MOTOROLA

Portable Cellular Phone SAR Test Report

Test Report #: 20978-1F
Date of Report: Sep-19-2007
Date of Test: Aug-28-2007 to Sep-12-2007
FCC ID #: **IHDP56HB1**
Generic Name: **MQ6-4411A11**

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

Report Author:
Thomas Nipple
RF Engineer

Accreditation:

ACCREDITED

TESTING CERT #2518-02

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

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

On the following products or types of products:
Wireless Communications Devices (Examples): Two Way Radios; Portable Phones (including Cellular, Licensed Non-Broadcast and PCS); Low Frequency Readers; and Pagers

Statement of Compliance:

Motorola declares under its sole responsibility that the portable cellular telephone model to which this declaration relates, is in conformity with the appropriate General Population/Uncontrolled RF exposure standards, recommendations and guidelines (FCC 47 CFR §2.1093) as well as with CENELEC en50360:2001 and ANSI / IEEE C95.1. It also declares that the product was tested in accordance with IEEE 1528 / CENELEC EN62209-1 (2006), as well as other appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

(none)

Motorola encourages all feedback, both positive and negative, on this test report.

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1. Introduction

The Motorola Mobile Devices Business Product Safety Laboratory has performed measurements of the maximum potential exposure to the user of the portable cellular phone covered by this test report. The Specific Absorption Rate (SAR) of this product was measured. The portable cellular phone was tested in accordance with [1], [4] and [5]. The SAR values measured for the portable cellular phone are below the maximum recommended levels of 1.6 W/kg in a 1 g average set in [3] and 2.0 W/kg in a 10 g average set in [2].

2. Description of the Device Under Test

2.1 Antenna description

Type	Internal	
Location	Bottom of Transceiver	
Dimensions	Length	48 mm
	Width	14 mm
Configuration	PIFA	

2.2 Device description

Serial Number	**355827010006580**				
Mode(s) of Operation	GSM 850	GSM 900	GSM 1800	GSM 1900	Bluetooth
Modulation Mode(s)	GMSK	GMSK	GMSK	GMSK	GFSK
Maximum Output Power Setting	33.00 dBm	33.00 dBm	30.50 dBm	30.30 dBm	4.0 dBm
Duty Cycle	1:8	1:8	1:8	1:8	1:1
Transmitting Frequency Range(s)	824.2 - 848.8 MHz	880.2 - 914.8 MHz	1710.2 - 1784.8 MHz	1850.2 - 1909.8 MHz	2400.0 - 2483.5 MHz
Production Unit or Identical Prototype (47 CFR §2.908)	Identical Prototype				
Device Category	Portable				
RF Exposure Limits	General Population / Uncontrolled				

Mode(s) of Operation	GPRS 850				GPRS 900				GPRS 1800				GPRS 1900			
Modulation Mode(s)	GMSK				GMSK				GMSK				GMSK			
Maximum Output Power Setting	33.00 dBm	31.50 dBm	**30.00 dBm**	28.00 dBm	33.00 dBm	31.50 dBm	**30.00 dBm**	28.00 dBm	30.50 dBm	**29.00 dBm**	27.00 dBm	25.00 dBm	30.30 dBm	**29.00 dBm**	27.00 dBm	25.00 dBm
Duty Cycle	1:8	2:8	**3:8**	4:8	1:8	2:8	**3:8**	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				880.2 - 914.8 MHz				1710.2 - 1784.8 MHz				1850.2 - 1909.8 MHz			

Mode(s) of Operation	EDGE 850				EDGE 900				EDGE 1800				EDGE 1900			
Modulation Mode(s)	8PSK				8PSK				8PSK				8PSK			
Maximum Output Power Setting	27.50 dBm	**27.00 dBm**	25.00 dBm	23.00 dBm	27.50 dBm	**27.00 dBm**	25.00 dBm	23.00 dBm	27.00 dBm	**26.00 dBm**	24.00 dBm	22.00 dBm	26.50 dBm	**26.00 dBm**	24.00 dBm	22.00 dBm
Duty Cycle	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				880.2 - 914.8 MHz				1710.2 - 1784.8 MHz				1850.2 - 1909.8 MHz			

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

3. Test Equipment Used

3.1 Dosimetric System

The Motorola Mobile Devices Business Product Safety & Compliance Laboratory utilizes a Dosimetric Assessment System (Dasy4™ v4.7) manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. All the SAR measurements are taken within a shielded enclosure. The overall 10 g RSS uncertainty of the measurement system is ±10.8% (K=1) with an expanded uncertainty of ±21.6% (K=2). The overall 1 g 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 in the following table.

Description	Serial Number	Cal Due Date
DASY4™ DAE V1	702	May-30-2008
E-Field Probe ES3DV3	3124	Mar-20-2008
DASY4™ DAE V1	703	May-30-2007
E-Field Probe ET3DV6R	1397	Apr-24-2008
DASY4™ DAE V1	440	Jan-24-2008
E-Field Probe ES3DV3	3115	Jul-16-2008
Dipole Validation Kit, DV900V2	96	May-01-2008
Dipole Validation Kit, DV900V2	78	May-01-2008
S.A.M. Phantom used for 800/900 MHz	TP-1106	
S.A.M. Phantom used for 800/900 MHz	TP-1131	
Dipole Validation Kit, DV1800V2	272TR	May-01-2008
Dipole Validation Kit, DV1800V2	259TR	May-01-2008
S.A.M. Phantom used for 1800/1900 MHz	TP-1250	
S.A.M. Phantom used for 1800/1900 MHz	TP-1139	
S.A.M. Phantom used for 1800/1900 MHz	TP-1131	

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3847A04982	Jun-13-2009
Power Meter E4419B	GB39511087	Jul-19-2008
Power Sensor #1 – E9301A	US39210931	Jul-20-2008
Power Sensor #2 – E9301A	US39210932	Jul-20-2008
Signal Generator HP8648C	3847A04843	Jul-10-2008
Power Meter E4419B	US39250622	Jun-07-2009
Power Sensor #1 – E9301A	US39211006	Jun-20-2008
Power Sensor #2 – E9301A	US39211007	Jun-21-2008
Signal Generator HP8648C	3847A04632	Mar-30-2008
Power Meter E4419B	GB39510900	Mar-29-2008
Power Sensor #1 – E9301A	US39210915	Apr-11-2008
Power Sensor #2 – E9301A	US39210916	Apr-03-2008
Network Analyzer HP8753ES	US39171846	Jul-19-2008
Dielectric Probe Kit HP85070C	US99360070	

4. Electrical parameters of the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity, ε_r, and the conductivity, σ, of the tissue simulating liquids were measured with a HP85070 Dielectric Probe Kit These values, along with the temperature of the simulated tissue are shown in the table below. The recommended limits for permittivity and conductivity are also shown. A mass density of $\rho = 1\ ^{g}/_{cm^3}$ was entered into the system in all the cases. It can be seen that the measured parameters are within tolerance of the recommended limits specified in [1] and [5].

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Temp (C)
835	Head	**Measured,** Aug-28-2007	42.4	0.92	20.1
		Measured, Sep-05-2007	40.9	0.90	19.6
		Measured, Sep-11-2007	42.1	0.93	19.4
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** Aug-29-2007	53.6	0.97	20.0
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
900	Head	**Measured,** Aug-28-2007	41.6	0.98	20.1
		Measured, Aug-29-2007	41.4	0.98	19.9
		Measured, Sep-05-2007	40.1	0.96	19.9
		Measured, Sep-11-2007	41.3	0.99	20.0
		Recommended Limits	41.5 ±5%	0.97 ±5%	18-25
	Body	**Measured,** Aug-29-2007	53.0	1.04	20.0
		Recommended Limits	55.0 ±5%	1.05 ±5%	18-25
1750	Head	**Measured,** Aug-30-2007	38.7	1.32	19.9
		Measured, Sep-05-2007	40.6	1.34	19.6
		Measured, Sep-11-2007	39.1	1.34	19.1
		Recommended Limits	40.1 ±5%	1.37 ±5%	18-25
	Body	**Measured,** Aug-30-2007	52.6	1.43	19.7
		Recommended Limits	53.4 ±5%	1.49 ±5%	18-25
1880	Head	**Measured,** Aug-30-2007	38.1	1.46	19.8
		Measured, Sep-05-2007	39.9	1.47	19.7
		Measured, Sep-11-2007	38.5	1.47	19.2
		Recommended Limits	40.0 ±5%	1.40 ±5%	18-25
	Body	**Measured,** Aug-30-2007	52.0	1.58	19.7
		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	835 MHz / 900 MHz Head	835 MHz / 900 MHz Body	1800 MHz / 1900 MHz Head	1800 MHz / 1900 MHz Body	2450 MHz Head	2450 MHz Body
Sugar	57	44.9	--	--	--	--
DGBE	--	--	47	30.8	--	30
Diacetin	--	--	--	--	51	
Water	40.45	53.06	52.62	68.8	48.75	70
Salt	1.45	0.94	0.38	0.4	0.15	--
HEC	1	1	--	--	--	--
Bact.	0.1	0.1	--	--	0.1	--

5. System Accuracy Verification

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

A SAR measurement was performed to verify the measured SAR was within ±10% from the target SAR indicated in Section 8.3.7 Reference SAR Values in [5] or Appendix 7 for the 900 Mhz target reference SAR value. These tests were done at 900 MHz and 1800 MHz. These frequencies are within ±10% of the compliance test mid-band frequency as required in [1] and [5]. The test was conducted on the same days as the measurement of the DUT. Recommended limits for permittivity and conductivity, specified in [5], are shown in the table below. The obtained results from the system accuracy verification are also displayed in the table below. SAR values are normalized to 1 W forward power delivered to the dipole. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. The distributions of SAR compare well with those of the reference measurements (see Appendix 1). The tissue stimulant depth was verified to be 15.0 cm ± 0.5 cm. Z-axis scans showing the SAR penetration are also included in Appendix 1.

f (MHz)	Description	SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (C)	Tissue Temp (C)
			ε_r	σ (S/m)		
900	**Measured,** Aug-28-2007	10.75	41.6	0.98	20.6	20.4
	Measured, Aug-29-2007	10.625	41.4	0.98	20.6	20.1
	Measured, Sep-05-2007	11.075	40.1	0.96	20.5	20.0
	Measured, Sep-11-2007	11.175	41.3	0.99	20.1	20.0
	Recommended Limits	11.24	41.5 ±5%	0.97 ±5%	18-25	18-25
1800	**Measured,** Aug-30-2007	37.825	38.5	1.37	20.2	19.8
	Measured, Sep-05-2007	37.20	39.4	1.39	20.5	19.9
	Measured, Sep-11-2007	38.75	38.9	1.39	20.1	19.7
	Recommended Limits	37.5	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	3124	900	5.95	8 of 9
		1810	5.14	8 of 9
E-Field Probe ET3DV6R	1397	900	6.25	8 of 9
		1810	5.17	8 of 9
E-Field Probe ES3DV3	3115	900	6.03	8 of 9
		1810	4.92	8 of 9

6. Test Results

The test sample was operated using an actual transmission through a base station simulator. The base station simulator was setup to the proper channel, transmitter power level and transmit mode of operation. The phone was tested in the configurations stipulated in [1], [4] and [5]. The phone was positioned into these configurations using the device holder supplied with the DASY4™ SAR measurement system The measured dielectric constant of the material used for the device holder is less than 2.9 and the loss tangent is less than 0.02 (± 30%) at 850 MHz. The default settings for the “coarse” and “cube” scans were chosen and used for measurements. The grid spacing of the course scan was set to 15 cm as shown in the SAR plots included in Appendix 2 and 3. Please refer to the DASY4™ manual for additional information on SAR scanning procedures and algorithms used.

The Cellular Phone model covered by this report has the following battery options:
Model SNN5795A – 930 mAH Battery

The battery with the highest capacity is the Model SNN5795A. 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

The SAR results shown in tables 1 through 6 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to the [6]. Also shown are the measured conducted output power levels, the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is New SAR = Old SAR * $10^{(-drift/10)}$. The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

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

The SAR measurements were performed using the SAM phantoms listed in section 3.1. Since the same phantoms and simulated tissue were used for the system accuracy verification and the device SAR measurements, the Z-axis scans included in Appendix 1 are applicable for verification of simulated tissue depth to be 15.0 cm ± 0.5 cm.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3124	900	5.95	8 of 9
		1810	5.14	8 of 9
E-Field Probe ET3DV6R	1397	900	6.25	8 of 9
		1810	5.17	8 of 9
E-Field Probe ES3DV3	3115	900	6.03	8 of 9
		1810	4.92	8 of 9

Left Head Cheek Position								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
850 MHz	**Channel 128**	32.99						
	Channel 190	32.97	20.1	0.030	0.37	0.37	0.517	0.52
	Channel 251	32.86						
1900 MHz	**Channel 512**	30.25						
	Channel 661	30.30	**19.8**	**-0.254**	**0.36**	**0.38**	**0.631**	**0.67**
	Channel 810	30.22						

Table 1: SAR measurement results at the highest possible output power, measured in a head cheek position against the ICNIRP and ANSI SAR Limit.

Right Head Cheek Position								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
850 MHz	**Channel 128**	32.99						
	Channel 190	32.97	**20.1**	**0.012**	**0.400**	**0.40**	**0.553**	**0.55**
	Channel 251	32.86						
1900 MHz	**Channel 512**	30.25						
	Channel 661	30.30	19.3	-0.064	0.267	0.27	0.449	0.46
	Channel 810	30.22						

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

Left Head 15° Tilt Position								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
850 MHz	**Channel 128**	32.99						
	Channel 190	32.97	20.1	0.060	0.229	0.23	0.305	0.31
	Channel 251	32.86						
1900 MHz	**Channel 512**	30.25						
	Channel 661	30.30	**19.8**	**0.268**	**0.138**	**0.14**	**0.231**	**0.23**
	Channel 810	30.22						

Table 3: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.

Right Head 15° Tilt Position								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
850 MHz	Channel 128	32.99						
	Channel 190	32.97	**20.0**	**-0.070**	**0.262**	**0.27**	**0.352**	**0.36**
	Channel 251	32.86						
1900 MHz	Channel 512	30.25						
	Channel 661	30.30	19.3	-0.271	0.125	0.13	0.208	0.22
	Channel 810	30.22						

Table 4: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.

Noted Head Cheek Position, GPRS Mode using *Noted Multislot Class*								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
850 MHz *Right Cheek, Class 11*	Channel 128	29.91	19.1	0.015	0.518	0.52	0.716	0.72
	Channel 190	29.91	20.0	-0.260	0.547	0.58	0.76	0.81
	Channel 251	29.82	**19.4**	**-0.107**	**0.718**	**0.74**	**0.997**	**1.02**
1900 MHz *Left Cheek, Class 10*	Channel 512	28.91	**19.2**	**-0.110**	**0.481**	**0.49**	**0.863**	**0.89**
	Channel 661	28.99	19.5	-0.070	0.472	0.48	0.816	0.83
	Channel 810	28.85	19.1	-0.117	0.300	0.31	0.521	0.54

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

Noted Head Cheek Position, EDGE Mode using Multislot Class 10								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
850 MHz *Right Cheek*	Channel 128							
	Channel 190	26.85	19.5	-0.102	0.209	0.21	0.291	0.30
	Channel 251							
1900 MHz *Left Cheek*	Channel 512							
	Channel 661	25.88	19.0	-0.811	0.179	0.22	0.306	0.37
	Channel 810							

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

6.2 Push-to-Talk/Dispatch Mode Test Results

The SAR results shown in table 7 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to the [6]. Also shown are the measured conducted output powers, the temperature of the simulated tissue 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 DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

A full data set output of one test condition per band with the highest SAR values from the DASY™ measurement system is included as appendix 3. The test conditions included are indicated as bold numbers in the following tables. All other test conditions measured lower SAR values than those included.

The SAR measurements were performed using the SAM phantoms listed in section 3.1. Since the same phantoms and simulated tissue were used for the system accuracy verification and the device SAR measurements, the Z-axis scans included in Appendix 1 are applicable for verification of simulated tissue depth to be 15.0 cm ± 0.5 cm.

The test sample was operated in an over-the-air call in GPRS mode in the GSM 850, 900, 1800, and 1900 MHz bands. For the purposes of these tests the unit is commanded to the proper channel, transmitter power level and transmit mode of operation. To ensure worst-case SAR performance, the multi-slot GPRS class resulting in the highest time-average transmit power was utilized in each band. The radio was placed in the SAR measurement system with a fully charged battery. The radio was placed with the front of the device positioned at 2.5 cm from the flat portion of the SAM phantom, as per Supplement C 01-01 with flip open.

The following probe conversion factors were used on the E-Field probe(s) used for Push-To-Talk measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3124	900	5.95	8 of 9
		1810	5.14	8 of 9

Push-to-Talk Position, GPRS Mode using *Noted Multislot Class*									
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (C)**	**Drift (dB)**	***10 g SAR value***		***1 g SAR value***		
					Measured (W/kg)	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	
850 MHz *Class 11*	**Channel 128**	29.91							
	Channel 190	29.91	**19.6**	**-0.052**	**0.371**	**0.38**	**0.505**	**0.51**	
	Channel 251	29.82							
1900 MHz *Class 10*	**Channel 512**	28.91							
	Channel 661	28.99	**19.7**	**0.068**	**0.071**	**0.07**	**0.110**	**0.11**	
	Channel 810	28.85							

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

6.3 Body Worn Test Results

The SAR results shown in tables 8 through 12 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to the [6]. Also shown are the measured conducted output power levels, the temperature of the test facility during the test, the temperature of the tissue simulate after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is New SAR = Old SAR * $10^{(-drift/10)}$. The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

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 2.0 mm. It measures 52.7 cm(long) x 26.7 cm(wide) x 21.2 cm(tall). The measured dielectric constant of the material used is less than 2.3 and the loss tangent is less than 0.0046 all the way up to 2.184 GHz.

The tissue stimulant depth was verified to be 15.0 cm ± 0.5 cm. The same device holder described in section 6 was used for positioning the phone. The functional accessories were divided into two categories, the ones with metal components and the ones with non-metal components. For non-metallic component accessories’, testing was performed on the accessory that displayed the closest proximity to the flat phantom. Each metallic component accessory, if any, was checked for uniqueness of metal component so that each is tested with the device. If multiple accessories shared an identical metal component, only the accessory that dictates the closest spacing to the body was tested. In addition to accessory testing, the cellular phone was tested with the front and back of the phone facing the phantom. For voice mode operation, the phone was placed as a distance of 15 mm from the phantom. For data mode operation, the phone was placed as a distance of 25 mm from the phantom. The cellular phone was tested with a headset connected to the device for all body-worn SAR measurements.

There are no Body-Worn Accessories available for this phone.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3124	900	5.90	8 of 9
		1810	4.85	8 of 9
E-Field Probe ET3DV6R	1397	900	6.04	8 of 9
		1810	4.83	8 of 9
E-Field Probe ES3DV3	3115	900	5.72	8 of 9
		1810	4.70	8 of 9

Body-Worn; Front of Phone 15 mm from Phantom								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
850 MHz	Channel 128	32.99						
	Channel 190	32.97	20.0	0.002	0.385	0.39	0.519	0.52
	Channel 251	32.86						
1900 MHz	Channel 512	30.25						
	Channel 661	30.30	19.7	-0.267	0.145	0.15	0.244	0.26
	Channel 810	30.22						

Table 8 SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn; Back of Phone 15 mm from Phantom								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
850 MHz	Channel 128	32.99						
	Channel 190	32.97	20.0	0.183	0.497	0.50	0.668	0.67
	Channel 251	32.86						
1900 MHz	Channel 512	30.25						
	Channel 661	30.30	19.7	-0.316	0.235	0.25	0.393	0.42
	Channel 810	30.22						

Table 9: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn; Back of Phone 15 mm From Phantom with Bluetooth Enabled								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
850 MHz	Channel 128	32.99	19.2	-0.036	0.461	0.46	0.611	0.62
	Channel 190	32.97	**20.0**	**0.083**	**0.623**	**0.62**	**0.850**	**0.85**
	Channel 251	32.86	19.6	0.042	0.559	0.56	0.748	0.75
1900 MHz	Channel 512	30.25						
	Channel 661	30.30	**19.7**	**-0.290**	**0.284**	**0.30**	**0.490**	**0.52**
	Channel 810	30.22						

Table 10: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn; Back of Phone 25 mm From Phantom with GPRS Mode using *Noted Multislot Class*									
f (MHz)	Description	Conducted Output Power (dBm)	Temp (C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	
850 MHz *Class 11*	**Channel 128**	29.91							
	Channel 190	29.91	19.5	0.033	0.335	0.34	0.458	0.46	
	Channel 251	29.82							
1900 MHz *Class 10*	**Channel 512**	28.91							
	Channel 661	28.99	19.5	0.218	0.101	0.10	0.159	0.16	
	Channel 810	28.85							

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

Body-Worn; Back of Phone 25 mm From Phantom with EDGE Mode using Multislot Class 10								
f (MHz)	Description	Conducted Output Power (dBm)	Temp (C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
850 MHz	**Channel 128**							
	Channel 190	26.85	19.8	0.024	0.111	0.11	0.153	0.15
	Channel 251							
1900 MHz	**Channel 512**							
	Channel 661	25.88	19.4	-0.109	0.047	0.05	0.075	0.08
	Channel 810							

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

References

[1] CENELEC, en62209-1:2006 “Human Exposure to Radio Frequency Fields From Hand - Held and Body - Mounted Wireless Communication Devices – Human Models, Instrumentation, and Procedures”

[2] CENELEC, en50360:2001 “Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz – 3 GHz)”.

[3] ANSI / IEEE, C95.1 1999 Edition “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”

[4] FCC OET Bulletin 65 Supplement C 01-01

[5] IEEE 1528 2003 Edition “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”

[6] ICNIRP Guidelines “Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz)”

Appendix 1

SAR distribution comparison for the system accuracy verification

Date/Time: 8/28/2007 8:22:10 AM

Test Laboratory: Motorola - 082807 900Mhz GOOD-4.4%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:078; FCC ID: IDHP56HB1
Procedure Notes: 900 MHz System Performance Check; Dipole Sn# 78; Input Power = 200 mW
Sim.Temp@meas = 20.4 ┌C; Sim.Temp@SPC = 20.4 ┌C; Room Temp @ SPC = 20.6 ┌C
Communication System: CW - Dipole; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 900 MHz; σ = 0.98 mho/m; ε_r = 41.6; ρ = 1000 kg/m^3

DASY4 Configuration:

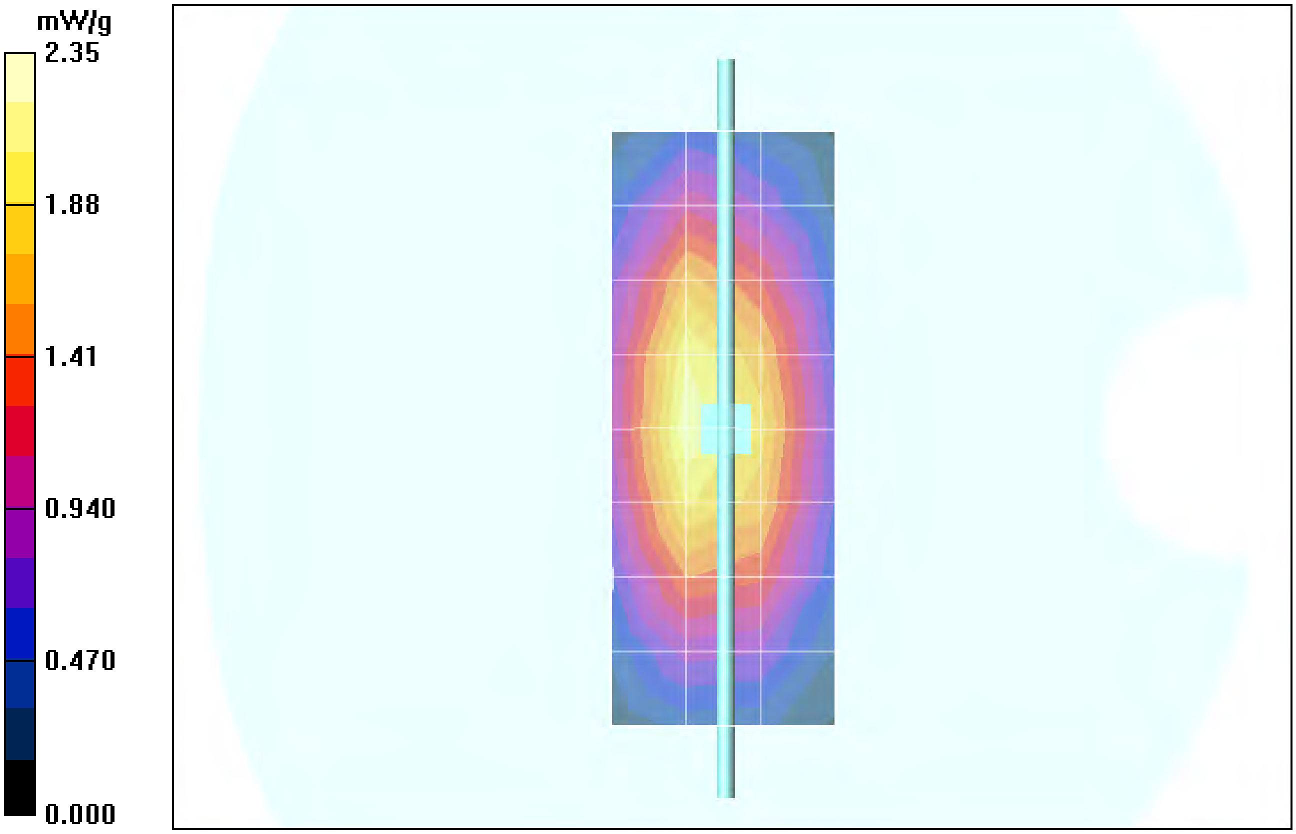
- Probe: ES3DV3 - SN3115; ConvF(6.03, 6.03, 6.03); Calibrated: 7/16/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/24/2007
- Phantom: R2: Sugar SAM; Type: SAM; Serial: TP-1106;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

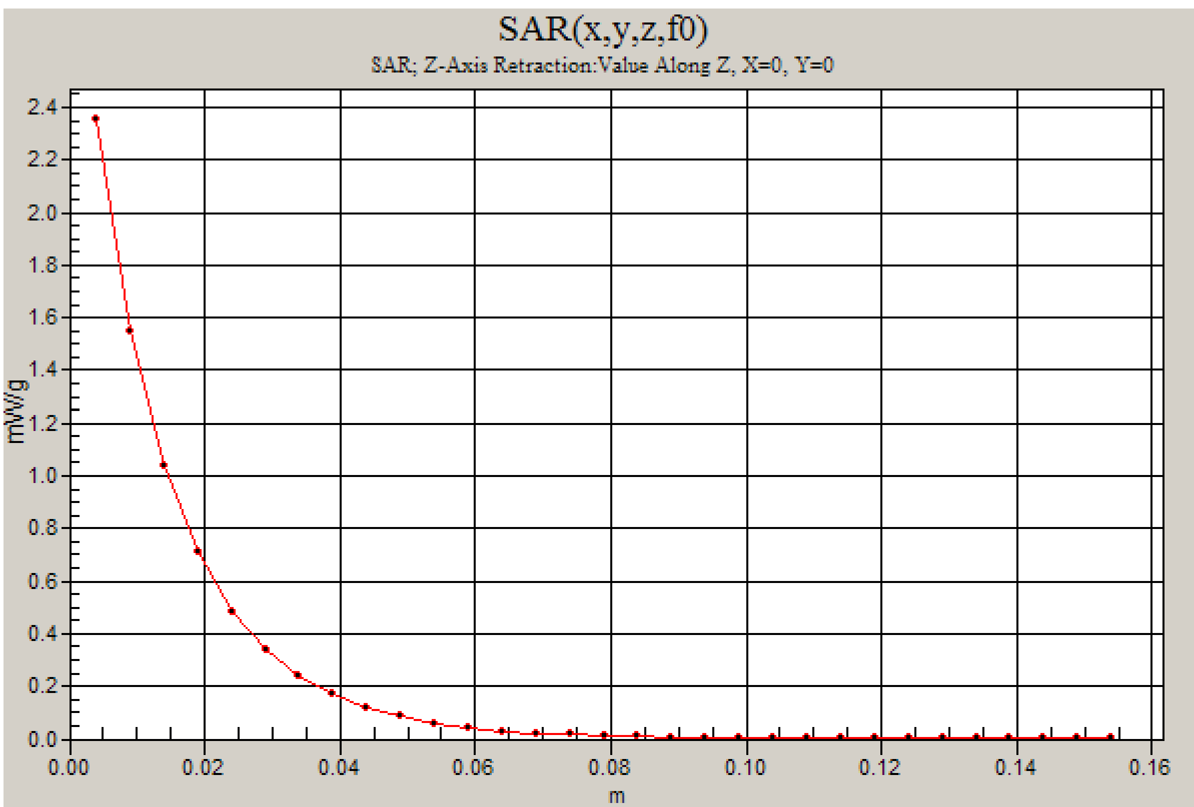
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 2.17 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.8 V/m; Power Drift = 0.000 dB; Peak SAR (extrapolated) = 3.24 W/kg
SAR(1 g) = 2.15 mW/g; SAR(10 g) = 1.38 mW/g; Maximum value of SAR (measured) = 2.33 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.8 V/m; Power Drift = 0.000 dB; Peak SAR (extrapolated) = 3.23 W/kg
SAR(1 g) = 2.15 mW/g; SAR(10 g) = 1.38 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) = 2.35 mW/g


mW/g
2.35
1.88
1.41
0.940
0.470
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date/Time: 8/29/2007 7:52:26 AM

Test Laboratory: Motorola - 082907 900Mhz GOOD-5.5%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:078; FCC ID: IHDP56HB1
Procedure Notes: 900 MHz System Performance Check; Dipole Sn# 78; Input Power = 200 mW
Sim.Temp@meas = 20.1 ┌C; Sim.Temp@SPC = 20.1 ┌C; Room Temp @ SPC = 20.6 ┌C
Communication System: CW - Dipole; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 900 MHz; σ = 0.98 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3

DASY4 Configuration:

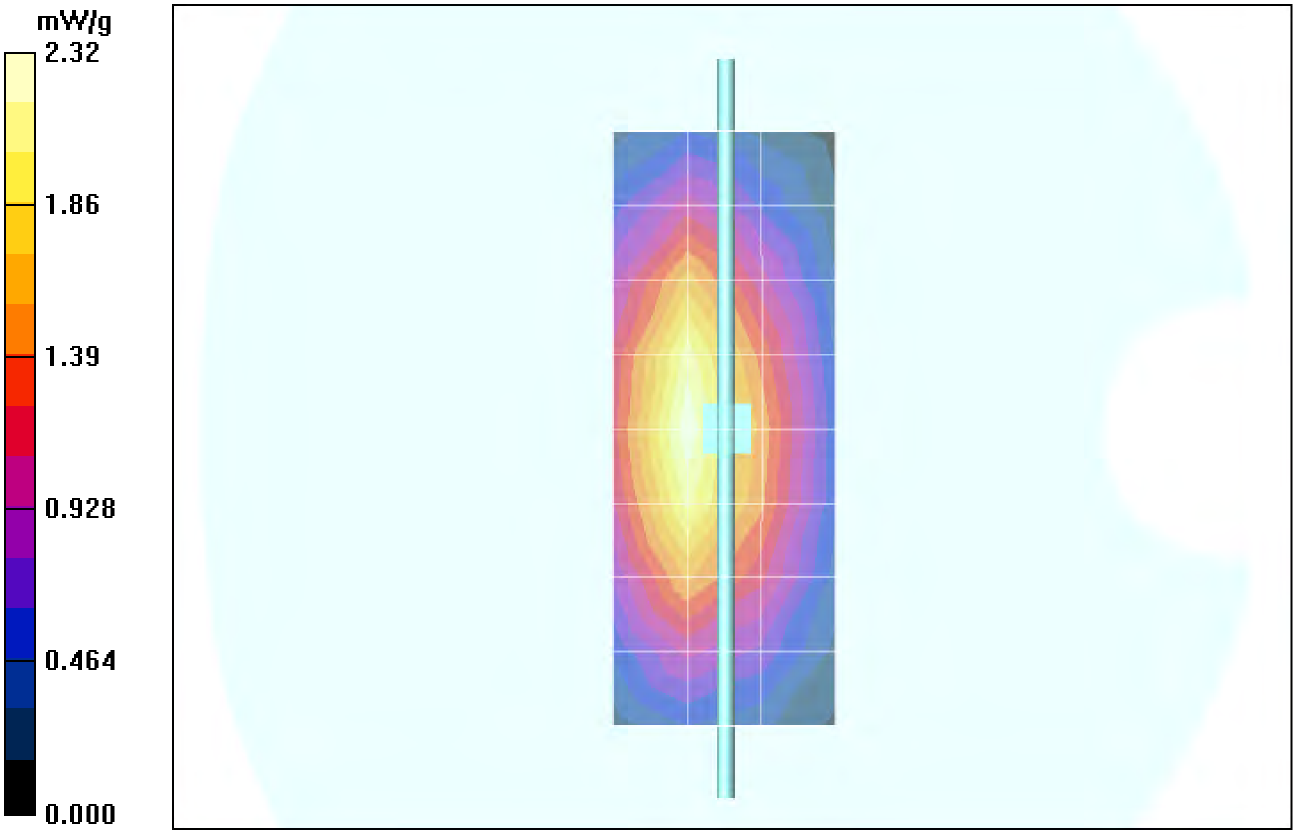
- Probe: ES3DV3 - SN3115; ConvF(6.03, 6.03, 6.03); Calibrated: 7/16/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/24/2007
- Phantom: R2: Sugar SAM; Type: SAM; Serial: TP-1106;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

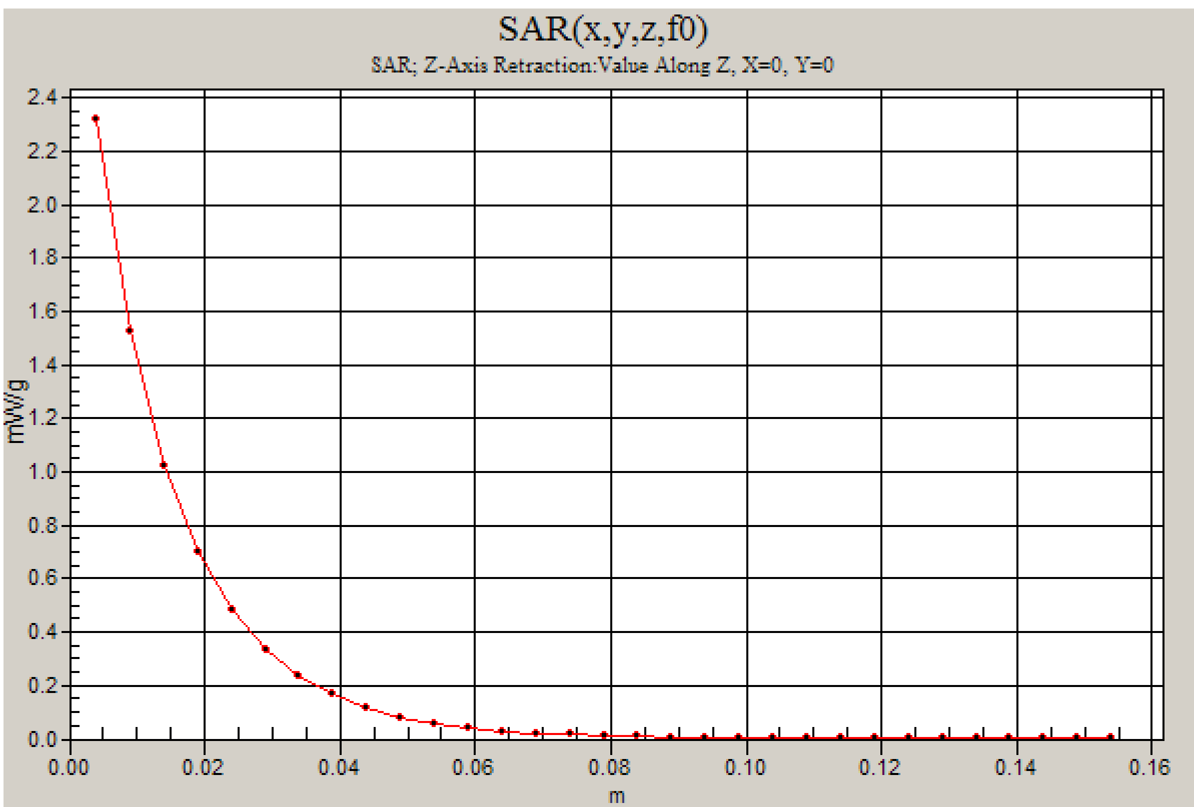
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 2.29 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 46.9 V/m; Power Drift = -0.045 dB; Peak SAR (extrapolated) = 3.21 W/kg
SAR(1 g) = 2.13 mW/g; SAR(10 g) = 1.36 mW/g; Maximum value of SAR (measured) = 2.32 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 46.9 V/m; Power Drift = -0.045 dB; Peak SAR (extrapolated) = 3.17 W/kg
SAR(1 g) = 2.12 mW/g; SAR(10 g) = 1.36 mW/g; Maximum value of SAR (measured) = 2.28 mW/g

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


mW/g
2.32
1.86
1.39
0.928
0.464
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
m
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Date/Time: 9/5/2007 9:47:15 AM

Test Laboratory: Motorola - 090507 900MHz Good at -1.5%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:096; FCC ID: IHDP56HB1
Procedure Notes: 900 MHz System Performance Check; Dipole Sn# 096; Input Power = 200mW
Sim.Temp@meas = 20.0*C; Sim.Temp@SPC =20.0*C; Room Temp @ SPC = 20.5*C
Communication System: CW - Dipole; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 900 MHz; σ = 0.96 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3

DASY4 Configuration:

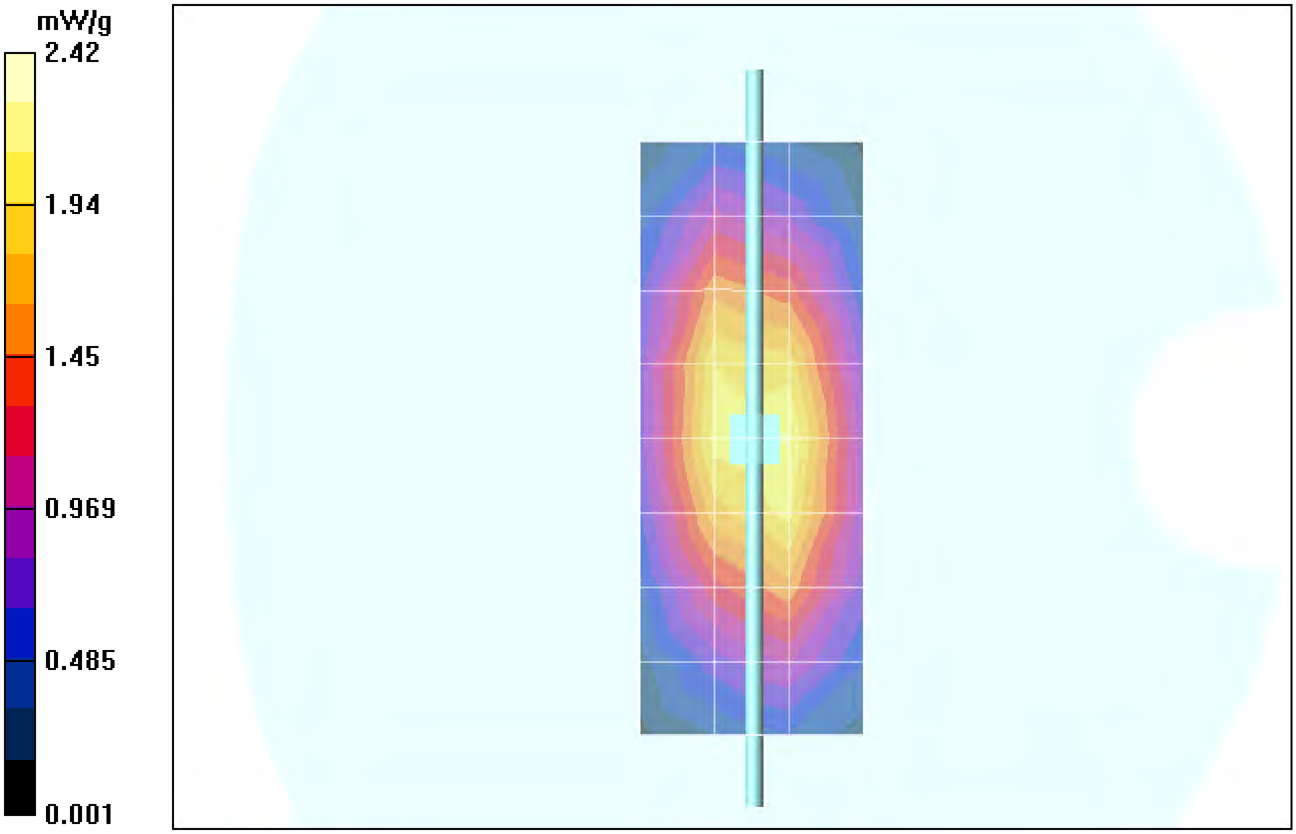
- Probe: ES3DV3 - SN3124; ConvF(5.95, 5.95, 5.95); Calibrated: 3/20/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/30/2007
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

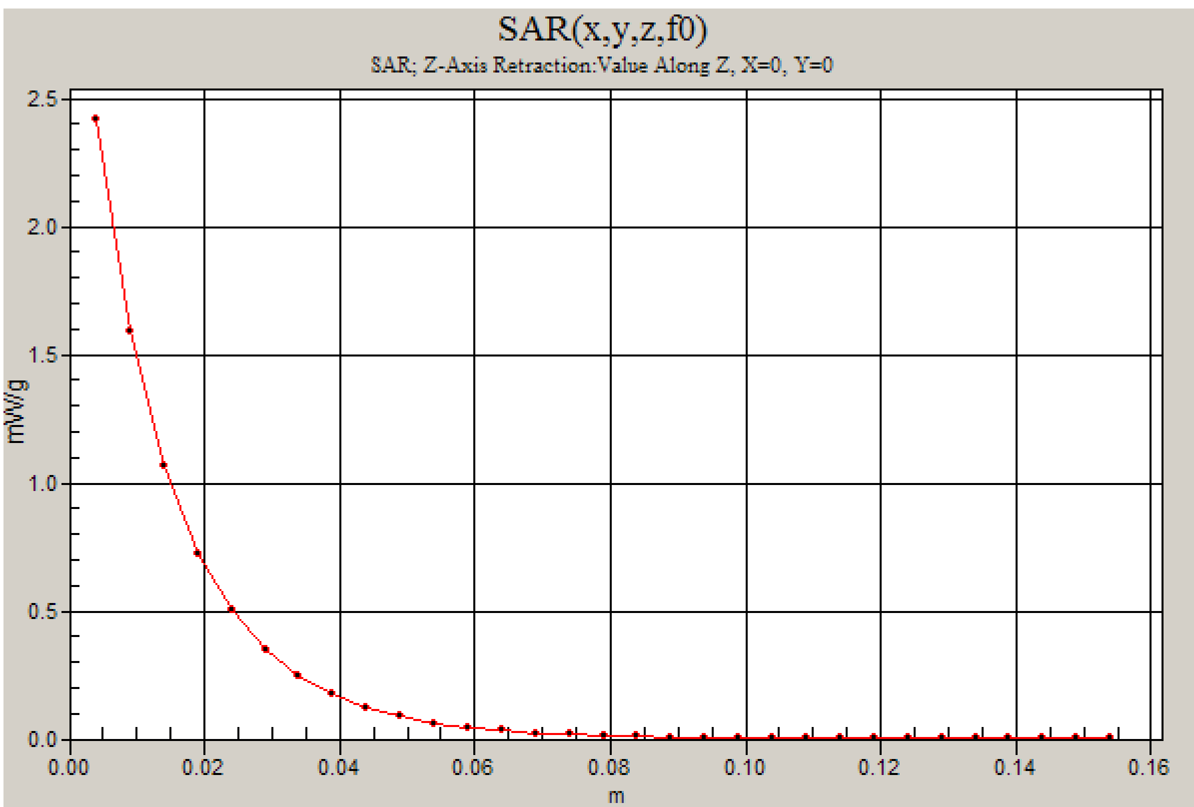
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 2.13 mW/g

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 = 0.008 dB; Peak SAR (extrapolated) = 3.32 W/kg
SAR(1 g) = 2.21 mW/g; SAR(10 g) = 1.42 mW/g; Maximum value of SAR (measured) = 2.39 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 = 0.008 dB; Peak SAR (extrapolated) = 3.34 W/kg
SAR(1 g) = 2.22 mW/g; SAR(10 g) = 1.43 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.42 mW/g


mW/g
2.42
1.94
1.45
0.969
0.485
0.001


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: 9/11/2007 10:08:57 AM

Test Laboratory: Motorola - R4 091107 900MHz Good at -0.6%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:096; FCC ID: IHDP56HB1
Procedure Notes: 900 MHz System Performance Check; Dipole Sn# 096; Input Power = 200 mW
Sim.Temp@meas = 20.0*C; Sim.Temp@SPC =20.0*C; Room Temp @ SPC = 20.1*C
Communication System: CW - Dipole; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 900 MHz; σ = 0.99 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3

DASY4 Configuration:

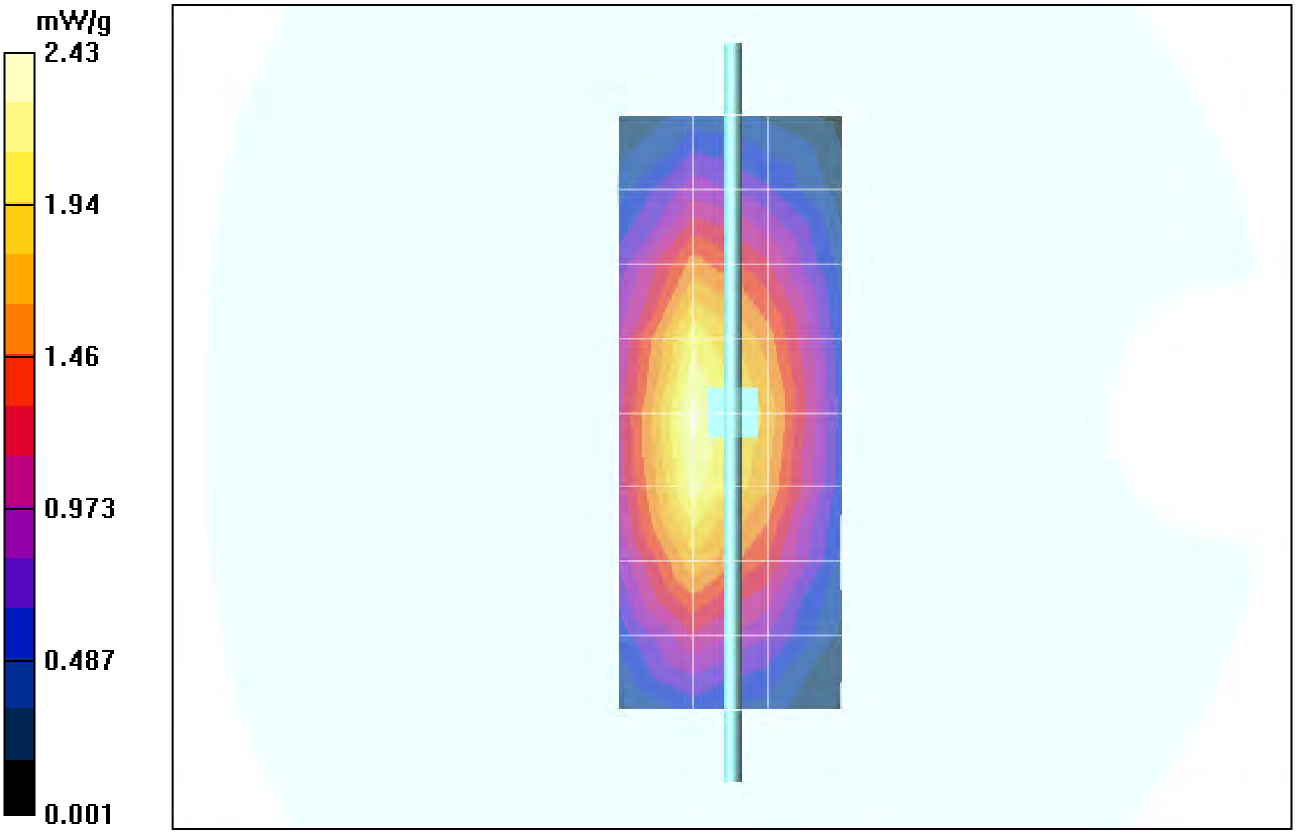
- Probe: ES3DV3 - SN3124; ConvF(5.95, 5.95, 5.95); Calibrated: 3/20/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/30/2007
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

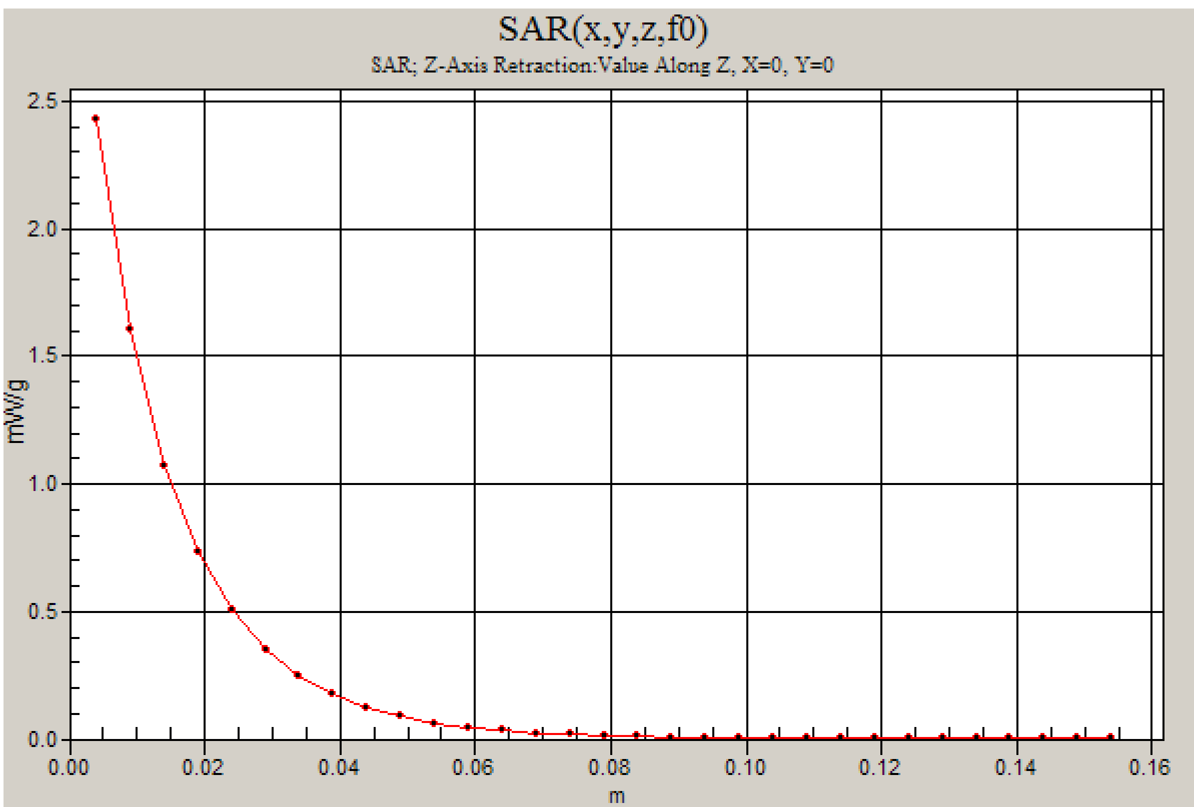
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 2.33 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.0 V/m; Power Drift = 0.011 dB; Peak SAR (extrapolated) = 3.35 W/kg
SAR(1 g) = 2.23 mW/g; SAR(10 g) = 1.43 mW/g; Maximum value of SAR (measured) = 2.43 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.0 V/m; Power Drift = 0.011 dB; Peak SAR (extrapolated) = 3.37 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/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm


mW/g
2.43
1.94
1.46
0.973
0.487
0.001


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
m
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

Date/Time: 8/30/2007 6:22:14 AM

Test Laboratory: Motorola - 083007 1800MHz Good at -0.7%

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:259TR; FCC ID: IHDP56HB1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 259tr; Input Power = 200 mW
Sim.Temp@meas = 19 C; Sim.Temp@SPC = 19.8 C; Room Temp @ SPC = 20.2 C
Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 1800 MHz; σ = 1.37 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ET3DV6R - SN1397; ConvF(5.17, 5.17, 5.17); Calibrated: 4/24/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 5/30/2007
- Phantom: R1: Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 8.20 mW/g

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

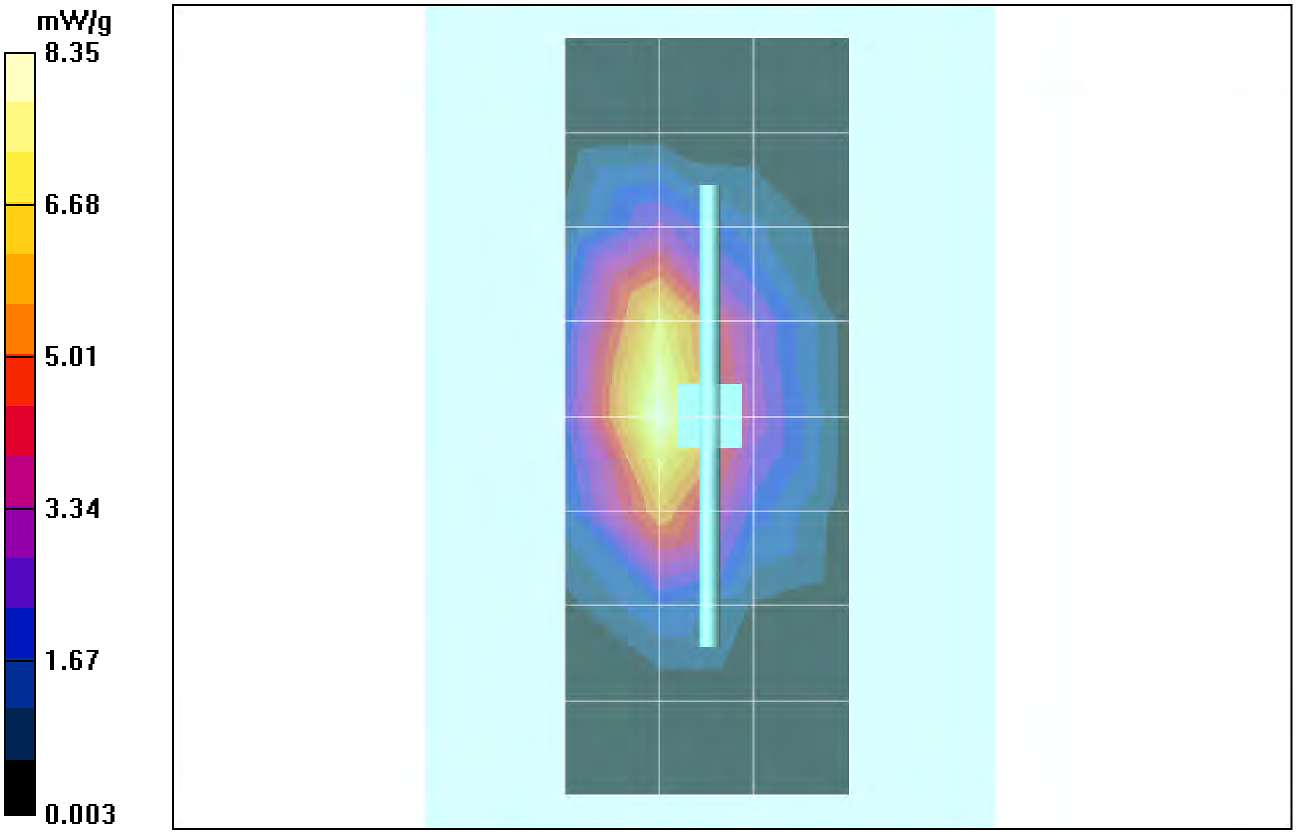
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 72.6 V/m; Power Drift = -0.007 dB; Peak SAR (extrapolated) = 12.3 W/kg
SAR(1 g) = 7.33 mW/g; SAR(10 g) = 3.97 mW/g; Maximum value of SAR (measured) = 8.17 mW/g

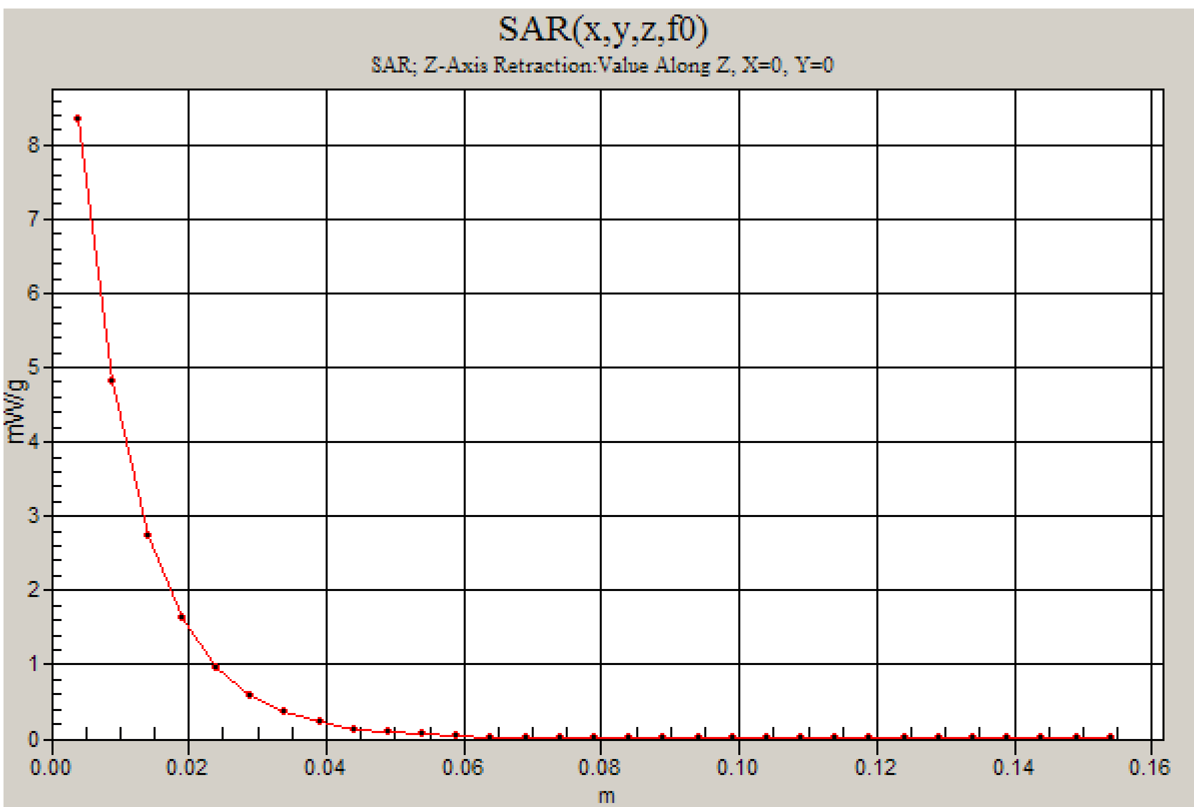
Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 72.6 V/m; Power Drift = -0.007 dB; Peak SAR (extrapolated) = 13.2 W/kg
SAR(1 g) = 7.8 mW/g; SAR(10 g) = 4.21 mW/g; Maximum value of SAR (measured) = 8.24 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.35 mW/g


mW/g
8.35
6.68
5.01
3.34
1.67
0.003


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
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Date/Time: 9/5/2007 9:10:11 AM

Test Laboratory: Motorola - 090507 1800MHz Good at -2.4%

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:272TR; FCC ID: IHDP56HB1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272tr; Input Power = 200mW
Sim.Temp@meas = 19.4*C; Sim.Temp@SPC =19.9*C; Room Temp @ SPC = 20.5*C
Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 1800 MHz; σ = 1.39 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3

DASY4 Configuration:

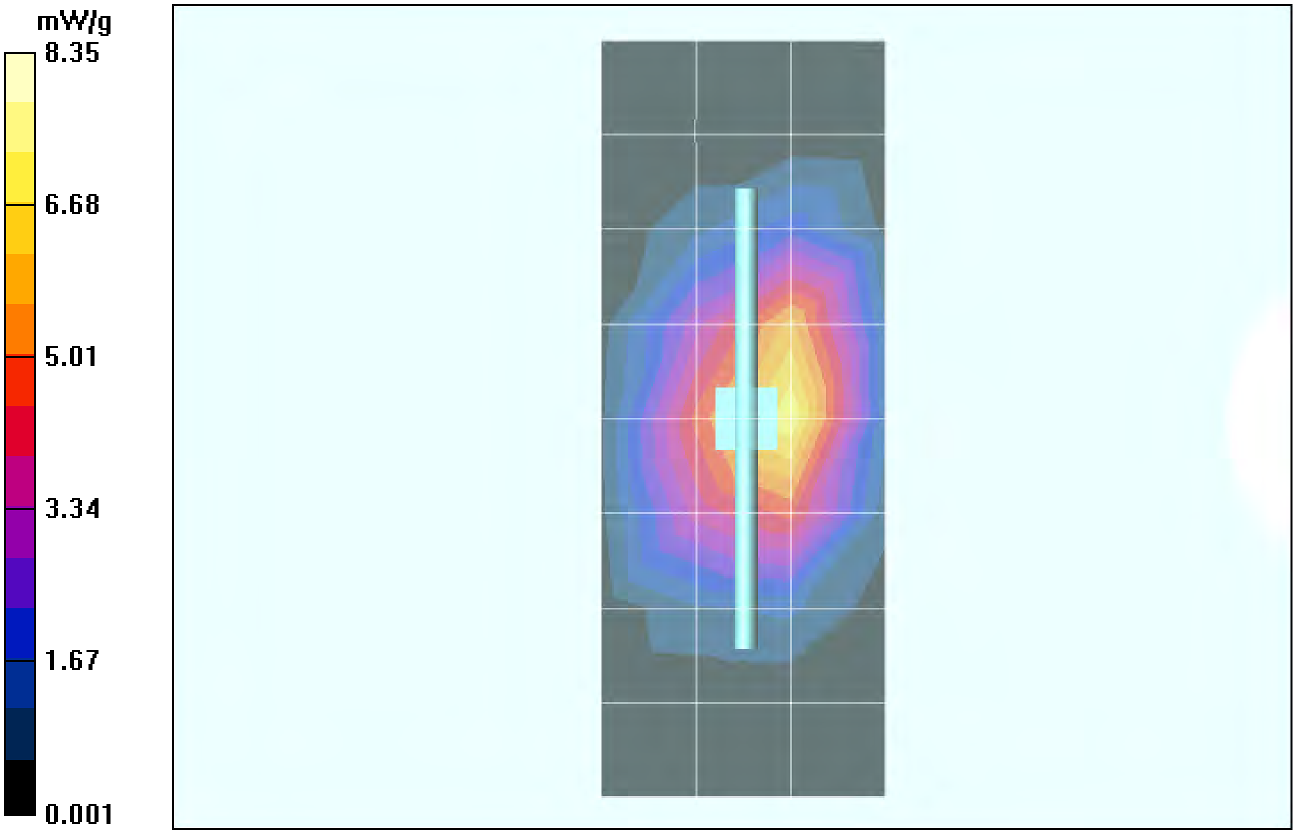
- Probe: ES3DV3 - SN3124; ConvF(5.14, 5.14, 5.14); Calibrated: 3/20/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/30/2007
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

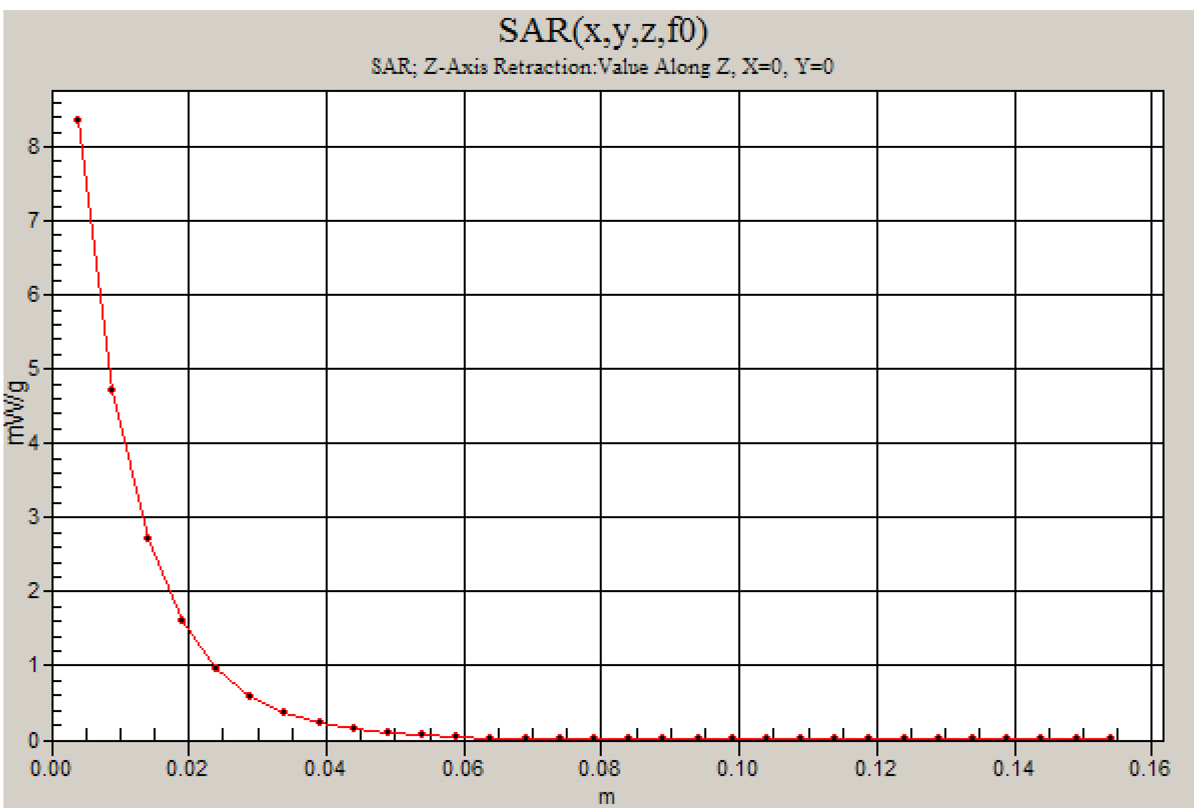
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.20 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.6 V/m; Power Drift = 0.036 dB; Peak SAR (extrapolated) = 13.3 W/kg
SAR(1 g) = 7.41 mW/g; SAR(10 g) = 3.92 mW/g; Maximum value of SAR (measured) = 8.29 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.6 V/m; Power Drift = 0.036 dB; Peak SAR (extrapolated) = 13.4 W/kg
SAR(1 g) = 7.47 mW/g; SAR(10 g) = 3.95 mW/g; Maximum value of SAR (measured) = 8.39 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.35 mW/g


mW/g
8.35
6.68
5.01
3.34
1.67
0.001


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: 9/11/2007 9:21:40 AM

Test Laboratory: Motorola - R4 091107 1800MHz Good at +1.7%

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:272TR; FCC ID: IHDP56HB1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272tr; Input Power = 200 mW
Sim.Temp@meas = 19.4*C; Sim.Temp@SPC =19.7*C; Room Temp @ SPC = 20.1*C
Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 1800 MHz; σ = 1.39 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(5.14, 5.14, 5.14); Calibrated: 3/20/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/30/2007
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 6.36 mW/g

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

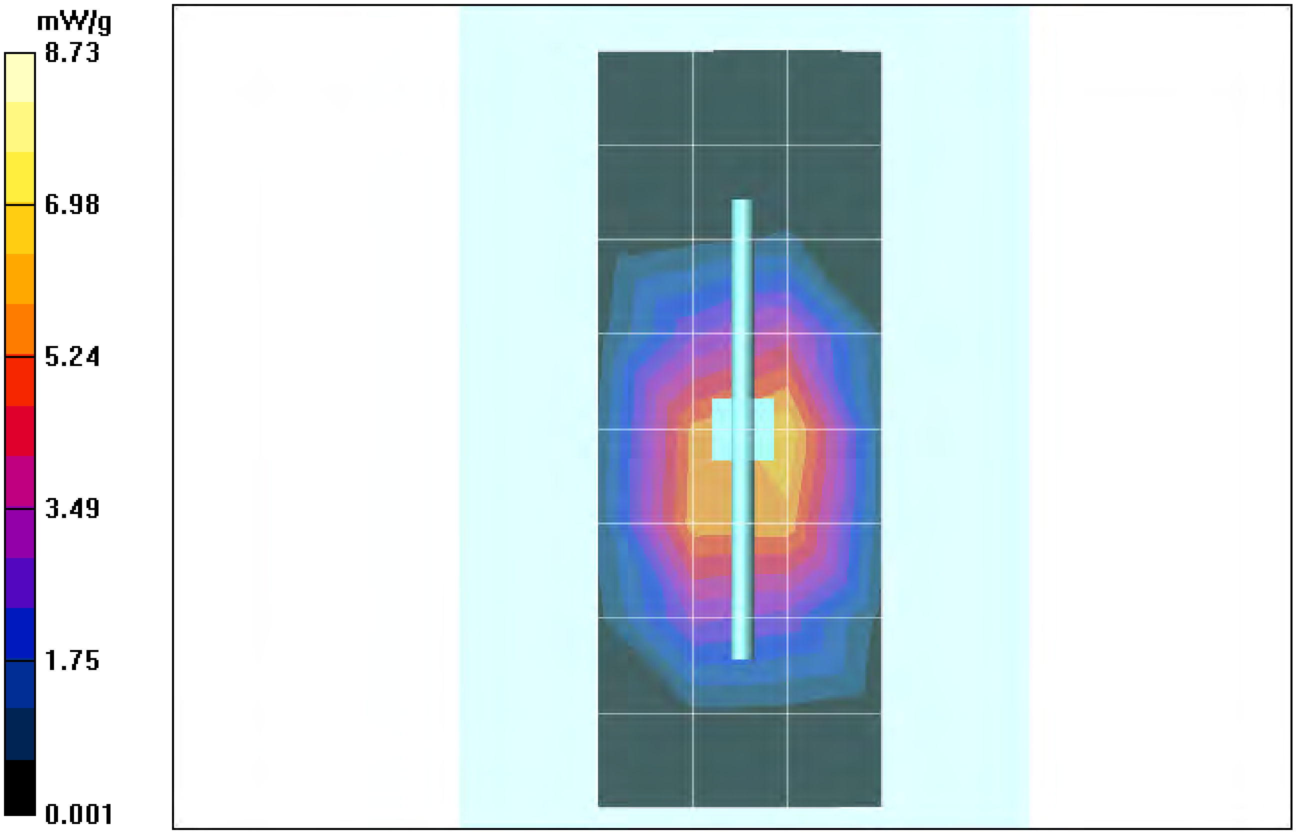
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.6 V/m; Power Drift = 0.067 dB; Peak SAR (extrapolated) = 14.0 W/kg
SAR(1 g) = 7.73 mW/g; SAR(10 g) = 4.06 mW/g; Maximum value of SAR (measured) = 8.70 mW/g

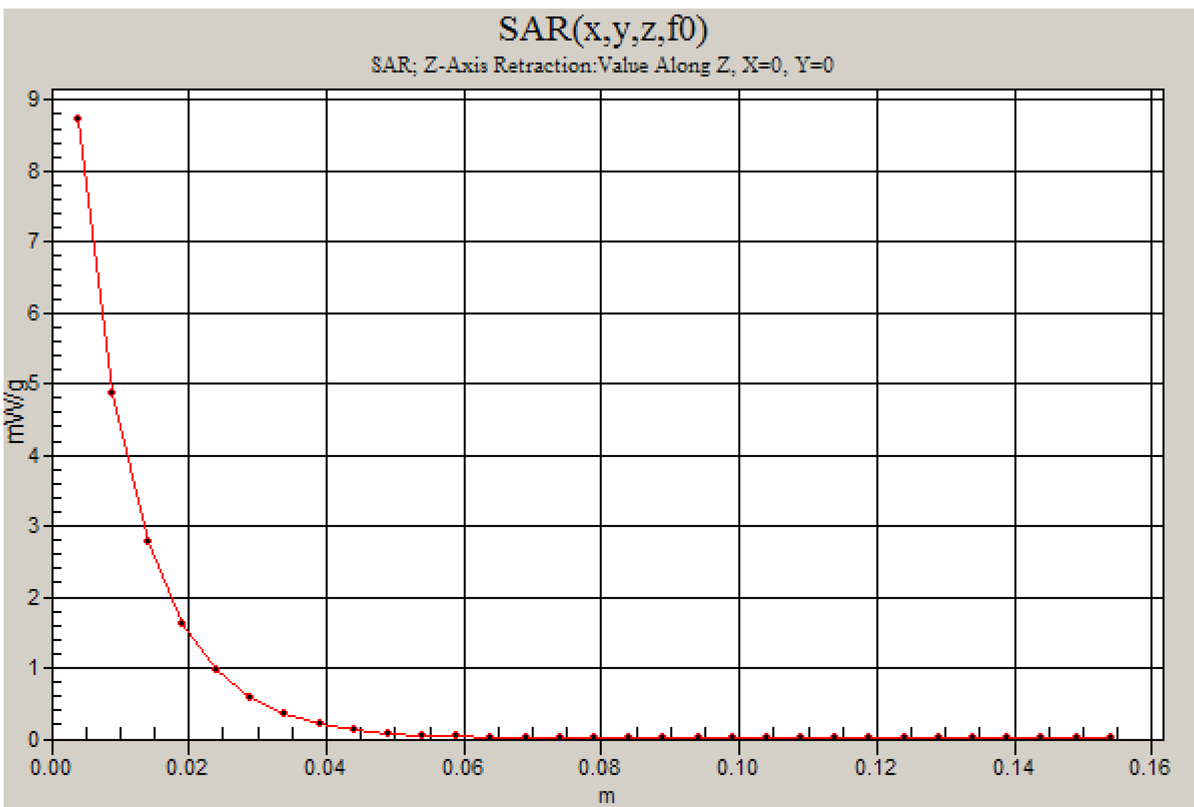
Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.6 V/m; Power Drift = 0.067 dB; Peak SAR (extrapolated) = 14.2 W/kg
SAR(1 g) = 7.77 mW/g; SAR(10 g) = 4.09 mW/g; Maximum value of SAR (measured) = 8.63 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.73 mW/g


mW/g
8.73
6.98
5.24
3.49
1.75
0.001


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

Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

Date/Time: 8/28/2007 10:19:52 PM

Test Laboratory: Motorola - GSM 850 Cheek

Serial: 355827010006580; FCC ID: IHDP56HB1
Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5795A; DEVICE POSITION (cheek or rotated): CHEEK
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 = 0.92 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3

DASY4 Configuration:

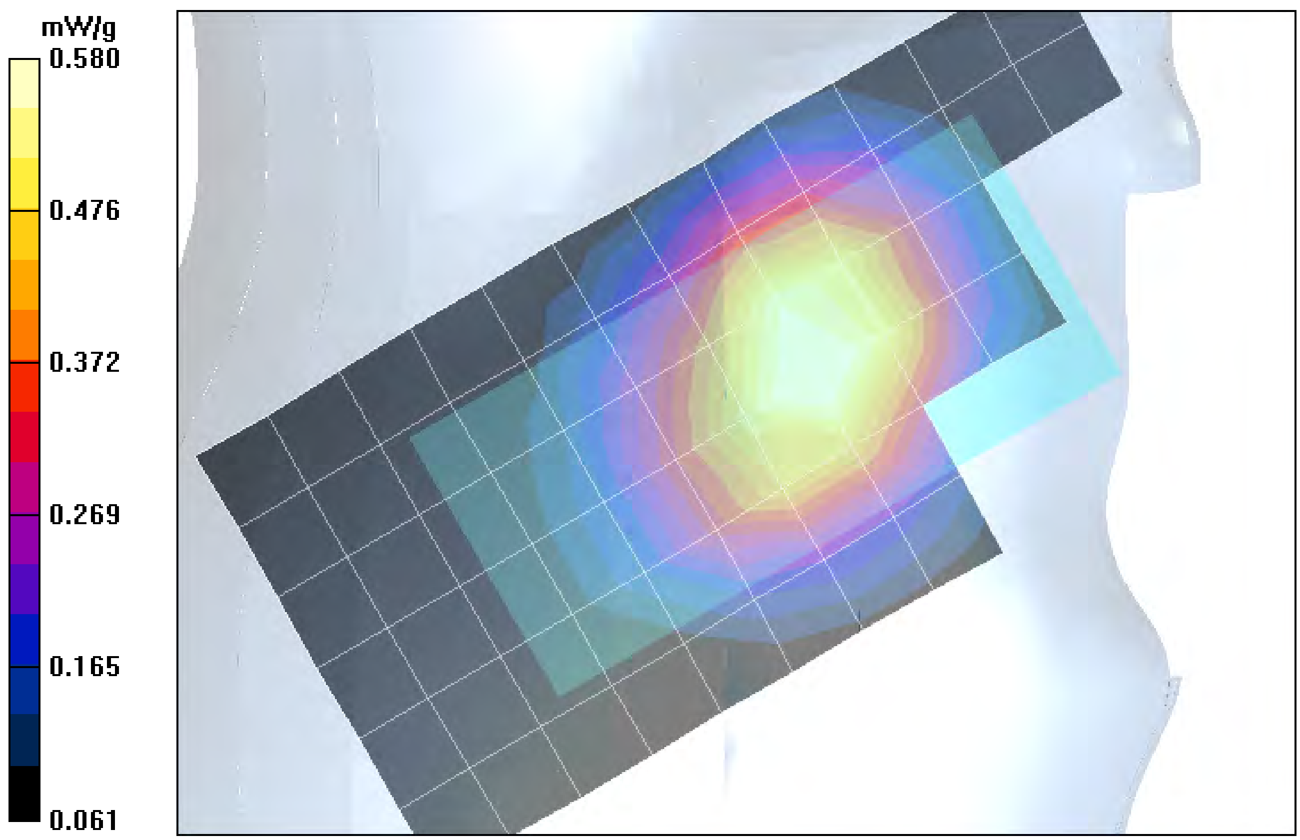
- Probe: ES3DV3 - SN3115; ConvF(6.03, 6.03, 6.03); Calibrated: 7/16/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/24/2007
- Phantom: R2: Sugar SAM; Type: SAM; Serial: TP-1106;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.629 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.0 V/m; Power Drift = 0.012 dB; Peak SAR (extrapolated) = 0.730 W/kg
SAR(1 g) = 0.553 mW/g; SAR(10 g) = 0.400 mW/g; Maximum value of SAR (measured) = 0.580 mW/g



Date/Time: 8/30/2007 2:57:17 PM

Test Laboratory: Motorola - GSM 1900 Cheek

Serial: 355827010006580; FCC ID: IHDP56HB1

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5795A; DEVICE POSITION (cheek or rotated): Cheek
Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8

Medium: Regular Glycol Head
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3

DASY4 Configuration:

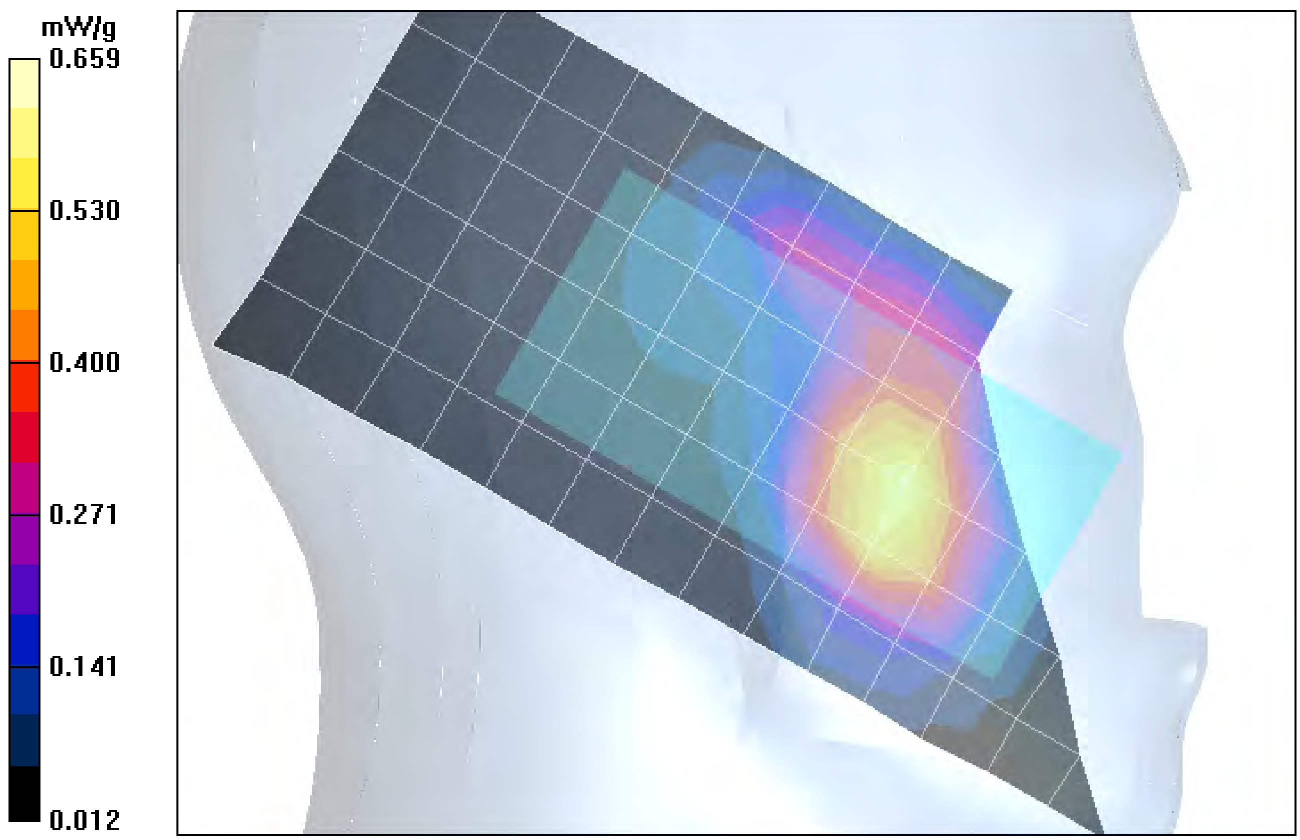
- Probe: ET3DV6R - SN1397; ConvF(5.17, 5.17, 5.17); Calibrated: 4/24/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 5/30/2007
- Phantom: R1: Glycol SAM; Type: SAM; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.582 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.2 V/m; Power Drift = -0.254 dB;Peak SAR (extrapolated) = 0.977 W/kg
SAR(1 g) = 0.631 mW/g; SAR(10 g) = 0.360 mW/g; Maximum value of SAR (measured) = 0.659 mW/g



Date/Time: 8/28/2007 11:35:51 PM

Test Laboratory: Motorola - GSM 850 Tilt

Serial: 355827010006580; FCC ID: IHDP56HB1
Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5795A; DEVICE POSITION (cheek or rotated): Tilted
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 = 0.92 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3

DASY4 Configuration:

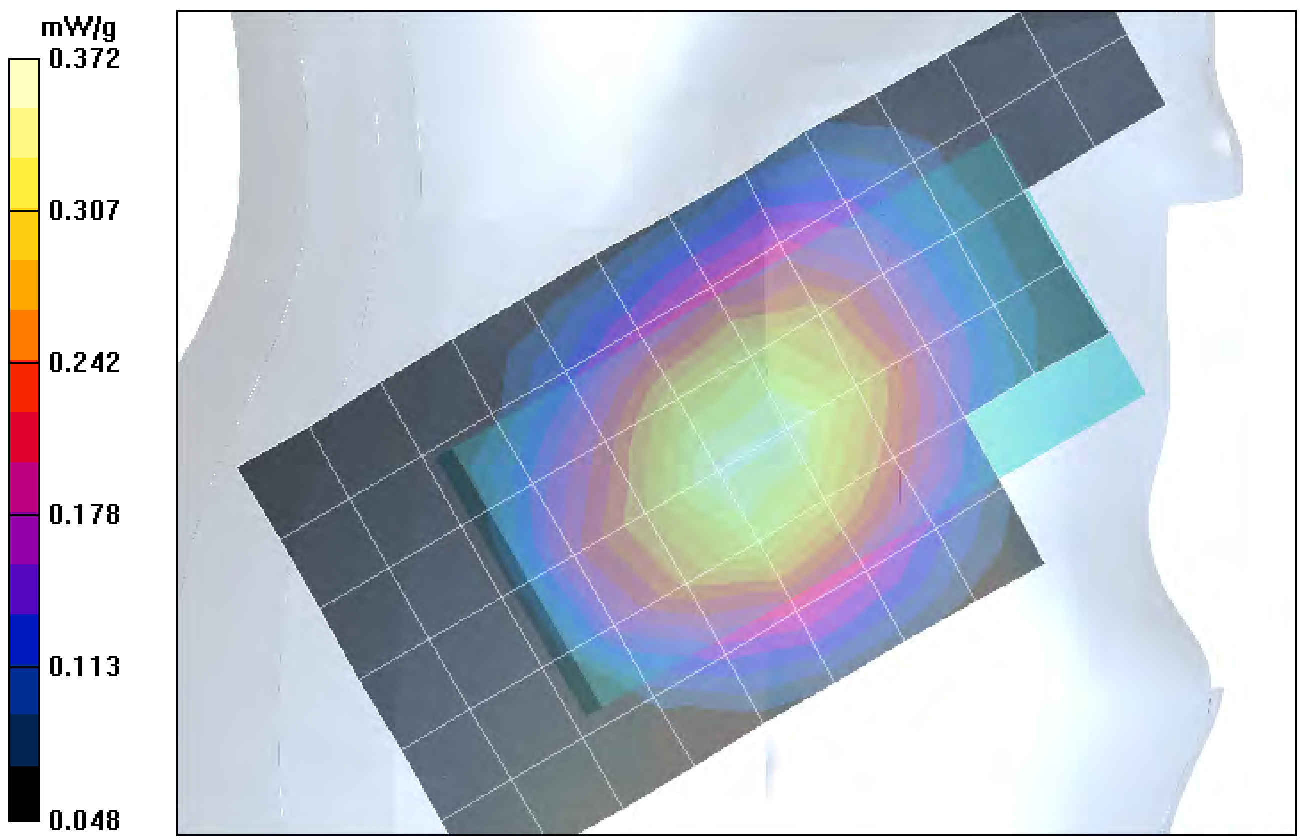
- Probe: ES3DV3 - SN3115; ConvF(6.03, 6.03, 6.03); Calibrated: 7/16/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/24/2007
- Phantom: R2: Sugar SAM; Type: SAM; Serial: TP-1106;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.359 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.8 V/m; Power Drift = -0.070 dB; Peak SAR (extrapolated) = 0.439 W/kg
SAR(1 g) = 0.352 mW/g; SAR(10 g) = 0.262 mW/g; Maximum value of SAR (measured) = 0.372 mW/g



Date/Time: 8/30/2007 3:22:18 PM

Test Laboratory: Motorola - GSM 1900 Tilt

Serial: 355827010006580; FCC ID: IHDP56HB1
Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5795A; DEVICE POSITION (cheek or rotated): Tilted
Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8

Medium: Regular Glycol Head
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3

DASY4 Configuration:

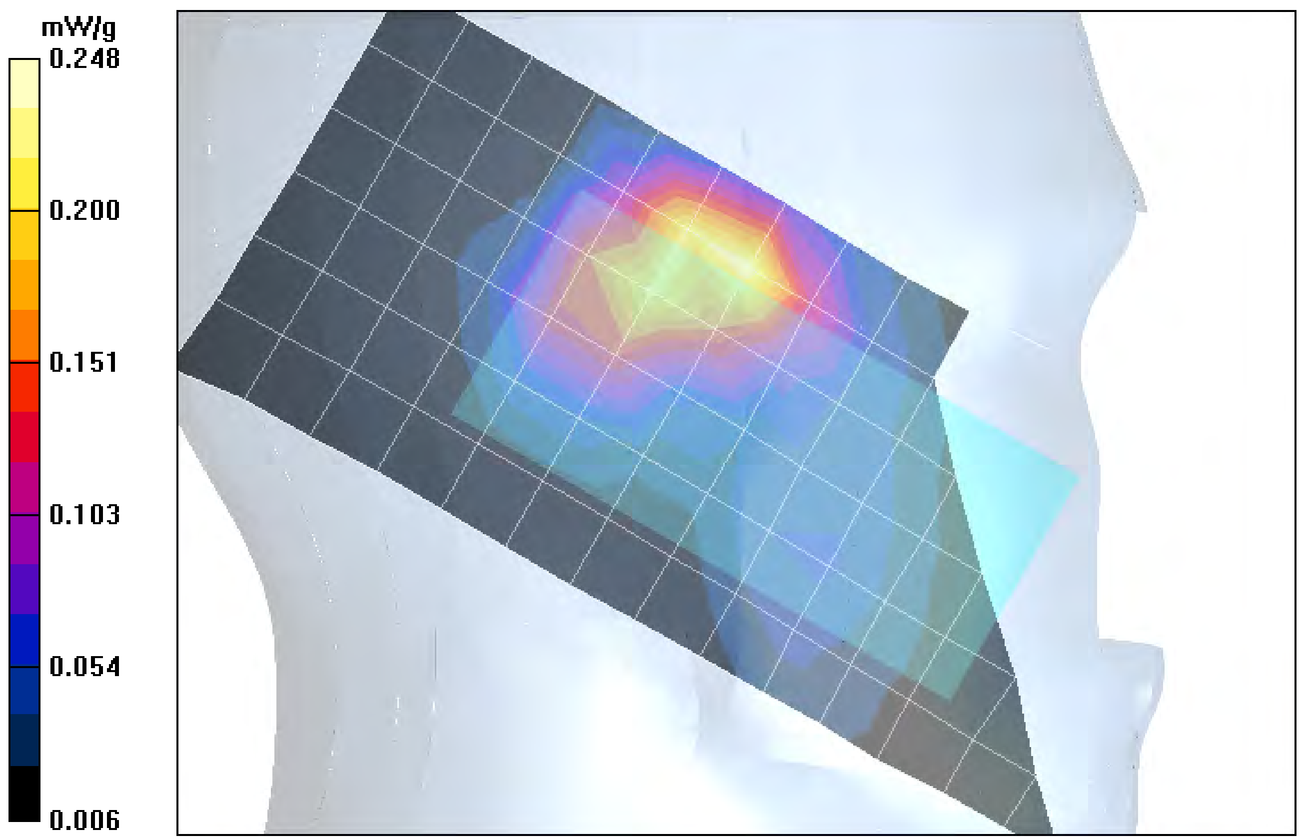
- Probe: ET3DV6R - SN1397; ConvF(5.17, 5.17, 5.17); Calibrated: 4/24/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 5/30/2007
- Phantom: R1: Glycol SAM; Type: SAM; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.231 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.7 V/m; Power Drift = 0.268 dB; Peak SAR (extrapolated) = 0.364 W/kg
SAR(1 g) = 0.231 mW/g; SAR(10 g) = 0.138 mW/g; Maximum value of SAR (measured) = 0.248 mW/g



Date/Time: 9/11/2007 8:34:43 PM

Test Laboratory: Motorola - GSM 850 GPRS Head

Serial: 355827010006580; FCC ID: IHDP56HB1

Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5795A; DEVICE POSITION (cheek or rotated): Cheek
Communication System: GPRS 850 Cl 11; Frequency: 848.8 MHz; Channel Number: 251; Duty Cycle: 1:2.67

Medium: Low Freq Head
Medium parameters used: f = 835 MHz; σ = 0.93 mho/m; ε_r = 42.1; ρ = 1000 kg/m^3

DASY4 Configuration:

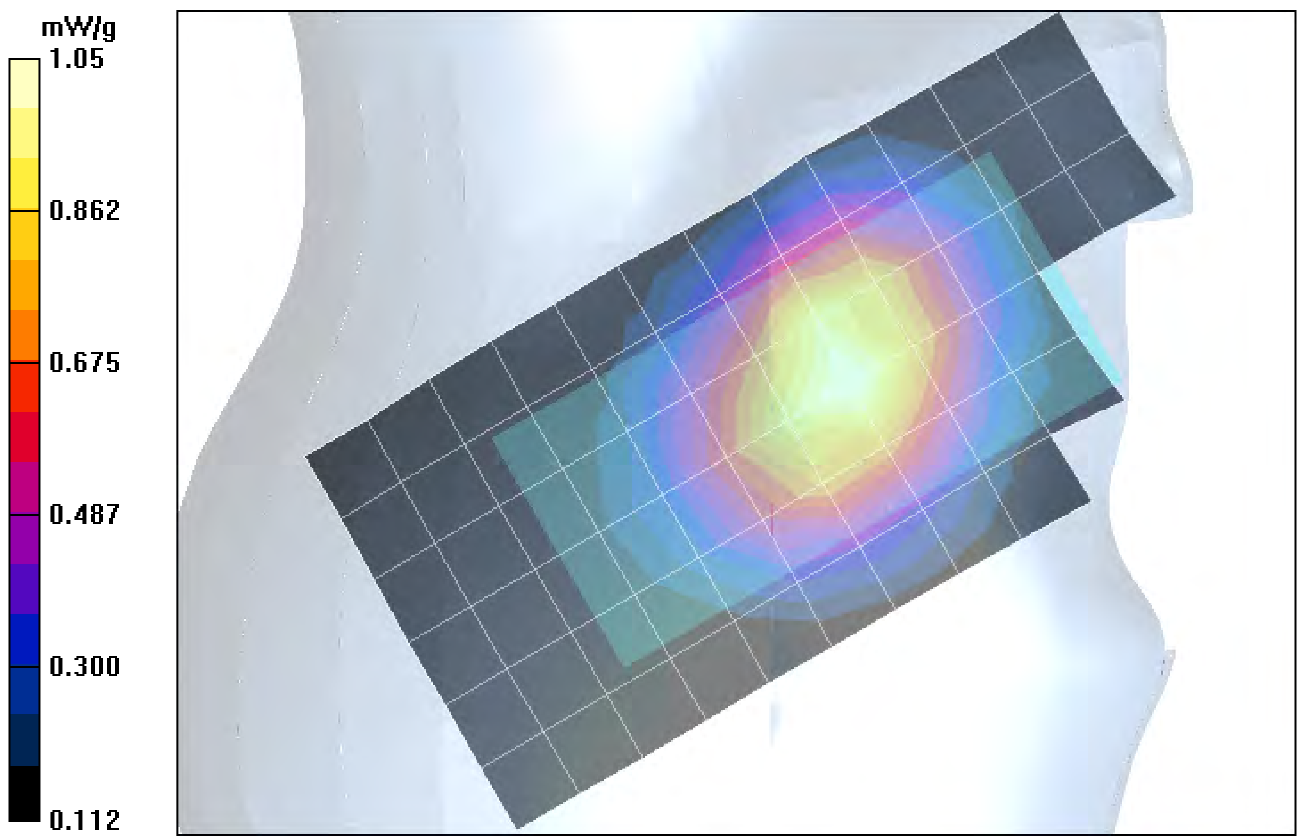
- Probe: ES3DV3 - SN3124; ConvF(5.95, 5.95, 5.95); Calibrated: 3/20/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/30/2007
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.08 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.5 V/m; Power Drift = -0.107 dB; Peak SAR (extrapolated) = 1.30 W/kg
SAR(1 g) = 0.997 mW/g; SAR(10 g) = 0.718 mW/g; Maximum value of SAR (measured) = 1.05 mW/g



Date/Time: 9/11/2007 10:22:52 PM

Test Laboratory: Motorola - GSM 1900 GPRS Head

Serial: 355827010006580; FCC ID: IHDP56HB1
Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5795A; DEVICE POSITION (cheek or rotated): Cheek
Communication System: GPRS 1900 Cl 10; Frequency: 1850.2 MHz; Channel Number: 512; Duty Cycle: 1:4

Medium: Regular Glycol Head
Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3

DASY4 Configuration:

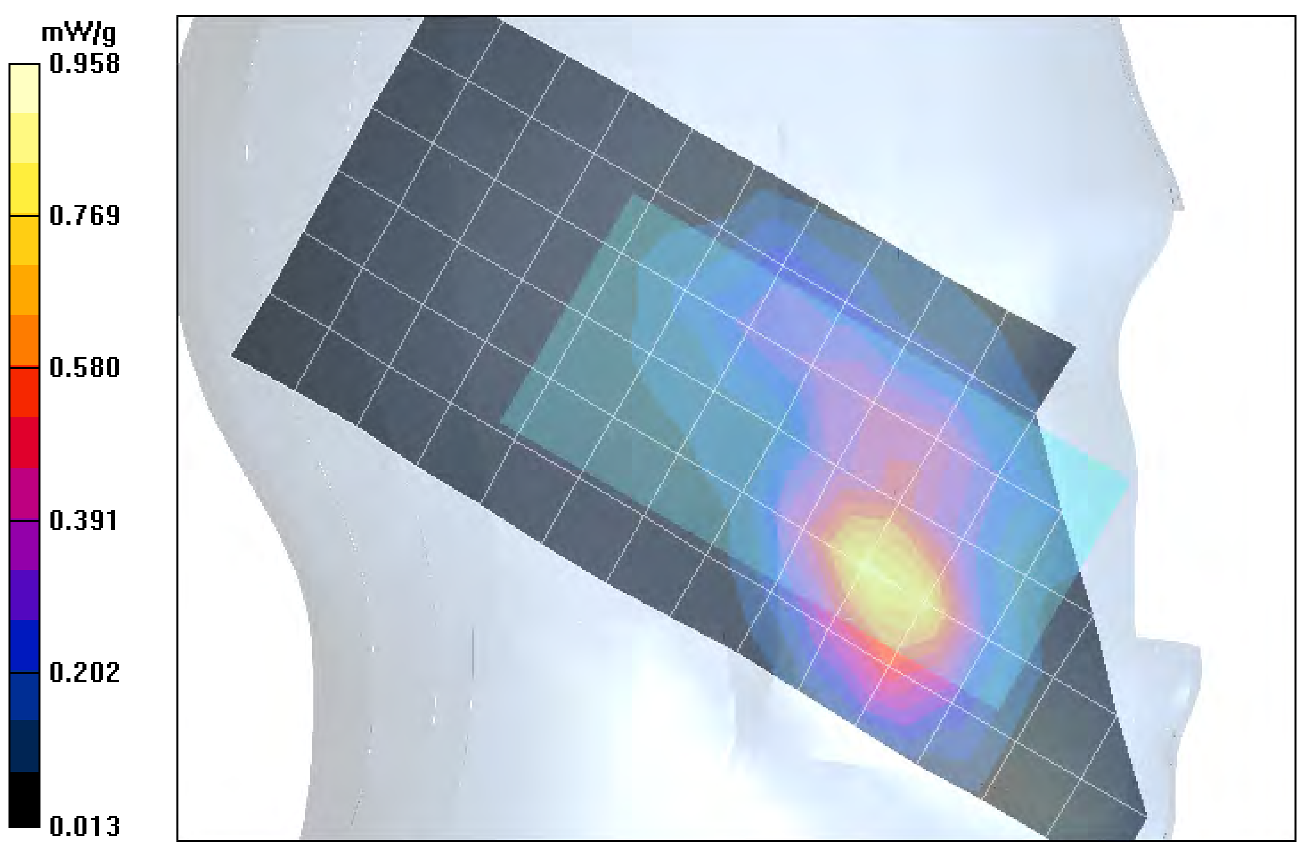
- Probe: ES3DV3 - SN3124; ConvF(5.14, 5.14, 5.14); Calibrated: 3/20/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/30/2007
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.801 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.4 V/m; Power Drift = -0.110 dB; Peak SAR (extrapolated) = 1.34 W/kg
SAR(1 g) = 0.863 mW/g; SAR(10 g) = 0.481 mW/g; Maximum value of SAR (measured) = 0.958 mW/g



Appendix 3

SAR distribution plots for Push-to-Talk Configuration

Date/Time: 9/6/2007 12:38:30 AM

Test Laboratory: Motorola - GSM 850 PTT

Serial: 355827010006580; FCC ID: IHDP56HB1
Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Battery Model #: SNN5795A
Device Position: Push-to-Talk Position, Front of Phone 25mm from Flat Phantom
Communication System: GPRS 850 Cl 11; Frequency: 836.6 MHz; Channel: 190; Duty Cycle: 1:2.67

Medium: Low Freq Head
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3

DASY4 Configuration:

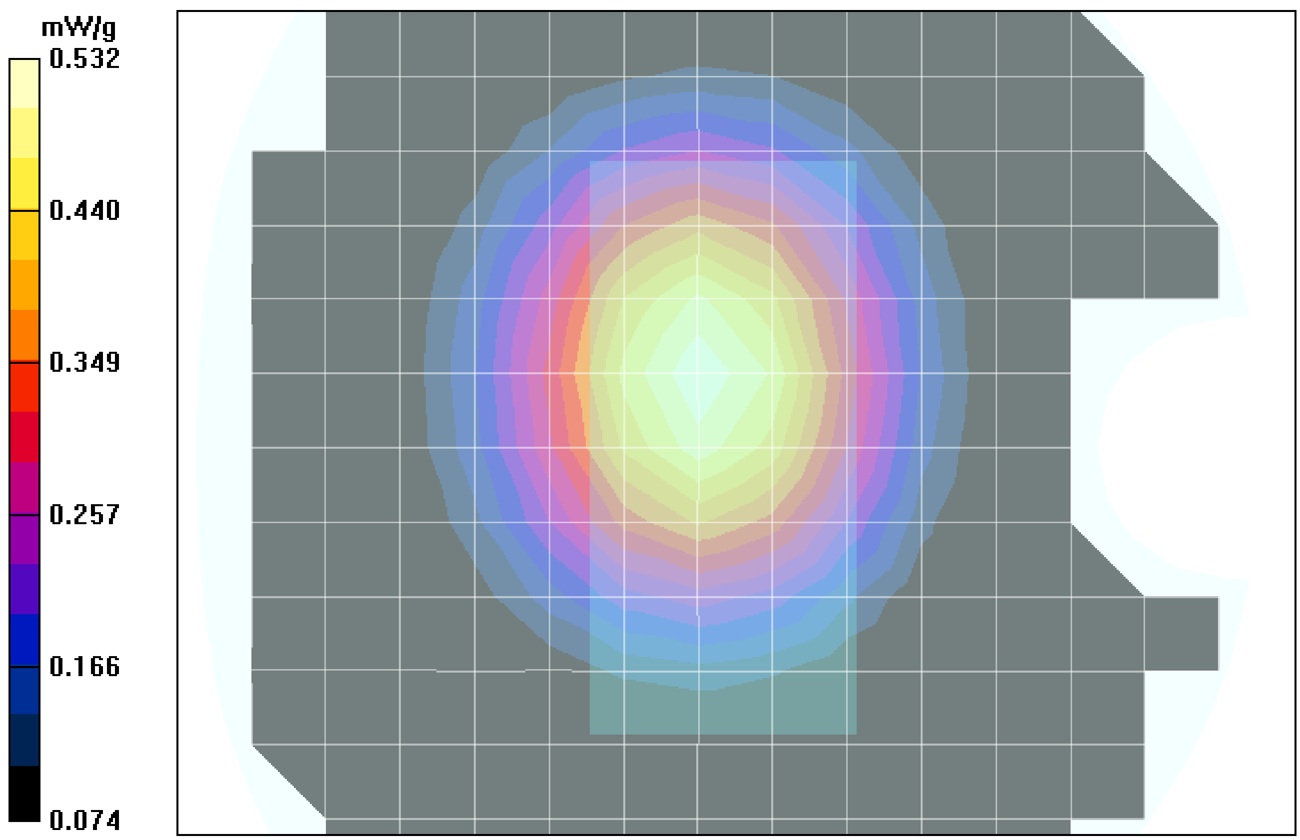
- Probe: ES3DV3 - SN3124; ConvF(5.95, 5.95, 5.95); Calibrated: 3/20/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/30/2007
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

SAM Phone Against Flat Section/Area Scan - Full Body (15mm) (21x15x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.529 mW/g

SAM Phone Against Flat Section/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.7 V/m; Power Drift = -0.052 dB; Peak SAR (extrapolated) = 0.653 W/kg
SAR(1 g) = 0.505 mW/g; SAR(10 g) = 0.371 mW/g; Maximum value of SAR (measured) = 0.532 mW/g



Date/Time: 9/5/2007 11:57:57 PM

Test Laboratory: Motorola - GSM 1900 PTT

Serial: 355827010006580; FCC ID: IHDP56HB1
Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Battery Model #: SNN5795A
Device Position: Push-to-Talk Position, Front of Phone 25mm from Flat Phantom
Communication System: GPRS 1900 Cl 10; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:4

Medium: Regular Glycol Head
Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3

DASY4 Configuration:

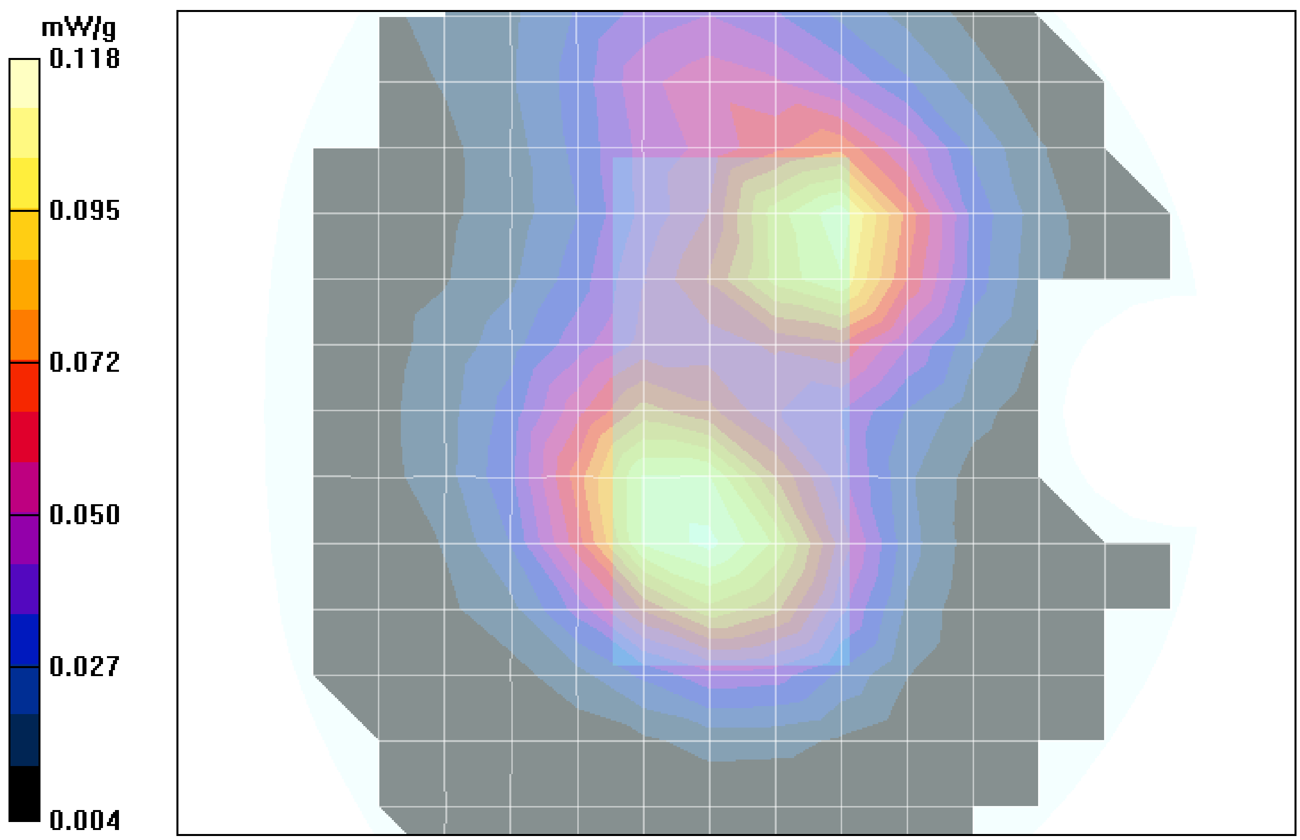
- Probe: ES3DV3 - SN3124; ConvF(5.14, 5.14, 5.14); Calibrated: 3/20/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/30/2007
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

SAM Phone Against Flat Section/Area Scan - Full Body (15mm) (21x15x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.113 mW/g

SAM Phone Against Flat Section/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.31 V/m; Power Drift = 0.068 dB; Peak SAR (extrapolated) = 0.167 W/kg
SAR(1 g) = 0.110 mW/g; SAR(10 g) = 0.071 mW/g; Maximum value of SAR (measured) = 0.118 mW/g



Appendix 4

SAR distribution plots for Body Worn Configuration

Date/Time: 8/29/2007 3:44:57 PM

Test Laboratory: Motorola - GSM 850 Body Worn

Serial: 355827010006580; FCC ID: IHDP56HB1

Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Battery Model #: SNN5795A
Device Position: Body Worn, Back of Phone 15mm From Phantom with Bluetooth Enabled
Communication System: GSM 850; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8

Medium: Low Freq Body;
Medium parameters used: f = 835 MHz; σ = 0.97 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3

DASY4 Configuration:

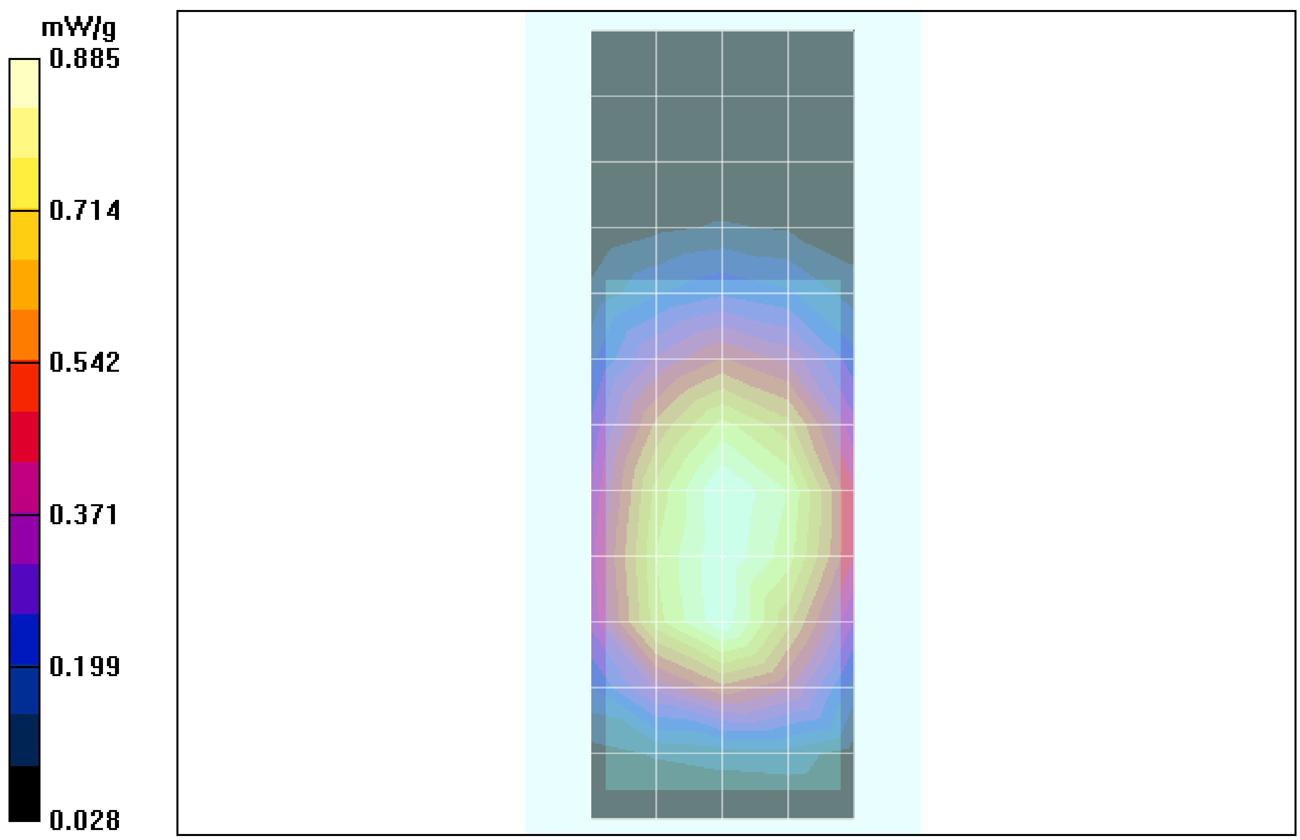
- Probe: ES3DV3 - SN3115; ConvF(5.72, 5.72, 5.72); Calibrated: 7/16/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/24/2007
- Phantom: R2 Section 2, Amy Twin, Rev2 (23-June-04); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.891 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.0 V/m; Power Drift = 0.083 dB; Peak SAR (extrapolated) = 1.10 W/kg
SAR(1 g) = 0.850 mW/g; SAR(10 g) = 0.623 mW/g; Maximum value of SAR (measured) = 0.885 mW/g



Date/Time: 8/30/2007 6:48:43 PM

Test Laboratory: Motorola - GSM 1900 Body

Serial: 355827010006580; FCC ID: IHDP56HB1

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Battery Model #:SNN5795A
Device Position: Body Worn, Back of Phone 15mm From Phantom with Bluetooth Enabled
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 = 1.58 mho/m; ε_r = 52; ρ = 1000 kg/m^3

DASY4 Configuration:

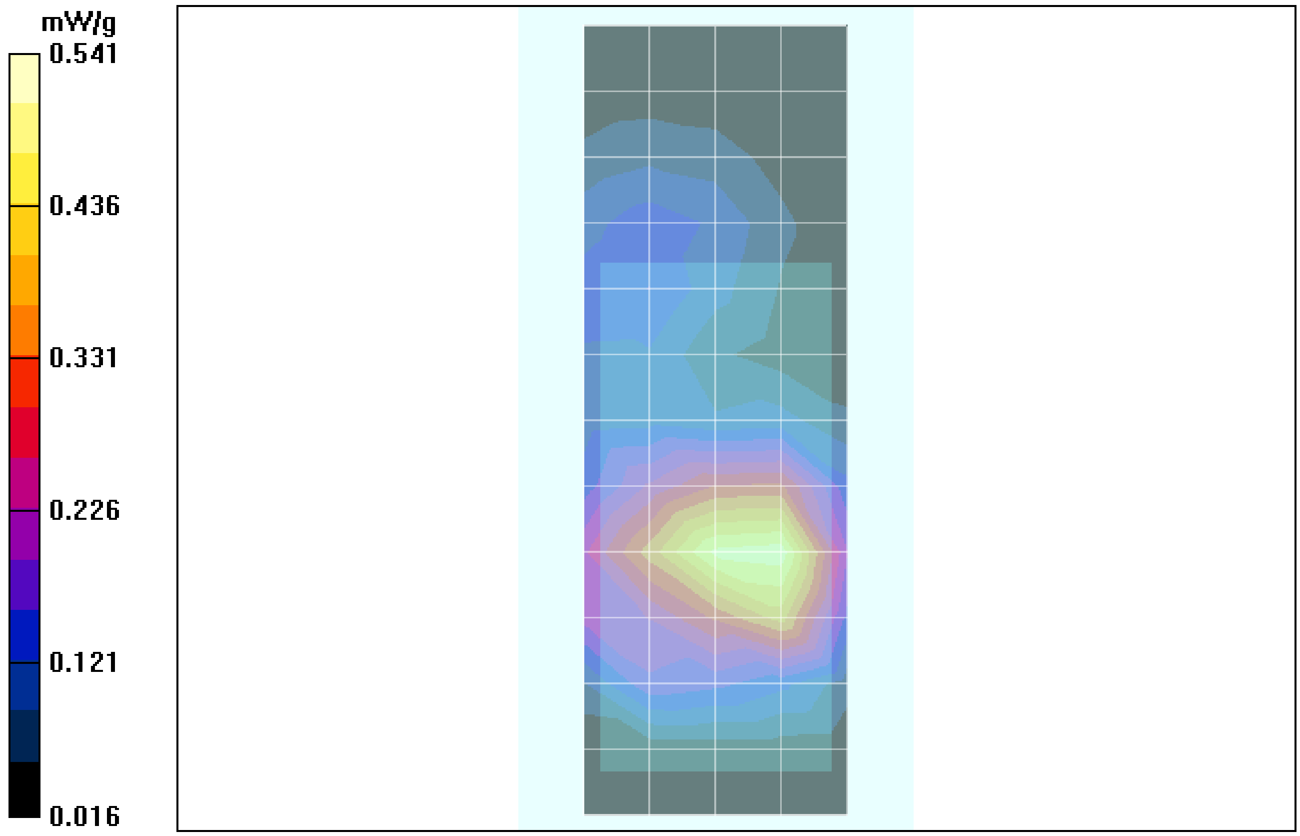
- Probe: ET3DV6R - SN1397; ConvF(4.83, 4.83, 4.83); Calibrated: 4/24/2007
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 5/30/2007
- Phantom: R1: Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.495 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.5 V/m; Power Drift = -0.290 dB; Peak SAR (extrapolated) = 0.807 W/kg
SAR(1 g) = 0.490 mW/g; SAR(10 g) = 0.284 mW/g; Maximum value of SAR (measured) = 0.541 mW/g



Appendix 5

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: ES3-3124_Mar07

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3124
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	March 20, 2007
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-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41495277	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41498087	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-06 (METAS, No. 217-00592)	Aug-07
Reference 20 dB Attenuator	SN: S5086 (20b)	4-Apr-06 (METAS, No. 251-00558)	Apr-07
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-06 (METAS, No. 217-00593)	Aug-07
Reference Probe ES3DV2	SN: 3013	4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Jan-08
DAE4	SN: 654	21-Jun-06 (SPEAG, No. DAE4-654_Jun06)	Jun-07

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Fin Bomholt	R&D Director	

Issued: March 21, 2007

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

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

Methods Applied and Interpretation of Parameters:

- *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:3124

Manufactured:	July 11, 2006
Last calibrated:	November 20, 2006
Recalibrated:	March 20, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ES3DV3 SN:3124

Sensitivity in Free Space[A]

NormX	**1.25** ± 10.1%	$\mu V/(V/m)^2$
NormY	**1.29** ± 10.1%	$\mu V/(V/m)^2$
NormZ	**1.33** ± 10.1%	$\mu V/(V/m)^2$

Diode Compression[B]

DCP X	**94** mV
DCP Y	**95** 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		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	6.0	2.7
SAR_{be} [%]	With Correction Algorithm	0.0	0.0

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	4.3	1.9
SAR_{be} [%]	With Correction Algorithm	0.2	0.3

Sensor Offset

Probe Tip to Sensor Center **2.0** mm

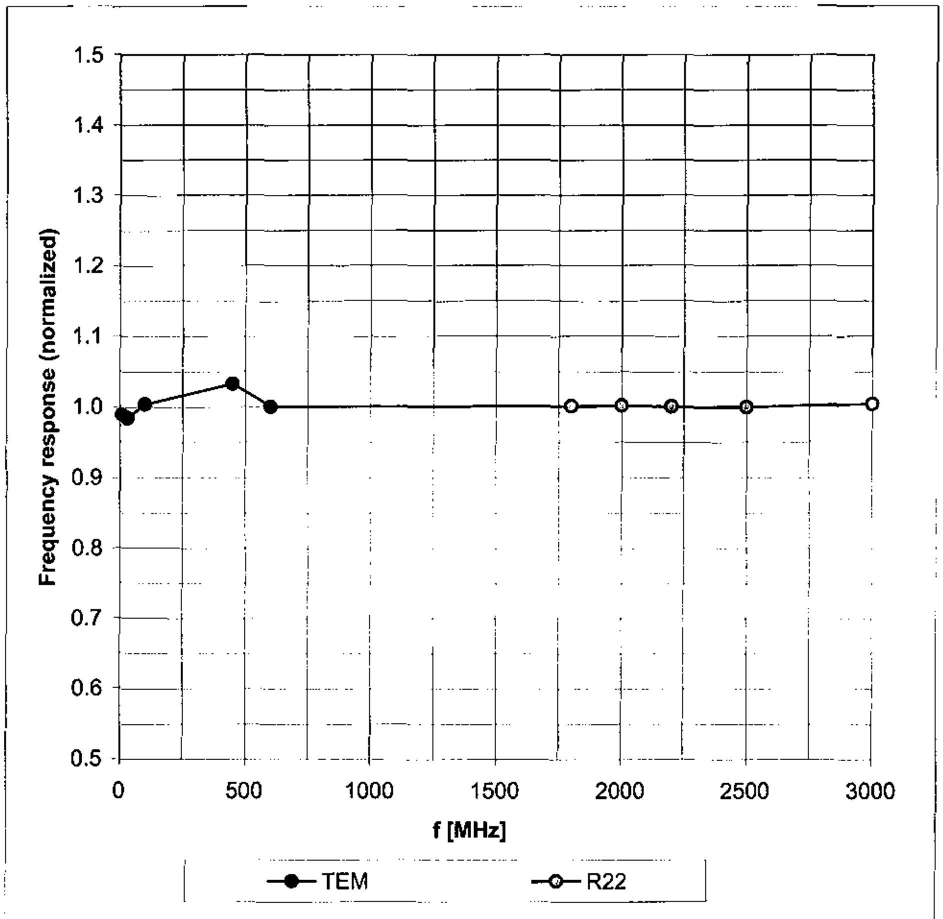
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

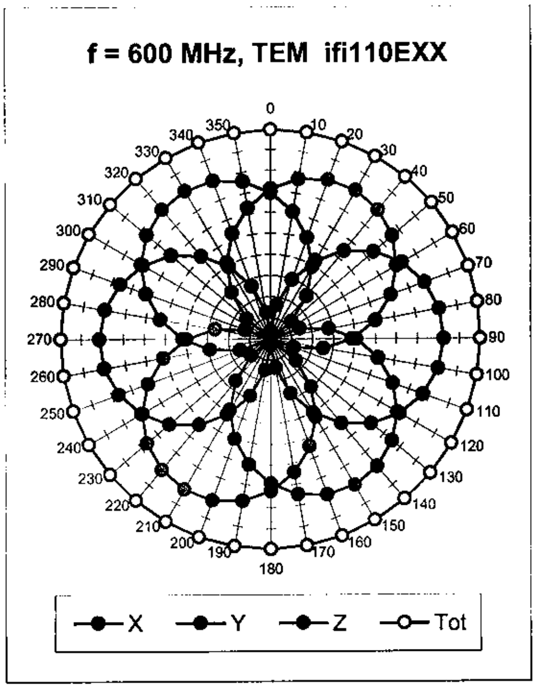
Frequency Response of E-Field

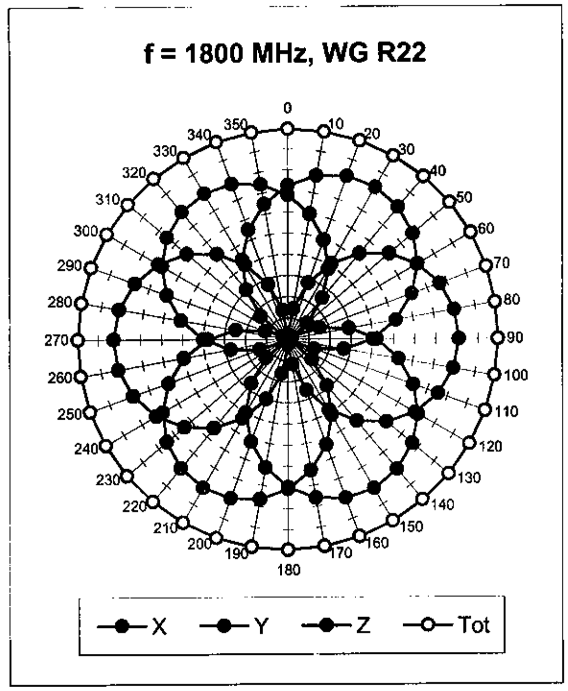
(TEM-Cell:ifi110 EXX, Waveguide: R22)

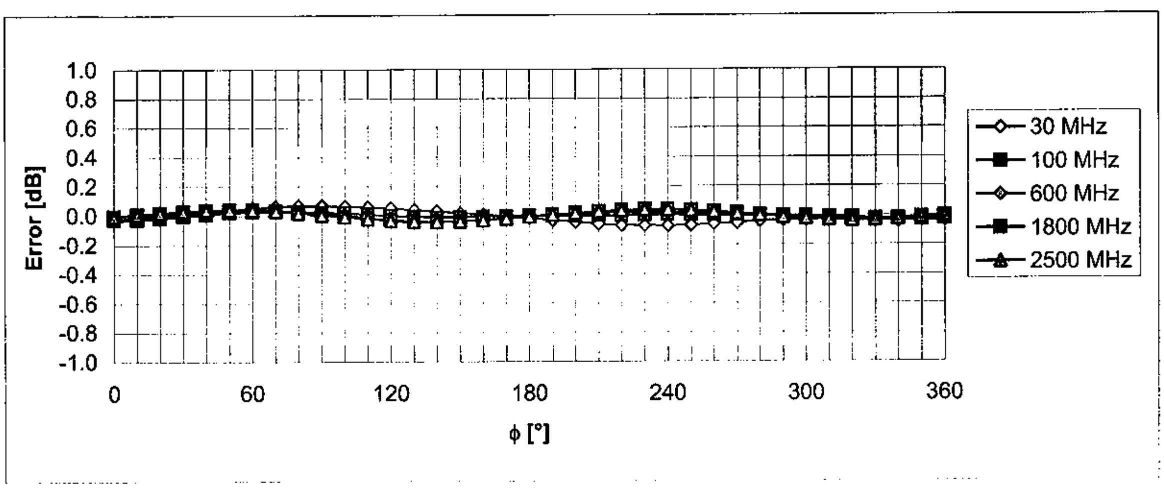


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (φ), ϑ = 0°



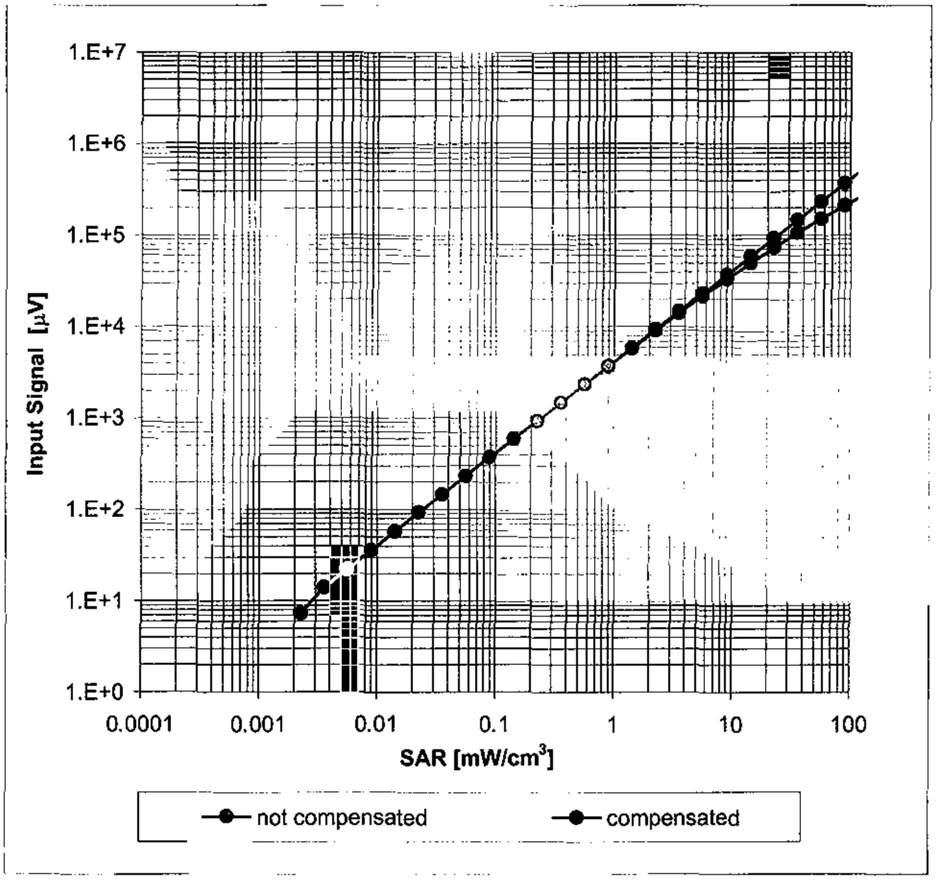


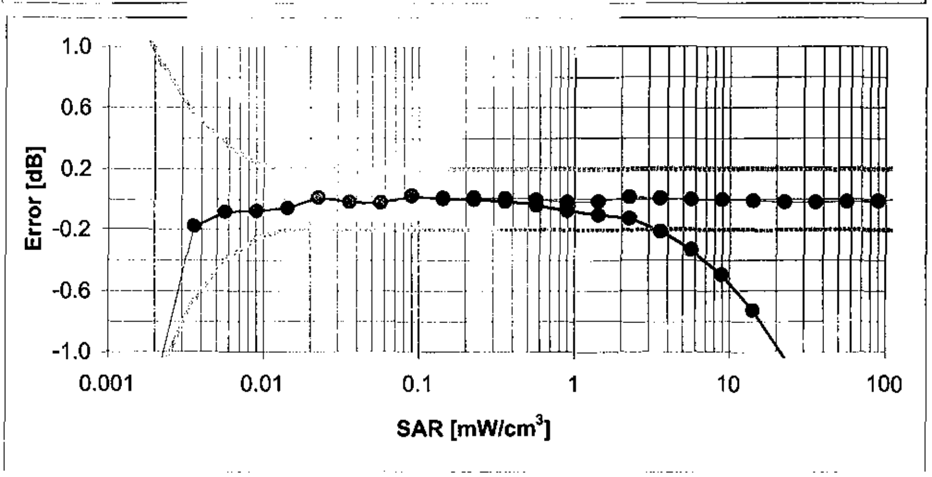


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

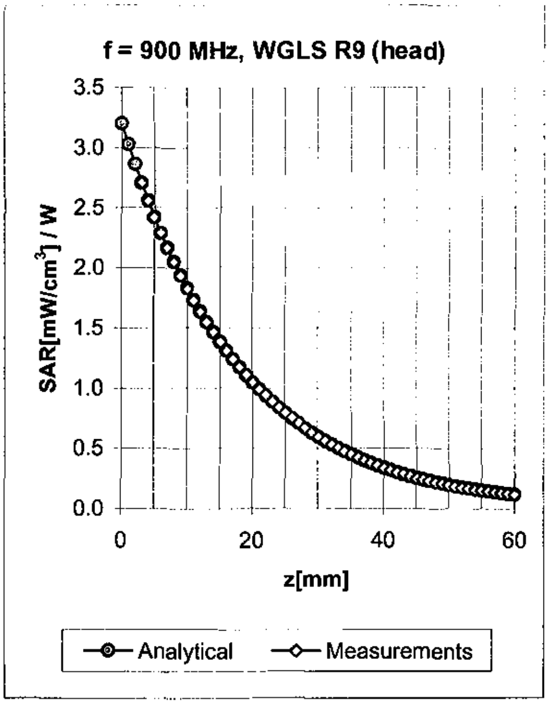
(Waveguide R22, f = 1800 MHz)

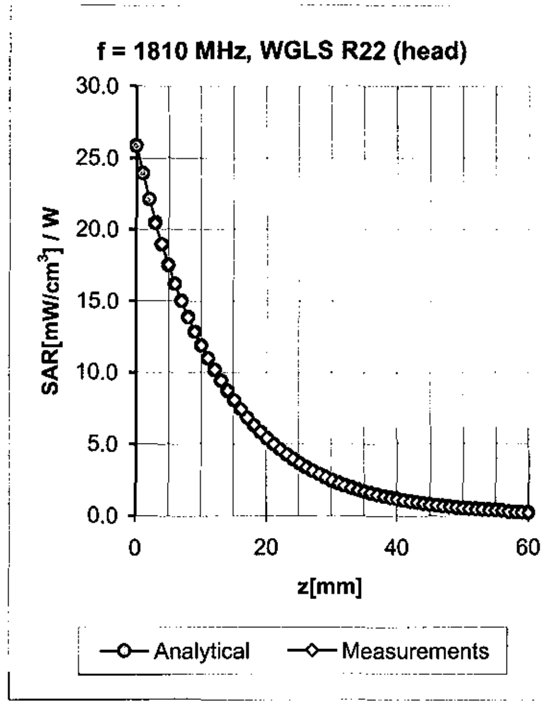




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



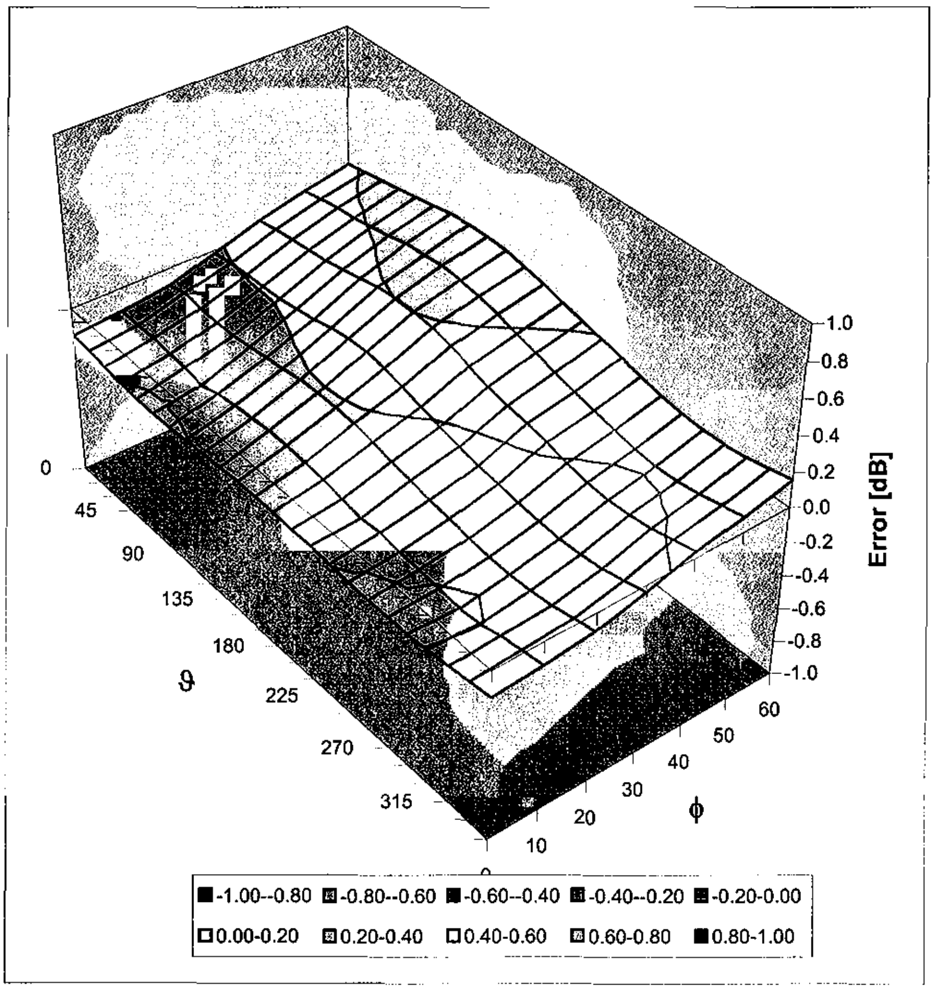


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.56	1.30	5.95	± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.90	1.23	5.14	± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.87	1.24	4.81	± 11.0% (k=2)
2300	± 50 / ± 100	Head	39.4 ± 5%	1.71 ± 5%	0.71	1.47	4.70	± 11.8% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.88	1.23	4.61	± 11.8% (k=2)
2600	± 50 / ± 100	Head	39.0 ± 5%	1.96 ± 5%	0.91	1.20	4.46	± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.99	1.15	5.90	± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.99	1.19	4.85	± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.80	1.30	4.59	± 11.0% (k=2)
2300	± 50 / ± 100	Body	52.8 ± 5%	1.85 ± 5%	0.83	1.26	4.38	± 11.8% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.85	1.05	4.28	± 11.8% (k=2)
2600	± 50 / ± 100	Body	52.5 ± 5%	2.16 ± 5%	0.99	1.00	4.11	± 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 Flensburg**

Certificate No: ET3-1397_Apr07

CALIBRATION CERTIFICATE

Object	ET3DV6R - SN:1397
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	April 24, 2007
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	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41495277	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41498087	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-06 (METAS, No. 217-00592)	Aug-07
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-07 (METAS, No. 217-00671)	Mar-08
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-06 (METAS, No. 217-00593)	Aug-07
Reference Probe ES3DV2	SN: 3013	4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Jan-08
DAE4	SN: 654	21-Jun-06 (SPEAG, No. DAE4-654_Jun06)	Jun-07

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	[signature]
Approved by:	Fin Bomholt	R&D Director	[signature]

Issued: April 24, 2007

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

Methods Applied and Interpretation of Parameters:

- *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 ET3DV6R

SN:1397

Manufactured:	October 24, 1999
Last calibrated:	May 3, 2006
Recalibrated:	April 24, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6R SN:1397

Sensitivity in Free Space[A]

NormX	**1.79** ± 10.1%	$\mu V/(V/m)^2$
NormY	**1.70** ± 10.1%	$\mu V/(V/m)^2$
NormZ	**1.94** ± 10.1%	$\mu V/(V/m)^2$

Diode Compression[B]

DCP X	**95** mV
DCP Y	**97** mV
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	9.5	4.9
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

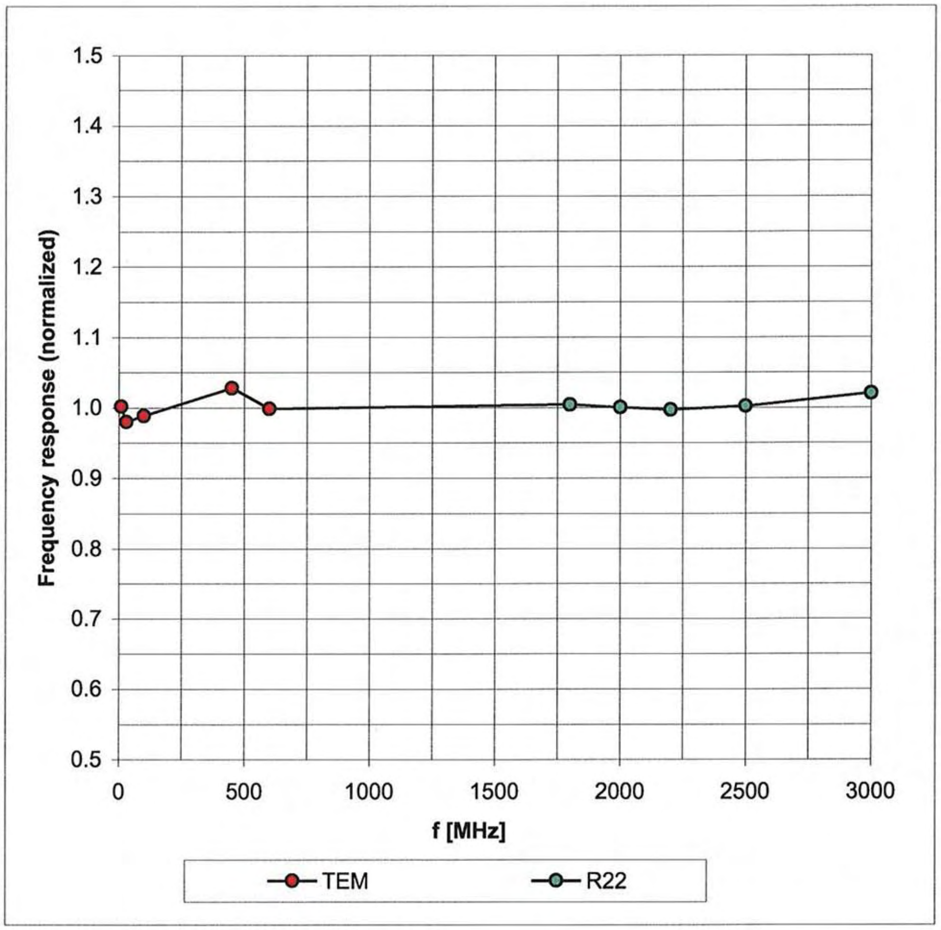
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

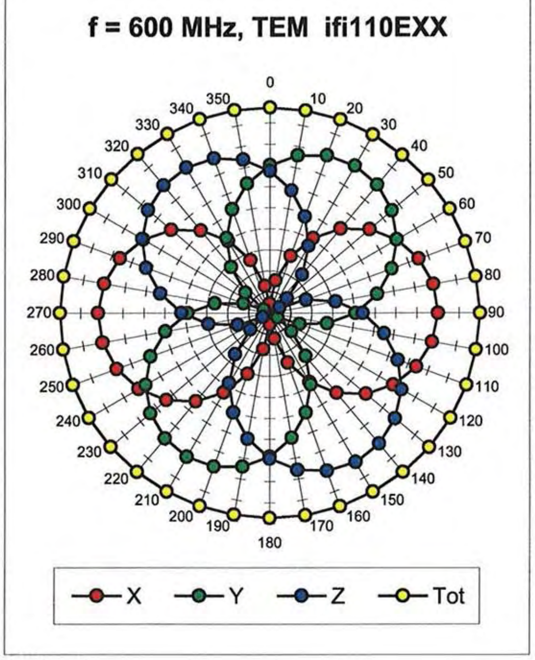
Frequency Response of E-Field

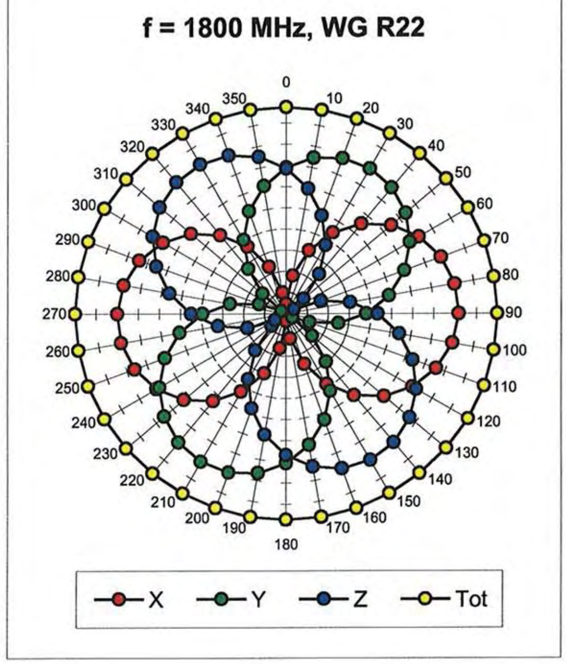
(TEM-Cell:ifi110 EXX, Waveguide: R22)

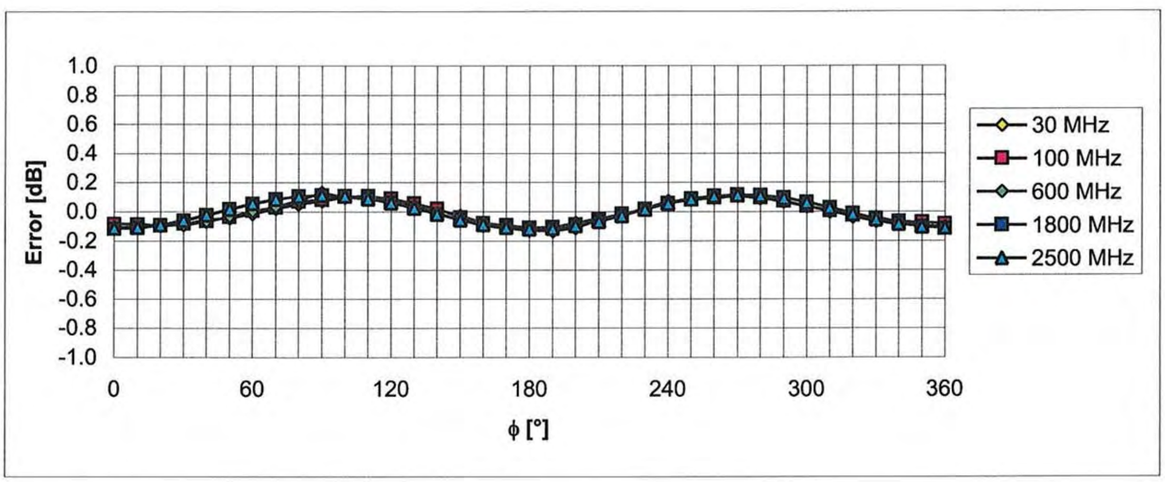


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



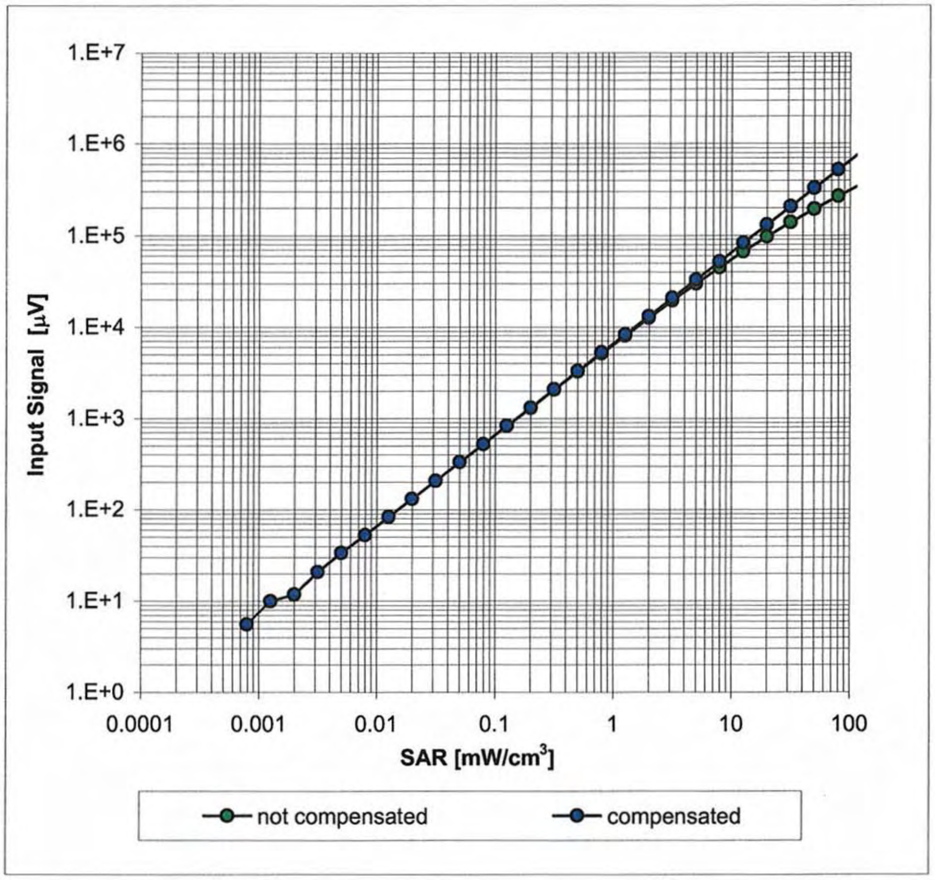


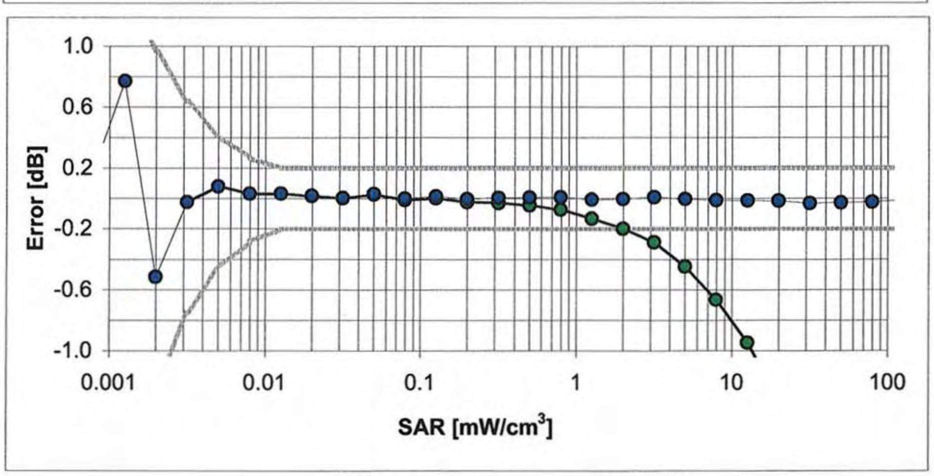


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

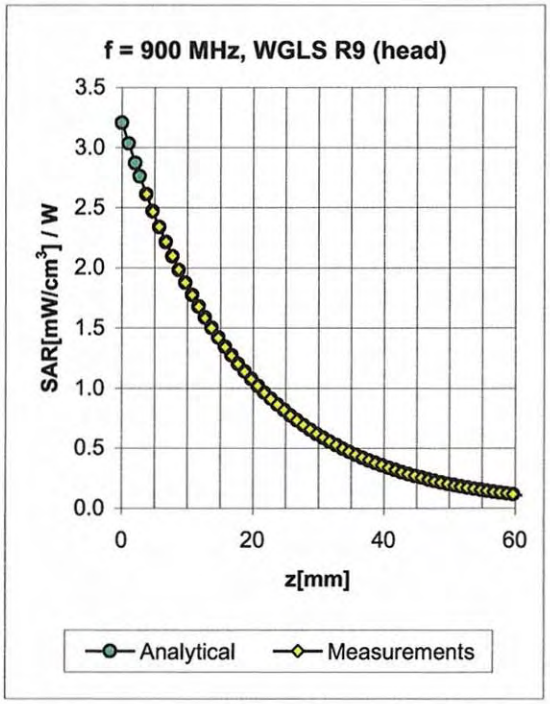
(Waveguide R22, f = 1800 MHz)

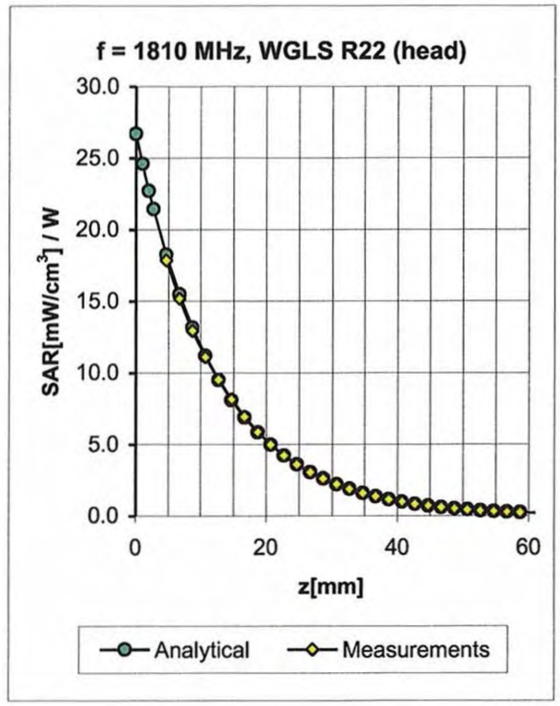




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



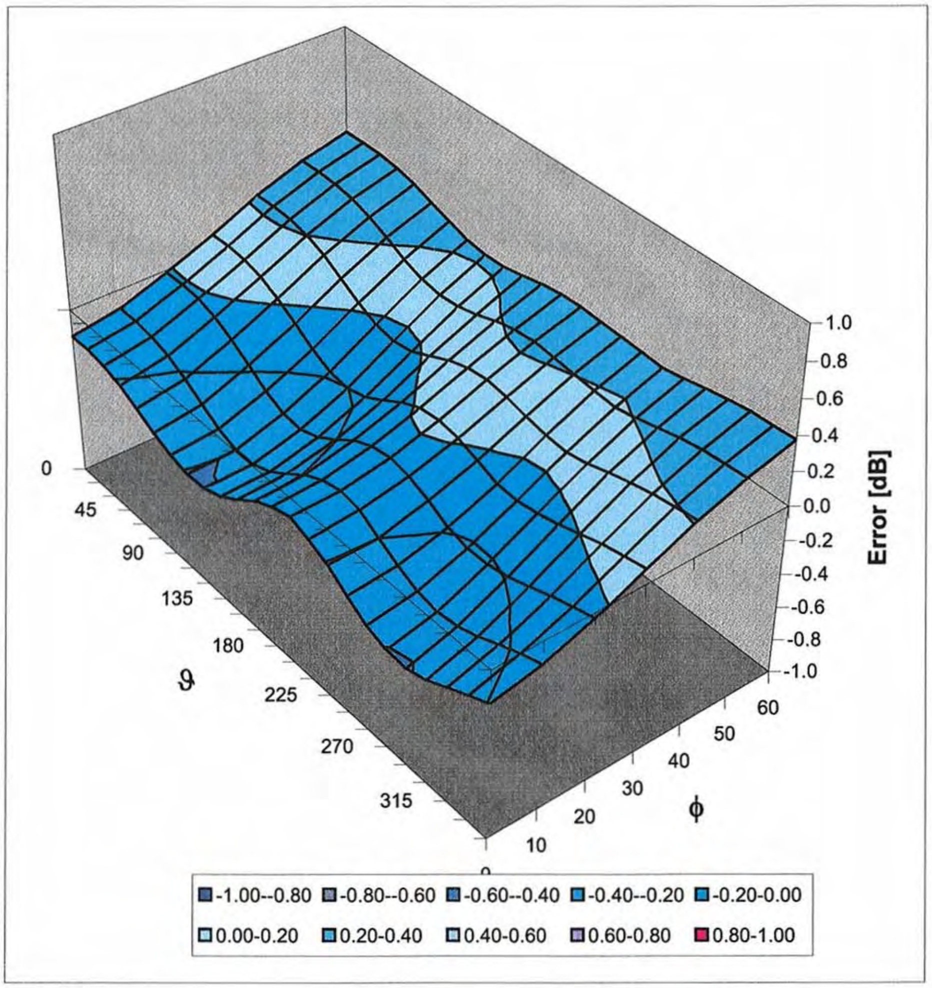


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.32	2.72	6.25	± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.51	2.65	5.17	± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.57	2.49	4.95	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.73	1.94	4.56	± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.34	2.80	6.04	± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.61	2.48	4.83	± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.73	2.28	4.63	± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.65	2.17	4.18	± 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
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**

Certificate No: ES3-3115_Jul07

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3115
Calibration procedure(s)	QA CAL-01.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	July 16, 2007
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	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41495277	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Power sensor E4412A	MY41498087	29-Mar-07 (METAS, No. 217-00670)	Mar-08
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-06 (METAS, No. 217-00592)	Aug-07
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-07 (METAS, No. 217-00671)	Mar-08
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-06 (METAS, No. 217-00593)	Aug-07
Reference Probe ES3DV2	SN: 3013	4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Jan-08
DAE4	SN: 654	20-Apr-07 (SPEAG, No. DAE4-654_Apr07)	Apr-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

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

Issued: July 17, 2007

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

Methods Applied and Interpretation of Parameters:

- *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:3115

Manufactured:	March 6, 2006
Last calibrated:	July 3, 2006
Recalibrated:	July 16, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ES3DV3 SN:3115

Sensitivity in Free Space[A]

NormX	**1.26** ± 10.1%	$\mu V/(V/m)^2$
NormY	**1.27** ± 10.1%	$\mu V/(V/m)^2$
NormZ	**1.28** ± 10.1%	$\mu V/(V/m)^2$

Diode Compression[B]

DCP X	**95** mV
DCP Y	**95** mV
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		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	5.6	2.4
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	5.3
SAR_{be} [%]	With Correction Algorithm	0.0	0.0

Sensor Offset

Probe Tip to Sensor Center **2.0** mm

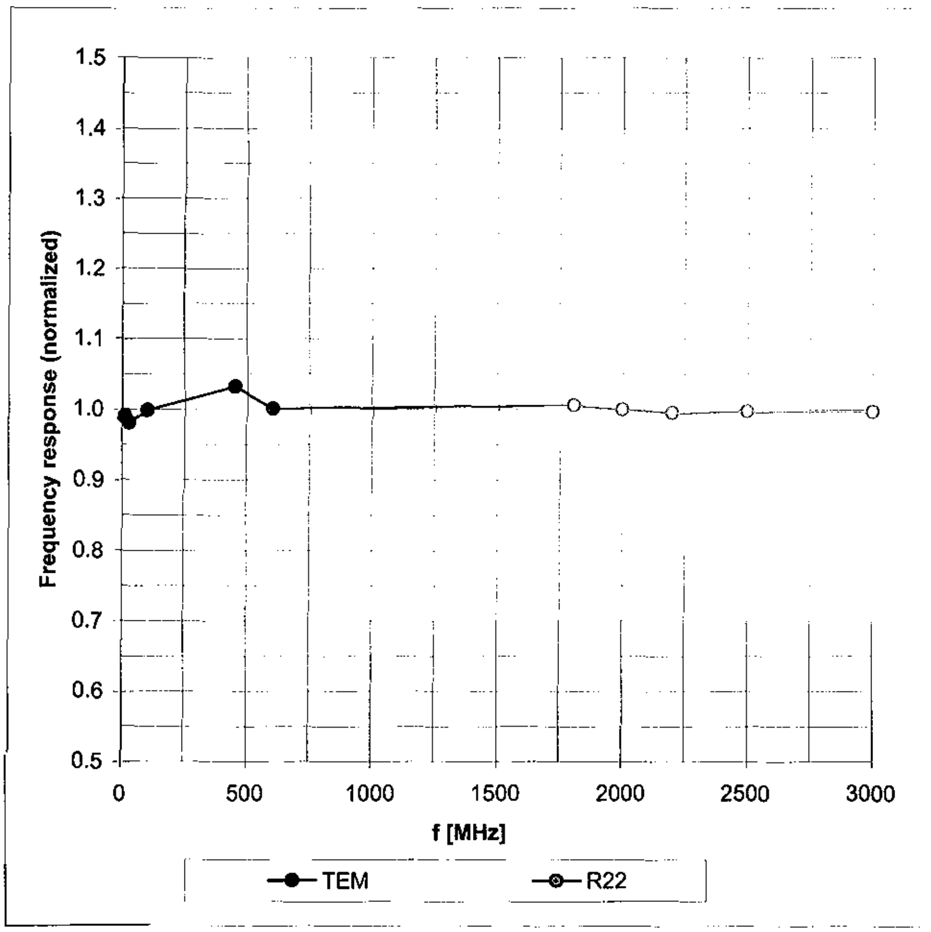
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

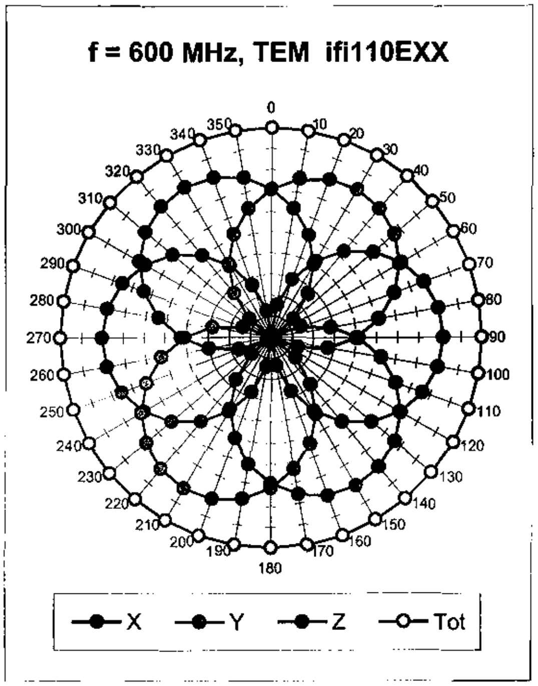
Frequency Response of E-Field

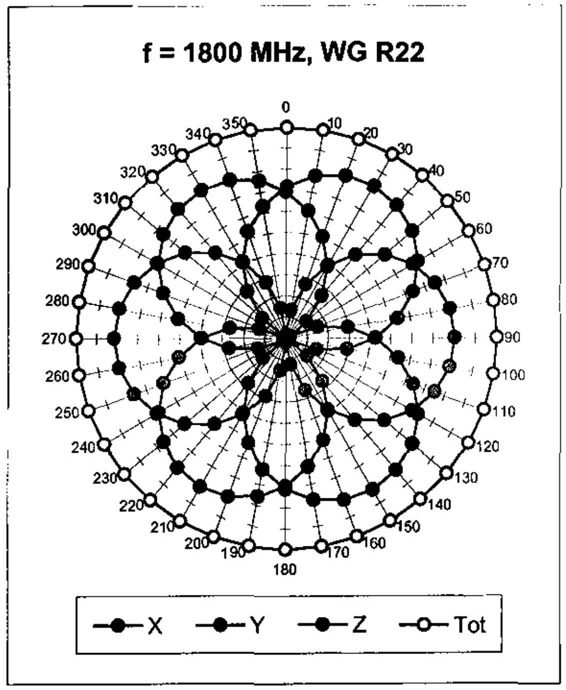
(TEM-Cell:ifi110 EXX, Waveguide: R22)

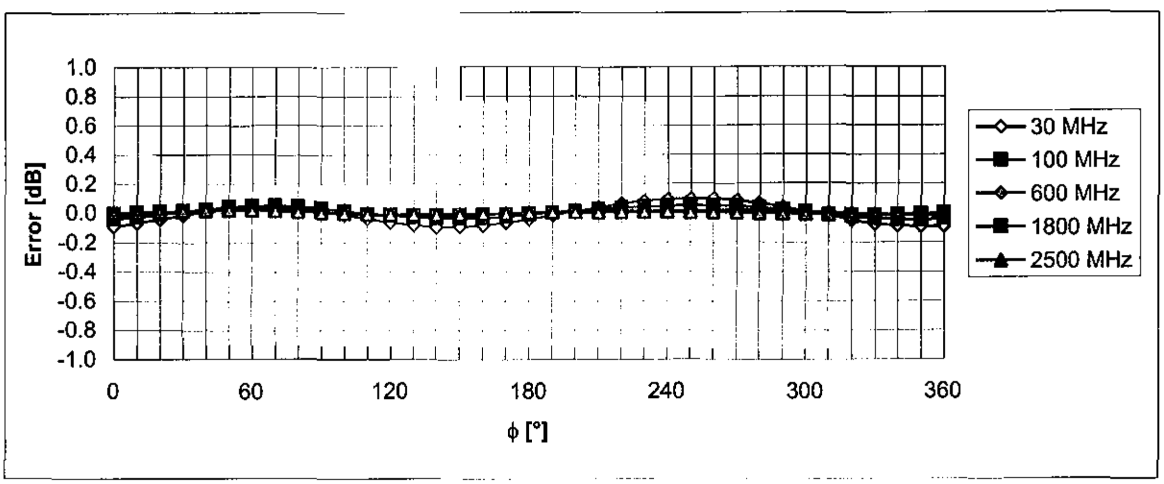


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



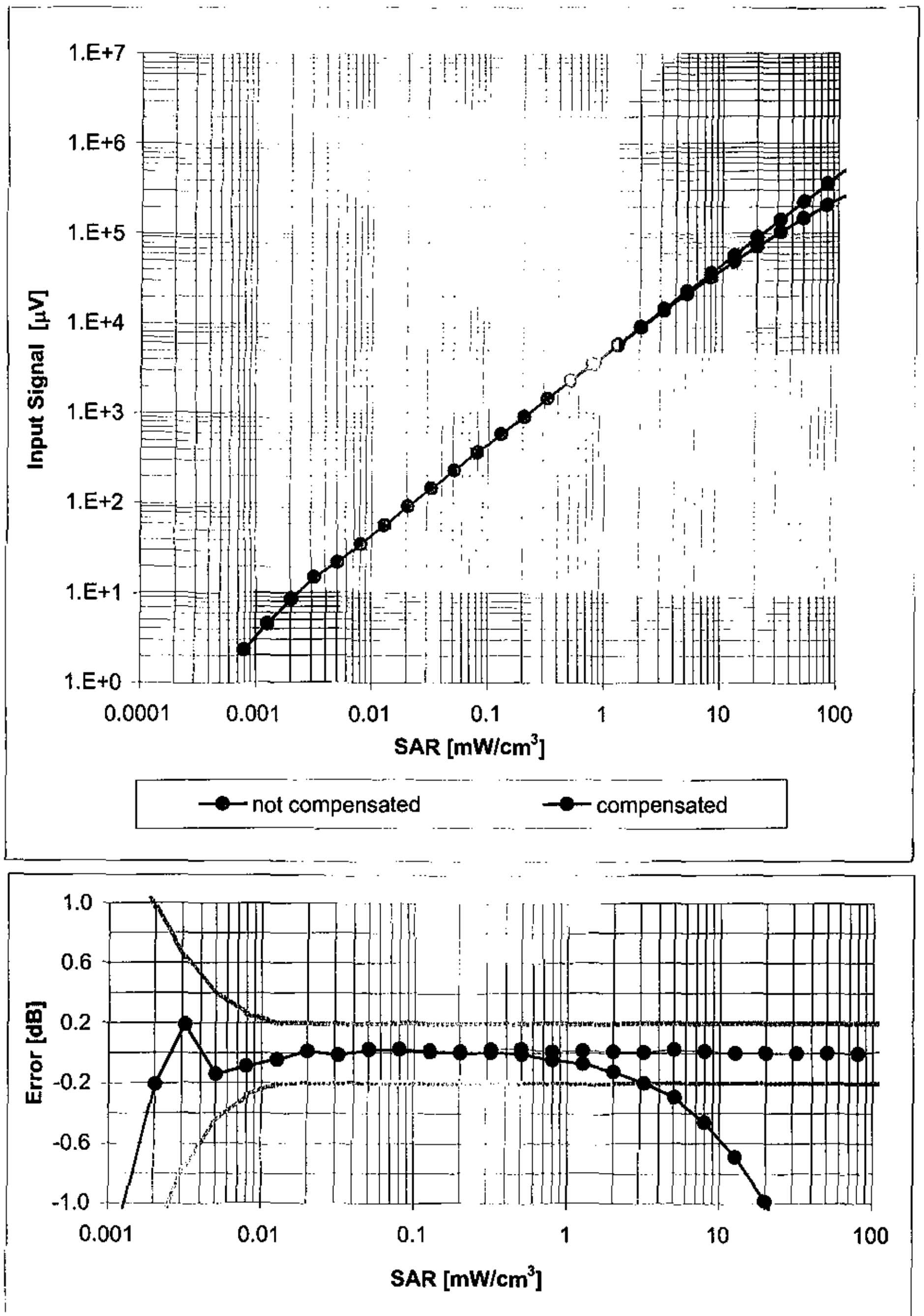




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

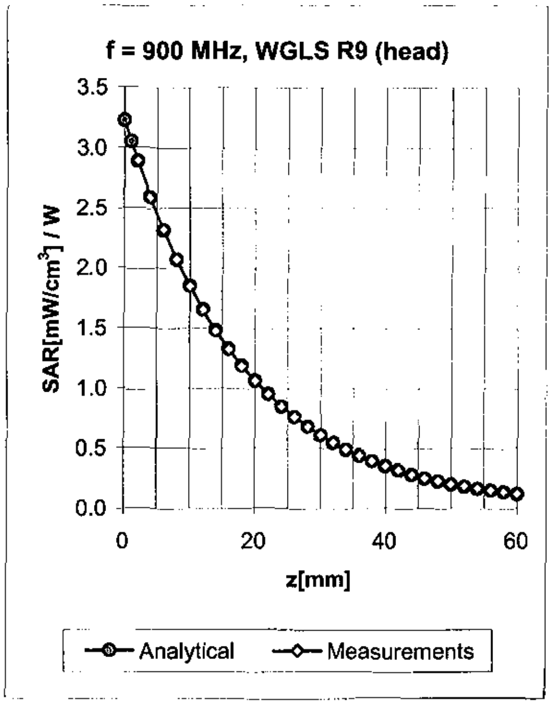
Dynamic Range f(SAR_{head})

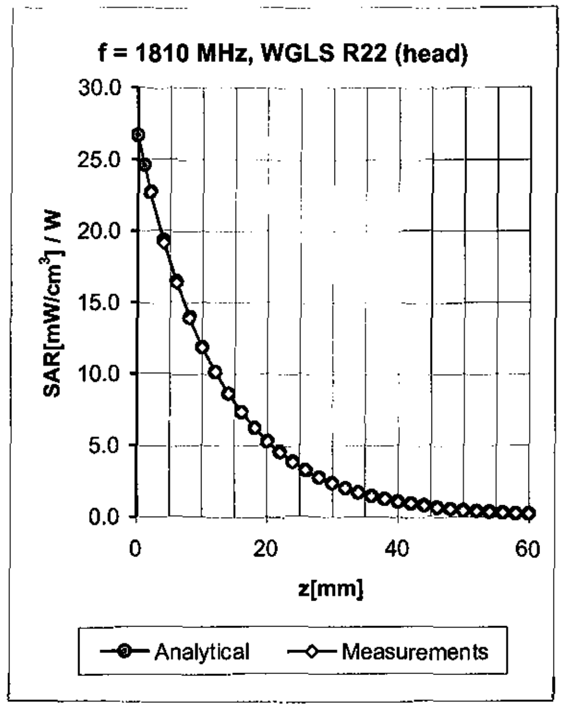
(Waveguide R22, f = 1800 MHz)



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

Conversion Factor Assessment



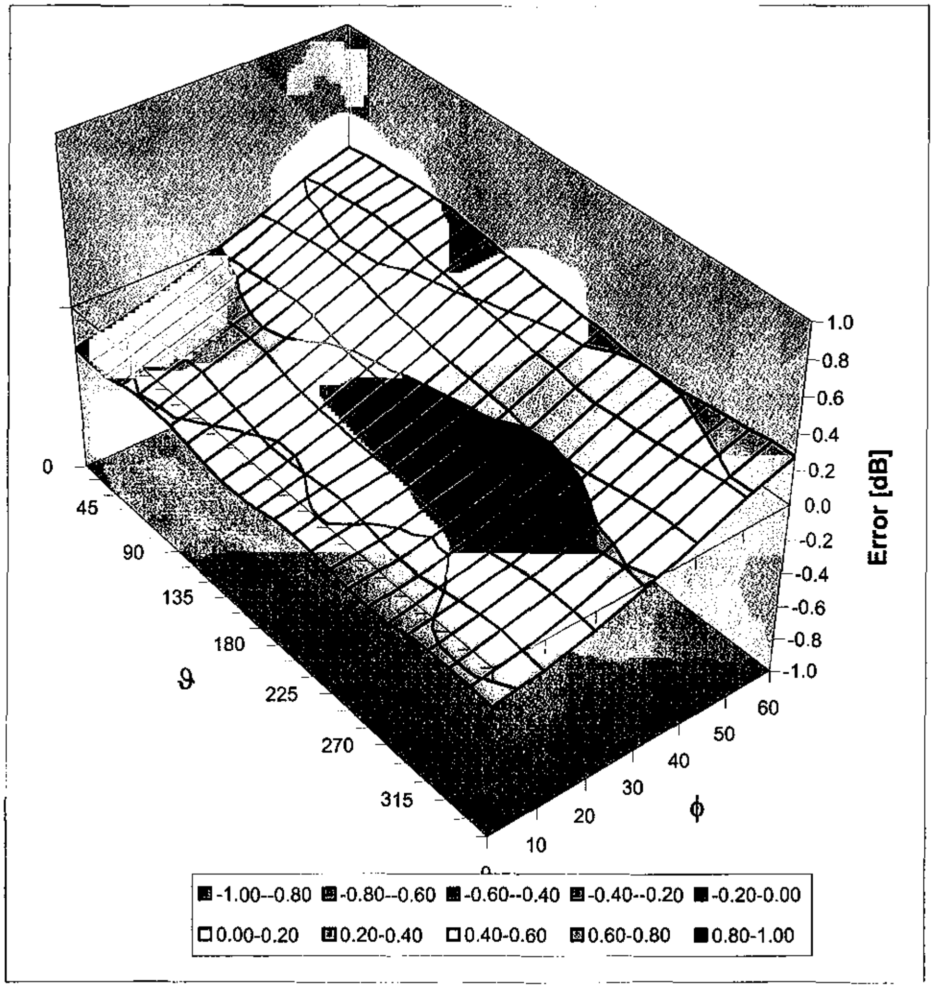


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	1.00	1.11	6.03	± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.81	1.32	4.92	± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.90	1.20	4.72	± 11.0% (k=2)
2300	± 50 / ± 100	Head	39.4 ± 5%	1.71 ± 5%	0.76	1.34	4.58	± 11.8% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.76	1.34	4.39	± 11.8% (k=2)
2600	± 50 / ± 100	Head	39.0 ± 5%	1.96 ± 5%	0.86	1.20	4.24	± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	1.00	1.22	5.72	± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.76	1.44	4.70	± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.74	1.40	4.55	± 11.0% (k=2)
2300	± 50 / ± 100	Body	52.8 ± 5%	1.85 ± 5%	0.73	1.38	4.35	± 11.8% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.91	1.17	4.07	± 11.8% (k=2)
2600	± 50 / ± 100	Body	52.5 ± 5%	2.16 ± 5%	1.00	1.08	3.84	± 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 6

Measurement Uncertainty Budget

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	

Appendix 8

Dipole Characterization Certificate

Certification of System Performance Check Targets
Based on WI-0396

-Historical Data-

	900MHz	
IEEE/IEC Target:	10.8	**(W/kg)**
Measurement Uncertainty (k=1):	9.0%	
Measurement Period:	*10-May-06 to 18-April-07*	
# of tests performed:	1,562	
Grand Average:	11.24	**(W/kg)**
% Delta (Average - IEEE1528 Target)	4.1%	
Is % Delta <= Expanded Measurement Uncertainty (k=2)?	**Yes**	
Accept/Reject Average as new system performance check target?	**ACCEPT**	
	Applies to Dipole SN's: 55, 69, 77, 78, 79, 80, 91, 92, 93, 94, 95, 96, 97, 1d034, 1d035	

-New System Performance Check Targets- per WI-0396

(based on analysis of historical data)

Frequency	SAR Target (W/kg)	Permittivity	Conductivity (S/m)
900MHz	**11.24**	41.5 ± 5%	0.97 ± 5%

-Approvals-

Submitted by: Marge Kaunas   Date: 24-Apr-07

Signed:

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

Approved by: Mark Douglas   **Date:** 1-May-07

Signed:

Comments:

Certification of System Performance Check Targets
Based on WI-0396

-Historical Data-

	1800MHz	
IEEE1528 Target:	38.1	**(W/kg)**
Measurement Uncertainty (k=1):	9.0%	
Measurement Period:	*10-May-06 to 18-April-07*	
# of tests performed:	1314	
Grand Average:	37.5	**(W/kg)**
% Delta (Average - IEEE1528 Target)	-1.6%	
Is % Delta <= Expanded Measurement Uncertainty (k=2)?	**Yes**	
Accept/Reject Average as new system performance check target?	**ACCEPT**	
	Applies to Dipole SN's: 246tr, 250tr, 251tr, 259tr, 263tr, 271tr, 272tr, 276tr, 277tr, 279tr, 280tr, 281tr, 283tr, 284tr, 2d128, 2d129	

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

Frequency	SAR Target (W/kg)	Permittivity	Conductivity (S/m)
1800MHz	**37.5**	40.0 ± 5%	1.40 ± 5%

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-Approvals-

Submitted by: Marge Kaunas — Date: 24-Apr-07

Signed: Marge Kaunas

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

Approved by: Mark Douglas — **Date:** 1-May-07

Signed: Mark Douglas

Comments:

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