



FCC OET BULLETIN 65 SUPPLEMENT C

SAR EVALUATION REPORT

For

10.1 Inches Netbook

MODEL: Toshiba NB200 / NB205

FCC ID: CJ6UPLL20PC

REPORT NUMBER: 09U12710-5A2

ISSUE DATE: July 31, 2009

Prepared for

**TOSHIBA CORPORATION
DIGITAL MEDIA NETWORK COMPANY
OME COMPLEX, 2-9, SUEHIRO-CHO
TOKYO, 198-8710, JAPAN**

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	July 16, 2009	Initial Issue	--
A	July 21, 2009		Sunny Shih
A1	July 29, 2009	Indicating the screen size of Netbook	Sunny Shih
A2	July 31, 2009	Modified section 2.0 to identification applicable KDB SAR procedure.	Sunny Shih

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS.....	5
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION.....	6
4. CALIBRATION AND UNCERTAINTY.....	7
4.1. MEASURING INSTRUMENT CALIBRATION.....	7
4.2. MEASUREMENT UNCERTAINTY.....	8
5. EQUIPMENT UNDER TEST	9
6. SYSTEM SPECIFICATIONS.....	10
7. COMPOSITION OF INGREDIENTS FOR TISSUE SIMULATING LIQUIDS	11
8. LIQUID PARAMETERS CHECK.....	12
8.1. LIQUID CHECK RESULTS FOR 1900 MHZ.....	13
8.2. LIQUID CHECK RESULTS FOR 835 MHZ.....	14
8.3. LIQUID CHECK RESULTS FOR 2450 MHZ.....	15
9. SYSTEM CHECK	16
9.1. SYSTEM CHECK RESULTS FOR D1900V2.....	17
9.2. SYSTEM CHECK RESULTS FOR D835V2.....	17
9.3. SYSTEM CHECK RESULTS FOR D2450V2.....	17
10. OUTPUT POWER VERIFICATION.....	18
10.1. CDMA2000 1xRTT	18
10.2. CDMA200 1xEv-Do.....	19
10.2.1. Rel 0	19
10.2.2. Rev A.....	20
10.3. (E)GPRS	21
10.4. UMTS RELEASE 99.....	22
10.5. UMTS HSDPA.....	23
10.6. UMTS Rel 6 HSPA (HSDPA & HSUPA)	24
10.7. WiFi	26
11. SUMMARY OF TEST RESULTS.....	27
11.1. GSM	27
11.2. UMTS (WCDMA).....	27
11.3. CDMA2000.....	27
11.4. WiFi (802.11bg).....	27

12.	KDB 616217 LAPTOP COMPUTER SIMULTANEOUSLY TX SAR ASSESSMENT	28
13.	WORST-CASE SAR TEST PLOTS	29
14.	ATTACHMENTS	32
15.	TEST SETUP PHOTO	33
16.	HOST DEVICE PHOTO	34

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: TOSHIBA CORPORATION
DIGITAL MEDIA NETWORK COMPANY
OME COMPLEX, 2-9, SUEHIRO-CHO
TOKYO, 198-8710, JAPAN

EUT DESCRIPTION: 10.1 Inches Netbook

MODEL NUMBER: Toshiba NB200/NB205

DEVICE CATEGORY: Portable

EXPOSURE CATEGORY: General Population/Uncontrolled Exposure

DATE TESTED: July 12 – 16, 2009

THE HIGHEST SAR VALUES:

FCC / IC Rule Parts	Frequency Range [MHz]	The Highest 1g SAR (1g_mW/g)	Limit (mW/g)
22H / RSS-132	824 - 849	0.045	1.6
24E / RSS-133	1850 - 1910	0.108	
15.247 / RSS-102	2400 – 2483.5	0.044	

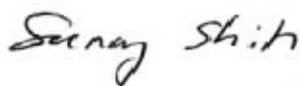
APPLICABLE STANDARDS AND TEST PROCEDURES:

STANDARDS AND TEST PROCEDURES	TEST RESULTS
- FCC OET Bulletin 65 Supplement C and the following specific Test Procedures: - KDB 941225 D01 SAR test for 3G devices - KDB 248227 SAR Measurement Procedure for 820.11abg Transmitters - KDB 447498 D01 Mobile Portable RF Exposure v03r03 - KDB 616217 Laptop Computer SAR Procedures	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, and the following specific FCC Test Procedures.

- o KDB 941225 D01 SAR test for 3G devices
- o KDB 616217 Laptop computer with antenna installed at display section
- o 447498 D01 Mobile Portable RF Exposure v03r03
- o KDB 248227 SAR Measurement Procedure for 820.11abg Transmitters

EUT is 10.1 inches Netbook computer with antennas installed at the display section. As indicated in KDB 616217, for screen size less than 12 inches, KDB 447498 procedure should follow. However, based upon previous instructions given by FCC, for Netbook computer with screen size less than 12 inches, KDB 616217 procedure can be applied. SAR evaluation test configuration as documented in this report was following the instructions given in KDB 616217.

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	14	2009
Signal Generator	Agilent	8753ES-6	MY40001647	11	14	2009
E-Field Probe	SPEAG	EX3DV4	3686	3	23	1010
Thermometer	ERTCO	639-1S	1718	5	1	2010
Data Acquisition Electronics	SPEAG	DAE3 V1	427	10	20	2009
System Validation Dipole	SPEAG	D835V2	4d002	4	23	2011
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	1003	11	21	2009
MXA Signal Analyzer	Agilent	N9020A	US48350984	10	23	2009
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	CCS	M1900	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M835	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M900	N/A	Within 24 hrs of first test		
Simulating Liquid	SPAEG	M2450	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	2.90	R	1.732	1	1	1.67	1.67
algorithms for max. SAR evaluation	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
Notesfor table							
1. Tol. - tolerance in influence quaitity							
2. N - Nomal							
3. R - Rectangular							
4. Div. - Divisor used to obtain standard uncertainty							
5. Ci - is te sensitivity coefficient							

5. EQUIPMENT UNDER TEST

10.1 Inches Netbook with BT2.0+EDR, 802.11bgn 20/40 MHz 1x1, CDMA2000 1x / 1x-EVDO, WCDMA / HSPA & GSM/GPRS/EDGE

<u>Radio</u>	<u>FCC ID</u>
BT2.0+EDR	RYYEYTFXCS
WLAN (WiFi)	CJ6UPA3722WL
WWAN	N7NGOBI2

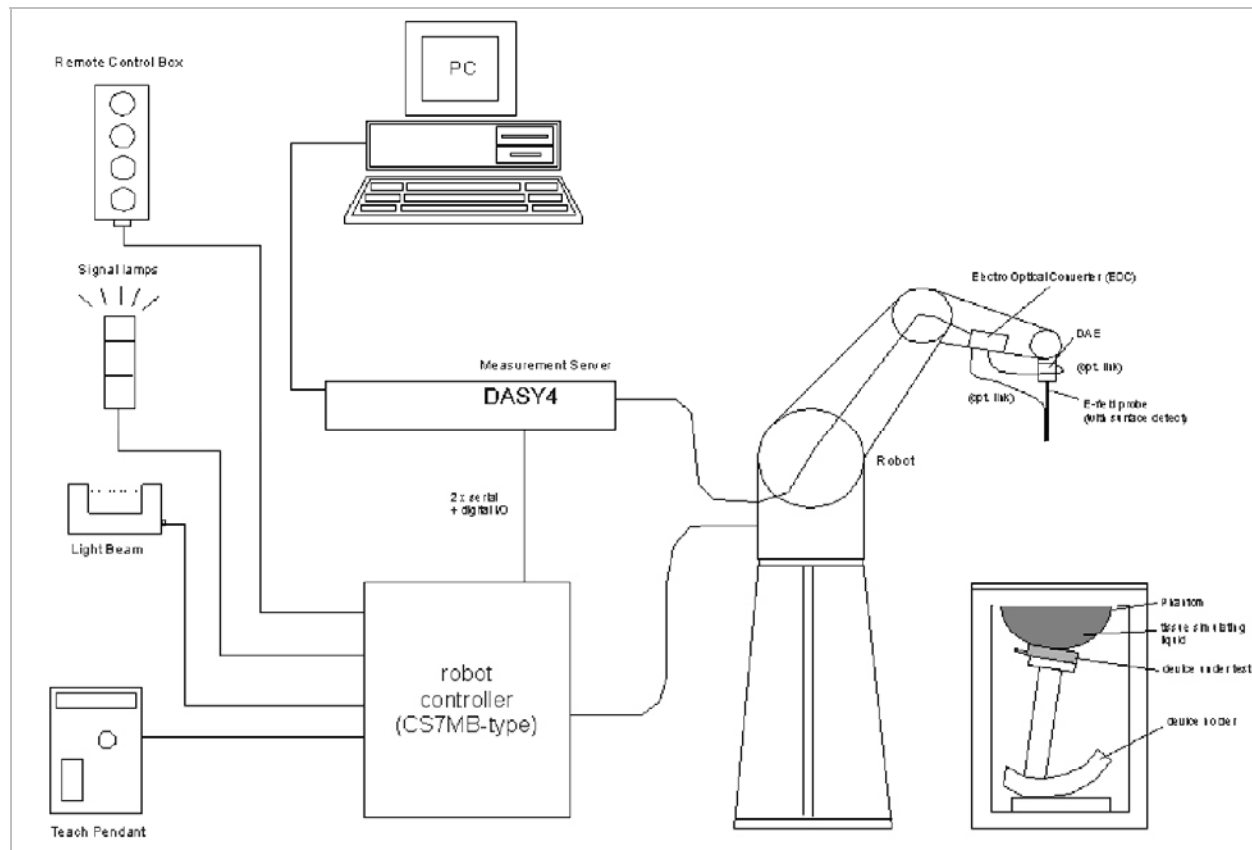
Normal operation: Lap-held only

Note: SAR test with display open at 90° to the keyboard

Antenna tested:	<u>Radio</u>	<u>Manufactured</u>	<u>Model Number</u>	<u>Max Peak Gain (dBi)</u>
	WiFi	Hitachi	HFT60	-0.25
	WWAN	Hitachi	HCG17	-0.97 (Cell band) 0.68 (PCS band)

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 1900 MHZ

Simulating Liquid Dielectric Parameters for Muscle 1900 MHz

Room Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Sunny Shih

f (MHz)	Muscle Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1900	e'	53.004	Relative Permittivity (ϵ_r):	53.0042	53.3	-0.55	± 5
	e"	14.179	Conductivity (σ):	1.49866	1.52	-1.40	± 5

Liquid temperature: 23 deg. C

July 12, 2009 02:58 PM

Frequency	e'	e"
1710000000.	53.7326	13.5943
1720000000.	53.7006	13.6554
1730000000.	53.7040	13.7604
1740000000.	53.6888	13.7961
1750000000.	53.6894	13.8478
1760000000.	53.6064	13.8676
1770000000.	53.5455	13.8766
1780000000.	53.4743	13.8584
1790000000.	53.4012	13.8573
1800000000.	53.3630	13.8775
1810000000.	53.3115	13.9135
1820000000.	53.2583	13.9659
1830000000.	53.2126	14.0448
1840000000.	53.1912	14.1317
1850000000.	53.1665	14.1633
1860000000.	53.1305	14.2163
1870000000.	53.0839	14.1990
1880000000.	53.0717	14.1618
1890000000.	53.0270	14.1473
1900000000.	53.0042	14.1785
1910000000.	52.9487	14.2548

The conductivity (σ) can be given as:

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

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

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

8.2. LIQUID CHECK RESULTS FOR 835 MHZ

Simulating Liquid Dielectric Parameters for Muscle 900 MHz

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

Measured by: Sunny Shih

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	53.67	Relative Permittivity (ϵ_r):	53.671	55.2	-2.77	± 5
	e''	20.78	Conductivity (σ):	0.965	0.97	-0.47	± 5

Liquid temperature: 23 deg. C

July 14, 2009 03:15 PM

Frequency	e'	e''
800000000.	54.1026	21.1174
805000000.	54.0137	21.0790
810000000.	53.9608	21.0117
815000000.	53.9029	20.9749
820000000.	53.8287	20.9053
825000000.	53.7988	20.8484
830000000.	53.7390	20.8138
835000000.	53.6705	20.7828
840000000.	53.6200	20.7677
845000000.	53.5896	20.7453
850000000.	53.5671	20.7419
855000000.	53.5098	20.7296
860000000.	53.4347	20.7243
865000000.	53.4125	20.7423
870000000.	53.3339	20.7493
875000000.	53.2937	20.7419
880000000.	53.2360	20.7413
885000000.	53.1898	20.7681
890000000.	53.1363	20.7451
895000000.	53.1090	20.7331
900000000.	53.0701	20.6892

The conductivity (σ) can be given as:

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

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

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

8.3. 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'	53.249	Relative Permittivity (ϵ_r):	53.249	52.7	1.04	± 5
	e''	13.803	Conductivity (σ):	1.881	1.95	-3.52	± 5

Liquid Temperature: 23 deg. C

July 16, 2009 05:19 PM

Frequency	e'	e''
2400000000.	53.3076	13.5938
2405000000.	53.3049	13.6891
2410000000.	53.2910	13.7490
2415000000.	53.2948	13.8130
2420000000.	53.2847	13.8337
2425000000.	53.2876	13.8373
2430000000.	53.2921	13.8389
2435000000.	53.3076	13.8339
2440000000.	53.3101	13.8305
2445000000.	53.2904	13.8219
2450000000.	53.2494	13.8030
2455000000.	53.1733	13.7809
2460000000.	53.1103	13.7338
2465000000.	53.0450	13.6905
2470000000.	53.0037	13.6305
2475000000.	52.9896	13.5964
2480000000.	52.9920	13.5943
2485000000.	52.9998	13.6161
2490000000.	53.0009	13.6783
2495000000.	53.0111	13.7752
2500000000.	52.9963	13.9106

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 CHECK

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 Head or Body simulating liquid of the following parameters.
- The DASY4 system with an Isotropic E-Field Probe EX3DV3 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 $250 \text{ mW} \pm 3\%$.
- The results are normalized to 1 W input power.

450 to 2450 MHz Reference SAR Values for Body-tissue (From SPEAG)

Dipole Type	Distance	Frequency	SAR (1g)	SAR (10g)	SAR (peak)
	(mm)	(MHz)	[W/kg]	[W/kg]	[W/kg]
D450V2	15	450	5.01	3.36	7.22
D835V2	15	835	9.71	6.38	14.1
D900V2	15	900	11.1	7.17	16.3
D1450V2	10	1450	29.6	16.6	49.8
D1800V2	10	1800	38.5	20.3	67.5
D1900V2	10	1900	39.8	20.8	69.6
D2000V2	10	2000	40.9	21.2	71.5
D2450V2	10	2450	51.2	23.7	97.6

9.1. SYSTEM CHECK RESULTS FOR D1900V2

Date: July 12, 2009

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

Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	1900	250	1g SAR:	40.6	39.8	2.01	±10
			10g SAR:	21.3	20.8	2.40	

9.2. SYSTEM CHECK RESULTS FOR D835V2

System Validation Dipole: D835V2 SN:4d002

Date: July 14, 2009

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

Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	835	250	1g SAR:	9.93	9.71	2.27	±10
			10g SAR:	6.52	6.38	2.19	

9.3. SYSTEM CHECK RESULTS FOR D2450V2

System Validation Dipole: D2450V2 SN: 748

Date: July 16, 2009

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

Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	2450	250	1g SAR:	52.8	51.2	3.12	±10
			10g SAR:	25	23.7	5.49	

10.2. CDMA200 1xEv-Do

10.2.1. Rel 0

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

EVDO Release 0 - RTAP

- Call Setup > Shift & Preset
- Call Control:
 - o Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
 - o Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Params:
 - o Cell Power > -105.5 dBm/1.23 MHz
 - o Cell Band > (Select US Cellular or US PCS)
 - o Channel > (Enter channel number)
 - o Application Config > Enhanced Test Application Protocol > RTAP
 - o RTAP Rate > 153.6 kbps
 - o Rvs Power Ctrl > Active bits
 - o Protocol Rel > 0 (1xEV-DO)
- Press "Start Data Connection" when "Session Open" appear in "Active Cell"
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

EVDO Release 0 - FTAP

- Call Setup > Shift & Preset
- Call Control:
 - o Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
 - o Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Params:
 - o Cell Power > -105.5 dBm/1.23 MHz
 - o Cell Band > (Select US Cellular or US PCS)
 - o Channel > (Enter channel number)
 - o Application Config > Enhanced Test Application Protocol > FTAP (default)
 - o FTAP Rate > 307.2 kbps (2 Slot, QPSK)
 - o Rvs Power Ctrl > Active bits
 - o Protocol Rel > 0 (1xEV-DO)
- Press "Start Data Connection" when "Session Open" appear in "Active Cell"
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

RF Power Output for EV-DO Rel 0

Band	FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm)	
					Average	Peak
Cellular	307.2 kbps (2 slot, QPSK)	153.6 kbps	1013	824.70	24.21	
			384	836.52	24.31	
			777	848.31	24.25	
PCS	307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	24.15	
			600	1880.00	24.37	
			1175	1908.75	24.21	

10.2.2. Rev A

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

<u>Application</u>	<u>Rev, License</u>
1xEV-DO Terminal Test	A.09.13

EVDO Release A – RETAP

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > RETAP
- R-Data Pkt Size > 4096
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2
- > PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots > ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

EVDO Release A - FETAP

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > FETAP
- F-Traffic Format > 4 (1024, 2,128) Canonical (307.2k, QPSK)
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2
- > PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots > ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

Band	FETAP Traffic Format	RETAP Data Payload Size	Channel	f (MHz)	Conducted power (dBm)	
					Average	Peak
Cellular	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	1013	824.70	23.84	
			384	836.52	24.08	
			777	848.31	23.95	
PCS	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	23.97	
			600	1880.00	24.41	
			1175	1908.75	23.85	

10.3. (E)GPRS

GPRS (GMSK) - Coding Scheme: MCS4

Band	Ch No.	Frequency	Conducted output power (dBm)			
			1 slot	2 slot	3 slot	4 slot
GSM850	128	824.2	32.30	32.20	n/a	n/a
	190	836.6	32.50	32.40	n/a	n/a
	251	848.8	32.40	32.40	n/a	n/a
GSM1900	512	1850.2	29.40	29.50	n/a	n/a
	661	1880	29.50	29.50	n/a	n/a
	810	1909.8	29.30	29.30	n/a	n/a

EGPRS (8PSK) - Coding Scheme: MCS9

Band	Ch No.	Frequency	Conducted output power (dBm)			
			1 slot	2 slot	3 slot	4 slot
GSM850	128	824.2	27.50	27.50	n/a	n/a
	190	836.6	27.60	27.50	n/a	n/a
	251	848.8	27.50	27.50	n/a	n/a
GSM1900	512	1850.2	26.60	26.60	n/a	n/a
	661	1880	26.70	26.70	n/a	n/a
	810	1909.8	26.50	26.50	n/a	n/a

10.4. UMTS RELEASE 99

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 V7.5.0 specification. The EUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7). A summary of these settings are illustrated below:

WCDMA General Settings	Mode	Rel99
	Subtest	-
	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	HSDPA FRC	Not Applicable
	HSUPA Test	Not Applicable
	Power Control Algorithm	Algorithm2
	β_c	Not Applicable
	β_d	Not Applicable
	β_{ec}	Not Applicable
	β_c/β_d	8/15
	β_{hs}	Not Applicable
	β_{ed}	Not Applicable

Results

Rel 99 (12.2kps RMC)

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	O/P Power (dBm)
UMTS850 (Band V)	Rel 99 12.2kps RMC	4132	4357	826.4	24.60
		4182	4407	836.4	24.60
		4233	4458	846.6	24.40
UMTS1900 (Band II)	Rel 99 12.2kps RMC	9262	9662	1852.4	24.80
		9400	9800	1880.0	25.00
		9538	9938	1907.6	24.50

10.5. UMTS HSDPA

The following 4 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

Mode	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA
Subtest	1	2	3	4
Loopback Mode	Test Mode 1			
Rel99 RMC	12.2kbps RMC			
HSDPA FRC	H-Set1			
HSUPA Test	Not Applicable			
Power Control Algorithm	Algorithm 2			
β_c	2/15	12/15	15/15	15/15
β_d	15/15	15/15	8/15	4/15
Bd (SF)	64			
β_{ec}	-	-	-	-
β_c/β_d	2/15	12/15	15/8	15/4
β_{hs}	4/15	24/15	30/15	30/15
β_{ed}	Not Applicable			
CM (dB)	0	1	1.5	1.5
MPR (dB)	0	0	0.5	0.5
DACK	8			
DNAK	8			
DCQI	8			
Ack-Nack repetition factor	3			
CQI Feedback (Table 5.2B.4)	4ms			
CQI Repetition Factor (Table 5.2B.4)	2			
Ahs = β_{hs}/β_c	30/15			

Results

Rel 6 HSDPA

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	O/P Power (dBm)
UMTS850 (Band V)	Subtest 1	4132	4357	826.4	24.39
		4182	4407	836.4	24.46
		4233	4458	846.6	24.25
	Subtest 2	4132	4357	826.4	23.90
		4182	4407	836.4	23.90
		4233	4458	846.6	23.70
	Subtest 3	4132	4357	826.4	23.89
		4182	4407	836.4	23.96
		4233	4458	846.6	23.75
	Subtest 4	4132	4357	826.4	23.40
		4182	4407	836.4	23.40
		4233	4458	846.6	23.20
UMTS1900 (Band II)	Subtest 1	9262	9662	1852.4	24.40
		9400	9800	1880.0	24.50
		9538	9938	1907.6	24.40
	Subtest 2	9262	9662	1852.4	24.50
		9400	9800	1880.0	24.40
		9538	9938	1907.6	24.00
	Subtest 3	9262	9662	1852.4	23.90
		9400	9800	1880.0	24.00
		9538	9938	1907.6	23.90
	Subtest 4	9262	9662	1852.4	24.00
		9400	9800	1880.0	23.90
		9538	9938	1907.6	23.50

10.6. UMTS Rel 6 HSPA (HSDPA & HSUPA)

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	15/15
	β_{ec}	209/225	12/15	30/15	2/15	24/15
	β_c/β_d	11/15	6/15	15/9	2/15	15/15
	β_{hs}	22/15	12/15	30/15	4/15	30/15
	β_{ed}	1309/225	94/75	47/15 47/15	56/75	134/15
	CM (dB)	1.0	3.0	2.0	3.0	1.0
HSDPA Specific Settings	MPR (dB)	0	2	1	2	0
	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
HSUPA Specific Settings	Ahs = β_{hs}/β_c	30/15				
	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18		E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27

Results

Rel 6 HSDPA

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	O/P Power (dBm)
UMTS850 (Band V)	Subtest 1	4132	4357	826.4	24.20
		4182	4407	836.4	24.20
		4233	4458	846.6	24.10
	Subtest 2	4132	4357	826.4	22.20
		4182	4407	836.4	22.20
		4233	4458	846.6	22.10
	Subtest 3	4132	4357	826.4	23.20
		4182	4407	836.4	23.20
		4233	4458	846.6	23.10
	Subtest 4	4132	4357	826.4	21.20
		4182	4407	836.4	21.20
		4233	4458	846.6	21.10
	Subtest 5	4132	4357	826.4	24.20
		4182	4407	836.4	24.30
		4233	4458	846.6	24.20
UMTS1900 (Band II)	Subtest 1	9262	9662	1852.4	24.30
		9400	9800	1880.0	24.30
		9538	9938	1907.6	24.20
	Subtest 2	9262	9662	1852.4	22.30
		9400	9800	1880.0	22.30
		9538	9938	1907.6	22.20
	Subtest 3	9262	9662	1852.4	23.30
		9400	9800	1880.0	23.30
		9538	9938	1907.6	23.20
	Subtest 4	9262	9662	1852.4	21.30
		9400	9800	1880.0	21.30
		9538	9938	1907.6	21.20
	Subtest 5	9262	9662	1852.4	24.40
		9400	9800	1880.0	24.30
		9538	9938	1907.6	24.20

10.7. WiFi

The client provided a special driver and program, ART, v0.9_b7 which enable a user to control the frequency and output power of the module.

The modes with highest output power channel were chosen for the conducted output power measurement

RF Conducted Output Power Measurement Results:

802.11b

Ch. No.	f (MHz)	Average Conducted power (dBm)
6	2437	18.10

802.11n 20 MHz

Ch. No.	f (MHz)	Average Conducted power (dBm)
6	2437	17.30

11. SUMMARY OF TEST RESULTS

If the SAR measured at the middle channel for each test configuration is at least 3.0 dB (0.8 mW/g) lower than the SAR limit (1.6 mW/g), testing at the high and low channels is optional for such test configuration(s).

Test configuration: Lap-held with display open at 90° to the keyboard

11.1. GSM

Band	Mode	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
GSM850	GPRS 2 slots	128	824.2		1.6
		190	836.6	0.045	
		251	848.8		
GSM1900	GPRS 2 slots	512	1850.2		1.6
		661	1880.0	0.070	
		810	1909.8		

11.2. UMTS (WCDMA)

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Band V	R99	4132	4357	826.4		1.6
		4182	4407	836.4	0.040	
		4233	4458	846.6		
Band II	R99	9262	9662	1850.2		1.6
		9400	9800	1880.0	0.105	
		9538	9938	1909.8		

11.3. CDMA2000

Band	Mode	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Cellular	1xRTT (RC3, SO32)	1013	824.70		1.6
		384	836.52	0.040	
		777	848.31		
PCS	1xRTT (RC3, SO32)	25	1851.25		1.6
		600	1880.00	0.108	
		1175	1908.75		

11.4. WiFi (802.11bg)

Mode	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
802.11b	1	2412		1.6
	6	2437	0.042	
	11	2462		
802.11n 20 MHz	1	2412		1.6
	6	2437	0.044	
	11	2462		

12. KDB 616217 LAPTOP COMPUTER SIMULTANEOUSLY TX SAR ASSESSMENT

Co-located Tx:

- WWAN can transmit simultaneously with WiFi
- WWAN can transmit simultaneously with Bluetooth
- WiFi can transmit simultaneously with Bluetooth

Highest 1-g SAR:

<u>Radio</u>	<u>1g SAR</u>	<u>Sum of the 1-g SAR</u>
--------------	---------------	---------------------------

WiFi	0.044 mW/g	0.152 mW/g
------	------------	------------

WWAN	0.108 mW/g	
------	------------	--

Bluetooth Conducted average power is below Pref/12mW, stand alone SAR evaluation is not required.

Simultaneous TX SAR:

Not required, due to

1. Antennas are separated sufficiently from each other and there is little and no SAR overlap.
2. The Sum of the 1g SAR < SAR limit

13. WORST-CASE SAR TEST PLOTS

WORST-CASE SAR PLOT for Part 22H

Date/Time: 7/14/2009 4:37:34 PM

Test Laboratory: Compliance Certification Services

GSM835

DUT: Toshiba; Type: NB205; Serial: n/a

Communication System: GSM850; Frequency: 836.6 MHz; Duty Cycle: 1:4

Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.967$ mho/m; $\epsilon_r = 53.7$; $\rho = 1000$ 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(8.7, 8.7, 8.7); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:XXXX
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mid-ch_GPRS 2 slots/Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (measured) = 0.047 mW/g

Mid-ch_GPRS 2 slots/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm

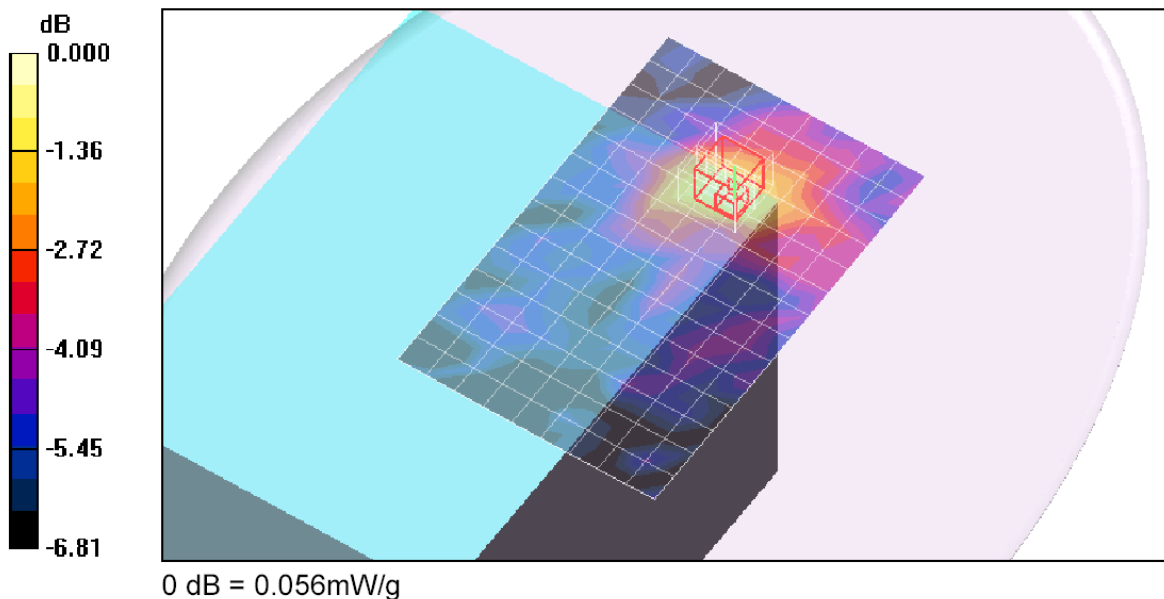
Reference Value = 3.45 V/m; Power Drift = -0.828 dB

Peak SAR (extrapolated) = 0.074 W/kg

SAR(1 g) = 0.045 mW/g; SAR(10 g) = 0.033 mW/g

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

Maximum value of SAR (measured) = 0.056 mW/g



WORST-CASE SAR PLOT for Part 24E

Date/Time: 7/12/2009 6:10:25 PM

Test Laboratory: Compliance Certification Services

CDMA2000 PCS

DUT: Toshiba; Type: NB205; Serial: n/a

Communication System: CDMA PCS band; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

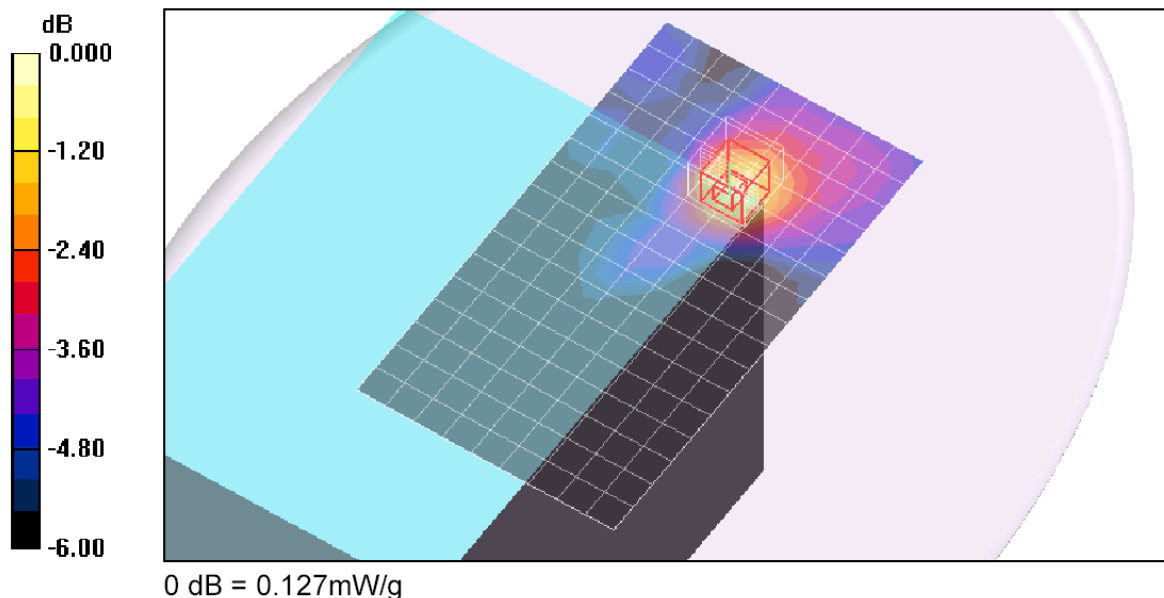
Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

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(6.85, 6.85, 6.85); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:XXXX
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Mid-ch_PCS 1xRTT (RC3, SO32)/Area Scan (10x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.115 mW/g

Mid-ch_PCS 1xRTT (RC3, SO32)/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.13 V/m; Power Drift = 0.022 dB
Peak SAR (extrapolated) = 0.166 W/kg
SAR(1 g) = 0.108 mW/g; SAR(10 g) = 0.075 mW/g
Maximum value of SAR (measured) = 0.127 mW/g



WORST-CASE SAR PLOT for Part 15.247

Date/Time: 7/16/2009 7:17:31 PM

Test Laboratory: Compliance Certification Services

WLAN (WiFi)

DUT: Toshiba; Type: NB205; Serial: n/a

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

Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.88$ 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 Sn427; Calibrated: 10/20/2008
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:XXXX
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

802.11n 20MHz M-ch/Area Scan (13x14x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (measured) = 0.045 mW/g

802.11n 20MHz M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm

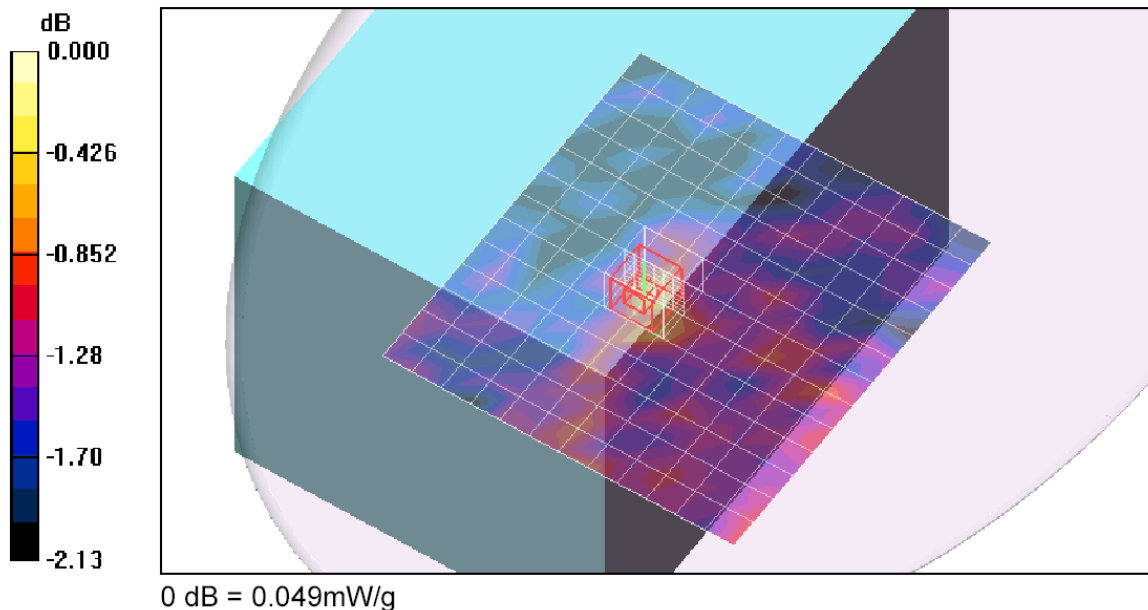
Reference Value = 4.29 V/m; Power Drift = 0.106 dB

Peak SAR (extrapolated) = 0.058 W/kg

SAR(1 g) = 0.044 mW/g; SAR(10 g) = 0.039 mW/g

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

Maximum value of SAR (measured) = 0.049 mW/g



14. ATTACHMENTS

No.	Contents	No. of page (s)
1	System Performance Check Plots	6
2-1	SAR Test Plots for WWAN	7
2-2	SAR Test Plots for WiFi	2
3	Certificate of E-Field Probe - EX3DV4 SN3686	10
4	Certificate of System Validation Dipole - D835V2 SN:4d002	9
5	Certificate of System Validation Dipole - D1900V2 SN:5d043	9