



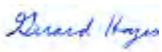
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Approved SEM/CV/PF/P Gerard Hayes	Checked		A

Exhibit 11: SAR Test Report of Portable Cellular Phone FCC ID: PY7A3880009 Model: C510

Date of test: December 1 – December 10, 2008
Date of Report: December 16, 2008

Laboratory: SAR Testing Laboratory Sony Ericsson Mobile Communications, Inc. 7001 Development Drive, P.O. Box 13969, Research Triangle Park, NC, 27709, USA

Tested by: Rodney Dixon
 Eng. Technician IV, Global Type Approval

Test Responsible: Gerard Hayes 
 Technical Manager

Accreditation: This laboratory is accredited to ISO/IEC 17025:2005 to perform the following electromagnetic tests:



A2LA Certificate #1650-01

Specific Absorption Rate (SAR) tests:
 FCC OET Bulletin 65 supplement C
 IEEE 1528
 CENELEC EN 50361
 IEC PT 62209 Part 1, Part 2 (2007-01-30)

On the following types of products: Wireless communications devices.

Statement of Compliance: Sony Ericsson Mobile Communications, Inc declares under its sole responsibility that portable cellular telephone FCC ID PY7A3880009 model C510 to which this declaration relates, is in conformity with the appropriate General Population/Uncontrolled RF exposure standards, recommendations and guidelines (FCC 47 CFR §2.1093). It also declares that the product was tested in accordance with the appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

(none)

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This test report shall not be reproduced except in full, without written approval of the laboratory.

The results and statements contained herein relate only to the items tested. The names of individuals involved may be mentioned only in connection with the statements or results from this report.

Sony Ericsson Mobile Communications encourages all feedback, both positive and negative, on this test report.



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1. Introduction

The Sony Ericsson SAR Laboratory has performed measurements of the maximum potential exposure to the user of portable cellular phone FCC ID PY7A3880009 model C510. The Specific Absorption Rate (SAR) of this product was measured. The applicable RF safety guidelines and the SAR measurement specifications used for the test are described in [1].

2. Description of the Device Under Test

2.1 Antenna description

Type	Monopole	
Location	Chin Cover	
Dimensions	Width	40.0 mm
	Length	14.0 mm
	Height	

2.2 Device description

FCC ID Number / Device Model	PY7A3880009 / C510	
Hardware Revision #	AP1	
Software Revision #	R1CA	
Mode(s) of Operation		Serial number of Device Tested
Transmitting Frequency Range	GSM/GPRS/EDGE 1850-1910 MHz	BX900G0690
Production Unit or Identical Prototype (47 CFR §2.908)	Identical Prototype	
Device Category	Portable	
RF Exposure Limits	General Population / Uncontrolled	

GSM		1900 MHz	
	Target Value for Maximum Output Power Setting	f_{low}	30.5
		f_{mid}	30.5
		f_{high}	30.5
	Calibration Frequency ($f_{low}, f_{mid}, f_{high}$)	$f_{low}, f_{mid}, f_{high}$	
Duty Cycle	1/8		



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Device description (continued)

GPRS Target Value for Maximum Output Power Setting Calibration Frequency (f_{low}, f_{mid}, f_{high}) Duty Cycle		1900 MHz
	f_{low}	28.0
	f_{mid}	28.0
	f_{high}	28.0
		f_{low} , f_{mid} , f_{high}
		1/4

EGPRS Target Value for Maximum Output Power Setting Calibration Frequency (f_{low}, f_{mid}, f_{high}) Duty Cycle		1900 MHz
	f_{low}	27.0
	f_{mid}	27.0
	f_{high}	27.0
		f_{low} , f_{mid} , f_{high}
		1/4



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3. Test Equipment Used

3.1 Dosimetric System

The Sony Ericsson SAR Laboratory utilizes Dosimetric Assessment Systems (Dasy4™) for adjacent to head and body-worn measurements manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. The overall RSS uncertainty of the measurement system is ± 8.4 % (K=1) with an expanded uncertainty of ± 16.7 % (K=2) for Dasy4™. The measurement uncertainty budget is given in Appendix 5 for the system. The list of calibrated equipment used for the measurements is shown in the following table.

Description	Serial Number	Cal Due Date
DASY3 DAE V1	392	May-07-2009
DASY3 DAE V1	417	Nov-07-2009
DASY3 DAE V1	432	May-13-2009
E-Field Probe ETDV6	1538	May-19-2009
E-Field Probe ETDV6	1584	Nov-17-2009
E-Field Probe ETDV6	1586	May-19-2009
Dipole Validation Kit, DV1900V2	536	May-08-2008
S.A.M. Phantom used for 1900MHz (Head)	1054/1335	
S.A.M. Phantom used for 1900MHz (Body)	1020	

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3443U00433	February 01, 2009
Power Meter 437B	3125U16382	December 04, 2009
Power Meter 437B	3125U16190	May 05, 2009
Power Sensor - 8482H	MY41090241	June 18, 2009
Power Sensor - 8482H	3318A09268	July 02, 2009
Dielectric Probe Kit HP85070B	US33020256	Sept. 11, 2009
Digital Thermometer 61220-601 And Probe (61220-604)	21117674	March 13, 2009
Digital Hygrometer/ Thermometer	230355187	March 03, 2009
HP RF Amplifier 8347A	3307A1069	May 07, 2009



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4. Electrical parameters of the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity, ϵ_r , and the conductivity, σ , of the tissue simulating liquids were measured with the dielectric probe kit. These values, along with the temperature of the simulated tissue are shown in the table below. A mass density of $\rho=1g/cm^3$ was entered into the system in all the cases. It can be seen that the measured parameters are within tolerance of the recommended limits [1]. The ambient temperature of the laboratory was maintained within the desired the range and the liquid depth above the ear reference points was above 15.0 cm in all the cases. It is seen that the measured parameters are satisfactory for compliance testing.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ϵ_r	σ (S/m)	Simulated Tissue Temp (°C)
1900	Head	December 3, 2008	38.41	1.444	22.5
		December 4, 2008	38.77	1.399	22.8
		December 5, 2008	38.67	1.41	21.7
		Recommended Limits	40	1.4	20-25
	Body	December 10, 2008	51.76	1.504	23
		Recommended Limits	53.3	1.52	20-25

The list of ingredients and the percent composition used for the simulated tissue are indicated in the table below.

Ingredient	1900 MHz Head	1900MHz Body
Sugar	--	--
DGBE	44.92%	30.82%
Water	54.90%	68.89%
Salt	0.18%	0.29%
HEC	--	--
Bact.	--	--



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5. System Accuracy Verification

A system accuracy verification of the DASY4 was performed using the measurement equipment listed in Section 3.1. The daily system accuracy verification occurs within the flat section of the SAM phantom.

A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR indicated on the dipole certification sheet. These tests were done at 835MHz/900MHz and/or 1800MHz/1900MHz. These frequencies are within 100MHz of the mid-band frequency of the test device, according to [1].

The test was conducted on the same days as the measurement of the DUT. The results from the system accuracy verification are displayed in the table below (SAR values are normalized to 1W forward power delivered to the dipole). The ambient temperature of the laboratory was maintained within the desired the range and the liquid depth above the ear reference points was above 15.0 cm in all the cases.

It is seen in the following table that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. The SAR distributions for each dipole measurement are shown in Appendix 1.

f (MHz)	Tissue Type	Date Measured	SAR (W/kg)		Dielectric Parameters		Tissue Temp (°C)
			1g	10g	ϵ_r	σ (S/m)	
1900	Head	Dec-03-08	41.62	21.66	38.41	1.44	22.5
		Dec-04-08	38.79	20.35	38.77	1.40	22.8
		Dec-05-08	38.34	20.22	38.67	1.41	21.7
		Recommended Limits	39.7	20.5	40	1.4	20-25
	Body	Dec-10-08	41.46	21.88	51.76	1.50	23
		Recommended Limits	40.5	20.89	53.3	1.52	20-25

Daily, prior to conducting tests, measurements were made with the RF sources powered off to determine the system noise level. The highest system noise was 0.00035 W/kg, which is below the recommended limit in [1].



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6.0 Test Results

For all measurements, the test sample was operated using a base station simulator (CMU-200) that allows control of the transmitter using the signally software that is installed on the phone. For the purposes of these tests, the unit is commanded to set to the proper channel, transmitter power level and transmit mode of operation. The phone was tested in the configurations stipulated in [1,2]. The phone was positioned into these configurations using the positioner supplied with the DASY4 SAR measurement system.

For head measurements, the units were measured in the following voice modes which correspond to the operating conditions with the highest conducted power:

GSM with a 1/8 duty cycle

For body measurements, the units were measured in the following data modes which correspond to the operating conditions with the highest conducted power:

E/GPRS (Multislot, Class 10) with a 1/4 duty cycle

Simultaneous Transmitter (i.e. Bluetooth) Considerations

FCC Guidelines were derived from document Number: 648474 D02 SAR Policy Handsts Multi Xmitter Ant v01r01. Since a minimum antenna separation between the main antenna (bottom, rear of the phone) and Bluetooth antenna (top, left, rear section) antenna is 9.0 cm (i.e. >5 cm) and the maximum conducted Bluetooth power is 2.8 mW, simultaneous SAR evaluation and stand-alone Bluetooth SAR evaluation are not required. All reported measurements were made with Bluetooth Off.

Battery Considerations

The Cellular Phone FCC ID PY7A3880009 has one battery option, BKB 193 203 (BST-38). The phone was placed in the SAR measurement system with a fully charged battery for each measurement.



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6.1 Head Adjacent Test Results

The SAR results shown in Tables 1 and 2 are maximum SAR values averaged over 1 gram and 10 grams of phantom tissue. Also shown are the measured conducted output powers, the temperature of the test facility during the test, the temperature of the simulated tissue, the measured drift, and the extrapolated SAR. The extrapolated SAR corresponds to the measured SAR scaled to the maximum conducted output power.

The ambient temperature of the laboratory was maintained within the desired the range and the liquid depth above the ear reference points was above 15.0 cm in all the cases.

The test conditions indicated as bold numbers in the following tables are included in Appendix 2. All other test conditions measured lower SAR values than those included.

f(MHz)	Channel/ frequency	Conducted Output Power (dBm)	FCC ID PY7A3880009 with Standard Battery BST-38						
			Left Head (Cheek / Touch Position)					Ambient Temp (°C)	Simulate Temp (°C)
			GSM 1:8 Duty Cycle	Measured (W/kg) 1g / 10g		Drift (dB)	Extrapolated (W/kg) 1g / 10g		
1900 GSM	512 / 1850	30.5	1.22		-0.07	1.22		22.8	22.5
	660/1880	30.5	1.23		0.00	1.23			
	810/1910	30.5	1.22		0.02	1.22			
f(MHz)	Channel/ frequency	Conducted Output Power (dBm)	FCC ID PY7A3880009 with Standard Battery BST-38						
			Left Head (15° Tilt Position)					Ambient Temp (°C)	Simulate Temp (°C)
			GSM 1:8 Duty Cycle	Measured (W/kg) 1g / 10g		Drift (dB)	Extrapolated (W/kg) 1g / 10g		
1900 GSM	512 / 1850	30.5	0.47		0.09	0.47		22.8	22.5
	660/1880	30.5	0.47		0.05	0.47			
	810/1910	30.5	0.47		0.02	0.47			

Table 1: SAR measurement results for the portable cellular telephone FCC ID PY7A3880009 model C510 at maximum output power with Standard Battery BST-38. Measured against the left head in GSM mode.



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f(MHz)	Channel/ frequency	Conducted Output Power (dBm)	FCC ID PY7A3880009 with Standard Battery BST-38					
			Right Head (Cheek / Touch Position)				Ambient Temp (°C)	Simulate Temp (°C)
			GSM 1:8 Duty Cycle	Measured (W/kg) 1g / 10g	Drift (dB)	Extrapolated (W/kg) 1g / 10g		
1900 GSM	512 / 1850	30.5	1.16		-0.04	1.16	22.4	22.3
	660/1880	30.5	1.19		-0.03	1.19		
	810/1910	30.5	1.24		-0.02	1.24		
f(MHz)	Channel/ frequency	Conducted Output Power (dBm)	FCC ID PY7A3880009 with Standard Battery BST-38					
			Right Head (15° Tilt Position)				Ambient Temp (°C)	Simulate Temp (°C)
			GSM 1:8 Duty Cycle	Measured (W/kg) 1g / 10g	Drift (dB)	Extrapolated (W/kg) 1g / 10g		
1900 GSM	512 / 1850	30.5	0.44		0.03	0.44	22.4	22.3
	660/1880	30.5	0.42		0.02	0.42		
	810/1910	30.5	0.35		0.02	0.35		

Table 2: SAR measurement results for the portable cellular telephone FCC ID PY7A3880009 model C510 at maximum output power with Standard Battery BST-38. Measured against the right head in GSM mode.



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6.2 Body-Worn Test Results

The SAR results shown in Tables 3 and 4 are the maximum SAR values averaged over 1gram and 10 grams of phantom tissue. Also shown are the measured conducted output powers, the temperature of the test facility during the test, the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The extrapolated SAR corresponds to the measured SAR scaled to the maximum conducted output power.

A “flat” phantom was used for the body-worn tests. This “flat” phantom corresponds to the flat portion of the SAM phantom.

The ambient temperature of the laboratory was maintained within the desired the range and the liquid depth above the ear reference points was above 15.0 cm in all the cases.

The same device holder described in section 6 was used for positioning the phone. The cellular phone was tested with a headset (HBP-20) connected to the device for all body-worn SAR measurements.

The following body-worn accessories were tested for this phone:

- 15 mm spacer
- ICE30 Carry Case

A full data set output of the test conditions with the highest SAR values is included as Appendix 3. These test conditions included are indicated as bold numbers in the following tables. All other test conditions measured lower SAR values than those included.



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f(MHz)	Operating Condition	Channel/frequency	Conducted Output Power (dBm)	Body Worn						
				15mm SPACER						
				Measured (W/kg) 1g / 10g	Drift (dB)	Extrapolated (W/kg) 1g / 10g	Ambient Temp (°C)	Simulate Temp (°C)		
Back of phone facing body										
1900 GSM	2:8 Duty Cycle	512 / 1850	28.0	0.41		-0.02	0.41		23.3	23
		660/1880	28.0	0.42		0.03	0.42			
		810/1910	28.0	0.38		0.01	0.38			
Front of phone facing body										
1900 GSM	2:8 Duty Cycle	512 / 1850	28.0	0.34		0.03	0.34		23.8	23.6
		660/1880	28.0	0.39		0.01	0.39			
		810/1910	28.0	0.39		0.03	0.39			

Table 3: SAR measurement results for the portable cellular telephone FCC ID PY7A3880009 model C510 at maximum output power with Standard Battery BST-38. Measured with GSM/GPRS Mode.



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f(MHz)	Operating Condition	Channel/frequency	Conducted Output Power (dBm)	FCC ID PY7A3880009 with Standard Battery BST-38						
				Body Worn			Carry Accessory: ICE30 Back of phone facing body			
				Measured (W/kg) 1g / 10g	Drift (dB)	Extrapolated (W/kg) 1g / 10g	Ambient Temp (°C)	Simulate Temp (°C)		
Back of phone facing body										
1900 GSM	2:8 Duty Cycle	512 / 1850	28.0	0.38		-0.07	0.38		22.9	23
		660/1880	28.0	0.40		-0.03	0.40			
		810/1910	28.0	0.37		-0.01	0.37			
Front of phone facing body										
1900 GSM	2:8 Duty Cycle	512 / 1850	28.0	0.39		0.03	0.39		22.5	23
		660/1880	28.0	0.49		0.07	0.49			
		810/1910	28.0	0.39		0.00	0.39			

Table 4: SAR measurement results for the portable cellular telephone FCC ID PY7A3880009 model C510 at maximum output power with Standard Battery BST-38. Measured with GSM/GPRS Mode.



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References

- [1] FCC, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields: Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions," Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01).
- [2] IEC 62209-1, "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures – Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", First Edition 2005-02.
- [3] IEEE, "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques," Std 1528-2003, June 2003.



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Appendix 1

SAR distribution comparison for the system accuracy verification



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1900 MHz SAR Distribution of Validation Dipole Antenna

System Performance Check (Using head tissue).

Validation_1900Head_536_1335_03Dec08_T01

File Name: [Validation_1900Head_536_1335_03Dec08_T01.da4](#)

Phantom: SAM with CRP (High Band Head) Phantom section: Flat Section

Probe: ET3DV6 - SN1584ConvF(5.1, 5.1, 5.1) Duty Cycle: 1:1 Frequency: 1900 MHz

Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.44 \text{ mho/m}$; $\epsilon_r = 38.4$; $\rho = 1000 \text{ kg/m}^3$

Measurement Standard: DAS4 (High Precision Assessment)

Dipole at 10 mm/Area Scan (61x61x1):

Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 5.30 mW/g

Dipole at 10 mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 56.7 V/m; Power Drift = 0.051 dB

Peak SAR (extrapolated) = 7.54 W/kg

SAR(1 g) = 4.17 mW/g; SAR(10 g) = 2.18 mW/g

Maximum value of SAR (measured) = 4.69 mW/g

Dipole at 10 mm/Zoom Scan 2 (7x7x7)/Cube 0:

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 56.7 V/m; Power Drift = 0.051 dB

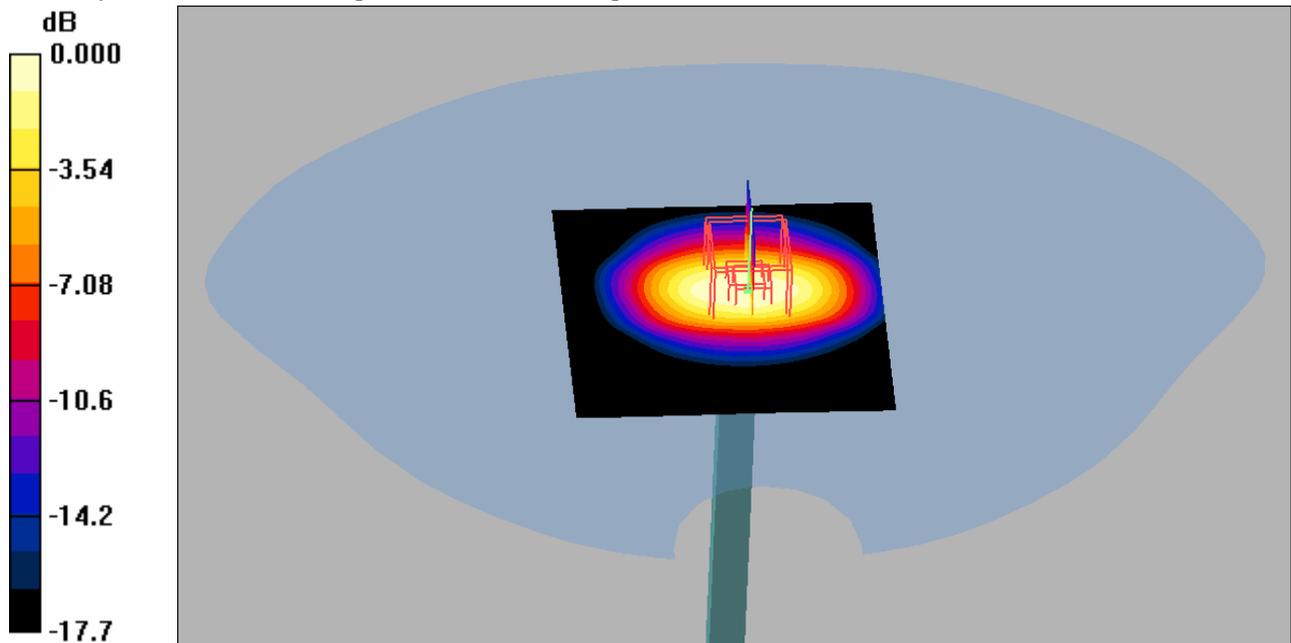
Peak SAR (extrapolated) = 7.65 W/kg

SAR(1 g) = 4.17 mW/g; SAR(10 g) = 2.16 mW/g

Maximum value of SAR (measured) = 4.62 mW/g

Procedure Notes: Pin: before 99.8 mW / after 100.6 mW

Humidity: 39.3 % Ambient Temp: 22.8 C Simulant Temp: 22.5 C



0 dB = 4.62mW/g



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1900 MHz SAR Distribution of Validation Dipole Antenna

System Performance Check (Using head tissue).

Validation_1900Head_536_1054_04Dec08_T01

File Name: [Validation_1900Head_536_1054_04Dec08_T01.da4](#)

Phantom: SAM with CRP (High Band Head) Phantom section: Flat Section

Probe: ET3DV6 - SN1538 ConvF(5.18, 5.18, 5.18) Duty Cycle: 1:1 Frequency: 1900 MHz

Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.4 \text{ mho/m}$; $\epsilon_r = 38.8$; $\rho = 1000 \text{ kg/m}^3$

Measurement Standard: DASY4 (High Precision Assessment)

Dipole at 10 mm/Area Scan (61x61x1):

Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 4.73 mW/g

Dipole at 10 mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 58.6 V/m; Power Drift = 0.015 dB

Peak SAR (extrapolated) = 6.82 W/kg

SAR(1 g) = 3.83 mW/g; SAR(10 g) = 2.01 mW/g

Maximum value of SAR (measured) = 4.30 mW/g

Dipole at 10 mm/Zoom Scan 2 (7x7x7)/Cube 0:

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 58.6 V/m; Power Drift = 0.015 dB

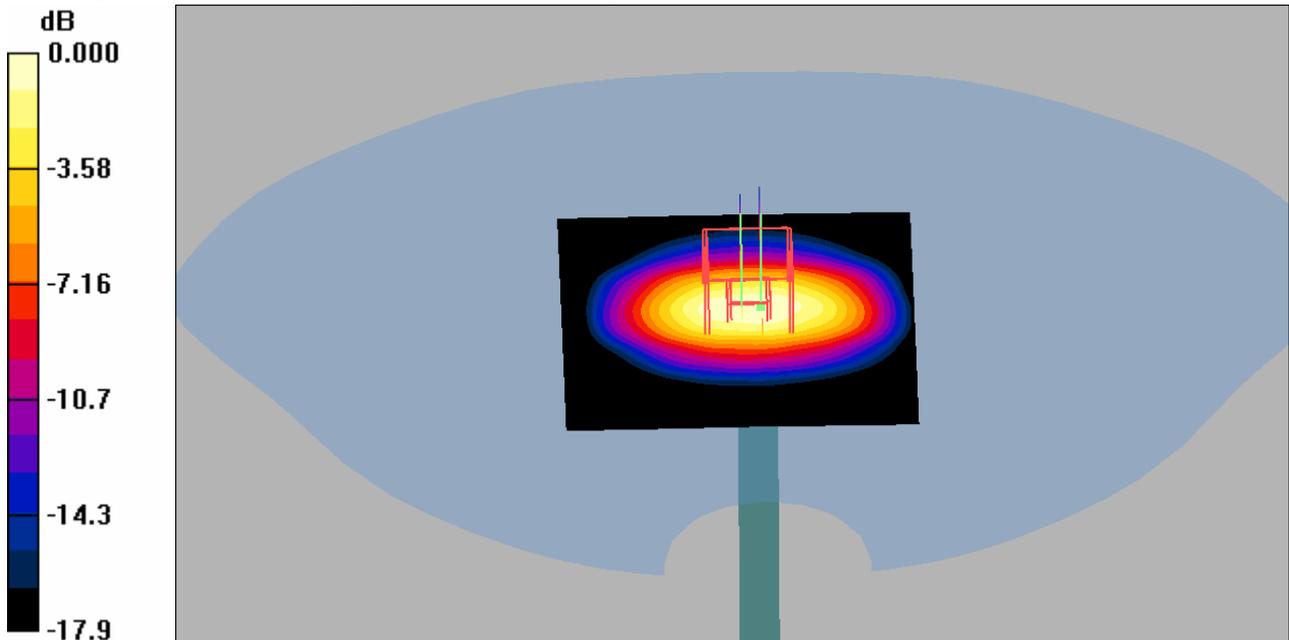
Peak SAR (extrapolated) = 7.14 W/kg

SAR(1 g) = 4.04 mW/g; SAR(10 g) = 2.12 mW/g

Maximum value of SAR (measured) = 4.53 mW/g

Procedure Notes: Pin: before 101.4 mW / after 101.5 mW

Humidity: 36.3 % Ambient Temp: 22.7 C Simulant Temp: 22.8 C



0 dB = 4.53mW/g



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1900 MHz SAR Distribution of Validation Dipole Antenna System Performance Check (Using head tissue).

Validation_1900Head_536_1054_05Dec08_T01

File Name: [Validation_1900Head_536_1054_05Dec08_T01.da4](#)

Phantom: SAM with CRP (High Band Head) Phantom section: Flat Section

Probe: ET3DV6 - SN1538ConvF(5.18, 5.18, 5.18) Duty Cycle: 1:1 Frequency: 1900 MHz

Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.41 \text{ mho/m}$; $\epsilon_r = 38.7$; $\rho = 1000 \text{ kg/m}^3$

Measurement Standard: DAS4 (High Precision Assessment)

Dipole at 10 mm/Area Scan (61x61x1):

Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 4.75 mW/g

Dipole at 10 mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 57.1 V/m; Power Drift = -0.030 dB

Peak SAR (extrapolated) = 6.63 W/kg

SAR(1 g) = 3.74 mW/g; SAR(10 g) = 1.97 mW/g

Maximum value of SAR (measured) = 4.24 mW/g

Dipole at 10 mm/Zoom Scan 2 (7x7x7)/Cube 0:

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 57.1 V/m; Power Drift = -0.030 dB

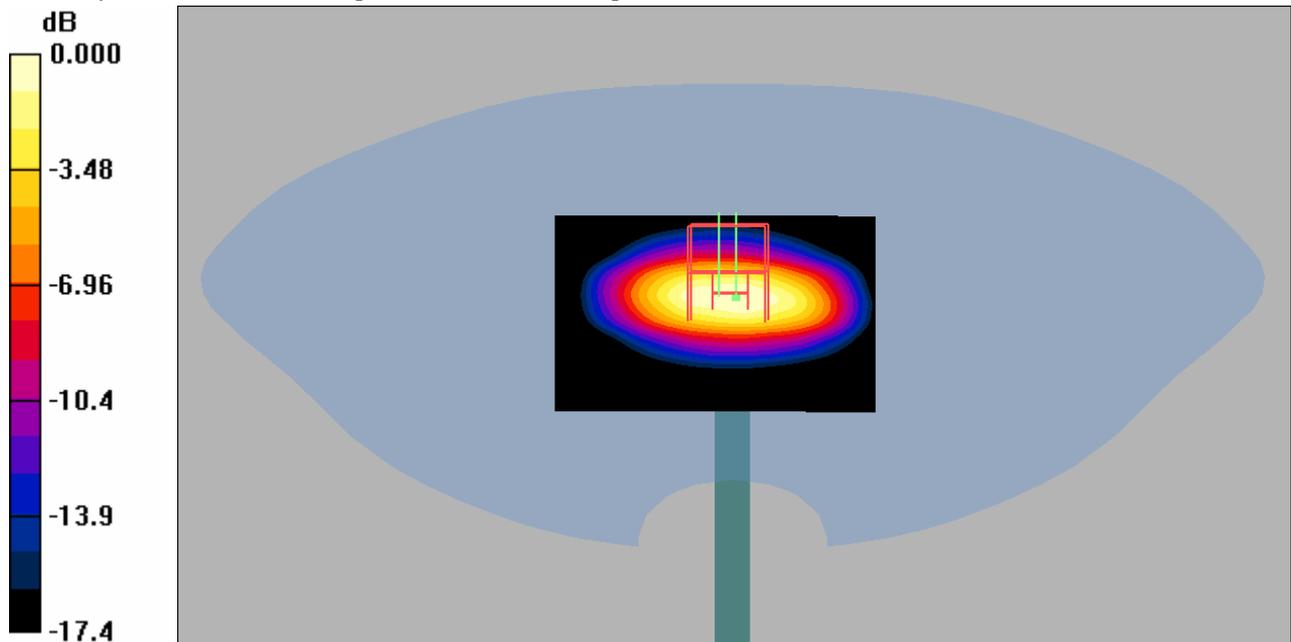
Peak SAR (extrapolated) = 6.89 W/kg

SAR(1 g) = 3.94 mW/g; SAR(10 g) = 2.08 mW/g

Maximum value of SAR (measured) = 4.41 mW/g

Procedure Notes: Pin: before 99.3 mW / after 101 mW

Humidity: 36.2 % Ambient Temp: 21.3 C Simulant Temp: 21.7 C



0 dB = 4.41mW/g



Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked		A

1900 MHz SAR Distribution of Validation Dipole Antenna System Performance Check (Using body tissue).

Validation_1900Body_536_1020_10Dec08_T01

File Name: [Validation_1900Body_536_1020_10Dec08_T01.da4](#)

Phantom: SAM with CRP (High Band Body) Phantom section: Flat Section

Probe: ET3DV6 - SN1586ConvF(4.64, 4.64, 4.64) Duty Cycle: 1:1 Frequency: 1900 MHz

Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.5 \text{ mho/m}$; $\epsilon_r = 51.8$; $\rho = 1000 \text{ kg/m}^3$

Measurement Standard: DASy4 (High Precision Assessment)

Dipole at 10 mm/Area Scan (61x61x1):

Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 5.24 mW/g

Dipole at 10 mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 52.1 V/m; Power Drift = 0.019 dB

Peak SAR (extrapolated) = 7.44 W/kg

SAR(1 g) = 4.16 mW/g; SAR(10 g) = 2.19 mW/g

Maximum value of SAR (measured) = 4.69 mW/g

Dipole at 10 mm/Zoom Scan 2 (7x7x7)/Cube 0:

Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 52.1 V/m; Power Drift = 0.019 dB

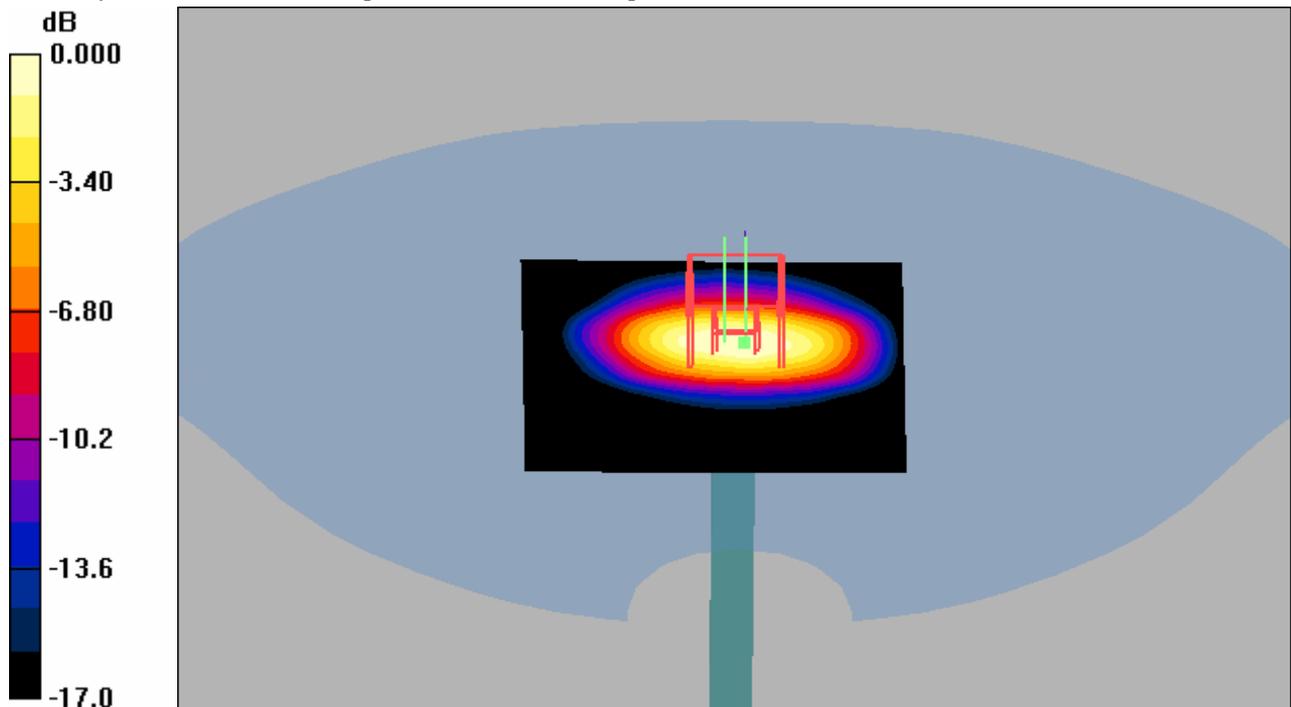
Peak SAR (extrapolated) = 7.62 W/kg

SAR(1 g) = 4.29 mW/g; SAR(10 g) = 2.27 mW/g

Maximum value of SAR (measured) = 4.80 mW/g

Procedure Notes: Pin: before 101.4 mW / after 102.4 mW

Humidity - 34.7 % Ambient Temp - 23.3 C Simulant Temp - 23 C



0 dB = 4.80mW/g



Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

Appendix 2

SAR distribution plots for Phantom Head Adjacent Use



Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked		A

1900 GSM Band: Distribution and Extrapolation of Maximum SAR

Model: C510 with Standard Battery: BST-38, Right Cheek Position.

Date/Time: 12/3/2008 11:46:21 AM

File Name: [03Dec08_C510_GSM1900_0690_RC01.da4](#)

DUT: C510

Phantom: SAM with CRP (High Band Head) Phantom section: Right Section

Probe: ET3DV6 - SN1584 ConvF(5.1, 5.1, 5.1)

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 38.3$; $\rho = 1000$ kg/m³

Measurement Standard: DASY4 (High Precision Assessment)

Program Notes: Battery - BST38 Humidity - 39.1 % Ambient Temp - 22.4 C Simulant Tem - 22.3 C

DASY4 Configuration:

- Probe: ET3DV6 - SN1584; ConvF(5.1, 5.1, 5.1); Calibrated: 11/17/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn392; Calibrated: 5/7/2008

- Phantom: SAM with CRP (High Band Head); Type: SAM; Serial: TP: 1054

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Unnamed procedure 3/Area Scan (51x81x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.45 mW/g

Unnamed procedure 3/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.9 V/m; Power Drift = -0.022 dB

Peak SAR (extrapolated) = 1.82 W/kg

SAR(1 g) = 1.24 mW/g; SAR(10 g) = 0.743 mW/g

Maximum value of SAR (measured) = 1.36 mW/g

Unnamed procedure 3/Zoom Scan (31x31x36)/Cube 0:

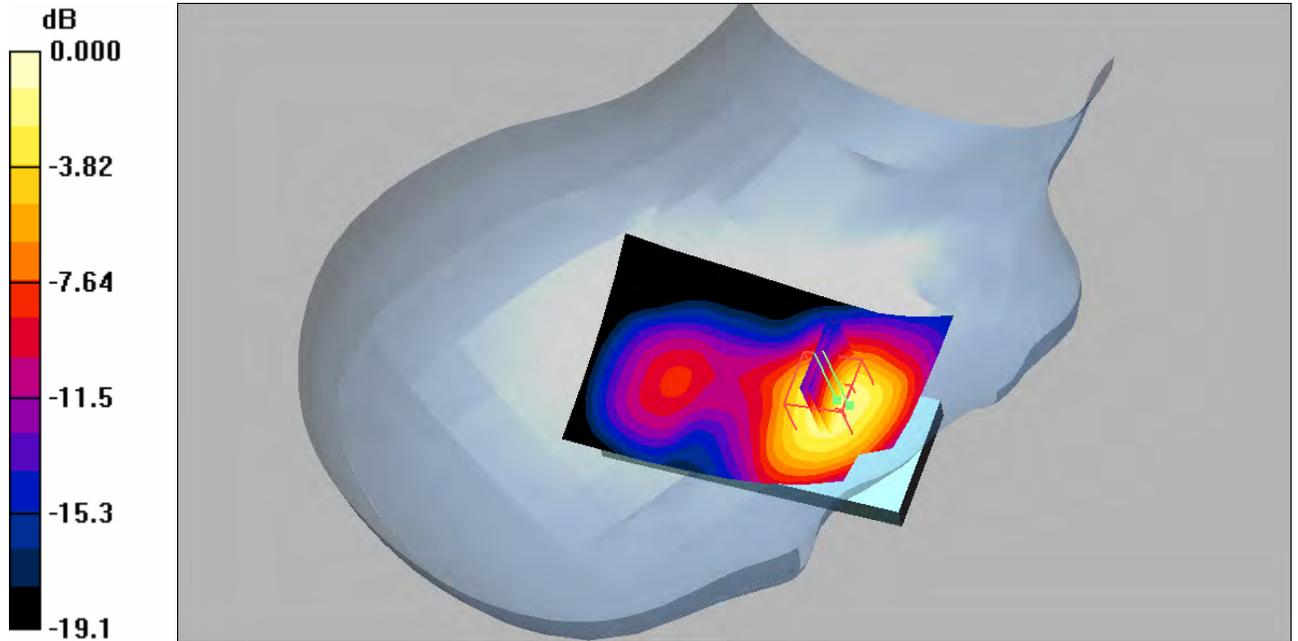
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.9 V/m; Power Drift = -0.022 dB

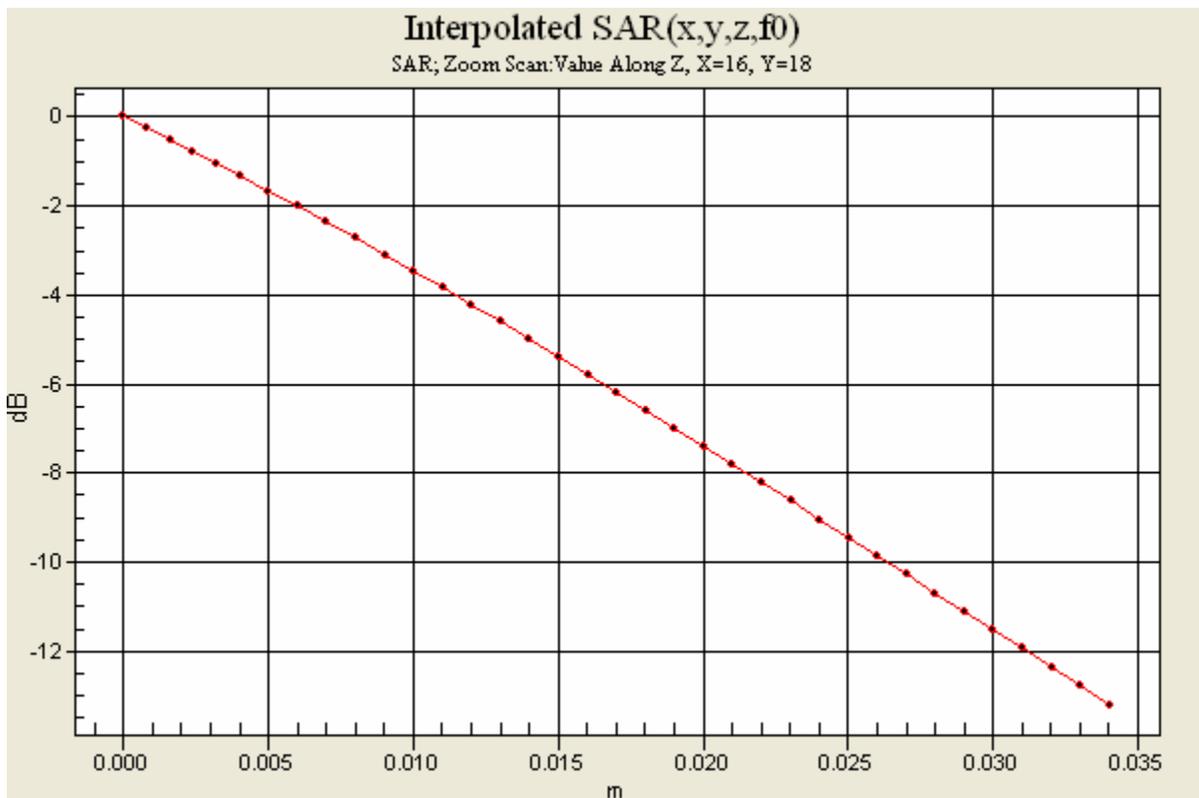
Maximum value of SAR (interpolated) = 1.82 mW/g



Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	



0 dB = 1.82mW/g





Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked		A

1900 GSM Band: Distribution and Extrapolation of Maximum SAR

Model: C510 with Standard Battery: BST-38, Right Tilt Position.

Date/Time: 12/3/2008 12:08:07 PM

File Name: [03Dec08_C510_GSM1900_0690_RT01.da4](#)

DUT: C510

Phantom: SAM with CRP (High Band Head) Phantom section: Right Section

Probe: ET3DV6 - SN1584 ConvF(5.1, 5.1, 5.1)

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 38.8$; $\rho = 1000$ kg/m³

Measurement Standard: DASY4 (High Precision Assessment)

Program Notes: Battery - BST38 Humidity - 39.1 % Ambient Temp - 22.4 C Simulant Tem - 22.3 C

DASY4 Configuration:

- Probe: ET3DV6 - SN1584; ConvF(5.1, 5.1, 5.1); Calibrated: 11/17/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn392; Calibrated: 5/7/2008

- Phantom: SAM with CRP (High Band Head); Type: SAM; Serial: TP: 1054

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Unnamed procedure/Area Scan (51x81x1):

Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.492 mW/g

Unnamed procedure/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.2 V/m; Power Drift = 0.032 dB

Peak SAR (extrapolated) = 0.660 W/kg

SAR(1 g) = 0.436 mW/g; SAR(10 g) = 0.265 mW/g

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

Maximum value of SAR (measured) = 0.471 mW/g

Unnamed procedure/Zoom Scan (31x31x36)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

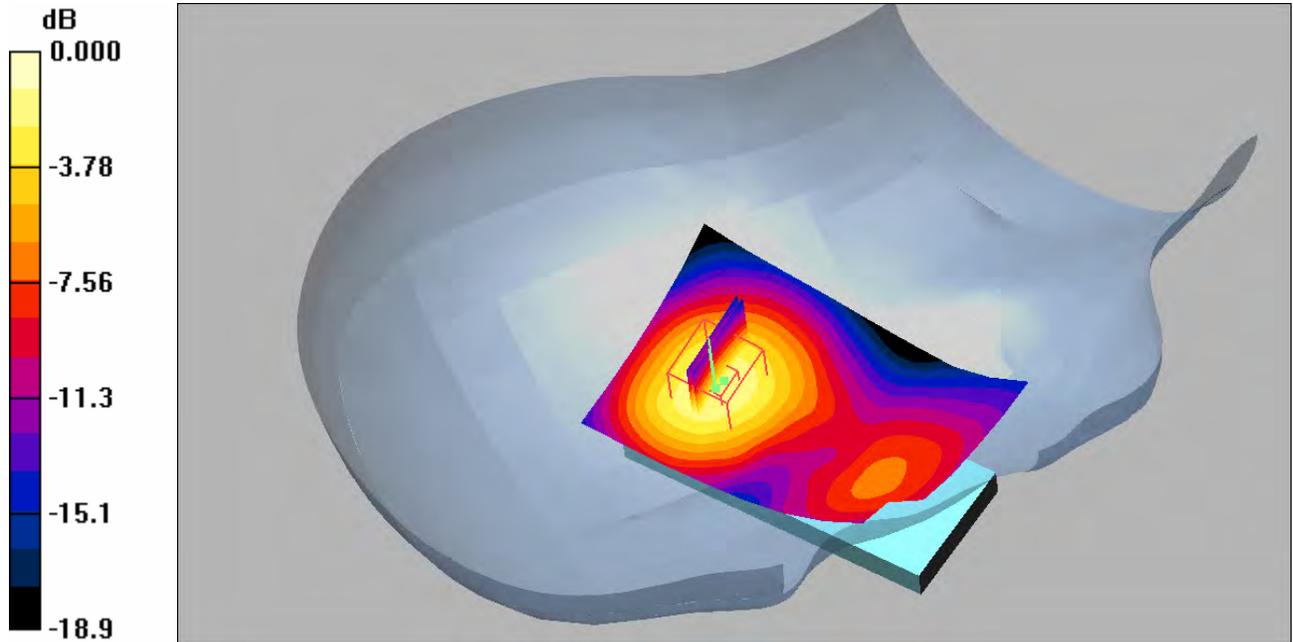
Reference Value = 17.2 V/m; Power Drift = 0.032 dB

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

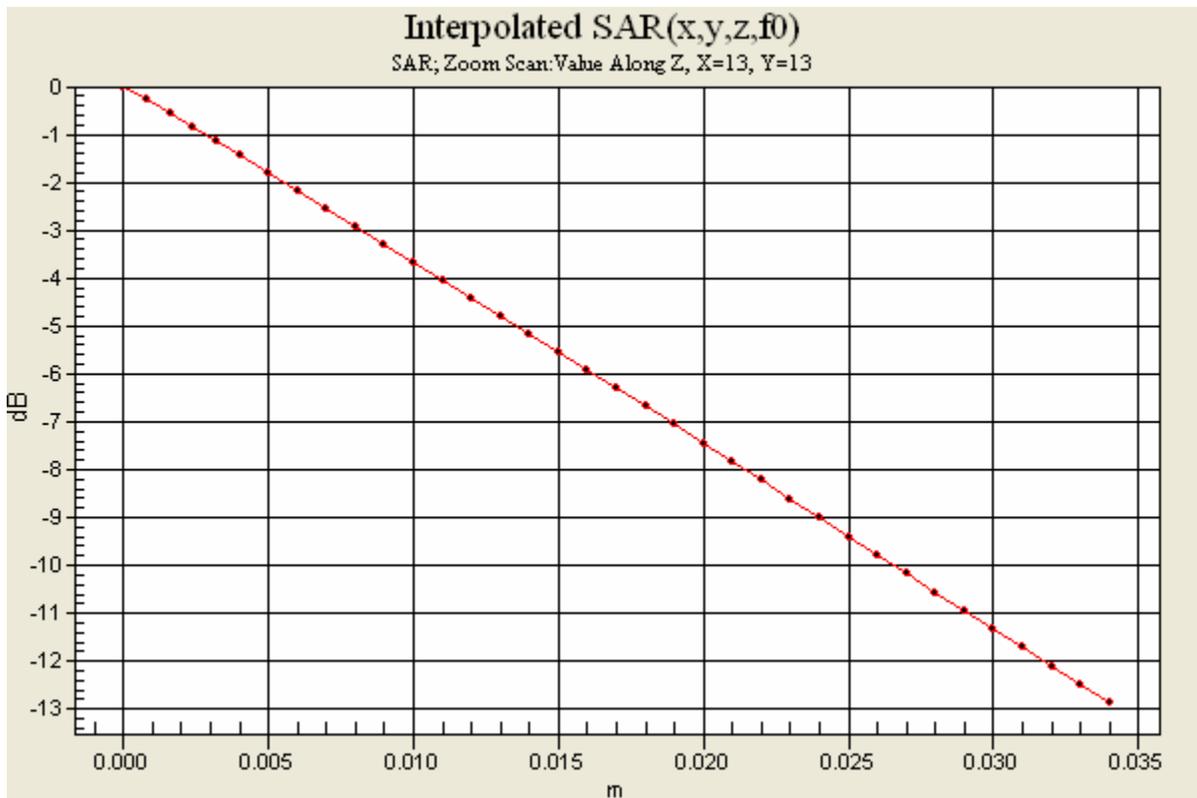
Maximum value of SAR (interpolated) = 0.660 mW/g



Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
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0 dB = 0.660mW/g





Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked		A

1900 GSM Band: Distribution and Extrapolation of Maximum SAR

Model: C510 with Standard Battery: BST-38, Left Cheek Position.

Date/Time: 12/3/2008 9:24:43 AM

File Name: [03Dec08_C510_GSM1900_0690_LC01.da4](#)

DUT: C510

Phantom: SAM with CRP (High Band Head) Phantom section: Left Section

Probe: ET3DV6 - SN1584 ConvF(5.1, 5.1, 5.1)

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.43 \text{ mho/m}$; $\epsilon_r = 38.6$; $\rho = 1000 \text{ kg/m}^3$

Measurement Standard: DASY4 (High Precision Assessment)

Program Notes: Battery - BST-38 Humidity: 39.3% Ambient Temp: 22.8 C Simulant Temp: 22.5 C

DASY4 Configuration:

- Probe: ET3DV6 - SN1584; ConvF(5.1, 5.1, 5.1); Calibrated: 11/17/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn392; Calibrated: 5/7/2008

- Phantom: SAM with CRP (High Band Head); Type: SAM; Serial: TP: 1054

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Unnamed procedure 2/Area Scan (51x81x1):

Measurement grid: dx=15mm, dy=15mm

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

Unnamed procedure 2/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.4 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 1.83 W/kg

SAR(1 g) = 1.23 mW/g; SAR(10 g) = 0.744 mW/g

Maximum value of SAR (measured) = 1.33 mW/g

Unnamed procedure 2/Zoom Scan (31x31x36)/Cube 0:

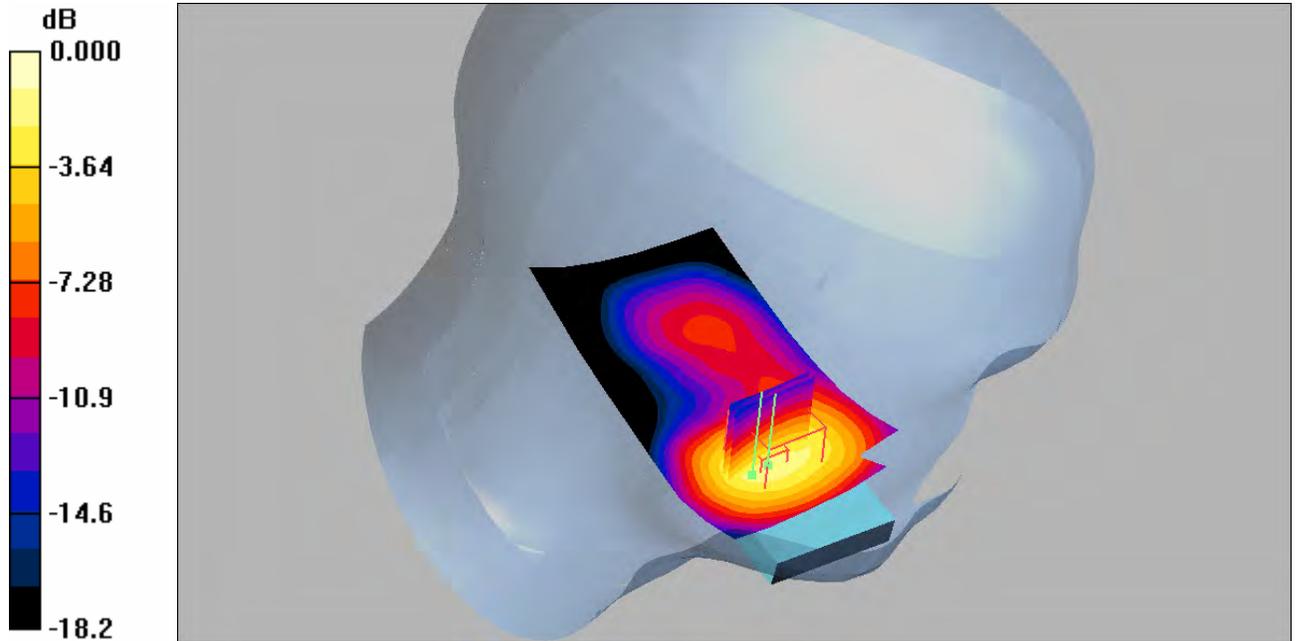
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.4 V/m; Power Drift = -0.002 dB

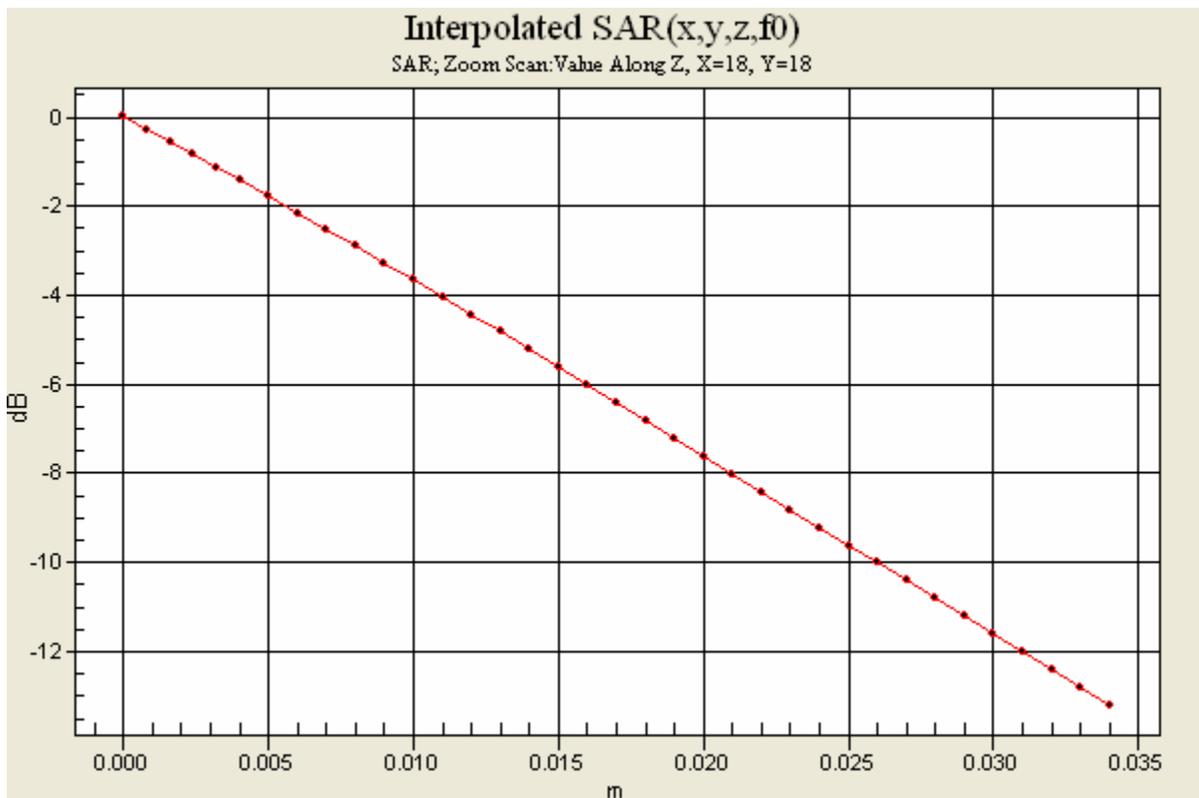
Maximum value of SAR (interpolated) = 1.83 mW/g



Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
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0 dB = 1.83mW/g





Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked		A

1900 GSM Band: Distribution and Extrapolation of Maximum SAR

Model: C510 with Standard Battery: BST-38, Left Tilt Position.

Date/Time: 12/3/2008 10:42:28 AM

File Name: [03Dec08_C510_GSM1900_0690_LT01.da4](#)

DUT: C510

Phantom: SAM with CRP (High Band Head) Phantom section: Left Section

Probe: ET3DV6 - SN1584 ConvF(5.1, 5.1, 5.1)

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 38.3$; $\rho = 1000$ kg/m³

Measurement Standard: DASY4 (High Precision Assessment)

Program Notes: Battery - BST-38 Humidity: 39.3% Ambient Temp: 22.8 C Simulant Temp: 22.5 C

DASY4 Configuration:

- Probe: ET3DV6 - SN1584; ConvF(5.1, 5.1, 5.1); Calibrated: 11/17/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn392; Calibrated: 5/7/2008

- Phantom: SAM with CRP (High Band Head); Type: SAM; Serial: TP: 1054

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Unnamed procedure 3/Area Scan (51x81x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.555 mW/g

Unnamed procedure 3/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.7 V/m; Power Drift = 0.025 dB

Peak SAR (extrapolated) = 0.733 W/kg

SAR(1 g) = 0.471 mW/g; SAR(10 g) = 0.278 mW/g

Maximum value of SAR (measured) = 0.513 mW/g

Unnamed procedure 3/Zoom Scan (31x31x36)/Cube 0:

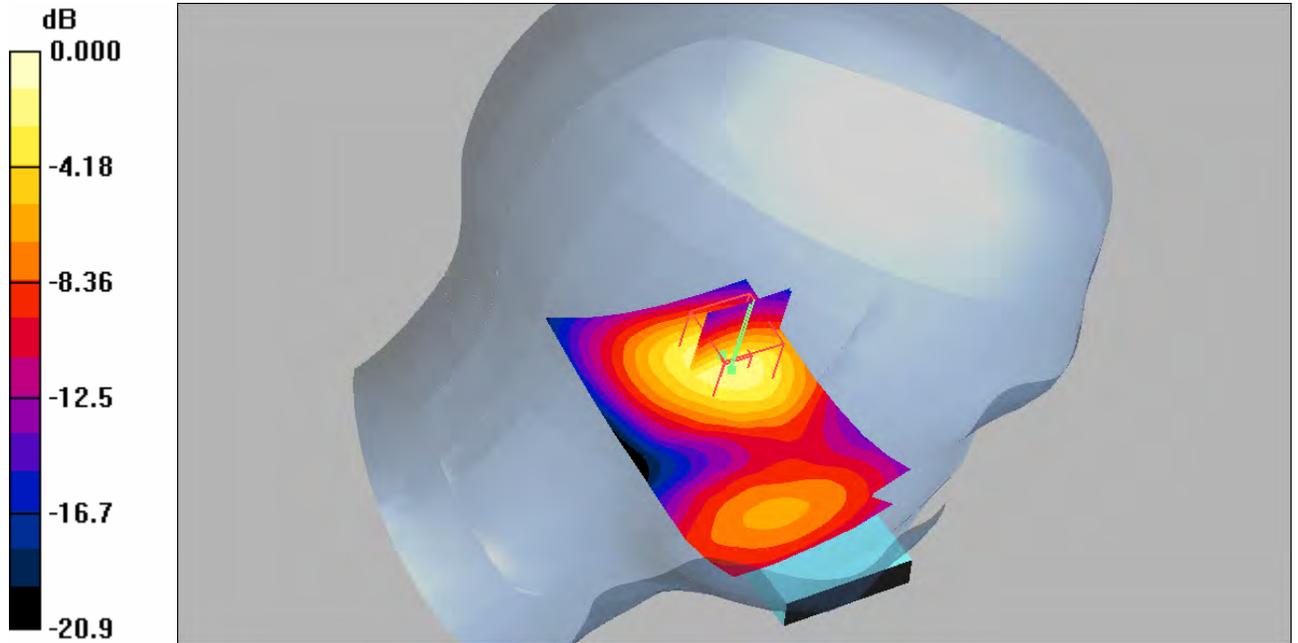
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.7 V/m; Power Drift = 0.025 dB

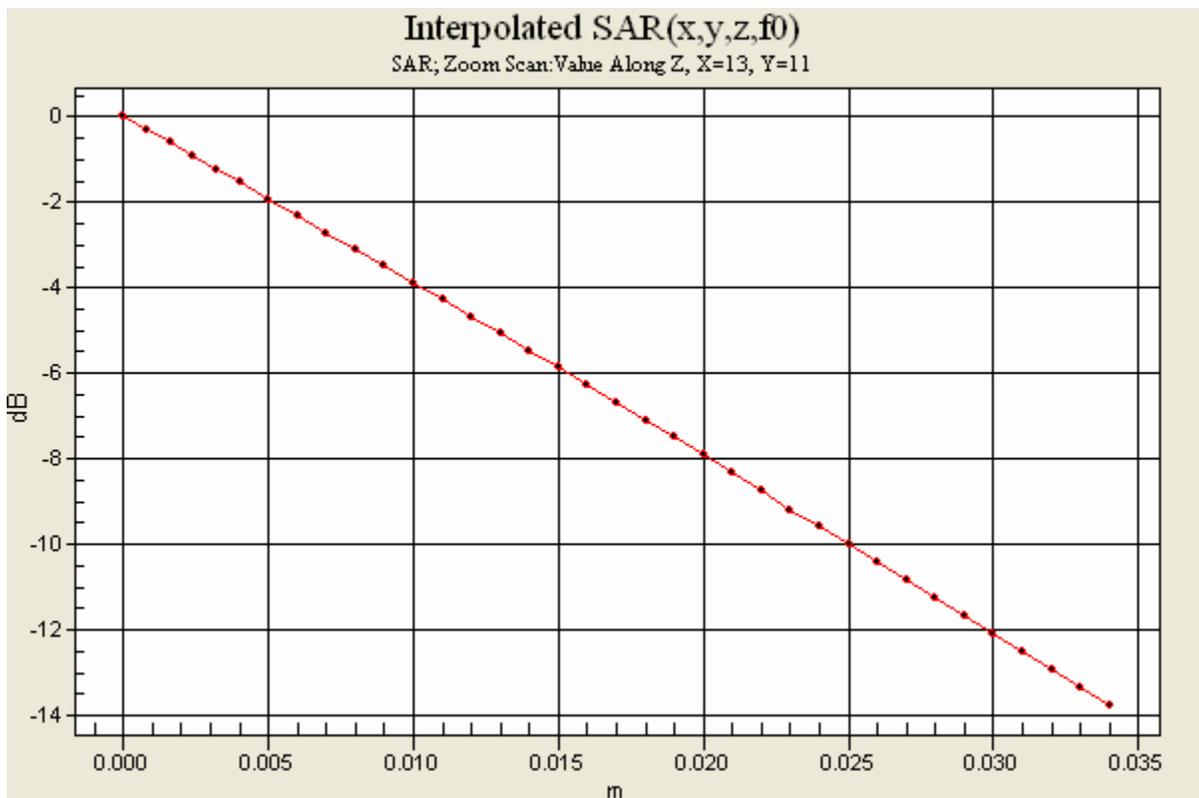
Maximum value of SAR (interpolated) = 0.733 mW/g



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0 dB = 0.733mW/g





Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

Appendix 3

SAR distribution plots for Body Worn Configuration



Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

Distribution of maximum SAR in 1900 GSM band. Measured with back of device facing the body using a 15mm spacer. (Standard Battery, BST-38)

Date/Time: 12/10/2008 8:45:57 AM

File Name: [10Dec08_C510_GSM1900_0690_15mm_BB01.da4](#)

DUT: C510

Phantom: SAM with CRP (High Band Body) Phantom section: Flat Section

Probe: ET3DV6 - SN1586 ConvF(4.64, 4.64, 4.64)

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

Measurement Standard: DASY4 (High Precision Assessment)

Program Notes: Battery - BST38 Humidity - 34.7 % Ambient Temp - 23.3 C Simulant Temp - 23 C

DASY4 Configuration:

- Probe: ET3DV6 - SN1586; ConvF(4.64, 4.64, 4.64); Calibrated: 5/19/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn432; Calibrated: 5/13/2008

- Phantom: SAM with CRP (High Band Body); Type: SAM; Serial: TP: 1020

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Unnamed procedure 2/Area Scan (51x91x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.458 mW/g

Unnamed procedure 2/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.7 V/m; Power Drift = 0.030 dB

Peak SAR (extrapolated) = 0.698 W/kg

SAR(1 g) = 0.418 mW/g; SAR(10 g) = 0.254 mW/g

Maximum value of SAR (measured) = 0.449 mW/g

Unnamed procedure 2/Zoom Scan (31x31x36)/Cube 0:

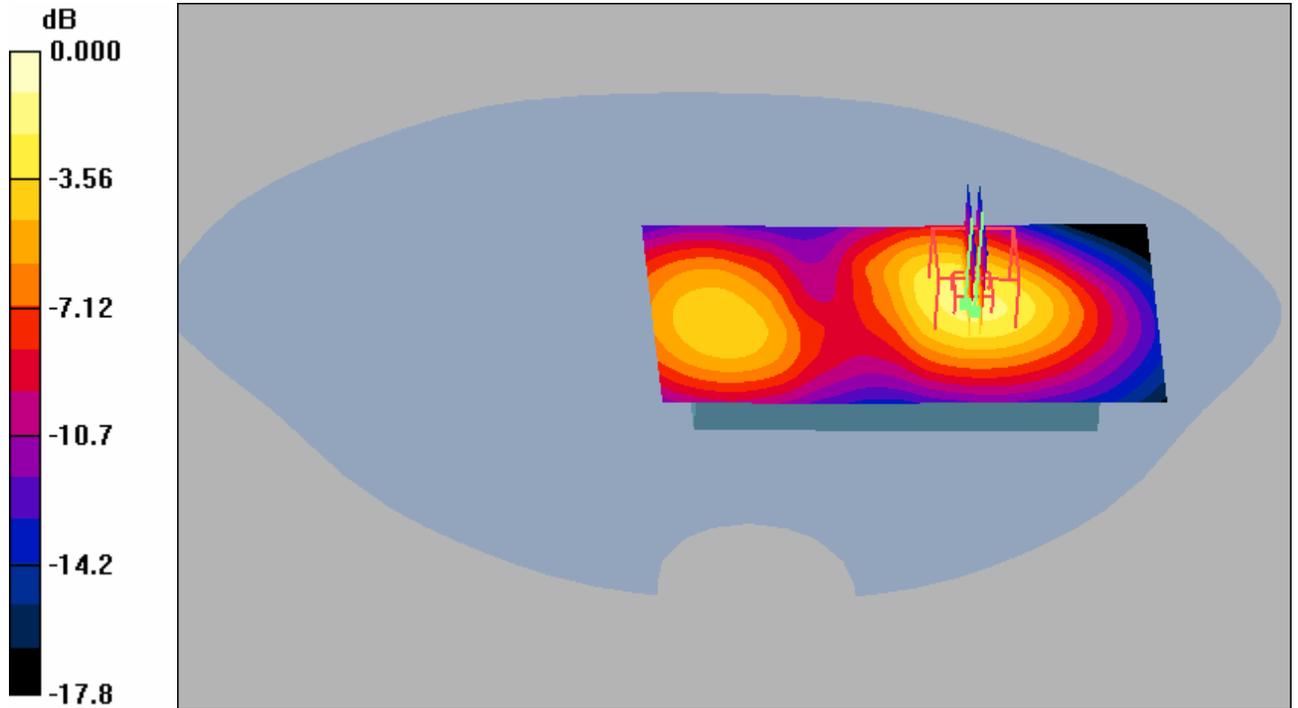
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.7 V/m; Power Drift = 0.030 dB

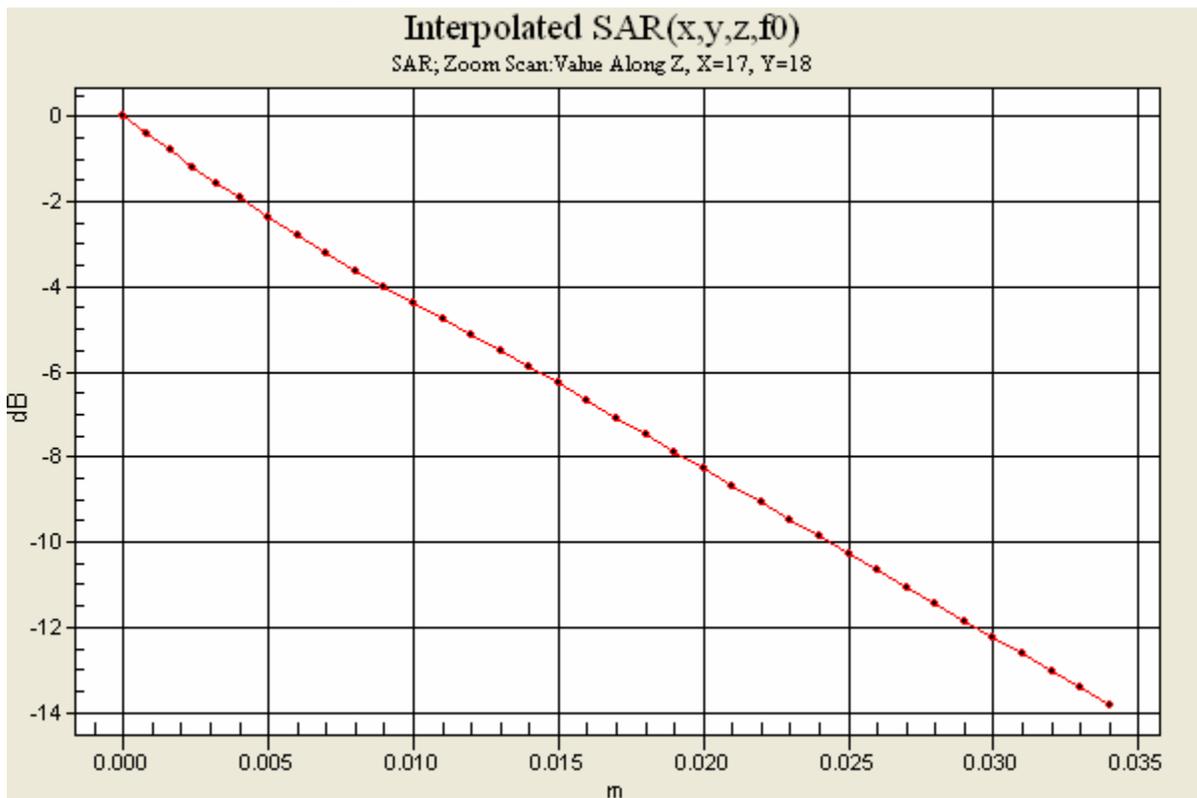
Maximum value of SAR (interpolated) = 0.698 mW/g



Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked		A



0 dB = 0.698mW/g





Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

Distribution of maximum SAR in 1900 GSM band. Measured with back of device facing the body using the ICE30 case. (Standard Battery, BST-38)

Date/Time: 12/10/2008 10:56:22 AM

File Name: [10Dec08_C510_GSM1900_0690_ICE30_BB01.da4](#)

DUT: C510

Phantom: SAM with CRP (High Band Body) Phantom section: Flat Section

Probe: ET3DV6 - SN1586 ConvF(4.64, 4.64, 4.64)

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

Measurement Standard: DASY4 (High Precision Assessment)

Program Notes: Battery - BST38 Humidity - 35.9 % Ambient Temp - 22.9 C Simulant Temp - 23 C

DASY4 Configuration:

- Probe: ET3DV6 - SN1586; ConvF(4.64, 4.64, 4.64); Calibrated: 5/19/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn432; Calibrated: 5/13/2008

- Phantom: SAM with CRP (High Band Body); Type: SAM; Serial: TP: 1020

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Unnamed procedure 2/Area Scan (51x91x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.446 mW/g

Unnamed procedure 2/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.7 V/m; Power Drift = -0.034 dB

Peak SAR (extrapolated) = 0.660 W/kg

SAR(1 g) = 0.402 mW/g; SAR(10 g) = 0.249 mW/g

Maximum value of SAR (measured) = 0.431 mW/g

Unnamed procedure 2/Zoom Scan (31x31x36)/Cube 0:

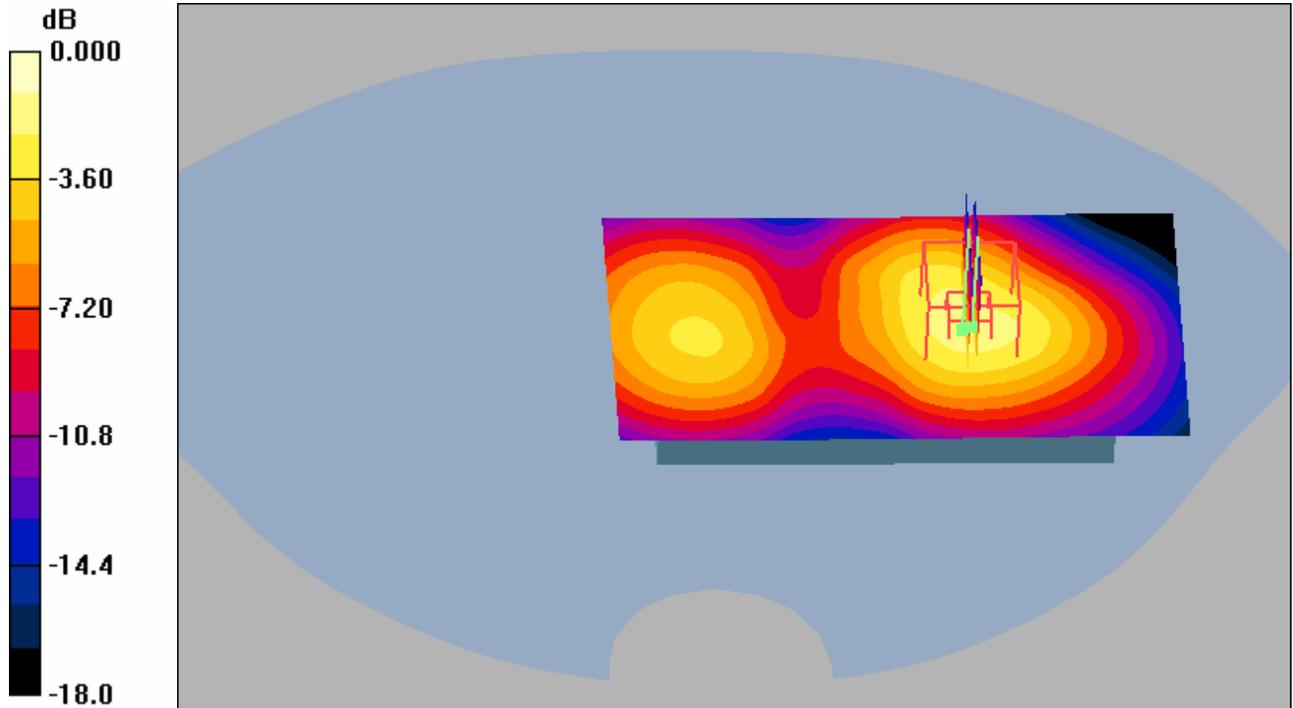
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.7 V/m; Power Drift = -0.034 dB

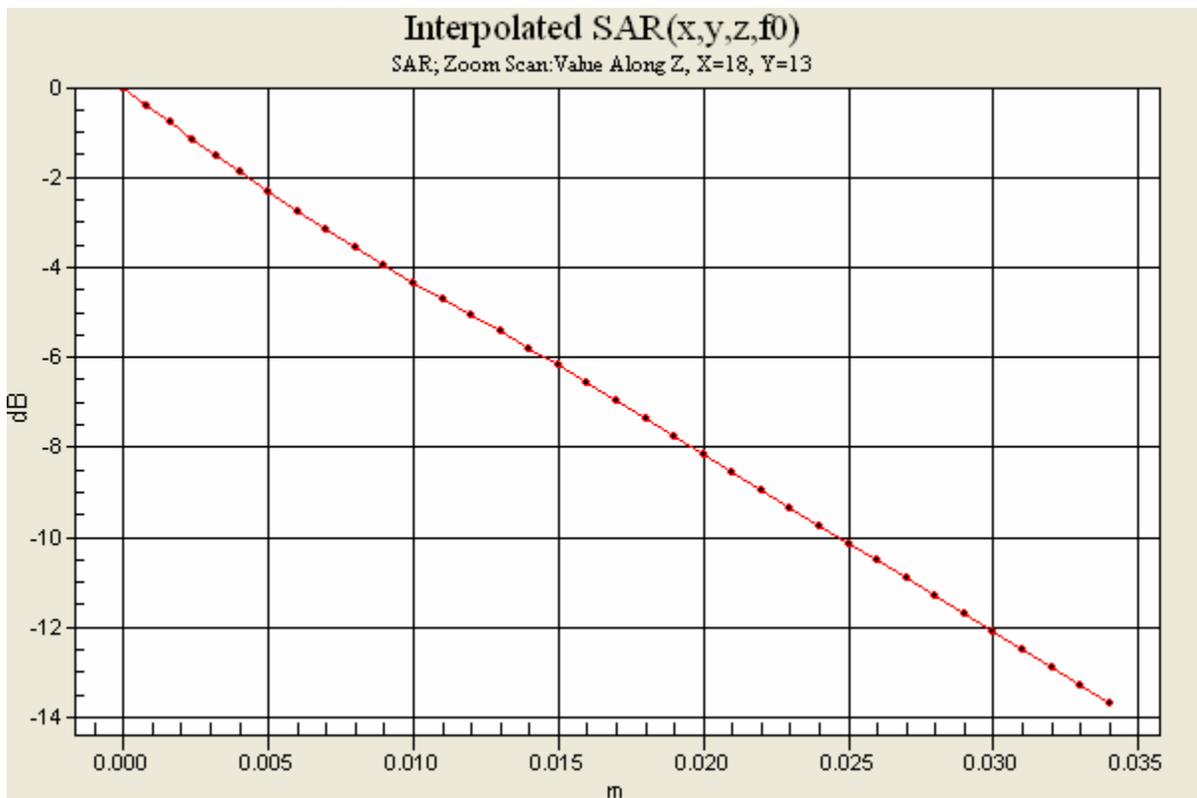
Maximum value of SAR (interpolated) = 0.660 mW/g



Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	



0 dB = 0.660mW/g





Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

Distribution of maximum SAR in 1900 GSM band. Measured with front of device facing the body using the ICE30 case. (Standard Battery, BST-38)

Date/Time: 12/10/2008 10:36:40 AM

File Name: [10Dec08_C510_GSM1900_0690_ICE30_BF01.da4](#)

DUT: C510

Phantom: SAM with CRP (High Band Body) Phantom section: Flat Section

Probe: ET3DV6 - SN1586 ConvF(4.64, 4.64, 4.64)

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

Measurement Standard: DASY4 (High Precision Assessment)

Program Notes: Battery - BST38 Humidity - 35.9 % Ambient Temp - 22.9 C Simulant Temp - 23 C

DASY4 Configuration:

- Probe: ET3DV6 - SN1586; ConvF(4.64, 4.64, 4.64); Calibrated: 5/19/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn432; Calibrated: 5/13/2008

- Phantom: SAM with CRP (High Band Body); Type: SAM; Serial: TP: 1020

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Unnamed procedure 2/Area Scan (51x91x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.543 mW/g

Unnamed procedure 2/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.0 V/m; Power Drift = 0.065 dB

Peak SAR (extrapolated) = 0.748 W/kg

SAR(1 g) = 0.486 mW/g; SAR(10 g) = 0.309 mW/g

Maximum value of SAR (measured) = 0.517 mW/g

Unnamed procedure 2/Zoom Scan (31x31x36)/Cube 0:

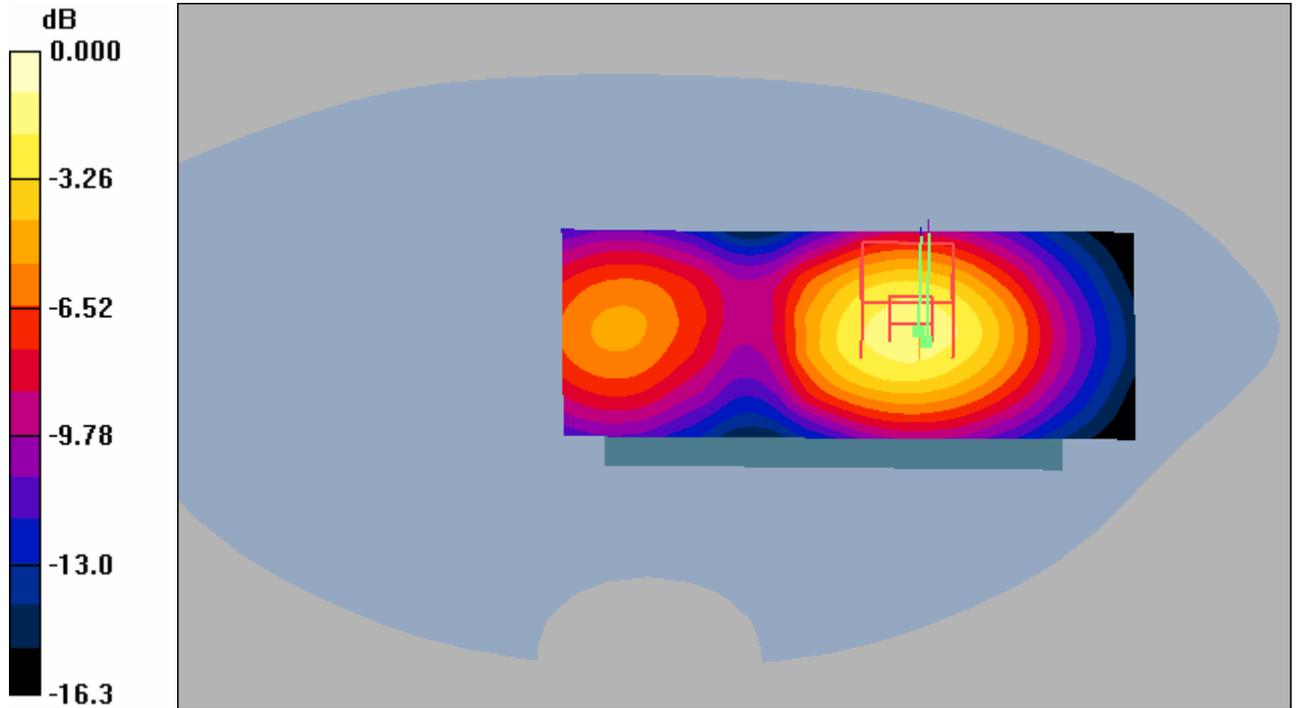
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.0 V/m; Power Drift = 0.065 dB

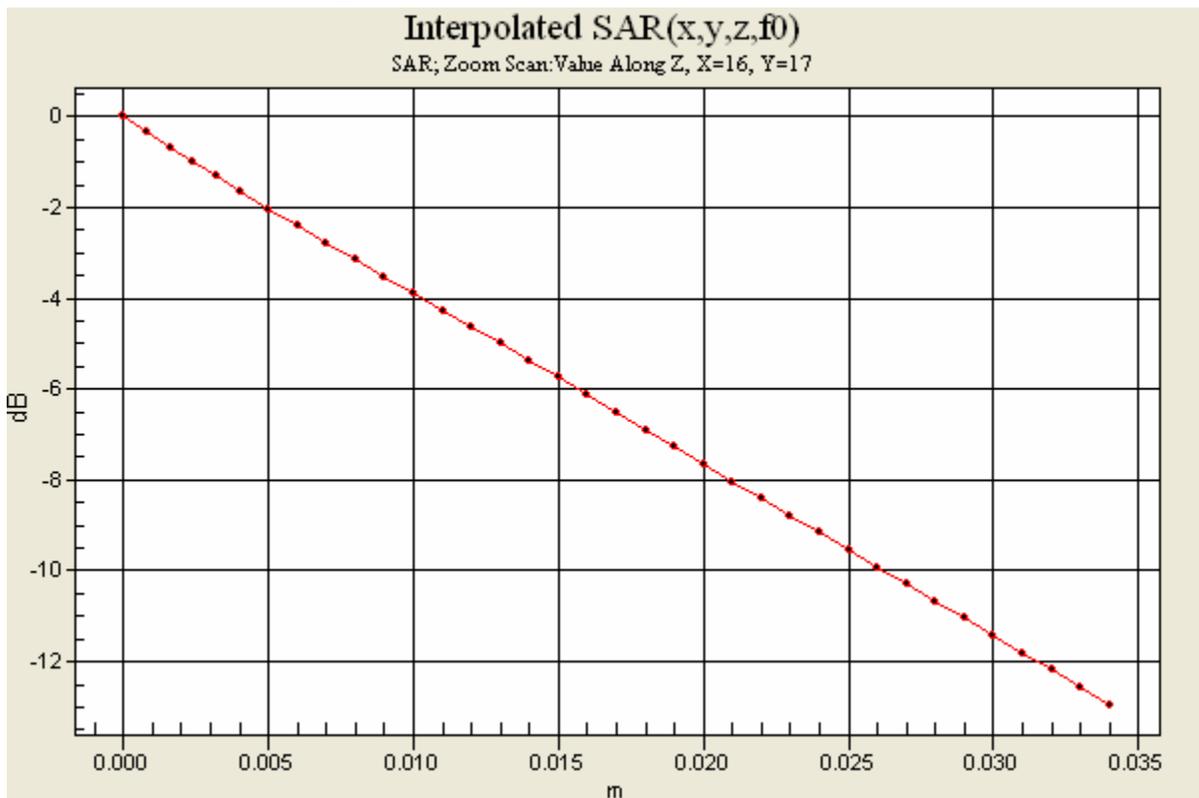
Maximum value of SAR (interpolated) = 0.748 mW/g



Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	



0 dB = 0.748mW/g





Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

Appendix 4

Probe Calibration Certificates

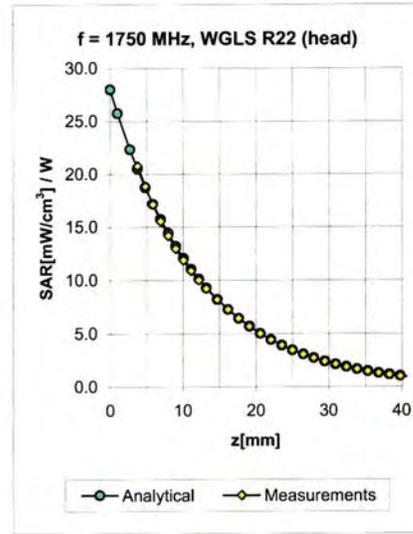
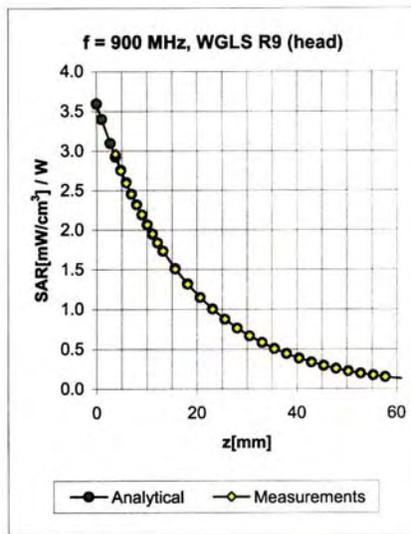


Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2008 004 C510 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

ET3DV6 SN:1538

May 19, 2008

Conversion Factor Assessment



f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.23	3.69	6.22 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.28	3.22	6.08 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.55	2.50	5.46 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.53	2.50	5.18 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.50	2.40	4.68 ± 11.0% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.32	3.06	6.07 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.41	2.70	5.93 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.56	2.50	4.82 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.50	2.50	4.58 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.48	2.40	4.15 ± 11.0% (k=2)

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

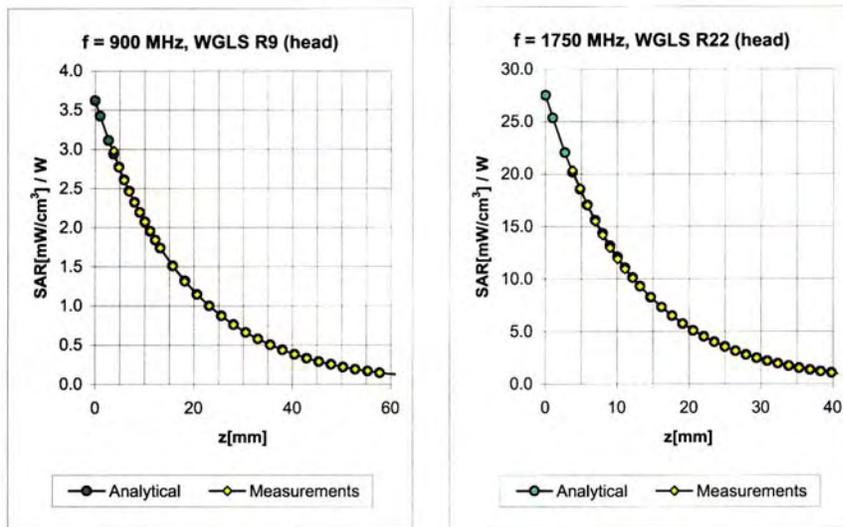


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Conversion Factor Assessment



f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.19	4.09	6.34 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.23	3.46	6.18 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.89	1.84	5.36 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.99	1.66	5.10 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.99	1.27	4.51 ± 11.0% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.23	3.72	6.14 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.30	2.92	6.03 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.99	1.88	4.78 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.99	1.77	4.46 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.99	1.35	3.90 ± 11.0% (k=2)

^c The validity of ± 100 MHz only applies for DASYS v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.



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DASY - Parameters of Probe: ET3DV6 SN:1584

Sensitivity in Free Space^A

Diode Compression^B

NormX	1.89 ± 10.1%	μV/(V/m) ²	DCP X	93 mV
NormY	1.81 ± 10.1%	μV/(V/m) ²	DCP Y	94 mV
NormZ	1.90 ± 10.1%	μV/(V/m) ²	DCP Z	94 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL 900 MHz Typical SAR gradient: 5 % per mm

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	9.9	5.9
SAR _{be} [%]	With Correction Algorithm	0.8	0.6

TSL 1750 MHz Typical SAR gradient: 10 % per mm

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	10.7	6.6
SAR _{be} [%]	With Correction Algorithm	0.8	0.5

Sensor Offset

Probe Tip to Sensor Center 2.7 mm

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

^B Numerical linearization parameter: uncertainty not required.

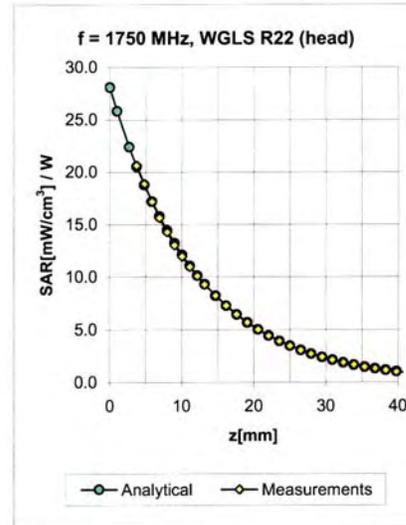
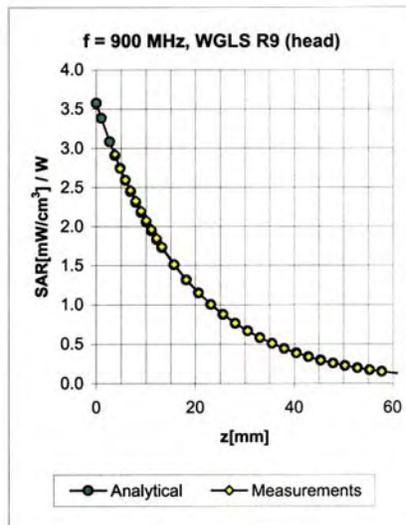


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May 19, 2008

Conversion Factor Assessment



f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.68	2.06	6.50 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.35	2.80	6.29 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.55	2.50	5.54 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.50	2.50	5.29 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.45	2.50	4.69 ± 11.0% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.65	2.14	6.25 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.35	2.80	6.10 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.50	2.50	4.91 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.48	2.50	4.64 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.40	2.50	4.11 ± 11.0% (k=2)

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.



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Appendix 5

Measurement Uncertainty Budget



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Table 1. Uncertainty Budget for System Performance Check (Dipole & flat phantom) DASY4 System

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	$e = f(d,k)$	<i>f</i>	<i>g</i>	$h = c \times f / e$	$i = c \times g / e$	<i>k</i>
Uncertainty Component	Sec.	Tol. (± %)	Prob. Dist.	Div.	c_i (1-g)	c_i (10-g)	1-g u_i (±%)	10-g u_i (±%)	v_i
Measurement System									
Probe Calibration (<i>k</i> =1)	E2.1	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Axial Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Hemispherical Isotropy	E.2.2	1.0	R	1.73	1	1	0.6	0.6	∞
Boundary Effect	E.2.3	4.7	R	1.73	1	1	2.7	2.7	∞
Linearity	E.2.4	1.0	R	1.73	1	1	0.6	0.6	∞
System Detection Limits	E.2.5	1.0	N	1	1	1	1.0	1.0	∞
Readout Electronics	E.2.6	0.8	R	1.73	1	1	0.5	0.5	∞
Response Time	E.2.7	2.6	R	1.73	1	1	1.5	1.5	∞
Integration Time	E.2.8	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance (corresponds to the mechanical constrains of the robot)	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	2.9	R	1.73	1	1	1.7	1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1	1	0.6	0.6	∞
Dipole									
Dipole Axis to Liquid Distance	8, E.4.2	1.0	R	1.73	1	1	0.6	0.6	∞
Input Power and SAR Drift Measurement	8, 6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty - shell thickness tolerance	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity - deviation from target values (5)	E.3.2	4.3	R	1.73	0.64	0.43	1.59	1.07	∞
Liquid Conductivity - measurement uncertainty (6)	E.3.3	6.20	R	1.73	0.64	0.43	2.29	1.54	∞



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Liquid Permittivity - deviation from target values (5)	E.3.2	3.7	R	1.73	0.6	0.49	1.28	1.05	∞
Liquid Permittivity - measurement uncertainty (6)	E.3.3	6.08	R	1.73	0.6	0.49	2.11	1.72	∞
Combined Standard Uncertainty			RSS				9.37	9.03	
Expanded Uncertainty (95% C.L.)							18.74	18.05	



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Table 2: Uncertainty Budget for the Device Under Test with DASY4 System

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	$e = f(d,k)$	<i>f</i>	<i>g</i>	$h = c \times f / e$	$i = c \times g / e$	<i>k</i>
Uncertainty Component	Sec.	Tol. (± %)	Prob. Dist.	Div.	c_i (1-g)	c_i (10-g)	1-g u_i (±%)	10-g u_i (±%)	v_i
Measurement System									
Probe Calibration (<i>k</i> =1)	E2.1	4.8	N	1	1	1	4.8	4.8	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	1.0	N	1	1	1	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1	1	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance (corresponds to the mechanical constrains of the robot)	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	2.9	R	1.73	1	1	1.7	1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1	1	0.6	0.6	∞
Test sample Related									
Test Sample Positioning	E.4.2	2.0	N	1	1	1	2.0	2.0	4
Device Holder Uncertainty	E.4.1	2.0	R	1.73	1	1	1.2	1.2	4
Output Power Variation - SAR drift measurement (4)	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞



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Liquid Conductivity - deviation from target values (5)	E.3.2	4.3	R	1.73	0.64	0.43	1.6	1.1	∞
Liquid Conductivity - measurement uncertainty (6)	E.3.3	6.20	R	1.73	0.64	0.43	2.3	1.5	∞
Liquid Permittivity - deviation from target values (5)	E.3.2	3.7	R	1.73	0.6	0.49	1.3	1.0	∞
Liquid Permittivity - measurement uncertainty (6)	E.3.3	6.08	R	1.73	0.6	0.49	2.1	1.7	∞
Combined Standard Uncertainty			RSS				8.4	8.0	
Expanded Uncertainty (95% CONFIDENCE LEVEL)			K=2				16.7	15.9	



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Table 3a. Values for ϵ'

Uncertainty Component	Tolerance (±%)	Probability Distribution	Divisor	c_i	Standard Uncertainty (±%)	v_i or v_{eff}
Repeatability (n repeats)	0.97	N	1	1	0.97	4
Network analyzer uncertainty sources	8.38	R	1.73	1	4.83	∞
Dielectric Error Sources	5.93	R	1.73	1	3.42	∞
Combined standard uncertainty					6.08	

Table 3b. Values for σ

Uncertainty Component	Tolerance (±%)	Probability Distribution	Divisor	c_i	Standard Uncertainty (±%)	v_i or v_{eff}
Repeatability (n repeats)	1.85	N	1	1	1.85	4
Network analyzer uncertainty sources	8.38	R	1.73	1	4.83	∞
Dielectric Error Sources	5.93	R	1.73	1	3.42	∞
Combined standard uncertainty					6.20	



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Appendix 6

Photographs of the Device Under Test



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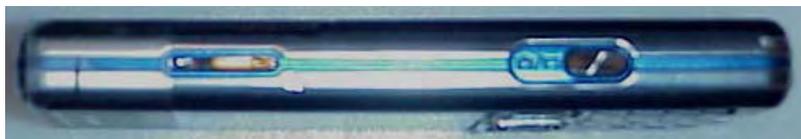
Front:



Back:



Side:





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Position of device against head phantom using the “cheek” and “tilt” position



“cheek/touch” position



“tilt” position

Position with device against flat phantom using an ICE30 carry case with hands free accessory.



Front of device against flat phantom



Back of device against flat phantom.

Position with device against flat phantom using a 15mm spacer with hands free accessory.



Front of device against flat phantom



Back of device against flat phantom.



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Accessory: ICE30 front.



ICE30 back.

Handsfree Accessory:

