Portable Cellular Phone SAR Test Report

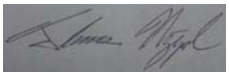
Test Report #:	20699-1F
Date of Report:	Jun-22-2007 revised Aug-09-2007
Date of Test:	Jun-12-2007 to Jun-19-2007
FCC ID #:	**IHDT56HS1**
Generic Name:	**N/A**

Laboratory:

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

Report Author:

Thomas Nipple
RF Engineer



Accreditation:

This laboratory is accredited to ISO/IEC 17025-1999 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

A2LA certificate # 2518-02

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)

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 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	800 MHz Band, Internal	
Location	Bottom, Back of Transceiver	
Dimensions	Length	50.96 mm
	Width	15.97 mm
Configuration	PIFA	

Type	1900 MHz Band, Internal	
Location	Top, Back of Transceiver	
Dimensions	Length	19.70 mm
	Width	21.85 mm
Configuration	PIFA	

2.2 Device description

Serial number	**A000000212FA75**				
Mode(s) of Operation	800 CDMA	1900 CDMA	800 EV-DO	1900 EV-DO	BlueTooth
Modulation Mode(s)	QPSK	QPSK	QPSK	QPSK	GFSK
Maximum Output Power Setting	26.00 dBm	25.00 dBm	26.00 dBm	25.00 dBm	4.00 dBm
Duty Cycle	1:1	1:1	1:1	1:1	1:1
Transmitting Frequency Range(s)	824.70 – 848.31 MHz	1851.25 – 1908.75 MHz	824.70 – 848.31 MHz	1851.25 – 1908.75 MHz	2400 – 2483.5 MHz
Production Unit or Identical Prototype (47 CFR §2.908)	Identical Prototype				
Device Category	Portable				
RF Exposure Limit	General Population / Uncontrolled				

3. Test Equipment Used

3.1 Dosimetric System

The Motorola Mobile Devices Business Product Safety & Compliance Laboratory utilizes a Dosimetric Assessment System (DASY4™ v4.7) manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. All the SAR measurements are taken within a shielded enclosure. The overall 10 g RSS uncertainty of the measurement system is ±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	437	Jul-18-2007
E-Field Probe ET3DV6	1514	Jul-14-2007
DASY4™ DAE V1	702	May-30-2008
E-Field Probe ES3DV3	3124	Mar-20-2008
Dipole Validation Kit, DV900V2	96	May-01-2008
S.A.M. Phantom used for 800 MHz	TP-1131	
Dipole Validation Kit, DV1800V2	272TR	
S.A.M. Phantom used for 1900	TP-1250	

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3847A04633	Jul-07-2007
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	US39172529	Sep-26-2007
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 $\rho = 1\ ^{g}/_{cm3}$ 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,** Jun-14-2007	41.2	0.91	19.1
		Measured, Jun-15-2007	42.1	0.91	19.7
		Measured, Jun-19-2007	41.3	0.91	20.0
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** Jun-19-2007	53.6	0.98	19.0
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1880	Head	**Measured,** Jun-12-2007	39.3	1.47	19.4
		Measured, Jun-13-2007	40.5	1.47	20.0
		Measured, Jun-16-2007	39.8	1.46	20.0
		Recommended Limits	40.0 ±5%	1.40 ±5%	18-25
	Body	**Measured,** Jun-16-2007	51.3	1.59	20.0
		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
Sugar	57	44.9	--	--
DGBE	--	--	47	30.8
Diacetin	--	--	--	--
Water	40.45	53.06	52.62	68.8
Salt	1.45	0.94	0.38	0.4
HEC	1	1	--	--
Bact.	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 8 for the 900 Mhz target reference SAR values. 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,** Jun-14-2007	11.3	40.5	0.97	20.7	19.7
	Measured, Jun-15-2007	11.8	41.3	0.97	20.7	19.7
	Measured, Jun-19-2007	11.425	40.5	0.97	21.6	19.9
	Recommended Limits	11.24	41.5 ±5%	0.97 ±5%	18-25	18-25
1800	**Measured,** Jun-12-2007	39.275	38.5	1.38	21.2	19.6
	Measured, Jun-13-2007	38.875	40.9	1.38	20.8	19.9
	Measured, Jun-16-2007	37.775	40.2	1.37	20.6	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 ET3DV6	1514	900	5.99	8 of 9
		1810	5.05	8 of 9
		2450	4.47	8 of 9
E-Field Probe ES3DV3	3124	900	5.95	8 of 9
		1810	5.14	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 set up to the proper channel, transmitter power level and transmit mode of operation. The phone was tested in the configurations stipulated in [1], [4] and [5]. The phone was positioned into these configurations using the device holder supplied with the DASY4™ SAR measurement system. The measured dielectric constant of the material used for the device holder is less than 2.9 and the loss tangent is less than 0.02 (± 30%) at 850 MHz. The default settings for the "coarse" and "cube" scans were chosen and used for measurements. The grid spacing of the course scan was set to 15 mm or less as shown in the SAR plots included in Appendices 2, 3, and 4. 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:
Battery #1 – Model SNN5827A – 1860 mAH
Battery #2 – Model SNN5765A – 1640 mAH
Battery #3 – Model SNN5783B – 1100 mAH
Battery #4 – Model SNN5771A – 850 mAH

The battery with the highest capacity is the Model SNN5827A. This battery was used to do most of the SAR testing. The phone was placed in the SAR measurement system with a fully charged battery. The configurations that resulted in the highest SAR values were tested using the other batteries listed above.

Per the "SAR Measurement Procedures for 3G Devices" released in June, 2006, RC1, RC3 and RC3 (FCH + SCH) CDMA modes were considered. The conducted power measurements (per steps 3, 4 & 10 of section 4.4.5.2 of 3GPP2 C.5.011 / TIA -98-E) for each mode are shown in the table below.

Conducted power (dBm) for CDMA modes						
	Channel	RC1		RC3		RC3 (FCH + SCH)
		SO2	SO55	SO2	SO55	
CDMA 800	1013	25.84	25.87	25.84	25.85	Per Motorola designs, the maximum power, when in a mode that allows supplemental channels, will always be less than the RC3/RC1 maximum conducted power limit.
	384	25.90	25.82	25.83	25.89	
	777	25.78	25.79	25.78	25.84	
CDMA 1900	25	24.97	24.98	24.93	24.95	
	600	24.95	24.92	24.93	24.92	
	1175	24.93	24.94	24.89	24.99	

6.1 Head Adjacent Test Results

The SAR results shown in tables 1 through 10 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 [6]. Also shown are the measured conducted output power levels for the CDMA RC3/SO55 mode, the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is New SAR = Old SAR * $10^{(-\text{drift}/10)}$. The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test. Note that 800 MHz digital mode SAR measurements were performed in accordance with [4].

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

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

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ET3DV6	1514	900	5.99	8 of 9
		1810	5.05	8 of 9
		2450	4.47	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)
800 MHz	Chan. 1013	25.85						
	Chan. 384	25.89	19.7	0.131	0.35	0.35	0.467	0.47
	Chan. 777	25.84						
1900 MHz	Chan. 25	24.95	19.5	0.058	0.545	0.55	0.867	0.87
	Chan. 600	24.92	19.4	0.002	0.527	0.53	0.864	0.86
	Chan. 1175	24.99	19.5	0.048	0.547	0.55	0.892	0.89

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)
800 MHz	Chan. 1013	25.85						
	Chan. 384	25.89	19.7	-0.009	0.437	0.44	0.582	0.58
	Chan. 777	25.84						
1900 MHz	Chan. 25	24.95	20.0	0.016	0.491	0.49	0.849	0.85
	Chan. 600	24.92	20.0	0.000	0.495	0.50	0.861	0.86
	Chan. 1175	24.99	20.0	-0.060	0.527	0.53	0.934	0.95

Table 2: 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 with Battery SNN5765A								
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)
800 MHz	Chan. 1013	25.85						
	Chan. 384	25.89	19.4	0.010	0.415	0.42	0.564	0.56
	Chan. 777	25.84						
1900 MHz	Chan. 25	24.95						
	Chan. 600	24.92						
	Chan. 1175	24.99	**20.0**	**-0.016**	**0.552**	**0.55**	**0.967**	**0.97**

Table 3: 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 with Battery SNN5783B								
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)
800 MHz	Chan. 1013	25.85						
	Chan. 384	25.89	**19.1**	**-0.182**	**0.472**	**0.49**	**0.624**	**0.65**
	Chan. 777	25.84						
1900 MHz	Chan. 25	24.95						
	Chan. 600	24.92						
	Chan. 1175	24.99	19.1	0.035	0.542	0.54	0.958	0.96

Table 4: 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 with Battery SNN5771A								
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)
800 MHz	Chan. 1013	25.85						
	Chan. 384	25.89	19.1	-0.027	0.471	0.47	0.626	0.63
	Chan. 777	25.84						
1900 MHz	Chan. 25	24.95						
	Chan. 600	24.92						
	Chan. 1175	24.99	18.8	0.004	0.531	0.53	0.938	0.94

Table 5: 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)
800 MHz	Chan. 1013	25.85						
	Chan. 384	25.89	19.7	0.045	0.284	0.28	0.375	0.38
	Chan. 777	25.84						
1900 MHz	Chan. 25	24.95	20.0	0.200	0.727	0.73	1.22	1.22
	Chan. 600	24.92	**19.4**	**0.303**	**0.736**	**0.74**	**1.28**	**1.28**
	Chan. 1175	24.99	19.2	0.010	0.686	0.69	1.17	1.17

Table 6: 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)**
800 MHz	**Chan. 1013**	25.85						
	Chan. 384	25.89	19.2	0.306	0.289	0.29	0.389	0.39
	Chan. 777	25.84						
1900 MHz	**Chan. 25**	24.95	20.0	0.105	0.585	0.59	0.986	0.99
	Chan. 600	24.92	20.0	0.013	0.566	0.57	0.95	0.95
	Chan. 1175	24.99	20.0	-0.026	0.552	0.56	0.91	0.92

Table 7: 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 15° Tilt Position with Battery SNN5765A**								
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)**
800 MHz ***Right Head***	**Chan. 1013**	25.85						
	Chan. 384	25.89	19.0	0.113	0.29	0.29	0.384	0.38
	Chan. 777	25.84						
1900 MHz ***Left Head***	**Chan. 25**	24.95						
	Chan. 600	24.92	18.9	-0.018	0.66	0.66	1.12	1.12
	Chan. 1175	24.99						

Table 8: 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 15° Tilt Position with Battery SNN5783B**								
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)**
800 MHz ***Right Head***	**Chan. 1013**	25.85						
	Chan. 384	25.89	19.3	0.192	0.332	0.33	0.44	0.44
	Chan. 777	25.84						
1900 MHz ***Left Head***	**Chan. 25**	24.95						
	Chan. 600	24.92	18.8	0.354	0.689	0.69	1.18	1.18
	Chan. 1175	24.99						

Table 9: 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 15° Tilt Position with Battery SNN5771A								
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)**
800 MHz ***Right Head***	**Chan. 1013**	25.85						
	Chan. 384	25.89	**19.7**	**-0.209**	**0.348**	**0.37**	**0.463**	**0.49**
	Chan. 777	25.84						
1900 MHz ***Left Head***	**Chan. 25**	24.95						
	Chan. 600	24.92	19.1	0.216	0.688	0.69	1.17	1.17
	Chan. 1175	24.99						

Table 10: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.

6.2 Push-to-Talk/Dispatch Mode Test Results

The SAR results shown in tables 11 through 14 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 [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.

The test conditions that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 3. All other test conditions measured lower SAR values than those included in Appendix 3.

The 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 EV-DO mode in the CDMA 800 and 1900 MHz bands. For the purposes of this test the unit is commanded to the proper channel, transmitter power level and transmit mode of operation. The radio was then placed in the SAR measurement system with a fully charged battery. The radio was placed with the front of the device positioned at 2.5 cm from the flat portion of the SAM phantom, as per Supplement C 01-01.

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 ET3DV6	1514	900	5.99	8 of 9
		1810	5.05	8 of 9

Push-to-Talk Position with EV-DO Mode								
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)
800 MHz	Chan. 1013	25.85						
	Chan. 384	25.89	19.6	-0.194	0.473	0.49	0.652	0.68
	Chan. 777	25.84						
1900 MHz	Chan. 25	24.95						
	Chan. 600	24.92	**20.0**	**-0.328**	**0.132**	**0.14**	**0.22**	**0.24**
	Chan. 1175	24.99						

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

Push-to-Talk Position with EV-DO Mode and Battery SNN5765A								
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)
800 MHz	Chan. 1013	25.85						
	Chan. 384	25.89	20.0	-0.078	0.419	0.43	0.63	0.64
	Chan. 777	25.84						
1900 MHz	Chan. 25	24.95						
	Chan. 600	24.92	20.0	-0.690	0.122	0.14	0.202	0.24
	Chan. 1175	24.99						

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

Push-to-Talk Position with EV-DO Mode and Battery SNN5783B								
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)
800 MHz	Chan. 1013	25.85						
	Chan. 384	25.89	20.0	0.061	0.424	0.42	0.585	0.59
	Chan. 777	25.84						
1900 MHz	Chan. 25	24.95						
	Chan. 600	24.92	20.0	0.030	0.113	0.11	0.182	0.18
	Chan. 1175	24.99						

Table 13: SAR measurement results at the highest possible output power, measured in a Push-To-Talk position against the ICNIRP and ANSI SAR Limit.

Push-to-Talk Position with EV-DO Mode and Battery SNN5771A								
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)
800 MHz	**Chan. 1013**	25.85						
	Chan. 384	25.89	**20.0**	**-0.304**	**0.456**	**0.49**	**0.671**	**0.72**
	Chan. 777	25.84						
1900 MHz	**Chan. 25**	24.95						
	Chan. 600	24.92	20.0	-0.245	0.119	0.13	0.194	0.21
	Chan. 1175	24.99						

Table 14: 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 15 through 23 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 [6]. Also shown are the measured conducted output power levels for the CDMA RC3/SO55 mode, 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. Note that 800 MHz digital mode SAR measurements were performed in accordance with [4].

The test conditions that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 4. All other test conditions measured lower SAR values than those included in Appendix 4.

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 at 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, except those conducted with Bluetooth active.

There are two Body-Worn Accessories available for this phone:
A Leather Pouch with Belt Clip: Model SYN1985A
A Plastic Holster and Belt Clip: Model SYN2087A

The Plastic Holster causes closer proximity and does differ in metal components. Both accessories were used for the SAR measurements.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ET3DV6	1514	900	5.86	8 of 9
		1810	4.53	8 of 9
		2450	4.16	8 of 9
E-Field Probe ES3DV3	3124	900	4.38	8 of 9
		1810	4.28	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)
800 MHz	Chan. 1013	25.85						
	Chan. 384	25.89	19.6	-0.150	0.216	0.22	0.296	0.31
	Chan. 777	25.84						
1900 MHz	Chan. 25	24.95						
	Chan. 600	24.92	19.6	0.253	0.282	0.28	0.441	0.44
	Chan. 1175	24.99						

Table 15: 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)
800 MHz	Chan. 1013	25.85						
	Chan. 384	25.89	19.6	0.045	0.502	0.50	0.699	0.70
	Chan. 777	25.84						
1900 MHz	Chan. 25	24.95						
	Chan. 600	24.92	19.5	-0.045	0.479	0.48	0.777	0.79
	Chan. 1175	24.99						

Table 16: 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)
800 MHz	Chan. 1013	25.85	19.6	-0.029	0.709	0.71	0.962	0.97
	Chan. 384	25.89	19.6	0.082	0.652	0.65	0.879	0.88
	Chan. 777	25.84	19.6	-0.098	0.635	0.65	0.864	0.88
1900 MHz	Chan. 25	24.95						
	Chan. 600	24.92	19.4	-0.083	0.432	0.44	0.698	0.71
	Chan. 1175	24.99						

Table 17: 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 EV-DO mode 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)
800 MHz	Chan. 1013	25.85						
	Chan. 384	25.89	18.7	-0.507	0.315	0.35	0.458	0.51
	Chan. 777	25.84						
1900 MHz	Chan. 25	24.95						
	Chan. 600	24.92	20.0	0.083	0.207	0.21	0.326	0.33
	Chan. 1175	24.99						

Table 18: 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 Battery SNN5765A *(Bluetooth enabled where noted)*								
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)
800 MHz *(BT Enabled)*	Chan. 1013	25.85	19.0	-0.171	0.69	0.72	0.938	0.98
	Chan. 384	25.89						
	Chan. 777	25.84						
1900 MHz	Chan. 25	24.95						
	Chan. 600	24.92	20.0	0.079	0.45	0.45	0.728	0.73
	Chan. 1175	24.99						

Table 19: 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 Battery SNN5783B *(Bluetooth enabled where noted)*								
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)**
800 MHz *(BT Enabled)*	**Chan. 1013**	25.85	**19.0**	**-0.018**	**0.832**	**0.84**	**1.12**	**1.12**
	Chan. 384	25.89						
	Chan. 777	25.84						
1900 MHz	**Chan. 25**	24.95						
	Chan. 600	24.92	**20.0**	**-0.065**	**0.756**	**0.77**	**1.27**	**1.29**
	Chan. 1175	24.99						

Table 20: 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 Battery SNN5771A *(Bluetooth enabled where noted)*								
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)**
800 MHz *(BT Enabled)*	**Chan. 1013**	25.85	19.1	0.250	0.796	0.80	1.08	1.08
	Chan. 384	25.89						
	Chan. 777	25.84						
1900 MHz	**Chan. 25**	24.95						
	Chan. 600	24.92	20.0	-0.052	0.759	0.77	1.26	1.28
	Chan. 1175	24.99						

Table 21: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn with Leather Pouch SYN1985A *(Bluetooth enabled where noted)*								
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)**
800 MHz *(BT Enabled)*	**Chan. 1013**	25.85	19.9	0.071	0.742	0.74	1.00	1.00
	Chan. 384	25.89						
	Chan. 777	25.84						
1900 MHz	**Chan. 25**	24.95						
	Chan. 600	24.92	20.0	0.115	0.446	0.45	0.707	0.71
	Chan. 1175	24.99						

Table 22: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn with Plastic Clip SYN2087A *(Bluetooth enabled where noted)*								
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)**
800 MHz *(BT Enabled)*	**Chan. 1013**	25.85	20.0	-0.207	0.534	0.56	0.718	0.75
	Chan. 384	25.89						
	Chan. 777	25.84						
1900 MHz	**Chan. 25**	24.95						
	Chan. 600	24.92	20.0	0.126	0.295	0.30	0.453	0.45
	Chan. 1175	24.99						

Table 23: 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: 6/14/2007 9:15:40 AM

Test Laboratory: Motorola - 061407 900MHz Good at +0.5%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:096; FCC ID: IHDT56HS1
Procedure Notes: 900 MHz System Performance Check; Dipole Sn# 096; Input Power = 200 mW
Sim.Temp@meas = 19.7*C; Sim.Temp@SPC =19.7*C; Room Temp @ SPC = 20.7*C
Communication System: CW - Dipole; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 900 MHz; σ = 0.97 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3

DASY4 Configuration:

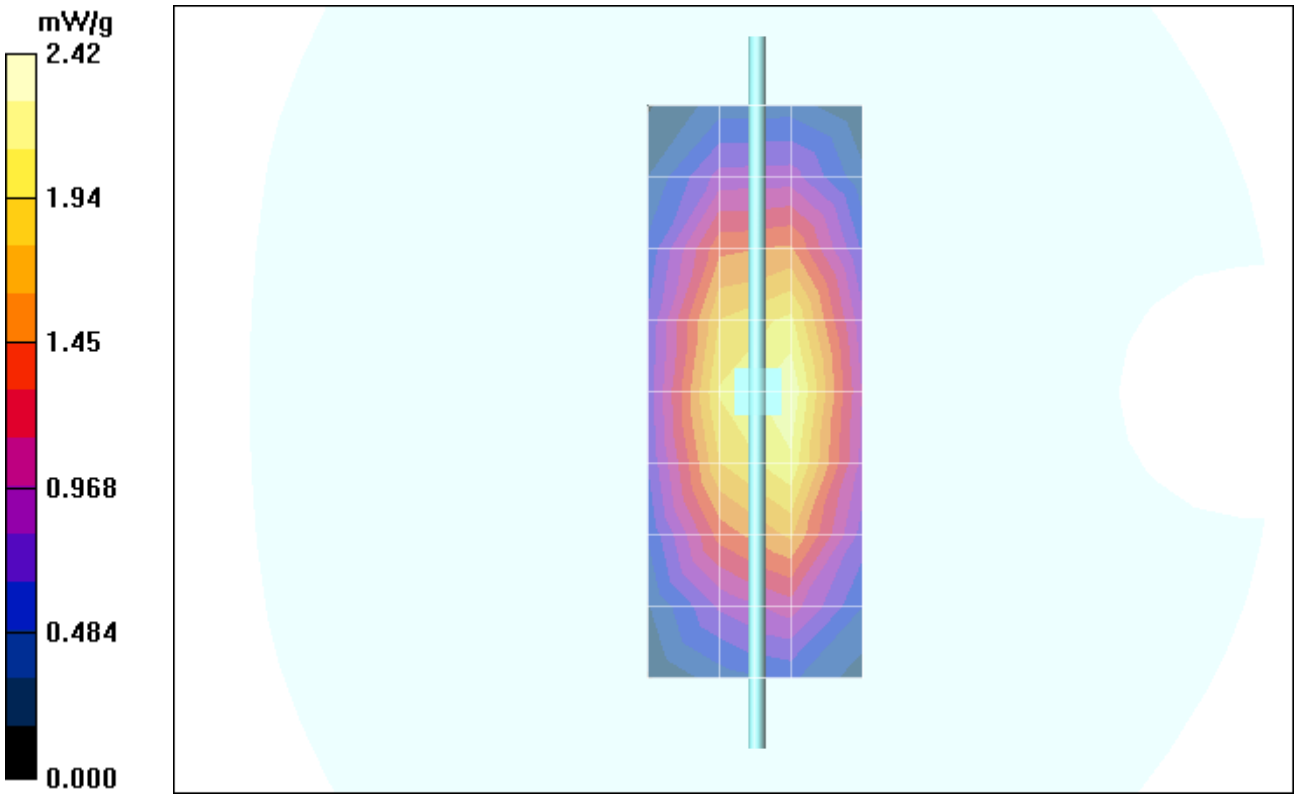
- Probe: ET3DV6 - SN1514; ConvF(5.99, 5.99, 5.99); Calibrated: 7/17/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

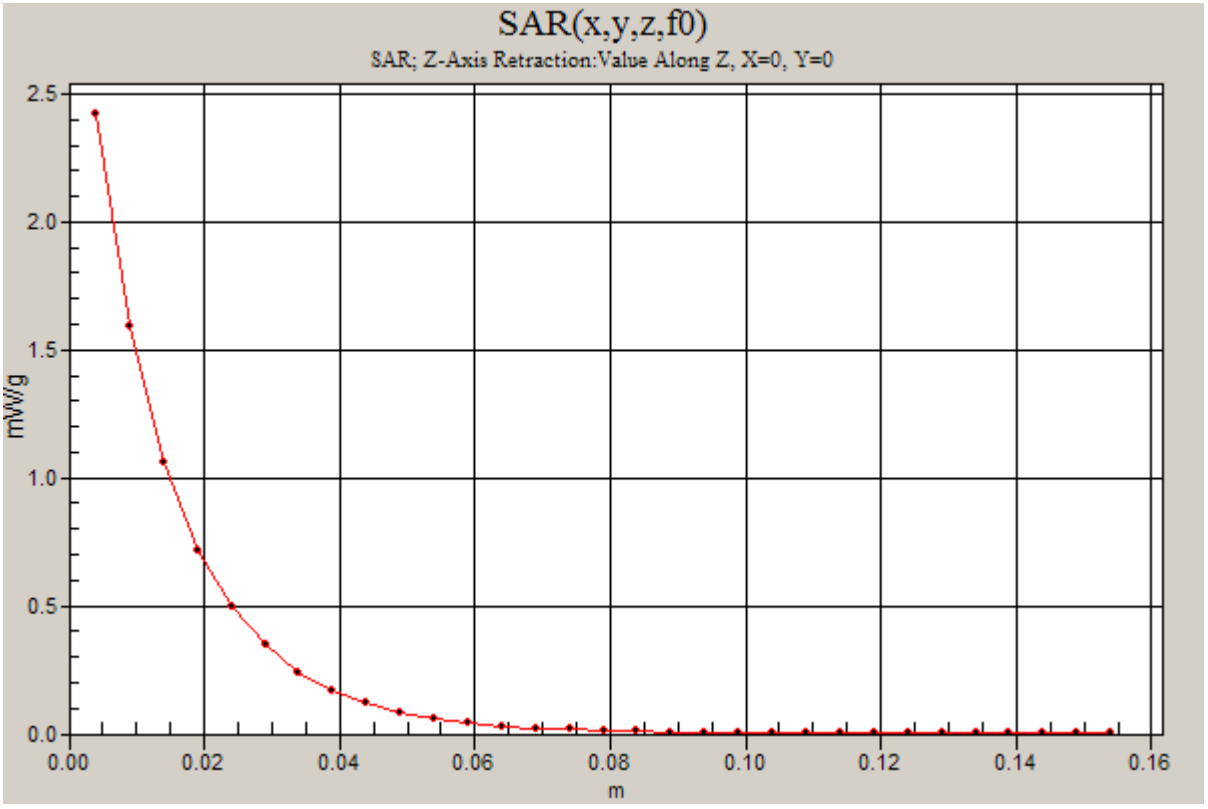
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 2.24 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 51.9 V/m; Power Drift = -0.011 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 = 51.9 V/m; Power Drift = -0.011 dB; Peak SAR (extrapolated) = 3.49 W/kg
SAR(1 g) = 2.28 mW/g; SAR(10 g) = 1.45 mW/g; Maximum value of SAR (measured) = 2.40 mW/g

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


mW/g
2.42
1.94
1.45
0.968
0.484
0.000


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: 6/15/2007 9:12:09 AM

Test Laboratory: Motorola - 061507 900MHz Good at +5.0%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:096; FCC ID: IHDT56HS1
Procedure Notes: 900 MHz System Performance Check; Dipole Sn# 096; Input Power = 200 mW
Sim.Temp@meas = 19.7*C; Sim.Temp@SPC =19.7*C; Room Temp @ SPC = 20.7*C
Communication System: CW - Dipole; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 900 MHz; σ = 0.97 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3

DASY4 Configuration:

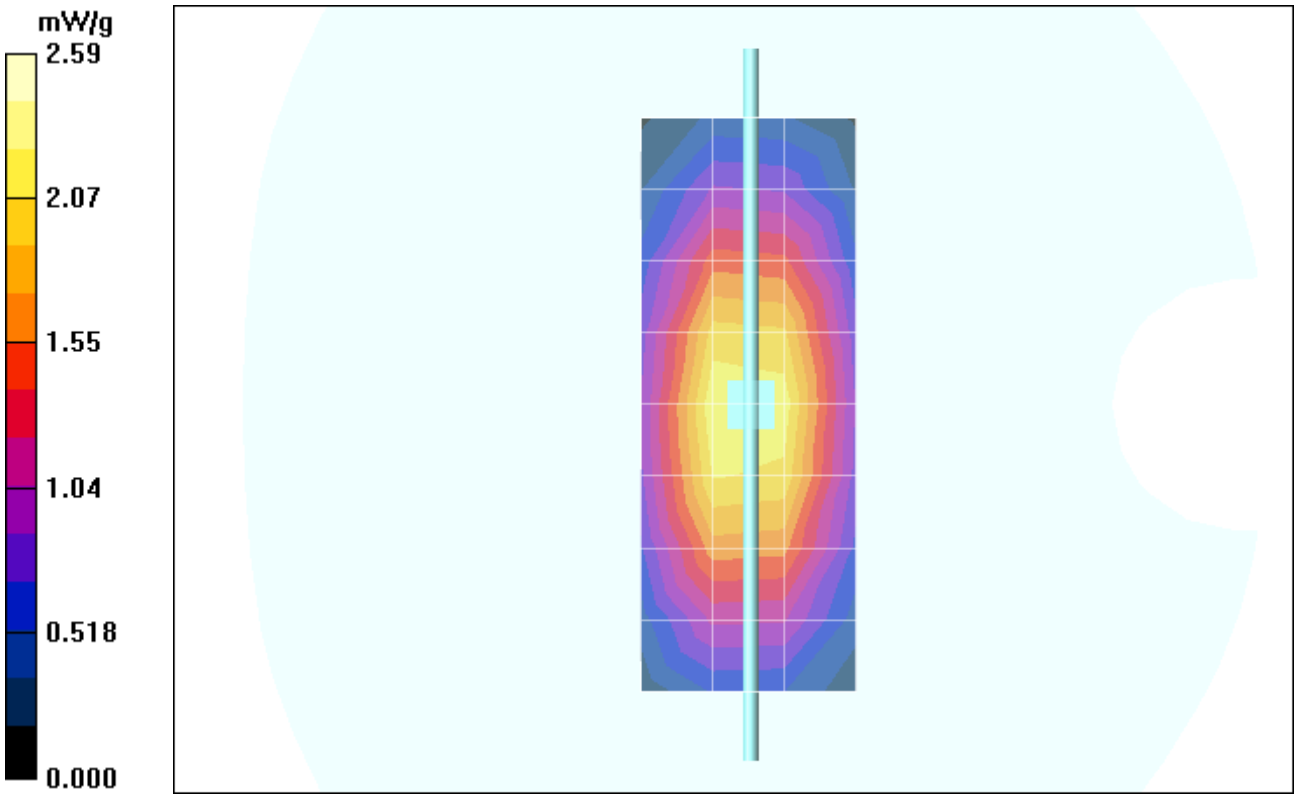
- Probe: ET3DV6 - SN1514; ConvF(5.99, 5.99, 5.99); Calibrated: 7/17/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

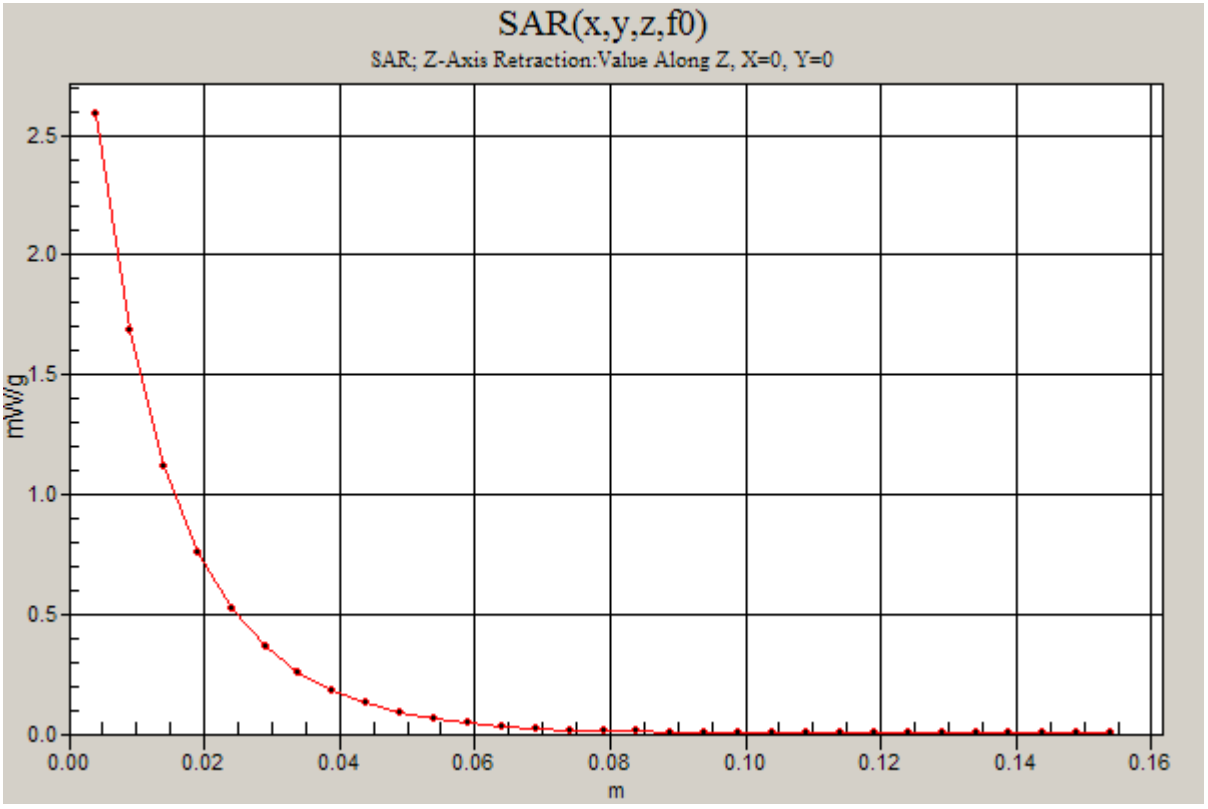
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 2.22 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 53.6 V/m; Power Drift = -0.012 dB; Peak SAR (extrapolated) = 3.58 W/kg
SAR(1 g) = 2.36 mW/g; SAR(10 g) = 1.51 mW/g; Maximum value of SAR (measured) = 2.55 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 53.6 V/m; Power Drift = -0.012 dB; Peak SAR (extrapolated) = 3.57 W/kg
SAR(1 g) = 2.36 mW/g; SAR(10 g) = 1.51 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.59 mW/g


mW/g
2.59
2.07
1.55
1.04
0.518
0.000


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: 6/19/2007 9:23:47 AM

Test Laboratory: Motorola - 061907 900MHz Good at +1.6%

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:096; FCC ID: IHDT56HS1
Procedure Notes: 900 MHz System Performance Check; Dipole Sn# 096; Input Power = 200 mW
Sim.Temp@meas = 19.9*C; Sim.Temp@SPC =19.9*C; Room Temp @ SPC = 21.6*C
Communication System: CW - Dipole; Frequency: 900 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 900 MHz; σ = 0.97 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3

DASY4 Configuration:

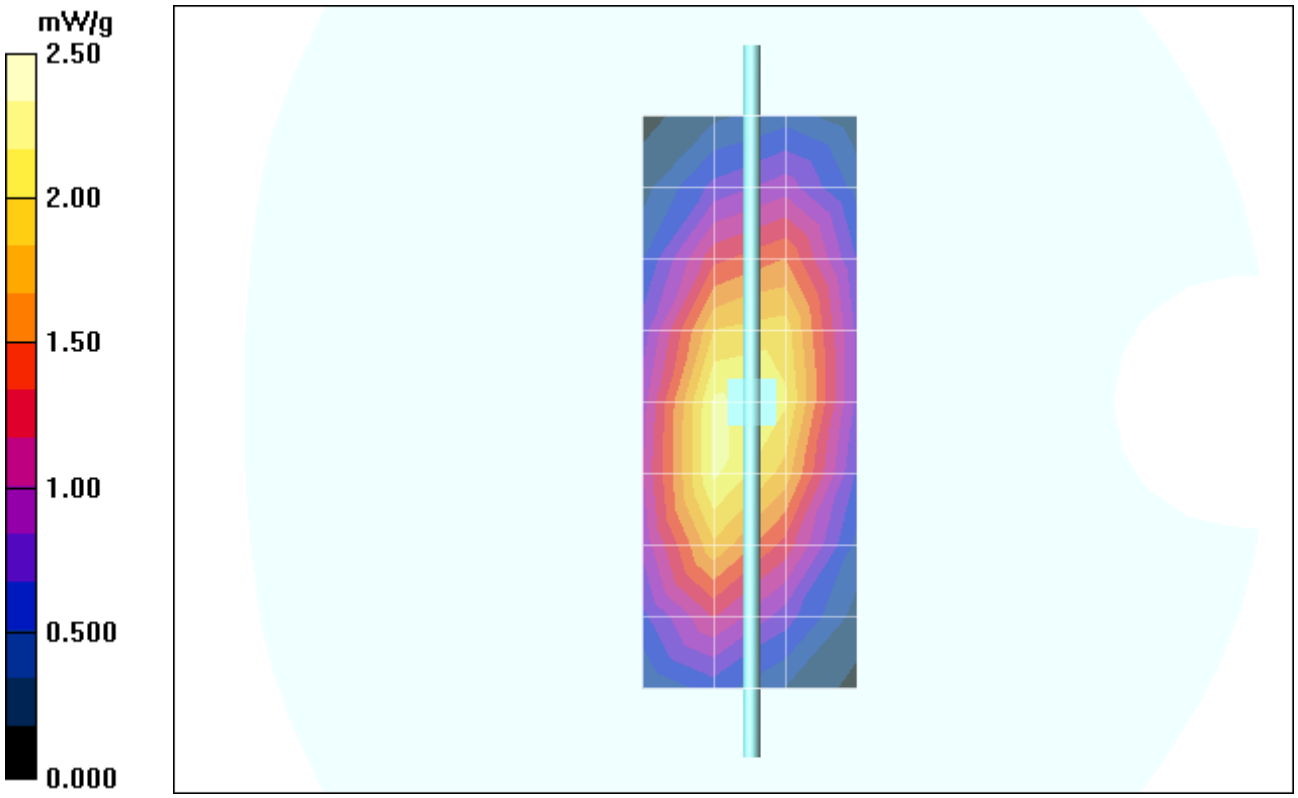
- Probe: ET3DV6 - SN1514; ConvF(5.99, 5.99, 5.99); Calibrated: 7/17/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

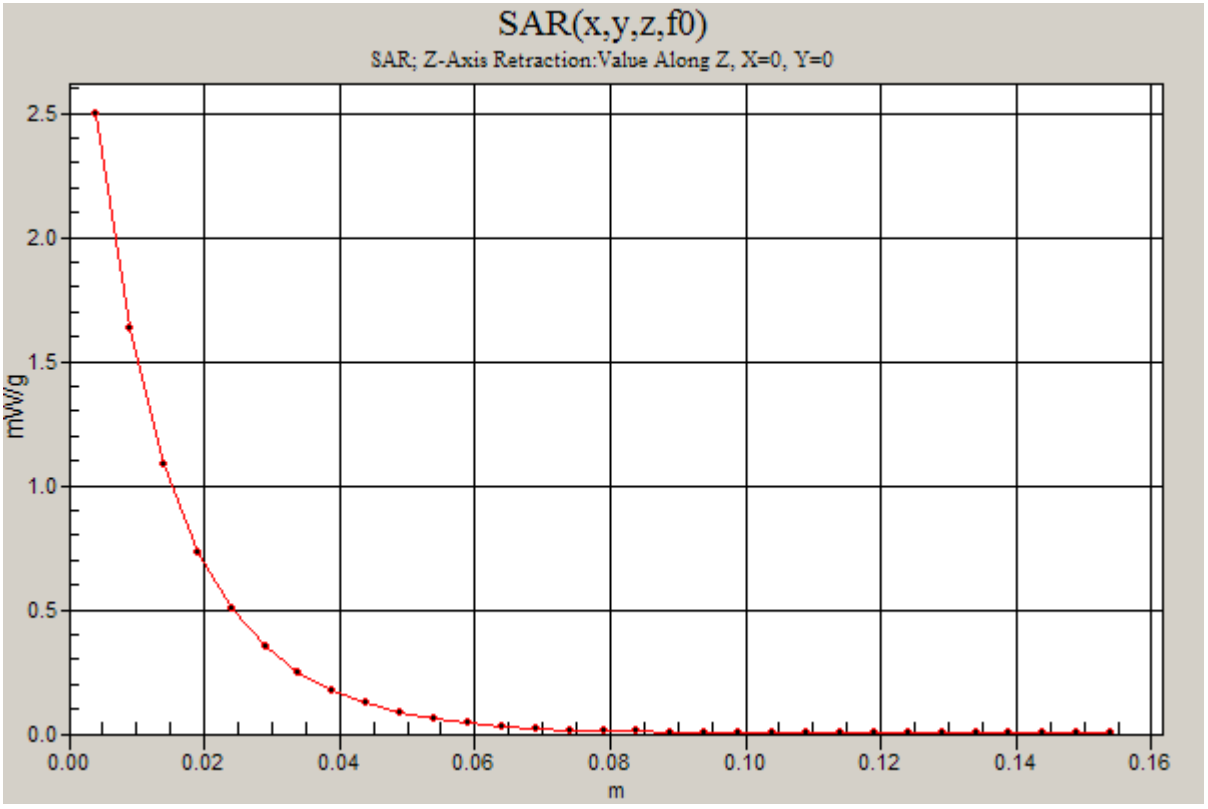
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 2.21 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 52.3 V/m; Power Drift = 0.031 dB; Peak SAR (extrapolated) = 3.49 W/kg
SAR(1 g) = 2.29 mW/g; SAR(10 g) = 1.46 mW/g; Maximum value of SAR (measured) = 2.50 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 52.3 V/m; Power Drift = 0.031 dB; Peak SAR (extrapolated) = 3.48 W/kg
SAR(1 g) = 2.28 mW/g; SAR(10 g) = 1.45 mW/g; Maximum value of SAR (measured) = 2.48 mW/g

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


mW/g
2.50
2.00
1.50
1.00
0.500
0.000


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: 6/12/2007 9:29:15 AM

Test Laboratory: Motorola - 061207 1800MHz Good at +3.1%

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:272TR; FCC ID: IHDT56HS1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272tr; Input Power = 200 mW
Sim.Temp@meas = 20.1*C; Sim.Temp@SPC =19.6*C; Room Temp @ SPC = 21.2*C
Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 1800 MHz; σ = 1.38 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3

DASY4 Configuration:

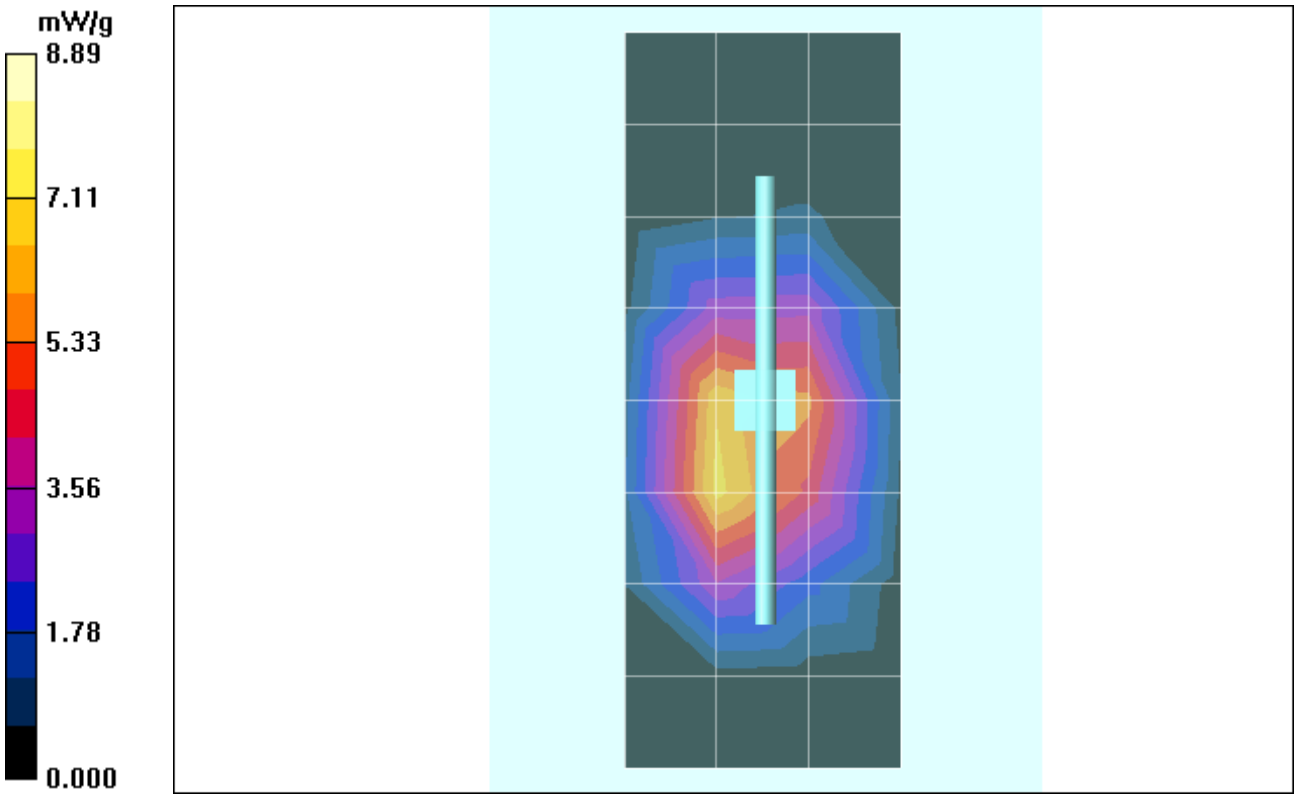
- Probe: ET3DV6 - SN1514; ConvF(5.05, 5.05, 5.05); Calibrated: 7/17/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

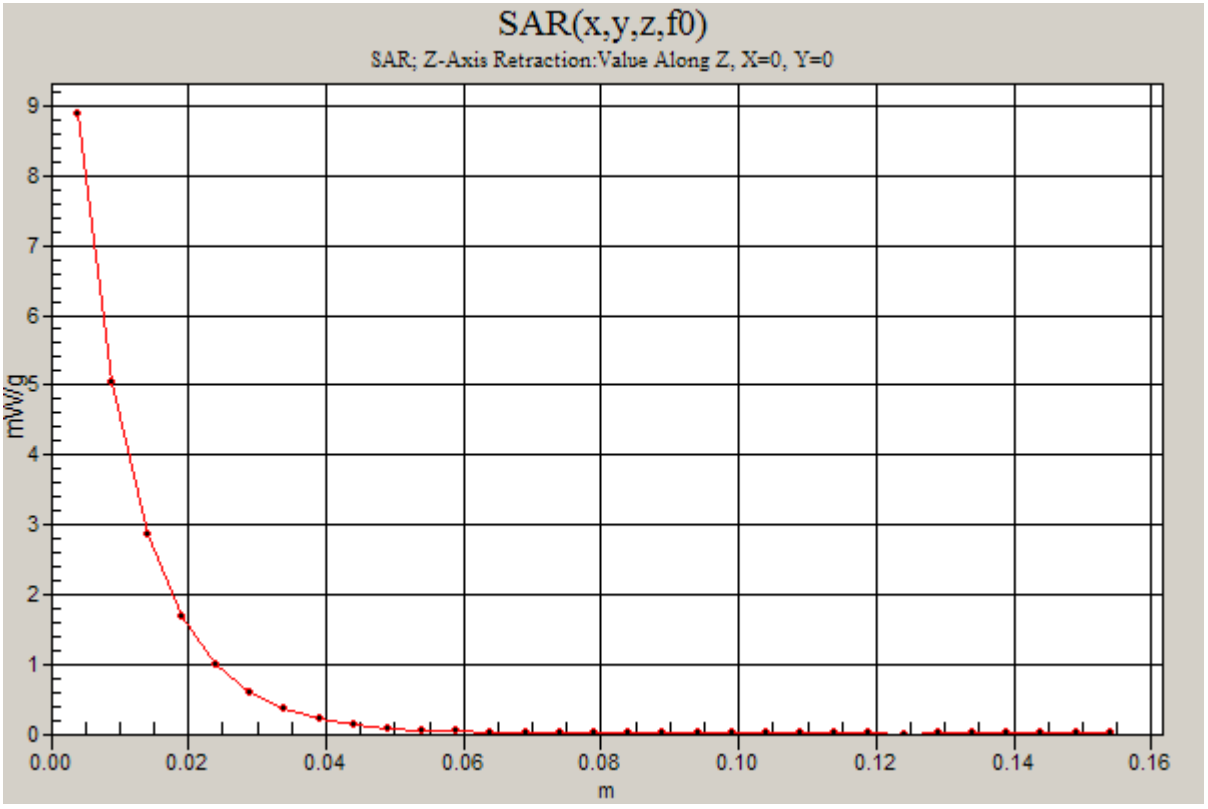
Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 6.77 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 81.3 V/m; Power Drift = 0.099 dB; Peak SAR (extrapolated) = 13.7 W/kg
SAR(1 g) = 7.84 mW/g; SAR(10 g) = 4.15 mW/g; Maximum value of SAR (measured) = 8.84 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 81.3 V/m; Power Drift = 0.099 dB; Peak SAR (extrapolated) = 13.8 W/kg
SAR(1 g) = 7.87 mW/g; SAR(10 g) = 4.18 mW/g; Maximum value of SAR (measured) = 8.52 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.89 mW/g


mW/g
8.89
7.11
5.33
3.56
1.78
0.000


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

Date/Time: 6/13/2007 8:41:44 AM

Test Laboratory: Motorola - 061307 1800MHz Good at +2.0%

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:272TR; FCC ID: IHDT56HS1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272tr; Input Power = 200 mW
Sim.Temp@meas = 20.3*C; Sim.Temp@SPC =19.9*C; Room Temp @ SPC = 20.8*C
Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 1800 MHz; σ = 1.38 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3

DASY4 Configuration:

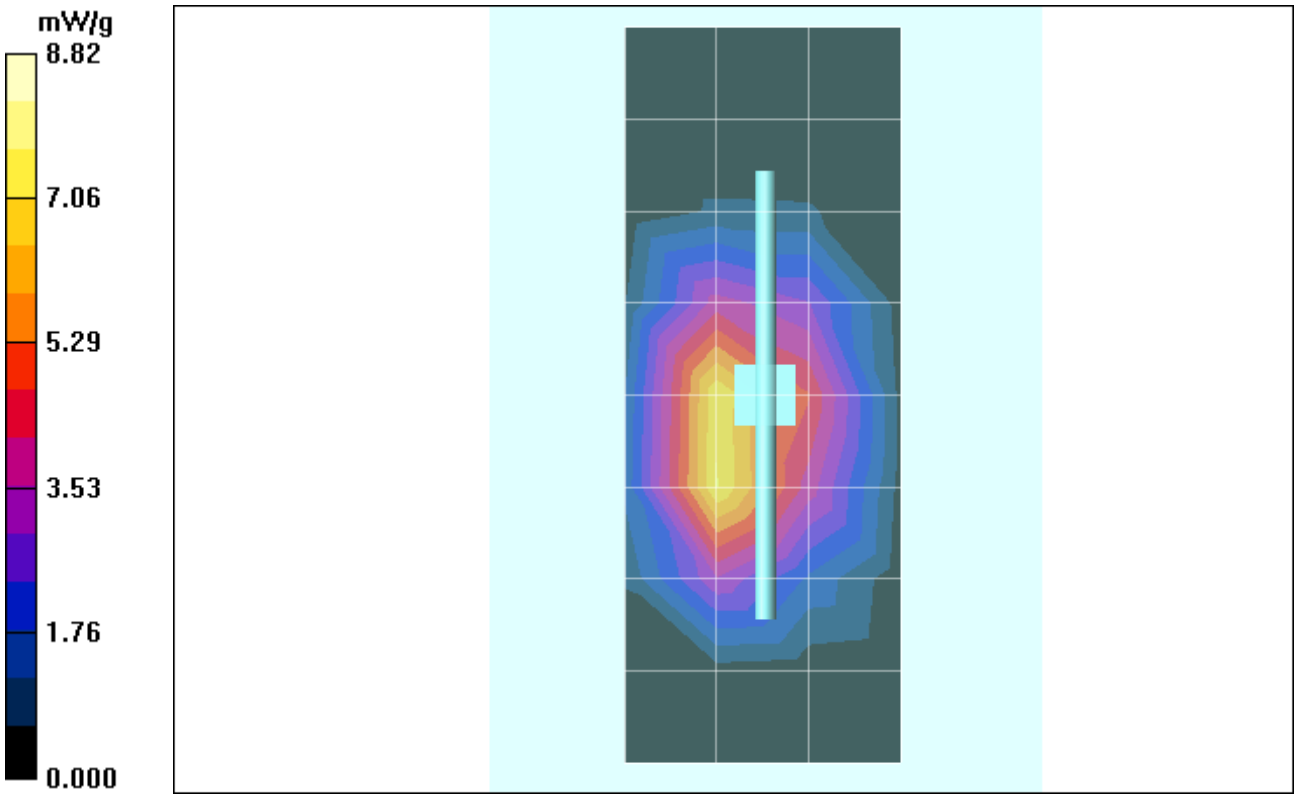
- Probe: ET3DV6 - SN1514; ConvF(5.05, 5.05, 5.05); Calibrated: 7/17/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

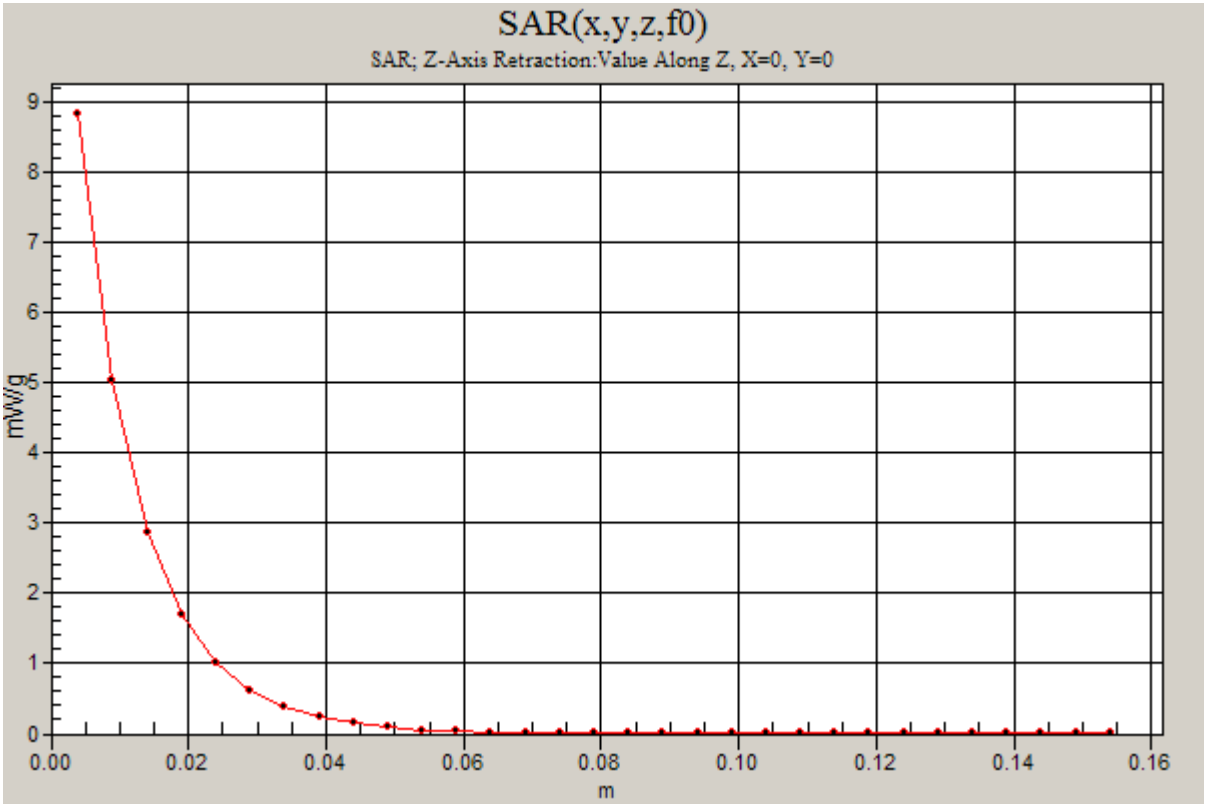
Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.12 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 80.1 V/m; Power Drift = 0.092 dB; Peak SAR (extrapolated) = 13.5 W/kg
SAR(1 g) = 7.74 mW/g; SAR(10 g) = 4.12 mW/g; Maximum value of SAR (measured) = 8.64 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 80.1 V/m; Power Drift = 0.092 dB; Peak SAR (extrapolated) = 13.8 W/kg
SAR(1 g) = 7.81 mW/g; SAR(10 g) = 4.14 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) = 8.82 mW/g


mW/g
8.82
7.06
5.29
3.53
1.76
0.000


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

Date/Time: 6/16/2007 6:19:03 AM

Test Laboratory: Motorola - 061607 1800MHz Good at -0.9%

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:272TR; IHDT56HS1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272tr; Input Power = 200 mW
Sim.Temp@meas = 20*C; Sim.Temp@SPC =20*C; Room Temp @ SPC = 20.6*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 = 40.2; ρ = 1000 kg/m^3

DASY4 Configuration:

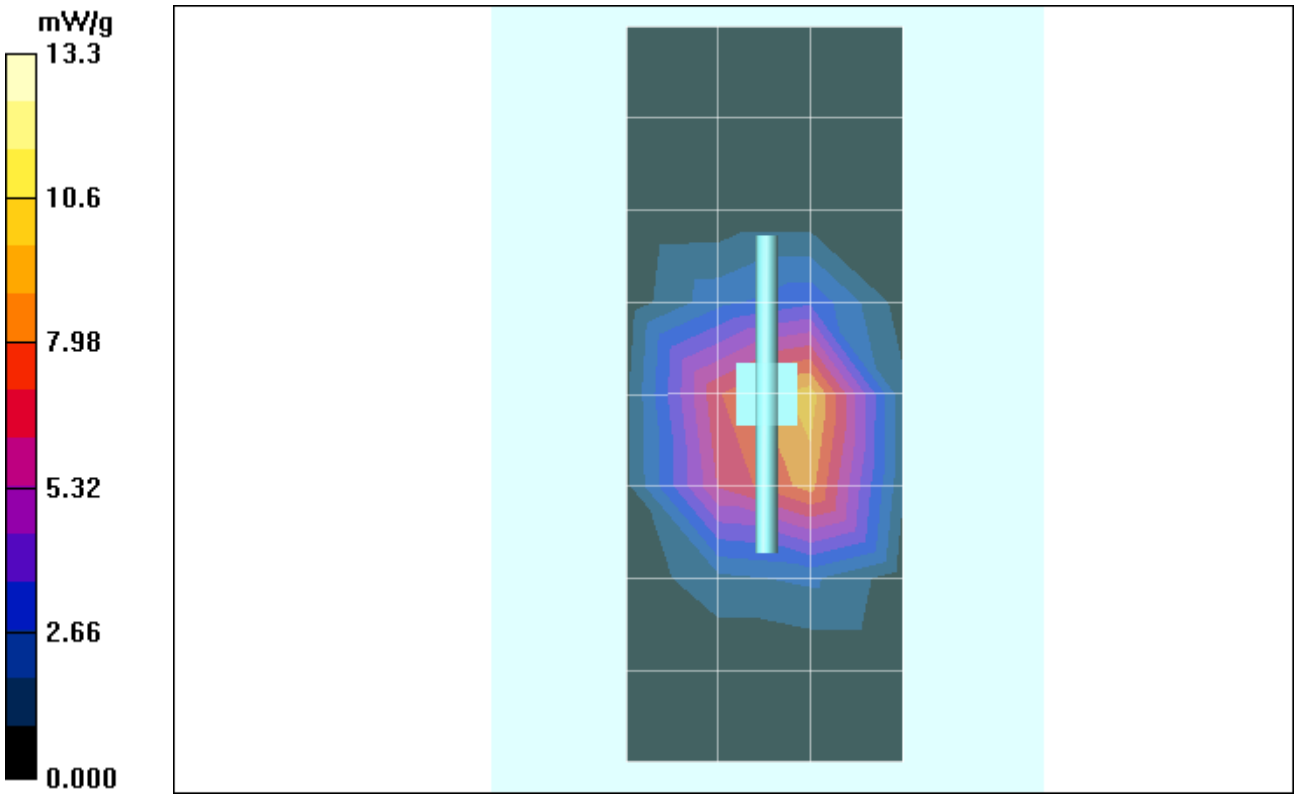
- Probe: ET3DV6 - SN1514; ConvF(5.05, 5.05, 5.05); Calibrated: 7/17/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

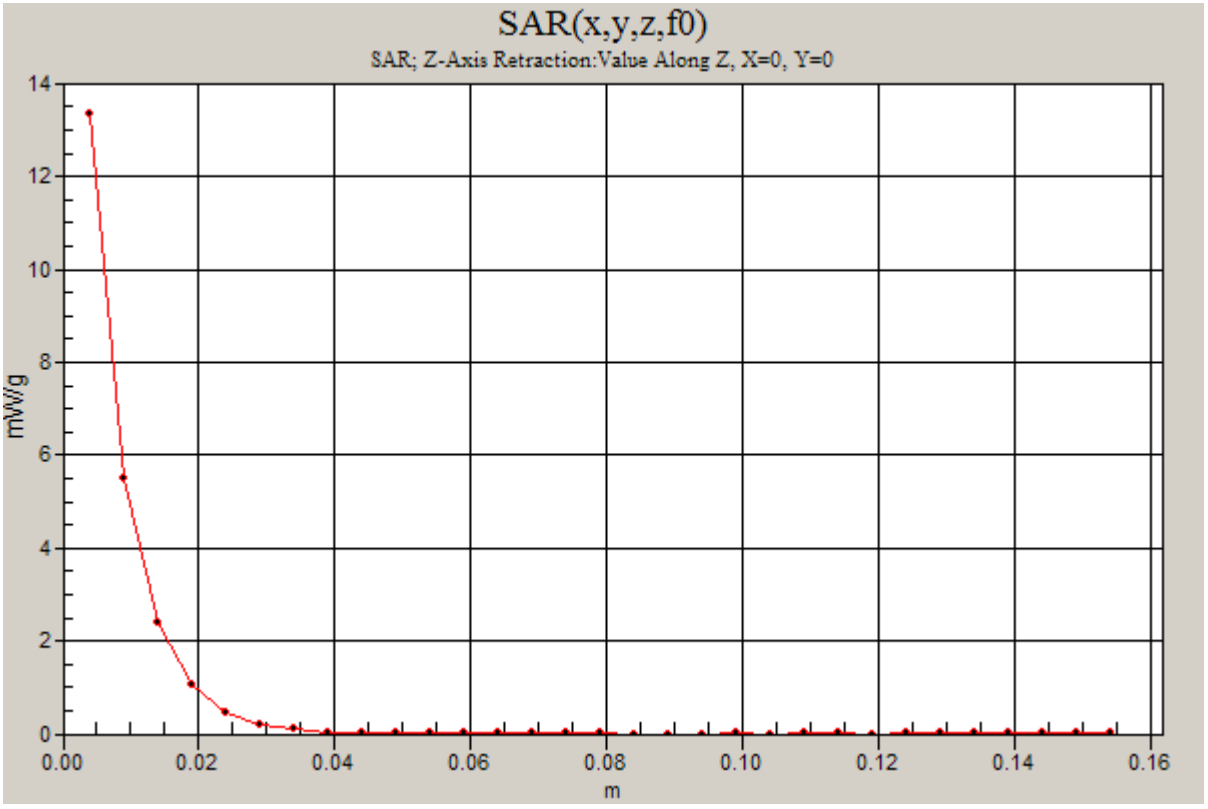
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 6.44 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.5 V/m; Power Drift = 0.039 dB; Peak SAR (extrapolated) = 13.1 W/kg
SAR(1 g) = 7.55 mW/g; SAR(10 g) = 4.03 mW/g; Maximum value of SAR (measured) = 8.51 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.5 V/m; Power Drift = 0.039 dB; Peak SAR (extrapolated) = 13.2 W/kg
SAR(1 g) = 7.56 mW/g; SAR(10 g) = 4.03 mW/g; Maximum value of SAR (measured) = 8.28 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.59 mW/g


mW/g
13.3
10.6
7.98
5.32
2.66
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
m
0
2
4
6
8
10
12
14
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: 6/14/2007 11:36:37 PM

Test Laboratory: Motorola - CDMA 800 Cheek

Serial: A000000212FA75; FCC ID: IHDT56HS1

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5783B; DEVICE POSITION (cheek or rotated): Cheek
Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3

DASY4 Configuration:

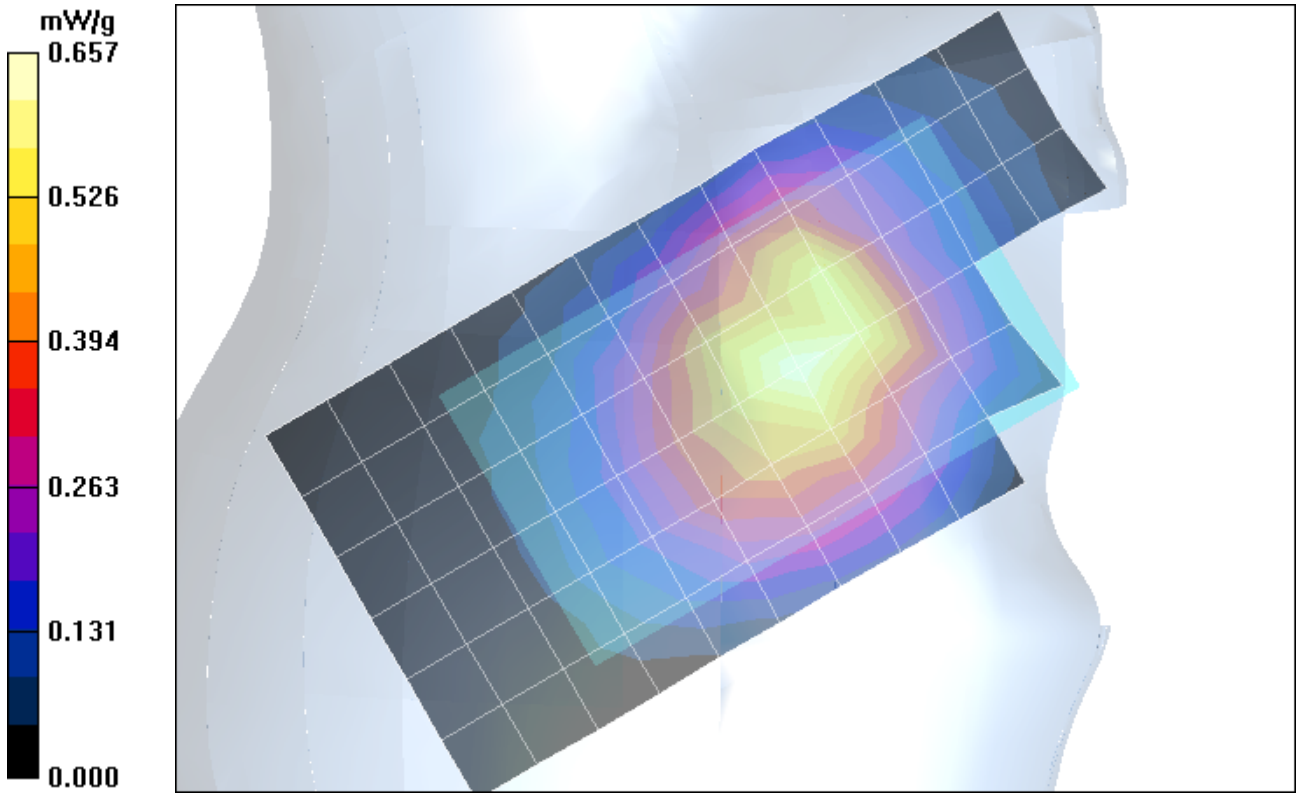
- Probe: ET3DV6 - SN1514; ConvF(5.99, 5.99, 5.99); Calibrated: 7/17/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 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) = 0.657 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm;
Reference Value = 27.0 V/m; Power Drift = -0.182 dB; Peak SAR (extrapolated) = 0.772 W/kg
SAR(1 g) = 0.624 mW/g; SAR(10 g) = 0.472 mW/g; Maximum value of SAR (measured) = 0.659 mW/g



Date/Time: 6/15/2007 10:12:12 AM

Test Laboratory: Motorola - CDMA 800 Tilt

Serial: A000000212FA75; FCC ID: IHDT56HS1
Procedure Notes: Pwr Step: All Bits Up; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5771A; DEVICE POSITION: Tilt
Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 42.1; ρ = 1000 kg/m^3

DASY4 Configuration:

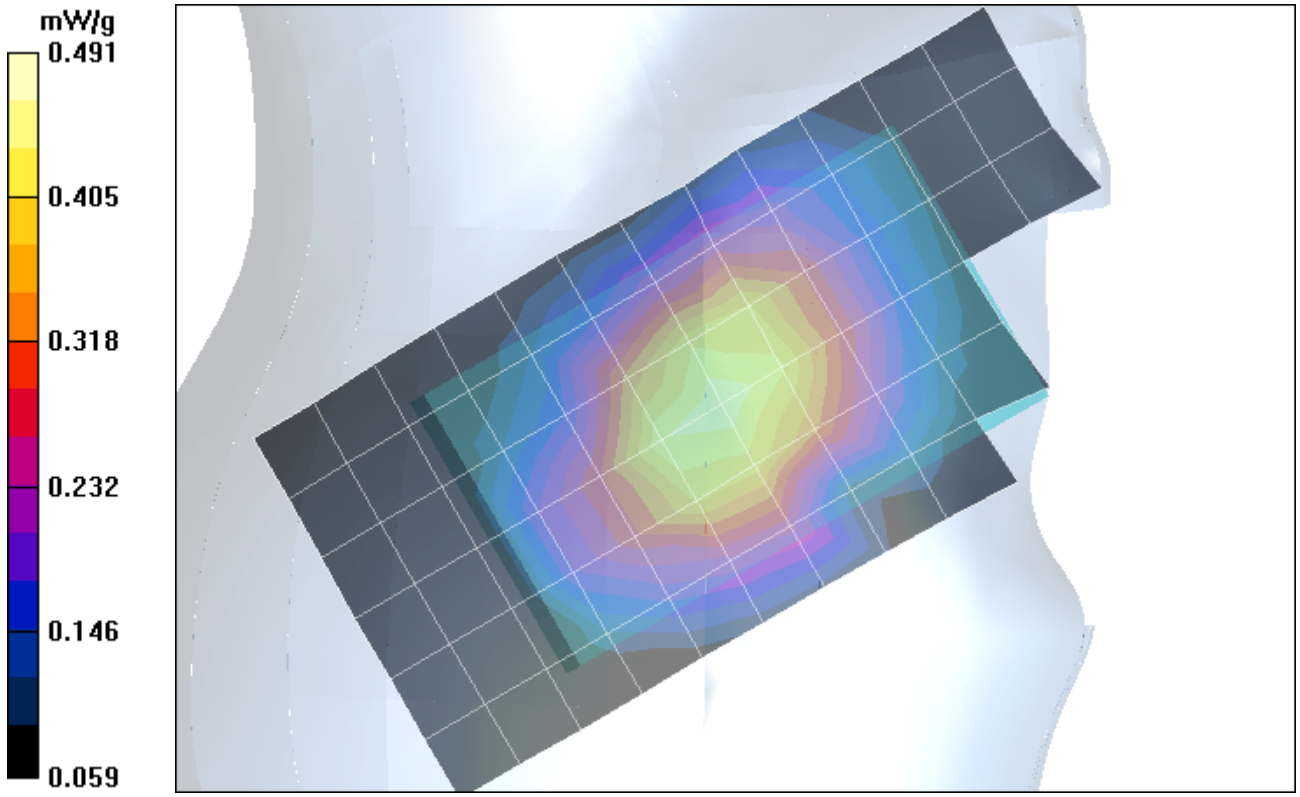
- Probe: ET3DV6 - SN1514; ConvF(5.99, 5.99, 5.99); Calibrated: 7/17/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 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) = 0.459 mW/g

Right 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 = -0.209 dB; Peak SAR (extrapolated) = 0.588 W/kg
SAR(1 g) = 0.463 mW/g; SAR(10 g) = 0.348 mW/g; Maximum value of SAR (measured) = 0.491 mW/g



Date/Time: 6/13/2007 2:46:25 PM

Test Laboratory: Motorola - CDMA 1900 Cheek

Serial: A000000212FA75; FCC ID: IHDT56HS1

Procedure Notes: Pwr Step: All Bits Up; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5765A; DEVICE POSITION: Cheek
Communication System: CDMA 1900; Frequency: 1908.75 MHz; Channel Number: 1175; Duty Cycle: 1:1
Medium: Glycol Head; Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3

DASY4 Configuration:

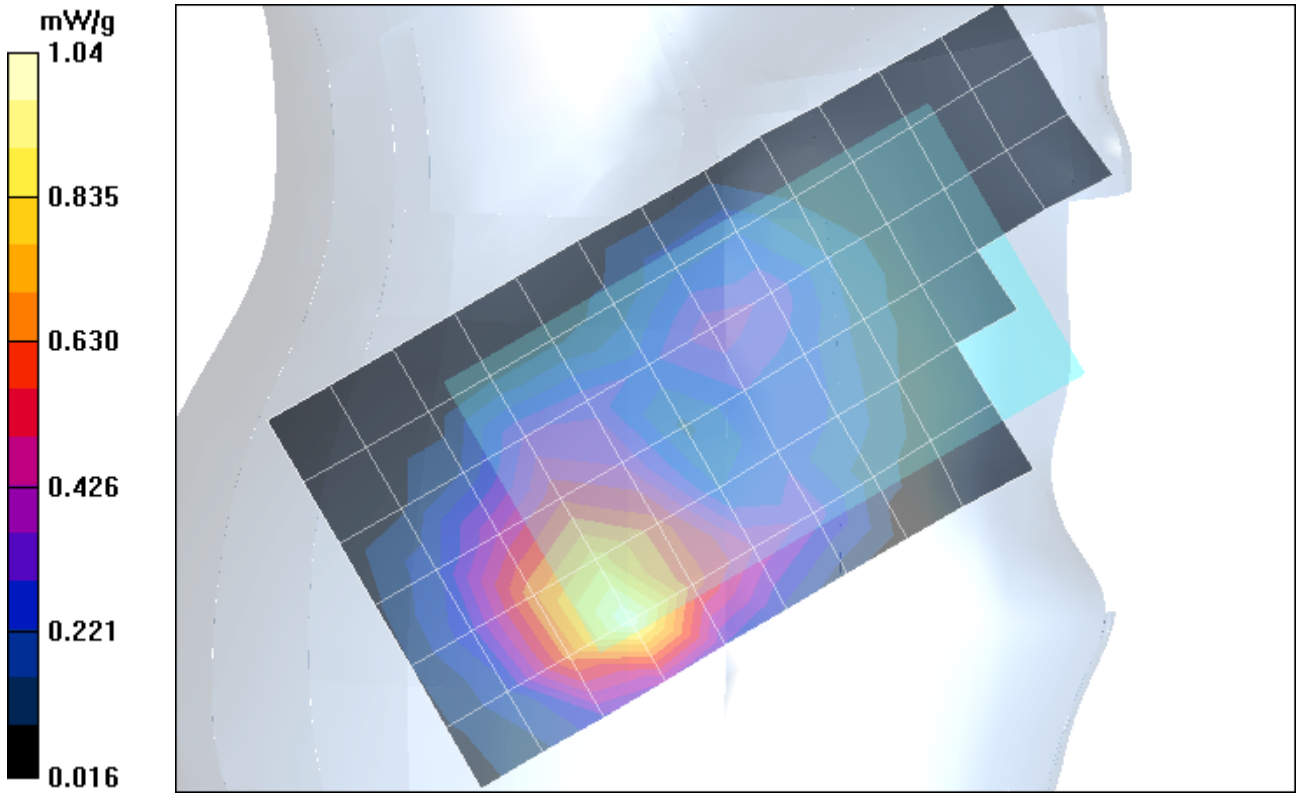
- Probe: ET3DV6 - SN1514; ConvF(5.05, 5.05, 5.05); Calibrated: 7/17/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.04 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.6 V/m; Power Drift = -0.016 dB; Peak SAR (extrapolated) = 1.72 W/kg
SAR(1 g) = 0.967 mW/g; SAR(10 g) = 0.552 mW/g



Date/Time: 6/12/2007 11:45:38 PM

Test Laboratory: Motorola - CDMA 1900 Tilt

Serial: A000000212FA75; FCC ID: IHDT56HS1

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Accessory Model #: None
Battery Model #: SNN5827A; DEVICE POSITION (cheek or rotated): Rotated
Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1
Medium: Glycol Head; Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3

DASY4 Configuration:

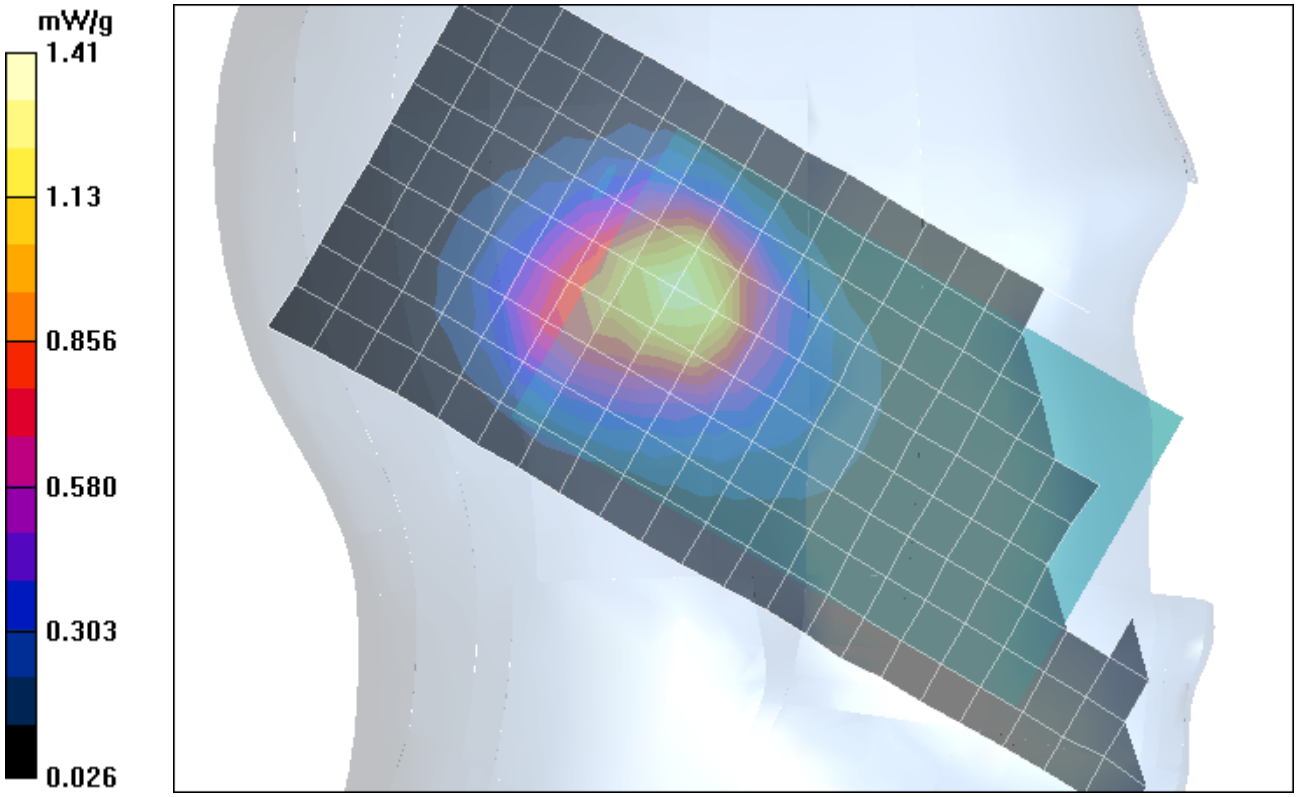
- Probe: ET3DV6 - SN1514; ConvF(5.05, 5.05, 5.05); Calibrated: 7/17/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 1.34 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.2 V/m; Power Drift = 0.303 dB; Peak SAR (extrapolated) = 2.07 W/kg
SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.736 mW/g; Maximum value of SAR (measured) = 1.41 mW/g



Appendix 3

SAR distribution plots for Push-To-Talk Use

Date/Time: 6/19/2007 1:13:04 PM

Test Laboratory: Motorola - CDMA 800 PTT

Serial: A000000212FA75; FCC ID: IHDT56HS1

Procedure Notes: Pwr Step: All Bits Up; Antenna Position: Internal; Battery Model #: SNN5771A
Device Position: Push-to-Talk Position, Front of Phone 25mm from Flat Phantom with EV-DO enabled
Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3

DASY4 Configuration:

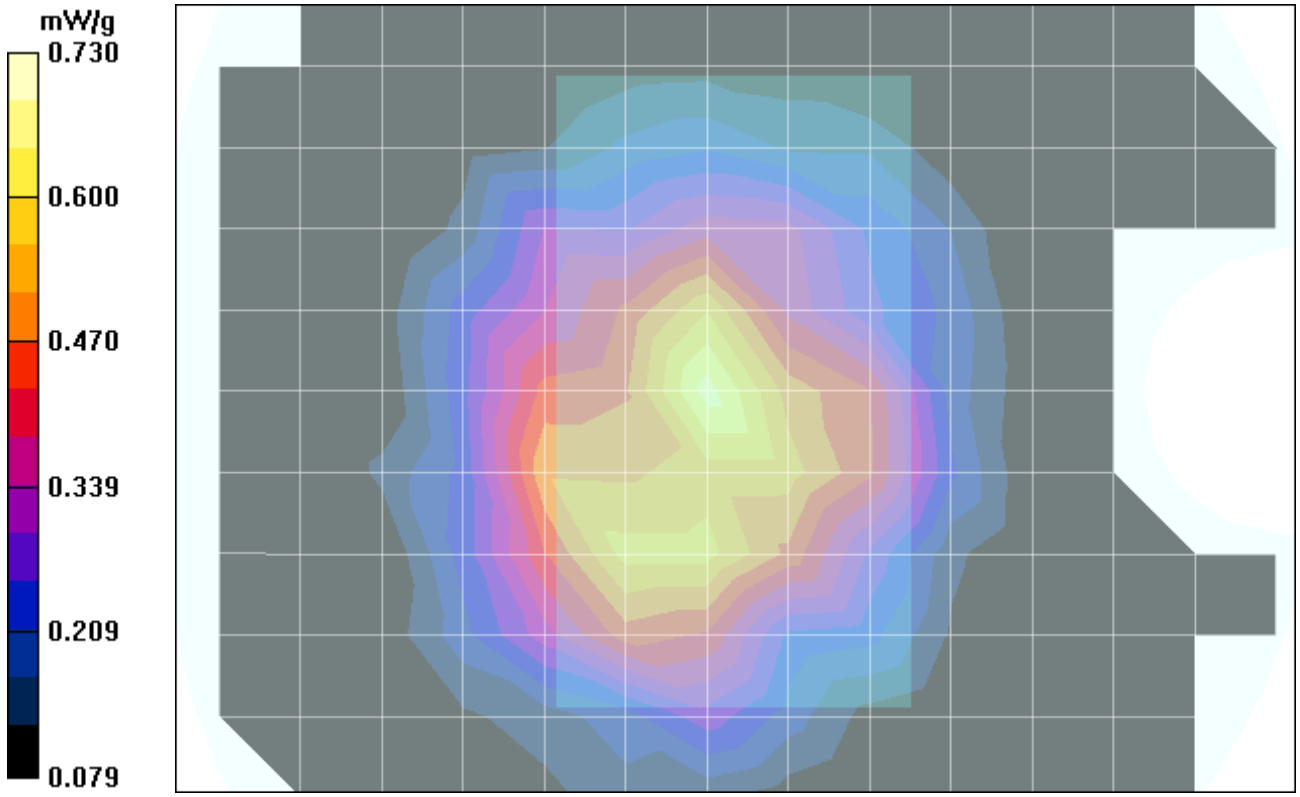
- Probe: ET3DV6 - SN1514; ConvF(5.99, 5.99, 5.99); Calibrated: 7/17/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Sugar Water SAM; Type: SAM; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, 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) = 0.668 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm;
Reference Value = 24.3 V/m; Power Drift = -0.304 dB; Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.671 mW/g; SAR(10 g) = 0.456 mW/g; Maximum value of SAR (measured) = 0.730 mW/g



Date/Time: 6/16/2007 7:21:31 AM

Test Laboratory: Motorola - CDMA 1900 PTT

Serial: A000000212FA75; FCC ID: IHDT56HS1

Procedure Notes: Pwr Step: All Bits Up; Antenna Position: Internal; Battery Model #: SNN5827A
Device Position: Push-to-Talk Position, Front of Phone 25mm from Flat Phantom with EV-DO enabled
Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1
Medium: Glycol Head; Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 39.8; ρ = 1000 kg/m^3

DASY4 Configuration:

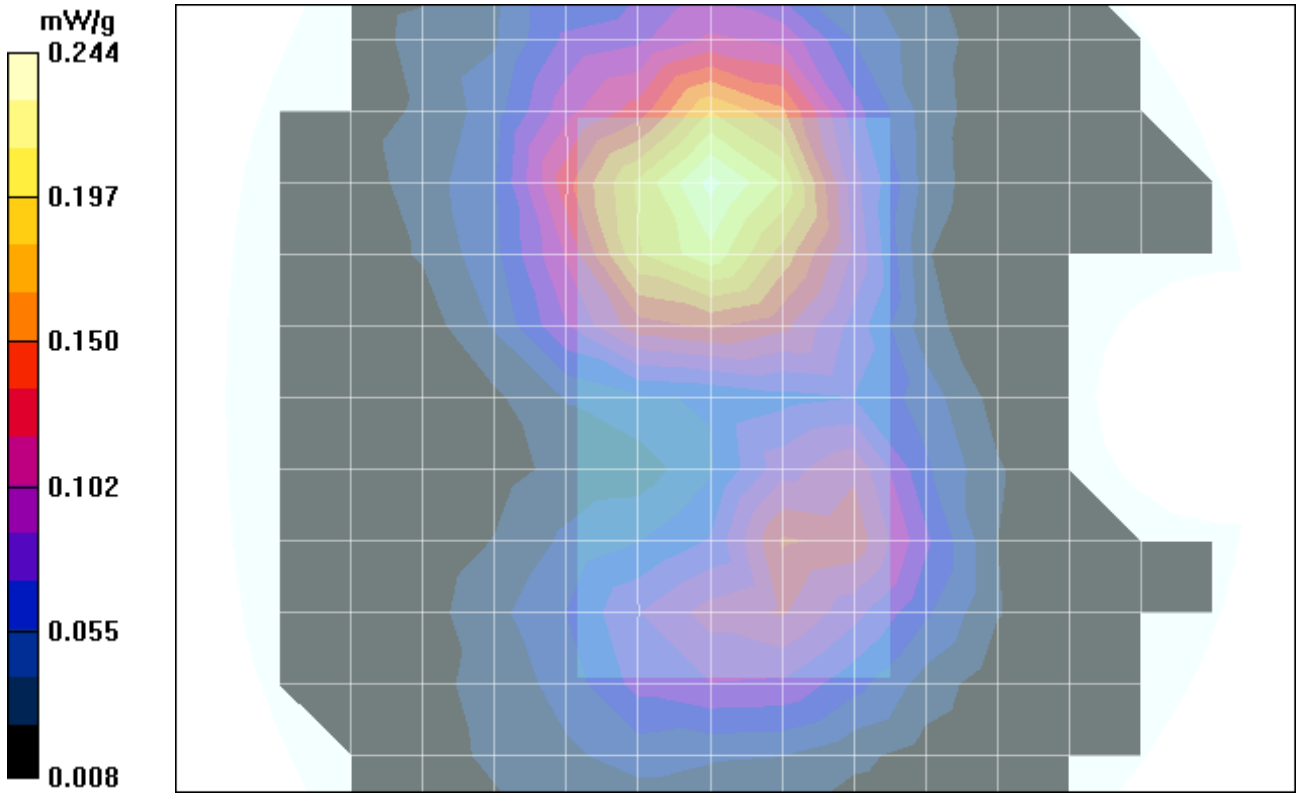
- Probe: ET3DV6 - SN1514; ConvF(5.05, 5.05, 5.05); Calibrated: 7/17/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4: Glycol SAM; Type: SAM; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.234 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.1 V/m; Power Drift = -0.328 dB; Peak SAR (extrapolated) = 0.362 W/kg
SAR(1 g) = 0.220 mW/g; SAR(10 g) = 0.132 mW/g; Maximum value of SAR (measured) = 0.244 mW/g



Appendix 4

SAR distribution plots for Body Worn Configurations

Date/Time: 6/19/2007 4:52:24 PM

Test Laboratory: Motorola - CDMA 800 Body

Serial: A000000212FA75; FCC ID: IHDT56HS1
Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Battery Model #: SNN5783B
Device Position: Body Worn, Back of Phone 15mm From Flat Phantom with Bluetooth enabled
Communication System: CDMA 835; Frequency: 824.7 MHz; Channel Number: 1013; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3

DASY4 Configuration:

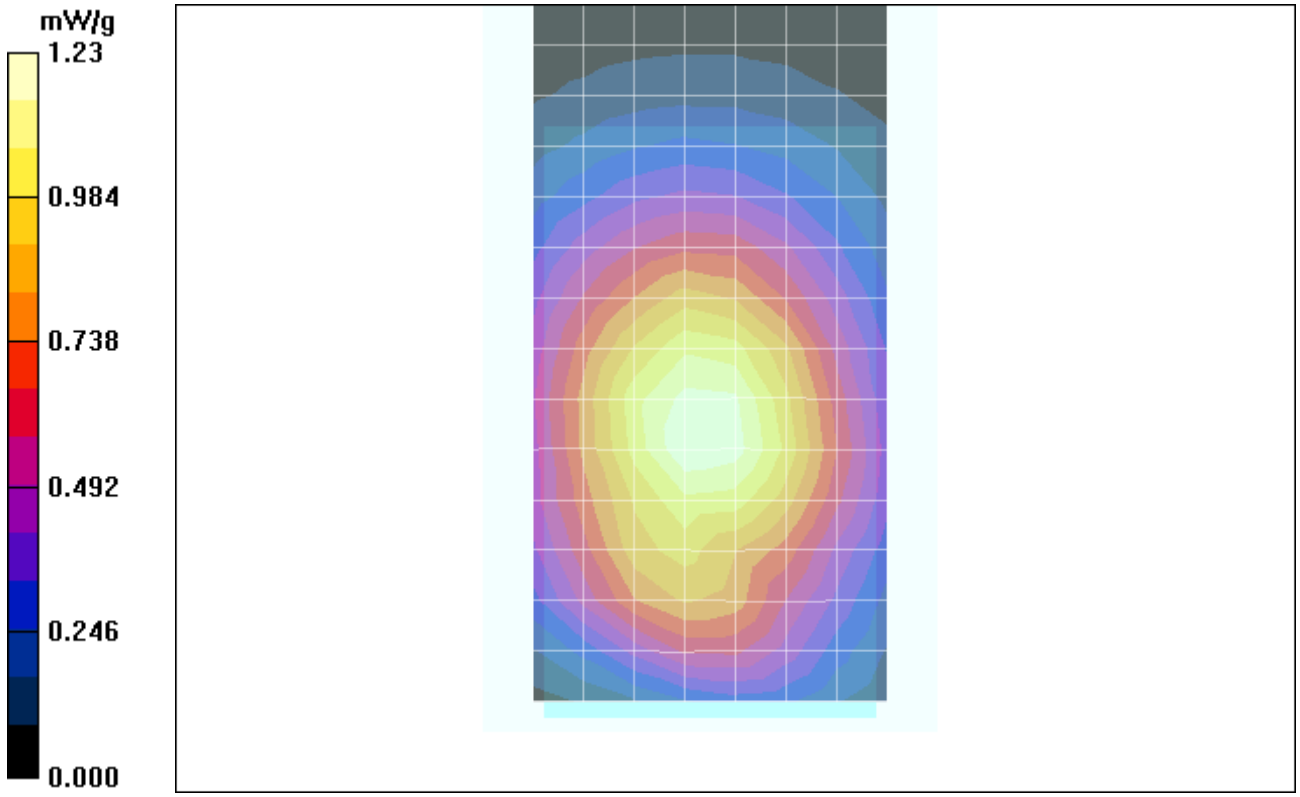
- Probe: ET3DV6 - SN1514; ConvF(5.86, 5.86, 5.86); Calibrated: 7/17/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4 : Sect.1, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

Amy Twin Phone Template/Area Scan - Normal Extended Body (10mm) (24x10x1):

Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 1.23 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.6 V/m; Power Drift = -0.018 dB; Peak SAR (extrapolated) = 1.50 W/kg
SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.832 mW/g; Maximum value of SAR (measured) = 1.18 mW/g



Date/Time: 6/16/2007 9:14:17 AM

Test Laboratory: Motorola - CDMA 1900 Body

Serial: A000000212FA75; FCC ID: IHDT56HS1

Procedure Notes: Pwr Step: All Bits Up; Antenna Position: Internal; Battery Model #: SNN5783B
Device Position: Body Worn, Back of Phone 15mm from Flat Phantom
Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1
Medium: Glycol Body; Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3

DASY4 Configuration:

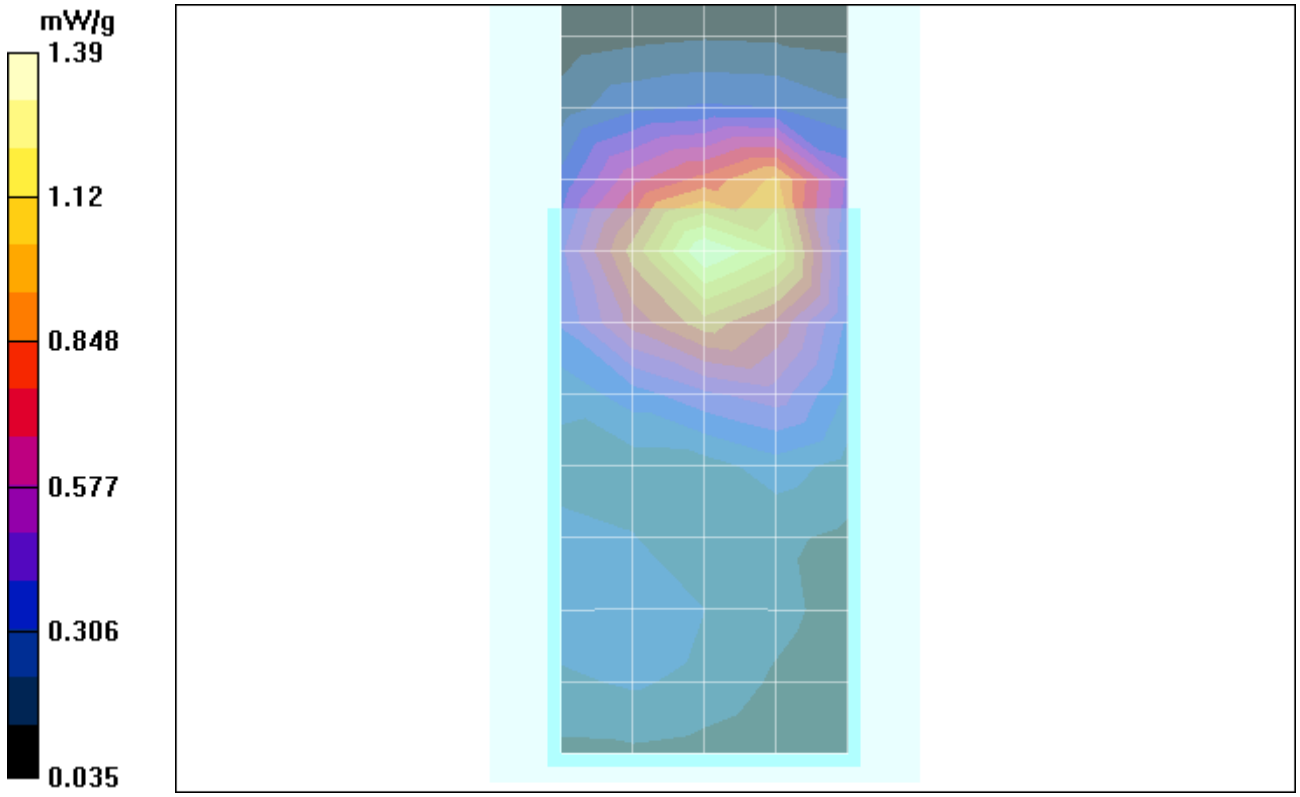
- Probe: ET3DV6 - SN1514; ConvF(4.53, 4.53, 4.53); Calibrated: 7/17/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn437; Calibrated: 7/18/2006
- Phantom: R4 : Sect.2, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.30 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.1 V/m; Power Drift = -0.065 dB; Peak SAR (extrapolated) = 2.10 W/kg
SAR(1 g) = 1.27 mW/g; SAR(10 g) = 0.756 mW/g; Maximum value of SAR (measured) = 1.39 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
S Swiss Calibration Service

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

Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: ET3-1514_Jul06

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1514
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	July 17, 2006
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)	11-Aug-05 (METAS, No. 251-00499)	Aug-06
Reference 20 dB Attenuator	SN: S5086 (20b)	4-Apr-06 (METAS, No. 251-00558)	Apr-07
Reference 30 dB Attenuator	SN: S5129 (30b)	11-Aug-05 (METAS, No. 251-00500)	Aug-06
Reference Probe ES3DV2	SN: 3013	2-Jan-06 (SPEAG, No. ES3-3013_Jan06)	Jan-07
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 Nov-05)	In house check: Nov 06

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

Issued: July 17, 2006

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

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

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

Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ET3DV6

SN:1514

Manufactured:	November 24, 1999
Last calibrated:	July 20, 2005
Recalibrated:	July 17, 2006

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1514

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

NormX	**1.74** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**86** mV
NormY	**1.90** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**91** mV
NormZ	**1.87** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**84** 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	9.7	5.0
SAR_{be} [%]	With Correction Algorithm	0.1	0.3

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	11.8	7.0
SAR_{be} [%]	With Correction Algorithm	0.2	0.4

Sensor Offset

Probe Tip to Sensor Center	**2.7** mm

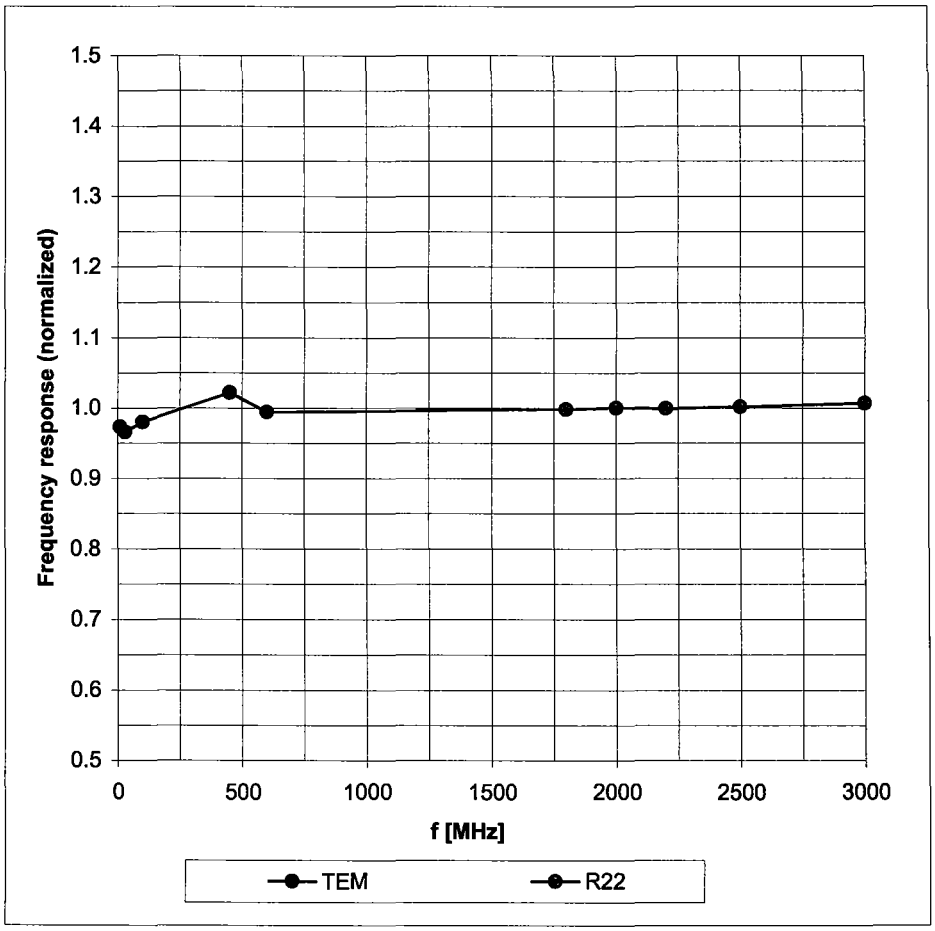
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

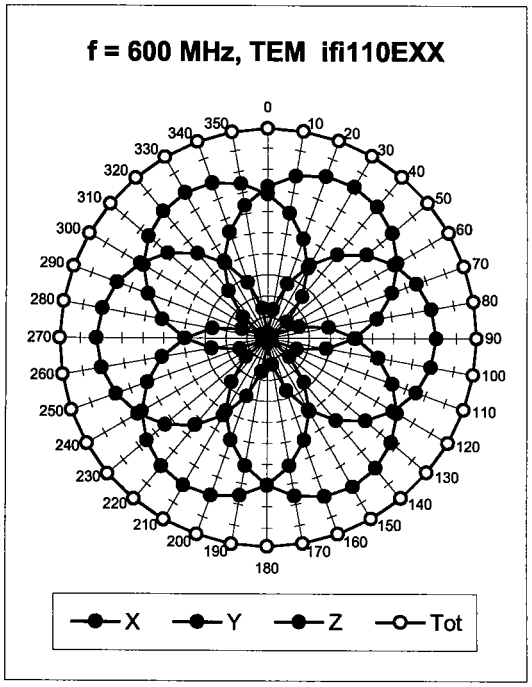
Frequency Response of E-Field

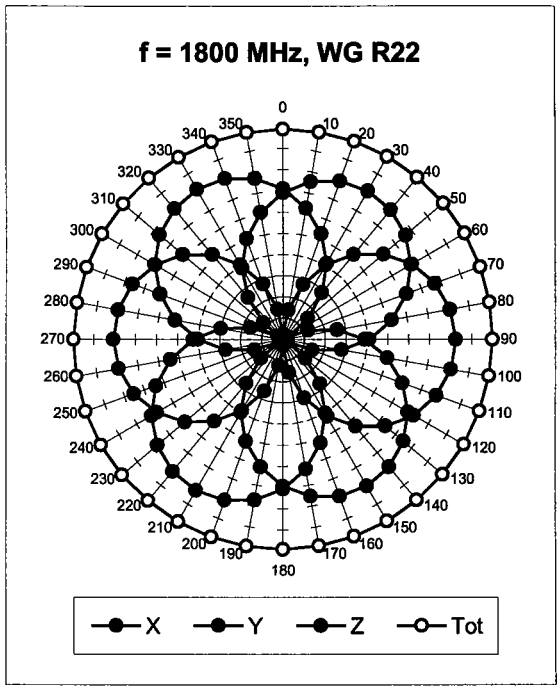
(TEM-Cell:ifi110 EXX, Waveguide: R22)

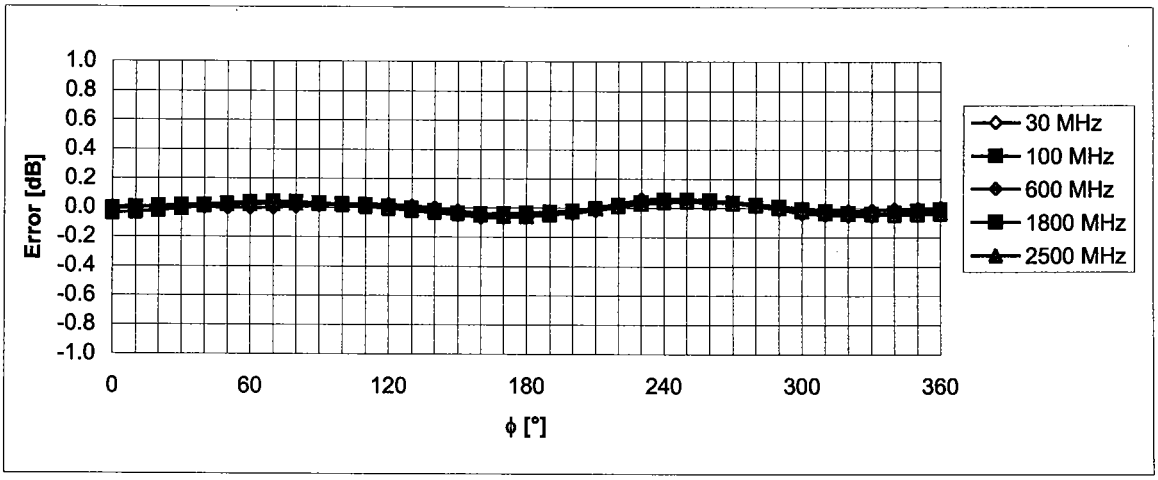


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



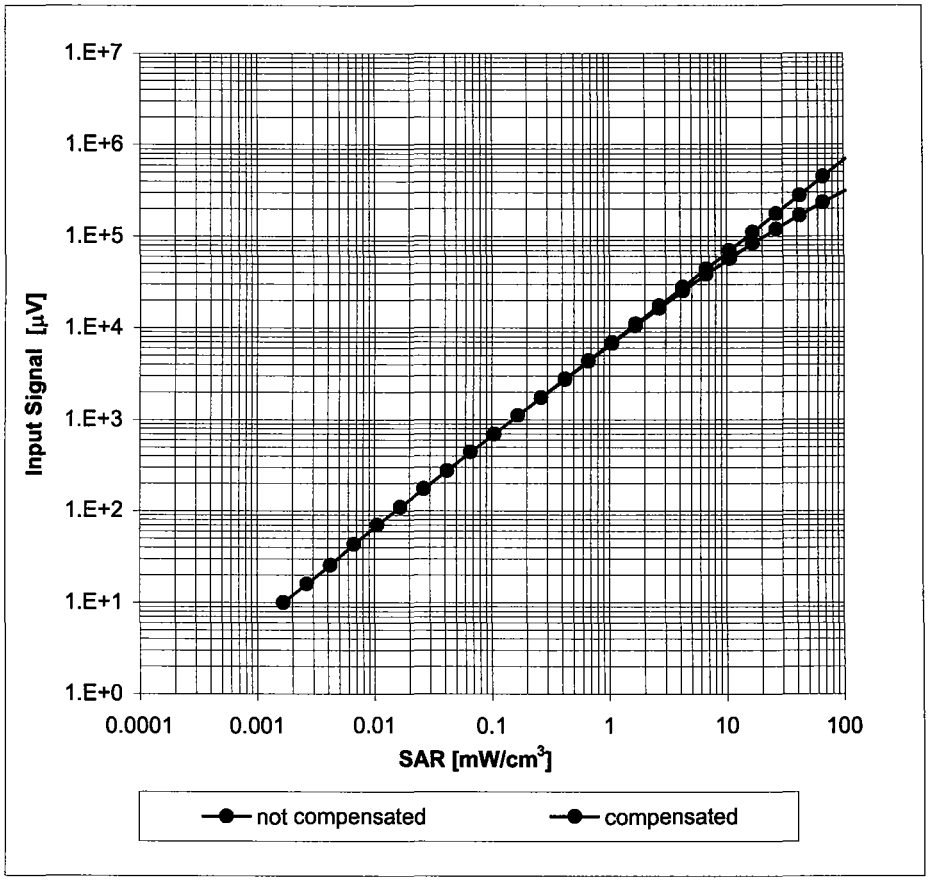


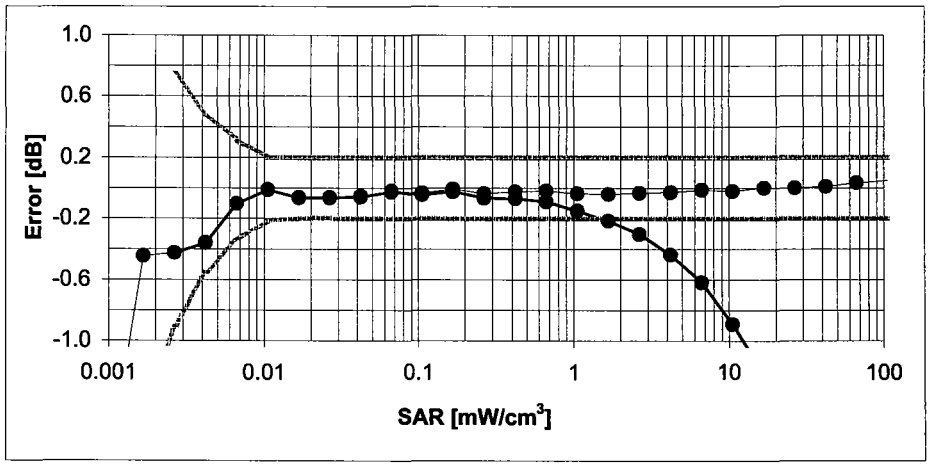


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

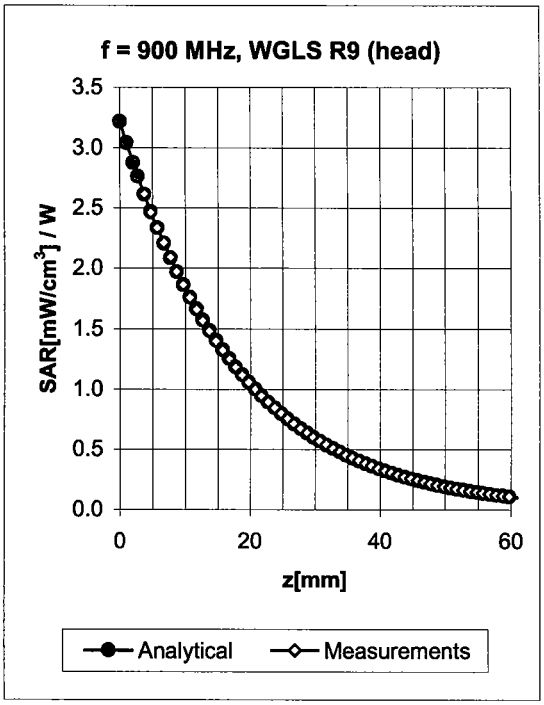
(Waveguide R22, f = 1800 MHz)

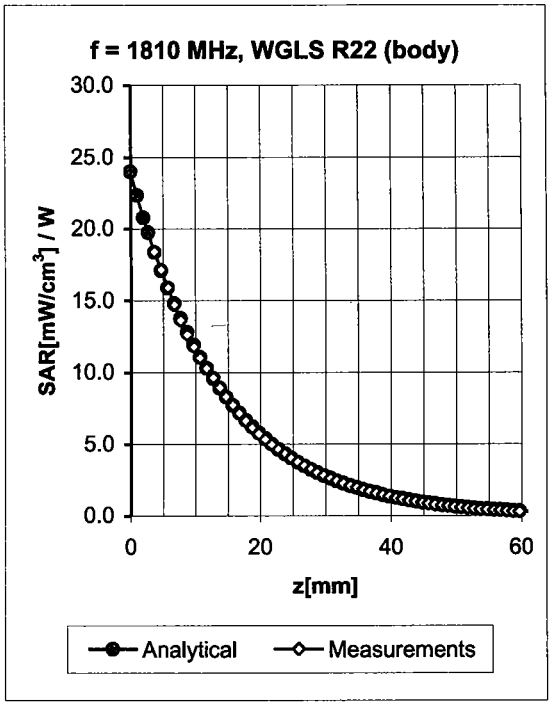




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



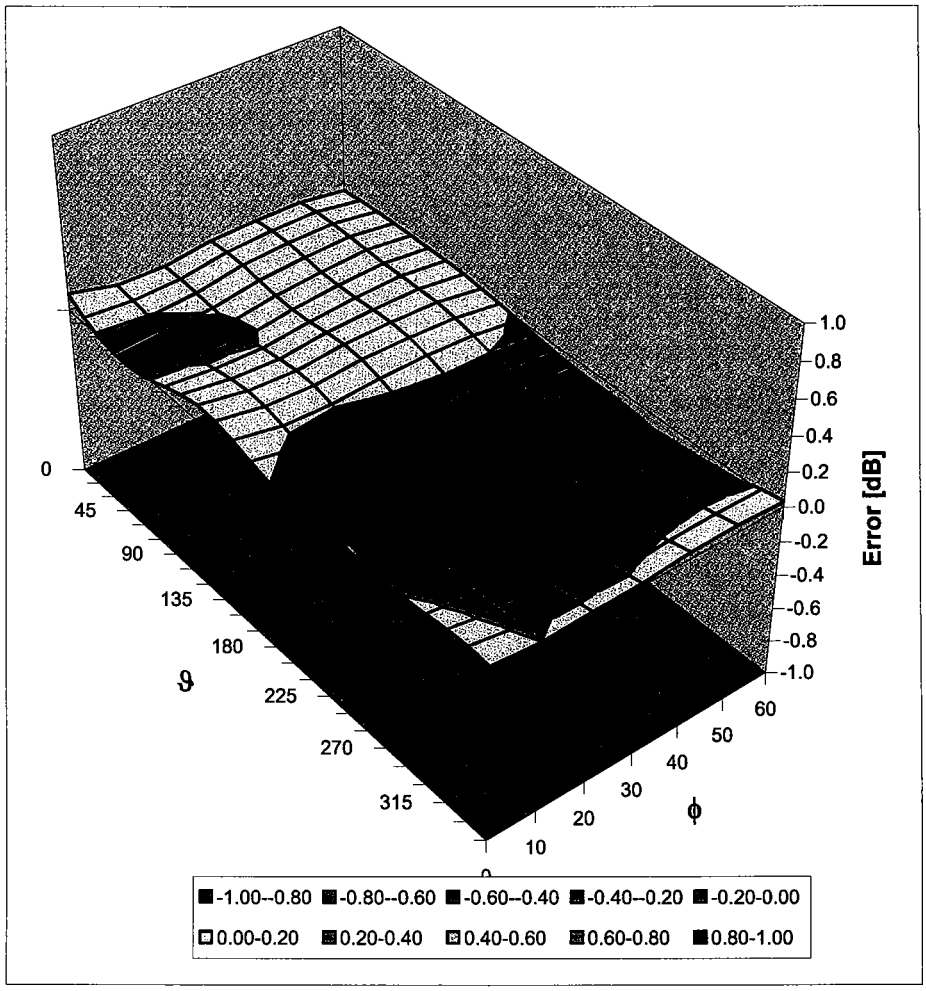


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.67	1.82	5.99	± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.57	2.46	5.05	± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.56	2.49	4.76	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.65	2.09	4.47	± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.64	1.95	5.86	± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.61	2.53	4.53	± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.75	2.16	4.30	± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.62	2.07	4.16	± 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
S Swiss Calibration Service

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

Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: ES3-3124_Nov06

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3124
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	November 20, 2006
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	2-Jan-06 (SPEAG, No. ES3-3013_Jan06)	Jan-07
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:	Niels Kuster	Quality Manager	

Issued: November 20, 2006

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ES3DV3

SN:3124

Manufactured: July 11, 2006
Calibrated: November 20, 2006

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ES3DV3 SN:3124

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

NormX	**1.25** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**94** mV
NormY	**1.29** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**95** mV
NormZ	**1.33** ± 10.1%	$\mu V/(V/m)^2$	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

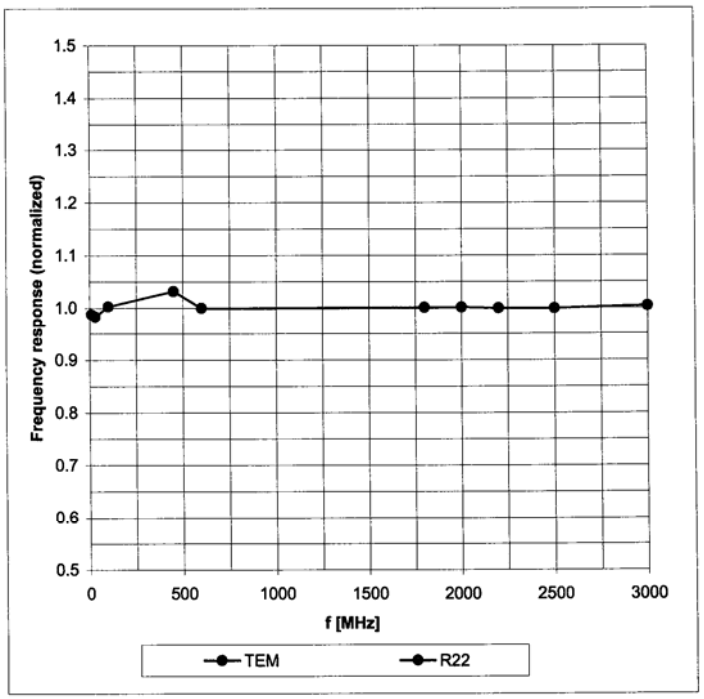
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

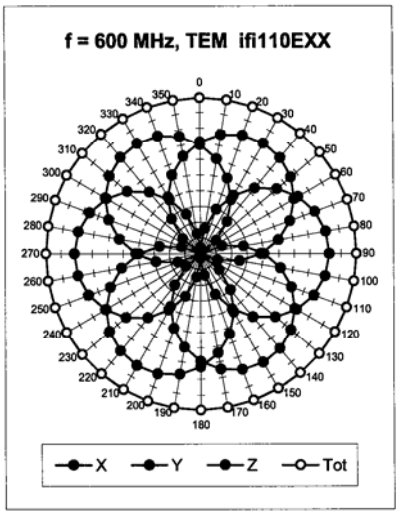
Frequency Response of E-Field

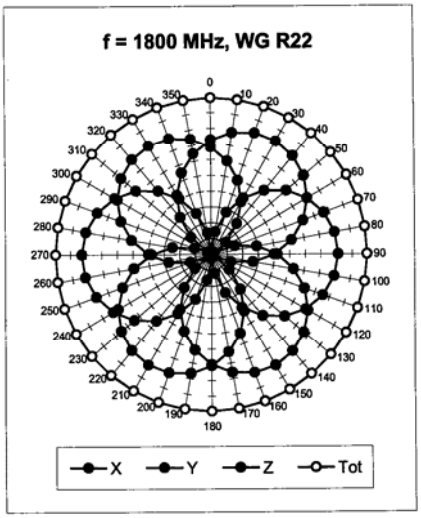
(TEM-Cell:ifi110 EXX, Waveguide: R22)

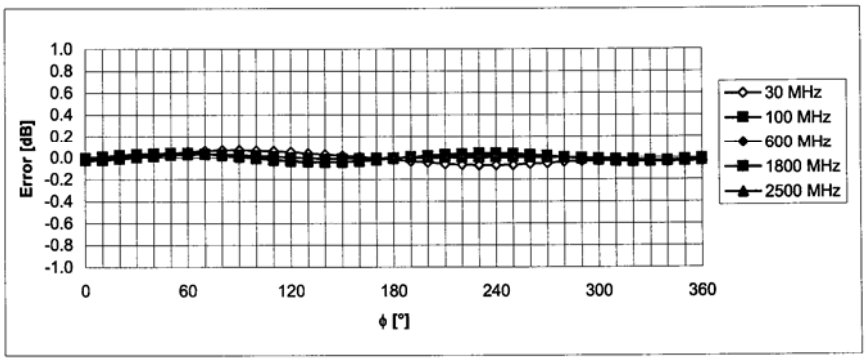


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



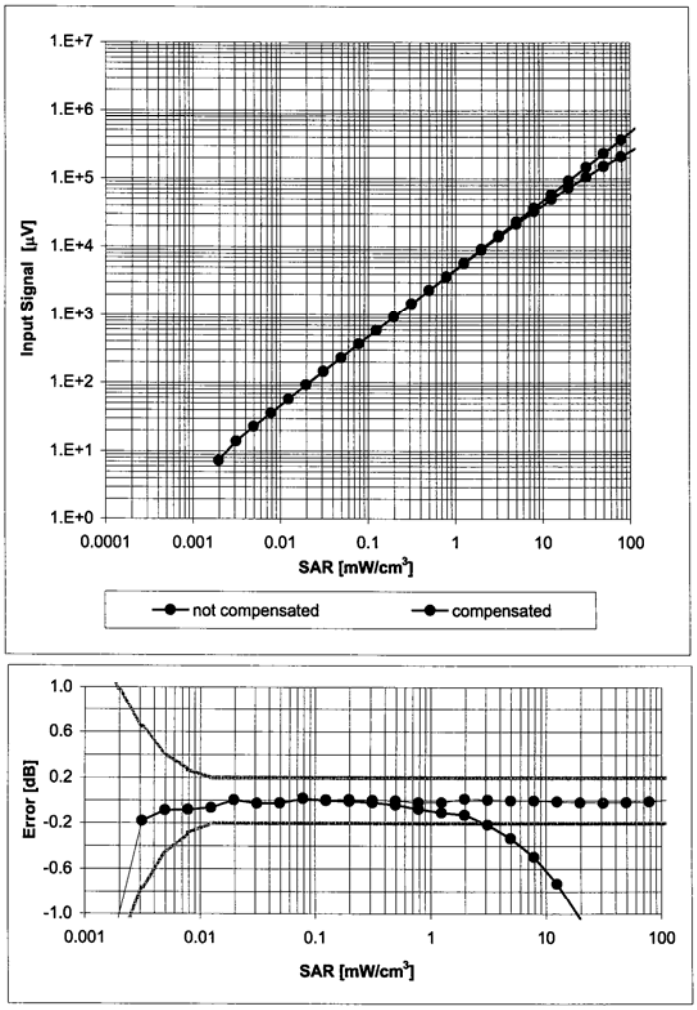




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

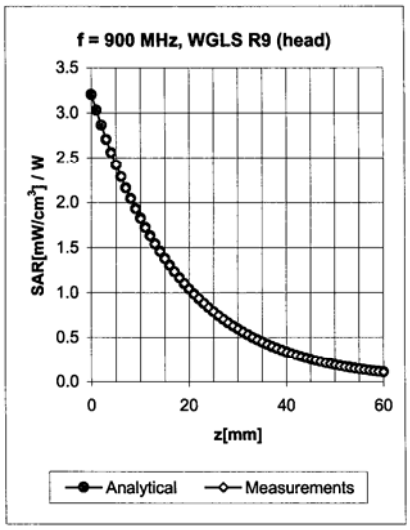
Dynamic Range f(SAR_{head})

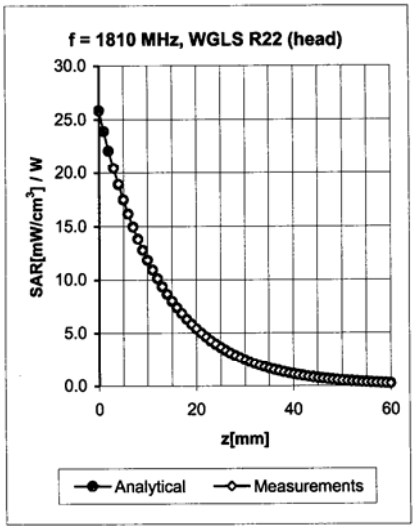
(Waveguide R22, f = 1800 MHz)



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

Conversion Factor Assessment



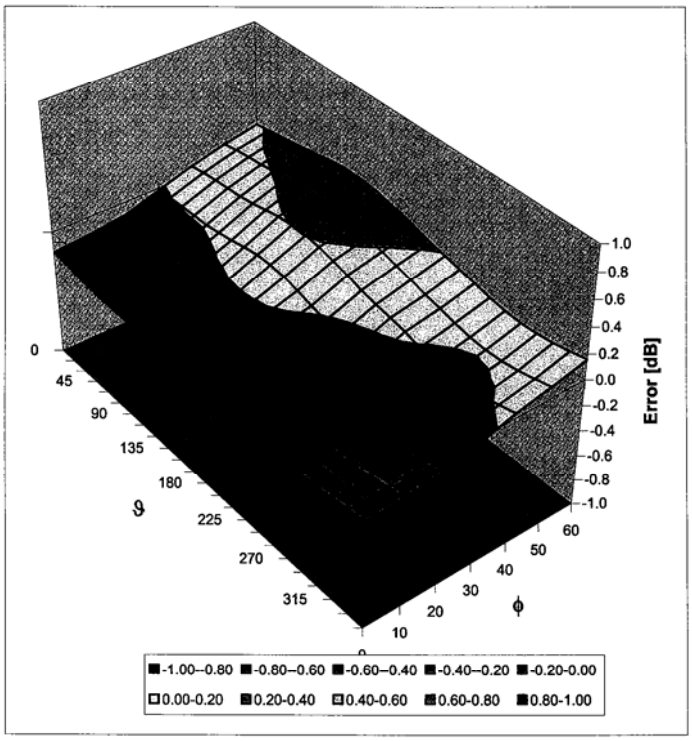


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.56	1.30	5.95 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.90	1.23	5.14 ± 11.0% (k=2)
2300	± 50 / ± 100	Head	39.4 ± 5%	1.71 ± 5%	0.71	1.47	4.70 ± 11.8% (k=2)
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)
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)

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 7

Photographs of the device under test

For photographs, please refer to Exhibit 7.

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: Marge Kaunas

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

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

Signed: Mark Douglas

Comments:

Certification of System Performance Check Targets
Based on WI-0396

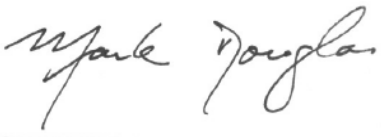
-Historical Data-

	2450MHz	
IEEE1528 Target:	52.4	**(W/kg)**
Measurement Uncertainty (k=1):	9.0%	
Measurement Period:	*10-May-06 to 18-April-07*	
# of tests performed:	32	
Grand Average:	58.0	**(W/kg)**
% Delta (Average - IEEE1528 Target)	10.6%	
Is % Delta <= Expanded Measurement Uncertainty (k=2)?	**Yes**	
Accept/Reject Average as new system performance check target?	**ACCEPT**	
	Applies to Dipole SN's: **740, 766, 767, 788, 789**	

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

Frequency	SAR Target (W/kg)	Permittivity	Conductivity (S/m)
2450MHz	**58.0**	39.2 ± 5%	1.80 ± 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:			