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SAR Compliance Test Report

Test report no.:	WR652.001	**Date of report:**	26-Jan-05
Template version:	3	**Number of pages:**	22
Testing laboratory:	Test & Certification Center (TCC) Dallas Nokia, Inc. 6021 Connection Drive Irving, TX 75039, USA Tel. +1 972 894 5000 Fax +1 972 894 4988	**Client:**	Nokia, Inc. 12278 Scripps Summit Dr. San Diego, CA 92131 Tel. +1 858 831 5955 Fax +1 858 831 6500
Responsible test engineer:	Jesse Torres	**Product contact person:**	Jose P. Hernandez
Measurements made by:	Cindy Trinh		
Tested device:	RM-60		
FCC ID:	QMNRM-60	**IC:**	661X-RM60
Supplement reports:	-		

Testing has been carried out in accordance with:

47CFR §2.1093
Radiofrequency Radiation Exposure Evaluation: Portable Devices

FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01)
Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

RSS-102
Evaluation Procedure for Mobile and Portable Radio Transmitters with Respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields

IEEE 1528 - 2003
IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques

Documentation: The documentation of the testing performed on the tested devices is archived for 15 years at TCC Dallas.

Test results: **The tested device complies with the requirements in respect of all parameters subject to the test.** The test results and statements relate only to the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory.

Date and signatures: **03-Feb-05**

For the contents:

Nerina Walton
Lab Manager

Jesse Torres
Test Engineer

CONTENTS

1. SUMMARY OF SAR TEST REPORT

1.1 Test Details

Period of test	20-Jan-05 to 25-Jan-05
SN, HW and SW numbers of tested device	SN: 044/08943889 HW: 2003 SW: S100_04w21_25_01
Batteries used in testing	BL-6C
Headsets used in testing	HDS-3, HS-9
Other accessories used in testing	-
State of sample	Prototype unit
Notes	-

1.2 Maximum Results

The maximum measured SAR values for Head configuration and Body Worn configuration are given in section 1.2.1 and 1.2.2 respectively. The device conforms to the requirements of the standard(s) when the maximum measured SAR value is less than or equal to the limit.

1.2.1 Head Configuration

Mode	Ch / *f* (MHz)	Conducted power	Position	SAR limit (1g avg)	Measured SAR value (1g avg)	Result
AMPS	799 / 848.97	25.5 dBm	Left Cheek	1.6 W/kg	1.22 W/kg	PASSED
CDMA800	777 / 848.31	25.2 dBm	Left Cheek	1.6 W/kg	1.13 W/kg	PASSED
CDMA1900	600 / 1880.00	23.1 dBm	Left Tilt	1.6 W/kg	1.24 W/kg	PASSED

1.2.2 Body Worn Configuration

Mode	Ch / *f* (MHz)	Conducted power	Separation distance	SAR limit (1g avg)	Measured SAR value (1g avg)	Result
AMPS	384 / 836.52	25.5 dBm	2.2 cm	1.6 W/kg	1.26 W/kg	PASSED
CDMA800	384 / 836.52	25.2 dBm	2.2 cm	1.6 W/kg	1.22 W/kg	PASSED
CDMA1900	1175 / 1908.75	23.1 dBm	2.2 cm	1.6 W/kg	0.64 W/kg	PASSED

1.2.3 Maximum Drift

Maximum drift during measurements	-0.30 dB

1.2.4 Measurement Uncertainty

Extended Uncertainty (k=2) 95%	± 29.8 %

2. DESCRIPTION OF THE DEVICE UNDER TEST

Device category	Portable
Exposure environment	Uncontrolled exposure

Modes and Bands of Operation	AMPS 800	CDMA 800	CDMA1900
Modulation Mode	FM	QPSK	QPSK
Duty Cycle	1	1	1
Transmitter Frequency Range (MHz)	824.04 - 848.97	824.7 – 848.31	1851.25 – 1908.75

2.1 Picture of the Device

2.2 Description of the Antenna

The device has an internal patch antenna.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Period of measurement:	20-Jan-05 to 25-Jan-05
Ambient temperature (°C):	21.0 to 23.0
Ambient humidity (RH %):	29.0 to 49.0

3.2 Test Signal, Frequencies, and Output Power

The device was put into operation by using call tester. Communication between the device and the call tester was established by air link.

The device output power was set to maximum power level for all tests; a fully charged battery was used for every test sequence.

In all operating bands the measurements were performed on lowest, middle and highest channels.

4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement System and Components

The measurements were performed using an automated near-field scanning system, DASY4 software version 4.4, manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland. The SAR extrapolation algorithm used in all measurements on the device was the 'worst-case extrapolation' algorithm.

The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration interval	Calibration expiry
DASY4 DAE V1	377	12 months	22-Sep-05
E-field Probe ET3DV6	1504	12 months	22-Sep-05
Dipole Validation Kit, D835V2	455	24 months	03-Oct-05
Dipole Validation Kit, D1900V2	504	24 months	16-Jul-05

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Amplifier	AR 5S1G2	25583	-	-
Dielectric Probe Kit	Agilent 85070D	US01440005	-	-
Signal Generator	R&S SMT06	100243	12 months	01-Jun-05
Vector Network Analyzer	Agilent 8753ES	US39174932	12 months	19-Feb-05
Power Meter	Boonton 4232A	26001	12 months	08-Jun-05
Power Sensor	Boonton 51015	31143	12 months	08-Jun-05
Power Sensor	Boonton 51015	31144	12 months	08-Jun-05
Call Tester	R&S CMU200	101055	12 months	29-Jun-05

4.1.1 Isotropic E-field Probe SN1504

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., butyl diglycol)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to 3 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Optical Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)
Dynamic Range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application	General dosimetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

4.2 Phantoms

The phantom used for all tests i.e. for both validation testing and device testing, was the twin-headed "SAM Phantom", manufactured by SPEAG. The phantom conforms to the requirements of IEEE 1528 - 2003.

Validation tests were performed using the flat section, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.

The SPEAG device holder (see Section 5.1) was used to position the device in all tests whilst a tripod was used to position the validation dipoles against the flat section of phantom.

4.3 Simulating Liquids

Recommended values for the dielectric parameters of the simulating liquids are given in IEEE 1528 - 2003 and FCC Supplement C to OET Bulletin 65. All tests were carried out using liquids whose dielectric parameters were within ± 5% of the recommended values. All tests were carried out within 24 hours of measuring the dielectric parameters.

The depth of the liquid was 15.0 ± 0.5 cm measured from the ear reference point during validation and device measurements.

4.3.1 Liquid Recipes

The following recipes were used for Head and Body liquids:

800MHz Band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	51.07	65.45
HEC	0.23	-
Sugar	47.31	34.31
Preservative	0.24	0.10
Salt	1.15	0.62

1900MHz Band

Ingredient	Head (% by weight)	Body (% by weight)
Deionised Water	54.88	69.02
Butyl Diglycol	44.91	30.76
Salt	0.21	0.22

4.3.2 Verification of the System

The manufacturer calibrates the probes annually. Dielectric parameters of the simulating liquids were measured every day using the dielectric probe kit and the network analyser. A SAR measurement was made following the determination of the dielectric parameters of the liquids, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The validation results (dielectric parameters and SAR values) are given in the table below.

System verification, head tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ε_r	σ [S/m]	
	Reference result	2.37	43.0	0.90	N/A
	± 10% window	2.13 to 2.61			
835	24-Jan-05	2.43	41.5	0.90	21.3
	Reference result	10.2	40.2	1.46	N/A
	± 10% window	9.18 to 11.22			
1900	20-Jan-05	9.43	38.4	1.44	20.1

System verification, body tissue simulant

f [MHz]	Description	SAR [W/kg], 1g	Dielectric Parameters		Temp [°C]
			ε_r	σ [S/m]	
	Reference result	2.48	55.0	0.98	N/A
	± 10% window	2.23 to 2.73			
835	21-Jan-05	2.47	53.8	0.94	21.2
	Reference result	10.5	50.9	1.60	N/A
	± 10% window	9.45 to 11.55			
1900	25-Jan-05	9.73	51.1	1.59	21.1

Plots of the Verification scans are given in Appendix A.

4.3.3 Tissue Simulants used in the Measurements

Head tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ε_r	σ [S/m]	
	Recommended value	41.5	0.90	N/A
	± 5% window	39.4 – 43.6	0.86 – 0.95	
836.5	24-Jan-05	41.5	0.90	21.3
	Recommended value	40.0	1.40	N/A
	± 5% window	38.0 – 42.0	1.33 – 1.47	
1880	20-Jan-05	38.5	1.42	20.1

Body tissue simulant measurements

f [MHz]	Description	Dielectric Parameters		Temp [°C]
		ε_r	σ [S/m]	
	Recommended value	55.2	0.97	N/A
	± 5% window	52.4 – 58.0	0.92 – 1.02	
836.5	21-Jan-05	53.8	0.95	21.2
	Recommended value	53.3	1.52	N/A
	± 5% window	50.6 – 56.0	1.44 – 1.60	
1880	25-Jan-05	51.2	1.57	21.1

5. DESCRIPTION OF THE TEST PROCEDURE

5.1 Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the Dasy system.

Device holder supplied by SPEAG

A Nokia designed spacer (illustrated below) was used to position the device within the SPEAG holder. The spacer positions the device so that the holder has minimal effect on the test results but still holds the device securely. The spacer was removed before the tests.

Nokia spacer

5.2 Test Positions

5.2.1 Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.

The positions used in the measurements were according to IEEE 1528 - 2003 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”.

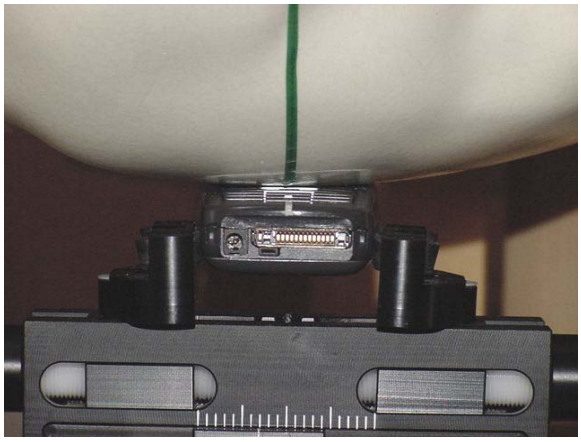


Photo of the device in “cheek” position

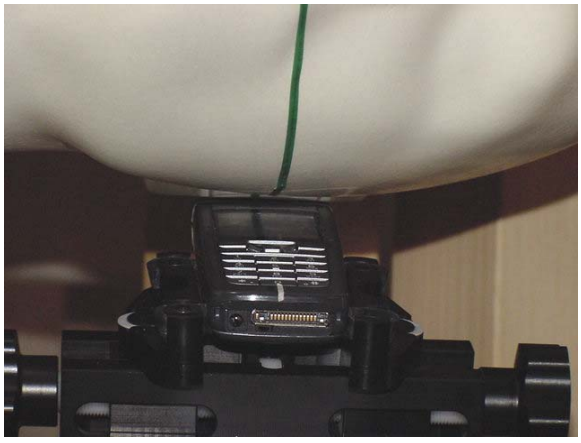


Photo of the device in “tilt” position

5.2.2 Body Worn Configuration

The device was placed in the SPEAG holder using the Nokia spacer and placed below the flat section of the phantom. The distance between the device and the phantom was kept at the separation distance indicated in the photo below using a separate flat spacer that was removed before the start of the measurements. The device was oriented with its antenna facing the phantom since this orientation gave higher results.

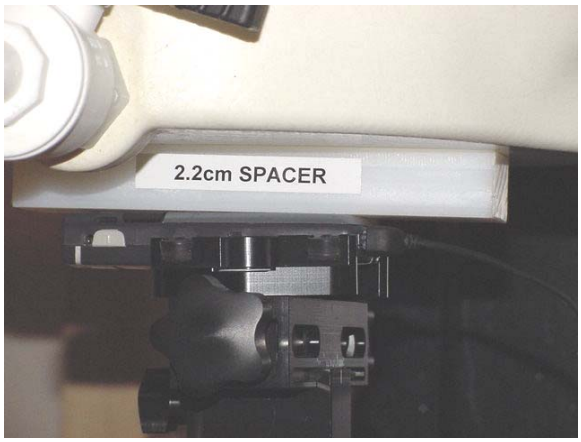


Photo of the device positioned for Body SAR measurement.
The spacer was removed for the tests.

5.3 Scan Procedures

First coarse scans were used for determination of the field distribution. Next a cube scan, a minimum of 5x5x7 points covering a volume of at least 32x32x30mm was performed around the highest E-field value to determine the averaged SAR value. Drift was determined by measuring the same point at the start of the coarse scan and again at the end of the cube scan.

5.4 SAR Averaging Methods

The maximum SAR value was averaged over a cube of tissue using interpolation and extrapolation.

The interpolation, extrapolation and maximum search routines within Dasy4 are all based on the modified Quadratic Shepard's method (Robert J. Renka, "Multivariate Interpolation Of Large Sets Of Scattered Data", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148).

The interpolation scheme combines a least-square fitted function method with a weighted average method. A trivariate 3-D / bivariate 2-D quadratic function is computed for each measurement point and fitted to neighbouring points by a least-square method. For the cube scan, inverse distance weighting is incorporated to fit distant points more accurately. The interpolating function is finally calculated as a weighted average of the quadratics.

In the cube scan, the interpolation function is used to extrapolate the Peak SAR from the deepest measurement points to the inner surface of the phantom.

6. MEASUREMENT UNCERTAINTY

Table 6.1 – Measurement uncertainty evaluation

Uncertainty Component	Section in IEEE 1528	Tol. (%)	Prob Dist	Div	c_i	$c_i . u_i$ (%)	v_i
Measurement System							
Probe Calibration	E2.1	±5.8	N	1	1	±5.8	∞
Axial Isotropy	E2.2	±4.7	R	√3	$(1-c_p)^{1/2}$	±1.9	∞
Hemispherical Isotropy	E2.2	±9.6	R	√3	$(c_p)^{1/2}$	±3.9	∞
Boundary Effect	E2.3	±8.3	R	√3	1	±4.8	∞
Linearity	E2.4	±4.7	R	√3	1	±2.7	∞
System Detection Limits	E2.5	±1.0	R	√3	1	±0.6	∞
Readout Electronics	E2.6	±1.0	N	1	1	±1.0	∞
Response Time	E2.7	±0.8	R	√3	1	±0.5	∞
Integration Time	E2.8	±2.6	R	√3	1	±1.5	∞
RF Ambient Conditions - Noise	E6.1	±3.0	R	√3	1	±1.7	∞
RF Ambient Conditions - Reflections	E6.1	±3.0	R	√3	1	±1.7	∞
Probe Positioner Mechanical Tolerance	E6.2	±0.4	R	√3	1	±0.2	∞
Probe Positioning with respect to Phantom Shell	E6.3	±2.9	R	√3	1	±1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	E5.2	±3.9	R	√3	1	±2.3	∞
Test sample Related							
Test Sample Positioning	E4.2.1	±6.0	N	1	1	±6.0	11
Device Holder Uncertainty	E4.1.1	±5.0	N	1	1	±5.0	7
Output Power Variation - SAR drift measurement	6.6.3	±10.0	R	√3	1	±5.8	∞
Phantom and Tissue Parameters							
Phantom Uncertainty (shape and thickness tolerances)	E3.1	±4.0	R	√3	1	±2.3	∞
Liquid Conductivity Target - tolerance	E3.2	±5.0	R	√3	0.64	±1.8	∞
Liquid Conductivity - measurement uncertainty	E3.3	±5.5	N	1	0.64	±3.5	5
Liquid Permittivity Target tolerance	E3.2	±5.0	R	√3	0.6	±1.7	∞
Liquid Permittivity - measurement uncertainty	E3.3	±2.9	N	1	0.6	±1.7	5
Combined Standard Uncertainty			RSS			**±14.9**	206
Coverage Factor for 95%			**k=2**				
Expanded Standard Uncertainty						**±29.8**	

7. RESULTS

The measured Head SAR values for the test device are tabulated below:

AMPS Head SAR results

Position		SAR, averaged over 1g (W/kg)		
		Ch 991 824.04 MHz	Ch 384 836.52 MHz	Ch 799 848.97 MHz
Power level		25.5 dBm	25.5 dBm	25.5 dBm
Left	Cheek	1.09	1.17	**1.22**
	Tilt	-	0.60	-
Right	Cheek	1.06	1.05	1.04
	Tilt	-	0.68	-

CDMA800 Head SAR results

Position		SAR, averaged over 1g (W/kg)		
		Ch 1013 824.70 MHz	Ch 384 836.52 MHz	Ch 777 848.31 MHz
Power level		25.2 dBm	25.2 dBm	25.2 dBm
Left	Cheek	1.00	1.10	**1.13**
	Tilt	-	0.56	-
Right	Cheek	1.05	1.07	1.09
	Tilt	-	0.62	-

CDMA1900 Head SAR results

Position		SAR, averaged over 1g (W/kg)		
		Ch 25 1851.25 MHz	Ch 600 1880.00 MHz	Ch 1175 1908.75 MHz
Power level		23.1 dBm	23.1 dBm	23.1 dBm
Left	Cheek	0.94	1.00	0.99
	Tilt	1.06	**1.24**	1.16
Right	Cheek	-	0.70	-
	Tilt	0.98	0.92	0.95

The measured Body SAR values for the test device are tabulated below

AMPS Body SAR results

Body-worn location setup	SAR, averaged over 1g (W/kg)		
	Ch 991 824.04 MHz	Ch 384 836.52 MHz	Ch 799 848.97 MHz
Power level	25.5 dBm	25.5 dBm	25.5 dBm
Without headset	1.25	**1.26**	1.15
Headset HDS-3	-	0.58	-
Headset HS-9	-	0.95	-

CDMA800 Body SAR results

Body-worn location setup	SAR, averaged over 1g (W/kg)		
	Ch 1013 824.70 MHz	Ch 384 836.52 MHz	Ch 777 848.31 MHz
Power level	25.2 dBm	25.2 dBm	25.2 dBm
Without headset	1.21	**1.22**	1.06
Headset HDS-3	-	0.58	-
Headset HS-9	-	0.64	-

CDMA1900 Body SAR results

Body-worn location setup	SAR, averaged over 1g (W/kg)		
	Ch 25 1851.25 MHz	Ch 600 1880.00 MHz	Ch 1175 1908.75 MHz
Power level	23.1 dBm	23.1 dBm	23.1 dBm
Without headset	0.47	0.62	**0.64**
Headset HDS-3	-	-	0.49
Headset HS-9	-	-	0.50

Plots of the Measurement scans are given in Appendix B.

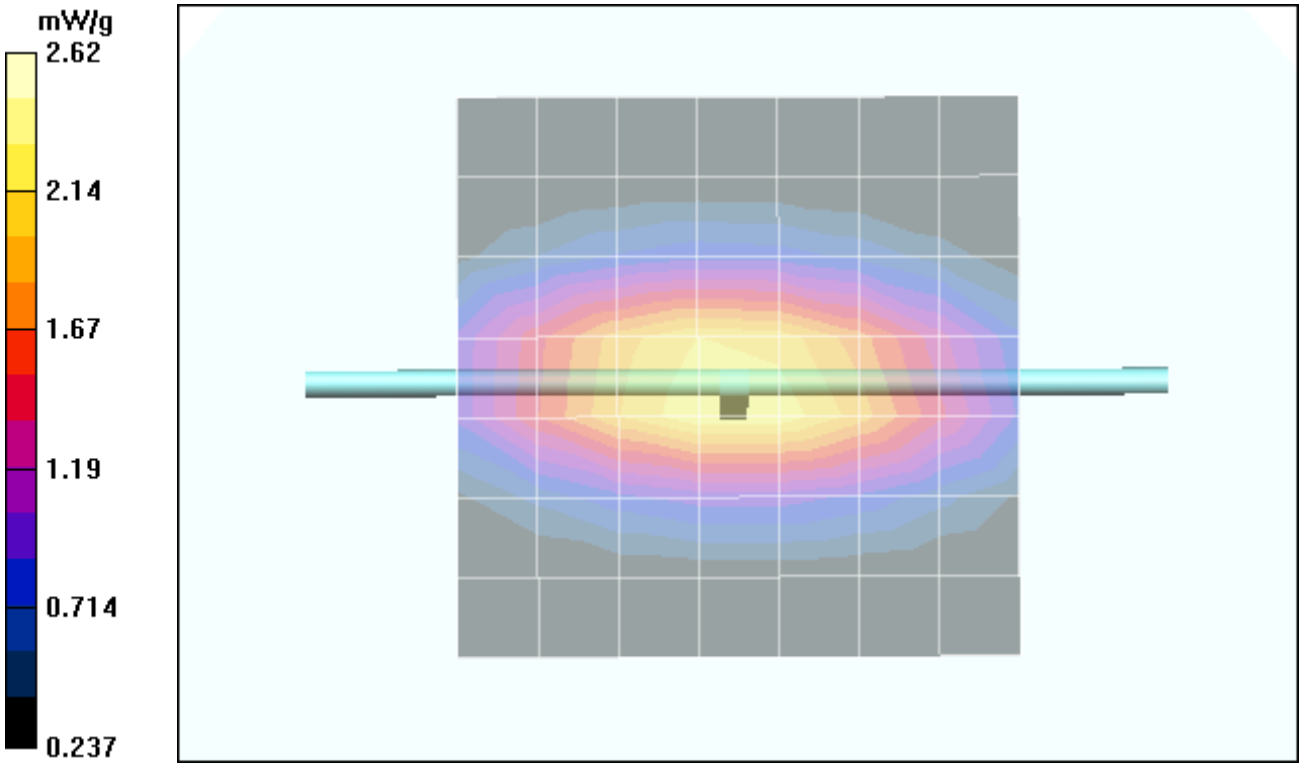
APPENDIX A: VALIDATION SCANS

Date: 01/24/05

835MHz Head Validation

Phantom: SAM1 Cellular Head, Phantom section: Flat Section
Medium: 835MHz Head, Frequency: 835 MHz, Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3 , Temperature: 21.3
Probe: ET3DV6 - SN1504, ConvF(6.73, 6.73, 6.73)

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.6 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 3.63 W/kg
SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.58 mW/g (Advance Extrapolation)
Maximum value of SAR (measured) = 2.62 mW/g

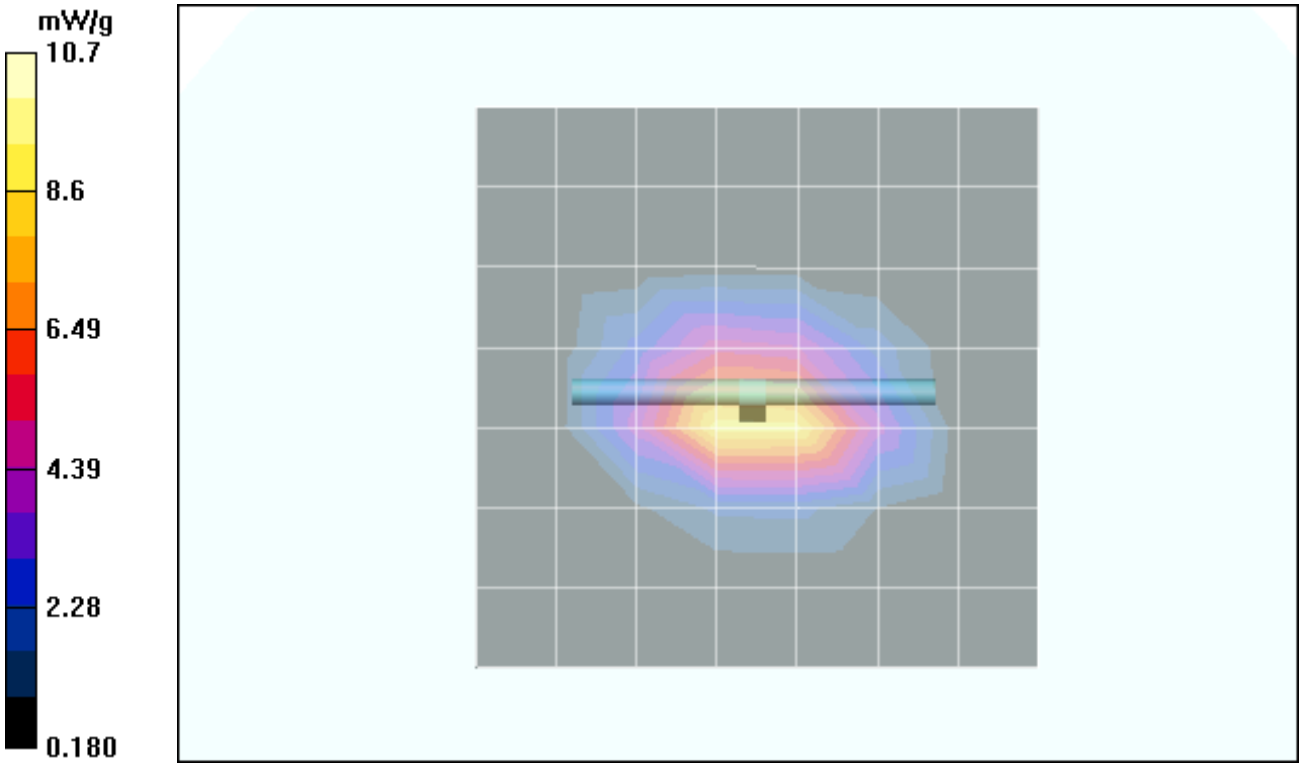


Date: 01/20/05

1900MHz Head Validation

Phantom: SAM3 PCS Head and Body, Phantom section: Flat Section
Medium: 1900MHz Head, Frequency: 1900 MHz, Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.44 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3 , Temperature: 20.1
Probe: ET3DV6 - SN1504, ConvF(5.13, 5.13, 5.13)

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.4 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 17 W/kg
SAR(1 g) = 9.43 mW/g; SAR(10 g) = 4.88 mW/g (Advance Extrapolation)
Maximum value of SAR (measured) = 10.7 mW/g

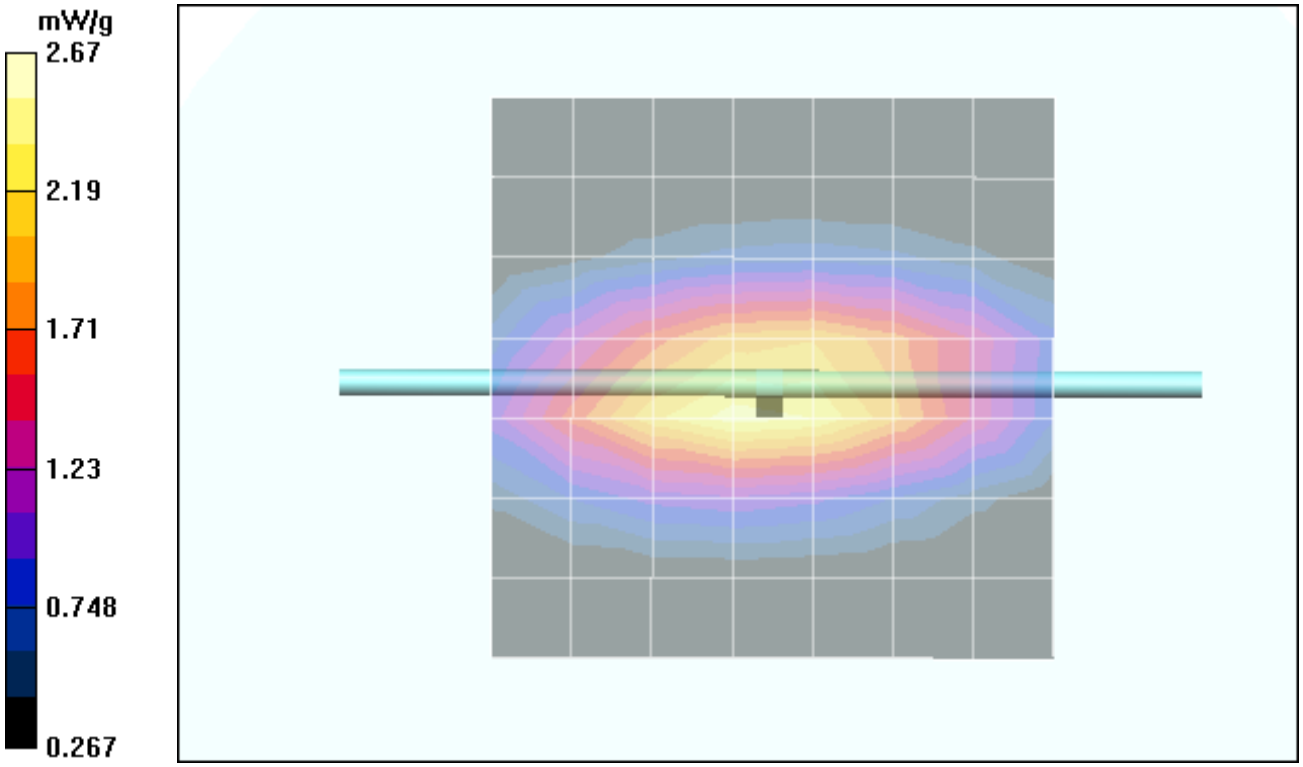


Date: 01/21/05

835MHz Body Validation

Phantom: SAM2 Cellular Body, Phantom section: Flat Section
Medium: 835MHz Body, Frequency: 835 MHz, Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.941 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3 , Temperature: 21.2
Probe: ET3DV6 - SN1504, ConvF(6.3, 6.3, 6.3)

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.4 V/m; Power Drift = -0.006 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 2.47 mW/g; SAR(10 g) = 1.63 mW/g (Advance Extrapolation)
Maximum value of SAR (measured) = 2.67 mW/g

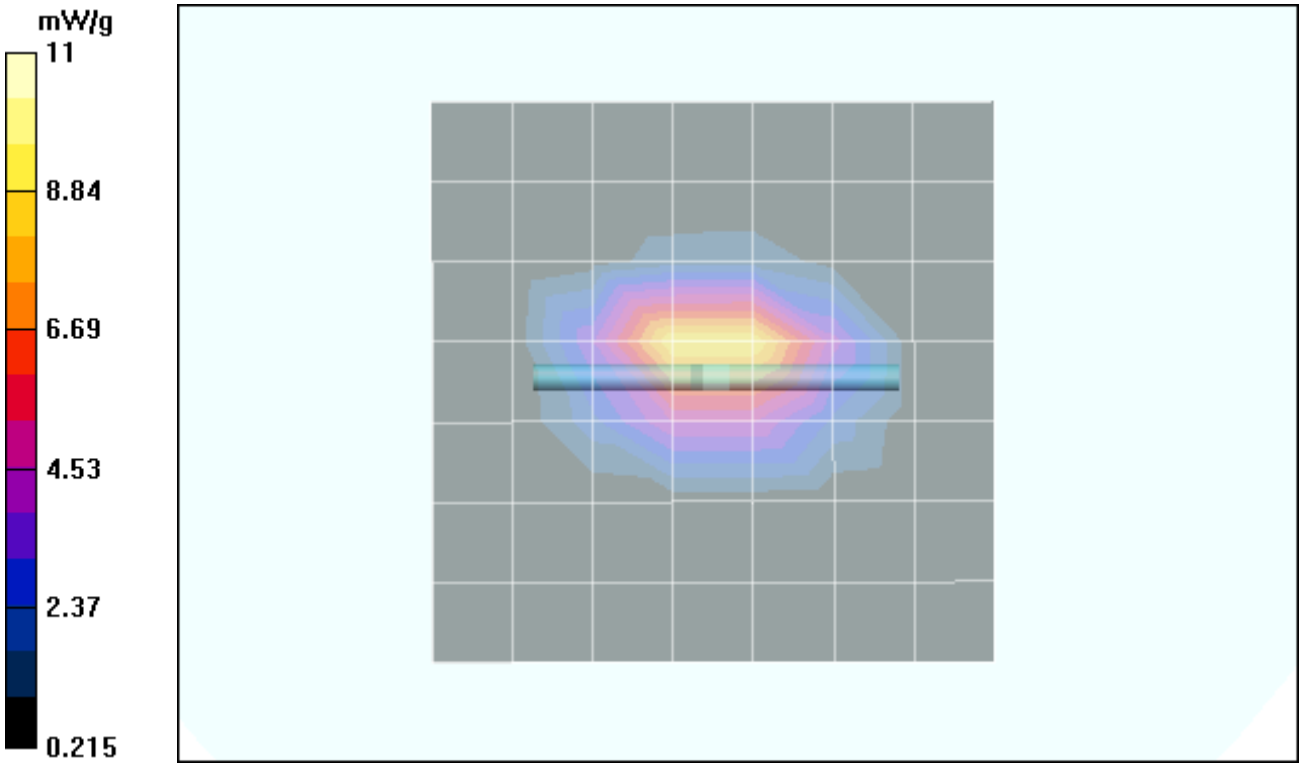


Date: 01/25/05

1900MHz Body Validation

Phantom: SAM3 PCS Head and Body, Phantom section: Flat Section
Medium: 1900MHz Body, Frequency: 1900 MHz, Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.59 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3 , Temperature: 21.1
Probe: ET3DV6 - SN1504, ConvF(4.56, 4.56, 4.56)

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 86.6 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 17.1 W/kg
SAR(1 g) = 9.73 mW/g; SAR(10 g) = 5.09 mW/g (Advance Extrapolation)
Maximum value of SAR (measured) = 11 mW/g



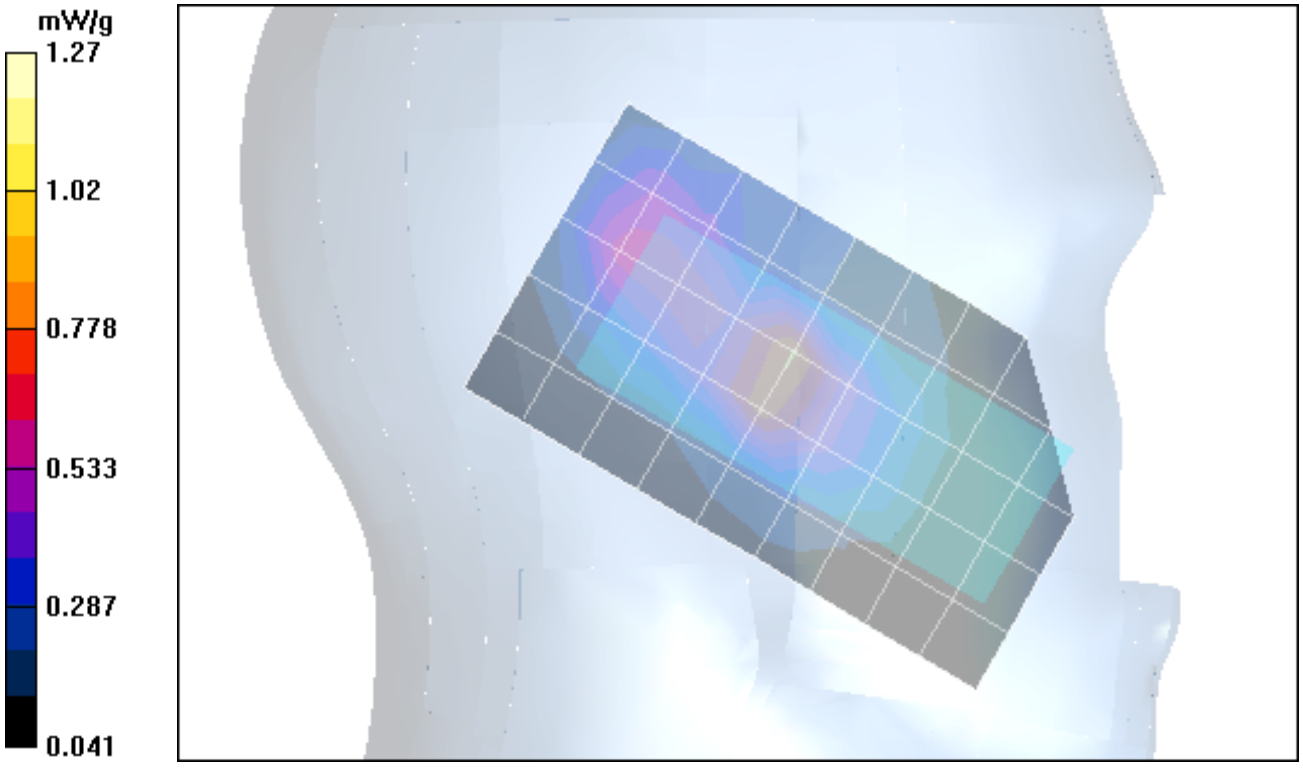
APPENDIX B: MEASUREMENT SCANS

Date: 01/24/05

RM-60, AMPS, Channel 799, Left Cheek Position with BL-6C Battery

Phantom: SAM1 Cellular Head, Phantom section: Left Section
Medium: 835MHz Head, Frequency: 848.97 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 848.97 MHz; σ = 0.913 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3 ,
Temperature: 21.3
Probe: ET3DV6 - SN1504, ConvF(6.73, 6.73, 6.73)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.3 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 3.66 W/kg
SAR(1 g) = 1.22 mW/g; SAR(10 g) = 0.550 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1.27 mW/g

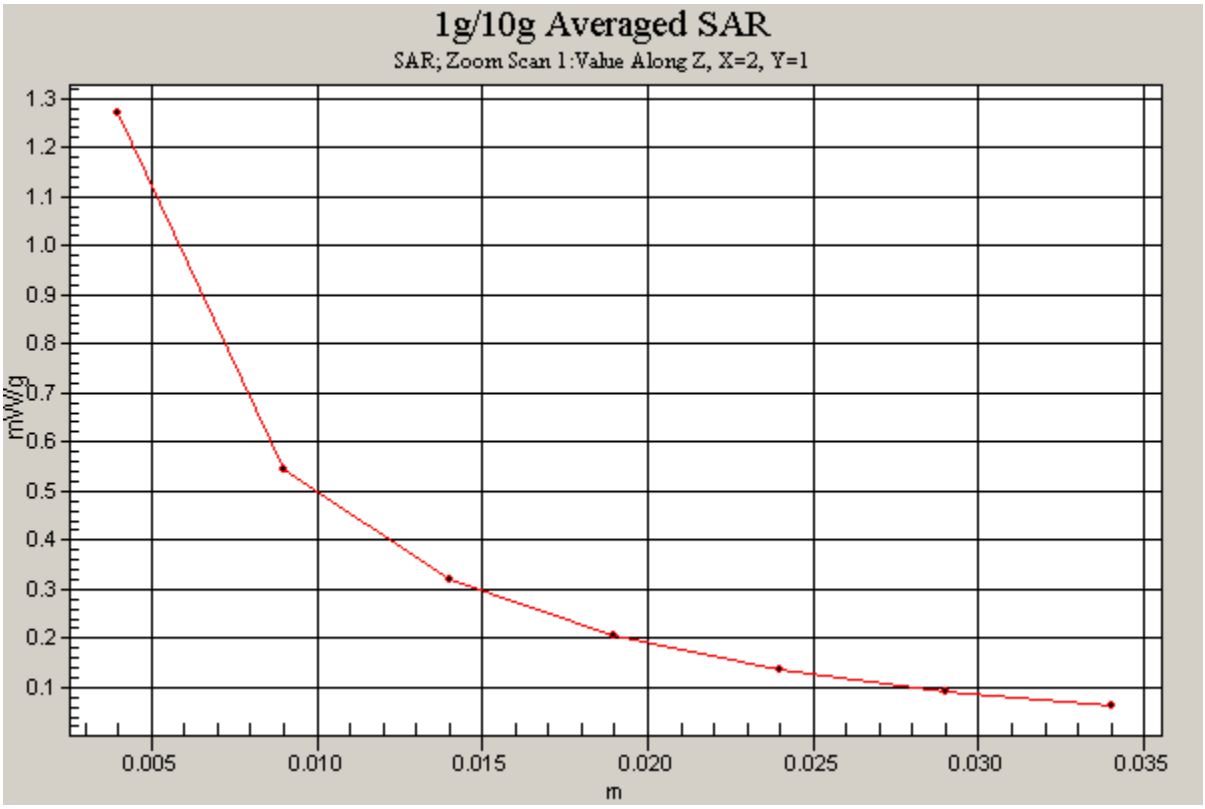


Date: 01/24/05

RM-60, AMPS, Channel 799, Left Cheek Position with BL-6C Battery

Phantom: SAM1 Cellular Head, Phantom section: Left Section
Medium: 835MHz Head, Frequency: 848.97 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 848.97 MHz; σ = 0.913 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3 ,
Temperature: 21.3
Probe: ET3DV6 - SN1504, ConvF(6.73, 6.73, 6.73)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.3 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 3.66 W/kg
SAR(1 g) = 1.22 mW/g; SAR(10 g) = 0.550 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1.27 mW/g



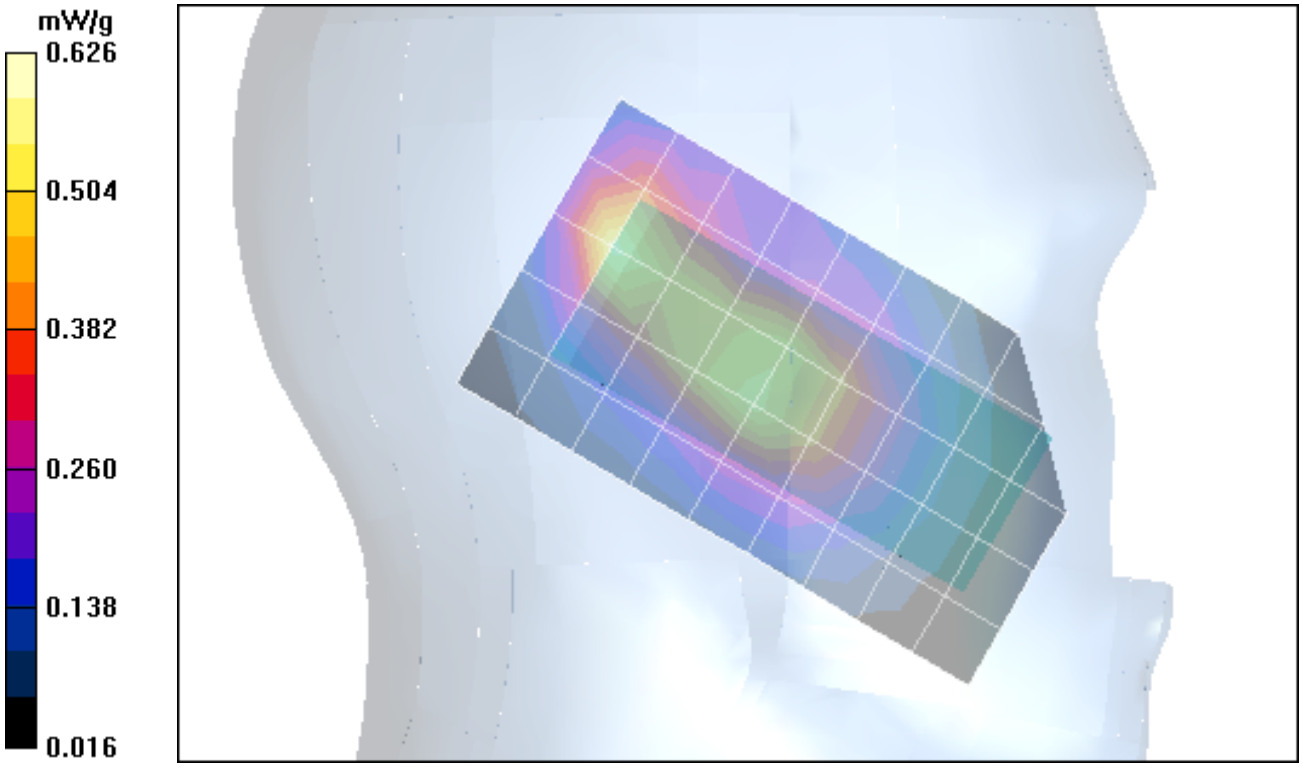
Date: 01/24/05

RM-60, AMPS, Channel 384, Left Tilt Position with BL-6C Battery

Phantom: SAM1 Cellular Head, Phantom section: Left Section
Medium: 835MHz Head, Frequency: 836.52 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.901 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3 ,
Temperature: 21.3
Probe: ET3DV6 - SN1504, ConvF(6.73, 6.73, 6.73)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.1 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 1.27 W/kg
SAR(1 g) = 0.577 mW/g; SAR(10 g) = 0.315 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.626 mW/g

Zoom Scan 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.1 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.595 mW/g; SAR(10 g) = 0.360 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.620 mW/g

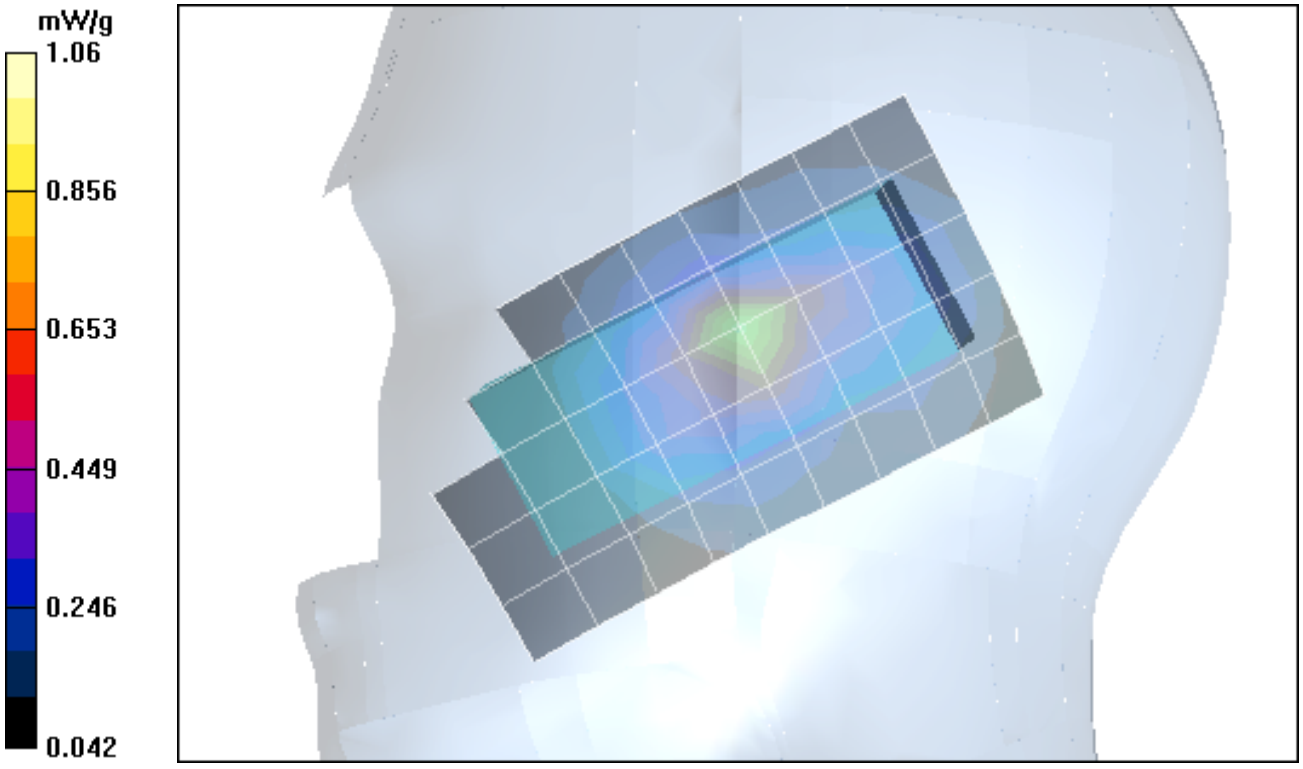


Date: 01/24/05

RM-60, AMPS, Channel 991, Right Cheek Position with BL-6C Battery

Phantom: SAM1 Cellular Head, Phantom section: Right Section
Medium: 835MHz Head, Frequency: 824.04 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 824.04 MHz; σ = 0.891 mho/m; ε_r = 41.6; ρ = 1000 kg/m^3 ,
Temperature: 21.3
Probe: ET3DV6 - SN1504, ConvF(6.73, 6.73, 6.73)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.5 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 2.85 W/kg
SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.529 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1.06 mW/g

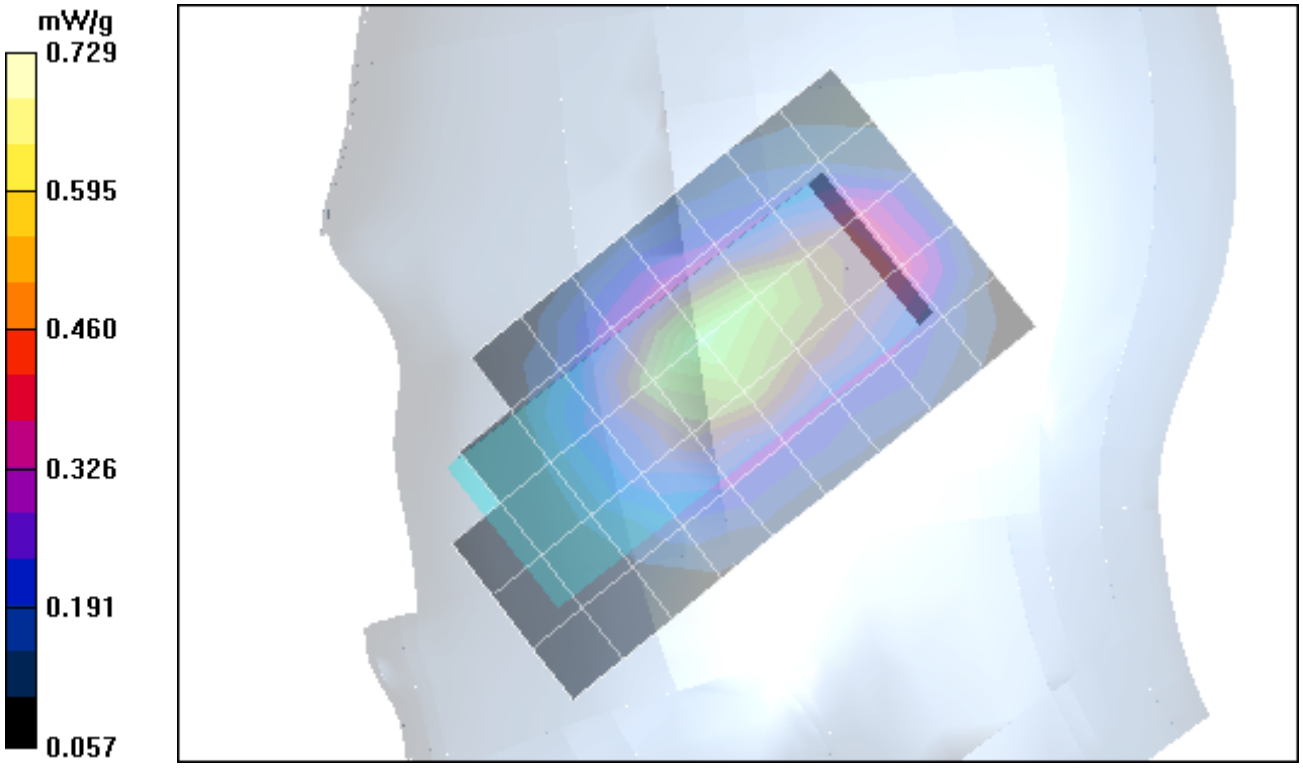


Date: 01/24/05

RM-60, AMPS, Channel 384, Right Tilt Position with BL-6C Battery

Phantom: SAM1 Cellular Head, Phantom section: Right Section
Medium: 835MHz Head, Frequency: 836.52 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.901 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3 ,
Temperature: 21.3
Probe: ET3DV6 - SN1504, ConvF(6.73, 6.73, 6.73)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.678 mW/g; SAR(10 g) = 0.415 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.729 mW/g

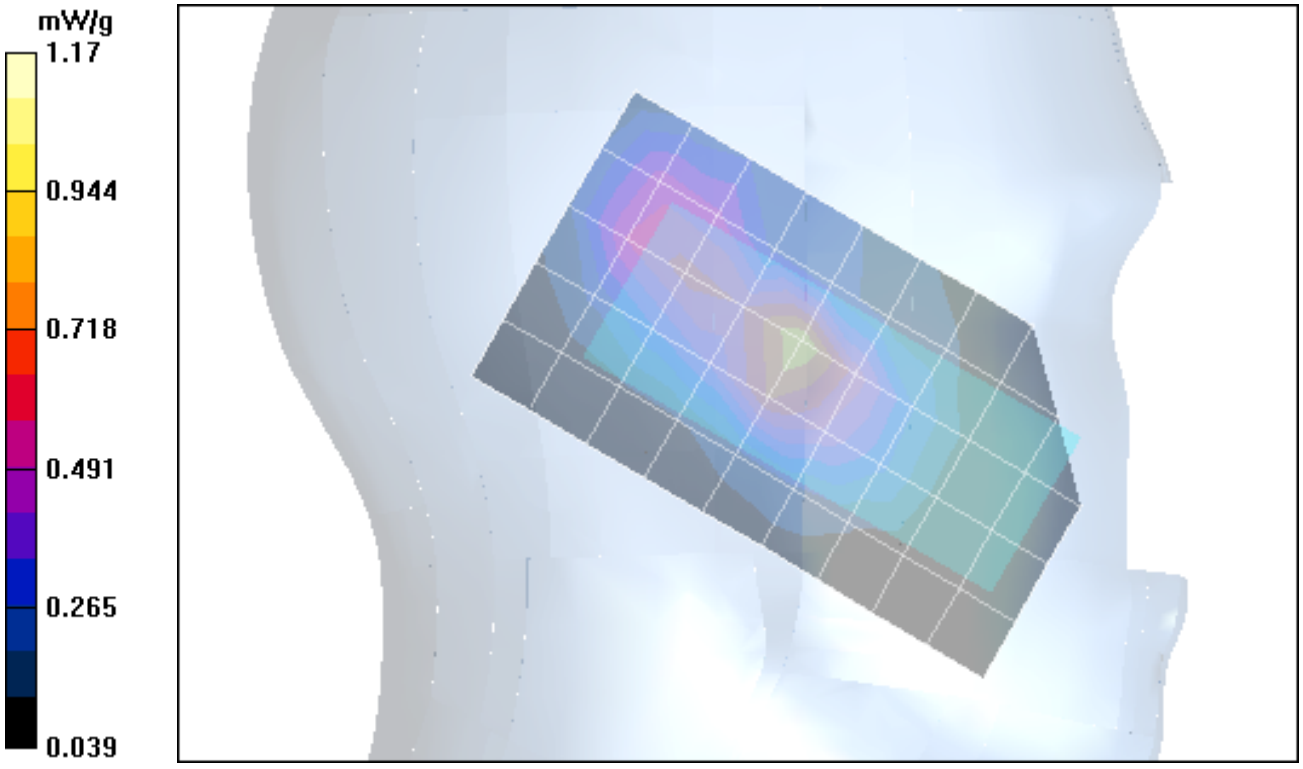


Date: 01/24/05

RM-60, CDMA800, Channel 777, Left Cheek Position with BL-6C Battery

Phantom: SAM1 Cellular Head, Phantom section: Left Section
Medium: 835MHz Head, Frequency: 848.31 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.911 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3 ,
Temperature: 21.3
Probe: ET3DV6 - SN1504, ConvF(6.73, 6.73, 6.73)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.8 V/m; Power Drift = 0.2 dB
Peak SAR (extrapolated) = 3.2 W/kg
SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.521 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1.17 mW/g

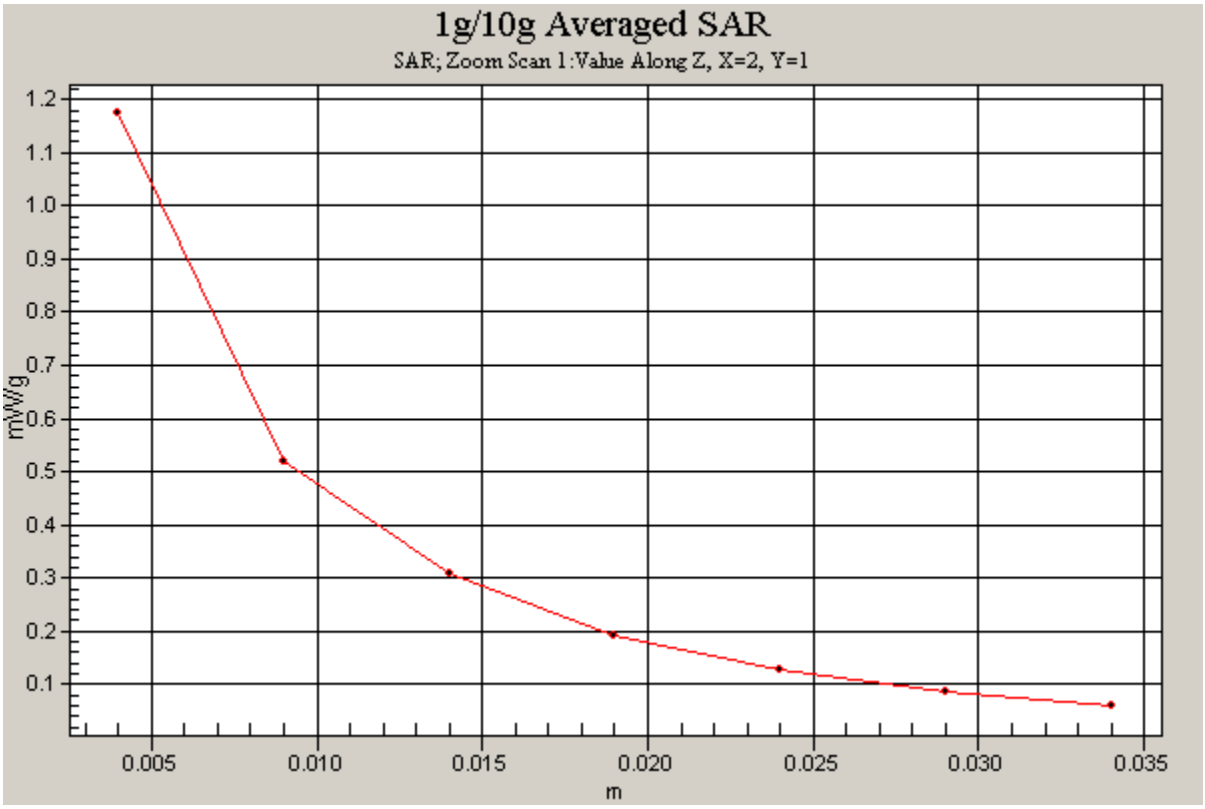


Date: 01/24/05

RM-60, CDMA800, Channel 777, Left Cheek Position with BL-6C Battery

Phantom: SAM1 Cellular Head, Phantom section: Left Section
Medium: 835MHz Head, Frequency: 848.31 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.911 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3 ;
Temperature: 21.3
Probe: ET3DV6 - SN1504, ConvF(6.73, 6.73, 6.73)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.8 V/m; Power Drift = 0.2 dB
Peak SAR (extrapolated) = 3.2 W/kg
SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.521 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1.17 mW/g



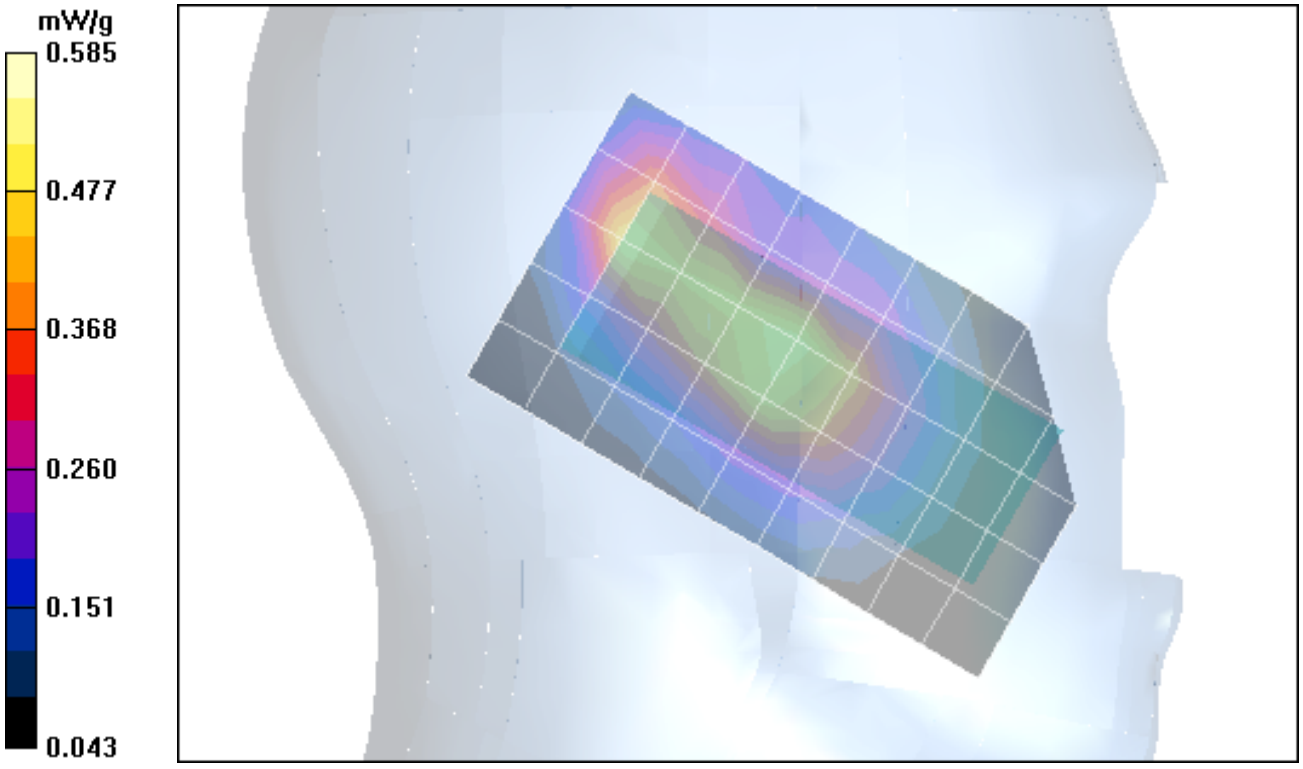
Date: 01/24/05

RM-60, CDMA800, Channel 384, Left Tilt Position with BL-6C Battery

Phantom: SAM1 Cellular Head, Phantom section: Left Section
Medium: 835MHz Head, Frequency: 836.52 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.901 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3 ,
Temperature: 21.3
Probe: ET3DV6 - SN1504, ConvF(6.73, 6.73, 6.73)

Zoom Scan 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.9 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.528 mW/g; SAR(10 g) = 0.292 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.576 mW/g

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.9 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.562 mW/g; SAR(10 g) = 0.339 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.585 mW/g

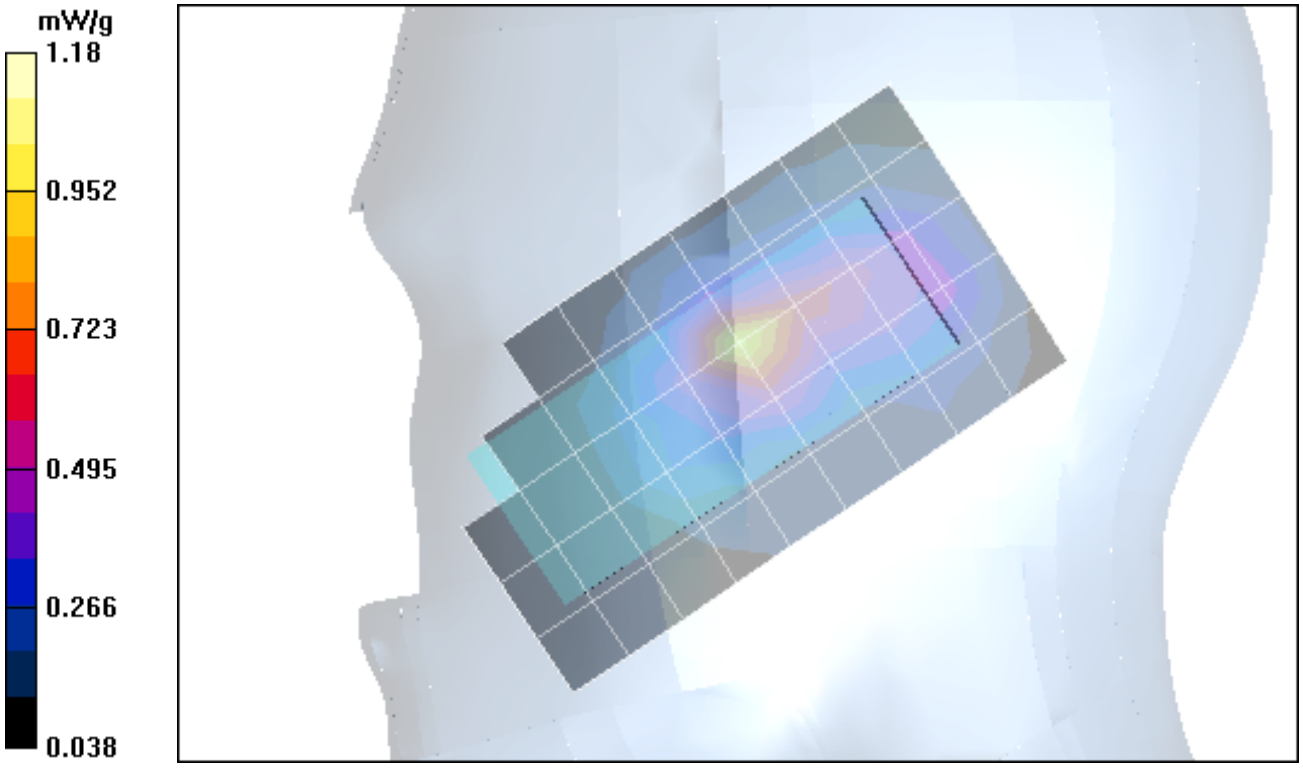


Date: 01/24/05

RM-60, CDMA800, Channel 777, Right Cheek Position with BL-6C Battery

Phantom: SAM1 Cellular Head, Phantom section: Right Section
Medium: 835MHz Head, Frequency: 848.31 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.911 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3 ,
Temperature: 21.3
Probe: ET3DV6 - SN1504, ConvF(6.73, 6.73, 6.73)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.3 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 3.26 W/kg
SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.504 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1.18 mW/g

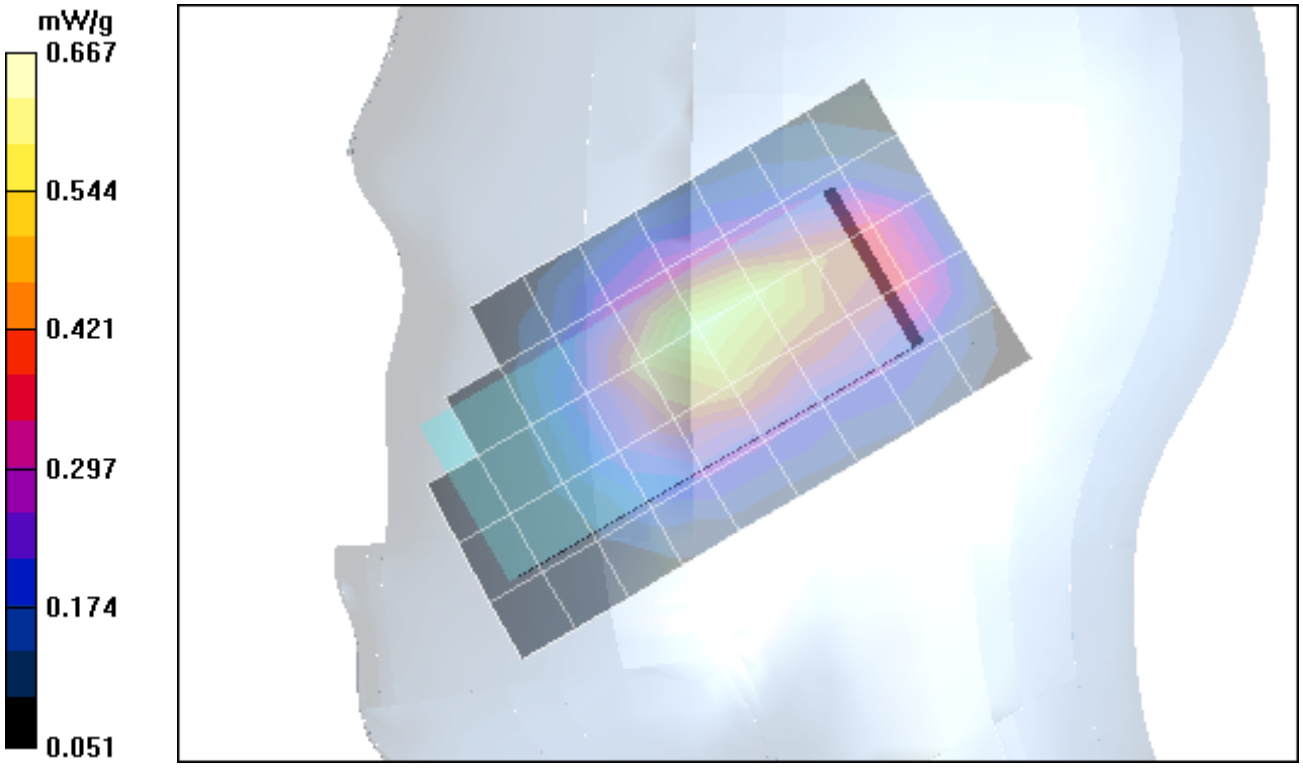


Date: 01/24/05

RM-60, CDMA800, Channel 384, Right Tilt Position with BL-6C Battery

Phantom: SAM1 Cellular Head, Phantom section: Right Section
Medium: 835MHz Head, Frequency: 836.52 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.901 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3 ,
Temperature: 21.3
Probe: ET3DV6 - SN1504, ConvF(6.73, 6.73, 6.73)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.2 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.624 mW/g; SAR(10 g) = 0.383 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.667 mW/g



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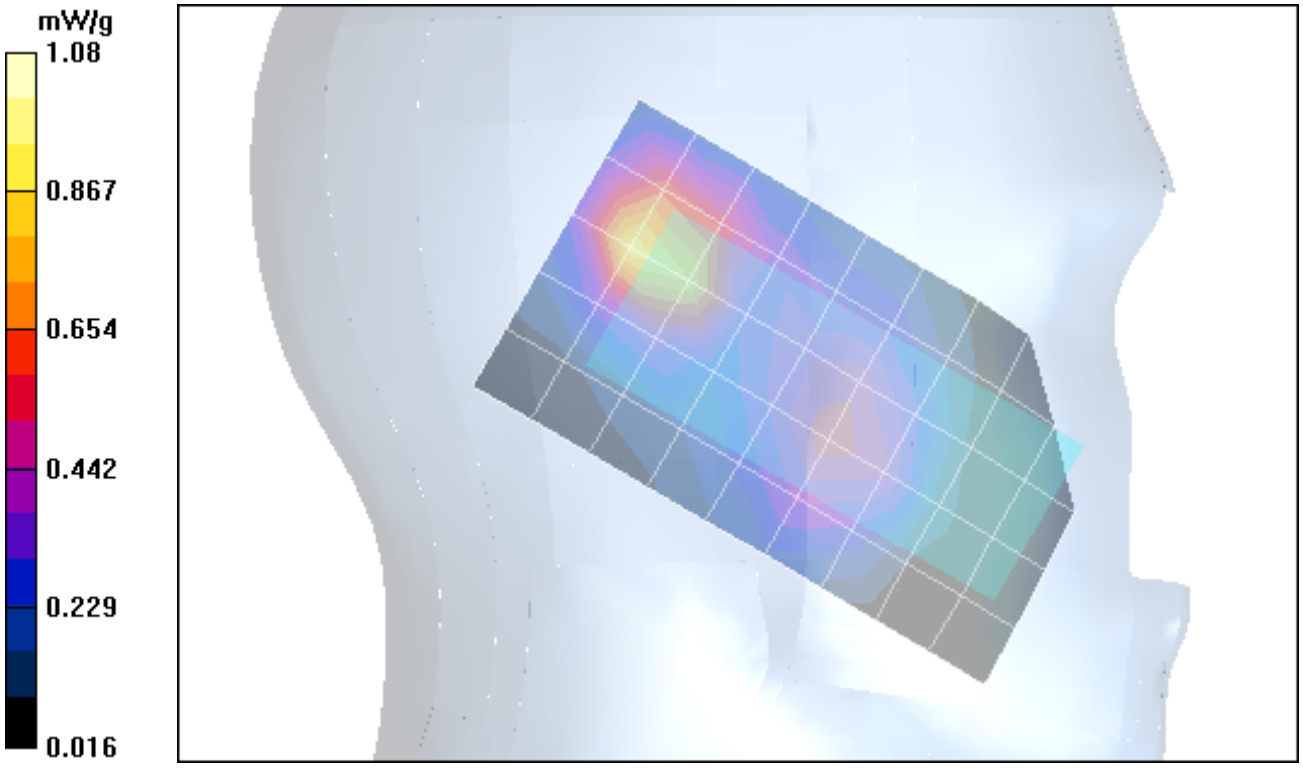
RM-60, CDMA1900, Channel 600, Left Cheek Position with BL-6C Battery

Phantom: SAM3 PCS Head and Body, Phantom section: Left Section
Medium: 1900MHz Head, Frequency: 1880 MHz, Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3 , Temperature: 20.1
Probe: ET3DV6 - SN1504, ConvF(5.13, 5.13, 5.13)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.5 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 2.23 W/kg
SAR(1 g) = 1 mW/g; SAR(10 g) = 0.511 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1.08 mW/g

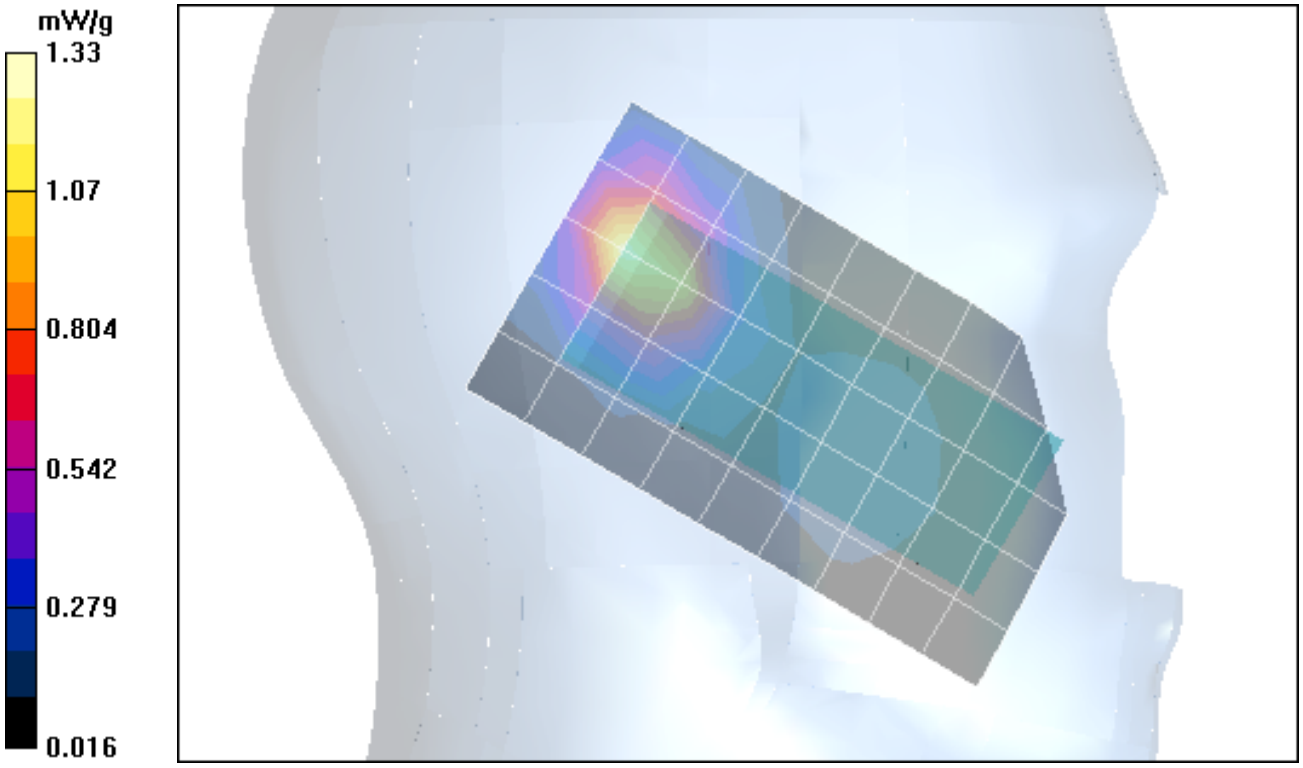


Date: 01/20/05

RM-60, CDMA1900, Channel 600, Left Tilt Position with BL-6C Battery

Phantom: SAM3 PCS Head and Body, Phantom section: Left Section
Medium: 1900MHz Head, Frequency: 1880 MHz, Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3 , Temperature: 20.1
Probe: ET3DV6 - SN1504, ConvF(5.13, 5.13, 5.13)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.9 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 2.72 W/kg
SAR(1 g) = 1.24 mW/g; SAR(10 g) = 0.630 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1.33 mW/g

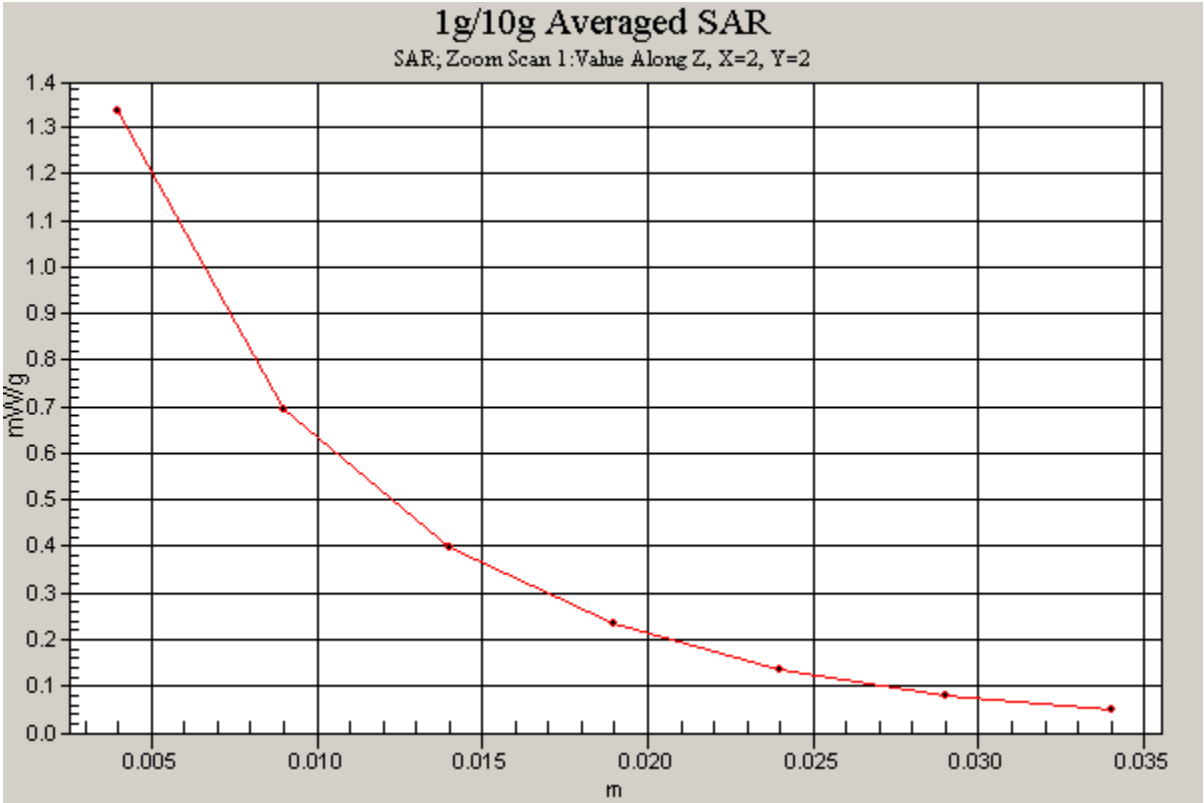


Date: 01/20/05

RM-60, CDMA1900, Channel 600, Left Tilt Position with BL-6C Battery

Phantom: SAM3 PCS Head and Body, Phantom section: Left Section
Medium: 1900MHz Head, Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3 ; Temperature: 20.1
Probe: ET3DV6 - SN1504, ConvF(5.13, 5.13, 5.13)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.9 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 2.72 W/kg
SAR(1 g) = 1.24 mW/g; SAR(10 g) = 0.630 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1.33 mW/g



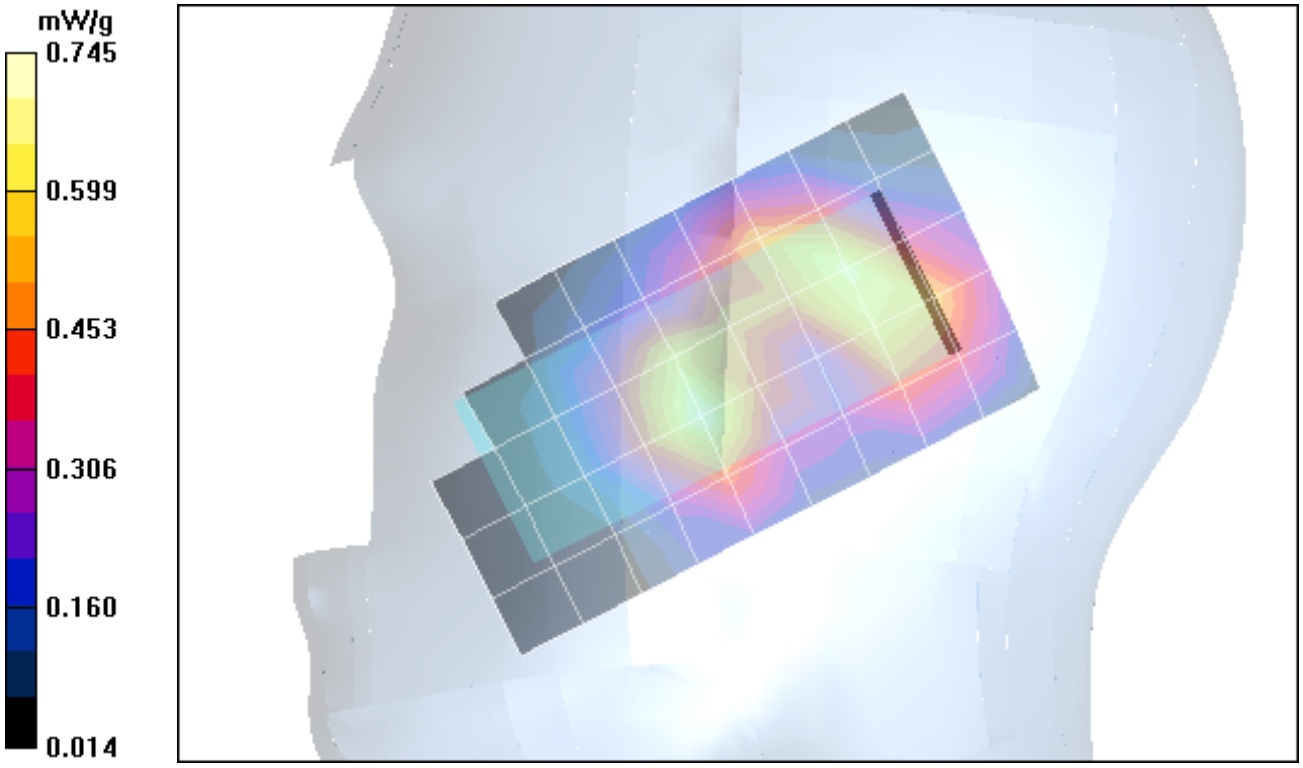
Date: 01/20/05

RM-60, CDMA1900, Channel 600, Right Cheek Position with BL-6C Battery

Phantom: SAM3 PCS Head and Body, Phantom section: Right Section
Medium: 1900MHz Head, Frequency: 1880 MHz, Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3 , Temperature: 20.1
Probe: ET3DV6 - SN1504, ConvF(5.13, 5.13, 5.13)

Zoom Scan 2(7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 1.34 W/kg
SAR(1 g) = 0.685 mW/g; SAR(10 g) = 0.389 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.734 mW/g

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.695 mW/g; SAR(10 g) = 0.396 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.745 mW/g

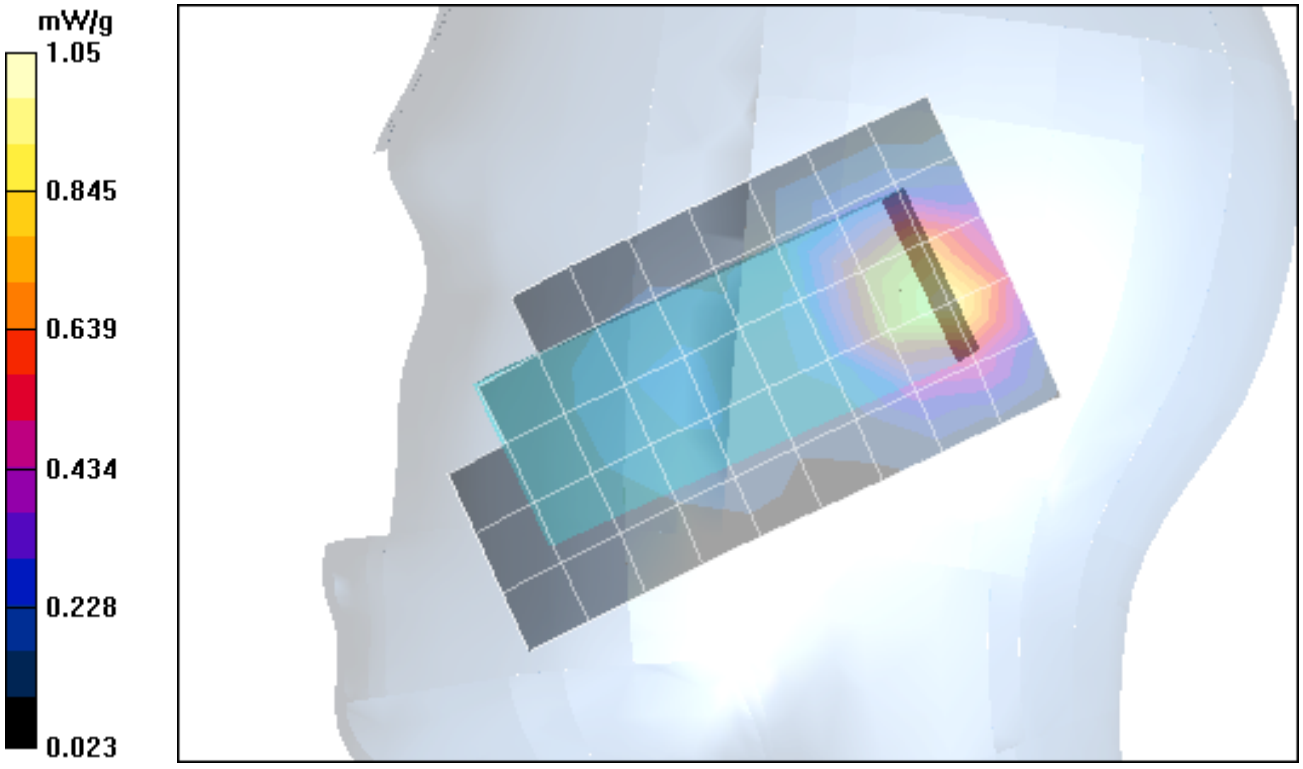


Date: 01/20/05

RM-60, CDMA1900, Channel 25, Right Tilt Position with BL-6C Battery

Phantom: SAM3 PCS Head and Body, Phantom section: Right Section
Medium: 1900MHz Head, Frequency: 1851.25 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.39 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3 ,
Temperature: 20.1
Probe: ET3DV6 - SN1504, ConvF(5.13, 5.13, 5.13)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.5 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 2.04 W/kg
SAR(1 g) = 0.984 mW/g; SAR(10 g) = 0.533 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1.05 mW/g

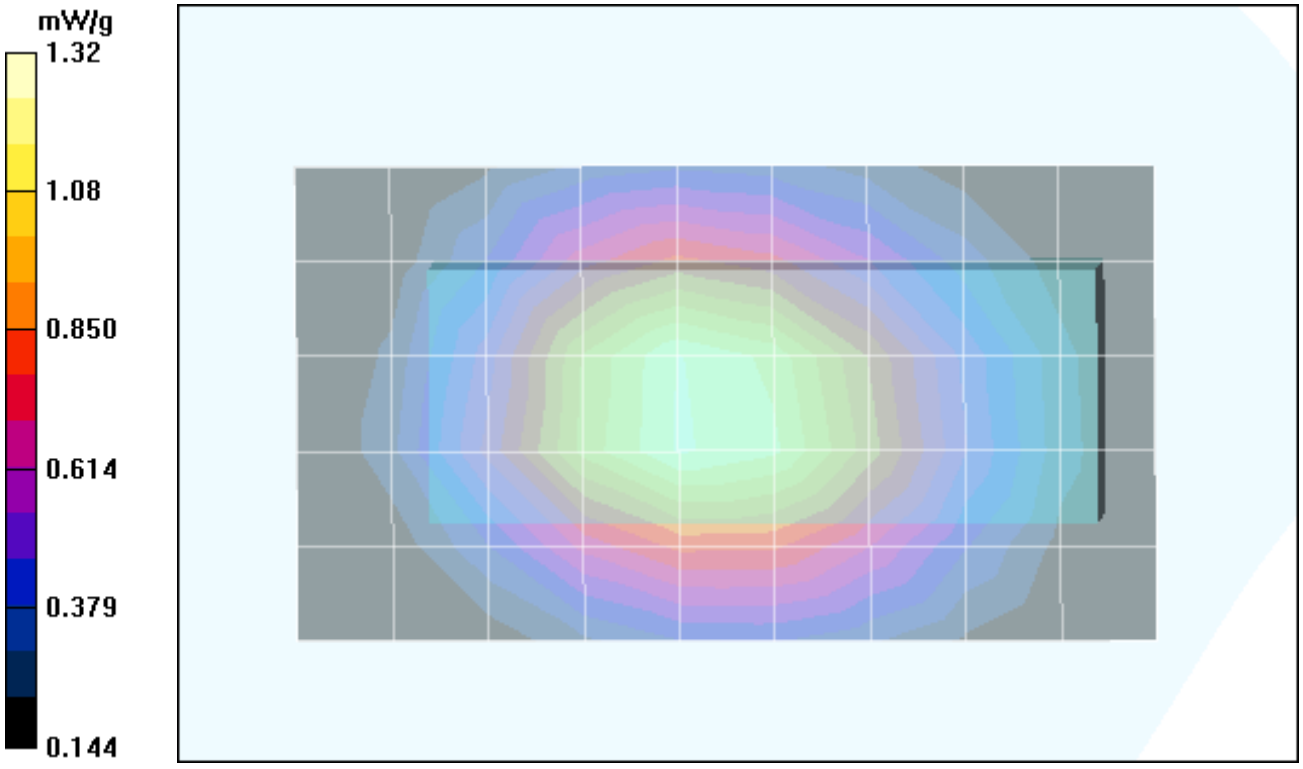


Date: 01/21/05

RM-60, AMPS, Channel 384, Flat Position with 2.2cm Spacer and BL-6C Battery

Phantom: SAM2 Cellular Body, Phantom section: Flat Section
Medium: 835MHz Body, Frequency: 836.52 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.945 mho/m; εr = 53.8; ρ = 1000 kg/m^3 ,
Temperature: 21.2
Probe: ET3DV6 - SN1504, ConvF(6.3, 6.3, 6.3)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.2 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 1.86 W/kg
SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.880 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1.32 mW/g

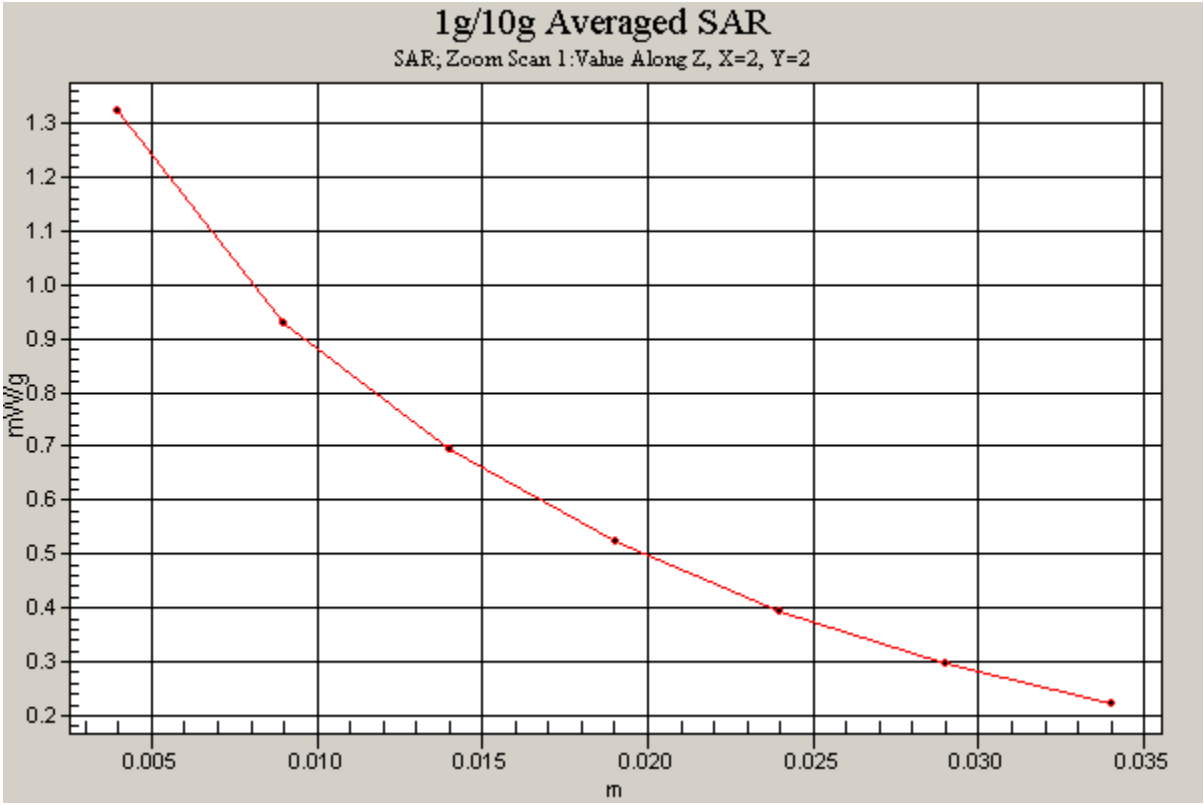


Date: 01/21/05

RM-60, AMPS, Channel 384, Flat Position with 2.2cm Spacer and BL-6C Battery

Phantom: SAM2 Cellular Body, Phantom section: Flat Section
Medium: 835MHz Body, Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.945 mho/m; εr = 53.8; ρ = 1000 kg/m^3 ;
Temperature: 21.2
Probe: ET3DV6 - SN1504, ConvF(6.3, 6.3, 6.3)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.2 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 1.86 W/kg
SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.880 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1.32 mW/g

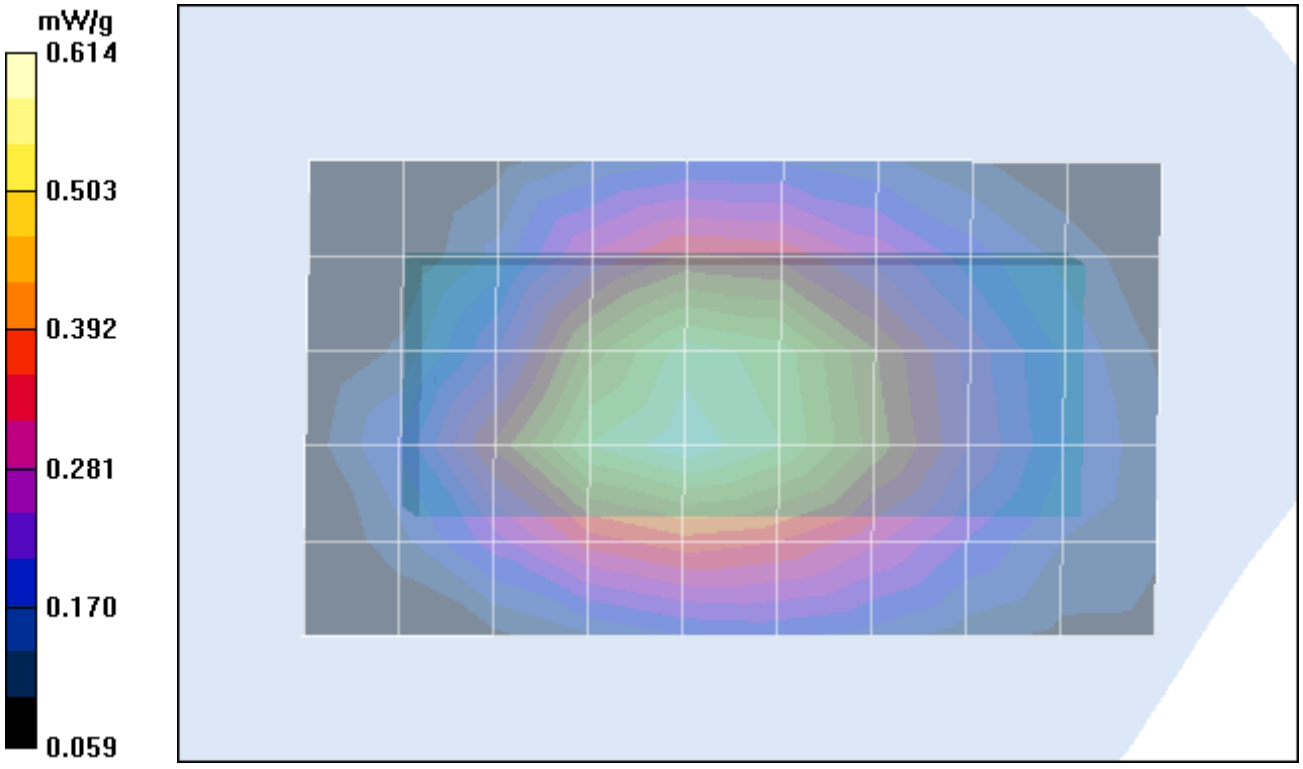


Date: 01/21/05

RM-60, AMPS, Channel 384, Flat Position with 2.2cm Spacer, BL-6C Battery and HDS-3 Headset

Phantom: SAM2 Cellular Body, Phantom section: Flat Section
Medium: 835MHz Body, Frequency: 836.52 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.945 mho/m; εr = 53.8; ρ = 1000 kg/m^3 ,
Temperature: 21.2
Probe: ET3DV6 - SN1504, ConvF(6.3, 6.3, 6.3)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.4 V/m; Power Drift = -0.2 dB
Peak SAR (extrapolated) = 0.868 W/kg
SAR(1 g) = 0.580 mW/g; SAR(10 g) = 0.403 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.614 mW/g

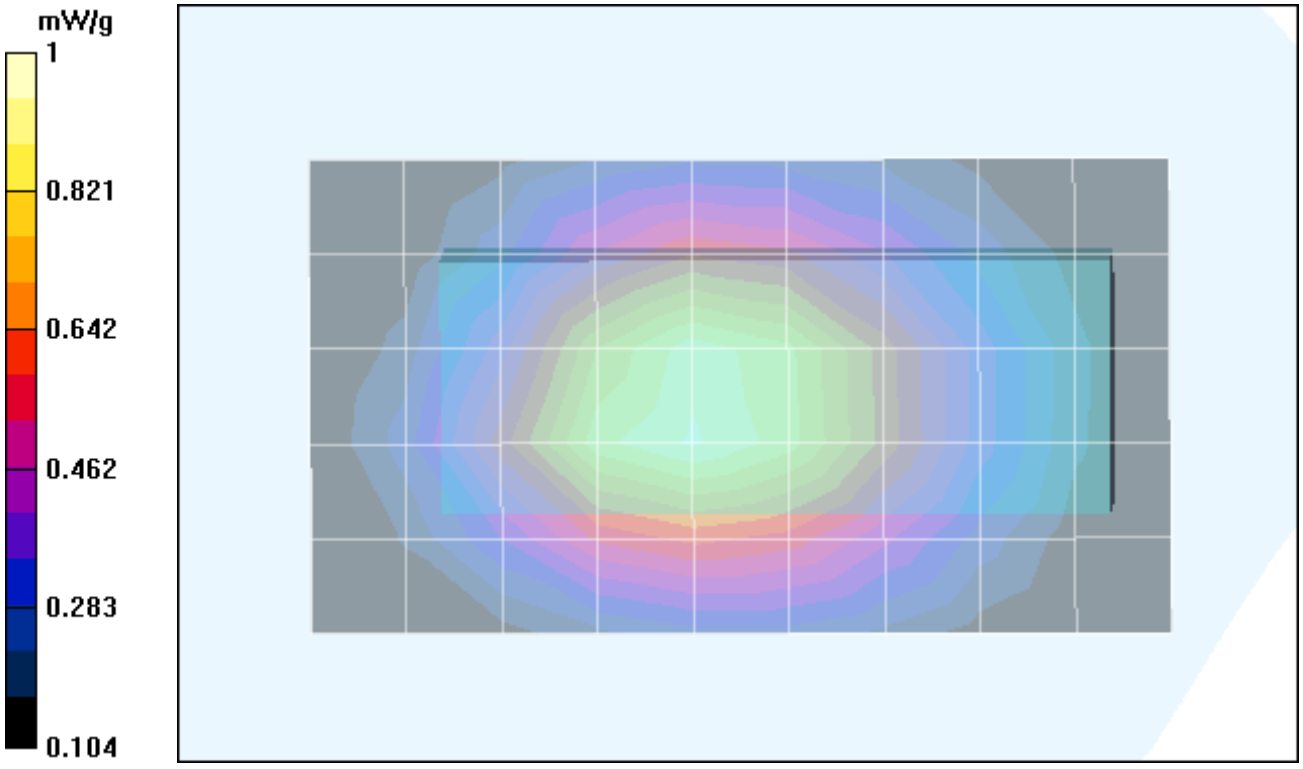


Date: 01/21/05

RM-60, AMPS, Channel 384, Flat Position with 2.2cm Spacer, BL-6C Battery and HS-9 Headset

Phantom: SAM2 Cellular Body, Phantom section: Flat Section
Medium: 835MHz Body, Frequency: 836.52 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.945 mho/m; εr = 53.8; ρ = 1000 kg/m^3 ,
Temperature: 21.2
Probe: ET3DV6 - SN1504, ConvF(6.3, 6.3, 6.3)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.9 V/m; Power Drift = 0.0 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.950 mW/g; SAR(10 g) = 0.664 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1 mW/g

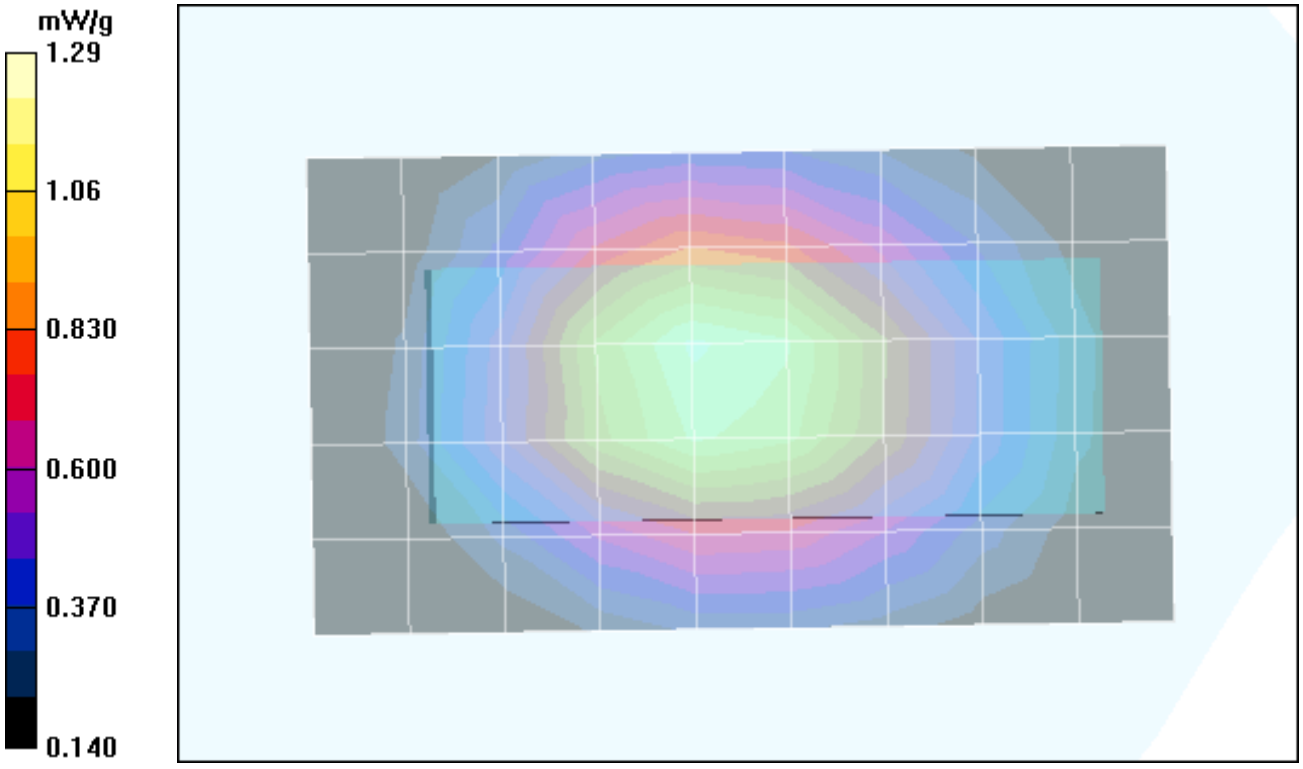


Date: 01/21/05

RM-60, CDMA800, Channel 384, Flat Position with 2.2cm Spacer and BL-6C Battery

Phantom: SAM2 Cellular Body, Phantom section: Flat Section
Medium: 835MHz Body, Frequency: 836.52 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.945 mho/m; εr = 53.8; ρ = 1000 kg/m^3 ,
Temperature: 21.2
Probe: ET3DV6 - SN1504, ConvF(6.3, 6.3, 6.3)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.6 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 1.84 W/kg
SAR(1 g) = 1.22 mW/g; SAR(10 g) = 0.856 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1.29 mW/g

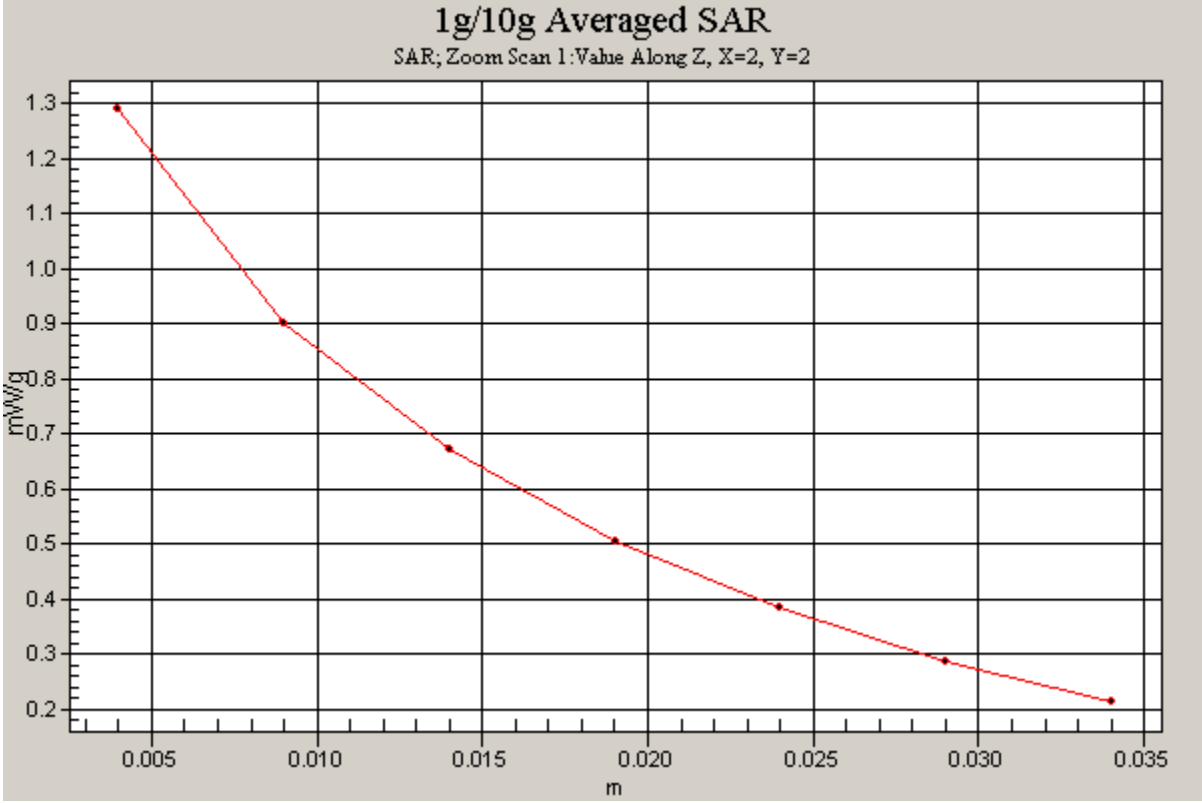


Date: 01/21/05

RM-60, CDMA800, Channel 384, Flat Position with 2.2cm Spacer and BL-6C Battery

Phantom: SAM2 Cellular Body, Phantom section: Flat Section
Medium: 835MHz Body, Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.945 mho/m; εr = 53.8; ρ = 1000 kg/m^3 ;
Temperature: 21.2
Probe: ET3DV6 - SN1504, ConvF(6.3, 6.3, 6.3)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.6 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 1.84 W/kg
SAR(1 g) = 1.22 mW/g; SAR(10 g) = 0.856 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 1.29 mW/g

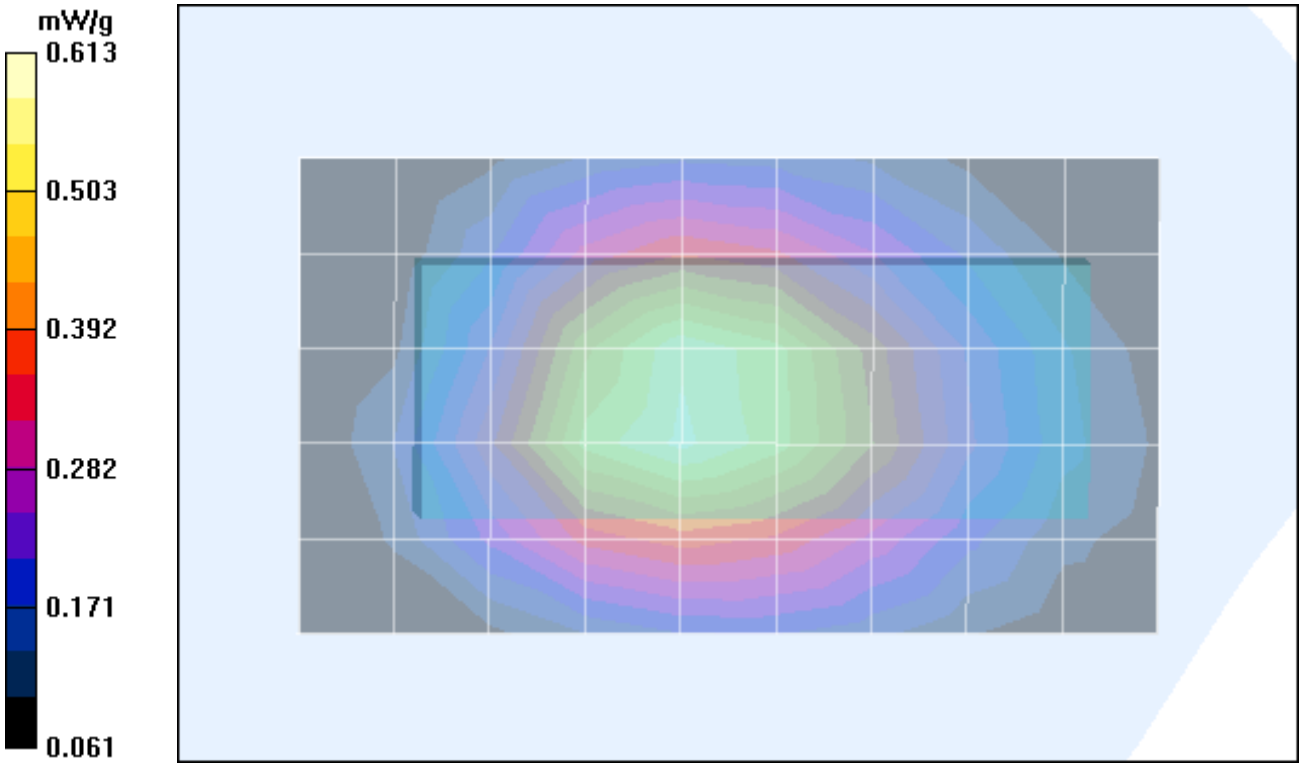


Date: 01/21/05

RM-60, CDMA800, Channel 384, Flat Position with 2.2cm Spacer, BL-6C Battery and HDS-3 Headset

Phantom: SAM2 Cellular Body, Phantom section: Flat Section
Medium: 835MHz Body, Frequency: 836.52 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.945 mho/m; εr = 53.8; ρ = 1000 kg/m^3 ,
Temperature: 21.2
Probe: ET3DV6 - SN1504, ConvF(6.3, 6.3, 6.3)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.9 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 0.871 W/kg
SAR(1 g) = 0.583 mW/g; SAR(10 g) = 0.408 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.613 mW/g

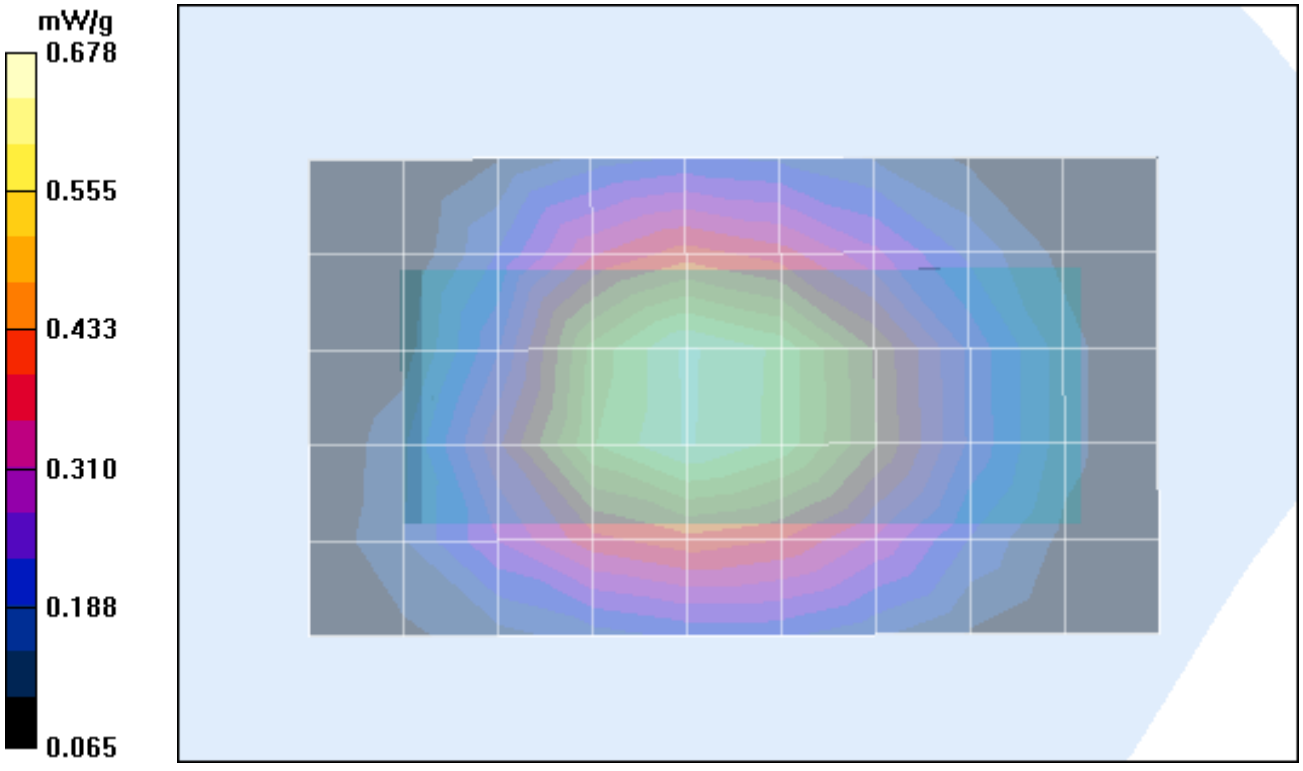


Date: 01/21/05

RM-60, CDMA800, Channel 384, Flat Position with 2.2cm Spacer, BL-6C Battery and HS-9 Headset

Phantom: SAM2 Cellular Body, Phantom section: Flat Section
Medium: 835MHz Body, Frequency: 836.52 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.945 mho/m; εr = 53.8; ρ = 1000 kg/m^3 ,
Temperature: 21.2
Probe: ET3DV6 - SN1504, ConvF(6.3, 6.3, 6.3)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.5 V/m; Power Drift = -0.007 dB
Peak SAR (extrapolated) = 0.960 W/kg
SAR(1 g) = 0.643 mW/g; SAR(10 g) = 0.450 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.678 mW/g

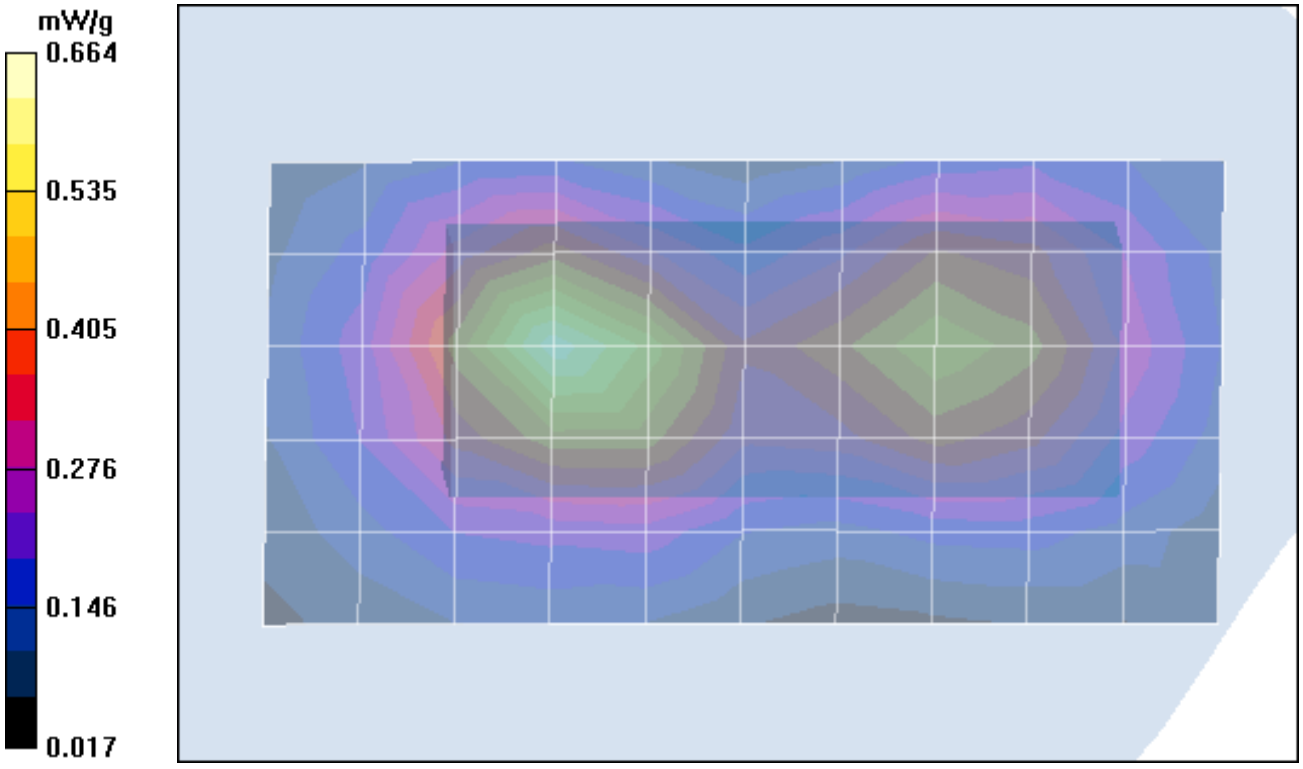


Date: 01/25/05

RM-60, CDMA1900, Channel 1175, Flat Position with 2.2cm Spacer and BL-6C Battery

Phantom: SAM3 PCS Head and Body, Phantom section: Flat Section
Medium: 1900MHz Body, Frequency: 1908.75 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.6 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3 ,
Temperature: 21.1
Probe: ET3DV6 - SN1504, ConvF(4.56, 4.56, 4.56)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.636 mW/g; SAR(10 g) = 0.359 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.664 mW/g

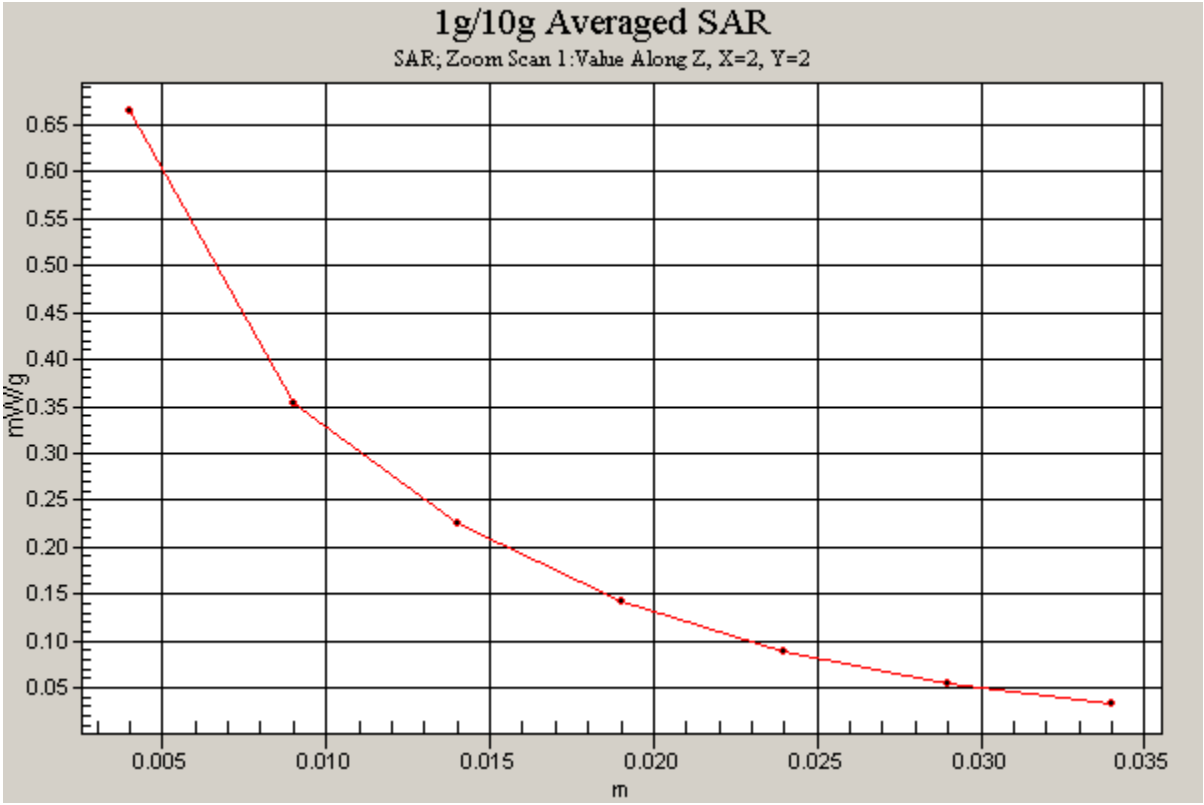


Date: 01/25/05

RM-60, CDMA1900, Channel 1175, Flat Position with 2.2cm Spacer and BL-6C Battery

Phantom: SAM3 PCS Head and Body, Phantom section: Flat Section
Medium: 1900MHz Body, Frequency: 1908.75 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.6 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3 ;
Temperature: 21.1
Probe: ET3DV6 - SN1504, ConvF(4.56, 4.56, 4.56)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.636 mW/g; SAR(10 g) = 0.359 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.664 mW/g



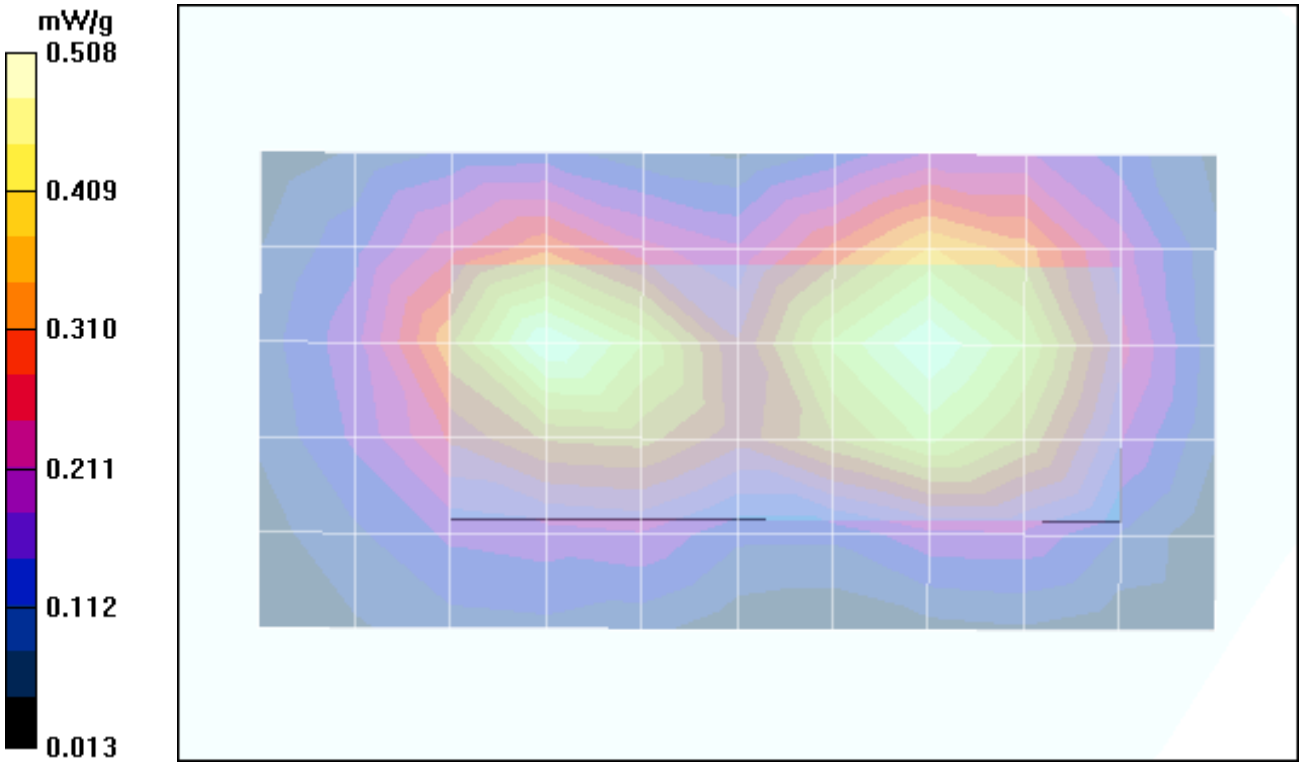
Date: 01/25/05

RM-60, CDMA1900, Channel 1175, Flat Position with 2.2cm Spacer, BL-6C Battery and HDS-3 Headset

Phantom: SAM3 PCS Head and Body, Phantom section: Flat Section
Medium: 1900MHz Body, Frequency: 1908.75 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.6 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3 ,
Temperature: 21.1
Probe: ET3DV6 - SN1504, ConvF(4.56, 4.56, 4.56)

Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.3 V/m; Power Drift = -0.3 dB
Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.484 mW/g; SAR(10 g) = 0.274 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.503 mW/g

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.3 V/m; Power Drift = -0.2 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.489 mW/g; SAR(10 g) = 0.278 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.508 mW/g

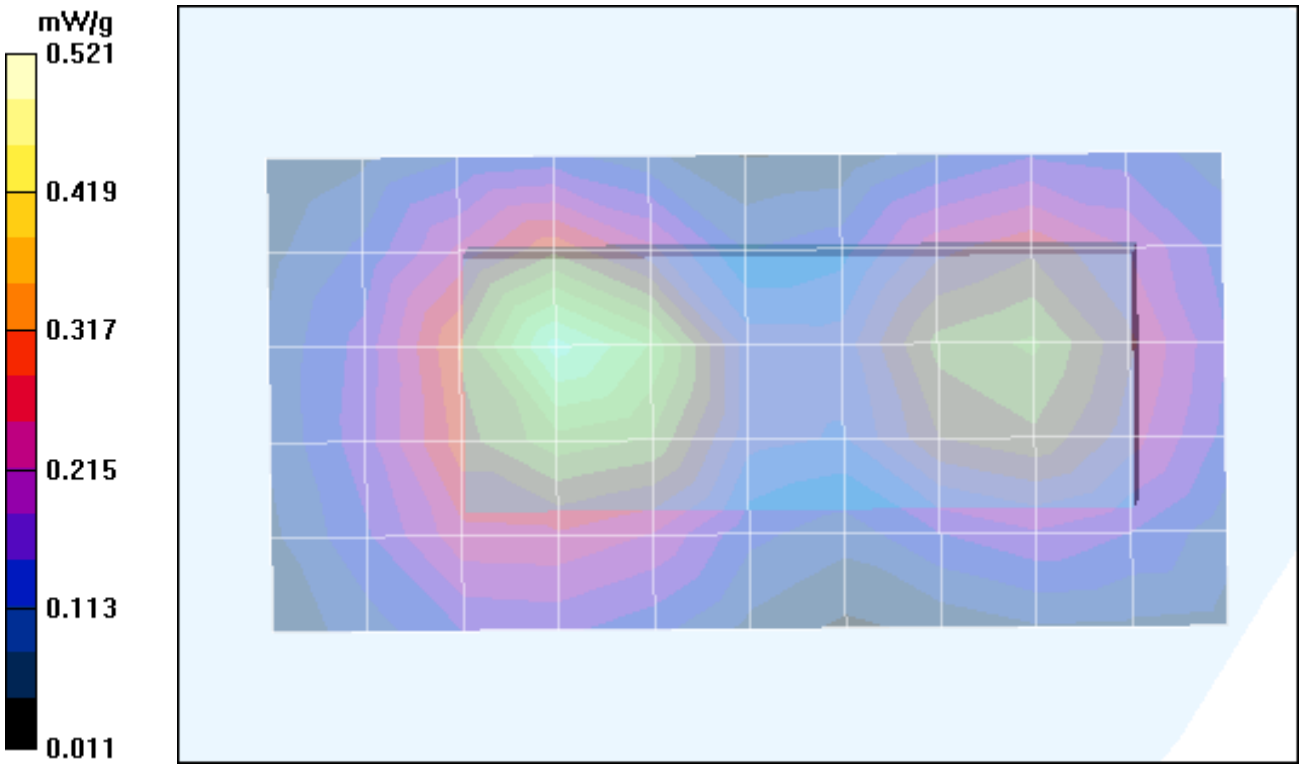


Date: 01/25/05

RM-60, CDMA1900, Channel 1175, Flat Position with 2.2cm Spacer, BL-6C Battery and HS-9 Headset

Phantom: SAM3 PCS Head and Body, Phantom section: Flat Section
Medium: 1900MHz Body, Frequency: 1908.75 MHz, Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.6 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3 ,
Temperature: 21.1
Probe: ET3DV6 - SN1504, ConvF(4.56, 4.56, 4.56)

Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.3 V/m; Power Drift = -0.0 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.496 mW/g; SAR(10 g) = 0.284 mW/g (Worst Case Extrapolation)
Maximum value of SAR (measured) = 0.521 mW/g



APPENDIX C: RELEVANT PAGES FROM PROBE CALIBRATION REPORT(S)

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client Nokia TX

Certificate No: ET3-1504_Sep04

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1504
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	September 22, 2004
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	3-Apr-03 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	3-Apr-03 (METAS, No. 251-00404)	Aug-05
Reference Probe ES3DV2	SN:3013	8-Jan-04 (SPEAG, No. ES3-3013_Jan04)	Jan-05
DAE4	SN: 617	26-May-04 (SPEAG, No. DAE4-617_May04)	May-05

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-03)	In house check: Nov 04

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 24, 2004

DASY - Parameters of Probe: ET3DV6 SN:1504

Sensitivity in Free Space[A]

NormX	**2.18** ± 9.9%	$\mu V/(V/m)^2$	DCP X	**91** mV
NormY	**1.82** ± 9.9%	$\mu V/(V/m)^2$	DCP Y	**91** mV
NormZ	**1.72** ± 9.9%	$\mu V/(V/m)^2$	DCP Z	**91** mV

Diode Compression[B]

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	9.3	4.8
SAR_{be} [%]	With Correction Algorithm	0.1	0.1

TSL **1900 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	13.9	9.3
SAR_{be} [%]	With Correction Algorithm	0.7	0.2

Sensor Offset

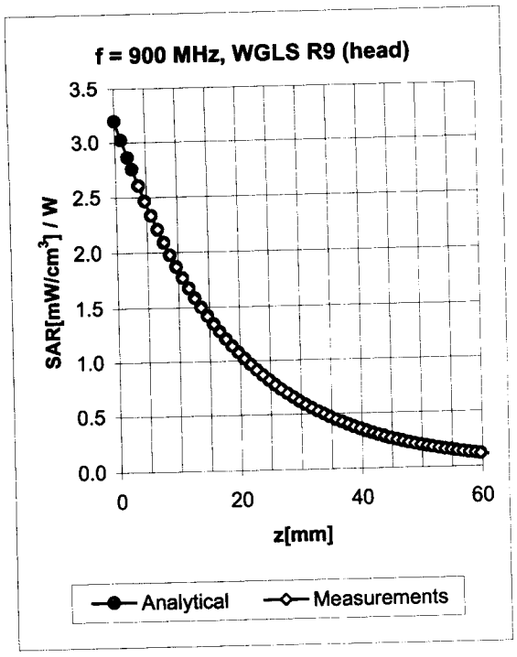
Probe Tip to Sensor Center	**2.7** mm

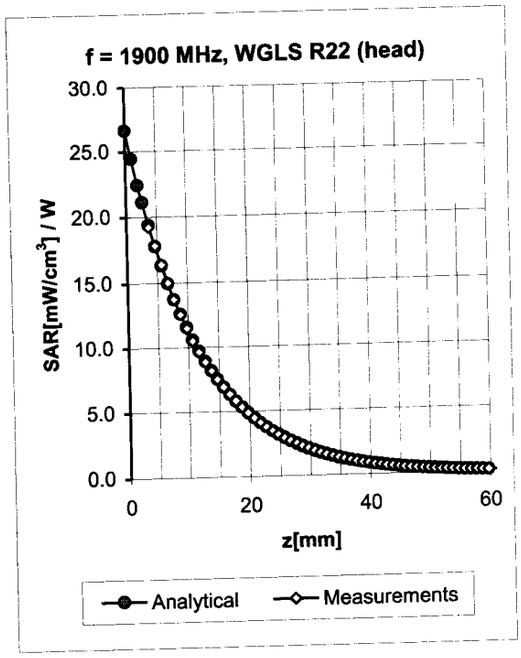
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

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%	0.77	1.65	6.73 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.73	1.73	6.42 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.72	2.06	5.30 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.64	2.30	5.13 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.74	2.24	4.54 ± 11.8% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.60	1.94	6.30 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.59	2.00	6.03 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.63	2.55	4.67 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.62	2.65	4.56 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.80	1.95	4.32 ± 11.8% (k=2)

[C] The validity of ± 100 MHz only applies for DASY 4.3 B17 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.

APPENDIX D: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORT(S)

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

Client Nokia Inc., Texas

CALIBRATION CERTIFICATE

Object(s) D835V2 - SN:455

Calibration procedure(s) QA CAL-05 v2
Calibration procedure for dipole validation kits

Calibration date: October 3, 2003

Condition of the calibrated item In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
Power sensor HP 8481A	US37292783	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Power meter EPM E442	GB37480704	30-Oct-02 (METAS, No. 252-0236)	Oct-03
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03

	Name	Function	Signature
Calibrated by:	Judith Mueller	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: October 10, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

3453

ConvF(6.7, 6.7, 6.7)Date/Time: 10/03/03 13:02:25

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN455

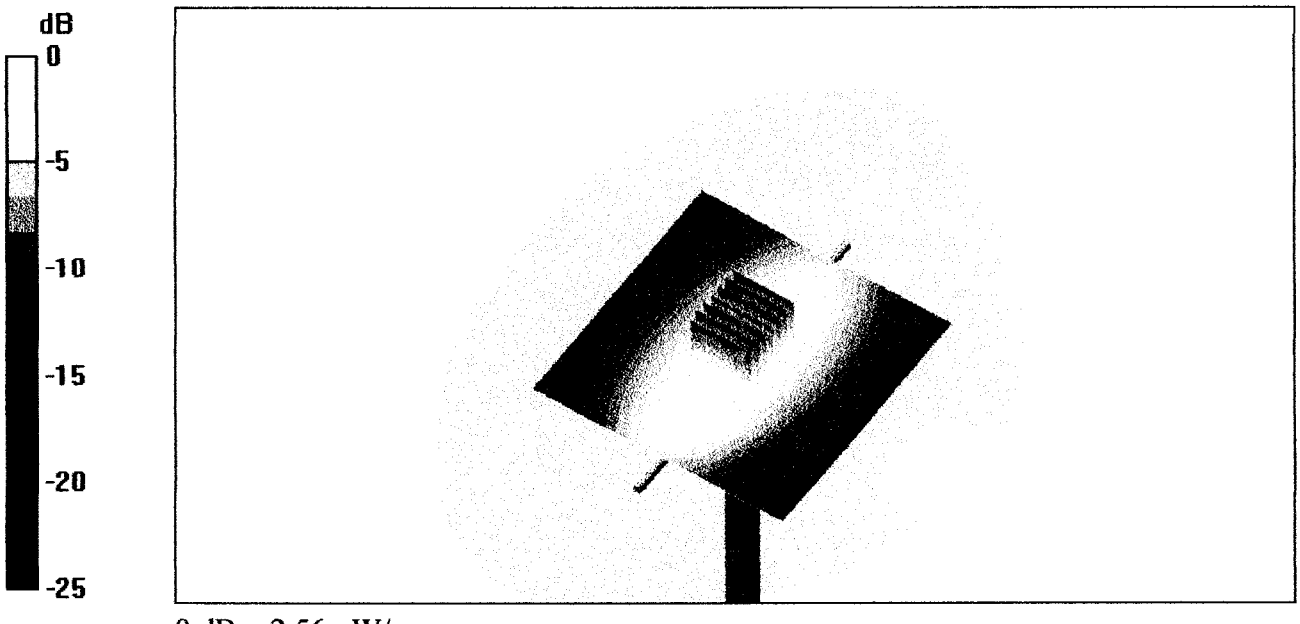
Communication System: CW-835; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL 835 MHz (σ = 0.9 mho/m, ε_r = 43, ρ = 1000 kg/m^3)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.7, 6.7, 6.7); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.8 Build 60

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 55.4 V/m
Power Drift = -0.007 dB
Maximum value of SAR = 2.56 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 3.52 W/kg
SAR(1 g) = 2.37 mW/g; SAR(10 g) = 1.56 mW/g
Reference Value = 55.4 V/m
Power Drift = -0.007 dB
Maximum value of SAR = 2.56 mW/g



0 dB = 2.56mW/g

ConvF(6.3, 6.3, 6.3)Date/Time: 10/02/03 13:39:51

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN455

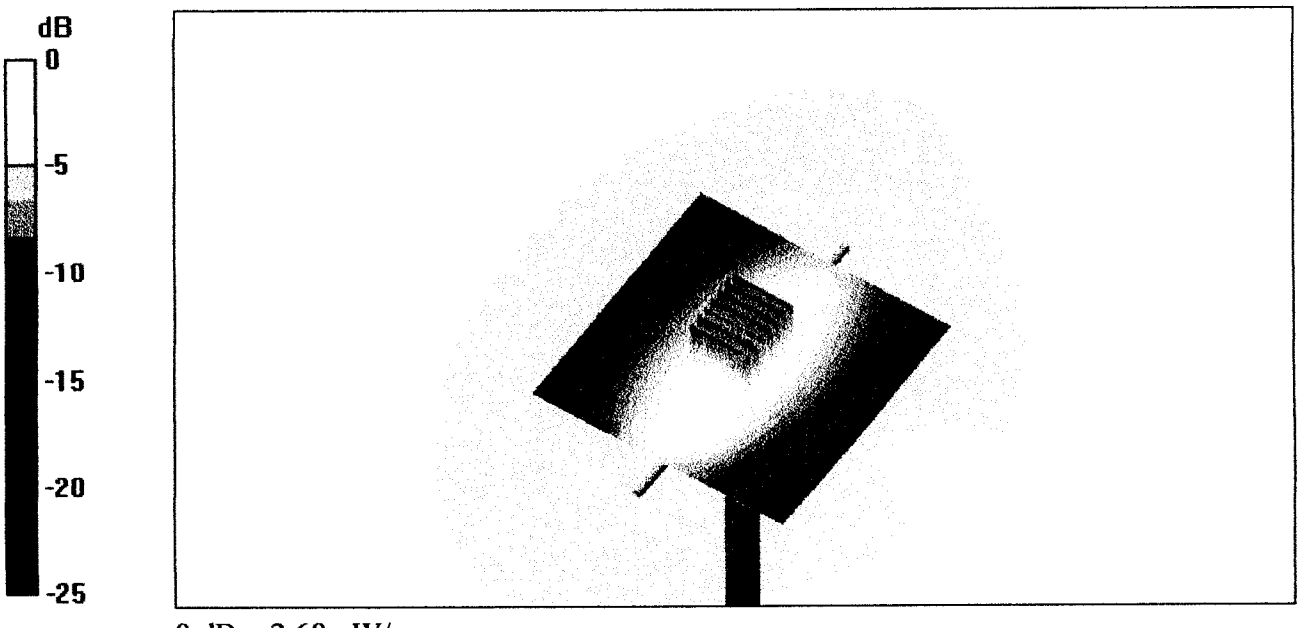
Communication System: CW-835; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Muscle 835 MHz (σ = 0.98 mho/m, ε_r = 54.98, ρ = 1000 kg/m^3)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(6.3, 6.3, 6.3); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.8 Build 60

Pin = 250 mW; d = 15 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 54.8 V/m
Power Drift = -0.006 dB
Maximum value of SAR = 2.66 mW/g

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 3.6 W/kg
SAR(1 g) = 2.48 mW/g; SAR(10 g) = 1.64 mW/g
Reference Value = 54.8 V/m
Power Drift = -0.006 dB
Maximum value of SAR = 2.68 mW/g



0 dB = 2.68mW/g

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

Client **Nokia Inc. Texas**

CALIBRATION CERTIFICATE

Object(s)	D1900V2 - SN:504
Calibration procedure(s)	QA CAL-05.v2 Calibration procedure for dipole validation kits
Calibration date:	July 16, 2003
Condition of the calibrated item	In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
Power sensor HP 8481A	US37292783	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Power meter EPM E442	GB37480704	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03

	Name	Function	Signature
Calibrated by:	Judith Mueller	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: July 17, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

Date/Time: 07/16/03 17:31:56

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN504_SN1507_HSL1900_160703.da4

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN504
Program: Dipole Calibration

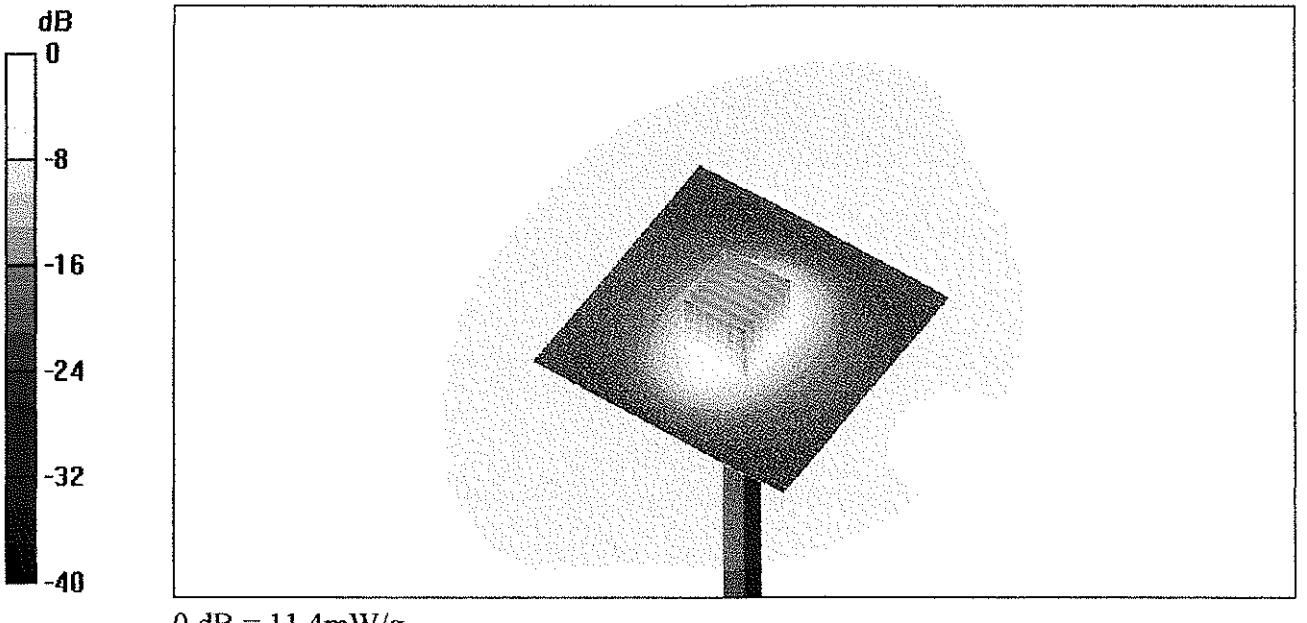
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL 1900 MHz (σ = 1.46 mho/m, ε_r = 40.17, ρ = 1000 kg/m^3)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(5.2, 5.2, 5.2); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- *Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115*

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 93.5 V/m
Power Drift = -0.02 dB
Maximum value of SAR = 11.4 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 17.6 W/kg
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.29 mW/g
Reference Value = 93.5 V/m
Power Drift = -0.02 dB
Maximum value of SAR = 11.4 mW/g



0 dB = 11.4mW/g

Date/Time: 07/16/03 11:37:18

Test Laboratory: SPEAG, Zurich, Switzerland
File Name: SN504_SN1507_M1900_160703.da4

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN504
Program: Dipole Calibration

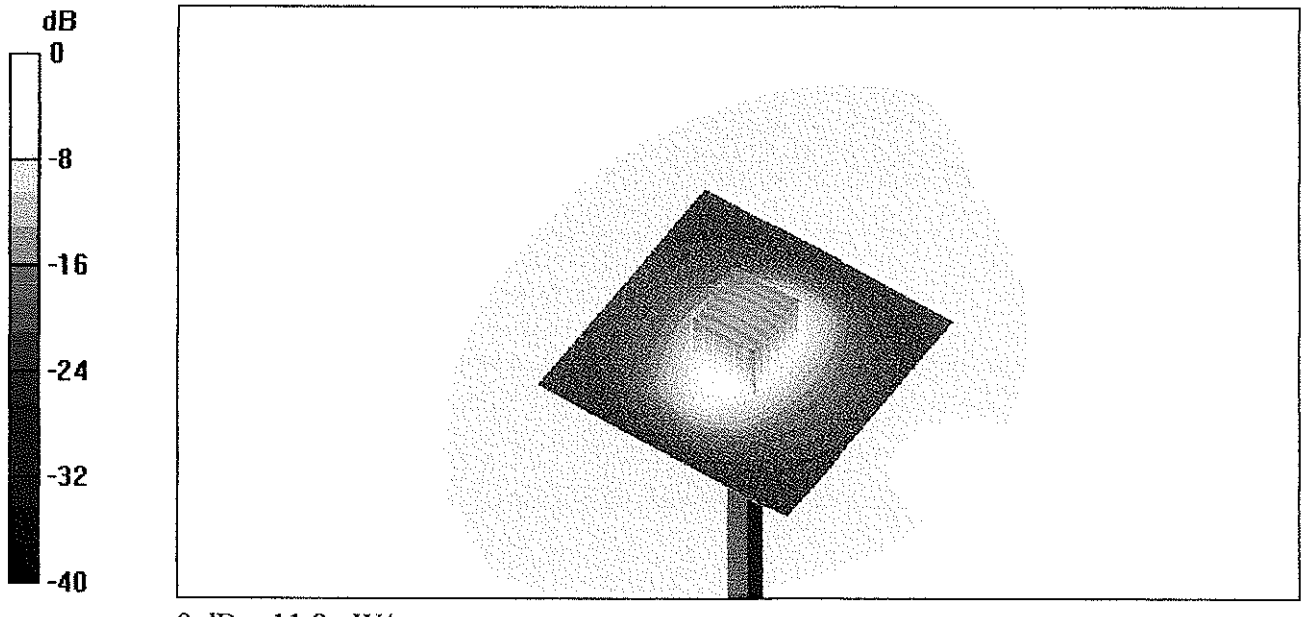
Communication System: CW-1900; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: Muscle 1900 MHz (σ = 1.6 mho/m, ε_r = 50.87, ρ = 1000 kg/m^3)
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.8, 4.8, 4.8); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- *Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115*

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 92 V/m
Power Drift = 0.02 dB
Maximum value of SAR = 11.7 mW/g

Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 18.2 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.45 mW/g
Reference Value = 92 V/m
Power Drift = 0.02 dB
Maximum value of SAR = 11.8 mW/g



0 dB = 11.8mW/g