



MOTOROLA

Portable Cellular Phone SAR Test Report

Tests Requested By: Motorola Mobile Devices
600 N. US Highway 45
Libertyville, IL 60048

Test Report #: 23341-1F
Date of Report: Sep-16-2009
Date of Test: Sep-11-2009 to Sep-14-2009
FCC ID #: IHDP56KC1
Generic Name: N/A

Test Laboratory: Motorola Mobile Devices Business Product Safety & Compliance Laboratory
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This laboratory is accredited to ISO/IEC 17025-2005 to perform the following tests:

Accreditation:



TESTING CERT #2518-02

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
ARIB Std. T-56 (2002)

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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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 0.82 W/kg for head-adjacent use and 0.85 W/kg for body-worn use. For ANSI / IEEE C95.1 (1 g), the final SAR reading for this phone is 1.42 W/kg for head-adjacent use and 1.16 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 Rear of Phone	
Dimensions	Length	56 mm
	Width	15 mm
	Height	4 mm
Configuration	FICA	

2.2 Device description

Serial number	A0000015B0CC70, LSVV320088					
Mode(s) of Operation	CDMA 800	CDMA 1900	EV-DO 800 Rev. A	EV-DO 100 Rev. A	Wi-Fi 802.11b/g	Bluetooth
Modulation Mode(s)	QPSK	QPSK	QPSK	QPSK	BPSK	GMSK
Maximum Output Power Setting	25.00 dBm	25.00 dBm	25.00 dBm	25.00 dBm	18.00 dBm	10.00 dBm
Duty Cycle	1:1	1:1	1:1	1:1	1:1	1:1
Transmitting Frequency Range(s)	824.70 – 848.31 MHz	1851.25 – 1908.75 MHz	824.70 – 848.31 MHz	1851.25 – 1908.75 MHz	2412.0 - 2462.5 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 $\pm 10.8\%$ (K=1) with an expanded uncertainty of $\pm 21.6\%$ (K=2). The overall 1 g RSS uncertainty of the measurement system is $\pm 11.1\%$ (K=1) with an expanded uncertainty of $\pm 22.2\%$ (K=2). The measurement uncertainty budget is given in Appendix 5. Per IEEE 1528, this uncertainty budget is applicable to the SAR range of 0.4 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	387	Apr-01-2010
E-Field Probe ET3DV6	1524	Feb-12-2010
S.A.M. Phantom used for 800/900 MHz	TP-1005	
S.A.M. Phantom used for 1800/1900/2450 MHz	TP-1139	
Dipole Validation Kit, DV900V2	78	Apr-01-2010
Dipole Validation Kit, DV1800V2	259TR	Apr-01-2010
Dipole Validation Kit, DV2450V2	740	Apr-01-2010

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3847A04822	Apr-22-2010
Power Meter E4419B	GB39510961	Jan-24-2010
Power Sensor #1 - E9301A	US39210917	Jun-04-2010
Power Sensor #2 - E9301A	US39210918	Jun-04-2010
Network Analyzer HP8753ES	US39172529	Jun-11-2010
Dielectric Probe Kit HP85070C	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 $\rho = 1 \text{ g/cm}^3$ 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, Sep-11-2009	41.6	0.91	19.2
		Recommended Limits	41.5 \pm 5%	0.90 \pm 5%	18-25
	Body	Measured, Sep-11-2009	53.7	0.98	19.2
		Recommended Limits	55.2 \pm 5%	0.97 \pm 5%	18-25
1880	Head	Measured, Sep-11-2009	38.1	1.45	19.3
		Recommended Limits	40.0 \pm 5%	1.40 \pm 5%	18-25
	Body	Measured, Sep-11-2009	51.4	1.59	19.3
		Recommended Limits	53.3 \pm 5%	1.52 \pm 5%	18-25
2450	Head	Measured, Sep-14-2009	36.8	1.75	18.8
		Recommended Limits	39.2 \pm 10%	1.80 \pm 5%	18-25
	Body	Measured, Sep-14-2009	49.4	2.03	18.6
		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	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 $\pm 10\%$ 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 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 \pm 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, Sep-11-2009	11.65	40.8	0.97	20.0	19.2
	Recommended Limits	11.19	41.5 \pm 5%	0.97 \pm 5%	18-25	18-25
1800	Measured, Sep-11-2009	39.05	38.5	1.37	19.6	19.1
	Recommended Limits	37.91	40.0 \pm 5%	1.4 \pm 5%	18-25	18-25
2450	Measured, Sep-14-2009	53.75	36.8	1.75	19.8	18.8
	Recommended Limits	56.68	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	1524	900	5.23	8 of 9
		1810	4.43	8 of 9
		2450	3.89	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 mm or less 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 SNN5843A - 1390 mAH Battery

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 “SAR Measurement Procedures for 3G Devices” released in October, 2007, RC1, RC3 and RC3 (FCH + SCH) CDMA modes, EV-DO Rev O, EV-DO Rev A were considered. The conducted power measurements (per steps 3, 4 & 10 of section 4.4.5.2 of 3GPP2 C.5.011 / TIA -98-E) for each mode are shown in the table below.

Conducted power (dBm) for CDMA modes						
	Channel	RC1		RC3		RC3 (FCH + SCH)
		SO2	SO55	SO2	SO55	
CDMA 800	1013	24.83	24.92	24.88	24.88	Per Motorola designs, the maximum power, when in a mode that allows supplemental channels, will always be less than the RC3/RC1 maximum conducted power limit.
	384	25.00	24.91	24.94	24.99	
	777	24.90	24.84	24.88	24.93	
CDMA 1900	25	24.83	24.98	24.97	24.84	
	600	25.00	25.06	24.98	24.99	
	1175	24.95	24.96	24.92	24.84	

Conducted power (dBm) for EV-DO modes					
	Channel	Rev 0		Rev A	
		FTAP 307.2k	RTAP 153.6k	Subtype 2 FETAP	Subtype 2 RETAP
CDMA 800	1013	24.90	24.95	25.04	25.14
	384	25.03	25.10	24.98	25.12
	777	24.91	24.96	24.95	25.04
CDMA 1900	25	24.89	24.96	25.09	25.20
	600	24.89	25.04	25.15	25.12
	1175	24.80	24.95	24.98	25.09

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 for the CDMA RC3/SO55 mode, 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 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 guidelines provided in “SAR for Handsets with Multiple Transmitters” (KDB publication 648474 - D01 v01r03) were utilized for evaluation of the need for simultaneous transmission SAR testing. These guidelines direct that if the SAR-to-peak location separation ratio for the CDMA antenna and the Wi-Fi antenna is < 0.3 then SAR evaluation for simultaneous transmission is not required. For CDMA 800, the SAR-to-peak location separation ratio is 0.08. For CDMA 1900, the SAR-to-peak location separation ratio is 0.21. Thus, no testing was performed to determine the aggregate 1 g SAR. SAR plots with the Wi-Fi SAR overlaid upon the CDMA SAR are provided in Appendix 2 to provide visual indication of the separation of the SAR hotspots for each modulation.

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 head-adjacent measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ET3DV6	1524	900	5.23	8 of 9
		1810	4.43	8 of 9
		2450	3.89	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)
CDMA 800	Channel 1013	24.88						
	Channel 384	24.99	19.1	0.056	0.272	0.27	0.378	0.38
	Channel 777	24.93						
CDMA 1900	Channel 25	24.84	18.6	-0.127	0.712	0.73	1.23	1.27
	Channel 600	24.99	18.3	0.473	0.822	0.82	1.42	1.42
	Channel 1175	24.84	18.3	-0.032	0.570	0.57	0.982	0.99
Wi-Fi 2450	Channel 1	17.95						
	Channel 6	17.87	19.0	0.050	0.0664	0.07	0.125	0.13
	Channel 1	17.33						

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)
CDMA 800	Channel 1013	24.88						
	Channel 384	24.99	19.1	-0.054	0.278	0.28	0.366	0.37
	Channel 777	24.93						
CDMA 1900	Channel 25	24.84						
	Channel 600	24.99	18.2	-0.231	0.468	0.49	0.737	0.78
	Channel 1175	24.84						
Wi-Fi 2450	Channel 1	17.95						
	Channel 6	17.87	19.0	0.041	0.098	0.10	0.206	0.21
	Channel 1	17.33						

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)
CDMA 800	Channel 1013	24.88						
	Channel 384	24.99	19.1	-0.039	0.150	0.15	0.230	0.23
	Channel 777	24.93						
CDMA 1900	Channel 25	24.84						
	Channel 600	24.99	18.6	0.071	0.396	0.40	0.612	0.61
	Channel 1175	24.84						
Wi-Fi 2450	Channel 1	17.95						
	Channel 6	17.87	19.0	0.004	0.0638	0.06	0.126	0.13
	Channel 1	17.33						

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)
CDMA 800	Channel 1013	24.88						
	Channel 384	24.99	19.1	0.040	0.232	0.23	0.305	0.31
	Channel 777	24.93						
CDMA 1900	Channel 25	24.84						
	Channel 600	24.99	18.5	0.004	0.467	0.47	0.782	0.78
	Channel 1175	24.84						
Wi-Fi 2450	Channel 1	17.95						
	Channel 6	17.87	19.0	0.000	0.095	0.10	0.203	0.20
	Channel 1	17.33						

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.

The below SAR results were corrected for the tissue permittivity that was measured above the nominal target. Corrections were performed using the data provided in FCC KDB 450824. No correction was made for conductivity, since the measured tissue value already represents a conservative result in the measured SAR.

Highest Head SAR Configurations, Corrected SAR for Tissue Dielectric Parameters					
f (MHz)	Description	10 g SAR value		1 g SAR value	
		Extrapolated Measurement (W/kg)	Corrected Measurement (W/kg)	Extrapolated Measurement (W/kg)	Corrected Measurement (W/kg)
CDMA 800	Left Head Cheek Position Channel 384	0.27	0.27	0.38	0.38

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

6.2 Body Worn Test Results

The SAR results shown in tables 6 through 8 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 for the CDMA RC3/SO55 mode, 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 800 MHz 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. The tables below also include the highest SAR value summations for primary and secondary co-located transmitters, with the results indicated in italics.

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 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 thus the device was tested per the supplement C testing guidelines for devices that do not have body-worn accessories. A separation distance of 15 mm between the device and the flat phantom was used for testing body-worn SAR. The device was tested with the front and back of the device facing the phantom.

The cellular phone was also tested in data mode operations with the front and back of the phone facing the phantom. For these tests, a separation distance of 25 mm between the device and the flat phantom was used. The device was tested in the worst-case SAR position and channel configuration from the voice-mode body-worn testing.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ET3DV6	1524	900	5.14	8 of 9
		1810	4.03	8 of 9
		2450	3.40	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)
CDMA 800	Channel 1013	24.88						
	Channel 384	24.99	19.1	0.063	0.297	0.30	0.389	0.39
	Channel 777	24.93						
CDMA 1900	Channel 25	24.84						
	Channel 600	24.99	18.4	-0.011	0.329	0.33	0.519	0.52
	Channel 1175	24.84						
Wi-Fi 2450	Channel 1	17.95						
	Channel 6	17.87	19.0	-0.073	0.038	0.04	0.065	0.07
	Channel 1	17.33						
Wi-Fi + CDMA 800						0.34		0.46
Wi-Fi + CDMA 1900						0.37		0.59

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)
CDMA 800	Channel 1013	24.88	19.1	-0.009	0.719	0.72	0.959	0.96
	Channel 384	24.99	20.0	-0.172	0.668	0.69	0.899	0.94
	Channel 777	24.93	19.1	-0.007	0.779	0.78	1.04	1.04
CDMA 1900	Channel 25	24.84	19.0	0.024	0.632	0.63	0.953	0.95
	Channel 600	24.99	18.9	-0.144	0.609	0.63	0.930	0.96
	Channel 1175	24.84	18.5	-0.140	0.540	0.56	0.821	0.85
Wi-Fi 2450	Channel 1	17.95						
	Channel 6	17.87	19.0	-0.003	0.068	0.07	0.123	0.12
	Channel 1	17.33						
Bluetooth 2450	Channel 0	8.486						
	Channel 39	8.870	19.0	0.961	0.00134	0.00	0.00176	0.00
	Channel 78	7.101						
Wi-Fi + CDMA 800						0.85		1.16
Wi-Fi + CDMA 1900						0.70		1.08
Bluetooth + CDMA 800						0.78		1.04
Bluetooth + CDMA 1900						0.63		0.96

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

EV-DO (Rev. A) RETAP Mode								
Body-Worn; Back of Phone 25 mm from Phantom								
<i>f</i> (MHz)	Description	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	<i>10 g SAR value</i>		<i>1 g SAR value</i>	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
CDMA 800	Channel 1013	25.14						
	Channel 384	25.12	20.4	-0.112	0.254	0.26	0.349	0.36
	Channel 777	25.04						
CDMA 1900	Channel 25	25.20						
	Channel 600	25.12	19.0	-0.227	0.249	0.26	0.377	0.40
	Channel 1175	25.09						

Table 8: 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, 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 (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

Test Laboratory: Motorola - 091109 900 MHz

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN: 78; FCC ID: IHDP56KC1

Procedure Notes: 900 MHz System Performance Check; Dipole Sn# 78; Input Power = 200 mW

Sim.Temp@meas = 19.2°C; Sim.Temp@SPC = 19.2°C; Room Temp @ SPC = 20.0

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

Medium: VALIDATION Only

Medium parameters used: $f = 900$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 40.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1524; ConvF(5.23, 5.23, 5.23); Calibrated: 2/12/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 4/1/2009
- Phantom: R1_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1005;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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 = 53.3 V/m; Power Drift = -0.043 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:

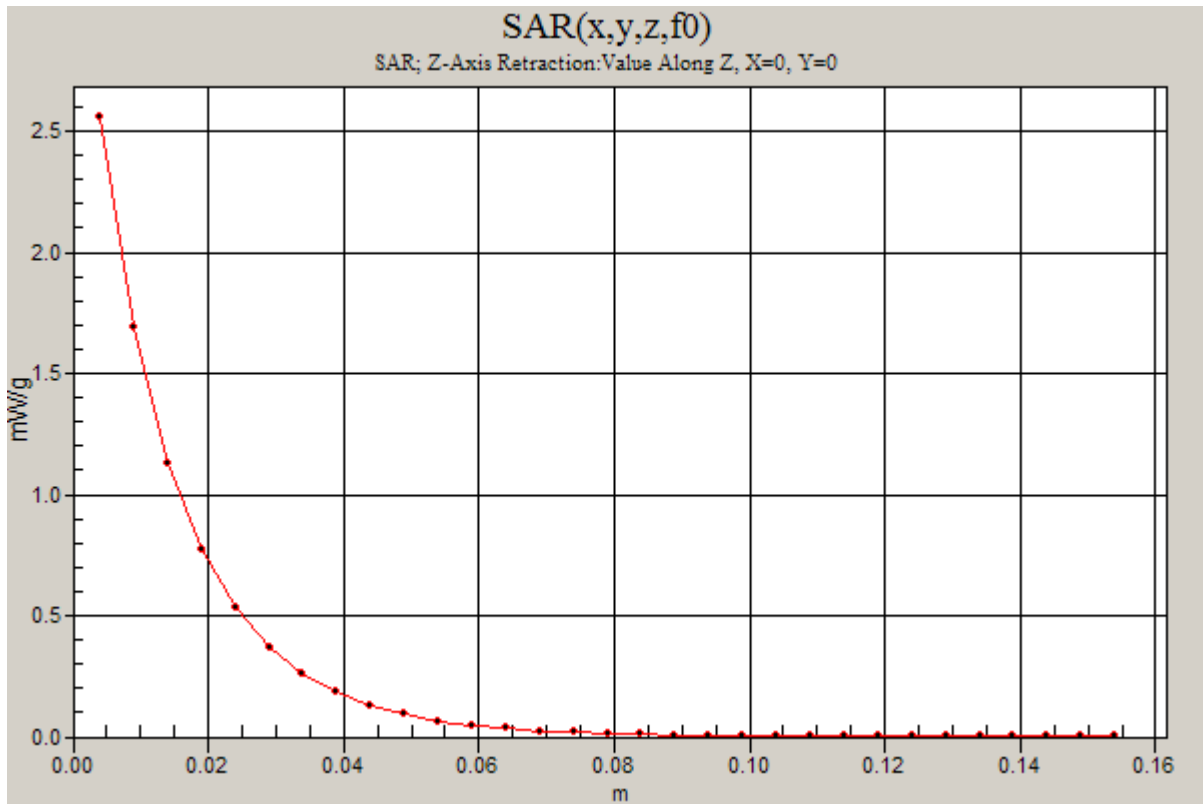
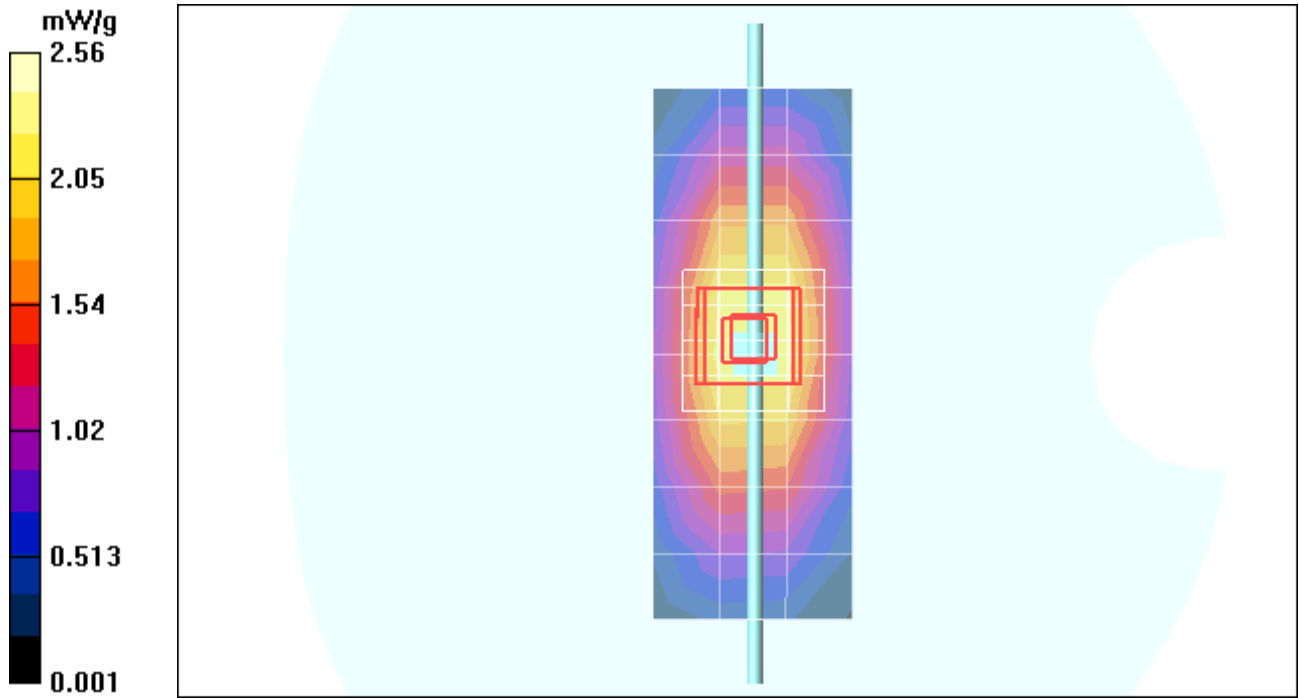
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 53.3 V/m; Power Drift = -0.043 dB; Peak SAR (extrapolated) = 3.45 W/kg

SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.48 mW/g; Maximum value of SAR (measured) = 2.48 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.56 mW/g



Test Laboratory: Motorola - 091109 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 259TR; FCC ID: IHDP56KC1

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 259tr; Input Power = 200 mW

Sim.Temp@meas = 19.3 °C; Sim.Temp@SPC = 19.1 °C; Room Temp @ SPC = 19.6 °C

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

Medium: VALIDATION Only

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.37$ mho/m; $\epsilon_r = 38.5$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1524; ConvF(4.43, 4.43, 4.43); Calibrated: 2/12/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 4/1/2009
- Phantom: R1_ Section 2, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.95 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

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

Reference Value = 82.6 V/m; Power Drift = -0.028 dB; Peak SAR (extrapolated) = 13.4 W/kg

SAR(1 g) = 7.89 mW/g; SAR(10 g) = 4.22 mW/g; Maximum value of SAR (measured) = 8.80 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

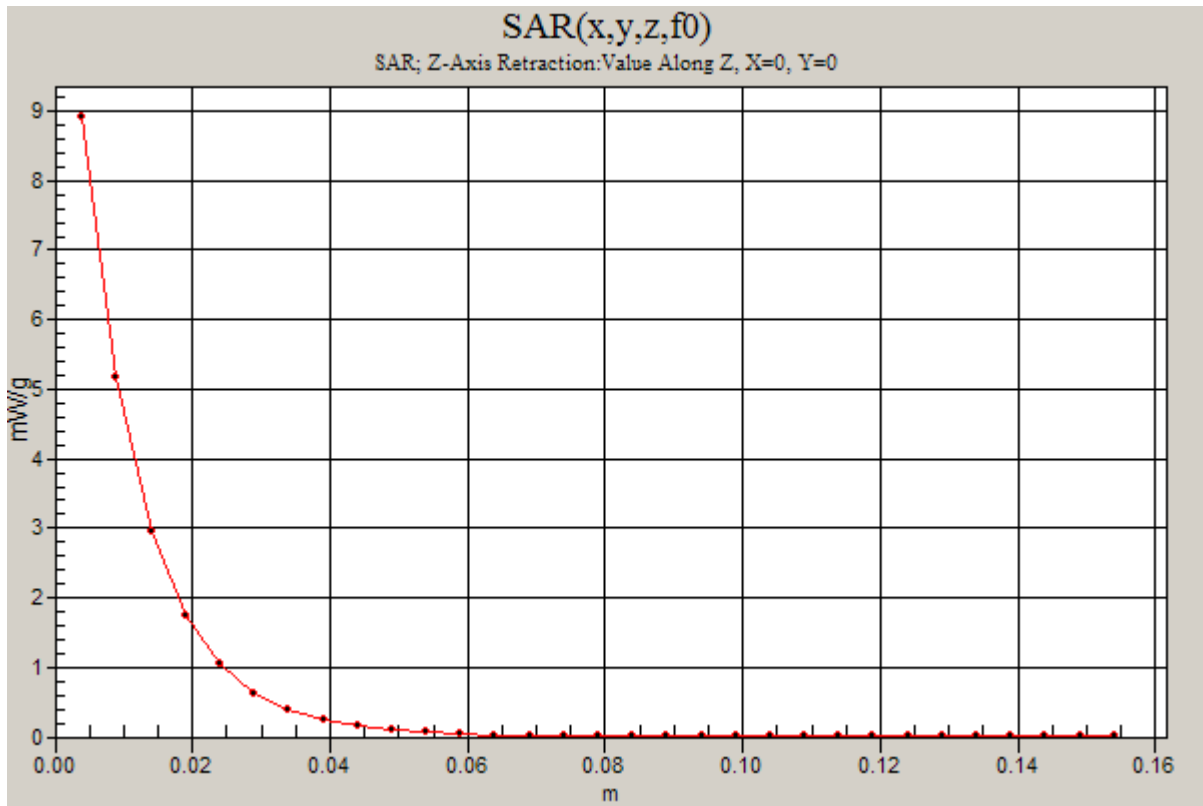
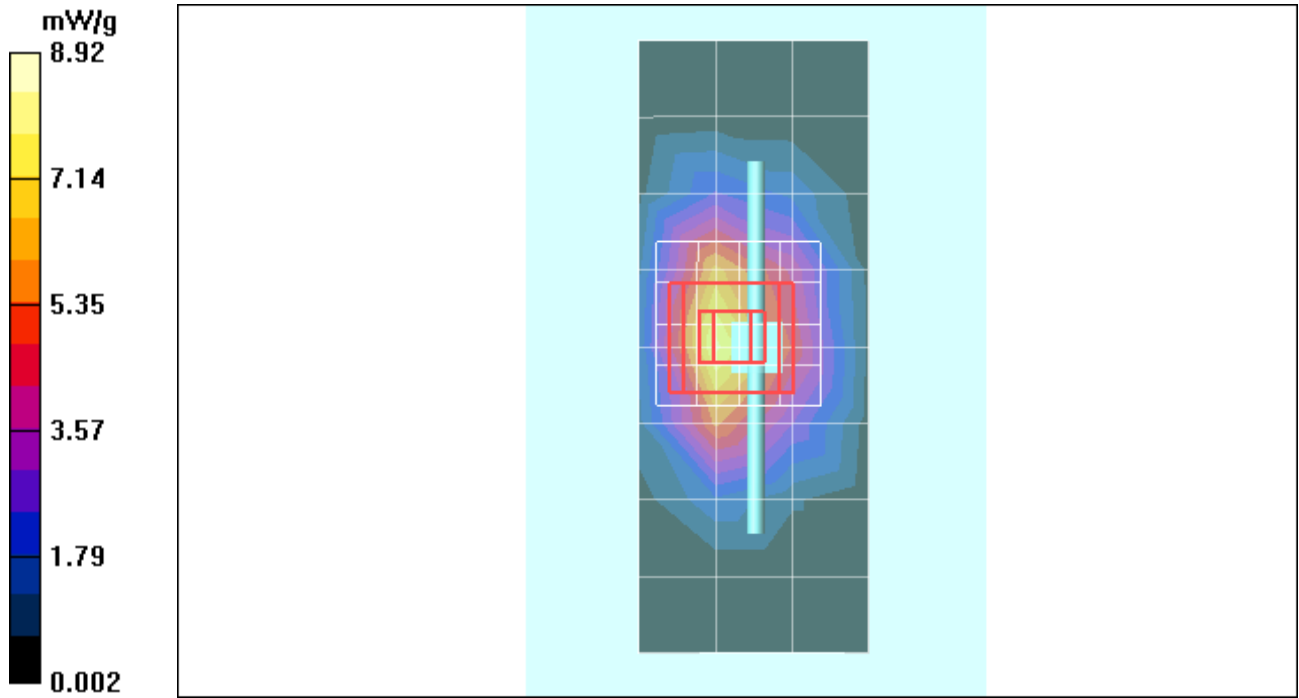
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 82.6 V/m; Power Drift = -0.028 dB; Peak SAR (extrapolated) = 13.1 W/kg

SAR(1 g) = 7.73 mW/g; SAR(10 g) = 4.16 mW/g; Maximum value of SAR (measured) = 8.36 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.92 mW/g



Test Laboratory: Motorola - 091409 2450 MHz

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 740; FCC ID: IHDP56KC1

Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 740; Input Power = 200 mW

Sim.Temp@meas = 18.8°C; Sim.Temp@SPC = 18.8°C; Room Temp @ SPC = 19.8°C

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

Medium: VALIDATION Only

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.75$ mho/m; $\epsilon_r = 36.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1524; ConvF(3.89, 3.89, 3.89); Calibrated: 2/12/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 4/1/2009
- Phantom: R1_Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x9x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 11.0 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 = 0.010 dB; Peak SAR (extrapolated) = 24.5 W/kg

SAR(1 g) = 10.8 mW/g; SAR(10 g) = 4.92 mW/g; Maximum value of SAR (measured) = 11.8 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

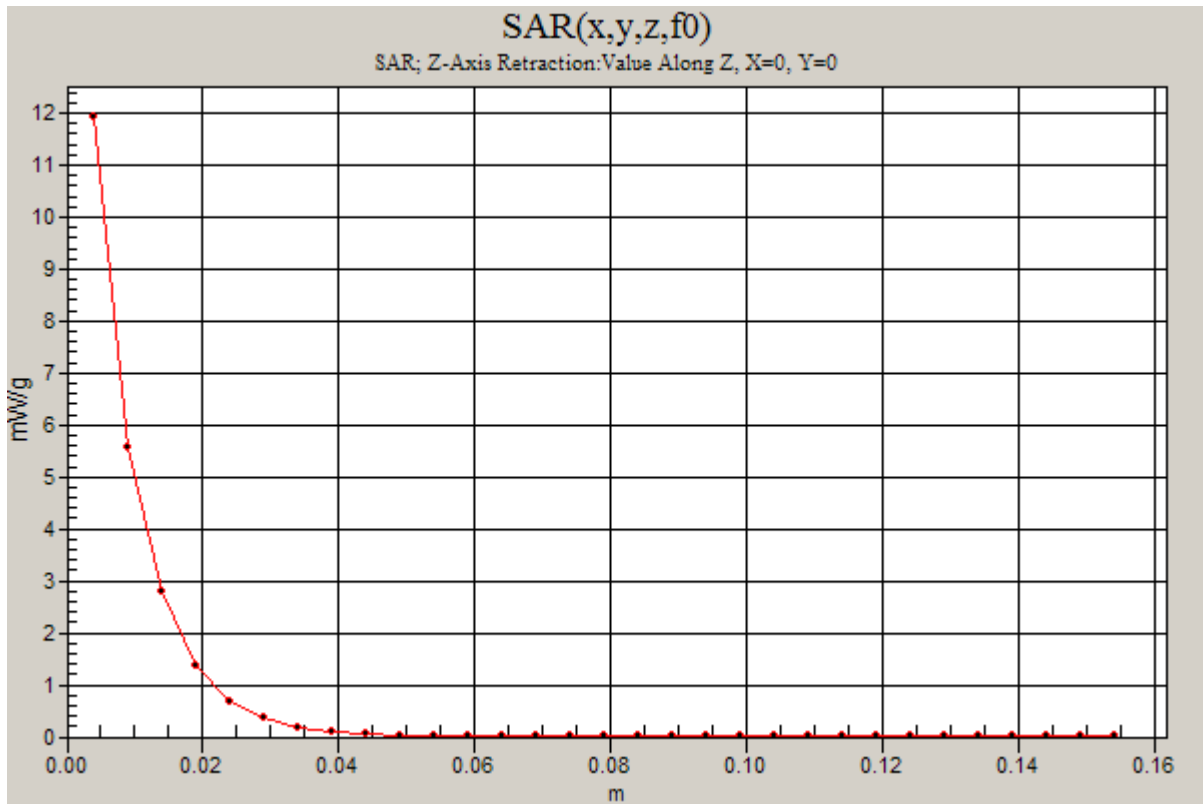
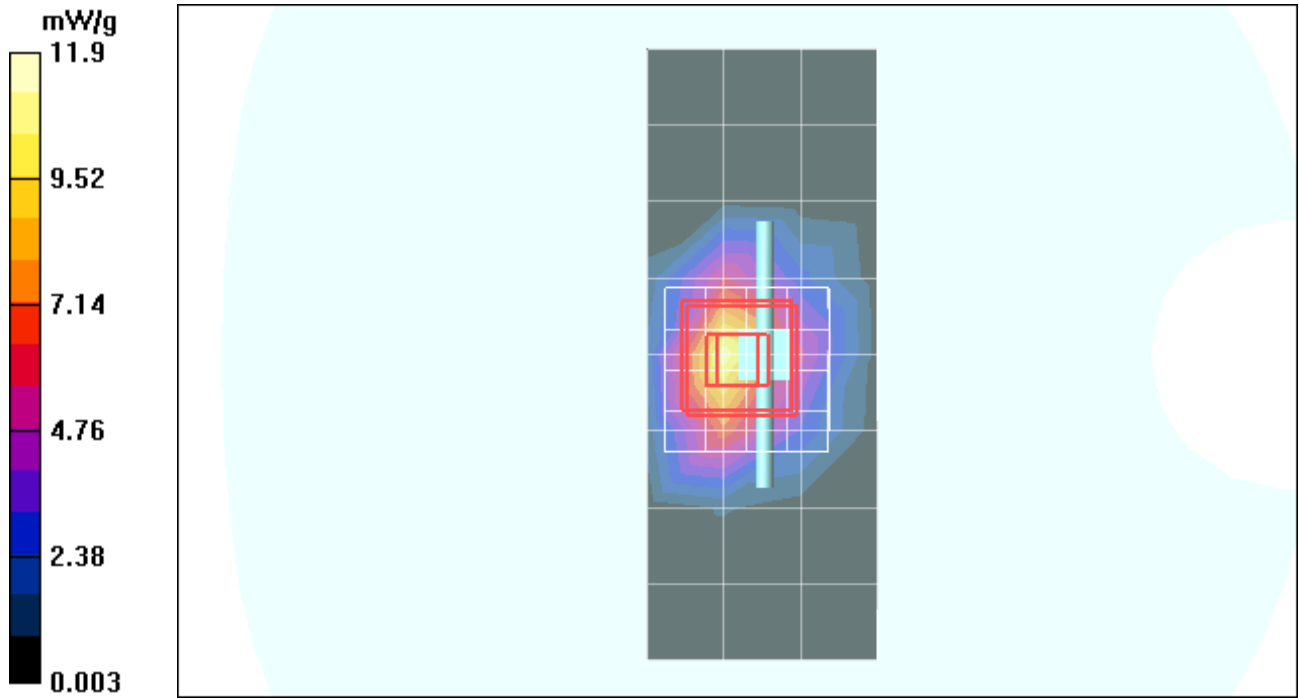
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 80.6 V/m; Power Drift = 0.010 dB; Peak SAR (extrapolated) = 24.6 W/kg

SAR(1 g) = 10.7 mW/g; SAR(10 g) = 4.87 mW/g; Maximum value of SAR (measured) = 11.3 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



Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

Test Laboratory: Motorola - CDMA 800 Cheek

Serial: A00000015B0CC70; FCC ID: IHDP56KC1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Cheek

Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1

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 - SN1524; ConvF(5.23, 5.23, 5.23); Calibrated: 2/12/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 4/1/2009
- Phantom: R1_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1005;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

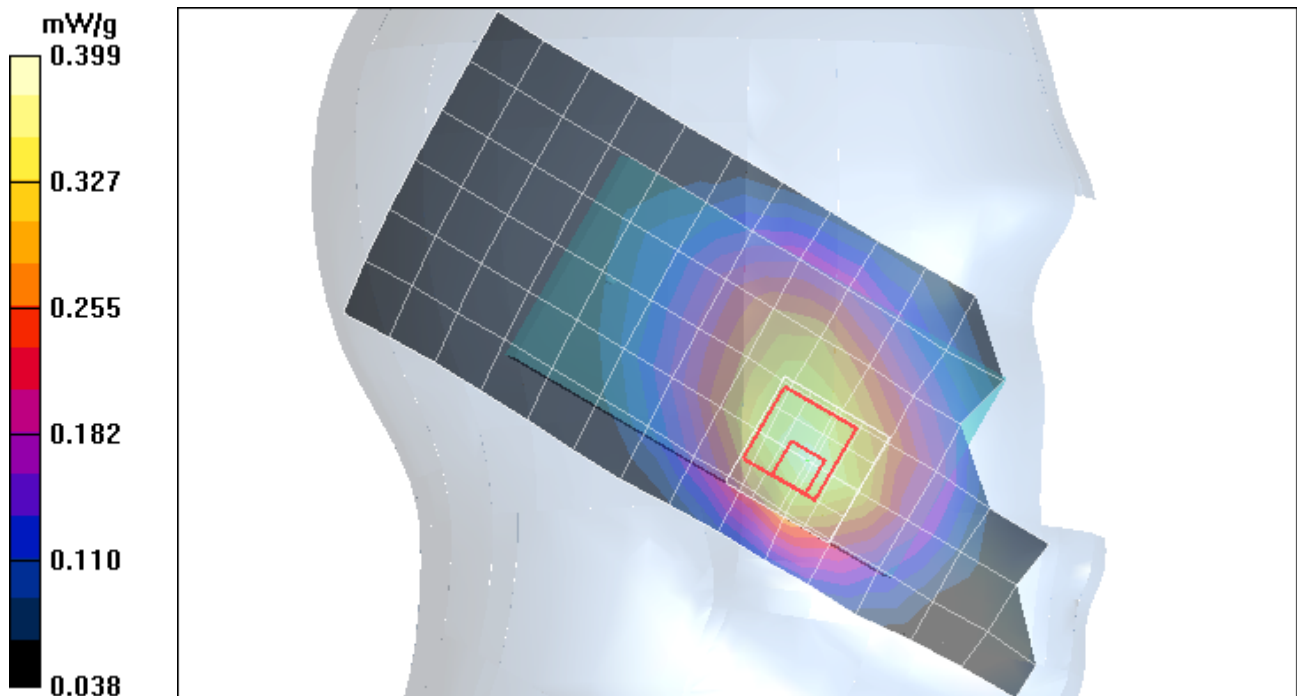
Measurement grid: $dx=15$ mm, $dy=15$ mm; Maximum value of SAR (measured) = 0.394 mW/g

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

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

Reference Value = 20.7 V/m; Power Drift = 0.056 dB; Peak SAR (extrapolated) = 0.529 W/kg

SAR(1 g) = 0.378 mW/g; SAR(10 g) = 0.272 mW/g; Maximum value of SAR (measured) = 0.399 mW/g



Test Laboratory: Motorola - CDMA 1900 Cheek

Serial: A00000015B0CC70; FCC ID: IHDP56KC1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Cheek

Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1524; ConvF(4.43, 4.43, 4.43); Calibrated: 2/12/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 4/1/2009
- Phantom: R1_Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

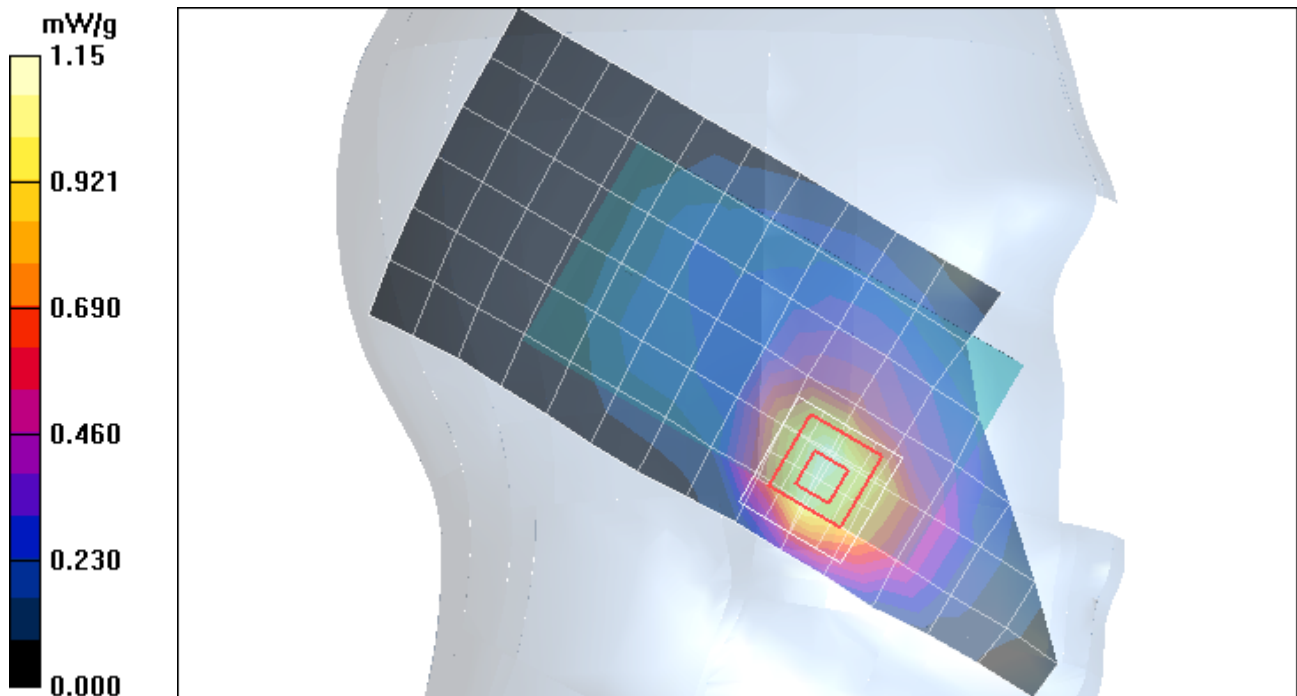
Measurement grid: $dx=15$ mm, $dy=15$ mm; Maximum value of SAR (measured) = 1.15 mW/g

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

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

Reference Value = 25.6 V/m; Power Drift = 0.473 dB; Peak SAR (extrapolated) = 2.27 W/kg

SAR(1 g) = 1.42 mW/g; SAR(10 g) = 0.822 mW/g; Maximum value of SAR (measured) = 1.61 mW/g



Test Laboratory: Motorola - Wi-Fi 2450 MHz Cheek

Serial: A00000015B0CC70; FCC ID: IHDP56KC1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION: Cheek

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

Medium: 2450 Glycol Head

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.75$ mho/m; $\epsilon_r = 36.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1524; ConvF(3.89, 3.89, 3.89); Calibrated: 2/12/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 4/1/2009
- Phantom: R1_Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

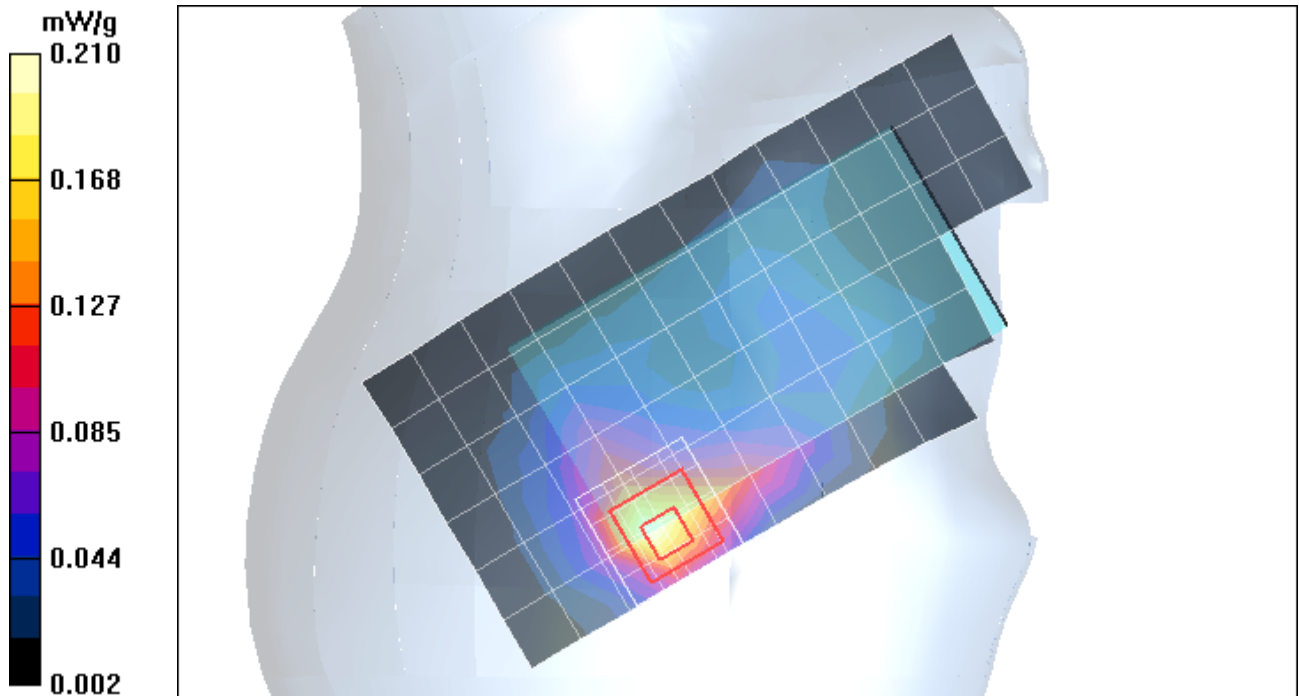
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.215 mW/g

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

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

Reference Value = 7.04 V/m; Power Drift = 0.041 dB; Peak SAR (extrapolated) = 0.505 W/kg

SAR(1 g) = 0.206 mW/g; SAR(10 g) = 0.098 mW/g; Maximum value of SAR (measured) = 0.210 mW/g



Test Laboratory: Motorola - CDMA 800 Tilt

Serial: A00000015B0CC70; FCC ID: IHDP56KC1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Cheek

Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1

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 - SN1524; ConvF(5.23, 5.23, 5.23); Calibrated: 2/12/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 4/1/2009
- Phantom: R1_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1005;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

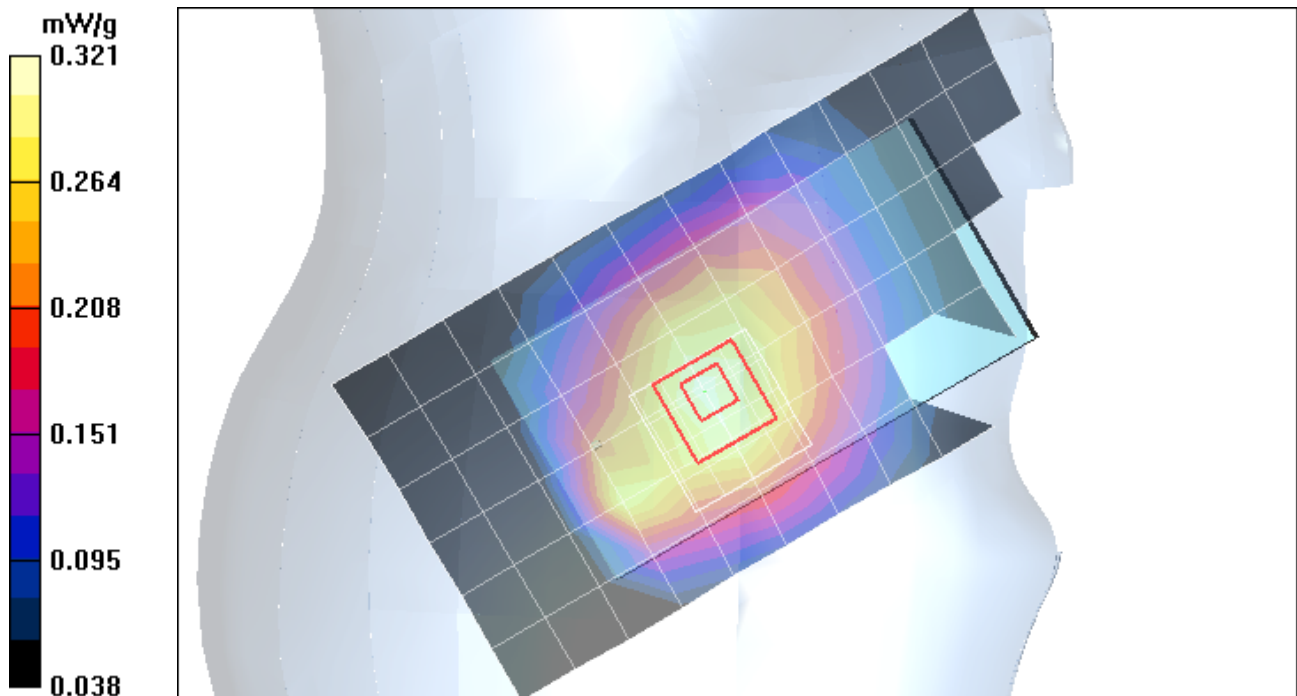
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.312 mW/g

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

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

Reference Value = 19.3 V/m; Power Drift = 0.040 dB; Peak SAR (extrapolated) = 0.376 W/kg

SAR(1 g) = 0.305 mW/g; SAR(10 g) = 0.232 mW/g; Maximum value of SAR (measured) = 0.321 mW/g



Test Laboratory: Motorola - CDMA 1900 Tilt

Serial: A00000015B0CC70; FCC ID: IHDP56KC1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Rotated

Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1524; ConvF(4.43, 4.43, 4.43); Calibrated: 2/12/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 4/1/2009
- Phantom: R1_Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

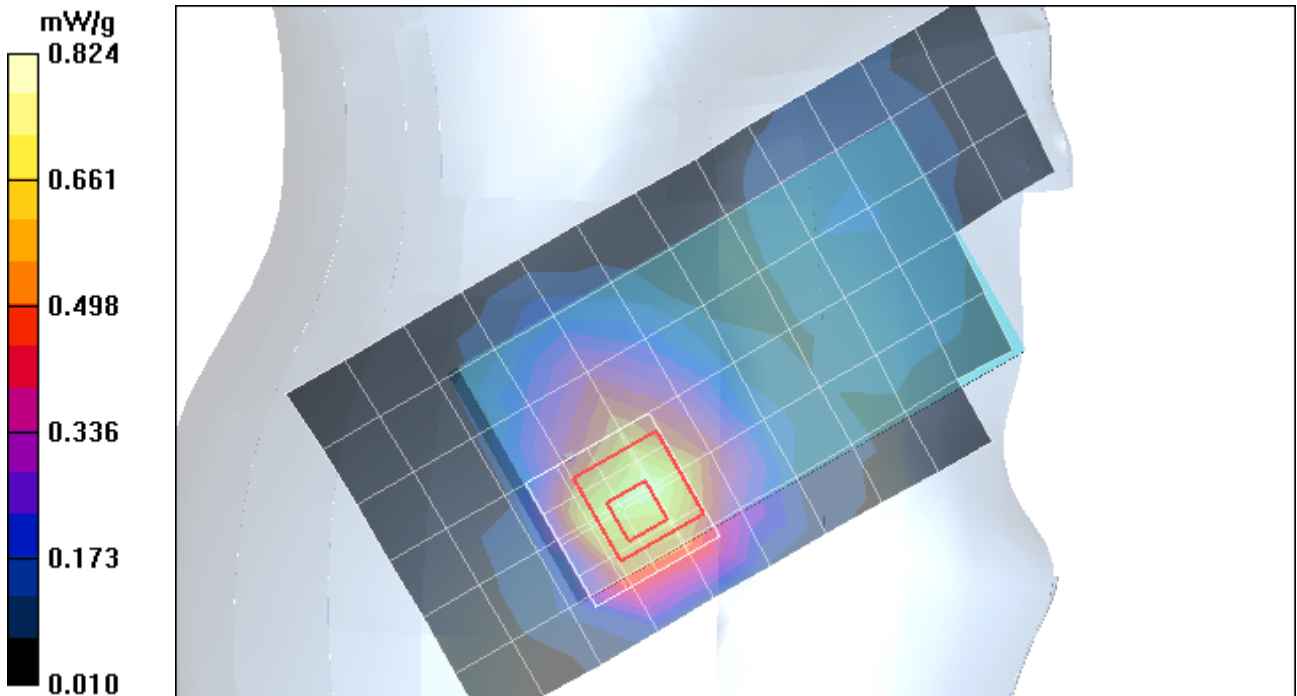
Measurement grid: $dx=15$ mm, $dy=15$ mm; Maximum value of SAR (measured) = 0.780 mW/g

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

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

Reference Value = 23.6 V/m; Power Drift = 0.004 dB; Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.782 mW/g; SAR(10 g) = 0.467 mW/g; Maximum value of SAR (measured) = 0.824 mW/g



Test Laboratory: Motorola - Wi-Fi 2450 MHz Tilt

Serial: A00000015B0CC70; FCC ID: IHDP56KC1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION: Tilt

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

Medium: 2450 Glycol Head

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.75$ mho/m; $\epsilon_r = 36.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1524; ConvF(3.89, 3.89, 3.89); Calibrated: 2/12/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 4/1/2009
- Phantom: R1_Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

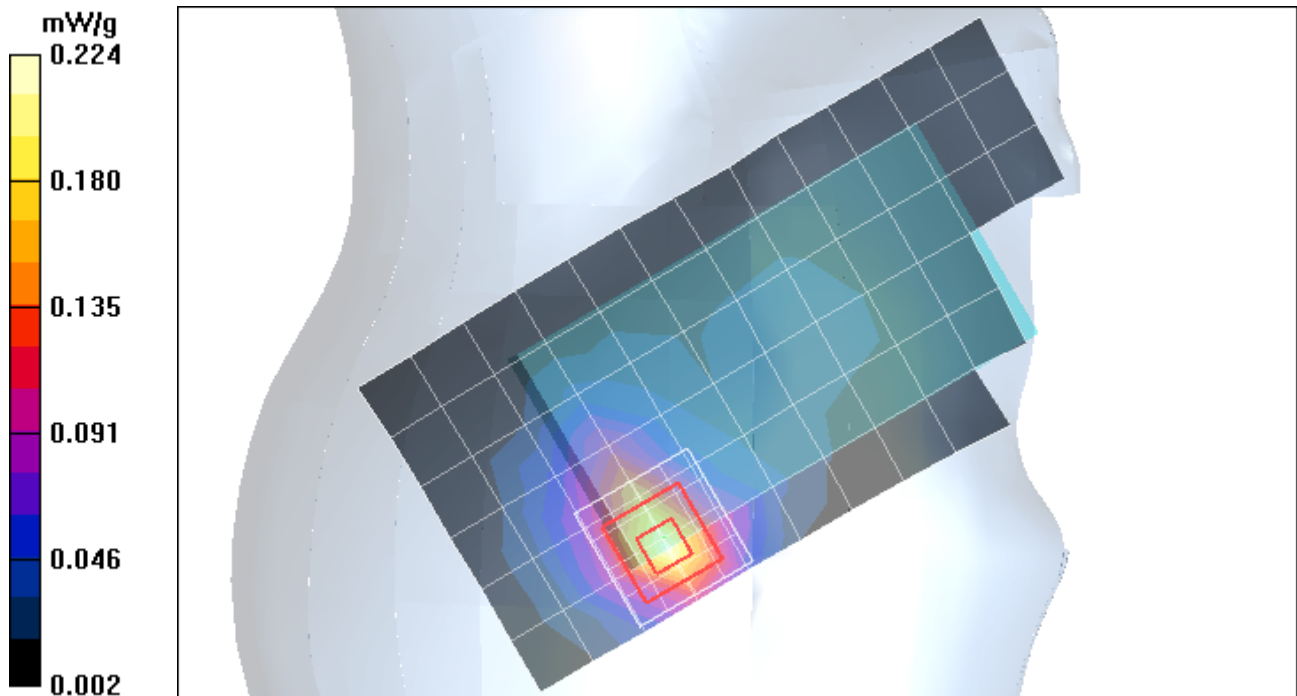
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.222 mW/g

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

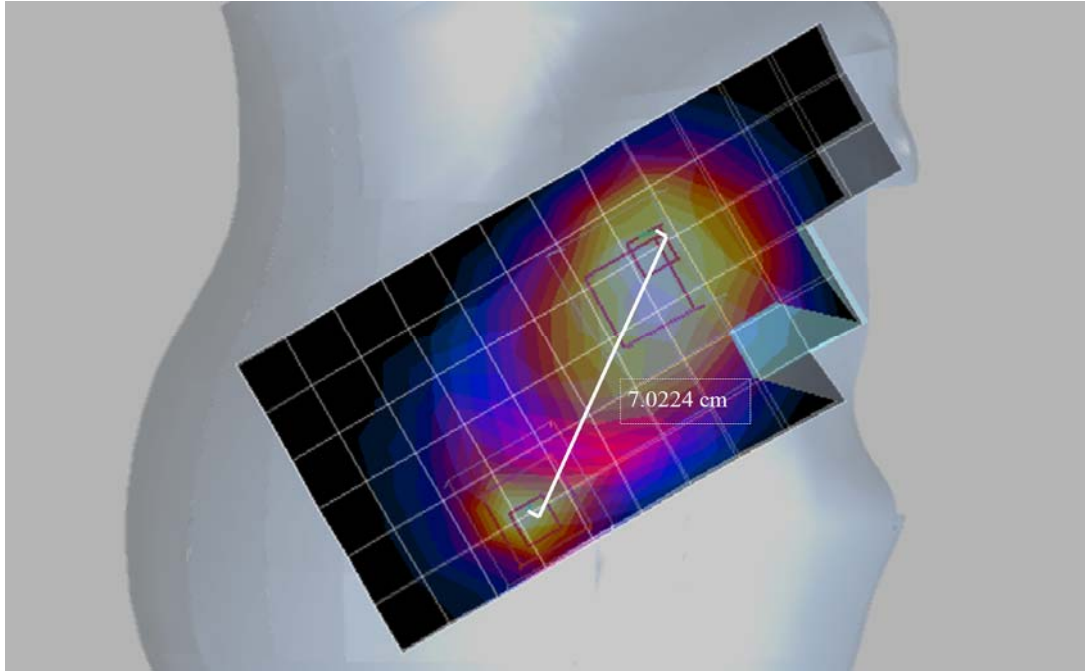
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.73 V/m; Power Drift = 0.000 dB; Peak SAR (extrapolated) = 0.490 W/kg

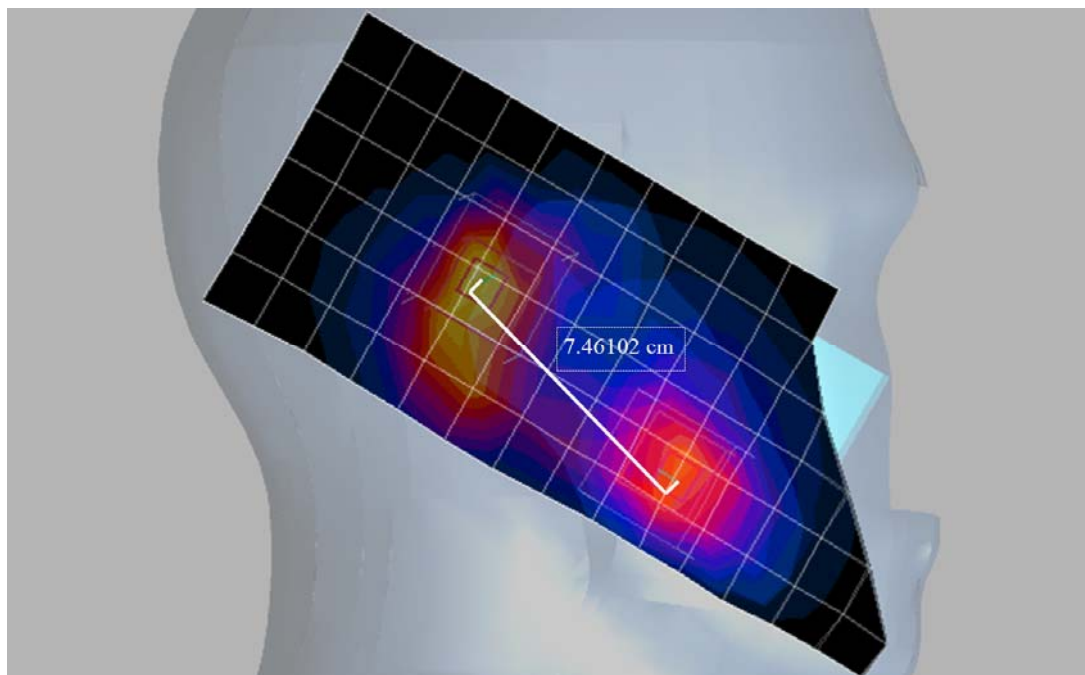
SAR(1 g) = 0.203 mW/g; SAR(10 g) = 0.095 mW/g; Maximum value of SAR (measured) = 0.224 mW/g



The guidelines provided in “SAR for Handsets with Multiple Transmitters” (KDB publication 648474 - D01 v01r03) were utilized for evaluation of the need for simultaneous transmission SAR testing. These guidelines direct that if the SAR-to-peak location separation ratio for the CDMA antenna and the Wi-Fi antenna is < 0.3 then SAR evaluation for simultaneous transmission is not required. For CDMA 800, the SAR-to-peak location separation ratio is 0.08. For CDMA 1900, the SAR-to-peak location separation ratio is 0.21. Thus, no testing was performed to determine the aggregate 1 g SAR. SAR plots with the Wi-Fi SAR overlaid upon the CDMA SAR are provided below. These summation plots provide visual indication of the separation of the SAR hotspots for each modulation.



CDMA 800 Right Head Tilt SAR overlaid with Wi-Fi Right Head Tilt SAR



CDMA 1900 Left Head Cheek SAR overlaid with Wi-Fi Left Head Cheek SAR

Appendix 3

SAR distribution plots for Body Worn Configuration

Test Laboratory: Motorola - CDMA 800 Body-Worn

Serial: A00000015B0CC70; FCC ID: IHDP56KC1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Body Worn, Back of Phone 15 mm from Phantom

Communication System: CDMA 835; Frequency: 848.31 MHz; Channel Number: 777; Duty Cycle: 1:1

Medium: Low Freq Body

Medium parameters used: $f = 835$ MHz; $\sigma = 0.98$ mho/m; $\epsilon_r = 53.7$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1524; ConvF(5.14, 5.14, 5.14); Calibrated: 2/12/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 4/1/2009
- Phantom: R1_Section 1, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

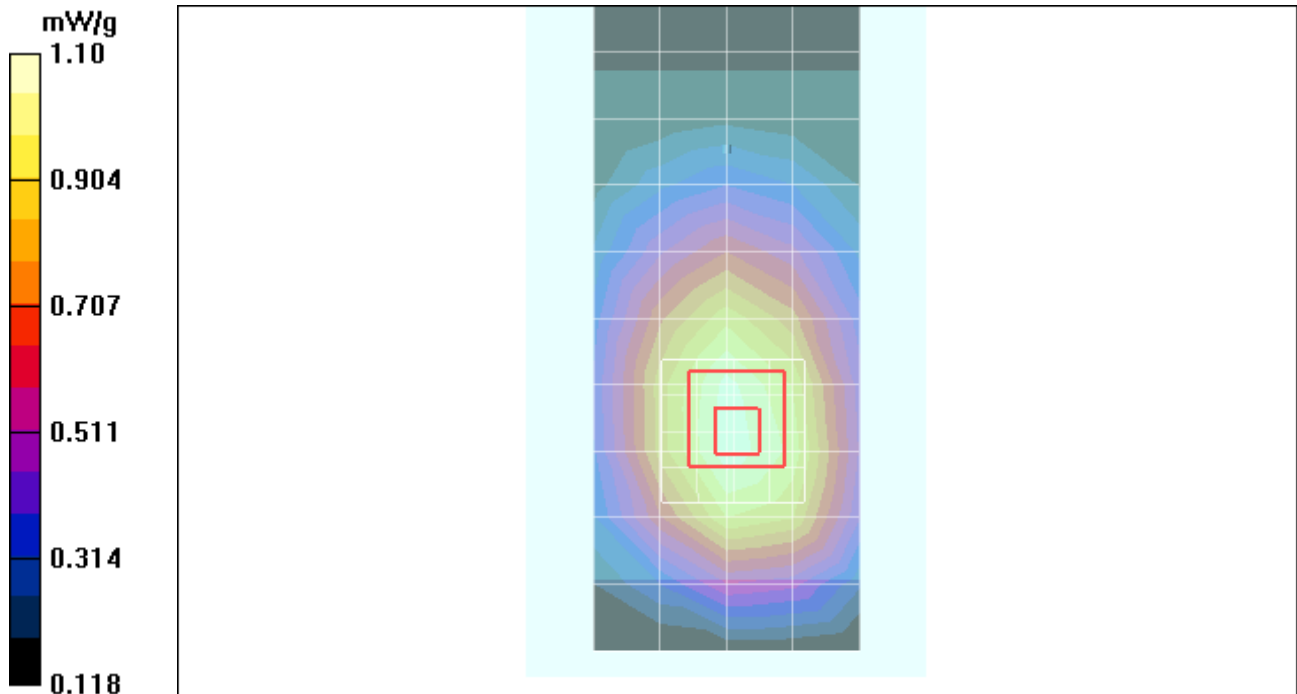
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.09 mW/g

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

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

Reference Value = 33.8 V/m; Power Drift = -0.007 dB; Peak SAR (extrapolated) = 1.25 W/kg

SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.779 mW/g; Maximum value of SAR (measured) = 1.10 mW/g



Test Laboratory: Motorola - CDMA 1900 Body-Worn

Serial: A00000015B0CC70; FCC ID: IHDP56KC1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Body Worn, Back of Phone 15 mm from Phantom

Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.59$ mho/m; $\epsilon_r = 51.4$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1524; ConvF(4.03, 4.03, 4.03); Calibrated: 2/12/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 4/1/2009
- Phantom: R1_Section 2, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Full Body (15mm) (18x8x1):

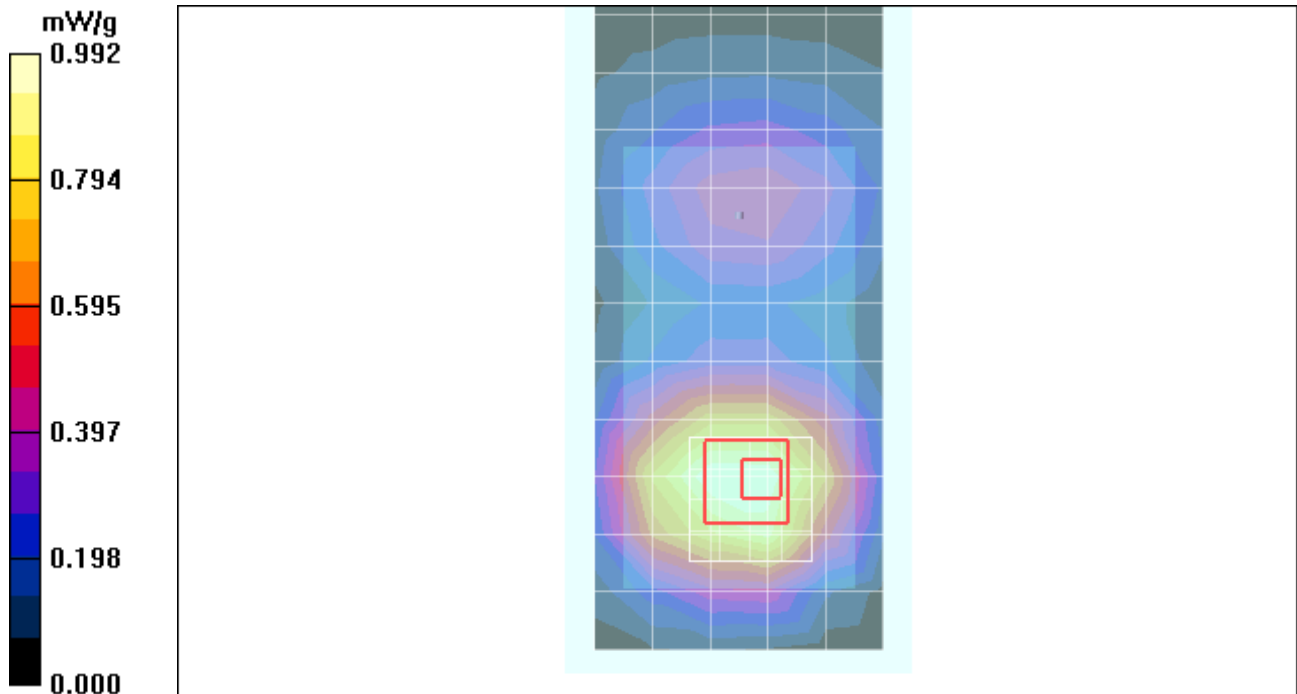
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.992 mW/g

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

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

Reference Value = 24.9 V/m; Power Drift = -0.144 dB; Peak SAR (extrapolated) = 1.41 W/kg

SAR(1 g) = 0.930 mW/g; SAR(10 g) = 0.609 mW/g; Maximum value of SAR (measured) = 0.989 mW/g



Test Laboratory: Motorola - Wi-Fi 2450 MHz Body-Worn

Serial: A00000015B0CC70; FCC ID: IHDP56KC1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Body Worn, Back of Phone 15 mm 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; $\sigma = 2.03$ mho/m; $\epsilon_r = 49.4$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1524; ConvF(3.4, 3.4, 3.4); Calibrated: 2/12/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 4/1/2009
- Phantom: R1_Section 2, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

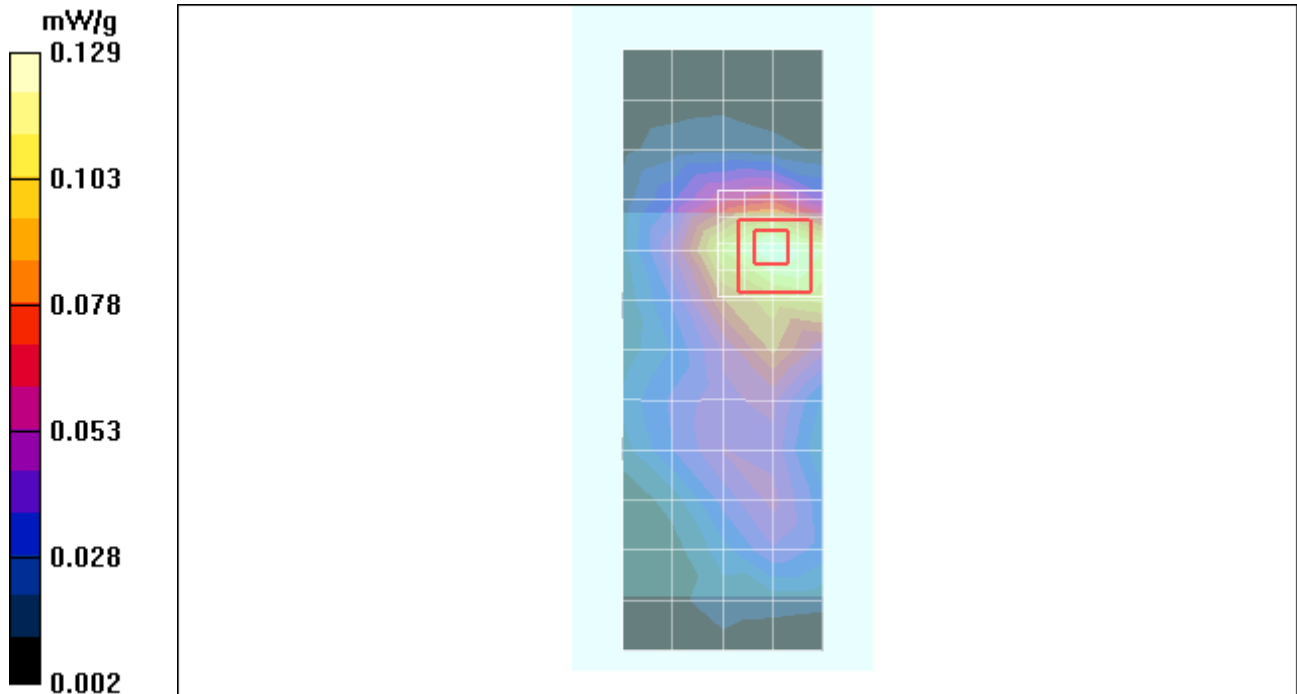
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.130 mW/g

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

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

Reference Value = 7.18 V/m; Power Drift = -0.003 dB; Peak SAR (extrapolated) = 0.273 W/kg

SAR(1 g) = 0.123 mW/g; SAR(10 g) = 0.068 mW/g; Maximum value of SAR (measured) = 0.129 mW/g



Test Laboratory: Motorola - Bluetooth Body-Worn

Serial: A00000015B0CC70; FCC ID: IHDP56KC1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Body Worn, Back of Phone 15 mm from Phantom

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

Medium: 2450 Glycol Body

Medium parameters used: $f = 2450$ MHz; $\sigma = 2.03$ mho/m; $\epsilon_r = 49.4$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ET3DV6 - SN1524; ConvF(3.4, 3.4, 3.4); Calibrated: 2/12/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn387; Calibrated: 4/1/2009
- Phantom: R1_Section 2, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

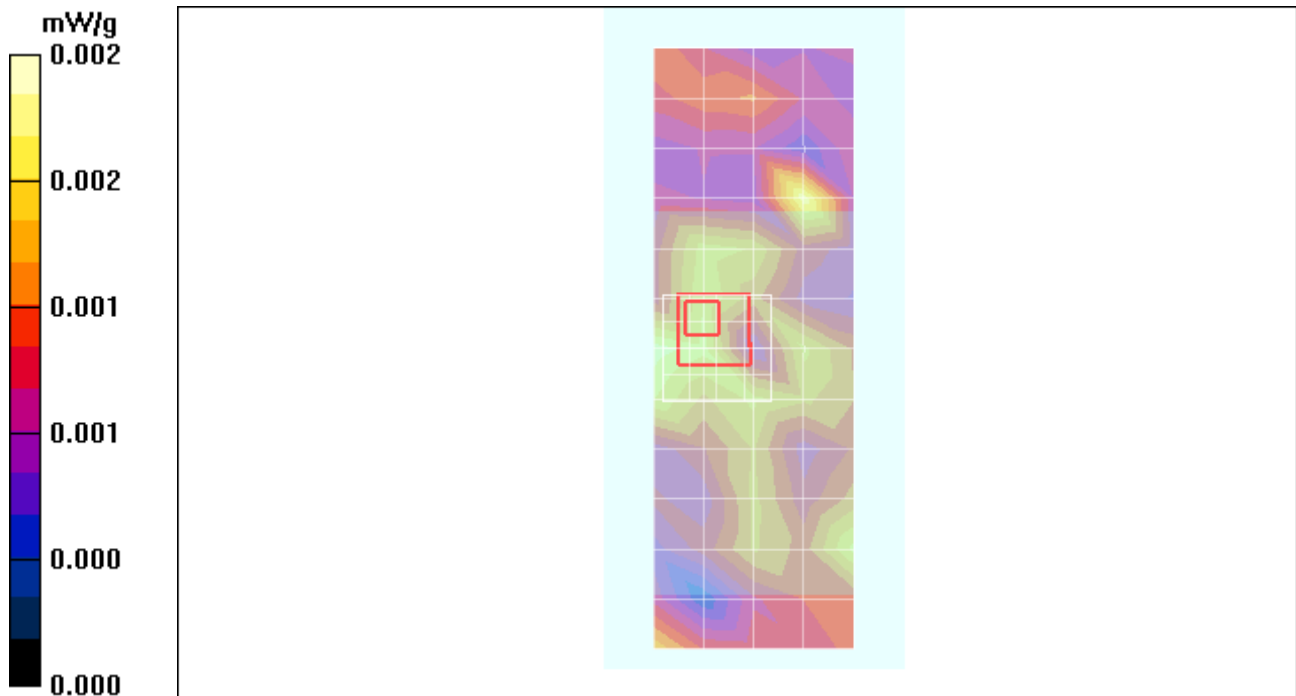
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.002 mW/g

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

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

Reference Value = 0.754 V/m; Power Drift = 0.961 dB; Peak SAR (extrapolated) = 0.006 W/kg

SAR(1 g) = 0.00176 mW/g; SAR(10 g) = 0.00134 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 MDb**

Certificate No: **ET3-1524_Feb09**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1524**

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

Calibration date: **February 12, 2009**

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 (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)	1-Jul-08 (No. 217-00865)	Jul-09
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	1-Jul-08 (No. 217-00866)	Jul-09
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09

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-08)	In house check: Oct-09

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

Issued: February 12, 2009

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



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**

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:1524

Manufactured:	March 21, 2000
Last calibrated:	May 31, 2007
Recalibrated:	February 12, 2009

Calibrated for DASYS Systems

(Note: non-compatible with DASYS2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1524

Sensitivity in Free Space^A

Diode Compression^B

NormX	2.16 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	93 mV
NormY	2.44 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	91 mV
NormZ	2.36 ± 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	11.5	7.1
SAR _{be} [%]	With Correction Algorithm	0.9	0.6

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	10.6	5.9
SAR _{be} [%]	With Correction Algorithm	0.8	0.5

Sensor Offset

Probe Tip to Sensor Center **2.7 mm**

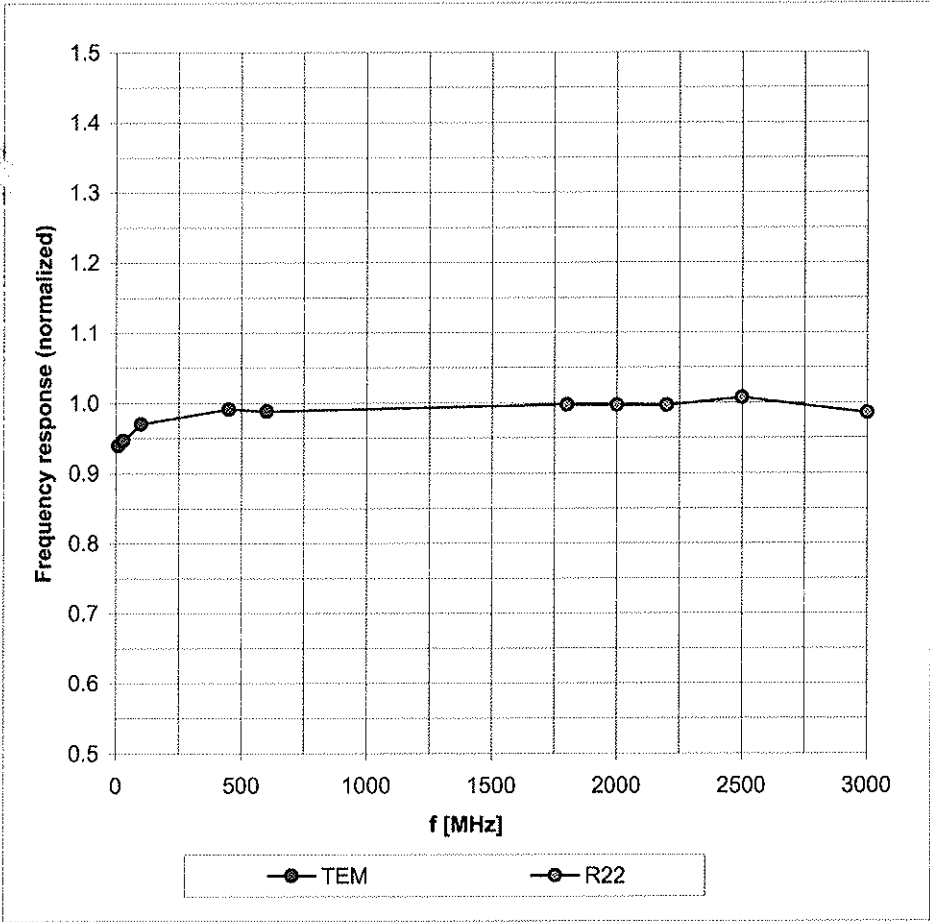
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

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

^B Numerical linearization parameter: uncertainty not required.

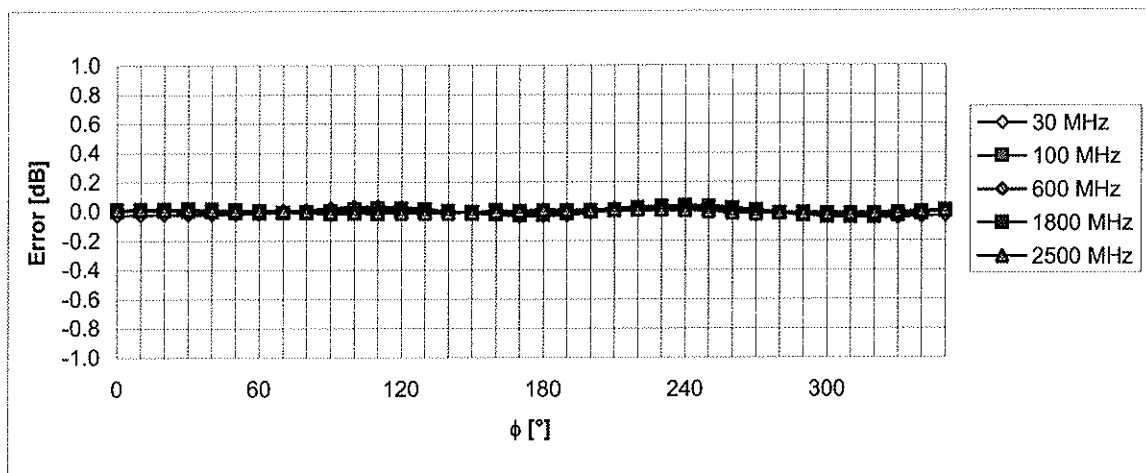
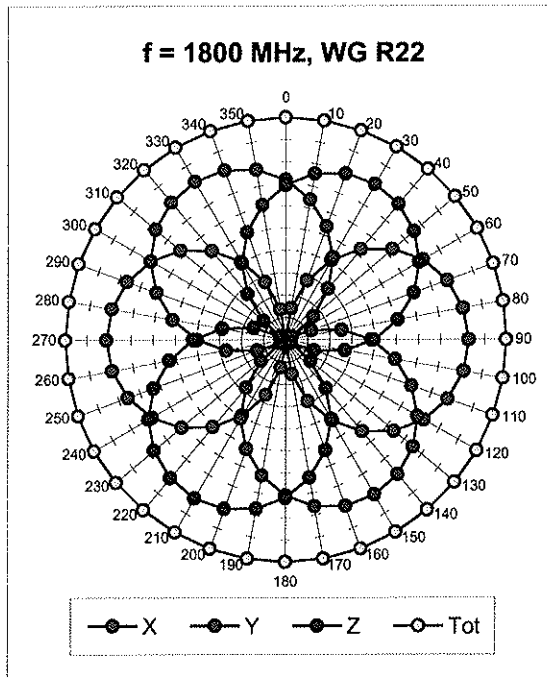
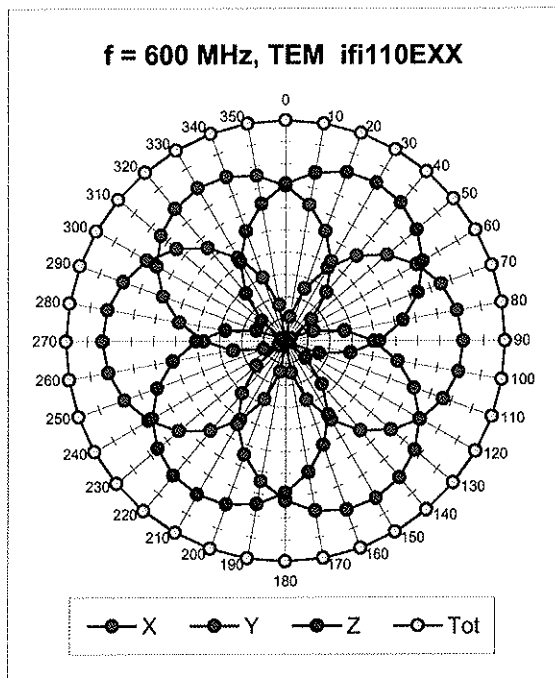
Frequency Response of E-Field

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



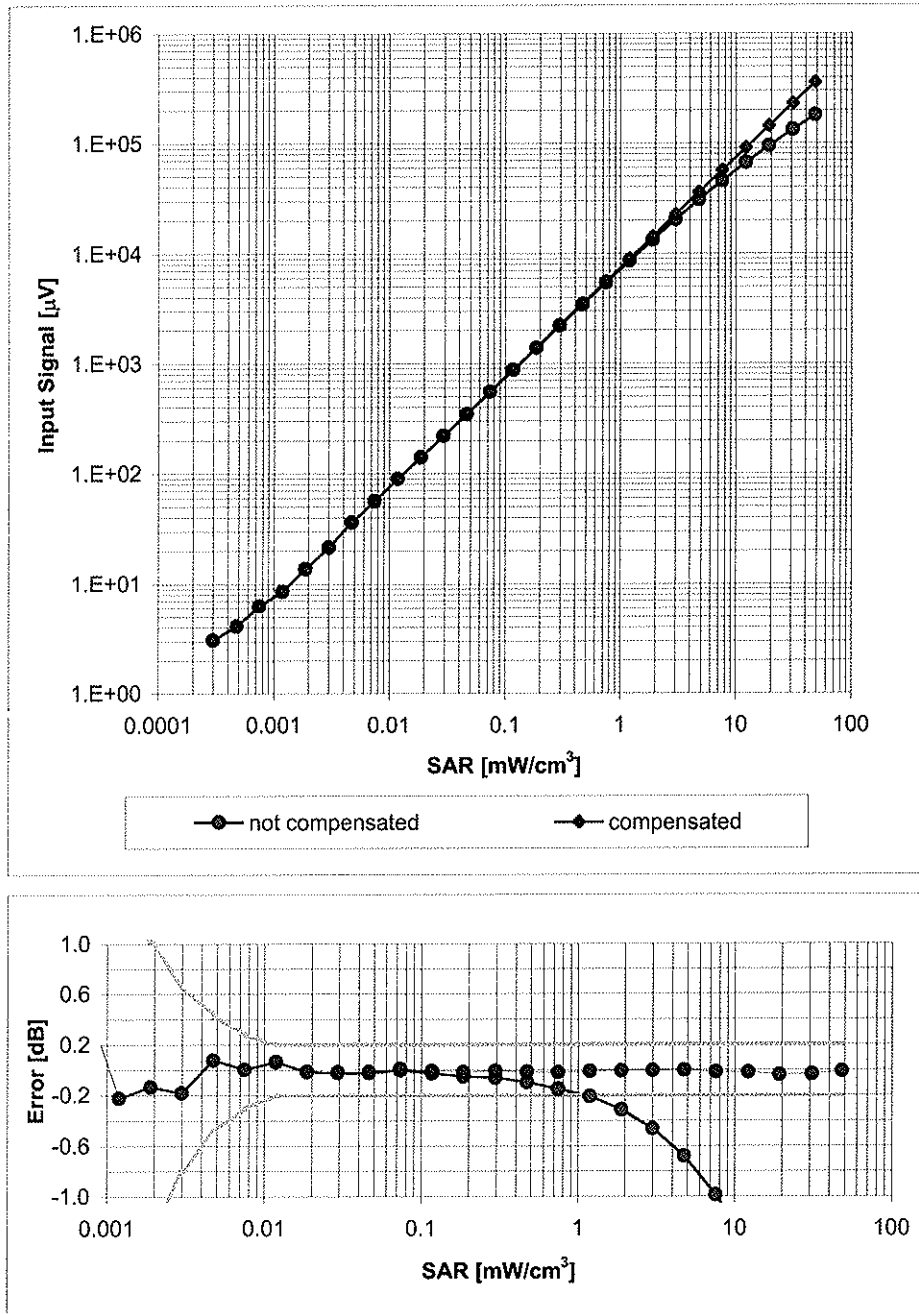
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

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



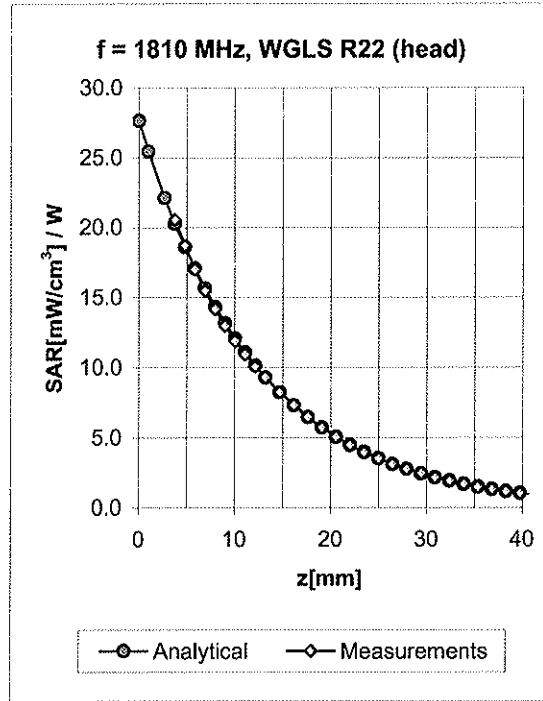
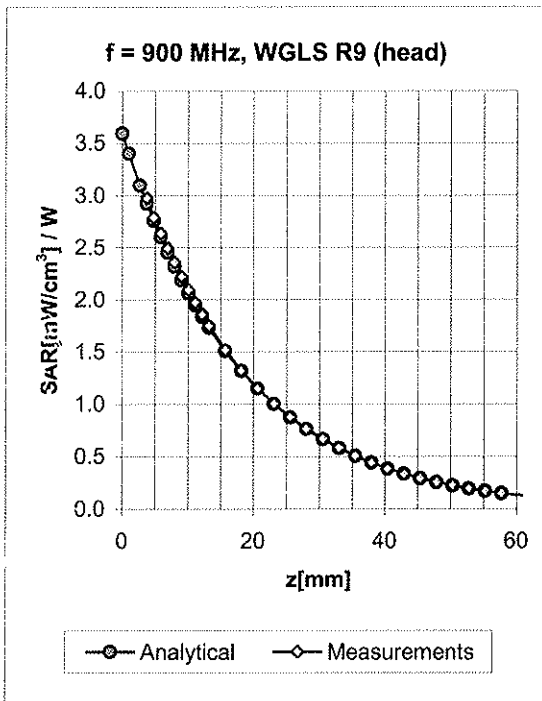
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

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

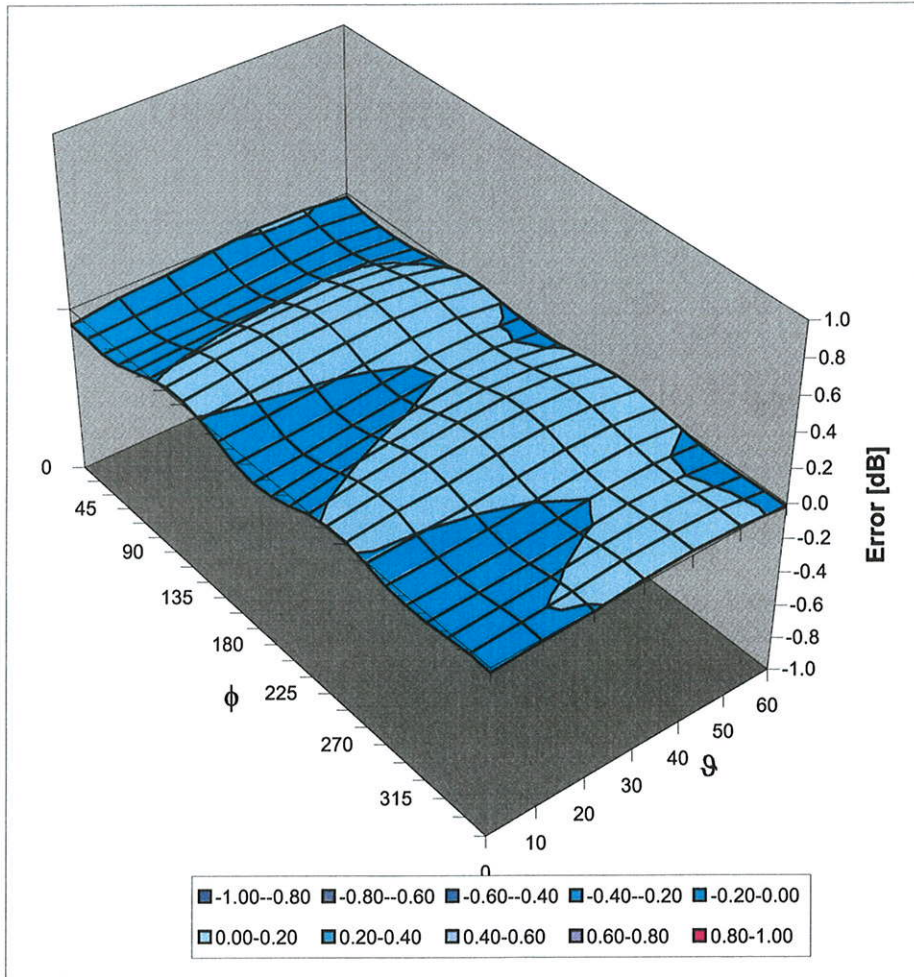


f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.41	2.41	5.23 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.61	2.40	4.43 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.81	2.03	4.24 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.99	1.65	3.89 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.41	2.62	5.14 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.90	2.02	4.03 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.99	1.75	4.00 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.99	1.30	3.40 ± 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), $f = 900$ 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>	$e = f(d,k)$	<i>f</i>	<i>g</i>	$h = c \times f / e$	$i = c \times g / e$	<i>k</i>
Uncertainty Component	IEEE 1528 section	Tol. (\pm %)	Prob Dist	Div.	c_i (1 g)	c_i (10 g)	1 g u_i (\pm %)	10 g u_i (\pm %)	v_i
Measurement System									
Probe Calibration	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

FCD-1806, rev-1

-Historical Data-

900 MHz	
Reference Target:	10.9 (W/kg)
Measurement Uncertainty (k=1):	9.0%
Measurement Period:	15April08 - 26March09
# of tests performed:	1,099
Grand Average:	11.19 (W/kg)
% Delta (Average - Reference Target)	2.7%
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> 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 Target +/- %	Conductivity (S/m) Target +/- %
900 MHz	11.19	41.5 +/- 5%	0.97 +/- 5%


-Approvals-

Submitted by: Date:

Signed: 

Comments:

Approved by: Date:

Signed: 

Comments:

Certification of System Performance Check Targets

FCD-1806, rev-1

-Historical Data-

1800 MHz	
Reference Target:	38.4 (W/kg)
Measurement Uncertainty (k=1):	9.0%
Measurement Period:	15April08 - 26March09
# of tests performed:	929
Grand Average:	37.91 (W/kg)
% Delta (Average - Reference Target)	-1.3%
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 Target +/- %	Conductivity (S/m) Target +/- %
1800 MHz	37.91	40.0 +/- 5%	1.40 +/- 5%

-Approvals-

Submitted by: Date:

Signed: 

Comments:

Approved by: Date:

Signed: 

Comments:

Certification of System Performance Check Targets

FCD-1806, rev-1

-Historical Data-

2450 MHz	
Reference Target:	52.4 (W/kg)
Measurement Uncertainty (k=1):	9.0%
Measurement Period:	15April08 - 26March09
# of tests performed:	150
Grand Average:	56.68 (W/kg)
% Delta (Average - Reference Target)	8.2%
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 Target +/- %	Conductivity (S/m) Target +/- %
2450 MHz	56.68	39.2 +/- 10%	1.80 +/- 5%

-Approvals-

Submitted by: Date:

Signed: 

Comments:

Approved by: Date:

Signed: 

Comments:

END OF REPORT