FCC OET BULLETIN 65 SUPPLEMENT C 01-01
IEEE 1528:2003
RSS-102 Issue 4, March 2010
IEC 62209-2:2010

SAR EVALUATION REPORT

For

Apple iPad

MODEL: A1416

FCC ID: BCGA1416

IC: 579C-A1416

REPORT NUMBER: 11U13938-8

ISSUE DATE: December 15, 2011

Prepared for

APPLE INC.
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CUPERTINO, CA 95014-2084

Prepared by

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

Revision History

Rev.	Issue Date	Revisions	Revised By
--	December 15, 2011	Initial Issue	--

Table of Contents

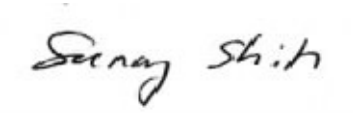
1. Attestation of Test Results

Applicant:	APPLE INC.		
EUT description:	The Apple iPad, Model A1416 is a tablet device with iPod functions (music, application support, and video), 802.11a/b/g/n radio, and Bluetooth radio functions		
Model number:	A1416		
Device category:	Portable		
Exposure category:	General Population/Uncontrolled Exposure		
Date tested:	October 10 – 25, 2011		
FCC Rule Parts	Freq. Range [MHz]	Highest 1-g SAR (W/kg)	Limit (W/kg)
15.247	2412-2462	1.15 W/kg (Body_ Bottom w/ 0 mm distance)	1.6
	5725-5850	1.19 W/kg (Body_ Bottom w/ 0 mm distance)	
15.407	5150-5250	0.52 W/kg (Body_ Bottom w/ 0 mm distance)	
	5250-5350	1.16 W/kg (Body_ Bottom w/ 0 mm distance)	
	5500-5700	1.19 W/kg (Body_ Bottom w/ 0 mm distance)	
Applicable Standards			Test Results
FCC OET Bulletin 65 Supplement C 01-01, IEEE 1528:2003, RSS-102 Issue 4, March 2010 and IEC 62209-2:2010			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.

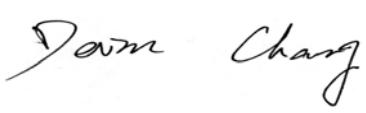
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this 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 UL CCS By:



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

Tested By:



Devin Chang
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 01-01, IEEE 1528:2003, RSS-102 Issue 4, March 2010, IEC 62209-2:2010 and the following KDB Test Procedures.

- 447498 D01 Mobile Portable RF Exposure v04
- 248227 D01 SAR meas for 802 11abg v01r02
- 865664 SAR 3 to 6 GHz Rev SAR measurement procedures for transmitters operating in the 3 to 6 GHz range

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
Dielectronic Probe kit	HP	85070C	N/A	N/A		
Synthesized Signal Generator	HP	83732B	US34490599	7	14	2012
E-Field Probe	SPEAG	EX3DV4	3749	12	13	2011
E-Field Probe	SPEAG	EX3DV4	3686	1	24	2012
Thermometer	ERTCO	639-1S	1718	7	19	2012
Data Acquisition Electronics	SPEAG	DAE3	500	7	14	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	437B	3125U16345	5	13	2012
Power Sensor	HP	8481A	2702A60780	5	13	2012
Amplifier	MITEQ	4D00400600-50-30P	1620606	N/A		
Directional coupler	Werlatone	C8060-102	2141	N/A		

Notes:

*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. (See Appendix “16.6_Calibration Certificate - Validation Dipole D2450V2 - SN 706” with extended cal. data)
4. Impedance is within 5Ω of calibrated measurement (See Appendix “16.6_Calibration Certificate - Validation Dipole D2450V2 - SN 706” with extended cal. data)

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	-4.92	Normal	1	0.64	-3.15
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement uncertainty	-4.13	Normal	1	0.6	-2.48
				Combined Standard Uncertainty Uc(y) =	10.26
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 20.51	%
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 1.62	dB

Measurement uncertainty for 3 to 6 GHz averaged over 1 gram

Component	error, %	Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1)	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	4.80	Normal	1	0.64	3.07
Liquid Permittivity - deviation from target	10.00	Rectangular	1.732	0.6	3.46
Liquid Permittivity - measurement uncertainty	-4.44	Normal	1	0.6	-2.66
				Combined Standard Uncertainty Uc(y), %:	11.21
				Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence = 21.98	%
				Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence = 1.73	dB

5. Equipment Under Test

The Apple iPad, Model A1416 is a tablet device with iPod functions (music, application support, and video), 802.11a/b/g/n radio, and Bluetooth radio functions Model: A1416	
Normal operation:	Body
Antenna-to-antenna and antenna-to-edges' separation distances:	Please refer to Section 17 Antenna Locations & Separation Distances
Simultaneous Transmission:	• WiFi 2.4 GHz Radio cannot transmit simultaneously with Bluetooth Radio. • WiFi 5 GHz Radio can transmit simultaneously with Bluetooth Radio. Due to Bluetooth's maximum output is < 60/f(GHz) mW and standalone SAR is not required, WiFi and Bluetooth are not considered as co-located transmitters with each other. Bluetooth's max. output power: 15.49 mW.

5.1. Band and Air interlaces

Air Interfaces:	WiFi: 802.11abgn: 2.4GHz, 5GHz Bluetooth: 2.4 GHz

6. RF Output Power Measurement

6.1. Wi-Fi

2.4 GHz

Mode	Channel #	Freq. (MHz)	Conducted Avg Power	
			(dBm)	(mW)
802.11b	1	2412	16.5	44.67
	6	2437	16.6	45.71
	11	2462	16.5	44.67
802.11g	1	2412	16.0	39.81
	6	2437	16.5	44.67
	11	2462	16.0	39.81
802.11n (HT20)	1	2412	15.5	35.48
	6	2437	16.5	44.67
	11	2462	15.0	31.62

5.2 GHz band (5150-5250 MHz)

Mode	Channel #	Freq. (MHz)	Conducted Avg Power	
			(dBm)	(mW)
802.11a	36	5180	13.5	22.39
	40	5200	13.5	22.39
	48	5240	13.5	22.39
802.11n (HT20)	36	5180	13.6	22.75
	40	5200	13.6	22.96
	48	5240	13.6	22.86

5.3 GHz band (5250-5350 MHz)

Mode	Channel #	Freq. (MHz)	Conducted Avg Power	
			(dBm)	(mW)
802.11a	52	5260	17.5	56.23
	60	5300	17.5	56.23
	64	5320	16.5	44.67
802.11n (HT20)	52	5260	17.4	54.95
	60	5300	17.4	54.95
	64	5320	16.4	43.65

5.5 GHz band (5500-5700 MHz)

Mode	Channel #	Freq. (MHz)	Conducted Avg Power	
			(dBm)	(mW)
802.11a	100	5500	16.5	44.67
	120	5600	16.5	44.67
	140	5700	16.5	44.67
802.11n (HT20)	100	5500	16.5	44.67
	120	5600	16.5	44.67
	140	5700	16.5	44.67

5.8 GHz band (5725-5850 MHz)

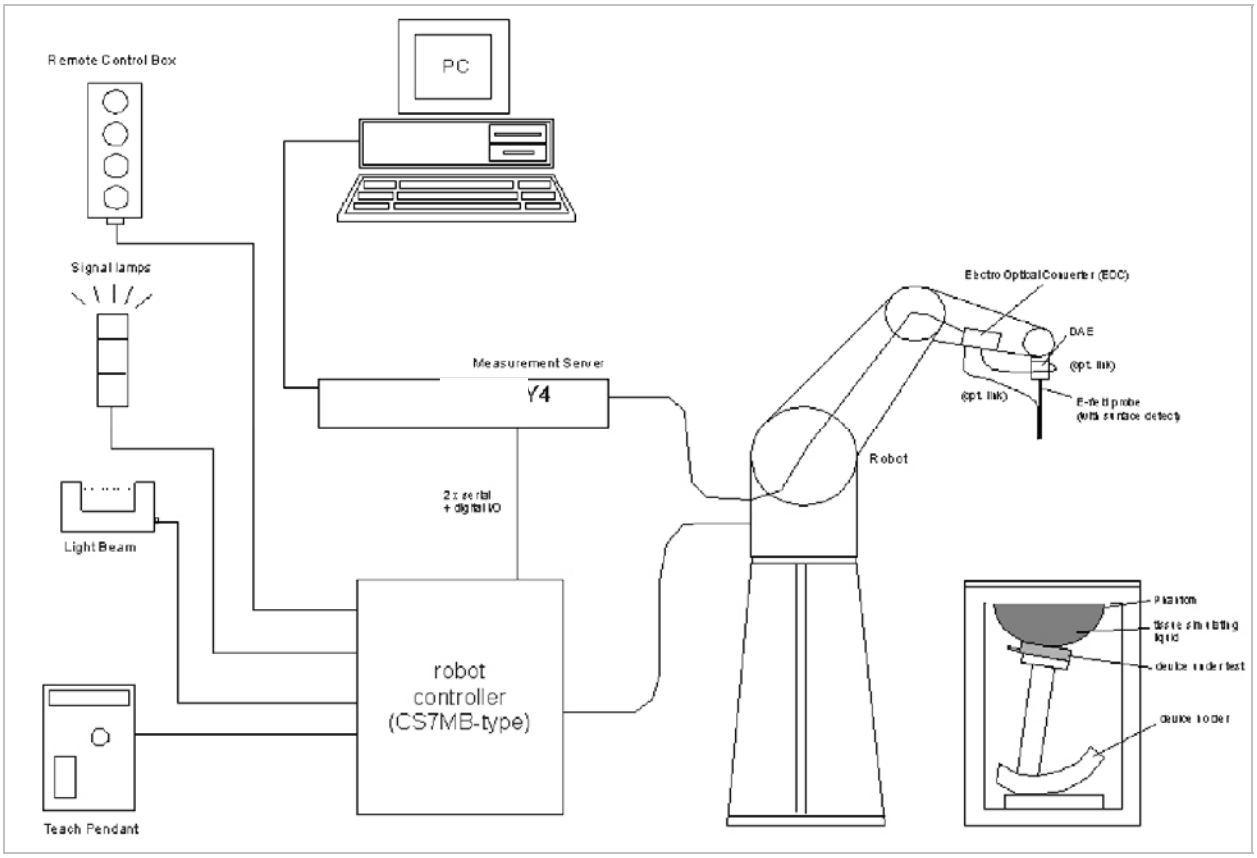
Mode	Channel #	Freq. (MHz)	Conducted Avg Power	
			(dBm)	(mW)
802.11a	149	5745	17.5	56.23
	157	5785	17.5	56.23
	165	5825	17.4	54.95
802.11n (HT20)	149	5745	17.5	56.23
	157	5785	17.5	56.23
	165	5825	17.5	56.23

6.2. Bluetooth

Mode	Channel #	Freq. (MHz)	Conducted Avg Power	
			(dBm)	(mW)
V2.1 + EDR, GFSK	0	2402	11.9	15.49
	39	2441	11.7	14.79
	78	2480	10.8	12.02
V2.1 + EDR, π/4 DQPSK	0	2402	9.8	9.55
	39	2441	10.0	10.00
	78	2480	9.3	8.51
V2.1 + EDR, 8-DPSK	0	2402	9.9	9.77
	39	2441	10.0	10.00
	78	2480	9.3	8.51
V4.0 LE, GFSK	0	2402	8.8	7.59
	39	2441	8.9	7.76
	78	2480	8.7	7.41

Note(s):
Stand-alone SAR is not required as the output power is less than 25 mW [$60/f_{(GHz)}$].

7. System Specifications



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

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

8. 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

9. Liquid 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).

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)

9.1. Liquid Check Results

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
10/10/2011	Body 2450	e'	50.5230	Relative Permittivity (εr):	50.52	52.70	-4.13	5
		e"	14.5573	Conductivity (σ):	1.98	1.95	1.70	5
	Body 2410	e'	50.6534	Relative Permittivity (εr):	50.52	52.70	-4.13	5
		e"	14.4109	Conductivity (σ):	1.98	1.95	1.70	5
	Body 2435	e'	50.5759	Relative Permittivity (εr):	50.52	52.70	-4.13	5
		e"	14.5011	Conductivity (σ):	1.98	1.95	1.70	5
	Body 2465	e'	50.4696	Relative Permittivity (εr):	50.52	52.70	**-4.13**	5
		e"	14.6156	Conductivity (σ):	1.98	1.95	1.70	5
10/10/2011	Body 5180	e'	49.1209	Relative Permittivity (ε_r):	49.12	49.05	0.15	10
		e"	18.4112	Conductivity (σ):	5.30	5.27	0.60	5
	Body 5200	e'	49.1282	Relative Permittivity (ε_r):	49.13	49.02	0.22	10
		e"	18.4697	Conductivity (σ):	5.34	5.29	0.86	5
	Body 5500	e'	48.5634	Relative Permittivity (ε_r):	48.56	48.61	-0.10	10
		e"	18.7437	Conductivity (σ):	5.73	5.64	1.55	5
	Body 5800	e'	48.0852	Relative Permittivity (ε_r):	48.09	48.20	-0.24	10
		e"	19.0479	Conductivity (σ):	6.14	6.00	2.38	5
	Body 5825	e'	48.0422	Relative Permittivity (ε_r):	48.04	48.20	-0.33	10
		e"	19.0569	Conductivity (σ):	6.17	6.00	2.87	5
10/11/2011	Body 5180	e'	47.3328	Relative Permittivity (ε_r):	47.33	49.05	-3.49	10
		e"	18.4853	Conductivity (σ):	5.32	5.27	1.00	5
	Body 5200	e'	47.1193	Relative Permittivity (ε_r):	47.12	49.02	-3.88	10
		e"	18.4634	Conductivity (σ):	5.34	5.29	0.83	5
	Body 5500	e'	46.7376	Relative Permittivity (ε_r):	46.74	48.61	-3.86	10
		e"	18.8227	Conductivity (σ):	5.76	5.64	1.98	5
	Body 5800	e'	46.1847	Relative Permittivity (ε_r):	46.18	48.20	-4.18	10
		e"	19.1559	Conductivity (σ):	6.18	6.00	2.96	5
	Body 5825	e'	46.0593	Relative Permittivity (ε_r):	46.06	48.20	-4.44	10
		e"	19.1725	Conductivity (σ):	6.21	6.00	3.50	5
10/11/2011	Body 2450	e'	54.0530	Relative Permittivity (ε_r):	54.05	52.70	2.57	5
		e"	13.6199	Conductivity (σ):	1.86	1.95	-4.85	5
	Body 2410	e'	54.1646	Relative Permittivity (ε_r):	54.16	52.76	2.66	5
		e"	13.5487	Conductivity (σ):	1.82	1.91	-4.82	5
	Body 2435	e'	54.0939	Relative Permittivity (ε_r):	54.09	52.73	2.59	5
		e"	13.5605	Conductivity (σ):	1.84	1.93	**-4.92**	5
	Body 2465	e'	54.0080	Relative Permittivity (ε_r):	54.01	52.68	2.52	5
		e"	13.6836	Conductivity (σ):	1.88	1.97	-4.85	5

Liquid Check Results (continued)

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
10/11/2011	Body 5200	e'	49.2153	Relative Permittivity (ε_r):	49.22	49.02	0.40	10
		e"	18.8478	Conductivity (σ):	5.45	5.29	2.93	5
	Body 5180	e'	49.2245	Relative Permittivity (ε_r):	49.22	49.05	0.36	10
		e"	18.8052	Conductivity (σ):	5.42	5.27	2.75	5
	Body 5250	e'	49.1116	Relative Permittivity (ε_r):	49.11	48.95	0.33	10
		e"	18.8602	Conductivity (σ):	5.51	5.35	2.85	5
	Body 5320	e'	49.0038	Relative Permittivity (ε_r):	49.00	48.86	0.30	10
		e"	18.9581	Conductivity (σ):	5.61	5.43	3.19	5
10/12/2011	Body 5180	e'	48.3255	Relative Permittivity (ε_r):	48.33	49.05	-1.47	10
		e"	18.3454	Conductivity (σ):	5.28	5.27	0.24	5
	Body 5200	e'	48.3026	Relative Permittivity (ε_r):	48.30	49.02	-1.46	10
		e"	18.3780	Conductivity (σ):	5.31	5.29	0.36	5
	Body 5500	e'	47.7738	Relative Permittivity (ε_r):	47.77	48.61	-1.73	10
		e"	18.6793	Conductivity (σ):	5.71	5.64	1.20	5
	Body 5800	e'	47.2691	Relative Permittivity (ε_r):	47.27	48.20	-1.93	10
		e"	18.9790	Conductivity (σ):	6.12	6.00	2.01	5
	Body 5825	e'	47.2315	Relative Permittivity (ε_r):	47.23	48.20	-2.01	10
		e"	19.0031	Conductivity (σ):	6.15	6.00	2.58	5
10/12/2011	Body 5180	e'	48.7356	Relative Permittivity (ε_r):	48.74	49.05	-0.63	10
		e"	18.2183	Conductivity (σ):	5.25	5.27	-0.46	5
	Body 5200	e'	48.7131	Relative Permittivity (ε_r):	48.71	49.02	-0.63	10
		e"	18.2494	Conductivity (σ):	5.28	5.29	-0.34	5
	Body 5500	e'	48.1450	Relative Permittivity (ε_r):	48.15	48.61	-0.96	10
		e"	18.4791	Conductivity (σ):	5.65	5.64	0.12	5
	Body 5800	e'	47.6225	Relative Permittivity (ε_r):	47.62	48.20	-1.20	10
		e"	18.7524	Conductivity (σ):	6.05	6.00	0.79	5
	Body 5825	e'	47.5898	Relative Permittivity (ε_r):	47.59	48.20	-1.27	10
		e"	18.7720	Conductivity (σ):	6.08	6.00	1.33	5
10/24/2011	Body 5180	e'	48.5943	Relative Permittivity (ε_r):	48.59	49.05	-0.92	10
		e"	18.8801	Conductivity (σ):	5.44	5.27	3.16	5
	Body 5200	e'	48.5741	Relative Permittivity (ε_r):	48.57	49.02	-0.91	10
		e"	18.9207	Conductivity (σ):	5.47	5.29	3.32	5
	Body 5500	e'	47.9902	Relative Permittivity (ε_r):	47.99	48.61	-1.28	10
		e"	19.2292	Conductivity (σ):	5.88	5.64	4.18	5
	Body 5700	e'	47.6270	Relative Permittivity (ε_r):	47.63	48.34	-1.48	10
		e"	19.4345	Conductivity (σ):	6.16	5.88	4.80	5

Liquid Check Results (continued)

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ? %)
10/25/2011	Body 2450	e'	51.1919	Relative Permittivity (ϵ_r):	51.19	52.70	-2.86	5
		e"	14.2594	Conductivity (σ):	1.94	1.95	-0.38	5
	Body 2410	e'	51.3125	Relative Permittivity (εr):	50.52	52.70	-4.13	5
		e"	14.0991	Conductivity (σ):	1.98	1.95	1.70	5
	Body 2435	e'	51.2404	Relative Permittivity (εr):	50.52	52.70	-4.13	5
		e"	14.1995	Conductivity (σ):	1.98	1.95	1.70	5
	Body 2465	e'	51.1372	Relative Permittivity (εr):	50.52	52.70	-4.13	5
		e"	14.3225	Conductivity (σ):	1.98	1.95	1.70	5

10. SAR Measurement Procedure

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, 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.

11. 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%.

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 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 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	Serial No.	Cal. date	Cal. Freq. (GHz)	SAR Avg (mW/g)		
				Tissue:	Head	Body
D2450V2	706	4/19/11	2.45	1g SAR:	51.6	52.4
				10g SAR:	24.4	24.5
D5GHzV2	1003	8/23/11	5200	1g SAR:	76.5	74.5
				10g SAR:	21.8	20.8
			5500	1g SAR:	80.9	80.0
				10g SAR:	23.1	22.3
			5800	1g SAR:	76.3	76.3
				10g SAR:	21.7	21.2

11.1. System Check Results

Date Tested	System validation dipole		Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
10/10/11	Body	2450	1g SAR:	52.4	52.4	0.00	±10
			10g SAR:	24.4	24.5	-0.41	
10/10/11	Body	5200	1g SAR:	74.1	74.5	-0.54	±10
			10g SAR:	21.3	20.8	2.40	
10/11/11	Body	2450	1g SAR:	52.5	52.4	0.19	±10
			10g SAR:	24.8	24.5	1.22	
10/11/11	Body	5800	1g SAR:	70.6	76.3	-7.47	±10
			10g SAR:	19.9	21.2	-6.13	
10/11/11	Body	5200	1g SAR:	76.1	74.5	2.15	±10
			10g SAR:	22.0	20.8	5.77	
10/12/11	Body	5500	1g SAR:	85.8	80	7.25	±10
			10g SAR:	24.2	22.3	8.52	
10/12/11	Body	5800	1g SAR:	73.1	76.3	-4.19	±10
			10g SAR:	20.7	21.2	-2.36	
10/12/11	Body	5200	1g SAR:	75.4	74.5	1.21	±10
			10g SAR:	21.4	20.8	2.88	
10/12/11	Body	5500	1g SAR:	83.8	80	4.75	±10
			10g SAR:	24.1	22.3	8.07	
10/24/11	Body	5200	1g SAR:	73.4	74.5	-1.48	±10
			10g SAR:	20.7	20.8	-0.48	
10/24/11	Body	5500	1g SAR:	78.2	80	-2.25	±10
			10g SAR:	22.0	22.3	-1.35	
10/25/11	Body	2450	1g SAR:	49.9	52.4	-4.77	±10
			10g SAR:	23.4	24.5	-4.49	

12. SAR Test Results

12.1. WiFi (802.11abgn)

802.11bgn (2.4GHz)

Per KDB 248227, SAR is not required for 802.11g /n (HT20) channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels.

Test position	dist. (mm)	Pwr back-off	Mode	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g) 1-g	Note
Rear	0	N/A	802.11 b 1Mbps	1	2412.0	16.5		1
				6	2437.0	16.6	0.074	
				11	2462.0	16.5		1
bottom	0	N/A	802.11 b 1Mbps	1	2412.0	16.5	0.945	
				6	2437.0	16.6	**1.150**	
				11	2462.0	16.5	1.060	
Right	0	N/A	802.11 b 1Mbps	1	2412.0	16.5		1
				6	2437.0	16.6	0.045	
				11	2462.0	16.5		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).

802.11an (5GHz)

Per KDB 248227, SAR is not required for 802.11n (HT20) channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a channels.

Test position	dist. (mm)	Pwr back-off	Mode	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g) 1-g	Note
Rear	0	N/A	802.11 a 5.2GHz 6Mbps	36	5180.0	13.5		1
				40	5200.0	13.5	0.038	
				48	5240.0	13.5		1
bottom	0	N/A		36	5180.0	13.5		1
				40	5200.0	13.5	**0.517**	
				48	5240.0	13.5		1
Right	0	N/A		36	5180.0	13.5		1
				40	5200.0	13.5	0.042	
				48	5240.0	13.5		1
Rear	0	N/A	802.11 a 5.3GHz 6Mbps	52	5260.0	17.5		1
				60	5300.0	17.5	0.125	
				64	5320.0	16.5		1
bottom	0	N/A		52	5260.0	17.5	1.100	
				60	5300.0	17.5	1.140	
				64	5320.0	16.5	**1.160**	
Right	0	N/A		52	5260.0	17.5		1
				60	5300.0	17.5	0.056	
				64	5320.0	16.5		1
Rear	0	N/A	802.11 a 5.5GHz 6Mbps	100	5500.0	16.5		2
				120	5600.0	16.5	0.140	
				140	5700.0	16.5		2
bottom	0	N/A		100	5500.0	16.5	0.911	
				120	5600.0	16.5	**1.190**	
				140	5700.0	16.5	1.170	
Right	0	N/A		100	5500.0	16.5		2
				120	5600.0	16.5	0.068	
				140	5700.0	16.5		2
Rear	0	N/A	802.11 a 5.8GHz 6Mbps	149	5745.0	17.5		1
				157	5785.0	17.5	0.076	
				165	5825.0	17.4		1
bottom	0	N/A		149	5745.0	17.5	1.090	
				157	5785.0	17.5	**1.190**	
				165	5825.0	17.4	1.030	
Right	0	N/A		149	5745.0	17.5		1
				157	5785.0	17.5	0.019	
				165	5825.0	17.4		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. Summary of Highest 1g SAR

FCC rule part	Technology/Band	Test configuration	Mode	Separation distance (mm)	Highest 1g SAR (W/kg)
15.247	WiFi 2.4 GHz	Bottom	802.11b	0	1.15
15.407	WiFi 5.2 GHz	Bottom	802.11a	0	0.52
	WiFi 5.3 GHz	Bottom	802.11a	0	1.16
	WiFi 5.5 GHz	Bottom	802.11a	0	1.19
15.247	WiFi 5.8 GHz	Bottom	802.11a	0	1.19

14. Worst-case SAR Plots

Date/Time: 10/10/2011 4:06:39 PM

Test Laboratory: UL CCS SAR Lab D

WiFi 2.4GHz_Body

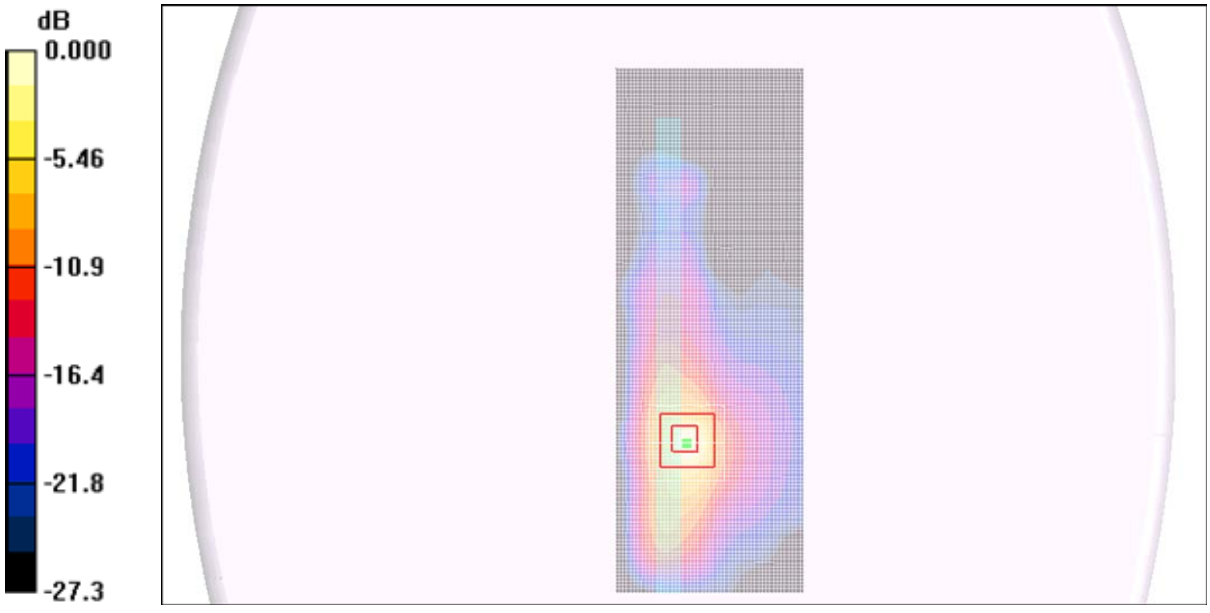
Communication System: 802.11b/g 2.4GHz; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.97 mho/m; ε_r = 50.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

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

DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3749; ConvF(6.9, 6.9, 6.9); Calibrated: 12/13/2010
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1259; Calibrated: 5/3/2011
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: 1017
- Measurement SW: DASY4, V4.7 Build 80; Post processing SW: SEMCAD, V1.8 Build 186

Bottom_ch 6/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.76 mW/g

Bottom_ch 6/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 29.9 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 3.47 W/kg
SAR(1 g) = 1.15 mW/g; SAR(10 g) = 0.398 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.85 mW/g



0 dB = 1.85mW/g

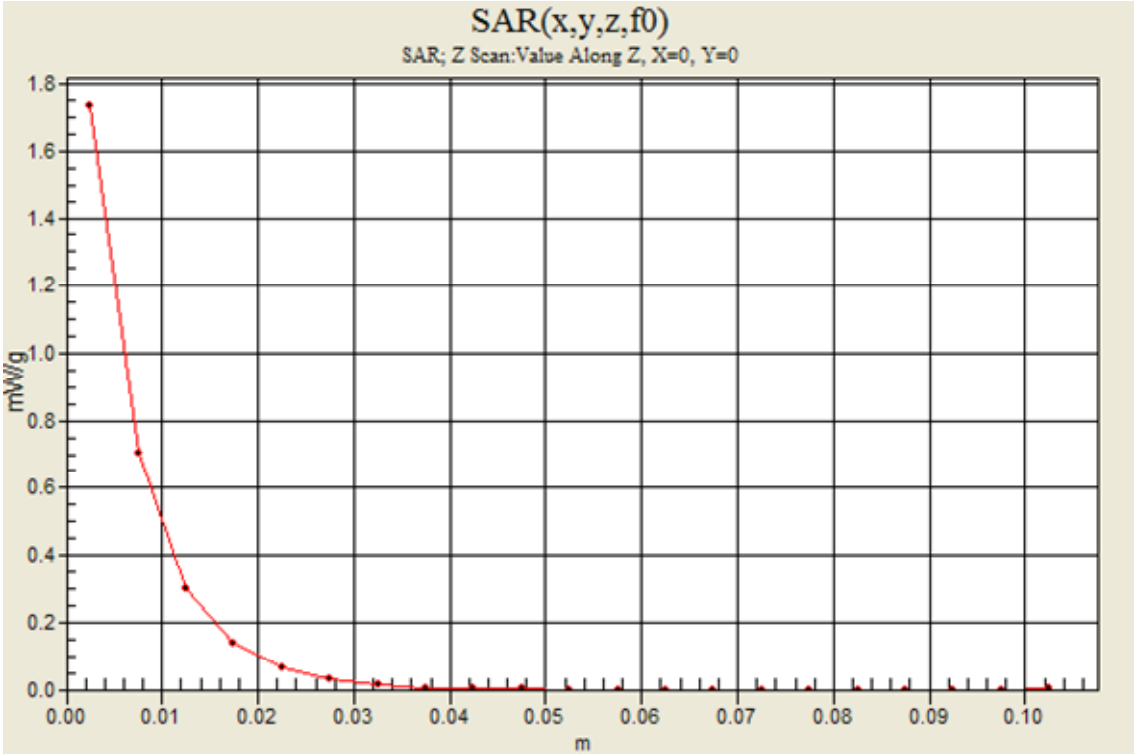
Date/Time: 10/10/2011 4:34:14 PM

Test Laboratory: UL CCS SAR Lab D

WiFi 2.4GHz_Body

Communication System: 802.11b/g 2.4GHz; Frequency: 2437 MHz; Duty Cycle: 1:1

Bottom_ch 6/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.73 mW/g



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Test Laboratory: UL CCS SAR Lab D

5GHz_Body

DUT: Apple; Type: 17 inch; Serial: N/A

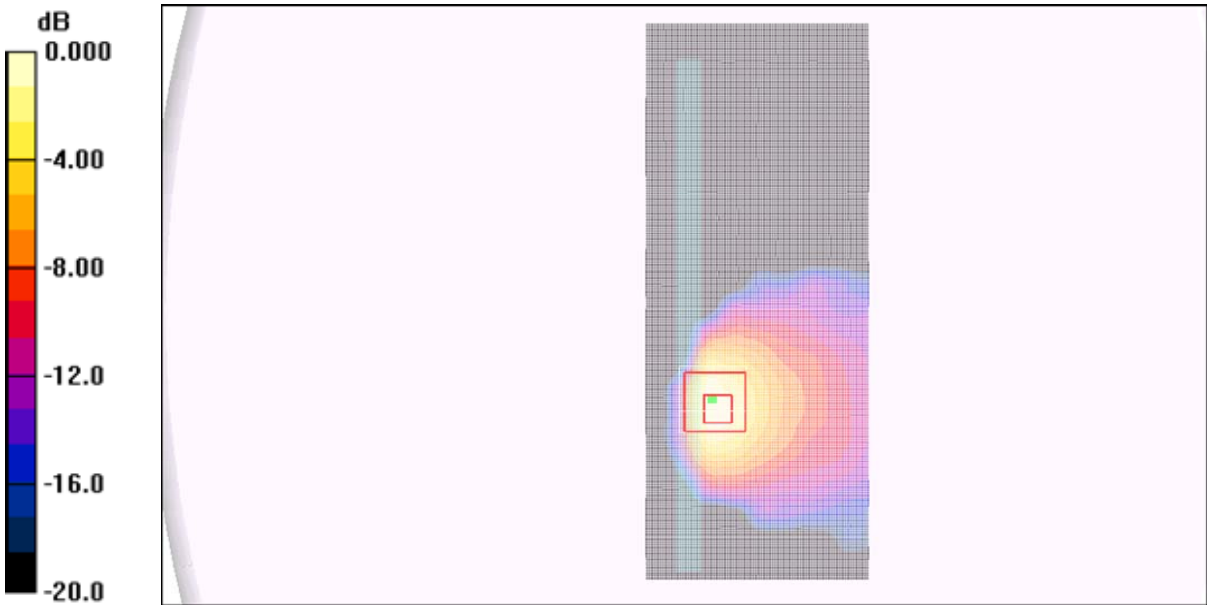
Communication System: 802.11abgn; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.47 mho/m; ε_r = 48.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

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

DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3749; ConvF(4.07, 4.07, 4.07); Calibrated: 12/13/2010
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1259; Calibrated: 5/3/2011
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017
- Measurement SW: DASY4, V4.7 Build 80; Post processing SW: SEMCAD, V1.8 Build 186

Bottom_Ch40/Area Scan (81x201x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.923 mW/g

Bottom_Ch40/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 12.2 V/m; Power Drift = 0.187 dB
Peak SAR (extrapolated) = 1.67 W/kg
SAR(1 g) = 0.517 mW/g; SAR(10 g) = 0.170 mW/g
Maximum value of SAR (measured) = 0.888 mW/g



0 dB = 0.888mW/g

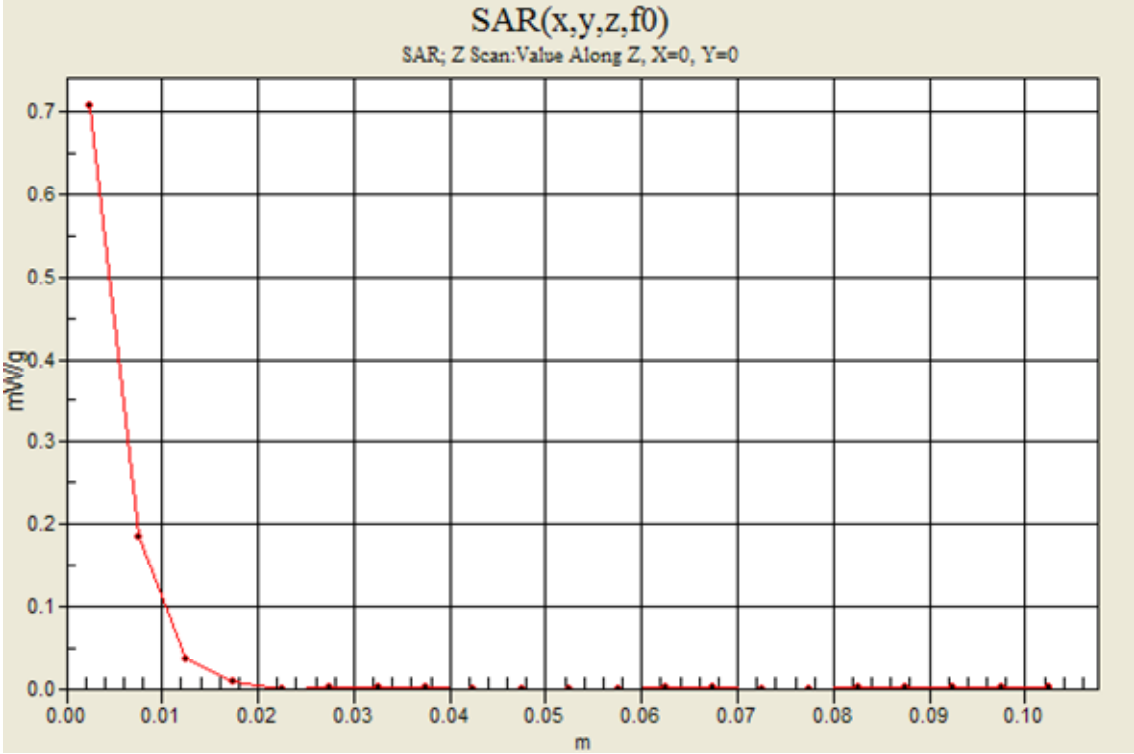
Date/Time: 10/24/2011 3:59:25 PM

Test Laboratory: UL CCS SAR Lab D

5GHz_Body

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

Bottom_Ch40/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.708 mW/g



Date: 10/11/2011

Test Laboratory: UL CCS SAR Lab A

WiFi 5GHz_Body

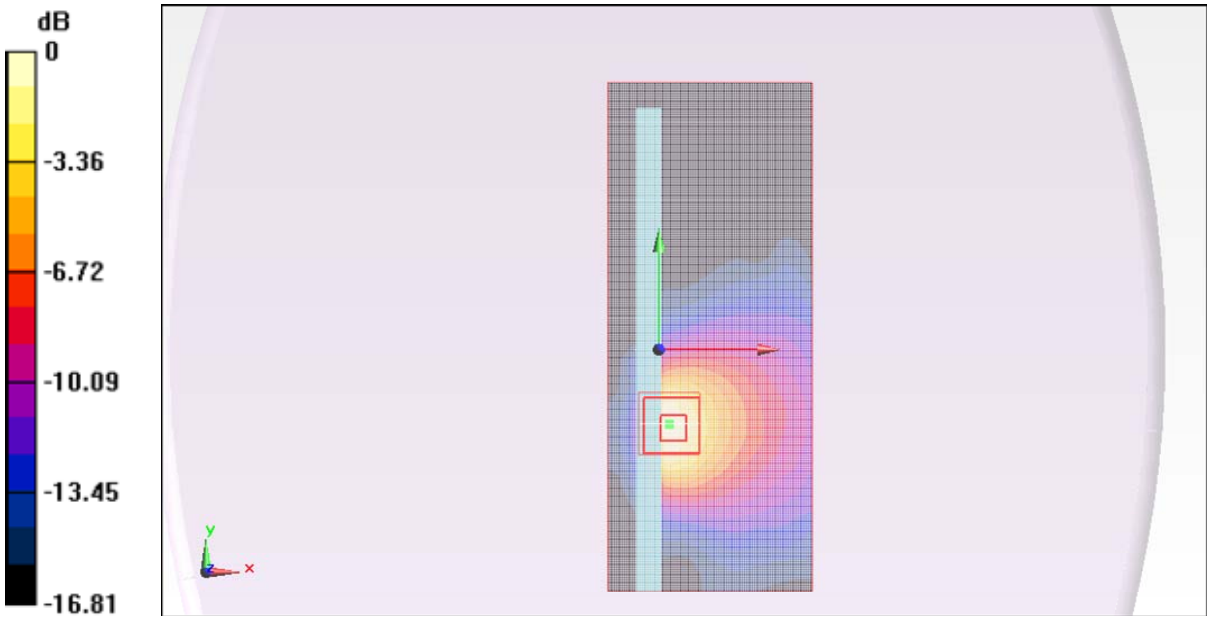
Communication System: WLAN 5GHz; Frequency: 5320 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5320 MHz; σ = 5.611 mho/m; ε_r = 49.004; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 (Locations From Previous Scan Used)), Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 7/14/2011
- Phantom: ELI v4.0(A); Type: QDOVA001BB; Serial: 1119
- Measurement SW: DASY52, Version 52.6 (2);SEMCAD X Version 14.4.5 (3634)

Bottom/Ch 64/Area Scan (81x201x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.142 mW/g

Bottom/Ch 64/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 17.599 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 3.718 W/kg
SAR(1 g) = 1.16 mW/g; SAR(10 g) = 0.436 mW/g
Maximum value of SAR (measured) = 1.908 mW/g



0 dB = 1.910mW/g

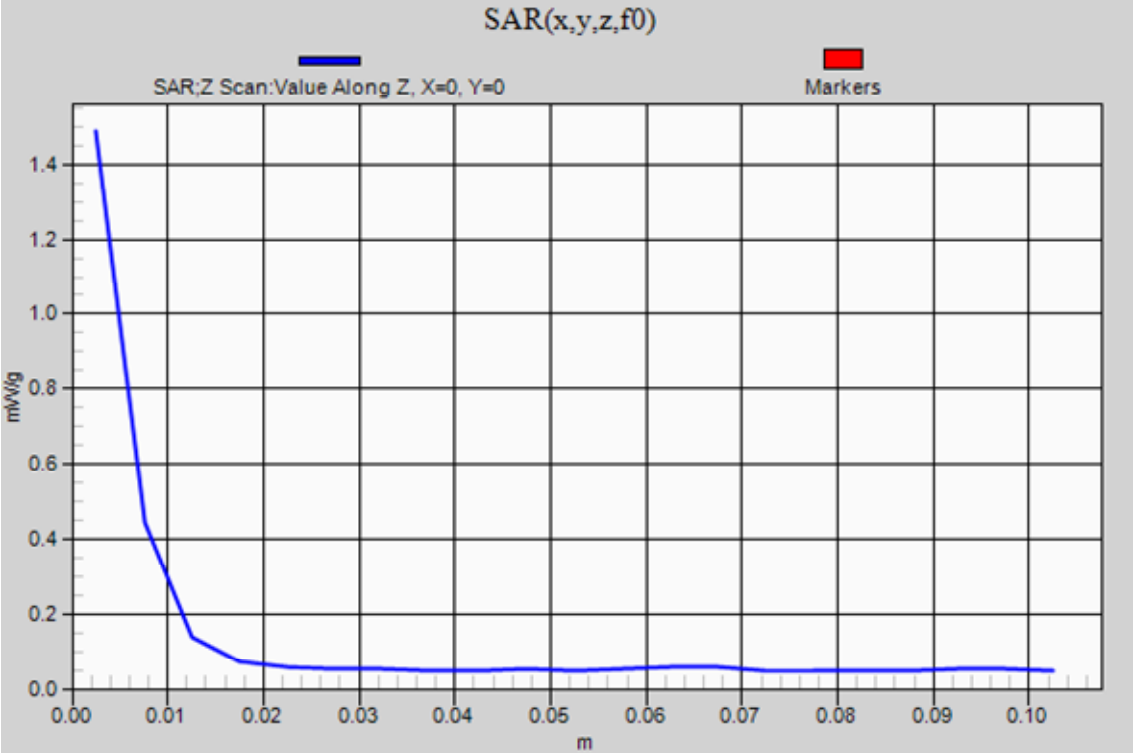
Date: 10/12/2011

Test Laboratory: UL CCS SAR Lab A

WiFi 5GHz_Body

Communication System: WLAN 5GHz; Frequency: 5320 MHz; Duty Cycle: 1:1

Bottom/Ch 64/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.488 mW/g



Date: 10/12/2011

Test Laboratory: UL CCS SAR Lab A

WiFi 5GHz_Body

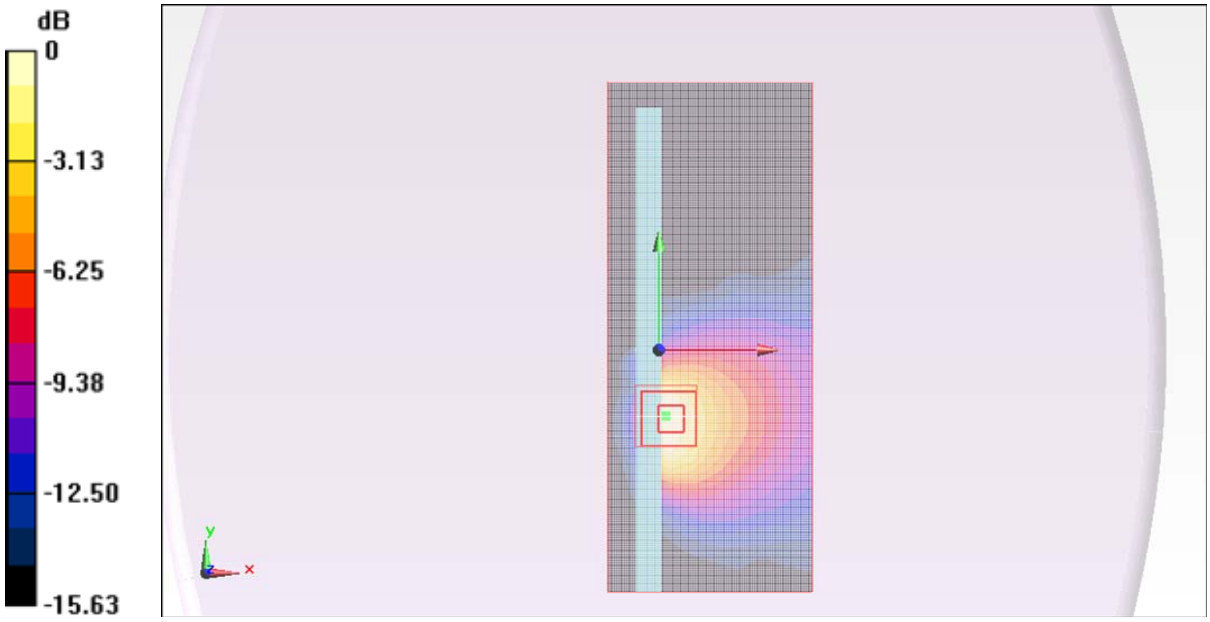
Communication System: WLAN 5GHz; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 5.784 mho/m; ε_r = 47.969; ρ = 1000 kg/m^3
Phantom section: Flat Section

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: DAE3 Sn500; Calibrated: 7/14/2011
- Phantom: ELI v4.0(A); Type: QDOVA001BB; Serial: 1119
- Measurement SW: DASY52, Version 52.6 (2);SEMCAD X Version 14.4.5 (3634)

Bottom/Ch 120/Area Scan (81x201x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.442 mW/g

Bottom/Ch 120/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 19.016 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 3.797 W/kg
SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.453 mW/g
Maximum value of SAR (measured) = 1.997 mW/g



0 dB = 2.000mW/g

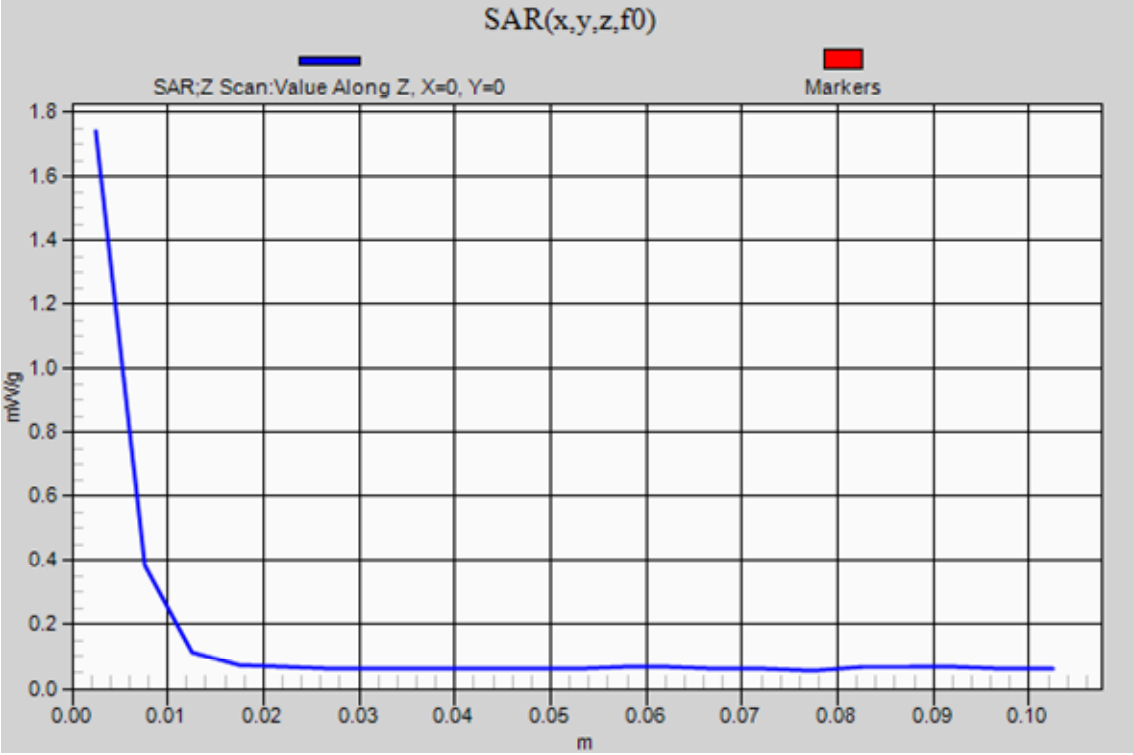
Date: 10/12/2011

Test Laboratory: UL CCS SAR Lab A

WiFi 5GHz_Body

Communication System: WLAN 5GHz; Frequency: 5600 MHz; Duty Cycle: 1:1

Bottom/CH 120/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.741 mW/g



Date/Time: 10/12/2011 11:24:48 AM

Test Laboratory: UL CCS SAR Lab D

5GHz_Body

DUT: Apple; Type: 17 inch; Serial: N/A

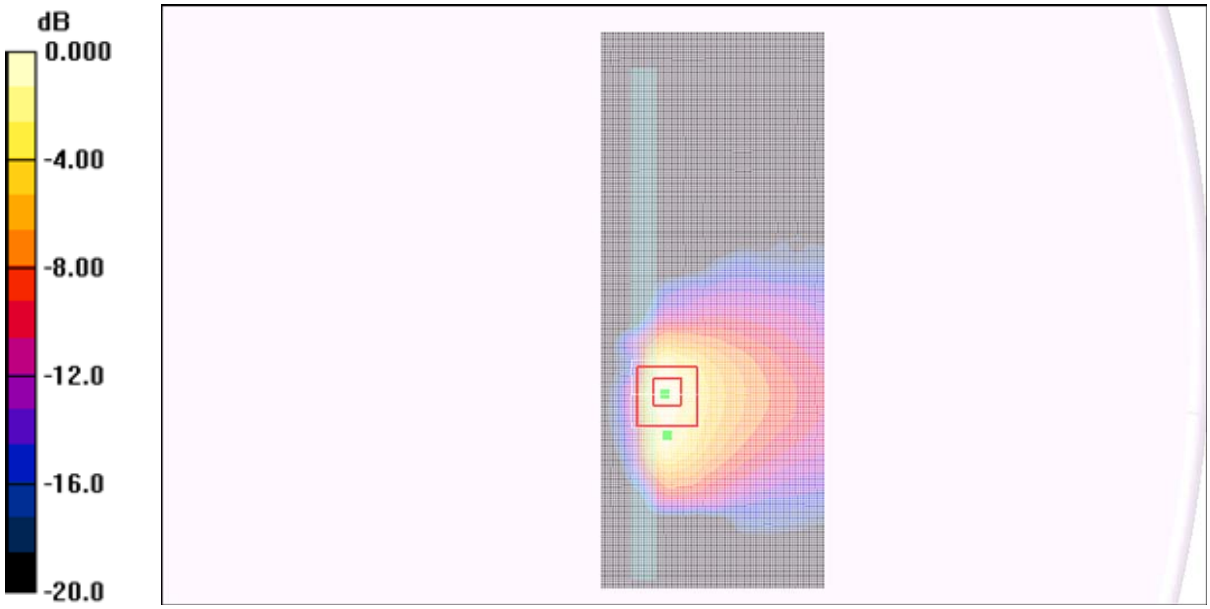
Communication System: 802.11abgn; Frequency: 5785 MHz; Duty Cycle: 1:1
Medium parameters used: f = 5785 MHz; σ = 6.1 mho/m; ε_r = 47.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

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

DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3749; ConvF(3.65, 3.65, 3.65); Calibrated: 12/13/2010
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1259; Calibrated: 5/3/2011
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BB; Serial: SN:1017
- Measurement SW: DASY4, V4.7 Build 80; Post processing SW: SEMCAD, V1.8 Build 186

Bottom_Ch157/Area Scan (81x201x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.65 mW/g

Bottom_Ch157/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 19.4 V/m; Power Drift = -0.041 dB
Peak SAR (extrapolated) = 4.09 W/kg
SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.396 mW/g
Maximum value of SAR (measured) = 2.15 mW/g



0 dB = 2.15mW/g

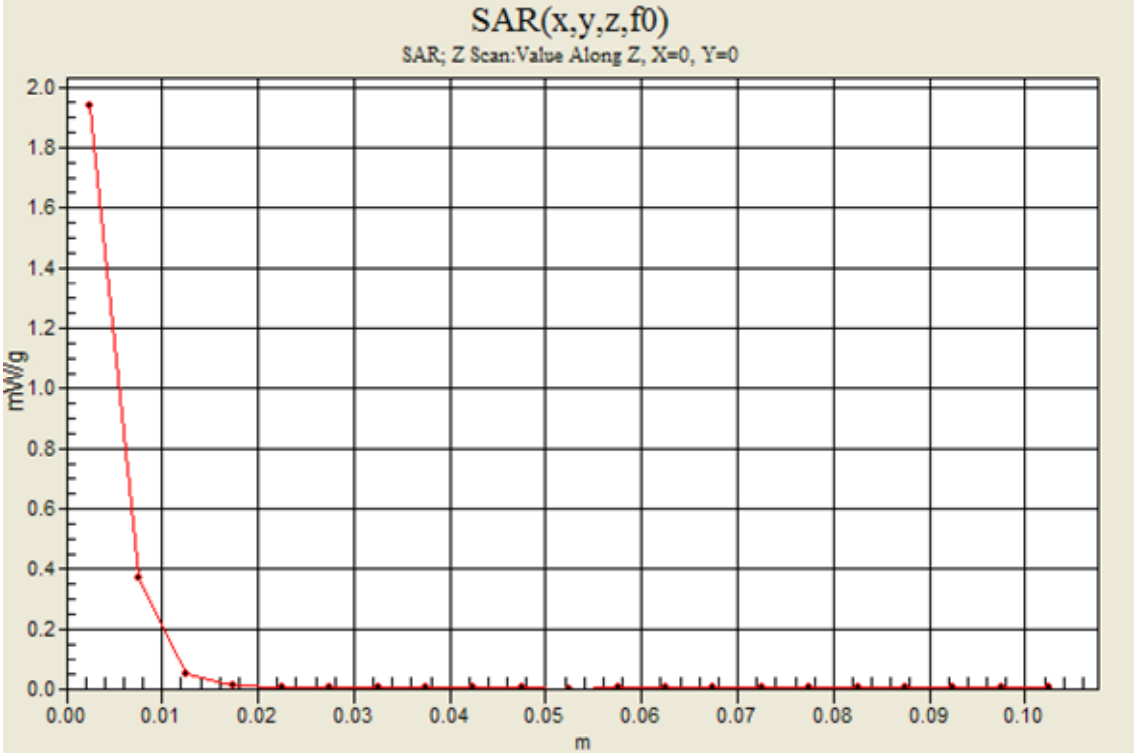
Date/Time: 10/12/2011 12:00:45 PM

Test Laboratory: UL CCS SAR Lab D

5GHz_Body

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

Bottom_Ch157/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.94 mW/g



15. Appendixes

Refer to separated files for the following appendixes.

15.1. System check plots

15.2. SAR test plots for WiFi 2.4 GHz

15.3. SAR test plots for WiFi 5 GHz Bands

15.4. Calibration certificate for E-Field Probe EX3DV4 SN 3686

15.5. Calibration certificate for E-Field Probe EX3DV4 SN 3749

15.6. Calibration certificate for D2450V2 SN: 706 with extended cal. Data

15.7. Calibration certificate for D5GHzV2 SN 1003