FCC OET BULLETIN 65 SUPPLEMENT C 01-01
IEEE STD 1528:2003

SAR EVALUATION REPORT

For

Gobi2000 PCI Express Mini Card
(Tested inside of Panasonic Tablet PC CF-C1)

MODEL NUMBER: GOBI2000
FCC ID: N7NGOBI2

REPORT NUMBER: 11J13758-1

ISSUE DATE: May 19, 2011

Prepared for

PANASONIC CORPORATION OF NORTH AMERICA.
ONE PANASONIC WAY, 4B-8
SECAUCUS, NJ 07094, U.S.A

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	May 19, 2011	Initial Issue	--

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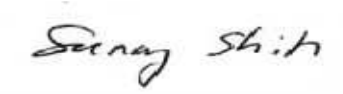
1. ATTESTATION OF TEST RESULTS

Applicant name:	PANASONIC CORPORATION OF NORTH AMERICA. ONE PANASONIC WAY, 4B-8 SECAUCUS, NJ 07094, U.S.A		
EUT description:	The EUT is the Sierra Wireless Gobi2000 850/1900 GSM/WCDMA/GPRS/EDGE/CDMA Module (Tested inside of Panasonic Tablet PC, Model CF-C1)		
Model number:	GOBI2000		
Device category:	Portable		
Exposure category:	General Population/Uncontrolled Exposure		
Date tested:	May 11 - 17, 2011		
FCC / IC Rule Parts	Freq. Range [MHz]	Highest 1-g SAR (mW/g)	Limit (mW/g)
22H / RSS-132	824 - 849	0.261 mW/g (UMTS) Tablet Mode – Secondary Landscape	1.6
24E / RSS-133	1850 - 1910	0.625 mW/g (CDMA2000) Tablet Mode – Secondary Landscape	
Applicable Standards			Test Results
OET Bulletin 65 Supplement C 01-01, IEEE STD 1528: 2003			Pass

Compliance Certification Services, Inc. (UL CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released For CCS By:



Sunny Shih
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Compliance Certification Services (UL CCS)

Tested By:

Hung Thai
RF Engineer
Compliance Certification Services (UL CCS)

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C Edition 01-01, IEEE STD 1528:2003, and the following KDB Procedures.

- 248227 SAR measurement procedures for 802.11a/b/g transmitters
- 447498 D01 Mobile Portable RF Exposure v04

3. FACILITIES AND ACCREDITATION

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

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

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	TX90	C01209	N/A		
Robot Remote Control	Stäubli	CS8C	N/A	N/A		
DASY5 Measurement Server	SPEAG	SEUMS014AA	1064	N/A		
Probe Alignment Unit	SPEAG	LB5 / 80	N/A	N/A		
SAM Phantom	SPEAG	QP 000 P40 CC	1602	N/A		
Oval Flat Phantom (ELI 4.0)	SPEAG	QD OVA001 B	1099	N/A		
Dielectronic Probe kit	HP	85070C	N/A	N/A		
ESA Series Network Analyzer	Agilent	E5071B	MY42100131	8	2	2011
Synthesized Signal Generator	HP	83732B	US34490599	7	14	2012
Wireless comunication test set	Agilent	E5515C (8960)	GB46160222	6	17	2012
E-Field Probe	SPEAG	EX3DV3	3686	1	23	2013
Data Acquisition Electronics	SPEAG	DAE 4	1239	11	17	2011
Thermometer	ERTCO	639-1S	1718	7	19	2011
System Validation Dipole	SPEAG	D835V2	4d002	4	4	2012
System Validation Dipole	SPEAG	*D1900V2	5d043	11	24	2012
Power Meter	Giga-tronics	8651A	8651404	3	13	2012
Power Sensor	Giga-tronics	80701A	1834588	3	13	2012
Power Meter	Boonton	4541	12405	4	5	2012
Power Sensor	Boonton	57006	6940	3	31	2012
Amplifier	Mini-Circuits	ZHL-42W	D072701-5	N/A		
Simulating Liquid	SPEAG	MSL1900	N/A	Within 24 hrs of first test		
Simulating Liquid	SPEAG	MSL835	N/A	Within 24 hrs of first test		

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

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

4.2. MEASUREMENT UNCERTAINTY

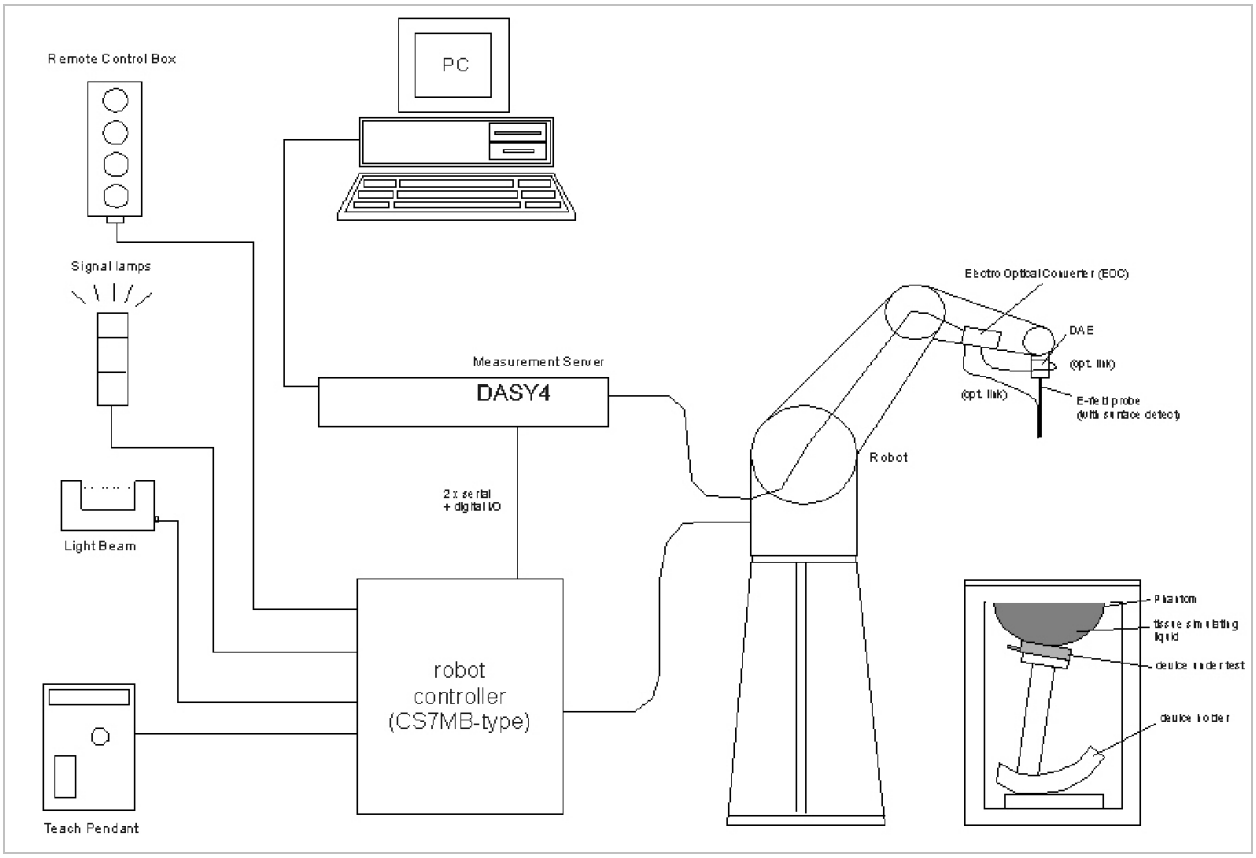
Measurement uncertainty for 300 MHz to 3 GHz averaged over 1 gram

Component	error, %	Probe Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1)	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 (Body 1900 MHz)	2.29	Normal	1	0.64	1.47
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement uncertainty (Body 850 MHz)	-3.89	Normal	1	0.6	-2.33
				Combined Standard Uncertainty Uc(y) =	9.83
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 19.67 %	
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 1.56 dB	

5. EQUIPMENT UNDER TEST

The EUT is the Sierra Wireless Gobi 2000 850/1900 for GSM/WCDMA/GPRS/EDGE/CDMA Module. Tested inside Panasonic Tablet PC, CF-C1, SN: 1BKSA00017	
Normal operation:	Laptop mode - with display open at 90° to the keyboard Tablet mode - Multiple display orientations supporting both portrait and landscape configurations.
Antenna tested:	Part number: ANTENNA MAIN: DFUP1887ZA(1) Manufactured by: Panasonic Corporation Of North America
Antenna-to-antenna/user separation distances:	See Section 13 for details of antenna locations and separation distances.
Simultaneous transmission:	• WWAN can transmit simultaneously with WiFi • WWAN can transmit simultaneously with Bluetooth • WiFi can transmit simultaneously with Bluetooth
Assessment for SAR evaluation for Simultaneous transmission:	**WiFi and BT** The Bluetooth's maximum output power is ≤ 60/$f_{(GHz)}$ mW. Therefore stand-alone SAR evaluation is not required. Additionally, simultaneous transmission SAR evaluation is not required for WiFi/Bluetooth antenna pair. (Bluetooth - FCC ID: ACJ9TGBT11B; IC: 216A-CFBT11B) **WWAN and BT** Same as WiFi and BT **WWAN and WiFi** SAR is not required due to $\sum$ (SAR_{1g}) < SAR limit.

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 validating 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. LIQUID CHECK RESULTS

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
5/11/2011	Body 835	e'	53.3924	Relative Permittivity (ϵ_r):	53.39	55.20	-3.27	5
		e''	20.7979	Conductivity (σ):	0.97	0.97	-0.45	5

Liquid Check
Ambient temperature: 24deg. C; Liquid temperature: 23 deg. C; Relative Humidity = 39%
May 11, 2011 05:18 PM

Frequency	e'	e''
800000000.	53.9161	20.9852
805000000.	53.9347	21.0012
810000000.	53.6533	20.9836
815000000.	53.8790	21.0114
820000000.	53.6802	20.7708
825000000.	53.7071	20.8631
830000000.	53.6846	20.8912
835000000.	**53.3924**	**20.7979**
840000000.	53.4867	20.8234
845000000.	53.4995	20.8512
850000000.	53.4947	20.8350
855000000.	53.3095	20.8973
860000000.	53.3517	20.8739
865000000.	53.2436	20.7311
870000000.	53.1990	20.7289
875000000.	53.2532	20.7555
880000000.	53.1282	20.7672
885000000.	53.0550	20.5411
890000000.	53.0456	20.8120
895000000.	52.9753	20.7823
900000000.	52.9642	20.7800
905000000.	52.9509	20.7110
910000000.	52.9374	20.4905
915000000.	53.0581	20.5829
920000000.	52.9296	20.6054
925000000.	52.8566	20.6849
930000000.	52.8061	20.6177
935000000.	52.6788	20.4955
940000000.	52.5162	20.5117
945000000.	52.6450	20.6126
950000000.	52.3967	20.6468

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
5/12/2011	Body 835	e'	53.0518	Relative Permittivity (ϵ_r):	53.05	55.20	-3.89	5
		e''	20.6589	Conductivity (σ):	0.96	0.97	-1.12	5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
May 12, 2011 09:19 AM

Frequency	e'	e''
800000000.	53.4077	20.7803
805000000.	53.3578	20.7637
810000000.	53.3073	20.7483
815000000.	53.2504	20.7261
820000000.	53.1991	20.7076
825000000.	53.1500	20.6926
830000000.	53.1017	20.6755
835000000.	**53.0518**	**20.6589**
840000000.	53.0036	20.6425
845000000.	52.9569	20.6245
850000000.	52.9108	20.6167
855000000.	52.8631	20.6000
860000000.	52.8158	20.5793
865000000.	52.7644	20.5671
870000000.	52.7204	20.5504
875000000.	52.6713	20.5340
880000000.	52.6303	20.5189
885000000.	52.5835	20.4999
890000000.	52.5370	20.4865
895000000.	52.4891	20.4681
900000000.	52.4504	20.4475
905000000.	52.4095	20.4280
910000000.	52.3693	20.4133
915000000.	52.3282	20.3985
920000000.	52.2928	20.3778
925000000.	52.2509	20.3688
930000000.	52.2176	20.3623
935000000.	52.1766	20.3551
940000000.	52.1348	20.3554
945000000.	52.0944	20.3573
950000000.	52.0431	20.3523

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
5/13/2011	Body 835	e'	53.7855	Relative Permittivity (ϵ_r):	53.79	55.20	-2.56	5
		e''	20.5920	Conductivity (σ):	0.96	0.97	-1.44	5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
May 13, 2011 03:23 PM

Frequency	e'	e''
800000000.	54.1297	20.6974
805000000.	54.0819	20.6806
810000000.	54.0240	20.6652
815000000.	53.9754	20.6524
820000000.	53.9304	20.6317
825000000.	53.8797	20.6207
830000000.	53.8343	20.6033
835000000.	**53.7855**	**20.5920**
840000000.	53.7415	20.5740
845000000.	53.6900	20.5617
850000000.	53.6421	20.5471
855000000.	53.6003	20.5299
860000000.	53.5505	20.5186
865000000.	53.5019	20.5048
870000000.	53.4557	20.4861
875000000.	53.4099	20.4734
880000000.	53.3613	20.4616
885000000.	53.3124	20.4433
890000000.	53.2689	20.4285
895000000.	53.2301	20.4145
900000000.	53.1819	20.3941
905000000.	53.1394	20.3828
910000000.	53.0959	20.3666
915000000.	53.0595	20.3569
920000000.	53.0198	20.3499
925000000.	52.9816	20.3438
930000000.	52.9378	20.3358
935000000.	52.9011	20.3340
940000000.	52.8585	20.3378
945000000.	52.8160	20.3368
950000000.	52.7643	20.3351

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
5/16/2011	Body 1900	e'	53.6470	Relative Permittivity (ϵ_r):	53.65	53.30	0.65	5
		e''	14.7178	Conductivity (σ):	1.55	1.52	2.29	5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 42%
May 16, 2011 11:25 AM

Frequency	e'	e''
1710000000.	54.3108	14.0854
1720000000.	54.2743	14.1328
1730000000.	54.2402	14.1728
1740000000.	54.2100	14.2023
1750000000.	54.1812	14.2300
1760000000.	54.1512	14.2558
1770000000.	54.1187	14.2838
1780000000.	54.0826	14.3185
1790000000.	54.0447	14.3653
1800000000.	54.0079	14.4164
1810000000.	53.9743	14.4690
1820000000.	53.9434	14.5194
1830000000.	53.9152	14.5608
1840000000.	53.8807	14.5885
1850000000.	53.8361	14.6024
1860000000.	53.7917	14.6101
1870000000.	53.7578	14.6206
1880000000.	53.7237	14.6411
1890000000.	53.6847	14.6764
1900000000.	**53.6470**	**14.7178**
1910000000.	53.6094	14.7627

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
5/17/2011	Body 1900	e'	53.5405	Relative Permittivity (ϵ_r):	53.54	53.30	0.45	5
		e''	14.5679	Conductivity (σ):	1.54	1.52	1.25	5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 42%
May 16, 2011 11:25 AM

Frequency	e'	e''
1710000000.	54.3108	14.0854
1720000000.	54.2743	14.1328
1730000000.	54.2402	14.1728
1740000000.	54.2100	14.2023
1750000000.	54.1812	14.2300
1760000000.	54.1512	14.2558
1770000000.	54.1187	14.2838
1780000000.	54.0826	14.3185
1790000000.	54.0447	14.3653
1800000000.	54.0079	14.4164
1810000000.	53.9743	14.4690
1820000000.	53.9434	14.5194
1830000000.	53.9152	14.5608
1840000000.	53.8807	14.5885
1850000000.	53.8361	14.6024
1860000000.	53.7917	14.6101
1870000000.	53.7578	14.6206
1880000000.	53.7237	14.6411
1890000000.	53.6847	14.6764
1900000000.	**53.6470**	**14.7178**
1910000000.	53.6094	14.7627

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

SYSTEM VERIFICATION

The system performance check is performed prior to any usage of the system in order to verify SAR system measurement accuracy. The system performance check verifies that the system operates within its specifications of ±10%.

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 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. date	SAR Avg (mW/g)		
			Tissue:	Head	Body
D835V2 SN: 4d002	D835V2-4d002_Apr11	4/4/11	1g SAR:	9.36	10.2
			10g SAR:	6.12	6.68
D1900V2 SN: 5d043	D1900V2-5d043_Nov09	11/24/09	1g SAR:	39.8	40.4
			10g SAR:	20.7	21.4

8.2. SYSTEM CHECK RESULTS

System validation dipole	Date Tested	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
		Tissue:	Body			
D835V2 SN: 4d002	05/11/11	1g SAR:	10.0	10.2	-1.96	±10
		10g SAR:	6.59	6.68	-1.35	
D835V2 SN: 4d002	05/12/11	1g SAR:	9.91	10.2	-2.84	±10
		10g SAR:	6.51	6.68	-2.54	
D835V2 SN: 4d002	05/13/11	1g SAR:	9.75	10.2	-4.41	±10
		10g SAR:	6.41	6.68	-4.04	
D1900V2 SN: 5d043	05/16/11	1g SAR:	41.5	40.4	2.72	±10
		10g SAR:	21.7	21.4	1.40	
D1900V2 SN: 5d043	05/17/11	1g SAR:	41.3	40.4	2.23	±10
		10g SAR:	21.6	21.4	0.93	

9. SAR MEASUREMENT PROCEDURES

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The Minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties (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 ≥ 7 x 7 x 9 points within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

Step 5: Z-Scan

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation, the extrapolated distance should not be larger than the step size in Z-direction.

10. RF OUTPUT POWER VERIFICATION

10.1. GSM

GPRS (GMSK) - Coding Scheme: CS1

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slot	Frame Avg Pwr
GSM850	128	824.2	32.1	23.1	32.0	**26.0**
	190	836.6	32.2	23.2	32.0	**26.0**
	251	848.8	32.0	23.0	31.9	**25.9**
GSM1900	512	1850.2	30.0	21.0	29.9	**23.9**
	661	1880	30.0	21.0	29.8	**23.8**
	810	1909.8	29.8	20.8	29.8	**23.8**

EGPRS (8PSK) - Coding Scheme: MCS5

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slot	Frame Avg Pwr
GSM850	128	824.2	27.9	18.9	27.7	21.7
	190	836.6	27.9	18.9	27.8	21.8
	251	848.8	27.9	18.9	27.8	21.8
GSM1900	512	1850.2	26.7	17.7	26.7	20.7
	661	1880	26.7	17.7	26.7	20.7
	810	1909.8	26.3	17.3	26.3	20.3

Note:

1. Since the source-based time-averaged output power for EGPRS mode is lower than that in the GPRS mode, therefore Body SAR test reduction is applicable for this device.
2. Based on output power above and time slots, the following worst-case configurations were chosen for Body SAR testing.
    a. GPRS850 2 time slots
    b. GPRS1900 2 time slots

10.2. UMTS RELEASE 99

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

	Mode	Rel99
	Subtest	-
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

Results

Rel 99 (12.2kps RMC)

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	Avg Tx Pwr (dBm)
UMTS850 (Band V)	Rel 99 12.2kbps RMC	4132	4357	826.4	24.6
		4183	4408	836.6	25.0
		4233	4458	846.6	24.9
UMTS1900 (Band II)	Rel 99 12.2kps RMC	9262	9662	1852.4	24.7
		9400	9800	1880.0	25.1
		9538	9938	1907.6	24.7

10.3. CDMA2000

CDMA2000 1xRTT

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

Application	Rev, License
CDMA2000 Mobile Test	B.13.08, L

- Protocol Rev > 6 (IS-2000-0)
- System ID: 2004 (Cell & PCS); NID: 65535 (Cell & PCS); Reg. Ch. #.: 384 (Cell) & 600 (PCS)
- Radio Config (RC) > Please see following table for details
- FCH Service Option (SO) Setup > Please see following table or details
- Traffic Data Rate > Full
- TDSO SCH Info > F-SCH Parameters > F-SCH Data Rate > 153.6 kbps
  > R-SCH Parameters > R-SCH Data Rate > 153.6 kbps
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

RF Output Power for Cellular Band

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)		
		Ch. 1013/824.7 MHz	Ch. 384/836.52 MHz	Ch. 777/848.31 MHz
		Average	Average	Average
RC1	55 (Loopback)	24.5	24.5	24.5
RC3	55 (Loopback)	24.6	24.5	24.6
	32 (+ F-SCH)	24.5	24.5	24.6

RF Output Power for PCS Band

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)		
		Ch. 25/1851.25 MHz	Ch. 600/1880 MHz	Ch. 1175/1908.75 MHz
		Average	Average	Average
RC1	55 (Loopback)	24.7	25.0	24.7
RC3	55 (Loopback)	24.7	25.1	24.8
	32 (+ F-SCH)	24.9	25.1	25.0

11. SUMMARY OF TEST RESULT

Configuration	Antenna-to-User distance	SAR Require	Comments
Laptop mode: Lap-held	158 mm From Main-to-user	Yes	
Bottom Face	32 mm From Antenna-to-user	Yes	
Edge - Primary Landscape	138 mm From Main-to-user	No	This is not the most conservative antenna-to-user distance at edge mode. Per According to KDB 447498 4) b) ii) (2)
Edge - Secondary Landscape	21 mm From antenna-to-user	Yes	This is the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2), SAR is required only for the edge with the most conservative exposure conditions.
Edge - Primary Portrait	295 mm from antenna to Primary edge	No	SAR is not required due to separation distance > 20 cm from antenna-to-user.
Edge - Secondary Portrait	< 2 mm from antenna to edge	No	Main antenna is disabled by software at this configuration.

11.1. GPRS 850 & 1900

Laptop Mode - LapHeld

Band	Slot	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
GPRS850	2	128	824.2		
		190	836.6	0.077	0.060
		251	848.8		
GPRS1900	2	512	1850.2		
		661	1880.0	0.00664	0.00244
		810	1909.8		

Tablet Mode - Bottom Face

Band	Slot	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
GPRS850	2	128	824.2		
		190	836.6	0.074	0.051
		251	848.8		
GPRS1900	2	512	1850.2		
		661	1880.0	0.023	0.014
		810	1909.8		

Tablet Mode – Secondary Landscape

Band	Slot	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
GPRS850	2	128	824.2		
		190	836.6	0.204	0.126
		251	848.8		
GPRS1900	2	512	1850.2		
		661	1880.0	0.471	0.225
		810	1909.8		

11.2. UMTS BAND V & II

Test reduction considerations:
KDB 941225 D01 – Body SAR is not required for HSDPA when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is < 75% of the SAR limit.

Laptop Mode - LapHeld

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
					1-g	10-g
Band V	R99	4132	4357	826.4		
	12.2kbps	4183	4408	836.6	0.019	0.014
	RMC	4233	4458	846.6		
Band II	R99	9262	9662	1850.2		
	12.2kbps	9400	9800	1880.0	0.011	0.00735
	RMC	9538	9938	1907.6		

Tablet Mode – Bottom Face

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
					1-g	10-g
Band V	R99	4132	4357	826.4		
	12.2kbps	4183	4408	836.6	0.221	0.147
	RMC	4233	4458	846.6		
Band II	R99	9262	9662	1850.2		
	12.2kbps	9400	9800	1880.0	0.022	0.014
	RMC	9538	9938	1907.6		

Tablet Mode – Secondary Landscape

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
					1-g	10-g
Band V	R99	4132	4357	826.4		
	12.2kbps	4183	4408	836.6	**0.261**	0.159
	RMC	4233	4458	846.6		
Band II	R99	9262	9662	1850.2		
	12.2kbps	9400	9800	1880.0	**0.625**	0.300
	RMC	9538	9938	1907.6		

11.3. CDMA2000 Cell & PCS Band

Laptop Mode - LapHeld

Band	Mode	Ch No.	f (MHz)	SAR (mW/g)	
				1-g	10-g
Cellular	1xRTT (RC3, SO32)	1013	824.70		
		384	836.52	0.044	0.03
		777	848.31		
PCS	1xRTT (RC3, SO32)	25	1851.25		
		600	1880.00	0.011	0.0063
		1175	1908.75		

Tablet Mode – Bottom Face

Band	Mode	Ch No.	f (MHz)	SAR (mW/g)	
				1-g	10-g
Cellular	1xRTT (RC3, SO32)	1013	824.70		
		384	836.52	0.185	0.126
		777	848.31		
PCS	1xRTT (RC3, SO32)	25	1851.25		
		600	1880.00	0.03	0.014
		1175	1908.75		

Tablet Mode – Secondary Landscape

Band	Mode	Ch No.	f (MHz)	SAR (mW/g)	
				1-g	10-g
Cellular	1xRTT (RC3, SO32)	1013	824.70		
		384	836.52	0.262	0.159
		777	848.31		
PCS	1xRTT (RC3, SO32)	25	1851.25		
		600	1880.00	0.485	0.239
		1175	1908.75		

WORST-CASE SAR TEST PLOTS

Date/Time: 5/13/2011 9:00:23 PM

Test Laboratory: UL CCS

5_Secondary Landscape

DUT: Panasonic ; Type: Tablet; Serial: 1BKKSA00017

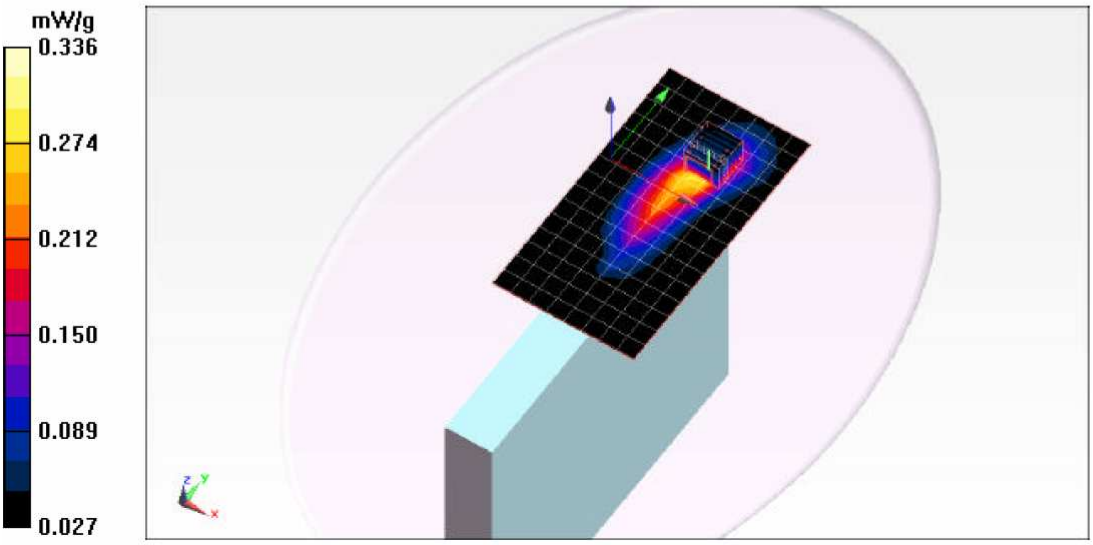
Communication System: UMTS Band V; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; s = 0.958 mho/m; e_r = 53.771; ? = 1000 kg/m^3
Phantom section: Flat Section

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

DASY5 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(8.78, 8.78, 8.78); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: ELI 4.0; Type: QDOVA001BB; Serial: 1099
- Measurement SW: DASY52, Version 52.6 (1);SEMCAD X Version 14.4.2 (2595)

UMTS/Band V_R99_CH4183/Area Scan (9x16x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.309 mW/g

UMTS/Band V_R99_CH4183/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 18.210 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.462 W/kg
SAR(1 g) = 0.261 mW/g; SAR(10 g) = 0.159 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.336 mW/g



Date/Time: 5/13/2011 9:18:13 PM

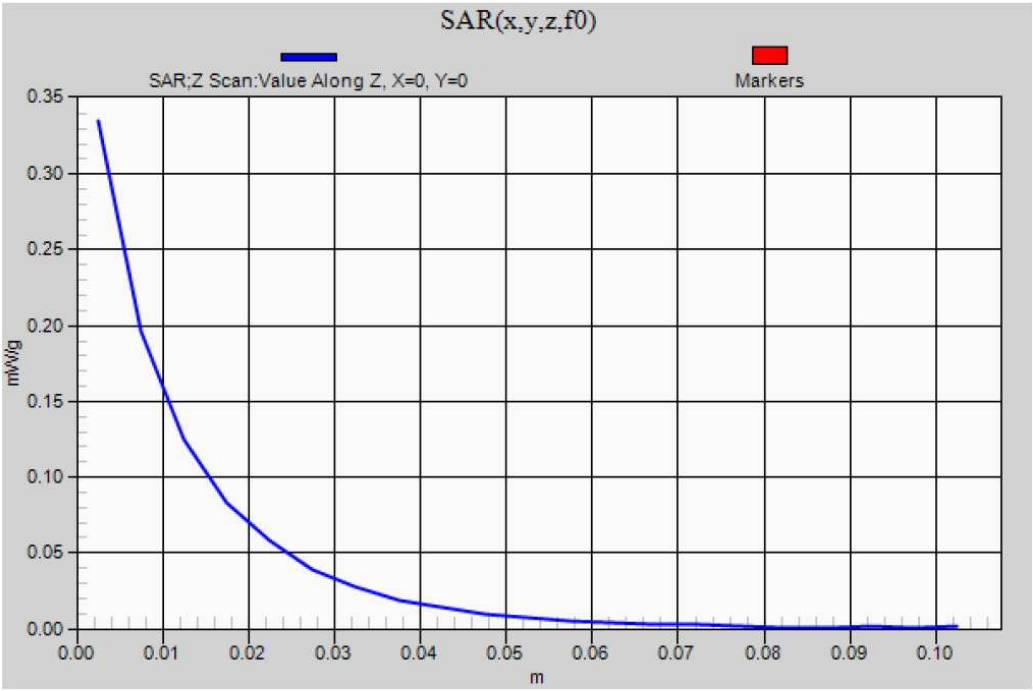
Test Laboratory: UL CCS

5_Secondary Landscape

DUT: Panasonic ; Type: Tablet; Serial: 1BKKSA00017

Communication System: UMTS Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1

UMTS/Band V_R99_CH4183/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.335 mW/g



Date/Time: 5/17/2011 12:31:30 AM

Test Laboratory: UL CCS

5_Secondary Landscape

DUT: Panasonic ; Type: Tablet; Serial: 1BKKSA00017

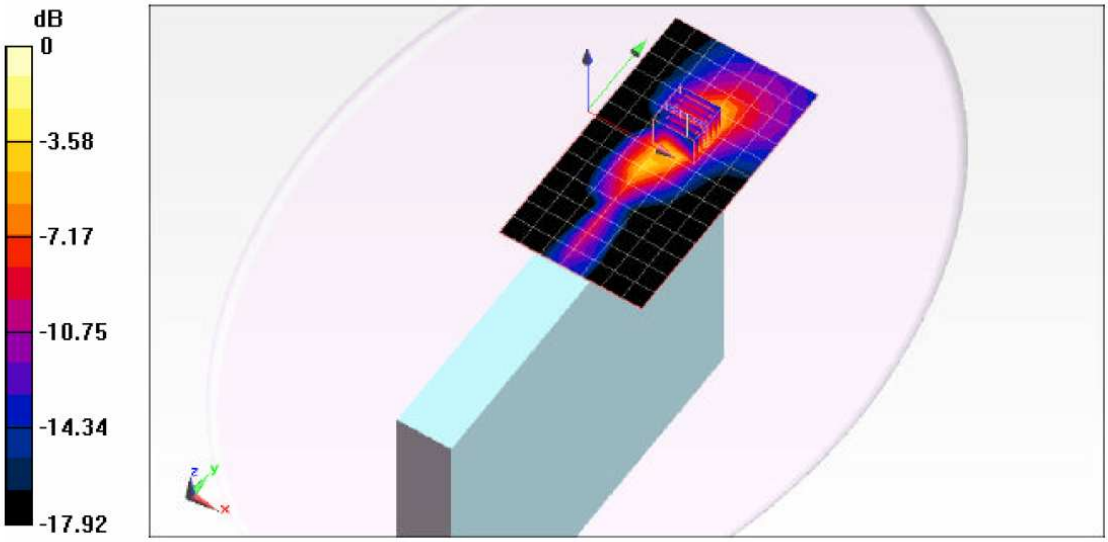
Communication System: UMTS Band II; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; s = 1.531 mho/m; e_r = 53.724; ? = 1000 kg/m^3
Phantom section: Flat Section

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

DASY5 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(6.99, 6.99, 6.99); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: ELI 4.0; Type: QDOVA001BB; Serial: 1099
- Measurement SW: DASY52, Version 52.6 (1);SEMCAD X Version 14.4.2 (2595)

UMTS/Band II_R99_CH_9400/Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.659 mW/g

UMTS/Band II_R99_CH_9400/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 20.941 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.180 W/kg
SAR(1 g) = 0.625 mW/g; SAR(10 g) = 0.300 mW/g
Maximum value of SAR (measured) = 0.861 mW/g



0 dB = 0.860mW/g

Date/Time: 5/17/2011 12:49:21 AM

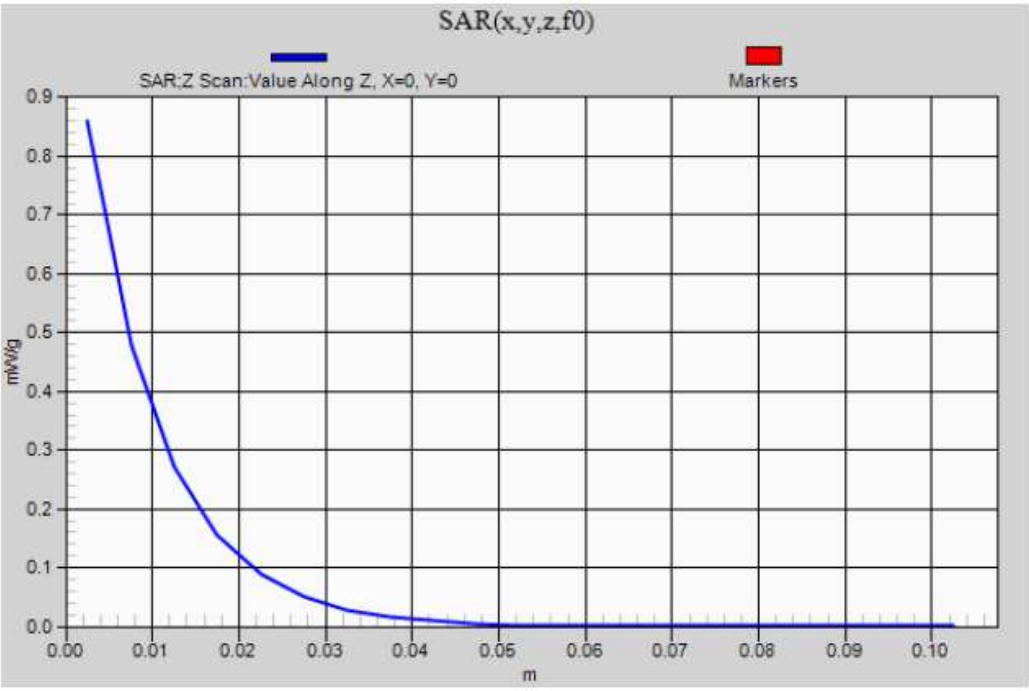
Test Laboratory: UL CCS

5_Secondary Landscape

DUT: Panasonic ; Type: Tablet; Serial: 1BKKSA00017

Communication System: UMTS Band II; Frequency: 1880 MHz;Duty Cycle: 1:1

UMTS/Band II_R99_CH_9400/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.860 mW/g



12. ATTACHMENTS

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