



**MOTOROLA**

Exhibit 11: SAR Test Report IHDT56FE1

**Date of test:** 6/23/2005 – 6/24/2005  
**Date of Report:** 7/1/2005

**Laboratory:** Motorola Mobile Devices Business Product Safety & Compliance Laboratory  
 600 N. US Highway 45  
 Room: MW113  
 Libertyville, Illinois 60048

**Test Responsible:** Paul Ma  
 RF Engineer

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



<p><u>Tests:</u>                  Electromagnetic Specific Absorption Rate</p> <p>Simulated Tissue Preparation                  RF Power Measurement</p>	<p><u>Procedures:</u>                  ANSI/IEEE C95.1-1992, 1999                  (SAR) IEEE C95.3-1991                  IEEE 1528, IEC 62209-1                  FCC OET Bulletin 65 (<i>including Supplements A, B, C</i>)                  Australian Communications Authority Radio                  Communications (Electromagnetic Radiation – Human                  Exposure) Standard 1999                  CENELEC EN 50361 (2001)                  APP-0247                  DOI-0876, 0900, 0902, 0904, 0915</p>
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On the following products or types of products:  
 Wireless Communications Devices (Examples): Two Way Radios; Portable Phones (including Cellular, Licensed Non-Broadcast and PCS); Low Frequency Readers; and Pagers

A2LA certificate #1651-01

**Statement of Compliance:** Motorola declares under its sole responsibility that portable cellular telephone FCC ID IHDT56FE1 to which this declaration relates, is in conformity with the appropriate General Population/Uncontrolled RF exposure standards, recommendations and guidelines (FCC 47 CFR §2.1093). It also declares that the product was tested in accordance with the appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

(none)

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 This test report shall not be reproduced except in full, without written approval of the laboratory.

The results and statements contained herein relate only to the items tested. The names of individuals involved may be mentioned only in connection with the statements or results from this report.

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 portable cellular phone (FCC ID **IHDT56FE1**). The Specific Absorption Rate (SAR) of this product was measured. The portable cellular phone was tested in accordance with FCC OET Bulletin 65 Supplement C 01-01.

## 2 Description of the Device Under Test

### 2.1 Antenna description

<b>Type</b>	Stubby	
<b>Location</b>	Upper Right Corner	
<b>Dimensions</b>	Length (max)	19mm
	Width (max)	10mm
<b>Configuration</b>	Helix	

### 2.2 Device description

<b>FCC ID Number</b>	IHDT56FE1	
<b>Serial number</b>	004400013683279	
<b>Mode(s) of Operation</b>	GSM850	GSM1900
<b>Modulation Mode(s)</b>	GMSK	GMSK
<b>Maximum Output Power Setting</b>	32.7	30
<b>Duty Cycle</b>	1:8	1:8
<b>Transmitting Frequency Rang(s)</b>	824.2-848.8 MHz	1850.2-1909.8 MHz
<b>Production Unit or Identical Prototype (47 CFR §2.908)</b>	Identical Prototype	
<b>Device Category</b>	Portable	
<b>RF Exposure Limits</b>	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™ v4.5) manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. All the SAR measurements are taken within a shielded enclosure. The overall RSS uncertainty of the measurement system is ±11.1% (K=1) with an expanded uncertainty of ±22.2% (K=2). The measurement uncertainty budget is given in Appendix 6. Per IEEE 1528, this uncertainty budget is applicable to the SAR range of 0.4 W/kg to 10 W/kg. The list of calibrated equipment used for the measurements is shown below.

<b>Description</b>	<b>Serial Number</b>	<b>Cal Due Date</b>
DASY4 DAE3	367	5/30/2006
E-Field Probe ET3DV6	1390	4/22/2006
Dipole Validation Kit, D900V2	094	
S.A.M. Phantom used for 800MHz	TP-1168	
Dipole Validation Kit, D1800V2	276TR	
S.A.M. Phantom used for 1900MHz	TP-1138	

### 3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3847A04840	2/26/2006
Power Meter E4419B	GB39511085	12/1/2005
Power Sensor #1 - 8481A	3318A85415	12/17/2005
Power Sensor #2 - 8481A	2702A82671	12/17/2005
Network Analyzer HP8753ES	3847A04822	2/6/2006
Dielectric Probe Kit HP85070B	US99360074	

## 4 Electrical parameters of the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity,  $\epsilon_r$ , and the conductivity,  $\sigma$ , of the tissue simulating liquids were measured with the HP85070 Dielectric Probe Kit. These values, along with the temperature of the tissue simulate are shown in the table below. The recommended limits for maximum permittivity and minimum conductivity are also shown. These come from the Federal Communication Commission, OET Bulletin 65 Supplement C 01-01. It is seen that the measured parameters are satisfactory for compliance testing.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			$\epsilon_r$	$\sigma$ (S/m)	Temp (°C)
850	Head	Measured, 6/23/2005	42.6	0.93	21.3
		Measured, 6/24/2005	42.4	0.92	21.3
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	Measured, 6/23/2005	55	0.97	21.7
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
		Measured, 6/24/2005	39.9	1.46	21.2
1900	Head	Recommended Limits	40.0 ±5%	1.40 ±5%	18-25
		Measured, 6/24/2005	52.6	1.58	20.8
	Body	Measured, 6/24/2005	52.7	1.59	20.8
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25

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

Ingredient	800MHz Head	800MHz Body	1900MHz Head	1900MHz Body
Sugar	57.0	44.9	--	--
DGBE	--	--	47.0	30.80
Water	40.45	53.06	52.8	68.91
Salt	1.45	0.94	0.2	0.29
HEC	1.0	1.0	--	--
Bact.	0.1	0.1	--	--

## 5 System Accuracy Verification

A system accuracy verification of the DASY4 v4.5 was performed using the measurement equipment listed in Section 3.1. The daily system accuracy verification occurs within center section of the SAM phantom.

A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR indicated in Section 8.3.7 Reference SAR Values in IEEE 1528. These tests were done at 900MHz and/or 1800MHz. These frequencies are within 100MHz of the mid-band frequency of the test device. This is within the allowable window given in Supplement C 01-01 Appendix D System Verification section item #5. The test was conducted on the same days as the measurement of the DUT. Recommended limits for maximum permittivity, minimum conductivity are shown in the table below. These come from the Federal Communication Commission, OET Bulletin 65 Supplement C 01-01. The obtained results from the system accuracy verification are displayed in the table below. 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 ±0.5cm. Z-axis scans showing the SAR penetration are also included in Appendix 1. SAR values are normalized to 1W forward power delivered to the dipole.

f (MHz)	Description	SAR (W/kg), 1gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			$\epsilon_r$	$\sigma$ (S/m)		
900	Measured, 6/23/2005	12.03	41.9	0.99	21	21
	Measured, 6/24/2005	11.91	41.6	0.98	21	20.8
	Recommended Limits	10.8	41.5 ±5%	0.97 ±5%	18-25	18-25
1800	Measured, 6/23/2005	37.8	40.3	1.38	20	21.7
	Measured, 6/24/2005	37.4	40.3	1.37	21	21.2
	Recommended Limits	38.1	40.0 ±5%	1.4 ±5%	18-25	18-25

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ET3DV6	SN1390	900	6.45	9 of 10
		1810	5.24	9 of 10

## 6 Test Results

The test sample was operated in a test mode that allows control of the transmitter without the need to place actual phone calls. For the purposes of this test the unit is commanded to test mode and manually set to the proper channel, transmitter power level and transmit mode of operation. The phone was tested in the configurations stipulated in OET Bulletin 65 Supplement C 01-01. Motorola also followed the requirements in Supplement C / Appendix D: SAR Measurement Procedures, section titled “Devices Operating Next To A Person’s Ear “. These directions state “The device should be tested on the left and right side of the head phantom in the “Cheek/Touch” and “Ear/Tilt” positions. When applicable, each configuration should be tested with the antenna in its fully extended and fully retracted positions. These test configurations should be tested at the high, middle and low frequency channels of each operating mode; for example, AMPS, CDMA, and TDMA. If the SAR measured at the middle channel for each test configuration (left, right, Cheek/Touch, Tile/Ear, extended and retracted) is at least 2.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).“

The DASY4 v4.5 SAR measurement system specified in section 3.1 was utilized within the intended operations as set by the SPEAG™ setup. The phone was positioned into the measurement configurations using the positioner supplied with the DASY4 v4.5 SAR measurement system. The measured dielectric constant of the material used for the positioner is less than 2.9 and the loss tangent is less than 0.02 (± 30%) at 850MHz. The default settings for the “coarse” and “cube” scans were chosen and use for measurements. The grid spacing of the course scan was set to 15cm as shown in the SAR plots included in appendix 2 and 3. Please refer to the DASY manual for additional information on SAR scanning procedures and algorithms used.

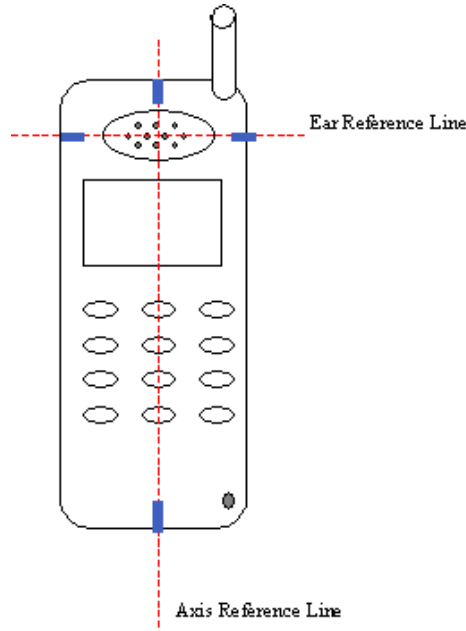
The Cellular Phone (FCC ID IHDT56FE1) has the SNN5749A as the only available battery option. This battery was used to do all of the SAR testing. The phone was placed in the SAR measurement system with a fully charged battery.

**6.1 Head Adjacent Test Results**

To aid in positioning repeatability, the ear reference line of the device and the axis reference line of the device have been physically added using a non-metallic marker.

- Per Figure 1, the "Ear Reference Line" is centered vertically through the center of the listening area (as defined by the speaker holes in the housing).
- The "Axis Reference Line" bisects the front surface of the device at its top and bottom edges.
- The intersection of these two lines defines the location of the "Ear Reference Point".

The lines drawn on the device extended to the outside edges, as shown in blue in the figure below, & wrap around the sides of the device.



The SAR results shown in tables 1 and 2 are maximum SAR values averaged over 1 gram of phantom tissue. Also shown are the measured conducted output powers, the temperature of the test facility during the test, the temperature of the tissue simulate after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is  $New\ SAR = Old\ SAR * 10^{(-drift/10)}$ . The SAR reported at the end of the measurement process by the DASY™ 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. The test conditions indicated as bold numbers in the following table are included in Appendix 2

The SAR measurements were performed using the SAM phantoms listed in section 3.1. Since same phantoms and tissue simulate are used for the system accuracy verification as the device SAR measurements, the Z-axis scans included in within Appendix 1 are applicable for verification of tissue simulate depth to be 15.0cm ±0.5cm. All other test conditions measured lower SAR values than those included in Appendix 2. Note that 800MHz digital mode SAR measurements were performed in accordance with Supplement C.

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	SN1390	900	6.45	9 of 10
		1810	5.24	9 of 10

f (MHz)	Description	Conducted Output Power (dBm)	Cheek / Touch Position							
			Left Head				Right Head			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
GSM 850MHz	Channel 128	32.75	0.901	-0.08	0.92	21.2	1.02	0	1.02	21.2
	Channel 189	32.73	0.85	-0.02	0.85	21.2	0.967	0.07	0.97	21.1
	Channel 251	32.73	0.977	0.05	0.98	21.3	1.08	0.07	1.08	21.1
GSM 1900MHz	Channel 512	29.95	<b>1.07</b>	<b>-0.4</b>	<b>1.17</b>	<b>21.2</b>	1.11	-0.03	1.12	20.4
	Channel 661	29.95	0.884	-0.45	0.98	21.4	0.931	0	0.93	20.6
	Channel 810	30.00	0.825	0.2	0.83	20.9	0.848	0.02	0.85	20.4

**Table 1: SAR measurement results for the portable cellular telephone FCC ID IHDT56FE1 at highest possible output power. Measured against the head in the Cheek/Touch Position.**

f (MHz)	Description	Conducted Output Power (dBm)	15° Tilt Position							
			Left Head				Right Head			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
GSM 850MHz	Channel 128	32.75								
	Channel 189	32.73	0.2	0.1	0.2	21.3	0.214	0.06	0.21	21
	Channel 251	32.73								
GSM 1900MHz	Channel 512	29.95								
	Channel 661	29.95	0.456	-0.19	0.48	20.8	0.495	-0.03	0.50	20.2
	Channel 810	30.00								

**Table 2: SAR measurement results for the portable cellular telephone FCC ID IHDT56FE1 at highest possible output power. Measured against the head in the Tilt Position.**

### 6.2 Body Worn Test Results

The SAR results shown in table 3 are the maximum SAR values averaged over 1 gram of phantom tissue. Also shown are the measured conducted output powers, the temperature of the test facility during the test, the temperature of the tissue simulate after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is  $New\ SAR = Old\ SAR * 10^{(-drift/10)}$ . The SAR reported at the end of the measurement process by the DASY™ 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. The test conditions indicated as bold numbers in the following table are included in Appendix 3. Note that 800MHz digital mode SAR measurements were performed in accordance with OET Bulletin 65 Supplement C 01-01. 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. The cellular phone was tested with a headset connected to the device for all body-worn SAR measurements.

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	SN1390	900	6.37	9 of 10
		1810	4.77	9 of 10

f (MHz)	Description	Conducted Output Power (dBm)	Body Worn							
			Front of phone 15 mm away from phantom (GSM)				Back of phone 15 mm away from phantom (GSM)			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
GSM 850MHz	Channel 128	32.75								
	Channel 189	32.73	0.228	0.07	0.23	21.8	<b>0.389</b>	<b>0.02</b>	<b>0.39</b>	<b>21.7</b>
	Channel 251	32.73								
GSM 1900MHz	Channel 512	29.95								
	Channel 661	29.95	0.09	-0.09	0.09	20.8	0.207	-0.01	0.21	20.8
	Channel 810	30.00								

**Table 3 : SAR measurement results for the portable cellular telephone FCC ID IHDT56FE1 at highest possible output power. Measured against the body.**

### 6.3 Push-to-Talk/Dispatch Mode Test Results

The SAR results shown in table 4 are maximum SAR values averaged over 1 gram of phantom tissue for the Push-to-Talk/Dispatch Mode SAR measurements. Also shown are the measured conducted output powers.

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

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

f (MHz)	Description	Conducted Output Power (dBm)	Push-To-Talk Mode GPRS Class 8			
			Ant Fixed			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
GSM 850MHz	Channel 128	32.75				
	Channel 189	32.73	0.117	0.05	0.12	21.1
	Channel 251	32.73				
GSM 1900MHz	Channel 512	29.95				
	Channel 661	29.95	0.098	-0.03	0.10	20.7
	Channel 810	30.00				

**Table 4: SAR measurement results for the portable cellular telephone FCC ID IHDT56FE1 against a flat phantom in PTT Mode**

**Appendix 1**

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

Date/Time: 6/24/2005 8:04:27 AM

## Test Laboratory: Motorola

### 20050624 900MHz\_Good+5.4%

**DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:094**

Procedure Notes: 900 MHz System Performance Check / Dipole Sn# 094 PM1 Power = 199 mW Sim.Temp@meas = 20.84°C Sim.Temp@SPC = 20.8°C Room Temp @ SPC = 21°C

Communication System: CW - Dipole; Frequency: 900 MHz; Channel Number: 4; Duty Cycle: 1:1  
Medium: VALIDATION Only; Medium parameters used:  $\sigma = 0.98$  mho/m,  $\epsilon_r = 41.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ET3DV6 - SN1390; ConvF(6.45, 6.45, 6.45); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8: Sugar Water SAM; Type: SAM; Serial: TP-1168;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

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

Maximum value of SAR (measured) = 2.30 mW/g

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

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

Reference Value = 52.3 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 3.55 W/kg

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

Maximum value of SAR (measured) = 2.52 mW/g

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

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

Reference Value = 52.3 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 3.63 W/kg

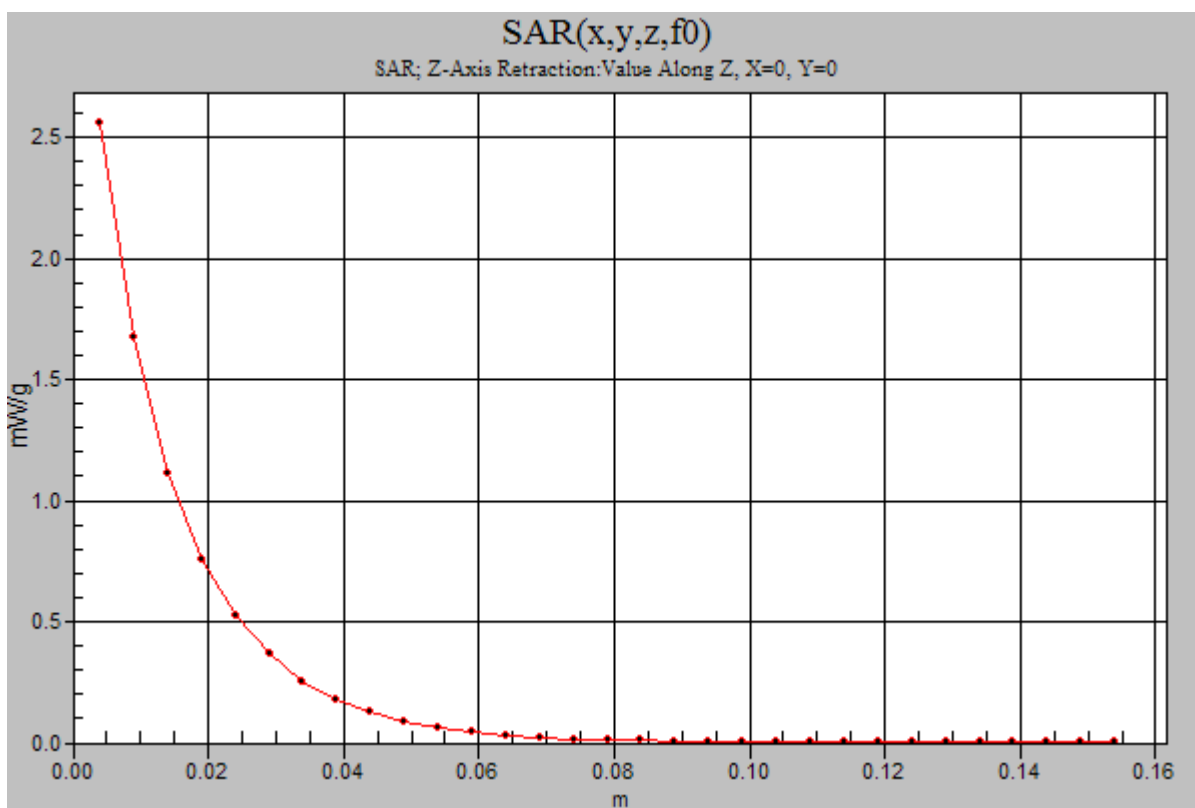
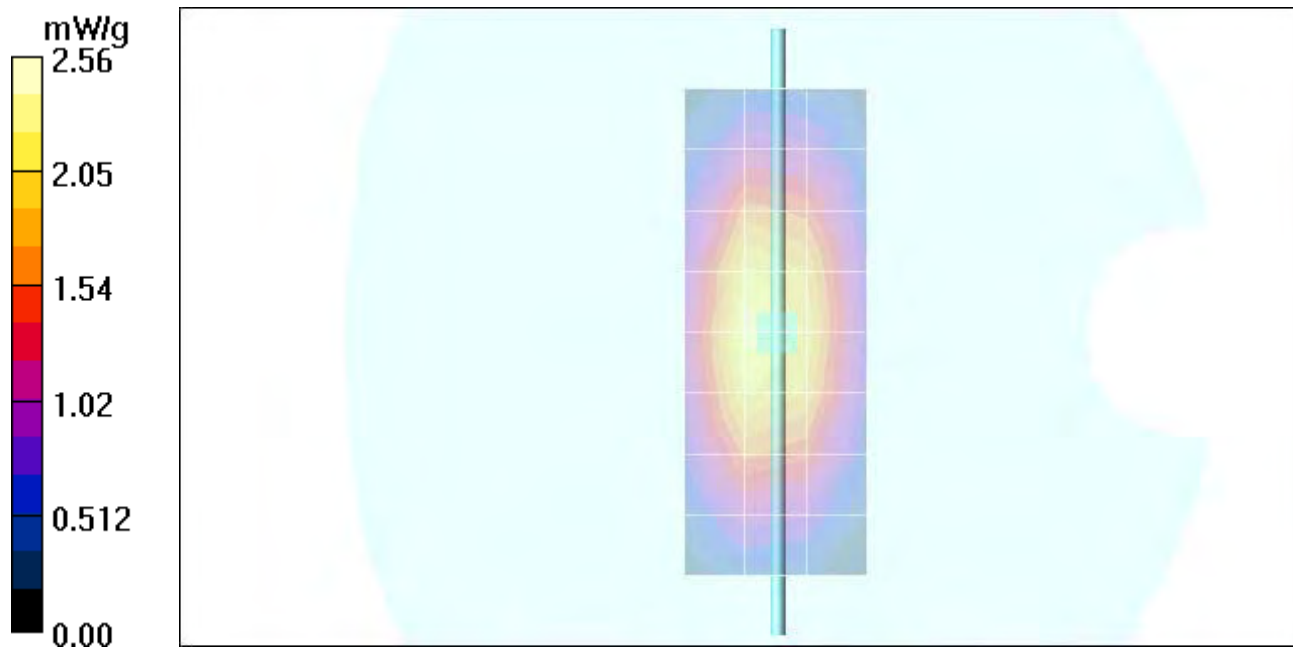
**SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.54 mW/g**

Maximum value of SAR (measured) = 2.60 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

### 20050623 1800MHz\_Good-0.7%

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:276tr**

Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 276tr PM1 Power = 200 mW

Sim.Temp@meas = 22.05°C Sim.Temp@SPC = 21.7°C Room Temp @ SPC = 20°C

Communication System: CW - Dipole; Frequency: 1800 MHz; Channel Number: 8; Duty Cycle: 1:1  
Medium: VALIDATION Only; Medium parameters used:  $\sigma = 1.38$  mho/m,  $\epsilon_r = 40.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ET3DV6 - SN1390; ConvF(5.24, 5.24, 5.24); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8; Glycol SAM; Type: SAM; Serial: TP-1138;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

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

Maximum value of SAR (measured) = 6.58 mW/g

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

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

Reference Value = 81.1 V/m; Power Drift = 0.043 dB

Peak SAR (extrapolated) = 12.7 W/kg

**SAR(1 g) = 7.47 mW/g; SAR(10 g) = 4.01 mW/g**

Maximum value of SAR (measured) = 8.43 mW/g

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

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

Reference Value = 81.1 V/m; Power Drift = 0.043 dB

Peak SAR (extrapolated) = 13.0 W/kg

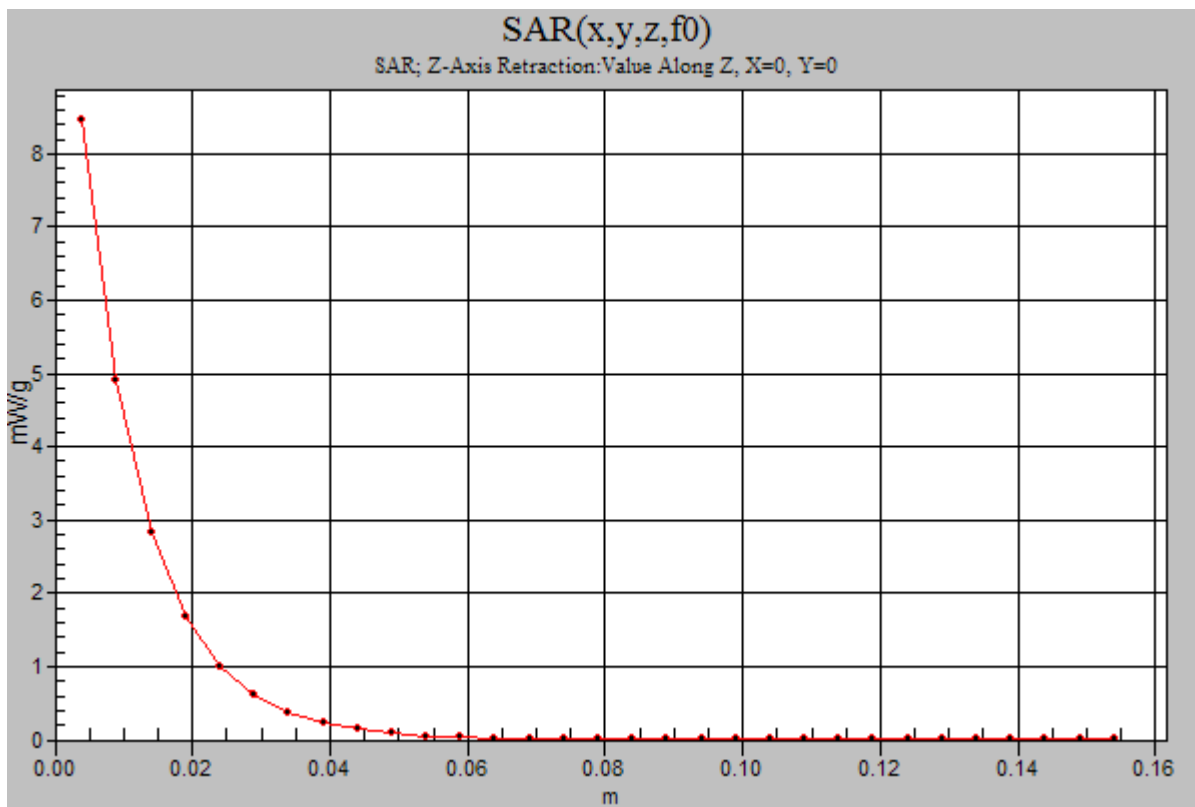
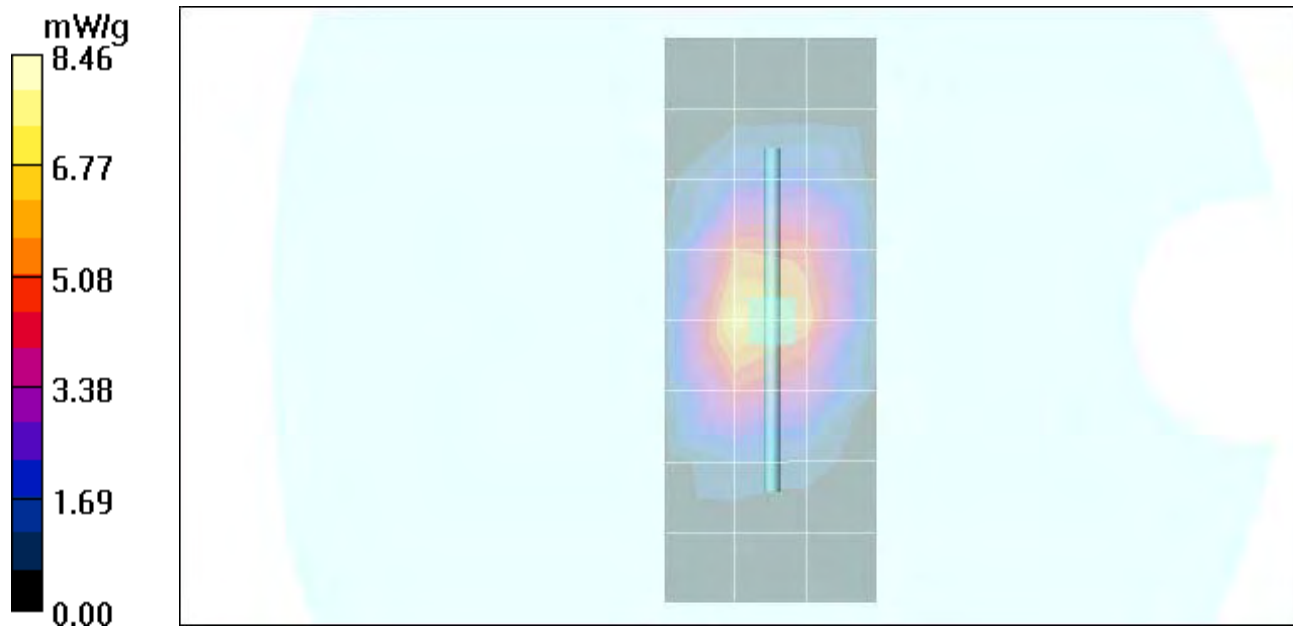
**SAR(1 g) = 7.66 mW/g; SAR(10 g) = 4.13 mW/g**

Maximum value of SAR (measured) = 8.29 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 8.46 mW/g



Date/Time: 6/23/2005 7:55:35 AM

## Test Laboratory: Motorola

### 20050623 900MHz\_Good+6.4%

**DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:094**

Procedure Notes: 900 MHz System Performance Check / Dipole Sn# 094 PM1 Power = 200 mW Sim.Temp@meas = 21.01°C Sim.Temp@SPC = 21°C Room Temp @ SPC = 21°C

Communication System: CW - Dipole; Frequency: 900 MHz; Channel Number: 4; Duty Cycle: 1:1  
Medium: VALIDATION Only; Medium parameters used:  $\sigma = 0.99$  mho/m,  $\epsilon_r = 41.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ET3DV6 - SN1390; ConvF(6.45, 6.45, 6.45); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8: Sugar Water SAM; Type: SAM; Serial: TP-1168;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 2.28 mW/g

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

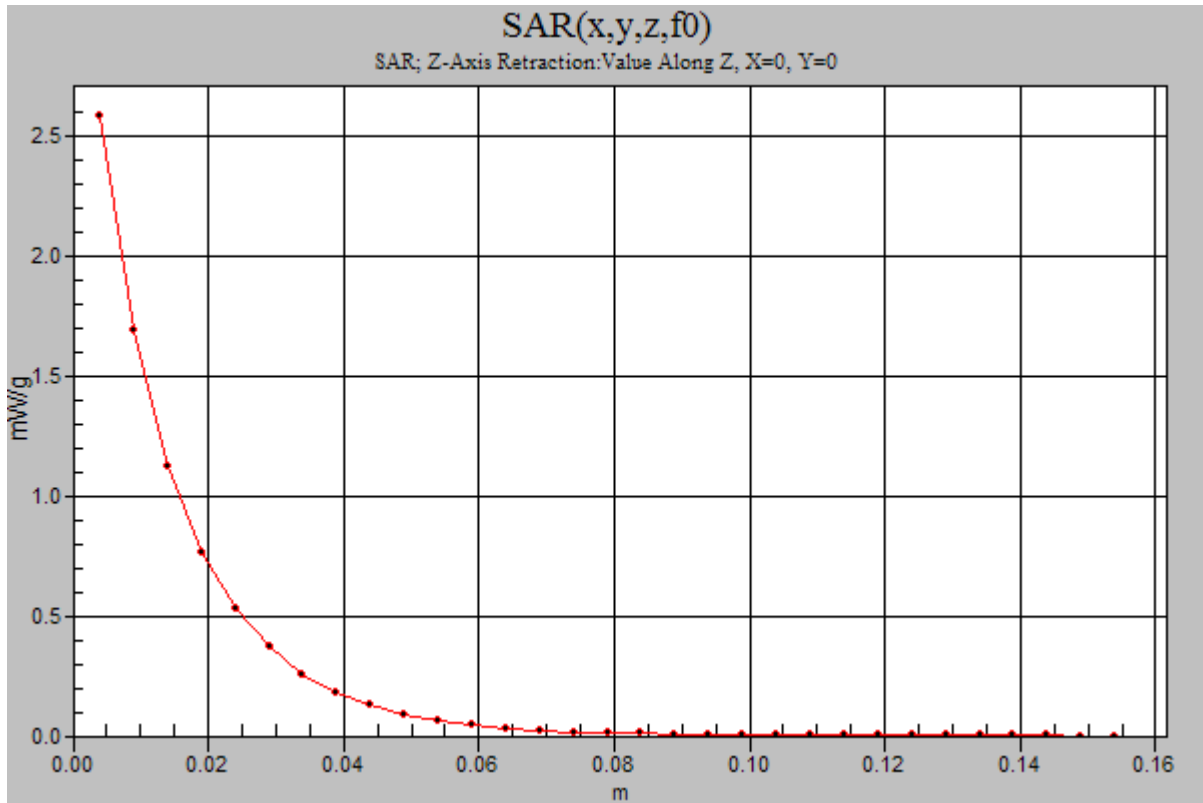
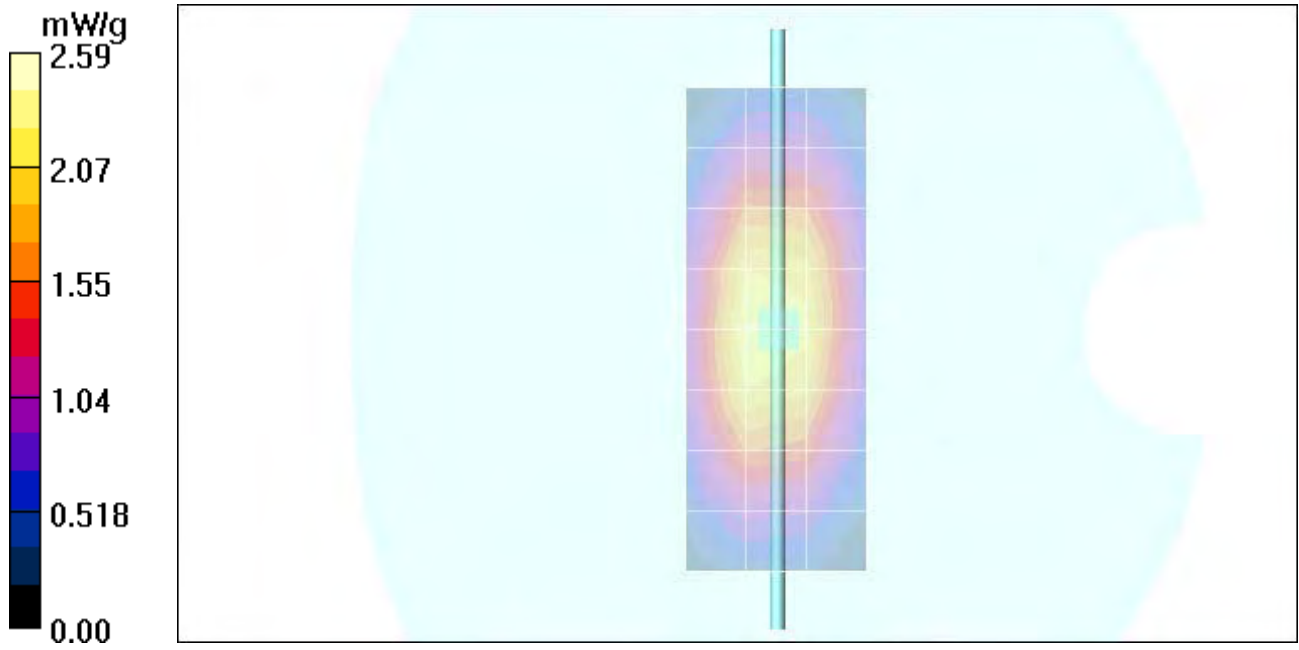
Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 52.4 V/m; Power Drift = -0.01 dB  
Peak SAR (extrapolated) = 3.61 W/kg  
**SAR(1 g) = 2.38 mW/g; SAR(10 g) = 1.52 mW/g**  
Maximum value of SAR (measured) = 2.58 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 52.4 V/m; Power Drift = -0.01 dB  
Peak SAR (extrapolated) = 3.67 W/kg  
**SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.55 mW/g**  
Maximum value of SAR (measured) = 2.64 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 2.59 mW/g



## Test Laboratory: Motorola

### 20050624 1800MHz\_Good-1.9%

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:276tr**

Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 276tr PM1 Power = 200 mW

Sim.Temp@meas = 22.16°C Sim.Temp@SPC = 21.2°C Room Temp @ SPC = 21°C

Communication System: CW - Dipole; Frequency: 1800 MHz; Channel Number: 8; Duty Cycle: 1:1  
Medium: VALIDATION Only; Medium parameters used:  $\sigma = 1.37$  mho/m,  $\epsilon_r = 40.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ET3DV6 - SN1390; ConvF(5.24, 5.24, 5.24); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8; Glycol SAM; Type: SAM; Serial: TP-1138;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

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

Maximum value of SAR (measured) = 6.82 mW/g

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

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

Reference Value = 81.1 V/m; Power Drift = 0.034 dB

Peak SAR (extrapolated) = 12.6 W/kg

**SAR(1 g) = 7.37 mW/g; SAR(10 g) = 3.93 mW/g**

Maximum value of SAR (measured) = 8.29 mW/g

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

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

Reference Value = 81.1 V/m; Power Drift = 0.034 dB

Peak SAR (extrapolated) = 13.0 W/kg

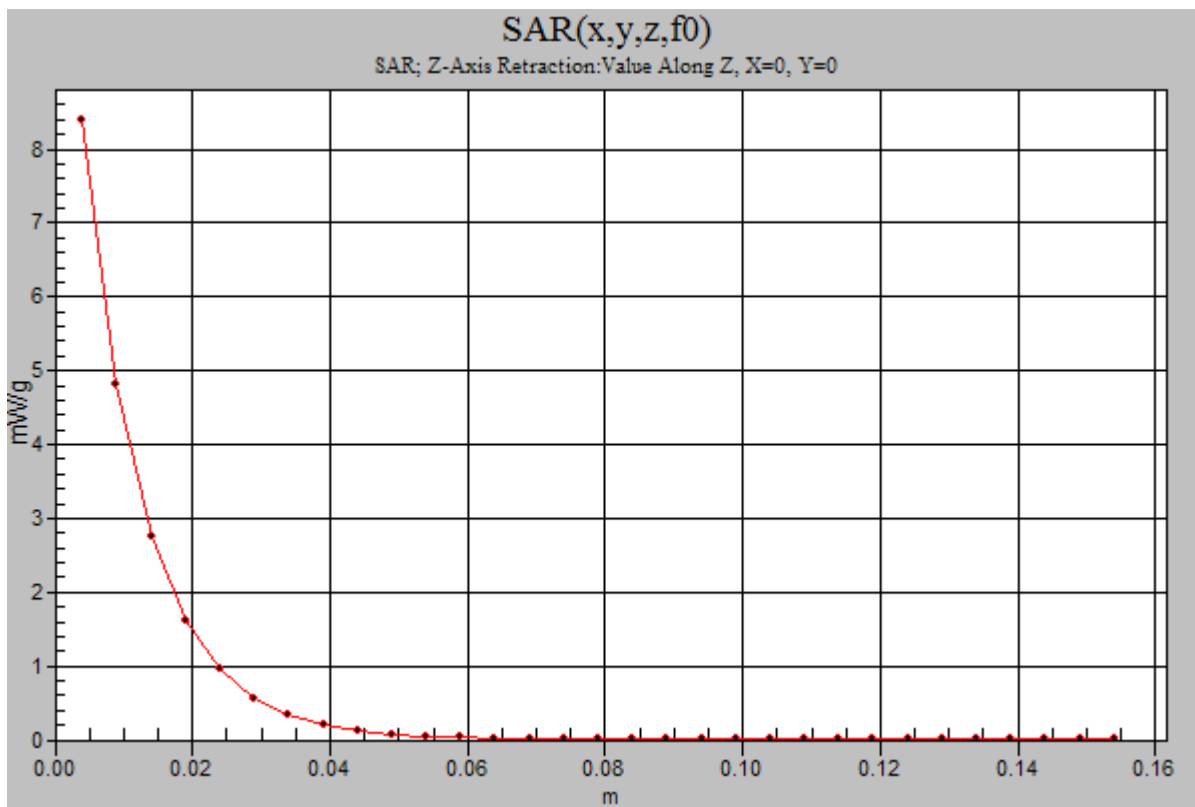
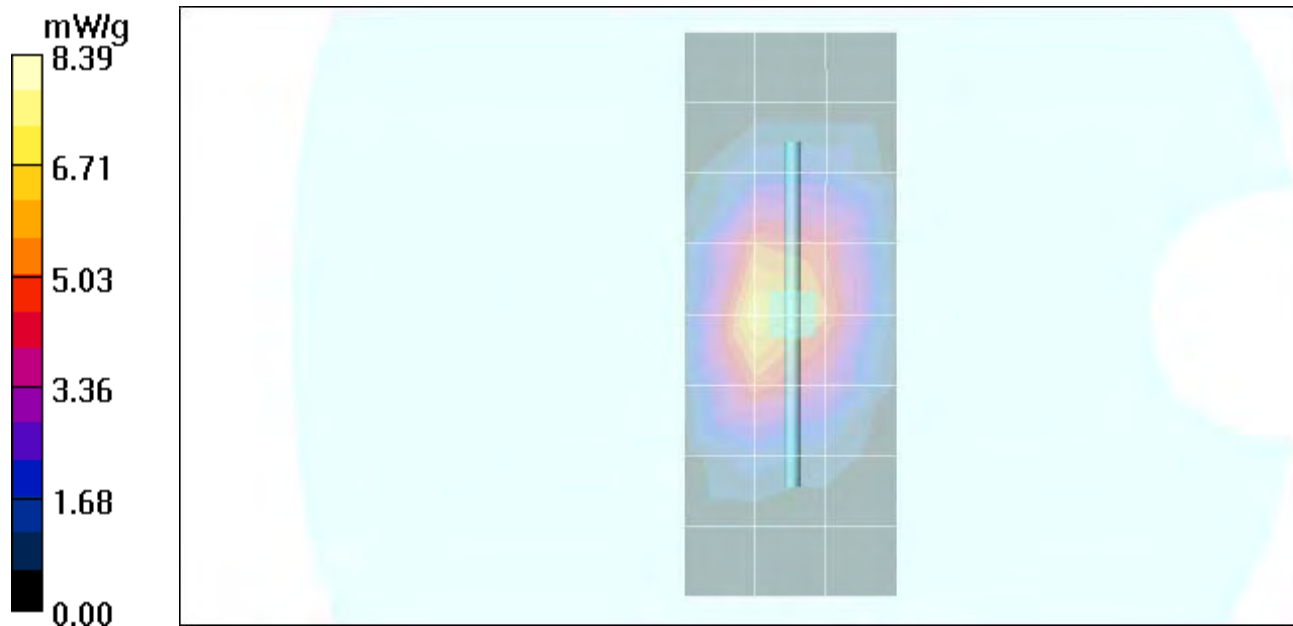
**SAR(1 g) = 7.58 mW/g; SAR(10 g) = 4.05 mW/g**

Maximum value of SAR (measured) = 8.50 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 8.39 mW/g



**Appendix 2**

**SAR distribution plots for Phantom Head Adjacent Use**

Date/Time: 6/24/2005 11:45:02 AM

## Test Laboratory: Motorola

1900 RH Cheek ch512

Serial: 004400013683279

**Procedure Notes: Pwr Step: 00(OTA) Antenna Position: Fixed Accessory Model #: N/A Battery Model #: SNN5749A DEVICE POSITION (cheek or rotated): cheek**

Communication System: GSM 1900; Frequency: 1850.2 MHz; Channel Number: 512; Duty Cycle: 1:8

Medium: Regular Glycol Head; Medium parameters used:  $\sigma = 1.46$  mho/m,  $\epsilon_r = 39.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ET3DV6 - SN1390; ConvF(5.24, 5.24, 5.24); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8: Glycol SAM; Type: SAM; Serial: TP-1138;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

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

Reference Value = 30.5 V/m; Power Drift = -0.031 dB

Peak SAR (extrapolated) = 1.68 W/kg

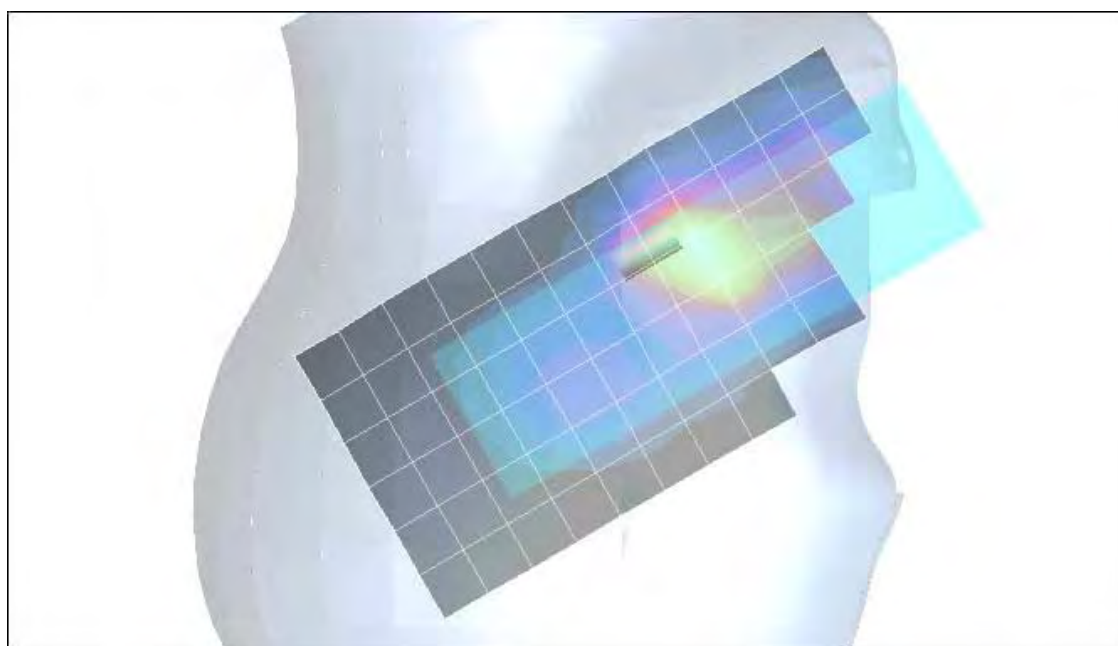
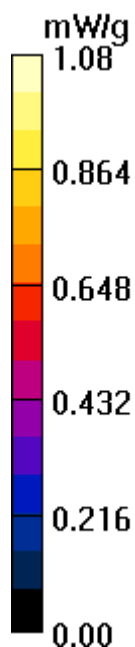
**SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.633 mW/g**

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

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

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

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



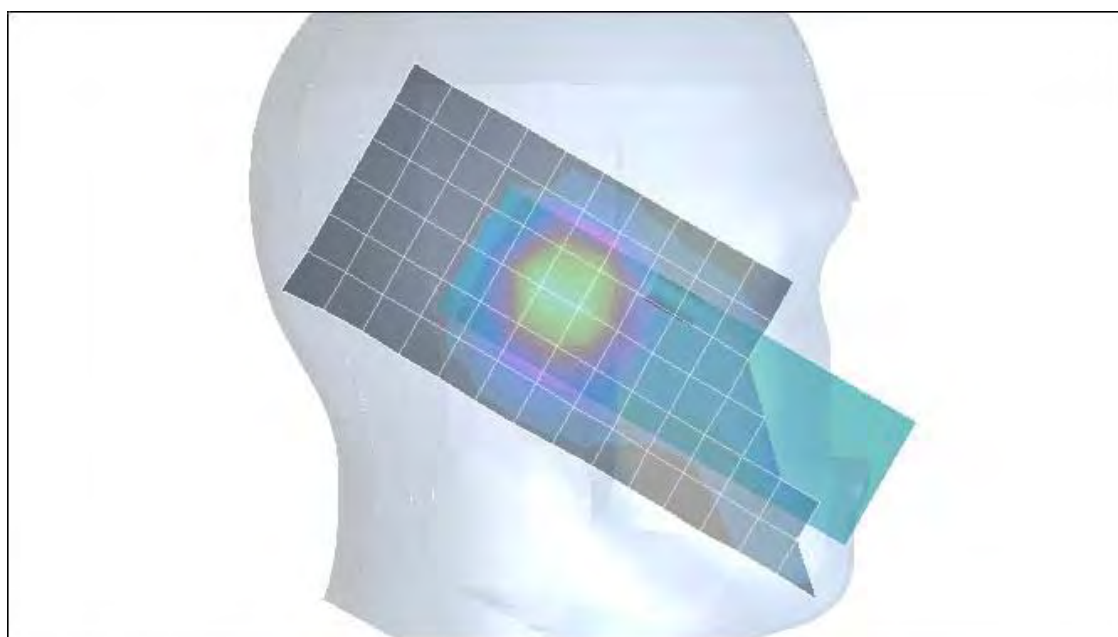
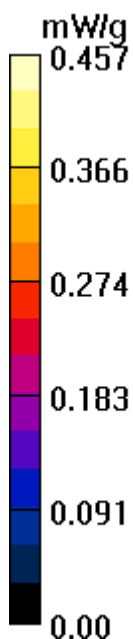
**Test Laboratory: Motorola****1900 LH Tilt ch661**

Serial: 004400013683279

**Procedure Notes: Pwr Step: 00(OTA) Antenna Position: Fixed Accessory Model #: N/A Battery Model #: SNN5749A DEVICE POSITION (cheek or rotated): rotated**Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8  
Medium: Regular Glycol Head; Medium parameters used:  $\sigma = 1.46$  mho/m,  $\epsilon_r = 39.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ET3DV6 - SN1390; ConvF(5.24, 5.24, 5.24); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8: Glycol SAM; Type: SAM; Serial: TP-1138;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

**Left Head Template/Zoom Scan (7x7x7)/Cube 0:**Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 18.1 V/m; Power Drift = -0.186 dB  
Peak SAR (extrapolated) = 0.674 W/kg  
**SAR(1 g) = 0.456 mW/g; SAR(10 g) = 0.278 mW/g**  
Maximum value of SAR (measured) = 0.493 mW/g**Left Head Template/Area Scan - Normal (15mm) (7x17x1):**Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 0.457 mW/g

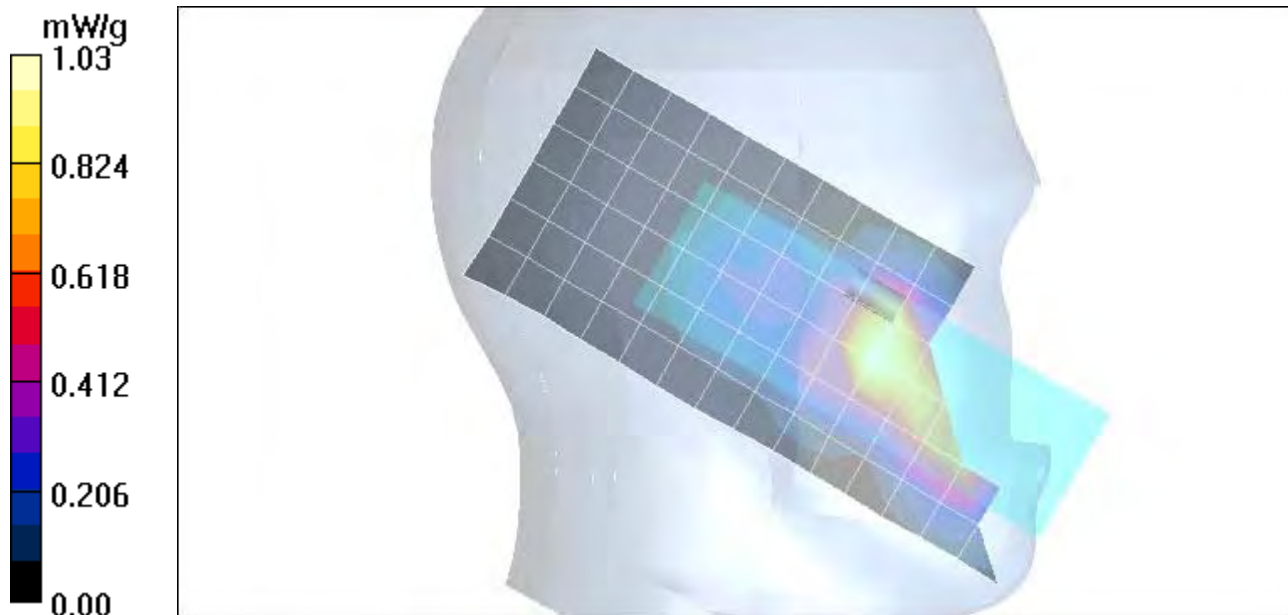
**Test Laboratory: Motorola****1900 LH Cheek ch512**

Serial: 004400013683279

**Procedure Notes: Pwr Step: 00(OTA) Antenna Position: Fixed Accessory Model #: N/A Battery Model #: SNN5749A DEVICE POSITION (cheek or rotated): cheek**Communication System: GSM 1900; Frequency: 1850.2 MHz; Channel Number: 512; Duty Cycle: 1:8  
Medium: Regular Glycol Head; Medium parameters used:  $\sigma = 1.46$  mho/m,  $\epsilon_r = 39.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ET3DV6 - SN1390; ConvF(5.24, 5.24, 5.24); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8: Glycol SAM; Type: SAM; Serial: TP-1138;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

**Left Head Template/Zoom Scan (7x7x7)/Cube 0:**Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 24.6 V/m; Power Drift = -0.397 dB  
Peak SAR (extrapolated) = 1.67 W/kg  
**SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.597 mW/g**  
Maximum value of SAR (measured) = 1.18 mW/g**Left Head Template/Area Scan - Normal (15mm) (7x17x1):**Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 1.03 mW/g

## Test Laboratory: Motorola

850 RH Tilt ch189

Serial: 004400013683279

**Procedure Notes: Pwr Step: 05(OTA) Antenna Position: Fixed Accessory Model #: N/A Battery Model #: SNN5749A DEVICE POSITION (cheek or rotated): Rotated**

Communication System: GSM 850; Frequency: 836.4 MHz; Channel Number: 189; Duty Cycle: 1:8  
Medium: Low Freq Head; Medium parameters used:  $\sigma = 0.93$  mho/m,  $\epsilon_r = 42.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ET3DV6 - SN1390; ConvF(6.45, 6.45, 6.45); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8; Sugar Water SAM; Type: SAM; Serial: TP-1168;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

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

Reference Value = 15.8 V/m; Power Drift = 0.061 dB

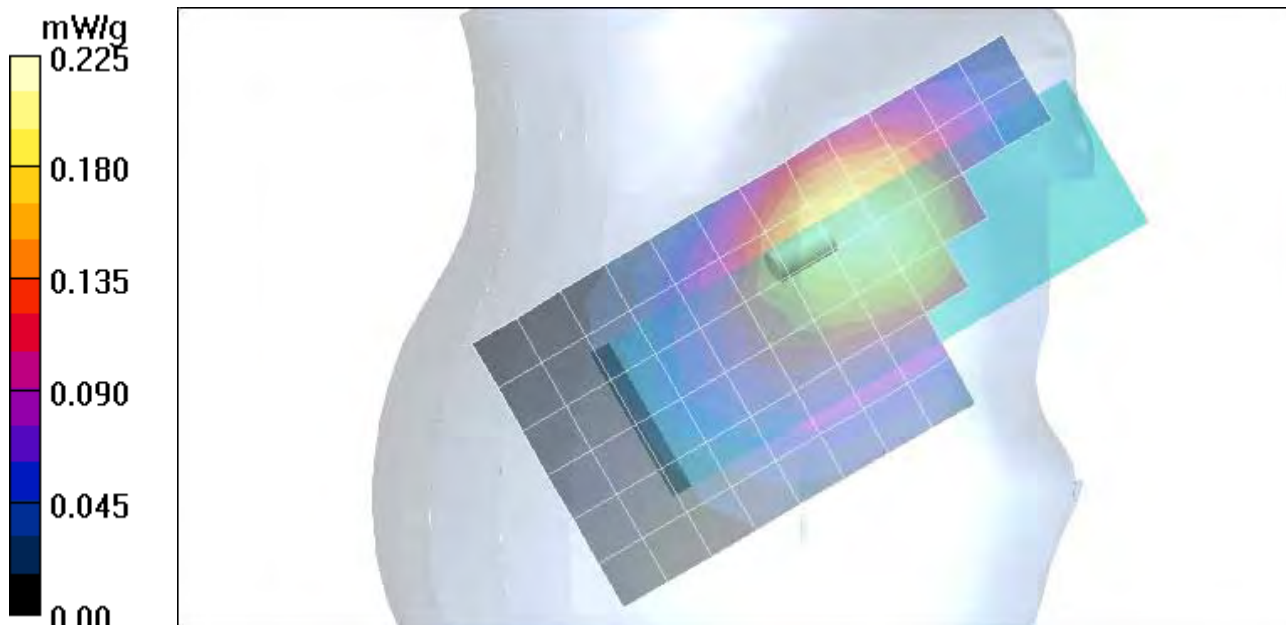
Peak SAR (extrapolated) = 0.274 W/kg

**SAR(1 g) = 0.214 mW/g; SAR(10 g) = 0.160 mW/g**

Maximum value of SAR (measured) = 0.225 mW/g

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

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



**Test Laboratory: Motorola**

850 RH Cheek ch251

Serial: 004400013683279

**Procedure Notes: Pwr Step: 05(OTA) Antenna Position: Fixed Accessory Model #: N/A Battery Model #: SNN5749A DEVICE POSITION (cheek or rotated): Cheek**

Communication System: GSM 850; Frequency: 848.8 MHz; Channel Number: 251; Duty Cycle: 1:8  
Medium: Low Freq Head; Medium parameters used:  $\sigma = 0.93$  mho/m,  $\epsilon_r = 42.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ET3DV6 - SN1390; ConvF(6.45, 6.45, 6.45); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8; Sugar Water SAM; Type: SAM; Serial: TP-1168;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

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

Reference Value = 34.1 V/m; Power Drift = 0.068 dB

Peak SAR (extrapolated) = 1.51 W/kg

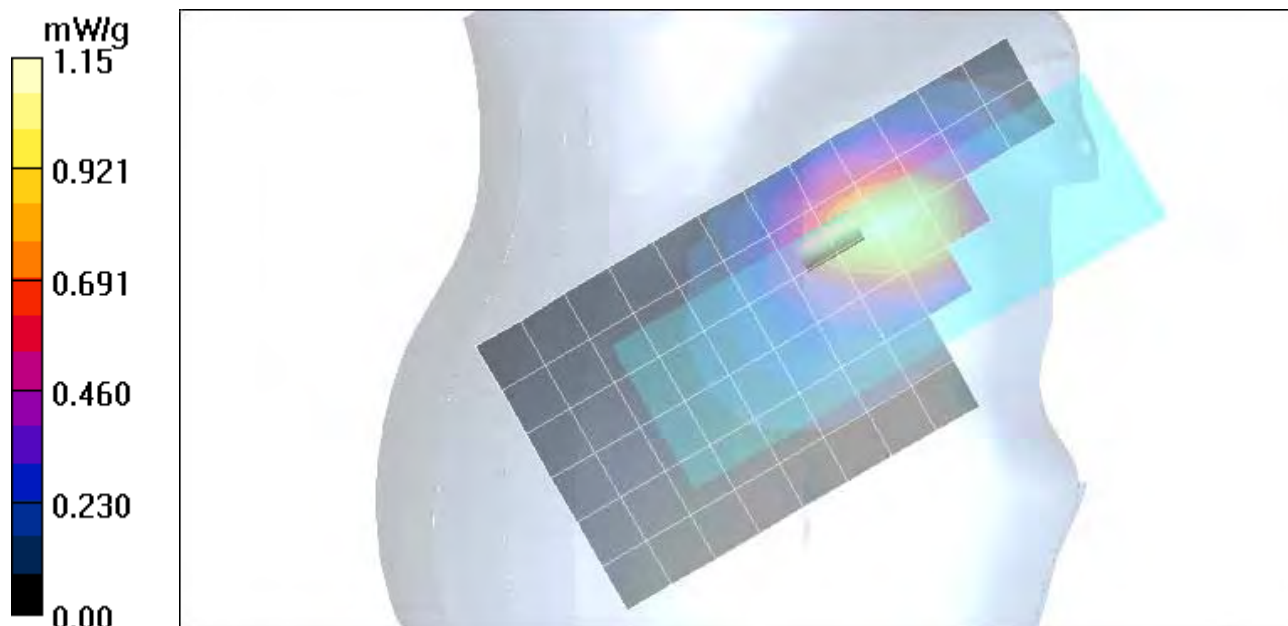
**SAR(1 g) = 1.08 mW/g; SAR(10 g) = 0.715 mW/g**

Maximum value of SAR (measured) = 1.17 mW/g

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

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

Maximum value of SAR (measured) = 1.15 mW/g



**Test Laboratory: Motorola****850 LH Tilt ch189**

Serial: 004400013683279

**Procedure Notes: Pwr Step: 05(OTA) Antenna Position: Fixed Accessory Model #: N/A Battery Model #: SNN5749A DEVICE POSITION (cheek or rotated): rotated**Communication System: GSM 850; Frequency: 836.4 MHz; Channel Number: 189; Duty Cycle: 1:8  
Medium: Low Freq Head; Medium parameters used:  $\sigma = 0.93$  mho/m,  $\epsilon_r = 42.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ET3DV6 - SN1390; ConvF(6.45, 6.45, 6.45); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8: Sugar Water SAM; Type: SAM; Serial: TP-1168;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

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

Reference Value = 15.1 V/m; Power Drift = 0.107 dB

Peak SAR (extrapolated) = 0.257 W/kg

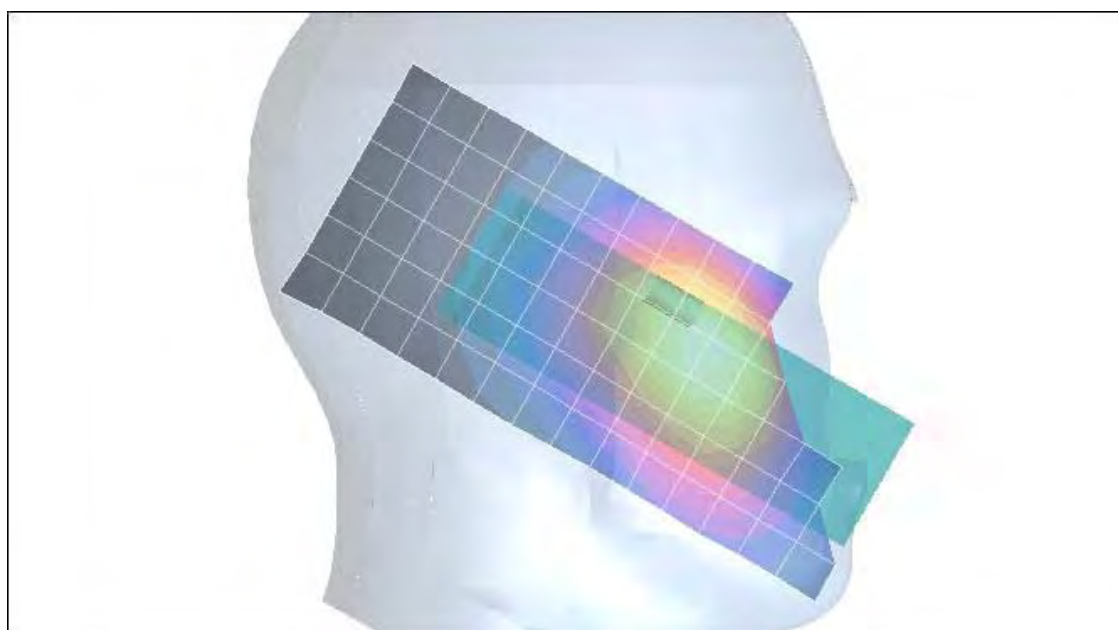
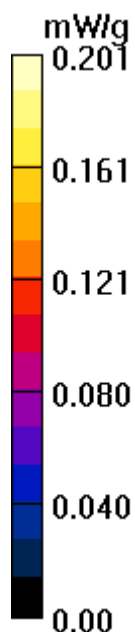
**SAR(1 g) = 0.200 mW/g; SAR(10 g) = 0.148 mW/g**

Maximum value of SAR (measured) = 0.210 mW/g

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

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

Maximum value of SAR (measured) = 0.201 mW/g



**Test Laboratory: Motorola**

850 LH Cheek ch251

Serial: 004400013683279

**Procedure Notes: Pwr Step: 05(OTA) Antenna Position: Fixed Accessory Model #: N/A Battery Model #: SNN5749A DEVICE POSITION (cheek or rotated): cheek**

Communication System: GSM 850; Frequency: 848.8 MHz; Channel Number: 251; Duty Cycle: 1:8  
Medium: Low Freq Head; Medium parameters used:  $\sigma = 0.93$  mho/m,  $\epsilon_r = 42.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ET3DV6 - SN1390; ConvF(6.45, 6.45, 6.45); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8: Sugar Water SAM; Type: SAM; Serial: TP-1168;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

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

Reference Value = 34.1 V/m; Power Drift = 0.048 dB

Peak SAR (extrapolated) = 1.36 W/kg

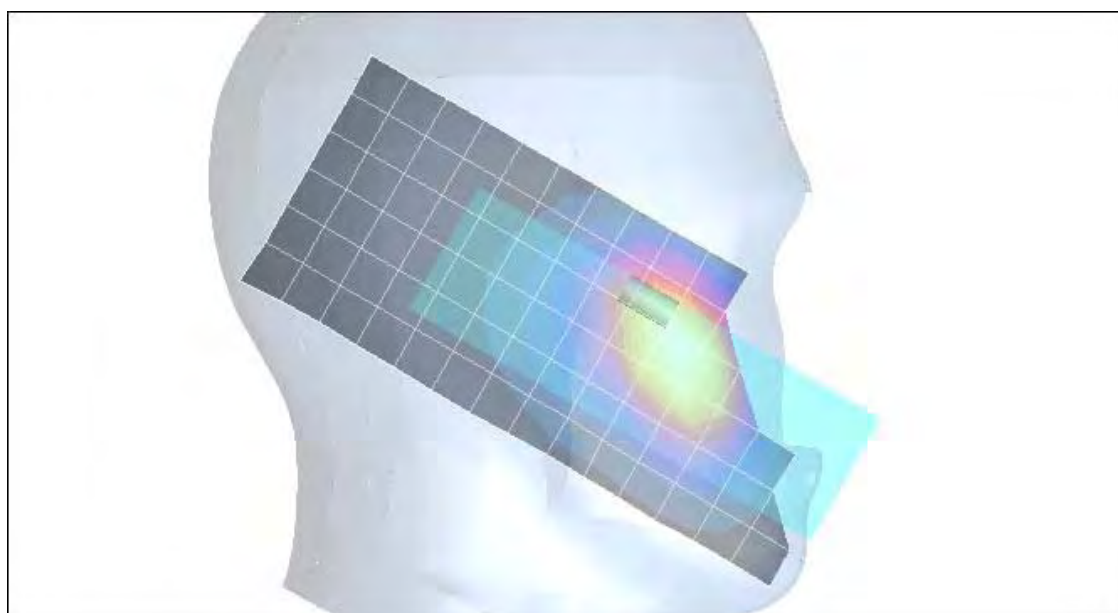
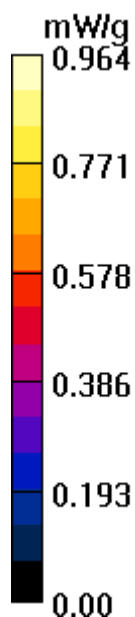
**SAR(1 g) = 0.977 mW/g; SAR(10 g) = 0.659 mW/g**

Maximum value of SAR (measured) = 1.04 mW/g

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

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

Maximum value of SAR (measured) = 0.964 mW/g



## Test Laboratory: Motorola

1900 RH Tilt ch661

Serial: 004400013683279

**Procedure Notes: Pwr Step: 00(OTA) Antenna Position: Fixed Accessory Model #: N/A Battery Model #: SNN5749A DEVICE POSITION (cheek or rotated): rotated**

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8  
Medium: Regular Glycol Head; Medium parameters used:  $\sigma = 1.46$  mho/m,  $\epsilon_r = 39.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

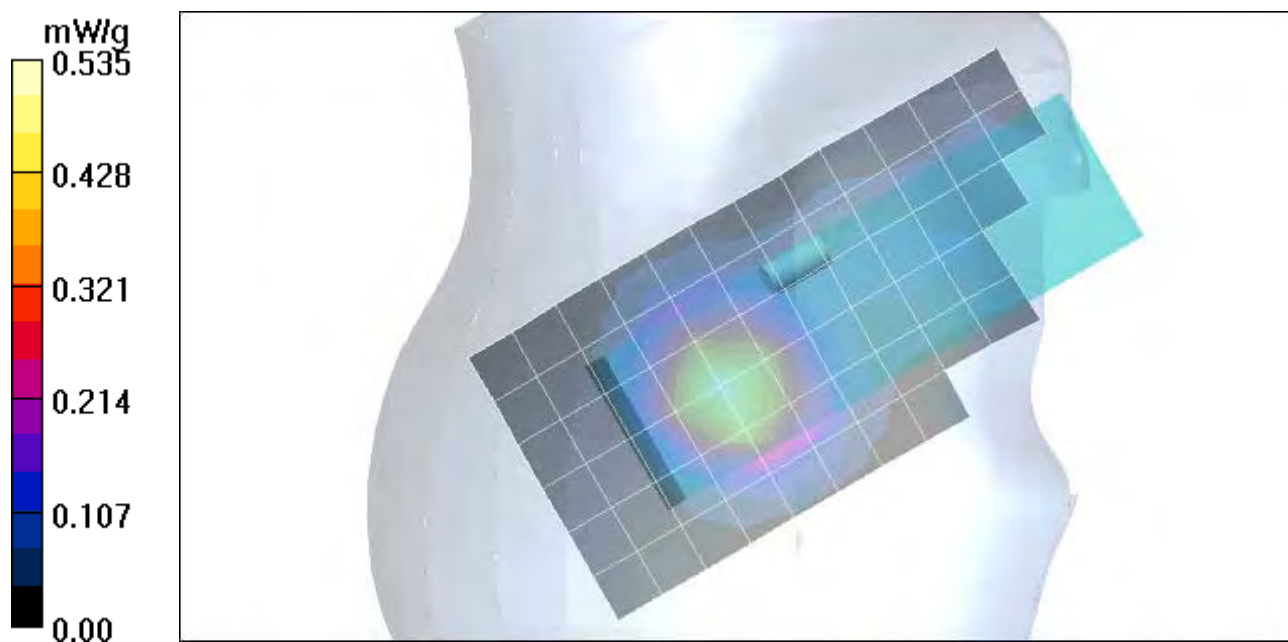
- Probe: ET3DV6 - SN1390; ConvF(5.24, 5.24, 5.24); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8: Glycol SAM; Type: SAM; Serial: TP-1138;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 19.2 V/m; Power Drift = -0.027 dB  
Peak SAR (extrapolated) = 0.735 W/kg  
**SAR(1 g) = 0.495 mW/g; SAR(10 g) = 0.300 mW/g**  
Maximum value of SAR (measured) = 0.537 mW/g

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

Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 0.535 mW/g



**Appendix 3**

**SAR distribution plots for Body Worn and PTT Configuration**

**Test Laboratory: Motorola**

1900 BW Back 15mm ch661

Serial: 004400013683279

**Procedure Notes: Pwr Step: 00 (OTA) Antenna Position: Fixed Battery Model #: SNN5749A****Back of Phone 15mm Away From Flat Phantom**

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8  
 Medium: Regular Glycol Body; Medium parameters used:  $\sigma = 1.59$  mho/m,  $\epsilon_r = 52.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

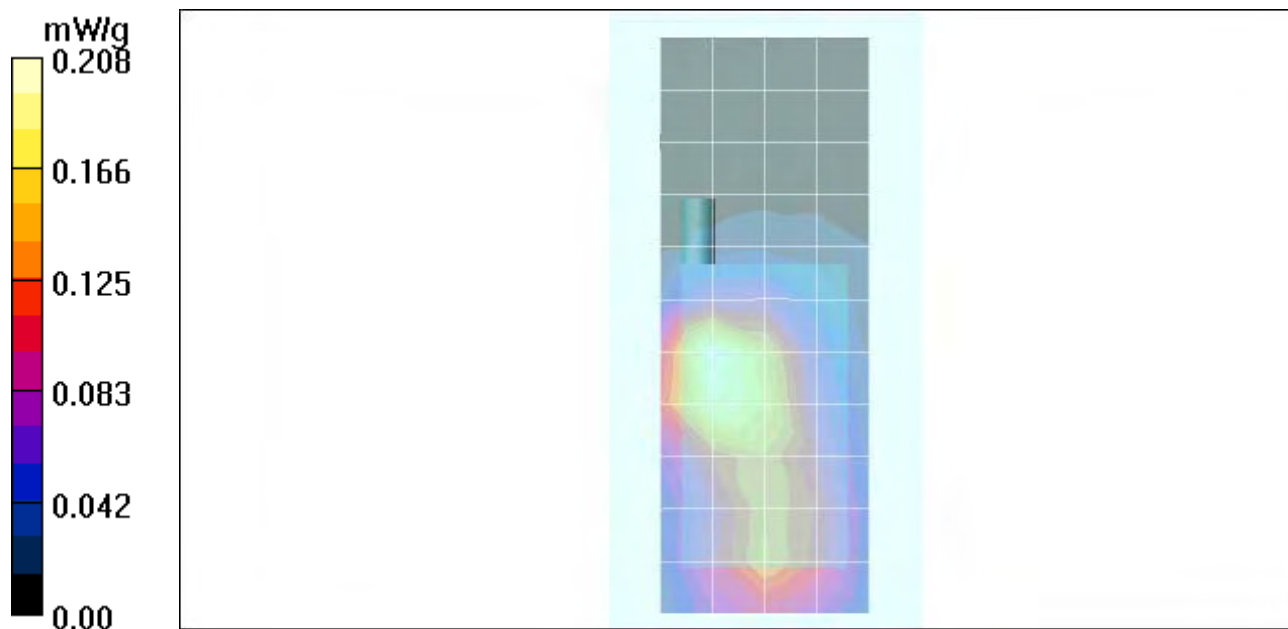
- Probe: ET3DV6 - SN1390; ConvF(4.77, 4.77, 4.77); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8: Section 2, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 10.3 V/m; Power Drift = -0.011 dB  
 Peak SAR (extrapolated) = 0.328 W/kg  
**SAR(1 g) = 0.207 mW/g; SAR(10 g) = 0.125 mW/g**  
 Maximum value of SAR (measured) = 0.223 mW/g

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

Measurement grid: dx=15mm, dy=15mm  
 Maximum value of SAR (measured) = 0.208 mW/g



**Test Laboratory: Motorola**

1900 BW Front 15mm ch661

Serial: 004400013683279

**Procedure Notes: Pwr Step: 00(OTA) Antenna Position: Fixed Battery Model #: SNN5749A****Front of Phone 15mm Away From Flat Phantom**

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8  
 Medium: Regular Glycol Body; Medium parameters used:  $\sigma = 1.58$  mho/m,  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

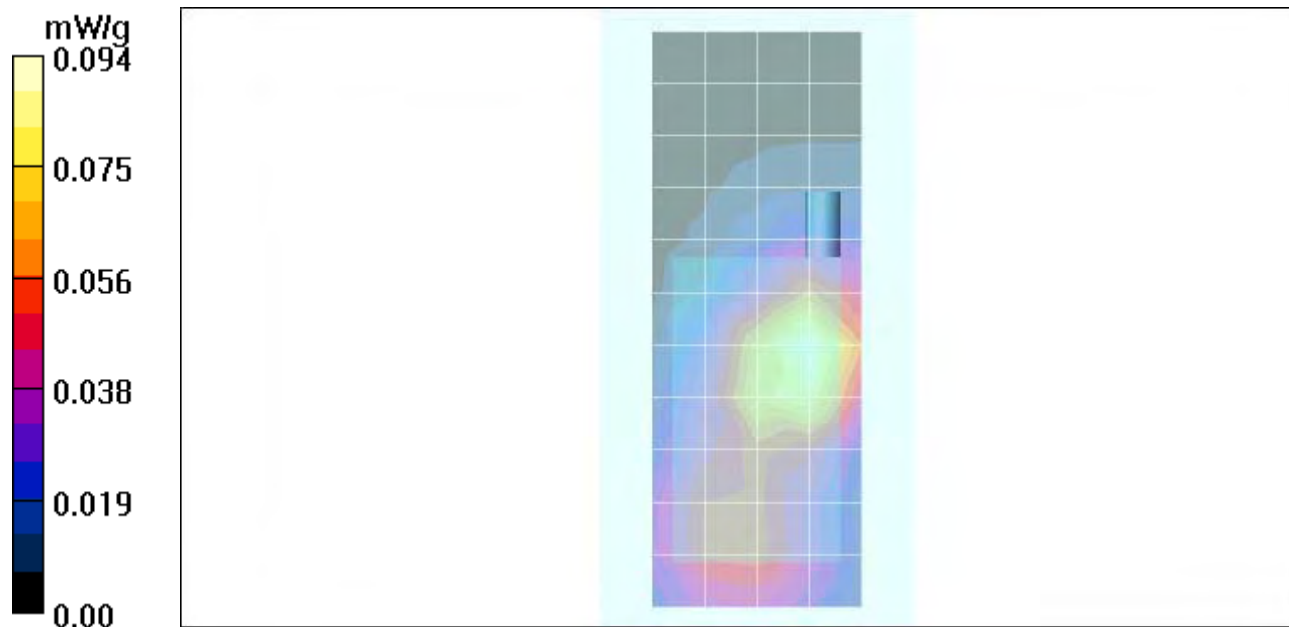
- Probe: ET3DV6 - SN1390; ConvF(4.77, 4.77, 4.77); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8: Section 2, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 6.47 V/m; Power Drift = -0.086 dB  
 Peak SAR (extrapolated) = 0.144 W/kg  
**SAR(1 g) = 0.090 mW/g; SAR(10 g) = 0.054 mW/g**  
 Maximum value of SAR (measured) = 0.097 mW/g

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

Measurement grid: dx=15mm, dy=15mm  
 Maximum value of SAR (measured) = 0.094 mW/g



## Test Laboratory: Motorola

850 BW Back 15mm ch189

Serial: 004400013683279

**Procedure Notes: Pwr Step: 05 (OTA) Antenna Position: Fixed Battery Model #: SNN5749A**

### Back of Phone 15 mm Away From Flat Phantom

Communication System: GSM 850; Frequency: 836.4 MHz; Channel Number: 189; Duty Cycle: 1:8  
Medium: Low Freq Body; Medium parameters used:  $\sigma = 0.97$  mho/m,  $\epsilon_r = 55$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ET3DV6 - SN1390; ConvF(6.37, 6.37, 6.37); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8: Section 1, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

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

Reference Value = 18.7 V/m; Power Drift = 0.018 dB

Peak SAR (extrapolated) = 0.520 W/kg

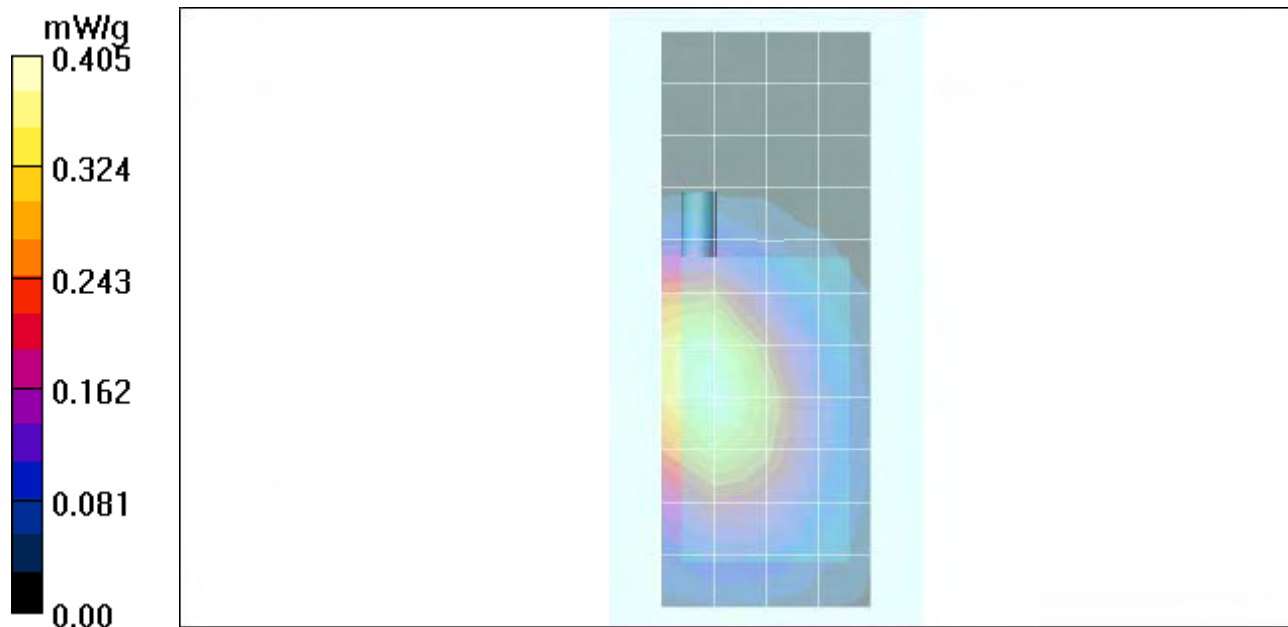
**SAR(1 g) = 0.389 mW/g; SAR(10 g) = 0.272 mW/g**

Maximum value of SAR (measured) = 0.415 mW/g

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

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

Maximum value of SAR (measured) = 0.405 mW/g



Date/Time: 6/23/2005 9:14:56 PM

## Test Laboratory: Motorola

850 BW Front 15mm ch189

Serial: 004400013683279

**Procedure Notes: Pwr Step: 05 (OTA) Antenna Position: Fixed Battery Model #: SNN5749A**

### Front of Phone 15mm Away from Phantom

Communication System: GSM 850; Frequency: 836.4 MHz; Channel Number: 189; Duty Cycle: 1:8  
Medium: Low Freq Body; Medium parameters used:  $\sigma = 0.97$  mho/m,  $\epsilon_r = 55$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

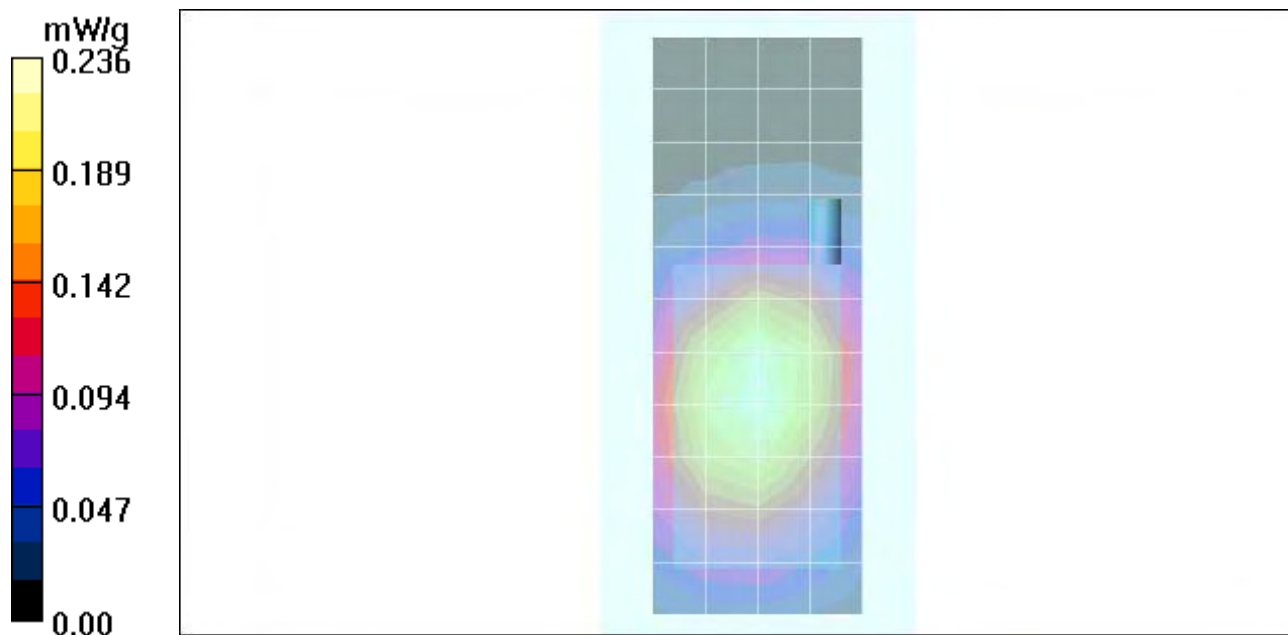
- Probe: ET3DV6 - SN1390; ConvF(6.37, 6.37, 6.37); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8: Section 1, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 15.4 V/m; Power Drift = 0.065 dB  
Peak SAR (extrapolated) = 0.300 W/kg  
**SAR(1 g) = 0.228 mW/g; SAR(10 g) = 0.163 mW/g**  
Maximum value of SAR (measured) = 0.243 mW/g

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

Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 0.236 mW/g



**Test Laboratory: Motorola**

850 PTT Front 25mm ch189

Serial: 004400013683279

**Procedure Notes: Pwr Step: 05 (OTA) Antenna Position: Fixed Battery Model #: SNN5749A****PTT Front of Phone 25mm Away From Phantom**

Communication System: GSM 850; Frequency: 836.4 MHz; Channel Number: 189; Duty Cycle: 1:8

Medium: Low Freq Head; Medium parameters used:  $\sigma = 0.92$  mho/m,  $\epsilon_r = 42.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ET3DV6 - SN1390; ConvF(6.45, 6.45, 6.45); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8: Sugar Water SAM; Type: SAM; Serial: TP-1168;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

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

Reference Value = 11.6 V/m; Power Drift = 0.052 dB

Peak SAR (extrapolated) = 0.157 W/kg

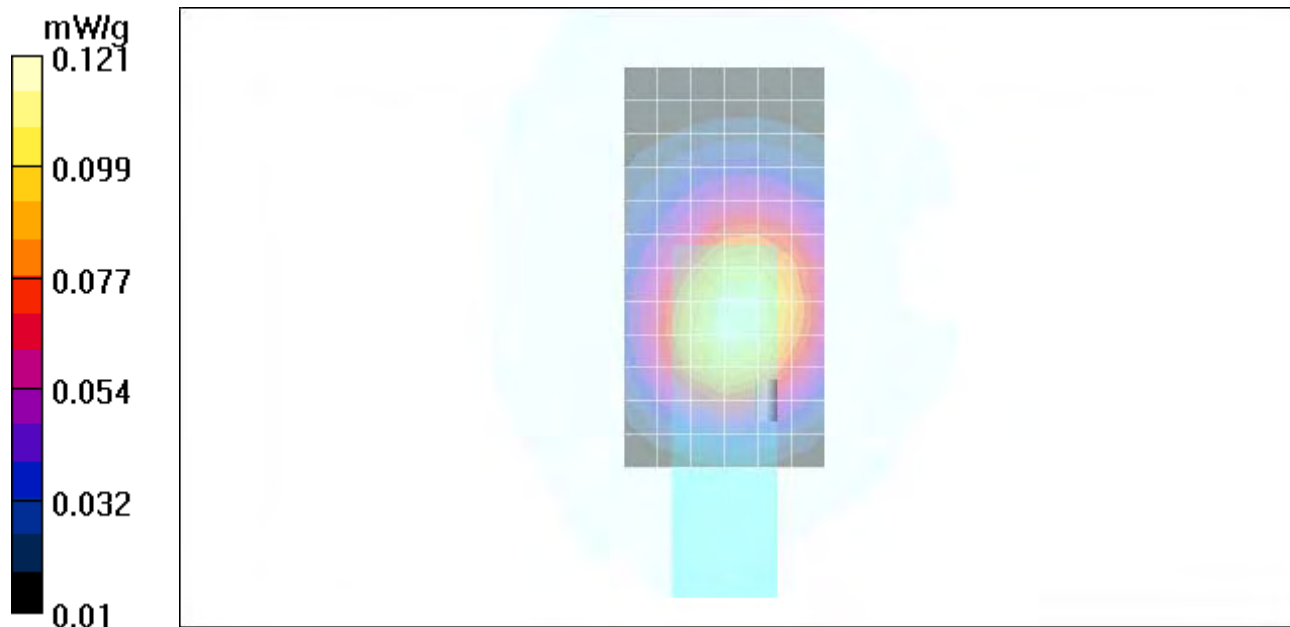
**SAR(1 g) = 0.117 mW/g; SAR(10 g) = 0.084 mW/g**

Maximum value of SAR (measured) = 0.124 mW/g

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

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

Maximum value of SAR (measured) = 0.121 mW/g



**Test Laboratory: Motorola**

1900 PTT Front 25mm ch661

Serial: 004400013683279

**Procedure Notes: Pwr Step: 00 (OTA) Antenna Position: Fixed Battery Model #: SNN5749A****PTT Front of Phone 25mm Away from Phantom**

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

Medium: Regular Glycol Head; Medium parameters used:  $\sigma = 1.46$  mho/m,  $\epsilon_r = 39.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ET3DV6 - SN1390; ConvF(5.24, 5.24, 5.24); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn367; Calibrated: 5/30/2005
- Phantom: PCS-8; Glycol SAM; Type: SAM; Serial: TP-1138;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

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

Reference Value = 8.50 V/m; Power Drift = -0.025 dB

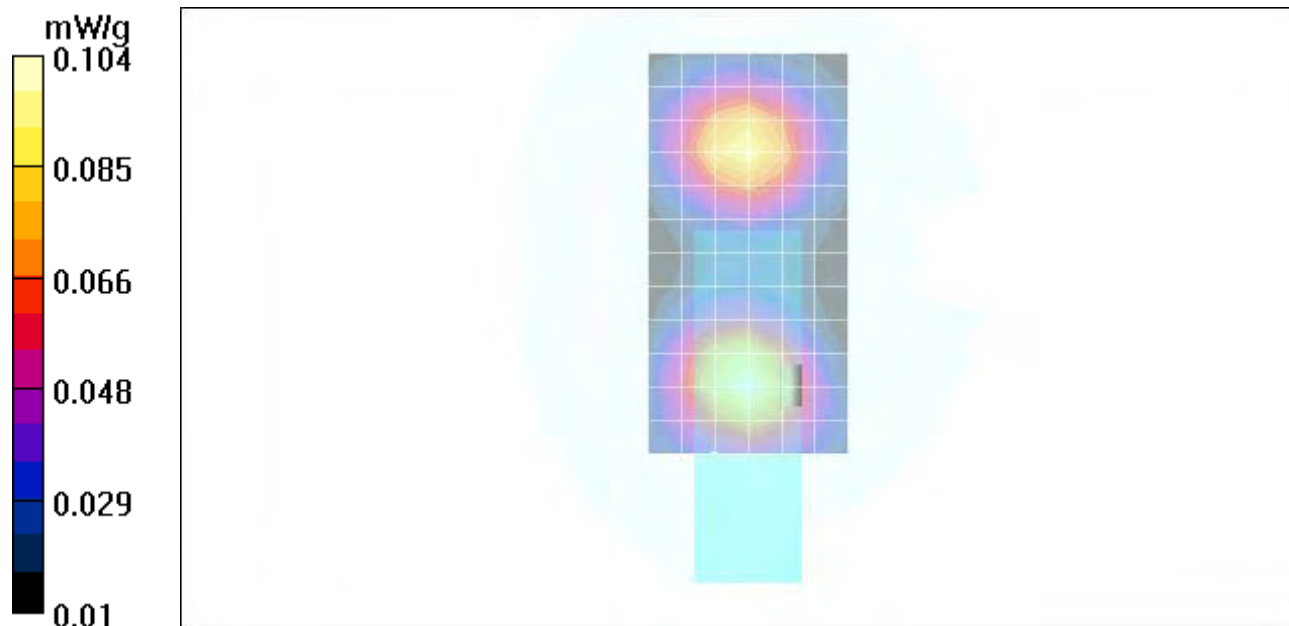
Peak SAR (extrapolated) = 0.150 W/kg

**SAR(1 g) = 0.098 mW/g; SAR(10 g) = 0.061 mW/g**

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

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

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



**Appendix 4**  
**Probe Calibration Certificate**

## **IMPORTANT NOTICE**

### **USAGE OF PROBES IN ORGANIC SOLVENTS**

Diethylene Glycol Monobutyl Ether (the basis for liquids above 1 GHz), as many other organic solvents, is a very effective softener for synthetic materials. These solvents can cause irreparable damage to certain SPEAG products, except those which are explicitly declared as compliant with organic solvents.

#### **Compatible Probes:**

- ET3DV6
- ET3DV6R
- ES3DVx
- ER3DV6
- H3DV6

#### **Important Note for ET3DV6 Probes:**

**The ET3DV6 probes shall not be exposed to solvents longer than necessary for the measurements and shall be cleaned daily after use with warm water and stored dry.**

**s p e a g**

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Schmid & Partner Engineering AG



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

Accreditation No.: **SCS 108**

Client **Motorola Korea**

Certificate No: **ET3-1390\_Apr05**

## CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1390**

Calibration procedure(s) **QA CAL-01.v5  
Calibration procedure for dosimetric E-field probes**

Calibration date: **April 22, 2005**

Condition of the calibrated item **In Tolerance**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-04 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe ES3DV2	SN: 3013	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 617	19-Jan-05 (SPEAG, No. DAE4-617_Jan05)	Jan-06

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

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Laboratory Technician	

Approved by:	Katja Pokovic	Technical Manager	
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Issued: April 25, 2005

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



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

Accreditation No.: **SCS 108**

### Glossary:

TSL	tissue simulating liquid
NORM <sub>x,y,z</sub>	sensitivity in free space
ConF	sensitivity in TSL / NORM <sub>x,y,z</sub>
DCP	diode compression point
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\vartheta$	$\vartheta$ 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
- CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

### Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not effect the E<sup>2</sup>-field uncertainty inside TSL (see below *ConvF*).
- NORM(f)<sub>x,y,z</sub>** = NORM<sub>x,y,z</sub> \* *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<sub>x,y,z</sub>**: 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<sub>x,y,z</sub> \* *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  $\pm 50$  MHz to  $\pm 100$  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:1390

Manufactured:	October 1, 1999
Last calibrated:	April 27, 2004
Recalibrated:	April 22, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

## DASY - Parameters of Probe: ET3DV6 SN:1390

### Sensitivity in Free Space<sup>A</sup>

NormX	1.93 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	91 mV
NormY	1.75 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	91 mV
NormZ	1.94 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	91 mV

### Diode Compression<sup>B</sup>

### 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		<b>3.7 mm</b>	<b>4.7 mm</b>
SAR <sub>be</sub> [%]	Without Correction Algorithm	8.2	4.3
SAR <sub>be</sub> [%]	With Correction Algorithm	0.0	0.2

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

Sensor Center to Phantom Surface Distance		<b>3.7 mm</b>	<b>4.7 mm</b>
SAR <sub>be</sub> [%]	Without Correction Algorithm	12.9	8.8
SAR <sub>be</sub> [%]	With Correction Algorithm	0.5	0.1

### Sensor Offset

Probe Tip to Sensor Center                      **2.7 mm**

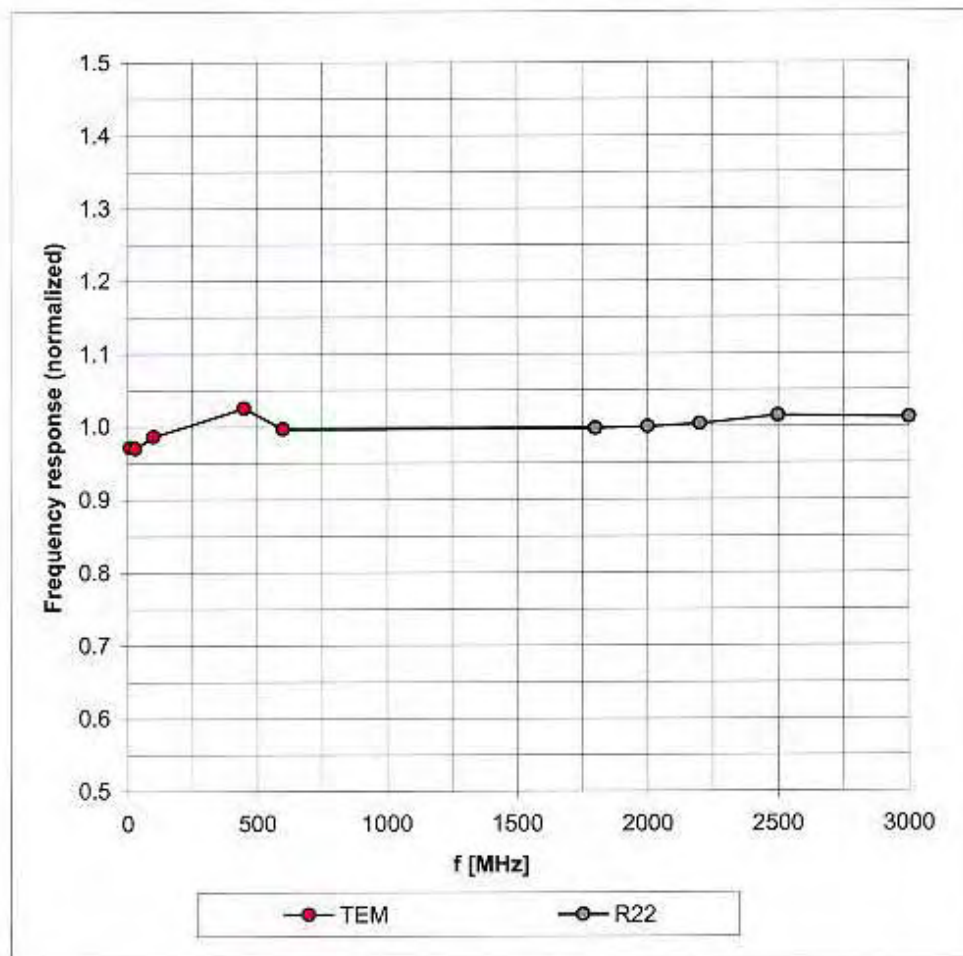
**The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.**

<sup>A</sup> The uncertainties of NormX,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Page 8).

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

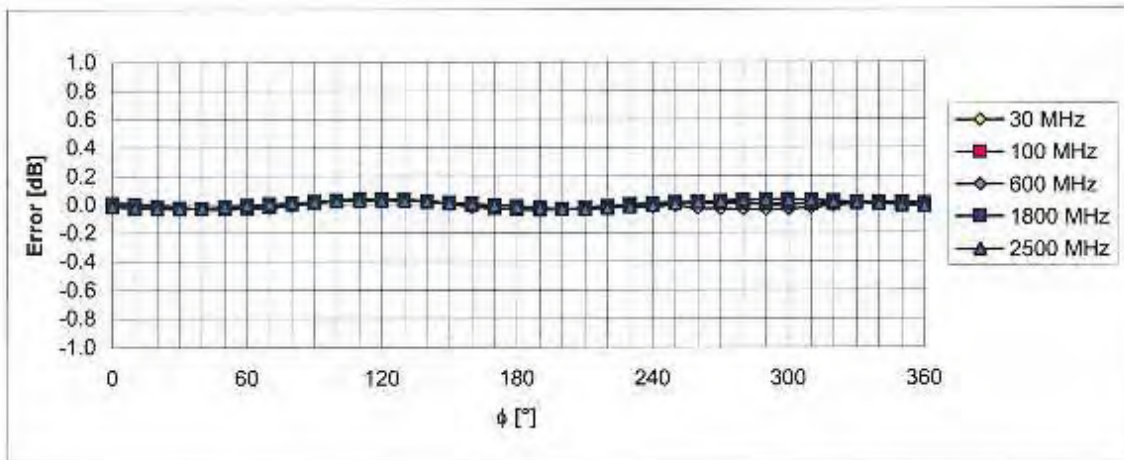
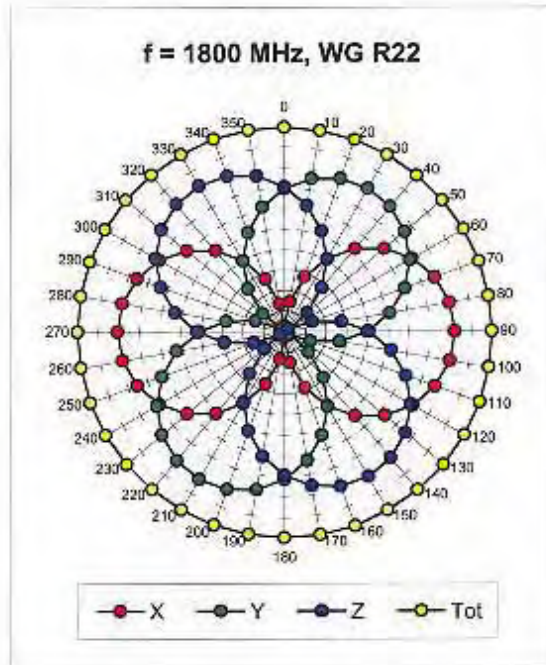
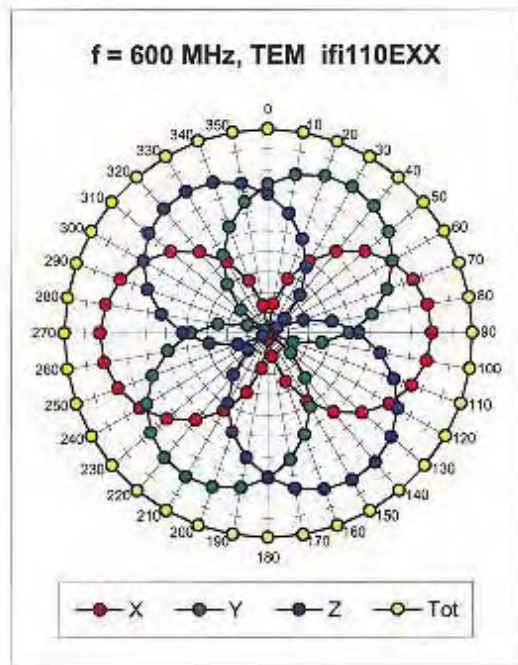
## Frequency Response of E-Field

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



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

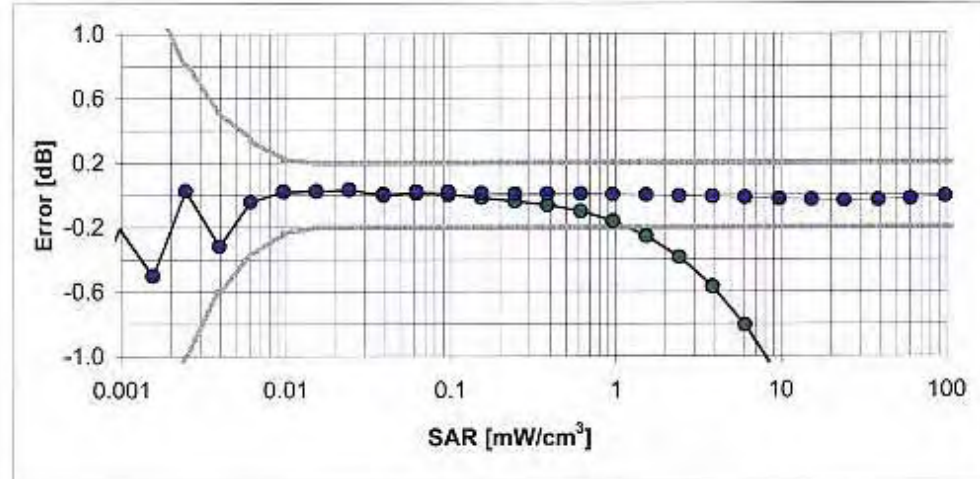
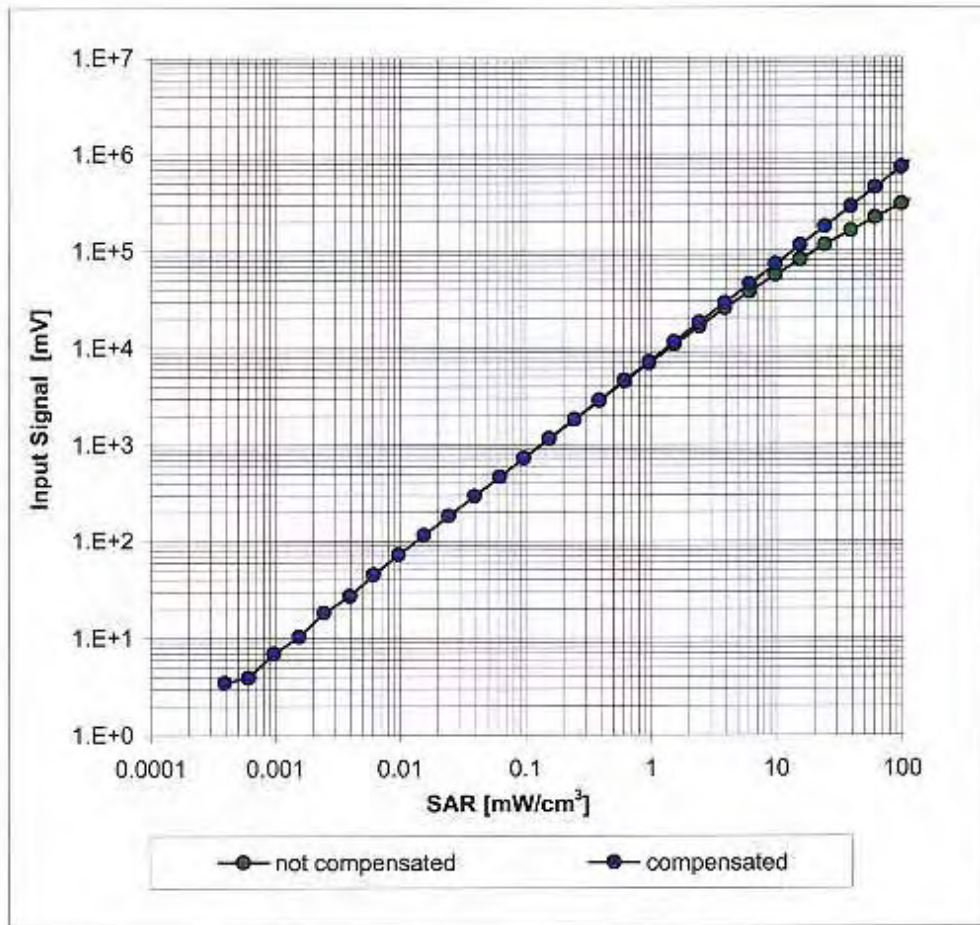
### Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$



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

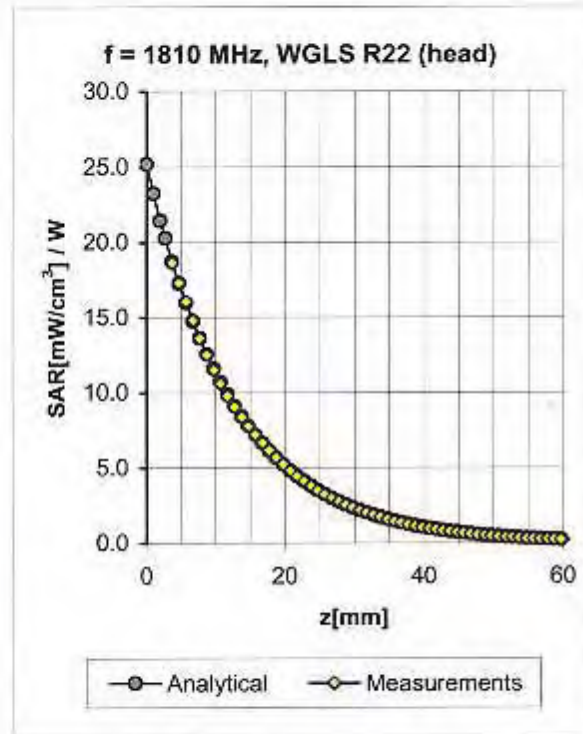
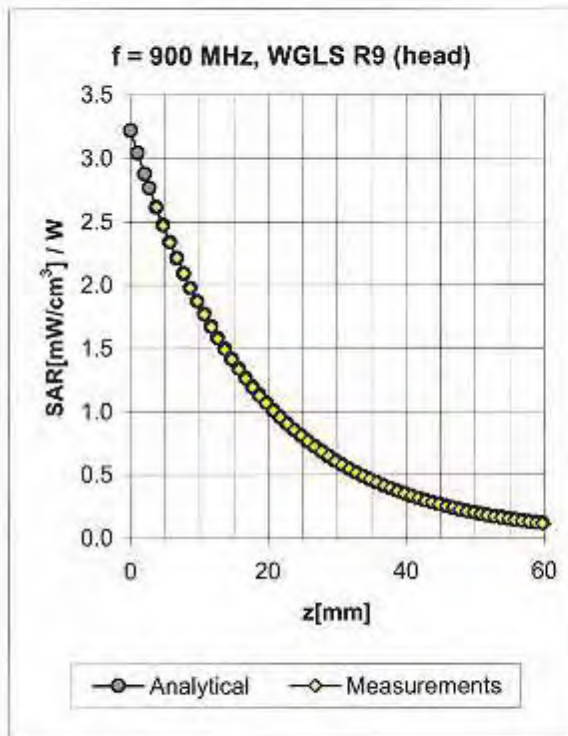
# Dynamic Range $f(\text{SAR}_{\text{head}})$

(Waveguide R22,  $f = 1800 \text{ MHz}$ )



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

## Conversion Factor Assessment

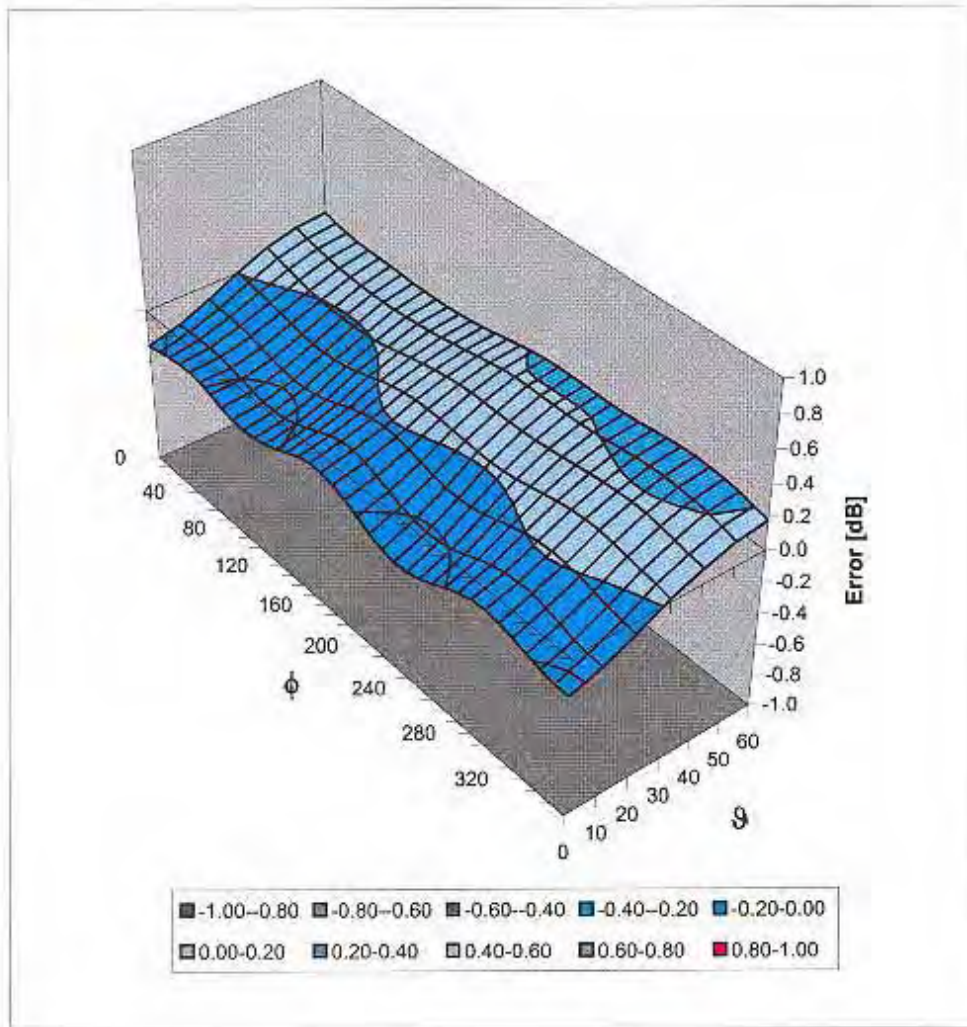


f [MHz]	Validity [MHz] <sup>c</sup>	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.59	1.80	6.45 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.50	2.55	5.24 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.50	2.67	4.98 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.53	2.02	6.37 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.49	2.98	4.77 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.55	2.60	4.50 ± 11.0% (k=2)

<sup>c</sup> 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 ( $\phi$ ,  $\theta$ ),  $f = 900$  MHz



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

**Appendix 5**  
**Measurement Uncertainty Budget**

**Uncertainty Budget for Device Under Test: 30 – 3000 MHz**

<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>
<b>Uncertainty Component</b>	IEEE 1528 section	Tol. (± %)	Prob  Dist	Div.	<i>c<sub>i</sub></i> (1 g)	<i>c<sub>i</sub></i> (10 g)	1 g  <i>u<sub>i</sub></i> (±%)	10 g  <i>u<sub>i</sub></i> (±%)	<i>v<sub>i</sub></i>
<b>Measurement System</b>									
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	∞
<b>Test sample Related</b>									
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	∞
<b>Phantom and Tissue Parameters</b>									
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	∞
<b>Combined Standard Uncertainty</b>			RSS				11.1	10.8	411
<b>Expanded Uncertainty (95% CONFIDENCE LEVEL)</b>			<i>k=2</i>				22.2	21.6	

**Uncertainty Budget for System Check: 30 – 3000 MHz**

<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>
<b>Uncertainty Component</b>	IEEE 1528 section	Tol. (± %)	Prob. Dist.	Div.	<i>c<sub>i</sub></i> (1 g)	<i>c<sub>i</sub></i> (10 g)	1 g  <i>u<sub>i</sub></i> (±%)	10 g  <i>u<sub>i</sub></i> (±%)	<i>v<sub>i</sub></i>
<b>Measurement System</b>									
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	1	1	2.7	2.7	∞
Spherical Isotropy	E.2.2	9.6	R	1.73	0	0	0.0	0.0	∞
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	0.0	R	1.73	1	1	0.0	0.0	∞
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 Mechanical 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	∞
<b>Dipole</b>									
Dipole Axis to Liquid Distance	<sup>8,</sup> E.4.2	2.0	R	1.73	1	1	1.2	1.2	∞
Input Power and SAR Drift Measurement	<sup>8,</sup> 6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
<b>Phantom and Tissue Parameters</b>									
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	R	1.73	0.64	0.43	1.2	0.8	∞
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	R	1.73	0.6	0.49	0.6	0.5	∞
<b>Combined Standard Uncertainty</b>			RSS				9.0	8.8	9999 9
<b>Expanded Uncertainty</b> (95% CONFIDENCE LEVEL)			<i>k=2</i>				17.7	17.3	

**Appendix 6**

**Photographs of the device under test**



**Figure 1. Front of Phone**



**Figure 2. Back of Phone**



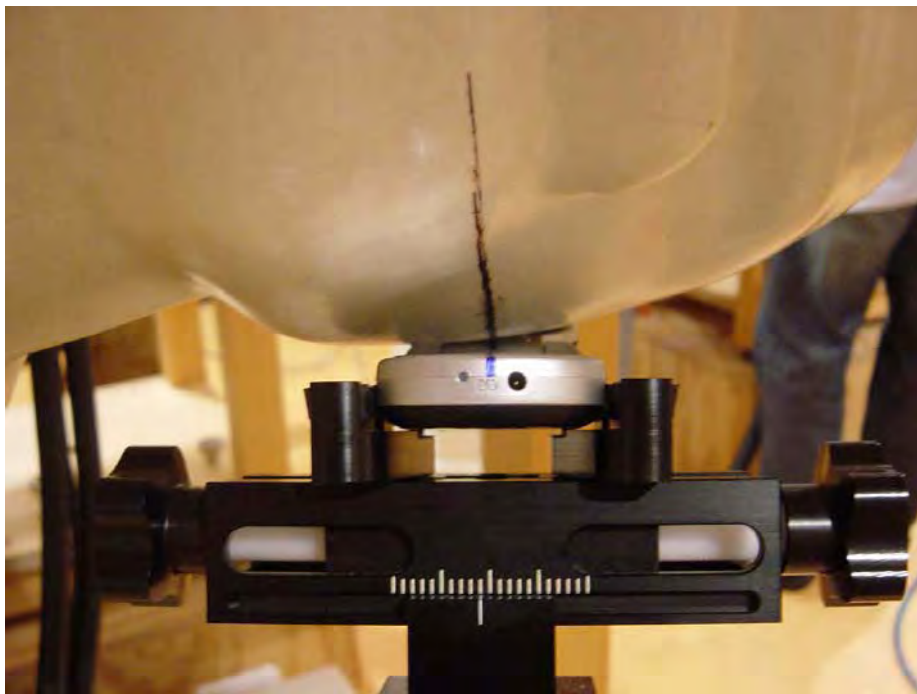
**Figure 3. Open Front**



**Figure 4. Open Back**



**Figure 5. Bodyworn**



**Figure 6. Cheek Bottom**



**Figure 7. Cheek Top**



**Figure 8. Tilted Bottom**



**Figure 9. Tilted Top**



**Figure 10. PTT Top**