Portable Cellular Phone SAR Test Report

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Date of Report:	Nov-01-2006
Date of Test:	Oct-12-2006 to Oct-20-2006
FCC ID #:	**IHDT56GN1**
Generic Name:	**MWT6-334411A11**
Laboratory:	Motorola Mobile Devices Business Product Safety & Compliance Laboratory 600 N. US Highway 45 Libertyville, Illinois 60048
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Accreditation:

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

Tests:	Procedures:
Electromagnetic Specific Absorption Rate	ANSI / IEEE C95.1-1992, 1999 (SAR) IEEE C95.3-1991 IEEE 1528, IEC 62209-1 FCC OET Bulletin 65 (*including Supplements A, B, C*) Australian Communications Authority Radio Communications (Electromagnetic Radiation – Human Exposure) Standard 2003 CENELEC EN 50361 (2001)
Simulated Tissue Preparation	WI-0247
RF Power Measurement	WI-1847, WI-1873

On the following products or types of products:
Wireless Communications Devices (Examples): Two Way Radios; Portable Phones (including Cellular, Licensed Non-Broadcast and PCS); Low Frequency Readers; and Pagers

A2LA certificate #1651-01

Statement of Compliance:

Motorola declares under its sole responsibility that the portable cellular telephone model 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) as well as with CENELEC en50360:2001 and ANSI / IEEE C95.1. It also declares that the product was tested in accordance with CENELEC en50361:2001, IEEE 1528, as well as other appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

(none)

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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.

Motorola encourages all feedback, both positive and negative, on this test report.

Table of Contents

1. Introduction **2**

2. Description of the Device Under Test **2**

2.1 Antenna description *2*

2.2 Device description *2*

3. Test Equipment Used **3**

3.1 Dosimetric System *3*

3.2 Additional Equipment *3*

4. Electrical parameters of the tissue simulating liquid **4**

5. System Accuracy Verification **5**

6. Test Results **6**

6.1 Head Adjacent Test Results *7*

6.2 Push to Talk Mode Test Results *10*

6.3 Body Worn Test Results *11*

References **15**

Appendix 1: SAR distribution comparison for system accuracy verification **16**

Appendix 2: SAR distribution plots for Phantom Head Adjacent Use **17**

Appendix 3: SAR distribution plots for Push-To-Talk Use **18**

Appendix 4: SAR distribution plots for Body Worn Configuration **19**

Appendix 5: Probe Calibration Certificate **20**

Appendix 6: Measurement Uncertainty Budget **21**

Appendix 7: Photographs of the device under test **23**

Appendix 8: Dipole Characterization Certificate **29**

1. Introduction

The Motorola Mobile Devices Business Product Safety Laboratory has performed measurements of the maximum potential exposure to the user of the portable cellular phone covered by this test report. The Specific Absorption Rate (SAR) of this product was measured. The portable cellular phone was tested in accordance with [1], [4] and [5]. The SAR values measured for the portable cellular phone are below the maximum recommended levels of 1.6 W/kg in a 1 g average set in [3] and 2.0 W/kg in a 10 g average set in [2].

For ICNIRP (10 g), the final SAR reading for this phone is 0.42 W/kg for head adjacent use, 0.33 W/kg for face-dispatch use, and 0.81 W/kg for body worn use. For ANSI / IEEE C95.1 (1 g), the final SAR reading for this phone is 0.71 W/kg for head adjacent use, 0.44 W/kg for face-dispatch use, and 1.21 W/kg for body worn use. These measurements were performed using a Dasy4™ v4.7 system manufactured by Schmid & Partner Engineering AG (SPEAG), of Zurich Switzerland.

2. Description of the Device Under Test

2.1 Antenna description

Type	Internal	
Location	Bottom of Transceiver	
Dimensions	Length	38 mm
	Width	7.5 mm
Configuration	FJA	

2.2 Device description

Serial Number	**004401022950816**											
Mode(s) of Operation	UMTS 800	UMTS 1900	GSM 850	GSM 1800	GSM 1900	GPRS Class 10 850	GPRS Class 10 1800	GPRS Class 10 1900	EDGE Class 10 900	EDGE Class 10 1800	EDGE Class 10 1900	Bluetooth
Modulation Mode(s)	QPSK	QPSK	GMSK	GMSK	GMSK	GMSK	GMSK	GMSK	8PSK	8PSK	8PSK	GFSK
Maximum Output Power Setting	24.00 dBm	24.00 dBm	32.50 dBm	29.50 dBm	29.50 dBm	32.50 dBm	29.50 dBm	29.50 dBm	27.50 dBm	26.50 dBm	26.50 dBm	4.0 dBm
Duty Cycle	1:1	1:1	1:8	1:8	1:8	2:8	2:8	2:8	2:8	2:8	2:8	1:1
Transmitting Frequency Range(s)	826.4-846.6 MHz	1852.4-1907.6 MHz	824.2-848.8 MHz	1710.2-1784.8 MHz	1850.2-1909.8 MHz	824.2-848.8 MHz	1710.2-1784.8 MHz	1850.2-1909.8 MHz	824.2-848.8 MHz	1710.2-1784.8 MHz	1850.2-1909.8 MHz	2400.0 - 2483.5 MHz
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype											
Device Category	Portable											
RF Exposure Limits	General Population / Uncontrolled											

3. Test Equipment Used

3.1 Dosimetric System

The Motorola Mobile Devices Business Product Safety & Compliance Laboratory utilizes a Dosimetric Assessment System (Dasy4™ v4.7) manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. All the SAR measurements are taken within a shielded enclosure. The overall 10 g RSS uncertainty of the measurement system is ±10.8% (K=1) with an expanded uncertainty of ±21.6% (K=2). The overall 1 g RSS uncertainty of the measurement system is ±11.1% (K=1) with an expanded uncertainty of ±22.2% (K=2). The measurement uncertainty budget is given in Appendix 6. Per IEEE 1528, this uncertainty budget is applicable to the SAR range of 0.4 W/kg to 10 W/kg.

The list of calibrated equipment used for the measurements is shown in the following table.

Description	Serial Number	Cal Due Date
DASY4™ DAE V1	437	Jul-18-2007
E-Field Probe ES3DV3	3037	Nov-17-2006
Dipole Validation Kit, DV900V2	96	May-22-2007
S.A.M. Phantom used for 800/900 MHz	TP-1131	
Dipole Validation Kit, DV1800V2	272(TR)	
S.A.M. Phantom used for 1800/1900 MHz	TP-1250	

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3847A04633	Jul-07-2007
Power Meter E4419B	GB39511087	Jul-05-2007
Power Sensor #1 – E9301A	MY41495336	Jun-28-2007
Power Sensor #2 - E9301A	US39210918	Aug-17-2007
Network Analyzer HP8753ES	US39172529	Sep-26-2007
Dielectric Probe Kit HP85070B	US99360070	

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 a HP85070 Dielectric Probe Kit These values, along with the temperature of the simulated tissue are shown in the table below. The recommended limits for permittivity and conductivity are also shown. A mass density of ρ = 1 g/cm3 was entered into the system in all the cases. It can be seen that the measured parameters are within tolerance of the recommended limits specified in [1] and [5].

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Temp (°C)
835	Head	**Measured,** Oct-12-2006	41.4	0.91	20.0
		Measured, Oct-14-2006	41.0	0.90	19.8
		Measured, Oct-18-2006	43.3	0.94	20.0
		Measured, Oct-20-2006	42.7	0.93	20.0
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** Oct-14-2006	54.5	0.98	19.9
		Measured, Oct-19-2006	53.9	0.98	20.0
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1750	Head	**Measured,** Oct-19-2006	39.7	1.31	18.9
		Measured, Oct-20-2006	39.3	1.31	19.3
		Recommended Limits	40.1 ±5%	1.35 ±5%	18-25
	Body	**Measured,** Oct-18-2006	52.1	1.46	19.6
		Recommended Limits	53.4 ±5%	1.49 ±5%	18-25
1880	Head	**Measured,** Oct-16-2006	39.0	1.44	19.1
		Measured, Oct-17-2006	39.5	1.44	19.1
		Measured, Oct-20-2006	38.7	1.44	19.3
		Recommended Limits	40.0 ±5%	1.40 ±5%	18-25
	Body	**Measured,** Oct-17-2006	51.4	1.58	19.6
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25

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

Ingredient	835 MHz / 900 MHz Head	835 MHz / 900 MHz Body	1800 MHz / 1900 MHz Head	1800 MHz / 1900 MHz Body	2450 MHz Head	2450 MHz Body
Sugar	57	44.9	--	--	--	--
DGBE	--	--	47	30.8	--	30
Diacetin	--	--	--	--	51	
Water	40.45	53.06	52.62	68.8	48.75	70
Salt	1.45	0.94	0.38	0.4	0.15	--
HEC	1	1	--	--	--	--
Bact.	0.1	0.1	--	--	0.1	--

5. System Accuracy Verification

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

A SAR measurement was performed to verify the measured SAR was within ±10% from the target SAR indicated in Section 8.3.7 Reference SAR Values in [5] or Appendix 7 for the 900Mhz target reference SAR value. These tests were done at 900MHz and 1800MHz. These frequencies are within ±10% of the compliance test mid-band frequency as required in [1] and [5]. The test was conducted on the same days as the measurement of the DUT. Recommended limits for permittivity and conductivity, specified in [5], are shown in the table below. The obtained results from the system accuracy verification are also displayed in the table below. SAR values are normalized to 1 W forward power delivered to the dipole. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. The distributions of SAR compare well with those of the reference measurements (see Appendix 1). The tissue stimulant depth was verified to be 15.0 cm ± 0.5 cm. Z-axis scans showing the SAR penetration are also included in Appendix 1.

f (MHz)	Description	SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			ε_r	σ (S/m)		
900	**Measured,** Oct-12-2006	11.025	40.7	0.97	21.0	20.0
	Measured, Oct-14-2006	10.85	40.2	0.96	20.7	19.8
	Measured, Oct-18-2006	11.00	42.6	1.00	21.1	20.0
	Measured, Oct-19-2006	11.00	41.7	0.98	20.5	20.0
	Measured, Oct-20-2006	10.90	41.7	0.98	20.8	20.0
	Recommended Limits	11.3	41.5 ±5%	0.97 ±5%	18-25	18-25
1800	**Measured,** Oct-16-2006	38.125	39.4	1.36	21.0	19.3
	Measured, Oct-17-2006	38.275	39.9	1.35	20.6	19.3
	Measured, Oct-18-2006	38.15	39.6	1.35	21.0	19.3
	Measured, Oct-19-2006	37.075	39.4	1.36	20.5	19.3
	Measured, Oct-20-2006	38.775	39.1	1.37	20.8	19.3
	Recommended Limits	38.1	40.0 ±5%	1.4 ±5%	18-25	18-25

The following probe conversion factors were used on the E-Field probe(s) used for the system accuracy verification measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3037	900	6.07	8 of 9
		1810	5.01	8 of 9

6. Test Results

The test sample was operated using an actual transmission through a base station simulator. The base station simulator was setup to the proper channel, transmitter power level and transmit mode of operation. The phone was tested in the configurations stipulated in [1], [4] and [5]. The phone was positioned into these configurations using the device holder supplied with the DASY4™ SAR measurement system The measured dielectric constant of the material used for the device holder is less than 2.9 and the loss tangent is less than 0.02 (± 30%) at 850 MHz. The default settings for the "coarse" and "cube" scans were chosen and used for measurements. The grid spacing of the course scan was set to 15 cm as shown in the SAR plots included in Appendix 2 and 3. Please refer to the DASY manual for additional information on SAR scanning procedures and algorithms used.

The Cellular Phone model covered by this report has the following battery options:
Model SNN5789B – 900 mAH Battery

The battery with the highest capacity is the SNN5789B. This battery was used to do all of the SAR testing. The phone was placed in the SAR measurement system with a fully charged battery.

Per the "Preliminary Guidance for Reviewing Applications for Certifications of 3G Devices" released on May 9, 2006, 12.2 kbps RMC and 12.2 kbps AMR modes were considered. The conducted power measurements (per 3GPP TS 34.121) for each mode are shown in the table below.

Conducted power (dBm) for WCDMA modes			
	Channel	RMC	AMR
WCDMA 850	4132	24.07	24.06
	4180	24.08	24.03
	4233	24.06	24.07
WCDMA 1900	9262	24.14	24.16
	9400	24.09	24.10
	9538	24.07	24.08

6.1 Head Adjacent Test Results

The SAR results shown in tables 1 through 4 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to the [6]. Also shown are the measured conducted output power levels, the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is New SAR = Old SAR * 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test. Note that 800 MHz digital mode SAR measurements were performed in accordance with [4].

The left head and right head SAR contour distributions are similar. Because of this similarity, the cheek/touch and 15° tilt test conditions with the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 2. All other test conditions measured lower SAR values than those included in Appendix 2.

The SAR measurements were performed using the SAM phantoms listed in section 3.1. Since the same phantoms and simulated tissue were used for the system accuracy verification and the device SAR measurements, the Z-axis scans included in Appendix 1 are applicable for verification of simulated tissue depth to be 15.0 cm ± 0.5 cm.

The following probe conversion factors were used on the E-Field probe(s) used for the head adjacent measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3037	900	6.07	8 of 9
		1810	5.01	8 of 9

Left Head Cheek Position								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
UMTS 800	Channel 4132	23.86						
	Channel 4180	23.95	**20.0**	**0.198**	**0.376**	**0.38**	**0.595**	**0.60**
	Channel 4233	24.00						
GSM 850	Channel 128	32.48						
	Channel 190	32.50	**20.0**	**0.481**	**0.301**	**0.30**	**0.459**	**0.46**
	Channel 251	32.47						
GSM 1800	Channel 512	29.45	**19.3**	**0.147**	**0.186**	**0.19**	**0.308**	**0.31**
	Channel 700	29.50	19.1	0.316	0.179	0.18	0.309	0.31
	Channel 885	29.52	19.3	0.0006	0.181	0.18	0.312	0.31
GSM 1900	Channel 512	29.45						
	Channel 661	29.50	19.8	0.0368	0.114	0.11	0.196	0.20
	Channel 810	29.52						
UMTS 1900	Channel 9262	24.06						
	Channel 9400	24.02	19.1	-0.0397	0.255	0.26	0.433	0.44
	Channel 9538	24.07						

Table 1: SAR measurement results at the highest possible output power, measured in a head cheek position against the ICNIRP and ANSI SAR Limit.

Right Head Cheek Position								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
UMTS 800	Channel 4132	23.86						
	Channel 4180	23.95	20.0	0.307	0.285	0.29	0.447	0.45
	Channel 4233	24.00						
GSM 850	Channel 128	32.48						
	Channel 190	32.50	20.0	0.175	0.23	0.23	0.389	0.39
	Channel 251	32.47						
GSM 1800	Channel 512	29.45						
	Channel 700	29.50	19.0	0.0096	0.15	0.15	0.231	0.23
	Channel 885	29.52						
GSM 1900	Channel 512	29.45						
	Channel 661	29.50	**19.1**	**0.272**	**0.147**	**0.15**	**0.248**	**0.25**
	Channel 810	29.52						
UMTS 1900	Channel 9262	24.06						
	Channel 9400	24.02	**19.1**	**0.164**	**0.418**	**0.42**	**0.712**	**0.71**
	Channel 9538	24.07						

Table 2: SAR measurement results at the highest possible output power, measured in a head cheek position against the ICNIRP and ANSI SAR Limit.

Left Head 15° Tilt Position								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
UMTS 800	Channel 4132	23.86						
	Channel 4180	23.95	**20.0**	**0.198**	**0.24**	**0.24**	**0.311**	**0.31**
	Channel 4233	24.00						
GSM 850	Channel 128	32.48						
	Channel 190	32.50	20.0	0.0187	0.214	0.21	0.276	0.28
	Channel 251	32.47						
GSM 1800	Channel 512	29.45						
	Channel 700	29.50	19.0	0.184	0.0442	0.04	0.071	0.07
	Channel 885	29.52						
GSM 1900	Channel 512	29.45						
	Channel 661	29.50	19.8	-0.0762	0.0414	0.04	0.0746	0.08
	Channel 810	29.52						
UMTS 1900	Channel 9262	24.06						
	Channel 9400	24.02	**19.1**	**-0.078**	**0.114**	**0.12**	**0.202**	**0.21**
	Channel 9538	24.07						

Table 3: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.

Right Head 15° Tilt Position								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
UMTS 800	Channel 4132	23.86						
	Channel 4180	23.95	20.0	0.109	0.237	0.24	0.311	0.31
	Channel 4233	24.00						
GSM 850	Channel 128	32.48						
	Channel 190	32.50	**20.0**	**-0.33**	**0.206**	**0.22**	**0.273**	**0.29**
	Channel 251	32.47						
GSM 1800	Channel 512	29.45						
	Channel 700	29.50	**18.9**	**-0.041**	**0.058**	**0.06**	**0.090**	**0.09**
	Channel 885	29.52						
GSM 1900	Channel 512	29.45						
	Channel 661	29.50	**19.3**	**0.493**	**0.052**	**0.05**	**0.090**	**0.09**
	Channel 810	29.52						
UMTS 1900	Channel 9262	24.06						
	Channel 9400	24.02	19.2	0.0341	0.118	0.12	0.197	0.20
	Channel 9538	24.07						

Table 4: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.

6.2 Push-to-Talk/Dispatch Mode Test Results

The SAR results shown in table 5 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to the [6]. Also shown are the measured conducted output powers, the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is New SAR = Old SAR * 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

A full data set output of one test condition per band with the highest SAR values from the DASY™ measurement system is included as appendix 4. The test conditions included are indicated as bold numbers in the following tables. All other test conditions measured lower SAR values than those included.

The SAR measurements were performed using the SAM phantoms listed in section 3.1. Since the same phantoms and simulated tissue were used for the system accuracy verification and the device SAR measurements, the Z-axis scans included in Appendix 1 are applicable for verification of simulated tissue depth to be 15.0 cm ± 0.5 cm.

The test sample was operated in an over the air call in GPRS Class 10 mode in the GSM 850, 1800, and 1900 MHz bands. For the purposes of this test the unit is commanded to the proper channel, transmitter power level and transmit mode of operation. The radio was then placed in the SAR measurement system with a fully charged battery. The radio was placed with the front of the device positioned at 2.5 cm from the flat portion of the SAM phantom, as per Supplement C 01-01 with flip open.

The following probe conversion factors were used on the E-Field probe(s) used for the Push-To-Talk measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3037	900	6.07	8 of 9
		1810	5.01	8 of 9

Push-To-Talk with GPRS Class 10 Mode								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
GSM 850	Channel 128	32.48						
	Channel 190	32.50	**19.9**	**-0.084**	**0.321**	**0.33**	**0.431**	**0.44**
	Channel 251	32.47						
GSM 1800	Channel 512	29.45	19.3	0.0433	0.121	0.12	0.18	0.18
	Channel 700	29.50	19.6	-0.0118	0.144	0.14	0.217	0.22
	Channel 885	29.52	**19.6**	**-0.217**	**0.169**	**0.18**	**0.255**	**0.27**
GSM 1900	Channel 512	29.45						
	Channel 661	29.50	**19.3**	**0.004**	**0.158**	**0.16**	**0.245**	**0.25**
	Channel 810	29.52						

Table 5: SAR measurement results at the highest possible output power, measured in a Push-To-Talk position against the ICNIRP and ANSI SAR Limit.

6.3 Body Worn Test Results

The SAR results shown in tables 6 through 10 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to the [6]. Also shown are the measured conducted output power levels, the temperature of the test facility during the test, the temperature of the tissue simulate after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is New SAR = Old SAR * 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test. Note that 800MHz digital mode SAR measurements were performed in accordance with [4].

The test conditions that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 3. All other test conditions measured lower SAR values than those included in Appendix 3.

A “flat” phantom was for the body-worn tests. This “flat” phantom is made out of 1” thick natural High Density Polyethylene with a thickness at the bottom equal to 2.0 mm. It measures 52.7 cm(long) x 26.7 cm(wide) x 21.2 cm(tall). The measured dielectric constant of the material used is less than 2.3 and the loss tangent is less than 0.0046 all the way up to 2.184 GHz.

The tissue stimulant depth was verified to be 15.0 cm ± 0.5 cm. The same device holder described in section 6 was used for positioning the phone. The functional accessories were divided into two categories, the ones with metal components and the ones with non-metal components. For non-metallic component accessories, testing was performed on the accessory that displayed the closest proximity to the flat phantom. Each metallic component accessory, if any, was checked for uniqueness of metal component so that each is tested with the device. If multiple accessories shared an identical metal component, only the accessory that dictates the closest spacing to the body was tested. In addition to accessory testing, the cellular phone was tested with the front and back of the phone facing the phantom. For voice mode operation, the phone was placed as a distance of 15 mm from the phantom. For data mode operation, the phone was placed as a distance of 25 mm from the phantom. The cellular phone was tested with a headset connected to the device for all body-worn SAR measurements.

There are no Body-Worn Accessories available for this phone:

The following probe conversion factors were used on the E-Field probe(s) used for the body worn measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3037	900	5.93	8 of 9
		1810	4.65	8 of 9

Body Worn; Front of Phone 15 mm from Phantom								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
UMTS 800	Channel 4132	23.86	20.0	0.0237	0.479	0.48	0.66	0.66
	Channel 4180	23.95	20.0	-0.105	0.579	0.59	0.797	0.82
	Channel 4233	24.00	20.0	-0.0301	0.629	0.63	0.871	0.88
GSM 850	Channel 128	32.48						
	Channel 190	32.50	20.3	-0.265	0.429	0.46	0.6	0.64
	Channel 251	32.47						
GSM 1800	Channel 512	29.45	19.7	0.0646	0.121	0.12	0.192	0.19
	Channel 700	29.50	19.6	0.0263	0.139	0.14	0.223	0.22
	Channel 885	29.52	19.7	0.0435	0.151	0.15	0.245	0.25
GSM 1900	Channel 512	29.45						
	Channel 661	29.50	19.1	-0.0022	0.12	0.12	0.196	0.20
	Channel 810	29.52						
UMTS 1900	Channel 9262	24.06						
	Channel 9400	24.02	**19.6**	**-0.034**	**0.442**	**0.45**	**0.705**	**0.71**
	Channel 9538	24.07						

Table 6: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body Worn; Back of Phone 15 mm from Phantom								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
UMTS 800	Channel 4132	23.86	20.0	0.028	0.599	0.60	0.884	0.88
	Channel 4180	23.95	20.0	-0.0297	0.755	0.76	1.12	1.13
	Channel 4233	24.00	**20.0**	**-0.014**	**0.811**	**0.81**	**1.21**	**1.21**
GSM 850	Channel 128	32.48	20.3	0.0064	0.547	0.55	0.822	0.82
	Channel 190	32.50	20.3	-0.0858	0.537	0.55	0.801	0.82
	Channel 251	32.47	20.3	-0.0254	0.531	0.53	0.796	0.80
GSM 1800	Channel 512	29.45	19.2	-0.0063	0.0946	0.09	0.152	0.15
	Channel 700	29.50	19.3	0.103	0.11	0.11	0.182	0.18
	Channel 885	29.52	19.6	0.0649	0.128	0.13	0.214	0.21
GSM 1900	Channel 512	29.45						
	Channel 661	29.50	19.1	-0.0228	0.134	0.13	0.228	0.23
	Channel 810	29.52						
UMTS 1900	Channel 9262	24.06						
	Channel 9400	24.02	19.2	0.0219	0.371	0.37	0.637	0.64
	Channel 9538	24.07						

Table 7: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body Worn; *Noted Facing of Phone* 15 mm from Phantom with Bluetooth Mode Enabled								
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	***10 g SAR value***		***1 g SAR value***	
					Measured (W/kg)	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
UMTS 800 ***Back of Phone***	**Channel 4132**	23.86	20.0	-0.0003	0.599	0.60	0.886	0.89
	Channel 4180	23.95	20.0	0.0006	0.767	0.77	1.14	1.14
	Channel 4233	24.00	20.0	-0.0886	0.795	0.81	1.18	1.20
GSM 850 ***Back of Phone***	**Channel 128**	32.48	20.3	-0.0182	0.517	0.52	0.759	0.76
	Channel 190	32.50	20.3	-0.0219	0.552	0.55	0.814	0.82
	Channel 251	32.47	**20.3**	**-0.037**	**0.588**	**0.59**	**0.874**	**0.88**
GSM 1800 ***Front of Phone***	**Channel 512**	29.45	19.1	-0.0044	0.156	0.16	0.245	0.25
	Channel 700	29.50	19.1	-0.0545	0.166	0.17	0.262	0.27
	Channel 885	29.52	**19.1**	**0.013**	**0.174**	**0.17**	**0.278**	**0.28**
GSM 1900 ***Back of Phone***	**Channel 512**	29.45						
	Channel 661	29.50	**19.1**	**0.023**	**0.172**	**0.17**	**0.287**	**0.29**
	Channel 810	29.52						
UMTS 1900 ***Front of Phone***	**Channel 9262**	24.06						
	Channel 9400	24.02	19.1	-0.0208	0.394	0.40	0.628	0.63
	Channel 9538	24.07						

Table 8: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body Worn; *Noted Facing of Phone* 15 mm from Phantom with GPRS Class 10 Mode Enabled								
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	***10 g SAR value***		***1 g SAR value***	
					Measured (W/kg)	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850 ***Back of Phone***	**Channel 128**	32.48						
	Channel 190	32.50	20.3	-0.0327	0.442	0.45	0.613	0.62
	Channel 251	32.47						
GSM 1800 ***Front of Phone***	**Channel 512**	29.45	19.1	0.0045	0.109	0.11	0.163	0.16
	Channel 700	29.50	19.0	-0.0148	0.12	0.12	0.182	0.18
	Channel 885	29.52	19.0	0.0191	0.121	0.12	0.184	0.18
GSM 1900 ***Back of Phone***	**Channel 512**	29.45						
	Channel 661	29.50	19.0	-0.025	0.0973	0.10	0.156	0.16
	Channel 810	29.52						

Table 9: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body Worn; *Noted Facing of Phone* 15 mm from Phantom with EDGE Class 10 Mode Enabled								
***f* (MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	***10 g SAR value***		***1 g SAR value***	
					Measured (W/kg)	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850 ***Back of Phone***	**Channel 128**	27.48						
	Channel 190	27.50	20.3	-0.0085	0.0941	0.09	0.131	0.13
	Channel 251	27.49						
GSM 1800 ***Front of Phone***	**Channel 512**	26.49	19.4	-0.236	0.0525	0.06	0.0818	0.09
	Channel 700	26.50	19.3	-0.0169	0.0548	0.06	0.084	0.08
	Channel 885	26.47	19.2	-0.0065	0.0547	0.05	0.0844	0.08
GSM 1900 ***Back of Phone***	**Channel 512**	26.52						
	Channel 661	26.52	19.0	0.0034	0.0448	0.04	0.0721	0.07
	Channel 810	26.54						

Table 10: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

References

[1] CENELEC, en50361:2001 “Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz – 3 GHz)”

[2] CENELEC, en50360:2001 “Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz – 3 GHz)”.

[3] ANSI / IEEE, C95.1 1999 Edition “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”

[4] FCC OET Bulletin 65 Supplement C 01-01

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

[6] ICNIRP Guidelines “Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz)”

Appendix 1

SAR distribution comparison for the system accuracy verification

Date/Time: 10/12/2006 8:56:04 AM

Test Laboratory: Motorola - 101206 900MHz Good at -2.4%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:96
Procedure Notes: 900 MHz System Performance Check; Dipole Sn# 096; Input Power =200mW
Sim.Temp@meas = 20*C; Sim.Temp@SPC =20*C; Room Temp @ SPC = 21*C
Communication System: CW - Dipole; Frequency: 900 MHz; Channel Number: 4; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 900 MHz; σ = 0.97 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

DASY4 Configuration:

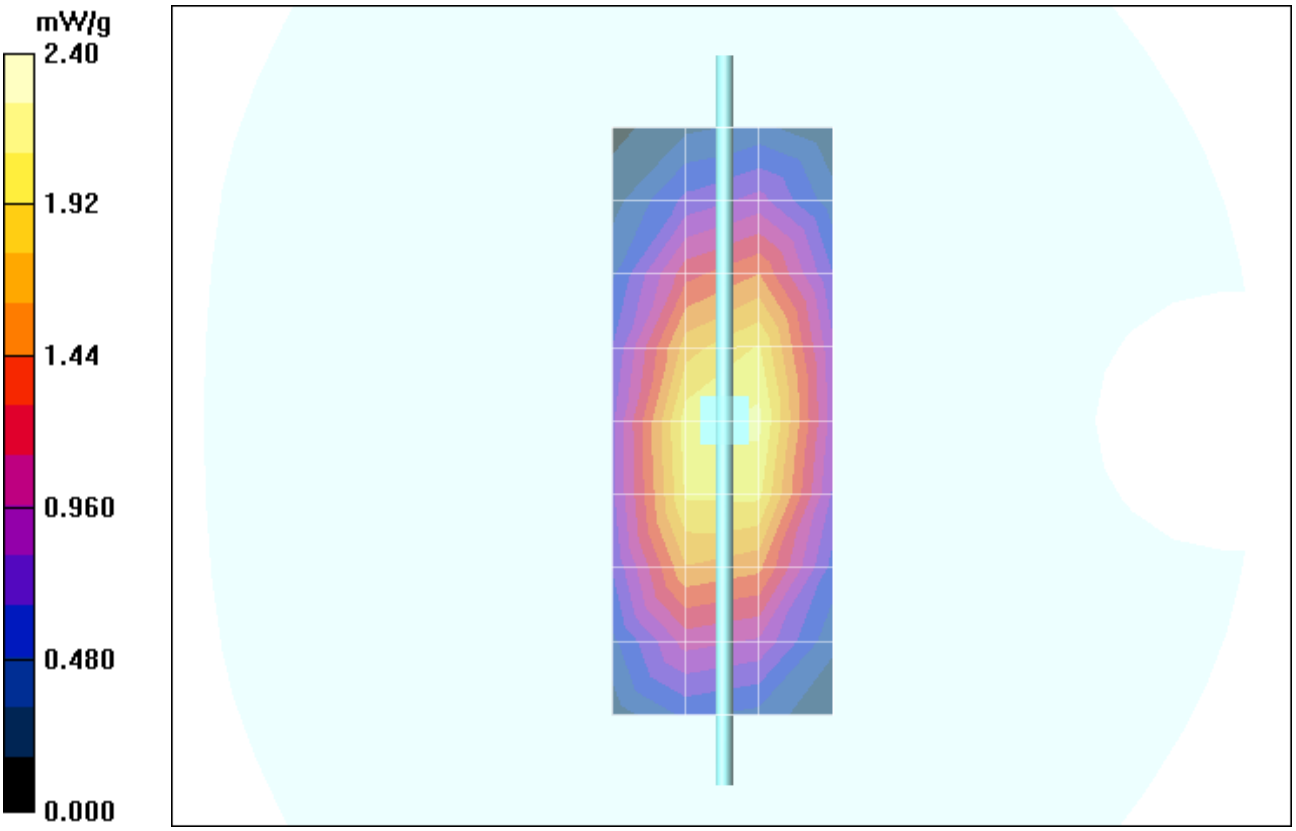
- Probe: ES3DV3 - SN3037; ConvF(6.07, 6.07, 6.07); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

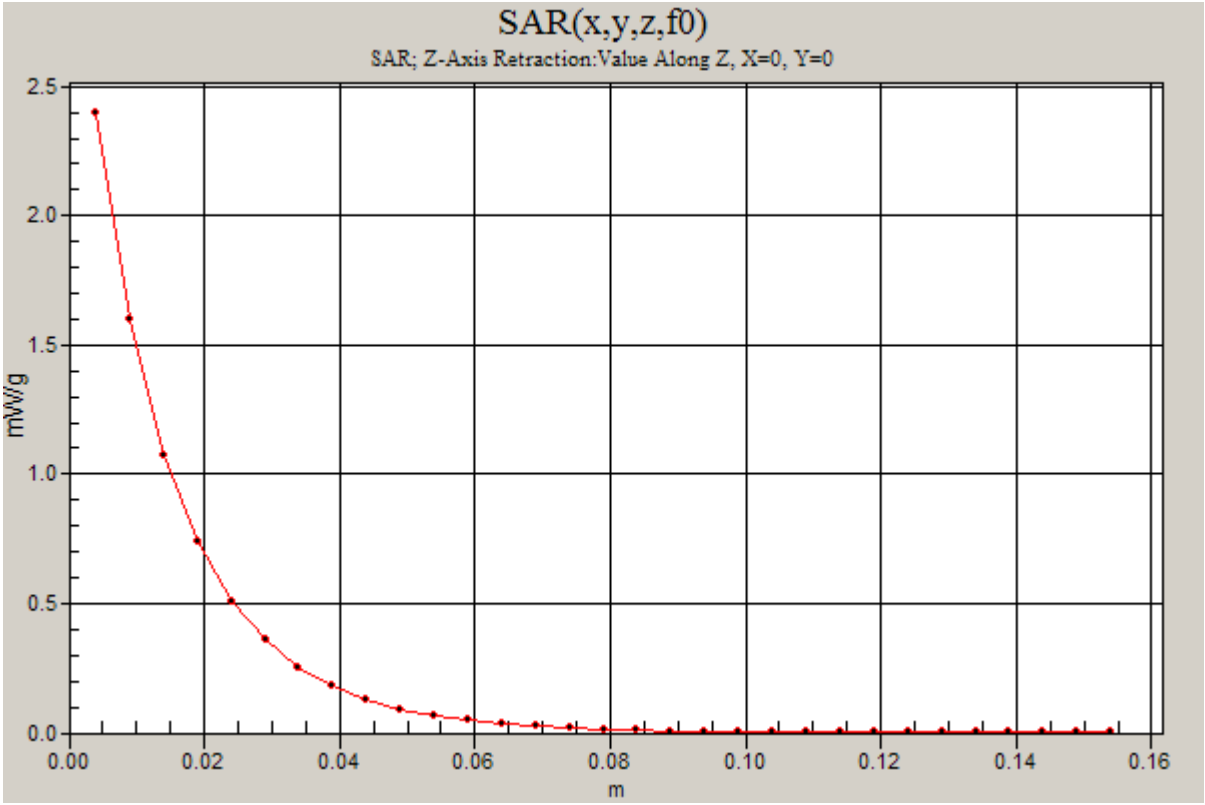
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 2.13 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 50.7 V/m; Power Drift = -0.087 dB; Peak SAR (extrapolated) = 3.27 W/kg
SAR(1 g) = 2.21 mW/g; SAR(10 g) = 1.42 mW/g; Maximum value of SAR (measured) = 2.39 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 50.7 V/m; Power Drift = -0.087 dB; Peak SAR (extrapolated) = 3.19 W/kg
SAR(1 g) = 2.2 mW/g; SAR(10 g) = 1.43 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.40 mW/g


mW/g
2.40
1.92
1.44
0.960
0.480
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
2.5
2.0
1.5
1.0
0.5
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date/Time: 10/14/2006 2:47:05 AM

Test Laboratory: Motorola - 101406 900MHz Good at -4.0%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:96
Procedure Notes: 900 MHz System Performance Check; Dipole Sn# 096; Input Power =200mW
Sim.Temp@meas = 19.8*C; Sim.Temp@SPC =19.8*C; Room Temp @ SPC = 20.7*C
Communication System: CW - Dipole; Frequency: 900 MHz; Channel Number: 4; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 900 MHz; σ = 0.96 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3

DASY4 Configuration:

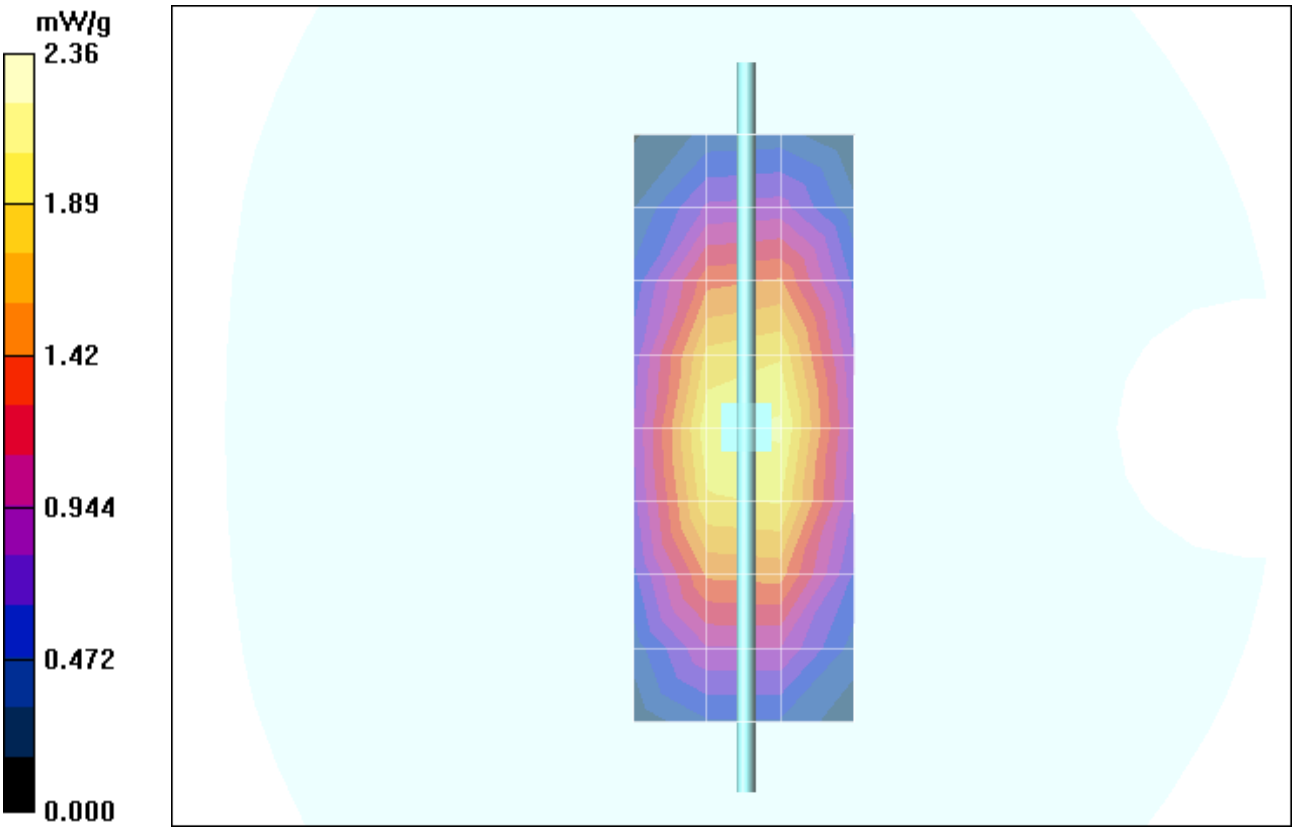
- Probe: ES3DV3 - SN3037; ConvF(6.07, 6.07, 6.07); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 2.08 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 50.4 V/m; Power Drift = -0.036 dB; Peak SAR (extrapolated) = 3.20 W/kg
SAR(1 g) = 2.18 mW/g; SAR(10 g) = 1.4 mW/g; Maximum value of SAR (measured) = 2.36 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 50.4 V/m; Power Drift = -0.036 dB; Peak SAR (extrapolated) = 3.13 W/kg
SAR(1 g) = 2.16 mW/g; SAR(10 g) = 1.41 mW/g; Maximum value of SAR (measured) = 2.32 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm;


mW/g
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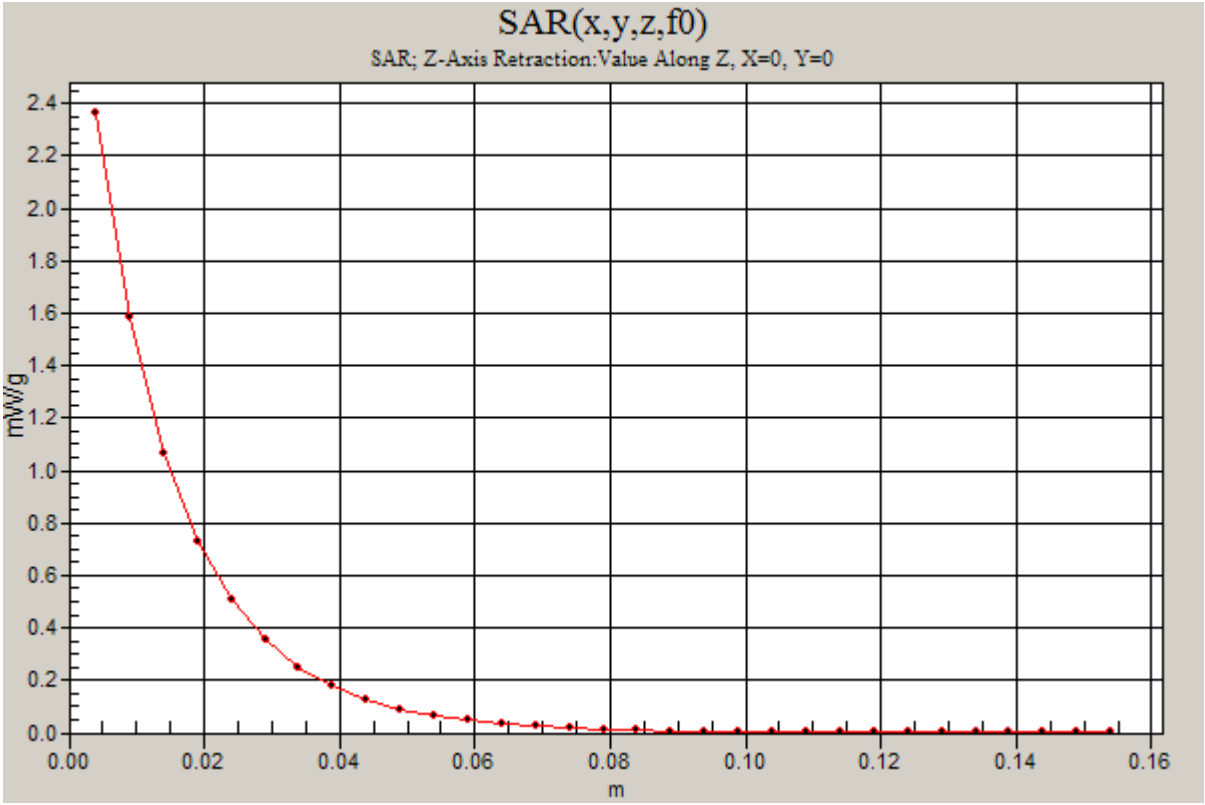
1.89
1.42
0.944
0.472
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date/Time: 10/18/2006 9:07:52 AM

Test Laboratory: Motorola - 101806 900MHz Good at -2.7%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:96
Procedure Notes: 900 MHz System Performance Check; Dipole Sn# 096; Input Power =200mW
Sim.Temp@meas = 20*C; Sim.Temp@SPC =20*C; Room Temp @ SPC = 21.1*C
Communication System: CW - Dipole; Frequency: 900 MHz; Channel Number: 4; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 900 MHz; σ = 1 mho/m; ε_r = 42.6; ρ = 1000 kg/m^3

DASY4 Configuration:

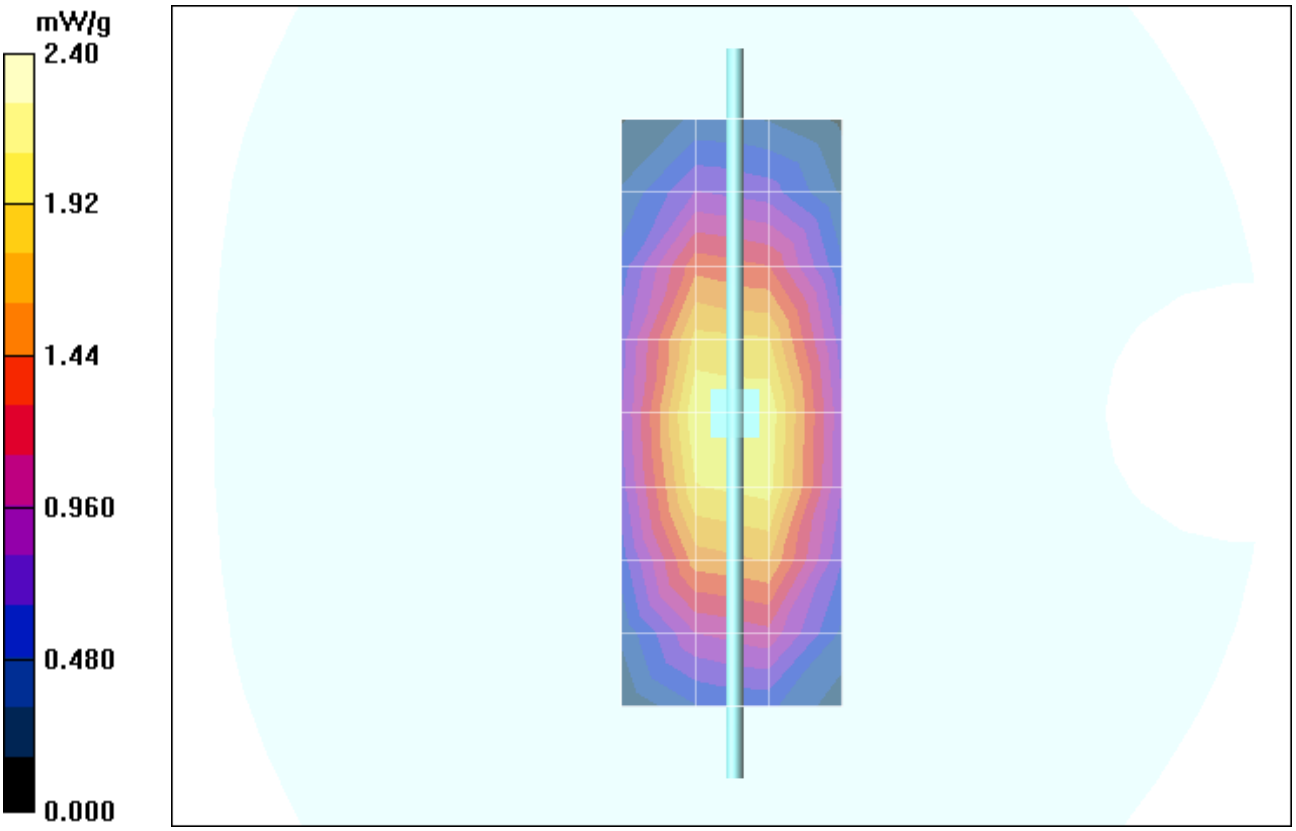
- Probe: ES3DV3 - SN3037; ConvF(6.07, 6.07, 6.07); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

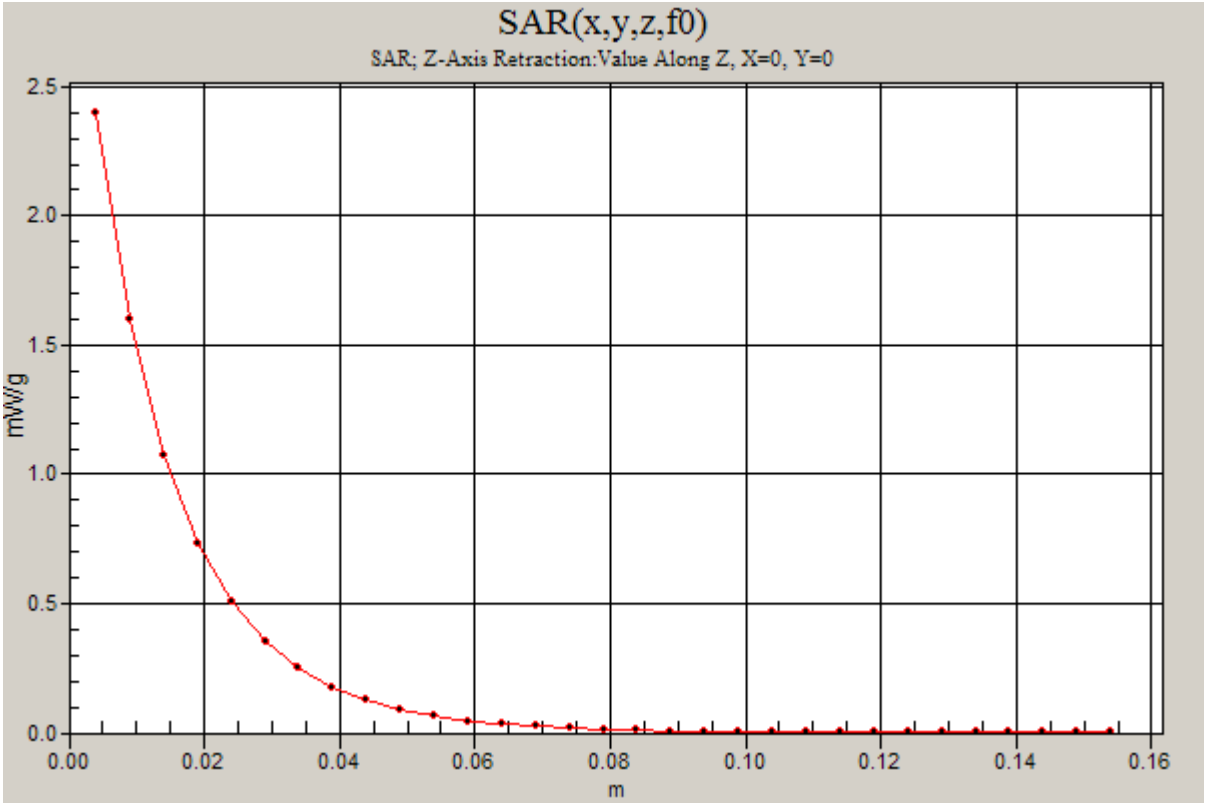
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 2.06 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.5 V/m; Power Drift = -0.031 dB; Peak SAR (extrapolated) = 3.25 W/kg
SAR(1 g) = 2.19 mW/g; SAR(10 g) = 1.42 mW/g; Maximum value of SAR (measured) = 2.39 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.5 V/m; Power Drift = -0.031 dB; Peak SAR (extrapolated) = 3.22 W/kg
SAR(1 g) = 2.21 mW/g; SAR(10 g) = 1.43 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.40 mW/g


mW/g
2.40
1.92
1.44
0.960
0.480
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
2.5
2.0
1.5
1.0
0.5
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date/Time: 10/19/2006 8:17:03 AM

Test Laboratory: Motorola - 101906 900MHz Good at -3.1%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:96
Procedure Notes: 900 MHz System Performance Check; Dipole Sn# 096; Input Power =200mW
Sim.Temp@meas = 20*C; Sim.Temp@SPC =20*C; Room Temp @ SPC = 20.5*C
Communication System: CW - Dipole; Frequency: 900 MHz; Channel Number: 4; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 900 MHz; σ = 0.98 mho/m; ε_r = 41.7; ρ = 1000 kg/m^3

DASY4 Configuration:

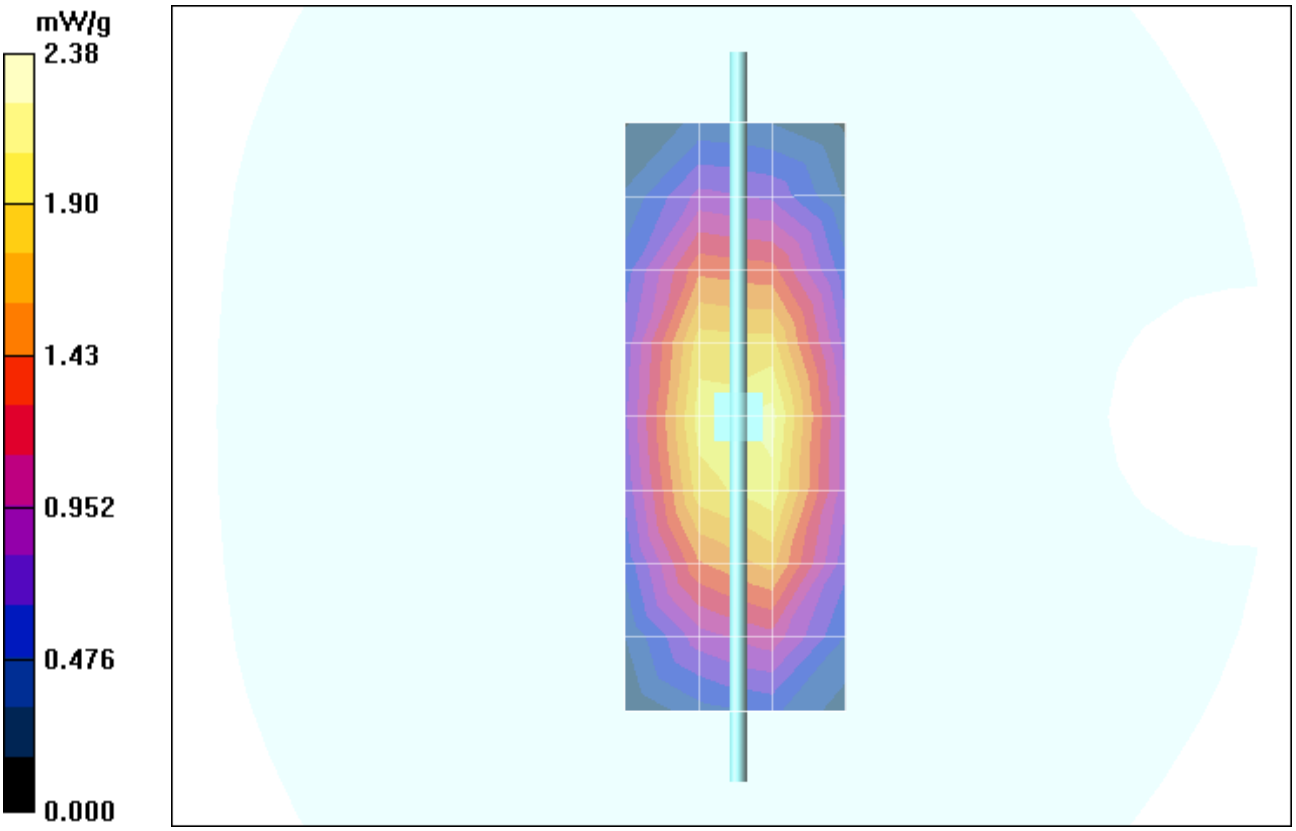
- Probe: ES3DV3 - SN3037; ConvF(6.07, 6.07, 6.07); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

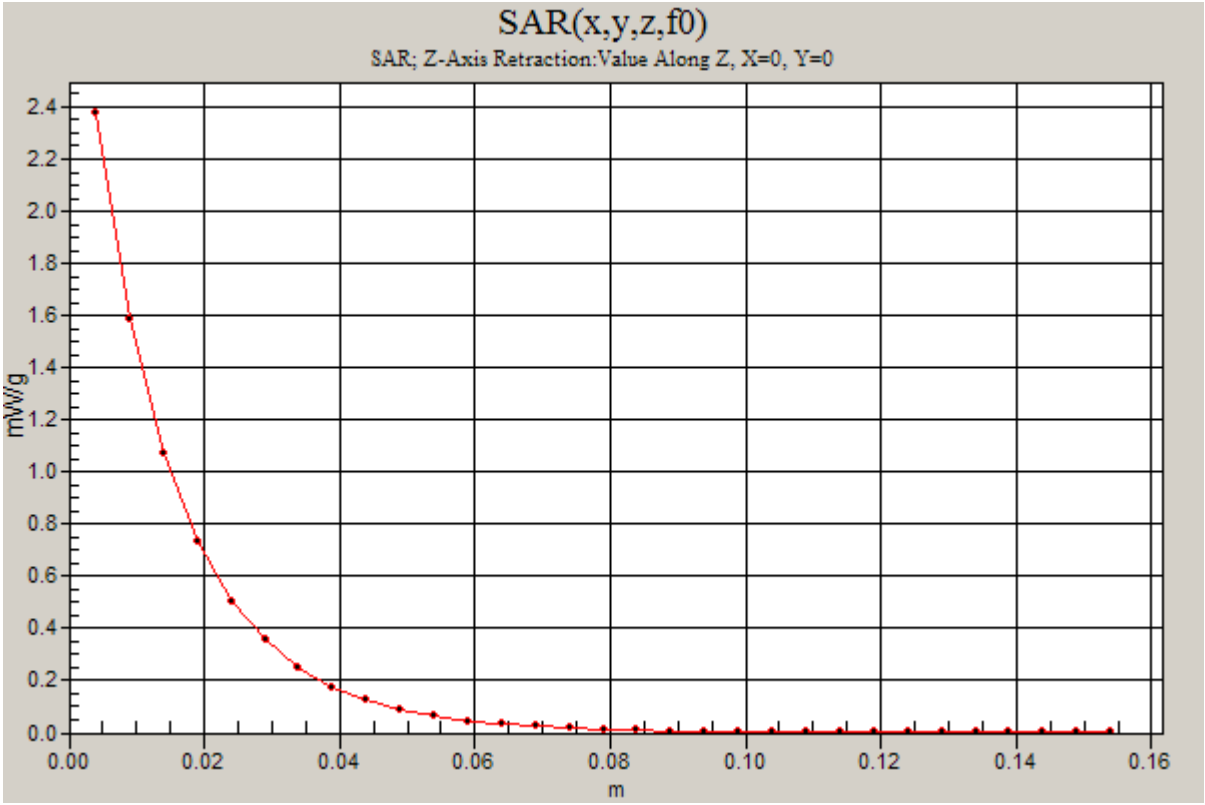
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 2.13 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.9 V/m; Power Drift = -0.025 dB; Peak SAR (extrapolated) = 3.25 W/kg
SAR(1 g) = 2.19 mW/g; SAR(10 g) = 1.41 mW/g; Maximum value of SAR (measured) = 2.38 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.9 V/m; Power Drift = -0.025 dB; Peak SAR (extrapolated) = 3.25 W/kg
SAR(1 g) = 2.21 mW/g; SAR(10 g) = 1.42 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm


mW/g
2.38
1.90
1.43
0.952
0.476
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date/Time: 10/20/2006 8:49:02 AM

Test Laboratory: Motorola - 102006 900MHz Good at -3.5%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:96
Procedure Notes: 900 MHz System Performance Check; Dipole Sn# 096; Input Power =200mW
Sim.Temp@meas = 20*C; Sim.Temp@SPC =20*C; Room Temp @ SPC = 20.8*C
Communication System: CW - Dipole; Frequency: 900 MHz; Channel Number: 4; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 900 MHz; σ = 0.98 mho/m; ε_r = 41.7; ρ = 1000 kg/m^3

DASY4 Configuration:

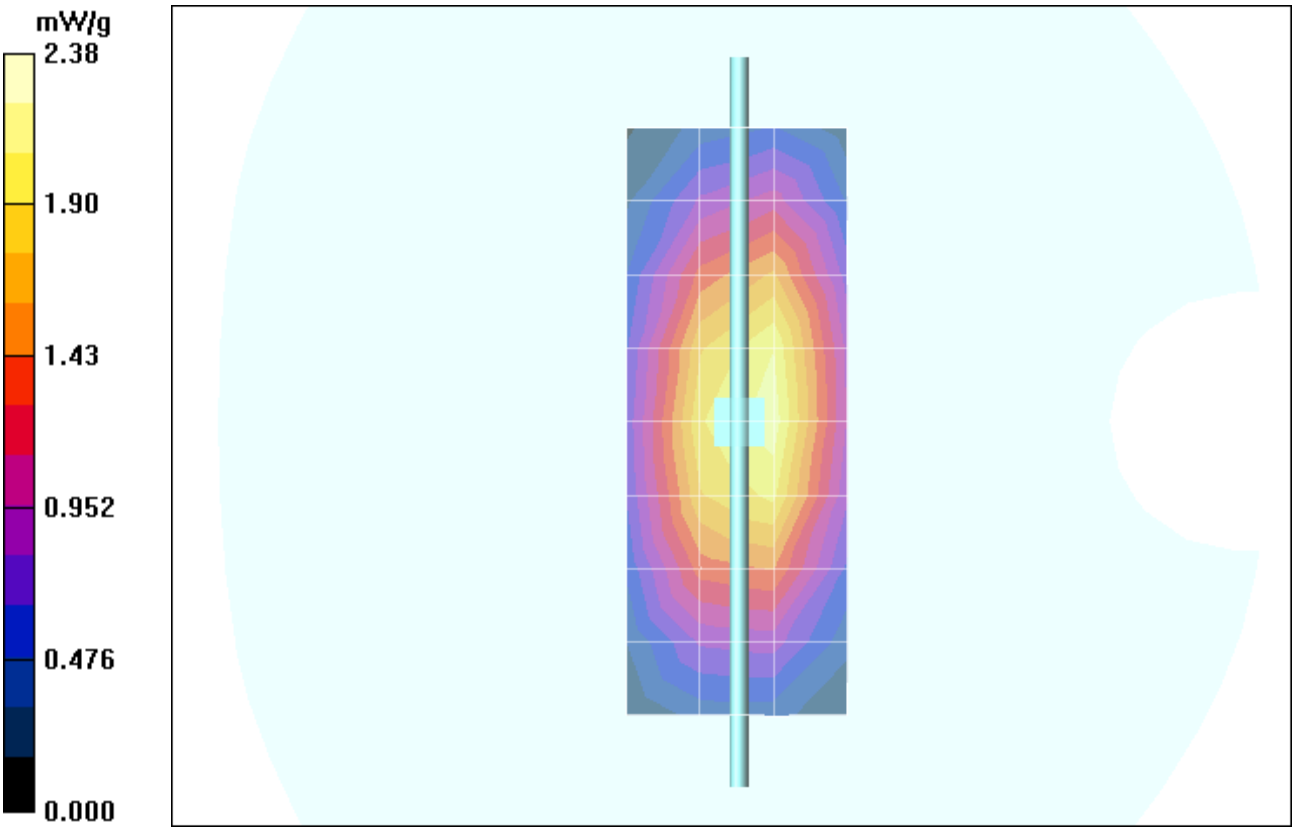
- Probe: ES3DV3 - SN3037; ConvF(6.07, 6.07, 6.07); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

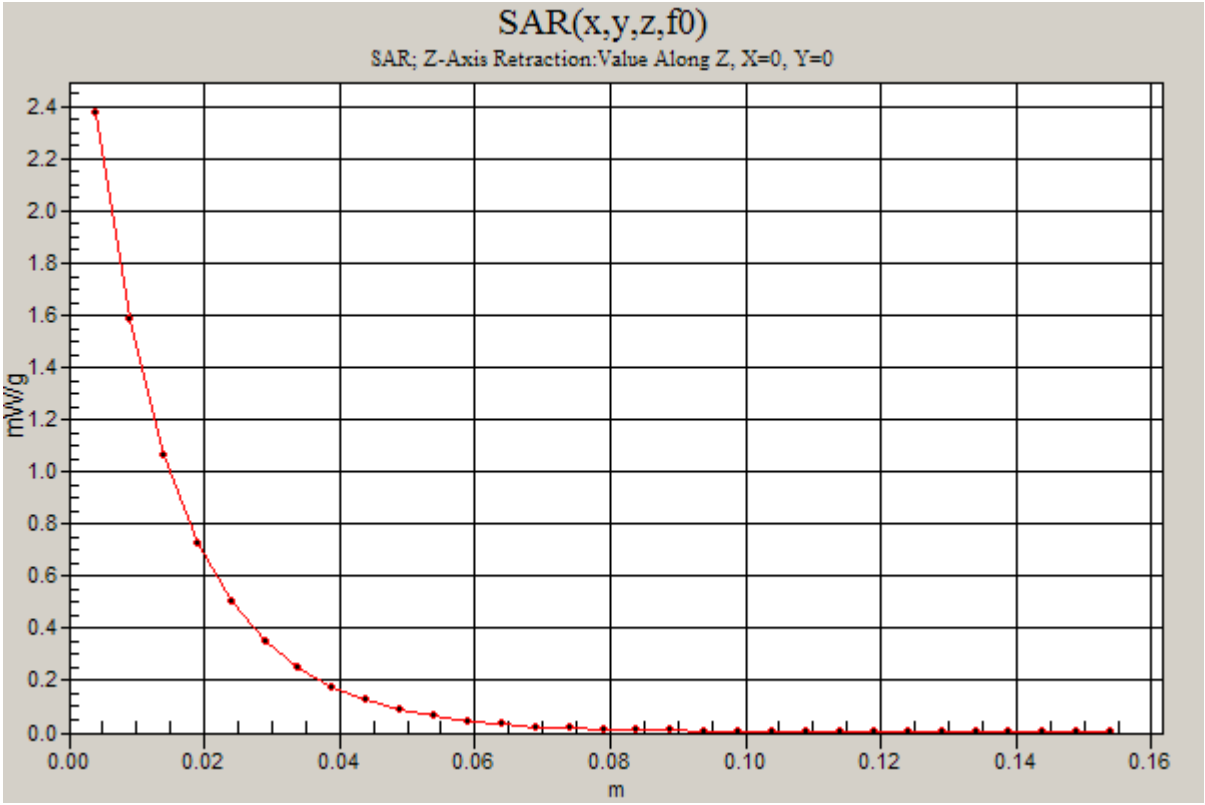
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 2.16 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.8 V/m; Power Drift = 0.023 dB; Peak SAR (extrapolated) = 3.24 W/kg
SAR(1 g) = 2.18 mW/g; SAR(10 g) = 1.41 mW/g; Maximum value of SAR (measured) = 2.36 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.8 V/m; Power Drift = 0.023 dB; Peak SAR (extrapolated) = 3.18 W/kg
SAR(1 g) = 2.18 mW/g; SAR(10 g) = 1.42 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.38 mW/g


mW/g
2.38
1.90
1.43
0.952
0.476
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date/Time: 10/16/2006 8:30:30 AM

Test Laboratory: Motorola - 101606 1800MHz Good at+0.1%

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:272
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272(TR); Input Power = 200mW
Sim.Temp@meas = 19.8*C; Sim.Temp@SPC = 19.3*C; Room Temp @ SPC = 21*C
Communication System: CW - Dipole; Frequency: 1800 MHz; Channel Number: 8; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 1800 MHz; σ = 1.36 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3

DASY4 Configuration:

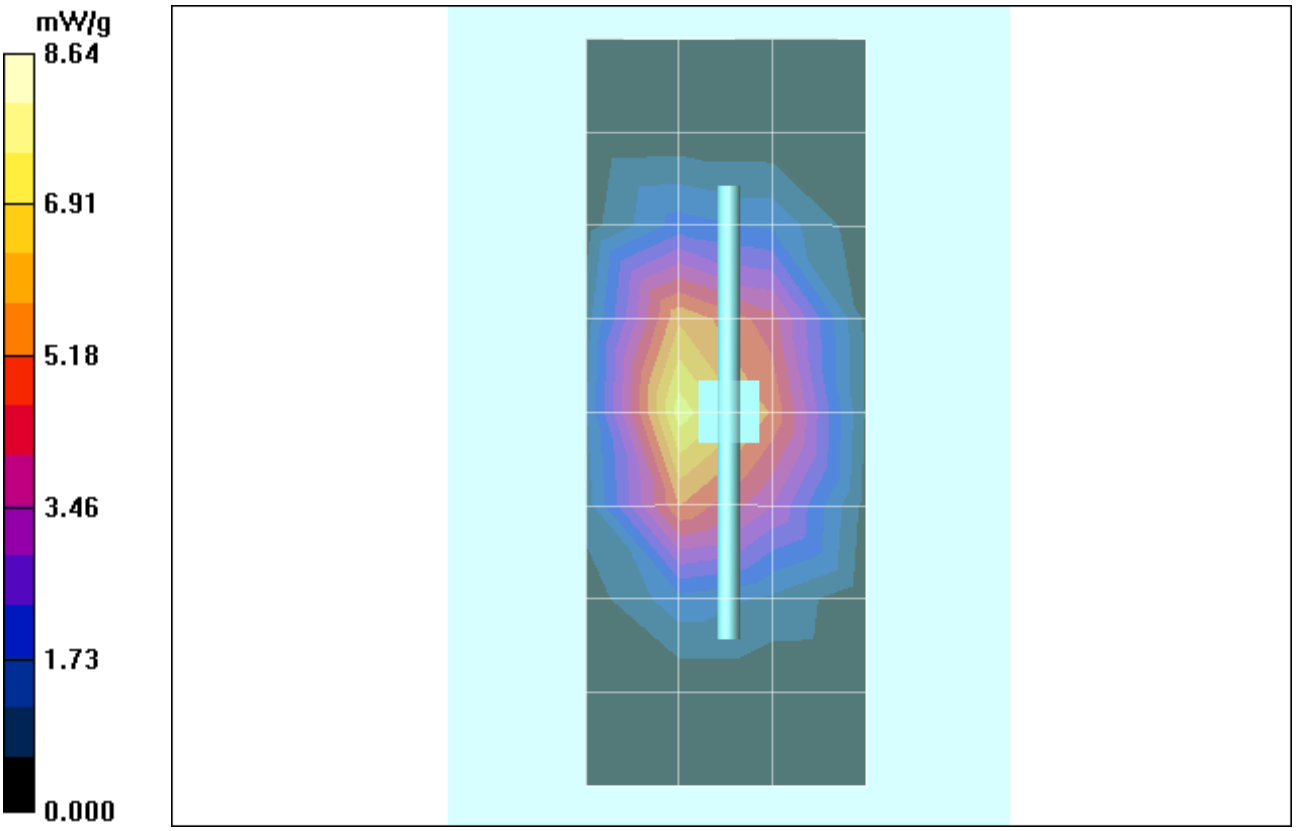
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

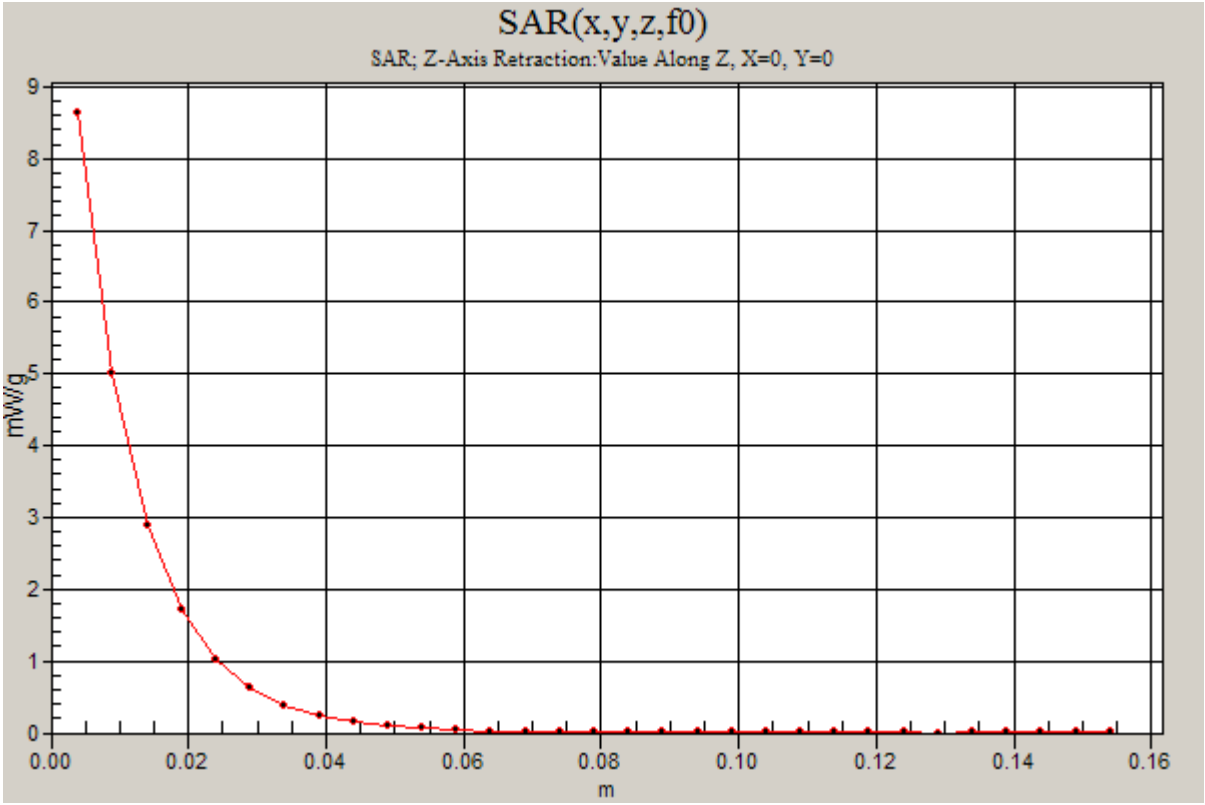
Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.27 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.8 V/m; Power Drift = -0.022 dB; Peak SAR (extrapolated) = 13.1 W/kg
SAR(1 g) = 7.63 mW/g; SAR(10 g) = 4.1 mW/g; Maximum value of SAR (measured) = 8.56 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.8 V/m; Power Drift = -0.022 dB; Peak SAR (extrapolated) = 12.9 W/kg
SAR(1 g) = 7.62 mW/g; SAR(10 g) = 4.12 mW/g; Maximum value of SAR (measured) = 8.51 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.64 mW/g


mW/g
8.64
6.91
5.18
3.46
1.73
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
0
1
2
3
4
5
6
7
8
9
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date/Time: 10/17/2006 8:28:27 AM

Test Laboratory: Motorola - 101706 1800MHz Good at+0.5%

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:272
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272(TR); Input Power = 200mW
Sim.Temp@meas = 20*C; Sim.Temp@SPC = 19.3*C; Room Temp @ SPC = 20.6*C
Communication System: CW - Dipole; Frequency: 1800 MHz; Channel Number: 8; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 1800 MHz; σ = 1.35 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

DASY4 Configuration:

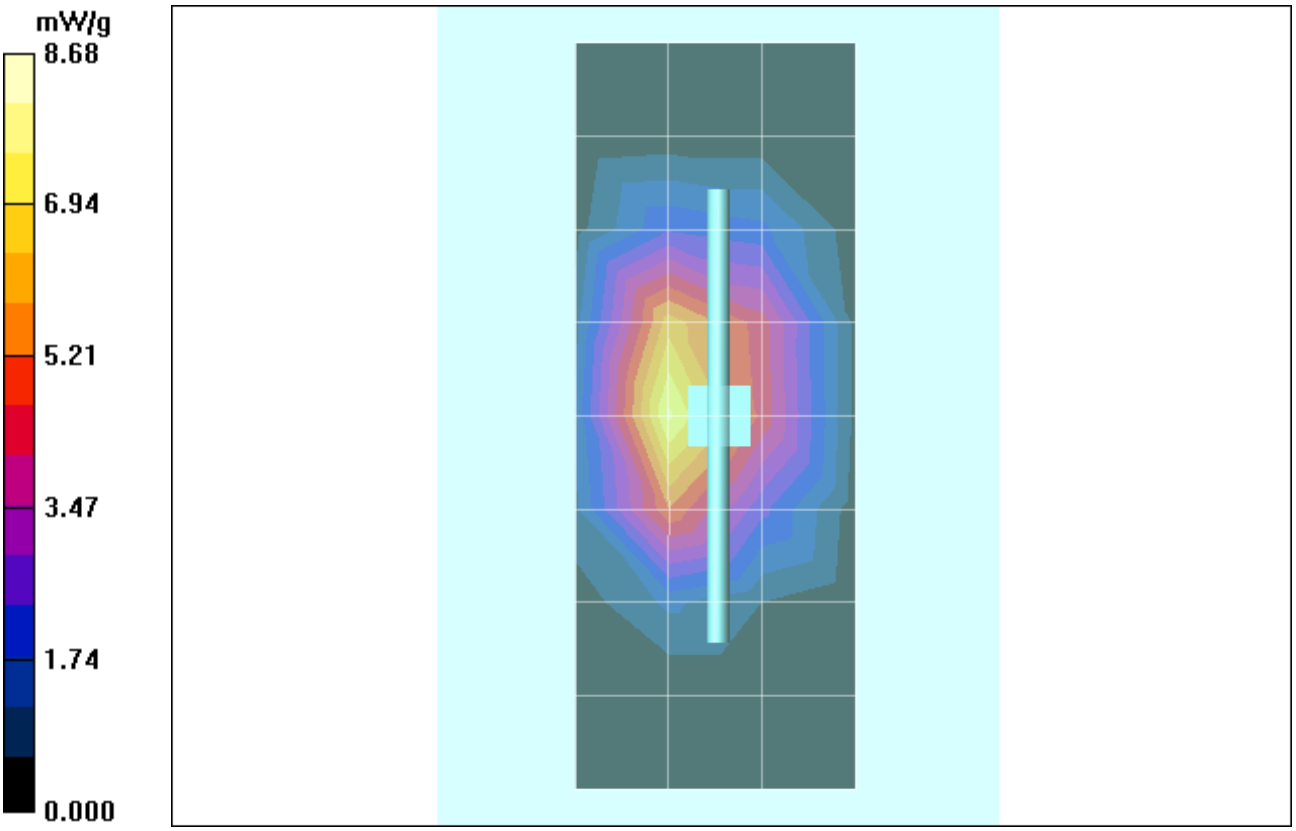
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

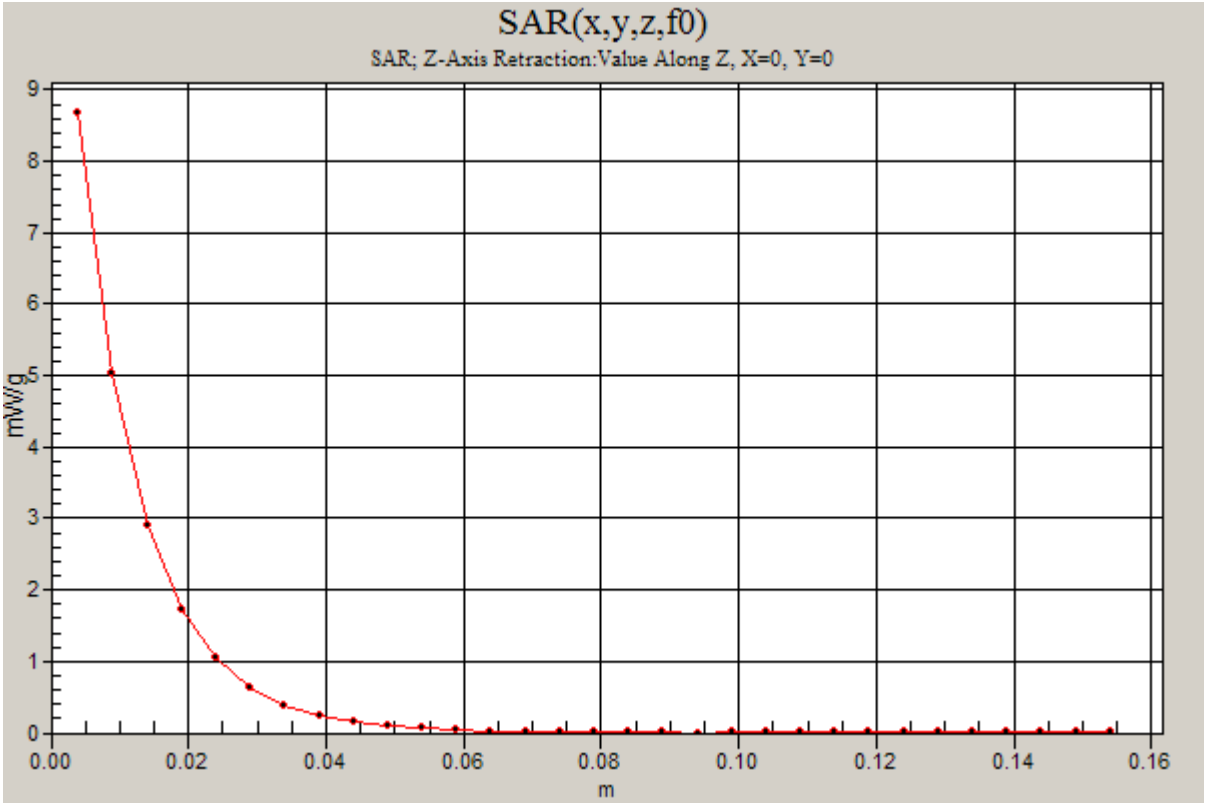
Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.69 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.0 V/m; Power Drift = 0.033 dB; Peak SAR (extrapolated) = 13.3 W/kg
SAR(1 g) = 7.68 mW/g; SAR(10 g) = 4.11 mW/g; Maximum value of SAR (measured) = 8.56 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.0 V/m; Power Drift = 0.033 dB; Peak SAR (extrapolated) = 12.8 W/kg
SAR(1 g) = 7.63 mW/g; SAR(10 g) = 4.13 mW/g; Maximum value of SAR (measured) = 8.40 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.68 mW/g


mW/g
8.68
6.94
5.21
3.47
1.74
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
0
1
2
3
4
5
6
7
8
9
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date/Time: 10/18/2006 9:35:53 AM

Test Laboratory: Motorola - 101806 1800MHz Good at+0.1%

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:272
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272(TR); Input Power = 200mW
Sim.Temp@meas = 19.4*C; Sim.Temp@SPC = 19.3*C; Room Temp @ SPC = 21*C
Communication System: CW - Dipole; Frequency: 1800 MHz; Channel Number: 8; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 1800 MHz; σ = 1.35 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3

DASY4 Configuration:

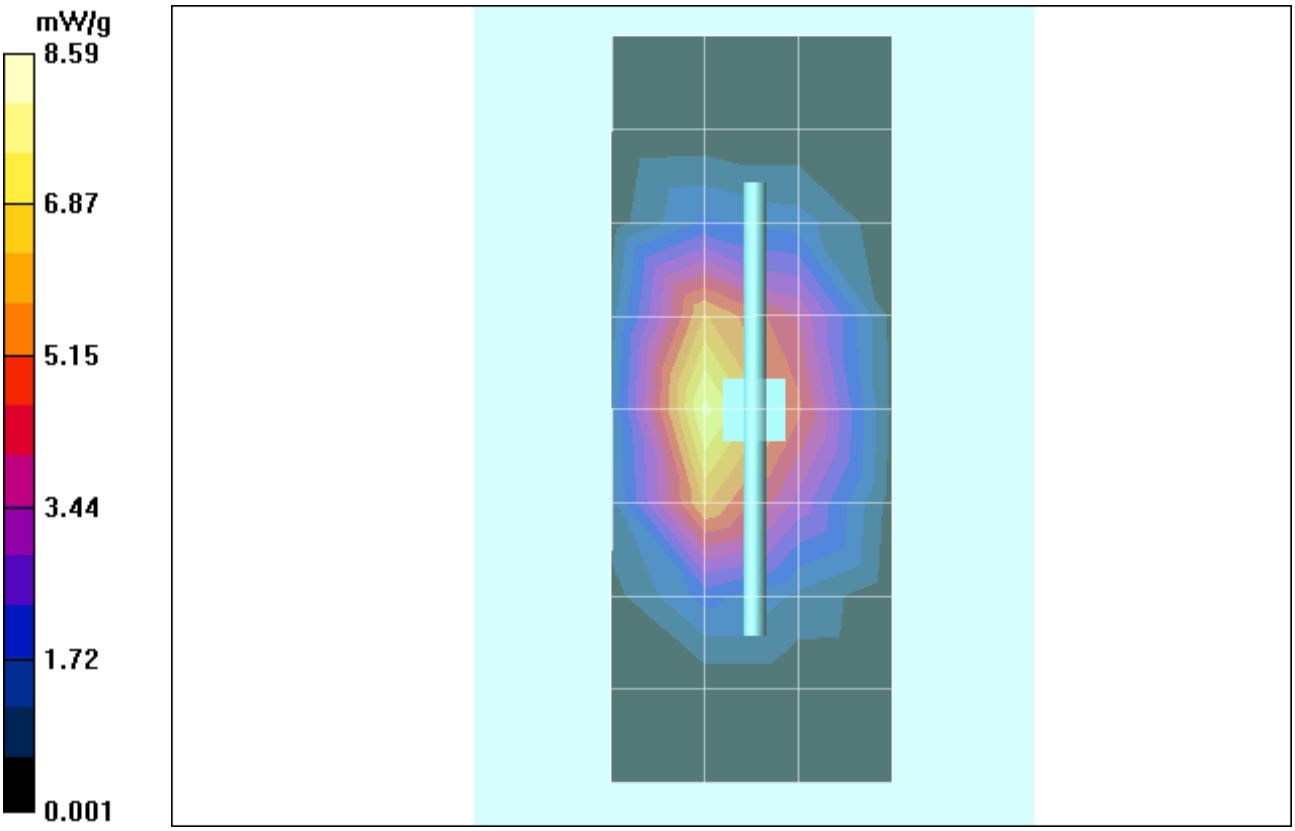
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

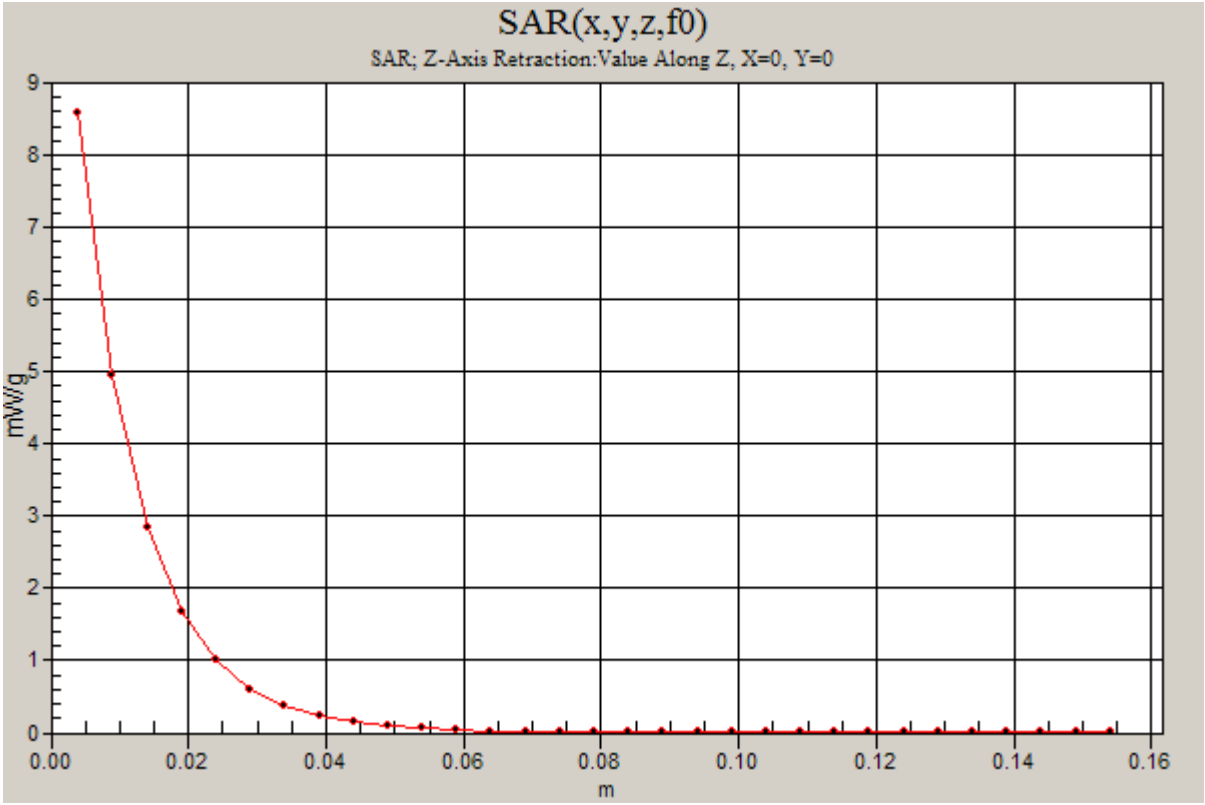
Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.68 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.4 V/m; Power Drift = -0.026 dB; Peak SAR (extrapolated) = 13.1 W/kg
SAR(1 g) = 7.64 mW/g; SAR(10 g) = 4.12 mW/g; Maximum value of SAR (measured) = 8.42 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.4 V/m; Power Drift = -0.026 dB; Peak SAR (extrapolated) = 12.9 W/kg
SAR(1 g) = 7.62 mW/g; SAR(10 g) = 4.13 mW/g; Maximum value of SAR (measured) = 8.44 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.59 mW/g


mW/g
8.59
6.87
5.15
3.44
1.72
0.001


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
m
0
1
2
3
4
5
6
7
8
9
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Date/Time: 10/19/2006 7:52:17 AM

Test Laboratory: Motorola - 101906 1800MHz Good at -2.7%

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:272
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272(TR); Input Power = 200mW
Sim.Temp@meas = 19.8*C; Sim.Temp@SPC = 19.3*C; Room Temp @ SPC = 20.5*C
Communication System: CW - Dipole; Frequency: 1800 MHz; Channel Number: 8; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 1800 MHz; σ = 1.36 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3

DASY4 Configuration:

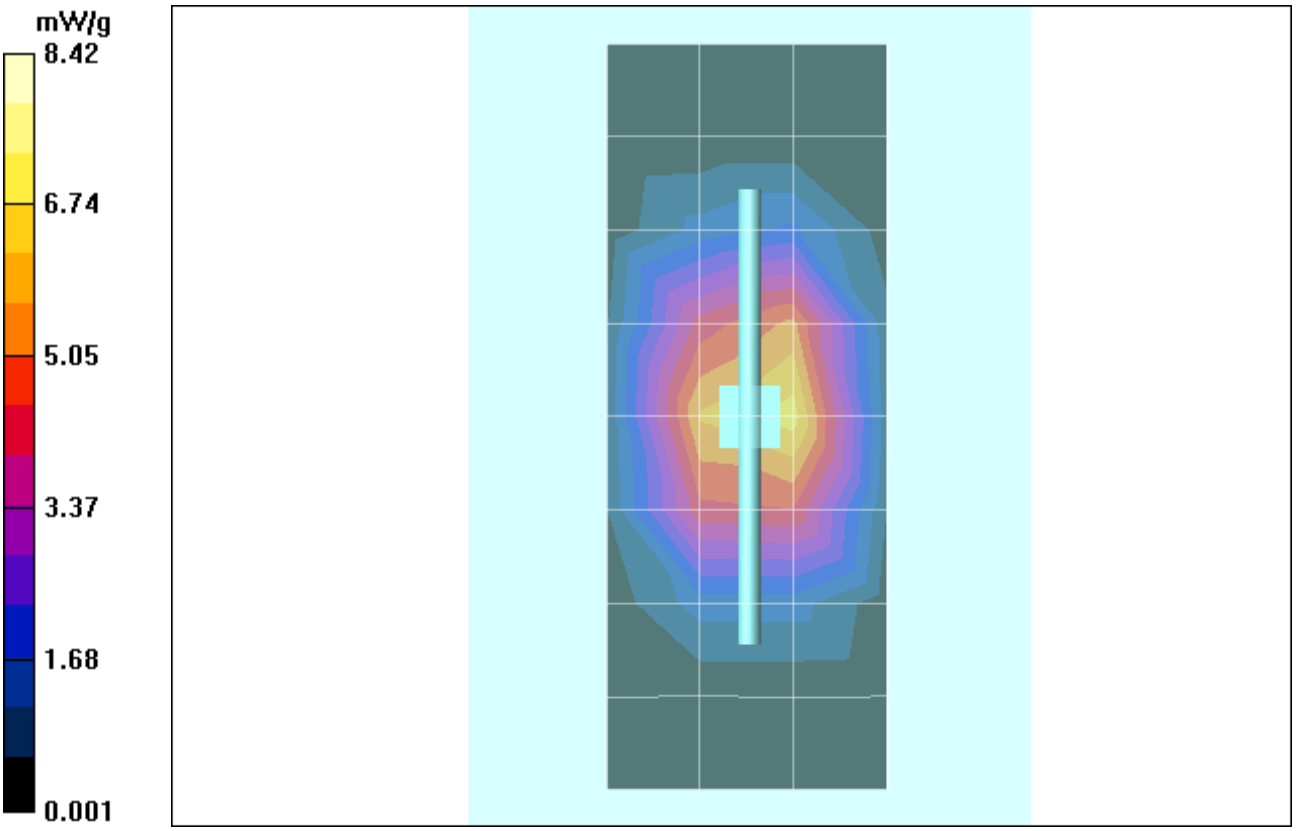
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

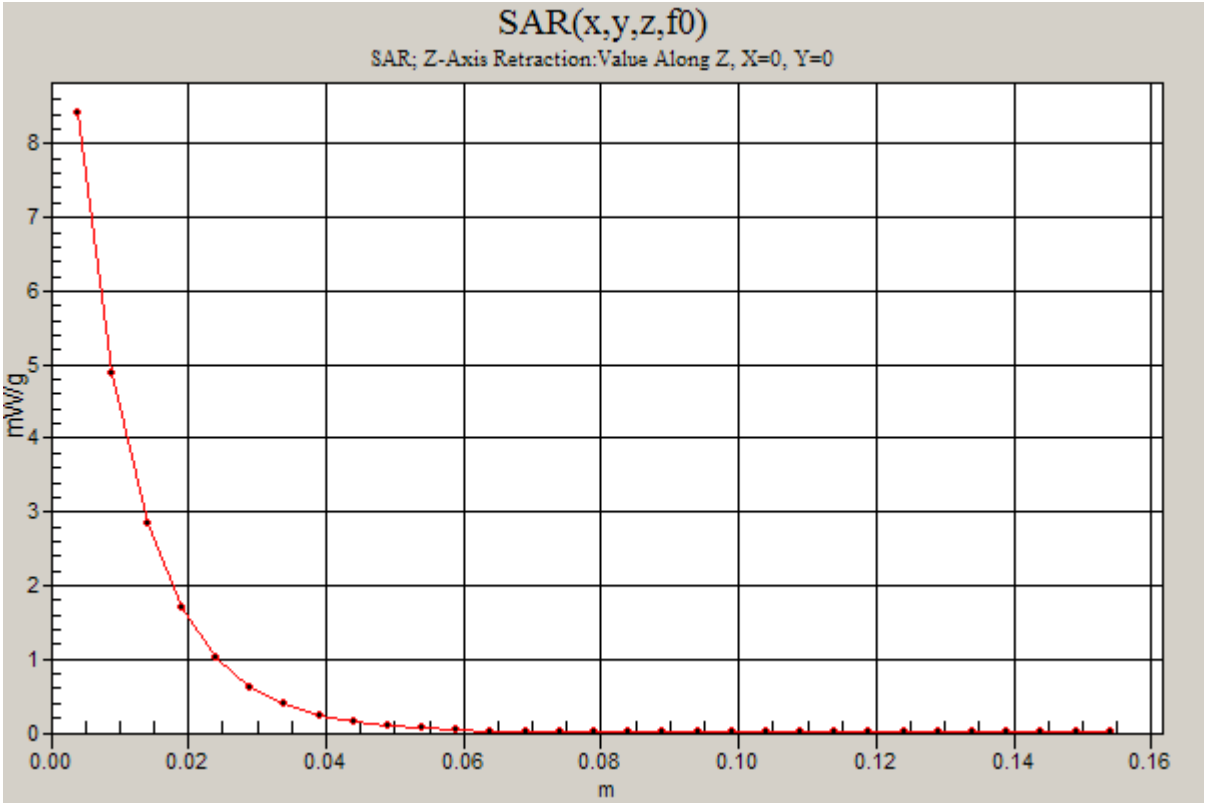
Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 6.50 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 80.8 V/m; Power Drift = 0.013 dB; Peak SAR (extrapolated) = 12.6 W/kg
SAR(1 g) = 7.42 mW/g; SAR(10 g) = 4 mW/g; Maximum value of SAR (measured) = 8.33 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 80.8 V/m; Power Drift = 0.013 dB; Peak SAR (extrapolated) = 12.4 W/kg
SAR(1 g) = 7.41 mW/g; SAR(10 g) = 4.02 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.42 mW/g


mW/g
8.42
6.74
5.05
3.37
1.68
0.001


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
0
1
2
3
4
5
6
7
8
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date/Time: 10/20/2006 7:59:33 AM

Test Laboratory: Motorola - 102006 1800MHz Good at+1.8%

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:272
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272(TR); Input Power = 200mW
Sim.Temp@meas = 19.*C; Sim.Temp@SPC = 19.3*C; Room Temp @ SPC = 20.8*C
Communication System: CW - Dipole; Frequency: 1800 MHz; Channel Number: 8; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 1800 MHz; σ = 1.37 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3

DASY4 Configuration:

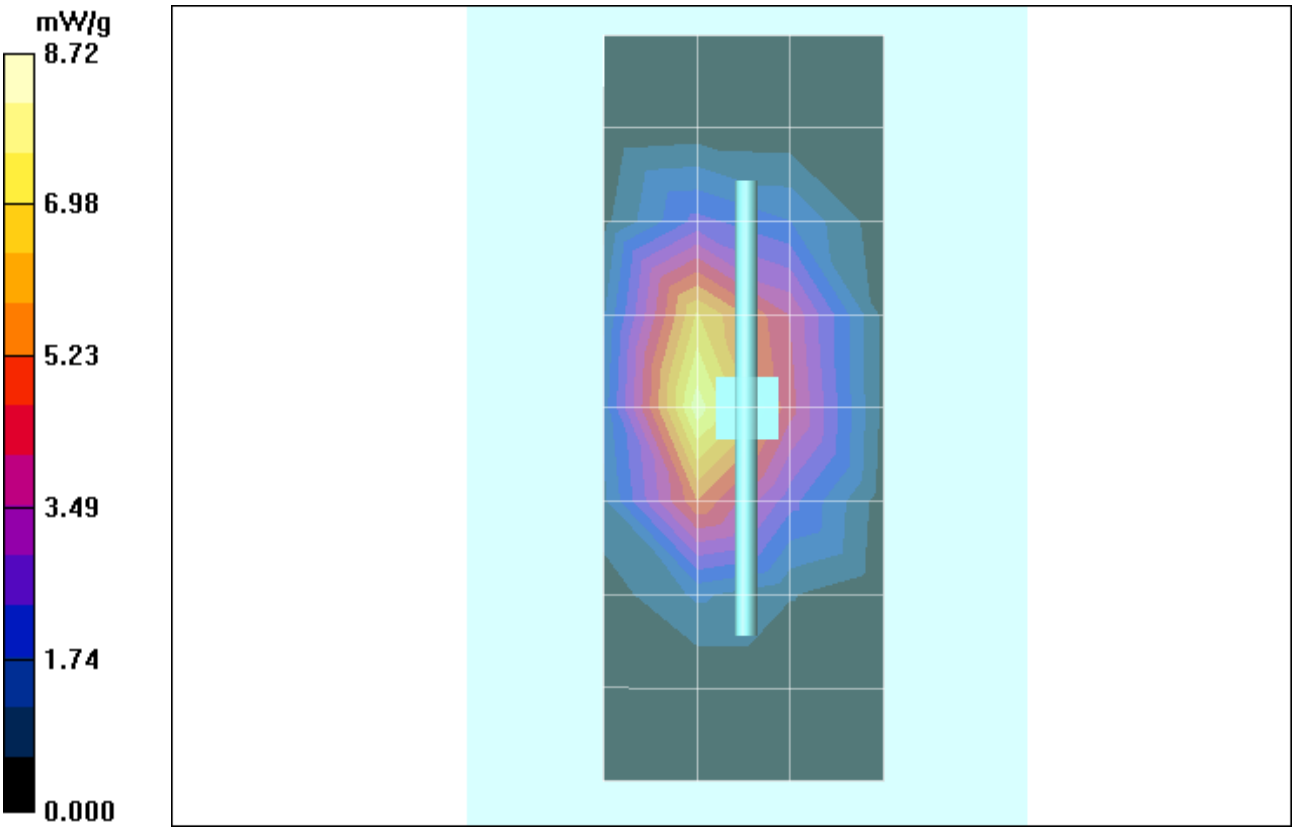
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

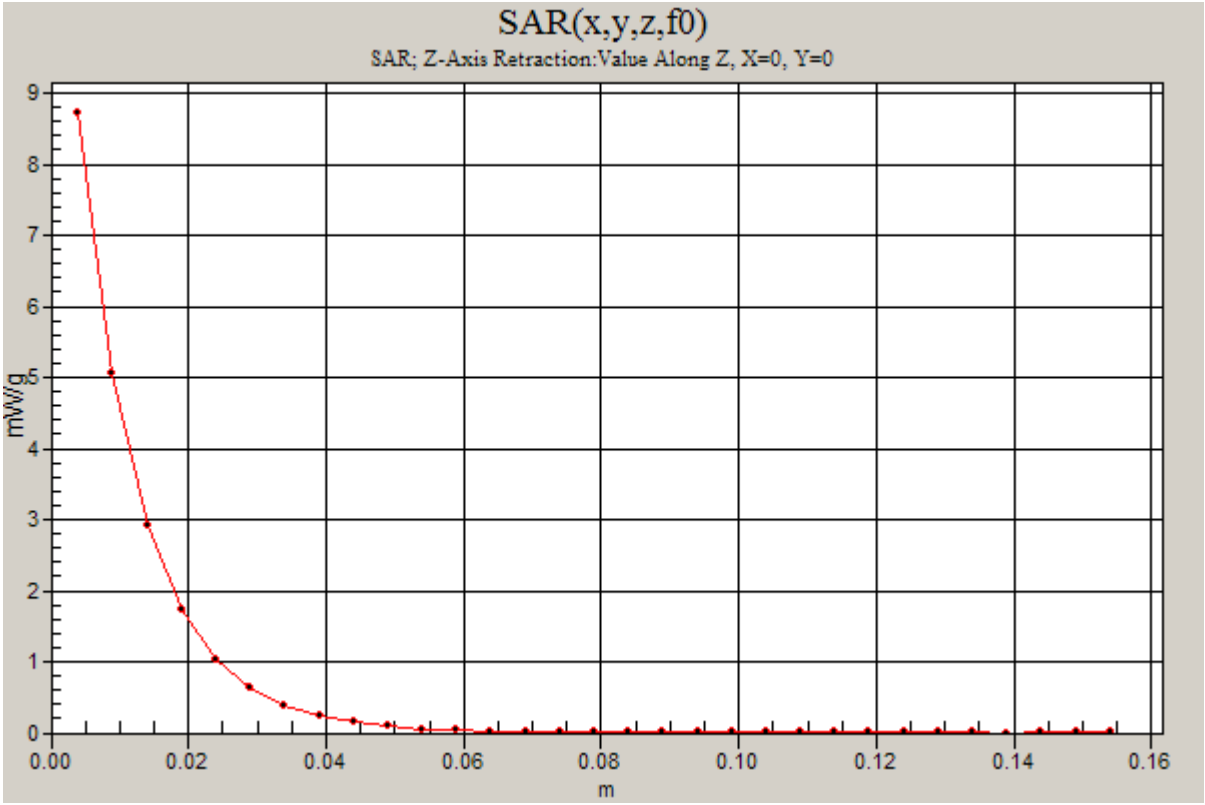
Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.93 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.3 V/m; Power Drift = -0.006 dB; Peak SAR (extrapolated) = 13.3 W/kg
SAR(1 g) = 7.73 mW/g; SAR(10 g) = 4.14 mW/g; Maximum value of SAR (measured) = 8.65 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.3 V/m; Power Drift = -0.006 dB; Peak SAR (extrapolated) = 13.2 W/kg
SAR(1 g) = 7.78 mW/g; SAR(10 g) = 4.19 mW/g; Maximum value of SAR (measured) = 8.62 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.72 mW/g


mW/g
8.72
6.98
5.23
3.49
1.74
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
0
1
2
3
4
5
6
7
8
9
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

Date/Time: 10/18/2006 11:33:07 AM

Test Laboratory: Motorola - WCDMA 850 Cheek

Serial: 004401022950816

Procedure Notes: Pwr Step: All Bits Up; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5789B DEVICE POSITION: CHEEK
Communication System: 3G-WCDMA 850; Frequency: 836 MHz; Channel Number: 4180; Duty Cycle: 1:1

Medium: Low Freq Head
Medium parameters used: f = 835 MHz; σ = 0.94 mho/m; ε_r = 43.3; ρ = 1000 kg/m^3

DASY4 Configuration:

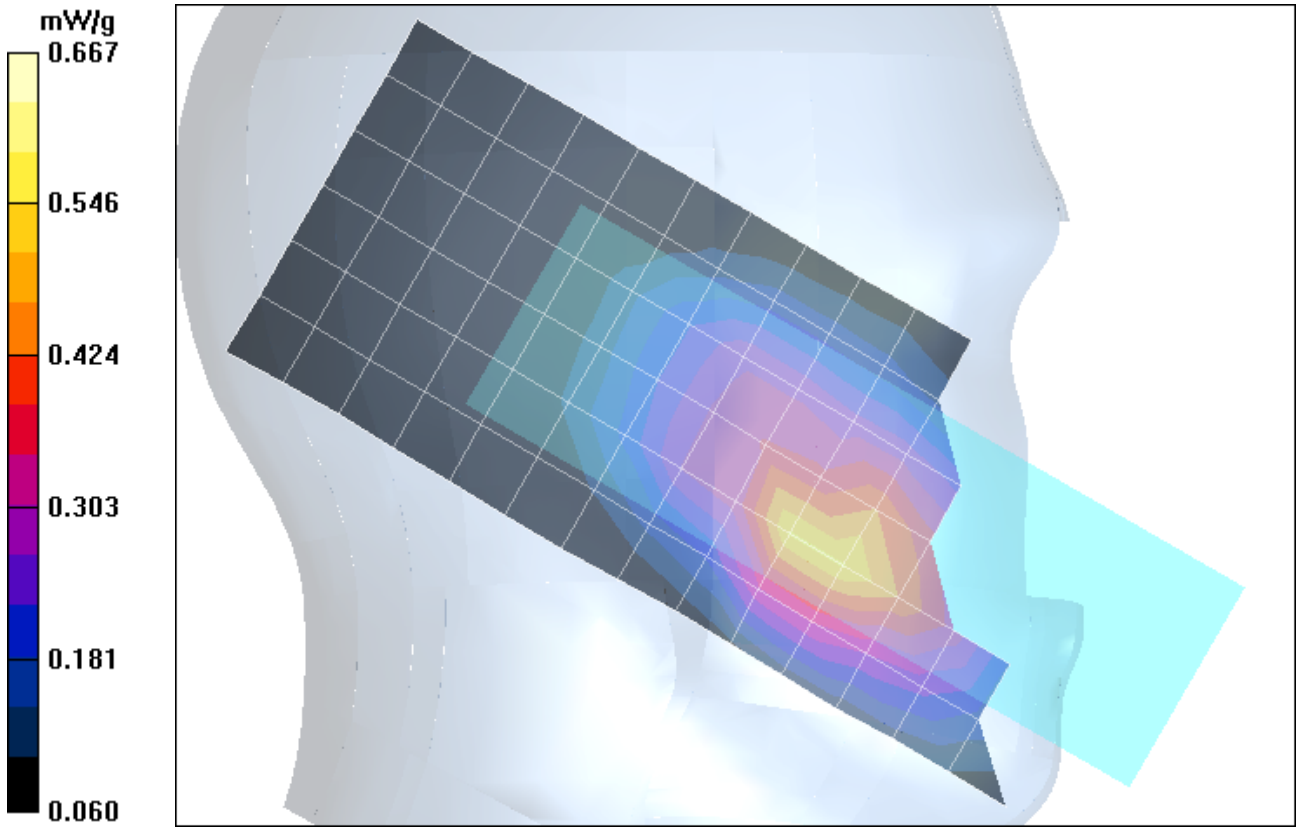
- Probe: ES3DV3 - SN3037; ConvF(6.07, 6.07, 6.07); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Left Head Template/Area Scan - Normal (15mm) (7x17x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.512 mW/g

Left Head Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.6 V/m; Power Drift = 0.198 dB; Peak SAR (extrapolated) = 1.34 W/kg
SAR(1 g) = 0.595 mW/g; SAR(10 g) = 0.376 mW/g; Maximum value of SAR (measured) = 0.667 mW/g



Date/Time: 10/12/2006 12:49:38 PM

Test Laboratory: Motorola - GSM 850 Cheek

Serial: 004401022950816

Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5789B; DEVICE POSITION: CHEEK
Communication System: GSM 850; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8

Medium: Low Freq Head
Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3

DASY4 Configuration:

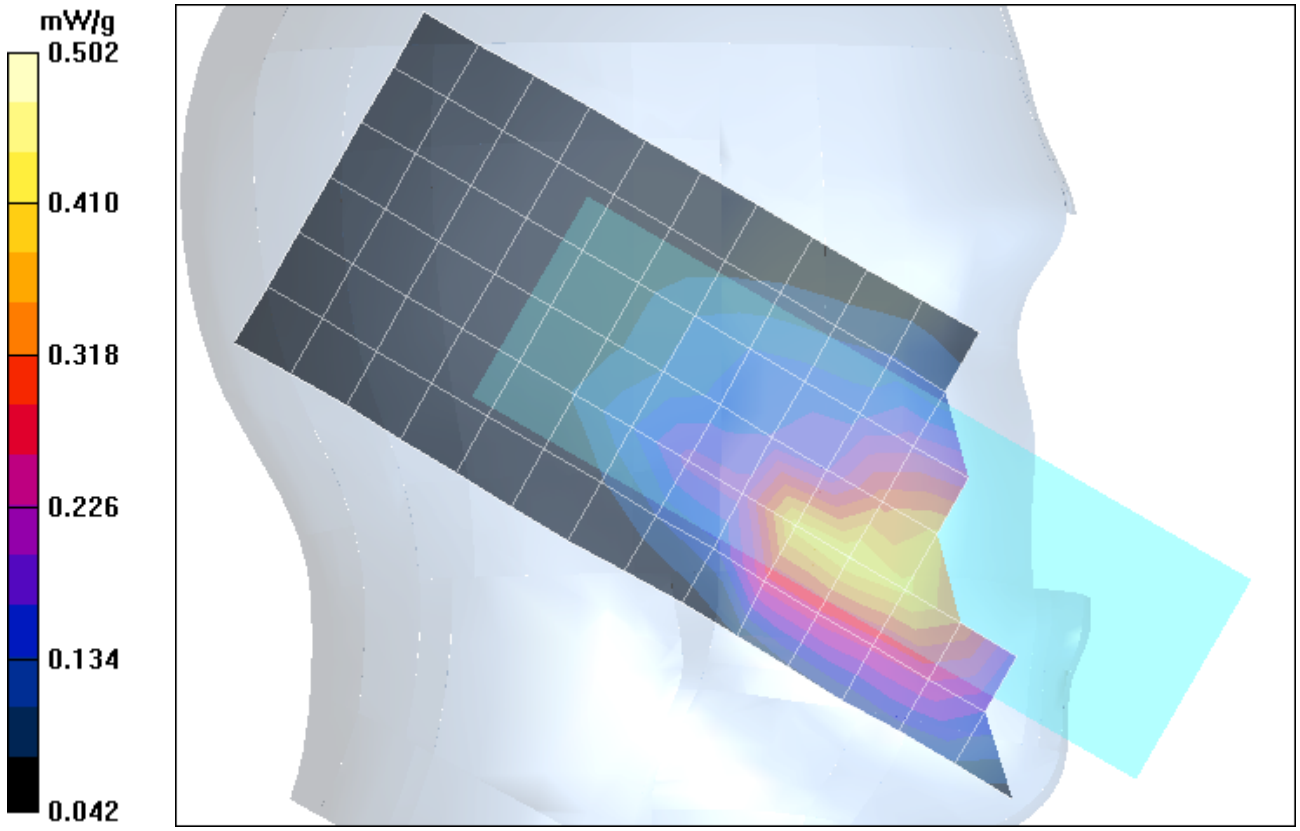
- Probe: ES3DV3 - SN3037; ConvF(6.07, 6.07, 6.07); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Left Head Template/Area Scan - Normal (15mm) (7x17x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.415 mW/g

Left Head Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.9 V/m; Power Drift = 0.481 dB; Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.459 mW/g; SAR(10 g) = 0.301 mW/g; Maximum value of SAR (measured) = 0.502 mW/g



Date/Time: 10/20/2006 11:43:01 AM

Test Laboratory: Motorola - GSM 1800 Cheek

Serial: 004401022950816

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5789B; DEVICE POSITION: CHEEK
Communication System: GSM 1800; Frequency: 1710.2 MHz; Channel Number: 512; Duty Cycle: 1:8

Medium: Regular Glycol Head
Medium parameters used: f = 1750 MHz; σ = 1.31 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3

DASY4 Configuration:

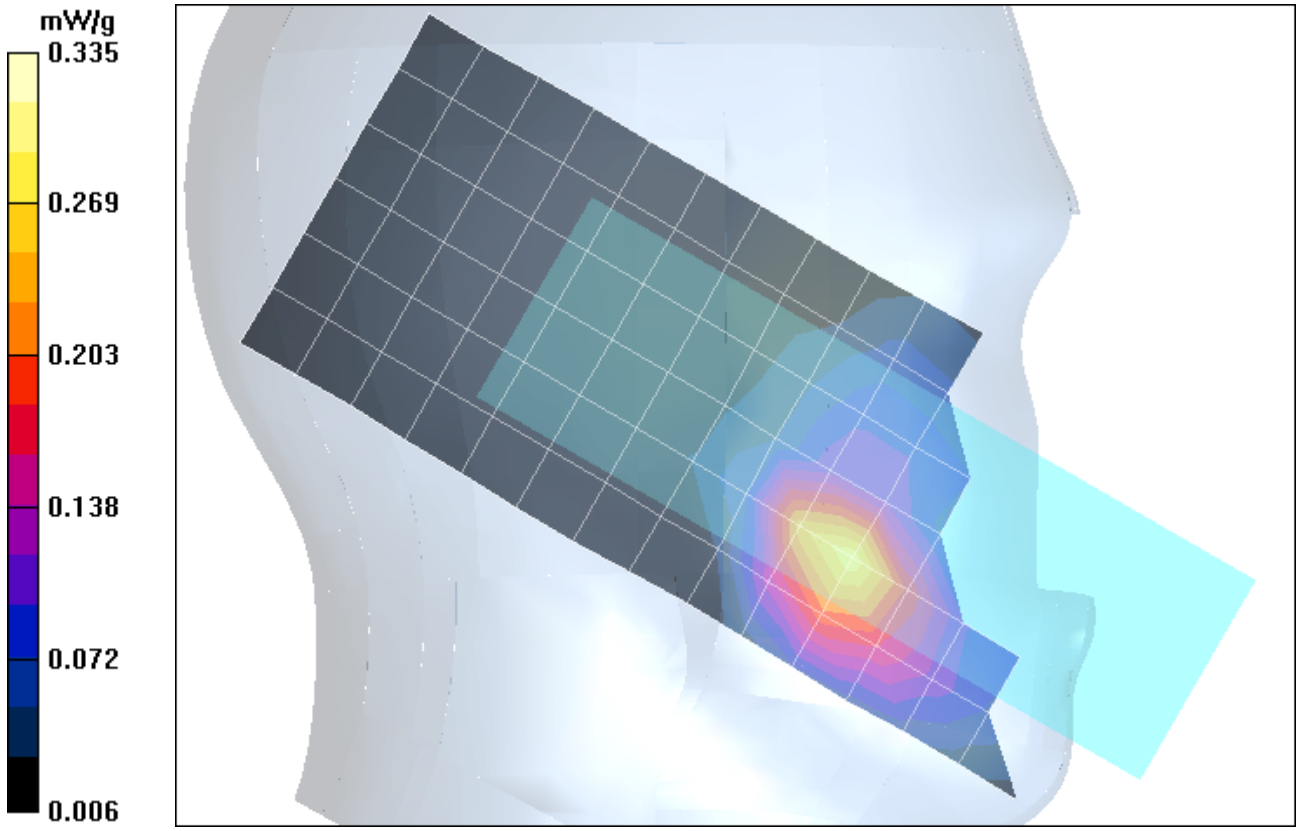
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Left Head Template/Area Scan - Normal (15mm) (7x17x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.289 mW/g

Left Head Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.2 V/m; Power Drift = 0.147 dB; Peak SAR (extrapolated) = 0.535 W/kg
SAR(1 g) = 0.308 mW/g; SAR(10 g) = 0.186 mW/g; Maximum value of SAR (measured) = 0.335 mW/g



Date/Time: 10/17/2006 11:26:47 PM

Test Laboratory: Motorola - GSM 1900 Cheek

Serial: 004401022950816

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5789B DEVICE POSITION (cheek or rotated): Cheek
Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8

Medium: Regular Glycol Head
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3

DASY4 Configuration:

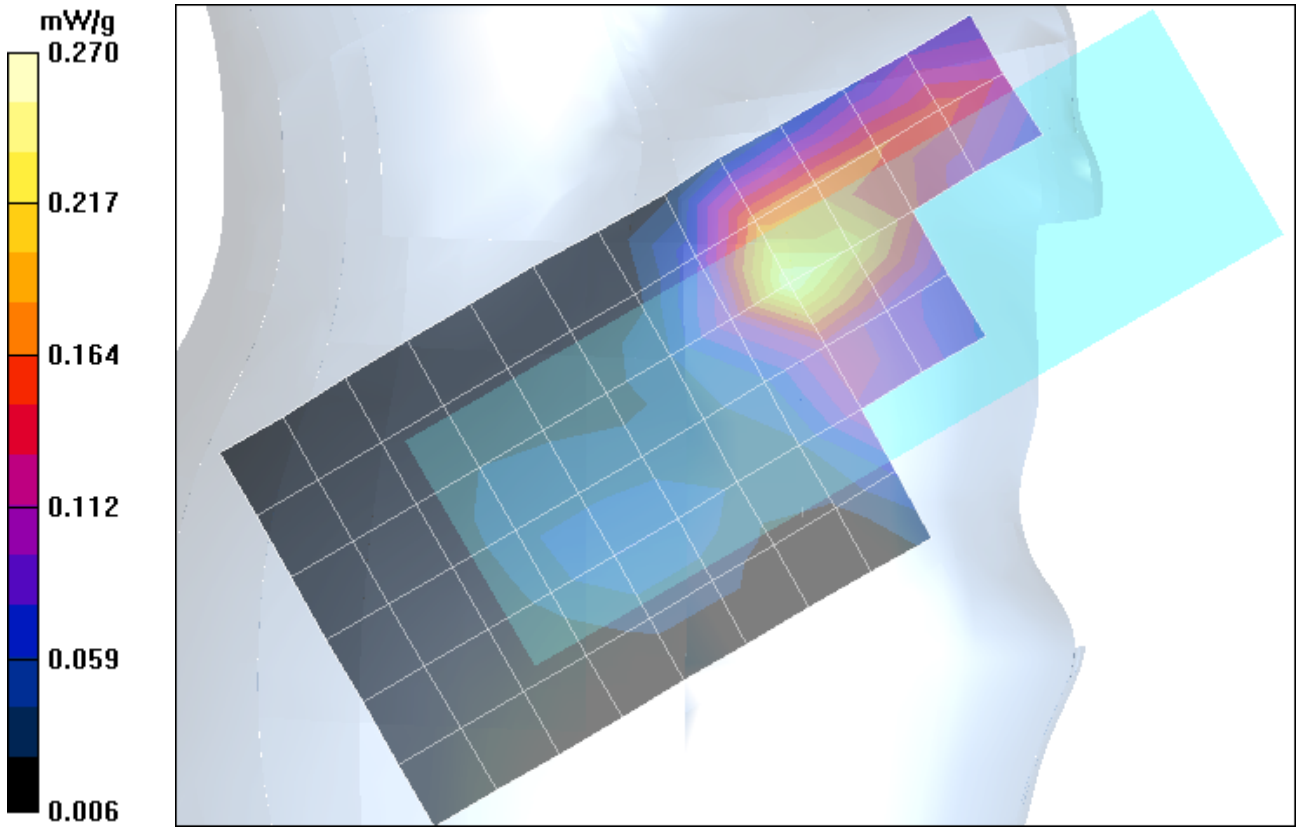
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Right Head Template/Area Scan - Normal (15mm) (7x17x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.254 mW/g

Right Head Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.0 V/m; Power Drift = 0.272 dB; Peak SAR (extrapolated) = 0.443 W/kg
SAR(1 g) = 0.248 mW/g; SAR(10 g) = 0.147 mW/g; Maximum value of SAR (measured) = 0.270 mW/g



Date/Time: 10/16/2006 11:00:35 PM

Test Laboratory: Motorola - WCDMA 1900 Cheek

Serial: 004401022950816

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5789B DEVICE POSITION (cheek or rotated): Cheek
Communication System: WCDMA 1900; Frequency: 1880 MHz; Channel Number: 9400; Duty Cycle: 1:1

Medium: Back-Up Glycol Head
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 39; ρ = 1000 kg/m^3

DASY4 Configuration:

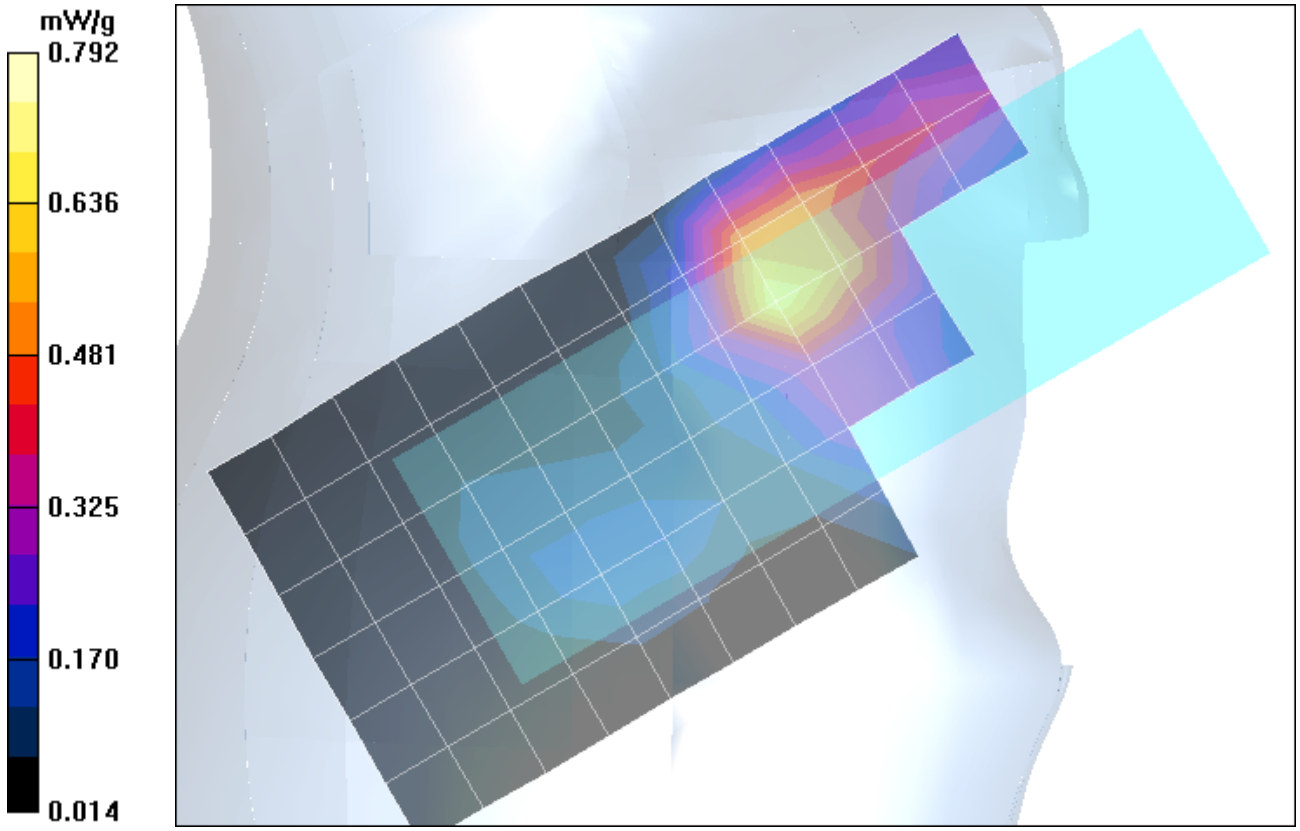
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Right Head Template/Area Scan - Normal (15mm) (7x17x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.695 mW/g

Right Head Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.1 V/m; Power Drift = 0.164 dB; Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.712 mW/g; SAR(10 g) = 0.418 mW/g; Maximum value of SAR (measured) = 0.792 mW/g



Date/Time: 10/18/2006 12:16:50 PM

Test Laboratory: Motorola - WCDMA 850 Tilt

Serial: 004401022950816

Procedure Notes: Pwr Step: All Bits Up; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5789B; DEVICE POSITION: TILT
Communication System: 3G-WCDMA 850; Frequency: 836 MHz; Channel Number: 4180; Duty Cycle: 1:1

Medium: Low Freq Head
Medium parameters used: f = 835 MHz; σ = 0.94 mho/m; ε_r = 43.3; ρ = 1000 kg/m^3

DASY4 Configuration:

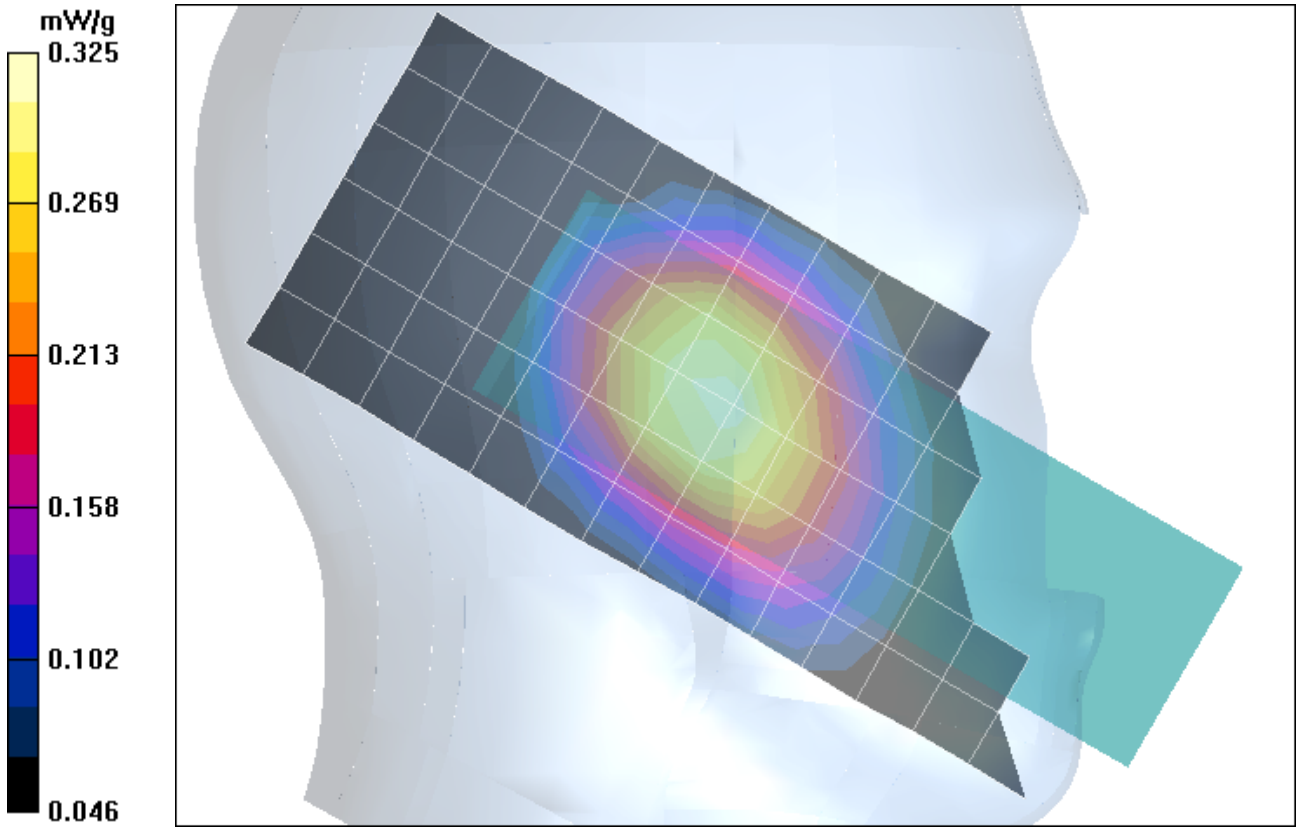
- Probe: ES3DV3 - SN3037; ConvF(6.07, 6.07, 6.07); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Left Head Template/Area Scan - Normal (15mm) (7x17x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.321 mW/g

Left Head Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.1 V/m; Power Drift = 0.198 dB; Peak SAR (extrapolated) = 0.374 W/kg
SAR(1 g) = 0.311 mW/g; SAR(10 g) = 0.240 mW/g; Maximum value of SAR (measured) = 0.325 mW/g



Date/Time: 10/14/2006 5:34:37 AM

Test Laboratory: Motorola - GSM 850 Tilt

Serial: 004401022950816

Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5789B; DEVICE POSITION: TILT
Communication System: GSM 850; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8

Medium: Low Freq Head
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 41; ρ = 1000 kg/m^3

DASY4 Configuration:

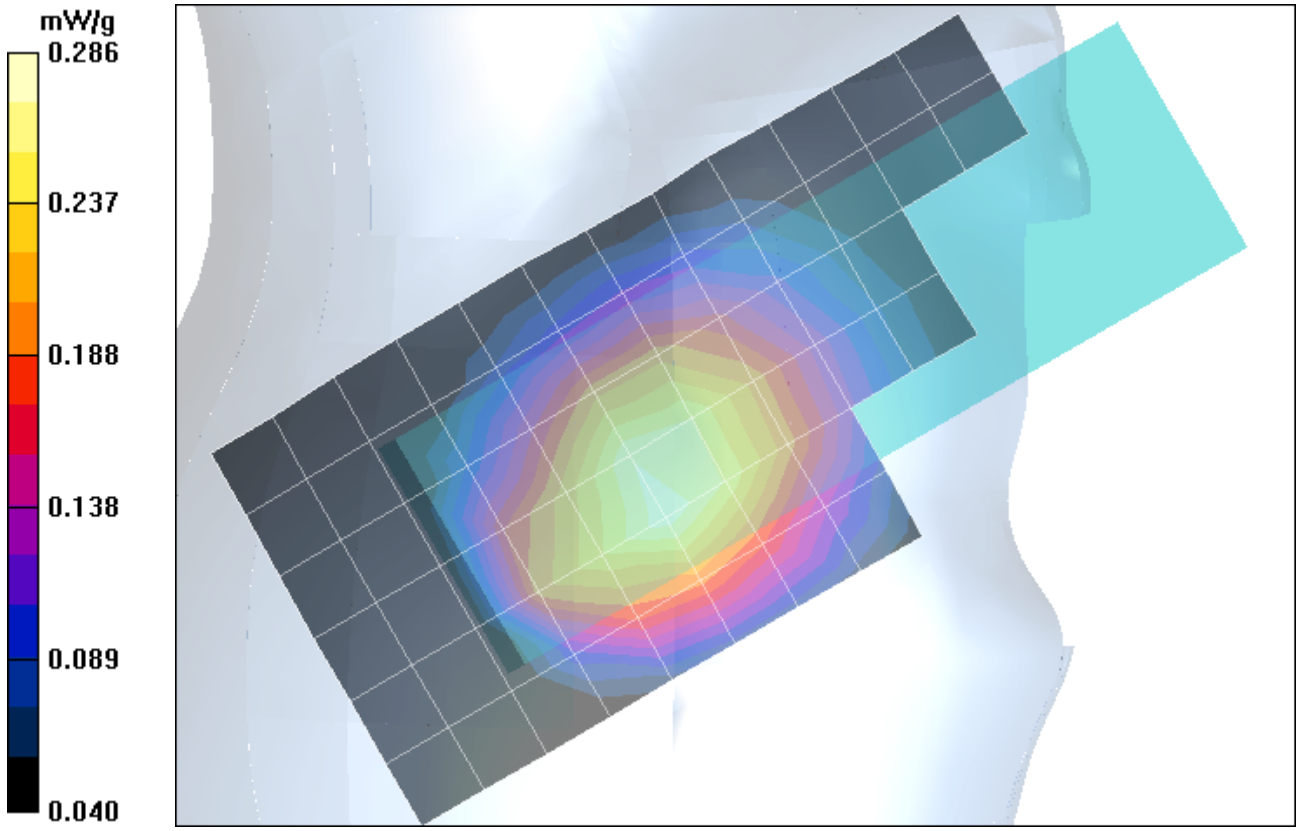
- Probe: ES3DV3 - SN3037; ConvF(6.07, 6.07, 6.07); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Right Head Template/Area Scan - Normal (15mm) (7x17x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.281 mW/g

Right Head Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.1 V/m; Power Drift = -0.330 dB; Peak SAR (extrapolated) = 0.331 W/kg
SAR(1 g) = 0.273 mW/g; SAR(10 g) = 0.206 mW/g; Maximum value of SAR (measured) = 0.286 mW/g



Date/Time: 10/19/2006 11:54:59 PM

Test Laboratory: Motorola - GSM 1800 Tilt

Serial: 004401022950816

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5789B DEVICE POSITION (cheek or rotated): Rotated
Communication System: GSM 1800; Frequency: 1747.8 MHz; Channel Number: 700; Duty Cycle: 1:8

Medium: Back-Up Glycol Head
Medium parameters used: f = 1750 MHz; σ = 1.31 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3

DASY4 Configuration:

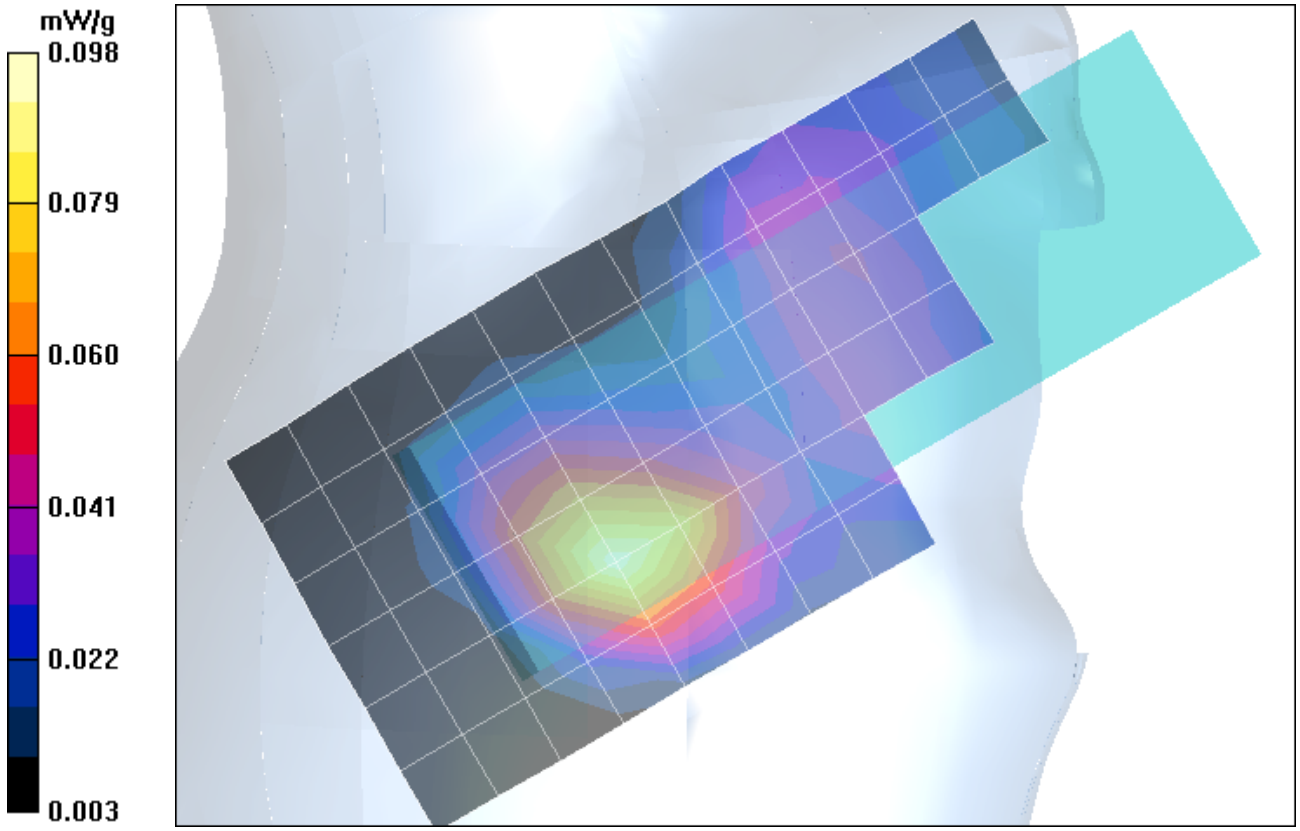
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Right Head Template/Area Scan - Normal (15mm) (7x17x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.096 mW/g

Right Head Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.46 V/m; Power Drift = -0.041 dB; Peak SAR (extrapolated) = 0.125 W/kg
SAR(1 g) = 0.090 mW/g; SAR(10 g) = 0.058 mW/g; Maximum value of SAR (measured) = 0.098 mW/g



Date/Time: 10/20/2006 10:07:50 AM

Test Laboratory: Motorola - GSM 1900 Tilt

Serial: 004401022950816
Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5789B DEVICE POSITION: TILT
Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8

Medium: Regular Glycol Head
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3

DASY4 Configuration:

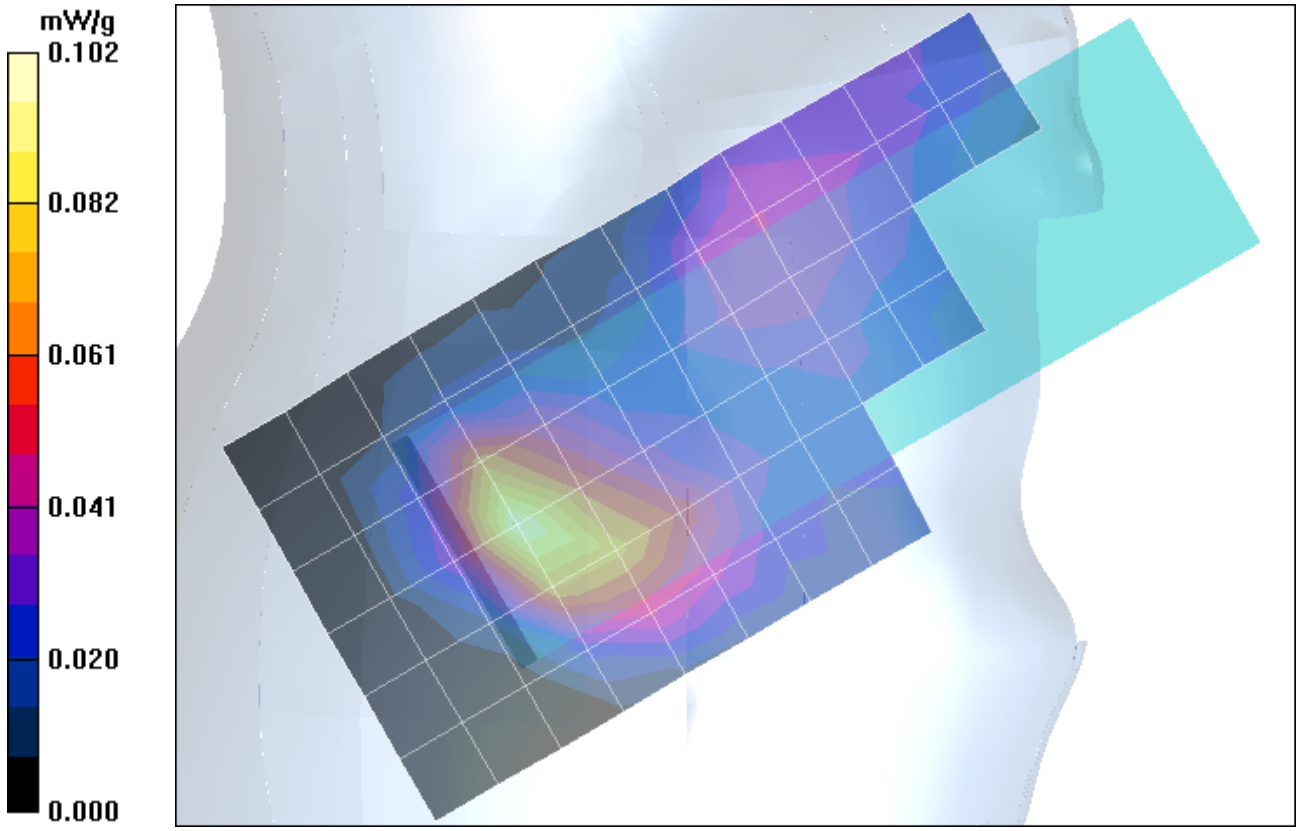
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Right Head Template/Area Scan - Normal (15mm) (7x17x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.096 mW/g

Right Head Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.18 V/m; Power Drift = 0.493 dB; Peak SAR (extrapolated) = 0.146 W/kg
SAR(1 g) = 0.090 mW/g; SAR(10 g) = 0.052 mW/g; Maximum value of SAR (measured) = 0.102 mW/g



Date/Time: 10/16/2006 8:48:45 PM

Test Laboratory: Motorola - WCDMA 1900 Tilt

Serial: 004401022950816

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5789B DEVICE POSITION (cheek or rotated): Rotated
Communication System: WCDMA 1900; Frequency: 1880 MHz; Channel Number: 9400; Duty Cycle: 1:1

Medium: Back-Up Glycol Head
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 39; ρ = 1000 kg/m^3

DASY4 Configuration:

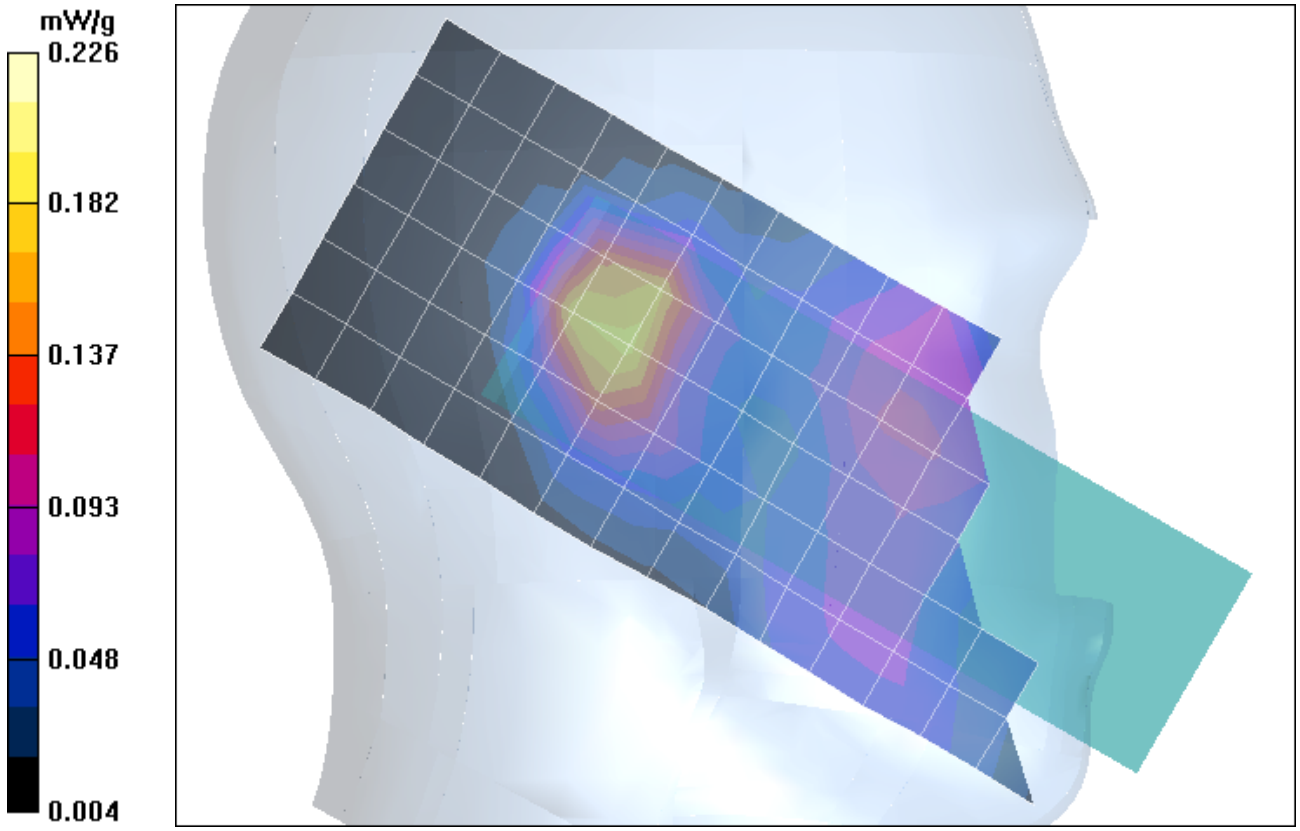
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Left Head Template/Area Scan - Normal (15mm) (7x17x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.175 mW/g

Left Head Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.3 V/m; Power Drift = -0.078 dB; Peak SAR (extrapolated) = 0.323 W/kg
SAR(1 g) = 0.202 mW/g; SAR(10 g) = 0.114 mW/g; Maximum value of SAR (measured) = 0.226 mW/g



Appendix 3

SAR distribution plots for Push-To-Talk Use

Date/Time: 10/20/2006 5:10:00 PM

Test Laboratory: Motorola - GSM 850 PTT

Serial: 004401022950816

Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Battery Model #: SNN5789B
Device Position: Face Dispatch - Flip Open, Front of Phone 25 mm from Flat Phantom
Communication System: GPRS 850 Cls. 10; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:4

Medium: Low Freq Head
Medium parameters used: f = 835 MHz; σ = 0.93 mho/m; ε_r = 42.7; ρ = 1000 kg/m^3

DASY4 Configuration:

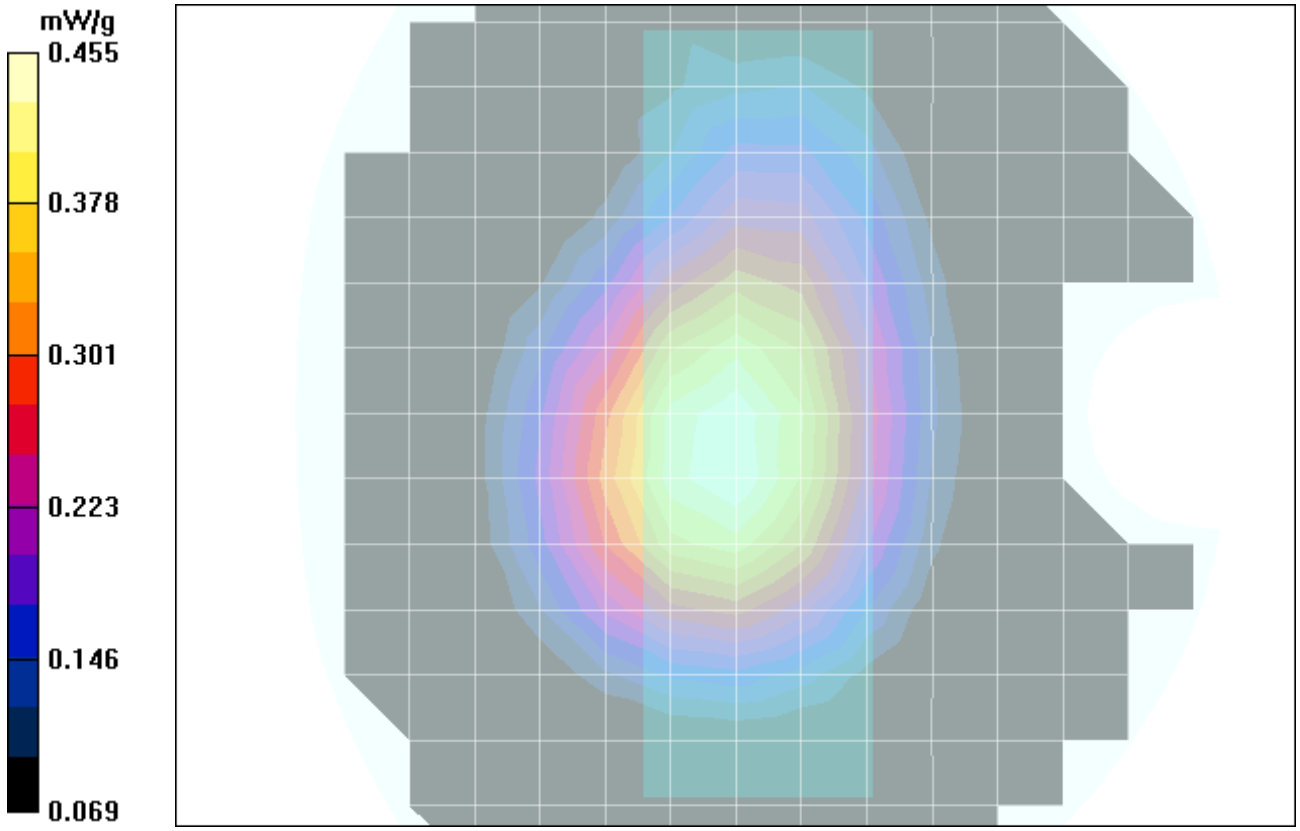
- Probe: ES3DV3 - SN3037; ConvF(6.07, 6.07, 6.07); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SAM Phone Against Flat Section/Area Scan - Full Body (15mm) (21x15x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.457 mW/g

SAM Phone Against Flat Section/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.0 V/m; Power Drift = -0.084 dB; Peak SAR (extrapolated) = 0.548 W/kg
SAR(1 g) = 0.431 mW/g; SAR(10 g) = 0.321 mW/g; Maximum value of SAR (measured) = 0.455 mW/g



Date/Time: 10/20/2006 2:51:44 PM

Test Laboratory: Motorola - GSM 1800 PTT

Serial: 004401022950816

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Battery Model #: SNN5789B
Device Position: Face Dispatch - Flip Open, Front of Phone 25 mm from Flat Phantom
Communication System: GPRS 1800 Cl 10; Frequency: 1784.8 MHz; Channel Number: 885; Duty Cycle: 1:4

Medium: Regular Glycol Head
Medium parameters used: f = 1750 MHz; σ = 1.31 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3

DASY4 Configuration:

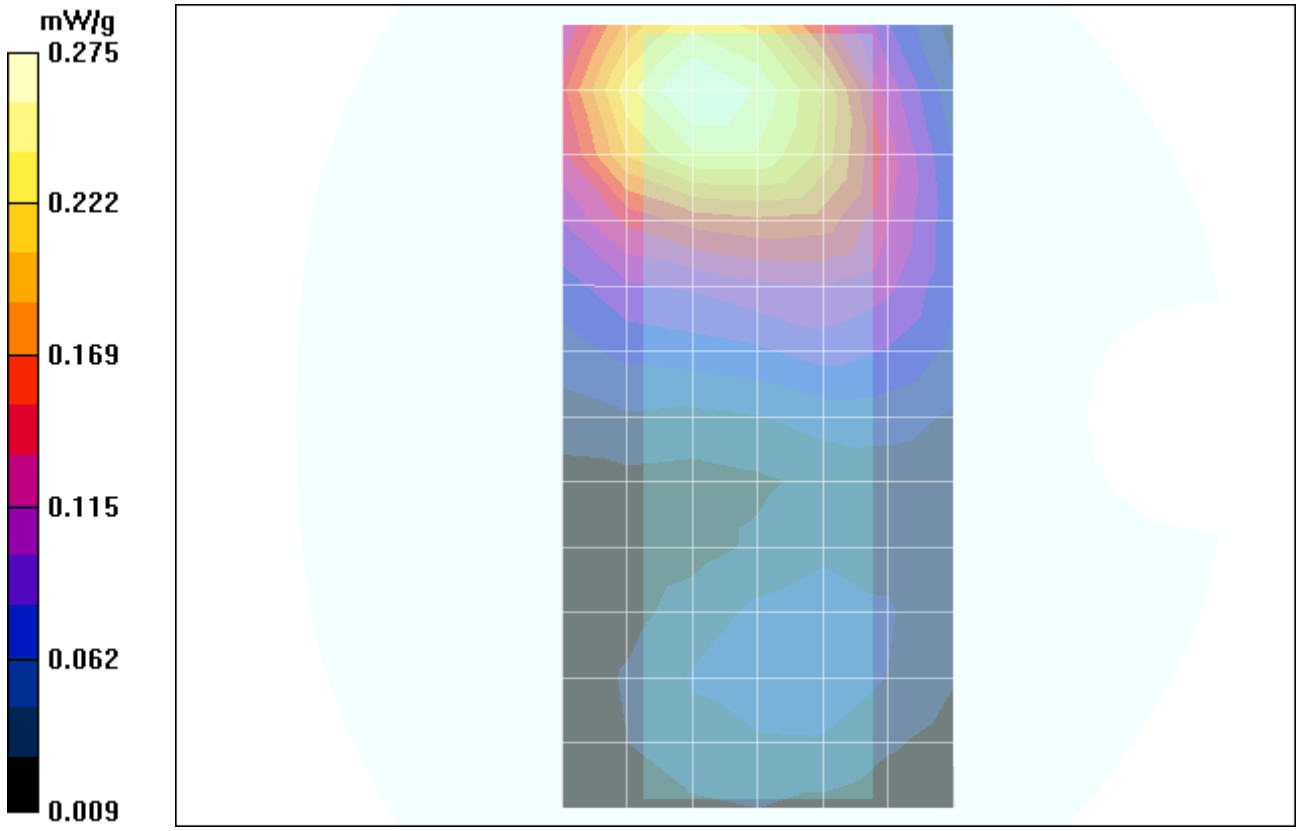
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SAM Phone Against Flat Section/Area Scan - Normal Body (15mm) (13x7x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.281 mW/g

SAM Phone Against Flat Section/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.6 V/m; Power Drift = -0.217 dB; Peak SAR (extrapolated) = 0.376 W/kg
SAR(1 g) = 0.255 mW/g; SAR(10 g) = 0.169 mW/g; Maximum value of SAR (measured) = 0.275 mW/g



Date/Time: 10/20/2006 10:37:28 AM

Test Laboratory: Motorola - GSM 1900 PTT

Serial: 004401022950816

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Battery Model #: SNN5789B
Device Position: Face Dispatch - Flip Open, Front of Phone 25 mm from Flat Phantom
Communication System: GPRS 1900 Cl 10; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:4

Medium: Regular Glycol Head
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3

DASY4 Configuration:

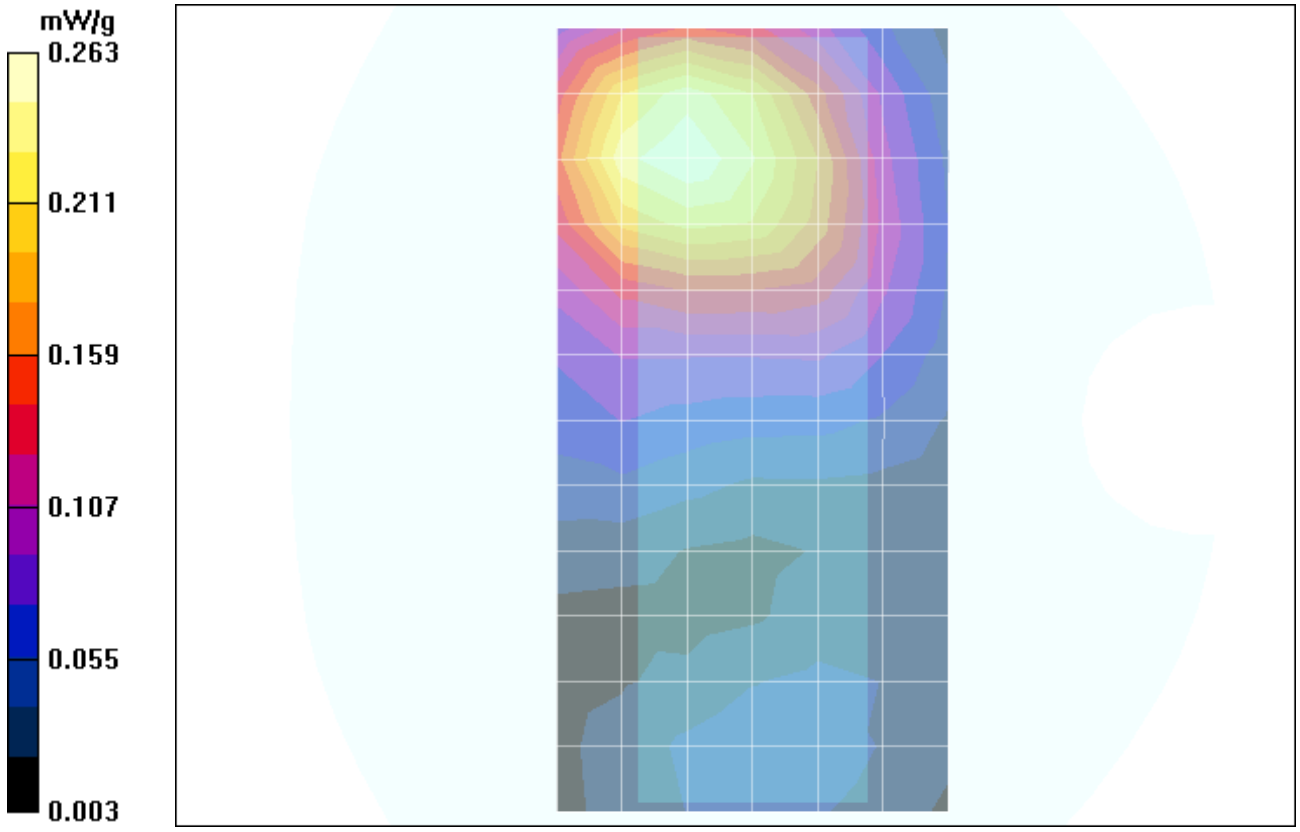
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

SAM Phone Against Flat Section/Area Scan - Normal Body (15mm) (13x7x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.263 mW/g

SAM Phone Against Flat Section/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.3 V/m; Power Drift = 0.004 dB; Peak SAR (extrapolated) = 0.364 W/kg
SAR(1 g) = 0.245 mW/g; SAR(10 g) = 0.158 mW/g



Appendix 4

SAR distribution plots for Body Worn Configuration

Date/Time: 10/19/2006 12:08:48 PM

Test Laboratory: Motorola - WCDMA 850 Body

Serial: 004401022950816

Procedure Notes: Pwr Step: All Bits Up; Antenna Position: Internal; Battery Model #: SNN5789B
Device Position: Body Worn, Back of Phone 15 mm from Flat Phantom
Communication System: 3G-WCDMA 850; Frequency: 846.6 MHz; Channel Number: 4233; Duty Cycle: 1:1

Medium: Low Freq Body
Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3

DASY4 Configuration:

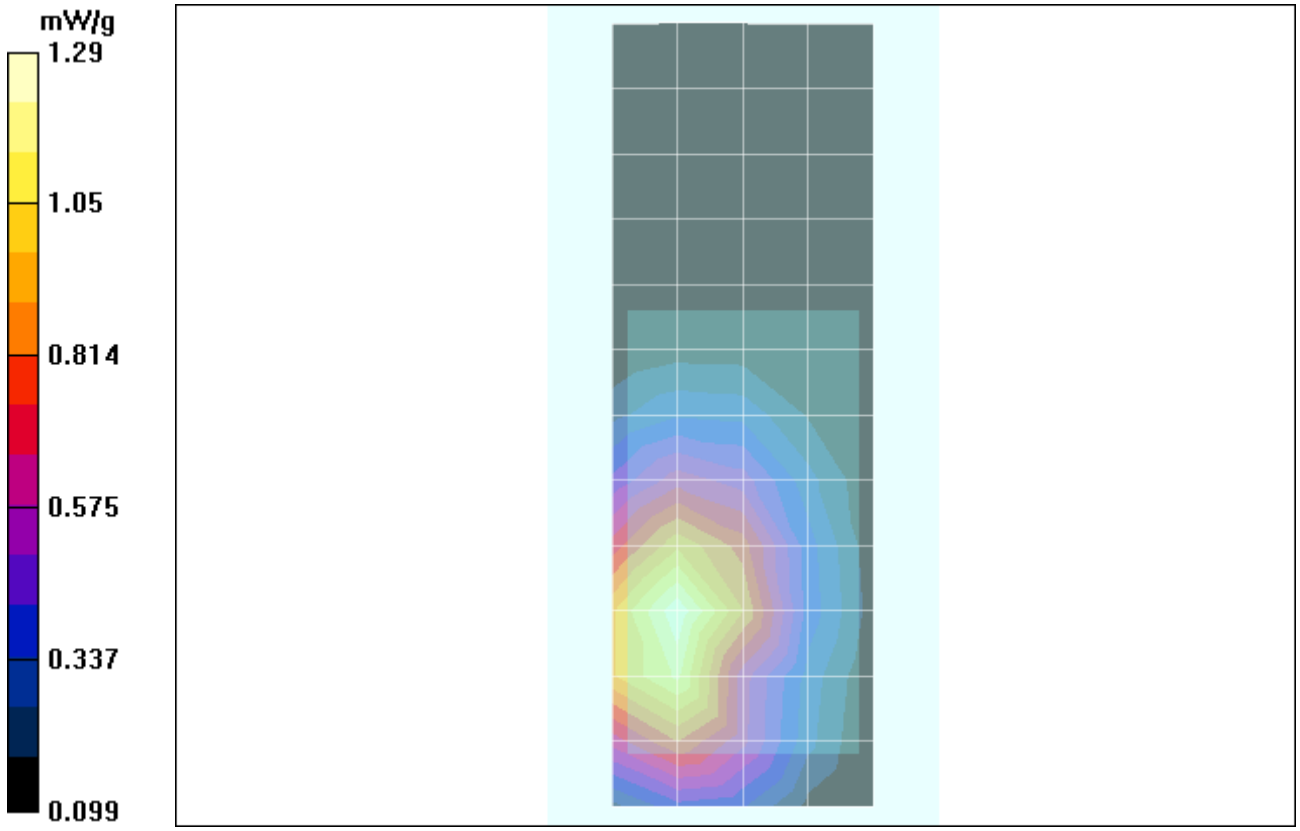
- Probe: ES3DV3 - SN3037; ConvF(5.93, 5.93, 5.93); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4 : Sect.1, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Amy Twin Phone Template/Area Scan - Normal Body (15mm) (13x7x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.28 mW/g

Amy Twin Phone Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 32.4 V/m; Power Drift = -0.014 dB; Peak SAR (extrapolated) = 1.73 W/kg
SAR(1 g) = 1.21 mW/g; SAR(10 g) = 0.811 mW/g; Maximum value of SAR (measured) = 1.29 mW/g



Date/Time: 10/14/2006 8:51:11 AM

Test Laboratory: Motorola - GSM 850 Body

Serial: 004401022950816

Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Battery Model #: SNN5789B
Device Position: Back of Phone 15mm From Flat Phantom, Bluetooth Mode Enabled
Communication System: GSM 850; Frequency: 848.8 MHz; Channel Number: 251; Duty Cycle: 1:8

Medium: Low Freq Body
Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 54.5; ρ = 1000 kg/m^3

DASY4 Configuration:

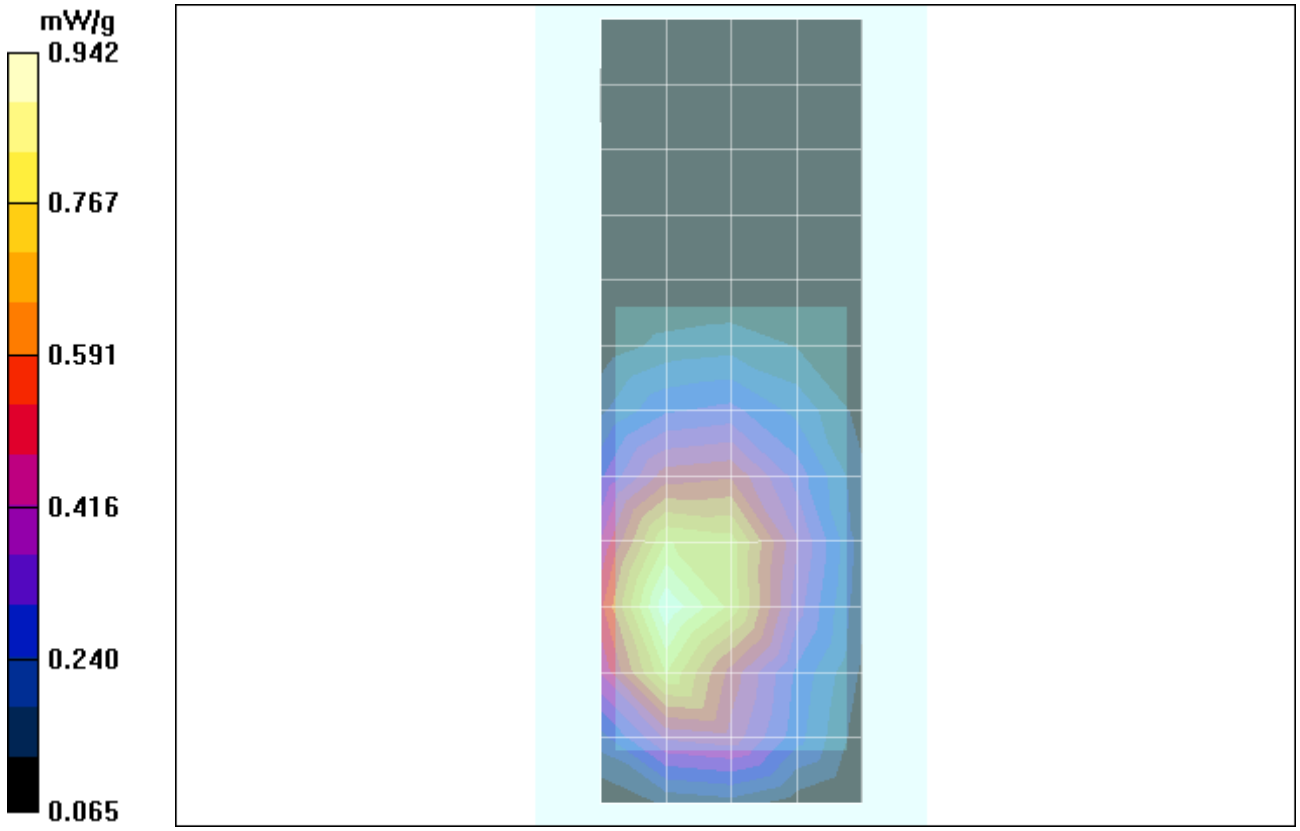
- Probe: ES3DV3 - SN3037; ConvF(5.93, 5.93, 5.93); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4 : Sect.1, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Amy Twin Phone Template/Area Scan - Normal Body (15mm) (13x7x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.936 mW/g

Amy Twin Phone Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.9 V/m; Power Drift = -0.037 dB; Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.874 mW/g; SAR(10 g) = 0.588 mW/g; Maximum value of SAR (measured) = 0.942 mW/g



Date/Time: 10/18/2006 10:24:17 PM

Test Laboratory: Motorola - GSM 1800 Body

Serial: 004401022950816

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Battery Model #: SNN5789B
Device Position: Front of Phone 15 mm from Flat Phantom, Bluetooth Mode Enabled
Communication System: GSM 1800; Frequency: 1784.8 MHz; Channel Number: 885; Duty Cycle: 1:8

Medium: Regular Glycol Body
Medium parameters used: f = 1750 MHz; σ = 1.46 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

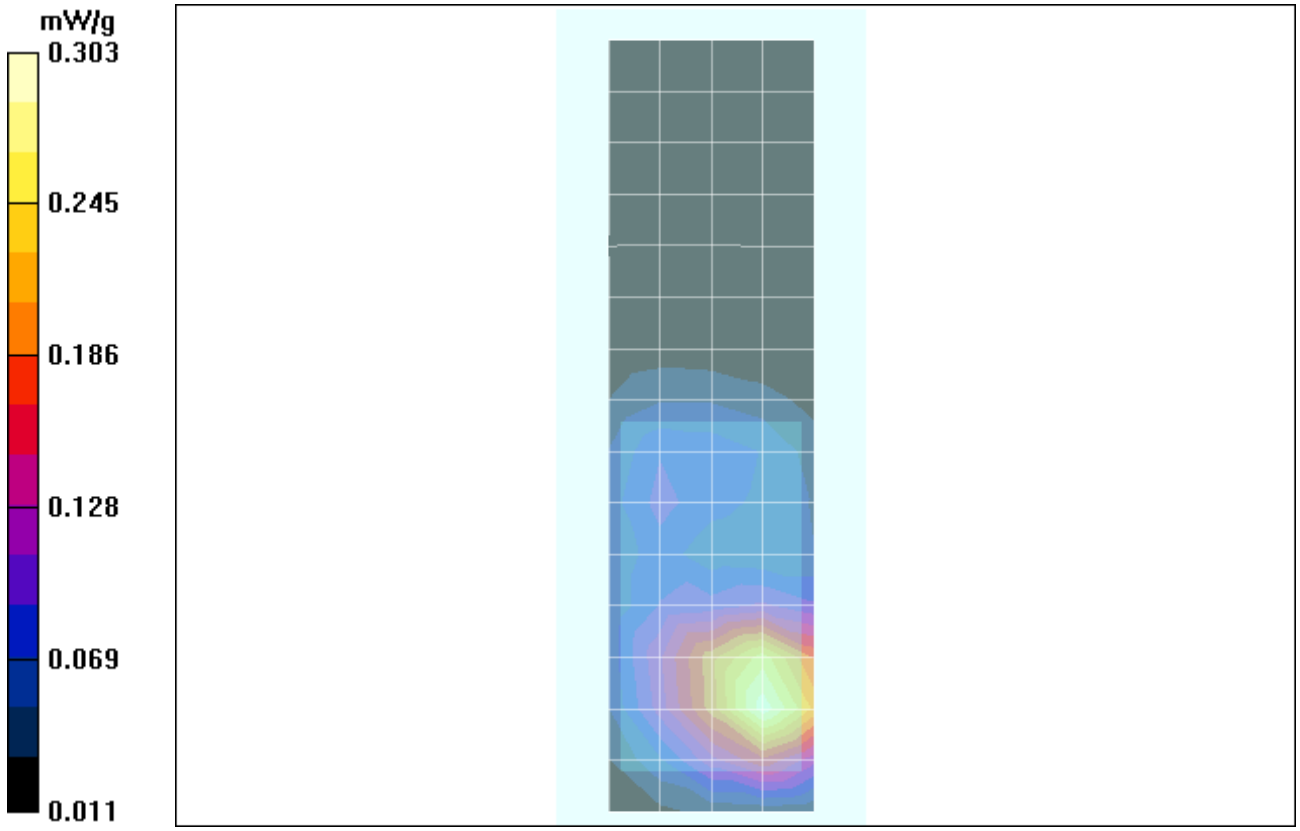
- Probe: ES3DV3 - SN3037; ConvF(4.65, 4.65, 4.65); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.297 mW/g

Amy Twin Phone Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.7 V/m; Power Drift = 0.013 dB; Peak SAR (extrapolated) = 0.417 W/kg
SAR(1 g) = 0.278 mW/g; SAR(10 g) = 0.174 mW/g; Maximum value of SAR (measured) = 0.303 mW/g



Date/Time: 10/17/2006 8:12:19 PM

Test Laboratory: Motorola - GSM 1900 Body

Serial: 004401022950816

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Battery Model #: SNN5789B
Device Position: Back of Phone 15 mm from Flat Phantom, Bluetooth Mode Enabled
Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8

Medium: Regular Glycol Body
Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3

DASY4 Configuration:

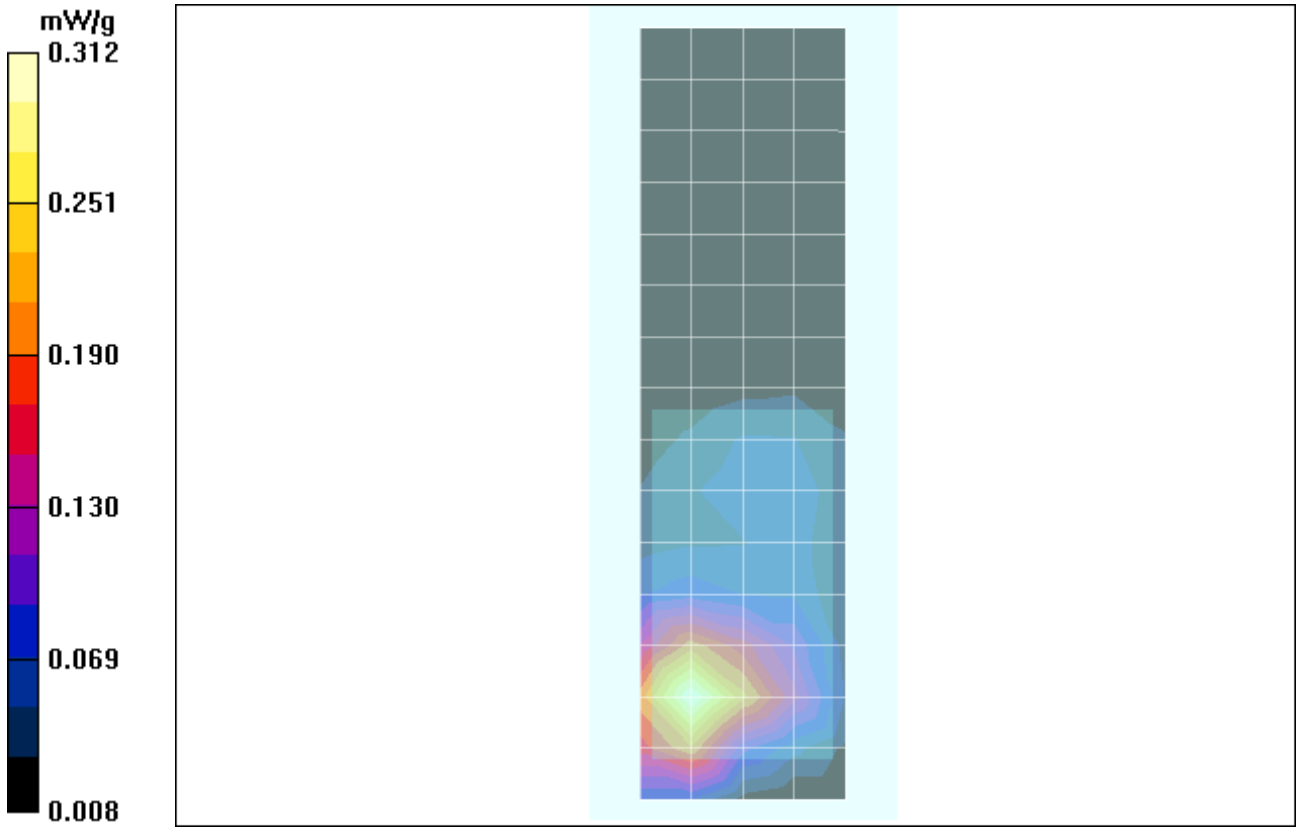
- Probe: ES3DV3 - SN3037; ConvF(4.65, 4.65, 4.65); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.314 mW/g

Amy Twin Phone Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.1 V/m; Power Drift = 0.023 dB; Peak SAR (extrapolated) = 0.442 W/kg
SAR(1 g) = 0.287 mW/g; SAR(10 g) = 0.172 mW/g; Maximum value of SAR (measured) = 0.312 mW/g



Date/Time: 10/17/2006 3:59:22 PM

Test Laboratory: Motorola - WCDMA 1900 Body

Serial: 004401022950816

Procedure Notes: Pwr Step: All Bits Up; Antenna Position: Internal; Battery Model #: SNN5789B
Device Position: Body Worn, Front of Phone 15 mm from Flat Phantom
Communication System: WCDMA 1900; Frequency: 1880 MHz; Channel Number: 9400; Duty Cycle: 1:1

Medium: Regular Glycol Body
Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3

DASY4 Configuration:

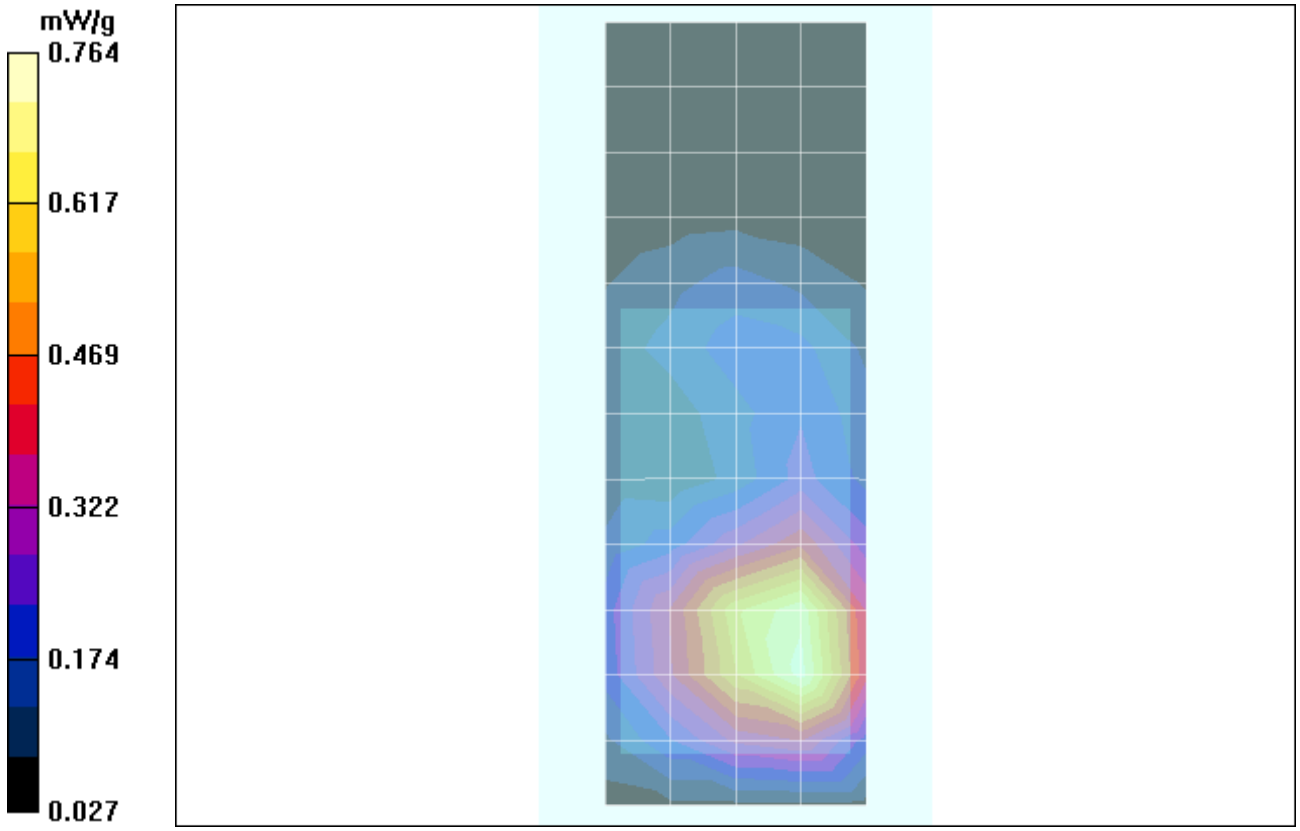
- Probe: ES3DV3 - SN3037; ConvF(4.65, 4.65, 4.65); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Amy Twin Phone Template/Area Scan - Normal Body (15mm) (13x7x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.737 mW/g

Amy Twin Phone Template/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.1 V/m; Power Drift = -0.034 dB; Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.705 mW/g; SAR(10 g) = 0.442 mW/g; Maximum value of SAR (measured) = 0.764 mW/g



Appendix 5

Probe Calibration Certificate

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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 **Motorola MDb**

Certificate No: ES3-3037_Nov05

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3037
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	November 17, 2005
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	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41498087	3-May-05 (METAS, No. 251-00466)	May-06
Reference 3 dB Attenuator	SN: S5054 (3c)	11-Aug-05 (METAS, No. 251-00499)	Aug-06
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-05 (METAS, No. 251-00467)	May-06
Reference 30 dB Attenuator	SN: S5129 (30b)	11-Aug-05 (METAS, No. 251-00500)	Aug-06
Reference Probe ES3DV2	SN: 3013	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 654	27-Oct-05 (SPEAG, No. DAE4-654_Oct05)	Oct-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
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-04)	In house check: Nov 05

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

Issued: November 17, 2005

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3037

Manufactured:	August 21, 2003
Last calibrated:	November 25, 2005
Recalibrated:	November 17, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ES3DV3 SN:3037

Sensitivity in Free Space[A]

NormX	**1.15** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**97** mV
NormY	**0.84** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**97** mV
NormZ	**0.95** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**97** 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		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	5.1	2.3
SAR_{be} [%]	With Correction Algorithm	0.0	0.1

TSL **1810 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	8.4	5.2
SAR_{be} [%]	With Correction Algorithm	0.0	0.1

Sensor Offset

Probe Tip to Sensor Center **2.0** mm

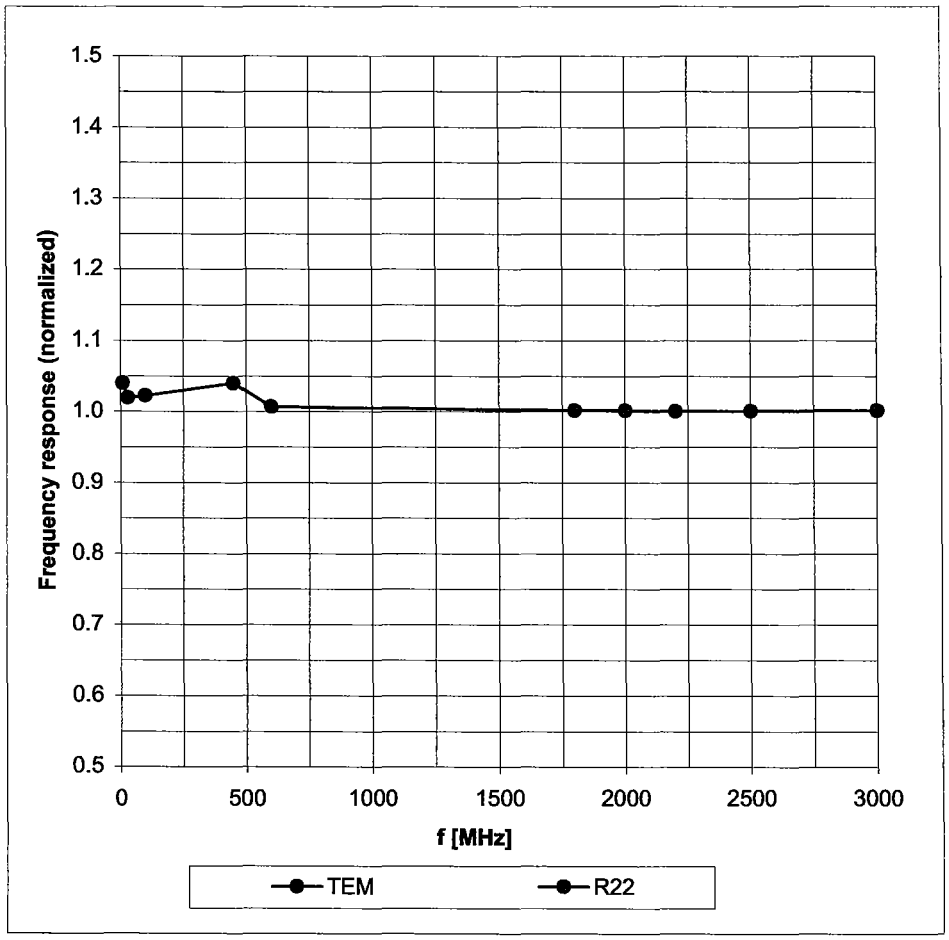
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

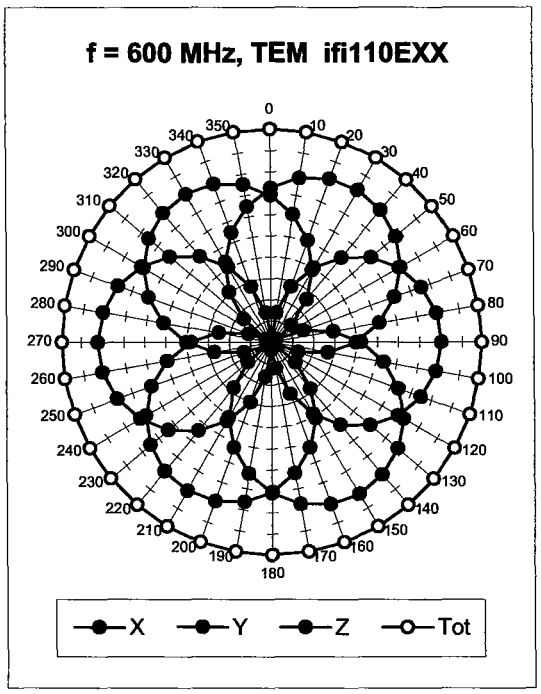
Frequency Response of E-Field

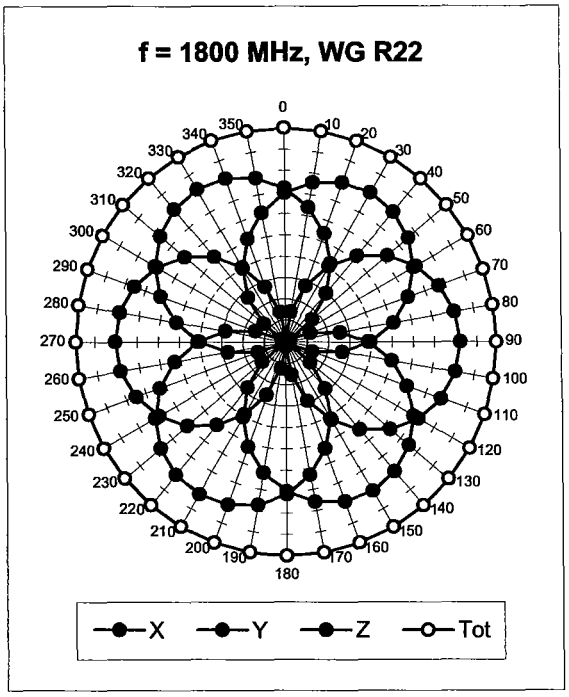
(TEM-Cell:ifi110 EXX, Waveguide: R22)

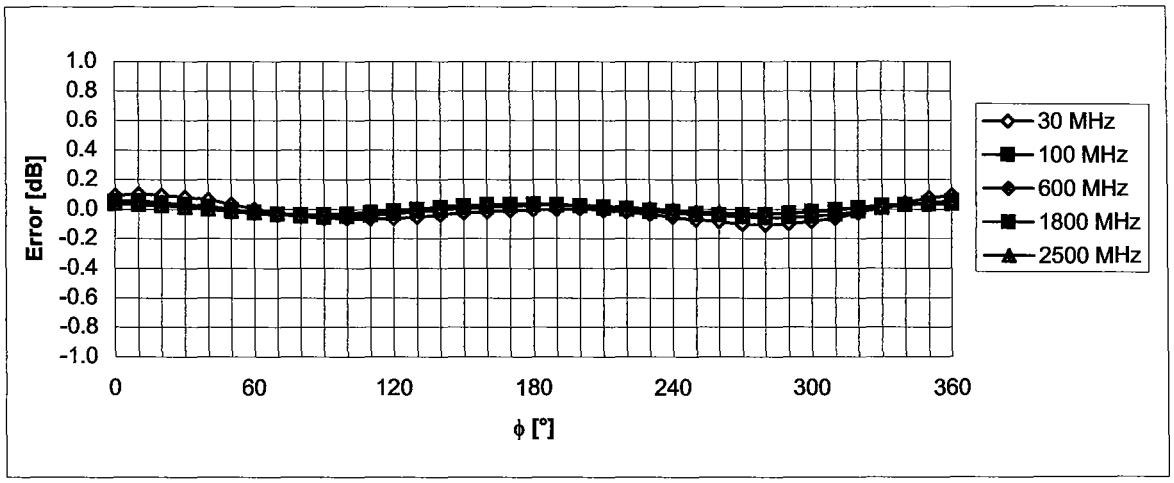


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



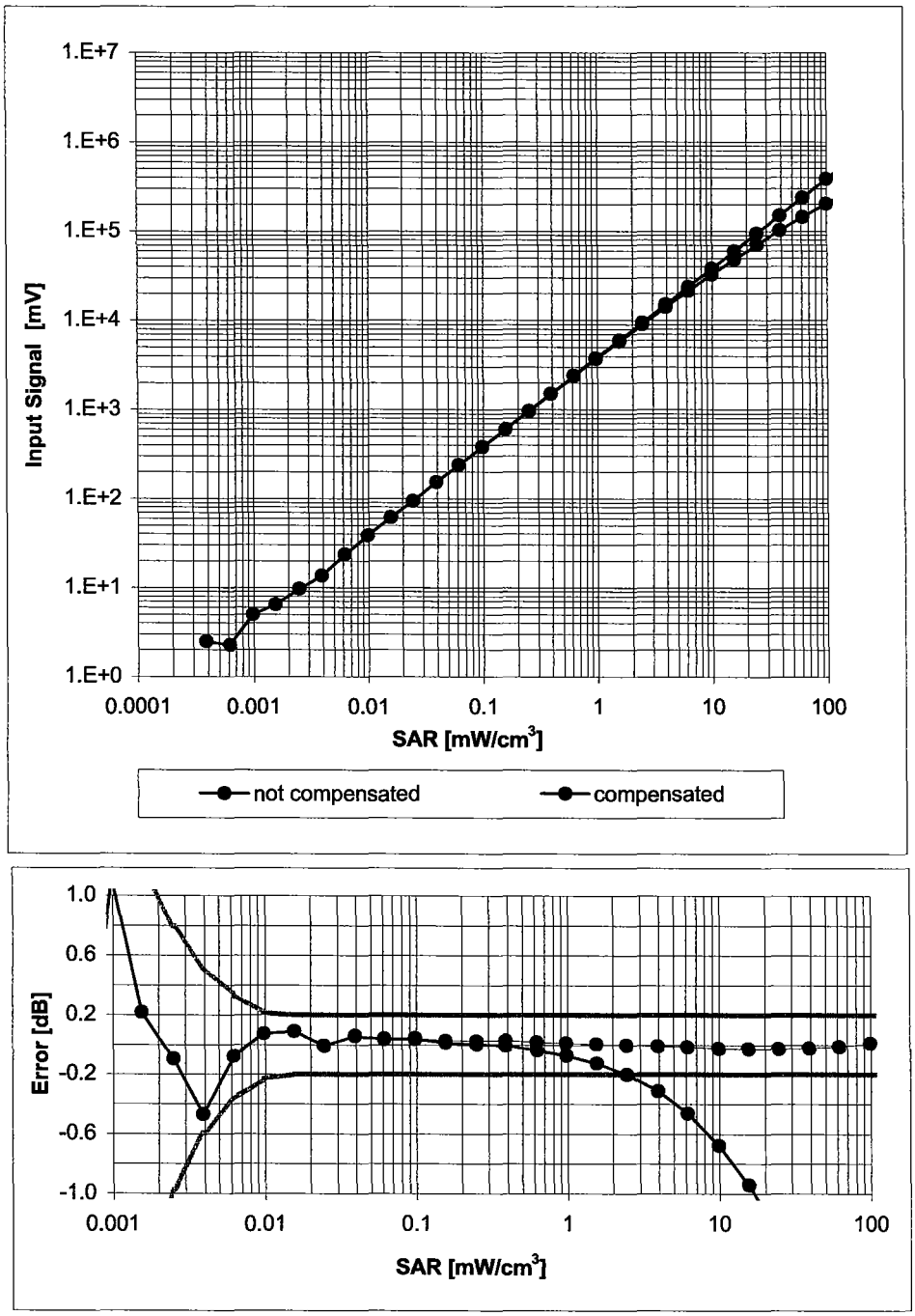




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

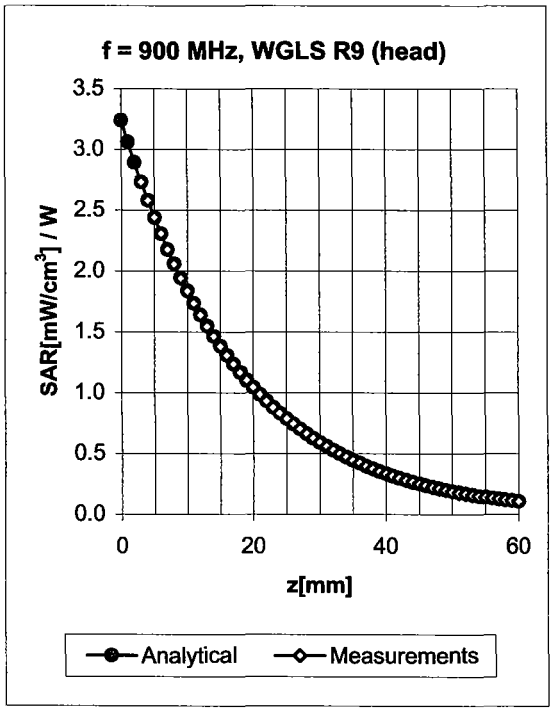
Dynamic Range f(SAR_{head})

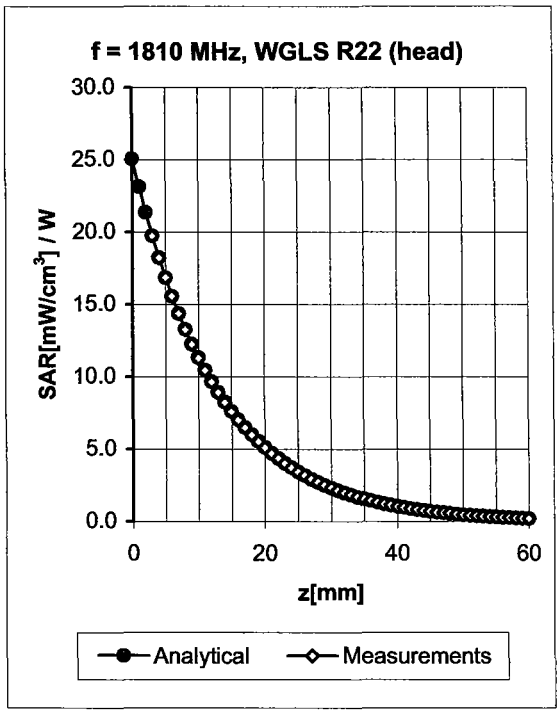
(Waveguide R22, f = 1800 MHz)



Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



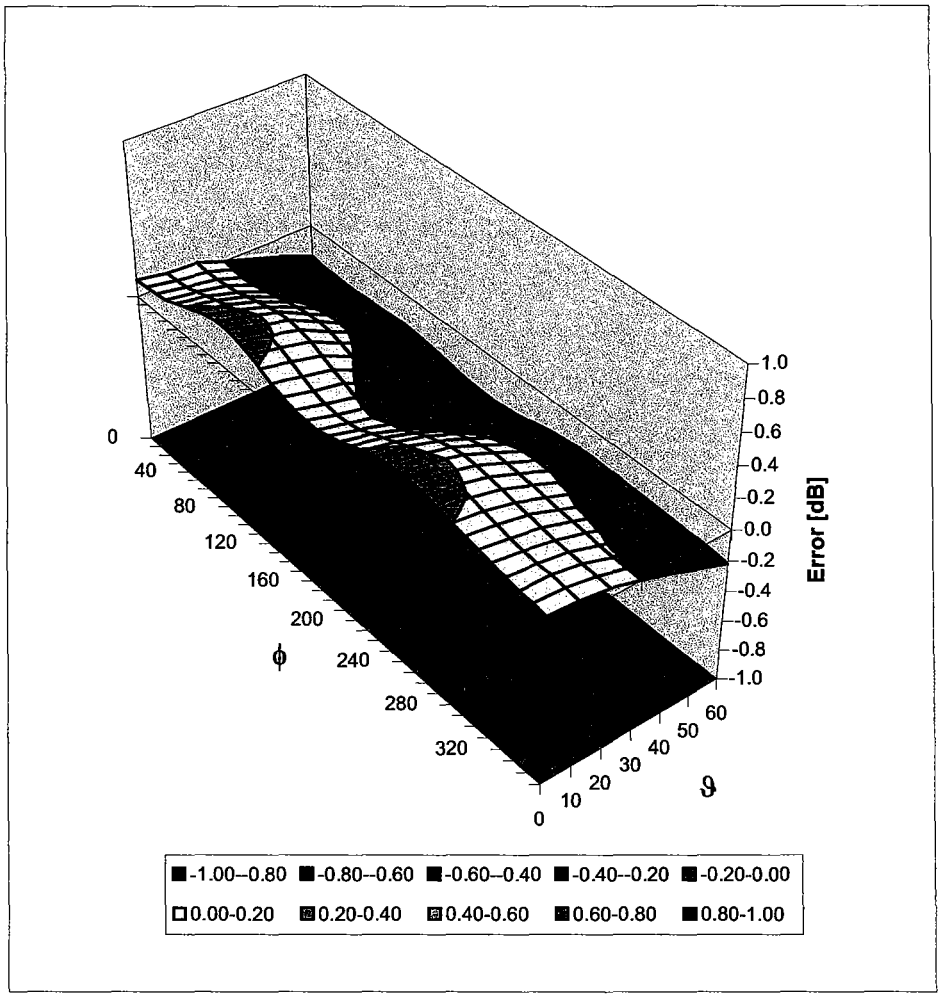


f [MHz]	Validity [MHz][c]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.44	1.35	6.07 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.27	2.38	5.01 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.28	2.21	4.66 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.48	1.52	4.31 ± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.52	1.27	5.93 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.27	2.51	4.65 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.33	2.04	4.44 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.49	1.53	4.30 ± 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.

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Appendix 6

Measurement Uncertainty Budget

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**IEEE 1528 section**	**Tol. (± %)**	**Prob Dist**	**Div.**	**c_i (1 g)**	**c_i (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	5.9	N	1.00	1	1	5.9	5.9	∞
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	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8	1.1	R	1.73	1	1	0.6	0.6	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mech. Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Test sample Related									
Test Sample Positioning	E.4.2	3.2	N	1.00	1	1	3.2	3.2	29
Device Holder Uncertainty	E.4.1	4.0	N	1.00	1	1	4.0	4.0	8
SAR drift	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	3.3	N	1.00	0.64	0.43	2.1	1.4	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	1.9	N	1.00	0.6	0.49	1.1	0.9	∞
Combined Standard Uncertainty			RSS				11.1	10.8	411
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				22.2	21.6	

Appendix 7

Photographs of the device under test

Figure 1 – Front of Transceiver

Figure 2 – Back of Transceiver

Figure 3 – Front of Transceiver, Flip Open

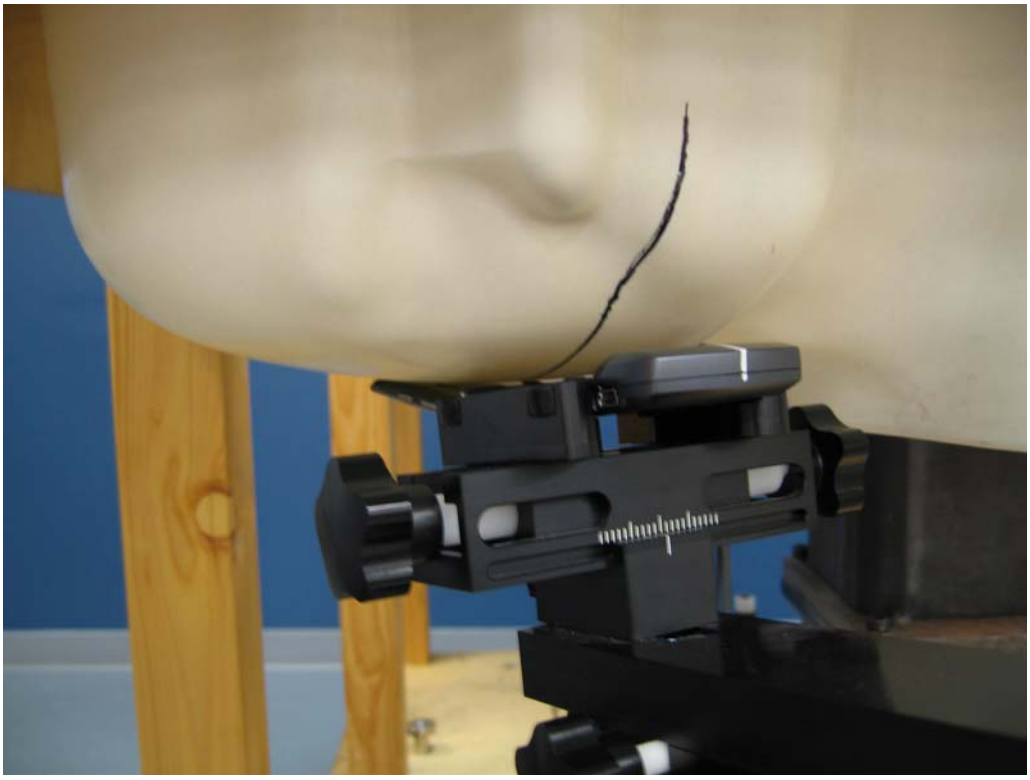


Figure 4 – Transceiver against head, Cheek Touch position

Figure 5 – Transceiver against head, Cheek Touch position

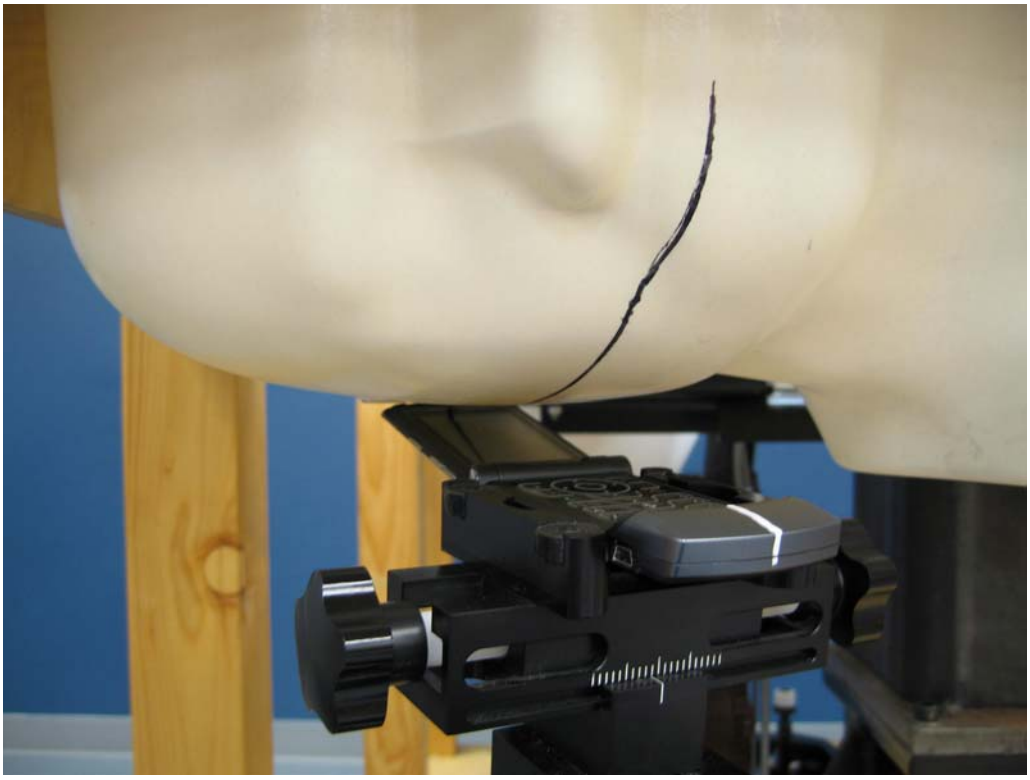


Figure 6 – Transceiver against head, 15º Tilt position

Figure 7 – Transceiver against head, 15º Tilt position

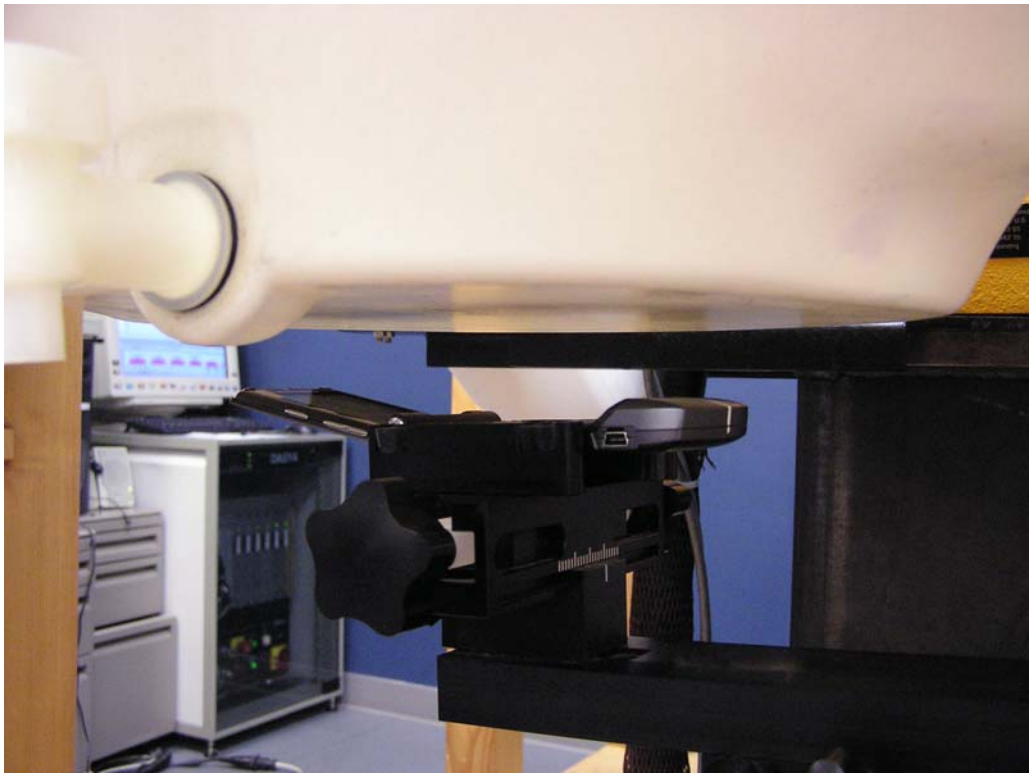


Figure 8 – Transceiver in Face Dispatch position, 25 mm from Phantom

Figure 9 – Transceiver against body, Back of Phone 15 mm from Phantom position

Appendix 8

Dipole Characterization Certificate

Certification of System Performance Check Targets
Based on WI-0396

-Historical Data-

	900MHz	
IEEE1528 Target:	10.8	**(W/kg)**
Measurement Uncertainty (k=1):	9.0%	
Measurement Period:	*3-June-05 to 10-May-06*	
# of tests performed:	1571	
Grand Average:	11.3	**(W/kg)**
% Delta (Average - IEEE1528 Target)	4.3%	
Is % Delta <= Expanded Measurement Uncertainty (k=2)?	**Yes**	
Accept/Reject Average as new system performance check target?	**ACCEPT**	
	Applies to Dipole SN's: **55, 69, 77, 78, 79, 80, 91, 92, 93, 94, 95, 96, 97**	

-New System Performance Check Targets- per WI-0396
(based on analysis of historical data)

Frequency	SAR Target (W/kg)	Permittivity	Conductivity (S/m)
900MHz	**11.3**	41.5 ± 5%	0.97 ± 5%

= =

-Approvals-

Submitted by: Marge Kaunas — Date: 12-May-06

Signed: Marge Kaunas

Comments: Spreadsheet detailing referenced historical measurements is available upon request.

Approved by: Mark Douglas — **Date:** 22-May-06

Signed: Mark Douglas

Comments:

= =