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

SAR EVALUATION REPORT

For

GSM/UMTS Phone with 802.11bg and Bluetooth

MODEL: P121UNA

FCC ID: O8F- PIXUW
IC: 39Ø5A-PIXUW

REPORT NUMBER: 09U12974-1, Revision B

ISSUE DATE: February 19, 2010

Prepared for

PALM
950 MAUDE AVENUE
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UNITED STATES

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	December 18, 2009	Initial Issue	--
A	December 21, 2009	Corrected typo on page 27	A. Zaffar
B	February 19, 2010	Added average RF conducted output power in Section 10.4	Sunny Shih

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COMPLIANCE CERTIFICATION SERVICES FORM NO: CCSUP4031B
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	PALM 950 MAUDE AVENUE SUNNYVALE, CA. 94085, UNITED STATES
EUT DESCRIPTION:	GSM/UMTS Phone with 802.11bg and Bluetooth
MODEL NUMBER:	P121UNA
DEVICE CATEGORY:	Portable
EXPOSURE CATEGORY:	General Population/Uncontrolled Exposure
DATE TESTED:	December 8 - 14, 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 (UMTS LHS Touch); Body: 0.807 (UMTS w/ inductive back cover)	1.6
24E / RSS-133	1850 - 1910	Head: 1.43 (UMTS LHS Touch); Body: 1.02 (GPRS 2 slots w/ inductive cover) Body: 1.35 (GPRS 4 slots w/ inductive cover)	1.6
15.247 / RSS-210	2400 – 2483.5	Head: 0.149 (RHS Touch); Body: 0.034 (w/ inductive & headset)	1.6

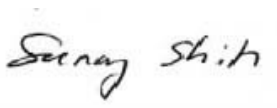
APPLICABLE STANDARDS AND TEST PROCEDURES:

STANDARDS AND TEST PROCEDURES	TEST RESULTS
• FCC OET Bulletin 65 Supplement C and the following specific test procedures: o KDB 941225 D01 SAR test for 3G devices v02 o KDB 941225 D03 SAR Test Reduction GSM/GPRS/EDGE vo1 o KDB 648474 D01 SAR Handsets Multi Xmiter and Ant, v01r05 o KDB 248227 D01 SAR meas for 802 11abg v01r02	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

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 Procedures.

- KDB 941225 D01 SAR test for 3G devices v02
- KDB 941225 D03 SAR Test Reduction GSM/GPRS/EDGE vo1
- KDB 648474 D01 SAR Handsets Multi Xmiter and Ant, v01r05
- KDB 248227 D01 SAR meas for 802 11 a b g v01r02

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	22	2010
Signal Generator	Agilent	8753ES-6	MY40001647	11	22	2010
E-Field Probe	SPEAG	EX3DV4	3686	3	23	2010
Thermometer	ERTCO	639-1S	1718	5	1	2010
Data Acquisition Electronics	SPEAG	DAE3 V1	500	9	15	2010
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	11	24	2011
System Validation Dipole	SPEAG	D2450V2	748	4	14	2010
System Validation Dipole	SPEAG	D5GHzV2	1075	9	3	2011
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

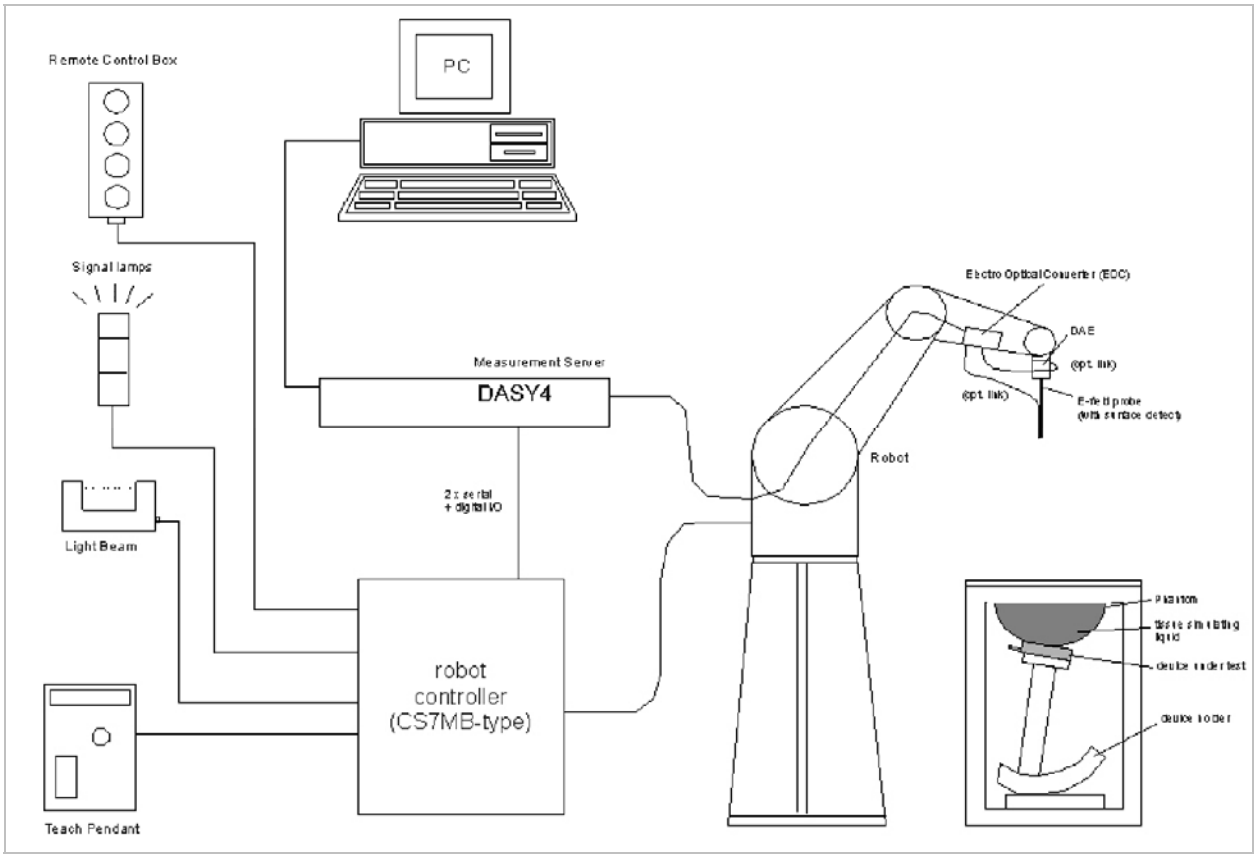
Uncertainty component	Tol. (±%)	Probe Dist.	Div.	Ci (1g)	Ci (10g)	Std. Unc.(±%)	
						Ui (1g)	Ui(10g)
Measurement System							
Probe Calibration	4.80	N	1	1	1	4.80	4.80
Axial Isotropy	4.70	R	1.732	0.707	0.707	1.92	1.92
Hemispherical Isotropy	9.60	R	1.732	0.707	0.707	3.92	3.92
Boundary Effects	1.00	R	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

GSM/UMTS Phone with 802.11bg and Bluetooth	
Mobile phone capability:	Class B
GPRS Multi-slot class:	Class 10 (2 up slots) or Class 12 (4 up slots)
Normal operation:	Held to head Worn on body (LCD facing-up; LCD facing-down) with 15 mm separation distance.
Body Worn Accessory	Headset
Other radio modules in host:	Bluetooth & 802.11b/g
Co-located Tx:	WWAN can transmit simultaneously with Bluetooth and WiFi
Antenna-to-antenna distance	BT/WiFi antenna-to-WWAN antenna: 7 (cm) BT & WiFi share the same antenna

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: Devin Chang

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	43.02	Relative Permittivity (ϵ_r):	43.019	41.5	3.66	± 5
	e"	18.74	Conductivity (σ):	0.871	0.90	-3.28	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
December 10, 2009 01:12 PM

Frequency	e'	e"
770000000.	43.9080	18.9016
775000000.	43.8199	18.9271
780000000.	43.7649	18.9226
785000000.	43.6742	18.8897
790000000.	43.6187	18.8776
795000000.	43.5760	18.8948
800000000.	43.4849	18.8722
805000000.	43.4236	18.8678
810000000.	43.3706	18.8603
815000000.	43.3057	18.8204
820000000.	43.2349	18.8044
825000000.	43.1503	18.7821
830000000.	43.0963	18.7808
835000000.	**43.0190**	**18.7402**
840000000.	42.9489	18.7340
845000000.	42.8993	18.7157
850000000.	42.8433	18.7086
855000000.	42.8283	18.7006
860000000.	42.7566	18.7086
865000000.	42.6775	18.6961
870000000.	42.6290	18.6870
875000000.	42.5733	18.7051
880000000.	42.5249	18.7281
885000000.	42.4756	18.7555
890000000.	42.3780	18.7411
895000000.	42.3552	18.7338
900000000.	42.2858	18.7159

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 835 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Devin Chang

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	56.45	Relative Permittivity (ϵ_r):	56.452	55.2	2.27	± 5
	e"	21.27	Conductivity (σ):	0.988	0.97	1.87	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
December 10, 2009 02:45 PM

Frequency	e'	e"
770000000.	57.1272	21.6259
775000000.	57.0934	21.6243
780000000.	57.0323	21.5851
785000000.	56.9634	21.5553
790000000.	56.9347	21.5098
795000000.	56.8838	21.4996
800000000.	56.8415	21.4852
805000000.	56.7813	21.4344
810000000.	56.7600	21.4279
815000000.	56.6817	21.3558
820000000.	56.6550	21.3345
825000000.	56.5789	21.3040
830000000.	56.5409	21.2986
835000000.	**56.4518**	**21.2719**
840000000.	56.4329	21.2386
845000000.	56.3760	21.1998
850000000.	56.3245	21.1765
855000000.	56.3040	21.1898
860000000.	56.2607	21.1447
865000000.	56.1887	21.1253
870000000.	56.1658	21.0961
875000000.	56.1135	21.0754
880000000.	56.0905	21.0954
885000000.	56.0339	21.0777
890000000.	55.9679	21.0792
895000000.	55.9599	21.0427
900000000.	55.9184	21.0218

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 835 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Sunny Shih

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	43.38	Relative Permittivity (ϵ_r):	43.384	41.5	4.54	± 5
	e"	19.21	Conductivity (σ):	0.893	0.90	-0.83	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
December 13, 2009 09:04 AM

Frequency	e'	e"
770000000.	44.2399	19.3292
775000000.	44.1599	19.3311
780000000.	44.0711	19.2850
785000000.	44.0245	19.2661
790000000.	43.9346	19.2648
795000000.	43.8492	19.2494
800000000.	43.7792	19.2581
805000000.	43.7308	19.2331
810000000.	43.6596	19.2429
815000000.	43.6062	19.2207
820000000.	43.5340	19.2316
825000000.	43.4902	19.2269
830000000.	43.4458	19.2186
835000000.	**43.3835**	**19.2139**
840000000.	43.3566	19.2029
845000000.	43.2810	19.2003
850000000.	43.2545	19.1855
855000000.	43.2072	19.1960
860000000.	43.1258	19.1807
865000000.	43.0815	19.1742
870000000.	43.0237	19.1338
875000000.	42.9675	19.1411
880000000.	42.9103	19.1253
885000000.	42.8447	19.1334
890000000.	42.7838	19.1041
895000000.	42.7461	19.0809
900000000.	42.6560	19.0969

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 = 24°C; Relative humidity = 35% Measured by: Sunny Shih

f (MHz)	Liquid Parameters		Measured Results		Target	Delta (%)	Limit (%)
1900	e'	40.651	Relative Permittivity (ϵ_r):	40.6509	40.0	1.63	± 5
	e"	13.320	Conductivity (σ):	1.40794	1.40	0.57	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
December 08, 2009 11:38 AM

Frequency	e'	e"
1710000000.	41.4073	12.7049
1720000000.	41.3748	12.7407
1730000000.	41.3410	12.7791
1740000000.	41.3026	12.8144
1750000000.	41.2615	12.8537
1760000000.	41.2199	12.8887
1770000000.	41.1759	12.9259
1780000000.	41.1301	12.9629
1790000000.	41.0885	12.9929
1800000000.	41.0451	13.0240
1810000000.	41.0004	13.0553
1820000000.	40.9582	13.0845
1830000000.	40.9179	13.1105
1840000000.	40.8820	13.1418
1850000000.	40.8407	13.1694
1860000000.	40.8017	13.1994
1870000000.	40.7646	13.2278
1880000000.	40.7265	13.2585
1890000000.	40.6886	13.2910
1900000000.	**40.6509**	**13.3202**
1910000000.	40.6092	13.3509

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 = 24°C; Relative humidity = 35% Measured by: Sunny Shih

f (MHz)	Liquid Parameters		Measured Results		Target	Delta (%)	Limit (%)
1900	e'	40.112	Relative Permittivity (ϵ_r):	40.1118	40.0	0.28	± 5
	e"	13.526	Conductivity (σ):	1.42971	1.40	2.12	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
December 09, 2009 10:22 AM

Frequency	e'	e''
1710000000.	40.9018	12.9653
1720000000.	40.8573	12.9990
1730000000.	40.8123	13.0283
1740000000.	40.7679	13.0587
1750000000.	40.7265	13.0895
1760000000.	40.6847	13.1149
1770000000.	40.6416	13.1433
1780000000.	40.5967	13.1725
1790000000.	40.5545	13.2001
1800000000.	40.5123	13.2296
1810000000.	40.4670	13.2611
1820000000.	40.4249	13.2882
1830000000.	40.3871	13.3207
1840000000.	40.3499	13.3511
1850000000.	40.3115	13.3800
1860000000.	40.2723	13.4084
1870000000.	40.2338	13.4390
1880000000.	40.1932	13.4689
1890000000.	40.1531	13.4981
1900000000.	**40.1118**	**13.5262**
1910000000.	40.0711	13.5524

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: Sunny Shih

f (MHz)	Muscle Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1900	e'	55.043	Relative Permittivity (ϵ_r):	55.0425	53.3	3.27	± 5
	e"	14.621	Conductivity (σ):	1.54544	1.52	1.67	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
December 08, 2009 11:42 PM

Frequency	e'	e''
1710000000.	55.6992	14.0826
1720000000.	55.6619	14.1148
1730000000.	55.6282	14.1503
1740000000.	55.5919	14.1784
1750000000.	55.5586	14.2153
1760000000.	55.5202	14.2429
1770000000.	55.4859	14.2757
1780000000.	55.4496	14.3088
1790000000.	55.4117	14.3433
1800000000.	55.3674	14.3754
1810000000.	55.3256	14.4036
1820000000.	55.2887	14.4348
1830000000.	55.2523	14.4643
1840000000.	55.2169	14.4898
1850000000.	55.1827	14.5133
1860000000.	55.1502	14.5337
1870000000.	55.1210	14.5550
1880000000.	55.0874	14.5770
1890000000.	55.0669	14.5974
1900000000.	**55.0425**	**14.6211**
1910000000.	55.0180	14.6476

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

8.3. LIQUID CHECK RESULTS FOR 2450 MHZ

Simulating Liquid Dielectric Parameters for Muscle 2450 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Sunny Shih

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
2450	e'	53.51	Relative Permittivity (ϵ_r):	53.507	52.7	1.53	± 5
	e"	14.08	Conductivity (σ):	1.919	1.95	-1.57	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
December 11, 2009 01:23 PM

Frequency	e'	e"
2400000000.	54.8027	14.4145
2405000000.	54.8006	14.3566
2410000000.	54.7617	14.3248
2415000000.	54.6737	14.2716
2420000000.	54.5516	14.2051
2425000000.	54.4031	14.1515
2430000000.	54.2131	14.0876
2435000000.	54.0223	14.0460
2440000000.	53.8439	14.0363
2445000000.	53.6785	14.0533
2450000000.	**53.5071**	**14.0829**
2455000000.	53.3542	14.1315
2460000000.	53.2617	14.2012
2465000000.	53.2256	14.2660
2470000000.	53.2368	14.3539
2475000000.	53.2858	14.4462
2480000000.	53.3892	14.5400
2485000000.	53.5390	14.6465
2490000000.	53.6938	14.7585
2495000000.	53.8646	14.8689
2500000000.	54.0202	14.9321

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 2450 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Sunny Shih

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
2450	e'	53.20	Relative Permittivity (ϵ_r):	53.199	52.7	0.95	± 5
	e"	14.03	Conductivity (σ):	1.913	1.95	-1.91	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
December 12, 2009 09:30 AM

Frequency	e'	e"
2400000000.	54.5297	14.3842
2405000000.	54.5503	14.3048
2410000000.	54.5298	14.2452
2415000000.	54.4406	14.1705
2420000000.	54.3224	14.0920
2425000000.	54.1580	14.0293
2430000000.	53.9597	13.9938
2435000000.	53.7393	13.9735
2440000000.	53.5254	13.9689
2445000000.	53.3559	13.9880
2450000000.	**53.1992**	**14.0337**
2455000000.	53.0541	14.1109
2460000000.	52.9720	14.2057
2465000000.	52.9340	14.3043
2470000000.	52.9628	14.4234
2475000000.	53.0005	14.5546
2480000000.	53.0996	14.6667
2485000000.	53.2425	14.7636
2490000000.	53.3805	14.8556
2495000000.	53.5579	14.9257
2500000000.	53.7359	14.9831

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 2450 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Sunny Shih

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
2450	e'	39.03	Relative Permittivity (ϵ_r):	39.029	39.2	-0.44	± 5
	e"	13.77	Conductivity (σ):	1.876	1.80	4.24	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
December 12, 2009 09:56 AM

Frequency	e'	e"
2400000000.	40.1255	14.2010
2405000000.	40.1727	14.1494
2410000000.	40.1700	14.1033
2415000000.	40.1440	14.0369
2420000000.	40.0473	13.9717
2425000000.	39.9286	13.8973
2430000000.	39.7759	13.8359
2435000000.	39.5904	13.7950
2440000000.	39.3932	13.7759
2445000000.	39.2122	13.7745
2450000000.	**39.0293**	**13.7668**
2455000000.	38.8751	13.8051
2460000000.	38.7574	13.8796
2465000000.	38.6602	13.9481
2470000000.	38.6260	14.0249
2475000000.	38.6155	14.1098
2480000000.	38.6677	14.2089
2485000000.	38.7687	14.3057
2490000000.	38.8867	14.4049
2495000000.	39.0286	14.4948
2500000000.	39.1834	14.5591

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

Reference SAR Values for HEAD & BODY-tissue from calibration certificate of SPEAG.
Certificate no: D2450V2-748_April 14, 2008

f (MHz)	Head Tissue		Body Tissue	
	SAR_{1g}	SAR_{10g}	SAR_{1g}	SAR_{10g}
2450			49.5	23.3

9.1. SYSTEM CHECK RESULTS FOR D835V2

System Validation Dipole: D835V2 SN:4d002

Date: December 10, 2009

Ambient Temperature = 25°C; Relative humidity = 40% Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Head	835	100	1g SAR:	10.1	9.71	4.02	±10
			10g SAR:	6.57	6.38	2.98	

Date: December 13, 2009

Ambient Temperature = 25°C; Relative humidity = 40% Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Head	835	100	1g SAR:	9.79	9.71	0.82	±10
			10g SAR:	6.41	6.38	0.47	

9.2. SYSTEM CHECK RESULTS FOR D1900V2

System Validation Dipole: D1900V2 SN: 5d043

Date: December 8, 2009

Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Head	1900	250	1g SAR:	37.4	39.7	-5.79	±10
			10g SAR:	19.2	20.5	-6.34	

Date: December 9, 2009

Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Head	1900	250	1g SAR:	40.6	39.7	2.27	±10
			10g SAR:	20.8	20.5	1.46	

9.3. SYSTEM CHECK RESULTS FOR D2450V2

Date: December 11, 2009

Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	2450	100	1g SAR:	53.3	49.5	7.68	±10
			10g SAR:	24.6	23.3	5.58	

Date: December 12, 2009

Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	2450	100	1g SAR:	54.0	49.5	9.09	±10
			10g SAR:	25.2	23.3	8.15	

10. OUTPUT POWER VERIFICATION

10.1. GSM

Band	Ch No.	Frequency	Conducted output Pwr (dBm)	
			Average	Peak
GSM850	128	824.2	31.8	
	190	836.6	31.6	
	251	848.8	31.6	
GSM1900	512	1850.2	29.1	
	661	1880	29.0	
	810	1909.8	29.1	

GPRS (GMSK) - Coding Scheme: MCS4

Band	Ch No.	f (MHz)	Conducted output power (dBm)							
			1 slot	Time Average power	2 slot	Time Average power	3 slot	Time Average power	4 slot	Time Average power
GSM850	128	824.2	31.80	22.80	28.70	22.70	27.20	22.94	26.30	23.30
	190	836.6	31.60	22.60	28.50	22.50	27.00	22.74	26.10	23.10
	251	848.8	31.60	22.60	28.50	22.50	27.00	22.74	26.00	23.00
GSM1900	512	1850.2	29.10	20.10	29.10	23.10	29.00	24.74	27.40	24.40
	661	1880	29.00	20.00	28.90	22.90	28.90	24.64	27.30	24.30
	810	1909.8	29.00	20.00	29.00	23.00	28.90	24.64	27.40	24.40

EGPRS (8PSK) - Coding Scheme: MCS9

Band	Ch No.	f (MHz)	Conducted output power (dBm)							
			1 slot	Time Average power	2 slot	Time Average power	3 slot	Time Average power	4 slot	Time Average power
GSM850	128	824.2	25.60	16.60	25.50	19.50	25.50	21.24	25.00	22.00
	190	836.6	25.70	16.70	25.70	19.70	25.60	21.34	25.20	22.20
	251	848.8	25.60	16.60	25.60	19.60	25.60	21.34	25.50	22.50
GSM1900	512	1850.2	25.90	22.90	25.90	19.90	25.70	21.44	25.70	22.70
	661	1880	25.80	22.80	25.80	19.80	25.60	21.34	25.50	22.50
	810	1909.8	25.80	22.80	25.80	19.80	25.60	21.34	25.60	22.60

10.2. UMTS RELEASE 99

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 V7.5.0 specification. The EUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7). A summary of these settings are illustrated below:

	Mode	Rel99
	Subtest	-
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	HSDPA FRC	Not Applicable
	HSUPA Test	Not Applicable
	Power Control Algorithm	Algorithm2
	βc	Not Applicable
	βd	Not Applicable
	βec	Not Applicable
	βc/βd	8/15
	βhs	Not Applicable
	βed	Not Applicable

Results

Rel 99 (12.2kps RMC)

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	O/P Power (dBm)
UMTS850 (Band V)	Rel 99 12.2kps RMC	4132	4357	826.4	23.10
		4183	4408	836.6	23.10
		4233	4458	846.6	23.05
UMTS1900 (Band II)	Rel 99 12.2kps RMC	9262	9662	1852.4	21.85
		9400	9800	1880.0	21.98
		9538	9938	1907.6	21.95

10.3. UMTS HSDPA

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	Rel5 HSDPA	Rel5 HSDPA	Rel5 HSDPA	Rel5 HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	HSUPA Test	Not Applicable			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βec	-	-	-	-
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	βed	Not Applicable			
	CM (dB)	0	1	1.5	1.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs = βhs/βc	30/15			

Results

Rel 5 HSDPA

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	O/P Power (dBm)
UMTS850 (Band V)	Subtest 1	4132	4357	826.4	22.90
		4183	4408	836.6	22.90
		4233	4458	846.6	22.90
	Subtest 2	4132	4357	826.4	22.30
		4183	4408	836.6	22.40
		4233	4458	846.6	22.30
	Subtest 3	4132	4357	826.4	22.40
		4183	4408	836.0	22.37
		4233	4458	846.6	22.37
	Subtest 4	4132	4357	826.4	22.40
		4183	4408	836.4	22.40
		4233	4458	846.6	22.35
UMTS1900 (Band II)	Subtest 1	9262	9662	1852.4	21.80
		9400	9800	1880.0	21.90
		9538	9938	1907.6	21.00
	Subtest 2	9262	9662	1852.4	21.30
		9400	9800	1880.0	21.45
		9538	9938	1907.6	21.40
	Subtest 3	9262	9662	1852.4	21.50
		9400	9800	1880.0	21.50
		9538	9938	1907.6	21.50
	Subtest 4	9262	9662	1852.4	21.35
		9400	9800	1880.0	21.50
		9538	9938	1907.6	21.50

10.4. WIFI RF OUTPUT POWER

802.11b

Channel	Frequency (MHz)	Power (dBm)
Low	2412	12.05
Middle	2437	12.50
High	2462	12.40

802.11g

Channel	Frequency (MHz)	Power (dBm)
Low	2412	11.50
Middle	2437	11.60
High	2462	11.30

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.

11.1. UMTS BAND II & UMTS BAND V

11.1.1. LEFT HAND SIDE

Band	Mode	Test position	UL Ch No.	DL Ch No.	Freq (MHz)	SAR (mW/g)	
						1-g	10-g
Band V	R99	Touch	4132	4357	826.4	0.90	0.660
			4183	4408	836.6	1.21	0.878
			4233	4458	846.6	1.12	0.816
		w/ inductive cover	4183	4408	836.6	1.14	0.841
		Tilt (15°C)	4132	4357	826.4		
			4183	4408	836.6	0.529	0.393
			4233	4458	846.6		
Band II	R99	Touch	9262	9662	1850.2	1.28	0.756
			9400	9800	1880.0	1.37	0.807
			9538	9938	1907.6	1.43	0.845
		Touch w/ inductive cover	9262	9662	1850.2	1.20	0.723
			9400	9800	1880.0	1.33	0.798
			9538	9938	1907.6	1.33	0.792
		Tilt (15°C)	9262	9662	1850.2		
			9400	9800	1880.0	0.433	0.272
			9538	9938	1907.6		

11.1.2. RIGHT HAND SIDE

Band	Mode	Test position	UL Ch No.	DL Ch No.	Freq (MHz)	SAR (mW/g)	
						1-g	10-g
Band V	R99	Touch	4132	4357	826.4	0.885	0.648
			4183	4408	836.6	1.18	0.864
			4233	4458	846.6	1.09	0.792
		Tilt (15°C)	4132	4357	826.4		
			4183	4408	836.6	0.516	0.383
			4233	4458	846.6		
Band II	R99	Touch	9262	9662	1850.2	0.961	0.503
			9400	9800	1880.0	1.04	0.540
			9538	9938	1907.6	1.02	0.527
		Tilt (15°C)	9262	9662	1850.2		
			9400	9800	1880.0	0.475	0.288
			9538	9938	1907.6		

11.1.3. BODY

Band	Mode	Test position	UL Ch No.	DL Ch No.	Freq (MHz)	SAR (mW/g)	
						1-g	10-g
Band V	R99	Face up w/ 1.5 cm sep. dist	4132	4357	826.4		
			4183	4408	836.6	0.792	0.579
			4233	4458	846.6		
		Face down w/ 1.5 cm sep. dist	4132	4357	826.4		
			4183	4408	836.6	0.785	0.570
			4233	4458	846.6		
Band II	R99	Face up w/ 1.5 cm sep. dist	9262	9662	1850.2		
			9400	9800	1880.0	0.704	0.394
			9538	9938	1907.6		
		Face down w/ 1.5 cm sep. dist	9262	9662	1850.2		
			9400	9800	1880.0	0.632	0.365
			9538	9938	1907.6		

11.1.4. BODY WITH INDUCTIVE BACK COVER

Band	Mode	Test position	UL Ch No.	DL Ch No.	Freq (MHz)	SAR (mW/g)	
						1-g	10-g
Band V	R99	Face up w/ 1.5 cm sep. dist	4132	4357	826.4	0.720	0.528
			4183	4408	836.6	0.807	0.592
			4233	4458	846.6	0.764	0.559
		w/ headset	4183	4408	836.6	0.581	0.422

11.2. GSM850 AND GSM1900

11.2.1. LEFT HAND SIDE

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
GSM850	GSM	Touch	128	824.2	0.927	0.684
			190	836.6	1.010	0.747
			251	848.8	0.900	0.659
		Tilt (15°C)	128	824.2		
			190	836.6	0.447	0.356
			251	848.8		
GSM1900	GSM	Touch	512	1850.2	0.845	0.502
			661	1880.0	0.838	0.494
			810	1909.8	0.869	0.510
		Tilt (15°C)	512	1850.2		
			661	1880.0	0.256	0.159
			810	1909.8		

11.2.2. RIGHT HAND SIDE

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
GSM850	GSM	Touch	128	824.2	0.970	0.719
			190	836.6	1.070	0.783
			251	848.8	0.925	0.678
		Tilt (15°C)	128	824.2		
			190	836.6	0.488	0.363
			251	848.8		
GSM1900	GSM	Touch	512	1850.2		
			661	1880.0	0.720	0.364
			810	1909.8		
		Tilt (15°C)	512	1850.2		
			661	1880.0	0.280	0.171
			810	1909.8		

11.2.3. BODY

Band	Mode	Seperation distance (cm)	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
						1-g	10-g
GSM850	GPRS 2 slots	1.5	Face up	128	824.2		
				190	836.6	0.651	0.478
				251	848.8		
			Face down	128	824.2		
				190	836.6	0.657	0.476
				251	848.8		
			w/ headset	190	836.6	0.487	0.351
GSM850	GPRS 4 slots	1.5	Face up	128	824.2		
				190	836.6	0.695	0.510
				251	848.8		
			Face down	128	824.2		
				190	836.6	0.745	0.539
				251	848.8		
			w/ headset	190	836.6	0.550	0.397
GSM1900	GPRS 2 slots	1.5	Face up	512	1850.2		
				661	1880.0	0.742	0.415
				810	1909.8		
			Face down	512	1850.2		
				661	1880.0	0.641	0.372
				810	1909.8		
GSM1900	GPRS 4 slots	1.5	Face up	512	1850.2	0.973	0.544
				661	1880.0	0.996	0.556
				810	1909.8	0.915	0.514
			Face down	512	1850.2	**1.010**	0.582
				661	1880.0	0.886	0.512
				810	1909.8	0.798	0.477

11.2.4. BODY WITH INDUCTIVE BACK COVER

Band	Mode	Seperation distance (cm)	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
						1-g	10-g
GSM850	GPRS 2 slots	1.5	Face down	128	824.2		
				190	836.6	0.588	0.427
				251	848.8		
GSM850	GPRS 4 slots	1.5	Face down	128	824.2		
				190	836.6	0.658	0.477
				251	848.8		
GSM1900	GPRS 2 slots	1.5	Face up	512	1850.2	1.02	0.563
				661	1880.0	0.847	0.466
				810	1909.8	0.798	0.440
			w/ headset	512	1850.2	0.996	0.550
GSM1900	GPRS 4 slots	1.5	Face up	512	1850.2	1.35	0.742
				661	1880.0	1.14	0.629
				810	1909.8	1.07	0.587
			w/ headset	512	1850.2	1.34	0.734
			Face down	512	1850.2	0.949	0.551

11.3. WIFI

11.3.1. LEFT HAND SIDE

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
2.4 GHz	802.11b	Touch	1	2412		
			6	2437	0.051	0.028
			11	2462		
		Tilt (15°C)	1	2412		
			6	2437	0.039	0.021
			11	2462		

11.3.2. RIGHT HAND SIDE

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
2.4 GHz	802.11b	Touch	1	2412		
			6	2437	0.149	0.061
			11	2462		
		Co-Tx w/ BT	6	2437	0.130	0.058
		w/ inductive cover	6	2437	0.116	0.053
		Tilt (15°C)	1	2412		
			6	2437	0.086	0.040
			11	2462		

11.3.3. BODY WORN

Band	Mode	Seperation distance (cm)	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
						1-g	10-g
2.4 GHz	802.11b	1.5	Face up	1	2412		
				6	2437	0.015	0.0078
				11	2462		
			Face down	1	2412		
				6	2437	0.021	0.0012
				11	2462		
			w/ inductive cover	6	2437	0.027	0.013
			w/ inductive cover & headset	6	2437	0.034	0.019
			w/ inductive cover & headset and Co-Tx w/ BT	6	2437	0.029	0.017

12. 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:

WWAN – BT: Since stand-alone SAR evaluation is not required for Bluetooth antenna and its antenna is more than 5.0 (cm) from other antennas, simultaneous transmission SAR evaluation is not required.

WWAN – WLAN: Since the sum of the 1-g SAR is < 1.6 W/kg for all simultaneous transmission antennas, simultaneous transmission SAR evaluation is not required.

13. WORST-CASE SAR TEST PLOTS

Worst-case HEAD SAR Plot for Part 22

Date/Time: 12/13/2009 10:08:53 AM

Test Laboratory: Compliance Certification Services

1_Left Hand Side_Touch

DUT: Palm; Type: N/A; Serial: 8020

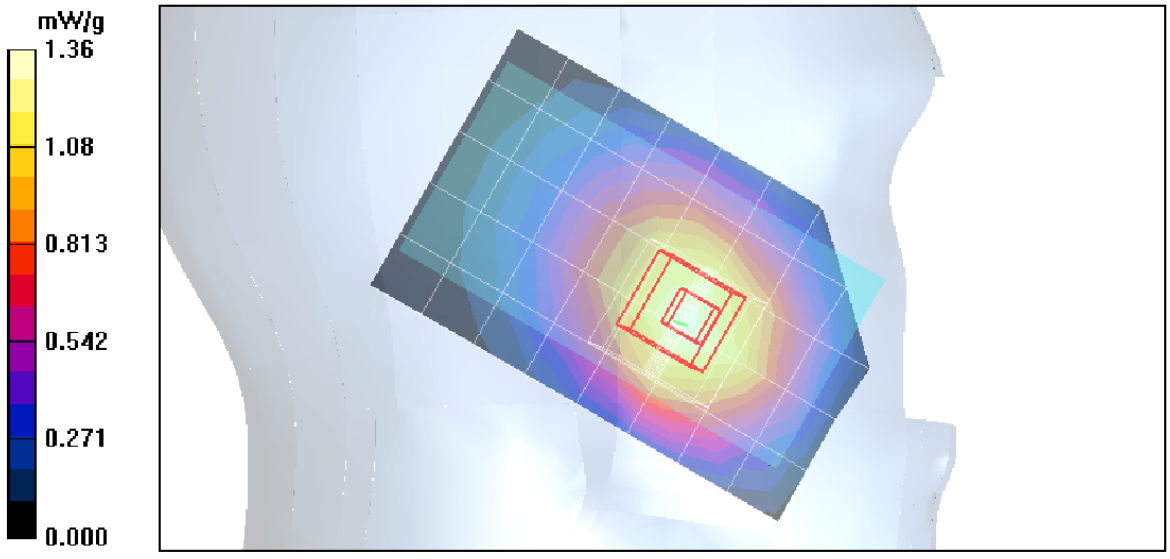
Communication System: UMTS850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.894 mho/m; ε_r = 43.4; ρ = 1000 kg/m^3
Phantom section: Left Section

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(8.72, 8.72, 8.72); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 9/15/2009
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Touch - M-ch/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.36 mW/g

Touch - M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 10.7 V/m; Power Drift = -0.051 dB
Peak SAR (extrapolated) = 1.59 W/kg
SAR(1 g) = 1.21 mW/g; SAR(10 g) = 0.878 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.35 mW/g



Worst-case HEAD SAR Plot for Part 24

Date/Time: 12/8/2009 2:29:05 PM

Test Laboratory: Compliance Certification Services

Left Hand Side

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

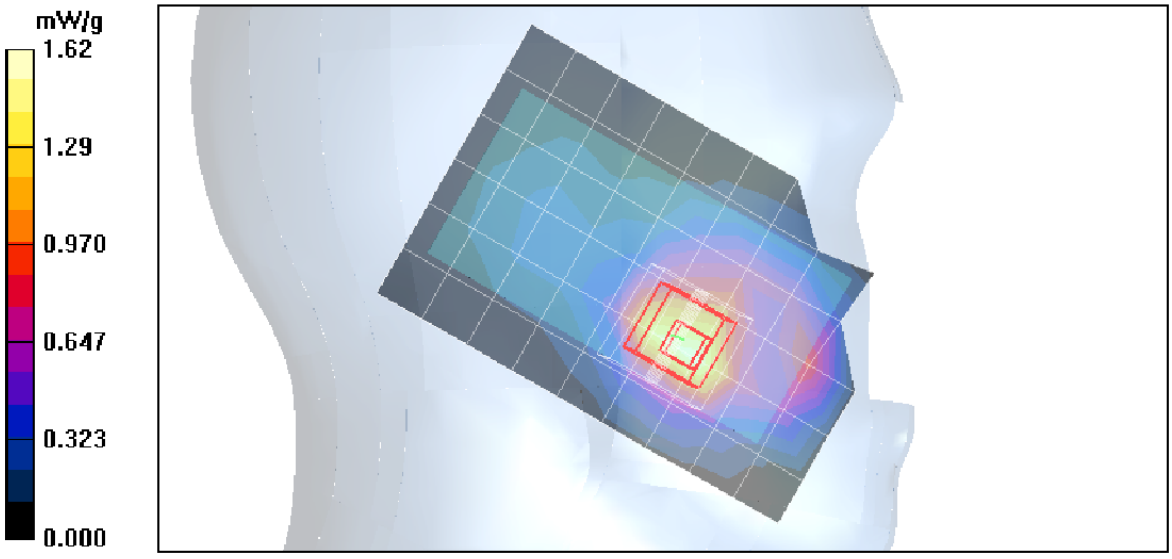
Communication System: PCS 1900; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1907.6 MHz; σ = 1.42 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Left Section

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(7.51, 7.51, 7.51); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 9/15/2009
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Touch - H-ch/Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.62 mW/g

Touch - H-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 10.4 V/m; Power Drift = 0.013 dB
Peak SAR (extrapolated) = 2.06 W/kg
SAR(1 g) = 1.43 mW/g; SAR(10 g) = 0.845 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.69 mW/g



Worst-case HEAD SAR Plot for Part 15 C

Date/Time: 12/12/2009 11:59:16 AM

Test Laboratory: Compliance Certification Services

WiFi Right Hand Side_Touch

DUT: Palm; Type: N/A; Serial: 8101

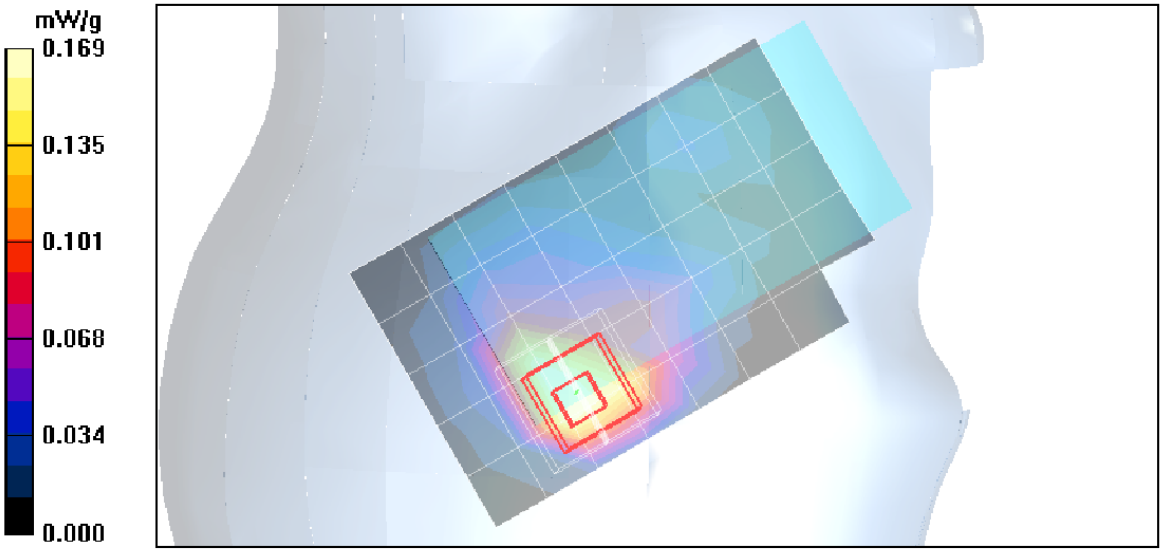
Communication System: 802.11bg; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.87 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Right Section

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(6.81, 6.81, 6.81); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 9/15/2009
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Touch - M-ch/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.169 mW/g

Touch - M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 6.86 V/m; Power Drift = -0.236 dB
Peak SAR (extrapolated) = 0.335 W/kg
SAR(1 g) = 0.149 mW/g; SAR(10 g) = 0.061 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.221 mW/g



Worst-case BODY SAR plot for Part 22

Date/Time: 12/11/2009 11:03:02 AM

Test Laboratory: Compliance Certification Services

UMTS850 Body_Face up with inductive cover

DUT: Palm; Type: NA; Serial: NA

Communication System: UMTS850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

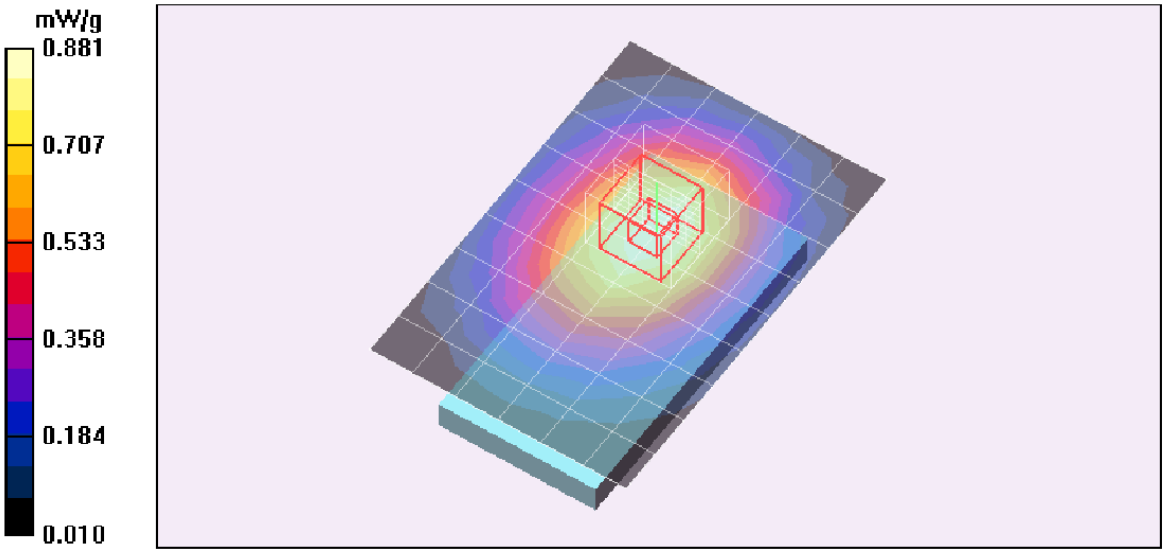
Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

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 Sn500; Calibrated: 9/15/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Face up - R99 M-ch/Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.881 mW/g

Face up - R99 M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 28.5 V/m; Power Drift = 0.068 dB
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.807 mW/g; SAR(10 g) = 0.592 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.896 mW/g



Worst-case BODY SAR plot for Part 24 (GPRS 2 slots)

Date/Time: 12/9/2009 9:13:34 PM

Test Laboratory: Compliance Certification Services

GPRS1900 Body_Face up with conductive cover

DUT: Palm; Type: NA; Serial: NA

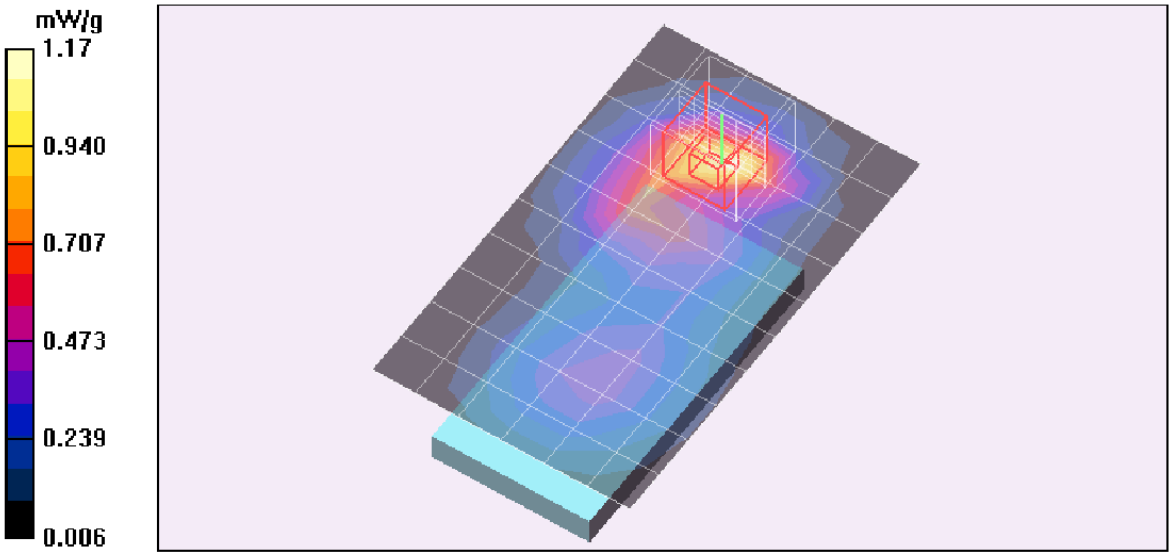
Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.49 mho/m; ε_r = 55.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 Sn500; Calibrated: 9/15/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Face up - GPRS 2 slots L-ch/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.17 mW/g

Face up - GPRS 2 slots L-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 13.2 V/m; Power Drift = -0.211 dB
Peak SAR (extrapolated) = 1.66 W/kg
SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.563 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.25 mW/g



Worst-case BODY SAR plot for Part 24 (GPRS 4 slots)

Date/Time: 12/10/2009 9:37:00 AM

Test Laboratory: Compliance Certification Services

Body_Face up with conductive cover & headset 2

DUT: Palm; Type: NA; Serial: NA

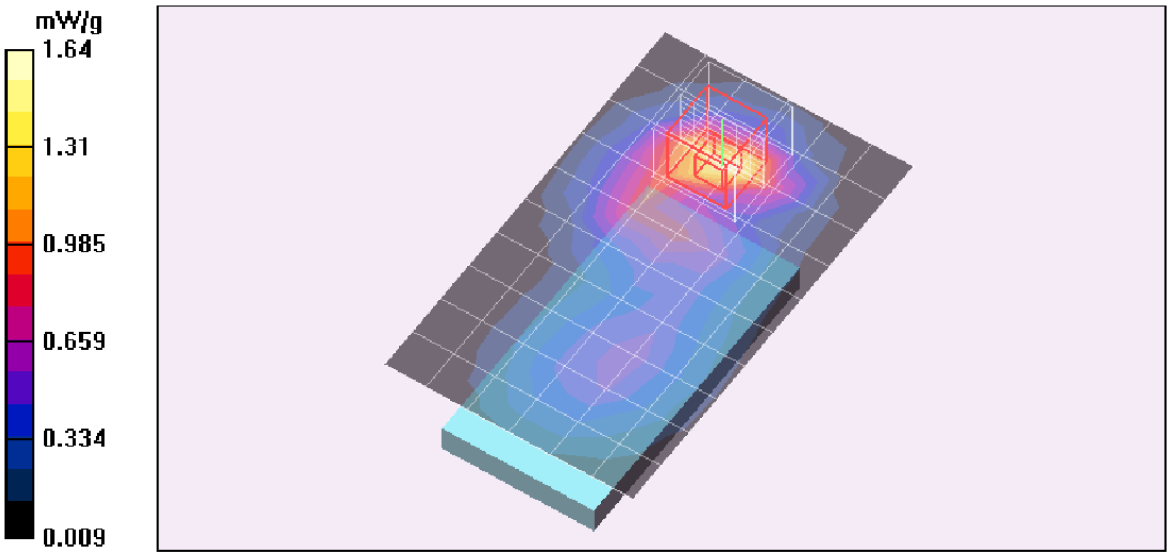
Communication System: DCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:2
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.49 mho/m; ε_r = 55.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 Sn500; Calibrated: 9/15/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Face up - GPRS 4 slots L-ch/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.64 mW/g

Face up - GPRS 4 slots L-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 16.4 V/m; Power Drift = -0.634 dB
Peak SAR (extrapolated) = 2.19 W/kg
SAR(1 g) = 1.34 mW/g; SAR(10 g) = 0.734 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.66 mW/g



Worst-case BODY SAR plot for Part 15 C

Date/Time: 12/11/2009 11:12:05 PM

Test Laboratory: Compliance Certification Services

WiFi Body_Face down with inductive cover

DUT: Palm; Type: NA; Serial: NA

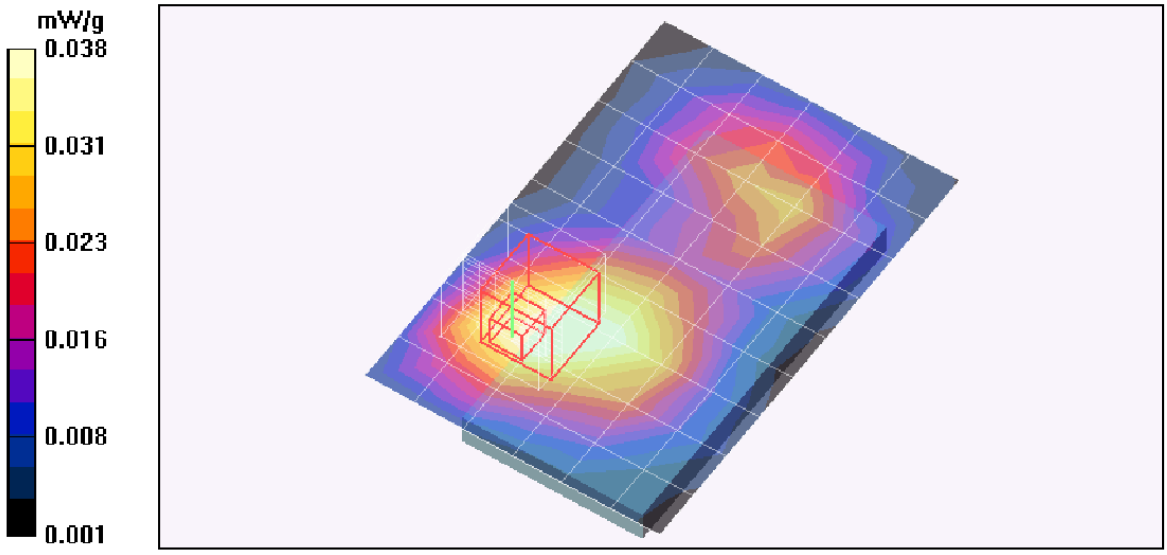
Communication System: 802.11bg; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.9 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section

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(6.48, 6.48, 6.48); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 9/15/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

11b_M-ch_w Headset/Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.038 mW/g

11b_M-ch_w Headset/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 3.07 V/m; Power Drift = -0.336 dB
Peak SAR (extrapolated) = 0.063 W/kg
SAR(1 g) = 0.034 mW/g; SAR(10 g) = 0.019 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.041 mW/g



14. ATTACHMENTS

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5	Certificate of System Validation Dipole - D1900V2 SN:5d043	9
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