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-C1)

MODEL NUMBER: WL11A
FCC ID: ACJ9TGWL11A

REPORT NUMBER: 11J13739-3

ISSUE DATE: May 5, 2011

Prepared for

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

Prepared by

COMPLIANCE CERTIFICATION SERVICES (UL CCS)
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	May 5, 2011	Initial Issue	--

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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-C1)
Model number:	WL11A
Device Category:	Portable
Exposure category:	General Population/Uncontrolled Exposure
Date of tested:	March 31 – April 5, 2011 & April 27– May 4, 2011

FCC Rule Parts	Freq. Range [MHz]	The Highest 1g SAR	Limit (W/kg)
15.247	2400 – 2483.5	0.135 W/kg Primary Landscape	1.6
	5725 – 5850	0.166 W/kg Primary Landscape	
15.407	5150 – 5250	0.091 W/kg Primary Landscape	
	5250 – 5350	0.200 W/kg Primary Landscape	
	5470 – 5725	0.156 W/kg Primary Landscape	

Applicable Standards	Test Results
OET Bulletin 65 Supplement C 01-01, IEEE STD 1528: 2003	Pass

Compliance Certification Services (UL CCS) 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 CCS 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 CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS 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 (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released For UL CCS By:	Tested By:
	and
Sunny Shih Engineering Team Leader Compliance Certification Services (UL CCS)	Chenghua Yang and Chakrit Thammanavarat RF Engineer Compliance Certification Services (UL CCS)

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, January 1, 2011 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 47173 Benicia Street, Fremont, California, USA.

UL CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due date		
				MM	DD	Year
Robot - Six Axes	Stäubli	RX90BL	N/A	N/A		
Robot Remote Control	Stäubli	CS7MB	3403-91535	N/A		
DASY4 Measurement Server	SPEAG	SEUMS001BA	1041	N/A		
Probe Alignment Unit	SPEAG	LB (V2)	261	N/A		
Oval Flat Phantom (ELI 4.0)	SPEAG	QD OVA001 B	1003	N/A		
Oval Flat Phantom (ELI 4.0)	SPEAG	QD OVA001 B	1099	N/A		
Dielectronic Probe kit	HP	85070C	N/A	N/A		
Wireless comunication test set	Agilent	E5515C (8960)	GB46160222	6	17	2012
E-Field Probe	SPEAG	EX3DV3	3686	1	24	2012
E-Field Probe	SPEAG	EX3DV4	3749	12	13	2011
Data Acquisition Electronics	SPEAG	DAE4	1239	11	17	2011
Data Acquisition Electronics	SPEAG	DAE3	427	7	21	2011
System Validation Dipole	SPEAG	D2450V2	706	4	19	2012
System Validation Dipole	SPEAG	*D5GHzV2	1075	9	3	2011
Thermometer	ERTCO	639-1S	1718	7	19	2011
Amplifier	Mini-Circuits	ZVE-8G	90606	N/A		
Amplifier	Mini-Circuits	ZHL-42W	D072701-5	N/A		
ESA Series Network Analyzer	Agilent	E5071B	MY42100131	8	2	2011
Synthesized Signal Generator	HP	83732B	US34490599	7	14	2012
Power Meter	Giga-tronics	8651A	8651404	3	13	2012
Power Sensor	Giga-tronics	80701A	1834588	3	13	2012
Simulating Liquid	SPEAG	M2450	N/A	Within 24 hrs of first test		
Simulating Liquid	SPAEG	M5800	N/A	Within 24 hrs of first test		

***Note:** Per KDB 450824 D02 requirements for dipole calibration, UL CCS has adopted two years calibration intervals. On annual basis, each measurement dipole has been evaluated and is in compliance with the following criteria:

1. There is no physical damage on the dipole
2. System validation with specific dipole is within 10% of calibrated value.
3. Return-loss is within 20% of calibrated measurement (test data on file in UL CCS)
4. Impedance is within 5Ω of calibrated measurement (test data on file in UL CCS)

COMPLIANCE CERTIFICATION SERVICES (UL CCS) FORM NO: CCSUP4031B
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4.2. MEASUREMENT UNCERTAINTY

Measurement uncertainty for 300 MHz to 3 GHz averaged over 1 gram

Component	error, %	Probe Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1) @ Body 2450 MHz	5.50	Normal	1	1	5.50
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	3.45	Rectangular	1.732	1	1.99
System Detection Limits	1.00	Rectangular	1.732	1	0.58
Readout Electronics	0.30	Normal	1	1	0.30
Response Time	0.80	Rectangular	1.732	1	0.46
Integration Time	2.60	Rectangular	1.732	1	1.50
RF Ambient Conditions - Noise	3.00	Rectangular	1.732	1	1.73
RF Ambient Conditions - Reflections	3.00	Rectangular	1.732	1	1.73
Probe Positioner Mechanical Tolerance	0.40	Rectangular	1.732	1	0.23
Probe Positioning with respect to Phantom	2.90	Rectangular	1.732	1	1.67
Extrapolation, Interpolation and Integration	1.00	Rectangular	1.732	1	0.58
Test Sample Related					
Test Sample Positioning	2.90	Normal	1	1	2.90
Device Holder Uncertainty	3.60	Normal	1	1	3.60
Output Power Variation - SAR Drift	5.00	Rectangular	1.732	1	2.89
Phantom and Tissue Parameters					
Phantom Uncertainty (shape and thickness)	4.00	Rectangular	1.732	1	2.31
Liquid Conductivity - deviation from target	5.00	Rectangular	1.732	0.64	1.85
Liquid Conductivity - measurement	3.22	Normal	1	0.64	2.06
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement	3.33	Normal	1	0.6	2.00
Combined Standard Uncertainty Uc(y) =					9.87
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				19.73	%
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				1.56	dB

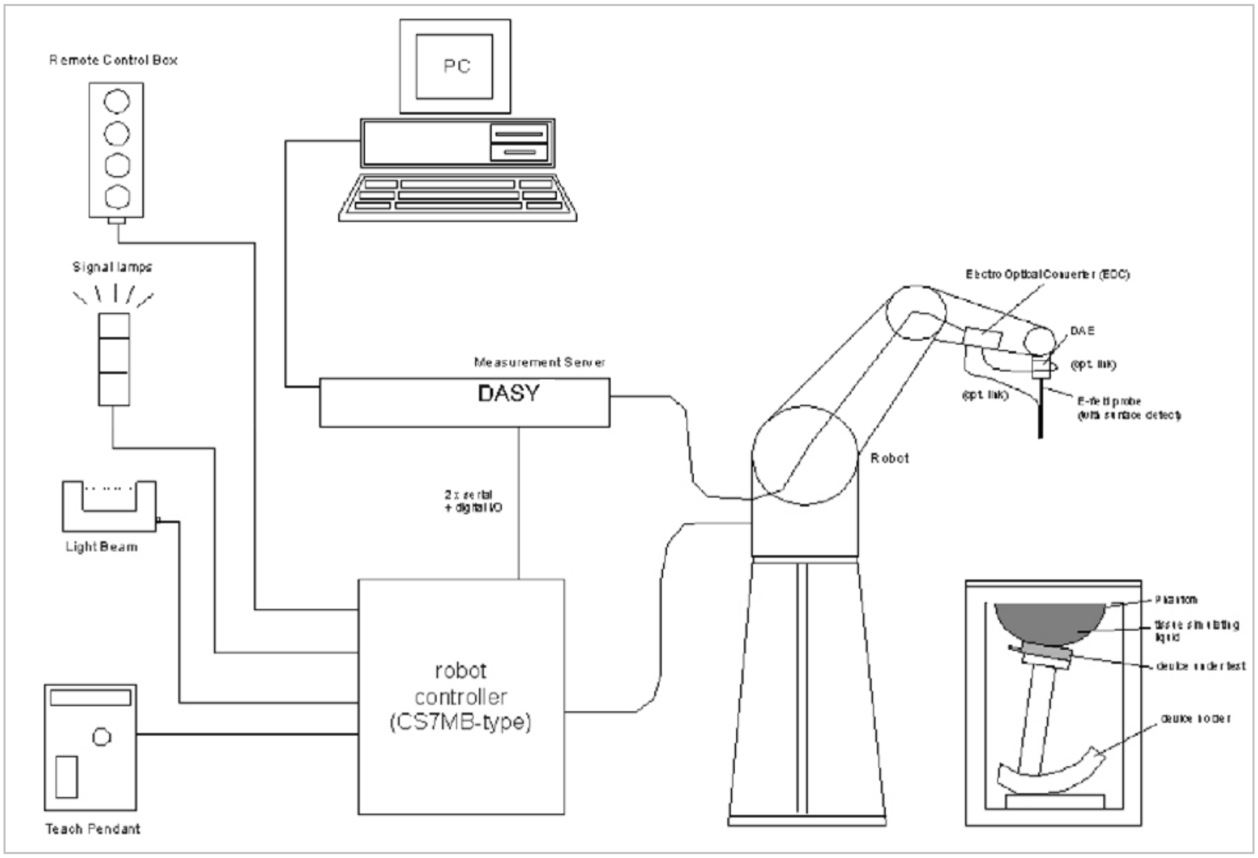
3 to 6 GHz averaged over 1 gram

Component	error, %	Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1) @ 5GHz	6.55	Normal	1	1	6.55
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	3.45	Rectangular	1.732	1	1.99
System Detection Limits	1.00	Rectangular	1.732	1	0.58
Readout Electronics	1.00	Normal	1	1	1.00
Response Time	0.80	Rectangular	1.732	1	0.46
Integration Time	2.60	Rectangular	1.732	1	1.50
RF Ambient Conditions - Noise	3.00	Rectangular	1.732	1	1.73
RF Ambient Conditions - Reflections	3.00	Rectangular	1.732	1	1.73
Probe Positioner Mechanical Tolerance	0.40	Rectangular	1.732	1	0.23
Probe Positioning with respect to Phantom	2.90	Rectangular	1.732	1	1.67
Extrapolation, Interpolation and Integration	3.90	Rectangular	1.732	1	2.25
Test Sample Related					
Test Sample Positioning	1.10	Normal	1	1	1.10
Device Holder Uncertainty	3.60	Normal	1	1	3.60
Output Power Variation - SAR Drift	5.00	Rectangular	1.732	1	2.89
Phantom and Tissue Parameters					
Phantom Uncertainty (shape and thickness)	4.00	Rectangular	1.732	1	2.31
Liquid Conductivity - deviation from target	5.00	Rectangular	1.732	0.64	1.85
Liquid Conductivity - measurement	2.62	Normal	1	0.64	1.68
Liquid Permittivity - deviation from target	10.00	Rectangular	1.732	0.6	3.46
Liquid Permittivity - measurement uncertainty	3.89	Normal	1	0.6	2.33
Combined Standard Uncertainty Uc(y), %:					10.84
Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence =				21.24	%
Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence =				1.67	dB

5. EQUIPMENT UNDER TEST

Intel® Centrino® Advanced-N6205, Model WL11A. (Tested inside of Panasonic Tablet PC CF-C1)	
Normal operation:	Laptop mode - with display open at 90° to the keyboard Tablet mode - Multiple display orientations supporting both portrait and landscape configurations.
Antenna tested:	Manufactured: Intel Corporation Part number: Main (Chain A) Antenna: DFUP1886ZA-1 Aux (Chain B) Antenna: DFUP1886ZA-2
Antenna-to-antenna/user separation distances:	Refer to Sec. 14 for details of antenna locations and separation distances.
Assessment for SAR evaluation for Simultaneous transmission:	WiFi can transmit simultaneously with Bluetooth. WiFi can transmit simultaneously with Bluetooth. Due to Bluetooth's (FCC ID: ACJ9TGBT11B) maximum output < 60/f(GHz) mW and stand-alone SAR is not required, thus WiFi and Bluetooth are not considered as co-located transmitters each other WWAN co-located RF exposure assessment will be addressed in a separate FCC application filed under WWAN application.

6. SYSTEM SPECIFICATIONS



The DASY4 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.

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

8. TISSUE DIELECTRIC PARAMETERS

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine of 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 should be within ± 5% of the target values. For frequencies in the range of 2–3 GHz and above the measured conductivity should be within ± 5% of the target values. The measured relative permittivity tolerance can be relaxed to no more than ± 10%.

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
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
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)

8.1. TISSUE PARAMETERS CHECK RESULTS

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ? %)
3/31/2011	Body 5200	e'	48.3473	Relative Permittivity (ϵ_r):	48.35	49.02	-1.37	10
		e''	18.1939	Conductivity (σ):	5.26	5.29	-0.65	5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
March 31, 2011 08:30 AM

Frequency	e'	e''
4600000000.	49.7013	17.1955
4650000000.	49.5107	17.2320
4700000000.	49.4586	17.3736
4750000000.	49.2603	17.3857
4800000000.	49.1811	17.5398
4850000000.	49.0541	17.5802
4900000000.	48.9790	17.7136
4950000000.	48.8679	17.7760
5000000000.	48.7910	17.8846
5050000000.	48.6922	17.9456
5100000000.	48.6091	18.0312
5150000000.	48.4432	18.0915
5200000000.	**48.3473**	**18.1939**
5250000000.	48.1980	18.2495
5300000000.	48.1484	18.3453
5350000000.	47.9895	18.4003
5400000000.	47.9926	18.5090
5450000000.	47.8173	18.5397
5500000000.	**47.8166**	**18.6693**
5550000000.	47.6313	18.6712
5600000000.	47.5587	18.8024
5650000000.	47.4300	18.8205
5700000000.	47.3417	18.9334
5750000000.	47.2238	18.9631
5800000000.	**47.1464**	**19.0913**
5850000000.	47.0872	19.1277
5900000000.	46.9423	19.2127
5950000000.	46.8423	19.2577
6000000000.	46.6920	19.3324

The conductivity (σ) can be given as:

$$\sigma = \omega\varepsilon_0 e'' = 2\pi f \varepsilon_0 e''$$

where f = target $f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
4/1/2011	Body 5200	e'	48.5206	Relative Permittivity (ϵ_r):	48.52	49.02	-1.02	10
		e''	17.9986	Conductivity (σ):	5.20	5.29	-1.71	5
4/1/2011	Body 5500	e'	48.0396	Relative Permittivity (ϵ_r):	48.04	48.61	-1.18	10
		e''	18.5390	Conductivity (σ):	5.67	5.64	0.44	5
4/1/2011	Body 5800	e'	47.3466	Relative Permittivity (ϵ_r):	47.35	48.20	-1.77	10
		e''	18.8098	Conductivity (σ):	6.07	6.00	1.10	5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 38%
April 01, 2011 08:54 AM

Frequency	e'	e''
4600000000.	49.7761	16.9827
4650000000.	49.7220	17.1691
4700000000.	49.6285	17.1821
4750000000.	49.4879	17.3390
4800000000.	49.4568	17.3989
4850000000.	49.2598	17.4858
4900000000.	49.2344	17.5936
4950000000.	49.1076	17.6515
5000000000.	48.9670	17.7721
5050000000.	48.9676	17.9049
5100000000.	48.6931	17.8860
5150000000.	48.6970	18.0813
5200000000.	**48.5206**	**17.9986**
5250000000.	48.4857	18.2191
5300000000.	48.4304	18.1605
5350000000.	48.2215	18.3113
5400000000.	48.2774	18.3521
5450000000.	47.9717	18.3921
5500000000.	**48.0396**	**18.5390**
5550000000.	47.8360	18.5228
5600000000.	47.7551	18.6403
5650000000.	47.7243	18.6885
5700000000.	47.5409	18.7122
5750000000.	47.5279	18.8448
5800000000.	**47.3466**	**18.8098**
5850000000.	47.2928	18.9852
5900000000.	47.2045	18.9524
5950000000.	47.0475	19.0755
6000000000.	47.0295	19.1500

The conductivity (σ) can be given as:

$$\sigma = \omega\varepsilon_0 e'' = 2\pi f \varepsilon_0 e''$$

where f = target $f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ? %)
4/4/2011	Body 5200	e'	49.3266	Relative Permittivity (ϵ_r):	49.33	49.02	0.63	10
		e"	18.2049	Conductivity (σ):	5.26	5.29	-0.59	5
4/4/2011	Body 5500	e'	48.7258	Relative Permittivity (ϵ_r):	48.73	48.61	0.23	10
		e"	18.6509	Conductivity (σ):	5.70	5.64	1.05	5
4/4/2011	Body 5800	e'	48.1330	Relative Permittivity (ϵ_r):	48.13	48.20	-0.14	10
		e"	19.0930	Conductivity (σ):	6.16	6.00	2.62	5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
April 04, 2011 09:02 AM

Frequency	e'	e''
4600000000.	50.5372	17.1518
4650000000.	50.4467	17.2337
4700000000.	50.3450	17.3434
4750000000.	50.2540	17.4236
4800000000.	50.1428	17.5237
4850000000.	50.0546	17.6035
4900000000.	49.9373	17.6970
4950000000.	49.8468	17.7795
5000000000.	49.7388	17.8714
5050000000.	49.6375	17.9557
5100000000.	49.5332	18.0447
5150000000.	49.4253	18.1151
5200000000.	**49.3266**	**18.2049**
5250000000.	49.2311	18.2684
5300000000.	49.1171	18.3509
5350000000.	49.0321	18.4243
5400000000.	48.9197	18.5019
5450000000.	48.8243	18.5790
5500000000.	**48.7258**	**18.6509**
5550000000.	48.6272	18.7262
5600000000.	48.5329	18.7985
5650000000.	48.4277	18.8671
5700000000.	48.3347	18.9426
5750000000.	48.2361	19.0156
5800000000.	**48.1330**	**19.0930**
5850000000.	48.0479	19.1655
5900000000.	47.9422	19.2420
5950000000.	47.8600	19.3167
6000000000.	47.7491	19.3936

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target $f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
4/5/2011	Body 5200	e'	48.5197	Relative Permittivity (ϵ_r):	48.52	49.02	-1.02	10
		e"	17.8941	Conductivity (σ):	5.17	5.29	-2.28	5
4/5/2011	Body 5500	e'	47.9221	Relative Permittivity (ϵ_r):	47.92	48.61	-1.42	10
		e"	18.3205	Conductivity (σ):	5.60	5.64	-0.74	5
4/5/2011	Body 5800	e'	47.3431	Relative Permittivity (ϵ_r):	47.34	48.20	-1.78	10
		e"	18.7493	Conductivity (σ):	6.05	6.00	0.78	5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
April 05, 2011 09:03 AM

Frequency	e'	e"
4600000000.	49.7188	16.8581
4650000000.	49.6243	16.9322
4700000000.	49.5262	17.0483
4750000000.	49.4347	17.1198
4800000000.	49.3266	17.2297
4850000000.	49.2358	17.3023
4900000000.	49.1236	17.4018
4950000000.	49.0337	17.4760
5000000000.	48.9246	17.5685
5050000000.	48.8248	17.6433
5100000000.	48.7239	17.7363
5150000000.	48.6203	17.7956
5200000000.	**48.5197**	**17.8941**
5250000000.	48.4231	17.9462
5300000000.	48.3156	18.0396
5350000000.	48.2254	18.0961
5400000000.	48.1144	18.1826
5450000000.	48.0288	18.2455
5500000000.	**47.9221**	**18.3205**
5550000000.	47.8282	18.3875
5600000000.	47.7307	18.4668
5650000000.	47.6364	18.5285
5700000000.	47.5382	18.6075
5750000000.	47.4448	18.6703
5800000000.	**47.3431**	**18.7493**
5850000000.	47.2655	18.8101
5900000000.	47.1523	18.8823
5950000000.	47.0715	18.9550
6000000000.	46.9624	19.0271

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target f * 10^6

$\varepsilon_0 = 8.854 * 10^{-12}$

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ? %)
04/27/2011	Body 2450	e'	50.9428	Relative Permittivity (ϵ_r):	50.94	52.70	-3.33	5
		e''	14.7174	Conductivity (σ):	2.00	1.95	2.82	5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 39%
April 27, 2011 09:30 AM

Frequency	e'	e''
2410000000.	51.0771	14.5371
2415000000.	51.0124	14.5541
2420000000.	50.9582	14.5640
2425000000.	50.9815	14.5749
2430000000.	51.0097	14.5856
2435000000.	50.9928	14.6258
2440000000.	50.8668	14.6552
2445000000.	50.9158	14.6308
2450000000.	**50.9428**	**14.7174**
2455000000.	50.9938	14.7095
2460000000.	50.8996	14.7732
2465000000.	50.8469	14.8048
2470000000.	50.8334	14.7900
2475000000.	50.8374	14.9011
2480000000.	50.7069	14.8639
2485000000.	50.7951	14.9294

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target $f \cdot 10^{6}$

$\varepsilon_0 = 8.854 \cdot 10^{-12}$

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ? %)
04/28/2011	Body 2450	e'	51.7121	Relative Permittivity (ϵ_r):	51.71	52.70	-1.87	5
		e''	14.7758	Conductivity (σ):	2.01	1.95	3.22	5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 38%
April 28, 2011 07:58 AM

Frequency	e'	e''
2410000000.	51.9054	14.6168
2415000000.	51.8714	14.6771
2420000000.	51.8722	14.7111
2425000000.	51.8769	14.7212
2430000000.	51.8723	14.6376
2435000000.	51.8161	14.7421
2440000000.	51.7373	14.7817
2445000000.	51.7967	14.8212
2450000000.	**51.7121**	**14.7758**
2455000000.	51.7520	14.8565
2460000000.	51.7136	14.8855
2465000000.	51.7571	14.7982
2470000000.	51.7614	14.9224
2475000000.	51.6719	14.9655
2480000000.	51.6974	14.9700
2485000000.	51.5920	14.9399

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target $f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
5/3/2011	Body 5200	e'	47.4436	Relative Permittivity (ϵ_r):	47.44	49.02	-3.22	10
		e"	18.0119	Conductivity (σ):	5.21	5.29	-1.64	5
5/3/2011	Body 5500	e'	46.9446	Relative Permittivity (ϵ_r):	46.94	48.61	-3.43	10
		e"	18.4207	Conductivity (σ):	5.63	5.64	-0.20	5
5/3/2011	Body 5800	e'	46.3231	Relative Permittivity (ϵ_r):	46.32	48.20	-3.89	10
		e"	18.8012	Conductivity (σ):	6.06	6.00	1.06	5

Liquid Check
Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C; Relative humidity = 40%
May 03, 2011 03:24 PM

Frequency	e'	e"
4600000000.	48.5413	16.9813
4650000000.	48.4520	17.0856
4700000000.	48.4542	17.1494
4750000000.	48.3062	17.2525
4800000000.	48.2412	17.4204
4850000000.	48.1824	17.2612
4900000000.	48.0445	17.4211
4950000000.	47.8924	17.5475
5000000000.	47.8994	17.6340
5050000000.	47.7925	17.6731
5100000000.	47.5737	17.8526
5150000000.	47.5706	17.8906
5200000000.	**47.4436**	**18.0119**
5250000000.	47.3509	18.0043
5300000000.	47.1030	18.1165
5350000000.	47.1230	18.2252
5400000000.	46.9666	18.1291
5450000000.	46.8896	18.3018
5500000000.	**46.9446**	**18.4207**
5550000000.	46.6380	18.3605
5600000000.	46.6503	18.5105
5650000000.	46.6206	18.6427
5700000000.	46.4439	18.6005
5750000000.	46.2975	18.6623
5800000000.	**46.3231**	**18.8012**
5850000000.	46.0805	18.8325
5900000000.	46.2379	18.9882
5950000000.	45.9667	18.9393
6000000000.	46.1912	18.9916

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target $f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ? %)
05/04/2011	Body 5200	e'	50.0737	Relative Permittivity (ϵ_r):	50.07	49.02	2.15	10
		e"	18.2118	Conductivity (σ):	5.27	5.29	-0.55	5
05/04/2011	Body 5500	e'	49.4127	Relative Permittivity (ϵ_r):	49.41	48.61	1.64	10
		e"	18.7295	Conductivity (σ):	5.73	5.64	1.48	5
05/04/2011	Body 5800	e'	49.0618	Relative Permittivity (ϵ_r):	49.06	48.20	1.79	10
		e"	19.1120	Conductivity (σ):	6.16	6.00	2.73	5

Liquid Check
Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C; Relative humidity = 40%
May 04, 2011 02:22 PM

Frequency	e'	e''
4600000000.	51.1630	17.6303
4650000000.	51.0057	17.6184
4700000000.	51.1523	17.7525
4750000000.	50.8227	17.7659
4800000000.	50.7052	17.8394
4850000000.	50.6752	17.9775
4900000000.	50.6132	18.0759
4950000000.	50.4823	18.0887
5000000000.	50.4377	18.1753
5050000000.	50.2879	18.2346
5100000000.	50.2759	18.2826
5150000000.	50.1969	18.3220
5200000000.	**50.0737**	**18.2118**
5250000000.	49.9651	18.4973
5300000000.	49.9225	18.4995
5350000000.	49.7905	18.5083
5400000000.	49.8595	18.6709
5450000000.	49.7079	18.6360
5500000000.	**49.4127**	**18.7295**
5550000000.	49.5298	18.7157
5600000000.	49.4219	18.8268
5650000000.	49.3308	18.9417
5700000000.	49.1897	18.8739
5750000000.	49.0730	19.0829
5800000000.	**49.0618**	**19.1120**
5850000000.	48.9265	19.0248
5900000000.	48.8632	19.3799
5950000000.	48.8808	19.2411
6000000000.	48.6773	19.2311

The conductivity (σ) can be given as:

$$\sigma = \omega\varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target $f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

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 DASY4 system with an Isotropic E-Field EX3DV4 SN 3749 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 fine cube was chosen for cube
- Distance between probe sensors and phantom surface was set to 3 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 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 706	D2450V2-706_Apr10	4/19/10	2.4	1g SAR:	51.6	52.4
				10g SAR:	24.4	24.5
D5GHzV2 SN 1075	D5GHzV2-1075_Sep09	9/3/09	5.2	1g SAR:		79.0
				10g SAR:		22.0
			5.5	1g SAR:		85.4
				10g SAR:		23.5
			5.8	1g SAR:		73.2
				10g SAR:		20.1

9.1. SYSTEM CHECK RESULTS

System validation dipole	Date Tested	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
		Tissue:	Body			
D5GHzV2 (5.2GHz)	03/31/11	1g SAR:	79.2	79.0	0.25	? 0
		10g SAR:	23.0	22.0	4.55	
D5GHzV2 (5.2GHz)	04/01/11	1g SAR:	79.9	79.0	1.14	? 0
		10g SAR:	23.2	22.0	5.45	
D5GHzV2 (5.5GHz)	04/01/11	1g SAR:	84.5	85.4	-1.05	? 0
		10g SAR:	24.1	23.5	2.55	
D5GHzV2 (5.8GHz)	04/01/11	1g SAR:	72.9	73.2	-0.41	? 0
		10g SAR:	20.7	20.1	2.99	
D5GHzV2 (5.2GHz)	04/04/11	1g SAR:	73.4	79.0	-7.09	? 0
		10g SAR:	21.1	22.0	-4.09	
D5GHzV2 (5.5GHz)	04/04/11	1g SAR:	83.8	85.4	-1.87	? 0
		10g SAR:	24.1	23.5	2.55	
D5GHzV2 (5.8GHz)	04/04/11	1g SAR:	67.6	73.2	-7.65	? 0
		10g SAR:	19.1	20.1	-4.98	
D5GHzV2 (5.2GHz)	04/05/11	1g SAR:	73.8	79.0	-6.58	? 0
		10g SAR:	21.3	22.0	-3.18	
D5GHzV2 (5.5GHz)	04/05/11	1g SAR:	80.0	85.4	-6.32	? 0
		10g SAR:	22.7	23.5	-3.40	
D5GHzV2 (5.8GHz)	04/05/11	1g SAR:	74.7	73.2	2.05	? 0
		10g SAR:	21.3	20.1	5.97	
D2450V2 (2.45GHz)	04/27/11	1g SAR:	53.9	52.4	2.86	? 0
		10g SAR:	24.8	24.5	1.22	
D2450V2 (2.45GHz)	04/28/11	1g SAR:	55.5	52.4	5.92	? 0
		10g SAR:	25.5	24.5	4.08	
D5GHzV2 (5.2GHz)	05/03/11	1g SAR:	77.5	79.0	-1.90	? 0
		10g SAR:	22.1	22.0	0.45	
D5GHzV2 (5.5GHz)	05/03/11	1g SAR:	83.1	85.4	-2.69	? 0
		10g SAR:	23.6	23.5	0.43	
D5GHzV2 (5.8GHz)	05/03/11	1g SAR:	74.2	73.2	1.37	? 0
		10g SAR:	20.9	20.1	3.98	
D5GHzV2 (5.2GHz)	05/04/11	1g SAR:	72.2	79.0	-8.61	? 0
		10g SAR:	20.6	22.0	-6.36	
D5GHzV2 (5.5GHz)	05/04/11	1g SAR:	80.5	85.4	-5.74	? 0
		10g SAR:	22.6	23.5	-3.83	
D5GHzV2 (5.8GHz)	05/04/11	1g SAR:	71.3	73.2	-2.60	? 0
		10g SAR:	19.9	20.1	-1.00	

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 (for example, 1.2 mm for an EX3DV3 probe type).

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 DASY4 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, EN 50361 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 ≥ 7 x 7 x 9 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.

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	
			Chain A	Chain B	Chain A	Chain B
802.11b	1	2412	15.5			
	6	2437	**15.7**		15.8	
	11	2462	15.5			
	1	2412		15.6		
	6	2437		**15.5**		15.6
	11	2462		15.6		
802.11g	1	2412	14.0			
	6	2437	**16.6**		16.7	
	11	2462	14.0			
	1	2412		14.1		
	6	2437		16.5		
	11	2462		14.1		
802.11n HT20	1	2412	13.1			
	6	2437	16.5			
	11	2462	12.4			
	1	2412		13.1		
	6	2437		**16.8**		16.9
	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			
	9	2450	9.6			
	3	2422		9.6		
	6	2437		16.4		
	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.

11.2. RF OUTPUT POWER FOR 5 GHZ BANDS

5.2 GHz Band						
Mode	Ch. #	Freq. (MHz)	Original Target Pwr (dBm)		Actual Measured Pwr	
			Chain A	Chain B	Chain A	Chain B
802.11a	36	5180	16.1			
	40	5200	**16.0**		16.2	
	48	5240	16.1			
	36	5180		16.2		
	40	5200		**16.1**		16.1
	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	
			Chain A	Chain B	Chain A	Chain B
802.11a	52	5260	16.1			
	60	5300	**16.2**		16.2	
	64	5320	16.1			
	52	5260		16.2		
	60	5300		**16.2**		16.2
	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**		16.5	
	62	5310	11.2			
	54	5270		**16.6**		16.6
	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.

5.5 GHz Band						
Mode	Ch. #	Freq. (MHz)	Original Target Pwr (dBm)		Actual Measured Pwr	
			Chain A	Chain B	Chain A	Chain B
802.11a	100	5500	16.6			
	120	5600	**16.6**		16.7	
	140	5700	16.6			
	100	5500		16.6		
	120	5600		**16.7**		16.7
	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.

5.8 GHz Band						
Mode	Ch. #	Freq. (MHz)	Original Target Pwr (dBm)		Actual Measured Pwr	
			Chain A	Chain B	Chain A	Chain B
802.11a	149	5745	16.6			
	157	5785	**16.5**		16.6	
	165	5825	16.5			
	149	5745		16.5		
	157	5785		**16.5**		16.8
	165	5825		16.5		
802.11n HT20	149	5745	16.7			
	157	5785	**16.7**			
	165	5825	16.6			
	149	5745		**16.7**		
	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			
	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.

12. SUMMARY OF SAR TEST RESULTS

SUMMARY OF SAR TEST CONFIGURATIONS

Configuration	Antenna-to-User distance	SAR Require	Comments
Laptop mode: Lap-held	92 mm From Main (Chain A)-to-user	No	This is not the most conservative antenna-to-user distance at edge mode.
	86 mm from Aux (Chain B)-to-user	Yes	SAR evaluation
Bottom Face	41 mm From Main (Chain A)-to-user	Yes	
	38 mm From Aux (Chain B)-to-user	Yes	
Edge - Primary Landscape	70 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)
	65 mm From Aux (Chain B)-to-user	Yes	SAR evaluation This is the most conservative antenna-to-user distance at edge mode.
Edge - Secondary Landscape	126 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.
	134 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.
Edge - Primary Portrait	< 2 mm from Main (Chain A) antenna to edge	No	Main (Chain A) antenna is disabled by software at this configuration.
Edge - Secondary Portrait	< 2 mm from Aux (Chain B) antenna to edge	No	Aux (Chain B) antenna is disabled by software at this configuration.

12.1. 2.4 GHZ BAND

Laptop mode: Lap-held (Aux/Chain B only)

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		15.6	0.014	0.00603
	11	2462				
802.11n HT20	1	2412				
	6	2437		16.9	0.020	0.00942
	11	2462				

Bottom Face (Both Main and Aux antenna)

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	15.8		0.023	0.012
	11	2462				
	1	2412				
	6	2437		15.6	0.031	0.00857
	11	2462				
802.11g	1	2412				
	6	2437	16.7		0.024	0.011
	11	2462				
802.11n HT20	1	2412				
	6	2437		16.9	0.027	0.012
	11	2462				

Edges - Primary Landscape (Aux/Chain B)

Mode	Channel	f (MHz)	Avg. Output Pwr (dBm)		Results (mW/g)	
			Chain A	Chain B	1g-SAR	10g-SAR
802.11b	1	2412				
	6	2437		15.6	**0.135**	0.054
	11	2462				
802.11n HT20	1	2412				
	6	2437		16.9	0.113	0.045
	11	2462				

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

12.2. 5 GHZ BANDS

Laptop mode: Lap-Held

5.2 GHz Band						
Mode	Ch. #	Freq. (MHz)	Avg. Output Pwr (dBm)		Results (mW/g)	
			Chain A	Chain B	1g-SAR	10g-SAR
802.11a	36	5180				
	40	5200		16.1	0.052	0.047
	48	5240				
5.3 GHz Band						
Mode	Ch. #	Freq. (MHz)	Avg. Output Pwr (dBm)		Results (mW/g)	
			Chain A	Chain B	1g-SAR	10g-SAR
802.11a	52	5260				
	60	5300		16.2	0.011	0.004
	64	5320				
802.11n HT40	54	5270				
	62	5310		16.6	0.017	0.007
5.5 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		16.7	0.011	0.002
	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		16.8	0.029	0.012
	165	5825				

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

Bottom Face (Both Main and Aux antenna)

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	16.2		0.024	0.00966
	48	5240				
	36	5180				
	40	5200		16.1	0.024	0.011
	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	16.2		0.024	0.010
	64	5320				
	52	5260				
	60	5300		16.2	0.026	0.013
	64	5320				
802.11n HT40	54	5270				
	62	5310	16.5		0.033	0.012
	54	5270				
	62	5310		16.6	0.043	0.0095

5.5 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	16.7		0.038	0.021
	140	5700				
	100	5500				
	120	5600		16.7	0.037	0.019
	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	16.6		0.00112	0.00014
	165	5825				
802.11a	149	5745				
	157	5785		16.8	0.029	0.015
	165	5825				

Note:

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

Edges - Primary Landscape (Aux/Chain B)

5.2 GHz Band

Mode	Ch. #	Freq. (MHz)	Avg. Output Pwr (dBm)		Results (mW/g)	
			Chain A	Chain B	1g-SAR	10g-SAR
802.11a	36	5180				
	40	5200		16.1	**0.091**	0.020
	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		16.2	0.150	0.046
	64	5320				
802.11n HT40	54	5270				
	62	5310		16.6	**0.200**	0.060

5.5 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		16.7	**0.156**	0.051
	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		16.8	**0.166**	0.046
	165	5825				

Note:

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

WORST-CASE SAR TEST PLOTS

2.4 GHZ

Date/Time: 4/28/2011 5:14:49 PM

Test Laboratory: UL CCS

Edges Primary Landscape

DUT: Panasonic; Type: Tablet; Serial: 1BKKSA00017

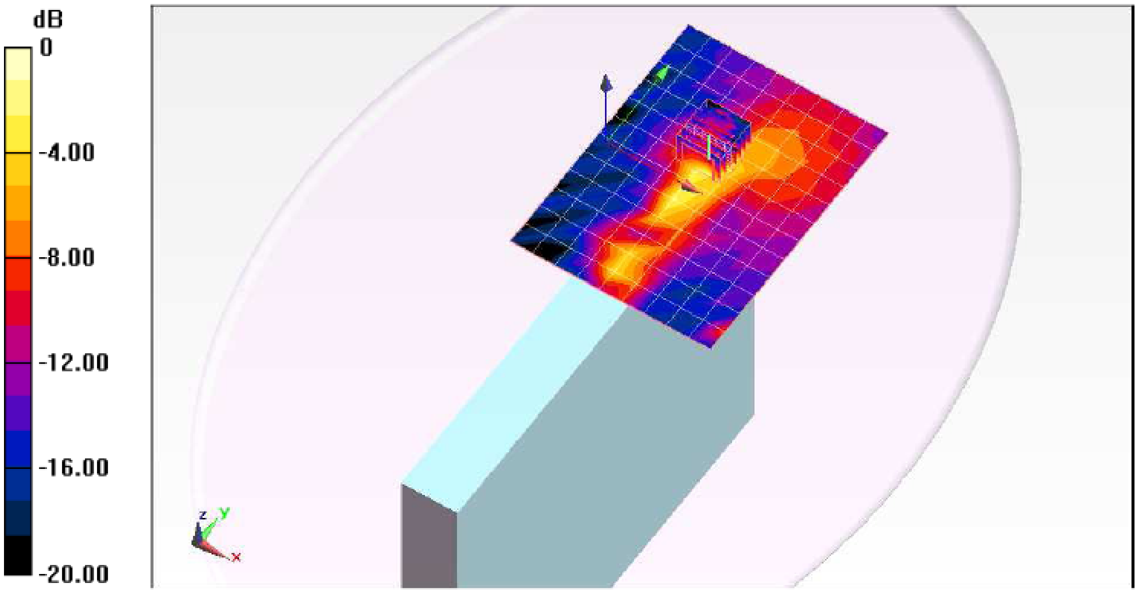
Communication System: 802.11b/g 2.4GHz; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 2.001 mho/m; ε_r = 51.785; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 - SN3686; ConvF(6.86, 6.86, 6.86); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: ELI 4.0; Type: QDOVA001BB; Serial: 1099
- Measurement SW: DASY52, Version 52.6 (1);SEMCAD X Version 14.4.2 (2595)

802.11b_Ant-Aux Ch-6/Area Scan (10x13x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.148 mW/g

802.11b_Ant-Aux Ch-6/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 2.249 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.487 W/kg
SAR(1 g) = 0.135 mW/g; SAR(10 g) = 0.054 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.185 mW/g



0 dB = 0.180mW/g

5.2 GHZ

Date/Time: 5/4/2011 10:48:39 PM

Test Laboratory: UL CCS

Edges - Primary Landscape (Aux)

DUT: Panasonic; Type: Tablet; Serial: 1BKKSA00017

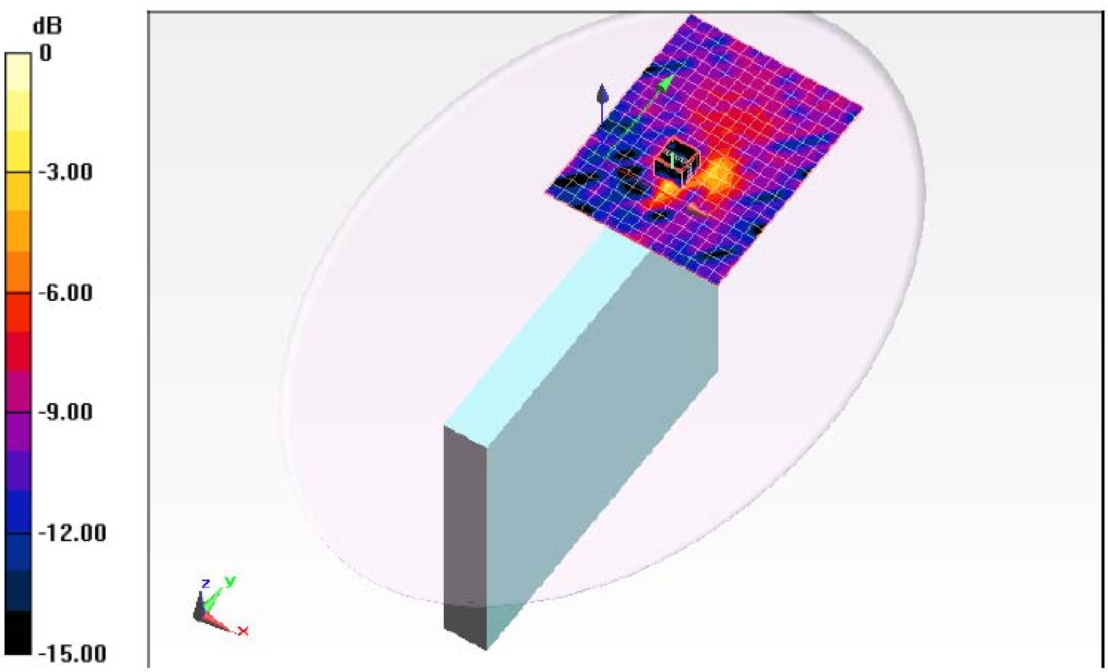
Communication System: 802.11a 5.2-5.3GHz; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.268 mho/m; ε_r = 50.074; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 - SN3686; ConvF(3.98, 3.98, 3.98); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: ELI 4.0; Type: QDOVA001BB; Serial: 1099
- Measurement SW: DASY52, Version 52.6 (1);SEMCAD X Version 14.4.2 (2595)

802.11a_5.2GHz/Ant Aux_Ch 40/Area Scan (16x20x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.166 mW/g

802.11a_5.2GHz/Ant Aux_Ch 40/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 5.755 V/m; Power Drift = 0.0091 dB
Peak SAR (extrapolated) = 0.302 W/kg
SAR(1 g) = 0.091 mW/g; SAR(10 g) = 0.020 mW/g
Maximum value of SAR (measured) = 0.157 mW/g



0 dB = 0.160mW/g

5.3 GHZ

Date/Time: 5/5/2011 12:09:25 AM

Test Laboratory: UL CCS

Edges - Primary Landscape (Aux)

DUT: Panasonic; Type: Tablet; Serial: 1BKKSA00017

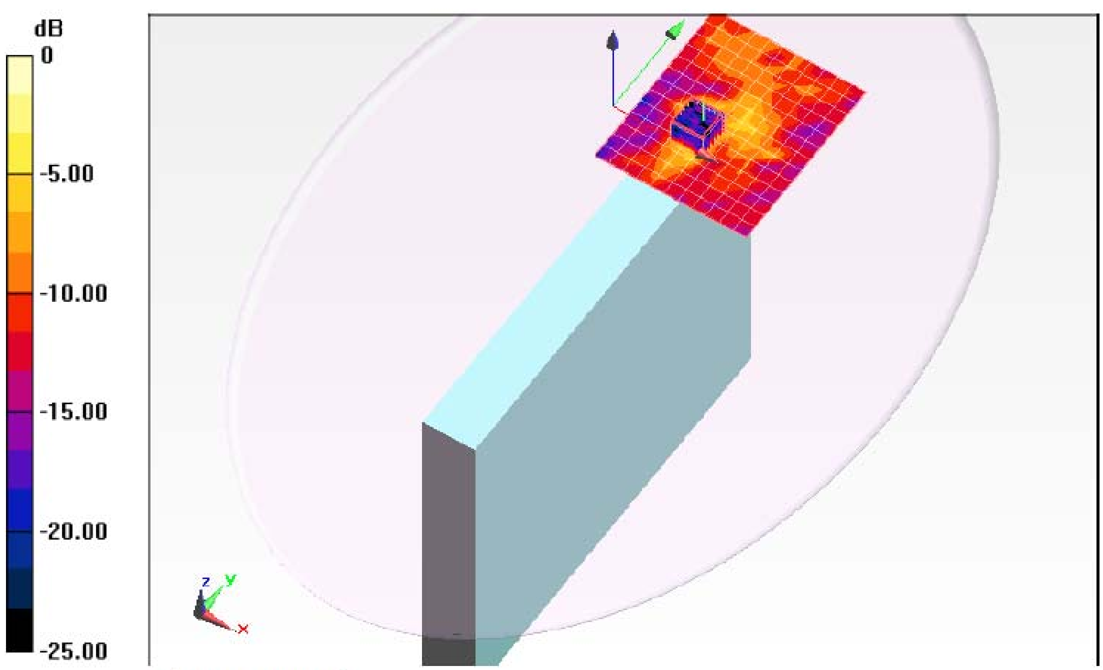
Communication System: 802.11a 5.2-5.3GHz; Frequency: 5310 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5310 MHz; σ = 5.465 mho/m; ε_r = 49.896; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 - SN3686; ConvF(3.7, 3.7, 3.7); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection), Sensor-Surface: 2.5mm (Fix Surface)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: ELI 4.0; Type: QDOVA001BB; Serial: 1099
- Measurement SW: DASY52, Version 52.6 (1);SEMCAD X Version 14.4.2 (2595)

802.11n HT40_5.3GHz/Ant Aux_Ch 62/Area Scan (12x14x1): Measurement grid: dx=10mm, dy=10mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.293 mW/g

802.11n HT40_5.3GHz/Ant Aux_Ch 62/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 7.658 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 0.735 W/kg
SAR(1 g) = 0.200 mW/g; SAR(10 g) = 0.060 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.355 mW/g



0 dB = 0.360mW/g

5.5 GHZ

Date/Time: 5/5/2011 12:48:26 AM

Test Laboratory: UL CCS

Edges - Primary Landscape (Aux)

DUT: Panasonic; Type: Tablet; Serial: 1BKKSA00017

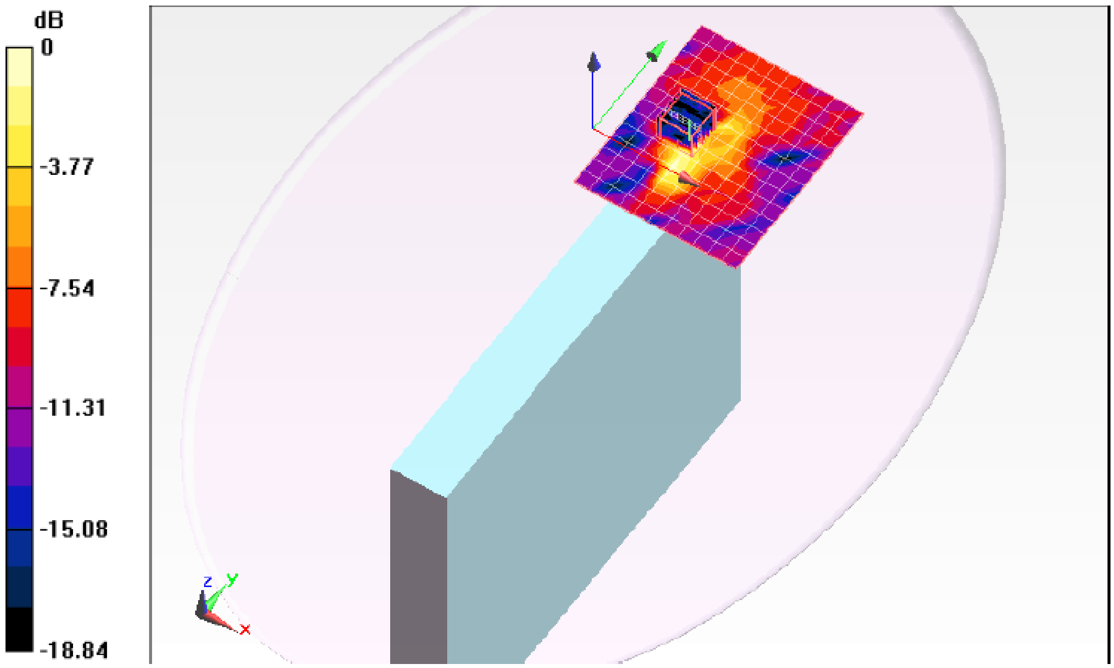
Communication System: 802.11a 5.5GHz; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.865 mho/m; ε_r = 49.422; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 - SN3686; ConvF(3.29, 3.29, 3.29); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: ELI 4.0; Type: QDOVA001BB; Serial: 1099
- Measurement SW: DASY52, Version 52.6 (1);SEMCAD X Version 14.4.2 (2595)

802.11a_5.5GHz/Ant Aux_Ch 120/Area Scan (12x14x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.254 mW/g

802.11a_5.5GHz/Ant Aux_Ch 120/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 7.194 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.540 W/kg
SAR(1 g) = 0.156 mW/g; SAR(10 g) = 0.051 mW/g
Maximum value of SAR (measured) = 0.276 mW/g



0 dB = 0.280mW/g

5.8 GHZ

Date/Time: 5/5/2011 1:29:15 AM

Test Laboratory: UL CCS

Edges - Primary Landscape (Aux)

DUT: Panasonic; Type: Tablet; Serial: 1BKKSA00017

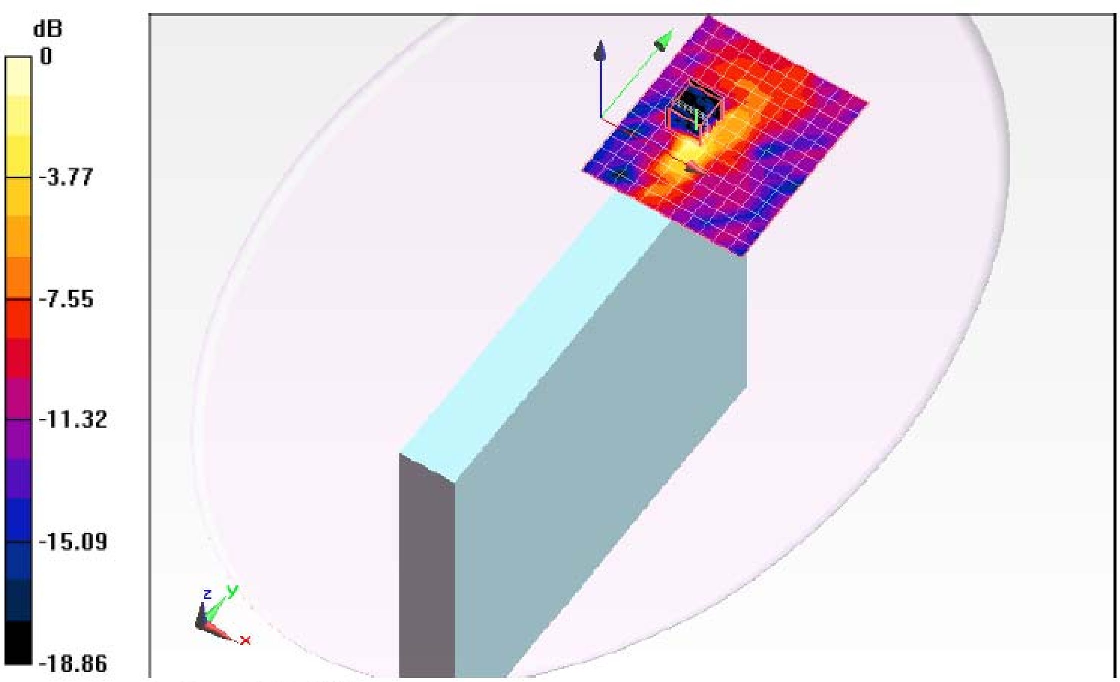
Communication System: 802.11a 5.8GHz; Frequency: 5785 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5785 MHz; σ = 6.148 mho/m; ε_r = 49.065; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 - SN3686; ConvF(3.7, 3.7, 3.7); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: ELI 4.0; Type: QDOVA001BB; Serial: 1099
- Measurement SW: DASY52, Version 52.6 (1);SEMCAD X Version 14.4.2 (2595)

802.11a 5.8GHz/Ant Aux_Ch 157/Area Scan (12x14x1): Measurement grid: dx=10mm, dy=10mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.292 mW/g

802.11a 5.8GHz/Ant Aux_Ch 157/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 7.352 V/m; Power Drift = 0.0049 dB
Peak SAR (extrapolated) = 0.580 W/kg
SAR(1 g) = 0.166 mW/g; SAR(10 g) = 0.046 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.295 mW/g



0 dB = 0.290mW/g

13. ATTACHMENTS

No.	Contents	No. of page (s)
1-1	System Check Plots for D2450V2 SN 706	4
1-2	System Check Plots for D5GHzV2 SN 1075	22
2-1	SAR Test Plots for 2.4 GHz	8
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3-1	Certificate of E-Field Probe - EX3DV4 SN 3749	11
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5	Certificate of System Validation Dipole - D5GHzV2 SN 1075	11