



MOTOROLA

Portable Cellular Phone SAR Test Report

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

Tests:
Electromagnetic Specific Absorption Rate

Procedures:
IEC 62209-1
RSS-102
IEEE 1528 - 2003
FCC OET Bulletin 65 (*including Supplement C*)
Australian Communications Authority Radio
Communications (Electromagnetic Radiation – Human
Exposure) Standard 2003
CENELEC EN 50360 (2001)
CENELEC EN 50361 (2001)
ARIB Std. T-56 (2002)

Accreditation:



TESTING CERT #2518-03

On the following products or types of products:

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

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 IEEE 1528 / CENELEC EN62209-1 (2006), 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.

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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 1g average set in [3] and 2.0W/kg in a 10g average set in [2].

For ANSI / IEEE C95.1 (1g), the final SAR reading for this phone is 1.31 W/kg for head adjacent use and 1.33 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

- GSM/WCDMA Antenna

Type	Internal	
Location	Bottom of the Transceiver	
Dimensions	Length	54mm
	Width	16mm
Configuration	FICA	

- Bluetooth/WiFi 802.11b/g Antenna

Type	Internal	
Location	Back of the Transceiver at the top	
Dimensions	Length	18mm
	Width	6mm
Configuration	IFA	

2.2 Device description

Serial number	004401028823223								
Mode(s) of Operation	GSM 850	GSM 900	GSM 1800	GSM 1900	WCDMA 850	WCDMA 1900	WCDMA 2100	Blue Tooth	WiFi 802.11b /g
Modulation Mode(s)	GMSK	GMSK	GMSK	GMSK	QPSK	QPSK	QPSK	GFSK	FDMS
Maximum Output Power Setting	32.50 dBm	32.50 dBm	30.00 dBm	30.00 dBm	23.50 dBm	23.50 dBm	24.00 dBm	4.00 dBm	16.00 dBm
Duty Cycle	1:8	1:8	1:8	1:8	1:1	1:1	1:1	1:1	1:1
Transmitting Frequency Range(s)	824.2-848.8 MHz	880.2-914.8 MHz	1710.2-1784.8 MHz	1710.2-1784.8 MHz	826.4 - 846.6 MHz	1852.4-1907.6 MHz	1920.3-1979.7 MHz	2400 - 2483.5 MHz	2412 – 2472 Mhz
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype								
Device Category	Portable								
RF Exposure Limits	General Population / Uncontrolled								

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Mode(s) of Operation	GPRS 850				GPRS 900				GPRS 1800				GPRS 1900			
Modulation Mode(s)	GMSK				GMSK				GMSK				GMSK			
Maximum Output Power Setting	32.5 dBm	32.5 dBm	32.5 dBm	32.5 dBm	32.5 dBm	32.5 dBm	32.5 dBm	32.5 dBm	30.0 dBm	30.0 dBm	30.0 dBm	30.0 dBm	30.0 dBm	30.0 dBm	30.0 dBm	30.0 dBm
Duty Cycle	1:8	2:8	3:8	4:8	1:8	2:8	3:8	4:8	1:8	2:8	3:8	4:8	1:8	2:8	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				880.2 - 914.8 MHz				1710.2 - 1784.8 MHz				1850.2 - 1909.8 MHz			

Mode(s) of Operation	EDGE 850				EDGE 900				EDGE 1800				EDGE 1900			
Modulation Mode(s)	8PSK				8PSK				8PSK				8PSK			
Maximum Output Power Setting	27.5 dBm	27.5 dBm	27.5 dBm	27.5 dBm	27.5 dBm	27.5 dBm	27.5 dBm	27.5 dBm	26.5 dBm	26.5 dBm	26.5 dBm	26.5 dBm	26.5 dBm	26.5 dBm	26.5 dBm	26.5 dBm
Duty Cycle	1:8	2:8	3:8	4:8	1:8	2:8	3:8	4:8	1:8	2:8	3:8	4:8	1:8	2:8	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				880.2 - 914.8 MHz				1710.2 - 1784.8 MHz				1850.2 - 1909.8 MHz			

Note: Bolded entries indicate data mode of highest time-average power per band and data mode type.

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 10g RSS uncertainty of the measurement system is ±10.8% (K=1) with an expanded uncertainty of ±21.6% (K=2). The overall 1g 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 5. Per IEEE 1528, this uncertainty budget is applicable to the SAR range of 0.4W/kg to 10W/kg.

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

Description	Serial Number	Cal Due Date
DASY4™ DAE4	656	19-May-2009
E-Field Probe ET3DV6	1502	19-May-2009
S.A.M. Phantom used for 800/900MHz	TP-1129	
S.A.M. Phantom used for 1800/1900/2450MHz	TP-1134	
Dipole Validation Kit, DV900V2	97	22-Apr-2009
Dipole Validation Kit, DV1800V2	277tr	22-Apr-2009
Dipole Validation Kit, DV2450V2	767	22-Apr-2009

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3847A04840	28-Jan-2009
Power Meter E4419B	GB39511085	28-Jan-2009
Power Sensor #1 - 8481A	MY41095450	28-Jan-2009
Power Sensor #2 - 8481A	2702A82671	28-Jan-2009
Network Analyzer HP8753ES	US39172714	30-Jul-2009
Dielectric Probe Kit HP85070C	US99360207	

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 $\rho=1\text{g/cm}^3$ was entered into the system in all the cases. It can be seen that the measured parameters are within tolerance of the recommended limits specified in [1] and [5].

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ϵ_r	σ (S/m)	Temp (°C)
835	Head	Measured, 16-Sep-2008	41.6	0.91	21.3
		Measured, 17-Sep-2008	42.1	0.92	21.5
		Measured, 18-Sep-2008	42.1	0.92	21.3
		Recommended Limits	$41.5 \pm 5\%$	$0.90 \pm 5\%$	18-25
	Body	Measured, 17-Sep-2008	55.6	1.00	21.5
		Measured, 18-Sep-2008	55.5	1.00	21.5
		Recommended Limits	$55.2 \pm 5\%$	$0.97 \pm 5\%$	18-25
1880	Head	Measured, 18-Sep-2008	39.7	1.45	21.7
		Measured, 18-Sep-2008	39.3	1.44	21.8
		Measured, 19-Sep-2008	39.1	1.45	20.4
		Recommended Limits	$40.0 \pm 5\%$	$1.40 \pm 5\%$	18-25
	Body	Measured, 18-Sep-2008	52.4	1.59	21.2
		Measured, 18-Sep-2008	52.1	1.59	21.1
		Recommended Limits	$53.3 \pm 5\%$	$1.52 \pm 5\%$	18-25
2450	Head	Measured, 23-Sep-2008	37.5	1.88	21.4
		Recommended Limits	$39.2 \pm 10\%$	$1.80 \pm 5\%$	18-25
	Body	Measured, 23-Sep-2008	48.5	2.04	21.8
		Measured, 24-Sep-2008	48.5	2.04	20.5
		Recommended Limits	$52.7 \pm 10\%$	$1.95 \pm 5\%$	18-25

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

Ingredient	835MHz / 900 MHz Head	835MHz / 900 MHz Body	1800MHz / 1900 MHz Head	1800 MHz / 1900 MHz Body	2450MHz 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 $\pm 10\%$ from the target SAR indicated in Appendix 6. These frequencies are within $\pm 10\%$ 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 1W 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 15.0cm ± 0.5 cm. Z-axis scans showing the SAR penetration are also included in Appendix 1.

f (MHz)	Description	SAR (W/kg), 1gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			ϵ_r	σ (S/m)		
900	Measured, 16-Sep-2008	11.73	40.9	0.98	21.0	21.9
	Measured, 17-Sep-2008	11.70	41.4	0.98	22.0	21.9
	Measured, 18-Sep-2008	11.80	41.3	0.98	22.0	21.9
	Recommended Limits	11.29	41.5 $\pm 5\%$	0.97 $\pm 5\%$	18-25	18-25
1800	Measured, 17-Sep-2008	36.73	40.1	1.36	21.6	21.9
	Measured, 18-Sep-2008	36.23	39.6	1.36	21.2	22.0
	Measured, 19-Sep-2008	36.45	39.4	1.36	21.0	21.0
	Recommended Limits	37.7	40.0 $\pm 5\%$	1.4 $\pm 5\%$	18-25	18-25
2450	Measured, 23-Sep-2008	53.75	37.5	1.88	21.6	21.5
	Measured, 24-Sep-2008	52.25	37.4	1.88	21.4	22.0
	Recommended Limits	56.5	39.2 $\pm 10\%$	1.80 $\pm 5\%$	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 ET3DV6	SN1502	900	6.20	8 of 9
		1810	5.34	8 of 9
		2450	4.64	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 ($\pm 30\%$) at 850MHz. 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 mm as shown in the SAR plots included in Appendix 2 and 3. Please refer to the DASY4™ 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 SNN5782C - 1100 mAH Battery

Model SNN5771B - 850 mAH Battery

The battery with the highest capacity is the SNN5782C battery. This battery was used to do most of the SAR testing. The phone was placed in the SAR measurement system with a fully charged battery. The configuration that resulted in the highest SAR values were tested using the other batteries listed above.

Per the “SAR Measurement Procedures for 3G Devices” released in October, 2007, 12.2kbps RMC, 12.2kbps AMR, , HS-DPCCH Sub-test 1-4, and E-DCH Sub-test 1-5 modes were considered. The conducted power measurements (per section 5.2 of 3GPP TS 34.121) for each mode are shown in the table below.

Band	Channel	Conducted power (dBm) for WCDMA modes		Conducted Power (dBm) for WCDMA – HSDPA (Rel 5) Modes				Conducted Power (dBm) for WCDMA – HSPA (Rel 6) Modes				
		RMC	AMR	Sub test 1	Sub test 2	Sub test 3	Sub test 4	Sub test 1	Sub test 2	Sub test 3	Sub test 4	Sub test 5
WCDMA 850	4132	23.59	23.48	23.46	23.59	23.56	23.59	23.11	23.17	23.25	23.19	23.24
	4180	23.62	23.54	23.55	23.65	23.63	23.65	23.15	23.19	23.05	23.21	23.16
	4233	23.69	23.64	23.61	23.65	23.65	23.66	23.26	23.28	23.32	23.30	23.29
WCDMA 1900	9262	23.50	23.44	23.40	23.44	23.44	23.46	23.19	23.34	23.35	23.20	23.44
	9400	23.70	23.57	23.53	23.59	23.61	23.63	23.53	23.56	23.57	23.60	23.74
	9538	23.70	23.83	23.68	23.70	23.72	23.71	23.44	23.47	23.48	23.40	23.53

Per the “SAR Measurement Procedures for 802.11 a/b/g Transmitters” released in October, 2007, 802.11 b and 802.11 g modes were considered. The conducted power measurements for each mode are shown in the table below.

		Conducted power (dBm) for 802.11b/g modes	
Freq (MHz)	Channel	Data rate	
		11Mbps (802.11b)	33Mbps (802.11g)
2450MHz	1	15.92	15.37
	6	15.55	15.51
	11	15.09	14.95

6.1 Head Adjacent Test Results

The SAR results shown in tables 1 through 7 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 $\text{New SAR} = \text{Old SAR} * 10^{(-\text{drift}/10)}$. 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 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 15.0cm ±0.5cm.

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 ET3DV6	SN1502	900	6.20	8 of 9
		1810	5.34	8 of 9
		2450	4.64	8 of 9

Left Head Cheek Position								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	10g SAR value		1g SAR value	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
GSM 850MHz	Channel 128	32.38						
	Channel 190	32.41	21.8	-0.08	0.559	0.57	0.768	0.78
	Channel 251	32.35						
GSM 1900MHz	Channel 512	30.00						
	Channel 661	29.95	21.7	-0.04	0.257	0.26	0.447	0.45
	Channel 810	29.82						
WCDMA 850 MHz	Channel 4123	23.59						
	Channel 4180	23.62	21.7	-0.05	0.503	0.51	0.686	0.69
	Channel 4233	23.69						
WCDMA 1900 MHz	Channel 9262	23.50	21.9	0.05	0.454	0.45	0.775	0.78
	Channel 9400	23.70	21.8	-0.08	0.606	0.62	1.07	1.09
	Channel 9538	23.70	21.8	-0.01	0.542	0.54	0.949	0.95
WiFi 802.11b 2450MHz	Channel 1	15.92						
	Channel 6	15.55	21.4	-0.07	0.106	0.11	0.214	0.22
	Channel 11	15.09						
GSM 850 + WIFI	N/A	N/A				0.68		1.00
GSM 1900 + WIFI	N/A	N/A				0.37		0.67
WCDMA 850 + WIFI	N/A	N/A				0.62		0.91
WCDMA 1900 + WIFI	N/A	N/A				0.73		1.31

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								
<i>f</i> (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	10g SAR value		1g SAR value	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
GSM 850MHz	Channel 128	32.38	21.5	-0.09	0.673	0.69	0.918	0.94
	Channel 190	32.41	21.6	-0.15	0.604	0.63	0.824	0.85
	Channel 251	32.35	21.4	0.02	0.488	0.49	0.664	0.66
GSM 1900MHz	Channel 512	30.00						
	Channel 661	29.95	21.4	-0.02	0.246	0.25	0.429	0.43
	Channel 810	29.82						
WCDMA 850 MHz	Channel 4123	23.59						
	Channel 4180	23.62	21.5	-0.02	0.537	0.54	0.732	0.74
	Channel 4233	23.69						
WCDMA 1900 MHz	Channel 9262	23.50	21.2	-0.03	0.373	0.38	0.651	0.66
	Channel 9400	23.70	21.3	0.01	0.46	0.46	0.807	0.81
	Channel 9538	23.70	21.2	-0.01	0.461	0.46	0.795	0.80
WiFi 802.11b 2450MHz	Channel 1	15.92						
	Channel 6	15.55	21.1	0.07	0.0704	0.07	0.123	0.12
	Channel 11	15.09						
GSM 850 + WIFI	N/A	N/A				0.76		1.06
GSM 1900 + WIFI	N/A	N/A				0.32		0.55
WCDMA 850 + WIFI	N/A	N/A				0.61		0.86
WCDMA 1900 + WIFI	N/A	N/A				0.53		0.93

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

Noted Highest Head Cheek Position with SNN5771B Battery								
<i>f</i> (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	10g SAR value		1g SAR value	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
GSM 850MHz <i>Right</i>	Channel 128	32.38	21.5	-0.34	0.645	0.70	0.881	0.95
	Channel 190	32.41						
	Channel 251	32.35						
GSM 1900MHz <i>Left</i>	Channel 512	30.00						
	Channel 661	29.95	21.7	-0.10	0.29	0.30	0.512	0.52
	Channel 810	29.82						
WCDMA 850 MHz <i>Right</i>	Channel 4123	23.59						
	Channel 4180	23.62	21.3	-0.05	0.531	0.54	0.732	0.74
	Channel 4233	23.69						
WCDMA 1900 MHz <i>Left</i>	Channel 9262	23.50						
	Channel 9400	23.70	20.7	0.26	0.607	0.61	1.07	1.07
	Channel 9538	23.70						
WiFi 802.11b 2450MHz <i>Left</i>	Channel 1	15.92						
	Channel 6	15.55	20.9	0.07	0.105	0.11	0.209	0.21
	Channel 11	15.09						
WiFi 802.11b 2450MHz <i>Right</i>	Channel 1	15.92						
	Channel 6	15.55	21.3	0.17	0.0809	0.08	0.141	0.14
	Channel 11	15.09						
GSM 850 + WIFI	N/A	N/A				0.78		1.09
GSM 1900 + WIFI	N/A	N/A				0.41		0.73
WCDMA 850 + WIFI	N/A	N/A				0.62		0.88
WCDMA 1900 + WIFI	N/A	N/A				0.72		1.28

Table 3: 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)	10g SAR value		1g SAR value	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
GSM 850MHz	Channel 128	32.38						
	Channel 190	32.41	21.7	0.01	0.293	0.29	0.385	0.39
	Channel 251	32.35						
GSM 1900MHz	Channel 512	30.00						
	Channel 661	29.95	21.6	0.00	0.159	0.16	0.253	0.25
	Channel 810	29.82						
WCDMA 850 MHz	Channel 4123	23.59						
	Channel 4180	23.62	21.6	-0.04	0.284	0.29	0.378	0.38
	Channel 4233	23.69						
WCDMA 1900 MHz	Channel 9262	23.50						
	Channel 9400	23.70	21.5	0.13	0.327	0.33	0.519	0.52
	Channel 9538	23.70						
WiFi 802.11b 2450MHz	Channel 1	15.92						
	Channel 6	15.55	21.2	0.617	0.0879	0.09	0.181	0.18
	Channel 11	15.09						
GSM 850 + WIFI	N/A	N/A				0.38		0.57
GSM 1900 + WIFI	N/A	N/A				0.25		0.43
WCDMA 850 + WIFI	N/A	N/A				0.38		0.56
WCDMA 1900 + WIFI	N/A	N/A				0.42		0.70

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.

Right Head 15° Tilt Position								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	10g SAR value		1g SAR value	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
GSM 850MHz	Channel 128	32.38						
	Channel 190	32.41	21.3	-0.06	0.306	0.31	0.408	0.41
	Channel 251	32.35						
GSM 1900MHz	Channel 512	30.00						
	Channel 661	29.95	21.3	-0.04	0.146	0.15	0.247	0.25
	Channel 810	29.82						
WCDMA 850 MHz	Channel 4123	23.59						
	Channel 4180	23.62	21.4	-0.01	0.288	0.29	0.377	0.38
	Channel 4233	23.69						
WCDMA 1900 MHz	Channel 9262	23.50						
	Channel 9400	23.70	21.0	0.02	0.276	0.28	0.465	0.47
	Channel 9538	23.70						
WiFi 802.11b 2450MHz	Channel 1	15.92						
	Channel 6	15.55	21.0	0.02	0.0704	0.07	0.134	0.13
	Channel 11	15.09						
GSM 850 + WIFI	N/A	N/A				0.38		0.54
GSM 1900 + WIFI	N/A	N/A				0.22		0.38
WCDMA 850 + WIFI	N/A	N/A				0.36		0.51
WCDMA 1900 + WIFI	N/A	N/A				0.35		0.60

Table 5: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.

<i>Noted Highest Head 15° Tilt Position with SNN5771B Battery</i>								
<i>f</i> (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	10g SAR value		1g SAR value	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
GSM 850MHz Right	Channel 128	32.38						
	Channel 190	32.41	21.2	-0.35	0.287	0.31	0.379	0.41
	Channel 251	32.35						
GSM 1900MHz Left	Channel 512	30.00						
	Channel 661	29.95	21.6	0.01	0.178	0.18	0.283	0.28
	Channel 810	29.82						
WCDMA 850 MHz Left	Channel 4123	23.59						
	Channel 4180	23.62	21.2	-0.04	0.272	0.27	0.359	0.36
	Channel 4233	23.69						
WCDMA 1900 MHz Left	Channel 9262	23.50						
	Channel 9400	23.70	20.4	0.08	0.33	0.33	0.531	0.53
	Channel 9538	23.70						
WiFi 802.11b 2450MHz Left	Channel 1	15.92						
	Channel 6	15.55	20.7	0.24	0.106	0.11	0.216	0.22
	Channel 11	15.09						
WiFi 802.11b 2450MHz Right	Channel 1	15.92						
	Channel 6	15.55	21.2	0.18	0.0728	0.07	0.13	0.13
	Channel 11	15.09						
GSM 850 + WIFI	N/A	N/A				0.38		0.54
GSM 1900 + WIFI	N/A	N/A				0.29		0.50
WCDMA 850 + WIFI	N/A	N/A				0.38		0.58
WCDMA 1900 + WIFI	N/A	N/A				0.44		0.75

Table 6: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.

Highest Extrapolated SAR Values (including WiFi summation)							
<i>f</i> (MHz)	Description	10 g SAR value			1 g SAR value		
		Original Measurement (W/kg)	WiFi Measurement (W/kg)	Summation (W/kg)	Original Measurement (W/kg)	WiFi Measurement (W/kg)	Summation (W/kg)
GSM 850 MHz	Right Head Cheek with Battery SNN5771B Battery	0.70	0.08	0.78	0.95	0.14	1.09
GSM 1900 MHz	Left Head Cheek with Battery SNN5771B Battery	0.30	0.11	0.41	0.52	0.21	0.73
WCDMA 850 MHz	Left Head Cheek with Battery SNN5782C Battery	0.51	0.11	0.62	0.69	0.22	0.91
WCDMA 1900 MHz	Left Head Cheek with Battery SNN5782C Battery	0.62	0.11	0.73	1.09	0.22	1.31

Table 7: SAR measurement results at the highest possible output power, calculated for the head position against the ICNIRP and ANSI SAR Limit.

6.2 Body Worn Test Results

The SAR results shown in tables 8 through 14 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 $\text{New SAR} = \text{Old SAR} * 10^{(-\text{drift}/10)}$. 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], 1900MHz WCDMA HSUPA mode SAR measurement were performed in accordance with FCC the “SAR Measurement Procedures for 3G Devices” released in October, 2007.

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 2.0mm. It measures 52.7cm(long) x 26.7cm(wide) x 21.2cm(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 2.184GHz.

The tissue stimulant depth was verified to be 15.0cm ±0.5cm. 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 15mm from the phantom. For data mode operation, the phone was placed as a distance of 25mm 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 at the time of testing hence the device was tested per the supplement C testing guidelines for devices that do not have body worn accessories. The phone was placed a maximum of 15mm away from a flat phantom per the supplement C standard guidelines to perform SAR measurement.

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 ET3DV6	SN1520	900	6.08	8 of 9
		1810	4.85	8 of 9
		2450	4.16	8 of 9

Body-Worn; Front of Phone 15mm from Phantom								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	10g SAR value		1g SAR value	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
GSM 850MHz	Channel 128	32.38						
	Channel 190	32.41	21.2	-0.05	0.286	0.29	0.389	0.39
	Channel 251	32.35						
GSM 1900MHz	Channel 512	30.00						
	Channel 661	29.95	21.3	0.06	0.0961	0.10	0.163	0.16
	Channel 810	29.82						
WCDMA 850 MHz	Channel 4123	23.59						
	Channel 4180	23.62	21.6	-0.01	0.225	0.23	0.308	0.31
	Channel 4233	23.69						
WCDMA 1900 MHz	Channel 9262	23.50						
	Channel 9400	23.70	21.3	0.29	0.219	0.22	0.368	0.37
	Channel 9538	23.70						
WiFi 802.11b 2450MHz	Channel 1	15.92						
	Channel 6	15.55	21.9	0.03	0.0137	0.01	0.0237	0.02
	Channel 11	15.09						
GSM 850 + WIFI	N/A	N/A				0.30		0.41
GSM 1900 + WIFI	N/A	N/A				0.11		0.18
WCDMA 850 + WIFI	N/A	N/A				0.24		0.33
WCDMA 1900 + WIFI	N/A	N/A				0.23		0.39

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; Back of Phone 15mm from Phantom								
<i>f</i> (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	10g SAR value		1g SAR value	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
GSM 850MHz	Channel 128	32.38						
	Channel 190	32.41	21.5	-0.01	0.391	0.39	0.535	0.54
	Channel 251	32.35						
GSM 1900MHz	Channel 512	30.00						
	Channel 661	29.95	21.2	0.14	0.324	0.32	0.589	0.59
	Channel 810	29.82						
WCDMA 850 MHz	Channel 4123	23.59						
	Channel 4180	23.62	21.5	0.06	0.371	0.37	0.51	0.51
	Channel 4233	23.69						
WCDMA 1900 MHz	Channel 9262	23.50	21.0	0.17	0.696	0.70	1.27	1.27
	Channel 9400	23.70	21.1	0.19	0.706	0.71	1.30	1.30
	Channel 9538	23.70	20.9	0.09	0.606	0.61	1.12	1.12
WCDMA HSUPA Subtest-5 1900 MHz	Channel 9262	23.44						
	Channel 9400	23.74	22.0	-0.14	0.623	0.64	1.13	1.17
	Channel 9538	23.53						
WiFi 802.11b 2450MHz	Channel 1	15.92						
	Channel 6	15.55	21.8	0.13	0.0141	0.01	0.027	0.03
	Channel 11	15.09						
GSM 850 + WIFI	N/A	N/A				0.40		0.57
GSM 1900 + WIFI	N/A	N/A				0.33		0.62
WCDMA 850 + WIFI	N/A	N/A				0.38		0.54
WCDMA 1900 + WIFI	N/A	N/A				0.72		1.33
WCDMA HSUPA 1900 + WIFI	N/A	N/A				0.65		1.20

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; Back of phone 25mm from Phantom								
<i>f</i> (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	10g SAR value		1g SAR value	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
GPRS Class 12 850MHz	Channel 128	32.38						
	Channel 190	32.41	21.4	-0.04	0.182	0.18	0.242	0.24
	Channel 251	32.35						
GPRS Class 12 1900MHz	Channel 512	30.00						
	Channel 661	29.95	21.1	0.07	0.10	0.10	0.165	0.17
	Channel 810	29.82						
WiFi 802.11b 2450MHz	Channel 1	15.92						
	Channel 6	15.55	21.2	0.06	0.00709	0.01	0.0138	0.01
	Channel 11	15.09						
GPRS 850 + WIFI	N/A	N/A				0.19		0.25
GPRS 1900 + WIFI	N/A	N/A				0.11		0.18

Table 10: 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 25mm from Phantom								
<i>f</i> (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	10g SAR value		1g SAR value	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
EDGE Class 12 850MHz	Channel 128	27.42						
	Channel 190	27.43	21.3	0.00	0.0632	0.06	0.0847	0.08
	Channel 251	27.50						
EDGE Class 12 1900MHz	Channel 512	26.65						
	Channel 661	26.60	21.0	0.06	0.0459	0.05	0.0763	0.08
	Channel 810	26.46						
WiFi 802.11b 2450MHz	Channel 1	15.92						
	Channel 6	15.55	21.2	0.06	0.00709	0.01	0.0138	0.01
	Channel 11	15.09						
EDGE 850 + WIFI	N/A	N/A				0.07		0.09
EDGE 1900 + WIFI	N/A	N/A				0.06		0.09

Table 11: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

<i>Noted Highest Body-Worn position with SNN5771B Battery</i>								
<i>f</i> (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	10g SAR value		1g SAR value	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
GSM 850MHz Back of phone 15mm	Channel 128	32.38						
	Channel 190	32.41	21.2	-0.05	0.385	0.39	0.525	0.53
	Channel 251	32.35						
GSM 1900MHz Back of phone 15mm	Channel 512	30.00						
	Channel 661	29.95	20.8	0.17	0.317	0.32	0.579	0.58
	Channel 810	29.82						
WCDMA 850 MHz Back of phone 15mm	Channel 4123	23.59						
	Channel 4180	23.62	21.4	-0.17	0.333	0.35	0.453	0.47
	Channel 4233	23.69						
WCDMA 1900 MHz Back of phone 15mm	Channel 9262	23.50						
	Channel 9400	23.70	20.9	-0.05	0.646	0.65	1.18	1.19
	Channel 9538	23.70						
WiFi 802.11b 2450MHz Back of phone 15mm	Channel 1	15.92						
	Channel 6	15.55	20.8	0.22	0.0142	0.01	0.0283	0.03
	Channel 11	15.09						
GSM 850 + WIFI	N/A	N/A				0.40		0.56
GSM 1900 + WIFI	N/A	N/A				0.33		0.61
WCDMA 850 + WIFI	N/A	N/A				0.36		0.50
WCDMA 1900 + WIFI	N/A	N/A				0.66		1.22

Table 12: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

<i>Bluetooth; Noted highest Body-Worn with highest battery</i>								
<i>f</i> (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	10g SAR value		1g SAR value	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
Bluetooth 2450MHz Back 15mm with SNN5782C Battery	Channel 0							
	Channel 39		20.5	0.00	0.00000424	0.00	0.000037	0.00
	Channel 78							

Table 13: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Highest Extrapolated SAR Values (including WiFi and Bluetooth summation)									
<i>f</i> (MHz)	Description	<i>10 g SAR value</i>				<i>1 g SAR value</i>			
		Original Measureme nt (W/kg)	WiFi Measureme nt (W/kg)	Bluetooth Measureme nt (W/kg)	Summation (W/kg)	Original Measureme nt (W/kg)	WiFi Measureme nt (W/kg)	Bluetooth Measureme nt (W/kg)	Summation (W/kg)
GSM 850 MHz	Back of phone 15mm from phantom with SNN5782C Battery	0.39	0.01	0.00	0.40	0.54	0.03	0.00	0.57
GSM 1900 MHz	Back of phone 15mm from phantom with SNN5782C Battery	0.32	0.01	0.00	0.33	0.59	0.03	0.00	0.62
WCDMA 850 MHz	Back of phone 15mm from phantom with SNN5782C Battery	0.37	0.01	0.00	0.38	0.51	0.03	0.00	0.54
WCDMA 1900 MHz	Back of phone 15mm from phantom with SNN5782C Battery	0.71	0.01	0.00	0.72	1.30	0.03	0.00	1.33

Table 14: SAR measurement results at the highest possible output power, calculated for the body-worn position against the ICNIRP and ANSI SAR Limit.

References

- [1] CENELEC, en62209-1:2006 “Human Exposure to Radio Frequency Fields From Hand - Held and Body - Mounted Wireless Communication Devices – Human Models, Instrumentation, and Procedures”
- [2] CENELEC, en50360:2001 “Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300MHz – 3GHz)”.
- [3] ANSI / IEEE, C95.1 1999 Edition “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300GHz”
- [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: 09/16/2008 AM 07:55:04

Test Laboratory: Motorola**09/16/2008_900MHz_Good +3.9%**

Procedure Notes: 900 MHz System Performance Check / Dipole Sn# 097 PM1 Power = 200 mW

Sim.Temp@meas = 22C Sim.Temp@SPC = 21.9C Room Temp @ SPC = 21C

Communication System: CW - Dipole; Frequency: 900 MHz; Channel Number: 4; Duty Cycle: 1:1

Medium: VALIDATION Only; Medium parameters used: $f = 900$ MHz; $\sigma = 0.98$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³**DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(6.2, 6.2, 6.2); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP- 1129;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 2.19 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 53.1 V/m; Power Drift = -0.010 dB

Peak SAR (extrapolated) = 3.42 W/kg

SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.48 mW/g

Maximum value of SAR (measured) = 2.53 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 53.1 V/m; Power Drift = -0.010 dB

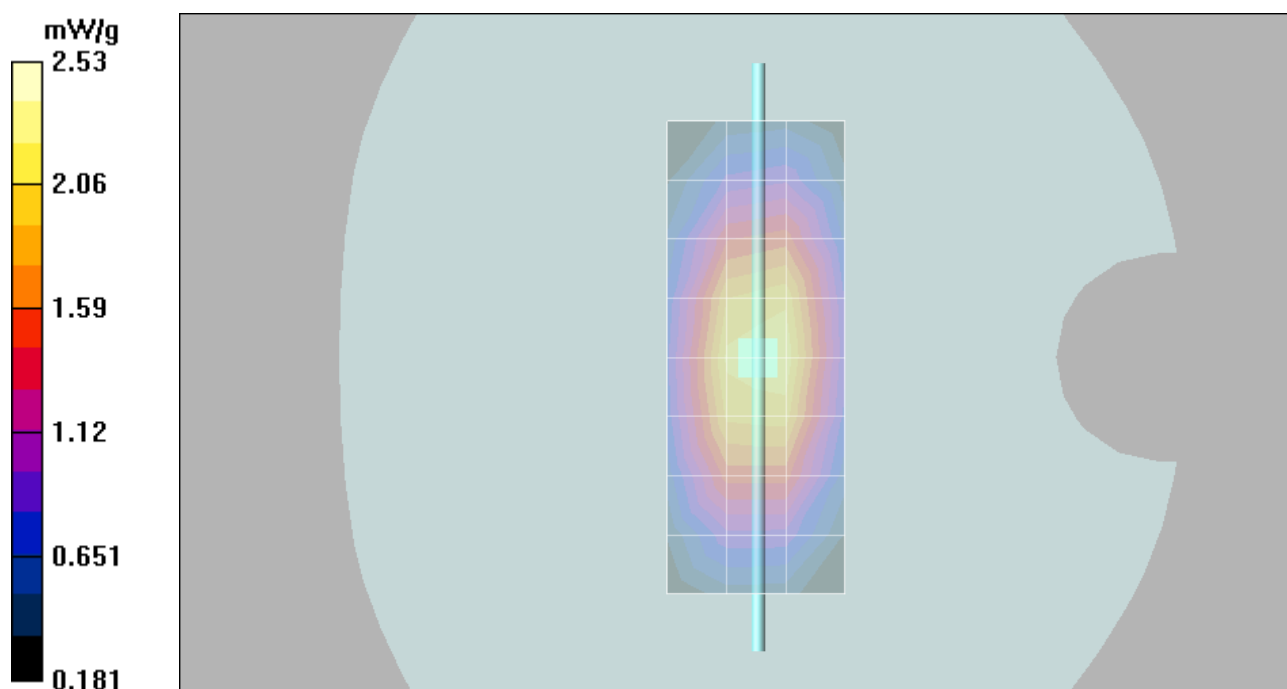
Peak SAR (extrapolated) = 3.49 W/kg

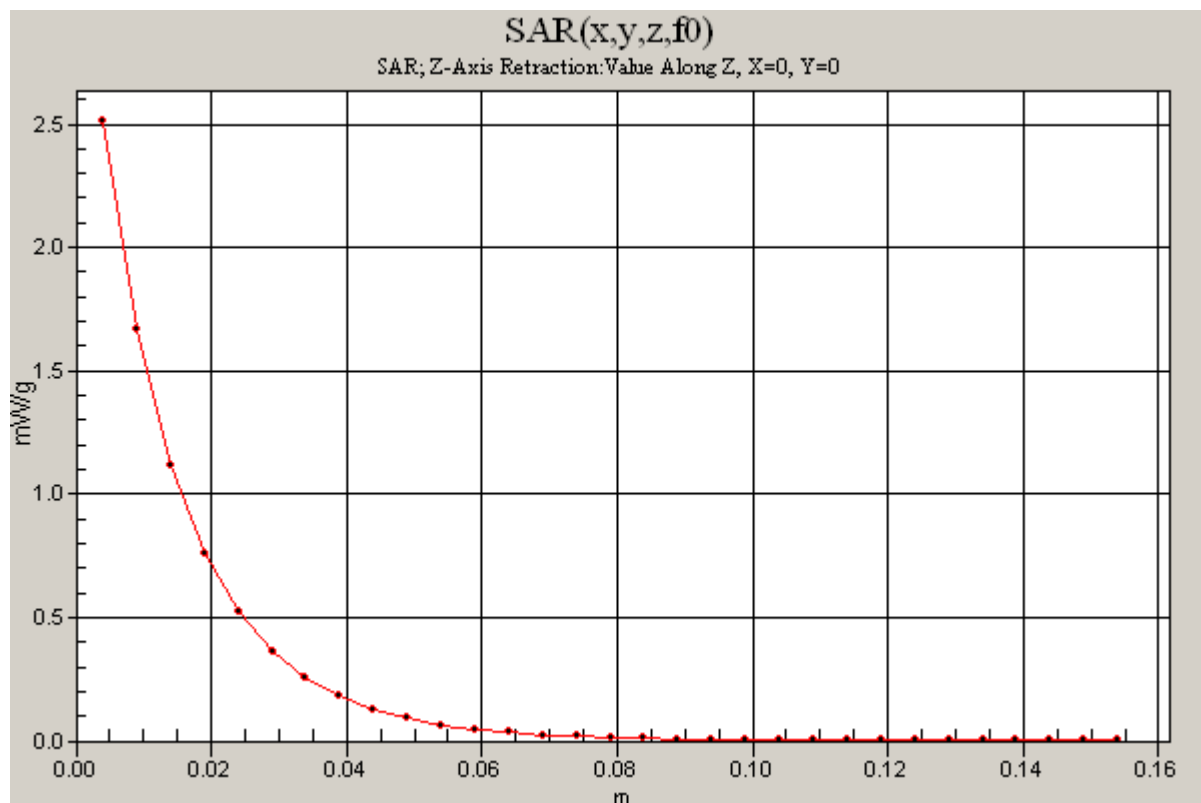
SAR(1 g) = 2.37 mW/g; SAR(10 g) = 1.51 mW/g

Maximum value of SAR (measured) = 2.57 mW/g

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

Maximum value of SAR (measured) = 2.51 mW/g





Test Laboratory: Motorola**09/17/2008_900MHz_Good +3.6%**

Procedure Notes: 900 MHz System Performance Check / Dipole Sn# 097 PM1 Power = 200 mW

Sim.Temp@meas =22C Sim.Temp@SPC = 21.9C Room Temp @ SPC = 22C

Communication System: CW - Dipole; Frequency: 900 MHz; Channel Number: 4; Duty Cycle: 1:1

Medium: VALIDATION Only; Medium parameters used: $f = 900$ MHz; $\sigma = 0.98$ mho/m; $\epsilon_r = 41.4$; $\rho = 1000$ kg/m³**DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(6.2, 6.2, 6.2); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP- 1129;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 2.18 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 53.0 V/m; Power Drift = -0.006 dB

Peak SAR (extrapolated) = 3.42 W/kg

SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.49 mW/g

Maximum value of SAR (measured) = 2.54 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 53.0 V/m; Power Drift = -0.006 dB

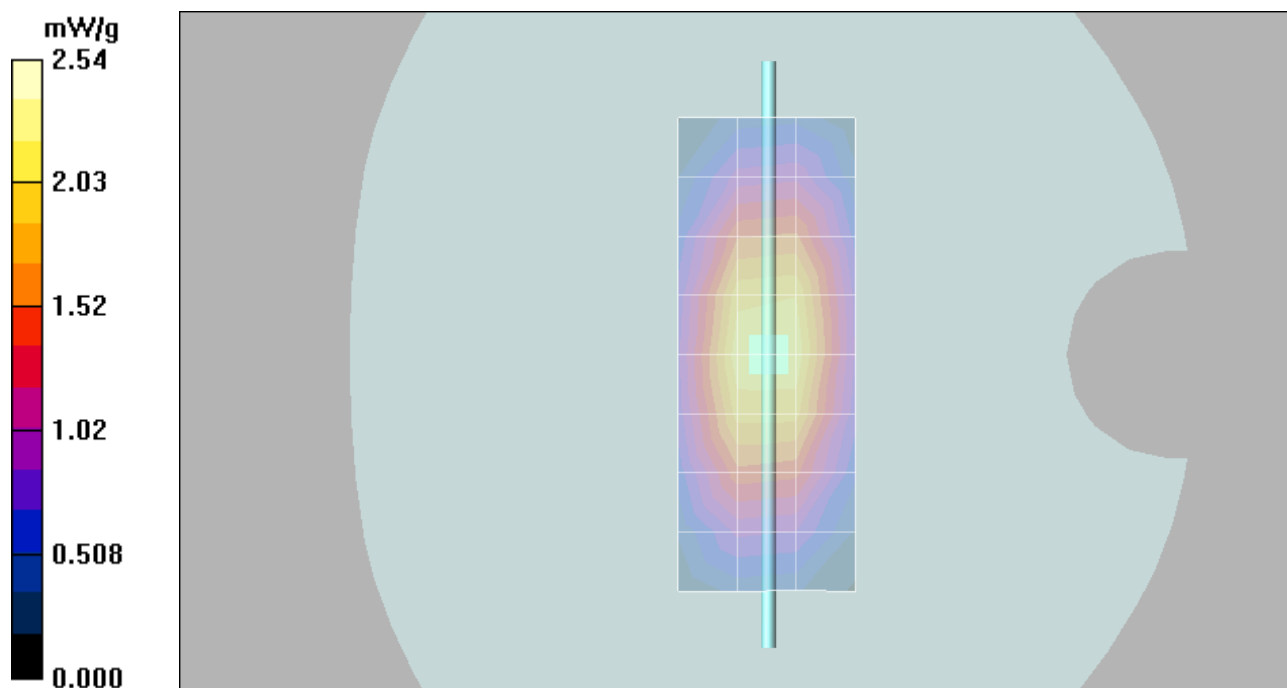
Peak SAR (extrapolated) = 3.44 W/kg

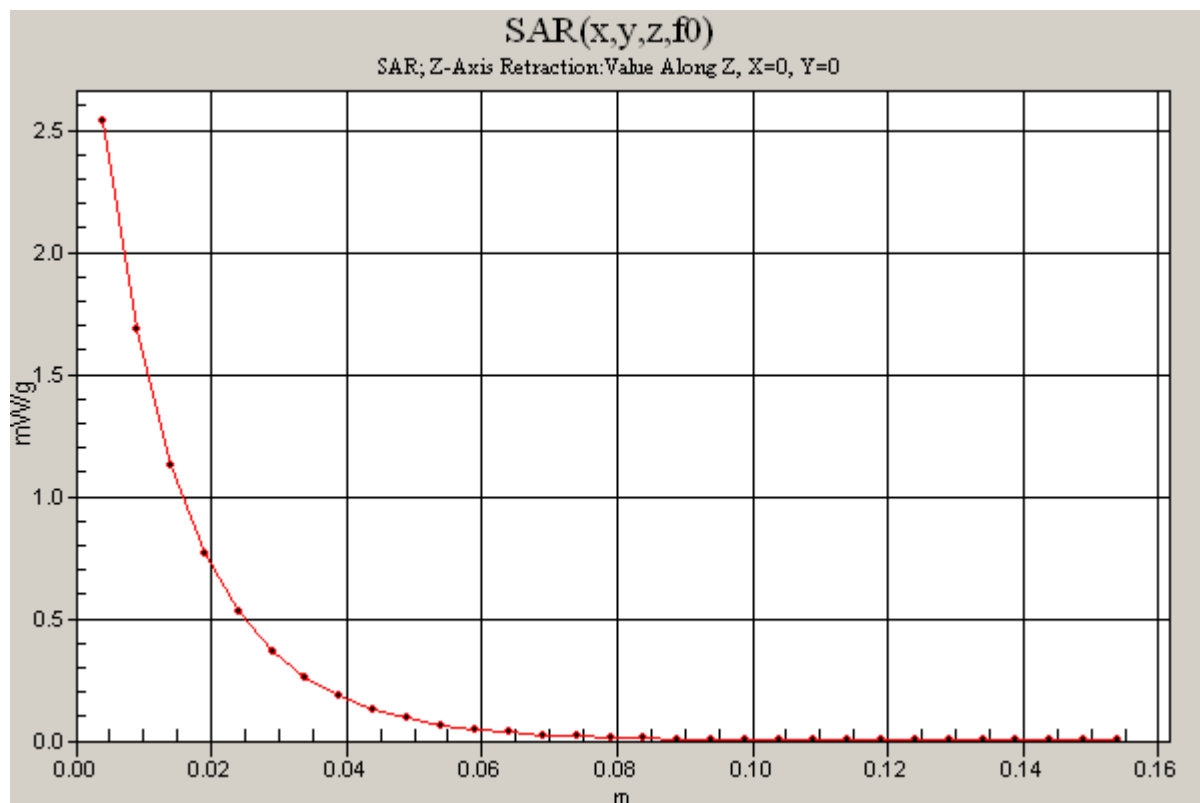
SAR(1 g) = 2.36 mW/g; SAR(10 g) = 1.51 mW/g

Maximum value of SAR (measured) = 2.56 mW/g

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

Maximum value of SAR (measured) = 2.54 mW/g





Test Laboratory: Motorola**09/18/2008_900MHz_Good +4.5%**

Procedure Notes: 900 MHz System Performance Check / Dipole Sn# 097 PM1 Power = 200 mW

Sim.Temp@meas = 22C Sim.Temp@SPC = 21.9C Room Temp @ SPC = 22C

Communication System: CW - Dipole; Frequency: 900 MHz; Channel Number: 4; Duty Cycle: 1:1

Medium: VALIDATION Only; Medium parameters used: $f = 900$ MHz; $\sigma = 0.98$ mho/m; $\epsilon_r = 41.3$; $\rho = 1000$ kg/m³**DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(6.2, 6.2, 6.2); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP- 1129;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 2.22 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 53.5 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 3.45 W/kg

SAR(1 g) = 2.34 mW/g; SAR(10 g) = 1.5 mW/g

Maximum value of SAR (measured) = 2.54 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 53.5 V/m; Power Drift = -0.002 dB

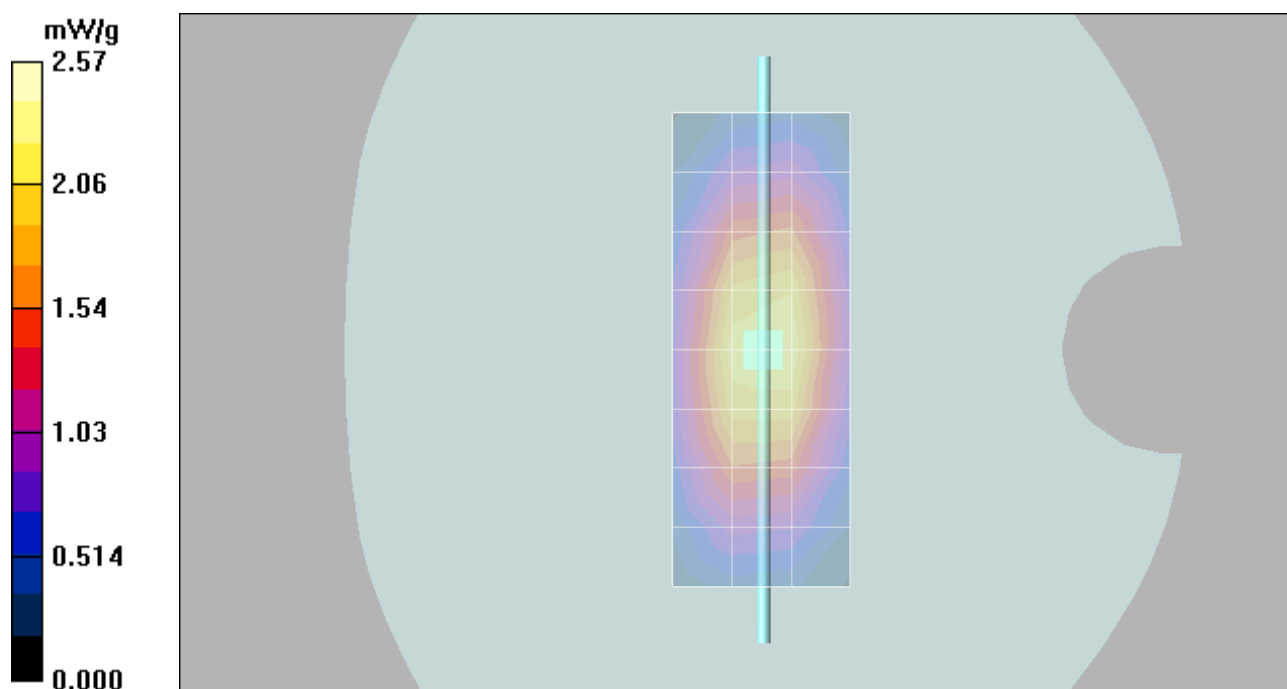
Peak SAR (extrapolated) = 3.51 W/kg

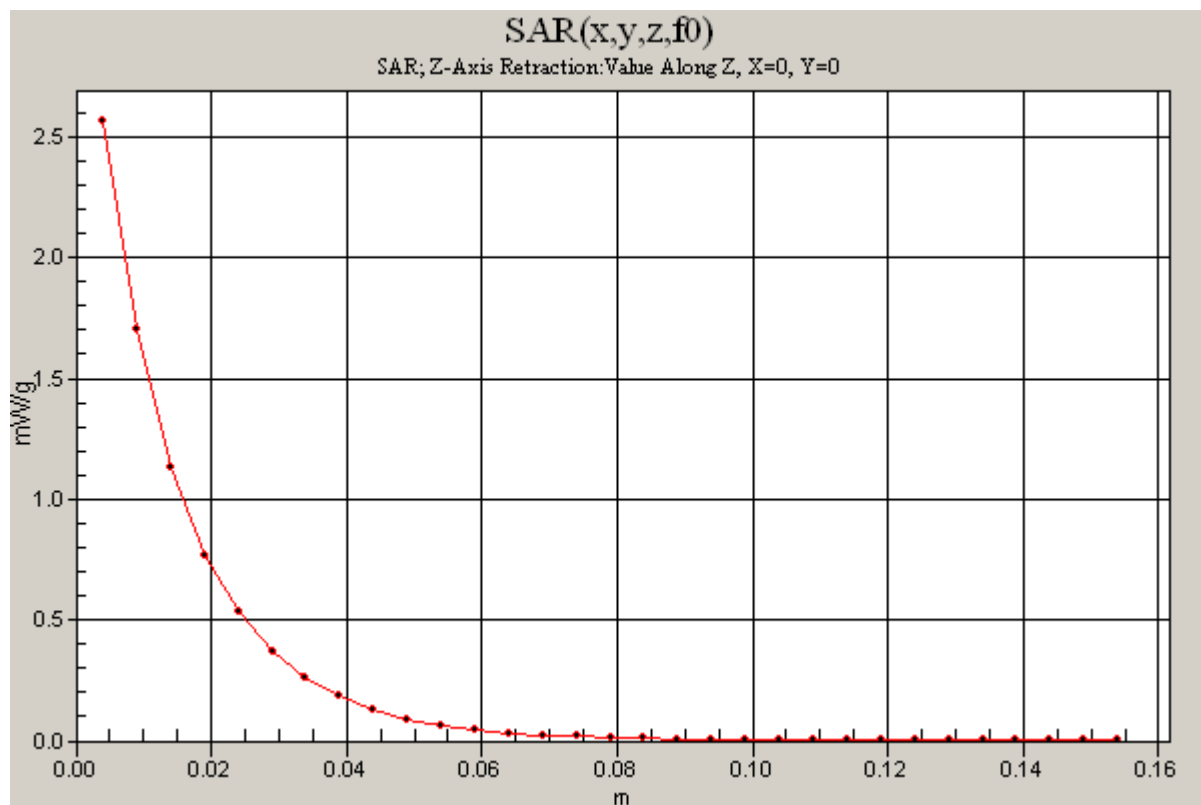
SAR(1 g) = 2.38 mW/g; SAR(10 g) = 1.53 mW/g

Maximum value of SAR (measured) = 2.56 mW/g

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

Maximum value of SAR (measured) = 2.57 mW/g





Date/Time: 09/17/2008 PM 03:30:59

Test Laboratory: Motorola 09/17/2008_1800MHz_Good -2.7%

Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 277tr PM1 Power = 200 mW

Sim.Temp@meas =22.1C Sim.Temp@SPC = 21.9C Room Temp @ SPC = 21.6C

Communication System: CW - Dipole; Frequency: 1800 MHz; Channel Number: 8; Duty Cycle: 1:1

Medium: VALIDATION Only; Medium parameters used: $f = 1800$ MHz; $\sigma = 1.36$ mho/m; $\epsilon_r = 40.1$; $\rho = 1000$ kg/m³**DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(5.34, 5.34, 5.34); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1134;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 5.97 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 80.6 V/m; Power Drift = 0.047 dB

Peak SAR (extrapolated) = 12.7 W/kg

SAR(1 g) = 7.33 mW/g; SAR(10 g) = 3.92 mW/g

Maximum value of SAR (measured) = 8.24 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 80.6 V/m; Power Drift = 0.047 dB

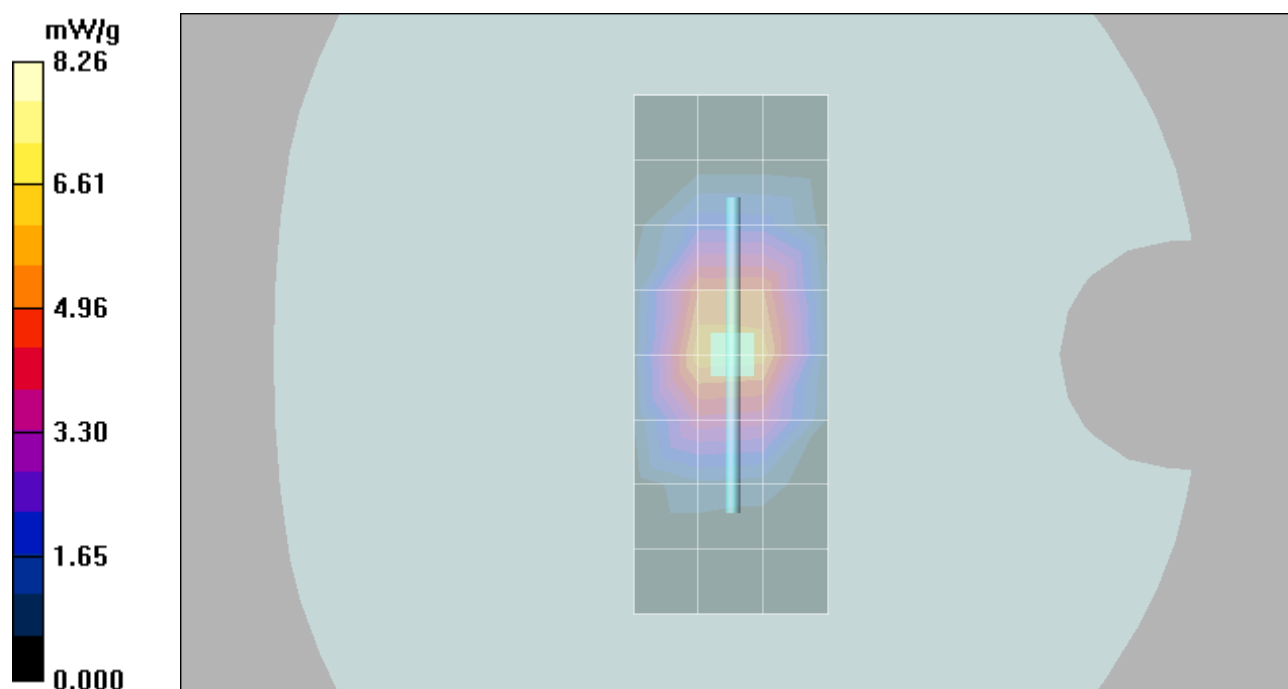
Peak SAR (extrapolated) = 12.8 W/kg

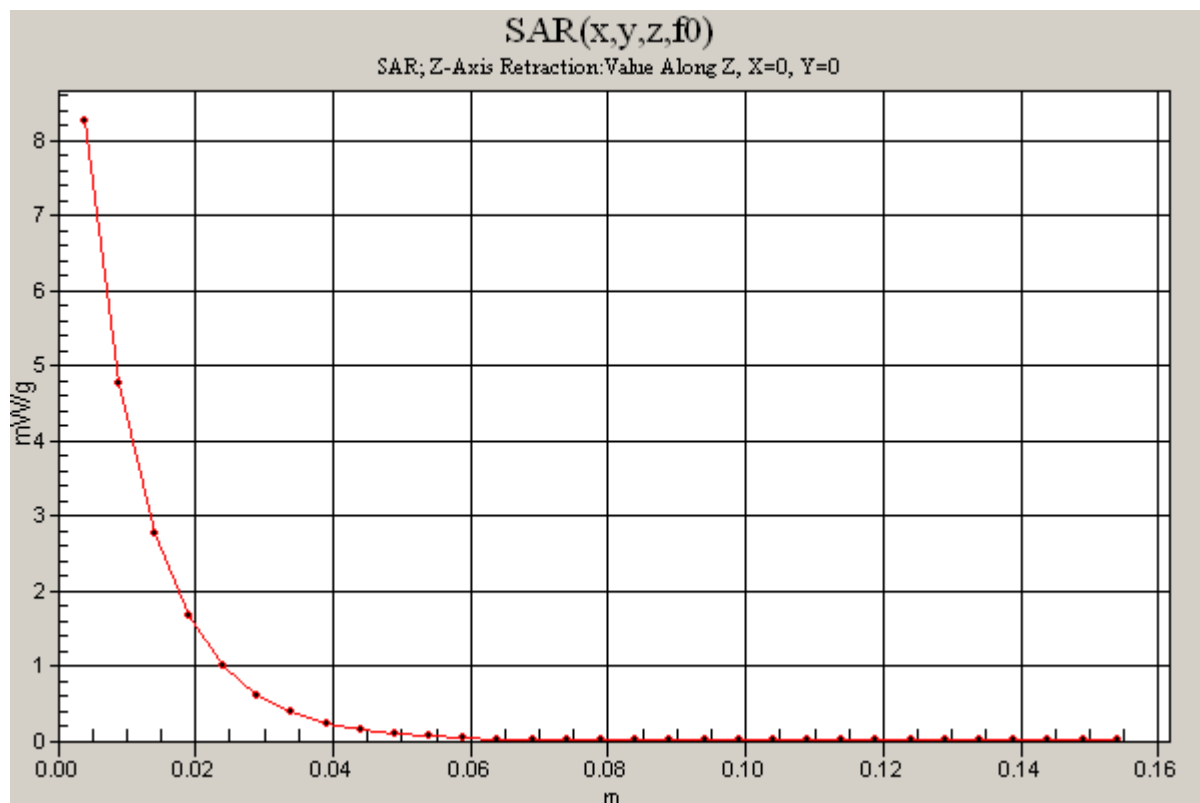
SAR(1 g) = 7.35 mW/g; SAR(10 g) = 3.95 mW/g

Maximum value of SAR (measured) = 8.23 mW/g

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

Maximum value of SAR (measured) = 8.26 mW/g





Test Laboratory: Motorola 09/18/2008_1800MHz_Good -3.9%

Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 277tr PM1 Power = 200 mW

Sim.Temp@meas =21.9C Sim.Temp@SPC = 22C Room Temp @ SPC = 21.2C

Communication System: CW - Dipole; Frequency: 1800 MHz; Channel Number: 8; Duty Cycle: 1:1

Medium: VALIDATION Only; Medium parameters used: $f = 1800$ MHz; $\sigma = 1.36$ mho/m; $\epsilon_r = 39.6$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1502; ConvF(5.34, 5.34, 5.34); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1134;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 6.11 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 80.6 V/m; Power Drift = 0.023 dB

Peak SAR (extrapolated) = 12.6 W/kg

SAR(1 g) = 7.23 mW/g; SAR(10 g) = 3.87 mW/g

Maximum value of SAR (measured) = 8.10 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 80.6 V/m; Power Drift = 0.023 dB

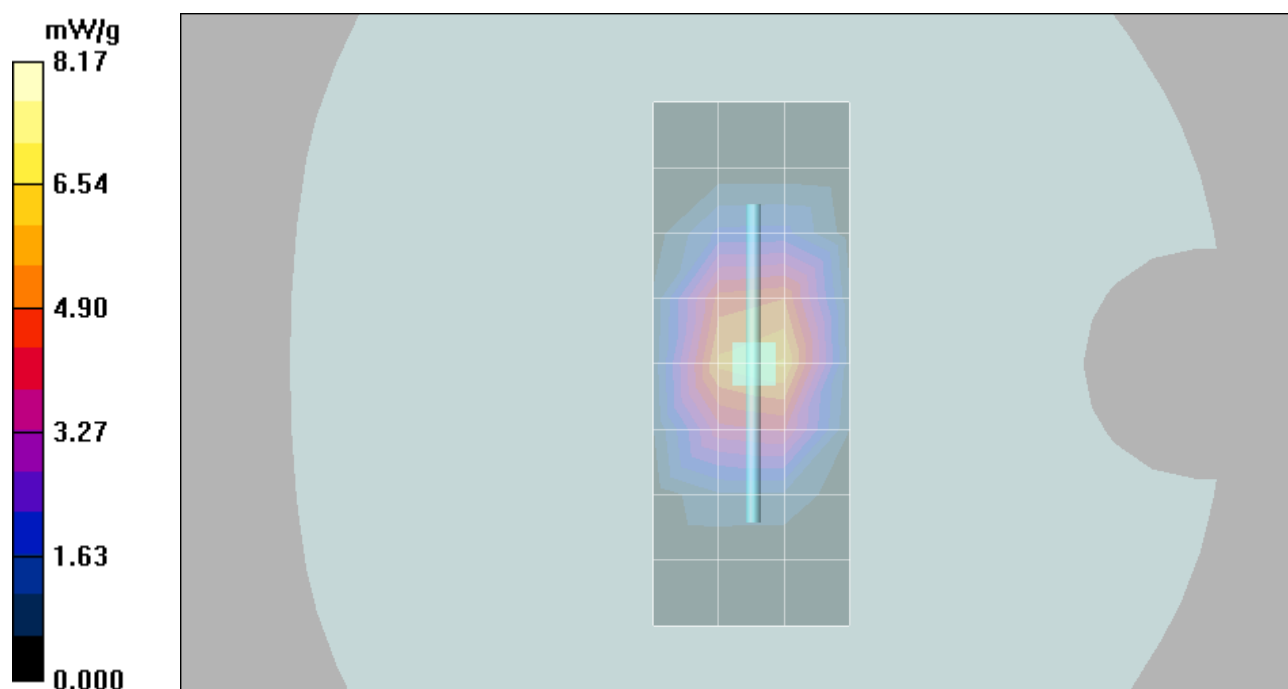
Peak SAR (extrapolated) = 12.6 W/kg

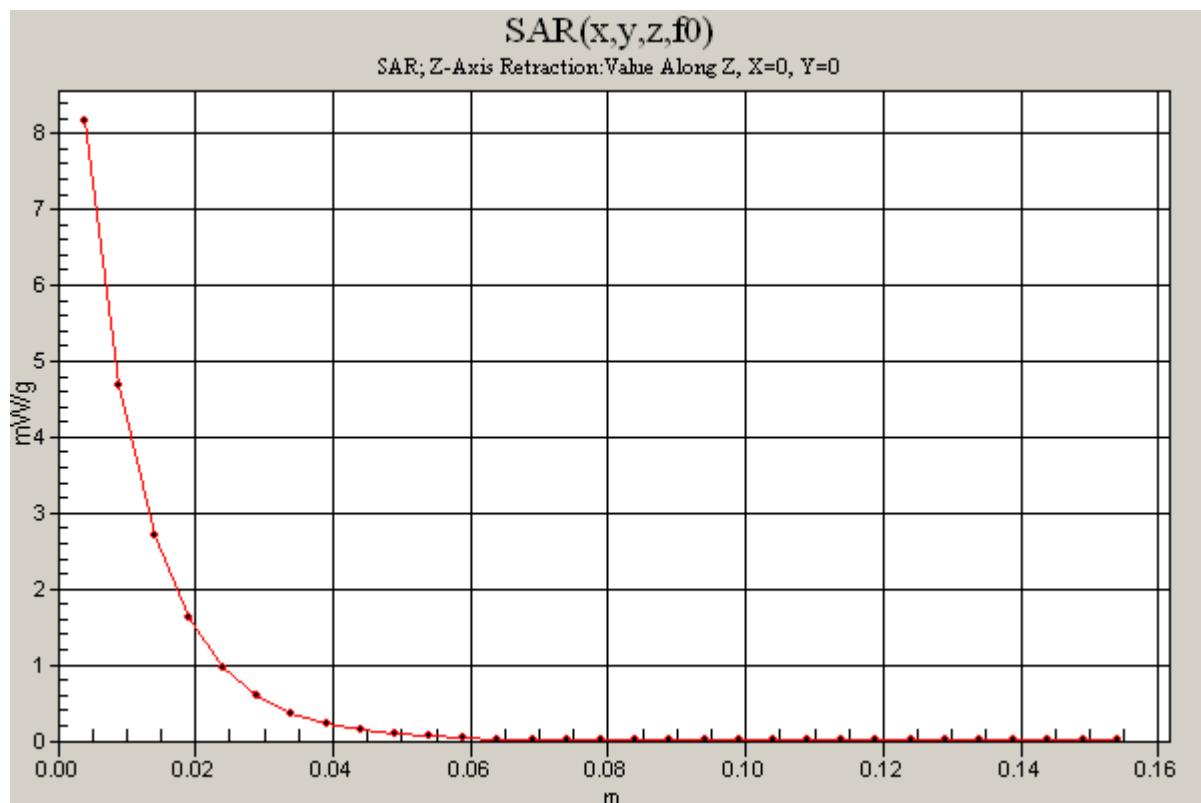
SAR(1 g) = 7.26 mW/g; SAR(10 g) = 3.89 mW/g

Maximum value of SAR (measured) = 8.04 mW/g

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

Maximum value of SAR (measured) = 8.17 mW/g





Date/Time: 09/19/2008 PM 02:06:30

Test Laboratory: Motorola 09192008_1800MHz_Good -3.3%

Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 277tr PM1 Power = 200 mW

Sim.Temp@meas =21.1C Sim.Temp@SPC = 21C Room Temp @ SPC = 21C

Communication System: CW - Dipole; Frequency: 1800 MHz; Channel Number: 8; Duty Cycle: 1:1

Medium: VALIDATION Only; Medium parameters used: $f = 1800$ MHz; $\sigma = 1.36$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1502; ConvF(5.34, 5.34, 5.34); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1134;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 6.05 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 81.6 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 12.9 W/kg

SAR(1 g) = 7.32 mW/g; SAR(10 g) = 3.88 mW/g

Maximum value of SAR (measured) = 8.26 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 81.6 V/m; Power Drift = -0.009 dB

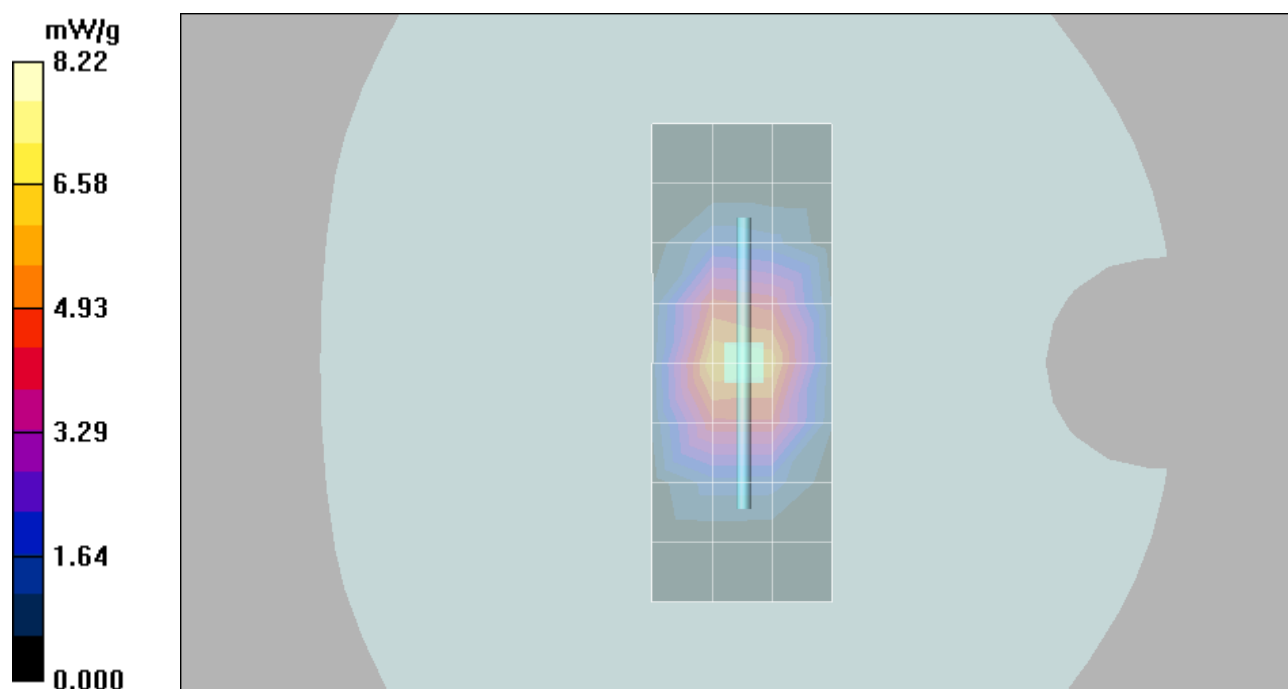
Peak SAR (extrapolated) = 12.7 W/kg

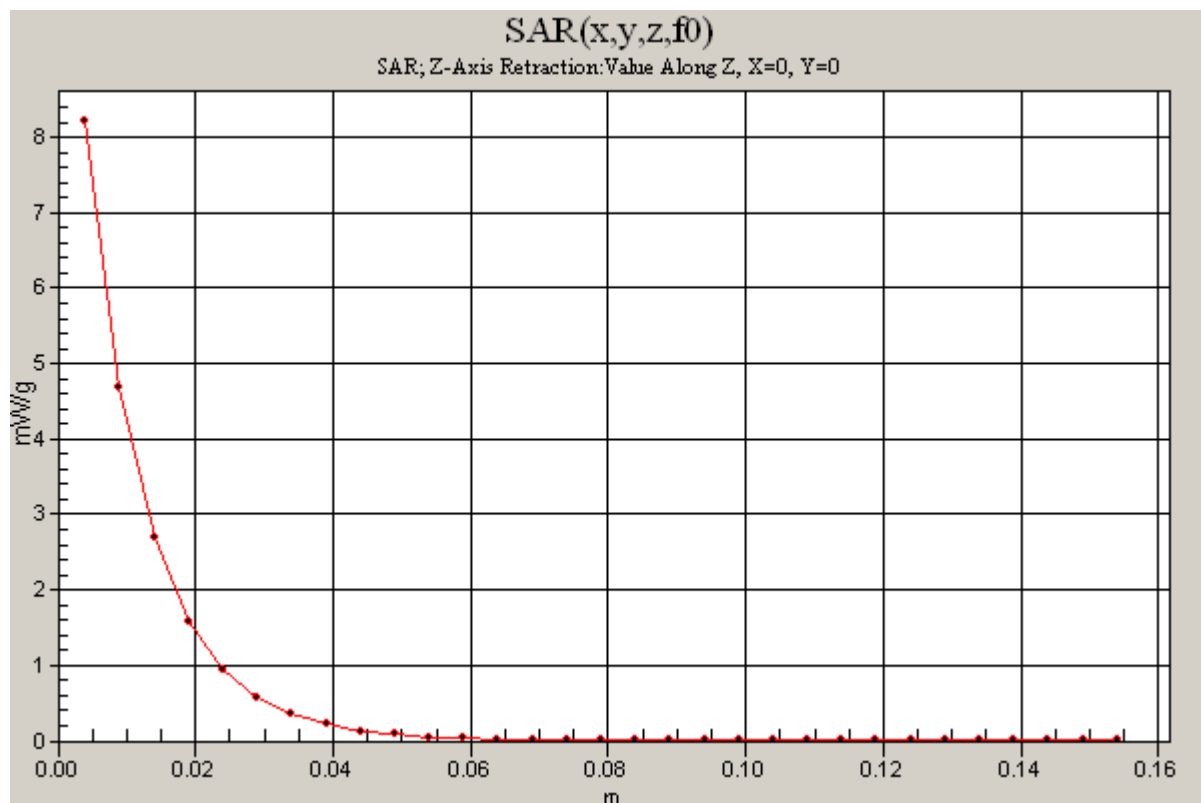
SAR(1 g) = 7.26 mW/g; SAR(10 g) = 3.88 mW/g

Maximum value of SAR (measured) = 7.56 mW/g

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

Maximum value of SAR (measured) = 8.22 mW/g





Date/Time: 09/23/2008 PM 04:04:57

Test Laboratory: Motorola**09/23/2008_2450MHz_Good -4.9%**

Procedure Notes: 2450 MHz System Performance Check / Dipole Sn# 767 PM1 Power = 200 mW

Sim.Temp@meas = 22.3C Sim.Temp@SPC = 21.5C Room Temp @ SPC = 21.6C

Communication System: CW - Dipole; Frequency: 2450 MHz; Channel Number: 11; Duty Cycle: 1:1

Medium: VALIDATION Only; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.88$ mho/m; $\epsilon_r = 37.5$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1502; ConvF(4.64, 4.64, 4.64); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1134;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 8.16 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 82.5 V/m; Power Drift = 0.026 dB

Peak SAR (extrapolated) = 24.4 W/kg

SAR(1 g) = 10.7 mW/g; SAR(10 g) = 4.91 mW/g

Maximum value of SAR (measured) = 11.9 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 82.5 V/m; Power Drift = 0.026 dB

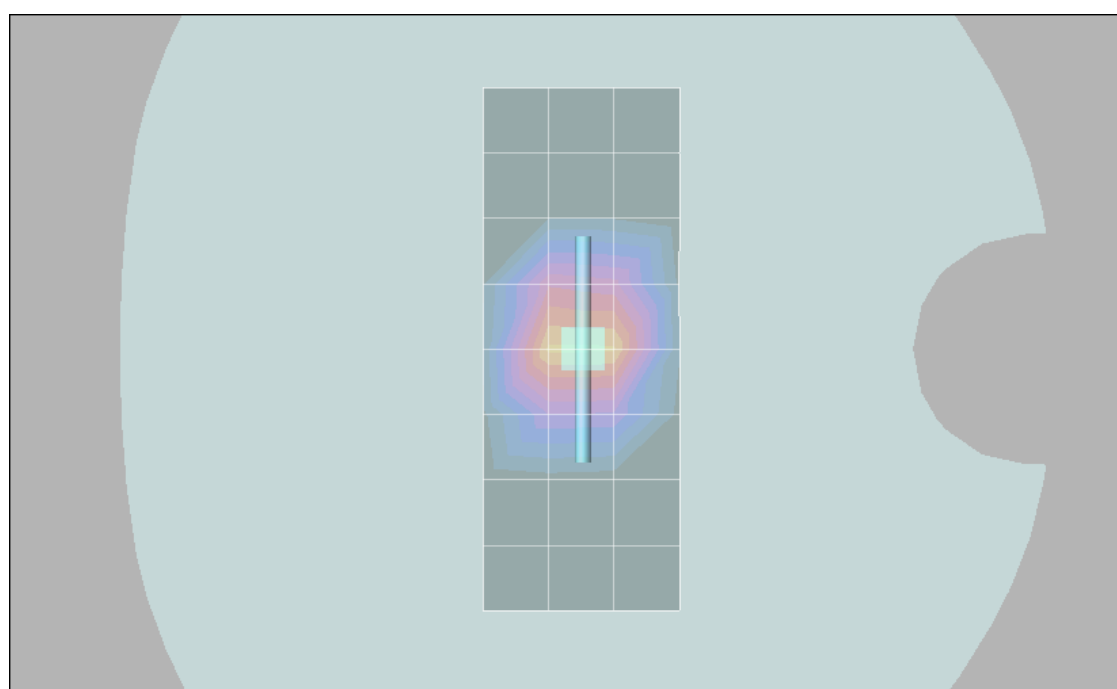
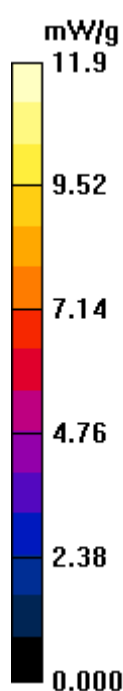
Peak SAR (extrapolated) = 24.4 W/kg

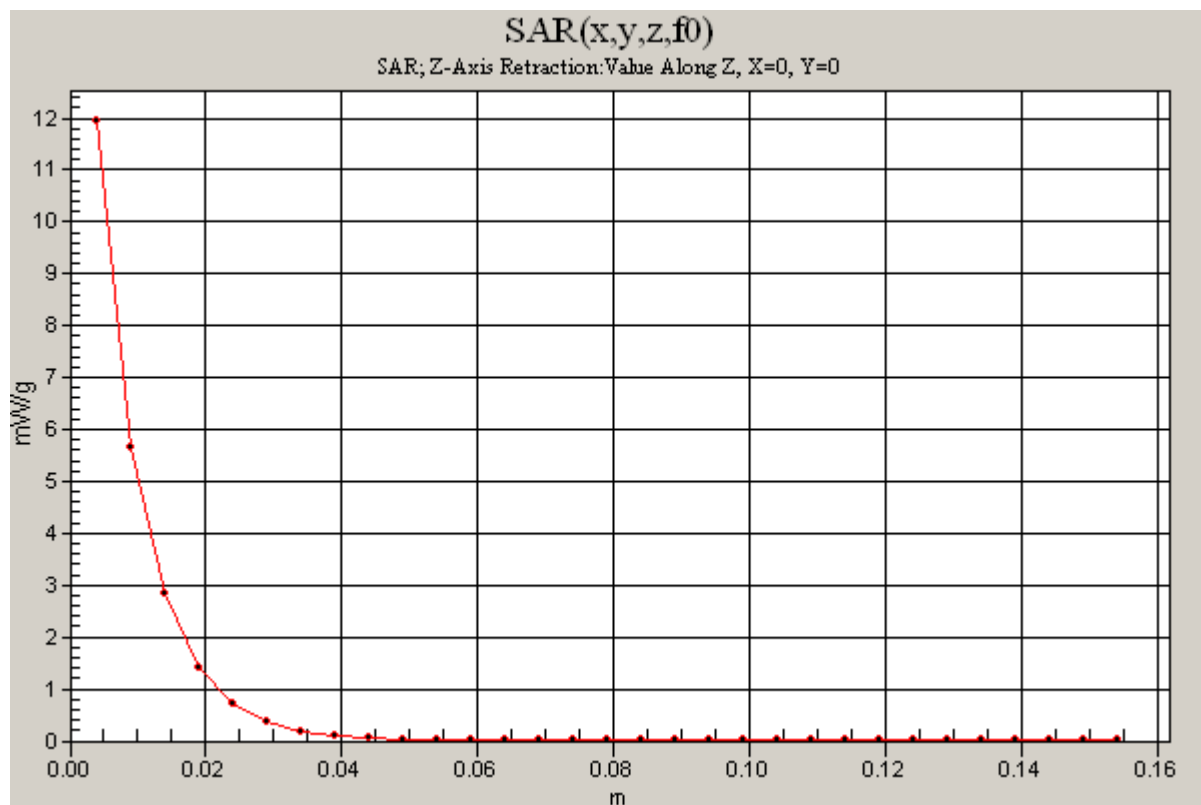
SAR(1 g) = 10.8 mW/g; SAR(10 g) = 4.95 mW/g

Maximum value of SAR (measured) = 11.7 mW/g

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

Maximum value of SAR (measured) = 11.9 mW/g





Date/Time: 09/24/2008 PM 01:38:26

Test Laboratory: Motorola**09/24/2008_2450MHz_Good -7.5%**

Procedure Notes: 2450 MHz System Performance Check / Dipole Sn# 767 PM1 Power = 200 mW

Sim.Temp@meas = 22.2C Sim.Temp@SPC = 22C Room Temp @ SPC = 21.4C

Communication System: CW - Dipole; Frequency: 2450 MHz; Channel Number: 11; Duty Cycle: 1:1

Medium: VALIDATION Only; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.88$ mho/m; $\epsilon_r = 37.4$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1502; ConvF(4.64, 4.64, 4.64); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1134;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 8.85 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 81.5 V/m; Power Drift = -0.028 dB

Peak SAR (extrapolated) = 23.6 W/kg

SAR(1 g) = 10.5 mW/g; SAR(10 g) = 4.83 mW/g

Maximum value of SAR (measured) = 11.5 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 81.5 V/m; Power Drift = -0.028 dB

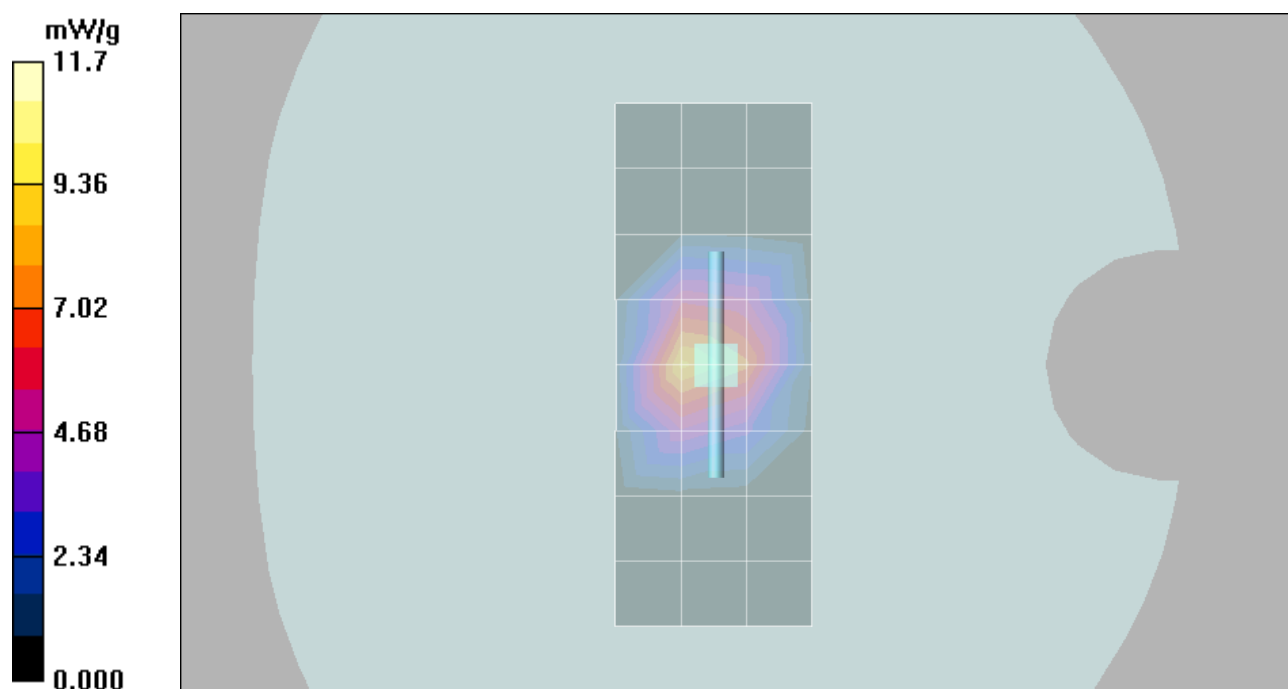
Peak SAR (extrapolated) = 23.2 W/kg

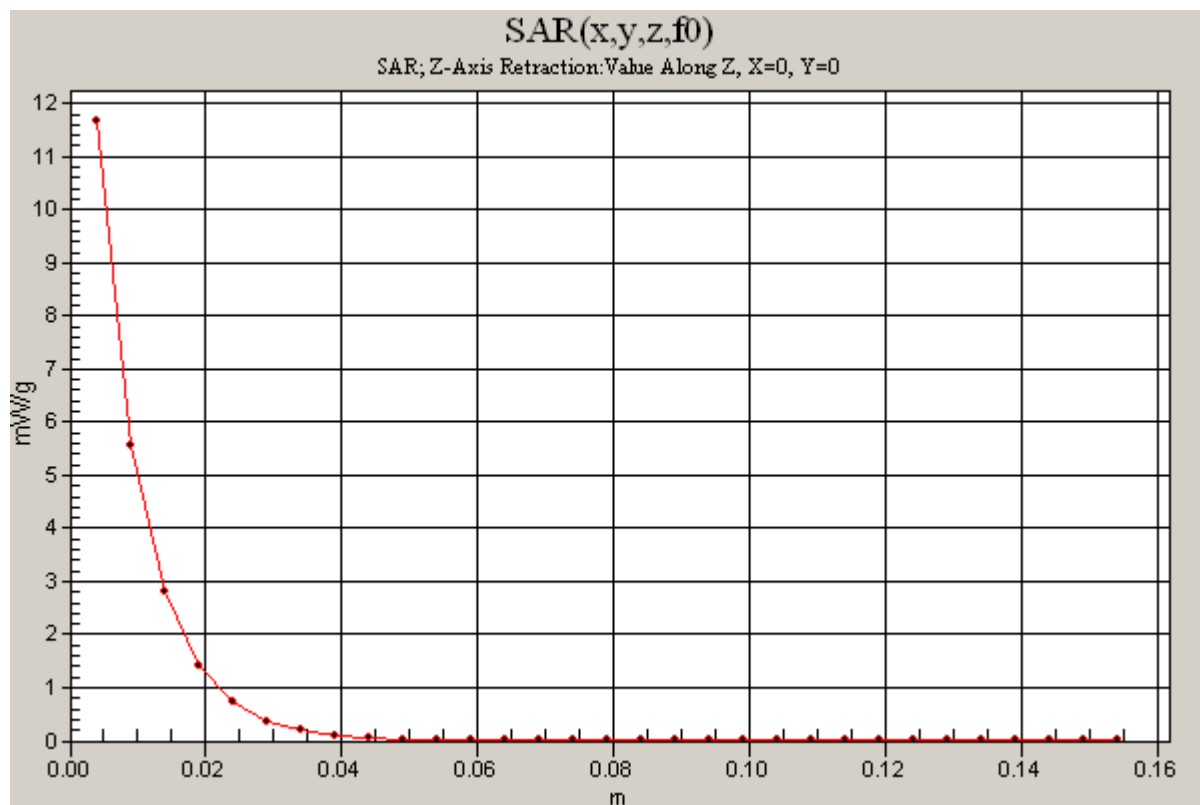
SAR(1 g) = 10.4 mW/g; SAR(10 g) = 4.82 mW/g

Maximum value of SAR (measured) = 11.2 mW/g

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

Maximum value of SAR (measured) = 11.7 mW/g





Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

Date/Time: 09/17/2008 AM 08:42:21

Test Laboratory: Motorola GSM850 Cheek

FCC ID#: IHDP56JH1 Serial: 004401028823223;

Procedure Notes: Pwr Step: 05(OTA) Antenna Position: Internal

Battery Model #: SNN5771B DEVICE POSITION (cheek or rotated): cheek

Communication System: GSM 850; Frequency: 824.2 MHz; Channel Number: 128; Duty Cycle: 1:8

Medium: Low Freq Head; Medium parameters used: $f = 835$ MHz; $\sigma = 0.92$ mho/m; $\epsilon_r = 42.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1502; ConvF(6.2, 6.2, 6.2); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP- 1129;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.906 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

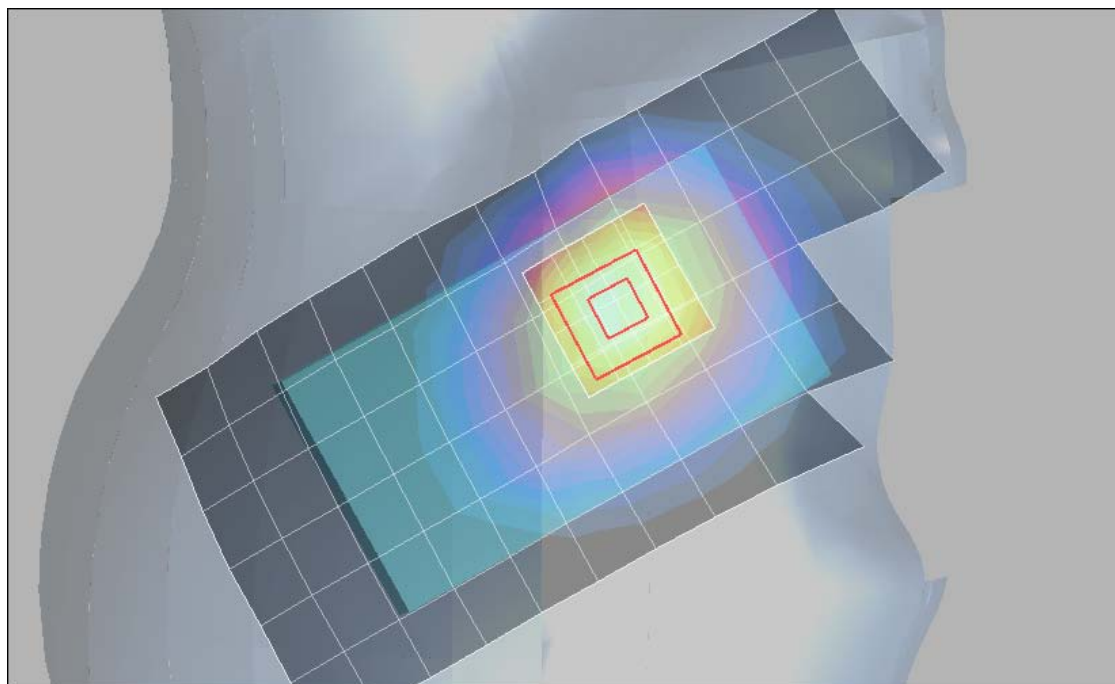
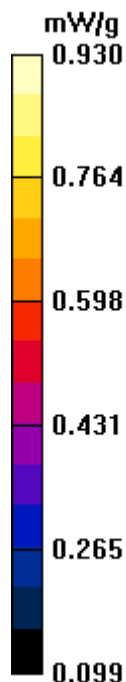
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 33.9 V/m; Power Drift = -0.340 dB

Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.881 mW/g; SAR(10 g) = 0.645 mW/g

Maximum value of SAR (measured) = 0.930 mW/g



Test Laboratory: Motorola**GSM850 Tilted****FCC ID#: IHDP56JH1 Serial: 004401028823223;**

Procedure Notes: Pwr Step: 05(OTA) Antenna Position: Internal

Battery Model #: SNN5782C DEVICE POSITION (cheek or rotated): rotated

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; $\sigma = 0.91$ mho/m; $\epsilon_r = 41.6$; $\rho = 1000$ kg/m³**DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(6.2, 6.2, 6.2); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP- 1129;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

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

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

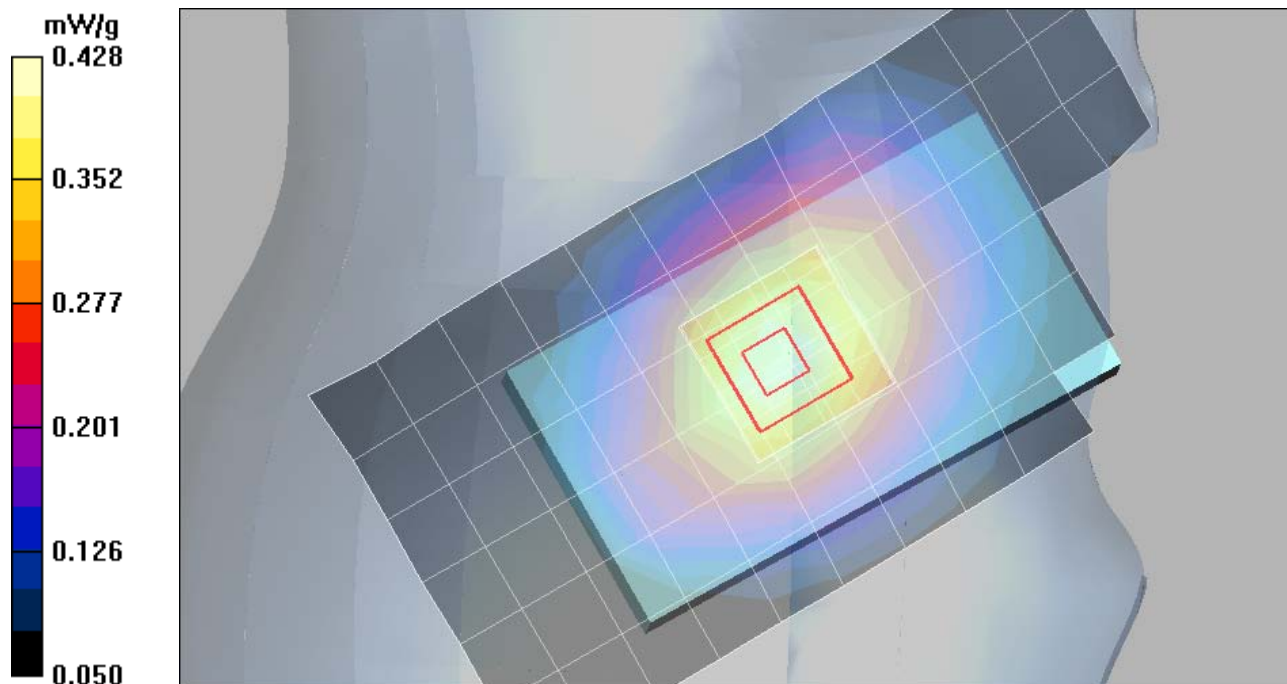
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.6 V/m; Power Drift = -0.057 dB

Peak SAR (extrapolated) = 0.489 W/kg

SAR(1 g) = 0.408 mW/g; SAR(10 g) = 0.306 mW/g

Maximum value of SAR (measured) = 0.428 mW/g



Test Laboratory: Motorola GSM1900 Cheek

FCC ID#: IHDP56JH1 Serial: 004401028823223;

Procedure Notes: Pwr Step: 00(OTA) Antenna Position: Internal

Battery Model #: SNN5771B DEVICE POSITION (cheek or rotated): Cheek

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8

Medium: Regular Glycol Head 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1502; ConvF(5.34, 5.34, 5.34); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1134;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.511 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

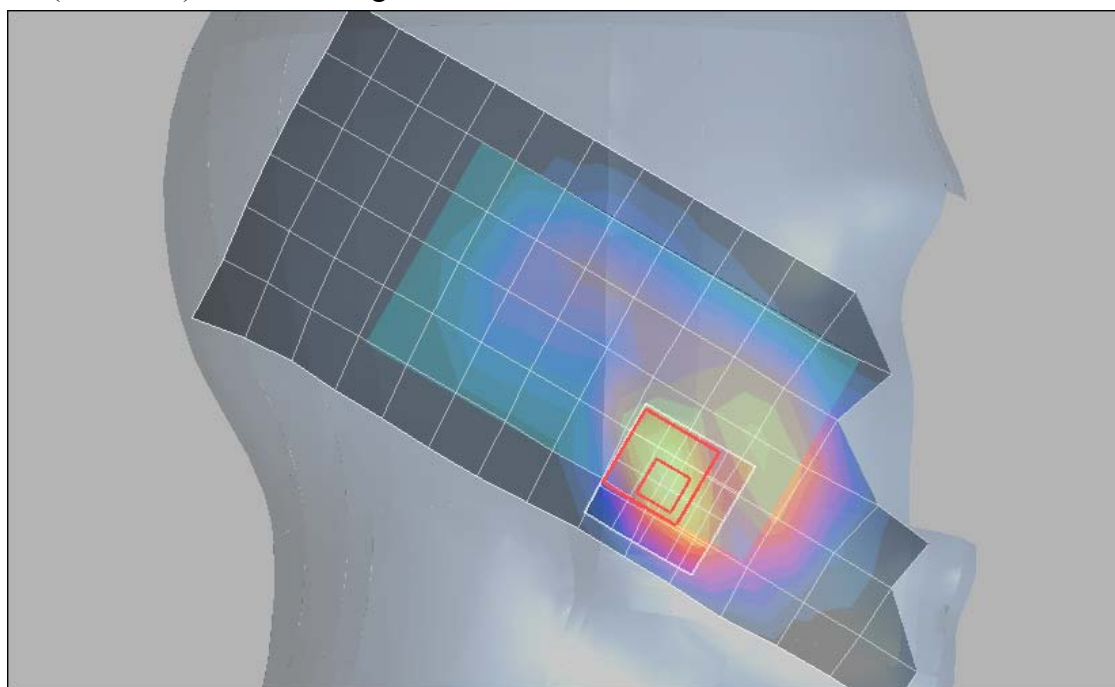
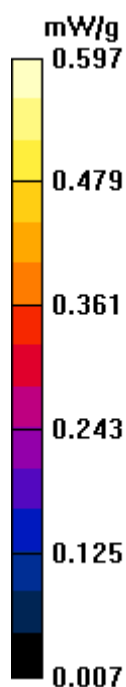
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.6 V/m; Power Drift = -0.101 dB

Peak SAR (extrapolated) = 0.896 W/kg

SAR(1 g) = 0.512 mW/g; SAR(10 g) = 0.290 mW/g

Maximum value of SAR (measured) = 0.597 mW/g



Test Laboratory: Motorola **GSM1900 Tilted****FCC ID#: IHDP56JH1 Serial:004401028823223;**

Procedure Notes: Pwr Step: 00(OTA) Antenna Position: Internal

Battery Model #: SNN5771B DEVICE POSITION (cheek or rotated): rotated

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8

Medium: Regular Glycol Head 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³**DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(5.34, 5.34, 5.34); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1134;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.295 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

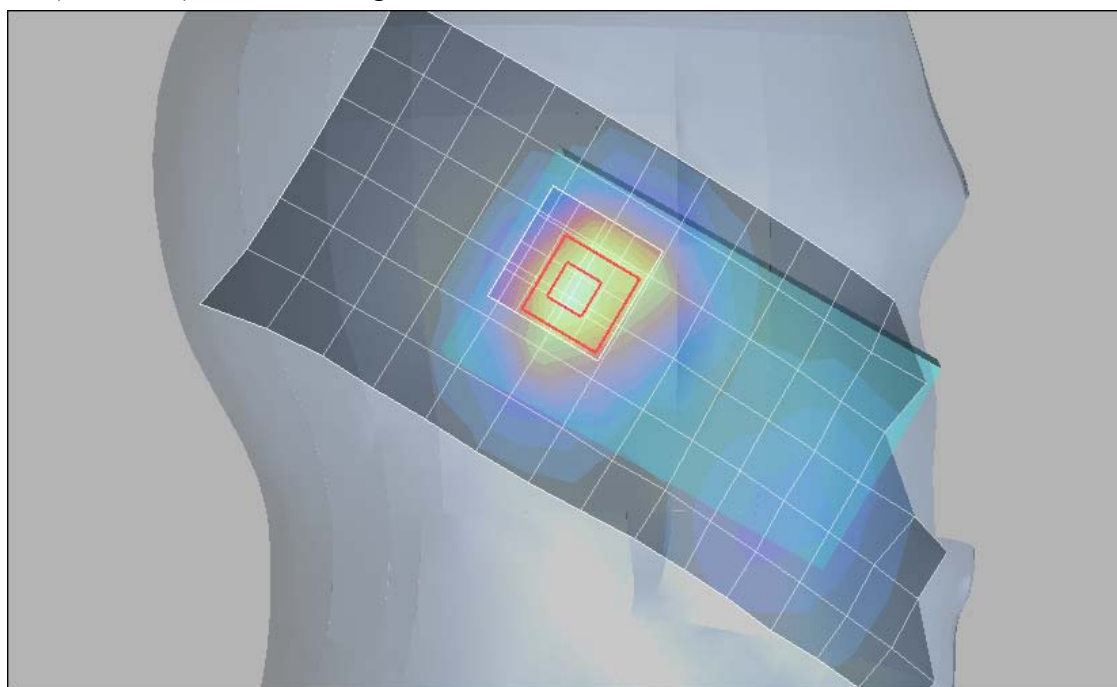
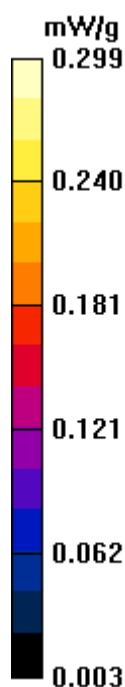
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.2 V/m; Power Drift = 0.013 dB

Peak SAR (extrapolated) = 0.418 W/kg

SAR(1 g) = 0.283 mW/g; SAR(10 g) = 0.178 mW/g

Maximum value of SAR (measured) = 0.299 mW/g



Test Laboratory: Motorola **WCDMA850 Cheek****FCC ID#: IHDP56JH1 Serial: 004401028823223;**

Procedure Notes: Pwr Step: All Up Bit(OTA) Antenna Position: Internal

Battery Model #: SNN5771B DEVICE POSITION (cheek or rotated): Cheek

Communication System: 3G-WCDMA 850; Frequency: 836 MHz; Channel Number: 4180; Duty Cycle: 1:1

Medium: Low Freq Head; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.92 \text{ mho/m}$; $\epsilon_r = 42.1$; $\rho = 1000 \text{ kg/m}^3$ **DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(6.2, 6.2, 6.2); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP- 1129;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.736 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

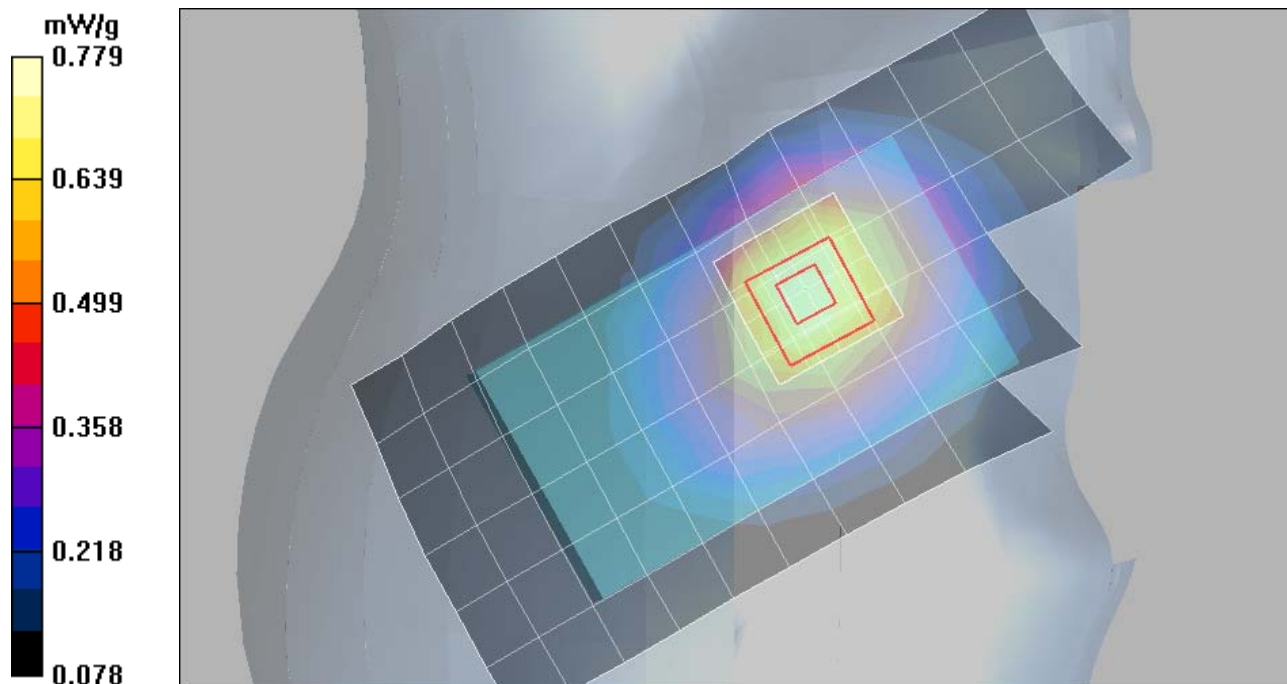
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 30.3 V/m; Power Drift = -0.050 dB

Peak SAR (extrapolated) = 0.914 W/kg

SAR(1 g) = 0.732 mW/g; SAR(10 g) = 0.531 mW/g

Maximum value of SAR (measured) = 0.779 mW/g



Test Laboratory: Motorola WCDMA850 Tilted

FCC ID#: IHDP56JH1 Serial: 004401028823223;

Procedure Notes: Pwr Step: All Up Bit(OTA) Antenna Position: Internal

Battery Model #: SNN5782C DEVICE POSITION (cheek or rotated): Rotated

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; $\sigma = 0.92$ mho/m; $\epsilon_r = 42.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1502; ConvF(6.2, 6.2, 6.2); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP- 1129;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.399 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

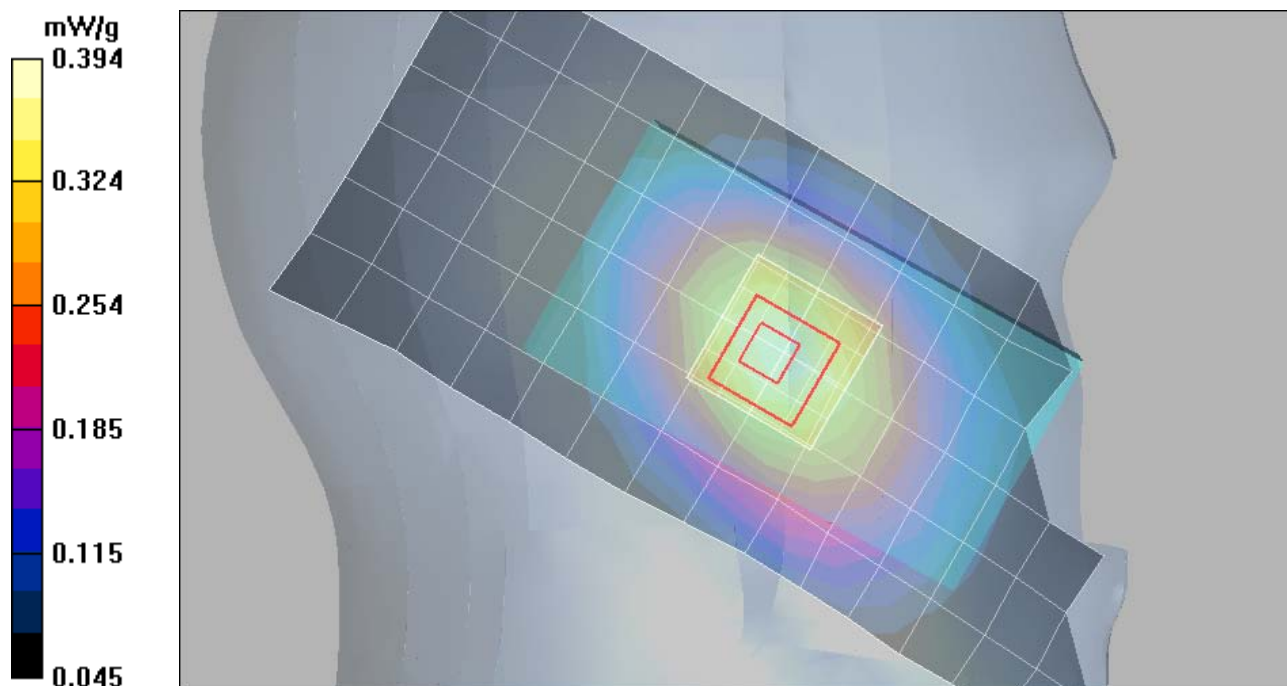
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.3 V/m; Power Drift = -0.039 dB

Peak SAR (extrapolated) = 0.455 W/kg

SAR(1 g) = 0.378 mW/g; SAR(10 g) = 0.284 mW/g

Maximum value of SAR (measured) = 0.394 mW/g



Test Laboratory: Motorola**WCDMA1900 Cheek****FCC ID#: IHDP56JH1 Serial: 004401028823223;**

Procedure Notes: Pwr Step: All Up Bit(OTA) Antenna Position: Internal

Battery Model #: SNN5782C DEVICE POSITION (cheek or rotated): Cheek

Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz; Channel Number: 9400; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 39.3$; $\rho = 1000$ kg/m³**DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(5.34, 5.34, 5.34); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1134;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.08 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

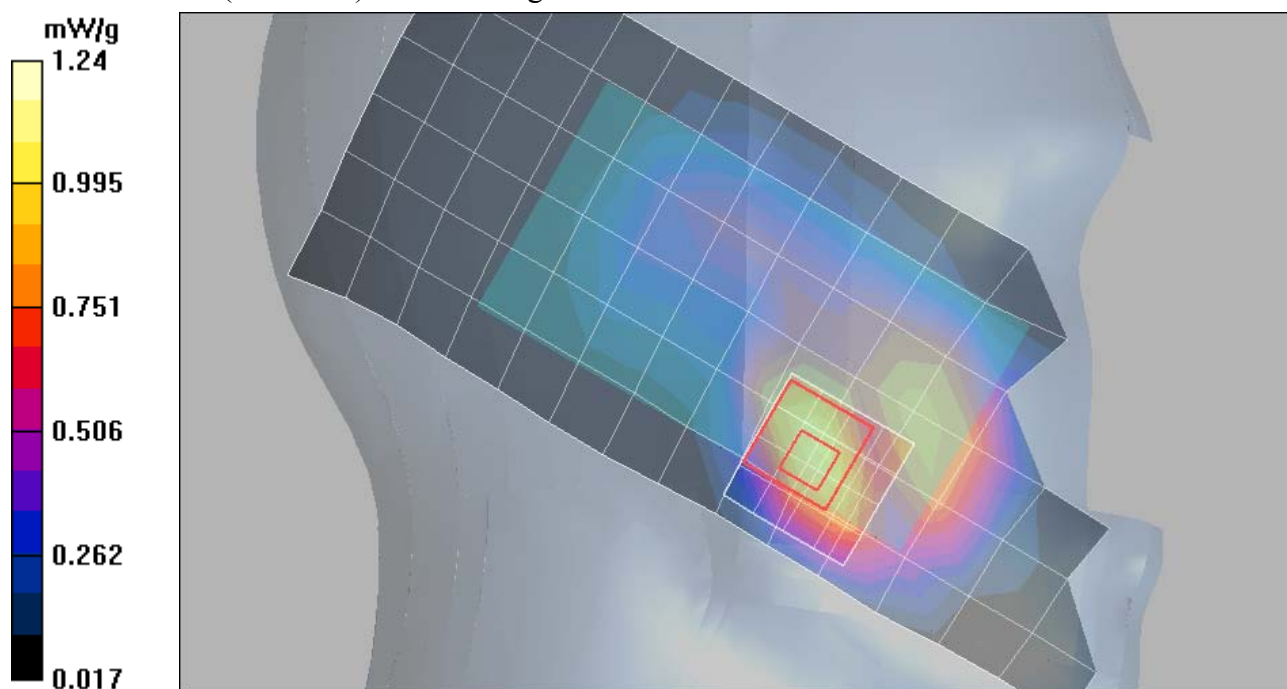
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 27.4 V/m; Power Drift = -0.079 dB

Peak SAR (extrapolated) = 1.88 W/kg

SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.606 mW/g

Maximum value of SAR (measured) = 1.24 mW/g



Test Laboratory: Motorola WCDMA1900 Tilted**FCC ID#: IHDP56JH1 Serial: 004401028823223;**

Procedure Notes: Pwr Step: All Up Bit(OTA) Antenna Position: Internal

Battery Model #: SNN5771B DEVICE POSITION (cheek or rotated): Rotated

Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz; Channel Number: 9400; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880; Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 39.1$; $\rho = 1000 \text{ kg/m}^3$ **DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(5.34, 5.34, 5.34); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1134;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.545 mW/g

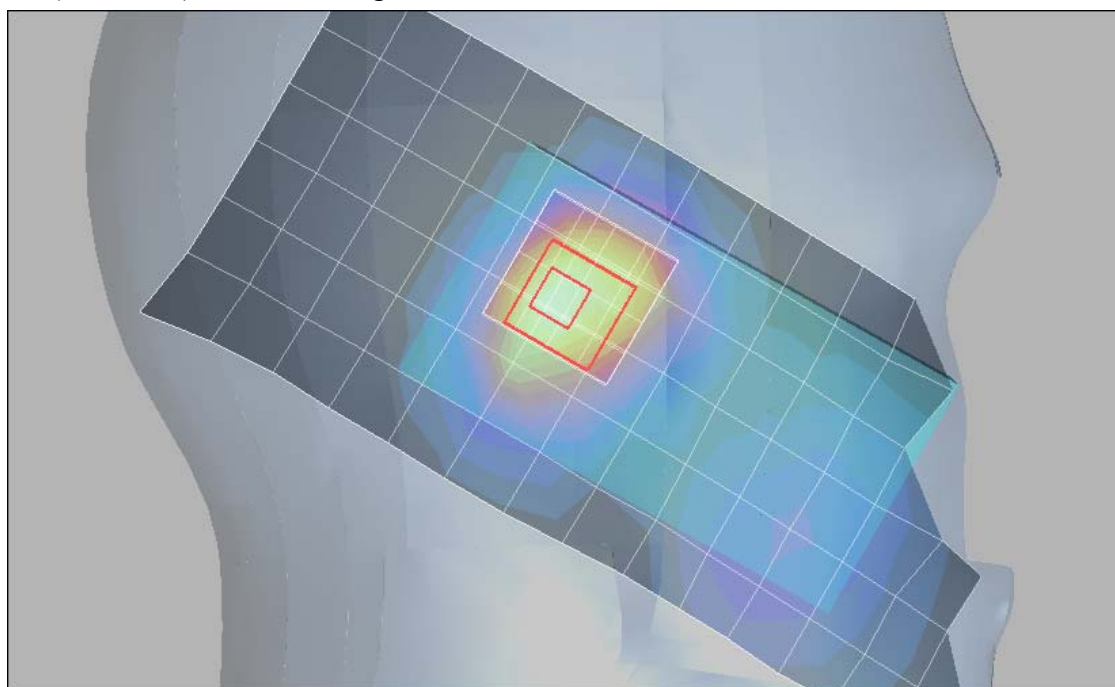
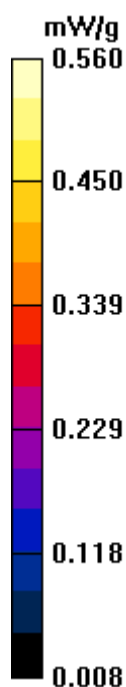
Left Head Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) (5x5x7)/Cube 0:Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 19.8 V/m; Power Drift = 0.084 dB

Peak SAR (extrapolated) = 0.787 W/kg

SAR(1 g) = 0.531 mW/g; SAR(10 g) = 0.330 mW/g

Maximum value of SAR (measured) = 0.560 mW/g



Date/Time: 09/23/2008 PM 05:37:53

Test Laboratory: Motorola**WiFi 2450 802.11b Cheek****FCC ID#: IHDP56JH1 Serial: 004401028823223;**

Procedure Notes: Pwr Step: 16dBm (Test mode) Antenna Position: Internal

Battery Model #: SNN5782C DEVICE POSITION (cheek or rotated): Cheek

Communication System: Wi-Fi 2450; Frequency: 2437 MHz; Channel Number: 6; Duty Cycle: 1:1

Medium: 2450 Glycol Head; Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.88 \text{ mho/m}$; $\epsilon_r = 37.5$; $\rho = 1000 \text{ kg/m}^3$ **DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(4.64, 4.64, 4.64); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1134;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.222 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

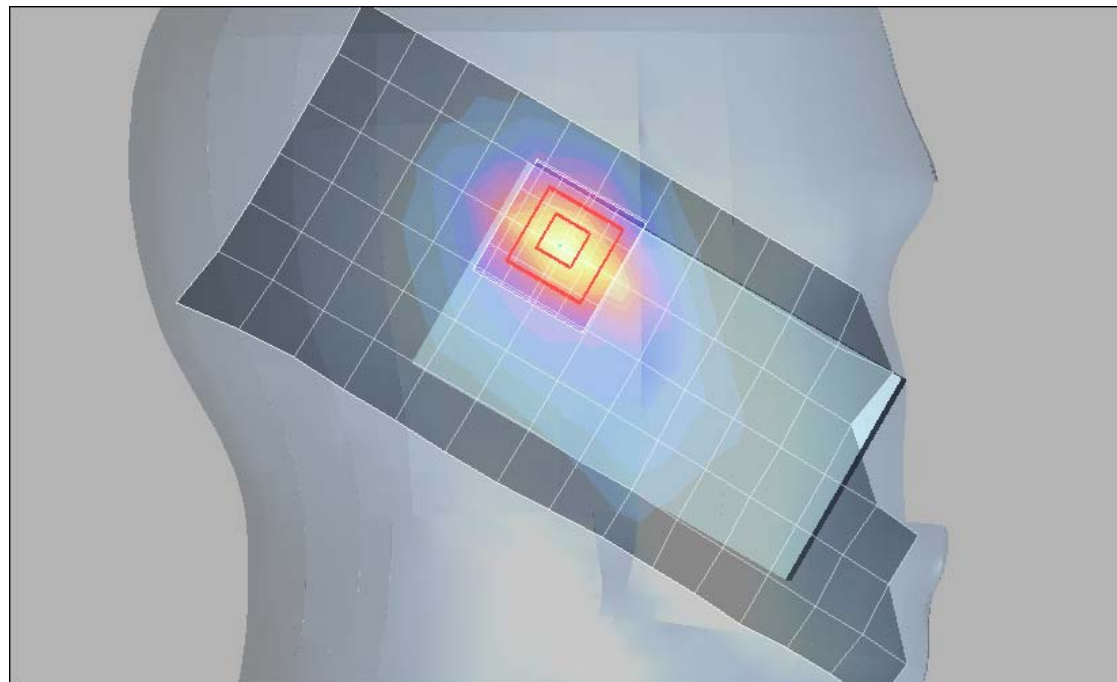
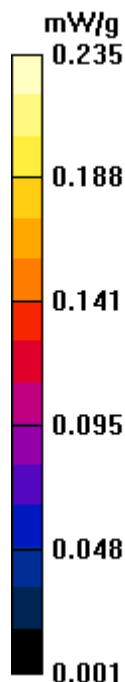
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.2 V/m; Power Drift = -0.074 dB

Peak SAR (extrapolated) = 0.459 W/kg

SAR(1 g) = 0.214 mW/g; SAR(10 g) = 0.106 mW/g

Maximum value of SAR (measured) = 0.235 mW/g



Date/Time: 09/23/2008 PM 08:51:28

Test Laboratory: Motorola**WiFi2450 802.11b Tilted****FCC ID#: IHDP56JH1 Serial: 004401028823223;**

Procedure Notes: Pwr Step: 16dBm(test mode) Antenna Position: Internal

Battery Model #: SNN5771B DEVICE POSITION (cheek or rotated): Rotated

Communication System: Wi-Fi 2450; Frequency: 2437 MHz; Channel Number: 6; Duty Cycle: 1:1

Medium: 2450 Glycol Head; Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.88 \text{ mho/m}$; $\epsilon_r = 37.5$; $\rho = 1000 \text{ kg/m}^3$ **DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(4.64, 4.64, 4.64); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: PCS-9_Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1134;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.197 mW/g

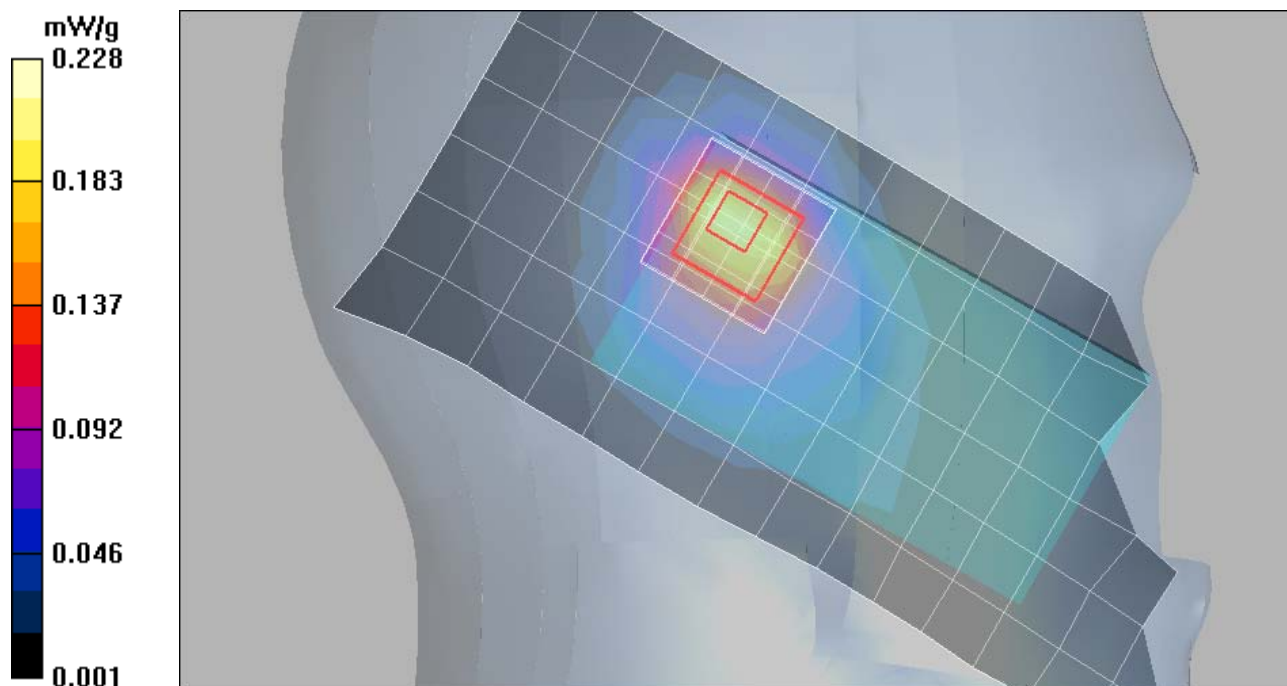
Left Head Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) (5x5x7)/Cube 0:Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.8 V/m; Power Drift = 0.239 dB

Peak SAR (extrapolated) = 0.526 W/kg

SAR(1 g) = 0.216 mW/g; SAR(10 g) = 0.106 mW/g

Maximum value of SAR (measured) = 0.228 mW/g



Appendix 3

SAR distribution plots for Body Worn Configuration

Test Laboratory: Motorola**GSM850 BodyWorn****FCC ID#: IHDP56JH1 Serial: 004401028823223;**

Procedure Notes: Pwr Step: 05(OTA) Antenna Position: Internal

Battery Model #: SNN5782C Device position: Back of phone 15mm from phantom

Communication System: GSM 850; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8

Medium: Low Freq Body; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 55.6$; $\rho = 1000 \text{ kg/m}^3$ **DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(6.08, 6.08, 6.08); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: R#9_Section 1, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Amy Twin Phone Template/Area Scan - Normal Body (15mm) (13x7x1):Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.548 mW/g

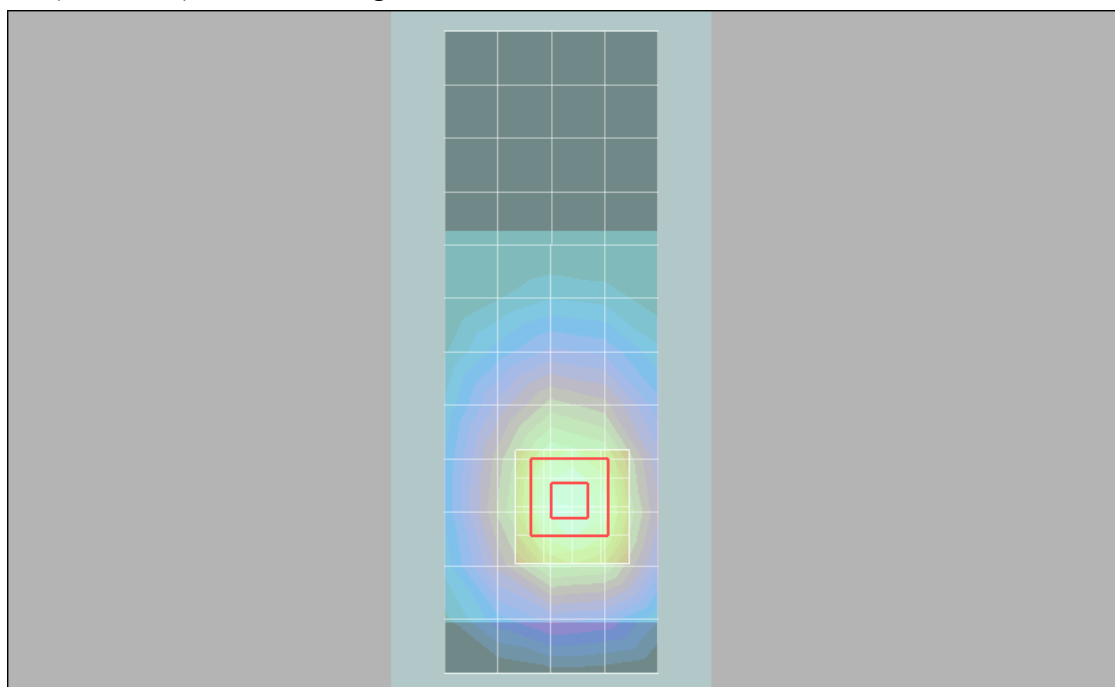
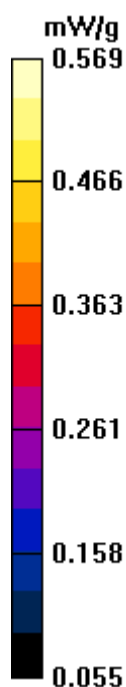
Amy Twin Phone Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) (5x5x7)/Cube 0:Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 23.1 V/m; Power Drift = -0.013 dB

Peak SAR (extrapolated) = 0.667 W/kg

SAR(1 g) = 0.535 mW/g; SAR(10 g) = 0.391 mW/g

Maximum value of SAR (measured) = 0.569 mW/g



Test Laboratory: Motorola**GSM1900 BodyWorn****FCC ID#: IHDP56JH1 Serial: 004401028823223;**

Procedure Notes: Pwr Step: 00(OTA) Antenna Position: Internal

Battery Model #: SNN5782C Device Position: Back of phone 15mm from phantom

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8

Medium: Regular Glycol Body 1750/1880; Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.59 \text{ mho/m}$; $\epsilon_r = 52.4$; $\rho = 1000 \text{ kg/m}^3$ **DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(4.85, 4.85, 4.85); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: R#9_Section 2, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Amy Twin Phone Template/Area Scan - Normal Body (15mm) (13x7x1):Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.520 mW/g

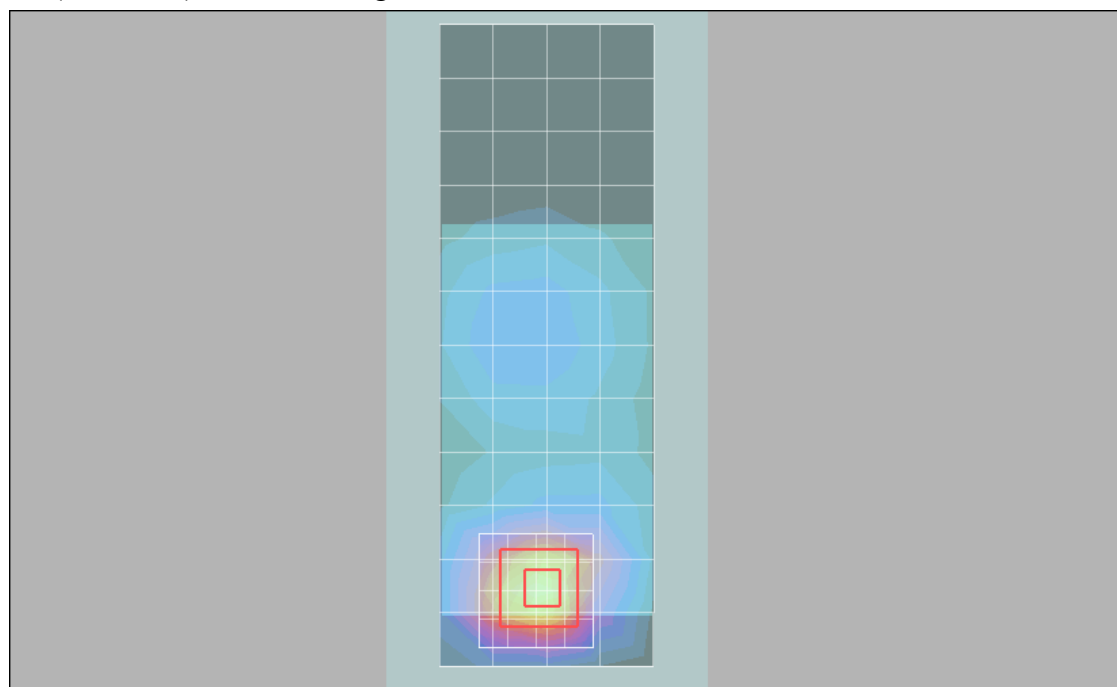
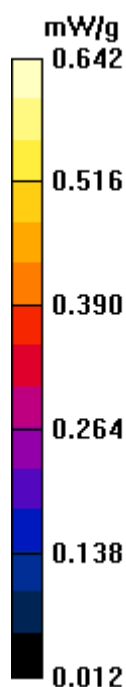
Amy Twin Phone Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) (5x5x7)/Cube 0:Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 15.9 V/m; Power Drift = 0.141 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.589 mW/g; SAR(10 g) = 0.324 mW/g

Maximum value of SAR (measured) = 0.642 mW/g



Test Laboratory: Motorola WCDMA850 BodyWorn**FCC ID#: IHDP56JH1 Serial: 004401028823223;**

Procedure Notes: Pwr Step: All Up Bit(OTA) Antenna Position: Internal

Battery Model #: SNN5782C Device Position : Back of phone 15mm from phantom

Communication System: 3G-WCDMA 850; Frequency: 836 MHz; Channel Number: 4180; Duty Cycle: 1:1

Medium: Low Freq Body; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 1 \text{ mho/m}$; $\epsilon_r = 55.5$; $\rho = 1000 \text{ kg/m}^3$ **DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(6.08, 6.08, 6.08); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: R#9_Section 1, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Amy Twin Phone Template/Area Scan - Normal Body (15mm) (13x7x1):Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.519 mW/g

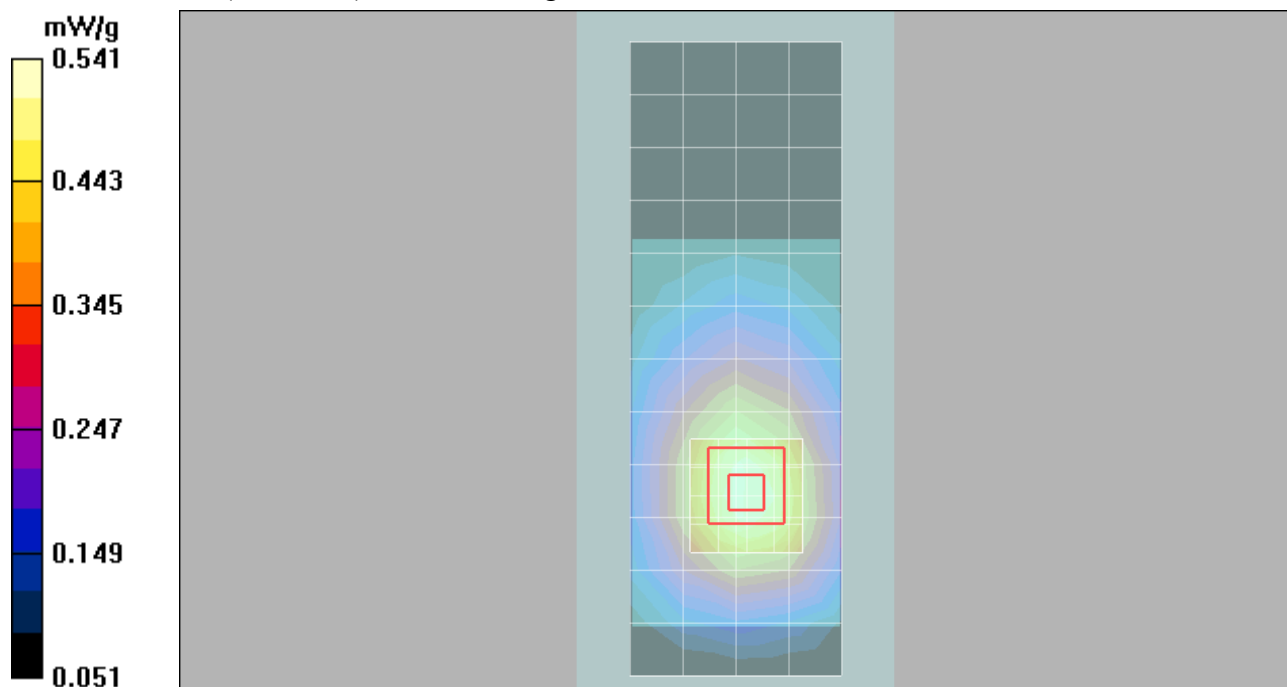
Amy Twin Phone Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) (5x5x7)/Cube 0:Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 23.2 V/m; Power Drift = 0.006 dB

Peak SAR (extrapolated) = 0.640 W/kg

SAR(1 g) = 0.510 mW/g; SAR(10 g) = 0.371 mW/g

Maximum value of SAR (measured) = 0.541 mW/g



Test Laboratory: Motorola**WCDMA1900 BodyWorn****FCC ID#: IHDP56JH1 Serial: 004401028823223;**

Procedure Notes: Pwr Step: All Up Bit(OTA) Antenna Position: Internal

Battery Model #: SNN5782C Device Position: Back of phone 15mm from Phantom

Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz; Channel Number: 9400; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.59$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³**DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(4.85, 4.85, 4.85); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: R#9_Section 2, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

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

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

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

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

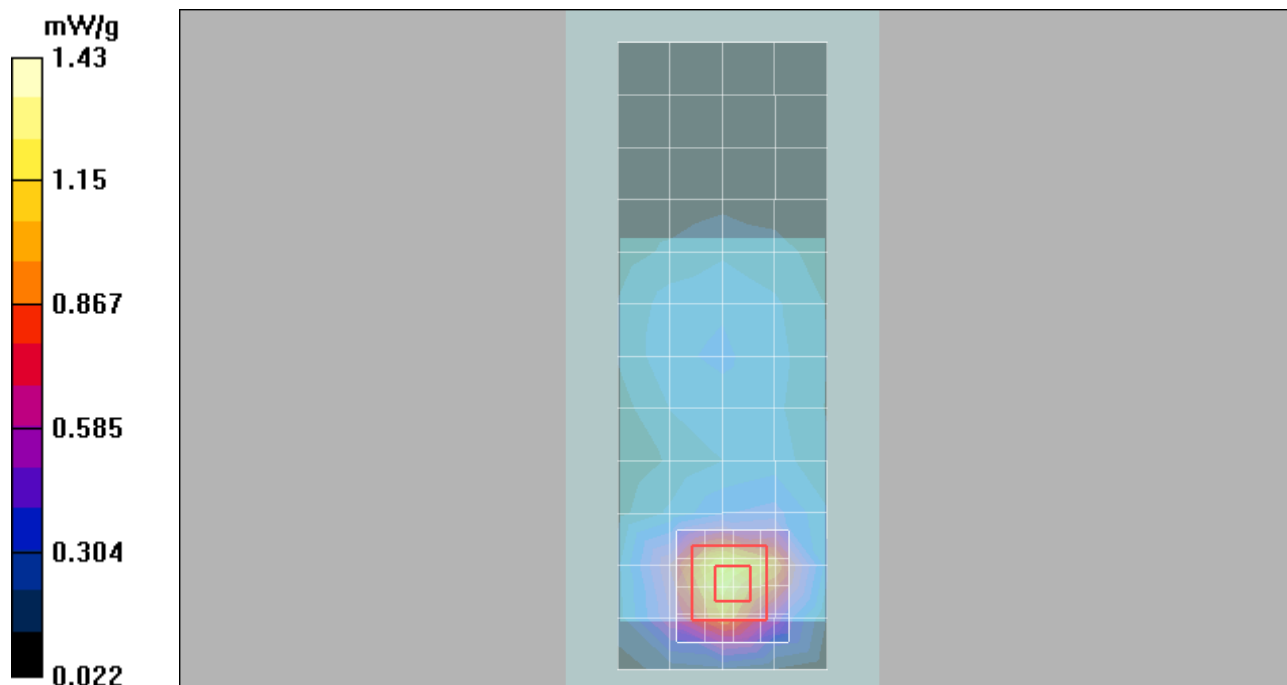
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.5 V/m; Power Drift = 0.190 dB

Peak SAR (extrapolated) = 2.38 W/kg

SAR(1 g) = 1.3 mW/g; SAR(10 g) = 0.706 mW/g

Maximum value of SAR (measured) = 1.43 mW/g



Test Laboratory: Motorola**WiFi2450 802.11b BodyWorn**

FCC ID#: IHDP56JH1 Serial: 004401028823223; Procedure Notes: Pwr Step: 16dBm(Test Mode) Antenna Position: Internal Battery Model #: SNN5782C Device Position: Back of phone 15mm from phantom Communication System: Wi-Fi 2450; Frequency: 2437 MHz; Channel Number: 6; Duty Cycle: 1:1 Medium: 2450 Glycol Body; Medium parameters used: $f = 2450$ MHz; $\sigma = 2.04$ mho/m; $\epsilon_r = 48.5$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1502; ConvF(4.16, 4.16, 4.16); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: R#9_Section 2, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

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

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

Maximum value of SAR (measured) = 0.028 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

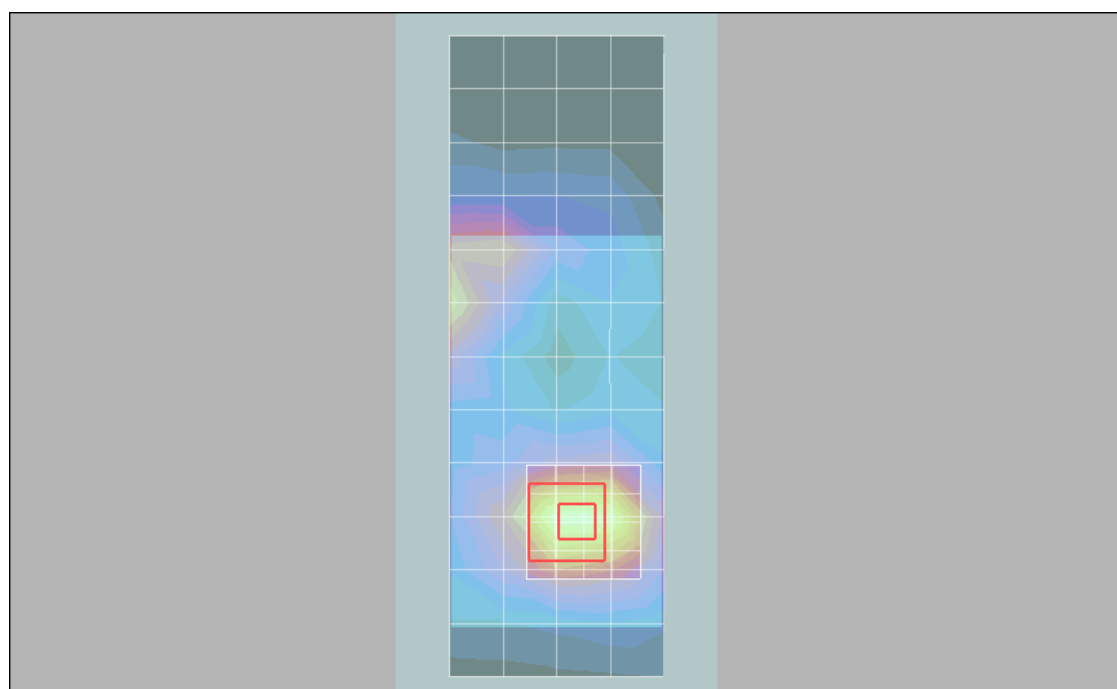
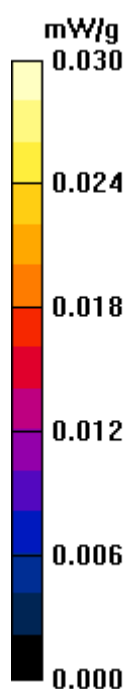
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.47 V/m; Power Drift = 0.129 dB

Peak SAR (extrapolated) = 0.052 W/kg

SAR(1 g) = 0.027 mW/g; SAR(10 g) = 0.014 mW/g

Maximum value of SAR (measured) = 0.030 mW/g



Test Laboratory: Motorola**Bluetooth 2450 BodyWorn****FCC ID#: IHDP56JH1 Serial#: 004401028823223;**

Procedure Notes: Pwr Step: Bluetooth(OTA) Antenna Position: Internal

Battery Model #: SNN5782C Device Position: Back of phone 15mm from phantom

Communication System: Bluetooth; Frequency: 2441 MHz; Channel Number: 39; Duty Cycle: 1:1

Medium: 2450 Glycol Body; Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 2.04 \text{ mho/m}$; $\epsilon_r = 48.5$; $\rho = 1000 \text{ kg/m}^3$ **DASY4 Configuration:**

- Probe: ET3DV6 - SN1502; ConvF(4.16, 4.16, 4.16); Calibrated: 05/19/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn656; Calibrated: 05/19/2008
- Phantom: R#9 _ Section 2, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Amy Twin Phone Template/Area Scan - Normal Body (15mm) (13x7x1):Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.001 mW/g

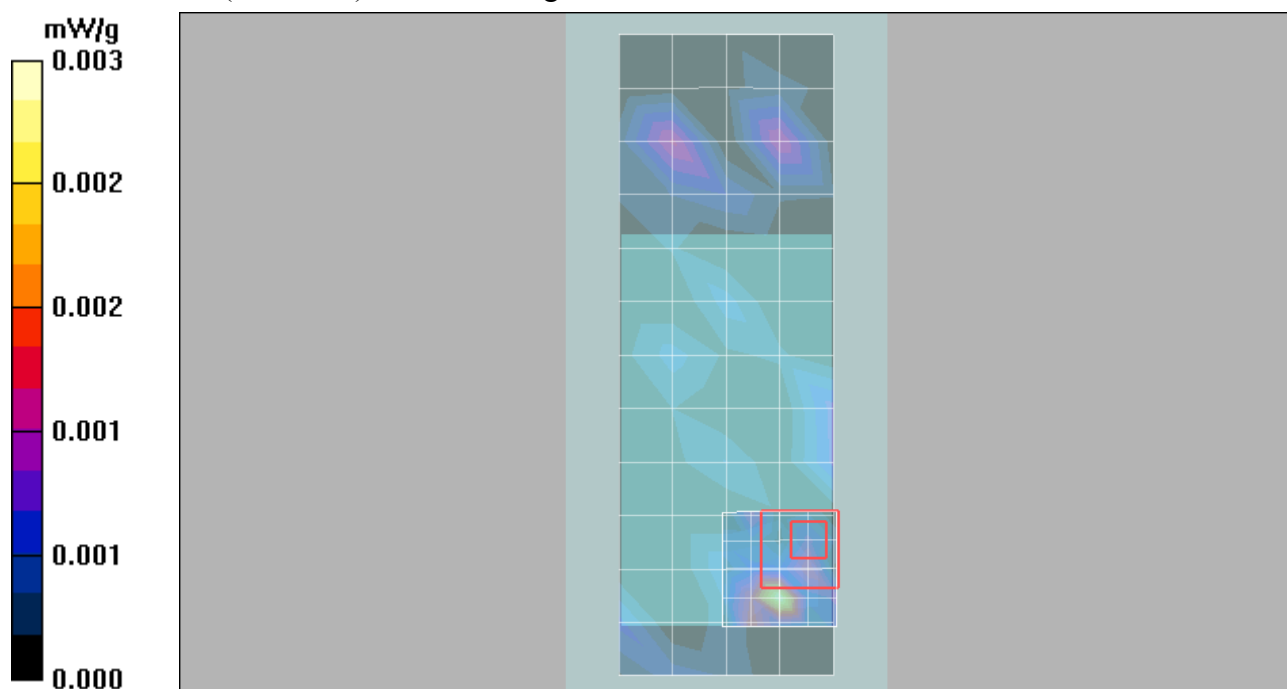
Amy Twin Phone Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) (5x5x7)/Cube 0:Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

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

Peak SAR (extrapolated) = 0.001 W/kg

SAR(1 g) = 3.7e-005 mW/g; SAR(10 g) = 4.24e-006 mW/g

Maximum value of SAR (measured) = 0.003 mW/g



Appendix 4

Probe Calibration Certificate



Accredited by the Swiss Accreditation Service (SAS)
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 Korea**

Certificate No.: **ET3-1502_May08**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1502**

Calibration procedure(s) **QA CAL-01.v6 and QA CAL-23.v3
Calibration procedure for dosimetric E-field probes**

Calibration date: **May 19, 2008**

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 $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	8-Aug-07 (No. 217-00719)	Aug-08
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	8-Aug-07 (No. 217-00720)	Aug-08
Reference Probe ES3DV2	SN: 3013	2-Jan-08 (No. ES3-3013_Jan08)	Jan-09
DAE4	SN: 660	3-Sep-07 (No. DAE4-660_Sep07)	Sep-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: May 20, 2008

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,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:

- 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E²-field uncertainty inside TSL (see below *ConvF*).
- NORM(f)_{x,y,z}** = NORM_{x,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*.
- DCP_{x,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 NORM_{x,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 ET3DV6

SN:1502

Manufactured:	October 24, 1999
Last calibrated:	July 11, 2007
Recalibrated:	May 19, 2008

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1502

Sensitivity in Free Space^A

Diode Compression^B

NormX	1.74 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	93 mV
NormY	1.86 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	92 mV
NormZ	1.82 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	90 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	10.6	6.5
SAR _{be} [%]	With Correction Algorithm	0.4	0.1

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

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	11.3	7.0
SAR _{be} [%]	With Correction Algorithm	0.5	0.3

Sensor Offset

Probe Tip to Sensor Center **2.7 mm**

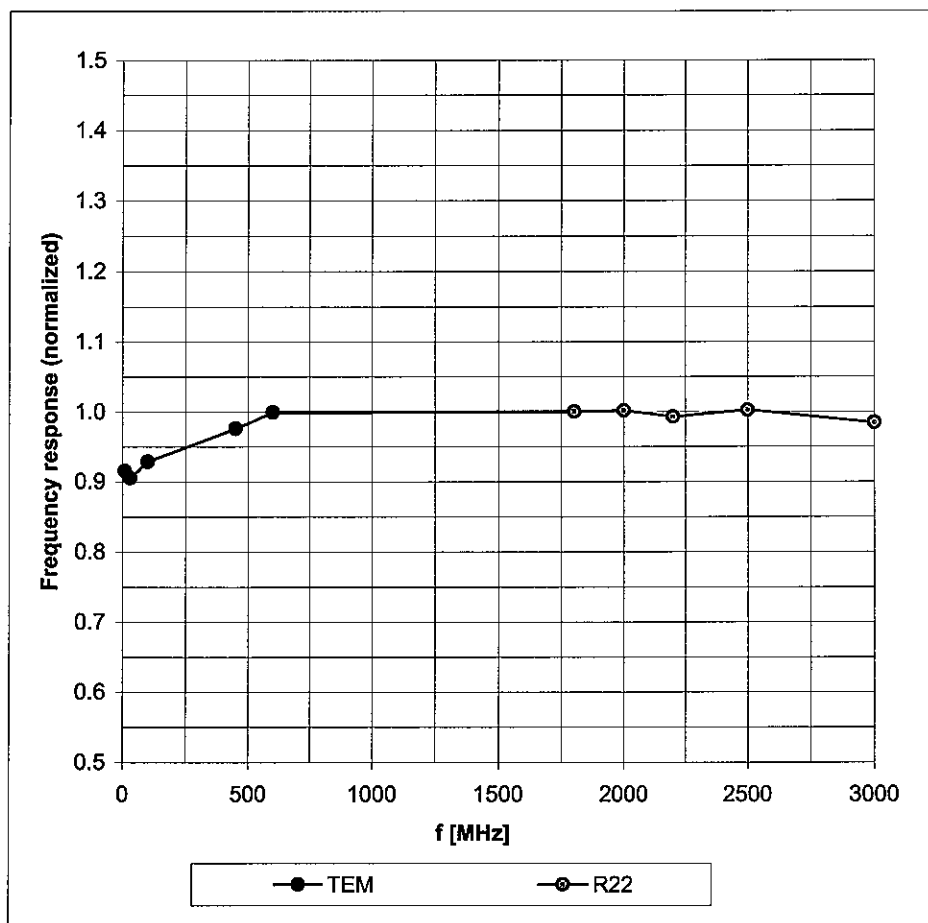
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

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

^B Numerical linearization parameter: uncertainty not required.

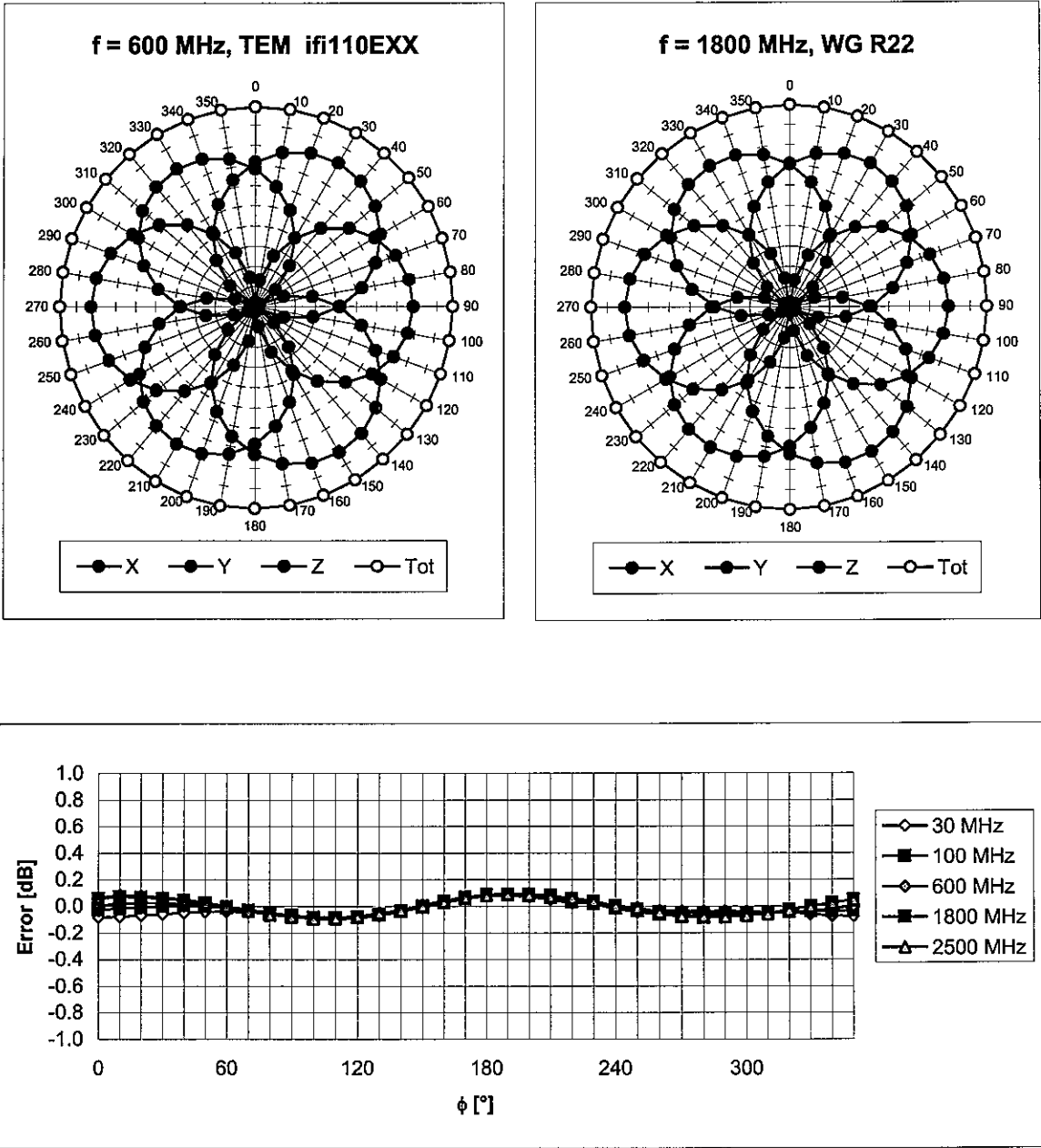
Frequency Response of E-Field

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



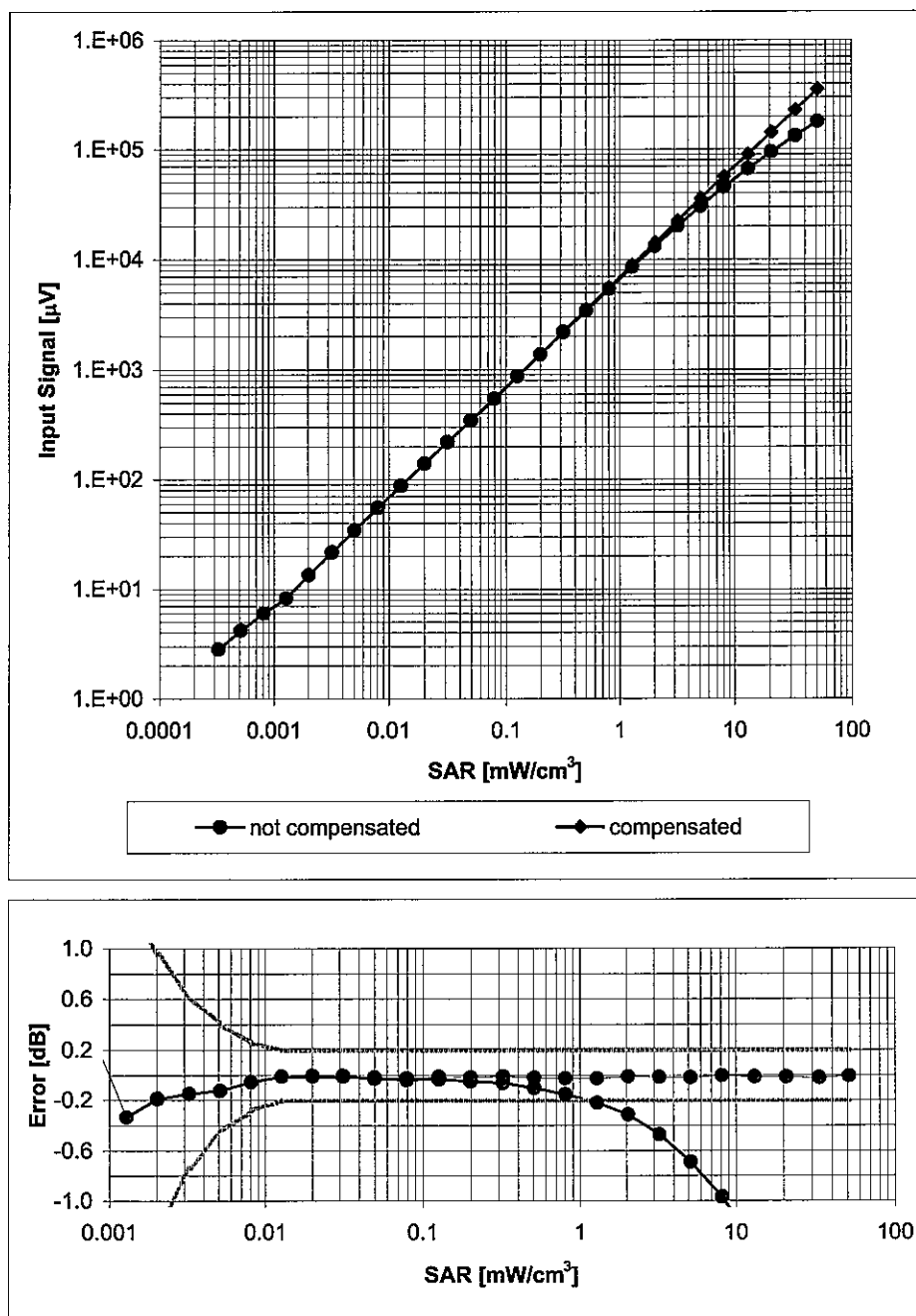
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$



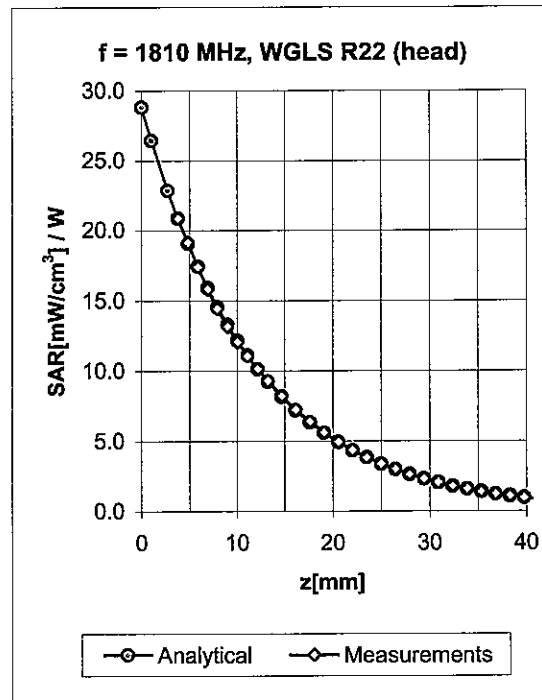
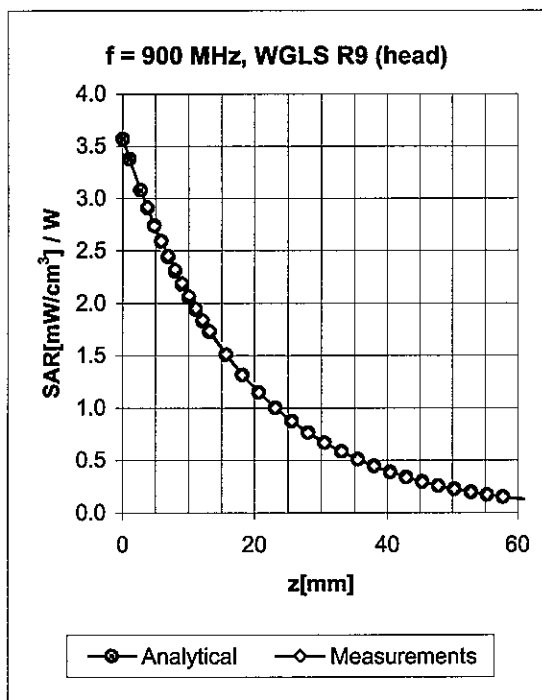
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range $f(\text{SAR}_{\text{head}})$ (Waveguide R22, $f = 1800 \text{ MHz}$)



Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

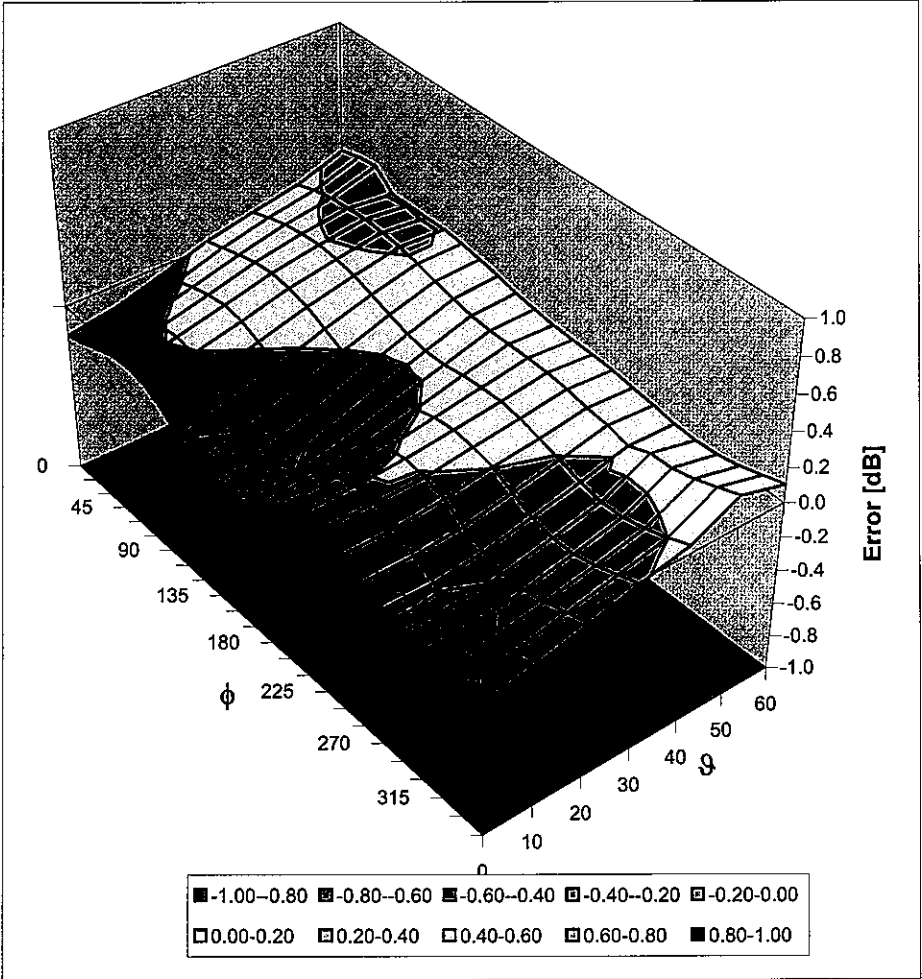
Conversion Factor Assessment



f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.35	2.80	6.20 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.45	2.55	5.34 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.50	2.55	5.08 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.48	2.30	4.64 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.32	2.99	6.08 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.50	2.50	4.85 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.50	2.50	4.77 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.45	2.40	4.16 ± 11.0% (k=2)

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

Deviation from Isotropy in HSL
Error (ϕ , ϑ), $f = 900 \text{ MHz}$



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ ($k=2$)

Appendix 5

Measurement Uncertainty Budget

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e = f(d,k)</i>	<i>f</i>	<i>g</i>	<i>h = c x f / e</i>	<i>i = c x g / e</i>	<i>k</i>
Uncertainty Component	IEEE 1528 section	Tol. (± %)	Prob Dist	Div.	<i>c_i</i> (1 g)	<i>c_i</i> (10 g)	1 g <i>u_i</i> (±%)	10 g <i>u_i</i> (±%)	<i>v_i</i>
Measurement System									
Probe Calibration	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 6

Dipole Characterization Certificate

Certification of System Performance Check Targets

Based on WI-0396

-Historical Data-

	900MHz	
Reference Target:	10.9	(W/kg)
Measurement Uncertainty (k=1):	9.0%	
Measurement Period:	18-April-07 to 14-April-08	
# of tests performed:	1,125	
Grand Average:	11.29	(W/kg)
% Delta (Average - Reference Target)	3.6%	
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, 1d034, 1d035	

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

Frequency	SAR Target (W/kg)	Permittivity	Conductivity (S/m)
900MHz	11.29	41.5 ± 5%	0.97 ± 5%

-Approvals-

Submitted by:

Marge Kaunas

 Date:

16-Apr-08

Signed:

Marge Kaunas

Comments:

Spreadsheet detailing referenced historical measurements is available upon request.

Approved by:

Mark Douglas

 Date:

22-Apr-08

Signed:

Mark Douglas

Comments:

Certification of System Performance Check Targets

Based on WI-0396

-Historical Data-

	1800MHz	
Reference Target:	38.4	(W/kg)
Measurement Uncertainty (k=1):	9.0%	
Measurement Period:	18-April-07 to 14-April-08	
# of tests performed:	1,028	
Grand Average:	37.7	(W/kg)
% Delta (Average - Reference Target)	-1.7%	
Is % Delta <= Expanded Measurement Uncertainty (k=2)?	Yes	
Accept/Reject <u>Average</u> as new system performance check target?	ACCEPT	
	<u>Applies to Dipole SN's:</u> 246tr, 250tr, 251tr, 259tr, 263tr, 271tr, 272tr, 276tr, 277tr, 279tr, 280tr, 281tr, 283tr, 284tr, 2d128, 2d129	

-New System Performance Check Targets- per WI-0396

(based on analysis of historical data)

Frequency	SAR Target (W/kg)	Permittivity	Conductivity (S/m)
1800MHz	37.7	40.0 ± 5%	1.40 ± 5%

-Approvals-

Submitted by: Marge Kaunas Date: 16-Apr-08

Signed: Marge Kaunas

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

Approved by: Mark Douglas Date: 22-Apr-08

Signed: Mark Douglas

Comments:

Certification of System Performance Check Targets

Based on WI-0396

-Historical Data-

	2450MHz	
Reference Target:	52.4	(W/kg)
Measurement Uncertainty (k=1):	9.0%	
Measurement Period:	18-April-07 to 14-April-08	
# of tests performed:	77	
Grand Average:	56.5	(W/kg)
% Delta (Average - IEEE1528 Target)	7.8%	
Is % Delta <= Expanded Measurement Uncertainty (k=2)?	Yes	
Accept/Reject <u>Average</u> as new system performance check target?	ACCEPT	
	Applies to Dipole SN's: 740, 766, 767, 788, 789	

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

Frequency	SAR Target (W/kg)	Permittivity	Conductivity (S/m)
2450MHz	56.5	39.2 ± 5%	1.80 ± 5%

-Approvals-

Submitted by:

Marge Kaunas

Date:

16-Apr-08

Signed:

Marge Kaunas

Comments:

Spreadsheet detailing referenced historical measurements is available upon request.

Approved by:

Mark Douglas

Date:

22-Apr-08

Signed:

Mark Douglas

Comments:

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