FCC OET BULLETIN 65 SUPPLEMENT C 01-01
IC RSS-102 ISSUE 4

SAR EVALUATION REPORT

For

UMTS Phone with 802.11b/g and Bluetooth

MODEL: P102UNA
FCC ID: O8F-ROAU
IC: 3905A-ROAU

REPORT NUMBER: 10U13380-8B

ISSUE DATE: October 7, 2010

Prepared for

PALM, INC.
950 MAUDE AVENUE
SUNNYVALE, CA. 94085
UNITED STATES

Prepared by

COMPLIANCE CERTIFICATION SERVICES
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	September 8, 2010	Initial Issue	--
A	September 16, 2010	Fixed typos on page 37, Changed “Rel6’ to ‘Rel5”.	Devin Chang
B	October 7, 2010	Added Z-axis plots in the section 12	Devin Chang

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1. ATTESTATION OF TEST RESULTS

Applicant:	PALM, INC. 950 MAUDE AVENUE SUNNYVALE, CA. 94085, UNITED STATES
EUT description:	UMTS phone with 802.11 b/g and Bluetooth
Model number:	P102UNA
Serial number:	WWAN: RD1BN6RA6816 & RDV2N7QA1255 WiFi: RD1BN6RA6835
Device category:	Portable
Exposure category:	General Population/Uncontrolled Exposure
Date tested:	August 18 - September 1, 2010

FCC / IC Rule Parts	Frequency Range [MHz]	Highest 1-g SAR (mW/g)	Limit (mW/g)
22H / RSS-132	824 - 849	Head: 0.629 (RHS Touch closed) Body: 0.991 (Face down)	1.6
24E / RSS-133	1850 - 1910	Head: 0.562 (RHS Touch closed) Body: 0.655 (Face down)	
15.247 / RSS-102	2412 - 2462	Head: 0.254 (LHS Touch open) Body: 0.014 (Face up w/ headset)	
	2402 - 2480	n/a	

Applicable Standards	Test Results
FCC OET Bulletin 65 Supplement C 01-01 IC RSS 102 Issue 4	Pass

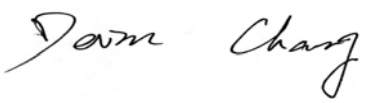
Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties 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 (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released For CCS By:

SUNNY SHIH
ENGINEERING TEAM LEADER
COMPLIANCE CERTIFICATION SERVICES

Tested By:



DEVIN CHANG
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 01-01, IC RSS 102 Issue 4 and the following specific FCC Test Procedures.

☒ - KDB 941225 D01 SAR test for 3G devices v02
☒ - KDB 648474 D01 SAR Handsets Multi Xmiter and Ant, v01r05
☒ - KDB 248227 D01 SAR meas for 802 11abg 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	EX3DV3	3531	2	23	2011
Thermometer	ERTCO	639-1S	1718	7	19	2011
Data Acquisition Electronics	SPEAG	DAE3 V1	500	9	15	2010
System Validation Dipole	SPEAG	D835V2	4d002	4	23	2012
System Validation Dipole	SPEAG	D1900V2	5d043	11	24	2012
System Validation Dipole	SPEAG	D2450V2	706	4	19	2013
Power Meter	Giga-tronics	8651A	8651404	3	13	2012
Power Sensor	Giga-tronics	80701A	1834588	3	13	2012
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		

Note: Per KDB 450824 D02 requirements for dipole calibration, 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 (test data on file in CCS)
4. Impedance is within 5Ω of calibrated measurement (test data on file in CCS)

4.2. MEASUREMENT UNCERTAINTY

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

Component	error, %	Probe Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1)	5.50	Normal	1	1	5.50
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	3.45	Rectangular	1.732	1	1.99
System Detection Limits	1.00	Rectangular	1.732	1	0.58
Readout Electronics	0.30	Normal	1	1	0.30
Response Time	0.80	Rectangular	1.732	1	0.46
Integration Time	2.60	Rectangular	1.732	1	1.50
RF Ambient Conditions - Noise	3.00	Rectangular	1.732	1	1.73
RF Ambient Conditions - Reflections	3.00	Rectangular	1.732	1	1.73
Probe Positioner Mechanical Tolerance	0.40	Rectangular	1.732	1	0.23
Probe Positioning with respect to Phantom	2.90	Rectangular	1.732	1	1.67
Extrapolation, Interpolation and Integration	1.00	Rectangular	1.732	1	0.58
Test Sample Related					
Test Sample Positioning	2.90	Normal	1	1	2.90
Device Holder Uncertainty	3.60	Normal	1	1	3.60
Output Power Variation - SAR Drift	5.00	Rectangular	1.732	1	2.89
Phantom and Tissue Parameters					
Phantom Uncertainty (shape and thickness)	4.00	Rectangular	1.732	1	2.31
Liquid Conductivity - deviation from target	5.00	Rectangular	1.732	0.64	1.85
Liquid Conductivity - measurement (1900MHz)	-3.67	Normal	1	0.64	-2.35
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement (850MHz)	-2.41	Normal	1	0.6	-1.45
Combined Standard Uncertainty Uc(y) =					9.84
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				19.67	%
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				1.56	dB

Measurement uncertainty for 300 MHz to 3 GHz averaged over 10 gram

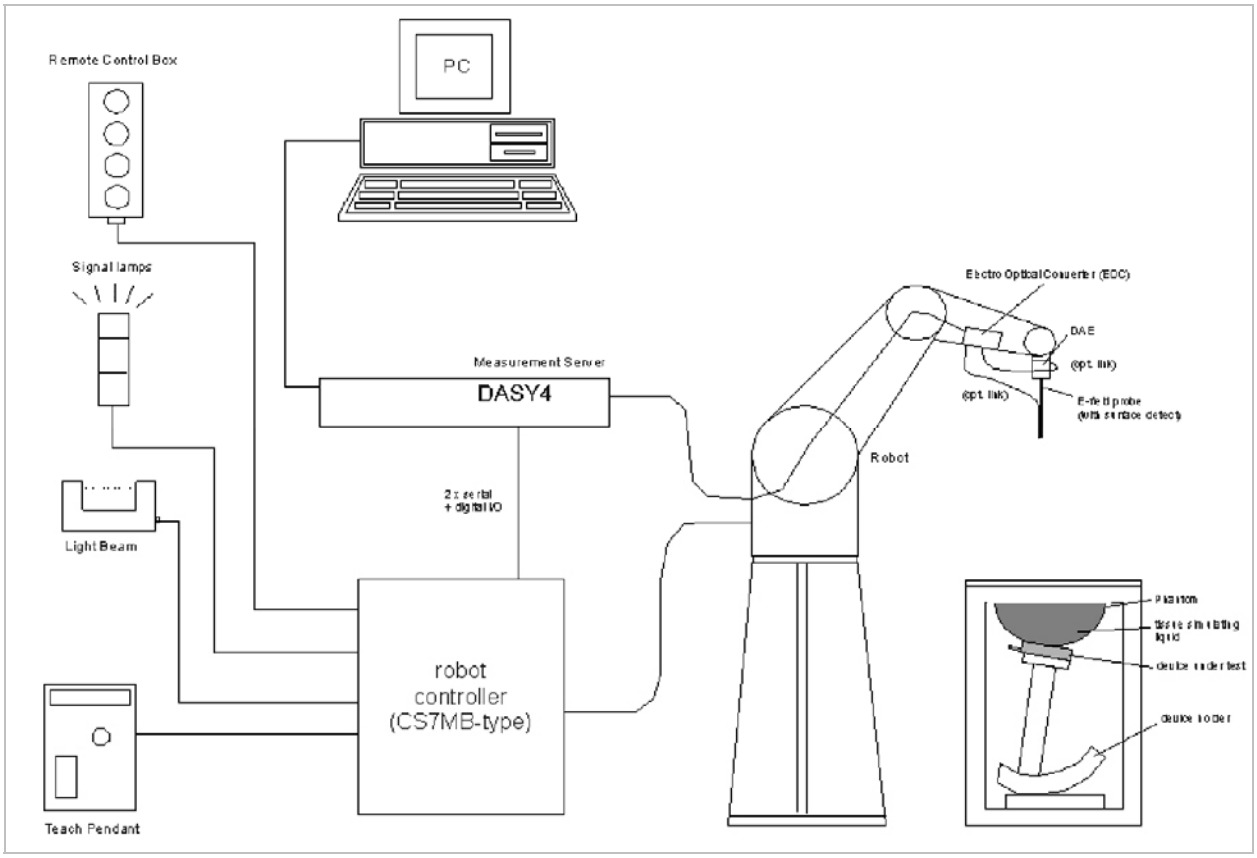
Component	error, %	Probe Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1) @ 2450 MHz	5.50	Normal	1	1	5.50
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
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
Test Sample Related					
Test Sample Positioning	2.90	Normal	1	1	2.90
Device Holder Uncertainty	3.60	Normal	1	1	3.60
Output Power Variation - SAR Drift	5.00	Rectangular	1.732	1	2.89
Phantom and Tissue Parameters					
Phantom Uncertainty (shape and thickness)	4.00	Rectangular	1.732	1	2.31
Liquid Conductivity - deviation from target	5.00	Rectangular	1.732	0.43	1.24
Liquid Conductivity - measurement (1900MHz)	-3.67	Normal	1	0.43	-1.58
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.49	1.41
Liquid Permittivity - measurement (850MHz)	-3.41	Normal	1	0.49	-1.67
Combined Standard Uncertainty Uc(y), % =					9.57
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				19.13	%
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				1.52	dB

5. EQUIPMENT UNDER TEST

UMTS phone with 802.11 b/g and Bluetooth Model P102UNA	
Mobile phone capability:	☐ Class A[1] ☒ Class B[2] ☐ Class C[3]
GPRS Multi-slot class:	☒ Class 12 ☐ Class 10 ☐ Class 8
Normal operation:	• Held to head (open and closed – by sliding) • Worn on body (Facing-up and Facing-down) with 1.5 cm separation distance
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:	7.5 cm from WWAN antenna-to-WiFi/BT antenna when slide closed 11.0 cm from WWAN antenna-to-WiFi/BT antenna when slide open 0 cm from WiFi antenna-to-BT antenna
Simultaneous transmission:	- WWAN can transmit simultaneously with WiFi - WWAN can transmit simultaneously with Bluetooth - WiFi can transmit simultaneously with Bluetooth

[1] Class A mobile phones can be connected to both GPRS and GSM services simultaneously.
[2] Class B mobile phones can be attached to both GPRS and GSM services, using one service at a time.
[3] 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. 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. For frequencies in 300 MHz to just under 2 GHz, the measured conductivity and relative permittivity should be within ± 5% of the target values. For frequencies in the range of 2–3 GHz and above the measured conductivity should be within ± 5% of the target values. The measured relative permittivity tolerance can be relaxed to no more than ± 10%.

Reference Values of Tissue Dielectric Parameters for 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	
	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 Measured by: Devin Chang

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	40.50	Relative Permittivity (ϵ_r):	40.501	41.5	-2.41	± 5
	e"	18.84	Conductivity (σ):	0.875	0.90	-2.77	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
August 18, 2010 11:23 AM

Frequency	e'	e"
800000000.	40.4761	18.8217
805000000.	41.0725	19.0632
810000000.	40.7851	18.6931
815000000.	40.6570	19.0536
820000000.	40.6968	18.8434
825000000.	40.5444	18.7738
830000000.	40.3582	18.7917
835000000.	**40.5005**	**18.8375**
840000000.	40.3934	18.6565
845000000.	40.2241	18.9428
850000000.	40.5342	18.5765
855000000.	40.1602	18.8071
860000000.	40.2450	18.8128
865000000.	40.1082	18.5784
870000000.	40.0629	18.7699
875000000.	40.0283	18.7092
880000000.	39.9479	18.5429
885000000.	39.7883	18.7091
890000000.	39.8428	18.7380
895000000.	39.8897	18.3227
900000000.	39.3832	18.6305
905000000.	39.7304	18.2690
910000000.	39.6650	18.5951
915000000.	39.6459	18.7979
920000000.	39.4214	18.5473
925000000.	39.3809	18.3742
930000000.	39.4106	18.7282
935000000.	39.2058	18.6433
940000000.	39.3867	18.3827
945000000.	39.4751	18.3733
950000000.	39.4952	18.3259

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 Body 835 MHz Measured by: Devin Chang

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	54.81	Relative Permittivity (ϵ_r):	54.811	55.2	-0.70	± 5
	e"	21.44	Conductivity (σ):	0.996	0.97	2.67	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
August 18, 2010 11:33 AM

Frequency	e'	e"
800000000.	54.6712	21.6961
805000000.	55.2575	21.7353
810000000.	55.0071	21.4162
815000000.	54.8866	21.7472
820000000.	54.8473	21.6266
825000000.	54.7488	21.4524
830000000.	54.8135	21.6800
835000000.	**54.8109**	**21.4385**
840000000.	54.5004	21.4079
845000000.	54.8205	21.5759
850000000.	54.7566	21.2633
855000000.	54.5415	21.4472
860000000.	54.5419	21.4209
865000000.	54.3006	21.2725
870000000.	54.3425	21.3653
875000000.	54.4878	21.2554
880000000.	54.3080	21.2043
885000000.	54.3202	21.2600
890000000.	54.2119	21.3224
895000000.	54.1231	21.1022
900000000.	54.1178	21.2109
905000000.	54.0162	20.9151
910000000.	54.0289	21.0648
915000000.	54.1363	21.1462
920000000.	54.0207	20.9004
925000000.	54.1198	20.9640
930000000.	53.7907	21.0324
935000000.	53.9116	21.0994
940000000.	53.9443	20.9942
945000000.	53.9211	20.9434
950000000.	53.7155	20.9016

The conductivity (σ) can be given as:

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

where f = target f * 10^6

ε_0 = 8.854 * 10^{-12}

Simulating Liquid Dielectric Parameters for Head 835 MHz Measured by: Devin Chang

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	40.57	Relative Permittivity (ϵ_r):	40.572	41.5	-2.24	± 5
	e"	18.79	Conductivity (σ):	0.873	0.90	-3.01	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
August 19, 2010 9:27 AM

Frequency	e'	e"
800000000.	40.5717	18.9113
805000000.	41.1370	18.8599
810000000.	40.8754	18.7787
815000000.	40.9466	18.9476
820000000.	40.7808	18.7950
825000000.	40.6145	18.7225
830000000.	40.4872	18.9373
835000000.	**40.5795**	**18.7908**
840000000.	40.4300	18.6262
845000000.	40.4799	18.8673
850000000.	40.4694	18.5742
855000000.	40.4186	18.7053
860000000.	40.1418	18.6318
865000000.	40.2532	18.5957
870000000.	40.0522	18.6249
875000000.	40.1154	18.7213
880000000.	40.0237	18.5475
885000000.	39.8687	18.7544
890000000.	39.9105	18.5520
895000000.	39.7036	18.5832
900000000.	39.7865	18.5199
905000000.	39.6745	18.5136
910000000.	39.6962	18.4680
915000000.	39.6216	18.5193
920000000.	39.7168	18.4394
925000000.	39.5869	18.5969
930000000.	39.6469	18.4863
935000000.	39.4650	18.4858
940000000.	39.4835	18.4088
945000000.	39.3469	18.3686
950000000.	39.2225	18.3538

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 Body 835 MHz Measured by: Devin Chang

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	54.64	Relative Permittivity (ϵ_r):	54.644	55.2	-1.01	± 5
	e"	21.43	Conductivity (σ):	0.995	0.97	2.62	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
August 19, 2010 9:33 AM

Frequency	e'	e"
800000000.	55.0554	21.6568
805000000.	55.0125	21.6693
810000000.	55.0767	21.4711
815000000.	54.9092	21.5808
820000000.	54.9992	21.4836
825000000.	54.8736	21.4320
830000000.	54.7206	21.5041
835000000.	**54.6443**	**21.4284**
840000000.	54.6022	21.2642
845000000.	54.6036	21.4296
850000000.	54.5440	21.3871
855000000.	54.5689	21.4897
860000000.	54.4012	21.4139
865000000.	54.3106	21.4032
870000000.	54.3711	21.3538
875000000.	54.3804	21.4638
880000000.	54.2894	21.2102
885000000.	54.1852	21.3138
890000000.	54.1674	21.1741
895000000.	54.2210	20.7881
900000000.	53.9379	21.2270
905000000.	54.0111	20.7937
910000000.	54.0522	20.9787
915000000.	54.1293	21.1930
920000000.	53.8037	21.0687
925000000.	53.9560	20.8729
930000000.	53.8717	21.0695
935000000.	53.8380	21.0964
940000000.	53.8422	21.0210
945000000.	53.8539	20.8237
950000000.	53.9406	20.9553

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 Measured by: Devin Chang

f (MHz)	Liquid Parameters		Measured Results		Target	Delta (%)	Limit (%)
1900	e'	39.525	Relative Permittivity (ε_r):	39.5253	40.0	-1.19	± 5
	e"	13.151	Conductivity (σ):	1.39004	1.40	-0.71	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
August 31, 2010 01:22 PM

Frequency	e'	e"
1710000000.	40.2079	12.6724
1720000000.	40.1677	12.7179
1730000000.	40.1390	12.7872
1740000000.	40.0954	12.8307
1750000000.	40.0699	12.8418
1760000000.	40.0511	12.8585
1770000000.	40.0354	12.8644
1780000000.	39.9820	12.8737
1790000000.	39.9209	12.8851
1800000000.	39.8665	12.9051
1810000000.	39.8020	12.9491
1820000000.	39.7501	13.0046
1830000000.	39.6677	13.0554
1840000000.	39.6245	13.1042
1850000000.	39.5955	13.1153
1860000000.	39.6153	13.1174
1870000000.	39.5953	13.1291
1880000000.	39.5821	13.1347
1890000000.	39.5552	13.1509
1900000000.	**39.5253**	**13.1509**
1910000000.	39.4616	13.1897

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 Body 1900 MHz Measured by: Devin Chang

f (MHz)	Muscle Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1900	e'	52.529	Relative Permittivity (ε_r):	52.5290	53.3	-1.45	± 5
	e"	13.852	Conductivity (σ):	1.46415	1.52	-3.67	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
August 31, 2010 01:26 PM

Frequency	e'	e"
1710000000.	53.0523	13.3180
1720000000.	53.0366	13.3831
1730000000.	53.0013	13.4366
1740000000.	52.9818	13.4705
1750000000.	52.9714	13.4857
1760000000.	52.9620	13.4967
1770000000.	52.9455	13.5260
1780000000.	52.8987	13.5395
1790000000.	52.8450	13.5600
1800000000.	52.7801	13.5819
1810000000.	52.7279	13.6388
1820000000.	52.6747	13.6985
1830000000.	52.6049	13.7443
1840000000.	52.5737	13.7764
1850000000.	52.5739	13.7926
1860000000.	52.5961	13.8056
1870000000.	52.5909	13.8116
1880000000.	52.5751	13.8301
1890000000.	52.5513	13.8415
1900000000.	**52.5290**	**13.8520**
1910000000.	52.4808	13.9027

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 Measured by: Devin Chang

f (MHz)	Liquid Parameters		Measured Results		Target	Delta (%)	Limit (%)
1900	e'	39.553	Relative Permittivity (ε_r):	39.5529	40.0	-1.12	± 5
	e"	13.197	Conductivity (σ):	1.39492	1.40	-0.36	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
September 1, 2010 10:04 AM

Frequency	e'	e"
1710000000.	40.2318	12.7194
1720000000.	40.1995	12.7802
1730000000.	40.1690	12.8342
1740000000.	40.1373	12.8782
1750000000.	40.1125	12.8771
1760000000.	40.0906	12.8965
1770000000.	40.0641	12.9089
1780000000.	40.0140	12.9122
1790000000.	39.9583	12.9325
1800000000.	39.8938	12.9474
1810000000.	39.8320	13.0001
1820000000.	39.7747	13.0436
1830000000.	39.7007	13.1033
1840000000.	39.6580	13.1403
1850000000.	39.6346	13.1543
1860000000.	39.6381	13.1715
1870000000.	39.6156	13.1714
1880000000.	39.6224	13.1859
1890000000.	39.5914	13.1946
1900000000.	**39.5529**	**13.1970**
1910000000.	39.5064	13.2302

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 Body 1900 MHz Measured by: Devin Chang

f (MHz)	Muscle Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1900	e'	53.077	Relative Permittivity (ε_r):	53.0769	53.3	-0.42	± 5
	e"	13.969	Conductivity (σ):	1.47648	1.52	-2.86	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
September 1, 2010 10:11 AM

Frequency	e'	e"
1710000000.	53.6077	13.4145
1720000000.	53.5876	13.4747
1730000000.	53.5580	13.5252
1740000000.	53.5481	13.5819
1750000000.	53.5237	13.5966
1760000000.	53.5291	13.5993
1770000000.	53.5067	13.6254
1780000000.	53.4537	13.6359
1790000000.	53.3960	13.6665
1800000000.	53.3427	13.6925
1810000000.	53.2886	13.7412
1820000000.	53.2310	13.7965
1830000000.	53.1675	13.8622
1840000000.	53.1407	13.8847
1850000000.	53.1339	13.9078
1860000000.	53.1518	13.9239
1870000000.	53.1458	13.9437
1880000000.	53.1338	13.9493
1890000000.	53.1188	13.9728
1900000000.	**53.0769**	**13.9687**
1910000000.	53.0308	14.0300

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 Head 2450 MHz Measured by: Devin Chang

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
2450	e'	39.40	Relative Permittivity (ϵ_r):	39.398	39.2	0.51	± 5
	e"	13.65	Conductivity (σ):	1.860	1.80	3.35	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
August 25, 2010 08:53 AM

Frequency	e'	e"
2400000000.	39.5668	13.4876
2405000000.	39.5395	13.4979
2410000000.	39.5285	13.5202
2415000000.	39.5038	13.5093
2420000000.	39.4830	13.5329
2425000000.	39.4729	13.5393
2430000000.	39.4522	13.5693
2435000000.	39.4221	13.5877
2440000000.	39.4220	13.5873
2445000000.	39.4142	13.6036
2450000000.	**39.3982**	**13.6495**
2455000000.	39.3603	13.6702
2460000000.	39.3356	13.6733
2465000000.	39.3192	13.6778
2470000000.	39.3023	13.6953
2475000000.	39.2860	13.7152
2480000000.	39.2691	13.7299
2485000000.	39.2517	13.7396
2490000000.	39.2389	13.7614
2495000000.	39.2111	13.7766
2500000000.	39.1952	13.8001

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 Body 2450 MHz Measured by: Devin Chang

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
2450	e'	53.53	Relative Permittivity (ϵ_r):	53.532	52.7	1.58	± 5
	e"	14.75	Conductivity (σ):	2.011	1.95	3.11	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
August 25, 2010 08:59 AM

Frequency	e'	e"
2400000000.	53.6806	14.5141
2405000000.	53.6661	14.5424
2410000000.	53.6531	14.5619
2415000000.	53.6373	14.5892
2420000000.	53.6401	14.6052
2425000000.	53.6161	14.6311
2430000000.	53.5949	14.6624
2435000000.	53.5863	14.6800
2440000000.	53.5765	14.7015
2445000000.	53.5661	14.7134
2450000000.	**53.5315**	**14.7523**
2455000000.	53.5314	14.7860
2460000000.	53.5092	14.8064
2465000000.	53.4905	14.8186
2470000000.	53.4689	14.8272
2475000000.	53.4527	14.8582
2480000000.	53.4402	14.8860
2485000000.	53.4220	14.9113
2490000000.	53.4070	14.9353
2495000000.	53.3919	14.9660
2500000000.	53.3750	14.9843

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 VERIFICATION

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

System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the SAM twin phantom filled with Head or Body simulating liquid of the following parameters.
- The DASY4 system with an Isotropic E-Field Probe EX3DV3 SN3531 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	04/23/12	SAR_{1g}:	9.64	9.96
			SAR_{10g}:	6.28	6.56
D1900V2	D1900V2-5d043_Nov09	11/24/12	SAR_{1g}:	39.8	40.4
			SAR_{10g}:	20.7	21.4
D2450V2	D2450V2-706_Apr10	04/19/13	SAR_{1g}:	51.6	52.4
			SAR_{10g}:	24.4	24.5

9.1. SYSTEM CHECK RESULTS FOR D835V2

System validation dipole	Date Tested	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
		Tissue:	Head			
D835V2	08/18/10	SAR_{1g}:	9.89	9.64	2.59	±10
		SAR_{10g}:	6.5	6.28	3.50	
D835V2	08/19/10	SAR_{1g}:	9.98	9.64	3.53	±10
		SAR_{10g}:	6.57	6.28	4.62	

9.2. SYSTEM CHECK RESULTS FOR D1900V2

System validation dipole	Date Tested	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
		Tissue:	Head			
D1900V2	08/31/10	SAR_{1g}:	41.3	39.8	3.77	±10
		SAR_{10g}:	21.7	20.7	4.83	
D1900V2	09/01/10	SAR_{1g}:	40.1	39.8	0.75	±10
		SAR_{10g}:	21.0	20.7	1.45	

9.3. SYSTEM CHECK RESULTS FOR D2450V2

System validation dipole	Date Tested	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
		Tissue:	Body			
D2450V2	08/25/10	SAR_{1g}:	50.5	52.4	-3.63	±10
		SAR_{10g}:	23.3	24.5	-4.90	

SYSTEM CHECK PLOT for D835V2

Date/Time: 8/18/2010 12:06:18 PM

Test Laboratory: Compliance Certification Services

System Performance Check - D835V2

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:xxx

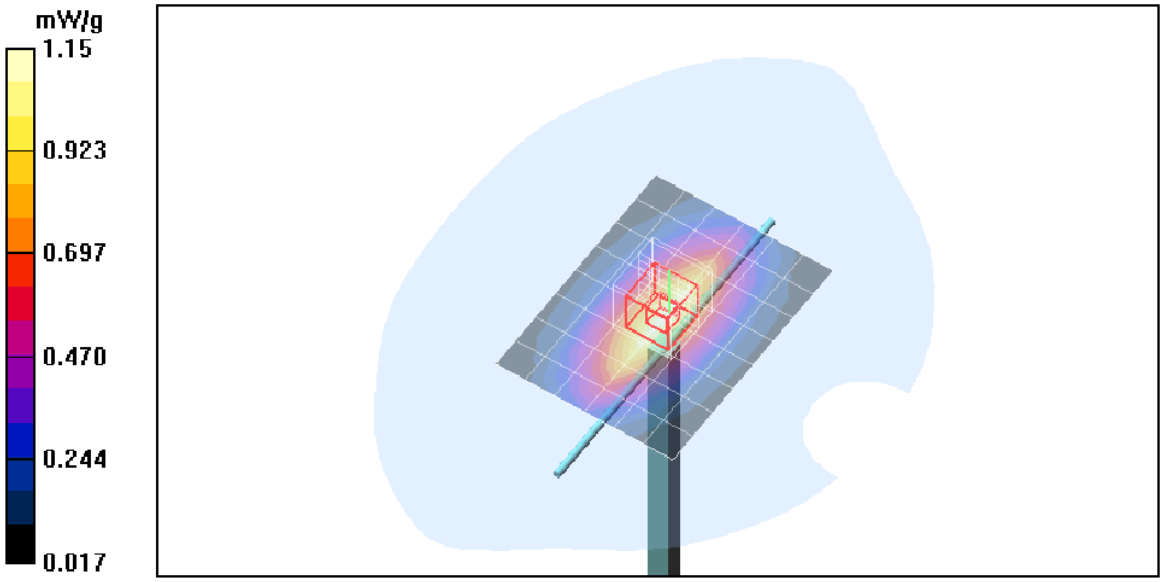
Communication System: CW 835; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.875 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

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: EX3DV3 - SN3531; ConvF(10.13, 10.13, 10.13); Calibrated: 2/23/2010
- 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

d=15mm, Pin=100 mW/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.15 mW/g

d=15mm, Pin=100 mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 36.3 V/m; Power Drift = 0.000 dB
Peak SAR (extrapolated) = 1.48 W/kg
SAR(1 g) = 0.989 mW/g; SAR(10 g) = 0.650 mW/g



Z-Axis PLOT for D835V2

Date/Time: 8/18/2010 12:23:53 PM

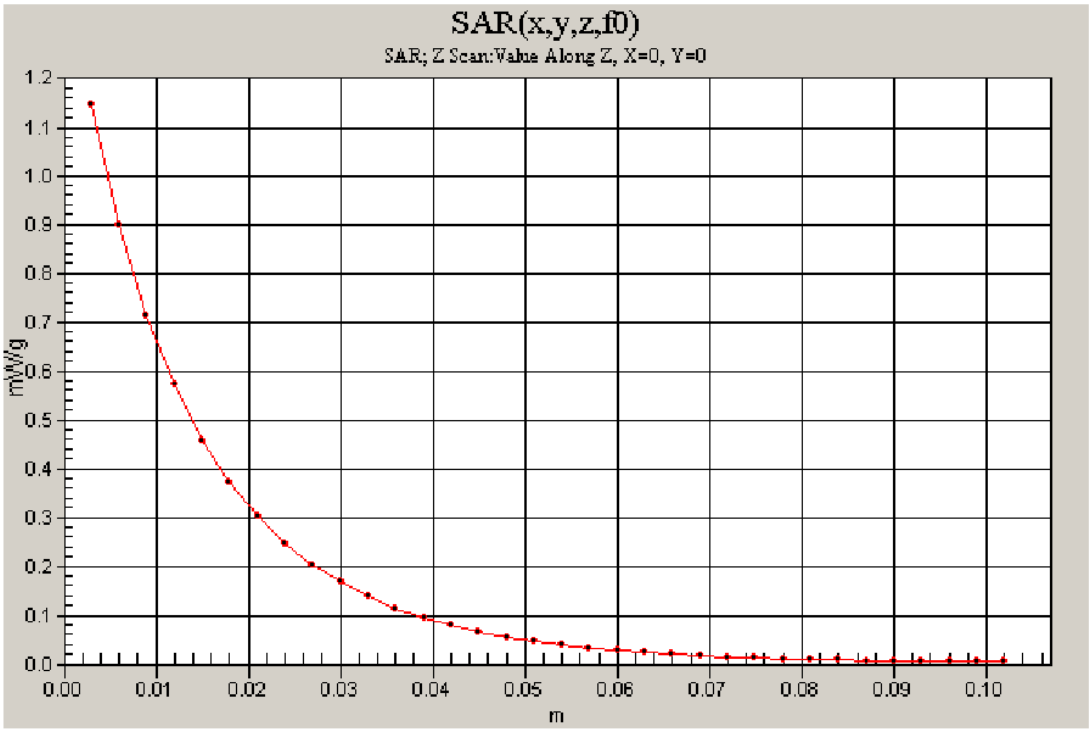
Test Laboratory: Compliance Certification Services

System Performance Check - D835V2

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:xxx

Communication System: CW 835; Frequency: 835 MHz;Duty Cycle: 1:1

d=15mm, Pin=100 mW/Z Scan (1x1x34): Measurement grid: dx=20mm, dy=20mm, dz=3mm
Maximum value of SAR (measured) = 1.15 mW/g



SYSTEM CHECK PLOT for D835V2

Date/Time: 8/19/2010 10:06:13 AM

Test Laboratory: Compliance Certification Services

System Performance Check - D835V2

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:xxx

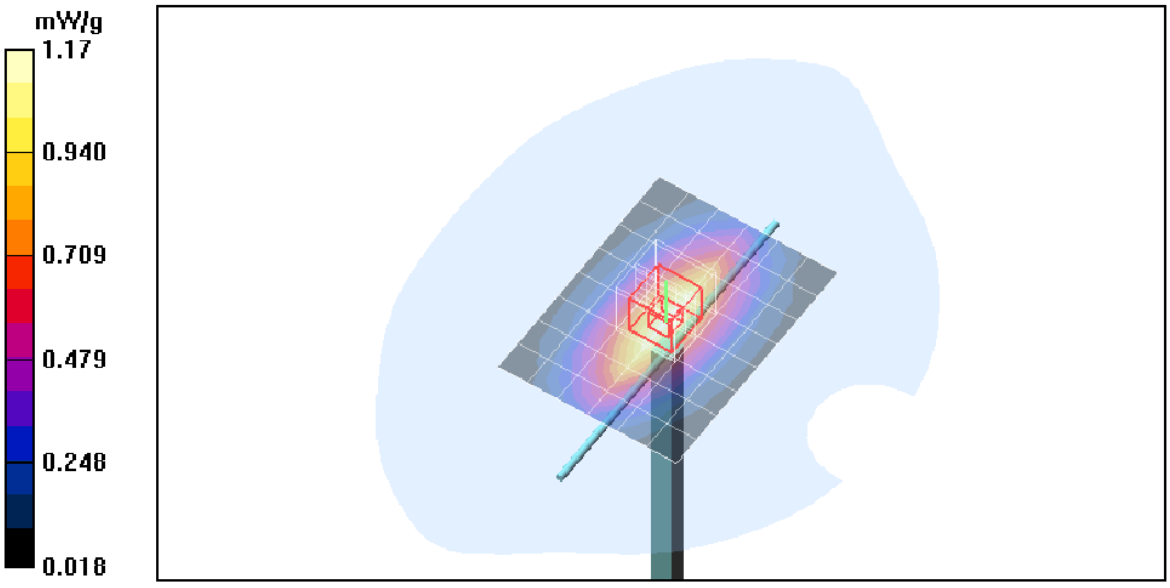
Communication System: CW 835; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.873 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

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: EX3DV3 - SN3531; ConvF(10.13, 10.13, 10.13); Calibrated: 2/23/2010
- 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

d=15mm, Pin=100 mW/Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.17 mW/g

d=15mm, Pin=100 mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 36.7 V/m; Power Drift = -0.028 dB
Peak SAR (extrapolated) = 1.49 W/kg
SAR(1 g) = 0.998 mW/g; SAR(10 g) = 0.657 mW/g
Maximum value of SAR (measured) = 1.16 mW/g



Z-Axis PLOT for D835V2

Date/Time: 8/19/2010 10:14:20 AM

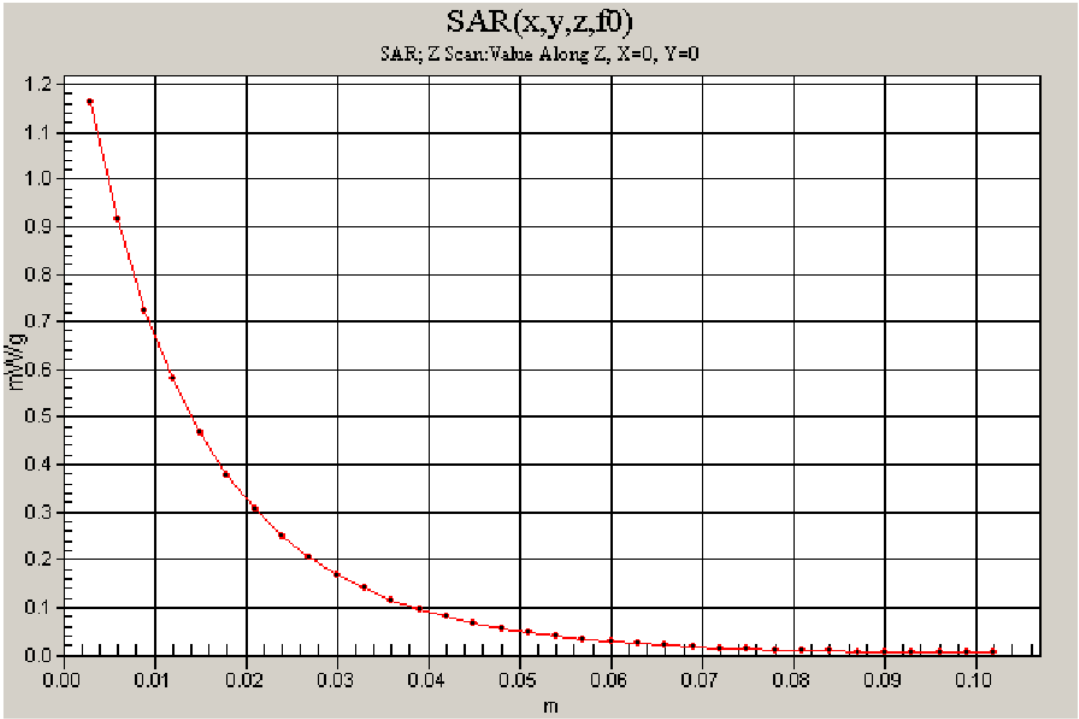
Test Laboratory: Compliance Certification Services

System Performance Check - D835V2

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:xxx

Communication System: CW 835; Frequency: 835 MHz;Duty Cycle: 1:1

d=15mm, Pin=100 mW/Z Scan (1x1x34): Measurement grid: dx=20mm, dy=20mm, dz=3mm
Maximum value of SAR (measured) = 1.16 mW/g



SYSTEM CHECK PLOT for D1900V2

Date/Time: 8/31/2010 1:36:47 PM

Test Laboratory: Compliance Certification Services

System Performance Check - D1900V2

DUT: Dipole; Type: D1900V2; Serial: 5d043

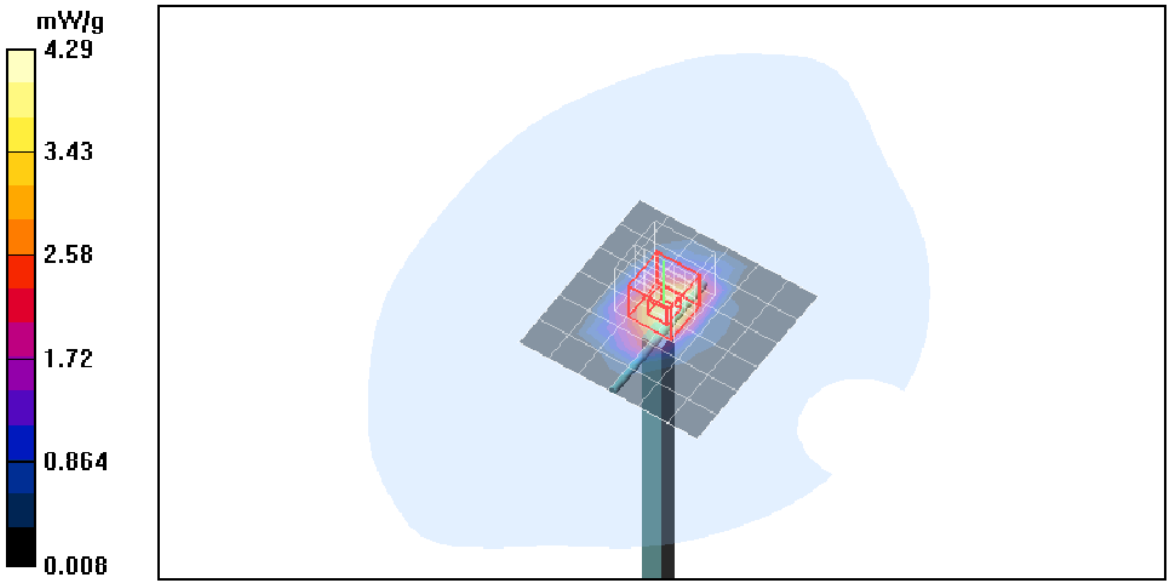
Communication System: System Check Signal - CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.39 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

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: EX3DV3 - SN3531; ConvF(8.64, 8.64, 8.64); Calibrated: 2/23/2010
- 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

d=10mm, Pin=100mW/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 4.29 mW/g

d=10mm, Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.1 V/m; Power Drift = -0.169 dB
Peak SAR (extrapolated) = 7.62 W/kg
SAR(1 g) = 4.13 mW/g; SAR(10 g) = 2.17 mW/g
Maximum value of SAR (measured) = 5.16 mW/g



Z-Axis PLOT for D1900V2

Date/Time: 8/31/2010 1:53:11 PM

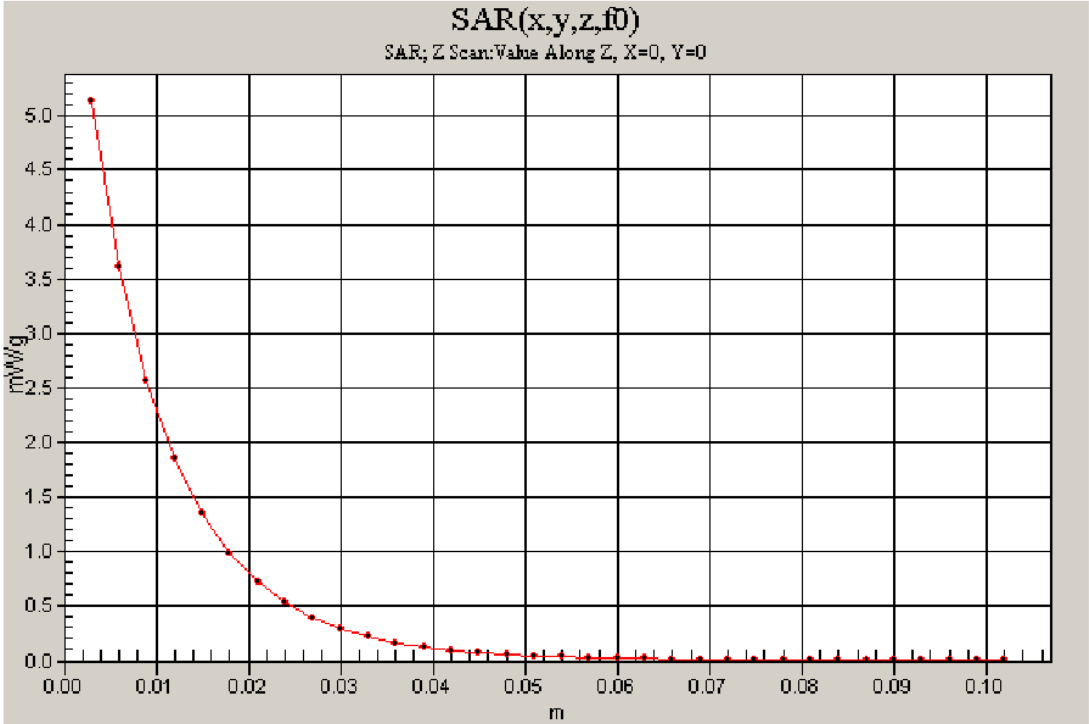
Test Laboratory: Compliance Certification Services

System Performance Check - D1900V2

DUT: Dipole; Type: D1900V2; Serial: 5d043

Communication System: System Check Signal - CW; Frequency: 1900 MHz;Duty Cycle: 1:1

d=10mm, Pin=100mW/Z Scan (1x1x34): Measurement grid: dx=20mm, dy=20mm, dz=3mm
Maximum value of SAR (measured) = 5.14 mW/g



SYSTEM CHECK PLOT for D1900V2

Date/Time: 9/1/2010 11:02:41 AM

Test Laboratory: Compliance Certification Services

System Performance Check - D1900V2

DUT: Dipole; Type: D1900V2; Serial: 5d043

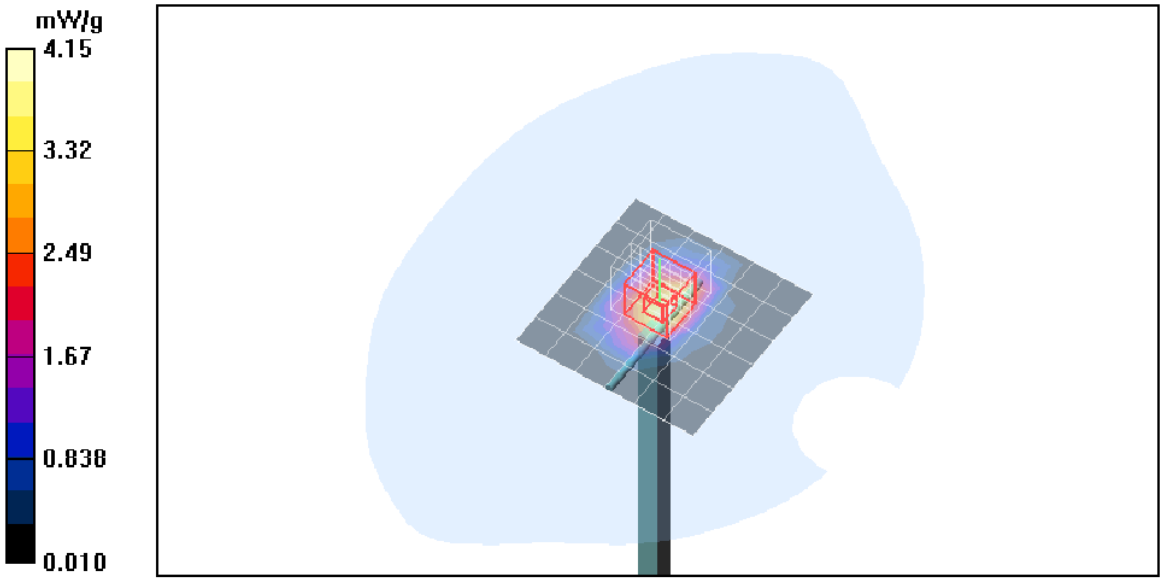
Communication System: System Check Signal - CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.39 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

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: EX3DV3 - SN3531; ConvF(8.64, 8.64, 8.64); Calibrated: 2/23/2010
- 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

d=10mm, Pin=100mW/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 4.15 mW/g

d=10mm, Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.8 V/m; Power Drift = -0.102 dB
Peak SAR (extrapolated) = 7.39 W/kg
SAR(1 g) = 4.01 mW/g; SAR(10 g) = 2.1 mW/g
Maximum value of SAR (measured) = 5.01 mW/g



Z-Axis PLOT for D1900V2

Date/Time: 9/1/2010 11:19:13 AM

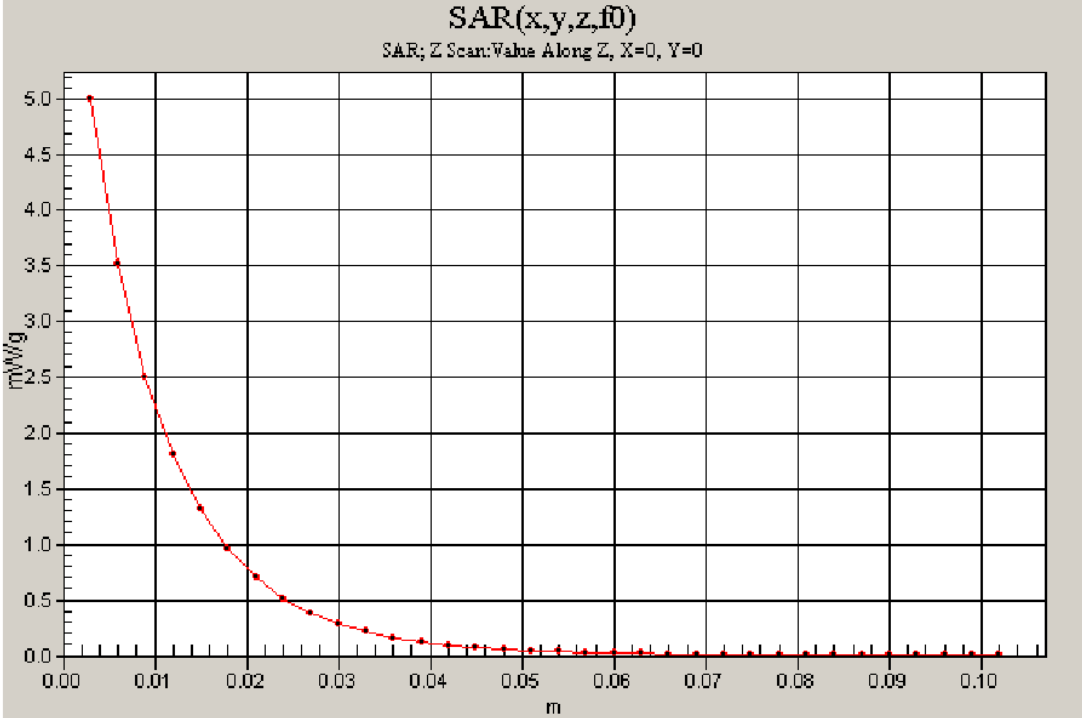
Test Laboratory: Compliance Certification Services

System Performance Check - D1900V2

DUT: Dipole; Type: D1900V2; Serial: 5d043

Communication System: System Check Signal - CW; Frequency: 1900 MHz;Duty Cycle: 1:1

d=10mm, Pin=100mW/Z Scan (1x1x34): Measurement grid: dx=20mm, dy=20mm, dz=3mm
Maximum value of SAR (measured) = 5.00 mW/g



SYSTEM CHECK plot for D2450V2

Date/Time: 8/25/2010 11:32:40 AM

Test Laboratory: Compliance Certification Services

System Performance Check - D2450V2

DUT: Dipole ; Type: D2450V2; Serial: 706

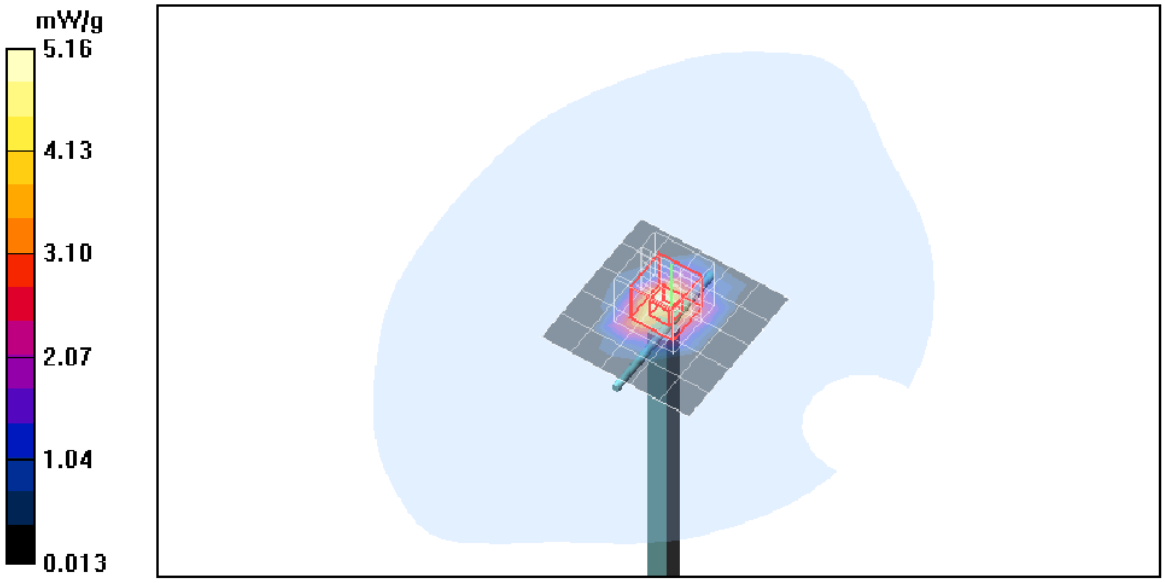
Communication System: System Check Signal - CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.86 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

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: EX3DV3 - SN3531; ConvF(7.6, 7.6, 7.6); Calibrated: 2/23/2010
- 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

d=10mm, Pin=100mW/Area Scan (6x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 5.16 mW/g

d=10mm, Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.2 V/m; Power Drift = -0.153 dB
Peak SAR (extrapolated) = 10.7 W/kg
SAR(1 g) = 5.05 mW/g; SAR(10 g) = 2.33 mW/g
Maximum value of SAR (measured) = 6.54 mW/g



Z-Axis Plot for D1900V2

Date/Time: 8/25/2010 11:48:01 AM

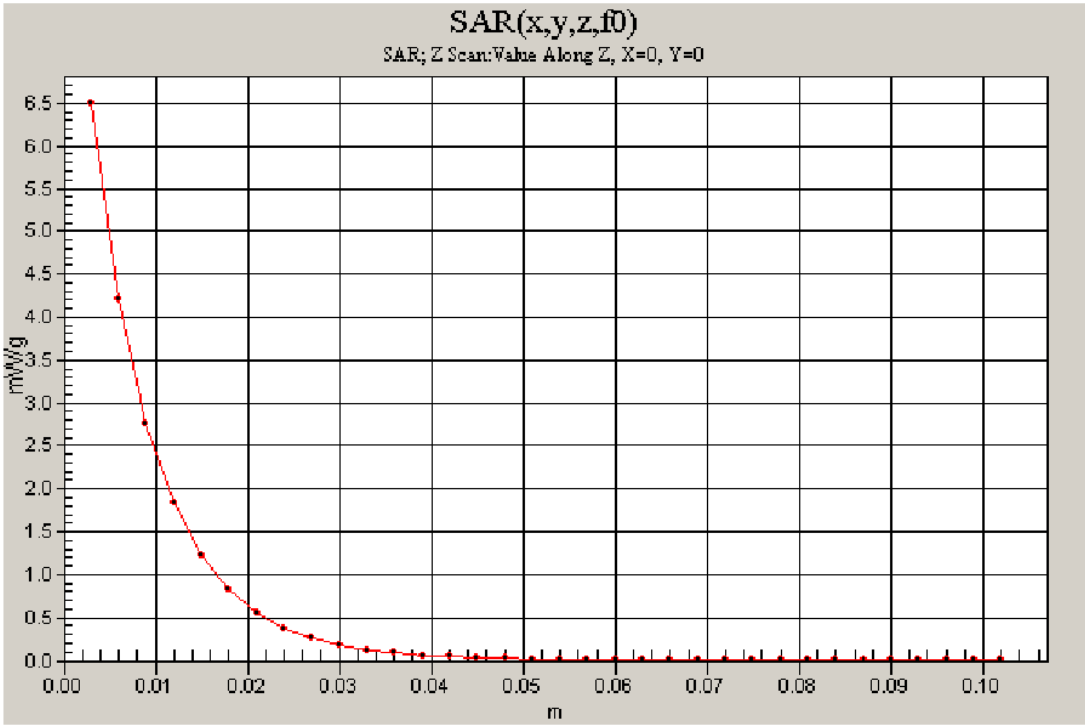
Test Laboratory: Compliance Certification Services

System Performance Check - D2450V2

DUT: Dipole ; Type: D2450V2; Serial: 706

Communication System: System Check Signal - CW; Frequency: 2450 MHz;Duty Cycle: 1:1

d=10mm, Pin=100mW/Z Scan (1x1x34): Measurement grid: dx=20mm, dy=20mm, dz=3mm
Maximum value of SAR (measured) = 6.50 mW/g



10. OUTPUT POWER VERIFICATION

10.1. GSM

GSM (GMSK) voice mode

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)
GSM850	128	824.2	32.7
	190	836.6	32.6
	251	848.8	32.5
GSM1900	512	1850.2	29.8
	661	1880	29.7
	810	1909.8	30.2

GPRS (GMSK) - Coding Scheme: CS4

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	32.6	23.6	30.6	**24.6**	28.6	24.4	27.2	24.2
	190	836.6	32.5	23.5	30.5	**24.5**	28.5	24.3	27.1	24.1
	251	848.8	32.5	23.5	30.5	**24.5**	28.5	24.2	27.0	24.0
GSM1900	512	1850.2	29.8	20.8	29.7	23.7	29.6	**25.3**	28.2	25.2
	661	1880	29.7	20.7	29.6	23.6	29.5	**25.2**	28.1	25.1
	810	1909.8	30.2	21.2	30.1	24.1	30.0	**25.7**	28.6	25.6

EGPRS (8PSK) - Coding Scheme: MCS9

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	27.3	18.3	27.3	21.3	27.3	23.0	26.8	23.8
	190	836.6	27.2	18.2	27.2	21.2	27.2	22.9	26.7	23.7
	251	848.8	27.1	18.1	27.1	21.1	27.1	22.8	26.6	23.6
GSM1900	512	1850.2	26.3	20.3	26.3	20.3	26.3	22.0	26.3	23.3
	661	1880	26.2	20.2	26.2	20.2	26.2	21.9	26.2	23.2
	810	1909.8	26.8	20.8	26.7	20.7	26.7	22.4	26.7	23.7

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 2 time slots
    b. GPRS1900 3 time slots

10.2. UMTS RELEASE 99

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

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

Results

Rel 99 (12.2kbps RMC)

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	Avg Tx Pwr (dBm)
UMTS850 (Band V)	Rel 99 12.2kbps RMC	4132	4357	826.4	23.77
		4183	4408	836.6	23.75
		4233	4458	846.6	23.68
UMTS1900 (Band II)	Rel 99 12.2kbps RMC	9262	9662	1852.4	24.41
		9400	9800	1880.0	24.29
		9538	9938	1907.6	24.19

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			
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	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			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	CM (dB)	0	1	1.5	1.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	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)	Avg Tx Pwr (dBm)
UMTS850 (Band V)	Subtest 1	4132	4357	826.4	23.75
		4183	4408	836.6	23.71
		4233	4458	846.6	23.64
	Subtest 2	4132	4357	826.4	22.69
		4183	4408	836.6	22.67
		4233	4458	846.6	22.46
	Subtest 3	4132	4357	826.4	22.13
		4183	4408	836.0	22.11
		4233	4458	846.6	21.93
	Subtest 4	4132	4357	826.4	21.07
		4183	4408	836.4	21.10
		4233	4458	846.6	20.88
UMTS1900 (Band II)	Subtest 1	9262	9662	1852.4	24.38
		9400	9800	1880.0	24.35
		9538	9938	1907.6	24.15
	Subtest 2	9262	9662	1852.4	23.36
		9400	9800	1880.0	23.34
		9538	9938	1907.6	23.20
	Subtest 3	9262	9662	1852.4	22.54
		9400	9800	1880.0	22.48
		9538	9938	1907.6	22.41
	Subtest 4	9262	9662	1852.4	21.40
		9400	9800	1880.0	21.32
		9538	9938	1907.6	21.56

Note: KDB 941225 D01 – Body SAR is not required for HSDPA when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is < 75% (1.2 W/kg) of the SAR limit.

10.4. WIFI RF OUTPUT POWER

802.11b			
Channel #	Freq. (MHz)	Conducted Avg Power	
		(dBm)	(mW)
1	2412	11.1	12.9
6	2437	11.5	14.1
11	2462	11.0	12.6
802.11g			
1	2412	10.4	11.0
6	2437	10.0	10.0
11	2462	9.8	9.5

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

10.5. BLUETOOTH RF OUTPUT POWER

Bluetooth with GFSK Mode

Channel #	Freq. (MHz)	Conducted Peak Power	
		(dBm)	(mW)
0	2402	3.2	2.1
39	2441	3.8	2.4
78	2482	3.3	2.1

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

☒ Output ≤ $2 \cdot P_{Ref}$ (24 mW) and antenna is ≥ 5.0 cm from other antennas
☐ Output ≤ P_{Ref} (12 mW) and antenna is ≥ 2.5 cm from other antennas
☐ Output ≤ P_{Ref} (12 mW) and antenna is < 2.5 cm from other antennas, each with either output power ≤ P_{Ref} or 1-g SAR < 1.2 W/kg

11. SUMMARY OF TEST RESULTS

11.1. 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	0.472	0.351
			251	848.8		
		Tilt (15°C) (open)	128	824.2		
			190	836.6	0.206	0.155
			251	848.8		
GSM850	GSM	Touch (closed)	128	824.2		
			190	836.6	0.595	0.435
			251	848.8		
		Tilt (15°C) (closed)	128	824.2		
			190	836.6	0.232	0.177
			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	0.450	0.338
			251	848.8		
		Tilt (15°C) (open)	128	824.2		
			190	836.6	0.191	0.145
			251	848.8		
GSM850	GSM	Touch (closed)	128	824.2		
			190	836.6	**0.629**	0.457
			251	848.8		
		Tilt (15°C) (closed)	128	824.2		
			190	836.6	0.221	0.165
			251	848.8		

Body with 1.5 cm separation distance

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
GSM850	GPRS 2 slots	Face up	128	824.2		
			190	836.6	0.637	0.457
			251	848.8		
		Face down	128	824.2	0.956	0.657
			190	836.6	**0.991**	0.681
			251	848.8	0.760	0.520
		w/ headset	190	836.6	0.746	0.509

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 2 time slots was chosen for Body SAR testing.

11.2. 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	0.121	0.077
			810	1909.8		
		Tilt (15°C) (open)	512	1850.2		
			661	1880.0	0.097	0.061
			810	1909.8		
GSM1900	GSM	Touch (closed)	512	1850.2		
			661	1880.0	0.312	0.172
			810	1909.8		
		Tilt (15°C) (closed)	512	1850.2		
			661	1880.0	0.096	0.059
			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	0.170	0.110
			810	1909.8		
		Tilt (15°C) (open)	512	1850.2		
			661	1880.0	0.115	0.074
			810	1909.8		
GSM1900	GSM	Touch (closed)	512	1850.2		
			661	1880.0	0.391	0.223
			810	1909.8		
		Tilt (15°C) (closed)	512	1850.2		
			661	1880.0	0.114	0.072
			810	1909.8		

Body 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	0.410	0.242
			810	1909.8		
		Face down	512	1850.2		
			661	1880.0	**0.655**	0.416
			810	1909.8		
		w/ headset	810	1909.8	0.631	0.391

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.

11.3. UMTS BAND V

Left Hand Side (LHS)

Band	Mode	Test position	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
						1-g	10-g
Band V	R99 12.2kbps RMC	Touch (open)	4132	4357	826.4		
			4183	4408	836.6	0.489	0.364
			4233	4458	846.6		
		Tilt (15°C) (open)	4132	4357	826.4		
			4183	4408	836.6	0.179	0.138
			4233	4458	846.6		
		Touch (closed)	4132	4357	826.4		
			4183	4408	836.6	0.512	0.364
			4233	4458	846.6		
		Tilt (15°C) (closed)	4132	4357	826.4		
			4183	4408	836.6	0.185	0.140
			4233	4458	846.6		

Right Hand Side (RHS)

Band	Mode	Test position	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
						1-g	10-g
Band V	R99 12.2kbps RMC	Touch (open)	4132	4357	826.4		
			4183	4408	836.6	0.420	0.317
			4233	4458	846.6		
		Tilt (15°C) (open)	4132	4357	826.4		
			4183	4408	836.6	0.189	0.145
			4233	4458	846.6		
		Touch (closed)	4132	4357	826.4		
			4183	4408	836.6	0.544	0.392
			4233	4458	846.6		
		Tilt (15°C) (closed)	4132	4357	826.4		
			4183	4408	836.6	0.230	0.174
			4233	4458	846.6		

Body with 1.5 cm separation distance

Band	Mode	Test position	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
						1-g	10-g
Band V	R99 12.2kbps RMC	Face up	4132	4357	826.4		
			4183	4408	836.6	0.436	0.319
			4233	4458	846.6		
		Face down	4132	4357	826.4	0.755	0.519
			4183	4408	836.6	0.821	0.563
			4233	4458	846.6	0.894	0.617
		w/ headset	4233	4458	846.6	0.626	0.420

Notes:

1) KDB 941225 D01 – Body SAR is not required for HSDPA when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is < 75% of the SAR limit.
2) KDB 941225 D01 – Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit.

11.4. UMTS BAND II

Left Hand Side (LHS)

Band	Mode	Test position	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
						1-g	10-g
Band II	R99 12.2kbps RMC	Touch (open)	9262	9662	1850.2		
			9400	9800	1880.0	0.283	0.175
			9538	9938	1907.6		
		Tilt (15°C) (open)	9262	9662	1850.2		
			9400	9800	1880.0	0.190	0.120
			9538	9938	1907.6		
		Touch (closed)	9262	9662	1850.2		
			9400	9800	1880.0	0.414	0.227
			9538	9938	1907.6		
		Tilt (15°C) (closed)	9262	9662	1850.2		
			9400	9800	1880.0	0.058	0.036
			9538	9938	1907.6		

Right Hand Side (RHS)

Band	Mode	Test position	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
						1-g	10-g
Band II	R99 12.2kbps RMC	Touch (open)	9262	9662	1850.2		
			9400	9800	1880.0	0.354	0.231
			9538	9938	1907.6		
		Tilt (15°C) (open)	9262	9662	1850.2		
			9400	9800	1880.0	0.230	0.147
			9538	9938	1907.6		
		Touch (closed)	9262	9662	1850.2		
			9400	9800	1880.0	**0.562**	0.304
			9538	9938	1907.6		
		Tilt (15°C) (closed)	9262	9662	1850.2		
			9400	9800	1880.0	0.076	0.047
			9538	9938	1907.6		

Body with 1.5 cm separation distance

Band	Mode	Test position	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
						1-g	10-g
Band II	R99 12.2kbps RMC	Face up	9262	9662	1850.2		
			9400	9800	1880.0	0.166	0.100
			9538	9938	1907.6		
		Face down	9262	9662	1850.2		
			9400	9800	1880.0	0.367	0.237
			9538	9938	1907.6		
		w/ headset	9400	9800	1880.0	0.348	0.223

Notes:

1) KDB 941225 D01 – Body SAR is not required for HSDPA when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is < 75% of the SAR limit.
2) KDB 941225 D01 – Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit.

11.5. WIFI

Left Hand Side (LHS)

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
2.4 GHz	802.11b	Touch (open)	1	2412		
			6	2437	**0.254**	0.124
			11	2462		
		Tilt (15°C) (open)	1	2412		
			6	2437	0.172	0.083
			11	2462		
		Touch (closed)	1	2412		
			6	2437	0.155	0.069
			11	2462		
		Tilt (15°C) (closed)	1	2412		
			6	2437	0.053	0.026
			11	2462		

Right Hand Side (RHS)

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
2.4 GHz	802.11b	Touch (open)	1	2412		
			6	2437	0.167	0.087
			11	2462		
		Tilt (15°C) (open)	1	2412		
			6	2437	0.163	0.080
			11	2462		
		Touch (closed)	1	2412		
			6	2437	0.068	0.037
			11	2462		
		Tilt (15°C) (closed)	1	2412		
			6	2437	0.063	0.032
			11	2462		

Body with 1.5 cm separation distance

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
2.4 GHz	802.11b	Face up	1	2412		
			6	2437	0.013	0.00772
			11	2462		
		w/ headset	6	2437	**0.014**	0.00789
		Face down	1	2412		
			6	2437	0.00785	0.00412
			11	2462		

Note: KDB 248227 - SAR is not required for 802.11g/HT20 channels when the maximum average output power is less than 1/4 dBm (0.25 dBm) higher than that measured on the corresponding 802.11b channels

12. WORST-CASE SAR TEST PLOTS

Worst-case HEAD SAR Plot for Part 22

Date/Time: 8/18/2010 5:11:03 PM

Test Laboratory: Compliance Certification Services

GSM 850_Right Hand Side_closed

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

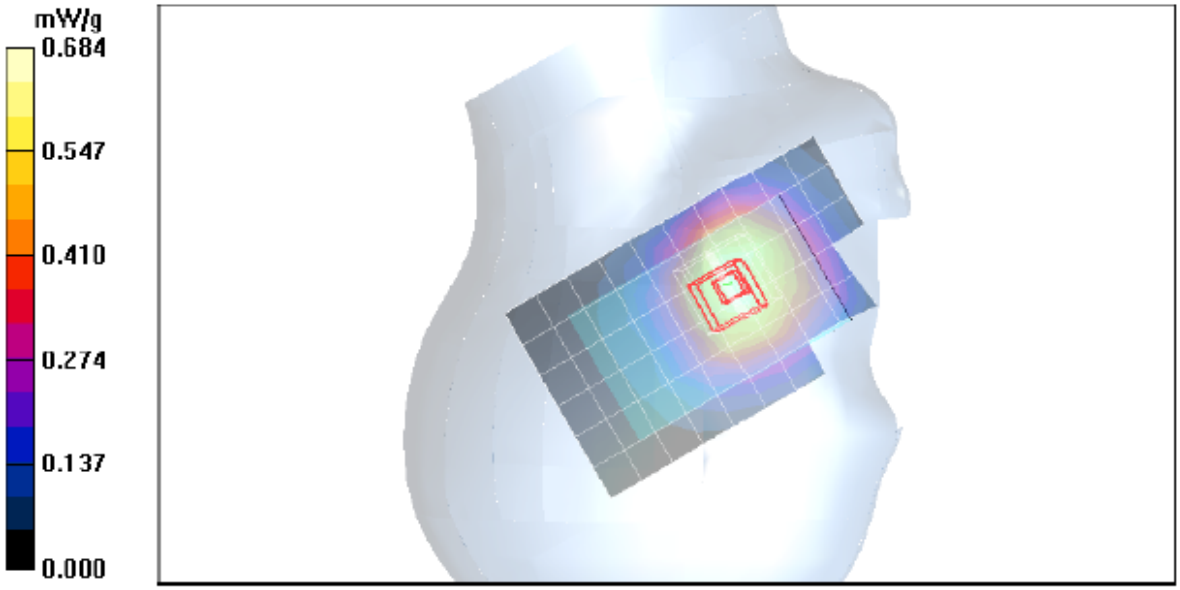
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.874 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Right Section

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: EX3DV3 - SN3531; ConvF(10.13, 10.13, 10.13); Calibrated: 2/23/2010
- 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 (7x11x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.684 mW/g

Touch_M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 27.9 V/m; Power Drift = 0.063 dB
Peak SAR (extrapolated) = 0.826 W/kg
SAR(1 g) = 0.629 mW/g; SAR(10 g) = 0.457 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.698 mW/g



Z-axis plot

Date/Time: 8/18/2010 5:21:22 PM

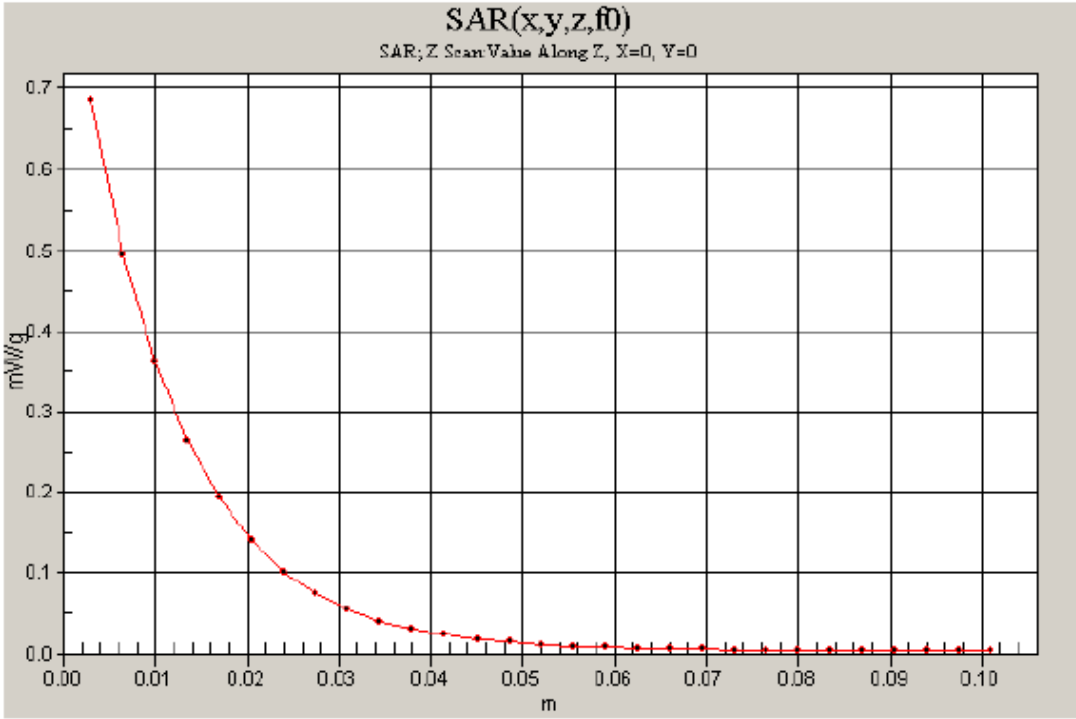
Test Laboratory: Compliance Certification Services

GSM 850_Right Hand Side_closed

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

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8

Touch_M-ch/Area Scan (1x1x29): Measurement grid: dx=20mm, dy=20mm, dz=3.5mm
Maximum value of SAR (measured) = 0.685 mW/g



Worst-case BODY SAR plot for Part 22

Date/Time: 8/18/2010 7:00:34 PM

Test Laboratory: Compliance Certification Services

GPRS 850_Body

DUT: Palm; Type: NA; Serial: NA

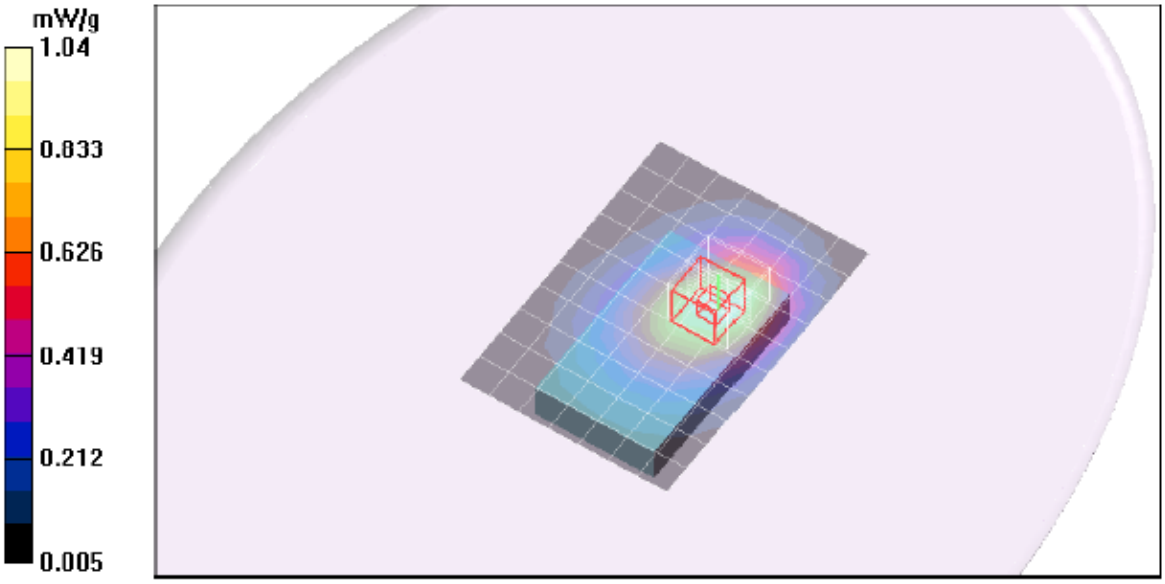
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.995 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

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: EX3DV3 - SN3531; ConvF(10.18, 10.18, 10.18); Calibrated: 2/23/2010
- 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 down_2 slot_M-ch/Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.04 mW/g

Face down_2 slot_M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 32.4 V/m; Power Drift = -0.079 dB
Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 0.991 mW/g; SAR(10 g) = 0.681 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.13 mW/g



Z-axis plot

Date/Time: 8/18/2010 7:09:11 PM

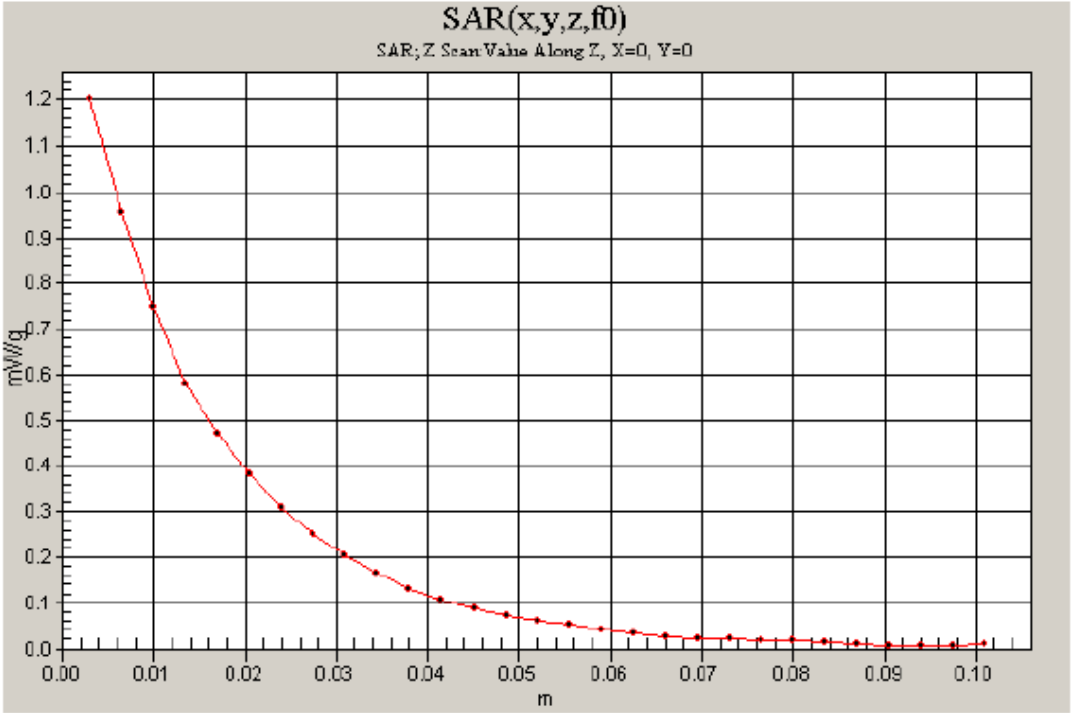
Test Laboratory: Compliance Certification Services

GPRS 850_Body

DUT: Palm; Type: NA; Serial: NA

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

Face down_2 slot_M-ch/Z Scan (1x1x29): Measurement grid: dx=20mm, dy=20mm, dz=3.5mm
Maximum value of SAR (measured) = 1.20 mW/g



Worst-case HEAD SAR Plot for Part 24

Date/Time: 8/31/2010 3:04:12 PM

Test Laboratory: Compliance Certification Services

UMTS band II_Right Hand Side_closed

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

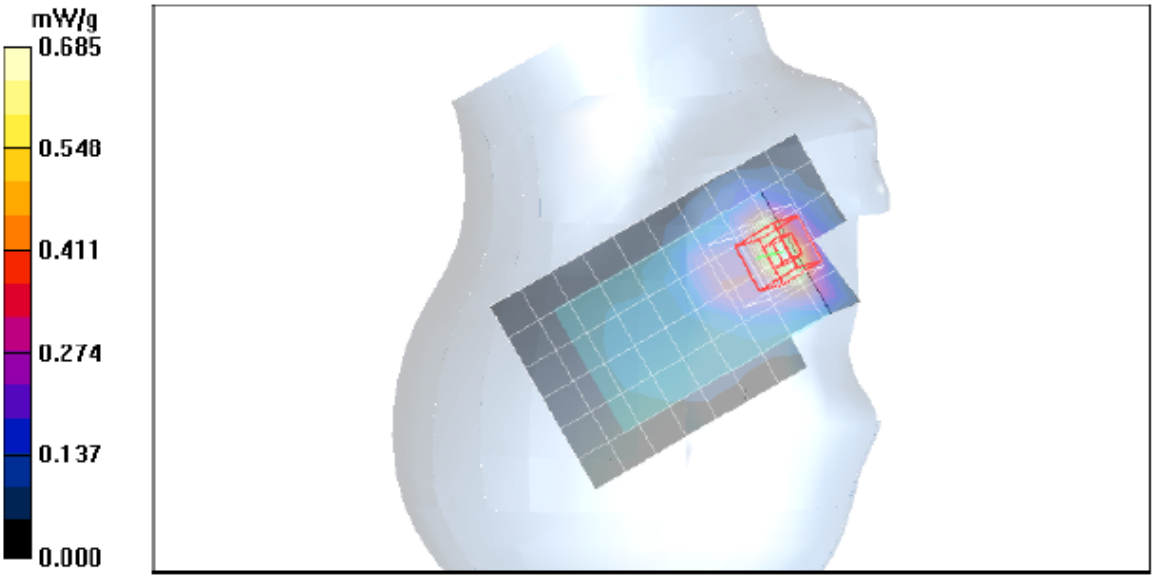
Communication System: UMTS Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Right Section

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: EX3DV3 - SN3531; ConvF(8.64, 8.64, 8.64); Calibrated: 2/23/2010
- 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 (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.685 mW/g

Touch_M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 22.5 V/m; Power Drift = -0.056 dB
Peak SAR (extrapolated) = 0.967 W/kg
SAR(1 g) = 0.562 mW/g; SAR(10 g) = 0.304 mW/g
Maximum value of SAR (measured) = 0.700 mW/g



Z-axis plot

Date/Time: 8/31/2010 3:36:53 PM

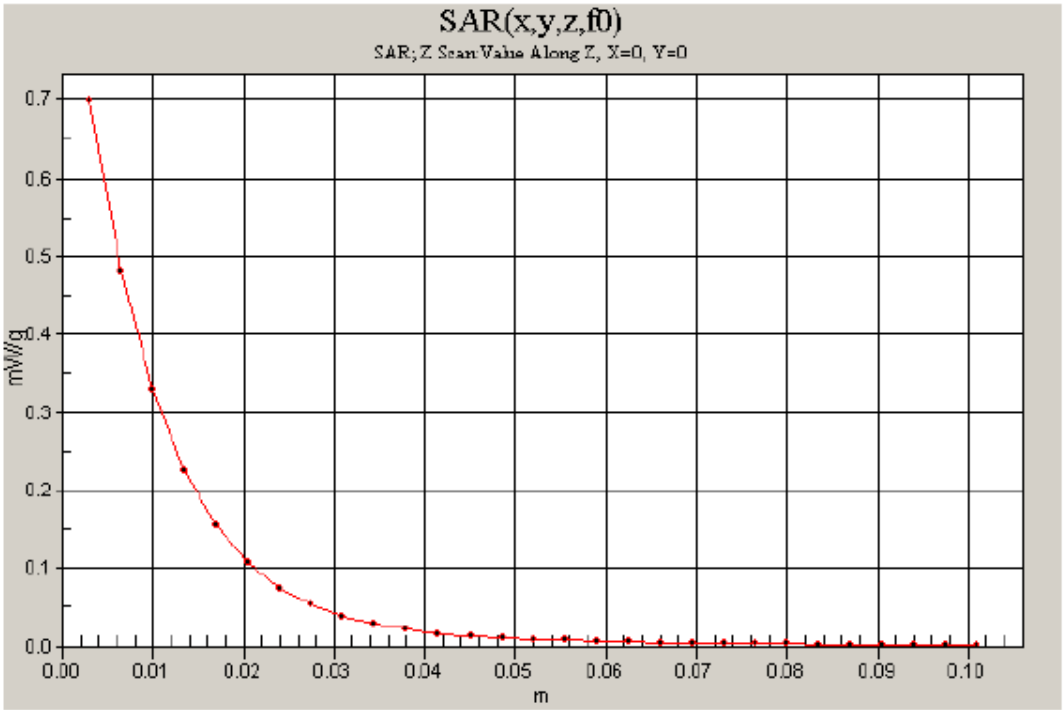
Test Laboratory: Compliance Certification Services

UMTS band II_Right Hand Side_closed

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

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

Touch_M-ch/Z Scan (1x1x29): Measurement grid: dx=20mm, dy=20mm, dz=3.5mm
Maximum value of SAR (measured) = 0.699 mW/g



Worst-case BODY SAR plot for Part 24

Date/Time: 9/1/2010 5:10:53 PM

Test Laboratory: Compliance Certification Services

PCS 1900_Body

DUT: Palm; Type: NA; Serial: NA

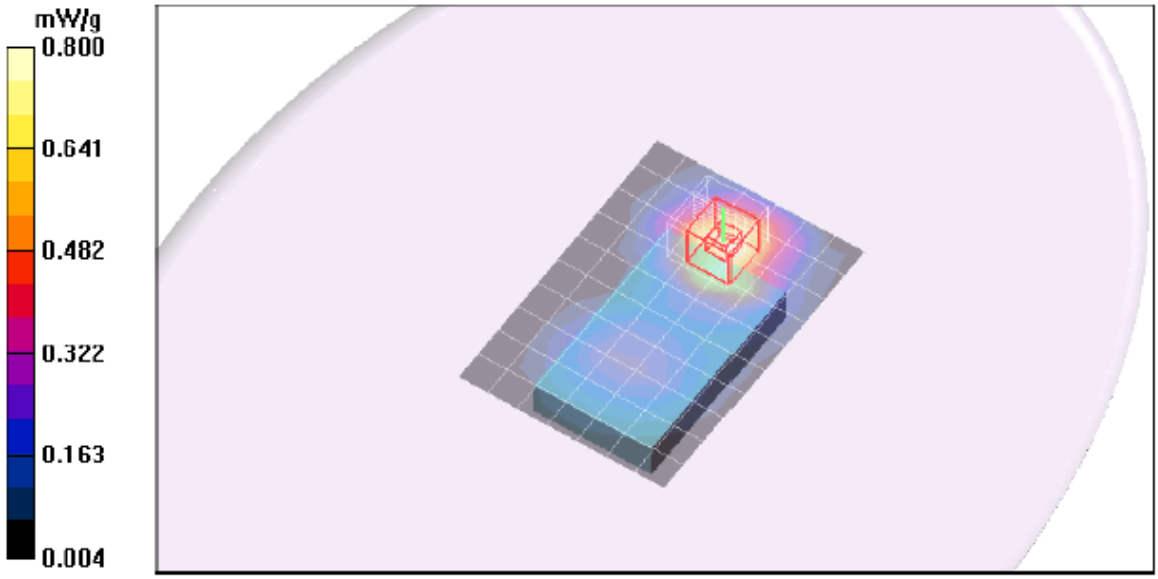
Communication System: PCS Band; Frequency: 1880 MHz;Duty Cycle: 1:2.67
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

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: EX3DV3 - SN3531; ConvF(8.04, 8.04, 8.04); Calibrated: 2/23/2010
- 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 down_3 slot_M-ch/Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.779 mW/g

Face down_3 slot_M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 22.7 V/m; Power Drift = -0.026 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.655 mW/g; SAR(10 g) = 0.416 mW/g
Maximum value of SAR (measured) = 0.775 mW/g



Z-axis plot

Date/Time: 9/1/2010 5:19:03 PM

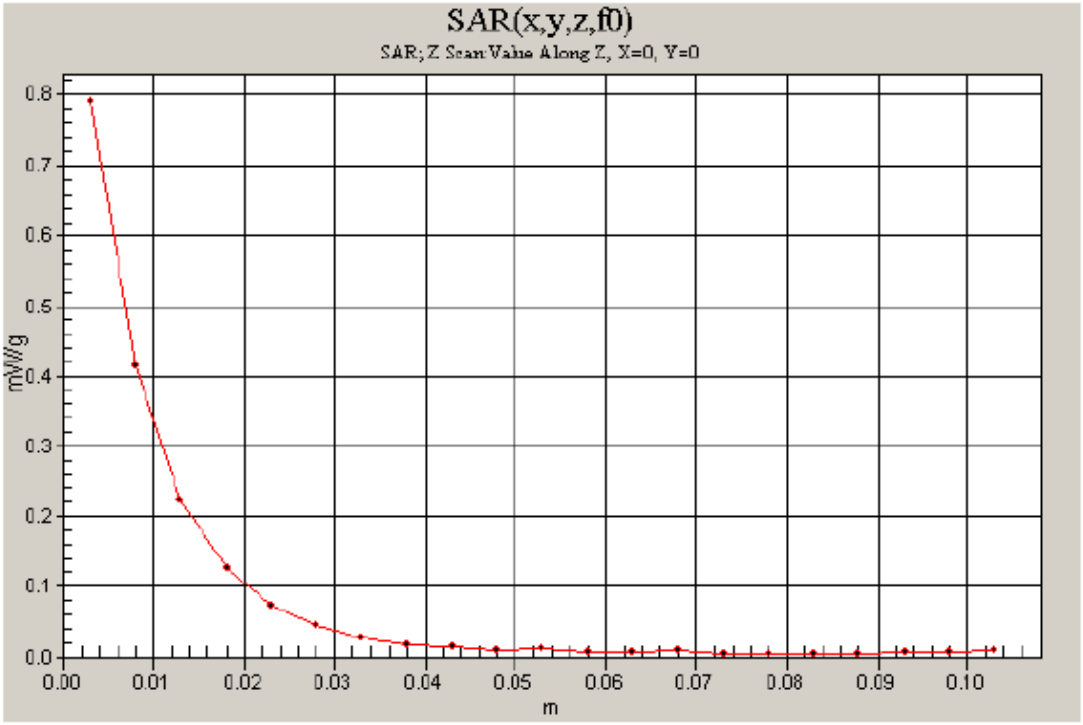
Test Laboratory: Compliance Certification Services

PCS 1900_Body

DUT: Palm; Type: NA; Serial: NA

Communication System: PCS Band; Frequency: 1880 MHz;Duty Cycle: 1:2.67

Face down_3 slot_M-ch/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 0.790 mW/g



Worst-case HEAD SAR Plot for Part 15 C

Date/Time: 8/25/2010 3:50:51 PM

Test Laboratory: Compliance Certification Services

WiFi_Left Hand Side_open

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

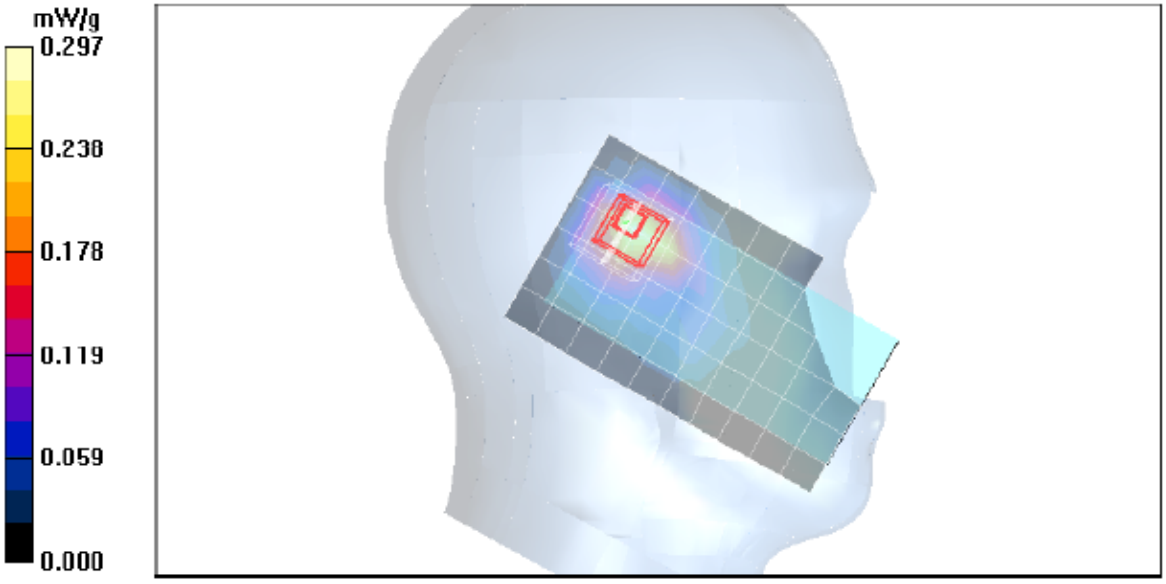
Communication System: 802.11 b/g; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.84 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Left Section

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: EX3DV3 - SN3531; ConvF(7.6, 7.6, 7.6); Calibrated: 2/23/2010
- 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 (7x11x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.297 mW/g

Touch_M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 12.9 V/m; Power Drift = -0.028 dB
Peak SAR (extrapolated) = 0.623 W/kg
SAR(1 g) = 0.254 mW/g; SAR(10 g) = 0.124 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.330 mW/g



Z-axis plot

Date/Time: 8/25/2010 3:58:31 PM

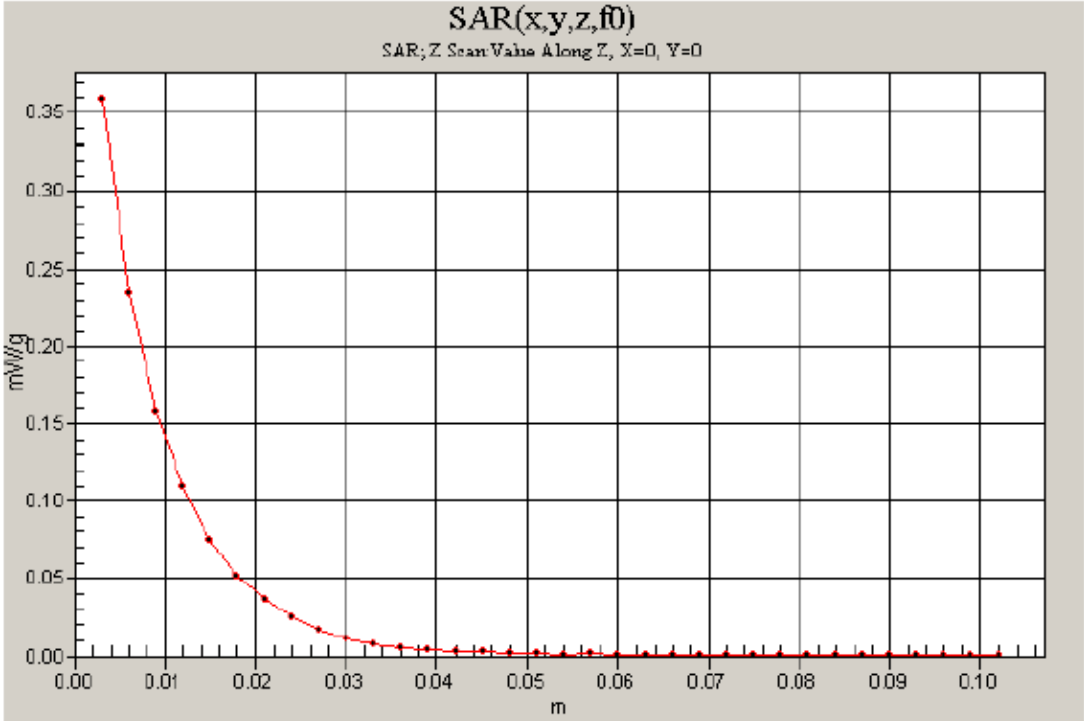
Test Laboratory: Compliance Certification Services

WiFi_Left Hand Side_open

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

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

Touch_M-ch/Z Scan (1x1x34): Measurement grid: dx=20mm, dy=20mm, dz=3mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.359 mW/g



Worst-case BODY SAR plot for Part 15 C

Date/Time: 8/25/2010 5:49:27 PM

Test Laboratory: Compliance Certification Services

WiFi_Body

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

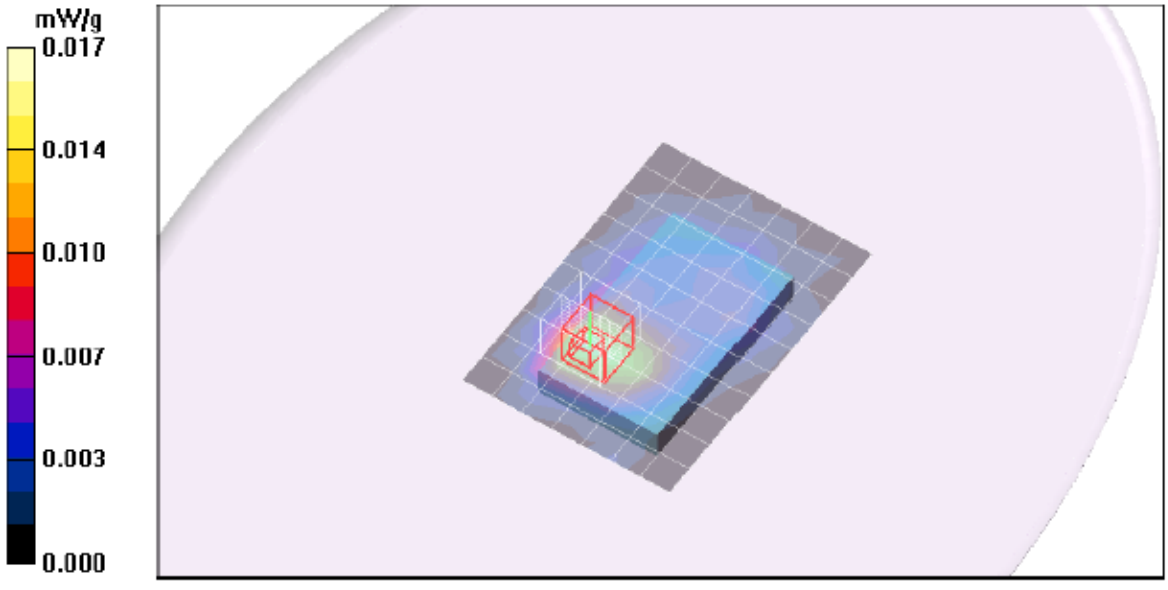
Communication System: 802.11 b/g; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.99 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

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: EX3DV3 - SN3531; ConvF(7.58, 7.58, 7.58); Calibrated: 2/23/2010
- 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 w/headset_M-ch/Area Scan (8x11x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.017 mW/g

Face up w/headset_M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 2.78 V/m; Power Drift = 0.023 dB
Peak SAR (extrapolated) = 0.025 W/kg
SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00789 mW/g
Info: Interpolated medium parameters used for SAR evaluation.



Z-axis plot

Date/Time: 8/25/2010 5:58:24 PM

Test Laboratory: Compliance Certification Services

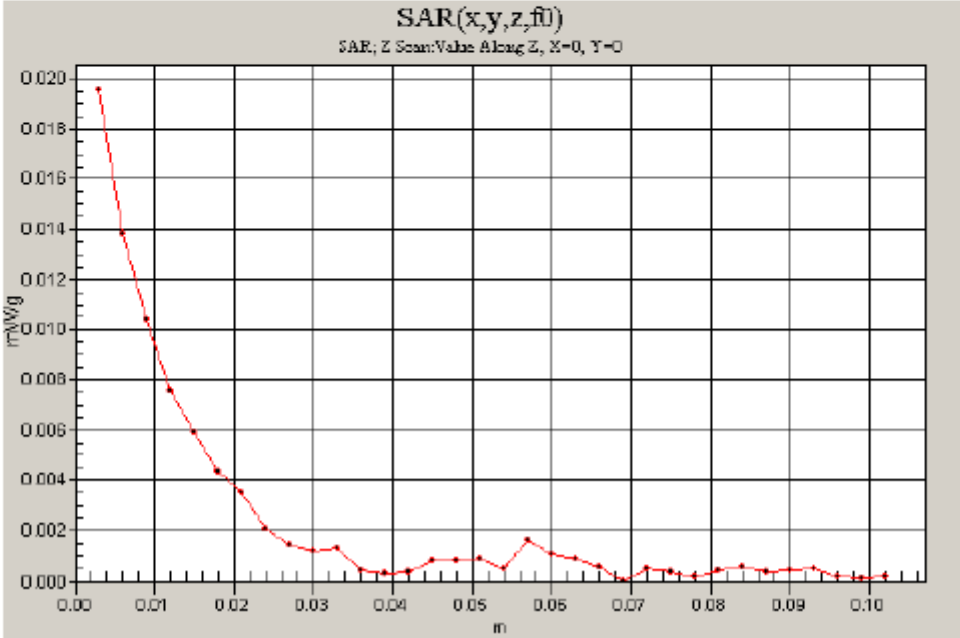
WiFi_Body

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

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

Face up w/headset_M-ch/Z Scan (1x1x34): Measurement grid: dx=20mm, dy=20mm, dz=3mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.020 mW/g



13. KDB 648474 SIMULTANEOUS TRANSMISSION CONSIDERATION

Summary of SAR Evaluation for a Cell Phone with Multiple Transmitters

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

Simultaneous transmission:

- WWAN can transmit simultaneously with WiFi
- WWAN can transmit simultaneously with Bluetooth
- WiFi can transmit simultaneously with Bluetooth

Antenna-to-antenna separation distances:

7.5 cm - WWAN antenna-to-WiFi/BT main antenna when slide closed
11.0 cm - WWAN antenna-to-WiFi/BT main antenna when slide open
0 cm - WiFi antenna-to-BT antenna. (WiFi and BT transmitters sharing a common antenna)

Highest SAR value and the sum of the 1-g SAR for WWAN & WiFi

Tes position	Highest 1-g SAR (W/kg)			∑ 1-g SAR (W/kg)
	WWAN		WiFi	
Head (RHS Touch closed)	GSM850	0.629	0.068	0.697
	UMTS1900	0.562		0.630
Body (Face down)	GPRS850 2 slots	0.991	0.00785	0.999
	GPRS1900 3slots	0.655		0.655

Highest SAR value and the sum of the 1-g SAR for WiFi & 3G

Tes position	Highest 1-g SAR (W/kg)			∑ 1-g SAR (W/kg)
	WiFi	WWAN		
Head (LHS Touch)	0.254	UMTS850	0.489	0.743
		UMTS1900	0.283	0.537
Body (Face up)	0.014	GPRS850 2 slots	0.637	0.651
		GPRS1900 3slots	0.41	0.424

CONCLUSIONS:

WWAN & WiFi:
Simultaneous transmission is SAR not required for WWAN & WiFi because the antenna is > 5 cm from each others and the sum of the 1-g SA is < 1.6 W/kg.

WWAN & Bluetooth:
Simultaneous transmission is SAR not required for WWAN & Bluetooth because stand-alone SAR is not required due to Bluetooth's output < 2. P_{Ref} (24 mW) and antenna is > 5 cm from other antenna.

WiFi & Bluetooth:
Simultaneous transmission is SAR not required for WiFi & Bluetooth because stand-alone SAR is not required due to Bluetooth's output < P_{Ref} (12 mW)

14. ATTACHMENTS

No.	Contents	No. of page (s)
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2	Certificate of E-Field Probe - EX3DV3 SN 3531	11
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