

FCC SAR Test Report

APPLICANT : LXE Inc.
EQUIPMENT : Marathon
BRAND NAME : Marathon
MODEL NAME : FX1
FCC ID : KDZLXE-FX1
STANDARD : FCC 47 CFR Part 2 (2.1093)
IEEE C95.1-1991
IEEE 1528-2003
FCC OET Bulletin 65 Supplement C (Edition 01-01)

The product was received on Mar. 09, 2011 and completely tested on Jun. 04, 2011. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Jones Tsai / Manager



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FCC ID : KDZLXE-FX1

Page Number : 1 of 33

Report Issued Date : Jun. 08, 2011

Report Version : Rev. 01

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA130939	Rev. 01	Initial issue of report	Jun. 08, 2011

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **LXE Inc. Marathon Marathon FX1** are as follows (with expanded uncertainty 21.4 % for 300 MHz to 3 GHz, and 25.6% for 3 GHz to 6 GHz).

Band	Position	SAR _{1g} (W/kg)
802.11b/g/n	Body	0.149
802.11a/n	Body	0.596
Bluetooth	Body	N/A

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1991, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2003 and FCC OET Bulletin 65 Supplement C (Edition 01-01).

2. Administration Data

2.1 Testing Laboratory

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978

2.2 Applicant

Company Name	LXE Inc.
Address	125 Technology Parkway, Norcross GA 30092

2.3 Manufacturer

Company Name	NEXCOM International Co., Ltd.
Address	5F., 7F., 8F., 9F., 10F. & 12F., No. 63, Sec. 1, Sanmin Rd., Banqiao Dist, New Taipei City, Taiwan

2.4 Application Details

Date of Receipt of Application	Mar. 09, 2011
Date of Start during the Test	May 31, 2011
Date of End during the Test	Jun. 04, 2011

3. General Information

3.1 Description of Device Under Test (DUT)

Product Feature & Specification	
DUT Type	Marathon
Brand Name	Marathon
Model Name	FX1
FCC ID	KDZLXE-FX1
Tx Frequency	802.11b/g/n : 2400 MHz ~ 2483.5 MHz 802.11a/n : 5150 MHz ~ 5350 MHz; 5470 MHz ~ 5725 MHz; 5725 MHz ~ 5825 MHz; 5725 MHz ~ 5850 MHz Bluetooth : 2400 MHz ~ 2483.5 MHz
Rx Frequency	802.11b/g/n : 2400 MHz ~ 2483.5 MHz 802.11a/n : 5150 MHz ~ 5350 MHz; 5470 MHz ~ 5725 MHz; 5725 MHz ~ 5825 MHz; 5725 MHz ~ 5850 MHz Bluetooth : 2400 MHz ~ 2483.5 MHz
Maximum Output Power to Antenna	802.11b : 13.01 dBm (average), 17.62dBm (peak) 802.11g : 8.82 dBm (average), 19.05dBm (peak) 802.11n (1T1R) 802.11n (2.4GHz) (BW 20MHz) : 8.21 dBm (average), 18.16dBm (peak) 802.11n (2.4GHz) (BW 40MHz) : 7.58 dBm (average), 18.10dBm (peak) 802.11a : 13.90 dBm(average) 802.11n (5GHz) (BW 20MHz) : 14.04 dBm (average) 802.11n (5GHz) (BW 40MHz) : 12.84 dBm (average)
Antenna Type	PIFA Antenna
HW Version	50DC
SW Version	Windows XP
Type of Modulation	802.11b : DSSS (BPSK / QPSK / CCK) 802.11a/g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
DUT Stage	Production Unit

3.2 Product Photos

Please refer to Appendix D.

3.3 Applied Standards

The Specific Absorption Rate (SAR) testing specification, method and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- IEEE C95.1-1991
- IEEE 1528-2003
- FCC OET Bulletin 65 Supplement C (Edition 01-01)
- FCC KDB 248227 D01 v01r02
- FCC KDB 447498 D01 v04
- FCC KDB 616217 D03 v01

3.4 Device Category and SAR Limits

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

3.5 Test Conditions

3.5.1 Ambient Condition

Ambient Temperature	20 to 24 °C
Humidity	< 60 %

3.5.2 Test Configuration

For WLAN SAR testing, WLAN engineering testing software installed on the DUT can provide continuous transmitting RF signal. This RF signal utilized in SAR measurement has almost 100% duty cycle and its crest factor is 1.

The data rates for WLAN SAR testing were set in 11Mbps for 802.11b, 6Mbps for 802.11g, and 6.5Mbps for 802.11n(BW 20MHz), 13.5Mbps for 802.11n(BW 40MHz), 6Mbps for 802.11a, 6.5Mbps for 802.11n(BW 20MHz), and 13.5Mbps for 802.11n(BW 40MHz) with both antennas transmit due to the highest RF output power.

The simultaneous transmission SAR for WLAN and Bluetooth was not required because the closest separation distance of these antennas (6.3cm) is larger than 5 cm and the output power of Bluetooth (5.11 dBm) is less than $2P_{Ref}$ (13.8 dBm).

Bluetooth standalone SAR is not required because the Bluetooth power (5.11 dBm) is less than 60/f.

4. Specific Absorption Rate (SAR)

4.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

4.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

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

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

SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = C \left(\frac{\delta T}{\delta t} \right)$$

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

5. SAR Measurement System

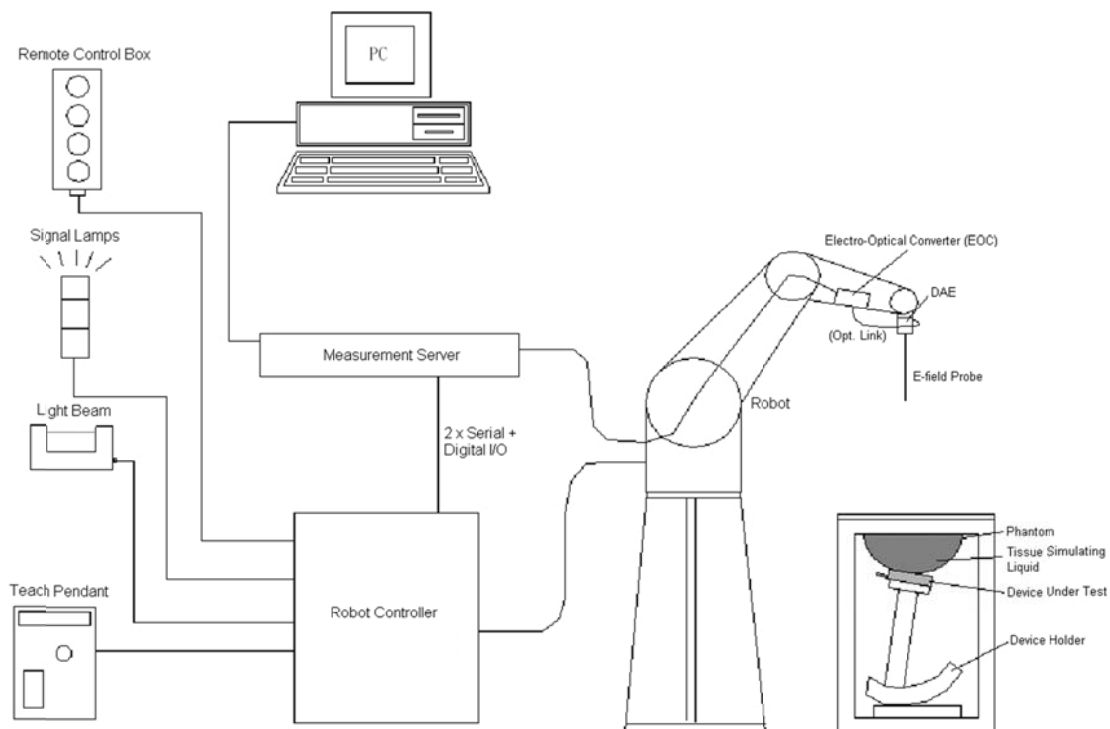


Fig 5.1 SPEAG DASY4 or DASY5 System Configurations

The DASY4 or DASY5 system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic (DAE) attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter (ECO) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows XP
- DASY4 or DASY5 software
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

Some of the components are described in details in the following sub-sections.

5.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG). The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

5.1.1 E-Field Probe Specification

<ET3DV6>

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	10 MHz to 3 GHz; Linearity: ± 0.2 dB
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)
Dynamic Range	5 μ W/g to 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm (Tip: 16 mm) Tip diameter: 6.8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.7 mm



Fig 5.2 Photo of ET3DV6

<EX3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μ W/g to 100 mW/g; Linearity: ± 0.2 dB (noise: typically < 1 μ W/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

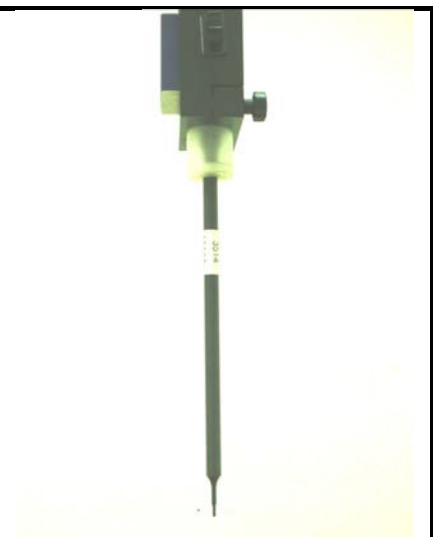


Fig 5.3 Photo of EX3DV4

5.1.2 E-Field Probe Calibration

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than $\pm 10\%$. The spherical isotropy shall be evaluated and within ± 0.25 dB. The sensitivity parameters (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to appendix C of this report.

5.2 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock. The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



Fig 5.4 Photo of DAE

5.3 Robot

The SPEAG DASY system uses the high precision robots (DASY4: RX90BL; DASY5: TX90XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY4: CS7MB; DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ± 0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)



Fig 5.5 Photo of DASY4



Fig 5.6 Photo of DASY5

5.4 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY4: 166 MHz, Intel Pentium; DASY5: 400 MHz, Intel Celeron), chipdisk (DASY4: 32 MB; DASY5: 128 MB), RAM (DASY4: 64 MB, DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.



Fig 5.7 Photo of Server for DASY4



Fig 5.8 Photo of Server for DASY5

5.5 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
Measurement Areas	Left Hand, Right Hand, Flat Phantom	

Fig 5.9 Photo of SAM Phantom

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

<ELI4 Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)	
Filling Volume	Approx. 30 liters	
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm	

Fig 5.10 Photo of ELI4 Phantom

The ELI4 phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

5.6 Device Holder

<Device Holder for SAM Twin Phantom>

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of ± 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR). Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.



Fig 5.11 Device Holder

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.

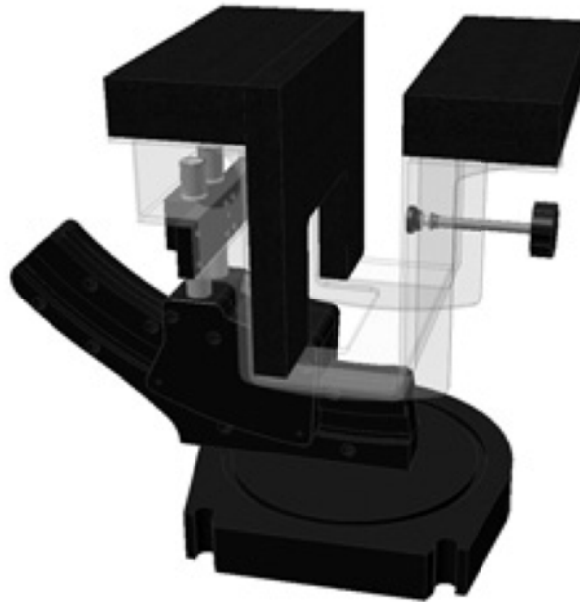


Fig 5.12 Laptop Extension Kit

5.7 Data Storage and Evaluation

5.7.1 Data Storage

The DASY software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The post-processing 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 erroneous parameter settings. For example, if a measurement has been performed with an incorrect crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be reevaluated.

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

5.7.2 Data Evaluation

The DASY post-processing software (SEMCAD) 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	Norm _i , 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	σ
	- Density	ρ

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 DASY components. In the direct measuring mode of the multi-meter 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 :

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

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 :

$$\text{E-field Probes : } E_i = \sqrt{\frac{V_i}{\text{Norm}_i \cdot \text{ConvF}}}$$

$$\text{H-field Probes : } H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1}f + a_{i2}f^2}{f}$$

with V_i = compensated signal of channel i, (i = x, y, z)
 Norm_i = sensor sensitivity of channel i, (i = x, y, z), $\mu\text{V}/(\text{V/m})^2$ 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) :

$$E_{\text{tot}} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

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

$$\text{SAR} = E_{\text{tot}}^2 \cdot \frac{\sigma}{\rho \cdot 1000}$$

with SAR = local specific absorption rate in mW/g
 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 set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

5.8 Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	Dosimetric E-Field Probe	ET3DV6	1787	May 20, 2011	May 19, 2012
SPEAG	Dosimetric E-Field Probe	EX3DV4	3731	Sep. 20, 2010	Sep. 19, 2011
SPEAG	Dosimetric E-Field Probe	EX3DV4	3697	Nov. 23, 2010	Nov. 22, 2011
SPEAG	2450MHz System Validation Kit	D2450V2	735	Jun. 17, 2010	Jun. 16, 2011
SPEAG	5GHz System Validation Kit	D5GHzV2	1040	Jun. 23, 2010	Jun. 22, 2011
SPEAG	Data Acquisition Electronics	DAE4	778	Oct. 22, 2010	Oct. 21, 2011
SPEAG	Data Acquisition Electronics	DAE4	1249	Feb. 21, 2011	Feb. 20, 2012
SPEAG	SAM Phantom	QD 000 P40 C	TP-1303	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1383	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1446	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1478	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 001 BB	1026	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 001 BA	1029	NCR	NCR
Agilent	ENA Series Network Analyzer	E5071C	MY46106933	Jul. 06, 2010	Jul. 05, 2011
Agilent	Wireless Communication Test Set	E5515C	MY48360820	Jan. 12, 2010	Jan. 11, 2012
Agilent	Wireless Communication Test Set	E5515C	GB46311322	Mar. 23, 2011	Mar. 22, 2013
R&S	Universal Radio Communication Tester	CMU200	114256	Feb. 08, 2010	Feb. 07, 2012
Agilent	Dielectric Probe Kit	85070D	US01440205	NCR	NCR
Agilent	Dual Directional Coupler	778D	50422	NCR	NCR
AR	Power Amplifier	5S1G4M2	0328767	NCR	NCR
R&S	Spectrum Analyzer	FSP40	100055	Jun. 11, 2010	Jun. 10, 2011

Table 5.1 Test Equipment List

Note: The calibration certificate of DASY can be referred to appendix C of this report.

6. Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 6.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 6.2.



Fig 6.1 Photo of Liquid Height for Head SAR



Fig 6.2 Photo of Liquid Height for Body SAR

The following table gives the recipes for tissue simulating liquid.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ϵ_r)
For Head								
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
For Body								
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
900	50.8	48.2	0	0.9	0.1	0	1.05	55.0
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7

Table 6.1 Recipes of Tissue Simulating Liquid

The following table gives the targets for tissue simulating liquid.

Frequency (MHz)	Liquid Type	Conductivity (σ)	$\pm 5\%$ Range	Permittivity (ϵ_r)	$\pm 5\%$ Range
2450	Head	1.80	1.71 ~ 1.89	39.2	37.2 ~ 41.2
5200	Head	4.66	4.43 ~ 4.89	36.0	34.2 ~ 37.8
5500	Head	4.96	4.71 ~ 5.21	35.6	33.8 ~ 37.4
5800	Head	5.27	5.01 ~ 5.53	35.3	33.5 ~ 37.1
2450	Body	1.95	1.85 ~ 2.05	52.7	50.1 ~ 55.3
5200	Body	5.30	5.04 ~ 5.57	49.0	46.6 ~ 51.5
5500	Body	5.65	5.37 ~ 5.93	48.6	46.2 ~ 51.0
5800	Body	6.00	5.70 ~ 6.30	48.2	45.8 ~ 50.6

Table 6.2 Targets of Tissue Simulating Liquid

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an Agilent 85070D Dielectric Probe Kit and an Agilent Network Analyzer.

The following table shows the measuring results for simulating liquid.

Frequency (MHz)	Liquid Type	Temperature ($^{\circ}\text{C}$)	Conductivity (σ)	Permittivity (ϵ_r)	Measurement Date
2450	Body	21.3	2.02	53.9	Jun. 04, 2011
5200	Body	21.4	5.27	47.6	May 31, 2011
5200	Body	21.4	5.28	47.5	Jun. 02, 2011
5200	Body	21.3	5.11	47.4	Jun. 03, 2011
5200	Body	21.3	5.28	47.6	Jun. 04, 2011
5500	Body	21.4	5.66	47.0	May 31, 2011
5500	Body	21.4	5.68	47.0	Jun. 02, 2011
5500	Body	21.3	5.49	47.0	Jun. 03, 2011
5800	Body	21.4	6.15	46.5	May 31, 2011
5800	Body	21.4	6.18	46.4	Jun. 02, 2011
5800	Body	21.3	6.17	46.5	Jun. 04, 2011

Table 6.3 Measuring Results for Simulating Liquid

7. Uncertainty Assessment

The component of uncertainty may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainty by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in Table 7.1

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor ^(a)	1/ κ ^(b)	1/ $\sqrt{3}$	1/ $\sqrt{6}$	1/ $\sqrt{2}$

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) κ is the coverage factor

Table 7.1 Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is showed in Table 7.2 and Table 7.3.

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Standard Uncertainty (1g)
Measurement System					
Probe Calibration	5.5	Normal	1	1	± 5.5 %
Axial Isotropy	4.7	Rectangular	√3	0.7	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	± 3.9 %
Boundary Effects	1.0	Rectangular	√3	1	± 0.6 %
Linearity	4.7	Rectangular	√3	1	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	± 0.6 %
Readout Electronics	0.3	Normal	1	1	± 0.3 %
Response Time	0.8	Rectangular	√3	1	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	± 1.7 %
Probe Positioner	0.4	Rectangular	√3	1	± 0.2 %
Probe Positioning	2.9	Rectangular	√3	1	± 1.7 %
Max. SAR Eval.	1.0	Rectangular	√3	1	± 0.6 %
Test Sample Related					
Device Positioning	2.9	Normal	1	1	± 2.9 %
Device Holder	3.6	Normal	1	1	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	± 2.9 %
Phantom and Setup					
Phantom Uncertainty	4.0	Rectangular	√3	1	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	± 1.8 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.64	± 1.6 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	± 1.7 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.6	± 1.5 %
Combined Standard Uncertainty					± 10.7 %
Coverage Factor for 95 %					K = 2
Expanded Uncertainty					± 21.4 %

Table 7.2 Uncertainty Budget of DASY for frequency range 300 MHz to 3 GHz

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Standard Uncertainty (1g)
Measurement System					
Probe Calibration	6.55	Normal	1	1	± 6.55 %
Axial Isotropy	4.7	Rectangular	√3	0.7	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	± 3.9 %
Boundary Effects	2.0	Rectangular	√3	1	± 1.2 %
Linearity	4.7	Rectangular	√3	1	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	± 0.6 %
Readout Electronics	0.3	Normal	1	1	± 0.3 %
Response Time	0.8	Rectangular	√3	1	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	± 1.7 %
Probe Positioner	0.8	Rectangular	√3	1	± 0.5 %
Probe Positioning	9.9	Rectangular	√3	1	± 5.7 %
Max. SAR Eval.	4.0	Rectangular	√3	1	± 2.3 %
Test Sample Related					
Device Positioning	2.9	Normal	1	1	± 2.9 %
Device Holder	3.6	Normal	1	1	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	± 2.9 %
Phantom and Setup					
Phantom Uncertainty	4.0	Rectangular	√3	1	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.43	± 1.8 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.43	± 1.6 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.49	± 1.7 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.49	± 1.5 %
Combined Standard Uncertainty					± 12.8 %
Coverage Factor for 95 %					K = 2
Expanded Uncertainty					± 25.6 %

Table 7.3 Uncertainty Budget of DASY for frequency range 3 GHz to 6 GHz

8. SAR Measurement Evaluation

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

8.1 Purpose of System Performance check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

8.2 System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:

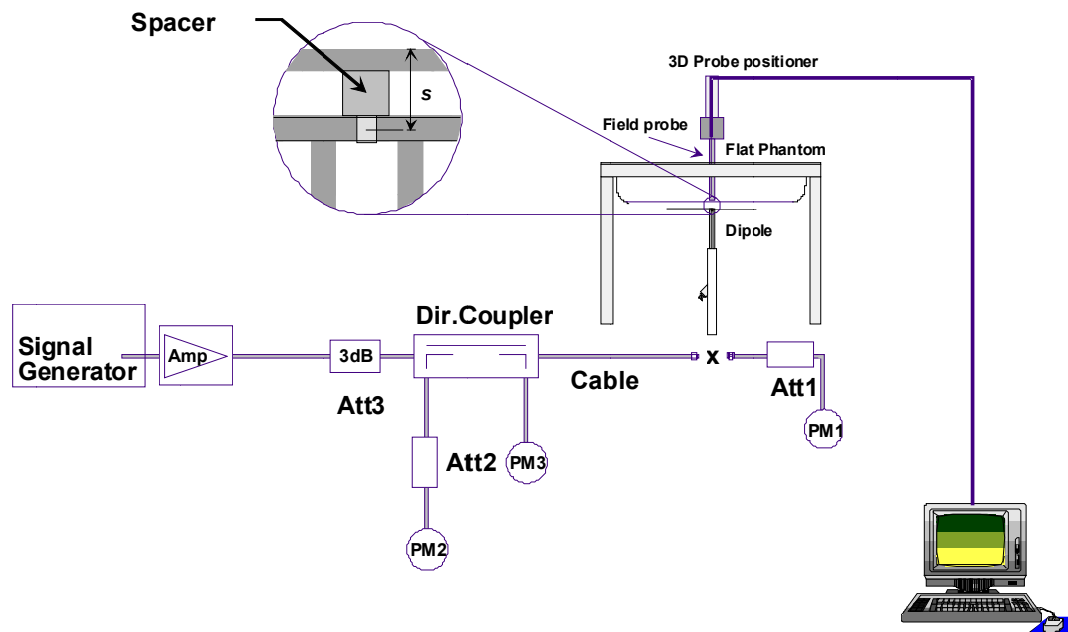


Fig 8.1 System Setup for System Evaluation

1. Signal Generator
2. Amplifier
3. Directional Coupler
4. Power Meter
5. Calibrated Dipole

The output power on dipole port must be calibrated to 24 dBm (250 mW) before dipole is connected.



Fig 8.2 Photo of Dipole Setup

8.3 Validation Results

Comparing to the original SAR value provided by SPEAG, the validation data should be within its specification of 10 %. Table 8.1 shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Measurement Date	Frequency (MHz)	Targeted SAR _{1g} (W/kg)	Measured SAR _{1g} (W/kg)	Normalized SAR _{1g} (W/kg)	Deviation (%)
Jun. 04, 2011	2450	53.500	5.480	54.80	2.43
May 31, 2011	5200	75.700	7.070	70.70	-6.61
Jun. 02, 2011	5200	75.700	7.900	79.00	4.36
Jun. 03, 2011	5200	75.700	7.490	74.90	-1.06
Jun. 04, 2011	5200	75.700	7.670	76.70	1.32
May 31, 2011	5500	80.300	8.790	87.90	9.46
Jun. 02, 2011	5500	80.300	8.820	88.20	9.84
Jun. 03, 2011	5500	80.300	8.520	85.20	6.10
May 31, 2011	5800	69.200	7.360	73.60	6.36
Jun. 02, 2011	5800	69.200	6.300	63.00	-8.96
Jun. 04, 2011	5800	69.200	6.250	62.50	-9.68

Table 8.1 Target and Measurement SAR after Normalized

9. DUT Testing Position

This DUT was tested in one different position. It is rear face of the DUT. In this position, the surface of DUT is touching with phantom 0 cm gap or holster surface and the flat phantom to 0 cm. Please refer to Appendix E for the test setup photos.

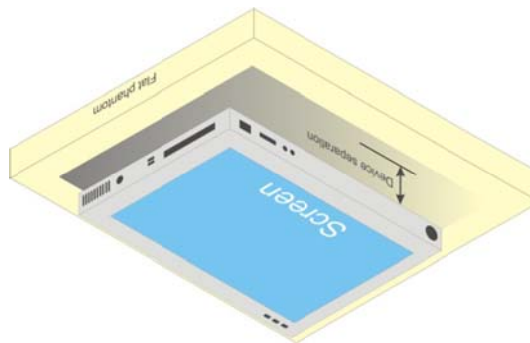


Fig 9.1 Illustration for Lap-touching Position

10. Measurement Procedures

The measurement procedures are as follows:

- (a) Use engineering software to transmit RF power continuously (continuous Tx) in the highest power channel
- (b) Measure output power through RF cable and power meter
- (c) Place the DUT in the positions described in the last section
- (d) Set scan area, grid size and other setting on the DASY software
- (e) Taking data for the middle channel on each testing position
- (f) Find out the largest SAR result on these testing positions of each band
- (g) Measure SAR results for other channels in worst SAR testing position if the SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- (a) Power reference measurement
- (b) Area scan
- (c) Zoom scan
- (d) Power drift measurement

10.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values from the measurement grid to the high-resolution grid
- (e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
- (f) Calculation of the averaged SAR within masses of 1g and 10g

10.2 Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan measures 5x5x7 points with step size 8, 8 and 5 mm for 300 MHz to 3 GHz, and 8x8x8 points with step size 4, 4 and 2.5 mm for 3 GHz to 6 GHz. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.

10.3 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the DUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing (step-size is 4, 4 and 2.5 mm). When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

10.4 SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

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. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.

10.5 Power Drift Monitoring

All SAR testing is under the DUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of DUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drift more than 5%, the SAR will be retested.

11. SAR Test Results

11.1 Conducted Power (Unit: dBm)

Band	802.11b			802.11g		
Channel	1	6	11	1	6	11
Frequency (MHz)	2412	2437	2462	2412	2437	2462
Power	12.86	13.01	12.74	8.51	8.82	8.39

Band	802.11n (BW 20MHz)			802.11n (BW 40MHz)		
Channel	1	6	11	3	6	9
Frequency (MHz)	2412	2437	2462	2422	2437	2452
Power	8.18	8.21	8.13	7.58	7.36	6.97

Band	802.11a						
Channel	36	40	48	52	56	64	100
Frequency (MHz)	5180	5200	5240	5260	5280	5320	5500
Power	11.98	12.32	11.71	13.76	13.79	12.76	13.18

Band	802.11a				
Channel	104	116	124	136	140
Frequency (MHz)	5520	5580	5620	5680	5700
Power	13.06	13.57	13.22	13.44	13.9

Band	802.11n (BW 20MHz)						
Channel	36	40	48	52	56	64	100
Frequency (MHz)	5180	5200	5240	5260	5280	5320	5500
Power	8.13	8.08	7.81	13.71	13.74	14.04	12.80

Band	802.11n (BW 20MHz)				
Channel	104	116	124	136	140
Frequency (MHz)	5520	5580	5620	5680	5700
Power	12.89	13.36	12.94	13.25	12.87

Band	802.11n (BW 40MHz)							
Channel	38	46	54	62	102	134	151	159
Frequency (MHz)	5190	5230	5270	5310	5510	5670	5755	5795
Power	9.87	9.72	12.59	12.84	11.95	12.08	7.85	7.98

11.2 Test Records for Body SAR Test

Plot No.	Band	Mode	Test Position	Ch.	Ear-phone	Battery	Data Rate	Power Setting	Holster	SAR _{1g} (W/kg)
17	802.11b	-	Rear Face	6	v	x	11M	75	x	0.149
43	802.11b	-	Rear Face	6	v	1	11M	75	x	0.046
44	802.11b	-	Rear Face	6	v	2	11M	75	x	0.059
39	802.11b	-	Rear Face	6	v	x	11M	75	v	0.082
41	802.11b	-	Rear Face	6	v	1	11M	75	v	0.037
42	802.11b	-	Rear Face	6	v	2	11M	75	v	0.044
1	802.11a	-	Rear Face	140	v	x	6M	100	x	0.539
3	802.11a	-	Rear Face	36	v	x	6M	100	x	0.511
4	802.11a	-	Rear Face	48	v	x	6M	100	x	0.446
5	802.11a	-	Rear Face	52	v	x	6M	100	x	0.74
6	802.11a	-	Rear Face	64	v	x	6M	100	x	0.439
7	802.11a	-	Rear Face	104	v	x	6M	100	x	0.549
8	802.11a	-	Rear Face	116	v	x	6M	100	x	0.609
9	802.11a	-	Rear Face	124	v	x	6M	100	x	0.684
10	802.11a	-	Rear Face	136	v	x	6M	100	x	0.765
11	802.11a	-	Rear Face	149	v	x	6M	20	x	0.226
12	802.11a	-	Rear Face	157	v	x	6M	20	x	0.22
13	802.11a	-	Rear Face	161	v	x	6M	20	x	0.212
14	802.11a	-	Rear Face	165	v	x	6M	20	x	0.213
15	802.11a	BW (20MHz)	Rear Face	136	v	x	6.5M	100	x	0.567
16	802.11a	BW (40MHz)	Rear Face	136	v	x	13.5M	100	x	0.421
37	802.11a	-	Rear Face	136	v	1	6M	100	x	0.294
38	802.11a	-	Rear Face	136	v	2	6M	100	x	0.343
19	802.11a	-	Rear Face	140	v	x	6M	100	v	0.464
21	802.11a	-	Rear Face	36	v	x	6M	100	v	0.463
22	802.11a	-	Rear Face	48	v	x	6M	100	v	0.504
23	802.11a	-	Rear Face	52	v	x	6M	100	v	0.596
24	802.11a	-	Rear Face	64	v	x	6M	100	v	0.523
25	802.11a	-	Rear Face	104	v	x	6M	100	v	0.506
26	802.11a	-	Rear Face	116	v	x	6M	100	v	0.506
27	802.11a	-	Rear Face	124	v	x	6M	100	v	0.538
28	802.11a	-	Rear Face	136	v	x	6M	100	v	0.489
29	802.11a	-	Rear Face	149	v	x	6M	20	v	0.17
30	802.11a	-	Rear Face	157	v	x	6M	20	v	0.171
31	802.11a	-	Rear Face	161	v	x	6M	20	v	0.135
32	802.11a	-	Rear Face	165	v	x	6M	20	v	0.136

Plot No.	Band	Mode	Test Position	Ch.	Ear-phone	Battery	Data Rate	Power Setting	Holster	SAR _{1g} (W/kg)
33	802.11a	BW (20MHz)	Rear Face	52	v	x	6.5M	100	v	0.513
34	802.11a	BW (40MHz)	Rear Face	52	v	x	13.5M	100	v	0.558
35	802.11a	-	Rear Face	52	v	1	6M	100	v	0.256
36	802.11a	-	Rear Face	52	v	2	6M	100	v	0.288

Note:

1. According to October 2010 TCB Workshop RF Exposure Procedures Update, the WLAN Antenna SAR for hotspot mode only Rear Face is needed due to the antenna location is within 2.5 cm from the edge. Down side is no needed due to the antenna location is more than 5cm.
2. x : means internal battery

Test Engineer : Michael and Troy

12. References

- [1] FCC 47 CFR Part 2 "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"
- [2] IEEE Std. C95.1-1991, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz", 1991
- [3] IEEE Std. 1528-2003, "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- [4] FCC OET Bulletin 65 (Edition 97-01) Supplement C (Edition 01-01), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", June 2001
- [5] SPEAG DASY System Handbook
- [6] FCC KDB 248227 D01 v01r02, "SAR Measurement Procedures for 802.11 a/b/g Transmitters", May 2007
- [7] FCC KDB 447498 D01 v04, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", November 2009
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- [9] FCC KDB 616217 D01 v01r01, "SAR Evaluation Considerations for Laptop Computers with Antennas Built-in on Display Screens", November 2009
- [10] FCC KDB 616217 D03 v01, "SAR Evaluation Considerations for Laptop/Notebook/Netbook and Tablet Computers", November 2009
- [11] FCC KDB 648474 D01 v01r05, "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas", September 2008
- [12] FCC KDB 941225 D01 v02, "SAR Measurement Procedures for 3G Devices – CDMA 2000 / Ev-Do / WCDMA / HSDPA / HSPA", October 2007
- [13] FCC KDB 941225 D03 v01, "Recommended SAR Test Reduction Procedures for GSM / GPRS / EDGE", December 2008
- [14] FCC KDB 941225 D04 v01, "Evaluating SAR for GSM/(E)GPRS Dual Transfer Mode", January 27 2010



Appendix A. Plots of System Performance Check

The plots are shown as follows.

System Check_Body_2450MHz_110601

DUT: Dipole 2450 MHz

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

Medium: MSL_2450_110601 Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.92 \text{ mho/m}$; $\epsilon_r = 53.2$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.2 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(7.02, 7.02, 7.02); Calibrated: 2010/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 6.46 mW/g

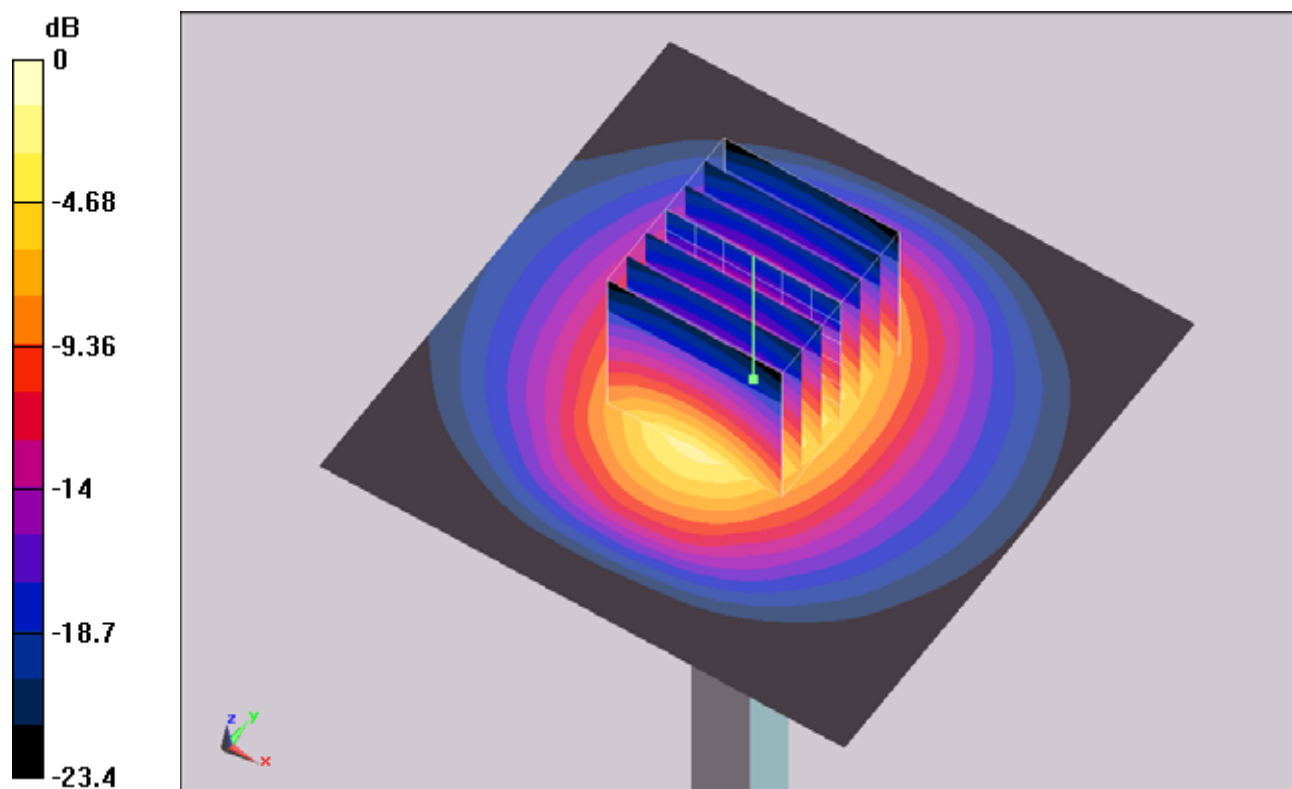
Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56 V/m; Power Drift = -0.00086 dB

Peak SAR (extrapolated) = 13 W/kg

SAR(1 g) = 5.65 mW/g; SAR(10 g) = 2.54 mW/g

Maximum value of SAR (measured) = 6.41 mW/g



0 dB = 6.41mW/g

System Check_Body_2450MHz_110604

DUT: Dipole 2450 MHz

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

Medium: MSL_2450_110604 Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 2.02 \text{ mho/m}$; $\epsilon_r = 53.9$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(3.96, 3.96, 3.96); Calibrated: 2011/5/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 6.35 mW/g

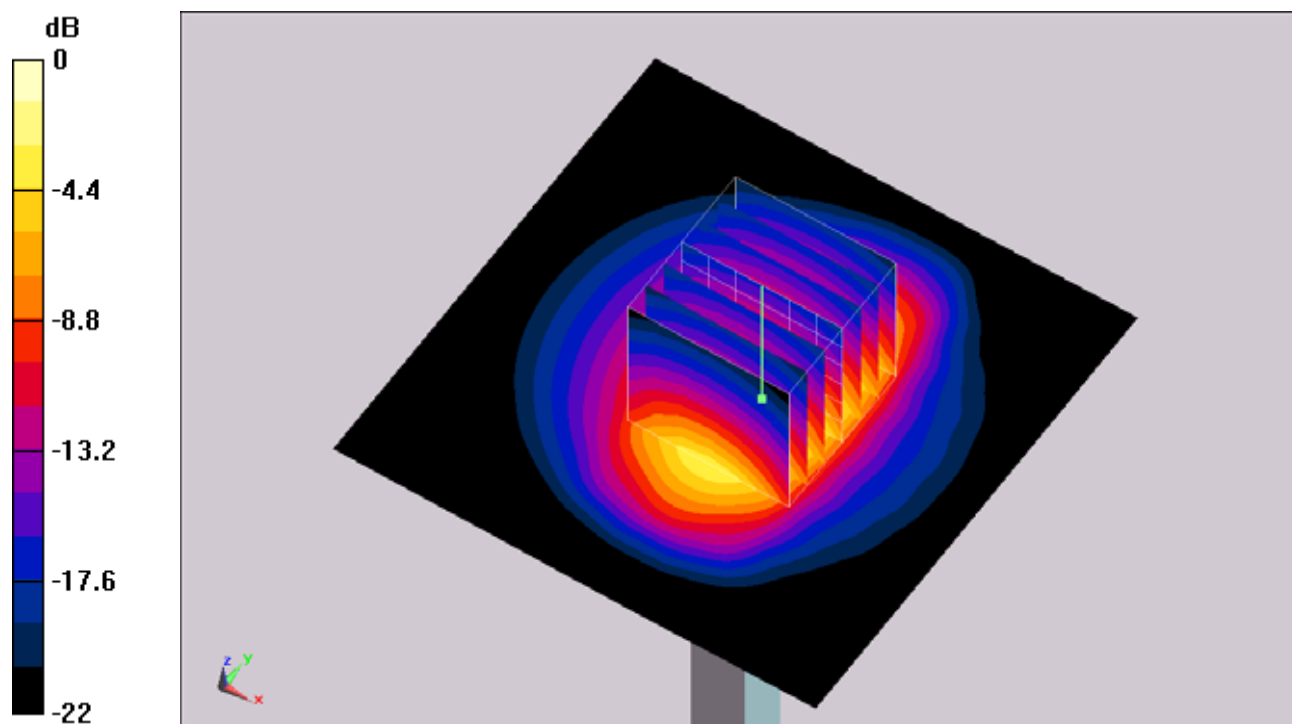
Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55 V/m; Power Drift = -0.070 dB

Peak SAR (extrapolated) = 13.4 W/kg

SAR(1 g) = 5.48 mW/g; SAR(10 g) = 2.51 mW/g

Maximum value of SAR (measured) = 5.98 mW/g



0 dB = 5.98mW/g

System Check_Body_5200MHz_110531

DUT: Dipole 5GHz

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

Medium: MSL5G_110531 Medium parameters used: $f = 5200 \text{ MHz}$; $\sigma = 5.27 \text{ mho/m}$; $\epsilon_r = 47.6$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.97, 3.97, 3.97); Calibrated: 2011/4/19
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 13.1 mW/g

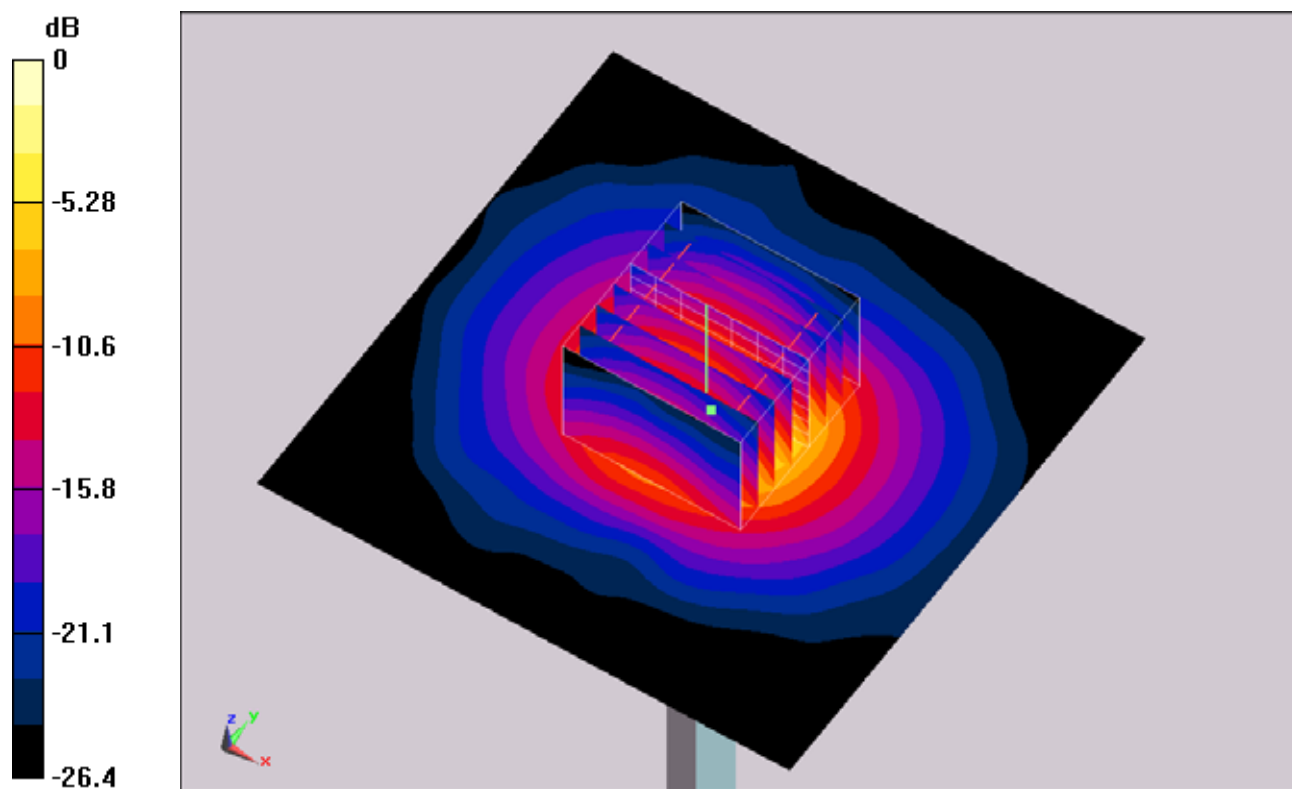
Pin=100mW/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 54.8 V/m; Power Drift = -0.135 dB

Peak SAR (extrapolated) = 16.5 W/kg

SAR(1 g) = 7.07 mW/g; SAR(10 g) = 2.36 mW/g

Maximum value of SAR (measured) = 10.8 mW/g



0 dB = 10.8mW/g

System Check_Body_5200MHz_110602

DUT: Dipole 5GHz

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

Medium: MSL5G_110602 Medium parameters used: $f = 5200 \text{ MHz}$; $\sigma = 5.28 \text{ mho/m}$; $\epsilon_r = 47.5$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.87, 3.87, 3.87); Calibrated: 2010/9/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2009/9/18
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 13.5 mW/g

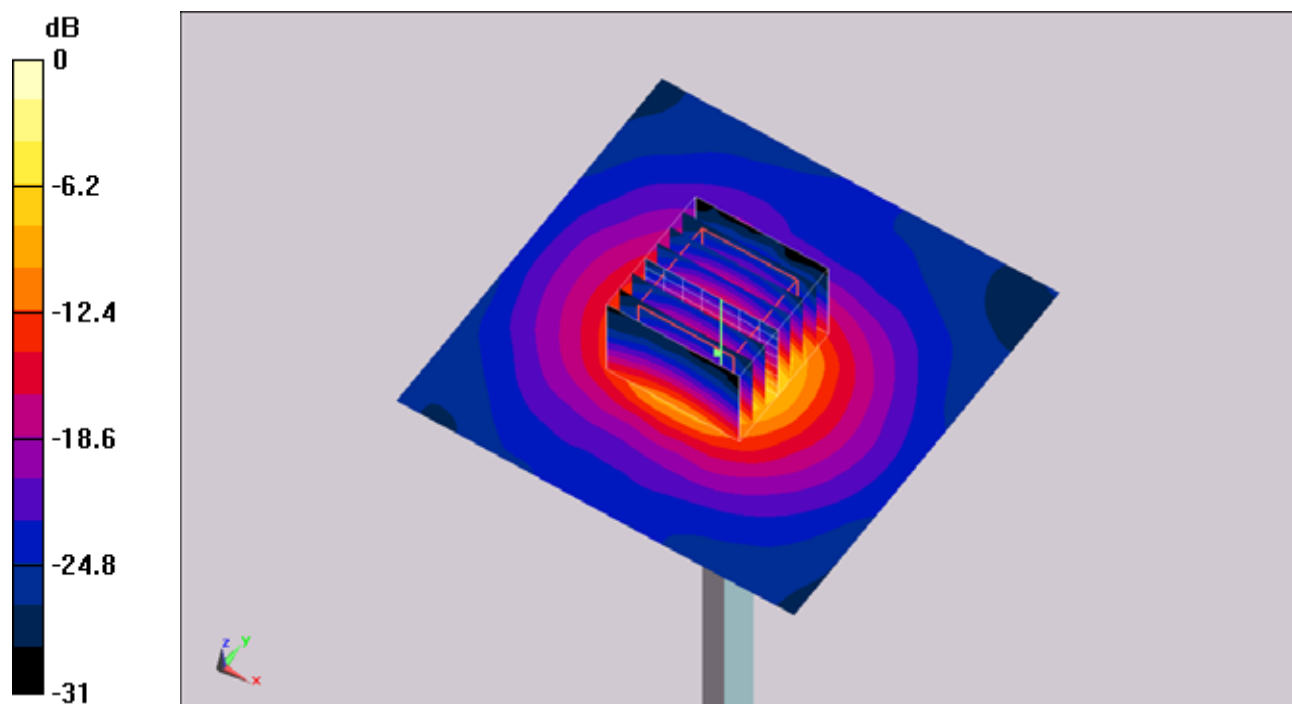
Pin=100mW/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 54.8 V/m; Power Drift = 0.112 dB

Peak SAR (extrapolated) = 21.6 W/kg

SAR(1 g) = 7.67 mW/g; SAR(10 g) = 2.23 mW/g

Maximum value of SAR (measured) = 12.6 mW/g



0 dB = 12.6mW/g

System Check_Body_5200MHz_110603

DUT: Dipole 5GHz

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

Medium: MSL5G_110603 Medium parameters used: $f = 5200 \text{ MHz}$; $\sigma = 5.11 \text{ mho/m}$; $\epsilon_r = 47.4$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.87, 3.87, 3.87); Calibrated: 2010/9/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 12.8 mW/g

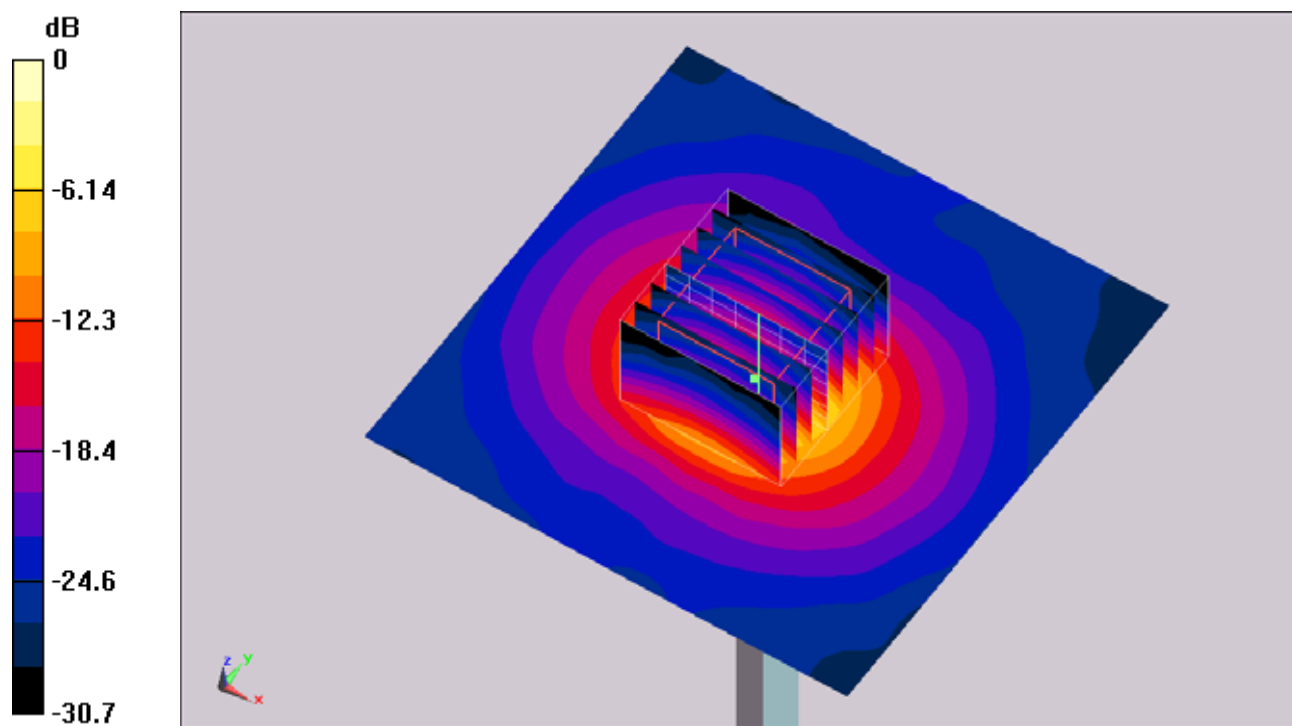
Pin=100mW/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 56.4 V/m; Power Drift = -0.115 dB

Peak SAR (extrapolated) = 21 W/kg

SAR(1 g) = 7.49 mW/g; SAR(10 g) = 2.17 mW/g

Maximum value of SAR (measured) = 12.4 mW/g



0 dB = 12.4mW/g

System Check_Body_5200MHz_110604

DUT: Dipole 5GHz

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

Medium: MSL_5G_110604 Medium parameters used: $f = 5200 \text{ MHz}$; $\sigma = 5.28 \text{ mho/m}$; $\epsilon_r = 47.6$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.3 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.87, 3.87, 3.87); Calibrated: 2010/9/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 13.5 mW/g

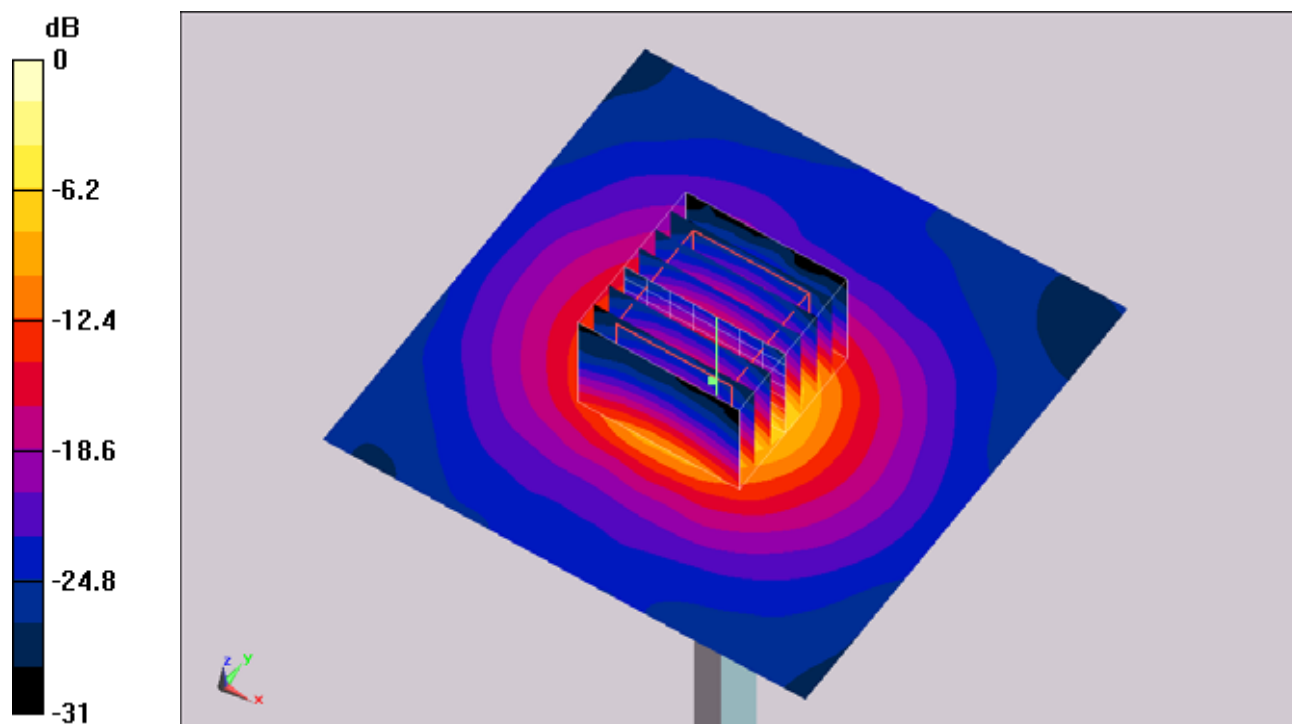
Pin=100mW/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 54.8 V/m; Power Drift = 0.112 dB

Peak SAR (extrapolated) = 21.5 W/kg

SAR(1 g) = 7.67 mW/g; SAR(10 g) = 2.23 mW/g

Maximum value of SAR (measured) = 12.6 mW/g



System Check_Body_5500MHz_110531

DUT: Dipole 5GHz

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

Medium: MSL5G_110531 Medium parameters used: $f = 5500 \text{ MHz}$; $\sigma = 5.66 \text{ mho/m}$; $\epsilon_r = 47$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.44, 3.44, 3.44); Calibrated: 2010/9/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 15.2 mW/g

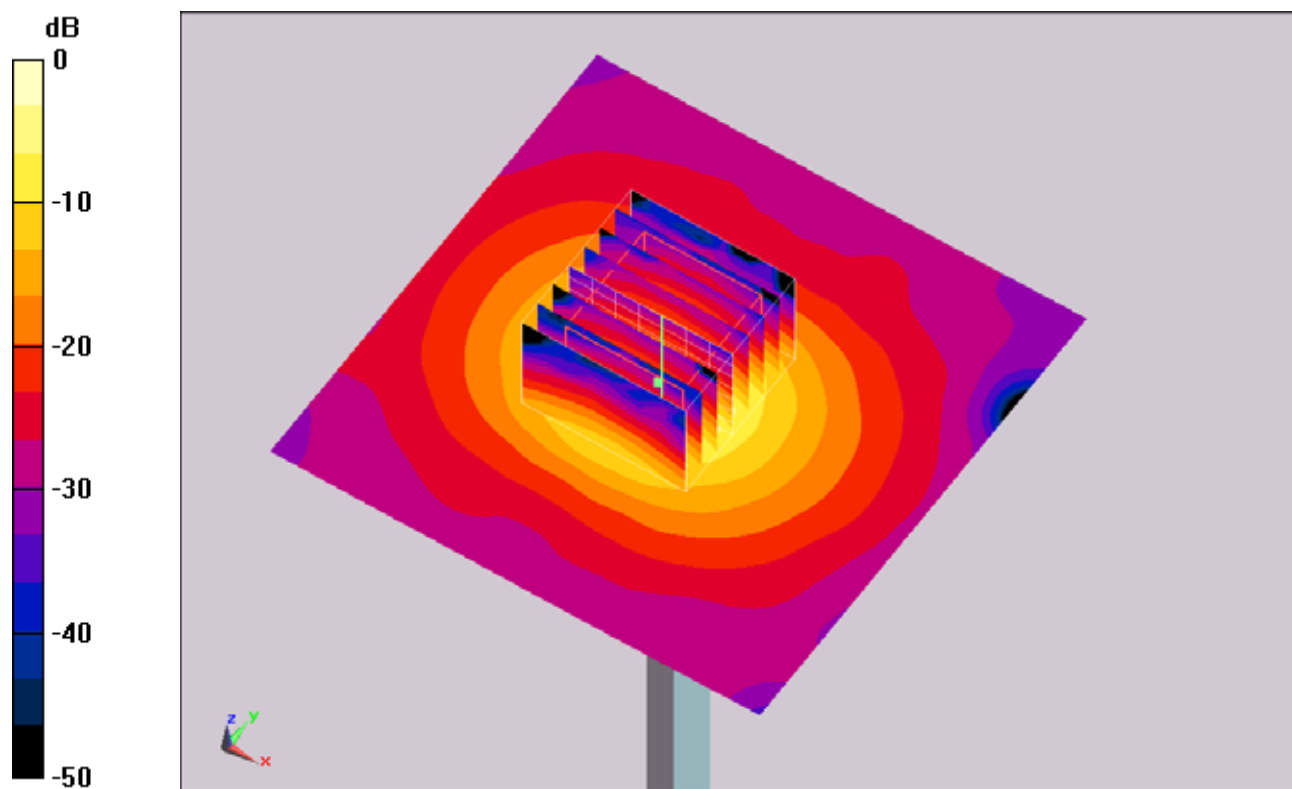
Pin=100mW/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 57.4 V/m; Power Drift = 0.126 dB

Peak SAR (extrapolated) = 28.8 W/kg

SAR(1 g) = 8.79 mW/g; SAR(10 g) = 2.46 mW/g

Maximum value of SAR (measured) = 15.6 mW/g



0 dB = 15.6mW/g

System Check_Body_5500MHz_110602

DUT: Dipole 5GHz

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

Medium: MSL5G_110602 Medium parameters used: $f = 5500 \text{ MHz}$; $\sigma = 5.68 \text{ mho/m}$; $\epsilon_r = 47$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.44, 3.44, 3.44); Calibrated: 2010/9/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 15.2 mW/g

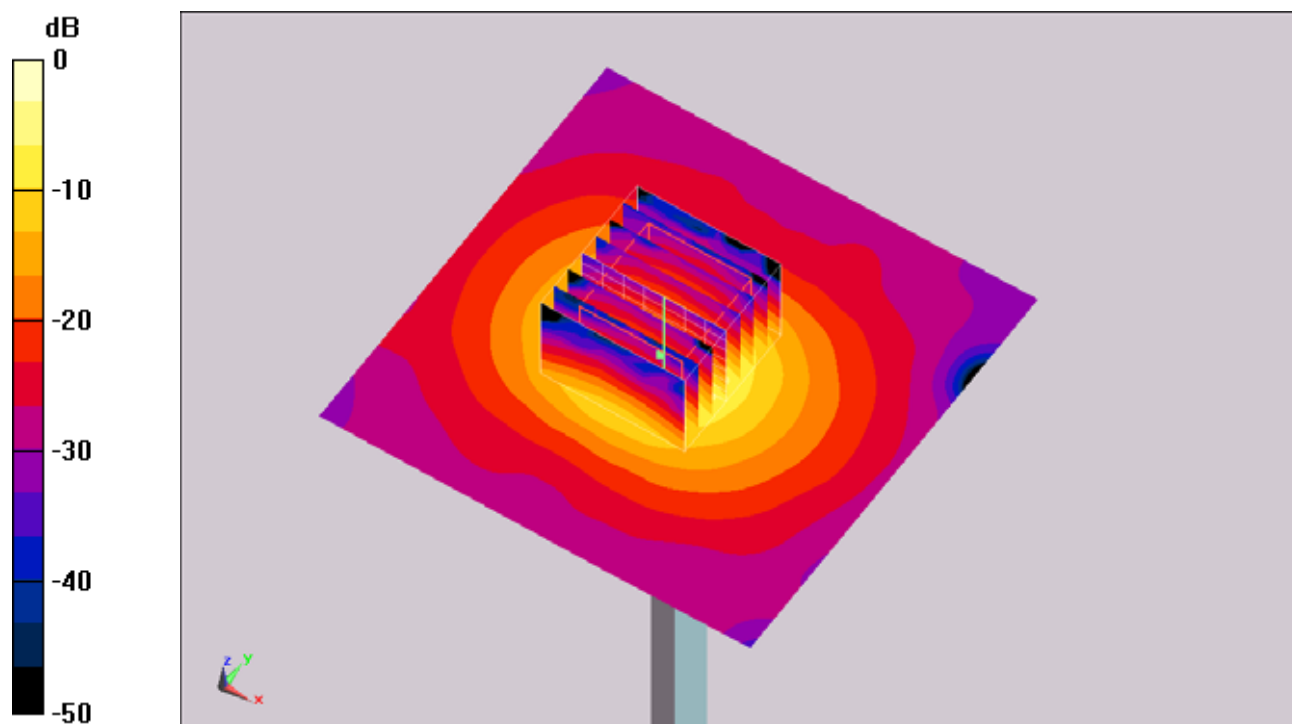
Pin=100mW/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 57.4 V/m; Power Drift = 0.126 dB

Peak SAR (extrapolated) = 28.9 W/kg

SAR(1 g) = 8.82 mW/g; SAR(10 g) = 2.46 mW/g

Maximum value of SAR (measured) = 15.6 mW/g



0 dB = 15.6mW/g

System Check_Body_5500MHz_110603

DUT: Dipole 5GHz

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

Medium: MSL5G_110603 Medium parameters used: $f = 5500 \text{ MHz}$; $\sigma = 5.49 \text{ mho/m}$; $\epsilon_r = 47$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.44, 3.44, 3.44); Calibrated: 2010/9/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 14.7 mW/g

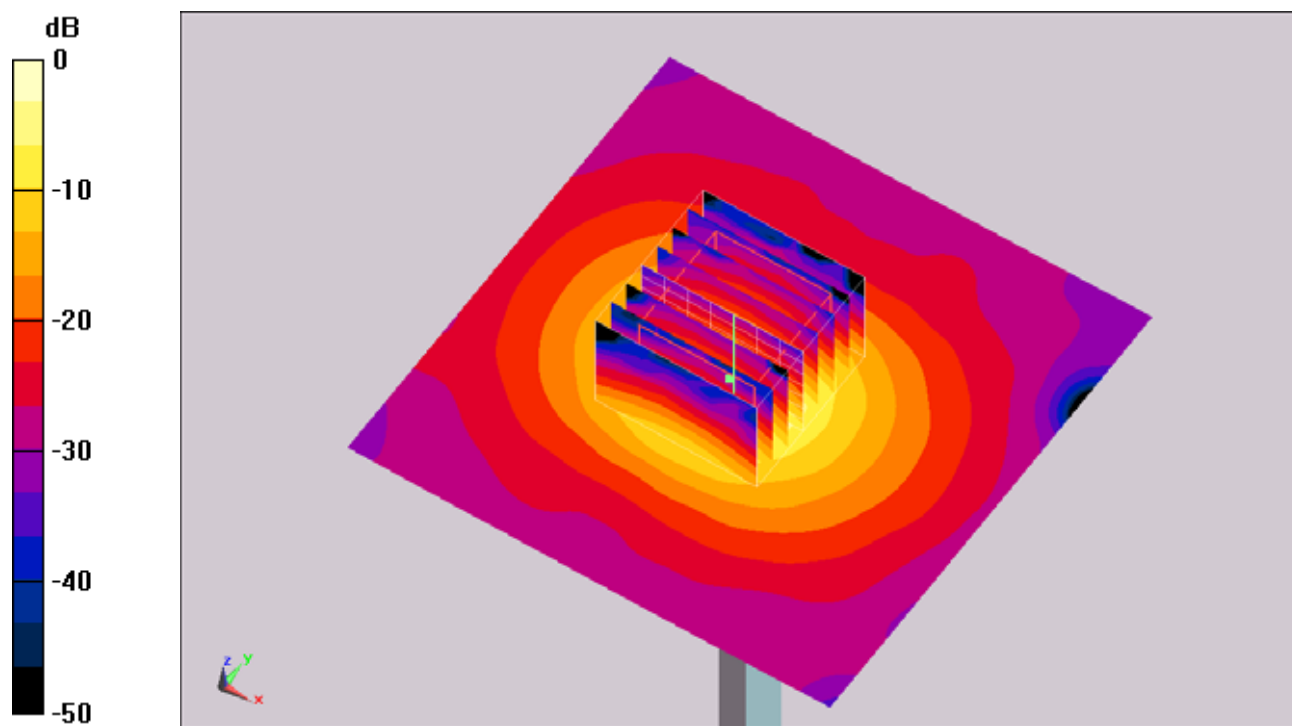
Pin=100mW/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 57.4 V/m; Power Drift = 0.126 dB

Peak SAR (extrapolated) = 27.9 W/kg

SAR(1 g) = 8.52 mW/g; SAR(10 g) = 2.38 mW/g

Maximum value of SAR (measured) = 15.1 mW/g



0 dB = 15.1mW/g

System Check_Body_5800MHz_110531

DUT: Dipole 5GHz

Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 6.15 \text{ mho/m}$; $\epsilon_r = 46.5$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.66, 3.66, 3.66); Calibrated: 2011/4/19
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 12.7 mW/g

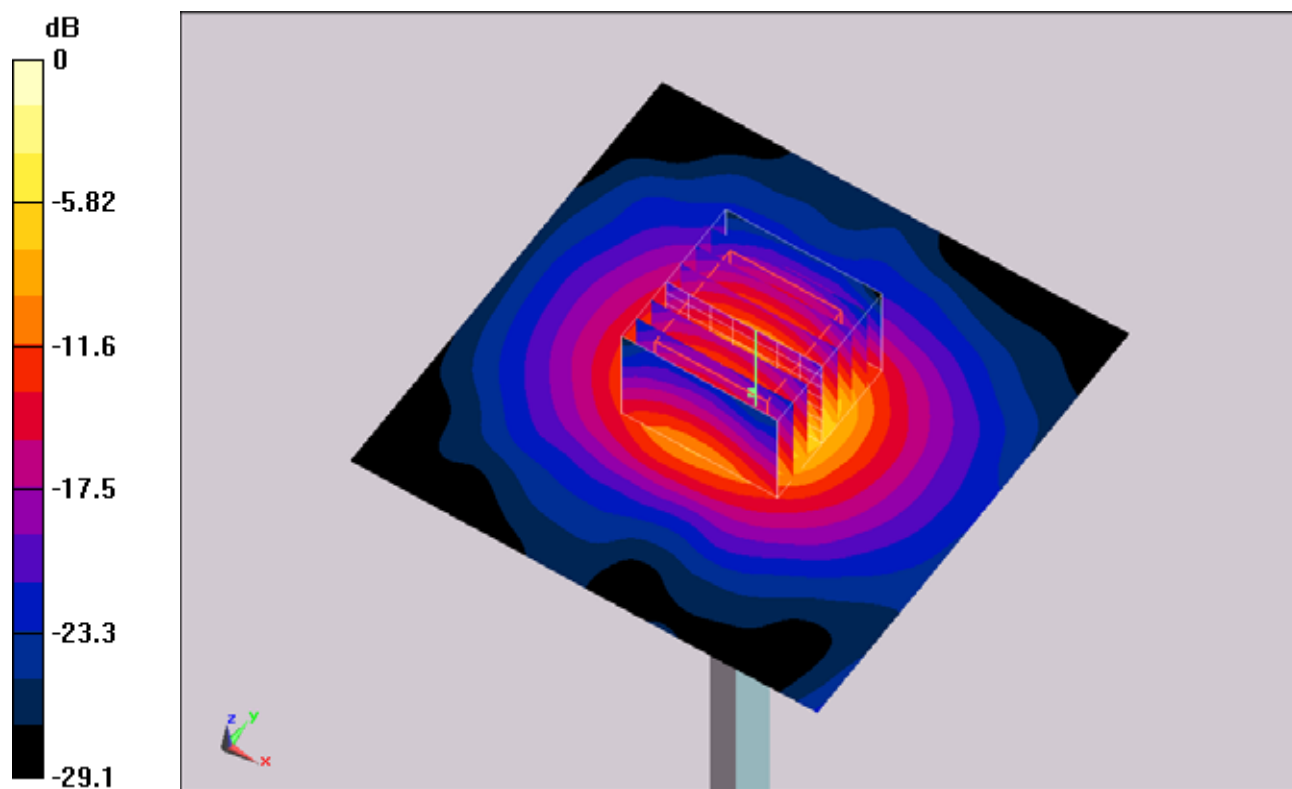
Pin=100mW/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 49.7 V/m; Power Drift = -0.173 dB

Peak SAR (extrapolated) = 15.3 W/kg

SAR(1 g) = 7.36 mW/g; SAR(10 g) = 2.48 mW/g

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



0 dB = 11mW/g

System Check_Body_5800MHz_110602

DUT: Dipole 5GHz

Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: MSL5G_110602 Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 6.18 \text{ mho/m}$; $\epsilon_r = 46.4$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.55, 3.55, 3.55); Calibrated: 2010/9/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 10.9 mW/g

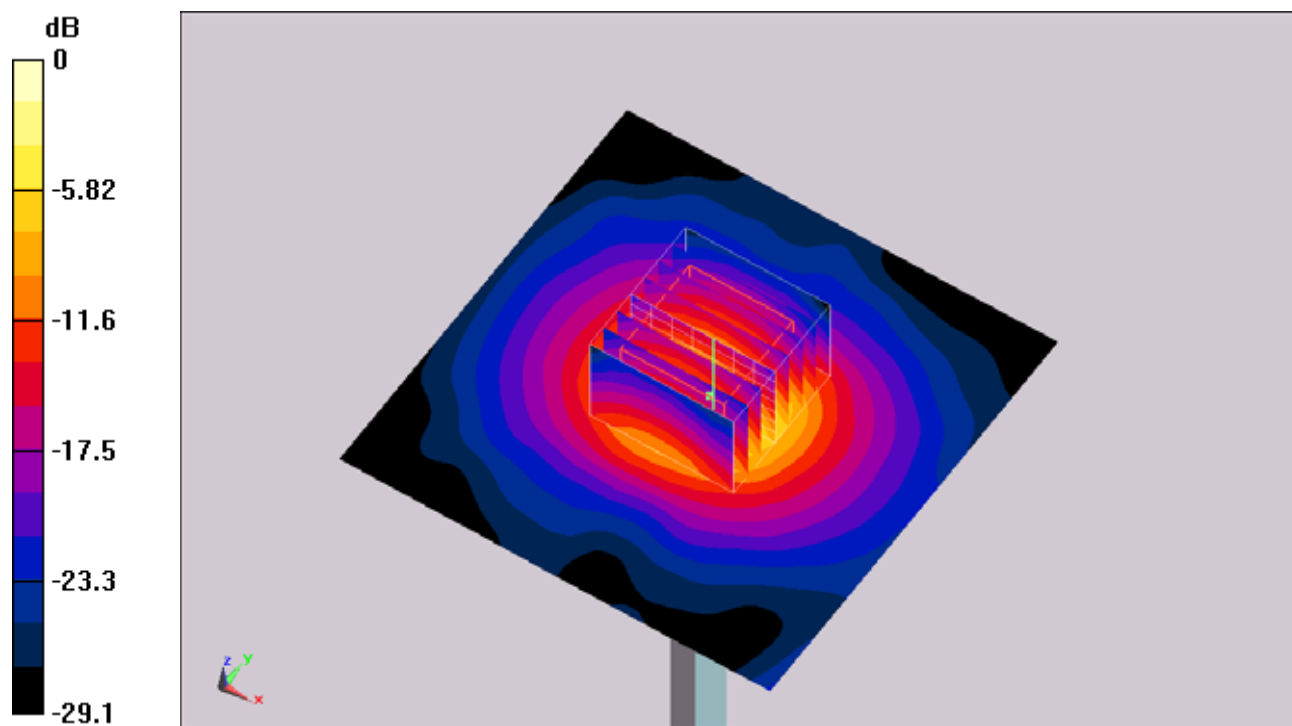
Pin=100mW/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 46 V/m; Power Drift = -0.173 dB

Peak SAR (extrapolated) = 12.9 W/kg

SAR(1 g) = 6.3 mW/g; SAR(10 g) = 2.12 mW/g

Maximum value of SAR (measured) = 9.38 mW/g



0 dB = 9.38mW/g

System Check_Body_5800MHz_110604

DUT: Dipole 5GHz

Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: MSL_5G_110604 Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 6.17 \text{ mho/m}$; $\epsilon_r = 46.5$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.3 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.55, 3.55, 3.55); Calibrated: 2010/9/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1249; Calibrated: 2011/2/21
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Pin=100mW/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 10.8 mW/g

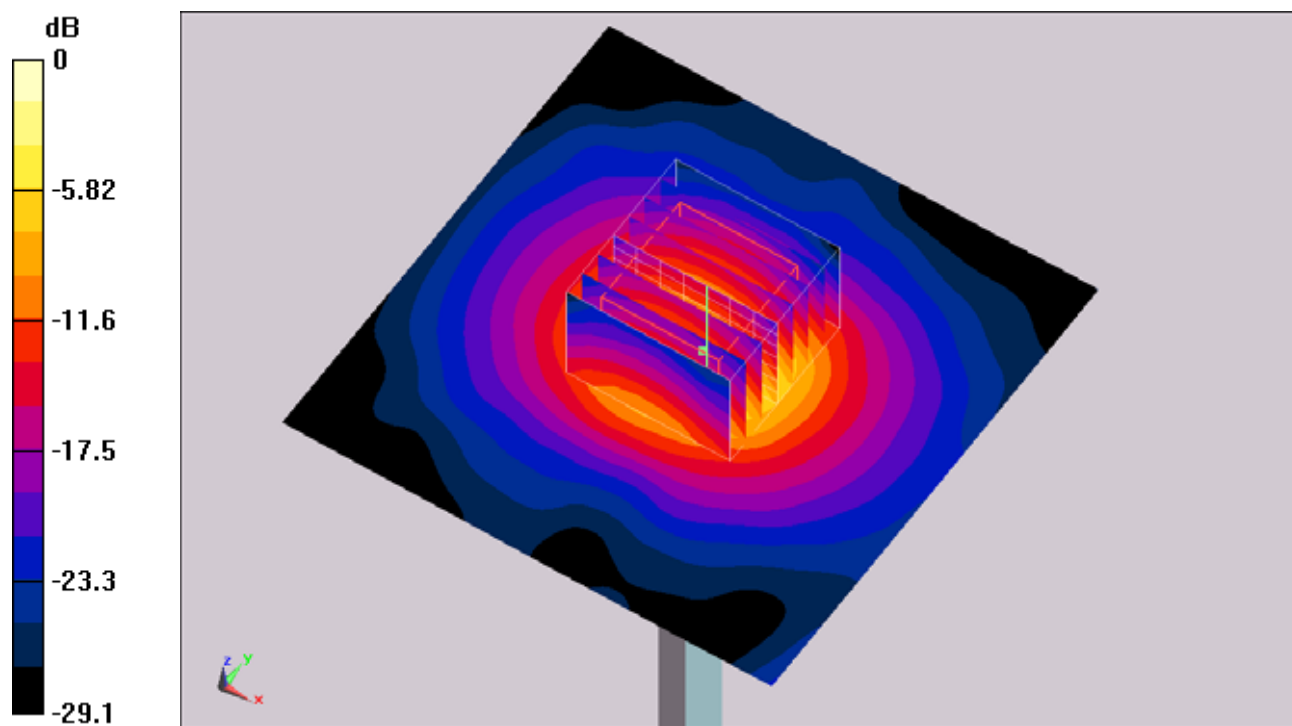
Pin=100mW/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 45.9 V/m; Power Drift = -0.187 dB

Peak SAR (extrapolated) = 12.8 W/kg

SAR(1 g) = 6.25 mW/g; SAR(10 g) = 2.11 mW/g

Maximum value of SAR (measured) = 9.32 mW/g



0 dB = 9.32mW/g



Appendix B. Plots of SAR Measurement

The plots are shown as follows.

#17 802.11b_Rear Face_0cm_Ch6_Earphone

DUT: 130939

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

Medium: MSL_2450_110604 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 2 \text{ mho/m}$; $\epsilon_r = 53.9$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.3 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(3.96, 3.96, 3.96); Calibrated: 2011/5/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch6/Area Scan (121x121x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.151 mW/g

Ch6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.384 V/m; Power Drift = -0.134 dB

Peak SAR (extrapolated) = 0.333 W/kg

SAR(1 g) = 0.149 mW/g; SAR(10 g) = 0.071 mW/g

Maximum value of SAR (measured) = 0.154 mW/g

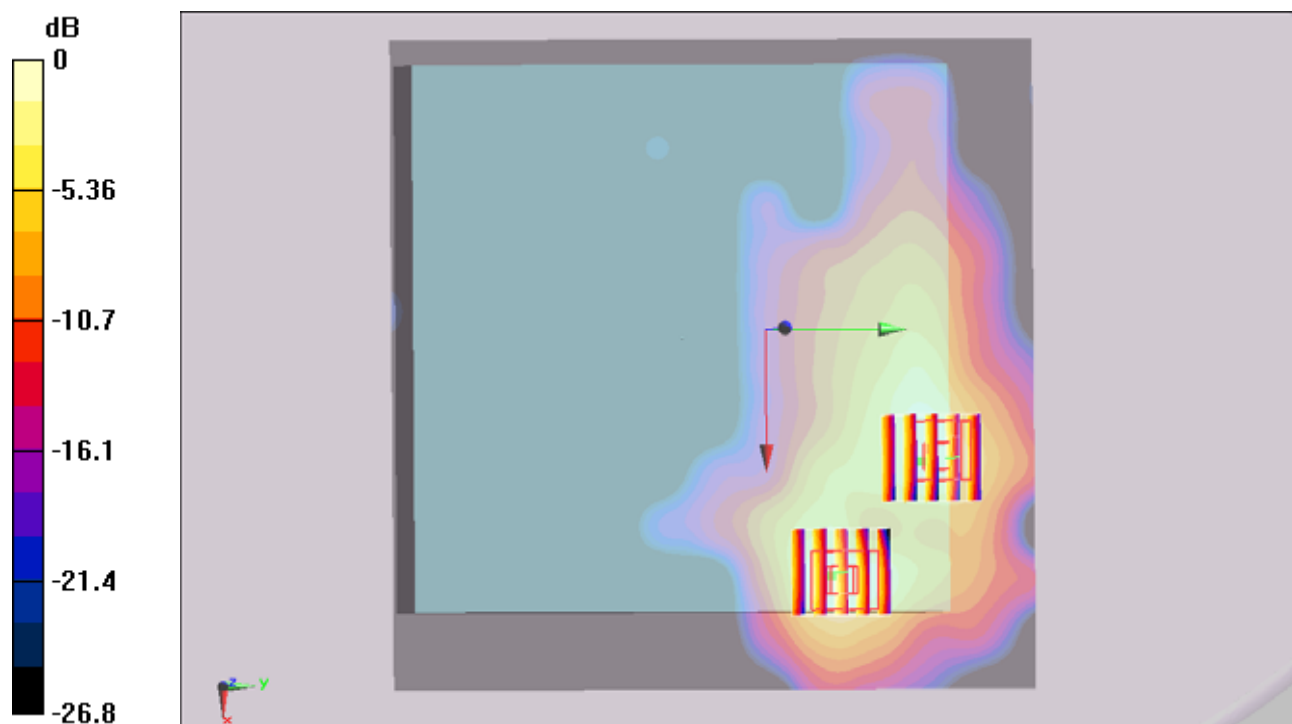
Ch6/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.384 V/m; Power Drift = -0.134 dB

Peak SAR (extrapolated) = 0.263 W/kg

SAR(1 g) = 0.110 mW/g; SAR(10 g) = 0.055 mW/g

Maximum value of SAR (measured) = 0.114 mW/g



#17 802.11b_Rear Face_0cm_Ch6_Earphone_2D

DUT: 130939

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

Medium: MSL_2450_110604 Medium parameters used: $f = 2437$ MHz; $\sigma = 2$ mho/m; $\epsilon_r = 53.9$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.3 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(3.96, 3.96, 3.96); Calibrated: 2011/5/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch6/Area Scan (121x121x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.151 mW/g

Ch6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.384 V/m; Power Drift = -0.134 dB

Peak SAR (extrapolated) = 0.333 W/kg

SAR(1 g) = 0.149 mW/g; SAR(10 g) = 0.071 mW/g

Maximum value of SAR (measured) = 0.154 mW/g

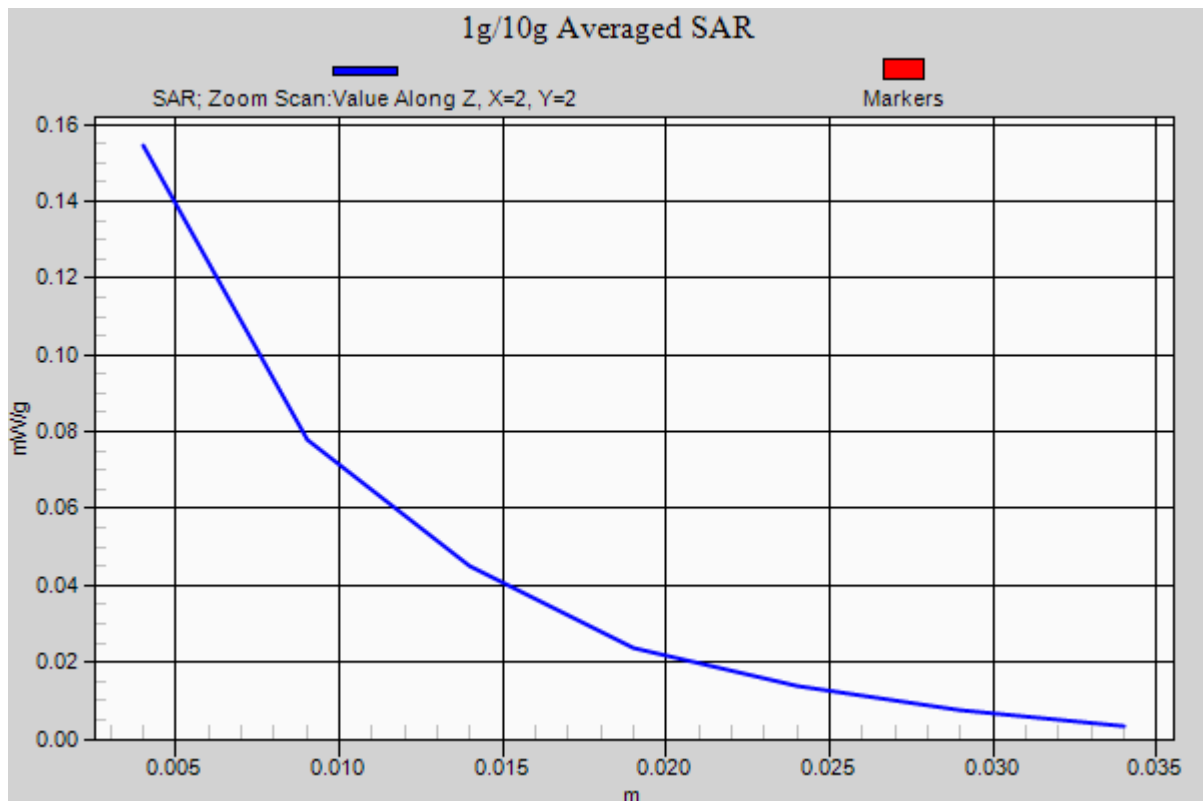
Ch6/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.384 V/m; Power Drift = -0.134 dB

Peak SAR (extrapolated) = 0.263 W/kg

SAR(1 g) = 0.110 mW/g; SAR(10 g) = 0.055 mW/g

Maximum value of SAR (measured) = 0.114 mW/g



#43 802.11b_Rear Face_0cm_Ch6_Earphone_Battery1

DUT: 130939

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

Medium: MSL_2450_110604 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 2 \text{ mho/m}$; $\epsilon_r = 53.9$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(3.96, 3.96, 3.96); Calibrated: 2011/5/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch6/Area Scan (51x121x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.057 mW/g

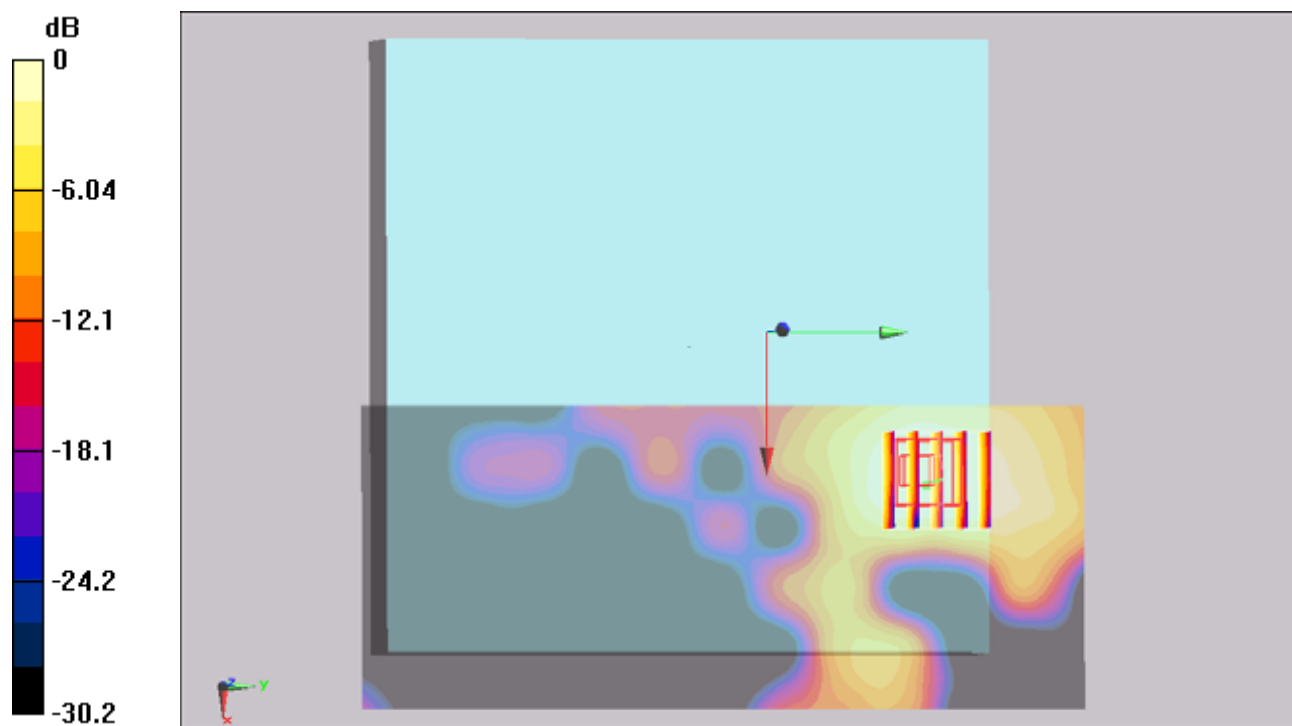
Ch6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.553 V/m; Power Drift = -0.128 dB

Peak SAR (extrapolated) = 0.091 W/kg

SAR(1 g) = 0.046 mW/g; SAR(10 g) = 0.025 mW/g

Maximum value of SAR (measured) = 0.047 mW/g



0 dB = 0.047mW/g

#44 802.11b_Rear Face_0cm_Ch6_Earphone_Battery2

DUT: 130939

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

Medium: MSL_2450_110604 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 2 \text{ mho/m}$; $\epsilon_r = 53.9$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(3.96, 3.96, 3.96); Calibrated: 2011/5/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch6/Area Scan (51x121x1): Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$

Maximum value of SAR (interpolated) = 0.071 mW/g

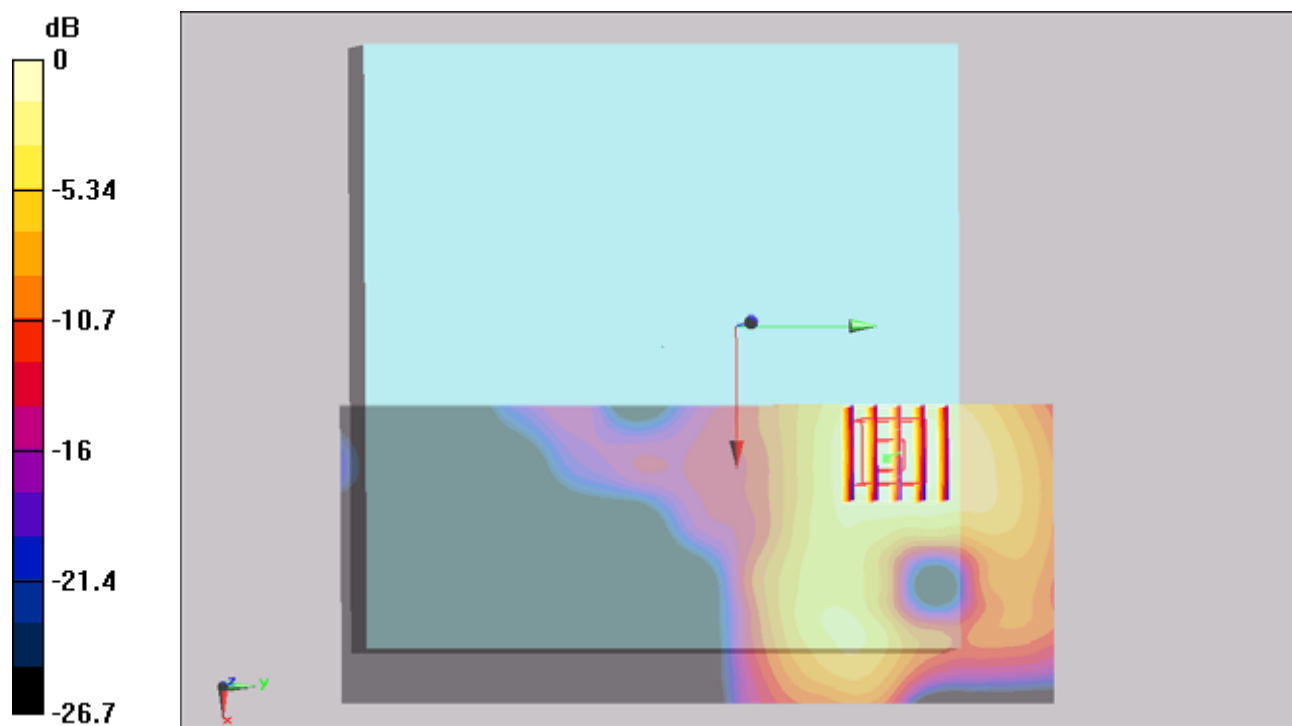
Ch6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 0.649 V/m; Power Drift = 0.155 dB

Peak SAR (extrapolated) = 0.130 W/kg

SAR(1 g) = 0.059 mW/g; SAR(10 g) = 0.033 mW/g

Maximum value of SAR (measured) = 0.062 mW/g



0 dB = 0.062mW/g

#01 802.11a_Rear Face_0cm_Ch140_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5700 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used: $f = 5700$ MHz; $\sigma = 5.97$ mho/m; $\epsilon_r = 46.7$; $\rho = 1000$

kg/m³

Ambient Temperature : 22.5 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.25, 3.25, 3.25); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch140/Area Scan (241x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.888 mW/g

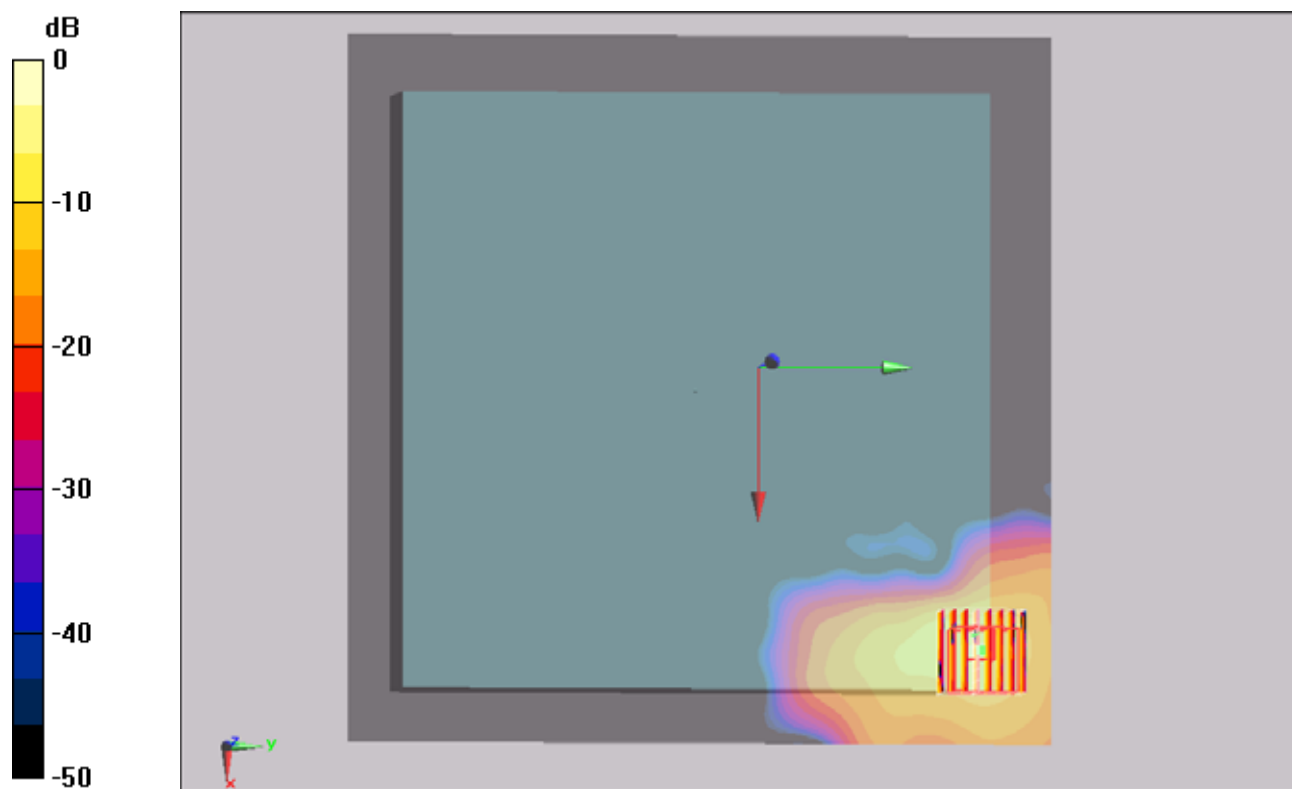
Ch140/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 1.36 V/m; Power Drift = -0.192 dB

Peak SAR (extrapolated) = 3.92 W/kg

SAR(1 g) = 0.539 mW/g; SAR(10 g) = 0.167 mW/g

Maximum value of SAR (measured) = 3.92 mW/g



#03 802.11a_Rear Face_0cm_Ch36_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5180 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used: $f = 5180 \text{ MHz}$; $\sigma = 5.23 \text{ mho/m}$; $\epsilon_r = 47.6$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.97, 3.97, 3.97); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch36/Area Scan (81x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.742 mW/g

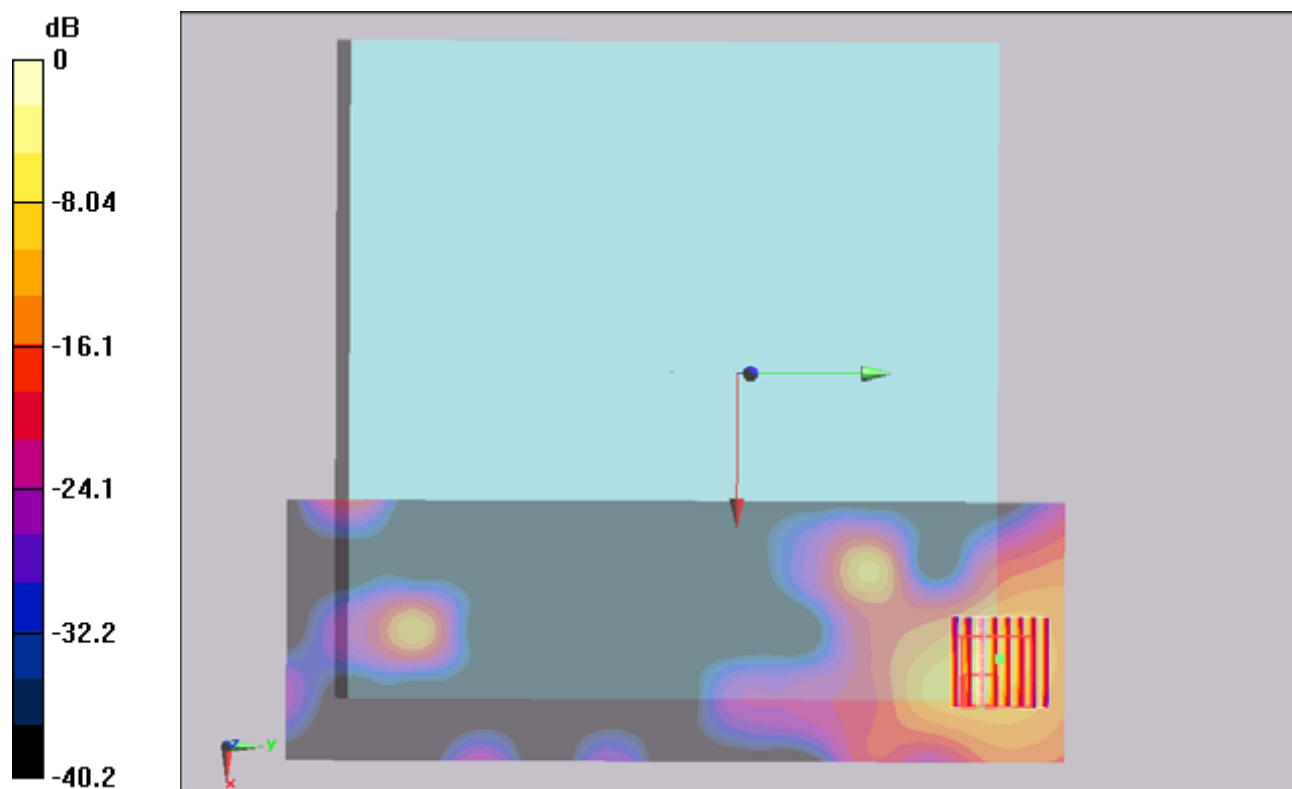
Ch36/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.152 dB

Peak SAR (extrapolated) = 7 W/kg

SAR(1 g) = 0.511 mW/g; SAR(10 g) = 0.226 mW/g

Maximum value of SAR (measured) = 3.49 mW/g



#04 802.11a_Rear Face_0cm _Ch48_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5240 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used: $f = 5240$ MHz; $\sigma = 5.3$ mho/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.97, 3.97, 3.97); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch48/Area Scan (81x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.802 mW/g

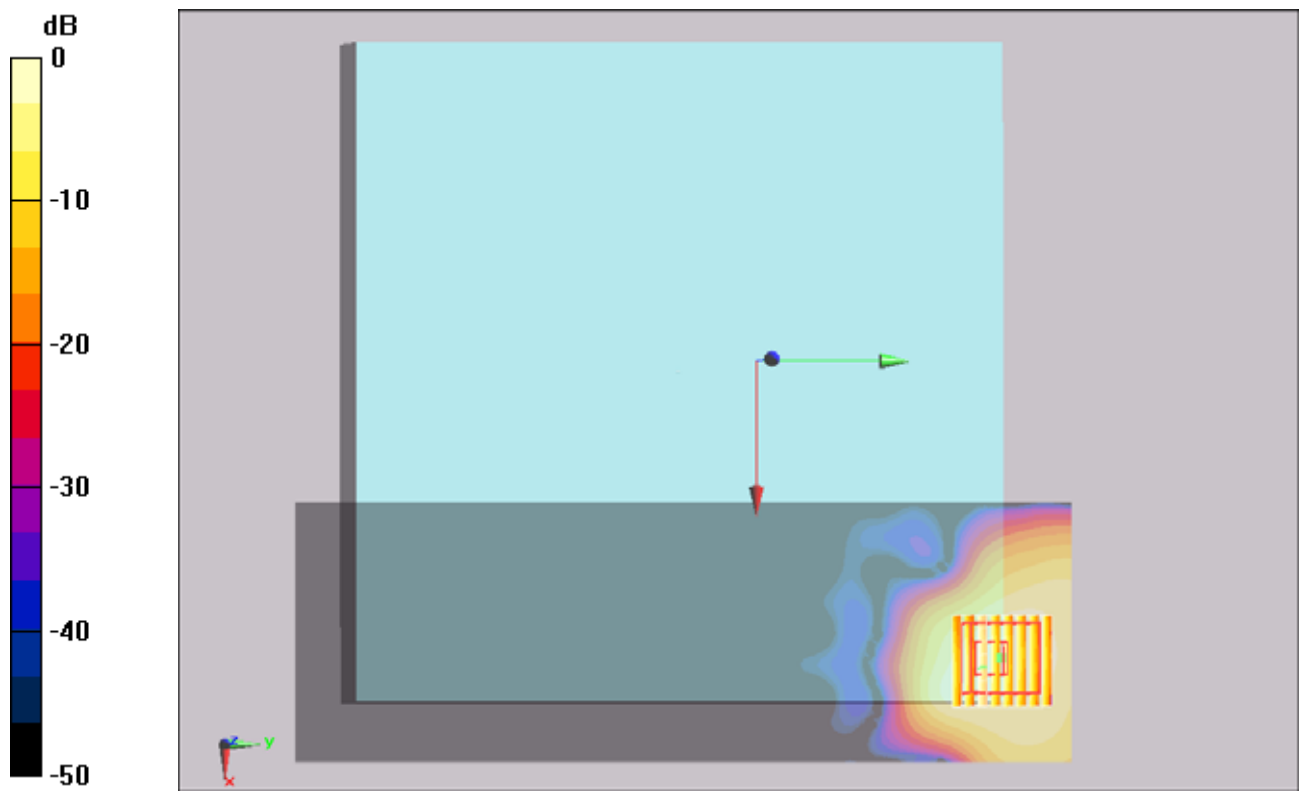
Ch48/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.153 dB

Peak SAR (extrapolated) = 0.987 W/kg

SAR(1 g) = 0.446 mW/g; SAR(10 g) = 0.196 mW/g

Maximum value of SAR (measured) = 0.691 mW/g



#05 802.11a_Rear Face_0cm _Ch52_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5260 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used: $f = 5260$ MHz; $\sigma = 5.32$ mho/m; $\epsilon_r = 47.4$; $\rho = 1000$

kg/m³

Ambient Temperature : 22.5 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.97, 3.97, 3.97); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch52/Area Scan (81x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.31 mW/g

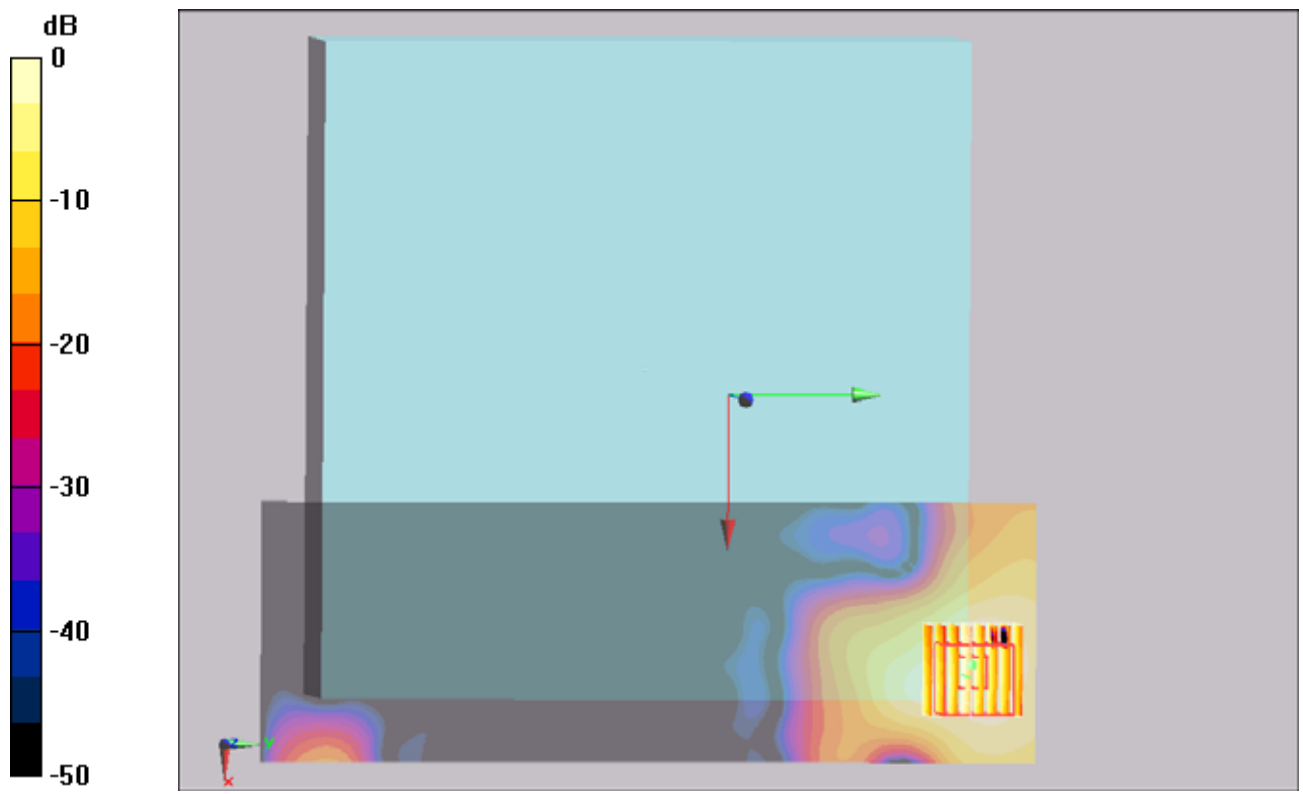
Ch52/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0.531 V/m; Power Drift = -0.191 dB

Peak SAR (extrapolated) = 1.7 W/kg

SAR(1 g) = 0.740 mW/g; SAR(10 g) = 0.322 mW/g

Maximum value of SAR (measured) = 1.16 mW/g



0 dB = 1.16mW/g

#06 802.11a_Rear Face_0cm _Ch64_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5320 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used : $f = 5320 \text{ MHz}$; $\sigma = 5.42 \text{ mho/m}$; $\epsilon_r = 47.3$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.63, 3.63, 3.63); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch64/Area Scan (81x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.741 mW/g

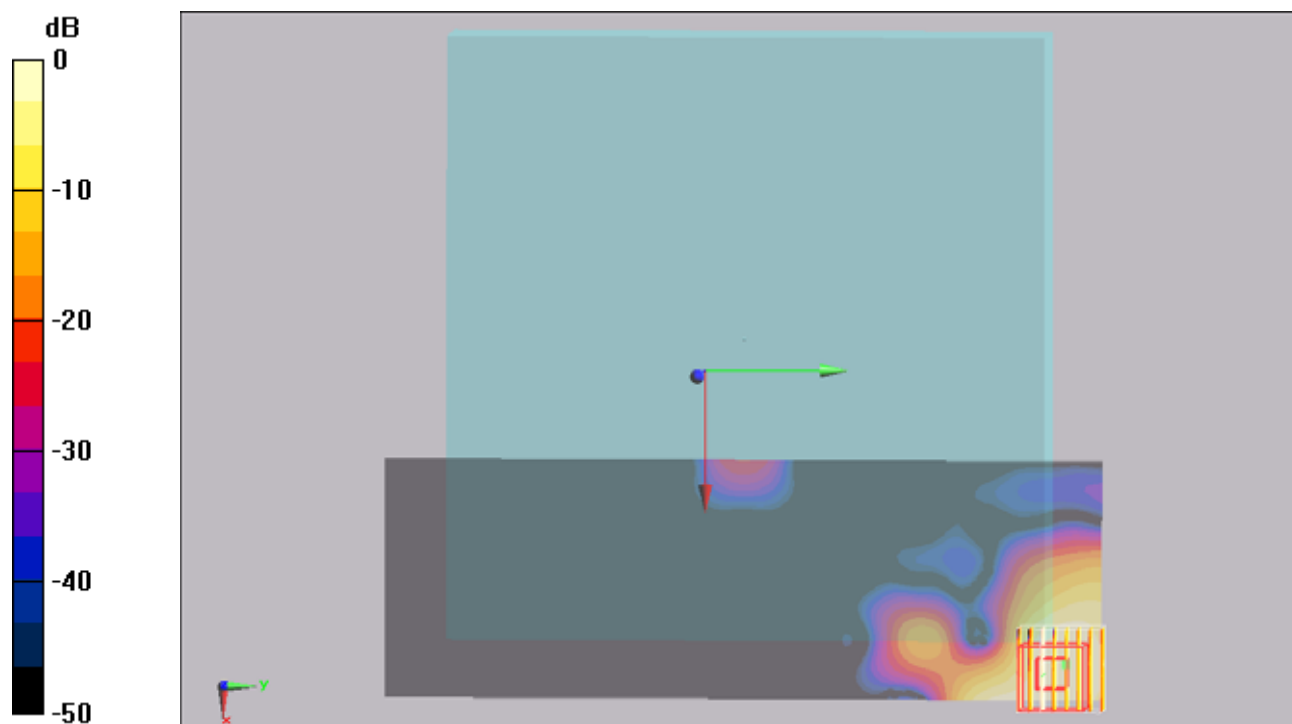
Ch64/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.1 dB

Peak SAR (extrapolated) = 0.864 W/kg

SAR(1 g) = 0.439 mW/g; SAR(10 g) = 0.173 mW/g

Maximum value of SAR (measured) = 0.657 mW/g



0 dB = 0.657mW/g

#07 802.11a_Rear Face_0cm _Ch104_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5520 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used: $f = 5520$ MHz; $\sigma = 5.69$ mho/m; $\epsilon_r = 47$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.44, 3.44, 3.44); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch104/Area Scan (81x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.805 mW/g

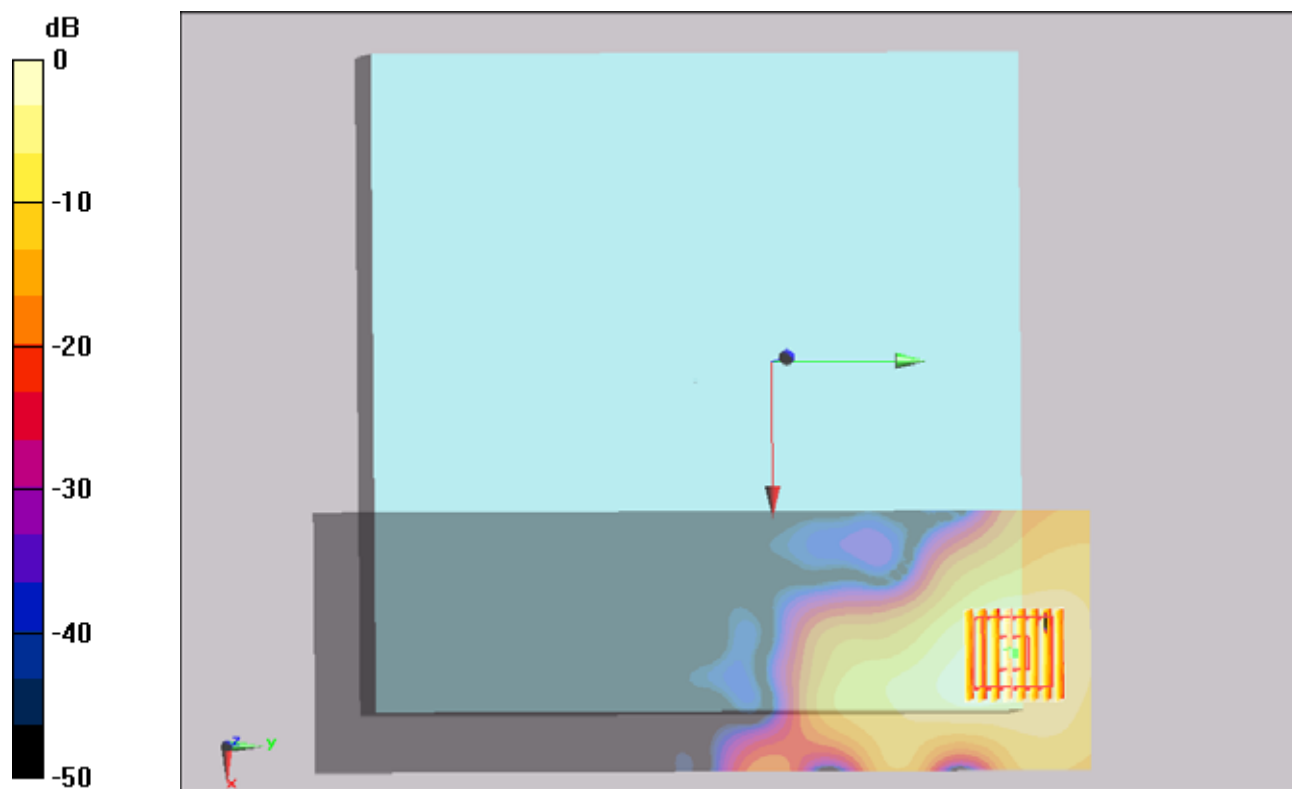
Ch104/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.123 dB

Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.549 mW/g; SAR(10 g) = 0.233 mW/g

Maximum value of SAR (measured) = 0.866 mW/g



0 dB = 0.866mW/g

#08 802.11a_Rear Face_0cm_Ch116_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5580 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used: $f = 5580 \text{ MHz}$; $\sigma = 5.78 \text{ mho/m}$; $\epsilon_r = 46.9$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.5 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.25, 3.25, 3.25); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch116/Area Scan (81x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.27 mW/g

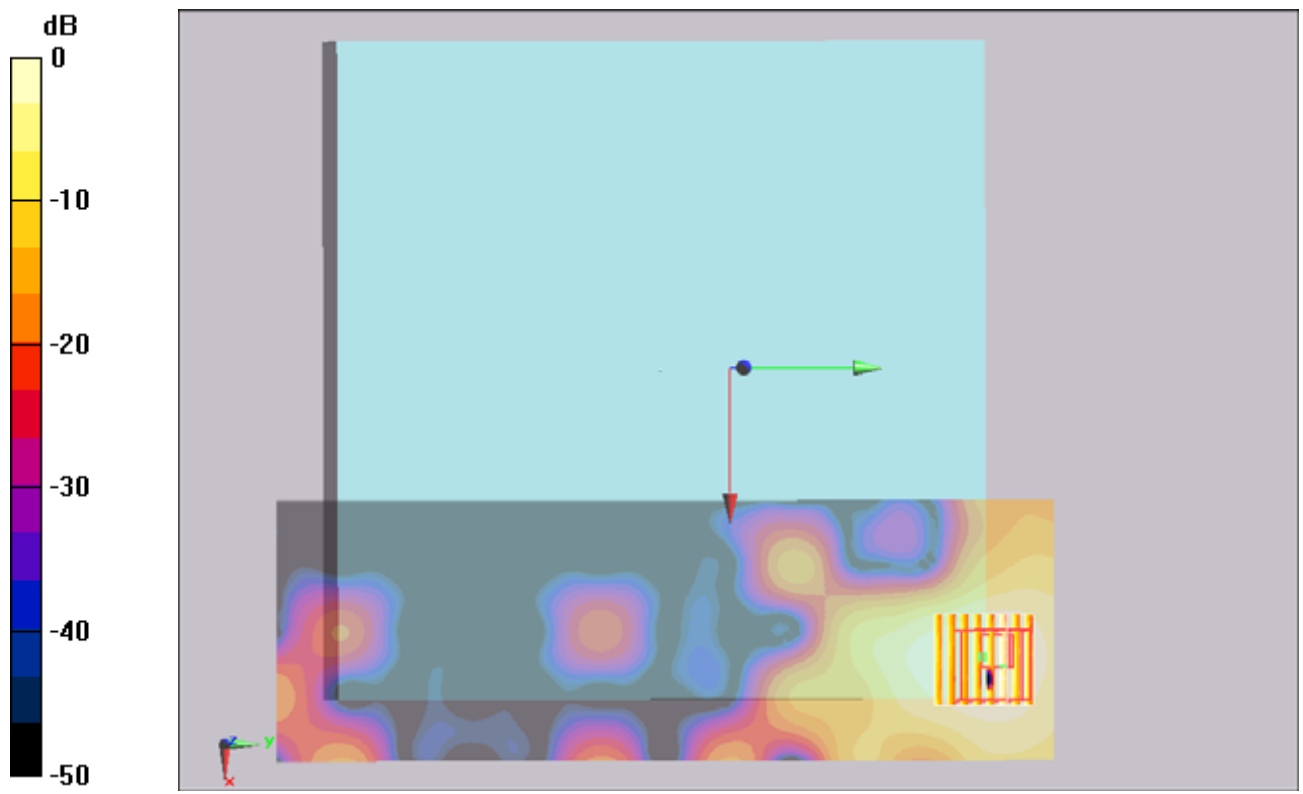
Ch116/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0.289 V/m; Power Drift = -0.129 dB

Peak SAR (extrapolated) = 1.7 W/kg

SAR(1 g) = 0.609 mW/g; SAR(10 g) = 0.240 mW/g

Maximum value of SAR (measured) = 0.961 mW/g



#09 802.11a_Rear Face_0cm _Ch124_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5620 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used: $f = 5620 \text{ MHz}$; $\sigma = 5.84 \text{ mho/m}$; $\epsilon_r = 46.8$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.25, 3.25, 3.25); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch124/Area Scan (81x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.57 mW/g

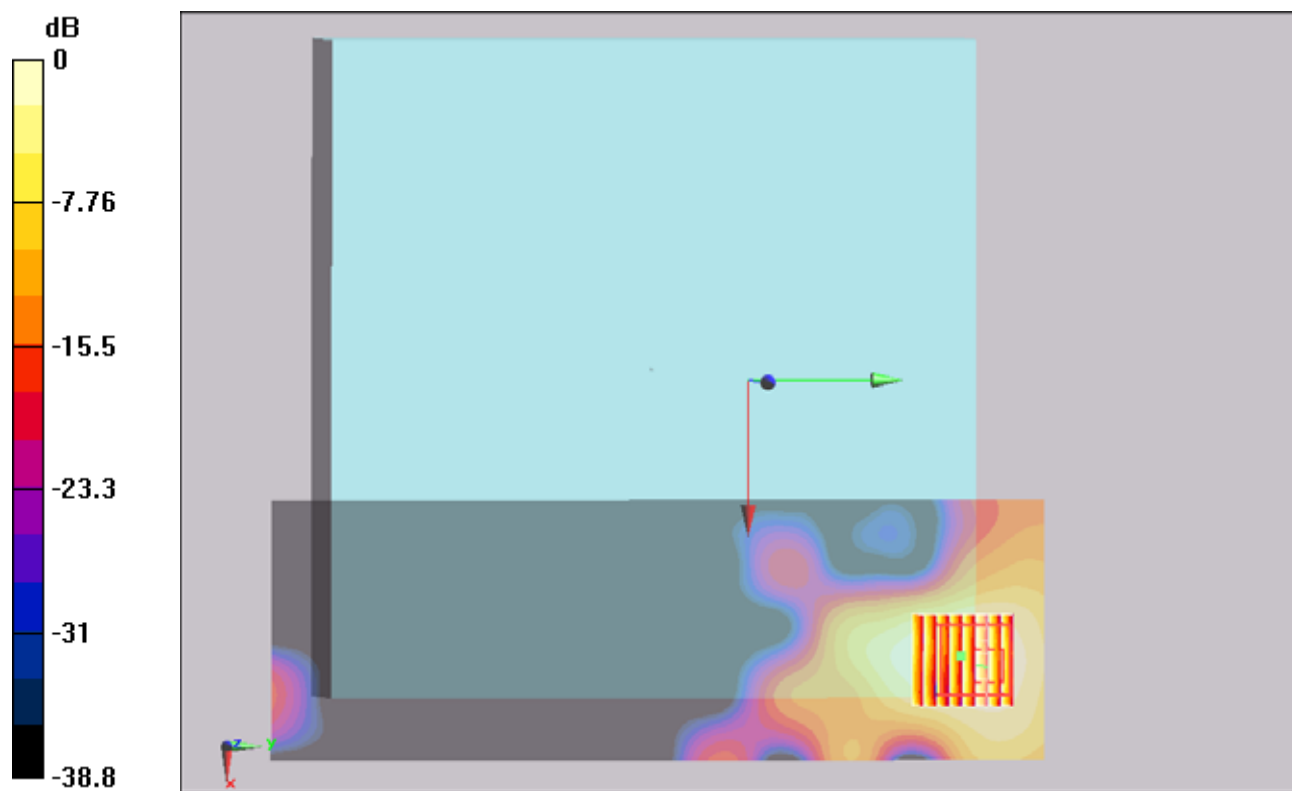
Ch124/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.123 dB

Peak SAR (extrapolated) = 1.46 W/kg

SAR(1 g) = 0.684 mW/g; SAR(10 g) = 0.271 mW/g

Maximum value of SAR (measured) = 1.08 mW/g



#10 802.11a_Rear Face_0cm _Ch136_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5680 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used : $f = 5680 \text{ MHz}$; $\sigma = 5.94 \text{ mho/m}$; $\epsilon_r = 46.7$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.25, 3.25, 3.25); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch136/Area Scan (81x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.7 mW/g

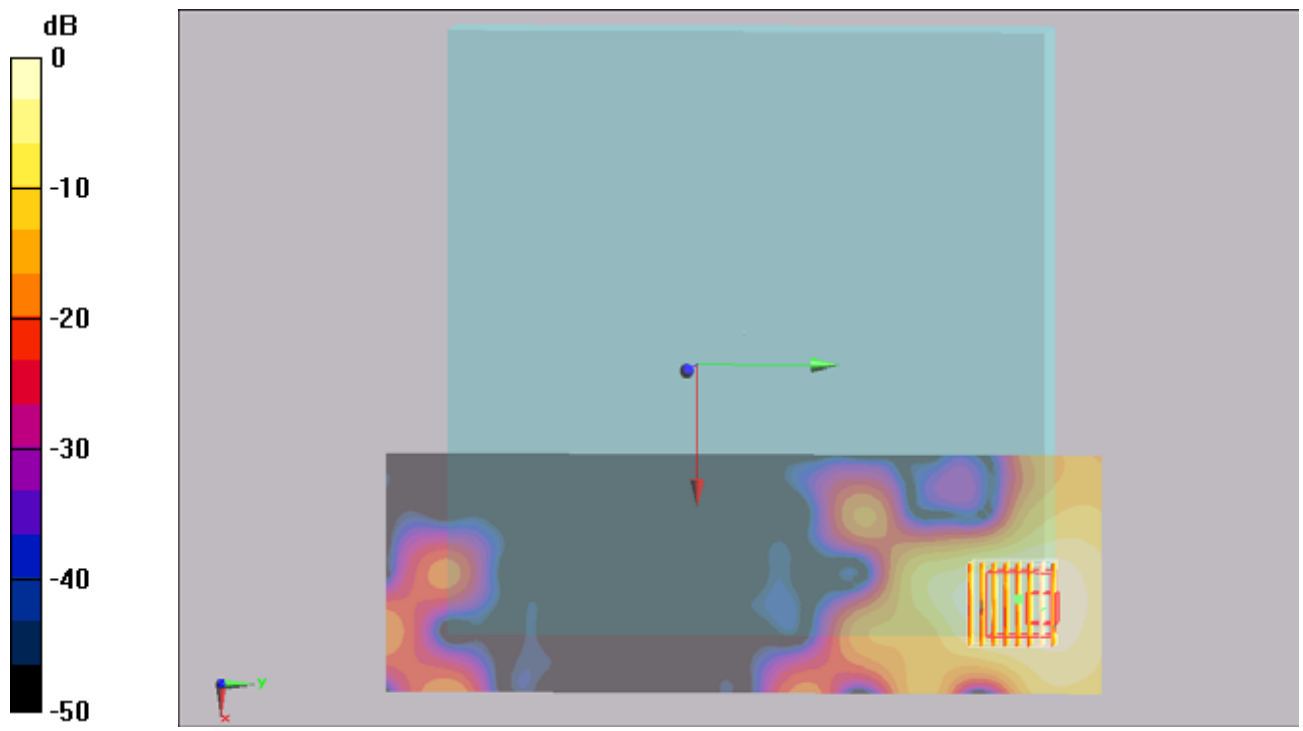
Ch136/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 1.63 W/kg

SAR(1 g) = 0.765 mW/g; SAR(10 g) = 0.215 mW/g

Maximum value of SAR (measured) = 1.2 mW/g



0 dB = 1.2mW/g

#10 802.11a_Rear Face_0cm _Ch136_Earphone_2D

DUT: 130939

Communication System: 802.11a; Frequency: 5680 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used: $f = 5680$ MHz; $\sigma = 5.94$ mho/m; $\epsilon_r = 46.7$; $\rho = 1000$

kg/m³

Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.25, 3.25, 3.25); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch136/Area Scan (81x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.7 mW/g

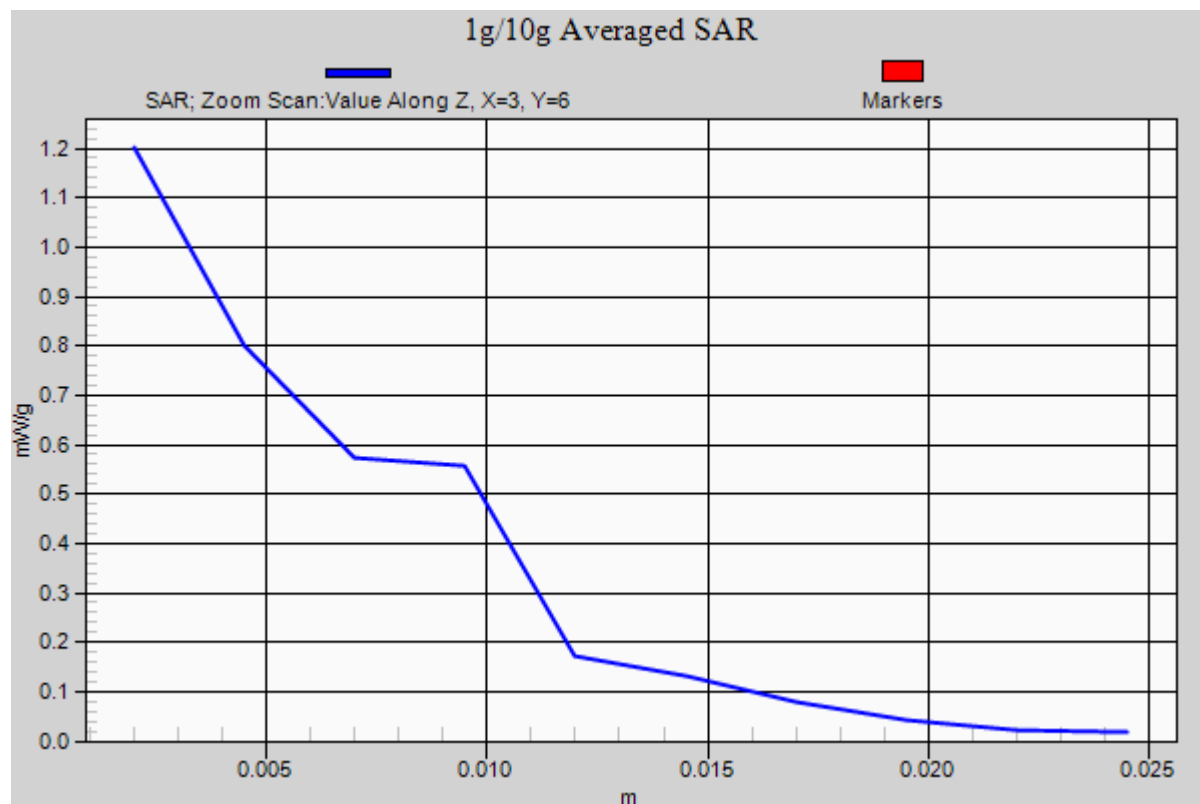
Ch136/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.124 dB

Peak SAR (extrapolated) = 1.63 W/kg

SAR(1 g) = 0.765 mW/g; SAR(10 g) = 0.215 mW/g

Maximum value of SAR (measured) = 1.2 mW/g



#11 802.11a_Rear Face_0cm _Ch149_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5745 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used : $f = 5745 \text{ MHz}$; $\sigma = 6.09 \text{ mho/m}$; $\epsilon_r = 46.7$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.66, 3.66, 3.66); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch149/Area Scan (81x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.444 mW/g

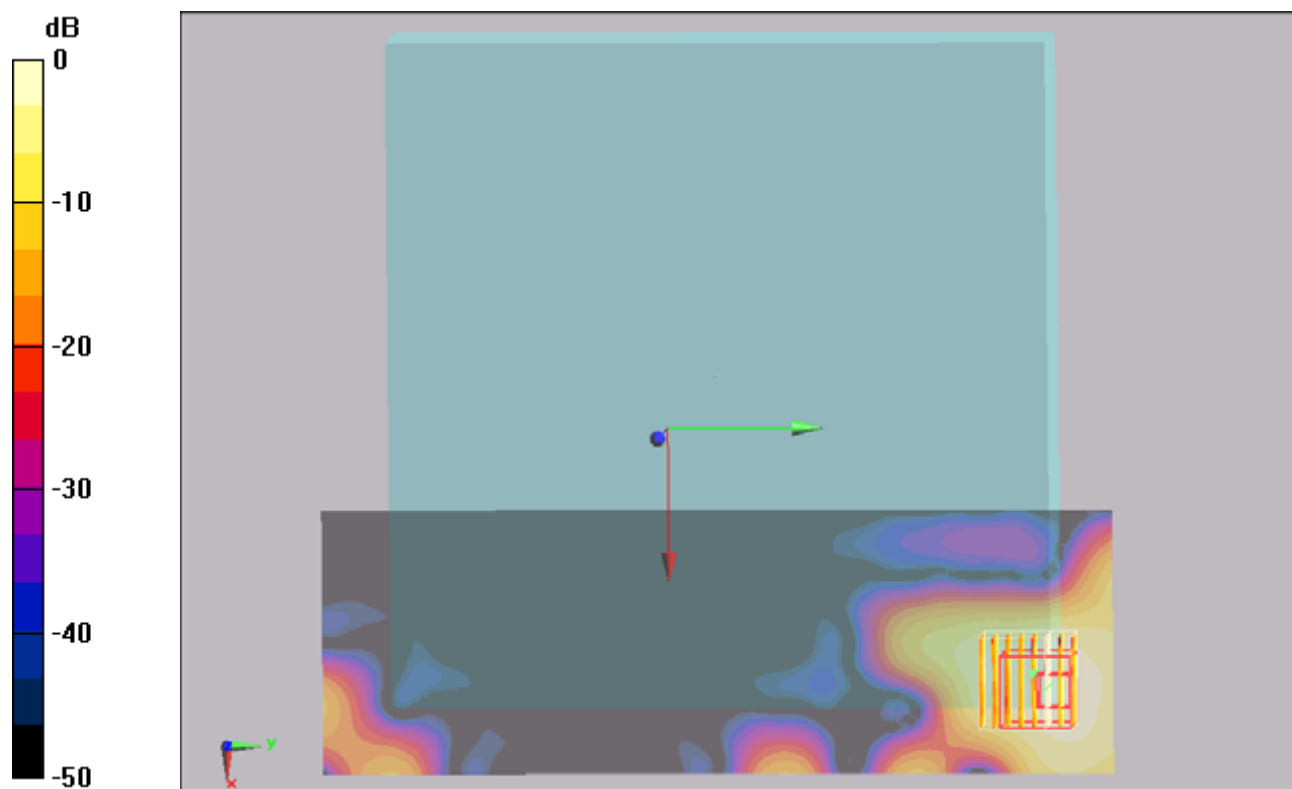
Ch149/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.145 dB

Peak SAR (extrapolated) = 0.570 W/kg

SAR(1 g) = 0.226 mW/g; SAR(10 g) = 0.076 mW/g

Maximum value of SAR (measured) = 0.368 mW/g



0 dB = 0.368mW/g

#12 802.11a_Rear Face_0cm _Ch157_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used : $f = 5785 \text{ MHz}$; $\sigma = 6.14 \text{ mho/m}$; $\epsilon_r = 46.5$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.66, 3.66, 3.66); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch157/Area Scan (81x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.451 mW/g

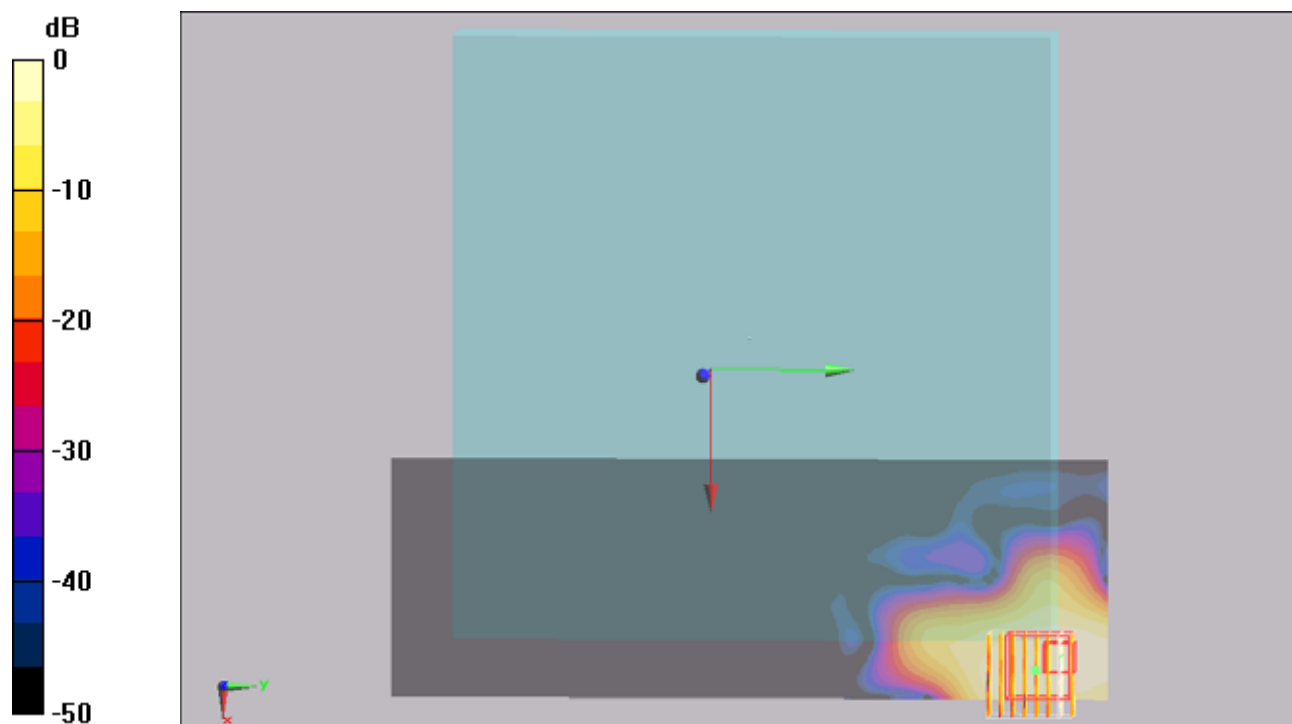
Ch157/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0.421 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.583 W/kg

SAR(1 g) = 0.220 mW/g; SAR(10 g) = 0.066 mW/g

Maximum value of SAR (measured) = 0.375 mW/g



0 dB = 0.375mW/g

#13 802.11a_Rear Face_0cm _Ch161_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5805 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used : $f = 5805 \text{ MHz}$; $\sigma = 6.17 \text{ mho/m}$; $\epsilon_r = 46.5$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.66, 3.66, 3.66); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch161/Area Scan (81x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.664 mW/g

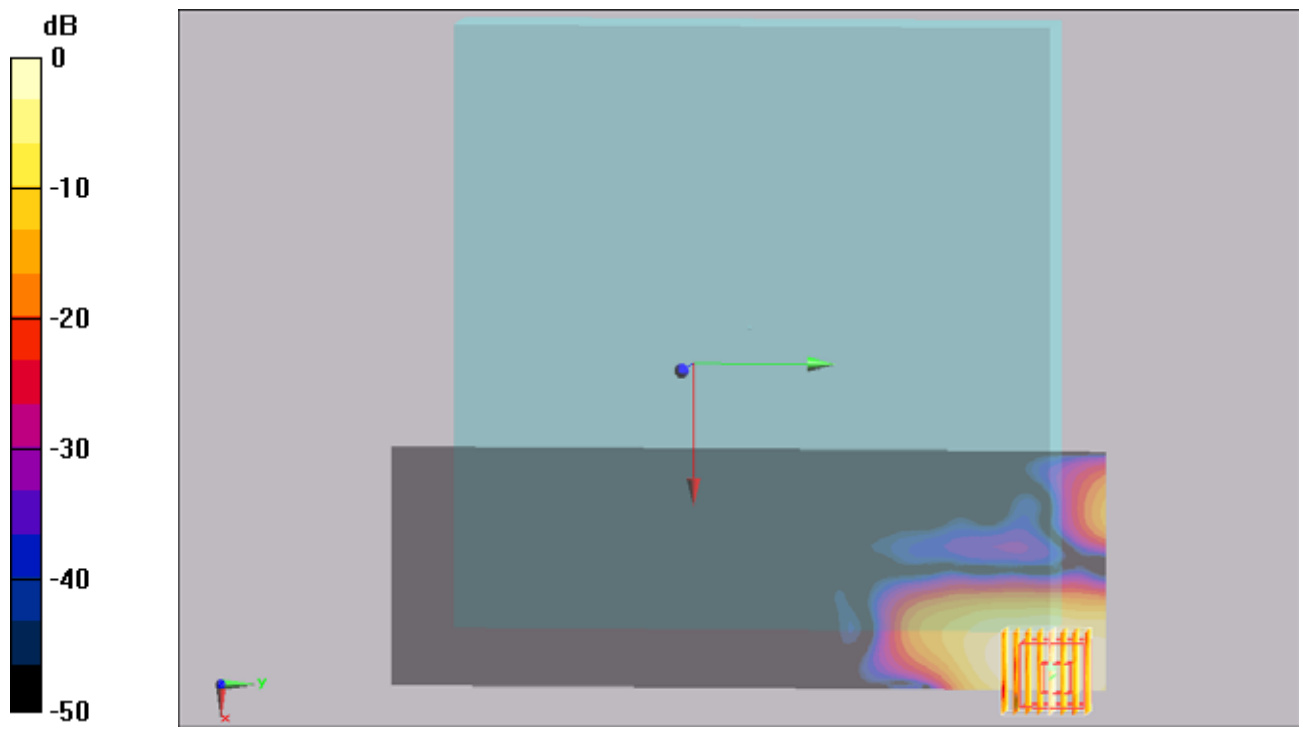
Ch161/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0.332 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.516 W/kg

SAR(1 g) = 0.212 mW/g; SAR(10 g) = 0.083 mW/g

Maximum value of SAR (measured) = 0.343 mW/g



#14 802.11a_Rear Face_0cm _Ch165_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5825 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used : $f = 5825 \text{ MHz}$; $\sigma = 6.22 \text{ mho/m}$; $\epsilon_r = 46.4$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.66, 3.66, 3.66); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch165/Area Scan (81x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.677 mW/g

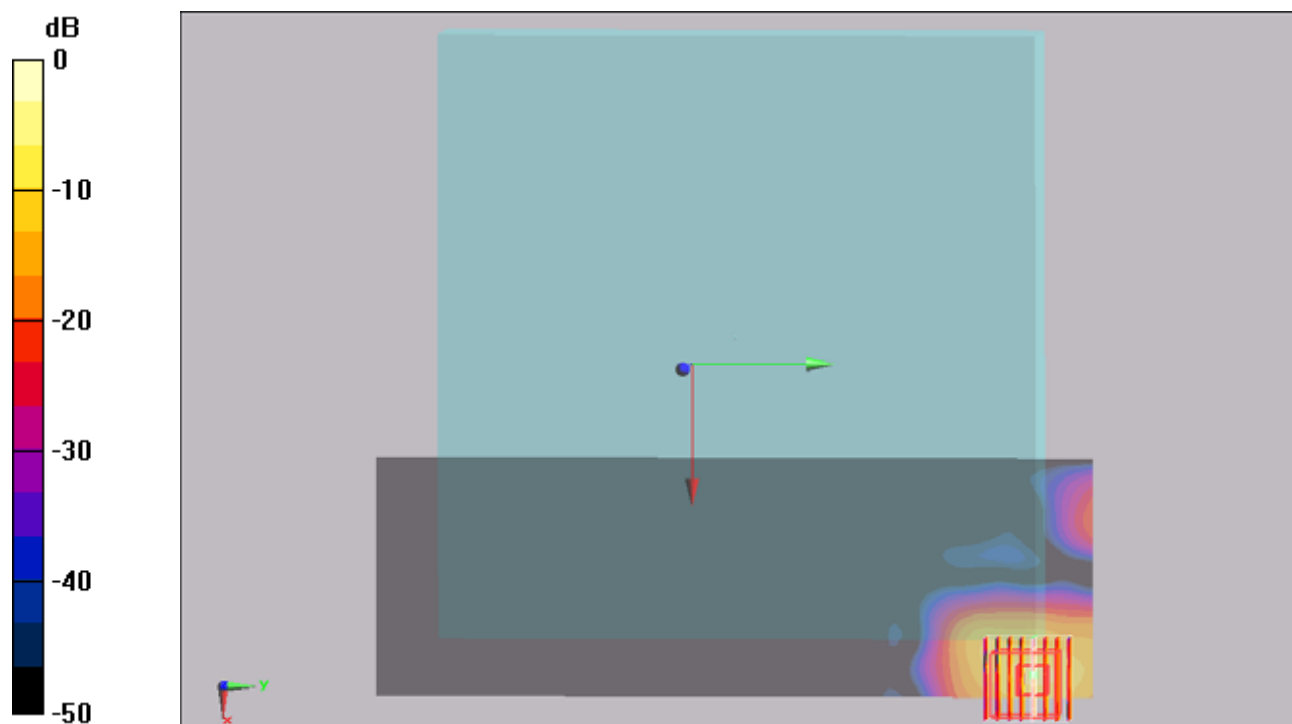
Ch165/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 2.47 W/kg

SAR(1 g) = 0.213 mW/g; SAR(10 g) = 0.054 mW/g

Maximum value of SAR (measured) = 2.47 mW/g



#15 802.11a_20n_Rear Face_0cm _Ch136_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5680 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used : $f = 5680 \text{ MHz}$; $\sigma = 5.94 \text{ mho/m}$; $\epsilon_r = 46.7$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.25, 3.25, 3.25); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch136/Area Scan (81x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.11 mW/g

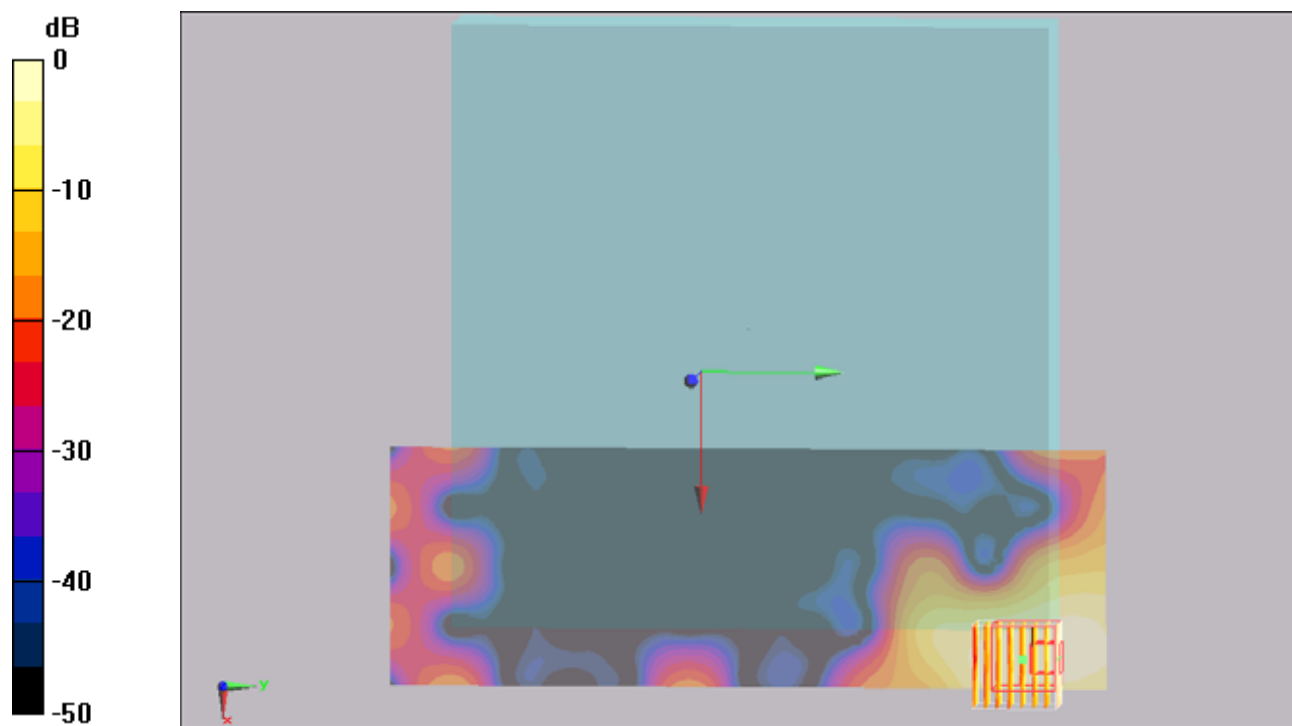
Ch136/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 1.69 W/kg

SAR(1 g) = 0.567 mW/g; SAR(10 g) = 0.214 mW/g

Maximum value of SAR (measured) = 1.26 mW/g



0 dB = 1.26mW/g

#16 802.11a_Rear Face_0cm _Ch136_Earphone

DUT: 130939

Communication System: 802.11a; Frequency: 5680 MHz; Duty Cycle: 1:1

Medium: MSL5G_110531 Medium parameters used : $f = 5680 \text{ MHz}$; $\sigma = 5.94 \text{ mho/m}$; $\epsilon_r = 46.7$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.6 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3697; ConvF(3.25, 3.25, 3.25); Calibrated: 2011/4/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch136/Area Scan (81x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.18 mW/g

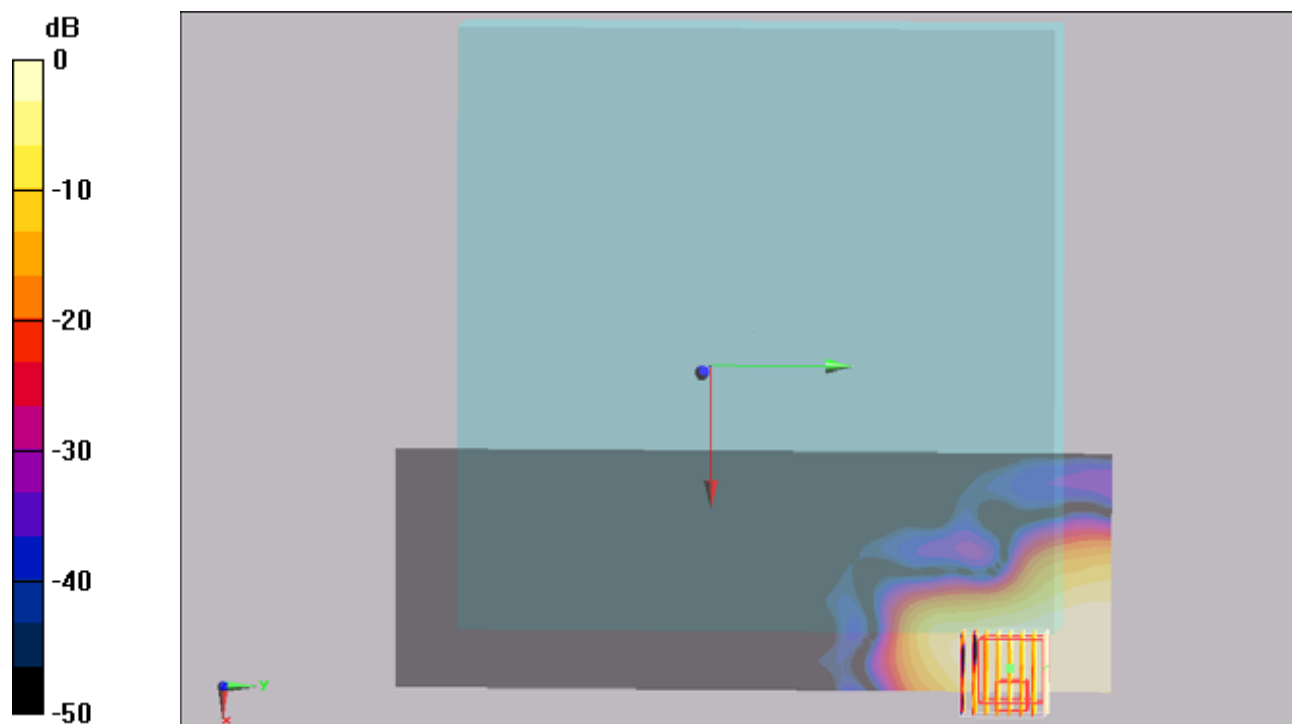
Ch136/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.14 W/kg

SAR(1 g) = 0.421 mW/g; SAR(10 g) = 0.154 mW/g

Maximum value of SAR (measured) = 0.767 mW/g



0 dB = 0.767mW/g

#37 802.11a_Rear Face_0cm _Ch136_Earphone_Battery1

DUT: 130939

Communication System: 802.11a; Frequency: 5680 MHz; Duty Cycle: 1:1

Medium: MSL_5G_110604 Medium parameters used: $f = 5680 \text{ MHz}$; $\sigma = 5.96 \text{ mho/m}$; $\epsilon_r = 46.7$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.3 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.2, 3.2, 3.2); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1249; Calibrated: 2011/2/21
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch136/Area Scan (41x121x1): Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$

Maximum value of SAR (interpolated) = 0.431 mW/g

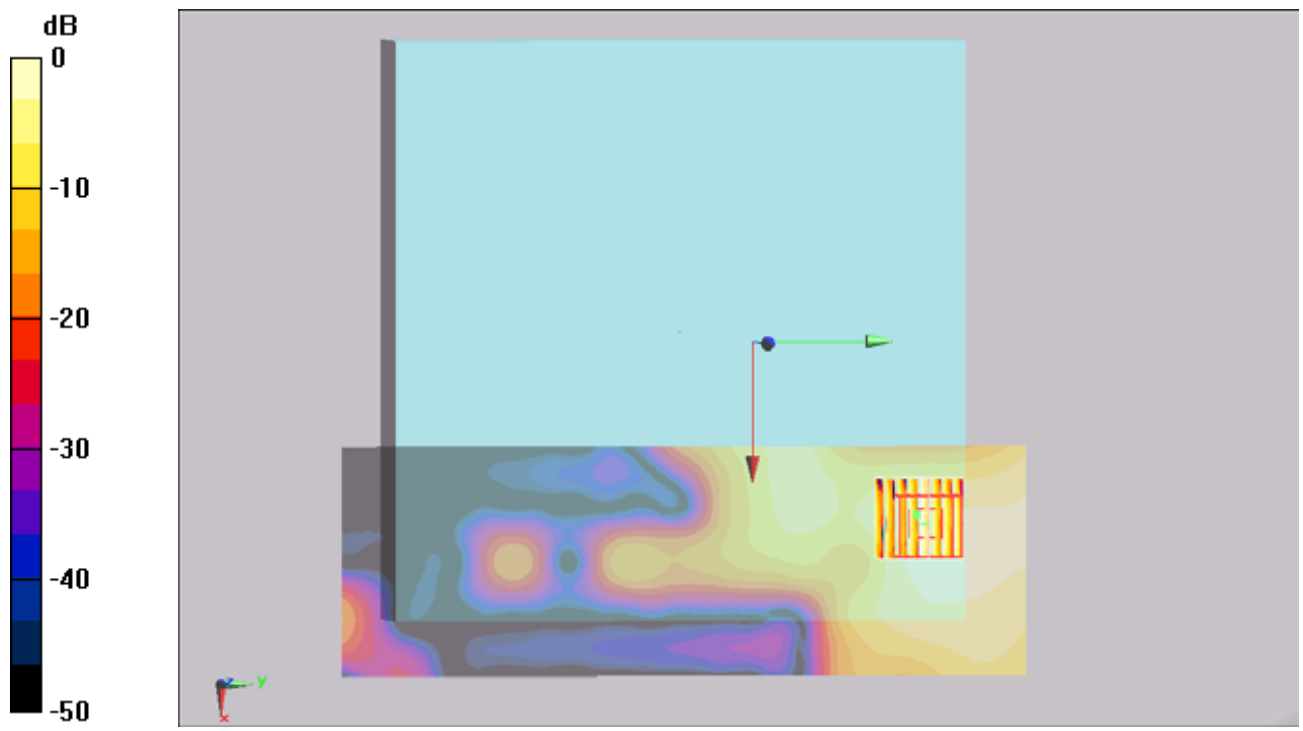
Ch136/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 1.25 V/m; Power Drift = -0.125 dB

Peak SAR (extrapolated) = 0.574 W/kg

SAR(1 g) = 0.294 mW/g; SAR(10 g) = 0.129 mW/g

Maximum value of SAR (measured) = 0.438 mW/g



0 dB = 0.438mW/g

#38 802.11a_Rear Face_0cm _Ch136_Earphone_Battery2

DUT: 130939

Communication System: 802.11a; Frequency: 5680 MHz; Duty Cycle: 1:1

Medium: MSL_5G_110604 Medium parameters used: $f = 5680 \text{ MHz}$; $\sigma = 5.96 \text{ mho/m}$; $\epsilon_r = 46.7$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.3 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.2, 3.2, 3.2); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1249; Calibrated: 2011/2/21
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch136/Area Scan (41x131x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.541 mW/g

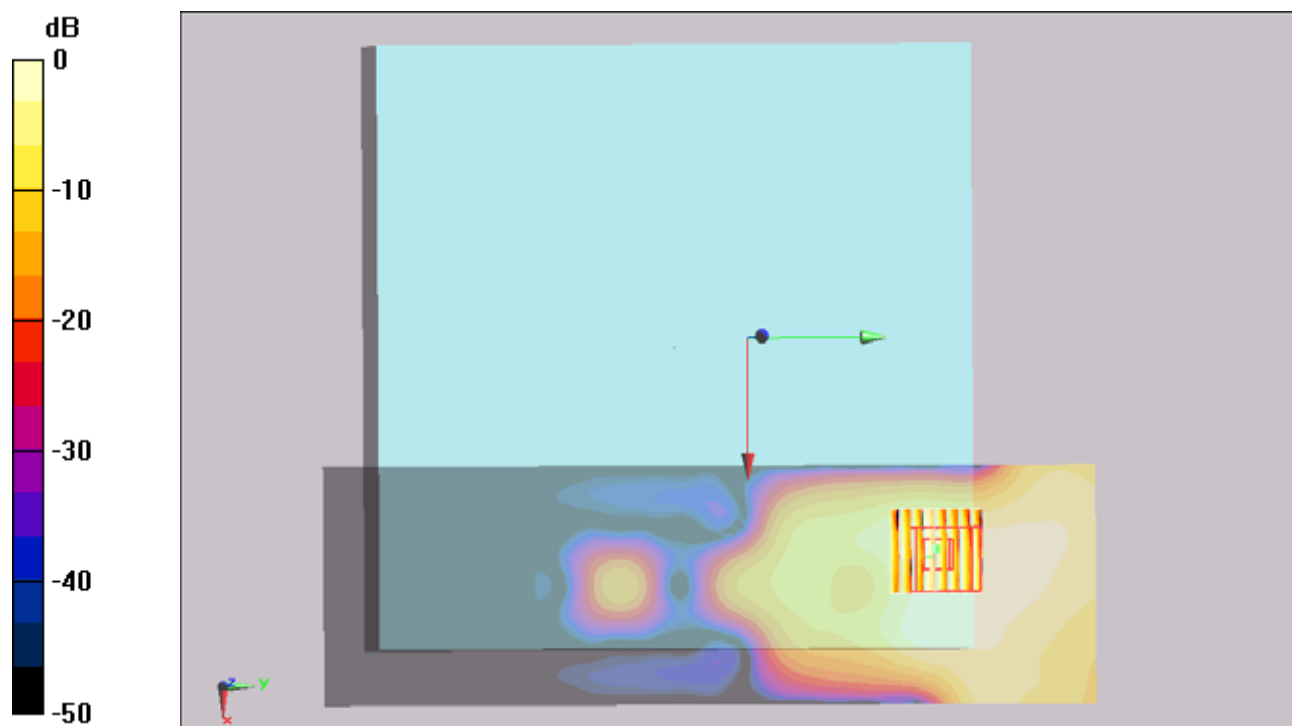
Ch136/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.125 dB

Peak SAR (extrapolated) = 0.673 W/kg

SAR(1 g) = 0.343 mW/g; SAR(10 g) = 0.155 mW/g

Maximum value of SAR (measured) = 0.518 mW/g



0 dB = 0.518mW/g

#39 802.11b_Rear Face_0cm_Ch6_Earphone_Holster

DUT: 130939

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

Medium: MSL_2450_110604 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 2 \text{ mho/m}$; $\epsilon_r = 53.9$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(3.96, 3.96, 3.96); Calibrated: 2011/5/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch6/Area Scan (121x121x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.089 mW/g

Ch6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0 V/m; Power Drift = 0.110 dB

Peak SAR (extrapolated) = 0.187 W/kg

SAR(1 g) = 0.082 mW/g; SAR(10 g) = 0.043 mW/g

Maximum value of SAR (measured) = 0.087 mW/g

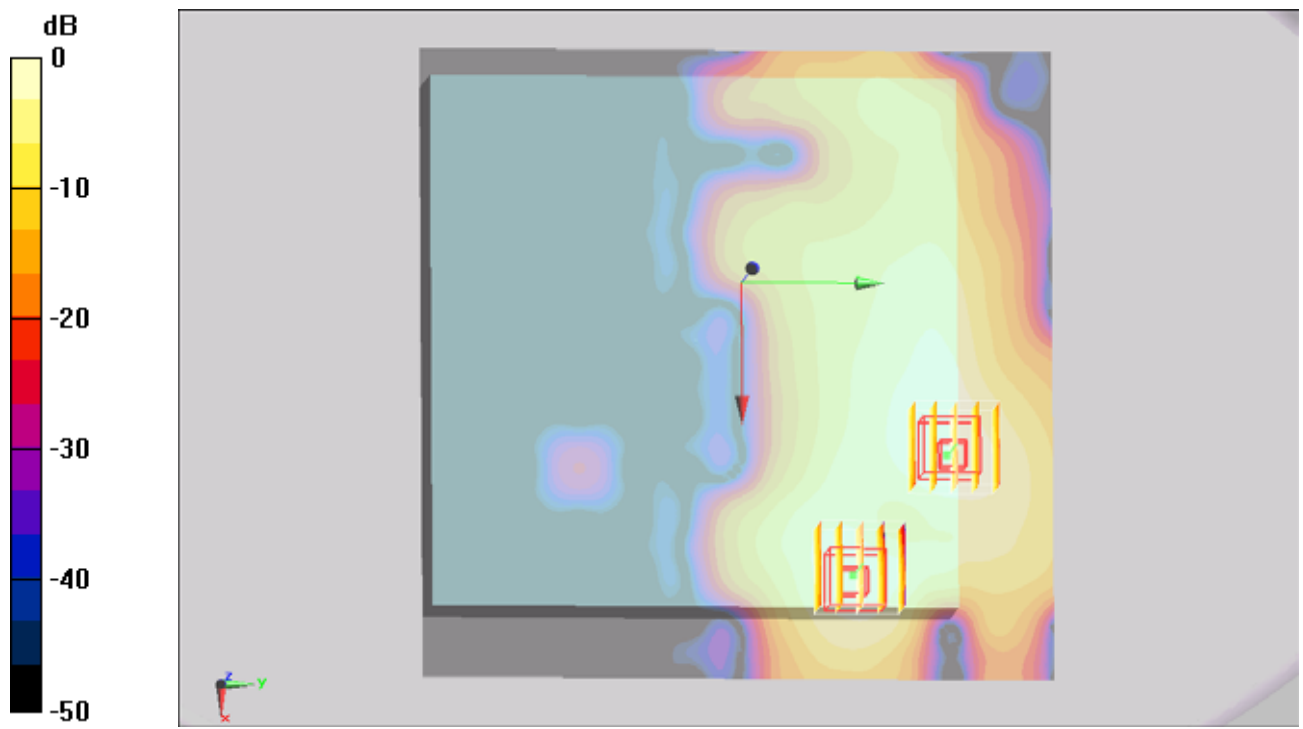
Ch6/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0 V/m; Power Drift = 0.110 dB

Peak SAR (extrapolated) = 0.151 W/kg

SAR(1 g) = 0.070 mW/g; SAR(10 g) = 0.035 mW/g

Maximum value of SAR (measured) = 0.073 mW/g



0 dB = 0.073mW/g

#39 802.11b_Rear Face_0cm_Ch6_Earphone_Holster_2D

DUT: 130939

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

Medium: MSL_2450_110604 Medium parameters used: $f = 2437$ MHz; $\sigma = 2$ mho/m; $\epsilon_r = 53.9$; $\rho = 1000$ kg/m^3

Ambient Temperature : 22.4 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(3.96, 3.96, 3.96); Calibrated: 2011/5/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch6/Area Scan (121x121x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.089 mW/g

Ch6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0 V/m; Power Drift = 0.110 dB

Peak SAR (extrapolated) = 0.187 W/kg

SAR(1 g) = 0.082 mW/g; SAR(10 g) = 0.043 mW/g

Maximum value of SAR (measured) = 0.087 mW/g

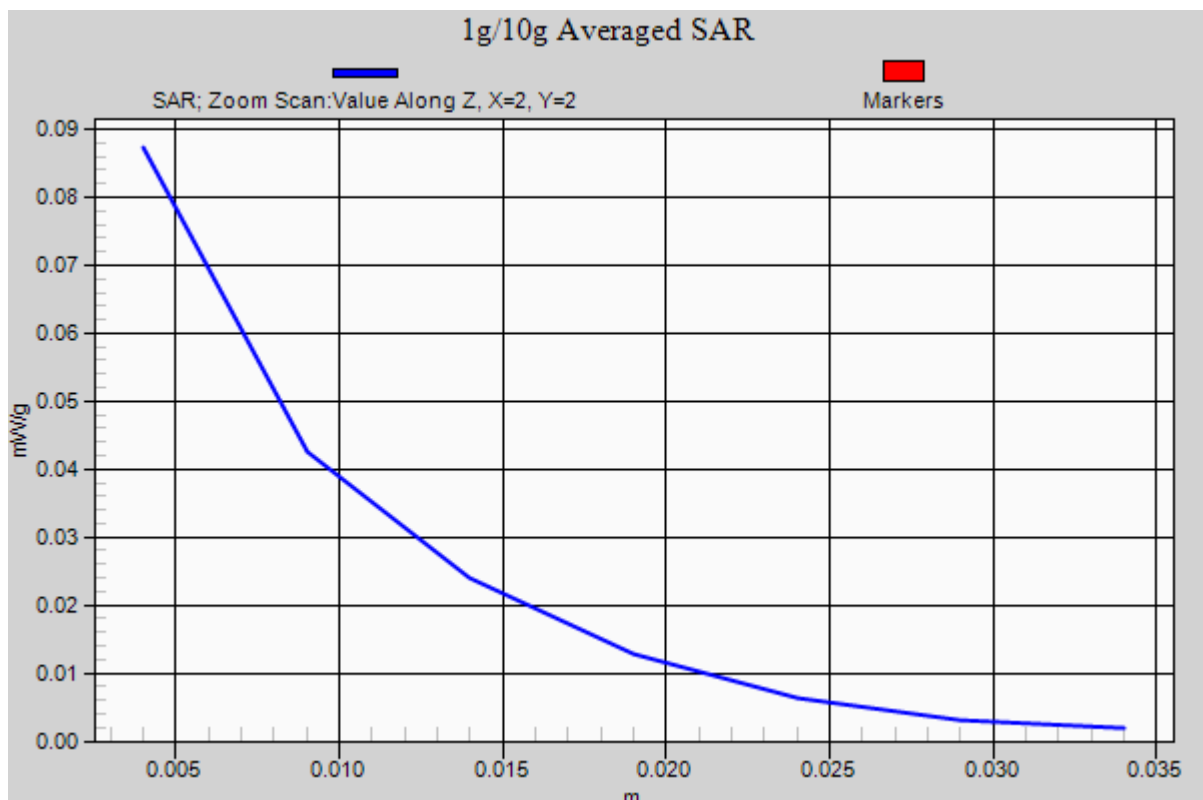
Ch6/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0 V/m; Power Drift = 0.110 dB

Peak SAR (extrapolated) = 0.151 W/kg

SAR(1 g) = 0.070 mW/g; SAR(10 g) = 0.035 mW/g

Maximum value of SAR (measured) = 0.073 mW/g



#41 802.11b_Rear Face_0cm_Ch6_Earphone_Holster_Battery1

DUT: 130939

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

Medium: MSL_2450_110604 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 2 \text{ mho/m}$; $\epsilon_r = 53.9$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(3.96, 3.96, 3.96); Calibrated: 2011/5/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch6/Area Scan (121x121x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.040 mW/g

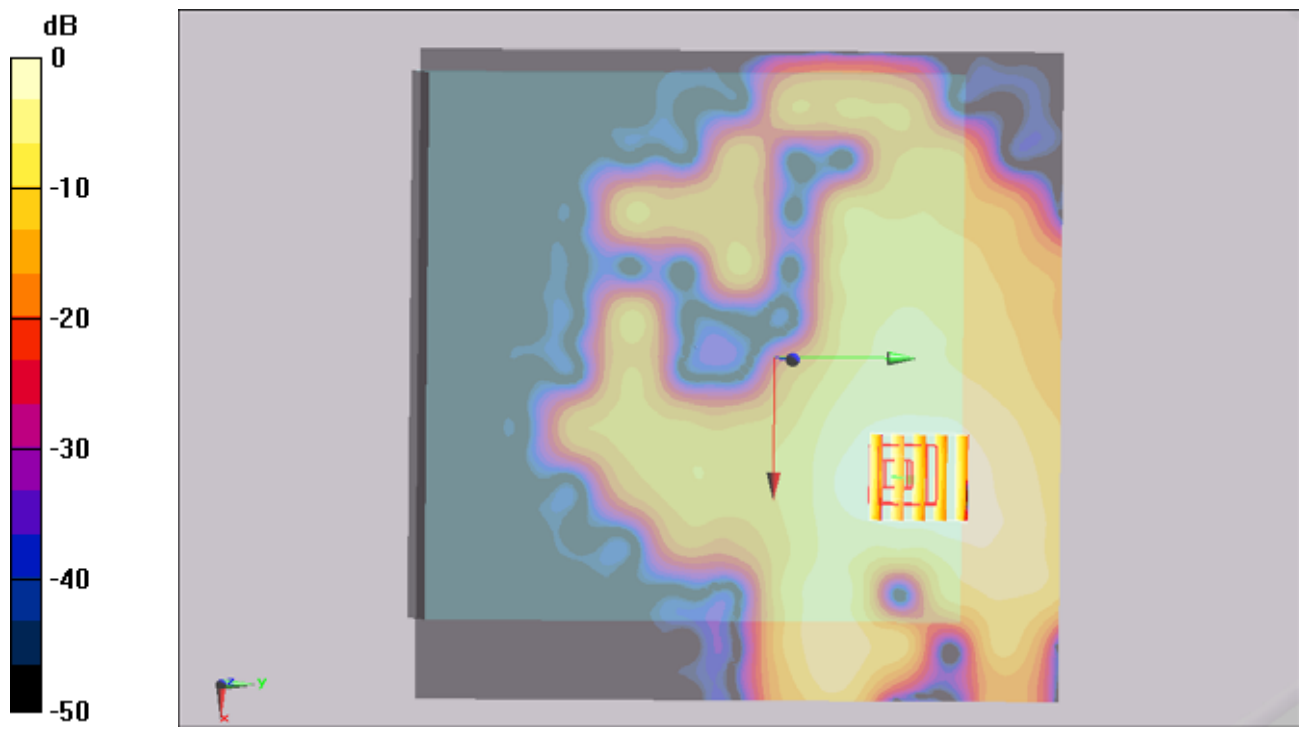
Ch6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.565 V/m; Power Drift = -0.138 dB

Peak SAR (extrapolated) = 0.072 W/kg

SAR(1 g) = 0.037 mW/g; SAR(10 g) = 0.021 mW/g

Maximum value of SAR (measured) = 0.039 mW/g



0 dB = 0.039mW/g

#42 802.11b_Rear Face_0cm_Ch6_Earphone_Holster_Battery2

DUT: 130939

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

Medium: MSL_2450_110604 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 2 \text{ mho/m}$; $\epsilon_r = 53.9$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.1 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: ET3DV6 - SN1787; ConvF(3.96, 3.96, 3.96); Calibrated: 2011/5/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch6/Area Scan (51x121x1): Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$

Maximum value of SAR (interpolated) = 0.049 mW/g

Ch6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 0.363 V/m; Power Drift = 0.168 dB

Peak SAR (extrapolated) = 0.089 W/kg

SAR(1 g) = 0.044 mW/g; SAR(10 g) = 0.025 mW/g

Maximum value of SAR (measured) = 0.047 mW/g

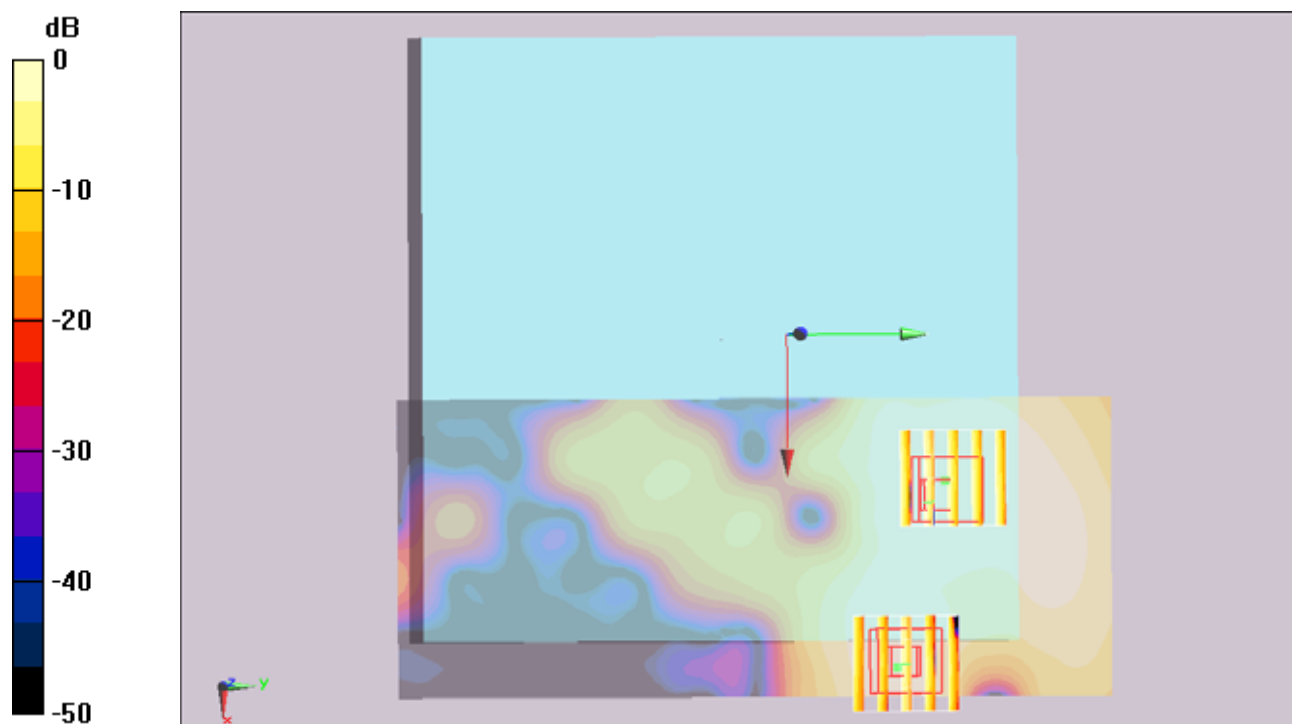
Ch6/Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 0.363 V/m; Power Drift = 0.168 dB

Peak SAR (extrapolated) = 0.067 W/kg

SAR(1 g) = 0.032 mW/g; SAR(10 g) = 0.017 mW/g

Maximum value of SAR (measured) = 0.035 mW/g



0 dB = 0.035mW/g

#19 802.11a_Rear Face_0cm_Ch140_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5700 MHz; Duty Cycle: 1:1

Medium: MSL5G_110602 Medium parameters used: $f = 5700$ MHz; $\sigma = 6$ mho/m; $\epsilon_r = 46.6$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.2, 3.2, 3.2); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch140/Area Scan (241x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.745 mW/g

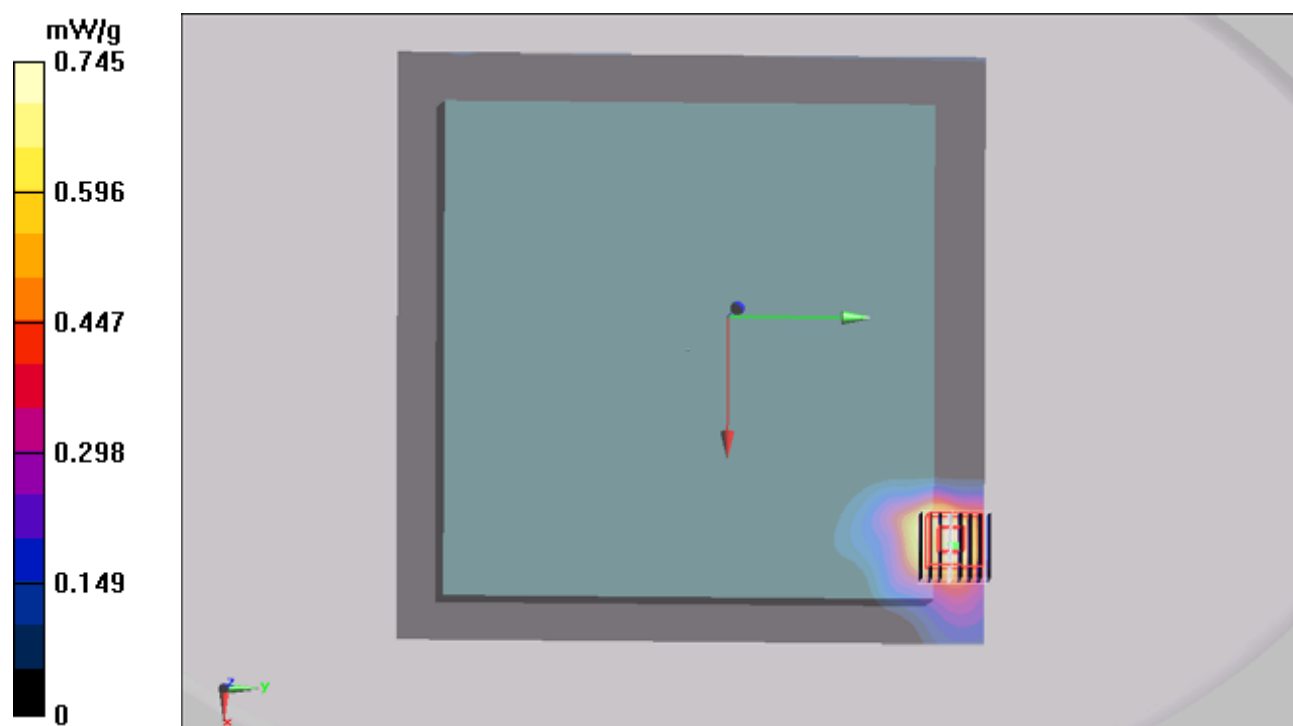
Ch140/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 5.24 V/m; Power Drift = -0.199 dB

Peak SAR (extrapolated) = 0.957 W/kg

SAR(1 g) = 0.464 mW/g; SAR(10 g) = 0.208 mW/g

Maximum value of SAR (measured) = 0.723 mW/g



#21 802.11a_Rear Face_0cm_Ch36_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5180 MHz; Duty Cycle: 1:1

Medium: MSL5G_110602 Medium parameters used : $f = 5180 \text{ MHz}$; $\sigma = 5.25 \text{ mho/m}$; $\epsilon_r = 47.5$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.87, 3.87, 3.87); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch36/Area Scan (241x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.743 mW/g

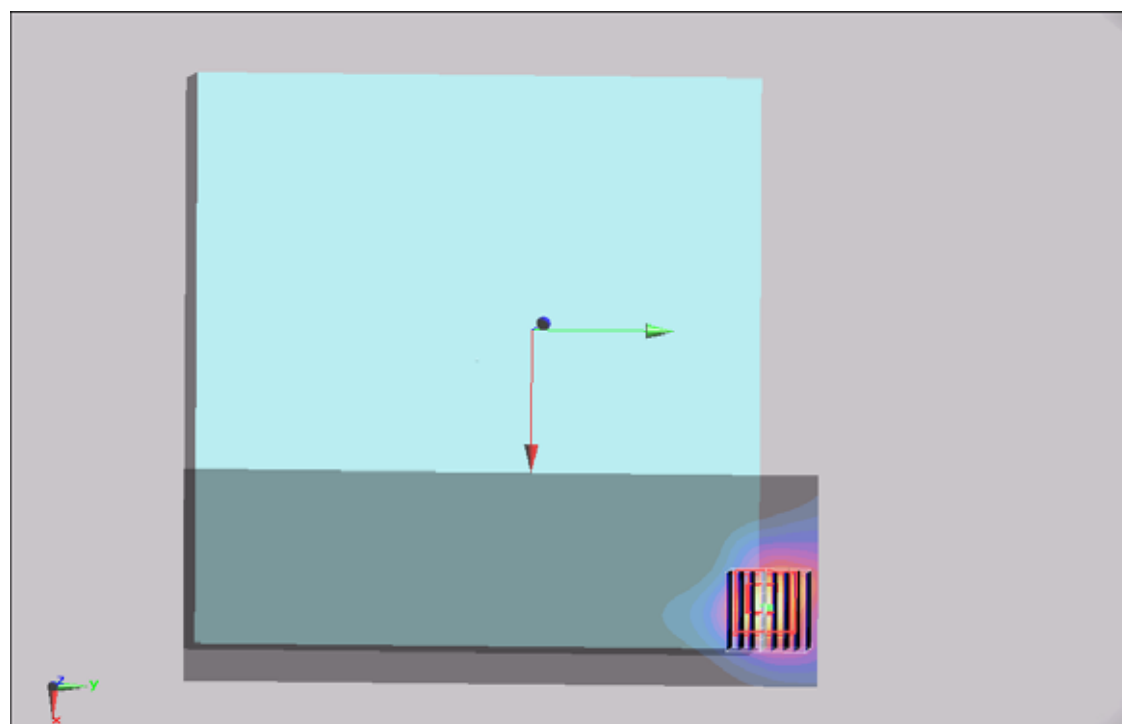
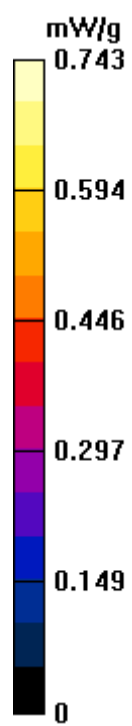
Ch36/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.011 dB

Peak SAR (extrapolated) = 0.872 W/kg

SAR(1 g) = 0.463 mW/g; SAR(10 g) = 0.216 mW/g

Maximum value of SAR (measured) = 0.683 mW/g



#22 802.11a_Rear Face_0cm_Ch48_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5240 MHz; Duty Cycle: 1:1

Medium: MSL5G_110602 Medium parameters used : $f = 5240 \text{ MHz}$; $\sigma = 5.31 \text{ mho/m}$; $\epsilon_r = 47.4$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.87, 3.87, 3.87); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch48/Area Scan (241x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.857 mW/g

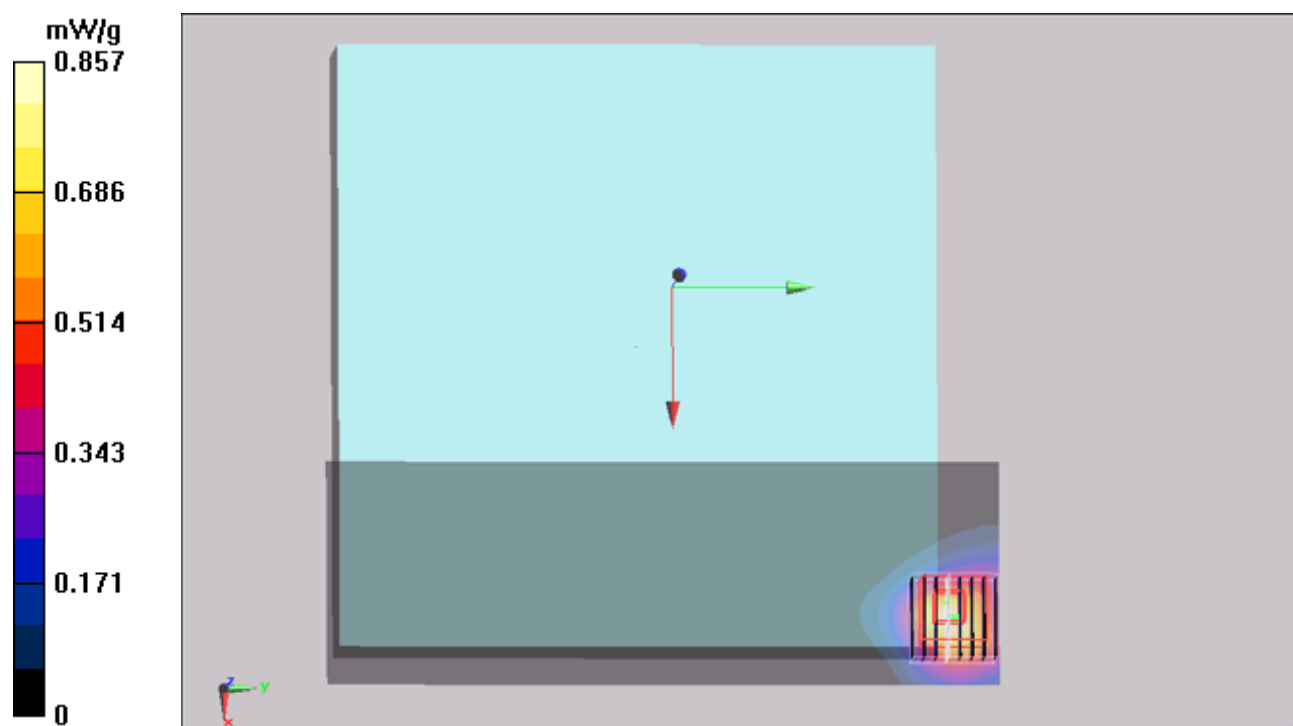
Ch48/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.021 dB

Peak SAR (extrapolated) = 0.955 W/kg

SAR(1 g) = 0.504 mW/g; SAR(10 g) = 0.236 mW/g

Maximum value of SAR (measured) = 0.744 mW/g



#23 802.11a_Rear Face_0cm _Ch52_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5260 MHz; Duty Cycle: 1:1

Medium: MSL5G_110603 Medium parameters used: $f = 5260 \text{ MHz}$; $\sigma = 5.17 \text{ mho/m}$; $\epsilon_r = 47.3$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.2 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.63, 3.63, 3.63); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch52/Area Scan (81x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.15 mW/g

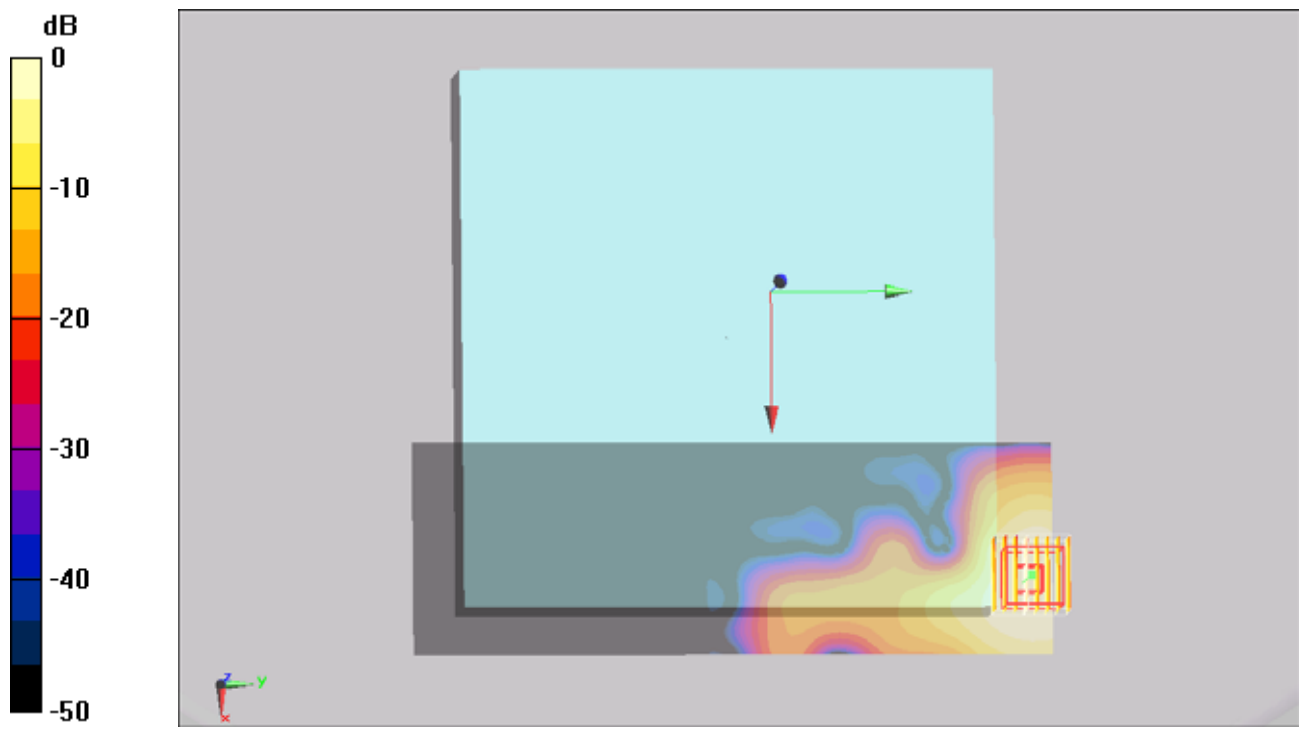
Ch52/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.09 W/kg

SAR(1 g) = 0.596 mW/g; SAR(10 g) = 0.294 mW/g

Maximum value of SAR (measured) = 0.862 mW/g



0 dB = 0.862mW/g

#23 802.11a_Rear Face_0cm _Ch52_Earphone_Holster_2D

DUT: 130939

Communication System: 802.11a; Frequency: 5260 MHz; Duty Cycle: 1:1

Medium: MSL5G_110603 Medium parameters used: $f = 5260$ MHz; $\sigma = 5.17$ mho/m; $\epsilon_r = 47.3$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.2 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.63, 3.63, 3.63); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch52/Area Scan (81x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.15 mW/g

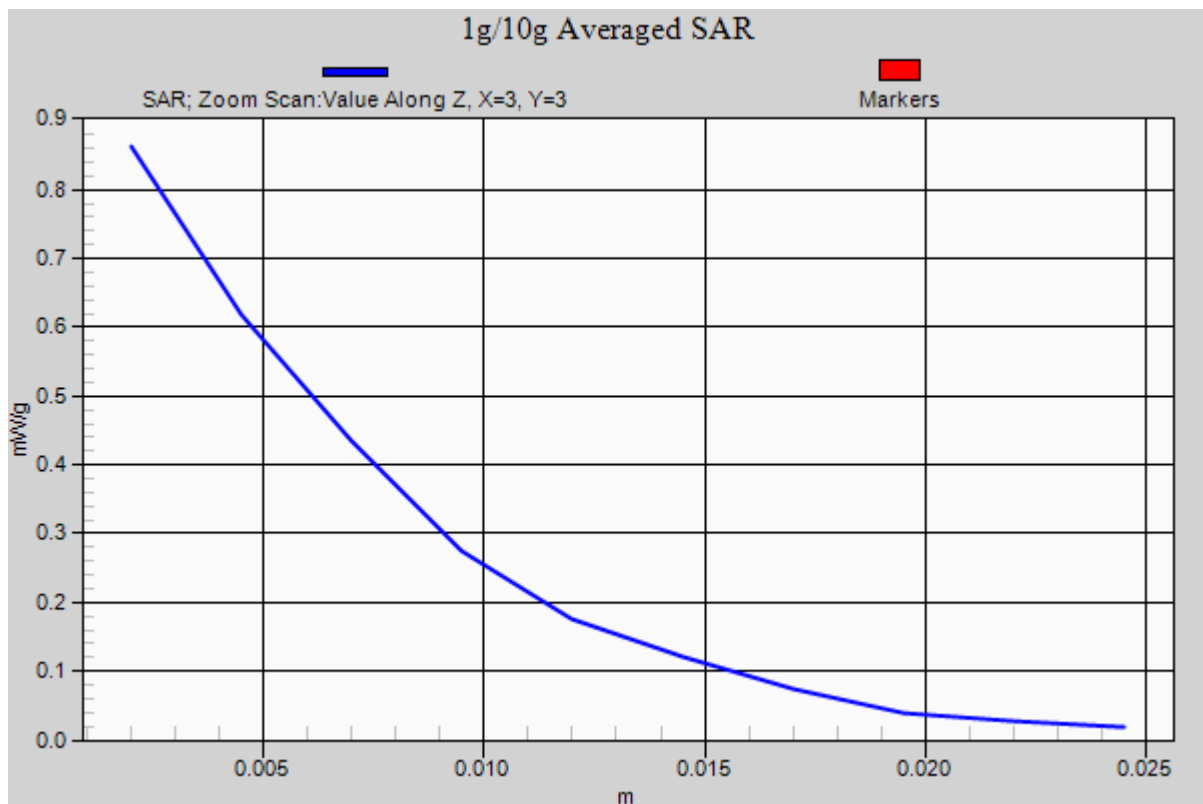
Ch52/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.156 dB

Peak SAR (extrapolated) = 1.09 W/kg

SAR(1 g) = 0.596 mW/g; SAR(10 g) = 0.294 mW/g

Maximum value of SAR (measured) = 0.862 mW/g



#24 802.11a_Rear Face_0cm_Ch64_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5320 MHz; Duty Cycle: 1:1

Medium: MSL5G_110602 Medium parameters used : $f = 5320 \text{ MHz}$; $\sigma = 5.43 \text{ mho/m}$; $\epsilon_r = 47.2$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.63, 3.63, 3.63); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch64/Area Scan (241x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.791 mW/g

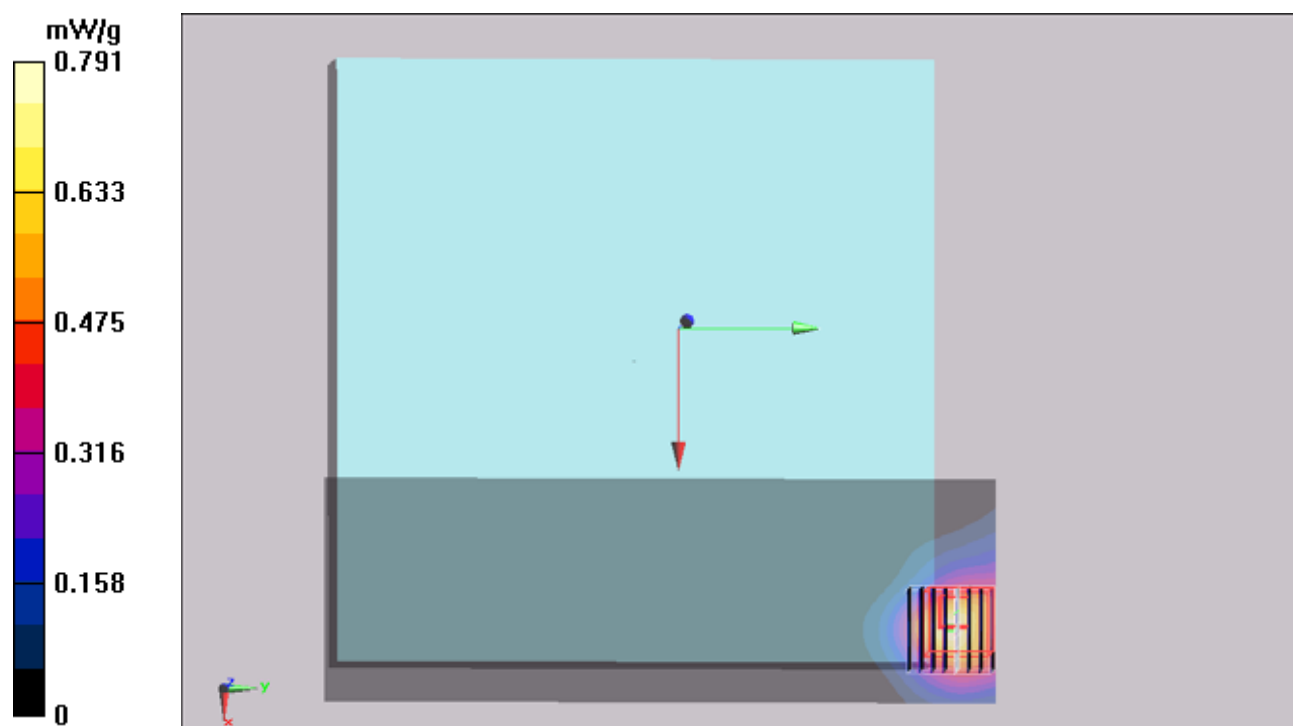
Ch64/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.014 dB

Peak SAR (extrapolated) = 0.989 W/kg

SAR(1 g) = 0.523 mW/g; SAR(10 g) = 0.239 mW/g

Maximum value of SAR (measured) = 0.781 mW/g



#25 802.11a_Rear Face_0cm_Ch104_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5520 MHz; Duty Cycle: 1:1

Medium: MSL5G_110602 Medium parameters used : $f = 5520 \text{ MHz}$; $\sigma = 5.71 \text{ mho/m}$; $\epsilon_r = 46.9$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.44, 3.44, 3.44); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch104/Area Scan (241x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.752 mW/g

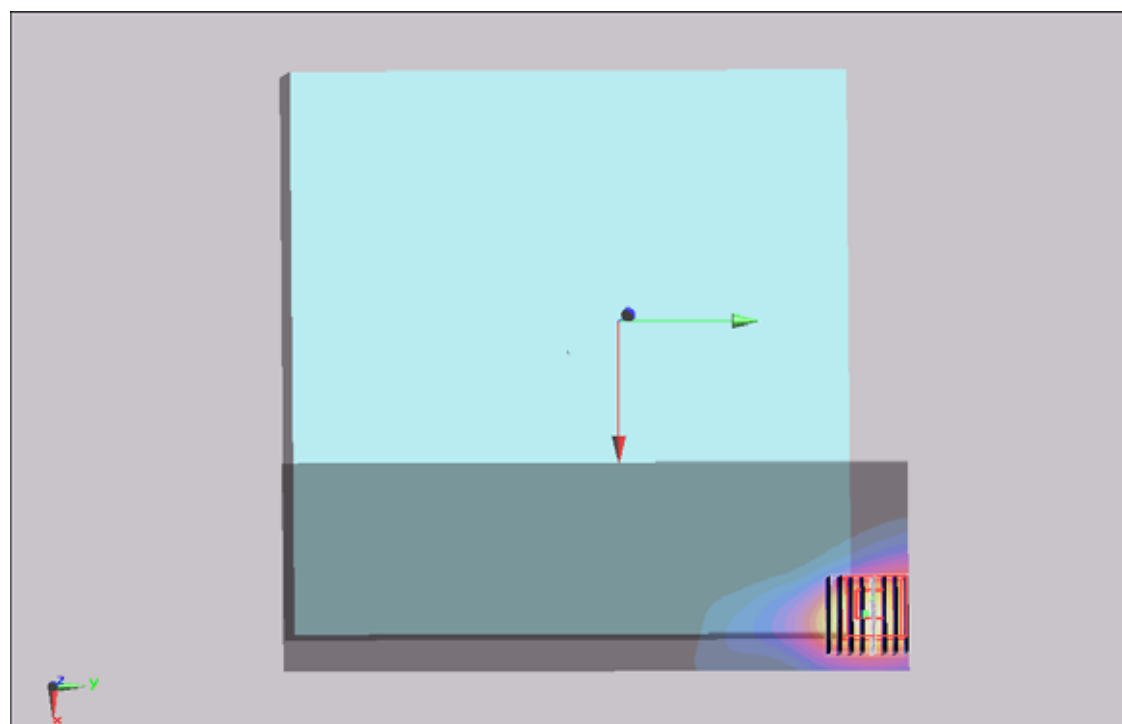
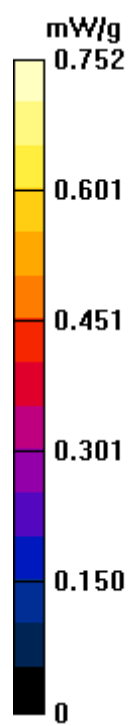
Ch104/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.056 dB

Peak SAR (extrapolated) = 0.952 W/kg

SAR(1 g) = 0.506 mW/g; SAR(10 g) = 0.239 mW/g

Maximum value of SAR (measured) = 0.754 mW/g



#26 802.11a_Rear Face_0cm_Ch116_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5580 MHz;Duty Cycle: 1:1

Medium: MSL5G_110602 Medium parameters used: $f = 5580 \text{ MHz}$; $\sigma = 5.8 \text{ mho/m}$; $\epsilon_r = 46.8$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.2, 3.2, 3.2); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch116/Area Scan (241x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.08 mW/g

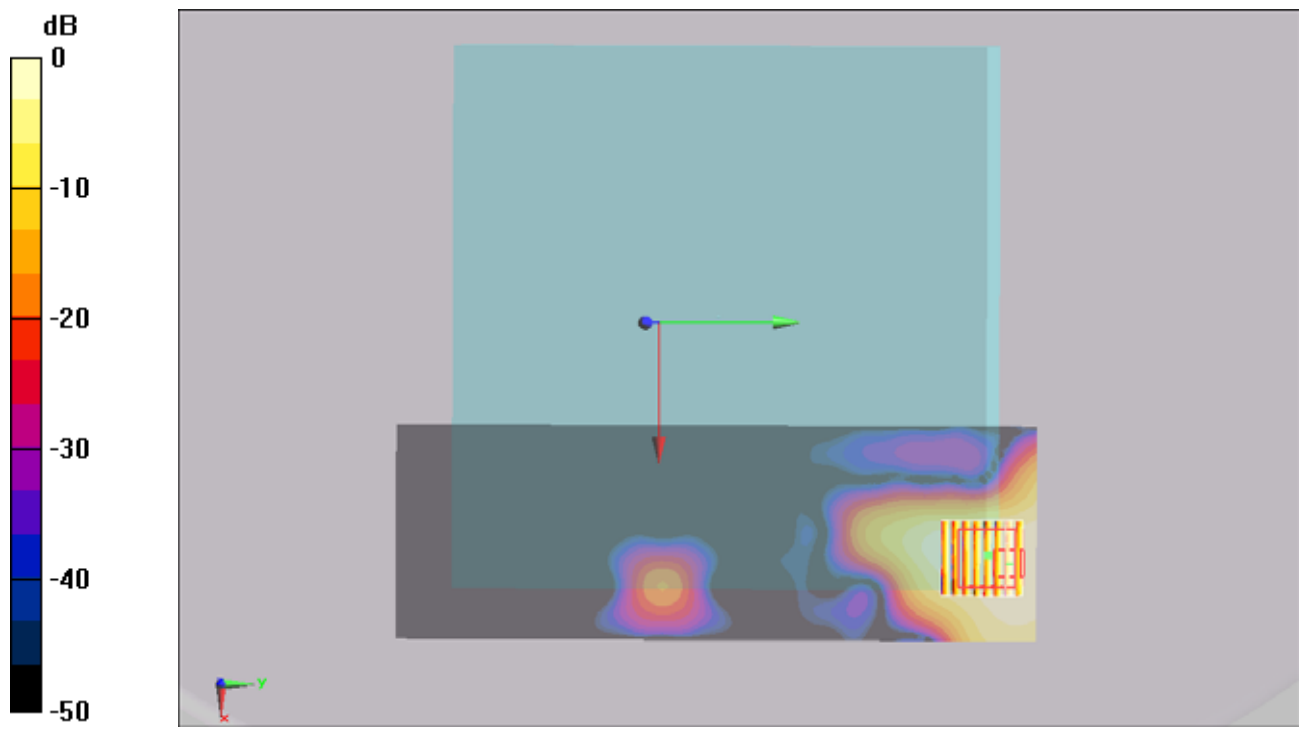
Ch116/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.147 dB

Peak SAR (extrapolated) = 0.951 W/kg

SAR(1 g) = 0.506 mW/g; SAR(10 g) = 0.224 mW/g

Maximum value of SAR (measured) = 0.752 mW/g



#27 802.11a_Rear Face_0cm_Ch124_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5620 MHz;Duty Cycle: 1:1

Medium: MSL5G_110602 Medium parameters used : $f = 5620 \text{ MHz}$; $\sigma = 5.86 \text{ mho/m}$; $\epsilon_r = 46.7$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.2, 3.2, 3.2); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch124/Area Scan (241x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.16 mW/g

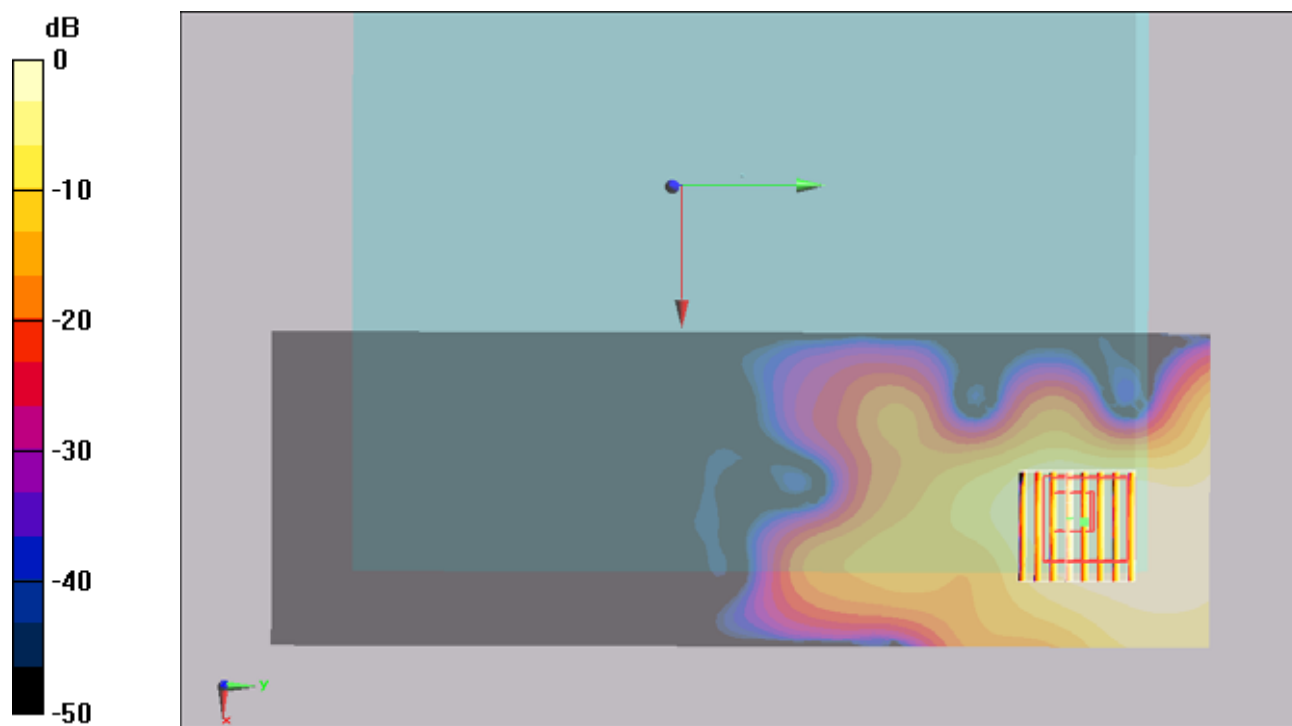
Ch124/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.538 mW/g; SAR(10 g) = 0.245 mW/g

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



0 dB = 0.828mW/g

#28 802.11a_Rear Face_0cm_Ch136_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5680 MHz; Duty Cycle: 1:1

Medium: MSL5G_110602 Medium parameters used: $f = 5680 \text{ MHz}$; $\sigma = 5.97 \text{ mho/m}$; $\epsilon_r = 46.6$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.5 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.2, 3.2, 3.2); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch136/Area Scan (81x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.717 mW/g

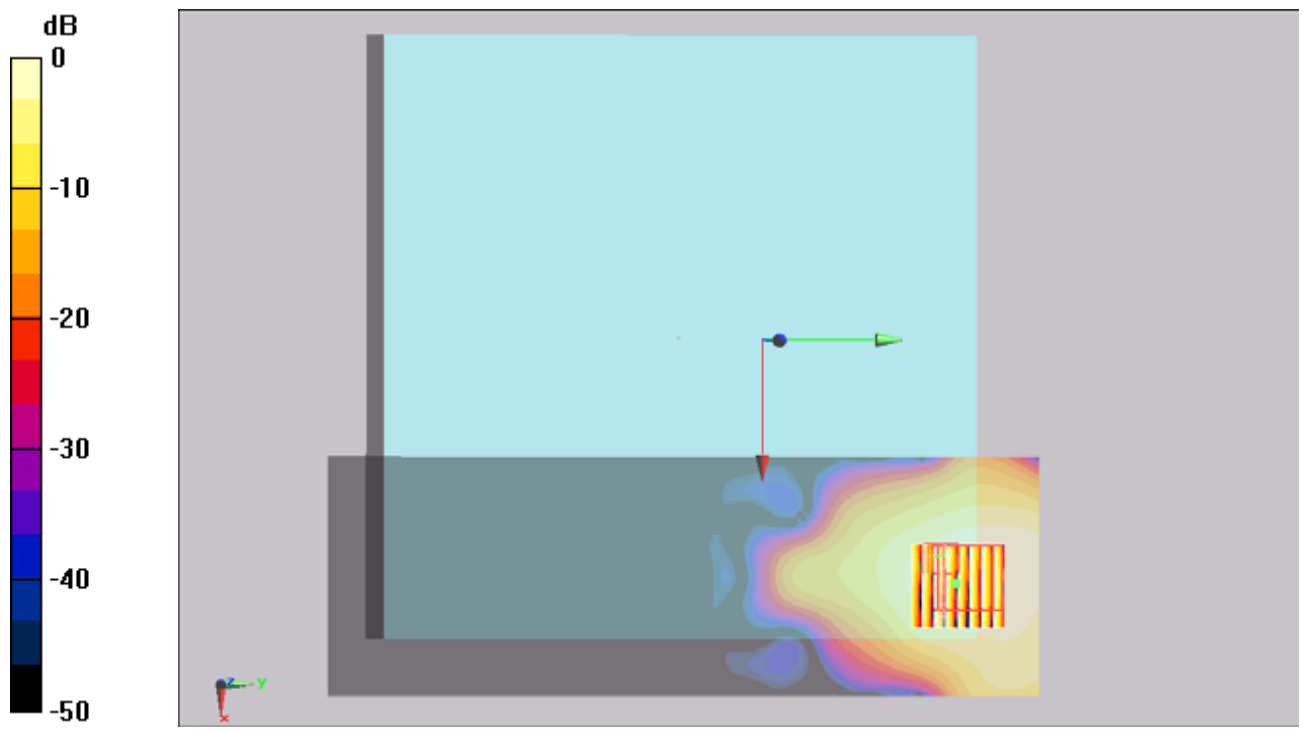
Ch136/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.125 dB

Peak SAR (extrapolated) = 1.03 W/kg

SAR(1 g) = 0.489 mW/g; SAR(10 g) = 0.194 mW/g

Maximum value of SAR (measured) = 0.799 mW/g



0 dB = 0.799mW/g

#29 802.11a_Rear Face_0cm_Ch149_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5745 MHz; Duty Cycle: 1:1

Medium: MSL5G_110602 Medium parameters used: $f = 5745 \text{ MHz}$; $\sigma = 6.12 \text{ mho/m}$; $\epsilon_r = 46.6$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.55, 3.55, 3.55); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch149/Area Scan (81x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.270 mW/g

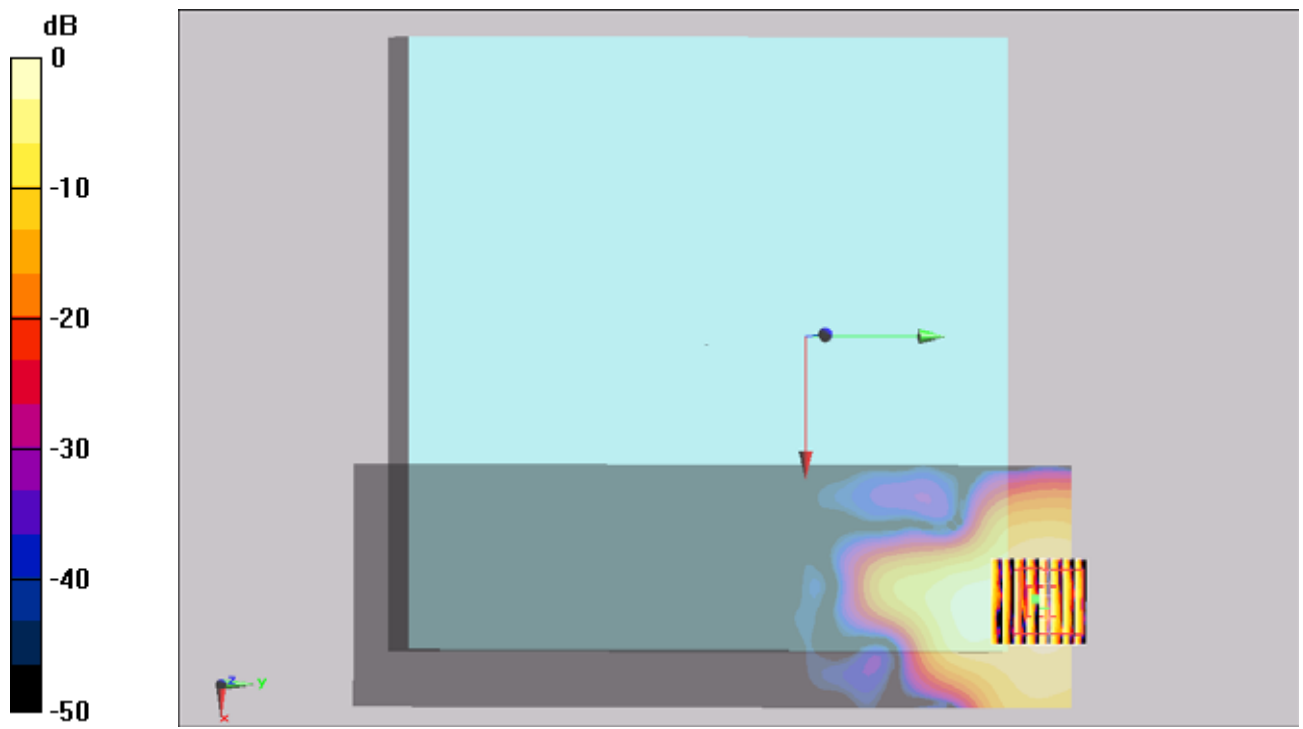
Ch149/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.143 dB

Peak SAR (extrapolated) = 0.370 W/kg

SAR(1 g) = 0.170 mW/g; SAR(10 g) = 0.070 mW/g

Maximum value of SAR (measured) = 0.275 mW/g



0 dB = 0.275mW/g

#30 802.11a_Rear Face_0cm_Ch157_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: MSL5G_110603 Medium parameters used: $f = 5785 \text{ MHz}$; $\sigma = 5.94 \text{ mho/m}$; $\epsilon_r = 46.5$; $\rho = 1000$

kg/m^3

Ambient Temperature : 22.4 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.55, 3.55, 3.55); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch157/Area Scan (81x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.421 mW/g

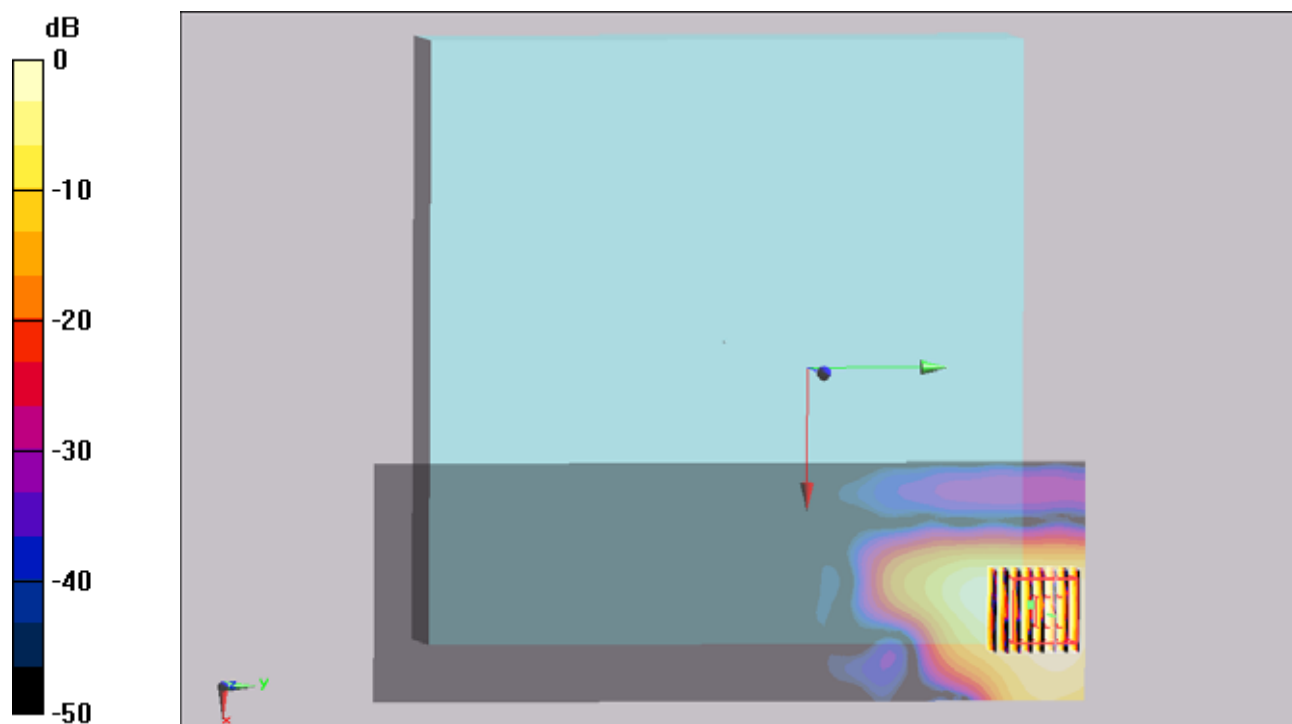
Ch157/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.125 dB

Peak SAR (extrapolated) = 0.380 W/kg

SAR(1 g) = 0.171 mW/g; SAR(10 g) = 0.066 mW/g

Maximum value of SAR (measured) = 0.280 mW/g



0 dB = 0.280mW/g

#31 802.11a_Rear Face_0cm_Ch161_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5805 MHz; Duty Cycle: 1:1

Medium: MSL5G_110603 Medium parameters used: $f = 5805 \text{ MHz}$; $\sigma = 5.97 \text{ mho/m}$; $\epsilon_r = 46.5$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.55, 3.55, 3.55); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch161/Area Scan (81x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.401 mW/g

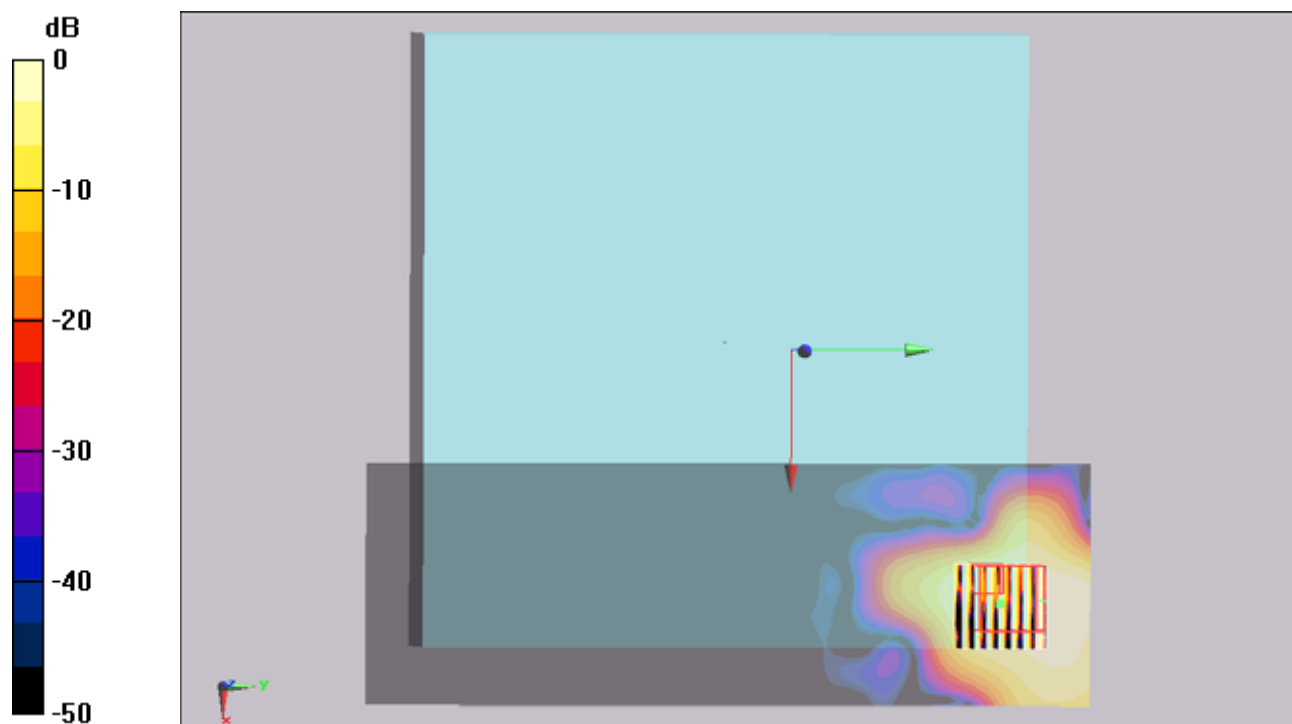
Ch161/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.121 dB

Peak SAR (extrapolated) = 0.347 W/kg

SAR(1 g) = 0.135 mW/g; SAR(10 g) = 0.045 mW/g

Maximum value of SAR (measured) = 0.248 mW/g



#32 802.11a_Rear Face_0cm _Ch165_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5825 MHz; Duty Cycle: 1:1

Medium: MSL5G_110603 Medium parameters used : $f = 5825 \text{ MHz}$; $\sigma = 6.02 \text{ mho/m}$; $\epsilon_r = 46.4$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.5 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.55, 3.55, 3.55); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch165/Area Scan (81x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.236 mW/g

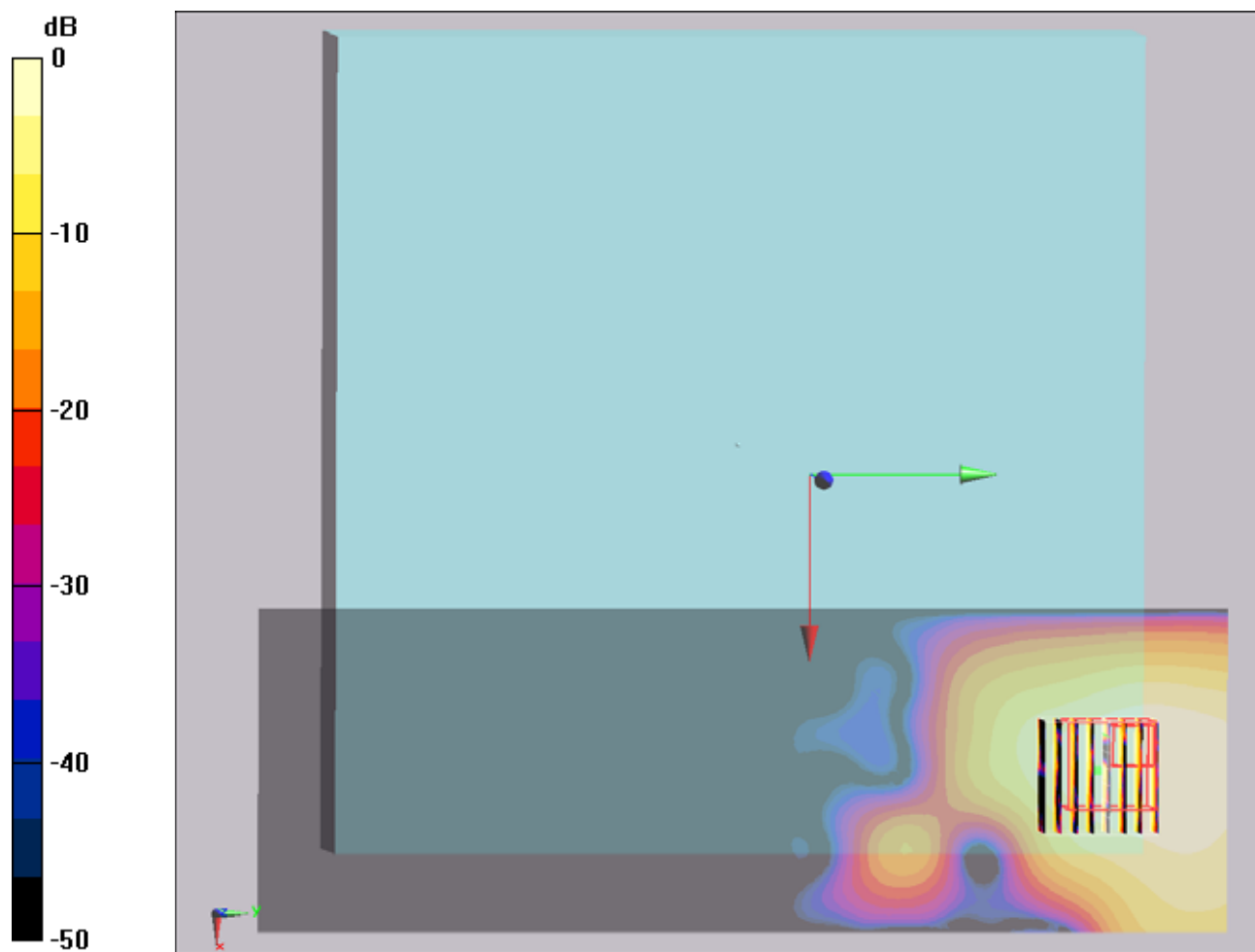
Ch165/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.356 W/kg

SAR(1 g) = 0.136 mW/g; SAR(10 g) = 0.051 mW/g

Maximum value of SAR (measured) = 0.264 mW/g



0 dB = 0.264mW/g

#33 802.11a_20n_Rear Face_0cm _Ch52_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5260 MHz; Duty Cycle: 1:1

Medium: MSL5G_110603 Medium parameters used: $f = 5260 \text{ MHz}$; $\sigma = 5.17 \text{ mho/m}$; $\epsilon_r = 47.3$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.2 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.63, 3.63, 3.63); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch52/Area Scan (81x241x1): Measurement grid: dx=10mm, dy=10mm

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

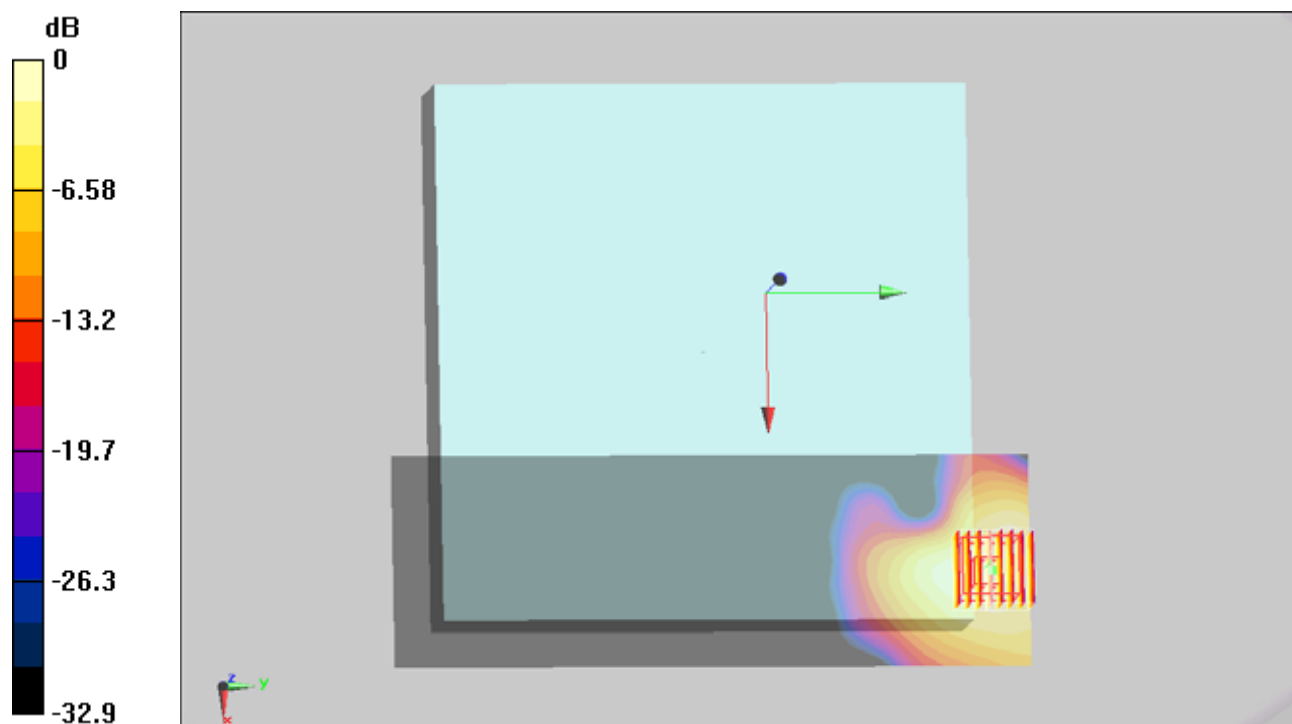
Ch52/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.962 W/kg

SAR(1 g) = 0.513 mW/g; SAR(10 g) = 0.254 mW/g

Maximum value of SAR (measured) = 0.754 mW/g



0 dB = 0.754mW/g

#34 802.11a_40n_Rear Face_0cm_Ch52_Earphone_Holster

DUT: 130939

Communication System: 802.11a; Frequency: 5260 MHz; Duty Cycle: 1:1

Medium: MSL5G_110602 Medium parameters used : $f = 5260 \text{ MHz}$; $\sigma = 5.34 \text{ mho/m}$; $\epsilon_r = 47.3$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 21.4 ; Liquid Temperature : 21.4

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.63, 3.63, 3.63); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch52/Area Scan (241x241x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.01 mW/g

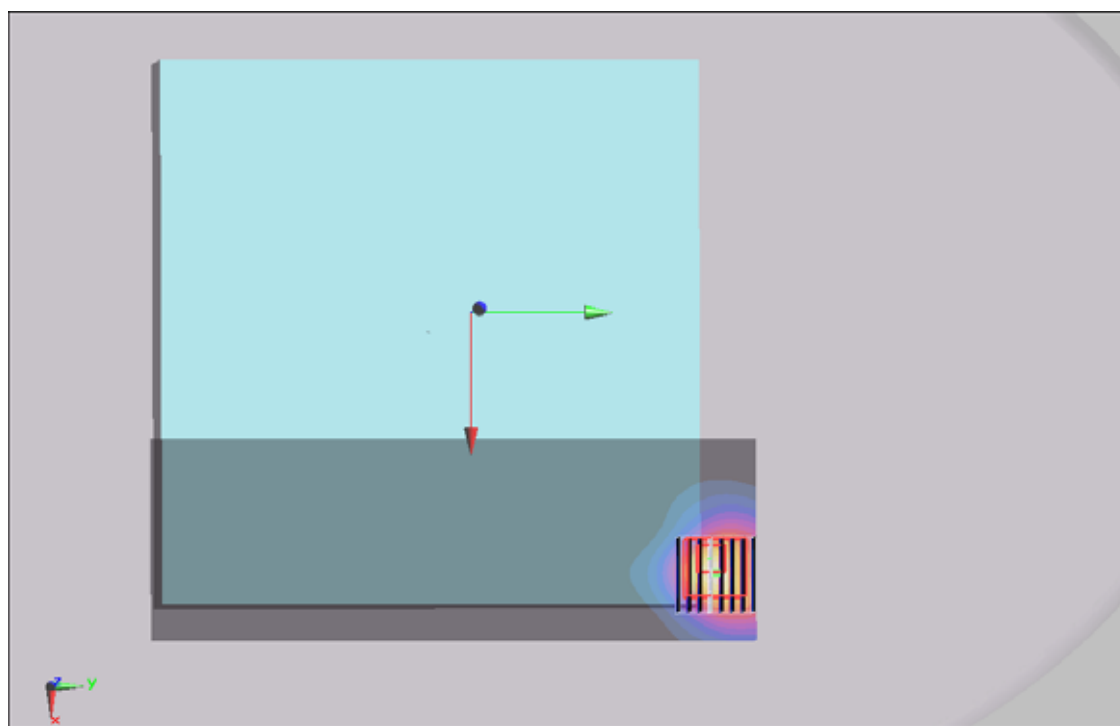
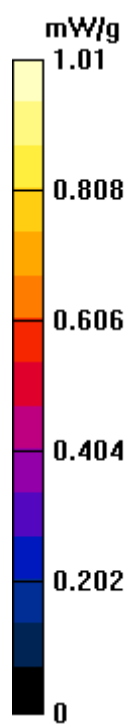
Ch52/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.114 dB

Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.558 mW/g; SAR(10 g) = 0.268 mW/g

Maximum value of SAR (measured) = 0.840 mW/g



#35 802.11a_Rear Face_0cm _Ch52_Earphone_Holster_Battery1

DUT: 130939

Communication System: 802.11a; Frequency: 5260 MHz; Duty Cycle: 1:1

Medium: MSL_5G_110604 Medium parameters used: $f = 5260 \text{ MHz}$; $\sigma = 5.34 \text{ mho/m}$; $\epsilon_r = 47.4$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.4 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.63, 3.63, 3.63); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch52/Area Scan (241x241x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.371 mW/g

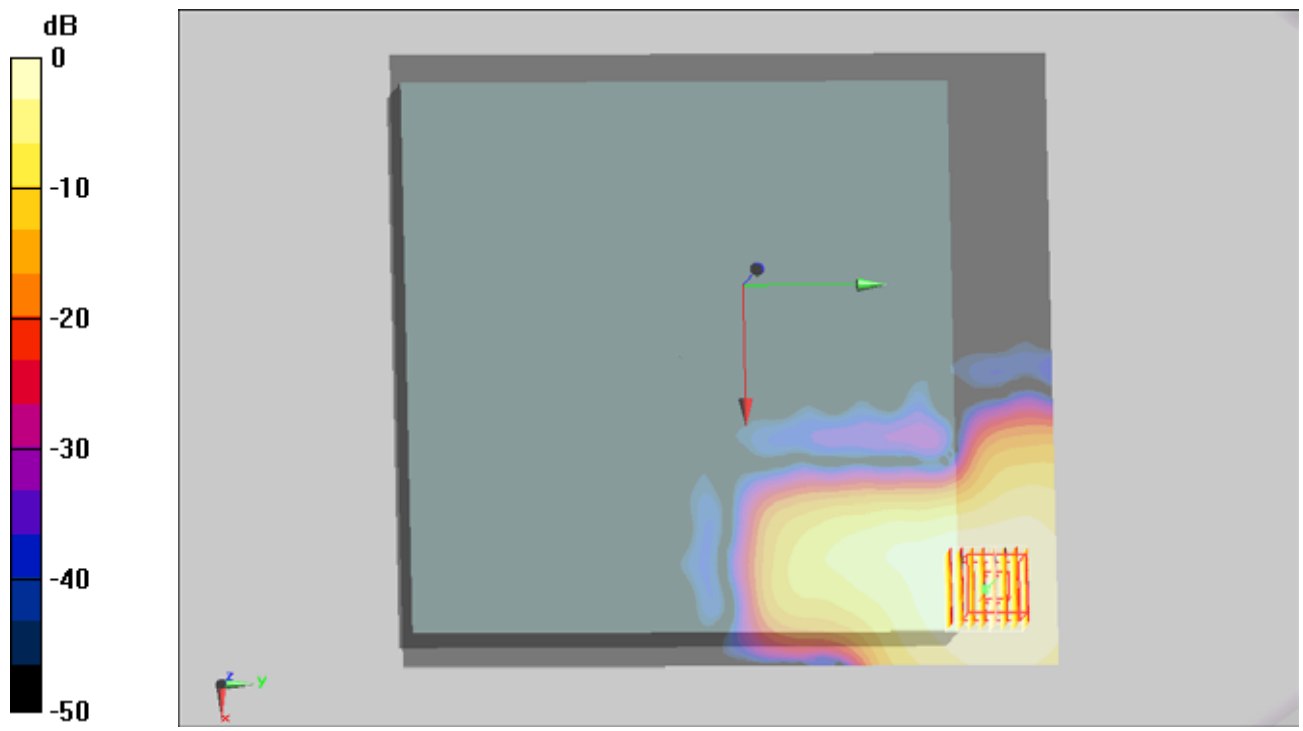
Ch52/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 0 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.465 W/kg

SAR(1 g) = 0.256 mW/g; SAR(10 g) = 0.132 mW/g

Maximum value of SAR (measured) = 0.372 mW/g



0 dB = 0.372mW/g

#36 802.11a_Rear Face_0cm _Ch52_Earphone_Holster_Battery2

DUT: 130939

Communication System: 802.11a; Frequency: 5260 MHz; Duty Cycle: 1:1

Medium: MSL_5G_110604 Medium parameters used: $f = 5260 \text{ MHz}$; $\sigma = 5.34 \text{ mho/m}$; $\epsilon_r = 47.4$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.2 ; Liquid Temperature : 21.3

DASY5 Configuration:

- Probe: EX3DV4 - SN3731; ConvF(3.63, 3.63, 3.63); Calibrated: 2010/9/20
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2010/10/22
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Ch52/Area Scan (91x121x1): Measurement grid: dx=25mm, dy=20mm

Maximum value of SAR (interpolated) = 0.602 mW/g

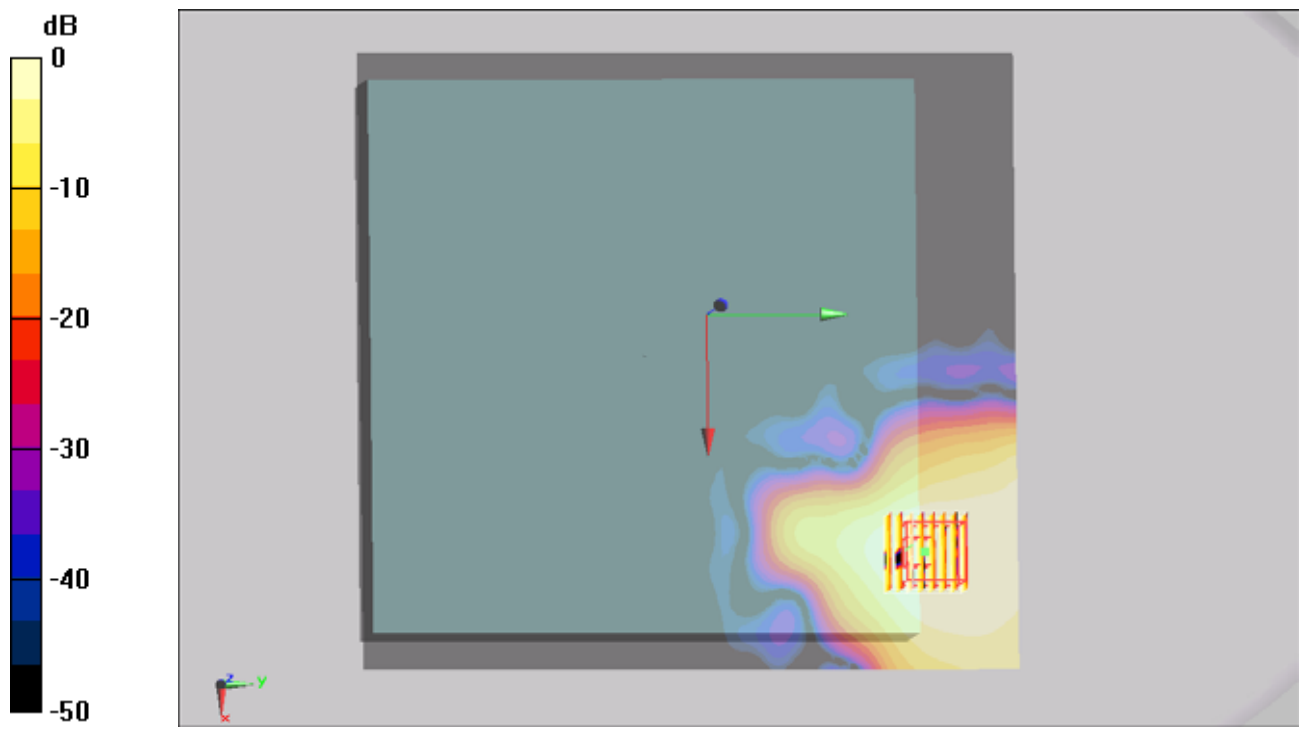
Ch52/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.825 W/kg

SAR(1 g) = 0.288 mW/g; SAR(10 g) = 0.146 mW/g

Maximum value of SAR (measured) = 0.414 mW/g



0 dB = 0.414mW/g



Appendix C. DASY Calibration Certificate

The DASY calibration certificates are shown as follows.



Calibration Certificate of DASY

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



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

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Auden**

Certificate No: **D2450V2-735_Jun10**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 735**

Calibration procedure(s) **QA CAL-05.v7
Calibration procedure for dipole validation kits**

Calibration date: **June 17, 2010**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-09)	In house check: Oct-10

Calibrated by: **Name** **Function**
Claudio Leubler **Laboratory Technician**

Signature

Approved by: **Katja Pokovic** **Technical Manager**

Issued: June 21, 2010

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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



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

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

**Measurement Conditions**

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

DASY Version	DASY5	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.9 $\pm$ 6 %	1.78 mho/m $\pm$ 6 %
Head TSL temperature during test	(22.0 $\pm$ 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.0 mW / g
SAR normalized	normalized to 1W	52.0 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	52.2 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.10 mW / g
SAR normalized	normalized to 1W	24.4 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	24.4 mW / g $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.7 ± 6 %	1.96 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.4 mW / g
SAR normalized	normalized to 1W	53.6 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	53.5 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.28 mW / g
SAR normalized	normalized to 1W	25.1 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	25.1 mW / g ± 16.5 % (k=2)



Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$53.8 \Omega + 3.4 j\Omega$
Return Loss	- 25.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$50.5 \Omega + 3.7 j\Omega$
Return Loss	- 25.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.154 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 07, 2003