

SAR Test Report

Product Name : Dual-band Wireless USB Adapter

Model No. : USB-N53

Applicant : ASUSTeK COMPUTER INC.

Address : No. 15, Li-Te Rd., Peitou, Taipei 112, Taiwan R.O.C.

Date of Receipt : 2011/05/11

Issued Date : 2011/09/14

Report No. : 115250R-HPUSP10V01

Report Version : V2.0

The test results relate only to the samples tested.

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1. General Information

1.1 EUT Description

Product Name	Dual-band Wireless USB Adapter
Trade Name	ASUSTeK COMPUTER INC.
Model No.	USB-N53
FCC ID	MSQ-USBN53
TX Frequency	802.11b/802.11g : 2412MHz~2462MHz 802.11a : 5150MHz~5825MHz
Type of Modulation	DSSS/OFDM
Antenna Type	PIFA
Device Category	Portable
RF Exposure Environment	Uncontrolled
Max. Output Power (Conducted)	802.11b: 19.90 dBm 802.11g: 18.80 dBm 802.11a: 14.80 dBm

1.2 Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	ASKEY	WLU5090-D61(Ant1)	1.99 dBi for 2.4GHz
		WLU5090-D61(Ant2)	3.17 dBi for 5GHz

1.3 Test Environment

Ambient conditions in the laboratory:

Test Date: Sun 18, 2011

Items	Required	Actual
Temperature (°C)	18-25	20.8± 2
Humidity (%RH)	30-70	56

Test Date: Sep 13, 2011

Items	Required	Actual
Temperature (°C)	18-25	22.3± 2
Humidity (%RH)	30-70	51

Site Description:

Accredited by TAF
 Accredited Number: 0914
 Effective through: December 12, 2011

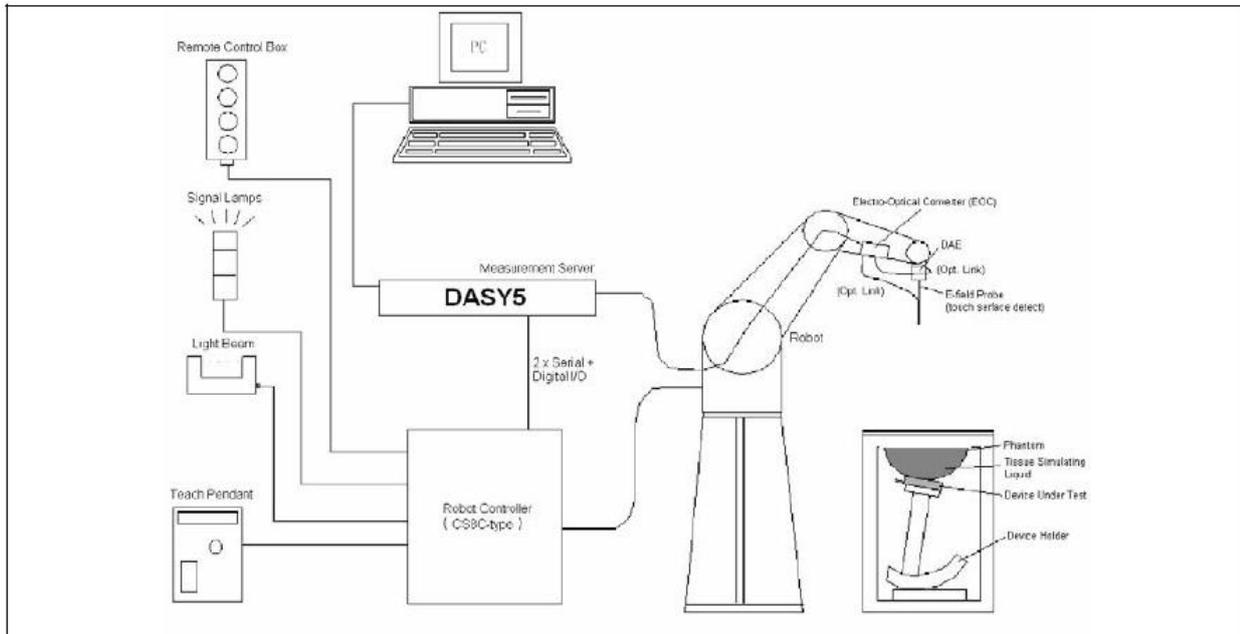


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2. SAR Measurement System

2.1 DASY5 System Description



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

- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

2.1.1 Applications

Predefined procedures and evaluations for automated compliance testing with all worldwide standards, e.g., IEEE 1528, OET 65, IEC 62209-1, IEC 62209-2, EN 50360, EN 50383 and others.

2.1.2 Area Scans

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a 10mm² step integral, with 1mm interpolation used to locate the peak SAR area used for zoom scan assessments.

When an Area Scan has measured all reachable points, it computes the field maxima found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE 1528-2003, EN 50361 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan).

2.1.3 Zoom Scan (Cube Scan Averaging)

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. A density of 1000 kg/m³ is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1 g cube is 10mm, with the side length of the 10 g cube 21,5mm.

The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications (including FCC) utilize a physical step of 5x5x7 (8mmx8mmx5mm) providing a volume of 32mm in the X & Y axis, and 30mm in the Z axis.

2.1.4 Uncertainty of Inter-/Extrapolation and Averaging

In order to evaluate the uncertainty of the interpolation, extrapolation and averaged SAR calculation algorithms of the Postprocessor, DASY5 allows the generation of measurement grids which are artificially predefined by analytically based test functions. Therefore, the grids of area scans and zoom scans can be filled with uncertainty test data, according to the SAR benchmark functions of IEEE 1528. The three analytical functions shown in equations as below are used to describe the possible range of the expected SAR distributions for the tested handsets. The field gradients are covered by the spatially flat

distribution f1, the spatially steep distribution f3 and f2 accounts for H-field cancellation on the phantom/tissue surface.

$$f_1(x, y, z) = Ae^{-\frac{z}{2a}} \cos^2 \left(\frac{\pi \sqrt{x'^2 + y'^2}}{5a} \right)$$

$$f_2(x, y, z) = Ae^{-\frac{z}{a}} \frac{a^2}{a^2 + x'^2} \left(3 - e^{-\frac{2z}{a}} \right) \cos^2 \left(\frac{\pi y'}{2 \cdot 3a} \right)$$

$$f_3(x, y, z) = A \frac{a^2}{\frac{a^2}{4} + x'^2 + y'^2} \left(e^{-\frac{2z}{a}} + \frac{a^2}{2(a + 2z)^2} \right)$$

2.2 DASY5 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. SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528, EN 62209-1, IEC 62209, etc.) under ISO 17025. The calibration data are in Appendix D.

2.2.1 Isotropic E-Field Probe Specification

Model	Ex3DV4	
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 (30 MHz to 6 GHz)	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 µW/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)	
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.	

2.3 Boundary Detection Unit and Probe Mounting Device

The DASY probes use a precise connector and an additional holder for the probe, consisting of a plastic tube and a flexible silicon ring to center the probe. The connector at the DAE is flexibly mounted and held in the default position with magnets and springs. Two switching systems in the connector mount detect frontal and lateral probe collisions and trigger the necessary software response.



2.4 DATA Acquisition Electronics (DAE) and Measurement Server

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 DAE4 is 200M Ohm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.



The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz intel ULV Celeron, 128MB chipdisk and 128MB RAM. The necessary circuits for communication with the DAE electronics box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.



2.5 Robot

The DASY5 system uses the high precision robots TX90 XL type out of the newer series from Stäubli SA (France). For the 6-axis controller DASY5 system, the CS8C robot controller version from Stäubli is used.

The XL robot series have many features that are important for our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller



2.6 Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.

The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.



2.7 Device Holder

The DASY5 device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR).

Thus the device needs no repositioning when changing the angles.

The DASY5 device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon_r = 3$ 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.



2.8 SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas:

- Left head
- Right head
- Flat 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.

3. Tissue Simulating Liquid

3.1 The composition of the tissue simulating liquid

INGREDIENT (% Weight)	2450MHz Head	2450MHz Body	5200MHz Body	5800MHz Body
Water	--	73.2	76	75.68
Salt	--	0.04	0.00	0.43
Sugar	--	0.00	0.00	0.00
HEC	--	0.00	0.00	0.00
Preventol	--	0.00	0.00	0.00
DGBE	--	26.7	4.44	4.42
Triton X-100	--	0.00	19.56	19.47

3.2 Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using APREL Dielectric Probe Kit and Anritsu MS4623B Vector Network Analyzer.

Body Tissue Simulant Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ϵ_r	σ [s/m]	
2450 MHz	Reference result ± 5% window	52.7 50.065 to 55.335	1.95 1.8525 to 2.0475	N/A
	18-Jun-11	53.46	1.92	20.4
2412 MHz	Low channel	54.21	1.88	20.4
2437 MHz	Mid channel	53.68	1.91	20.4
2462 MHz	High channel	53.11	1.95	20.4

Body Tissue Simulant Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ϵ_r	σ [s/m]	
5200MHz	Reference result ± 5% window	49 46.55 to 51.45	5.3 5.035 to 5.565	N/A
	13-Sep-11	50.33	5.16	21.3
5180 MHz	Low channel	51.05	5.11	21.3
5220 MHz	Mid channel	50.15	5.21	21.3
5240 MHz	High channel	49.83	5.33	21.3

Body Tissue Simulant Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ϵ_r	σ [s/m]	
5800MHz	Reference result ± 5% window	48.2 45.79 to 50.61	6 5.7 to 6.3	N/A
	13-Sep-11	48.03	6.13	21.3
5745 MHz	Low channel	49.77	5.79	21.3
5785 MHz	Mid channel	48.75	6.02	21.3
5825 MHz	High channel	47.98	6.15	21.3

3.3 Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

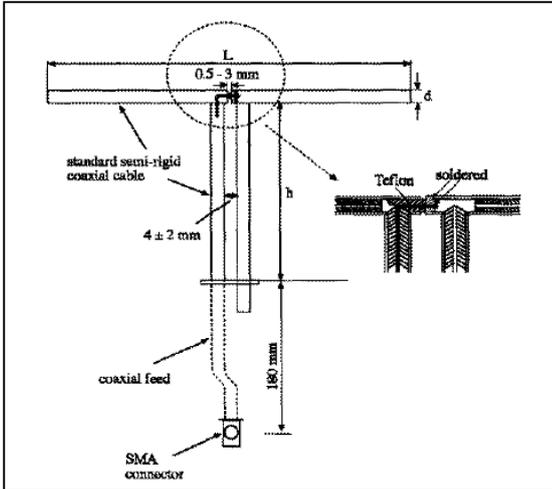
Target Frequency (MHz)	Head		Body	
	ϵ_r	σ (S/m)	ϵ_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

(ϵ_r = relative permittivity, σ = conductivity and $\rho = 1000 \text{ kg/m}^3$)

4. SAR Measurement Procedure

4.1 SAR System Validation

4.1.1 Validation Dipoles



The dipoles used is based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of both IEEE and FCC Supplement C. the table below provides details for the mechanical and electrical specifications for the dipoles.

Frequency	L (mm)	h (mm)	d (mm)
2450MHz	53.5	30.4	3.6
5200MHz	23.1	14.2	3.6
5800MHz	21.2	13.1	3.6

4.1.2 Validation Result

System Performance Check at 2450MHz				
Validation Kit:D2450V2				
Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
2450 MHz	Reference result ± 10% window	52 46.8 to 57.2	24.2 21.78 to 24.2	N/A
	18-Jun-11	53.44	23.68	20.4

Note: 1. The power level is used 250mW
2. All SAR values are normalized to 1W forward power.

System Performance Check at 5200MHz				
Validation Kit: D5GHzV2				
Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
5200 MHz	Reference result ± 10% window	70 63 to 77	19.4 17.46 to 21.34	N/A
	13-Sep-11	75.5	20.6	21.3
Note: 1. The power level is used 100mW 2. All SAR values are normalized to 1W forward power.				

System Performance Check at 5800MHz				
Validation Kit: D5GHzV2				
Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
5800 MHz	Reference result ± 10% window	68.2 61.38 to 75.02	18.7 16.83 to 20.57	N/A
	13-Sep-11	73.1	19.6	21.3
Note: 1. The power level is used 100mW 2. All SAR values are normalized to 1W forward power.				

4.2 Arrangement Assessment Setup

4.2.1 Test Positions of Device Relative to Head

This specifies exactly two test positions for the handset against the head phantom, the “cheek” position and the “tilted” position. The handset should be tested in both positions on the left and right sides of the SAM phantom. If the handset construction is such that it cannot be positioned using the handset positioning procedures described in 4.2.2.1 and 4.2.2.2 to represent normal use conditions (e.g., asymmetric handset), alternative alignment procedures should be considered with details provided in the test report.

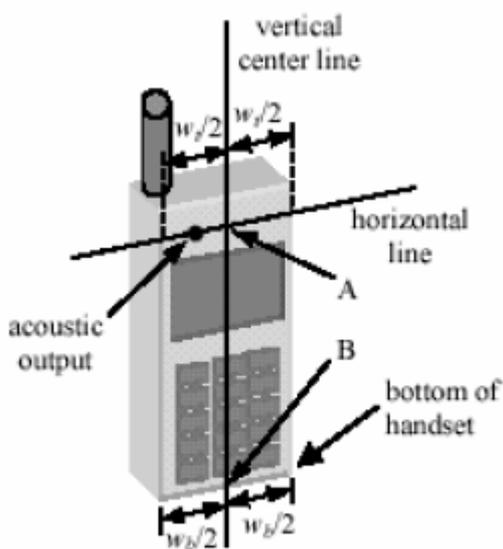


Figure 4.1a Fixed Case

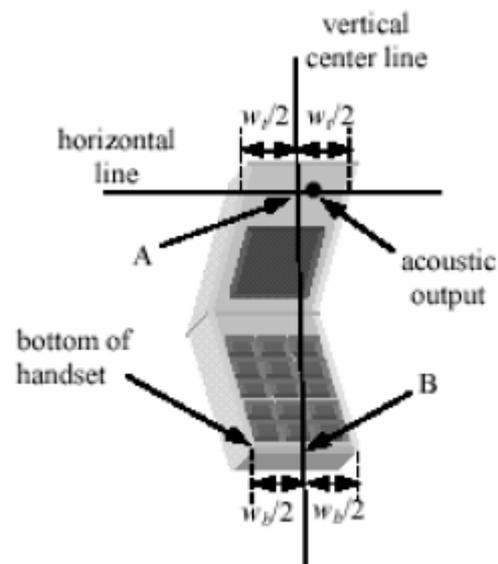


Figure 4.1b Clam Shell

4.2.1.1 Definition of the “Cheek” Position

The “cheek” position is defined as follows:

- a. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece, open the cover. (If the handset can also be used with the cover closed both configurations must be tested.)
- b. Define two imaginary lines on the handset: the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset: the midpoint of the width w_t of the handset at the level of the acoustic output (point A on Figures 4.1a and 4.1b), and the midpoint of the width w_b of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 4.1a). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output. However, the acoustic output may be located elsewhere on the horizontal line.

Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 4.1b), especially for clamshell handsets, handsets with flip pieces, and other irregularly-shaped handsets.

- c. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 4.2), such that the plane defined by the vertical center line and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
- d. Translate the handset towards the phantom along the line passing through RE and LE until the handset touches the pinna.
- e. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to MB-NF including the line MB (called the reference plane).
- f. Rotate the handset around the vertical centerline until the handset (horizontal line) is symmetrical with respect to the line NF.
- g. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE and maintaining the handset contact with the pinna, rotate the handset about the line NF until any point on the handset is in contact with a phantom point below the pinna (cheek). See Figure 4.2 the physical angles of rotation should be noted.

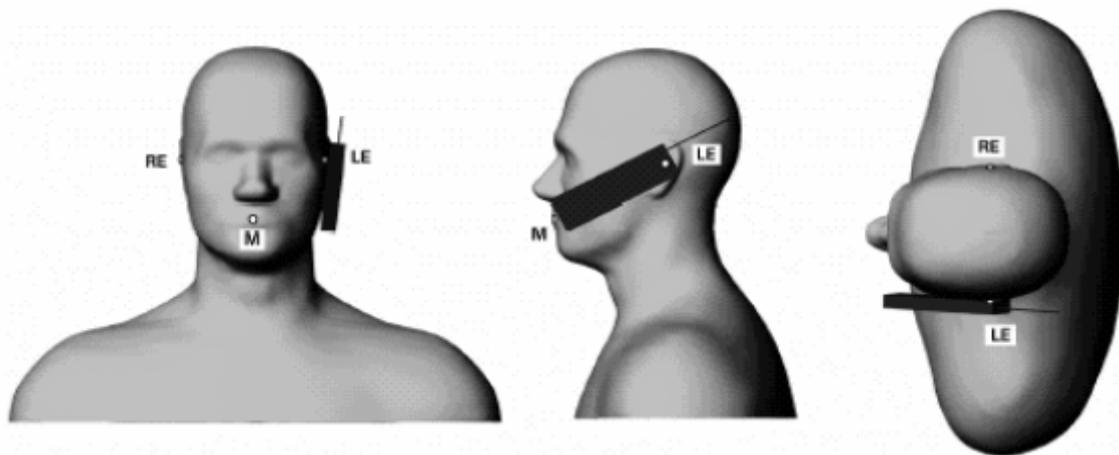


Figure 4.2 – Phone position 1, “cheek” or “touch” position.

4.2.1.2 Definition of the “Tilted” Position

The “tilted” position is defined as follows:

- a. Repeat steps (a) – (g) of 4.2.1.1 to place the device in the “cheek position.”
- b. While maintaining the orientation of the handset move the handset away from the pinna along the line passing through RE and LE in order to enable a rotation of the handset by 15 degrees.
- c. Rotate the handset around the horizontal line by 15 degrees.
- d. While maintaining the orientation of the handset, move the handset towards the phantom on a line passing through RE and LE until any part of the handset touches the ear. The tilted position is obtained when the contact is on the pinna. If the contact is at any location other than the pinna (e.g., the antenna with the back of the phantom head), the angle of the handset should be reduced. In this case, the tilted position is obtained if any part of the handset is in contact with the pinna as well as a second part of the handset is contact with the phantom (e.g., the antenna with the back of the head).

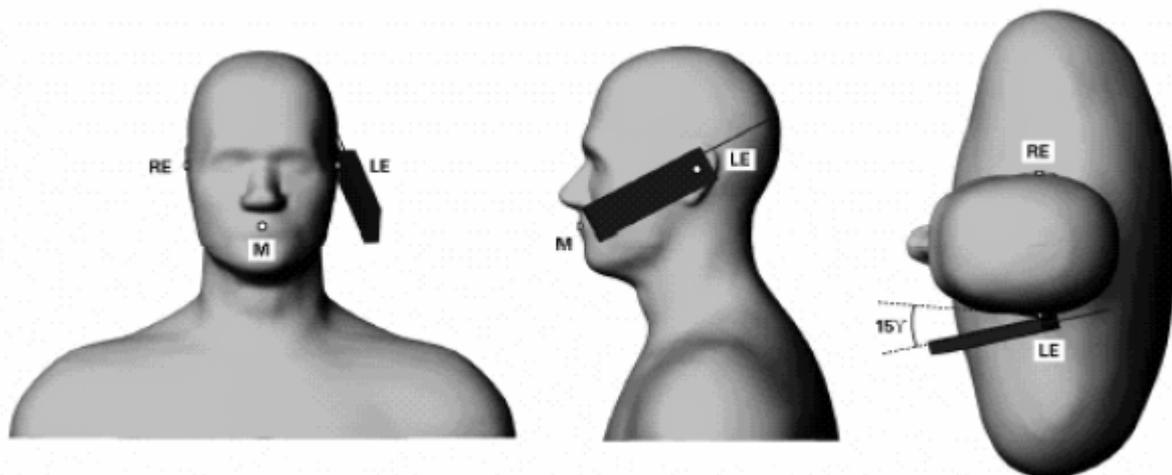


Figure 4.3 – Phone position 2, “tilted” position.

4.2.2 Test Positions for body-worn

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. A separation distance of 1.5 cm between the back of the device and a flat phantom is recommended for testing body-worn SAR compliance under such circumstances. Other separation distance may be use, but not exceed 2.5 cm.

4.3 SAR Measurement Procedure

The Dasy5 calculates SAR using the following equation,

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

σ : represents the simulated tissue conductivity

ρ : represents the tissue density

The EUT is set to transmit at the required power in line with product specification, at each frequency relating to the LOW, MID, and HIGH channel settings.

Pre-scans are made on the device to establish the location for the transmitting antenna, using a large area scan in either air or tissue simulation fluid.

The EUT is placed against the Universal Phantom where the maximum area scan dimensions are larger than the physical size of the resonating antenna. When the scan size is not large enough to cover the peak SAR distribution, it is modified by either extending the area scan size in both the X and Y directions, or the device is shifted within the predefined area.

The area scan is then run to establish the peak SAR location (interpolated resolution set at 1mm²) which is then used to orient the center of the zoom scan. The zoom scan is then executed and the 1g and 10g averages are derived from the zoom scan volume (interpolated resolution set at 1mm³).

5. SAR Exposure Limits

SAR assessments have been made in line with the requirements of IEEE-1528, FCC Supplement C, and comply with ANSI/IEEE C95.1-1992 “Uncontrolled Environments” limits. These limits apply to a location which is deemed as “Uncontrolled Environment” which can be described as a situation where the general public may be exposed to an RF source with no prior knowledge or control over their exposure.

Limits for General Population/Uncontrolled Exposure (W/kg)

Type Exposure	Uncontrolled Environment Limit
Spatial Peak SAR (1g cube tissue for brain or body)	1.60 W/kg
Spatial Average SAR (whole body)	0.08 W/kg
Spatial Peak SAR (10g for hands, feet, ankles and wrist)	4.00 W/kg

6. Test Equipment List

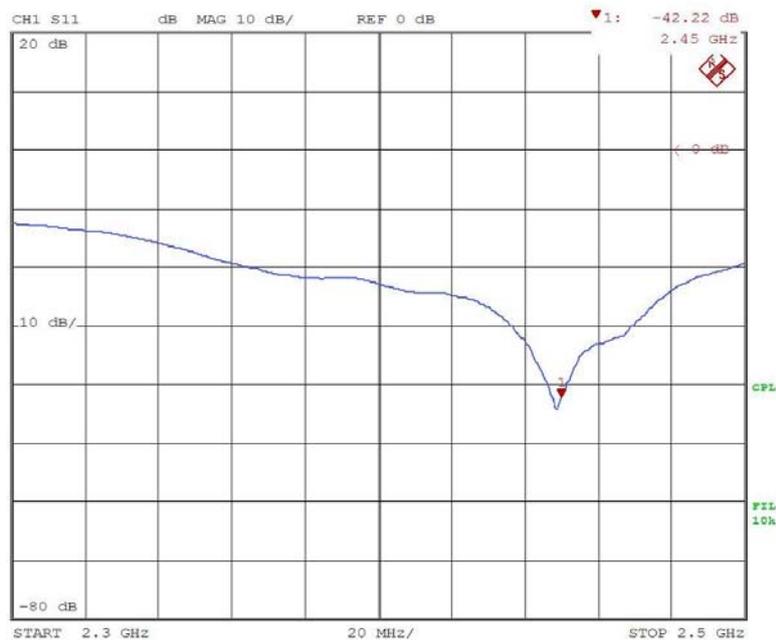
Instrument	Manufacturer	Model No.	Serial No.	Last Calibration	Next Calibration
Stäubli Robot TX60L	Stäubli	TX60L	F09/5BL1A1/A 06	May. 2009	only once
Controller	Speag	CS8c	N/A	May. 2009	only once
Speag Reference Dipole 2.4GHz	Speag	D2450V2	839	Mar. 2010	Mar. 2012
Speag Reference Dipole 5GHz	Speag	D5GHzV2	1041	May. 2011	May. 2013
SAM Twin Phantom	Speag	QD000 P40 CA	Tp 1515	N/A	N/A
Device Holder	Speag	N/A	N/A	N/A	N/A
Data Acquisition Electronic	Speag	DAE4	1207	May. 2011	May. 2012
E-Field Probe	Speag	EX3DV4	3698	Jul. 2011	Jul. 2012
SAR Software	Speag	DASY5	Version52.6 (1)	N/A	N/A
Apral Dipole Spaccer	Apral	ALS-DS-U	QTK-295	N/A	N/A
Power Amplifier	Mini-Circuit	ZHL-42	D051404-20	N/A	N/A
Directional Coupler	Agilent	778D-012	50550	N/A	N/A
Universal Radio Communication Tester	R&S	CMU 200	104846	May. 2011	May. 2012
Vector Network	Anritsu	MS4623B	992801	Jul. 2011	Jul. 2012
Signal Generator	Anritsu	MG3692A	042319	Jun. 2011	Jun. 2012
Power Meter	Anritsu	ML2487A	6K00001447	Nov. 2010	Nov. 2011
Wide Bandwidth Sensor	Anritsu	MA2491	030677	Nov. 2010	Nov. 2011

Note:

Per KDB 450824 D02 requirements for dipole calibration, the following are recommended FCC procedures for SAR dipole calibration.

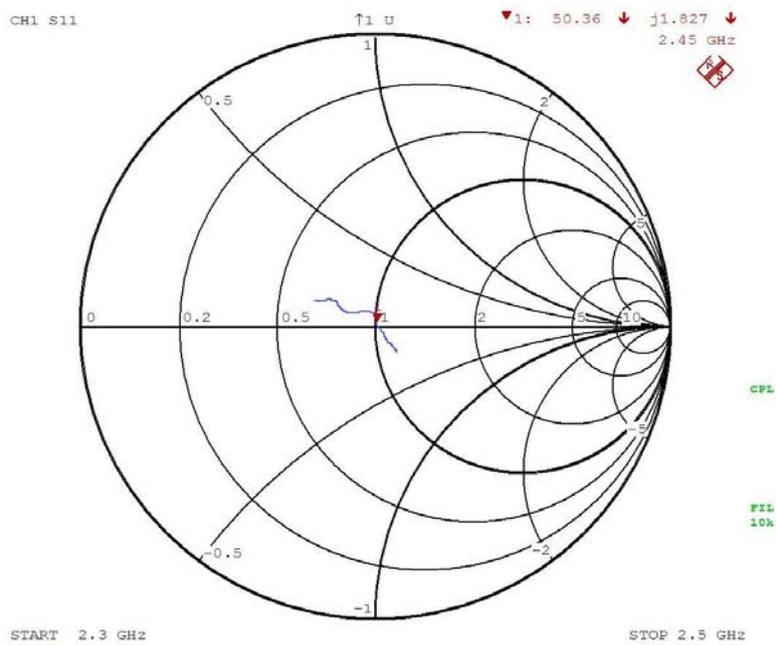
1. After a dipole is damaged and properly repaired to meet required specifications
2. When the measured SAR deviates from the calibrated SAR value by more than 10% due to changes in physical, mechanical, electrical or other relevant dipole conditions;
3. When the most recent return-loss, measured at least annually, deviates by more than 20% from the previous measurement (i.e. 0.2 of the dB value) or not meeting the required -20 dB return-loss specification

	Frequency	Tissue	Return loss	Limit	Verified Date
Calibration	2450	Body	-40.8dB	Within 20%	2011.06.20
Measurement	2450	Body	-42.22dB		



4. When the most recent measurement of the real or imaginary parts of the impedance, measured at least annually, deviates by more than 5 Ω from the previous measurement

	Frequency	Tissue	Impedance	Limit	Verified Date
Calibration	2450	Body	50Ω	Within 5Ω	2011.06.20
Measurement	2450	Body	50.36Ω		



7. Measurement Uncertainty

Uncertainty								
Error Description	Uncertainty value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±5.9 %	N	1	1	1	±5.9 %	±5.9 %	∞
Axial Isotropy	±4.7 %	R	√3	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	√3	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±1.0 %	R	√3	1	1	±0.6 %	±0.6 %	∞
Linearity	±4.7 %	R	√3	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	√3	1	1	±0.6 %	±0.6 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	√3	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	√3	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	√3	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	√3	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.4 %	R	√3	1	1	±0.2 %	±0.2 %	∞
Probe Positioning	±2.9 %	R	√3	1	1	±1.7 %	±1.7 %	∞
Max. SAR Eval.	±1.0 %	R	√3	1	1	±0.6 %	±0.6 %	∞
Test Sample Related								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	√3	1	1	±2.9 %	±2.9 %	∞
Phantom and Setup								
Phantom Uncertainty	±4.0 %	R	√3	1	1	±2.3 %	±2.3 %	∞
Liquid Conductivity (target)	±5.0 %	R	√3	0.64	0.43	±1.8 %	±1.2 %	∞
Liquid Conductivity (meas.)	±2.5 %	N	1	0.64	0.43	±1.6 %	±1.1 %	∞
Liquid Permittivity (target)	±5.0 %	R	√3	0.6	0.49	±1.7 %	±1.4 %	∞
Liquid Permittivity (meas.)	±2.5 %	N	1	0.6	0.49	±1.5 %	±1.2 %	∞
Combined Std. Uncertainty						±10.9 %	±10.7 %	387
Expanded STD Uncertainty						±21.9 %	±21.4 %	

8. Conducted Power Measurement

Mode	Frequency (MHz)	Channel	Average Power (dBm)
802.11b	2412	1	19.75
802.11b	2437	6	19.90
802.11b	2462	11	19.18
802.11g	2412	1	18.80
802.11g	2437	6	18.64
802.11g	2462	11	18.41
802.11a	5180	36	14.32
802.11a	5220	44	14.70
802.11a	5240	48	14.80
802.11a	5745	149	14.22
802.11a	5785	157	14.23
802.11a	5825	165	14.08
802.11n(20M)-TX1	2412	1	18.13
802.11n(20M)-TX2	2412	1	17.96
802.11n(20M)-TX1	2437	6	18.30
802.11n(20M)-TX2	2437	6	17.95
802.11n(20M)-TX1	2462	11	18.08
802.11n(20M)-TX2	2462	11	18.17
802.11n(20M)-TX1	5180	36	13.93
802.11n(20M)-TX2	5180	36	13.55
802.11n(20M)-TX1	5220	44	13.79
802.11n(20M)-TX2	5220	44	13.03
802.11n(20M)-TX1	5240	48	13.49
802.11n(20M)-TX2	5240	48	13.81
802.11n(20M)-TX1	5745	149	14.06
802.11n(20M)-TX2	5745	149	14.30
802.11n(20M)-TX1	5785	157	14.08
802.11n(20M)-TX2	5785	157	14.10
802.11n(20M)-TX1	5825	165	13.92
802.11n(20M)-TX2	5825	165	14.30

802.11n(40M)-TX1	2422	3	18.15
802.11n(40M)-TX2	2422	3	18.13
802.11n(40M)-TX1	2437	6	18.26
802.11n(40M)-TX2	2437	6	18.41
802.11n(40M)-TX1	2452	9	18.30
802.11n(40M)-TX2	2452	9	18.08
802.11n(40M)-TX1	5190	38	13.30
802.11n(40M)-TX2	5190	38	13.79
802.11n(40M)-TX1	5230	46	13.52
802.11n(40M)-TX2	5230	46	13.19
802.11n(40M)-TX1	5755	151	14.12
802.11n(40M)-TX2	5755	151	14.20
802.11n(40M)-TX1	5795	159	14.37
802.11n(40M)-TX2	5795	159	14.00

Note : Refer to KDB 248227 D01 , SAR is not required for 802.11g channel when the maximum average output power is than 1/4dB higher than that measured on the corresponding 802.11b channels.

9. Test Results

9.1 SAR Test Results Summary

SAR MEASUREMENT						
Ambient Temperature (°C) : 20.8 ±2			Relative Humidity (%) : 56			
Liquid Temperature (°C) : 20.4 ±2			Depth of Liquid (cm):>15			
Test Mode: 802.11b - 2450 MHz –ASKEY Tx1 Antenna, P/N: WLU5090-D61						
Test Position Body	Antenna Position	Frequency		Conducted Power (dBm)	SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz			
NB-Back	Fixed	6	2437	19.90	0.955	1.6
NB-Left	Fixed	6	2437	19.90	0.107	1.6
Back	Fixed	6	2437	19.90	0.966	1.6
L-Side	Fixed	6	2437	19.90	0.112	1.6
R-Side	Fixed	6	2437	19.90	0.466	1.6
Front	Fixed	1	2412	19.75	0.97	1.6
Front	Fixed	6	2437	19.90	1.08	1.6
Front	Fixed	11	2462	19.18	0.88	1.6
Test Mode: 802.11n (20M) - 2450 MHz –ASKEY Tx1 Antenna, P/N: WLU5090-D61						
Front	Fixed	11	2462	18.08	0.81	1.6
Test Mode: 802.11n (20M) - 2450 MHz –ASKEY Tx2 Antenna, P/N: WLU5090-D61						
Front	Fixed	11	2462	18.17	0.75	1.6
Test Mode: 802.11n (40M) - 2450 MHz –ASKEY Tx1 Antenna, P/N: WLU5090-D61						
Front	Fixed	9	2452	18.30	0.94	1.6
Test Mode: 802.11n (40M) - 2450 MHz –ASKEY Tx2 Antenna, P/N: WLU5090-D61						
Front	Fixed	9	2452	18.08	0.803	1.6
Note: (1) EUT was tested with Dell M/N: M65 via USB cable (2) The separation distance between EUT and flat phantom is 0.5 cm.						

SAR MEASUREMENT						
Ambient Temperature (°C) : 22.6 ±2				Relative Humidity (%): 51		
Liquid Temperature (°C) : 21.3 ±2				Depth of Liquid (cm):>15		
Test Mode: 802.11a - 5 GHz –ASKEY Tx1 Antenna, P/N: WLU5090-D61						
Test Position Body	Antenna Position	Frequency		Conducted Power (dBm)	SAR 1g (W/kg)	Limit (W/kg)
		Channel	MHz			
NB-Back	Fixed	48	5240	14.80	0.161	1.6
NB-Left	Fixed	48	5240	14.80	0.048	1.6
Front	Fixed	48	5240	14.80	0.135	1.6
L-Side	Fixed	48	5240	14.80	0.054	1.6
R-Side	Fixed	48	5240	14.80	0.139	1.6
Back	Fixed	36	5180	14.32	0.151	1.6
Back	Fixed	44	5220	14.70	0.191	1.6
Back	Fixed	48	5240	14.80	0.188	1.6
Back	Fixed	149	5745	14.22	0.071	1.6
Back	Fixed	157	5785	14.23	0.077	1.6
Back	Fixed	165	5825	14.08	0.063	1.6
Test Mode: 802.11n (20M) - 5 GHz –ASKEY Tx1 Antenna, P/N: WLU5090-D61						
Back	Fixed	48	5240	13.49	0.150	1.6
Test Mode: 802.11n (20M) - 5 GHz –ASKEY Tx2 Antenna, P/N: WLU5090-D61						
Back	Fixed	48	5240	13.81	0.143	1.6
Test Mode: 802.11n (40M) - 5 GHz –ASKEY Tx1 Antenna, P/N: WLU5090-D61						
Back	Fixed	46	5230	13.52	0.148	1.6
Test Mode: 802.11n (40M) - 5 GHz –ASKEY Tx2 Antenna, P/N: WLU5090-D61						
Back	Fixed	46	5230	13.19	0.137	1.6
Note: (1) EUT was tested with Dell M/N: M65 via USB cable (2) The separation distance between EUT and flat phantom is 0.5 cm.						

Appendix**Appendix A. SAR System Validation Data****Appendix B. SAR measurement Data****Appendix C. Test Setup Photographs & EUT Photographs****Appendix D. Probe Calibration Data****Appendix E. Dipole Calibration Data**

Appendix A. SAR System Validation Data

Test Laboratory: QuieTek

Date/Time: 6/18/2011

System Performance Check_2450MHz-Body

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 839

Communication System: CW; Frequency: 2450 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.92 \text{ mho/m}$; $\epsilon_r = 53.46$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 20.8, Liquid Temperature ($^{\circ}\text{C}$) : 20.4

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.01, 7.01, 7.01); Calibrated: 7/19/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 5/19/2011
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASYS2, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/2450MHz_Body/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 18.608 mW/g

Configuration/2450MHz_Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

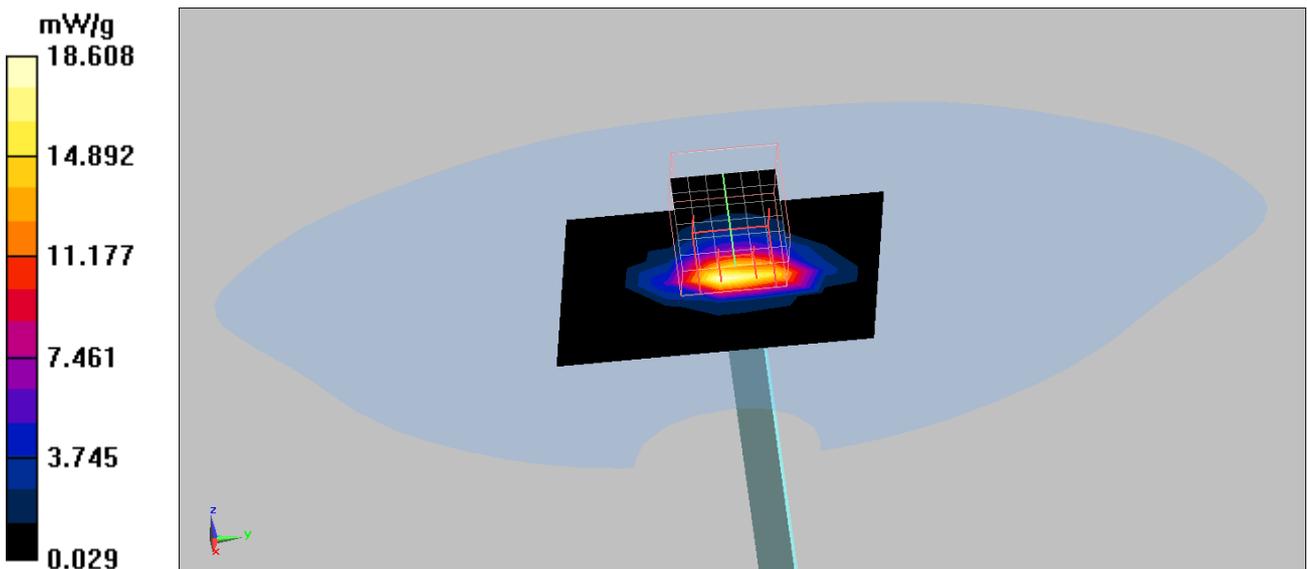
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 103.52 V/m; Power Drift = -0.044 dB

Peak SAR (extrapolated) = 29.204 W/kg

SAR(1 g) = 13.36 mW/g; SAR(10 g) = 5.92 mW/g

Maximum value of SAR (measured) = 15.165 mW/g



Test Laboratory: Quietek

Date/Time: 2011/9/13

System Performance Check_5200-Body

DUT: Dipole 5GHz; Type: D5GHzV2

Communication System: CW-5GHz; Frequency: 5200 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5200$ MHz; $\sigma = 5.16$ mho/m; $\epsilon_r = 50.33$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 22.6, Liquid Temperature (°C) : 21.3

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(3.95, 3.95, 3.95); Calibrated: 2011/7/28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

System Performance Check with D5GHzV2 Dipole (graded grid)/d=10mm, Pin=100mW, f=5200 MHz/Area Scan (10x10x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 13.817 mW/g

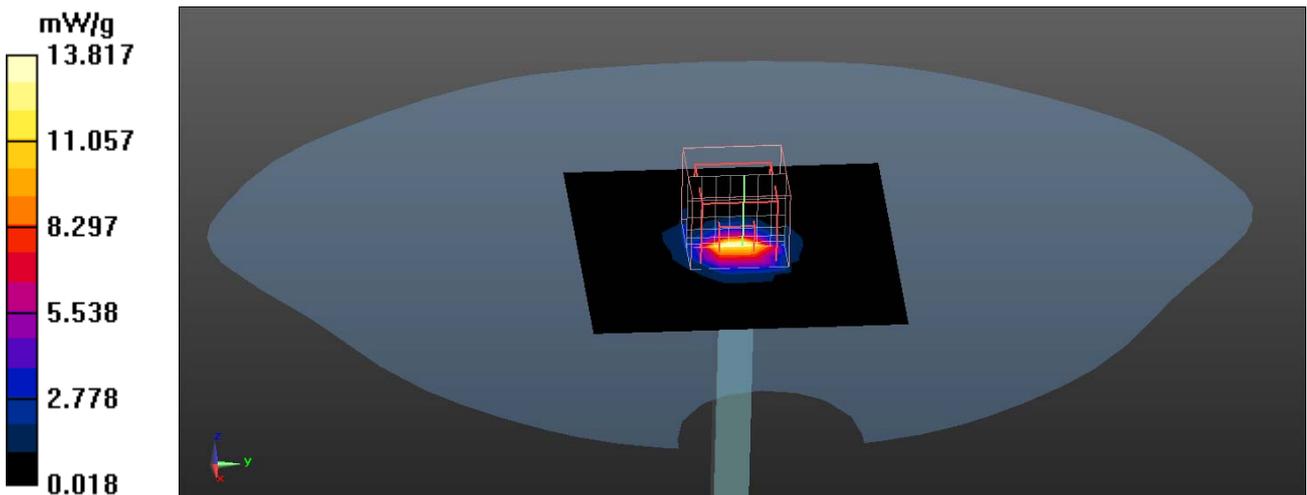
System Performance Check with D5GHzV2 Dipole (graded grid)/d=10mm, Pin=100mW, f=5200 MHz/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 68.258 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 30.453 W/kg

SAR(1 g) = 7.55mW/g; SAR(10 g) = 2.06 mW/g

Maximum value of SAR (measured) = 17.943 mW/g



Test Laboratory: Quietek

Date/Time: 2011/9/13

System Performance Check_5800-Body

DUT: Dipole 5GHz; Type: D5GHzV2

Communication System: CW-5GHz; Frequency: 5800 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5800$ MHz; $\sigma = 6.13$ mho/m; $\epsilon_r = 48.03$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 22.6, Liquid Temperature (°C) : 21.3

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(3.74, 3.74, 3.74); Calibrated: 2011/7/28
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

System Performance Check with D5GHzV2 Dipole (graded grid)/d=10mm, Pin=100mW, f=5800 MHz/Area Scan (10x10x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 15.442 mW/g

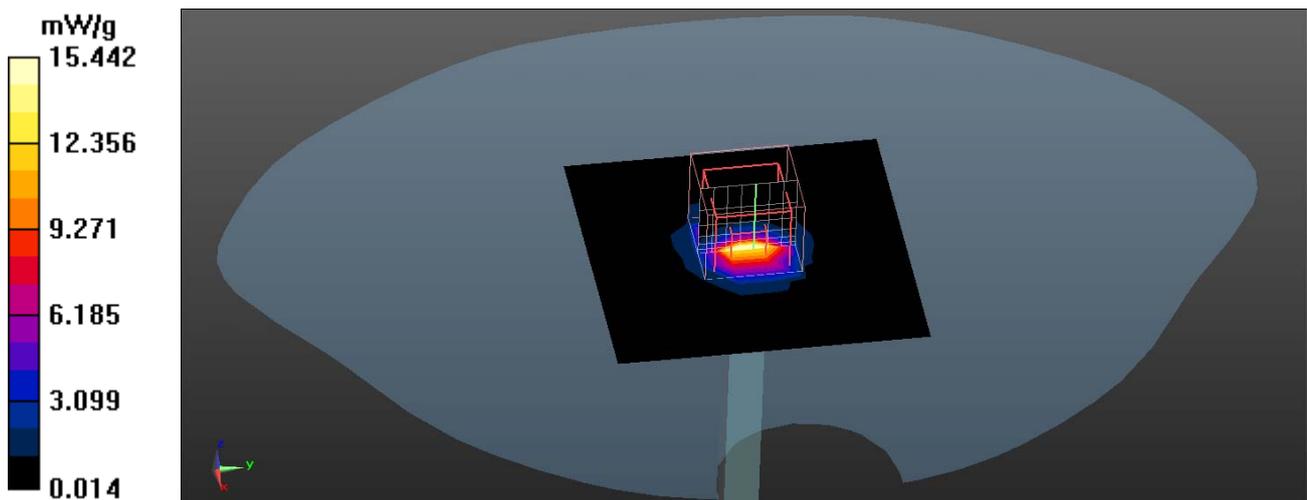
System Performance Check with D5GHzV2 Dipole (graded grid)/d=10mm, Pin=100mW, f=5800 MHz/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 67.617 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 33.776 W/kg

SAR(1 g) = 7.31 mW/g; SAR(10 g) = 1.96 mW/g

Maximum value of SAR (measured) = 20.365 mW/g



Appendix B. SAR measurement Data

Antenna Kit: ASKEY: Tx1 Antenna: P/N: WLU5090-D61

Test Laboratory: QuieTek

Date/Time: 6/18/2011

802.11b_2437-NB+Back

DUT: USB; Type: N53

Communication System: WLAN2.4G; Frequency: 2437 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.91$ mho/m; $\epsilon_r = 53.68$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 20.8, Liquid Temperature (°C) : 20.4

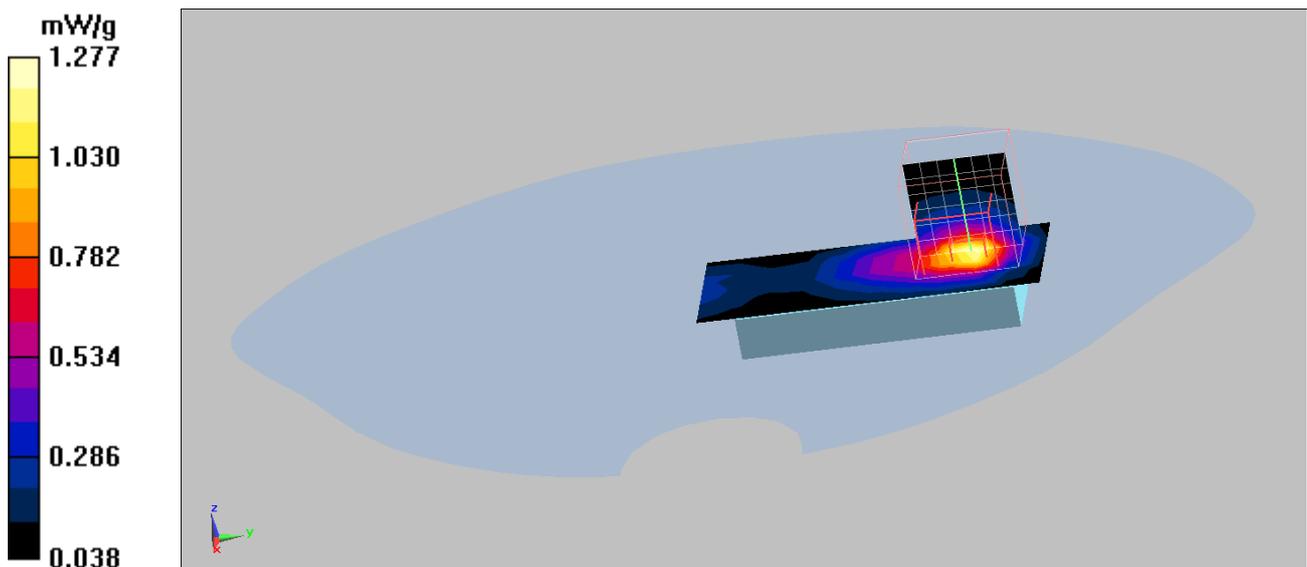
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.01, 7.01, 7.01); Calibrated: 7/19/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 5/19/2011
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASYS2, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (measured) = 1.277 mW/g

Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 11.552 V/m; Power Drift = -0.10 dB
 Peak SAR (extrapolated) = 2.172 W/kg
SAR(1 g) = 0.955 mW/g; SAR(10 g) = 0.435 mW/g
 Maximum value of SAR (measured) = 1.281 mW/g



Test Laboratory: QuieTek

Date/Time: 6/18/2011

802.11b 2437-NB+Left

DUT: USB; Type: N53

Communication System: WLAN2.4G; Frequency: 2437 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 1.91 \text{ mho/m}$; $\epsilon_r = 53.68$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 20.8, Liquid Temperature ($^{\circ}\text{C}$) : 20.4

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.01, 7.01, 7.01); Calibrated: 7/19/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 5/19/2011
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASYS2, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$
 Maximum value of SAR (measured) = 0.116 mW/g

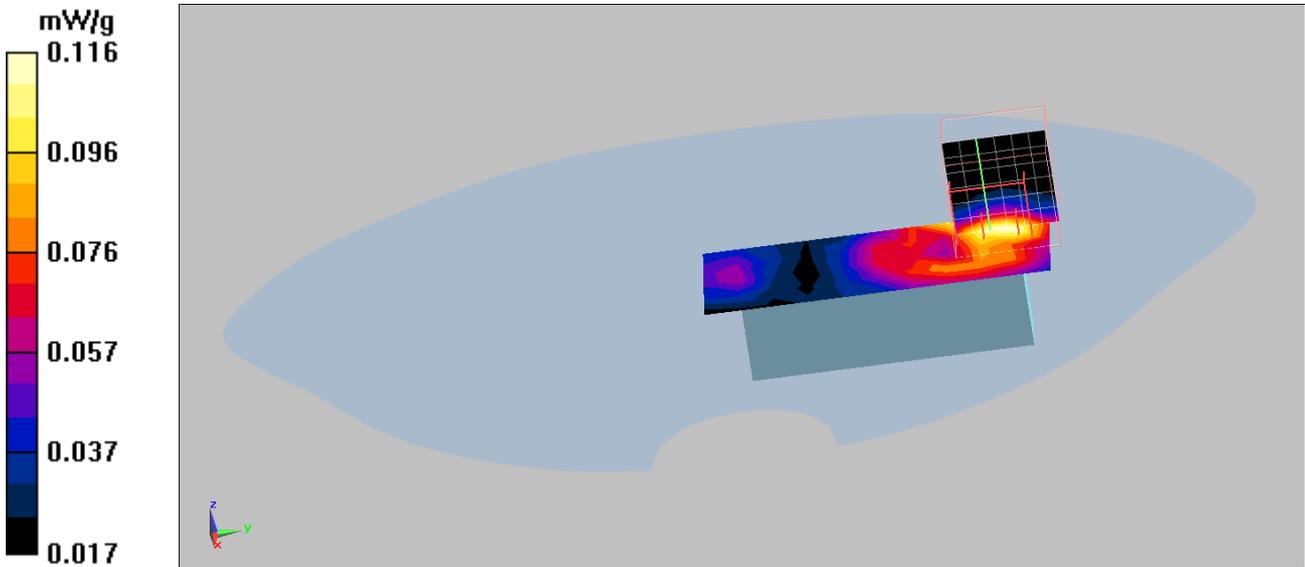
Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:
 $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 5.506 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 0.210 W/kg

SAR(1 g) = 0.107 mW/g; SAR(10 g) = 0.057 mW/g

Maximum value of SAR (measured) = 0.120 mW/g



Test Laboratory: QuieTek

Date/Time: 6/18/2011

802.11b_2437-Back

DUT: USB; Type: N53

Communication System: WLAN2.4G; Frequency: 2437 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 1.91 \text{ mho/m}$; $\epsilon_r = 53.68$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 20.8, Liquid Temperature ($^{\circ}\text{C}$) : 20.4

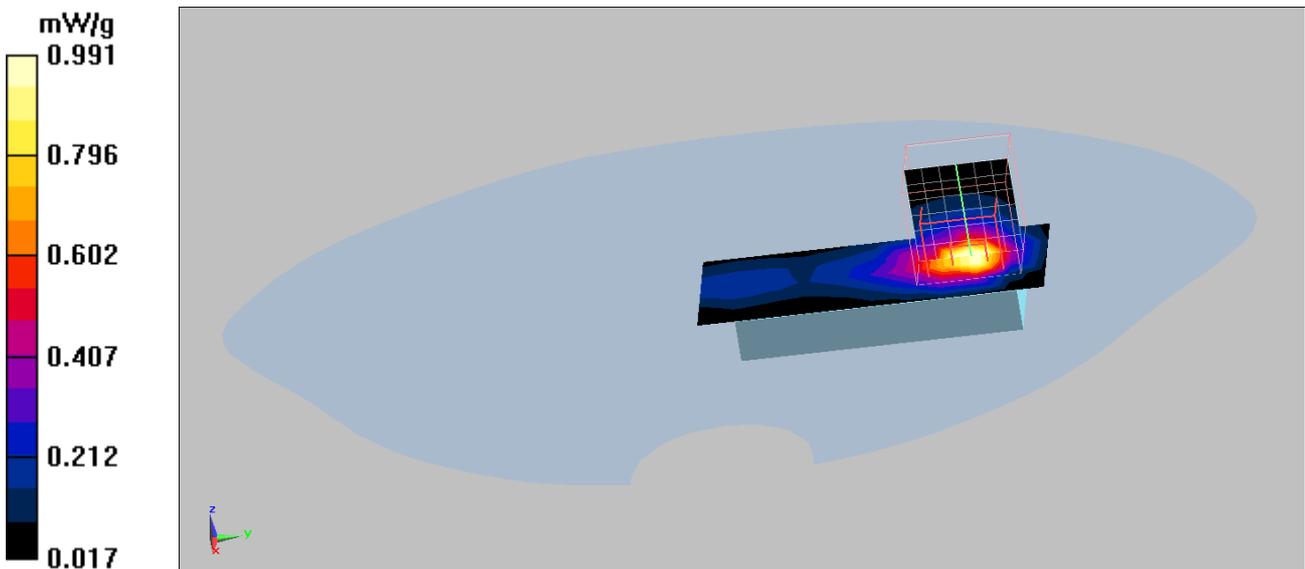
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.01, 7.01, 7.01); Calibrated: 7/19/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 5/19/2011
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$
 Maximum value of SAR (measured) = 0.991 mW/g

Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:
 $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
 Reference Value = 10.744 V/m; Power Drift = -0.18 dB
 Peak SAR (extrapolated) = 2.173 W/kg
SAR(1 g) = 0.966 mW/g; SAR(10 g) = 0.424 mW/g
 Maximum value of SAR (measured) = 1.147 mW/g



Test Laboratory: QuieTek

Date/Time: 6/18/2011

802.11b 2437-Left

DUT: USB; Type: N53

Communication System: WLAN2.4G; Frequency: 2437 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 1.91 \text{ mho/m}$; $\epsilon_r = 53.68$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 20.8, Liquid Temperature ($^{\circ}\text{C}$) : 20.4

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.01, 7.01, 7.01); Calibrated: 7/19/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 5/19/2011
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$
 Maximum value of SAR (measured) = 0.142 mW/g

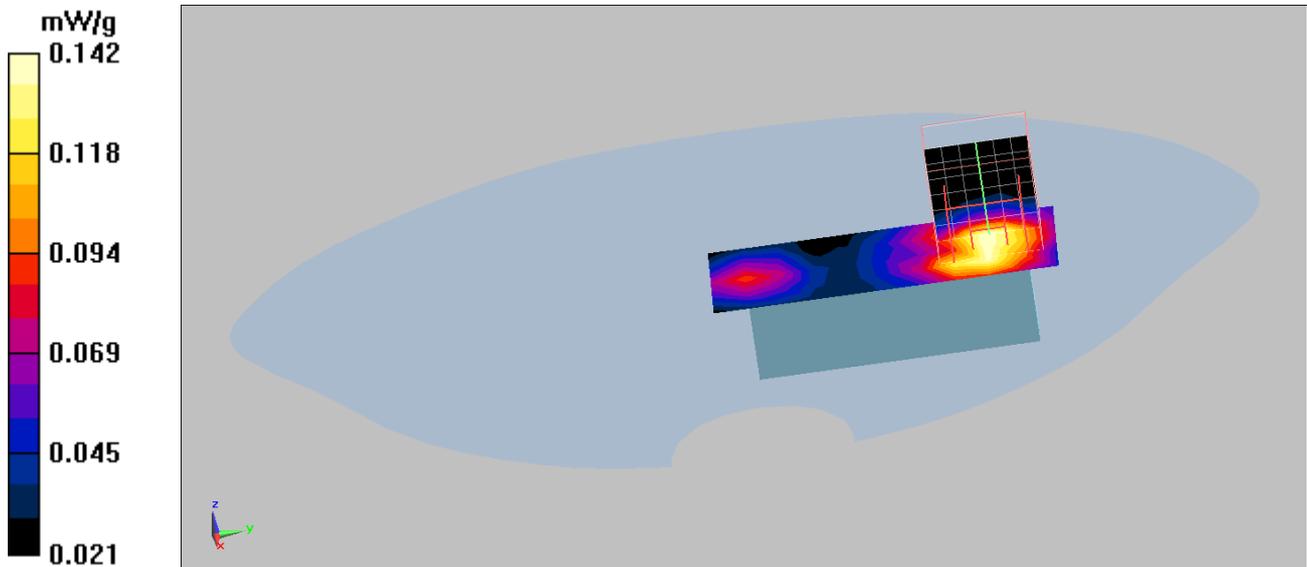
Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:
 $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 6.921 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.267 W/kg

SAR(1 g) = 0.112 mW/g; SAR(10 g) = 0.072 mW/g

Maximum value of SAR (measured) = 0.144 mW/g



Test Laboratory: QuieTek

Date/Time: 6/18/2011

802.11b_2437-Right

DUT: USB; Type: N53

Communication System: WLAN2.4G; Frequency: 2437 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 1.91 \text{ mho/m}$; $\epsilon_r = 53.68$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 20.8, Liquid Temperature ($^{\circ}\text{C}$) : 20.4

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.01, 7.01, 7.01); Calibrated: 7/19/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 5/19/2011
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASYS2, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$
 Maximum value of SAR (measured) = 0.480 mW/g

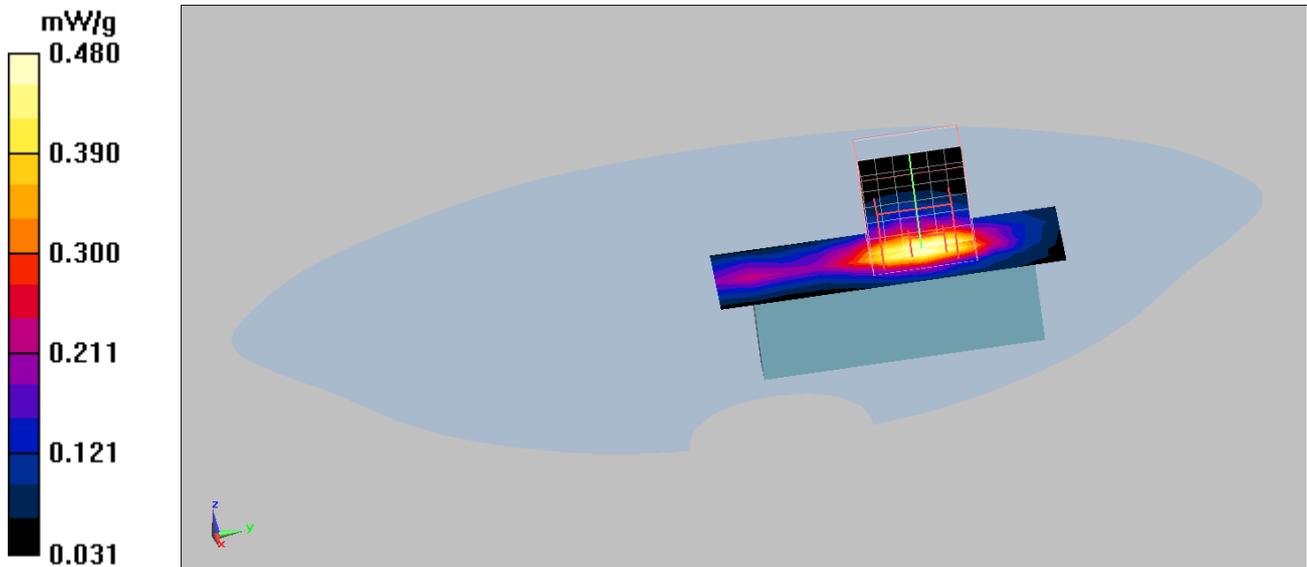
Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:
 $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 11.029 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.971 W/kg

SAR(1 g) = 0.466 mW/g; SAR(10 g) = 0.234 mW/g

Maximum value of SAR (measured) = 0.526 mW/g



Test Laboratory: QuieTek

Date/Time: 6/18/2011

802.11b_2412-Front

DUT: USB; Type: N53

Communication System: WLAN2.4G; Frequency: 2412 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2412$ MHz; $\sigma = 1.88$ mho/m; $\epsilon_r = 54.21$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 20.8, Liquid Temperature (°C) : 20.4

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.01, 7.01, 7.01); Calibrated: 7/19/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 5/19/2011
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASYS2, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.349 mW/g

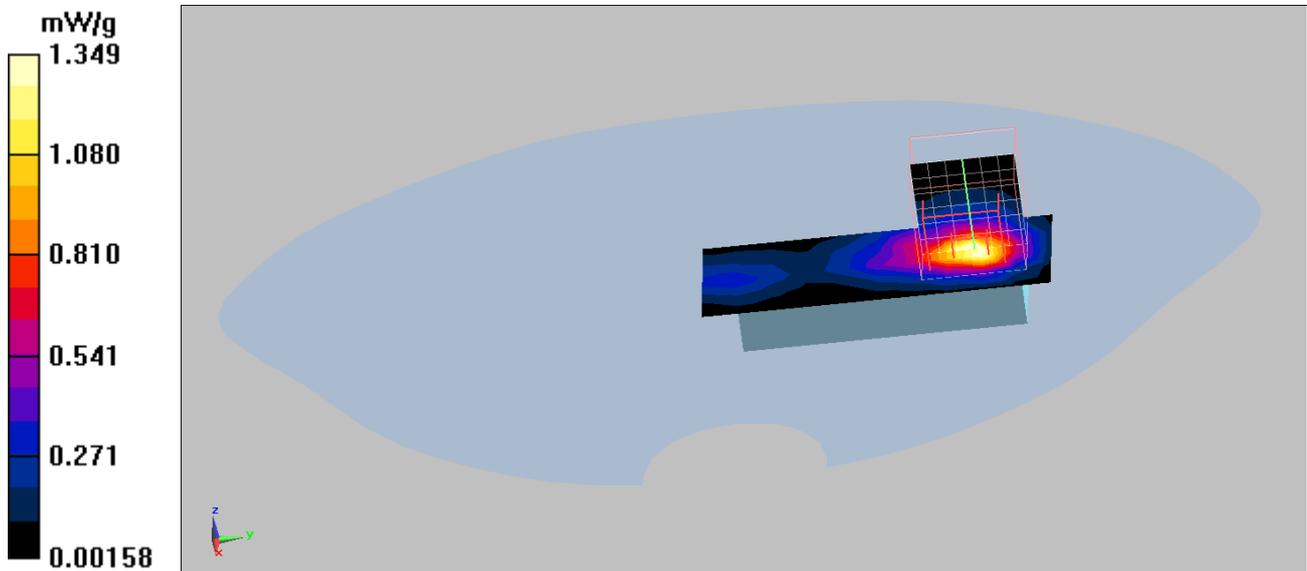
Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:
dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.494 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.754 W/kg

SAR(1 g) = 1.051 mW/g; SAR(10 g) = 0.602 mW/g

Maximum value of SAR (measured) = 1.518 mW/g



Test Laboratory: QuieTek

Date/Time: 6/18/2011

802.11b_2437-Front

DUT: USB; Type: N53

Communication System: WLAN2.4G; Frequency: 2437 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.91$ mho/m; $\epsilon_r = 53.68$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 20.8, Liquid Temperature (°C) : 20.4

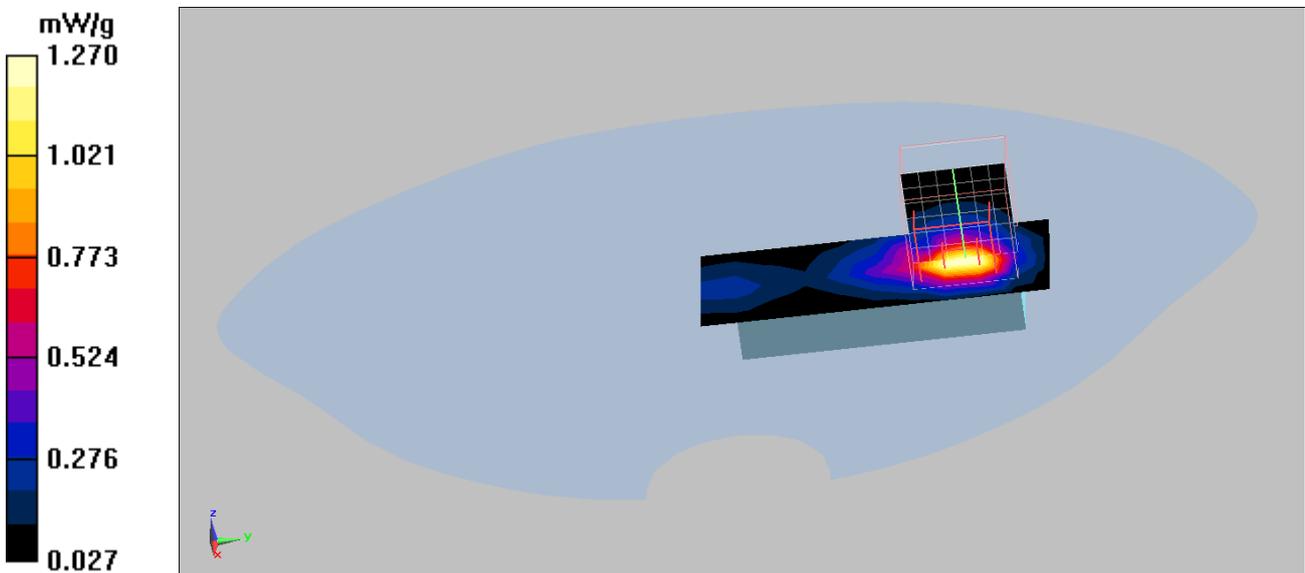
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.01, 7.01, 7.01); Calibrated: 7/19/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 5/19/2011
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (measured) = 1.270 mW/g

Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:
 dx=5mm, dy=5mm, dz=5mm
 Reference Value = 12.280 V/m; Power Drift = -0.14 dB
 Peak SAR (extrapolated) = 2.088 W/kg
SAR(1 g) = 0.97 mW/g; SAR(10 g) = 0.479 mW/g
 Maximum value of SAR (measured) = 1.183 mW/g



Test Laboratory: QuieTek

Date/Time: 6/18/2011

802.11b_2462-Front

DUT: USB; Type: N53

Communication System: WLAN2.4G; Frequency: 2462 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 53.93$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 20.8, Liquid Temperature (°C) : 20.4

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.01, 7.01, 7.01); Calibrated: 7/19/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 5/19/2011
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (measured) = 1.162 mW/g

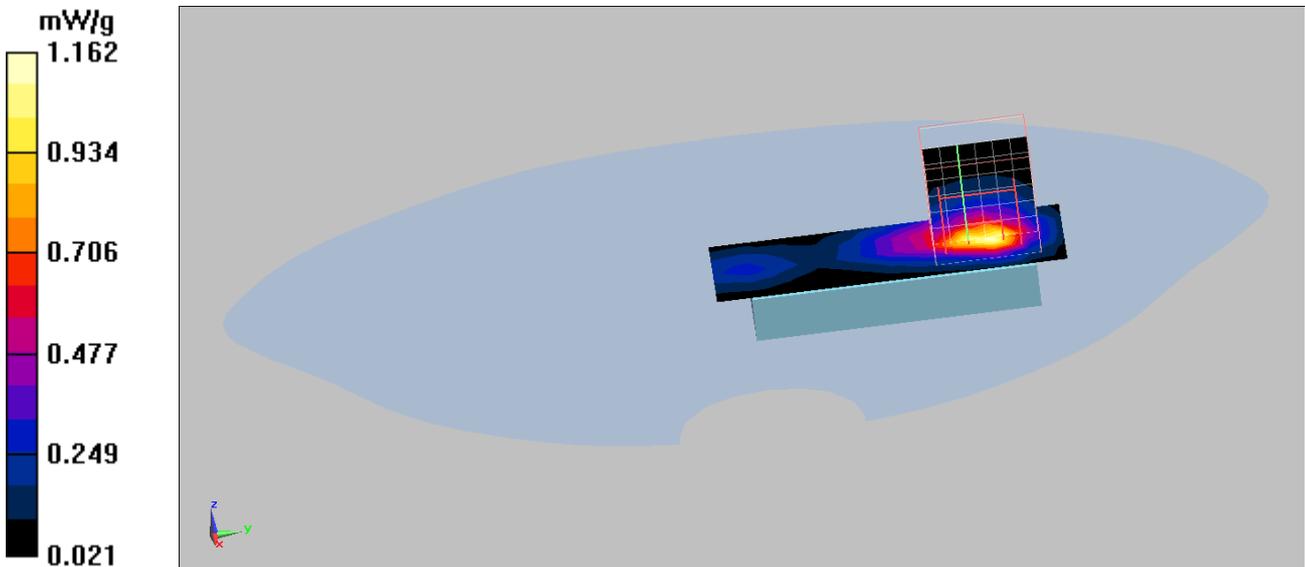
Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:
 dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.123 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.605 W/kg

SAR(1 g) = 0.88 mW/g; SAR(10 g) = 0.515 mW/g

Maximum value of SAR (measured) = 1.236 mW/g



Test Laboratory: QuieTek

Date/Time: 6/18/2011

802.11n_20M_2462-Front_TX1

DUT: USB; Type: N53

Communication System: WLAN2.4G; Frequency: 2462 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 53.93$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 20.8, Liquid Temperature (°C) : 20.4

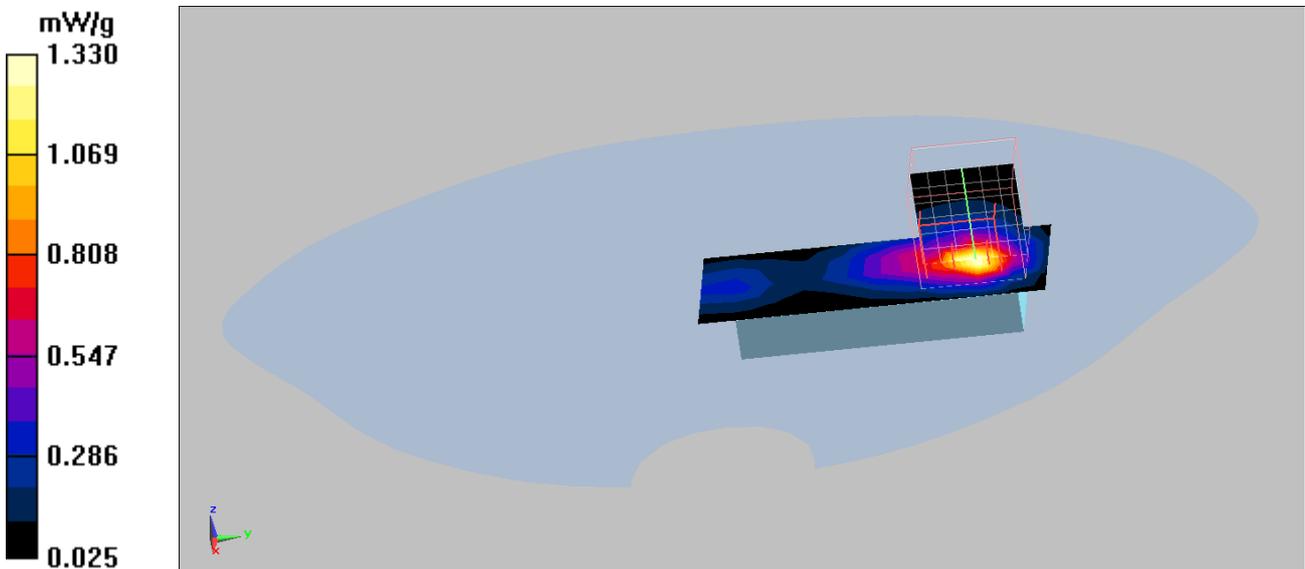
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.01, 7.01, 7.01); Calibrated: 7/19/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 5/19/2011
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASYS2, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (measured) = 1.330 mW/g

Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:
 dx=5mm, dy=5mm, dz=5mm
 Reference Value = 14.062 V/m; Power Drift = -0.12 dB
 Peak SAR (extrapolated) = 1.667 W/kg
SAR(1 g) = 0.81 mW/g; SAR(10 g) = 0.471 mW/g
 Maximum value of SAR (measured) = 1.426 mW/g



Test Laboratory: QuieTek

Date/Time: 6/18/2011

802.11n_40M_2452-Front_TX1

DUT: USB; Type: N53

Communication System: WLAN2.4G; Frequency: 2452 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2452 \text{ MHz}$; $\sigma = 1.93 \text{ mho/m}$; $\epsilon_r = 53.39$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 20.8, Liquid Temperature ($^{\circ}\text{C}$) : 20.4

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.01, 7.01, 7.01); Calibrated: 7/19/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 5/19/2011
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$
 Maximum value of SAR (measured) = 1.225 mW/g

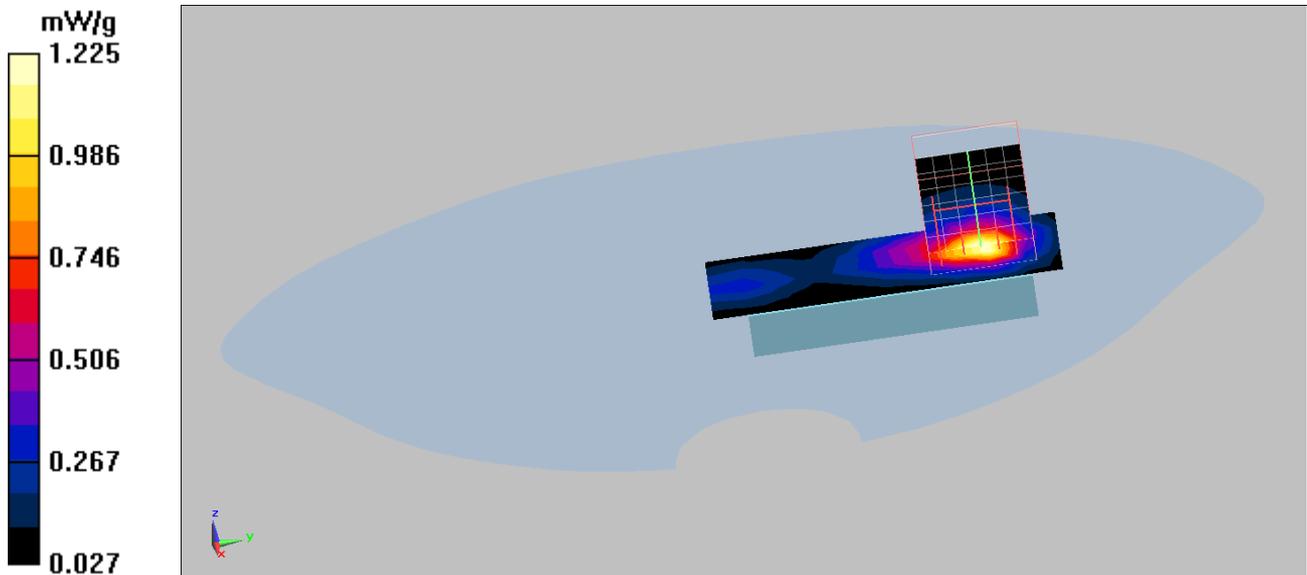
Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:
 $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 11.291 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 1.557 W/kg

SAR(1 g) = 0.94 mW/g; SAR(10 g) = 0.416 mW/g

Maximum value of SAR (measured) = 1.312 mW/g



Antenna Kit : ASKEY: Tx2 Antenna: P/N: WLU5090-D61

Test Laboratory: QuieTek

Date/Time: 6/18/2011

802.11n_20M_2462-Front_TX2

DUT: USB; Type: N53

Communication System: WLAN2.4G; Frequency: 2462 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 53.93$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 20.8, Liquid Temperature (°C) : 20.4

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.01, 7.01, 7.01); Calibrated: 7/19/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 5/19/2011
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASYS2, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.321 mW/g

Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:

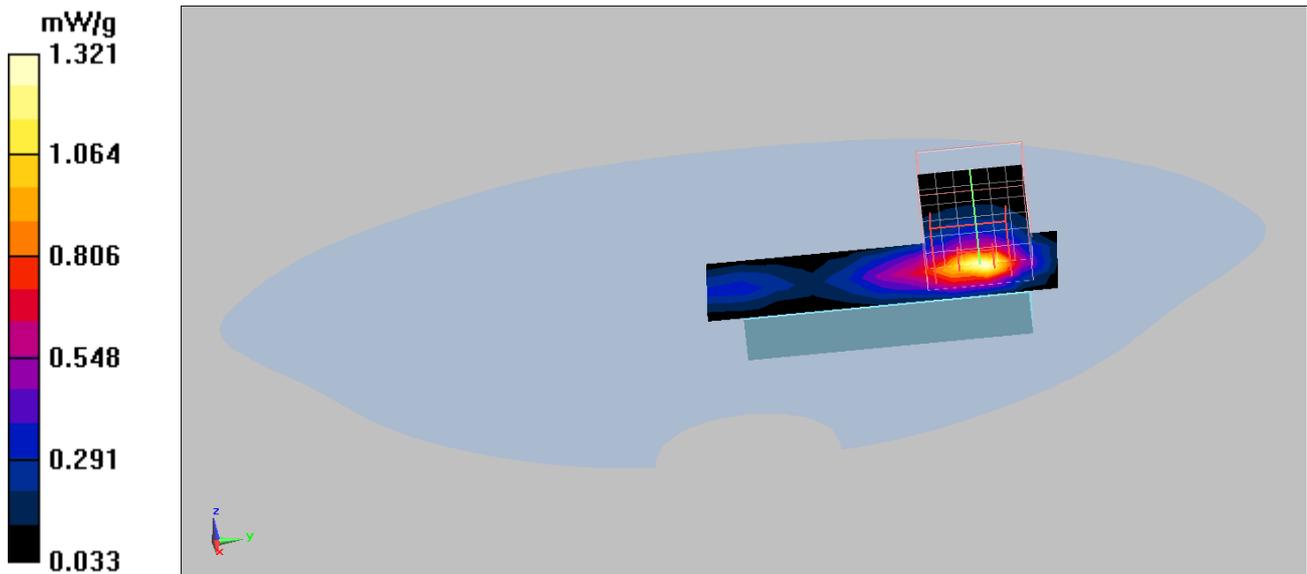
dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.193 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 1.736 W/kg

SAR(1 g) = 0.75 mW/g; SAR(10 g) = 0.445 mW/g

Maximum value of SAR (measured) = 1.357 mW/g



Test Laboratory: QuieTek

Date/Time: 6/18/2011

802.11n_40M_2452-Front_TX2

DUT: USB; Type: N53

Communication System: WLAN2.4G; Frequency: 2452 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 2452$ MHz; $\sigma = 1.93$ mho/m; $\epsilon_r = 53.39$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 20.8, Liquid Temperature (°C) : 20.4

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(7.01, 7.01, 7.01); Calibrated: 7/19/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 5/19/2011
- Phantom: SAM with right table; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (measured) = 0.823 mW/g

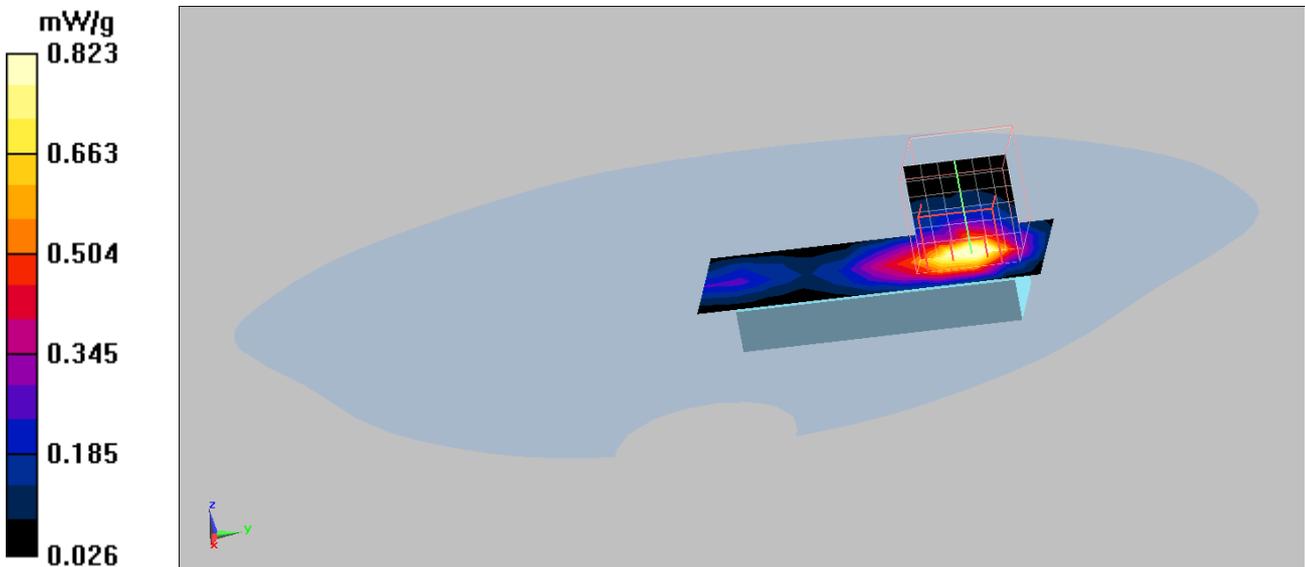
Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:
 dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.793 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.854 W/kg

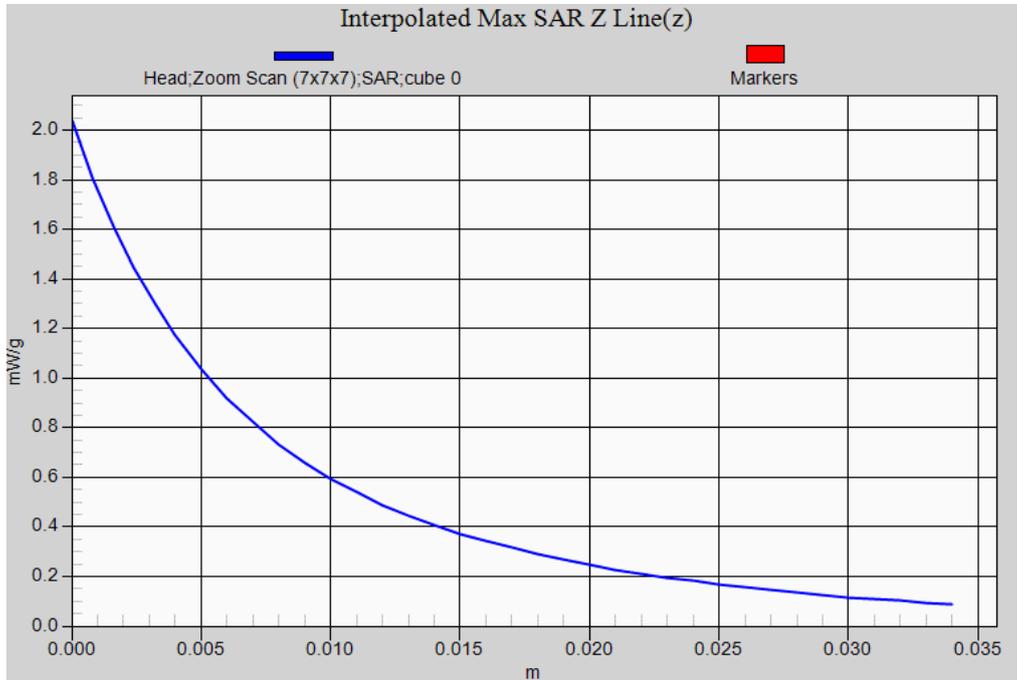
SAR(1 g) = 0.803 mW/g; SAR(10 g) = 0.438 mW/g

Maximum value of SAR (measured) = 1.054 mW/g



802.11b Tx1 Antenna EUT Front Z-Axis plot

Channel: 1



Antenna Kit: ASKEY: Tx1 Antenna: P/N: WLU5090-D61

Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11a_5240-NB+Back

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5240 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5240 \text{ MHz}$; $\sigma = 5.33 \text{ mho/m}$; $\epsilon_r = 49.83$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 22.6, Liquid Temperature ($^{\circ}\text{C}$) : 21.3

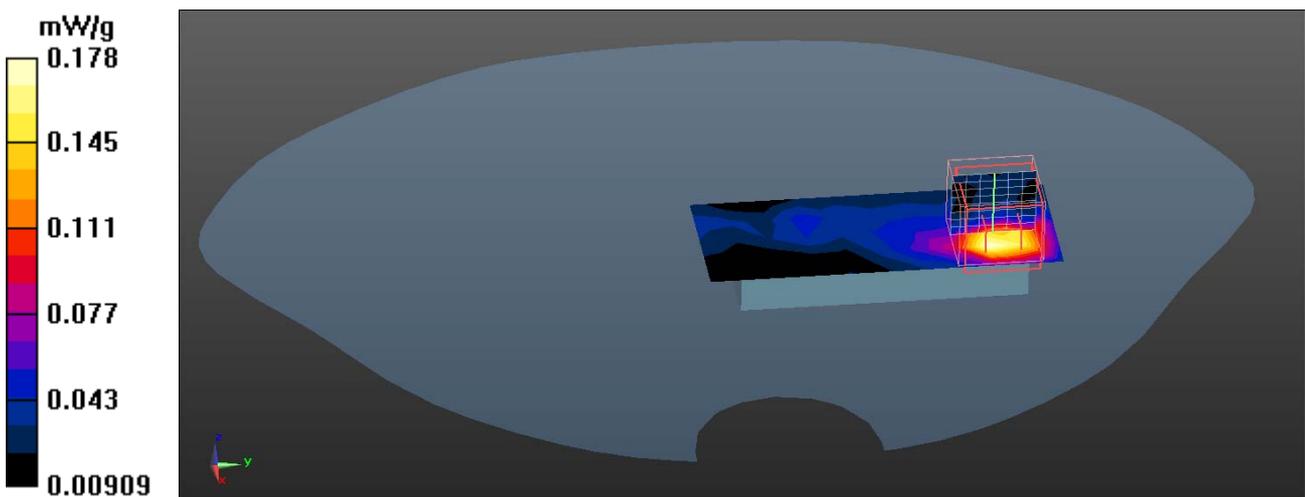
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(4.11, 4.11, 4.11); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$
 Maximum value of SAR (measured) = 0.178 mW/g

Configuration/Body/Zoom Scan (7x7x9) (7x7x9)/Cube 0: Measurement grid:
 $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$
 Reference Value = 2.093 V/m; Power Drift = 0.15 dB
 Peak SAR (extrapolated) = 0.619 W/kg
SAR(1 g) = 0.161 mW/g; SAR(10 g) = 0.056 mW/g
 Maximum value of SAR (measured) = 0.143 mW/g



Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11a_5240-NB+L-Side

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5240 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5240$ MHz; $\sigma = 5.33$ mho/m; $\epsilon_r = 49.83$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 22.6, Liquid Temperature (°C) : 21.3

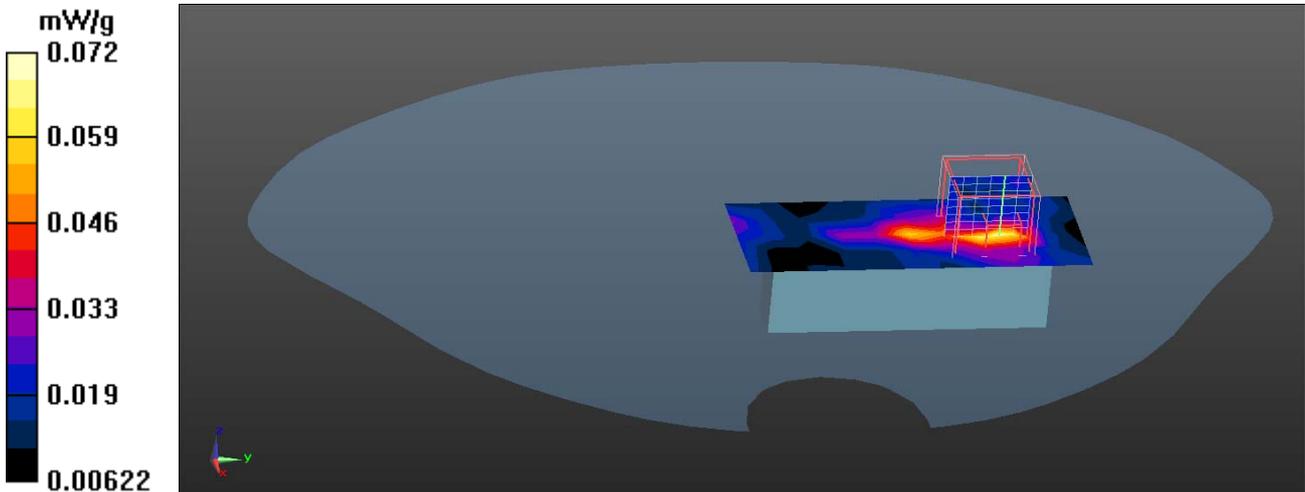
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(4.11, 4.11, 4.11); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (measured) = 0.072 mW/g

Configuration/Body/Zoom Scan (7x7x9) (7x7x9)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2.5mm
 Reference Value = 2.204 V/m; Power Drift = 0.18 dB
 Peak SAR (extrapolated) = 0.162 W/kg
SAR(1 g) = 0.048 mW/g; SAR(10 g) = 0.028 mW/g
 Maximum value of SAR (measured) = 0.073 mW/g



Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11a_5240-Front

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5240 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5240$ MHz; $\sigma = 5.33$ mho/m; $\epsilon_r = 49.83$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 22.6, Liquid Temperature (°C) : 21.3

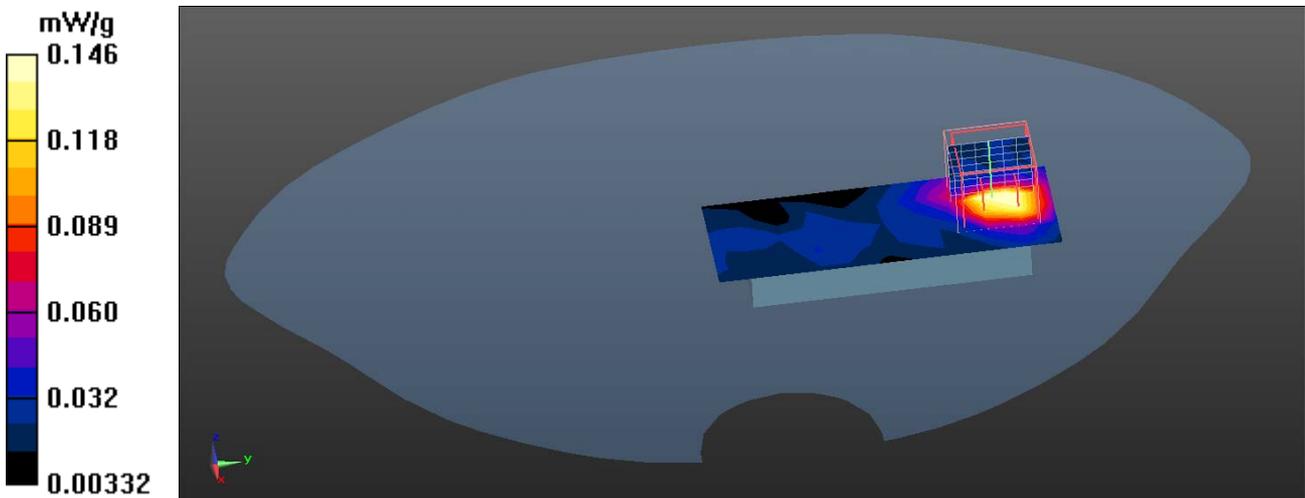
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(4.11, 4.11, 4.11); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (measured) = 0.146 mW/g

Configuration/Body/Zoom Scan (7x7x9) (7x7x9)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2.5mm
 Reference Value = 2.295 V/m; Power Drift = 0.12 dB
 Peak SAR (extrapolated) = 0.404 W/kg
SAR(1 g) = 0.135 mW/g; SAR(10 g) = 0.052 mW/g
 Maximum value of SAR (measured) = 0.183 mW/g



Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11a_5240-L-Side

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5240 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5240$ MHz; $\sigma = 5.33$ mho/m; $\epsilon_r = 49.83$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 22.6, Liquid Temperature (°C) : 21.3

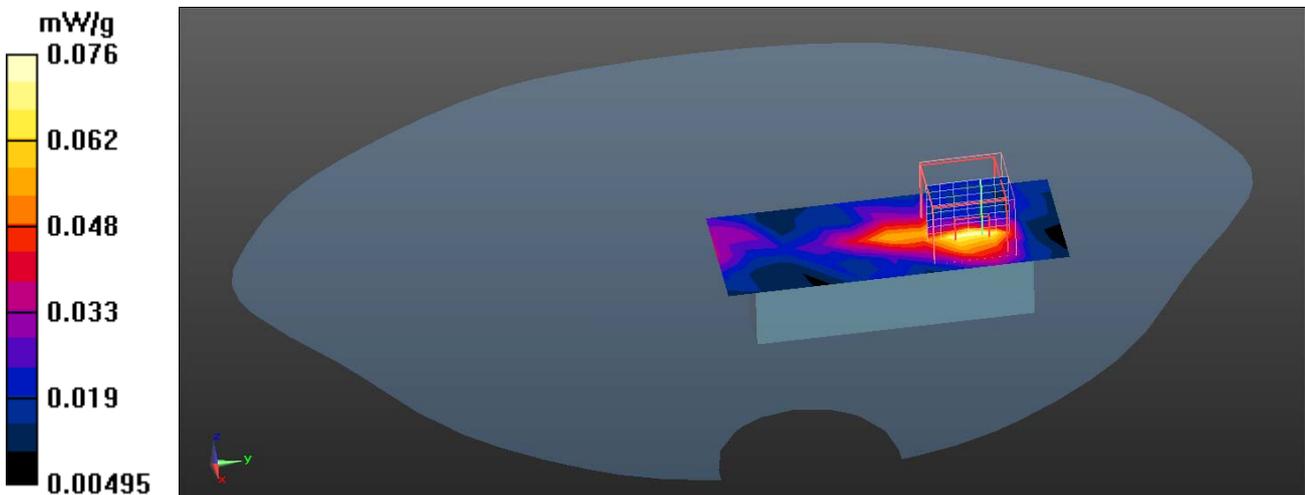
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(4.11, 4.11, 4.11); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASYS2, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (measured) = 0.076 mW/g

Configuration/Body/Zoom Scan (7x7x9) (7x7x9)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2.5mm
 Reference Value = 2.279 V/m; Power Drift = 0.12 dB
 Peak SAR (extrapolated) = 0.224 W/kg
SAR(1 g) = 0.054 mW/g; SAR(10 g) = 0.035 mW/g
 Maximum value of SAR (measured) = 0.091 mW/g



Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11a_5240-R-Side

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5240 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5240$ MHz; $\sigma = 5.33$ mho/m; $\epsilon_r = 49.83$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 22.6, Liquid Temperature (°C) : 21.3

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(4.11, 4.11, 4.11); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASYS2, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.204 mW/g

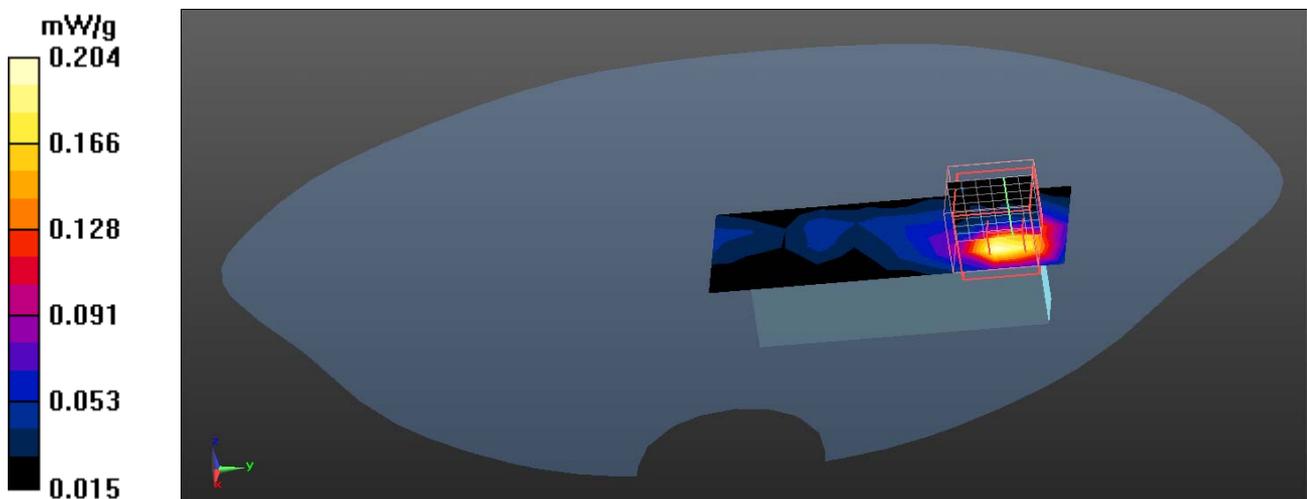
Configuration/Body/Zoom Scan (7x7x9) (7x7x9)/Cube 0: Measurement grid:
dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 2.055 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.358 W/kg

SAR(1 g) = 0.139 mW/g; SAR(10 g) = 0.058 mW/g

Maximum value of SAR (measured) = 0.162 mW/g



Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11a_5180-Back

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5180 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5180$ MHz; $\sigma = 5.11$ mho/m; $\epsilon_r = 51.05$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 22.6, Liquid Temperature (°C) : 21.3

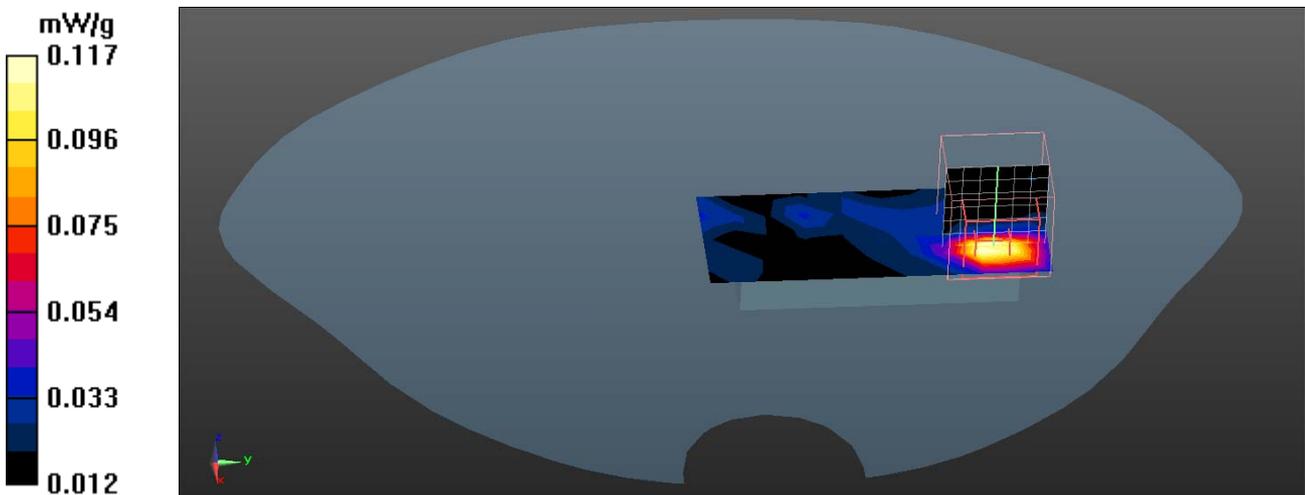
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(4.11, 4.11, 4.11); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASYS2, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (measured) = 0.117 mW/g

Configuration/Body/Zoom Scan (7x7x9) (7x7x7)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2.5mm
 Reference Value = 2.055 V/m; Power Drift = 0.18 dB
 Peak SAR (extrapolated) = 0.861 W/kg
SAR(1 g) = 0.151 mW/g; SAR(10 g) = 0.058 mW/g
 Maximum value of SAR (measured) = 0.142 mW/g



Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11a_5220-Back

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5220 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5220$ MHz; $\sigma = 5.21$ mho/m; $\epsilon_r = 50.15$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 22.6, Liquid Temperature (°C) : 21.3

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(4.11, 4.11, 4.11); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.192 mW/g

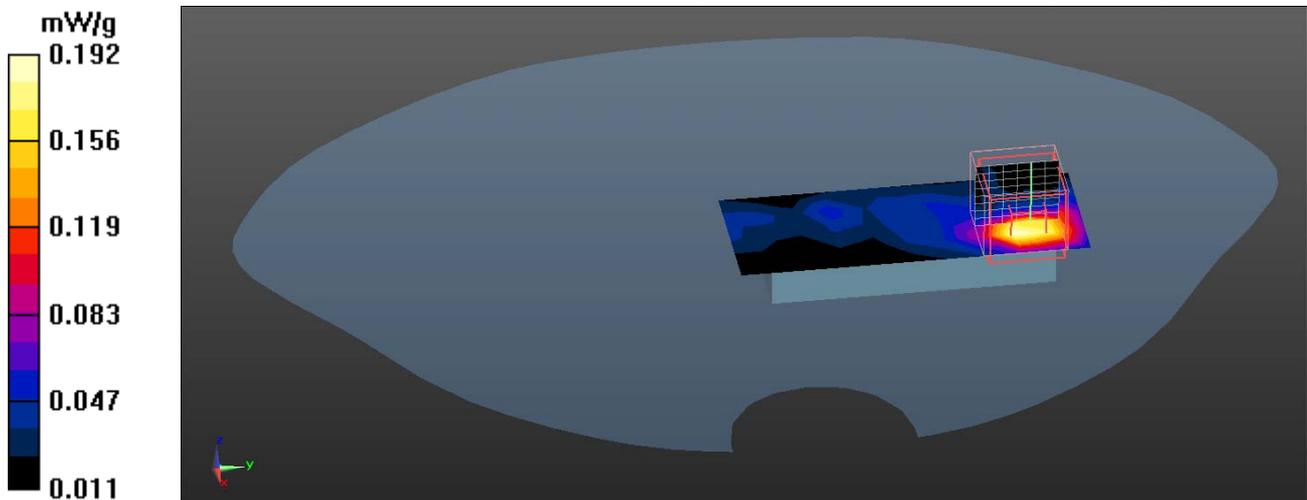
Configuration/Body/Zoom Scan (7x7x9) (7x7x9)/Cube 0: Measurement grid:
dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 2.214 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.479 W/kg

SAR(1 g) = 0.191 mW/g; SAR(10 g) = 0.057 mW/g

Maximum value of SAR (measured) = 0.164 mW/g



Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11a_5240-Back

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5240 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5240$ MHz; $\sigma = 5.33$ mho/m; $\epsilon_r = 49.83$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 22.6, Liquid Temperature (°C) : 21.3

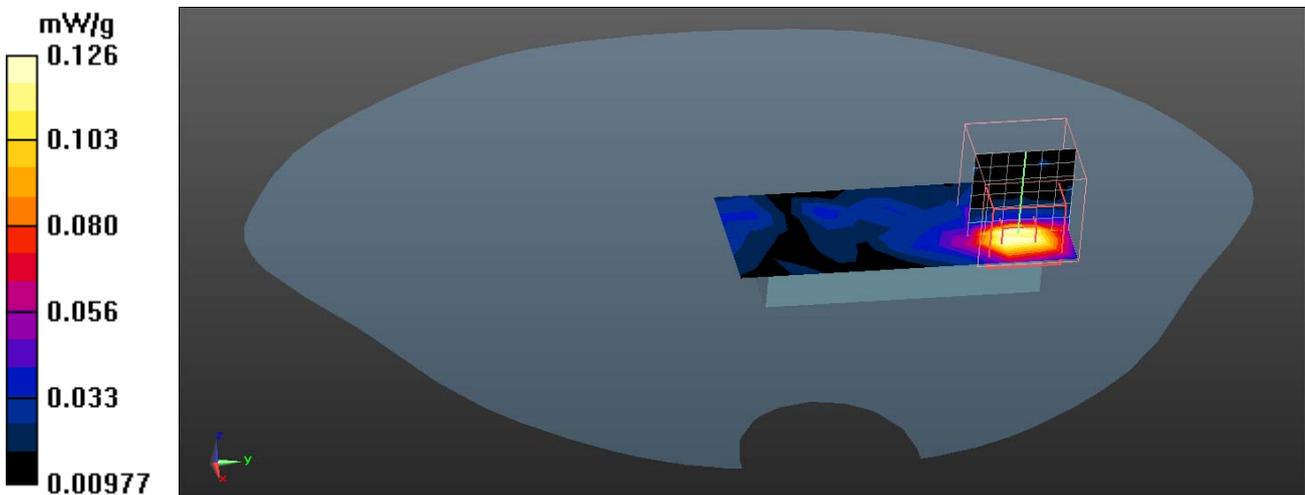
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(4.11, 4.11, 4.11); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (measured) = 0.126 mW/g

Configuration/Body/Zoom Scan (7x7x9) (7x7x7)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2.5mm
 Reference Value = 2.160 V/m; Power Drift = 0.17 dB
 Peak SAR (extrapolated) = 1.129 W/kg
SAR(1 g) = 0.188 mW/g; SAR(10 g) = 0.067 mW/g
 Maximum value of SAR (measured) = 0.165 mW/g



Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11a_5745-Back

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5745 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5745$ MHz; $\sigma = 5.79$ mho/m; $\epsilon_r = 49.77$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 22.6, Liquid Temperature (°C) : 21.3

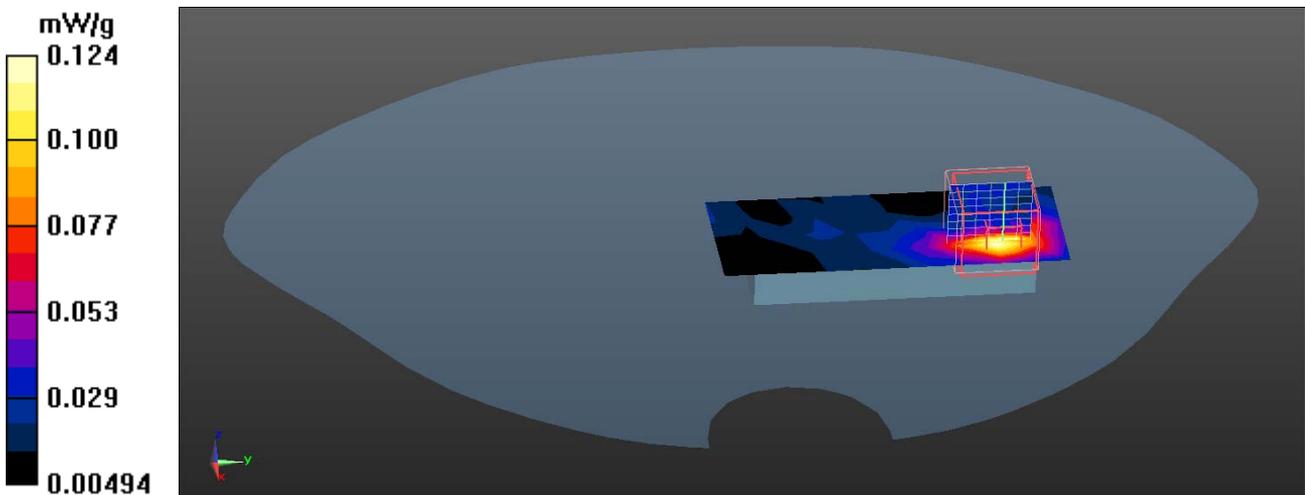
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(3.48, 3.48, 3.48); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASYS2, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (measured) = 0.124 mW/g

Configuration/Body/Zoom Scan (7x7x9) (7x7x9)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2.5mm
 Reference Value = 1.560 V/m; Power Drift = 0.18 dB
 Peak SAR (extrapolated) = 0.296 W/kg
SAR(1 g) = 0.071 mW/g; SAR(10 g) = 0.039 mW/g
 Maximum value of SAR (measured) = 0.133 mW/g



Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11a_5785-Back

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5785 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5785$ MHz; $\sigma = 6.02$ mho/m; $\epsilon_r = 48.75$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 22.6, Liquid Temperature (°C) : 21.3

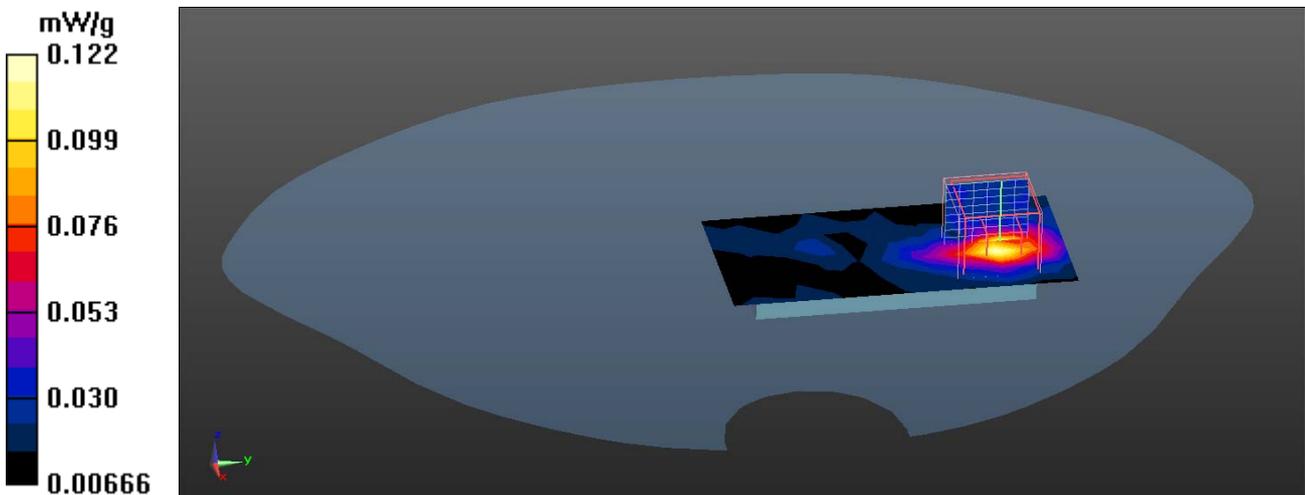
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(3.48, 3.48, 3.48); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (6x11x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (measured) = 0.122 mW/g

Configuration/Body/Zoom Scan (7x7x9) (7x7x9)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2.5mm
 Reference Value = 1.603 V/m; Power Drift = 0.12 dB
 Peak SAR (extrapolated) = 0.220 W/kg
SAR(1 g) = 0.077 mW/g; SAR(10 g) = 0.040 mW/g
 Maximum value of SAR (measured) = 0.116 mW/g



Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11a_5825-Back

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5825 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5825 \text{ MHz}$; $\sigma = 6.15 \text{ mho/m}$; $\epsilon_r = 47.98$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 22.6, Liquid Temperature ($^{\circ}\text{C}$) : 21.3

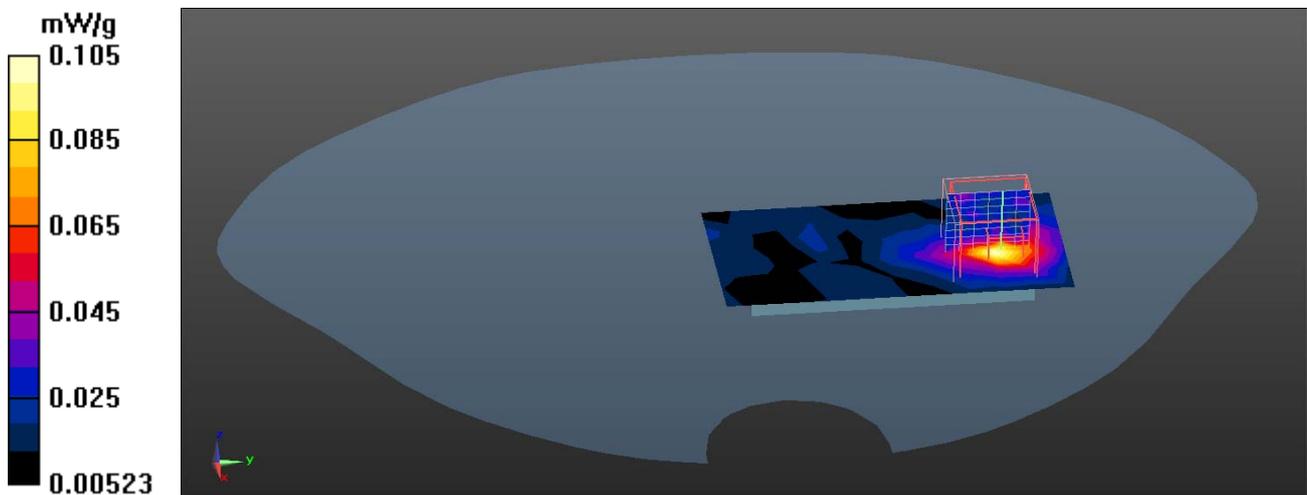
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(3.48, 3.48, 3.48); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (6x11x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$
 Maximum value of SAR (measured) = 0.105 mW/g

Configuration/Body/Zoom Scan (7x7x9) (7x7x9)/Cube 0: Measurement grid:
 $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$
 Reference Value = 1.917 V/m; Power Drift = 0.08 dB
 Peak SAR (extrapolated) = 0.177 W/kg
SAR(1 g) = 0.063 mW/g; SAR(10 g) = 0.036 mW/g
 Maximum value of SAR (measured) = 0.097 mW/g



Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11n_20M TX1 5240-Back

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5240 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5240 \text{ MHz}$; $\sigma = 5.33 \text{ mho/m}$; $\epsilon_r = 49.83$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 22.6, Liquid Temperature ($^{\circ}\text{C}$) : 21.3

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(4.11, 4.11, 4.11); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$
 Maximum value of SAR (measured) = 0.169 mW/g

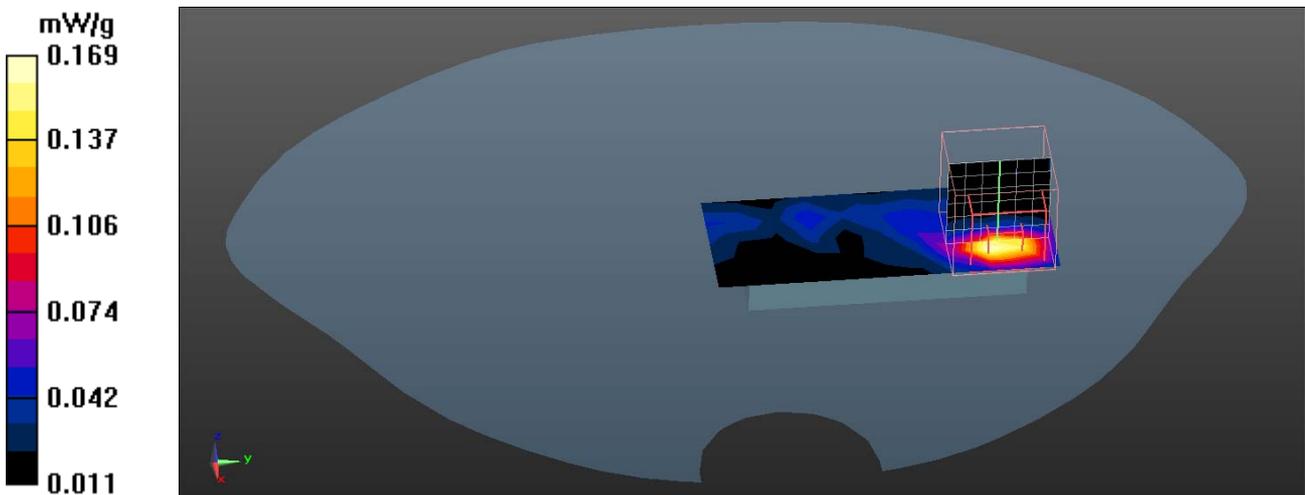
Configuration/Body/Zoom Scan (7x7x9) (7x7x7)/Cube 0: Measurement grid:
 $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 1.950 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.637 W/kg

SAR(1 g) = 0.150 mW/g; SAR(10 g) = 0.060 mW/g

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



Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11n_40M TX1 5230-Back

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5230 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5230$ MHz; $\sigma = 5.28$ mho/m; $\epsilon_r = 49.98$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 22.6, Liquid Temperature (°C) : 21.3

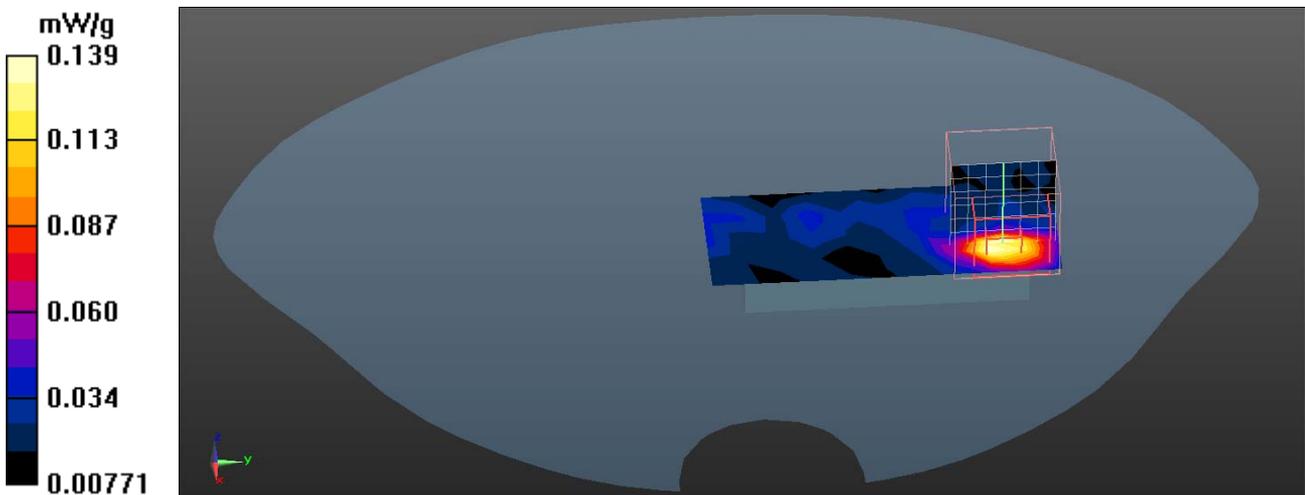
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(4.11, 4.11, 4.11); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.139 mW/g

Configuration/Body/Zoom Scan (7x7x9) (7x7x7)/Cube 0: Measurement grid:
dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 2.034 V/m; Power Drift = 1.54 dB
Peak SAR (extrapolated) = 0.377 W/kg
SAR(1 g) = 0.148 mW/g; SAR(10 g) = 0.059 mW/g
Maximum value of SAR (measured) = 0.165 mW/g



Antenna Kit : ASKEY: Tx2 Antenna: P/N: WLU5090-D61

Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11n_20M TX2 5240-Back

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5240 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5240$ MHz; $\sigma = 5.33$ mho/m; $\epsilon_r = 49.83$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Ambient Temperature (°C) : 22.6, Liquid Temperature (°C) : 21.3

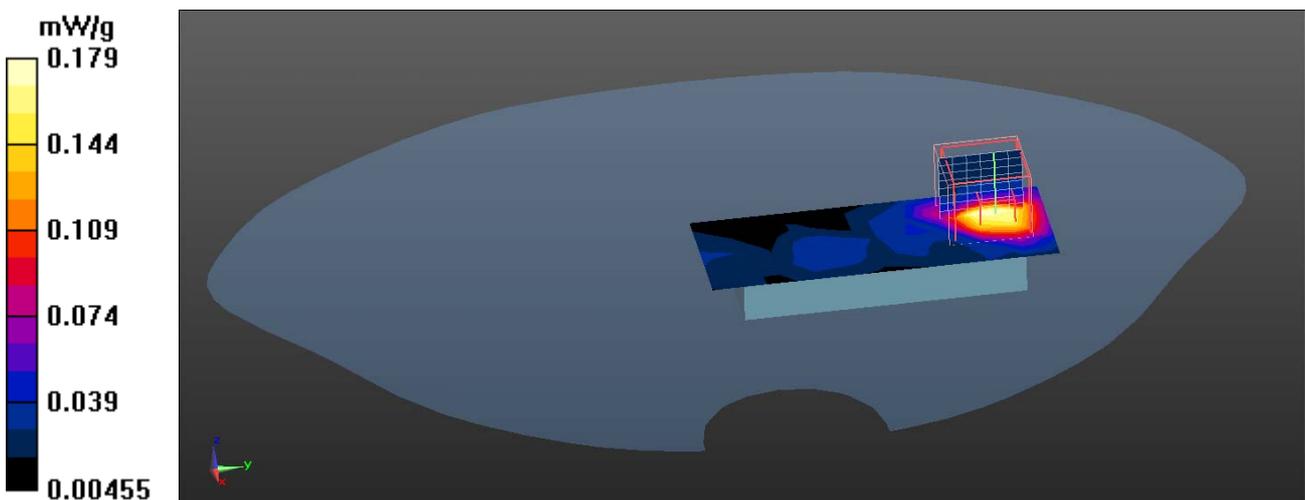
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(4.11, 4.11, 4.11); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (measured) = 0.179 mW/g

Configuration/Body/Zoom Scan (7x7x9) (7x7x9)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2.5mm
 Reference Value = 2.529 V/m; Power Drift = 0.16 dB
 Peak SAR (extrapolated) = 0.462 W/kg
SAR(1 g) = 0.143 mW/g; SAR(10 g) = 0.058 mW/g
 Maximum value of SAR (measured) = 0.224 mW/g



Test Laboratory: Quietek

Date/Time: 2011/9/13

802.11n_40M_TX2_5230-Back

DUT: USB; Type: N53

Communication System: WLAN5G; Frequency: 5230 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 5230 \text{ MHz}$; $\sigma = 5.28 \text{ mho/m}$; $\epsilon_r = 49.98$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Ambient Temperature ($^{\circ}\text{C}$) : 22.6, Liquid Temperature ($^{\circ}\text{C}$) : 21.3

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3698; ConvF(4.11, 4.11, 4.11); Calibrated: 2010/7/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1207; Calibrated: 2011/5/19
- Phantom: SAM with left table; Type: SAM
- Measurement SW: DASYS2, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

Configuration/Body/Area Scan (5x11x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$
 Maximum value of SAR (measured) = 0.151 mW/g

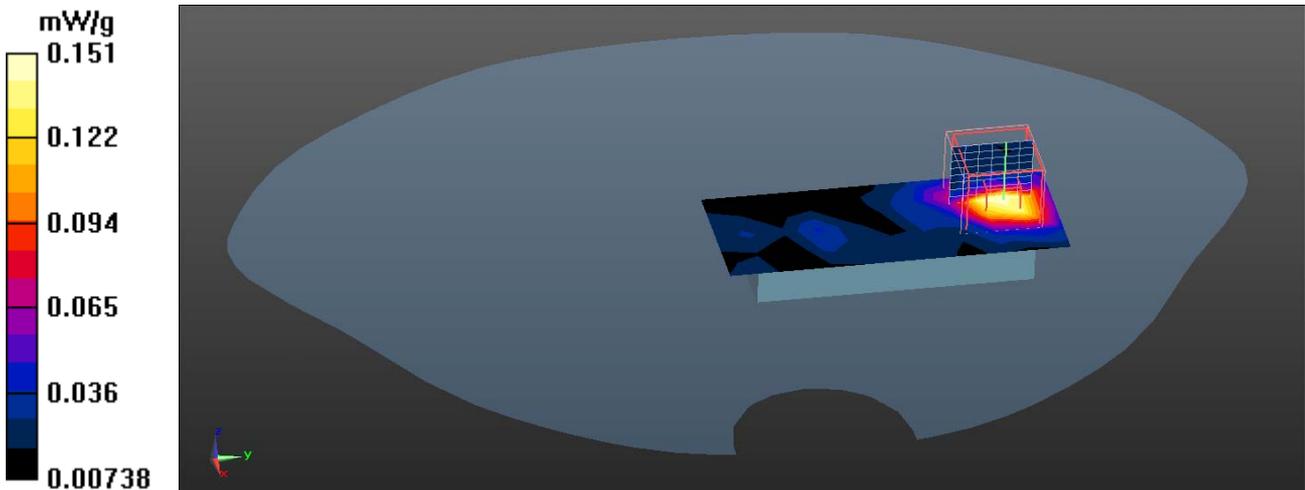
Configuration/Body/Zoom Scan (7x7x9) (7x7x9)/Cube 0: Measurement grid:
 $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2.5\text{mm}$

Reference Value = 2.212 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.372 W/kg

SAR(1 g) = 0.137 mW/g; SAR(10 g) = 0.050 mW/g

Maximum value of SAR (measured) = 0.187 mW/g



802.11a Tx1 Antenna EUT Back Z-Axis plot

Channel: 44

