MOTOROLA

Exhibit 11: SAR Test Report IHDT56GT1

Date of test: 6/9/2006 through 6/23/2006
Date of Report: 7/5/2006

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

Test Responsible:
Paul Ma
RF Engineer

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

<u>Tests</u>:	<u>Procedures</u>:
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

<u>On the following products or types of products:</u>
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 IHDT56GT1 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)

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

The Motorola Mobile Devices Business Product Safety Laboratory has performed measurements of the maximum potential exposure to the user of portable cellular phone (FCC ID IHDT56GT1). 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	Bottom of Phone	
Dimensions	Length	37 mm
	Width	7.5 mm
Configuration	FJA Antenna	

2.2 Device description

FCC ID Number	**IHDT56GT1**											
Serial number(s)	LCYA3D0017											
Mode(s) of Operation	GSM 850	GSM 900	GSM 1800	GSM 1900	GPRS 850	GPRS 900	GPRS 1800	GPRS 1900	EDGE 850	EDGE 900	EDGE 1800	EDGE 1900
Modulation Mode(s)	GMSK	GMSK	GMSK	GMSK	GMSK	GMSK	GMSK	GMSK	8PSK	8PSK	8PSK	8PSK
Maximum Output Power Setting	33.00 dBm	33.00 dBm	30.50 dBm	30.50 dBm	33.00 dBm	33.00 dBm	30.50 dBm	30.50 dBm	27.00 dBm	27.00 dBm	26.00 dBm	26.00 dBm
Duty Cycle	1:8	1:8	1:8	1:8	4:8	4:8	4:8	4:8	4:8	4:8	4:8	4:8
Transmitting Frequency Rang(s)	824.2-848.8 MHz	880.2-914.8 MHz	1710.2-1784.8 MHz	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	824.2-848.8 MHz	880.2-914.8 MHz	1710.2-1784.8 MHz	1850.2 – 1909.8 MHz
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype											
Device Category	Portable											
RF Exposure Limits	General Population / Uncontrolled											

3 Test Equipment Used

3.1 Dosimetric System

The Motorola Mobile Devices Business Product Safety & Compliance Laboratory utilizes a Dosimetric Assessment System (Dasy4™ v4.6) 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	376	9/5/2006
DASY4 DAE3	378	5/22/2007
E-Field Probe ES3DV3	3037	11/17/2006
E-Field Probe ET3DV6R	1513	9/19/2006
Dipole Validation Kit, D900V2	96	
Dipole Validation Kit, D900V2	80	
S.A.M. Phantom used for 800MHz	TP-1131	
S.A.M. Phantom used for 800MHz	TP-1153	
S.A.M. Phantom used for 1900MHz	TP-1250	
Dipole Validation Kit, D1800V2	272TR	

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3847A04632	9/20/2006
Power Meter E4419B	GB39511084	8/19/2006
Power Sensor #1 – E9301A	US39210918	9/21/2006
Power Sensor #2 - E9301A	US39210934	9/21/2006
Network Analyzer HP8753ES	US39171846	8/22/2006
Dielectric Probe Kit HP85070C	US99360070	

4 Electrical parameters of the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity, ε_r, and the conductivity, σ, of the tissue simulating liquids were measured with 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)
835	Head	**Measured,** 6/14/2006	42.3	0.91	20.0
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** 6/22/2006	53.9	0.98	20.5
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1880	Head	**Measured,** 6/15/2006	39.0	1.43	20.1
		Recommended Limits	40.0 ±5%	1.40 ±5%	18-25
	Body	**Measured,** 6/16/2006	52.7	1.57	20.3
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25

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

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

5 System Accuracy Verification

A system accuracy verification of the DASY4 v4.6 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,** 6/14/2006	11.3	41.5	0.97	21.5	20.0
	Measured, 6/22/2006	11.1	40.9	0.97	21.2	20.9
	Recommended Limits	11.3	41.5 ±5%	0.97 ±5%	18-25	18-25
1800	**Measured,** 6/15/2006	40.6	38.7	1.34	21.5	20.0
	Measured, 6/16/2006	40.8	39.5	1.35	21.2	20.0
	Recommended Limits	38.1	40.0 ±5%	1.4 ±5%	18-25	18-25

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	SN3037	900	6.07	8 of 9
		1800	5.01	8 of 9
E-Field Probe ET3DV6R	SN1513	900	5.83	8 of 9
		1800	4.76	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 v4.6 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 v4.6 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.

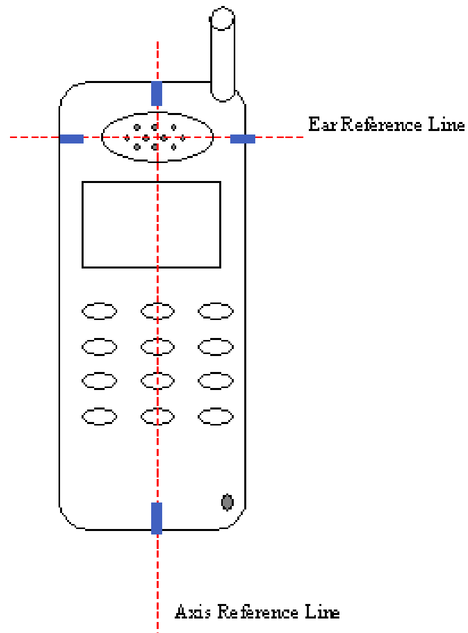
The Cellular Phone (FCC ID IHDT56GT1) has the battery SNN5779A as the only battery option. This battery was used to do all of the SAR testing. The phone was placed in the SAR measurement system with a fully charged battery.

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

The SAR measurements were performed using the SAM phantoms listed in section 3.1. Since the same phantoms and 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.

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	SN3037	900	6.07	8 of 9
		1800	5.01	8 of 9
E-Field Probe ET3DV6R	SN1513	900	5.83	8 of 9
		1800	4.76	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	32.94	0.724	0.01	0.72	20.0	0.84	-0.04	0.85	20.0
	Channel 190	32.88	0.904	-0.02	0.91	20.0	0.95	-0.05	0.96	20.2
	Channel 251	32.80	0.92	0.01	0.92	20.2	**1.0**	**0.03**	**1.0**	**20.0**
Digital 1900MHz	Channel 512	30.37								
	Channel 661	30.37	0.33	-0.02	0.33	20.7	**0.51**	**-0.01**	**0.51**	**20.2**
	Channel 810	30.30								

Table 1: SAR measurement results for the portable cellular telephone FCC ID IHDT56GT1 at highest possible output power. Measured against the head in the Cheek/Touch Position.

f (MHz)	Description	Conducted Output Power (dBm)	15° Tilt Position							
			Left Head				Right Head			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Digital 850MHz	Channel 128	32.94								
	Channel 190	32.88	**0.44**	**0.05**	**0.44**	**20.0**	0.43	0.01	0.43	19.9
	Channel 251	32.80								
Digital 1900MHz	Channel 512	30.37								
	Channel 661	30.37	**0.2**	**0.04**	**0.2**	**20.1**	0.12	0	0.12	20.4
	Channel 810	30.30								

Table 2: SAR measurement results for the portable cellular telephone FCC ID IHDT56GT1 at highest possible output power. Measured against the head in the 15 degrees 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 that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 3. All other test conditions measured lower SAR values than those included in Appendix 3.

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

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

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	SN3037	900	5.93	8 of 9
		1800	4.65	8 of 9
E-Field Probe ET3DV6R	SN1513	900	5.66	8 of 9
		1800	4.16	8 of 9

f (MHz)	Description	Conducted Output Power (dBm)	Body Worn							
			Front of phone 15 mm away from phantom (GSM)				Back of phone 15 mm away from phantom (GSM)			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Digital 850MHz	Channel 128	32.94					0.96	-0.02	0.97	20.3
	Channel 190	32.88	0.58	0	0.58	20.3	0.97	-0.02	0.98	20.7
	Channel 251	32.80					0.9	-0.01	0.9	20.3
Digital 1900MHz	Channel 512	30.37								
	Channel 661	30.37	**0.49**	**0.03**	**0.49**	**20.3**	0.33	-0.05	0.33	20.1
	Channel 810	30.30								

Table 3: SAR measurement results for the portable cellular telephone FCC ID IHDT56GT1 at highest possible output power. Measured against the body.

f (MHz)	Description	Conducted Output Power (dBm)	Body Worn							
			15 mm away from phantom (GSM & Bluetooth enabled)				25 mm away from phantom (GPRS Class 12)			
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Digital 850MHz Back of Phone	Channel 128	32.94	**1.18**	**-0.04**	**1.19**	**20.5**	0.84	-0.03	0.84	20.3
	Channel 190	32.88	1.15	-0.06	1.17	20.4	0.85	-0.02	0.85	20.2
	Channel 251	32.80	1.08	-0.04	1.09	20.3	0.8	-0.1	0.82	20.4
Digital 1900MHz Front of Phone	Channel 512	30.37								
	Channel 661	30.37	0.44	-0.03	0.45	20.5	0.1	0.06	0.11	20.1
	Channel 810	30.30								

Table 4: SAR measurement results for the portable cellular telephone FCC ID IHDT56GT1 at highest possible output power. Measured against the body.

f (MHz)	Description	Conducted Output Power (dBm)	Body Worn							
			25 mm away from phantom (Edge Class 12)							
			Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)	Measured (W/kg)	Drift (dB)	Extrapolated (W/kg)	Simulate Temp (°C)
Digital 850MHz Back of Phone	Channel 128	32.94								
	Channel 190	32.88	0.14	0.01	0.14	21.2				
	Channel 251	32.80								
Digital 1900MHz Front of Phone	Channel 512	30.37								
	Channel 661	30.37	0.07	0.03	0.07	20.2				
	Channel 810	30.30								

Table 5: SAR measurement results for the portable cellular telephone FCC ID IHDT56GT1 at highest possible output power. Measured against the body.

Appendix 1

SAR distribution comparison for the system accuracy verification

Date/Time: 6/14/2006 8:28:06 AM

Test Laboratory: Motorola

061406 900MHz Good at +0.0%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:96
Procedure Notes: 900 MHz System Performance Check / Dipole Sn# 96

PM1 Power = 200mW Sim.Temp@meas = 20*C Sim.Temp@SPC = 20*C Room Temp @ SPC = 21.5*C

Communication System: CW - Dipole; Frequency: 900 MHz; Channel Number: 4; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 900 MHz; σ = 0.97 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.07, 6.07, 6.07); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 9/5/2005
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.23 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 50.9 V/m; Power Drift = -0.040 dB
Peak SAR (extrapolated) = 3.39 W/kg
SAR(1 g) = 2.24 mW/g; SAR(10 g) = 1.44 mW/g
Maximum value of SAR (measured) = 2.42 mW/g

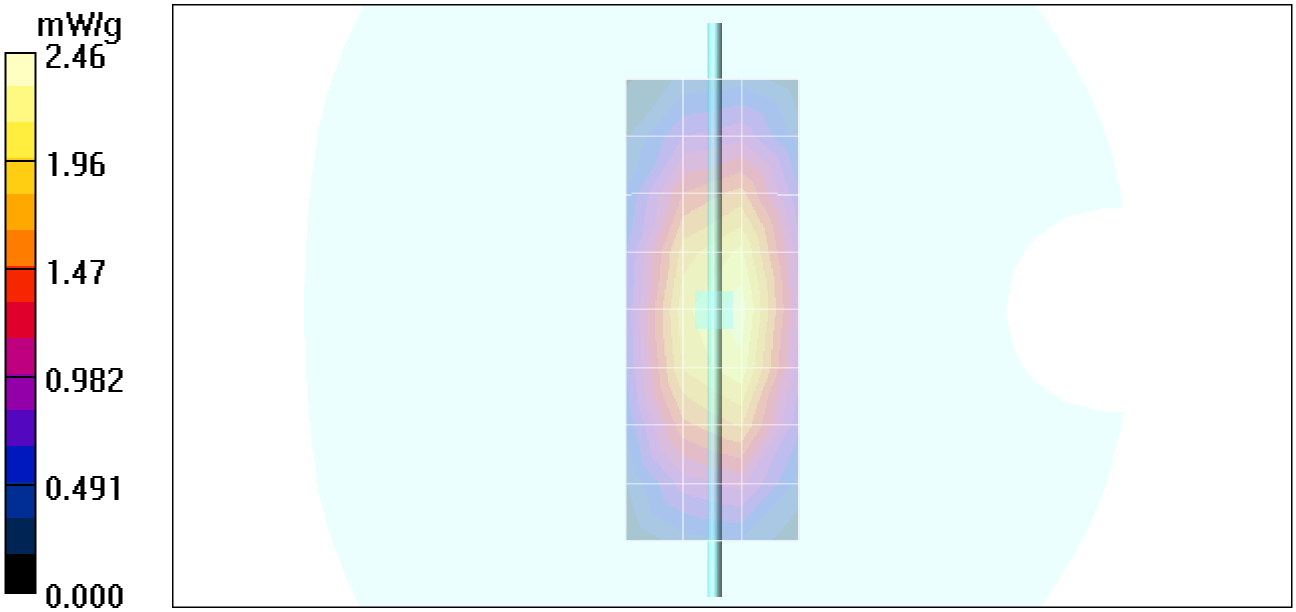
Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

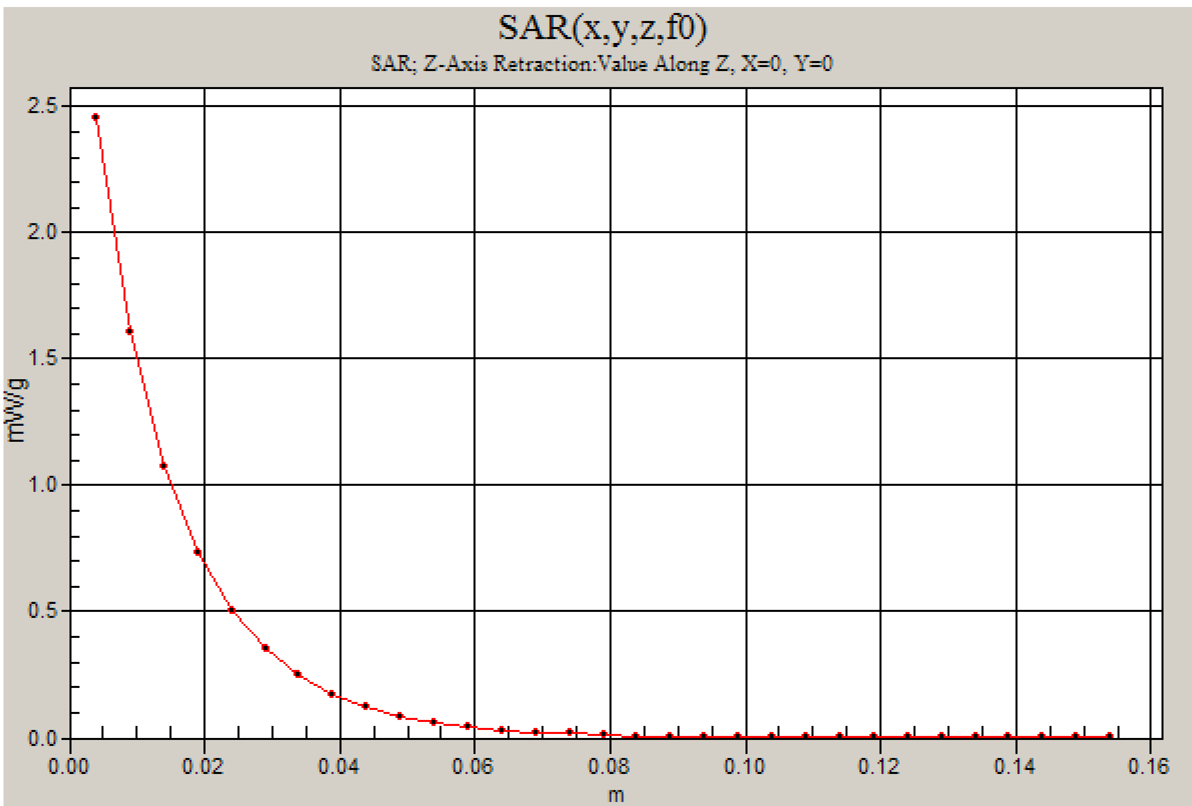
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 50.9 V/m; Power Drift = -0.040 dB
Peak SAR (extrapolated) = 3.47 W/kg
SAR(1 g) = 2.28 mW/g; SAR(10 g) = 1.46 mW/g
Maximum value of SAR (measured) = 2.45 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.46 mW/g

061406 900MHz Good at +0.0%





Date/Time: 6/15/2006 8:19:53 AM

Test Laboratory: Motorola

061506 1800MHz Good at +6.4%

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:272(TR)
Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 272(TR)

PM1 Power = 200mW   Sim.Temp@meas = 20.5*C Sim.Temp@SPC = 20*C Room Temp @ SPC = 21.5*C

Communication System: CW - Dipole; Frequency: 1800 MHz; Channel Number: 8; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 1800 MHz; $\sigma = 1.34$ mho/m; $\varepsilon_r = 38.7$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 9/5/2005
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 8.62 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.0 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 14.3 W/kg
SAR(1 g) = 8.08 mW/g; SAR(10 g) = 4.3 mW/g
Maximum value of SAR (measured) = 8.99 mW/g

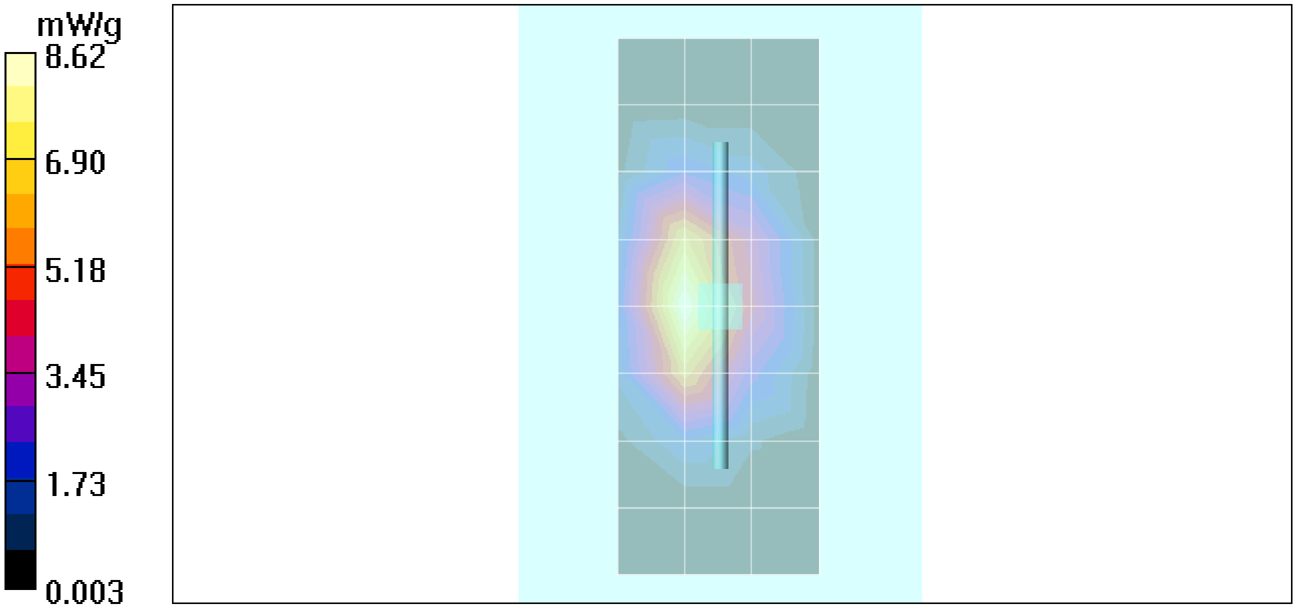
Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

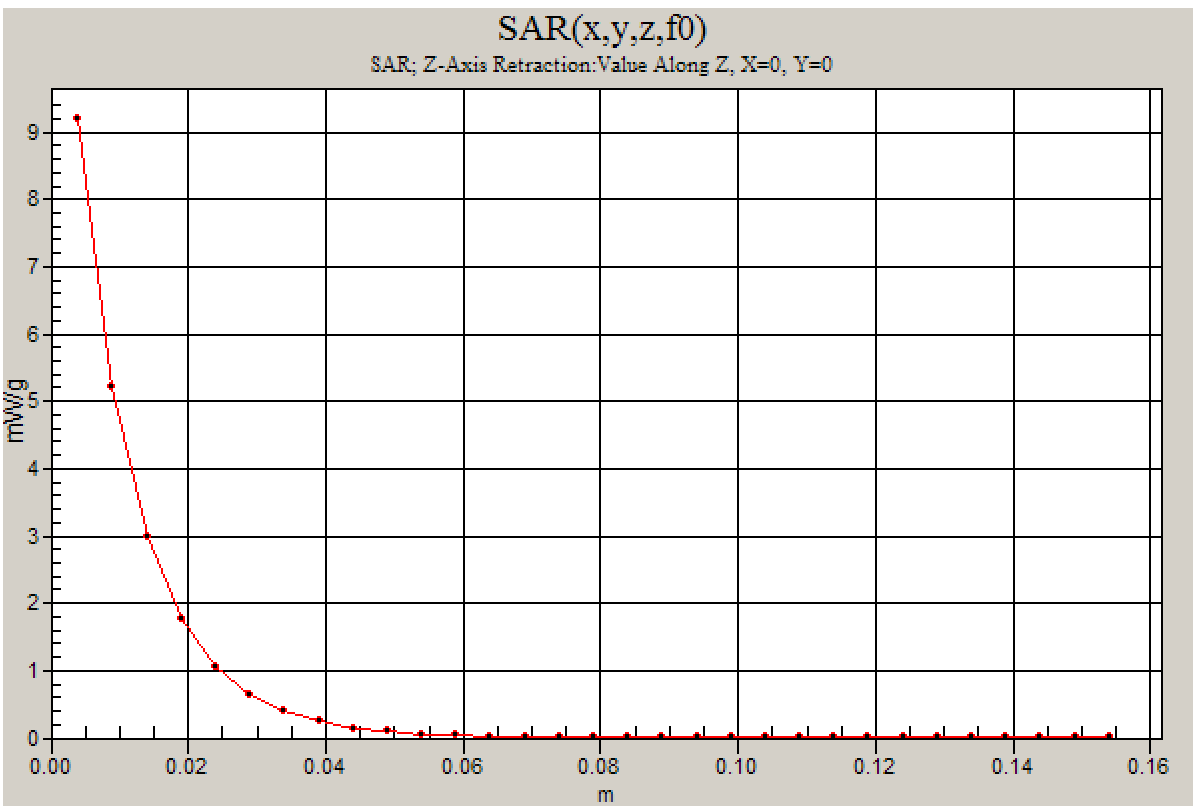
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.0 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 14.3 W/kg
SAR(1 g) = 8.14 mW/g; SAR(10 g) = 4.33 mW/g
Maximum value of SAR (measured) = 9.12 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 9.20 mW/g

061506 1800MHz Good at +6.4%





Date/Time: 6/16/2006 8:36:42 AM

Test Laboratory: Motorola

061606 1800MHz Good at +7.1%

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:272(TR)
Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 272(TR) PM1 Power = 200mW
Sim.Temp@meas = 20.7*C Sim.Temp@SPC = 20*C Room Temp @ SPC = 21.2*C

Communication System: CW - Dipole; Frequency: 1800 MHz; Channel Number: 8; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 1800 MHz; σ = 1.35 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 9/5/2005
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 8.05 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 81.9 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 14.4 W/kg
SAR(1 g) = 8.19 mW/g; SAR(10 g) = 4.36 mW/g
Maximum value of SAR (measured) = 9.05 mW/g

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

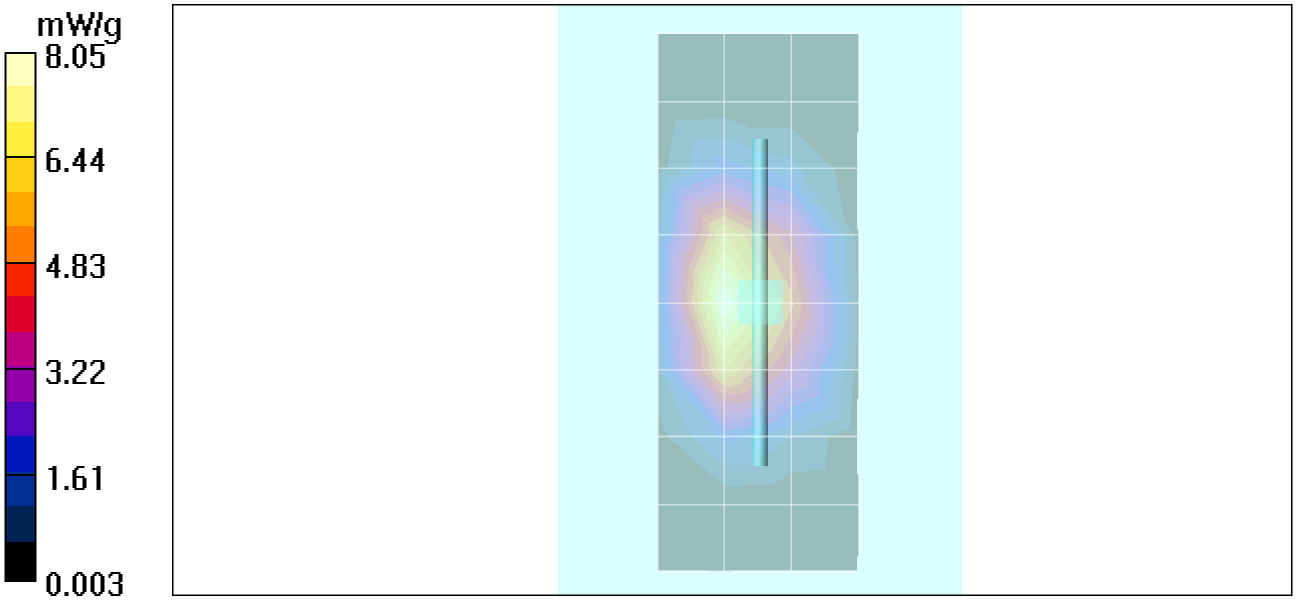
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 81.9 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 14.2 W/kg
SAR(1 g) = 8.13 mW/g; SAR(10 g) = 4.35 mW/g

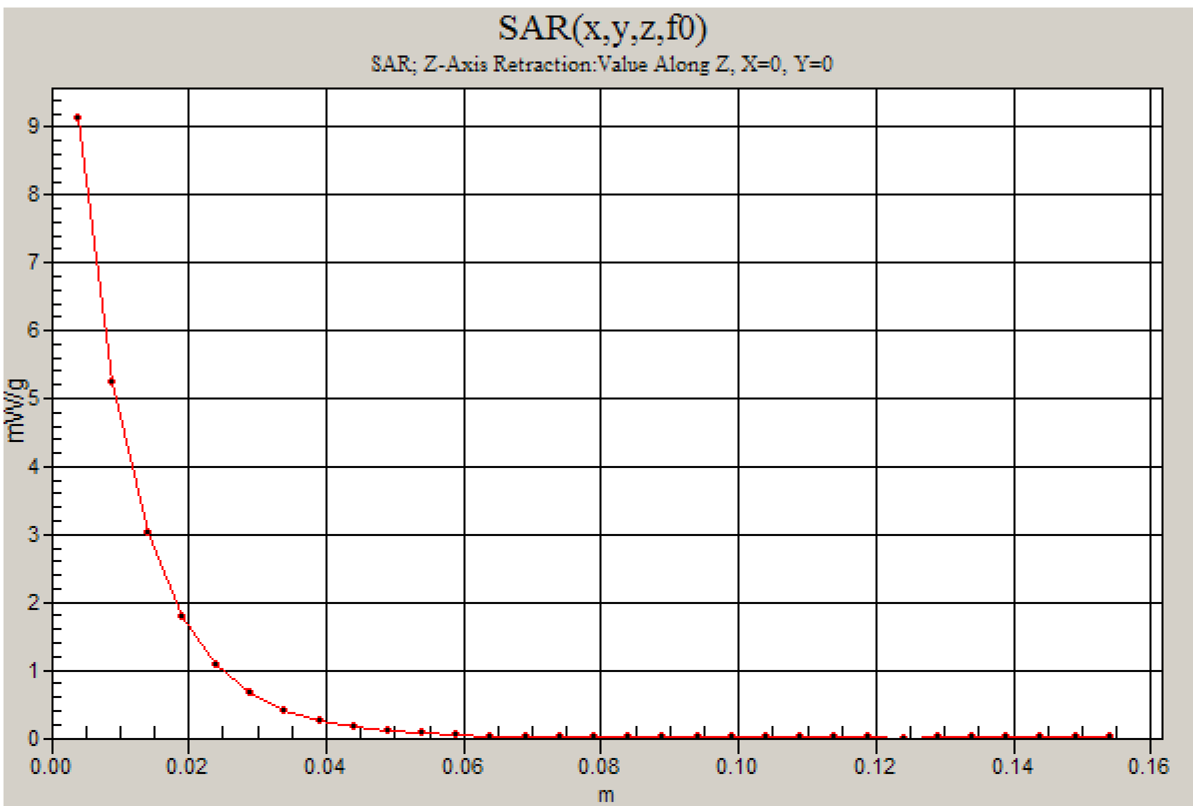
Maximum value of SAR (measured) = 8.77 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 9.13 mW/g

061606 1800MHz Good at +7.1%





created 6/29/2006

Date/Time: 6/22/2006 6:08:32 PM

Test Laboratory: Motorola

062206 900MHz Good at -2.2%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:080
Procedure Notes: 900MHz System Performance Check / Dipole Sn# 080

PM1 Power = 200mW Sim.Temp@meas = 21.8 Sim.Temp@SPC = 20.9 Room Temp @ SPC = 21.2

Communication System: CW - Dipole; Frequency: 900 MHz; Channel Number: 4; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 900 MHz; σ = 0.97 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ET3DV6R - SN1513; ConvF(5.83, 5.83, 5.83); Calibrated: 9/19/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 5/22/2006
- Phantom: R3: Sugar Water SAM; Type: SAM; Serial: TP-1153;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.09 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 51.0 V/m; Power Drift = -0.007 dB
Peak SAR (extrapolated) = 3.32 W/kg
SAR(1 g) = 2.17 mW/g; SAR(10 g) = 1.39 mW/g
Maximum value of SAR (measured) = 2.35 mW/g

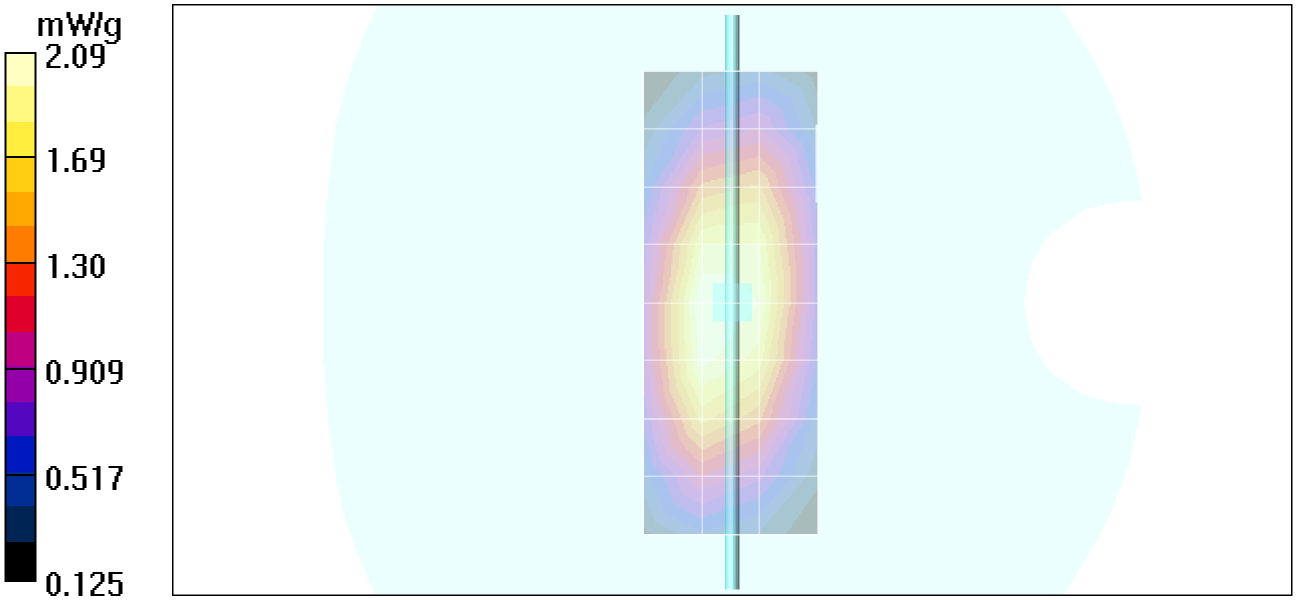
Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

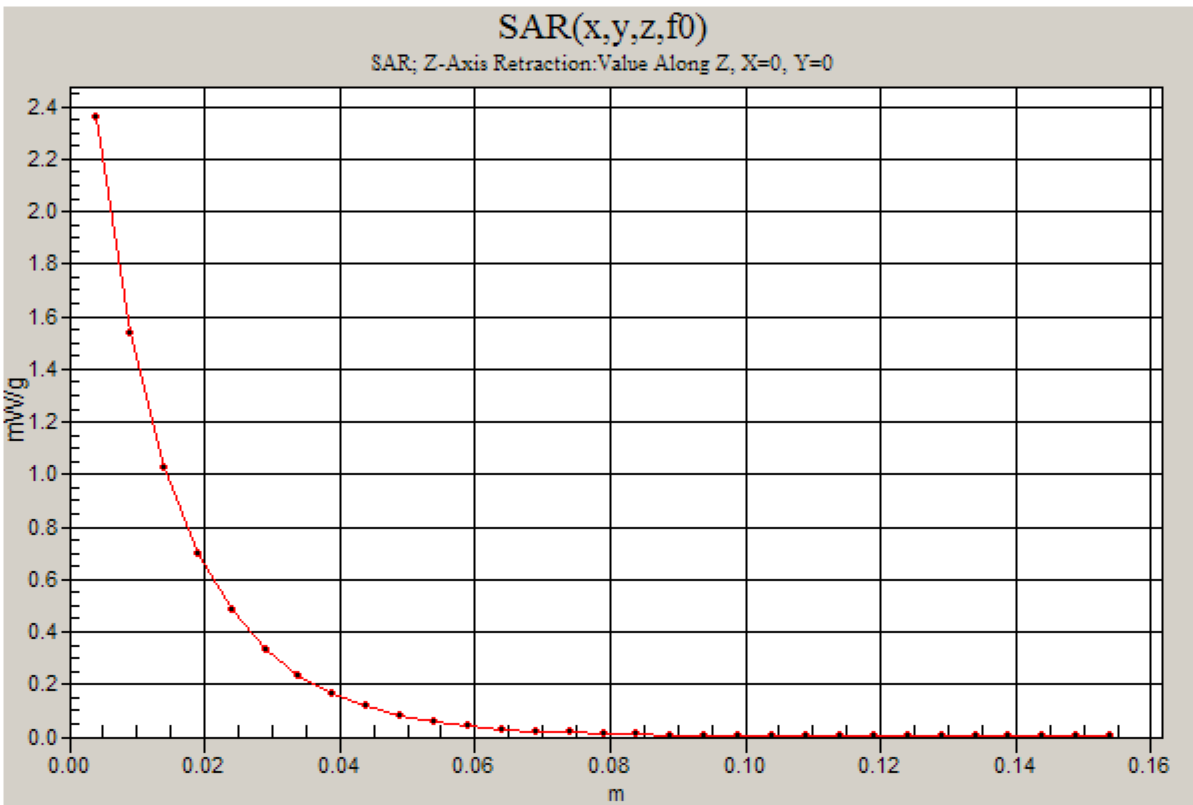
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 51.0 V/m; Power Drift = -0.007 dB
Peak SAR (extrapolated) = 3.44 W/kg
SAR(1 g) = 2.25 mW/g; SAR(10 g) = 1.44 mW/g
Maximum value of SAR (measured) = 2.42 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.36 mW/g

062206 900MHz Good at -2.2%





Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

Date/Time: 6/15/2006 5:20:21 PM

Test Laboratory: Motorola

1900 LH Tilt

Serial: LCYA3D0017
Procedure Notes: Pwr Step: 0   Antenna Position: Internal

Battery Model #: SNN5779A   DEVICE POSITION (cheek or rotated): Rotated

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8
Medium: Back-Up Glycol Head; Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 39; ρ = 1000 kg/m^3

DASY4 Configuration:

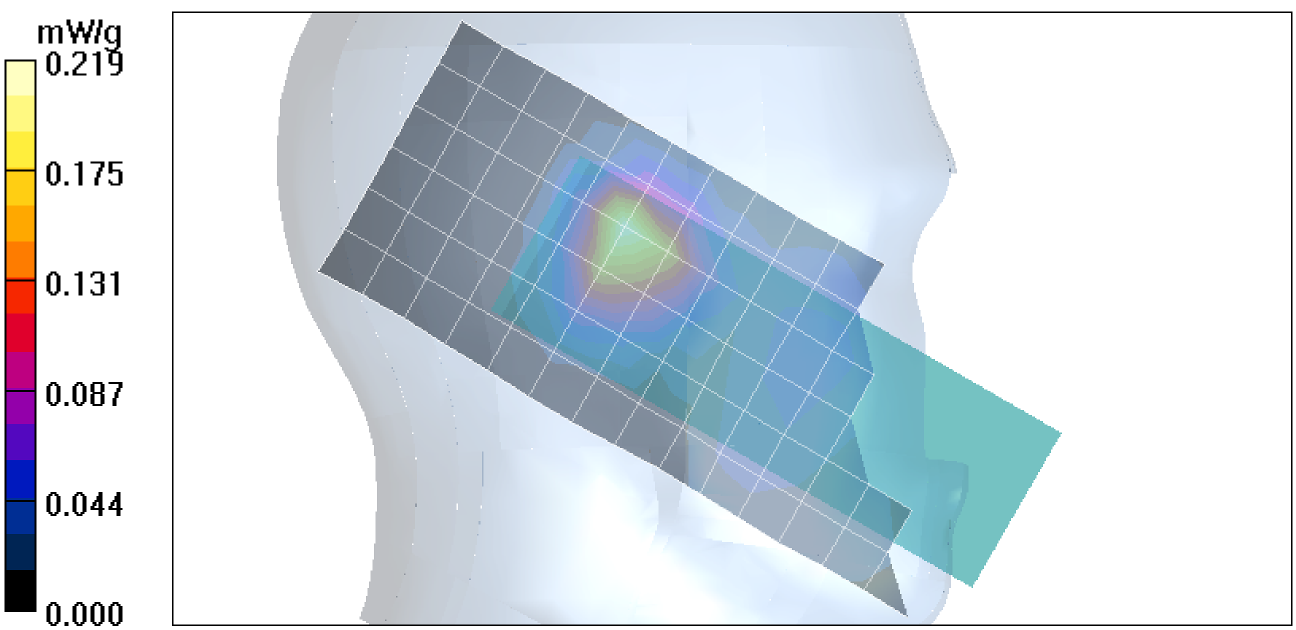
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 9/5/2005
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.219 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.7 V/m; Power Drift = 0.036 dB
Peak SAR (extrapolated) = 0.317 W/kg
SAR(1 g) = 0.200 mW/g; SAR(10 g) = 0.116 mW/g
Maximum value of SAR (measured) = 0.220 mW/g



Date/Time: 6/14/2006 8:20:20 PM

Test Laboratory: Motorola

850 RH Cheek

Serial: LCYA3D0017

Procedure Notes: Pwr Step: 5 **Antenna Position: Internal**

Battery Model #: SNN5779A **DEVICE POSITION (cheek or rotated): Cheek**

Communication System: GSM 850; Frequency: 848.8 MHz; Channel Number: 251; Duty Cycle: 1:8
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 42.3; ρ = 1000 kg/m^3

DASY4 Configuration:

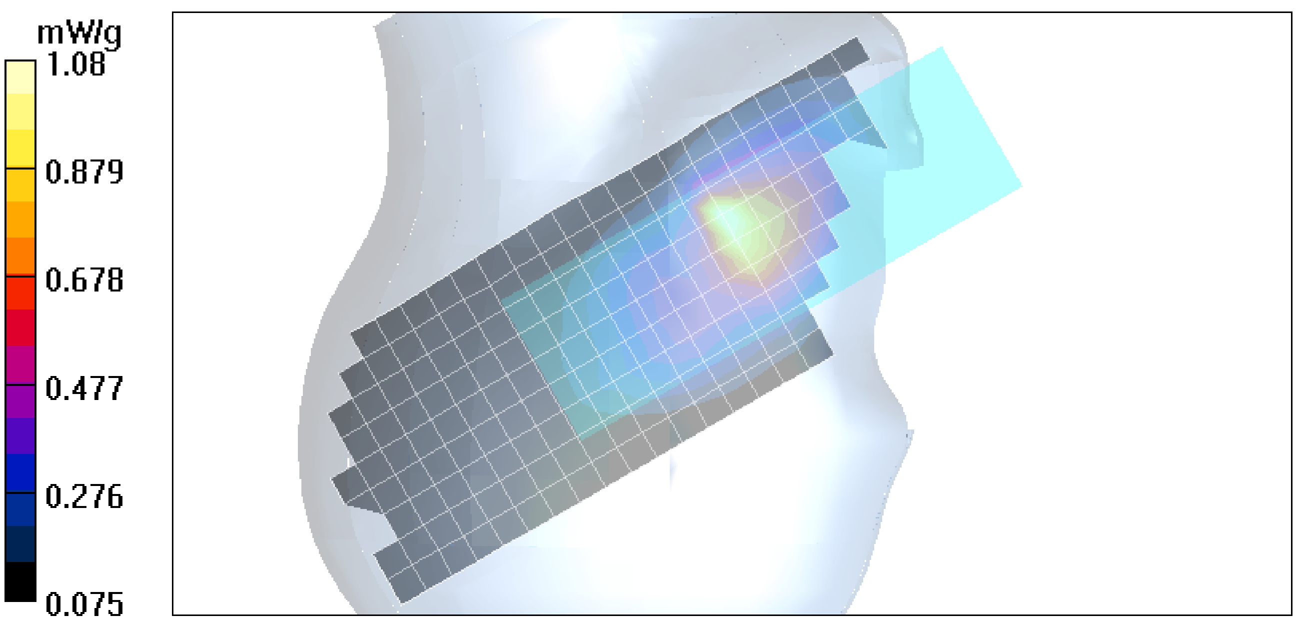
- Probe: ES3DV3 - SN3037; ConvF(6.07, 6.07, 6.07); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 9/5/2005
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Right Head Template/Area Scan - Normal Extended (10mm) (10x25x1):

Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.17 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 35.6 V/m; Power Drift = 0.028 dB
Peak SAR (extrapolated) = 2.52 W/kg
SAR(1 g) = 1.000 mW/g; SAR(10 g) = 0.588 mW/g
Maximum value of SAR (measured) = 1.08 mW/g



Date/Time: 6/14/2006 5:42:54 PM

Test Laboratory: Motorola

850 LH Tilt

Serial: LCYA3D0017

Procedure Notes: Pwr Step: 5 Antenna Position: Internal

Battery Model #: SNN5779A DEVICE POSITION (cheek or rotated): Rotated

Communication System: GSM 850; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 42.3; ρ = 1000 kg/m^3

DASY4 Configuration:

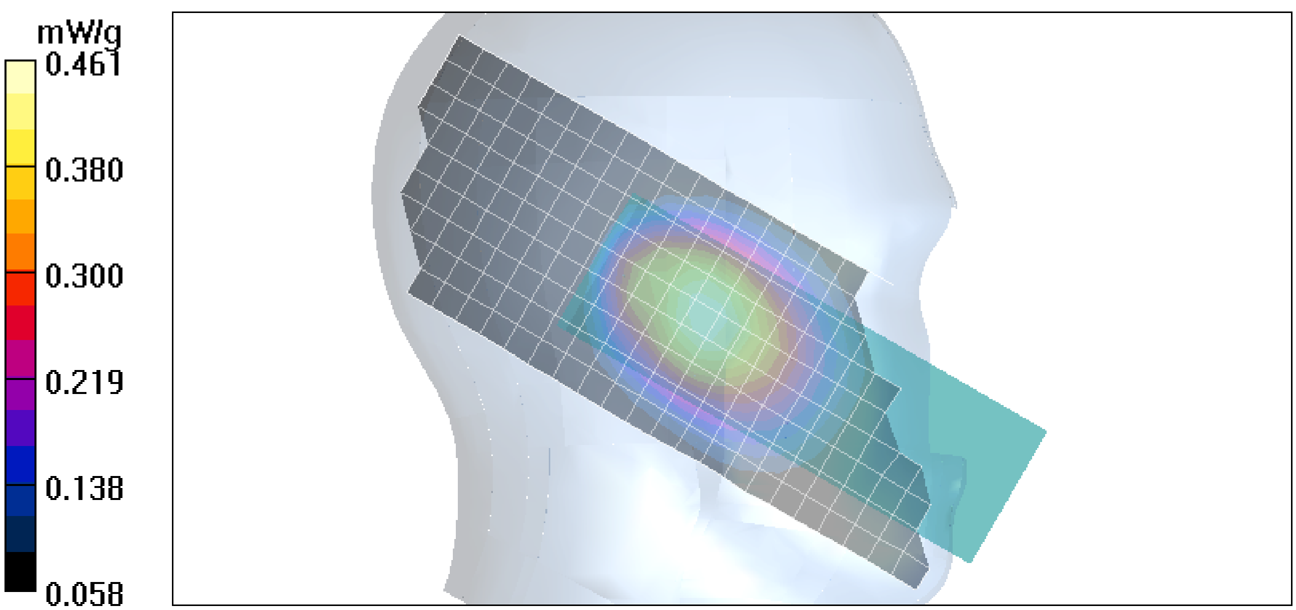
- Probe: ES3DV3 - SN3037; ConvF(6.07, 6.07, 6.07); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 9/5/2005
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

Left Head Template/Area Scan - Normal Extended (10mm) (10x25x1):

Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.452 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.4 V/m; Power Drift = 0.048 dB
Peak SAR (extrapolated) = 0.566 W/kg
SAR(1 g) = 0.436 mW/g; SAR(10 g) = 0.323 mW/g
Maximum value of SAR (measured) = 0.461 mW/g



Date/Time: 6/15/2006 5:51:45 PM

Test Laboratory: Motorola

1900 RH Cheek

Serial: LCYA3D0017
Procedure Notes: Pwr Step: 0 Antenna Position: Internal

Battery Model #: SNN5779A DEVICE POSITION (cheek or rotated): Cheek

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8
Medium: Back-Up Glycol Head; Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 39; ρ = 1000 kg/m^3

DASY4 Configuration:

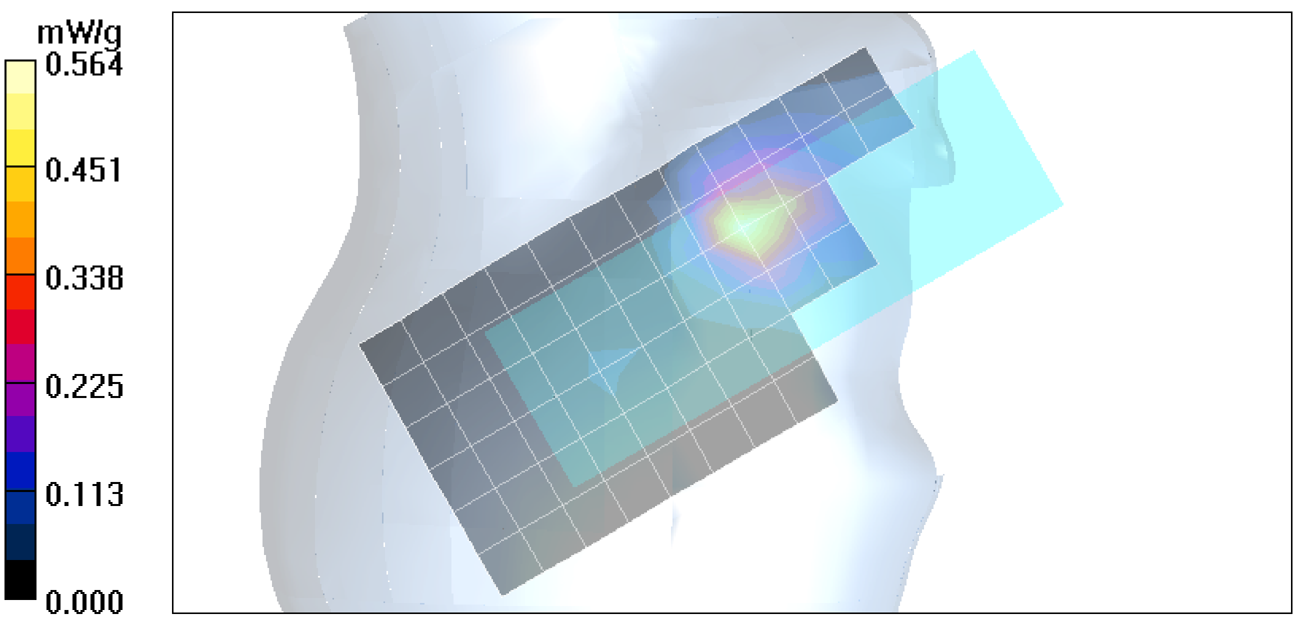
- Probe: ES3DV3 - SN3037; ConvF(5.01, 5.01, 5.01); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 9/5/2005
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.564 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.4 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 0.935 W/kg
SAR(1 g) = 0.513 mW/g; SAR(10 g) = 0.279 mW/g
Maximum value of SAR (measured) = 0.570 mW/g



Appendix 3

SAR distribution plots for Body Worn Configuration

Date/Time: 6/22/2006 8:29:46 PM

Test Laboratory: Motorola

850 Bodyworn Bluetooth

Serial: LCYA3D0017
Procedure Notes: Pwr Step: 5 Antenna Position:internal

Battery Model #: SNN5779A Accessory Model # = Bluetooth Bodyworn 15mm Away From Phantom (Back of Phone)

Communication System: GSM 850; Frequency: 824.2 MHz; Channel Number: 128; Duty Cycle: 1:8
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; $\sigma = 0.98$ mho/m; $\varepsilon_r = 53.9$; $\rho = 1000$ kg/m^3

DASY4 Configuration:

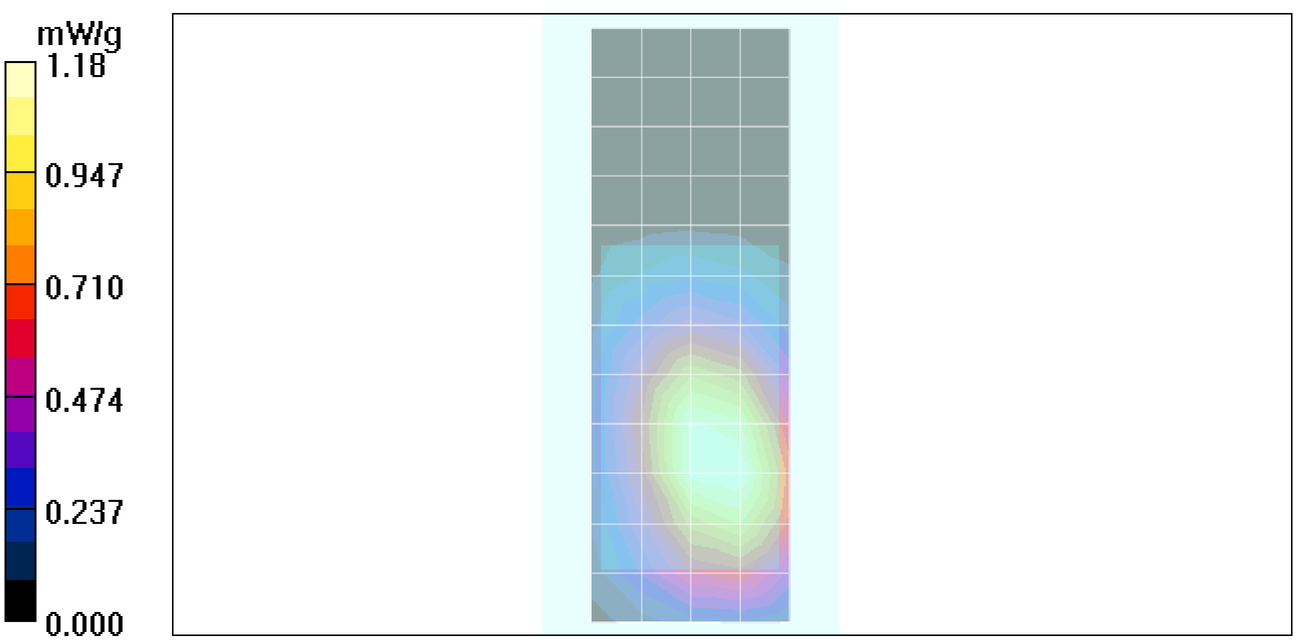
- Probe: ET3DV6R - SN1513; ConvF(5.66, 5.66, 5.66); Calibrated: 9/19/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 5/22/2006
- Phantom: R3: Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.18 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 34.2 V/m; Power Drift = -0.038 dB
Peak SAR (extrapolated) = 1.58 W/kg
SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.835 mW/g
Maximum value of SAR (measured) = 1.27 mW/g



Date/Time: 6/16/2006 12:55:30 PM

Test Laboratory: Motorola

1900 Bodyworn

Serial: LCYA3D0017

Procedure Notes: Pwr Step: 0 Antenna Position: internal

Battery Model #: SNN5779A Accessory Model # = Front Phone 15mm

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8
Medium: Regular Glycol Body; Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3

DASY4 Configuration:

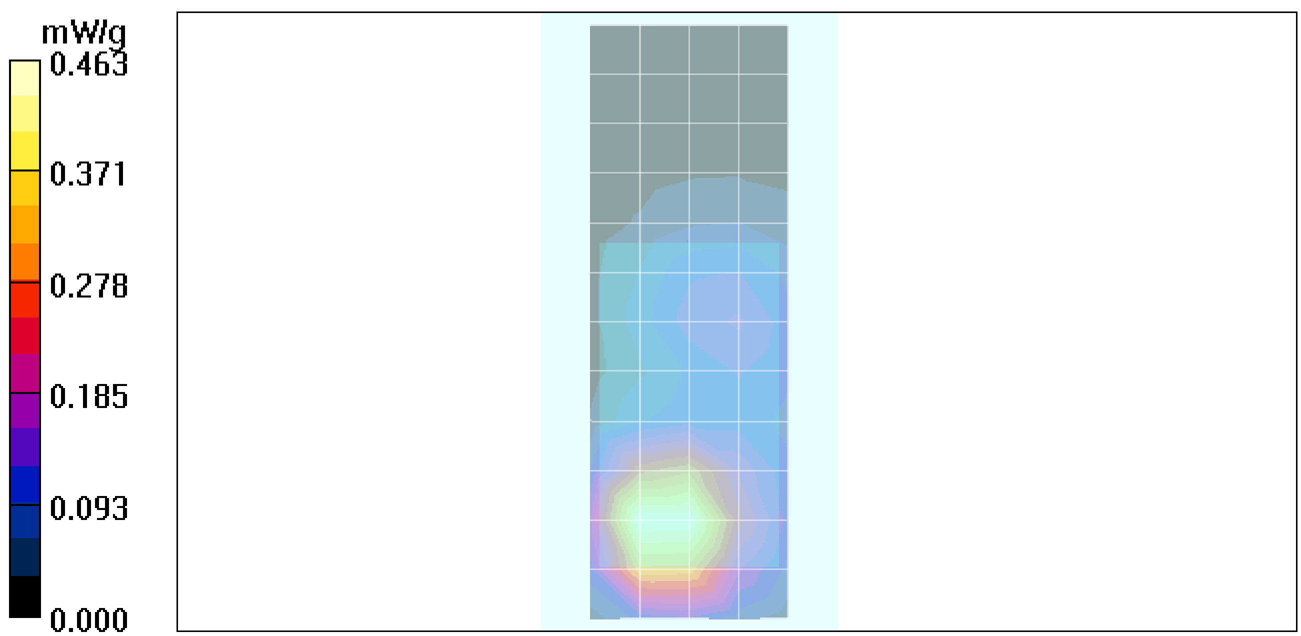
- Probe: ES3DV3 - SN3037; ConvF(4.65, 4.65, 4.65); Calibrated: 11/17/2005
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 9/5/2005
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

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

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.463 mW/g

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.4 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 0.773 W/kg
SAR(1 g) = 0.485 mW/g; SAR(10 g) = 0.286 mW/g
Maximum value of SAR (measured) = 0.534 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**
Swiss Calibration Service

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

Accreditation No.: SCS 108

Client **Motorola MDb**

Certificate No: ES3-3037_Nov05

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3037
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	November 17, 2005
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41498087	3-May-05 (METAS, No. 251-00466)	May-06
Reference 3 dB Attenuator	SN: S5054 (3c)	11-Aug-05 (METAS, No. 251-00499)	Aug-06
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-05 (METAS, No. 251-00467)	May-06
Reference 30 dB Attenuator	SN: S5129 (30b)	11-Aug-05 (METAS, No. 251-00500)	Aug-06
Reference Probe ES3DV2	SN: 3013	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 654	27-Oct-05 (SPEAG, No. DAE4-654_Oct05)	Oct-06

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

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

Issued: November 17, 2005

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**
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., ϑ = 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 ϑ = 0 (f ≤ 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 ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3037

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

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ES3DV3 SN:3037

Sensitivity in Free Space[A]

NormX	**1.15** ± 10.1%	$\mu V/(V/m)^2$
NormY	**0.84** ± 10.1%	$\mu V/(V/m)^2$
NormZ	**0.95** ± 10.1%	$\mu V/(V/m)^2$

Diode Compression[B]

DCP X	**97** mV
DCP Y	**97** mV
DCP Z	**97** 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	5.1	2.3
SAR_{be} [%]	With Correction Algorithm	0.0	0.1

TSL 1810 MHz Typical SAR gradient: 10 % per mm

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

Sensor Offset

Probe Tip to Sensor Center **2.0** mm

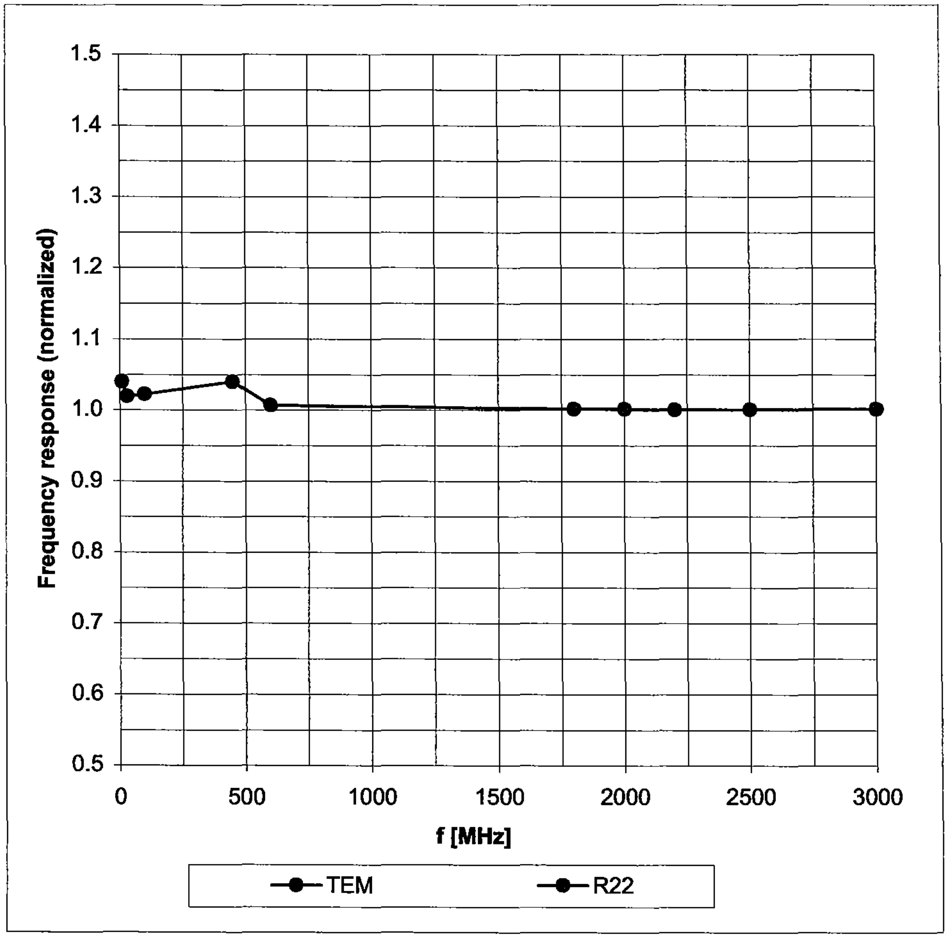
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

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

[B] Numerical linearization parameter: uncertainty not required.

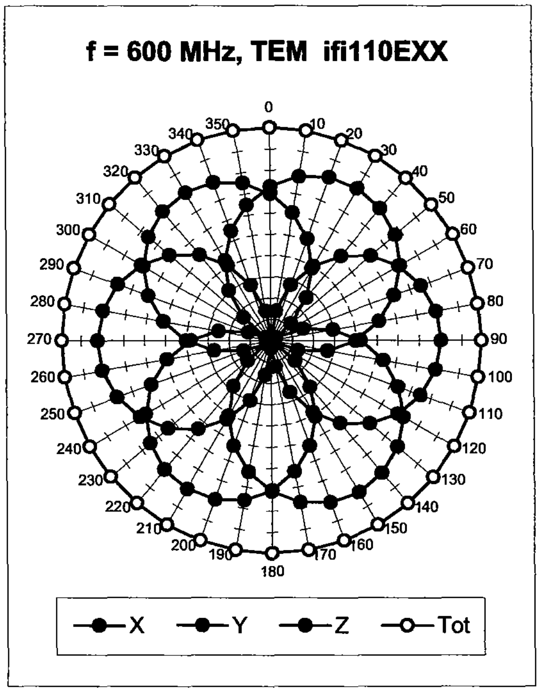
Frequency Response of E-Field

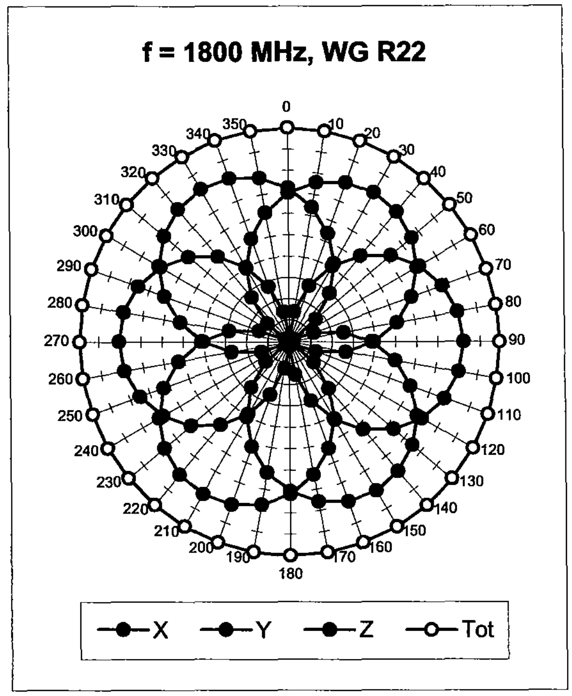
(TEM-Cell:ifi110 EXX, Waveguide: R22)

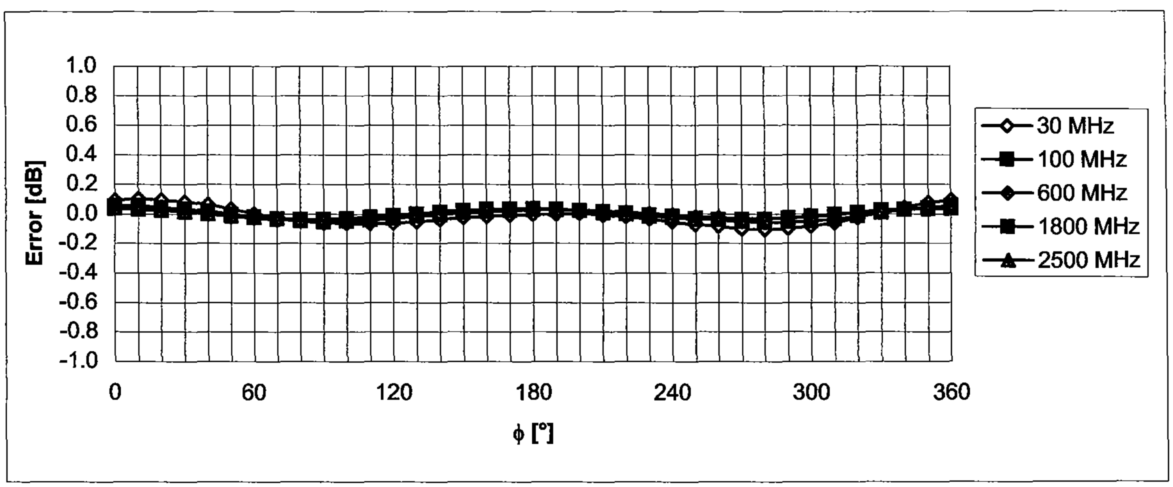


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



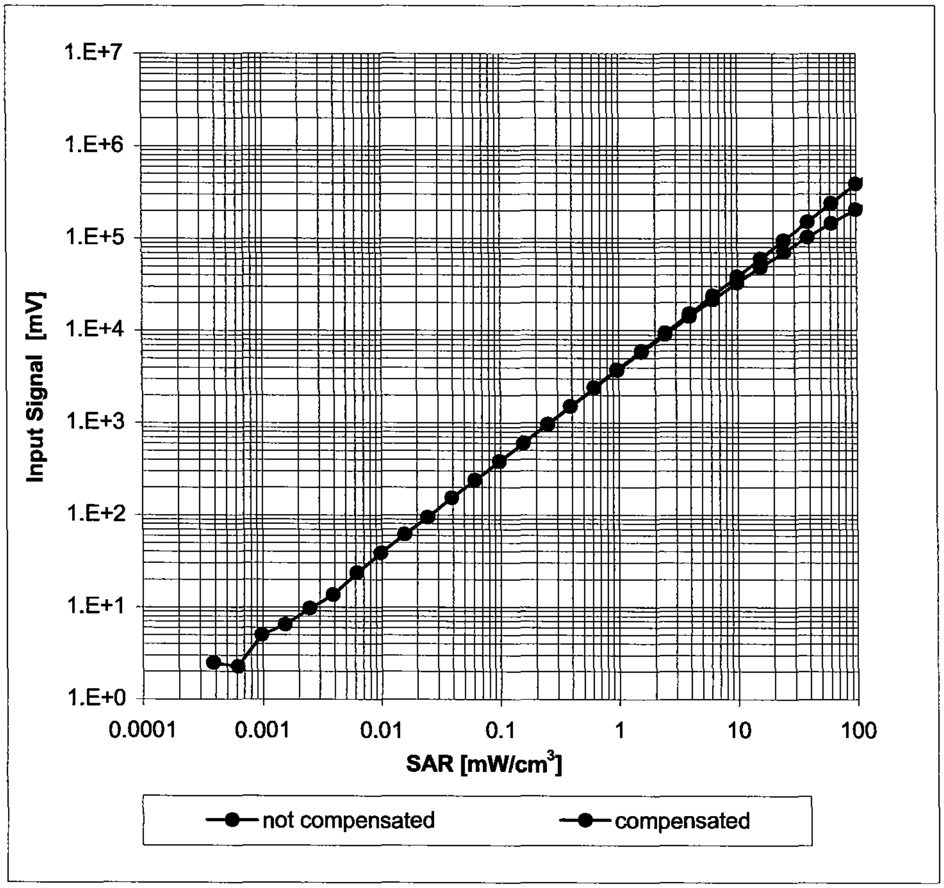


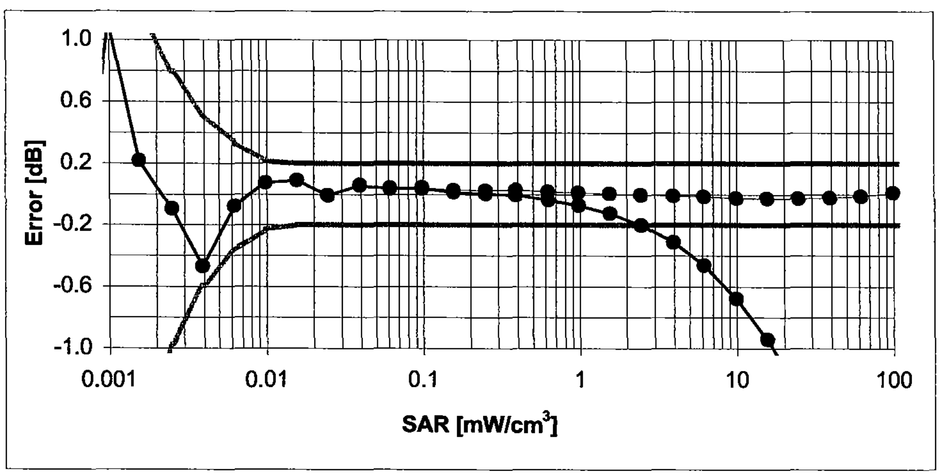


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

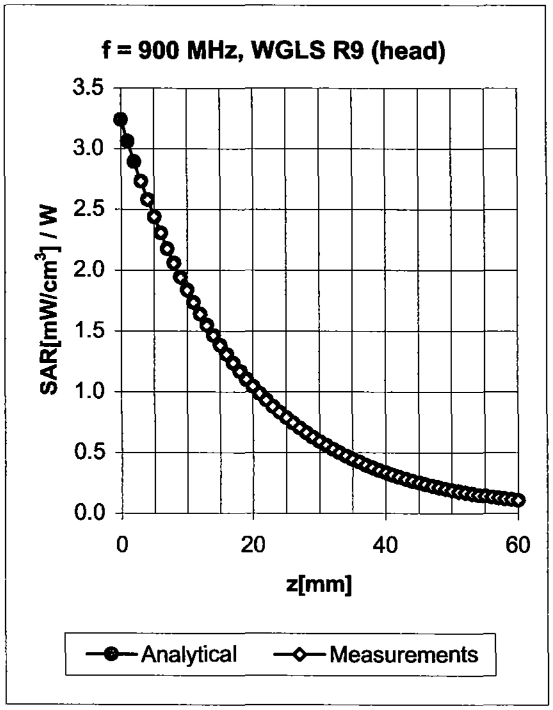
(Waveguide R22, f = 1800 MHz)

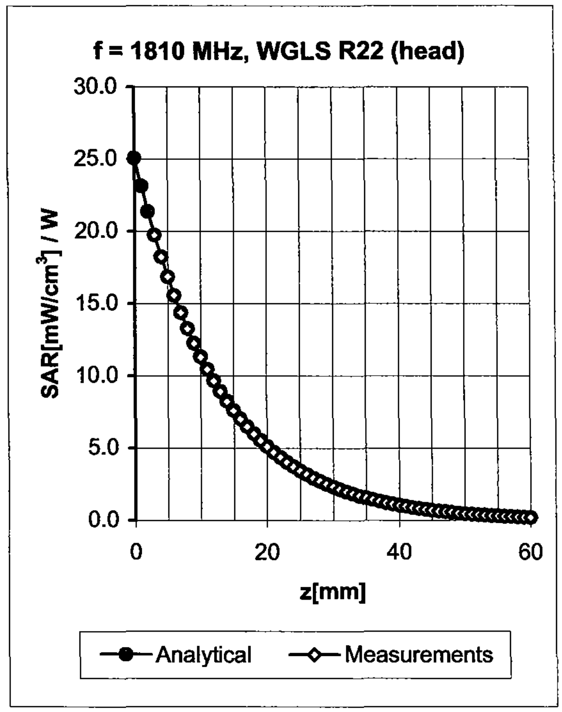




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



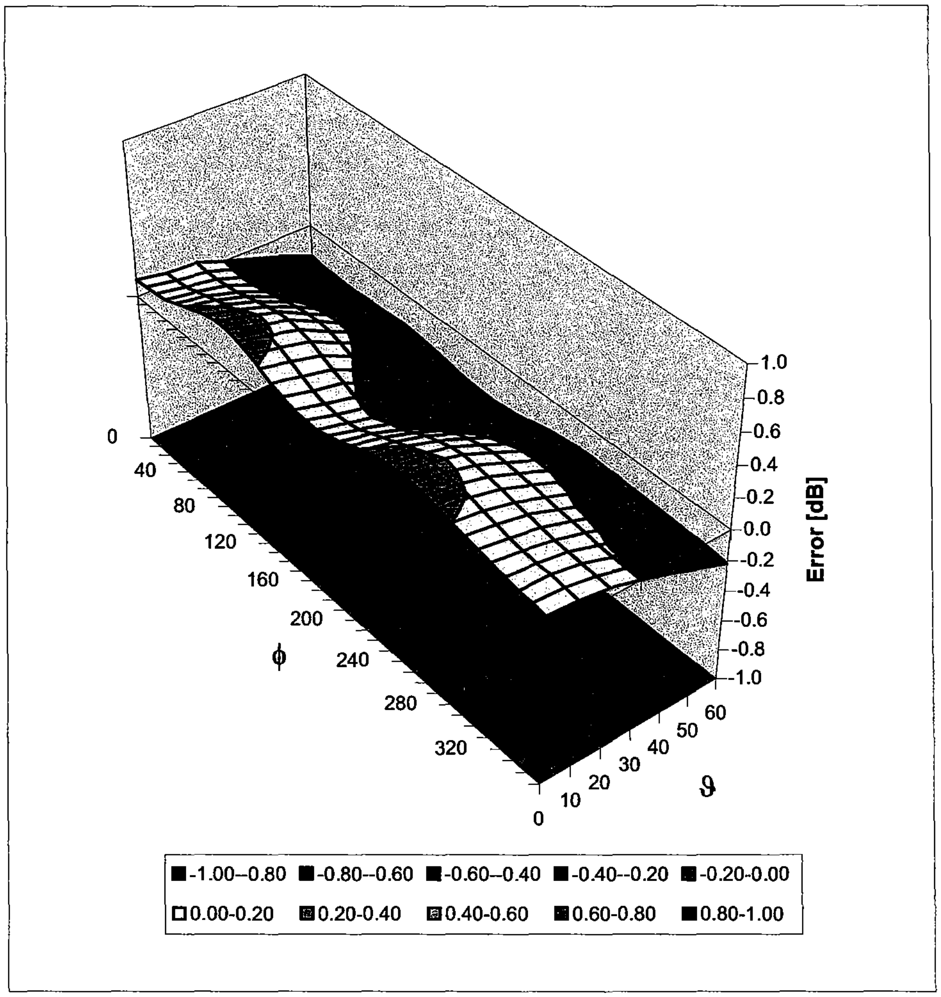


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.44	1.35	6.07	± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.27	2.38	5.01	± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.28	2.21	4.66	± 11.0% (k=2)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

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

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

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**
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: **ET3-1513_Sep05**

CALIBRATION CERTIFICATE

Object	ET3DV6R - SN:1513
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	September 19, 2005
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41498087	3-May-05 (METAS, No. 251-00466)	May-06
Reference 3 dB Attenuator	SN: S5054 (3c)	11-Aug-05 (METAS, No. 251-00499)	Aug-06
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-05 (METAS, No. 251-00467)	May-06
Reference 30 dB Attenuator	SN: S5129 (30b)	11-Aug-05 (METAS, No. 251-00500)	Aug-06
Reference Probe ES3DV2	SN: 3013	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 654	29-Nov-04 (SPEAG, No. DAE4-654_Nov04)	Nov-05

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

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

Issued: September 19, 2005

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:1513

Manufactured:	May 3, 2002
Last calibrated:	September 24, 2004
Recalibrated:	September 19, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6R SN:1513

Sensitivity in Free Space[A]

NormX	**2.31** ± 10.1%	$\mu V/(V/m)^2$
NormY	**1.98** ± 10.1%	$\mu V/(V/m)^2$
NormZ	**2.11** ± 10.1%	$\mu V/(V/m)^2$

Diode Compression[B]

DCP X	**94** mV
DCP Y	**94** mV
DCP Z	**94** 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	8.7	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	13.1	8.7
SAR_{be} [%]	With Correction Algorithm	1.0	0.1

Sensor Offset

Probe Tip to Sensor Center **2.7** mm

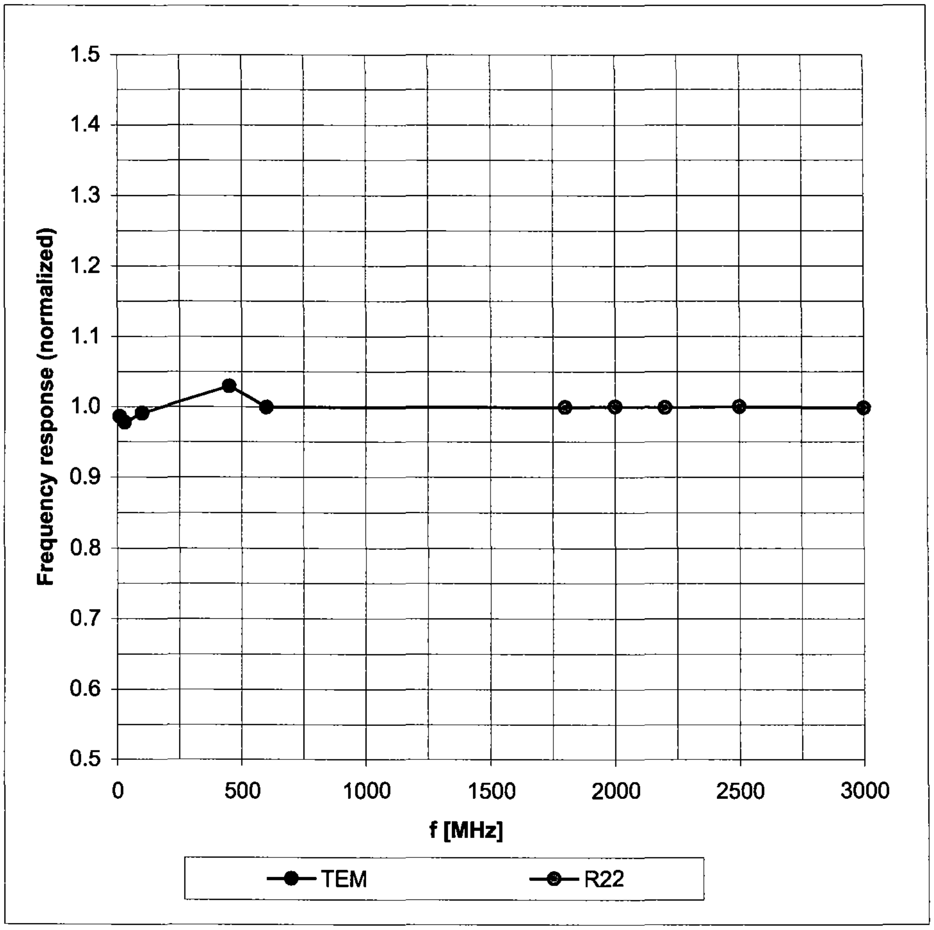
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

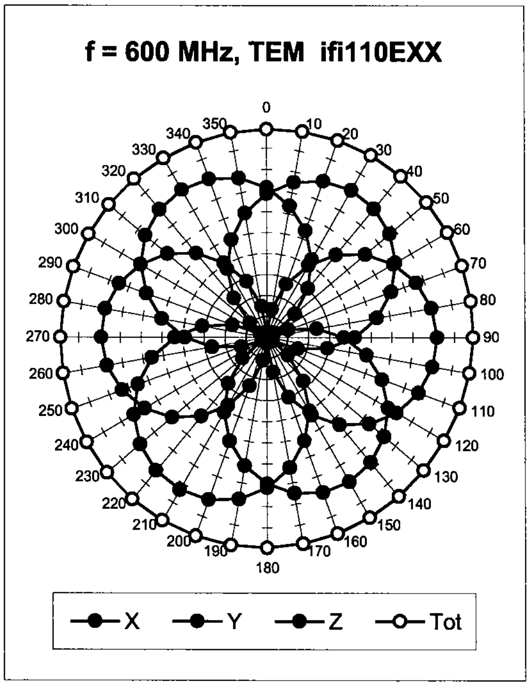
Frequency Response of E-Field

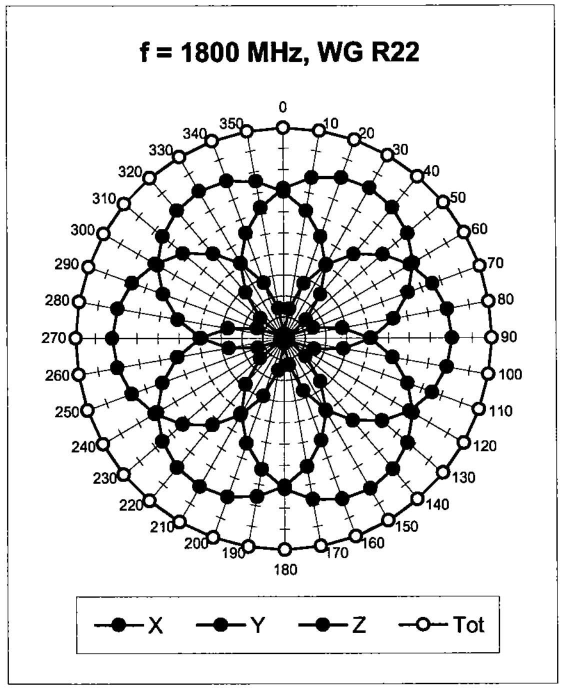
(TEM-Cell:ifi110 EXX, Waveguide: R22)

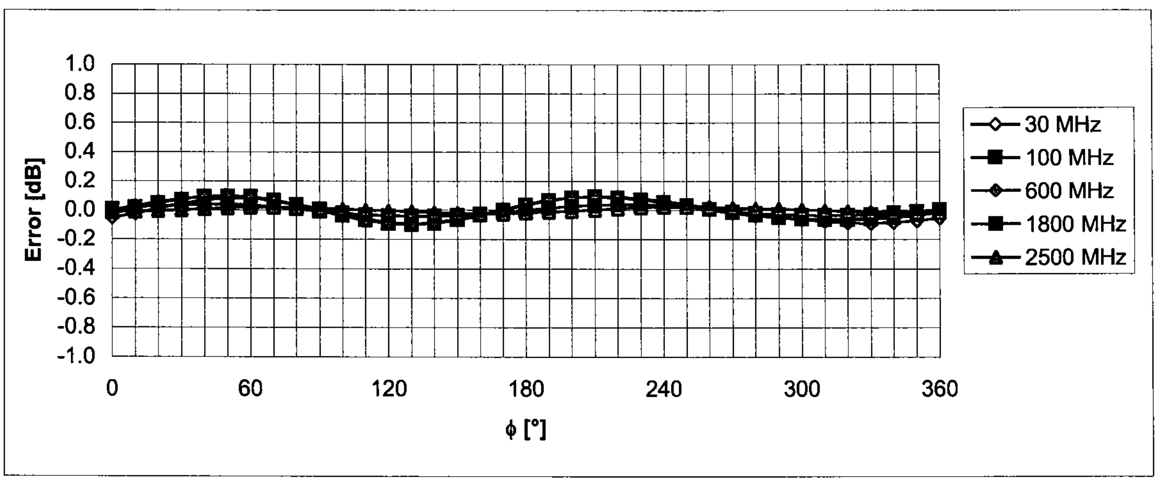


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



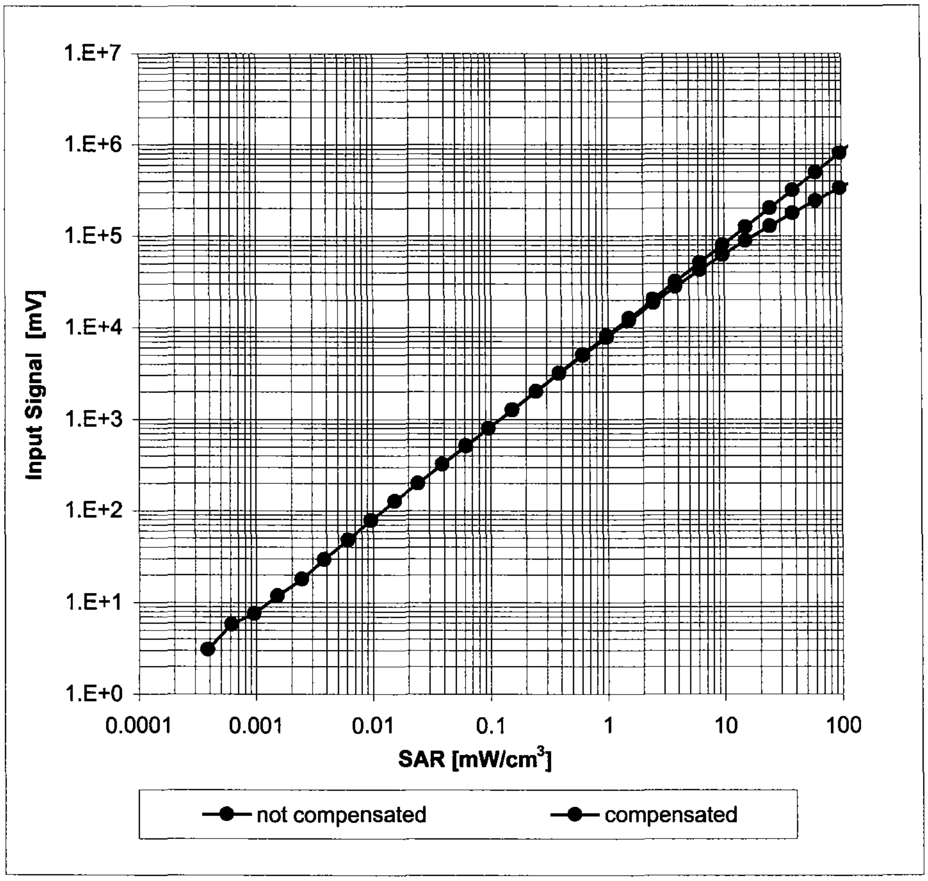


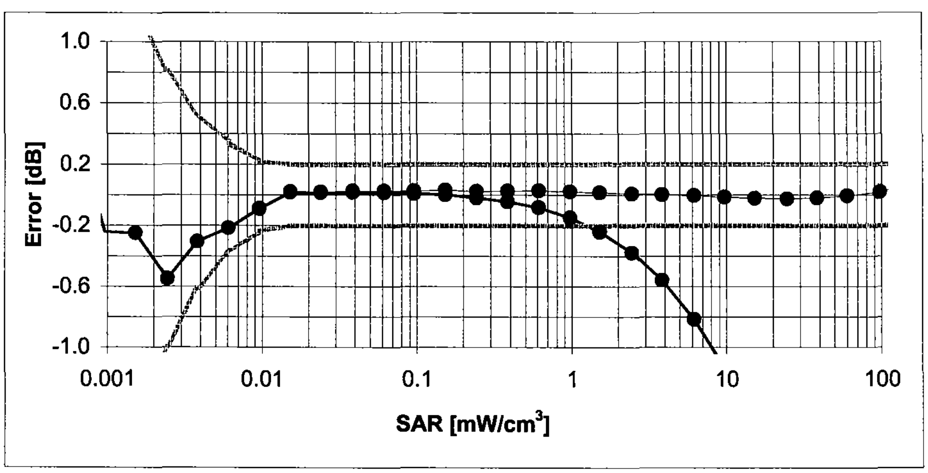


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

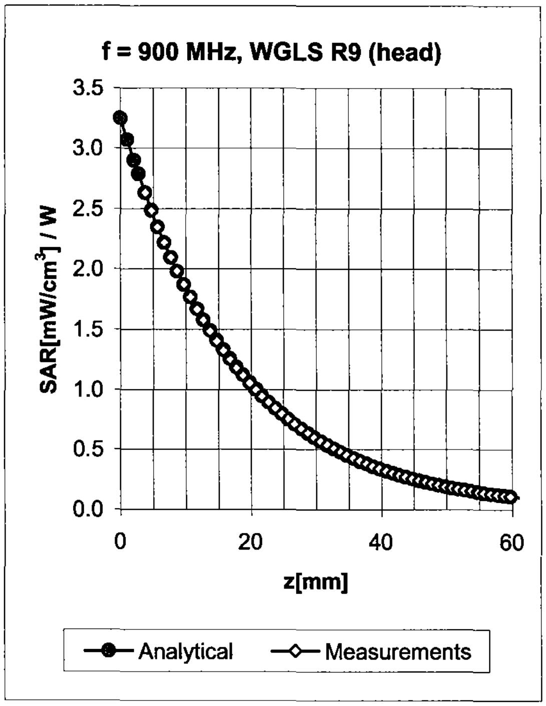
(Waveguide R22, f = 1800 MHz)

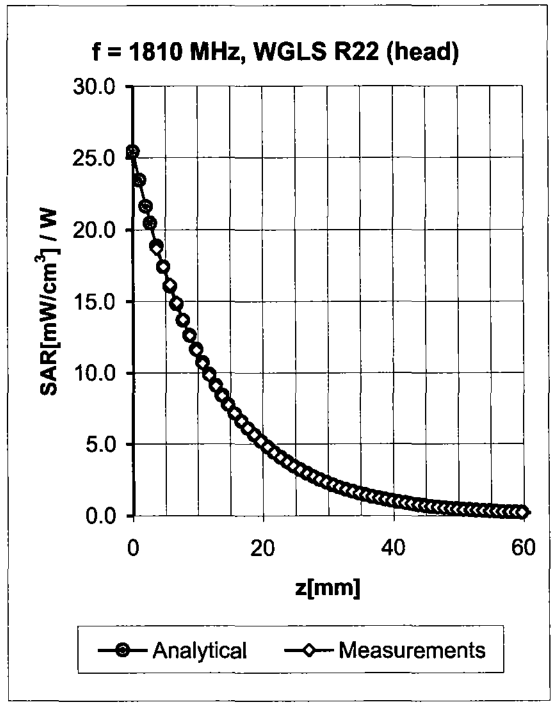




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



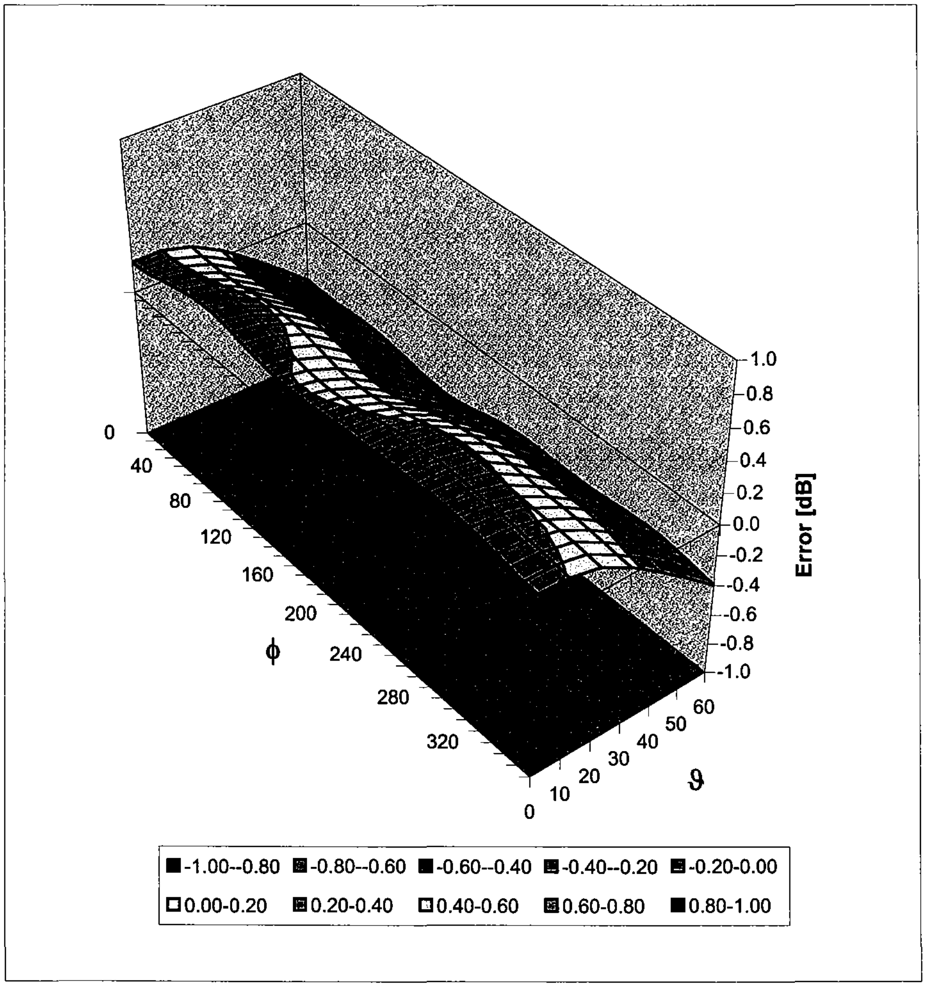


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.57	1.87	5.83	± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.66	2.22	4.76	± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.61	2.40	4.41	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.77	2.04	4.10	± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.53	2.03	5.66	± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.60	2.59	4.16	± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.66	2.37	3.99	± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.92	1.69	3.90	± 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 (95% CONFIDENCE LEVEL)			*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. Front of Phone Open

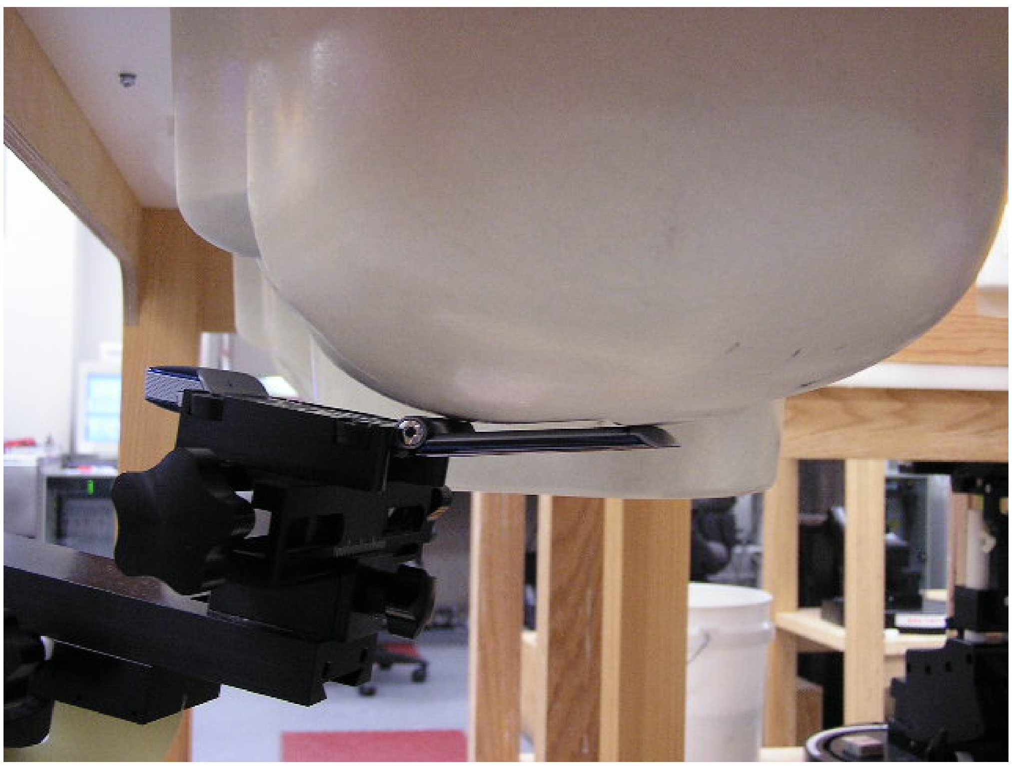


Figure 4. Phone Against the Head Phantom (Cheek Touch)

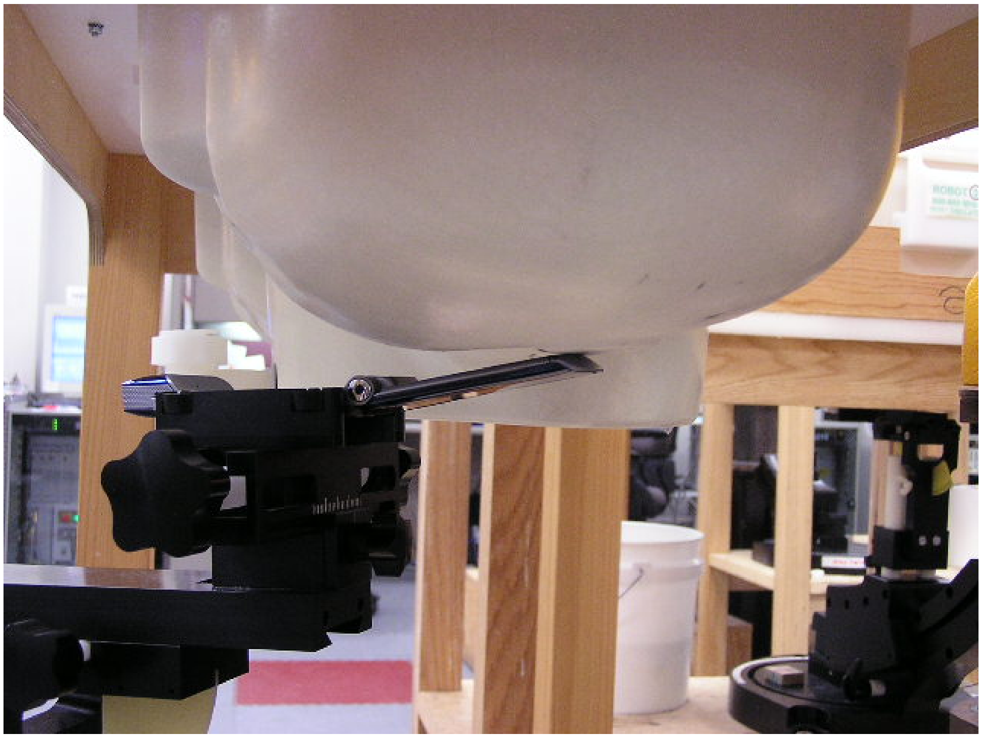


Figure 5. Phone Against the Head Phantom (15 degrees Tilt)

Figure 6. Phone Against the Flat Phantom

Appendix 7

Dipole Characterization Certificate

Certification of System Performance Check Targets
Based on WI-0396

-Historical Data-

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

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

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

-Approvals-

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

Signed: Marge Kaunas

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

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

Signed: Mark Douglas

Comments:

Certification of System Performance Check Targets
Based on WI-0396

-Historical Data-

	1900MHz	
IEEE1528 Target:	39.7	**(W/kg)**
Measurement Uncertainty (k=1):	9.0%	
Measurement Period:	*3-June-05 to 10-May-06*	
# of tests performed:	145	
Grand Average:	40.9	**(W/kg)**
% Delta (Average - IEEE1528 Target)	3.0%	
Is % Delta <= Expanded Measurement Uncertainty (k=2)?	**Yes**	
Accept/Reject Average as new system performance check target?	**ACCEPT**	
	Applies to Dipole SN's: 513TR, 514TR, 518TR, 519TR, 520TR, 523TR, 524TR, 526TR, 527TR, 528TR, 529TR, 530TR, 533TR	

-New System Performance Check Targets- per WI-0396

(based on analysis of historical data)

Frequency	SAR Target (W/kg)	Permittivity	Conductivity (S/m)
1900MHz	**40.9**	40.0 ± 5%	1.40 ± 5%

-Approvals-

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

Signed: Marge Kaunas

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

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

Signed: Mark Douglas

Comments: