FCC OET BULLETIN 65 SUPPLEMENT C
Class II Permissive Change
IC RSS-102 ISSUE 4

SAR EVALUATION REPORT

For

802.11g / Draft 802.11n WLAN + Bluetooth PCI-E Minicard
(Tested inside of SAMSUNG Notebook PC, NP-N230)

MODEL: BCM94313HMGB

FCC ID: QDS-BRCM1051
IC: 4324A-BRCM1051

REPORT NUMBER: 10I13236-2B

ISSUE DATE: June 22, 2010

Prepared for

BROADCOM CORPORATION
190 MATHILDA PLACE
SUNNYVALE, CA 94086

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	June 1, 2010	Initial Issue	--
A	June 2, 2010	Updated EUT description	Devin Chang
B	June 22, 2010	Updated report based on reviewer's comments. 1. Updated the highest 1g SAR value in section 1 2. Updated the SAR data in section 11 3. Regenerated plots with the correct E-field probe in section 12	Devin Chang

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	BROADCOM CORPORATION 190 MATHILDA PLACE SUNNYVALE, CA 94086
EUT DESCRIPTION:	802.11g / Draft 802.11n WLAN + Bluetooth PCI-E Minicard (Tested inside of SAMSUNG Notebook PC, NP-N230)
MODEL NUMBER:	BCM94313HMGB
DEVICE CATEGORY:	Portable
EXPOSURE CATEGORY:	General Population/Uncontrolled Exposure
DATE TESTED:	May 27, 2010

FCC / IC Rule Parts	Freq. Range [MHz]	The Highest 1g SAR mW/g)	Limit (mW/g)
15.247 / RSS-102	2412 – 2472	0.043	1.6

Applicable Standards	Test Results
FCC OET Bulletin 65 Supplement C 01-01 IC RSS 102 Issue 4	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 (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released For CCS By:

SUNNY SHIH
ENGINEERING SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

DEVIN CHANG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

FCC OET Bulletin 65 Supplement C 01-01, IC RSS-102 ISSUE 4 and the following specific FCC test procedures:

- KDB 248227 SAR measurement procedures for 802.11a/b/g transmitters
- KDB 447498 D01 Mobile Portable RF Exposure v04, suppl. to KDB 616217 D03

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	Staubli	RX90BL	N/A	N/A		
Robot Remote Control	Staubli	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	EX3DV3	3531	2	23	2011
Data Acquisition Electronics	SPEAG	DAE3 V1	500	9	15	2010
System Validation Dipole	SPEAG	D2450V2	706	4	18	2013
ESG Vector Signal Generator	Agilent	E4438C	US44271090	9	17	2010
Amplifier	Mini-Circuits	ZVE-8G	90606	N/A		
Amplifier	Mini-Circuits	ZHL-42W	D072701-5	N/A		
Simulating Liquid	SPAEG	M2450	N/A	Within 24 hrs of first test		

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

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

4.2. MEASUREMENT UNCERTAINTY

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

Component	error, %	Probe Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1) @ Body 2450 MHz	5.50	Normal	1	1	5.50
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	3.45	Rectangular	1.732	1	1.99
System Detection Limits	1.00	Rectangular	1.732	1	0.58
Readout Electronics	0.30	Normal	1	1	0.30
Response Time	0.80	Rectangular	1.732	1	0.46
Integration Time	2.60	Rectangular	1.732	1	1.50
RF Ambient Conditions - Noise	3.00	Rectangular	1.732	1	1.73
RF Ambient Conditions - Reflections	3.00	Rectangular	1.732	1	1.73
Probe Positioner Mechanical Tolerance	0.40	Rectangular	1.732	1	0.23
Probe Positioning with respect to Phantom	2.90	Rectangular	1.732	1	1.67
Extrapolation, Interpolation and Integration	1.00	Rectangular	1.732	1	0.58
Test Sample Related					
Test Sample Positioning	2.90	Normal	1	1	2.90
Device Holder Uncertainty	3.60	Normal	1	1	3.60
Output Power Variation - SAR Drift	5.00	Rectangular	1.732	1	2.89
Phantom and Tissue Parameters					
Phantom Uncertainty (shape and thickness)	4.00	Rectangular	1.732	1	2.31
Liquid Conductivity - deviation from target	5.00	Rectangular	1.732	0.64	1.85
Liquid Conductivity - measurement	1.23	Normal	1	0.64	0.79
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement	-1.31	Normal	1	0.6	-0.79
				Combined Standard Uncertainty Uc(y) =	9.51
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 19.01 %	
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 1.51 dB	

Measurement uncertainty for 300 MHz to 3 GHz averaged over 10 gram

Component	error, %	Probe Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1) @ 2450 MHz	5.50	Normal	1	1	5.50
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	3.45	Rectangular	1.732	1	1.99
System Detection Limits	1.00	Rectangular	1.732	1	0.58
Readout Electronics	0.30	Normal	1	1	0.30
Response Time	0.80	Rectangular	1.732	1	0.46
Integration Time	2.60	Rectangular	1.732	1	1.50
RF Ambient Conditions - Noise	3.00	Rectangular	1.732	1	1.73
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Probe Positioning with respect to Phantom	2.90	Rectangular	1.732	1	1.67
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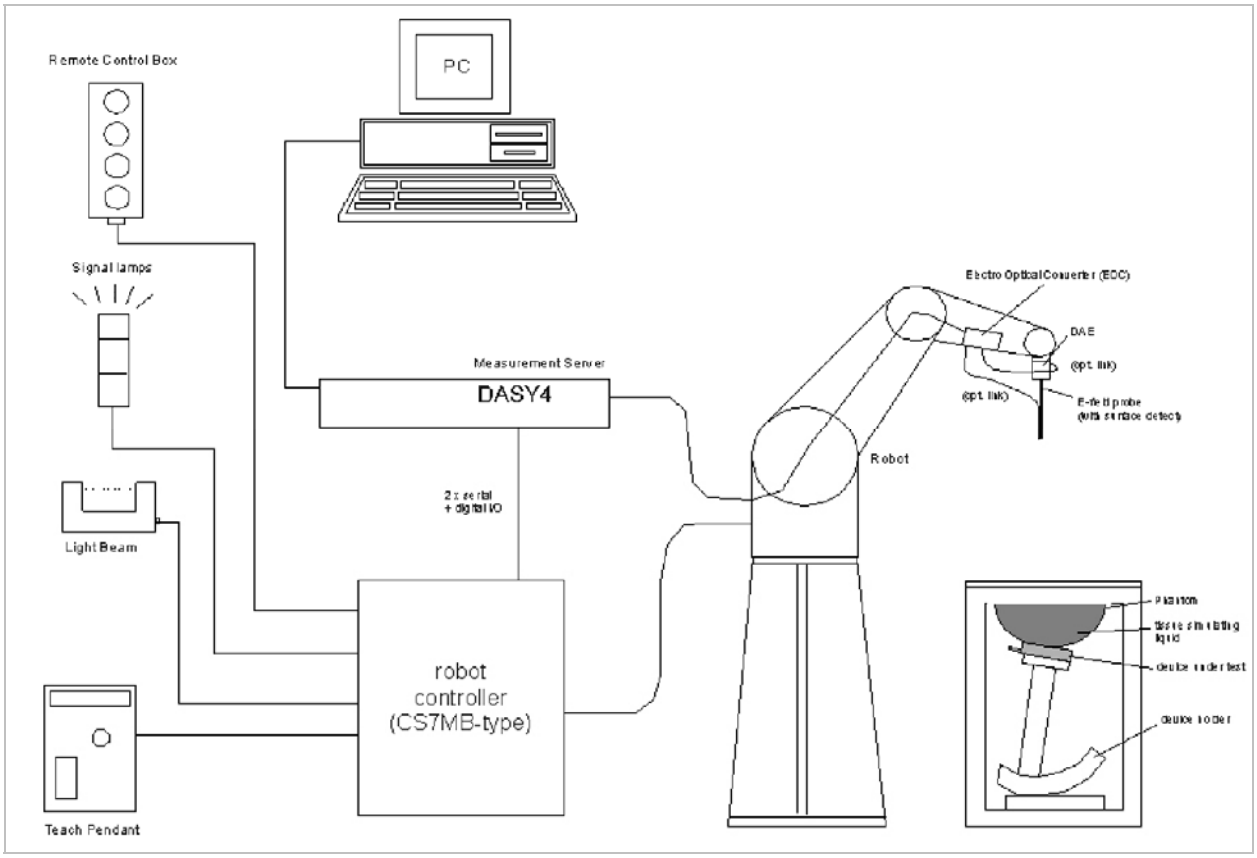
Test Sample Related					
Test Sample Positioning	2.90	Normal	1	1	2.90
Device Holder Uncertainty	3.60	Normal	1	1	3.60
Output Power Variation - SAR Drift	5.00	Rectangular	1.732	1	2.89
Phantom and Tissue Parameters					
Phantom Uncertainty (shape and thickness)	4.00	Rectangular	1.732	1	2.31
Liquid Conductivity - deviation from target	5.00	Rectangular	1.732	0.43	1.24
Liquid Conductivity - measurement	1.23	Normal	1	0.43	0.53
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.49	1.41
Liquid Permittivity - measurement uncertainty	-1.31	Normal	1	0.49	-0.64
				Combined Standard Uncertainty Uc(y), % =	9.32
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 18.65 %	
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 1.49 dB	

5. EQUIPMENT UNDER TEST

802.11g / Draft 802.11n WLAN + Bluetooth PCI-E Minicard (Tested inside of SAMSUNG Notebook PC, NP-N230)	
Normal operation:	Laptop mode (display open at 90° to the keyboard)
Antenna tested:	Manufactured / Part number Foxconn / Main: WDAN-M1PB1001-DF Wistron / Aux: 81.EHD15.G21
Antenna-to-user separation distances:	180mm from Main/Aux antenna to user.
Antenna-to-antenna separation distances:	0.0 cm from Aux-to-Bluetooth antenna (Aux antenna and Bluetooth antenna are sharing a common antenna) > 6 mm from Main-to-Aux/BT antenna
Simultaneous transmission:	WiFi can transmit simultaneously with Bluetooth (Bluetooth - FCC ID: QDS-BRCM1051; IC ID: 4324A- BRCM1051) WiFi can transmit simultaneously with WWAN
Assessment for SAR evaluation for Simultaneous transmission:	**WiFi and BT** KDB 447498 - The Bluetooth's output power (2.79mW) is ≤ 60/f(GHz) mW, which stand-alone SAR evaluation is not required. Thus, simultaneous transmission SAR evaluation is not required for WiFi and Bluetooth antenna pair. **WiFi and WWAN** WWAN co-located RF exposure assessment will be addressed in a separate FCC application filed under WWAN application.

6. SYSTEM SPECIFICATIONS



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

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

Simulating Liquids for 5 GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	78
Mineral oil	11
Emulsifiers	9
Additives and Salt	2

8. TISSUE DIELECTRIC PARAMETERS CHECK

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 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 Body (for 300 – 3000 MHz and 5800 MHz)
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)	Body (Supplement C 01-01)	
	ε_r	σ (S/m)
300	58.20	0.92
450	56.70	0.94
835	55.20	0.97
900	55.00	1.05
915	55.00	1.06
1450	54.00	1.30
1610	53.80	1.40
1800 – 2000	53.30	1.52
2450	52.70	1.95
3000	52.00	2.73
5800	48.20	6.00

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

8.1. TISSUE PARAMETERS CHECK RESULTS FOR 2450 MHZ

Simulating Liquid Dielectric Parameters for Body 2450 MHz

Room Ambient Temperature = 24°C; Relative humidity = 42% Measured by: Devin Chang

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
2450	e'	52.01	Relative Permittivity (ϵ_r):	52.008	52.7	-1.31	? 5
	e"	14.48	Conductivity (σ):	1.974	1.95	1.23	? 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
May 27, 2010 09:34 AM

Frequency	e'	e"
2400000000.	52.1495	14.2886
2405000000.	52.1417	14.3080
2410000000.	52.1352	14.3461
2415000000.	52.1173	14.3423
2420000000.	52.1124	14.3781
2425000000.	52.0932	14.3733
2430000000.	52.0765	14.3899
2435000000.	52.0721	14.4047
2440000000.	52.0576	14.4172
2445000000.	52.0225	14.4571
2450000000.	**52.0075**	**14.4825**
2455000000.	51.9625	14.5043
2460000000.	51.9485	14.5069
2465000000.	51.8972	14.5346
2470000000.	51.8737	14.5284
2475000000.	51.8458	14.5338
2480000000.	51.8315	14.5559
2485000000.	51.8253	14.5699
2490000000.	51.8092	14.5977
2495000000.	51.7991	14.6277
2500000000.	51.7966	14.6674

The conductivity (σ) can be given as:

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

where f = target f * 10^6

ε_0 = 8.854 * 10^{-12}

9. SYSTEM VERIFICATION

The system performance check is performed prior to any usage of the system in order to verify SAR system 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 SAM twin phantom filled with Body simulating liquid of the following parameters.
- The DASY4 system with an Isotropic E-Field Probe EX3DV3-SN: 3531 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 3 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input powers (forward power) were 100 mW.
- The results are normalized to 1 W input power.

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

System validation dipole	Cal. certificate #	Cal. due date	SAR Avg (mW/g)		
			Tissue:	Head	Body
D2450V2	D2450V2-706_Apr10	04/18/13	SAR_{1g}:		52.8
			SAR_{10g}:		24.5

9.1. SYSTEM CHECK RESULTS FOR D2450V2

Ambient Temperature = 24°C; Relative humidity = 38% Measured by: Devin Chang

System validation dipole	Date Tested	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
		Tissue:	Body			
D2450V2	05/27/10	SAR_{1g}:	51.0	52.8	-3.41	±10
		SAR_{10g}:	23.8	24.5	-2.86	

SYSTEM CHECK PLOT

Date/Time: 5/27/2010 9:41:42 AM

Test Laboratory: Compliance Certification Services

System Performance Check - D2450V2

DUT: Dipole ; Type: D2450V2; Serial: 706

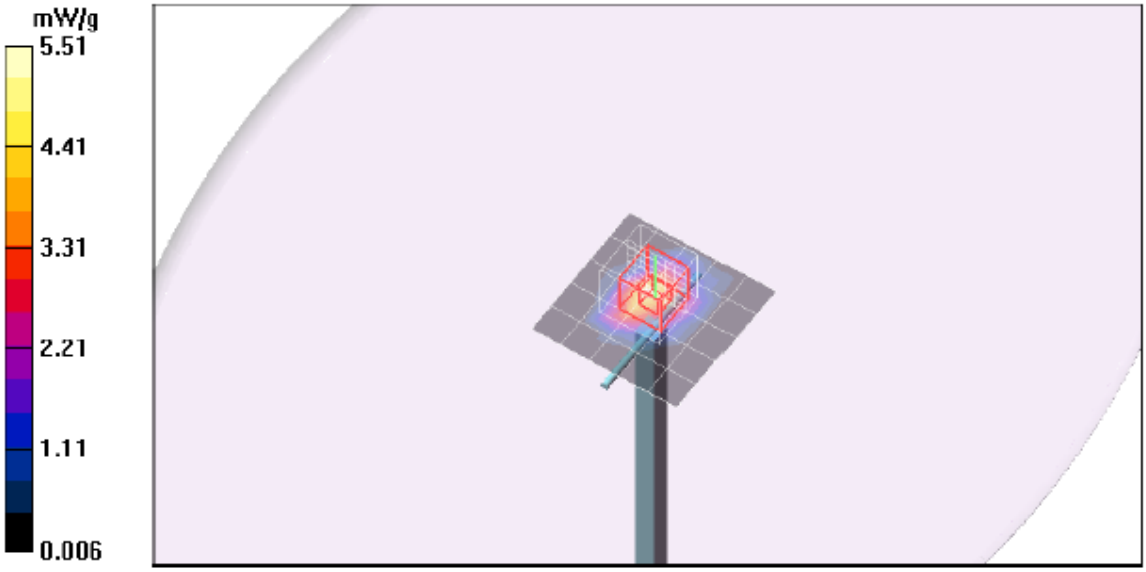
Communication System: System Check Signal - CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 52; ρ = 1000 kg/m^3
Phantom section: Flat Section

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: EX3DV3 - SN3531; ConvF(7.58, 7.58, 7.58); Calibrated: 2/23/2010
- 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

d=10mm, Pin=100mW/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 5.51 mW/g

d=10mm, Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.9 V/m; Power Drift = -0.143 dB
Peak SAR (extrapolated) = 10.4 W/kg
SAR(1 g) = 5.1 mW/g; SAR(10 g) = 2.38 mW/g
Maximum value of SAR (measured) = 6.74 mW/g



SYSTEM CHECK – Z Plot

Date/Time: 5/27/2010 9:57:47 AM

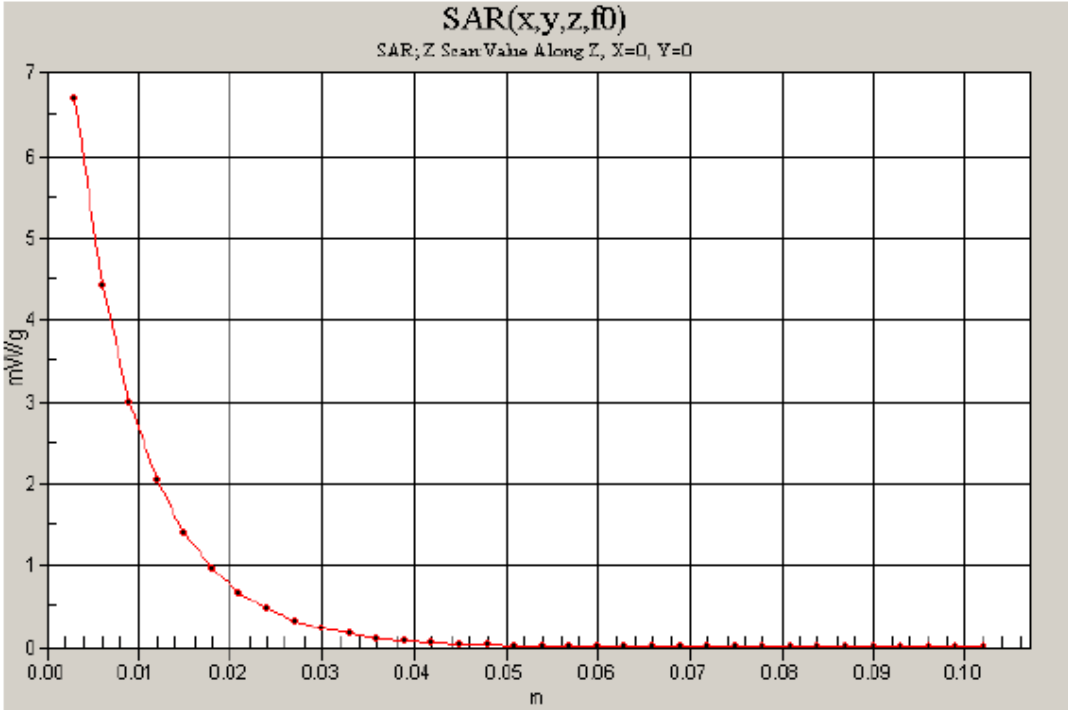
Test Laboratory: Compliance Certification Services

System Performance Check - D2450V2

DUT: Dipole ; Type: D2450V2; Serial: 706

Communication System: System Check Signal - CW; Frequency: 2450 MHz;Duty Cycle: 1:1

d=10mm, Pin=100mW/Z Scan (1x1x34): Measurement grid: dx=20mm, dy=20mm, dz=3mm
Maximum value of SAR (measured) = 6.69 mW/g



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 tester 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 11/10/2009 original filing.

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

11. SUMMARY OF SAR TEST RESULT

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

Mode	Channel	f (MHz)	Results (mW/g)	
			1g-SAR	10g-SAR
802.11b	1	2412		
	6	2437	0.043	0.029
	13	2472		

Mode	Channel	f (MHz)	Results (mW/g)	
			1g-SAR	10g-SAR
802.11g	1	2412		
	6	2437	0.019	0.016
	13	2472		

Notes:

1. 802.11b doesn't operate for Aux antenna. Thus, 802.11g is performed for Aux antenna instead.
2. The modes with highest output power channel were chosen for the testing.

12. SAR TEST PLOTS

Date/Time: 5/27/2010 11:53:10 AM

Test Laboratory: Compliance Certification Services

Laptop Mode

DUT: Samsung; Type: NA; Serial: NA

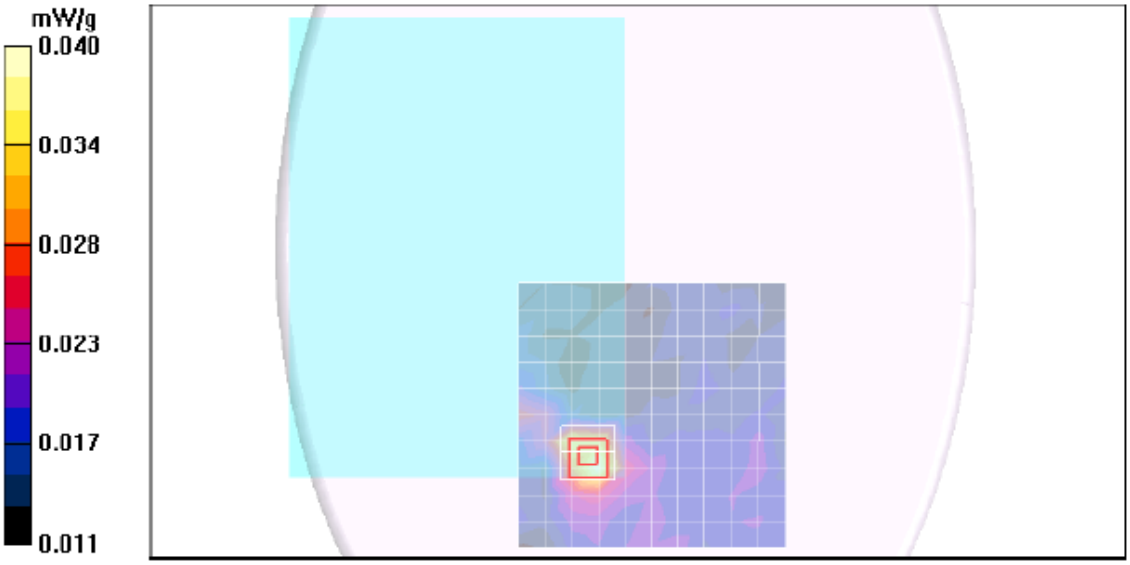
Communication System: 802.11bgn; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.95 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

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: EX3DV3 - SN3531; ConvF(7.58, 7.58, 7.58); Calibrated: 2/23/2010
- 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 M-ch Main Ant/Area Scan (11x11x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.040 mW/g

802.11b M-ch Main Ant/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.53 V/m; Power Drift = 0.230 dB
Peak SAR (extrapolated) = 0.082 W/kg
SAR(1 g) = 0.043 mW/g; SAR(10 g) = 0.029 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.052 mW/g



Date/Time: 5/27/2010 1:34:45 PM

Test Laboratory: Compliance Certification Services

Laptop Mode

DUT: Samsung; Type: NA; Serial: NA

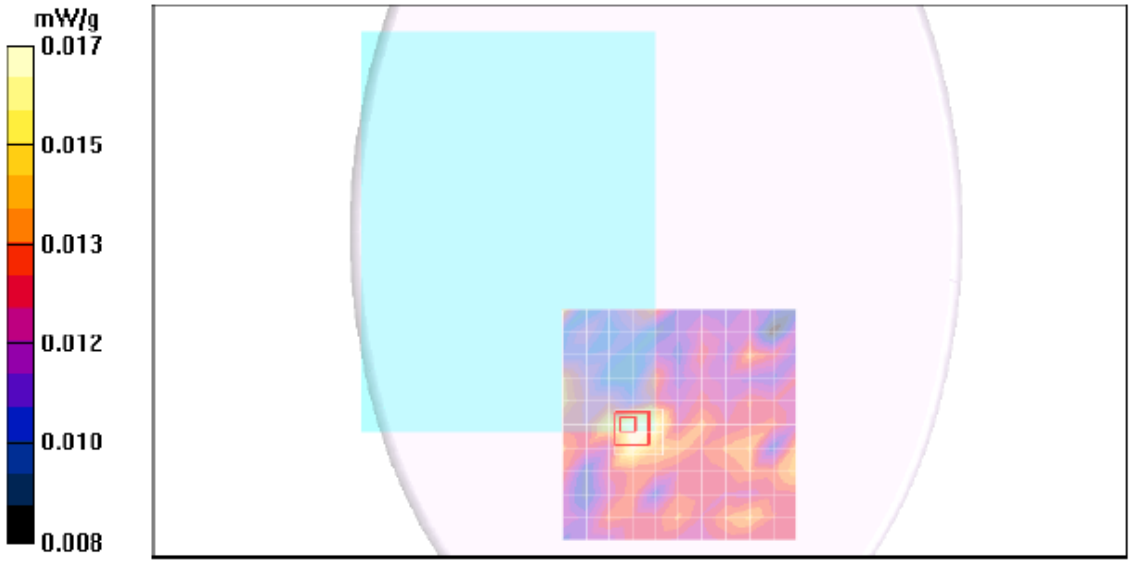
Communication System: 802.11bgn; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.95 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

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: EX3DV3 - SN3531; ConvF(7.58, 7.58, 7.58); Calibrated: 2/23/2010
- 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

802.11g M-ch Aux Ant/Area Scan (11x11x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.017 mW/g

802.11g M-ch Aux Ant/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 3.35 V/m; Power Drift = -0.002 dB
Peak SAR (extrapolated) = 0.027 W/kg
SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.016 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.023 mW/g



13. ATTACHMENTS

No.	Contents	No. of page (s)
1	Certificate of E-Field Probe - EX3DV3 SN 3531	11
2	Certificate of System Validation Dipole - D2450 SN:706	9