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-19)

MODEL NUMBER: WL11A
FCC ID: ACJ9TGWL11A

REPORT NUMBER: 11J14001-2

ISSUE DATE: January 19, 2012

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)
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	January 19, 2012	Initial Issue	--

COMPLIANCE CERTIFICATION SERVICES (UL CCS) FORM NO: CCSUP4031B
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

TABLE OF CONTENTS

COMPLIANCE CERTIFICATION SERVICES (UL CCS) FORM NO: CCSUP4031B
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

1. Attestation of Test Results

Applicant name:	Panasonic Corporation Of North America
EUT description:	Intel® Centrino® Advanced-N6205 (Tested inside of Panasonic Tablet PC, Model CF-19)
Model number:	WL11A
Device category:	Portable
Exposure category:	General Population/Uncontrolled Exposure
Date tested:	January 6,2012 – January 13,2012

FCC / IC Rule Parts	Freq. Range [MHz]	Highest 1g SAR (mW/g)	Limit (mW/g)
15.247 / RSS-102	2412 – 2462	0.12 W/kg (Primary Landscape)	1.6
	5725 – 5850	0.67 W/kg (Primary Portrait)	
15.407	5150 – 5250	0.57 W/kg (Primary Portrait)	
	5250 – 5350	0.72 W/kg (Primary Portrait)	
	5470 – 5725	0.86 W/kg (Primary Portrait)	

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

Compliance Certification Services, Inc. (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 CCS By:

Sunny Shih
Engineering Team Leader
Compliance Certification Services (UL CCS)

Tested By:

Chakrit Thammanavarat
SAR 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, and the following KDB Procedures.

- 248227 SAR measurement procedures for 802.11a/b/g transmitters
- 865664 SAR 3 to 6 GHz Rev
- 447498 D01 Mobile Portable RF Exposure v04
- 616217 D03 SAR Supp Note and Netbook Laptop V01

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	TX90 XL	N/A	N/A		
Robot Remote Control	Stäubli	CS8C	N/A	N/A		
DASY5 Measurement Server	SPEAG	SEUMS014AA	1064	N/A		
Probe Alignment Unit	SPEAG	LB5 / 80	N/A	N/A		
Oval Flat Phantom (ELI v5.0 (A))	SPEAG	QD OVA001 BB	1117	N/A		
Oval Flat Phantom (ELI v5.0 (B))	SPEAG	QD OVA001 BB	1121	N/A		
Dielectric Probe Kit	HP	85070C	N/A	N/A		
Network Analyzer	Agilent	E5071B	MY42100131	2	2	2012
Synthesized Signal Generator	Agilent	8665B	3438A00633	1	28	2012
E-Field Probe	SPEAG	EX3DV3	3531	12	19	2012
Thermometer	EXTECH	Thermometer	SCL29766	5	17	2012
Data Acquisition Electronics	SPEAG	DAE4	1259	5	3	2012
System Validation Dipole	SPEAG	D2450V2	706	4	19	2012
System Validation Dipole	SPEAG	D5GHzV2	1003	8	23	2012
Power Meter	HP	438A	3513U04320	9	17	2012
Power Sensor	Agilent	8481A	2237A31744	8	17	2013
Amplifier	Mini-Circuits	ZVE-8G	90606	N/A		
Amplifier	Mini-Circuits	ZHL-42W	D072701-5	N/A		
Simulating Liquid	SPEAG	M2450	N/A	Within 24 hrs of first test		
Simulating Liquid	SPEAG	MSL5800	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. (Verification data include with D2450V2 calibration certificate)
4. Impedance is within 5Ω of calibrated measurement. (Verification data include with dipole D2450V2 calibration certificate)

4.2. Measurement Uncertainty

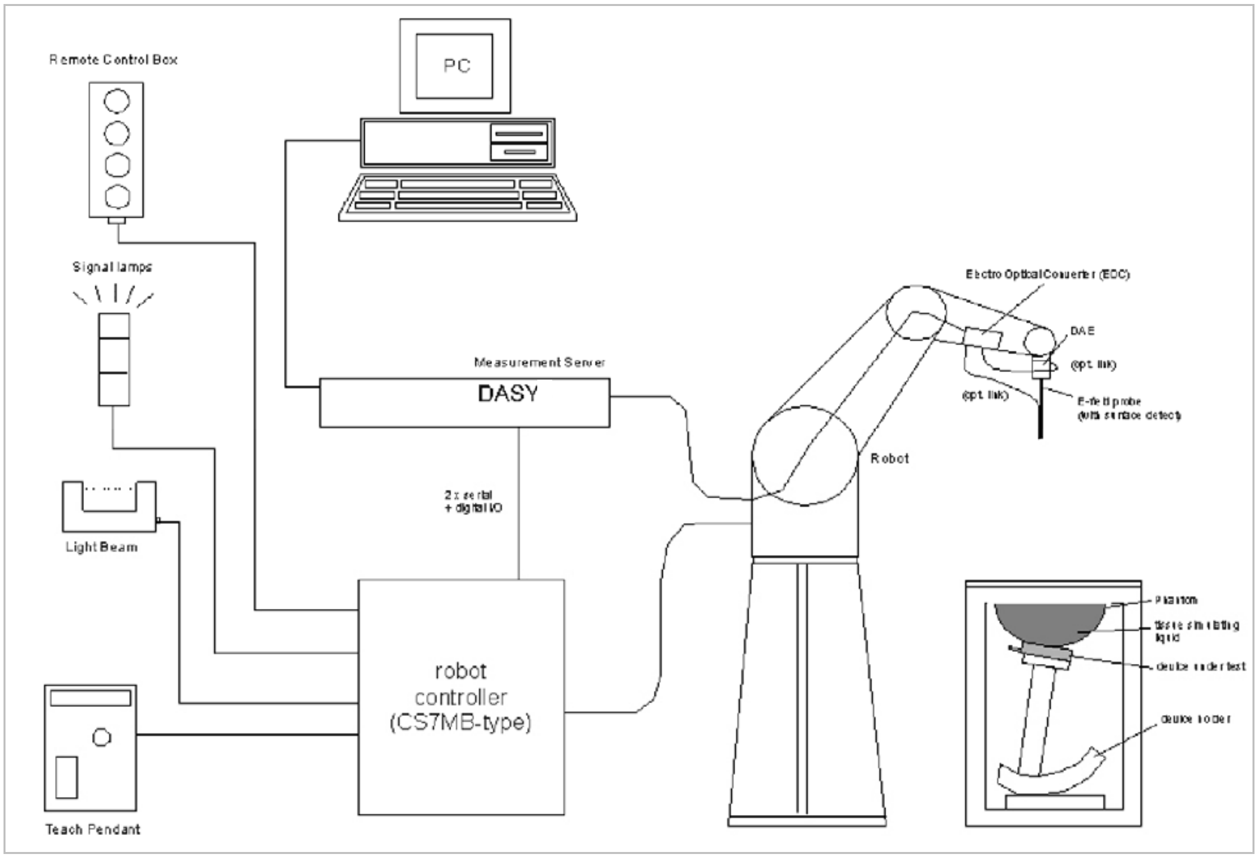
Measurement uncertainty for 300 MHz to 3 GHz averaged over 1 gram					
Component	error, %	Probe Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1)	5.50	Normal	1	1	5.50
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	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	-0.76	Normal	1	0.64	-0.49
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement	-4.87	Normal	1	0.6	-2.92
Combined Standard Uncertainty Uc(y) =					9.89
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				19.79	%
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				1.57	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	4.92	Normal	1	0.64	3.15
Liquid Permittivity - deviation from target	10.00	Rectangular	1.732	0.6	3.46
Liquid Permittivity - measurement uncertainty	-4.49	Normal	1	0.6	-2.69
Combined Standard Uncertainty Uc(y), %:					11.24
Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence =				22.04	%
Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence =				1.73	dB

5. Equipment Under Test

Intel® Centrino® Advanced-N6205, Model WL11A (Tested inside of Panasonic Tablet PC, Model CF-19)	
Normal operation:	• Laptop mode (notebook) • Tablet with Multiple display orientations supporting both portrait and landscape configurations.
Antenna tested:	<u>Manufactured</u> / <u>Part number</u> Intel Corporation: Main (Chain A) Antenna: DFUP1886ZA-1 Aux (Chain B) Antenna: DFUP1886ZA-2
Antenna-to-antenna/user separation distances:	See Section 15 for details of antenna locations and separation distances.
Assessment for SAR evaluation for Simultaneous transmission:	WWAN co-located RF exposure assessment will be addressed in a separate FCC application filed under WWAN application.

6. System Specification



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.

COMPLIANCE CERTIFICATION SERVICES (UL CCS) FORM NO: CCSUP4031B
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

COMPLIANCE CERTIFICATION SERVICES (UL CCS)
FORM NO: CCSUP4031B
47173 BENICIA STREET, FREMONT, CA 94538, USA
TEL: (510) 771-1000
FAX: (510) 661-0888

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
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
5800	35.3	5.27	48.2	6

(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 emulsifier. Dielectric parameters of these liquids were measured using an HP 8570C Dielectric Probe Kit in conjunction with an 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.

f (MHz)	Body Tissue		Reference
	rel. permittivity	conductivity	
3000	52.0	2.73	Standard
5100	49.1	5.18	Interpolated
5200	49.0	5.30	Interpolated
5300	48.9	5.42	Interpolated
5400	48.7	5.53	Interpolated
5500	48.6	5.65	Interpolated
5600	48.5	5.77	Interpolated
5700	48.3	5.88	Interpolated
5800	48.2	6.00	Standard

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

8.1. Liquid Check Results

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
01/06/2012	Body 2450	e'	50.1925	Relative Permittivity (ϵ_r):	50.19	52.70	-4.76	5
		e"	14.3603	Conductivity (σ):	1.96	1.95	0.32	5
01/06/2012	Body 2410	e'	50.3273	Relative Permittivity (ϵ_r):	50.33	52.76	-4.61	5
		e"	14.2074	Conductivity (σ):	1.90	1.91	-0.19	5
01/06/2012	Body 2435	e'	50.2450	Relative Permittivity (ϵ_r):	50.25	52.73	-4.71	5
		e"	14.3010	Conductivity (σ):	1.94	1.93	0.27	5
01/06/2012	Body 2475	e'	50.1011	Relative Permittivity (ϵ_r):	50.10	52.67	-4.87	5
		e"	14.4596	Conductivity (σ):	1.99	1.99	0.24	5
01/09/2012	Body 2450	e'	50.2576	Relative Permittivity (ϵ_r):	50.26	52.70	-4.63	5
		e"	14.2796	Conductivity (σ):	1.95	1.95	-0.24	5
01/09/2012	Body 2410	e'	50.3870	Relative Permittivity (ϵ_r):	50.39	52.76	-4.50	5
		e"	14.1264	Conductivity (σ):	1.89	1.91	-0.76	5
01/09/2012	Body 2435	e'	50.3112	Relative Permittivity (ϵ_r):	50.31	52.73	-4.58	5
		e"	14.2217	Conductivity (σ):	1.93	1.93	-0.29	5
01/09/2012	Body 2475	e'	50.1626	Relative Permittivity (ϵ_r):	50.16	52.67	-4.76	5
		e"	14.3874	Conductivity (σ):	1.98	1.99	-0.26	5
01/09/2012	Body 5180	e'	49.1900	Relative Permittivity (ϵ_r):	49.19	49.05	0.29	10
		e"	18.7807	Conductivity (σ):	5.41	5.27	2.62	5
	Body 5200	e'	49.1650	Relative Permittivity (ϵ_r):	49.17	49.02	0.30	10
		e"	18.8120	Conductivity (σ):	5.44	5.29	2.73	5
	Body 5500	e'	48.6235	Relative Permittivity (ϵ_r):	48.62	48.61	0.02	10
		e"	19.1401	Conductivity (σ):	5.85	5.64	3.70	5
	Body 5800	e'	48.0441	Relative Permittivity (ϵ_r):	48.04	48.20	-0.32	10
		e"	19.4279	Conductivity (σ):	6.27	6.00	4.42	5
	Body 5825	e'	48.0543	Relative Permittivity (ϵ_r):	48.05	48.20	-0.30	10
		e"	19.4369	Conductivity (σ):	6.30	6.00	4.92	5
01/11/2012	Body 5180	e'	48.1603	Relative Permittivity (ϵ_r):	48.16	49.05	-1.81	10
		e"	18.4385	Conductivity (σ):	5.31	5.27	0.75	5
	Body 5200	e'	48.1342	Relative Permittivity (ϵ_r):	48.13	49.02	-1.81	10
		e"	18.4559	Conductivity (σ):	5.34	5.29	0.78	5
	Body 5500	e'	47.6855	Relative Permittivity (ϵ_r):	47.69	48.61	-1.91	10
		e"	18.7463	Conductivity (σ):	5.73	5.64	1.57	5
	Body 5800	e'	47.1801	Relative Permittivity (ϵ_r):	47.18	48.20	-2.12	10
		e"	18.9058	Conductivity (σ):	6.10	6.00	1.62	5
	Body 5825	e'	47.1353	Relative Permittivity (ϵ_r):	47.14	48.20	-2.21	10
		e"	18.9169	Conductivity (σ):	6.13	6.00	2.12	5

COMPLIANCE CERTIFICATION SERVICES (UL CCS) FORM NO: CCSUP4031B
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
01/12/2012	Body 5180	e'	47.1106	Relative Permittivity (ϵ_r):	47.11	49.05	-3.95	10
		e"	18.4591	Conductivity (σ):	5.32	5.27	0.86	5
	Body 5200	e'	47.0875	Relative Permittivity (ϵ_r):	47.09	49.02	-3.94	10
		e"	18.5000	Conductivity (σ):	5.35	5.29	1.03	5
	Body 5500	e'	46.5418	Relative Permittivity (ϵ_r):	46.54	48.61	-4.26	10
		e"	18.8187	Conductivity (σ):	5.76	5.64	1.96	5
	Body 5800	e'	46.0583	Relative Permittivity (ϵ_r):	46.06	48.20	-4.44	10
		e"	19.0996	Conductivity (σ):	6.16	6.00	2.66	5
	Body 5825	e'	46.0360	Relative Permittivity (ϵ_r):	46.04	48.20	-4.49	10
		e"	19.1229	Conductivity (σ):	6.19	6.00	3.23	5
01/13/2012	Body 5180	e'	47.2279	Relative Permittivity (ϵ_r):	47.23	49.05	-3.71	10
		e"	17.8549	Conductivity (σ):	5.14	5.27	-2.44	5
	Body 5200	e'	47.2250	Relative Permittivity (ϵ_r):	47.23	49.02	-3.66	10
		e"	17.8999	Conductivity (σ):	5.18	5.29	-2.25	5
	Body 5500	e'	46.6823	Relative Permittivity (ϵ_r):	46.68	48.61	-3.97	10
		e"	18.0601	Conductivity (σ):	5.52	5.64	-2.15	5
	Body 5800	e'	46.2534	Relative Permittivity (ϵ_r):	46.25	48.20	-4.04	10
		e"	18.2711	Conductivity (σ):	5.89	6.00	-1.79	5
	Body 5825	e'	46.2035	Relative Permittivity (ϵ_r):	46.20	48.20	-4.14	10
		e"	18.2803	Conductivity (σ):	5.92	6.00	-1.32	5
01/18/2012	Body 5180	e'	47.5750	Relative Permittivity (ϵ_r):	47.58	49.05	-3.00	10
		e"	18.0243	Conductivity (σ):	5.19	5.27	-1.52	5
	Body 5200	e'	47.5890	Relative Permittivity (ϵ_r):	47.59	49.02	-2.92	10
		e"	18.0880	Conductivity (σ):	5.23	5.29	-1.22	5
	Body 5500	e'	47.0697	Relative Permittivity (ϵ_r):	47.07	48.61	-3.18	10
		e"	18.3165	Conductivity (σ):	5.60	5.64	-0.76	5
	Body 5800	e'	46.6304	Relative Permittivity (ϵ_r):	46.63	48.20	-3.26	10
		e"	18.6384	Conductivity (σ):	6.01	6.00	0.18	5
	Body 5825	e'	46.6097	Relative Permittivity (ϵ_r):	46.61	48.20	-3.30	10
		e"	18.6363	Conductivity (σ):	6.04	6.00	0.60	5

9. System Verification

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

System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ±0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The DASY system with an Isotropic E-Field Probe 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 2.5 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input powers (forward power) were 100 mW.
- The results are normalized to 1 W input power.

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

Cal. certificate #	Validation dipole	Cal. date	Freq. (MHz)	Ref. SAR values (mW/g) (from cal. certificate)		
				Tissue:	Head	Body
D2450V2-706_Apr10	D2450V2	4/19/10	2450	1g SAR:	51.6	52.4
				10g SAR:	24.4	24.5
D5GHz-1003_Aug11	D5GHzV2	8/23/11	5200	1g SAR:	76.5	74.5
				10g SAR:	21.8	20.8
			5500	1g SAR:	80.9	80
				10g SAR:	23.1	22.3
			5800	1g SAR:	76.3	76.3
				10g SAR:	21.7	21.2

9.1. System Check Results

Date Tested	System Validation Dipole	Freq. (MHz)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
01/06/12	D2450V2-706 Body	2450	1g SAR:	52.70	52.40	0.57	±10
			10g SAR:	24.40	24.50	-0.41	
01/09/12	D2450V2-706 Body	2450	1g SAR:	53.8	52.40	2.67	±10
			10g SAR:	25.1	24.50	2.45	
01/09/12	D5GHzV2 Body	5200	1g SAR:	73.9	74.5	-0.81	±10
			10g SAR:	20.7	20.8	-0.48	
	D5GHzV2 Body	5500	1g SAR:	76.1	80	-4.88	±10
			10g SAR:	21.4	22.3	-4.04	
	D5GHzV2 Body	5800	1g SAR:	71.3	76.3	-6.55	±10
			10g SAR:	20.1	21.2	-5.19	
01/11/12	D5GHzV2 Body	5200	1g SAR:	74.2	74.5	-0.40	±10
			10g SAR:	20.7	20.8	-0.48	
	D5GHzV2 Body	5500	1g SAR:	74.0	80	-7.50	±10
			10g SAR:	20.6	22.3	-7.62	
	D5GHzV2 Body	5800	1g SAR:	72.1	76.3	-5.50	±10
			10g SAR:	20.2	21.2	-4.72	
01/12/12	D5GHzV2 Body	5200	1g SAR:	73.8	74.5	-0.94	±10
			10g SAR:	20.7	20.8	-0.48	
	D5GHzV2 Body	5500	1g SAR:	75.0	80	-6.25	±10
			10g SAR:	20.9	22.3	-6.28	
	D5GHzV2 Body	5800	1g SAR:	77.3	76.3	1.31	±10
			10g SAR:	21.6	21.2	1.89	
01/13/12	D5GHzV2 Body	5200	1g SAR:	71.4	74.5	-4.16	±10
			10g SAR:	20.0	20.8	-3.85	
	D5GHzV2 Body	5500	1g SAR:	74.7	80	-6.63	±10
			10g SAR:	20.7	22.3	-7.17	
	D5GHzV2 Body	5800	1g SAR:	70.6	76.3	-7.47	±10
			10g SAR:	19.6	21.2	-7.55	
01/18/12	D5GHzV2 Body	5500	1g SAR:	81.0	80	1.25	±10
			10g SAR:	22.7	22.3	1.79	
	D5GHzV2 Body	5800	1g SAR:	80.4	76.3	5.37	±10
			10g SAR:	22.6	21.2	6.60	

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 DASY 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.

COMPLIANCE CERTIFICATION SERVICES (UL CCS) FORM NO: CCSUP4031B
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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) from Project#11J13739-3		Actual Measured Pwr (dBm)	
			Chain A	Chain B	Chain A	Chain B
802.11b	1	2412	15.5			
	6	2437	**15.7**		**15.7**	
	11	2462	15.5			
	1	2412		15.6		**15.7**
	6	2437		**15.5**		
	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**		16.8
	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 SAR Report #11J13739-3. 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) from Project#11J13739-3		Actual Measured Pwr (dBm)	
			Chain A	Chain B	Chain A	Chain B
802.11a	36	5180	**16.1**		**16.2**	
	40	5200	16.0			
	48	5240	16.1			
	36	5180		**16.2**		**16.2**
	40	5200		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 SAR Report #11J13739-3. 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) from Project#11J13739-3		Actual Measured Pwr (dBm)	
			Chain A	Chain B	Chain A	Chain B
802.11a	52	5260	16.1			
	60	5300	**16.2**		**16.3**	
	64	5320	16.1			
	52	5260		16.2		
	60	5300		**16.2**		**16.3**
	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**		**16.6**	
	62	5310	11.2			
	54	5270		**16.6**		**16.7**
	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 SAR Report #11J13739-3. 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) from Project#11J13739-3		Actual Measured Pwr (dBm)	
			Chain A	Chain B	Chain A	Chain B
802.11a	100	5500	16.6		16.6	
	120	5600	**16.6**		**16.6**	
	140	5700	16.6		16.6	
	100	5500		16.6		16.6
	120	5600		**16.7**		**16.7**
	140	5700		16.5		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 SAR Report #11J13739-3. 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) from Project#11J13739-3		Actual Measured Pwr (dBm)	
			Chain A	Chain B	Chain A	Chain B
802.11a	149	5745	**16.6**		**16.6**	
	157	5785	16.5			
	165	5825	16.5			
	149	5745		16.5		
	157	5785		**16.5**		**16.5**
	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 SAR Report #11J13739-3. Please refer to original report (FCC ID: PD962205ANH) for Average Power information as documented in 09/13/2010 original filing.

12. SAR Test Results

(1) Bottom Face (Chain A & B)

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	**15.7**		0.014	0.00662
	11	2462				
	1	2412		**15.7**	0.031	0.012
	6	2437				
	11	2462				
802.11g	1	2412				
	6	2437	**16.7**		0.018	0.00914
	11	2462				
802.11n HT20	1	2412				
	6	2437		**16.8**	0.072	0.027
	11	2462				

(2) Primary Lanscape (Chain A & B)

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	**15.7**		0.021	0.011
	11	2462				
	1	2412		**15.7**	0.12	0.065
	6	2437				
	11	2462				
802.11g	1	2412				
	6	2437	**16.7**		0.026	0.013
	11	2462				
802.11n HT20	1	2412				
	6	2437		**16.8**	0.065	0.036
	11	2462				

Note(s):

1. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.8 W/kg with the operating frequency band having a range of < 100 MHz. Per KDB 447498 1) e) i).

(3) Primary Portrait (Chain B)

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)	
			Chain A	Chain B	1g-SAR	10g-SAR
802.11b	1	2412		**15.7**	0.067	0.035
	6	2437				
	11	2462				
802.11n HT20	1	2412				
	6	2437		**16.8**	0.093	0.047
	11	2462				

(4) Secondary Portrait (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	**15.7**		0.060	0.032
	11	2462				
802.11g	1	2412				
	6	2437	**16.7**		0.073	0.039
	11	2462				

(5) Lap-Held (Chain A & B)

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	**15.7**		0.024	0.011
	11	2462				
	1	2412		**15.7**	0.025	0.012
	6	2437				
	11	2462				
802.11g	1	2412				
	6	2437	**16.7**		0.031	0.015
	11	2462				
802.11n HT20	1	2412				
	6	2437		**16.8**	0.024	0.011
	11	2462				

Note(s):

1. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.8 W/kg with the operating frequency band having a range of < 100 MHz. Per KDB 447498 1) e) i).

(1) Bottom Face (Chain A & B)

5.2 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	36	5180	**16.1**		0.024	0.00999	
	40	5200					1
	48	5240					1
	36	5180		**16.2**	0.033	0.013	
	40	5200					1
	48	5240					1

5.3 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	52	5260					1
	60	5300	**16.3**		0.033	0.013	
	64	5320					1
	52	5260					1
	60	5300		**16.3**	0.036	0.014	
	64	5320					1
802.11n HT40	54	5270	**16.6**		0.022	0.0076	
	62	5310					1
	54	5270		**16.7**	0.038	0.015	
	62	5310					1

5.5 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	100	5500					2
	120	5600	**16.6**		0.046	0.016	
	140	5700					2
	100	5500					2
	120	5600		**16.7**	0.058	0.022	
	140	5700					2

5.8 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	149	5745	**16.6**		0.028	0.012	
	157	5785					1
	165	5825					1
	149	5745					1
	157	5785		**16.5**	0.049	0.019	
	165	5825					1

Note(s):

1. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.8 W/kg with the operating frequency band having a range of < 100 MHz. Per KDB 447498 1) e) i).
2. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.4 W/kg with the operating frequency band having a range of ≤ 200 MHz. Per KDB 447498 1) e) ii).

(2) Primary Landscape (Chain A & B)

5.2 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	36	5180	**16.1**		0.018	0.004	
	40	5200					1
	48	5240					1
	36	5180		**16.2**	0.054	0.171	
	40	5200					1
	48	5240					1

5.3 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	52	5260					1
	60	5300	**16.3**		0.013	0.004	
	64	5320					1
	52	5260					1
	60	5300		**16.3**	0.058	0.018	
	64	5320					1
802.11n HT40	54	5270	**16.6**		0.015	0.00405	
	62	5310					1
	54	5270		**16.7**	0.067	0.021	
	62	5310					1

5.5 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	100	5500					2
	120	5600	**16.6**		0.0144	0.00464	
	140	5700					2
	100	5500					2
	120	5600		**16.7**	0.028	0.00815	
	140	5700					2

5.8 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	149	5745	**16.6**		0.026	0.0082	
	157	5785					1
	165	5825					1
	149	5745					1
	157	5785		**16.5**	0.064	0.020	
	165	5825					1

Note(s):

1. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.8 W/kg with the operating frequency band having a range of < 100 MHz. Per KDB 447498 1) e) i).
2. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.4 W/kg with the operating frequency band having a range of ≤ 200 MHz. Per KDB 447498 1) e) ii).

(3) Primary Portrait (Chain B)

5.2 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	36	5180		**16.2**	0.565	0.226	
	40	5200					1
	48	5240					1

5.3 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	52	5260					1
	60	5300		**16.3**	0.718	0.286	
	64	5320					1
802.11n HT40	54	5270		**16.7**	0.640	0.256	
	62	5310					1

5.5 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	100	5500		16.6	0.771	0.031	
	120	5600		**16.7**	**0.857**	**0.347**	
	140	5700		16.5	0.66	0.264	

5.8 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	149	5745					1
	157	5785		**16.5**	0.665	0.267	
	165	5825					1

Note(s):

1. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.8 W/kg with the operating frequency band having a range of < 100 MHz. Per KDB 447498 1) e) i).
2. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.4 W/kg with the operating frequency band having a range of ≤ 200 MHz. Per KDB 447498 1) e) ii).

(4) Secondary Portrait (Chain A)

5.2 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	36	5180	**16.2**		0.390	0.154	
	40	5200					1
	48	5240					1

5.3 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	52	5260					1
	60	5300	**16.3**		0.45	0.177	
	64	5320					1
802.11n HT40	54	5270	**16.6**		0.492	0.194	
	62	5310					1

5.5 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	100	5500	16.6		0.624	0.242	
	120	5600	**16.6**		0.501	0.192	
	140	5700	16.6		0.465	0.183	

5.8 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	149	5745	**16.6**		0.391	0.150	
	157	5785					1
	165	5825					1

Note(s):

1. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.8 W/kg with the operating frequency band having a range of < 100 MHz. Per KDB 447498 1) e) i).
2. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.4 W/kg with the operating frequency band having a range of ≤ 200 MHz. Per KDB 447498 1) e) ii).

(5) Lap-Held (Chain A & B)

5.2 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	36	5180	**16.1**		0.000104	0.0000114	
	40	5200					1
	48	5240					1
	36	5180		**16.2**	0.018	0.00674	
	40	5200					1
	48	5240					1

5.3 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	52	5260					1
	60	5300	**16.3**		0.000043	0.00000263	
	64	5320					1
	52	5260					1
	60	5300		**16.2**	0.017	0.00733	
	64	5320					1
802.11n HT40	54	5270	**16.6**		0.000383	0.0000815	
	62	5310					1
	54	5270		**16.7**	0.0193	0.00689	
	62	5310					1

5.5 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	100	5500					2
	120	5600	**16.7**		0.00222	0.000542	
	140	5700					2
	100	5500					2
	120	5600		**16.7**	0.0297	0.00972	
	140	5700					2

5.8 GHz Band

Mode	Channel	f (MHz)	Avg. Output Power (dBm)		Measured Result (mW/g)		Note
			Chain A	Chain B	1g-SAR	10g-SAR	
802.11a	149	5745	**16.6**		0.0140	0.00166	
	157	5785					1
	165	5825					1
	149	5745					1
	157	5785		**16.5**	0.029	0.00949	
	165	5825					1

Note(s):

1. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.8 W/kg with the operating frequency band having a range of < 100 MHz. Per KDB 447498 1) e) i).
2. Testing was performed on the channel with the highest output power only as the SAR was ≤ 0.4 W/kg with the operating frequency band having a range of ≤ 200 MHz. Per KDB 447498 1) e) ii).

13. Appendixes

13.1. System Check Plots

13.2. SAR Test Plots for 2.4 GHz

13.3. SAR Test Plots for 5 GHz bands

13.4. Calibration Certificate for EX3DV3 SN 3531

13.5. Calibration Certificate for D2450V2 SN 706 w/ extended cal. Data

13.6. Calibration Certificate for D5GHzV2 SN 1003

14. Summary of test configurations

Configuration	Antenna-to-User distance	SAR Require	Comments
(1) Bottom Face Tablet mode	45 mm from Main (Chain A) to user.	Yes	
	45 mm from Aux (Chain B) to user.	Yes	
Secondary Landscape	85 mm from Main (Chain A) to user.	No	
	85 mm from Aux (Chain B) to user.	No	
(2) Primary Landscape	100 mm from Main (Chain A) to user.	Yes	
	100 mm from Sub (Chain B) to user.	Yes	
(3) Primary Portrait	282 mm from Main (Chain A) to user.	No	
	16 mm from Main (Chain B) to user.	Yes	
(4) Secondary Portrait	16 mm from Main (Chain A) to user.	Yes	
	282 mm from Main (Chain B) to user.	No	
(5)Lap-held	135 mm from Main (Chain A) to user.	Yes	
	135 mm from Aux (Chain B) to user.	Yes	

COMPLIANCE CERTIFICATION SERVICES (UL CCS) FORM NO: CCSUP4031B
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888