FCC OET BULLETIN 65 SUPPLEMENT C 01-01
IEEE STD 1528:2003

SAR EVALUATION REPORT

For

Intel® Centrino® Advanced-N6205
(Tested inside of Panasonic Tablet PC CF-H2)

MODEL NUMBER: WL11A
FCC ID: ACJ9TGWL11A

REPORT NUMBER: 32EE0254-HO-R1

ISSUE DATE: January 10, 2012

Prepared for

PANASONIC CORPORATION OF NORTH AMERICA
ONE PANASONIC WAY, 4B-8
SECAUCUS, NEW JERSEY 07094, U.S.A.

Prepared by

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NVLAP LAB CODE: 200572-0

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	December 24, 2011	Initial Issue	--
1	January 10, 2012	Deleted Section 15 Corrected cal date and reference SAR Value of D2450V2 SN713 in Section 9. *This report is a revised version of 32EE0254-HO, which is replaced with this report.	M. Fujimura

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1. ATTESTATION OF TEST RESULTS

Company name:	PANASONIC CORPORATION OF NORTH AMERICA ONE PANASONIC WAY, 4B-8 SECAUCUS, NEW JERSEY 07094, U.S.A.		
EUT Description:	Intel® Centrino® Advanced-N6205 (Tested inside of Panasonic Tablet PC CF-H2)		
Model number:	WL11A		
Device Category:	Portable		
Exposure category:	General Population/Uncontrolled Exposure		
Date of tested:	December 24, 2011		
FCC Rule Parts	Freq. Range [MHz]	The Highest 1g SAR	Limit (W/kg)
15.247 / RSS-102	2412 – 2462	0.065 mW/g (Bottom(Handle Touch))	1.6
	5725 – 5850	0.295 mW/g (Bottom(Handle Touch))	
15.407 / RSS-102	5150 – 5250	0.253 mW/g (Bottom(Handle Touch))	
	5250 – 5350	0.265 mW/g (Bottom(Handle Touch))	
	5470 – 5725	0.411 mW/g (Bottom(Handle Touch))	
Applicable Standards			Test Results
OET Bulletin 65 Supplement C 01-01, IEEE STD 1528: 2003,			Pass

UL Japan, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Japan, Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Japan, Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Japan, Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C Edition 01-01, IEEE STD 1528:2003, and the following KDB Procedures.

- 248227 SAR measurement procedures for 802.11a/b/g transmitters
- 447498 D01 Mobile Portable RF Exposure v04

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN.

UL Japan, Inc. is accredited by NVLAP, Laboratory Code 200572-0

The full scope of accreditation can be viewed at
http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap

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4. CALIBRATION AND UNCERTANTY

4.1. MEASURING INSTRUMENT CALIBRATION

<SAR measurement>

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MPM-01	Power Meter	Agilent	E4417A	GB41290639	SAR	2011/02/01 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	SAR	2011/08/09 * 12
MPSE-01	Power Sensor	Agilent	E9300B	US40010300	SAR	2011/01/28 * 12
MPSE-03	Power Sensor	Agilent	E9327A	US40440576	SAR	2011/02/02 * 12
MPSE-17	Power Sensor	Anritsu	MA2411B	011598	SAR	2011/09/02 * 12
MAT-15	Attenuator(30dB)	Agilent	8498A	US40010300	SAR	2011/02/16 * 12
MSG-10	Signal Generator	Agilent	N5181A	MY47421098	SAR	2011/09/22 * 12
MRFA-08	Pre Amplifier	TSJ	TCBP0206	-	SAR	2011/03/27 * 12
MHDC-12	Dual Directional Coupler	Hewlett Packard	772D	2839A0016	SAR	Pre Check
EST-08	Network Analyzer	Agilent	8753ES	US39174808	SAR	2011/05/11 * 12
MDPK-01	Dielectric probe kit	Agilent	85070D	702	SAR	2011/10/25 * 24
EST-46	3.5mm Calibration Kit	Agilent	85052D	MY43252869	SAR	2011/06/13 * 12
MRENT-82	Dosimetric E-Field Probe	Schmid&Partner Engineering AG	EX3DV4	3540	SAR	2011/07/21 * 12
MDAE-01	Data Acquisition Electronics	Schmid&Partner Engineering AG	DAE4	509	SAR	2011/07/20 * 12
COTS-MSAR-03	Dasy5	Schmid&Partner Engineering AG	DASY52.6.1.408	-	SAR	-
COTS-MSAR-02	S-Parameter Network Analyzer	Agilent	-	-	SAR	-
MDA-07	Dipole Antenna	Schmid&Partner Engineering AG	D2450V2	713	SAR	2010/09/06 * 36
MDA-08	Dipole Antenna	Schmid&Partner Engineering AG	D5GHzV2	1020	SAR	2010/08/23 * 36
MPS-01	SAM Phantom	Schmid&Partner Engineering AG	SAM Twin Phantom V4.0	1196	SAR	Pre Check
MDH-01	Device holder	Schmid&Partner Engineering AG	Mounting device for transmitter	-	SAR	Pre Check
MOS-26	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q29	SAR	2011/05/26 * 12
MOS-10	Digtal thermometer	HANNA	Checktemp-2	MOS-10	SAR	2011/08/22 * 12
MBM-13	Barometer	Sunoh	SBR121	837	SAR	2011/03/14 * 36
MSL2450					Daily check Target value ± 5%	
MSL Broadband 3-6GHz					Daily check Target value ± 5%	
SAR room					Daily check : Ambient Noise<0.012W/kg	

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4.2. MEASUREMENT UNCERTAINTY

The uncertainty budget has been determined for the DASY5 measurement system according to the SPEAG documents[2] and is given in the following Table.

Error Description	Uncertainty value ± %	Probability distribution	divisor	(ci) 1g	Standard Uncertainty (1g)	vi or veff
Measurement System						
Probe calibration	±6.55	Normal	1	1	±6.55	∞
Axial isotropy of the probe	±4.7	Rectangular	√3	0.7	±1.9	∞
Spherical isotropy of the probe	±9.6	Rectangular	√3	0.7	±3.9	∞
Boundary effects	±2.0	Rectangular	√3	1	±1.2	∞
Probe linearity	±4.7	Rectangular	√3	1	±2.7	∞
Detection limit	±1.0	Rectangular	√3	1	±0.6	∞
Readout electronics	±0.3	Normal	1	1	±0.3	∞
Response time	±0.8	Rectangular	√3	1	±0.5	∞
Integration time	±2.6	Rectangular	√3	1	±1.5	∞
RF ambient Noise	±3.0	Rectangular	√3	1	±1.7	∞
RF ambient Reflections	±3.0	Rectangular	√3	1	±1.7	∞
Probe Positioner	±0.8	Rectangular	√3	1	±0.5	∞
Probe positioning	±9.9	Rectangular	√3	1	±5.7	∞
Max.SAR Eval.	±4.0	Rectangular	√3	1	±2.3	∞
Test Sample Related						
Device positioning	±2.9	Normal	1	1	±2.9	7
Device holder uncertainty	±3.6	Normal	1	1	±3.6	7
Power drift	±5.0	Rectangular	√3	1	±2.9	∞
Phantom and Setup						
Phantom uncertainty	±4.0	Rectangular	√3	1	±2.3	∞
Liquid conductivity (target)	±5.0	Rectangular	√3	0.64	±1.8	∞
Liquid conductivity (meas.)	+2.67	Rectangular	1	0.64	±1.7	∞
Liquid permittivity (target)	±5.0	Rectangular	√3	0.6	±1.7	∞
Liquid permittivity (meas.)	+3.35	Rectangular	1	0.6	±2.3	∞
Combined Standard Uncertainty					**±12.907**	
Expanded Uncertainty (k=2)					**±25.8**	

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5. EQUIPMENT UNDER TEST

Intel® Centrino® Advanced-N6205, Model WL11A. (Tested inside of Panasonic Tablet PC CF-H2)	
Normal operation:	Multiple display orientations supporting portrait and landscape configurations.
Antenna tested:	Manufactured: Intel Corporation Part number: Main (Chain A): DFUP2070ZA(1) Aux (Chain B): DFUP2070ZA(2)
Antenna-to-antenna/user separation distances:	Refer to Sec. 15 for details of antenna locations and separation distances.
Simultaneous transmission:	• WWAN can transmit simultaneously with WiFi • WWAN can transmit simultaneously with Bluetooth • WiFi can transmit simultaneously with Bluetooth
Assessment for SAR evaluation for Simultaneous transmission:	**WiFi and BT** Due to Bluetooth's maximum output is < $60/f_{(GHz)}$ mW and standalone SAR is not required, WiFi and Bluetooth are not considered as co-located transmitters with each other. Bluetooth Module – FCC ID: ACJ9TGBT11A, IC: 216ACFBT11A. Max. Power: 16.22 mW **WWAN and BT** Same as WiFi and BT **WWAN and WiFi** SAR is not required due to $\sum (SAR_{1g})$ < SAR limit. WWAN co-located RF exposure assessment will be addressed in a separate FCC application filed under WWAN application.

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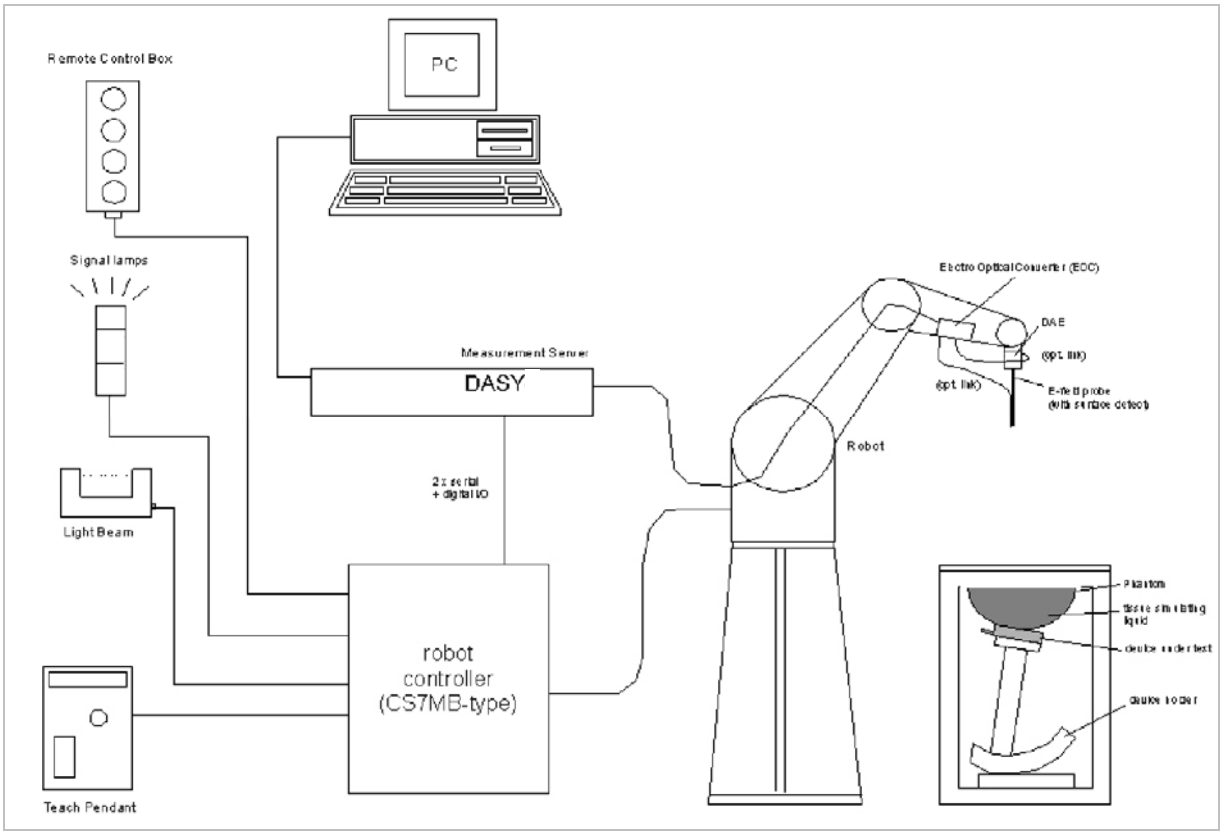
6. SYSTEM SPECIFICATIONS



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

- A standard high precision 6-axis robot (Stäubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition 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 function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 2000 or Windows XP.
- DASY software.
- Remote controls with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing validating the proper functioning of the system.

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7. COMPOSITION OF INGREDIENTS FOR TISSUE SIMULATING LIQUIDS

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Salt: 99+% Pure Sodium Chloride Sugar: 98+% Pure Sucrose
Water: De-ionized, 16 MΩ+ resistivity HEC: Hydroxyethyl Cellulose
DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

Simulating Liquids for 5 GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	78
Mineral oil	11
Emulsifiers	9
Additives and Salt	2

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8. TISSUE DIELECTRIC PARAMETERS

The simulating liquids are checked at the beginning of a series of SAR measurements to determine if the dielectric parameters are within the tolerances of the specified target values. For frequencies in 300 MHz to just under 2 GHz, the measured conductivity and relative permittivity were within ± 5% of the target values. For frequencies above 2 GHz the measured conductivity was within ± 5% of the target values. The measured relative permittivity tolerance was within ± 10% of the target value.

Reference Values of Tissue Dielectric Parameters for Head & Body Phantom

The body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations and extrapolated according to the head parameters specified in IEEE Standard 1528.

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.8
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
750	41.96	0.89	55.6	0.96
835	41.5	0.9	55.2	0.97
900	41.5	0.97	55	1.05
915	41.5	0.98	55	1.06
1450	40.5	1.2	54	1.3
1610	40.3	1.29	53.8	1.4
1750	40.08	1.37	53.44	1.49
1800 – 2000	40	1.4	53.3	1.52
2450	39.2	1.8	52.7	1.95
3000	38.5	2.4	52	2.73

(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

Reference Values of Tissue Dielectric Parameters for Body Phantom (for 3000 MHz – 5800 MHz)

In the current guidelines and draft standards for compliance testing of mobile phones (i.e., IEEE P1528, OET 65 Supplement C), the dielectric parameters suggested for head and body tissue simulating liquid are given only at 3.0 GHz and 5.8 GHz. As an intermediate solution, dielectric parameters for the frequencies between 5 to 5.8 GHz were obtained using linear interpolation (see table below).

SPEAG has developed suitable head and body tissue simulating liquids consisting of the following ingredients: de-ionized water, salt and a special composition including mineral oil and an emulgators. Dielectric parameters of these liquids were measured suing a HP 8570C Dielectric Probe Kit in conjunction with HP 8753ES Network Analyzer (30 kHz – 6G Hz). The differences with respect to the interpolated values were well within the desired ±5% for the whole 5 to 5.8 GHz range.

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
5000	36.2	4.45	49.3	5.07
5100	36.1	4.55	49.1	5.18
5200	36.0	4.66	49.0	5.30
5300	35.9	4.76	48.9	5.42
5400	35.8	4.86	48.7	5.53
5500	35.6	4.96	48.6	5.65
5600	35.5	5.07	48.5	5.77
5700	35.4	5.17	48.3	5.88
5800	35.3	5.27	48.2	6.00

(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

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TISSUE PARAMETERS CHECK RESULTS

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
2011/12/24	Body 2437	e'	51.3590	Relative Permittivity (ϵ_r):	51.36	52.73	-2.59	5
		e"	14.4681	Conductivity (σ):	1.96	1.93	1.52	5
	Body 2450	e'	51.3061	Relative Permittivity (ϵ_r):	51.31	52.70	-2.64	5
		e"	14.5293	Conductivity (σ):	1.98	1.95	1.50	5

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
2011/12/24	Body 5200	e'	50.6642	Relative Permittivity (ϵ_r):	50.66	49.02	3.35	10
		e"	18.2025	Conductivity (σ):	5.26	5.29	-0.60	5
	Body 5300	e'	50.4785	Relative Permittivity (ϵ_r):	50.48	48.88	3.26	10
		e"	18.3510	Conductivity (σ):	5.41	5.41	-0.06	5
	Body 5500	e'	50.1050	Relative Permittivity (ϵ_r):	50.11	48.61	3.07	10
		e"	18.6501	Conductivity (σ):	5.70	5.64	1.05	5
	Body 5600	e'	49.9159	Relative Permittivity (ϵ_r):	49.92	48.48	2.97	10
		e"	18.8011	Conductivity (σ):	5.85	5.76	1.62	5
	Body 5745	e'	49.6504	Relative Permittivity (ϵ_r):	49.65	48.28	2.84	10
		e"	19.0156	Conductivity (σ):	6.07	5.93	2.43	5
	Body 5785	e'	49.5707	Relative Permittivity (ϵ_r):	49.57	48.23	2.79	10
		e"	19.0667	Conductivity (σ):	6.13	5.98	2.62	5
	Body 5800	e'	49.5452	Relative Permittivity (ϵ_r):	49.55	48.20	2.79	10
		e"	19.1011	Conductivity (σ):	6.16	6.00	2.67	5

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9. SYSTEM VERIFICATION

The system performance check is performed prior to any usage of the system in order to verify SAR system measurement accuracy. The system performance check verifies that the system operates within its specifications of ±10%.

Measurement Conditions

- The measurements were performed in the flat section of the SAM twin phantom filled with Head or Body simulating liquid of the following parameters.
- The DASY5 system with an Isotropic E-Field EX3DV4 SN 3540 was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (2.4 GHz) fine cube was chosen for cube integration and Special 8x8x10 (5 GHz) fine cube was chosen for cube integration
- Distance between probe sensors and phantom surface was set to 2 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power

Reference SAR Values for HEAD & BODY-tissue from calibration certificate of SPEAG.

System validation dipole	Cal. certificate #	Cal. date	Cal. Freq. (GHz)	SAR Avg (mW/g)		
				Tissue:	Head	Body
D2450V2 SN 713	D2450V2-713_Sep06	9/6/10	2.45	1g SAR:	51.8	52.0
				10g SAR:	24.3	24.2
D5GHzV2 SN 1020	D5GHzV2-1020_Aug11	8/11/11	5.2	1g SAR:	75.9	75.2
				10g SAR:	21.6	21.1
			5.5	1g SAR:	79.1	80.0
				10g SAR:	22.4	22.2
			5.8	1g SAR:	73.1	74.5
				10g SAR:	20.8	20.7

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9.1. SYSTEM CHECK RESULTS

System validation dipole	Date Tested	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
		Tissue:	Body			
D2450V2 (2.45GHz)	12/24/11	1g SAR:	50.1	52	-3.65	±10
		10g SAR:	23.6	24.2	-2.48	
D5GHzV2 (5.2GHz)	12/24/11	1g SAR:	75.7	75.2	0.66	±10
		10g SAR:	20.9	21.1	-0.95	
D5GHzV2 (5.5GHz)	12/24/11	1g SAR:	80.1	80.0	0.12	±10
		10g SAR:	21.9	22.2	-1.35	
D5GHzV2 (5.8GHz)	12/24/11	1g SAR:	78.7	74.5	5.64	±10
		10g SAR:	21.4	20.7	3.38	

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10. SAR MEASUREMENT PROCEDURES

Step 1: Power Reference Measurement
The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The Minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: Area Scan
The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY5 software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal 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 Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Step 3: Zoom Scan
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. The Zoom Scan measures ≥ 7x7x9 (above 4.5 GHz) or 5x5x7 (below 3 GHz) points within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Step 4: Power drift measurement
The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

Step 5: Z-Scan
The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation, the extrapolated distance should not be larger than the step size in Z-direction.

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11. RF OUTPUT POWER VERIFICATION

The following procedures had been used to prepare the EUT for the SAR test.
The client provided a special driver and program, Intel DRTU v1.3.12-0263, which enable a user to control the frequency and output power of the module.

11.1. RF OUTPUT POWER FOR 2.4 GHZ BAND

2.4 GHz Band						
Mode	Ch. #	Freq. (MHz)	Original Target Pwr (dBm)		Actual Measured Pwr (dBm)	
			Chain A	Chain B	Chain A	Chain B
802.11b	1	2412	15.5			
	6	2437	**15.7**		**15.76**	
	11	2462	15.5			
	1	2412		15.6		
	6	2437		**15.5**		**15.55**
	11	2462		15.6		
802.11g	1	2412	14.0			
	6	2437	**16.6**		**16.65**	
	11	2462	14.0			
	1	2412		14.1		
	6	2437		**16.5**		16.56
	11	2462		14.1		
802.11n HT20	1	2412	13.1			
	6	2437	**16.5**		16.53	
	11	2462	12.4			
	1	2412		13.1		
	6	2437		**16.8**		**16.90**
	11	2462		12.8		
	1	2412	11.6	11.6		
	6	2437	13.7	13.7		
	11	2462	11.9	11.7		
802.11n HT40	3	2422	9.1			
	6	2437	**16.6**		16.61	
	9	2450	9.6			
	3	2422		9.6		
	6	2437		**16.4**		16.52
	9	2450		10.0		
	3	2422	8.0	8.0		
	6	2437	13.7	13.7		
	9	2450	8.6	8.6		

Notes:

1. The modes with highest output power channel were chosen for the conducted output power.
2. Original target power is from EMC report. Please refer to original report (FCC ID: PD962205ANH) for Average Power information as documented in 09/13/2010 original filing.

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11.2. RF OUTPUT POWER FOR 5 GHZ BANDS

5.2 GHz Band						
Mode	Ch. #	Freq. (MHz)	Original Target Pwr (dBm)		Actual Measured Pwr (dBm)	
			Chain A	Chain B	Chain A	Chain B
802.11a	36	5180	16.1			
	40	5200	**16.0**		**16.17**	
	48	5240	16.1			
	36	5180		16.2		
	40	5200		**16.1**		**16.14**
	48	5240		16.1		
802.11n HT20	36	5180	15.6			
	40	5200	16.1			
	48	5240	16.1			
	36	5180		15.6		
	40	5200		16.1		
	48	5240		16.0		
	36	5180	10.5	10.5		
	40	5200	11.0	11.1		
	48	5240	11.0	10.5		
802.11n HT40	38	5190	11.1			
	46	5230	16.1			
	38	5190		11.1		
	46	5230		16.0		
	38	5190	8.5	8.3		
	46	5230	11.7	10.6		

Notes:

1. The modes with highest output power channel were chosen for the conducted output power.
2. Original target power is from EMC report. Please refer to original report (FCC ID: PD962205ANH) for Average Power information as documented in 09/13/2010 original filing.

5.3 GHz Band						
Mode	Ch. #	Freq. (MHz)	Original Target Pwr (dBm)		Actual Measured Pwr (dBm)	
			Chain A	Chain B	Chain A	Chain B
802.11a	52	5260	16.1			
	60	5300	**16.2**		**16.38**	
	64	5320	16.1			
	52	5260		16.2		
	60	5300		**16.2**		16.33
	64	5320		16.2		
802.11n HT20	52	5260	16.2			
	60	5300	16.1			
	64	5320	16.0			
	52	5260		16.2		
	60	5300		16.1		
	64	5320		16.2		
	52	5260	10.6	10.9		
	60	5300	11.0	10.2		
	64	5320	10.5	10.3		
802.11n HT40	54	5270	**16.5**		16.51	
	62	5310	11.2			
	54	5270		**16.6**		**16.62**
	62	5310		11.1		
	54	5270	10.8	11.3		
	62	5310	7.9	7.5		

Notes:

1. The modes with highest output power channel were chosen for the conducted output power.
2. Original target power is from EMC report. Please refer to original report (FCC ID: PD962205ANH) for Average Power information as documented in 09/13/2010 original filing.

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5.5 GHz Band						
Mode	Ch. #	Freq. (MHz)	Original Target Pwr (dBm)		Actual Measured Pwr (dBm)	
			Chain A	Chain B	Chain A	Chain B
802.11a	100	5500	16.6			
	120	5600	**16.6**		**16.68**	
	140	5700	16.6			
	100	5500		16.6		
	120	5600		**16.7**		**16.72**
	140	5700		16.5		
802.11n HT20	100	5500	16.7			
	120	5600	16.7			
	140	5700	16.5			
	100	5500		16.6		
	120	5600		16.6		
	140	5700		16.7		
	100	5500	11.3	10.9		
	120	5600	11.5	12.2		
	140	5700	12.0	11.7		
802.11n HT40	102	5510	13.7			
	118	5590	16.5			
	134	5670	16.5			
	102	5510		13.6		
	118	5590		16.7		
	134	5670		16.7		
	102	5510	10.3	10.8		
	118	5590	11.2	11.2		
	134	5670	11.4	11.8		

Notes:

1. The modes with highest output power channel were chosen for the conducted output power.
2. Original target power is from EMC report. Please refer to original report (FCC ID: PD962205ANH) for Average Power information as documented in 09/13/2010 original filing.

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5.8 GHz Band						
Mode	Ch. #	Freq. (MHz)	Original Target Pwr (dBm)		Actual Measured Pwr (dBm)	
			Chain A	Chain B	Chain A	Chain B
802.11a	149	5745	16.6			
	157	5785	**16.5**		**16.67**	
	165	5825	16.5			
	149	5745		16.5		
	157	5785		**16.5**		**16.65**
	165	5825		16.5		
802.11n HT20	149	5745	16.7			
	157	5785	**16.7**		16.73	
	165	5825	16.6			
	149	5745		**16.7**		16.76
	157	5785		16.6		
	165	5825		16.6		
	149	5745	13.6	13.7		
	157	5785	13.7	13.7		
	165	5825	13.6	13.7		
802.11n HT40	151	5755	**16.7**		16.71	
	159	5795	16.6			
	151	5755		16.5		
	159	5795		16.6		
	151	5755	13.6	13.7		
	159	5795	13.5	13.7		

Notes:

1. The modes with highest output power channel were chosen for the conducted output power.
2. Original target power is from EMC report. Please refer to original report (FCC ID: PD962205ANH) for Average Power information as documented in 09/13/2010 original filing.

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12. SUMMARY OF SAR TEST RESULTS

12.1. SUMMARY OF SAR TEST CONFIGURATIONS

Configuration	Antenna-to-User distance	SAR Required	Comments
(1) Bottom/Base	62.28 mm From Main (Chain A)-to-user	Yes	
	14.37 mm From Aux (Chain B)-to-user	Yes	
(2) Bottom/Base/ Tilt	18 mm From Main (Chain A)-to-user	Yes	The handle is not-removable and that is why the tilt position was used rather than a touch position during testing.
	91 mm From Aux (Chain B)-to-user	No	
Primary Landscape	200 mm From Main (Chain A)-to-user	No	This is not the most conservative antenna-to-user distance at edge mode. Per According to KDB 447498 4) b) ii) (2)
	30 mm From Aux (Chain B)-to-user	No	This is not the most conservative antenna-to-user distance at edge mode. Per According to KDB 447498 4) b) ii) (2)
Secondary Landscape	48 mm From Main (Chain A)-to-user	No	This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2), SAR is required only for the edge with the most conservative exposure conditions.
	190 mm From Aux (Chain B)-to-user	No	This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2), SAR is required only for the edge with the most conservative exposure conditions.
(3) Secondary Portrait	21 mm from Main (Chain A) antenna to edge	Yes	
(4) Primary Portrait	10.5 mm from Aux (Chain B) antenna to edge	Yes	

This test report is only for (2) Bottom/Base/Tilt. As for other test data, refer to the report number 11J13820-4 FCC SAR Report.

12.2. 2.4 GHz BAND

Bottom/Base/Tilt (Chain A)

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)	
			Chain A	Chain B	1g-SAR	10g-SAR
802.11b	1	2412				
	6	2437	15.76		0.064	0.026
	11	2462				
	1	2412				
	6	2437		15.55		
	11	2462				
802.11g	1	2412				
	6	2437	16.65		0.065	0.027
	11	2462				
802.11n HT20	1	2412				
	6	2437		16.90		
	11	2462				

Note:

The modes with highest output power channel were chosen for the conducted output power.

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12.3. 5 GHz BAND

Bottom/Base /Tilt (Chain A)

5.2 GHz Band						
Mode	Ch. #	Freq. (MHz)	Avg. Output Power (dBm)		Results (mW/g)	
			Chain A	Chain B	1g-SAR	10g-SAR
802.11a	36	5180				
	40	5200	16.17		0.253	0.110
	48	5240				
	36	5180				
	40	5200		16.14		
	48	5240				

5.3 GHz Band						
Mode	Ch. #	Freq. (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)	
			Chain A	Chain B	1g-SAR	10g-SAR
802.11a	52	5260				
	60	5300	16.38		0.265	0.111
	64	5320				
802.11n HT40	54	5270		16.62		
	62	5310				

5.6 GHz Band						
Mode	Ch. #	Freq. (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)	
			Chain A	Chain B	1g-SAR	10g-SAR
802.11a	100	5500				
	120	5600	16.68		0.411	0.176
	140	5700				
	100	5500				
	120	5600		16.72		
	140	5700				

5.8 GHz Band						
Mode	Ch. #	Freq. (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)	
			Chain A	Chain B	1g-SAR	10g-SAR
802.11a	149	5745				
	157	5785	16.67		0.295	0.130
	165	5825				
	149	5745				
	157	5785		16.65		
	165	5825				

Note:

The modes with highest output power channel were chosen for the conducted output power.

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13. Test Plots

2.4 GHZ

Date: 2011/12/24

Test Laboratory: UL Japan, Inc. Head Office EMC Lab. SAR Room

Bottom/Base/Tilt

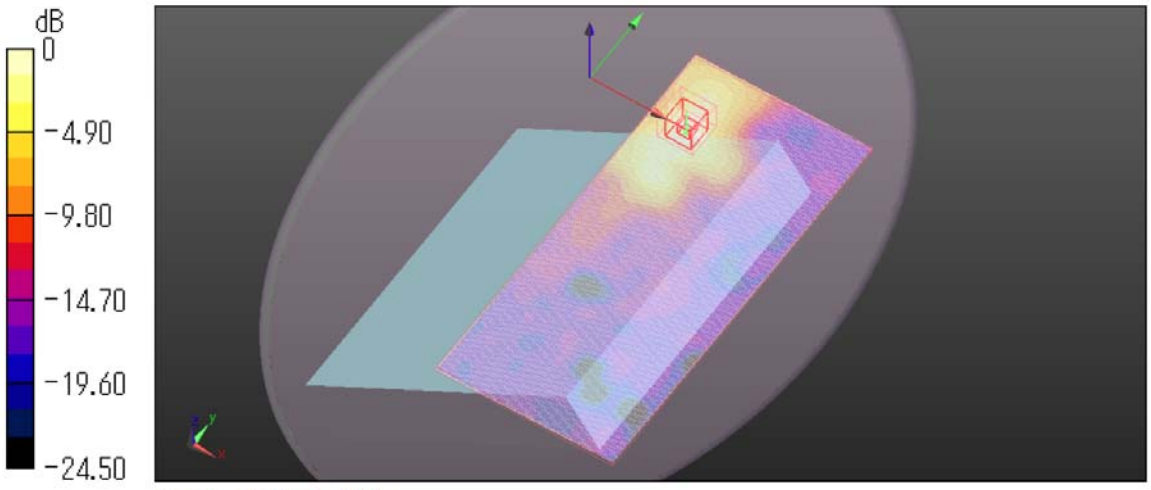
Communication System: WLAN 11a/b/g/n ; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.963 mho/m; ε_r = 51.352; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3540; ConvF(7.64, 7.64, 7.64); Calibrated: 2011/07/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn509; Calibrated: 2011/07/20
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1045
- Measurement SW: DASY52, Version 52.6 (2);SEMCAD X Version 14.4.5 (3634)

2.45GHz_11b_Mid-Ch/Area Scan (101x221x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.118 mW/g

2.45GHz_11b_Mid-Ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.678 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.268 W/kg
SAR(1 g) = 0.064 mW/g; SAR(10 g) = 0.026 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.116 mW/g



0 dB = 0.120mW/g

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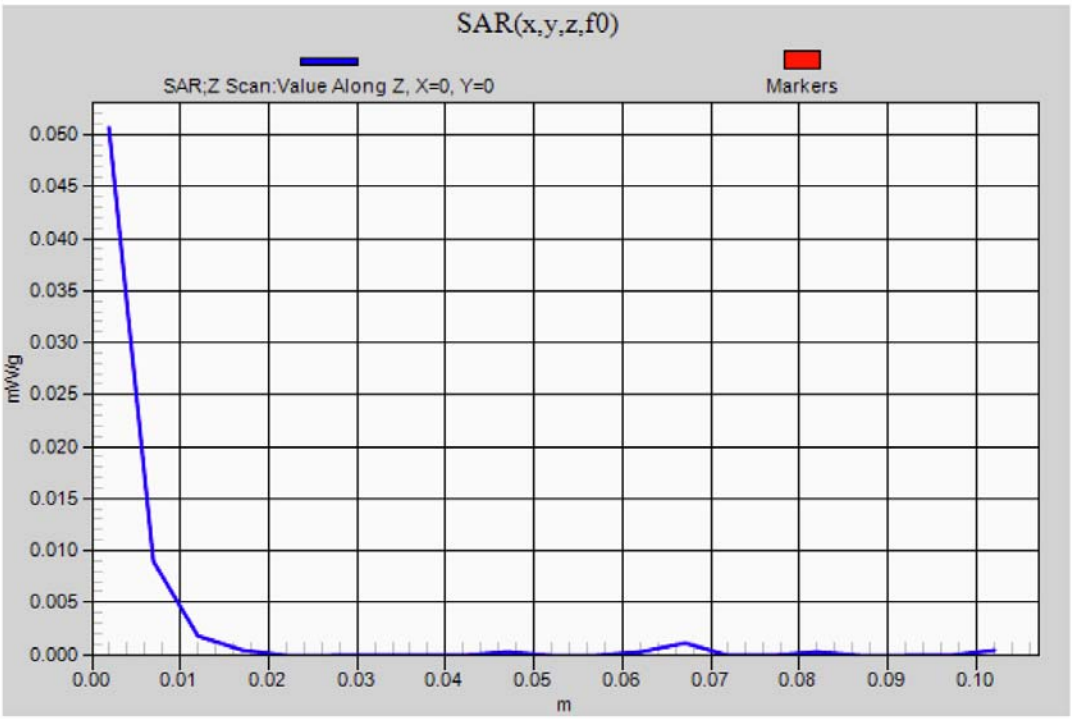
Date: 2011/12/24

Test Laboratory: UL Japan, Inc. Head Office EMC Lab. SAR Room

Bottom/Base/Tilt

Communication System: WLAN 11a/b/g/n ; Frequency: 2437 MHz;Duty Cycle: 1:1

2.45GHz_11b_Mid-Ch/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.051 mW/g



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Date: 2011/12/24

Test Laboratory: UL Japan, Inc. Head Office EMC Lab. SAR Room

Bottom/Base/Tilt

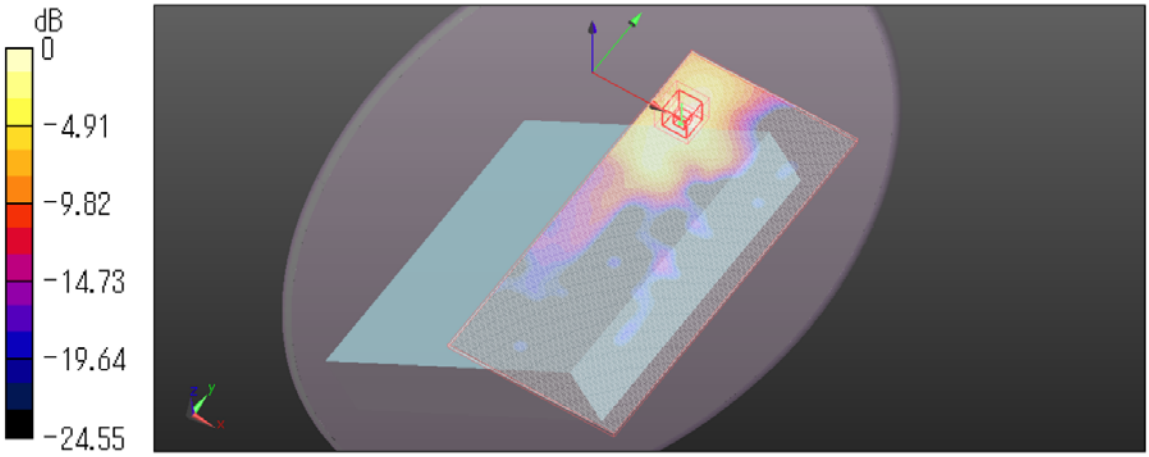
Communication System: WLAN 11a/b/g/n ; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.963 mho/m; ε_r = 51.352; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3540; ConvF(7.64, 7.64, 7.64); Calibrated: 2011/07/21
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn509; Calibrated: 2011/07/20
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1045
- Measurement SW: DASY52, Version 52.6 (2);SEMCAD X Version 14.4.5 (3634)

2.45GHz_11g_Mid-Ch/Area Scan (101x221x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.117 mW/g

2.45GHz_11g_Mid-Ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.665 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.275 W/kg
SAR(1 g) = 0.065 mW/g; SAR(10 g) = 0.027 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.118 mW/g



0 dB = 0.120mW/g

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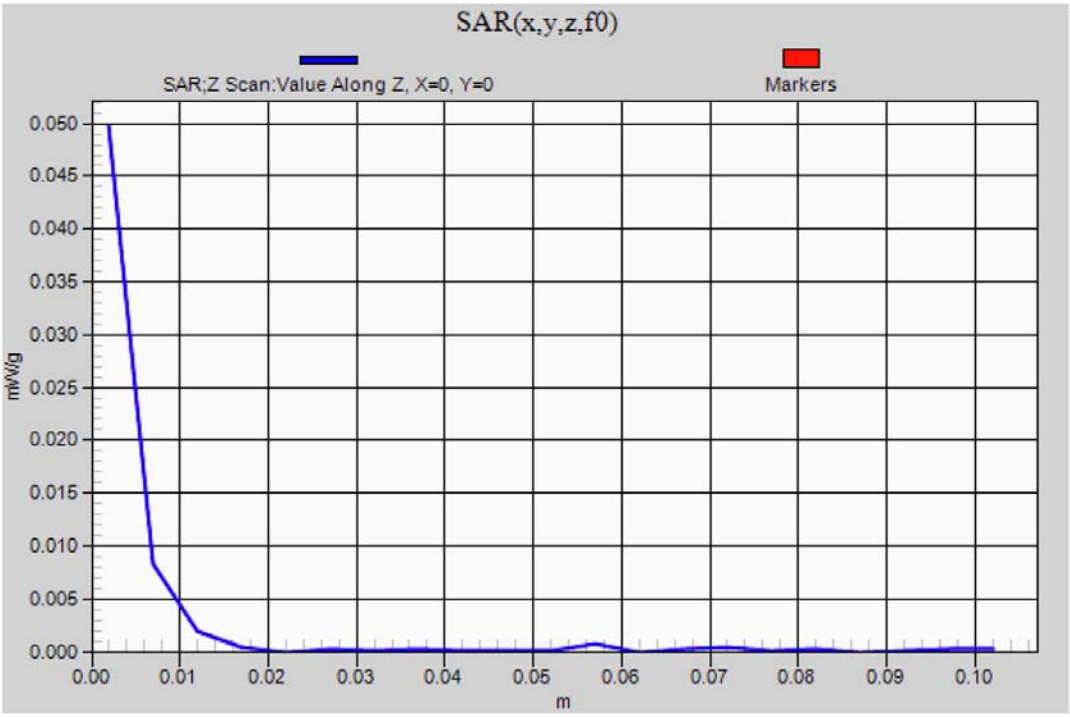
Date: 2011/12/24

Test Laboratory: UL Japan, Inc. Head Office EMC Lab. SAR Room

Bottom/Base/Tilt

Communication System: WLAN 11a/b/g/n ; Frequency: 2437 MHz;Duty Cycle: 1:1

2.45GHz_11g_Mid-Ch/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.050 mW/g



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Date: 2011/12/24

Test Laboratory: UL Japan, Inc. Head Office EMC Lab. SAR Room

Bottom/Base/Tilt

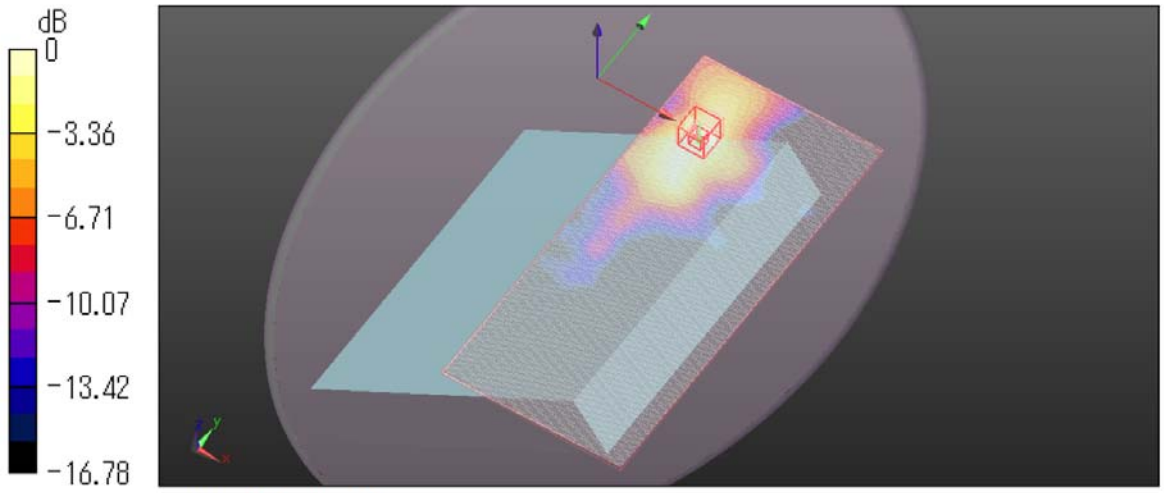
Communication System: WLAN 11a/b/g/n ; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.266 mho/m; ε_r = 50.664; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 deg. C

DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3540; ConvF(3.94, 3.94, 3.94); Calibrated: 2011/07/21
- Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn509; Calibrated: 2011/07/20
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1045
- Measurement SW: DASY52, Version 52.6 (2);SEMCAD X Version 14.4.5 (3634)

W52_11a_Mid-Ch/Area Scan 2 (101x221x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.412 mW/g

W52_11a_Mid-Ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 7.294 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.811 W/kg
SAR(1 g) = 0.253 mW/g; SAR(10 g) = 0.110 mW/g
Maximum value of SAR (measured) = 0.449 mW/g



0 dB = 0.450mW/g

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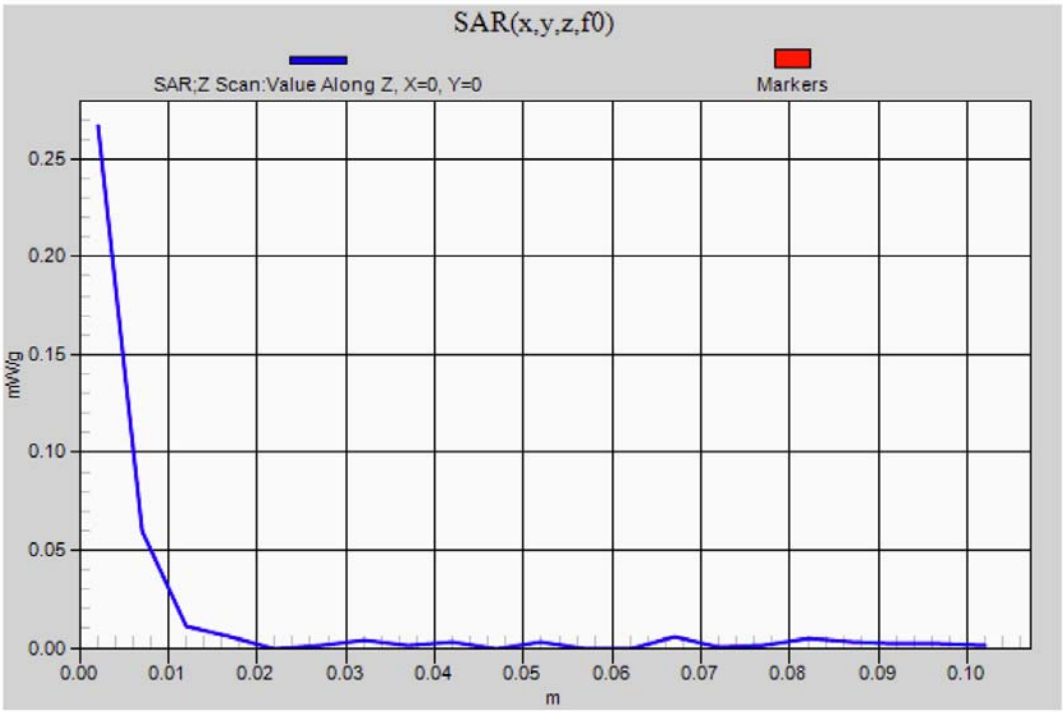
Date: 2011/12/24

Test Laboratory: UL Japan, Inc. Head Office EMC Lab. SAR Room

Bottom/Base/Tilt

Communication System: WLAN 11a/b/g/n ; Frequency: 5200 MHz;Duty Cycle: 1:1

W52_11a_Mid-Ch/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.267 mW/g



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Date: 2011/12/24

Test Laboratory: UL Japan, Inc. Head Office EMC Lab. SAR Room

Bottom/Base/Tilt

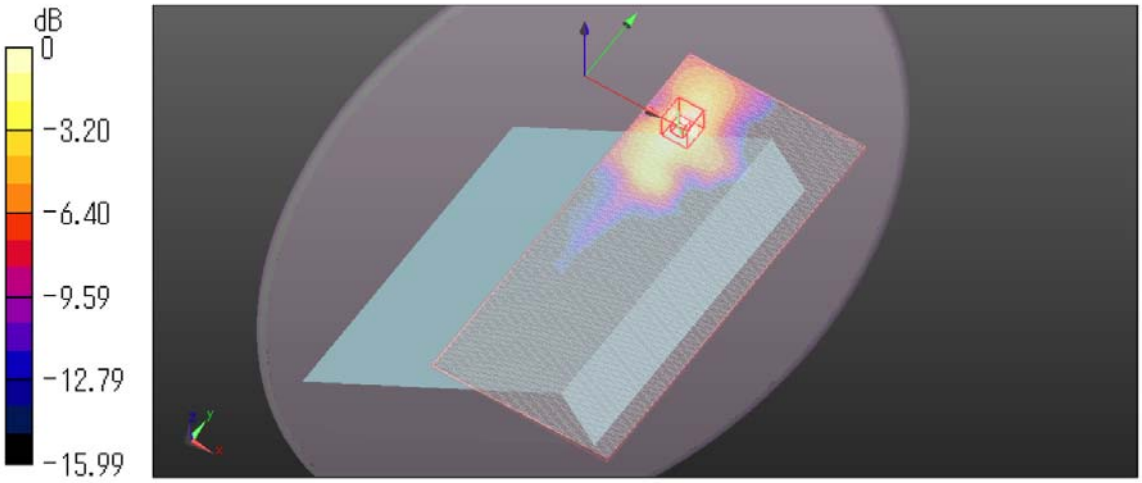
Communication System: WLAN 11a/b/g/n ; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5300 MHz; σ = 5.411 mho/m; ε_r = 50.478; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 deg. C

DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3540; ConvF(3.59, 3.59, 3.59); Calibrated: 2011/07/21
- Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn509; Calibrated: 2011/07/20
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1045
- Measurement SW: DASY52, Version 52.6 (2);SEMCAD X Version 14.4.5 (3634)

W53_11a_Mid-Ch/Area Scan (101x221x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.461 mW/g

W53_11a_Mid-Ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 7.057 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.912 W/kg
SAR(1 g) = 0.265 mW/g; SAR(10 g) = 0.111 mW/g
Maximum value of SAR (measured) = 0.471 mW/g



0 dB = 0.470mW/g

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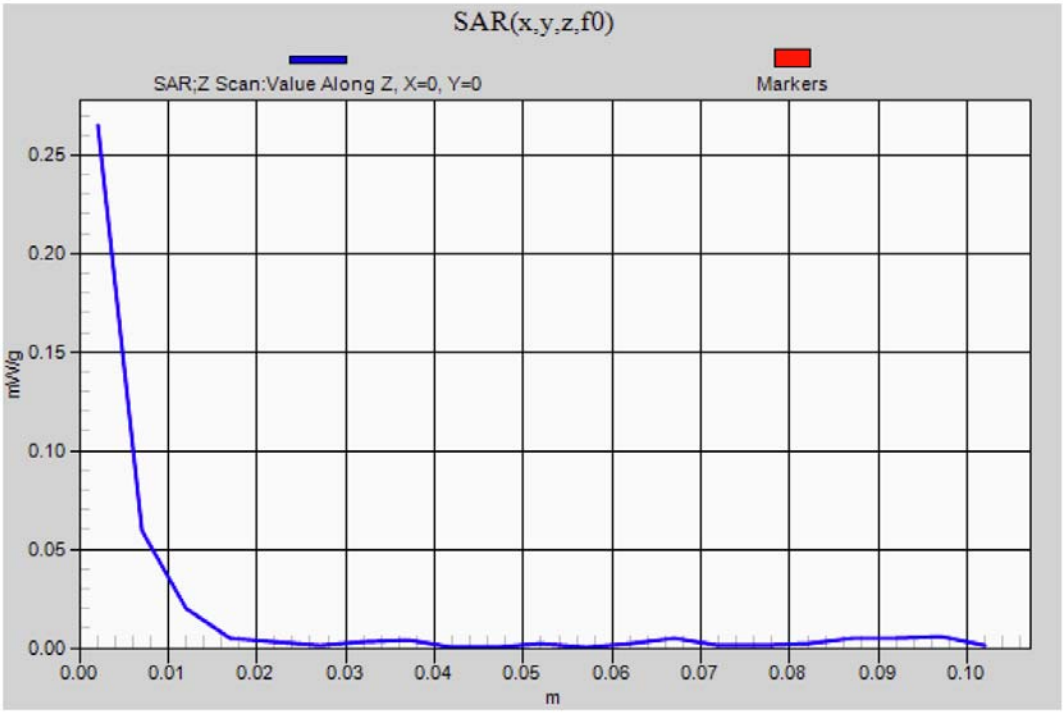
Date: 2011/12/24

Test Laboratory: UL Japan, Inc. Head Office EMC Lab. SAR Room

Bottom/Base/Tilt

Communication System: WLAN 11a/b/g/n ; Frequency: 5300 MHz;Duty Cycle: 1:1

W53_11a_Mid-Ch/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.265 mW/g



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Date: 2011/12/24

Test Laboratory: UL Japan, Inc. Head Office EMC Lab. SAR Room

Bottom/Base/Tilt

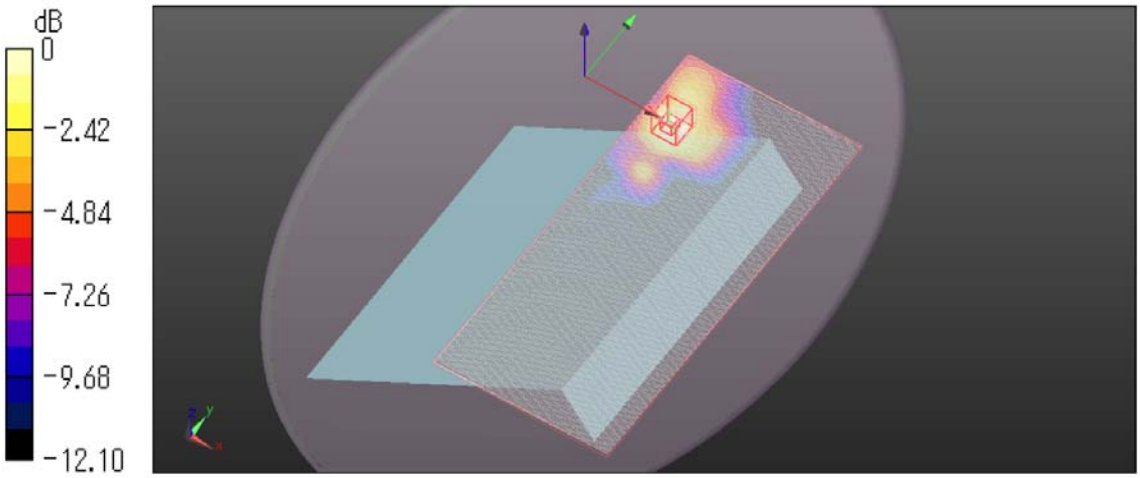
Communication System: WLAN 11a/b/g/n ; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.857 mho/m; ε_r = 49.916; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 deg. C

DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3540; ConvF(3.25, 3.25, 3.25); Calibrated: 2011/07/21
- Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn509; Calibrated: 2011/07/20
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1045
- Measurement SW: DASY52, Version 52.6 (2);SEMCAD X Version 14.4.5 (3634)

W56_11a_Mid-Ch/Area Scan 2 (101x221x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.679 mW/g

W56_11a_Mid-Ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 9.025 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.425 W/kg
SAR(1 g) = 0.411 mW/g; SAR(10 g) = 0.176 mW/g
Maximum value of SAR (measured) = 0.742 mW/g



0 dB = 0.740mW/g

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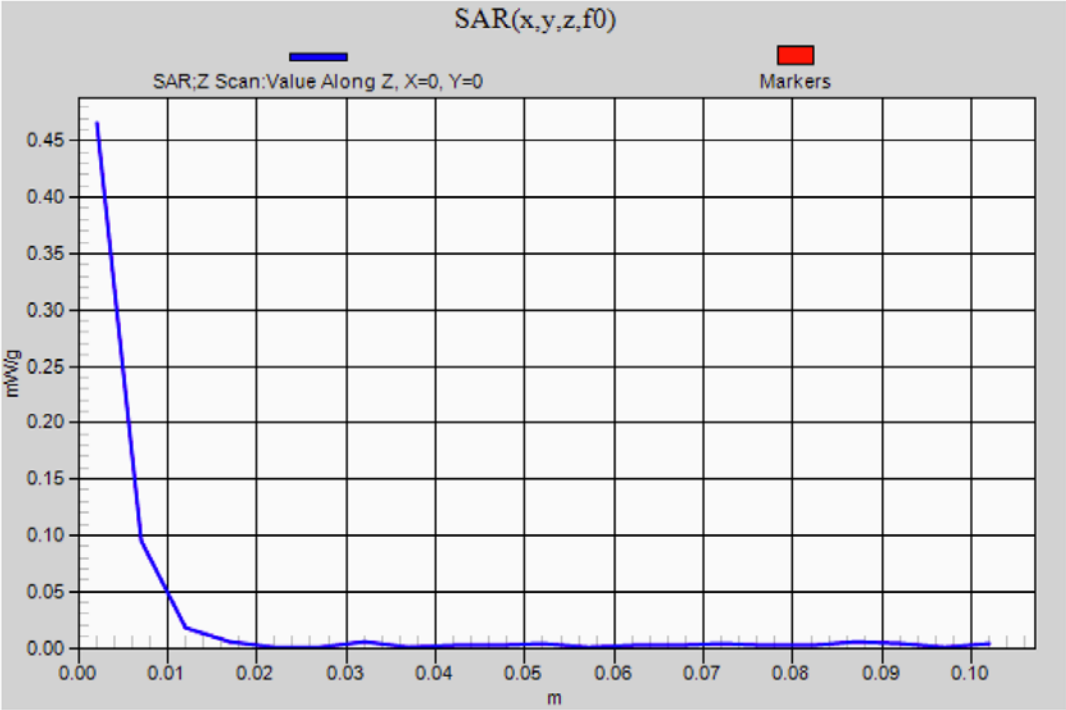
Communication System: WLAN 11a/b/g/n ; Frequency: 5600 MHz;Duty Cycle: 1:1

W56_11a_Mid-Ch/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.466 mW/g



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Test Laboratory: UL Japan, Inc. Head Office EMC Lab. SAR Room

Bottom/Base/Tilt

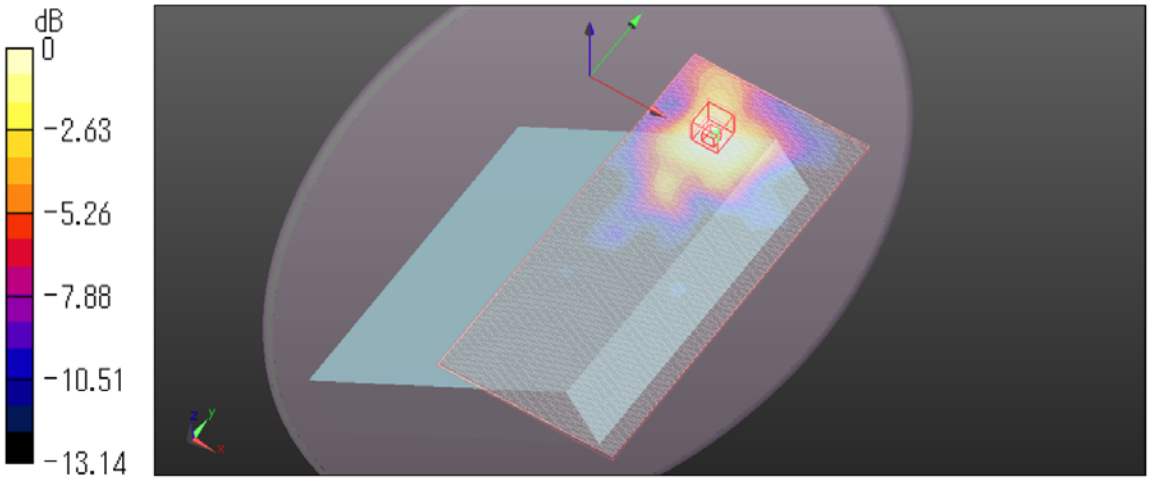
Communication System: WLAN 11a/b/g/n ; Frequency: 5785 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5785 MHz; σ = 6.136 mho/m; ε_r = 49.571; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 deg. C

DASY5 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3540; ConvF(3.4, 3.4, 3.4); Calibrated: 2011/07/21
- Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn509; Calibrated: 2011/07/20
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1045
- Measurement SW: DASY52, Version 52.6 (2);SEMCAD X Version 14.4.5 (3634)

W58_11a_Mid-Ch/Area Scan (101x221x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.545 mW/g

W58_11a_Mid-Ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 8.682 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 1.099 W/kg
SAR(1 g) = 0.295 mW/g; SAR(10 g) = 0.130 mW/g
Maximum value of SAR (measured) = 0.540 mW/g



0 dB = 0.540mW/g

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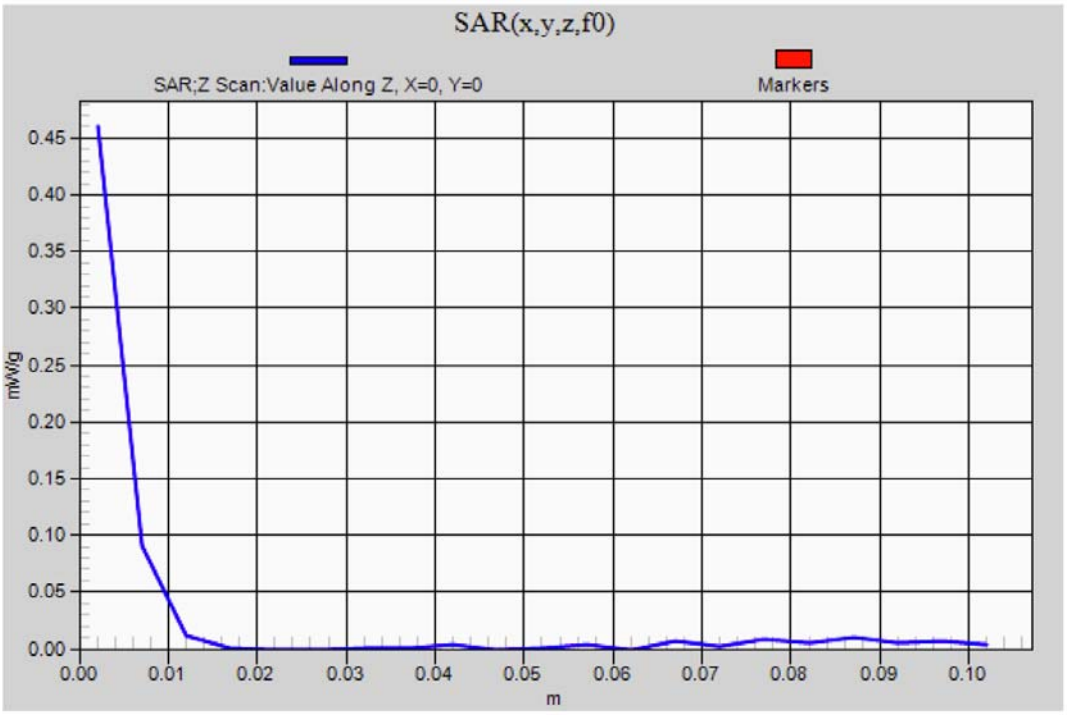
Bottom/Base/Tilt

Communication System: WLAN 11a/b/g/n ; Frequency: 5785 MHz;Duty Cycle: 1:1

W58_11a_Mid-Ch/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.460 mW/g



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14. Appendixes

Refer to separated files for the following appendixes

14.1. Appendix A: System Check Plots

14.2. Appendix B: Calibration Certificate for EX3DV4 SN 509

14.3. Appendix C: Calibration Certificate for D2450V2 SN 713

14.4. Appendix D: Calibration Certificate for D5GHzV2 SN 1020

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