FCC OET BULLETIN 65 SUPPLEMENT C 01-01
IEEE Std 1528-2003

(Class II Permissive Change)

SAR EVALUATION REPORT

For
Intel Centrino Wireless-N 1030
(Tested inside of Toshiba Tablet PC, Model WT200)

Model: PA3901-1MPC
FCC ID: CJ6UPA3901WB

Report Number: 12U14258-1A1

Issue Date: 04/10/2012

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	03/20/2012	Initial Issue	--
A	04/06/2012	Updated report as follows: 1. Added "UL" logo in the cover page 2. Added note in Section 7.1 to clarify antenna operation diversity 3. Added note in Section 8	Ray Su
A1	04/10/2012	Updated report as follows: 1. Added KDB 616217 D03 SAR Supp Note and Netbook Laptop v01 in Section 2 2. Added the BT antenna and antenna distance to the SAR photo exhibit 3. Section 7 – Updated normal operation description of the DUT	Sunny Shih

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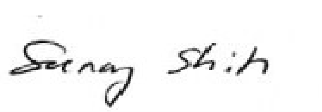
1. Attestation of Test Results

Applicant	Toshiba Corporation		
DUT description	Intel Centrino Wireless-N 1030 (Tested inside of Toshiba Tablet PC, Model WT200)		
Model	PA3901-1MPC		
Test device is	An identical prototype		
Device category	Portable device		
Exposure category	General Population/Uncontrolled Exposure		
Date tested	02/08/2012		
FCC Rule Parts	Freq. Range	Highest 1-g SAR	Limit
15.247	2412-2462 MHz	Body: 1.05 W/kg (Rear w/ 0 mm distance)	1.6 W/kg
Applicable Standards			Test Results
FCC 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 UL CCS By:



Sunny Shih
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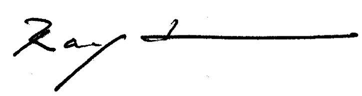
Tested By:



Ray Su
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.

- o 447498 D01 Mobile Portable RF Exposure v04
- o 248227 D01 SAR meas for 802 11abg v01r02
- o 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.

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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		
ESA Series Network Analyzer	Agilent	E5071B	MY42100131	2	22	2013
Synthesized Signal Generator	HP	83732B	US34490599	7	14	2012
E-Field Probe	SPEAG	EX3DV4	3749	1	27	2013
Thermometer	ERTCO	639-1S	1718	7	19	2012
Data Acquisition Electronics	SPEAG	DAE3	427	1	17	2013
System Validation Dipole	SPEAG	*D2450V2	706	4	19	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 Calibration Certificate for D2450V2 SN 706 incl. extended cal. data)
4. Impedance is within 5Ω of calibrated measurement (See Appendix Calibration Certificate for D2450V2 SN 706 incl. extended cal. data)

4.2. Measurement Uncertainty

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

Component	Error, %	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	**0.27**	Normal	1	0.64	0.17
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement uncertainty	**0.99**	Normal	1	0.6	0.59
Combined Standard Uncertainty Uc(y) =					9.46
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				18.92	%
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				1.51	dB

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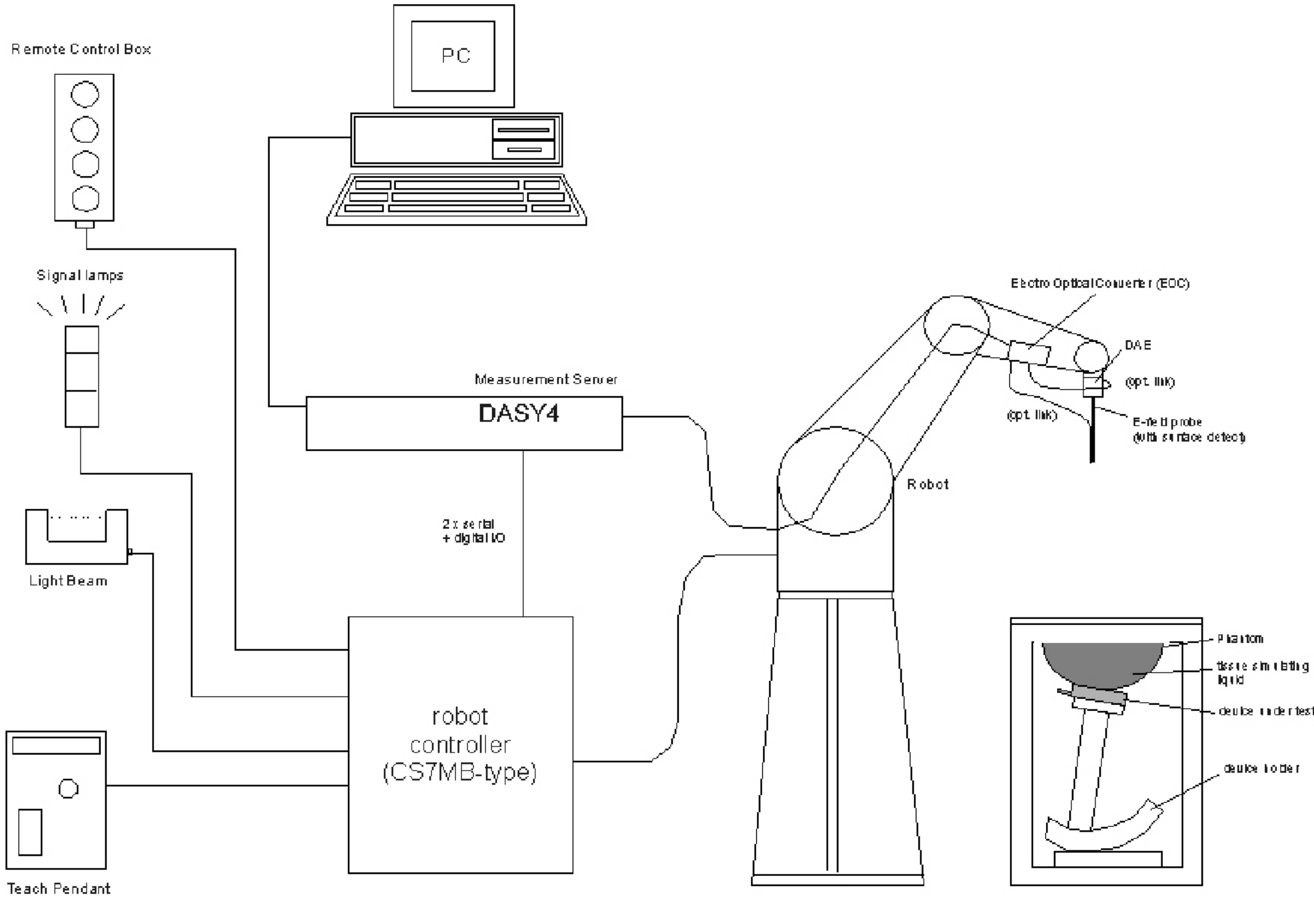
5. Measurement System Description and Setup

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.
- 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.

6. SAR Measurement Procedures

6.1. Normal 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 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.

6.2. Volume Scan 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: Volume Scan
Volume Scans are used to assess peak SAR and averaged SAR measurements in largely extended 3-dimensional volumes within any phantom. This measurement does not need any previous area scan. The grid can be anchored to a user specific point or to the current probe location.

Step 5: 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.

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7. Device Under Test

Intel Centrino Wireless-N 1030 (Tested inside of Toshiba Tablet PC, Model WT200)	
Normal operation	- Bottom Face (Rear) - Edges (Edge 1, 2, 3, and 4): Multiple display orientations supporting both portrait and landscape configurations

7.1. Band and Air Interfaces

Tx Frequency Bands	- 802.11b/g/n: 2412 - 2462 MHz, HT20 and HT40 - Bluetooth: 2402 - 2480 MHz Note: In 802.11bgn, the Main port is the Tx antenna, while the Aux port is the Rx antenna. With BT enabled, the Main port becomes the Rx antenna, and the Aux port the Tx antenna.

7.2. Simultaneous Transmission

Simultaneous transmission	WiFi 2.4 GHz can transmit simultaneously with BT
Assessment for SAR evaluation for Simultaneous transmission	As Bluetooth's max average power is 5.50 mW [<60/f(GHz) mW], standalone SAR is not required. Therefore, WiFi and Bluetooth simultaneous transmission SAR evaluation is not required.

8. Summary of Test Configurations

The following test configurations are based on KDB 447498 4) b) Tablet Mode

Test Configuration	Antenna-to-edge/surface	SAR Required	Note
Rear	10.9 mm	Yes	
Edge 1	166.89 mm	No	This is not the most conservative antenna-to-user distance at edge mode as per KDB 447498 4) b) ii) (2)
Edge 2	149 mm	No	This is not the most conservative antenna-to-user distance at edge mode as per KDB 447498 4) b) ii) (2)
Edge 3	1.6 mm	Yes	
Edge 4	82.64 mm	No	This is not the most conservative antenna-to-user distance at edge mode as per KDB 447498 4) b) ii) (2)
Note: The antenna here refers only to the Main Antenna, as it is the only antenna that requires SAR evaluation; the Auxiliary Antenna is Rx only when operating under WiFi.			

9. RF Output Power Verification

9.1. WiFi (802.11bgn)

Mode	Channel #	Freq. (MHz)	Target Power		Measured Power	
			(dBm)	(mW)	(dBm)	(mW)
802.11b	1	2412	16.80	47.86	16.96	49.66
	6	2437	16.80	47.86	17.05	50.70
	11	2462	16.80	47.86	17.03	50.47
802.11g	1	2412	16.70	46.77	16.80	47.86
	6	2437	16.70	46.77	16.70	46.77
	11	2462	14.10	25.70	14.20	26.30
802.11n (HT20)	1	2412	14.20	26.30	14.20	26.30
	6	2437	16.70	46.77	16.70	46.77
	11	2462	13.80	23.99	13.90	24.55
802.11n (HT40)	3	2422	12.20	16.60	12.20	16.60
	6	2437	14.70	29.51	14.80	30.20
	9	2452	12.30	16.98	12.40	17.38

Note(s):

Original target power is from EMC report R80706. Refer to the original report (FCC ID: PD911230BNH) for Average Power information as documented in the original filing dated 10/12/2010.

9.2. Bluetooth

Mode	Channel #	Freq. (MHz)	Conducted Avg Power	
			(dBm)	(mW)
GFSK	0	2402	7.0	5.01
	39	2441	7.4	5.50
	78	2480	7.3	5.37
8PSK	0	2402	2.8	1.91
	39	2441	4.5	2.82
	78	2480	4.6	2.88

Note(s):

According to KDB 616217, Table 2, Unlicensed transmitters
When there is simultaneous transmission, Stand-alone SAR not required when
☒ Output ≤ 2 · P_{Ref} (24 mW) and antenna is ≥ 5.0 cm from other antennas
☐ Output ≤ P_{Ref} (12 mW) and antenna is ≥ 2.5 cm from other antennas
☐ Output ≤ P_{Ref} (12 mW) and antenna is < 2.5 cm from other antennas

10. Tissue Dielectric Properties

IEEE Std 1528-2003 Table 2

Target Frequency (MHz)	Head	
	ε_r	σ (S/m)
300	45.3	0.87
450	43.5	0.87
835	41.5	0.90
900	41.5	0.97
1450	40.5	1.20
1800 – 2000	40.0	1.40
2450	39.2	1.80
2600	39.0	1.96
3000	38.5	2.40

FCC OET Bulletin 65 Supplement C 01-01

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
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

10.1. Composition of Ingredients for the Tissue Material used in the SAR Tests

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

10.2. Tissue Dielectric Parameter Check Results

Tissue dielectric parameters measured at the low, middle and high frequency of each operating frequency range of the test device.

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
2/8/2012	Body 2450	e'	53.1276	Relative Permittivity (ϵ_r):	53.13	52.70	0.81	5
		e"	14.3528	Conductivity (σ):	1.96	1.95	0.27	5
	Body 2410	e'	53.2811	Relative Permittivity (ϵ_r):	53.28	52.76	0.99	5
		e"	14.2388	Conductivity (σ):	1.91	1.91	0.03	5
	Body 2435	e'	53.1483	Relative Permittivity (ϵ_r):	53.15	52.73	0.80	5
		e"	14.2403	Conductivity (σ):	1.93	1.93	-0.16	5
	Body 2460	e'	53.0216	Relative Permittivity (ϵ_r):	53.02	52.69	0.63	5
		e"	14.3978	Conductivity (σ):	1.97	1.96	0.27	5

11. System Performance Check

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%.

11.1. 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.

11.2. Reference SAR values for System Performance Check

The reference SAR values can be obtained from the calibration certificate of system validation dipoles

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	SAR Measured (mW/g)		
				1g/10g	Head	Body
D2450V2	706	4/19/11	2450	1g	51.6	52.4
				10g	24.4	24.5

11.3. System Performance Check Results

Date Tested	System dipole		Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
2/8/2012	Body	2450	1g SAR	54.6	52.4	4.20	±10
			10g SAR	25.2	24.5	2.86	

12. SAR Test Results

12.1. WiFi (802.11bgn)

Test Reduction Consideration

SAR is not required for 802.11g/n (HT20/HT40) channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels as per KDB 248227.

Body SAR

Test Position	Mode	Dist. (mm)	Ch #.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g)		Note
						1-g	10-g	
Rear	802.11b	0	1	2412	16.96	0.816	0.379	
			6	2437	17.05	**1.050**	0.483	
			11	2462	17.03	1.020	0.470	
Edge 3	802.11b	0	1	2412	16.96	n/a	n/a	1
			6	2437	17.05	0.514	0.219	
			11	2462	17.03	n/a	n/a	1

Note(s):

1. For frequency bands with an operating range of < 100 MHz, when the SAR for the highest output power channel within is ≤ 0.8 W/kg, SAR for the remaining channels is not required. Per KDB 447498 1) e) i)

13. Summary of Highest SAR Values

The test configuration for each body exposure condition (head, body and Hotspot) is dependent on the applicable voice or data modes, and antenna selected.

Technology/Band	Test configuration	Mode	Separation distance (mm)	Highest 1g SAR (W/kg)
Wi-Fi 2.4 GHz	Body: Rear	802.11b, 1 Mbps	0	1.05

14. SAR Plots (from Summary of Highest SAR Values)

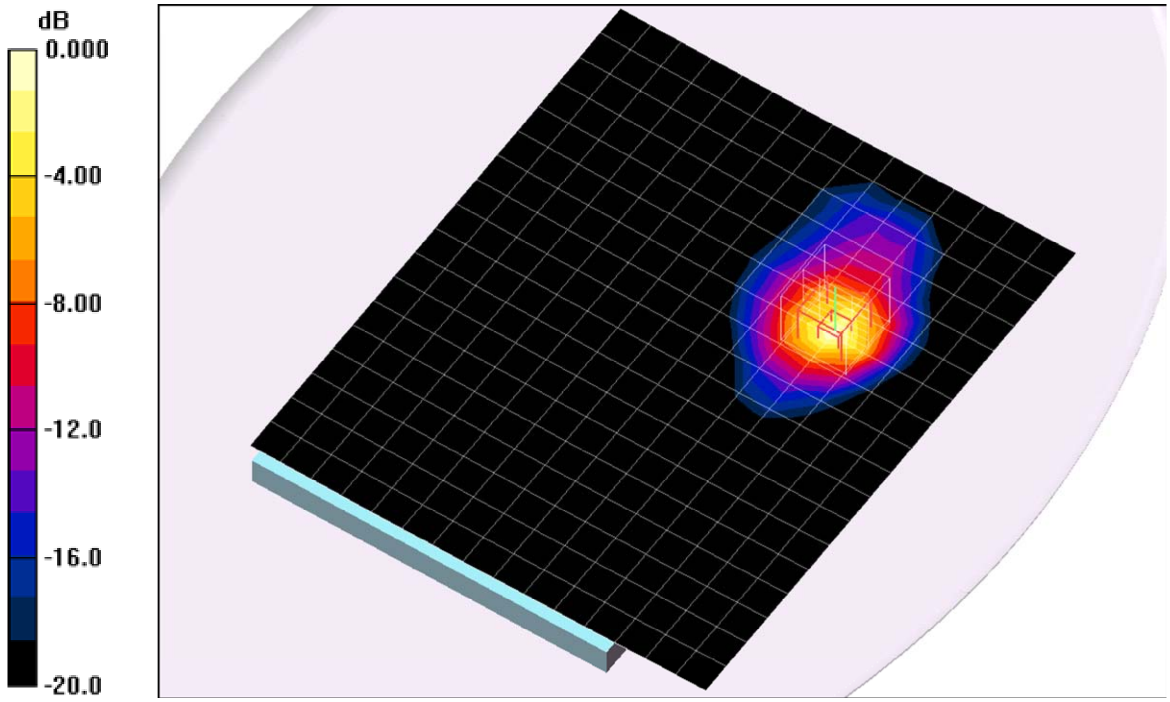
Test Laboratory: UL CCS SAR Lab D Date/Time: 2/8/2012 4:32:50 PM

WiFi 2.4GHz

Frequency: 2437 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.93 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3 ;
DASY4 Configuration:
- Electronics: DAE3 Sn427; Calibrated: 1/17/2012
- Probe: EX3DV4 - SN3749; ConvF(6.66, 6.66, 6.66); Calibrated: 1/27/2012
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003

Rear_802.11b_Ch 6/Area Scan (16x19x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.36 mW/g

Rear_802.11b_Ch 6/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.2 V/m; Power Drift = -0.156 dB
Peak SAR (extrapolated) = 2.15 W/kg
SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.483 mW/g
Maximum value of SAR (measured) = 1.39 mW/g



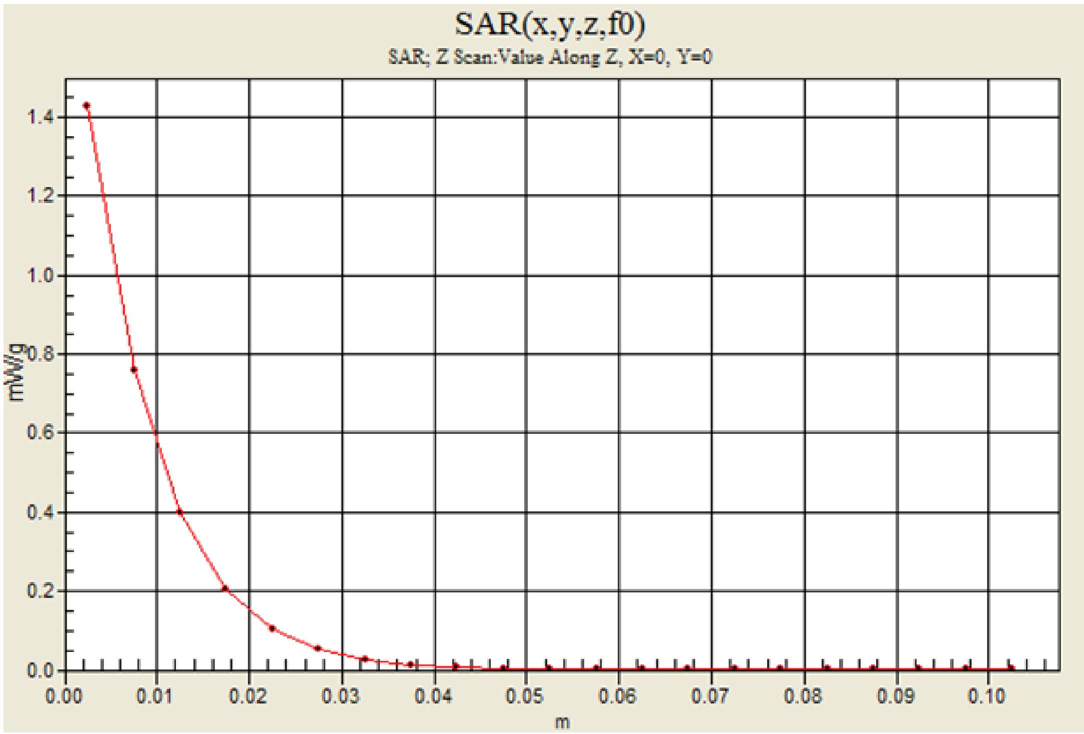
0 dB = 1.39mW/g

Test Laboratory: UL CCS SAR Lab D
Date/Time: 2/8/2012 5:46:09 PM

WiFi 2.4GHz

Frequency: 2437 MHz; Duty Cycle: 1:1

Rear_802.11b_Ch 6/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.43 mW/g



15. Simultaneous Transmission SAR Analysis

As Bluetooth's max average power is 5.50 mW [<60/f(GHz) mW] standalone SAR is not required. Therefore, WiFi and Bluetooth simultaneous transmission SAR evaluation is not required.

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16. Appendixes

Refer to the separated files for the following appendixes.

16.1. System Performance Check Plots

16.2. SAR Test Plots for WiFi (802.11bgn)

16.3. Calibration Certificate for E-Field Probe EX3DV4 SN 3749

16.4. Calibration Certificate for D2450V2 SN: 706 w/ extended cal. data