

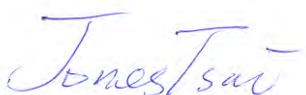
FCC SAR Test Report

APPLICANT : Belkin International, Inc.
EQUIPMENT : AC Wi-Fi Dual-Band USB Adapter
BRAND NAME : Belkin
MODEL NAME : F9L1106v1
FCC ID : K7SF9L1106V1
STANDARD : FCC 47 CFR Part 2 (2.1093)
ANSI/IEEE C95.1-1992
IEEE 1528-2003
FCC OET Bulletin 65 Supplement C (Edition 01-01)

The product was completely tested on Aug. 30, 2012. 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



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA280102	Rev. 01	Initial issue of report	Sep. 07, 2012

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Belkin International, Inc. AC Wi-Fi Dual-Band USB Adapter F9L1106v1** are as follows.

Band	Position	SAR _{1g} (W/kg)
WLAN2.4G	Body (0.5 cm)	1.04
WLAN5G	Body (0.5 cm)	1.05

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 C95.1-1992, 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	Belkin International, Inc.
Address	12045 East Waterfront Drive, Playa Vista, CA 90094

2.3 Manufacturer

Company Name	N/A
Address	N/A

2.4 Application Details

Date of Start during the Test	Aug. 28, 2012
Date of End during the Test	Aug. 30, 2012

3. General Information

3.1 Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT	AC Wi-Fi Dual-Band USB Adapter
Brand Name	Belkin
Model Name	F9L1106v1
FCC ID	K7SF9L1106V1
Tx Frequency	WLAN2.4G: 2412 MHz ~ 2462 MHz WLAN5G: 5180 MHz ~ 5240 MHz; 5745 MHz ~ 5825 MHz
Rx Frequency	WLAN2.4G: 2412 MHz ~ 2462 MHz WLAN5G: 5180 MHz ~ 5240 MHz; 5745 MHz ~ 5825 MHz
Maximum Average Output Power to Antenna	802.11b: 11.64 dBm 802.11g: 20.63 dBm 802.11n-HT20 (2.4GHz): 20.56 dBm 802.11n-HT40 (2.4GHz): 19.68 dBm 802.11a: 19.33 dBm 802.11n-HT20 (5GHz): 19.32 dBm 802.11n-HT40 (5GHz): 19.26 dBm 802.11ac-HT20 (5GHz): 19.23 dBm 802.11ac-HT40 (5GHz): 19.25 dBm 802.11ac-HT80 (5GHz): 18.73 dBm
Antenna Type	PCB Printed Antenna
Uplink Modulations	802.11b: DSSS (BPSK / QPSK / CCK) 802.11a/g/n/ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
EUT Stage	Production Unit
Remark:	
1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.	
2. Voice call is not supported.	

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)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2003
- FCC OET Bulletin 65 Supplement C (Edition 01-01)
- FCC KDB 447498 D01 v04
- FCC KDB 447498 D02 v02
- FCC KDB 248227 D01 v01r02
- FCC KDB 644545 D01 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 EUT can provide continuous transmitting RF signal.

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

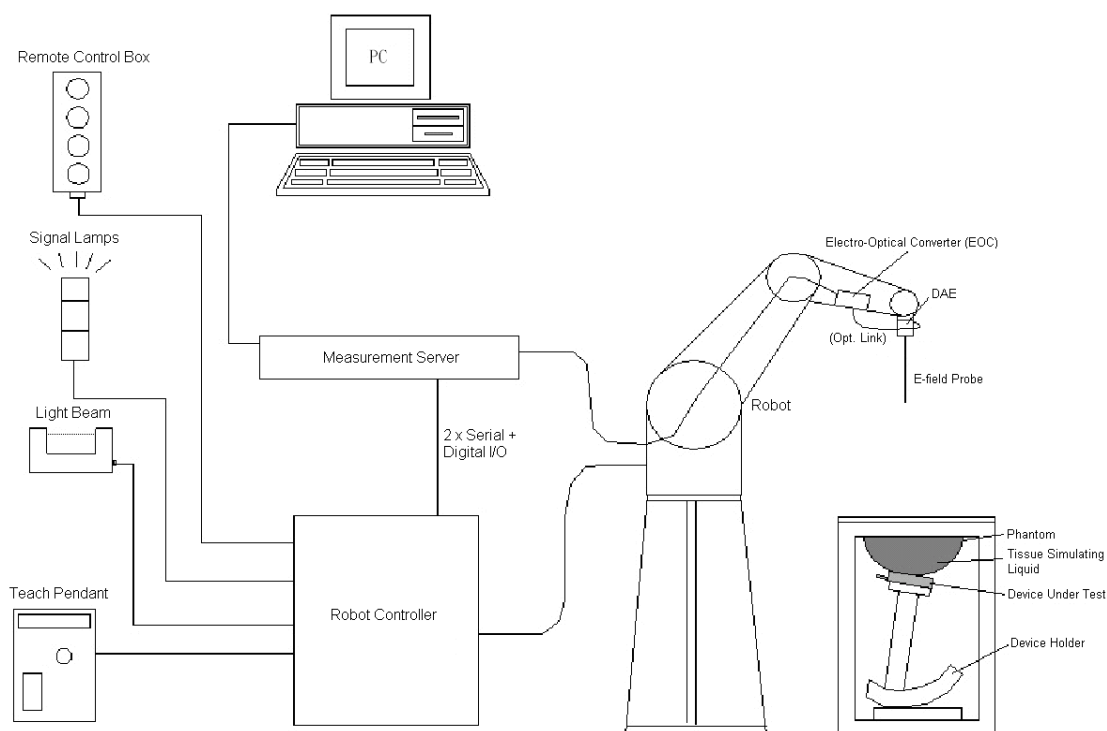


Fig 5.1 SPEAG DASY System Configurations

The DASY 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 (EOC) 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
- DASY 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 / ET3DV6R Probe >

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/ET3DV6R

<EX3DV4 / ES3DV4 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/ES3DV4

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 (ERP). 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.

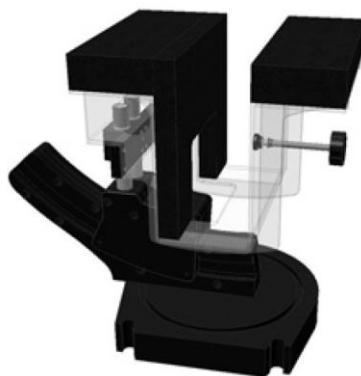


Fig 5.12 Laptop Extension Kit

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-loss 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	$\text{Norm}_i, a_{i0}, a_{i1}, a_{i2}$
	- 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	2450MHz System Validation Kit	D2450V2	736	Jul. 25, 2011	Jul. 24, 2013
SPEAG	5GHz System Validation Kit	D5GHzV2	1006	Jan. 18, 2012	Jan. 17, 2013
SPEAG	Data Acquisition Electronics	DAE3	495	Apr. 23, 2012	Apr. 22, 2013
SPEAG	Dosimetric E-Field Probe	EX3DV4	3792	Jun. 21, 2012	Jun. 20, 2013
SPEAG	Device Holder	N/A	N/A	NCR	NCR
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	SAM Phantom	QD 000 P41 C	TP-1150	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 CD	TP-1644	NCR	NCR
SPEAG	SAM Phantom	SM 000 T01 DA	TP-1542	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 001 BB	1026	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 001 BA	1029	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 002 AA	TP-1127	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 002 AA	TP-1131	NCR	NCR
Agilent	Network Analyzer	E5071C	MY46101588	May 11, 2012	May 10, 2013
Agilent	ESG Vector Series Signal Generator	E4438C	MY49070755	Oct. 17, 2011	Oct. 16, 2012
Anritsu	Power Meter	ML2495A	0932001	Sep. 21, 2011	Sep. 20, 2012
Anritsu	Radio Communication Analyzer	MT8820C	6201074414	Dec. 21, 2011	Dec. 20, 2012
Agilent	Wireless Communication Test Set	E5515C	MY48360820	Jan. 05, 2012	Jan. 04, 2014
Agilent	Wireless Communication Test Set	E5515C	GB46311322	Mar. 23, 2011	Mar. 22, 2013
Agilent	Wireless Communication Test Set	E5515C	MY50264370	Apr. 19, 2011	Apr. 18, 2013
Agilent	Wireless Communication Test Set	E5515C	MY50266977	Nov. 13, 2011	Nov. 12, 2013
R&S	Universal Digital Radio communication Tester	CMU200	106656	Jun. 28, 2012	Jun. 27, 2013
R&S	Spectrum Analyzer	FSP	101131	Jul. 23, 2012	Jul. 22, 2013

Table 5.1 Test Equipment List

Note:

1. The calibration certificate of DASY can be referred to appendix C of this report.
2. Referring to KDB 450824 D02, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The justification data of dipole D2450V2, SN: 736 can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.

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.

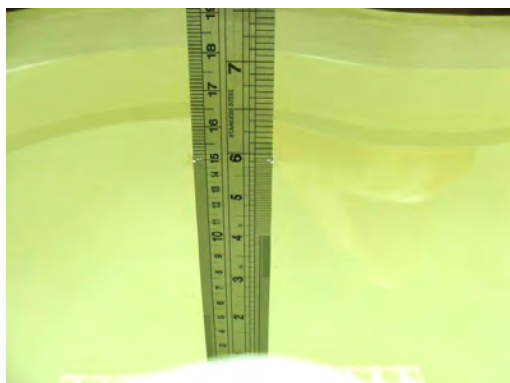


Fig 6.1 Photo of Liquid Height for Head SAR



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								
2450	55.0	0	0	0	0	45.0	1.80	39.2
For Body								
2450	68.6	0	0	0	0	31.4	1.95	52.7

Table 6.1 Recipes of Tissue Simulating Liquid

Simulating Liquid for 5G, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%



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.

Freq. (MHz)	Liquid Type	Temp. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
2450	Body	21.5	1.96	54.5	1.95	52.7	0.51	3.42	±5	Aug. 28, 2012
5200	Body	21.8	5.26	48.3	5.30	49.0	-0.75	-1.43	±5	Aug. 29, 2012
5800	Body	21.8	6.1	46.9	6.00	48.2	1.67	-2.70	±5	Aug. 30, 2012

Table 6.2 Measuring Results for Simulating Liquid

7. 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.

7.1 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.

7.2 System Setup

In the simplified setup for system evaluation, the EUT 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:

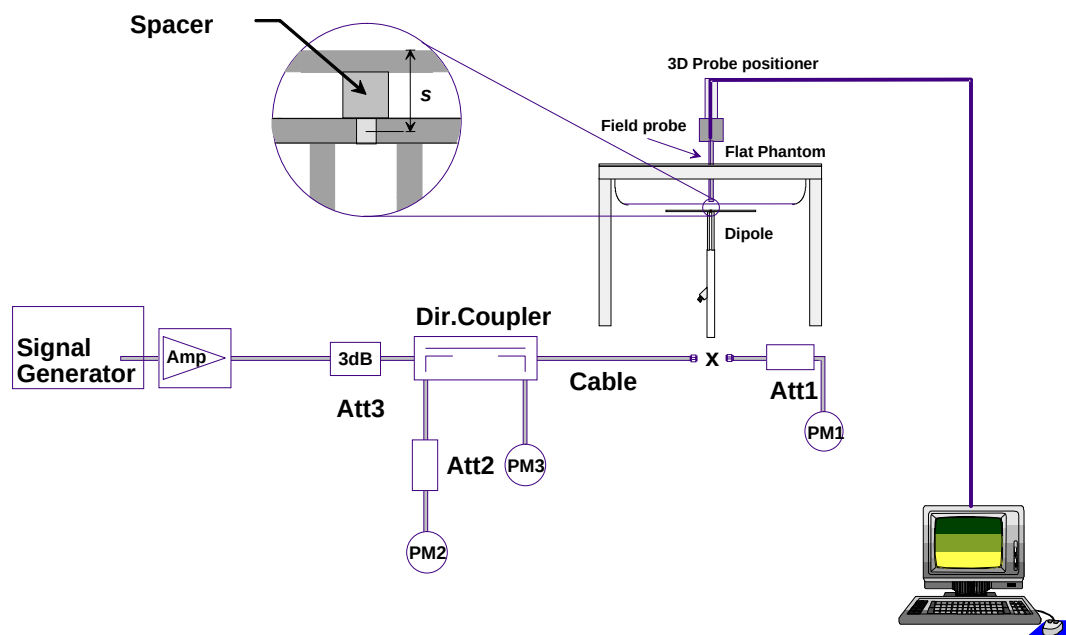


Fig 7.1 System Setup for System Evaluation

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.

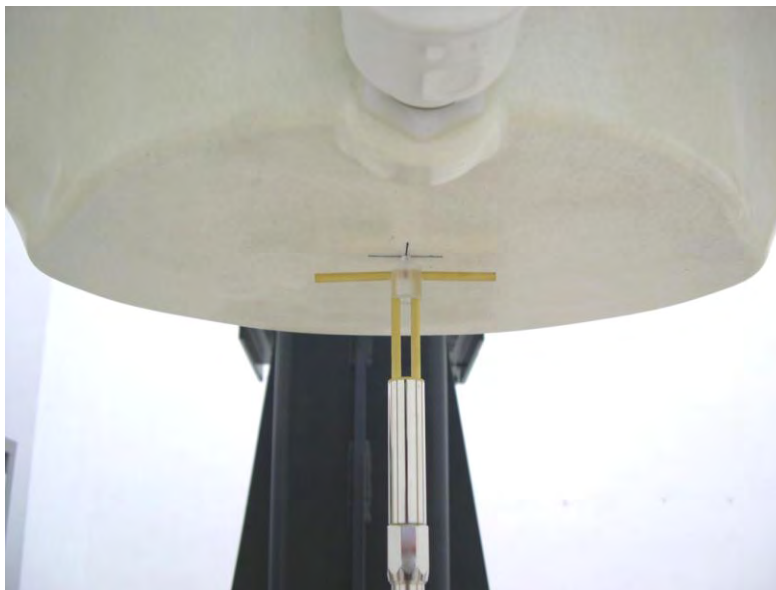


Fig 7.2 Photo of Dipole Setup

7.3 Validation Results

Comparing to the original SAR value provided by SPEAG, the validation data should be within its specification of 10 %. Table 7.1 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)	Liquid Type	Targeted SAR _{1g} (W/kg)	Measured SAR _{1g} (W/kg)	Normalized SAR _{1g} (W/kg)	Deviation (%)
Aug. 28, 2012	2450	Body	52.3	13	52.00	-0.57
Aug. 29, 2012	5200	Body	72.6	17.9	71.60	-1.38
Aug. 30, 2012	5800	Body	73.1	18.4	73.60	0.68

Table 7.1 Target and Measurement SAR after Normalized

8. EUT Testing Position

This EUT was tested in four different USB configurations. They are “direct laptop plug-in for configuration 1 and 4”, “USB cable plug-in for configuration 2 and 3”, and “direct laptop plug-in for Tip Mode (the tip of the EUT)” shown as below. Both direct laptop plug-in and USB cable plug-in test configurations are tested with 5 cm separation between the particular dongle orientation and the flat phantom. Please refer to Appendix E for the test setup photos.

			
Configuration 1 (Horizontal Up)	Configuration 2 (Horizontal Down)	Configuration 3 (Vertical Front)	Configuration 4 (Vertical Back)

Fig 8.1 Illustration for USB Connector Orientations

9. Measurement Procedures

The measurement procedures are as follows:

- (a) Use base station simulator (if applicable) or engineering software to transmit RF power continuously (continuous Tx) in the highest power channel.
- (b) Keep EUT to radiate maximum output power or 100% duty factor (if applicable)
- (c) Measure output power through RF cable and power meter.
- (d) Place the EUT in the positions as Appendix E demonstrates.
- (e) Set scan area, grid size and other setting on the DASY software.
- (f) Measure SAR results for the highest power channel on each testing position.
- (g) Find out the largest SAR result on these testing positions of each band
- (h) 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

9.1 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

9.2 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.

9.3 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 EUT 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.

9.4 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.

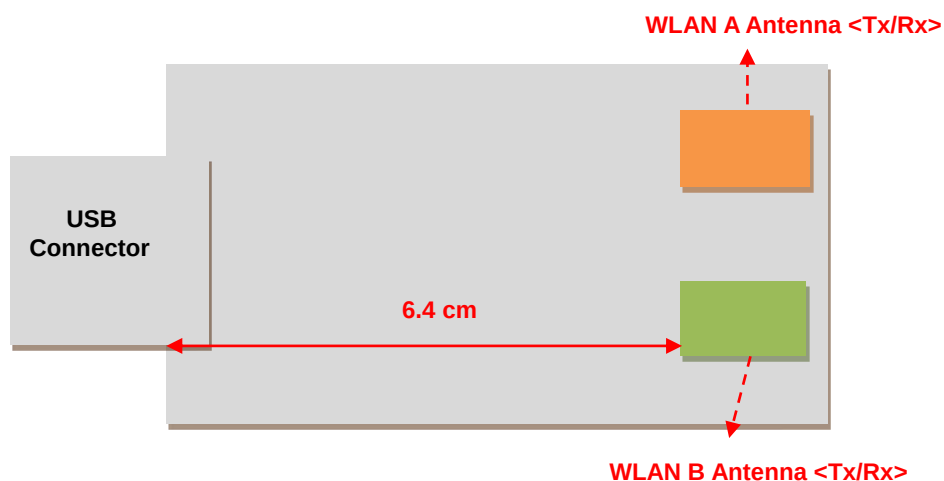
Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.

9.5 Power Drift Monitoring

All SAR testing is under the EUT 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 EUT 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.

10. SAR Test Configurations

10.1 Exposure Positions Consideration



Antennas	Wireless Interface
WLAN A(Tx/Rx)	802.11 b/g/n 802.11 a/n/ac
WLAN B (Tx/Rx)	802.11 b/g/n 802.11 a/n/ac

Band \ Antenna	Ant A	Ant B	Ant A+B
2.4GHz 802.11b	Yes	No	No
2.4GHz 802.11g/n	No	No	Yes
5GHz 802.11a	No	No	Yes
5GHz 802.11n	No	No	Yes
5GHz 802.11ac	No	No	Yes

Note: Ant .A represents the WLAN A Antenna transmission only; Ant .B represents the WLAN B. Antenna transmission only; Ant .A+B represents WLAN A and WLAN B antennas simultaneous transmission.

10.2 Conducted RF Power (Unit: dBm)

<WLAN 2.4GHz>

<Ant. A>

WLAN 2.4G 802.11b Average Power (dBm)						
Power vs. Channel			Power vs. Data Rate			
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)		
		1M		2M	5.5M	11M
CH 01	2412	11.64	CH 01	11.61	11.54	11.5
CH 06	2437	11.15				
CH 11	2462	11.22				

Note: Per KDB 447498, 2.4GHz WLAN SAR is excluded due to highest output power $\leq 60/f$ (GHz) mW, where $60/f$ (GHz) = 24mW = 13.8dBm.

<Ant. A+B>

WLAN 2.4G 802.11g Average Power (dBm)																			
Power vs. Channel				Power vs. Data Rate															
Channel	Frequency (MHz)	Chain	Data Rate (bps)	Channel	Data Rate (bps)														
			6M		9M	12M	18M	24M	36M	48M	54M								
CH 01	2412	A	17.74	CH 06	20.57	20.52	20.47	20.43	20.45	20.40	20.37								
		B	17.28																
		A+B	20.53																
CH 06	2437	A	17.79																
		B	17.44																
		A+B	20.63																
CH 11	2462	A	16.53																
		B	16.07																
		A+B	19.32																

WLAN 2.4G 802.11n (BW 20MHz) Average Power (dBm)																			
Power vs. Channel				Power vs. Data Rate															
Channel	Frequency (MHz)	Chain	MCS Index	Channel	MCS Index														
			MCS8		MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15								
CH 01	2412	A	15.03	CH 06	20.51	20.46	20.49	20.45	20.41	20.36	20.31								
		B	14.85																
		A+B	17.95																
CH 06	2437	A	17.78																
		B	17.31																
		A+B	20.56																
CH 11	2462	A	15.93																
		B	15.71																
		A+B	18.83																

WLAN 2.4G 802.11n (BW 40MHz) Average Power (dBm)																		
Power vs. Channel				Power vs. Data Rate														
Channel	Frequency (MHz)	Chain	MCS Index	Channel	MCS Index													
			MCS8		MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15							
CH 3	2422	A	14.64	06	19.64	19.60	19.54	19.56	19.51	19.46	19.49							
		B	14.31															
		A+B	17.49															
CH 6	2437	A	16.85															
		B	16.49															
		A+B	19.68															
CH 9	2452	A	14.55															
		B	14.19															
		A+B	17.38															

Note:

1. Per KDB 248227, choose the highest output power channel to test SAR and determine further SAR exclusion
2. Per KDB 248227, 11n(20M)and11n(40M) average output power is higher than 1/4 dB higher than 11g mode, SAR will be verified.
3. For each frequency band, testing at higher data rates and higher order modulations is not required when the maximum average output power for each of these configurations is less than 1/4 dB higher than those measured at the lowest data rate.

<WLAN 5GHz>
<Ant. A+B>

WLAN 5G 802.11a Average Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)						
		6M		9M	12M	18M	24M	36M	48M	54M
CH 36	5180	16.42	CH 40	16.37	16.33	16.29	16.25	16.22	16.19	16.15
CH 40	5200	16.42								
CH 44	5220	16.36								
CH 48	5240	16.38								
CH 149	5745	19.00	CH157	19.27	19.23	19.18	19.15	19.12	19.07	19.10
CH 153	5765	19.26								
CH 157	5785	19.33								
CH 161	5805	19.28								
CH 165	5825	19.20								

WLAN 5G 802.11n (BW 20M) Average Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS8		MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 36	5180	15.23	CH 48	15.84	15.81	15.75	15.78	15.72	15.67	15.69
CH 40	5200	14.38								
CH 44	5220	15.14								
CH 48	5240	15.89								
CH 149	5745	18.98	CH157	19.28	19.25	19.21	19.23	19.17	19.13	19.15
CH 153	5765	19.09								
CH 157	5785	19.32								
CH 161	5805	19.24								
CH 165	5825	19.17								

WLAN 5G 802.11n (BW 40M) Average Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS8		MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 38	5190	15.78	CH 46	15.72	15.65	15.68	15.62	15.6	15.57	15.54
CH 46	5230	15.79								
CH 151	5755	19.17	CH159	19.21	19.17	19.13	19.08	19.05	19.01	19.03
CH 159	5795	19.26								

WLAN 5G 802.11ac (BW 20M) Average Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS8		MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 36	5180	13.31	CH 48	15.7	15.64	15.6	15.56	15.51	15.54	15.48
CH 40	5200	15.45								
CH 44	5220	15.08								
CH 48	5240	15.74								
CH 149	5745	18.91	CH157	19.19	19.15	19.12	19.07	19.1	19.04	19.01
CH 153	5765	19.09								
CH 157	5785	19.23								
CH 161	5805	19.13								
CH 165	5825	19.05								

WLAN 5G 802.11ac (BW 40M) Average Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS8		MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 38	5190	15.96	CH 38	15.91	15.86	15.81	15.84	15.78	15.73	15.75
CH 46	5230	15.84								
CH 151	5755	19.20	CH159	19.21	19.17	19.14	19.16	19.13	19.09	19.11
CH 159	5795	19.25								

WLAN 5G 802.11ac (BW 80M) Average Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS8		MCS9	MCS10	MCS11	MCS12	MCS13	MCS14	MCS15
CH 42	5210	15.93	CH 42	15.9	15.84	15.87	15.84	15.81	15.78	15.8
CH 155	5775	18.73	CH155	18.69	18.64	18.66	18.61	18.57	18.53	18.55

Note:

1. Per KDB 248227, choose the highest output power channel to test SAR and determine further SAR exclusion
2. Per KDB 248227, choose the lowest order modulation mode to test SAR; therefore 11a was chosen for SAR testing.
3. For 5180MHz~5240MHz, 11n-HT20, 11n-HT40, 11ac-VHT20, 11ac-VHT40 output power is less than 1/4 dB higher than 11a mode, thus the SAR can be excluded.
4. For 5745MHz~5825MHz, 11n-HT20, 11n-HT40, 11ac-VHT20, 11ac-VHT40 output power is less than 1/4 dB higher than 11a mode, thus the SAR can be excluded.
5. For 11ac-VHT80, SAR is verified in both 5180MHz~5240MHz and 5745MHz~5825MHz due to conservative consideration for a wider bandwidth.

11. SAR Test Results

11.1 Test Records for Body SAR Test

Plot No.	Band	Mode	BW (MHz)	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Ant. Status	Power Drift (dB)	SAR _{1g} (W/kg)
1	WLAN2.4G	802.11g	-	Horizontal Up	0.5	6	2437	A+B	0.036	0.956
2	WLAN2.4G	802.11g	-	Horizontal Down	0.5	6	2437	A+B	-0.138	0.923
3	WLAN2.4G	802.11g	-	Vertical Front	0.5	6	2437	A+B	-0.12	0.409
4	WLAN2.4G	802.11g	-	Vertical Back	0.5	6	2437	A+B	-0.199	0.422
5	WLAN2.4G	802.11g	-	Tip Mode	0.5	6	2437	A+B	-0.023	0.394
6	WLAN2.4G	802.11g	-	Horizontal Up	0.5	1	2412	A+B	-0.17	1.04
7	WLAN2.4G	802.11g	-	Horizontal Up	0.5	11	2462	A+B	-0.126	0.73
8	WLAN2.4G	802.11g	-	Horizontal Down	0.5	1	2412	A+B	-0.136	0.986
9	WLAN2.4G	802.11g	-	Horizontal Down	0.5	11	2462	A+B	-0.032	0.671
10	WLAN5G	802.11a	-	Horizontal Up	0.5	40	5200	A+B	-0.115	0.333
11	WLAN5G	802.11a	-	Horizontal Down	0.5	40	5200	A+B	-0.008	0.398
12	WLAN5G	802.11a	-	Vertical Front	0.5	40	5200	A+B	0.06	0.251
13	WLAN5G	802.11a	-	Vertical Back	0.5	40	5200	A+B	0.117	0.115
14	WLAN5G	802.11a	-	Tip Mode	0.5	40	5200	A+B	-0.046	0.18
19	WLAN5G	802.11ac	80M	Horizontal Down	0.5	42	5210	A+B	0.052	0.485
20	WLAN5G	802.11a	-	Horizontal Up	0.5	157	5785	A+B	0.125	1.02
21	WLAN5G	802.11a	-	Horizontal Down	0.5	157	5785	A+B	0.166	1.03
22	WLAN5G	802.11a	-	Vertical Front	0.5	157	5785	A+B	-0.153	0.895
23	WLAN5G	802.11a	-	Vertical Back	0.5	157	5785	A+B	0.143	0.663
24	WLAN5G	802.11a	-	Tip Mode	0.5	157	5785	A+B	0.074	0.925
25	WLAN5G	802.11a	-	Horizontal Up	0.5	153	5765	A+B	0.12	1.01
26	WLAN5G	802.11a	-	Horizontal Up	0.5	165	5825	A+B	0.038	1.04
27	WLAN5G	802.11a	-	Horizontal Down	0.5	153	5765	A+B	0.092	1.01
28	WLAN5G	802.11a	-	Horizontal Down	0.5	165	5825	A+B	0.02	1.05
30	WLAN5G	802.11a	-	Vertical Front	0.5	153	5765	A+B	-0.134	0.963
31	WLAN5G	802.11a	-	Vertical Front	0.5	165	5825	A+B	0.12	0.943
32	WLAN5G	802.11a	-	Tip Mode	0.5	153	5765	A+B	0.14	0.894
33	WLAN5G	802.11a	-	Tip Mode	0.5	165	5825	A+B	-0.057	0.963
29	WLAN5G	802.11ac	80M	Horizontal Down	0.5	155	5775	A+B	0.017	0.905

Note: Per KDB 447498, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

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12. 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 12.1

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

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

(b) k is the coverage factor

Table 12.1 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 shown in following tables.

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.0	Normal	1	1	1	± 6.0 %	± 6.0 %
Axial Isotropy	4.7	Rectangular	√3	0.7	0.7	± 1.9 %	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	± 3.9 %	± 3.9 %
Boundary Effects	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	± 0.3 %
Response Time	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Probe Positioner	0.4	Rectangular	√3	1	1	± 0.2 %	± 0.2 %
Probe Positioning	2.9	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Max. SAR Eval.	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Test Sample Related							
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %
Phantom and Setup							
Phantom Uncertainty	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.64	0.43	± 1.6 %	± 1.1 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	0.49	± 1.7 %	± 1.4 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.6	0.49	± 1.5 %	± 1.2 %
Combined Standard Uncertainty						± 11.0 %	± 10.8 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						± 22.0 %	± 21.5 %

Table 12.2 Uncertainty Budget of DASY for frequency range 300 MHz to 3 GHz

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.55	Normal	1	1	1	± 6.55 %	± 6.55 %
Axial Isotropy	4.7	Rectangular	√3	0.7	0.7	± 1.9 %	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	± 3.9 %	± 3.9 %
Boundary Effects	2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	± 0.3 %
Response Time	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Probe Positioner	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Probe Positioning	9.9	Rectangular	√3	1	1	± 5.7 %	± 5.7 %
Max. SAR Eval.	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Test Sample Related							
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %
Phantom and Setup							
Phantom Uncertainty	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.64	0.43	± 1.6 %	± 1.1 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	0.49	± 1.7 %	± 1.4 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.6	0.49	± 1.5 %	± 1.2 %
Combined Standard Uncertainty						± 12.8 %	± 12.6 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						± 25.6 %	± 25.2 %

Table 12.3 Uncertainty Budget of DASY for frequency range 3 GHz to 6 GHz

13. References

- [1] FCC 47 CFR Part 2 "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"
- [2] ANSI/IEEE Std. C95.1-1992, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz", September 1992
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- [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
- [8] FCC KDB 447498 D02 v02, "SAR Measurement Procedures for USB Dongle Transmitters", November 2009
- [9] FCC KDB 644545 D01 v01, "Guidance for IEEE 802.11ac and Pre-ac Device Emission Testing", June 2012



Appendix A. Plots of System Performance Check

The plots are shown as follows.

System Check_Body_2450MHz_120828

DUT: D2450V2-SN:736

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

Medium: MSL_2450_120828 Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.96 \text{ mho/m}$; $\epsilon_r = 54.5$;

$\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : $22.5 \text{ }^\circ\text{C}$; Liquid Temperature : $21.5 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(7.1, 7.1, 7.1); Calibrated: 2012/6/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Pin=250mW/Area Scan (91x91x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 14.9 mW/g

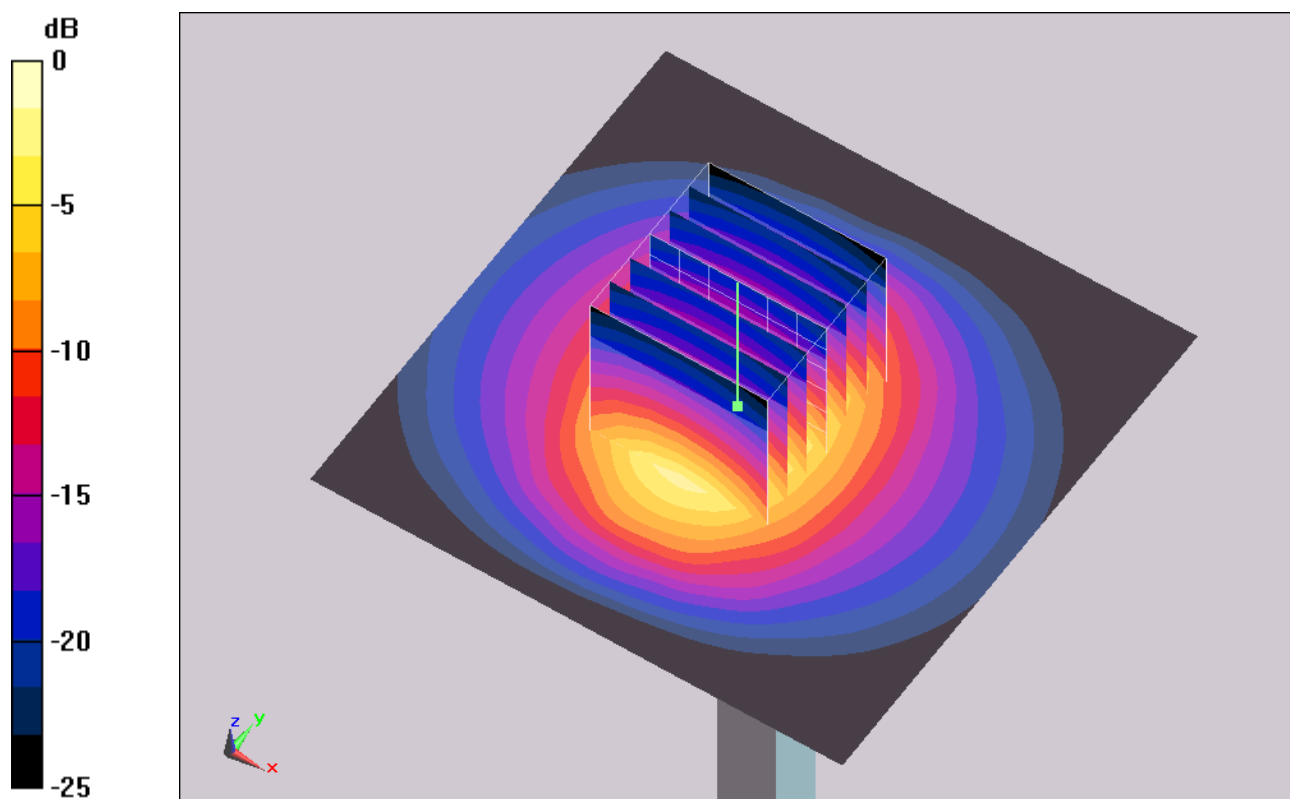
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 84.5 V/m ; Power Drift = 0.107 dB

Peak SAR (extrapolated) = 30.6 W/kg

SAR(1 g) = 13 mW/g ; SAR(10 g) = 5.63 mW/g

Maximum value of SAR (measured) = 14.6 mW/g



0 dB = 14.6mW/g

System Check_Body_5200MHz_120829

DUT: D5GHzV2-SN:1006

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

Medium: MSL_5G_120829 Medium parameters used: $f = 5200 \text{ MHz}$; $\sigma = 5.26 \text{ mho/m}$; $\epsilon_r = 48.3$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(4.2, 4.2, 4.2); Calibrated: 2012/6/21
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Pin=250mW/Area Scan (91x91x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 32.6 mW/g

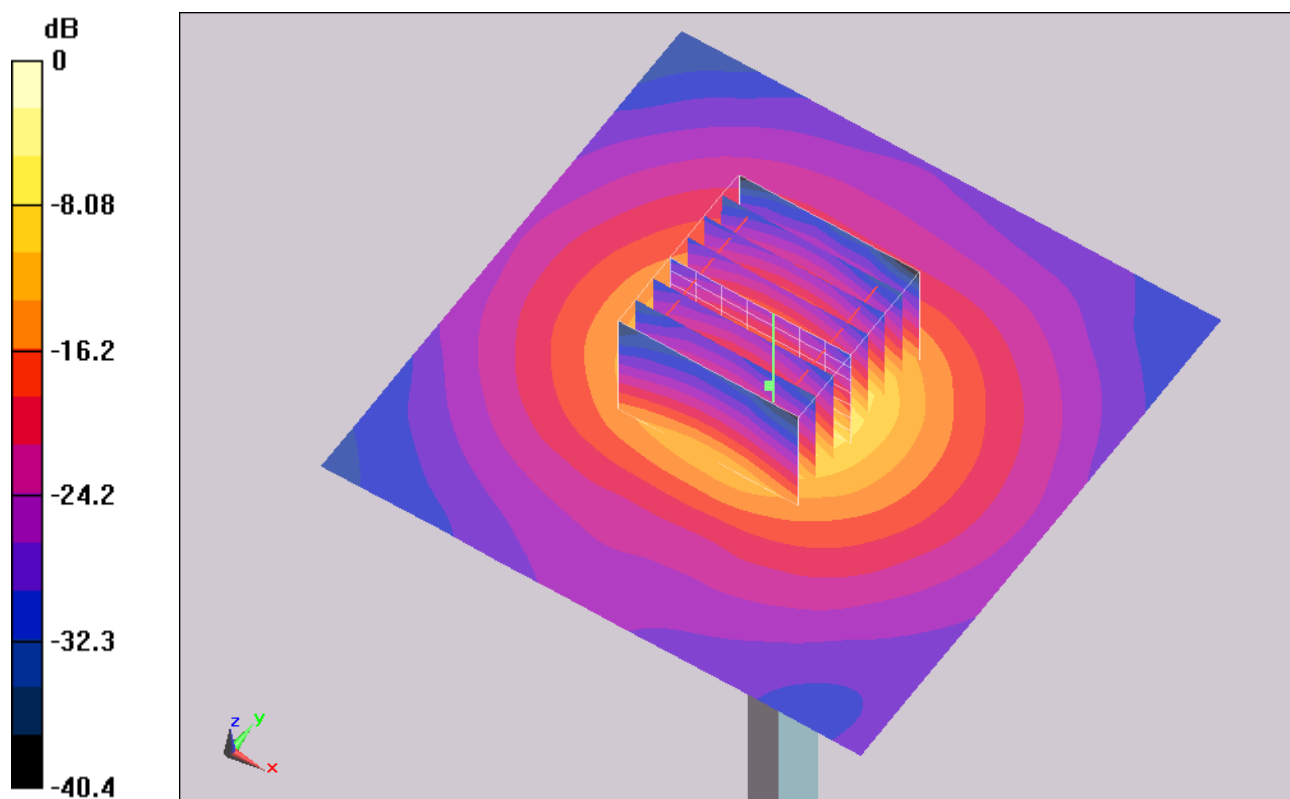
Pin=250mW/Zoom Scan (8x8x8)/Cube 0: Measurement grid: $dx=4.3\text{mm}$, $dy=4.3\text{mm}$, $dz=3\text{mm}$

Reference Value = 89.6 V/m ; Power Drift = -0.042 dB

Peak SAR (extrapolated) = 59.7 W/kg

SAR(1 g) = 17.9 mW/g ; SAR(10 g) = 5.08 mW/g

Maximum value of SAR (measured) = 29.5 mW/g



0 dB = 29.5mW/g

System Check_Body_5800MHz_120830

DUT: D5GHzV2-SN:1006

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

Medium: MSL_5G_120830 Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 6.1 \text{ mho/m}$; $\epsilon_r = 46.9$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Pin=250mW/Area Scan (91x91x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 32.9 mW/g

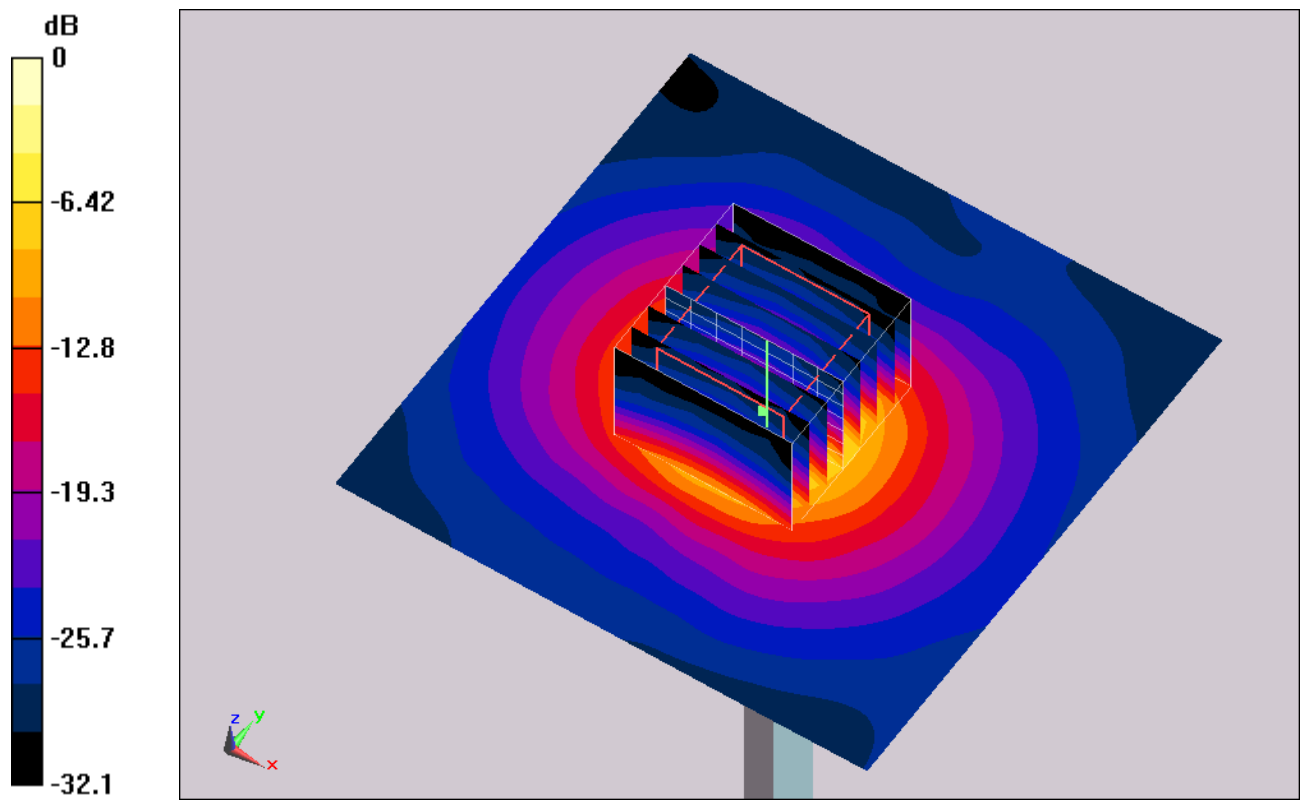
Pin=250mW/Zoom Scan (8x8x8)/Cube 0: Measurement grid: $dx=4.3\text{mm}$, $dy=4.3\text{mm}$, $dz=3\text{mm}$

Reference Value = 79.8 V/m ; Power Drift = 0.115 dB

Peak SAR (extrapolated) = 71.6 W/kg

SAR(1 g) = 18.4 mW/g ; SAR(10 g) = 5.15 mW/g

Maximum value of SAR (measured) = 31.9 mW/g



0 dB = 31.9mW/g



Appendix B. Plots of SAR Measurement

The plots are shown as follows.

#01 WLAN2.4G_802.11g_Horizontal Up_0.5cm_Ch6_Ant A+B

DUT: 280102

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

Medium: MSL_2450_120828 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 1.94 \text{ mho/m}$; $\epsilon_r = 54.6$;

$\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : $22.5 \text{ }^\circ\text{C}$; Liquid Temperature : $21.5 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(7.1, 7.1, 7.1); Calibrated: 2012/6/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch6/Area Scan (41x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

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

Reference Value = 21 V/m ; Power Drift = 0.036 dB

Peak SAR (extrapolated) = 2.05 W/kg

SAR(1 g) = 0.956 mW/g ; SAR(10 g) = 0.464 mW/g

Maximum value of SAR (measured) = 1.09 mW/g

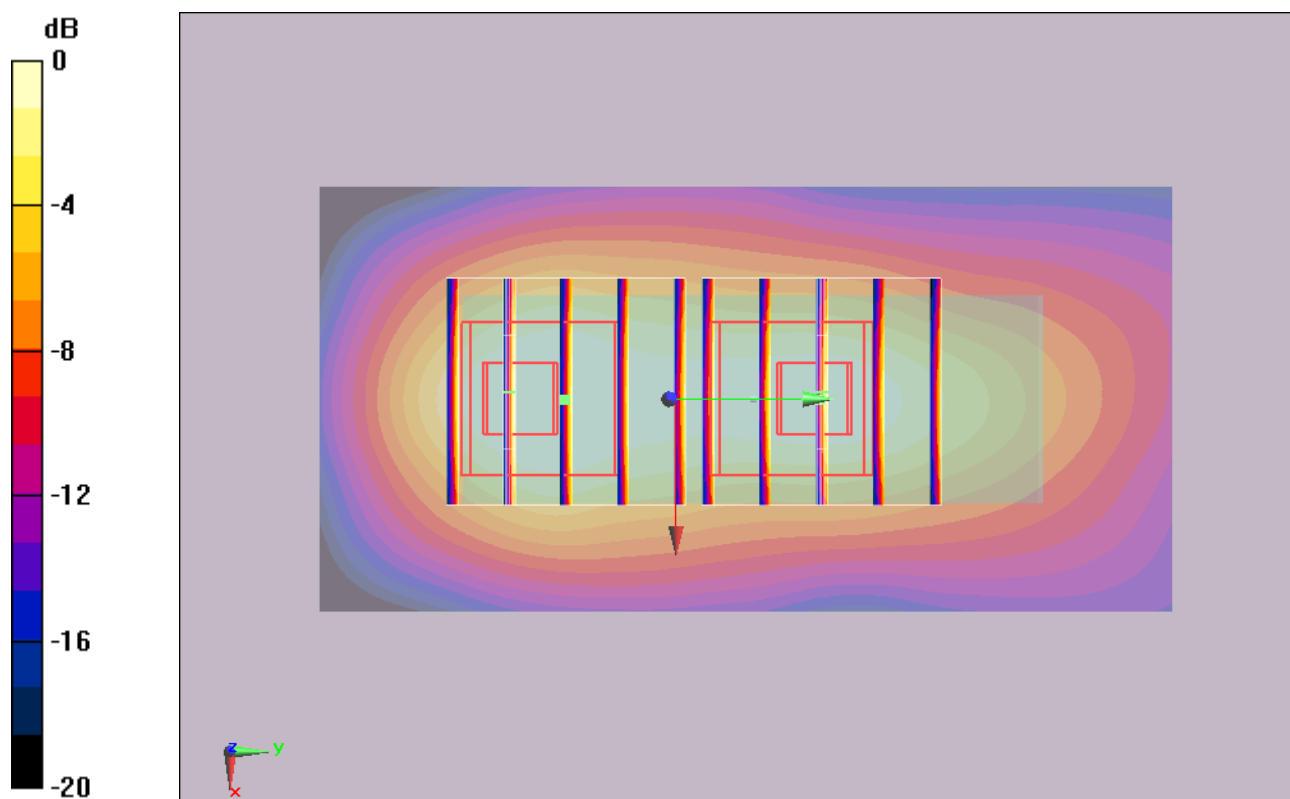
Ch6/Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 21 V/m ; Power Drift = 0.036 dB

Peak SAR (extrapolated) = 1.59 W/kg

SAR(1 g) = 0.860 mW/g ; SAR(10 g) = 0.440 mW/g

Maximum value of SAR (measured) = 0.953 mW/g



#02 WLAN2.4G_802.11g_Horizontal Down_0.5cm_Ch6_Ant A+B

DUT: 280102

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

Medium: MSL_2450_120828 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 1.94 \text{ mho/m}$; $\epsilon_r = 54.6$;

$\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.5°C ; Liquid Temperature : 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(7.1, 7.1, 7.1); Calibrated: 2012/6/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch6/Area Scan (41x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 1.04 mW/g

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

Reference Value = 14.6 V/m ; Power Drift = -0.138 dB

Peak SAR (extrapolated) = 1.94 W/kg

SAR(1 g) = 0.923 mW/g ; SAR(10 g) = 0.453 mW/g

Maximum value of SAR (measured) = 1.02 mW/g

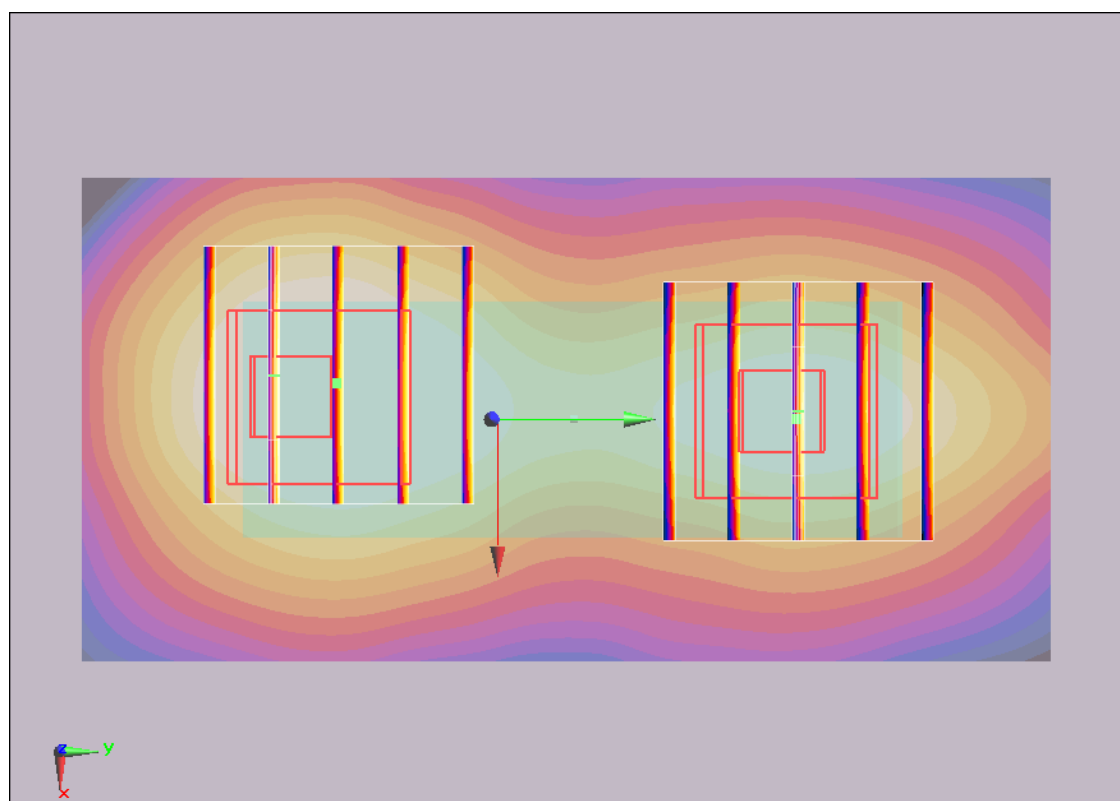
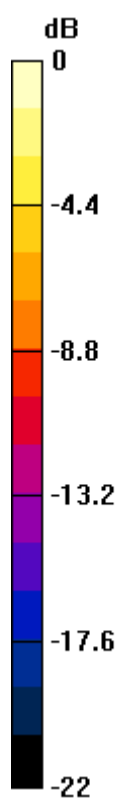
Ch6/Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 14.6 V/m ; Power Drift = -0.138 dB

Peak SAR (extrapolated) = 1.14 W/kg

SAR(1 g) = 0.600 mW/g ; SAR(10 g) = 0.298 mW/g

Maximum value of SAR (measured) = 0.670 mW/g



0 dB = 0.670mW/g

#03 WLAN2.4G_802.11g_Vertical Front_0.5cm_Ch6_Ant A+B

DUT: 280102

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

Medium: MSL_2450_120828 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 1.94 \text{ mho/m}$; $\epsilon_r = 54.6$;

$\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.5°C ; Liquid Temperature : 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(7.1, 7.1, 7.1); Calibrated: 2012/6/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch6/Area Scan (31x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.436 mW/g

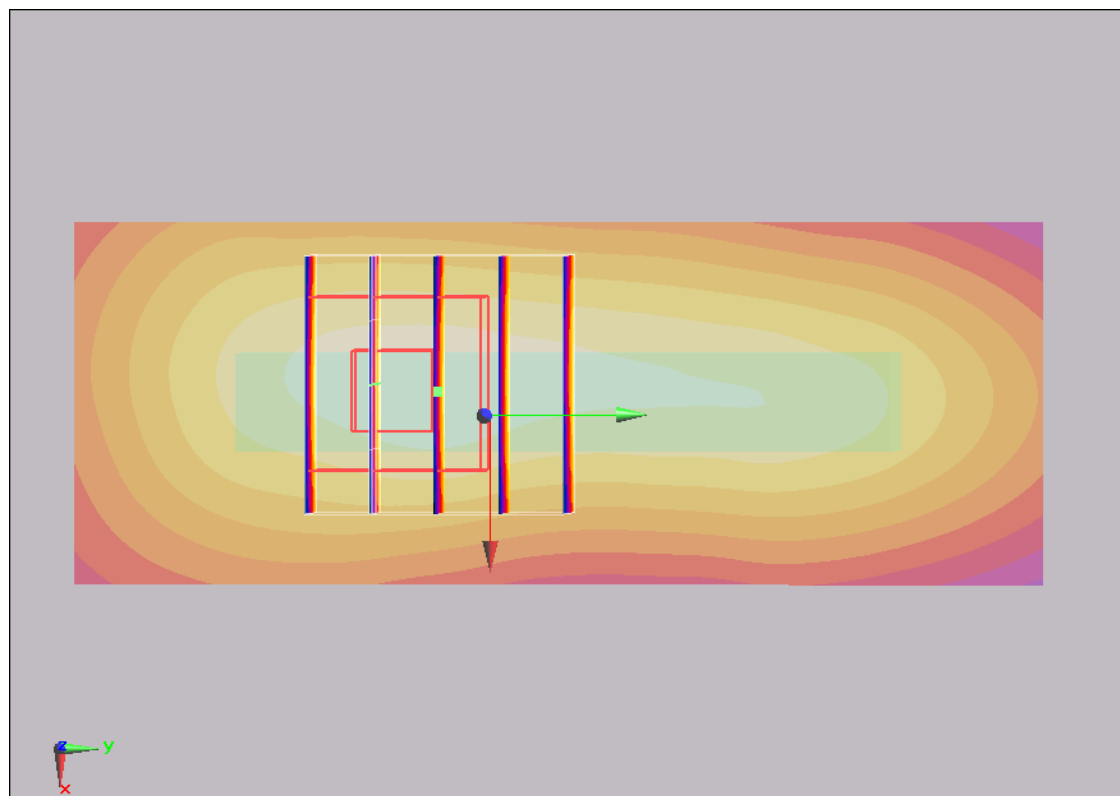
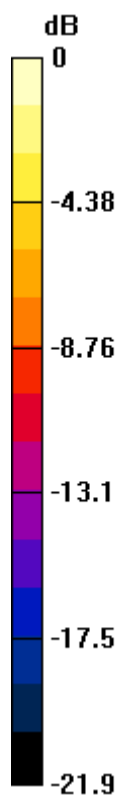
Ch6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 13.4 V/m ; Power Drift = -0.120 dB

Peak SAR (extrapolated) = 0.827 W/kg

SAR(1 g) = 0.409 mW/g ; SAR(10 g) = 0.203 mW/g

Maximum value of SAR (measured) = 0.466 mW/g



0 dB = 0.466mW/g

#04 WLAN2.4G_802.11g_Vertical Back_0.5cm_Ch6_Ant A+B

DUT: 280102

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

Medium: MSL_2450_120828 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 1.94 \text{ mho/m}$; $\epsilon_r = 54.6$;

$\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : $22.5 \text{ }^\circ\text{C}$; Liquid Temperature : $21.5 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(7.1, 7.1, 7.1); Calibrated: 2012/6/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch6/Area Scan (31x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.460 mW/g

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

Reference Value = 13.6 V/m ; Power Drift = -0.199 dB

Peak SAR (extrapolated) = 0.842 W/kg

SAR(1 g) = 0.422 mW/g ; SAR(10 g) = 0.209 mW/g

Maximum value of SAR (measured) = 0.462 mW/g

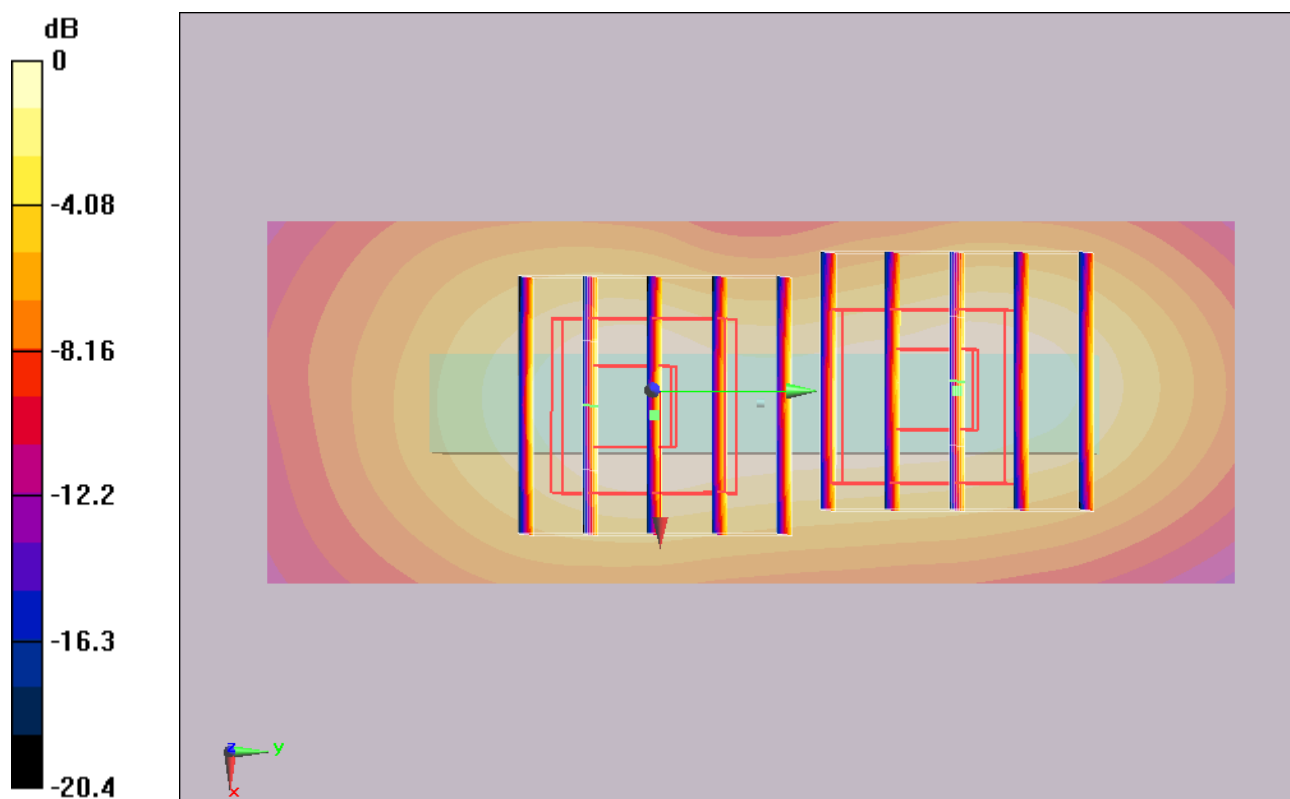
Ch6/Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 13.6 V/m ; Power Drift = -0.199 dB

Peak SAR (extrapolated) = 0.649 W/kg

SAR(1 g) = 0.352 mW/g ; SAR(10 g) = 0.187 mW/g

Maximum value of SAR (measured) = 0.388 mW/g



0 dB = 0.388mW/g

#05 WLAN2.4G_802.11g_Tip Mode_0.5cm_Ch6_Ant A+B

DUT: 280102

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

Medium: MSL_2450_120828 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 1.94 \text{ mho/m}$; $\epsilon_r = 54.6$;

$\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.5°C ; Liquid Temperature : 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(7.1, 7.1, 7.1); Calibrated: 2012/6/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch6/Area Scan (31x41x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.400 mW/g

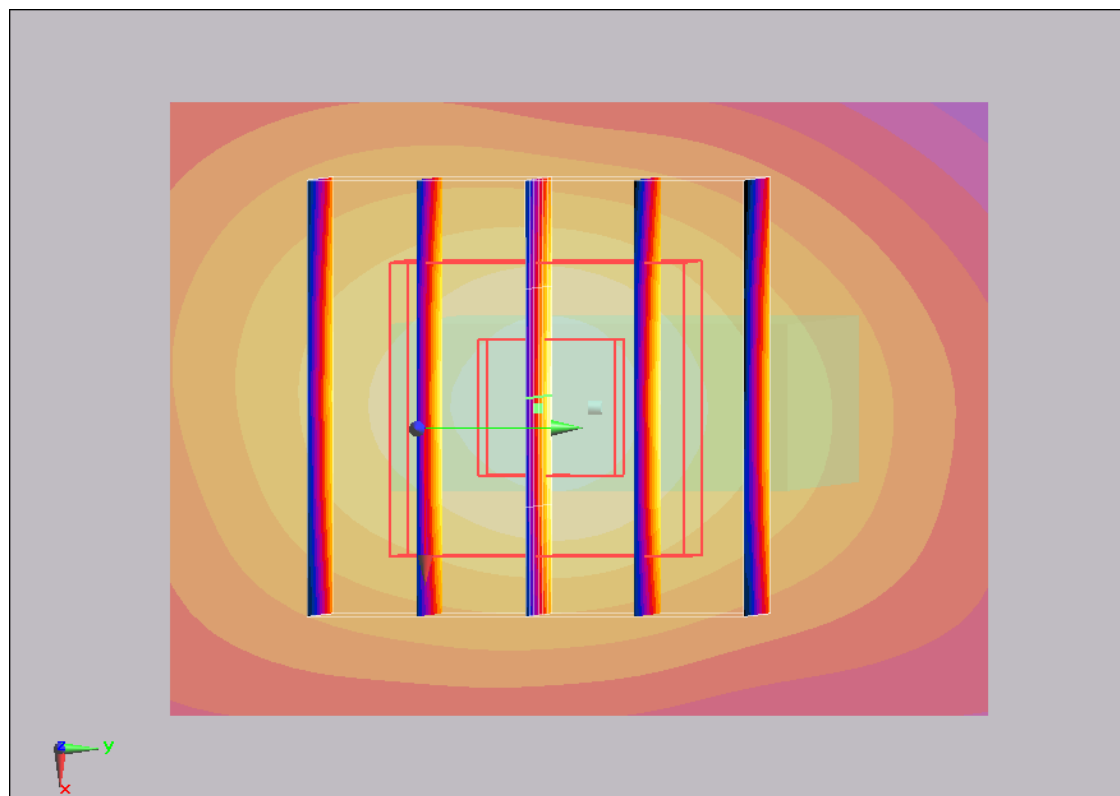
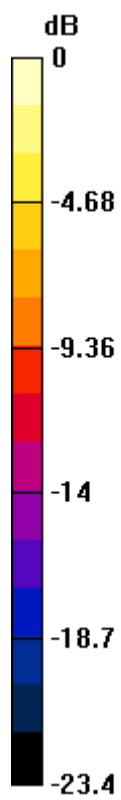
Ch6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 15.3 V/m ; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 0.821 W/kg

SAR(1 g) = 0.394 mW/g ; SAR(10 g) = 0.177 mW/g

Maximum value of SAR (measured) = 0.457 mW/g



0 dB = 0.457mW/g

#06 WLAN2.4G_802.11g_Horizontal Up_0.5cm_Ch1_Ant A+B

DUT: 280102

Communication System: 802.11g; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: MSL_2450_120828 Medium parameters used: $f = 2412 \text{ MHz}$; $\sigma = 1.91 \text{ mho/m}$; $\epsilon_r = 54.8$;

$\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.5°C ; Liquid Temperature : 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(7.1, 7.1, 7.1); Calibrated: 2012/6/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch1/Area Scan (41x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 1.33 mW/g

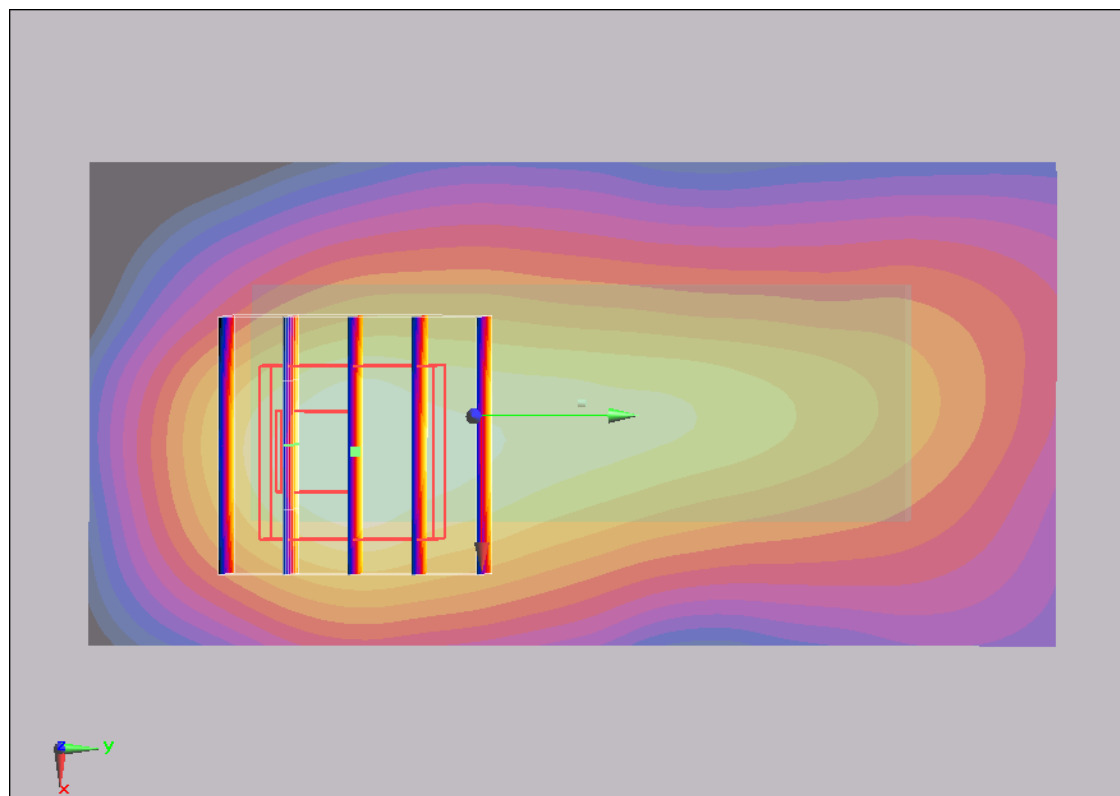
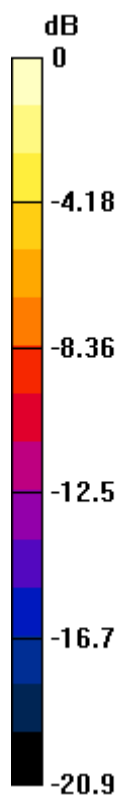
Ch1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 19.3 V/m ; Power Drift = -0.170 dB

Peak SAR (extrapolated) = 2.26 W/kg

SAR(1 g) = 1.04 mW/g ; SAR(10 g) = 0.504 mW/g

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



0 dB = 1.16mW/g

#06 WLAN2.4G_802.11g_Horizontal Up_0.5cm_Ch1_Ant A+B_2D**DUT: 280102**

Communication System: 802.11g; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: MSL_2450_120828 Medium parameters used: $f = 2412$ MHz; $\sigma = 1.91$ mho/m; $\epsilon_r = 54.8$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.5 °C; Liquid Temperature : 21.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(7.1, 7.1, 7.1); Calibrated: 2012/6/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch1/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.33 mW/g

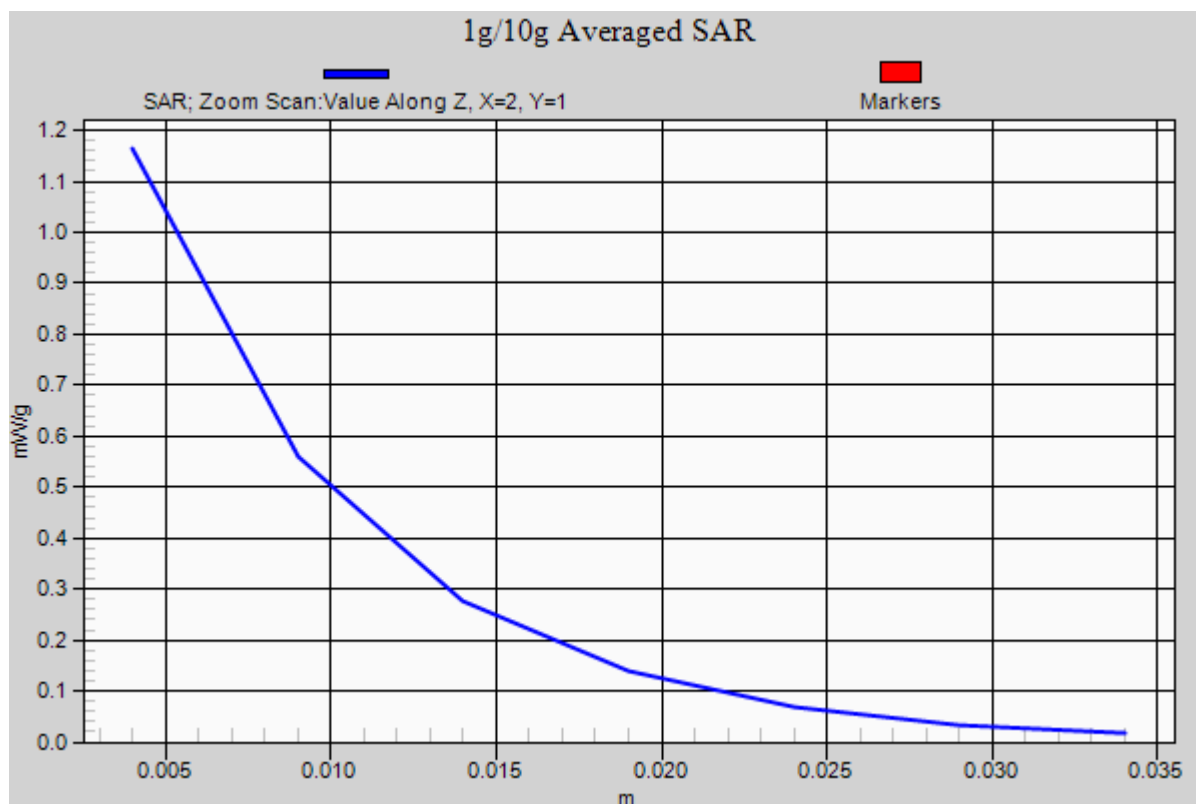
Ch1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.3 V/m; Power Drift = -0.170 dB

Peak SAR (extrapolated) = 2.26 W/kg

SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.504 mW/g

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



#07 WLAN2.4G_802.11g_Horizontal Up_0.5cm_Ch11_Ant A+B

DUT: 280102

Communication System: 802.11g; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: MSL_2450_120828 Medium parameters used: $f = 2462 \text{ MHz}$; $\sigma = 1.98 \text{ mho/m}$; $\epsilon_r = 54.5$;

$\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : $22.5 \text{ }^\circ\text{C}$; Liquid Temperature : $21.5 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(7.1, 7.1, 7.1); Calibrated: 2012/6/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch11/Area Scan (41x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.881 mW/g

Ch11/Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 18.7 V/m ; Power Drift = -0.126 dB

Peak SAR (extrapolated) = 1.38 W/kg

SAR(1 g) = 0.730 mW/g ; SAR(10 g) = 0.362 mW/g

Maximum value of SAR (measured) = 0.818 mW/g

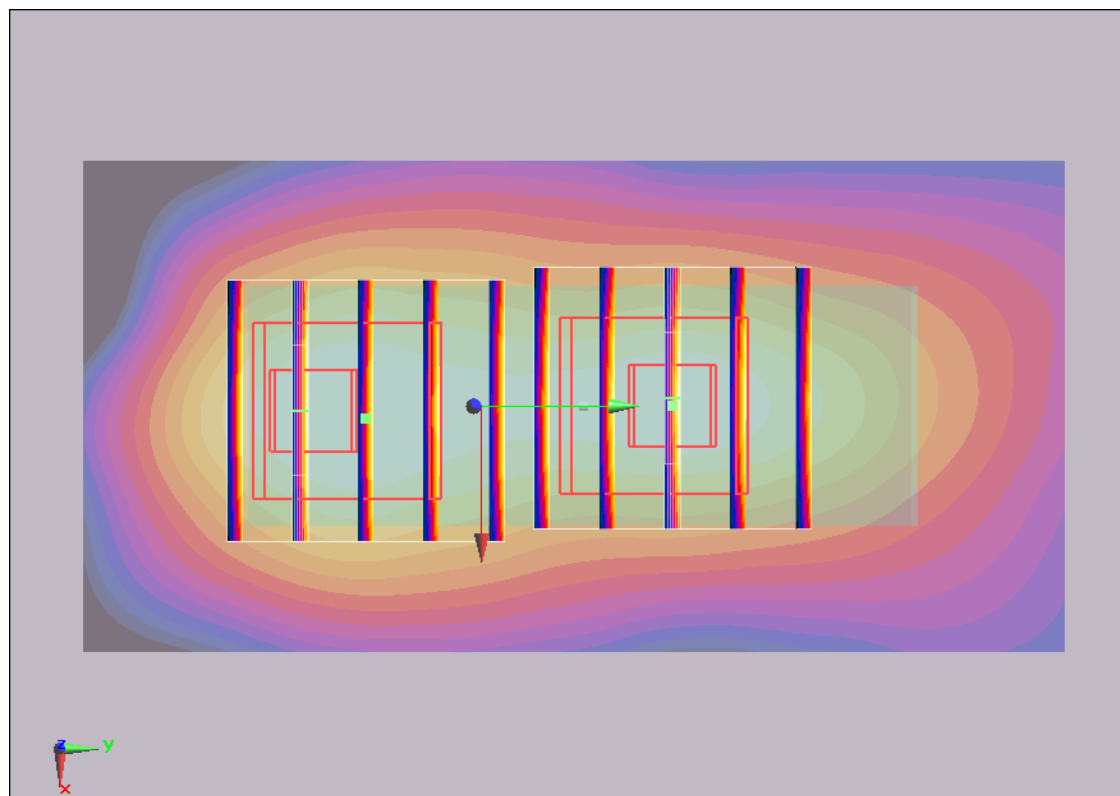
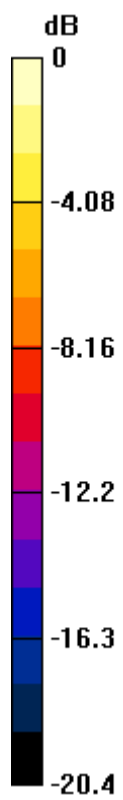
Ch11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 18.7 V/m ; Power Drift = -0.126 dB

Peak SAR (extrapolated) = 1.55 W/kg

SAR(1 g) = 0.727 mW/g ; SAR(10 g) = 0.358 mW/g

Maximum value of SAR (measured) = 0.822 mW/g



0 dB = 0.822mW/g

#08 WLAN2.4G_802.11g_Horizontal Down_0.5cm_Ch1_Ant A+B

DUT: 280102

Communication System: 802.11g; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: MSL_2450_120828 Medium parameters used: $f = 2412 \text{ MHz}$; $\sigma = 1.91 \text{ mho/m}$; $\epsilon_r = 54.8$;

$\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : $22.5 \text{ }^\circ\text{C}$; Liquid Temperature : $21.5 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(7.1, 7.1, 7.1); Calibrated: 2012/6/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch1/Area Scan (41x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 1.03 mW/g

Ch1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 14.1 V/m ; Power Drift = -0.136 dB

Peak SAR (extrapolated) = 2.07 W/kg

SAR(1 g) = 0.986 mW/g ; SAR(10 g) = 0.478 mW/g

Maximum value of SAR (measured) = 1.02 mW/g

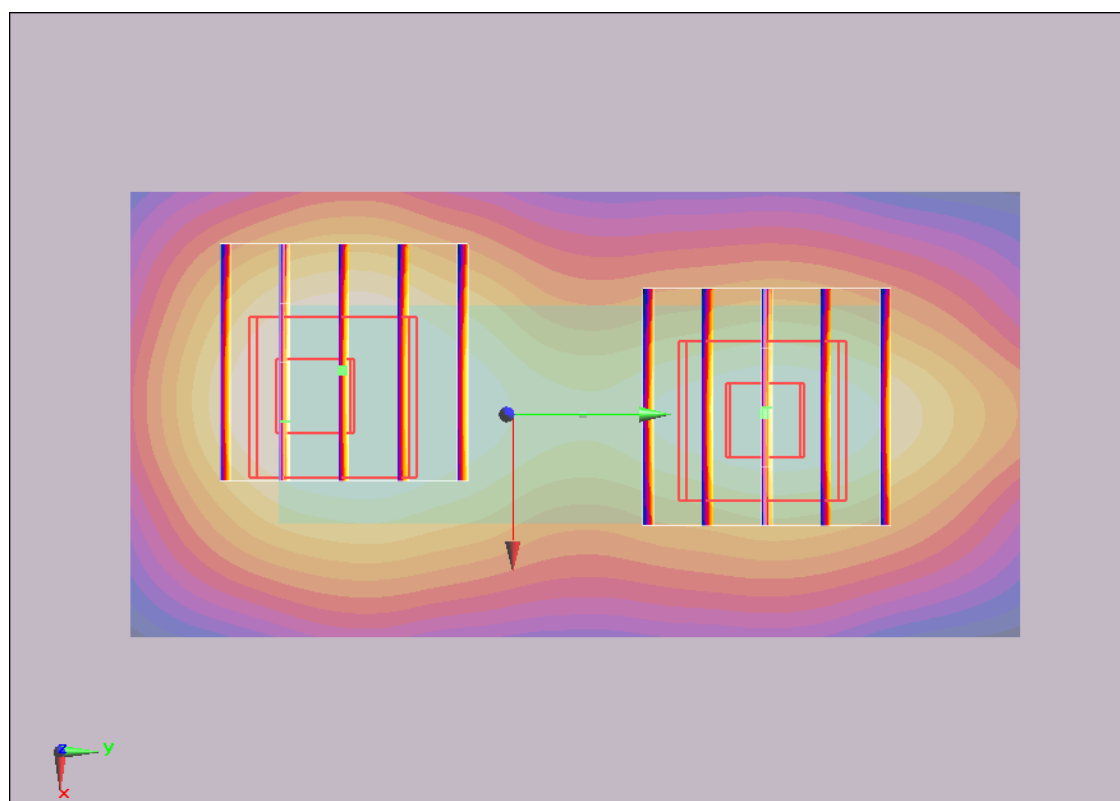
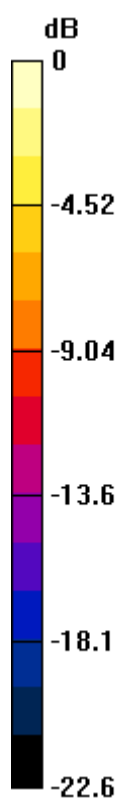
Ch1/Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 14.1 V/m ; Power Drift = -0.136 dB

Peak SAR (extrapolated) = 1.2 W/kg

SAR(1 g) = 0.633 mW/g ; SAR(10 g) = 0.313 mW/g

Maximum value of SAR (measured) = 0.705 mW/g



0 dB = 0.705mW/g

#09 WLAN2.4G_802.11g_Horizontal Down_0.5cm_Ch11_Ant A+B

DUT: 280102

Communication System: 802.11g; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: MSL_2450_120828 Medium parameters used: $f = 2462 \text{ MHz}$; $\sigma = 1.98 \text{ mho/m}$; $\epsilon_r = 54.5$;

$\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.5°C ; Liquid Temperature : 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(7.1, 7.1, 7.1); Calibrated: 2012/6/21
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1029
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch11/Area Scan (41x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.732 mW/g

Ch11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.6 V/m ; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 1.41 W/kg

SAR(1 g) = 0.671 mW/g ; SAR(10 g) = 0.331 mW/g

Maximum value of SAR (measured) = 0.736 mW/g

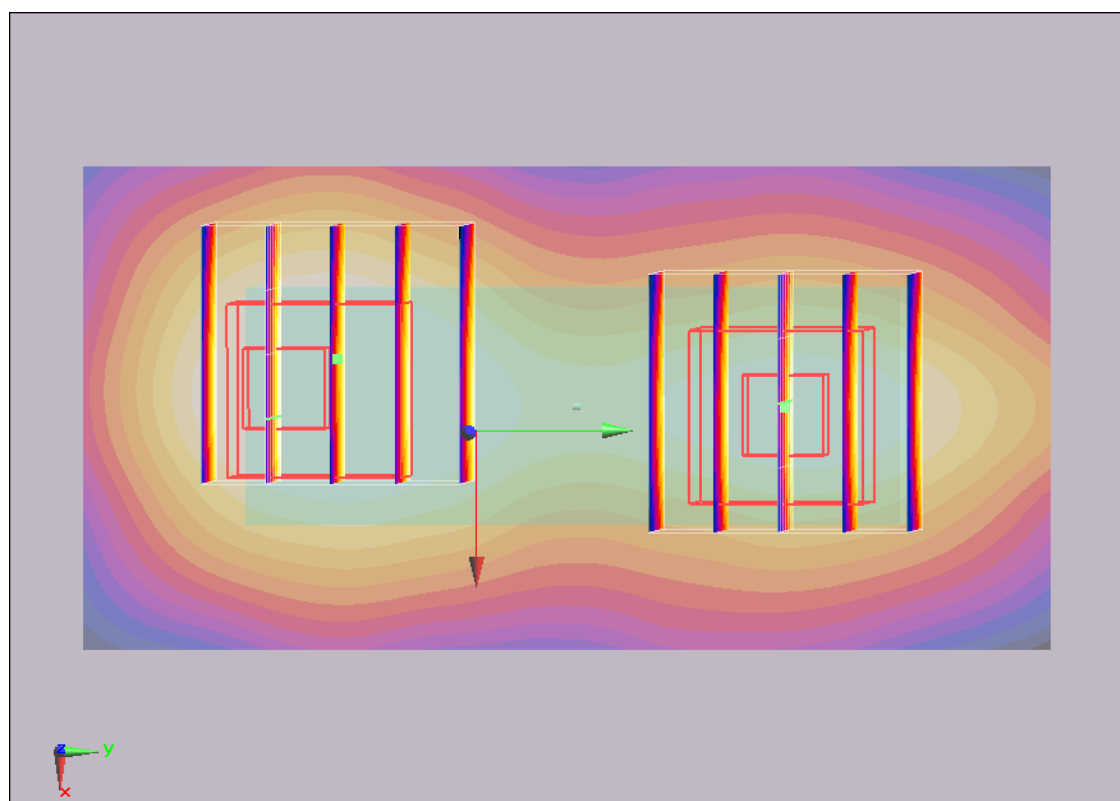
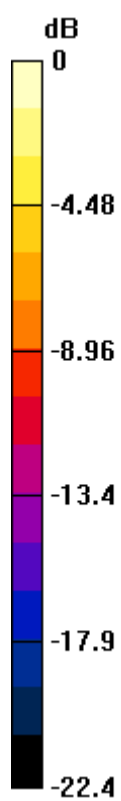
Ch11/Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.6 V/m ; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 0.860 W/kg

SAR(1 g) = 0.450 mW/g ; SAR(10 g) = 0.224 mW/g

Maximum value of SAR (measured) = 0.500 mW/g



0 dB = 0.500mW/g

#10 WLAN5G_802.11a_Horizontal Up_0.5cm_Ch40_Ant A+B

DUT: 280102

Communication System: 802.11a; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: MSL_5G_120829 Medium parameters used: $f = 5200$ MHz; $\sigma = 5.26$ mho/m; $\epsilon_r = 48.3$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.8 °C; Liquid Temperature : 21.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(4.2, 4.2, 4.2); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch40/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.697 mW/g

Ch40/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 7.26 V/m; Power Drift = -0.115 dB

Peak SAR (extrapolated) = 1.1 W/kg

SAR(1 g) = 0.333 mW/g; SAR(10 g) = 0.103 mW/g

Maximum value of SAR (measured) = 0.627 mW/g

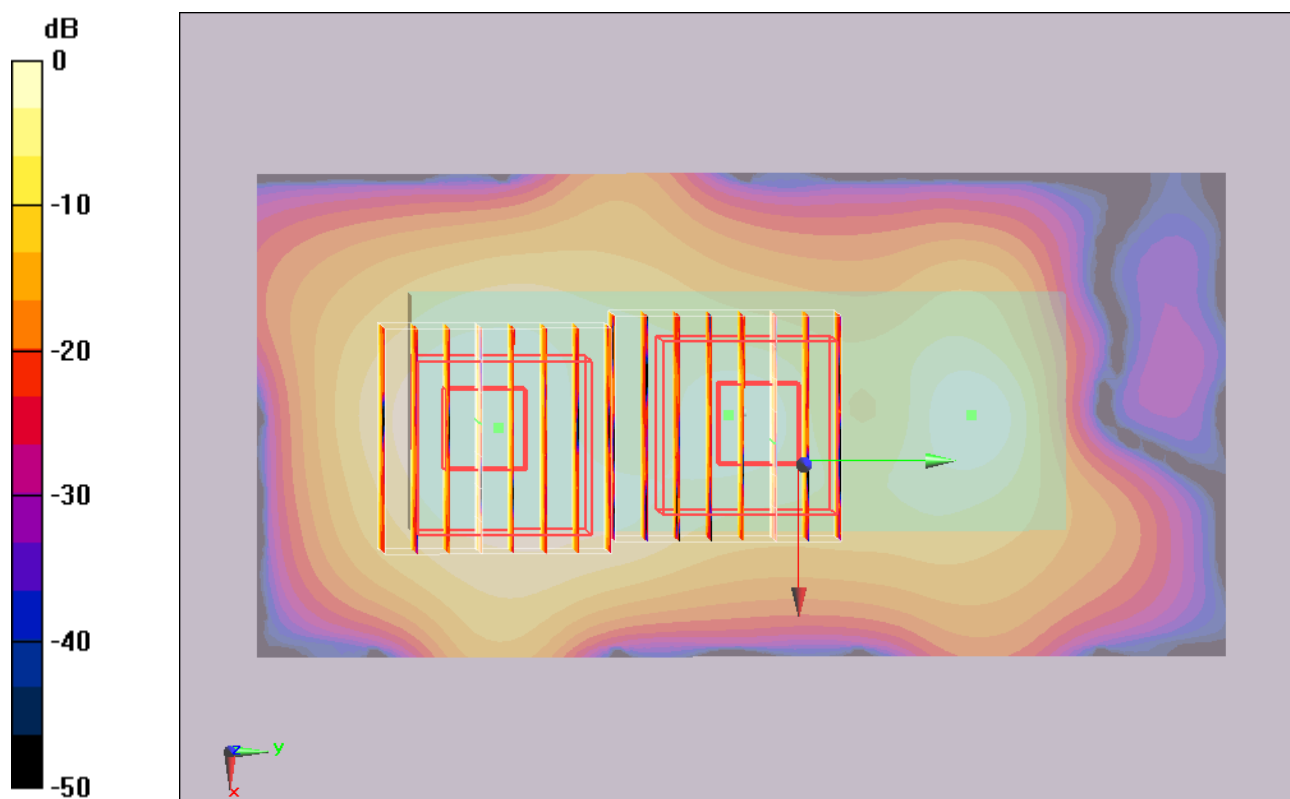
Ch40/Zoom Scan (8x8x10)/Cube 1: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 7.26 V/m; Power Drift = -0.115 dB

Peak SAR (extrapolated) = 0.754 W/kg

SAR(1 g) = 0.228 mW/g; SAR(10 g) = 0.059 mW/g

Maximum value of SAR (measured) = 0.450 mW/g



0 dB = 0.450mW/g

#11 WLAN5G_802.11a_Horizontal Down_0.5cm_Ch40_Ant A+B

DUT: 280102

Communication System: 802.11a; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: MSL_5G_120829 Medium parameters used: $f = 5200 \text{ MHz}$; $\sigma = 5.26 \text{ mho/m}$; $\epsilon_r = 48.3$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(4.2, 4.2, 4.2); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch40/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.843 mW/g

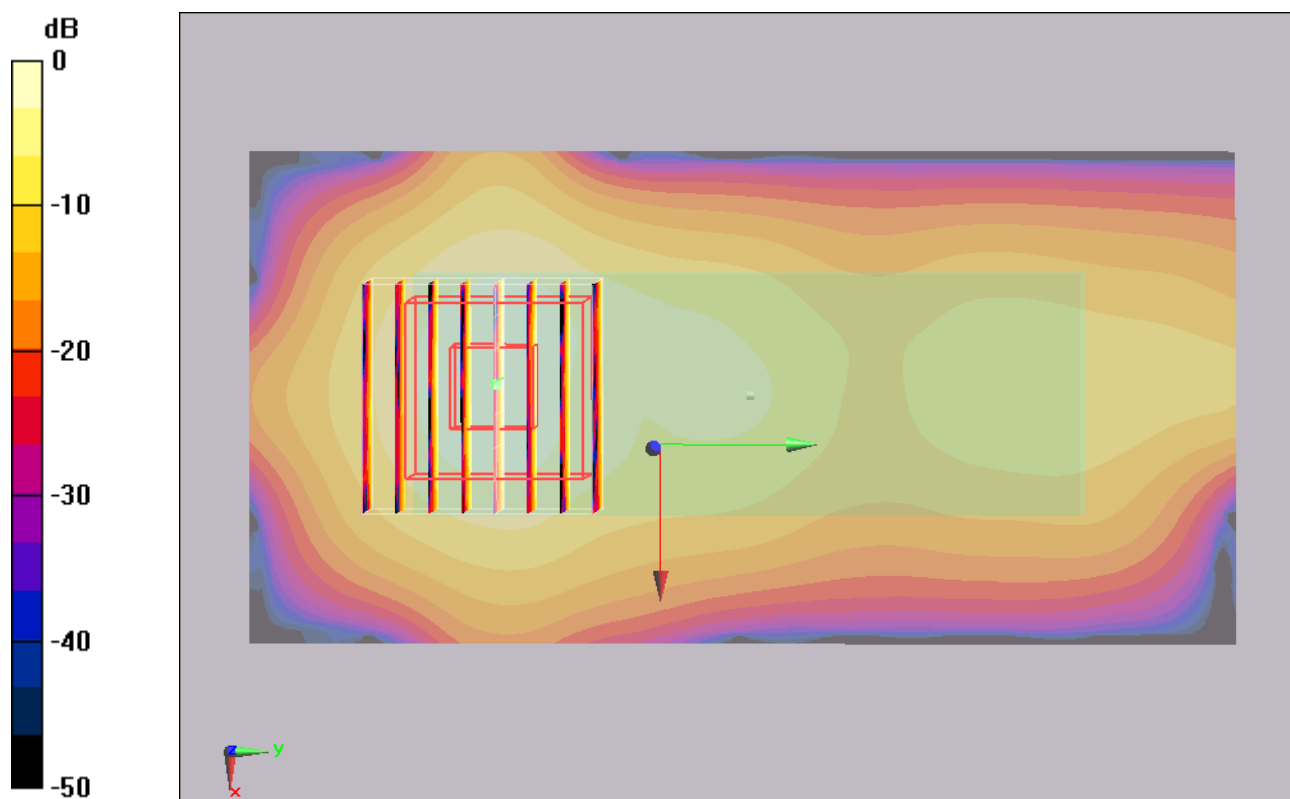
Ch40/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 4.88 V/m ; Power Drift = -0.008 dB

Peak SAR (extrapolated) = 1.3 W/kg

SAR(1 g) = 0.398 mW/g ; SAR(10 g) = 0.135 mW/g

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



0 dB = 0.742mW/g

#12 WLAN5G_802.11a_Vertical Front_0.5cm_Ch40_Ant A+B

DUT: 280102

Communication System: 802.11a; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: MSL_5G_120829 Medium parameters used: $f = 5200$ MHz; $\sigma = 5.26$ mho/m; $\epsilon_r = 48.3$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.8 °C; Liquid Temperature : 21.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(4.2, 4.2, 4.2); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch40/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.474 mW/g

Ch40/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 5.1 V/m; Power Drift = 0.060 dB

Peak SAR (extrapolated) = 0.821 W/kg

SAR(1 g) = 0.251 mW/g; SAR(10 g) = 0.087 mW/g

Maximum value of SAR (measured) = 0.483 mW/g

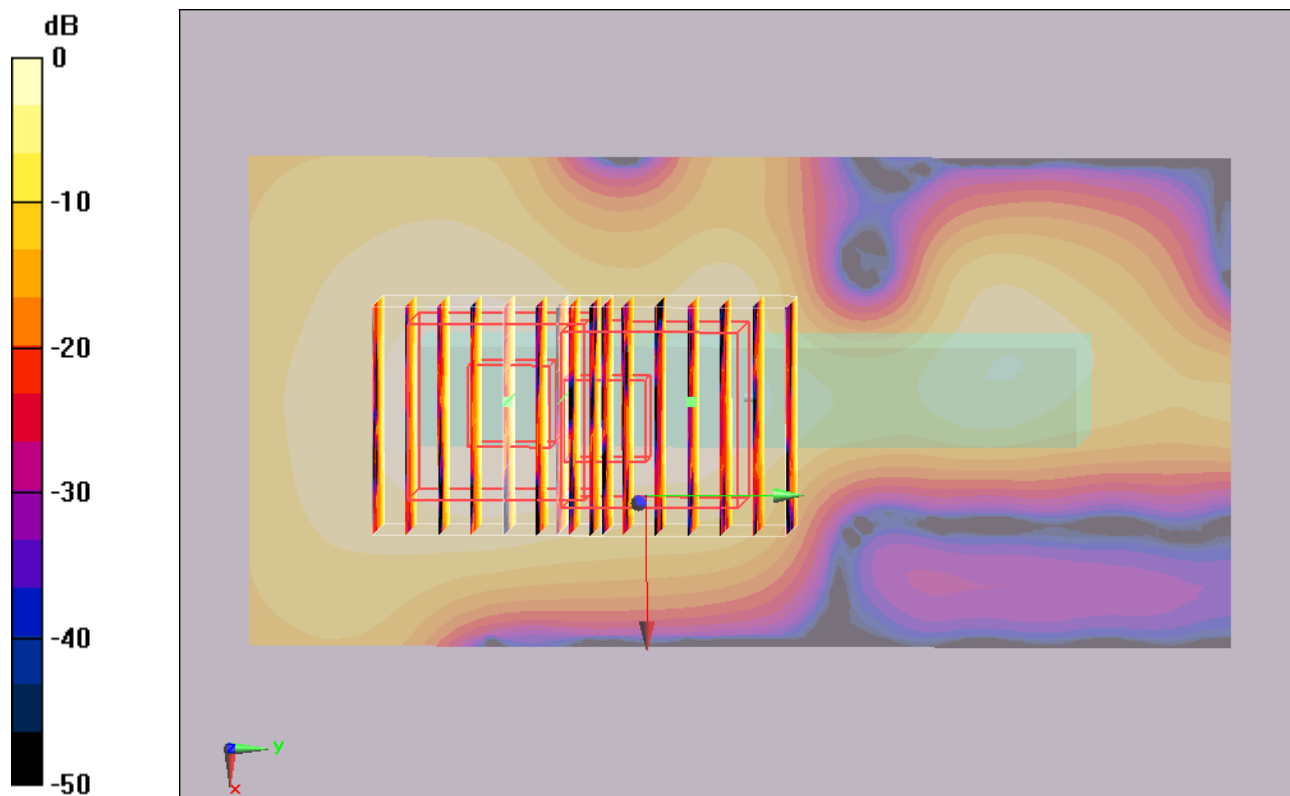
Ch40/Zoom Scan (8x8x10)/Cube 1: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 5.1 V/m; Power Drift = 0.060 dB

Peak SAR (extrapolated) = 0.610 W/kg

SAR(1 g) = 0.139 mW/g; SAR(10 g) = 0.044 mW/g

Maximum value of SAR (measured) = 0.359 mW/g



0 dB = 0.359mW/g

#13 WLAN5G_802.11a_Vertical Back_0.5cm_Ch40_Ant A+B

DUT: 280102

Communication System: 802.11a; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: MSL_5G_120829 Medium parameters used: $f = 5200$ MHz; $\sigma = 5.26$ mho/m; $\epsilon_r = 48.3$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.8 °C; Liquid Temperature : 21.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(4.2, 4.2, 4.2); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch40/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.261 mW/g

Ch40/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 4.68 V/m; Power Drift = 0.117 dB

Peak SAR (extrapolated) = 0.351 W/kg

SAR(1 g) = 0.115 mW/g; SAR(10 g) = 0.044 mW/g

Maximum value of SAR (measured) = 0.219 mW/g

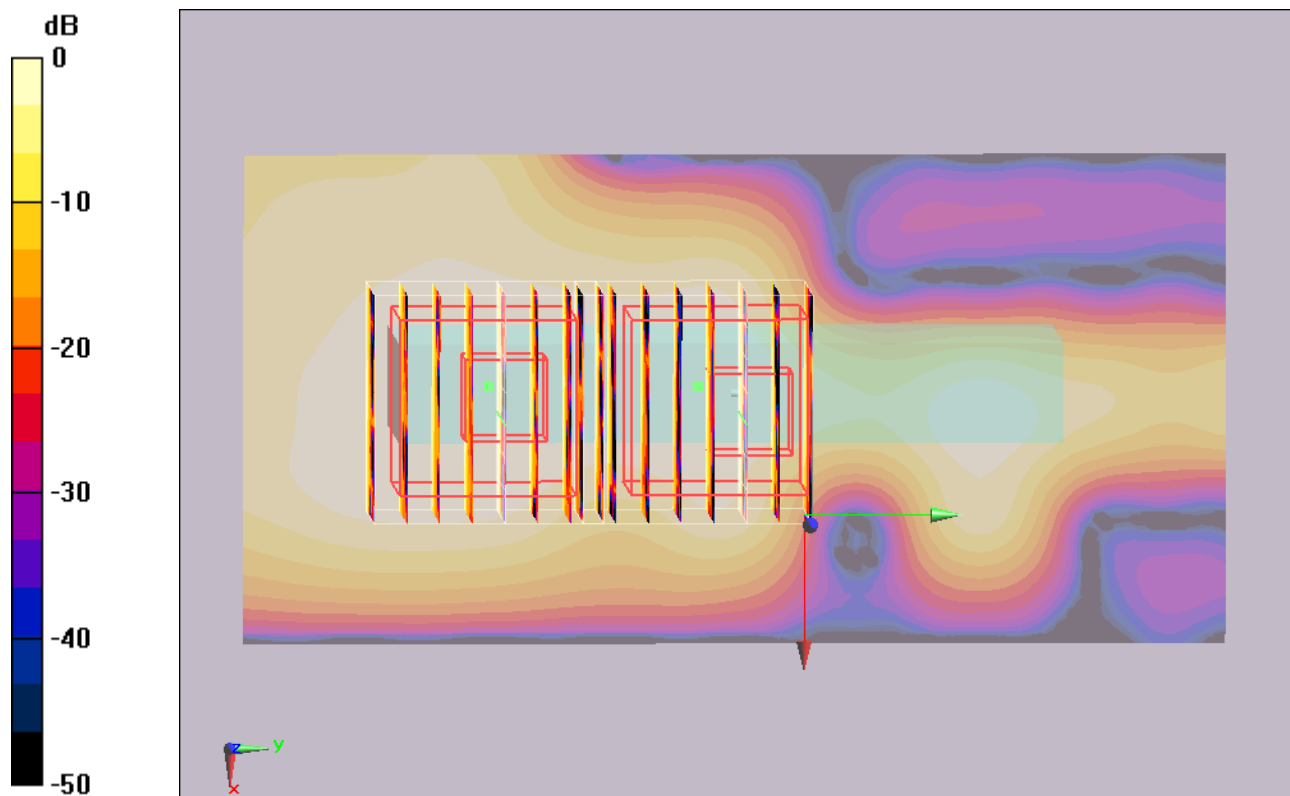
Ch40/Zoom Scan (8x8x10)/Cube 1: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 4.68 V/m; Power Drift = 0.117 dB

Peak SAR (extrapolated) = 0.332 W/kg

SAR(1 g) = 0.100 mW/g; SAR(10 g) = 0.032 mW/g

Maximum value of SAR (measured) = 0.195 mW/g



#14 WLAN5G_802.11a_Tip Mode_0.5cm_Ch40_Ant A+B

DUT: 280102

Communication System: 802.11a; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: MSL_5G_120829 Medium parameters used: $f = 5200$ MHz; $\sigma = 5.26$ mho/m; $\epsilon_r = 48.3$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.8 °C; Liquid Temperature : 21.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(4.2, 4.2, 4.2); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch40/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.335 mW/g

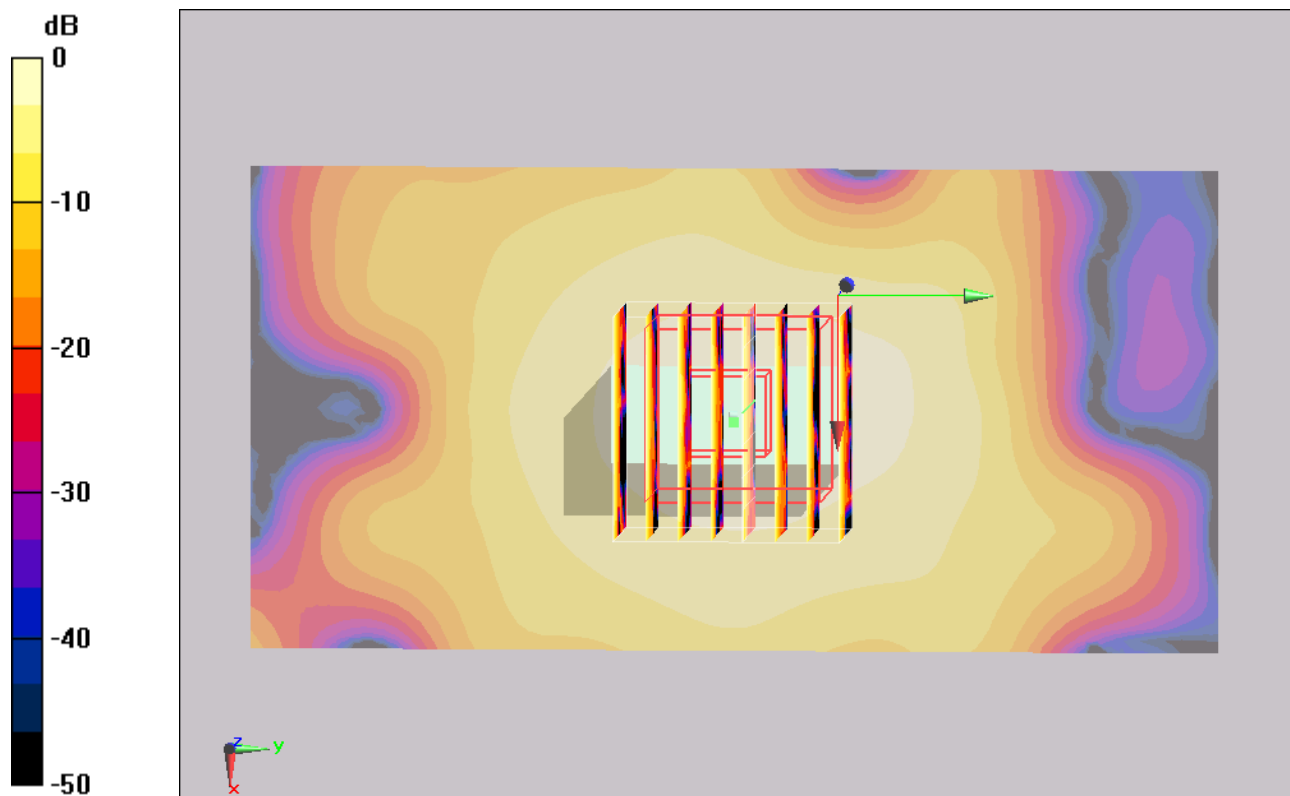
Ch40/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 6.21 V/m; Power Drift = -0.046 dB

Peak SAR (extrapolated) = 0.582 W/kg

SAR(1 g) = 0.180 mW/g; SAR(10 g) = 0.069 mW/g

Maximum value of SAR (measured) = 0.332 mW/g



#19 WLAN5G_802.11AC_80M_Horizontal Down_0.5cm_Ch42_Ant A+B

DUT: 280102

Communication System: 802.11n; Frequency: 5210 MHz; Duty Cycle: 1:1

Medium: MSL_5G_120829 Medium parameters used: $f = 5210 \text{ MHz}$; $\sigma = 5.28 \text{ mho/m}$; $\epsilon_r = 48.3$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(4.2, 4.2, 4.2); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch42/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 0.940 mW/g

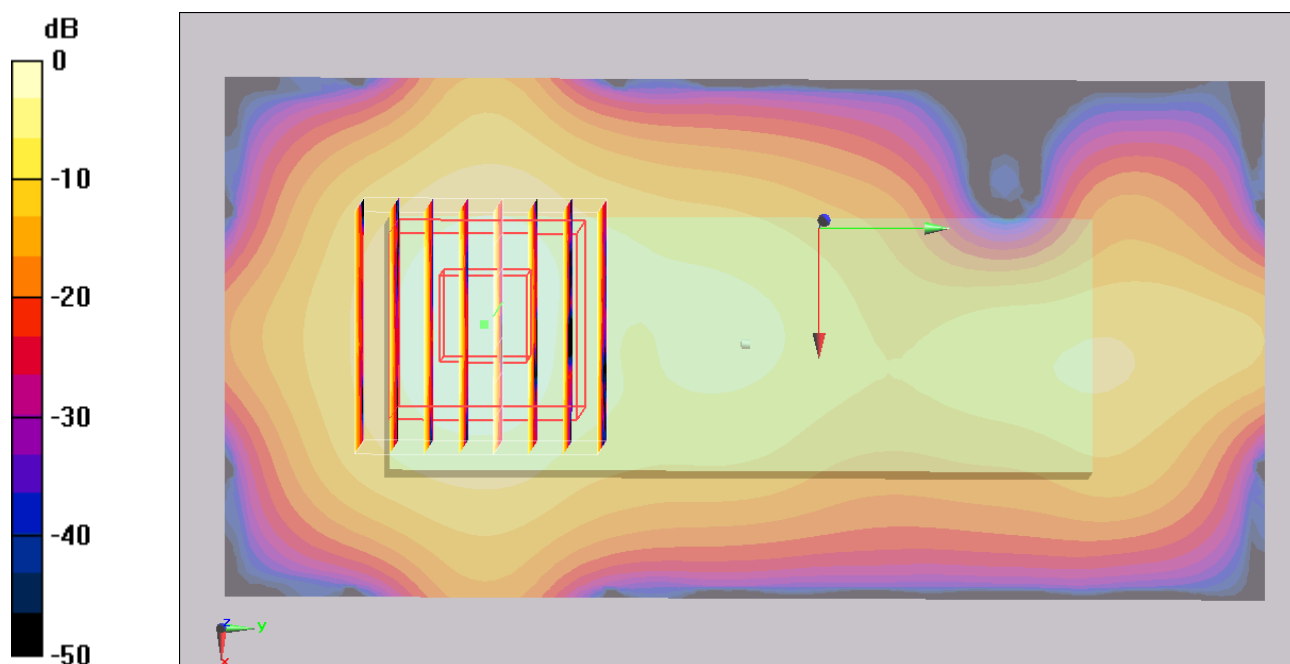
Ch42/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 5.31 V/m ; Power Drift = 0.052 dB

Peak SAR (extrapolated) = 1.6 W/kg

SAR(1 g) = 0.485 mW/g ; SAR(10 g) = 0.171 mW/g

Maximum value of SAR (measured) = 0.912 mW/g



#20 WLAN5G_802.11a_Horizontal Up_0.5cm_Ch157_Ant A+B

DUT: 280102

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

Medium: MSL_5G_120830 Medium parameters used: $f = 5785 \text{ MHz}$; $\sigma = 6.08 \text{ mho/m}$; $\epsilon_r = 47$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch157/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 2.01 mW/g

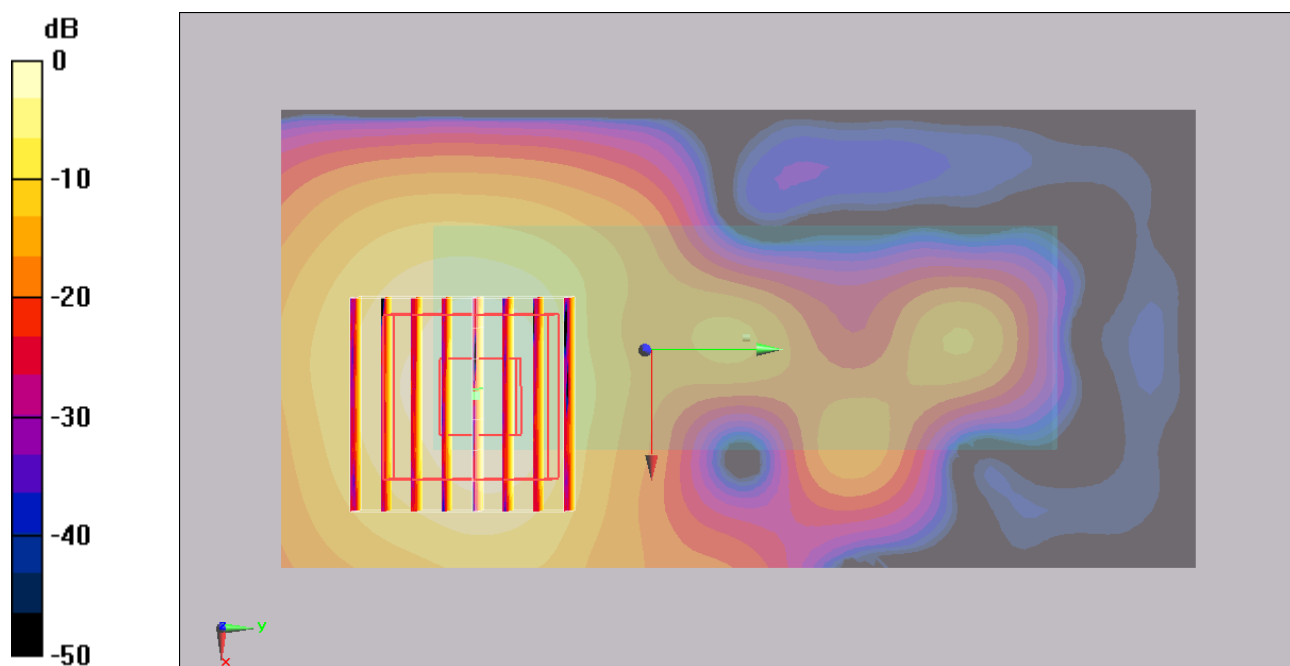
Ch157/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 3.06 V/m ; Power Drift = 0.125 dB

Peak SAR (extrapolated) = 3.46 W/kg

SAR(1 g) = 1.02 mW/g ; SAR(10 g) = 0.354 mW/g

Maximum value of SAR (measured) = 1.98 mW/g



0 dB = 1.98mW/g

#21 WLAN5G_802.11a_Horizontal Down_0.5cm_Ch157_Ant A+B

DUT: 280102

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

Medium: MSL_5G_120830 Medium parameters used: $f = 5785 \text{ MHz}$; $\sigma = 6.08 \text{ mho/m}$; $\epsilon_r = 47$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch157/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.94 mW/g

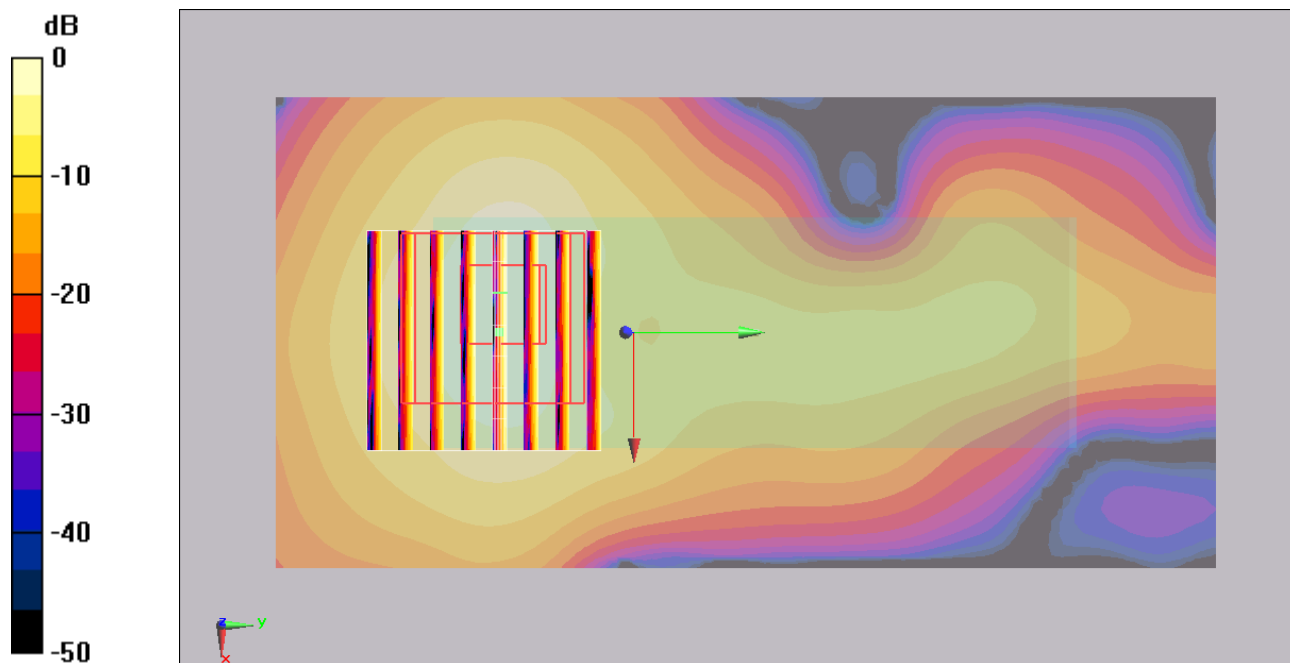
Ch157/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 5.35 V/m ; Power Drift = 0.166 dB

Peak SAR (extrapolated) = 3.57 W/kg

SAR(1 g) = 1.03 mW/g ; SAR(10 g) = 0.366 mW/g

Maximum value of SAR (measured) = 1.99 mW/g



0 dB = 1.99mW/g

#22 WLAN5G_802.11a_Vertical Front_0.5cm_Ch157_Ant A+B

DUT: 280102

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

Medium: MSL_5G_120830 Medium parameters used: $f = 5785 \text{ MHz}$; $\sigma = 6.08 \text{ mho/m}$; $\epsilon_r = 47$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch157/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 2.21 mW/g

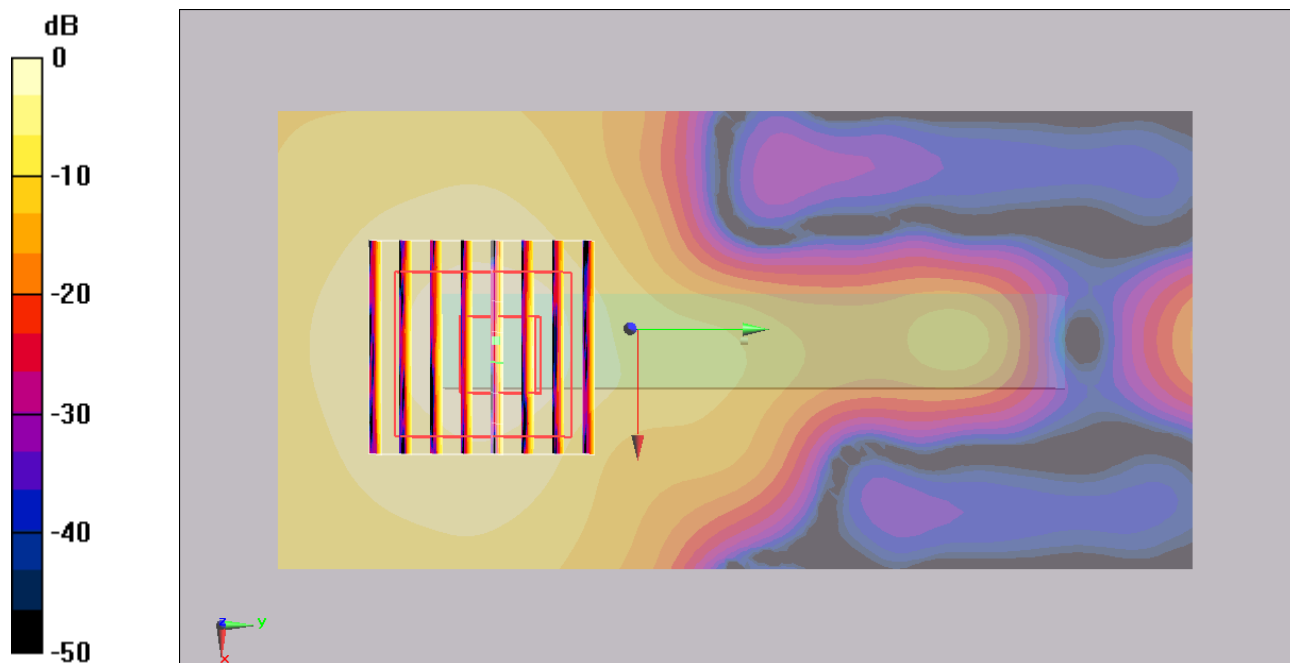
Ch157/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 4.27 V/m ; Power Drift = -0.153 dB

Peak SAR (extrapolated) = 3.21 W/kg

SAR(1 g) = 0.895 mW/g ; SAR(10 g) = 0.301 mW/g

Maximum value of SAR (measured) = 1.8 mW/g



0 dB = 1.8mW/g

#23 WLAN5G_802.11a_Vertical Back_0.5cm_Ch157_Ant A+B

DUT: 280102

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

Medium: MSL_5G_120830 Medium parameters used: $f = 5785 \text{ MHz}$; $\sigma = 6.08 \text{ mho/m}$; $\epsilon_r = 47$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch157/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.23 mW/g

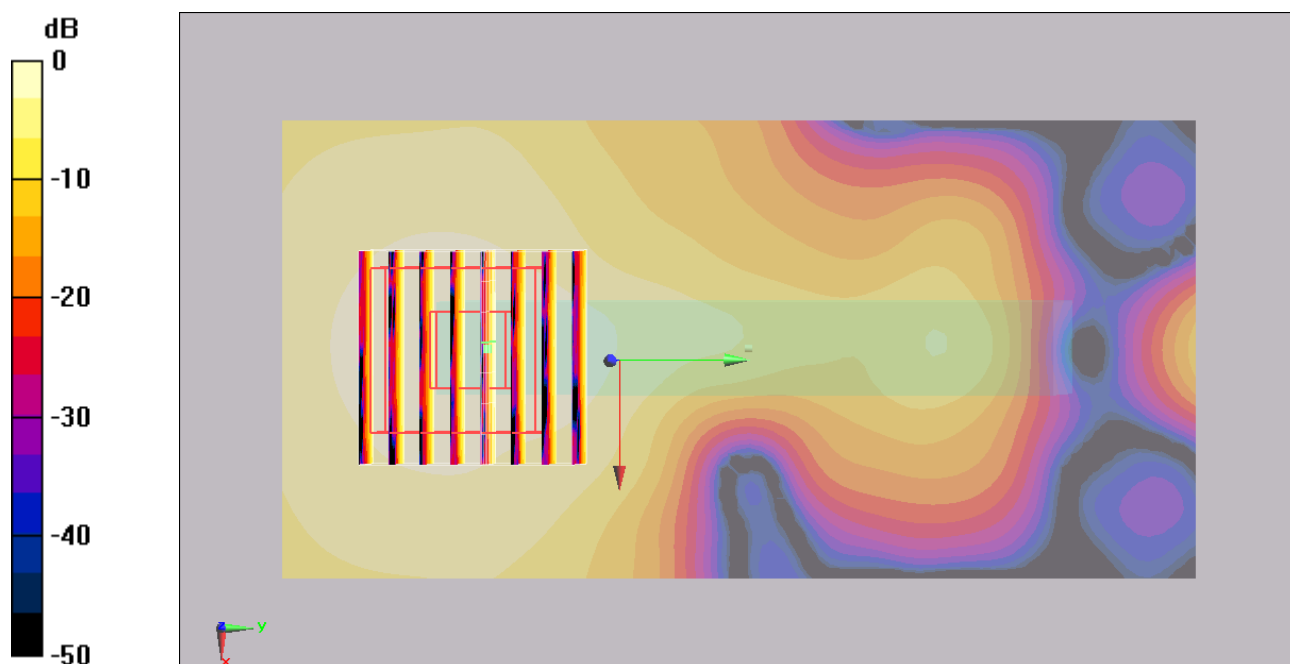
Ch157/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 4.83 V/m ; Power Drift = 0.143 dB

Peak SAR (extrapolated) = 2.14 W/kg

SAR(1 g) = 0.663 mW/g ; SAR(10 g) = 0.255 mW/g

Maximum value of SAR (measured) = 1.25 mW/g



0 dB = 1.25mW/g

#24 WLAN5G_802.11a_Tip Mode_0.5cm_Ch157_Ant A+B

DUT: 280102

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

Medium: MSL_5G_120830 Medium parameters used: $f = 5785 \text{ MHz}$; $\sigma = 6.08 \text{ mho/m}$; $\epsilon_r = 47$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch157/Area Scan (61x61x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.79 mW/g

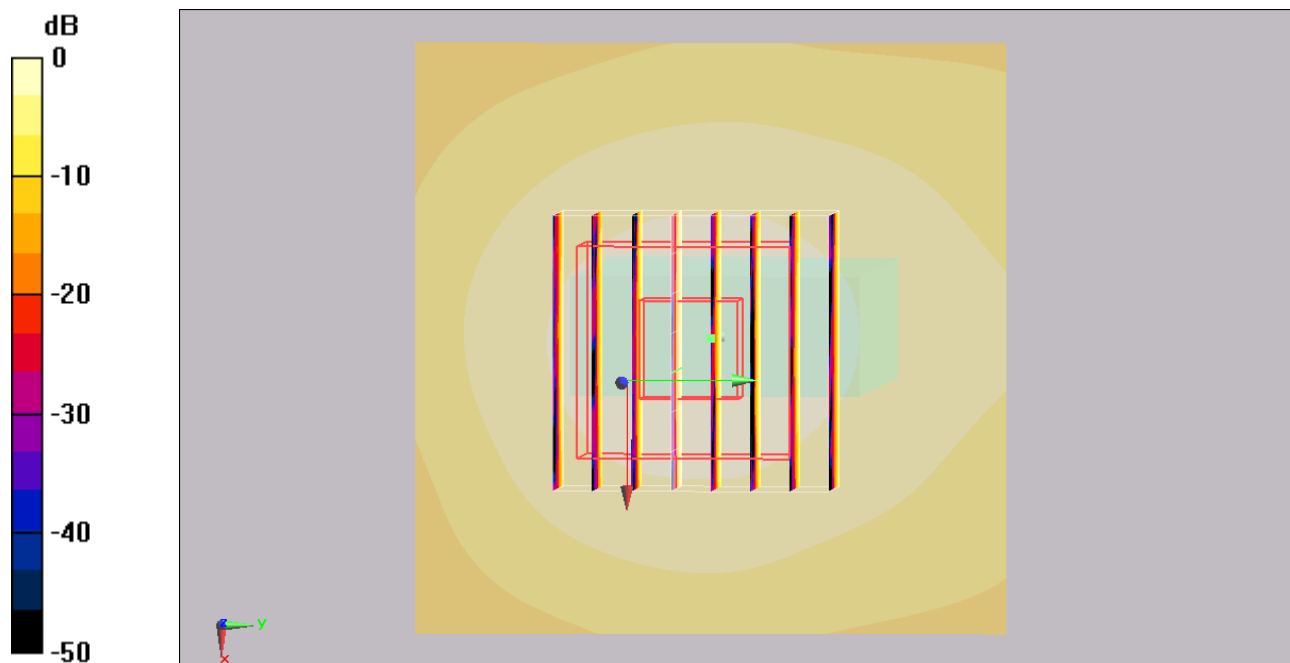
Ch157/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 13 V/m ; Power Drift = 0.074 dB

Peak SAR (extrapolated) = 3.14 W/kg

SAR(1 g) = 0.925 mW/g ; SAR(10 g) = 0.348 mW/g

Maximum value of SAR (measured) = 1.79 mW/g



#25 WLAN5G_802.11a_Horizontal Up_0.5cm_Ch153_Ant A+B

DUT: 280102

Communication System: 802.11a; Frequency: 5765 MHz; Duty Cycle: 1:1

Medium: MSL_5G_120830 Medium parameters used: $f = 5765 \text{ MHz}$; $\sigma = 6.06 \text{ mho/m}$; $\epsilon_r = 47.1$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch153/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 2.05 mW/g

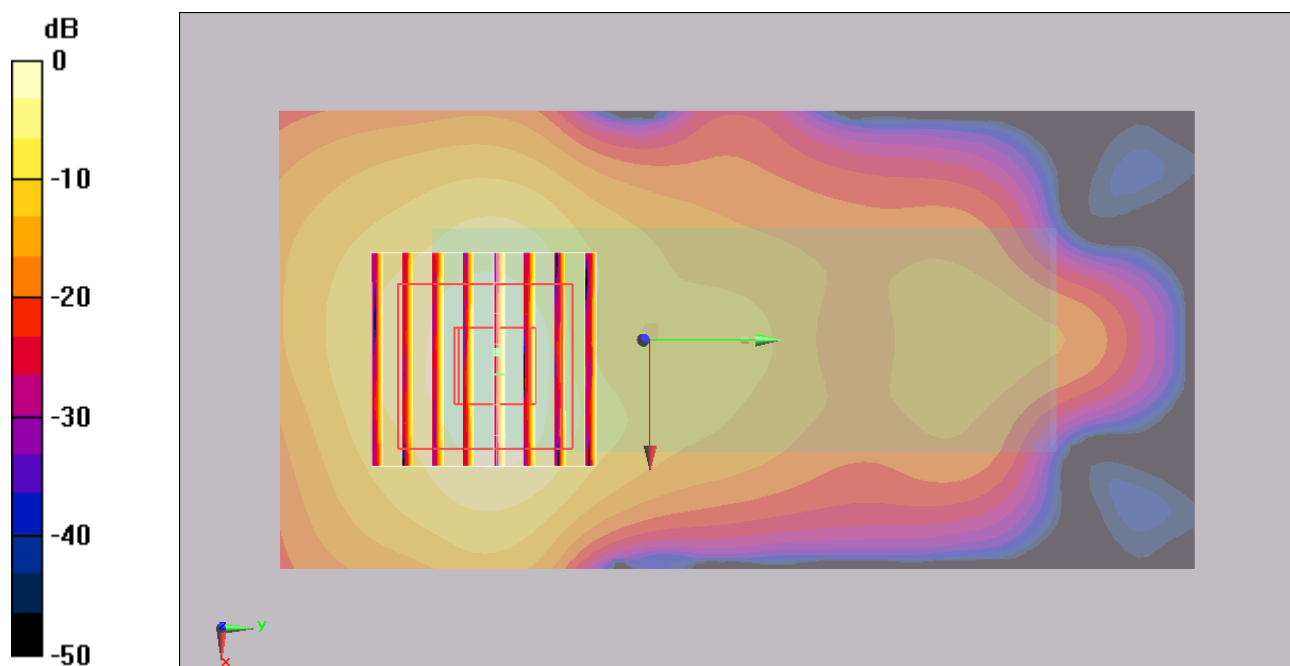
Ch153/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 3 V/m ; Power Drift = 0.120 dB

Peak SAR (extrapolated) = 3.48 W/kg

SAR(1 g) = 1.01 mW/g ; SAR(10 g) = 0.349 mW/g

Maximum value of SAR (measured) = 1.97 mW/g



0 dB = 1.97mW/g

#26 WLAN5G_802.11a_Horizontal Up_0.5cm_Ch165_Ant A+B

DUT: 280102

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

Medium: MSL_5G_120830 Medium parameters used: $f = 5825 \text{ MHz}$; $\sigma = 6.14 \text{ mho/m}$; $\epsilon_r = 46.8$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch165/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 2.12 mW/g

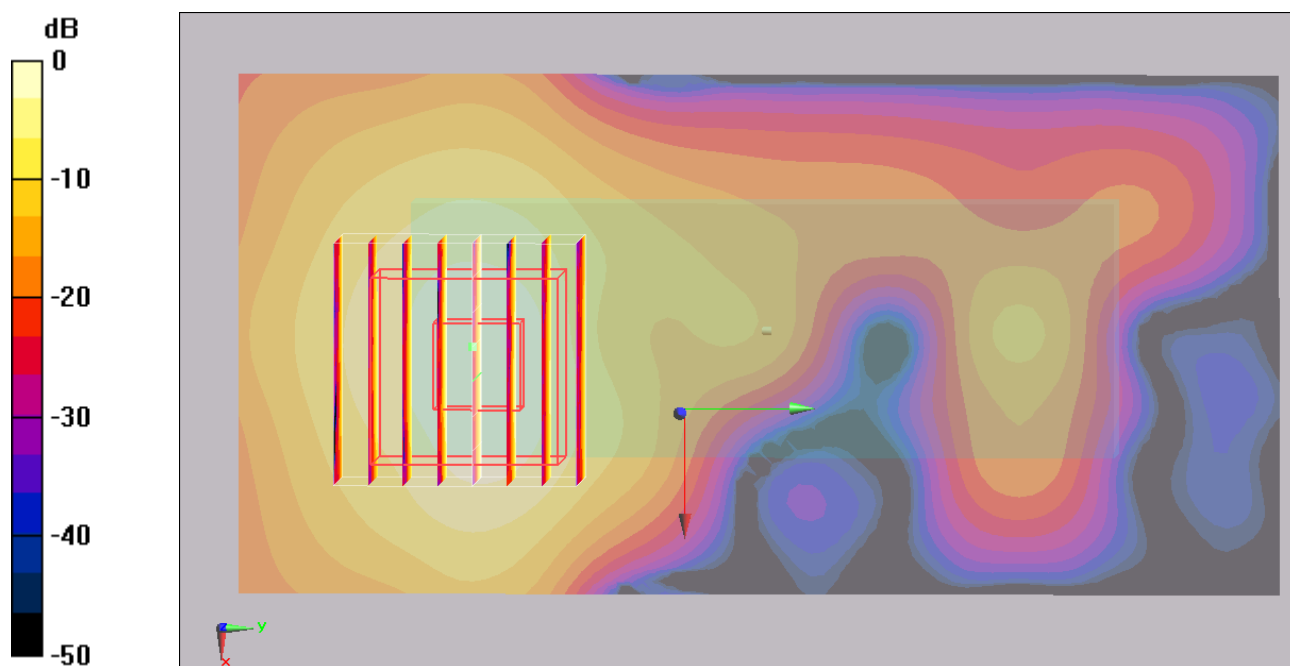
Ch165/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 2.69 V/m ; Power Drift = 0.038 dB

Peak SAR (extrapolated) = 3.76 W/kg

SAR(1 g) = 1.04 mW/g ; SAR(10 g) = 0.348 mW/g

Maximum value of SAR (measured) = 2.12 mW/g



0 dB = 2.12mW/g

#27 WLAN5G_802.11a_Horizontal Down_0.5cm_Ch153_Ant A+B

DUT: 280102

Communication System: 802.11a; Frequency: 5765 MHz; Duty Cycle: 1:1

Medium: MSL_5G_120830 Medium parameters used: $f = 5765 \text{ MHz}$; $\sigma = 6.06 \text{ mho/m}$; $\epsilon_r = 47.1$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch153/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.9 mW/g

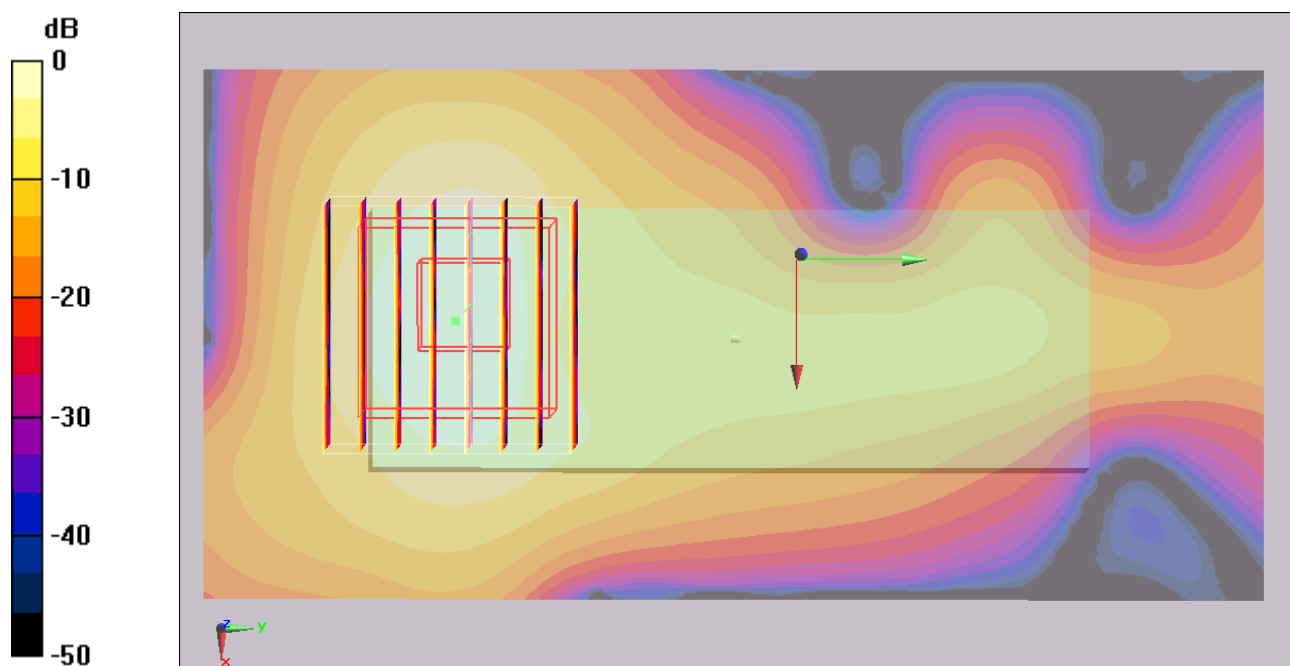
Ch153/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 5.39 V/m ; Power Drift = 0.092 dB

Peak SAR (extrapolated) = 3.56 W/kg

SAR(1 g) = 1.01 mW/g ; SAR(10 g) = 0.357 mW/g

Maximum value of SAR (measured) = 1.95 mW/g



0 dB = 1.95mW/g

#28 WLAN5G_802.11a_Horizontal Down_0.5cm_Ch165_Ant A+B

DUT: 280102

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

Medium: MSL_5G_120830 Medium parameters used: $f = 5825 \text{ MHz}$; $\sigma = 6.14 \text{ mho/m}$; $\epsilon_r = 46.8$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch165/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.98 mW/g

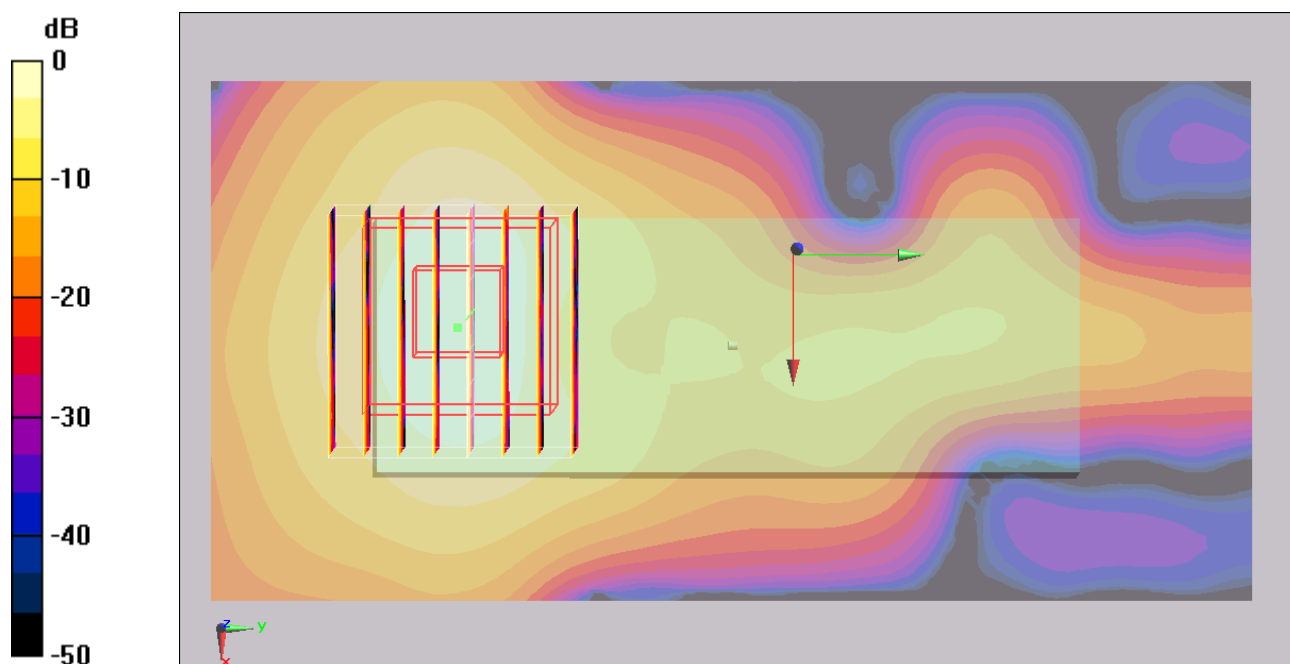
Ch165/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 4.36 V/m ; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.77 W/kg

SAR(1 g) = 1.05 mW/g ; SAR(10 g) = 0.370 mW/g

Maximum value of SAR (measured) = 2.05 mW/g



0 dB = 2.05mW/g

#28 WLAN5G_802.11a_Horizontal Down_0.5cm_Ch165_Ant A+B_2D**DUT: 280102**

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

Medium: MSL_5G_120830 Medium parameters used: $f = 5825$ MHz; $\sigma = 6.14$ mho/m; $\epsilon_r = 46.8$; $\rho = 1000$ kg/m³

Ambient Temperature : 22.8 °C; Liquid Temperature : 21.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch165/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.98 mW/g

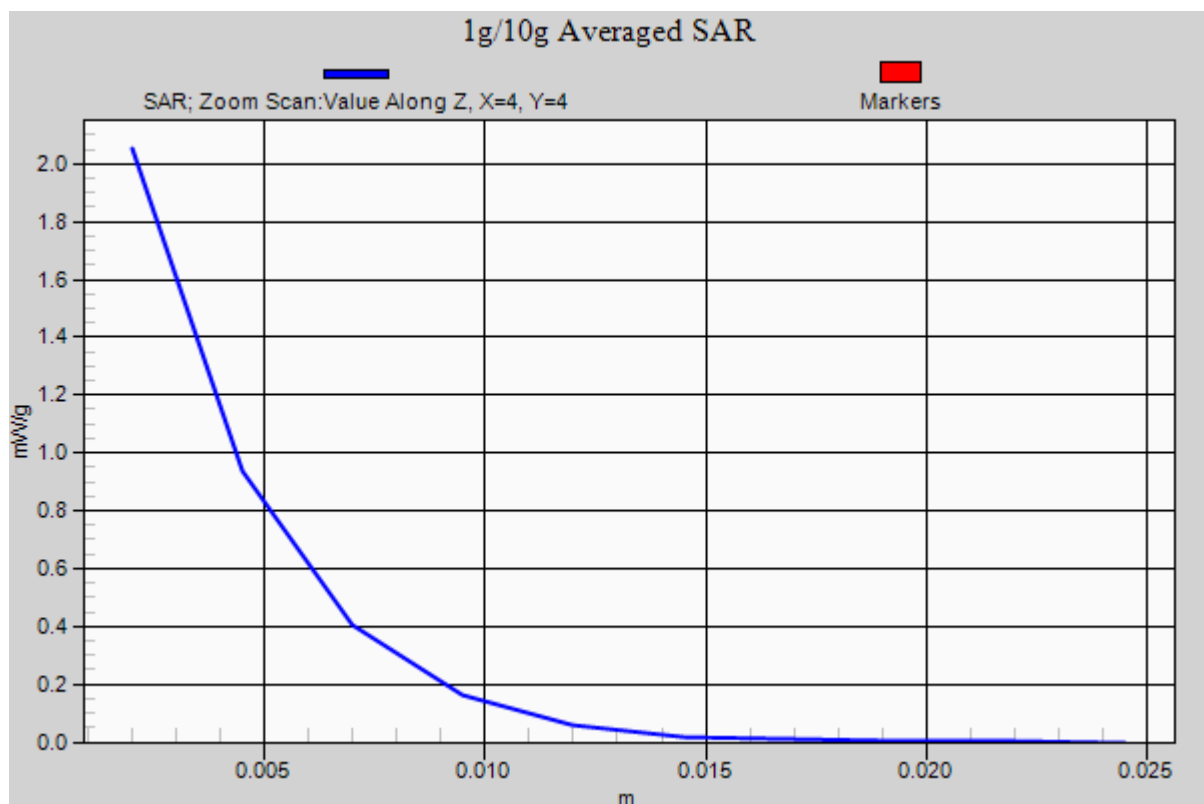
Ch165/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 4.36 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.77 W/kg

SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.370 mW/g

Maximum value of SAR (measured) = 2.05 mW/g



#30 WLAN5G_802.11a_Vertical Front_0.5cm_Ch153_Ant A+B

DUT: 280102

Communication System: 802.11a; Frequency: 5765 MHz; Duty Cycle: 1:1

Medium: MSL_5G_120830 Medium parameters used: $f = 5765 \text{ MHz}$; $\sigma = 6.06 \text{ mho/m}$; $\epsilon_r = 47.1$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch153/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 2.08 mW/g

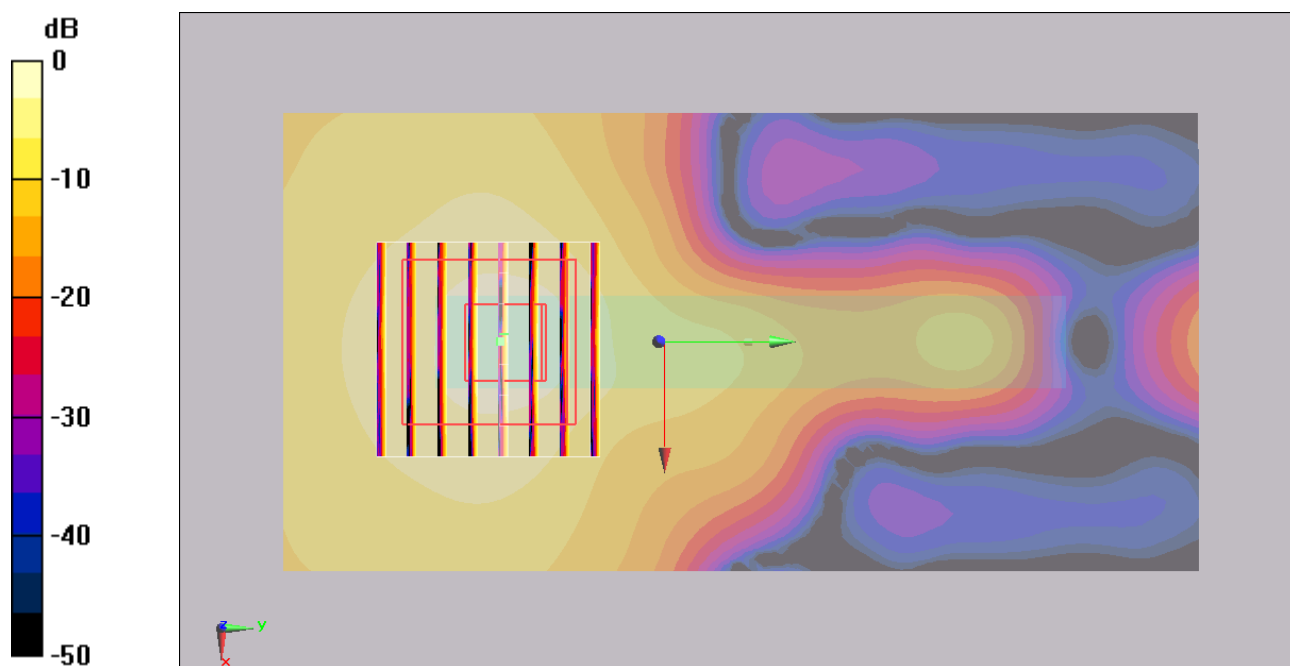
Ch153/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 4.35 V/m ; Power Drift = -0.134 dB

Peak SAR (extrapolated) = 3.57 W/kg

SAR(1 g) = 0.963 mW/g ; SAR(10 g) = 0.305 mW/g

Maximum value of SAR (measured) = 2 mW/g



0 dB = 2mW/g

#31 WLAN5G_802.11a_Vertical Front_0.5cm_Ch165_Ant A+B

DUT: 280102

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

Medium: MSL_5G_120830 Medium parameters used: $f = 5825 \text{ MHz}$; $\sigma = 6.14 \text{ mho/m}$; $\epsilon_r = 46.8$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch165/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 2.11 mW/g

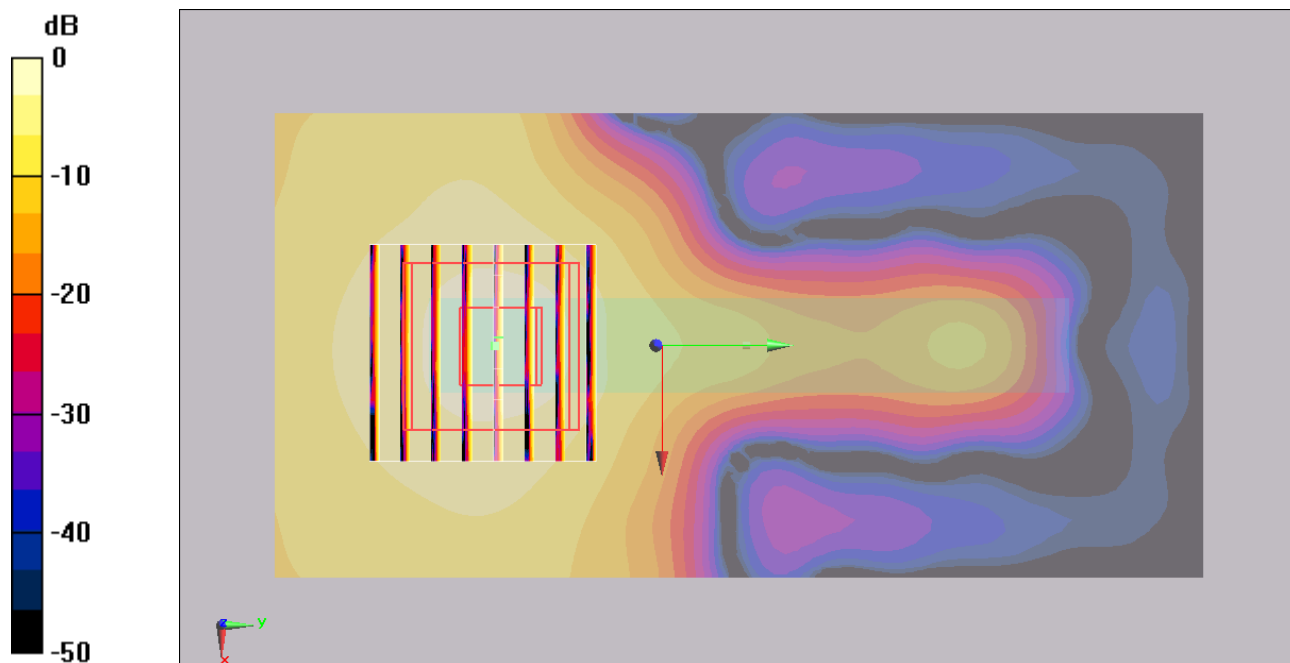
Ch165/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 3.66 V/m ; Power Drift = 0.120 dB

Peak SAR (extrapolated) = 4.18 W/kg

SAR(1 g) = 0.943 mW/g ; SAR(10 g) = 0.303 mW/g

Maximum value of SAR (measured) = 1.93 mW/g



0 dB = 1.93mW/g

#32 WLAN5G_802.11a_Tip Mode_0.5cm_Ch153_Ant A+B

DUT: 280102

Communication System: 802.11a; Frequency: 5765 MHz; Duty Cycle: 1:1

Medium: MSL_5G_120830 Medium parameters used: $f = 5765 \text{ MHz}$; $\sigma = 6.06 \text{ mho/m}$; $\epsilon_r = 47.1$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.5°C ; Liquid Temperature : 21.5°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch153/Area Scan (81x81x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.68 mW/g

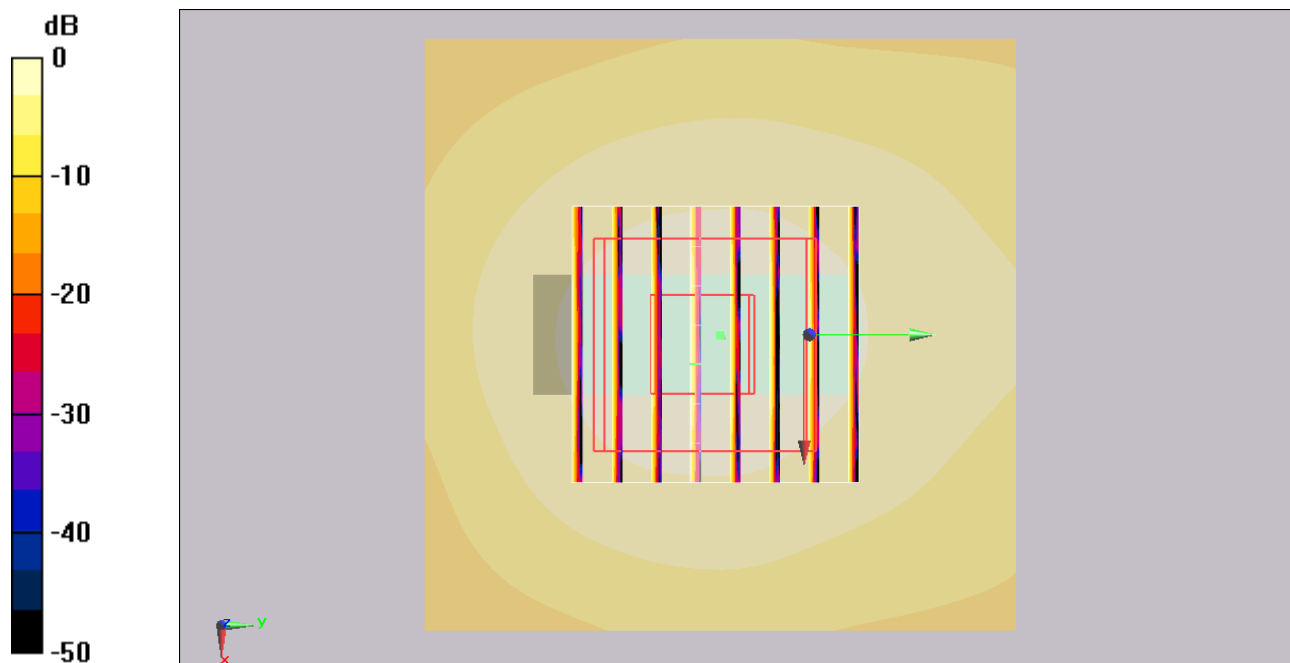
Ch153/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 12.7 V/m ; Power Drift = 0.140 dB

Peak SAR (extrapolated) = 3.01 W/kg

SAR(1 g) = 0.894 mW/g ; SAR(10 g) = 0.336 mW/g

Maximum value of SAR (measured) = 1.72 mW/g



#33 WLAN5G_802.11a_Tip Mode_0.5cm_Ch165_Ant A+B

DUT: 280102

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

Medium: MSL_5G_120830 Medium parameters used: $f = 5825 \text{ MHz}$; $\sigma = 6.14 \text{ mho/m}$; $\epsilon_r = 46.8$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch165/Area Scan (61x61x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.85 mW/g

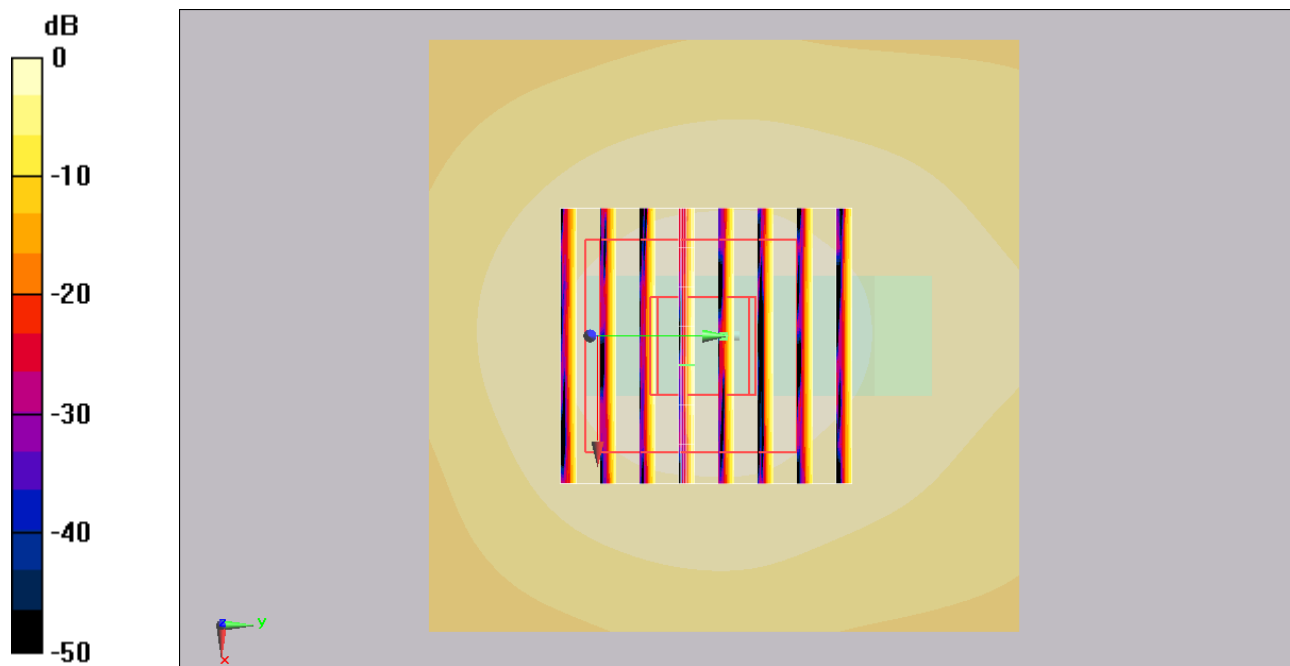
Ch165/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 13.3 V/m ; Power Drift = -0.057 dB

Peak SAR (extrapolated) = 3.3 W/kg

SAR(1 g) = 0.963 mW/g ; SAR(10 g) = 0.362 mW/g

Maximum value of SAR (measured) = 1.82 mW/g



#29 WLAN5G_802.11ac_80M_Horizontal Down_0.5cm_Ch155_Ant A+B

DUT: 280102

Communication System: 802.11a; Frequency: 5775 MHz; Duty Cycle: 1:1

Medium: MSL_5G_120830 Medium parameters used: $f = 5775 \text{ MHz}$; $\sigma = 6.07 \text{ mho/m}$; $\epsilon_r = 47$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 22.8°C ; Liquid Temperature : 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 - SN3792; ConvF(3.89, 3.89, 3.89); Calibrated: 2012/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI 4.0_Front; Type: QD 0VA 002 AA; Serial: TP-1131
- Software: DASY5 Version; SEMCAD X Version 13.4 Build 45

Ch155/Area Scan (61x121x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (interpolated) = 1.76 mW/g

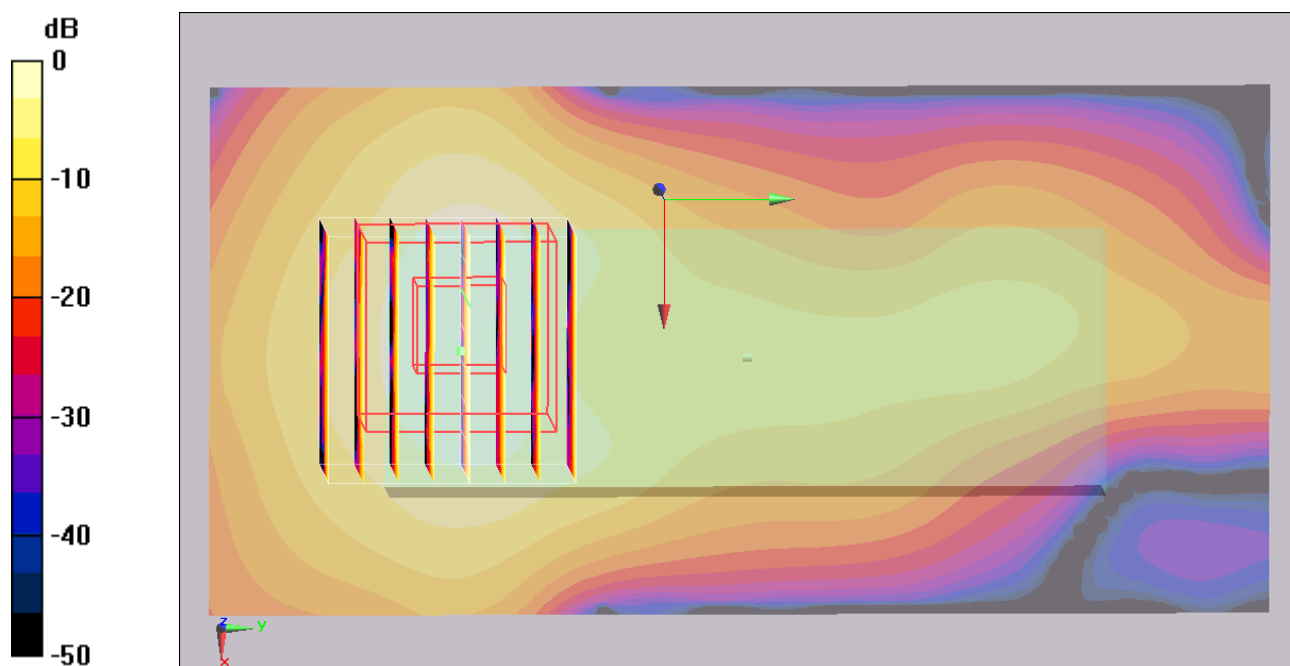
Ch155/Zoom Scan (8x8x10)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 5.2 V/m ; Power Drift = 0.017 dB

Peak SAR (extrapolated) = 3.22 W/kg

SAR(1 g) = 0.905 mW/g ; SAR(10 g) = 0.321 mW/g

Maximum value of SAR (measured) = 1.77 mW/g



0 dB = 1.77mW/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
S Service suisse d'étalonnage
C 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 **Sporton (Auden)**

Certificate No: **D2450V2-736_Jul11**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 736**

Calibration procedure(s) **QA CAL-05.v8**
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **July 25, 2011**

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-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Signature

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

Issued: July 25, 2011

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	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz $\pm$ 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 %	1.85 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.9 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	54.8 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.44 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	25.6 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 $\pm$ 0.2) °C	51.7 $\pm$ 6 %	2.00 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.3 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	52.3 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.18 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	24.5 mW / g $\pm$ 16.5 % (k=2)

**Appendix****Antenna Parameters with Head TSL**

Impedance, transformed to feed point	54.4 Ω + 1.5 j Ω
Return Loss	- 27.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.8 Ω + 2.8 j Ω
Return Loss	- 30.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.159 ns
----------------------------------	----------

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 26, 2003

DASY5 Validation Report for Head TSL

Date: 25.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 736

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

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

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

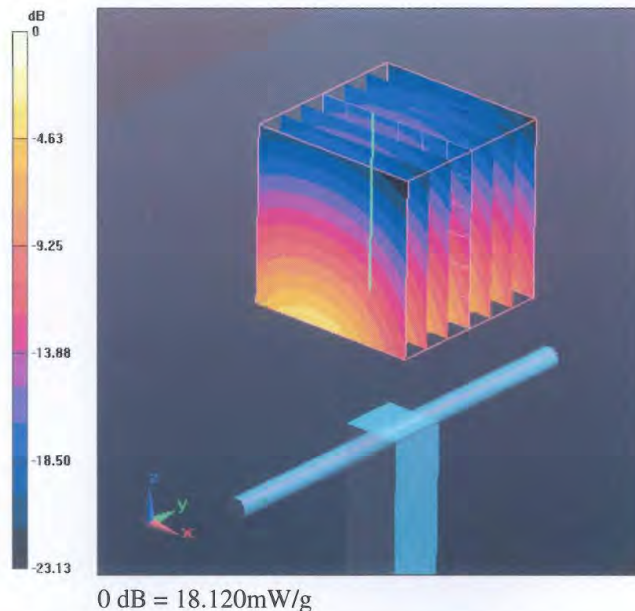
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.095 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 28.615 W/kg

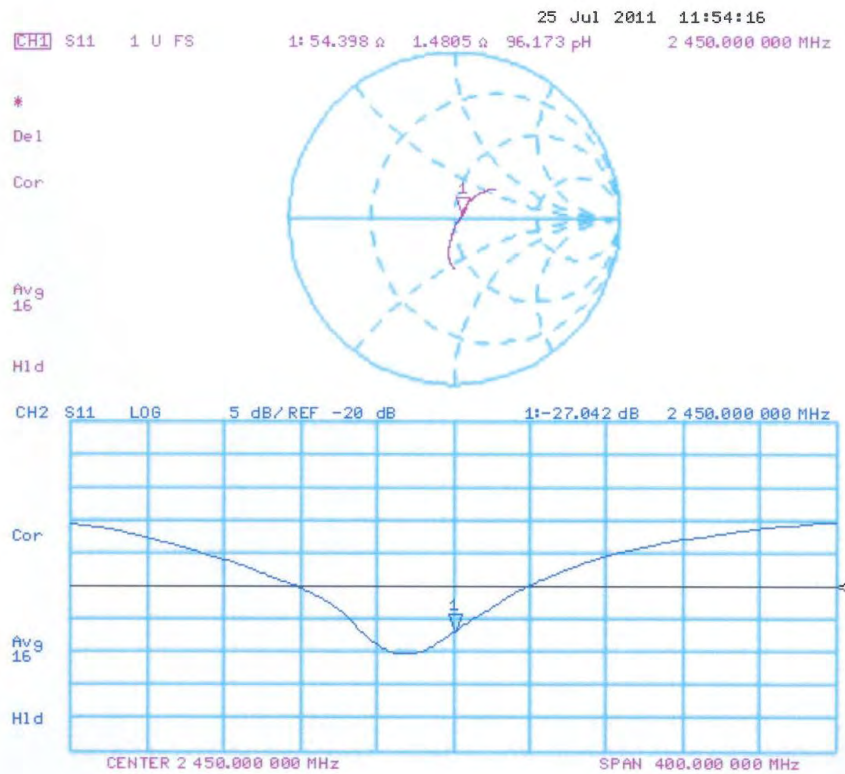
SAR(1 g) = 13.9 mW/g; SAR(10 g) = 6.44 mW/g

Maximum value of SAR (measured) = 18.121 mW/g





Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 25.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 736

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 2$ mho/m; $\epsilon_r = 51.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

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

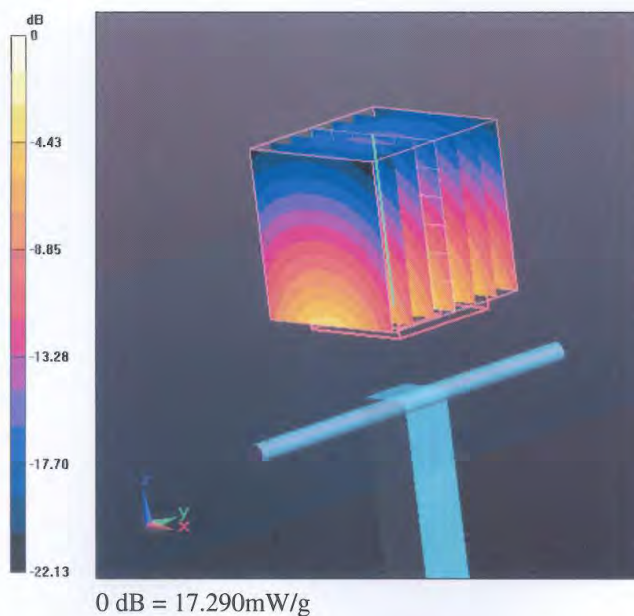
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.550 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 27.432 W/kg

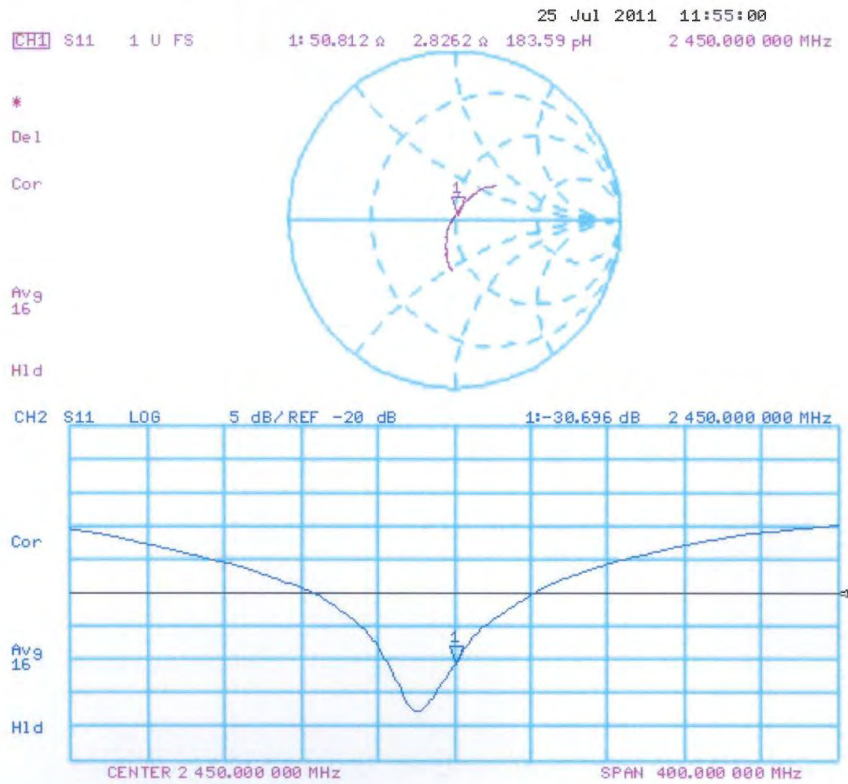
SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.18 mW/g

Maximum value of SAR (measured) = 17.294 mW/g





Impedance Measurement Plot for Body TSL



**D2450V2, serial no. 736 Extended Dipole Calibrations**

Referring to KDB 450824, if dipoles are verified in return loss ($< -20\text{dB}$, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

<Justification of the extended calibration>

D2450V2 – serial no. 736												
	2450 Head						2450 Body					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
7.25.2011	-27.042		54.398		1.4805		-30.696		50.812		2.8262	
7.25.2012	-27.950	-3.365	52.541	1.857	0.77343	0.707	-31.781	-3.535	50.572	0.24	1.5953	1.2309

The return loss is $< -20\text{dB}$, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration.

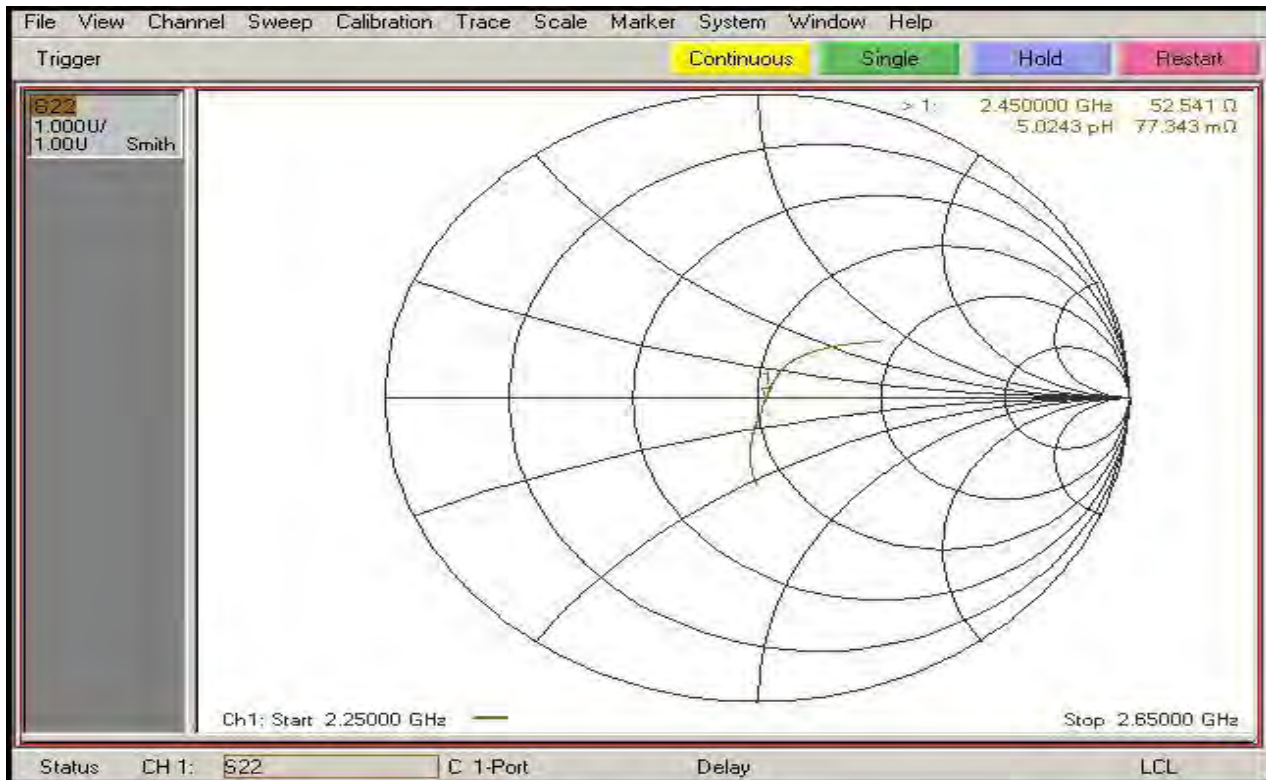
Therefore the verification result should support extended calibration.



FCC Test Report

<Dipole Verification Data> - D2450 V2, serial no. 736 (Date of Measurement : 7.25.2012)

2450 MHz - Head



SPORTON INTERNATIONAL INC.

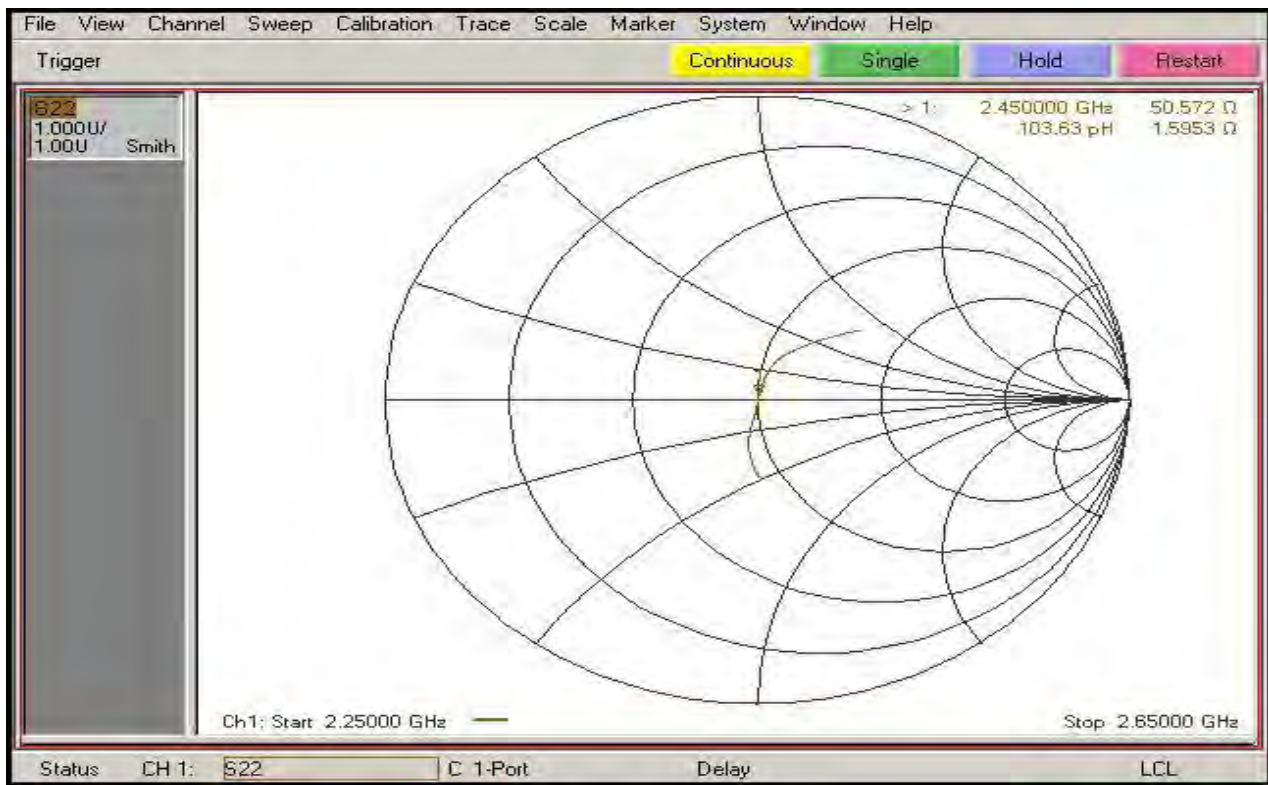
TEL : 886-3-327-3456

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FCC Test Report

2450 MHz – Body



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