC	MHz	RC1	RC3	RC11	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	564	820.1	24.96	25.08	25.20	25.00	25.00	25.03	24.97
	1013	824.7	25.06	24.96	25.17	25.10	25.13	25.03	25.01
	384	836.52	25.11	25.04	25.18	25.00	25.00	25.05	25.03
	777	848.31	24.93	24.95	25.16	24.95	24.92	25.04	25.01
PCS	25	1851.25	25.00	24.93	25.04	24.92	24.94	25.00	24.95
	600	1880	25.06	25.08	25.15	25.08	25.08	25.20	25.13
	1175	1908.75	24.94	25.03	25.19	24.95	25.00	25.04	25.03

Note: RC1 is only applicable for IS-95 compatibility. For FCC Rule Part 90S, per FCC KDB Publication 447498 6) c), only one channel is required since the transmission band is from 817.90 – 823.10 MHz.

Per KDB Publication 941225 D01:

1. Head SAR was tested with SO55 RC3. SO55 RC1 was not required since the average output power was not more than 0.25 dB than the SO55 RC3 powers.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. Ev-Do and TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers.
3. EVDO SAR (Hotspot) is measured using Subtype 0/1 Physical Layer configurations for Rev. 0. When the maximum output power of Rev. A for each channel is greater than the Rev. 0 power, Rev. A must additionally be tested using the highest output channel for the configuration that resulted in the highest SAR for Rev. 0.
4. CDMA 1x-RTT SAR was required to be evaluated for Hotspot exposure conditions to support simultaneous capabilities per **Table 1-2**.

Per Oct 2011 TCB Workshop:

1. CDMA 1X Advanced technology was required for PCS body-worn/Hotspot SAR since the measured SAR for PCS TDSO / SO32 was greater than 1.2 W/kg. See Section 9.2.2 for 1x Advanced test set up.
2. CDMA 1x Advanced SO75 power measurement was used with RC8 on the uplink and RC11 on the downlink.



**Figure 10-1**  
**Power Measurement Setup**

FCC ID: ZNFLS970	PCTEST ENGINEERING LABORATORY, INC.	SAR EVALUATION REPORT	LG	Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 20 of 52

## 10.2 Standalone LTE Conducted Powers

### 10.2.1 LTE Band 25 (PCS)

Table 10-1



LTE Band 25 (PCS) 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	1852.5	26065	5	QPSK	1	0	23.39	0	0
	1852.5	26065	5	QPSK	1	24	23.44	0	0
	1852.5	26065	5	QPSK	12	6	22.45	1	0-1
	1852.5	26065	5	QPSK	25	0	22.36	1	0-1
	1852.5	26065	5	16-QAM	1	0	22.23	1	0-1
	1852.5	26065	5	16-QAM	1	24	22.30	1	0-1
	1852.5	26065	5	16-QAM	12	6	21.30	2	0-2
	1852.5	26065	5	16-QAM	25	0	21.26	2	0-2
Mid	1882.5	26365	5	QPSK	1	0	23.30	0	0
	1882.5	26365	5	QPSK	1	24	23.28	0	0
	1882.5	26365	5	QPSK	12	6	22.39	1	0-1
	1882.5	26365	5	QPSK	25	0	22.35	1	0-1
	1882.5	26365	5	16-QAM	1	0	22.33	1	0-1
	1882.5	26365	5	16-QAM	1	24	22.40	1	0-1
	1882.5	26365	5	16-QAM	12	6	21.50	2	0-2
	1882.5	26365	5	16-QAM	25	0	21.38	2	0-2
High	1912.5	26665	5	QPSK	1	0	23.27	0	0
	1912.5	26665	5	QPSK	1	24	23.28	0	0
	1912.5	26665	5	QPSK	12	6	22.31	1	0-1
	1912.5	26665	5	QPSK	25	0	22.31	1	0-1
	1912.5	26665	5	16-QAM	1	0	22.17	1	0-1
	1912.5	26665	5	16-QAM	1	24	22.20	1	0-1
	1912.5	26665	5	16-QAM	12	6	21.27	2	0-2
	1912.5	26665	5	16-QAM	25	0	21.26	2	0-2

Table 10-2

LTE Band 25 (PCS) 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	1855	26090	10	QPSK	1	0	23.24	0	0
	1855	26090	10	QPSK	1	49	23.39	0	0
	1855	26090	10	QPSK	25	12	22.35	1	0-1
	1855	26090	10	QPSK	50	0	22.20	1	0-1
	1855	26090	10	16QAM	1	0	22.25	1	0-1
	1855	26090	10	16QAM	1	49	22.11	1	0-1
	1855	26090	10	16QAM	25	12	21.27	2	0-2
	1855	26090	10	16QAM	50	0	21.10	2	0-2
Mid	1882.5	26365	10	QPSK	1	0	23.05	0	0
	1882.5	26365	10	QPSK	1	49	23.35	0	0
	1882.5	26365	10	QPSK	25	12	22.40	1	0-1
	1882.5	26365	10	QPSK	50	0	22.25	1	0-1
	1882.5	26365	10	16QAM	1	0	22.03	1	0-1
	1882.5	26365	10	16QAM	1	49	22.26	1	0-1
	1882.5	26365	10	16QAM	25	12	21.45	2	0-2
	1882.5	26365	10	16QAM	50	0	21.30	2	0-2
High	1910	26640	10	QPSK	1	0	23.27	0	0
	1910	26640	10	QPSK	1	49	23.28	0	0
	1910	26640	10	QPSK	25	12	22.10	1	0-1
	1910	26640	10	QPSK	50	0	22.14	1	0-1
	1910	26640	10	16QAM	1	0	22.03	1	0-1
	1910	26640	10	16QAM	1	49	22.02	1	0-1
	1910	26640	10	16QAM	25	12	21.12	2	0-2
	1910	26640	10	16QAM	50	0	21.08	2	0-2

FCC ID: ZNFLS970	 PCTEST ENGINEERING LABORATORY, INC.	SAR EVALUATION REPORT	 LG	Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 21 of 52



## 10.2.2 Required RB Size and RB Offsets for SAR Testing

The bolded powers of the configurations above were tested for SAR.  
According to FCC KDB 941225 D05:

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



**Figure 10-2**  
**Power Measurement Setup**

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 22 of 52



## 10.3 WLAN Conducted Powers

**Table 10-3**  
**IEEE 802.11b Average RF Power**

Mode	Freq [MHz]	Channel	Conducted Power [dBm]			
			Data Rate [Mbps]			
			1	2	5.5	11
802.11b	2412	1	16.58	16.80	16.81	16.88
802.11b	2437	6	16.64	16.21	16.66	16.49
802.11b	2462	11	16.20	15.96	16.06	16.07

**Table 10-4**  
**IEEE 802.11g Average RF Power**

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11g	2412	1	12.80	12.13	10.84	10.54	12.45	10.55	11.12	11.75
802.11g	2437	6	12.75	12.29	11.30	10.50	12.69	12.65	11.44	12.00
802.11g	2462	11	12.73	12.47	11.53	11.24	12.71	11.62	11.68	12.13



**Table 10-5**  
**IEEE 802.11n Average RF Power**

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	20	26	39	52	58	65
802.11n	2412	1	10.83	10.70	10.00	9.95	9.82	10.33	10.86	11.92
802.11n	2437	6	11.05	11.22	10.19	9.85	9.82	11.08	11.79	11.76
802.11n	2462	11	11.11	11.33	10.24	9.47	9.36	11.01	11.58	11.61

**Table 10-6**  
**IEEE 802.11a Average RF Power**

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11a	5180	36*	12.17	12.18	12.20	12.21	12.16	12.19	12.11	12.18
802.11a	5200	40	12.15	12.23	12.02	12.13	12.13	12.13	12.20	12.17
802.11a	5220	44	12.17	12.19	12.18	11.93	11.95	12.09	12.06	12.11
802.11a	5240	48*	12.96	12.93	12.93	12.79	12.88	12.81	12.83	12.86
802.11a	5260	52*	12.87	12.83	12.80	12.80	12.86	12.76	12.94	12.73
802.11a	5280	56	12.94	12.92	12.86	12.87	12.90	12.90	12.97	12.93
802.11a	5300	60	12.97	12.94	12.94	12.96	12.91	12.91	12.85	12.97
802.11a	5320	64*	12.25	12.23	12.34	12.17	12.31	12.17	12.19	12.19
802.11a	5500	100	12.20	12.44	12.18	12.06	12.12	12.20	12.11	12.17
802.11a	5520	104*	12.46	12.46	12.39	12.26	12.42	12.27	12.46	12.52
802.11a	5540	108	12.34	12.41	12.35	12.25	12.31	12.37	12.36	12.36
802.11a	5560	112	11.77	11.72	11.90	11.72	11.78	11.77	11.77	11.83
802.11a	5580	116*	11.52	11.57	11.41	11.46	11.60	11.57	11.48	11.36
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	11.40	11.28	11.17	11.03	11.43	11.24	11.12	11.19
802.11a	5680	136*	11.49	11.31	10.90	10.77	11.42	10.91	10.86	11.33
802.11a	5700	140	12.65	12.69	12.10	11.67	12.52	12.13	12.19	12.57
802.11a	5745	149*	12.19	12.16	11.80	11.87	12.25	11.99	11.83	11.85
802.11a	5765	153	12.38	12.09	11.67	11.59	12.24	11.85	11.75	12.14
802.11a	5785	157*	12.88	12.82	12.51	12.54	12.95	12.41	12.50	12.90
802.11a	5805	161*	12.02	12.05	11.64	11.68	12.20	11.66	11.78	12.25
802.11a	5825	165	12.10	12.03	11.92	11.88	12.20	11.95	11.66	12.24

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.

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 23 of 52

**Table 10-7**  
**IEEE 802.11n Average RF Power**

Mode	Freq [MHz]	Channel	Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	20	26	39	52	58	65
802.11n	5180	36*	10.89	10.81	10.85	10.80	10.78	10.80	10.81	10.89
802.11n	5200	40	10.85	10.92	10.91	10.83	10.86	10.92	10.85	10.84
802.11n	5220	44	10.88	10.83	10.87	10.79	10.81	10.81	10.83	10.84
802.11n	5240	48*	11.94	11.98	11.76	11.63	11.78	11.94	11.96	11.93
802.11n	5260	52*	11.89	11.93	11.55	11.57	11.47	11.91	11.83	11.94
802.11n	5280	56	11.91	11.88	11.83	11.86	11.87	11.94	11.96	11.98
802.11n	5300	60	11.95	11.91	11.90	11.90	11.94	11.94	11.84	11.97
802.11n	5320	64*	10.88	11.02	11.04	10.99	10.89	11.06	10.99	10.98
802.11n	5500	100	10.96	11.10	10.83	10.86	10.80	11.15	11.02	11.23
802.11n	5520	104*	11.33	11.30	11.31	11.34	11.40	11.31	11.30	11.28
802.11n	5540	108	11.24	11.19	11.37	11.24	11.14	11.18	11.22	11.10
802.11n	5560	112	10.87	10.85	10.55	10.64	10.52	10.92	10.99	11.02
802.11n	5580	116*	10.51	10.61	10.30	10.32	10.21	10.53	10.74	10.75
802.11n	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5660	132	10.61	10.72	10.29	9.99	9.85	10.52	10.70	10.80
802.11n	5680	136*	10.34	10.25	9.98	10.08	9.79	10.48	10.52	10.55
802.11n	5700	140	11.39	11.51	11.13	11.36	10.89	11.42	11.48	11.60
802.11n	5745	149*	10.98	11.06	10.92	10.88	10.89	10.91	10.97	10.98
802.11n	5765	153	11.06	11.22	10.74	10.63	10.75	11.19	11.26	11.30
802.11n	5785	157*	11.33	11.09	10.94	10.89	10.84	11.13	11.52	11.35
802.11n	5805	161*	10.92	10.96	10.71	10.51	10.52	10.84	10.91	11.99
802.11n	5825	165	11.10	11.18	10.65	10.42	10.36	11.10	11.24	11.34

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 than the default channels, these “required channels” are considered instead of the default channels for SAR testing.

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) 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 powers of the data rates and channel above were tested for SAR.



**Figure 10-3**  
**Power Measurement Setup**

FCC ID: ZNFLS970	PCTEST ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>	LG	Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset	Page 24 of 52	



## 11 LTE POWER REDUCTION

### 11.1 Introduction to LTE Power Reduction

This device is capable of Simultaneous Voice and LTE (SVLTE) calls, with the voice call supported by a CDMA 1xRTT transmitter and the data connection supported by a separate LTE transmitter. A LTE power reduction scheme is applied during a LTE connection operating simultaneously with 1xRTT voice calls. The maximum transmit power of LTE is limited depending on the CDMA 1x voice transmit power level. When CDMA 1x Voice is operating at a certain range of high power levels, the maximum LTE transmit power is limited. When CDMA 1x Voice transmit power is below a certain threshold transmit power level, LTE can transmit at the maximum power. Target levels of power reduction and CDMA voice threshold levels are provided in Table 11-1.

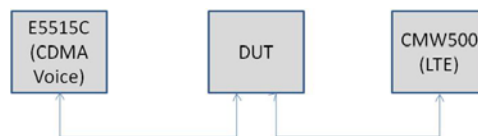
**Table 11-1**  
**SVLTE Power Reduction Scheme**

Mode	CDMA Current Voice Power for BC0, BC1 & BC10	LTE Max. Power for B25
SVLTE	P < 18.2 dBm	23.5 dBm (Limited)
	P ≥ 18.2 dBm	19.5 dBm (Limited)

### 11.2 Output Power Verification

Per KDB Publication 941225 D05, 5) B), output powers were measured in SVLTE mode to determine that the power reduction mechanism was operating reliably and consistently. The power reduction was investigated by simultaneously connecting the device to both LTE and CDMA base station simulators. LTE output powers were measured through conducted RF connections by first connecting the device in a LTE data call and subsequently a CDMA 1x-RTT call. CDMA powers were controlled by configuring the CDMA base station simulator to active bits. The LTE output power was monitored while changing the cell output power level.



The power reduction targets and threshold level described in Table 11-1 were confirmed. Please see results in Table 11-2.



**Figure 11-1**  
**SVLTE Conducted Test Setup Diagram**

**Table 11-2**  
**SVLTE Power Reduction Verification Results**

BC10 1x-RTT CDMA Voice Channel	BC10 1x-RTT CDMA Voice Tx(dBm)	LTE Band 25 channel 26365 (Mid) Conducted Power (dBm)							
		QPSK 1 RB 0 RB Offset	QPSK 1 RB 49 RB Offset	QPSK 25 RB 12 RB Offset	QPSK 50 RB 0 RB Offset	16QAM 1 RB 0 RB Offset	16QAM 1 RB 49 RB Offset	16QAM 25 RB 12 RB Offset	16QAM 50 RB 0 RB Offset
564 (Mid)	24	19.55	19.35	19.35	19.22	19.21	19.13	19.32	19.32
	18	19.41	19.36	19.18	19.13	19.15	19.13	19.22	19.32
	17.5	19.44	19.28	19.16	19.25	19.11	19.14	19.19	19.21
	17	23.17	23.11	22.35	22.33	22.11	22.22	21.32	21.14
	11	23.15	23.12	22.15	22.13	22.21	22.22	21.15	21.22

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 25 of 52

BC0 1x-RTT CDMA Voice Channel	BC0 1x-RTT CDMA Voice Tx(dBm)	LTE Band 25 channel 26365 (Mid) Conducted Power (dBm)							
		QPSK 1 RB 0 RB Offset	QPSK 1 RB 49 RB Offset	QPSK 25 RB 12 RB Offset	QPSK 50 RB 0 RB Offset	16QAM 1 RB 0 RB Offset	16QAM 1 RB 49 RB Offset	16QAM 25 RB 12 RB Offset	16QAM 50 RB 0 RB Offset
1013 (Low)	24	19.33	19.25	19.35	19.27	19.22	19.27	19.33	19.23
	18	19.58	19.62	19.38	19.25	19.20	19.23	19.30	19.24
	17.5	19.32	19.51	19.33	19.24	19.28	19.34	19.37	19.41
	17	23.46	23.47	22.45	22.33	22.23	22.33	21.33	21.29
	11	23.46	23.47	22.45	22.47	22.52	22.51	21.48	21.44

BC0 1x-RTT CDMA Voice Channel	BC0 1x-RTT CDMA Voice Tx(dBm)	LTE Band 25 channel 26365 (Mid) Conducted Power (dBm)							
		QPSK 1 RB 0 RB Offset	QPSK 1 RB 49 RB Offset	QPSK 25 RB 12 RB Offset	QPSK 50 RB 0 RB Offset	16QAM 1 RB 0 RB Offset	16QAM 1 RB 49 RB Offset	16QAM 25 RB 12 RB Offset	16QAM 50 RB 0 RB Offset
384 (Mid)	24	19.46	19.51	19.35	19.30	19.33	19.29	19.32	19.28
	18	19.41	19.51	19.38	19.33	19.32	19.42	19.22	19.49
	17.5	19.45	19.49	19.32	19.38	19.40	19.39	19.28	19.51
	17	23.37	23.41	22.45	22.40	22.51	22.52	21.46	21.54
	11	23.37	23.41	22.45	22.43	22.53	22.42	21.51	21.49

BC0 1x-RTT CDMA Voice Channel	BC0 1x-RTT CDMA Voice Tx(dBm)	LTE Band 25 channel 26365 (Mid) Conducted Power (dBm)							
		QPSK 1 RB 0 RB Offset	QPSK 1 RB 49 RB Offset	QPSK 25 RB 12 RB Offset	QPSK 50 RB 0 RB Offset	16QAM 1 RB 0 RB Offset	16QAM 1 RB 49 RB Offset	16QAM 25 RB 12 RB Offset	16QAM 50 RB 0 RB Offset
777 (High)	24	19.49	19.58	19.35	19.34	19.23	19.32	19.32	19.23
	18	19.53	19.54	19.32	19.35	19.38	19.32	19.46	19.23
	17.5	19.52	19.51	19.48	19.37	19.31	19.29	19.48	19.25
	17	23.31	23.43	22.33	22.30	22.43	22.54	21.49	21.53
	11	23.38	23.40	22.51	22.52	22.47	22.51	21.47	21.52



BC1 1x-RTT CDMA Voice Channel	BC1 1x-RTT CDMA Voice Tx(dBm)	LTE Band 25 channel 26365 (Mid) Conducted Power (dBm)							
		QPSK 1 RB 0 RB Offset	QPSK 1 RB 49 RB Offset	QPSK 25 RB 12 RB Offset	QPSK 50 RB 0 RB Offset	16QAM 1 RB 0 RB Offset	16QAM 1 RB 49 RB Offset	16QAM 25 RB 12 RB Offset	16QAM 50 RB 0 RB Offset
25 (Low)	24	19.33	19.33	19.35	19.53	19.33	19.37	19.23	19.33
	18	19.58	19.62	19.38	19.25	19.20	19.23	19.30	19.24
	17.5	19.54	19.43	19.33	19.27	19.30	19.24	19.32	19.38
	17	23.46	23.47	22.45	22.33	22.23	22.33	21.33	21.29
	11	23.46	23.47	22.45	22.47	22.52	22.51	21.48	21.44

BC1 1x-RTT CDMA Voice Channel	BC1 1x-RTT CDMA Voice Tx(dBm)	LTE Band 25 channel 26365 (Mid) Conducted Power (dBm)							
		QPSK 1 RB 0 RB Offset	QPSK 1 RB 49 RB Offset	QPSK 25 RB 12 RB Offset	QPSK 50 RB 0 RB Offset	16QAM 1 RB 0 RB Offset	16QAM 1 RB 49 RB Offset	16QAM 25 RB 12 RB Offset	16QAM 50 RB 0 RB Offset
600 (Mid)	24	19.36	19.51	19.35	19.35	19.33	19.34	19.22	19.28
	18	19.41	19.51	19.38	19.33	19.32	19.42	19.22	19.49
	17.5	19.45	19.49	19.35	19.38	19.29	19.38	19.31	19.35
	17	23.37	23.41	22.45	22.40	22.51	22.52	21.46	21.54
	11	23.37	23.41	22.45	22.43	22.53	22.42	21.46	21.49

BC1 1x-RTT CDMA Voice Channel	BC1 1x-RTT CDMA Voice Tx(dBm)	LTE Band 25 channel 26365 (Mid) Conducted Power (dBm)							
		QPSK 1 RB 0 RB Offset	QPSK 1 RB 49 RB Offset	QPSK 25 RB 12 RB Offset	QPSK 50 RB 0 RB Offset	16QAM 1 RB 0 RB Offset	16QAM 1 RB 49 RB Offset	16QAM 25 RB 12 RB Offset	16QAM 50 RB 0 RB Offset
1175 (High)	24	19.39	19.58	19.35	19.34	19.23	19.32	19.32	19.23
	18	19.53	19.54	19.32	19.35	19.38	19.32	19.46	19.23
	17.5	19.51	19.53	19.38	19.24	19.45	19.34	19.45	19.41
	17	23.31	23.50	22.33	22.34	22.43	22.54	21.49	21.53
	11	23.38	23.40	22.51	22.52	22.47	22.51	21.47	21.52

### 11.3 SVLTE SAR Testing Procedures

Per KDB 941225 D05, additional SAR testing was not required for the devices with power reduction mechanisms active for LTE and 1x-RTT CDMA modes with respect to the simultaneous transmission scenarios. Additional SAR testing at reduced power levels was excluded based upon the simultaneous SAR sums and volumetric SAR evaluations for standalone LTE and standalone 1x-RTT CDMA SAR at the maximum output power levels (see Section 14).

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 26 of 52

## 12 SYSTEM VERIFICATION



### 12.1 Tissue Verification

Table 12-1  
Measured Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (C°)	Measured Frequency (MHz)	Measured Conductivity, $\sigma$ (S/m)	Measured Dielectric Constant, $\epsilon$	TARGET Conductivity, $\sigma$ (S/m)	TARGET Dielectric Constant, $\epsilon$	% dev $\sigma$	% dev $\epsilon$
6/7/2012	835H	22.8	820	0.903	41.70	0.898	41.571	0.56%	0.31%
			835	0.919	41.49	0.900	41.500	2.11%	-0.02%
			850	0.935	41.35	0.916	41.500	2.07%	-0.36%
6/14/2012	835H	23.5	820	0.889	39.99	0.898	41.571	-1.00%	-3.80%
			835	0.904	39.71	0.900	41.500	0.44%	-4.31%
			850	0.917	39.54	0.916	41.500	0.11%	-4.72%
6/5/2012	1900H	22.2	1850	1.399	38.65	1.400	40.000	-0.07%	-3.38%
			1880	1.425	38.60	1.400	40.000	1.79%	-3.50%
			1910	1.459	38.48	1.400	40.000	4.21%	-3.80%
6/11/2012	1900H	23.2	1850	1.392	39.59	1.400	40.000	-0.57%	-1.02%
			1880	1.423	39.40	1.400	40.000	1.64%	-1.50%
			1910	1.452	39.26	1.400	40.000	3.71%	-1.85%
6/14/2012	1900H	22.1	1850	1.357	38.41	1.400	40.000	-3.07%	-3.98%
			1880	1.390	38.26	1.400	40.000	-0.71%	-4.35%
			1910	1.425	38.14	1.400	40.000	1.79%	-4.65%
6/13/2012	2450H	23.0	2401	1.816	38.23	1.758	39.298	3.30%	-2.72%
			2450	1.867	38.08	1.800	39.200	3.72%	-2.86%
			2499	1.924	37.87	1.852	39.135	3.89%	-3.23%
6/15/2012	2450H	23.6	2401	1.818	40.77	1.758	39.298	3.41%	3.75%
			2450	1.873	40.63	1.800	39.200	4.06%	3.65%
			2499	1.932	40.37	1.852	39.135	4.32%	3.16%
06/11/2012	5200H-5800H	22.4	5200	4.506	35.32	4.660	36.000	-3.30%	-1.89%
			5240	4.511	35.25	4.700	35.960	-4.02%	-1.97%
			5300	4.565	35.16	4.760	35.900	-4.10%	-2.06%
			5500	4.783	34.93	4.965	35.650	-3.67%	-2.02%
			5700	4.949	34.61	5.170	35.400	-4.27%	-2.23%
			5785	5.048	34.57	5.255	35.315	-3.94%	-2.11%
			5800	5.054	34.48	5.270	35.300	-4.10%	-2.32%
6/7/2012	835B	21.9	820	0.984	53.18	0.969	55.284	1.55%	-3.81%
			835	0.998	53.05	0.970	55.200	2.89%	-3.89%
			850	1.013	52.92	0.988	55.154	2.53%	-4.05%
6/5/2012	1900B	23.4	1850	1.492	51.30	1.520	53.300	-1.84%	-3.75%
			1880	1.522	51.21	1.520	53.300	0.13%	-3.92%
			1910	1.556	51.10	1.520	53.300	2.37%	-4.13%
6/8/2012	1900B	23.9	1850	1.508	53.33	1.520	53.300	-0.79%	0.06%
			1880	1.545	53.18	1.520	53.300	1.64%	-0.23%
			1910	1.581	53.13	1.520	53.300	4.01%	-0.32%
6/13/2012	2450B	24.6	2401	1.836	54.46	1.903	52.765	-3.52%	3.21%
			2450	1.893	54.27	1.950	52.700	-2.92%	2.98%
			2499	1.959	54.15	2.019	52.638	-2.97%	2.87%
06/12/2012	5200B-5800B	23.4	5200	5.242	48.06	5.299	49.014	-1.08%	-1.95%
			5240	5.269	47.99	5.346	48.933	-1.44%	-1.93%
			5300	5.359	47.80	5.416	48.851	-1.05%	-2.15%
			5500	5.676	47.35	5.650	48.580	0.46%	-2.53%
			5700	5.936	46.81	5.880	48.275	0.95%	-3.03%
			5785	6.098	46.70	5.982	48.242	1.94%	-3.20%
			5800	6.111	46.63	6.000	48.200	1.85%	-3.26%

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.

FCC ID: ZNFLS970	 PCTEST ENGINEERING LABORATORY, INC.	SAR EVALUATION REPORT	 LG	Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 27 of 52



Probe calibration used within  $\pm 100$  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.

## 12.2 Measurement Procedure for Tissue verification

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

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

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

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>	 <b>LG</b>	<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 28 of 52

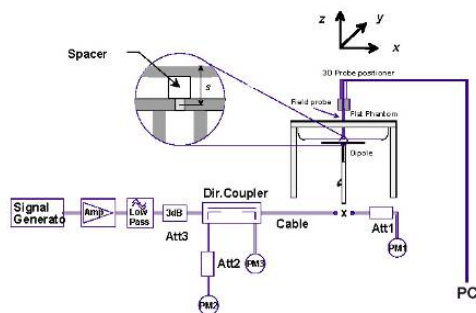
## 12.3 Test System Verification

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

**Table 12-2**  
**System Verification Results**

System Verification TARGET & MEASURED											
Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Dipole SN	Probe SN	Measured SAR <sub>1g</sub> (W/kg)	1 W Target SAR <sub>1g</sub> (W/kg)	1 W Normalized SAR <sub>1g</sub> (W/kg)	Deviation (%)
835	Head	06/07/2012	23.1	22.4	0.100	4d119	3258	0.991	9.420	9.910	5.20%
835	Head	06/14/2012	22.7	22.0	0.100	4d047	3561	0.965	9.410	9.650	2.55%
1900	Head	06/05/2012	22.8	21.4	0.100	5d080	3209	4.10	39.900	41.000	2.76%
1900	Head	06/11/2012	22.9	21.6	0.100	5d080	3022	3.91	39.900	39.100	-2.01%
1900	Head	06/14/2012	22.6	22.2	0.100	5d149	3288	3.93	39.300	39.300	0.00%
2450	Head	06/13/2012	22.1	22.2	0.100	797	3258	5.36	52.100	53.600	2.88%
2450	Head	06/15/2012	22.8	21.7	0.100	882	3287	5.34	53.500	53.400	-0.19%
5200	Head	06/11/2012	23.2	22.1	0.020	1057	3589	1.50	79.100	75.000	-5.18%
5500	Head	06/11/2012	23.5	22.3	0.018	1057	3589	1.51	84.900	83.889	-1.19%
5800	Head	06/11/2012	23.6	22.5	0.019	1057	3589	1.49	79.500	78.421	-1.36%
835	Body	06/07/2012	23.1	22.2	0.100	4d119	3258	1.02	9.560	10.200	6.69%
1900	Body	06/05/2012	23.4	21.9	0.100	5d080	3209	4.26	40.900	42.600	4.16%
1900	Body	06/08/2012	24.1	23.4	0.100	5d080	3022	4.20	40.900	42.000	2.69%
2450	Body	06/13/2012	22.8	22.7	0.100	797	3258	4.84	50.800	48.400	-4.72%
5200	Body	06/12/2012	23.5	22.3	0.020	1057	3589	1.44	73.400	72.000	-1.91%
5500	Body	06/12/2012	23.7	22.4	0.018	1057	3589	1.35	78.900	75.000	-4.94%
5800	Body	06/12/2012	23.9	22.7	0.019	1057	3589	1.35	74.300	71.053	-4.37%



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



**Figure 12-1**  
**System Verification Setup Diagram**



**Figure 12-2**  
**System Verification Setup Photo**

FCC ID: ZNFLS970	 PCTEST ENGINEERING LABORATORY, INC.	SAR EVALUATION REPORT	 LG	Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 29 of 52

## 13 SAR DATA SUMMARY

### 13.1 Standalone Head SAR Data

**Table 13-1**  
**Cell. CDMA - FCC Rule Part 90S 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)
820.10	564	Cell. CDMA - FCC Rule Part 90S	25.08	0.01	Right	Cheek	245	0.469
820.10	564	Cell. CDMA - FCC Rule Part 90S	25.08	0.08	Right	Tilt	245	0.294
820.10	564	Cell. CDMA - FCC Rule Part 90S	25.08	0.07	Left	Cheek	245	0.624
820.10	564	Cell. CDMA - FCC Rule Part 90S	25.08	-0.18	Left	Tilt	245	0.364
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 13-2**  
**Cell. CDMA - FCC Rule Part 22H 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)
836.52	384	Cell. CDMA/EVDO - FCC Rule Part 22H	25.04	0.00	Right	Cheek	245	0.406
836.52	384	Cell. CDMA/EVDO - FCC Rule Part 22H	25.04	0.03	Right	Tilt	245	0.237
836.52	384	Cell. CDMA/EVDO - FCC Rule Part 22H	25.04	-0.06	Left	Cheek	245	0.493
836.52	384	Cell. CDMA/EVDO - FCC Rule Part 22H	25.04	0.06	Left	Tilt	245	0.299
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 13-3**  
**PCS CDMA - FCC Rule Part 24E Head SAR Results**

MEASUREMENT RESULTS								
FREQUENCY		Mode/Band	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	SAR (1g)
MHz	Ch.							(W/kg)
1880.00	600	PCS CDMA - FCC Rule Part 24E	25.08	-0.03	Right	Cheek	245	0.341
1880.00	600	PCS CDMA - FCC Rule Part 24E	25.08	0.07	Right	Tilt	245	0.110
1880.00	600	PCS CDMA - FCC Rule Part 24E	25.08	-0.17	Left	Cheek	245	0.451
1880.00	600	PCS CDMA - FCC Rule Part 24E	25.08	0.12	Left	Tilt	245	0.113
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					Head 1.6 W/kg (mW/g) averaged over 1 gram			

FCC ID: ZNFLS970		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 30 of 52



**Table 13-4**  
**LTE Band 25 (PCS) – FCC Rule Part 24E Head SAR Results**

MEASUREMENT RESULTS															
FREQUENCY			Mode	Bandwidth h [MHz]	Battery Type	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)													
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	22.40	0.04	1	Right	Touch	QPSK	25	12	242	0.556
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	23.24	-0.10	0	Right	Touch	QPSK	1	0	242	0.658
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	23.39	0.02	0	Right	Touch	QPSK	1	49	242	0.579
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	21.45	-0.04	2	Right	Touch	16 QAM	25	12	242	0.440
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	22.03	-0.01	1	Right	Touch	16 QAM	1	0	242	0.525
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	22.26	0.01	1	Right	Touch	16 QAM	1	49	242	0.520
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	22.40	0.10	1	Right	Tilt	QPSK	25	12	242	0.450
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	23.24	-0.04	0	Right	Tilt	QPSK	1	0	242	0.541
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	23.39	0.04	0	Right	Tilt	QPSK	1	49	242	0.465
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	21.45	0.02	2	Right	Tilt	16 QAM	25	12	242	0.355
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	22.03	-0.01	1	Right	Tilt	16 QAM	1	0	242	0.436
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	22.26	0.04	1	Right	Tilt	16 QAM	1	49	242	0.375
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	22.35	-0.11	1	Left	Touch	QPSK	25	12	242	0.745
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	22.40	0.01	1	Left	Touch	QPSK	25	12	242	0.851
1910.00	26640	High	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	22.10	-0.01	1	Left	Touch	QPSK	25	12	242	0.712
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	23.24	-0.03	0	Left	Touch	QPSK	1	0	242	1.010
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	23.39	0.02	0	Left	Touch	QPSK	1	49	242	0.888
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	21.45	0.06	2	Left	Touch	16 QAM	25	12	242	0.707
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	22.03	-0.02	1	Left	Touch	16 QAM	1	0	242	0.796
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	22.26	0.00	1	Left	Touch	16 QAM	1	49	242	0.708
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	22.40	0.05	1	Left	Tilt	QPSK	25	12	242	0.505
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	23.24	-0.02	0	Left	Tilt	QPSK	1	0	242	0.605
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	23.39	0.03	0	Left	Tilt	QPSK	1	49	242	0.535
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	21.45	0.04	2	Left	Tilt	16 QAM	25	12	242	0.406
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	22.03	-0.02	1	Left	Tilt	16 QAM	1	0	242	0.483
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	Standard	22.26	0.04	1	Left	Tilt	16 QAM	1	49	242	0.431
ANSI / IEEE C95.1 1992 - SAFETY LIMIT									Head						
Spatial Peak									1.6 W/kg (mW/g)						
Uncontrolled Exposure/General Population									averaged over 1 gram						

Note: Per KDB 941225 D05, when the maximum average output power of 1 RB allocation is more than 0.5 dB higher than the 50% RB allocation, the highest output power for the 1 RB allocations is tested. Therefore, low channel was tested for the QPSK, 1 RB allocation configurations and mid channel was tested for the 16QAM, 1 RB allocation configurations.

**Table 13-5**  
**2.4 GHz WLAN - FCC Rule Part 15C 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)
2437	6	IEEE 802.11b - FCC Rule Part 15C	DSSS	16.64	0.20	Right	Cheek	257	1	0.031
2437	6	IEEE 802.11b - FCC Rule Part 15C	DSSS	16.64	-0.05	Right	Tilt	257	1	0.031
2437	6	IEEE 802.11b - FCC Rule Part 15C	DSSS	16.64	-0.04	Left	Cheek	257	1	0.045
2437	6	IEEE 802.11b - FCC Rule Part 15C	DSSS	16.64	-0.05	Left	Tilt	257	1	0.024
ANSI / IEEE C95.1 1992 - SAFETY LIMIT						Head				
Spatial Peak						1.6 W/kg (mW/g)				
Uncontrolled Exposure/General Population						averaged over 1 gram				

FCC ID: ZNFLS970		<b>SAR EVALUATION REPORT</b>		Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 31 of 52



**Table 13-6**  
**5.8 GHz WLAN – FCC Rule Part 15C 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)
5785	157	IEEE 802.11a - FCC Rule Part 15C	OFDM	12.88	0.00	Right	Cheek	242	6	0.000
5785	157	IEEE 802.11a - FCC Rule Part 15C	OFDM	12.88	0.00	Right	Tilt	242	6	0.001
5785	157	IEEE 802.11a - FCC Rule Part 15C	OFDM	12.88	0.00	Left	Cheek	242	6	0.000
5785	157	IEEE 802.11a - FCC Rule Part 15C	OFDM	12.88	0.00	Left	Tilt	242	6	0.000
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 13-7**  
**5.2 GHz WLAN – FCC Rule Part 15E 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)
5240	48	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.96	0.00	Right	Cheek	242	6	0.000
5240	48	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.96	0.00	Right	Tilt	242	6	0.000
5240	48	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.96	0.00	Left	Cheek	242	6	0.000
5240	48	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.96	0.00	Left	Tilt	242	6	0.000
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 13-8**  
**5.3 GHz WLAN – FCC Rule Part 15E 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)
5300	60	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.97	0.00	Right	Cheek	242	6	0.000
5300	60	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.97	0.00	Right	Tilt	242	6	0.000
5300	60	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.97	0.00	Left	Cheek	242	6	0.000
5300	60	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.97	0.00	Left	Tilt	242	6	0.000
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Head 1.6 W/kg (mW/g) averaged over 1 gram				

FCC ID: ZNFLS970		SAR EVALUATION REPORT					Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset				Page 32 of 52	



**Table 13-9**  
**5.5 - 5.7 GHz WLAN – FCC Rule Part 15E 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)
5700	140	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.65	0.00	Right	Cheek	242	6	0.000
5700	140	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.65	0.00	Right	Tilt	242	6	0.000
5700	140	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.65	0.00	Left	Cheek	242	6	0.000
5700	140	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.65	0.00	Left	Tilt	242	6	0.000
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Head 1.6 W/kg (mW/g) averaged over 1 gram				



## 13.2 Standalone Body-Worn SAR Data

**Table 13-10**  
**CDMA Body-Worn SAR Results**

MEASUREMENT RESULTS									
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Side	SAR (1g)
MHz	Ch.								(W/kg)
820.10	564	Cell. CDMA - FCC Rule Part 90S	TDSO / SO32	25.00	0.01	1.0 cm	245	back	1.010
824.70	1013	Cell. CDMA - FCC Rule Part 22H	TDSO / SO32	25.13	-0.06	1.0 cm	245	back	1.070
836.52	384	Cell. CDMA - FCC Rule Part 22H	TDSO / SO32	25.00	0.04	1.0 cm	245	back	0.856
848.31	777	Cell. CDMA - FCC Rule Part 22H	TDSO / SO32	24.92	-0.09	1.0 cm	245	back	0.689
1851.25	25	PCS CDMA - FCC Rule Part 24E	TDSO / SO32	24.94	-0.07	1.0 cm	260	back	0.801
1880.00	600	PCS CDMA - FCC Rule Part 24E	TDSO / SO32	25.08	0.14	1.0 cm	260	back	1.010
1908.75	1175	PCS CDMA - FCC Rule Part 24E	TDSO / SO32	25.00	0.10	1.0 cm	260	back	1.270
1908.75	1175	PCS CDMA - FCC Rule Part 24E	CDMA Rev. E 1x Advanced	25.19	-0.02	1.0 cm	260	back	1.180
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram			

**Notes:**

- For CDMA mode, hotspot SAR data was used for supporting body-worn accessory compliance per FCC KDB Publication 941225 D06. CDMA 1x-RTT SAR was required to be evaluated for hotspot exposure configurations since there are simultaneous combinations (see **Table 1-2**) that allow hotspot transmissions using CDMA 1x-RTT.
- CDMA 1x Advanced technology was required for PCS CDMA body-worn SAR since the measured SAR for PCS TDSO / SO32 was greater than 1.2 W/kg. See Section 9.2.2 for 1x Advanced test set up.

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>	 <b>LG</b>	<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset	Page 33 of 52	

**Table 13-11**  
**LTE Body-Worn SAR Results**

MEASUREMENT RESULTS														
FREQUENCY			Mode	Bandwidth [MHz]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	# of RB	RB Offset	Spacing	Side	SAR (1g)
MHz	Ch.	(W/kg)												
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.40	-0.09	1	242	QPSK	25	12	1.0 cm	back	0.297
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	23.24	-0.04	0	242	QPSK	1	0	1.0 cm	back	0.347
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	23.39	0.05	0	242	QPSK	1	49	1.0 cm	back	0.323
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	21.45	0.08	2	242	16 QAM	25	12	1.0 cm	back	0.239
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.03	0.00	1	242	16 QAM	1	0	1.0 cm	back	0.280
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.26	0.04	1	242	16 QAM	1	49	1.0 cm	back	0.261
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:

1. For LTE Mode, Hotspot SAR Data was used for supporting body-worn accessory compliance per FCC KDB Publication 941225 D06.
2. Per KDB 941225 D05, when the maximum average output power of 1 RB allocation is more than 0.5 dB higher than the 50% RB allocation, the highest output power for the 1 RB allocations is tested. Therefore, low channel was tested for the QPSK, 1 RB allocation configurations and mid channel was tested for the 16QAM, 1 RB allocation configurations.

**Table 13-12**  
**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)
2437	6	IEEE 802.11b - FCC Rule Part 15C	DSSS	16.64	0.07	1.0 cm	242	1	back	0.093
5785	157	IEEE 802.11a - FCC Rule Part 15C	OFDM	12.88	0.00	1.0 cm	242	6	back	0.000
5240	48	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.96	0.00	1.0 cm	242	6	back	0.000
5300	60	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.97	0.00	1.0 cm	242	6	back	0.000
5700	140	IEEE 802.11a - FCC Rule Part 15E	OFDM	12.65	0.00	1.0 cm	242	6	back	0.000
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: For IEEE 802.11b mode, Hotspot SAR Data was used for supporting body-worn compliance per FCC KDB Publication 941225 D06.

FCC ID: ZNFLS970		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 34 of 52



### 13.3 Standalone Wireless Router SAR Data

**Table 13-13**  
**CDMA Hotspot SAR Data**

MEASUREMENT RESULTS									
FREQUENCY		Mode	Service	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Side	SAR (1g)
MHz	Ch.								(W/kg)
820.10	564	Cell. CDMA - FCC Rule Part 90S	TDSO / SO32	25.00	0.01	1.0 cm	245	back	1.010
820.10	564	Cell. CDMA - FCC Rule Part 90S	TDSO / SO32	25.00	-0.01	1.0 cm	245	front	0.817
820.10	564	Cell. CDMA - FCC Rule Part 90S	TDSO / SO32	25.00	0.02	1.0 cm	245	bottom	0.245
820.10	564	Cell. CDMA - FCC Rule Part 90S	TDSO / SO32	25.00	0.05	1.0 cm	245	left	0.641
820.10	564	Cell. CDMA - FCC Rule Part 90S	EVDO Rev. 0	25.03	0.07	1.0 cm	245	back	1.020
820.10	564	Cell. CDMA - FCC Rule Part 90S	EVDO Rev. 0	25.03	-0.02	1.0 cm	245	front	0.784
820.10	564	Cell. CDMA - FCC Rule Part 90S	EVDO Rev. 0	25.03	0.12	1.0 cm	245	bottom	0.246
820.10	564	Cell. CDMA - FCC Rule Part 90S	EVDO Rev. 0	25.03	0.00	1.0 cm	245	left	1.000
824.70	1013	Cell. CDMA/EVDO - FCC Rule Part 22H	TDSO / SO32	25.13	-0.06	1.0 cm	245	back	1.070
836.52	384	Cell. CDMA/EVDO - FCC Rule Part 22H	TDSO / SO32	25.00	0.04	1.0 cm	245	back	0.856
848.31	777	Cell. CDMA/EVDO - FCC Rule Part 22H	TDSO / SO32	24.92	-0.09	1.0 cm	245	back	0.689
836.52	384	Cell. CDMA/EVDO - FCC Rule Part 22H	TDSO / SO32	25.00	0.06	1.0 cm	245	front	0.667
836.52	384	Cell. CDMA/EVDO - FCC Rule Part 22H	TDSO / SO32	25.00	0.00	1.0 cm	245	bottom	0.262
836.52	384	Cell. CDMA/EVDO - FCC Rule Part 22H	TDSO / SO32	25.00	0.00	1.0 cm	245	left	0.513
824.70	1013	Cell. CDMA/EVDO - FCC Rule Part 22H	EVDO Rev. 0	25.03	0.11	1.0 cm	245	back	1.090
836.52	384	Cell. CDMA/EVDO - FCC Rule Part 22H	EVDO Rev. 0	25.05	-0.01	1.0 cm	245	back	0.881
848.31	777	Cell. CDMA/EVDO - FCC Rule Part 22H	EVDO Rev. 0	25.04	-0.10	1.0 cm	245	back	0.702
836.52	384	Cell. CDMA/EVDO - FCC Rule Part 22H	EVDO Rev. 0	25.05	0.12	1.0 cm	245	front	0.652
836.52	384	Cell. CDMA/EVDO - FCC Rule Part 22H	EVDO Rev. 0	25.05	-0.08	1.0 cm	245	bottom	0.272
824.70	1013	Cell. CDMA/EVDO - FCC Rule Part 22H	EVDO Rev. 0	25.03	-0.14	1.0 cm	245	left	1.130
836.52	384	Cell. CDMA/EVDO - FCC Rule Part 22H	EVDO Rev. 0	25.05	-0.04	1.0 cm	245	left	0.918
848.31	777	Cell. CDMA/EVDO - FCC Rule Part 22H	EVDO Rev. 0	25.04	0.00	1.0 cm	245	left	0.735
1851.25	25	PCS CDMA - FCC Rule Part 24E	TDSO / SO32	24.94	-0.07	1.0 cm	260	back	0.801
1880.00	600	PCS CDMA - FCC Rule Part 24E	TDSO / SO32	25.08	0.14	1.0 cm	260	back	1.010
1908.75	1175	PCS CDMA - FCC Rule Part 24E	TDSO / SO32	25.00	0.10	1.0 cm	260	back	1.270
1908.75	1175	PCS CDMA - FCC Rule Part 24E	CDMA Rev. E 1x Advanced	25.19	-0.02	1.0 cm	260	back	1.180
1880.00	600	PCS CDMA - FCC Rule Part 24E	TDSO / SO32	25.20	0.09	1.0 cm	260	front	0.726
1880.00	600	PCS CDMA - FCC Rule Part 24E	TDSO / SO32	25.20	-0.12	1.0 cm	260	bottom	0.623
1880.00	600	PCS CDMA - FCC Rule Part 24E	TDSO / SO32	25.20	-0.04	1.0 cm	260	left	0.357
1880.00	600	PCS CDMA - FCC Rule Part 24E	EVDO Rev. 0	25.20	-0.07	1.0 cm	245	back	0.640
1880.00	600	PCS CDMA - FCC Rule Part 24E	EVDO Rev. 0	25.20	-0.10	1.0 cm	245	front	0.348
1880.00	600	PCS CDMA - FCC Rule Part 24E	EVDO Rev. 0	25.20	-0.14	1.0 cm	245	bottom	0.360
1880.00	600	PCS CDMA - FCC Rule Part 24E	EVDO Rev. 0	25.20	-0.17	1.0 cm	245	left	0.188
ANSI / IEEE C95.1 1992 - SAFETY LIMIT						Body			
Spatial Peak						1.6 W/kg (mW/g)			
Uncontrolled Exposure/General Population						averaged over 1 gram			

Note:

1. CDMA 1x Advanced technology was required for PCS CDMA Hotspot SAR since the measured SAR for PCS TDSO / SO32 was greater than 1.2 W/kg. See Section 9.2.2 for 1x Advanced test set up.
2. CDMA 1x-RTT SAR was required to be evaluated for Hotspot exposure conditions to support simultaneous capabilities per **Table 1-2**.

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>	 <b>LG</b>	Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 35 of 52



**Table 13-14**  
**LTE Hotspot SAR Data**

MEASUREMENT RESULTS														
FREQUENCY			Mode	Bandwidth [MHz]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	# of RB	RB Offset	Spacing	Side	SAR (1g)
MHz	Ch.	High												(W/kg)
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.40	-0.09	1	242	QPSK	25	12	1.0 cm	back	0.297
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	23.24	-0.04	0	242	QPSK	1	0	1.0 cm	back	0.347
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	23.39	0.05	0	242	QPSK	1	49	1.0 cm	back	0.323
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	21.45	0.08	2	242	16 QAM	25	12	1.0 cm	back	0.239
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.03	0.00	1	242	16 QAM	1	0	1.0 cm	back	0.280
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.26	0.04	1	242	16 QAM	1	49	1.0 cm	back	0.261
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.40	0.11	1	242	QPSK	25	12	1.0 cm	front	0.228
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	23.24	0.06	0	242	QPSK	1	0	1.0 cm	front	0.280
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	23.39	0.10	0	242	QPSK	1	49	1.0 cm	front	0.229
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	21.45	0.18	2	242	16 QAM	25	12	1.0 cm	front	0.182
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.03	0.17	1	242	16 QAM	1	0	1.0 cm	front	0.225
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.26	0.13	1	242	16 QAM	1	49	1.0 cm	front	0.200
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.40	0.04	1	242	QPSK	25	12	1.0 cm	top	0.106
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	23.24	-0.03	0	242	QPSK	1	0	1.0 cm	top	0.131
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	23.39	-0.01	0	242	QPSK	1	49	1.0 cm	top	0.117
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	21.45	-0.05	2	242	16 QAM	25	12	1.0 cm	top	0.087
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.03	-0.07	1	242	16 QAM	1	0	1.0 cm	top	0.105
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.26	-0.06	1	242	16 QAM	1	49	1.0 cm	top	0.094
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.40	0.06	1	242	QPSK	25	12	1.0 cm	right	0.176
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	23.24	0.06	0	242	QPSK	1	0	1.0 cm	right	0.203
1855.00	26090	Low	LTE Band 25 (PCS) - FCC Rule Part 24E	10	23.39	0.07	0	242	QPSK	1	49	1.0 cm	right	0.187
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	21.45	0.11	2	242	16 QAM	25	12	1.0 cm	right	0.141
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.03	0.10	1	242	16 QAM	1	0	1.0 cm	right	0.163
1882.50	26365	Mid	LTE Band 25 (PCS) - FCC Rule Part 24E	10	22.26	0.04	1	242	16 QAM	1	49	1.0 cm	right	0.151
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: Per KDB 941225 D05, when the maximum average output power of 1 RB allocation is more than 0.5 dB higher than the 50% RB allocation, the highest output power for the 1 RB allocations is tested. Therefore, low channel was tested for the QPSK, 1 RB allocation configurations and mid channel was tested for the 16QAM, 1 RB allocation configurations.

**Table 13-15**  
**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) (W/kg)
MHz	Ch.									
2437	6	2.4 GHz WLAN - FCC Rule Part 15C	DSSS	16.64	0.07	1.0 cm	242	1	back	0.093
2437	6	2.4 GHz WLAN - FCC Rule Part 15C	DSSS	16.64	-0.05	1.0 cm	242	1	front	0.016
2437	6	2.4 GHz WLAN - FCC Rule Part 15C	DSSS	16.64	0.20	1.0 cm	242	1	top	0.014
2437	6	2.4 GHz WLAN - FCC Rule Part 15C	DSSS	16.64	0.17	1.0 cm	242	1	right	0.046
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram			

FCC ID: ZNFLS970		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 36 of 52

## 13.4 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] and IEEE 1528-2003.
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. Per FCC KDB Publication 941225 D06, when the same wireless modes and device transmission configurations are required for body-worn accessories and hotspot mode, it is not necessary to additionally test body-worn accessory SAR for the same device orientation. Therefore, the 1x-RTT CDMA, LTE and 2.4 GHz WLAN hotspot data for the back side configuration additionally shows body-worn compliance at the same distance.

### CDMA Notes:

1. Head SAR for CDMA2000 mode was tested under RC3/SO55 per KDB Publication 941225 D01.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. Ev-Do and TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers.
3. CDMA Wireless Router SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 according to KDB 941225 D01 procedures for data devices. If the average output power of Subtype 2 for Rev. A is less than the Rev. 0 power levels, then Rev. A SAR is not required. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for that RF channel in Rev. 0.
4. CDMA 1x Advanced technology was required for PCS CDMA body-worn/Hotspot SAR since the measured SAR for PCS TDSO / SO32 was greater than 1.2 W/kg. See Section 9.2.2 for 1x Advanced test set up.
5. CDMA 1x-RTT SAR was required to be evaluated for Hotspot exposure conditions to support simultaneous capabilities per **Table 1-2**.

### 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 independent 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.



FCC ID: ZNFLS970		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 37 of 52

#### 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) 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. Since the maximum extrapolated peak SAR of the zoom scan for the maximum output channel was <1.6 W/kg and the 1g averaged SAR is <0.8 W/kg, SAR testing on other channels were not required.
6. For 5 GHz WIFI: 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.

#### Hotspot Notes:

1. Top Edge and Right Edge for the CDMA/EVDO transmitter were not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 guidance (see Section 1.3).
2. Bottom Edge and Left Edge for the LTE transmitter were not tested since the antenna distance from the edge was greater than 2.5 cm per FCC KDB Publication 941225 D06 guidance (see Section 1.3).
3. Bottom Edge and Left Edge for the WLAN transmitter were 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.)

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 38 of 52



## 14 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

### 14.1 Introduction

The following procedures adopted from “FCC SAR Considerations for Cell Phones with Multiple Transmitters” FCC KDB Publication 648474 and April 2012 TCB Workshop Notes 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.

### 14.2 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 14-1**  
**Output Power Thresholds for Unlicensed Transmitters**

	Individual Transmitter	Simultaneous Transmission
<b>Licensed Transmitters</b>	<u>Routine evaluation required</u>	<u>SAR not required:</u> <u>Unlicensed only</u> <ul style="list-style-type: none"> <li>when stand-alone 1-g SAR is not required and antenna is <math>\geq 5</math> cm from other antennas</li> </ul> <u>Licensed &amp; Unlicensed</u> <ul style="list-style-type: none"> <li>when the sum of the 1-g SAR is <math>&lt; 1.6</math> W/kg for all simultaneous transmitting antennas</li> <li>when SAR to peak location separation ratio of simultaneous transmitting antenna pair is <math>&lt; 0.3</math></li> </ul> <u>SAR required:</u> <u>Licensed &amp; Unlicensed</u> <p>antenna pairs with SAR to peak location separation ratio <math>\geq 0.3</math>; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition</p> <p><b>Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply</b></p>
<b>Unlicensed Transmitters</b>	<p><u>When there is no simultaneous transmission –</u></p> <ul style="list-style-type: none"> <li>output <math>\leq 60</math>/f: SAR not required</li> <li>output <math>&gt; 60</math>/f: stand-alone SAR required</li> </ul> <p><u>When there is simultaneous transmission –</u></p> <p><u>Stand-alone SAR not required when</u></p> <ul style="list-style-type: none"> <li>output <math>\leq 2 \cdot P_{Ref}</math> and antenna is <math>\geq 5.0</math> cm from other antennas</li> <li>output <math>\leq P_{Ref}</math> and antenna is <math>\geq 2.5</math> cm from other antennas</li> <li>output <math>\leq P_{Ref}</math> and antenna is <math>&lt; 2.5</math> cm from other antennas, each with either output power <math>\leq P_{Ref}</math> or 1-g SAR <math>&lt; 1.2</math> W/kg</li> </ul> <p><u>Otherwise stand-alone SAR is required</u></p> <p><u>When stand-alone SAR is required</u></p> <ul style="list-style-type: none"> <li>test SAR on highest output channel for each wireless mode and exposure condition</li> <li>if SAR for highest output channel is <math>&gt; 50\%</math> of SAR limit, evaluate all channels according to normal procedures</li> </ul>	

**Figure 14-2**  
**SAR Evaluation Requirements for Multiple Transmitter Handsets**

According to Figure 14-1 and Figure 14-2, 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.

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 39 of 52



## 14.3 Head SAR Simultaneous Transmission Analysis

**Table 14-1**  
**Simultaneous Transmission Scenario (Held to Ear)**

Simult Tx	Configuration	Cell. CDMA - FCC Rule Part 90S SAR (W/kg)	LTE Band 25 (PCS) - FCC Rule Part 24E SAR (W/kg)	2.4 GHz WLAN - FCC Rule Part 15C SAR (W/kg)	$\Sigma$ SAR (W/kg)			SPLSR		Volumetric SAR (W/kg)
		1	2	3	1+2	1+3	1+2+3	1+2	1+3	1+2+3
Head SAR	Right Cheek	0.469	0.658	0.031	1.127	0.500	<b>1.158</b>	N/A	N/A	N/A
	Right Tilt	0.294	0.541	0.031	0.835	0.325	0.866	N/A	N/A	N/A
	Left Cheek	0.624	1.010	0.045	See note 1	0.669	See note 2	0.22	0.10	0.973
	Left Tilt	0.364	0.605	0.024	0.969	0.388	0.993	N/A	N/A	N/A
Simult Tx	Configuration	Cell. CDMA - FCC Rule Part 22H SAR (W/kg)	LTE Band 25 (PCS) - FCC Rule Part 24E SAR (W/kg)	2.4 GHz WLAN - FCC Rule Part 15C SAR (W/kg)	$\Sigma$ SAR (W/kg)			SPLSR		Volumetric SAR (W/kg)
		1	2	3	1+2	1+3	1+2+3	1+2	1+3	1+2+3
Head SAR	Right Cheek	0.406	0.658	0.031	1.064	0.437	1.095	N/A	N/A	N/A
	Right Tilt	0.237	0.541	0.031	0.778	0.268	0.809	N/A	N/A	N/A
	Left Cheek	0.493	1.010	0.045	1.503	0.538	<b>1.548</b>	N/A	N/A	N/A
	Left Tilt	0.299	0.605	0.024	0.904	0.323	0.928	N/A	N/A	N/A
Simult Tx	Configuration	PCS CDMA - FCC Rule Part 24E SAR (W/kg)	LTE Band 25 (PCS) - FCC Rule Part 24E SAR (W/kg)	2.4 GHz WLAN - FCC Rule Part 15C SAR (W/kg)	$\Sigma$ SAR (W/kg)			SPLSR		Volumetric SAR (W/kg)
		1	2	3	1+2	1+3	1+2+3	1+2	1+3	1+2+3
Head SAR	Right Cheek	0.341	0.658	0.031	0.999	0.372	1.030	N/A	N/A	N/A
	Right Tilt	0.110	0.541	0.031	0.651	0.141	0.682	N/A	N/A	N/A
	Left Cheek	0.451	1.010	0.045	1.461	0.496	<b>1.506</b>	N/A	N/A	N/A
	Left Tilt	0.113	0.605	0.024	0.718	0.137	0.742	N/A	N/A	N/A

**Notes:**

1. No evaluation was performed to determine the aggregate 1-g SAR in this configuration as the SPLSR of both antenna pairs (Cell. CDMA – FCC Rule Part 90S and LTE band 25 (PCS) – FCC Rule Part 24E) was below 0.3 per FCC KDB Publication 648474 D01. See Section 14.6.1 for detailed SPLSR analysis.
2. No evaluation was performed to determine the aggregate 1-g SAR or SPLSR in this configuration as the aggregate volumetric SAR evaluation was less than 1.6 W/kg. See Section 14.7 for detailed volumetric evaluation analysis.

FCC ID: ZNFLS970		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 40 of 52



**Table 14-2**  
**Simultaneous Transmission Scenario (Held to Ear)**

Simult Tx	Configuration	Cell. CDMA - FCC Rule Part 90S SAR (W/kg)	5 GHz WLAN - FCC Rule Part 15 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	Cell. CDMA - FCC Rule Part 22H SAR (W/kg)	5 GHz WLAN - FCC Rule Part 15 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2			1	2	1+2
Head SAR	Right Cheek	0.469	0.000	0.469	Head SAR	Right Cheek	0.406	0.000	0.406
	Right Tilt	0.294	0.001	0.295		Right Tilt	0.237	0.001	0.238
	Left Cheek	0.624	0.000	<b>0.624</b>		Left Cheek	0.493	0.000	<b>0.493</b>
	Left Tilt	0.364	0.000	0.364		Left Tilt	0.299	0.000	0.299

Simult Tx	Configuration	PCS CDMA - FCC Rule Part 24E SAR (W/kg)	5 GHz WLAN - FCC Rule Part 15 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	Right Cheek	0.341	0.000	0.341
	Right Tilt	0.110	0.001	0.111
	Left Cheek	0.451	0.000	<b>0.451</b>
	Left Tilt	0.113	0.000	0.113

Note: For numerical sums below 1.6 W/kg, no SPLSR analysis or aggregate volumetric SAR evaluations for the transmitters were required.

## 14.4 Body-Worn Simultaneous Transmission Analysis

**Table 14-3**  
**Simultaneous Transmission Scenario (Body-Worn at 1.0 cm)**

Configuration	Mode	CDMA SAR (W/kg)	LTE Band 25 (PCS) - FCC Rule Part 24E SAR (W/kg)	2.4 GHz WLAN - FCC Rule Part 15C SAR (W/kg)	Σ SAR (W/kg)			SPLSR		Volumetric SAR (W/kg)
		1	2	3	1+2	1+3	1+2+3	1+2	1+3	1+2
Back Side	Cell. CDMA - FCC Rule Part 90S	1.010	0.347	0.093	1.357	1.103	1.450	N/A	N/A	N/A
Back Side	Cell. CDMA - FCC Rule Part 22H	1.070	0.347	0.093	1.417	1.163	<b>1.510</b>	N/A	N/A	N/A
Back Side	PCS CDMA - FCC Rule Part 24E	1.270	0.347	0.093	See Note 1	1.363	See Note 1	0.14	0.12	N/A



Note:

- No evaluation was performed to determine the aggregate 1-g SAR in this configuration as the SPLSR between each antenna pair was below 0.3 per FCC KDB Publication 648474 D01. See Section 14.6.2 for detailed SPLSR analysis.

**Table 14-4**  
**Simultaneous Transmission Scenario (Body-Worn at 1.0 cm)**

Configuration	Mode	CDMA SAR (W/kg)	5 GHz WLAN - FCC Rule Part 15 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Back Side	Cell. CDMA - FCC Rule Part 90S	1.010	0.000	1.010
Back Side	Cell. CDMA - FCC Rule Part 22H	1.070	0.000	1.070
Back Side	PCS CDMA - FCC Rule Part 24E	1.270	0.000	<b>1.270</b>

Note: For numerical sums below 1.6 W/kg, no SAR ratio analysis or aggregate volumetric SAR evaluations for the transmitters were required.

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>			 <b>LG</b>	Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset			Page 41 of 52	

## 14.5 Hotspot SAR Simultaneous Transmission Analysis



**Table 14-5**  
**Simultaneous Transmission Scenario (Hotspot at 1.0 cm)**

Simult Tx	Configuration	Cell. EVDO - FCC Rule Part 90S SAR (W/kg)	2.4 GHz WIFI - FCC Rule Part 15C SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	Cell. EVDO - FCC Rule Part 22H SAR (W/kg)	2.4 GHz WIFI - FCC Rule Part 15C SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	1.020	0.093	<b>1.113</b>	Body SAR	Back	1.090	0.093	<b>1.183</b>
	Front	0.784	0.016	0.800		Front	0.652	0.016	0.668
	Top	-	0.014	0.014		Top	-	0.014	0.014
	Bottom	0.246	-	0.246		Bottom	0.272	-	0.272
	Right	-	0.046	0.046		Right	-	0.046	0.046
	Left	1.000	-	1.000		Left	1.130	-	1.130
Simult Tx	Configuration	PCS EVDO - FCC Rule Part 24E SAR (W/kg)	2.4 GHz WIFI - FCC Rule Part 15C SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 25 (PCS) - FCC Rule Part 24E SAR (W/kg)	2.4 GHz WLAN - FCC Rule Part 15C SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.640	0.093	<b>0.733</b>	Body SAR	Back	0.347	0.093	<b>0.440</b>
	Front	0.348	0.016	0.364		Front	0.280	0.016	0.296
	Top	-	0.014	0.014		Top	0.131	0.014	0.145
	Bottom	0.360	-	0.360		Bottom	-	-	0.000
	Right	-	0.046	0.046		Right	0.203	0.046	0.249
	Left	0.188	-	0.188		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 ("").

**Table 14-6**  
**Simultaneous Transmission Scenario (Hotspot with Voice Call at 1.0 cm)**

Simult Tx	Configuration	Cell. CDMA - FCC Rule Part 90S SAR (W/kg)	LTE Band 25 (PCS) - FCC Rule Part 24E SAR (W/kg)	2.4 GHz WLAN - FCC Rule Part 15C SAR (W/kg)	Σ SAR (W/kg)	SPLSR			Volumetric SAR (W/kg)
		1	2	3	1+2+3	1+2	1+3	2+3	1+2+3
Body SAR	Back	1.010	0.347	0.093	<b>1.450</b>	N/A	N/A	N/A	N/A
	Front	0.817	0.280	0.016	1.113	N/A	N/A	N/A	N/A
	Top	-	0.131	0.014	0.145	N/A	N/A	N/A	N/A
	Bottom	0.245	-	-	0.245	N/A	N/A	N/A	N/A
	Right	-	0.203	0.046	0.249	N/A	N/A	N/A	N/A
	Left	0.641	-	-	0.641	N/A	N/A	N/A	N/A
Simult Tx	Configuration	Cell. CDMA - FCC Rule Part 22H SAR (W/kg)	LTE Band 25 (PCS) - FCC Rule Part 24E SAR (W/kg)	2.4 GHz WLAN - FCC Rule Part 15C SAR (W/kg)	Σ SAR (W/kg)	SPLSR			Volumetric SAR (W/kg)
		1	2	3	1+2+3	1+2	1+3	2+3	1+2+3
Body SAR	Back	1.070	0.347	0.093	<b>1.510</b>	N/A	N/A	N/A	N/A
	Front	0.667	0.280	0.016	0.963	N/A	N/A	N/A	N/A
	Top	-	0.131	0.014	0.145	N/A	N/A	N/A	N/A
	Bottom	0.262	-	-	0.262	N/A	N/A	N/A	N/A
	Right	-	0.203	0.046	0.249	N/A	N/A	N/A	N/A
	Left	0.513	-	-	0.513	N/A	N/A	N/A	N/A

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 42 of 52

Simult Tx	Configuration	PCS CDMA - FCC Rule Part 24E SAR (W/kg)	LTE Band 25 (PCS) - FCC Rule Part 24E SAR (W/kg)	2.4 GHz WLAN - FCC Rule Part 15C SAR (W/kg)	$\Sigma$ SAR (W/kg)	SPLSR			Volumetric SAR (W/kg)
		1	2	3					
Body SAR	Back	1.270	0.347	0.093	See Note 1	N/A	N/A	N/A	N/A
	Front	0.726	0.280	0.016	<b>1.022</b>	N/A	N/A	N/A	N/A
	Top	-	0.131	0.014	0.145	N/A	N/A	N/A	N/A
	Bottom	0.623	-	-	0.623	N/A	N/A	N/A	N/A
	Right	-	0.203	0.046	0.249	N/A	N/A	N/A	N/A
	Left	0.357	-	-	0.357	N/A	N/A	N/A	N/A

Notes:

1. No evaluation was performed to determine the aggregate 1-g SAR in this configuration as the SPLSR between each antenna pair was below 0.3 per FCC KDB Publication 648474 D01. See Section 14.6.2 for detailed SPLSR analysis.
2. Note: Per FCC KDB Publication 941225 D06, the edges with antennas more than 2.5 cm are not required to be evaluated for SAR (“-”).

## 14.6 SPLSR Evaluation Analysis

Per FCC KDB Publication 648474 D01, when the sum of the standalone transmitters is more than 1.6 W/kg, the SAR sum to peak locations can be analyzed to determine SAR distribution overlaps. Based on the 1-g SAR limit and a separation distance of 5 cm, when the SAR peak to location ratio for each pair of antennas is < 0.3, simultaneous SAR evaluation is not required. The distance between the transmitters was calculated using the following formula.



$$\text{Distance}_{\text{Tx1-Tx2}} = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$

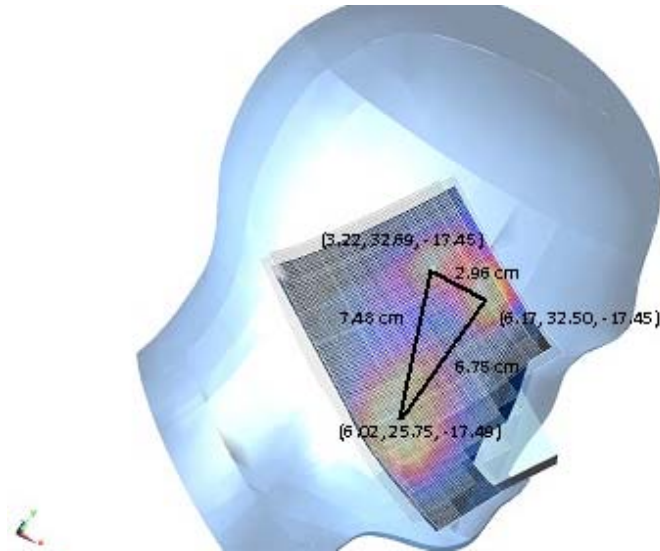
### 14.6.1 Left Cheek

The sum of the standalone SAR values was above 1.6 W/kg for the held-to-ear voice call with Cell. CDMA – FCC Rule Part 90S potentially operating with LTE Band 25 (PCS) Data and Cell. CDMA – FCC Rule Part 90S potentially operating with LTE Band 25 (PCS) Hotspot for the left cheek configuration.

**Table 14-7**  
**Peak SAR Locations for Left Cheek (Cell. CDMA – FCC Rule Part 90S, LTE Band 25 (PCS) – FCC Rule Part 24E, 2.4 GHz WLAN – FCC Rule Part 15C)**

Mode/Band	x (cm)	y (cm)	z (cm)
Cell. CDMA - FCC Rule Part 90S	6.02	25.75	-17.49
2.4 GHz WLAN - FCC Rule Part 15C	6.17	32.50	-17.45
LTE Band 25 (PCS) - FCC Rule Part 24E	3.22	32.69	-17.46

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 43 of 52





**Figure 14-3**  
**Peak SAR Location Plot of PCS CDMA, LTE Band 25 and 2.4 GHz WLAN**

**Table 14-8**  
**SAR Sum to Peak Location Separation Ratio Calculation**

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (cm)	SPLSR
Ant "a"	Ant "b"	a	b	a+b	$D_{(a-b)}$	$(a+b)/D_{(a-b)}$
Cell. CDMA - FCC Rule Part 90S	2.4 GHz WLAN - FCC Rule Part 15C	0.624	0.044	0.668	6.75	0.10
Cell. CDMA - FCC Rule Part 90S	LTE Band 25 (PCS) - FCC Rule Part 24E	0.624	1.01	1.634	7.48	0.22
2.4 GHz WLAN - FCC Rule Part 15C	LTE Band 25 (PCS) - FCC Rule Part 24E	1.01	0.044	1.054	2.96	See note 1

**Notes:**

- 1) When considering a Cell. CDMA – FCC Rule Part 90S Voice call potentially simultaneously operating with LTE Band 25 Hotspot, the SPLSR for each ratio pair is not less than 0.3. Please see Section 14.7 for volumetric SAR evaluation details.
- 2) For a Cell. CDMA – FCC Rule Part 90S Voice call potentially operating with LTE Band 25, the SPLSR between the two transmitters was less than 0.3. Therefore, no volumetric simultaneous transmission SAR is required.

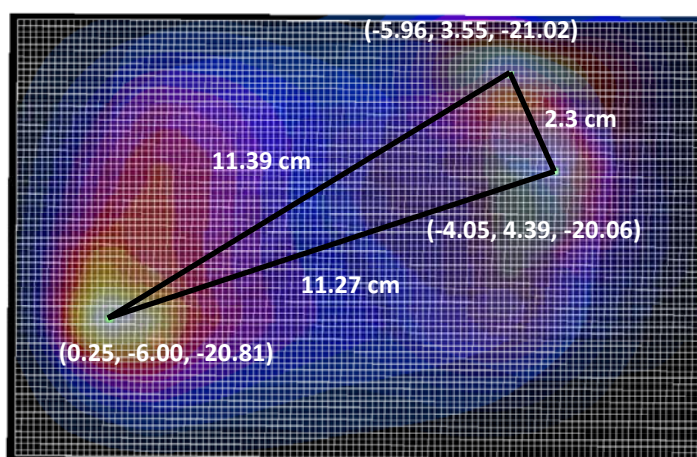
<b>FCC ID:</b> ZNFLS970		<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 44 of 52

## 14.6.2 Back Side

The sum of the standalone SAR values was above 1.6 W/kg for the PCS CDMA potentially operating with LTE Band 25 (PCS) Hotspot for the back side of the device at 1.0 cm.

**Table 14-9**  
**Peak SAR Locations for Back Side (PCS CDMA – FCC Rule Part 24E, LTE Band 25 (PCS)– FCC Rule Part 24E, 2.4 GHz WLAN – FCC Rule Part 15C)**

Mode/Band	x (cm)	y (cm)	z (cm)
PCS CDMA - FCC Rule Part 24E	0.25	-6.00	-20.81
2.4 GHz WLAN - FCC Rule Part 15C	-5.96	3.55	-21.02
LTE Band 25 (PCS) - FCC Rule Part 24E	-4.05	4.39	-20.06





**Figure 14-4**  
**Peak SAR Location Plot of PCS CDMA, LTE Band 25 and 2.4 GHz WLAN**

**Table 14-10**  
**SAR Sum to Peak Location Separation Ratio Calculation**

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (cm)	SPLSR
Ant "a"	Ant "b"	a	b	a+b	D <sub>(a-b)</sub>	(a+b) / D <sub>(a-b)</sub>
PCS CDMA - FCC Rule Part 24E	LTE Band 25 (PCS) - FCC Rule Part 24E	1.270	0.347	1.617	11.27	0.14
PCS CDMA - FCC Rule Part 24E	2.4GHz WLAN - FCC Rule Part 15C	1.270	0.093	1.363	11.39	0.12
LTE Band 25 (PCS) - FCC Rule Part 24E	2.4GHz WLAN - FCC Rule Part 15C	0.347	0.093	0.440	2.3	0.19

Since the SPLSR for each antenna pair was less than 0.3, no volumetric simultaneous transmission scenario is required per FCC KDB 648474 Publication D01.

FCC ID: ZNFLS970	 PCTEST ENGINEERING LABORATORY, INC.	SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 45 of 52

## 14.7 Volumetric SAR Evaluation Analysis

Per KDB Publication 648474, when the sum of the transmitters potentially operating simultaneously is greater than 1.6 W/kg and the sum to peak SAR location separation ratio between any pair of transmitters is more than 0.3, SAR tests are required for simultaneous transmission to determine the aggregate 1-g SAR. When required, each transmitter should be tested for simultaneous transmission in the configuration, channel and operating mode that resulted in the highest SAR during the stand-alone evaluation.

Simultaneous Transmission SAR was required for the left cheek configuration when evaluating a Cell. CDMA – FCC Rule Part 90S call potentially operating with LTE Band 25 (PCS) – FCC Rule Part 24E hotspot.

**Table 14-11**  
**Simultaneous Transmission SAR Analysis**



Band & Mode	Standalone 1g SAR (W/kg)	Simultaneous Transmission SAR (W/kg)	Standalone SAR Plot Number	Simultaneous SAR Plot Number
Cell. CDMA - FCC Rule Part 90S	0.624	0.540	A3	A46
LTE Band 25 (PCS) - FCC Rule Part 24E	1.010	0.949	A15	A47
2.4 GHz WLAN - FCC Rule Part 15C	0.045	0.040	A19	A48
Multi-Band SAR	-	0.973	-	A49

### Test Notes:

1. Each antenna was evaluated independently using the channel/configuration that produced the highest measured SAR when the standalone SAR was tested.
2. LTE and CDMA SAR volume scans were evaluated with a resolution of  $\Delta x = 8\text{mm}$ ,  $\Delta y = 8\text{mm}$ , and  $\Delta z = 5\text{mm}$  with a grid of 13x19x7 points.
3. WLAN SAR volume scan was evaluated with a resolution of  $\Delta x = 5\text{mm}$ ,  $\Delta y = 5\text{mm}$ , and  $\Delta z = 5\text{mm}$  with a grid of 20x30x7 points.
4. DASY52.8 (1) and SEMCAD X 14.6.5 multiband combiner required scans to overlap but does not require measurement point resolutions within the volumes to be identical for interpolation and superposition.

## 14.8 Simultaneous Transmission Conclusion

Based on the simultaneous transmission analysis guidance described in FCC KDB 648474 and the April 2012 TCB/FCC Workshop, the above simultaneous transmission SAR analyses indicate that the device operating in any of the simultaneous transmission scenarios will not exceed the SAR limit.



FCC ID: ZNFLS970		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 46 of 52



# 15 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	(9kHz-4GHz) Signal Generator	10/10/2011	Annual	10/10/2012	3613A00315
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	10/10/2011	Annual	10/10/2012	GB46110872
Agilent	E5515C	Wireless Communications Test Set	10/20/2011	Annual	10/20/2012	GB46310798
Agilent	E5515C	Wireless Communications Test Set	10/14/2011	Annual	10/14/2012	GB41450275
Agilent	E5515C	Wireless Communications Test Set	2/14/2012	Annual	2/14/2013	GB43304447
Agilent	E5515C	Wireless Communications Tester	4/4/2012	Annual	4/4/2013	US41140256
Agilent	E5515C	Wireless Communications Test Set	2/12/2012	Annual	2/12/2013	GB45360985
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	E8257D	(250kHz-20GHz) Signal Generator	4/5/2012	Annual	4/5/2013	MY45470194
Amplifier Research	551G4	5W, 800MHz-4.2GHz	CBT	N/A	CBT	21910
Anritsu	MA2411B	Pulse Sensor	10/13/2011	Annual	10/13/2012	1027293
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	2/14/2012	Annual	2/14/2013	5821
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	8013
Anritsu	MA2481A	Power Sensor	4/5/2012	Annual	4/5/2013	5605
Anritsu	MA2481A	Power Sensor	2/14/2012	Annual	2/14/2013	2400
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	ML2438A	Power Meter	10/13/2011	Annual	10/13/2012	1070030
Anritsu	ML2495A	Power Meter	10/13/2011	Annual	10/13/2012	1039008
Anritsu	MT8820C	Radio Communication Tester	11/11/2011	Annual	11/11/2012	6200901190
COMTECH	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M155A00-009
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Control Company	36934-158	Wall-Mounted Thermometer	1/4/2012	Biennial	1/4/2014	122014497
Control Company	36934-158	Wall-Mounted Thermometer	1/4/2012	Biennial	1/4/2014	122014488
Control Company	61220-416	Long-Stem Thermometer	2/15/2011	Biennial	2/15/2013	111331322
Control Company	61220-416	Long-Stem Thermometer	7/1/2011	Biennial	7/1/2013	111642916
Control Company	61220-416	Long-Stem Thermometer	10/12/2011	Biennial	10/12/2013	111860820
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/12/2011	Annual	10/12/2012	1833460
Gigatronics	8651A	Universal Power Meter	10/12/2011	Annual	10/12/2012	8650319
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
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
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
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/25/2011	Annual	8/25/2012	100976
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/7/2011	Annual	10/7/2012	103962
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
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
SPEAG	D1900V2	1900 MHz SAR Dipole	7/22/2011	Annual	7/22/2012	54080
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	D5GHzV2	5 GHz SAR Dipole	1/19/2012	Annual	1/19/2013	1057
SPEAG	D835V2	835 MHz SAR Dipole	1/25/2012	Annual	1/25/2013	40407
SPEAG	D835V2	835 MHz SAR Dipole	4/20/2012	Annual	4/20/2013	4d119
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/19/2012	Annual	4/19/2013	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/20/2012	Annual	2/20/2013	649
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/18/2012	Annual	1/18/2013	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/15/2012	Annual	2/15/2013	1323
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/12/2012	Annual	4/12/2013	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/10/2012	Annual	2/10/2013	1322
SPEAG	ES3DV2	SAR Probe	8/25/2011	Annual	8/25/2012	3022
SPEAG	ES3DV3	SAR Probe	3/16/2012	Annual	3/16/2013	3209
SPEAG	ES3DV3	SAR Probe	2/21/2012	Annual	2/21/2013	3258
SPEAG	ES3DV3	SAR Probe	2/7/2012	Annual	2/7/2013	3288
SPEAG	ES3DV3	SAR Probe	2/7/2012	Annual	2/7/2013	3287
SPEAG	EX3DV4	SAR Probe	1/27/2012	Annual	1/27/2013	3589
SPEAG	EX3DV4	SAR Probe	7/27/2011	Annual	7/27/2012	3561
Tektronix	RSA-6114A	Real Time Spectrum Analyzer	4/5/2012	Annual	4/5/2013	8010177
VWR	36934-158	Wall-Mounted Thermometer	1/21/2011	Biennial	1/21/2013	111286454
VWR	36934-158	Wall-Mounted Thermometer	9/30/2011	Biennial	9/30/2013	111859323
VWR	36934-158	Wall-Mounted Thermometer	9/30/2011	Biennial	9/30/2013	111859332

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.

FCC ID: ZNLS970		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: 0Y1206040771.ZNF	Test Dates: 06/05/12 - 06/15/12	DUT Type: Portable Handset		Page 47 of 52





## 16 MEASUREMENT UNCERTAINTIES

Applicable for frequencies less than 3000 MHz.

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	IEEE 1528 Sec.	Tol. (± %)	Prob. Dist.	Div.	c <sub>i</sub> 1gm	c <sub>i</sub> 10 gms	1gm u <sub>i</sub> (± %)	10gms u <sub>i</sub> (± %)	v <sub>i</sub>
<b>Measurement System</b>									
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	∞
<b>Test Sample Related</b>									
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	∞
<b>Phantom &amp; Tissue Parameters</b>									
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
<b>Combined Standard Uncertainty (k=1)</b>							RSS	12.1	11.7
<b>Expanded Uncertainty</b> (95% CONFIDENCE LEVEL)							k=2	24.2	23.5



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

FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>	 <b>LG</b>	<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 48 of 52

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 <sub>i</sub> 1gm	c <sub>i</sub> 10 gms	1gm u <sub>i</sub> (± %)	10gms u <sub>i</sub> (± %)	v <sub>i</sub>
<b>Measurement System</b>									
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	∞
<b>Test Sample Related</b>									
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	∞
<b>Phantom &amp; Tissue Parameters</b>									
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
<b>Combined Standard Uncertainty (k=1)</b>							RSS	12.4	12.0
<b>Expanded Uncertainty</b> (95% CONFIDENCE LEVEL)							k=2	24.7	24.0

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



FCC ID: ZNFLS970	 <b>PCTEST</b> ENGINEERING LABORATORY, INC.	<b>SAR EVALUATION REPORT</b>	 <b>LG</b>	<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 49 of 52

## 17 CONCLUSION

### 17.1 Measurement Conclusion



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

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



<b>FCC ID:</b> ZNFLS970		<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 50 of 52

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<b>FCC ID:</b> ZNFLS970		<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 51 of 52

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<b>FCC ID:</b> ZNFLS970		<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> 0Y1206040771.ZNF	<b>Test Dates:</b> 06/05/12 - 06/15/12	<b>DUT Type:</b> Portable Handset		Page 52 of 52

## APPENDIX A: SAR TEST DATA

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$ ;  $\sigma = 0.903 \text{ mho/m}$ ;  $\epsilon_r = 41.699$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

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

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular CDMA - FCC Rule Part 90S, Right Head, Cheek, Mid.ch**

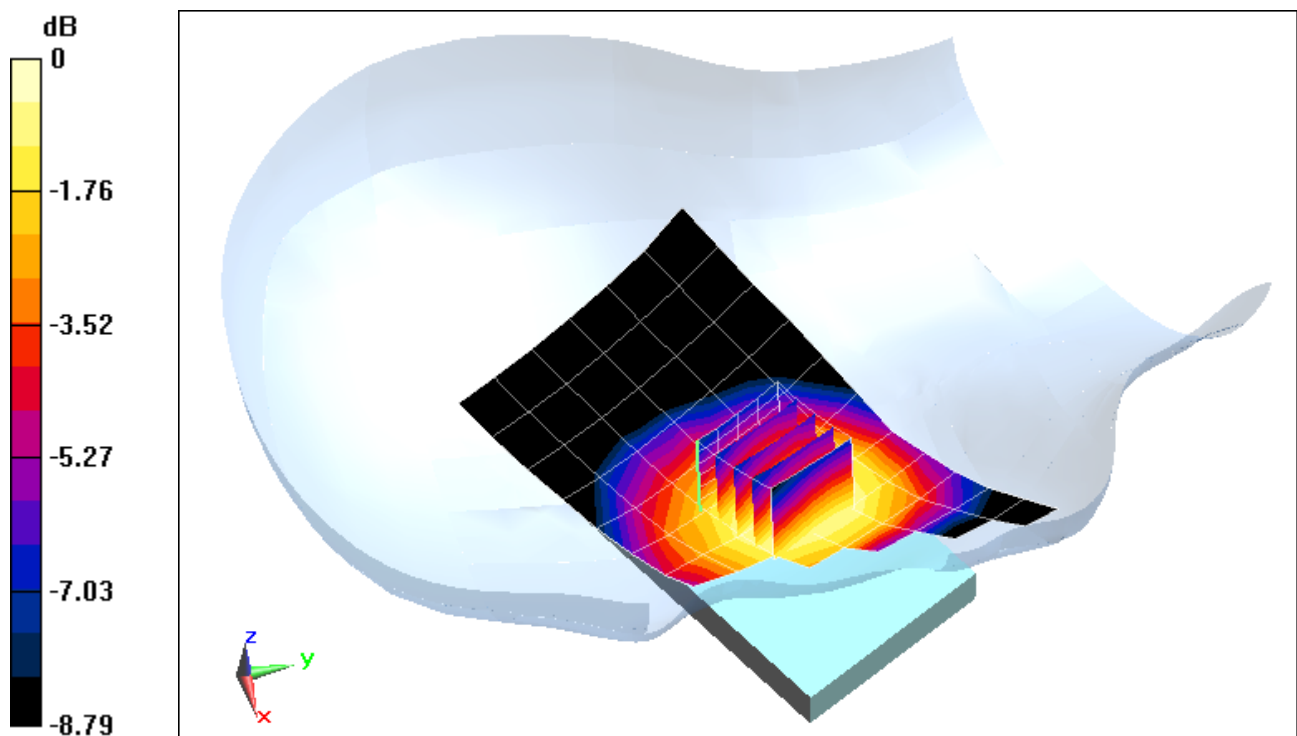
**Area Scan (7x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 24.420 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.555 mW/g

**SAR(1 g) = 0.469 mW/g; SAR(10 g) = 0.368 mW/g**



0 dB = 0.424 mW/g = -7.45 dB mW/g



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$ ;  $\sigma = 0.903 \text{ mho/m}$ ;  $\epsilon_r = 41.699$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

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

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular CDMA - FCC Rule Part 90S, Right Head, Tilt, Mid.ch**

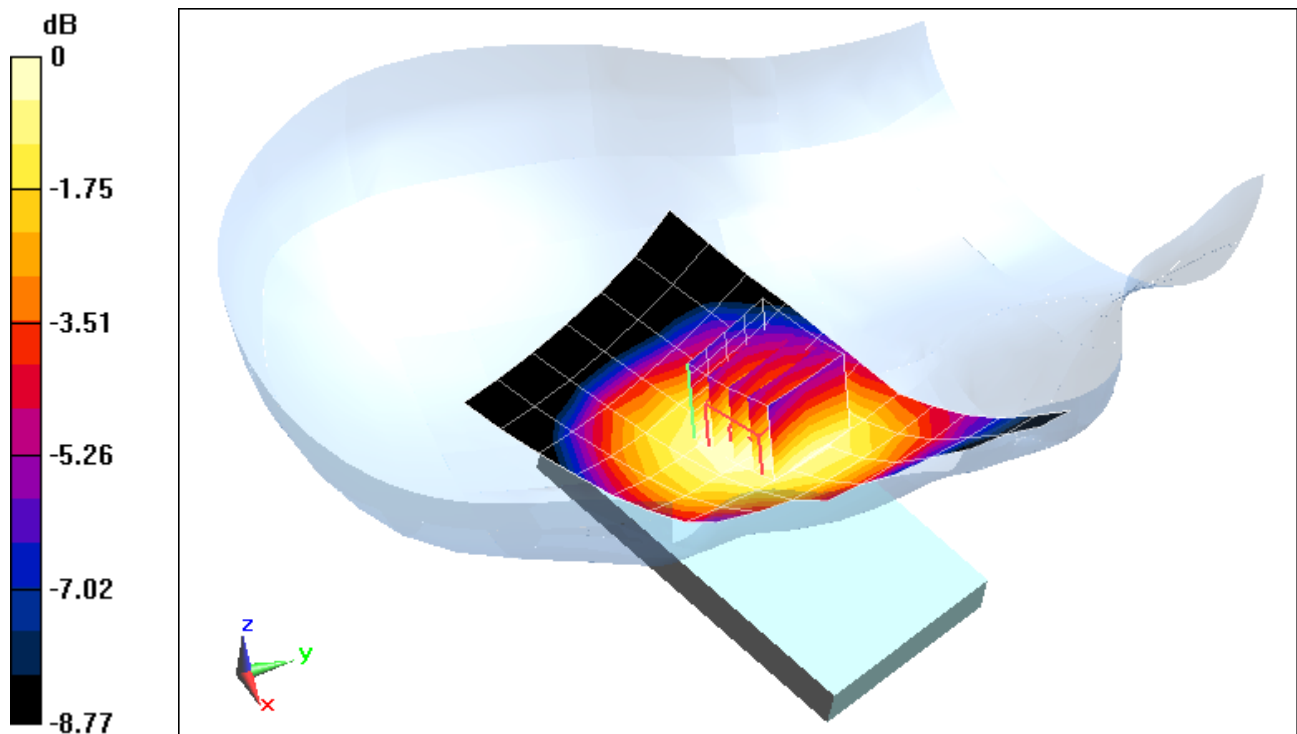
**Area Scan (7x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 18.643 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.341 mW/g

**SAR(1 g) = 0.294 mW/g; SAR(10 g) = 0.236 mW/g**



0 dB = 0.302 mW/g = -10.40 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$ ;  $\sigma = 0.903 \text{ mho/m}$ ;  $\epsilon_r = 41.699$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

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

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular CDMA - FCC Rule Part 90S, Left Head, Cheek, Mid.ch**

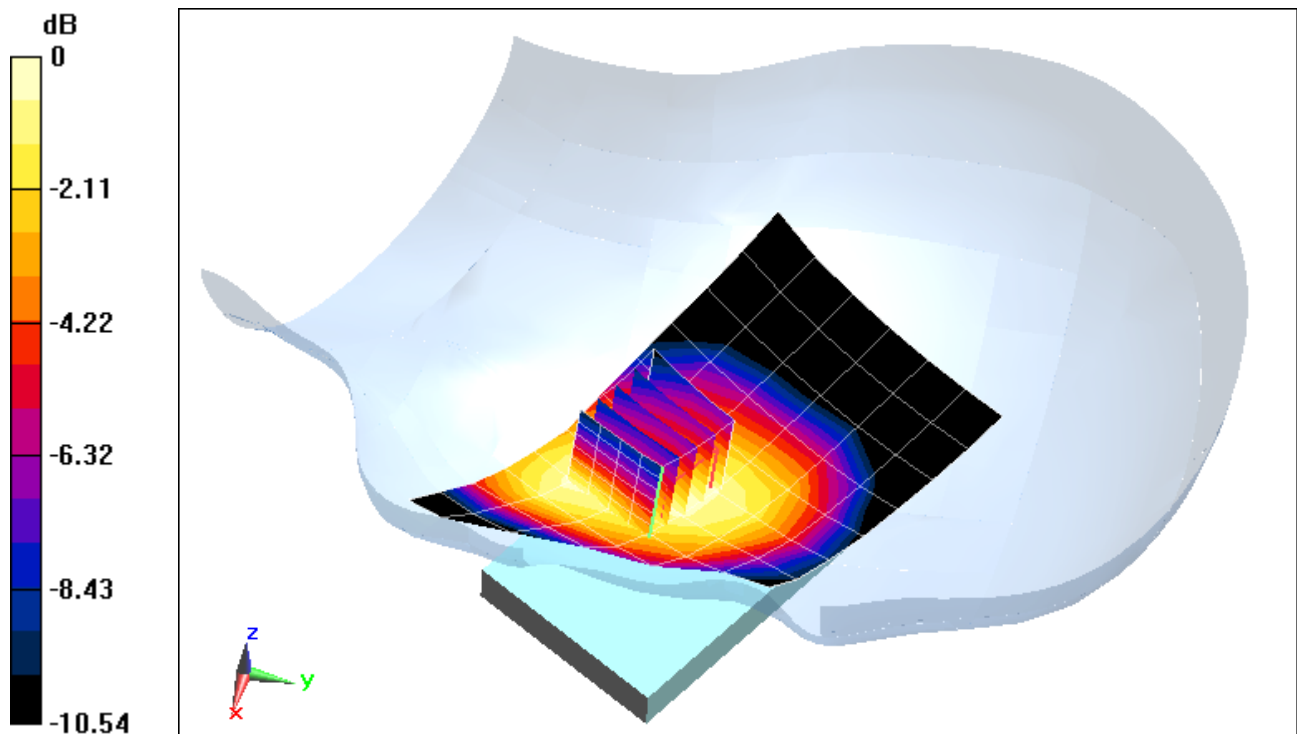
**Area Scan (7x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 28.383 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.810 mW/g

**SAR(1 g) = 0.624 mW/g; SAR(10 g) = 0.468 mW/g**



0 dB = 0.518 mW/g = -5.71 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$ ;  $\sigma = 0.903 \text{ mho/m}$ ;  $\epsilon_r = 41.699$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

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

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular CDMA - FCC Rule Part 90S, Left Head, Tilt, Mid.ch**

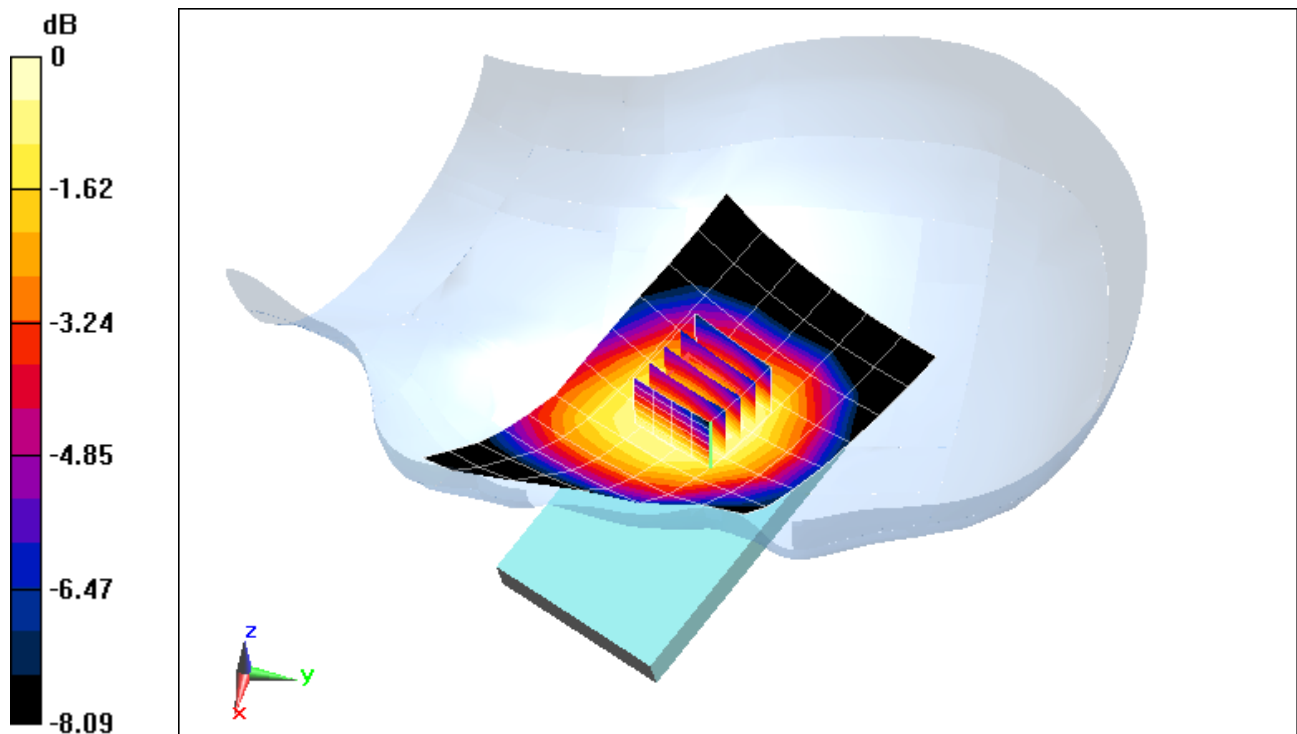
**Area Scan (7x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 21.504 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 0.424 mW/g

**SAR(1 g) = 0.364 mW/g; SAR(10 g) = 0.290 mW/g**



0 dB = 0.377 mW/g = -8.47 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.921 \text{ mho/m}$ ;  $\epsilon_r = 41.476$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

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

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular CDMA - FCC Rule Part 22H, Right Head, Cheek, Mid.ch**

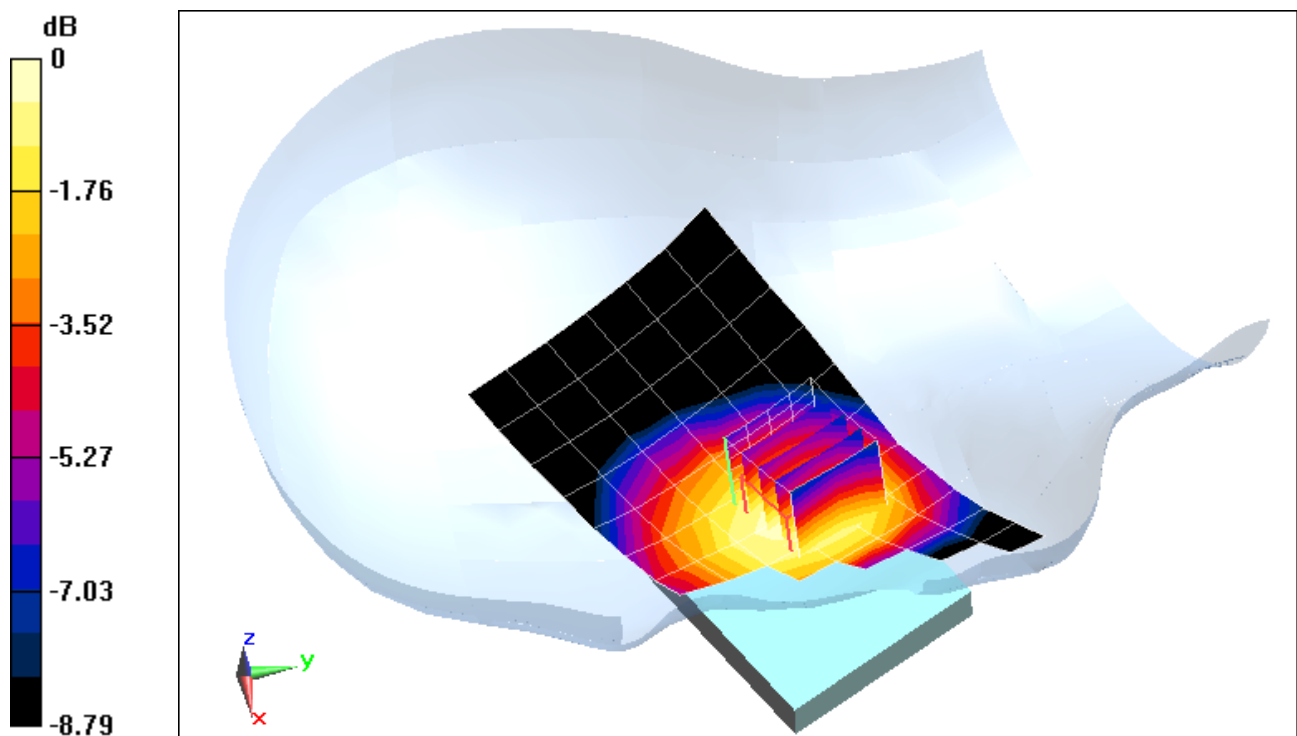
**Area Scan (7x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 22.055 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.483 mW/g

**SAR(1 g) = 0.406 mW/g; SAR(10 g) = 0.317 mW/g**



0 dB = 0.424 mW/g = -7.45 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.921 \text{ mho/m}$ ;  $\epsilon_r = 41.476$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

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

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular CDMA - FCC Rule Part 22H, Right Head, Tilt, Mid.ch**

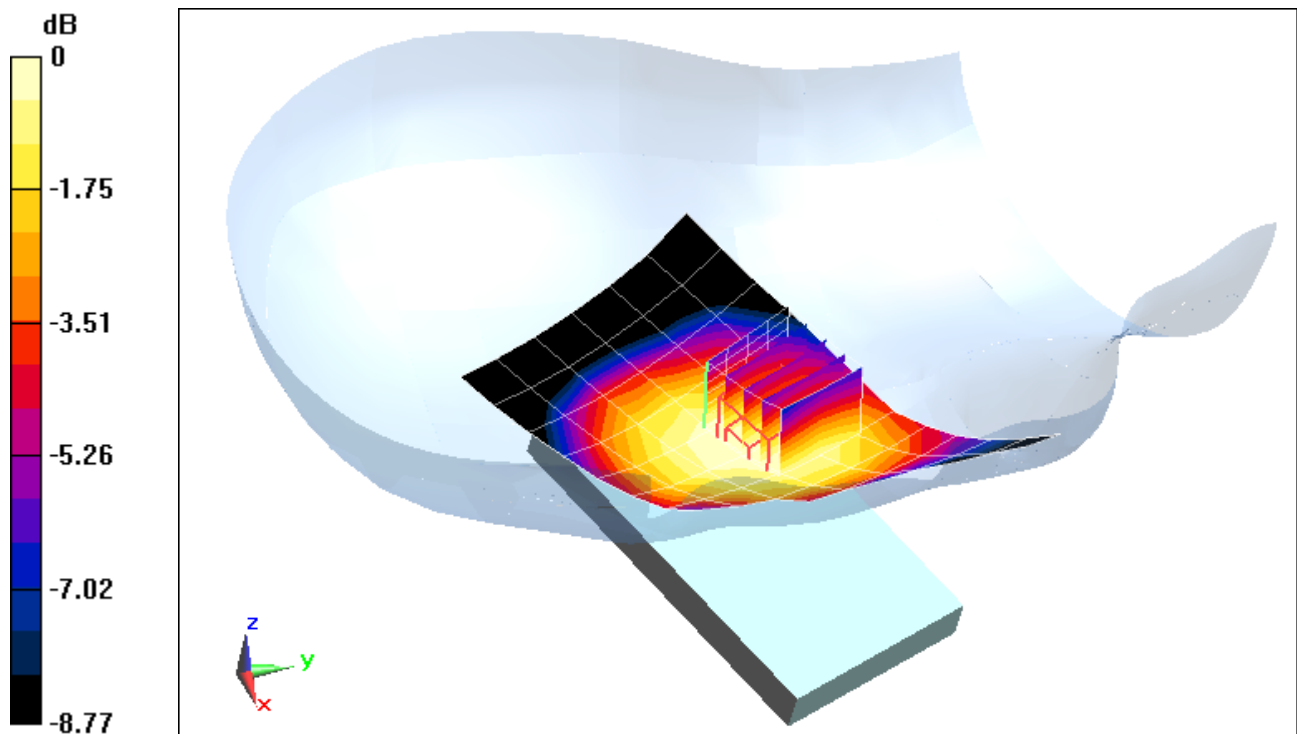
**Area Scan (7x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 16.952 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.275 mW/g

**SAR(1 g) = 0.237 mW/g; SAR(10 g) = 0.188 mW/g**



0 dB = 0.302 mW/g = -10.40 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.921 \text{ mho/m}$ ;  $\epsilon_r = 41.476$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

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

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular CDMA - FCC Rule Part 22H, Left Head, Cheek, Mid.ch**

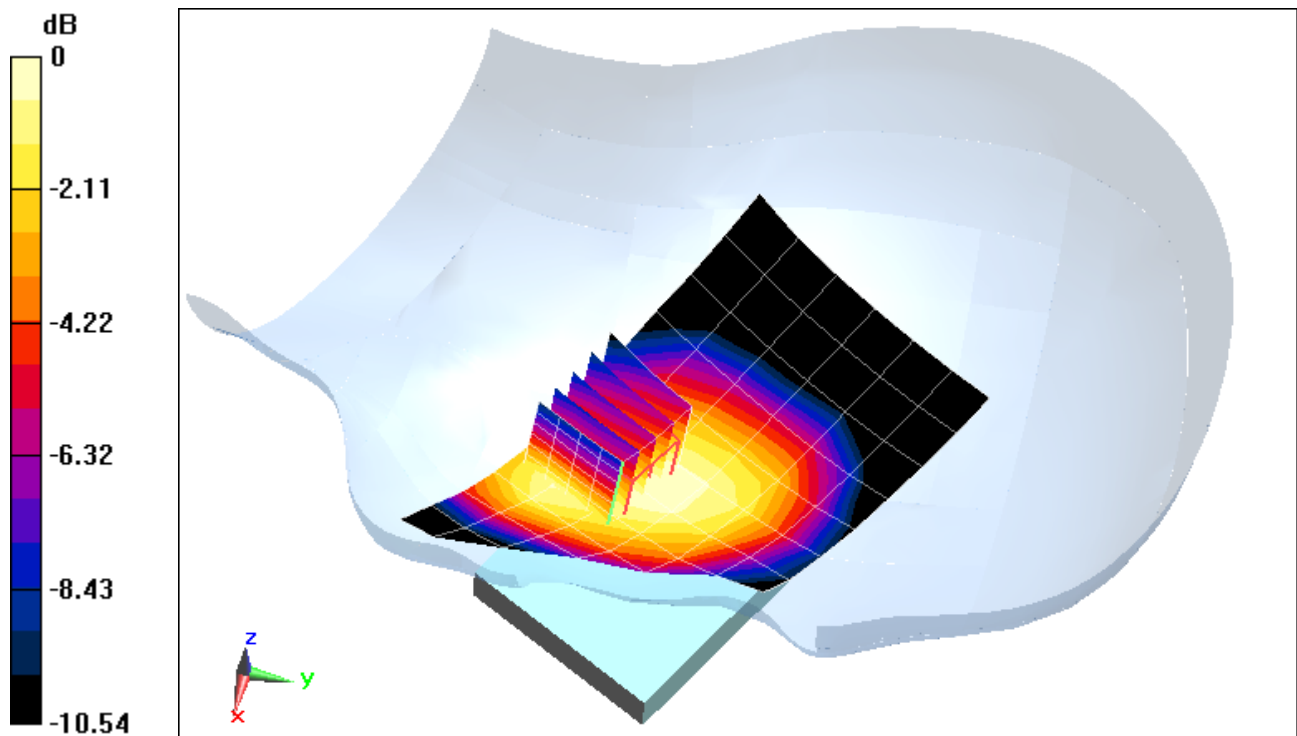
**Area Scan (7x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 25.421 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.642 mW/g

**SAR(1 g) = 0.493 mW/g; SAR(10 g) = 0.363 mW/g**



0 dB = 0.518 mW/g = -5.71 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 0.921 \text{ mho/m}$ ;  $\epsilon_r = 41.476$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

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

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular CDMA - FCC Rule Part 22H, Left Head, Tilt, Mid.ch**

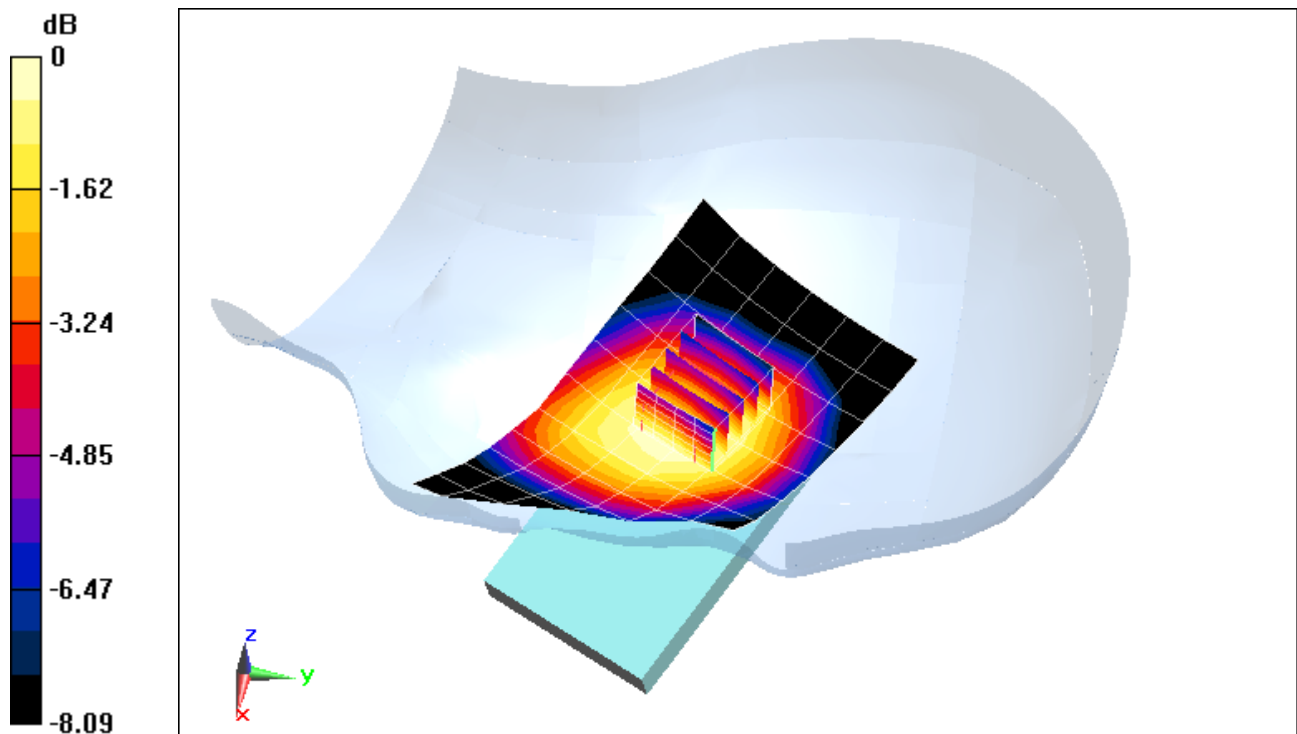
**Area Scan (7x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 18.976 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.357 mW/g

**SAR(1 g) = 0.299 mW/g; SAR(10 g) = 0.233 mW/g**



0 dB = 0.377 mW/g = -8.47 dB mW/g



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.423 \text{ mho/m}$ ;  $\epsilon_r = 39.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 06-11-2012; Ambient Temp: 22.9°C; Tissue Temp: 21.6°C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011;

Sensor-Surface: 4mm (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: PCS CDMA - FCC Rule Part 24E, Right Head, Cheek, Mid.ch**

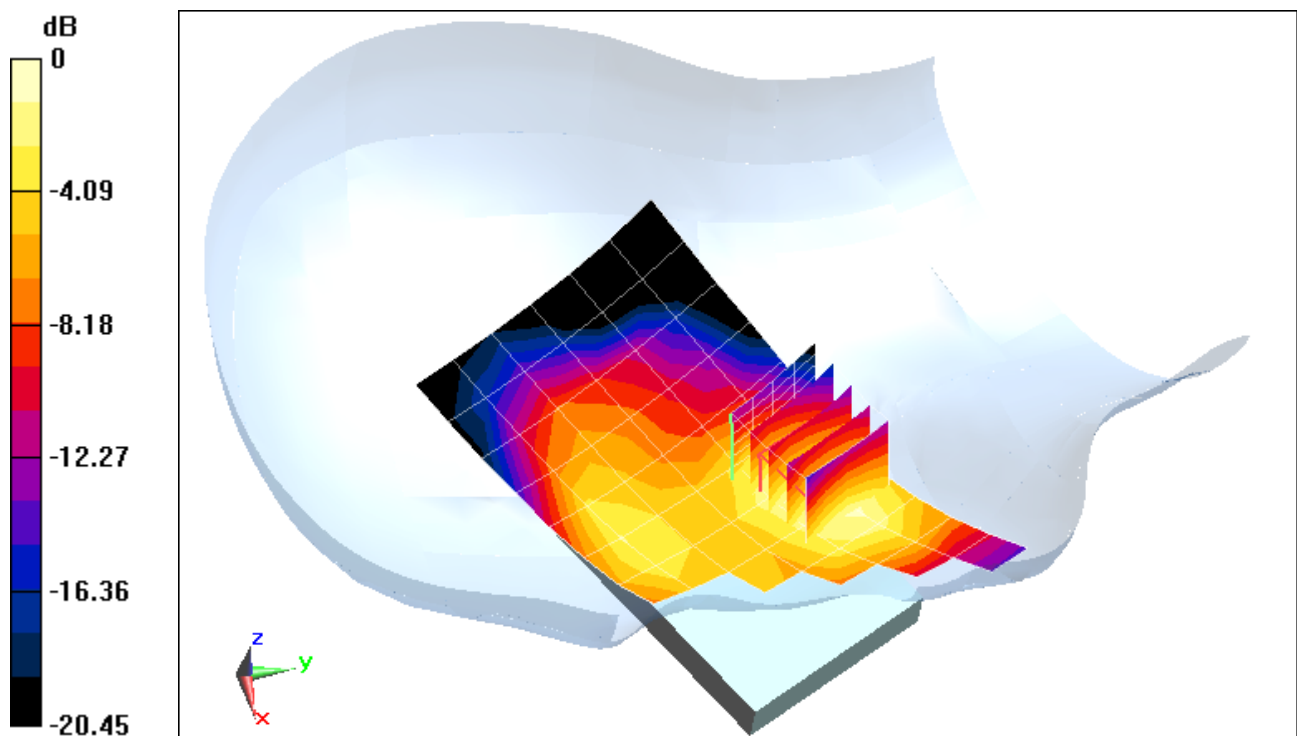
**Area Scan (7x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 16.894 V/m; Power Drift = -0.030 dB

Peak SAR (extrapolated) = 0.523 mW/g

**SAR(1 g) = 0.341 mW/g; SAR(10 g) = 0.210 mW/g**



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

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.423 \text{ mho/m}$ ;  $\epsilon_r = 39.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 06-11-2012; Ambient Temp: 22.9°C; Tissue Temp: 21.6°C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011;

Sensor-Surface: 4mm (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: PCS CDMA - FCC Rule Part 24E, Right Head, Tilt, Mid.ch**

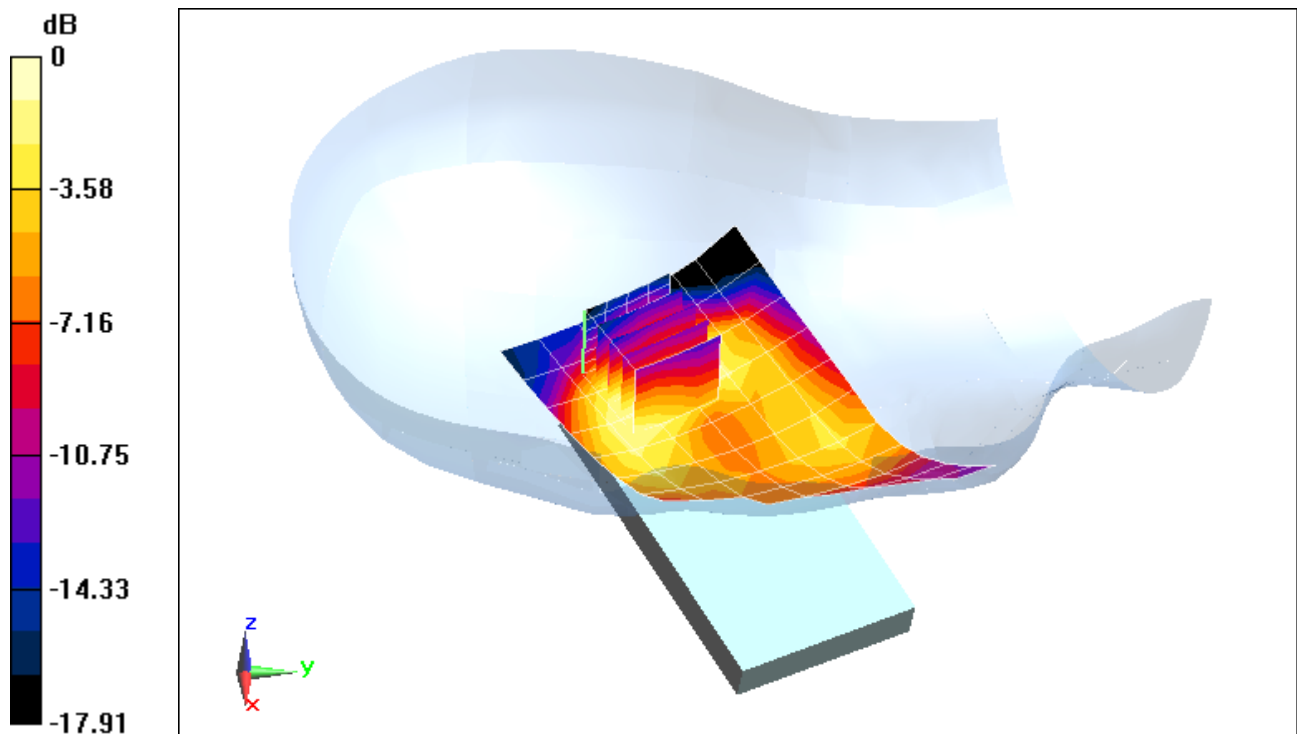
**Area Scan (7x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 8.976 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.179 mW/g

**SAR(1 g) = 0.110 mW/g; SAR(10 g) = 0.066 mW/g**



0 dB = 0.122 mW/g = -18.27 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.423 \text{ mho/m}$ ;  $\epsilon_r = 39.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-11-2012; Ambient Temp: 22.9°C; Tissue Temp: 21.6°C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

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

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Mode: PCS CDMA - FCC Rule Part 24E, Left Head, Cheek, Mid.ch**

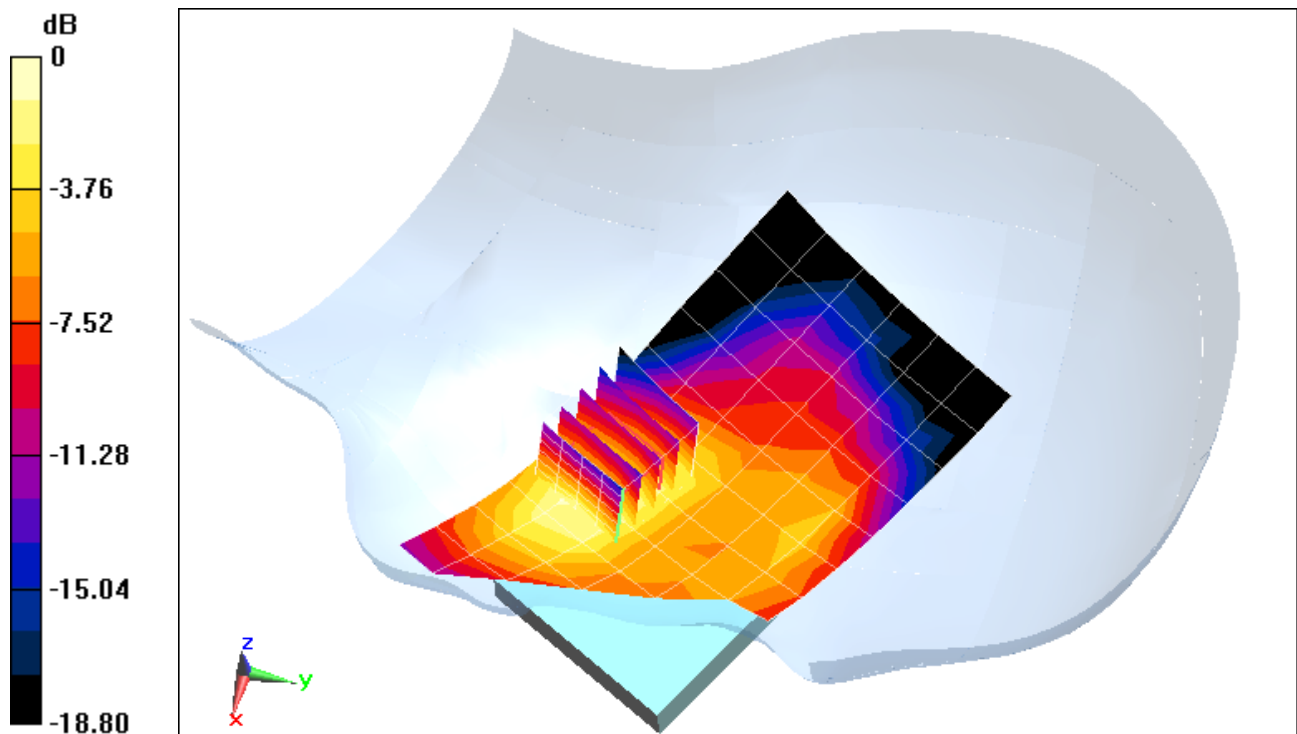
**Area Scan (7x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 18.863 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.716 mW/g

**SAR(1 g) = 0.451 mW/g; SAR(10 g) = 0.272 mW/g**



0 dB = 0.497 mW/g = -6.07 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.423 \text{ mho/m}$ ;  $\epsilon_r = 39.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-11-2012; Ambient Temp: 22.9°C; Tissue Temp: 21.6°C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 4/19/2012

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

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Mode: PCS CDMA - FCC Rule Part 24E, Left Head, Tilt, Mid.ch**

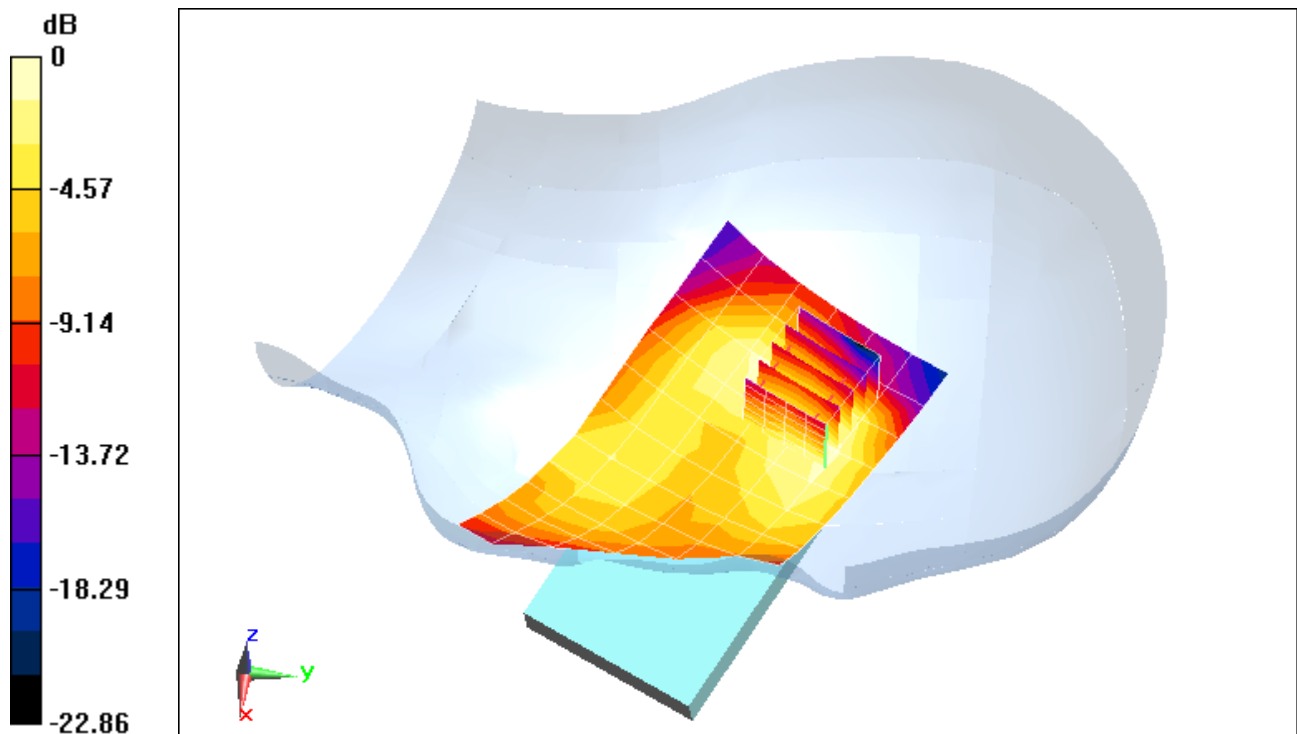
**Area Scan (7x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 9.058 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.179 mW/g

**SAR(1 g) = 0.113 mW/g; SAR(10 g) = 0.070 mW/g**



0 dB = 0.125 mW/g = -18.06 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: LTE B25 10 Mhz; Frequency: 1855 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1855 \text{ MHz}$ ;  $\sigma = 1.403 \text{ mho/m}$ ;  $\epsilon_r = 38.642$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

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

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Mode: LTE Band 25 (PCS) - FCC Rule Part 24E, Right Head, Cheek, Low.ch**  
**10 MHz BW, QPSK, 1 RB, 0 RB Offset**

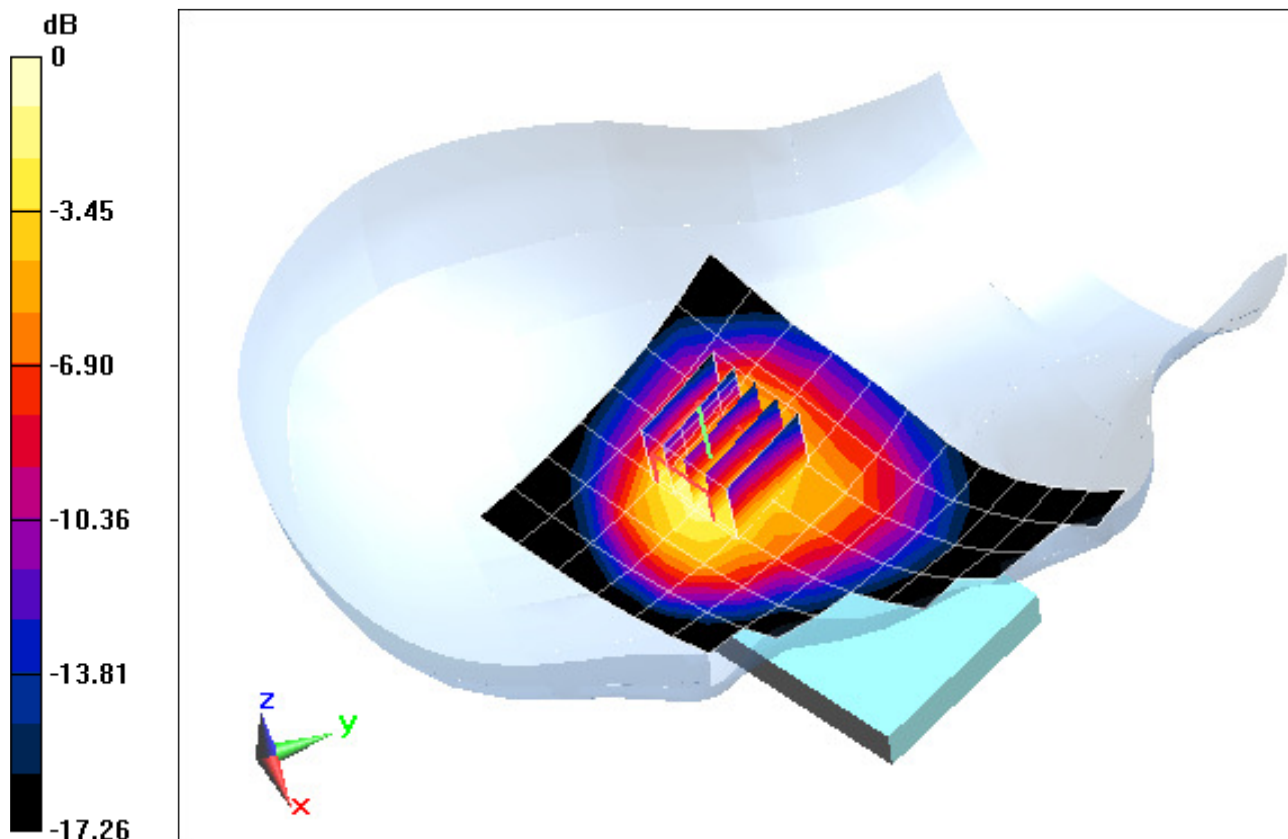
**Area Scan (8x12x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 22.836 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 1.060 mW/g

**SAR(1 g) = 0.658 mW/g; SAR(10 g) = 0.392 mW/g**



0 dB = 0.718 mW/g = -2.88 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: LTE B25 10 Mhz; Frequency: 1855 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1855 \text{ MHz}$ ;  $\sigma = 1.403 \text{ mho/m}$ ;  $\epsilon_r = 38.642$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

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

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Mode: LTE Band 25 (PCS) - FCC Rule Part 24E, Right Head, Tilt, Low.ch**  
**10 MHz BW, QPSK, 1 RB, 0 RB Offset**

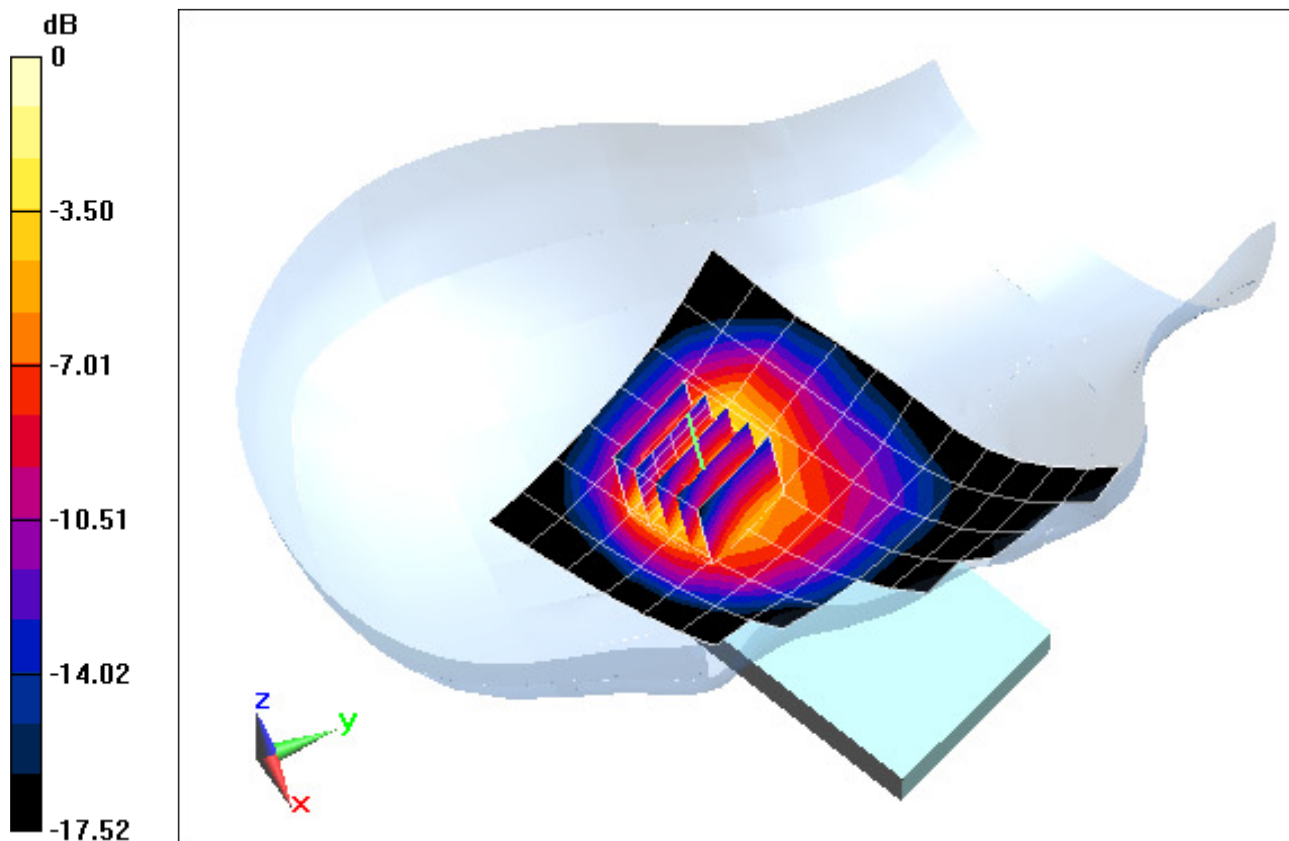
**Area Scan (8x12x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 20.203 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.890 mW/g

**SAR(1 g) = 0.541 mW/g; SAR(10 g) = 0.313 mW/g**



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



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: LTE B25 10 MHz; Frequency: 1855 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1855 \text{ MHz}$ ;  $\sigma = 1.403 \text{ mho/m}$ ;  $\epsilon_r = 38.642$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

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

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Mode: LTE Band 25 (PCS) - FCC Rule Part 24E, Left Head, Cheek, Low.ch**  
**10 MHz BW, QPSK, 1 RB, 0 RB Offset**

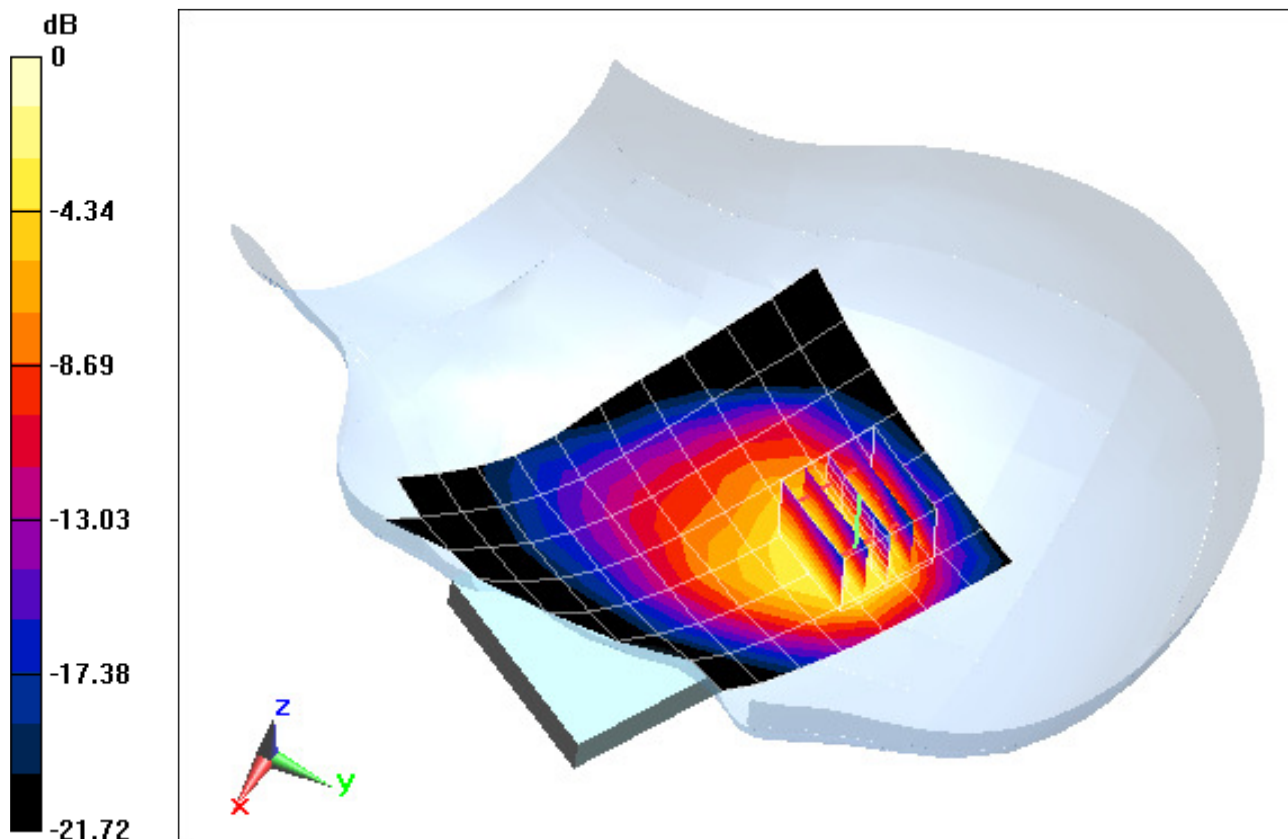
**Area Scan (8x12x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 30.165 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.970 mW/g

**SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.545 mW/g**



0 dB = 1.09 mW/g = 0.75 dB mW/g



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: LTE B25 10 MHz, Frequency: 1855 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1855 \text{ MHz}$ ;  $\sigma = 1.403 \text{ mho/m}$ ;  $\epsilon_r = 38.642$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

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

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

**Mode: LTE Band 25 (PCS) - FCC Rule Part 24E, Left Head, Tilt, Low.ch**  
**10 MHz BW, QPSK, 1 RB, 0 RB Offset**

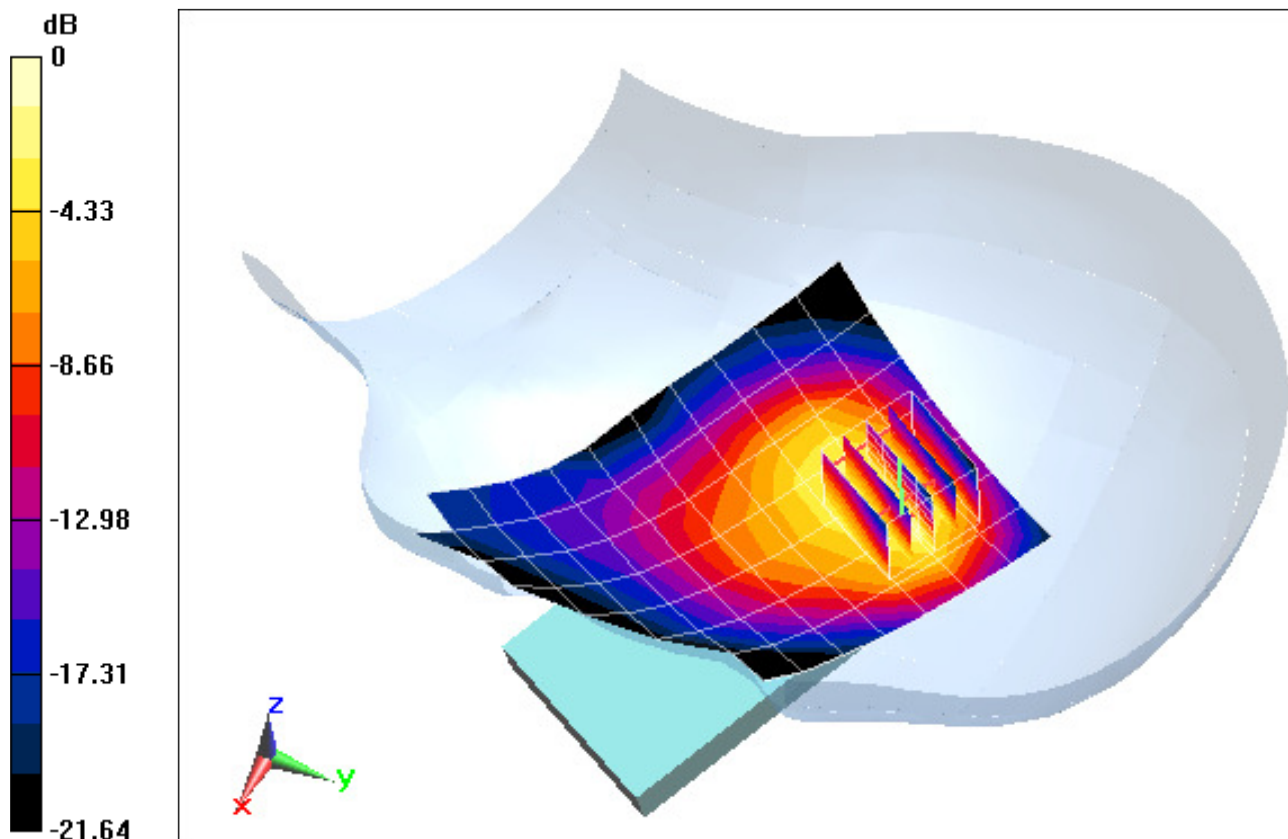
**Area Scan (8x12x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 23.408 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.204 mW/g

**SAR(1 g) = 0.605 mW/g; SAR(10 g) = 0.327 mW/g**



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

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 257**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$ ;  $\sigma = 1.853 \text{ mho/m}$ ;  $\epsilon_r = 38.12$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 06-13-2012; Ambient Temp: 22.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(4.46, 4.46, 4.46); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: IEEE 802.11b - FCC Rule Part 15C, Right Head, Cheek, Ch 06, 1 Mbps**

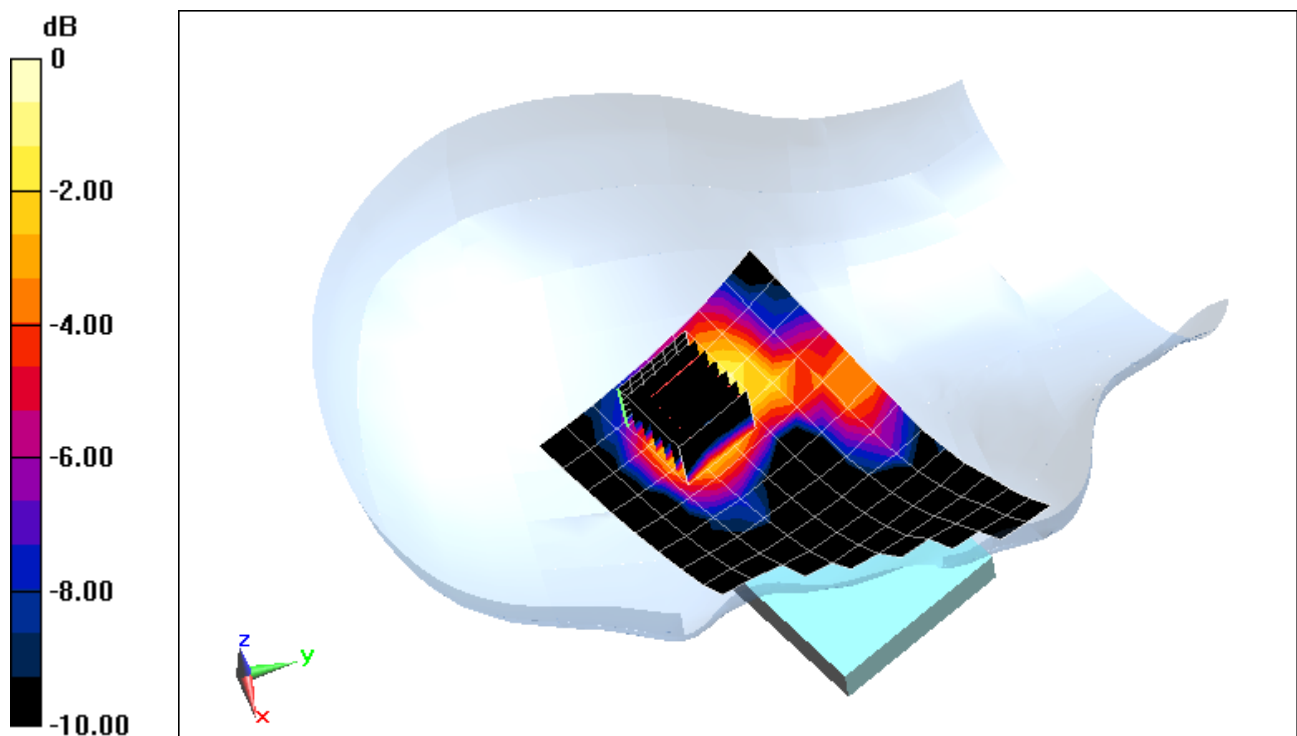
**Area Scan (9x14x1):** Measurement grid:  $dx=12\text{mm}$ ,  $dy=12\text{mm}$

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 4.324 V/m; Power Drift = 0.20 dB

Peak SAR (extrapolated) = 0.058 mW/g

**SAR(1 g) = 0.031 mW/g; SAR(10 g) = 0.017 mW/g**



0 dB = 0.0381 mW/g = -28.38 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 257**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$ ;  $\sigma = 1.853 \text{ mho/m}$ ;  $\epsilon_r = 38.12$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 06-13-2012; Ambient Temp: 22.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(4.46, 4.46, 4.46); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: IEEE 802.11b - FCC Rule Part 15C, Right Head, Tilt, Ch 06, 1 Mbps**

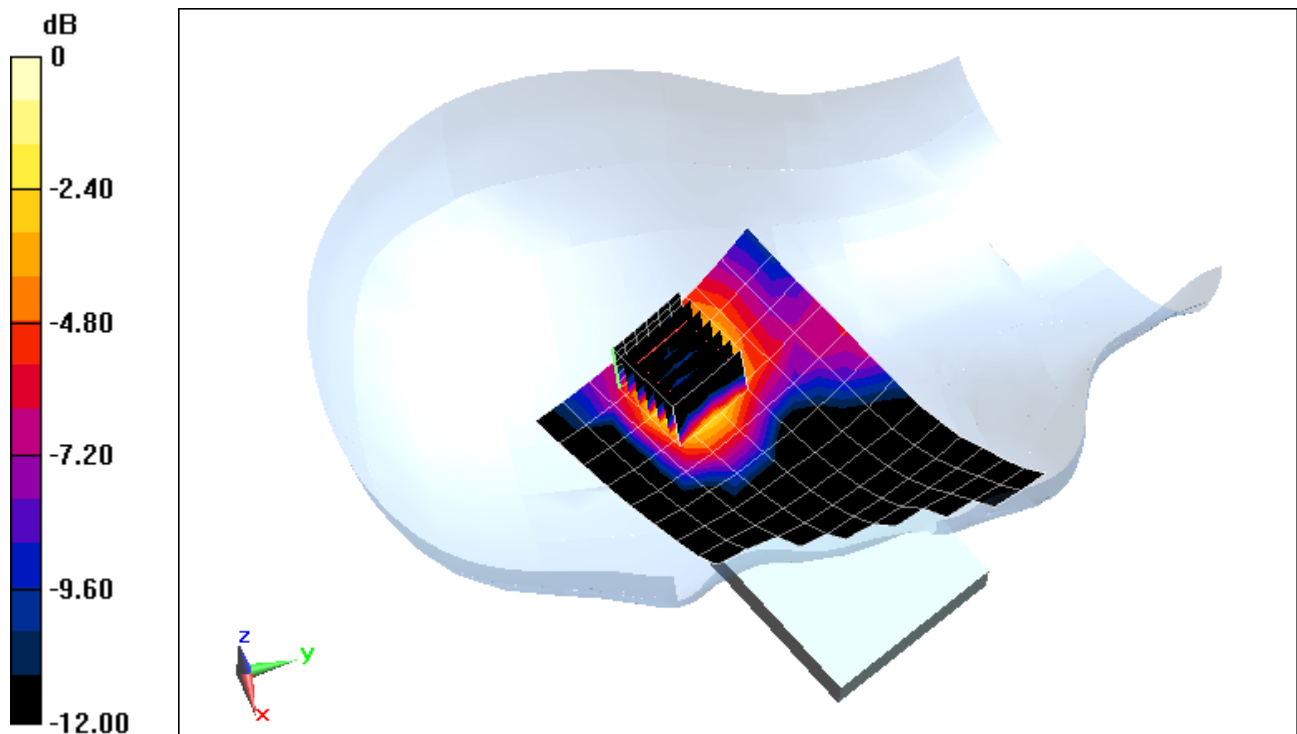
**Area Scan (9x14x1):** Measurement grid:  $dx=12\text{mm}$ ,  $dy=12\text{mm}$

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 4.426 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.059 mW/g

**SAR(1 g) = 0.031 mW/g; SAR(10 g) = 0.016 mW/g**



0 dB = 0.0388 mW/g = -28.22 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 257**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$ ;  $\sigma = 1.853 \text{ mho/m}$ ;  $\epsilon_r = 38.12$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-13-2012; Ambient Temp: 22.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(4.46, 4.46, 4.46); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: IEEE 802.11b - FCC Rule Part 15C, Left Head, Cheek, Ch 06, 1 Mbps**

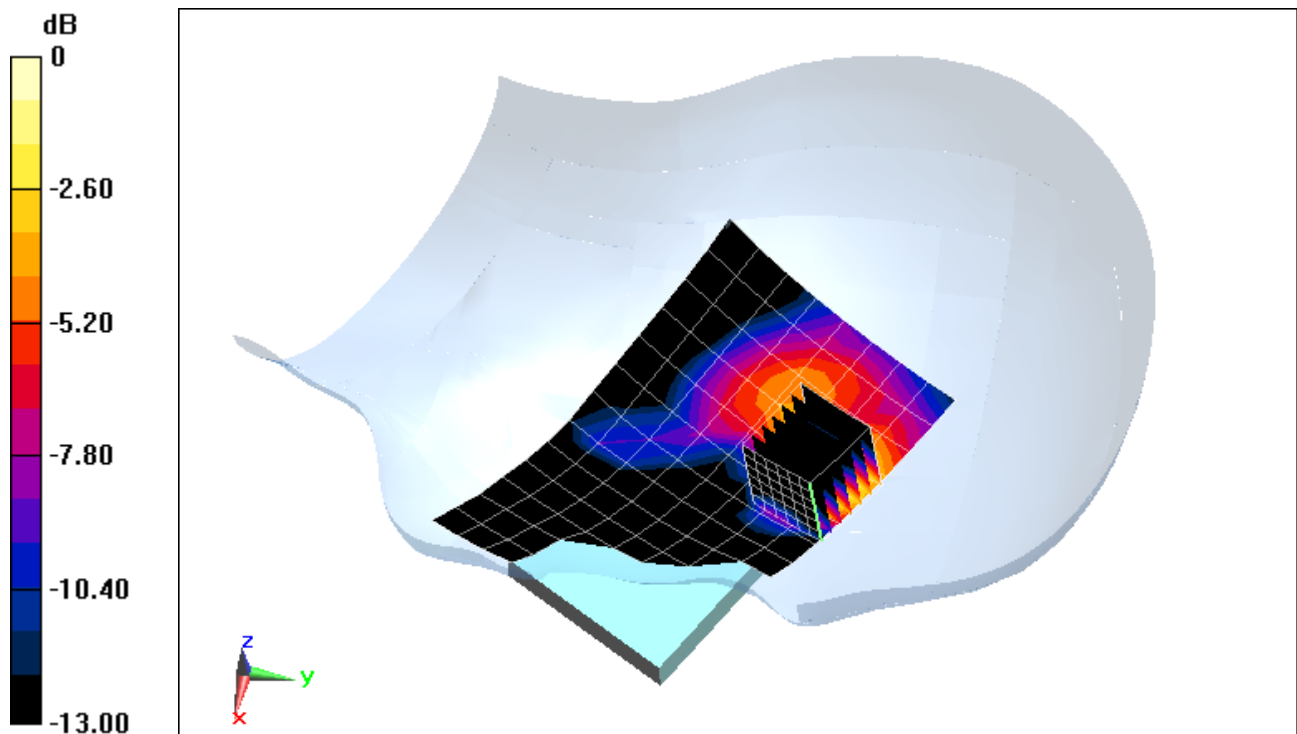
**Area Scan (9x14x1):** Measurement grid:  $dx=12\text{mm}$ ,  $dy=12\text{mm}$

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 5.116 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.112 mW/g

**SAR(1 g) = 0.045 mW/g; SAR(10 g) = 0.023 mW/g**



0 dB = 0.0587 mW/g = -24.63 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 257**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$ ;  $\sigma = 1.853 \text{ mho/m}$ ;  $\epsilon_r = 38.12$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-13-2012; Ambient Temp: 22.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(4.46, 4.46, 4.46); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: IEEE 802.11b - FCC Rule Part 15C, Left Head, Tilt, Ch 06, 1 Mbps**

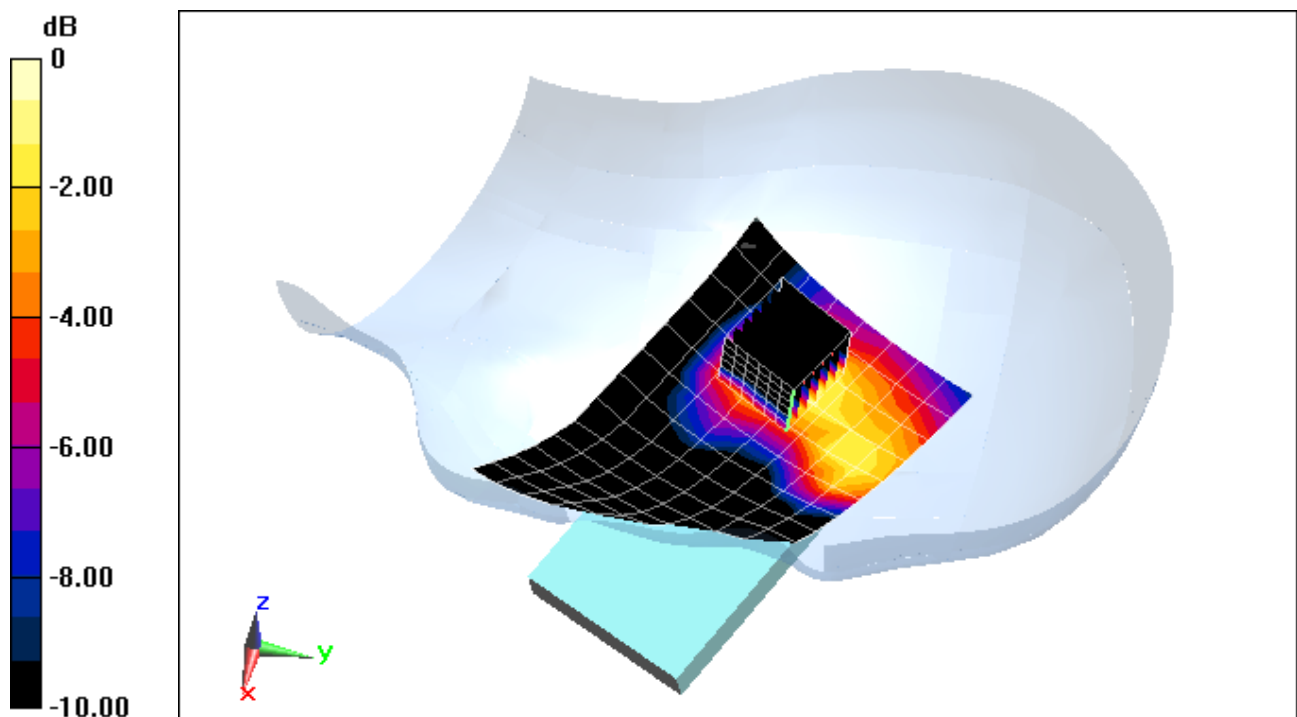
**Area Scan (9x14x1):** Measurement grid:  $dx=12\text{mm}$ ,  $dy=12\text{mm}$

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 3.774 V/m; Power Drift = -0.046 dB

Peak SAR (extrapolated) = 0.045 mW/g

**SAR(1 g) = 0.024 mW/g; SAR(10 g) = 0.013 mW/g**



0 dB = 0.0296 mW/g = -30.57 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used:

$f = 5785 \text{ MHz}$ ;  $\sigma = 5.048 \text{ mho/m}$ ;  $\epsilon_r = 34.57$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 06-11-2012; Ambient Temp: 23.6°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 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: IEEE 802.11a, 5.8 GHz - FCC Rule Part 15C, Right Head, Cheek, Ch 157, 6 Mbps**

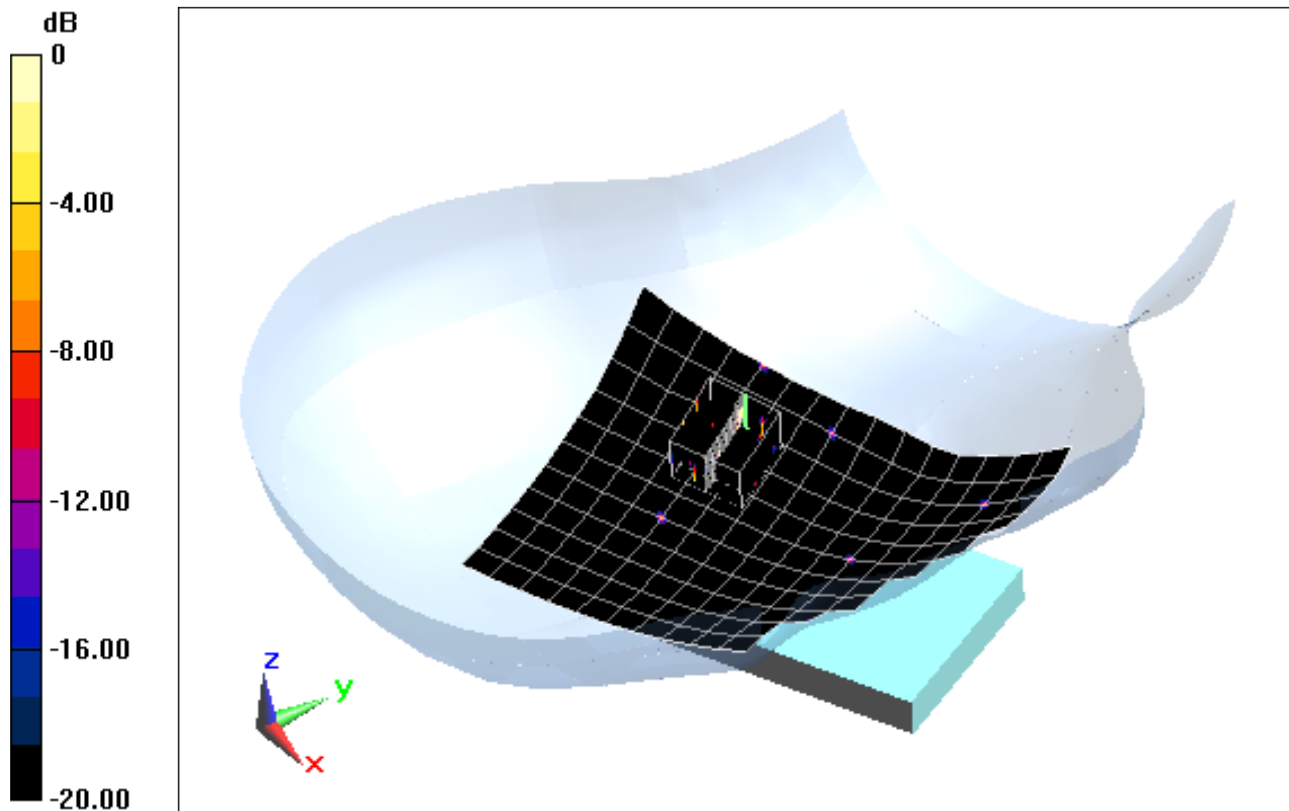
**Area Scan (12x16x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

**Zoom Scan (7x7x11)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0 mW/g

**SAR(1 g) = 0.0 mW/g ; SAR(10 g) = 0.0 mW/g**



0 dB = 0.0557 mW/g = -25.08 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used:

$f = 5785 \text{ MHz}$ ;  $\sigma = 5.048 \text{ mho/m}$ ;  $\epsilon_r = 34.57$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 06-11-2012; Ambient Temp: 23.6°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 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: IEEE 802.11a, 5.8 GHz - FCC Rule Part 15C, Right Head, Tilt, Ch 157, 6 Mbps**

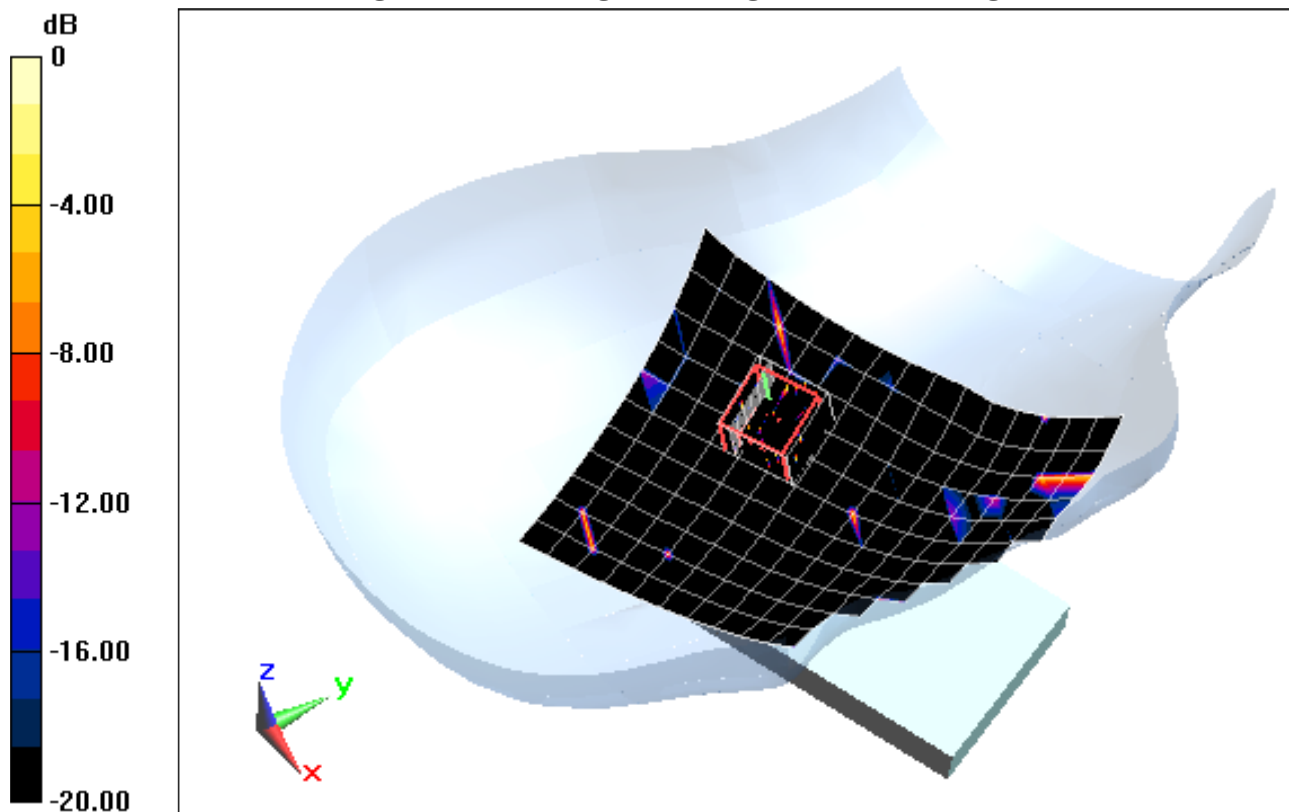
**Area Scan (12x16x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

**Zoom Scan (7x7x11)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.054 mW/g

**SAR(1 g) = 0.0014 mW/g; SAR(10 g) = 0.00014 mW/g**



0 dB = 0.0592 mW/g = -24.55 dB mW/g



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used:

$f = 5785 \text{ MHz}$ ;  $\sigma = 5.048 \text{ mho/m}$ ;  $\epsilon_r = 34.57$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-11-2012; Ambient Temp: 23.6°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 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: IEEE 802.11a, 5.8 GHz - FCC Rule Part 15C, Left Head, Cheek, Ch 157, 6 Mbps**

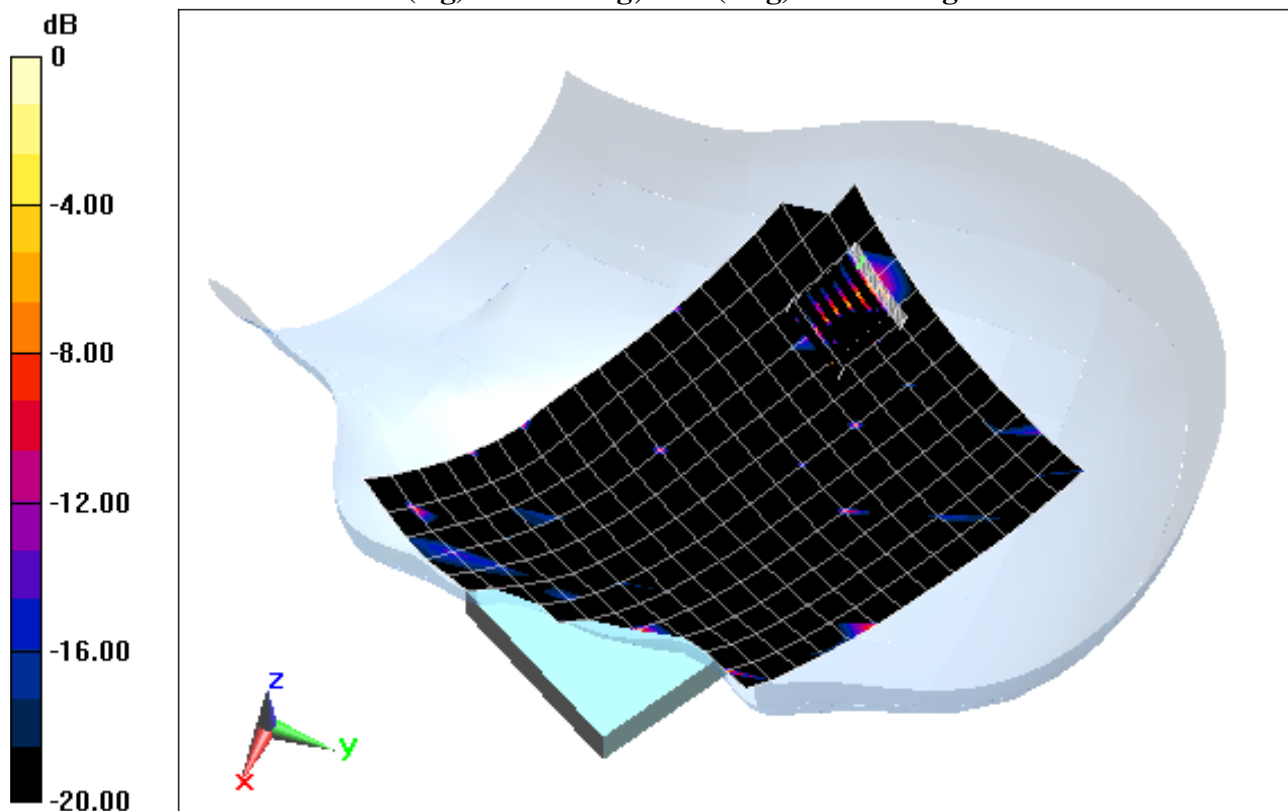
**Area Scan (13x19x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

**Zoom Scan (7x7x11)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 2.435 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0 mW/g

**SAR(1 g) = 0.0 mW/g; SAR(10 g) = 0.0 mW/g**



0 dB = 0.142 mW/g = -16.95 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used:

$f = 5785 \text{ MHz}$ ;  $\sigma = 5.048 \text{ mho/m}$ ;  $\epsilon_r = 34.57$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-11-2012; Ambient Temp: 23.6°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 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: IEEE 802.11a, 5.8 GHz - FCC Ruld Part 15C, Left Head, Tilt, Ch 157, 6 Mbps**

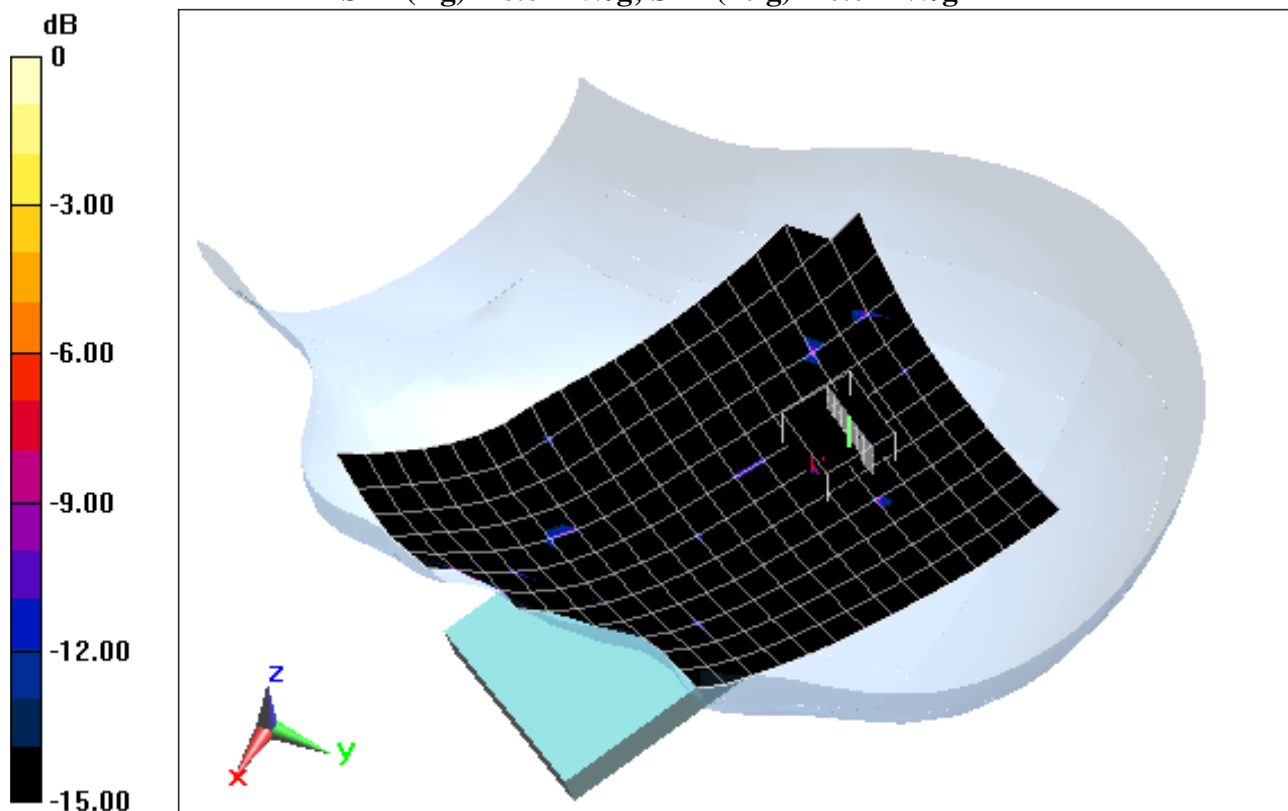
**Area Scan (13x19x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

**Zoom Scan (7x7x11)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0 mW/g

**SAR(1 g) = 0.0 mW/g; SAR(10 g) = 0.0 mW/g**



0 dB = 0.187 mW/g = -14.56 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$ ;  $\sigma = 0.984 \text{ mho/m}$ ;  $\epsilon_r = 53.179$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular EVDO - FCC Rule Part 90S, Body SAR, Back side, Mid.ch**

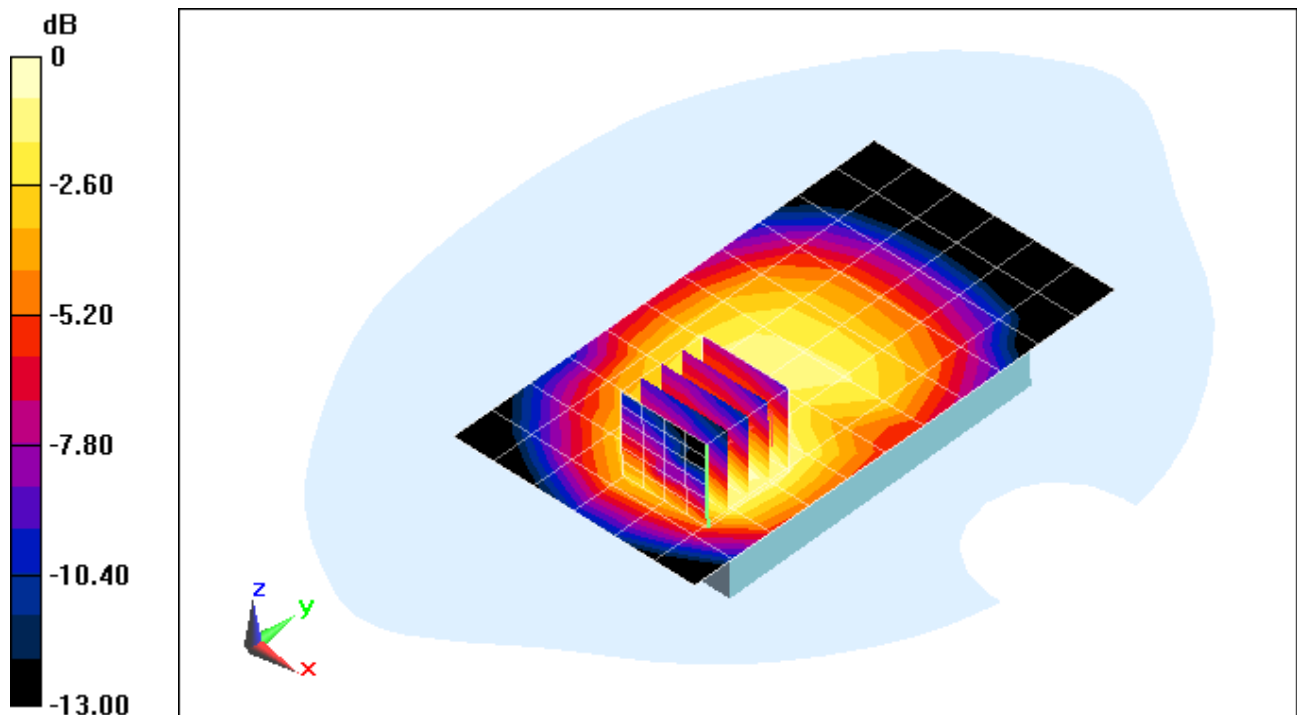
**Area Scan (7x12x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 34.915 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 1.471 mW/g

**SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.702 mW/g**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$ ;  $\sigma = 0.984 \text{ mho/m}$ ;  $\epsilon_r = 53.179$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular TDSO - FCC Rule Part 90S, Body SAR, Front side, Mid.ch**

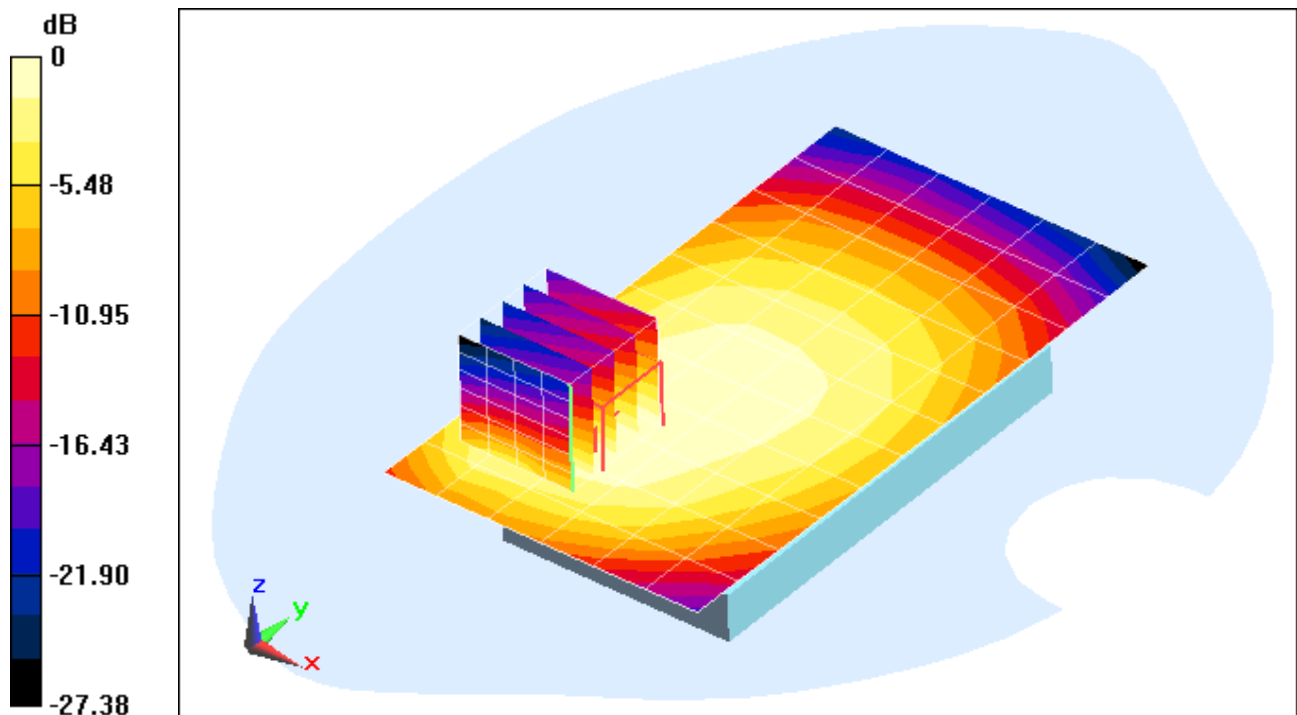
**Area Scan (7x12x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 31.563 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.214 mW/g

**SAR(1 g) = 0.817 mW/g; SAR(10 g) = 0.565 mW/g**



0 dB = 0.837 mW/g = -1.55 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$ ;  $\sigma = 0.984 \text{ mho/m}$ ;  $\epsilon_r = 53.179$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular EVDO - FCC Rule Part 90S, Body SAR, Bottom Edge, Mid.ch**

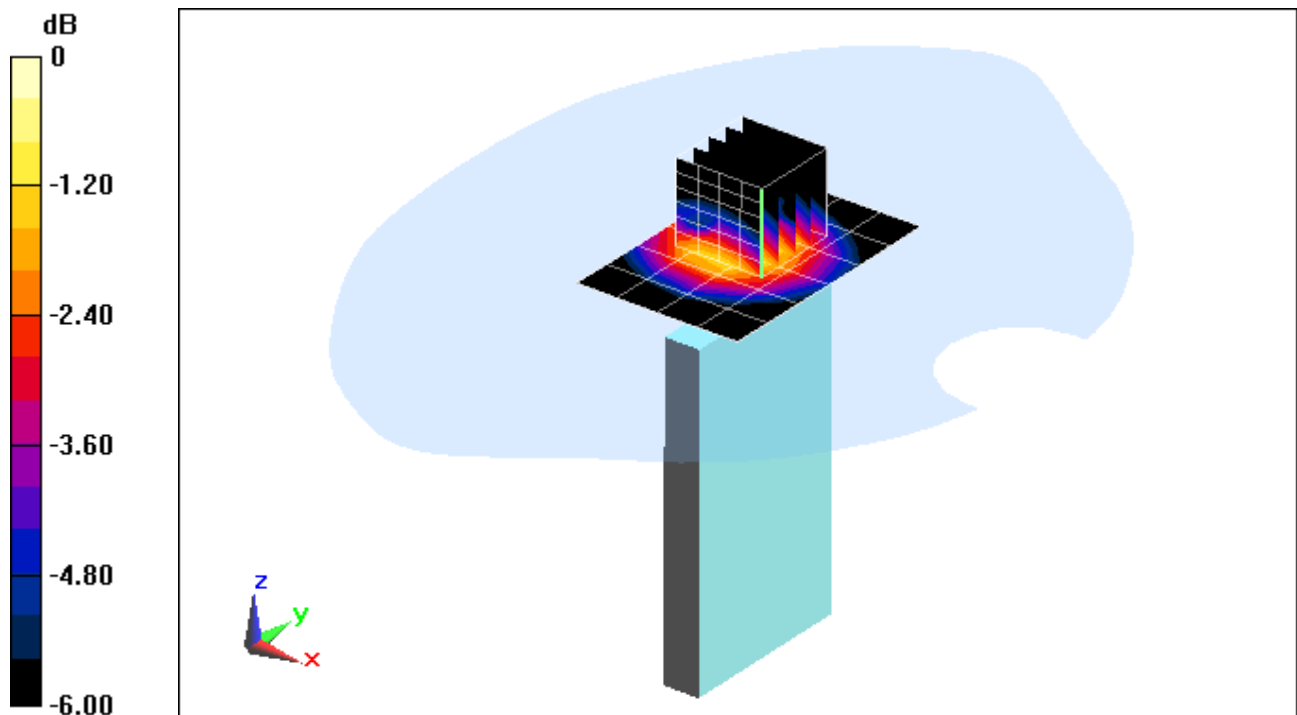
**Area Scan (5x7x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 16.423 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.313 mW/g

**SAR(1 g) = 0.246 mW/g; SAR(10 g) = 0.172 mW/g**



0 dB = 0.266 mW/g = -11.50 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$ ;  $\sigma = 0.984 \text{ mho/m}$ ;  $\epsilon_r = 53.179$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular EVDO - FCC Rule Part 90S, Body SAR, Left Edge, Mid.ch**

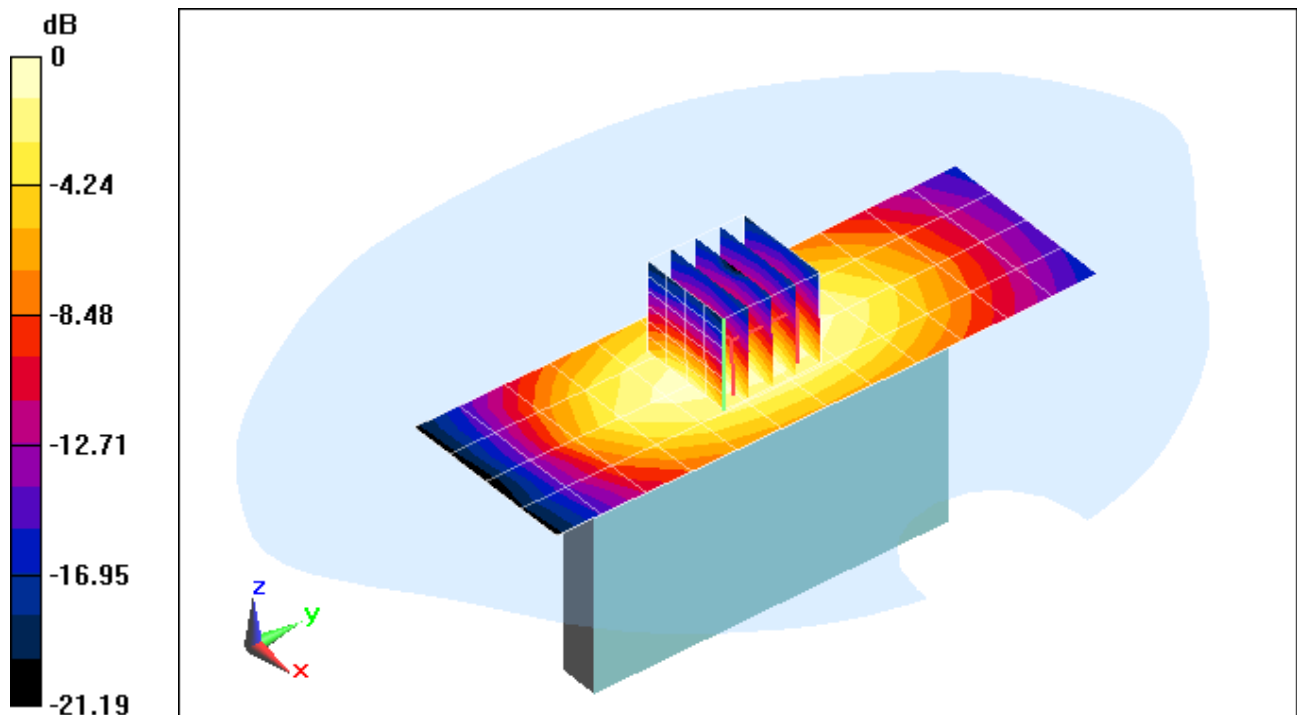
**Area Scan (5x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 35.620 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 1.395 mW/g

**SAR(1 g) = 1 mW/g; SAR(10 g) = 0.690 mW/g**



0 dB = 1.05 mW/g = 0.39 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 824.7 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 824.7 \text{ MHz}$ ;  $\sigma = 0.988 \text{ mho/m}$ ;  $\epsilon_r = 53.139$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular EVDO - FCC Rule Part 22H, Body SAR, Back side, Low.ch**

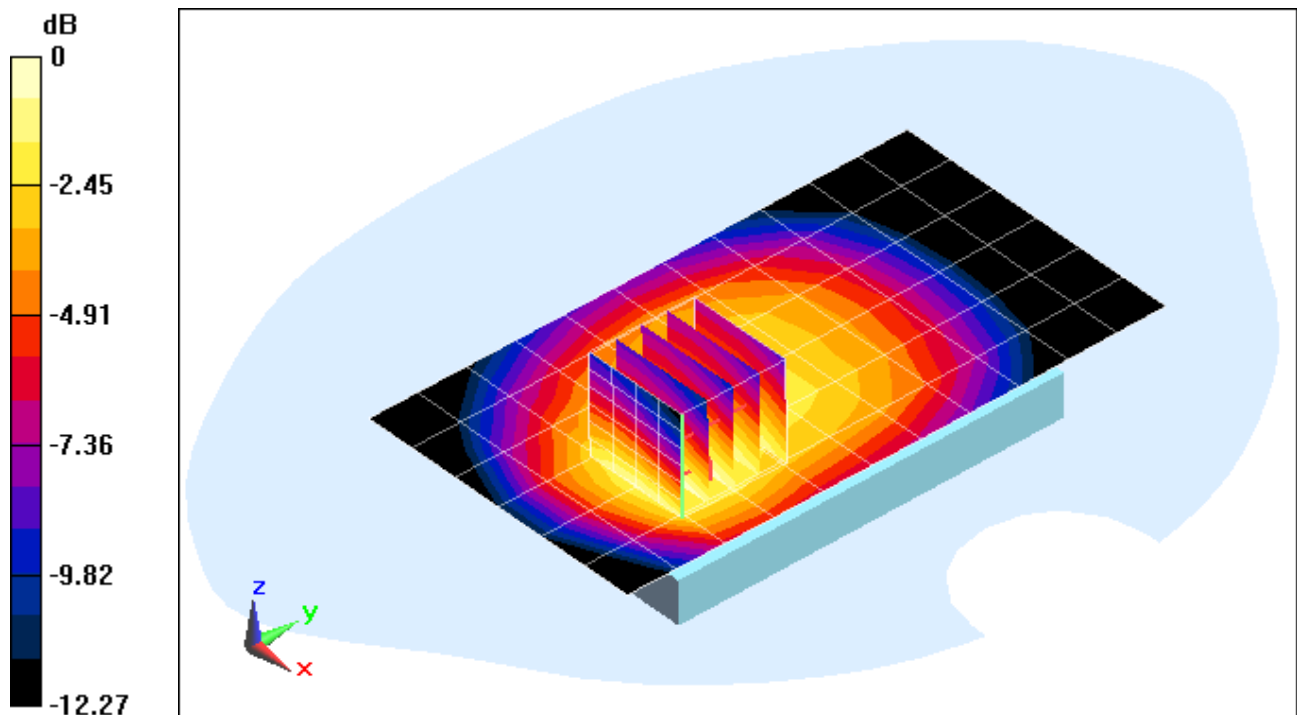
**Area Scan (7x12x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 35.591 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.590 mW/g

**SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.762 mW/g**



0 dB = 1.17 mW/g = 1.36 dB mW/g



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 1 \text{ mho/m}$ ;  $\epsilon_r = 53.037$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular TDSO - FCC Rule Part 22H, Body SAR, Front side, Mid.ch**

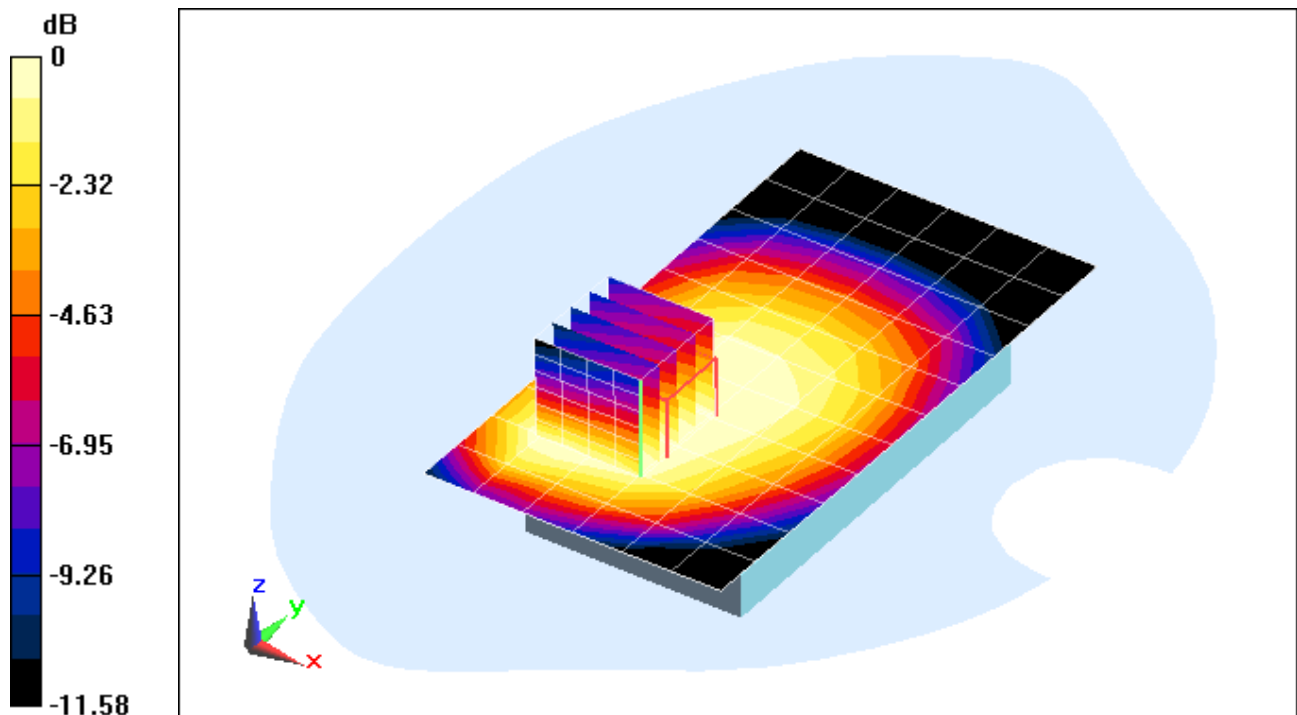
**Area Scan (7x12x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 28.210 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.964 mW/g

**SAR(1 g) = 0.667 mW/g; SAR(10 g) = 0.480 mW/g**



0 dB = 0.704 mW/g = -3.05 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$ ;  $\sigma = 1 \text{ mho/m}$ ;  $\epsilon_r = 53.037$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular EVDO - FCC Rule Part 22H, Body SAR, Bottom Edge, Mid.ch**

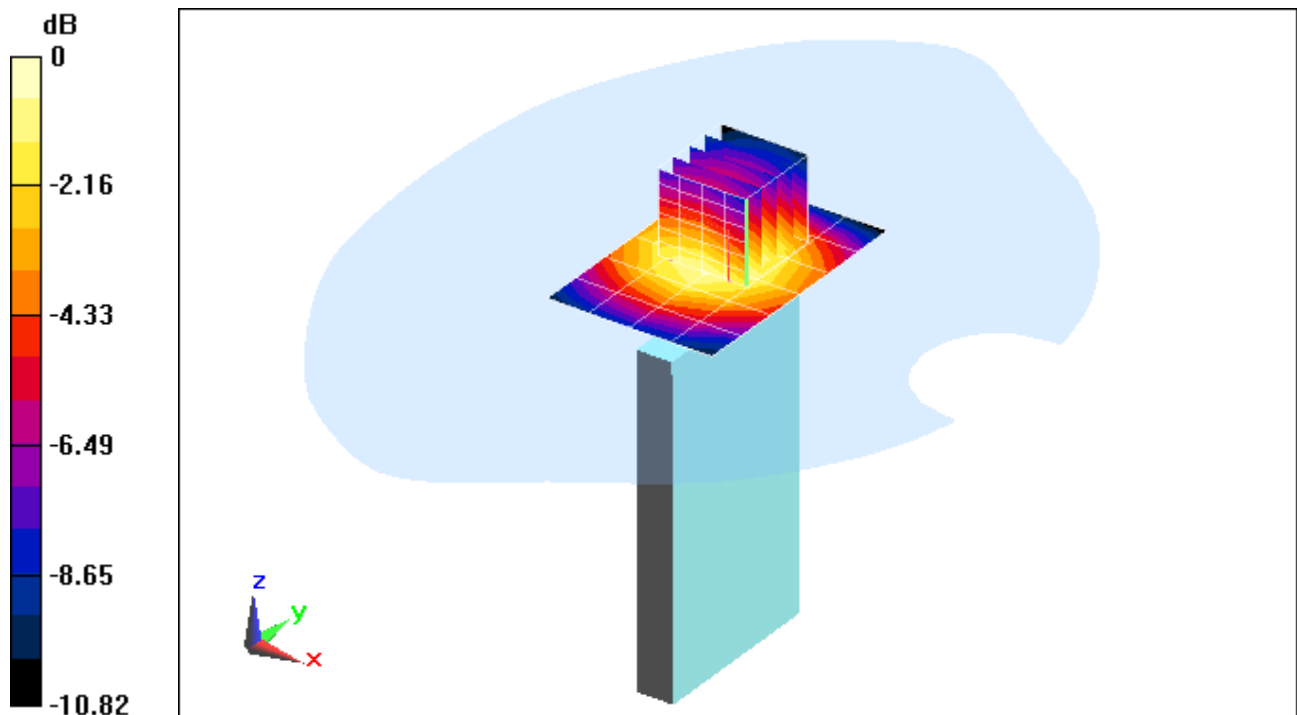
**Area Scan (5x7x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 17.820 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.351 mW/g

**SAR(1 g) = 0.272 mW/g; SAR(10 g) = 0.190 mW/g**



0 dB = 0.276 mW/g = -11.17 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: Cellular CDMA; Frequency: 824.7 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 824.7 \text{ MHz}$ ;  $\sigma = 0.988 \text{ mho/m}$ ;  $\epsilon_r = 53.139$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: Cellular EVDO - FCC Rule Part 22H, Body SAR, Left Edge, Low.ch**

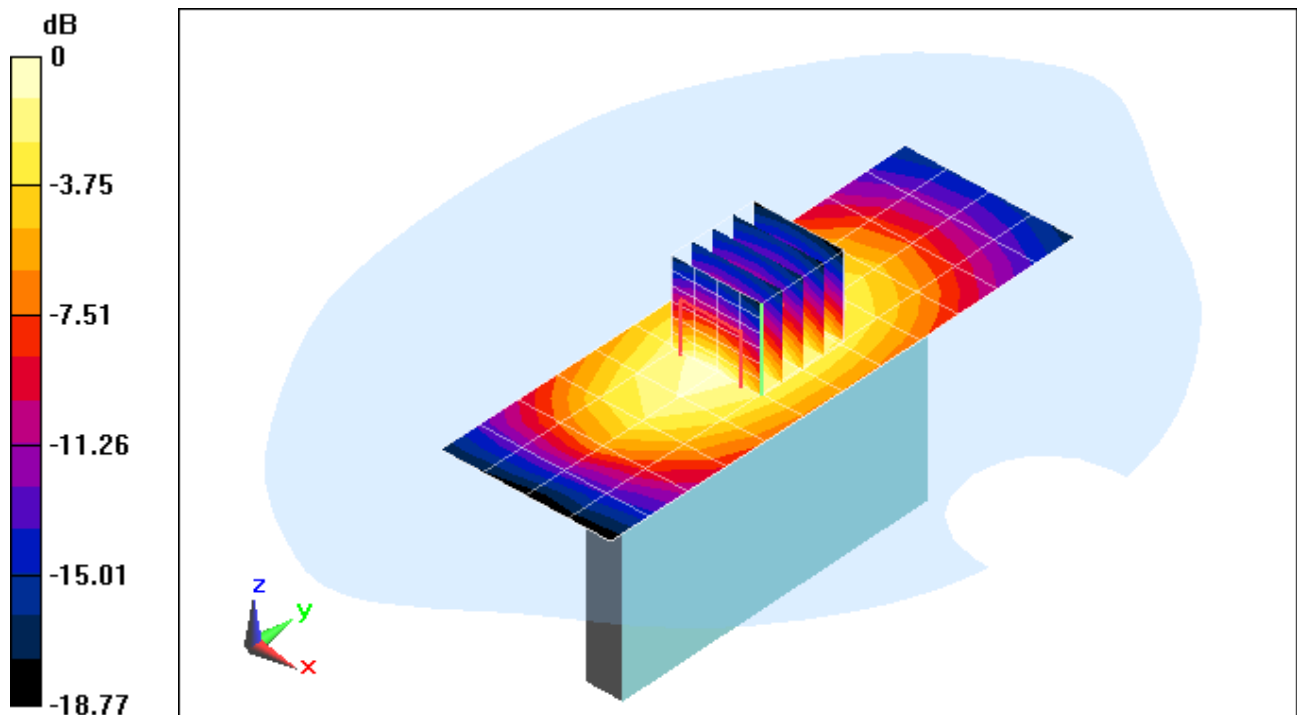
**Area Scan (5x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 37.318 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 1.575 mW/g

**SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.776 mW/g**



0 dB = 0.972 mW/g = -0.25 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 260**

Communication System: PCS CDMA; Frequency: 1908.75 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1908.75 \text{ MHz}$ ;  $\sigma = 1.579 \text{ mho/m}$ ;  $\epsilon_r = 53.132$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-08-2012; Ambient Temp: 24.1°C; Tissue Temp: 23.4°C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011;

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: PCS CDMA - FCC Rule Part 24E, Body SAR, Back side, High.ch**

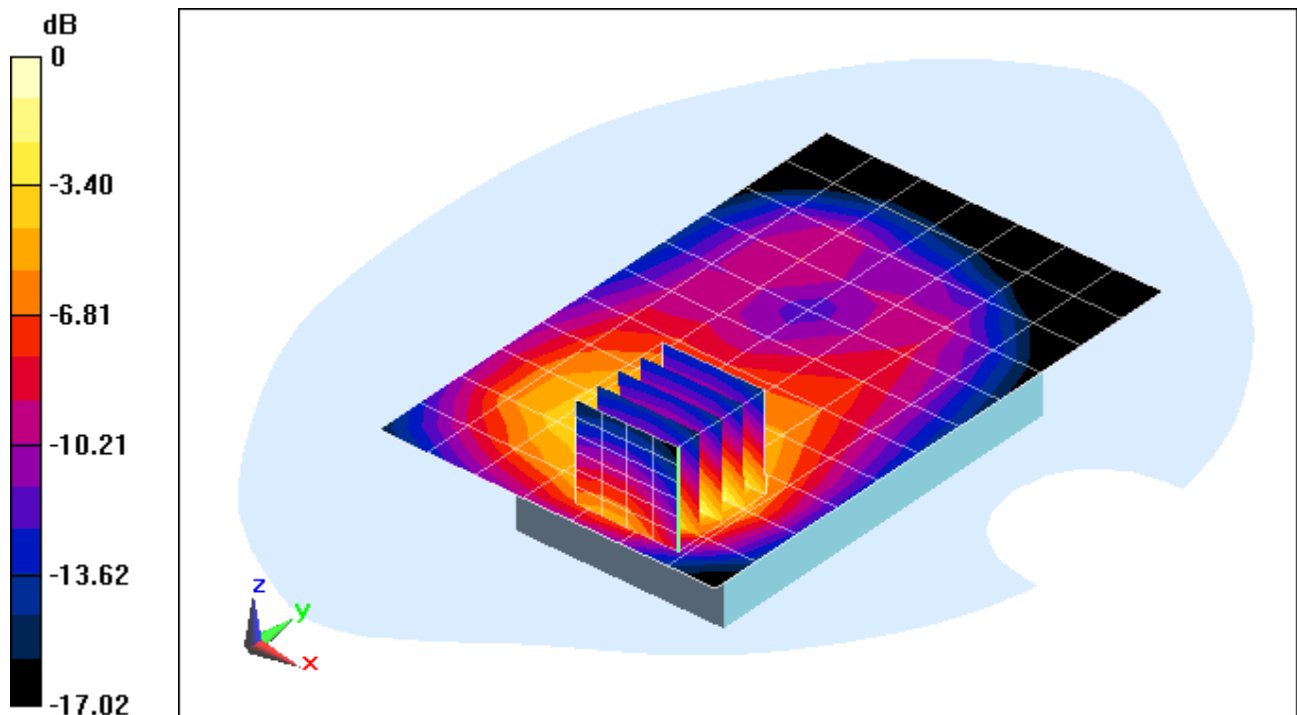
**Area Scan (8x12x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 30.662 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 2.215 mW/g

**SAR(1 g) = 1.27 mW/g; SAR(10 g) = 0.714 mW/g**



0 dB = 1.40 mW/g = 2.92 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 260**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.545 \text{ mho/m}$ ;  $\epsilon_r = 53.18$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-08-2012; Ambient Temp: 24.1°C; Tissue Temp: 23.4°C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011;

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: PCS CDMA - FCC Rule Part 24E, Body SAR, Front side, Mid.ch**

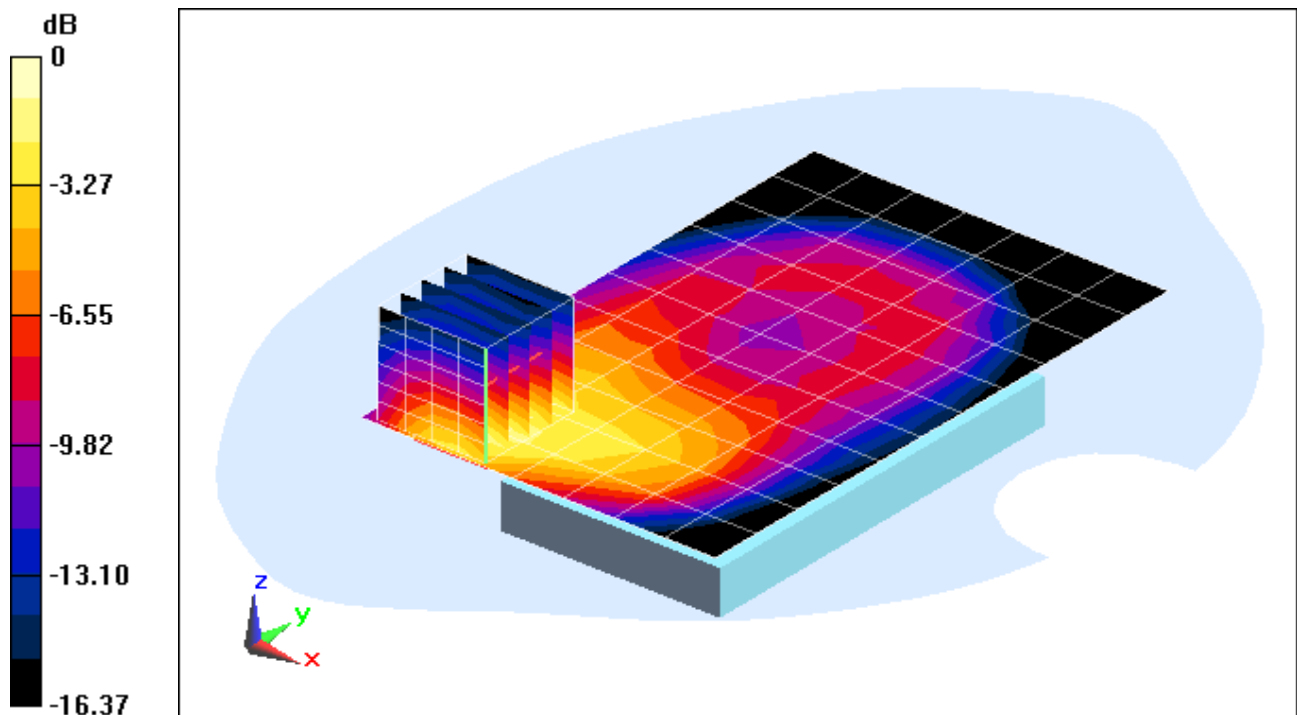
**Area Scan (8x12x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 22.555 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 1.366 mW/g

**SAR(1 g) = 0.726 mW/g; SAR(10 g) = 0.384 mW/g**



0 dB = 0.828 mW/g = -1.64 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 260**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.545 \text{ mho/m}$ ;  $\epsilon_r = 53.18$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-08-2012; Ambient Temp: 24.1°C; Tissue Temp: 23.4°C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011;

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: PCS CDMA - FCC Rule Part 24E, Body SAR, Bottom side, Mid.ch**

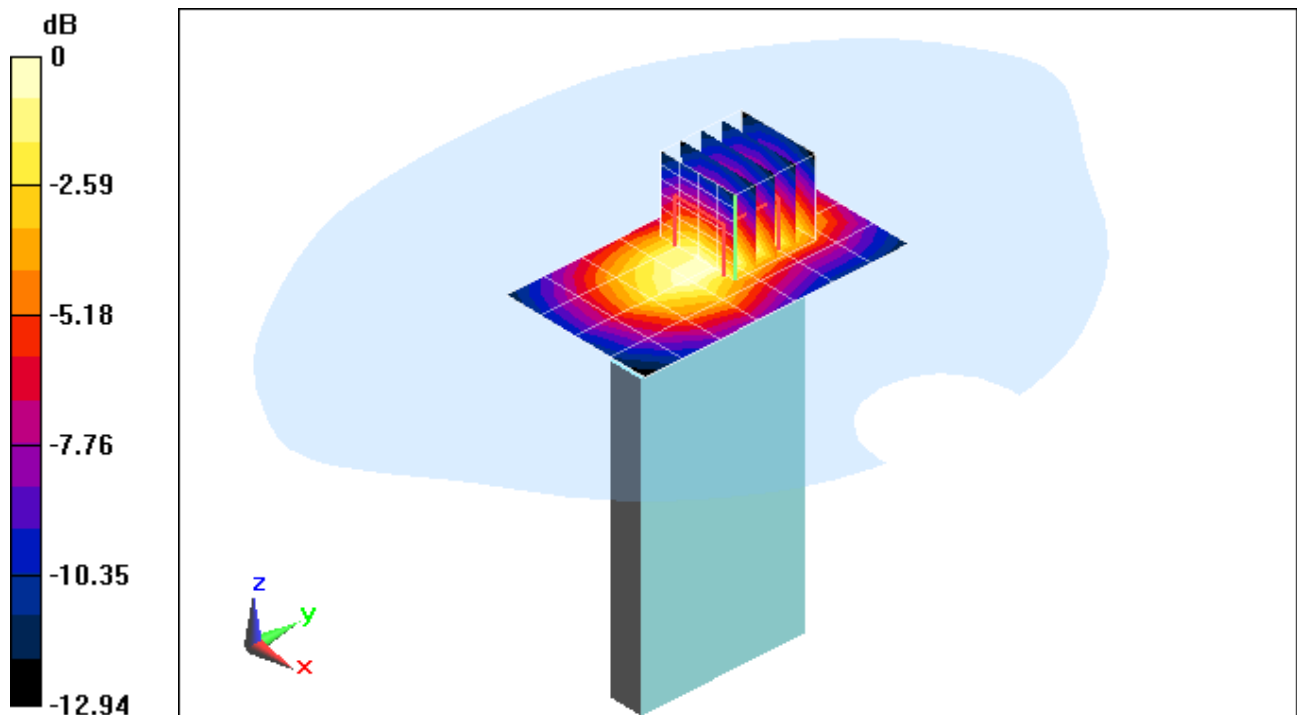
**Area Scan (5x8x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 21.982 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 1.053 mW/g

**SAR(1 g) = 0.623 mW/g; SAR(10 g) = 0.353 mW/g**



0 dB = 0.603 mW/g = -4.40 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 260**

Communication System: PCS CDMA; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.545 \text{ mho/m}$ ;  $\epsilon_r = 53.18$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-08-2012; Ambient Temp: 24.1°C; Tissue Temp: 23.4°C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011;

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: PCS CDMA - FCC Rule Part 24E, Body SAR, Left side, Mid.ch**

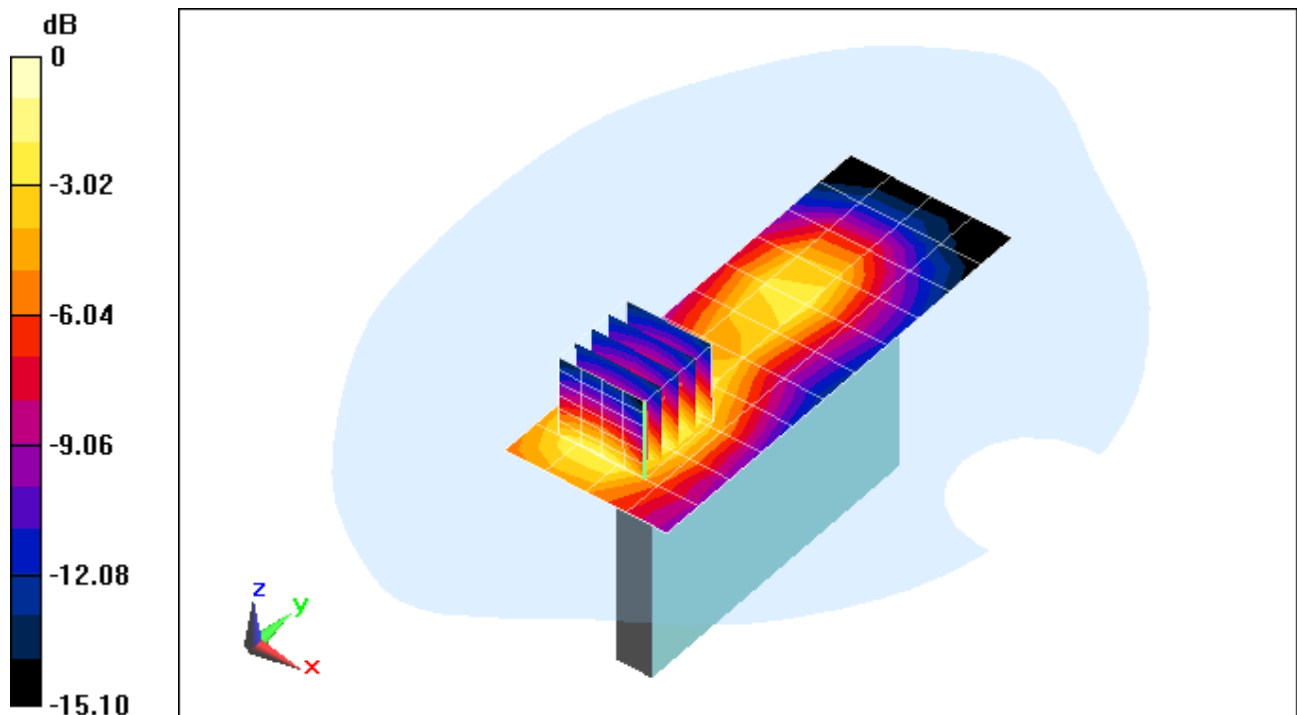
**Area Scan (5x12x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 16.257 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.558 mW/g

**SAR(1 g) = 0.357 mW/g; SAR(10 g) = 0.215 mW/g**



0 dB = 0.392 mW/g = -8.13 dB mW/g



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: LTE BAND 25; Frequency: 1855 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1855 \text{ MHz}$ ;  $\sigma = 1.497 \text{ mho/m}$ ;  $\epsilon_r = 51.285$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: LTE Band 25 (PCS) - FCC Rule Part 24E, Body SAR, Back side, Low.ch,  
10MHz BW, QPSK, 1 RB, 0 RB Offset**

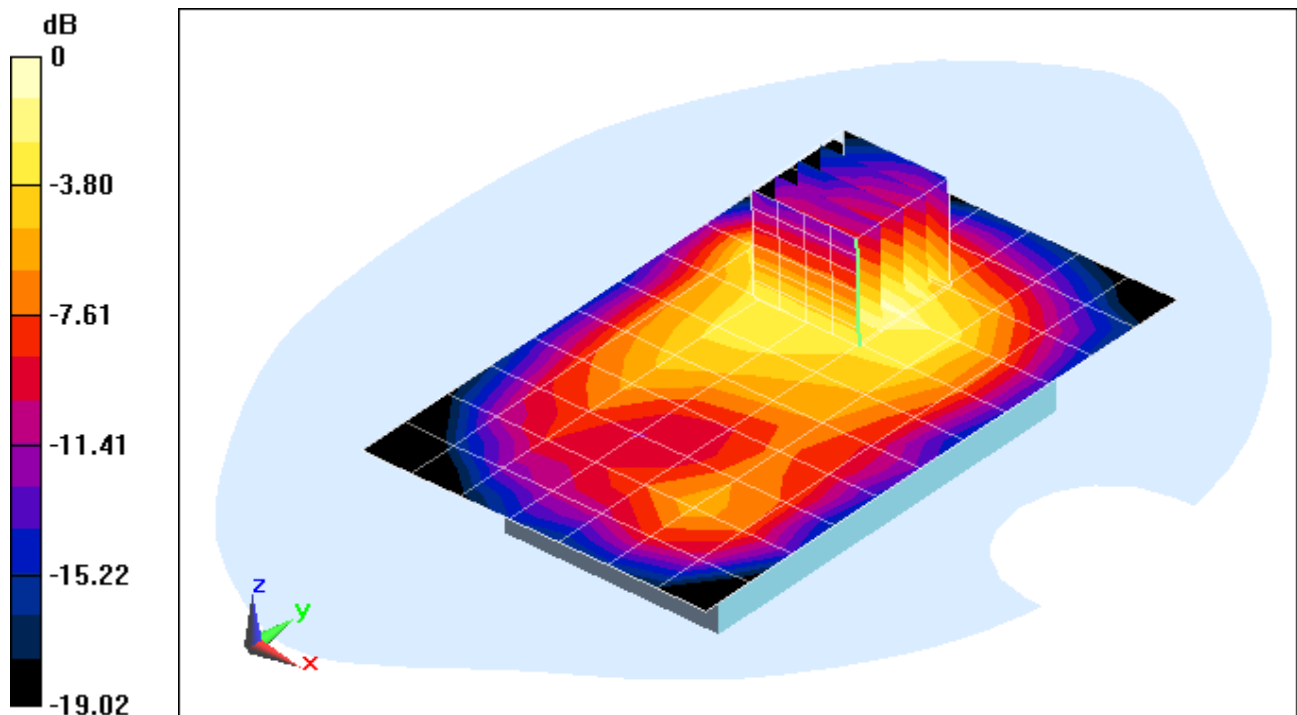
**Area Scan (8x12x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 15.666 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.619 mW/g

**SAR(1 g) = 0.347 mW/g; SAR(10 g) = 0.203 mW/g**



0 dB = 0.372 mW/g = -8.59 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: LTE BAND 25; Frequency: 1855 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1855 \text{ MHz}$ ;  $\sigma = 1.497 \text{ mho/m}$ ;  $\epsilon_r = 51.285$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: LTE Band 25 (PCS) - FCC Rule Part 24E, Body SAR, Front side, Low.ch,  
10MHz BW, QPSK, 1 RB, 0 RB Offset**

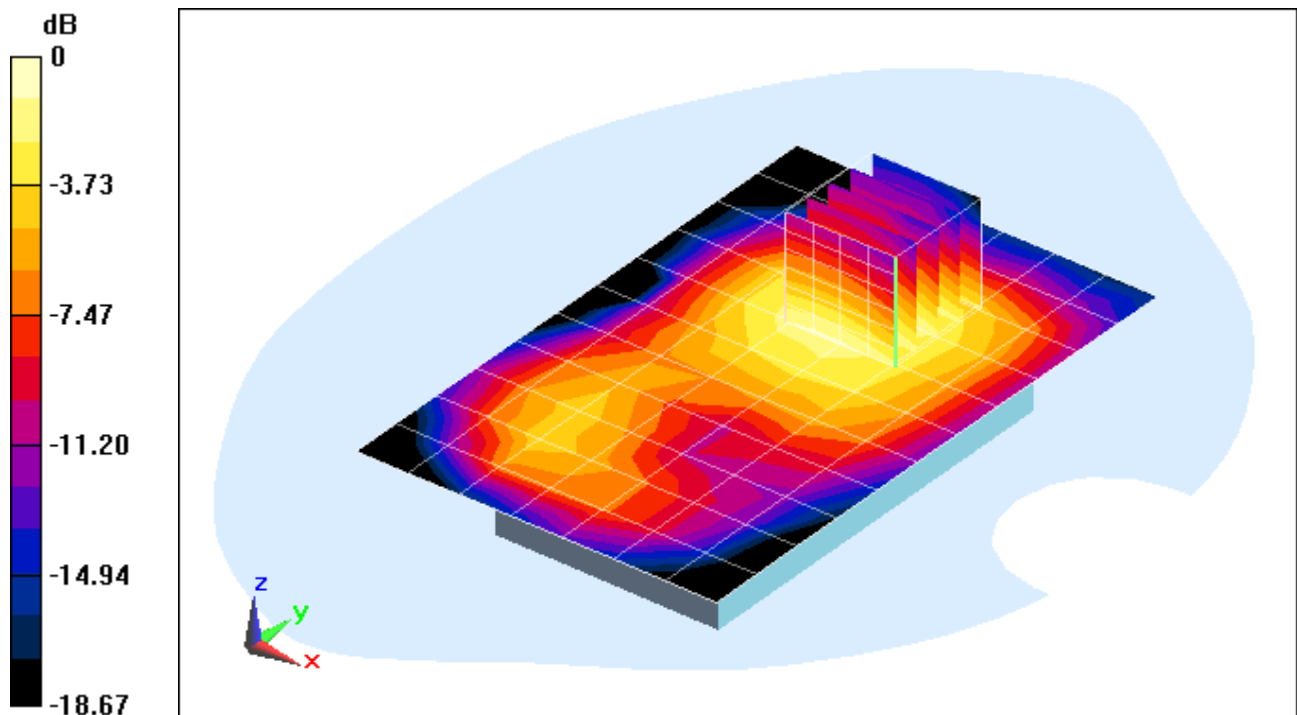
**Area Scan (8x12x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 14.227 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.427 mW/g

**SAR(1 g) = 0.280 mW/g; SAR(10 g) = 0.180 mW/g**



0 dB = 0.298 mW/g = -10.52 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: LTE BAND 25; Frequency: 1855 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1855 \text{ MHz}$ ;  $\sigma = 1.497 \text{ mho/m}$ ;  $\epsilon_r = 51.285$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: LTE Band 25 (PCS) - FCC Rule Part 24E, Body SAR, Top Edge, Low.ch,  
10MHz BW, QPSK, 1 RB, 0 RB Offset**

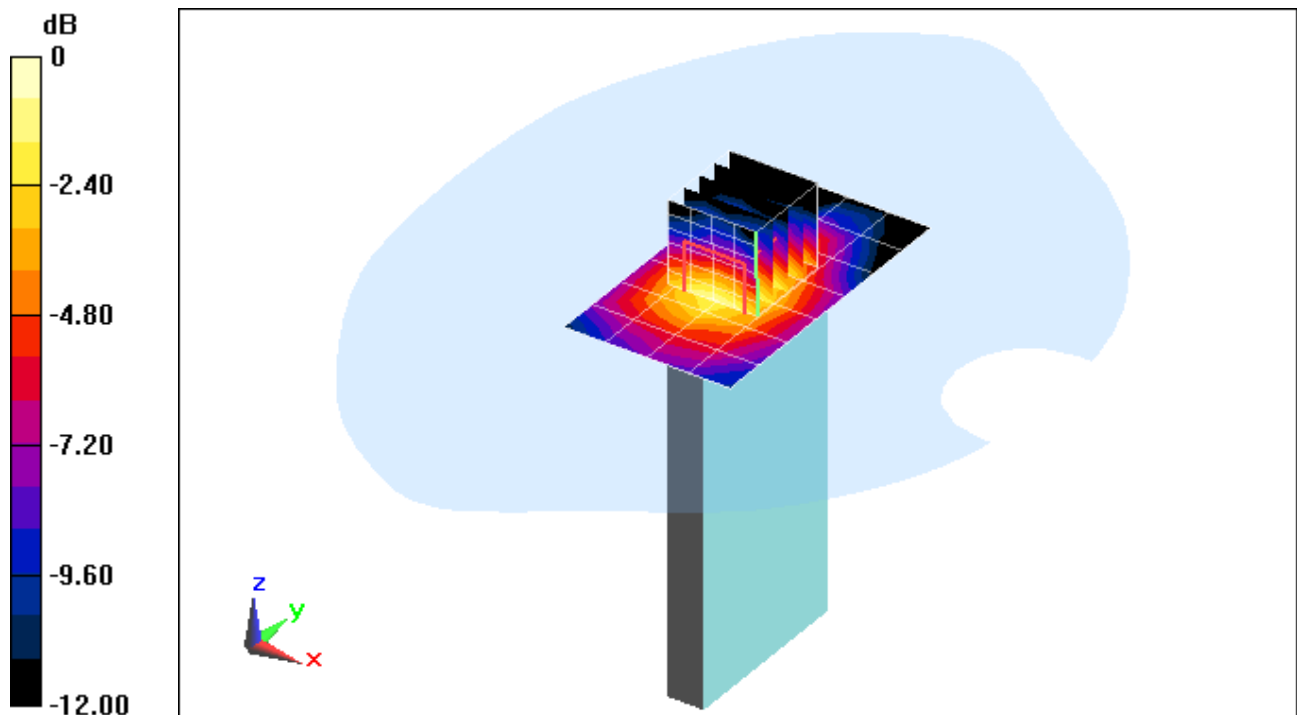
**Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 9.673 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.207 mW/g

**SAR(1 g) = 0.131 mW/g; SAR(10 g) = 0.081 mW/g**



0 dB = 0.142 mW/g = -16.95 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: LTE BAND 25; Frequency: 1855 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1855 \text{ MHz}$ ;  $\sigma = 1.497 \text{ mho/m}$ ;  $\epsilon_r = 51.285$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: LTE Band 25 (PCS) - FCC Rule Part 24E, Body SAR, Right Edge, Low.ch,  
10MHz BW, QPSK, 1 RB, 0 RB Offset**

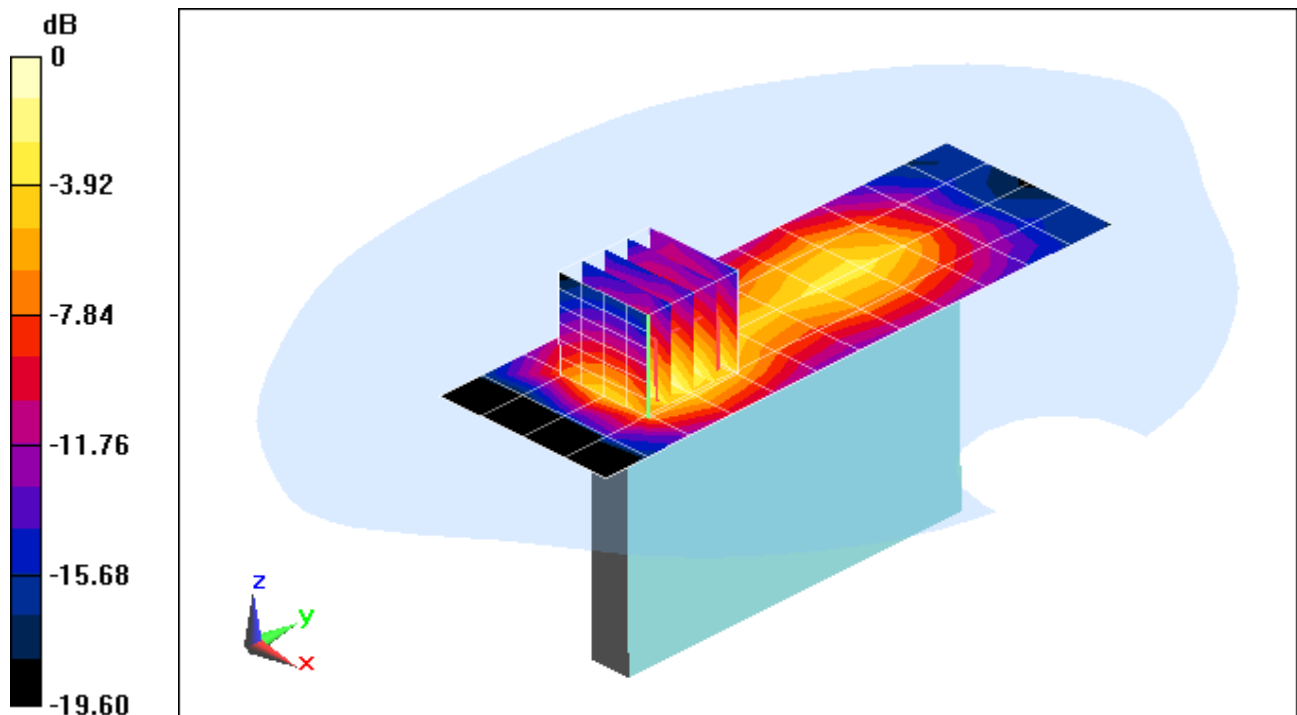
**Area Scan (5x13x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 12.504 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.345 mW/g

**SAR(1 g) = 0.203 mW/g; SAR(10 g) = 0.114 mW/g**



0 dB = 0.226 mW/g = -12.92 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$ ;  $\sigma = 1.878 \text{ mho/m}$ ;  $\epsilon_r = 54.32$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-13-2012; Ambient Temp: 22.8°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3258; ConvF(4.28, 4.28, 4.28); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: IEEE 802.11b - FCC Rule Part 15C, Body SAR, Ch 06, 1 Mbps, Back Side**

**Area Scan (10x15x1):** Measurement grid: dx=12HS

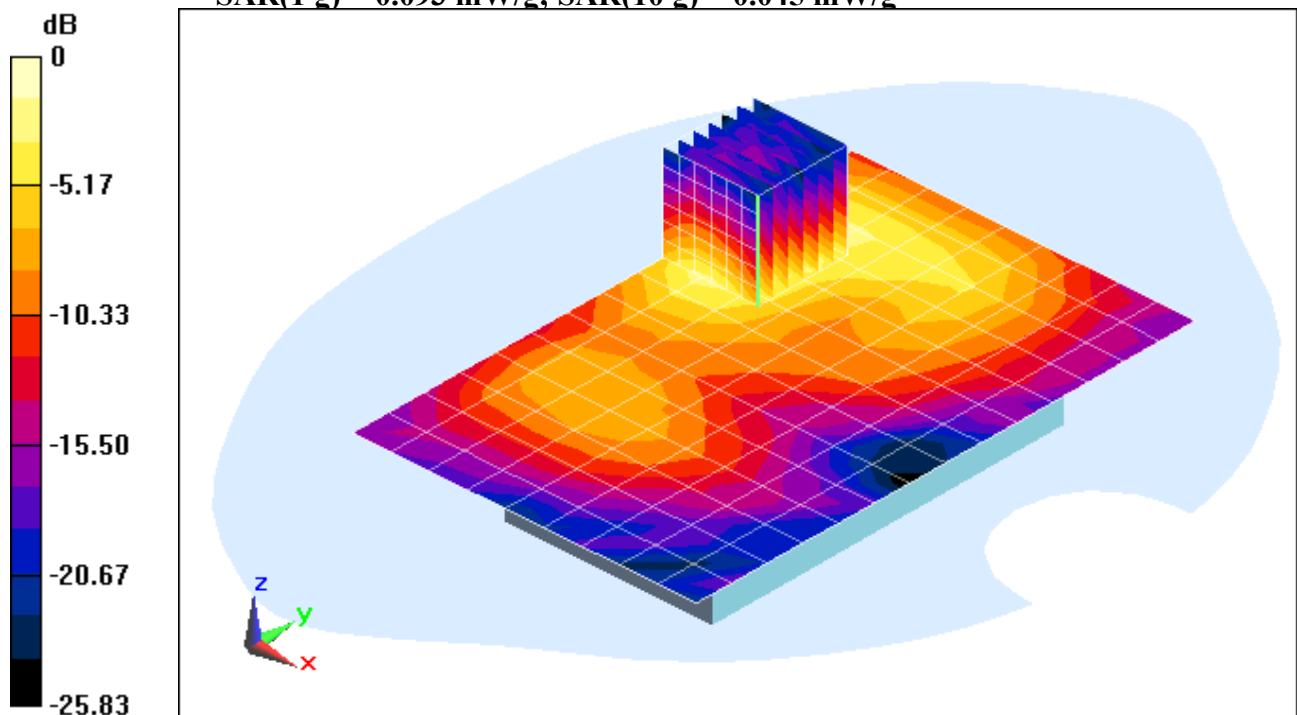
mm, dy=12mm

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.159 V/m; Power Drift = 0.068 dB

Peak SAR (extrapolated) = 0.189 mW/g

**SAR(1 g) = 0.093 mW/g; SAR(10 g) = 0.045 mW/g**



0 dB = 0.117 mW/g = -18.60 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$ ;  $\sigma = 1.878 \text{ mho/m}$ ;  $\epsilon_r = 54.32$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-13-2012; Ambient Temp: 22.8°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3258; ConvF(4.28, 4.28, 4.28); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: IEEE 802.11b - FCC Rule Part 15C, Body SAR, Ch 06, 1 Mbps, Front Side**

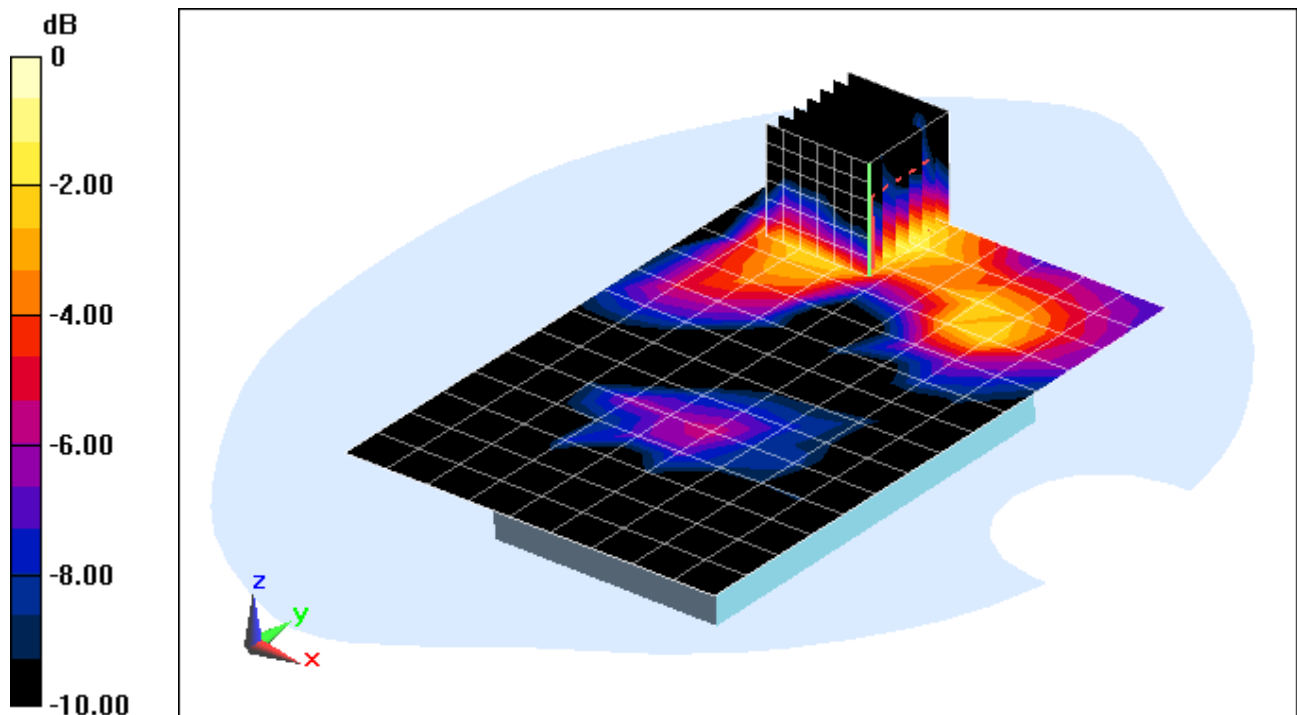
**Area Scan (10x15x1):** Measurement grid: dx=12mm, dy=12mm

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.589 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.032 mW/g

**SAR(1 g) = 0.016 mW/g; SAR(10 g) = 0.00875 mW/g**



0 dB = 0.0198 mW/g = -34.07 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$ ;  $\sigma = 1.878 \text{ mho/m}$ ;  $\epsilon_r = 54.32$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-13-2012; Ambient Temp: 22.8°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3258; ConvF(4.28, 4.28, 4.28); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: IEEE 802.11b - FCC Rule Part 15C, Body SAR, Ch 06, 1 Mbps, Top Edge**

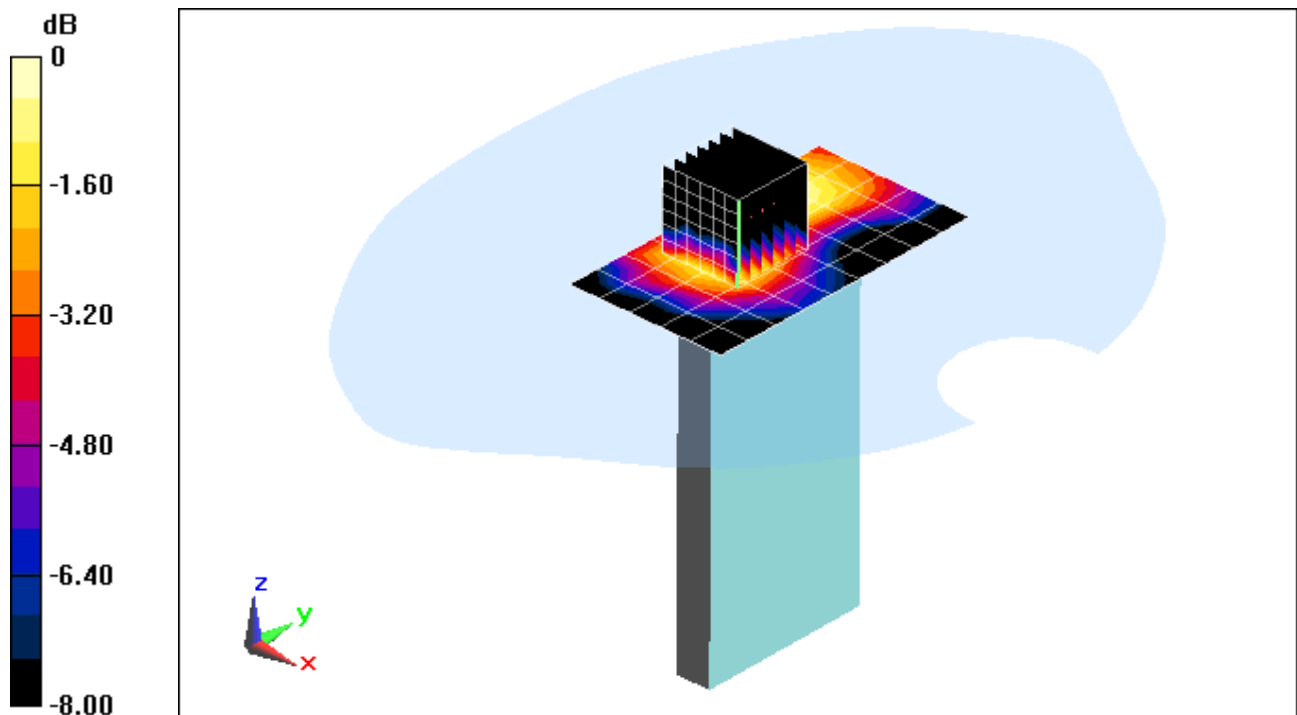
**Area Scan (6x10x1):** Measurement grid:  $dx=12\text{mm}$ ,  $dy=12\text{mm}$

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 2.436 V/m; Power Drift = 0.20 dB

Peak SAR (extrapolated) = 0.027 mW/g

**SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00769 mW/g**



0 dB = 0.0169 mW/g = -35.44 dB mW/g



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$ ;  $\sigma = 1.878 \text{ mho/m}$ ;  $\epsilon_r = 54.32$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-13-2012; Ambient Temp: 22.8°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3258; ConvF(4.28, 4.28, 4.28); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: IEEE 802.11b - FCC Rule Part 15C, Body SAR, Ch 06, 1 Mbps, Right Edge**

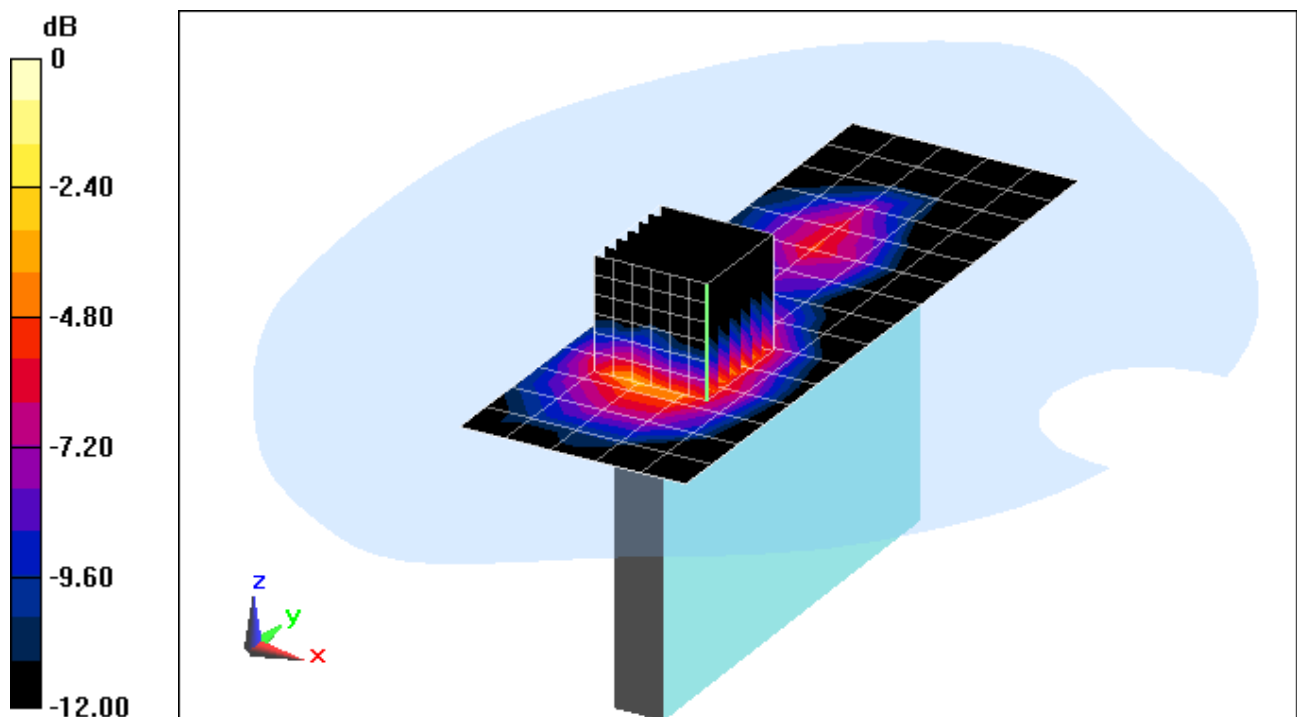
**Area Scan (6x16x1):** Measurement grid:  $dx=12\text{mm}$ ,  $dy=12\text{mm}$

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 2.136 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.102 mW/g

**SAR(1 g) = 0.046 mW/g; SAR(10 g) = 0.022 mW/g**



0 dB = 0.0589 mW/g = -24.60 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: IEEE 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5785 \text{ MHz}$ ;  $\sigma = 6.098 \text{ mho/m}$ ;  $\epsilon_r = 46.70$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-12-2012; Ambient Temp: 23.9°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN3589; ConvF(3.59, 3.59, 3.59); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

**Mode: IEEE 802.11a, 5.8 GHz - FCC Rule Part 15C,  
Body SAR, Ch 157, 6 Mbps, Back Side**

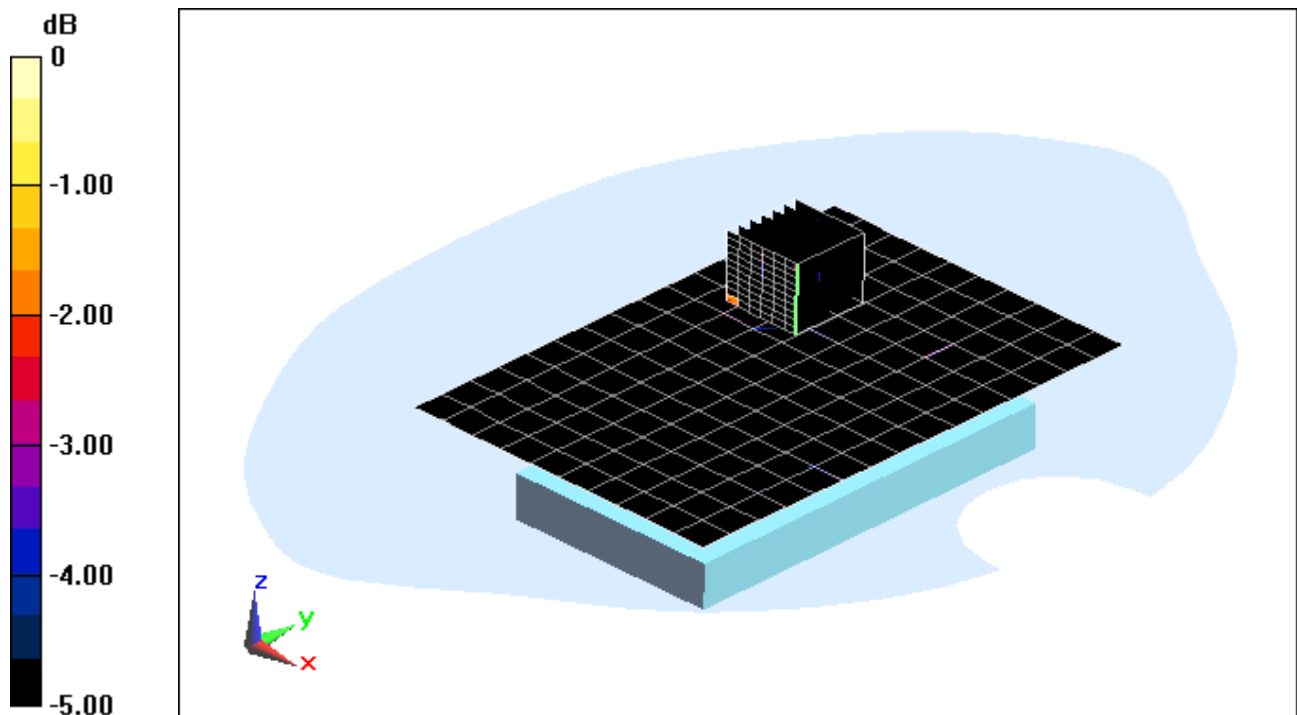
**Area Scan (11x16x1):** Measurement grid: dx=10mm, dy=10mm

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

Reference Value = 0 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0 mW/g

**SAR(1 g) = 0.0 mW/g; SAR(10 g) = 0.0 mW/g**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 245**

Communication System: CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$ ;  $\sigma = 0.889 \text{ mho/m}$ ;  $\epsilon_r = 39.988$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-14-2012; Ambient Temp: 22.7°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN3561; ConvF(8.07, 8.07, 8.07); Calibrated: 7/27/2011;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

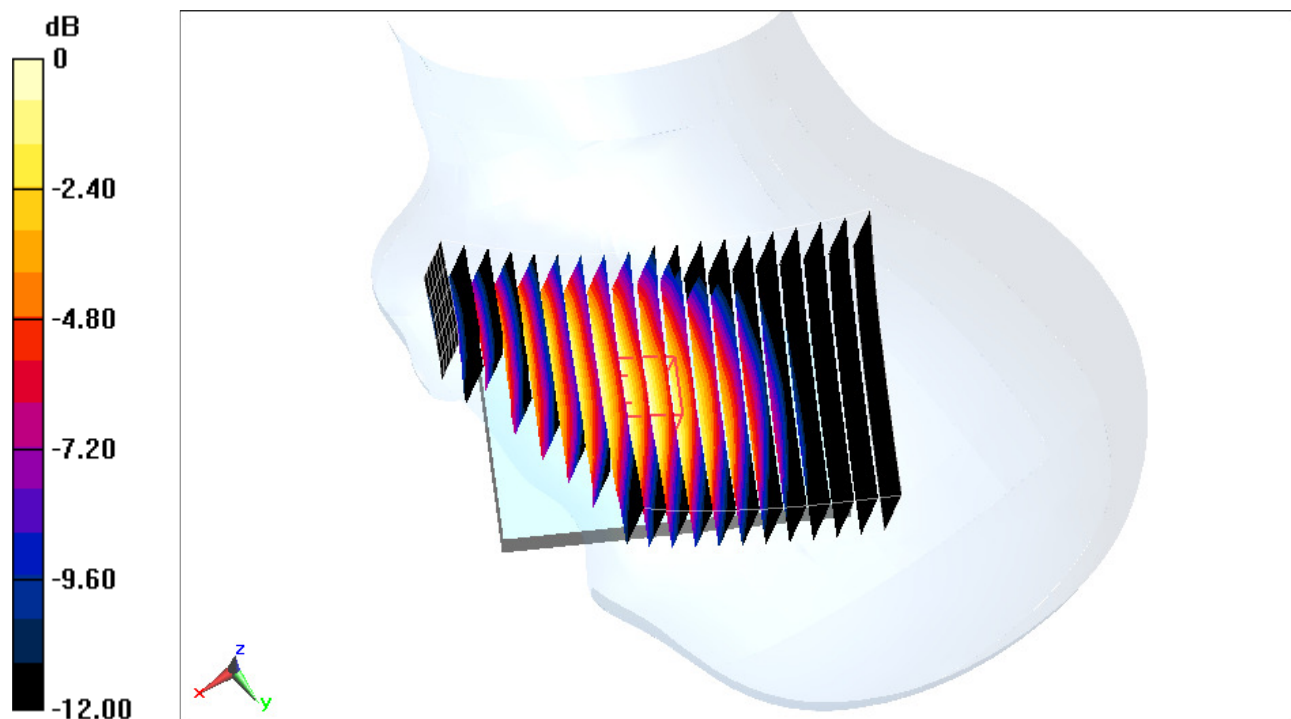
**Mode: Cell. CDMA - FCC Rule Part 90S, Left Head, Touch, Mid.ch**

**Zoom Scan (13x19x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 6.459 V/m; Power Drift = -0.087 dB

Peak SAR (extrapolated) = 0.689 mW/g

**SAR(1 g) = 0.540 mW/g; SAR(10 g) = 0.414 mW/g**



0 dB = 0.566 mW/g = -4.94 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 242**

Communication System: LTE Band 25; Frequency: 1852.5 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1852.5 \text{ MHz}$ ;  $\sigma = 1.36 \text{ mho/m}$ ;  $\epsilon_r = 38.398$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-14-2012; Ambient Temp: 22.6°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3288; ConvF(5.16, 5.16, 5.16); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (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)

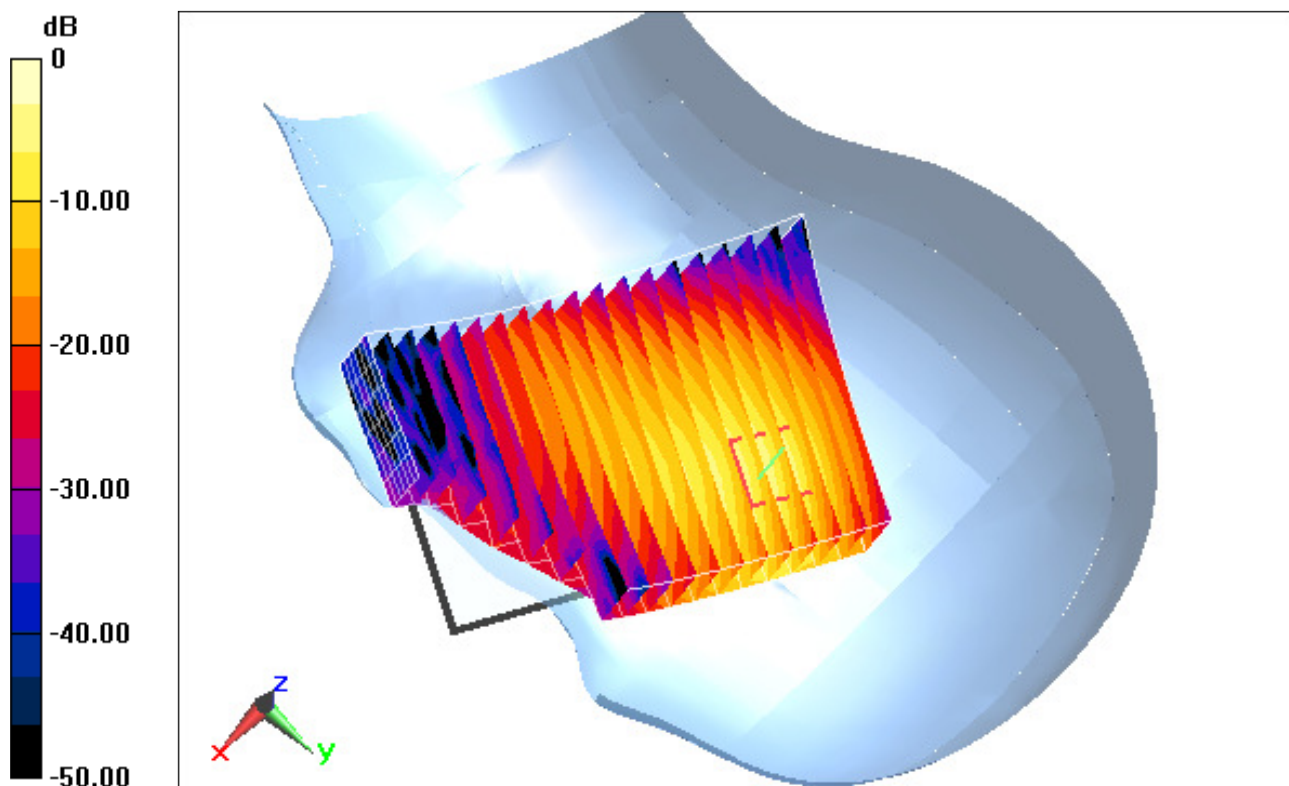
**Mode: LTE Band 25 (PCS) - FCC Rule Part 24E, Left Head, Touch, Low Ch  
10 MHz BW, QPSK, 1 RB, 0 RB Offset**

**Zoom Scan (13x19x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 17.029 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 1.523 mW/g

**SAR(1 g) = 0.949 mW/g; SAR(10 g) = 0.524 mW/g**



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

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFLS970; Type: Portable Handset; Serial: 257**

Communication System: IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$ ;  $\sigma = 1.83 \text{ mho/m}$ ;  $\epsilon_r = 40.739$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 06-15-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3287; ConvF(4.44, 4.44, 4.44); Calibrated: 2/7/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 2/10/2012

Phantom: SAM Front; Type: SAM; Serial: 1688

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

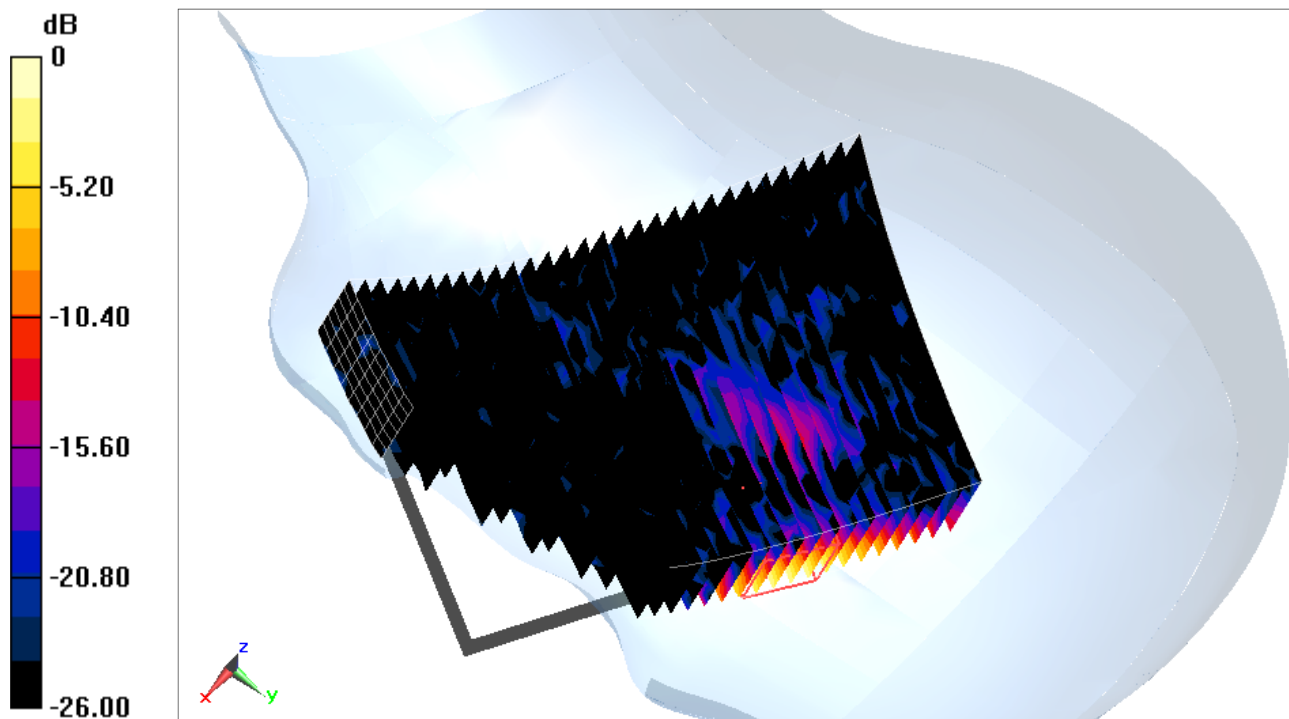
**Mode: IEEE 802.11b - FCC Rule Part 15C, Left Head, Touch, Ch 01, 1 Mbps**

**Zoom Scan (20x30x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 1.978 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.696 mW/g

**SAR(1 g) = 0.040 mW/g; SAR(10 g) = 0.019 mW/g**



# PCTEST ENGINEERING LABORATORY, INC.

## DUT: ZNFLS970; Type: Portable Handset

Communication System: IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$ ;  $\sigma = 1.83 \text{ mho/m}$ ;  $\epsilon_r = 40.739$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Communication System: CDMA; Frequency: 820.1 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 820.1 \text{ MHz}$ ;  $\sigma = 0.889 \text{ mho/m}$ ;  $\epsilon_r = 39.988$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Communication System: LTE Band 25; Frequency: 1852.5 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

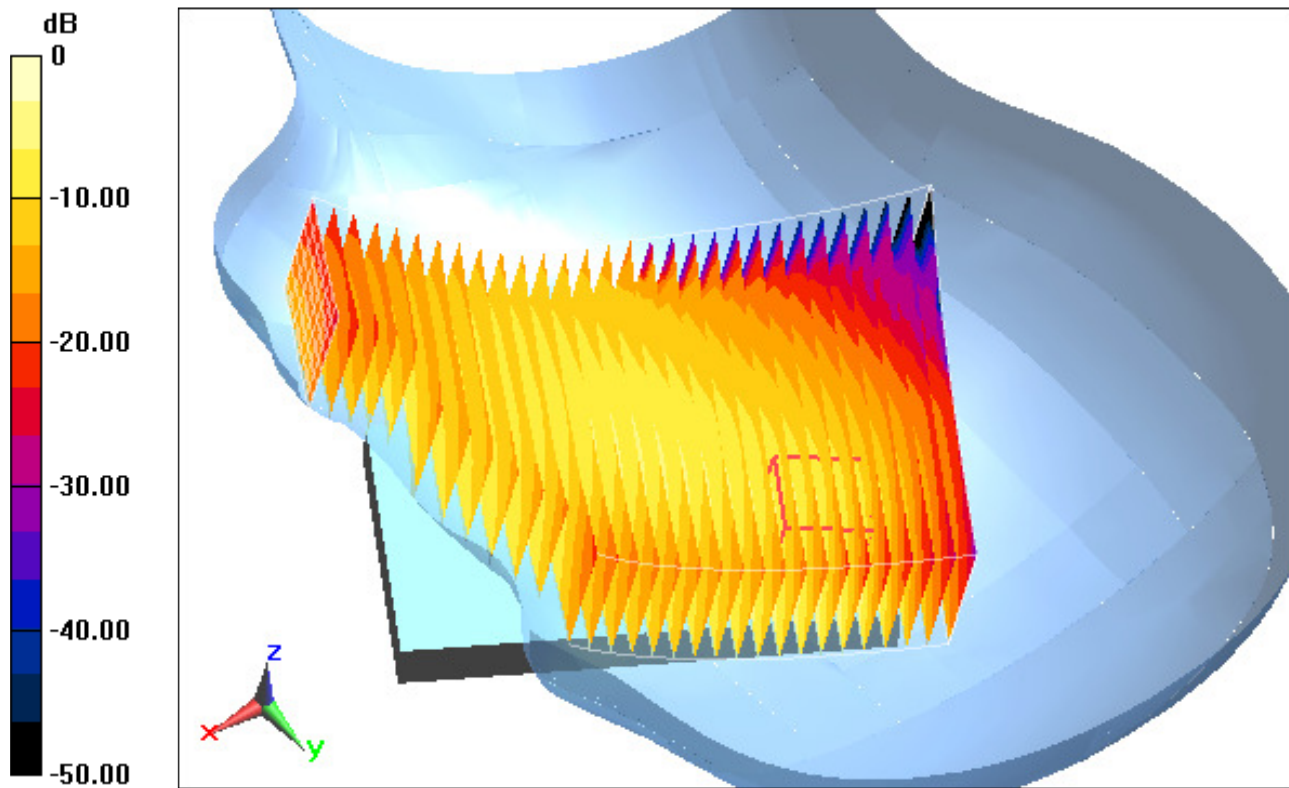
$f = 1852.5 \text{ MHz}$ ;  $\sigma = 1.36 \text{ mho/m}$ ;  $\epsilon_r = 38.398$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

### Multi Band Result:

**SAR(1 g) = 0.973 mW/g; SAR(10 g) = 0.572 mW/g**

Maximum value of SAR (interpolated) = 1.55 mW/g



0 dB = 1.55 mW/g = 3.81 dB mW/g

## APPENDIX B: SYSTEM VERIFICATION



# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.919 \text{ mho/m}$ ;  $\epsilon_r = 41.49$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

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

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 835MHz System Verification

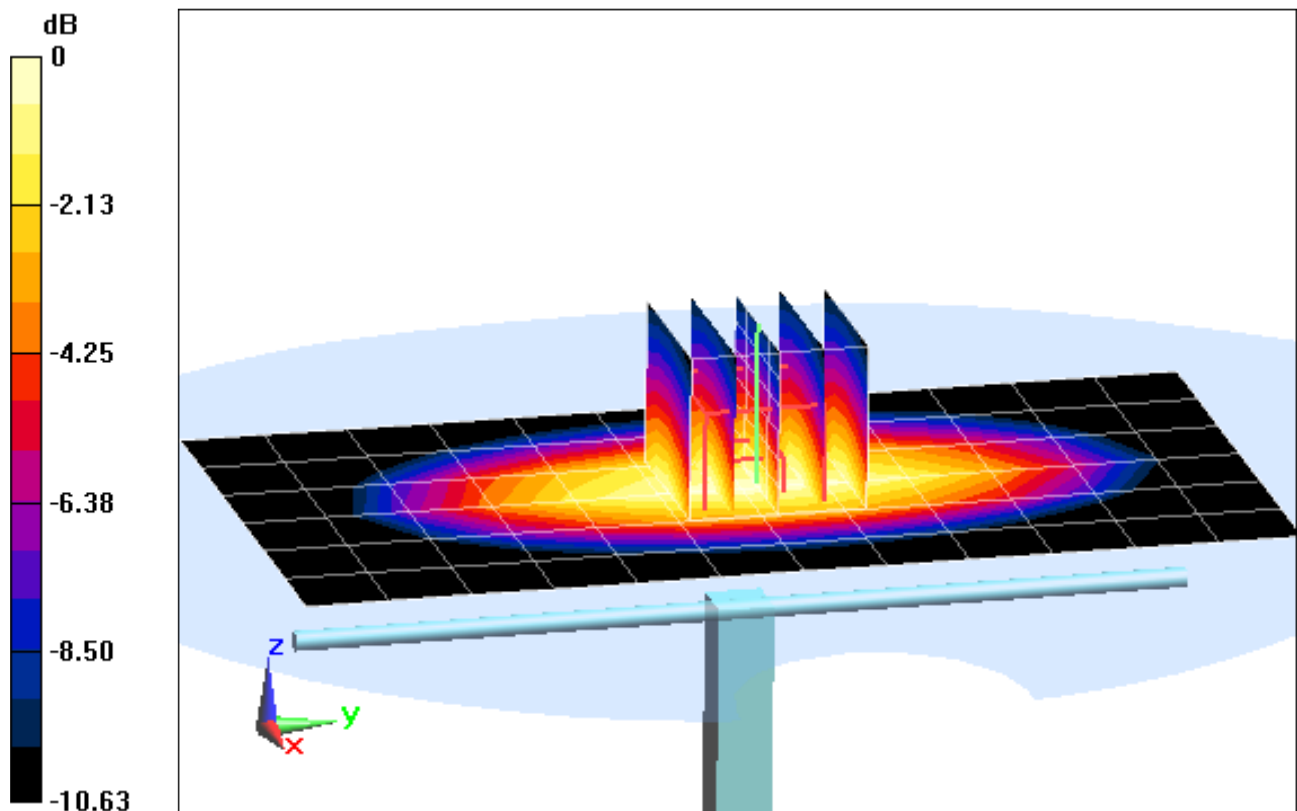
**Area Scan (7x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Input Power = 20 dBm (100 mW)

**SAR(1 g) = 0.991 mW/g; SAR(10 g) = 0.646 mW/g**

Deviation = 5.20%



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

# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.919 \text{ mho/m}$ ;  $\epsilon_r = 41.49$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

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

Probe: ES3DV3 - SN3258; ConvF(6.01, 6.01, 6.01); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 835MHz System Verification

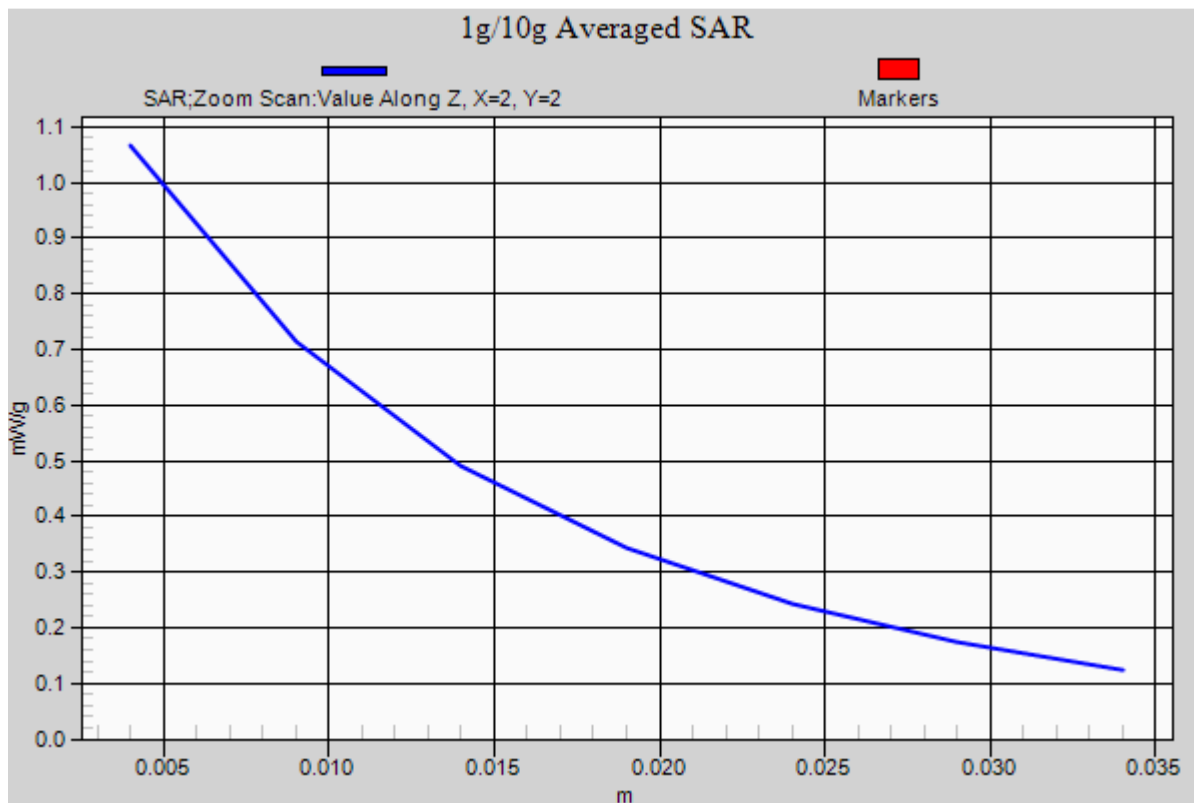
**Area Scan (7x13x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm (100 mW)

**SAR(1 g) = 0.991 mW/g; SAR(10 g) = 0.646 mW/g**

Deviation = 5.20%



# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.904 \text{ mho/m}$ ;  $\epsilon_r = 39.71$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-14-2012; Ambient Temp: 22.7°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN3561; ConvF(8.07, 8.07, 8.07); Calibrated: 7/27/2011;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

## 835 MHz System Verification

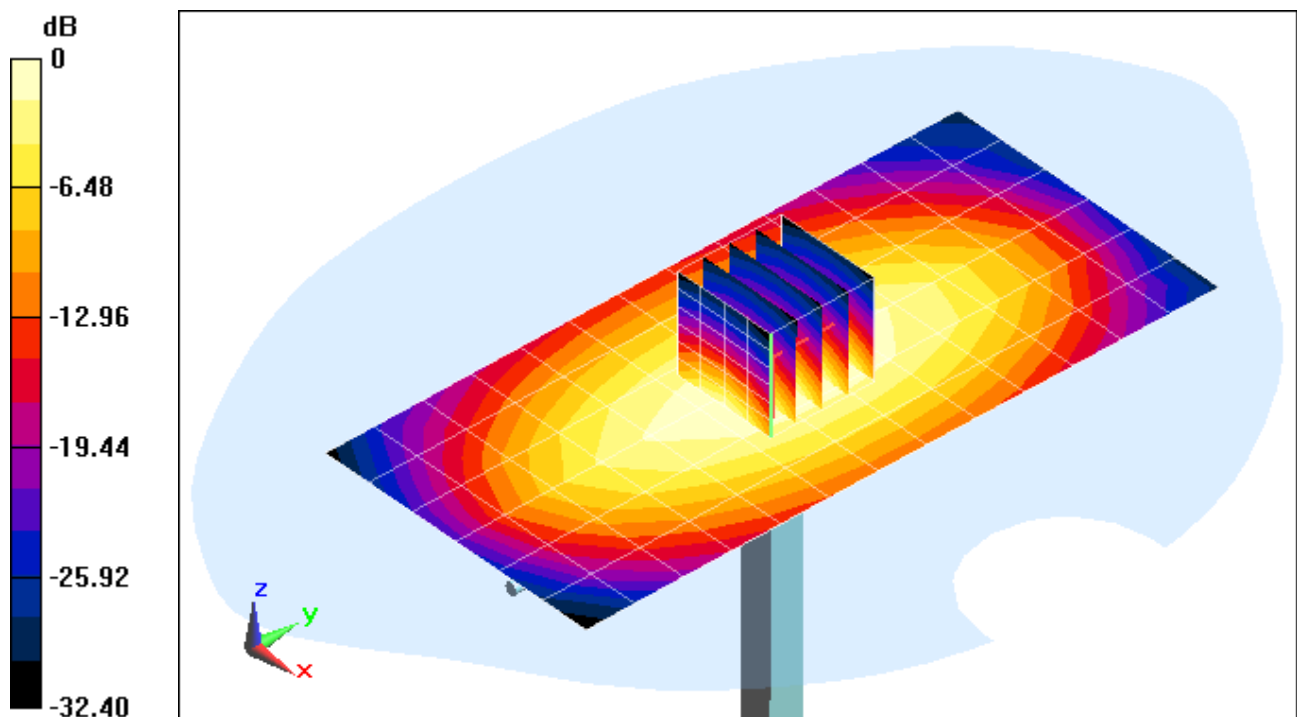
**Area Scan (7x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Input Power: 20.0 dBm (100 mW)

**SAR(1 g) = 0.965 mW/g; SAR(10 g) = 0.629 mW/g**

Deviation: 2.55%



0 dB = 1.01 mW/g = 0.08 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.904 \text{ mho/m}$ ;  $\epsilon_r = 39.71$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-14-2012; Ambient Temp: 22.7°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN3561; ConvF(8.07, 8.07, 8.07); Calibrated: 7/27/2011;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 4/12/2012

Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

## 835 MHz System Verification

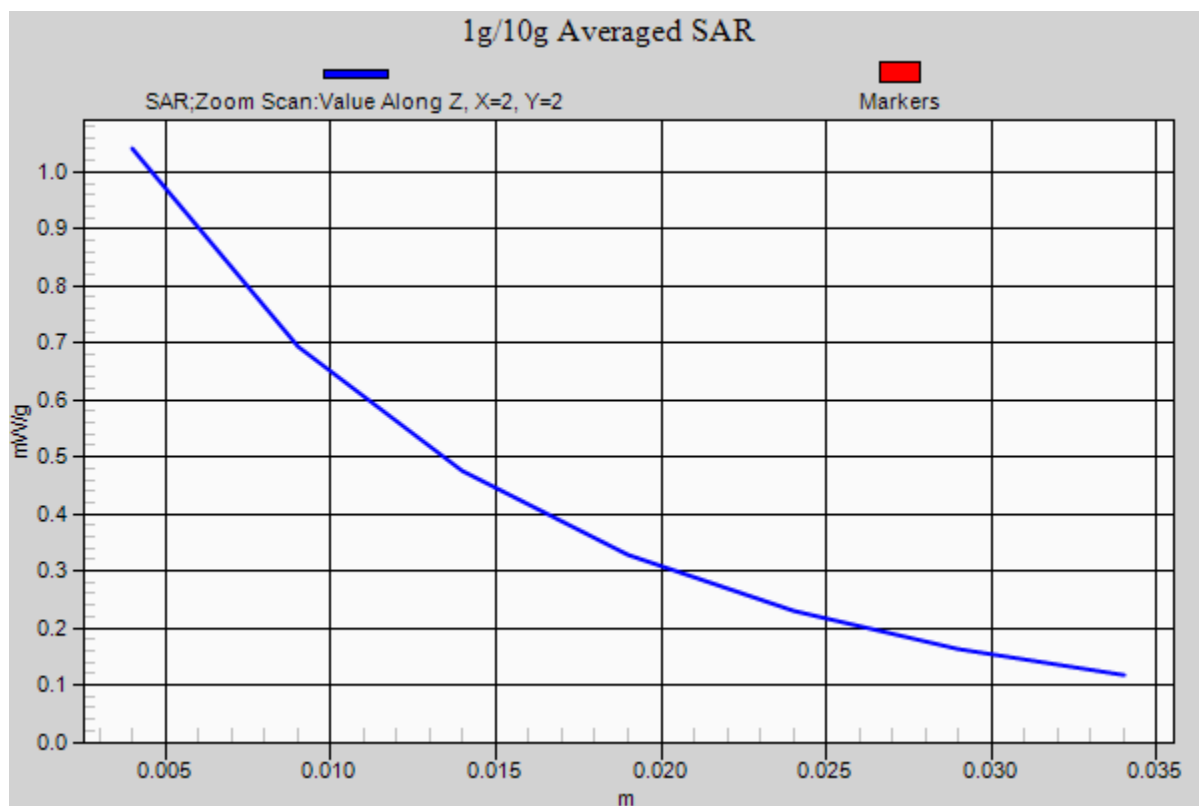
**Area Scan (7x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Input Power: 20.0 dBm (100 mW)

**SAR(1 g) = 0.965 mW/g; SAR(10 g) = 0.629 mW/g**

Deviation: 2.55%



# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.448 \text{ mho/m}$ ;  $\epsilon_r = 38.52$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 1900MHz System Verification

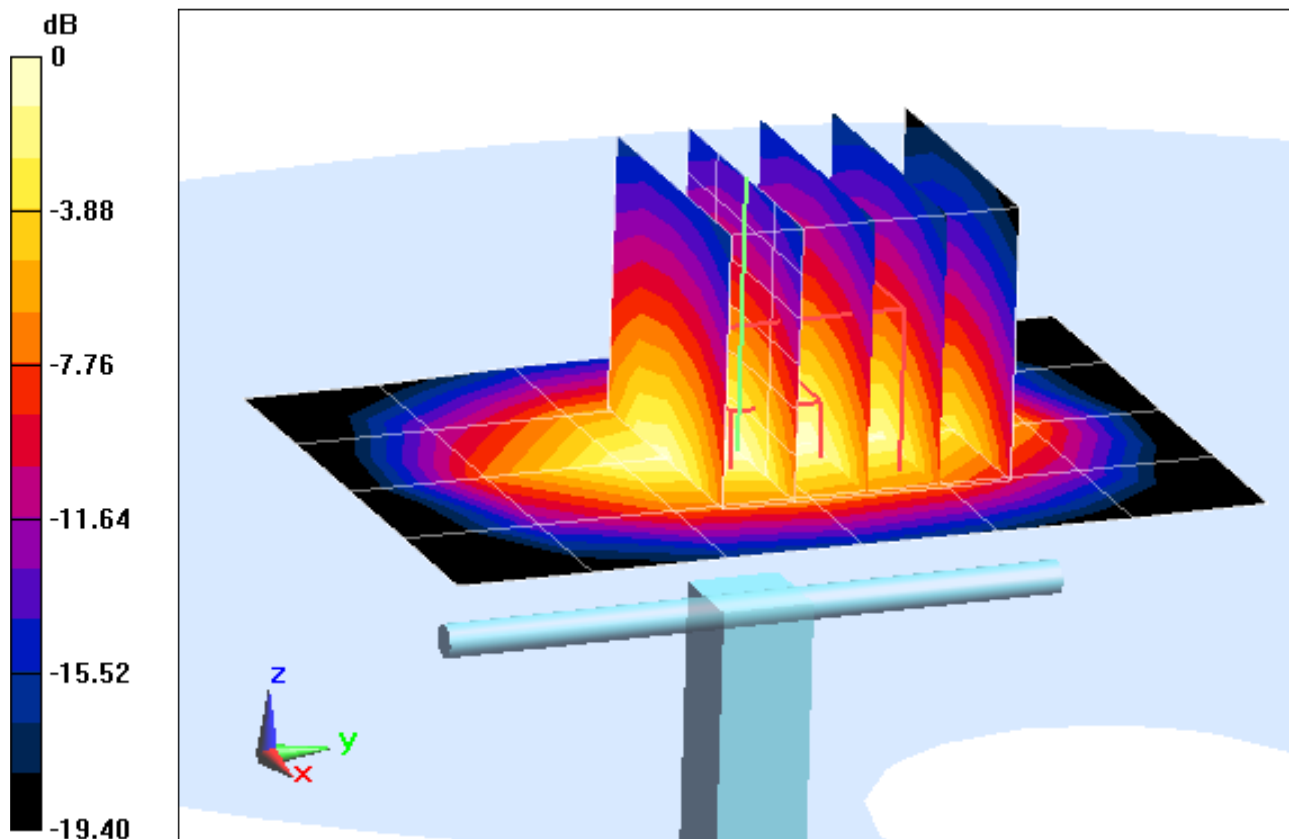
**Area Scan (5x7x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Input Power = 20 dBm (100 mW)

**SAR(1 g) = 4.1 mW/g; SAR(10 g) = 2.13 mW/g**

Deviation = 2.76%



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

# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.448 \text{ mho/m}$ ;  $\epsilon_r = 38.52$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3209; ConvF(5.15, 5.15, 5.15); Calibrated: 3/16/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 1900MHz System Verification

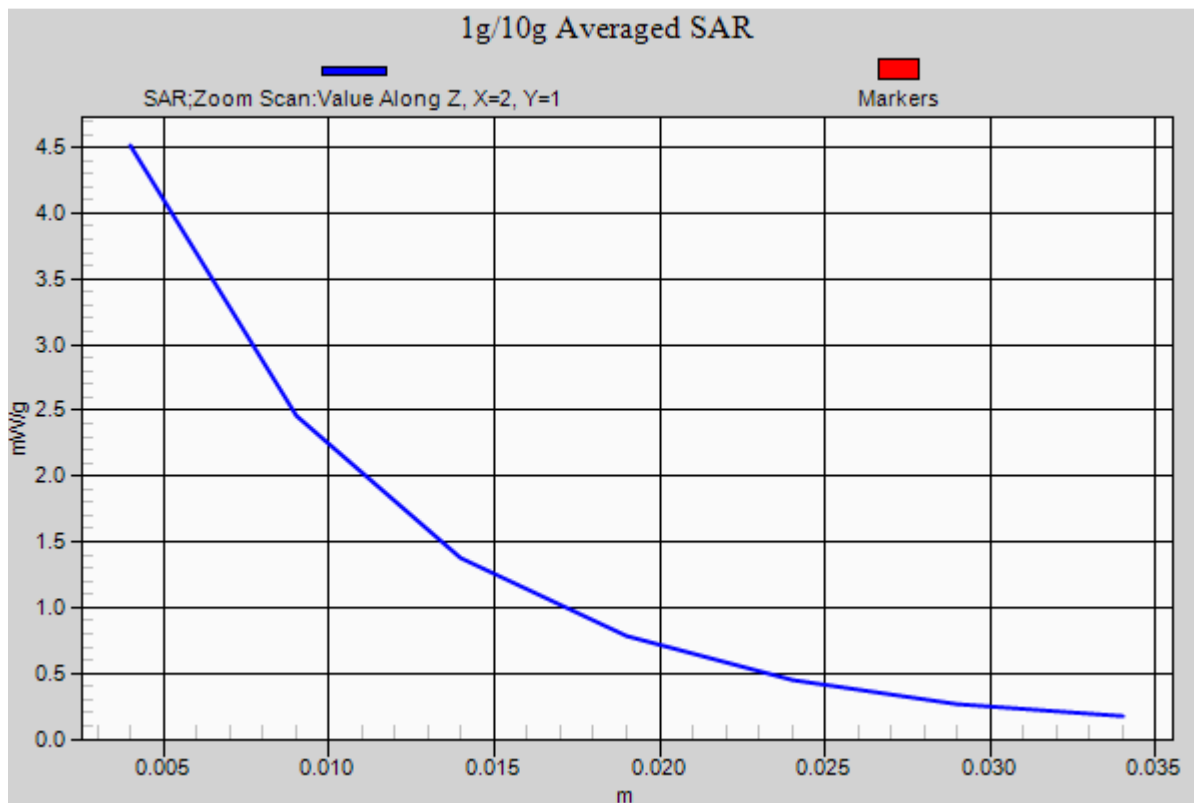
**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm (100 mW)

**SAR(1 g) = 4.1 mW/g; SAR(10 g) = 2.13 mW/g**

Deviation = 2.76%



# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.442 \text{ mho/m}$ ;  $\epsilon_r = 39.307$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-11-2012; Ambient Temp: 22.9°C; Tissue Temp: 21.6°C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011;

Sensor-Surface: 4mm (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)

## 1900MHz System Verification

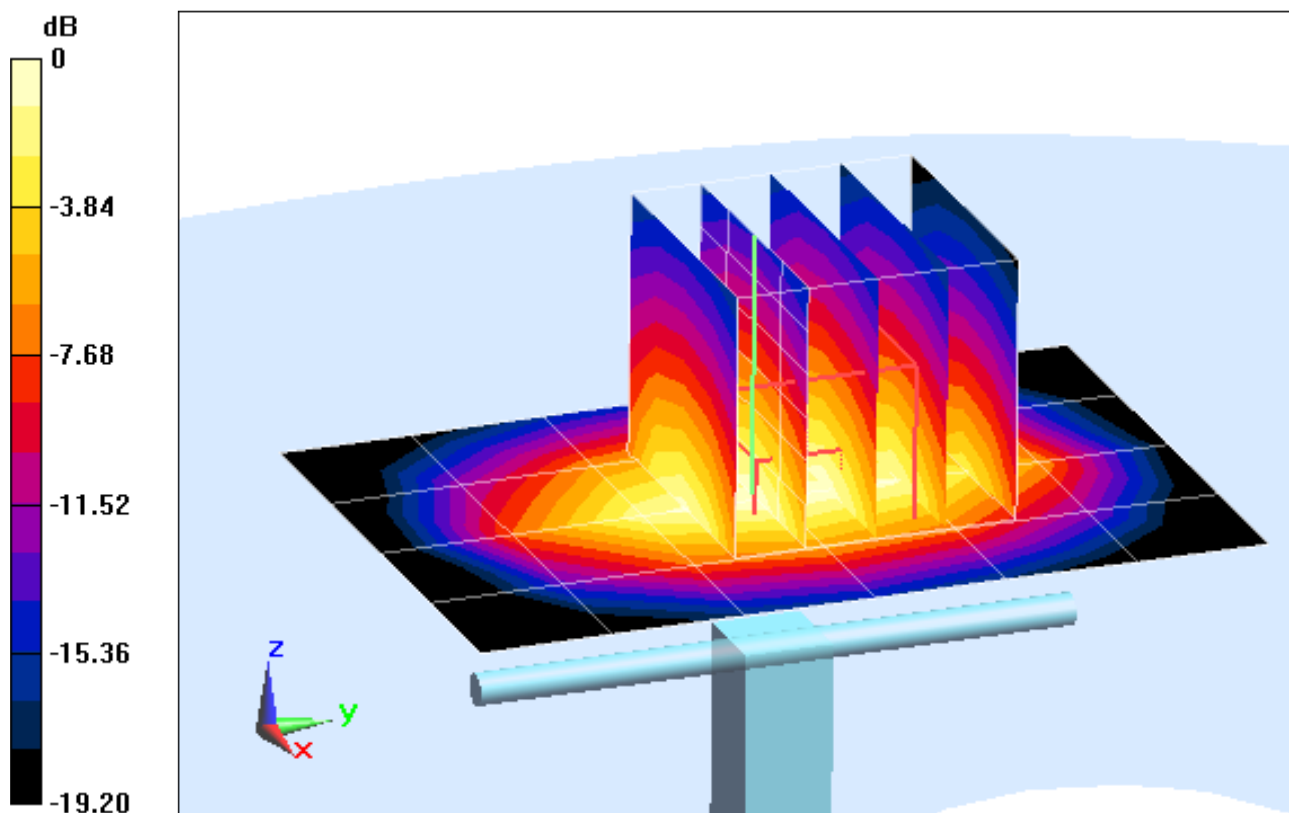
**Area Scan (5x7x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Input Power = 20 dBm (100 mW)

**SAR(1 g) = 3.91 mW/g; SAR(10 g) = 2.05 mW/g**

Deviation = -2.01%



0 dB = 4.32 mW/g = 12.71 dB mW/g



# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.442 \text{ mho/m}$ ;  $\epsilon_r = 39.307$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-11-2012; Ambient Temp: 22.9°C; Tissue Temp: 21.6°C

Probe: ES3DV2 - SN3022; ConvF(4.98, 4.98, 4.98); Calibrated: 8/25/2011;

Sensor-Surface: 4mm (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)

## 1900MHz System Verification

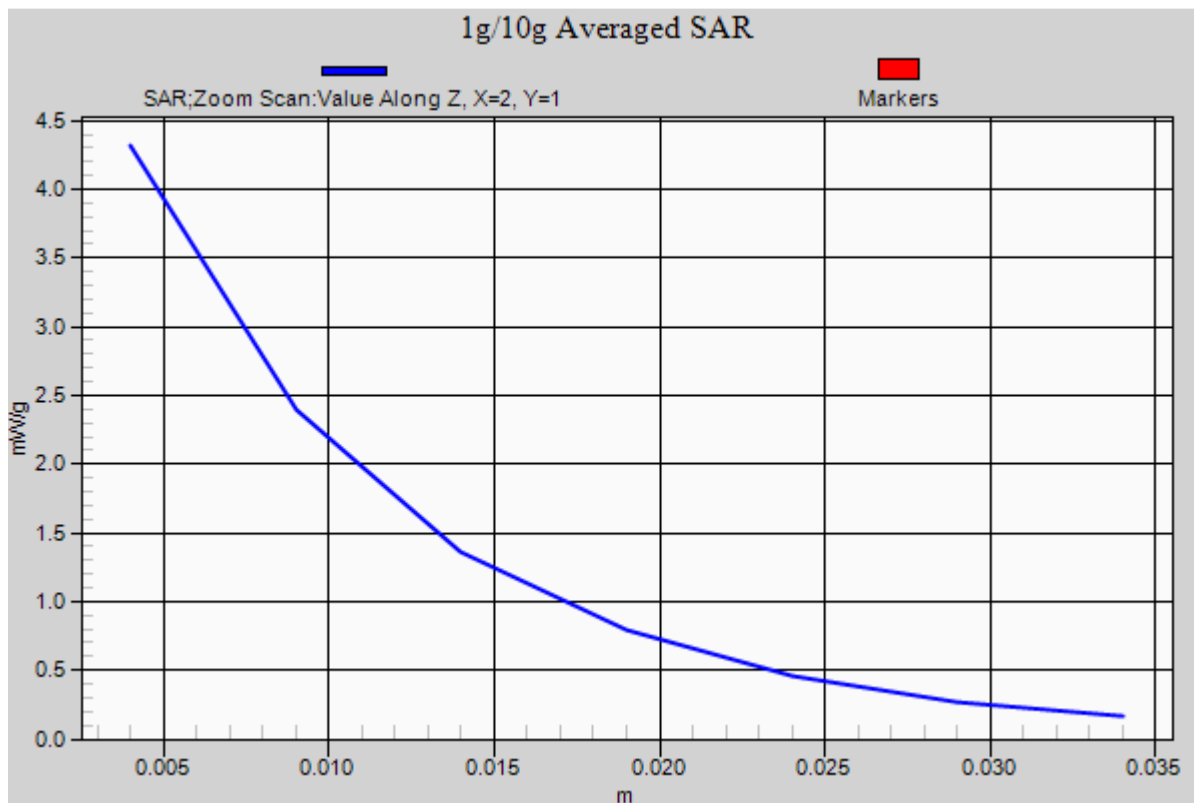
**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20 dBm (100 mW)

**SAR(1 g) = 3.91 mW/g; SAR(10 g) = 2.05 mW/g**

Deviation = -2.01%



# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head; Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.413 \text{ mho/m}$ ;  $\epsilon_r = 38.18$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-14-2012; Ambient Temp: 22.6°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3288; ConvF(5.16, 5.16, 5.16); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (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)

## 1900 MHz System Verification

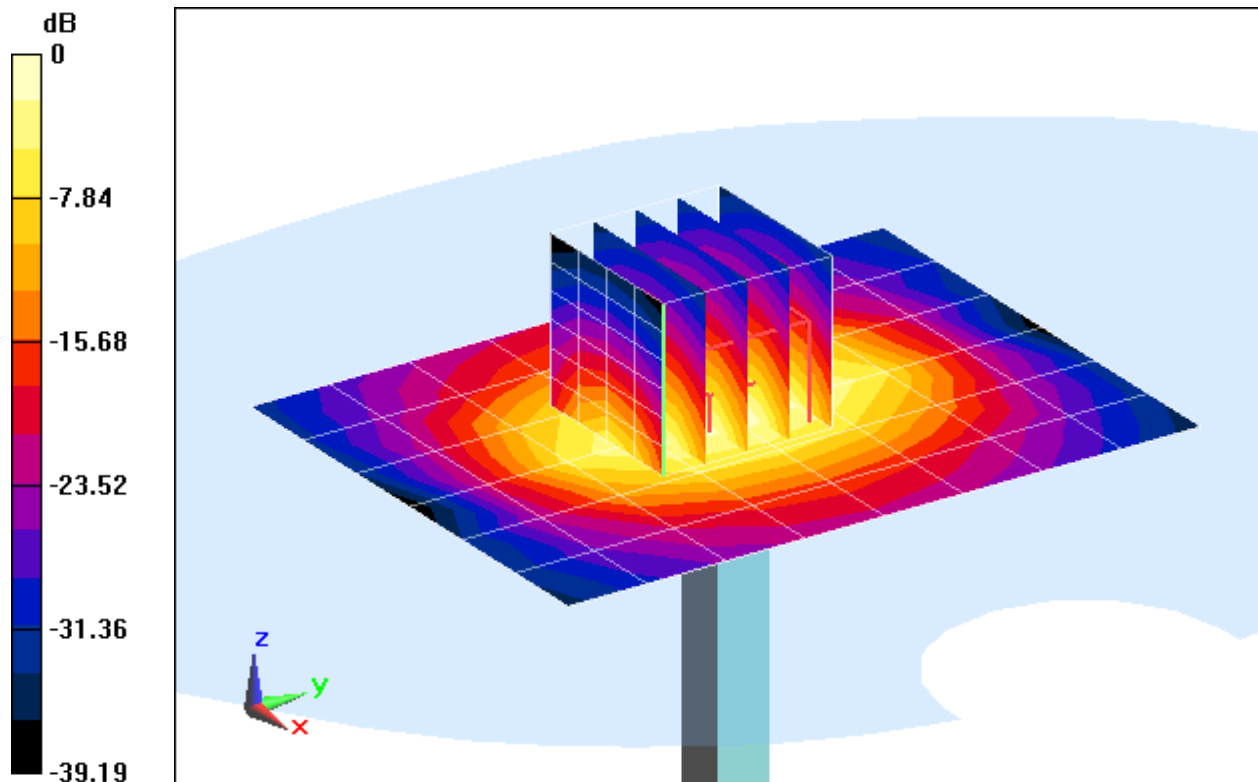
**Area Scan (7x9x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Input Power = 20.0 dBm (100 mW)

**SAR(1 g) = 3.93 mW/g; SAR(10 g) = 2.03 mW/g**

Deviation = 0.00%



0 dB = 4.36 mW/g = 12.79 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head; Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.413 \text{ mho/m}$ ;  $\epsilon_r = 38.18$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-14-2012; Ambient Temp: 22.6°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3288; ConvF(5.16, 5.16, 5.16); Calibrated: 2/7/2012;

Sensor-Surface: 4mm (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)

## 1900 MHz System Verification

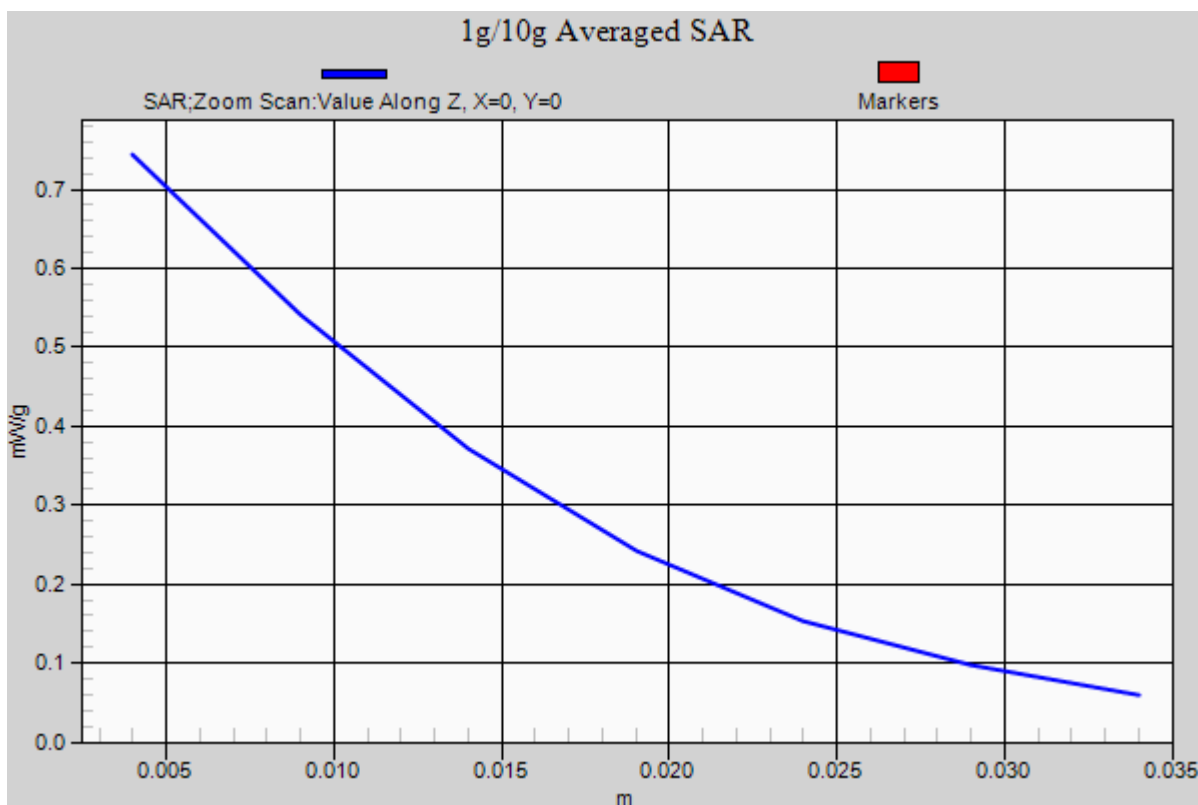
**Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power = 20.0 dBm (100 mW)

**SAR(1 g) = 3.93 mW/g; SAR(10 g) = 2.03 mW/g**

Deviation = 0.00%



# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.867 \text{ mho/m}$ ;  $\epsilon_r = 38.08$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-13-2012; Ambient Temp: 22.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(4.46, 4.46, 4.46); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 2450MHz System Verification

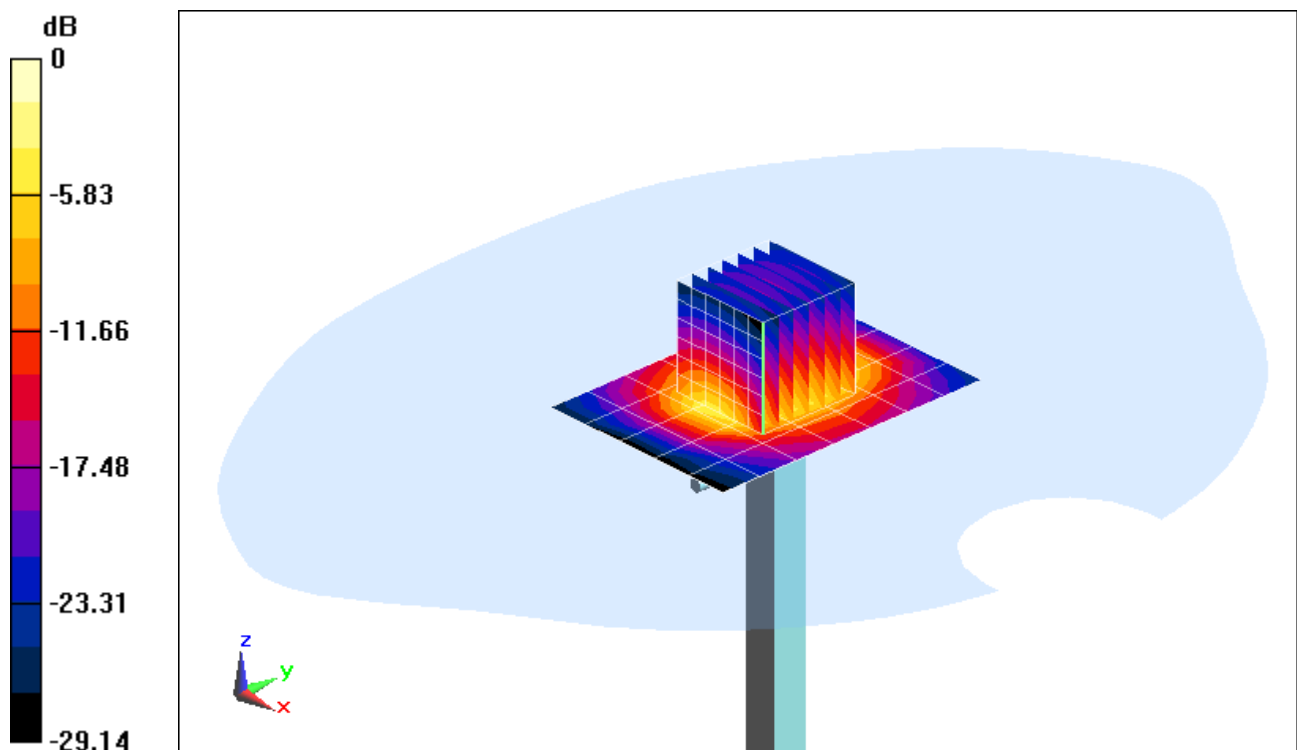
**Area Scan (6x8x1):** Measurement grid:  $dx=12\text{mm}$ ,  $dy=12\text{mm}$

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Input Power: 20.0 dBm (100 mW)

**SAR(1 g) = 5.36 mW/g; SAR(10 g) = 2.52 mW/g**

Deviation: 2.88%



0 dB = 6.60 mW/g = 16.39 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.867 \text{ mho/m}$ ;  $\epsilon_r = 38.08$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-13-2012; Ambient Temp: 22.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(4.46, 4.46, 4.46); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 2450MHz System Verification

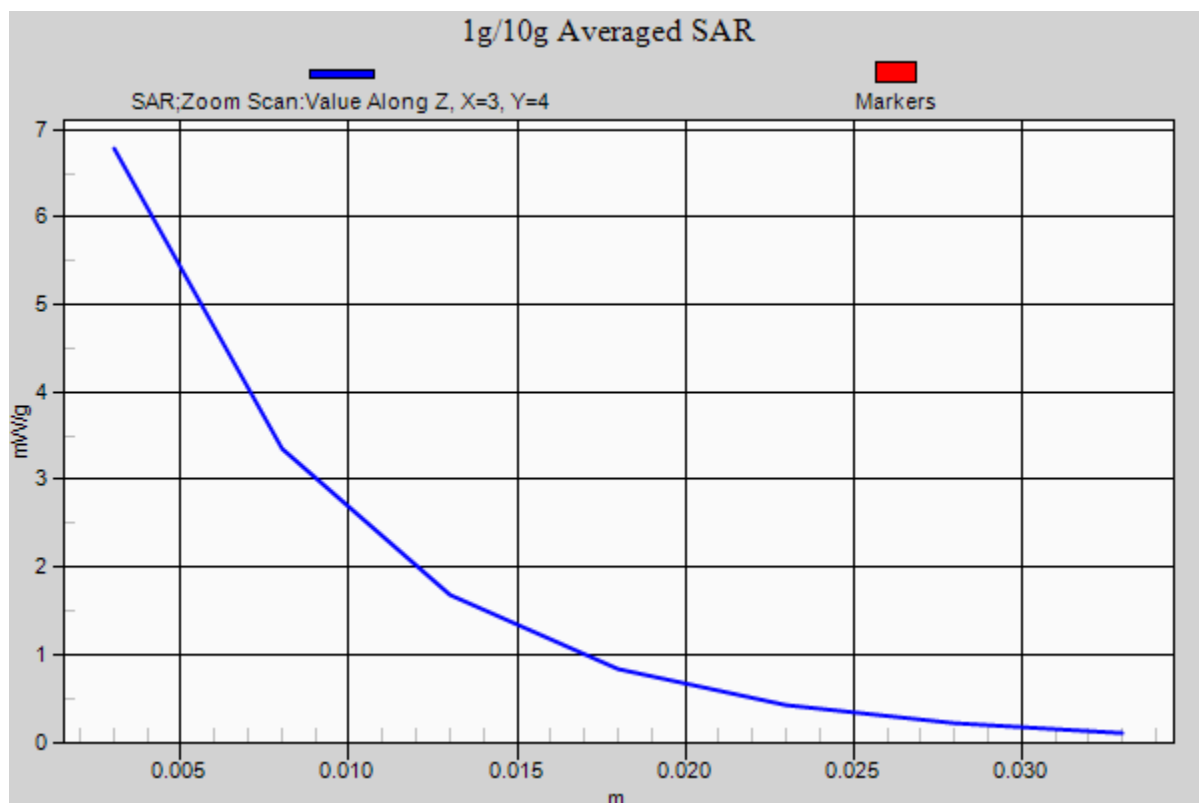
**Area Scan (6x8x1):** Measurement grid: dx=12mm, dy=12mm

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

**SAR(1 g) = 5.36 mW/g; SAR(10 g) = 2.52 mW/g**

Deviation: 2.88%



# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.873 \text{ mho/m}$ ;  $\epsilon_r = 40.63$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-15-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3287; ConvF(4.44, 4.44, 4.44); Calibrated: 2/7/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 2/10/2012

Phantom: SAM Front; Type: SAM; Serial: 1688

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

## 2450 MHz System Verification

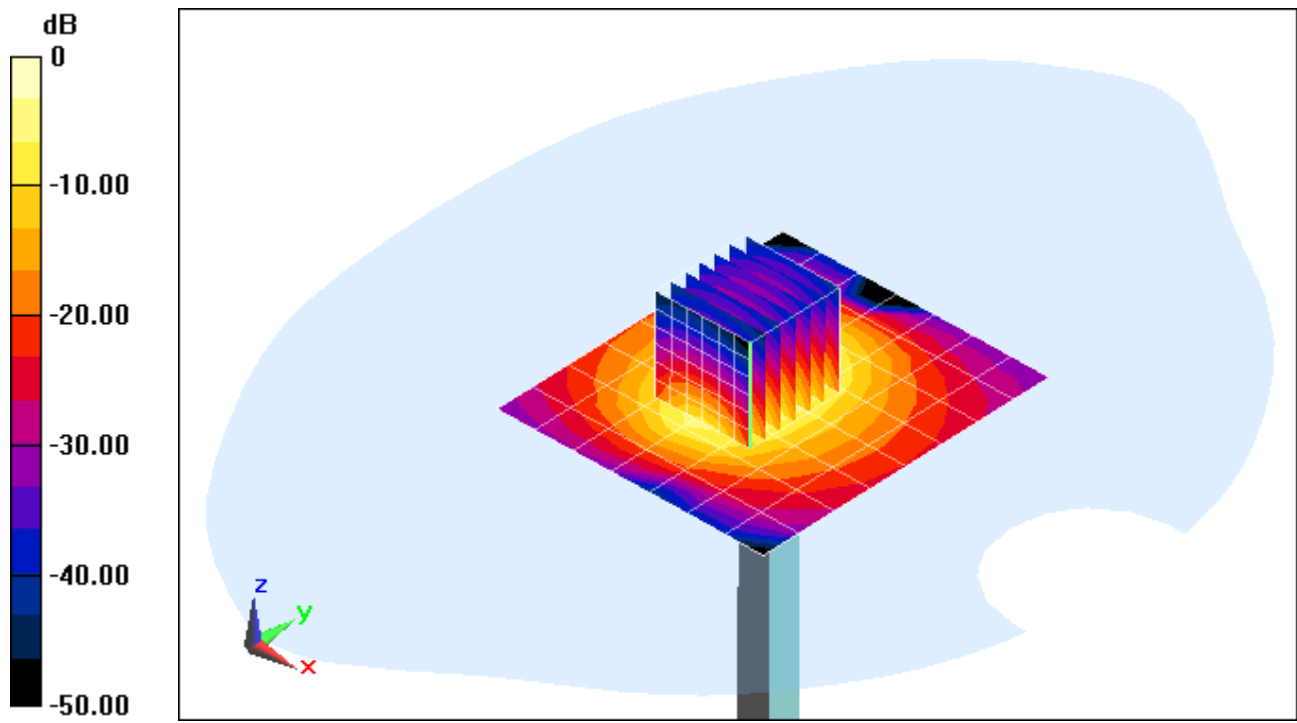
**Area Scan (8x9x1):** Measurement grid:  $dx=12\text{mm}$ ,  $dy=12\text{mm}$

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Input Power: 20.0 dBm (100 mW)

**SAR(1 g) = 5.34 mW/g; SAR(10 g) = 2.42 mW/g**

Deviation: -0.19%



# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.873 \text{ mho/m}$ ;  $\epsilon_r = 40.63$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-15-2012; Ambient Temp: 22.8°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3287; ConvF(4.44, 4.44, 4.44); Calibrated: 2/7/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 2/10/2012

Phantom: SAM Front; Type: SAM; Serial: 1688

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

## 2450 MHz System Verification

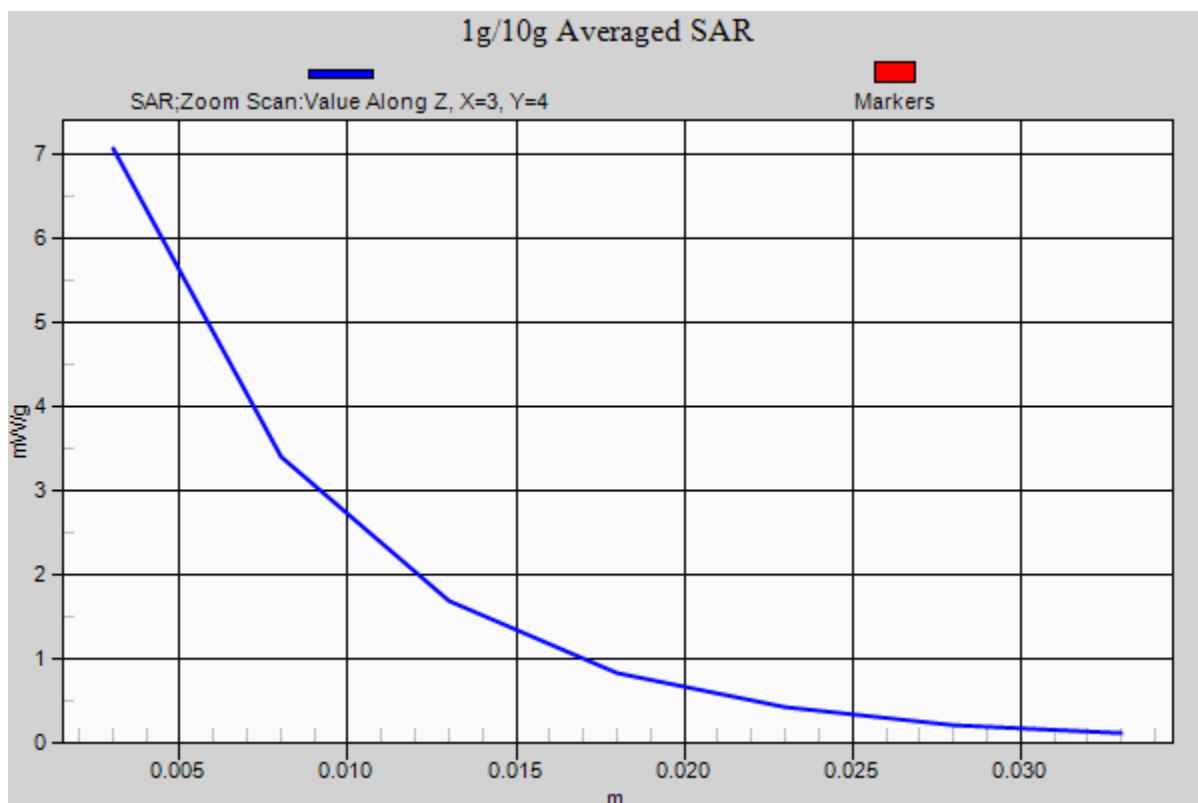
**Area Scan (8x9x1):** Measurement grid:  $dx=12\text{mm}$ ,  $dy=12\text{mm}$

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Input Power: 20.0 dBm (100 mW)

**SAR(1 g) = 5.34 mW/g; SAR(10 g) = 2.42 mW/g**

Deviation: -0.19%





# PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Head Medium parameters used:

$f = 5200 \text{ MHz}$ ;  $\sigma = 4.506 \text{ mho/m}$ ;  $\epsilon_r = 35.32$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-11-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN3589; ConvF(4.59, 4.59, 4.59); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 5200MHz System Verification

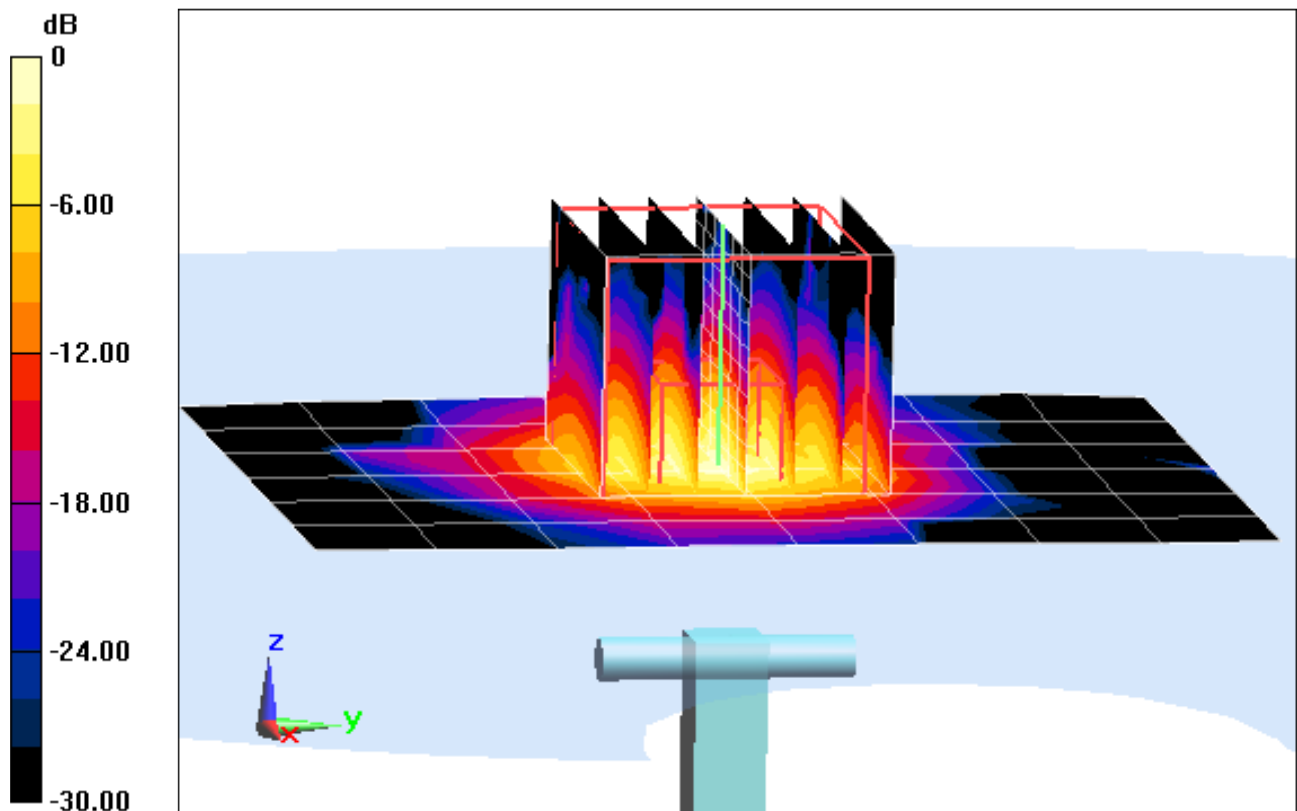
**Area Scan (7x9x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

**Zoom Scan (7x7x11)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Input Power = 13 dBm (20 mW)

**SAR(1 g) = 1.5 mW/g; SAR(10 g) = 0.408 mW/g**

Deviation = -5.18%



0 dB = 3.13 mW/g = 9.91 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: 5 GHz Head Medium parameters used:

$f = 5200 \text{ MHz}$ ;  $\sigma = 4.506 \text{ mho/m}$ ;  $\epsilon_r = 35.32$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-11-2012; Ambient Temp: 23.2°C; Tissue Temp: 22.1°C

Probe: EX3DV4 - SN3589; ConvF(4.59, 4.59, 4.59); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 5200MHz System Verification

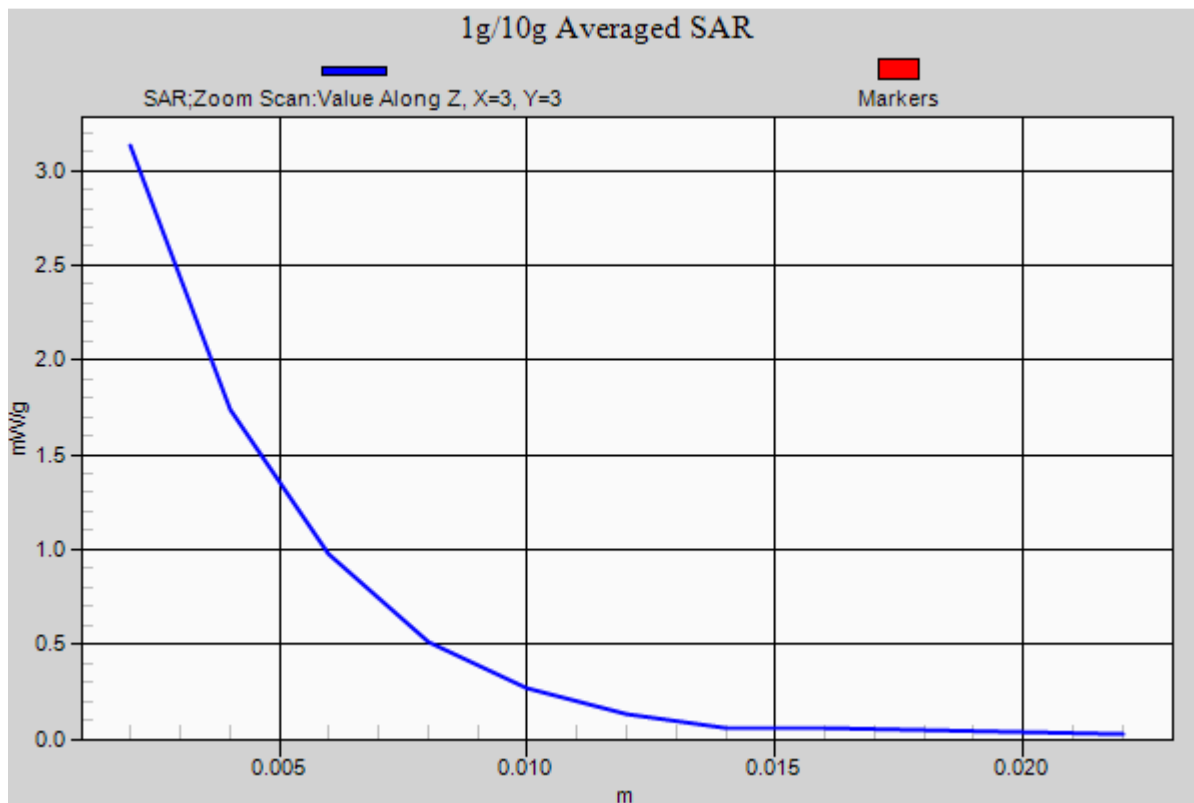
**Area Scan (7x9x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

**Zoom Scan (7x7x11)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Input Power = 13 dBm (20 mW)

**SAR(1 g) = 1.5 mW/g; SAR(10 g) = 0.408 mW/g**

Deviation = -5.18%



# PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Head Medium parameters used:

$f = 5500 \text{ MHz}$ ;  $\sigma = 4.783 \text{ mho/m}$ ;  $\epsilon_r = 34.93$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-11-2012; Ambient Temp: 23.5°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3589; ConvF(4.33, 4.33, 4.33); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 5500MHz System Verification

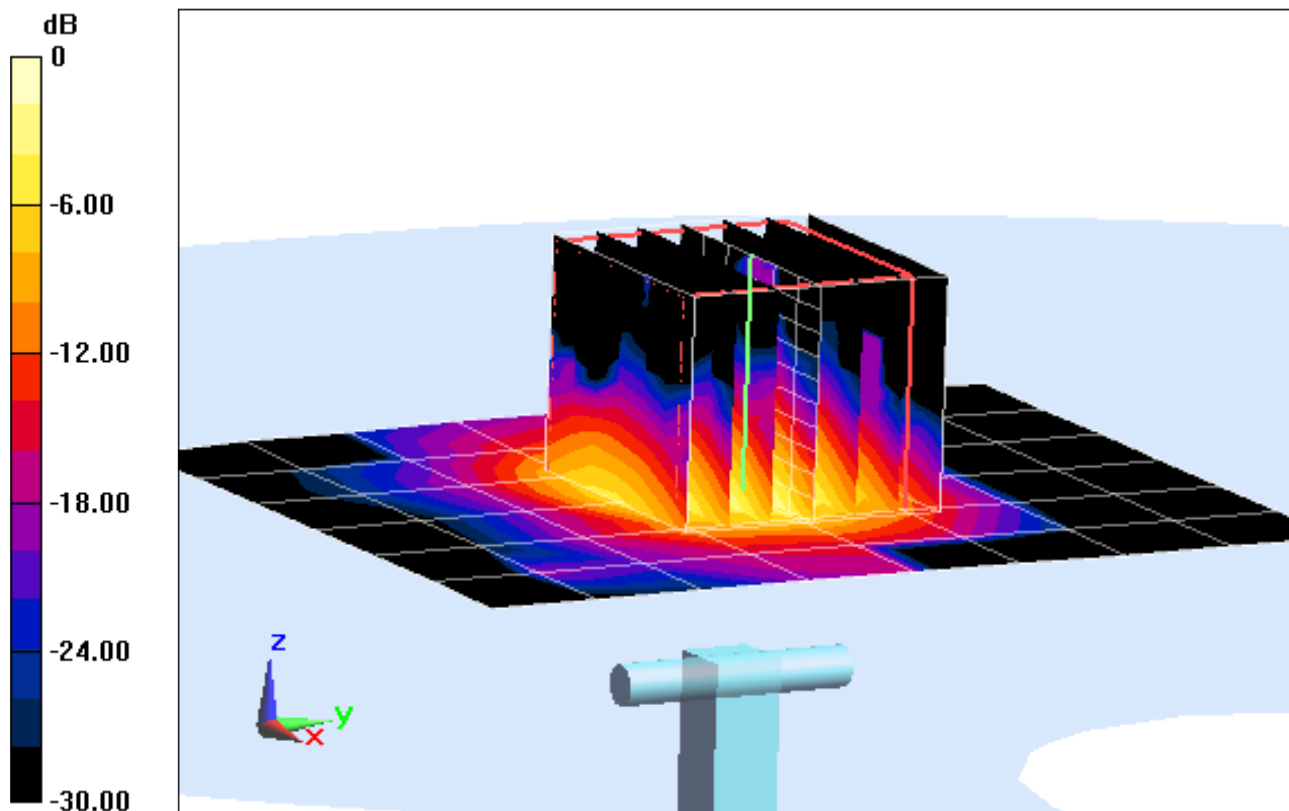
**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm

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

Input Power = 12.55 dBm (18 mW)

**SAR(1 g) = 1.51 mW/g; SAR(10 g) = 0.399 mW/g**

Deviation = -1.19%



0 dB = 3.04 mW/g = 9.66 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: 5 GHz Head Medium parameters used:

$f = 5500 \text{ MHz}$ ;  $\sigma = 4.783 \text{ mho/m}$ ;  $\epsilon_r = 34.93$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-11-2012; Ambient Temp: 23.5°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3589; ConvF(4.33, 4.33, 4.33); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 5500MHz System Verification

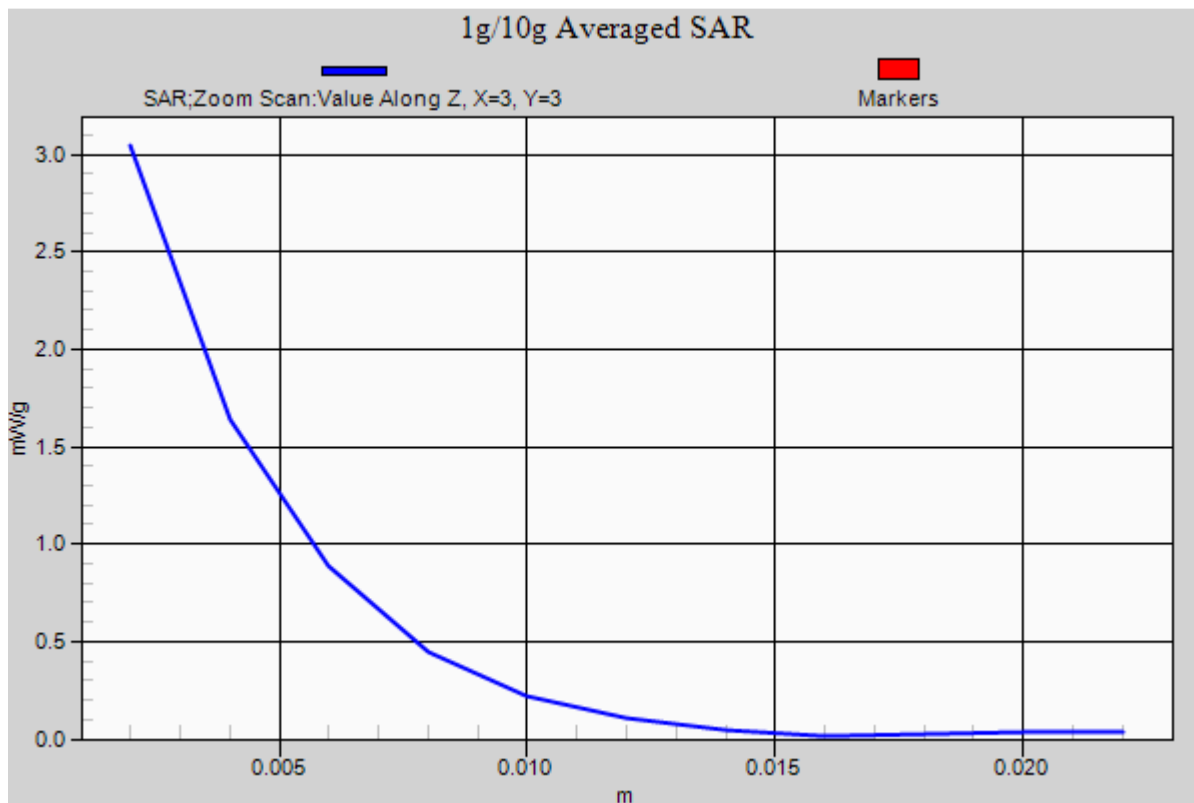
**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm

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

Input Power = 12.55 dBm (18 mW)

**SAR(1 g) = 1.51 mW/g; SAR(10 g) = 0.399 mW/g**

Deviation = -1.19%



# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used:

$f = 5800 \text{ MHz}$ ;  $\sigma = 5.054 \text{ mho/m}$ ;  $\epsilon_r = 34.48$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-11-2012; Ambient Temp: 23.6°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 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 5800MHz System Verification

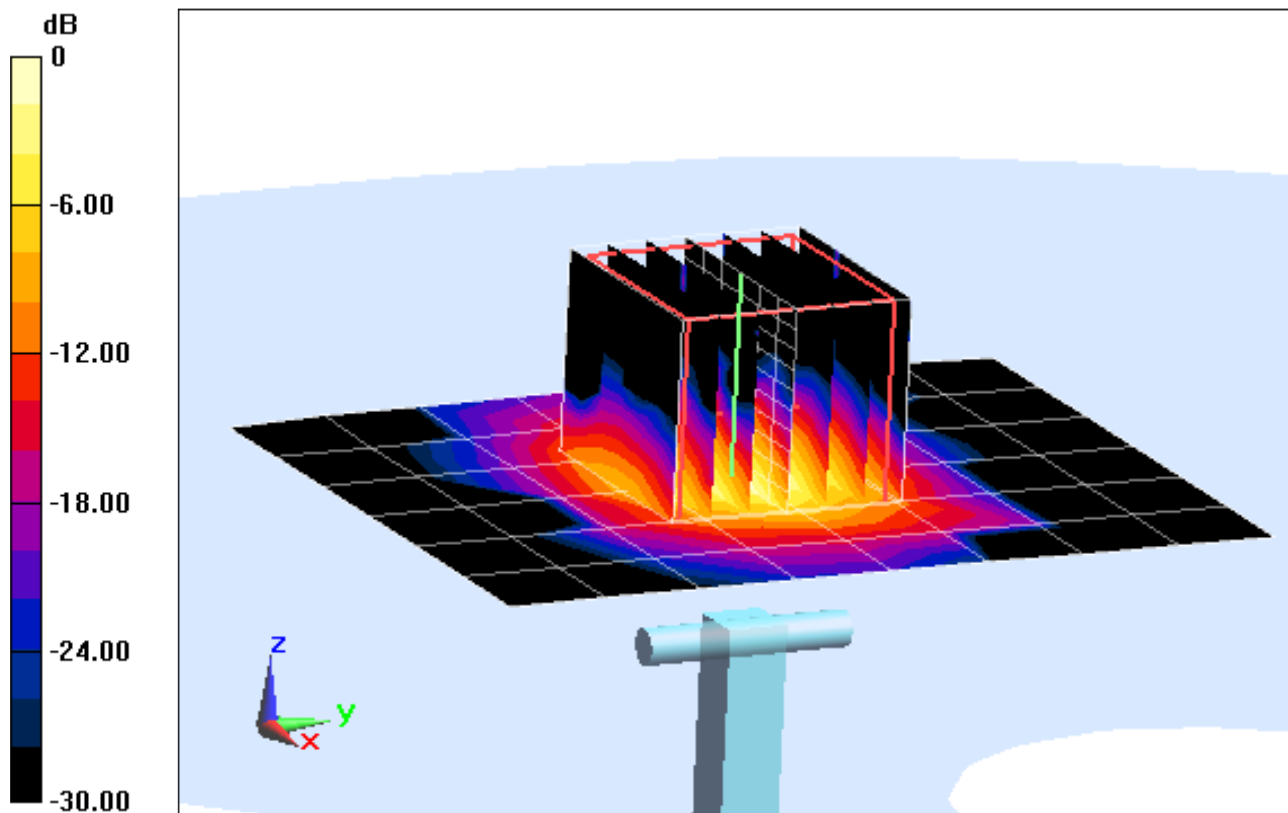
**Area Scan (7x9x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

**Zoom Scan (7x7x11)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$

Input Power = 12.79 dBm (19 mW)

**SAR(1 g) = 1.49 mW/g; SAR(10 g) = 0.392 mW/g**

Deviation = -1.36%



0 dB = 3.22 mW/g = 10.16 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: 5 GHz Head Medium parameters used:

$f = 5800 \text{ MHz}$ ;  $\sigma = 5.054 \text{ mho/m}$ ;  $\epsilon_r = 34.48$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-11-2012; Ambient Temp: 23.6°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 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 5800MHz System Verification

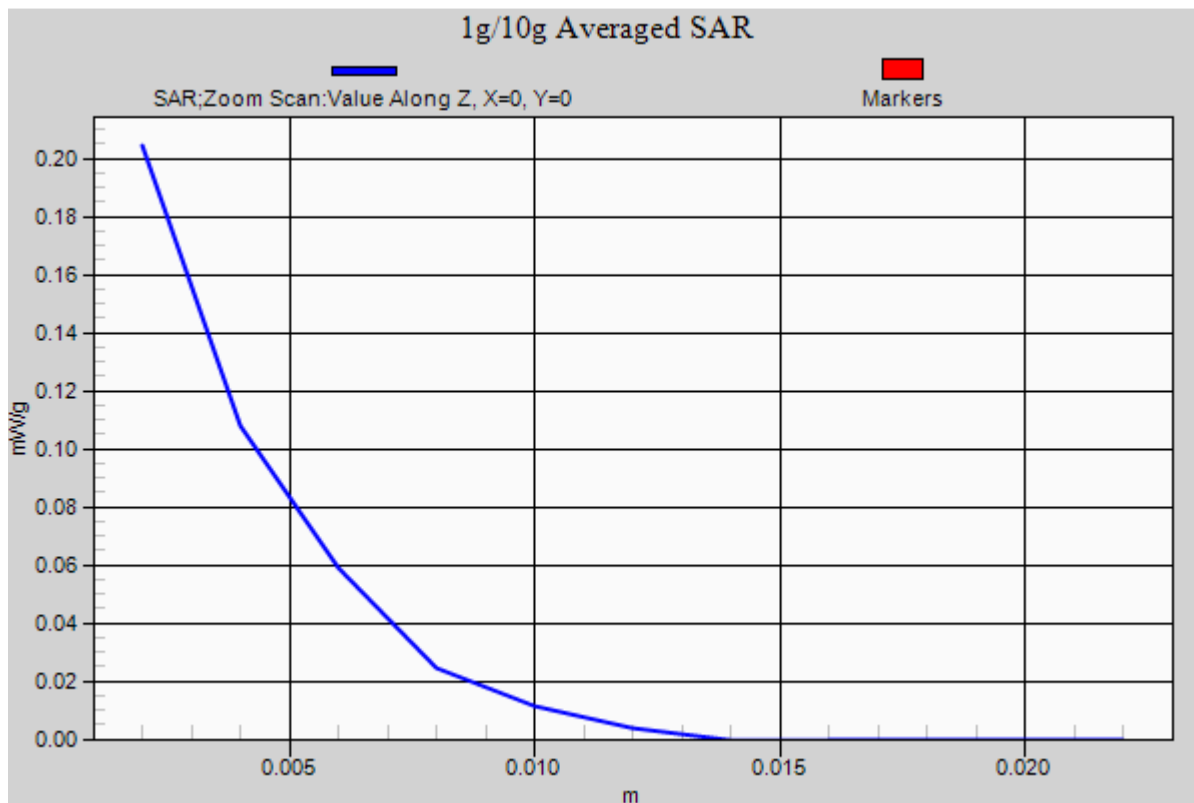
**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm

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

Input Power = 12.79 dBm (19 mW)

**SAR(1 g) = 1.49 mW/g; SAR(10 g) = 0.392 mW/g**

Deviation = -1.36%



# 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:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.998 \text{ mho/m}$ ;  $\epsilon_r = 53.05$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

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

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 835MHz System Verification

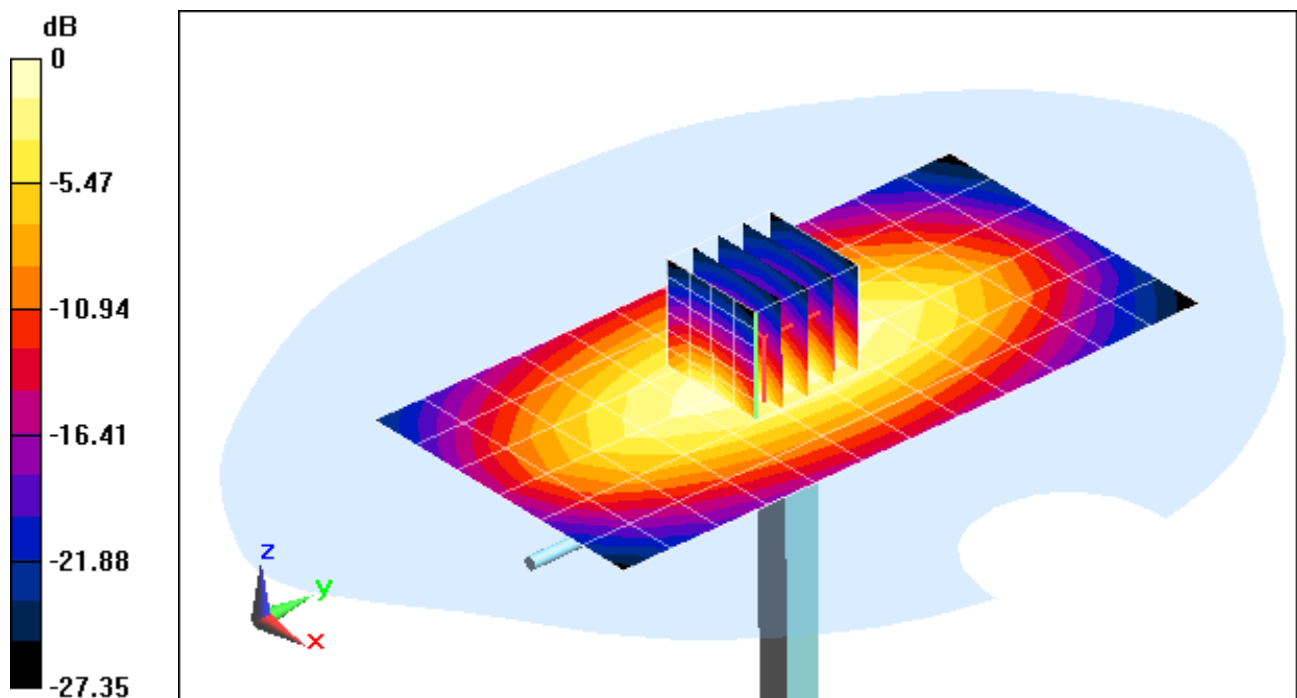
**Area Scan (7x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Input Power: 20.0 dBm (100 mW)

**SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.675 mW/g**

Deviation: 6.69%



0 dB = 1.12 mW/g = 1.02 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:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.998 \text{ mho/m}$ ;  $\epsilon_r = 53.05$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

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

Probe: ES3DV3 - SN3258; ConvF(6.06, 6.06, 6.06); Calibrated: 2/21/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 835MHz System Verification

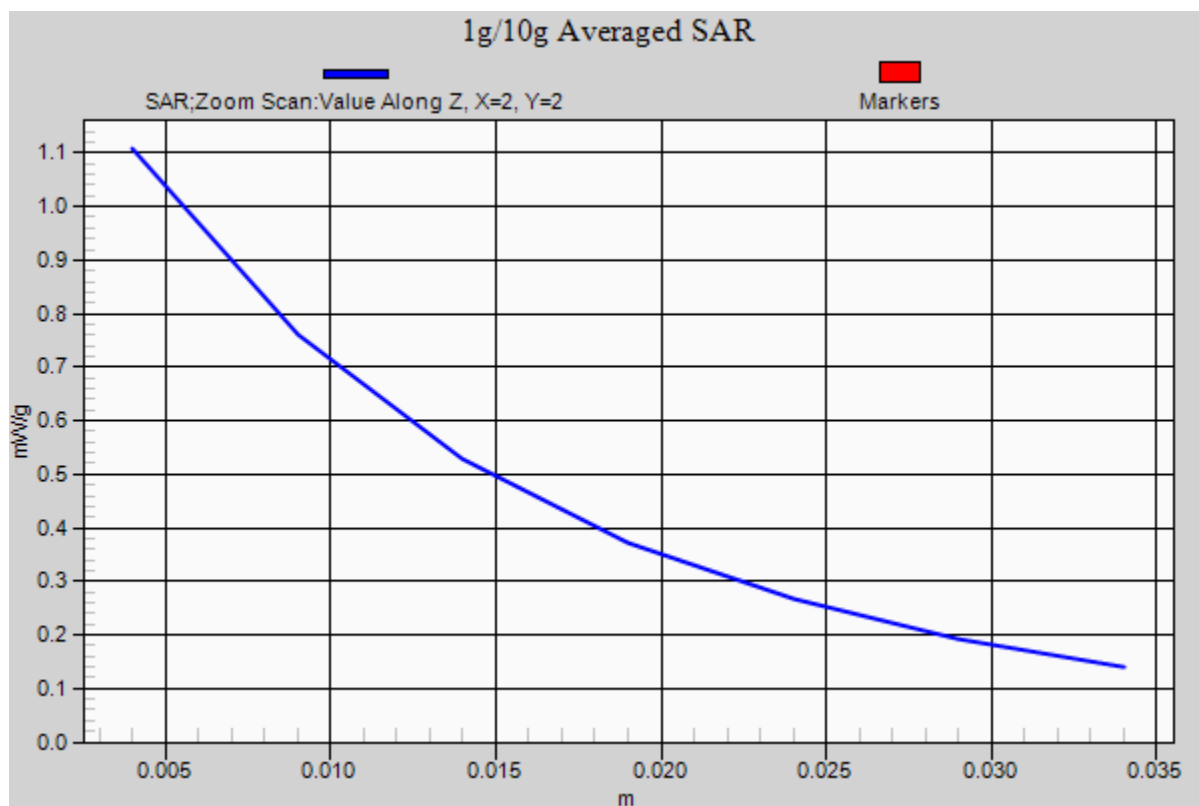
**Area Scan (7x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Input Power: 20.0 dBm (100 mW)

**SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.675 mW/g**

Deviation: 6.69%



# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.545 \text{ mho/m}$ ;  $\epsilon_r = 51.137$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 1900MHz System Verification

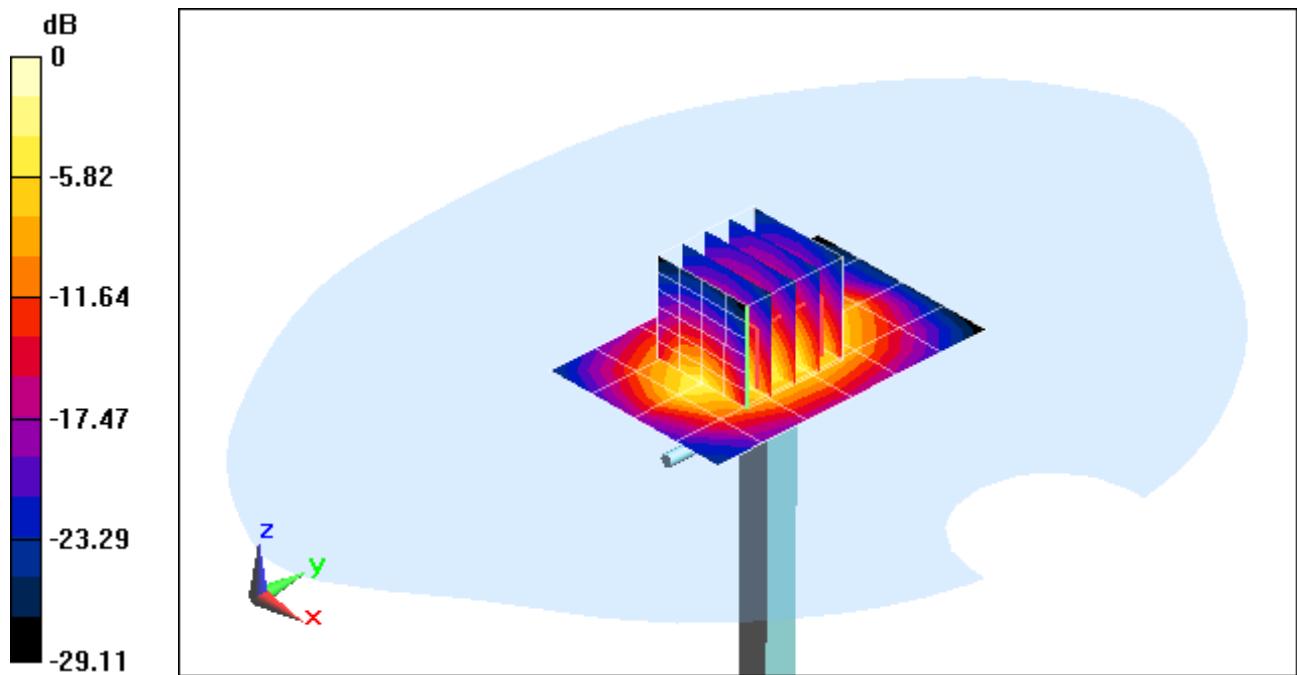
**Area Scan (5x7x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Input Power: 20.0 dBm (100 mW)

**SAR(1 g) = 4.26 mW/g; SAR(10 g) = 2.21 mW/g**

Deviation: 4.16%



0 dB = 4.71 mW/g = 13.46 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.545 \text{ mho/m}$ ;  $\epsilon_r = 51.137$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

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

Probe: ES3DV3 - SN3209; ConvF(4.63, 4.63, 4.63); Calibrated: 3/16/2012;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 1900MHz System Verification

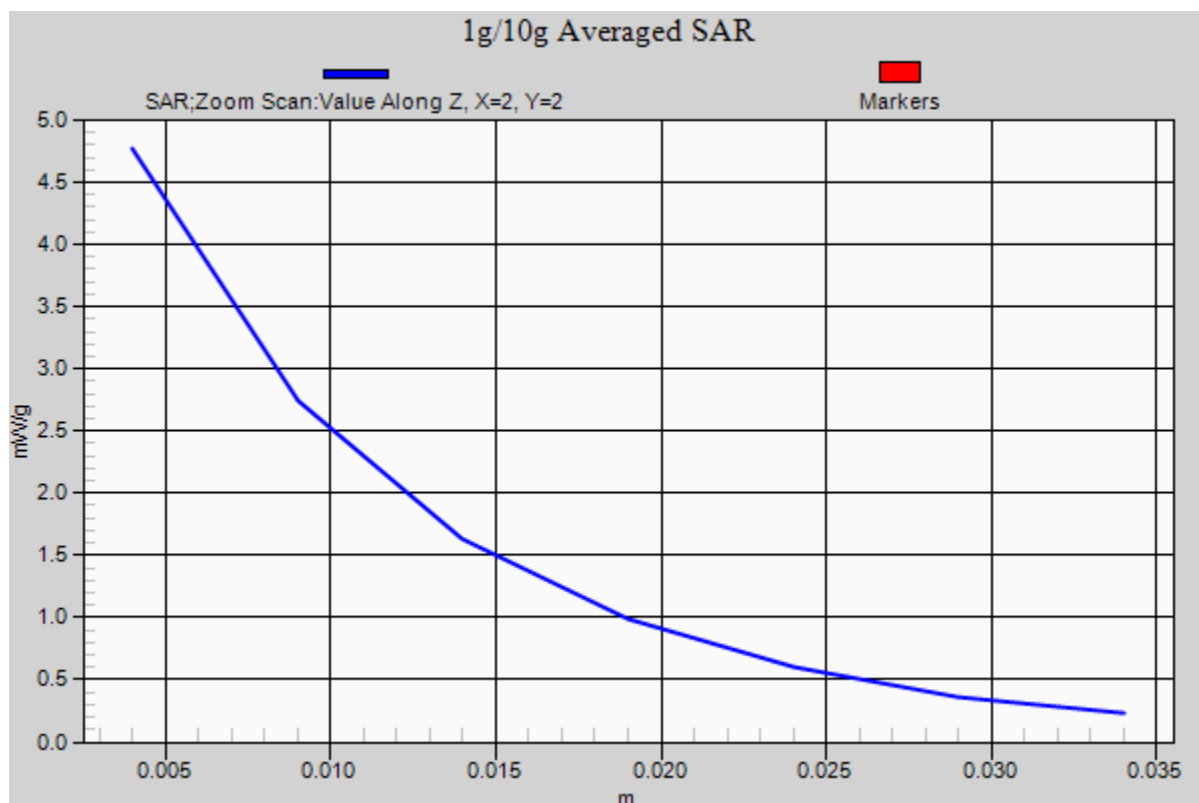
**Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm

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

Input Power: 20.0 dBm (100 mW)

**SAR(1 g) = 4.26 mW/g; SAR(10 g) = 2.21 mW/g**

Deviation: 4.16%



# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.569 \text{ mho/m}$ ;  $\epsilon_r = 53.147$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-08-2012; Ambient Temp: 24.1°C; Tissue Temp: 23.4°C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011;

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)

## 1900MHz System Verification

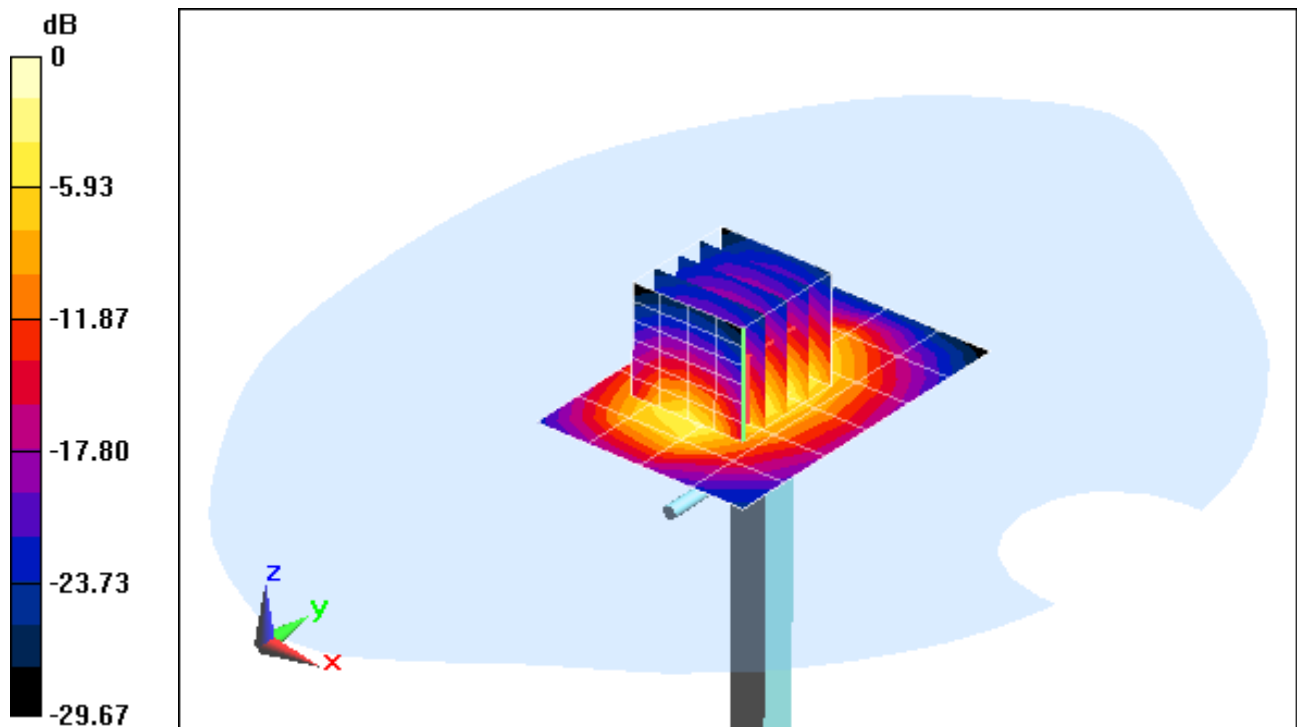
**Area Scan (5x7x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Input Power: 20.0 dBm (100 mW)

**SAR(1 g) = 4.2 mW/g; SAR(10 g) = 2.24 mW/g**

Deviation: 2.69%



0 dB = 4.60 mW/g = 13.25 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.569 \text{ mho/m}$ ;  $\epsilon_r = 53.147$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-08-2012; Ambient Temp: 24.1°C; Tissue Temp: 23.4°C

Probe: ES3DV2 - SN3022; ConvF(4.41, 4.41, 4.41); Calibrated: 8/25/2011;

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)

## 1900MHz System Verification

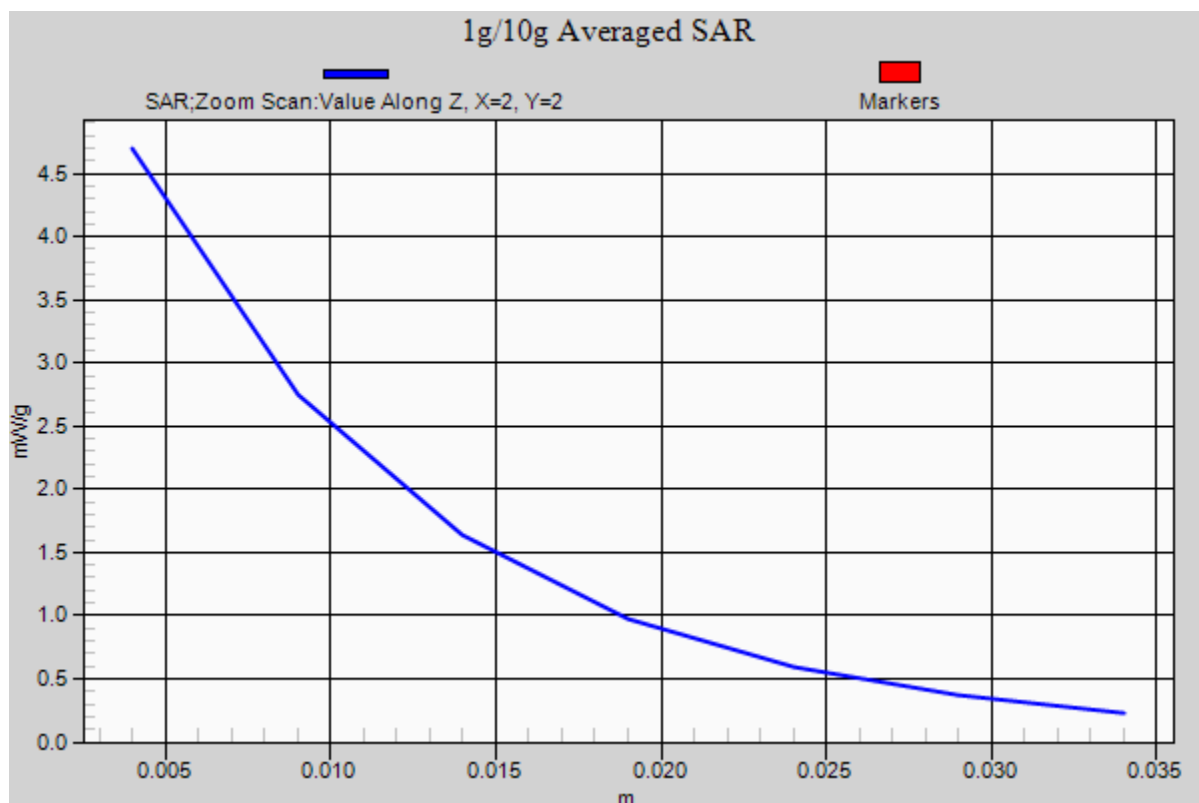
**Area Scan (5x7x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Input Power: 20.0 dBm (100 mW)

**SAR(1 g) = 4.2 mW/g; SAR(10 g) = 2.24 mW/g**

Deviation: 2.69%



# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.893 \text{ mho/m}$ ;  $\epsilon_r = 54.27$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-13-2012; Ambient Temp: 22.8°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3258; ConvF(4.28, 4.28, 4.28); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 2450MHz System Verification

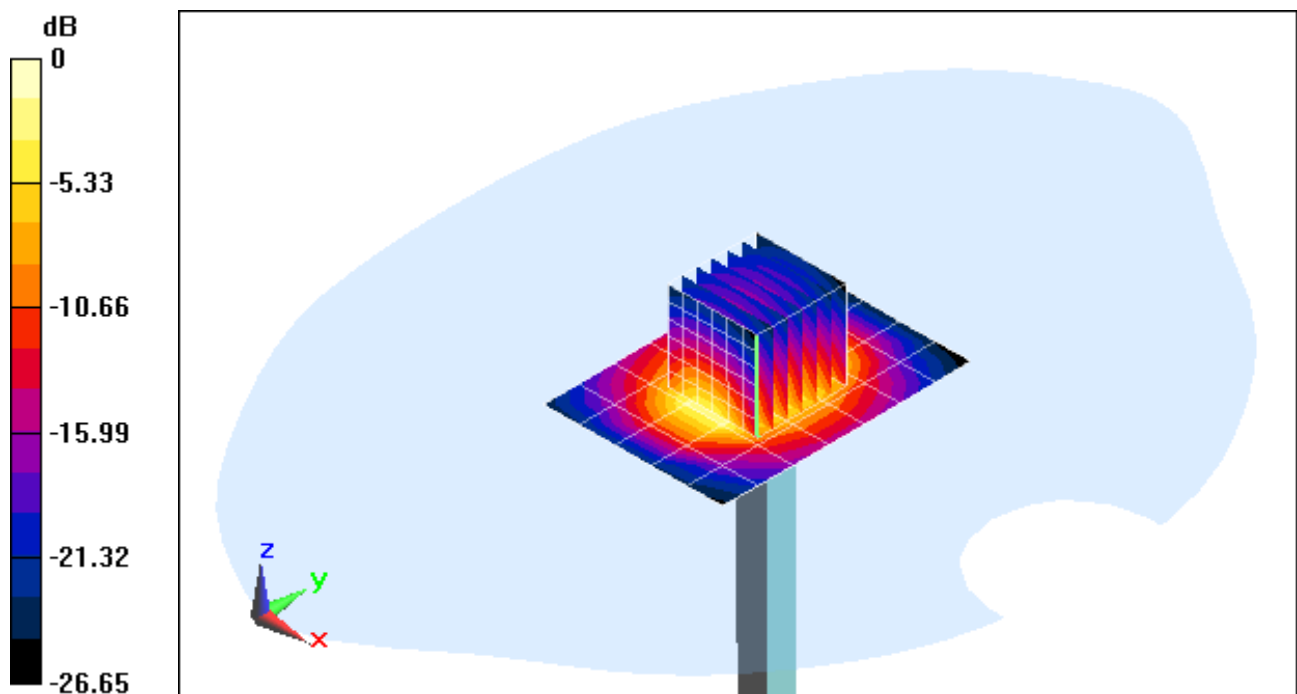
**Area Scan (6x8x1):** Measurement grid:  $dx=12\text{mm}$ ,  $dy=12\text{mm}$

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Input Power: 20.0 dBm (100 mW)

**SAR(1 g) = 4.84 mW/g; SAR(10 g) = 2.25 mW/g**

Deviation: -4.72%



0 dB = 4.68 mW/g = 13.40 dB mW/g

# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.893 \text{ mho/m}$ ;  $\epsilon_r = 54.27$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-13-2012; Ambient Temp: 22.8°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3258; ConvF(4.28, 4.28, 4.28); Calibrated: 2/21/2012;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/18/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 2450MHz System Verification

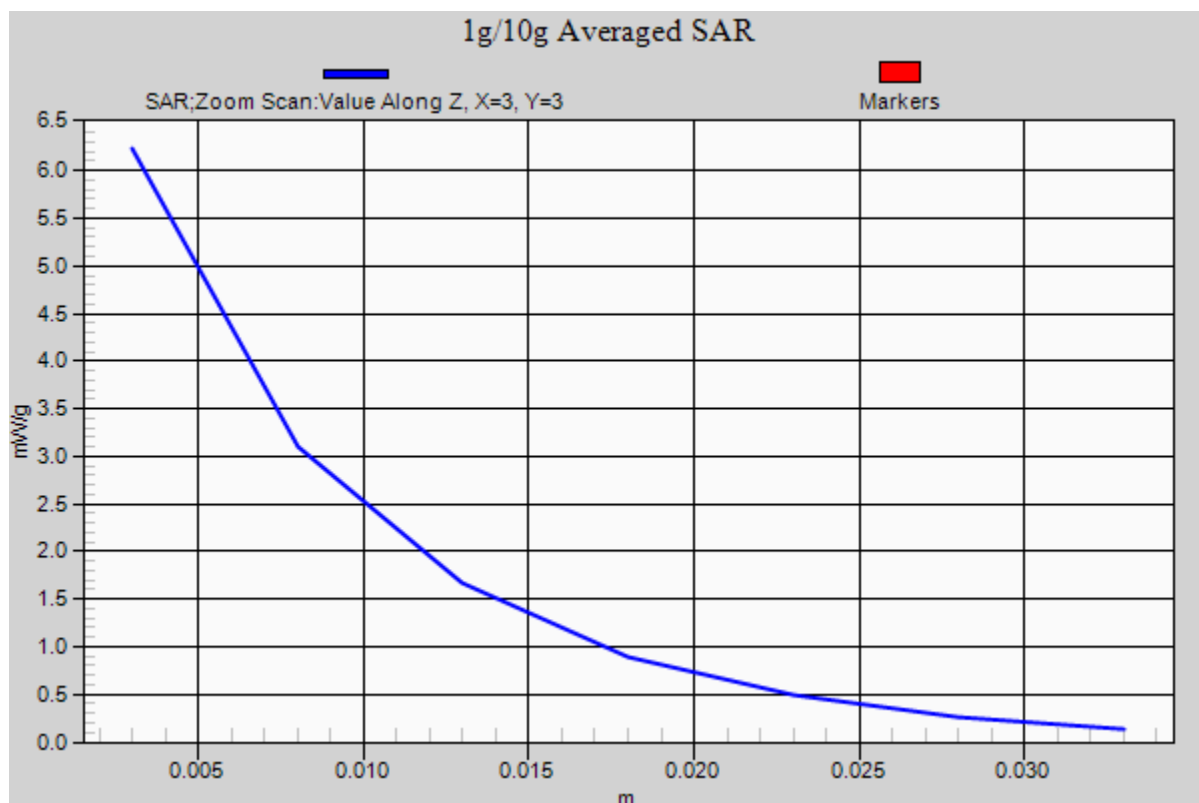
**Area Scan (6x8x1):** Measurement grid: dx=12mm, dy=12mm

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

**SAR(1 g) = 4.84 mW/g; SAR(10 g) = 2.25 mW/g**

Deviation: -4.72%



# PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Body Medium parameters used:

$f = 5200 \text{ MHz}$ ;  $\sigma = 5.242 \text{ mho/m}$ ;  $\epsilon_r = 48.06$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-12-2012; Ambient Temp: 23.5°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3589; ConvF(3.92, 3.92, 3.92); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 5200MHz System Verification

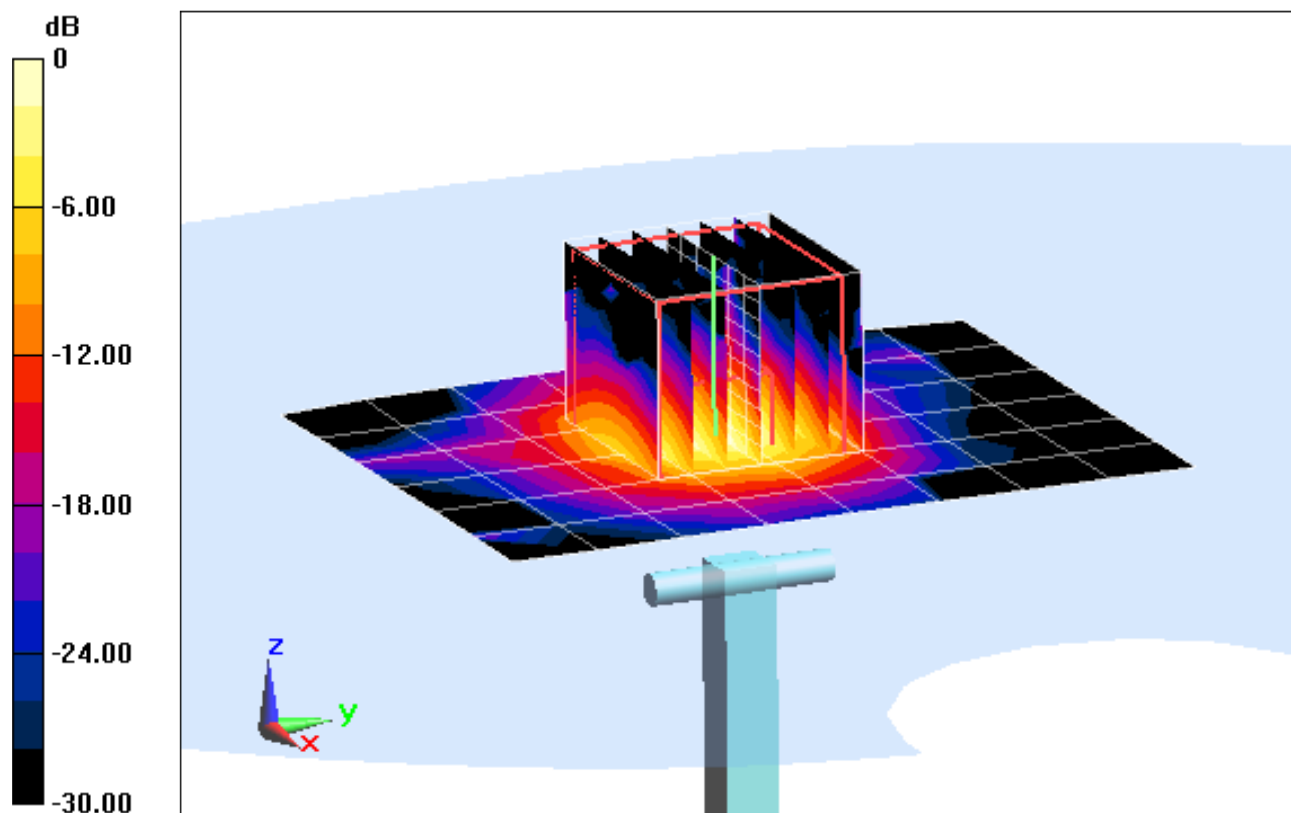
**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm

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

Input Power = 13 dBm (20 mW)

**SAR(1 g) = 1.44 mW/g; SAR(10 g) = 0.383 mW/g**

Deviation = -1.91%



0 dB = 2.99 mW/g = 9.51 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: 5 GHz Body Medium parameters used:

$f = 5200 \text{ MHz}$ ;  $\sigma = 5.242 \text{ mho/m}$ ;  $\epsilon_r = 48.06$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-12-2012; Ambient Temp: 23.5°C; Tissue Temp: 22.3°C

Probe: EX3DV4 - SN3589; ConvF(3.92, 3.92, 3.92); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 5200MHz System Verification

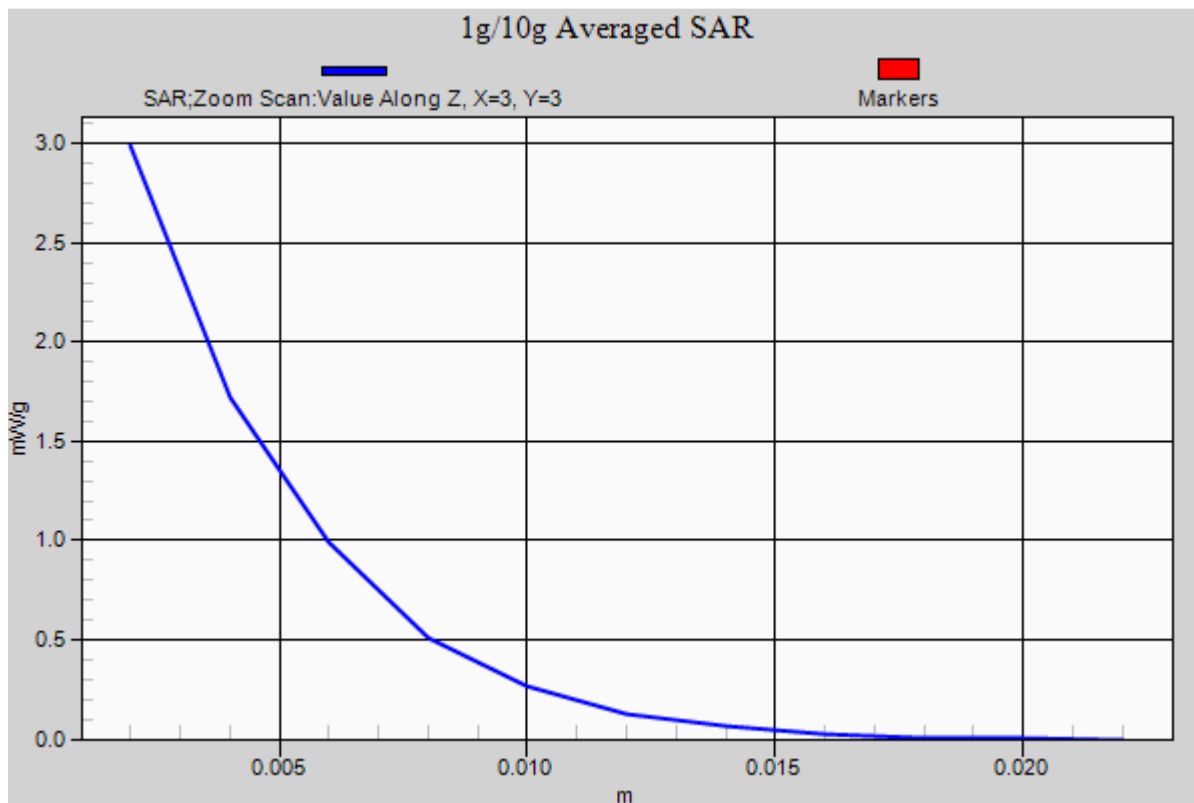
**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm

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

Input Power = 13 dBm (20 mW)

**SAR(1 g) = 1.44 mW/g; SAR(10 g) = 0.383 mW/g**

Deviation = -1.91%



# PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 5 GHz Body Medium parameters used:

$f = 5500 \text{ MHz}$ ;  $\sigma = 5.676 \text{ mho/m}$ ;  $\epsilon_r = 47.35$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-12-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN3589; ConvF(3.4, 3.4, 3.4); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 5500MHz System Verification

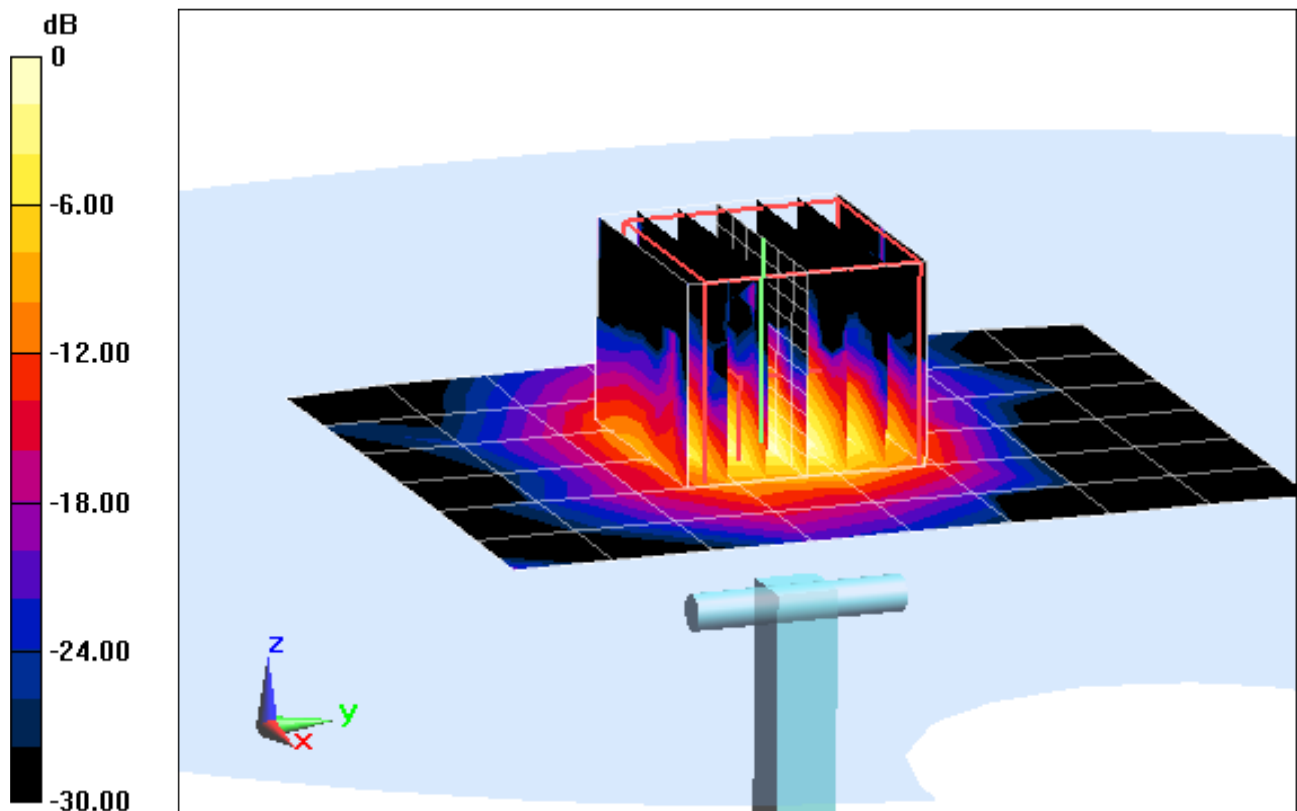
**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm

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

Input Power = 12.55 dBm (18 mW)

**SAR(1 g) = 1.35 mW/g; SAR(10 g) = 0.340 mW/g**

Deviation = -4.94%



0 dB = 2.84 mW/g = 9.07 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: 5 GHz Body Medium parameters used:

$f = 5500 \text{ MHz}$ ;  $\sigma = 5.676 \text{ mho/m}$ ;  $\epsilon_r = 47.35$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-12-2012; Ambient Temp: 23.7°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN3589; ConvF(3.4, 3.4, 3.4); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 5500MHz System Verification

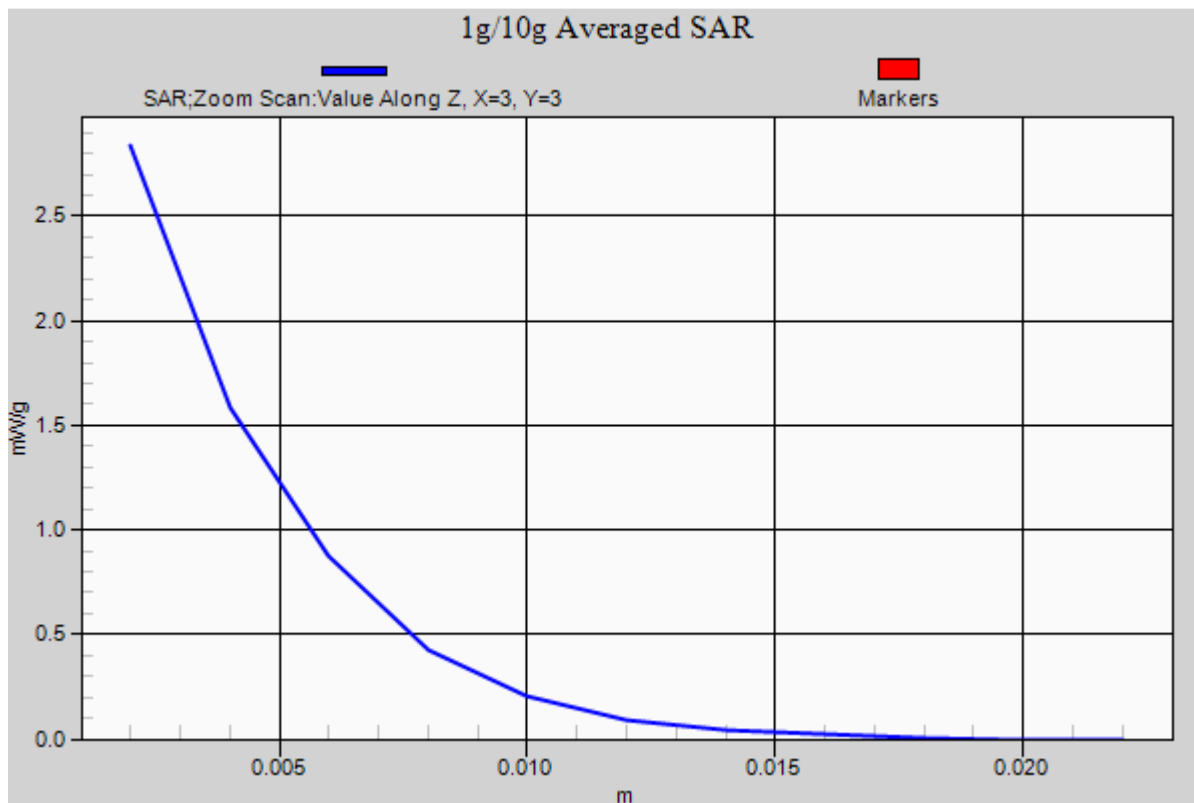
**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm

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

Input Power = 12.55 dBm (18 mW)

**SAR(1 g) = 1.35 mW/g; SAR(10 g) = 0.340 mW/g**

Deviation = -4.94%



# PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5800 \text{ MHz}$ ;  $\sigma = 6.111 \text{ mho/m}$ ;  $\epsilon_r = 46.63$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-12-2012; Ambient Temp: 23.9°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN3589; ConvF(3.59, 3.59, 3.59); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 5800MHz System Verification

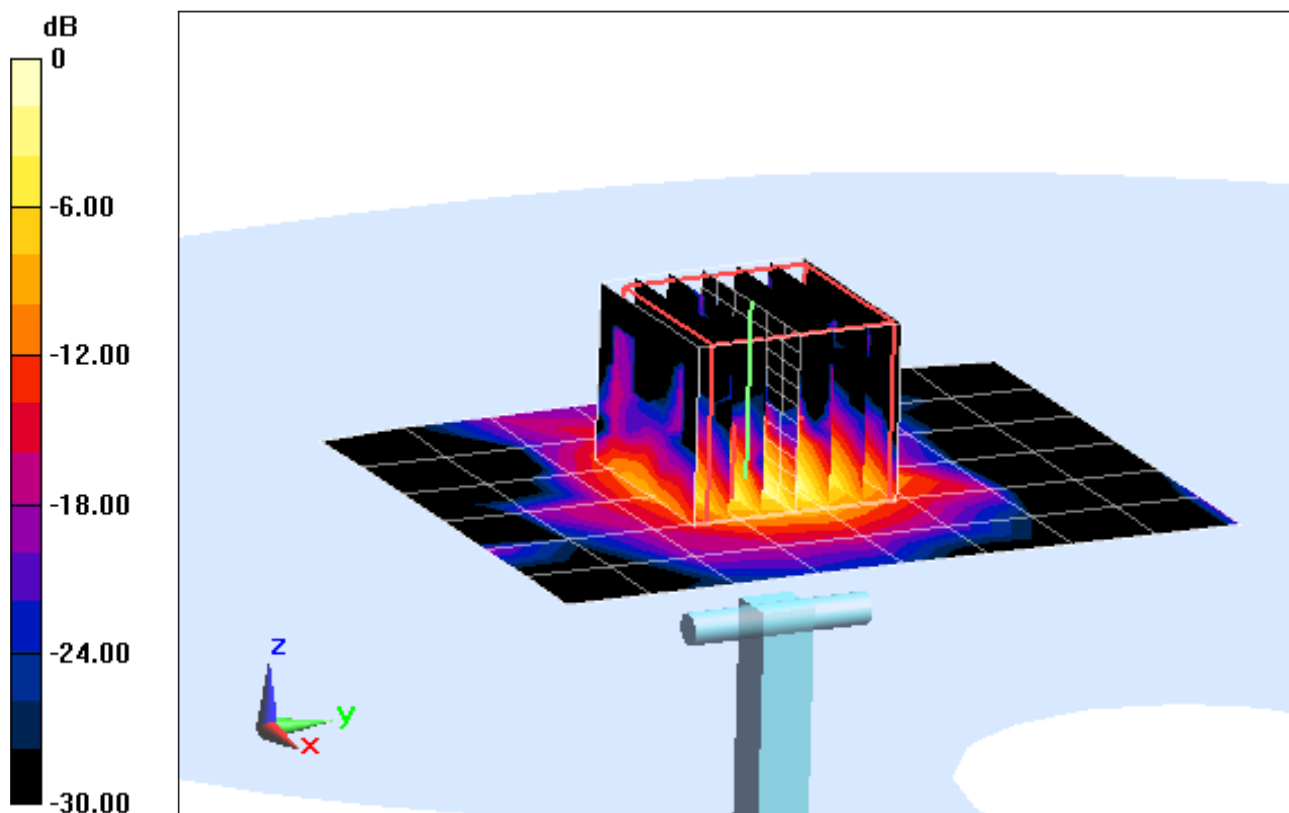
**Area Scan (7x9x1):** Measurement grid: dx=10mm, dy=10mm

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

Input Power = 12.79 dBm (19 mW)

**SAR(1 g) = 1.35 mW/g; SAR(10 g) = 0.347 mW/g**

Deviation = -4.37%



0 dB = 2.88 mW/g = 9.19 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: 5 GHz Body Medium parameters used:

$f = 5800 \text{ MHz}$ ;  $\sigma = 6.111 \text{ mho/m}$ ;  $\epsilon_r = 46.63$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-12-2012; Ambient Temp: 23.9°C; Tissue Temp: 22.7°C

Probe: EX3DV4 - SN3589; ConvF(3.59, 3.59, 3.59); Calibrated: 1/27/2012;

Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 2/15/2012

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

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.5 (6469)

## 5800MHz System Verification

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

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

Input Power = 12.79 dBm (19 mW)

**SAR(1 g) = 1.35 mW/g; SAR(10 g) = 0.347 mW/g**

Deviation = -4.37%

