



**FCC OET BULLETIN 65 SUPPLEMENT C
CLASS II PERMISSIVE CHANGE
IC RSS-102 ISSUE 3**

SAR EVALUATION REPORT

**FOR
802.11g WLAN PCI-E Mini Card
(Tested inside of HP Tablet PC, HSTNN-I77C & HSTNN-W75C)**

MODEL: BCM94312HMG

FCC ID: QDS-BRCM1030

REPORT NUMBER: 09U12957-2A

ISSUE DATE: December 11, 2009

Prepared for

**BROADCOM CORPORATION
190 MATHILDA PLACE
SUNNYVALE, CA 94086**

Prepared by

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



NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	December 4, 2009	Initial Issue	--
A	December 11, 2009	Additional SAR test with Tablet PC, HSTNN-W75C	Sunny Shih

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS.....	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION.....	5
4. CALIBRATION AND UNCERTAINTY.....	6
4.1. MEASURING INSTRUMENT CALIBRATION.....	6
4.2. MEASUREMENT UNCERTAINTY.....	7
5. EQUIPMENT UNDER TEST	8
6. SYSTEM SPECIFICATIONS.....	9
7. COMPOSITION OF INGREDIENTS FOR TISSUE SIMULATING LIQUIDS	10
8. LIQUID PARAMETERS CHECK.....	11
8.1. LIQUID CHECK RESULTS FOR 2450 MHZ.....	12
9. SYSTEM PERFORMANCE.....	14
9.1. SYSTEM CHECK RESULTS FOR D2450V2.....	14
10. OUTPUT POWER VERIFICATION.....	15
11. SUMMARY OF TEST RESULTS.....	16
11.1. HSTNN-I77C SAR TEST RESULTS.....	16
11.2. HSTNN-W75C SAR TEST RESULTS.....	17
12. SAR TEST PLOTS.....	18
13. ATTACHMENTS.....	20
14. HSTNN-I77C TEST SETUP PHOTO	21
15. HSTNN-W75C TEST SETUP PHOTO.....	24
16. HSTNN-I77C HOST DEVICE PHOTO	27
17. HSTNN-W75C HOST DEVICE PHOTO.....	28

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: BROADCOM CORPORATION
 190 MATHILDA PLACE
 SUNNYVALE, CA 94086

EUT DESCRIPTION: 802.11g WLAN PCI-E Mini Card
 (Tested inside of HP Tablet PC, HSTNN-I77C & HSTNN-W75C)

MODEL NUMBER: BCM94312HMG

DEVICE CATEGORY: Portable

EXPOSURE CATEGORY: General Population/Uncontrolled Exposure

DATE TESTED: November 30 & December 11, 2009

THE HIGHEST SAR VALUES:

FCC/IC Rule Parts	Frequency Range [MHz]	The Highest SAR Values (1g_mW/g)	Limit (mW/g)
15.247 / RSS-102	2400 – 2483.5	0.754 HSTNN-I77C Tablet - Secondary landscape	1.6
		0.908 HSTNN-W75C Tablet - Secondary landscape	

APPLICABLE STANDARDS:

STANDARD	TEST RESULTS
FCC OET BULLETIN 65 SUPPLEMENT C and the following specific Test Procedures: <ul style="list-style-type: none"> o KDB 248227 SAR measurement procedures for 802.11a/b/g transmitters o KDB 447498 D01 Mobile Portable RF Exposure v04, supplemental to KDB 616217 D03 	Pass
RSS-102 ISSUE 3	Pass

Compliance Certification Services, Inc. (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 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 CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by 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.

Approved & Released For CCS By:



SUNNY SHIH
 ENGINEERING SUPERVISOR
 COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C, Specific FCC Procedure KDB 248227 SAR Measurement Procedure for 802.11abg Transmitters, KDB 447498 D01 Mobile Portable RF Exposure v04, supplemental to KDB 616217 D03 and IC RSS 102 Issue 3.

And Schedule 2 of Radiocommunications (Electromagnetic Radiation - Human Exposure) Standard 2003 incl Amendment No 1, 2007 and NZS 2772.1:1999 Radiofrequency fields - Maximum exposure levels - 3 kHz to 300 GHz incl Amendment No. 1, 1999.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due date		
				MM	DD	Year
Robot - Six Axes	Stäubli	RX90BL	N/A	N/A		
Robot Remote Control	Stäubli	CS7MB	3403-91535	N/A		
DASY4 Measurement Server	SPEAG	SEUMS001BA	1041	N/A		
Probe Alignment Unit	SPEAG	LB (V2)	261	N/A		
SAM Phantom (SAM1)	SPEAG	QD000P40CA	1185	N/A		
SAM Phantom (SAM2)	SPEAG	QD000P40CA	1050	N/A		
Oval Flat Phantom (ELI 4.0)	SPEAG	QD OVA001 B	1003	N/A		
Electronic Probe kit	HP	85070C	N/A	N/A		
S-Parameter Network Analyzer	Agilent	8753ES-6	MY40001647	11	22	2010
Signal Generator	Agilent	8753ES-6	MY40001647	11	22	2010
E-Field Probe	SPEAG	EX3DV4	3686	3	23	1010
Data Acquisition Electronics	SPEAG	DAE3 V1	500	9	15	2010
System Validation Dipole	SPEAG	D900V2	108	1	21	2010
System Validation Dipole	SPEAG	D1800V2	294	1	29	2010
System Validation Dipole	SPEAG	D1900V2	5d043	1	29	2010
System Validation Dipole	SPEAG	D2450V2	748	4	14	2010
System Validation Dipole	SPEAG	D5GHzV2	1075	10	3	2012
ESG Vector Signal Generator	Agilent	E4438C	US44271090	9	17	2010
Power Meter	Giga-tronics	8651A	8651404	1	11	2010
Power Sensor	Giga-tronics	80701A	1834588	1	11	2010
Amplifier	Mini-Circuits	ZVE-8G	90606	N/A		
Amplifier	Mini-Circuits	ZHL-42W	D072701-5	N/A		
Simulating Liquid	SPAEG	H2450	N/A	Within 24 hrs of first test		
Simulating Liquid	SPAEG	M2450	N/A	Within 24 hrs of first test		
Simulating Liquid	SPAEG	M5800	N/A	Within 24 hrs of first test		

4.2. MEASUREMENT UNCERTAINTY

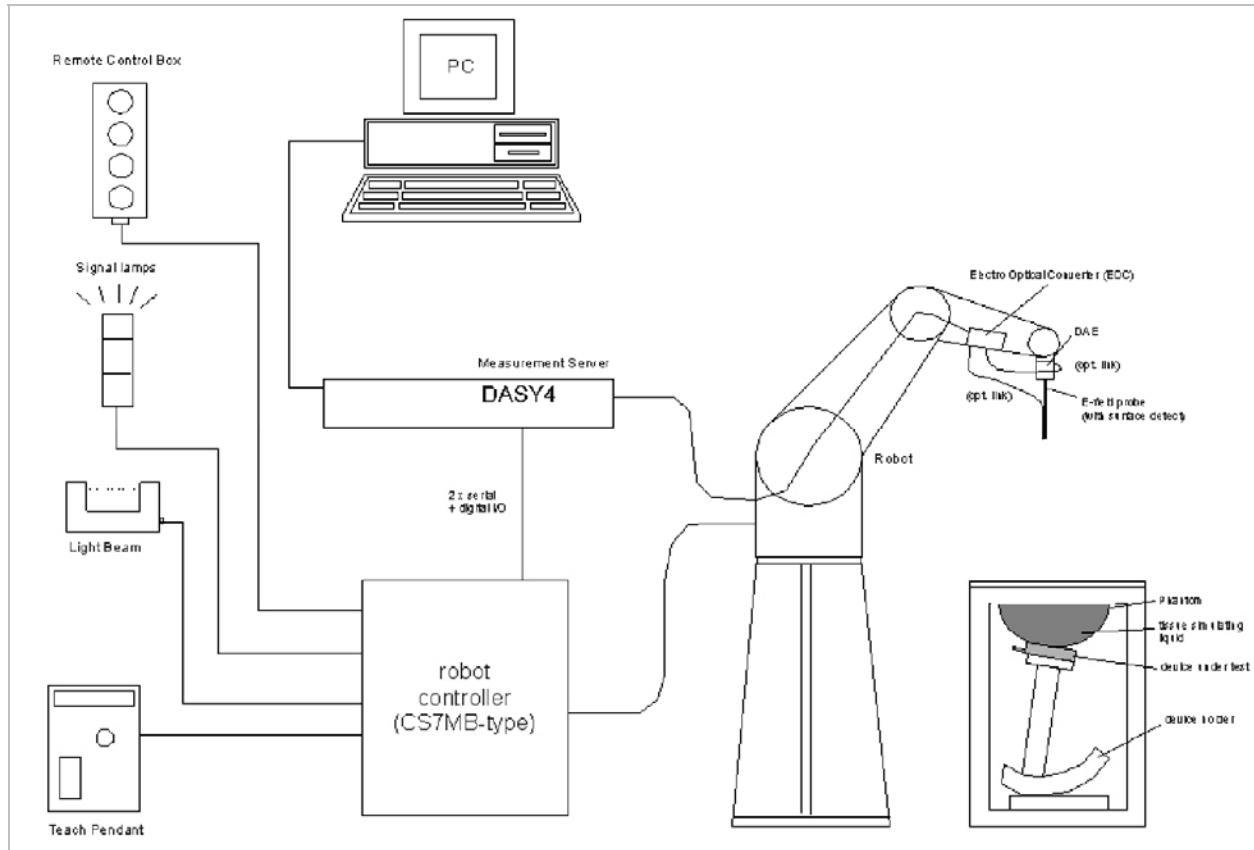
Measurement uncertainty for 300 MHz – 3000 MHz

Uncertainty component	Tol. (±%)	Probe Dist.	Div.	Ci (1g)	Ci (10g)	Std. Unc.(±%)	
						Ui (1g)	Ui(10g)
Measurement System							
Probe Calibration	4.80	N	1	1	1	4.80	4.80
Axial Isotropy	4.70	R	1.732	0.707	0.707	1.92	1.92
Hemispherical Isotropy	9.60	R	1.732	0.707	0.707	3.92	3.92
Boundary Effects	1.00	R	1.732	1	1	0.58	0.58
Linearity	4.70	R	1.732	1	1	2.71	2.71
System Detection Limits	1.00	R	1.732	1	1	0.58	0.58
Readout Electronics	1.00	N	1	1	1	1.00	1.00
Response Time	0.80	R	1.732	1	1	0.46	0.46
Integration Time	2.60	R	1.732	1	1	1.50	1.50
RF Ambient Conditions - Noise	1.59	R	1.732	1	1	0.92	0.92
RF Ambient Conditions - Reflections	0.00	R	1.732	1	1	0.00	0.00
Probe Positioner Mechanical Tolerance	0.40	R	1.732	1	1	0.23	0.23
Probe Positioning With Respect to Phantom Shell algorithms for max. SAR evaluation	2.90	R	1.732	1	1	1.67	1.67
	3.90	R	1.732	1	1	2.25	2.25
Test sample Related							
Test Sample Positioning	1.10	N	1	1	1	1.10	1.10
Device Holder Uncertainty	3.60	N	1	1	1	3.60	3.60
Power and SAR Drift Measurement	5.00	R	1.732	1	1	2.89	2.89
Phantom and Tissue Parameters							
Phantom Uncertainty	4.00	R	1.732	1	1	2.31	2.31
Liquid Conductivity - Target	5.00	R	1.732	0.64	0.43	1.85	1.24
Liquid Conductivity - Meas.	8.60	N	1	0.64	0.43	5.50	3.70
Liquid Permittivity - Target	5.00	R	1.732	0.6	0.49	1.73	1.41
Liquid Permittivity - Meas.	3.30	N	1	0.6	0.49	1.98	1.62
Combined Standard Uncertainty	RSS					11.44	10.49
Expanded Uncertainty (95% Confidence Interval)	K=2					22.87	20.98
Notes for table							
1. Tol. - tolerance in influence quantity							
2. N - Nomal							
3. R - Rectangular							
4. Div. - Divisor used to obtain standard uncertainty							
5. Ci - is te sensitivity coefficient							

5. EQUIPMENT UNDER TEST

802.11g WLAN PCI-E Mini Card (Tested inside of HP Tablet PC, HSTNN-I77C & HSTNN-W75C)													
Normal operation:	Laptop - Lap-held, Tablet - Edge (underarm) & lap-held												
Antenna tested:	<p><u>Install in</u></p> <table border="0"> <thead> <tr> <th><u>Host device</u></th> <th><u>Manufactured</u></th> <th><u>Model Number</u></th> </tr> </thead> <tbody> <tr> <td>HSTNN-I77C</td> <td><input checked="" type="checkbox"/> WNC</td> <td>Main: 81.EGG15.G12 Aux: 81.EGG15.G13</td> </tr> <tr> <td></td> <td><input type="checkbox"/> Yageo</td> <td>TX1: CAN43139WLIN00081 TX2: CAN43139WLIN00082</td> </tr> <tr> <td>HSTNN-W75C</td> <td><input checked="" type="checkbox"/> Ethertronics</td> <td>Main: 25.90946.001 Aux: 25.90947.001</td> </tr> </tbody> </table>	<u>Host device</u>	<u>Manufactured</u>	<u>Model Number</u>	HSTNN-I77C	<input checked="" type="checkbox"/> WNC	Main: 81.EGG15.G12 Aux: 81.EGG15.G13		<input type="checkbox"/> Yageo	TX1: CAN43139WLIN00081 TX2: CAN43139WLIN00082	HSTNN-W75C	<input checked="" type="checkbox"/> Ethertronics	Main: 25.90946.001 Aux: 25.90947.001
<u>Host device</u>	<u>Manufactured</u>	<u>Model Number</u>											
HSTNN-I77C	<input checked="" type="checkbox"/> WNC	Main: 81.EGG15.G12 Aux: 81.EGG15.G13											
	<input type="checkbox"/> Yageo	TX1: CAN43139WLIN00081 TX2: CAN43139WLIN00082											
HSTNN-W75C	<input checked="" type="checkbox"/> Ethertronics	Main: 25.90946.001 Aux: 25.90947.001											
Antenna-to-user separation distance:	Refer to Section 11 for antenna-to-user separation distance and												
Antenna-to-antenna distance:	Refer to antenna specifications												
Require SAR evaluation for Simultaneous transmission?	WWAN co-located RF exposure assessment will be addressed in a separate FCC application filed under WWAN application.												
Power supply:	Power supplied through laptop computer (host device)												

6. SYSTEM SPECIFICATIONS



The DASY4 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 2000 or Windows XP.
- DASY4 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 to validate the proper functioning of the system.

7. COMPOSITION OF INGREDIENTS FOR TISSUE SIMULATING LIQUIDS

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

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

Salt: 99+% Pure Sodium Chloride

Sugar: 98+% Pure Sucrose

Water: De-ionized, 16 MΩ+ resistivity

HEC: Hydroxyethyl Cellulose

DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]

Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

8. LIQUID PARAMETERS CHECK

The simulating liquids should be 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. The relative permittivity and conductivity of the tissue material should be within $\pm 5\%$ of the values given in the table below.

Reference Values of Tissue Dielectric Parameters for Head and Body Phantom (for 150 – 3000 MHz and 5800 MHz)

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in IEEE Standard 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and 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 $\rho = 1000 \text{ kg/m}^3$)

8.1. LIQUID CHECK RESULTS FOR 2450 MHZ

Simulating Liquid Dielectric Parameters for Muscle 2450 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40%

Measured by: Sunny Shih

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
2450	e'	53.24	Relative Permittivity (ϵ_r):	53.241	52.7	1.03	± 5
	e"	14.67	Conductivity (σ):	2.000	1.95	2.55	± 5

Liquid Check

Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C

November 30, 2009 02:28 PM

Frequency	e'	e"
2400000000.	53.5463	14.6351
2405000000.	53.5429	14.6392
2410000000.	53.5114	14.6604
2415000000.	53.4813	14.6643
2420000000.	53.4563	14.6659
2425000000.	53.4197	14.6554
2430000000.	53.3900	14.6439
2435000000.	53.3491	14.6475
2440000000.	53.3041	14.6567
2445000000.	53.2806	14.6612
2450000000.	53.2414	14.6713
2455000000.	53.2052	14.6892
2460000000.	53.1721	14.7034
2465000000.	53.1487	14.7362
2470000000.	53.1321	14.7681
2475000000.	53.1139	14.8101
2480000000.	53.1252	14.8561
2485000000.	53.1288	14.9049
2490000000.	53.1261	14.9544
2495000000.	53.1275	15.0065
2500000000.	53.1366	15.0523

The conductivity (σ) can be given as:

$$\sigma = \omega \epsilon_0 e'' = 2 \pi f \epsilon_0 e''$$

where $f = \text{target } f * 10^6$

$$\epsilon_0 = 8.854 * 10^{-12}$$

Simulating Liquid Dielectric Parameters for Muscle 2450 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40%

Measured by: Sunny Shih

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
2450	e'	53.51	Relative Permittivity (ϵ_r):	53.507	52.7	1.53	± 5
	e''	14.08	Conductivity (σ):	1.919	1.95	-1.57	± 5

Liquid Check

Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C

December 11, 2009 01:23 PM

Frequency	e'	e''
2400000000.	54.8027	14.4145
2405000000.	54.8006	14.3566
2410000000.	54.7617	14.3248
2415000000.	54.6737	14.2716
2420000000.	54.5516	14.2051
2425000000.	54.4031	14.1515
2430000000.	54.2131	14.0876
2435000000.	54.0223	14.0460
2440000000.	53.8439	14.0363
2445000000.	53.6785	14.0533
2450000000.	53.5071	14.0829
2455000000.	53.3542	14.1315
2460000000.	53.2617	14.2012
2465000000.	53.2256	14.2660
2470000000.	53.2368	14.3539
2475000000.	53.2858	14.4462
2480000000.	53.3892	14.5400
2485000000.	53.5390	14.6465
2490000000.	53.6938	14.7585
2495000000.	53.8646	14.8689
2500000000.	54.0202	14.9321

The conductivity (σ) can be given as:

$$\sigma = \omega \epsilon_0 e'' = 2 \pi f \epsilon_0 e''$$

where $f = \text{target } f * 10^6$

$$\epsilon_0 = 8.854 * 10^{-12}$$

9. SYSTEM PERFORMANCE

The system performance check is performed prior to any usage of the system in order to guarantee reproducible results. The system performance check verifies that the system operates within its specifications of $\pm 10\%$.

System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the SAM twin phantom filled with Body simulating liquid of the following parameters.
- The DASY4 system with an Isotropic E-Field Probe EX3DV4-SN: 3686 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 3mm.
 For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5mm
- The dipole input power (forward power) were 100 mW (5GHz) and 250 mW (2.4GHz) $\pm 3\%$
- The results are normalized to 1 W input power.

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

Certificate no: D2450V2-748_April 14, 2008

f (MHz)	Head Tissue		Body Tissue	
	SAR _{1g}	SAR _{10g}	SAR _{1g}	SAR _{10g}
2450			49.5	23.3

9.1. SYSTEM CHECK RESULTS FOR D2450V2

System Validation Dipole: D2450V2 SN: 748

Date: November 30, 2009

Ambient Temperature = 24°C; Relative humidity = 40%

Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
			1g SAR:	10g SAR:			
Body	2450	250	1g SAR:	52.6	49.5	6.26	± 10
			10g SAR:	24.1	23.3	3.43	

Date: November 30, 2009

Ambient Temperature = 24°C; Relative humidity = 40%

Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
			1g SAR:	10g SAR:			
Body	2450	100	1g SAR:	53.3	49.5	7.68	± 10
			10g SAR:	24.6	23.3	5.58	

10. 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, wl_tools, which enable a user to control the frequency and output power of the module.

RF Conducted Output Power Measurement Results:

Please refer to Broadcom's Operational Description document for Average Power information (confidential exhibit) as documented in 11/30/2007 original filing.

Before SAR evaluation, CCS has verified the RF conducted average powers which is in a agreement with previous reported average output power.

11. SUMMARY OF TEST RESULTS

11.1. HSTNN-I77C SAR TEST RESULTS

1) Laptop - Lap-held (with the display open at 90° to the keyboard)

Note: WLAN main and aux antennas are more than 20 cm from phantom for laptop mode, SAR test is not required.

2) Tablet - Lap-held (2.3 cm from Main/Aux antennas-to-user)

Mode	Channel	f (MHz)	Antenna	Results (mW/g)	
				1g-SAR	10g-SAR
802.11b	6	2437	Main	0.086	0.046
802.11g	6	2437	Aux	0.075	0.040

3) Tablet - Primary Landscape

Note: WLAN main and aux antennas are more than 20 cm from phantom for laptop mode, SAR test is not required.

4) Tablet - Secondary Landscape (0.4 cm from Main/Aux antennas-to-user)

Mode	Channel	f (MHz)	Antenna	Results (mW/g)	
				1g-SAR	10g-SAR
802.11b	6	2437	Main	0.754	0.315
802.11g	6	2437	Aux	0.477	0.222

5) Tablet - Primary Portrait (8.8 cm from Aux antenna-to-user)

Mode	Channel	f (MHz)	Antenna	Results (mW/g)	
				1g-SAR	10g-SAR
802.11g	6	2437	Aux	0.197	0.076

6) Tablet- Secondary Portrait (9.0 cm from Main antenna-to-user)

Mode	Channel	f (MHz)	Antenna	Results (mW/g)	
				1g-SAR	10g-SAR
802.11b	6	2437	Main	0.096	0.042

Notes:

- 802.11b doesn't operate for Aux antenna. Thus, 802.11g is performed for Aux antenna instead.
- The modes with highest output power channel were chosen for the testing.

11.2. HSTNN-W75C SAR TEST RESULTS

1) Laptop - Lap-held (with the display open at 90° to the keyboard)

Note: WLAN main and aux antennas are more than 20 cm from phantom for laptop mode, SAR test is not required.

2) Tablet - Lap-held (2.8 cm from Main/Aux antennas-to-user)

Mode	Channel	f (MHz)	Antenna	Results (mW/g)	
				1g-SAR	10g-SAR
802.11b	6	2437	Main	0.068	0.039
802.11g	6	2437	Aux	0.048	0.028

3) Tablet - Primary Landscape

Note: WLAN main and aux antennas are more than 20 cm from phantom for laptop mode, SAR test is not required.

4) Tablet - Secondary Landscape (0.4 cm from Main/Aux antennas-to-user)

Mode	Channel	f (MHz)	Antenna	Results (mW/g)	
				1g-SAR	10g-SAR
802.11b	6	2437	Main	0.553	0.256
802.11g	1	2412	Aux	0.797	0.322
	6	2437	Aux	0.908	0.378
	11	2462	Aux	0.461	0.190

5) Tablet - Primary Portrait (8.9 cm from Main antenna-to-user)

Mode	Channel	f (MHz)	Antenna	Results (mW/g)	
				1g-SAR	10g-SAR
802.11g	6	2437	Main	0.067	0.029

6) Tablet – Secondary Portrait (8.8 cm from Aux antenna-to-user)

Mode	Channel	f (MHz)	Antenna	Results (mW/g)	
				1g-SAR	10g-SAR
802.11g	6	2437	Aux	0.060	0.025

Notes:

- 802.11b doesn't operate for Aux antenna. Thus, 802.11g is performed for Aux antenna instead.
- The modes with highest output power channel were chosen for the testing.

12. SAR TEST PLOTS

WORST-CASE SAR PLOT - HSTNN-I77C

Date/Time: 11/30/2009 7:46:49 PM

Test Laboratory: Compliance Certification Services

HSTNN-I77C Tablet - Lapheld

DUT: HP; Type: NA; Serial: NA

Communication System: 802.11bg; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.99$ mho/m; $\epsilon_r = 53.3$; $\rho = 1000$ kg/m³

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 - SN3686; ConvF(6.48, 6.48, 6.48); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 9/15/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

802.11b_Main Ant/Area Scan (6x8x1): Measurement grid: dx=15mm, dy=15mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.091 mW/g

802.11b_Main Ant/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm

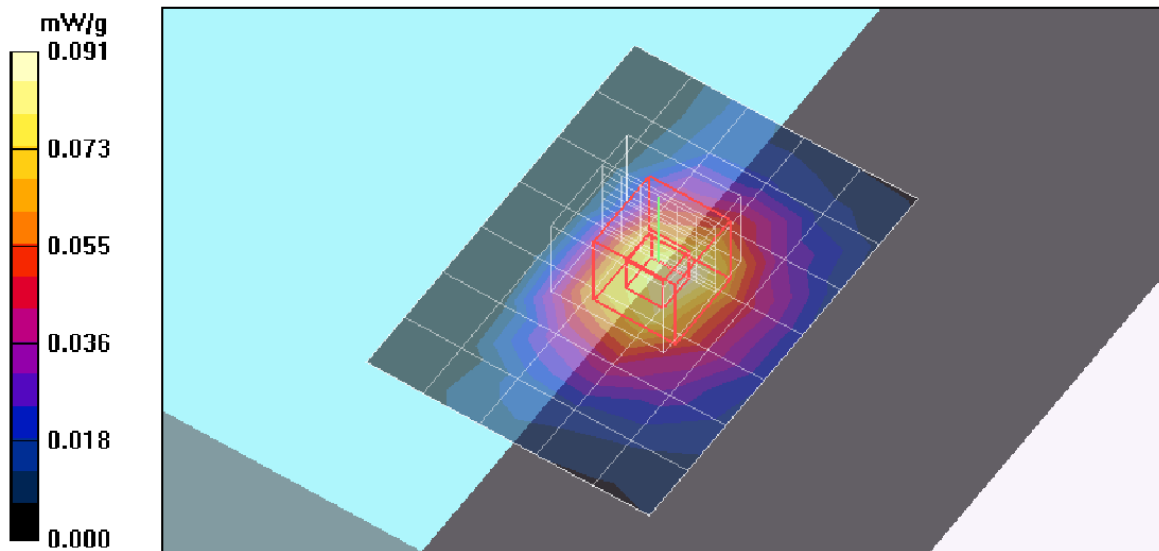
Reference Value = 6.85 V/m; Power Drift = 0.354 dB

Peak SAR (extrapolated) = 0.167 W/kg

SAR(1 g) = 0.086 mW/g; SAR(10 g) = 0.046 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.107 mW/g



WORST-CASE SAR PLOT - HSTNN-W75C

Date/Time: 12/11/2009 5:44:47 PM

Test Laboratory: Compliance Certification Services

HSTNN-W75C Tablet - Lapheld

DUT: HP; Type: NA; Serial: NA

Communication System: 802.11bg; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.9$ mho/m; $\epsilon_r = 54$; $\rho = 1000$ kg/m³
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 - SN3686; ConvF(6.48, 6.48, 6.48); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 9/15/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

802.11b_Main Ant/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.068 mW/g

802.11b_Main Ant/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm

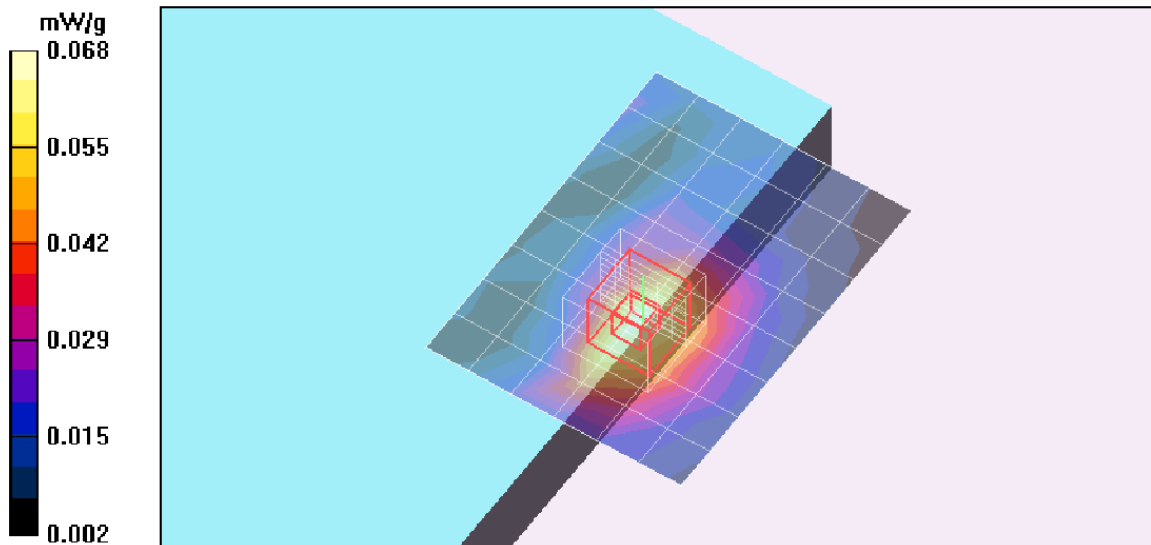
Reference Value = 6.53 V/m; Power Drift = 0.069 dB

Peak SAR (extrapolated) = 0.122 W/kg

SAR(1 g) = 0.068 mW/g; SAR(10 g) = 0.039 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.083 mW/g



13. ATTACHMENTS

<u>No.</u>	<u>Contents</u>	<u>No. of page (s)</u>
1	System Validation Plots	4
2-1	SAR Test Plots for HSTNN-I77C	7
2-2	SAR Test Plots for HSTNN-W75C	9
3	Certificate of E-Field Probe - EX3DV4 SN 3686	10
4	Certificate of System Validation Dipole D2450V2	6