SAR Evaluation Report

IN ACCORDANCE WITH THE REQUIREMENTS OF
FCC REPORT AND ORDER:
ET DOCKET 93-62 AND OET BULLETIN 65 SUPPLEMENT C
And RSS-102 Issue 1 (Provisional) September 25, 1999

FOR

CDMA 800/1900 CELL-PCS MODULE

MODELS: PA3490U-1EVD

FCC ID: CJ6UPA3490G3

REPORT NUMBER: 06U10102-5B

ISSUE DATE: MARCH 30, 2006

Prepared for

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LAB CODE:200065-0

Revision History

Rev.	Issued date	Revisions	Revised By
A	February 21, 2006	Initial issue	HS
B	March 30, 2006	Additional Tests for LCD edge position secondary landscape display mode. New materials are: 1. Liquid checks 2. System performance checks 3. Test results for LCD edge position secondary landscape display mode 4. Attachments	ND

CERTIFICATE OF COMPLIANCE (SAR EVALUATION)

DATES OF TEST: February 16, 17, and March 30, 2006

APPLICANT: ADDRESS:	Toshiba Corporation Digital Media Network Company Ome Complex, 2-9, Suehiro-cho, Tokyo, 198-8710, Japan
FCC ID: MODELS:	CJ6UPA3490G3 PA3490U-1EVD
DEVICE CATEGORY: EXPOSURE CATEGORY:	Portable Device General Population/Uncontrolled Explosure

CDMA 800/1900 Cell-PCS Module is installed in Toshiba Portege M400, including collocation with the Toshiba Bluetooth radio module FCC ID: CJ6UPA3418BT and Intel WLAN FCC ID: CJ6UPA3489WL.

Test Sample is a:	Production unit
Antenna(s)	The radio utilizes two antennas for diversity (main and auxiliary). TMZ001, Monopole, Tyco Electronics AMP K.K.

FCC Rule Parts	Frequency Range [MHz]	The Highest SAR Values [1g_mW/g]	WLAN Co-Location SAR Values [1g_mW/g]	Bluetooth Co-Location SAR Values [1g_mW/g]
22H	824.04-848.97	0.152	0.160	0.156
24E	1851.25-1908.75	0.123	0.138	0.126

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for General Population/Uncontrolled Exposure limits specified in ANSI/IEEE Std. C95.1-1992 and had been tested in accordance with the measurement procedures specified in FCC OET 65 Supplement C (Edition 01-01). And RSS-102 Issue 1 (Provisional) September 25, 1999.

The maximum 1g SAR level measured for all the tests performed did not exceed the limits for General Population/Uncontrolled Exposure (W/kg) Partial Body of 1.6 W/kg. Level defined in Supplement C (Edition 01-01) to OET Bulletin 65 (97-01).

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 Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

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EMC Engineer
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1 EQUIPMENT UNDER TEST (EUT) DESCRIPTION

CDMA 800/1900 Cell-PCS Module is installed in Toshiba Portege M400, including collocation with the Toshiba Bluetooth radio module FCC ID: CJ6UPA3418BT and Intel WLAN FCC ID: CJ6UPA3489WL.	
Normal operation:	Lap-held position
Accessory:	N/A
Earphone/Headset Jack:	N/A
Duty cycle:	100%
Host Device(s):	Toshiba Portege M400
Antenna(s)	The radio utilizes two antennas for diversity (main and auxiliary). TMZ001, Monopole, Tyco Electronics AMP K.K.
Power supply:	Power supplied through the laptop computer (host device)

2 FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

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LAB CODE:200065-0

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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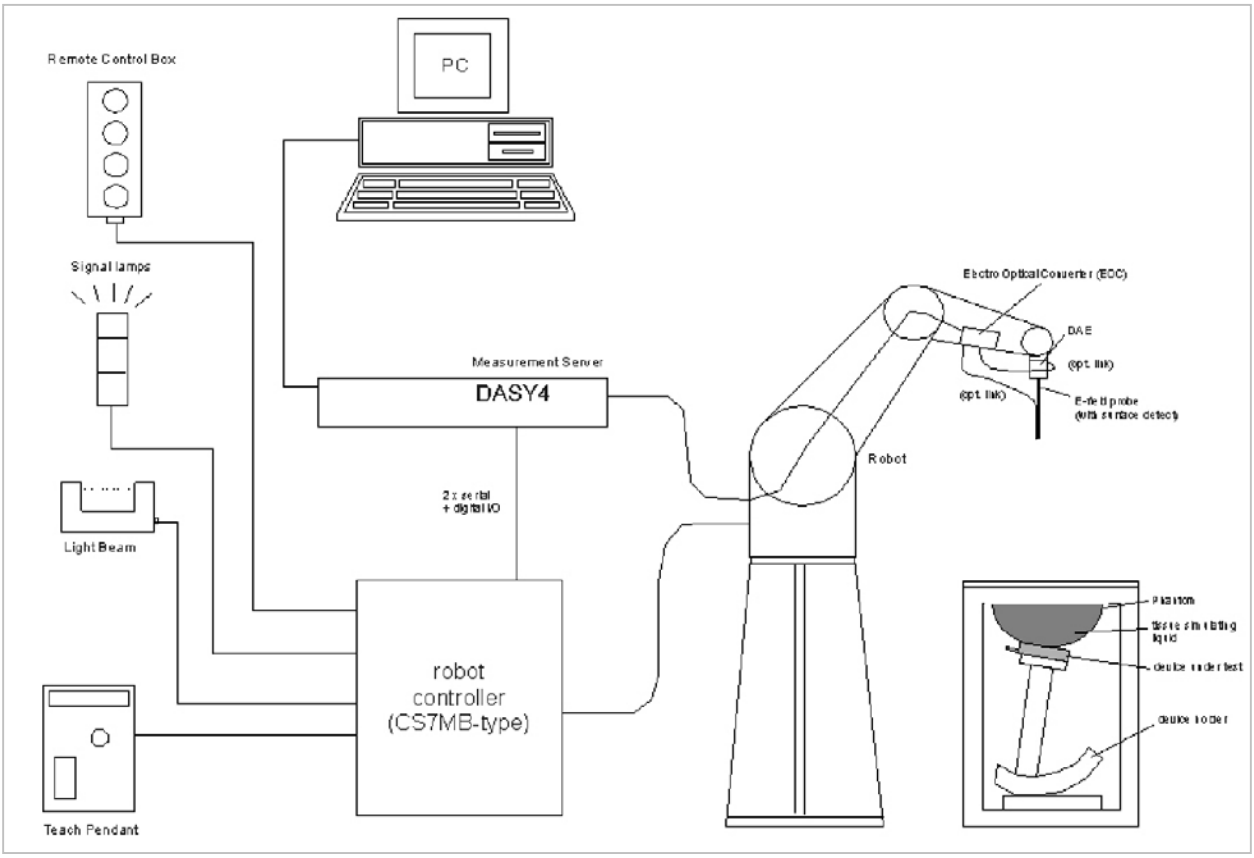
3 SYSTEM DESCRIPTION



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.

3.1 Composition of Ingredients for tissue simulating liquid

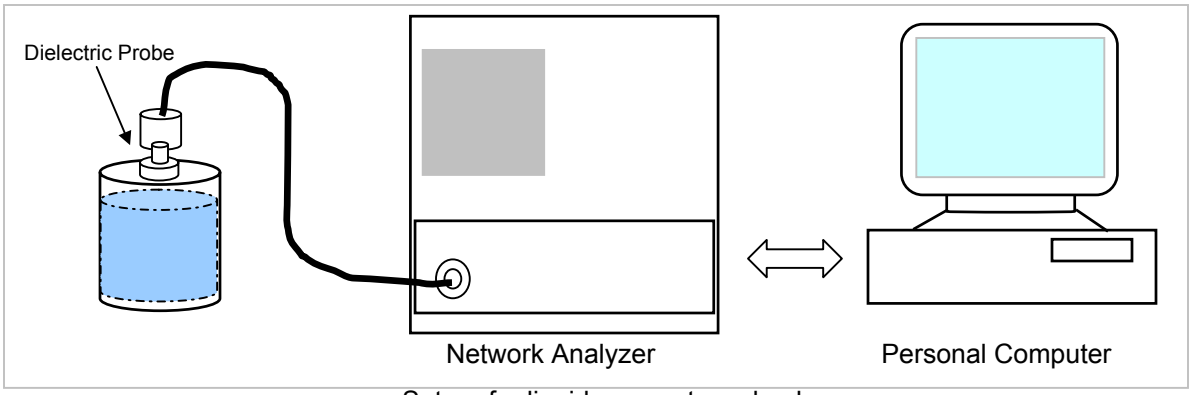
The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

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

4 SIMULATING LIQUID 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. The relative permittivity and conductivity of the tissue material should be within ± 5% of the values given in the table below.



Set-up for liquid parameters check

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	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

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

4.1 SIMULATING LIQUID PARAMETER CHECK RESULT

Simulating Liquid Parameter Check Result @ Muscle 835 MHz

Room Ambient Temperature = 23°C; Relative humidity = 30% Measured by: Ninous Davoudi

Simulating Liquid			Parameters		Target	Measured	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
835	21	15	e'	Relative Permittivity (e"):	55.2	53.4985	-3.08	± 5
			20.7024	Conductivity (σ):	0.97	0.9617	-0.86	± 5

Liquid Check
Ambient temperature: 23.0 deg. C; Liquid temperature: 21.0 deg C
February 16, 2006 09:43 AM

Frequency	e'	e"
750000000.	54.3023	22.0683
755000000.	54.2064	22.0723
760000000.	54.1158	22.0511
765000000.	54.0763	21.9662
770000000.	54.0059	21.8572
775000000.	53.9330	21.7388
780000000.	53.8919	21.5413
785000000.	53.8341	21.3631
790000000.	53.7974	21.1796
795000000.	53.7717	21.0284
800000000.	53.7397	20.8921
805000000.	53.7218	20.7635
810000000.	53.7229	20.6572
815000000.	53.6764	20.5742
820000000.	53.6507	20.5791
825000000.	53.6192	20.5803
830000000.	53.5735	20.6308
835000000.	53.4985	20.7024
840000000.	53.4118	20.7670
845000000.	53.3609	20.8946
850000000.	53.2748	20.9799

The conductivity (σ) can be given as:

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

where f = target $f * 10^6$
$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Dielectric Parameters Check Result @ Muscle 1900 MHz

Room Ambient Temperature = 23°C; Relative humidity = 30% Measured by: Ninous Davoudi

Simulating Liquid			Parameters		Target	Measured	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
1900	21	15	ε"	Relative Permittivity (ϵ_r):	53.3	51.6443	-3.11	± 5
			14.0602	Conductivity (σ):	1.52	1.4862	-2.23	± 5

Liquid Check
Ambient temperature: 23.0 deg. C; Liquid temperature: 21.0 deg C
February 17, 2006 09:41 AM

Frequency	e'	e"
1710000000.	52.3351	13.3807
1720000000.	52.3111	13.4071
1730000000.	52.2688	13.4662
1740000000.	52.2372	13.4915
1750000000.	52.1970	13.5563
1760000000.	52.1620	13.5810
1770000000.	52.1259	13.6105
1780000000.	52.0868	13.6642
1790000000.	52.0500	13.6838
1800000000.	52.0084	13.7292
1810000000.	51.9668	13.7428
1820000000.	51.9225	13.7803
1830000000.	51.8816	13.8401
1840000000.	51.8368	13.8680
1850000000.	51.7951	13.9220
1860000000.	51.7867	13.9259
1870000000.	51.7452	13.9590
1880000000.	51.7267	14.0040
1890000000.	51.6873	14.0392
1900000000.	51.6443	14.0602
1910000000.	51.5958	14.1007

The conductivity (σ) can be given as:

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

where $f = target\ f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Parameter Check Result @ Muscle 835 MHz

Room Ambient Temperature = 23°C; Relative humidity = 40% Measured by: Ninous Davoudi

Simulating Liquid f (MHz)	Temp. (°C)	Depth (cm)	Parameters		Target	Measured	Deviation (%)	Limit (%)
835	21	15	e'	Relative Permittivity (e"):	55.2	52.9933	-4.00	± 5
			20.6104	Conductivity (σ):	0.97	0.9574	-1.30	± 5

Liquid Check
Ambient temperature: 23.0 deg. C; Liquid temperature: 21.0 deg C
March 30, 2006 08:46 AM

Frequency	e'	e"
750000000.	53.9304	20.8646
755000000.	53.8526	20.8937
760000000.	53.7977	20.8445
765000000.	53.7580	20.8024
770000000.	53.6773	20.7745
775000000.	53.6294	20.8055
780000000.	53.5548	20.7531
785000000.	53.5227	20.7212
790000000.	53.4439	20.7171
795000000.	53.4142	20.7191
800000000.	53.3547	20.6973
805000000.	53.2932	20.6990
810000000.	53.2490	20.6500
815000000.	53.2179	20.6358
820000000.	53.1749	20.6482
825000000.	53.1074	20.6194
830000000.	53.0313	20.5941
835000000.	52.9933	20.6104
840000000.	52.9775	20.5639
845000000.	52.8855	20.5454
850000000.	52.8269	20.5260
855000000.	52.8179	20.5211
860000000.	52.7860	20.4815
865000000.	52.6917	20.4440
870000000.	52.6125	20.4441
875000000.	52.5625	20.4335
880000000.	52.5285	20.4066
885000000.	52.4930	20.4015
890000000.	52.4365	20.3938
895000000.	52.4049	20.3666
900000000.	52.3413	20.3621
905000000.	52.3082	20.3668
910000000.	52.2369	20.3501
915000000.	52.2117	20.3570
920000000.	52.1848	20.3440

The conductivity (σ) can be given as:

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

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

$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Dielectric Parameters Check Result @ Muscle 1900 MHz

Room Ambient Temperature = 23°C; Relative humidity = 40% Measured by: Ninous Davoudi

Simulating Liquid			Parameters		Target	Measured	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
1900	21	15	ε"	Relative Permittivity (ϵ_r):	53.3	51.7780	-2.86	± 5
			14.3502	Conductivity (σ):	1.52	1.5168	-0.21	± 5

Liquid Check
Ambient temperature: 23.0 deg. C; Liquid temperature: 21.0 deg C
March 30, 2006 09:11 AM

Frequency	e'	e"
1710000000.	52.4911	13.6391
1720000000.	52.4488	13.6681
1730000000.	52.4198	13.7153
1740000000.	52.3615	13.7505
1750000000.	52.3232	13.7984
1760000000.	52.2991	13.8348
1770000000.	52.2461	13.8772
1780000000.	52.2116	13.9046
1790000000.	52.1819	13.9353
1800000000.	52.1437	13.9877
1810000000.	52.1152	14.0320
1820000000.	52.0615	14.0443
1830000000.	52.0245	14.0821
1840000000.	51.9782	14.1317
1850000000.	51.9292	14.1840
1860000000.	51.9007	14.2081
1870000000.	51.8632	14.2403
1880000000.	51.8379	14.2799
1890000000.	51.8045	14.3163
1900000000.	51.7780	14.3502
1910000000.	51.7190	14.3815

The conductivity (σ) can be given as:

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

where $f = target\ f * 10^6$

$\varepsilon_0 = 8.854 * 10^{-12}$

5 SYSTEM PERFORMANCE 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 ±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 5 x 5 x 7 fine cube was chosen for cube integration(dx=dy=7.5mm; dz=5mm).
  (For 5 GHz band - Special 7 x 7 x 8 fine cube was chosen for cube integration
  (dx=dy=4.3mm; dz=3mm))
- Distance between probe sensors and phantom surface was set to 2.5 mm.
  (For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.0 mm
- The dipole input power (forward power) was 250 mW±3%.
- The results are normalized to 1 W input power.

Reference SAR Values for body-tissue

In the table below, the numerical reference SAR values of a SPEAG validation dipoles placed below the flat phantom filled with body-tissue simulating liquid are given. The reference SAR values were calculated using the finite-difference time-domain method and the geometry parameters.

Dipole Type	Distance (mm)	Frequency (MHz)	SAR (1g) [W/kg]	SAR (10g) [W/kg]	SAR (peak) [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

5.1 System Performance Check Results

@ System Validation Dipole: D835V2 SN:4d002

Date: February 16, 2006

Ambient Temperature = 23°C; Relative humidity = 30% Measured by: Ninous Davoudi

Body Simulating Liquid			Mrasured		Target_1g	Deviation[%]	Limit [%]
f (MHz)	Temp. [°C]	Depth [cm]	1g	Normalized to 1 W			
835	21	15	2.58	10.32	9.71	6.28	± 10
			10g	Normalized to 1 W	Target_10g	Deviation[%]	Limit [%]
			1.70	6.8	6.38	6.58	± 10

@ System Validation Dipole: D1900V2 SN:5d043

Date: February 17, 2006

Ambient Temperature = 23°C; Relative humidity = 30% Measured by: Ninous Davoudi

Body Simulating Liquid			Mrasured		Target_1g	Deviation[%]	Limit [%]
f (MHz)	Temp. [°C]	Depth [cm]	1g	Normalized to 1 W			
1900	21	15	10.20	40.8	39.8	2.51	± 10
			10g	Normalized to 1 W	Target_10g	Deviation[%]	Limit [%]
			5.36	21.44	20.8	3.08	± 10

@ System Validation Dipole: D835V2 SN:4d002

Date: March 30, 2006

Ambient Temperature = 23°C; Relative humidity = 40% Measured by: Ninous Davoudi

Body Simulating Liquid			Mrasured		Target_1g	Deviation[%]	Limit [%]
f (MHz)	Temp. [°C]	Depth [cm]	1g	Normalized to 1 W			
835	21	15	2.40	9.6	9.71	-1.13	± 10
			10g	Normalized to 1 W	Target_10g	Deviation[%]	Limit [%]
			1.58	6.32	6.38	-0.94	± 10

@ System Validation Dipole: D1900V2 SN:5d043

Date: March 30, 2006

Ambient Temperature = 23°C; Relative humidity = 40% Measured by: Ninous Davoudi

Body Simulating Liquid			Mrasured		Target_1g	Deviation[%]	Limit [%]
f (MHz)	Temp. [°C]	Depth [cm]	1g	Normalized to 1 W			
1900	21	15	10.20	40.8	39.8	2.51	± 10
			10g	Normalized to 1 W	Target_10g	Deviation[%]	Limit [%]
			5.32	21.28	20.8	2.31	± 10

6 SAR MEASUREMENT PROCEDURE

A summary of the procedure follows:

a) A measurement of the SAR value at a fixed location is used as a reference value for assessing the power drop of the EUT. The SAR at this point is measured at the start of the test, and then again at the end of the test.

b) The SAR distribution at the exposed flat section of the flat phantom is measured at a distance of 2.5 mm from the inner surface of the shell. The area covers the entire dimension of the EUT and the horizontal grid spacing is 15 mm x 15 mm. Based on this data, the area of the maximum absorption is determined by Spline interpolation. The first Area Scan covers the entire dimension of the EUT to ensure that the hotspot was correctly identified.

   (For 5 GHz band - The SAR distribution at the exposed flat section of the flat phantom is measured at a distance of 2.0 mm from the inner surface of the shell. The area covers the entire dimension of the EUT and the horizontal grid spacing is 10 mm x 10 mm. Based on this data, the area of the maximum absorption is determined by Spline interpolation. The first Area Scan covers the entire dimension of the EUT to ensure that the hotspot was correctly identified)

c) Around this point, a volume of X=Y= 30 and Z=21 mm is assessed by measuring 5 x 5 x 7 mm points. On the basis of this data set, the spatial peak SAR value is evaluated with the following procedure:

   (For 5 GHz band - Around this point, a volume of X=Y=Z=30 mm is assessed by measuring 7 x 7 x 8 mm points. On the basis of this data set, the spatial peak SAR value is evaluated with the following procedure:)

   (i) The data at the surface are extrapolated, since the centre of the dipoles is 1.2 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm. The extrapolation is based on a least square algorithm. A polynomial of the fourth order is calculated through the points in z-axes. This polynomial is then used to evaluate the points between the surface and the probe tip.

   (ii) The maximum interpolated value is searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g and 10 g) are computed using the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one-dimensional splines with the “Not a knot”- condition (in x, y and z-direction). The volume is integrated with the trapezoidal – algorithm. One thousand points (10 x 10 x 10) are interpolated to calculate the averages.

   (iii) All neighbouring volumes are evaluated until no neighbouring volume with a higher average value is found.

   (iv) The SAR value at the same location as in Step (a) is again measured to evaluate the actual power drift.

DASY4 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 (for example, 1.2 mm for an EX3DV3 probe type).

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 DASY4 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, EN 50361 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 5 x 5 x 7 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.

(For 5 GHz band – Same as above except the Zoom Scan measures 7 x 7 x 8 points.)

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.

7 PROCEDURES USED TO ESTABLISH TEST SIGNAL

The following procedures had been used to prepare the EUT for the SAR test.

The client provided a special driver and program, NW Tools Rev E, 12/19/2005, which enables the user to control the frequency and output power of the module.

The cable assembly insertion loss of 19.97 dB (including 19.77 dB pad and 0.2 dB connectors) was entered as an offset in the power meter to allow for direct reading of power.

CDMA 800

Channel	Frequency (MHz)	Power (dBm)
991	825.3	24.45
380	836.4	24.49
799	847.7	24.48

CDMA 1900

Channel	Frequency (MHz)	Power (dBm)
25	1851.25	24.44
600	1880	24.48
1175	1908.75	24.45

8 SAR MEASUREMENT RESULT

The LCD edge position is skipped due to the fact that CDMA module does not function in this position. See attached file, SAR Tool, for more details.

8.1 LAP-HELD POSITION

Photos are confidential, please see a seperate file

CDMA 800

Channel	f (MHz)	Measured 1g (mW/g)	Power Drift (dBm)	Extrapolated 1g (mW/g)	3 dB Limit (mW/g)	Limit (mW/g)
991	824.04	0.117	-0.085	0.119	0.80	1.6
380	836.40	0.128	0.000	**0.128**	0.80	1.6
799	848.97	0.125	-0.092	0.128	0.80	1.6
380 [3)]	836.40	0.132	-0.185	**0.138**	0.80	1.6
380 [4)]	836.40	0.129	-0.159	**0.134**	0.80	1.6

CDMA 1900

Channel	f (MHz)	Measured 1g (mW/g)	Power Drift (dBm)	Extrapolated 1g (mW/g)	3 dB Limit (mW/g)	Limit (mW/g)
25	1851.25	0.069	-0.171	0.072	0.80	1.6
600	1880.00	0.094	-0.226	**0.099**	0.80	1.6
1175	1908.75	0.087	-0.215	0.092	0.80	1.6
600 [3)]	1880.00	0.094	-0.163	**0.098**	0.80	1.6
600 [4)]	1880.00	0.095	-0.210	**0.100**	0.80	1.6

Notes:

1) The exact method of extrapolation is *measured SAR x 10^(-drift/10)*. The SAR reported at the end of the measurement process by the DASY4 measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process
2) Please see attachment for the detailed measurement data and plots showing the maximum SAR location of the EUT.
3) Collocation with Intel WLAN FCC ID: CJ6UPA3489WL
4) Collocation with Bluetooth FCC ID: CJ6UPA3418BT

8.2 LCD EDGE POSITION –SECONDARY LANDSCAPE DISPLAY MODE

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CDMA 800						
Channel	f (MHz)	Measured 1g (mW/g)	Power Drift (dBm)	Extrapolated 1g (mW/g)	3 dB Limit (mW/g)	Limit (mW/g)
991	824.04					
380	836.40	0.152	-0.005	**0.152**	0.80	1.6
799	848.97					
380 [3]	836.40	0.160	0.000	**0.160**	0.80	1.6
380 [4]	836.40	0.155	-0.020	**0.156**	0.80	1.6
CDMA 1900						
Channel	f (MHz)	Measured 1g (mW/g)	Power Drift (dBm)	Extrapolated 1g (mW/g)	3 dB Limit (mW/g)	Limit (mW/g)
25	1851.25					
600	1880.00	0.123	0.000	**0.123**	0.80	1.6
1175	1908.75					
600 [3]	1880.00	0.138	0.000	**0.138**	0.80	1.6
600 [4]	1880.00	0.125	-0.043	**0.126**	0.80	1.6

Notes:

1) The exact method of extrapolation is *measured SAR x 10^(-drift/10)*. The SAR reported at the end of the measurement process by the DASY4 measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process
2) Please see attachment for the detailed measurement data and plots showing the maximum SAR location of the EUT.
3) Collocation with Intel WLAN FCC ID: CJ6UPA3489WL
4) Collocation with Bluetooth FCC ID: CJ6UPA3418BT

9 MEASUREMENT UNCERTAINTY

9.1 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 Mechnical 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
Extrapolation, interpolation, and integration 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

10 EQUIPMENT LIST & CALIBRATION

Name of Equipment	Manufacturer	Type/Model	Serial Number	Cal. Due date
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
S-Parameter Network Analyzer	Agilent	8753ES-6	US39173569	2/9/07
Electronic Probe kit	Hewlett Packard	85070C	N/A	N/A
E-Field Probe	SPEAG	EX3DV3	3531	7/21/06
SAM Phantom (SAM1)	SPEAG	TP-1185	QD000P40CA	N/A
SAM Phantom (SAM2)	SPEAG	TP-1015	N/A	N/A
Data Acquisition Electronics	SPEAG	DAE4	558	1/20/07
System Validation Dipole	SPEAG	D835V2	4d002	1/23/08
System Validation Dipole	SPEAG	D1900V2	5d043	1/29/08
Power Meter	Giga-tronics	8651A	8651404	12/27/06
Power Sensor	Giga-tronics	80701A	1834588	12/27/07
Amplifier	Mini-Circuits	ZVE-8G	0360	N/A
Amplifier	Mini-Circuits	ZHL-42W	D072701-5	N/A
Radio Communication Tester	Rohde & Schwarz	CMU 200	838114/032	12/17/06
Simulating Liquid	CCS	M835	N/A	Within 24 hrs of first test
Simulating Liquid	CCS	M1900	N/A	Within 24 hrs of first test

11 EUT PHOTOS

CDMA 800/1900 CELL-PCS MODULE

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Host Device, Portege M400

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12 ATTACHMENT

No.	Contents	No. of page (s)
1	System Performance Check Plots	8
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4	Certificate of System Validation Dipole - D835V2 - SN 4d002	9
5	Certificate of System Validation Dipole - D1900V2 - SN 5d043	9
6	SAR Tool	2

END OF REPORT