FCC OET BULLETIN 65 SUPPLEMENT C
IC RSS-102 ISSUE 3

SAR EVALUATION REPORT

For

CDMA/1xEVDO Rel 0 /EVDO Rev. A with Bluetooth Phone

MODEL: P120EWW

FCC ID: O8F-PIXE

IC: 39Ø5A-PIXE

REPORT NUMBER: 09U12821-4A

ISSUE DATE: October 16, 2009

Prepared for

PALM
950 MAUDE AVENUE
SUNNYVALE, CA. 94085
UNITED STATES

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	September 14, 2009	Initial Issue	--
A	October 16, 2009	Added middle and high channels test with inductive cover in page 23	Chao Lin

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	PALM 950 MAUDE AVENUE SUNNYVALE, CA. 94085, UNITED STATES
EUT DESCRIPTION:	CDMA/1xEVDO Rel 0 /EVDO Rev. A with Bluetooth Phone
MODEL NUMBER:	P120EWW
DEVICE CATEGORY:	Portable
EXPOSURE CATEGORY:	General Population/Uncontrolled Exposure
DATE TESTED:	September 10 - 11, 2009

THE HIGHEST SAR VALUES:

FCC / IC Rule Parts	Frequency Range [MHz]	The Highest SAR Values (1g_mW/g)	Limit (mW/g)
22H / RSS-132	824 - 849	Head: 1.21; Body: 0.54	1.6
24E / RSS-133	1850 - 1910	Head: 1.56; Body: 0.634	

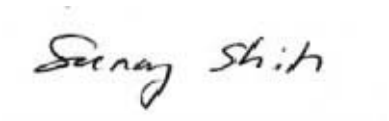
APPLICABLE STANDARDS AND TEST PROCEDURES:

STANDARDS AND TEST PROCEDURES	TEST RESULTS
• FCC OET Bulletin 65 Supplement C and the following specific Test Procedure: o KDB 941225 SAR test for 3G devices o KDB 648474 D01 SAR evaluation considerations for handsets with multiple transmitters and antennas	Pass
• RSS-102 ISSUE 3	Pass

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

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

Approved & Released For CCS By:



SUNNY SHIH
ENGINEERING SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

CHAO YEN LIN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C, IC RSS 102 Issue 3, and the following specific FCC Test Procedure.

- KDB 941225 SAR test for 3G devices
- KDB 648474 D01 SAR evaluation considerations for handsets with multiple transmitters and antennas

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due date		
				MM	DD	Year
Robot - Six Axes	Stäubli	RX90BL	N/A	N/A		
Robot Remote Control	Stäubli	CS7MB	3403-91535	N/A		
DASY4 Measurement Server	SPEAG	SEUMS001BA	1041	N/A		
Probe Alignment Unit	SPEAG	LB (V2)	261	N/A		
SAM Phantom (SAM1)	SPEAG	QD000P40CA	1185	N/A		
SAM Phantom (SAM2)	SPEAG	QD000P40CA	1050	N/A		
Oval Flat Phantom (ELI 4.0)	SPEAG	QD OVA001 B	1003	N/A		
Electronic Probe kit	HP	85070C	N/A	N/A		
S-Parameter Network Analyzer	Agilent	8753ES-6	MY40001647	11	14	2009
Signal Generator	Agilent	8753ES-6	MY40001647	11	14	2009
E-Field Probe	SPEAG	EX3DV4	3686	3	23	2010
Thermometer	ERTCO	639-1S	1718	5	1	2010
Data Acquisition Electronics	SPEAG	DAE3 V1	427	10	20	2009
System Validation Dipole	SPEAG	D835V2	4d002	4	23	2011
System Validation Dipole	SPEAG	D900V2	108	1	21	2010
System Validation Dipole	SPEAG	D1800V2	294	1	29	2010
System Validation Dipole	SPEAG	D1900V2	5d043	1	29	2010
System Validation Dipole	SPEAG	D2450V2	748	4	14	2010
System Validation Dipole	SPEAG	D5GHzV2	1003	11	21	2009
MXA Signal Analyzer	Agilent	N9020A	US48350984	10	23	2009
ESG Vector Signal Generator	Agilent	E4438C	US44271090	9	17	2010
Power Meter	Giga-tronics	8651A	8651404	1	11	2010
Power Sensor	Giga-tronics	80701A	1834588	1	11	2010
Amplifier	Mini-Circuits	ZVE-8G	90606	N/A		
Amplifier	Mini-Circuits	ZHL-42W	D072701-5	N/A		
Simulating Liquid	CCS	H1900	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M1900	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	H1800	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M1800	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	H1700	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M1700	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	H835	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M835	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	H900	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M900	N/A	Within 24 hrs of first test		
Simulating Liquid	SPAEG	H2450	N/A	Within 24 hrs of first test		
Simulating Liquid	SPAEG	M2450	N/A	Within 24 hrs of first test		

4.2. MEASUREMENT UNCERTAINTY

Measurement uncertainty for 300 MHz – 3000 MHz

Uncertainty component	Tol. (±%)	Probe Dist.	Div.	Ci (1g)	Ci (10g)	Std. Unc.(±%)	
						Ui (1g)	Ui(10g)
Measurement System							
Probe Calibration	4.80	N	1	1	1	4.80	4.80
Axial Isotropy	4.70	R	1.732	0.707	0.707	1.92	1.92
Hemispherical Isotropy	9.60	R	1.732	0.707	0.707	3.92	3.92
Boundary Effects	1.00	R	1.732	1	1	0.58	0.58
Linearity	4.70	R	1.732	1	1	2.71	2.71
System Detection Limits	1.00	R	1.732	1	1	0.58	0.58
Readout Electronics	1.00	N	1	1	1	1.00	1.00
Response Time	0.80	R	1.732	1	1	0.46	0.46
Integration Time	2.60	R	1.732	1	1	1.50	1.50
RF Ambient Conditions - Noise	1.59	R	1.732	1	1	0.92	0.92
RF Ambient Conditions - Reflections	0.00	R	1.732	1	1	0.00	0.00
Probe Positioner Mechnical Tolerance	0.40	R	1.732	1	1	0.23	0.23
Probe Positioning With Respect to Phantom Shell	2.90	R	1.732	1	1	1.67	1.67
Extrapolation, interpolation, and integration algorithms for max. SAR evaluation	3.90	R	1.732	1	1	2.25	2.25
Test sample Related							
Test Sample Positioning	1.10	N	1	1	1	1.10	1.10
Device Holder Uncertainty	3.60	N	1	1	1	3.60	3.60
Power and SAR Drift Measurement	5.00	R	1.732	1	1	2.89	2.89
Phantom and Tissue Parameters							
Phantom Uncertainty	4.00	R	1.732	1	1	2.31	2.31
Liquid Conductivity - Target	5.00	R	1.732	0.64	0.43	1.85	1.24
Liquid Conductivity - Meas.	8.60	N	1	0.64	0.43	5.50	3.70
Liquid Permittivity - Target	5.00	R	1.732	0.6	0.49	1.73	1.41
Liquid Permittivity - Meas.	3.30	N	1	0.6	0.49	1.98	1.62
Combined Standard Uncertainty	RSS					11.44	10.49
Expanded Uncertainty (95% Confidence Interval)	K=2					22.87	20.98

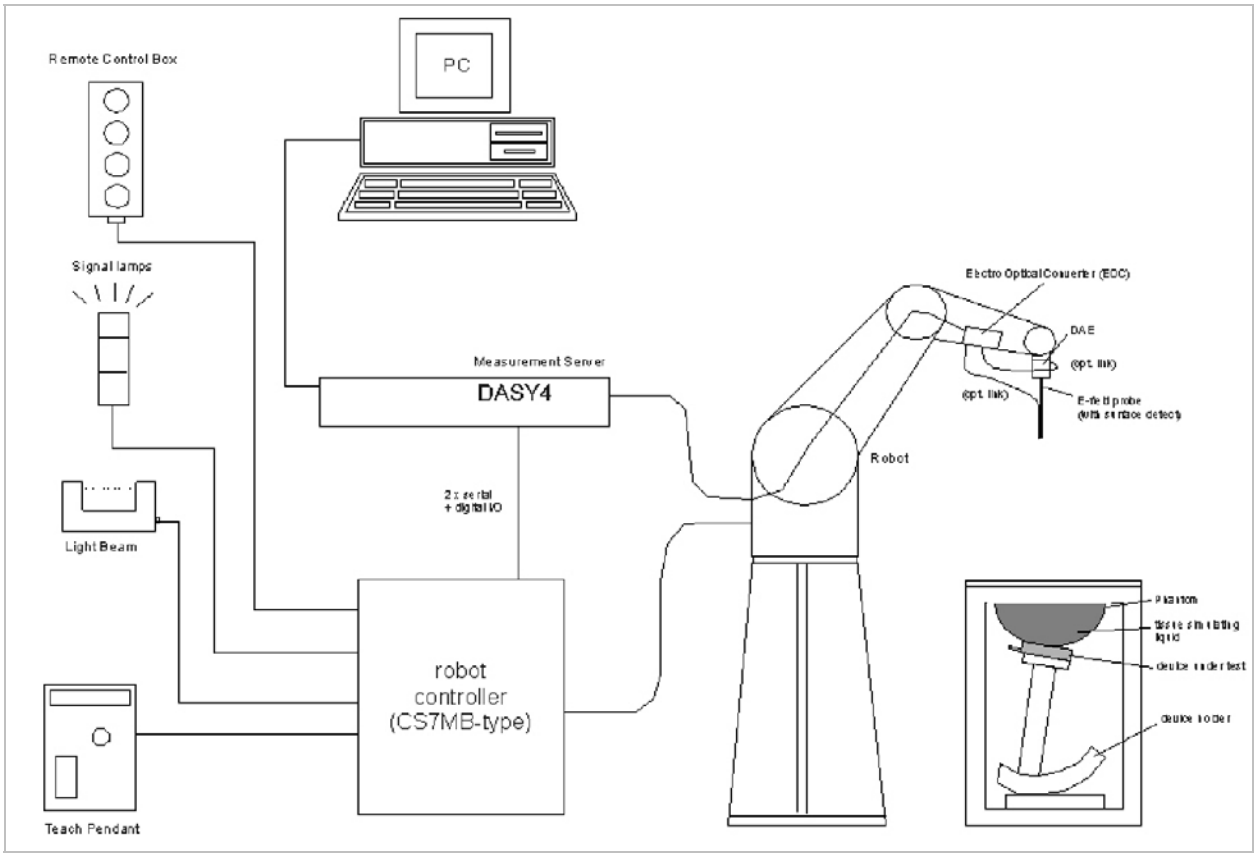
Notesfor table
1. Tol. - tolerance in influence quaitity
2. N - Nomal
3. R - Rectangular
4. Div. - Divisor used to obtain standard uncertainty
5. Ci - is te sensitivity coefficient

5. EQUIPMENT UNDER TEST

CDMA/1xEVDO Rel 0 /EVDO Rev. A with Bluetooth Phone

Normal operation:	• Held to head • Worn on body (LCD facing-up; LCD facing-down) with 15 mm separation distance
Body Worn Accessory	Headset
Antenna(s):	Internal
Other radio modules in host:	Bluetooth
Co-located Tx:	WWAN can transmit simultaneously with Bluetooth

6. SYSTEM SPECIFICATIONS



The DASY4 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 2000 or Windows XP.
- DASY4 software.
- Remote controls with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system.

7. COMPOSITION OF INGREDIENTS FOR TISSUE SIMULATING LIQUIDS

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

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Salt: 99+% Pure Sodium Chloride Sugar: 98+% Pure Sucrose
Water: De-ionized, 16 MΩ+ resistivity HEC: Hydroxyethyl Cellulose
DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

8. LIQUID PARAMETERS CHECK

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine of the dielectric parameters are within the tolerances of the specified target values. The relative permittivity and conductivity of the tissue material should be within ± 5% of the values given in the table below.

Reference Values of Tissue Dielectric Parameters for Head and Body Phantom (for 150 – 3000 MHz and 5800 MHz)

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in IEEE Standard 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations and extrapolated according to the head parameters specified in IEEE Standard 1528.

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

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

8.1. LIQUID CHECK RESULTS FOR 835 MHZ

Simulating Liquid Dielectric Parameters for Head 835 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Chaoyen Lin

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	41.82	Relative Permittivity (ϵ_r):	41.823	41.5	0.78	± 5
	e"	19.45	Conductivity (σ):	0.904	0.90	0.41	± 5
900	e'	41.21	Relative Permittivity (ϵ_r):	41.209	41.5	-0.70	± 5
	e"	19.03	Conductivity (σ):	0.953	0.97	-1.77	± 5

Liquid temperature: 23 deg. C
September 11, 2009 8:25 AM

Frequency	e'	e"
800000000	42.1477	19.4447
805000000	42.1384	19.4554
810000000	42.0995	19.4365
815000000	42.0644	19.4651
820000000	42.0166	19.465
825000000	41.9868	19.4865
830000000	41.9233	19.4804
835000000	**41.823**	**19.4538**
840000000	41.7463	19.4312
845000000	41.6688	19.3675
850000000	41.6326	19.3339
855000000	41.5257	19.2702
860000000	41.457	19.2268
865000000	41.411	19.1874
870000000	41.3292	19.1288
875000000	41.2783	19.1021
880000000	41.2283	19.0756
885000000	41.2003	19.0526
890000000	41.1998	19.0514
895000000	41.2331	19.0294
900000000	**41.2091**	**19.0303**
905000000	41.1693	19.0262
910000000	41.1266	19.0725
915000000	41.045	19.1014
920000000	40.9679	19.0946
925000000	40.8859	19.0995
930000000	40.8112	19.0635
935000000	40.7172	19.0246
940000000	40.665	18.9632
945000000	40.625	18.9081
950000000	40.6226	18.8793
955000000	40.572	18.8474
960000000	40.542	18.8187

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

Simulating Liquid Dielectric Parameters for Muscle 835 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Chaoyen Lin

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	55.04	Relative Permittivity (ϵ_r):	55.041	55.2	-0.29	± 5
	e"	20.83	Conductivity (σ):	0.968	0.97	-0.25	± 5
900	e'	54.47	Relative Permittivity (ϵ_r):	54.466	55.0	-0.97	± 5
	e"	20.31	Conductivity (σ):	1.017	1.05	-3.16	± 5

Liquid temperature: 23 deg. C
September 11, 2009 8:37 AM

Frequency	e'	e"
800000000	55.3379	20.8849
805000000	55.3005	20.8782
810000000	55.2573	20.8679
815000000	55.2298	20.8972
820000000	55.2183	20.8752
825000000	55.1767	20.8756
830000000	55.1051	20.837
835000000	**55.0407**	**20.8295**
840000000	54.9896	20.7951
845000000	54.9515	20.7343
850000000	54.9118	20.6964
855000000	54.8372	20.6504
860000000	54.7958	20.6032
865000000	54.7646	20.5525
870000000	54.6858	20.4883
875000000	54.606	20.4468
880000000	54.5846	20.415
885000000	54.5418	20.3812
890000000	54.4907	20.351
895000000	54.4896	20.3118
900000000	**54.4663**	**20.3078**
905000000	54.4014	20.3152
910000000	54.3485	20.3492
915000000	54.26	20.356
920000000	54.1995	20.3516
925000000	54.1045	20.3359
930000000	54.0485	20.2995
935000000	53.9739	20.2406
940000000	53.9372	20.1973
945000000	53.9134	20.1592
950000000	53.9181	20.1396
955000000	53.899	20.1098
960000000	53.884	20.0884

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

8.2. LIQUID CHECK RESULTS FOR 1900 MHZ

Simulating Liquid Dielectric Parameters for Head 1900 MHz

Room Ambient Temperature = 25°C; Relative humidity = 35% Measured by: Chao Lin

f (MHz)	Liquid Parameters		Measured Results		Target	Delta (%)	Limit (%)
1900	e'	40.016	Relative Permittivity (ϵ_r):	40.0156	40.0	0.04	± 5
	e"	13.118	Conductivity (σ):	1.38652	1.40	-0.96	± 5

Liquid temperature: 23 deg. C
September 10, 2009 07:30 AM

Frequency	e'	e"
1710000000	41.0673	12.4545
1720000000	41.019	12.4706
1730000000	41.001	12.5091
1740000000	40.9572	12.5846
1750000000	40.9243	12.6904
1760000000	40.8282	12.7602
1770000000	40.7224	12.8208
1780000000	40.6318	12.808
1790000000	40.5839	12.8126
1800000000	40.541	12.8234
1810000000	40.4854	12.812
1820000000	40.4368	12.7905
1830000000	40.4311	12.7878
1840000000	40.4244	12.8824
1850000000	40.3798	13.0005
1860000000	40.2575	13.0926
1870000000	40.1224	13.133
1880000000	40.0527	13.0995
1890000000	40.038	13.0851
1900000000	**40.0156**	**13.1176**
1910000000	39.984	13.1203

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

Simulating Liquid Dielectric Parameters for Muscle 1900 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Chaoyen Lin

f (MHz)	Muscle Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1900	e'	53.465	Relative Permittivity (ϵ_r):	53.4645	53.3	0.31	± 5
	e"	14.255	Conductivity (σ):	1.50678	1.52	-0.87	± 5

Liquid temperature: 23 deg. C
September 10, 2009 7:34 AM

Frequency	e'	e"
1710000000	54.0664	13.7244
1720000000	54.0557	13.7899
1730000000	54.0545	13.8768
1740000000	54.0512	13.9579
1750000000	54.0508	13.9917
1760000000	53.9943	13.9925
1770000000	53.959	13.9604
1780000000	53.8977	13.9221
1790000000	53.8389	13.9228
1800000000	53.7754	13.9577
1810000000	53.7025	14.0125
1820000000	53.6349	14.0707
1830000000	53.5824	14.1673
1840000000	53.5781	14.2573
1850000000	53.5541	14.3066
1860000000	53.5266	14.3335
1870000000	53.5115	14.3197
1880000000	53.5118	14.2734
1890000000	53.4853	14.2485
1900000000	**53.4645**	**14.2553**
1910000000	53.3853	14.2918

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

Simulating Liquid Dielectric Parameters for Head 1900 MHz

Room Ambient Temperature = 25°C; Relative humidity = 35% Measured by: Chao Lin

f (MHz)	Liquid Parameters		Measured Results		Target	Delta (%)	Limit (%)
1900	e'	39.889	Relative Permittivity (ε_r):	39.8886	40.0	-0.28	± 5
	e"	13.021	Conductivity (σ):	1.37627	1.40	-1.70	± 5

Liquid temperature: 23 deg. C
October 15, 2009 4:39 PM

Frequency	e'	e"
1710000000	40.9403	12.3575
1720000000	40.892	12.3736
1730000000	40.874	12.4121
1740000000	40.8302	12.4876
1750000000	40.7973	12.5934
1760000000	40.7012	12.6632
1770000000	40.5954	12.7238
1780000000	40.5048	12.711
1790000000	40.4569	12.7156
1800000000	40.414	12.7264
1810000000	40.3584	12.715
1820000000	40.3098	12.6935
1830000000	40.3041	12.6908
1840000000	40.2974	12.7854
1850000000	40.2528	12.9035
1860000000	40.1305	12.9956
1870000000	39.9954	13.036
1880000000	39.9257	13.0025
1890000000	39.911	12.9881
1900000000	**39.8886**	**13.0206**
1910000000	39.857	13.0233

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

Simulating Liquid Dielectric Parameters for Muscle 1900 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Chaoyen Lin

f (MHz)	Muscle Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1900	e'	53.490	Relative Permittivity (ε_r):	53.4895	53.3	0.36	± 5
	e"	14.237	Conductivity (σ):	1.50487	1.52	-1.00	± 5

Liquid temperature: 23 deg. C
October 15, 2009 4:34 PM

Frequency	e'	e"
1710000000	54.0914	13.7064
1720000000	54.0807	13.7719
1730000000	54.0795	13.8588
1740000000	54.0762	13.9399
1750000000	54.0758	13.9737
1760000000	54.0193	13.9745
1770000000	53.984	13.9424
1780000000	53.9227	13.9041
1790000000	53.8639	13.9048
1800000000	53.8004	13.9397
1810000000	53.7275	13.9945
1820000000	53.6599	14.0527
1830000000	53.6074	14.1493
1840000000	53.6031	14.2393
1850000000	53.5791	14.2886
1860000000	53.5516	14.3155
1870000000	53.5365	14.3017
1880000000	53.5368	14.2554
1890000000	53.5103	14.2305
1900000000	**53.4895**	**14.2373**
1910000000	53.4103	14.2738

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

9. SYSTEM CHECK

The system performance check is performed prior to any usage of the system in order to guarantee reproducible results. The system performance check verifies that the system operates within its specifications of ±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 EX3DV4 was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 fine cube was chosen for cube
- Distance between probe sensors and phantom surface was set to 3 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 250 mW±3%.
- The results are normalized to 1 W input power.

IEEE Standard 1528-2003 Numerical reference SAR values (W/kg) for reference dipole and flat phantom

Frequency (MHz)	Distance (mm)	1g SAR [W/kg]	10g SAR [W/kg]	Local SAR at surface (above feed-point)
300	15	3	2	4.4
450	15	4.9	3.3	7.2
835	15	9.5	6.2	4.1
900	15	10.8	6.9	16.4
1450	10	29	16	5.02
1800	10	38.1	19.8	69.5
1900	10	39.7	20.5	72.1
2000	10	41.1	21.1	74.6
2450	10	52.4	24	104.2
3000	10	63.8	25.7	104.2

Reference SAR Values for Body-tissue (From SPEAG)

Dipole Type	Distance	Frequency	SAR (1g)	SAR (10g)	SAR (peak)
	(mm)	(MHz)	[W/kg]	[W/kg]	[W/kg]
D835V2	15	835	9.71	6.38	14.1
D1900V2	10	1900	39.8	20.8	69.6

9.1. SYSTEM CHECK RESULTS FOR D1900V2

System Validation Dipole: D1900V2 SN: 5d043

Date: September 10, 2009

Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Chaoyen Lin

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	1900	250	1g SAR:	38.2	39.8	-4.02	±10
			10g SAR:	20.1	20.8	-3.37	

System Validation Dipole: D1900V2 SN: 5d043

Date: October 15, 2009

Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Chaoyen Lin

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	1900	250	1g SAR:	38.1	39.8	-4.27	±10
			10g SAR:	19.9	20.8	-4.33	

9.2. SYSTEM CHECK RESULTS FOR D835V2

System Validation Dipole: D835V2 SN:4d002

Date: September 11, 2009

Ambient Temperature = 25°C; Relative humidity = 40% Measured by: Chaoyen Lin

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	835	250	1g SAR:	10.1	9.71	4.02	±10
			10g SAR:	6.61	6.38	3.61	

10. OUTPUT POWER VERIFICATION

10.1. RF Output Power for WWAN

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

10.2. RF Output Power for 1XRTT

This procedure assumes the CMU200

- Call Setup > Shift & Preset
- Cell Info > Cell Parameters > System ID (SID) > 3333 for cell band
- Cell Info > Cell Parameters > System ID (SID) > 3333 for cell band
  > Network ID (NID) > 3333 for cell and PCS bands.
- Protocol Rev > 6 (IS-2000-0)
- Radio Config (RC) > Please see following table or details
- FCH Service Option (SO) Setup > Please see following table or details
- Traffic Data Rate > Full
- TDSO SCH Info > F-SCH Parameters > F-SCH Data Rate > 153.6 kbps
  > R-SCH Parameters > R-SCH Data Rate > 153.6 kbps
- Rvs Power Ctrl > Active bits
  - Rvs Power Ctrl > All Up bits (Maximum TxPout)

RF Power Output for 1xRTT - Cell Band				
Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)		
		Ch. 1013/824.7MHz	Ch. 384/836.52MHz	Ch. 777/848.31MHz
		Average	Average	Average
RC3 (Fwd3, Rvs3)	1 (Voice)			
	2 (Loopback)	23.91	23.90	23.92
	3 (Voice)			
	55 (Loopback)	23.94	23.96	23.94
	32 (+ F-SCH)	24.01	23.96	24.04
	32 (+ SCH)	24.00	23.91	23.95
	68 (Voice)			

RF Power Output for 1xRTT - PCS Band				
Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)		
		Ch. 25/1851.25MHz	Ch. 600/1880MHz	Ch. 1175/1908.75 MHz
		Average	Average	Average
RC3 (Fwd3, Rvs3)	1 (Voice)			
	2 (Loopback)	23.22	23.02	23.03
	3 (Voice)			
	55 (Loopback)	23.26	23.05	23.09
	32 (+ F-SCH)	23.25	23.13	23.16
	32 (+ SCH)	23.24	23.01	23.01
	68 (Voice)			
	32768 (Voice)			

10.3. RF Output Power for EVDO Release 0

This procedure assumes the CMU200

EVDO Release 0 - RTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 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 > 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

Cell Band

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm) Average
307.2 kbps (2 slot, QPSK)	153.6 kbps	1013	824.70	23.82
		384	836.52	23.90
		777	848.31	23.79

PCS Band

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm) Average
307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	23.19
		600	1880.00	23.09
		1175	1908.75	23.02

10.4. RF Output Power for EVDO Release A

This procedure assumes the CMU200

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

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

RF Power Output Results for EV-DO Rev A

Cell Band

FETAP-Traffic Format	RETAP-Data Payload Size	Channel	f (MHz)	Conducted power (dBm) Average
307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	1013	824.70	23.96
		384	836.52	24.02
		777	848.31	23.93

PCS Band

FETAP-Traffic Format	RETAP-Data Payload Size	Channel	f (MHz)	Conducted power (dBm) Average
307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	23.30
		600	1880.00	23.15
		1175	1908.75	23.08

10.5. KDB 941225 Test Reduction Consideration

Head SAR Measurement
Based upon the power measurement in section 10.3 and 10.4 for 1xEVDO, Rev.0 and Rev. A power measurement is not ¼ dB higher than RC3. Thus, RC3/SO55 is used for head SAR measurement.

Body SAR Measurement
Based upon the power measurement in section 10.3 and 10.4, SAR for 1xEVDO Rev.0 and Rev. A power measurement is not ¼ dB higher than RC3. Thus, RC3/SO32 is used for body SAR measurement.

10.6. KDB 648474 Simultaneous Transmission Consideration

Bluetooth Antenna Transmitter
Since the output power of Bluetooth transmitter is less than 60/f(GHz) and its antenna is separate more than 5.0 (cm) from WWAN antenna, stand-alone SAR evaluation is not required.

Simultaneous Transmission
Since stand-alone SAR evaluation is not required for Bluetooth antenna and its antenna is more than 5.0 (cm)/ 7 cm from other antennas, simultaneous transmission SAR evaluation is not required.

11. SUMMARY OF TEST RESULTS

WORST-CASE CONFIGURATIONS

Non-inductive back cover is used for all SAR testing. Additional SAR testing with inductive back cover is performed at worst-case test configurations.

Additional SAR testing with headset for body worn is performed at worst-case configurations as well.

11.1. PCS Band

11.1.1. LEFT HAND SIDE

Test position	Mode	UL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	SO55, RC3	25	1851.25	1.34	1.6
		600	1880.00	1.31	
		1175	1908.75	1.33	
Touch (with inductive backcover)	SO55, RC3	25	1851.25	1.56	1.6
		600	1880.00	1.47	
		1175	1908.75	1.44	
Tilt (15◦)	SO55, RC3	25	1851.25		1.6
		600	1880.00	0.490	
		1175	1908.75		

11.1.2. RIGHT HAND SIDE

Test position	Mode	UL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	SO55, RC3	25	1851.25	1.23	1.6
		600	1880.00	1.01	
		1175	1908.75	1.09	
Tilt (15◦)	SO55, RC3	25	1851.25		1.6
		600	1880.00	0.644	
		1175	1908.75		

11.1.3. BODY WORN

Test position	Mode	Separation distance (mm)	UL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
LCD down	SO32, RC3	15	25	1851.25		1.6
			600	1880.00	0.589	
			1175	1908.75		
LCD up	SO32, RC3	15	25	1851.25		1.6
			600	1880.00	0.634	
			1175	1908.75		
LCD up (with inductive backcover)	SO32, RC3	15	25	1851.25		1.6
			600	1880.00	0.612	
			1175	1908.75		
LCD up (with headset)	SO32, RC3	15	25	1851.25		1.6
			600	1880.00	0.609	
			1175	1908.75		

11.2. Cell Band

11.2.1. LEFT HAND SIDE

Test position	Mode	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	SO55, RC3	1013	824.70	1.200	1.6
		384	836.52	0.915	
		777	848.31	1.210	
Touch (with inductive backcover)	SO55, RC3	777	848.31	1.110	1.6
Tilt (15◦)	SO55, RC3	1013	824.70		1.6
		384	836.52	0.427	
		777	848.31		

11.2.2. RIGHT HAND SIDE

Test position	Mode	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	SO55, RC3	1013	824.70	1.190	1.6
		384	836.52	0.933	
		777	848.31	1.200	
Tilt (15◦)	SO55, RC3	1013	824.70		1.6
		384	836.52	0.531	
		777	848.31		

11.2.3. BODY WORN

Test position	Mode	Sep. dist. (cm)	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
LCD down	SO32, RC3	With Holster	1013	824.70		1.6
			384	836.52	0.526	
			777	848.31		
LCD up	SO32, RC3	With Holster	1013	824.70		1.6
			384	836.52	0.540	
			777	848.31		
LCD up(with inductive backcover)	SO32, RC3	With Holster	1013	824.70		1.6
			384	836.52	0.407	
			777	848.31		
LCD up(with headset)	SO32, RC3	With Holster	1013	824.70		1.6
			384	836.52	0.470	
			777	848.31		

12. WORST-CASE SAR TEST PLOTS

WORST-CASE SAR PLOT for CDMA1900 **HEAD** POSITION

Date/Time: 9/10/2009 5:52:14 PM

Test Laboratory: Compliance Certification Services

Left Hand Side

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

Communication System: CDMA PCS band; Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.34 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Left Section

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

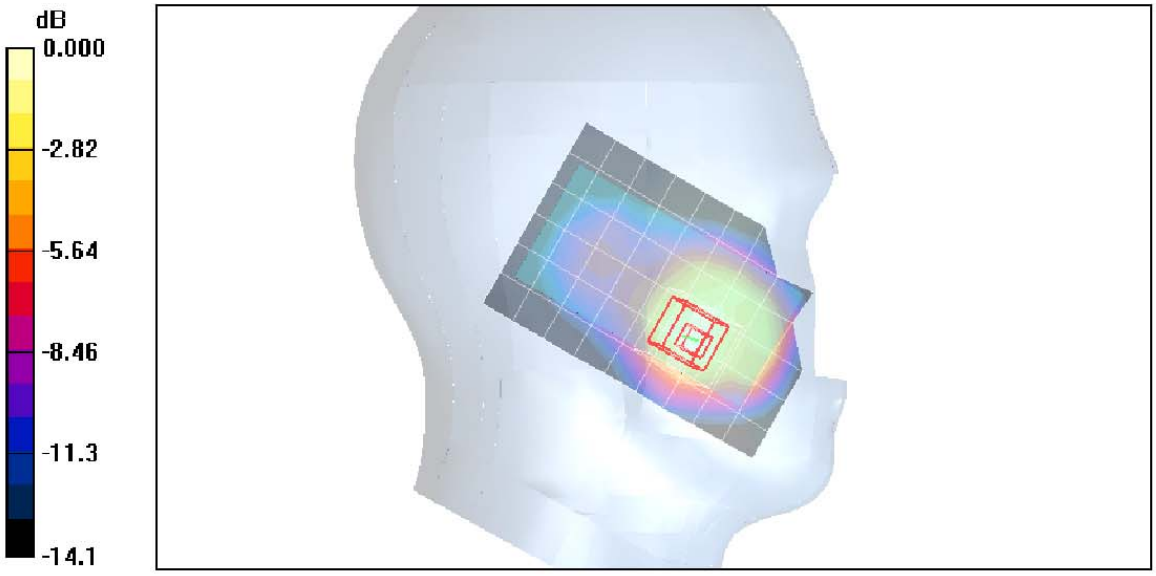
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(7.51, 7.51, 7.51); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Touch position - Low-ch with inductive cover/Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.84 mW/g

Touch position - Low-ch with inductive cover/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 11.7 V/m; Power Drift = -0.177 dB
Peak SAR (extrapolated) = 2.28 W/kg
SAR(1 g) = 1.56 mW/g; SAR(10 g) = 0.916 mW/g

Maximum value of SAR (measured) = 1.83 mW/g



0 dB = 1.83mW/g

WORST-CASE SAR PLOT for CDMA1900 **BODY** POSITION

Date/Time: 9/10/2009 7:24:08 PM

Test Laboratory: Compliance Certification Services

Body Worn PCS Band

DUT: Palm; Type: NA; Serial: NA

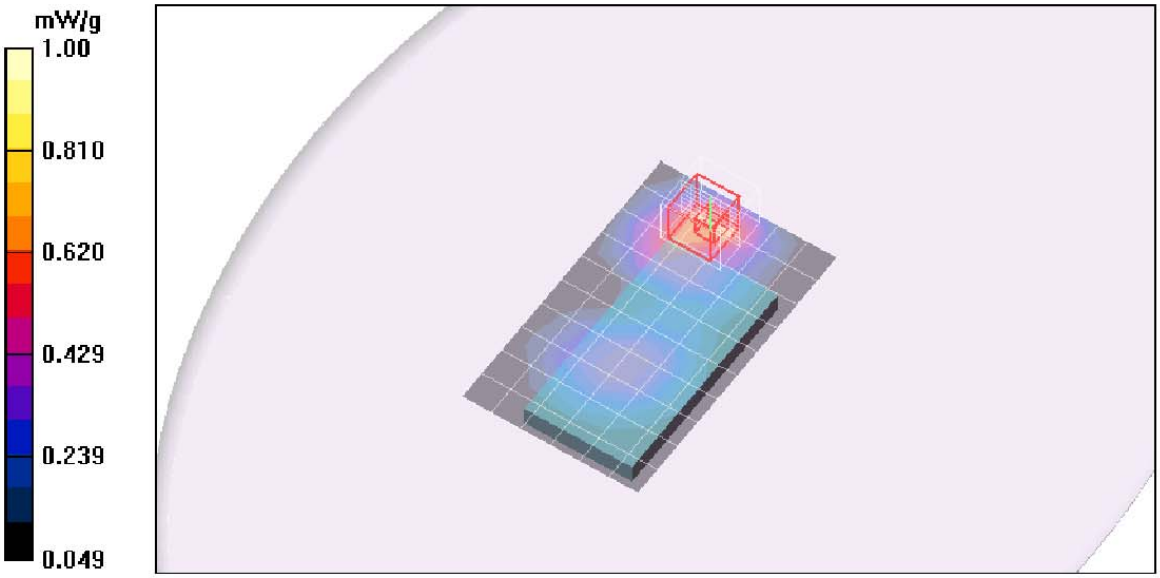
Communication System: CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.49 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

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

DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(6.85, 6.85, 6.85); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

LCD Face up - M-ch/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.686 mW/g

LCD Face up - M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 9.72 V/m; Power Drift = 0.603 dB
Peak SAR (extrapolated) = 0.984 W/kg
SAR(1 g) = 0.634 mW/g; SAR(10 g) = 0.382 mW/g
Maximum value of SAR (measured) = 0.748 mW/g



WORST-CASE SAR PLOT for CDMA850 - **HEAD** POSITION

Date/Time: 9/11/2009 11:01:20 AM

Test Laboratory: Compliance Certification Services

Left Hand Side

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

Communication System: CDMA; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.913 mho/m; ε_r = 41.6; ρ = 1000 kg/m^3
Phantom section: Left Section

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

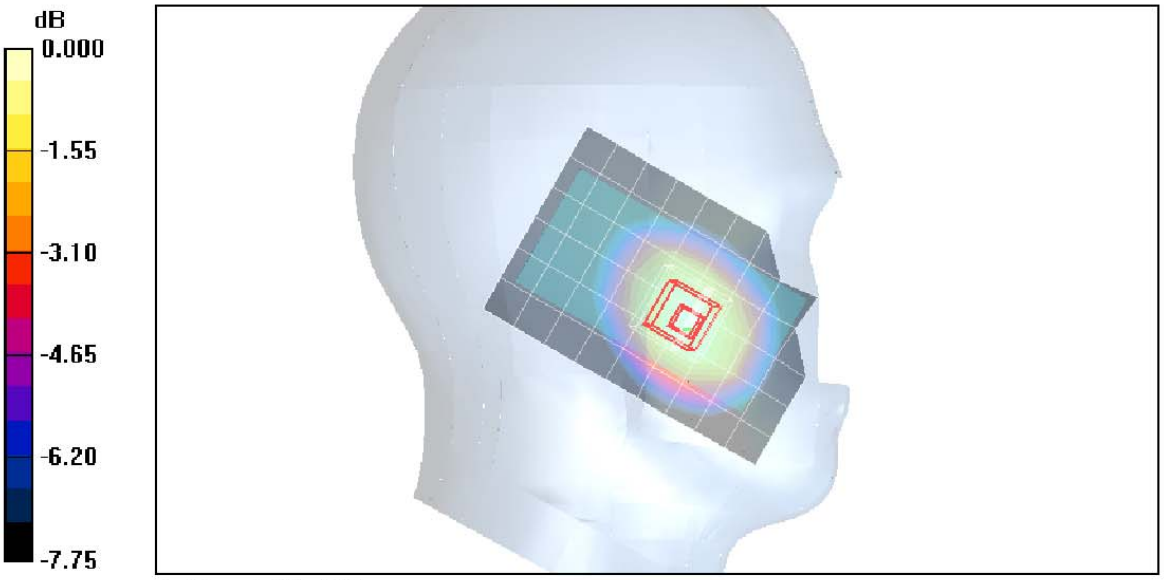
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(8.72, 8.72, 8.72); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Touch position - High-ch/Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.31 mW/g

Touch position - High-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 8.95 V/m; Power Drift = 0.098 dB
Peak SAR (extrapolated) = 1.59 W/kg
SAR(1 g) = 1.21 mW/g; SAR(10 g) = 0.885 mW/g

Maximum value of SAR (measured) = 1.35 mW/g



0 dB = 1.35mW/g

WORST-CASE SAR PLOT for CDMA850 - **BODY** POSITION

Date/Time: 9/11/2009 3:34:46 PM

Test Laboratory: Compliance Certification Services

Body Worn Cellular Band

DUT: Palm; Type: NA; Serial: NA

Communication System: CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.969 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section

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

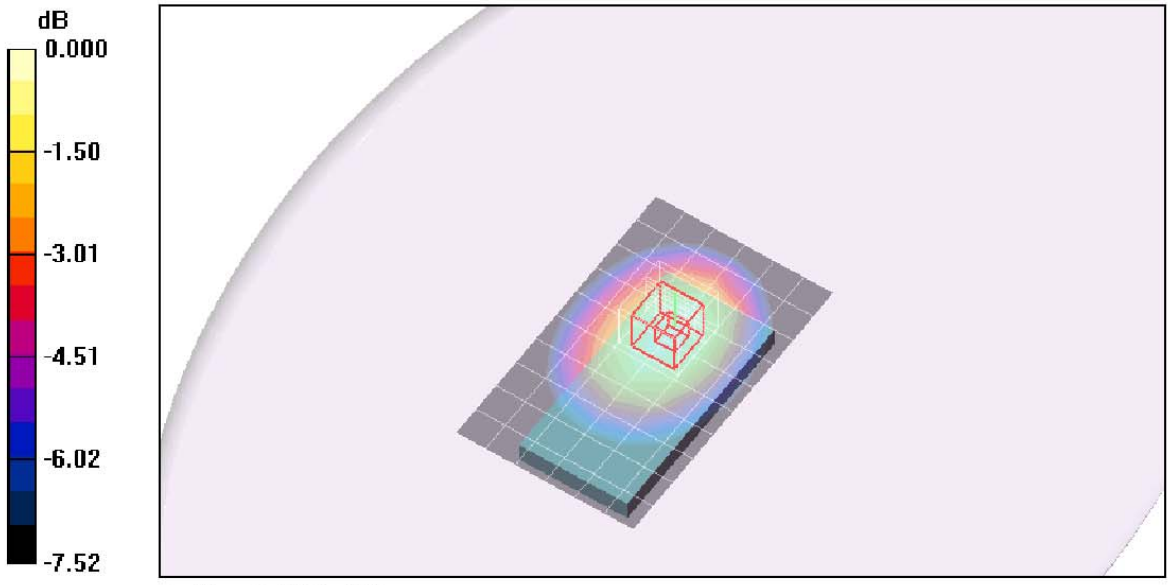
DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(8.7, 8.7, 8.7); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

LCD Face up - M-ch/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

LCD Face up - M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 18.3 V/m; Power Drift = 0.439 dB
Peak SAR (extrapolated) = 0.713 W/kg
SAR(1 g) = 0.540 mW/g; SAR(10 g) = 0.395 mW/g



0 dB = 0.603mW/g

13. ATTACHMENTS

No.	Contents	No. of page (s)
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3	Certificate of E-Field Probe – EX3DV4 SN3686	10
4	Certificate of System Validation Dipole - D835V2 SN:4d002	9
5	Certificate of System Validation Dipole - D1900V2 SN:5d043	9