TESTING
No. L2264

OET 65

TEST REPORT

Product Name	cdma2000 Digital Mobile Phone
Model	PCDM650KT/HUAWEI M650/ M650/HUAWEI C8350/C8350
FCC ID	QISM650
Client	Huawei Technologies Co., Ltd.

TA Technology (Shanghai) Co., Ltd.

GENERAL SUMMARY

Product Name	cdma2000 Digital Mobile Phone	**Model**	PCDM650KT/HUAWEI M650/ M650/HUAWEI C8350/C8350
FCC ID	QISM650	**Report No.**	RZA1106-1064SAR01R1
Client	Huawei Technologies Co., Ltd.		
Manufacturer	Huawei Technologies Co., Ltd.		
Standard(s)	**IEEE Std C95.1, 1999:** IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. **IEEE Std 1528™-2003:** IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques. **SUPPLEMENT C Edition 01-01 to OET BULLETIN 65 Edition 97-01 June 2001 including DA 02-1438 June 19, 2002:** Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields Additional Information for Evaluation Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions. **RSS-102 Issue 4 March 2010:** Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands). **KDB 941225 D06 Hot Spot SAR v01** SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities		
Conclusion	This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 7 of this test report are below limits specified in the relevant standards. General Judgment: **Pass** (Stamp) **Date of issue: July 8th, 2011**		
Comment	The test result only responds to the measured sample.		

Approved by Director **Revised by** SAR Manager **Performed by** SAR Engineer

TABLE OF CONTENT

1. General Information

1.1. Notes of the Test Report

TA Technology (Shanghai) Co., Ltd. guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

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If the electrical report is inconsistent with the printed one, it should be subject to the latter.

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1.3. Applicant Information

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1.4. Manufacturer Information

Company:	Huawei Technologies Co., Ltd.
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Postal Code:	518129
Country:	P.R. China
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1.5. Information of EUT

General Information

Device Type:	Portable Device		
Exposure Category:	Uncontrolled Environment / General Population		
Product Name:	cdma2000 Digital Mobile Phone		
MEID:	A000002E1FB1AA		
Hardware Version:	HC1M650M Ver.D		
Software Version:	M650V100R001USAC237B822		
Antenna Type:	Internal Antenna		
Device Operating Configurations:			
Supporting Mode(s):	CDMA Cellular; (tested) CDMA PCS; (tested) CDMA BC10/ CDMA BC14; (tested) 802.111b/g/n; (tested) Bluetooth; (untested)		
Test Modulation:	CDMA(QPSK)		
Test Channel: (Low - Middle - High)	1013 - 384 - 777 (CDMA Cellular) (tested) 25 - 600 - 1175 (CDMA PCS) (tested) 476 - 580 - 684 (CDMA BC10) (tested) 1225 - 1250 - 1275 (CDMA BC14) (tested) 1 - 6 - 11 (WIFI) (tested)		
Power Class:	CDMA Cellular: Tested with Power Control All up bits		
	CDMA PCS: Tested with Power Control All up bits		
	CDMA BC10: Tested with Power Control All up bits		
	CDMA BC14: Tested with Power Control All up bits		
Operating Frequency Range(s):	Mode	Tx (MHz)	Rx (MHz)
	CDMA Cellular	824.7 ~ 848.31	869.7 ~ 893.31
	CDMA PCS	1851.25 ~ 1908.75	1931.25 ~ 1988.75
	CDMA BC10	817.9 ~ 823.1	862.9 ~ 868.1
	CDMA BC14	1911.25 ~ 1913.75	1991.25 ~ 1993.75

Auxiliary Equipment Details

AE1:Battery

Model: HB4F1

Manufacturer: Huawei Technologies Co., Ltd.

SN: SGCB317HI1231065

Equipment Under Test (EUT) is a model of cdma2000 Digital Mobile Phone. The device has a internal antennas for CDMA Tx/Rx, and the other is Wifi/BT antenna that can be used for Tx/Rx. The detail about Mobile phone and Lithium Battery is in chapter 1.5 in this report. SAR is tested for CDMA Cellular, CDMA PCS, CDMA BC10, CDMA BC14, and WIFI.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. The Maximum SAR_{1g} Vaules

Head Configuration

Mode	Channel	Position	SAR_{1g} (W/kg)
CDMA Cellular	High/777	Left, Cheek	**0.787**
CDMA PCS	Middle/600	Right,Cheek	**1.020**
CDMA BC10	Low/476	Left, Cheek	**0.508**
CDMA BC14	Middle/1250	Right,Cheek	**0.770**
WIFI	Middle/6	Left, Cheek	**0.283**

Body Worn Configuration

Mode	Channel	Separation distance	SAR_{1g} (W/kg)
CDMA Cellular	Middle/384	10mm	**1.280**
CDMA PCS	Middle/600	10mm	**1.190**
CDMA BC10	Low/476	10mm	**1.220**
CDMA BC14	High/1275	10mm	**1.120**
WIFI	Middle/6	10mm	**0.124**

Extrapolated SAR Values of the highest measured SAR

Mode	Test Position	Channel	Measurement Result		Tune-up procedures MAX Power(dBm)	SAR_{1g} Limit 1.6 W/kg
			Conducted Power(dBm)	SAR_{1g}(W/kg)		Extrapolated Result (W/kg)
CDMA Cellular (RC3)	Towards Ground	Middle/384	24.89	1.280	25	1.313
CDMA Cellular (EVDO Rev.0)	Towards Ground	Middle/384	24.36	1.210	25	1.402
CDMA Cellular (EVDO Rev.A)	Towards Ground	Middle/384	24.12	1.220	25	1.494
CDMA PCS (RC3)	Right hand, Touch cheek	Middle/600	24.21	1.020	24.5	1.090
CDMA PCS (EVDO Rev.0)	Towards Ground	Middle/600	23.83	1.180	24.5	1.377
CDMA PCS (EVDO Rev.A)	Towards Ground	Middle/600	23.48	1.190	24.5	1.505
CDMA BC10 (RC3)	Towards Ground	Low/476	24.49	1.220	24.7	1.280
CDMA BC10 (EVDO Rev.0)	Towards Ground	Low/476	23.82	1.190	24.7	1.457
CDMA BC10 (EVDO Rev.A)	Towards Ground	Low/476	23.77	1.210	24.7	1.499
CDMA BC14 (RC3)	Towards Ground	High/1275	23.99	1.120	24.3	1.203
CDMA BC14 (EVDO Rev.0)	Towards Ground	High/1275	23.03	1.100	24.3	1.474
CDMA BC14 (EVDO Rev.A)	Towards Ground	High/1275	22.96	1.080	24.3	1.470

1.7. Conducted Power of Each Tested Mode

Band	Maximum Conducted Power (dBm)
CDMA Cellular	**24.99**
CDMA PCS	**24.21**
CDMA BC10	**24.49**
CDMA BC14	**23.99**
WIFI	**15.13**

Note: The detail Power refers to Table 5 (Power Measurement Results).

1.8. Test Date

The test is performed from June 29, 2011 to July 5, 2011.

2. Operational Conditions during Test

2.1. General Description of Test Procedures

A communication link is set up with a System Simulator (SS) by air link, and a call is established. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 1013, 384 and 777 respectively in the case of CDMA Cellular, to 25, 600 and 1175 respectively in the case of CDMA PCS, to 476, 580 and 684 respectively in the case of CDMA BC10, to 1225, 1250 and 1275 respectively in the case of CDMA BC14. The EUT is commanded to operate at maximum transmitting power.

Connection to the EUT is established via air interface with E5515C, and the EUT is set to maximum output power by E5515C. Using the E5515C Power control is set “All Up Bits” in SAR of CDMA. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. The antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the EUT. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the EUT by at least 30 dB.

2.2. Information for the Measurement of CDMA 1x Devices

2.2.1. Output Power Verification

Test Parameter setup for maximum RF output power according to section 4.4.5 of 3GPP2

Parameter	Units	Value
I or	dBm/1.23MHz	-104
PilotE c /I or	dB	-7
TrafficE c /I or	dB	-7.4

For SAR test, the maximum power output is very important and essential; it is identical under the measurement uncertainty. It is proper to use typical Test Mode 3 (FW RC3, RVS RC3, SO55) as the worst case for SAR test.

2.2.2. Head SAR Measurement

According to KDB 941225 D01 V02, SAR is measured in RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55.SAR for RC1 is not required because the maximum average output of each channel is less than 0.25 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.

2.2.3. Body SAR Measurement

According to KDB 941225 D01 V02, SAR is measured in RC3 with the EUT configured to transmit at full rate using TDSO/SO32, transmit at full rate on FCH with all other code channels disabled. SAR for multiple code channels (FCH+SCHn) is not required when the maximum average output of each

RF channel is less than 0.25dB higher than measured with FCH only.

Body SAR in RC1 is not required because the maximum average output of each channel is less than 0.25 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.

Test communication setup meet as followings:

Communication standard between mobile station and base station simulator	3GPP2 C.S0011-B
Radio configuration	RC3（Supporting CDMA 1X）
Spreading Rate	SR1
Data Rate	9600bps
Service Options	SO55 （loop back mode）
Service Options	SO32 （test data service mode）
Multiplex Options	The mobile station does not support this service.

2.3. Handsets with Ev-Do

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 should be configured in the downlink for both Rev. 0 and Rev. A.

2.4. WIFI Test Configuration

For the 802.11b/g SAR tests, a communication link is set up with the test mode software for WIFI mode test. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 1, 6 and 11 respectively in the case of 2450 MHz. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Each channel should be tested at the lowest data rate. Testing at higher data rates is not required when the maximum average output power is less than 0.25dB higher than those measured at the lowest data rate.

802.11b/g operating modes are tested independently according to the service requirements in each frequency band.802.11b/g modes are tested on channels1,6,11;however,if output power reduction is necessary for channels 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels must be tested instead.

SAR is not required for 802.11g channels when the maximum average output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels. When the maximum average output channel in each frequency band is not included in the “default test channels”, the maximum channel should be tested instead of an adjacent “default test channels”, these are referred to as the “required test channels” and are illustrated in Table 1.

Table 1: “Default Test Channels”

Mode	GHz	Channel	Turbo Channel	“Default Test Channels”			
				15.247		UNII	
				802.11b	802.11g		
802.11b/g	2.412	1#		√	*		
	2.437	6	6	√	*		
	2.462	11#		√	*		

Note: #=when output power is reduced for channel 1 and /or 11to meet restricted band requirements the highest out put channels closet to each of these channels should be tested.

√= “default test channels”

* =possible 802.11g channels with maximum average output 0.25dB>=the “default test channels”

2.5. Test Positions

2.5.1. Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.

The positions used in the measurements were according to IEEE 1528 - 2003 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate(SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

2.5.2. Body Worn Configuration

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. Devices with a headset output should be tested with a headset connected to the device. Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested. The distance between the device and the phantom was kept 10mm of wireless routers.

3. SAR Measurements System Configuration

3.1. SAR Measurement Set-up

The DASY5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- A unit to operate the optical surface detector which is connected to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
- The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2003
- DASY5 software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System validation dipoles allowing to validate the proper functioning of the system.

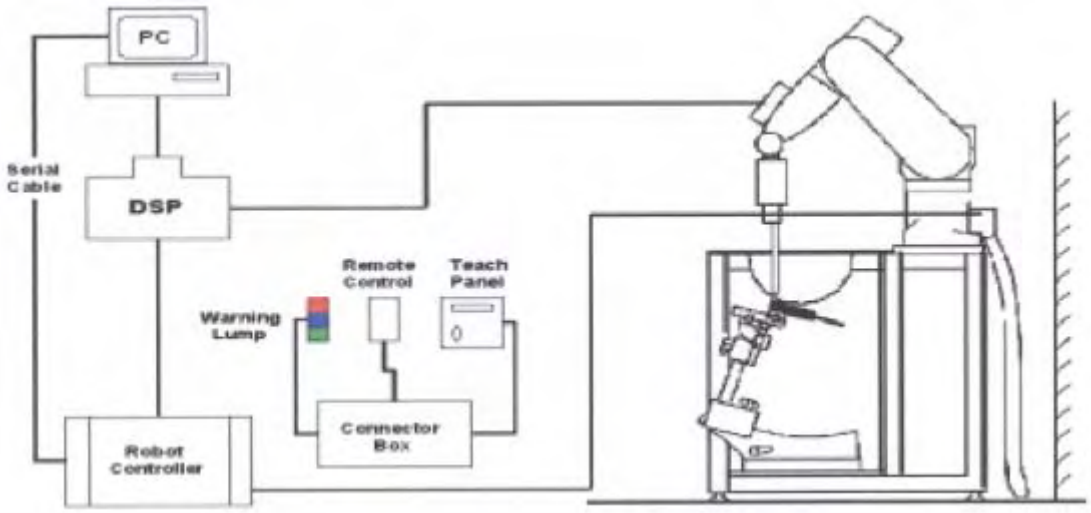

Figure 1. SAR Lab Test Measurement Set-up

3.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

3.2.1. EX3DV4 Probe Specification

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μW/g to > 100 mW/g Linearity: ± 0.2dB (noise: typically < 1 μW/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

Figure 2.EX3DV4 E-field Probe

Figure 3. EX3DV4 E-field probe

3.2.2. E-field Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.
E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

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

Where: Δt = Exposure time (30 seconds),
C = Heat capacity of tissue (brain or muscle),
ΔT = Temperature increase due to RF exposure.
Or

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

Where:
σ = Simulated tissue conductivity,
ρ = Tissue density (kg/m3).

3.3. Other Test Equipment

3.3.1. Device Holder for Transmitters

The DASY device holder is designed to cope with the die rent positions given in the standard.
It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.
The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the inference of the clamp on the test results could thus be lowered.

Figure 4.Device Holder

3.3.2. Phantom

The Generic Twin Phantom is constructed of a fiberglass shell integrated in a wooden Figure. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

Shell Thickness	2±0.1 mm
Filling Volume	Approx. 20 liters
Dimensions	810 x l000 x 500 mm (H x L x W)
Aailable	Special

Figure 5.Generic Twin Phantom

3.4. Scanning Procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

- The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5 %.

- The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

- Area Scan

  The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot.Before starting the area scan a grid

spacing of 15 mm x 15 mm is set. During the scan the distance of the probe to the phantom remains unchanged.
After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

- Zoom Scan
  Zoom Scans are used to estimate the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The default Zoom Scan is done by 7x7x7 points within a cube whose base is centered around the maxima found in the preceding area scan.

- Spatial Peak Detection
  The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses.The DASY5 system allows evaluations that combine measured data and robot positions, such as:
  • maximum search
  • extrapolation
  • boundary correction
  • peak search for averaged SAR
  During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard's method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.
  Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space. They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation. For a grid using 7x7x7 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1g and 10g cubes.
- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube 7x7x7 scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

3.5. Data Storage and Evaluation

3.5.1. Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DA4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

3.5.2. Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	Normi, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	Dcp_i
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	
	- Density	

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY5 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot c f / d c p_i$$

With V_i = compensated signal of channel i (i = x, y, z)

U_i = input signal of channel i (i = x, y, z)

cf = crest factor of exciting field (DASY parameter)

dcp_i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes: $E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$

H-field probes: $H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f$

With V_i = compensated signal of channel i (i = x, y, z)

$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)
$[mV/(V/m)^2]$ for E-field Probes

$ConvF$ = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

The primary field data are used to calculate the derived field units.

$$SAR = (E_{tot}^2 \cdot \ .) / (\quad \cdot 1000)$$

with $\boldsymbol{SAR}$ = local specific absorption rate in mW/g

$\boldsymbol{E_{tot}}$ = total field strength in V/m

σ = conductivity in [mho/m] or [Siemens/m]

ρ = equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 / 3770 \quad \text{or} \quad \boldsymbol{P_{pwe} = H_{tot}^2 \cdot 37.7}$$

with P_{pwe} = equivalent power density of a plane wave in mW/cm^2

$\boldsymbol{E_{tot}}$ = total electric field strength in V/m

$\boldsymbol{H_{tot}}$ = total magnetic field strength in A/m

3.6. System Check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyser. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the table 8 and table 9.

System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10 %).

System check is performed regularly on all frequency bands where tests are performed with the DASY5 system.

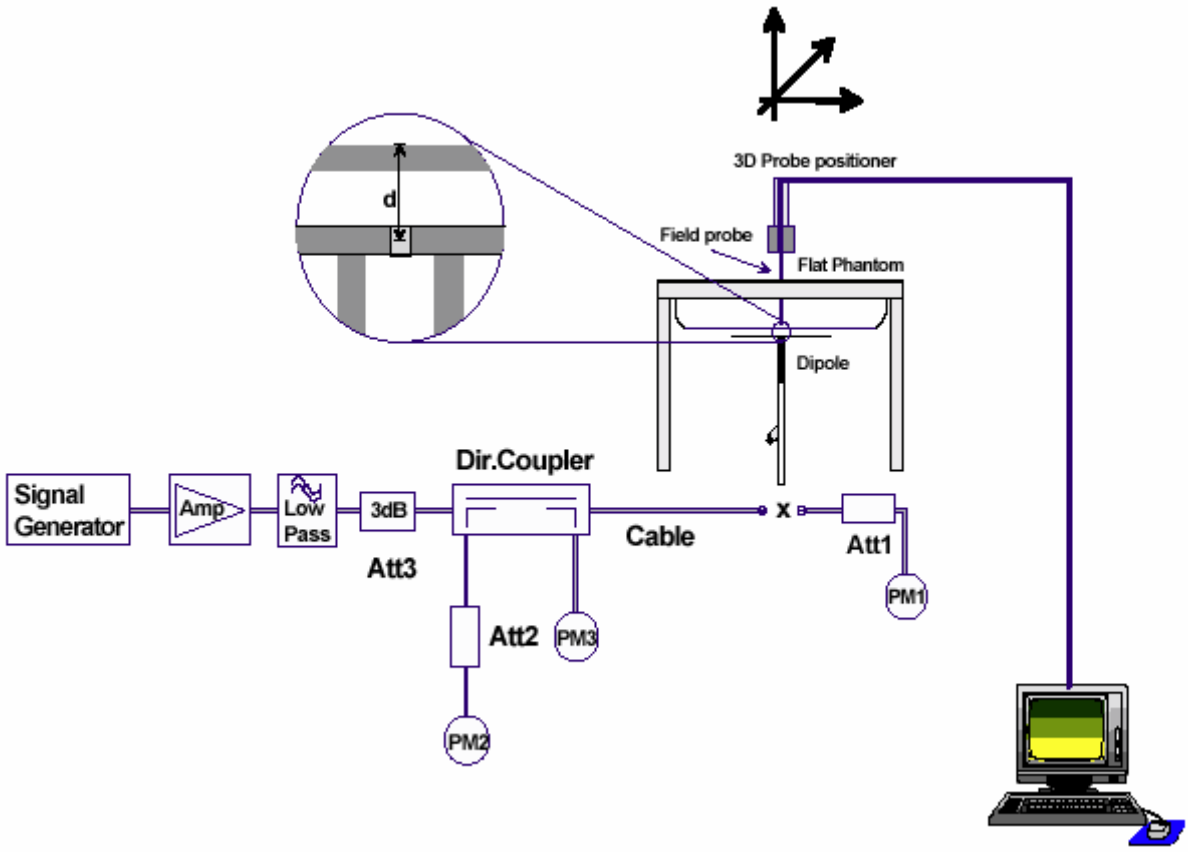

Figure 6. System Check Set-up

Justification for Extended SAR Dipole Calibrations

Usage of SAR dipoles calibrated less than 2 years ago but more than 1 year ago were confirmed in maintaining return loss (< - 20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 450824:

Dipole D835V2 SN: 4d092				
Head				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
1/14/2010	-30.3	1.3%	51.2	0.5Ω
1/13/2011	-29.9		51.7	
Body				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
1/14/2010	-25.6	0.4%	47.6	0.2Ω
1/13/2011	-25.7		47.4	

Dipole D1900V2 SN: 5d018				
Head				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
6/15/2010	-29.7	2.7%	52.1	1.9Ω
6/14/2011	-28.9		54.0	
Body				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
6/15/2010	-27.6	4.3 %	47.4	1.3Ω
6/14/2011	-26.4		48.7	

Dipole D2450V2 SN: 712				
Head				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2/19/2010	-27.1	4.4%	54.2	1.4Ω
2/18/2011	-25.9		55.6	
Body				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2/19/2010	-25.7	3.1%	50.1	1.7Ω
2/18/2011	-26.5		51.8	

3.7. Equivalent Tissues

The liquid is consisted of water, sugar, salt, Preventol,Glycol and Cellulose. The liquid has previously been proven to be suited for worst-case. The Table 2 and Table 3 show the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the OET 65.

Table 2: Composition of the Head Tissue Equivalent Matter

MIXTURE%	FREQUENCY(Brain) 835MHz
Water	41.45
Sugar	56
Salt	1.45
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz ε=41.5 σ=0.9

MIXTURE%	FREQUENCY(Brain) 1900MHz
Water	55.242
Glycol monobutyl	44.452
Salt	0.306
Dielectric Parameters Target Value	f=1900MHz ε=40.0 σ=1.40

MIXTURE%	FREQUENCY(Brain) 2450MHz
Water	62.7
Glycol	36.8
Salt	0.5
Dielectric Parameters Target Value	f=2450MHz ε=39.20 σ=1.80

Table 3: Composition of the Body Tissue Equivalent Matter

MIXTURE%	FREQUENCY(Body) 835MHz
Water	52.5
Sugar	45
Salt	1.4
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz ε=55.2 σ=0.97

MIXTURE%	FREQUENCY(Body) 1900MHz
Water	69.91
Glycol	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1900MHz ε=53.3 σ=1.52

MIXTURE%	FREQUENCY(Body) 2450MHz
Water	73.2
Glycol	26.7
Salt	0.1
Dielectric Parameters Target Value	f=2450MHz ε=52.70 σ=1.95

4. Laboratory Environment

Table 4: The Ambient Conditions during Test

Temperature	Min. = 20°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

5. Characteristics of the Test

5.1. Applicable Limit Regulations

IEEE Std C95.1, 1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 KHz to 300 GHz.

5.2. Applicable Measurement Standards

IEEE Std 1528™-2003: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

SUPPLEMENT C Edition 01-01 to OET BULLETIN 65 Edition 97-01 June 2001 including DA 02-1438 June 19, 2002: Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields Additional Information for Evaluation Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions.

RSS-102 Issue 4 March 2010: Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands).

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6. Conducted Output Power Measurement

6.1. Summary

The DUT is tested using an E5515C communications tester as controller unit to set test channels and maximum output power to the DUT, as well as for measuring the conducted power. Conducted output power was measured using an integrated RF connector and attached RF cable. This result contains conducted output power for the EUT.

6.2. Conducted Power Results

Table 5: Conducted Power Measurement Results

CDMA Cellular (RC3)	**Conducted Power(dBm)**		
	Channel 1013	Channel 384	Channel 777
Results	24.97	24.89	24.94
CDMA Cellular (RC1)	**Conducted Power(dBm)**		
	Channel 1013	Channel 384	Channel 777
Results	24.99	24.77	24.97
CDMA Cellular EVDO (Rev.0)	**Conducted Power(dBm)**		
	Channel 1013	Channel 384	Channel 777
Results	24.45	24.36	24.44
CDMA Cellular EVDO (Rev.A)	**Conducted Power(dBm)**		
	Channel 1013	Channel 384	Channel 777
Results	24.33	24.12	24.22
CDMA PCS (RC3)	**Conducted Power(dBm)**		
	Channel 25	Channel 600	Channel 1175
Results	23.97	24.21	23.77
CDMA PCS (RC1)	**Conducted Power(dBm)**		
	Channel 25	Channel 600	Channel 1175
Results	23.96	24.18	23.73
CDMA PCS EVDO (Rev.0)	**Conducted Power(dBm)**		
	Channel 25	Channel 600	Channel 1175
Results	23.68	23.83	23.45
CDMA PCS EVDO (Rev.A)	**Conducted Power(dBm)**		
	Channel 25	Channel 600	Channel 1175
Results	23.46	23.48	23.26

CDMA BC10 (RC3)	Conducted Power(dBm)		
	Channel 476	Channel 580	Channel 684
Results	24.49	24.36	24.33
CDMA BC10 (RC1)	**Conducted Power(dBm)**		
	Channel 476	Channel 580	Channel 684
Results	24.37	24.22	24.28
CDMA BC10 EVDO (Rev.0)	**Conducted Power(dBm)**		
	Channel 476	Channel 580	Channel 684
Results	23.82	23.77	23.66
CDMA BC10 EVDO (Rev.A)	**Conducted Power(dBm)**		
	Channel 476	Channel 580	Channel 684
Results	23.77	23.65	23.62
CDMA BC14 (RC3)	**Conducted Power(dBm)**		
	Channel 1225	Channel 1250	Channel 1275
Results	23.86	23.97	23.99
CDMA BC14 (RC1)	**Conducted Power(dBm)**		
	Channel 1225	Channel 1250	Channel 1275
Results	23.85	23.92	23.95
CDMA BC14 EVDO (Rev.0)	**Conducted Power(dBm)**		
	Channel 1225	Channel 1250	Channel 1275
Results	22.89	23.12	23.03
CDMA BC14 EVDO (Rev.A)	**Conducted Power(dBm)**		
	Channel 1225	Channel 1250	Channel 1275
Results	22.85	22.95	22.96

7. Test Results

7.1. Dielectric Performance

Table 6: Dielectric Performance of Head Tissue Simulating Liquid

Frequency	Description	Dielectric Parameters		Temp ℃
		ε_r	σ(s/m)	
835MHz (head)	Target value ±5% window	41.5 39.43 — 43.58	0.90 0.86 — 0.95	/
	Measurement value 2011-6-30	43.3	0.88	22.5
1900MHz (head)	Target value ±5% window	40.00 38.00 — 42.00	1.40 1.33 — 1.47	/
	Measurement value 2011-6-29	39.99	1.43	21.8
2450MHz (head)	Target value ±5% window	39.20 37.24 — 41.16	1.80 1.71 — 1.89	/
	Measurement value 2011-7-5	39.51	1.83	21.8

Table 7: Dielectric Performance of Body Tissue Simulating Liquid

Frequency	Description	Dielectric Parameters		Temp ℃
		ε_r	σ(s/m)	
835MHz (body)	Target value ±5% window	55.20 52.44 — 57.96	0.97 0.92 — 1.02	/
	Measurement value 2011-7-1	55.89	0.99	22.5
1900MHz (body)	Target value ±5% window	53.3 50.64 — 55.97	1.52 1.44 — 1.60	/
	Measurement value 2011-6-29	51.47	1.55	21.8
2450MHz (body)	Target value ±5% window	52.70 50.07 — 55.34	1.95 1.85 — 2.05	/
	Measurement value 2011-7-5	51.73	1.97	21.9

7.2. System Check

Table 8: System Checking for Head Tissue Simulating Liquid

Frequency	Description	SAR(W/kg)		Dielectric Parameters		Temp
		10g	1g	ε_r	σ(s/m)	℃
835MHz	Recommended value ±10% window	1.56 1.40 — 1.72	2.39 2.15 — 2.63	41.2	0.89	/
	Measurement value 2011-6-30	1.50	2.30	43.3	0.88	22.5
1900 MHz	Recommended value ±10% window	5.22 4.70 – 5.74	10.00 9.00 - 11.00	39.5	1.44	/
	Measurement value 2011-6-29	5.46	10.60	39.99	1.43	21.8
2450 MHz	Recommended result ±10% window	6.24 5.62 — 6.86	13.3 11.97—14.63	38.7	1.77	/
	Measurement value 2011-7-5	6.52	14.06	39.51	1.83	21.8

Note: 1. The graph results see ANNEX B.

2. Recommended Values used derive from the calibration certificate and 250 mW is used as feeding power to the calibrated dipole.

Table 9: System Check for Body Tissue Simulating Liquid

Frequency	Description	SAR(W/kg)		Dielectric Parameters		Temp
		10g	1g	ε_r	σ(s/m)	℃
835MHz	Recommended value ±10% window	1.63 1.47 — 1.79	2.49 2.24 — 2.74	54.6	0.98	/
	Measurement value 2011-7-1	1.58	2.40	55.89	0.99	22.5
1900 MHz	Recommended value ±10% window	5.52 4.97 — 6.57	10.30 9.27 — 11.33	53.5	1.54	/
	Measurement value 2011-6-29	5.17	9.73	51.47	1.55	21.8
2450 MHz	Recommended result ±10% window	5.97 5.37 — 6.57	13 11.7—14.3	51.8	2.01	/
	Measurement value 2011-7-5	6.48	14.01	51.73	1.97	21.9

Note: 1. The graph results see ANNEX B.

2. Recommended Values used derive from the calibration certificate and 250 mW is used as feeding power to the calibrated dipole.

7.3. Summary of Measurement Results

7.3.1. CDMA Cellular (CDMA/EVDO)

Table 10: SAR Values [CDMA Cellular (CDMA/EVDO)]

Limit of SAR		10 g Average	1 g Average	Power Drift	Graph Results
		2.0 W/kg	1.6 W/kg	± 0.21 dB	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Test Position of Head					
Left hand, Touch cheek	High/777	0.555	0.787	0.045	Figure 13
	Middle/384	0.548	0.768	-0.016	Figure 14
	Low/1013	0.431	0.609	0.130	Figure 15
Left hand, Tilt 15 Degree	Middle/384	0.338	0.442	0.141	Figure 16
Right hand, Touch cheek	Middle/384	0.426	0.611	-0.007	Figure 17
Right hand, Tilt 15 Degree	Middle/384	0.335(max.cube)	0.443(max.cube)	-0.016	Figure 18
Test Position of Body (Distance 10mm)					
Towards Ground	High/777	0.591(max.cube)	0.828(max.cube)	-0.097	Figure 19
	Middle/384	0.932(max.cube)	1.280(max.cube)	-0.059	Figure 20
	Low/1013	0.851(max.cube)	1.210(max.cube)	0.039	Figure 21
Towards Phantom	Middle/384	0.601	0.786	-0.091	Figure 22
Left Edge	Middle/384	0.485	0.704	-0.133	Figure 23
Right Edge	Middle/384	0.219	0.313	-0.021	Figure 24
Top Edge	N/A	N/A	N/A	N/A	N/A
Bottom Edge	Middle/384	0.121	0.214	0.014	Figure 25
Worst Case Position of Body with Earphone (Distance 10mm)					
Towards Ground	Middle/384	0.720(max.cube)	1.180(max.cube)	0.043	Figure 26
Worst Case Position of Body with EVDO Rev.0(Distance 10mm)					
Towards Ground	Middle/384	0.871(max.cube)	1.210(max.cube)	-0.179	Figure 27
Worst Case Position of Body with EVDO Rev.A(Distance 10mm)					
Towards Ground	Middle/384	0.884(max.cube)	1.220(max.cube)	0.193	Figure 28

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Upper and lower frequencies were measured at the worst position.
3. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR_{1g} limit (< 0.8W/kg), testing at the high and low channels is optional.
4. The (max.cube) labeling indicates that during the grid scanning an additional peak was found which was within 2.0dB of the highest peak. The value of the highest cube is given in the table above.
5. WWAN antenna is located at bottom edge; antenna-to-top edge distance is more than 2.5 cm(see ANNEX I). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested. Top Edge is excluded from hotspot mode SAR evaluation.

7.3.2. CDMA PCS (CDMA/EVDO)

Table 11: SAR Values [CDMA PCS (CDMA/EVDO)]

Limit of SAR		10 g Average	1 g Average	Power Drift	Graph Results
		2.0 W/kg	1.6 W/kg	± 0.21 dB	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Test Position of Head					
Left hand, Touch cheek	High/1175	0.472	0.786	-0.102	Figure 29
	Middle/600	0.547	0.892	0.059	Figure 30
	Low/25	0.352	0.570	-0.115	Figure 31
Left hand, Tilt 15 Degree	Middle/600	0.218	0.393	-0.011	Figure 32
Right hand, Touch cheek	High/1175	0.442	0.711	0.102	Figure 33
	Middle/600	0.614	1.020	0.009	Figure 34
	Low/25	0.402	0.660	0.189	Figure 35
Right hand, Tilt 15 Degree	Middle/600	0.230	0.384	0.102	Figure 36
Test Position of Body (Distance 10mm)					
Towards Ground	High/1175	0.565	0.952	0.041	Figure 37
	Middle/600	0.704	1.180	-0.127	Figure 38
	Low/25	0.519	0.878	0.022	Figure 39
Towards Phantom	High/1175	0.442	0.716	0.000	Figure 40
	Middle/600	0.530	0.861	-0.015	Figure 41
	Low/25	0.359	0.578	-0.024	Figure 42
Left Edge	Middle/600	0.124(max.cube)	0.213(max.cube)	0.071	Figure 43
Right Edge	Middle/600	0.293(max.cube)	0.508(max.cube)	-0.018	Figure 44
Top Edge	N/A	N/A	N/A	N/A	N/A
Bottom Edge	High/1175	0.398	0.702	-0.104	Figure 45
	Middle/600	0.505	0.888	-0.025	Figure 46
	Low/25	0.323	0.57	0.024	Figure 47
Worst Case Position of Body with Earphone (Distance 10mm)					
Towards Ground	Middle/600	0.694	1.190	-0.027	Figure 48
Worst Case Position of Body with EVDO Rev.0 (Distance 10mm)					
Towards Ground	Middle/600	0.696	1.180	-0.104	Figure 49
Worst Case Position of Body with EVDO Rev.A (Distance 10mm)					
Towards Ground	Middle/600	0.707	1.190	0.012	Figure 50

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Upper and lower frequencies were measured at the worst position.

3. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR_{1g} limit (< 0.8W/kg), testing at the high and low channels is optional.

4. The (max.cube) labeling indicates that during the grid scanning an additional peak was found which was within 2.0dB of the highest peak. The value of the highest cube is given in the table above.

5. WWAN antenna is located at bottom edge; antenna-to-top edge distance is more than 2.5 cm(see ANNEX I). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested. Top Edge is excluded from hotspot mode SAR evaluation.

7.3.3. CDMA BC10 (CDMA/EVDO)

Table 12: SAR Values [CDMA BC10 (CDMA/EVDO)]

Limit of SAR		10 g Average	1 g Average	Power Drift	Graph Results
		2.0 W/kg	1.6 W/kg	± 0.21 dB	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Test Position of Head					
Left hand, Touch cheek	High/684	0.360	0.501	0.054	Figure 51
	Middle/580	0.346	0.498	-0.042	Figure 52
	Low/476	0.371	0.508	0.002	Figure 53
Left hand, Tilt 15 Degree	Middle/580	0.224	0.293	-0.007	Figure 54
Right hand, Touch cheek	Middle/580	0.273	0.388	-0.079	Figure 55
Right hand, Tilt 15 Degree	Middle/580	0.240(max.cube)	0.312(max.cube)	0.015	Figure 56
Test Position of Body (Distance 10mm)					
Towards Ground	High/684	0.843(max.cube)	1.170(max.cube)	0.046	Figure 57
	Middle/580	0.856(max.cube)	1.180(max.cube)	0.078	Figure 58
	Low/476	0.885(max.cube)	1.220(max.cube)	0.027	Figure 59
Towards Phantom	Middle/580	0.503	0.655	-0.143	Figure 60
Left Edge	Middle/580	0.441	0.636	0.097	Figure 61
Right Edge	Middle/580	0.439	0.656	-0.012	Figure 62
Top Edge	N/A	N/A	N/A	N/A	N/A
Bottom Edge	Middle/580	0.126	0.220	0.010	Figure 63
Worst Case Position of Body with Earphone (Distance 10mm)					
Towards Ground	Low/476	0.575(max.cube)	0.962(max.cube)	0.162	Figure 64
Worst Case Position of Body with EVDO Rev.0(Distance 10mm)					
Towards Ground	Low/476	0.860(max.cube)	1.190(max.cube)	-0.107	Figure 65
Worst Case Position of Body with EVDO Rev.A(Distance 10mm)					
Towards Ground	Low/476	0.857(max.cube)	1.210(max.cube)	0.193	Figure 66

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Upper and lower frequencies were measured at the worst position.
3. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR_{1g} limit (< 0.8W/kg), testing at the high and low channels is optional.
4. The (max.cube) labeling indicates that during the grid scanning an additional peak was found which was within 2.0dB of the highest peak. The value of the highest cube is given in the table above.
5. WWAN antenna is located at bottom edge; antenna-to-top edge distance is more than 2.5 cm(see ANNEX I). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested. Top Edge is excluded from hotspot mode SAR evaluation.

7.3.4. CDMA BC14 (CDMA/EVDO)

Table 13: SAR Values [CDMA BC14 (CDMA/EVDO)]

Limit of SAR		10 g Average	1 g Average	Power Drift	Graph Results
		2.0 W/kg	1.6 W/kg	± 0.21 dB	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift (dB)	
		10 g Average	1 g Average		
Test Position of Head					
Left hand, Touch cheek	Middle/1250	0.458	0.756	0.039	Figure 67
Left hand, Tilt 15 Degree	Middle/1250	0.237	0.429	-0.096	Figure 68
Right hand, Touch cheek	High/1275	0.467	0.756	0.033	Figure 69
	Middle/1250	0.475	0.770	-0.189	Figure 70
	Low/1225	0.430	0.695	-0.025	Figure 71
Right hand, Tilt 15 Degree	Middle/1250	0.181(max.cube)	0.312(max.cube)	-0.095	Figure 72
Test Position of Body (Distance 10mm)					
Towards Ground	High/1275	0.654	1.120	-0.068	Figure 73
	Middle/1250	0.616	1.070	-0.009	Figure 74
	Low/1225	0.610	1.050	0.130	Figure 75
Towards Phantom	Middle/1250	0.410	0.663	-0.003	Figure 76
Left Edge	Middle/1250	0.096(max.cube)	0.163(max.cube)	0.101	Figure 77
Right Edge	Middle/1250	0.303(max.cube)	0.533(max.cube)	-0.085	Figure 78
Top Edge	N/A	N/A	N/A	N/A	N/A
Bottom Edge	Middle/1250	0.361	0.632	0.013	Figure 79
Worst Case Position of Body with Earphone (Distance 10mm)					
Towards Ground	High/1275	0.560	0.959	-0.050	Figure 80
Worst Case Position of Body with EVDO Rev.0(Distance 10mm)					
Towards Ground	High/1275	0.642	1.100	-0.062	Figure 81
Worst Case Position of Body with EVDO Rev.A(Distance 10mm)					
Towards Ground	High/1275	0.641	1.080	0.038	Figure 82

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Upper and lower frequencies were measured at the worst position.
3. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR_{1g} limit (< 0.8W/kg), testing at the high and low channels is optional.
4. The (max.cube) labeling indicates that during the grid scanning an additional peak was found which was within 2.0dB of the highest peak. The value of the highest cube is given in the table above.
5. WWAN antenna is located at bottom edge; antenna-to-top edge distance is more than 2.5 cm(see ANNEX I). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested. Top Edge is excluded from hotspot mode SAR evaluation.

7.3.5. Bluetooth/WIFI Function

According to KDB 648474 B01 v01r05, the distance between BT/WIFI antenna and CDMA antenna is >2.5cm and ＜5cm. The location of the antennas inside mobile phone refer to ANNEX I.

Output Power Thresholds for Unlicensed Transmitters

	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.				

The output power of BT antenna is as following:

Channel	**Ch 0 2402 MHz**	**Ch 39 2441 Mhz**	**Ch 78 2480 MHz**
Average Conducted Output Power(dBm)	7.41	9.12	9.15

The output power of WIFI antenna is as following:

Mode	Channel	Data rate (Mbps)	AV Power (dBm)
11b	1	1	15.11
		2	15.08
		5.5	15.13
		11	15.09
	6	1	14.96
		2	14.92
		5.5	14.95
		11	14.91
	11	1	14.68
		2	14.65
		5.5	14.62
		11	14.66
11g	1	6	10.75
		9	10.71
		12	10.73
		18	10.69
		24	10.72
		36	10.67
		48	10.74
		54	10.71

	6	6	10.34
		9	10.31
		12	10.29
		18	10.28
		24	10.32
		36	10.33
		48	10.29
		54	10.31
	11	6	10.12
		9	10.09
		12	10.11
		18	10.13
		24	10.08
		36	10.12
		48	10.13
		54	10.07
11n HT20	1	6.5	7.92
		13	7.91
		19.5	7.89
		26	7.86
		39	7.88
		52	7.85
		58.5	7.87
		65	7.9
	6	6.5	7.54
		13	7.52
		19.5	7.53
		26	7.49
		39	7.45
		52	7.51
		58.5	7.47
		65	7.52
	11	6.5	7.28
		13	7.25
		19.5	7.27
		26	7.26
		39	7.24
		52	7.22
		58.5	7.23
		65	7.27

Stand-alone SAR

According to the output power measurement result and the distance between BT/WIFI antenna and CDMA antenna we can draw the conclusion that:

wifi antenna is <5cm and >2.5cm from CDMA antenna. stand-alone SAR are required for WIFI, because the output power of WIFI transmitter is $\geqslant P_{Ref}$=10.8dBm.

Table 14: SAR Values (WIFI)

Limit of SAR (W/kg)		10 g Average	1g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.21	
Different Test Position	Channel	Measurement Result(W/kg)		Power Drift (dB)	
		10 g Average	1g Average		
Test position of Head(802.11b)					
Left hand, Touch cheek	High/11	0.025	0.108	0.015	Figure 83
	Middle/6	0.045	0.283	0.095	Figure 84
	Low/1	0.029	0.118	0.064	Figure 85
Left hand, Tilt 15 Degree	Middle/6	0.017	0.067	0.071	Figure 86
Right hand, Touch cheek	Middle/6	0.015	0.032	-0.018	Figure 87
Right hand, Tilt 15 Degree	Middle/6	0.008	0.026	0.004	Figure 88
Test position of Body (802.11b,Distance 10mm)					
Towards Ground	Middle/6	0.008	0.024	-0.078	Figure 89
Towards phantom	High/11	0.004	0.007	0.004	Figure 90
	Middle/6	0.033	0.124	0.033	Figure 91
	Low/1	0.007	0.013	0.007	Figure 92
Left Edge	Middle/6	0.015	0.032	-0.027	Figure 93
Right Edge	N/A	N/A	N/A	N/A	N/A
Top Edge	N/A	N/A	N/A	N/A	N/A
Bottom Edge	N/A	N/A	N/A	N/A	N/A
Worst case position of Body with Earphone(802.11b,Distance 10mm)					
Towards Phantom	Middle/6	0.003	0.007	0.183	Figure 94

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Upper and lower frequencies were measured at the worst position.
3. WLAN antenna is located at Left edge; antenna-to-top edge distance is more than 2.5 cm, antenna-to-bottom edge distance is more than 2.5 cm and antenna-to-right edge distance is also more than 2.5 cm (see ANNEX I). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested. Top Edge, Bottom Edge and Right Edge are excluded from hotspot mode SAR evaluation.
4. KDB 248227-SAR is not required for 802.11g/n channels when the maximum average output power is less than ¼ dB higher than measured on the corresponding 802.11b channels.

BT antenna is <5cm and >2.5cm from CDMA antenna. stand-alone SAR are not required for BT, because the output power of BT transmitter is ≤P_{Ref}=10.8dBm.

BT antenna is <2.5cm from WIFI antenna. stand-alone SAR are not required for BT, because the WIFI MAX.SAR<1.2 W/kg.

Simultaneous SAR

About BT and CDMA Antenna, because CDMA antenna is <5cm and >2.5cm from BT Antenna, stand-alone SAR are not required for BT, so Simultaneous SAR are not required for CDMA and BT Antenna.

About wifi and CDMA Antenna,

SAR1g(W/kg) / Test Position	CDMA Cellular	CDMA PCS	CDMA BC10	CDMA BC14	WIFI	MAX. Σ SAR1g
Left hand, Touch cheek	0.787	**0.892**	0.508	0.756	**0.283**	1.175
Left hand, Tilt 15 Degree	**0.442**	0.393	0.293	0.429	**0.067**	0.509
Right hand, Touch cheek	0.611	**1.020**	0.388	0.770	**0.032**	1.052
Right hand, Tilt 15 Degree	**0.443**	0.384	0.312	0.312	**0.026**	0.469
Body, Towards Ground	**1.280**	1.190	1.220	1.120	**0.024**	1.304
Body, Towards Phantom	0.786	**0.861**	0.655	0.663	**0.124**	0.985
Body, Left Edge	**0.704**	0.213	0.636	0.163	**0.032**	0.736
Body, Right Edge	0.313	0.508	**0.656**	0.533	**N/A**	0.656
Body, Top Edge	N/A	N/A	N/A	N/A	N/A	N/A
Body, Bottom Edge	0.214	**0.888**	0.220	0.632	**N/A**	0.888

Note: 1.The value with blue color is the maximum ΣSAR_{1g} Value.

2. MAX. ΣSAR_{1g} =Unlicensed SAR_{MAX}+licensed SAR_{MAX}

3.The maximum SAR values in each test position are marked in bold.

wifi antenna is <5cm and >2.5cm from CDMA Antenna. (CDMA Antenna SAR_{MAX})1.280+ (wifi antenna SAR_{MAX})0.024=1.304<1.6, so Simultaneous SAR are not required for CDMA and WIFI Antenna.

About WiFi and BT Antenna, because WIFI antenna is ＜2.5cm from BT Antenna, the output power of BT transmitter is ≤P_{Ref}=10.8dBm, so Simultaneous SAR are not required for WiFi and BT Antenna.

8. Measurement Uncertainty

No.	source	Type	Uncertainty Value (%)	Probability Distribution	k	c_i	Standard ncertainty u_i' (%)	Degree of freedom V_{eff} or v_i
1	System repetivity	A	0.5	N	1	1	0.5	9
Measurement system								
2	-probe calibration	B	5.9	N	1	1	5.9	∞
3	-axial isotropy of the probe	B	4.7	R	$\sqrt{3}$	$\sqrt{0.5}$	1.9	∞
4	- Hemispherical isotropy of the probe	B	9.4	R	$\sqrt{3}$	$\sqrt{0.5}$	3.9	∞
6	-boundary effect	B	1.9	R	$\sqrt{3}$	1	1.1	∞
7	-probe linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
8	- System detection limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
9	-readout Electronics	B	1.0	N	1	1	1.0	∞
10	-response time	B	0	R	$\sqrt{3}$	1	0	∞
11	-integration time	B	4.32	R	$\sqrt{3}$	1	2.5	∞
12	-noise	B	0	R	$\sqrt{3}$	1	0	∞
13	-RF Ambient Conditions	B	3	R	$\sqrt{3}$	1	1.73	∞
14	-Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
15	-Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
16	-Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
Test sample Related								
17	-Test Sample Positioning	A	2.9	N	1	1	4.92	71
18	-Device Holder Uncertainty	A	4.1	N	1	1	4.1	5
19	-Output Power Variation - SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.9	∞
Physical parameter								
20	-phantom	B	4.0	R	$\sqrt{3}$	1	2.3	∞

21	-liquid conductivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.64	1.8	∞
22	-liquid conductivity (measurement uncertainty)	B	0.77	N	1	0.64	0.493	9
23	-liquid permittivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
24	-liquid permittivity (measurement uncertainty)	B	0.29	N	1	0.6	0.174	9
Combined standard uncertainty		$u_c^{'} = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					11.36	
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N		k=2	22.72	

9. Main Test Instruments

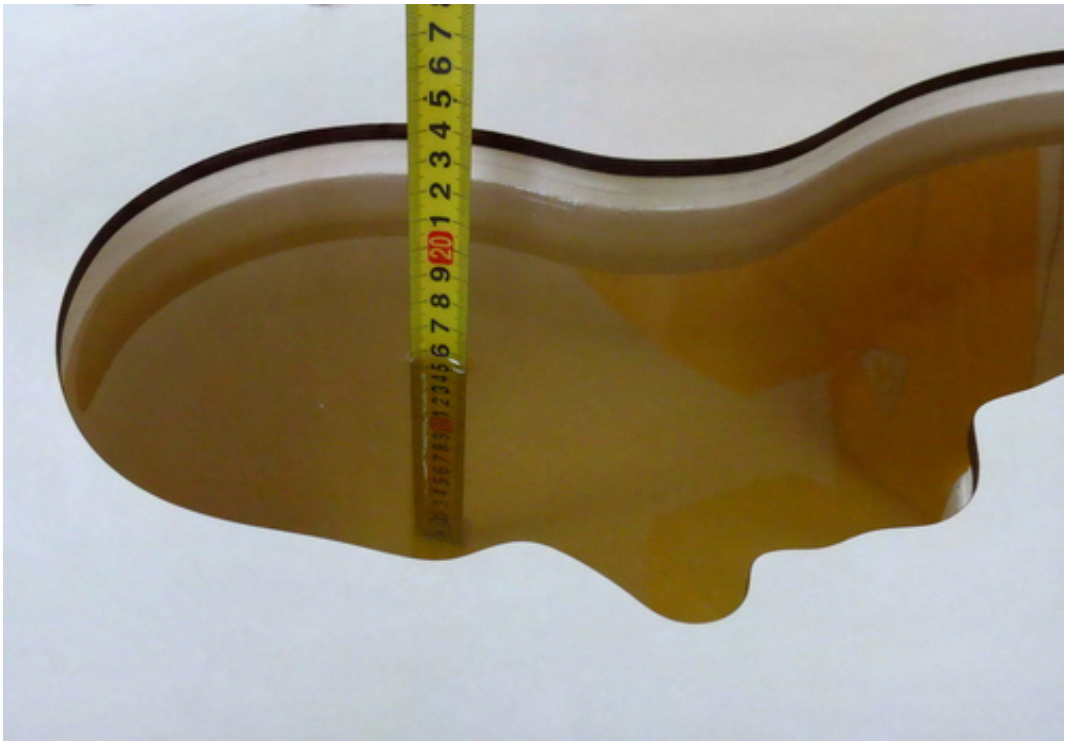
Table 15: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 13, 2010	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 12, 2011	One year
04	Power sensor	Agilent N8481H	MY50350004	September 26, 2010	One year
05	Signal Generator	HP 8341B	2730A00804	September 13, 2010	One year
06	Amplifier	IXA-020	0401	No Calibration Requested	
07	BTS	E5515C	MY48360988	December 3, 2010	One year
08	E-field Probe	EX3DV4	3677	November 24, 2010	One year
09	DAE	DAE4	871	November 18, 2010	One year
10	Validation Kit 835MHz	D835V2	4d092	January 14, 2010	Two years
12	Validation Kit 1900MHz	D1900V2	5d018	June 15, 2010	Two years
13	Validation Kit 2450MHz	D2450V2	712	February 19, 2010	Two years

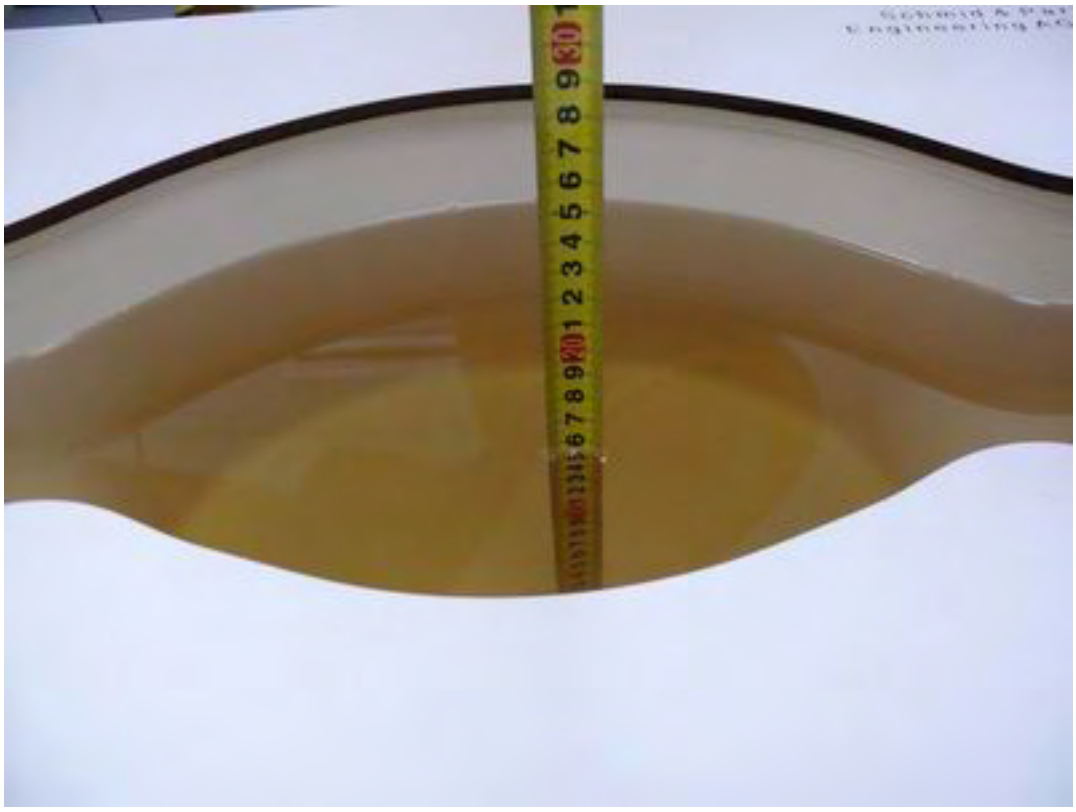
*******END OF REPORT BODY*******

ANNEX A: Test Layout

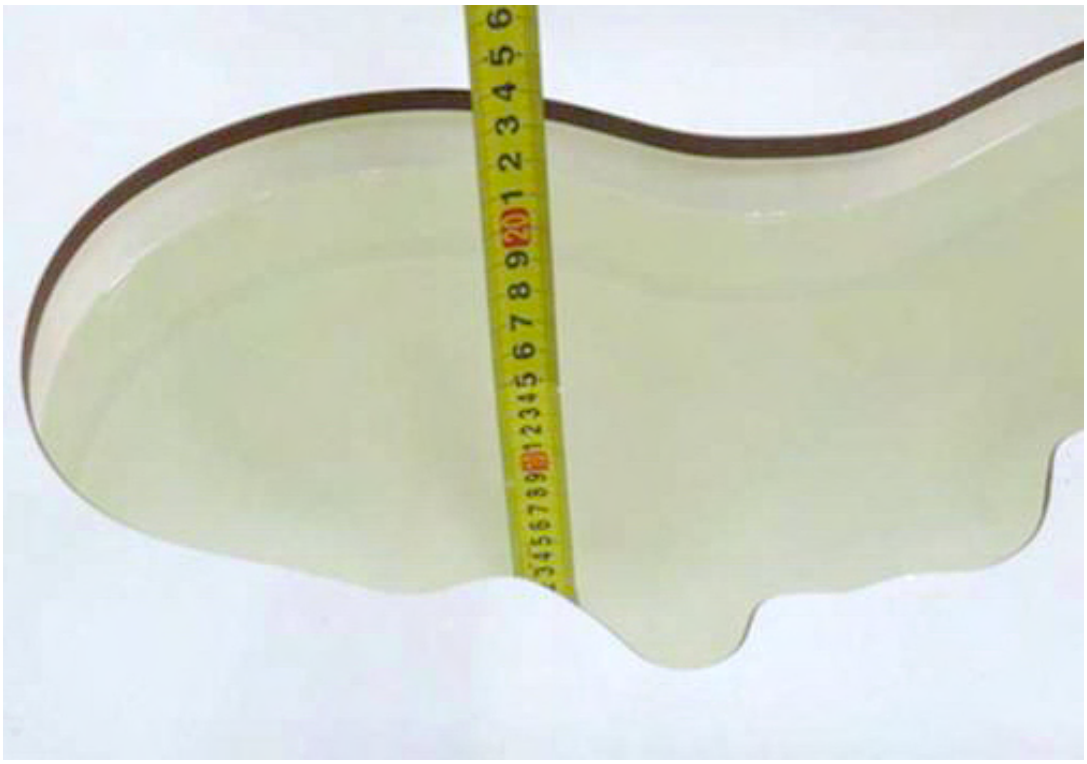
Picture 1: Specific Absorption Rate Test Layout



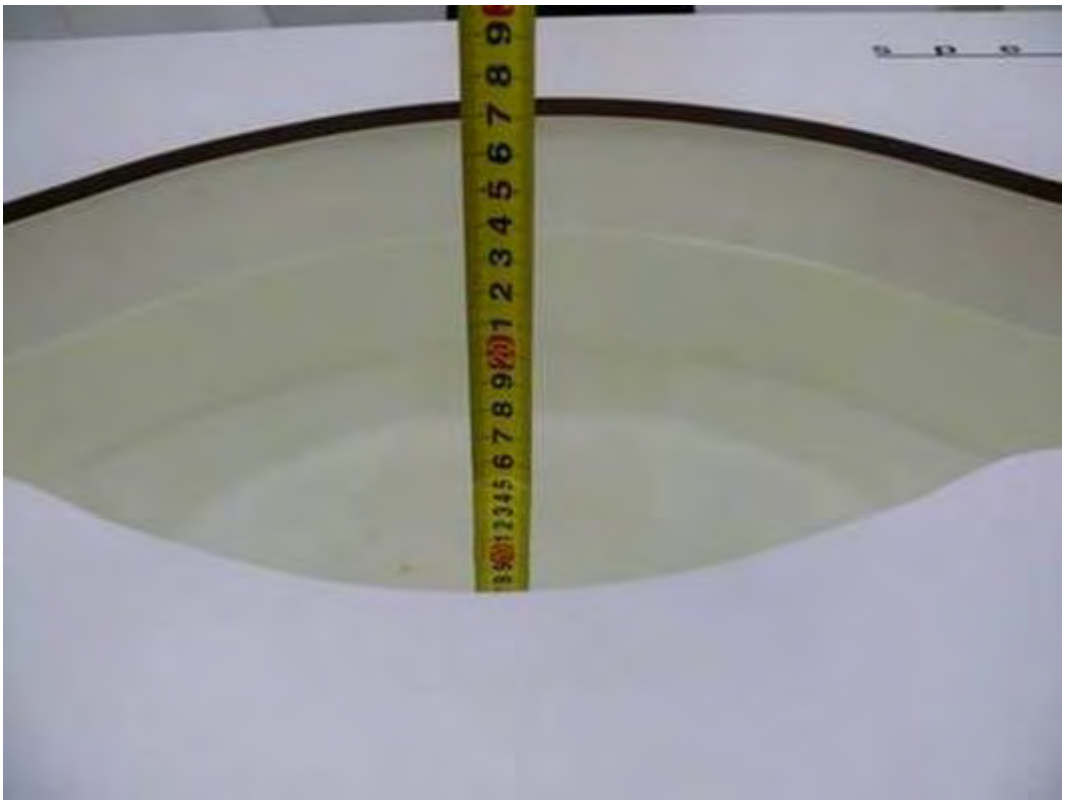
Picture 2: Liquid depth in the head Phantom (835MHz, 15.3cm depth)



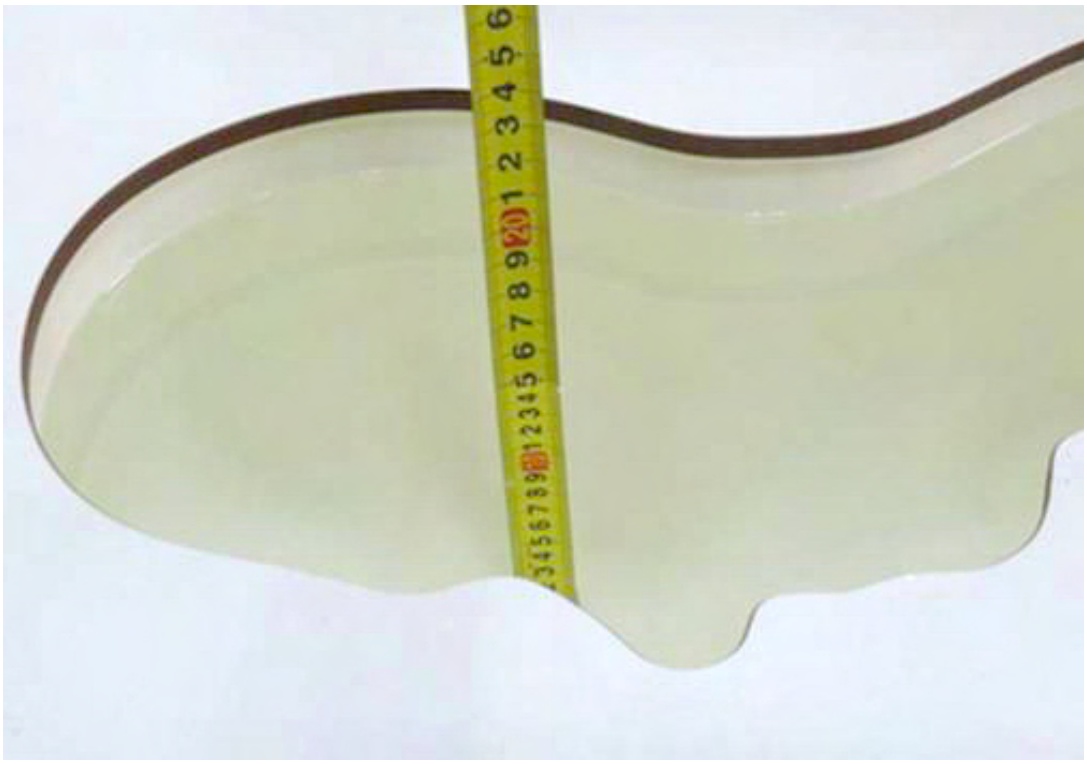
Picture 3: Liquid depth in the Flat Phantom (835 MHz, 15.4cm depth)



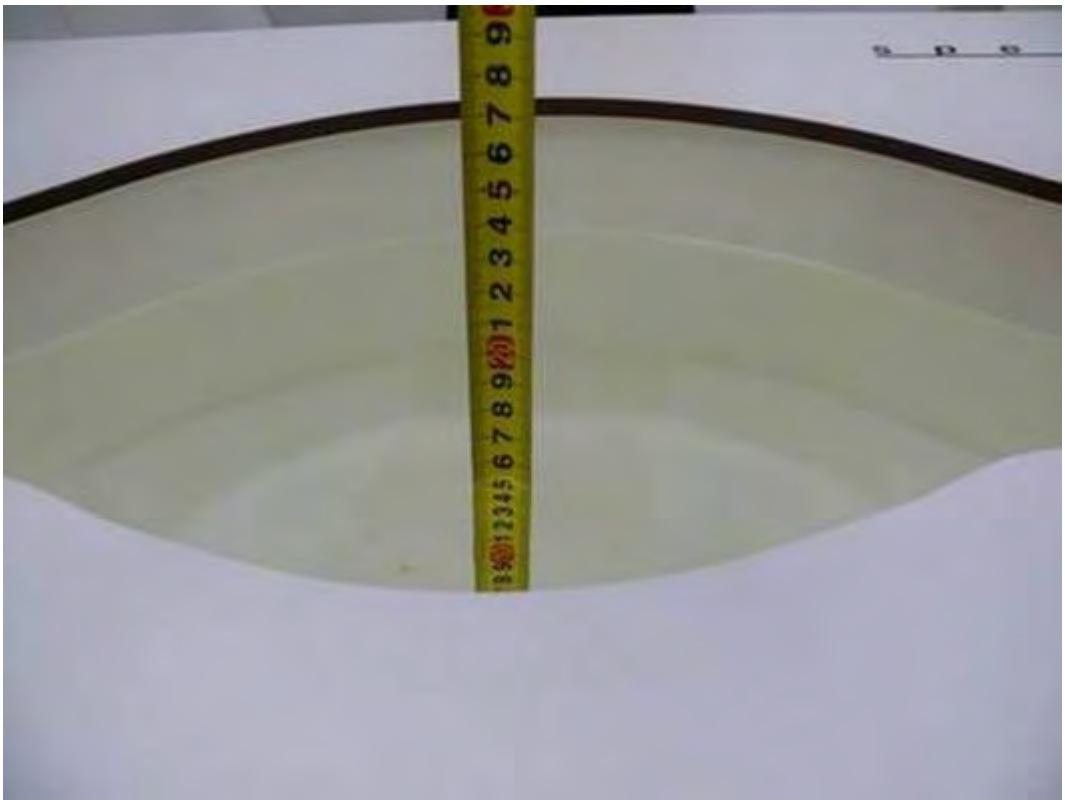
Picture 4: liquid depth in the head Phantom (1900 MHz, 15.1cm depth)



Picture 5: Liquid depth in the Flat Phantom (1900 MHz, 15.2cm depth)



Picture 6: liquid depth in the head Phantom (2450 MHz, 15.2cm depth)



Picture 7: Liquid depth in the Flat Phantom (2450 MHz, 15.3cm depth)

ANNEX B: System Check Results

System Performance Check at 835 MHz Head TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d092

Date/Time: 6/30/2011 2:00 AM

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.88 mho/m; ε_r = 43.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3℃ Liqiud Temperature: 22.5℃

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.50, 9.50, 9.50); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

d=15mm, Pin=250mW/Area Scan (101x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.81 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.8 V/m; Power Drift = -0.060 dB

Peak SAR (extrapolated) = 3.50 W/kg

SAR(1 g) = 2.3 mW/g; SAR(10 g) = 1.5 mW/g

Maximum value of SAR (measured) = 2.83 mW/g

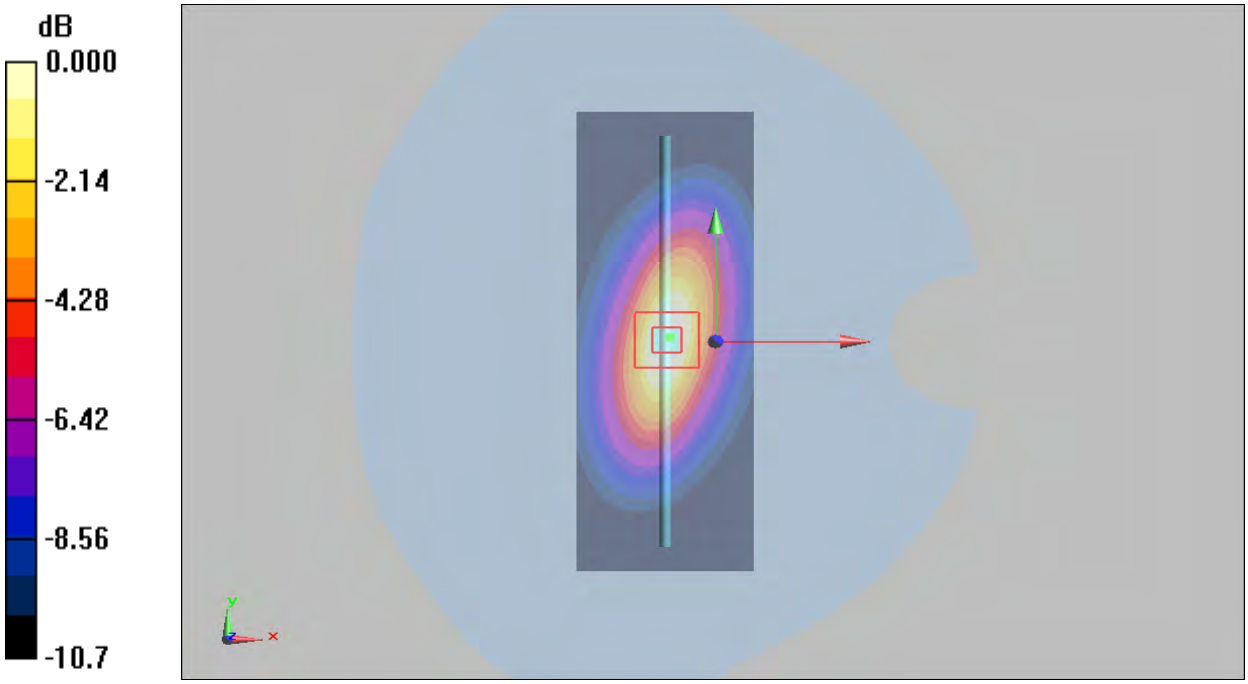


Figure 7 System Performance Check 835MHz 250mW

System Performance Check at 835 MHz Body TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d092

Date/Time: 7/1/2011 1:05:49 AM

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 55.89; ρ = 1000 kg/m^3

Ambient Temperature:22.3℃ Liqiud Temperature: 22.5℃

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

d=15mm, Pin=250mW/Area Scan (101x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.93 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.7 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 3.59 W/kg

SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.58 mW/g

Maximum value of SAR (measured) = 2.92 mW/g

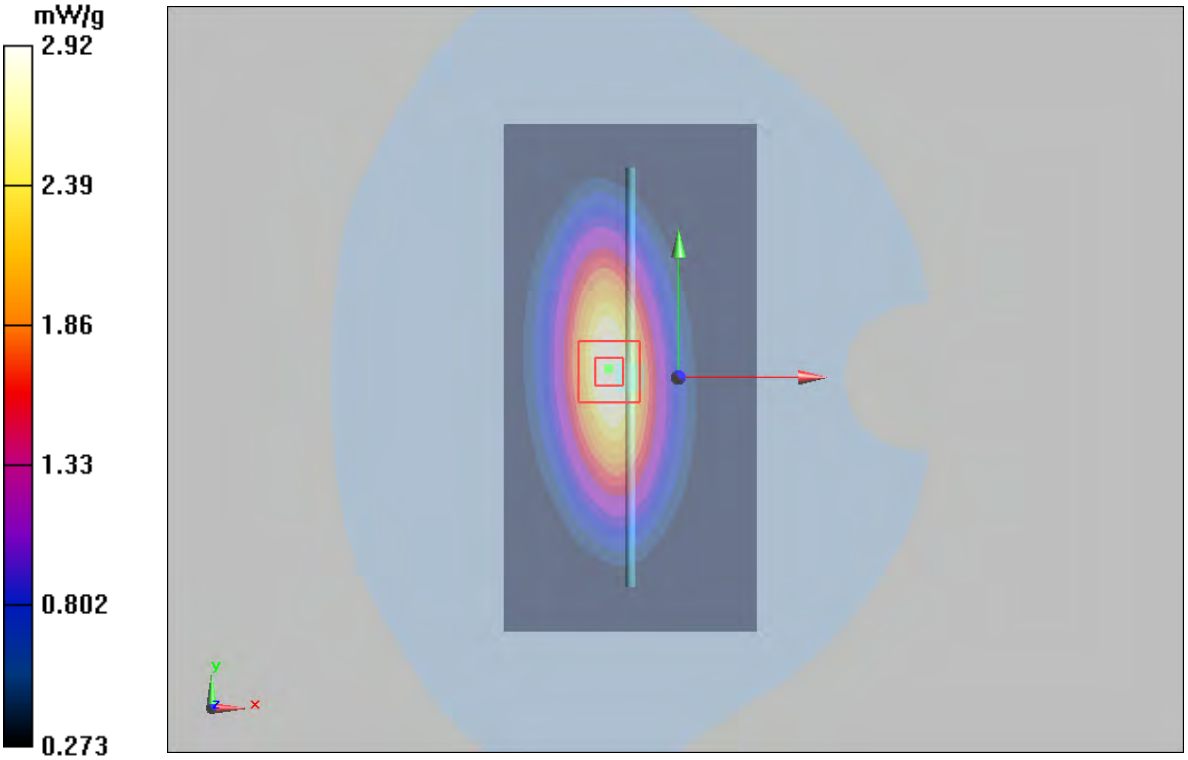


Figure 8 System Performance Check 835MHz 250mW

System Performance Check at 1900 MHz Head TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d018

Date/Time: 6/29/2011 4:40:04 AM

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.43 mho/m; ε_r = 39.99; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liqiud Temperature: 21.8℃

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.94, 7.94, 7.94); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 12.9 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 87.8 V/m; Power Drift = 0.040 dB

Peak SAR (extrapolated) = 20.1 W/kg

SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.46 mW/g

Maximum value of SAR (measured) = 11.9 mW/g

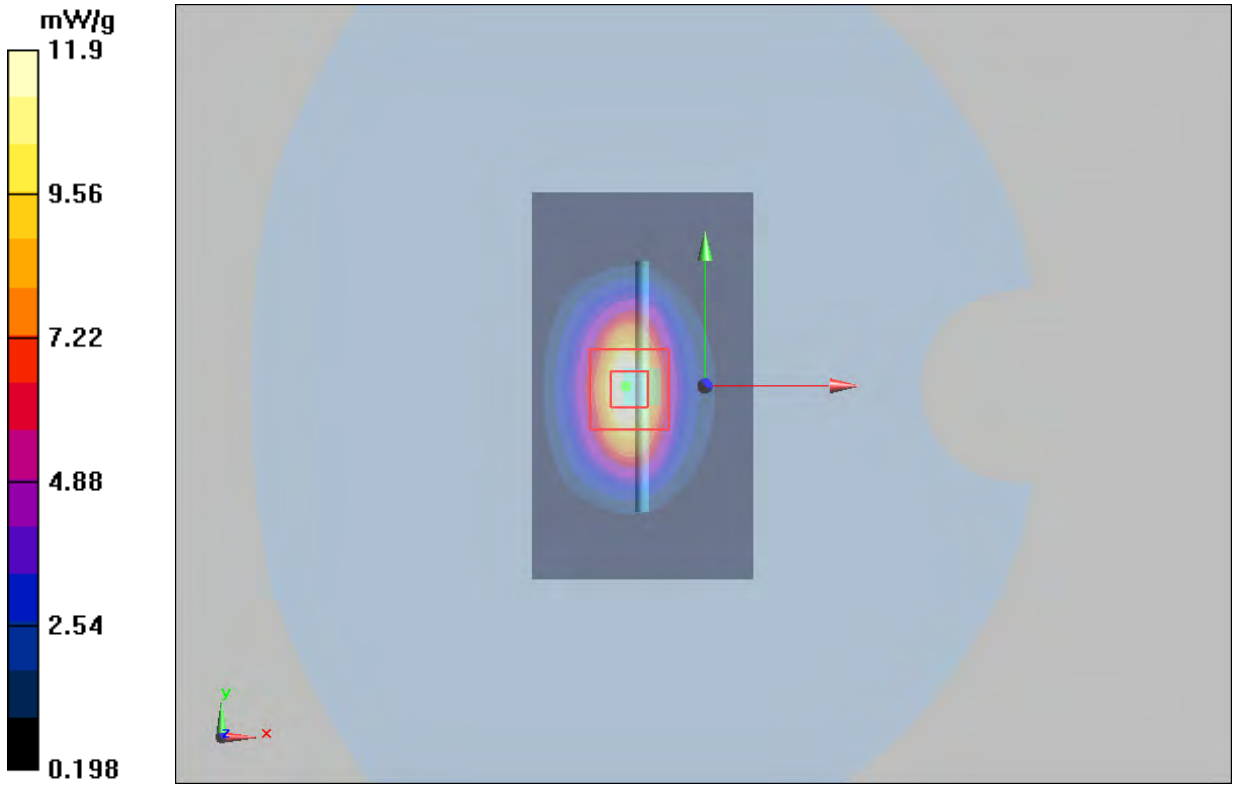


Figure 9 System Performance Check 1900MHz 250mW

System Performance Check at 1900 MHz Body TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d018

Date/Time: 6/29/2011 3:00:19 PM

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.55 mho/m; ε_r = 51.47; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liqiud Temperature: 21.8℃

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 12.5 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 75.9 V/m; Power Drift = 0.051 dB

Peak SAR (extrapolated) = 16.8 W/kg

SAR(1 g) = 9.73 mW/g; SAR(10 g) = 5.17 mW/g

Maximum value of SAR (measured) = 11 mW/g

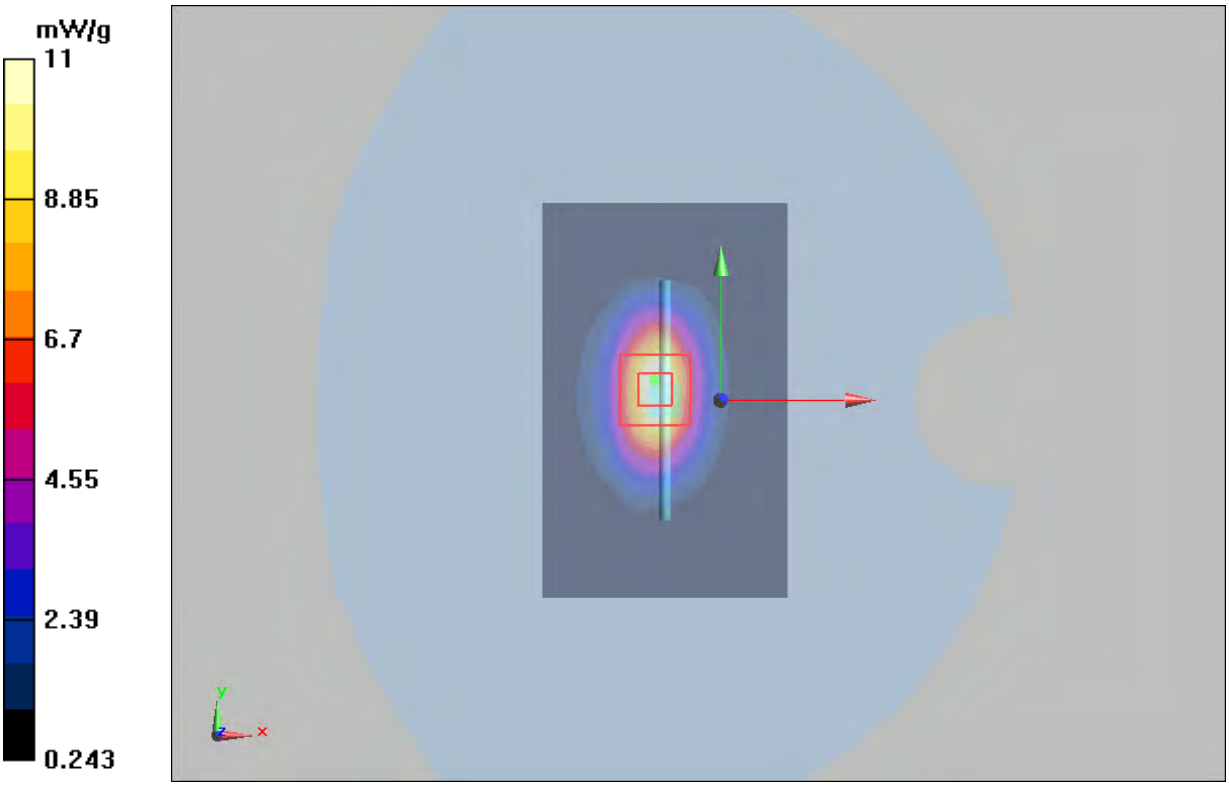


Figure 10 System Performance Check 1900MHz 250mW

System Performance Check at 2450 MHz Head TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 712

Date/Time: 7/5/2011 6:01:36 PM

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.83 mho/m; ε_r = 39.51; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liqiud Temperature: 21.8℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.32, 7.32, 7.32); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

d=10mm, Pin=250mW/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 21.4 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 67.0 V/m; Power Drift = 0.010 dB

Peak SAR (extrapolated) = 28.0 W/kg

SAR(1 g) = 14.06 mW/g; SAR(10 g) = 6.52 mW/g

Maximum value of SAR (measured) = 15.68 mW/g

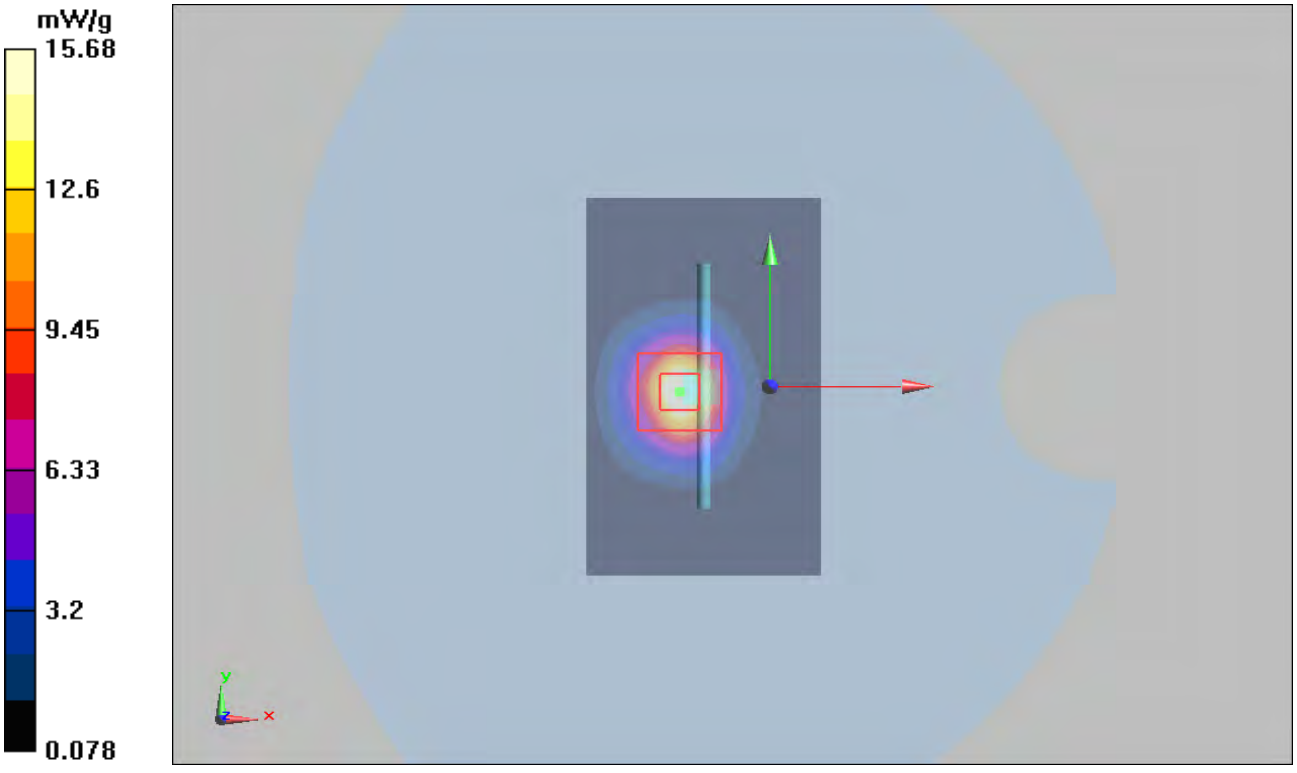


Figure 11 System Performance Check 2450MHz 250mW

System Performance Check at 2450 MHz Body TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 712

Date/Time: 7/5/2011 11:29:36 AM

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 51.73; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liqiud Temperature: 21.9℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.46, 7.46, 7.46); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

d=10mm, Pin=250mW/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 21.5 mW/g

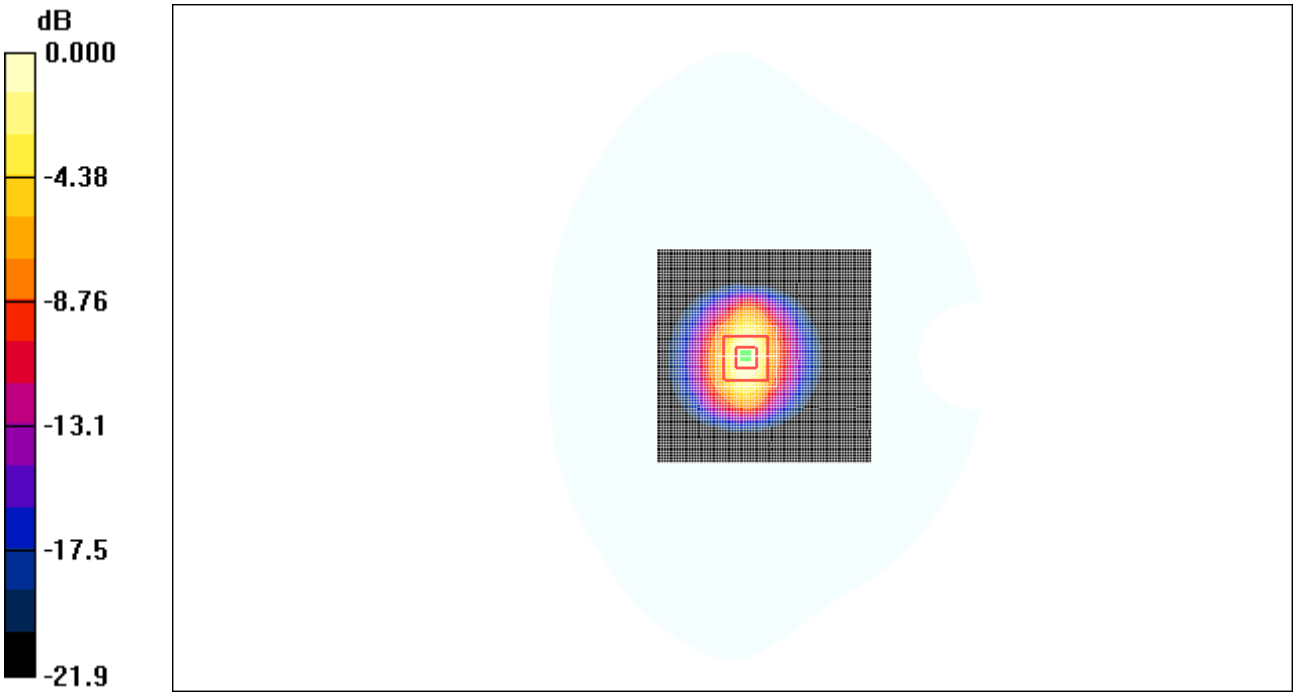
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 71.0 V/m; Power Drift = 0.011 dB

Peak SAR (extrapolated) = 28.2 W/kg

SAR(1 g) = 14.01 mW/g; SAR(10 g) = 6.48 mW/g

Maximum value of SAR (measured) = 19.82 mW/g



0 dB = 19.82mW/g

Figure 12 System Performance Check 2450MHz 250mW

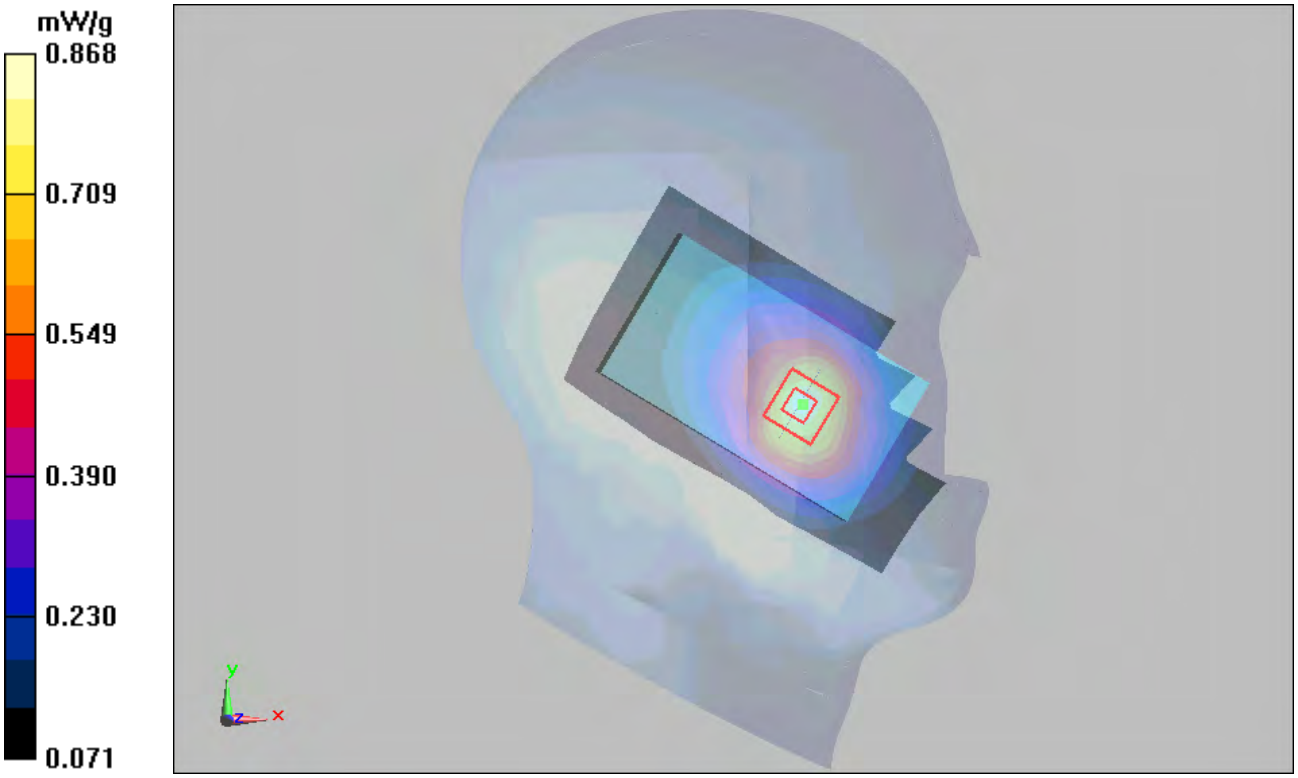
ANNEX C: Graph Results

CDMA Cellular Left Cheek High

Date/Time: 6/30/2011 4:36:47 AM
Communication System: CDMA Cellular; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.893 mho/m; ε_r = 43.1; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(9.50, 9.50, 9.50); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Cheek High/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.847 mW/g

Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.2 V/m; Power Drift = 0.045 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.787 mW/g; SAR(10 g) = 0.555 mW/g
Maximum value of SAR (measured) = 0.868 mW/g



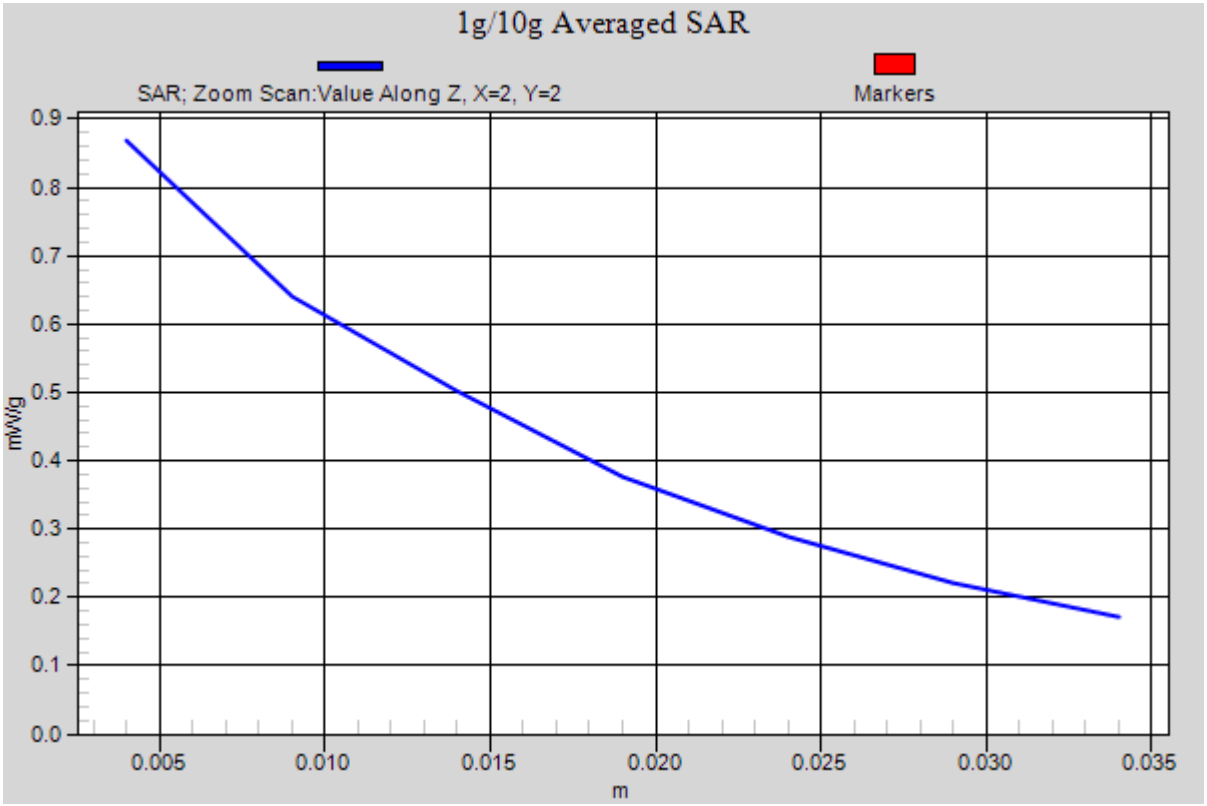


Figure 13 CDMA Cellular Left Hand Touch Cheek Channel 777

CDMA Cellular Left Cheek Middle

Date/Time: 6/30/2011 4:18:53 AM
Communication System: CDMA Cellular; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.882 mho/m; ε_r = 43.3; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(9.50, 9.50, 9.50); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Cheek Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.848 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.2 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.768 mW/g; SAR(10 g) = 0.548 mW/g
Maximum value of SAR (measured) = 0.829 mW/g

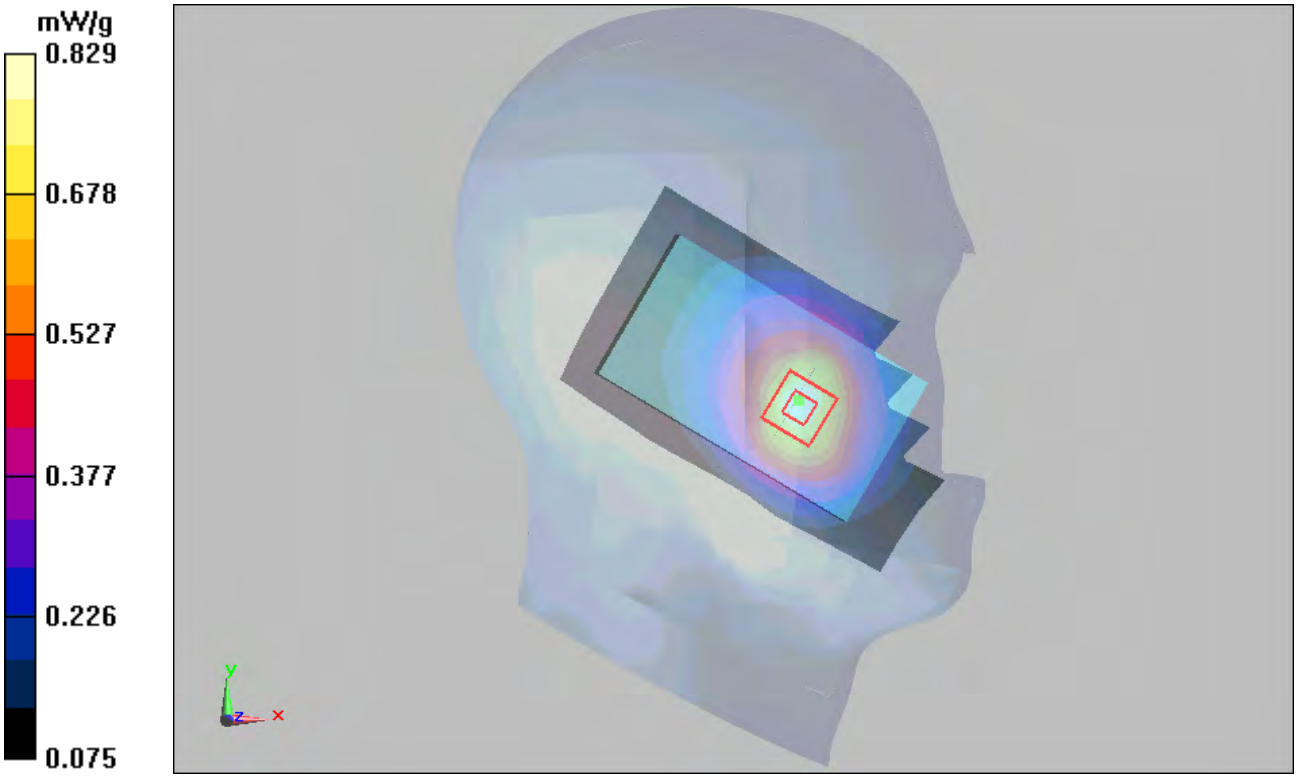


Figure 14 CDMA Cellular Left Hand Touch Cheek Channel 384

CDMA Cellular Left Cheek Low

Date/Time: 6/30/2011 4:53:57 AM
Communication System: CDMA Cellular; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium parameters used: f = 825 MHz; σ = 0.877 mho/m; ε_r = 43.5; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(9.50, 9.50, 9.50); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

CheekLow/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.679 mW/g

CheekLow/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.91 V/m; Power Drift = 0.130 dB
Peak SAR (extrapolated) = 0.816 W/kg
SAR(1 g) = 0.609 mW/g; SAR(10 g) = 0.431 mW/g
Maximum value of SAR (measured) = 0.682 mW/g

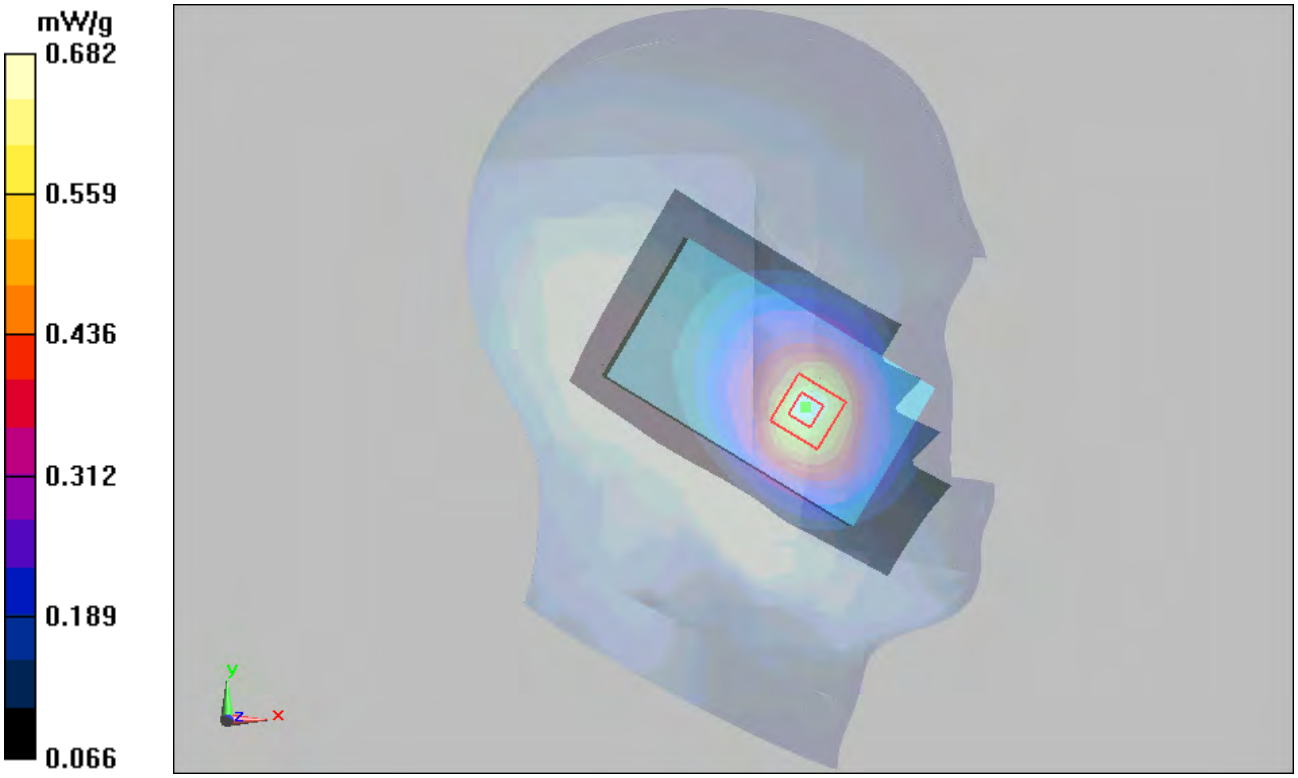


Figure 15 CDMA Cellular Left Hand Touch Cheek Channel 1013

CDMA Cellular Left Tilt Middle

Date/Time: 6/30/2011 5:12:08 AM
Communication System: CDMA Cellular; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.882 mho/m; ε_r = 43.3; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Left Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(9.50, 9.50, 9.50); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Tilt Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.468 mW/g

Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.7 V/m; Power Drift = 0.141 dB
Peak SAR (extrapolated) = 0.531 W/kg
SAR(1 g) = 0.442 mW/g; SAR(10 g) = 0.338 mW/g
Maximum value of SAR (measured) = 0.465 mW/g

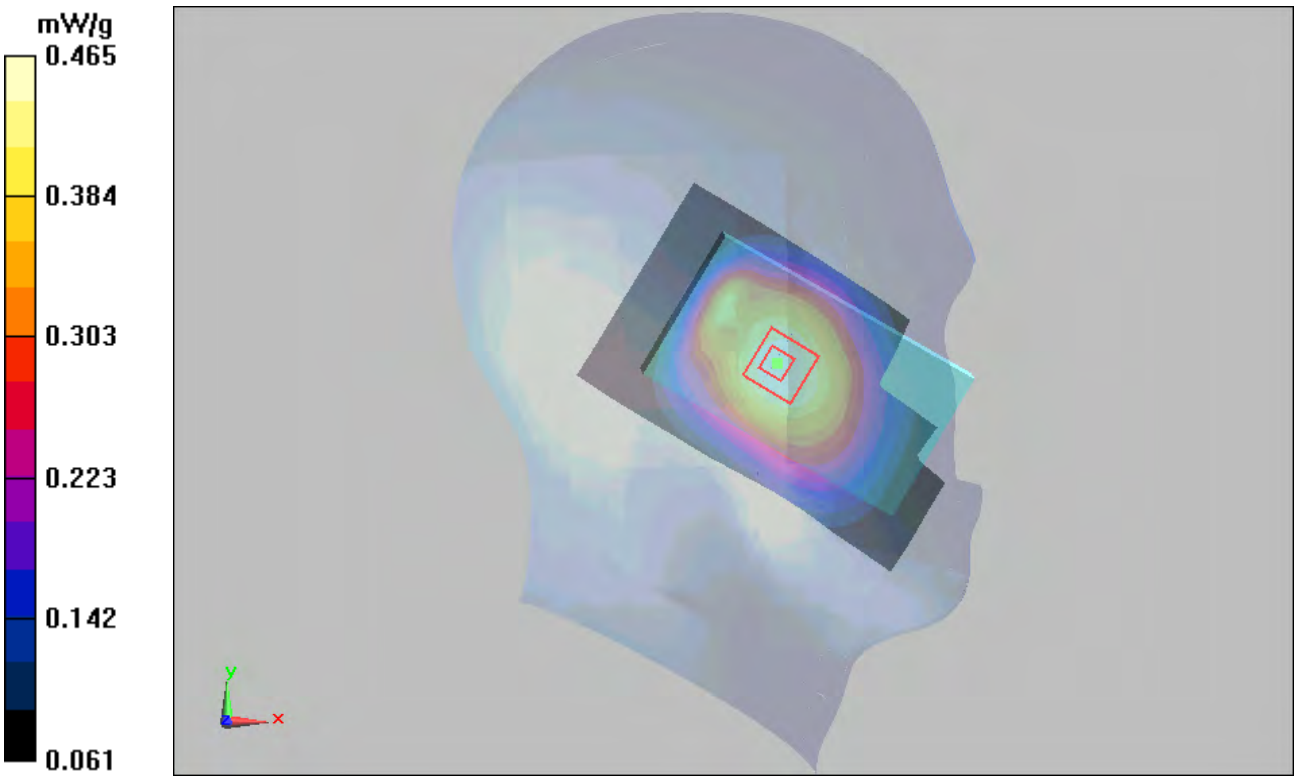


Figure 16 CDMA Cellular Left Hand Tilt 15° Channel 384

CDMA Cellular Right Cheek Middle

Date/Time: 6/30/2011 3:31:21 AM
Communication System: CDMA Cellular; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.882 mho/m; ε_r = 43.3; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(9.50, 9.50, 9.50); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Cheek Middle 2/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.694 mW/g

Cheek Middle 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11 V/m; Power Drift = -0.007 dB
Peak SAR (extrapolated) = 0.841 W/kg
SAR(1 g) = 0.611 mW/g; SAR(10 g) = 0.426 mW/g
Maximum value of SAR (measured) = 0.651 mW/g

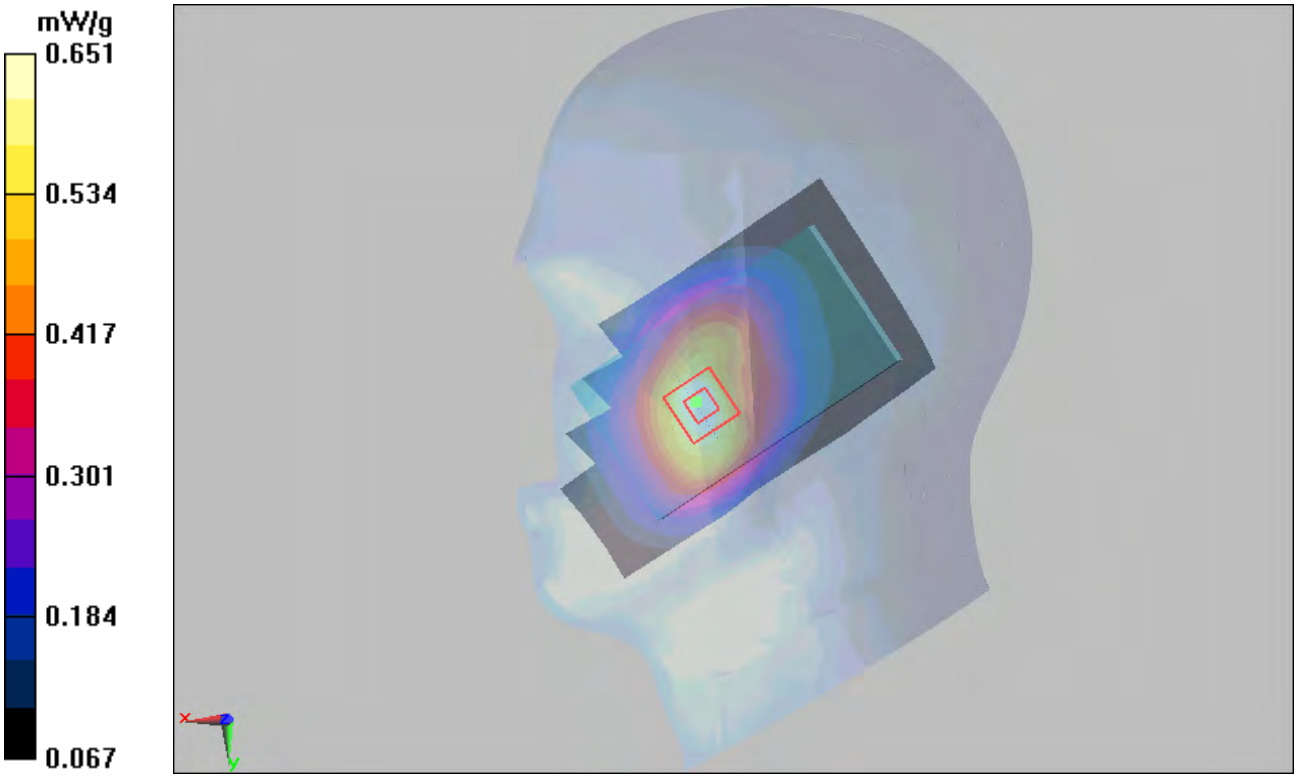


Figure 17 CDMA Cellular Right Hand Touch Cheek Channel 384

CDMA Cellular Right Tilt Middle

Date/Time: 6/30/2011 3:49:21 AM
Communication System: CDMA Cellular; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.882 mho/m; ε_r = 43.3; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Right Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(9.50, 9.50, 9.50); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45
Tilt Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.457 mW/g
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.1 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 0.550 W/kg
SAR(1 g) = 0.443 mW/g; SAR(10 g) = 0.335 mW/g
Maximum value of SAR (measured) = 0.468 mW/g
Tilt Middle/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.1 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 0.609 W/kg
SAR(1 g) = 0.400 mW/g; SAR(10 g) = 0.284 mW/g
Maximum value of SAR (measured) = 0.441 mW/g

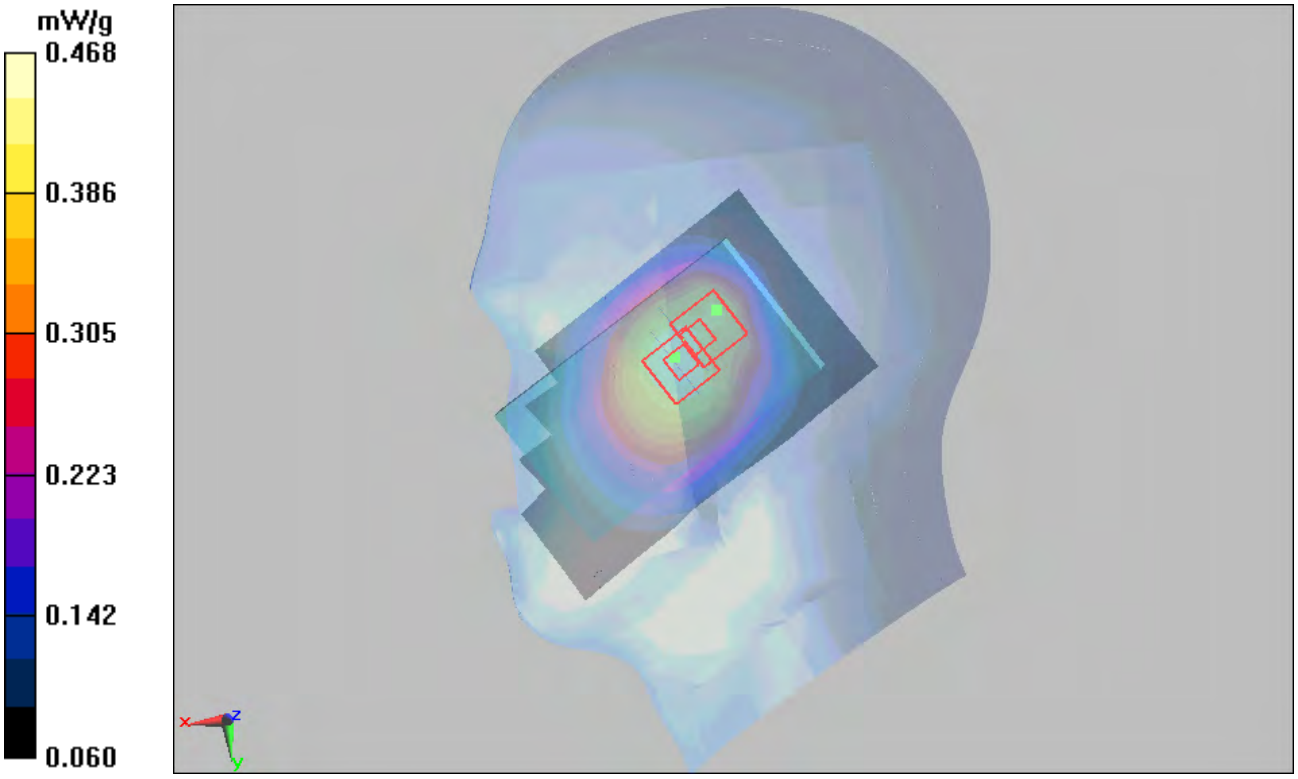


Figure 18 CDMA Cellular Right Hand Tilt 15° Channel 384

CDMA Cellular Towards Ground High

Date/Time: 7/1/2011 4:36:12 AM
Communication System: CDMA Cellular; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 848.31 MHz; σ = 1.01 mho/m; ε_r = 55.8; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Towards Ground High/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.914 mW/g
Towards Ground High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.8 V/m; Power Drift = -0.097 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.828 mW/g; SAR(10 g) = 0.591 mW/g
Maximum value of SAR (measured) = 0.871 mW/g
Towards Ground High/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.8 V/m; Power Drift = -0.097 dB
Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.623 mW/g; SAR(10 g) = 0.400 mW/g
Maximum value of SAR (measured) = 0.687 mW/g

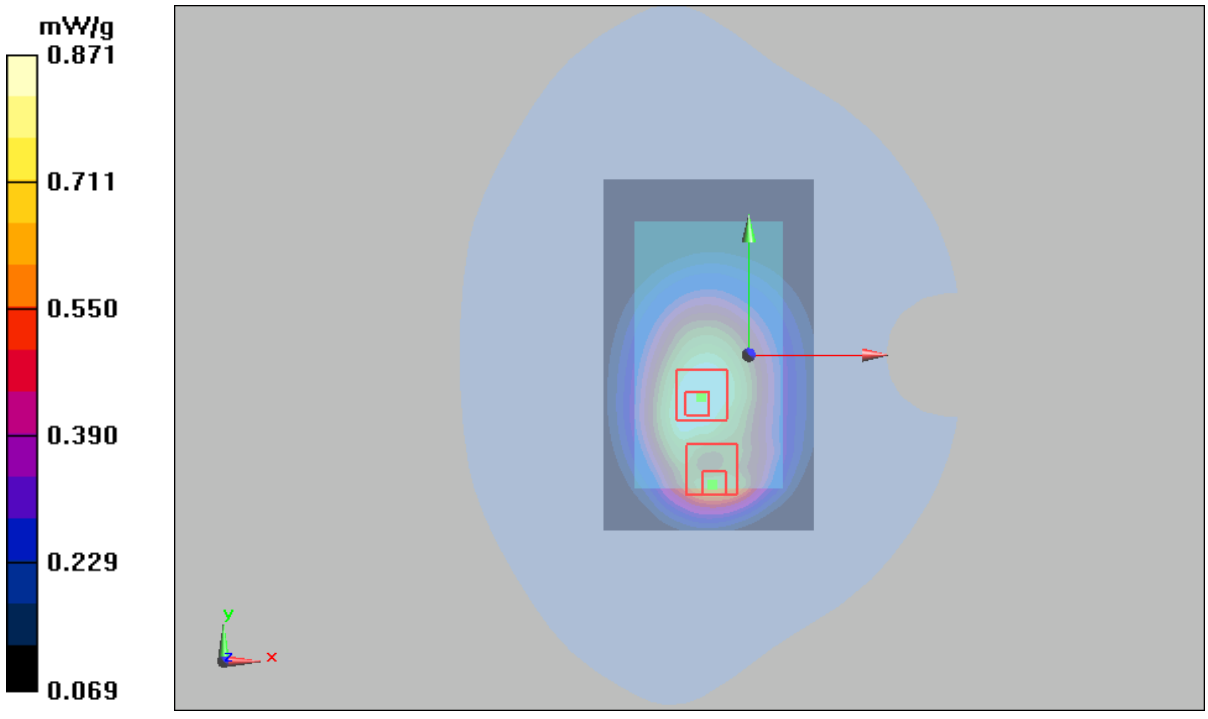
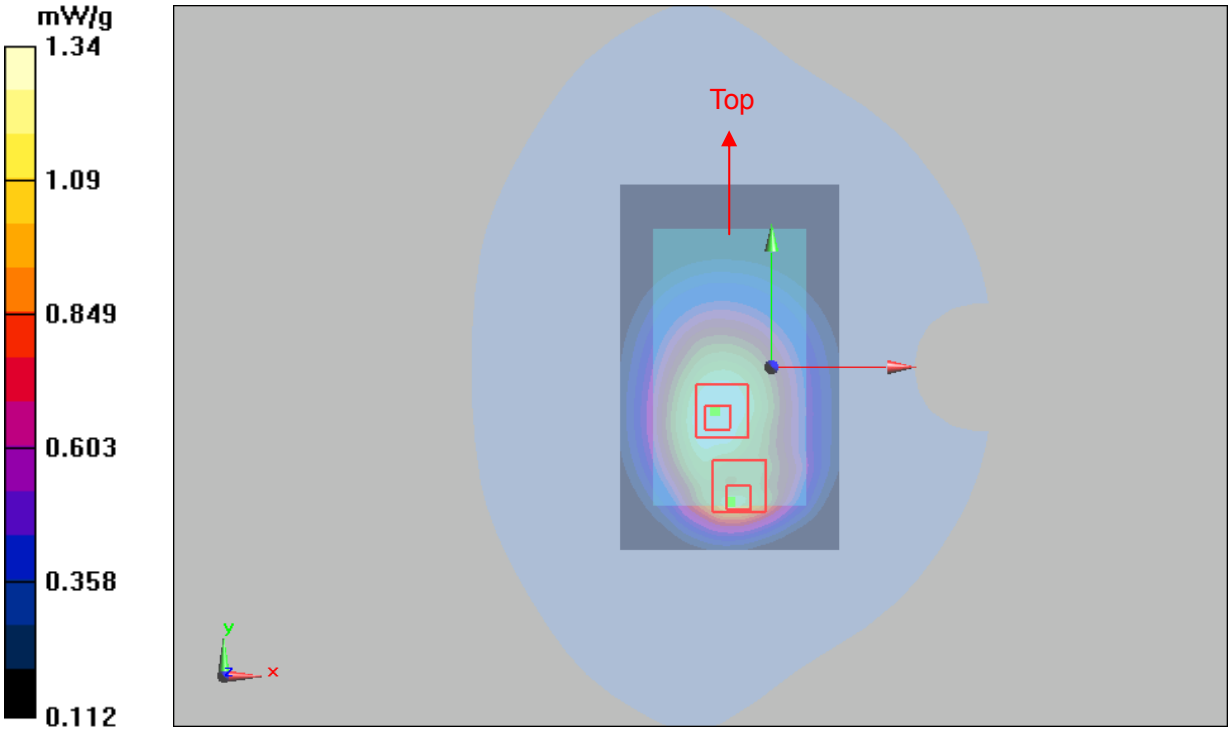


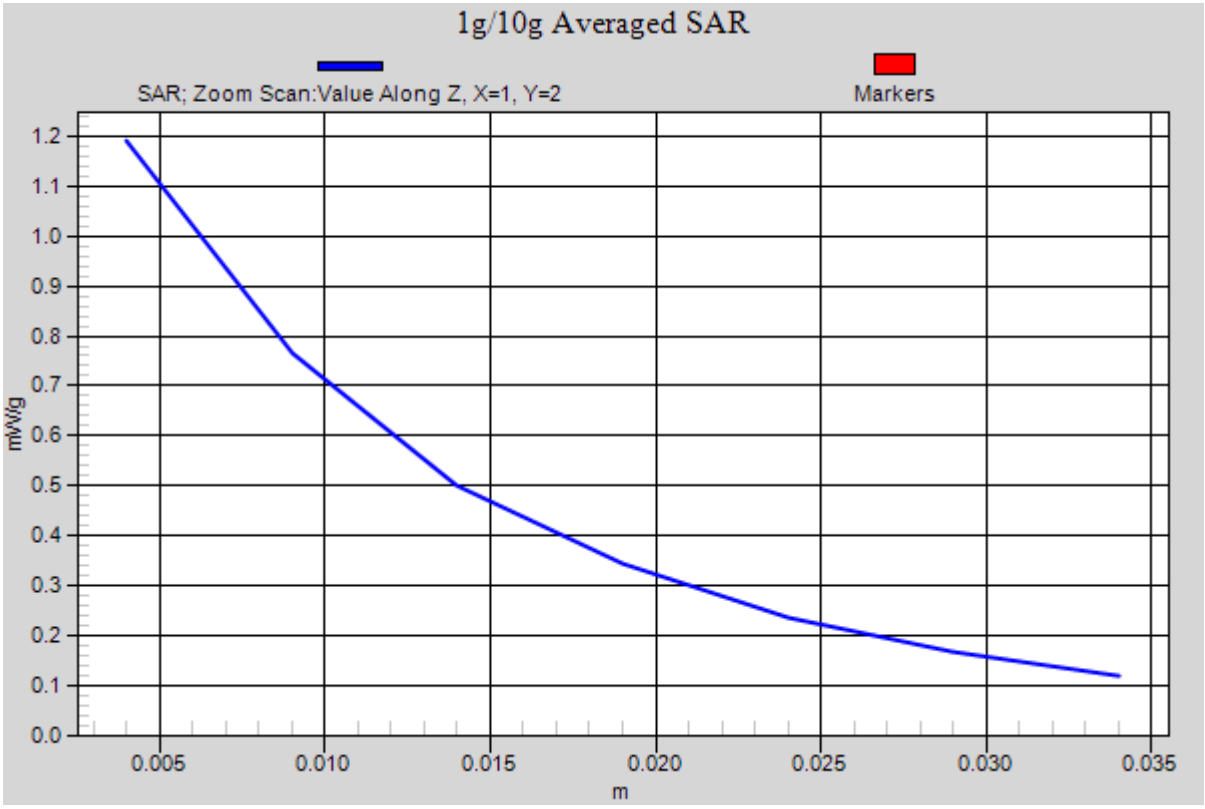
Figure 19 Body, CDMA Cellular Towards Ground Channel 777

CDMA Cellular Towards Ground Middle

Date/Time: 7/1/2011 4:11:31 AM
Communication System: CDMA Cellular; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.992 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Towards Ground Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.39 mW/g
Towards Ground Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 34 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 1.7 W/kg
SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.932 mW/g
Maximum value of SAR (measured) = 1.34 mW/g
Towards Ground Middle/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 34 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 1.08 mW/g; SAR(10 g) = 0.706 mW/g
Maximum value of SAR (measured) = 1.19 mW/g





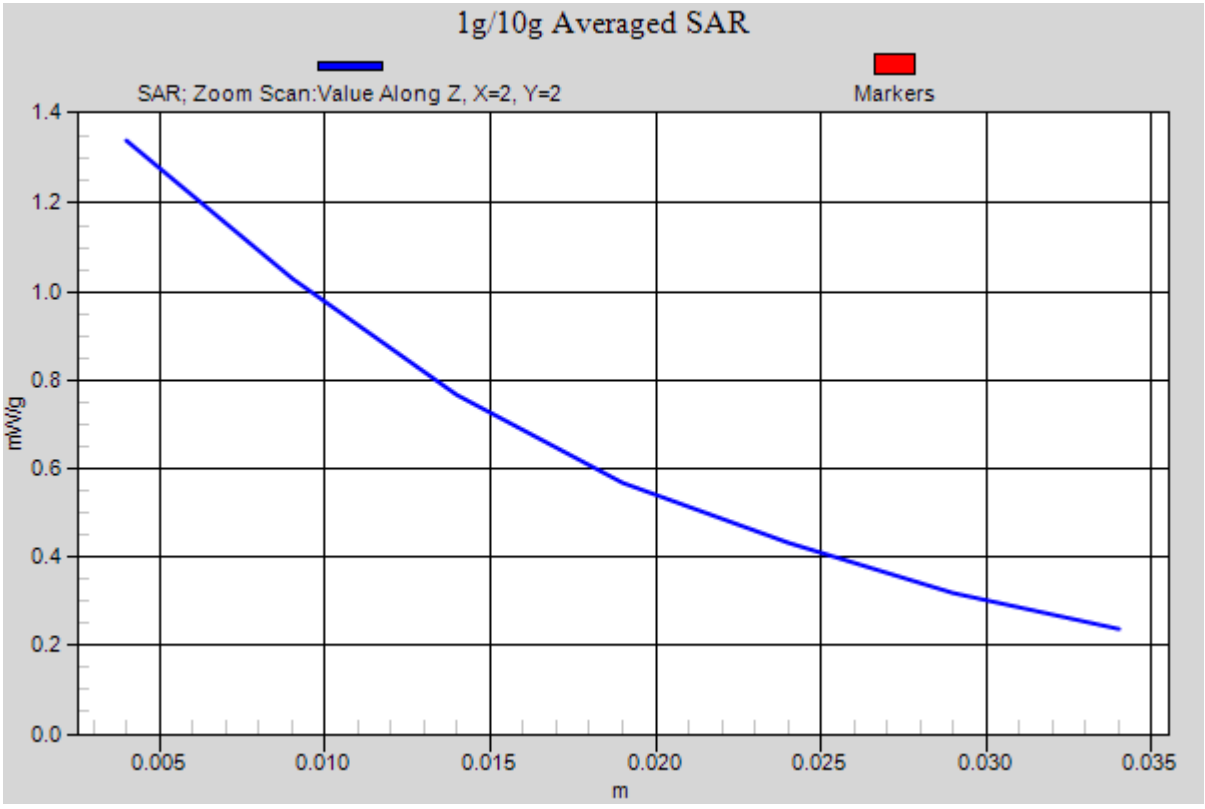


Figure 20 Body, CDMA Cellular Towards Ground Channel 384

CDMA Cellular Towards Ground Low

Date/Time: 7/1/2011 5:03:57 AM
Communication System: CDMA Cellular; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium parameters used: f = 825 MHz; σ = 0.979 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Towards Ground Low/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.27 mW/g
Towards Ground Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 31.5 V/m; Power Drift = 0.039 dB
Peak SAR (extrapolated) = 1.68 W/kg
SAR(1 g) = 1.21 mW/g; SAR(10 g) = 0.851 mW/g
Towards Ground Low/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 31.5 V/m; Power Drift = 0.039 dB
Peak SAR (extrapolated) = 1.53 W/kg
SAR(1 g) = 0.932 mW/g; SAR(10 g) = 0.615 mW/g
Maximum value of SAR (measured) = 1.08 mW/g

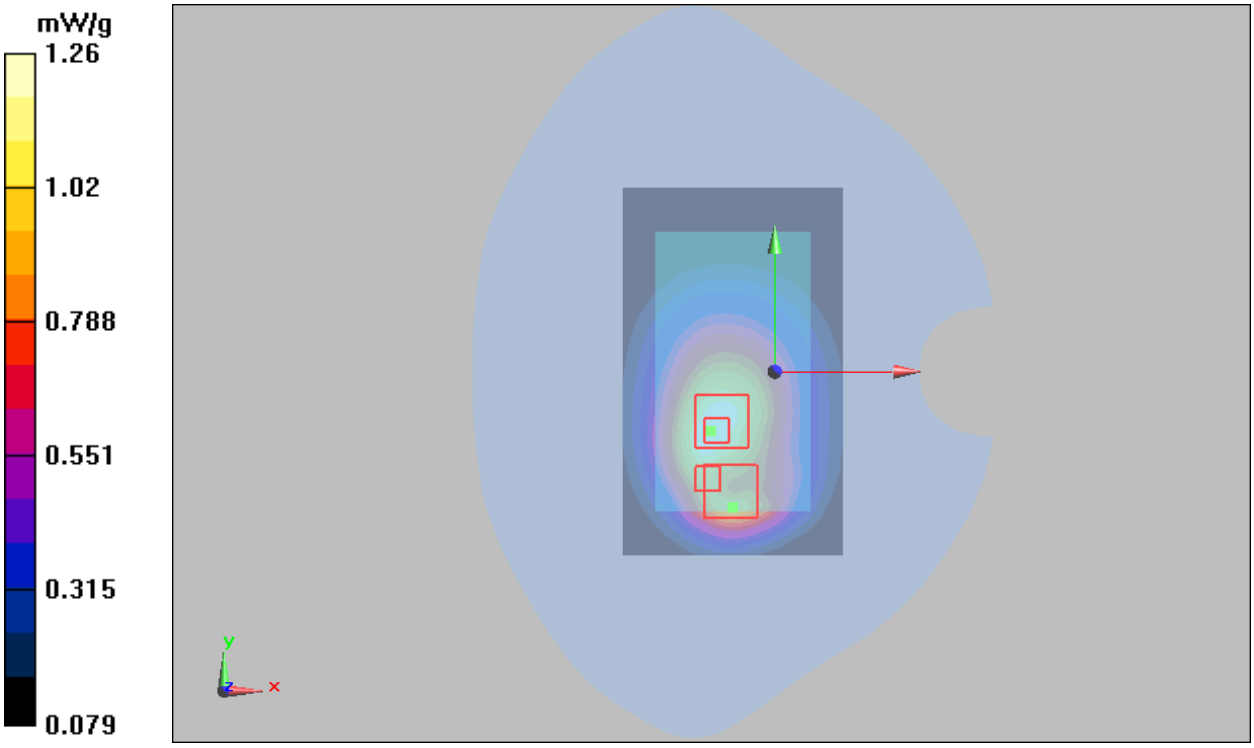


Figure 21 Body, CDMA Cellular Towards Ground Channel 1013

CDMA Cellular Towards Phantom Middle

Date/Time: 7/1/2011 2:47:25 AM

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

Medium parameters used: f = 837 MHz; σ = 0.992 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Towards Phantom Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.844 mW/g

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

Reference Value = 27.6 V/m; Power Drift = -0.091 dB

Peak SAR (extrapolated) = 0.975 W/kg

SAR(1 g) = 0.786 mW/g; SAR(10 g) = 0.601 mW/g

Maximum value of SAR (measured) = 0.828 mW/g

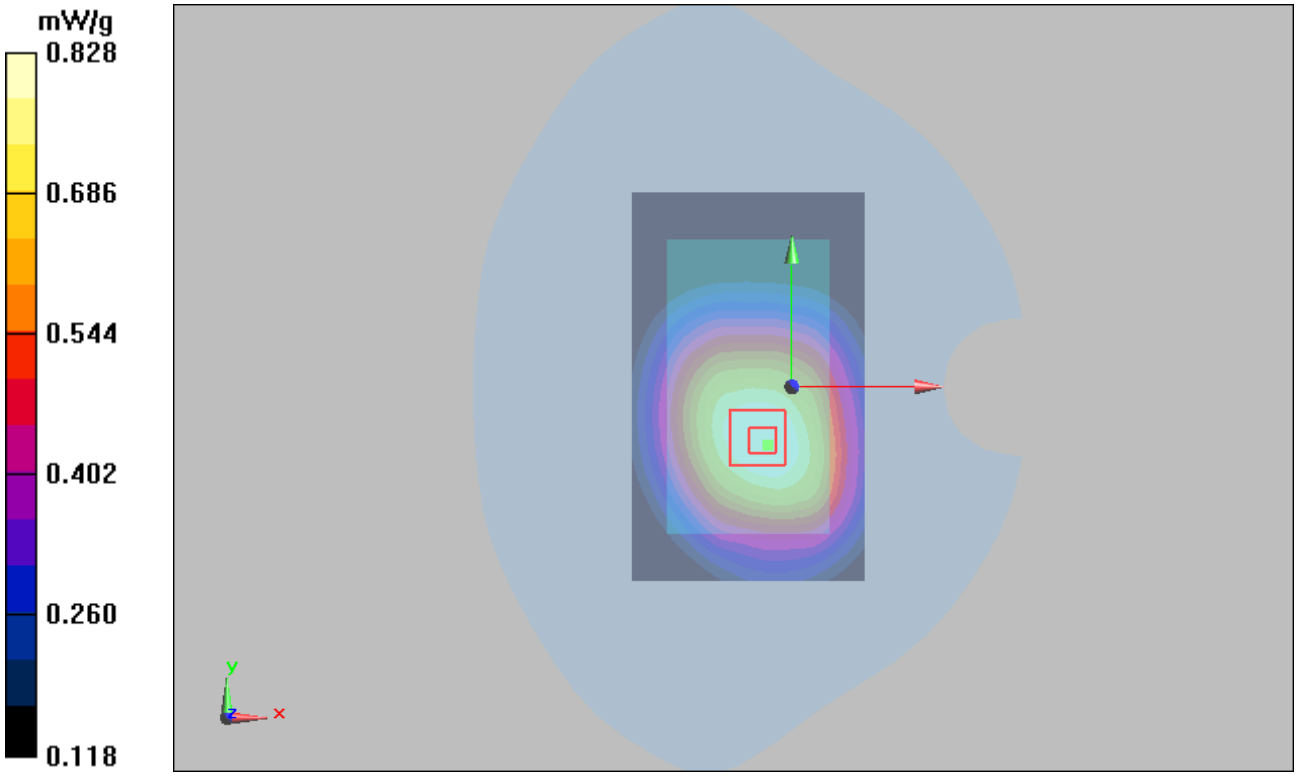


Figure 22 Body, CDMA Cellular Towards Phantom Channel 384

CDMA Cellular Left Edge Middle

Date/Time: 7/1/2011 3:08:50 AM
Communication System: CDMA Cellular; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.992 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Left Edge Middle/Area Scan (31x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.762 mW/g

Left Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.6 V/m; Power Drift = -0.133 dB
Peak SAR (extrapolated) = 0.987 W/kg
SAR(1 g) = 0.704 mW/g; SAR(10 g) = 0.485 mW/g
Maximum value of SAR (measured) = 0.755 mW/g

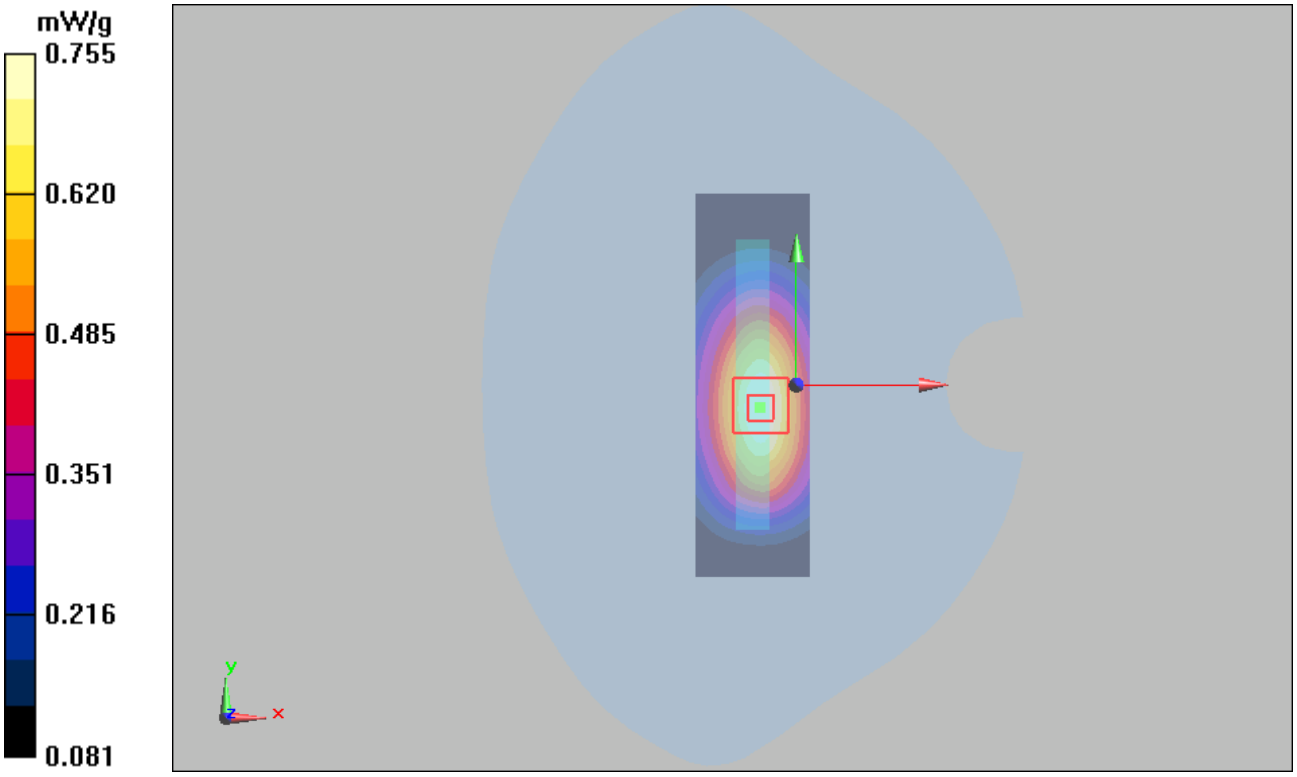


Figure 23 Body, CDMA Cellular Left Edge Channel 384

CDMA Cellular Right Edge Middle

Date/Time: 7/1/2011 3:31:15 AM
Communication System: CDMA Cellular; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.992 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Right Edge Middle/Area Scan (31x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.335 mW/g

Right Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.7 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 0.426 W/kg
SAR(1 g) = 0.313 mW/g; SAR(10 g) = 0.219 mW/g
Maximum value of SAR (measured) = 0.332 mW/g

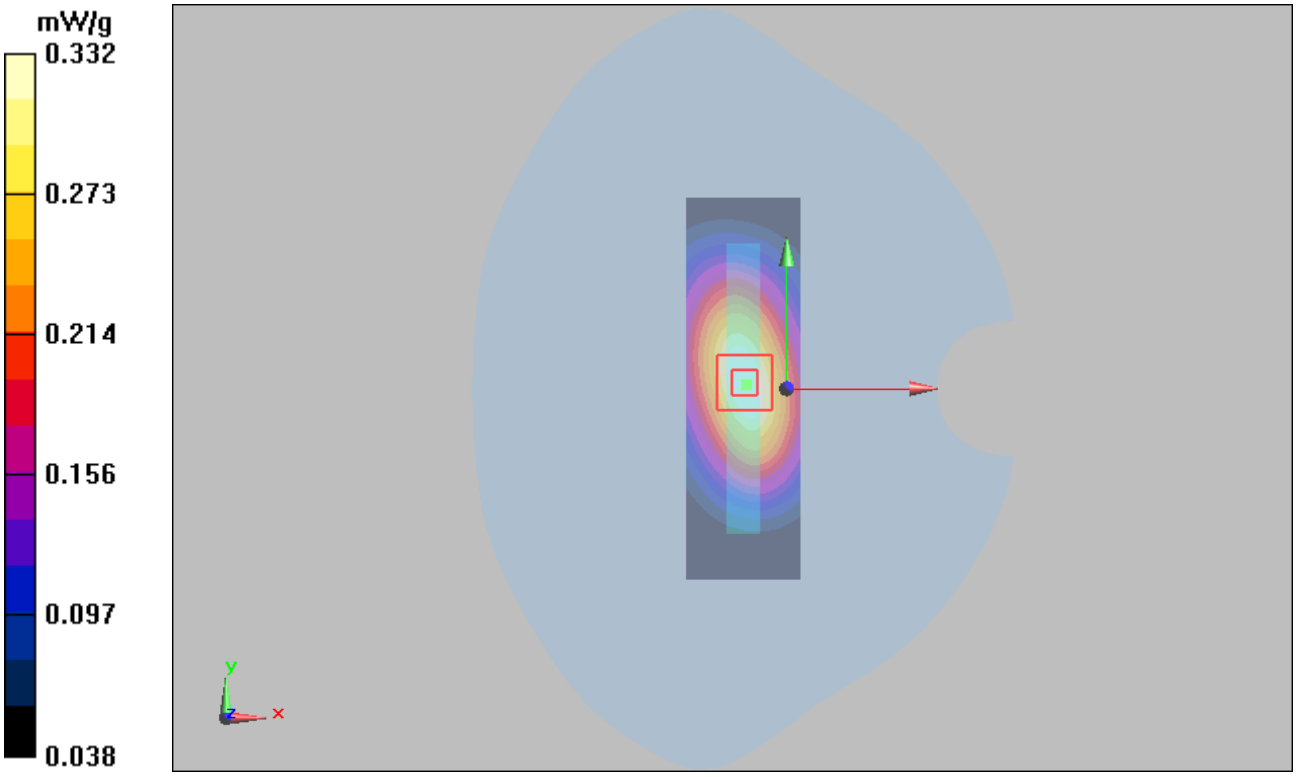


Figure 24 Body, CDMA Cellular Right Edge Channel 384

CDMA Cellular Bottom Edge Middle

Date/Time: 7/1/2011 3:56:33 AM
Communication System: CDMA Cellular; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.992 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Bottom Edge Middle/Area Scan (31x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.247 mW/g

Bottom Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.7 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 0.373 W/kg
SAR(1 g) = 0.214 mW/g; SAR(10 g) = 0.121 mW/g
Maximum value of SAR (measured) = 0.238 mW/g

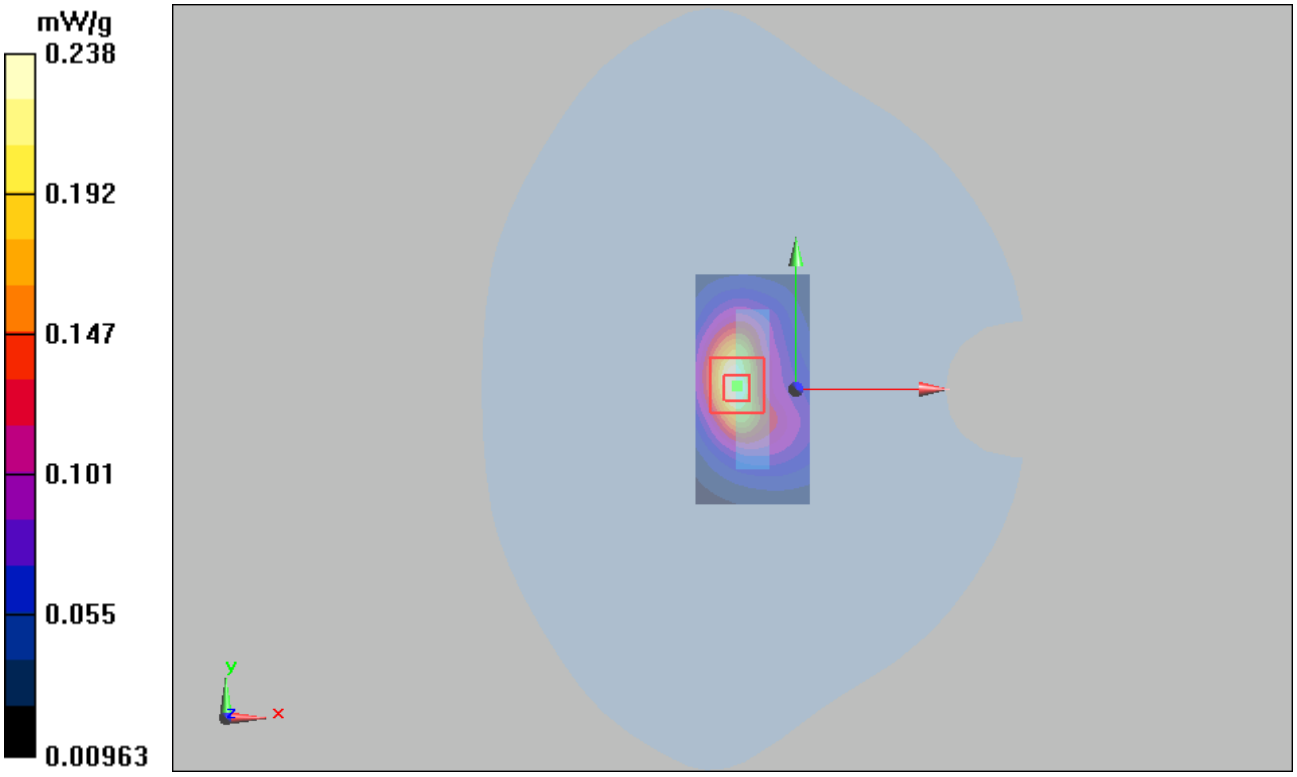


Figure 25 Body, CDMA Cellular Bottom Edge Channel 384

CDMA Cellular with Earphone Towards Ground Middle

Date/Time: 7/1/2011 6:47:17 AM
Communication System: CDMA Cellular; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.992 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Towards Ground Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.24 mW/g
Towards Ground Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.3 V/m; Power Drift = 0.043 dB
Peak SAR (extrapolated) = 1.95 W/kg
SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.720 mW/g
Maximum value of SAR (measured) = 1.3 mW/g
Towards Ground Middle/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.3 V/m; Power Drift = 0.043 dB
Peak SAR (extrapolated) = 1.59 W/kg
SAR(1 g) = 1.15 mW/g; SAR(10 g) = 0.804 mW/g
Maximum value of SAR (measured) = 1.21 mW/g

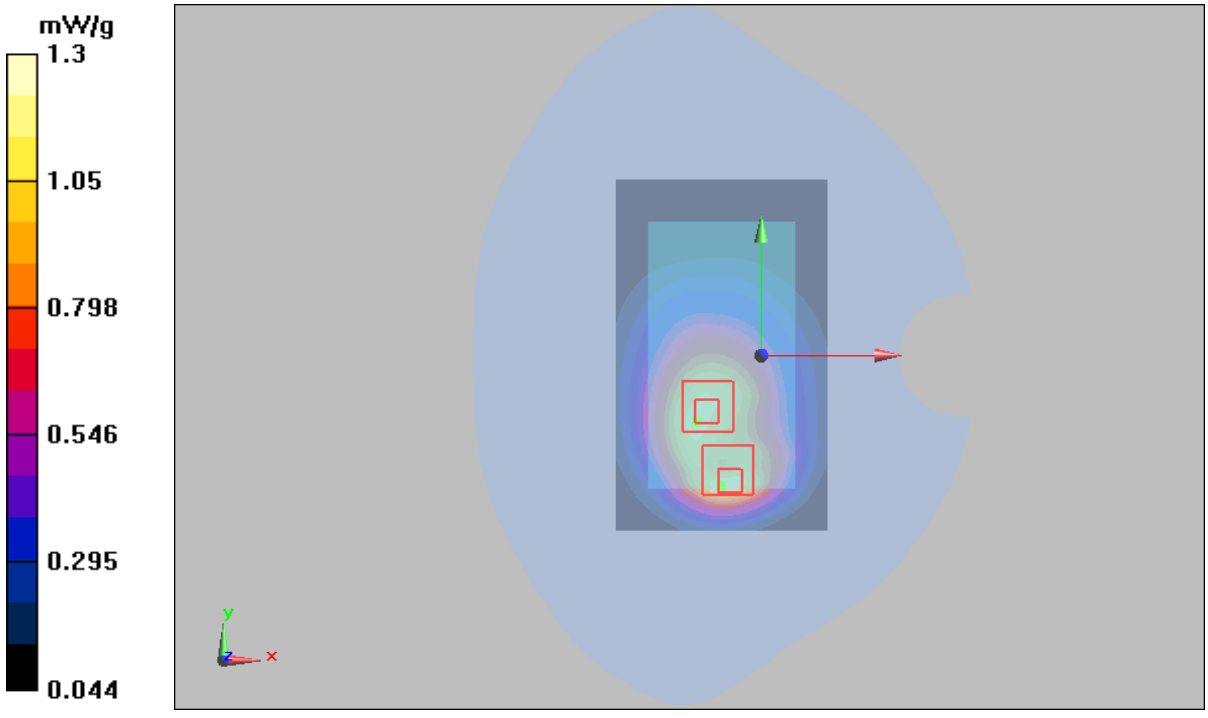


Figure 26 Body, CDMA Cellular with Earphone Towards Ground Channel 384

CDMA Cellular with EVDO Rev.0 Towards Ground Middle

Date/Time: 7/1/2011 11:25:18 AM
Communication System: CDMA Cellular EVDO Re.0; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.992 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Towards Ground Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.36 mW/g
Towards Ground Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 33.5 V/m; Power Drift = -0.179 dB
Peak SAR (extrapolated) = 1.63 W/kg
SAR(1 g) = 1.21 mW/g; SAR(10 g) = 0.871 mW/g
Maximum value of SAR (measured) = 1.29 mW/g
Towards Ground Middle/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 33.5 V/m; Power Drift = -0.179 dB
Peak SAR (extrapolated) = 1.62 W/kg
SAR(1 g) = 0.989 mW/g; SAR(10 g) = 0.660 mW/g
Maximum value of SAR (measured) = 1.11 mW/g

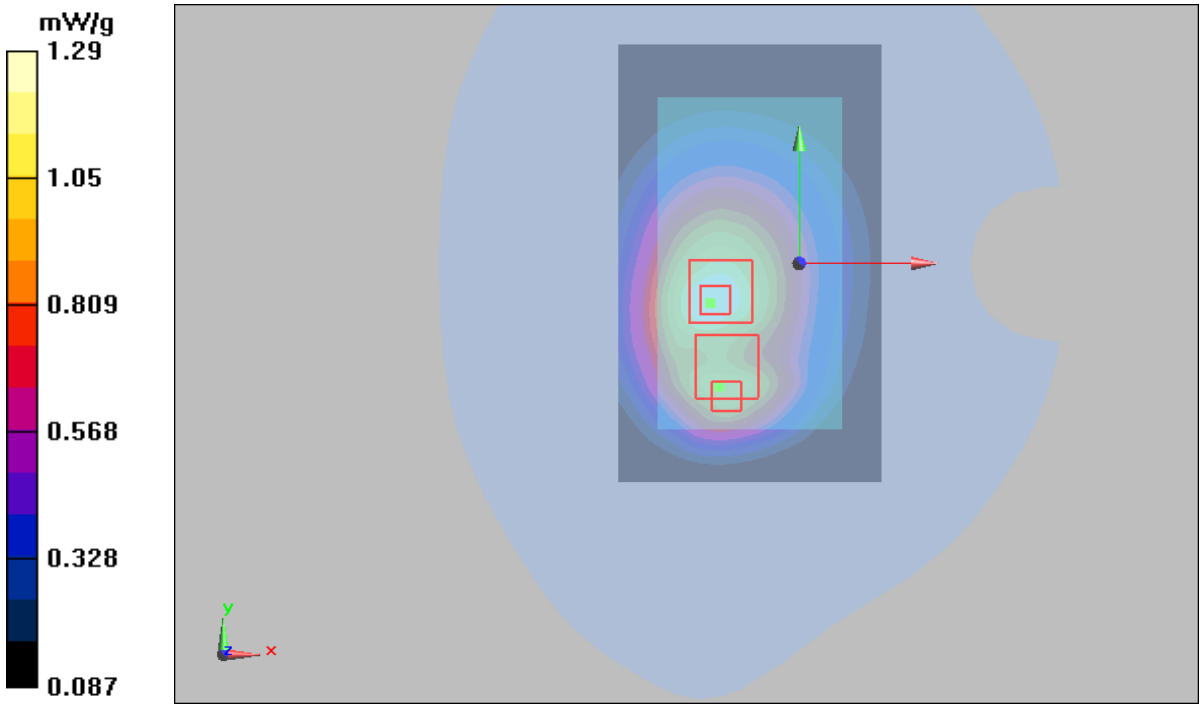


Figure 27 Body, CDMA Cellular with EVDO Rev.0 Towards Ground Channel 384

CDMA Cellular with EVDO Rev.A Towards Ground Middle

Date/Time: 7/1/2011 11:49:46 AM
Communication System: CDMA Cellular EVDO Re.A; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.992 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010
Electronics: DAE4 Sn871; Calibrated: 11/18/2010
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Towards Ground Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.31 mW/g
Towards Ground Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 33.7 V/m; Power Drift = 0.193 dB
Peak SAR (extrapolated) = 1.61 W/kg
SAR(1 g) = 1.22 mW/g; SAR(10 g) = 0.884 mW/g
Maximum value of SAR (measured) = 1.3 mW/g
Towards Ground Middle/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 33.7 V/m; Power Drift = 0.193 dB
Peak SAR (extrapolated) = 1.65 W/kg
SAR(1 g) = 0.996 mW/g; SAR(10 g) = 0.670 mW/g
Maximum value of SAR (measured) = 1.17 mW/g

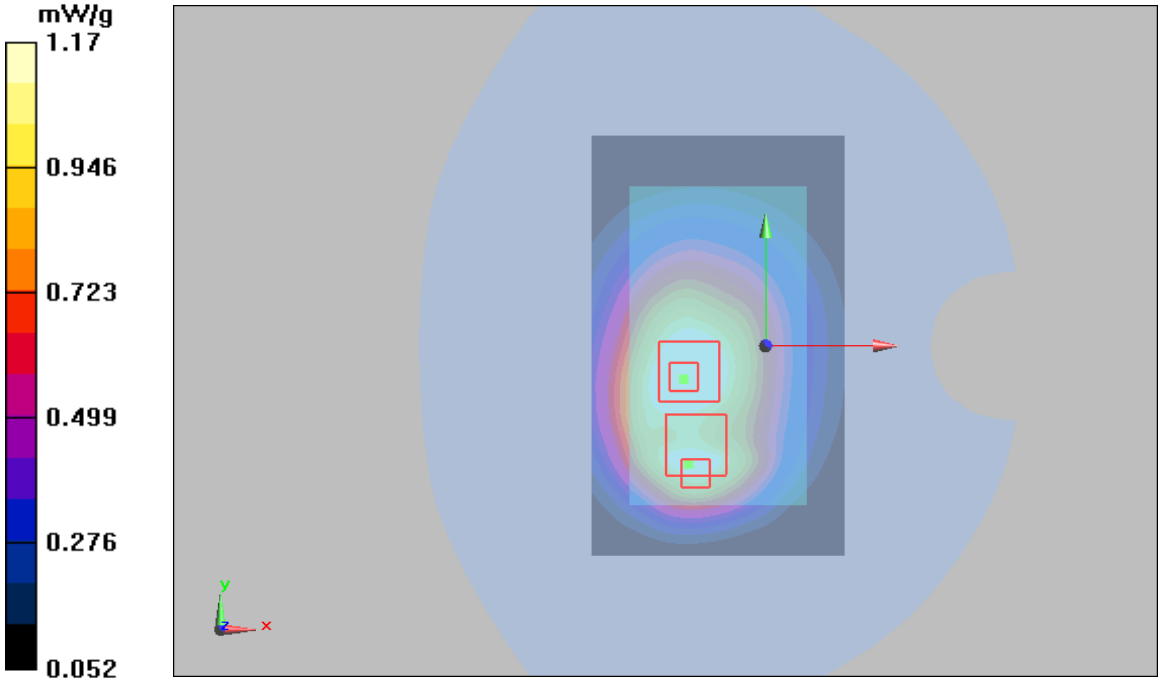


Figure 28 Body, CDMA Cellular with EVDO Rev.A Towards Ground Channel 384