



Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

Exhibit 11: SAR Test Report of Portable Cellular Phone FCC ID: PY7AC052011 Model : Z520i (HW-B)

Date of test: February 28 - March 12, 2006
Date of Report: March 24, 2006

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

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 Eng. Technician IV, Product Verification Group

Test Responsible: Gerard Hayes *Gerard Hayes 24 mar 2006*
 Consulting Engineer, Antenna/RF Development Group

Accreditation: This laboratory is accredited to ISO/IEC 17025-1999 to perform the following
 electromagnetic exposure tests:



Specific Absorption Rate (SAR)
 Dielectric parameters
 RF power measurement

On the following types of products:
 Wireless communications devices. A2LA certificate #1650-01

Statement of Compliance: Sony Ericsson Mobile Communications, Inc declares under its sole responsibility that portable cellular telephone FCC ID PY7AC052011 model Z520i 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 PY7AC052011 model Z520i (Hardware Revision B). 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	PIFA- Type Antenna	
Location	External plastic loop, near the hinge	
Dimensions	Width	40 mm
	Length	30 mm
	Height	8mm

2.2 Device description

FCC ID Number / Device Model	PY7AC052011 / Z520i							
Serial number	BD3050NURF						BD3050NURF	
Mode(s) of Operation	GSM 800						GSM 1900	
Modulation Mode(s)	TDMA						TDMA	
Target Value and Factory Tolerance Window for Maximum Output Power Setting GSM Mode: 1/8 Duty Cycle	f _{low}	32.2 dBm +0.4/-1.2 dB					f _{low}	30.0 dBm +0.5/-1.5 dB
	f _{mid}	31.7 dBm +0.4/-0.7 dB					f _{mid}	30.0 dBm +0.5/-1.5 dB
	f _{high}	31.7 dBm +0.3/-0.7 dB					f _{high}	30.0 dBm +0.5/-1.5 dB
GPRS Mode: 2/8 Duty Cycle Target Maximum Output Power Setting (adjusted from GSM mode)	f _{low}	32.2 dBm max.					f _{low}	Same as GSM 1:8
	f _{mid}	31.6 dBm max.					f _{mid}	Same as GSM 1:8
	f _{high}	31.2 dBm ± 0.3 dB					f _{high}	Same as GSM 1:8
Calibration Frequency (f _{low} , f _{mid} , f _{high})	f _{high}						f _{mid}	
Transmitting Frequency Rang(s)	824-849 MHz						1850-1910 MHz	
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype							
Device Category	Portable							
RF Exposure Limits	General Population / Uncontrolled							



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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 $\pm 9.49\%$ (K=1) with an expanded uncertainty of $\pm 18.98\%$ (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	345	10-Nov-2006
DASY3 DAE V1	416	10-Nov-2006
E-Field Probe ETDV6	1586	26-May-2006
E-Field Probe ETDV6	1539	22-Nov-2006
Dipole Validation Kit, DV835V2	429	21-Nov-2006
Dipole Validation Kit, DV1900V2	537	15-Nov-2006
S.A.M. Phantom used for 835MHz (Head)	1251	
S.A.M. Phantom used for 835MHz (Body)	1031	
S.A.M. Phantom used for 900MHz (Head and Body)	1251	
S.A.M. Phantom used for 1800MHz (Head and Body)	1335	
S.A.M. Phantom used for 1900MHz (Head)	1335	
S.A.M. Phantom used for 1900MHz (Body)	1020	

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3537A01598	August 30, 2006
Power Meter 437B	3125U16382	December 5, 2006
Power Meter 437B	3125U13729	June 3, 2006
Power Sensor - 8482H	MY41090240	April 29, 2006
Power Sensor - 8482H	MY41090239	April 29, 2006
Dielectric Probe Kit HP85070B	US33020390	August 29, 2006
Digital Thermometer 61220-601 And Probe (61220-604)	350078	November 9, 2006
Digital Hygrometer/ Thermometer	21242911	November 9, 2006
HP RF Amplifier 8347A	3307A1069	May 4, 2006



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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 $\rho=1\text{g/cm}^3$ 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]. During the tests, the ambient temperature of the laboratory was in the range 21.4-23.9°C, the relative humidity was 30.5%- 36.2 %, and the liquid depth above the ear reference points was more than 15.0 cm for 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)
835	Head	Measured, 28-Feb-06	41.58	.901	23
		Recommended Limits	41.50	0.90	20-25
	Body	Measured, 02-Mar-06	53.63	.999	23.4
		Recommended Limits	55.20	0.97	20-25
1900	Head	Measured, 10-Mar-06	38.4	1.454	22.6
		Recommended Limits	40.00	1.40	20-25
	Body	Measured, 11-Mar-06	51.49	1.519	22.9
		Recommended Limits	53.30	1.52	20-25

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

Ingredient	800/900 MHz Head 900MHz Body	800MHz Body	1800/1900 MHz Head 1800MHz Body	1900MHz Body
Sugar	57.99%	56.00%	--	--
DGBE	--	--	44.92%	30.82%
Water	39.72%	41.76%	54.90%	68.89%
Salt	1.18%	0.76%	0.18%	0.29%
HEC	0.92%	1.21%	--	--
Bact.	0.19%	0.27%	--	--



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5. System Accuracy Verification

A system accuracy verification of the DASY3 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). During the tests, the ambient temperature of the laboratory was in the range 21.4 – 23.9 °C, the relative humidity was in the range 30.5 – 36.2 % and the liquid depth above the ear reference points was above 15.0 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. The SAR distributions are shown in Appendix 1.

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 0.00099 W/kg, which is below the recommended limit in [1].

f (MHz)	Tissue Type	Description	SAR (W/kg) 1g / 10g		Dielectric Parameters		Tissue Temp (°C)
					ϵ_r	s (S/m)	
835	Head	Measured. 28-Feb-06	9.1	5.9	41.58	.901	23
		Recommended Limits	9.50	6.20	41.50	0.90	20-25
	Body	Measured. 02-Mar-06	9.4	6.2	53.63	.999	22.8
		Recommended Limits	9.90	6.46	55.20	0.97	20-25
1900	Head	Measured. 10-Mar-06	40.1	21	38.4	1.45	22.6
		Recommended Limits	39.70	20.50	40.00	1.40	20-25
	Body	Measured. 11-Mar-06	40.2	21.1	51.49	1.51	22.9
		Recommended Limits	40.50	20.89	53.30	1.52	20-25



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6. Test Results

For both head measurements (with a 1/8 GSM duty cycle) and body measurements (2/8 EGPRS duty cycle), the test sample was operated using a base station simulator that allows control of the transmitter using the signally software that installed on the phone call. 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.

The Cellular Phone FCC ID PY7AC052011 has the following battery option:
BKB 193 203 (BST-37) Standard Lithium Polymer Battery

The phone was placed in the SAR measurement system with a fully charged battery.

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 humidity and ambient temperature of the test facility were in the ranges 31.5 – 36.4 % and 22.2 -23.5°C, respectively. The SAR measurements were performed using the SAM phantoms listed in section 3.1.

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

Summary of Maximum Extrapolated SAR Results : Head Adjacent			
Frequency	Extrapolated SAR (W/kg)		Test Configuration
	1 g	10 g	
800 GSM	1.30	0.841	Right head, cheek/touch position, 849 MHz BST-37 battery, Bluetooth On
1900 GSM	0.525	0.258	Right head, cheek/touch position, 1850 MHz BST-37 battery



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f (MHz)	Channel/ frequency	Conducted Output Power (dBm) GSM 1:8 Duty Cycle	FCC ID PY7AC052011 with Standard Battery BST-37						
			Left Head (Cheek / Touch Position)					Ambient Temp (°C)	Simulate Temp (°C)
			Measured (W/kg) 1g / 10g		Drift (dB)	Extrapolated (W/kg) 1g / 10g			
800 GSM	128 / 824	32.5	0.481	0.317	0.03	0.481	0.317	23.5	23.4
	189 / 837	32.1	1.170	0.760	-0.08	1.170	0.760		
	251 / 849	32.0	1.110	0.720	0.00	1.110	0.720		
1900 GSM	512 / 1850	30.5	0.302	0.159	0.13	0.302	0.159	22.8	22.6
	660/1880	30.3	0.213	0.111	-0.06	0.213	0.111		
	810/1910	30.2	0.164	0.084	0.18	0.164	0.084		
f (MHz)	Channel/ frequency	Conducted Output Power (dBm) GSM 1:8 Duty Cycle	FCC ID PY7AC052011 with Standard Battery BST-37						
			Left Head (15° Tilt Position)					Ambient Temp (°C)	Simulate Temp (°C)
			Measured (W/kg) 1g / 10g		Drift (dB)	Extrapolated (W/kg) 1g / 10g			
800 GSM	128 / 824	32.5	0.135	0.100	0.04	0.135	0.100	23.1	23.1
	189 / 837	32.1	0.114	0.072	0.16	0.114	0.072		
	251 / 849	32.0	0.316	0.231	0.01	0.316	0.231		
1900 GSM	512 / 1850	30.5	0.093	0.057	-0.09	0.093	0.057	22.5	22.4
	660/1880	30.3	0.079	0.483	-0.05	0.079	0.483		
	810/1910	30.2	0.060	0.037	-0.17	0.060	0.037		

Table 1: SAR measurement results for the portable cellular telephone FCC ID PY7AC052011 model Z520i at maximum output power with Standard Battery BST-37. Measured against the left head.



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f (MHz)	Channel/ frequency	Conducted Output Power (dBm) GSM 1:8 Duty Cycle	FCC ID PY7AC052011 with Standard Battery BST-37						
			Right Head (Cheek / Touch Position)						
			Measured (W/kg) 1g / 10g		Drift (dB)	Extrapolated (W/kg) 1g / 10g		Ambient Temp (°C)	Simulate Temp (°C)
800 GSM	128 / 824	32.5	0.521	0.341	0.13	0.521	0.341	23.5	23
	189 / 837	32.1	0.745	0.484	0.02	0.745	0.484		
	251 / 849	32.0	1.290	0.832	-0.09	1.290	0.832		
Bluetooth On	251 / 849	32.0	1.30	0.841	0.01	1.30	0.841	23.5	23
1900 GSM	512 / 1850	30.5	0.525	0.258	-0.207	0.525	0.258	22.3	22.4
	660/1880	30.3	0.328	0.160	-0.03	0.328	0.160		
	810/1910	30.2	0.251	0.120	-0.03	0.251	0.120		
Bluetooth On	512 / 1850	30.5	0.517	0.253	0.03	0.517	0.253	22.3	22.4
f (MHz)	Channel/ frequency	Conducted Output Power (dBm) GSM 1:8 Duty Cycle	FCC ID PY7AC052011 with Standard Battery BST-37						
			Right Head (15° Tilt Position)						
			Measured (W/kg) 1g / 10g		Drift (dB)	Extrapolated (W/kg) 1g / 10g		Ambient Temp (°C)	Simulate Temp (°C)
800 GSM	128 / 824	32.5	0.157	0.117	0.04	0.157	0.117	23.3	22.8
	189 / 837	32.1	0.222	0.164	0.00	0.222	0.164		
	251 / 849	32.0	0.362	0.268	-0.04	0.362	0.268		
1900 GSM	512 / 1850	30.5	0.088	0.054	-0.08	0.088	0.054	22.4	22.5
	660/1880	30.3	0.068	0.042	-0.14	0.068	0.042		
	810/1910	30.2	0.053	0.031	-0.09	0.053	0.031		

Table 2: SAR measurement results for the portable cellular telephone FCC ID PY7AC052011 model Z520i at maximum output power with Standard Battery BST-37. Measured against the right head.



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6.2 Body-Worn Test Results

The SAR results shown in Table 3 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. The humidity and ambient temperature of the test facility were in the ranges 31.8 – 36.2 % and 21.4 – 23.2 °C, respectively.

A “flat” phantom was used for the body-worn tests. This “flat” phantom corresponds to the flat portion of the SAM phantom. The tissue stimulant depth above the ear canal was verified to be above 15.0 cm in all the measurements. 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:

-20 mm spacer

A full data set output of the test conditions with the highest SAR values from the DASY™ measurement system 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.

Summary of Maximum Extrapolated SAR Results: Body-worn			
Frequency	Extrapolated SAR (W/kg)		Test Configuration
	1 g	10 g	
800 GSM	1.15	0.787	20MM SPACER Carry Accessory, back of phone facing body, 849 MHz, 2:8 Duty Cycle, BST-37 battery, Bluetooth On
1900 GSM	0.466	0.282	20MM SPACER Carry Accessory, back of phone facing body, 1850MHz, 2:8 Duty Cycle BST-37 battery , Bluetooth On



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f (MHz)	Operating Condition	Channel/ frequency	Condu cted Output Power (dBm)	FCC ID PY7AC052011 with Standard Battery BST-37						
				Body Worn			Carry Accessory: 20MM SPACER			
				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										
800 GSM	2:8 Duty Cycle	128 / 824	32.0	0.505	0.352	0.07	0.517	0.360	22.8	23.4
		189 / 837	31.5	0.653	0.452	-0.03	0.668	0.463		
		251 / 849	31.4	1.090	0.753	0.03	1.12	0.771		
	Bluetooth On	251 / 849	31.4	1.12	0.769	0.00	1.15	0.787	22.8	23.4
	1:8 Duty Cycle	251 / 849	32.5	0.631	0.439	0.02	0.631	0.439	22.8	23.4
1900 GSM	2:8 Duty Cycle	512 / 1850	30.5	0.509	0.309	-0.15	0.509	0.309	23.2	22.9
		660/1880	30.3	0.438	0.268	-0.15	0.438	0.268		
		810/1910	30.2	0.328	0.200	-0.10	0.328	0.200		
	Bluetooth On	512 / 1710	30.5	0.466	0.282	-0.11	0.466	0.282	23.1	23
	1:8 Duty Cycle	512 / 1710	30.5	0.249	0.151	-0.10	0.249	0.151	23.1	23
Front of phone facing body										
800 GSM	2:8 Duty Cycle	128 / 824	32.0	0.148	0.109	0.05	0.148	0.109	22.5	23.1
		189 / 837	31.5	0.195	0.143	0.10	0.195	0.143		
		251 / 849	31.4	0.301	0.220	0.05	0.301	0.220		
1900 GSM	2:8 Duty Cycle	512 / 1850	30.5	0.295	0.193	-0.11	0.295	0.193	23.1	23
		660/1880	30.3	0.288	0.186	-0.03	0.288	0.186		
		810/1910	30.2	0.233	0.150	-0.03	0.233	0.150		

Table 3: SAR measurement results for the portable cellular telephone FCC ID PY7AC052011 model Z520i at maximum output power with Standard Battery BST-37. Measured against the body with carry accessory 20MM Spacer.



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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] 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 1528-200X, Draft 6.5 – August 20, 2001.

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Appendix 1**SAR distribution comparison for the system accuracy verification**



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835 MHz SAR Distribution of Validation Dipole Antenna

System Performance Check on February 28, 2006 (Using head tissue).

Validation_835Head_429_1251_28Feb06_T01

File Name: [Validation_835Head_429_1251_28Feb06_T01.da4](#)

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

Probe: ET3DV6 - SN1586ConvF(6.58, 6.58, 6.58) Duty Cycle: 1:1 Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $s = 0.902$ mho/m; $\epsilon_r = 41.6$; $\rho = 1000$ kg/m³

Measurement Standard: DASY4 (High Precision Assessment)

Dipole at 10 mm/Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.979 mW/g

Dipole at 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 34.5 V/m; Power Drift = -0.070 dB

Peak SAR (extrapolated) = 1.37 W/kg

SAR(1 g) = 0.915 mW/g; SAR(10 g) = 0.597 mW/g

Maximum value of SAR (measured) = 0.990 mW/g

Dipole at 10 mm/Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 34.5 V/m; Power Drift = -0.070 dB

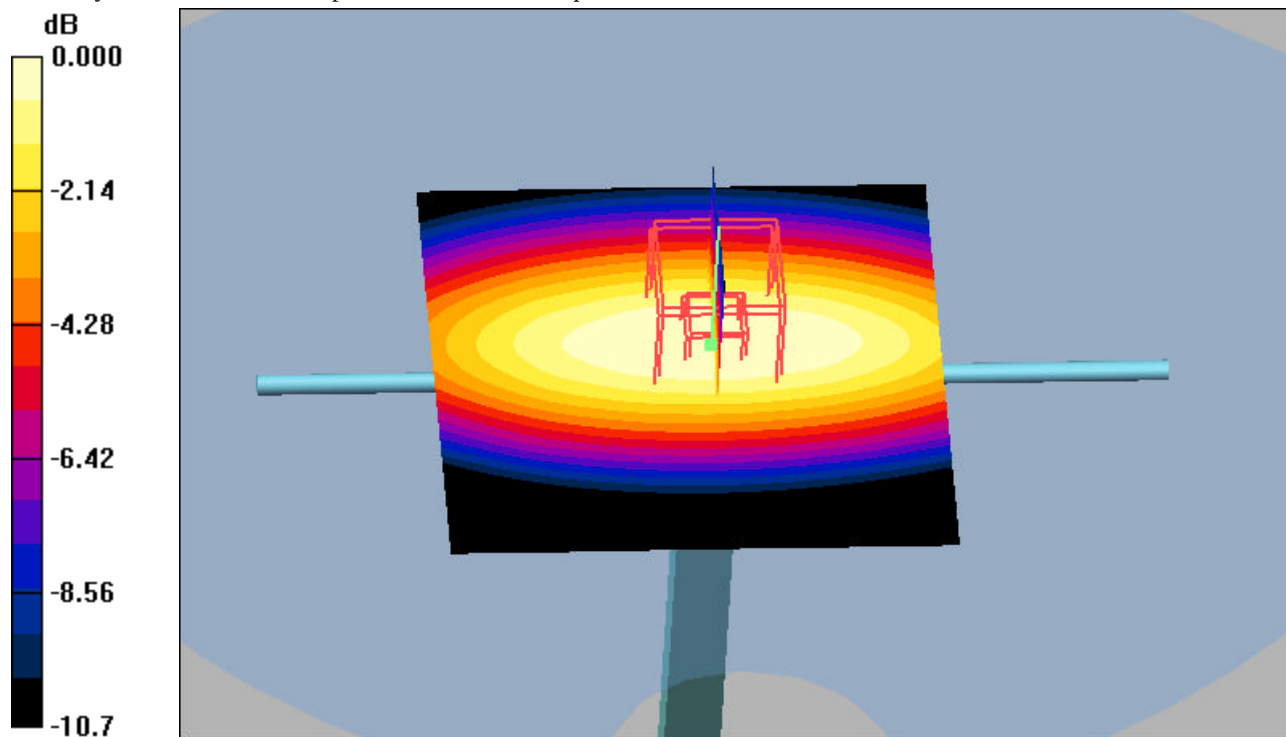
Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.875 mW/g; SAR(10 g) = 0.572 mW/g

Maximum value of SAR (measured) = 0.934 mW/g

Procedure Notes: Pin: before 100.4 mW / after 100.3 mW

Humidity: 31.5% Ambient Temp: 23.5 C Simulant Temp: 23 C



0 dB = 0.934mW/g



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835 MHz SAR Distribution of Validation Dipole Antenna

System Performance Check on March 2, 2006 (Using body tissue).

Validation_835Body_429_1031_02Mar06_T01

File Name: [Validation_835Body_429_1031_02Mar06_T01.da4](#)

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

Probe: ET3DV6 - SN1586ConvF(6.51, 6.51, 6.51) Duty Cycle: 1:1 Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $s = 1$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Measurement Standard: DASY4 (High Precision Assessment)

Dipole at 10 mm/Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 1.03 mW/g

Dipole at 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 32.7 V/m; Power Drift = -0.039 dB

Peak SAR (extrapolated) = 1.38 W/kg

SAR(1 g) = 0.955 mW/g; SAR(10 g) = 0.628 mW/g

Maximum value of SAR (measured) = 1.03 mW/g

Dipole at 10 mm/Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 32.7 V/m; Power Drift = -0.039 dB

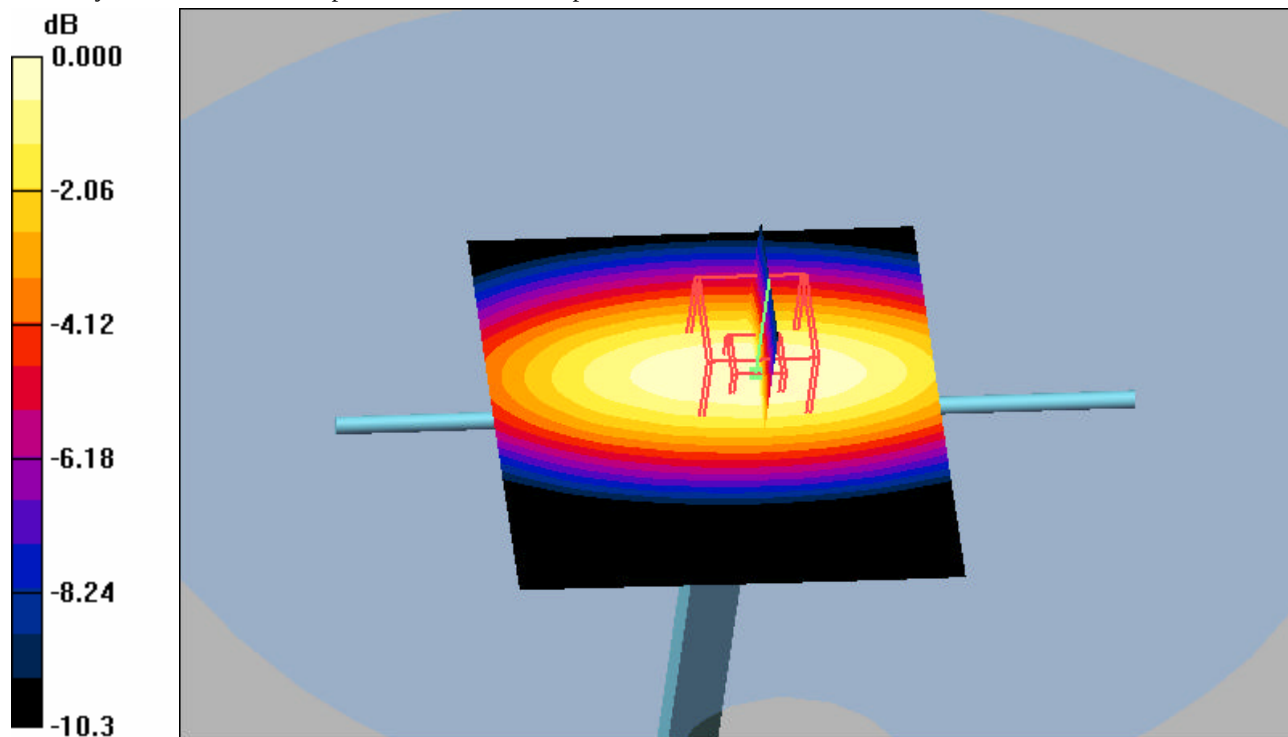
Peak SAR (extrapolated) = 1.36 W/kg

SAR(1 g) = 0.938 mW/g; SAR(10 g) = 0.618 mW/g

Maximum value of SAR (measured) = 1.02 mW/g

Procedure Notes: Pin: before 100.6mW / after 100.2mW

Humidity: 30.5% Ambient Temp: 22.9 C Simulant Temp: 22.8 C



0 dB = 1.02mW/g



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1900 MHz SAR Distribution of Validation Dipole Antenna

System Performance Check on March 10, 2006 (Using head tissue).

Validation_1900Head_537_1335_10Mar06_T01

File Name: [Validation_1900Head_537_1335_10Mar06_T01.da4](#)

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

Probe: ET3DV6 - SN1539 ConvF(4.55, 4.55, 4.55) Duty Cycle: 1:1 Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $s = 1.45$ mho/m; $\epsilon_r = 38.4$; $\rho = 1000$ kg/m³

Measurement Standard: DASY4 (High Precision Assessment)

Dipole at 10 mm/Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 5.16 mW/g

Dipole at 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 59.1 V/m; Power Drift = 0.035 dB

Peak SAR (extrapolated) = 7.08 W/kg

SAR(1 g) = 4.06 mW/g; SAR(10 g) = 2.13 mW/g

Maximum value of SAR (measured) = 4.60 mW/g

Dipole at 10 mm/Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 59.1 V/m; Power Drift = 0.035 dB

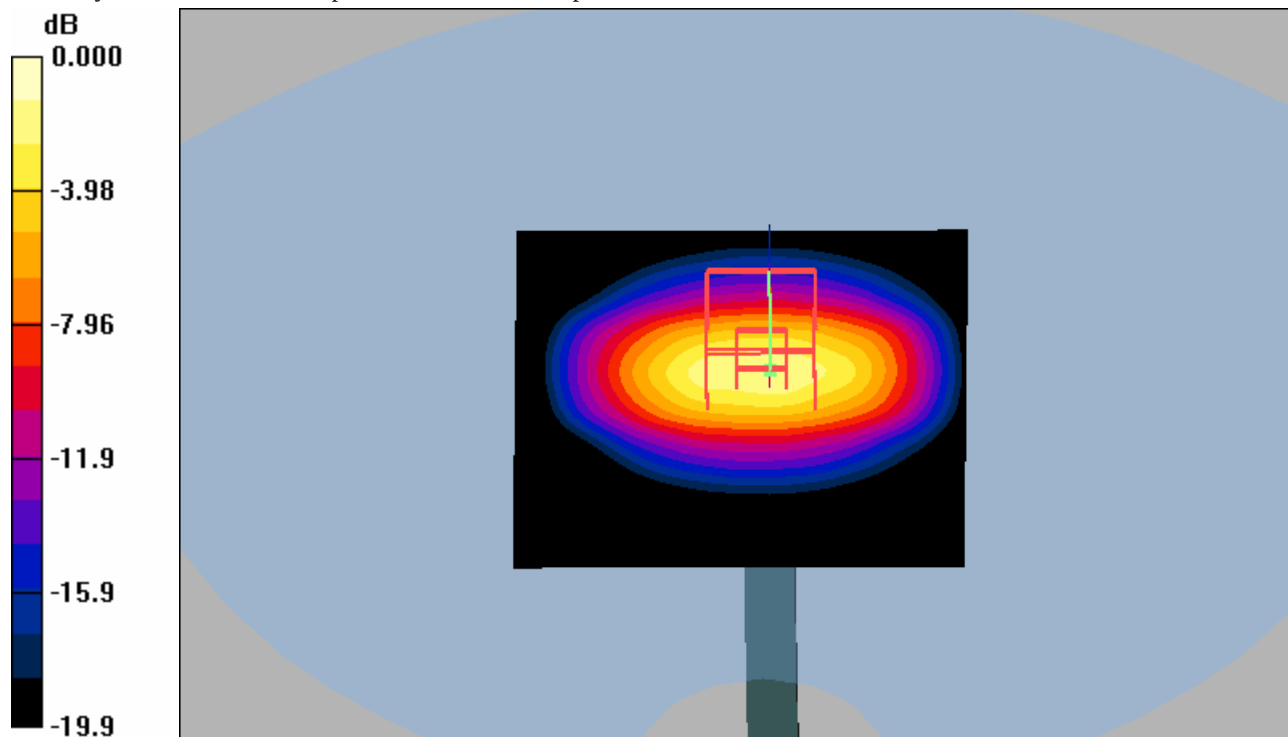
Peak SAR (extrapolated) = 7.08 W/kg

SAR(1 g) = 4.05 mW/g; SAR(10 g) = 2.12 mW/g

Maximum value of SAR (measured) = 4.57 mW/g

Procedure Notes: Pin: before 101 mW / after 101.4 mW

Humidity: 33.7% Ambient Temp: 22.8 C Simulant Temp: 22.6 C



0 dB = 7.08mW/g



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1900 MHz SAR Distribution of Validation Dipole Antenna

System Performance Check on March 11, 2005 (Using body tissue).

Validation_1900Body_537_1020_11Mar06_T01

File Name: [Validation_1900Body_537_1020_11Mar06_T01.da4](#)

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

Probe: ET3DV6 - SN1539 ConvF(4.12, 4.12, 4.12) Duty Cycle: 1:1 Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $s = 1.52$ mho/m; $\epsilon_r = 51.5$; $\rho = 1000$ kg/m³

Measurement Standard: DASY4 (High Precision Assessment)

Dipole at 10 mm/Area Scan (61x61x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 5.07 mW/g

Dipole at 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 55.5 V/m; Power Drift = 0.005 dB

Peak SAR (extrapolated) = 6.88 W/kg

SAR(1 g) = 4.04 mW/g; SAR(10 g) = 2.15 mW/g

Maximum value of SAR (measured) = 4.60 mW/g

Dipole at 10 mm/Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 55.5 V/m; Power Drift = 0.005 dB

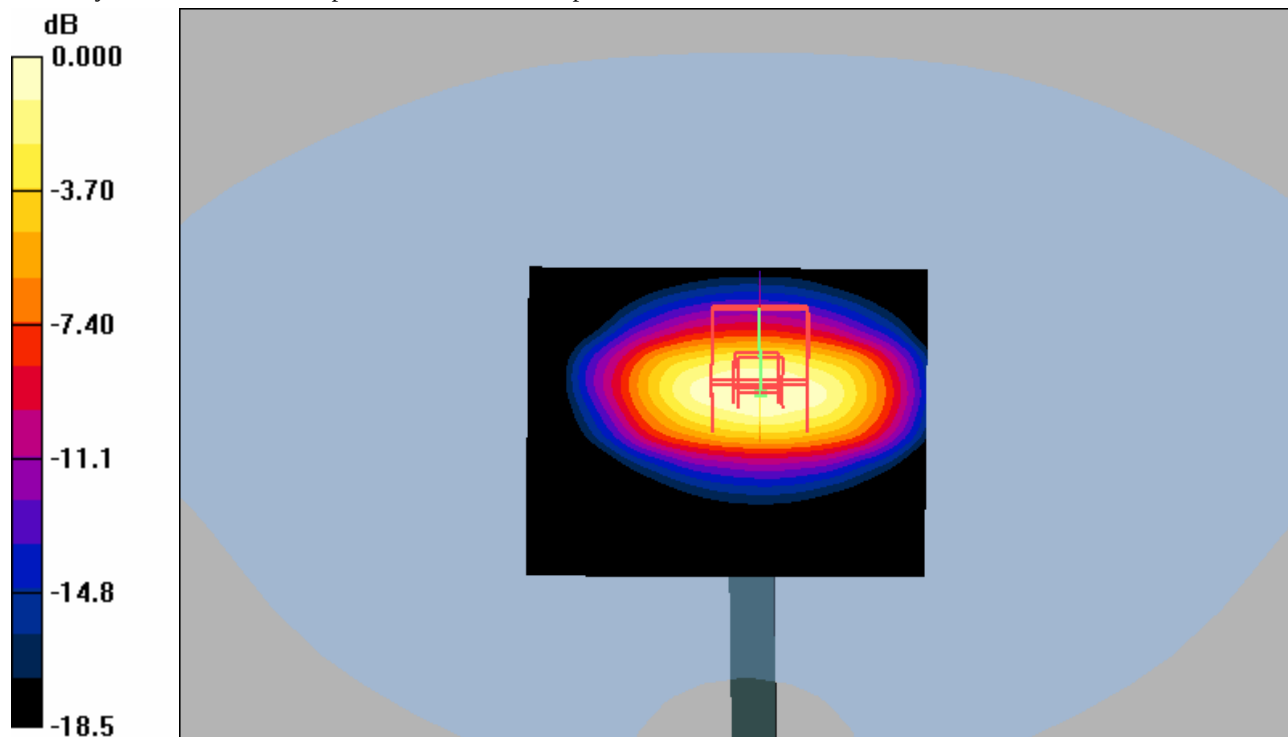
Peak SAR (extrapolated) = 6.99 W/kg

SAR(1 g) = 4.04 mW/g; SAR(10 g) = 2.09 mW/g

Maximum value of SAR (measured) = 4.52 mW/g

Procedure Notes: Pin: before 100.4 mW / after 100.6mW

Humidity: 35.1% Ambient Temp: 23.2 C Simulant Temp: 22.9 C



0 dB = 4.52mW/g

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Appendix 2

SAR distribution plots for Phantom Head Adjacent Use



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800 GSM Band: SAR Distribution and Extrapolation of Maximum SAR**Model: Z520i SN: BD3050NURF with Standard Battery: BST-37****Right Side, Cheek/Touch Position.**

Date/Time: 2/28/2006 8:29:17 AM

File Name: [28Feb06_Z520i_GSM850_NURF_RC01.da4](#)**DUT: Z520i**

Program Notes: Battery BST-37 Humidity: 31.5% Ambient Temp: 23.5 C Simulant Temp: 23 C

Communication System: GSM 850; Frequency: 849 MHz; Duty Cycle: 1:8.3

Medium: Head 835/900 MHz Medium parameters used (interpolated): f = 849 MHz; s = 0.918 mho/m; $\epsilon_r = 41.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1586; ConvF(6.58, 6.58, 6.58); Calibrated: 5/26/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn416; Calibrated: 11/10/2005
- Phantom: SAM with CRP (Low Band Head); Type: SAM; Serial: 1251
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

High Channel/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 1.39 mW/g

High Channel/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.6 V/m; Power Drift = -0.089 dB

Peak SAR (extrapolated) = 1.94 W/kg

SAR(1 g) = 1.29 mW/g; SAR(10 g) = 0.832 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.41 mW/g

High Channel/Zoom Scan (31x31x36)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.6 V/m; Power Drift = -0.089 dB

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

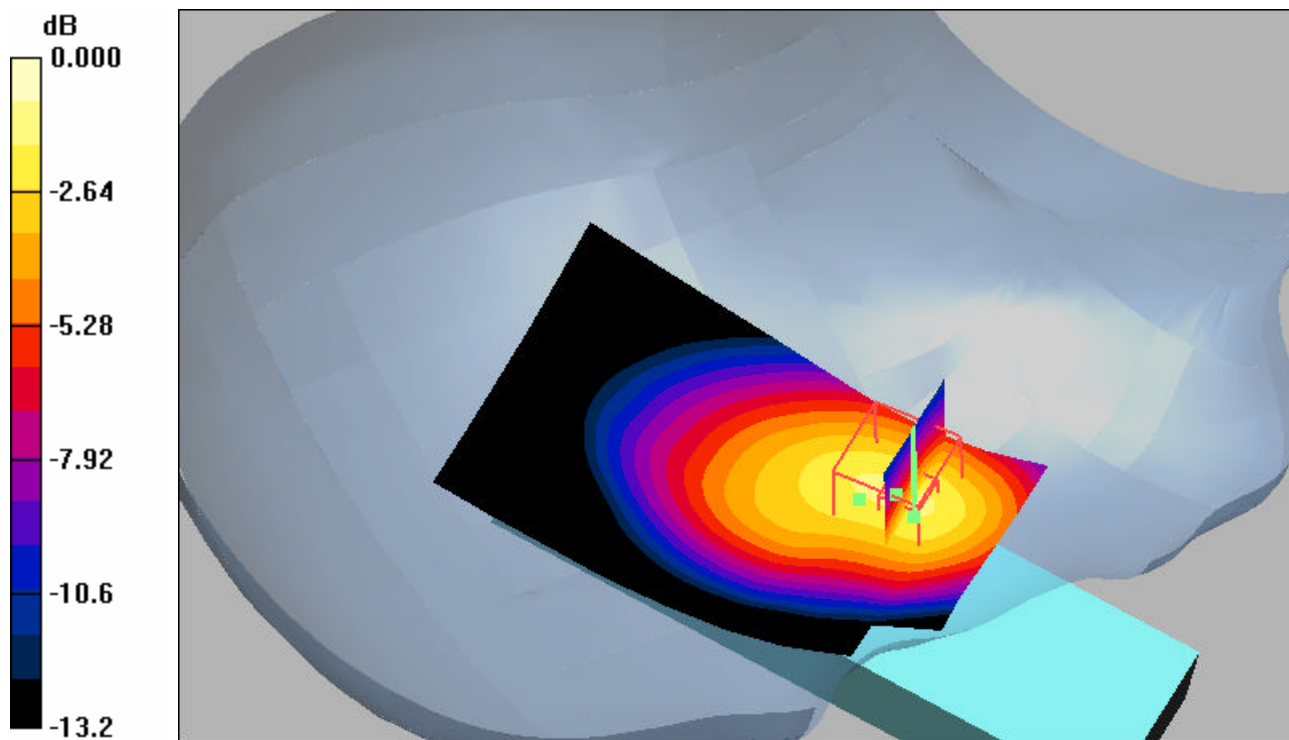
Maximum value of SAR (interpolated) = 1.94 mW/g

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0 dB = 1.94mW/g

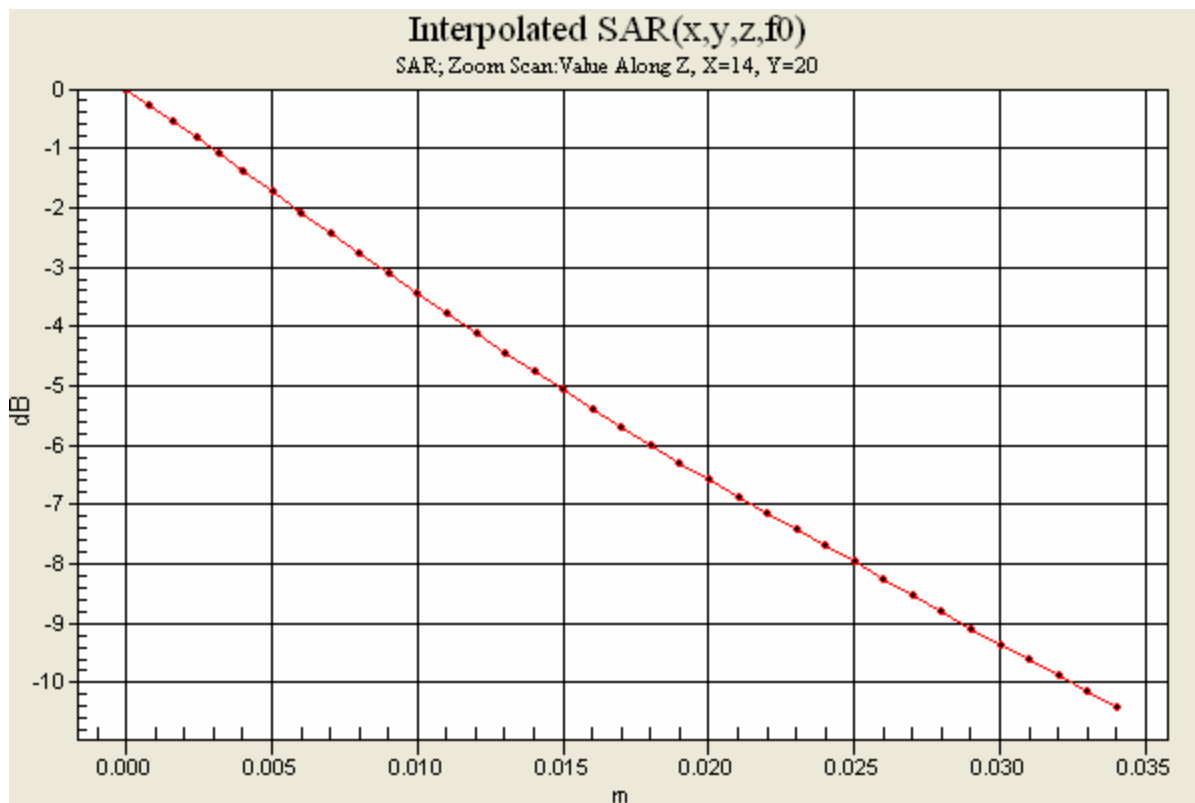


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21(86)

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SEM/CV/PF/P Gerard Hayes and Rodney Dixon		REP 2006 002 Z520i HWB 02		
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800 GSM Band: Distribution and Extrapolation of Maximum SAR**Model: Z520i SN: BD3050NURF with Standard Battery: BST-37****Right Side, Tilt Position.**

Date/Time: 2/28/2006 8:51:58 AM

File Name: [28Feb06_Z520i_GSM850_NURF_RT01.da4](#)**DUT: Z520i**

Program Notes: Battery BST-37 Humidity: 31.8% Ambient Temp: 23.3 C Simulant Temp: 22.8 C

Communication System: GSM 850; Frequency: 849 MHz; Duty Cycle: 1:8.3

Medium: Head 835/900 MHz Medium parameters used (interpolated): f = 849 MHz; s = 0.918 mho/m; $\epsilon_r = 41.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1586; ConvF(6.58, 6.58, 6.58); Calibrated: 5/26/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn416; Calibrated: 11/10/2005
- Phantom: SAM with CRP (Low Band Head); Type: SAM; Serial: 1251
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

High Channel/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.385 mW/g

High Channel/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.5 V/m; Power Drift = -0.035 dB

Peak SAR (extrapolated) = 0.472 W/kg

SAR(1 g) = 0.362 mW/g; SAR(10 g) = 0.268 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.385 mW/g

High Channel/Zoom Scan (31x31x36)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.5 V/m; Power Drift = -0.035 dB

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

Maximum value of SAR (interpolated) = 0.472 mW/g

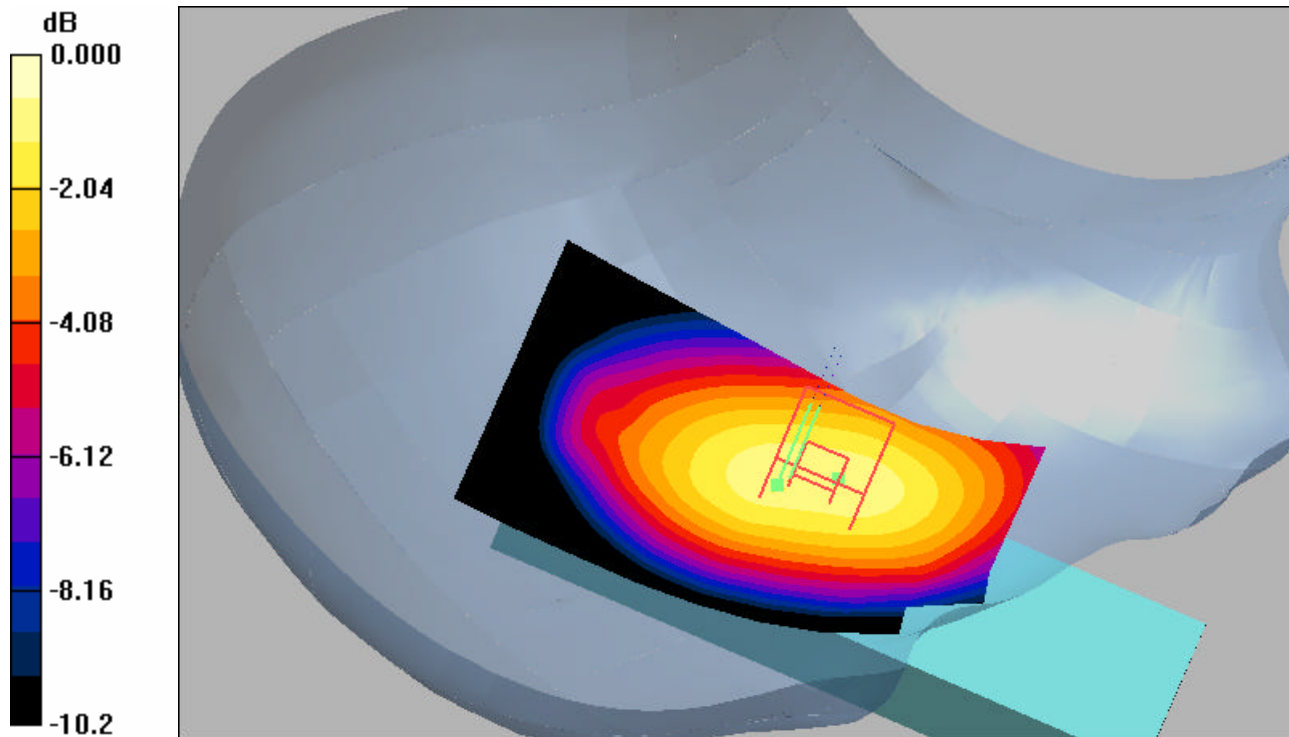


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SEM/CV/PF/P Gerard Hayes				



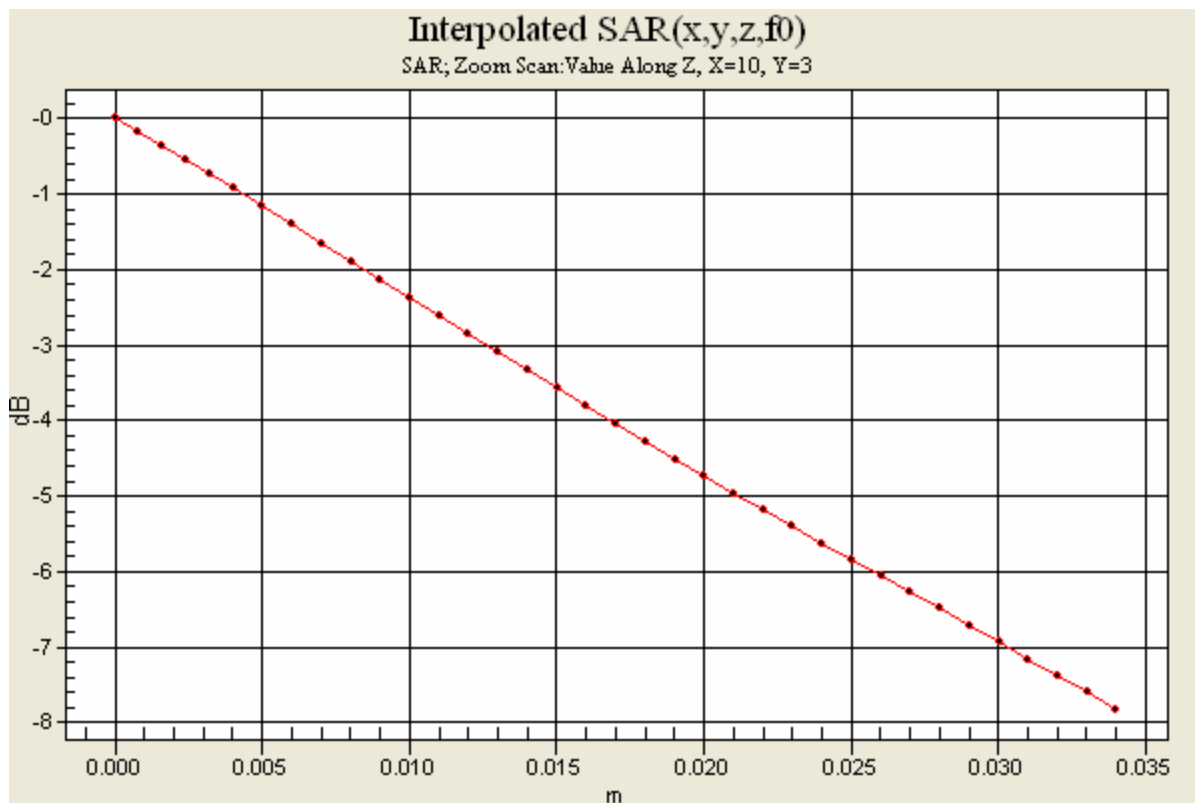
0 dB = 0.472mW/g

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24(86)

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

800 GSM Band: Distribution and Extrapolation of Maximum SAR**Model: Z520i SN: BD3050NURF with Standard Battery: BST-37****Left Side, Cheek/Touch Position.**

Date/Time: 2/28/2006 2:44:41 PM

File Name: [28Feb06_Z520i_GSM850_NURF_LC01.da4](#)**DUT: Z520i**

Program Notes: Battery BST-37 Humidity: 32.4% Ambient Temp: 23.5 C Simulant Temp: 23.4 C

Communication System: GSM 850; Frequency: 836 MHz; Duty Cycle: 1:8.3

Medium: Head 835/900 MHz Medium parameters used (interpolated): $f = 836 \text{ MHz}$; $s = 0.903 \text{ mho/m}$; $\epsilon_r = 41.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1586; ConvF(6.58, 6.58, 6.58); Calibrated: 5/26/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn416; Calibrated: 11/10/2005
- Phantom: SAM with CRP (Low Band Head); Type: SAM; Serial: 1251
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

Mid Channel/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ [Info: Interpolated medium parameters used for SAR evaluation.](#)

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

Mid Channel/Zoom Scan (7x9x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.7 V/m; Power Drift = -0.082 dB

Peak SAR (extrapolated) = 1.83 W/kg

SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.760 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.27 mW/g

Mid Channel/Zoom Scan (31x41x36)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.7 V/m; Power Drift = -0.082 dB

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

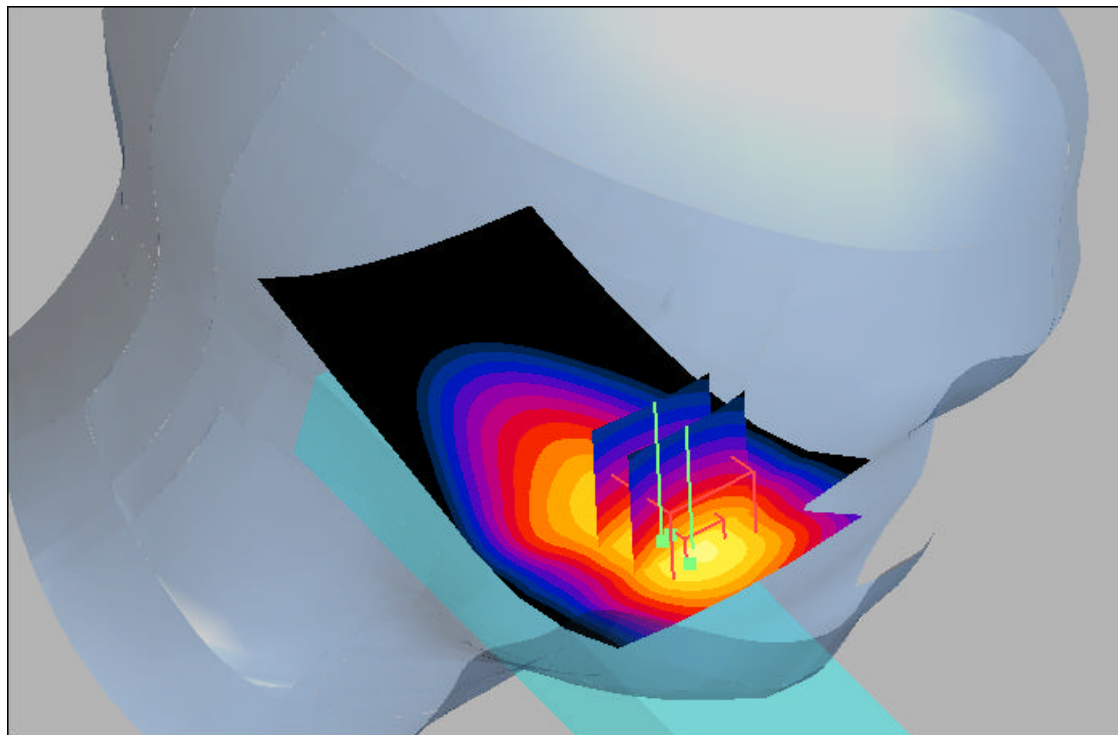
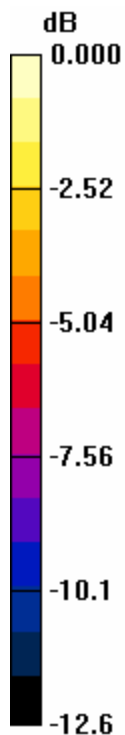
Maximum value of SAR (interpolated) = 1.83 mW/g

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0 dB = 1.83mW/g

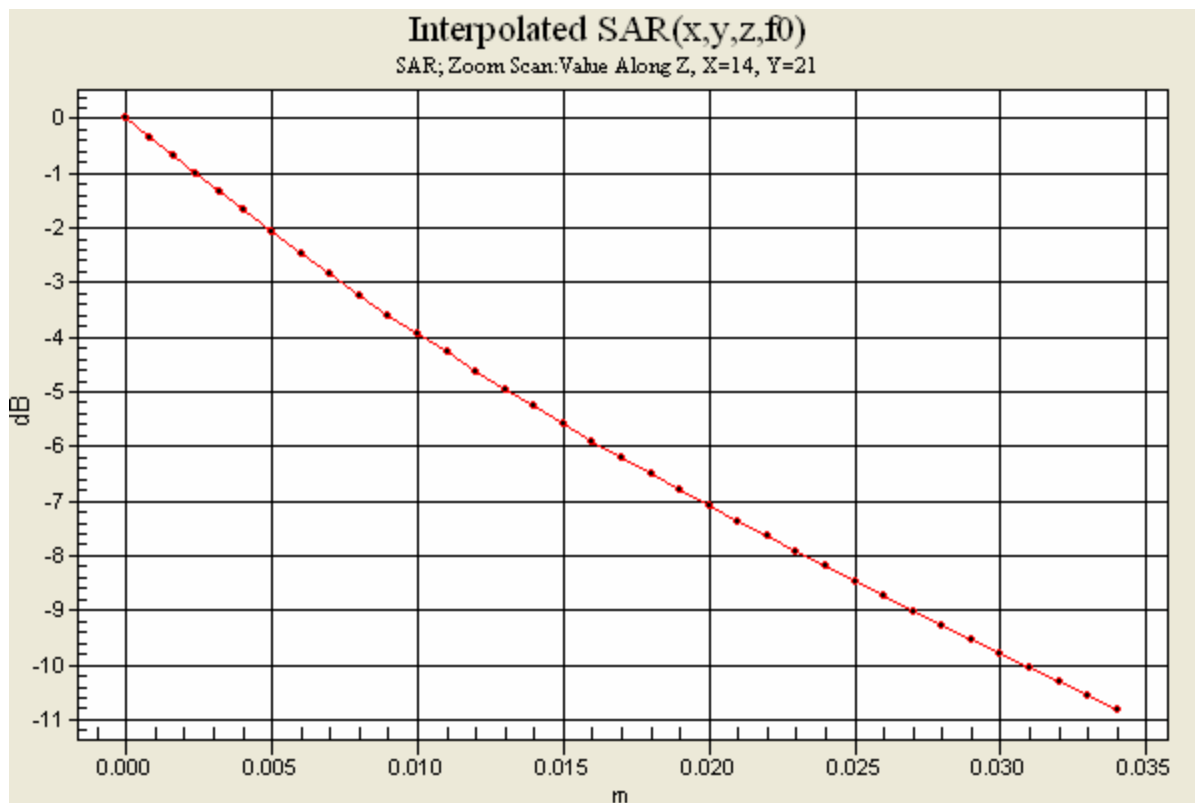


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27(86)

Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
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SEM/CV/PF/P Gerard Hayes and Rodney Dixon		REP 2006 002 Z520i HWB 02		
Approved	Checked		A	
SEM/CV/PF/P Gerard Hayes				

800 GSM Band: Distribution and Extrapolation of Maximum SAR**Model: Z520i SN: BD3050NURF with Standard Battery: BST-37****Left Side, Tilt Position.**

Date/Time: 2/28/2006 10:38:32 AM

File Name: [28Feb06_Z520i_GSM850_NURF_LT01.da4](#)**DUT: Z520i**

Program Notes: Battery BST-37 Humidity: 31.7% Ambient Temp: 23.1 C Simulant Temp: 23.1 C

Communication System: GSM 850; Frequency: 849 MHz; Duty Cycle: 1:8.3

Medium: Head 835/900 MHz Medium parameters used (interpolated): $f = 849 \text{ MHz}$; $s = 0.918 \text{ mho/m}$; $\epsilon_r = 41.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1586; ConvF(6.58, 6.58, 6.58); Calibrated: 5/26/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn416; Calibrated: 11/10/2005
- Phantom: SAM with CRP (Low Band Head); Type: SAM; Serial: 1251
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

High Channel/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ [Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.340 mW/g

High Channel/Zoom Scan (7x9x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.3 V/m; Power Drift = 0.013 dB

Peak SAR (extrapolated) = 0.424 W/kg

SAR(1 g) = 0.316 mW/g; SAR(10 g) = 0.231 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.335 mW/g

High Channel/Zoom Scan (31x41x36)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.3 V/m; Power Drift = 0.013 dB

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

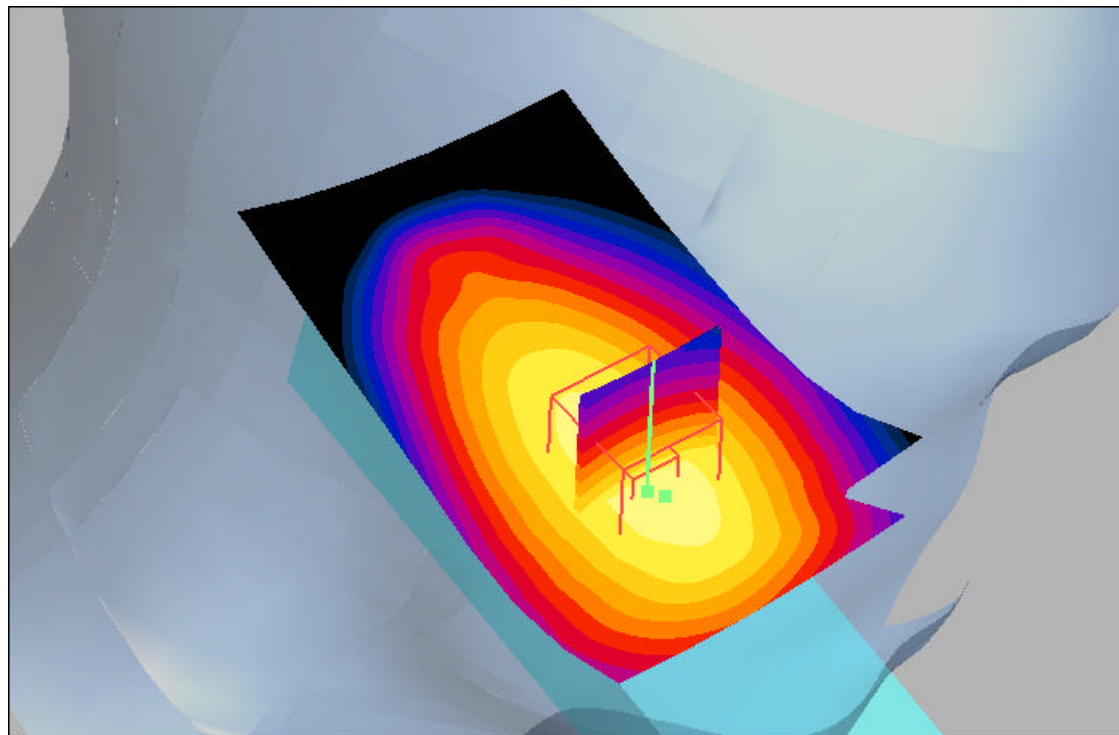
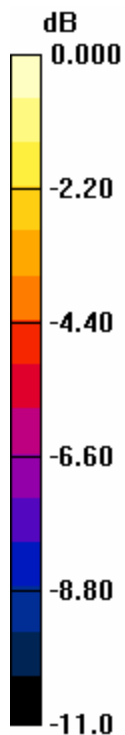
Maximum value of SAR (interpolated) = 0.424 mW/g

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Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
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0 dB = 0.424mW/g

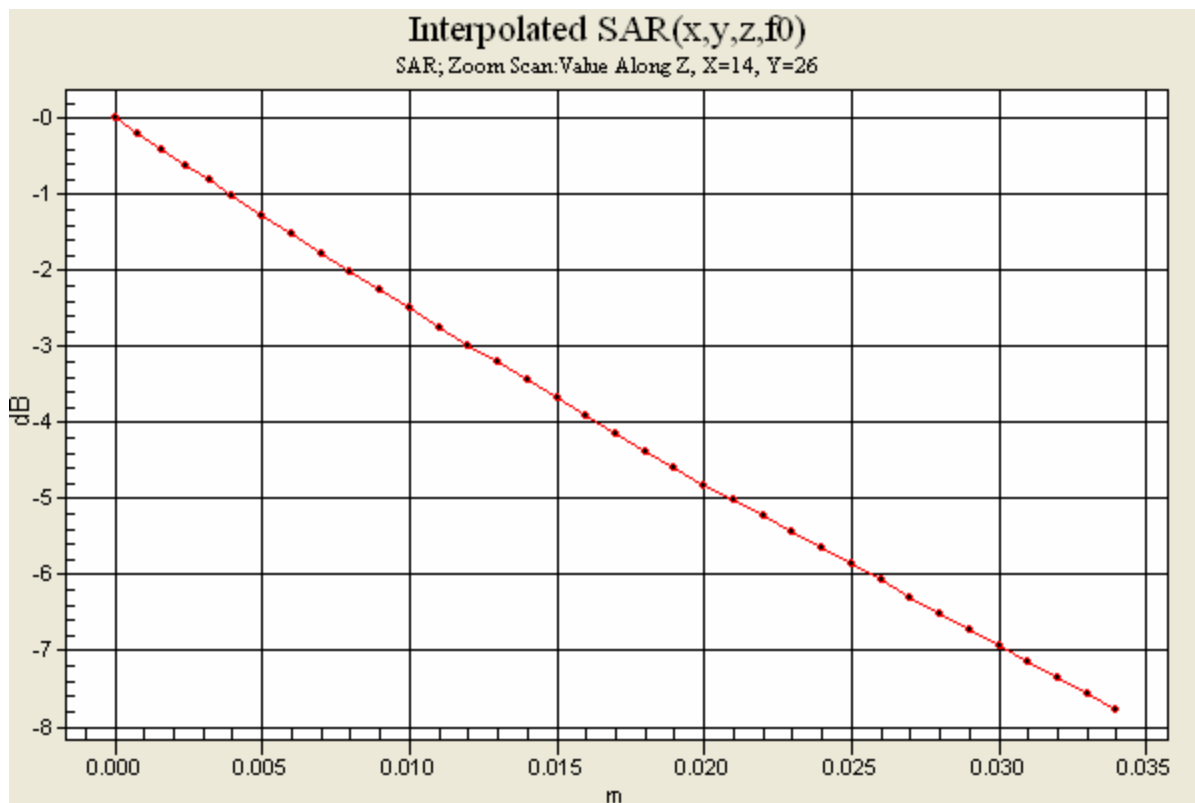


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30(86)

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Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked		A

800 GSM Band: Distribution and Extrapolation of Maximum SAR**Model: Z520i SN: BD3050NURF with Standard Battery: BST-37****Right Side, Cheek/Touch Position with Blue Tooth.**

Date/Time: 2/28/2006 3:35:55 PM

File Name: [28Feb06_Z520i_GSM850_NURF_BT_RC01.da4](#)**DUT: Z520i**

Program Notes: Battery BST-37 Humidity: 31.5% Ambient Temp: 23.5 C Simulant Temp: 23 C

Communication System: GSM 850; Frequency: 849 MHz; Duty Cycle: 1:8.3

Medium: Head 835/900 MHz Medium parameters used (interpolated): f = 849 MHz; s = 0.918 mho/m; $\epsilon_r = 41.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1586; ConvF(6.58, 6.58, 6.58); Calibrated: 5/26/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn416; Calibrated: 11/10/2005
- Phantom: SAM with CRP (Low Band Head); Type: SAM; Serial: 1251
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

High Channel/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 1.40 mW/g

High Channel/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.6 V/m; Power Drift = 0.014 dB

Peak SAR (extrapolated) = 2.03 W/kg

SAR(1 g) = 1.3 mW/g; SAR(10 g) = 0.841 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.42 mW/g

High Channel/Zoom Scan (31x31x36)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.6 V/m; Power Drift = 0.014 dB

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

Maximum value of SAR (interpolated) = 2.03 mW/g

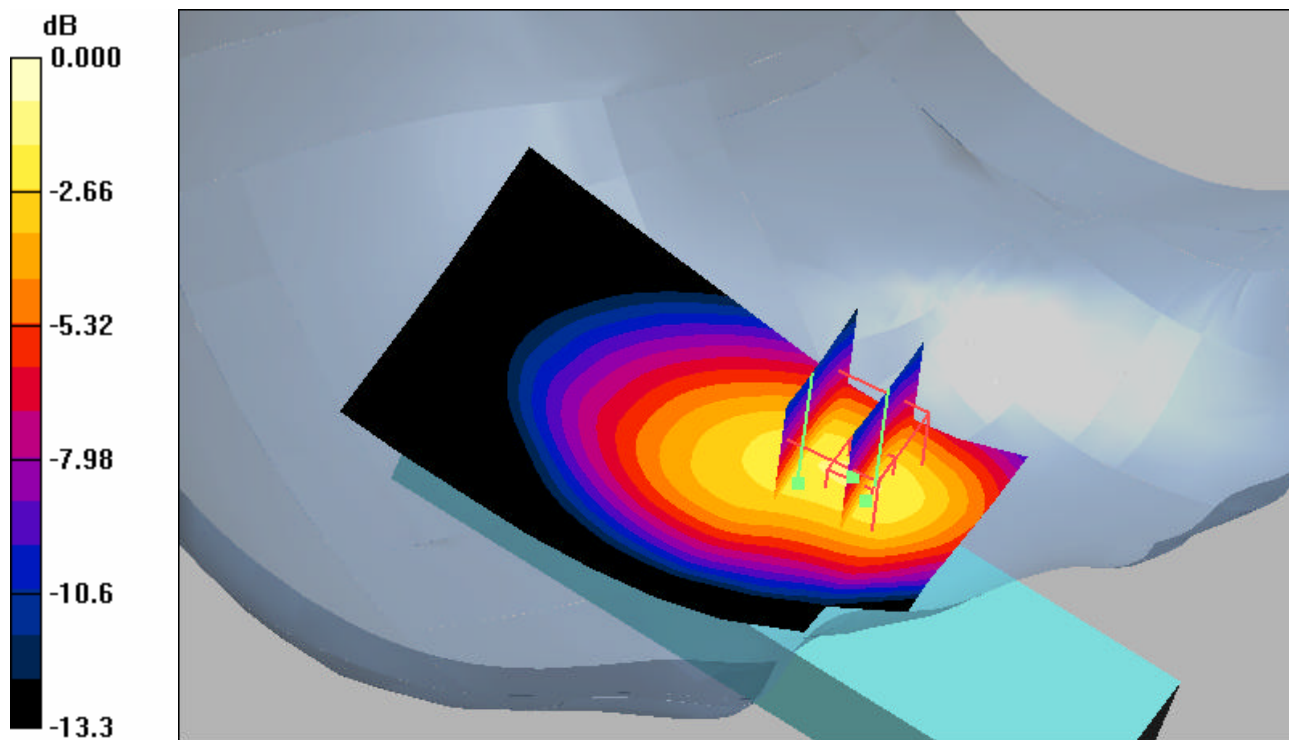


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SEM/CV/PF/P Gerard Hayes				



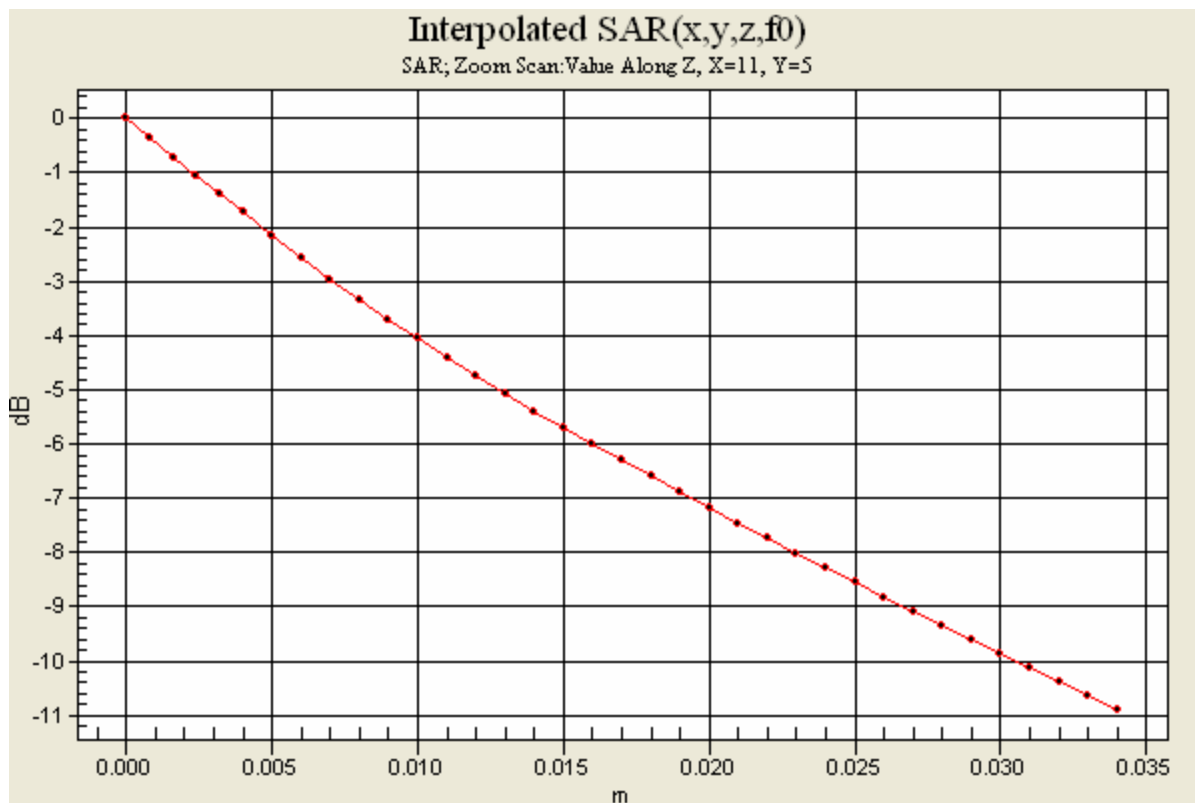
0 dB = 2.03mW/g

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Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
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Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

1900 GSM Band: Distribution and Extrapolation of Maximum SAR**Model: Z520i SN: BD3050NURF with Standard Battery: BST-37****Right Side, Cheek/Touch Position.**

Date/Time: 3/10/2006 5:49:08 PM

File Name: [10Mar06_Z520i_GSM1900_NURF_RC01.da4](#)**DUT: Z520i**

Program Notes: Battery: BST 37 Humidity: 34% Ambient Temp: 22.3C Simulant Temp: 22.4C

Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: Head 1800/1900 MHz Medium parameters used (interpolated): $f = 1850.2 \text{ MHz}$; $s = 1.41 \text{ mho/m}$; $\epsilon_r = 38.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1539; ConvF(4.55, 4.55, 4.55); Calibrated: 11/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn345; Calibrated: 11/10/2005
- Phantom: SAM with CRP (High Band Head); Type: SAM; Serial: TP: 1054
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

Low Channel/Area Scan (61x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ [Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.586 mW/g

Low Channel/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 3.24 V/m; Power Drift = -0.207 dB

Peak SAR (extrapolated) = 1.09 W/kg

SAR(1 g) = 0.525 mW/g; SAR(10 g) = 0.258 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.614 mW/g

Low Channel/Zoom Scan (31x31x36)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 3.24 V/m; Power Drift = -0.207 dB

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

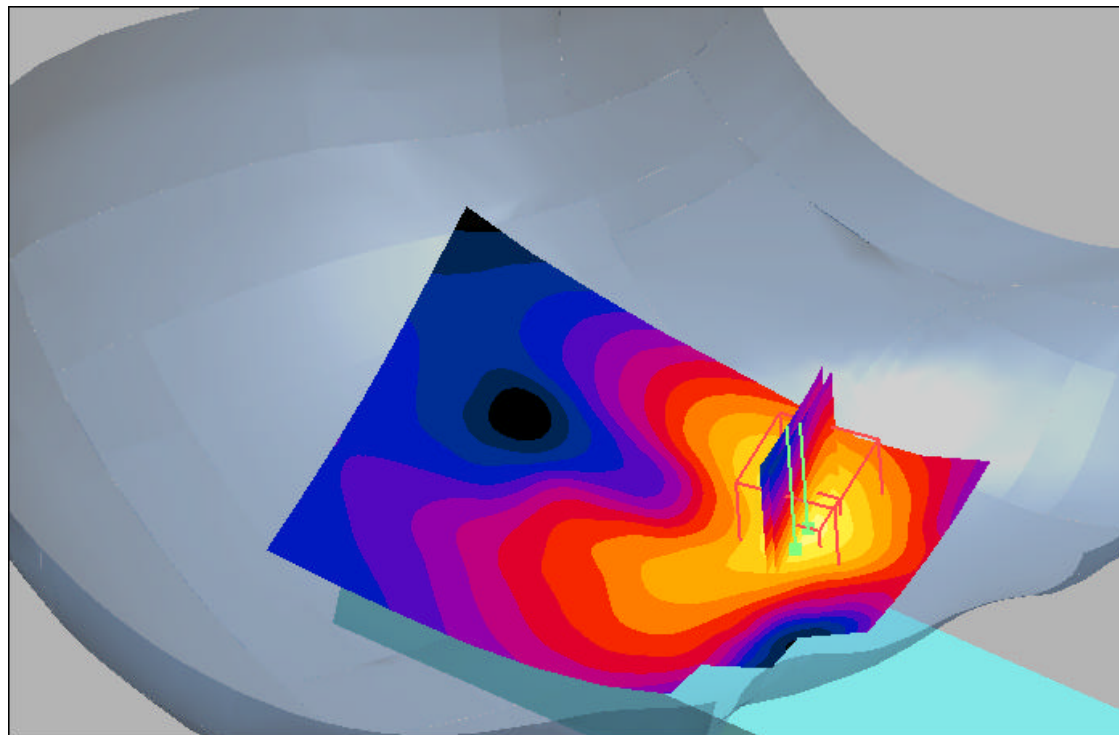
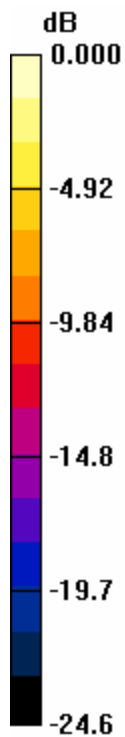
Maximum value of SAR (interpolated) = 1.09 mW/g

**Sony Ericsson**

REPORT

35(86)

Prepared (also subject responsible if other)		No.		
SEM/CV/PF/P Gerard Hayes and Rodney Dixon		REP 2006 002 Z520i HWB 02		
Approved	Checked		A	
SEM/CV/PF/P Gerard Hayes				



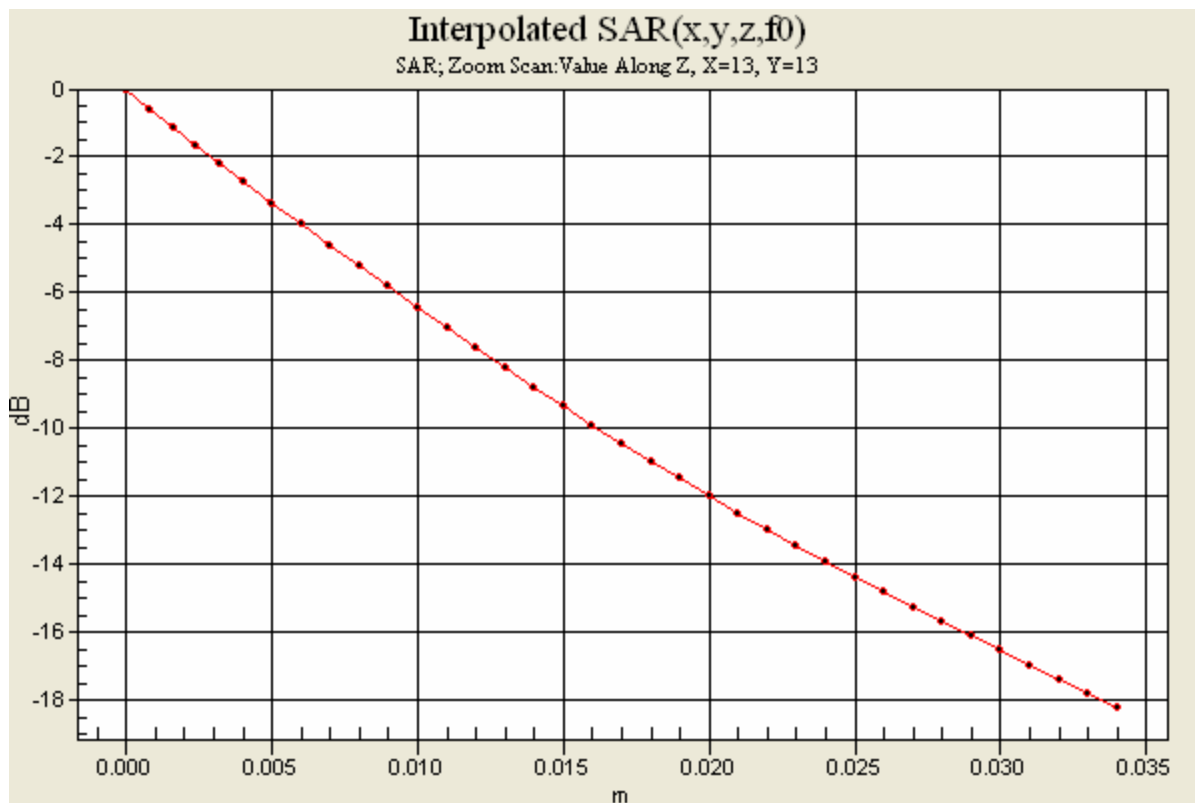
0 dB = 1.09mW/g

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REPORT

36(86)

Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	





Prepared (also subject responsible if other)		No.	
SEM/CV/PF/P Gerard Hayes and Rodney Dixon		REP 2006 002 Z520i HWB 02	
Approved	Checked		
SEM/CV/PF/P Gerard Hayes		A	

1900 GSM Band: Distribution and Extrapolation of Maximum SAR**Model: Z520i SN: BD3050NURF with Standard Battery: BST-37****Right Side, Tilt Position.**

Date/Time: 3/10/2006 4:24:56 PM

File Name: [10Mar06 Z520i GSM1900 NURF RT01.da4](#)**DUT: Z520i**

Program Notes: Battery: BST 37 Humidity: 33.1% Ambient Temp: 22.4C Simulant Temp: 22.5C

Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: Head 1800/1900 MHz Medium parameters used (interpolated): $f = 1850.2 \text{ MHz}$; $s = 1.41 \text{ mho/m}$; $\epsilon_r = 38.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1539; ConvF(4.55, 4.55, 4.55); Calibrated: 11/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn345; Calibrated: 11/10/2005
- Phantom: SAM with CRP (High Band Head); Type: SAM; Serial: TP: 1054
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

Low Channel/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ [Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.099 mW/g

Low Channel/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 6.13 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 0.132 W/kg

SAR(1 g) = 0.088 mW/g; SAR(10 g) = 0.054 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.097 mW/g

Low Channel/Zoom Scan (31x31x36)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 6.13 V/m; Power Drift = -0.076 dB

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

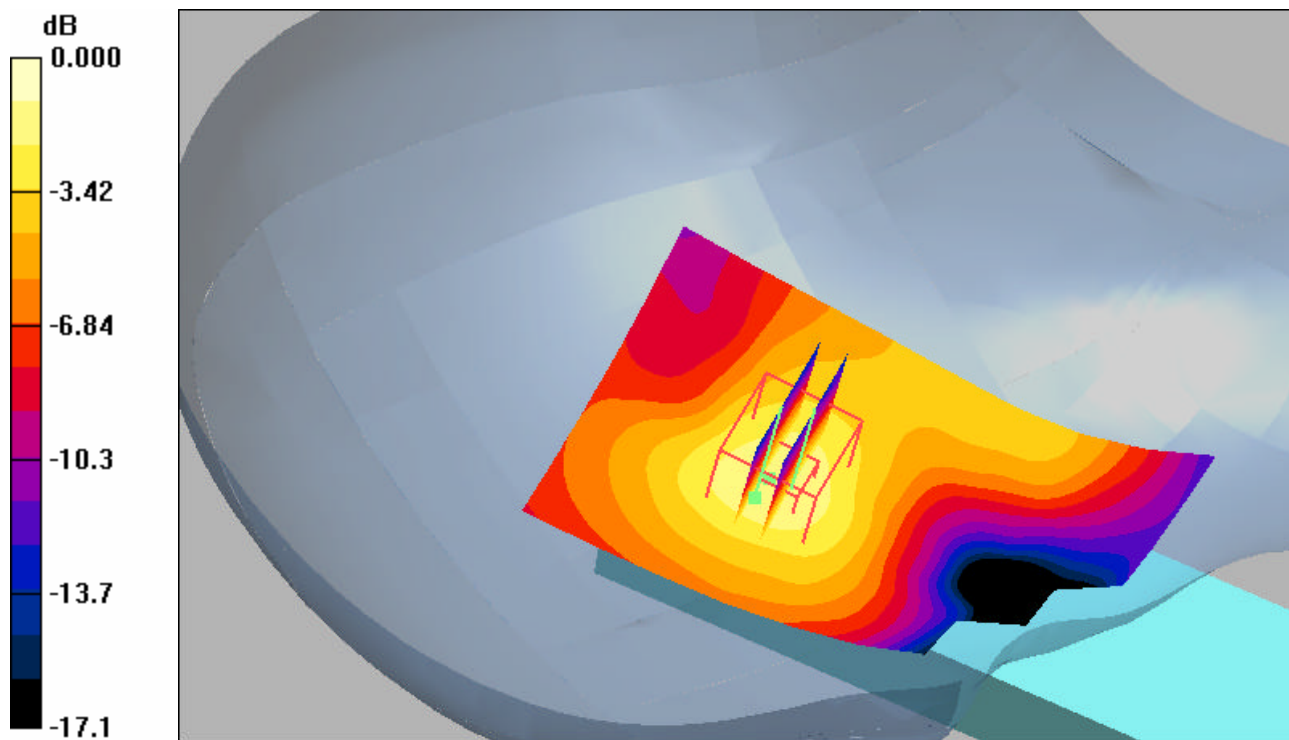
Maximum value of SAR (interpolated) = 0.132 mW/g

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REPORT

38(86)

Prepared (also subject responsible if other)		No.	33(33)	
SEM/CV/PF/P Gerard Hayes and Rodney Dixon		REP 2006 002 Z520i HWB 02		
Approved	Checked		A	
SEM/CV/PF/P Gerard Hayes				



0 dB = 0.132mW/g

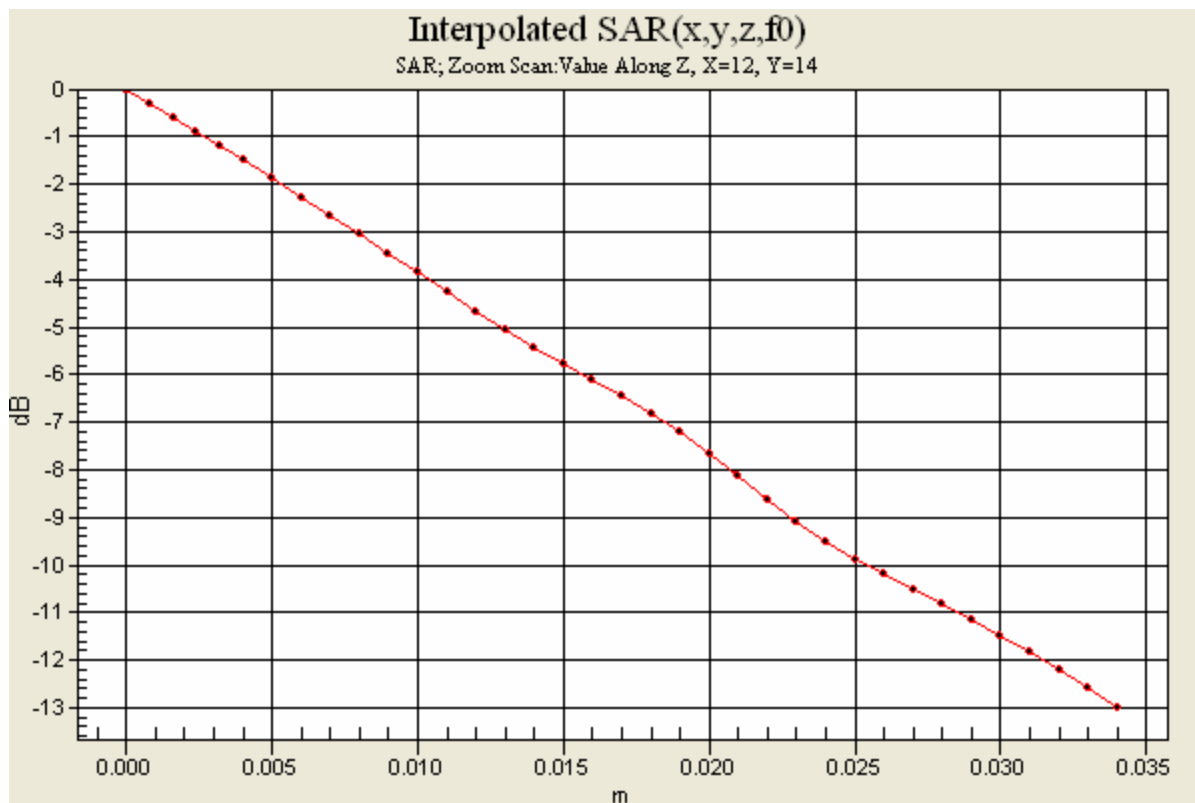


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39(86)

Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	





Prepared (also subject responsible if other)	No.	
SEM/CV/PF/P Gerard Hayes and Rodney Dixon	REP 2006 002 Z520i HWB 02	
Approved	Checked	
SEM/CV/PF/P Gerard Hayes		A

1900 GSM Band: Distribution and Extrapolation of Maximum SAR**Model: Z520i SN: BD3050NURF with Standard Battery: BST-37****Left Side, Cheek/Touch Position.**

Date/Time: 3/10/2006 1:17:45 PM

File Name: [10Mar06 Z520i GSM1900 NURF LC01.da4](#)**DUT: Z520i**

Program Notes: Battery: BST-37 Humidity: 33.7% Ambient Temp: 22.8 C Simulant Temp: 22.6 C

Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: Head 1800/1900 MHz Medium parameters used (interpolated): $f = 1850.2 \text{ MHz}$; $s = 1.41 \text{ mho/m}$; $\epsilon_r = 38.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1539; ConvF(4.55, 4.55, 4.55); Calibrated: 11/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn345; Calibrated: 11/10/2005
- Phantom: SAM with CRP (High Band Head); Type: SAM; Serial: TP: 1054
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

Low Channel/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ [Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.359 mW/g

Low Channel/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 3.30 V/m; Power Drift = 0.128 dB

Peak SAR (extrapolated) = 0.568 W/kg

SAR(1 g) = 0.302 mW/g; SAR(10 g) = 0.159 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.339 mW/g

Low Channel/Zoom Scan (31x31x36)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 3.30 V/m; Power Drift = 0.128 dB

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

Maximum value of SAR (interpolated) = 0.568 mW/g

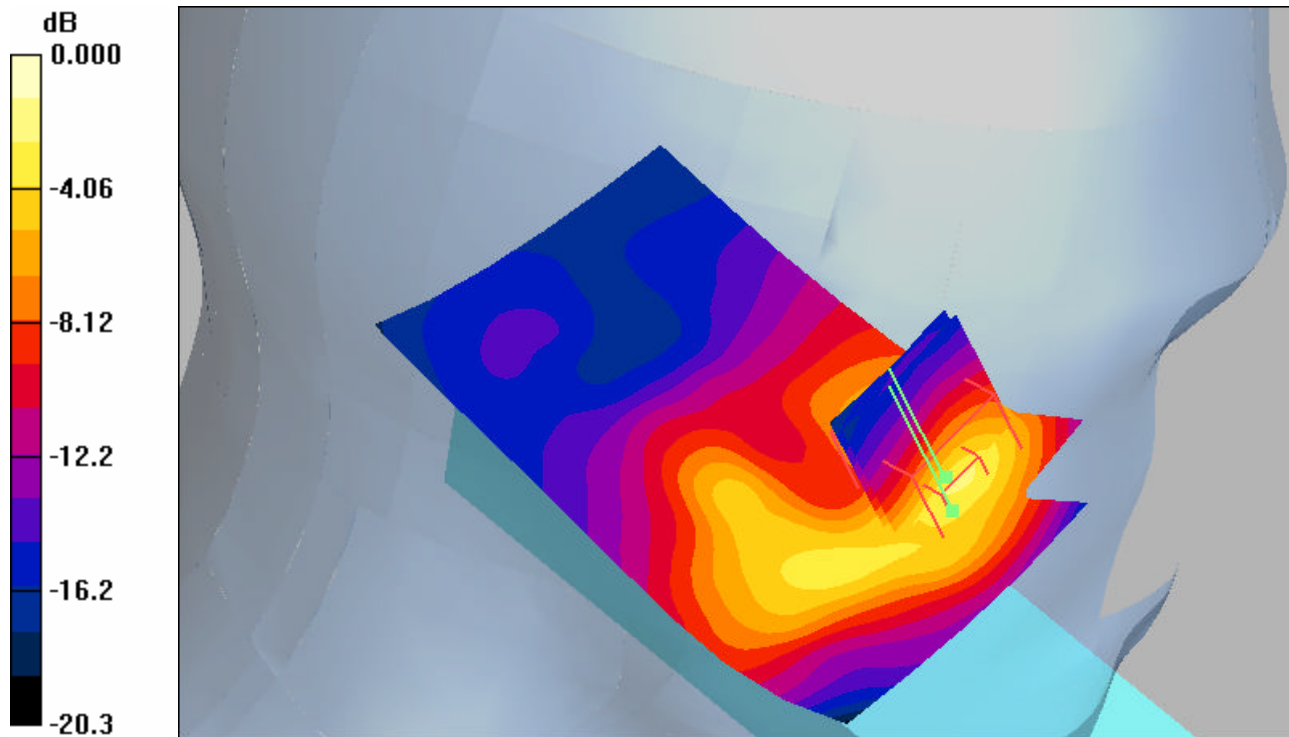


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41(86)

Prepared (also subject responsible if other)		No.		
SEM/CV/PF/P Gerard Hayes and Rodney Dixon		REP 2006 002 Z520i HWB 02		
Approved	Checked		A	
SEM/CV/PF/P Gerard Hayes				



0 dB = 0.568mW/g

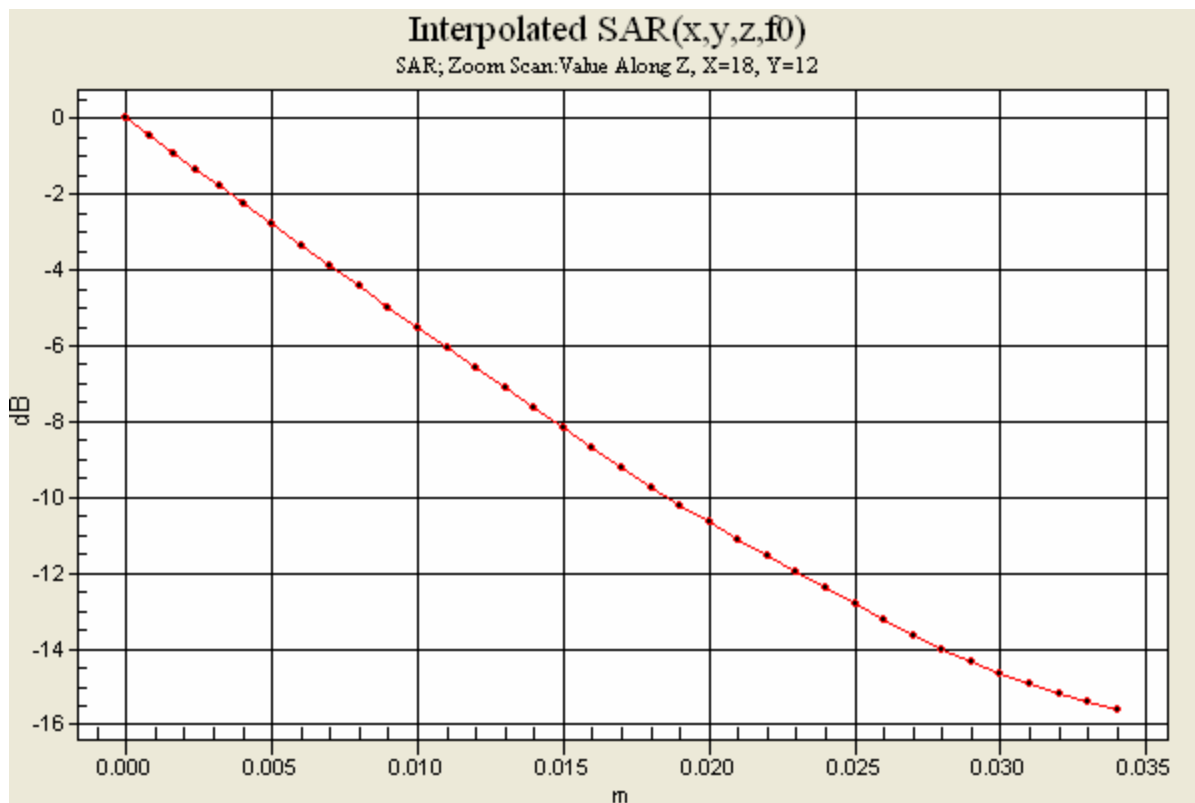


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42(86)

Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	





Prepared (also subject responsible if other)		No.	
SEM/CV/PF/P Gerard Hayes and Rodney Dixon		REP 2006 002 Z520i HWB 02	
Approved	Checked		
SEM/CV/PF/P Gerard Hayes		A	

1900 GSM Band: Distribution and Extrapolation of Maximum SAR**Model: Z520i SN: BD3050NURF with Standard Battery: BST-37****Left Side, Tilt Position.**

Date/Time: 3/10/2006 4:01:17 PM

File Name: [10Mar06 Z520i GSM1900 NURF LT01.da4](#)**DUT: Z520i**

Program Notes: Battery: BST-37 Humidity: 33.2% Ambient Temp: 22.5 C Simulant Temp: 22.4 C

Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: Head 1800/1900 MHz Medium parameters used (interpolated): $f = 1850.2 \text{ MHz}$; $s = 1.41 \text{ mho/m}$; $\epsilon_r = 38.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1539; ConvF(4.55, 4.55, 4.55); Calibrated: 11/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn345; Calibrated: 11/10/2005
- Phantom: SAM with CRP (High Band Head); Type: SAM; Serial: TP: 1054
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

Low Channel/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ [Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.104 mW/g

Low Channel/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 4.45 V/m; Power Drift = -0.095 dB

Peak SAR (extrapolated) = 0.142 W/kg

SAR(1 g) = 0.093 mW/g; SAR(10 g) = 0.057 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.103 mW/g

Low Channel/Zoom Scan (31x31x36)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 4.45 V/m; Power Drift = -0.095 dB

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

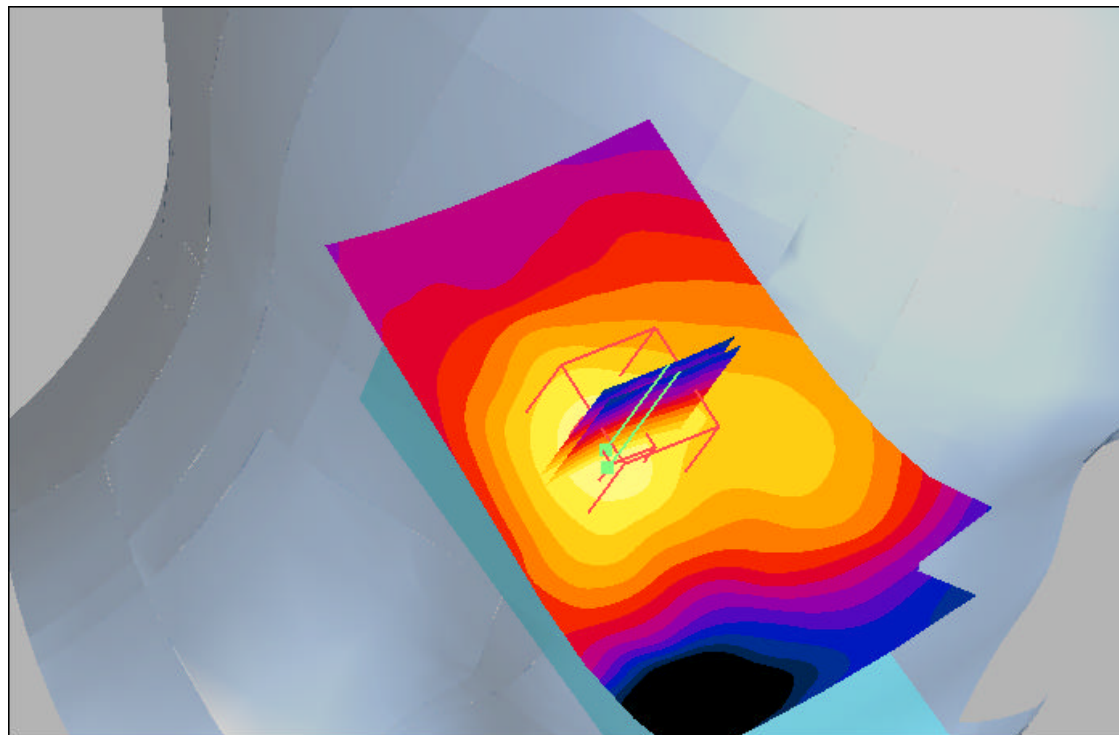
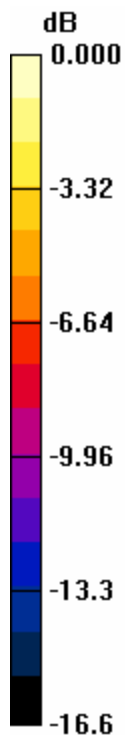
Maximum value of SAR (interpolated) = 0.142 mW/g

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Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	



0 dB = 0.142mW/g

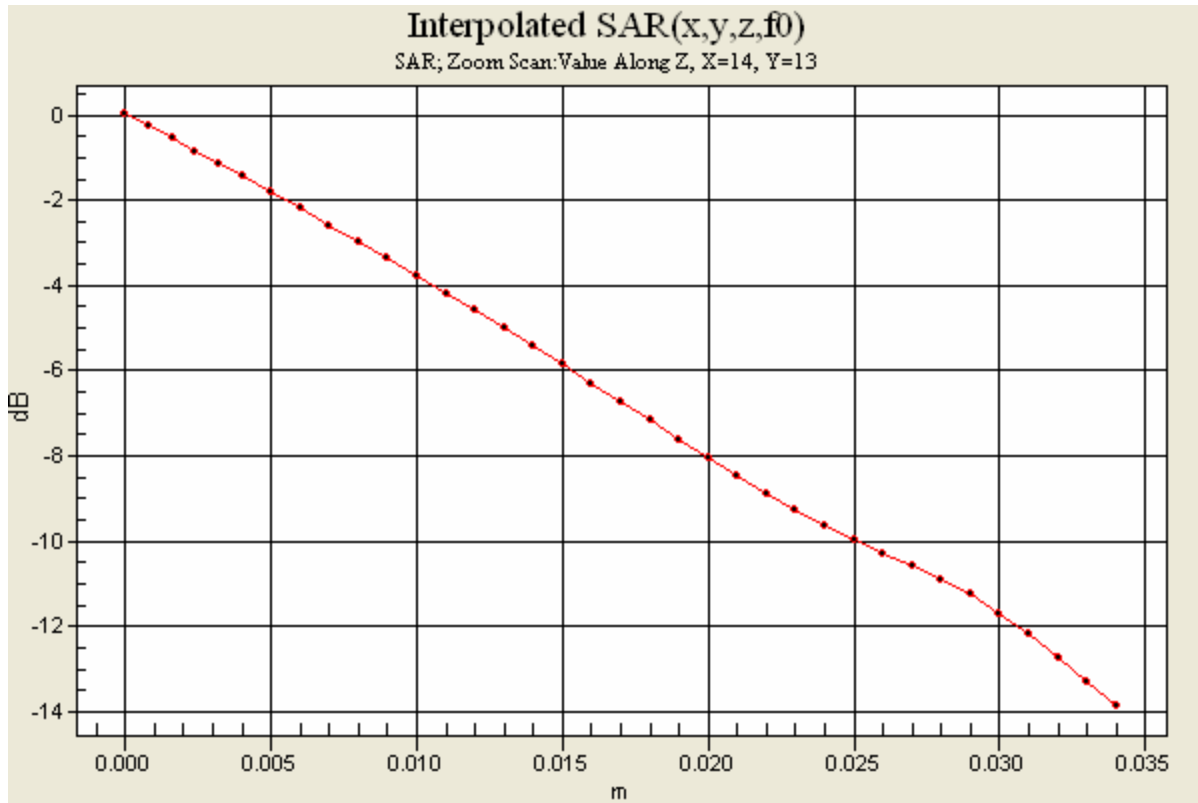


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45(86)

Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	





Prepared (also subject responsible if other)	No.		
SEM/CV/PF/P Gerard Hayes and Rodney Dixon	REP 2006 002 Z520i HWB 02		
Approved	Checked		
SEM/CV/PF/P Gerard Hayes		A	

1900 GSM Band: Distribution and Extrapolation of Maximum SAR**Model: Z520i SN: BD3050NURF with Standard Battery: BST-37****Right Side, Cheek/Touch Position with Blue Tooth.**

Date/Time: 3/10/2006 7:42:44 PM

File Name: [10Mar06 Z520i GSM1900 NURF BT RC01.da4](#)**DUT: Z520i**

Program Notes: Battery: BST 37 Humidity: 34% Ambient Temp: 22.3C Simulant Temp: 22.4C

Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: Head 1800/1900 MHz Medium parameters used (interpolated): $f = 1850.2 \text{ MHz}$; $s = 1.41 \text{ mho/m}$; $\epsilon_r = 38.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1539; ConvF(4.55, 4.55, 4.55); Calibrated: 11/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn345; Calibrated: 11/10/2005
- Phantom: SAM with CRP (High Band Head); Type: SAM; Serial: TP: 1054
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

Low Channel/Area Scan (61x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ [Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.579 mW/g

Low Channel/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 3.06 V/m; Power Drift = 0.030 dB

Peak SAR (extrapolated) = 1.07 W/kg

SAR(1 g) = 0.517 mW/g; SAR(10 g) = 0.253 mW/g[Info: Interpolated medium parameters used for SAR evaluation.](#)

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

Low Channel/Zoom Scan (31x31x36)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 3.06 V/m; Power Drift = 0.030 dB

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

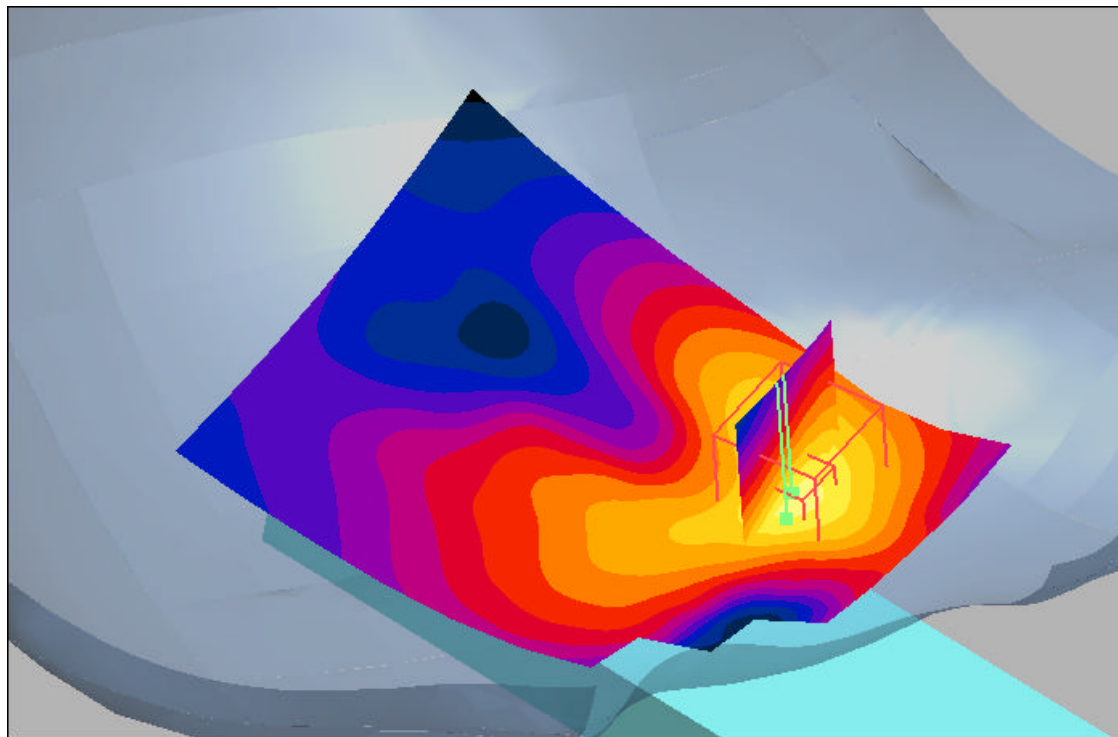
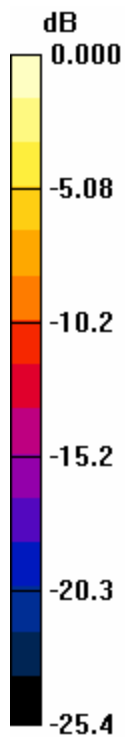
Maximum value of SAR (interpolated) = 1.07 mW/g

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47(86)

Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	



0 dB = 1.07mW/g

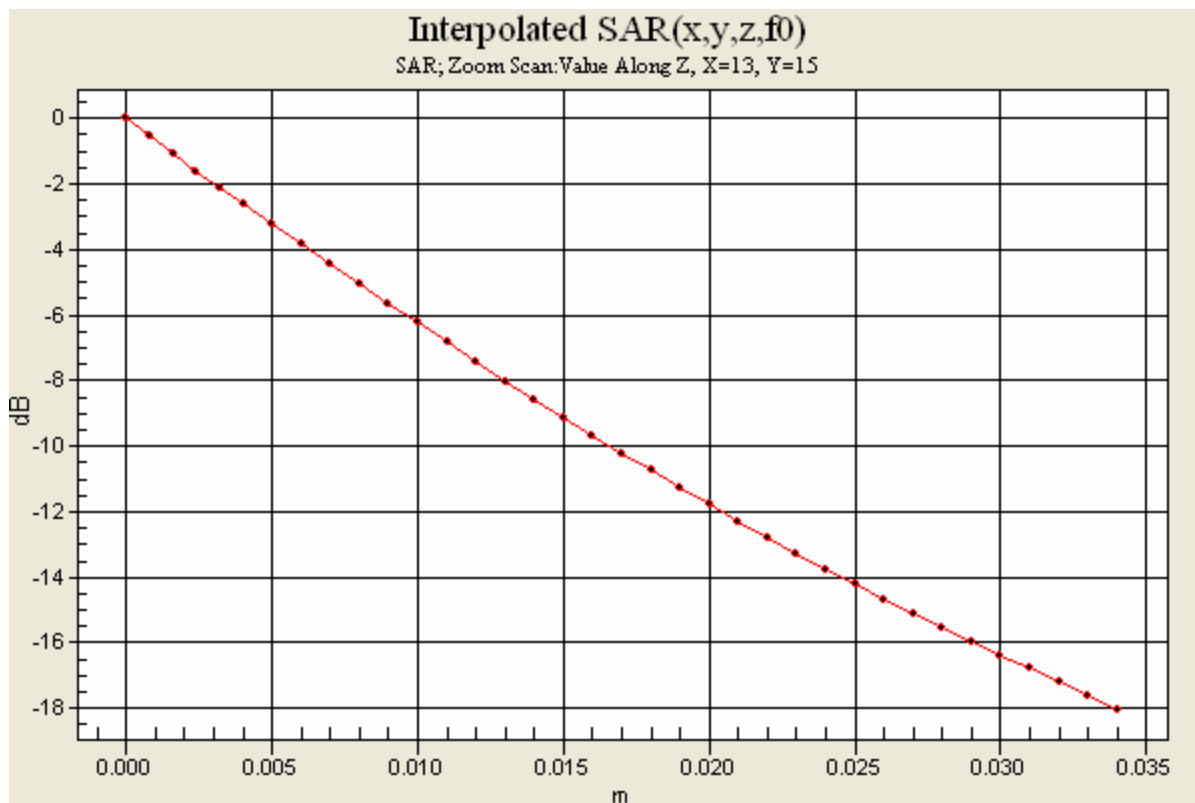


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48(86)

Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
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Prepared (also subject responsible if other)		No.	
SEM/CV/PF/P Gerard Hayes and Rodney Dixon		REP 2006 002 Z520i HWB 02	
Approved	Checked		
SEM/CV/PF/P Gerard Hayes		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 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

Distribution of maximum SAR in 800 GSM band. Measured with back of device facing the body using a 20MM spacer. (Standard Battery, BST-37)

Date/Time: 3/2/2006 9:55:29 AM

File Name: [02Mar06_Z520i_GSM835_NURF_BB01.da4](#)

DUT: Zoe body; Type: Sample

Program Notes: Battery: BST-37 Humidity: 36.9 % Ambient temp: 20.9 C Simulant temp: 22.1 C

Communication System: GSM 850 Body; Frequency: 849 MHz; Duty Cycle: 1:4.15

Medium: Body 835 MHz Medium parameters used (interpolated): $f = 849 \text{ MHz}$; $s = 1.01 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1586; ConvF(6.51, 6.51, 6.51); Calibrated: 5/26/2005

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

- Electronics: DAE3 Sn416; Calibrated: 11/10/2005

- Phantom: SAM with CRP (Low Band Body); Type: SAM; Serial: 1251

- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

High Channel/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 1.14 mW/g

High Channel/Zoom Scan (7x9x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 24.2 V/m; Power Drift = 0.030 dB

Peak SAR (extrapolated) = 1.50 W/kg

SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.753 mW/g

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

Maximum value of SAR (measured) = 1.16 mW/g

High Channel/Zoom Scan (31x41x36)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 24.2 V/m; Power Drift = 0.030 dB

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

Maximum value of SAR (interpolated) = 1.50 mW/g

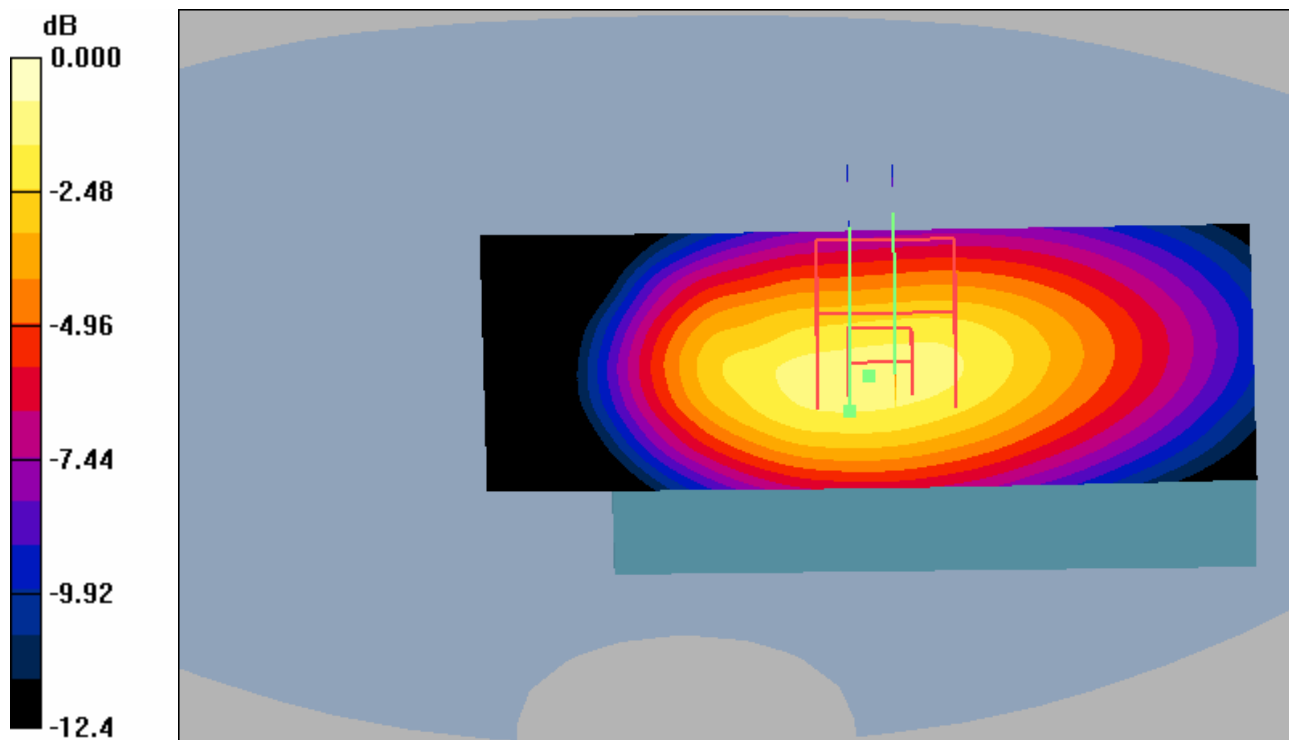


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51(86)

Prepared (also subject responsible if other)		No.		
SEM/CV/PF/P Gerard Hayes and Rodney Dixon		REP 2006 002 Z520i HWB 02		
Approved	Checked		A	
SEM/CV/PF/P Gerard Hayes				



0 dB = 1.50mW/g

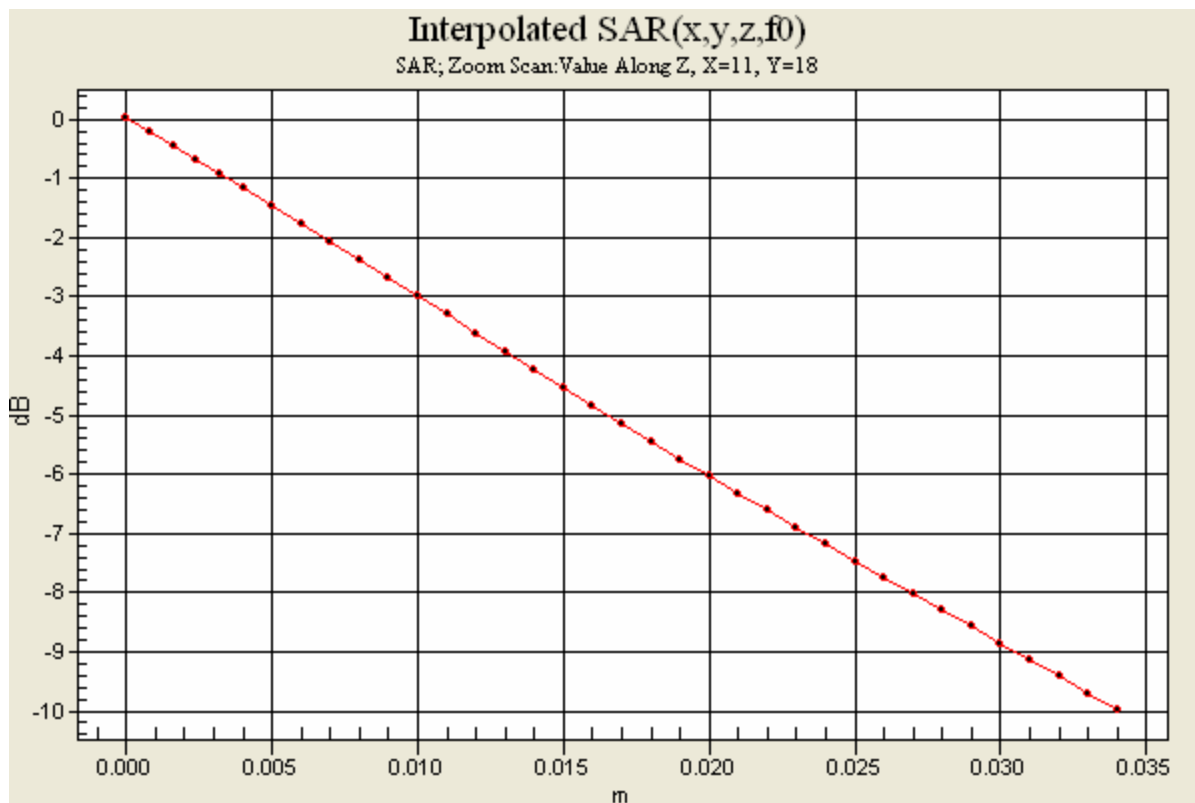


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52(86)

Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	





Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

Distribution of maximum SAR in 800 GSM band. Measured with front of device facing the body using a 20MM spacer. (Standard Battery, BST-37)

Date/Time: 3/2/2006 10:20:55 AM

File Name: [02Mar06_Z520i_GSM835_NURF_BF01.da4](#)

DUT: Zoe body; Type: Sample

Program Notes: Battery: BST-37 Humidity: 31.8 % Ambient temp: 22.8 C Simulant temp: 23.4 C

Communication System: GSM 850 Body; Frequency: 849 MHz; Duty Cycle: 1:4.15

Medium: Body 835 MHz Medium parameters used (interpolated): $f = 849 \text{ MHz}$; $s = 1.01 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1586; ConvF(6.51, 6.51, 6.51); Calibrated: 5/26/2005

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

- Electronics: DAE3 Sn416; Calibrated: 11/10/2005

- Phantom: SAM with CRP (Low Band Body); Type: SAM; Serial: 1251

- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

High Channel/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.316 mW/g

High Channel/Zoom Scan (7x9x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.9 V/m; Power Drift = 0.054 dB

Peak SAR (extrapolated) = 0.384 W/kg

SAR(1 g) = 0.301 mW/g; SAR(10 g) = 0.220 mW/g

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

Maximum value of SAR (measured) = 0.320 mW/g

High Channel/Zoom Scan (31x41x36)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.9 V/m; Power Drift = 0.054 dB

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

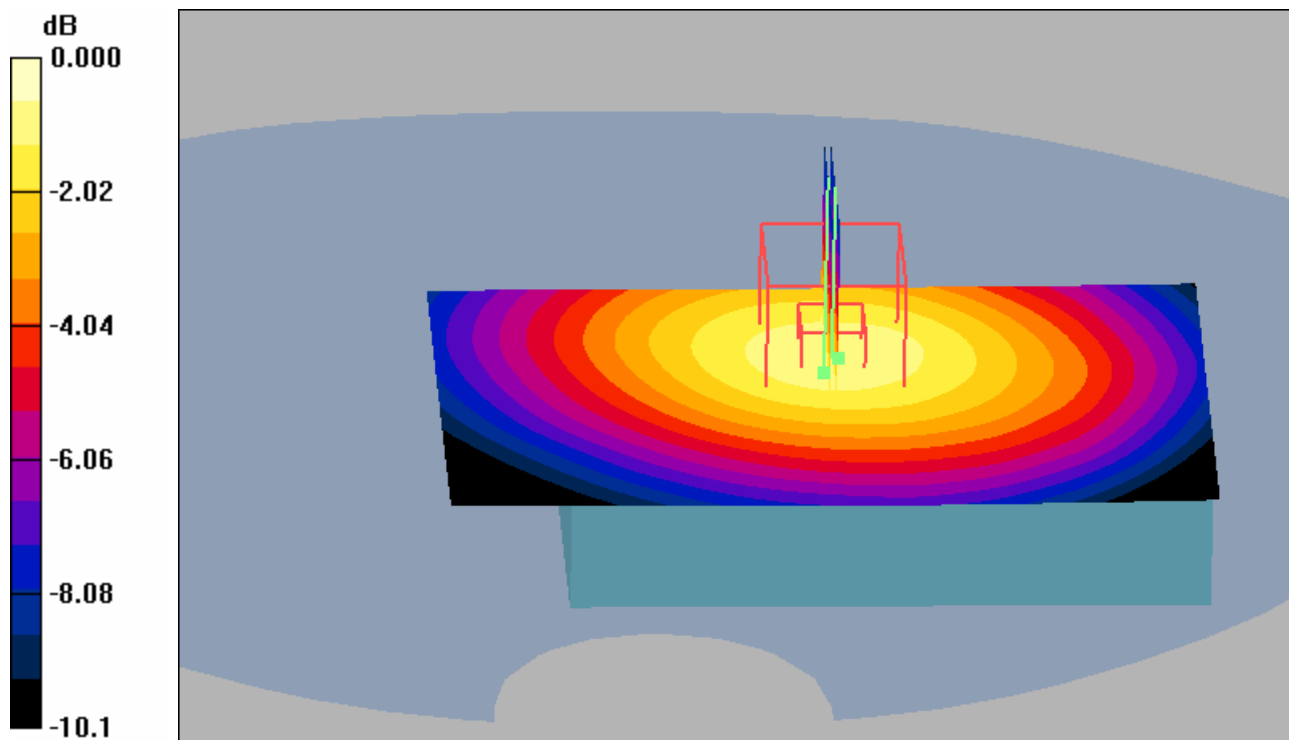
Maximum value of SAR (interpolated) = 0.384 mW/g

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REPORT

54(86)

Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	



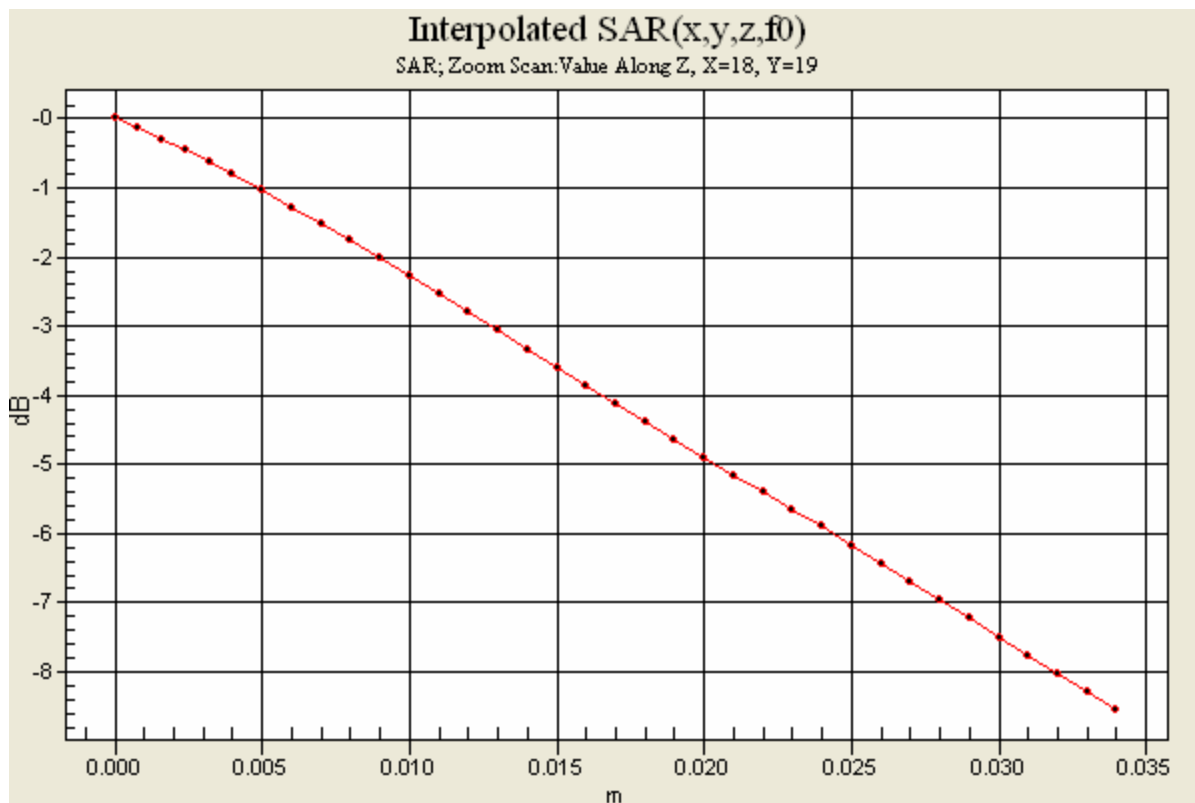
0 dB = 0.384mW/g

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55(86)

Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	





Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

Distribution of maximum SAR in 800 GSM band. Measured with back of device facing the body using a 20MM SPACER with Blue Tooth. (Standard Battery BST-37)

Date/Time: 3/11/2006 3:18:37 PM

File Name: [02Mar06 Z520i GSM835 NURF BT BB01.da4](#)

DUT: Zoe body; Type: Sample

Program Notes: Battery: BST-37 Humidity: 36.9 % Ambient temp: 20.9 C Simulant temp: 22.1 C

Communication System: GSM 850 Body; Frequency: 849 MHz; Duty Cycle: 1:4.15

Medium: Body 835 MHz Medium parameters used (interpolated): $f = 849 \text{ MHz}$; $s = 1.01 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1539; ConvF(5.88, 5.88, 5.88); Calibrated: 11/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn345; Calibrated: 11/10/2005
- Phantom: SAM with CRP (Low Band Body); Type: SAM; Serial: 1251
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

High Channel/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 1.18 mW/g

High Channel/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 28.2 V/m; Power Drift = 0.000 dB

Peak SAR (extrapolated) = 1.55 W/kg

SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.769 mW/g

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

Maximum value of SAR (measured) = 1.19 mW/g

High Channel/Zoom Scan (31x31x36)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 28.2 V/m; Power Drift = 0.000 dB

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

Maximum value of SAR (interpolated) = 1.55 mW/g

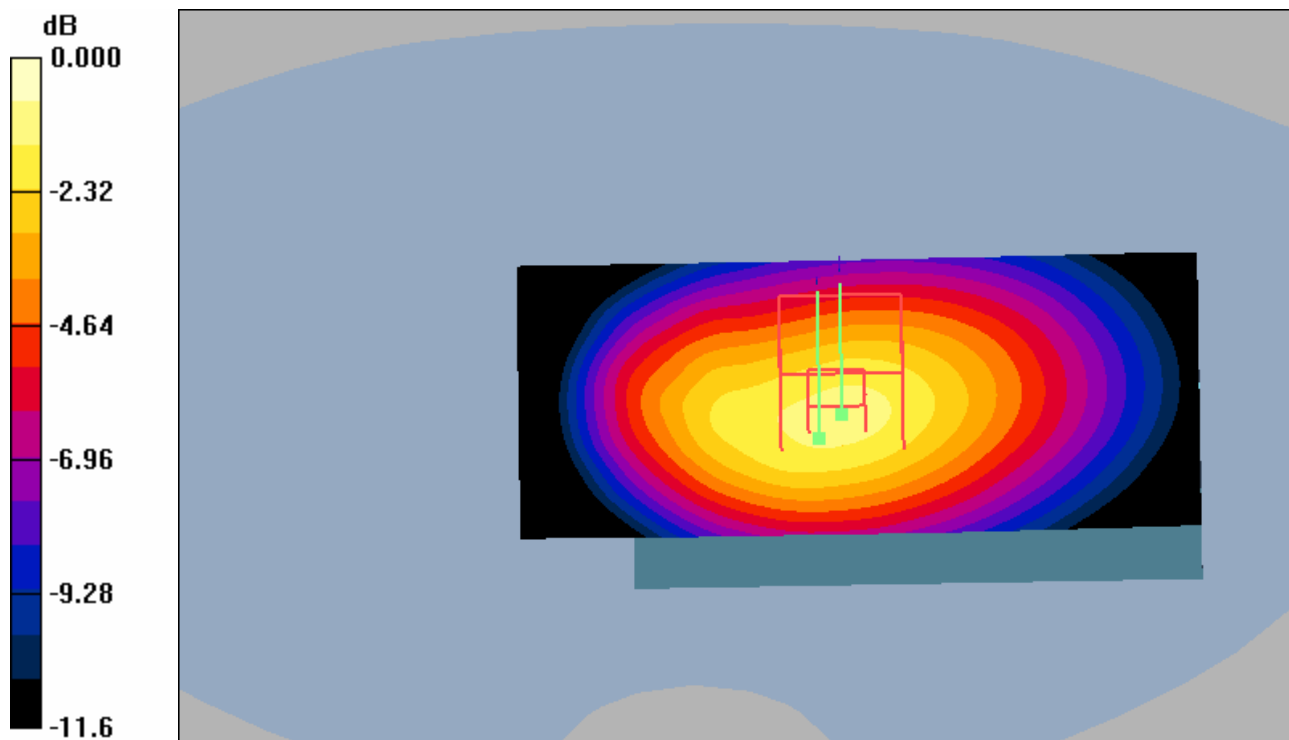


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SEM/CV/PF/P Gerard Hayes				



0 dB = 1.55mW/g

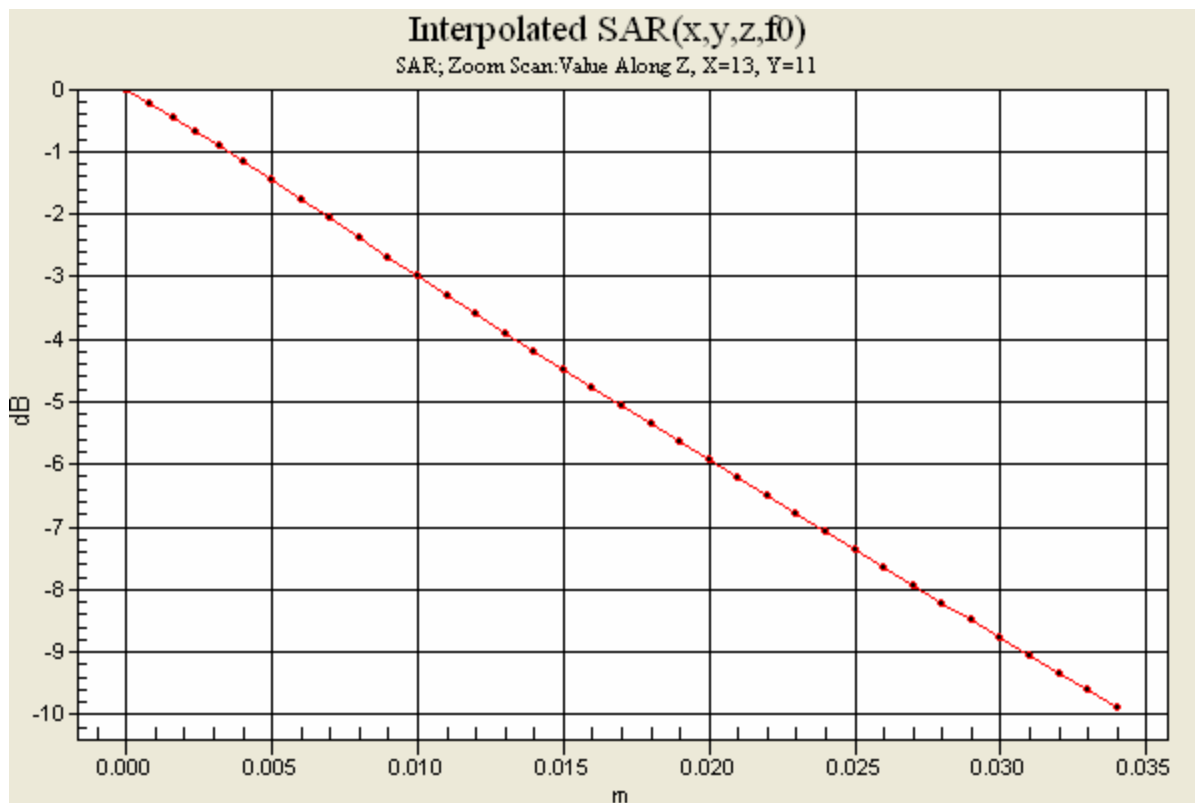


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Distribution of maximum SAR in 1900 GSM band. Measured with back of device facing the body using a 20MM spacer. (Standard Battery, BST-37)

Date/Time: 3/11/2006 11:04:04 AM

File Name: [10Mar06_Z520i_GSM1900_NURF_BB01.da4](#)

DUT: Zoe body; Type: Sample

Program Notes: Battery: BST-37 Humidity: 35.1% Ambient Temp: 23.2C Simulant Temp: 22.9C

Communication System: DCS 1900 Body; Frequency: 1850.2 MHz; Duty Cycle: 1:4.15

Medium: Head 1800/1900 MHz Medium parameters used (interpolated): $f = 1850.2 \text{ MHz}$; $s = 1.47 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1539; ConvF(4.12, 4.12, 4.12); Calibrated: 11/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn345; Calibrated: 11/10/2005
- Phantom: SAM with CRP (High Band Body); Type: SAM; Serial: TP: 1020
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

Low Channel/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.564 mW/g

Low Channel/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 13.8 V/m; Power Drift = -0.151 dB

Peak SAR (extrapolated) = 0.814 W/kg

SAR(1 g) = 0.509 mW/g; SAR(10 g) = 0.309 mW/g

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

Maximum value of SAR (measured) = 0.547 mW/g

Low Channel/Zoom Scan (31x31x36)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 13.8 V/m; Power Drift = -0.151 dB

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

Maximum value of SAR (interpolated) = 0.814 mW/g

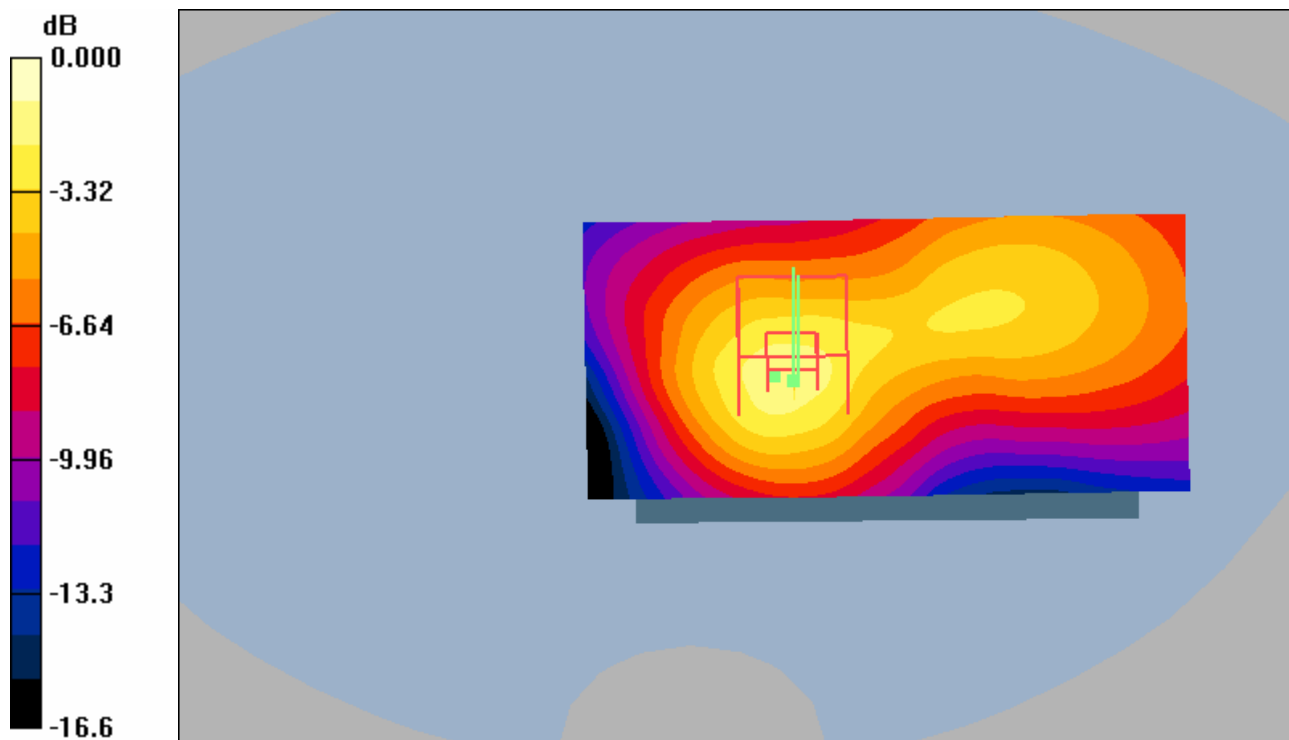


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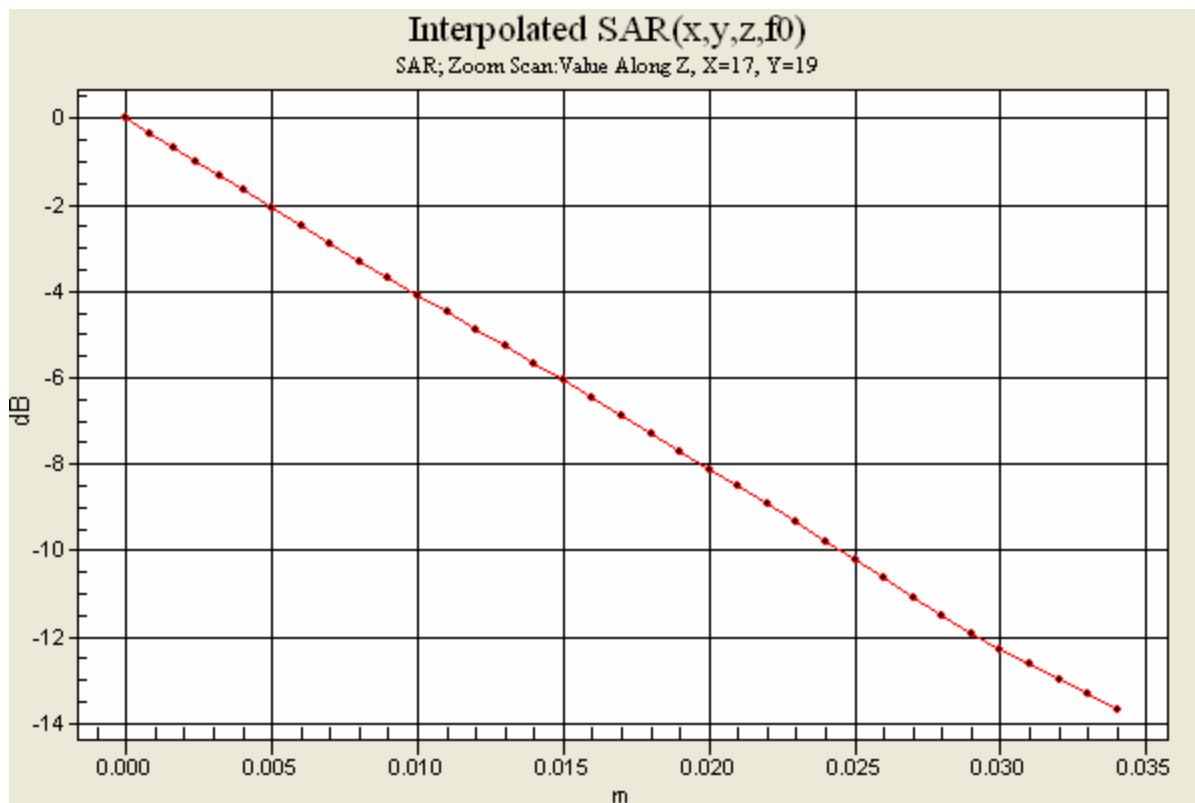
0 dB = 0.814mW/g

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Distribution of maximum SAR in 1900 GSM band. Measured with front of device facing the body using a 20MM spacer. (Standard Battery, BST-37)

Date/Time: 3/11/2006 1:35:51 PM

File Name: [10Mar06_Z520i_GSM1900_NURF_BF01.da4](#)

DUT: Zoe body; Type: Sample

Program Notes: Battery: BST-37 Humidity: 35.8% Ambient Temp: 23.1C Simulant Temp: 23C

Communication System: DCS 1900 Body; Frequency: 1850.2 MHz; Duty Cycle: 1:4.15

Medium: Head 1800/1900 MHz Medium parameters used (interpolated): $f = 1850.2 \text{ MHz}$; $s = 1.47 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1539; ConvF(4.12, 4.12, 4.12); Calibrated: 11/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn345; Calibrated: 11/10/2005
- Phantom: SAM with CRP (High Band Body); Type: SAM; Serial: TP: 1020
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

Low Channel/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.333 mW/g

Low Channel/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.6 V/m; Power Drift = -0.106 dB

Peak SAR (extrapolated) = 0.424 W/kg

SAR(1 g) = 0.295 mW/g; SAR(10 g) = 0.193 mW/g

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

Maximum value of SAR (measured) = 0.317 mW/g

Low Channel/Zoom Scan (31x31x36)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.6 V/m; Power Drift = -0.106 dB

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

Maximum value of SAR (interpolated) = 0.424 mW/g

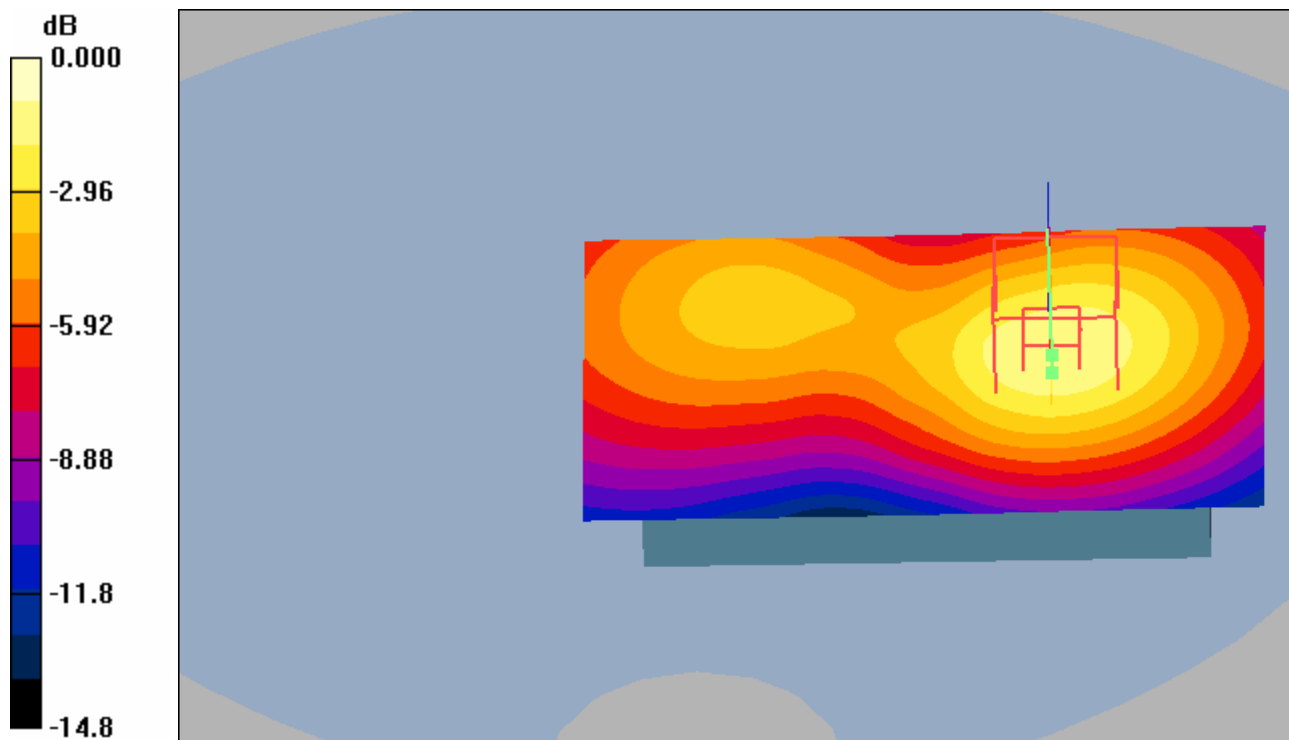


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0 dB = 0.424mW/g

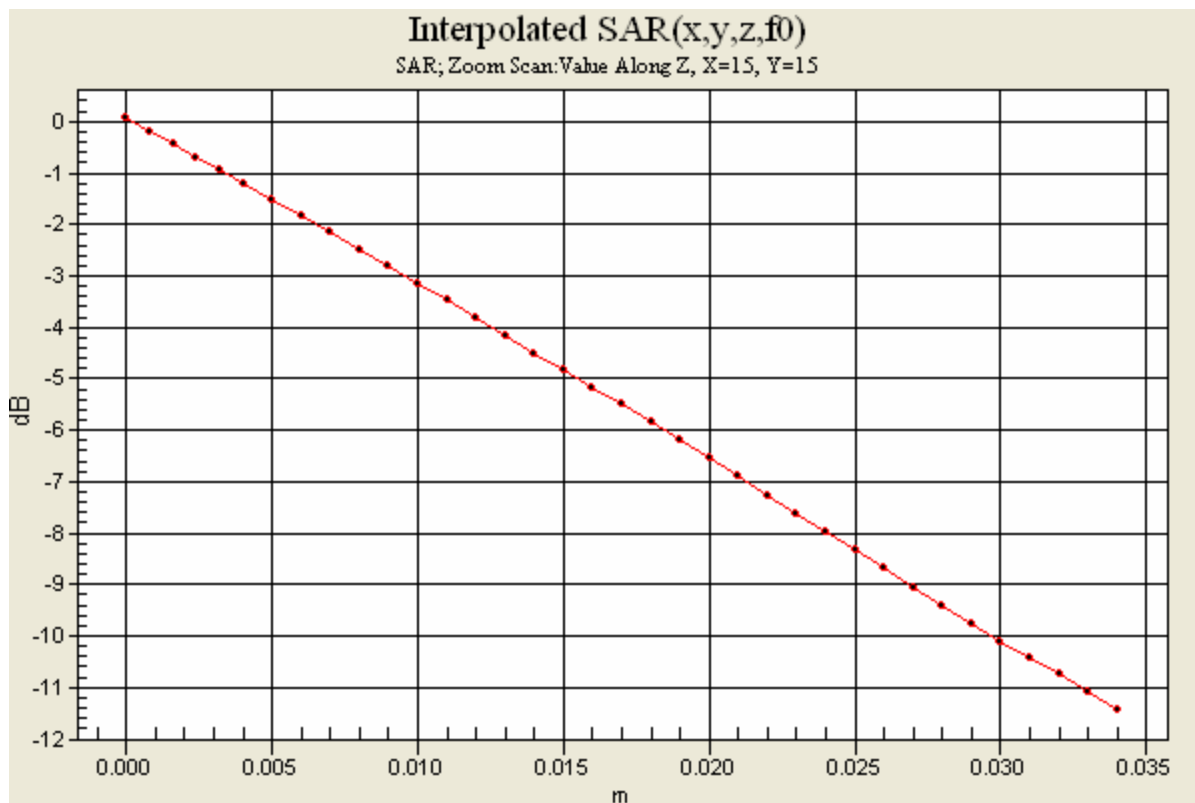


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Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

Distribution of maximum SAR in 1900 GSM band. Measured with back of device facing the body using a 20MM SPACER with Blue Tooth. (Standard Battery BST-37)

Date/Time: 3/11/2006 2:22:34 PM

File Name: [10Mar06_Z520i_GSM1900_NURF_BT_BB01.da4](#)

DUT: Zoe body; Type: Sample

Program Notes: Battery: BST-37 Humidity: 35.8% Ambient Temp: 23.1C Simulant Temp: 23C

Communication System: DCS 1900 Body; Frequency: 1850.2 MHz; Duty Cycle: 1:4.15

Medium: Head 1800/1900 MHz Medium parameters used (interpolated): $f = 1850.2 \text{ MHz}$; $s = 1.47 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1539; ConvF(4.12, 4.12, 4.12); Calibrated: 11/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn345; Calibrated: 11/10/2005
- Phantom: SAM with CRP (High Band Body); Type: SAM; Serial: TP: 1020
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 160

Low Channel/Area Scan (51x81x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Maximum value of SAR (interpolated) = 0.537 mW/g

Low Channel/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.5 V/m; Power Drift = -0.108 dB

Peak SAR (extrapolated) = 0.753 W/kg

SAR(1 g) = 0.466 mW/g; SAR(10 g) = 0.282 mW/g

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

Maximum value of SAR (measured) = 0.504 mW/g

Low Channel/Zoom Scan (31x31x36)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.5 V/m; Power Drift = -0.108 dB

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

Maximum value of SAR (interpolated) = 0.753 mW/g

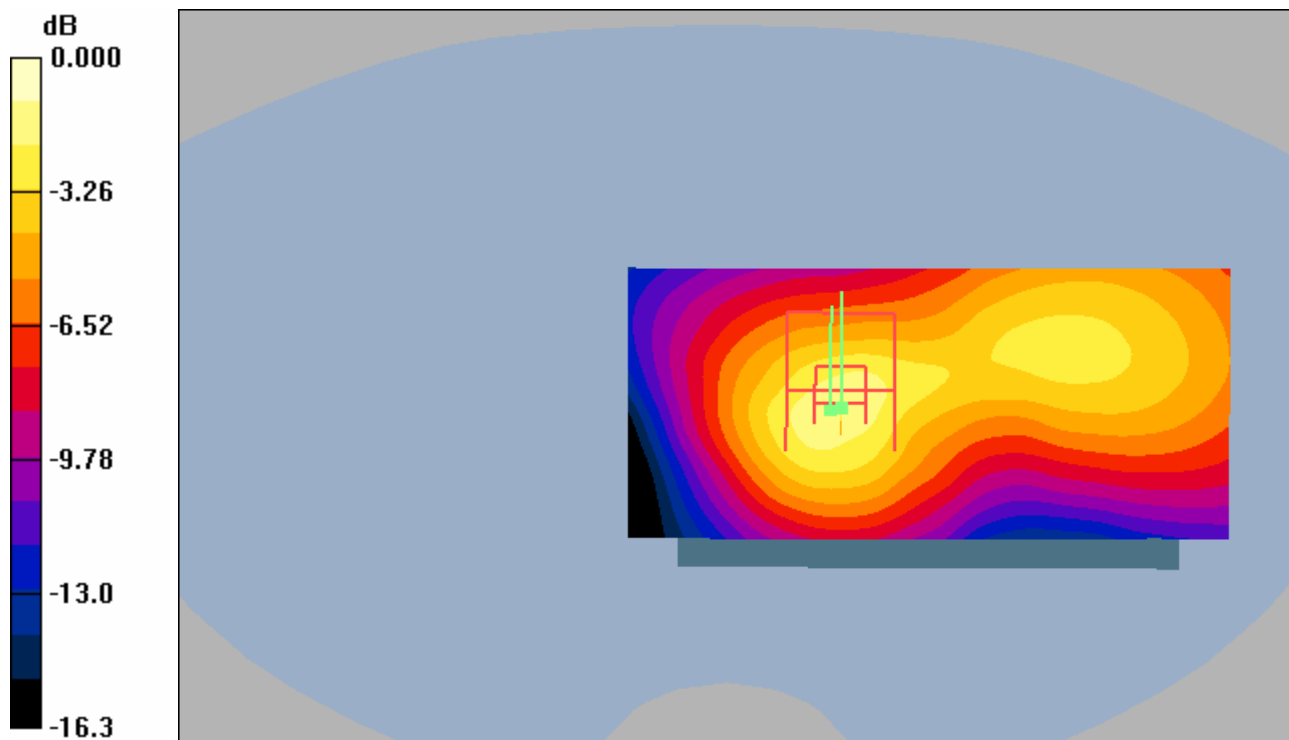


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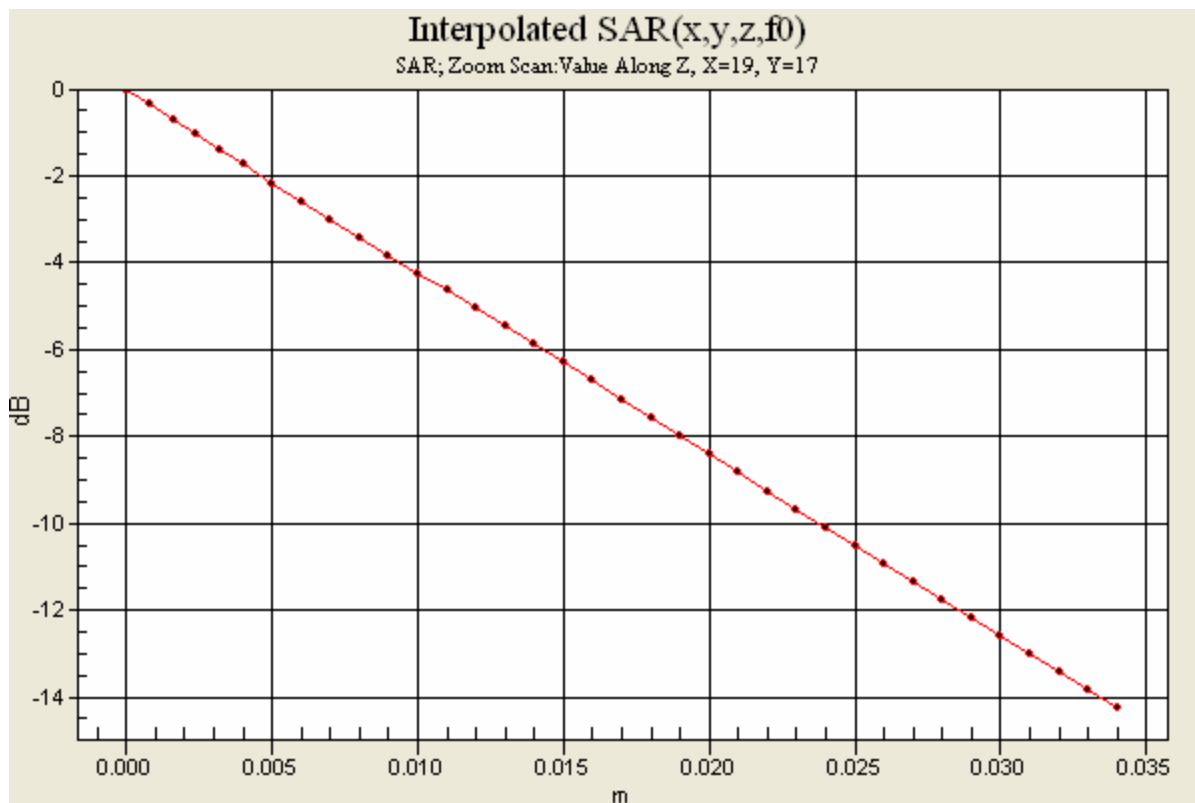
0 dB = 0.753mW/g

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Appendix 4

Probe Calibration Certificates



Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
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ET3DV6 SN:1586

May 26, 2005

DASY - Parameters of Probe: ET3DV6 SN:1586**Sensitivity in Free Space^A****Diode Compression^B**

NormX	1.90 ± 10.1%	$\mu V/(V/m)^2$	DCP X	94 mV
NormY	1.84 ± 10.1%	$\mu V/(V/m)^2$	DCP Y	94 mV
NormZ	1.89 ± 10.1%	$\mu V/(V/m)^2$	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 _{bs} [%]	Without Correction Algorithm	8.4	4.3
SAR _{bs} [%]	With Correction Algorithm	0.1	0.2

TSL 1750 MHz Typical SAR gradient: 10 % per mm

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{bs} [%]	Without Correction Algorithm	12.2	8.2
SAR _{bs} [%]	With Correction Algorithm	0.8	0.1

Sensor OffsetProbe 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.

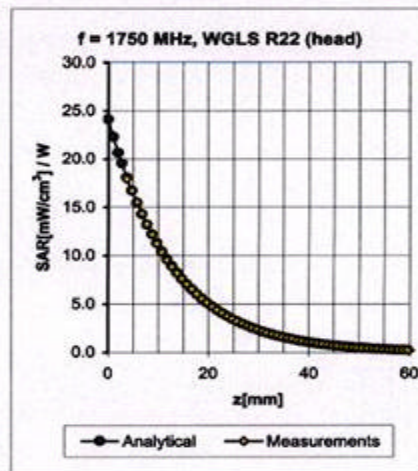
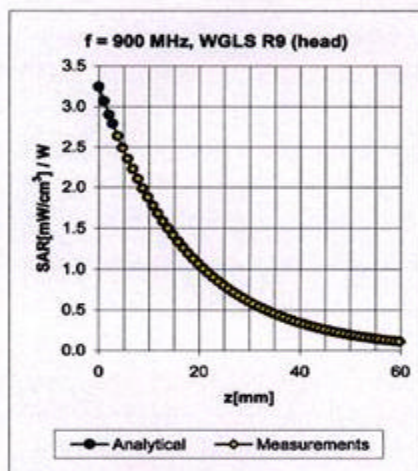


Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

ET3DV6 SN:1586

May 26, 2005

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%	0.62	1.76	6.58 ± 11.0%	(k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.61	1.78	6.46 ± 11.0%	(k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.59	2.26	5.29 ± 11.0%	(k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.56	2.50	5.10 ± 11.0%	(k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.66	2.22	4.58 ± 11.8%	(k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.54	1.96	6.51 ± 11.0%	(k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.52	2.05	6.21 ± 11.0%	(k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.55	2.76	4.71 ± 11.0%	(k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.56	2.76	4.61 ± 11.0%	(k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.68	2.13	4.26 ± 11.8%	(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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Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

ET3DV6 SN:1539

November 22, 2005

DASY - Parameters of Probe: ET3DV6 SN:1539**Sensitivity in Free Space^A****Diode Compression^B**

NormX	1.36 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	89 mV
NormY	1.27 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	89 mV
NormZ	1.39 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	89 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 _{tsl} [%]	Without Correction Algorithm	8.8	4.7
SAR _{tsl} [%]	With Correction Algorithm	0.1	0.3

TSL 1750 MHz Typical SAR gradient: 10 % per mm

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{tsl} [%]	Without Correction Algorithm	13.0	8.4
SAR _{tsl} [%]	With Correction Algorithm	0.8	0.0

Sensor OffsetProbe 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.

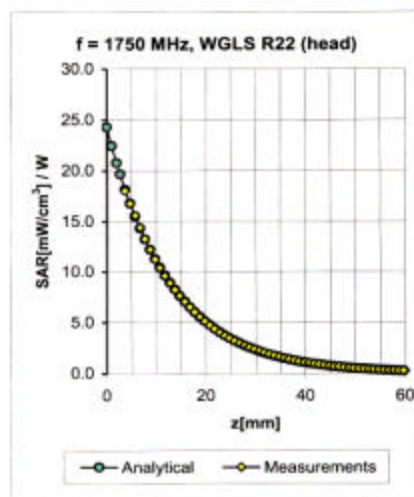
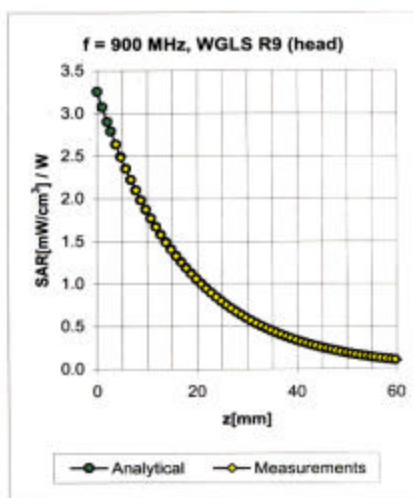


Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

ET3DV6 SN:1539

November 22, 2005

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%	0.63	1.80	5.99 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.54	1.93	5.86 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.66	2.19	4.76 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.64	2.43	4.55 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.81	2.04	4.06 ± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.56	1.99	5.88 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.53	2.08	5.63 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.65	2.48	4.21 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.66	2.48	4.12 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	1.18	1.35	4.06 ± 11.8% (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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SEM/CV/PF/P Gerard Hayes		A	

Appendix 5

Measurement Uncertainty Budget



Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

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>	<i>e = f(d,k)</i>	<i>f</i>	<i>g</i>	<i>h = c x f / e</i>	<i>i = c x g / e</i>	<i>k</i>
Uncertainty Component	Sec.	Tol. (± %)	Prob. · Dist.	Div.	<i>c_i</i> (1-g)	<i>c_i</i> (10-g)	1-g <i>u_i</i> (±%)	10-g <i>u_i</i> (±%)	<i>v_i</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 constraints 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	∞

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Liquid Conductivity - measurement uncertainty (6)	E.3.3	6.20	R	1.73	0.64	0.43	2.29	1.54	∞
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	



Prepared (also subject responsible if other) SEM/CV/PF/P Gerard Hayes and Rodney Dixon		No. REP 2006 002 Z520i HWB 02	
Approved SEM/CV/PF/P Gerard Hayes	Checked	A	

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. ($\pm$ %)	Prob. Dist.	Div.	c_i (1-g)	c_i (10-g)	1-g u_i ($\pm$ %)	10-g u_i ($\pm$ %)	v_i
Measurement System									
Probe Calibration ($k=1$)	E.2.1	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 constraints 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	1.3	N	1	1	1	1.3	1.3	4
Device Holder Uncertainty	E.4.1	1.9	R	1.73	1	1	1.1	1.1	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									

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Phantom Uncertainty (shape and thickness tolerances)	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	1.6	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				9.49	9.14	
Expanded Uncertainty (95% CONFIDENCE LEVEL)			K=2				18.98	18.28	



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Table 3a. Values for e'

Uncertainty Component	Tolerance ($\pm\%$)	Probability Distribution	Divisor	c_i	Standard Uncertainty ($\pm\%$)	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 s

Uncertainty Component	Tolerance ($\pm\%$)	Probability Distribution	Divisor	c_i	Standard Uncertainty ($\pm\%$)	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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SEM/CV/PF/P Gerard Hayes				

Appendix 6

Photographs of the Device Under Test

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a. Front



b. Back



c. Side

View of Device (Open)

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a. Front



b. Back



c. Side

View of Device (Closed)



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

**View of Hands-free Accessory**



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



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



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Position with front of device against flat phantom using a 20MM SPACER with hands free accessory.



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



Position with back of device against flat phantom using a 20MM SPACER with hands free accessory.