Exhibit 11: Class II Permissive Change SAR Test Report IHDT56GW1

Date of test: 7/9/2005 to 8/4/2005
Date of Report: 6/9/2006

Laboratory:
Motorola Personal Communications Sector 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:

Tests:	Procedures:
Electromagnetic Specific Absorption Rate	ANSI/IEEE C95.1-1992, 1999 (SAR) IEEE C95.3-1991 IEEE 1528, IEC 62209-1 FCC OET Bulletin 65 (*including Supplements A, B, C*) Australian Communications Authority Radio Communications (Electromagnetic Radiation – Human Exposure) Standard 1999 CENELEC EN 50361 (2001)
Simulated Tissue Preparation	APP-0247
RF Power Measurement	DOI-0876, 0900, 0902, 0904, 0915

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 IHDT56GW1 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)

©Motorola, Inc. 2006
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.

Table of Contents

1. INTRODUCTION 3

2. DESCRIPTION OF THE DEVICE UNDER TEST 3

2.1 Antenna description 3

2.2 Device description 3

3. TEST EQUIPMENT USED 4

3.1 Dosimetric System 4

3.2 Additional Equipment 4

4. ELECTRICAL PARAMETERS OF THE TISSUE SIMULATING LIQUID 5

5. SYSTEM ACCURACY VERIFICATION 5

6. TEST RESULTS 6

6.1 Head Adjacent Test Results 7

6.2 Body Worn Test Results 9

APPENDIX 1: SAR DISTRIBUTION COMPARISON FOR SYSTEM ACCURACY VERIFICATION 12

APPENDIX 2: SAR DISTRIBUTION PLOTS FOR PHANTOM HEAD ADJACENT USE 13

APPENDIX 3: SAR DISTRIBUTION PLOTS FOR BODY WORN CONFIGURATION 14

APPENDIX 4: PROBE CALIBRATION CERTIFICATE 15

APPENDIX 5: MEASUREMENT UNCERTAINTY BUDGET 16

APPENDIX 6: PHOTOGRAPHS OF DEVICE UNDER TEST 19

APPENDIX 7: DIPOLE CHARACTERIZATION CERTIFICATE 26

1 Introduction

The Motorola Personal Communications Sector Product Safety Laboratory has performed measurements of the maximum potential exposure to the user of portable cellular phone (FCC ID IHDT56GW1). 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

Type	Internal	
Location	Back of Phone	
Dimensions	Length	15 mm
	Width	40 mm
Configuration	FICA Antenna	

2.2 Device description

FCC ID Number	**IHDT56GW1**								
Serial number(s)	004400013814544								
Mode(s) of Operation	GSM 850	GSM 900	GSM 1800	GSM 1900	GPRS 850	GPRS 900	GPRS 1800	GPRS 1900	BlueTooth
Modulation Mode(s)	GMSK	GMSK	GMSK	GMSK	GMSK	GMSK	GMSK	GMSK	BT
Maximum Output Power Setting	33.00 dBm	33.00 dBm	30.00 dBm	30.00 dBm	33.00 dBm	33.00 dBm	30.00 dBm	30.00 dBm	19.00 dBm
Duty Cycle	1:8	1:8	1:8	1:8	2:8	2:8	2:8	2:8	1:1
Transmitting Frequency Rang(s)	824.2-848.8 MHz	880.2-914.8 MHz	1710.2-1784.8MHz	1850.2 – 1909.8 Mhz	824.2-848.8 MHz	880.2-914.8 MHz	1710.2-1784.8 MHz	1850.2 – 1909.8 MHz	2400 - 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 Personal Communications Sector 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.

Description	Serial Number	Cal Due Date
DASY4 DAE4	SN376	01/13/2006
DASY4 DAE3	SN365	9/22/2005
DASY4 DAE3	SN434	3/16/2006
E-Field Probe ES3DV3	SN3037	11/25/2005
E-Field Probe ET3DV6	SN1520	4/22/2006
E-Field Probe ET3DV6R	SN1397	4/22/2006
Dipole Validation Kit, D900V2	SN80	
S.A.M. Phantom used for 800MHz	TP-1153	
Dipole Validation Kit, D1800V2	SN251tr	
Dipole Validation Kit, D2450V2	SN740	
S.A.M. Phantom used for 1900MHz	TP-1159	
S.A.M. Phantom used for 2450MHz	TP-1250	

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3847A04844	10/25/2005
Signal Generator HP8648C	3847A04843	10/25/2005
Power Meter E4419B	GB39511082	12/16/2005
Power Meter E4419B	GB39511087	01/25/2006
Power Sensor #1 – 8481A	US37296470	12/28/2005
Power Sensor #1 – 8481A	US37296473	12/28/2005
Network Analyzer HP8753ES	US39171846	09/03/2005
Dielectric Probe Kit HP85070C	US99360070	NA

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 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		
			ε_r	σ (S/m)	Temp (°C)
850	**Head**	**Measured,** 7/9/2005	42.4	0.91	20
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** 7/10/2005	53.9	0.94	20
		Measured, 7/24/2005	53.6	0.96	20.5
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1900					
	Body	**Measured,** 7/12/2005	51.4	1.58	20
		Measured, 8/3/2005	51.1	1.58	20
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25
2450	**Head**	**Measured,** 7/15/2005	39.6	1.89	20.5
		Recommended Limits	39.2 ±5%	1.80 ±5%	18-25
	Body	**Measured,** 7/15/2005	52.5	2	20.5
		Measured, 7/22/2005	50.6	2.04	19.6
		Measured, 8/4/2005	50.6	2.04	19.9
		Recommended Limits	52.7 ±5%	1.95 ±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	2450MHz Head	2450MHz Body
Sugar	57.0	44.9	--	--	--	--
DGBE	--	--	47.0	30.80	--	30.0
Diacetin	--	--	--	--	51.0	--
Water	40.45	53.06	52.8	68.91	48.75	70.0
Salt	1.45	0.94	0.2	0.29	0.15	--
HEC	1.0	1.0	--	--	--	--
Bact.	0.1	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)
			ε_r	σ (S/m)		
900	**Measured,** 7/9/2005	11.23	41.6	0.98	20	20
	Measured, 7/10/2005	11.38	41.6	0.98	20	20.1
	Measured, 7/23/2005	11	40.9	0.96	20	21
	Recommended Limits	10.8	41.5 ±5%	0.97 ±5%	18-25	18-25
1800	**Measured,** 7/12/2005	37	39.8	1.36	21	19.9
	Measured, 8/3/2005	38.6	38.9	1.37	21	20
	Recommended Limits	38.1	40.0 ±5%	1.4 ±5%	18-25	18-25
2450	**Measured,** 7/15/2005	55.75	39.6	1.89	20	20.5
	Measured, 7/22/2005	58	37.9	1.89	20	20.5
	Measured, 8/4/2005	58	37.8	1.89	20	19.9
	Recommended Limits	57.6	39.2 ±5%	1.80 ±5%	18-25	18-25

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3037	900	6.11	8 of 9
		1810	5.16	8 of 9
E-Field Probe ET3DV6	1520	900	6.32	8 of 9
		1810	5.08	8 of 9
		2450	4.51	8 of 9
E-Field Probe ET3DV6R	1397	900	6.38	8 of 9
		1810	5.17	8 of 9

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.

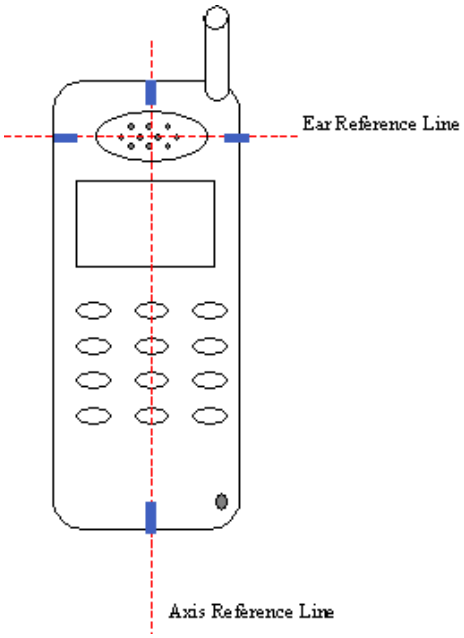
The Cellular Phone (FCC ID IHDT56GW1) has the SNN5696B as the only available battery option. This battery was used to do all of the SAR testing. The phone was placed in the SAR measurement system with a fully charged battery.

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 only highest test configurations for which the SAR values increased from previously reported SAR values have been highlighted in tables 1 and 2. All other data that is included in tables 1 and 2 is for reference only. This data has been included to show that only certain head adjacent SAR values have increased from that previously reported. As such, SAR distribution plots for phantom head adjacent use for only the highlighted test configurations have been included in Appendix 2 of this document. The SAR distribution plots for phantom head

adjacent use for the remainder of the test configurations that were included in Appendix 2 of the original filing report should still be considered to apply.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3037	900	6.11	8 of 9
		1810	5.16	8 of 9
E-Field Probe ET3DV6	1520	900	6.32	8 of 9
		1810	5.08	8 of 9
		2450	4.51	8 of 9
E-Field Probe ET3DV6R	1397	900	6.38	8 of 9
		1810	5.17	8 of 9

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)
Digital 850MHz	Channel 128	33.01	1.21	-0.07	1.23	20				
	Channel 190	33.0	**1.17**	**-0.31**	**1.26**	**20**	**0.725**	**0**	**0.73**	**20**
	Channel 251	32.97	1.13	-0.14	1.17	20				
Digital 1900MHz	Channel 512	29.99								
	Channel 661	29.98	0.155	0.08	0.16	19.8	0.173	0.06	0.17	19.8
	Channel 810	29.98								
Bluetooth	N/A	18.95	**0.121**	**-0.01**	**0.12**	**20.5**	**0.074**	**0.173**	**0.07**	**19.4**

Table 1: SAR measurement results for the portable cellular telephone FCC ID IHDT56GW1 at highest possible output power. Measured against the left and right 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)
Digital 850MHz	Channel 128	33.01								
	Channel 190	33.0	**0.512**	**-0.04**	**0.52**	**20**	0.443	0	0.44	20
	Channel 251	32.97								
Digital 1900MHz	Channel 512	29.99								
	Channel 661	29.98	0.039	0.06	0.04	19.8	0.591	-0.14	0.06	19.8
	Channel 810	29.98								
Bluetooth	N/A	18.95	**0.056**	**0.01**	**0.06**	**20.5**	**0.061**	**-0.01**	**0.06**	**19.3**

Table 2: SAR measurement results for the portable cellular telephone FCC ID IHDT56GW1 at highest possible output power. Measured against the left and right head in the 15° Tilt Position

6.2 Body Worn Test Results

The SAR results shown in tables 3 through 5 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. 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. There are no Body-Worn Accessories available for this phone at the time of testing hence the device was tested per the supplement C testing guidelines for devices that do not have body worn accessories. The phone was placed a maximum of 1 inch away from a flat phantom per the supplement C standard guidelines to perform SAR measurement. The cellular phone was tested with a headset connected to the device for all body-worn SAR measurements.

There are two Body-Worn Accessories, one using the wishbone belt clip, available for this phone:
Black Leather Case model #SYN1066B
Wishbone Belt Clip model #SYN8631A
Black Leather Case model #CHYN4647A

Note that only highest test configurations for which the SAR values increased from previously reported SAR values have been highlighted in tables 3 through 6. All other data that is included in tables 3 through 6 is for reference only. This data has been included to show that only certain bodyworn SAR values have increased from that previously reported. As such, SAR distribution plots for bodyworn use for only the highlighted test configurations have been included in Appendix 3 of this document. The SAR distribution plots for bodyworn use for the remainder of the test configurations that were included in Appendix 3 of the original filing report should still be considered to apply.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3037	900	6.00	8 of 9
		1810	4.71	8 of 9
E-Field Probe ET3DV6	1520	900	6.12	8 of 9
		1810	4.67	8 of 9
		2450	4.27	8 of 9
E-Field Probe ET3DV6R	1397	900	6.22	8 of 9
		1810	4.77	8 of 9

f (MHz)	Description	Conducted Output Power (dBm)	Body Worn							
			Front of phone 15 mm away from phantom				Back of phone 15 mm away from phantom			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Digital 850MHz	Channel 128	33.01					**0.948**	**-0.02**	**0.95**	**20**
	Channel 190	33.0	**0.627**	**-0.04**	**0.63**	**20**	0.905	-0.05	0.92	20
	Channel 251	32.97					0.851	-0.13	0.88	20
Digital 1900MHz	Channel 512	29.99								
	Channel 661	29.98	**0.147**	**-0.03**	**0.12**	**20**	**0.117**	**-0.03**	**0.12**	**20**
	Channel 810	29.98								
Bluetooth	N/A	18.95	**0.055**	**0.03**	**0.06**	**20.5**	**0.056**	**-0.03**	**0.06**	**20.5**
Digital 850MHz & Bluetooth 2400MHz	summation of extrapolated SAR values	N/A			0.69				1.01	
Digital 1900MHz & Bluetooth 2400MHz	summation of extrapolated SAR values	N/A			0.18				0.18	

Table 3: SAR measurement results for the portable cellular telephone FCC ID IHDT56GW1 at highest possible output power. Measured against the body.

f (MHz)	Description	Conducted Output Power (dBm)	Body Worn							
			Front of phone 25 mm away from phantom (GPRS Class 10)				Back of phone 25 mm away from phantom (GPRS Class 10)			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Digital 850MHz	Channel 128	33.01								
	Channel 190	33.0					0.438	-0.02	0.44	20
	Channel 251	32.97								
Digital 1900MHz	Channel 512	29.99								
	Channel 661	29.98	0.0752	-0.25	0.08	20				
	Channel 810	29.98								

Table 4: SAR measurement results for the portable cellular telephone FCC ID IHDT56GW1 at highest possible output power. Measured against the body.

f (MHz)	Description	Conducted Output Power (dBm)	Body Worn							
			BODYWORN with CASE SYN1066B and Wishbone Clip				BODYWORN with CASE CHYN4647A			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Digital 850MHz	Channel 128	33.01	**0.603**	**-0.05**	**0.61**	**20.5**	**0.822**	**0**	**0.82**	**20.5**
	Channel 190	33.0								
	Channel 251	32.97								
Digital 1900MHz	Channel 512	29.99								
	Channel 661	29.98	**0.063**	**-0.77**	**0.07**	**20.1**	**0.155**	**0.01**	**0.16**	**20**
	Channel 810	29.98								
Bluetooth	N/A	18.95	**0.0089**	**0.21**	**0.01**	**19.9**	**0.011**	**0.24**	**0.01**	**19.6**
Digital 850MHz & Bluetooth 2400MHz	summation of extrapolated SAR values	N/A			0.62				0.83	
Digital 1900MHz & Bluetooth 2400MHz	summation of extrapolated SAR values	N/A			0.08				0.17	

Table 5: SAR measurement results for the portable cellular telephone FCC ID IHDT56GW1 at highest possible output power. Measured against the body.

Appendix 1

SAR distribution comparison for the system accuracy verification

Date/Time: 7/9/2005 7:43:05 PM

Test Laboratory: Motorola

070905 900Mhz GOOD -.7%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:80
Procedure Notes: 900 MHz System Performance Check / Dipole Sn# 80

PM1 Power = 200mW Sim.Temp@meas = 20 Sim.Temp@SPC = 20 Room Temp @ SPC = 20

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, $\varepsilon_r = 41.6$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.11, 6.11, 6.11); Calibrated: 11/25/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 1/13/2005
- Phantom: R3: Sugar Water SAM; Type: SAM; Serial: TP-1153;
- 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) = 2.07 mW/g

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

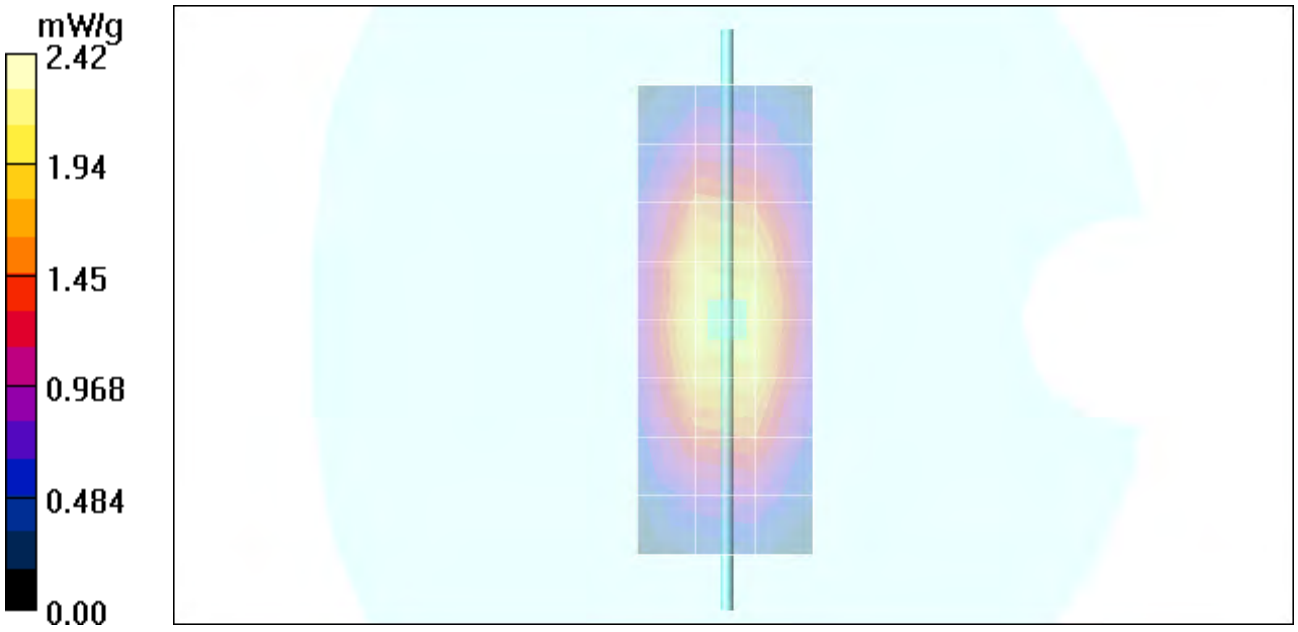
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 50.5 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 3.38 W/kg
SAR(1 g) = 2.23 mW/g; SAR(10 g) = 1.43 mW/g
Maximum value of SAR (measured) = 2.42 mW/g

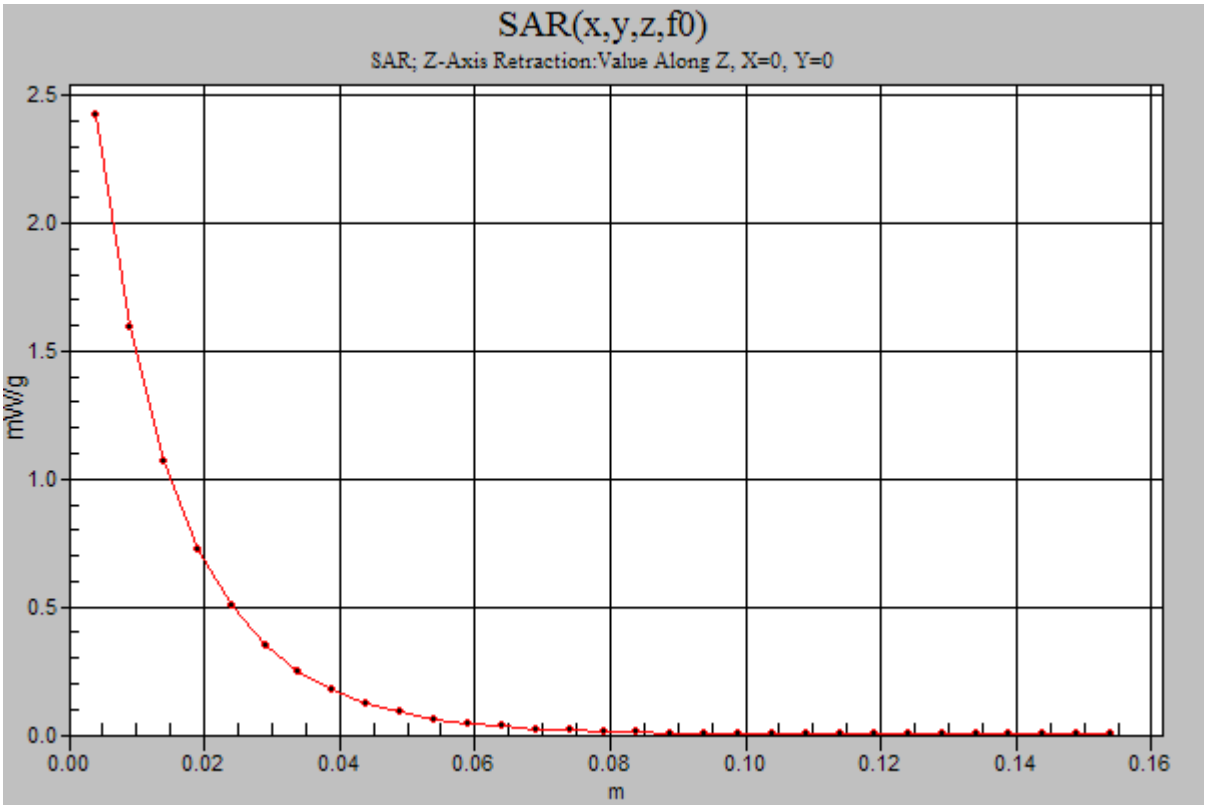
Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 50.5 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 3.44 W/kg
SAR(1 g) = 2.26 mW/g; SAR(10 g) = 1.44 mW/g

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

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


mW/g
2.42
1.94
1.45
0.968
0.484
0.00


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

Date/Time: 7/10/2005 5:36:11 PM

Test Laboratory: Motorola

071005 900Mhz GOOD .7%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:80
Procedure Notes: 900 MHz System Performance Check / Dipole Sn# 80

PM1 Power = 200 mW Sim.Temp@meas = 20 Sim.Temp@SPC = 20.1 Room Temp @ SPC = 20

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, $\varepsilon_r = 41.6$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.11, 6.11, 6.11); Calibrated: 11/25/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 1/13/2005
- Phantom: R3: Sugar Water SAM; Type: SAM; Serial: TP-1153;
- 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:

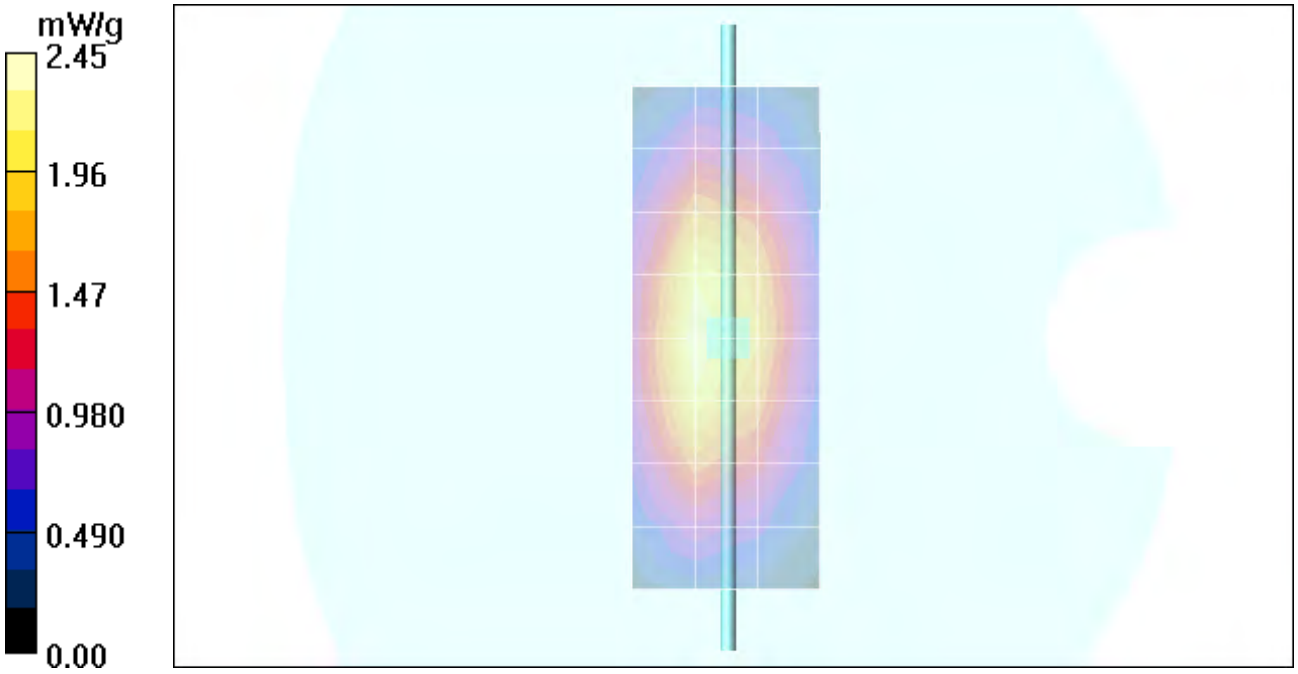
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.9 V/m; Power Drift = -0.081 dB
Peak SAR (extrapolated) = 3.45 W/kg
SAR(1 g) = 2.27 mW/g; SAR(10 g) = 1.45 mW/g
Maximum value of SAR (measured) = 2.46 mW/g

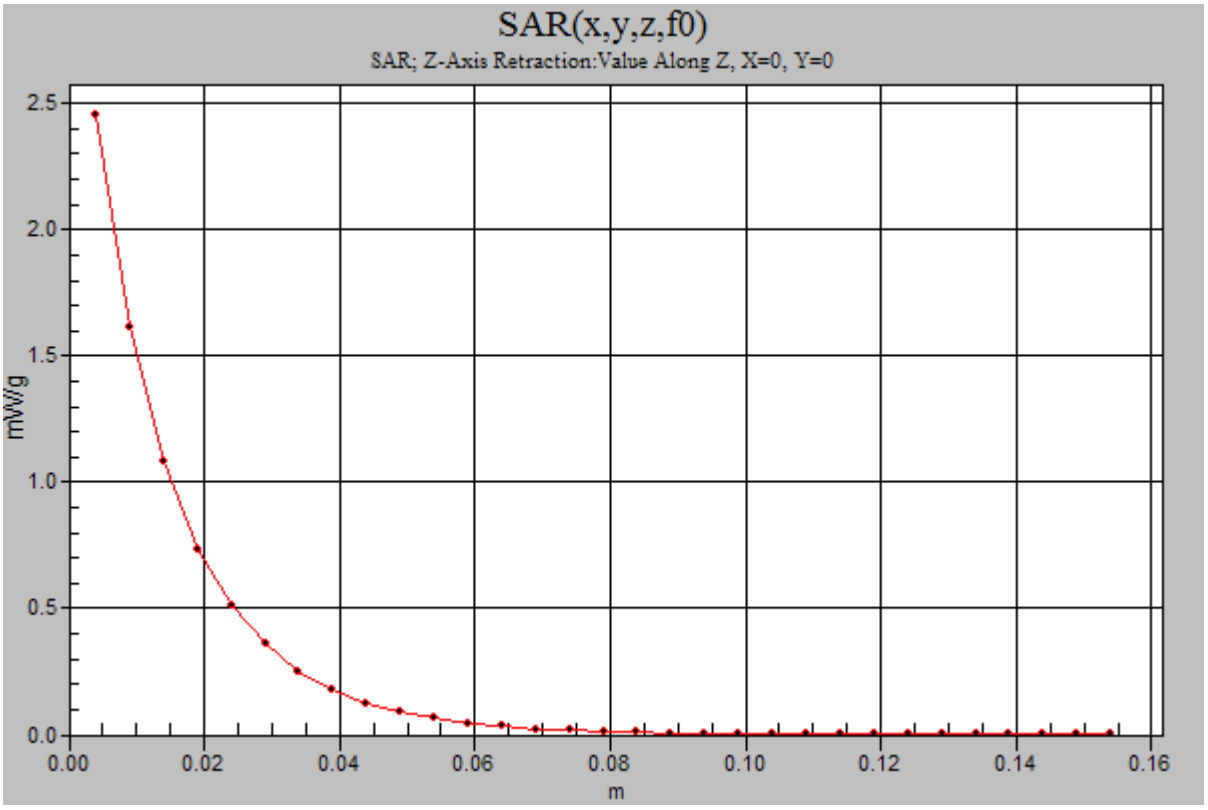
Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.9 V/m; Power Drift = -0.081 dB
Peak SAR (extrapolated) = 3.47 W/kg
SAR(1 g) = 2.28 mW/g; SAR(10 g) = 1.46 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.45 mW/g


mW/g
2.45
1.96
1.47
0.980
0.490
0.00


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

Date/Time: 7/12/2005 9:26:55 AM

Test Laboratory: Motorola

071205 1800Mhz GOOD-2.8% DAE 434 Open

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:251tr
Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 251tr

PM1 Power = 200 mW Sim.Temp@meas = 20.0ºC Sim.Temp@SPC = 19.9ºC Room Temp @ SPC = 21ºC

Communication System: CW - Dipole; Frequency: 1800 MHz; Channel Number: 8; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: $\sigma = 1.36$ mho/m, $\varepsilon_r = 39.8$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.16, 5.16, 5.16); Calibrated: 11/25/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 3/16/2005
- Phantom: R3: Glycol SAM; Type: SAM; Serial: TP-1159;
- 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) = 6.49 mW/g

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

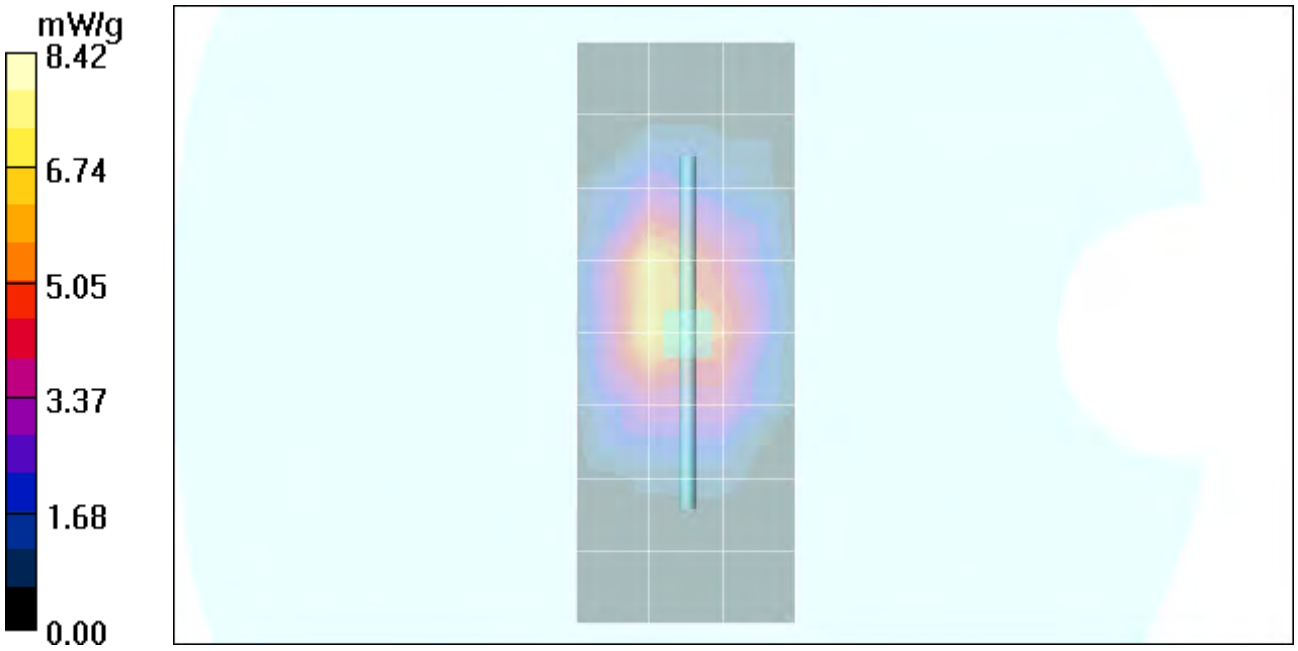
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.4 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 13.2 W/kg
SAR(1 g) = 7.46 mW/g; SAR(10 g) = 3.97 mW/g
Maximum value of SAR (measured) = 8.37 mW/g

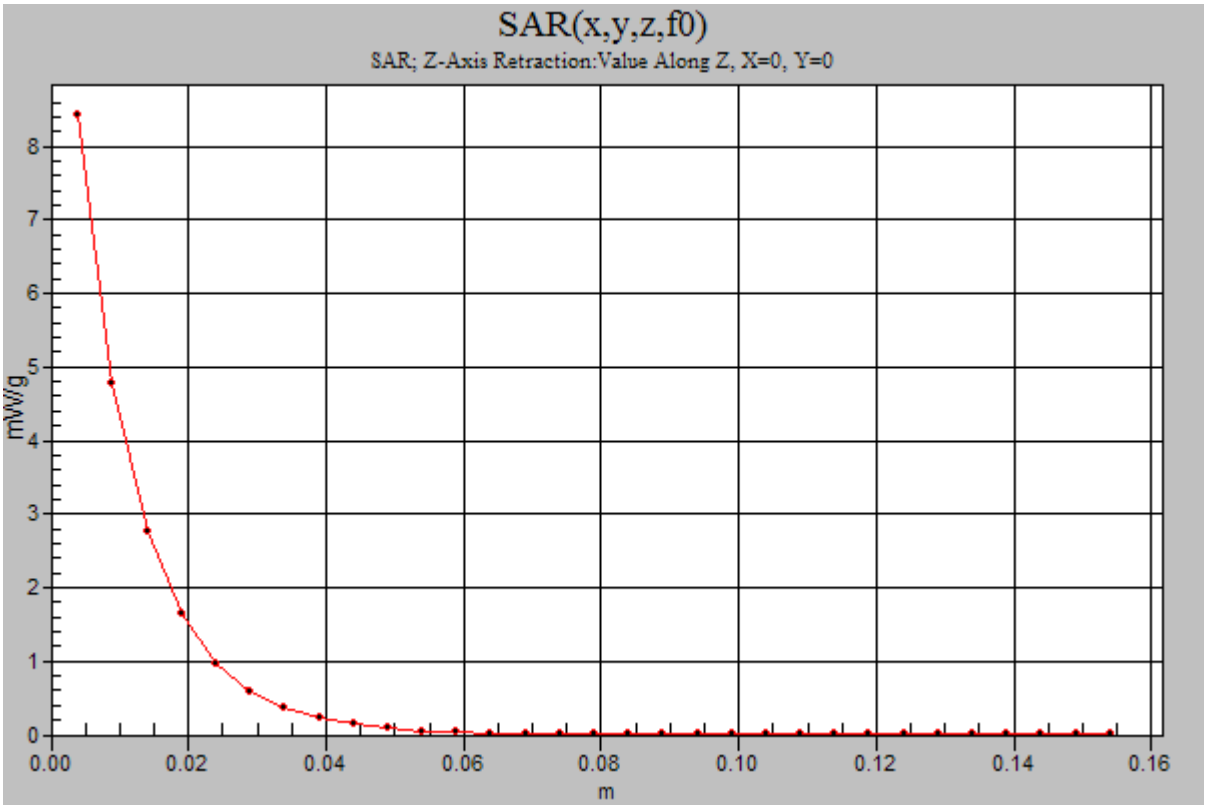
Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.4 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 12.9 W/kg
SAR(1 g) = 7.35 mW/g; SAR(10 g) = 3.94 mW/g
Maximum value of SAR (measured) = 7.97 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.42 mW/g


mW/g
8.42
6.74
5.05
3.37
1.68
0.00


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

Date/Time: 7/15/2005 11:27:29 AM

Test Laboratory: Motorola

071505 2450MHz Good at -1.8%

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:740
Procedure Notes: 2450 MHz System Performance Check / Dipole Sn# 740

PM1 Power = 200 mW Sim.Temp@meas = 20.5*C Sim.Temp@SPC = 20.5C Room Temp @ SPC = 20*C

Communication System: CW - Dipole; Frequency: 2450 MHz; Channel Number: 11; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: σ = 1.89 mho/m, ε_r = 39.6; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ET3DV6 - SN1520; ConvF(4.51, 4.51, 4.51); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn365; Calibrated: 9/22/2004
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

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:

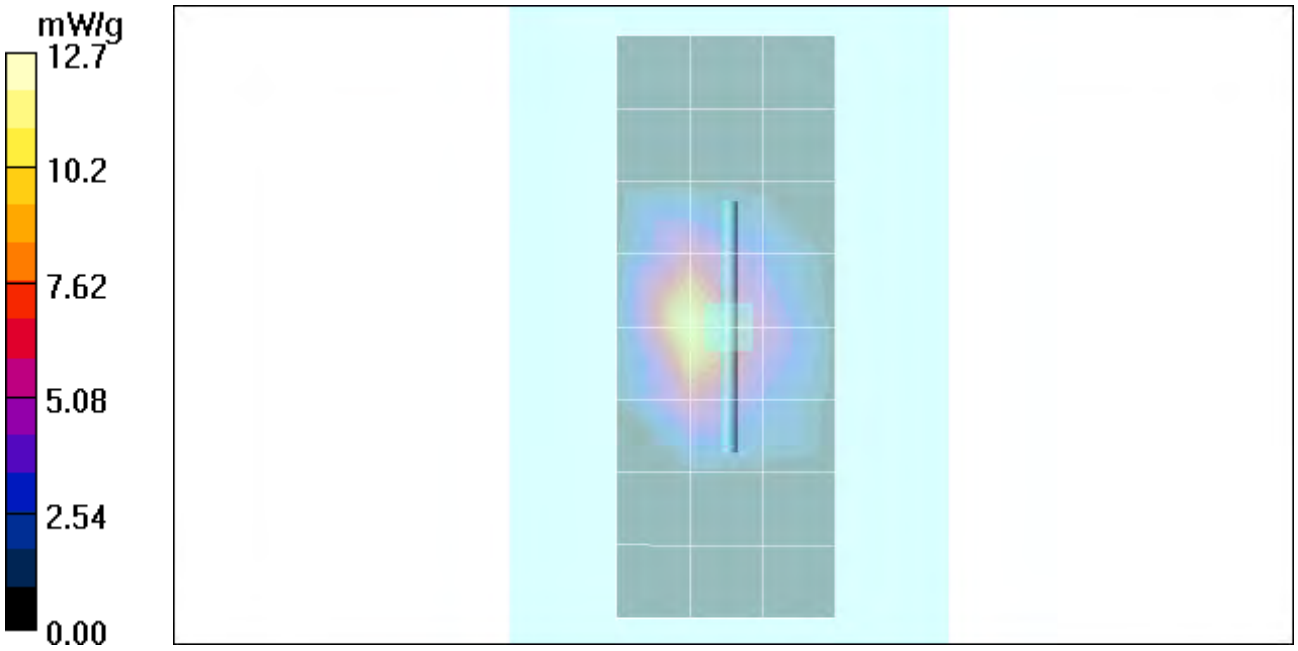
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 81.2 V/m; Power Drift = 0.010 dB
Peak SAR (extrapolated) = 24.6 W/kg
SAR(1 g) = 11.2 mW/g; SAR(10 g) = 5.13 mW/g
Maximum value of SAR (measured) = 12.6 mW/g

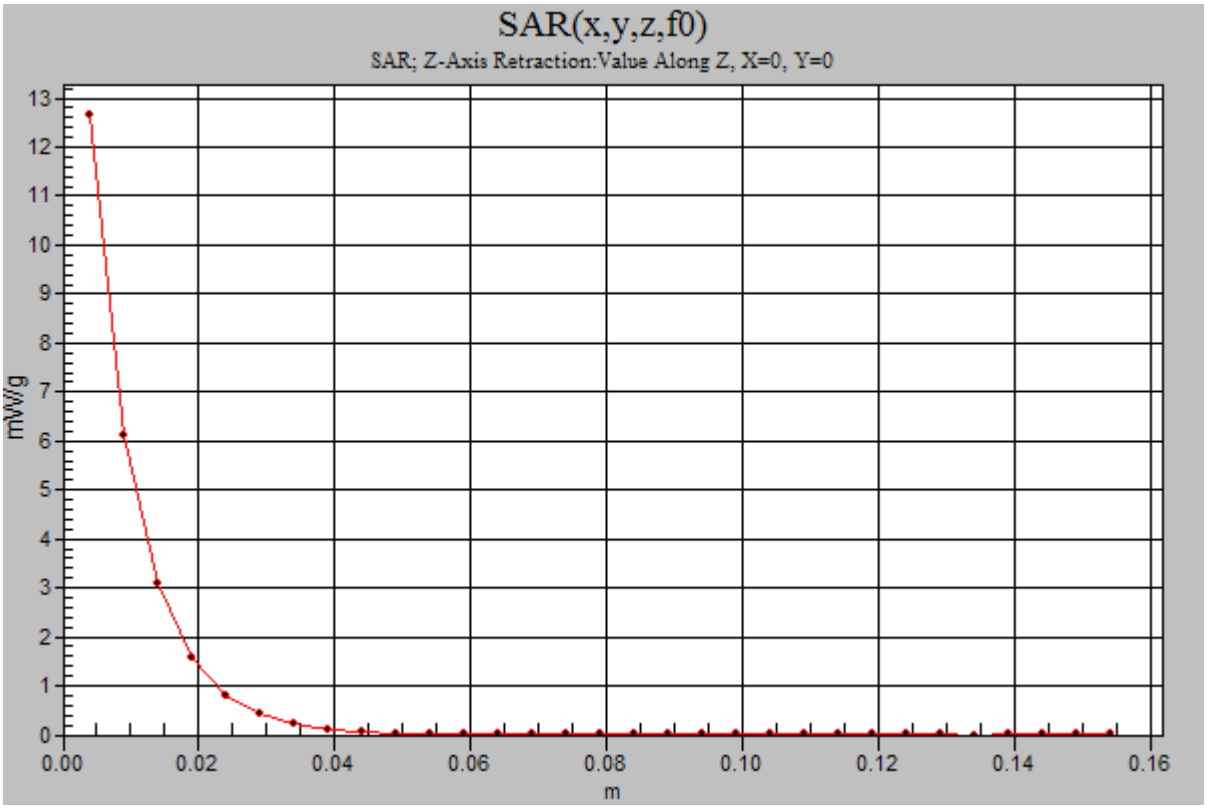
Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 81.2 V/m; Power Drift = 0.010 dB
Peak SAR (extrapolated) = 24.2 W/kg
SAR(1 g) = 11.1 mW/g; SAR(10 g) = 5.1 mW/g
Maximum value of SAR (measured) = 12.2 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 12.7 mW/g


mW/g
12.7
10.2
7.62
5.08
2.54
0.00


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
m
0
1
2
3
4
5
6
7
8
9
10
11
12
13
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Date/Time: 7/22/2005 11:50:50 AM

Test Laboratory: Motorola

072205 2450MHz Good at +2.1%

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:740
Procedure Notes: 2450 MHz System Performance Check / Dipole Sn# 740

PM1 Power = 200 mW Sim.Temp@meas = 20.5*C Sim.Temp@SPC = 20.5*C Room Temp @ SPC = 20*C

Communication System: CW - Dipole; Frequency: 2450 MHz; Channel Number: 11; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: $\sigma = 1.89$ mho/m, $\varepsilon_r = 37.9$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

- Probe: ET3DV6 - SN1520; ConvF(4.51, 4.51, 4.51); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn365; Calibrated: 9/22/2004
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- 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) = 10.3 mW/g

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

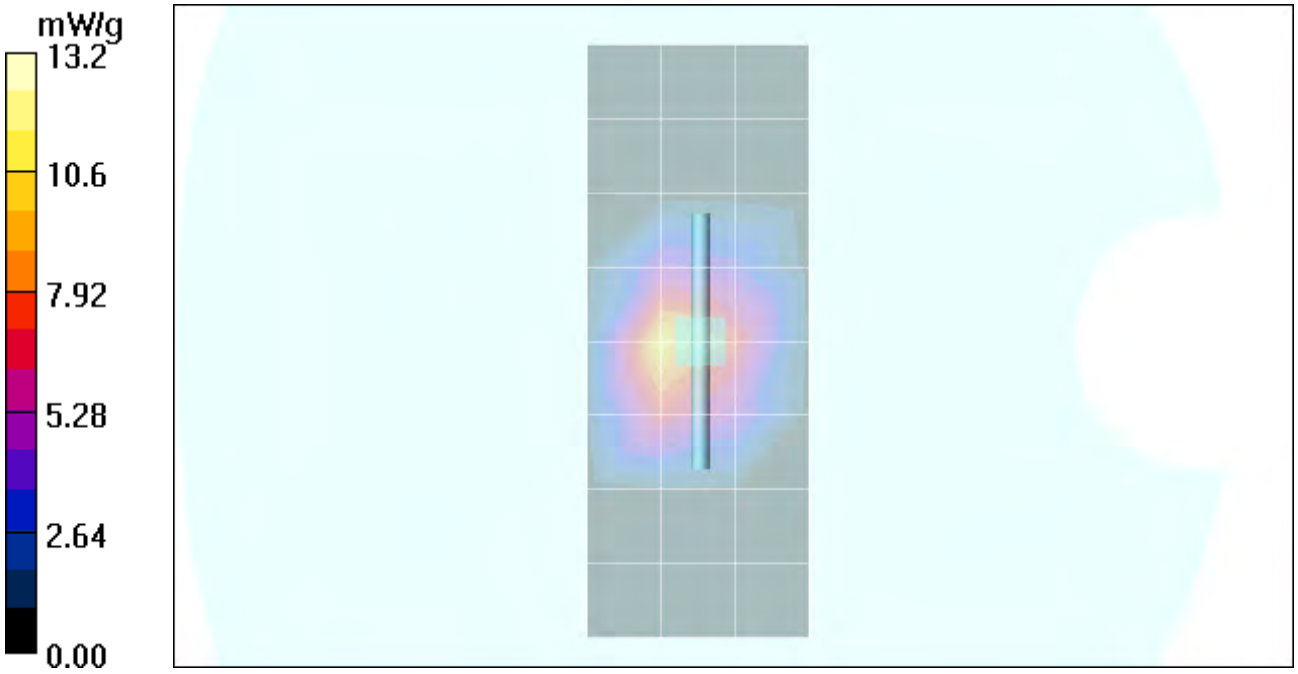
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 86.3 V/m; Power Drift = 0.035 dB
Peak SAR (extrapolated) = 25.2 W/kg
SAR(1 g) = 11.7 mW/g; SAR(10 g) = 5.4 mW/g
Maximum value of SAR (measured) = 13.0 mW/g

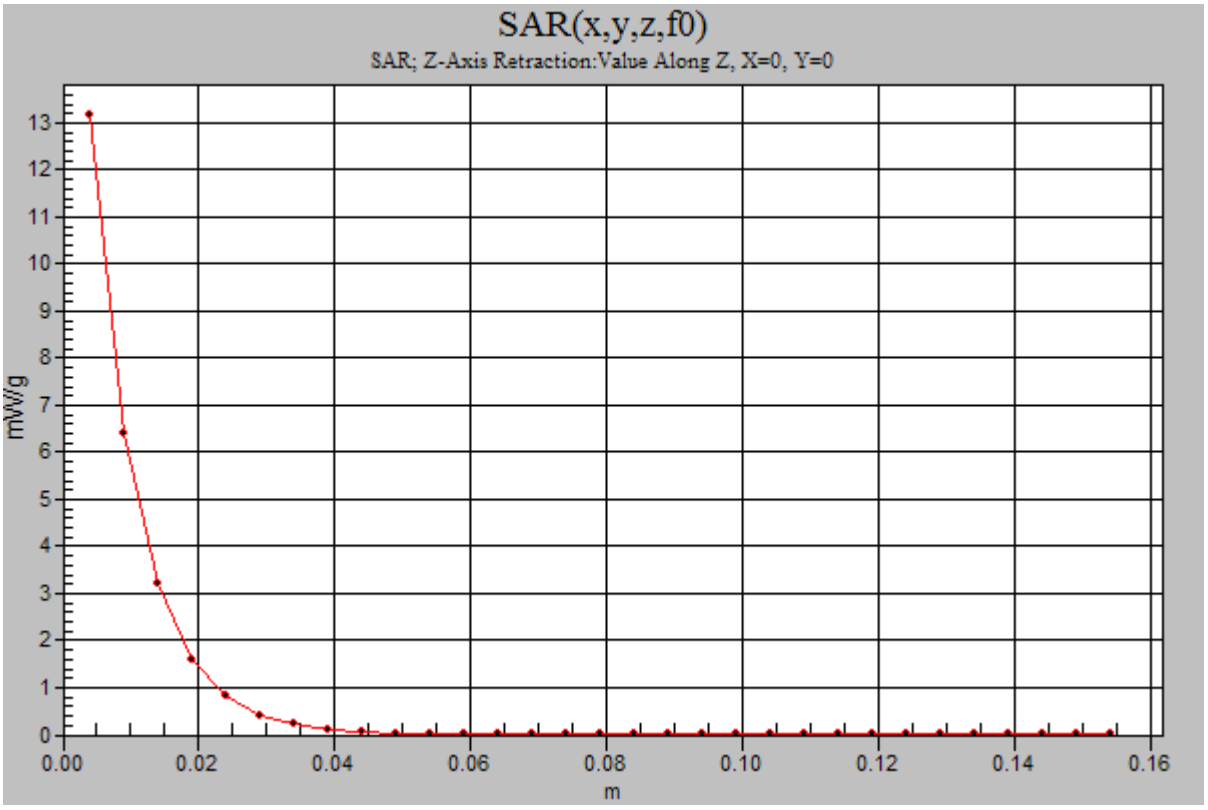
Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 86.3 V/m; Power Drift = 0.035 dB
Peak SAR (extrapolated) = 24.5 W/kg
SAR(1 g) = 11.5 mW/g; SAR(10 g) = 5.35 mW/g
Maximum value of SAR (measured) = 12.3 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 13.2 mW/g


mW/g
13.2
10.6
7.92
5.28
2.64
0.00


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

Date/Time: 7/23/2005 6:54:59 PM

Test Laboratory: Motorola

072305 900Mhz GOOD -2.7%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:80
Procedure Notes: 900MHz System Performance Check / Dipole Sn# 80

PM1 Power = 200 mW Sim.Temp@meas = 21 Sim.Temp@SPC = 21 Room Temp @ SPC = 20

Communication System: CW - Dipole; Frequency: 900 MHz; Channel Number: 4; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: $\sigma = 0.96$ mho/m, $\varepsilon_r = 40.9$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.11, 6.11, 6.11); Calibrated: 11/25/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 3/16/2005
- Phantom: R3: Sugar Water SAM; Type: SAM; Serial: TP-1153;
- 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) = 2.16 mW/g

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

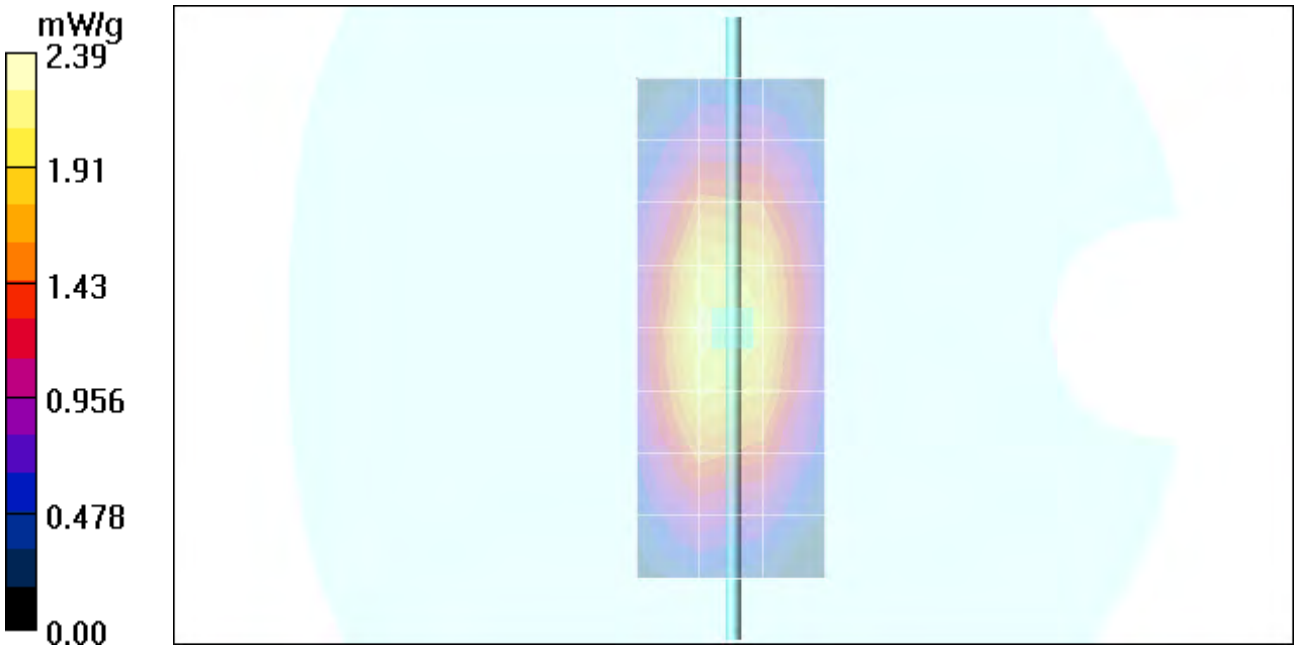
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 50.3 V/m; Power Drift = -0.027 dB
Peak SAR (extrapolated) = 3.30 W/kg
SAR(1 g) = 2.2 mW/g; SAR(10 g) = 1.41 mW/g
Maximum value of SAR (measured) = 2.38 mW/g

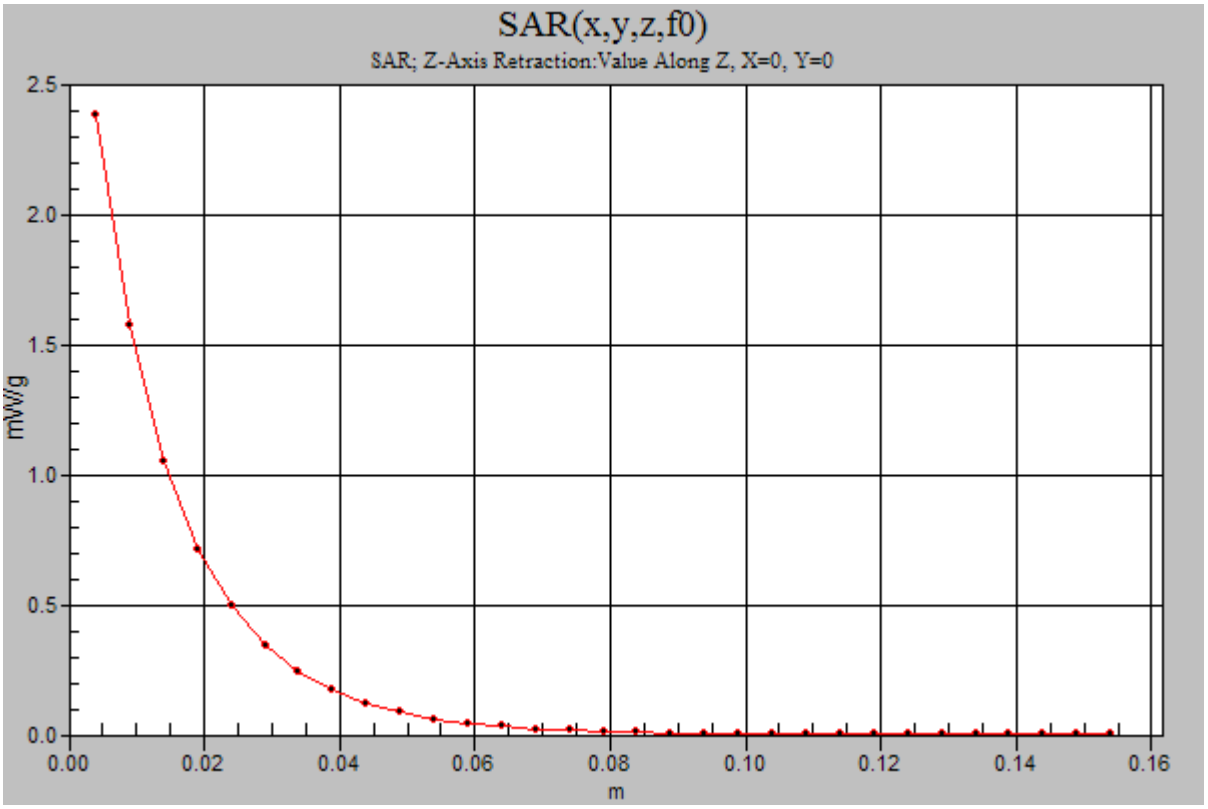
Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 50.3 V/m; Power Drift = -0.027 dB
Peak SAR (extrapolated) = 3.35 W/kg
SAR(1 g) = 2.2 mW/g; SAR(10 g) = 1.4 mW/g
Maximum value of SAR (measured) = 2.31 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.39 mW/g


mW/g
2.39
1.91
1.43
0.956
0.478
0.00


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

Date/Time: 8/3/2005 9:50:50 AM

Test Laboratory: Motorola

080305 1800MHz GOOD 1.2% Probe 1397 Open

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:251tr
Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 251tr

PM1 Power = 200 mW Sim.Temp@meas = 20.0ºC Sim.Temp@SPC = 20.0ºC Room Temp @ SPC = 21ºC

Communication System: CW - Dipole; Frequency: 1800 MHz; Channel Number: 8; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: σ = 1.37 mho/m, ε_r = 38.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ET3DV6R - SN1397; ConvF(5.17, 5.17, 5.17); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 3/16/2005
- Phantom: R3: Sect.1, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 8.58 mW/g

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

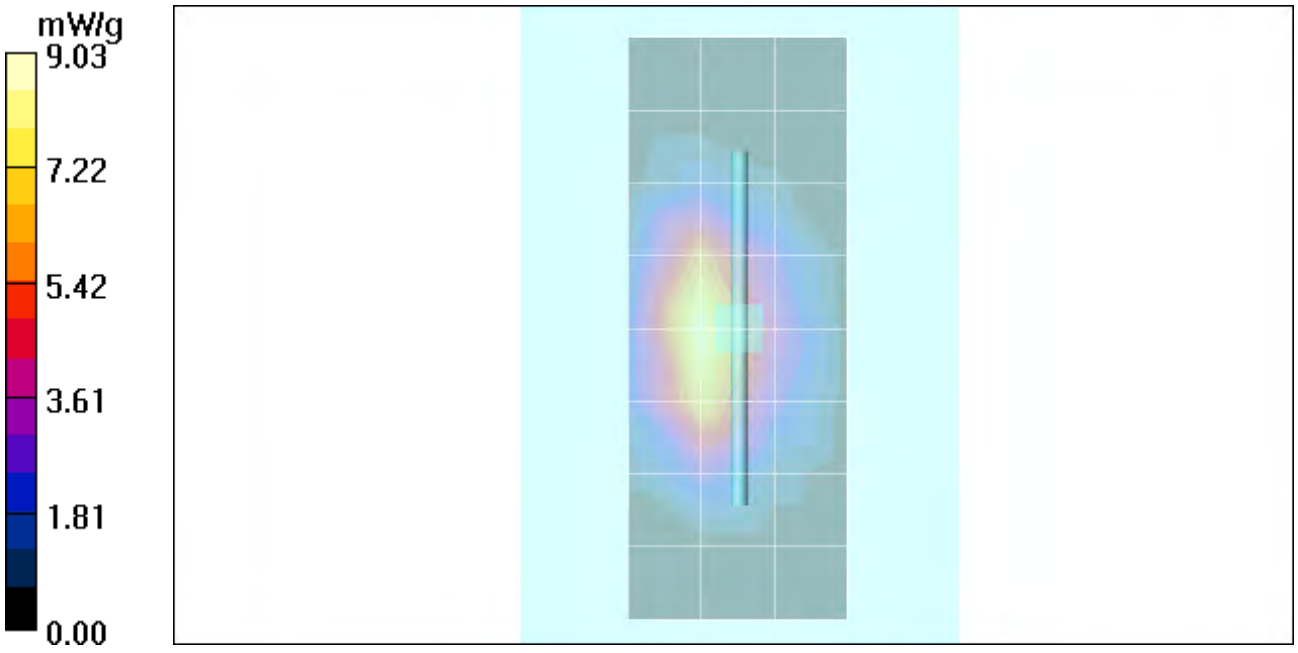
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.9 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 13.5 W/kg
SAR(1 g) = 7.93 mW/g; SAR(10 g) = 4.23 mW/g
Maximum value of SAR (measured) = 8.80 mW/g

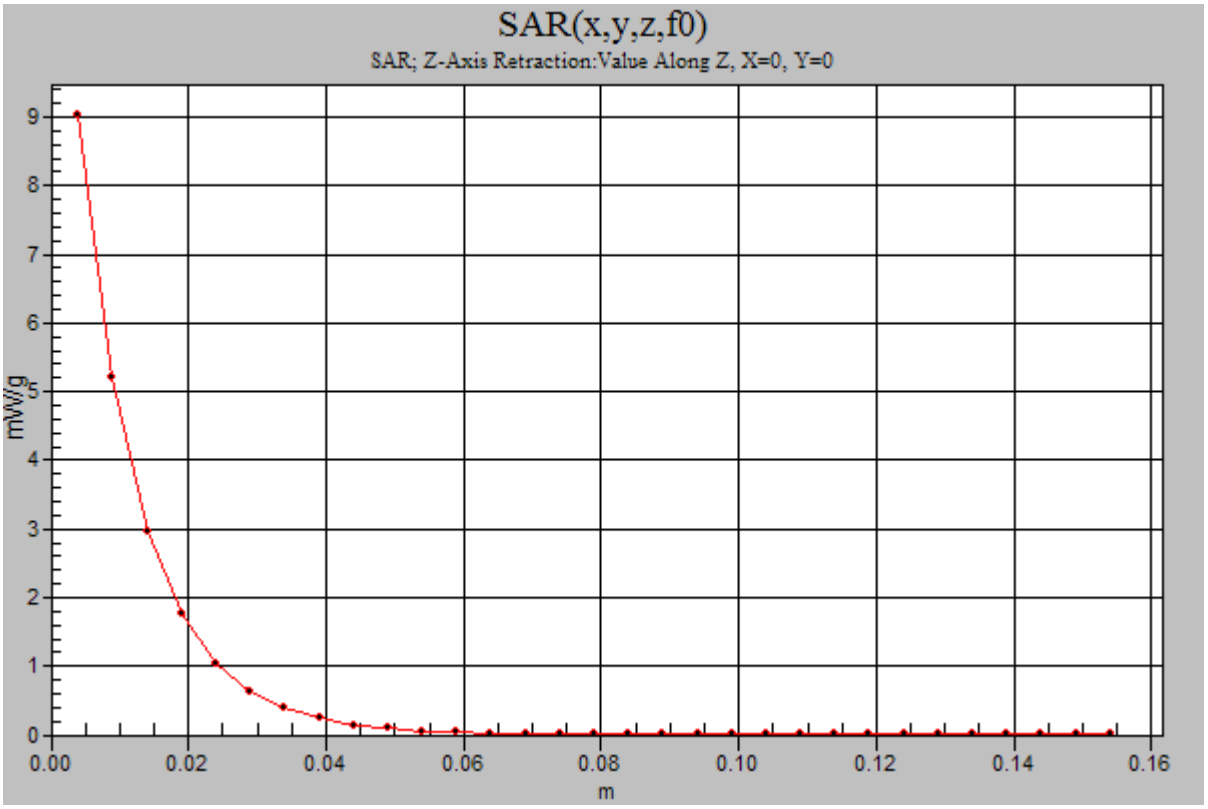
Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.9 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 12.9 W/kg
SAR(1 g) = 7.5 mW/g; SAR(10 g) = 4 mW/g
Maximum value of SAR (measured) = 7.90 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 9.03 mW/g


mW/g
9.03
7.22
5.42
3.61
1.81
0.00


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

Date/Time: 8/4/2005 3:06:14 PM

Test Laboratory: Motorola

080405 2450 MHz GOOD +2.1%

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:740
Procedure Notes: 2450 MHz System Performance Check / Dipole Sn# 740

PM1 Power = 200 mW Sim.Temp@meas = 19.8*C Sim.Temp@SPC = 19.9*C Room Temp @ SPC = 20*C

Communication System: CW - Dipole; Frequency: 2450 MHz; Channel Number: 11; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: $\sigma = 1.89$ mho/m, $\varepsilon_r = 37.8$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

- Probe: ET3DV6 - SN1520; ConvF(4.51, 4.51, 4.51); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn365; Calibrated: 9/22/2004
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- 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) = 10.3 mW/g

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

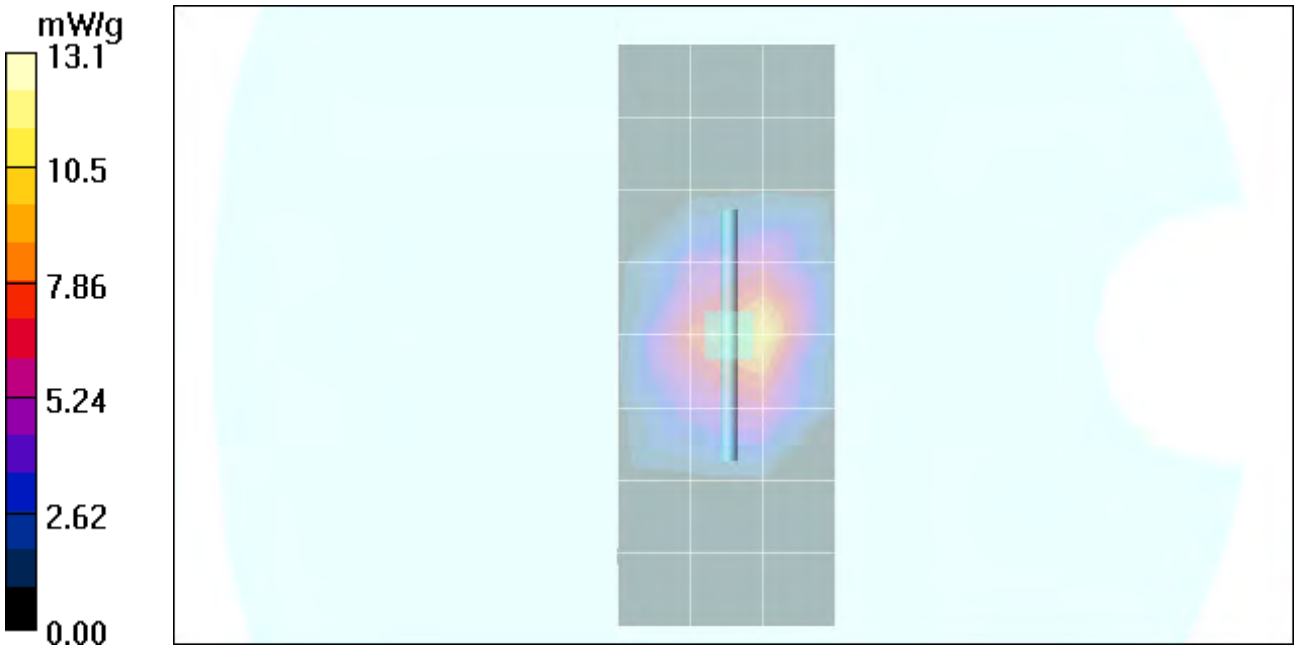
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 87.8 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 25.0 W/kg
SAR(1 g) = 11.7 mW/g; SAR(10 g) = 5.39 mW/g
Maximum value of SAR (measured) = 13.1 mW/g

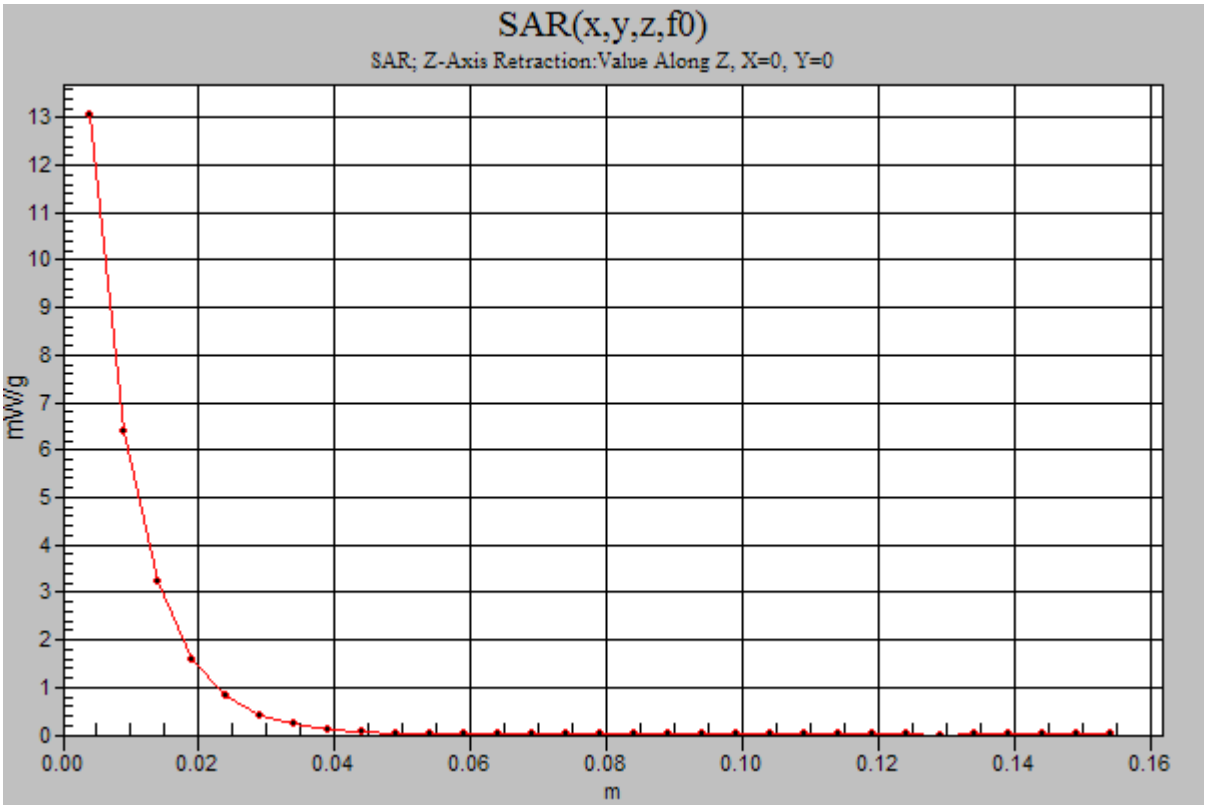
Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 87.8 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 24.4 W/kg
SAR(1 g) = 11.5 mW/g; SAR(10 g) = 5.35 mW/g
Maximum value of SAR (measured) = 12.4 mW/g

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

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


mW/g
13.1
10.5
7.86
5.24
2.62
0.00


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
m
0
1
2
3
4
5
6
7
8
9
10
11
12
13
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

Date/Time: 7/9/2005 8:23:13 PM

Test Laboratory: Motorola

850 LH Cheek ch190

Serial: 4400013814544

Procedure Notes: Pwr Step: 5 Antenna Position: internal Battery Model #: snn5696b DEVICE POSITION cheek

Communication System: GSM 850; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8
Medium: Low Freq Head; Medium parameters used: $\sigma = 0.91$ mho/m, $\varepsilon_r = 42.4$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

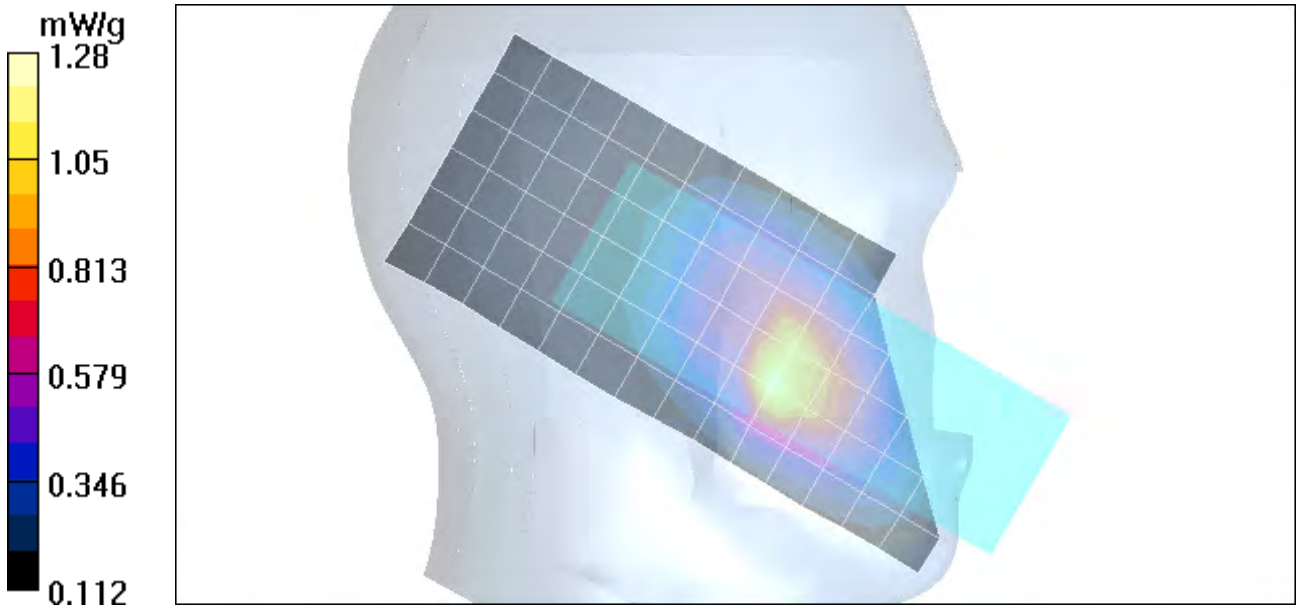
- Probe: ES3DV3 - SN3037; ConvF(6.11, 6.11, 6.11); Calibrated: 11/25/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 1/13/2005
- Phantom: R3: Sugar Water SAM; Type: SAM; Serial: TP-1153;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.21 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 34.9 V/m; Power Drift = -0.305 dB
Peak SAR (extrapolated) = 2.33 W/kg
SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.725 mW/g
Maximum value of SAR (measured) = 1.28 mW/g



Date/Time: 7/9/2005 9:50:09 PM

Test Laboratory: Motorola

850 LH Tilt ch190

Serial: 4400013814544

Procedure Notes: Pwr Step: 5 Antenna Position: internal

Battery Model #: snn5696b DEVICE POSITION tilt

Communication System: GSM 850; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8
Medium: Low Freq Head; Medium parameters used: $\sigma = 0.91$ mho/m, $\varepsilon_r = 42.4$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

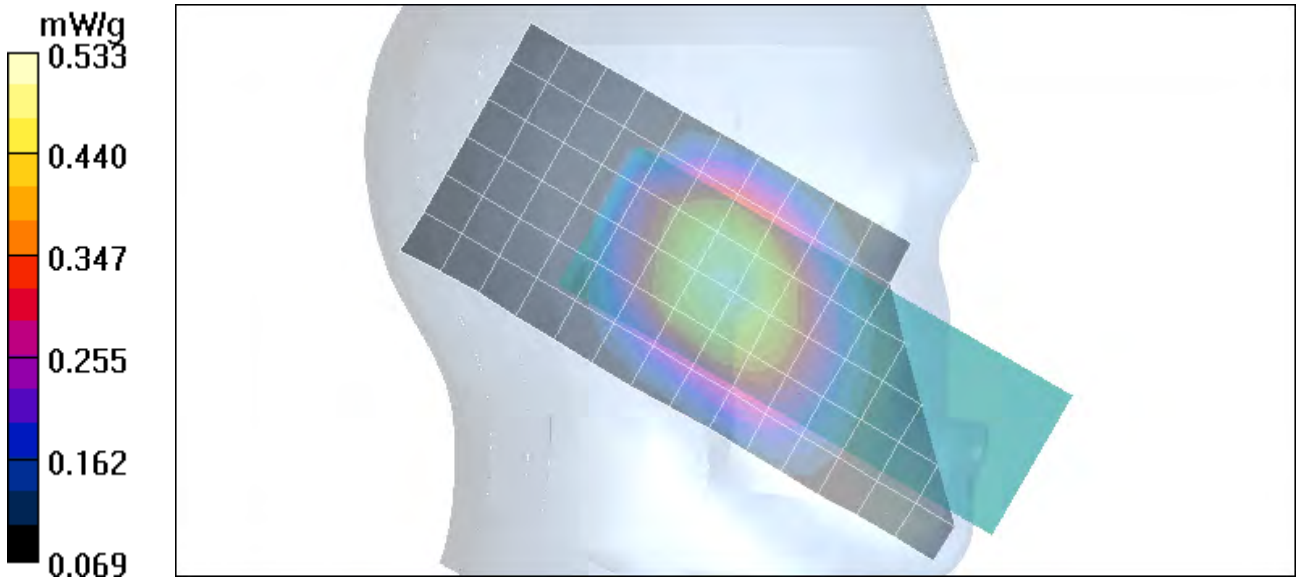
- Probe: ES3DV3 - SN3037; ConvF(6.11, 6.11, 6.11); Calibrated: 11/25/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 1/13/2005
- Phantom: R3: Sugar Water SAM; Type: SAM; Serial: TP-1153;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.528 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.7 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 0.645 W/kg
SAR(1 g) = 0.512 mW/g; SAR(10 g) = 0.387 mW/g
Maximum value of SAR (measured) = 0.533 mW/g



Date/Time: 7/12/2005 11:17:51 AM

Test Laboratory: Motorola

1880 RH Cheek ch661

Serial: 4400013814544
Procedure Notes: Pwr Step: 0 Antenna Position: Internal Battery Model #: SNN5696B DEVICE POSITION: Cheek

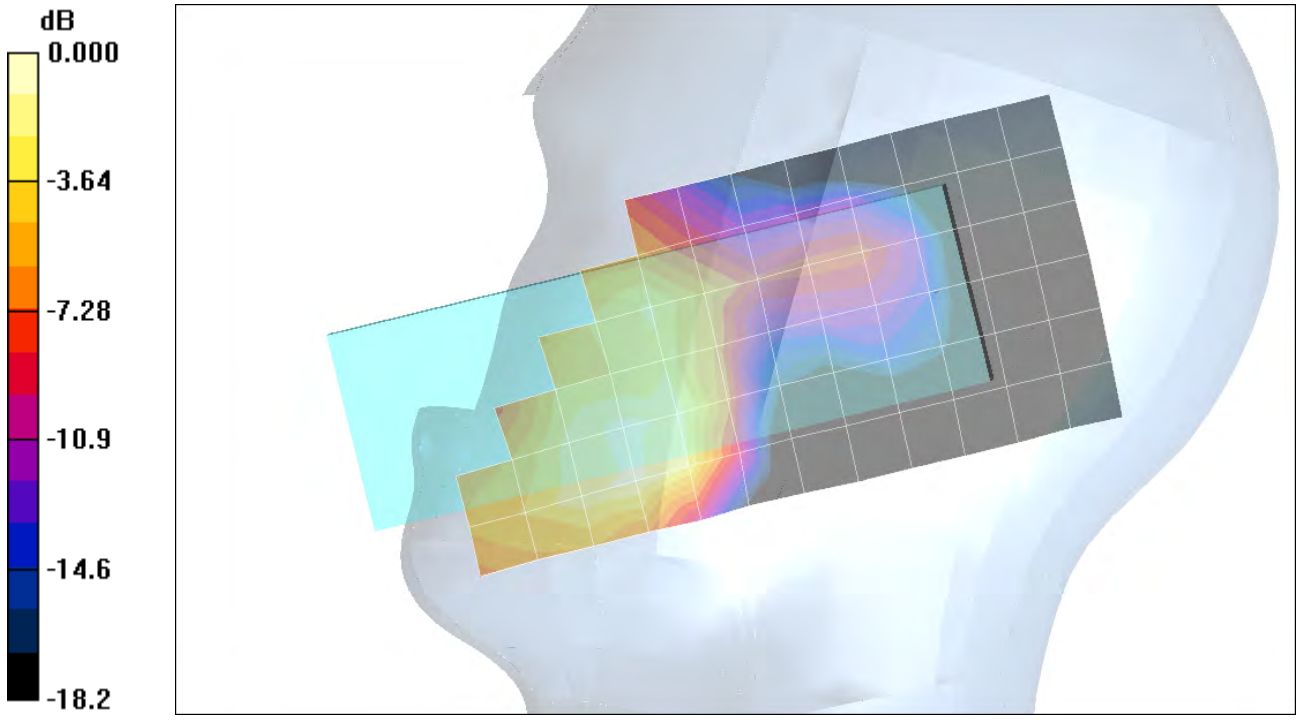
Communication System: GSM 1900; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:8
Medium: Regular Glycol Head; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.16, 5.16, 5.16); Calibrated: 11/25/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 3/16/2005
- Phantom: R3: Glycol SAM; Type: SAM; Serial: TP-1159;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 160

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.159 mW/g

Right Head Template/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.36 V/m; Power Drift = 0.064 dB
Peak SAR (extrapolated) = 0.261 W/kg
SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.105 mW/g
Maximum value of SAR (measured) = 0.188 mW/g



Date/Time: 7/12/2005 11:45:11 AM

Test Laboratory: Motorola

1880 RH Tilt ch661

Serial: 4400013814544
Procedure Notes: Pwr Step: 0 Antenna Position: Internal Battery Model #: SNN5696B DEVICE POSITION: Rotated

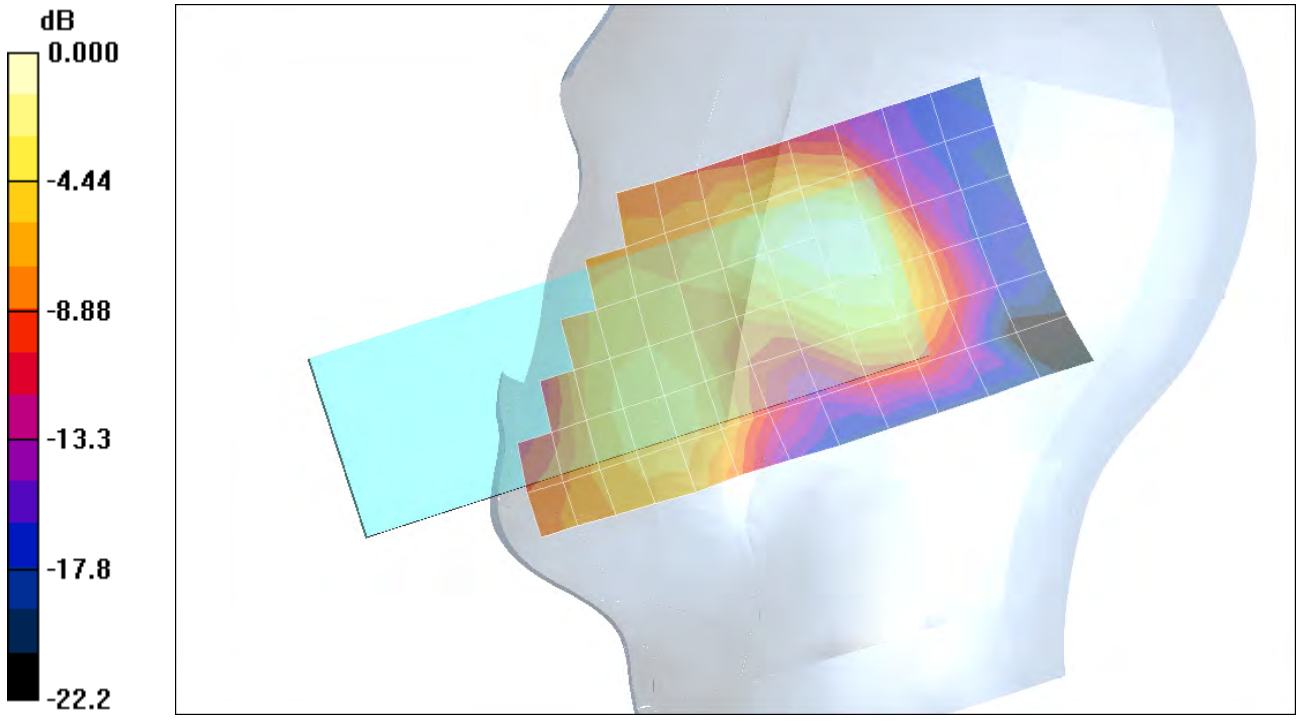
Communication System: GSM 1900; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:8
Medium: Regular Glycol Head; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.16, 5.16, 5.16); Calibrated: 11/25/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 3/16/2005
- Phantom: R3: Glycol SAM; Type: SAM; Serial: TP-1159;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 160

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.064 mW/g

Right Head Template/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.87 V/m; Power Drift = -0.127 dB
Peak SAR (extrapolated) = 0.094 W/kg
SAR(1 g) = 0.060 mW/g; SAR(10 g) = 0.035 mW/g
Maximum value of SAR (measured) = 0.065 mW/g



Date/Time: 7/15/2005 12:02:05 PM

Test Laboratory: Motorola

2441 LH Cheek ch39 Bluetooth

Serial: 4400013814544

Procedure Notes: Pwr Step: all up ota Antenna Position: INTERNAL

Accessory Model #: none Battery Model #: SNN5696B DEVICE POSITION: CHEEK

Communication System: Bluetooth; Frequency: 2441 MHz; Channel Number: 39; Duty Cycle: 1:1
Medium: 2450 Glycol Head; Medium parameters used: σ = 1.89 mho/m, ε_r = 39.6; ρ = 1000 kg/m^3

DASY4 Configuration:

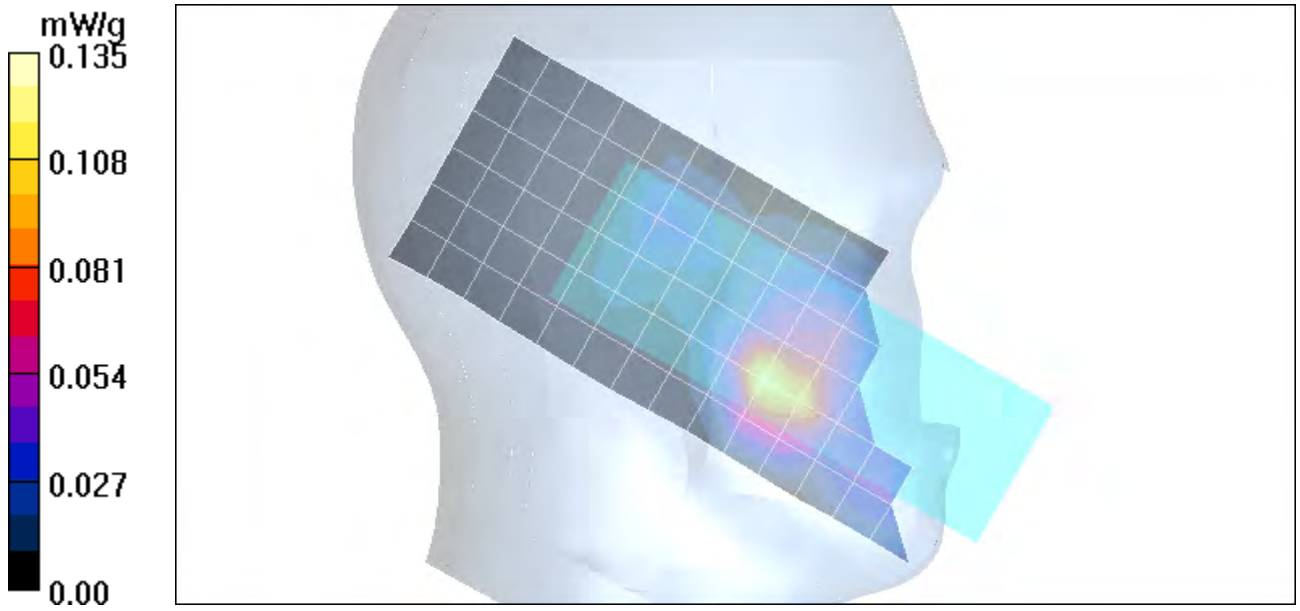
- Probe: ET3DV6 - SN1520; ConvF(4.51, 4.51, 4.51); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn365; Calibrated: 9/22/2004
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.119 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.75 V/m; Power Drift = -0.014 dB
Peak SAR (extrapolated) = 0.274 W/kg
SAR(1 g) = 0.121 mW/g; SAR(10 g) = 0.060 mW/g
Maximum value of SAR (measured) = 0.135 mW/g



Date/Time: 7/15/2005 11:03:09 PM

Test Laboratory: Motorola **2441 RH Tilt ch39 Bluetooth**

Serial: 4400013814544
Procedure Notes: Pwr Step: N/A Antenna Position: Internal

Battery Model #: SNN5696B DEVICE POSITION (cheek or rotated): Rotated

Communication System: Bluetooth; Frequency: 2441 MHz; Channel Number: 39; Duty Cycle: 1:1
Medium: 2450 Glycol Head; Medium parameters used: σ = 1.89 mho/m, ε_r = 39.6; ρ = 1000 kg/m^3

DASY4 Configuration:

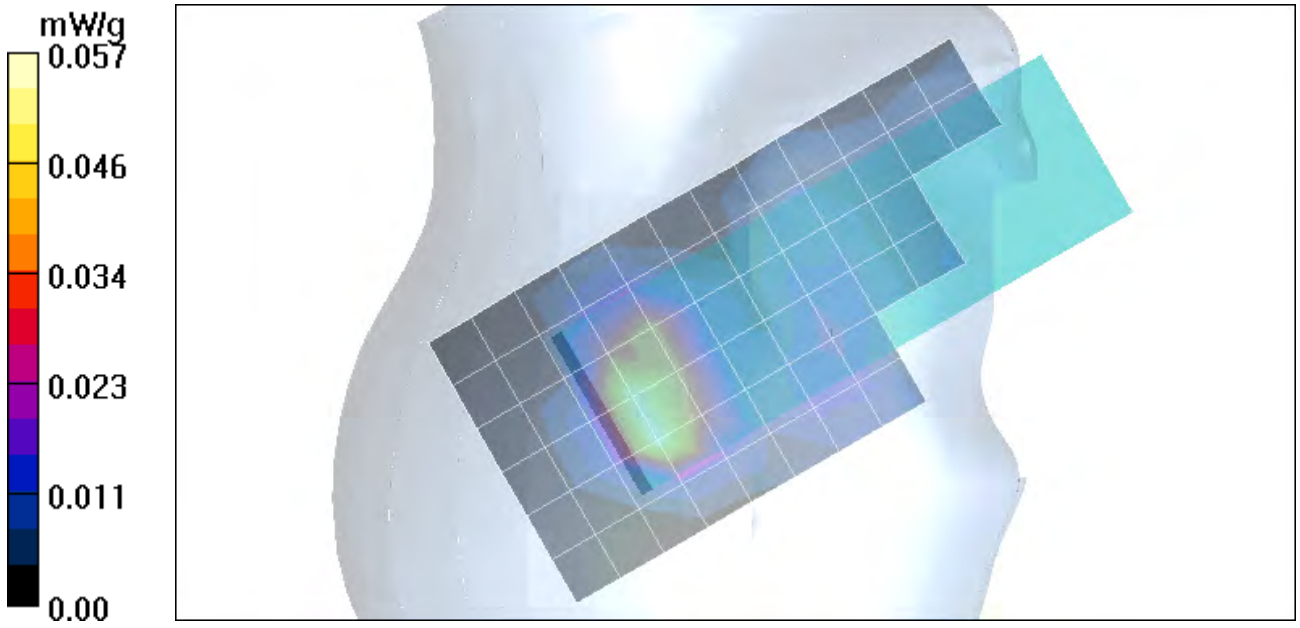
- Probe: ET3DV6 - SN1520; ConvF(4.51, 4.51, 4.51); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn365; Calibrated: 9/22/2004
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.057 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.35 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.115 W/kg
SAR(1 g) = 0.061 mW/g; SAR(10 g) = 0.031 mW/g
Maximum value of SAR (measured) = 0.067 mW/g



Appendix 3

SAR distribution plots for Body Worn Configuration

Date/Time: 7/10/2005 11:12:39 PM

Test Laboratory: Motorola

850 Front 15mm ch190

Serial: 4400013814544

Procedure Notes: Pwr Step: 5 Antenna Position: internal

Battery Model #: snn5696b front OF PHONE 15MM AWAY FROM PHANTOM

Communication System: GSM 850; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8
Medium: Low Freq Body; Medium parameters used: $\sigma = 0.94$ mho/m, $\varepsilon_r = 53.9$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

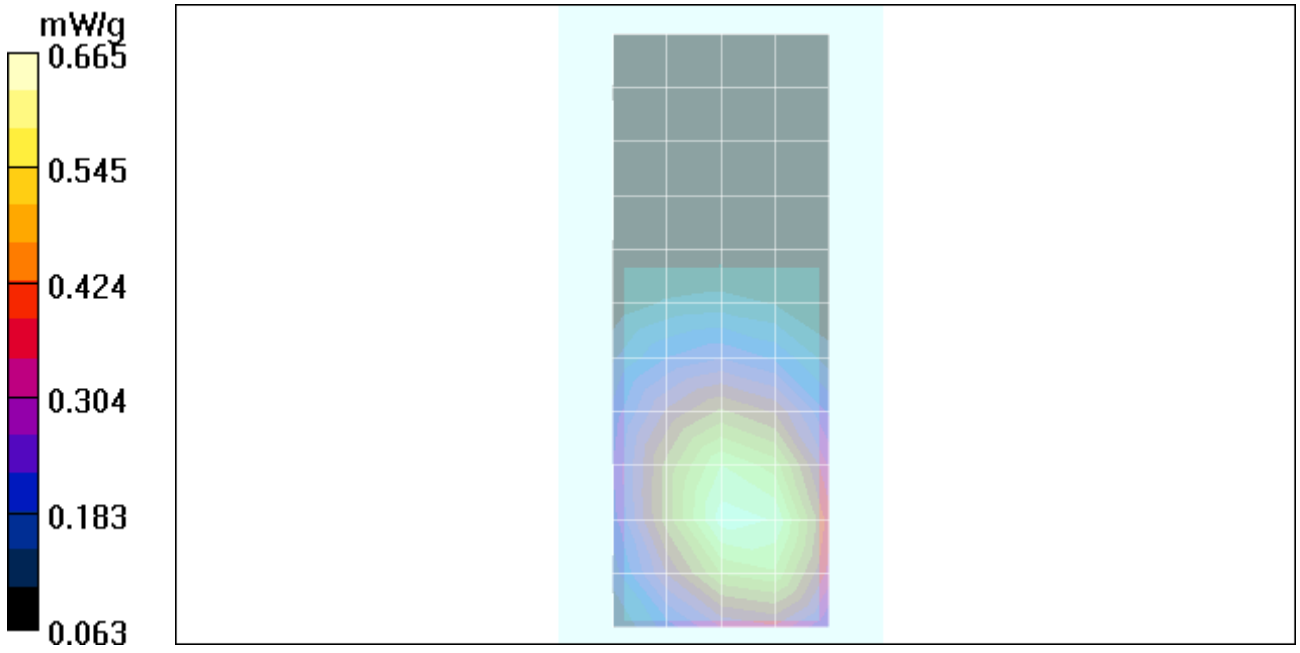
- Probe: ES3DV3 - SN3037; ConvF(6, 6, 6); Calibrated: 11/25/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 1/13/2005
- Phantom: R3: Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.646 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.1 V/m; Power Drift = -0.036 dB
Peak SAR (extrapolated) = 0.831 W/kg
SAR(1 g) = 0.627 mW/g; SAR(10 g) = 0.455 mW/g
Maximum value of SAR (measured) = 0.665 mW/g



Date/Time: 7/10/2005 11:53:20 PM

Test Laboratory: Motorola **850 Back of phone 15mm ch128**

Serial: 4400013814544
Procedure Notes: Pwr Step: 5 Antenna Position: internal

Battery Model #: snn5696b back OF PHONE 15MM AWAY FROM PHANTOM

Communication System: GSM 850; Frequency: 824.2 MHz; Channel Number: 128; Duty Cycle: 1:8
Medium: Low Freq Body; Medium parameters used: $\sigma = 0.94$ mho/m, $\varepsilon_r = 53.9$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

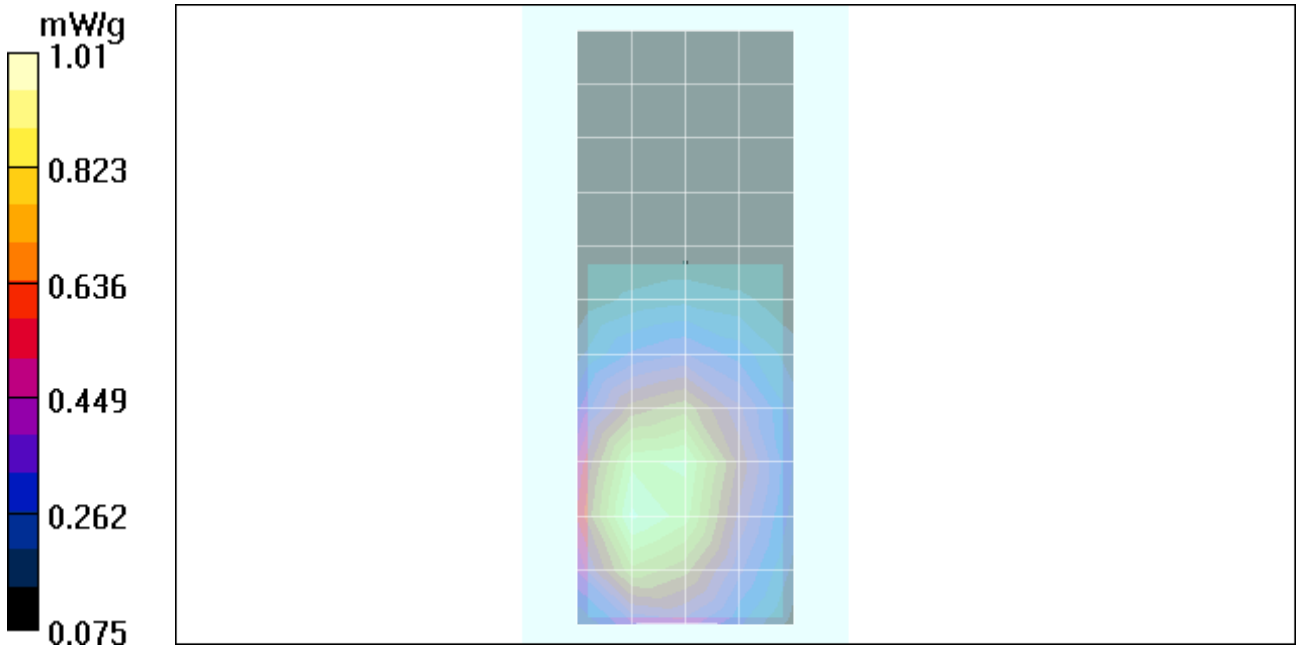
- Probe: ES3DV3 - SN3037; ConvF(6, 6, 6); Calibrated: 11/25/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 1/13/2005
- Phantom: R3: Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.964 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 30.1 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 1.33 W/kg
SAR(1 g) = 0.948 mW/g; SAR(10 g) = 0.651 mW/g



Date/Time: 7/24/2005 12:25:00 AM

Test Laboratory: Motorola

850 CHYN4647A Pouch ch128

Serial: ph1 14544

Procedure Notes: Pwr Step: 5 Antenna Position: int

Battery Model #: SNN5696B BODYWORN with case CHYN4647A

Communication System: GSM 850; Frequency: 824.2 MHz; Channel Number: 128; Duty Cycle: 1:8
Medium: Low Freq Body; Medium parameters used: $\sigma = 0.96$ mho/m, $\varepsilon_r = 53.6$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

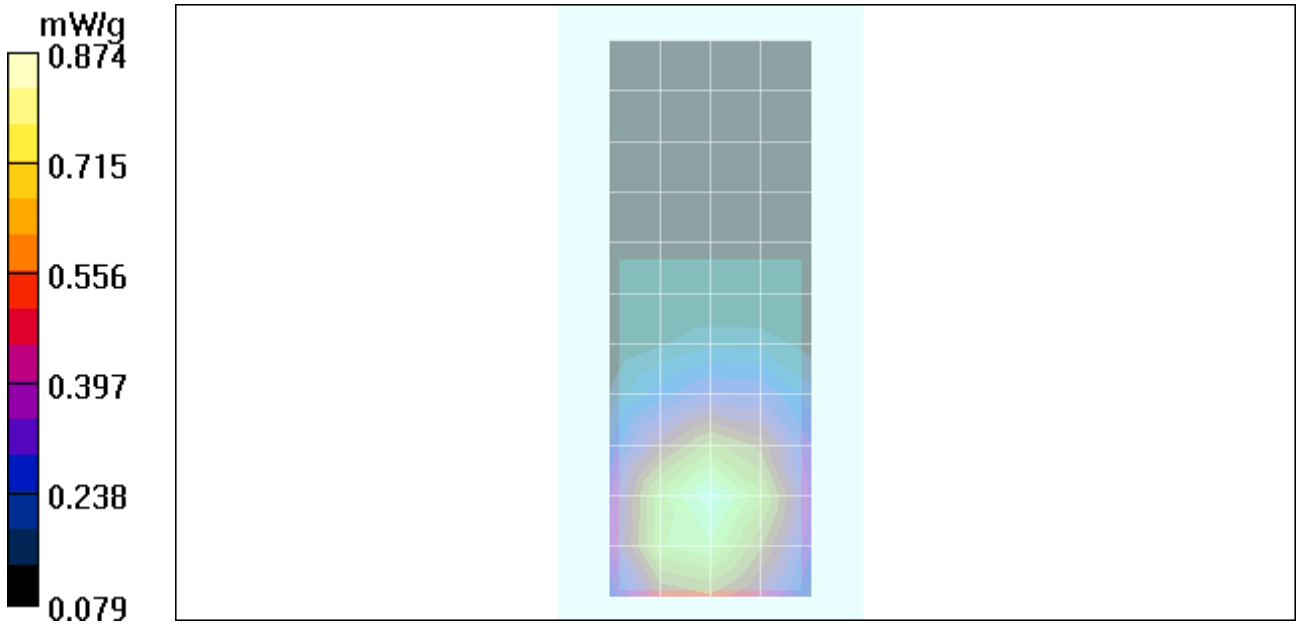
- Probe: ES3DV3 - SN3037; ConvF(6, 6, 6); Calibrated: 11/25/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 3/16/2005
- Phantom: R3: Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.859 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.9 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.822 mW/g; SAR(10 g) = 0.579 mW/g
Maximum value of SAR (measured) = 0.874 mW/g



Date/Time: 7/24/2005 12:00:09 AM

Test Laboratory: Motorola

850 SYN1066B Pouch ch128

Serial: ph1 14544

Procedure Notes: Pwr Step: 5 Antenna Position: int Battery

Model #: SNN5696B case syn1066b with wishbone

Communication System: GSM 850; Frequency: 824.2 MHz; Channel Number: 128; Duty Cycle: 1:8
Medium: Low Freq Body; Medium parameters used: $\sigma = 0.96$ mho/m, $\varepsilon_r = 53.6$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

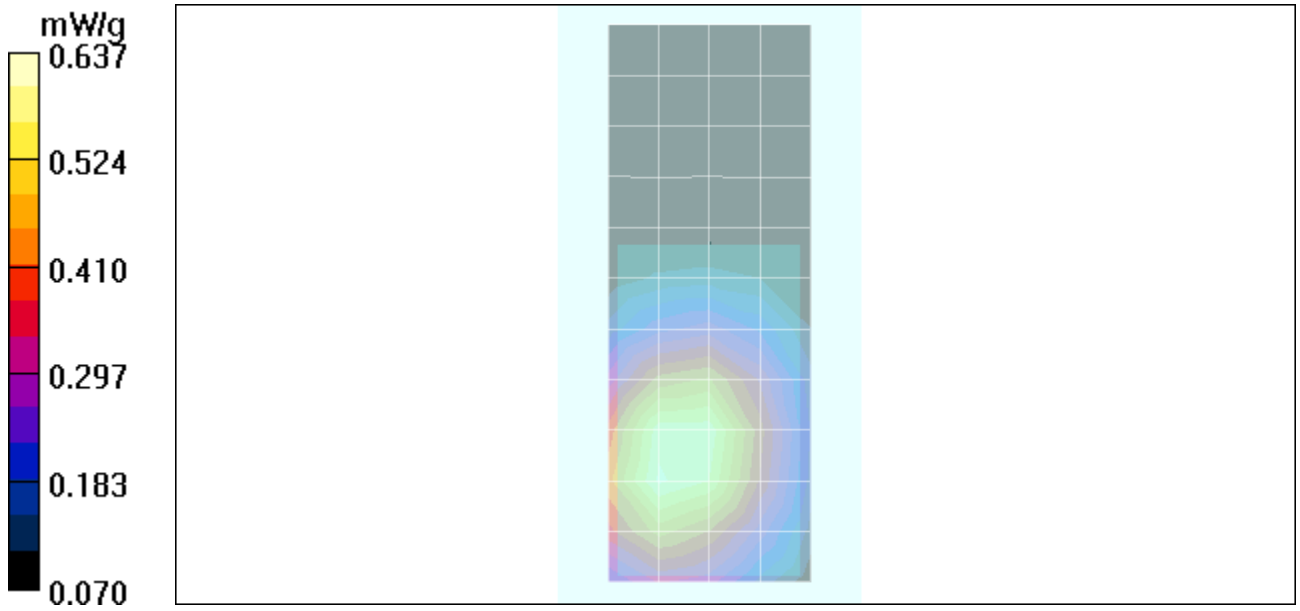
- Probe: ES3DV3 - SN3037; ConvF(6, 6, 6); Calibrated: 11/25/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 3/16/2005
- Phantom: R3: Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.608 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.3 V/m; Power Drift = -0.047 dB
Peak SAR (extrapolated) = 0.798 W/kg
SAR(1 g) = 0.603 mW/g; SAR(10 g) = 0.437 mW/g
Maximum value of SAR (measured) = 0.637 mW/g



Date/Time: 7/12/2005 3:46:15 PM

Test Laboratory: Motorola

1900 Front 15mm ch661

Serial: 4400013814544

Procedure Notes: Pwr Step: 0 Antenna Position: Internal Battery Model #: SNN5696B Accessory Model # = Front of Phone 15mm from Phantom

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8
Medium: Regular Glycol Body; Medium parameters used: σ = 1.58 mho/m, ε_r = 51.4; ρ = 1000 kg/m^3

DASY4 Configuration:

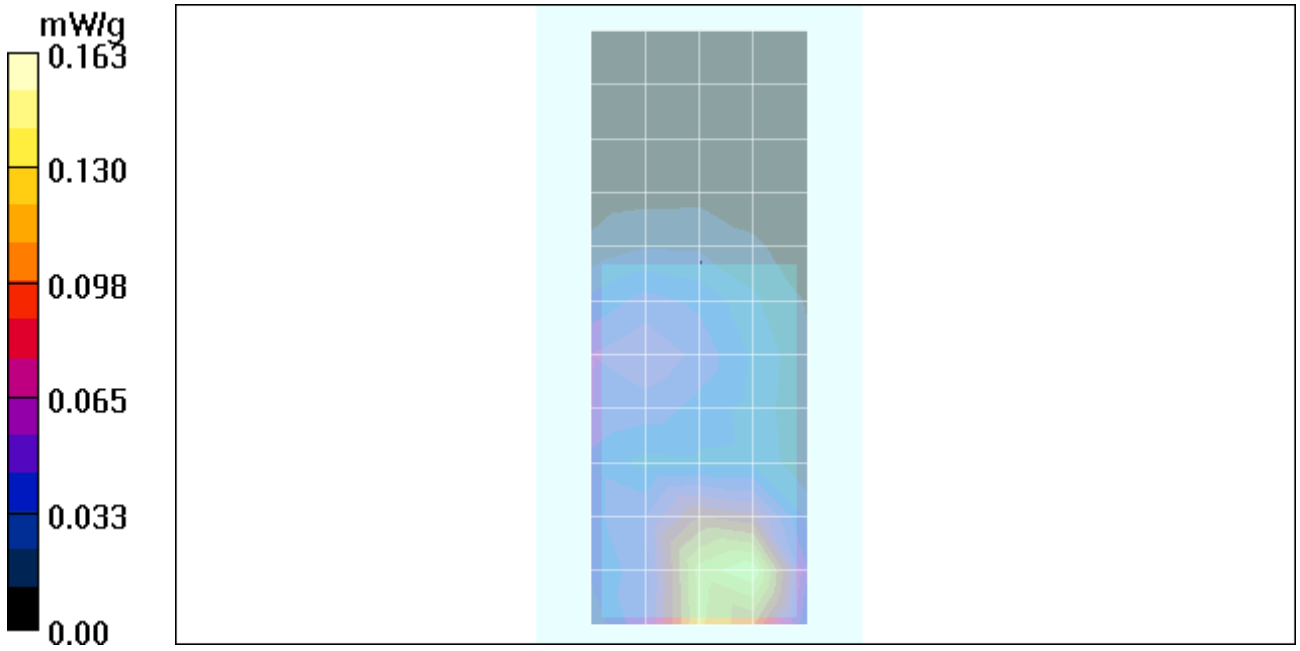
- Probe: ES3DV3 - SN3037; ConvF(4.71, 4.71, 4.71); Calibrated: 11/25/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 3/16/2005
- Phantom: R3: Sect.1, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.140 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.17 V/m; Power Drift = -0.027 dB
Peak SAR (extrapolated) = 0.233 W/kg
SAR(1 g) = 0.147 mW/g; SAR(10 g) = 0.086 mW/g
Maximum value of SAR (measured) = 0.163 mW/g



Date/Time: 7/12/2005 2:41:04 PM

Test Laboratory: Motorola

1900 Back 15mm ch661

Serial: 4400013814544

Procedure Notes: Pwr Step: 0 Antenna Position: Internal

Battery Model #: SNN5696B Accessory Model # = Back of Phone 15mm from Phantom

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8
Medium: Regular Glycol Body; Medium parameters used: σ = 1.58 mho/m, ε_r = 51.4; ρ = 1000 kg/m^3

DASY4 Configuration:

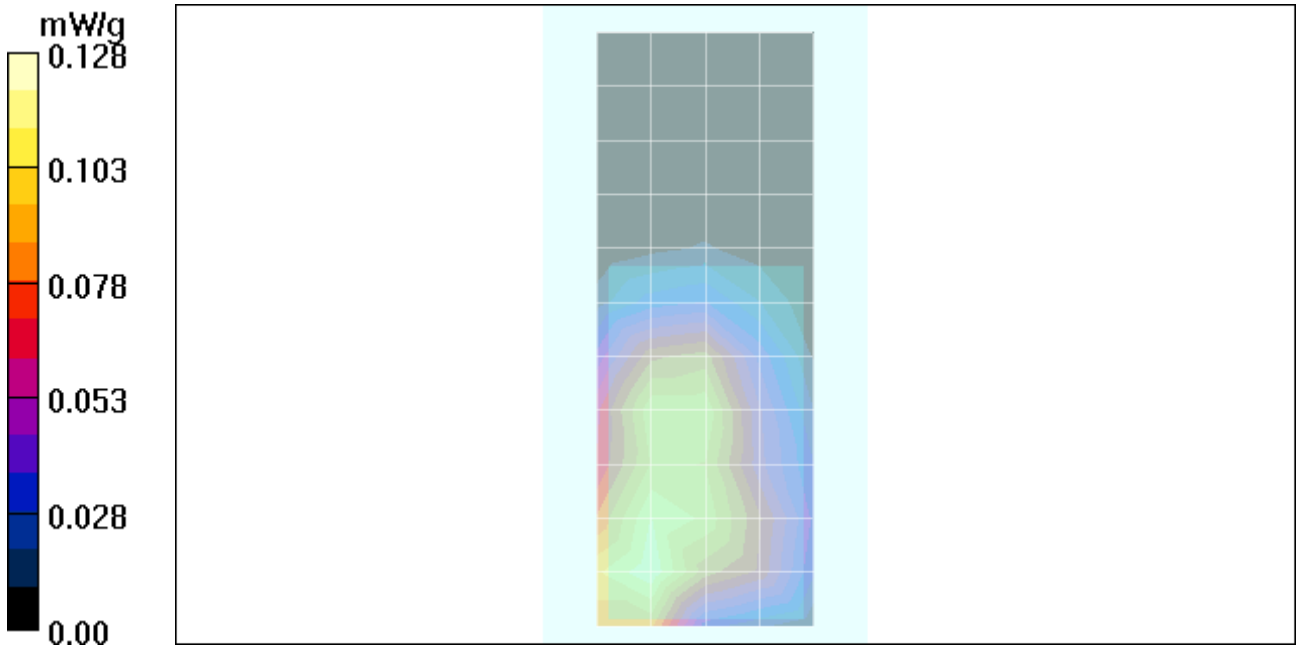
- Probe: ES3DV3 - SN3037; ConvF(4.71, 4.71, 4.71); Calibrated: 11/25/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 3/16/2005
- Phantom: R3: Sect.1, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.118 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.02 V/m; Power Drift = -0.027 dB
Peak SAR (extrapolated) = 0.178 W/kg
SAR(1 g) = 0.117 mW/g; SAR(10 g) = 0.072 mW/g
Maximum value of SAR (measured) = 0.128 mW/g



Date/Time: 8/3/2005 8:07:27 PM

Test Laboratory: Motorola

1900 CHYN4647A Pouch ch661

Serial: 4400013814544

Procedure Notes: Pwr Step: 0 Antenna Position: Internal

Battery Model #: SNN5696B Accessory Model # = CHYN4647A Flat Phantom #: 39

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8
Medium: Regular Glycol Body; Medium parameters used: σ = 1.58 mho/m, ε_r = 51.1; ρ = 1000 kg/m^3

DASY4 Configuration:

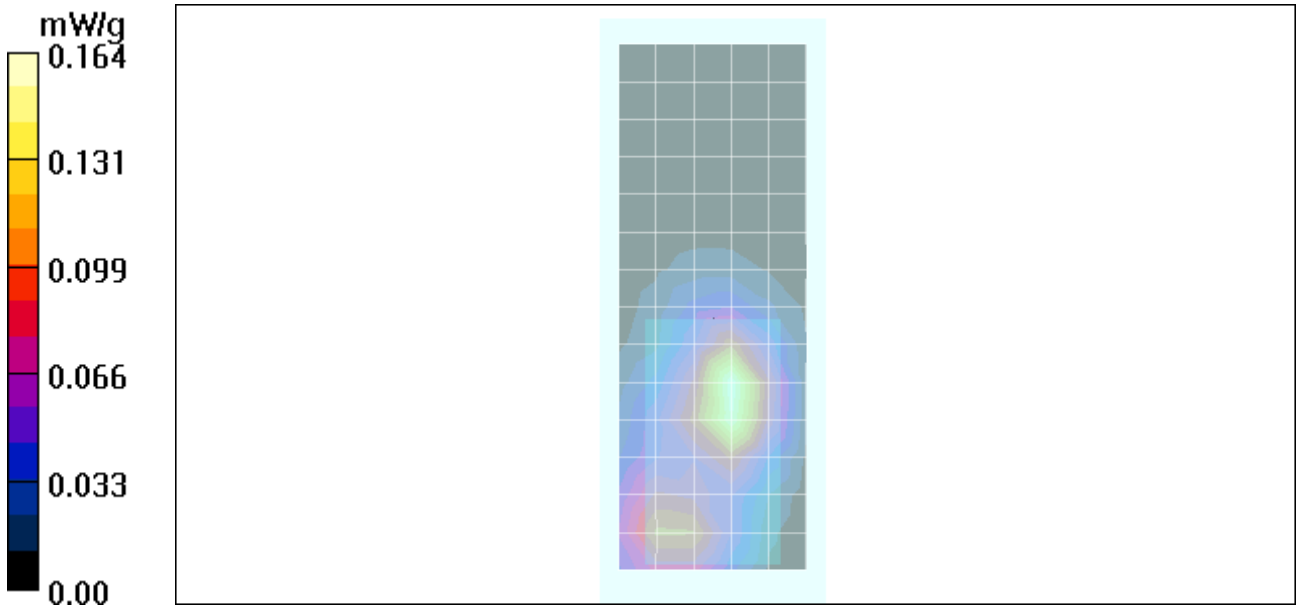
- Probe: ET3DV6R - SN1397; ConvF(4.77, 4.77, 4.77); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 3/16/2005
- Phantom: R3: Sect.1, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.164 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.24 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.257 W/kg
SAR(1 g) = 0.155 mW/g; SAR(10 g) = 0.090 mW/g
Maximum value of SAR (measured) = 0.171 mW/g



Date/Time: 8/3/2005 8:48:14 PM

Test Laboratory: Motorola

1900 SYN1066B Pouch ch661

Serial: 4400013814544

Procedure Notes: Pwr Step: 0 Antenna Position: Internal

Battery Model #: SNN5696B Accessory Model # = SYN1066B with SYN8631A

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8
Medium: Regular Glycol Body; Medium parameters used: σ = 1.58 mho/m, ε_r = 51.1; ρ = 1000 kg/m^3

DASY4 Configuration:

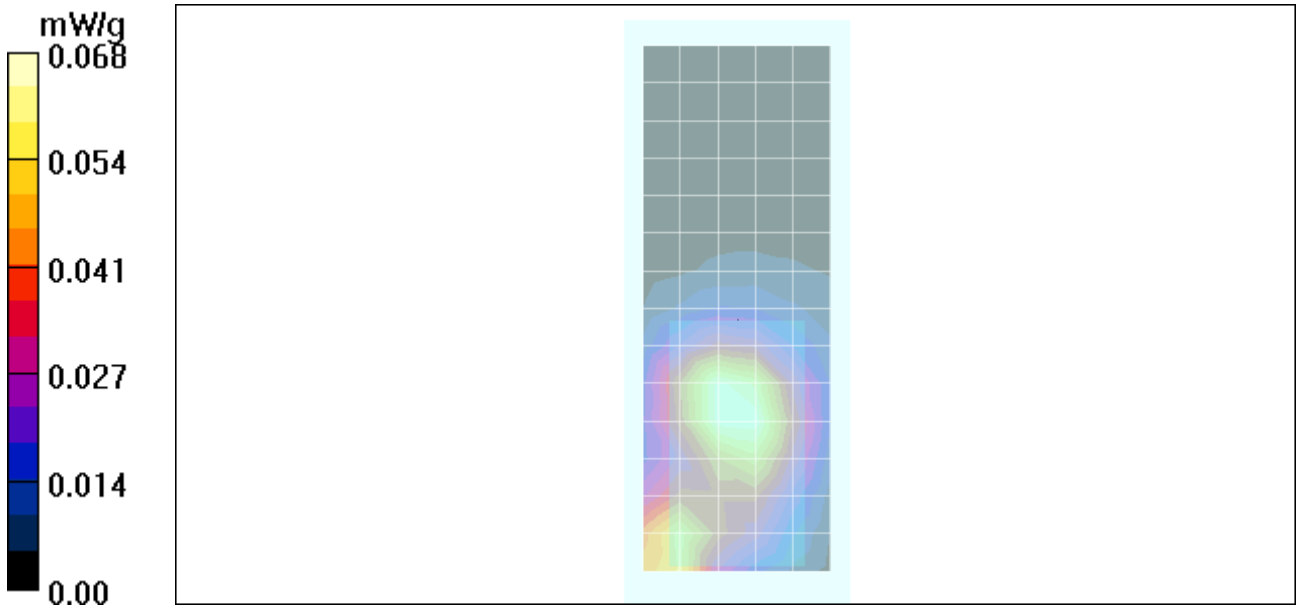
- Probe: ET3DV6R - SN1397; ConvF(4.77, 4.77, 4.77); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 3/16/2005
- Phantom: R3: Sect.1, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.067 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.68 V/m; Power Drift = -0.766 dB
Peak SAR (extrapolated) = 0.090 W/kg
SAR(1 g) = 0.063 mW/g; SAR(10 g) = 0.041 mW/g
Maximum value of SAR (measured) = 0.068 mW/g



Date/Time: 7/15/2005 2:38:01 PM

Test Laboratory: Motorola

2441 Front 15mm ch39 Bluetooth

Serial: 4400013814544

Procedure Notes: Pwr Step: all up ota Antenna Position: INTERNAL

Battery Model #: SNN5696B Accessory Model # = front15mm

Communication System: Bluetooth; Frequency: 2441 MHz; Channel Number: 39; Duty Cycle: 1:1
Medium: 2450 Glycol Head; Medium parameters used: $\sigma = 2$ mho/m, $\varepsilon_r = 52.5$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

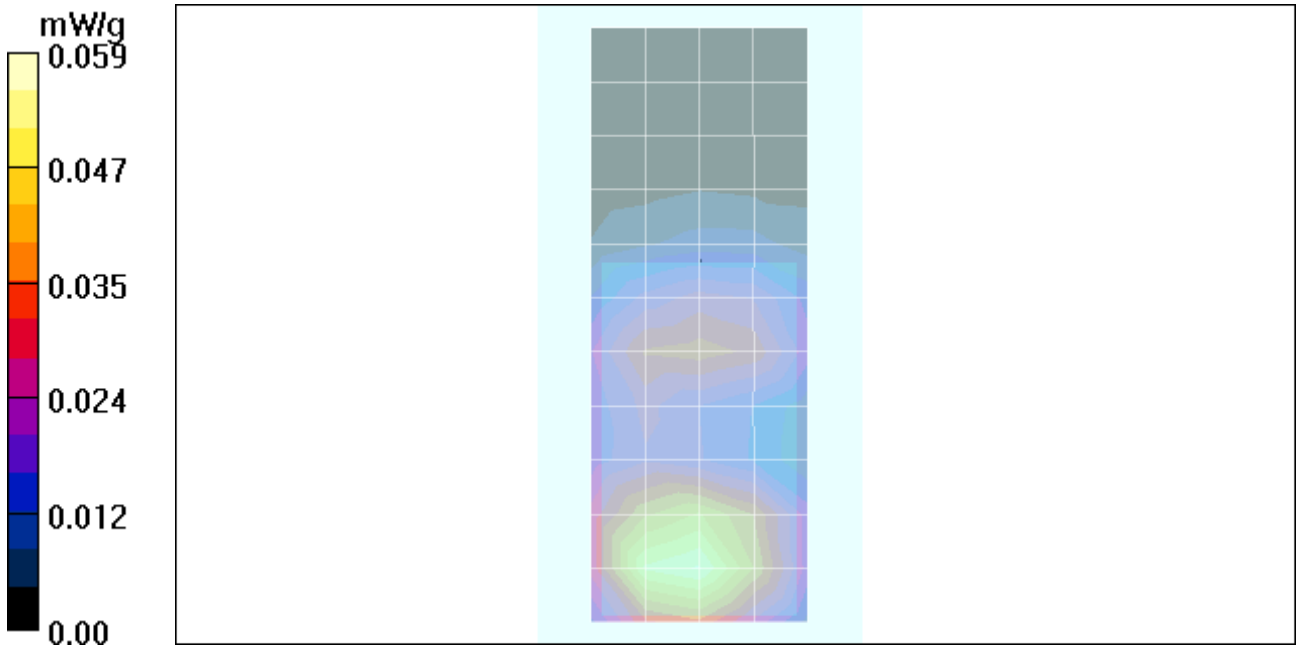
- Probe: ET3DV6 - SN1520; ConvF(4.27, 4.27, 4.27); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn365; Calibrated: 9/22/2004
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.056 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.51 V/m; Power Drift = 0.031 dB
Peak SAR (extrapolated) = 0.114 W/kg
SAR(1 g) = 0.055 mW/g; SAR(10 g) = 0.032 mW/g
Maximum value of SAR (measured) = 0.059 mW/g



Date/Time: 7/15/2005 3:00:26 PM

Test Laboratory: Motorola

2441 Back 15mm ch39 Bluetooth

Serial: 4400013814544

Procedure Notes: Pwr Step: all up ota Antenna Position: INTERNAL

Battery Model #: SNN5696B Accessory Model # = back15mm

Communication System: Bluetooth; Frequency: 2441 MHz; Channel Number: 39; Duty Cycle: 1:1
Medium: 2450 Glycol Head; Medium parameters used: $\sigma = 2$ mho/m, $\varepsilon_r = 52.5$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

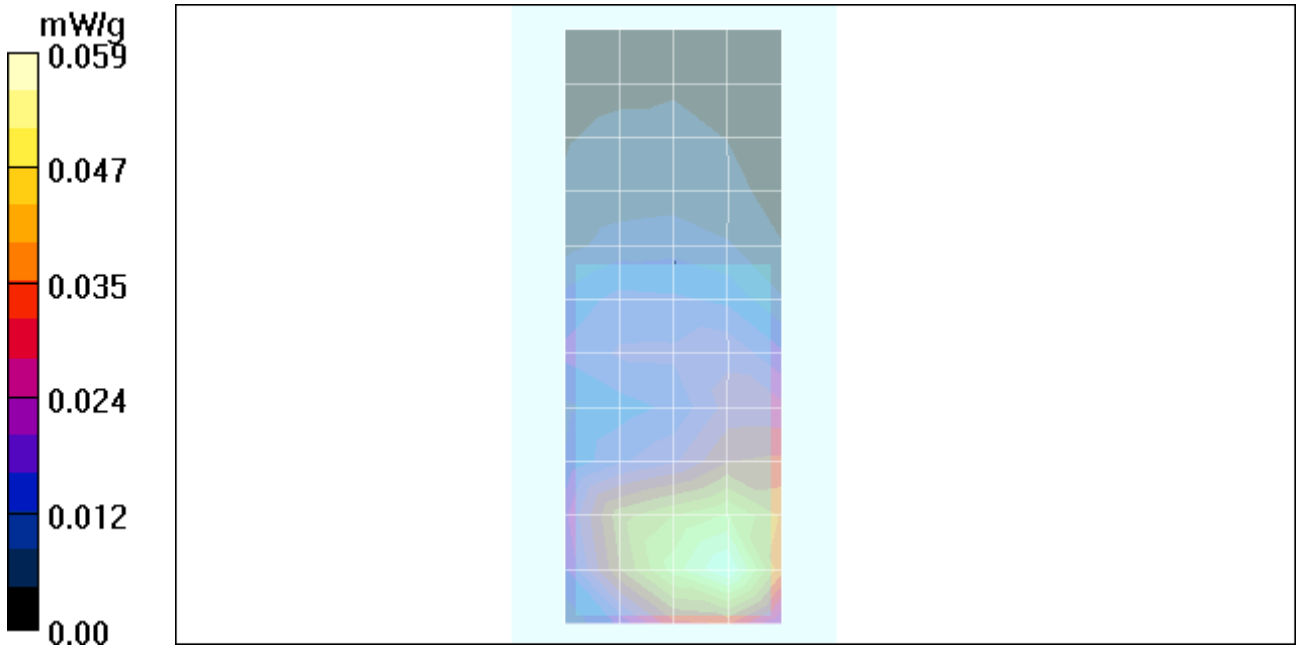
- Probe: ET3DV6 - SN1520; ConvF(4.27, 4.27, 4.27); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn365; Calibrated: 9/22/2004
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.060 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.33 V/m; Power Drift = -0.032 dB
Peak SAR (extrapolated) = 0.120 W/kg
SAR(1 g) = 0.056 mW/g; SAR(10 g) = 0.032 mW/g
Maximum value of SAR (measured) = 0.059 mW/g



Date/Time: 7/22/2005 11:06:55 PM

Test Laboratory: Motorola

2441 CHYN4647A ch39 Bluetooth

Serial: 4400013814544

Procedure Notes: Pwr Step: N/A Antenna Position: Internal

Battery Model #: SNN5696B Accessory Model # = CHYN4647A

Communication System: Bluetooth; Frequency: 2441 MHz; Channel Number: 39; Duty Cycle: 1:1
Medium: 2450 Glycol Body; Medium parameters used: $\sigma = 2.04$ mho/m, $\varepsilon_r = 50.6$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

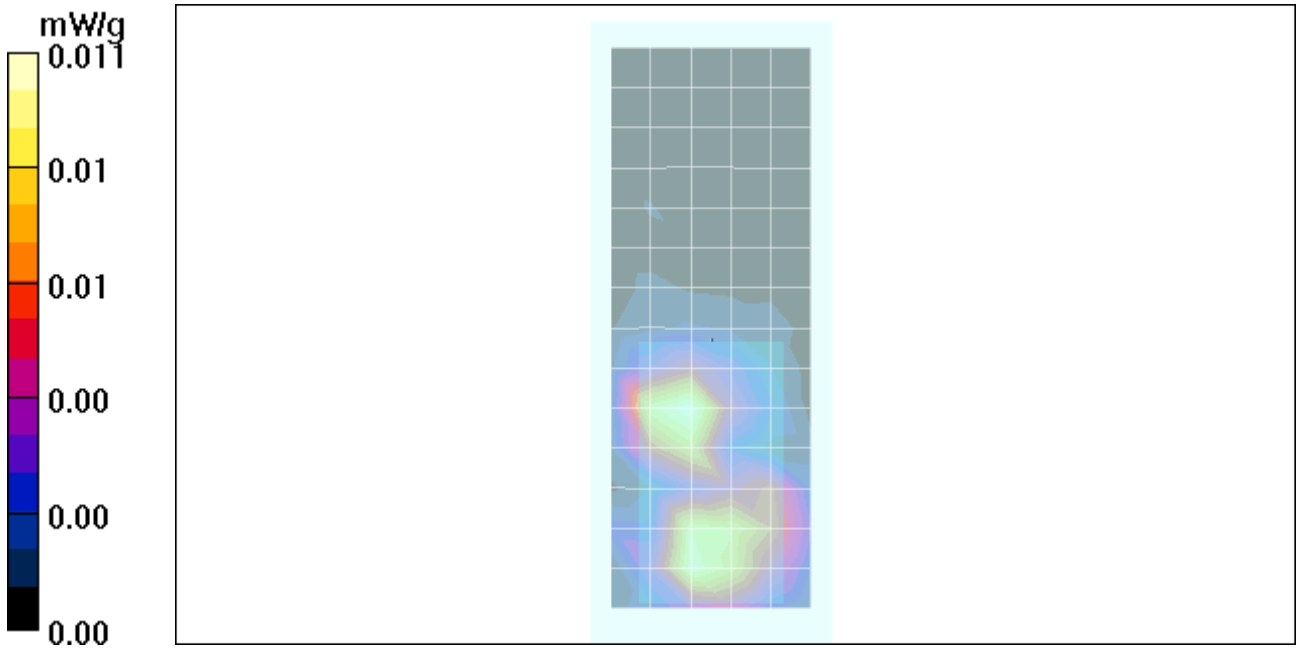
- Probe: ET3DV6 - SN1520; ConvF(4.27, 4.27, 4.27); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn365; Calibrated: 9/22/2004
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.011 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.44 V/m; Power Drift = 0.239 dB
Peak SAR (extrapolated) = 0.044 W/kg
SAR(1 g) = 0.011 mW/g; SAR(10 g) = 0.00484 mW/g
Maximum value of SAR (measured) = 0.013 mW/g



Date/Time: 8/4/2005 4:04:31 PM

Test Laboratory: Motorola **2441 SYN1066B ch39 Bluetooth**

Serial: 4400013814544

Procedure Notes: Pwr Step: Antenna Position: Internal

Battery Model #: SNN5696B Accessory Model # = SYN1066B

Communication System: Bluetooth; Frequency: 2441 MHz; Channel Number: 39; Duty Cycle: 1:1
Medium: 2450 Glycol Body; Medium parameters used: $\sigma = 2.04$ mho/m, $\varepsilon_r = 50.6$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

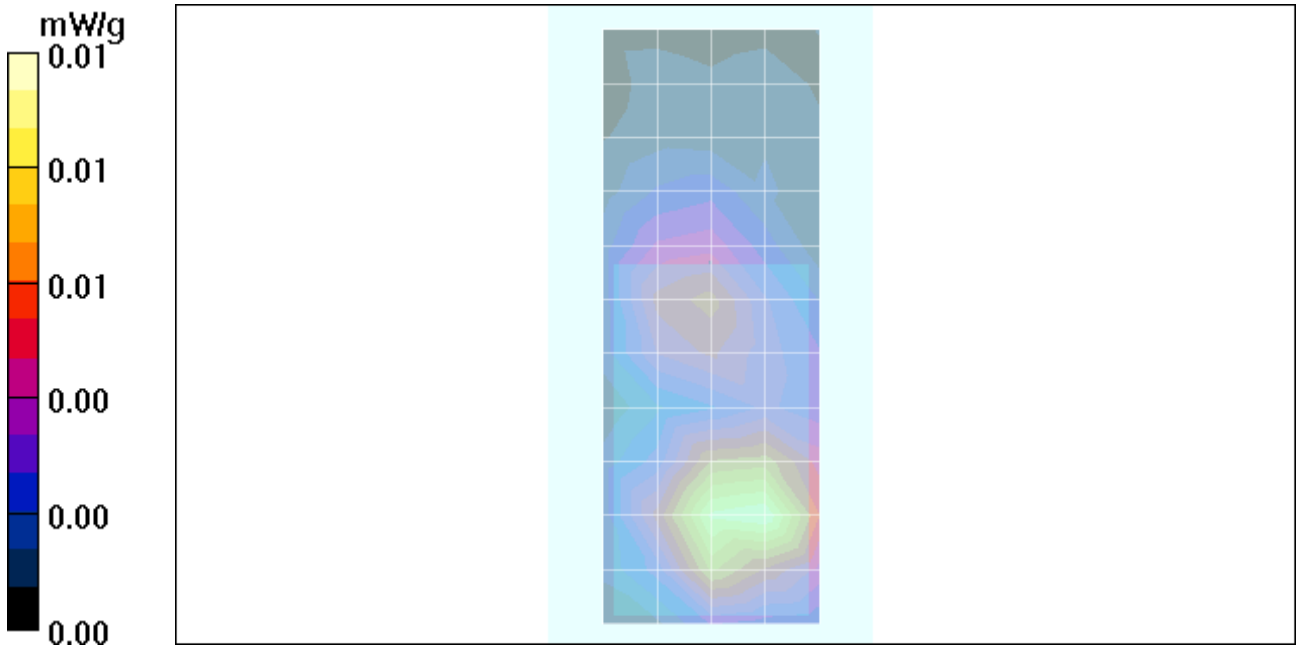
- Probe: ET3DV6 - SN1520; ConvF(4.27, 4.27, 4.27); Calibrated: 4/22/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn365; Calibrated: 9/22/2004
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 147

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.01 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.03 V/m; Power Drift = 0.209 dB
Peak SAR (extrapolated) = 0.037 W/kg
SAR(1 g) = 0.00886 mW/g; SAR(10 g) = 0.0042 mW/g



Appendix 4

Probe Calibration Certificate

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

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

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

Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: ET3-1397_Apr05

CALIBRATION CERTIFICATE

Object	ET3DV6R - SN:1397
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 ± 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	

Issued: April 25, 2005

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

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

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

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

Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ET3DV6R

SN:1397

Manufactured:	October 24, 1999
Last calibrated:	May 21, 2004
Recalibrated:	April 22, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6R SN:1397

Sensitivity in Free Space[A] Diode Compression[B]

NormX	**1.81** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**95** mV
NormY	**1.69** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**95** mV
NormZ	**1.95** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**95** 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	9.2	4.7
SAR_{be} [%]	With Correction Algorithm	0.1	0.2

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	13.5	9.1
SAR_{be} [%]	With Correction Algorithm	0.8	0.1

Sensor Offset

Probe Tip to Sensor Center	**2.7** mm

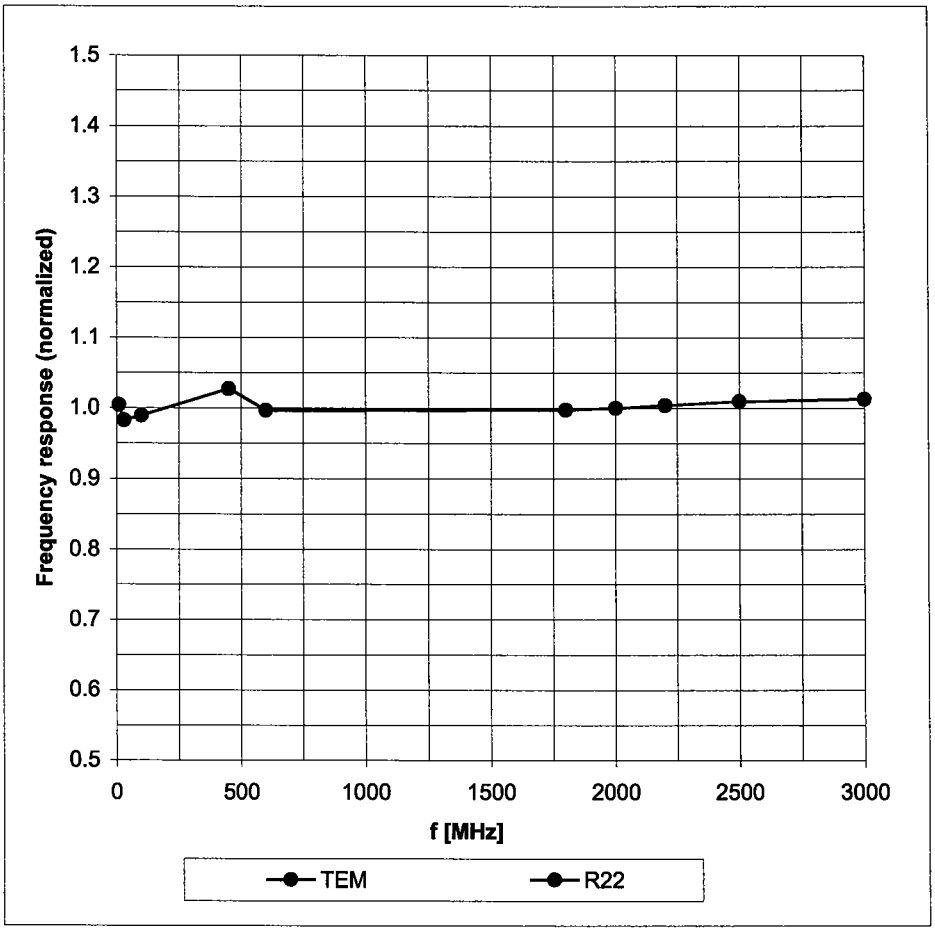
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

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

[B] Numerical linearization parameter: uncertainty not required.

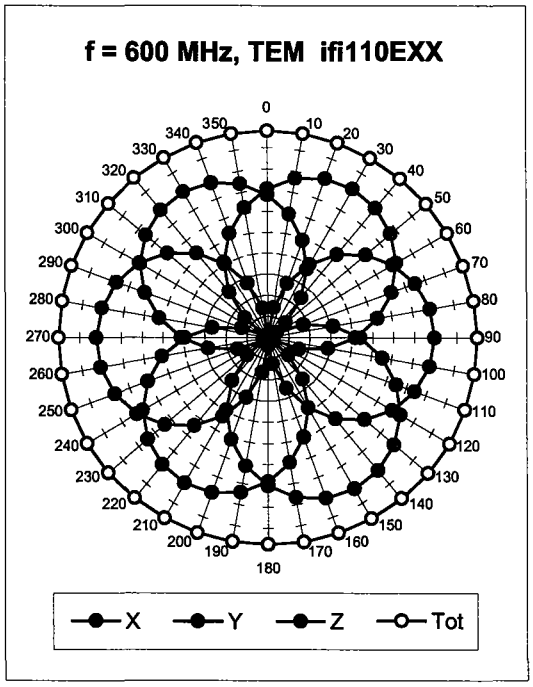
Frequency Response of E-Field

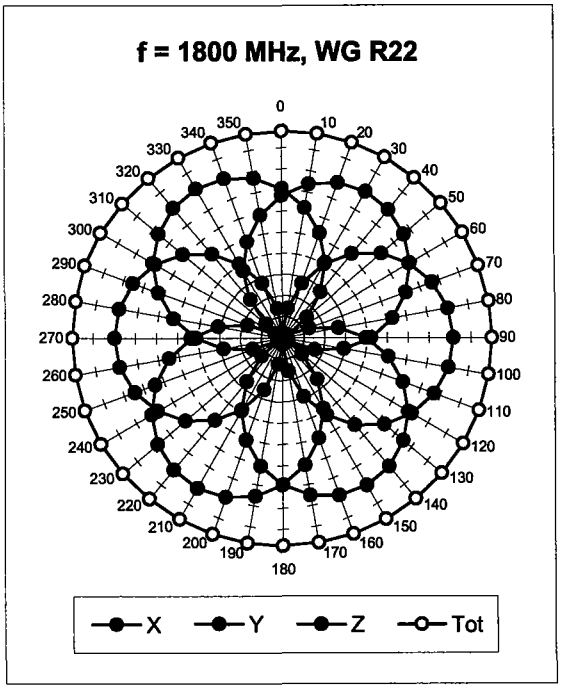
(TEM-Cell:ifi110 EXX, Waveguide: R22)

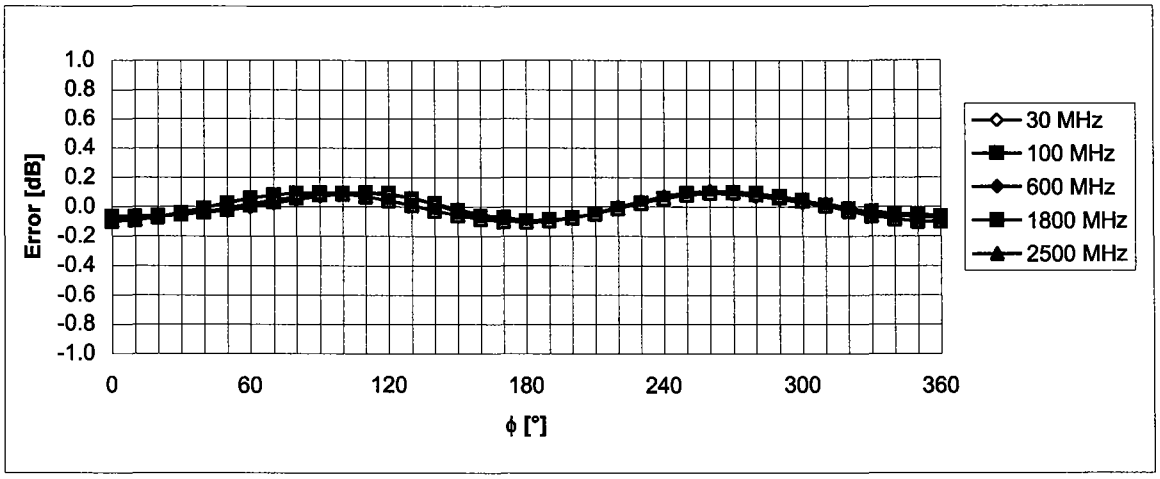


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



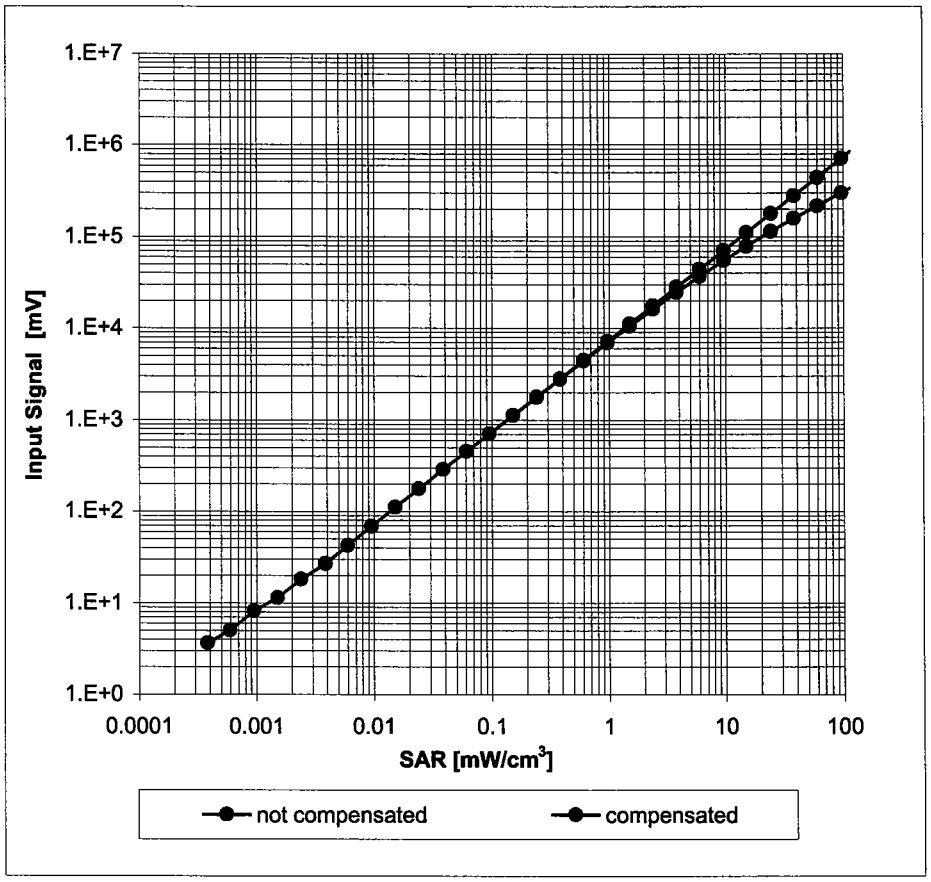


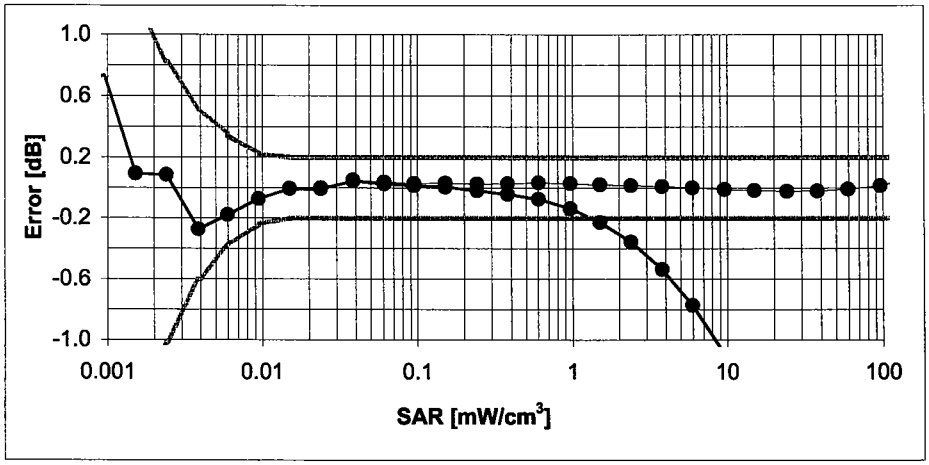


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

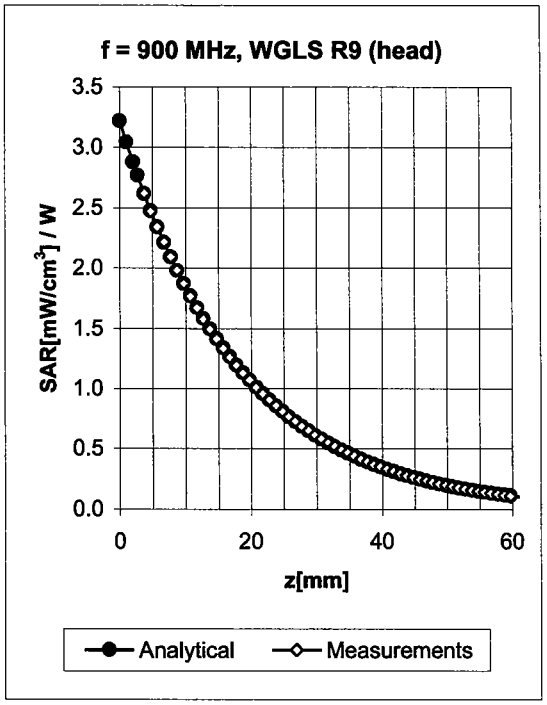
(Waveguide R22, f = 1800 MHz)

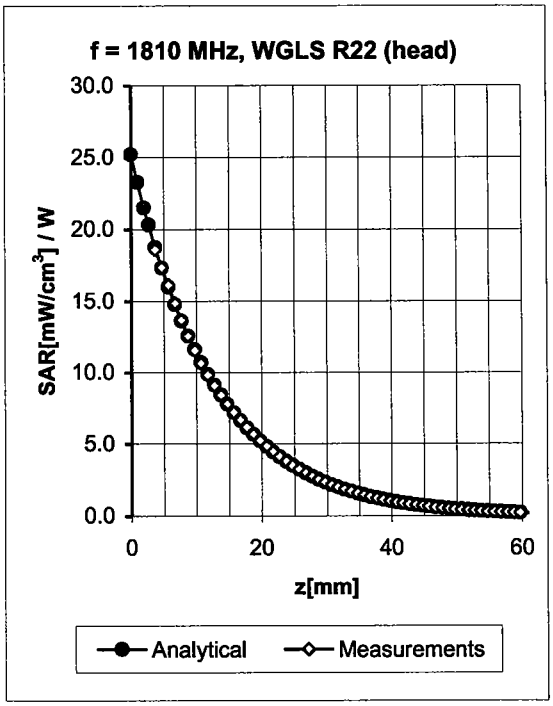




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



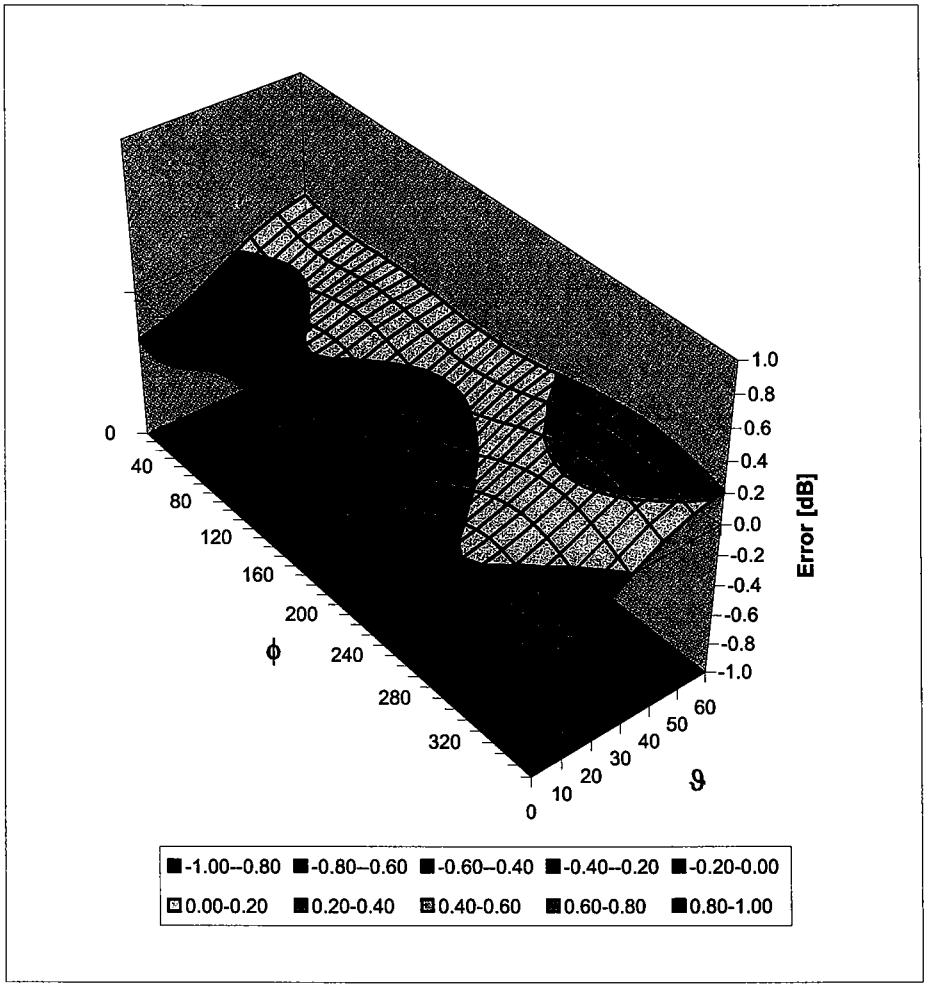


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.71	1.73	6.38 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.60	2.37	5.17 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.59	2.49	4.90 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.58	2.00	6.22 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.57	2.75	4.77 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.60	2.53	4.44 ± 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: ± 2.6% (k=2)

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

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

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

Accreditation No.: SCS 108

Client Motorola PCS

Certificate No: ES3-3037_Nov04

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3037
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	November 25, 2004
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	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	8-Jan-04 (SPEAG, No. ES3-3013_Jan04)	Jan-05
DAE4	SN: 617	29-Sep-04 (SPEAG, No. DAE4-617_Sep04)	Sep-05

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

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

Issued: November 26, 2004

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

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

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

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

Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ES3DV3

SN:3037

Manufactured:	August 21, 2003
Last calibrated:	October 10, 2003
Recalibrated:	November 25, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ES3DV3 SN:3037

Sensitivity in Free Space[A] Diode Compression[B]

NormX	**1.15** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**99** mV
NormY	**0.84** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**99** mV
NormZ	**0.94** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**99** 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		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	5.8	2.5
SAR_{be} [%]	With Correction Algorithm	0.0	0.1

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

Sensor Center to Phantom Surface Distance		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	7.7	4.5
SAR_{be} [%]	With Correction Algorithm	0.1	0.3

Sensor Offset

Probe Tip to Sensor Center	**2.0** mm

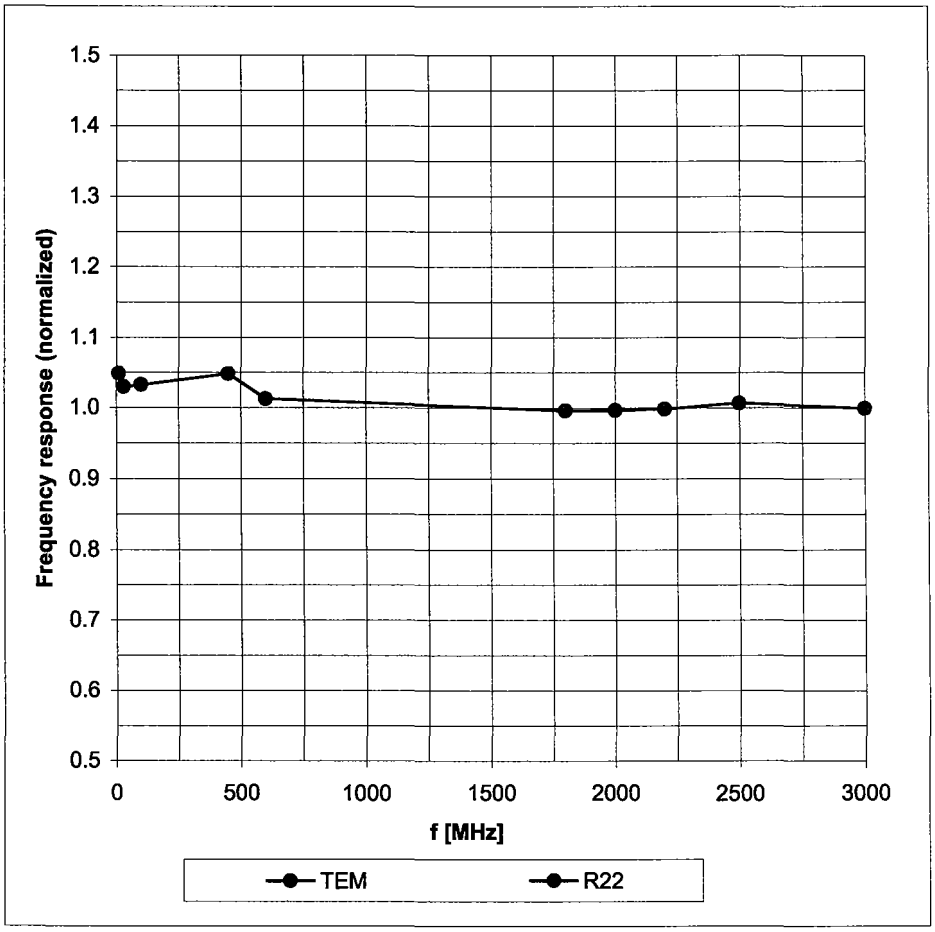
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

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

[B] Numerical linearization parameter: uncertainty not required.

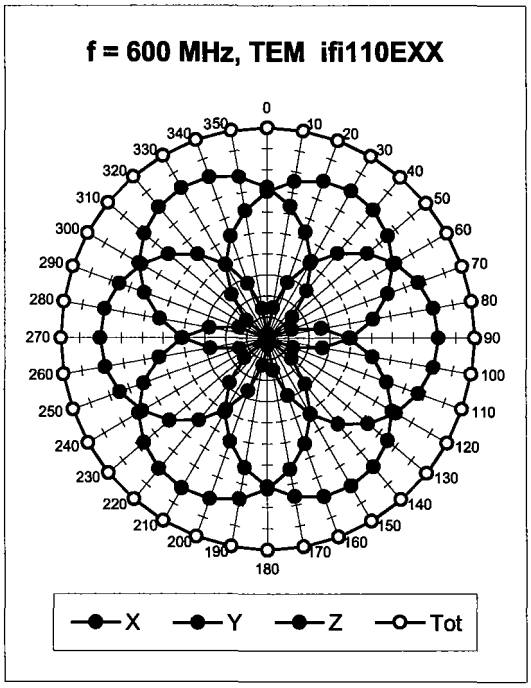
Frequency Response of E-Field

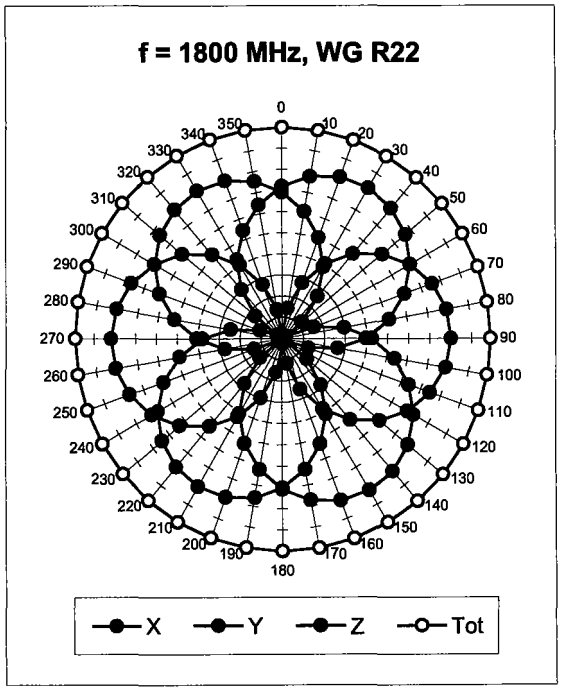
(TEM-Cell:ifi110 EXX, Waveguide: R22)

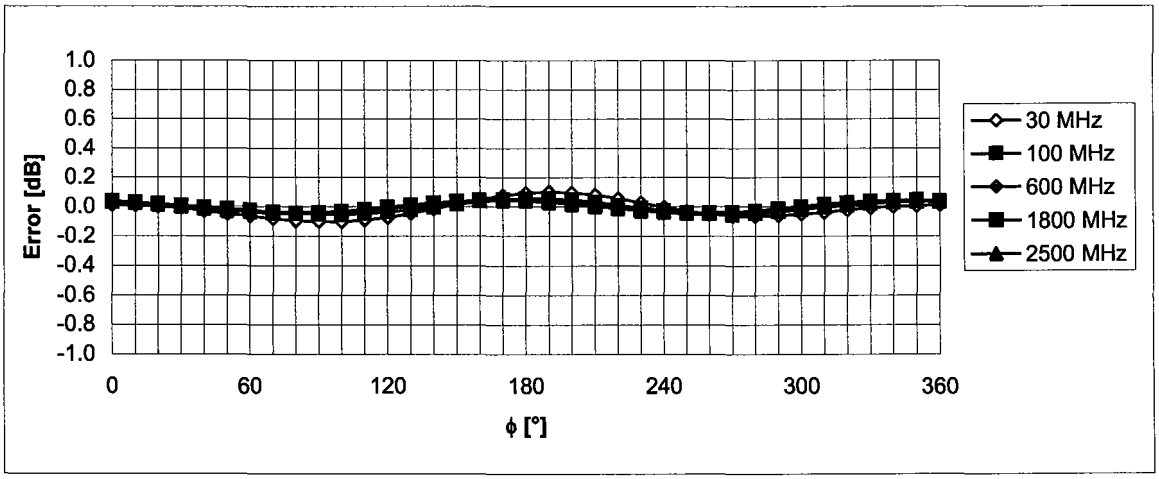


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



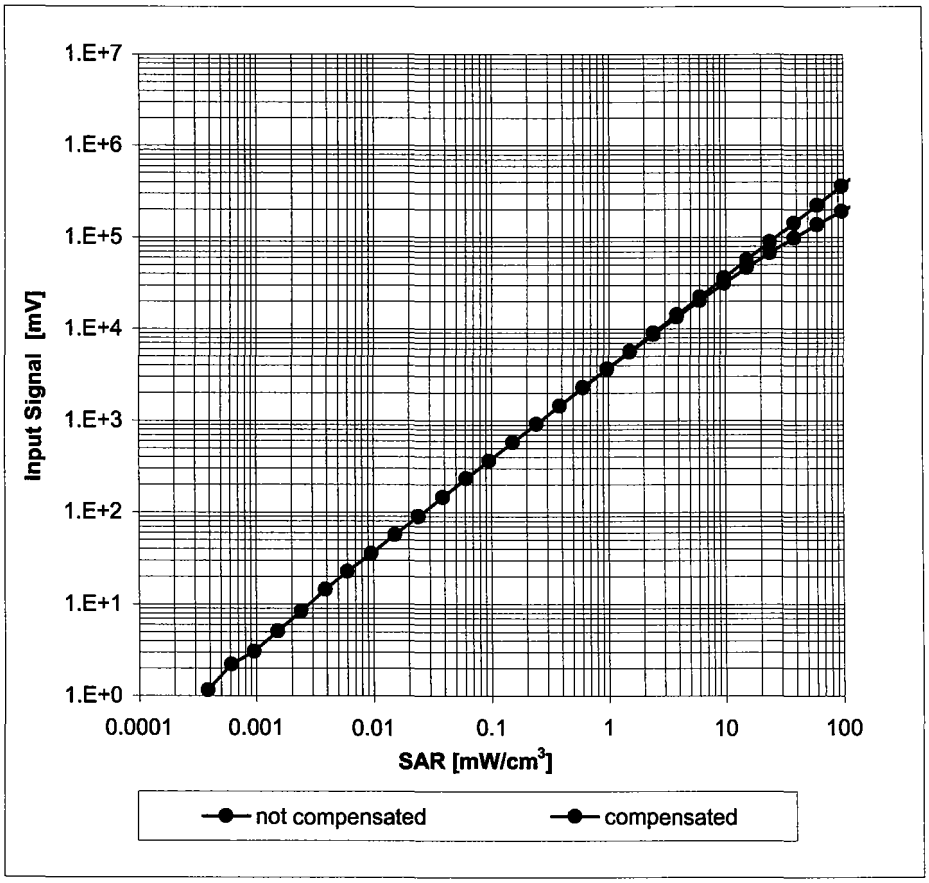


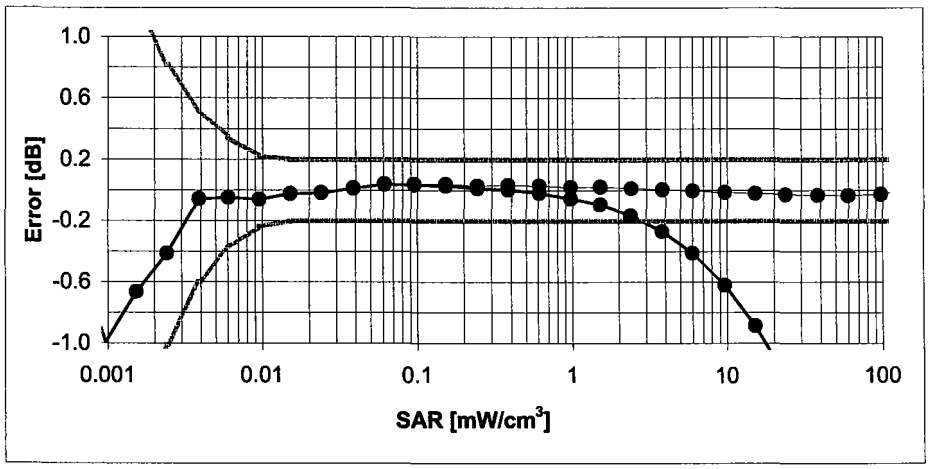


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

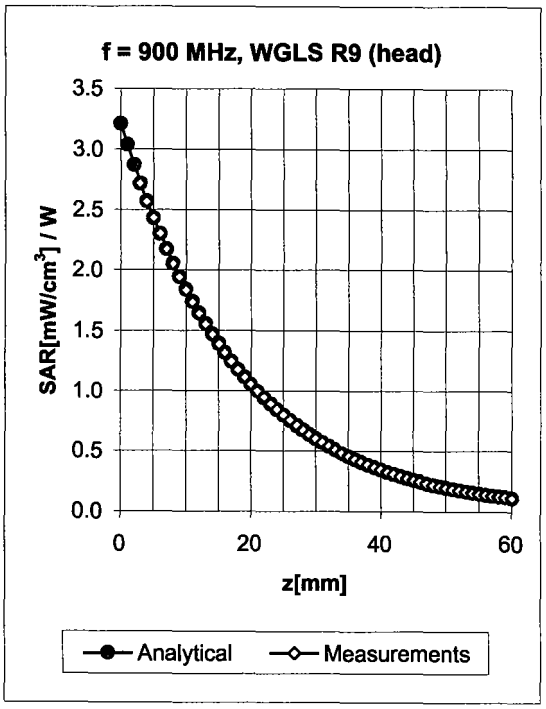
(Waveguide R22, f = 1800 MHz)

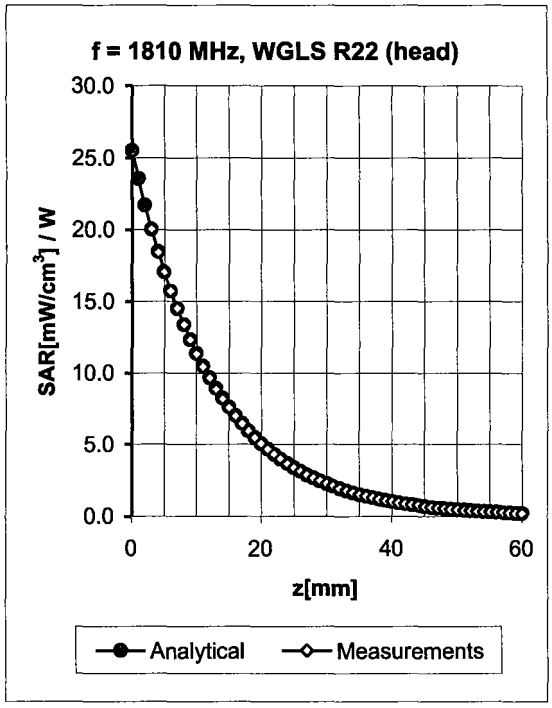




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



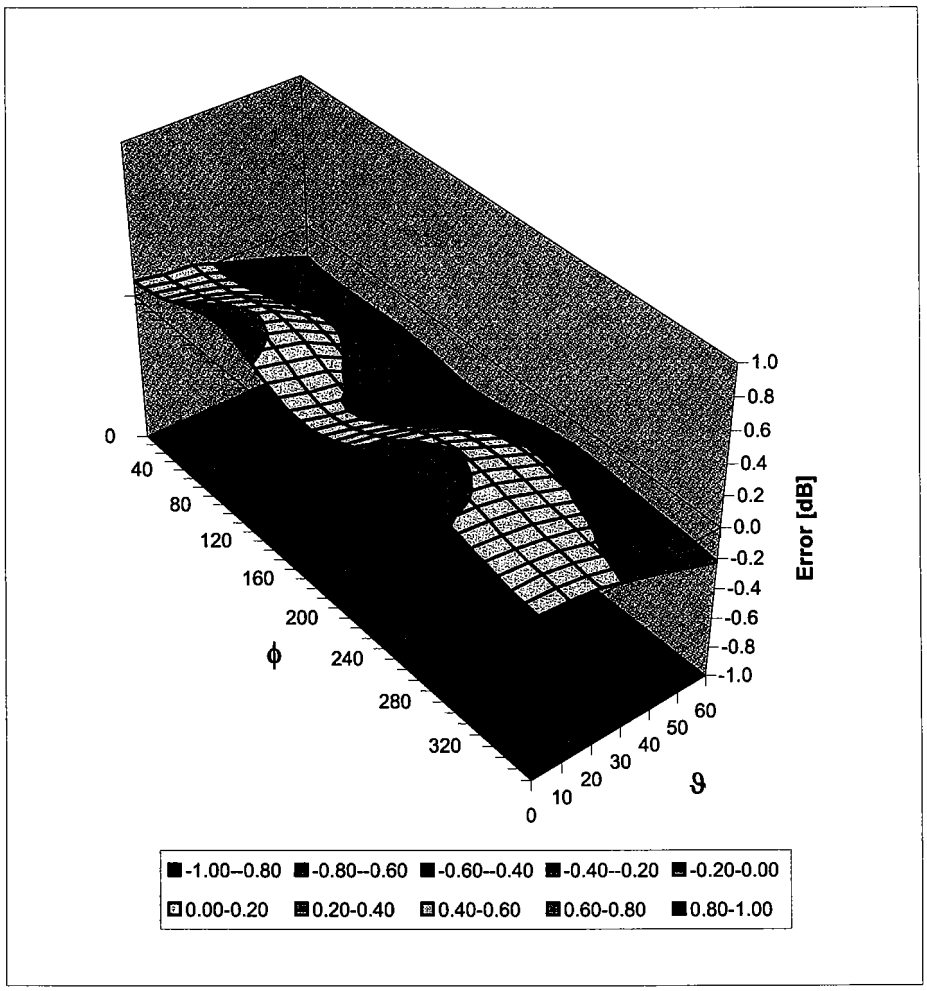


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.56	1.29	6.11 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.25	2.34	5.16 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.28	2.26	4.77 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.66	1.23	6.00 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.23	3.26	4.71 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.32	2.16	4.56 ± 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: ± 2.6% (k=2)

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

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

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

Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: ET3-1520_Apr05

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1520
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 ± 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	

Issued: April 25, 2005

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

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

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

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

Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ET3DV6

SN:1520

Manufactured:	February 1, 2000
Last calibrated:	May 27, 2004
Recalibrated:	April 22, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1520

Sensitivity in Free Space[A] Diode Compression[B]

NormX	**1.89** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**95** mV
NormY	**1.70** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**95** mV
NormZ	**1.89** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**95** 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	9.2	4.8
SAR_{be} [%]	With Correction Algorithm	0.1	0.2

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	13.7	9.2
SAR_{be} [%]	With Correction Algorithm	0.7	0.0

Sensor Offset

Probe Tip to Sensor Center	**2.7** mm

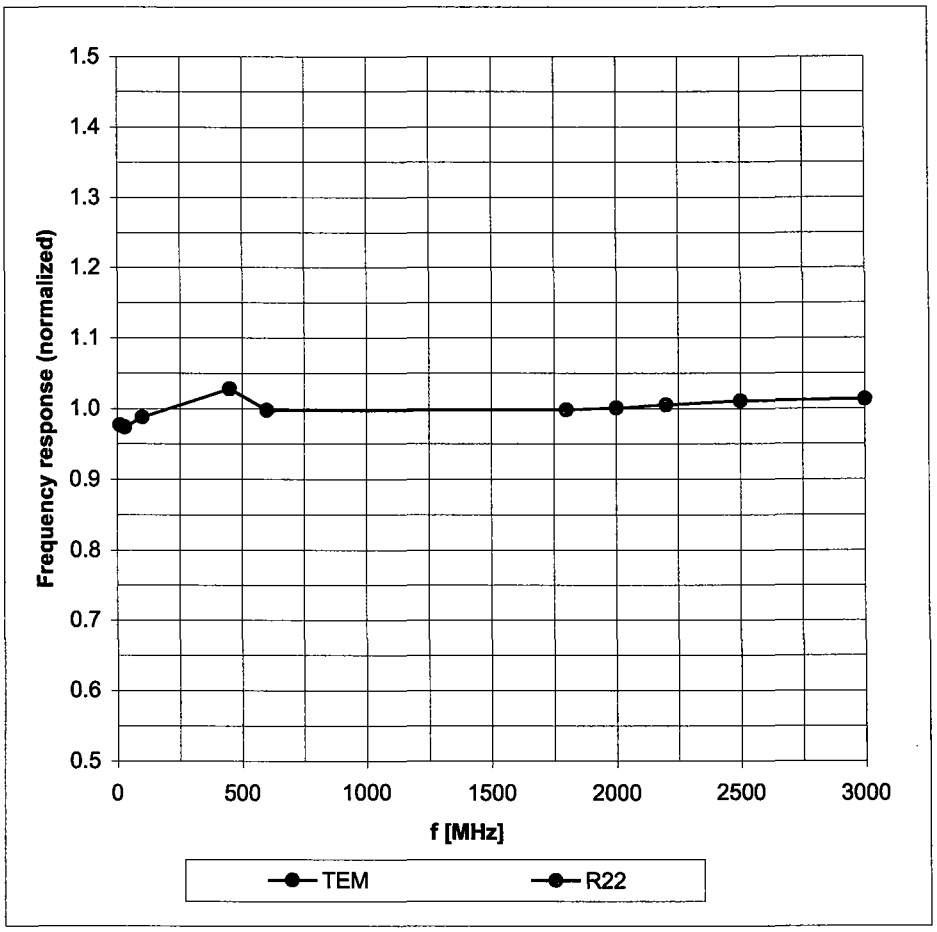
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

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

[B] Numerical linearization parameter: uncertainty not required.

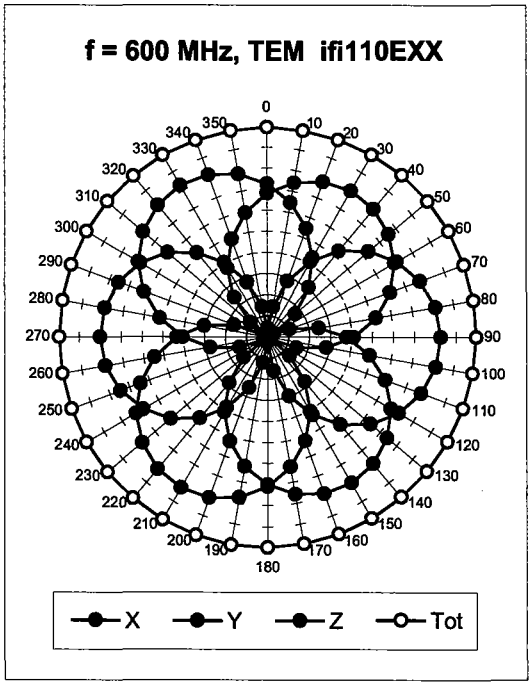
Frequency Response of E-Field

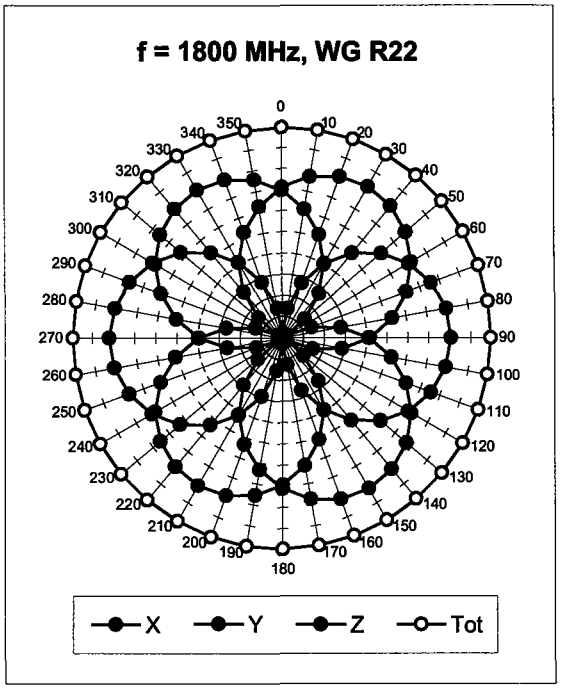
(TEM-Cell:ifi110 EXX, Waveguide: R22)

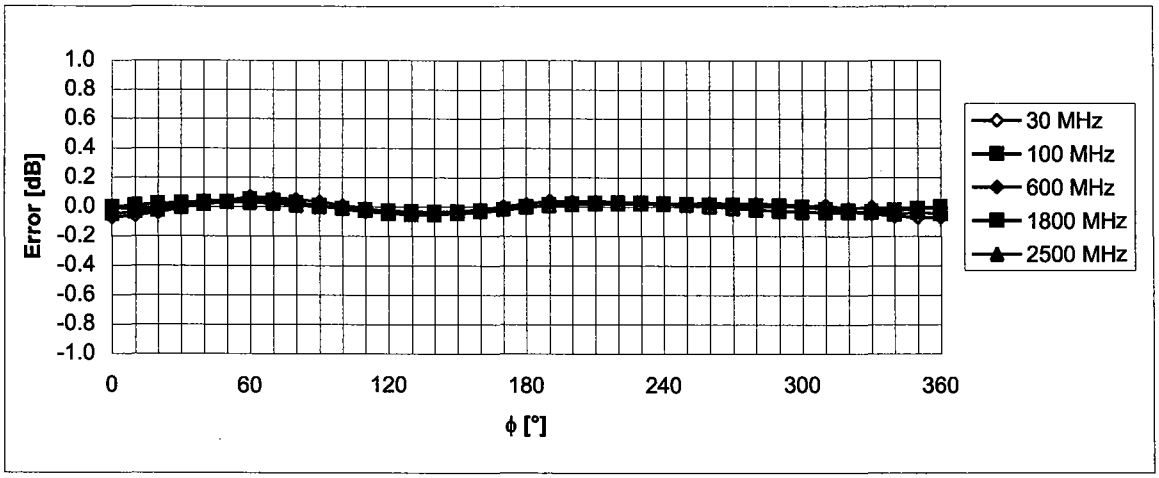


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



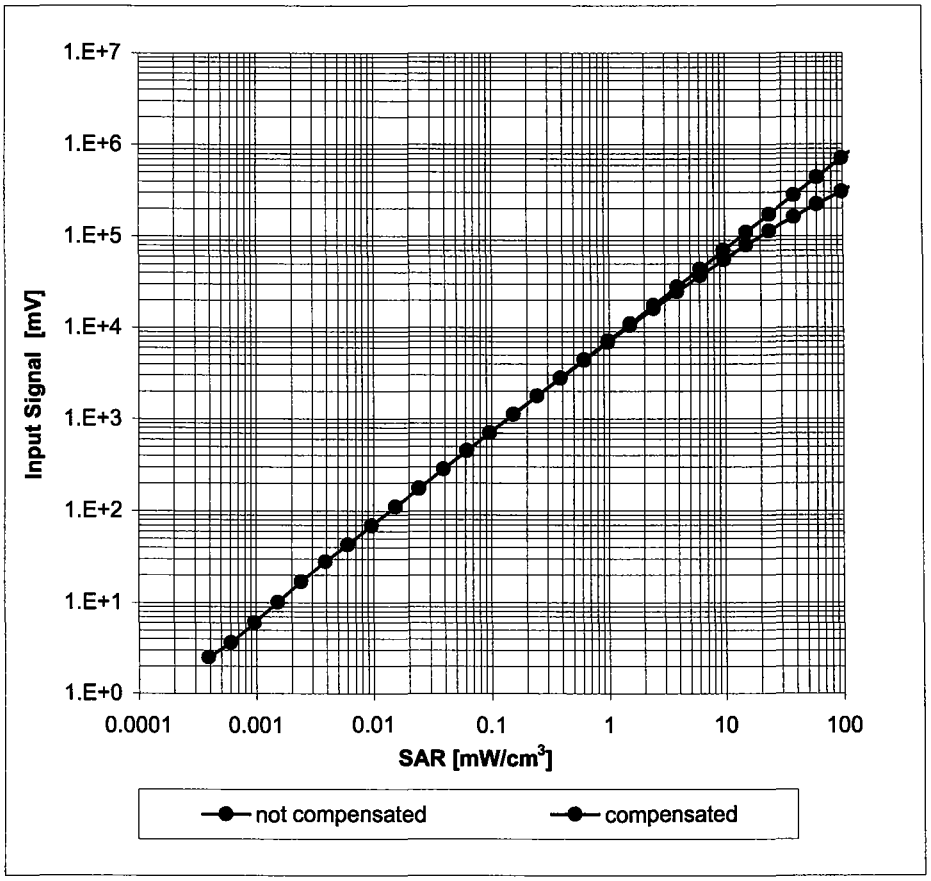


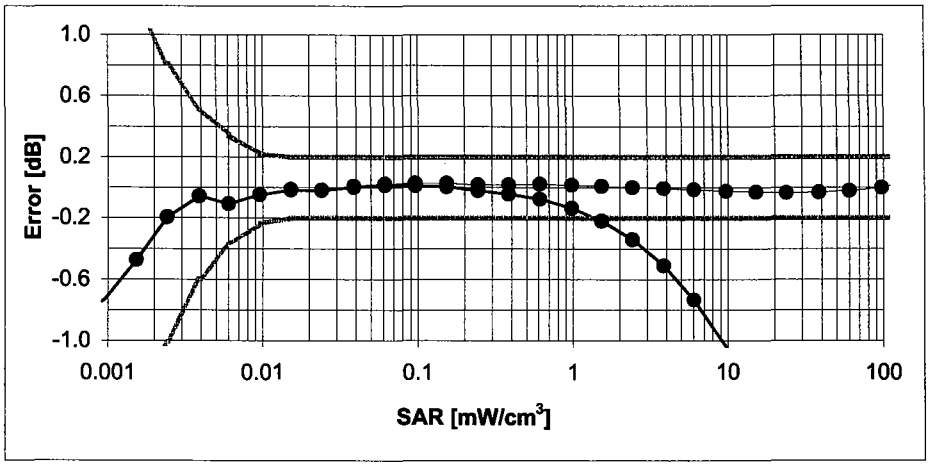


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

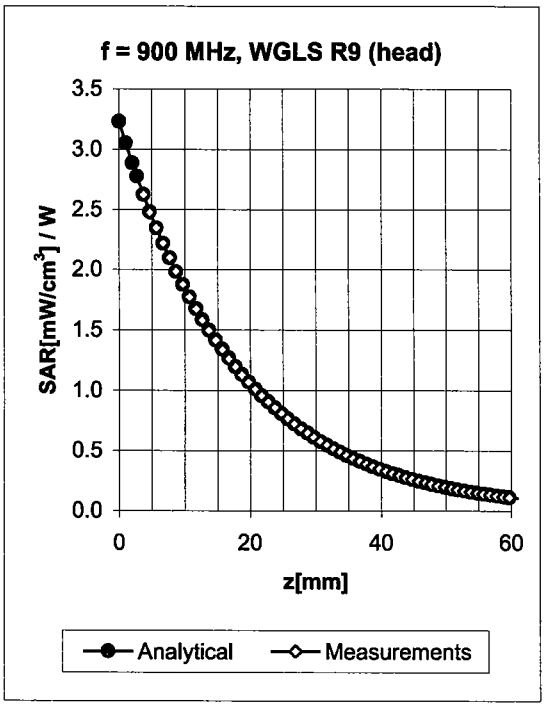
(Waveguide R22, f = 1800 MHz)

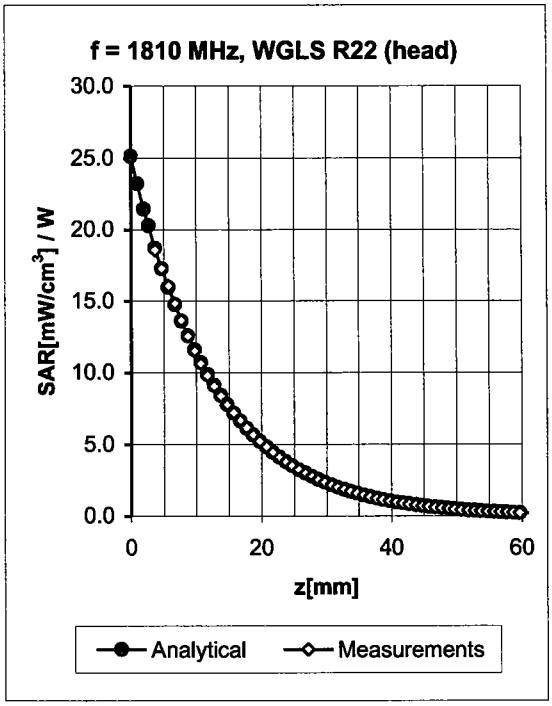




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



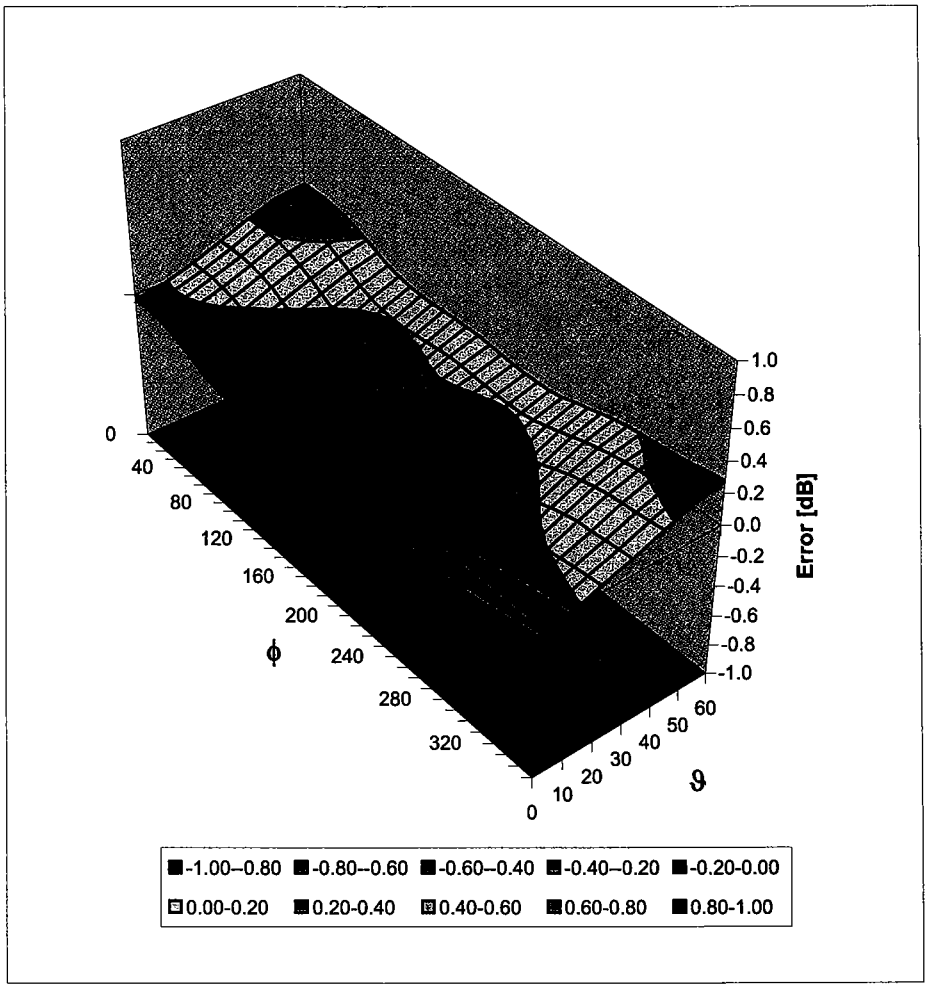


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.68	1.77	6.32 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.58	2.44	5.08 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.55	2.58	4.84 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.65	2.24	4.51 ± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.54	2.04	6.12 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.53	2.91	4.67 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.59	2.56	4.36 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.66	2.04	4.27 ± 11.8% (k=2)

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

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

Appendix 5

Measurement Uncertainty Budget

Uncertainty Budget for Device Under Test: 30 – 3000 MHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**IEEE 1528 section**	**Tol. (± %)**	**Prob Dist**	**Div.**	**c_i (1 g)**	**c_i (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	5.9	N	1.00	1	1	5.9	5.9	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8	1.1	R	1.73	1	1	0.6	0.6	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mech. Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Test sample Related									
Test Sample Positioning	E.4.2	3.2	N	1.00	1	1	3.2	3.2	29
Device Holder Uncertainty	E.4.1	4.0	N	1.00	1	1	4.0	4.0	8
SAR drift	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	3.3	N	1.00	0.64	0.43	2.1	1.4	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	1.9	N	1.00	0.6	0.49	1.1	0.9	∞
Combined Standard Uncertainty			RSS				11.1	10.8	411
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				22.2	21.6	

Uncertainty Budget for System Check: 30 – 3000 MHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**IEEE 1528 section**	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i (1 g)**	**c_i (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	5.9	N	1.00	1	1	5.9	5.9	∞
Axial Isotropy	E.2.2	4.7	R	1.73	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	∞
Dipole									
Dipole Axis to Liquid Distance	8, E.4.2	2.0	R	1.73	1	1	1.2	1.2	∞
Input Power and SAR Drift Measurement	8, 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	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	∞
Combined Standard Uncertainty			RSS				9.0	8.8	99999
Expanded Uncertainty			*k*=2				17.7	17.3	

Appendix 6

Photographs of the device under test

Figure 1.Front of Phone

Figure 2. Back of Phone

Figure 3. Phone Open

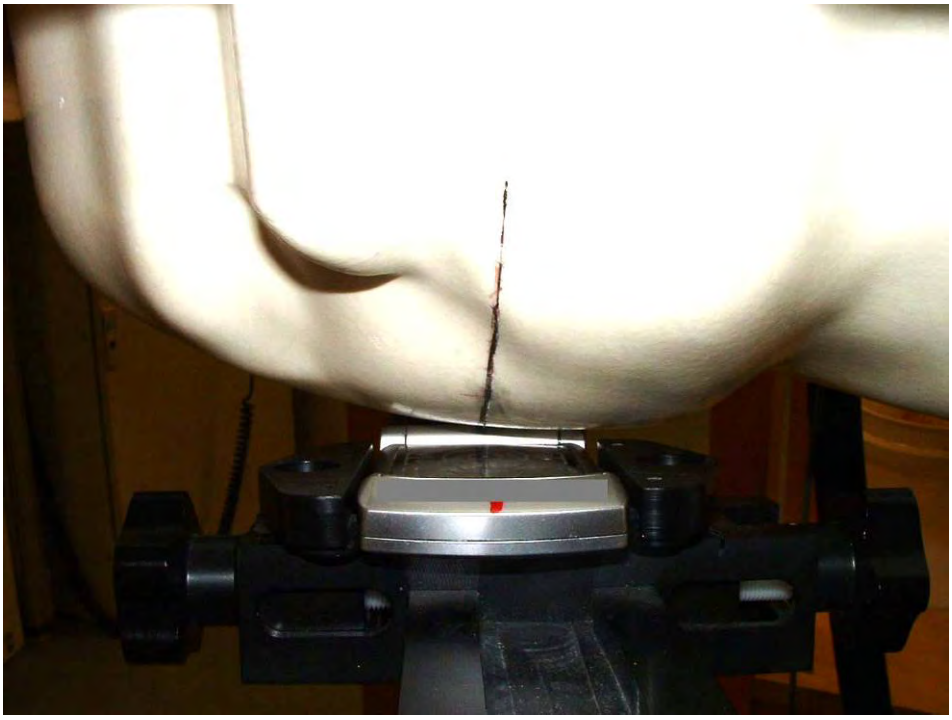


Figure 4. Front View; Cheek/Touch Position

Figure 5. Rear View; Cheek/Touch Position

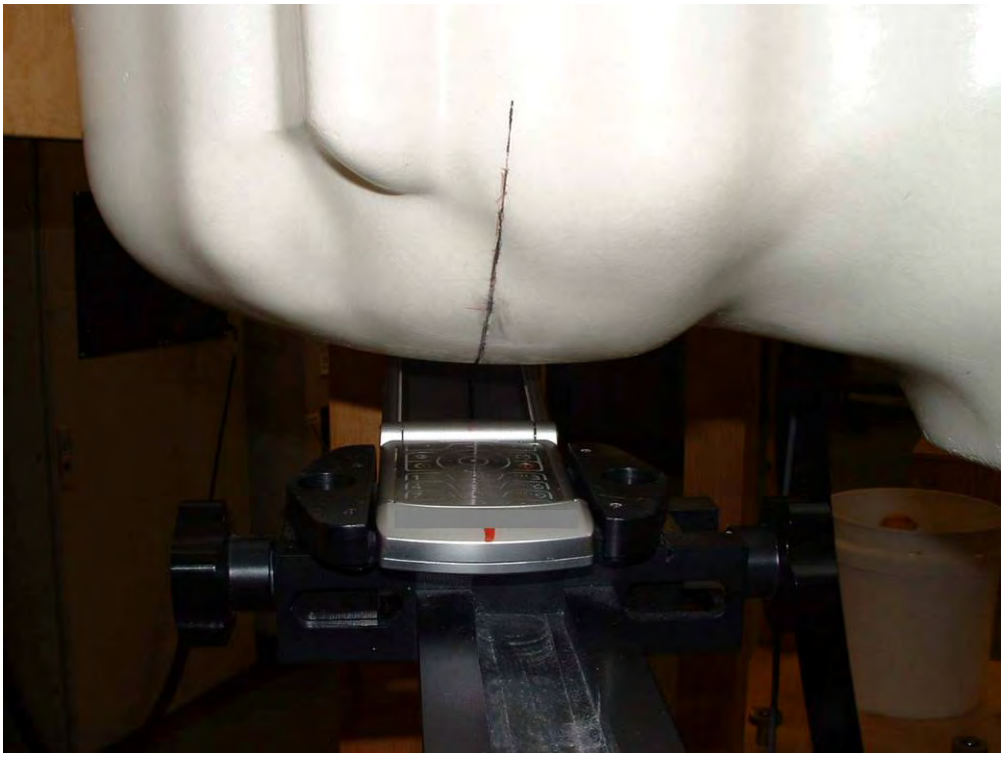


Figure 6. Front View; Tilt Position

Figure 7. Rear View; Tilt Position

Figure 8. Side View; SYN1066B Case with SYN8631A Belt Clip

Figure 9. Back View; SYN1066B Case with SYN8631A Belt Clip

Figure 10. Back View: Case CHYN4647A

Figure 11. Side View: Case CHYN4647A

Figure 12. Body Worn Testing

Appendix 7

Dipole Characterization Certificate

Certification of System Performance Check Targets

Based on APP-0396

-Historical Data-

	2450MHz	
IEEE1528 Target:	52.4	**(W/kg)**
Measurement Uncertainty (k=1):	9.0%	
Measurement Period:	*18-Nov-04 to 20-May-05*	
# of tests performed:	52	
Grand Average:	56.8	**(W/kg)**
% Delta (Average - IEEE1528 Target)	8.4%	
Is % Delta <= Expanded Measurement Uncertainty (k=2)?	**Yes**	
Accept/Reject Average as new system performance check target?	**ACCEPT**	
	Historic data included the following 2450MHz Dipoles:	
	740	
	766	
	767	

-New System Performance Check Targets- per APP-0396

(based on analysis of historical data)

Frequency	SAR Target (W/kg)	Permittivity	Conductivity (S/m)
2450MHz	**56.8**	39.2 ± 5%	1.80 ± 5%

-Approvals-

Submitted by: Marge Kaunas Date: 31-May-05

Signed: Marge Kaunas

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

Approved by: Mark Douglas **Date:** 1-Jun-05

Signed: Mark Douglas

Comments:

Certification of System Performance Check Targets

Based on APP-0396

-Historical Data-

	900MHz	
IEEE1528 Target:	10.8	**(W/kg)**
Measurement Uncertainty (k=1):	9.0%	
Measurement Period:	*9-Nov-04 to 2-June-05*	
# of tests performed:	813	
Grand Average:	11.3	**(W/kg)**
% Delta (Average - IEEE1528 Target)	4.4%	
Is % Delta <= Expanded Measurement Uncertainty (k=2)?	**Yes**	
Accept/Reject Average as new system performance check target?	**ACCEPT**	
	Historic data included the following 900MHz Dipoles:	
	69, 77	
	79, 80	
	91, 94	
	96, 97	

-New System Performance Check Targets- per APP-0396

(based on analysis of historical data)

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

-Approvals-

Submitted by: Marge Kaunas Date: 2-Jun-05

Signed: Marge Kaunas

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

Approved by: Mark Douglas **Date:** 2-Jun-05

Signed: Mark Douglas

Comments: