



**FCC OET BULLETIN 65 SUPPLEMENT C 01-01**

**IEEE STD 1528:2003**

**IC RSS-102 ISSUE 4**

**SAR EVALUATION REPORT**

*For*

**PHONE**

**MODEL: HSTNH-F30CV**

**FCC ID: B94HHF30CV**

**IC: 3905A-HHF30CV**

**REPORT NUMBER: 11U13622-1, Revision A**

**ISSUE DATE: April 27, 2011**

*Prepared for*

**HEWLETT PACKARD COMPANY, PALM GBU**

**950 MAUDE AVENUE**

**SUNNYVALE, CA. 94085**

**UNITED STATES**

*Prepared by*

**COMPLIANCE CERTIFICATION SERVICES (UL CCS)**

**47173 BENICIA STREET**

**FREMONT, CA 94538, U.S.A.**

**TEL: (510) 771-1000**

**FAX: (510) 661-0888**



**NVLAP LAB CODE 200065-0**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	April 25, 2011	Initial Issue	--
A	April 27, 2011	Revised IC ID	Aliza Zaffar

## TABLE OF CONTENTS

<b>FCC OET BULLETIN 65 SUPPLEMENT C 01-01 .....</b>	<b>1</b>
<b>1. ATTESTATION OF TEST RESULTS .....</b>	<b>5</b>
<b>2. TEST METHODOLOGY .....</b>	<b>6</b>
<b>3. FACILITIES AND ACCREDITATION .....</b>	<b>6</b>
<b>4. CALIBRATION AND UNCERTAINTY .....</b>	<b>7</b>
4.1. MEASURING INSTRUMENT CALIBRATION .....	7
4.2. MEASUREMENT UNCERTAINTY .....	8
<b>5. EQUIPMENT UNDER TEST .....</b>	<b>9</b>
<b>6. SYSTEM SPECIFICATIONS .....</b>	<b>10</b>
<b>7. LIQUID PARAMETERS .....</b>	<b>11</b>
7.1. LIQUID CHECK RESULTS .....	12
<b>8. SYSTEM VERIFICATION .....</b>	<b>32</b>
8.1. SYSTEM CHECK RESULTS .....	33
<b>9. SAR MEASUREMENT PROCEDURES .....</b>	<b>35</b>
<b>10. KDB 941225 TEST REDUCTION CONSIDERATION .....</b>	<b>36</b>
<b>11. RF OUTPUT POWER VERIFICATION .....</b>	<b>37</b>
11.1. GSM .....	37
11.2. CDMA2000 1xRTT .....	38
11.3. CDMA200 1xEv-Do .....	39
11.3.1. Release 0 (Rel. 0) .....	39
11.3.2. Revision A (Rev. A) .....	40
11.4. WIFI RF OUTPUT POWER .....	41
11.5. BLUETOOTH RF OUTPUT POWER .....	43
<b>12. SUMMARY OF SAR TEST RESULTS .....</b>	<b>44</b>
12.1. GSM850 .....	45
12.2. GSM1900 .....	47
12.3. CDMA2000 CELL BAND .....	49
12.4. CDMA2000 PCS BAND .....	52
12.5. WIFI 2.4 GHz BAND .....	55
12.6. WIFI 5 GHz BANDS .....	57

**13. Worst-case SAR Plots..... 59**

**14. KDB 648474 SIMULTANEOUS TRANSMISSION CONSIDERATION ..... 95**

**15. SIMULTANEOUS SAR TEST DATA SUMMARY ..... 95**

    15.1. *Simultaneous Transmission – Head (open)* ..... 96

    15.2. *Simultaneous Transmission – Head (closed)*..... 97

    15.3. *Simultaneous Transmission – Body-worn at 15 mm Separation Distance*..... 98

    15.4. *Simultaneous Transmission – Hotspot Mode at 10 mm Separation Distance* ..... 100

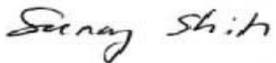
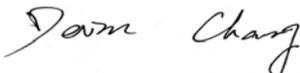
**16. ATTACHMENTS ..... 101**

**17. ANTENNA LOCATIONS AND SEPARATION DISTANCES ..... 102**

**18. TEST SETUP PHOTOS ..... 103**

**19. EXTERNAL PHOTOS..... 112**

### 1. ATTESTATION OF TEST RESULTS

Applicant:	HEWLETT PACKARD COMPANY, PALM GBU 950 MAUDE AVENUE SUNNYVALE, CA. 94085, UNITED STATES		
EUT description:	PHONE		
Model number:	HSTNH-F30CV SN: MD1DW2MB0036(WWAN), MD1DW2MB0069(WiFi)		
Device category:	Portable		
Exposure category:	General Population/Uncontrolled Exposure		
Date tested:	March 11 - 30, 2011		
FCC / IC Rule Parts	Frequency Range [MHz]	Highest 1-g SAR (W/kg)	Limit (W/kg)
22H / RSS-132	824 - 849	Head: 0.536 (RHS Touch) Body: 1.130 (Hotspot/Back side)	1.6
24E / RSS-133	1850 - 1910	Head: 0.423 (LHS Touch) Body: 1.400 (Hotspot/Back side)	
15.247 / RSS-102	2412 – 2462	Head: 0.149 (RHS Touch) Body: 0.211 (Face down w/ Headset)	
15.407 / RSS-102	5150 – 5250	Head: 0.325 (LHS Tilt) Body: 0.514 (Back side)	
	5250 – 5350	Head: 0.474 (LHS Tilt) Body: 0.654 (Back side)	
	5500 – 5700	Head: 0.387 (LHS Tilt) Body: 0.568 (Back side)	
15.247 / RSS-102	5725 – 5850	Head: 0.392 (LHS Tilt) Body: 0.557 (Back side)	
Applicable Standards			Test Results
FCC OET Bulletin 65 Supplement C 01-01 IEEE STD 1528:2003 and IC RSS 102 Issue 4			Pass
<p>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.</p> <p><b>Note:</b> 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.</p> <p>Approved &amp; Released For UL CCS By:  Tested By: </p>			
Sunny Shih Engineering Team Leader Compliance Certification Services (UL CCS)		Devin Chang EMC 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 01-01, IEEE STD 1528:2003, IC RSS 102 Issue 4 and the following KDB Test Procedures.

- 648474 D01 SAR Handsets Multi Xmitter and Ant, v01r05
- 248227 D01 SAR meas for 802 11abg v01r02
- 941225 D01 SAR test for 3G devices v02
- 941225 D03 SAR Test Reduction GSM/GPRS/EDGE vo1
- 941225 D06 Hot Spot SAR v01

## 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 BB	1099	N/A		
Dielectric Probe Kit	HP	85070C	N/A	N/A		
S-Parameter Network Analyzer	Agilent	8753ES-6	8753ES-6	11	22	2011
Signal Generator	Agilent	8753ES-6	8753ES-6	11	22	2011
E-Field Probe	SPEAG	EX3DV3	3531	2	23	2011
E-Field Probe	SPEAG	EX3DV4	3749	11	13	2011
E-Field Probe	SPEAG	EX3DV4	3721	6	23	2011
Thermometer	ERTCO	639-1S	1718	4	30	2011
Data Acquisition Electronics	SPEAG	DAE3 V4	1239	11	17	2011
System Validation Dipole	SPEAG	D835V2*	4d002	4	23	2011
System Validation Dipole	SPEAG	D1900V2*	5d043	11	24	2011
System Validation Dipole	SPEAG	D2450V2	706	4	19	2011
System Validation Dipole	SPEAG	D5GHzV2	1075	9	3	2011
Amplifier	Mini-Circuits	ZVE-8G	90606	N/A		
Amplifier	Mini-Circuits	ZHL-42W	D072701-5	N/A		
Simulating Liquid	SPEAG	H1900	N/A	Within 24 hrs of first test		
Simulating Liquid	SPEAG	M1900	N/A	Within 24 hrs of first test		
Simulating Liquid	SPEAG	H835	N/A	Within 24 hrs of first test		
Simulating Liquid	SPEAG	M835	N/A	Within 24 hrs of first test		
Simulating Liquid	SPEAG	H2450	N/A	Within 24 hrs of first test		
Simulating Liquid	SPEAG	M2450	N/A	Within 24 hrs of first test		
Simulating Liquid	SPEAG	M5800 (5-6GHz)	N/A	Within 24 hrs of first test		
Simulating Liquid	SPEAG	H5800 (5-6GHz)	N/A	Within 24 hrs of first test		

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

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

## 4.2. MEASUREMENT UNCERTAINTY

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

Component	error, %	Probe Distribution	Divisor	Sensitivity	U (Xi), %
<b>Measurement System</b>					
Probe Calibration (k=1) @ Body 1900 MHz	5.50	Normal	1	1	5.50
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	3.45	Rectangular	1.732	1	1.99
System Detection Limits	1.00	Rectangular	1.732	1	0.58
Readout Electronics	0.30	Normal	1	1	0.30
Response Time	0.80	Rectangular	1.732	1	0.46
Integration Time	2.60	Rectangular	1.732	1	1.50
RF Ambient Conditions - Noise	3.00	Rectangular	1.732	1	1.73
RF Ambient Conditions - Reflections	3.00	Rectangular	1.732	1	1.73
Probe Positioner Mechanical Tolerance	0.40	Rectangular	1.732	1	0.23
Probe Positioning with respect to Phantom	2.90	Rectangular	1.732	1	1.67
Extrapolation, Interpolation and Integration	1.00	Rectangular	1.732	1	0.58
<b>Test Sample Related</b>					
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
<b>Phantom and Tissue Parameters</b>					
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)	-3.55	Normal	1	0.64	-2.27
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement uncertainty (Body 1900 MHz)	3.39	Normal	1	0.6	2.03
Combined Standard Uncertainty Uc(y) =					9.92
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				19.84	%
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				1.57	dB

3 to 6 GHz averaged over 1 gram

Component	error, %	Distribution	Divisor	Sensitivity	U (Xi), %
<b>Measurement System</b>					
Probe Calibration (k=1) @ 5GHz	6.55	Normal	1	1	6.55
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	1.00	Normal	1	1	1.00
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	3.90	Rectangular	1.732	1	2.25
<b>Test Sample Related</b>					
Test Sample Positioning	1.10	Normal	1	1	1.10
Device Holder Uncertainty	3.60	Normal	1	1	3.60
Output Power Variation - SAR Drift	5.00	Rectangular	1.732	1	2.89
<b>Phantom and Tissue Parameters</b>					
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	3.28	Normal	1	0.64	2.10
Liquid Permittivity - deviation from target	10.00	Rectangular	1.732	0.6	3.46
Liquid Permittivity - measurement uncertainty	-4.00	Normal	1	0.6	-2.40
Combined Standard Uncertainty Uc(y), %:					10.93
Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence =				21.42	%
Expanded Uncertainty U, Coverage Factor = 1.96, > 95 % Confidence =				1.69	dB

### 5. EQUIPMENT UNDER TEST

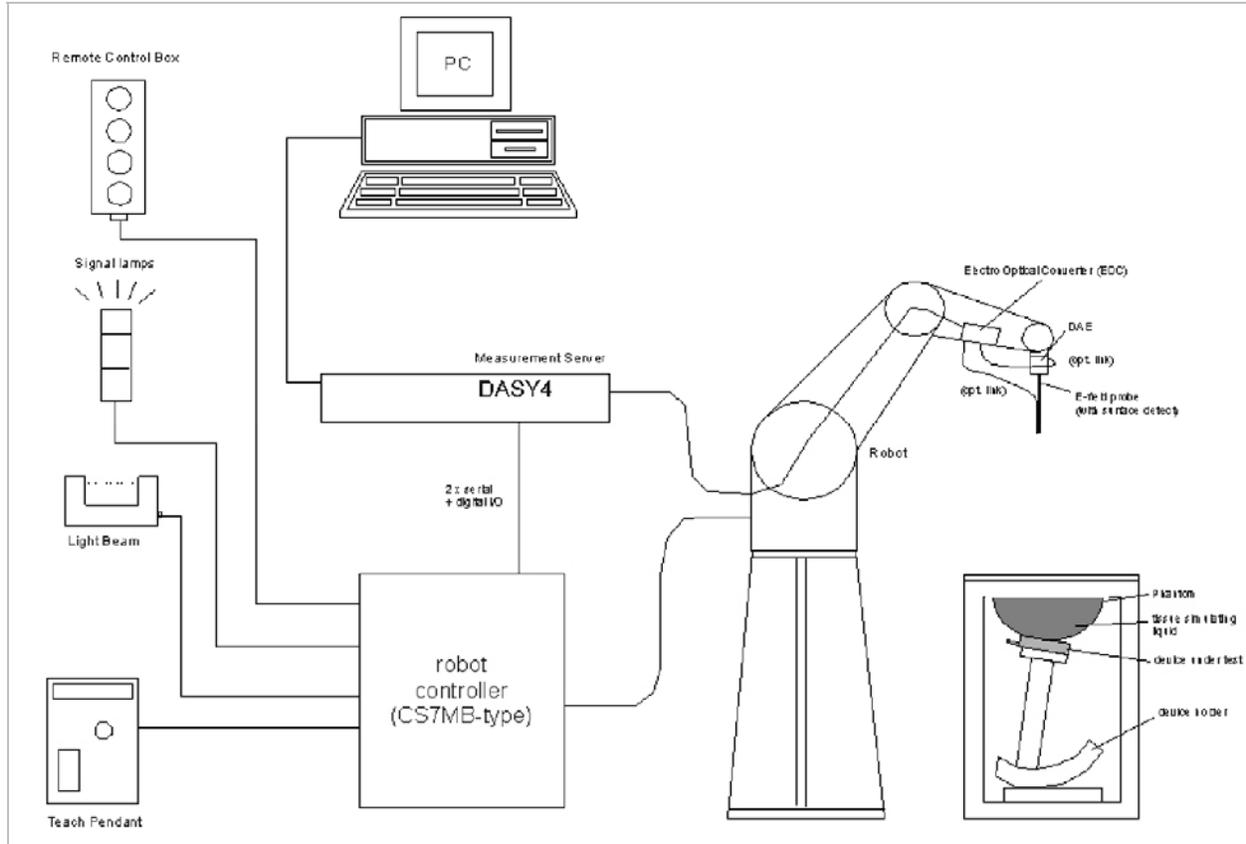
PHONE	
Mobile phone capability:	<input type="checkbox"/> Class A <sup>1</sup> <input checked="" type="checkbox"/> Class B <sup>2</sup> <input type="checkbox"/> Class C <sup>3</sup>
GPRS Multi-slot class:	<input checked="" type="checkbox"/> Class 12 <input type="checkbox"/> Class 10 <input type="checkbox"/> Class 8
Normal operation:	Held to head, Worn on body (LCD facing-up and LCD facing-down) with 15 mm separation distance for WWAN& 5GHz and 10 mm for 2.4 GHz. Personal Hot Spot with 1 cm separation distance to all sides and edges.
Body Worn Accessory	Headset, part #: 180-10632-00
Battery option that could affect the SAR results:	Rechargeable Li-ion Battery - Standard: 3.7 Vdc, 1150 mAh, 4.3 Wh - Extended: n/a
Antenna-to-antenna separation distances:	6.5 cm from WWAN antenna-to-WiFi/BT antenna when slide closed 6.5 cm from WWAN antenna-to-WiFi/BT antenna when slide open 0 cm from WiFi antenna-to-BT antenna (shared with BT)
Simultaneous transmission:	- WWAN can transmit simultaneously with WiFi - WWAN can transmit simultaneously with Bluetooth - WiFi cannot transmit simultaneously with Bluetooth

<sup>1</sup> Class A mobile phones can be connected to both GPRS and GSM services simultaneously.

<sup>2</sup> Class B mobile phones can be attached to both GPRS and GSM services, using one service at a time.

<sup>3</sup> Class C mobile phones are attached to either GPRS or GSM voice service. You need to switch manually between services

## 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. LIQUID PARAMETERS

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine if the dielectric parameters are within the tolerances of the specified target values. For frequencies in 300 MHz to just under 2 GHz, the measured conductivity and relative permittivity should be within  $\pm 5\%$  of the target values. For frequencies in the range of 2–3 GHz and above the measured conductivity should be within  $\pm 5\%$  of the target values. The measured relative permittivity tolerance can be relaxed to no more than  $\pm 10\%$ .

### Reference Values of Tissue Dielectric Parameters for Head and Body Phantom

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	
	$\epsilon_r$	$\sigma$ (S/m)	$\epsilon_r$	$\sigma$ (S/m)
150	52.3	0.76	61.9	0.8
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.9	55.2	0.97
900	41.5	0.97	55	1.05
915	41.5	0.98	55	1.06
1450	40.5	1.2	54	1.3
1610	40.3	1.29	53.8	1.4
1800 – 2000	40	1.4	53.3	1.52
2450	39.2	1.8	52.7	1.95
3000	38.5	2.4	52	2.73
5800	35.3	5.27	48.2	6

( $\epsilon_r$  = relative permittivity,  $\sigma$  = conductivity and  $\rho = 1000 \text{ kg/m}^3$ )

### 7.1. LIQUID CHECK RESULTS

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
03/11/2011	Head 1900	e'	41.3559	Relative Permittivity (ε <sub>r</sub> ):	41.36	40.00	3.39	5
		e"	12.7808	Conductivity (σ):	1.35	1.40	-3.55	5

**Liquid Check**

Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 42%

March 11, 2011 08:32 AM

Frequency	e'	e"
1710000000.	42.1987	12.0737
1720000000.	42.1613	12.1246
1730000000.	42.1284	12.1720
1740000000.	42.0978	12.2230
1750000000.	42.0681	12.2674
1760000000.	42.0349	12.3065
1770000000.	41.9911	12.3441
1780000000.	41.9391	12.3729
1790000000.	41.8813	12.3981
1800000000.	41.8162	12.4237
1810000000.	41.7530	12.4532
1820000000.	41.6923	12.4833
1830000000.	41.6395	12.5187
1840000000.	41.5889	12.5636
1850000000.	41.5482	12.6068
1860000000.	41.5145	12.6516
1870000000.	41.4786	12.6933
1880000000.	41.4440	12.7296
1890000000.	41.4007	12.7583
<b>1900000000.</b>	<b>41.3559</b>	<b>12.7808</b>
1910000000.	41.3060	12.7963

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
03/11/2011	Body 1900	e'	52.1608	Relative Permittivity (ε <sub>r</sub> ):	52.16	53.30	-2.14	5
		e''	14.0683	Conductivity (σ):	1.49	1.52	-2.22	5

Liquid Check

Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 42%

March 11, 2011 10:13 AM

Frequency	e'	e''
1710000000.	52.8000	13.4387
1720000000.	52.7662	13.4803
1730000000.	52.7370	13.5290
1740000000.	52.7170	13.5793
1750000000.	52.7044	13.6174
1760000000.	52.6858	13.6508
1770000000.	52.6632	13.6829
1780000000.	52.6265	13.7019
1790000000.	52.5813	13.7166
1800000000.	52.5246	13.7359
1810000000.	52.4622	13.7598
1820000000.	52.4047	13.7896
1830000000.	52.3468	13.8240
1840000000.	52.3041	13.8699
1850000000.	52.2715	13.9188
1860000000.	52.2491	13.9658
1870000000.	52.2335	14.0065
1880000000.	52.2165	14.0380
1890000000.	52.1918	14.0578
<b>1900000000.</b>	<b>52.1608</b>	<b>14.0683</b>
1910000000.	52.1154	14.0748

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
03/14/2011	Head 1900	e'	40.8014	Relative Permittivity (ε <sub>r</sub> ):	40.80	40.00	2.00	5
		e''	13.1720	Conductivity (σ):	1.39	1.40	-0.60	5

Liquid Check

Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%

March 14, 2011 10:03 AM

Frequency	e'	e''
1710000000.	41.1235	12.6057
1720000000.	41.1035	12.6188
1730000000.	41.0913	12.6307
1740000000.	41.0938	12.6451
1750000000.	41.0772	12.6575
1760000000.	41.0308	12.6626
1770000000.	40.9569	12.6709
1780000000.	40.8778	12.6835
1790000000.	40.8223	12.7006
1800000000.	40.7960	12.7168
1810000000.	40.8089	12.7450
1820000000.	40.8641	12.7877
1830000000.	40.9546	12.8566
1840000000.	41.0437	12.9414
1850000000.	41.0933	13.0249
1860000000.	41.0912	13.0844
1870000000.	41.0421	13.1187
1880000000.	40.9657	13.1332
1890000000.	40.8756	13.1461
<b>1900000000.</b>	<b>40.8014</b>	<b>13.1720</b>
1910000000.	40.7568	13.2295

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
03/14/2011	Body 1900	e'	54.1104	Relative Permittivity (ε <sub>r</sub> ):	54.11	53.30	1.52	5
		e''	14.4654	Conductivity (σ):	1.53	1.52	0.54	5

Liquid Check

Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%

March 14, 2011 10:12 AM

Frequency	e'	e''
1710000000.	54.7571	13.8698
1720000000.	54.7275	13.8891
1730000000.	54.7036	13.9219
1740000000.	54.6546	13.9748
1750000000.	54.6301	13.9909
1760000000.	54.5999	14.0409
1770000000.	54.5523	14.0764
1780000000.	54.5284	14.1205
1790000000.	54.4744	14.1357
1800000000.	54.4600	14.1733
1810000000.	54.4227	14.2045
1820000000.	54.3872	14.2347
1830000000.	54.3469	14.2652
1840000000.	54.3141	14.2904
1850000000.	54.2799	14.3404
1860000000.	54.2414	14.3690
1870000000.	54.2130	14.3966
1880000000.	54.1671	14.4275
1890000000.	54.1356	14.4548
<b>1900000000.</b>	<b>54.1104</b>	<b>14.4654</b>
1910000000.	54.0745	14.4944

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
03/15/2011	Body 835	e'	53.5048	Relative Permittivity (ε <sub>r</sub> ):	53.50	55.20	-3.07	5
		e''	21.1445	Conductivity (σ):	0.98	0.97	1.21	5

Liquid Check

Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C  
 March 15, 2011 10:20 AM

Frequency	e'	e''
800000000.	53.8239	21.3020
805000000.	53.7745	21.2742
810000000.	53.7346	21.2484
815000000.	53.6882	21.2207
820000000.	53.6389	21.2015
825000000.	53.5963	21.1844
830000000.	53.5529	21.1602
<b>835000000.</b>	<b>53.5048</b>	<b>21.1445</b>
840000000.	53.4557	21.1225
845000000.	53.4069	21.0984
850000000.	53.3580	21.0845
855000000.	53.3157	21.0557
860000000.	53.2613	21.0330
865000000.	53.2123	21.0125
870000000.	53.1608	20.9884
875000000.	53.1040	20.9713
880000000.	53.0512	20.9495
885000000.	53.0022	20.9356
890000000.	52.9497	20.9117
895000000.	52.8977	20.8942
900000000.	52.8444	20.8789
905000000.	52.8030	20.8599
910000000.	52.7564	20.8433
915000000.	52.7150	20.8278
920000000.	52.6713	20.8125
925000000.	52.6276	20.7987
930000000.	52.5880	20.7853
935000000.	52.5492	20.7714
940000000.	52.5139	20.7671
945000000.	52.4726	20.7561
950000000.	52.4272	20.7438

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
03/16/2011	Body 835	e'	53.8905	Relative Permittivity (ε <sub>r</sub> ):	53.89	55.20	-2.37	5
		e''	21.2217	Conductivity (σ):	0.99	0.97	1.58	5

Liquid Check

Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C

March 16, 2011 09:08 AM

Frequency	e'	e''
800000000.	54.2162	21.3865
805000000.	54.1740	21.3612
810000000.	54.1234	21.3355
815000000.	54.0797	21.3067
820000000.	54.0379	21.2856
825000000.	53.9902	21.2663
830000000.	53.9431	21.2375
<b>835000000.</b>	<b>53.8905</b>	<b>21.2217</b>
840000000.	53.8411	21.1958
845000000.	53.7947	21.1742
850000000.	53.7478	21.1581
855000000.	53.6936	21.1286
860000000.	53.6436	21.1081
865000000.	53.5948	21.0858
870000000.	53.5378	21.0647
875000000.	53.4889	21.0491
880000000.	53.4342	21.0257
885000000.	53.3847	21.0123
890000000.	53.3294	20.9895
895000000.	53.2822	20.9748
900000000.	53.2306	20.9571
905000000.	53.1844	20.9380
910000000.	53.1363	20.9238
915000000.	53.0928	20.9055
920000000.	53.0522	20.8905
925000000.	53.0080	20.8750
930000000.	52.9683	20.8618
935000000.	52.9314	20.8453
940000000.	52.8911	20.8458
945000000.	52.8569	20.8316
950000000.	52.8161	20.8245

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
03/17/2011	Head 835	e'	42.0222	Relative Permittivity (ε <sub>r</sub> ):	42.02	41.50	1.26	5
		e''	19.3182	Conductivity (σ):	0.90	0.90	-0.34	5

Liquid Check

Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C

March 17, 2011 08:59 AM

Frequency	e'	e''
800000000.	42.4630	19.3889
805000000.	42.3816	19.3782
810000000.	42.3106	19.3601
815000000.	42.2440	19.3509
820000000.	42.1795	19.3423
825000000.	42.1193	19.3332
830000000.	42.0694	19.3183
<b>835000000.</b>	<b>42.0222</b>	<b>19.3182</b>
840000000.	41.9784	19.3037
845000000.	41.9356	19.2968
850000000.	41.8852	19.2918
855000000.	41.8316	19.2844
860000000.	41.7742	19.2714
865000000.	41.7141	19.2614
870000000.	41.6463	19.2439
875000000.	41.5758	19.2256
880000000.	41.5043	19.2078
885000000.	41.4238	19.1905
890000000.	41.3542	19.1700
895000000.	41.2770	19.1511
900000000.	41.2111	19.1318
905000000.	41.1531	19.1113
910000000.	41.0885	19.1031
915000000.	41.0322	19.0819
920000000.	40.9764	19.0662
925000000.	40.9183	19.0493
930000000.	40.8629	19.0353
935000000.	40.8167	19.0232
940000000.	40.7778	19.0091
945000000.	40.7343	18.9950
950000000.	40.6917	18.9873

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/18/2011	Head 835	e'	42.4672	Relative Permittivity (ε <sub>r</sub> ):	42.47	41.50	2.33	5
		e''	19.3797	Conductivity (σ):	0.90	0.90	-0.03	5

Liquid Check

Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%

March 18, 2011 09:00 AM

Frequency	e'	e''
800000000.	42.8701	19.4505
805000000.	42.8102	19.4435
810000000.	42.7502	19.4379
815000000.	42.6915	19.4294
820000000.	42.6288	19.4196
825000000.	42.5744	19.4087
830000000.	42.5189	19.3916
<b>835000000.</b>	<b>42.4672</b>	<b>19.3797</b>
840000000.	42.4132	19.3616
845000000.	42.3644	19.3511
850000000.	42.3031	19.3330
855000000.	42.2534	19.3180
860000000.	42.1993	19.3057
865000000.	42.1383	19.2894
870000000.	42.0728	19.2778
875000000.	42.0123	19.2693
880000000.	41.9517	19.2564
885000000.	41.8909	19.2507
890000000.	41.8228	19.2412
895000000.	41.7597	19.2336
900000000.	41.6983	19.2258
905000000.	41.6361	19.2144
910000000.	41.5746	19.2102
915000000.	41.5163	19.2018
920000000.	41.4599	19.1910
925000000.	41.4050	19.1833
930000000.	41.3449	19.1731
935000000.	41.2891	19.1623
940000000.	41.2310	19.1459
945000000.	41.1718	19.1329
950000000.	41.1140	19.1222

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
03/21/2011	Head 2450	e'	38.1764	Relative Permittivity (ε <sub>r</sub> ):	38.18	39.20	-2.61	5
		e''	13.3307	Conductivity (σ):	1.82	1.80	0.89	5

Liquid Check

Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 41%

March 21, 2011 09:47 AM

Frequency	e'	e''
2410000000.	38.3188	13.2192
2415000000.	38.3020	13.2333
2420000000.	38.2850	13.2477
2425000000.	38.2662	13.2605
2430000000.	38.2493	13.2777
2435000000.	38.2316	13.2921
2440000000.	38.2136	13.3064
2445000000.	38.1975	13.3189
<b>2450000000.</b>	<b>38.1764</b>	<b>13.3307</b>
2455000000.	38.1544	13.3425
2460000000.	38.1358	13.3554
2465000000.	38.1153	13.3679
2470000000.	38.0946	13.3789
2475000000.	38.0727	13.3954
2480000000.	38.0513	13.4088
2485000000.	38.0324	13.4226

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
03/22/2011	Body 2450	e'	51.5336	Relative Permittivity (ε <sub>r</sub> ):	51.53	52.70	-2.21	5
		e''	14.7546	Conductivity (σ):	2.01	1.95	3.08	5

Liquid Check

Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 41%

March 22, 2011 09:40 AM

Frequency	e'	e''
2410000000.	51.6811	14.6078
2415000000.	51.6625	14.6282
2420000000.	51.6445	14.6447
2425000000.	51.6270	14.6667
2430000000.	51.6087	14.6826
2435000000.	51.5915	14.7017
2440000000.	51.5701	14.7193
2445000000.	51.5520	14.7374
<b>2450000000.</b>	<b>51.5336</b>	<b>14.7546</b>
2455000000.	51.5104	14.7708
2460000000.	51.4921	14.7895
2465000000.	51.4731	14.8072
2470000000.	51.4533	14.8254
2475000000.	51.4328	14.8453
2480000000.	51.4153	14.8626
2485000000.	51.3965	14.8821

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
03/24/2011	Body 5200	e'	49.7852	Relative Permittivity (ε <sub>r</sub> ):	49.79	49.02	1.56	10
		e''	17.8869	Conductivity (σ):	5.17	5.29	-2.32	5
03/24/2011	Body 5500	e'	49.1872	Relative Permittivity (ε <sub>r</sub> ):	49.19	48.61	1.18	10
		e''	18.3311	Conductivity (σ):	5.61	5.64	-0.68	5
03/24/2011	Body 5800	e'	48.6071	Relative Permittivity (ε <sub>r</sub> ):	48.61	48.20	0.84	10
		e''	18.6890	Conductivity (σ):	6.03	6.00	0.45	5

Liquid Check

Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C; Relative humidity = 39%  
 March 24, 2011 08:42 AM

Frequency	e'	e''
4600000000.	50.9707	16.8989
4650000000.	50.8645	16.9846
4700000000.	50.7803	17.0860
4750000000.	50.7014	17.1691
4800000000.	50.5879	17.2628
4850000000.	50.5202	17.3337
4900000000.	50.3705	17.4202
4950000000.	50.3500	17.5208
5000000000.	50.1804	17.5831
5050000000.	50.1375	17.7262
5100000000.	49.9623	17.7438
5150000000.	49.8710	17.8675
<b>5200000000.</b>	<b>49.7852</b>	<b>17.8869</b>
5250000000.	49.6847	17.9851
5300000000.	49.6182	18.0364
5350000000.	49.4878	18.1145
5400000000.	49.4109	18.1925
5450000000.	49.2863	18.2514
<b>5500000000.</b>	<b>49.1872</b>	<b>18.3311</b>
5550000000.	49.1015	18.3965
5600000000.	48.9865	18.4432
5650000000.	48.9067	18.5233
5700000000.	48.8111	18.5625
5750000000.	48.7156	18.6437
<b>5800000000.</b>	<b>48.6071</b>	<b>18.6890</b>
5850000000.	48.5195	18.7667
5900000000.	48.4086	18.8192
5950000000.	48.3561	18.9074
6000000000.	48.2361	18.9590

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
03/25/2011	Body 5200	e'	48.3494	Relative Permittivity (ε <sub>r</sub> ):	48.35	49.02	-1.37	10
		e''	17.9658	Conductivity (σ):	5.19	5.29	-1.89	5
03/25/2011	Body 5500	e'	47.7249	Relative Permittivity (ε <sub>r</sub> ):	47.72	48.61	-1.83	10
		e''	18.3408	Conductivity (σ):	5.61	5.64	-0.63	5
03/25/2011	Body 5800	e'	47.1324	Relative Permittivity (ε <sub>r</sub> ):	47.13	48.20	-2.21	10
		e''	18.7253	Conductivity (σ):	6.04	6.00	0.65	5

Liquid Check

Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C; Relative humidity = 40%  
 March 25, 2011 08:35 AM

Frequency	e'	e''
4600000000.	49.5972	17.0116
4650000000.	49.4845	17.0742
4700000000.	49.3862	17.1934
4750000000.	49.2979	17.2444
4800000000.	49.1604	17.3592
4850000000.	49.1104	17.4222
4900000000.	48.9522	17.5069
4950000000.	48.9044	17.5973
5000000000.	48.7682	17.6613
5050000000.	48.6797	17.7535
5100000000.	48.5499	17.8168
5150000000.	48.4363	17.8932
<b>5200000000.</b>	<b>48.3494</b>	<b>17.9658</b>
5250000000.	48.2406	18.0128
5300000000.	48.1373	18.1109
5350000000.	48.0561	18.1575
5400000000.	47.9383	18.2348
5450000000.	47.8514	18.2936
<b>5500000000.</b>	<b>47.7249</b>	<b>18.3408</b>
5550000000.	47.6163	18.4164
5600000000.	47.5239	18.4744
5650000000.	47.4108	18.5340
5700000000.	47.3534	18.6235
5750000000.	47.2584	18.6557
<b>5800000000.</b>	<b>47.1324</b>	<b>18.7253</b>
5850000000.	47.0654	18.7903
5900000000.	46.9628	18.8527
5950000000.	46.8854	18.9044
6000000000.	46.7673	18.9910

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
03/28/2011	Head 5200	e'	34.9626	Relative Permittivity (ε <sub>r</sub> ):	34.96	35.99	-2.86	10
		e''	16.3186	Conductivity (σ):	4.72	4.65	1.45	5
03/28/2011	Head 5500	e'	34.4261	Relative Permittivity (ε <sub>r</sub> ):	34.43	35.65	-3.43	10
		e''	16.5056	Conductivity (σ):	5.05	4.96	1.81	5
03/28/2011	Head 5800	e'	33.8876	Relative Permittivity (ε <sub>r</sub> ):	33.89	35.30	-4.00	10
		e''	16.6811	Conductivity (σ):	5.38	5.27	2.08	5

Liquid Check

Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C; Relative humidity = 40%  
 March 28, 2011 11:46 AM

Frequency	e'	e''
4600000000.	35.9957	15.8279
4650000000.	35.9297	15.8372
4700000000.	35.8310	15.9076
4750000000.	35.7680	15.9263
4800000000.	35.6703	15.9911
4850000000.	35.5920	16.0123
4900000000.	35.4956	16.0723
4950000000.	35.4218	16.0923
5000000000.	35.3128	16.1509
5050000000.	35.2423	16.1797
5100000000.	35.1437	16.2375
5150000000.	35.0626	16.2572
<b>5200000000.</b>	<b>34.9626</b>	<b>16.3186</b>
5250000000.	34.8891	16.3313
5300000000.	34.7864	16.3842
5350000000.	34.7063	16.3971
5400000000.	34.6124	16.4456
5450000000.	34.5232	16.4601
<b>5500000000.</b>	<b>34.4261</b>	<b>16.5056</b>
5550000000.	34.3468	16.5172
5600000000.	34.2316	16.5665
5650000000.	34.1702	16.5884
5700000000.	34.0601	16.6181
5750000000.	33.9902	16.6523
<b>5800000000.</b>	<b>33.8876</b>	<b>16.6811</b>
5850000000.	33.8103	16.7062
5900000000.	33.7219	16.7413
5950000000.	33.6358	16.7608
6000000000.	33.5283	16.7932

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
03/28/2011	Body 5200	e'	49.1309	Relative Permittivity (ε <sub>r</sub> ):	49.13	49.02	0.23	10
		e''	17.9944	Conductivity (σ):	5.20	5.29	-1.74	5
03/28/2011	Body 5500	e'	48.5153	Relative Permittivity (ε <sub>r</sub> ):	48.52	48.61	-0.20	10
		e''	18.3725	Conductivity (σ):	5.62	5.64	-0.46	5
03/28/2011	Body 5800	e'	47.9456	Relative Permittivity (ε <sub>r</sub> ):	47.95	48.20	-0.53	10
		e''	18.7393	Conductivity (σ):	6.04	6.00	0.72	5

Liquid Check

Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C; Relative humidity = 42%

March 28, 2011 09:06 AM

Frequency	e'	e''
4600000000.	50.3444	17.0257
4650000000.	50.2514	17.0816
4700000000.	50.1432	17.1957
4750000000.	50.0593	17.2666
4800000000.	49.9578	17.3695
4850000000.	49.8549	17.4378
4900000000.	49.7513	17.5282
4950000000.	49.6553	17.5993
5000000000.	49.5457	17.6865
5050000000.	49.4404	17.7479
5100000000.	49.3311	17.8492
5150000000.	49.2463	17.9034
<b>5200000000.</b>	<b>49.1309</b>	<b>17.9944</b>
5250000000.	49.0384	18.0420
5300000000.	48.9302	18.1191
5350000000.	48.8270	18.1770
5400000000.	48.7318	18.2527
5450000000.	48.6332	18.2989
<b>5500000000.</b>	<b>48.5153</b>	<b>18.3725</b>
5550000000.	48.4433	18.4421
5600000000.	48.3437	18.5033
5650000000.	48.2397	18.5547
5700000000.	48.1536	18.6426
5750000000.	48.0807	18.6865
<b>5800000000.</b>	<b>47.9456</b>	<b>18.7393</b>
5850000000.	47.8697	18.8139
5900000000.	47.7856	18.8710
5950000000.	47.6773	18.9256
6000000000.	47.5782	19.0101

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/29/2011	Head 5500	e'	35.6358	Relative Permittivity ( $\epsilon_r$ ):	35.64	35.65	-0.03	10
		e''	16.7115	Conductivity ( $\sigma$ ):	5.11	4.96	3.08	5
3/29/2011	Head 5800	e'	35.1648	Relative Permittivity ( $\epsilon_r$ ):	35.16	35.30	-0.38	10
		e''	16.8319	Conductivity ( $\sigma$ ):	5.43	5.27	3.00	5

Liquid Check

Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C; Relative humidity = 39%

March 29, 2011 01:03 PM

Frequency	e'	e''
4600000000.	36.9713	16.3932
4650000000.	36.9207	16.3682
4700000000.	36.8277	16.4202
4750000000.	36.7890	16.4168
4800000000.	36.6889	16.4521
4850000000.	36.6389	16.4729
4900000000.	36.5703	16.4931
4950000000.	36.4846	16.5032
5000000000.	36.4247	16.5415
5050000000.	36.3309	16.5282
5100000000.	36.2698	16.5946
5150000000.	36.1950	16.5662
5200000000.	36.0865	16.6326
5250000000.	36.0492	16.6166
5300000000.	35.9297	16.6571
5350000000.	35.8883	16.6642
5400000000.	35.7839	16.6821
5450000000.	35.7246	16.7065
<b>5500000000.</b>	<b>35.6358</b>	<b>16.7115</b>
5550000000.	35.5603	16.7359
5600000000.	35.4848	16.7534
5650000000.	35.3829	16.7577
5700000000.	35.3179	16.8113
5750000000.	35.2715	16.8104
<b>5800000000.</b>	<b>35.1648</b>	<b>16.8319</b>
5850000000.	35.1050	16.8502
5900000000.	35.0408	16.8753
5950000000.	34.9626	16.8870
6000000000.	34.8641	16.9064

The conductivity ( $\sigma$ ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
03/29/2011	Body 5500	e'	48.0605	Relative Permittivity (ε <sub>r</sub> ):	48.06	48.61	-1.14	10
		e''	18.8139	Conductivity (σ):	5.75	5.64	1.93	5
03/29/2011	Body 5800	e'	47.4581	Relative Permittivity (ε <sub>r</sub> ):	47.46	48.20	-1.54	10
		e''	19.2158	Conductivity (σ):	6.20	6.00	3.28	5

Liquid Check

Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C; Relative humidity = 41%

March 29, 2011 11:01 AM

Frequency	e'	e''
4600000000.	49.9077	17.3961
4650000000.	49.8181	17.4477
4700000000.	49.7065	17.5725
4750000000.	49.6274	17.6384
4800000000.	49.5173	17.7461
4850000000.	49.4252	17.8242
4900000000.	49.3210	17.9147
4950000000.	49.2207	17.9906
5000000000.	49.1104	18.0832
5050000000.	49.0089	18.1483
5100000000.	48.9014	18.2472
5150000000.	48.7928	18.3008
5200000000.	48.6738	18.4048
5250000000.	48.5845	18.4526
5300000000.	48.4705	18.5458
5350000000.	48.3725	18.6051
5400000000.	48.2760	18.6837
5450000000.	48.1674	18.7412
<b>5500000000.</b>	<b>48.0605</b>	<b>18.8139</b>
5550000000.	47.9689	18.8733
5600000000.	47.8553	18.9473
5650000000.	47.7545	19.0037
5700000000.	47.6525	19.0941
5750000000.	47.5816	19.1413
<b>5800000000.</b>	<b>47.4581</b>	<b>19.2158</b>
5850000000.	47.3787	19.2751
5900000000.	47.2734	19.3406
5950000000.	47.1807	19.4082
6000000000.	47.0682	19.4695

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/30/2011	Head 5500	e'	35.5275	Relative Permittivity (ε <sub>r</sub> ):	35.53	35.65	-0.34	10
		e''	16.5741	Conductivity (σ):	5.07	4.96	2.23	5
3/30/2011	Head 5800	e'	35.0578	Relative Permittivity (ε <sub>r</sub> ):	35.06	35.30	-0.69	10
		e''	16.7176	Conductivity (σ):	5.39	5.27	2.30	5

Liquid Check

Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C; Relative humidity = 40%

March 30, 2011 09:35 AM

Frequency	e'	e''
4600000000.	36.8900	16.3616
4650000000.	36.8137	16.2614
4700000000.	36.7210	16.3719
4750000000.	36.6873	16.3092
4800000000.	36.5608	16.3776
4850000000.	36.5490	16.3799
4900000000.	36.4542	16.3998
4950000000.	36.3577	16.3986
5000000000.	36.3260	16.4412
5050000000.	36.1867	16.3708
5100000000.	36.1977	16.4968
5150000000.	36.0879	16.4007
5200000000.	35.9911	16.5415
5250000000.	35.9304	16.4587
5300000000.	35.7949	16.5523
5350000000.	35.7768	16.5175
5400000000.	35.6458	16.5552
5450000000.	35.6289	16.5634
<b>5500000000.</b>	<b>35.5275</b>	<b>16.5741</b>
5550000000.	35.4632	16.5828
5600000000.	35.4019	16.6290
5650000000.	35.2838	16.5930
5700000000.	35.2249	16.7025
5750000000.	35.1869	16.6388
<b>5800000000.</b>	<b>35.0578</b>	<b>16.7176</b>
5850000000.	35.0514	16.6882
5900000000.	34.9284	16.7457
5950000000.	34.9176	16.7372
6000000000.	34.7512	16.7571

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
3/30/2011	Body 5500	e'	48.2899	Relative Permittivity (ε <sub>r</sub> ):	48.29	48.61	-0.67	10
		e''	18.6635	Conductivity (σ):	5.71	5.64	1.12	5
3/30/2011	Body 5800	e'	47.6890	Relative Permittivity (ε <sub>r</sub> ):	47.69	48.20	-1.06	10
		e''	19.1173	Conductivity (σ):	6.17	6.00	2.75	5

Liquid Check

Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C; Relative humidity = 46%

March 30, 2011 09:02 AM

Frequency	e'	e''
4600000000.	50.1527	17.3497
4650000000.	50.0053	17.3044
4700000000.	49.9165	17.5113
4750000000.	49.8274	17.4950
4800000000.	49.6809	17.6496
4850000000.	49.6554	17.7162
4900000000.	49.5104	17.7929
4950000000.	49.4016	17.8792
5000000000.	49.3348	17.9537
5050000000.	49.1562	17.9577
5100000000.	49.1751	18.1389
5150000000.	49.0029	18.0985
5200000000.	48.9181	18.3076
5250000000.	48.7871	18.2705
5300000000.	48.6651	18.4287
5350000000.	48.5868	18.4392
5400000000.	48.4560	18.5383
5450000000.	48.4051	18.5914
<b>5500000000.</b>	<b>48.2899</b>	<b>18.6635</b>
5550000000.	48.2035	18.7161
5600000000.	48.1207	18.8245
5650000000.	47.9716	18.8291
5700000000.	47.9145	19.0044
5750000000.	47.8273	18.9624
<b>5800000000.</b>	<b>47.6890</b>	<b>19.1173</b>
5850000000.	47.6579	19.1182
5900000000.	47.5121	19.2361
5950000000.	47.4768	19.2664
6000000000.	47.2879	19.3361

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
04/05/2011	Body 1900	e'	53.0802	Relative Permittivity (ε <sub>r</sub> ):	53.08	53.30	-0.41	5
		e''	14.1349	Conductivity (σ):	1.49	1.52	-1.76	5

Liquid Check

Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 38%

April 05, 2011 09:33 AM

Frequency	e'	e''
1710000000.	53.6199	13.4699
1720000000.	53.5858	13.4948
1730000000.	53.5557	13.5211
1740000000.	53.5282	13.5433
1750000000.	53.5008	13.5695
1760000000.	53.4745	13.5978
1770000000.	53.4504	13.6271
1780000000.	53.4243	13.6621
1790000000.	53.4019	13.6967
1800000000.	53.3749	13.7331
1810000000.	53.3486	13.7724
1820000000.	53.3243	13.8108
1830000000.	53.2977	13.8518
1840000000.	53.2693	13.8911
1850000000.	53.2426	13.9337
1860000000.	53.2109	13.9736
1870000000.	53.1837	14.0128
1880000000.	53.1496	14.0518
1890000000.	53.1164	14.0926
<b>1900000000.</b>	<b>53.0802</b>	<b>14.1349</b>
1910000000.	53.0460	14.1727

The conductivity (σ) can be given as:

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

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

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

Date	Freq. (MHz)	Liquid Parameters		Measured	Target	Delta (%)	Limit ±(%)	
04/05/2011	Body 835	e'	54.3291	Relative Permittivity (ε <sub>r</sub> ):	54.33	55.20	-1.58	5
		e''	21.2383	Conductivity (σ):	0.99	0.97	1.66	5

Liquid Check

Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%

April 05, 2011 06:47 PM

Frequency	e'	e''
800000000.	54.6740	21.3992
805000000.	54.6229	21.3831
810000000.	54.5765	21.3512
815000000.	54.5243	21.3337
820000000.	54.4738	21.3109
825000000.	54.4261	21.2845
830000000.	54.3775	21.2573
<b>835000000.</b>	<b>54.3291</b>	<b>21.2383</b>
840000000.	54.2867	21.2100
845000000.	54.2378	21.1910
850000000.	54.1978	21.1730
855000000.	54.1548	21.1532
860000000.	54.1094	21.1407
865000000.	54.0573	21.1236
870000000.	54.0084	21.1143
875000000.	53.9593	21.0931
880000000.	53.9118	21.0789
885000000.	53.8564	21.0610
890000000.	53.8071	21.0528
895000000.	53.7547	21.0314
900000000.	53.7056	21.0170
905000000.	53.6593	20.9994
910000000.	53.6072	20.9761
915000000.	53.5606	20.9636
920000000.	53.5089	20.9482
925000000.	53.4691	20.9313
930000000.	53.4230	20.9158
935000000.	53.3785	20.8970
940000000.	53.3313	20.8796
945000000.	53.2849	20.8633
950000000.	53.2376	20.8459

The conductivity (σ) can be given as:

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

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

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

## 8. 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  $\pm 10\%$ .

### System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the SAM twin phantom filled with Head or Body simulating liquid of the following parameters.
- The DASY4 system with an Isotropic E-Field Probe EX3DV3 was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.  
For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 fine cube was chosen for cube
- Distance between probe sensors and phantom surface was set to 3 mm.  
For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW
- The results are normalized to 1 W input power.

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

System validation dipole	Cal. certificate #	Cal. Due date	SAR Avg (mW/g)		
			Tissue:	Head	Body
D835V2	D835V2-4d002_Apr09	4/23/11	1g SAR:	9.64	9.96
			10g SAR:	6.28	6.56
D1900V2	D1900V2-5d043_Nov09	11/24/11	1g SAR:	39.8	40.4
			10g SAR:	20.7	21.4
D2450V2	D2450V2-706_Apr10	4/19/11	1g SAR:	51.6	52.4
			10g SAR:	24.4	24.5

**8.1. SYSTEM CHECK RESULTS**

System validation dipole	Date Tested	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
D1900V2 (Head)	03/11/11	1g SAR:	39.2	39.8	-1.51	±10
		10g SAR:	20.9	20.7	0.97	
D1900V2 (Head)	03/14/11	1g SAR:	40.7	39.8	2.26	±10
		10g SAR:	21.7	20.7	4.83	
D835V2 (Body)	03/15/11	1g SAR:	9.61	9.96	-3.51	±10
		10g SAR:	6.31	6.56	-3.81	
D835V2 (Body)	03/16/11	1g SAR:	10.3	9.96	3.41	±10
		10g SAR:	6.77	6.56	3.20	
D835V2 (Head)	03/17/11	1g SAR:	9.48	9.64	-1.66	±10
		10g SAR:	6.21	6.28	-1.11	
D835V2 (Head)	03/18/11	1g SAR:	9.45	9.64	-1.97	±10
		10g SAR:	6.19	6.28	-1.43	
D2450V2 (Head)	03/21/11	1g SAR:	51.9	51.6	0.58	±10
		10g SAR:	23.4	24.4	-4.10	
D2450V2 (Body)	03/22/11	1g SAR:	53.6	52.4	2.29	±10
		10g SAR:	24.5	24.5	0.00	

System validation dipole	Date Tested	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
D5GHzV2 5.2GHz (Body)	03/24/11	1g SAR:	80.3	79.0	1.65	±10
		10g SAR:	23.3	22.0	5.91	
D5GHzV2 5.5GHz (Body)	03/24/11	1g SAR:	84.7	85.4	-0.82	±10
		10g SAR:	24.1	23.5	2.55	
D5GHzV2 5.8GHz (Body)	03/24/11	1g SAR:	76.3	73.2	4.23	±10
		10g SAR:	21.2	20.1	5.47	
D5GHzV2 5.2GHz (Body)	03/25/11	1g SAR:	78.0	79.0	-1.27	±10
		10g SAR:	22.5	22.0	2.27	
D5GHzV2 5.5GHz (Body)	03/25/11	1g SAR:	82.7	85.4	-3.16	±10
		10g SAR:	23.6	23.5	0.43	
D5GHzV2 5.8GHz (Body)	03/25/11	1g SAR:	71.7	73.2	-2.05	±10
		10g SAR:	20.2	20.1	0.50	
D5GHzV2 5.2GHz (Body)	03/28/11	1g SAR:	80.6	79.0	2.03	±10
		10g SAR:	23.3	22.0	5.91	
D5GHzV2 5.5GHz (Body)	03/28/11	1g SAR:	83.1	85.4	-2.69	±10
		10g SAR:	23.6	23.5	0.43	
D5GHzV2 5.8GHz (Body)	03/28/11	1g SAR:	73.5	73.2	0.41	±10
		10g SAR:	20.8	20.1	3.48	
D5GHzV2 5.5GHz (Body)	03/29/11	1g SAR:	84.7	85.4	-0.82	±10
		10g SAR:	24.1	23.5	2.55	
D5GHzV2 5.8GHz (Body)	03/29/11	1g SAR:	76.7	73.2	4.78	±10
		10g SAR:	21.5	20.1	6.97	
D5GHzV2 5.8GHz (Body)	03/30/11	1g SAR:	75.2	73.2	2.73	±10
		10g SAR:	21.2	20.1	5.47	
D1900V2 (Body)	04/05/11	1g SAR:	41.4	40.4	2.48	±10
		10g SAR:	21.8	21.4	1.87	
D835V2 (Body)	04/05/11	1g SAR:	9.92	9.96	-0.40	±10
		10g SAR:	6.51	6.56	-0.76	

## 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  $\geq 7 \times 7 \times 9$  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. KDB 941225 TEST REDUCTION CONSIDERATION

### CDMA2000 1x handsets Test configurations based on KDB 941225 SAR test for 3G devices v02

#### Head SAR

1. SAR for RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55.
2. SAR for RC1
  - 1) Not required when the maximum average output of each channel is less than 0.25 dB higher than as measured in RC3.
  - 2) Else SAR is measured on the maximum output channel in RC1, for exposure configuration that produced highest SAR for that channel in RC3.

Based upon the power measurement in section 9.1, SAR for RC1 is not required due to the output power is not ¼ dB higher than RC3. Thus RC3/SO55 is used for Head SAR measurement.

#### Body SAR

1. SAR for RC3
  - 1) With DUT configured using TDSO/SO32, to transmit at full rate on FCH with all other code channels disabled.
  - 2) For multiples code channels (FCH + SCH<sub>n</sub>)
    - (1) Not required when the maximum average output of each RF channel is less than 0.25 dB higher than as measured with FCH only.
    - (2) Else SAR is measured on the maximum output channel (FCH + SCH<sub>n</sub>) with FCH at full rate and SCH<sub>0</sub> enabled at 9600 bps, for exposure configuration that produced highest SAR for that channel with FCH only.
2. SAR for RC1
  - 1) Not required when the maximum average output of each channel is less than 0.25 dB higher than as measured in RC3.
  - 2) Else SAR is measured on the maximum output channel in RC1, with Loopback Service Option SO55, at full rate, for exposure configuration that produced highest SAR for that channel in RC3.
3. Handsets with Ev-Do
  - 1) SAR for Release 0 (Rel. 0)
    - (1) Not required when the maximum average output of each channel is less than 0.25 dB higher than as measured in RC3 (1xRTT)
    - (2) Else SAR is measured on the maximum output channel, at 153.6 kbps, for exposure configuration that produced highest SAR for that channel in RC3.
  - 2) SAR for Revision A (Rev. A)
    - (1) Not required when the maximum average output of each channel is less than as measured in Release 0, or is less than 0.25 dB higher than as measured in RC3 (1xRTT).
    - (2) Else SAR is measured on the maximum output channel, using a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 Physical Layer configurations (TBD: may be "for exposure configuration that produced highest SAR for that channel in RC3")

## 11. RF OUTPUT POWER VERIFICATION

Maximum output power is verified on the Low, Middle and High channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E for 1xRTT, section 3.1.2.3.4 of 3GPP2 C.S0033-0/TIA-866 for Rel. 0 and section 4.3.4 of 3GPP2 C.S0033-A for Rev. A

### 11.1. GSM

#### GSM (GMSK) voice mode

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)
GSM850	128	824.2	32.5
	190	836.6	32.5
	251	848.8	32.5
GSM1900	512	1850.2	28.8
	661	1880.0	28.7
	810	1909.8	28.5

#### GPRS (GMSK) - Coding Scheme: CS1

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slot	Frame Avg Pwr	3 slot	Frame Avg Pwr	4 slot	Frame Avg Pwr
			GSM850	128	824.2	32.4	<b>23.4</b>	28.9	22.9	27.2
	190	836.6	32.5	<b>23.5</b>	28.9	22.9	27.2	22.9	25.9	22.9
	251	848.8	32.5	<b>23.5</b>	28.9	22.9	27.3	23.0	26.0	23.0
GSM1900	512	1850.2	29.1	20.1	27.1	21.1	25.4	<b>21.1</b>	24.0	21.0
	661	1880	29.1	20.1	27.4	21.4	25.7	<b>21.4</b>	24.2	21.2
	810	1909.8	29.5	20.5	27.4	21.4	25.8	<b>21.5</b>	24.2	21.2

#### EGPRS (8PSK) - Coding Scheme: MCS5

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)				Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slot	Frame Avg Pwr	3 slot	Frame Avg Pwr	4 slot	Frame Avg Pwr
			GSM850	128	824.2	26.4	17.4	26.3	20.3	26.1
	190	836.6	26.4	17.4	26.3	20.3	26.1	21.8	25.9	22.9
	251	848.8	26.5	17.5	26.3	20.3	26.1	21.8	25.9	22.9
GSM1900	512	1850.2	24.8	15.8	24.7	18.7	24.6	20.3	24.0	21.0
	661	1880	24.9	15.9	24.8	18.8	24.6	20.3	24.1	21.1
	810	1909.8	24.8	15.8	24.7	18.7	24.5	20.2	23.9	20.9

**Note:** According to KDB 941225 D03 SAR Test Reduction GSM/GPRS/EDGE vo1, noted in the following sections indicated below may be considered to determine SAR test reduction requirements for devices operating in GSM/GPRS/EDGE modes to demonstrate RF exposure compliance.

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 1 time slots
  - b. GPRS1900 3 time slots



### 11.3. CDMA200 1xEv-Do

#### 11.3.1. Release 0 (Rel. 0)

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

##### EVDO Release 0 – RTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 00800058 : 00000000 : 00000000 : 00000000 > Subnet Mask > 0
  - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Parms:
  - Cell Power > -105.5 dBm/1.23 MHz
  - Cell Band > (Select US Cellular or US PCS)
  - Channel > (Enter channel number)
  - Application Config > Enhanced Test Application Protocol > RTAP
  - RTAP Rate > 153.6 kbps
  - Rvs Power Ctrl > Active bits
  - Protocol Rel > 0 (1xEV-DO)
- Press “Start Data Connection” when “Session Open” appear in “Active Cell”
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

##### EVDO Release 0 - FTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 00800058 : 00000000 : 00000000 : 00000000 > Subnet Mask > 0
  - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Parms:
  - Cell Power > -105.5 dBm/1.23 MHz
  - Cell Band > (Select US Cellular or US PCS)
  - Channel > (Enter channel number)
  - Application Config > Enhanced Test Application Protocol > FTAP (default)
  - FTAP Rate > 307.2 kbps (2 Slot, QPSK)
  - Rvs Power Ctrl > Active bits
  - Protocol Rel > 0 (1xEV-DO)
- Press “Start Data Connection” when “Session Open” appear in “Active Cell”
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

##### **RF Power Output for EV-DO Rel 0**

Band	FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm)	
					Average	Peak
Cellular	307.2 kbps (2 slot, QPSK)	153.6 kbps	1013	824.70	23.6	
			384	836.52	23.7	
			777	848.31	23.7	
PCS	307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	23.9	
			600	1880.00	23.9	
			1175	1908.75	23.4	

**11.3.2. Revision A (Rev. A)**

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

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

EVDO Rev. A – RETAP

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > RETAP
- R-Data Pkt Size > 4096
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2
- > PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00800058: 00000000: 00000000: 00000000  
 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots  
 > ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

EVDO Rev. A - FETAP

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > FETAP
- F-Traffic Format > 4 (1024, 2,128) Canonical (307.2k, QPSK)
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2
- > PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00800058: 00000000: 00000000: 00000000  
 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots  
 > ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

Band	FETAP Traffic Format	RETAP Data Payload Size	Channel	f (MHz)	Conducted power (dBm)	
					Average	Peak
Cellular	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	1013	824.70	23.6	
			384	836.52	23.7	
			777	848.31	23.7	
PCS	307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	23.9	
			600	1880.00	23.9	
			1175	1908.75	23.4	

**11.4. WIFI RF OUTPUT POWER**

Band	Mode	Channel	Freq. (MHz)	Avg Pwr (dBm)
2.4 GHz	802.11b	1	2412	15.3
		6	2437	15.3
		11	2462	14.9
	802.11g	1	2412	12.5
		6	2437	15.3
		11	2462	11.3
	802.11n (HT20)	1	2412	11.2
		6	2437	15.2
		11	2462	10.3

**Note:** KDB 248227 - SAR is not required for 802.11g/HT20 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels.

Band	Mode	Ch. #	Freq. (MHz)	Avg Pwr (dBm)
5.2 GHz	<b>802.11a</b>	<b>36</b>	<b>5180</b>	<b>15.45</b>
		<b>40</b>	<b>5200</b>	<b>15.65</b>
		<b>48</b>	<b>5240</b>	<b>15.60</b>
	802.11n HT20	36	5180	15.10
		40	5200	15.60
		48	5240	15.20
	802.11n HT40	38	5190	12.30
		46	5230	15.40
5.3 GHz	<b>802.11a</b>	<b>52</b>	<b>5260</b>	<b>15.45</b>
		<b>60</b>	<b>5300</b>	<b>16.10</b>
		<b>64</b>	<b>5320</b>	<b>15.40</b>
	802.11n HT20	52	5260	15.40
		60	5300	16.00
		64	5320	15.10
	802.11n HT40	54	5270	15.40
		62	5310	12.25
5.5 GHz	<b>802.11a</b>	<b>100</b>	<b>5500</b>	<b>15.25</b>
		<b>120</b>	<b>5600</b>	<b>15.35</b>
		<b>140</b>	<b>5700</b>	<b>15.20</b>
	802.11n HT20	100	5500	15.15
		120	5600	15.10
		140	5700	15.12
	802.11n HT40	102	5500	14.70
		118	5600	14.85
134		5670	14.75	
5.8 GHz	<b>802.11a</b>	<b>149</b>	<b>5745</b>	<b>15.80</b>
		<b>157</b>	<b>5785</b>	<b>15.90</b>
		<b>165</b>	<b>5825</b>	<b>15.20</b>
	802.11n HT20	149	5745	15.70
		157	5785	15.60
		165	5825	15.30
	802.11n HT40	151	5755	15.70
159		5795	15.60	

### 11.5. BLUETOOTH RF OUTPUT POWER

Mode	Channel #	Freq. (MHz)	Conducted Avg Power	
			(dBm)	(mW)
GFSK	0	2402	4.45	2.8
	39	2441	4.52	2.8
	78	2480	4.21	2.6
8PSK	0	2402	0.50	1.1
	39	2441	0.40	1.1
	78	2480	0.20	1.0

**Note:** According to KDB 648474, Table 2, Unlicensed transmitters  
 When there is simultaneous transmission, Stand-alone SAR not required due to

- Output  $\leq 2 \cdot P_{Ref}$  (24 mW) and antenna is  $\geq 5.0$  cm from other antennas
- Output  $\leq P_{Ref}$  (12 mW) and antenna is  $\geq 2.5$  cm from other antennas
- Output  $\leq P_{Ref}$  (12 mW) and antenna is  $< 2.5$  cm from other antennas

## 12. SUMMARY OF SAR TEST RESULTS

Summary of SAR test results

Frequency band	Test configuration	Separation distance (cm)	Highest 1g SAR (W/kg)
GSM850 (Part 22)	Head: Right hand side touch (closed)	--	0.532
	Body worn: Face down	1.5	0.857
	Hotspot: Back side (Face down)	1.0	1.07
GSM1900 (Part 24)	Head: Left hand side touch (open)	--	0.242
	Body worn: Face down	1.5	0.432
	Hotspot: Back side (Face down)	1.0	0.755
CDMA2000 Cell (Part 22)	Head: Right hand side touch (closed)	--	<b>0.536</b>
	Body worn: Face down	1.5	0.891
	Hotspot: Back side (Face down)	1.0	1.130
CDMA2000 PCS (Part 24)	Head: Left hand side touch (open)	--	0.423
	Body worn: Face down	1.5	0.949
	Hotspot: Back side (Face down)	1.0	1.40
WiFi 2.4 GHz	Head: Left hand side tilt (closed)	--	0.149
	Body worn: Face down w/ headset	1.0	0.211
	Hotspot: Back side (Face down)	1.0	0.196
WiFi 5.2 GHz	Head: Left hand side tilt (closed)	--	0.325
	Body worn: Face down	1.5	0.514
	Hotspot: Back side (Face down)	n/a	n/a
WiFi 5.3 GHz	Head: Left hand side tilt (closed)	--	0.474
	Body worn: Face down	1.5	0.654
	Hotspot: Back side (Face down)	n/a	n/a
WiFi 5.5 GHz	Head: Left hand side tilt (closed)	--	0.387
	Body worn: Face down	1.5	0.568
	Hotspot: Back side (Face down)	n/a	n/a
WiFi 5.8 GHz	Head: Left hand side tilt (closed)	--	0.392
	Body worn: Face down w/ headset	1.5	0.557
	Hotspot: Back side (Face down)	n/a	n/a

**12.1. GSM850**

**Left Hand Side (LHS)**

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
GSM850	GSM	Touch (open)	128	824.2		
			190	836.6	0.405	0.307
			251	848.8		
		Tilt (15°C) (open)	128	824.2		
			190	836.6	0.208	0.159
			251	848.8		
GSM850	GSM	Touch (closed)	128	824.2		
			190	836.6	0.428	0.317
			251	848.8		
		Tilt (15°C) (closed)	128	824.2		
			190	836.6	0.361	0.270
			251	848.8		

**Right Hand Side (RHS)**

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
GSM850	GSM	Touch (open)	128	824.2		
			190	836.6	0.425	0.320
			251	848.8		
		Tilt (15°C) (open)	128	824.2		
			190	836.6	0.203	0.154
			251	848.8		
GSM850	GSM	Touch (closed)	128	824.2		
			190	836.6	<b>0.532</b>	0.404
			251	848.8		
		Tilt (15°C) (closed)	128	824.2		
			190	836.6	0.386	0.288
			251	848.8		

**Body worn with 1.5 cm separation distance**

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
GSM850	GPRS 1 slots	Face up	128	824.2		
			190	836.6	0.171	0.144
			251	848.8		
		Face down	128	824.2	<b>0.857</b>	0.683
			190	836.6	0.839	0.660
			251	848.8	0.679	0.534
		w/ headset	128	824.2	0.512	0.405

**Notes:**

According to KDB 941225 D03 SAR Test Reduction GSM/GPRS/EDGE vo1, the following sections indicated below SAR test reduction requirements are applicable for this device to demonstrate RF exposure compliance.

- 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 and time slots (section 10.1), GPRS850 1 time slots was chosen for Body SAR testing.

**Body with 1.0 cm separation distance (Hotspot)**

Test position	Mode	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Front side (Face up)	GPRS 1 slot	128	824.2		
		190	836.6	0.358	0.272
		251	848.8		
Back side (Face down)	GPRS 1 slot	128	824.2	<b>1.070</b>	0.772
		190	836.6	1.050	0.747
		251	848.8	0.750	0.534
Left edge	GPRS 1 slot	128	824.2		
		190	836.6	0.380	0.256
		251	848.8		
Right edge	GPRS 1 slot	128	824.2		
		190	836.6	0.412	0.286
		251	848.8		
Top edge	GPRS 1 slot	128	824.2		
		190	836.6	0.027	0.02
		251	848.8		
Bottom edge	GPRS 1 slot	128	824.2		
		190	836.6	0.094	0.056
		251	848.8		

## 12.2. GSM1900

### Left Hand Side (LHS)

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
GSM1900	GSM	Touch (open)	512	1850.2		
			661	1880.0	<b>0.242</b>	0.153
			810	1909.8		
		Tilt (15°C) (open)	512	1850.2		
			661	1880.0	0.092	0.057
			810	1909.8		
GSM1900	GSM	Touch (closed)	512	1850.2		
			661	1880.0	0.171	0.112
			810	1909.8		
		Tilt (15°C) (closed)	512	1850.2		
			661	1880.0	0.091	0.055
			810	1909.8		

### Right Hand Side (RHS)

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
GSM1900	GSM	Touch (open)	512	1850.2		
			661	1880.0	0.184	0.121
			810	1909.8		
		Tilt (15°C) (open)	512	1850.2		
			661	1880.0	0.117	0.066
			810	1909.8		
GSM1900	GSM	Touch (closed)	512	1850.2		
			661	1880.0	0.168	0.111
			810	1909.8		
		Tilt (15°C) (closed)	512	1850.2		
			661	1880.0	0.128	0.074
			810	1909.8		

**Body worn with 1.5 cm separation distance**

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
GSM1900	GPRS 3 slots	Face up	512	1850.2		
			661	1880.0	0.120	0.075
			810	1909.8		
		Face down	512	1850.2		
			661	1880.0	<b>0.432</b>	0.259
			810	1909.8		
		w/ headset	810	1909.8	0.408	0.243

**Notes:**

According to KDB 941225 D03 SAR Test Reduction GSM/GPRS/EDGE vo1, the following sections indicated below SAR test reduction requirements are applicable for this device to demonstrate RF exposure compliance.

- 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 and time slots (section 10.1), GPRS1900 3 time slots was chosen for Body SAR testing.

**Body with 1.0 cm separation distance (Hotspot mode)**

Test position	Mode	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Front side (Face up)	GPRS 3 slot	512	1850.2		
		661	1880.0	0.132	0.086
		810	1909.8		
Back side (Face down)	GPRS 3 slot	512	1850.2		
		661	1880.0	<b>0.755</b>	0.450
		810	1909.8		
Left edge	GPRS 3 slot	512	1850.2		
		661	1880.0	0.349	0.186
		810	1909.8		
Right edge	GPRS 3 slot	512	1850.2		
		661	1880.0	0.037	0.020
		810	1909.8		
Top edge	GPRS 3 slot	512	1850.2		
		661	1880.0	0.037	0.022
		810	1909.8		
Bottom edge	GPRS 3 slot	512	1850.2		
		661	1880.0	0.150	0.087
		810	1909.8		

### 12.3. CDMA2000 CELL BAND

Due to the maximum average output of 1x RTT (RC3, SO32) is greater than ¼ dB higher than that measured for Rel. 0 and Rev A, thus Body SAR measurement procedures in the CDMA 200 1 x Handsets section were applied.

#### Left Hand Side (LHS)

Test position	Mode	UL Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Touch (open)	1xRTT (RC3, SO55)	1013	824.70		
		384	836.52	0.330	0.249
		777	848.31		
Tilt (15°C) (open)	1xRTT (RC3, SO55)	1013	824.70		
		384	836.52	0.160	0.121
		777	848.31		
Touch (closed)	1xRTT (RC3, SO55)	1013	824.70		
		384	836.52	0.449	0.336
		777	848.31		
Tilt (15°C) (closed)	1xRTT (RC3, SO55)	1013	824.70		
		384	836.52	0.357	0.267
		777	848.31		

#### Right Hand Side (RHS)

Test position	Mode	UL Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Touch (open)	1xRTT (RC3, SO55)	1013	824.70		
		384	836.52	0.413	0.308
		777	848.31		
Tilt (15°C) (open)	1xRTT (RC3, SO55)	1013	824.70		
		384	836.52	0.184	0.140
		777	848.31		
Touch (closed)	1xRTT (RC3, SO55)	1013	824.70		
		384	836.52	<b>0.536</b>	0.406
		777	848.31		
Tilt (15°C) (closed)	1xRTT (RC3, SO55)	1013	824.70		
		384	836.52	0.398	0.296
		777	848.31		

#### Notes:

- Head SAR for RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55.
- Head SAR for RC1 is not required when the maximum average output of each channel is less than 0.25 dB higher than as measured in RC3.

**Body worn with 1.5 cm separation distance**

Test position	Mode	UL Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Front side (Face up)	1xRTT (RC3, SO32)	1013	824.70		
		384	836.52	0.481	0.402
		777	848.31		
Face down	1xRTT (RC3, SO32)	1013	824.70	<b>0.891</b>	0.708
		384	836.52	0.866	0.680
		777	848.31	0.714	0.559
Face down (with headset)	1xRTT (RC3, SO32)	1013	824.70	0.580	0.458

**Notes:**

- Based upon the power measurement in section 9.2, Body SAR for multiple code channel (FCH+SCH) is not required due to the output power is not ¼ dB higher than RC3/SO32.
- Based upon the power measurement in section 9.1.2 and 9.1.3, Body SAR for 1xEVDO Rel.0 and Rev. A power measurement is not ¼ dB higher than RC3.
- Thus, RC3/SO32 is used for all Body SAR measurement.

**Body with 1.0 cm separation distance (Hotspot mode)**

Test position	Mode	UL Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Front side (Face up)	1xRTT (RC3, SO32)	1013	824.70		
		384	836.52	0.399	0.303
		777	848.31		
	1x EV-DO Release 0	1013	824.70		
		384	836.52	0.394	0.300
		777	848.31		
Back side (Face down)	1xRTT (RC3, SO32)	1013	824.70	<b>1.130</b>	0.810
		384	836.52	1.040	0.738
		777	848.31	0.770	0.545
	1x EV-DO Release 0	1013	824.70	1.130	0.806
		384	836.52	1.050	0.745
		777	848.31	0.766	0.545
Left edge	1xRTT (RC3, SO32)	1013	824.70		
		384	836.52	0.592	0.398
		777	848.31		
	1x EV-DO Release 0	1013	824.70		
		384	836.52	0.592	0.399
		777	848.31		
Right edge	1xRTT (RC3, SO32)	1013	824.70		
		384	836.52	0.514	0.357
		777	848.31		
	1x EV-DO Release 0	1013	824.70		
		384	836.52	0.512	0.355
		777	848.31		
Top edge	1xRTT (RC3, SO32)	1013	824.70		
		384	836.52	0.029	0.021
		777	848.31		
	1x EV-DO Release 0	1013	824.70		
		384	836.52	0.028	0.021
		777	848.31		
Bottom edge	1xRTT (RC3, SO32)	1013	824.70		
		384	836.52	0.095	0.057
		777	848.31		
	1x EV-DO Release 0	1013	824.70		
		384	836.52	0.088	0.053
		777	848.31		

### 12.4. CDMA2000 PCS BAND

#### Left Hand Side (LHS)

Test position	Mode	UL Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Touch (open)	1xRTT (RC3, SO55)	25	1851.25		
		600	1880.00	<b>0.423</b>	0.268
		1175	1908.75		
Tilt (15°C) (open)	1xRTT (RC3, SO55)	25	1851.25		
		600	1880.00	0.175	0.105
		1175	1908.75		
Touch (closed)	1xRTT (RC3, SO55)	25	1851.25		
		600	1880.00	0.403	0.263
		1175	1908.75		
Tilt (15°C) (closed)	1xRTT (RC3, SO55)	25	1851.25		
		600	1880.00	0.213	0.129
		1175	1908.75		

#### Right Hand Side (RHS)

Test position	Mode	UL Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Touch (open)	1xRTT (RC3, SO55)	25	1851.25		
		600	1880.00	0.254	0.173
		1175	1908.75		
Tilt (15°C) (open)	1xRTT (RC3, SO55)	25	1851.25		
		600	1880.00	0.200	0.114
		1175	1908.75		
Touch (closed)	1xRTT (RC3, SO55)	25	1851.25		
		600	1880.00	0.285	0.193
		1175	1908.75		
Tilt (15°C) (closed)	1xRTT (RC3, SO55)	25	1851.25		
		600	1880.00	0.292	0.170
		1175	1908.75		

#### Notes:

- Head SAR for RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55.
- Head SAR for RC1 is not required when the maximum average output of each channel is less than 0.25 dB higher than as measured in RC3.

**Body worn with 1.5 cm separation distance**

Test position	Mode	UL Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Front side (Face up)	1xRTT (RC3, SO32)	25	1851.25		
		600	1880.00	0.201	0.132
		1175	1908.75		
Face down	1xRTT (RC3, SO32)	25	1851.25	0.820	0.503
		600	1880.00	<b>0.949</b>	0.580
		1175	1908.75	0.829	0.500
Face down (with headset)	1xRTT (RC3, SO32)	600	1880.00	0.891	0.533

**Notes:**

- Based upon the power measurement in section 9.2, Body SAR for multiple code channel (FCH+SCH) is not required due to the output power is not ¼ dB higher than RC3/SO32.
- Based upon the power measurement in section 9.1.2 and 9.1.3, Body SAR for 1xEVDO Rel.0 and Rev. A power measurement is not ¼ dB higher than RC3.
- Thus, RC3/SO32 is used for all Body SAR measurement.

**Body with 1.0 cm separation distance (Hotspot mode)**

Test position	Mode	UL Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Front side (Face up)	1xRTT (RC3, SO32)	25	1851.25		
		600	1880.00	0.289	0.186
		1175	1908.75		
	1x EV-DO Release 0	25	1851.25		
		600	1880.00	0.261	0.164
		1175	1908.75		
Back side (Face down)	1xRTT (RC3, SO32)	25	1851.25	1.310	0.746
		600	1880.00	<b>1.400</b>	0.836
		1175	1908.75	1.220	0.715
	1x EV-DO Release 0	25	1851.25	1.120	0.668
		600	1880.00	1.410	0.832
		1175	1908.75	1.080	0.641
Left edge	1xRTT (RC3, SO32)	25	1851.25		
		600	1880.00	0.592	0.312
		1175	1908.75		
	1x EV-DO Release 0	25	1851.25		
		600	1880.00	0.508	0.272
		1175	1908.75		
Right edge	1xRTT (RC3, SO32)	25	1851.25		
		600	1880.00	0.071	0.038
		1175	1908.75		
	1x EV-DO Release 0	25	1851.25		
		600	1880.00	0.063	0.040
		1175	1908.75		
Top edge	1xRTT (RC3, SO32)	25	1851.25		
		600	1880.00	0.040	0.024
		1175	1908.75		
	1x EV-DO Release 0	25	1851.25		
		600	1880.00	0.040	0.023
		1175	1908.75		
Bottom edge	1xRTT (RC3, SO32)	25	1851.25		
		600	1880.00	0.242	0.141
		1175	1908.75		
	1x EV-DO Release 0	25	1851.25		
		600	1880.00	0.243	0.142
		1175	1908.75		

### 12.5. WIFI 2.4 GHZ BAND

#### Left Hand Side (LHS)

Test position	Mode	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Touch (open)	802.11b	1	2412		
		6	2437	0.052	0.024
		11	2462		
Tilt (15°C) (open)	802.11b	1	2412		
		6	2437	0.00375	0.000944
		11	2462		
Touch (closed)	802.11b	1	2412		
		6	2437	0.102	0.050
		11	2462		
Tilt (15°C) (closed)	802.11b	1	2412		
		6	2437	<b>0.149</b>	0.068
		11	2462		

#### Right Hand Side (RHS)

Test position	Mode	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Touch (open)	802.11b	1	2412		
		6	2437	0.030	0.015
		11	2462		
Tilt (15°C) (open)	802.11b	1	2412		
		6	2437	0.00954	0.00482
		11	2462		
Touch (closed)	802.11b	1	2412		
		6	2437	0.095	0.046
		11	2462		
Tilt (15°C) (closed)	802.11b	1	2412		
		6	2437	0.148	0.068
		11	2462		

**Body worn with 1.0 cm separation distance**

Test position	Mode	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Face up	802.11b	1	2412		
		6	2437		
		11	2462		
Face down		1	2412		
		6	2437		
		11	2462		
Face down w/ headset		6	2437	<b>0.211</b>	0.104

**Note:**

KDB 248227 - SAR is not required for 802.11g/HT20 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels

**Body with 1.0 cm separation distance (Hotspot mode)**

Test position	Mode	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Front side (Face up)	802.11b	6	2437	0.030	0.016
Back side (Face down)		6	2437	<b>0.196</b>	0.094
Left Edge		6	2437	0.039	0.021
Right Edge		6	2437	0.026	0.014
Top Edge		6	2437	0.175	0.079

**Note:**

WLAN antenna is located at top edge; antenna-to-bottom edge distance is more than 2.5 cm. therefore, Bottom Edge with > 2.5 cm separation distance is excluded from SAR evaluation.

**12.6. WIFI 5 GHz BANDS**

**Left Hand Side (LHS)**

Test position	Mode	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Touch (open)	802.11a	40	5200	0.027	0.011
		60	5300	0.041	0.013
		120	5600	0.042	0.014
		157	5785	0.027	0.039
Tilt (15°C) (open)	802.11a	40	5200	0.032	0.0098
		60	5300	0.044	0.014
		120	5600	0.045	0.014
		157	5785	0.032	0.014
Touch (closed)	802.11a	40	5200	0.208	0.074
		60	5300	0.332	0.129
		120	5600	0.242	0.093
		157	5785	0.244	0.084
Tilt (15°C) (closed)	802.11a	40	5200	<b>0.325</b>	0.126
		60	5300	<b>0.474</b>	0.185
		120	5600	<b>0.387</b>	0.144
		157	5785	<b>0.392</b>	0.148

**Right Hand Side (RHS)**

Test position	Mode	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
Touch (open)	802.11a	40	5200	0.022	0.00603
		60	5300	0.043	0.015
		120	5600	0.019	0.00855
		157	5785	0.036	0.014
Tilt (15°C) (open)	802.11a	40	5200	0.020	0.00748
		60	5300	0.047	0.018
		120	5600	0.023	0.00676
		157	5785	0.018	0.00629
Touch (closed)	802.11a	40	5200	0.185	0.069
		60	5300	0.314	0.125
		120	5600	0.180	0.069
		157	5785	0.168	0.063
Tilt (15°C) (closed)	802.11a	40	5200	0.274	0.103
		60	5300	0.462	0.177
		120	5600	0.276	0.103
		157	5785	0.265	0.098

**Body worn with 1.5 cm separation distance**

Test position	Mode	Band	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
Front side (Face up)	802.11a	5.2 GHz	40	5200	0.051	0.023
		5.3 GHz	60	5300	0.064	0.028
		5.5 GHz	120	5600	0.094	0.035
		5.8 GHz	157	5785	0.034	0.015
Back side (Face down)	802.11a	5.2 GHz	40	5200	<b>0.514</b>	0.203
		5.3 GHz	60	5300	<b>0.654</b>	0.264
		5.5 GHz	120	5600	<b>0.568</b>	0.224
		5.8 GHz	157	5785	<b>0.557</b>	0.214
Back side (Face down) with Headset	802.11a	5.2 GHz	40	5200	0.513	0.202
		5.3 GHz	60	5300	0.571	0.219
		5.5 GHz	120	5600	0.484	0.184
		5.8 GHz	157	5785	0.522	0.203

**Note:**

KDB 248227 - SAR is not required for 802.11n HT20/HT40 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a channels

### 13. Worst-case SAR Plots

Date/Time: 3/17/2011 4:46:24 PM

Test Laboratory: UL CCS

#### GSM850\_Head

DUT: Plam; Type: n/a; Serial: n/a

Communication System: GSM850; Frequency: 836.6 MHz; Duty Cycle: 1:8.00018  
Medium parameters used (interpolated):  $f = 836.6$  MHz;  $\sigma = 0.899$  mho/m;  $\epsilon_r = 42.008$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Right 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(8.65, 8.65, 8.65); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: SAM with CRP; Type: SAM; Serial: 1602
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**RHS\_closed/Touch\_M-ch/Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (measured) = 0.597 mW/g

**RHS\_closed/Touch\_M-ch/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=3mm

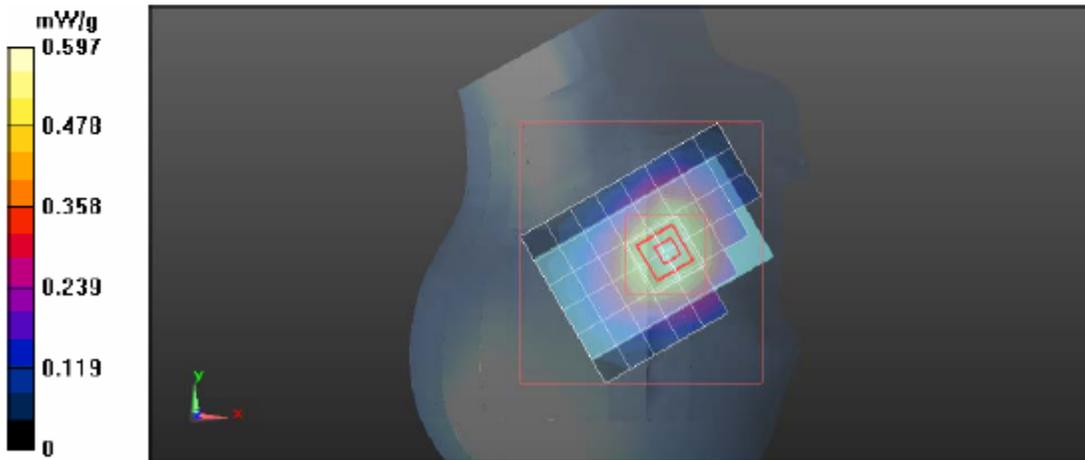
Reference Value = 25.972 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.672 W/kg

**SAR(1 g) = 0.532 mW/g; SAR(10 g) = 0.404 mW/g**

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

Maximum value of SAR (measured) = 0.596 mW/g



Date/Time: 3/17/2011 5:04:32 PM

Test Laboratory: UL CCS

### GSM850\_Head

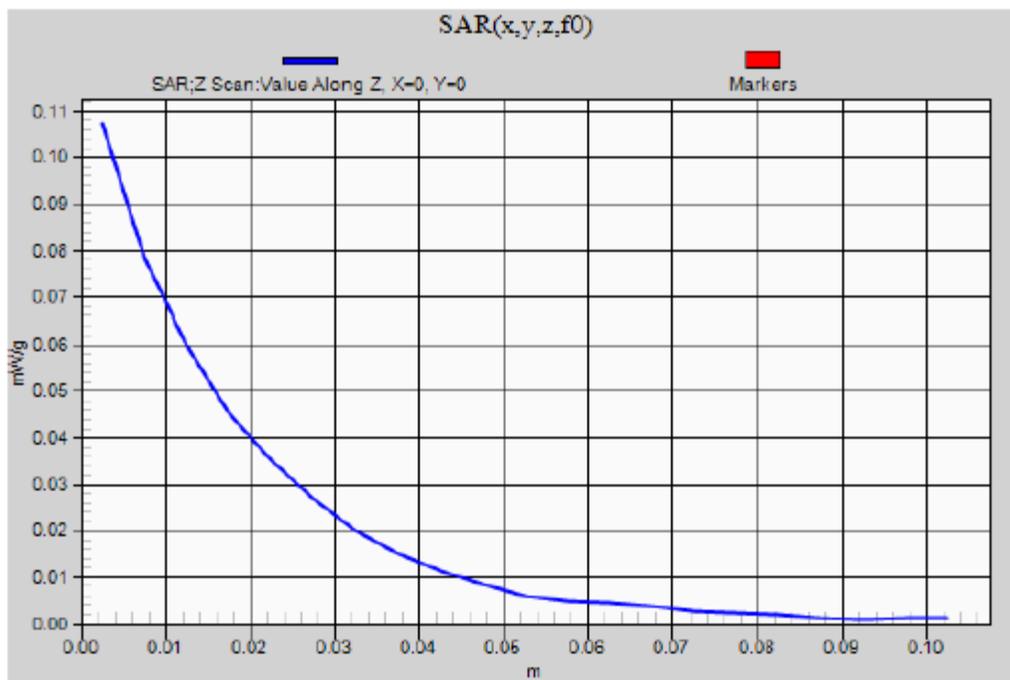
DUT: Plam; Type: n/a; Serial: n/a

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.00018

RHS\_closed/Touch\_M-ch/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.107 mW/g



Date/Time: 3/18/2011 6:24:27 PM

Test Laboratory: UL CCS

### GPRS850\_Body Worn

DUT: Plam; Type: n/a; Serial: n/a

Communication System: GSM850; Frequency: 824.2 MHz; Duty Cycle: 1:8.00018  
Medium parameters used:  $f = 825$  MHz;  $\sigma = 0.971$  mho/m;  $\epsilon_r = 54.167$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

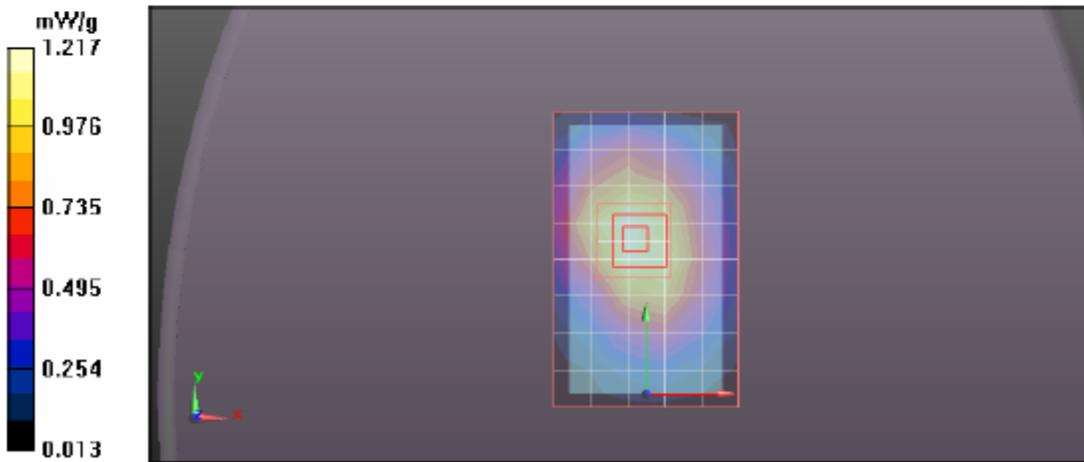
Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

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)

**Back side/1 slot\_L-ch/Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 1.217 mW/g

**Back side/1 slot\_L-ch/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=3mm  
Reference Value = 36.271 V/m; Power Drift = -0.05 dB  
Peak SAR (extrapolated) = 1.455 W/kg  
**SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.772 mW/g**  
Maximum value of SAR (measured) = 1.233 mW/g



Date/Time: 3/18/2011 6:42:32 PM

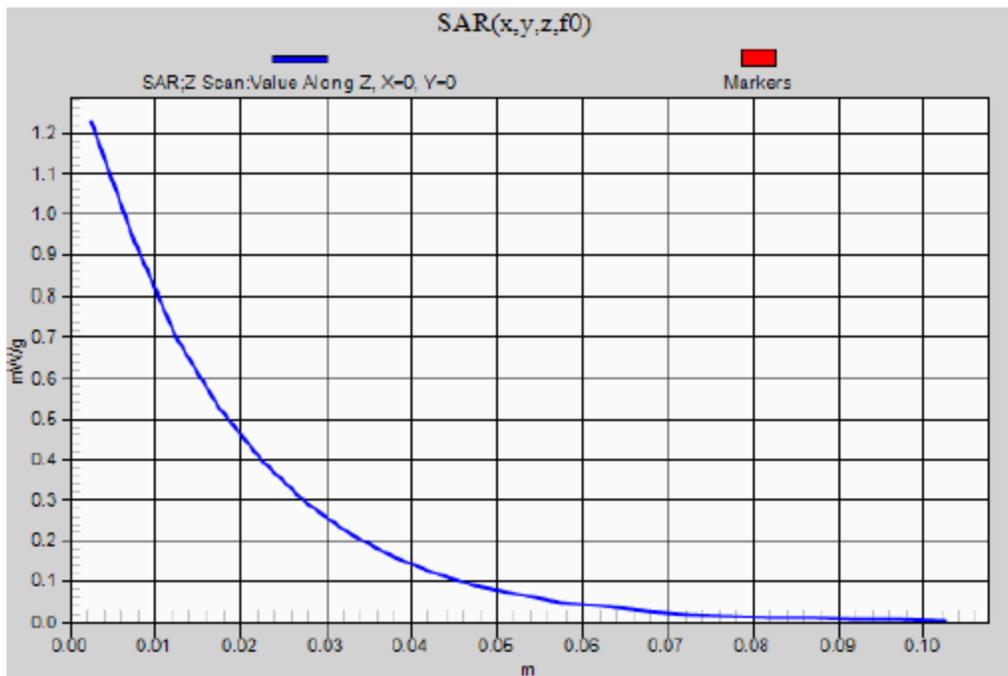
Test Laboratory: UL CCS

### GPRS850\_Body Worn

DUT: Plam; Type: n/a; Serial: n/a

Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:8.00018

**Back side/1 slot\_L-ch/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 1.226 mW/g



Date/Time: 3/14/2011 8:04:22 PM

Test Laboratory: UL CCS

### GSM1900\_Head

DUT: Plam; Type: n/a; Serial: n/a

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.00018  
Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.374$  mho/m;  $\epsilon_r = 40.966$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Left Section

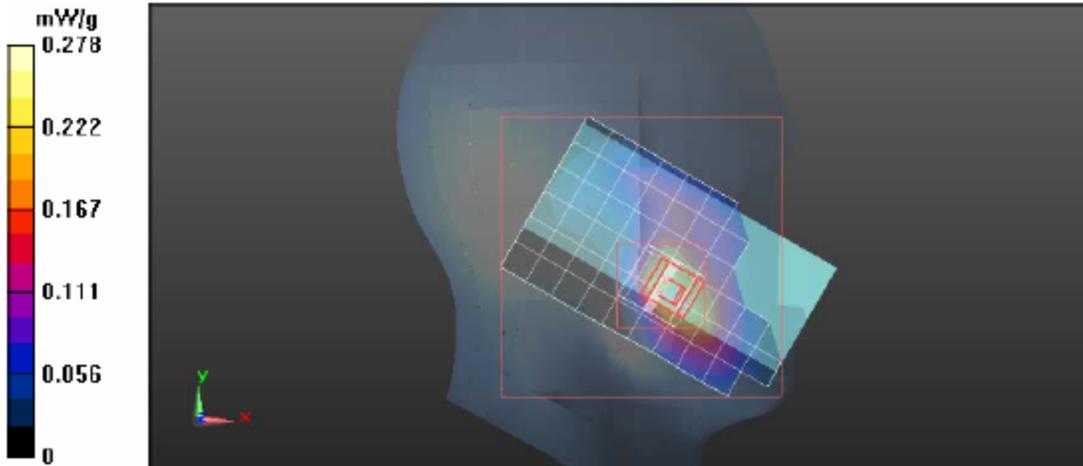
Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

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(7.42, 7.42, 7.42); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: SAM with CRP; Type: SAM; Serial: 1602
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**LHS\_open/Touch\_M-ch/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 0.278 mW/g

**LHS\_open/Touch\_M-ch/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=3mm  
Reference Value = 14.385 V/m; Power Drift = -0.07 dB  
Peak SAR (extrapolated) = 0.374 W/kg  
**SAR(1 g) = 0.242 mW/g; SAR(10 g) = 0.153 mW/g**  
Maximum value of SAR (measured) = 0.295 mW/g



Date/Time: 3/14/2011 8:22:39 PM

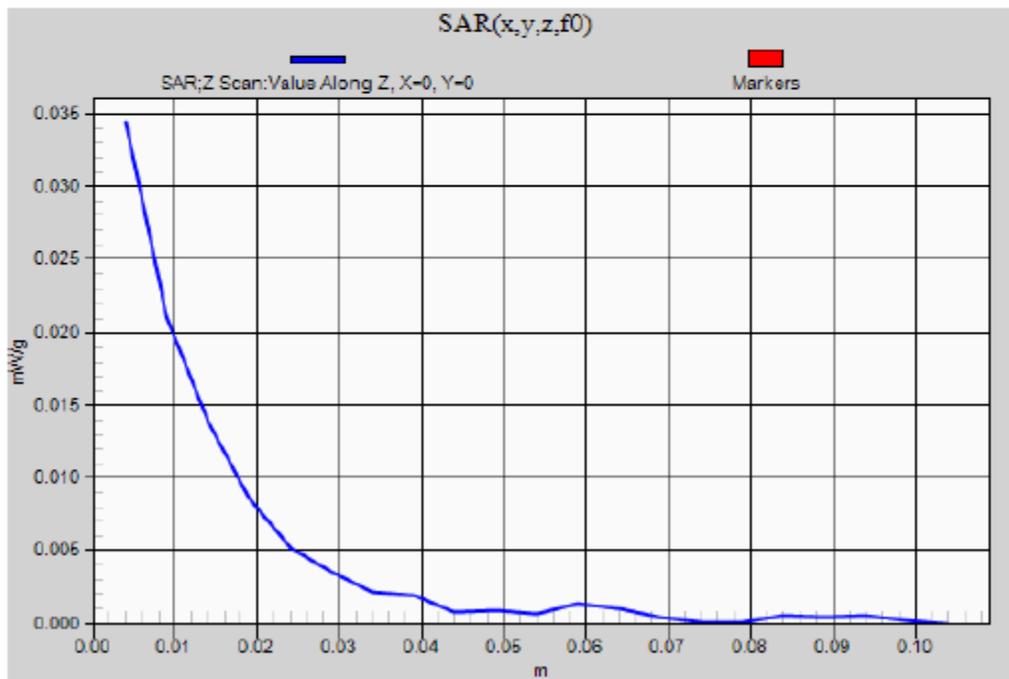
Test Laboratory: UL CCS

### GSM1900\_Head

DUT: Plam; Type: n/a; Serial: n/a

Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.00018

**LHS\_open/Touch\_M-ch/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 0.034 mW/g



Date/Time: 3/14/2011 12:00:10 PM

Test Laboratory: UL CCS

### GPRS1900\_Body Worn

DUT: Plam; Type: n/a; Serial: n/a

Communication System: PCS Band 3 slot; Frequency: 1880 MHz; Duty Cycle: 1:2.66993  
Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.509$  mho/m;  $\epsilon_r = 54.167$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

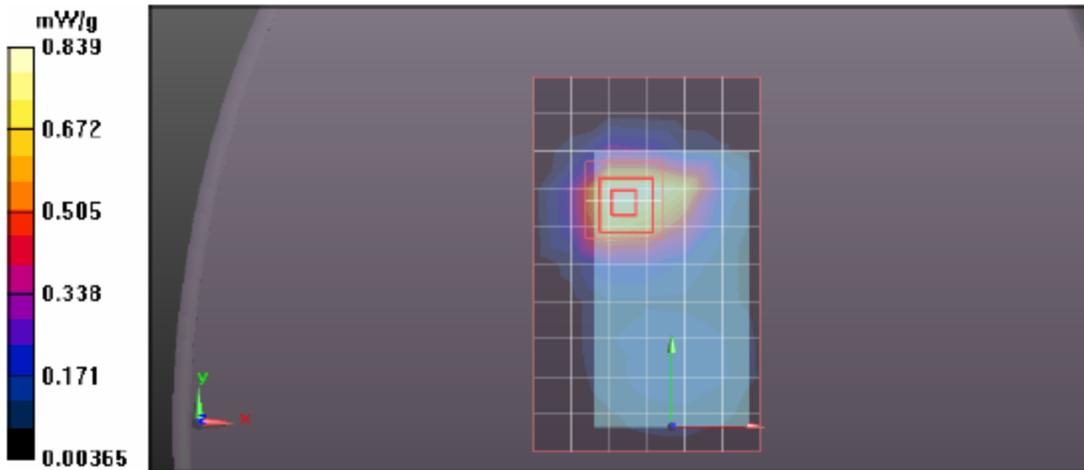
Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

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)

**Back side/3 slot\_M-ch/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 0.839 mW/g

**Back side/3 slot\_M-ch/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=3mm  
Reference Value = 23.711 V/m; Power Drift = -0.03 dB  
Peak SAR (extrapolated) = 1.224 W/kg  
**SAR(1 g) = 0.755 mW/g; SAR(10 g) = 0.450 mW/g**  
Maximum value of SAR (measured) = 0.944 mW/g



Date/Time: 3/14/2011 12:18:12 PM

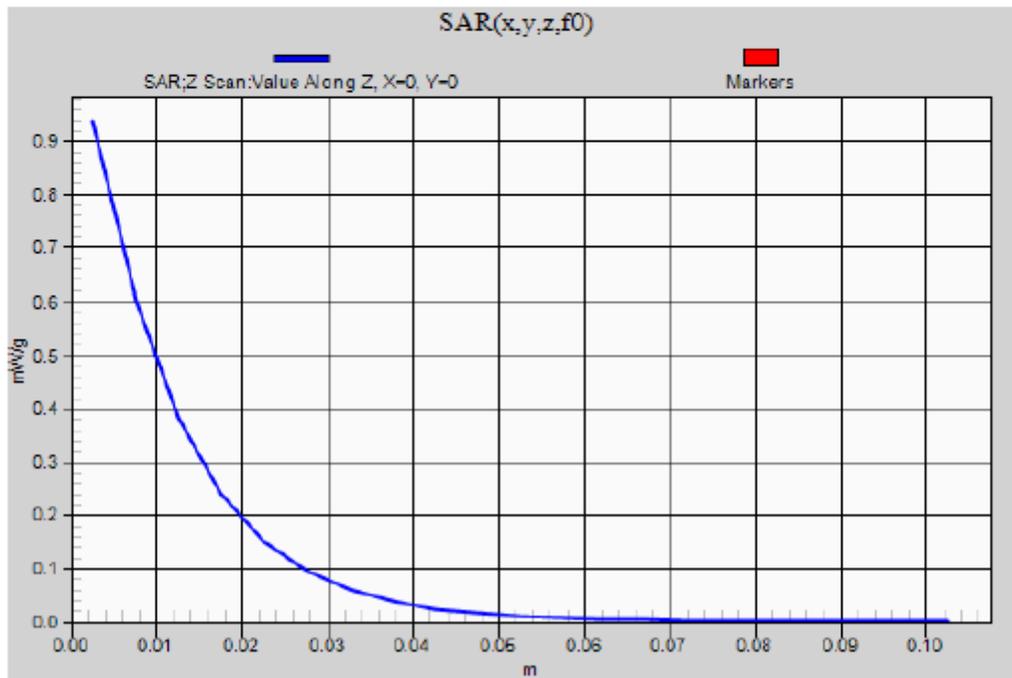
Test Laboratory: UL CCS

### GPRS1900\_Body Worn

DUT: Plam; Type: n/a; Serial: n/a

Communication System: PCS Band 3 slot; Frequency: 1880 MHz; Duty Cycle: 1:2.66993

**Back side/3 slot\_M-ch/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 0.938 mW/g



Date/Time: 3/18/2011 2:42:23 PM

Test Laboratory: UL CCS

### CDMA2000 Cell band\_Head

DUT: Plam; Type: n/a; Serial: n/a

Communication System: CDMA Cell Band for Palm; Frequency: 836.52 MHz; Duty Cycle: 1:1  
Medium parameters used (interpolated):  $f = 836.52$  MHz;  $\sigma = 0.902$  mho/m;  $\epsilon_r = 42.451$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Right 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(8.65, 8.65, 8.65); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: SAM with CRP; Type: SAM; Serial: 1602
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**RHS\_closed/Touch\_M-ch/Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (measured) = 0.606 mW/g

**RHS\_closed/Touch\_M-ch/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=3mm

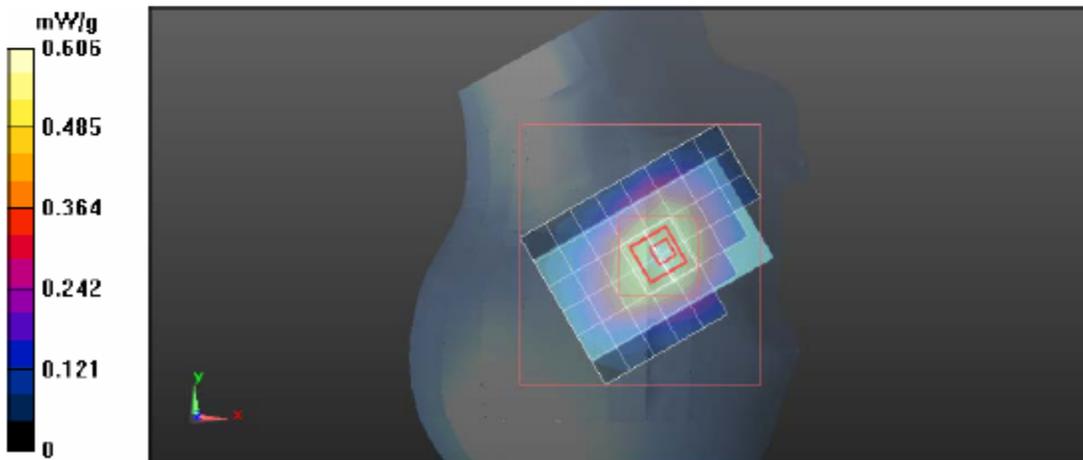
Reference Value = 26.035 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.692 W/kg

**SAR(1 g) = 0.536 mW/g; SAR(10 g) = 0.406 mW/g**

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

Maximum value of SAR (measured) = 0.603 mW/g



Date/Time: 3/18/2011 3:00:36 PM

Test Laboratory: UL CCS

### CDMA2000 Cell band\_Head

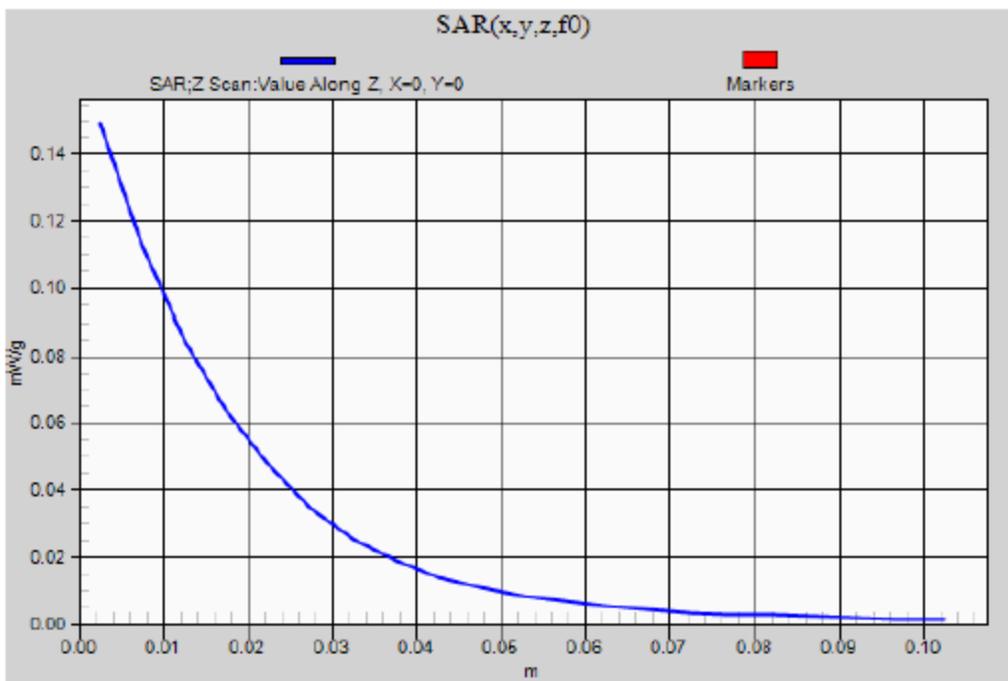
DUT: Plam; Type: n/a; Serial: n/a

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

RHS\_closed/Touch\_M-ch/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.149 mW/g



Date/Time: 3/15/2011 1:02:19 PM

Test Laboratory: The name of your organization

### CDMA2000 Cell band\_Body Worn

DUT: Plam; Type: n/a; Serial: n/a

Communication System: CDMA Cell Band; Frequency: 824.7 MHz;Duty Cycle: 1:1  
Medium parameters used:  $f = 825 \text{ MHz}$ ;  $\sigma = 0.972 \text{ mho/m}$ ;  $\epsilon_r = 53.6$ ;  $\rho = 1000 \text{ kg/m}^3$   
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, V52.2 Build 0;Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

**Back side/1xRTT SO32\_L-ch/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 1.28 mW/g

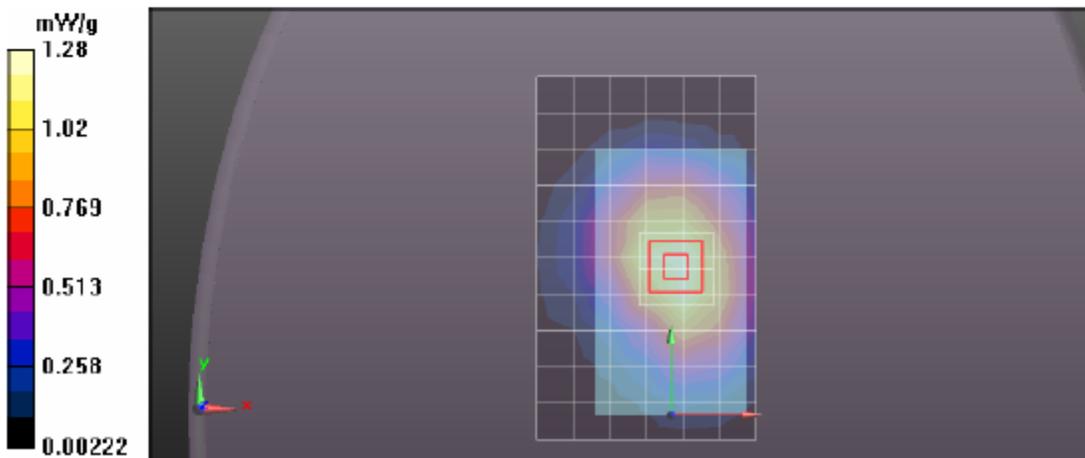
**Back side/1xRTT SO32\_L-ch/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 36.4 V/m; Power Drift = -0.014 dB

Peak SAR (extrapolated) = 1.52 W/kg

**SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.810 mW/g**

Maximum value of SAR (measured) = 1.32 mW/g



Date/Time: 3/15/2011 1:20:04 PM

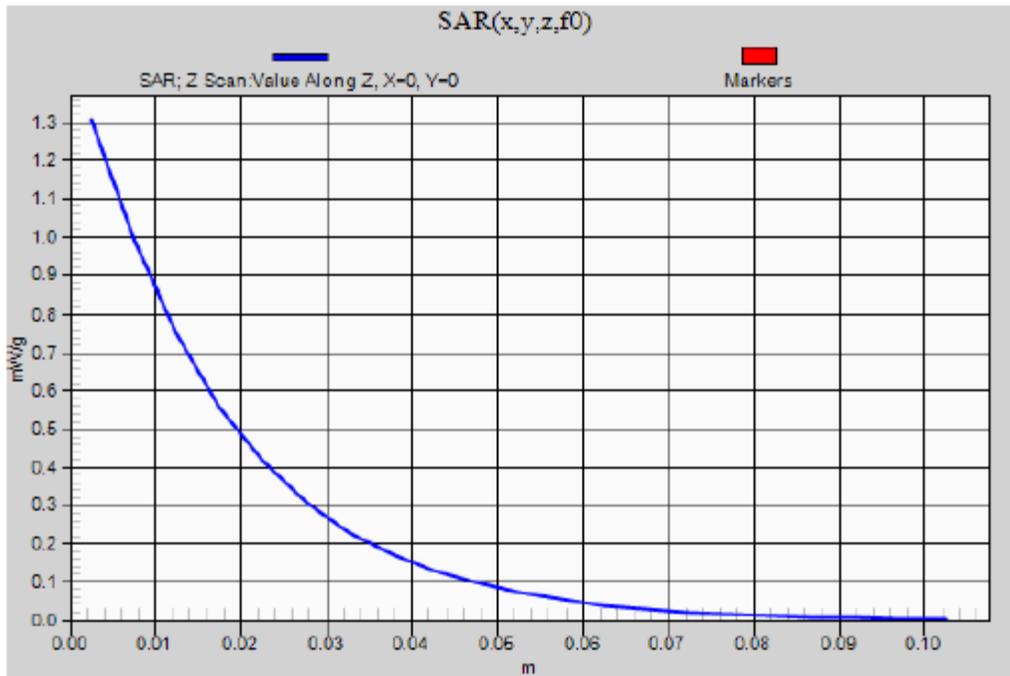
Test Laboratory: The name of your organization

### CDMA2000 Cell band\_Body Worn

DUT: Plam; Type: n/a; Serial: n/a

Communication System: CDMA Cell Band; Frequency: 824.7 MHz;Duty Cycle: 1:1

**Back side/1xRTT SO32\_L-ch/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 1.31 mW/g



Date/Time: 3/14/2011 9:11:23 PM

Test Laboratory: UL CCS

### CDMA2000 PCS band\_Head

DUT: Plam; Type: n/a; Serial: n/a

Communication System: CDMA PCS Band; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.374$  mho/m;  $\epsilon_r = 40.966$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Left 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(7.42, 7.42, 7.42); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: SAM with CRP; Type: SAM; Serial: 1602
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**LHS\_open/Touch\_M-ch/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 0.431 mW/g

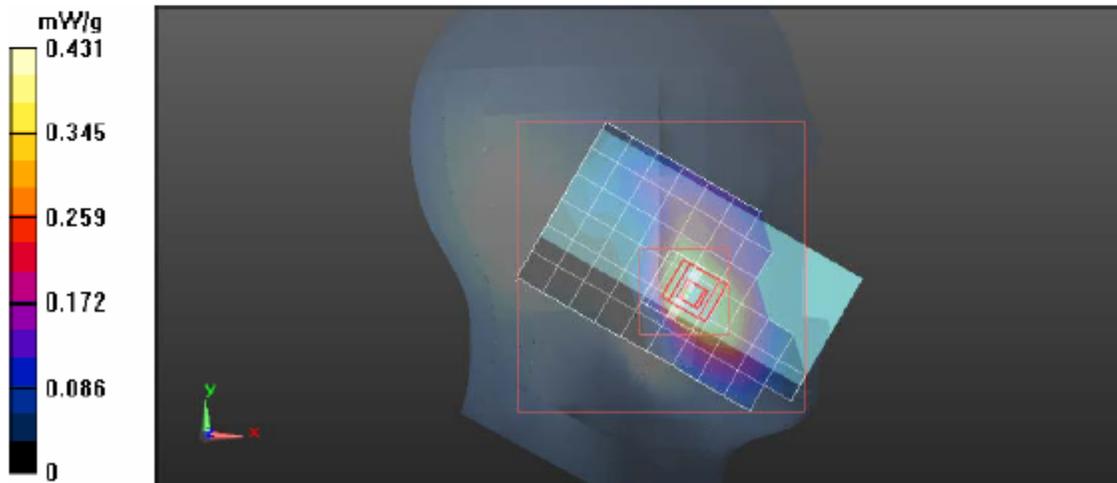
**LHS\_open/Touch\_M-ch/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 17.740 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.662 W/kg

**SAR(1 g) = 0.423 mW/g; SAR(10 g) = 0.268 mW/g**

Maximum value of SAR (measured) = 0.524 mW/g



Date/Time: 3/14/2011 9:29:33 PM

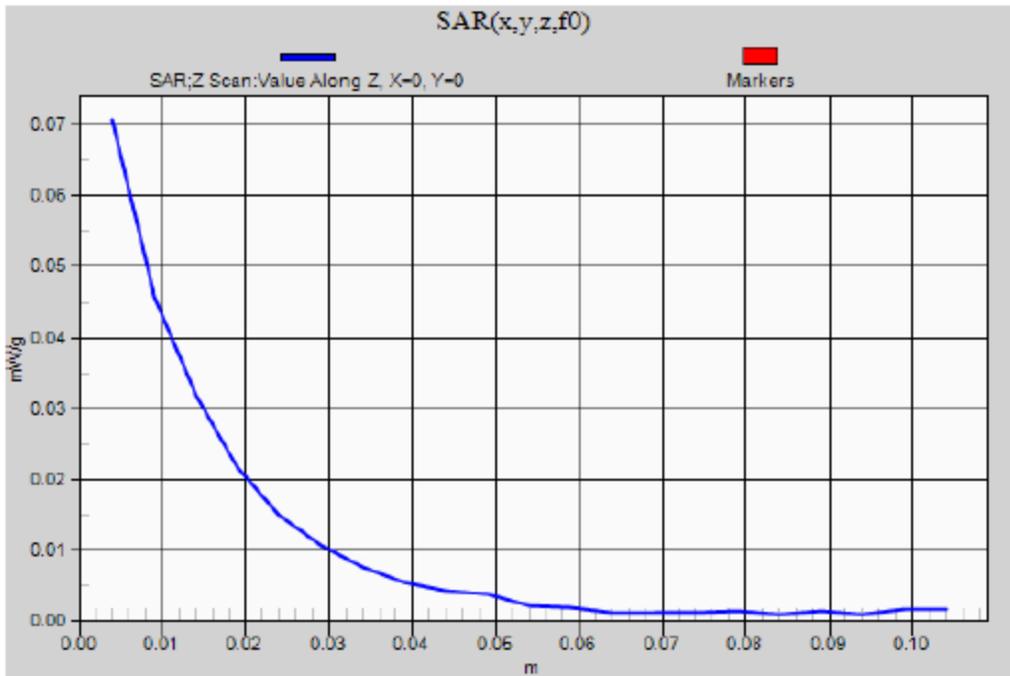
Test Laboratory: UL CCS

### CDMA2000 PCS band\_Head

DUT: Plam; Type: n/a; Serial: n/a

Communication System: CDMA PCS Band; Frequency: 1880 MHz;Duty Cycle: 1:1

**LHS\_open/Touch\_M-ch/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 0.071 mW/g



Date/Time: 3/11/2011 11:35:24 AM

Test Laboratory: UL CCS

### CDMA2000 PCS band\_Body Worn

DUT: Plam; Type: n/a; Serial: n/a

Communication System: CDMA PCS Band; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.468$  mho/m;  $\epsilon_r = 52.217$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

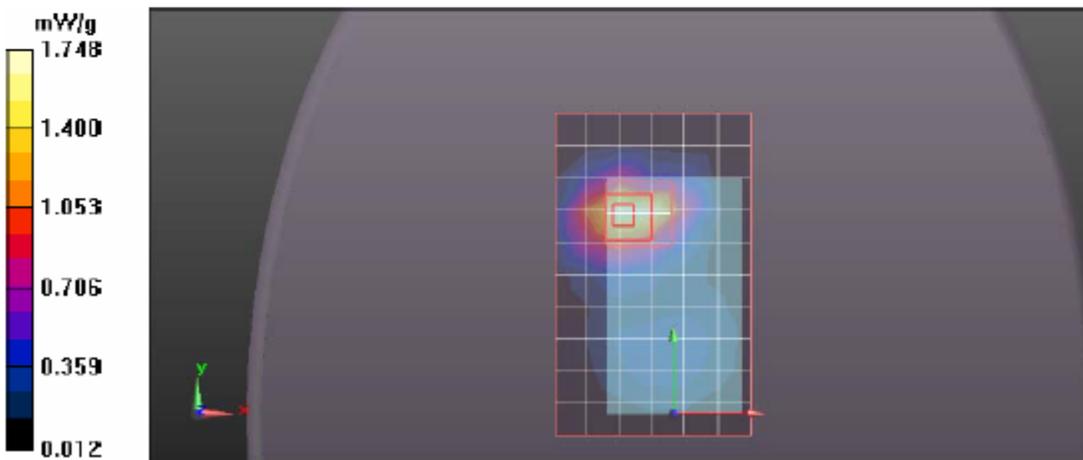
Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

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)

**Back side/1xRTT SO32\_M-ch/Area Scan (7x11x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 1.748 mW/g

**Back side/1xRTT SO32\_M-ch/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=3mm  
Reference Value = 34.558 V/m; Power Drift = 0.0071 dB  
Peak SAR (extrapolated) = 2.346 W/kg  
**SAR(1 g) = 1.4 mW/g; SAR(10 g) = 0.836 mW/g**  
Maximum value of SAR (measured) = 1.798 mW/g



Date/Time: 3/11/2011 11:54:30 AM

Test Laboratory: UL CCS

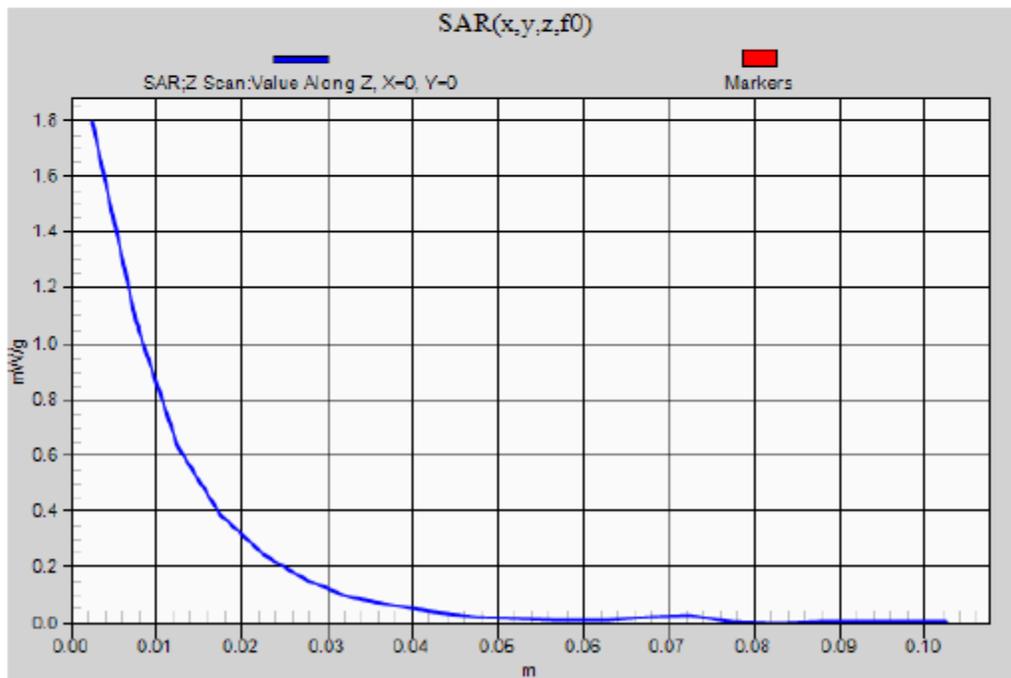
### CDMA2000 PCS band\_Body Worn

DUT: Plam; Type: n/a; Serial: n/a

Communication System: CDMA PCS Band; Frequency: 1880 MHz;Duty Cycle: 1:1

**Back side/1xRTT SO32\_M-ch/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 1.794 mW/g



Date/Time: 3/21/2011 9:04:03 PM

Test Laboratory: UL CCS

## WiFi 2.4GHz\_Head

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11b/g 2.4GHz; Frequency: 2437 MHz; Duty Cycle: 1:1  
Medium parameters used (interpolated):  $f = 2437$  MHz;  $\sigma = 1.803$  mho/m;  $\epsilon_r = 38.224$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Left 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(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: SAM with CRP; Type: SAM; Serial: 1602
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**LHS\_closed/Tilt\_M-ch/Area Scan (7x10x1):** Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (measured) = 0.177 mW/g

**LHS\_closed/Tilt\_M-ch/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=3mm

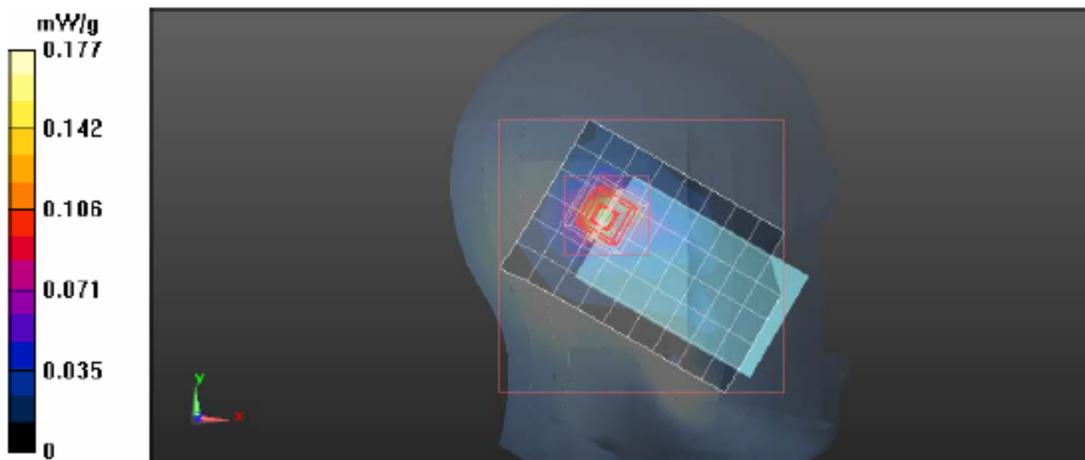
Reference Value = 10.816 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.319 W/kg

**SAR(1 g) = 0.149 mW/g; SAR(10 g) = 0.068 mW/g**

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

Maximum value of SAR (measured) = 0.208 mW/g



Date/Time: 3/21/2011 9:22:12 PM

Test Laboratory: UL CCS

### WiFi 2.4GHz\_Head

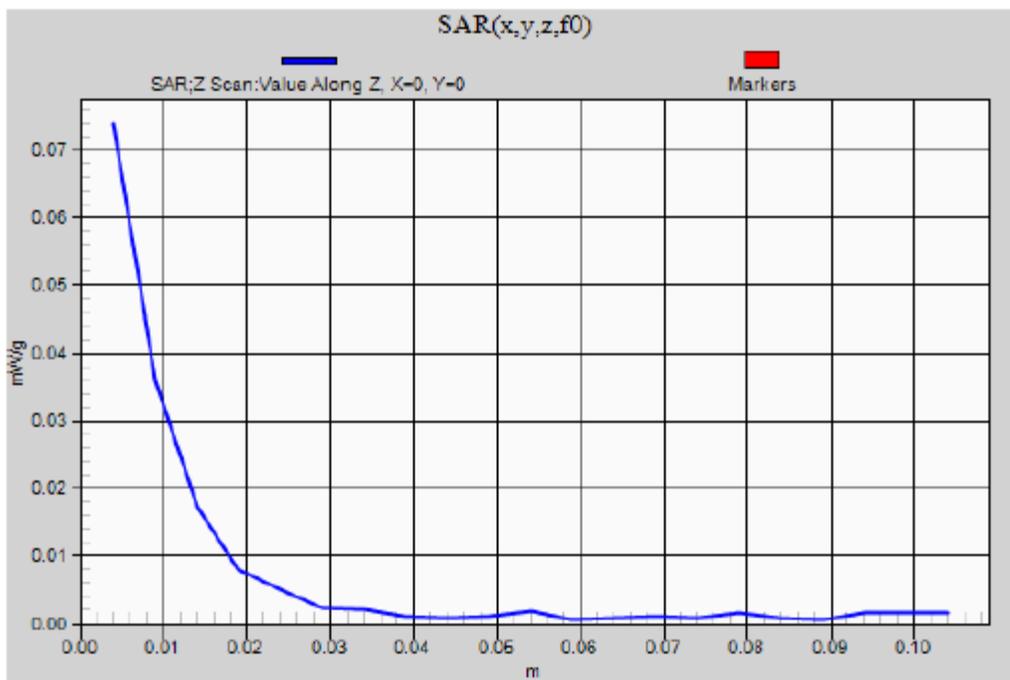
DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11b/g 2.4GHz; Frequency: 2437 MHz; Duty Cycle: 1:1

LHS\_closed/Tilt\_M-ch/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.074 mW/g



Date/Time: 3/22/2011 10:51:18 AM

Test Laboratory: UL CCS

### WiFi 2.4GHz\_Body Worn

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11b/g 2.4GHz; Frequency: 2437 MHz; Duty Cycle: 1:1  
Medium parameters used (interpolated):  $f = 2437$  MHz;  $\sigma = 1.994$  mho/m;  $\epsilon_r = 51.583$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
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(6.86, 6.86, 6.86); 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)

**Back side/802.11b\_M-ch/Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (measured) = 0.236 mW/g

**Back side/802.11b\_M-ch/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=3mm

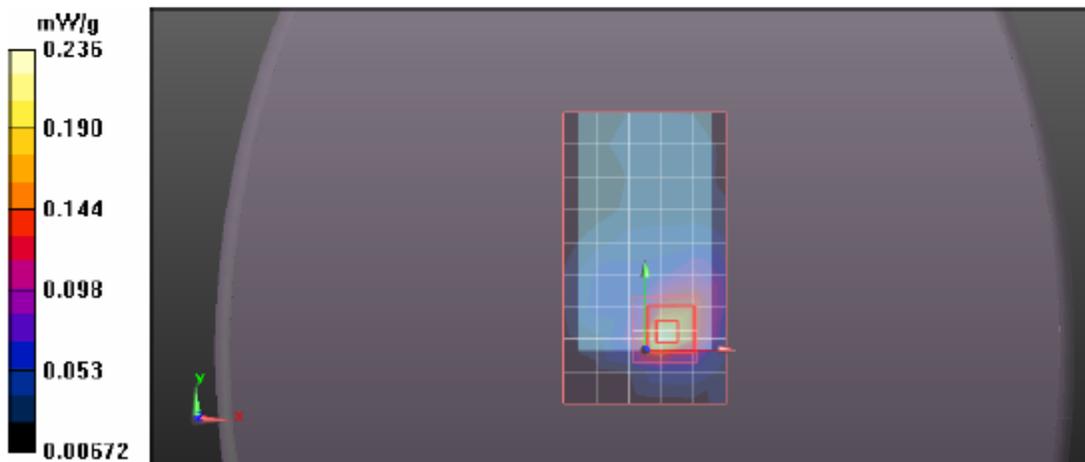
Reference Value = 11.496 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.393 W/kg

**SAR(1 g) = 0.196 mW/g; SAR(10 g) = 0.094 mW/g**

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

Maximum value of SAR (measured) = 0.270 mW/g



Date/Time: 3/22/2011 11:09:16 AM

Test Laboratory: UL CCS

### WiFi 2.4GHz\_Body Worn

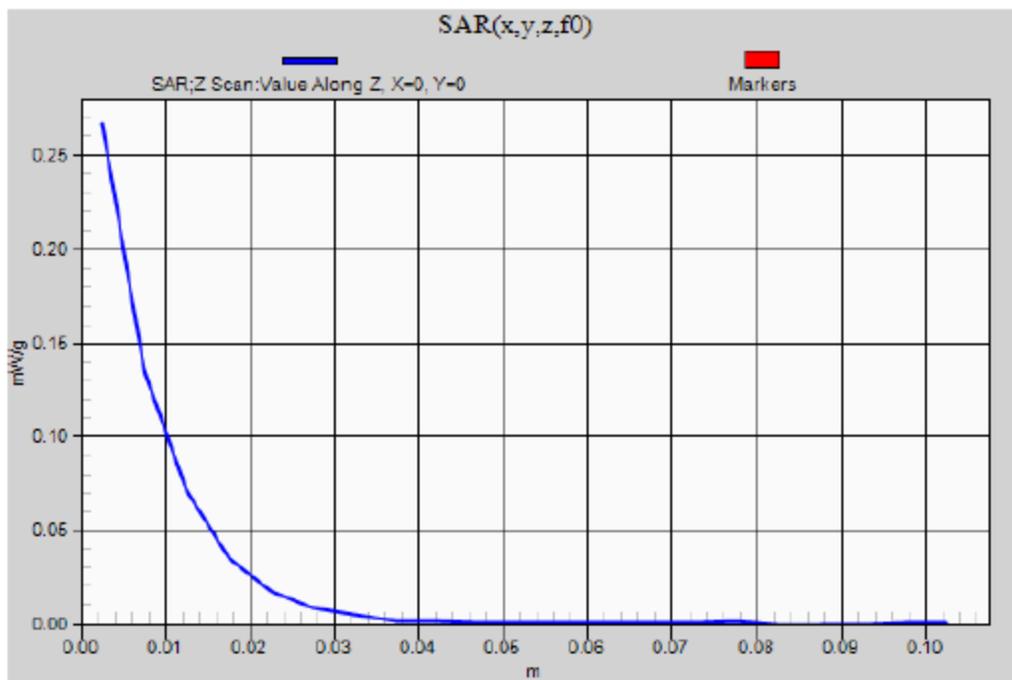
DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11b/g 2.4GHz; Frequency: 2437 MHz;Duty Cycle: 1:1

**Back side/802.11b\_M-ch/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm

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

Maximum value of SAR (measured) = 0.266 mW/g



Date/Time: 3/28/2011 12:26:32 PM

Test Laboratory: UL CCS

### WiFi 5.2GHz\_Head

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.2-5.3GHz; Frequency: 5200 MHz; Duty Cycle: 1:1  
Medium parameters used:  $f = 5200$  MHz;  $\sigma = 4.721$  mho/m;  $\epsilon_r = 34.963$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Left Section

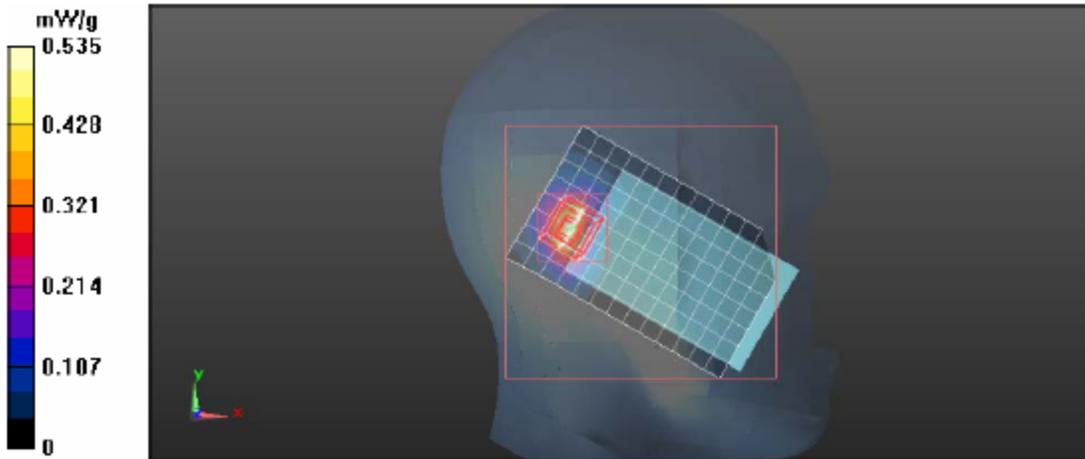
Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 deg. C

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(4.54, 4.54, 4.54); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: SAM with CRP; Type: SAM; Serial: 1602
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**LHS\_Closed/Tilt\_Ch40/Area Scan (9x14x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 0.535 mW/g

**LHS\_Closed/Tilt\_Ch40/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2.5mm  
Reference Value = 10.912 W/m; Power Drift = -0.02 dB  
Peak SAR (extrapolated) = 0.988 W/kg  
**SAR(1 g) = 0.325 mW/g; SAR(10 g) = 0.126 mW/g**  
Maximum value of SAR (measured) = 0.529 mW/g



Date/Time: 3/28/2011 12:44:27 PM

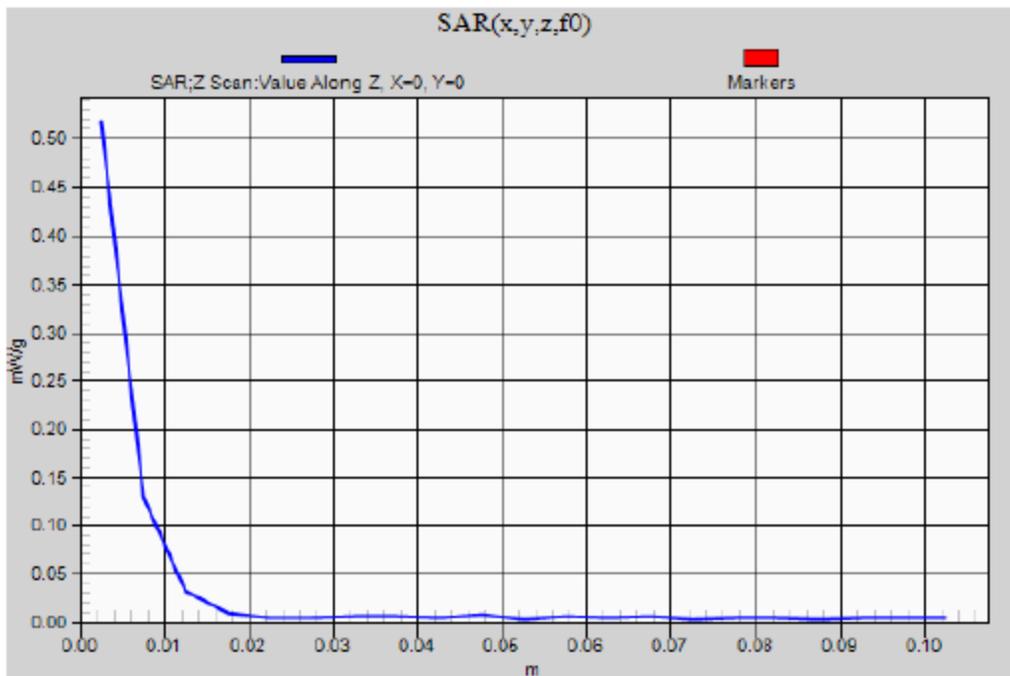
Test Laboratory: UL CCS

### WiFi 5.2GHz\_Head

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.2-5.3GHz; Frequency: 5200 MHz;Duty Cycle: 1:1

LHS\_Closed/Tilt\_Ch40/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 0.517 mW/g



Date/Time: 3/29/2011 1:22:53 AM

Test Laboratory: UL CCS

### WiFi 5.3GHz\_Head

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.2-5.3GHz; Frequency: 5300 MHz; Duty Cycle: 1:1  
Medium parameters used:  $f = 5300$  MHz;  $\sigma = 4.831$  mho/m;  $\epsilon_r = 34.786$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Left Section

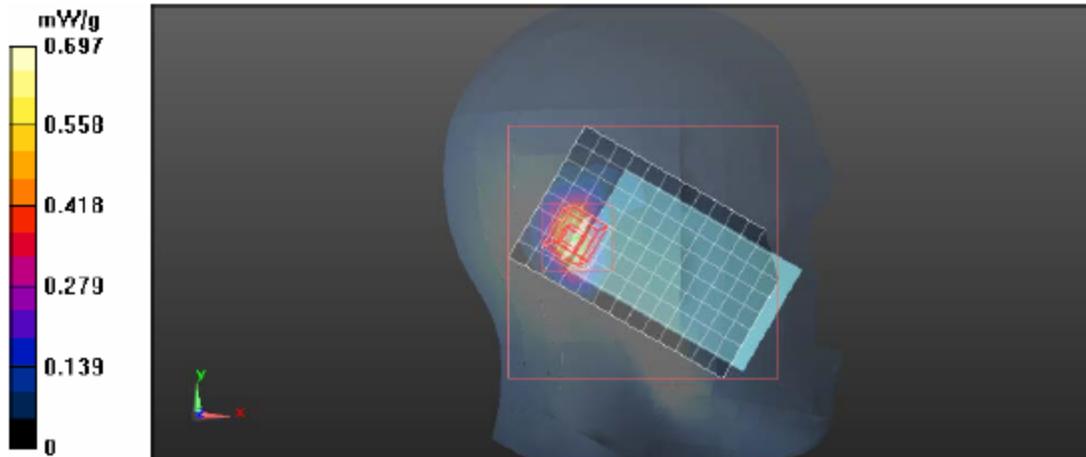
Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 deg. C

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(4.35, 4.35, 4.35); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: SAM with CRP; Type: SAM; Serial: 1602
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**LHS\_Closed/Tilt\_Ch60/Area Scan (9x14x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 0.697 mW/g

**LHS\_Closed/Tilt\_Ch60/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2.5mm  
Reference Value = 12.586 V/m; Power Drift = 0.07 dB  
Peak SAR (extrapolated) = 1.406 W/kg  
**SAR(1 g) = 0.474 mW/g; SAR(10 g) = 0.185 mW/g**  
Maximum value of SAR (measured) = 0.747 mW/g



Date/Time: 3/29/2011 1:40:51 AM

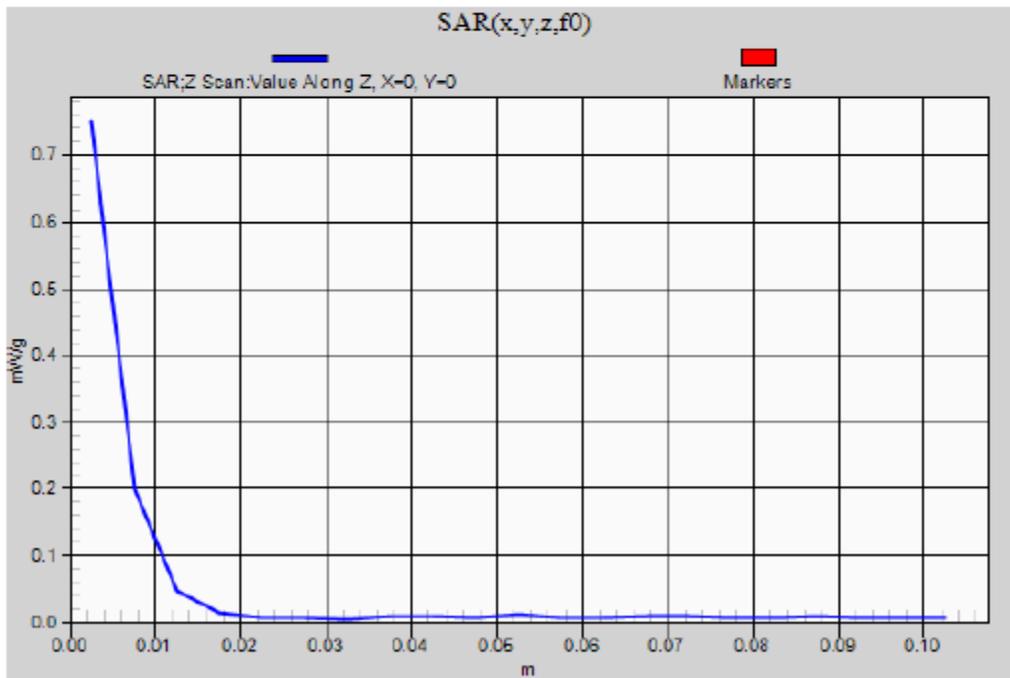
Test Laboratory: UL CCS

### WiFi 5.3GHz\_Head

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.2-5.3GHz; Frequency: 5300 MHz; Duty Cycle: 1:1

**LHS\_Closed/Tilt\_Ch60/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 0.750 mW/g



Date/Time: 3/29/2011 6:57:42 PM

Test Laboratory: UL CCS

### WiFi 5.5GHz\_Head

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.5GHz; Frequency: 5600 MHz; Duty Cycle: 1:1  
Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.219$  mho/m;  $\epsilon_r = 35.485$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Left Section

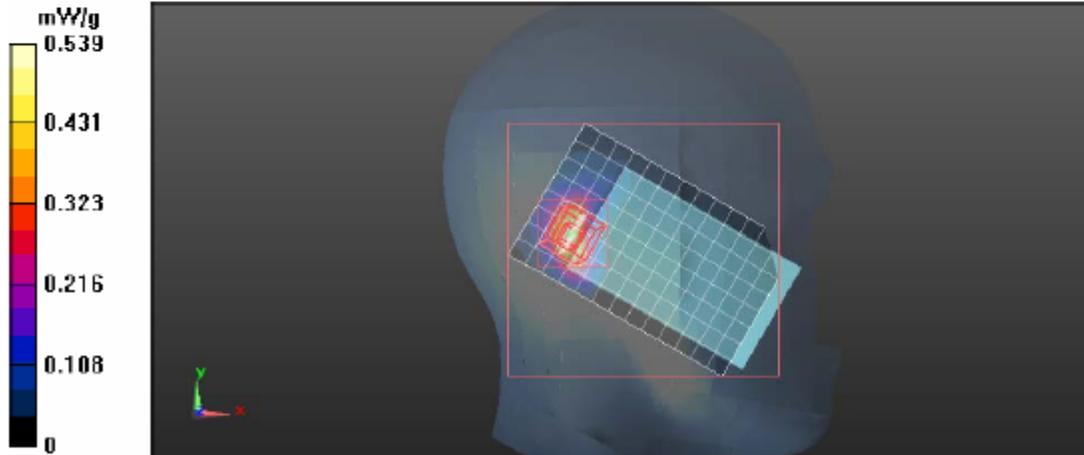
Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 deg. C

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(3.96, 3.96, 3.96); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: SAM with CRP; Type: SAM; Serial: 1602
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**LHS\_Closed/Tilt\_Ch120/Area Scan (9x14x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 0.539 mW/g

**LHS\_Closed/Tilt\_Ch120/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2.5mm  
Reference Value = 11.081 V/m; Power Drift = 0.10 dB  
Peak SAR (extrapolated) = 1.213 W/kg  
**SAR(1 g) = 0.387 mW/g; SAR(10 g) = 0.144 mW/g**  
Maximum value of SAR (measured) = 0.643 mW/g



Date/Time: 3/29/2011 7:15:38 PM

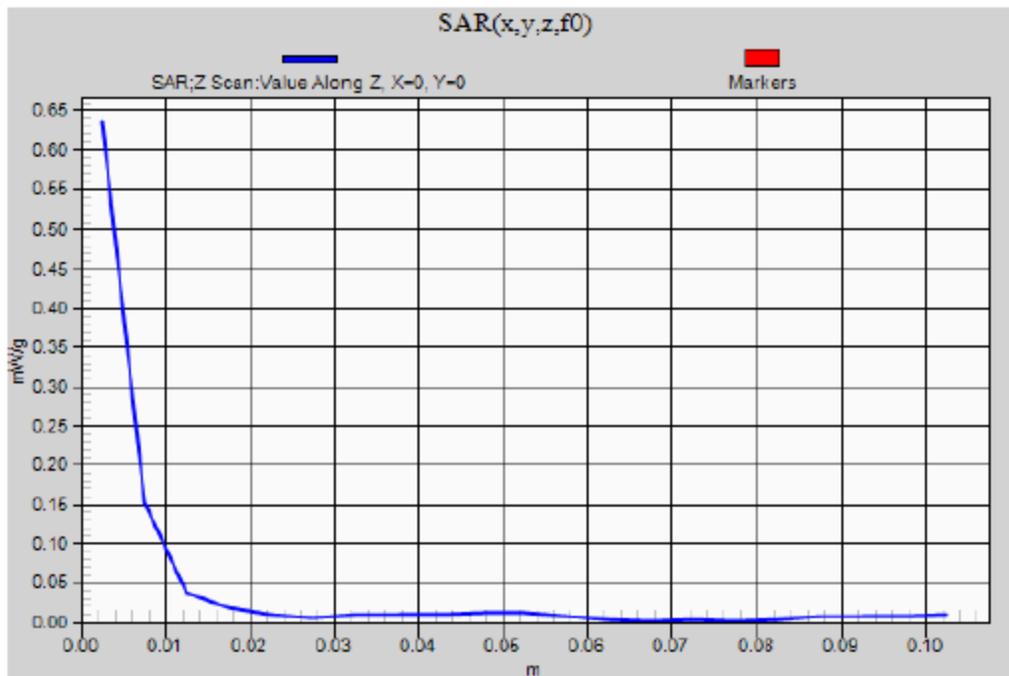
Test Laboratory: UL CCS

### WiFi 5.5GHz\_Head

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.5GHz; Frequency: 5600 MHz;Duty Cycle: 1:1

LHS\_Closed/Tilt\_Ch120/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 0.635 mW/g



Date/Time: 3/30/2011 12:41:54 PM

Test Laboratory: UL CCS

### WiFi 5.8GHz\_Head

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.8GHz; Frequency: 5785 MHz; Duty Cycle: 1:1  
Medium parameters used (interpolated):  $f = 5785$  MHz;  $\sigma = 5.373$  mho/m;  $\epsilon_r = 35.097$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Left Section

Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 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(4.04, 4.04, 4.04); Calibrated: 1/24/2011
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1239; Calibrated: 11/17/2010
- Phantom: SAM with CRP; Type: SAM; Serial: 1602
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**LHS\_Closed/Tilt\_Ch157/Area Scan (9x14x1):** Measurement grid: dx=10mm, dy=10mm

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

Maximum value of SAR (measured) = 0.626 mW/g

**LHS\_Closed/Tilt\_Ch157/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

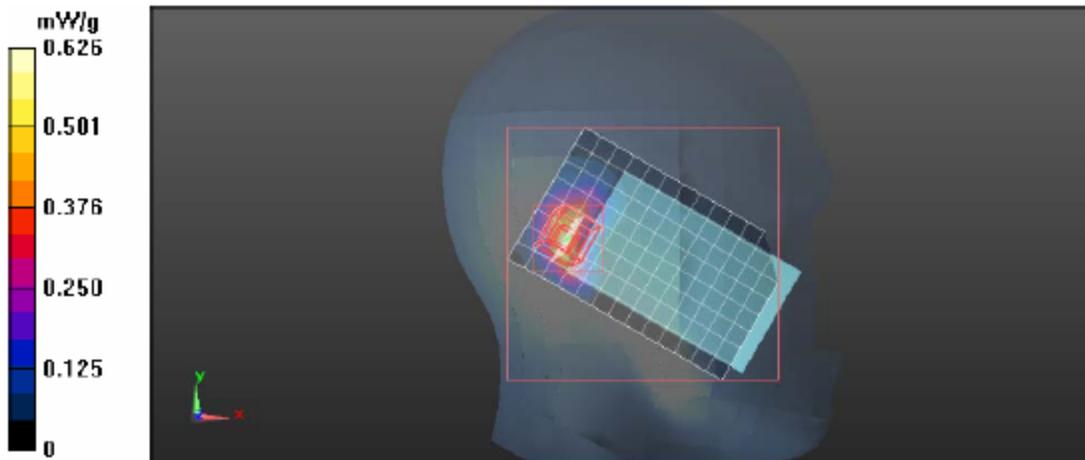
Reference Value = 11.440 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 1.280 W/kg

**SAR(1 g) = 0.392 mW/g; SAR(10 g) = 0.148 mW/g**

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

Maximum value of SAR (measured) = 0.649 mW/g



Date/Time: 3/30/2011 12:59:48 PM

Test Laboratory: UL CCS

### WiFi 5.8GHz\_Head

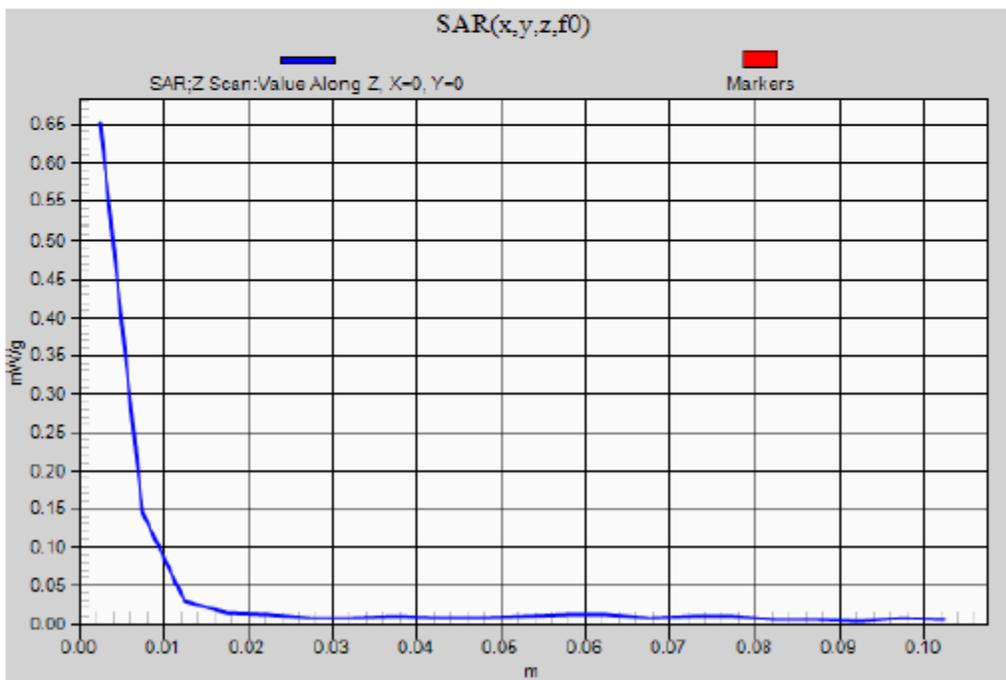
DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.8GHz; Frequency: 5785 MHz; Duty Cycle: 1:1

LHS\_Closed/Tilt\_Ch157/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.651 mW/g



Date/Time: 3/25/2011 4:47:24 PM

Test Laboratory: UL CCS

### WiFi 5GHz\_Body Worn (1.5cm)

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.2-5.3GHz; Frequency: 5200 MHz; Duty Cycle: 1:1  
Medium parameters used:  $f = 5200$  MHz;  $\sigma = 5.197$  mho/m;  $\epsilon_r = 48.349$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

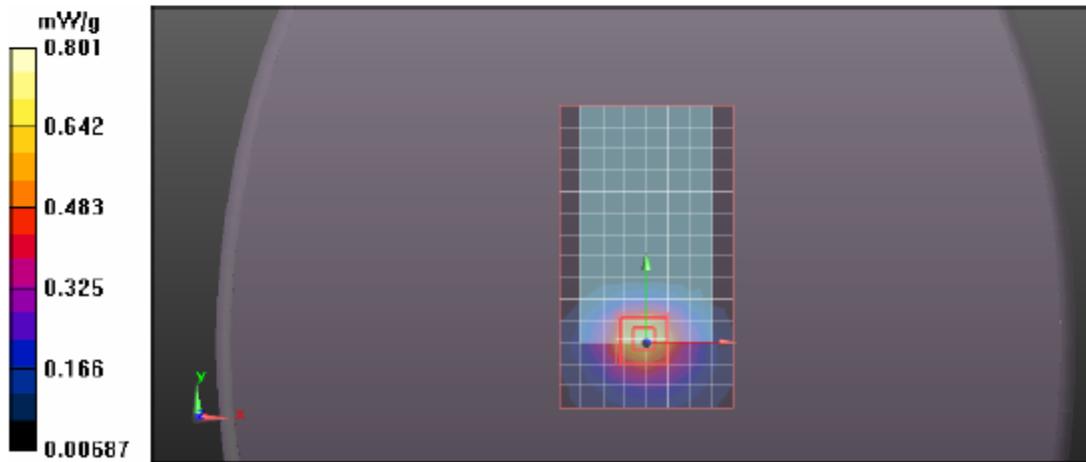
Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 deg. C

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(3.98, 3.98, 3.98); 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)

**back Side/Ch 40/Area Scan (9x15x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 0.801 mW/g

**back Side/Ch 40/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2.5mm  
Reference Value = 13.215 V/m; Power Drift = 0.0075 dB  
Peak SAR (extrapolated) = 1.514 W/kg  
**SAR(1 g) = 0.514 mW/g; SAR(10 g) = 0.203 mW/g**  
Maximum value of SAR (measured) = 0.813 mW/g



Date/Time: 3/25/2011 4:53:10 PM

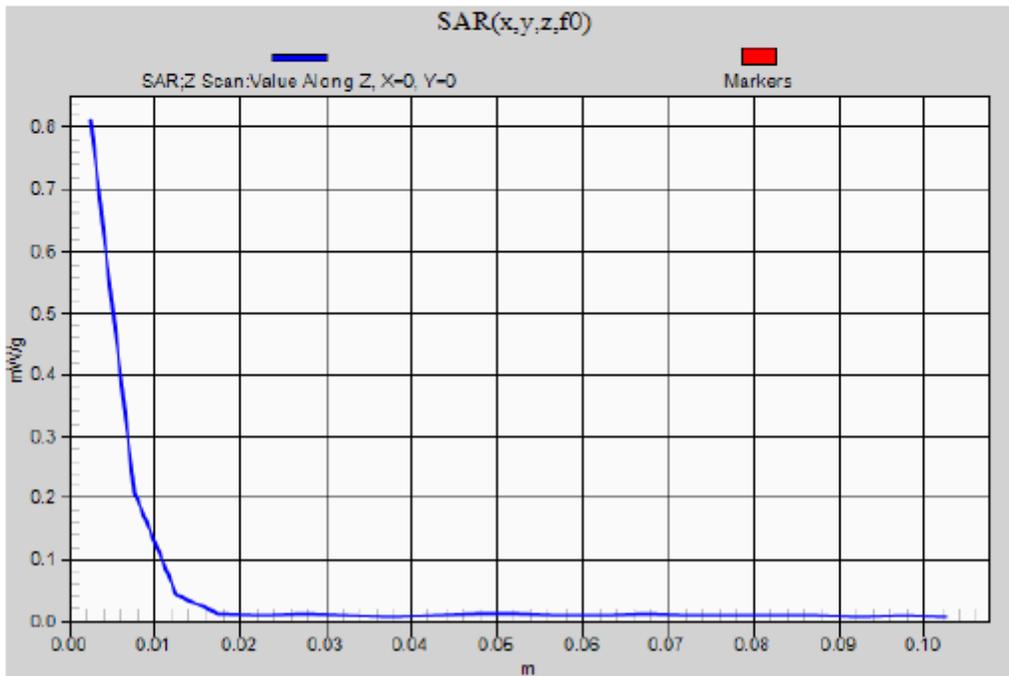
Test Laboratory: UL CCS

### WiFi 5GHz\_Body Worn (1.5cm)

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.2-5.3GHz; Frequency: 5200 MHz;Duty Cycle: 1:1

**Back Side/Ch 40/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 0.811 mW/g



Date/Time: 3/24/2011 1:02:25 PM

Test Laboratory: UL CCS

### WiFi 5GHz\_Body Worn (1.5cm)

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.2-5.3GHz; Frequency: 5300 MHz; Duty Cycle: 1:1  
Medium parameters used:  $f = 5300$  MHz;  $\sigma = 5.318$  mho/m;  $\epsilon_r = 49.618$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

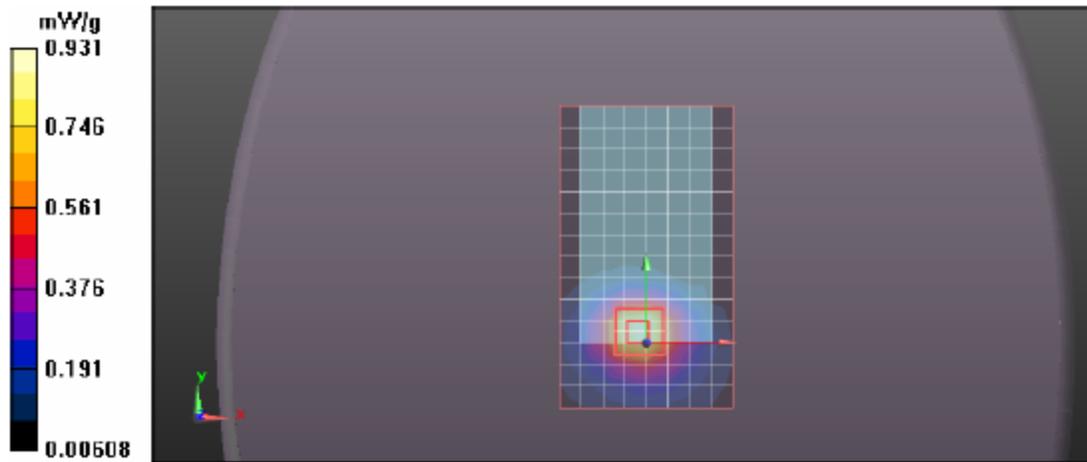
Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 deg. C

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(3.7, 3.7, 3.7); 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)

**Back Side/Ch 60/Area Scan (9x15x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 0.931 mW/g

**Back Side/Ch 60/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2.5mm  
Reference Value = 14.111 V/m; Power Drift = -0.21 dB  
Peak SAR (extrapolated) = 1.861 W/kg  
**SAR(1 g) = 0.654 mW/g; SAR(10 g) = 0.264 mW/g**  
Maximum value of SAR (measured) = 1.031 mW/g



Date/Time: 3/24/2011 1:08:40 PM

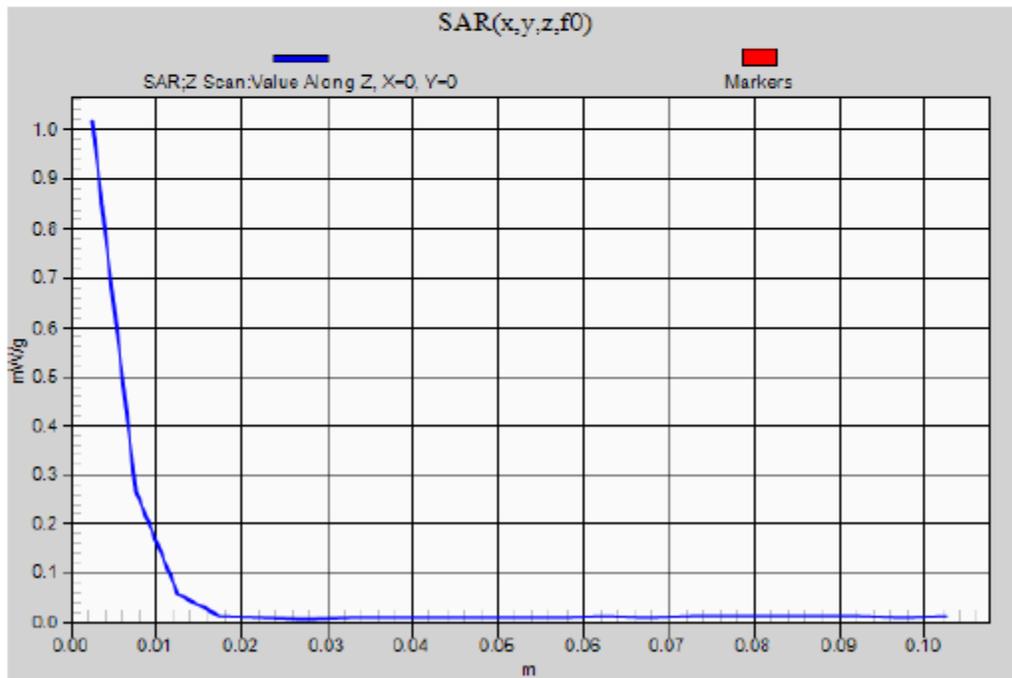
Test Laboratory: UL CCS

### WiFi 5GHz\_Body Worn (1.5cm)

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.2-5.3GHz; Frequency: 5300 MHz;Duty Cycle: 1:1

**Back Side/Ch 60/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 1.016 mW/g



Date/Time: 3/24/2011 5:09:31 PM

Test Laboratory: UL CCS

### WiFi 5GHz\_Body Worn (1.5cm)

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.5GHz; Frequency: 5600 MHz; Duty Cycle: 1:1  
Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.746$  mho/m;  $\epsilon_r = 48.986$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

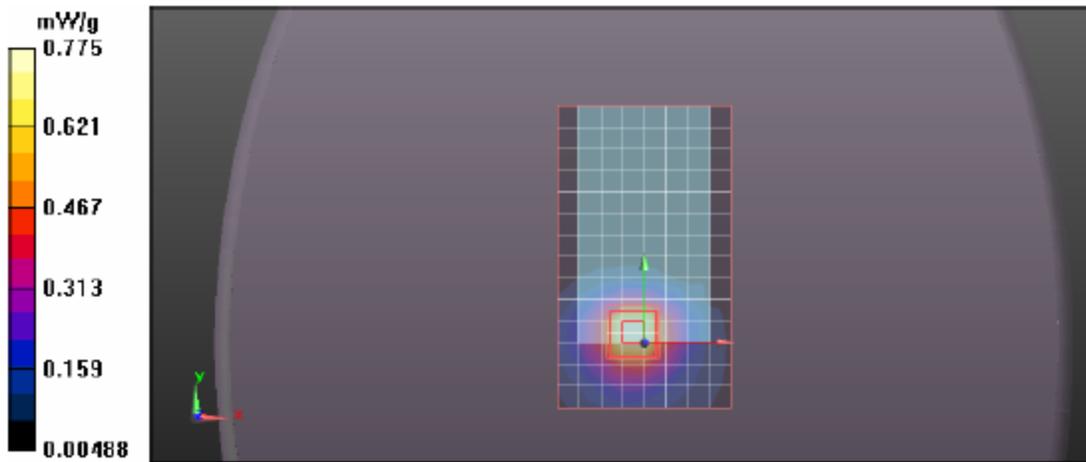
Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 deg. C

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(3.29, 3.29, 3.29); 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)

**Back Side/Ch 120/Area Scan (9x15x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 0.775 mW/g

**Back Side/Ch 120/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2.5mm  
Reference Value = 12.791 V/m; Power Drift = 0.02 dB  
Peak SAR (extrapolated) = 1.659 W/kg  
**SAR(1 g) = 0.568 mW/g; SAR(10 g) = 0.224 mW/g**  
Maximum value of SAR (measured) = 0.909 mW/g



Date/Time: 3/24/2011 5:13:17 PM

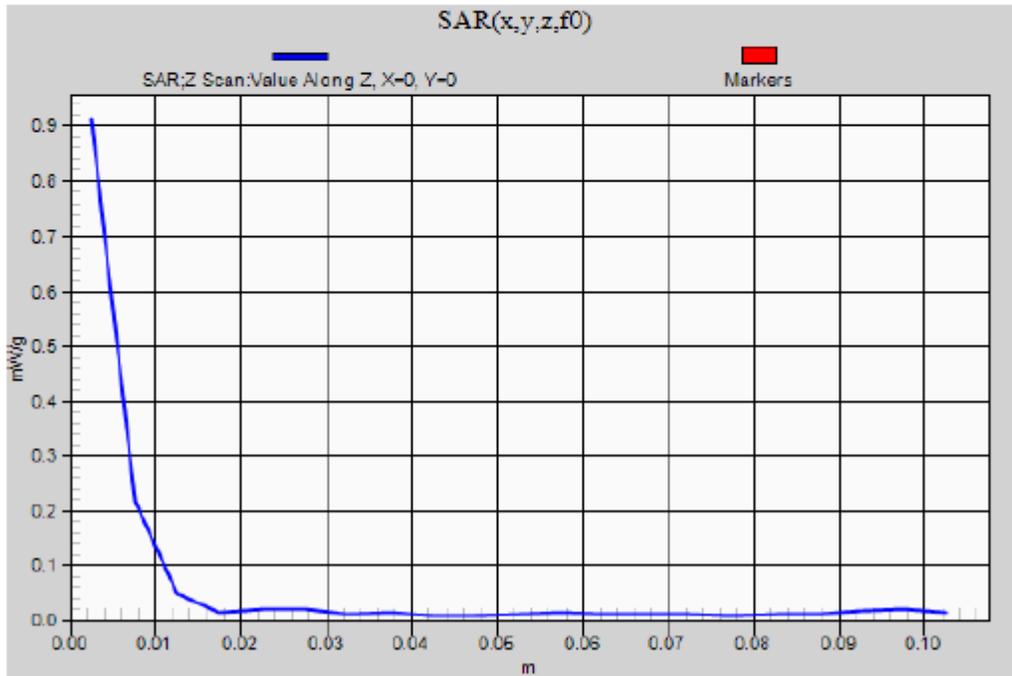
Test Laboratory: UL CCS

### WiFi 5GHz\_Body Worn (1.5cm)

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.5GHz; Frequency: 5600 MHz; Duty Cycle: 1:1

**Back Side/Ch 120/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 0.912 mW/g



Date/Time: 3/24/2011 5:45:23 PM

Test Laboratory: UL CCS

### WiFi 5GHz\_Body Worn (1.5cm)

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.8GHz; Frequency: 5785 MHz; Duty Cycle: 1:1  
Medium parameters used (interpolated):  $f = 5785$  MHz;  $\sigma = 6.01$  mho/m;  $\epsilon_r = 48.64$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 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(3.7, 3.7, 3.7); 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)

**Back Side/Ch 157/Area Scan (9x15x1):** Measurement grid: dx=10mm, dy=10mm

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

Maximum value of SAR (measured) = 0.796 mW/g

**Back Side/Ch 157/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

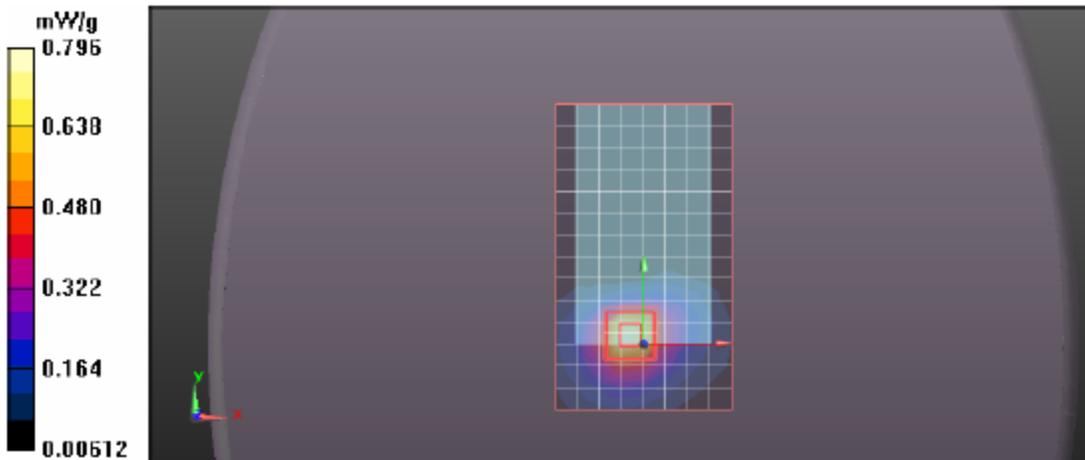
Reference Value = 12.568 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 1.704 W/kg

**SAR(1 g) = 0.557 mW/g; SAR(10 g) = 0.214 mW/g**

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

Maximum value of SAR (measured) = 0.905 mW/g



Date/Time: 3/24/2011 5:49:38 PM

Test Laboratory: UL CCS

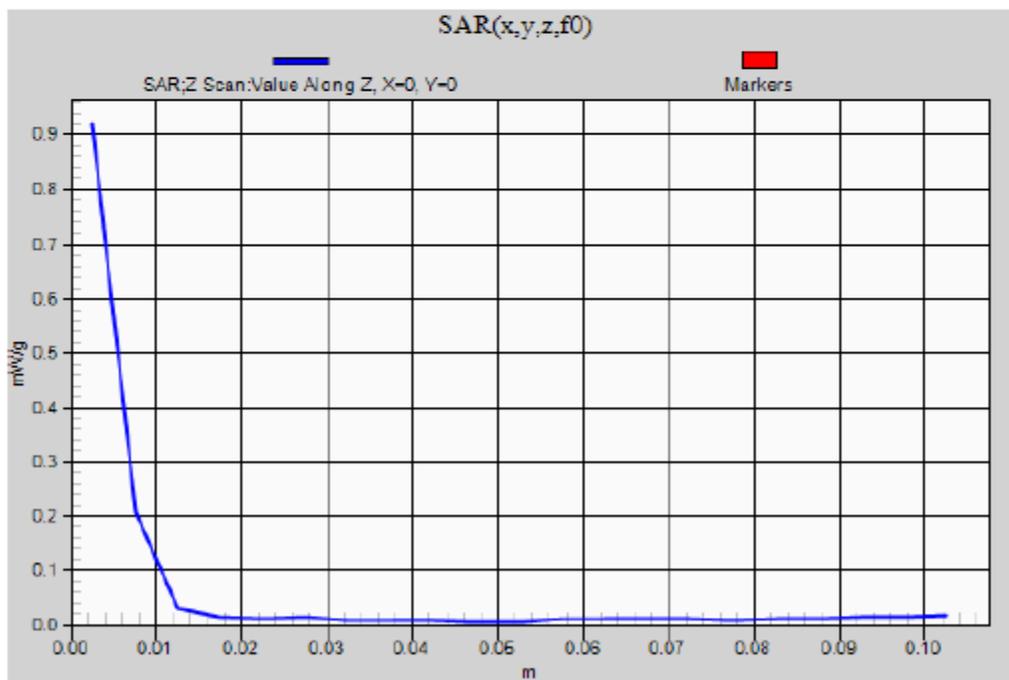
### WiFi 5GHz\_Body Worn (1.5cm)

DUT: Plam; Type: n/a; Serial: n/a

Communication System: 802.11a 5.8GHz; Frequency: 5785 MHz;Duty Cycle: 1:1

**Back Side/Ch 157/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)  
Maximum value of SAR (measured) = 0.919 mW/g



## 14. KDB 648474 SIMULTANEOUS TRANSMISSION CONSIDERATION

### SUMMARY OF SAR EVALUATION FOR A CELL PHONE WITH MULTIPLE TRANSMITTERS

<u>Individual Transmitter</u>	<u>Stand-alone SAR</u>
3G	Yes
WiFi	Yes
Bluetooth	Not required (average output is $< P_{Ref} / 12mW$ )

### SIMULTANEOUS TRANSMISSION

- 3G can transmit simultaneously with WiFi
- 3G can transmit simultaneously with Bluetooth
- WiFi can not transmit simultaneously with Bluetooth

## 15. SIMULTANEOUS SAR TEST DATA SUMMARY

The following tables show the peak SAR value for cellular and WiFi and the corresponding summation of such 1 gram SAR values for the different exposure conditions listed under the heading "Test Position" for the bands listed. The values in the table Simultaneous Transmission – Head/Body-worn/Hotspot were taken from section 19 above and from the table following section 13.3 below. These tables are provided for the purpose of showing that when the SAR summation is  $>1.6$  W/kg the SAR to Peak location separation ratio of the simultaneous transmitting antenna pair is  $<0.3$ .

**15.1. Simultaneous Transmission – Head (open)**

Test Position	Band	Cellular	Wi-Fi (2.4GHz)	∑ 1-g SAR (W/kg)
Left Touch	GSM 850	0.405	0.052	0.457
Left Tilt		0.208	0.00375	0.212
Right Touch		0.425	0.030	0.455
Right Tilt		0.203	0.00954	0.213
Left Touch	GSM 1900	0.242	0.052	0.294
Left Tilt		0.092	0.00375	0.096
Right Touch		0.184	0.030	0.214
Right Tilt		0.117	0.00954	0.127
Left Touch	CDMA2000 Cell Band	0.330	0.052	0.382
Left Tilt		0.160	0.00375	0.164
Right Touch		0.413	0.030	0.443
Right Tilt		0.184	0.00954	0.194
Left Touch	CDMA2000 PCS Band	0.423	0.052	0.475
Left Tilt		0.175	0.00375	0.179
Right Touch		0.254	0.030	0.284
Right Tilt		0.200	0.00954	0.210

Test Position	Band	Cellular	Wi-Fi (5GHz)	∑ 1-g SAR (W/kg)
Left Touch	GSM 850	0.405	0.042	0.447
Left Tilt		0.208	0.045	0.253
Right Touch		0.425	0.043	0.468
Right Tilt		0.203	0.047	0.250
Left Touch	GSM 1900	0.242	0.042	0.284
Left Tilt		0.092	0.045	0.137
Right Touch		0.184	0.043	0.227
Right Tilt		0.117	0.047	0.164
Left Touch	CDMA2000 Cell Band	0.330	0.042	0.372
Left Tilt		0.160	0.045	0.205
Right Touch		0.413	0.043	0.456
Right Tilt		0.184	0.047	0.231
Left Touch	CDMA2000 PCS Band	0.423	0.042	0.465
Left Tilt		0.175	0.045	0.220
Right Touch		0.254	0.043	0.297
Right Tilt		0.200	0.047	0.247

**15.2. Simultaneous Transmission – Head (closed)**

Test Position	Band	Cellular	Wi-Fi (2.4GHz)	$\Sigma$ 1-g SAR (W/kg)
Left Touch	GSM 850	0.428	0.102	0.530
Left Tilt		0.361	0.149	0.510
Right Touch		0.532	0.095	0.627
Right Tilt		0.386	0.148	0.534
Left Touch	GSM 1900	0.171	0.102	0.273
Left Tilt		0.091	0.149	0.240
Right Touch		0.168	0.095	0.263
Right Tilt		0.128	0.148	0.276
Left Touch	CDMA2000 Cell Band	0.449	0.102	0.551
Left Tilt		0.357	0.149	0.506
Right Touch		0.536	0.095	0.631
Right Tilt		0.398	0.148	0.546
Left Touch	CDMA2000 PCS Band	0.403	0.102	0.505
Left Tilt		0.213	0.149	0.362
Right Touch		0.285	0.095	0.380
Right Tilt		0.292	0.148	0.440

Test Position	Band	Cellular	Wi-Fi (5GHz)	$\Sigma$ 1-g SAR (W/kg)
Left Touch	GSM 850	0.428	0.332	0.760
Left Tilt		0.361	0.474	0.835
Right Touch		0.532	0.314	0.846
Right Tilt		0.386	0.462	0.848
Left Touch	GSM 1900	0.171	0.332	0.503
Left Tilt		0.091	0.474	0.565
Right Touch		0.168	0.314	0.482
Right Tilt		0.128	0.462	0.590
Left Touch	CDMA2000 Cell Band	0.449	0.332	0.781
Left Tilt		0.357	0.474	0.831
Right Touch		0.536	0.314	0.850
Right Tilt		0.398	0.462	0.860
Left Touch	CDMA2000 PCS Band	0.403	0.332	0.735
Left Tilt		0.213	0.474	0.687
Right Touch		0.285	0.314	0.599
Right Tilt		0.292	0.462	0.754

**15.3. Simultaneous Transmission – Body-worn at 15 mm Separation Distance**

Test Position	Band	Cellular	Wi-Fi (2.4 GHz)	$\Sigma$ 1-g SAR (W/kg)
Back Side	GPRS850 1 slot	0.857	0.196	1.053
Back Side	GPRS1900 3 slot	0.432	0.196	0.628
Back Side	CDMA2000 Cell Band	0.891	0.196	1.087
Back Side	CDMA2000 PCS Band	0.949	0.196	1.145
Test Position	Band	Cellular	Wi-Fi (5 GHz)	$\Sigma$ 1-g SAR (W/kg)
Back Side	GPRS850 1 slot	0.857	0.654	1.511
Back Side	GPRS1900 3 slot	0.432	0.654	1.086
Back Side	CDMA2000 Cell Band	0.891	0.654	1.545
*Back Side	CDMA2000 PCS Band	0.949	0.654	<b>1.603</b>

\*Antenna Pair SAR to Peak Location Separation Ratio  $\Sigma$  1-g SAR > 1.6 W/kg:

$\Sigma$ 1-g SAR (W/kg)	Separation distance (cm) Cellular-to-WiFi antenna	Antenna Pair SAR to Peak Location Separation Ratio
1.603	9	0.178

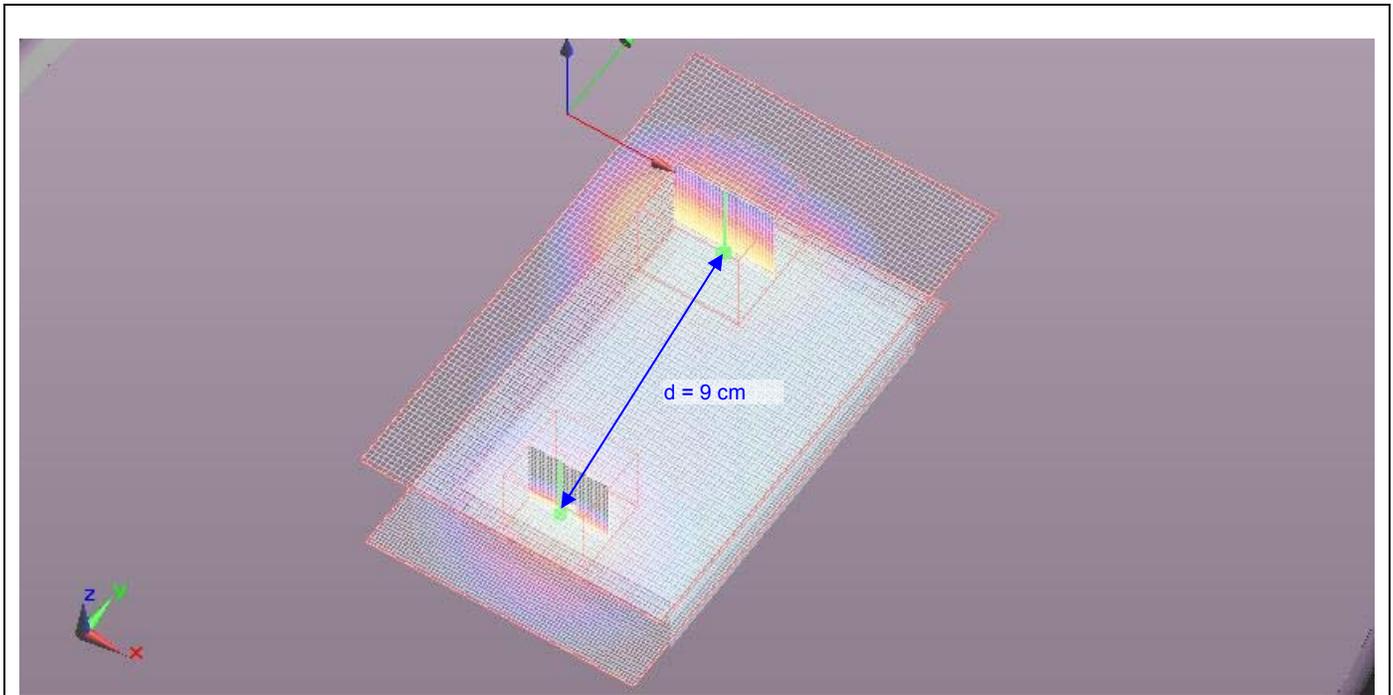
**Note:**

This table indicates the actual measured distance between peak SAR locations.

Simultaneous transmission SAR is not required for body-worn accessory mode because  $\Sigma$  1-g SAR < 1.6 W/kg.

**CDMA2000 PCS band - Back Side**

**Peaks SAR separation distance from cellular-to-WiFi 5 GHz band antenna**



CDMA2000 PCS  
 WiFi 5GHz  
 m

Value of SAR mW/g	X m	Y m	Z m
2.35	-0.016	0.0945	-0.181
1.86	-0.0046	0.0052	-0.182

Separation distance (d) =	0.0900	<b>9.00</b>	
	SQRT((X1-X2)^2+(Y1-Y2)^2+(Z1-Z2)^2)		

**15.4. Simultaneous Transmission – Hotspot Mode at 10 mm Separation Distance**

Test Position	Band	Cellular	Wi-Fi (2.4 GHz)	$\Sigma$ 1-g SAR (W/kg)
Back Side	GPRS850 1 slot	1.070	0.196	1.266
Back Side	GPRS1900 3 slot	0.755	0.196	0.951
Back Side	CDMA2000 Cell Band	1.130	0.196	1.326
Back Side	CDMA2000 PCS Band	1.400	0.196	1.596

**Note:**

Simultaneous transmission SAR is not required for Hotspot mode because  $\Sigma$  1-g SAR < 1.6 W/kg.

## 16. ATTACHMENTS

<u>No.</u>	<u>Contents</u>	<u>No. of page (s)</u>
1	System Check Plots	37
2-1	SAR Test Plots for GSM850	25
2-2	SAR Test Plots for GSM1900	21
2-3	SAR Test Plots for CDMA2000 Cell band	24
2-4	SAR Test Plots for CDMA2000 PCS band	24
2-5	SAR Test Plots for WiFi 2.4 GHz band	17
2-6	SAR Test Plots for WiFi 5 GHz band	52
3	Calibration Certificate - E-Field Probe - EX3DV3 SN 3686	11
4	Certificate of System Validation Dipole - D835V2 SN:4d002	11
5	Certificate of System Validation Dipole - D1900V2 SN:5d043	11
6	Certificate of System Validation Dipole - D2450 SN:706	9
7	Certificate of System Validation Dipole - D5GHzV2 SN 1075	11