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-H2)

MODEL NUMBER: GOBI2000
FCC ID: N7NGOBI2

REPORT NUMBER: 11J13819-1

ISSUE DATE: June 15, 2011

Prepared for

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Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	June 15, 2011	Initial Issue	--

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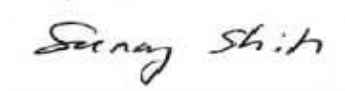
1. ATTESTATION OF TEST RESULTS

Applicant name:	Sierra Wireless Inc. 13811 Wireless Way Richmond, BC, V6V 3A4 Canada		
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-H2)		
Model number:	GOBI2000		
Device category:	Portable		
Exposure category:	General Population/Uncontrolled Exposure		
Date tested:	June 2 – June 3 , 2011		
FCC / IC Rule Parts	Freq. Range [MHz]	Highest 1g SAR (mW/g)	Limit (mW/g)
22H / RSS-132	824 - 849	0.691 mW/g (GPRS) Primary Portrait	1.6
24E / RSS-133	1850 - 1910	0.113 mW/g (UMTS Band II) Secondary Landscape	
Applicable Standards			Test Results
OET Bulletin 65 Supplement C 01-01, IEEE STD 1528: 2003, RSS-102 Issue 4, March 2010, RSS-102 Supplementary Procedures (SPR)-001, January 1, 2011			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
Engineering Team Leader
Compliance Certification Services (UL CCS)

Tested By:

David Rodgers
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	3749	12	13	2012
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	2013
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)

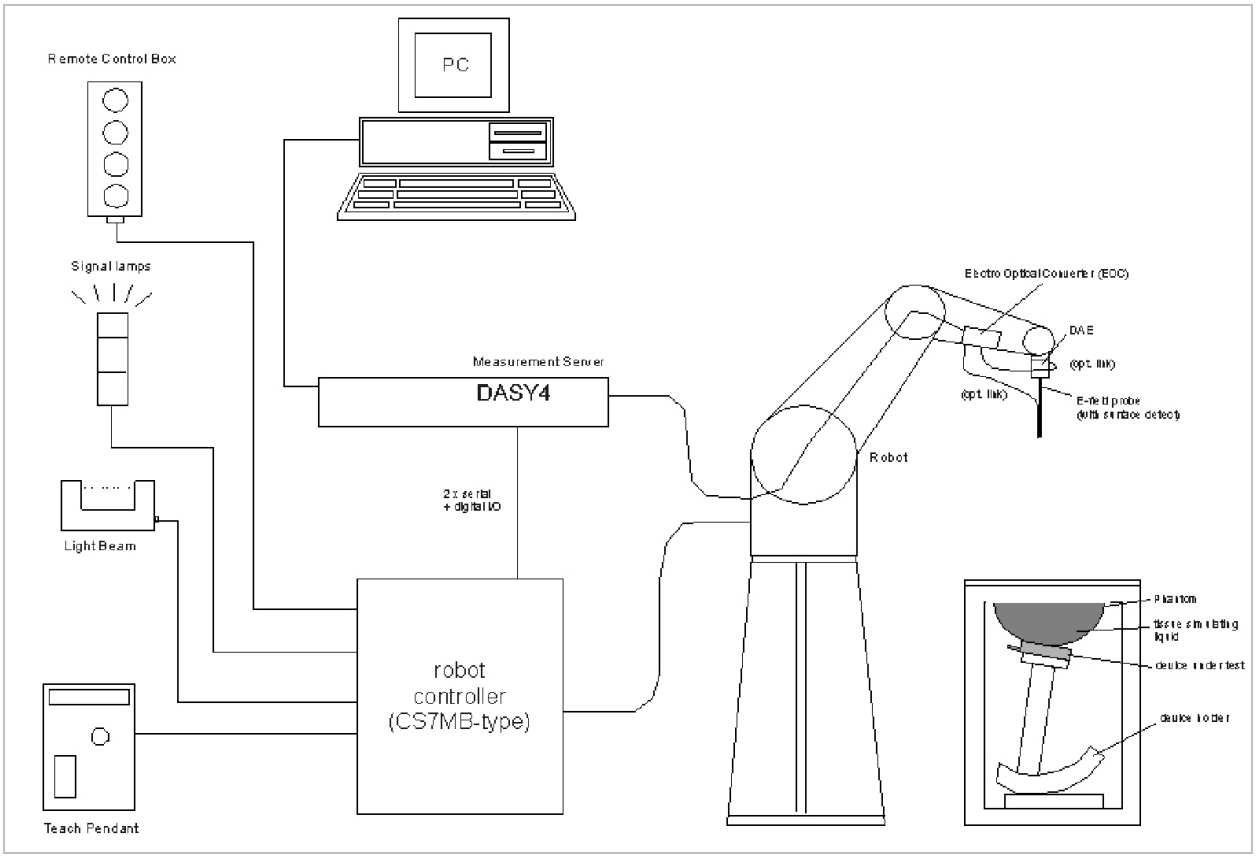
4.2. MEASUREMENT UNCERTAINTY

Specific Absorption Rate (SAR) uncertainty calculation					
Measurement uncertainty for 300 MHz to 3 GHz averaged over 1 gram					
Component	error, %	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 (835MHz)	1.27	Normal	1	0.64	0.81
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement uncertainty (1900MHz)	-2.52	Normal	1	0.6	-1.51
				Combined Standard Uncertainty Uc(y) =	9.60
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 19.19	%
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 1.52	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-H2	
Normal operation:	Multiple display orientations supporting both portrait and landscape configurations.
Antenna tested:	Part number: ANTENNA WWAN MAIN：DFUP2071ZA(1) Manufactured by: Panasonic
Antenna-to-antenna/user separation distances:	See Section 15 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

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

Measured by: David Rodgers

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
6/2/2011	Body 835	e'	53.6256	Relative Permittivity (ε_r):	53.63	55.20	-2.85	5
		e''	21.1569	Conductivity (σ):	0.98	0.97	1.27	5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
June 02, 2011 11:51 AM

Frequency	e'	e''
800000000.	53.9733	21.3307
805000000.	53.9227	21.3032
810000000.	53.8696	21.2811
815000000.	53.8183	21.2550
820000000.	53.7660	21.2319
825000000.	53.7181	21.2102
830000000.	53.6686	21.1831
835000000.	**53.6256**	**21.1569**
840000000.	53.5782	21.1324
845000000.	53.5340	21.1118
850000000.	53.4987	21.0860
855000000.	53.4534	21.0661
860000000.	53.4160	21.0524
865000000.	53.3694	21.0341
870000000.	53.3257	21.0166
875000000.	53.2811	21.0073
880000000.	53.2251	20.9975
885000000.	53.1763	20.9789
890000000.	53.1278	20.9624
895000000.	53.0744	20.9460
900000000.	53.0245	20.9299
905000000.	52.9734	20.9150
910000000.	52.9260	20.8920
915000000.	52.8767	20.8782
920000000.	52.8242	20.8638
925000000.	52.7830	20.8445
930000000.	52.7296	20.8283
935000000.	52.6877	20.8090
940000000.	52.6391	20.7963
945000000.	52.5904	20.7793
950000000.	52.5440	20.7663

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

Measured by: David Rodgers

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
6/3/2011	Body 1900	e'	51.8200	Relative Permittivity (ε_r):	51.82	53.30	-2.78	5
		e''	14.0252	Conductivity (σ):	1.48	1.52	-2.52	5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 42%
June 03, 2011 09:11 AM

Frequency	e'	e''
1710000000.	52.4287	13.3623
1720000000.	52.4102	13.3906
1730000000.	52.3910	13.4229
1740000000.	52.3712	13.4539
1750000000.	52.3498	13.4968
1760000000.	52.3242	13.5403
1770000000.	52.2930	13.5882
1780000000.	52.2611	13.6329
1790000000.	52.2230	13.6769
1800000000.	52.1887	13.7182
1810000000.	52.1480	13.7549
1820000000.	52.1048	13.7905
1830000000.	52.0652	13.8214
1840000000.	52.0223	13.8522
1850000000.	51.9845	13.8839
1860000000.	51.9505	13.9138
1870000000.	51.9144	13.9406
1880000000.	51.8799	13.9718
1890000000.	51.8502	13.9985
1900000000.	**51.8200**	**14.0252**
1910000000.	51.7922	14.0542

The conductivity (σ) can be given as:

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

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

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

9. 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

9.1. SYSTEM CHECK RESULTS

System validation dipole	Date Tested	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
		Tissue:	Body			
D835V2 SN: 4d002	06/02/11	1g SAR:	10.0	10.2	-2.25	±10
		10g SAR:	6.57	6.68	-1.65	
D1900V2 SN: 5d043	06/03/11	1g SAR:	41.2	40.4	1.98	±10
		10g SAR:	21.7	21.4	1.40	

10. 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.

11. RF OUTPUT POWER VERIFICATION

11.1. 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

11.2. 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

11.3. 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

12. SUMMARY OF TEST RESULT

Configuration	Antenna-to-User distance	SAR Require	Comments
(1) Bottom Face	78.7 mm From Antenna-to-user	Yes	
Primary Landscape	215 mm From Main-to-user	No	SAR is not required due to separation distance > 20 cm from antenna-to-user.
(2) Secondary Landscape	11 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.
Secondary Portrait	220 mm from antenna to Primary edge	No	SAR is not required due to separation distance > 20 cm from antenna-to-user.
(3) Primary Portrait	13 mm from antenna to edge	Yes	This is the second most conservative antenna-to-user distance at edge mode.

12.1. GPRS 850 & 1900

(1) Bottom Face

Band	Slot	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
GPRS850	2	128	824.2		
		190	836.6	0.056	0.042
		251	848.8		
GPRS1900	2	512	1850.2		
		661	1880.0	0.037	0.025
		810	1909.8		

(2) Secondary Landscape

Band	Slot	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
GPRS850	2	128	824.2		
		190	836.6	0.161	0.110
		251	848.8		
GPRS1900	2	512	1850.2		
		661	1880.0	**0.095**	**0.062**
		810	1909.8		

(3) Primary Portrait

Band	Slot	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
GPRS850	2	128	824.2		
		190	836.6	**0.691**	**0.460**
		251	848.8		
GPRS1900	2	512	1850.2		
		661	1880.0	0.078	0.049
		810	1909.8		

12.2. 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.

(1) 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	0.070	0.052
	RMC	4233	4458	846.6		
Band II	R99	9262	9662	1850.2		
	12.2kbps	9400	9800	1880.0	0.055	0.036
	RMC	9538	9938	1907.6		

(2) 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	0.128	0.088
	RMC	4233	4458	846.6		
Band II	R99	9262	9662	1850.2		
	12.2kbps	9400	9800	1880.0	**0.113**	**0.073**
	RMC	9538	9938	1907.6		

(3) Primary Portrait

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	**0.452**	**0.303**
	RMC	4233	4458	846.6		
Band II	R99	9262	9662	1850.2		
	12.2kbps	9400	9800	1880.0	0.086	0.053
	RMC	9538	9938	1907.6		

12.3. CDMA2000 Cell & PCS Band

(1) 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	0.072	0.054
		777	848.31		
PCS	1xRTT (RC3, SO32)	25	1851.25		
		600	1880.00	0.055	0.037
		1175	1908.75		

(2) 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	0.106	0.072
		777	848.31		
PCS	1xRTT (RC3, SO32)	25	1851.25		
		600	1880.00	0.038	0.025
		1175	1908.75		

(3) Primary Portrait

Band	Mode	Ch No.	f (MHz)	SAR (mW/g)	
				1-g	10-g
Cellular	1xRTT (RC3, SO32)	1013	824.70		
		384	836.52	**0.423**	**0.279**
		777	848.31		
PCS	1xRTT (RC3, SO32)	25	1851.25		
		600	1880.00	**0.088**	**0.055**
		1175	1908.75		

13. WORST-CASE SAR TEST PLOTS

Date/Time: 6/3/2011 5:57:00 PM

Test Laboratory: UL CCS

Secondary Landscape_GPRS1900

DUT: Panasonic; Type: N/A; Serial: N/A

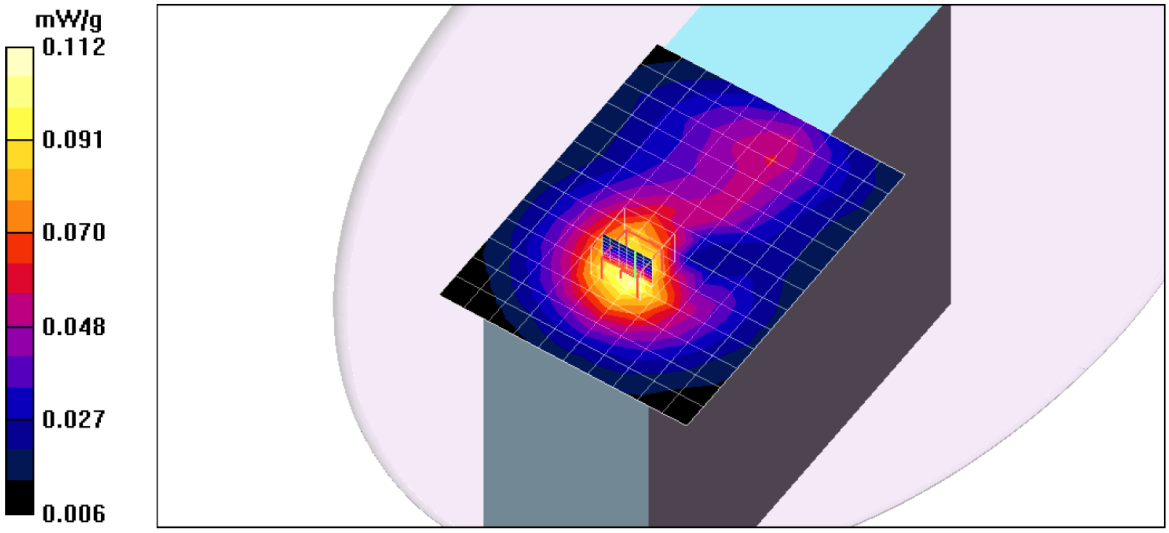
Communication System: PCS1900; Frequency: 1880 MHz;Duty Cycle: 1:4
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 23.0 deg. C; Liquid Temperature: 22.0 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 - SN3749; ConvF(7.33, 7.33, 7.33); Calibrated: 12/13/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 7/21/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Slot2 _M_CH 661/Area Scan (11x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.106 mW/g

Slot2 _M_CH 661/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 8.57 V/m; Power Drift = -0.012 dB
Peak SAR (extrapolated) = 0.146 W/kg
SAR(1 g) = 0.095 mW/g; SAR(10 g) = 0.062 mW/g
Maximum value of SAR (measured) = 0.112 mW/g



Date/Time: 6/3/2011 6:32:20 PM

Test Laboratory: UL CCS

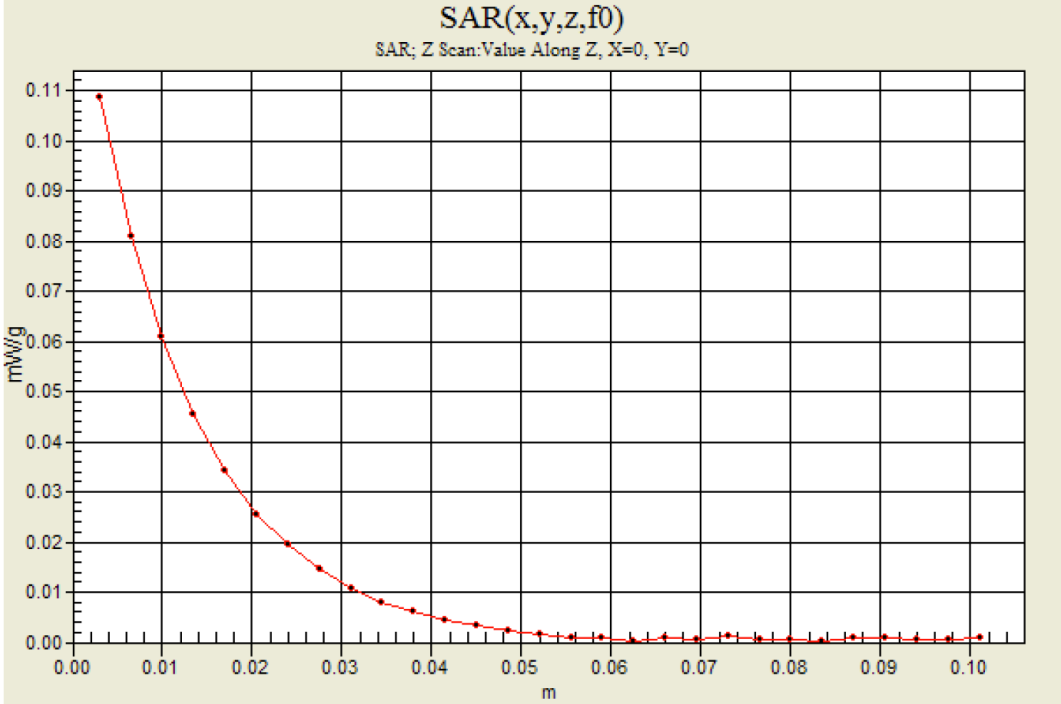
Secondary Landscape_GPRS1900

DUT: Panasonic; Type: N/A; Serial: N/A

Communication System: PCS1900; Frequency: 1880 MHz;Duty Cycle: 1:4

Slot2 _M_CH 661/Z Scan (1x1x29): Measurement grid: dx=20mm, dy=20mm, dz=3.5mm

Maximum value of SAR (measured) = 0.109 mW/g



Date/Time: 6/2/2011 6:20:11 PM

Test Laboratory: UL CCS

Primary Portrait Portrait

DUT: Panasonic; Type: N/A; Serial: N/A

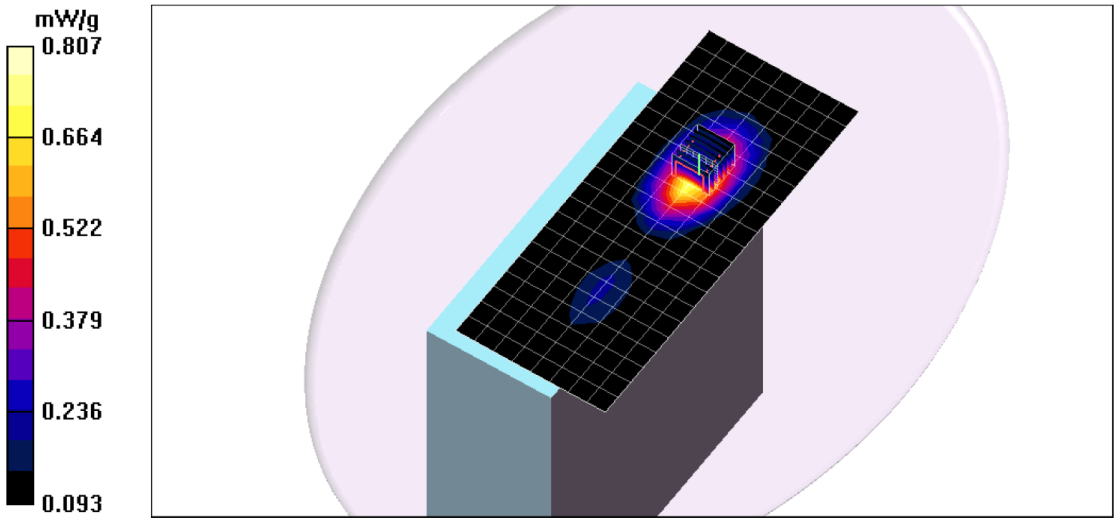
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.984 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 23.0 deg. C; Liquid Temperature: 22.0 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 - SN3749; ConvF(8.79, 8.79, 8.79); Calibrated: 12/13/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 7/21/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS_2Slot_M_Ch /Area Scan (9x21x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.790 mW/g

GPRS_2Slot_M_Ch /Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 28.4 V/m; Power Drift = -0.015 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.691 mW/g; SAR(10 g) = 0.460 mW/g
Maximum value of SAR (measured) = 0.807 mW/g



Date/Time: 6/2/2011 6:51:08 PM

Test Laboratory: UL CCS

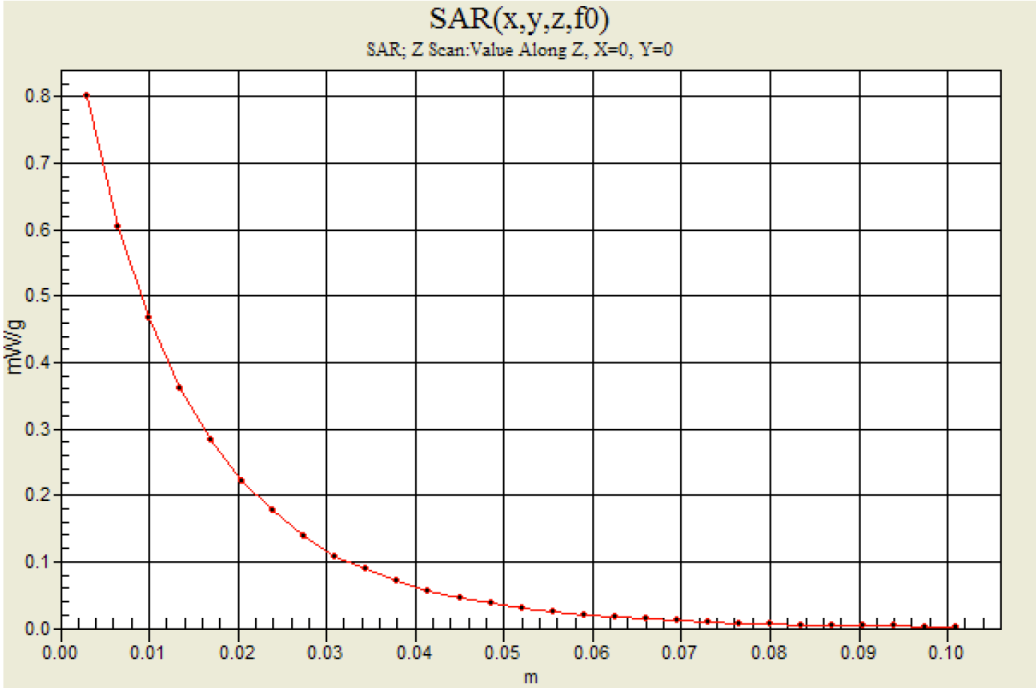
Primary Portrait Portrait

DUT: Panasonic; Type: N/A; Serial: N/A

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

GPRS_2Slot_M_Ch /Z Scan (1x1x29): Measurement grid: dx=20mm, dy=20mm, dz=3.5mm

Maximum value of SAR (measured) = 0.801 mW/g



Date/Time: 6/3/2011 10:58:37 PM

Test Laboratory: UL CCS

Secondary Landscape_UMTS BAND II

DUT: Panasonic; Type: N/A; Serial: N/A

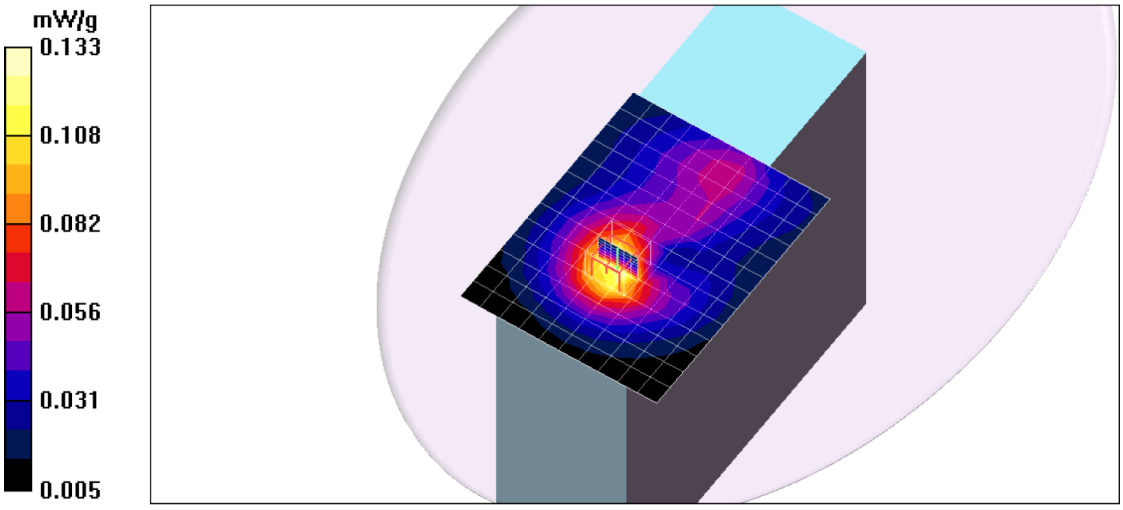
Communication System: UMTS Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 23.0 deg. C; Liquid Temperature: 22.0 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 - SN3749; ConvF(7.33, 7.33, 7.33); Calibrated: 12/13/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 7/21/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

UMTS Band II_Rel99_RMC_M_Ch/Area Scan (11x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.127 mW/g

UMTS Band II_Rel99_RMC_M_Ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 9.39 V/m; Power Drift = 0.130 dB
Peak SAR (extrapolated) = 0.170 W/kg
SAR(1 g) = 0.113 mW/g; SAR(10 g) = 0.073 mW/g
Maximum value of SAR (measured) = 0.133 mW/g



Date/Time: 6/3/2011 11:26:03 PM

Test Laboratory: UL CCS

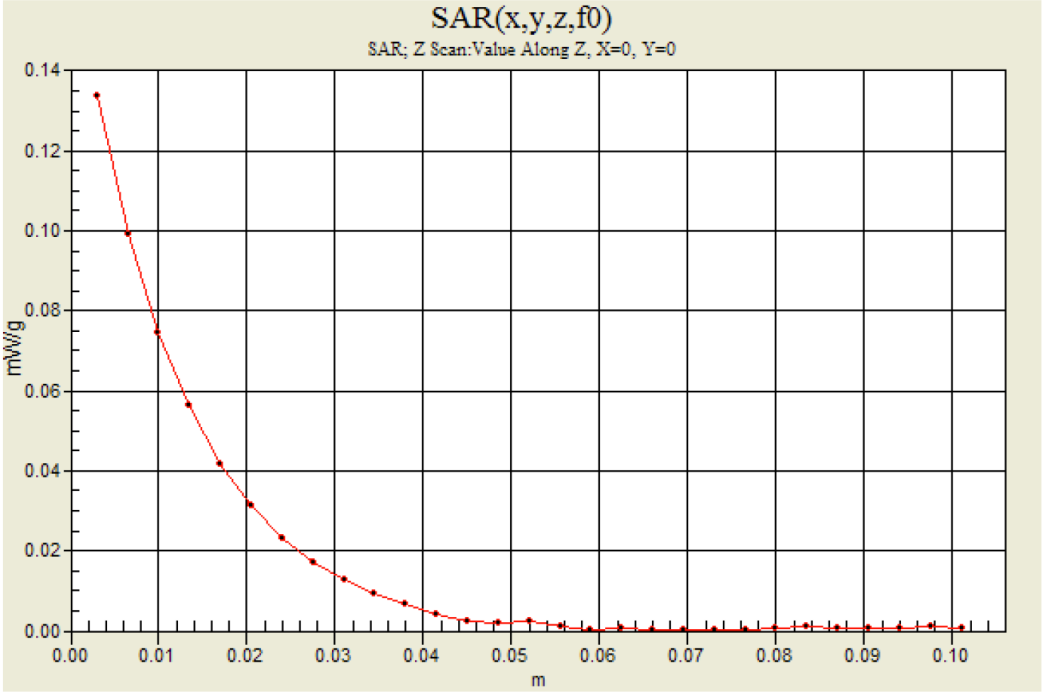
Secondary Landscape_UMTS BAND II

DUT: Panasonic; Type: N/A; Serial: N/A

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

UMTS Band II_Rel99_RMC_M_Ch/Z Scan (1x1x29): Measurement grid: dx=20mm, dy=20mm, dz=3.5mm

Maximum value of SAR (measured) = 0.134 mW/g



Date/Time: 6/2/2011 9:53:03 PM

Test Laboratory: UL CCS

Primary Portrait Portrait

DUT: Panasonic; Type: N/A; Serial: N/A

Communication System: UMTS Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.984 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 23.0 deg. C; Liquid Temperature: 22.0 deg. C

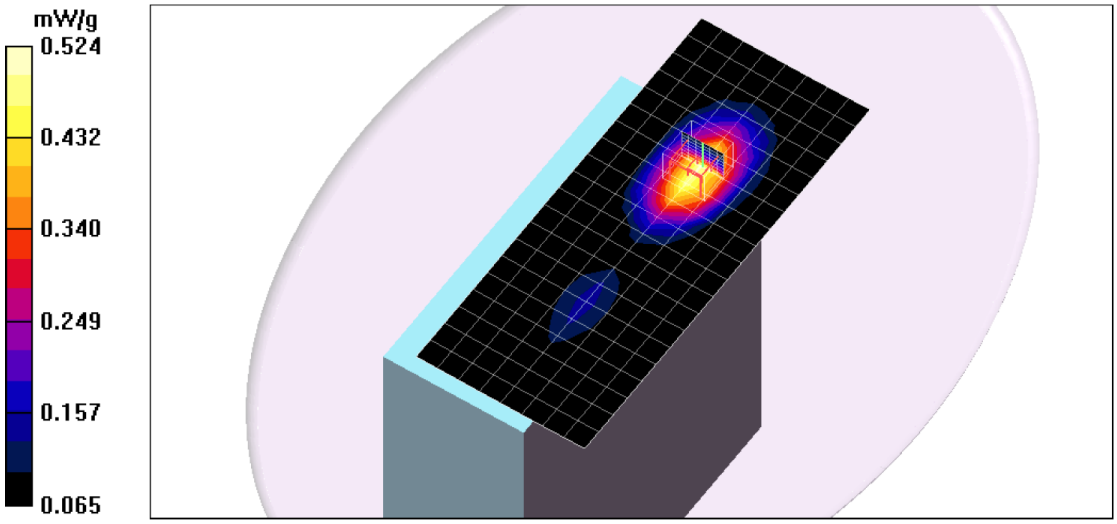
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3749; ConvF(8.79, 8.79, 8.79); Calibrated: 12/13/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 7/21/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

UMTS Band V_M_Ch/Area Scan (9x21x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.506 mW/g

UMTS Band V_M_Ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 22.7 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 0.689 W/kg
SAR(1 g) = 0.452 mW/g; SAR(10 g) = 0.303 mW/g
Maximum value of SAR (measured) = 0.524 mW/g



Date/Time: 6/2/2011 10:24:01 PM

Test Laboratory: UL CCS

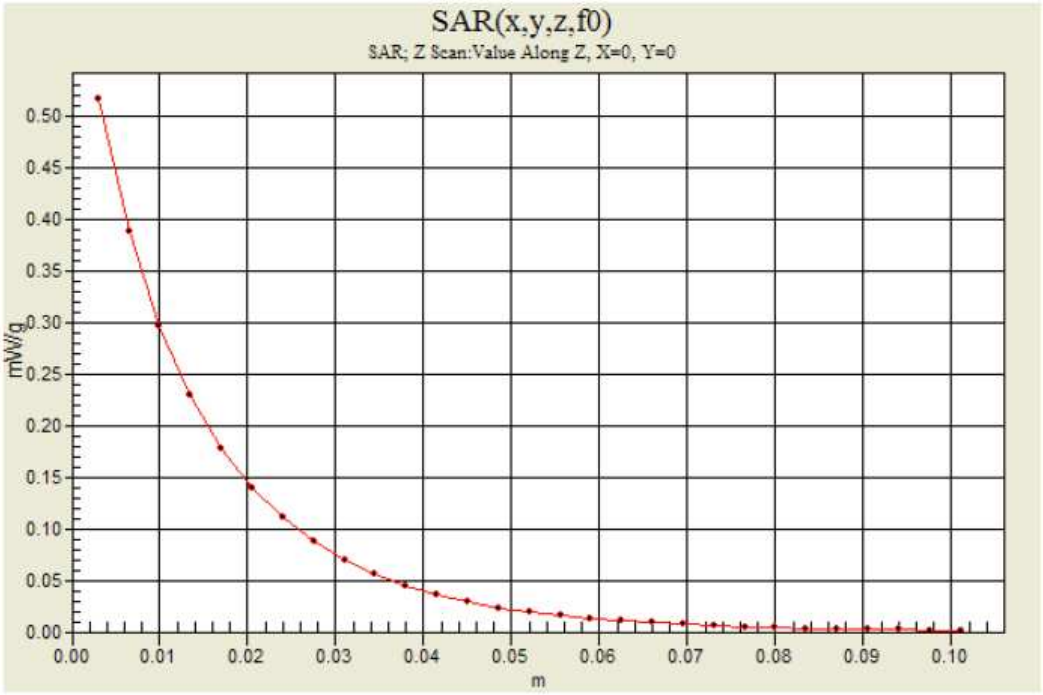
Primary Portrait Portrait

DUT: Panasonic; Type: N/A; Serial: N/A

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

UMTS Band V_M_Ch/Z Scan (1x1x29): Measurement grid: dx=20mm, dy=20mm, dz=3.5mm.

Maximum value of SAR (measured) = 0.516 mW/g



Date/Time: 6/3/2011 3:11:25 AM

Test Laboratory: UL CCS

Primary Protrait

DUT: Panasonic; Type: N/A; Serial: N/A

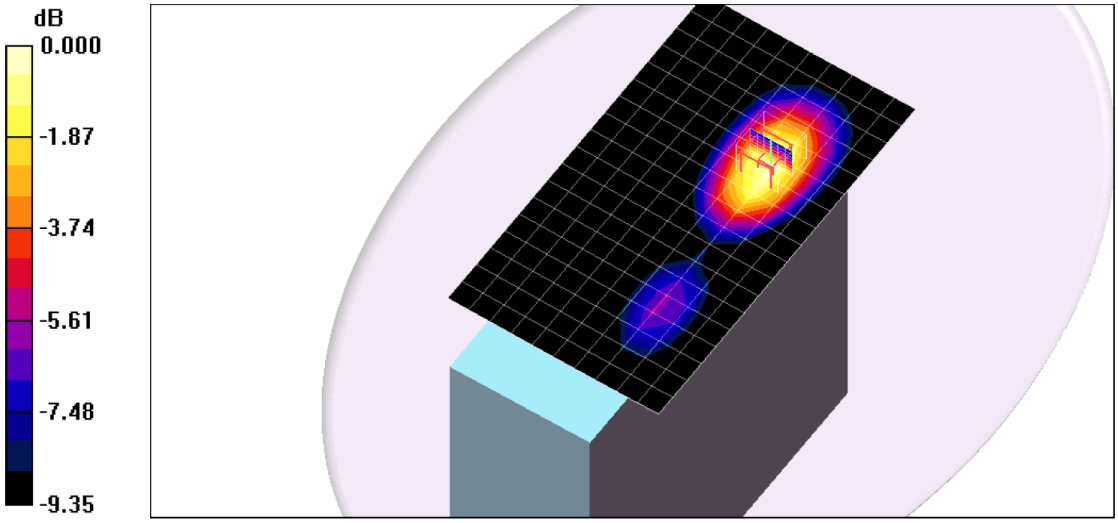
Communication System: CDMA Cell Band; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.984 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 23.0 deg. C; Liquid Temperature: 22.0 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 - SN3749; ConvF(8.79, 8.79, 8.79); Calibrated: 12/13/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 7/21/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

CDMA2000 Cell Band_M_Ch/Area Scan (11x19x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.467 mW/g

CDMA2000 Cell Band_M_Ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 21.9 V/m; Power Drift = 0.018 dB
Peak SAR (extrapolated) = 0.656 W/kg
SAR(1 g) = 0.423 mW/g; SAR(10 g) = 0.279 mW/g
Maximum value of SAR (measured) = 0.497 mW/g



Date/Time: 6/3/2011 3:43:18 AM

Test Laboratory: UL CCS

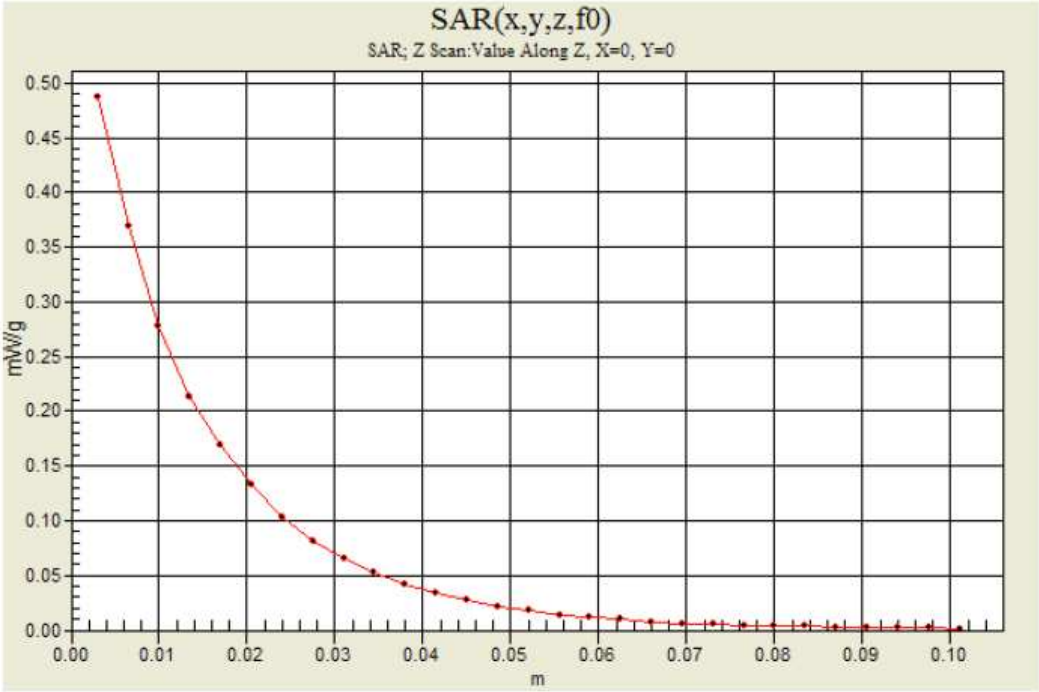
Primary Protrait

DUT: Panasonic; Type: N/A; Serial: N/A

Communication System: CDMA Cell Band; Frequency: 836.52 MHz;Duty Cycle: 1:1

CDMA2000 Cell Band_M_Ch/Z Scan (1x1x29): Measurement grid: dx=20mm, dy=20mm, dz=3.5mm

Maximum value of SAR (measured) = 0.487 mW/g



Date/Time: 6/3/2011 7:36:42 PM

Test Laboratory: UL CCS

Primary Portrait_CDMA2000

DUT: Panasonic; Type: N/A; Serial: N/A

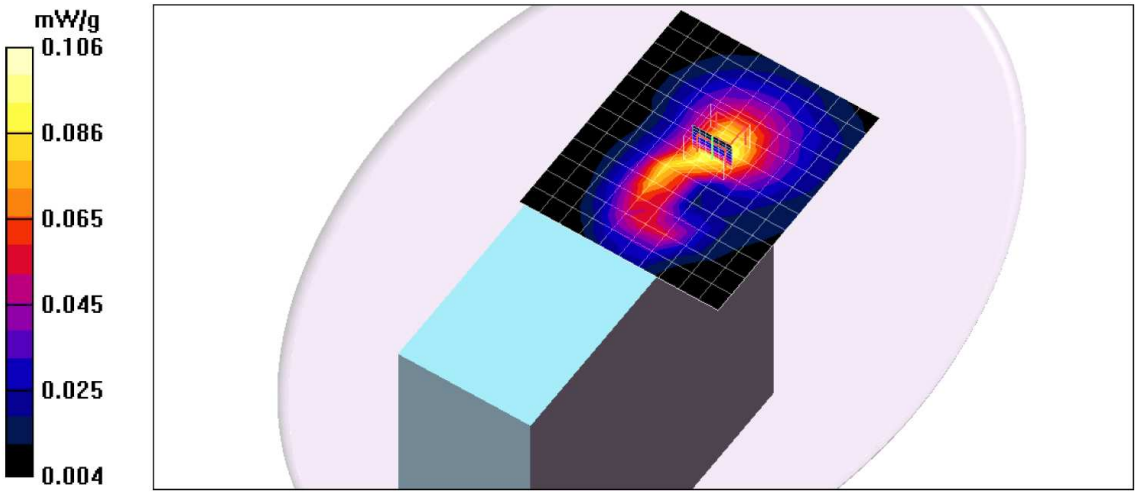
Communication System: PCS1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 23.0 deg. C; Liquid Temperature: 22.0 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 - SN3749; ConvF(7.33, 7.33, 7.33); Calibrated: 12/13/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 7/21/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

CDMA2000 PCS_1xRTT_Ch-M/Area Scan (11x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.095 mW/g

CDMA2000 PCS_1xRTT_Ch-M/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 8.11 V/m; Power Drift = -0.014 dB
Peak SAR (extrapolated) = 0.157 W/kg
SAR(1 g) = 0.088 mW/g; SAR(10 g) = 0.055 mW/g
Maximum value of SAR (measured) = 0.106 mW/g



Date/Time: 6/3/2011 8:03:45 PM

Test Laboratory: UL CCS

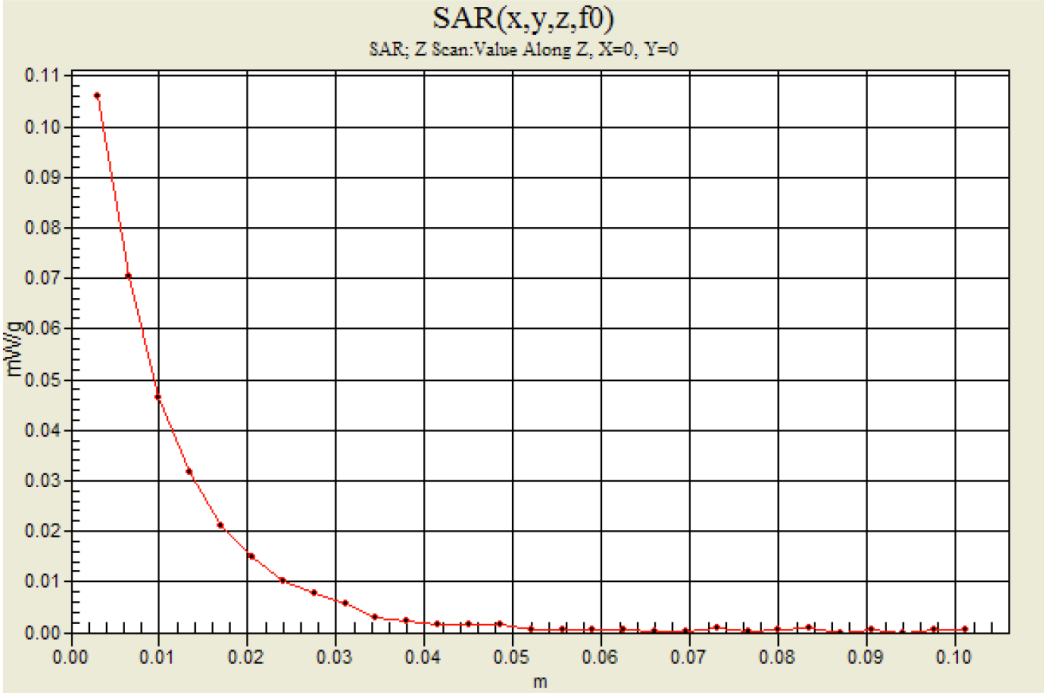
Primary Portrait_CDMA2000

DUT: Panasonic; Type: N/A; Serial: N/A

Communication System: PCS1900; Frequency: 1880 MHz;Duty Cycle: 1:1

CDMA2000 PCS_1xRTT_Ch-M/Z Scan (1x1x29): Measurement grid: dx=20mm, dy=20mm, dz=3.5mm

Maximum value of SAR (measured) = 0.106 mW/g



14. ATTACHMENTS

No.	Contents	No. of page (s)
1	System Check Plots	4
2-1	SAR Test Plots for 850MHz	18
2-2	SAR Test Plots for 1900MHz	18
3	Certificate of E-Field Probe - EX3DV3 SN 3749	11
4	Certificate of System Validation Dipole - D835V2 SN:4d002	9
5	Certificate of System Validation Dipole - D1900V2 SN:5d043	9