MOTOROLA

Portable Cellular Phone SAR Test Report

Tests Requested By:	Motorola Mobility, Inc. 600 N. US Highway 45 Libertyville, IL 60048
Test Report #:	23950-1F v2.0
Date of Report:	Aug-18-2010
Date of Test:	Jul-30-2010 to Aug-13-2010 & Sep-27-2010
FCC ID #:	IHDP56LV1
Generic Name:	MURQ6-3334411A11
Test Laboratory:	Motorola Mobility, Inc. - Product Safety & Compliance Laboratory 600 N. US Highway 45 Libertyville, IL 60048
Report Author:	Thomas Knipple Senior RF Engineer

Accreditation:

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 ARIB Std. T-56 (2002)

TESTING CERT #2518-02

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)

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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].

For ANSI / IEEE C95.1 (1 g), the final SAR reading for this phone is 1.39 W/kg for head-adjacent use and 0.78 W/kg for body-worn use. These measurements were performed using a Dasy4™ v4.7 system manufactured by Schmid & Partner Engineering AG (SPEAG), of Zurich Switzerland.

2. Description of the Device Under Test

2.1 Antenna description

Main Antenna

Type	Internal	
Location	Bottom of Transceiver	
Dimensions	Width	12.5 mm
	Length	55.41 mm

Bluetooth/Wi-Fi Antenna

Type	Internal	
Location	Left-Side Rear of Transceiver	
Dimensions	Width	3.47 mm
	Length	21.0 mm

2.2 Device description

Serial Number(s)	**353650040003084, 353650040003498**
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype
Device Category	Portable
RF Exposure Limits	General Population / Uncontrolled

Mode(s) of Operation	CDMA 800	CDMA 1900	EV-DO Rev. A 800	EV-DO Rev. A 1900	Wi-Fi 802.11b/g/n	Bluetooth
Modulation Mode(s)	QPSK	QPSK	QPSK	QPSK	BPSK	GFSK
Maximum Output Power Setting	25.0 dBm	25.0 dBm	25.0 dBm	25.0 dBm	20.0 dBm	10 dBm
Duty Cycle	1:1	1:1	1:1	1:1	1:1	1:1
Transmitting Frequency Range(s)	824.70 - 848.31 MHz	1851.20 - 1908.75 MHz	824.70 - 848.31 MHz	1851.20 - 1908.75 MHz	2412.0 - 2462.5 MHz	2402.0 - 2483.5 MHz

Mode(s) of Operation	GSM 850	GSM 900	GSM 1800	GSM 1900	WCDMA 850	WCDMA 1900	WCDMA 2100
Modulation Mode(s)	GMSK	GMSK	GMSK	GMSK	QPSK	QPSK	QPSK
Maximum Output Power Setting	33.5 dBm	33.5 dBm	30.5 dBm	30.5 dBm	24.0 dBm	24.0 dBm	24.0 dBm
Duty Cycle	1:8	1:8	1:8	1:8	1:1	1:1	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	826.4 - 846.6 MHz	1852.4 - 1907.6 MHz	1922.4 - 1977.6 MHz

Mode(s) of Operation	GPRS 850				GPRS 900				GPRS 1800				GPRS 1900			
Modulation	GMSK				GMSK				GMSK				GMSK			
Maximum Output Power Setting (dBm)	33.5	**31.0**	29.0	27.0	33.5	**31.0**	29.0	27.0	30.5	**28.0**	26.0	24.0	30.5	**28.0**	26.0	24.0
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	8PSK				8PSK				8PSK				8PSK			
Maximum Output Power Setting (dBm)	27.5	**25.5**	23.5	21.5	27.5	**25.5**	23.5	21.5	26.5	**24.5**	22.5	20.5	26.5	**24.5**	22.5	20.5
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 configurations of highest time-average power output per band and data mode type.

NOTE: The GSM/WCDMA network functions have been disabled by firmware and are SIM locked for all US operators.

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 5. 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	440	Feb-17-2011
E-Field Probe ES3DV3	3184	Sep-18-2010
S.A.M. Phantom used for 800/900 MHz	TP-1131	
S.A.M. Phantom used for 1800/1900/2450 MHz	TP-1250	
Dipole Validation Kit, DV835V2	436TR	Mar-17-2011
Dipole Validation Kit, DV1800V2	272TR	Mar-17-2011
Dipole Validation Kit, DV2450V2	766	Mar-17-2011

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3847A04843	Apr-22-2011
Power Meter E4419B	US39250622	Dec-22-2011
Power Sensor #1 - E9301A	US39210929	Nov-19-2010
Power Sensor #2 - E9301A	US39210930	Nov-19-2010
Signal Generator HP8648C	3847A04810	Oct-30-2011
Power Meter E4419B	GB39511087	Dec-22-2011
Power Sensor #1 - E9301A	US39211007	Dec-04-2010
Power Sensor #2 - E9301A	US39211008	Dec-04-2010
Network Analyzer HP8753ES	US39172529	Jun-04-2011
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-03-2010	40.8	0.90	21.5
		Measured, Aug-04-2010	40.4	0.90	20.7
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** Aug-04-2010	54.9	0.99	21.1
		Measured, Aug-12-2010	55.0	1.00	21.2
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1880	Head	**Measured,** Aug-05-2010	38.5	1.45	20.0
		Measured, Aug-06-2010	38.3	1.45	19.9
		Measured, Aug-08-2010	38.1	1.47	20.0
		Measured, Sep-27-2010	36.9	1.88	19.1
		Recommended Limits	40.0 ±5%	1.40 ±5%	18-25
	Body	**Measured,** Aug-03-2010	51.0	1.58	20.1
		Measured, Aug-04-2010	50.7	1.58	20.0
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25
2450	Head	**Measured,** Aug-13-2010	36.4	1.83	20.0
		Measured, Sep-27-2010	38.4	1.46	19.0
		Recommended Limits	39.2 ±10%	1.80 ±5%	18-25
	Body	**Measured,** Aug-13-2010	50.0	2.03	20.1
		Recommended Limits	52.7 ±10%	1.95 ±5%	18-25

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

Ingredient	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 Appendix 6. 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)		
835	**Measured,** Jul-30-2010	9.50	40.5	0.90	20.2	20.4
	Measured, Aug-03-2010	9.175	40.5	0.90	20.6	21.4
	Measured, Aug-04-2010	9.25	40.4	0.90	20.2	20.7
	Measured, Aug-08-2010	9.475	42.1	0.92	20.2	20.7
	Measured, Aug-12-2010	9.35	41.0	0.91	20.0	21.4
	Recommended Limits	9.59	41.5 ±5%	0.90 ±5%	18-25	18-25
1800	**Measured,** Aug-03-2010	36.825	39.1	1.37	20.5	20.1
	Measured, Aug-04-2010	36.40	38.8	1.37	20.2	20.0
	Measured, Aug-05-2010	36.525	38.9	1.36	20.2	20.0
	Measured, Aug-06-2010	36.05	38.6	1.36	20.3	19.9
	Measured, Aug-08-2010	36.75	38.2	1.37	20.2	20.0
	Measured, Aug-09-2010	37.375	38.9	1.36	20.2	20.1
	Measured, Sep-27-2010	39.40	38.8	1.39	19.6	19.2
	Recommended Limits	38.36	40.0 ±5%	1.40 ±5%	18-25	18-25
2450	**Measured,** Aug-12-2010	53.75	36.4	1.83	20.0	20.0
	Measured, Aug-13-2010	54.50	36.8	1.84	20.1	20.4
	Measured, Sep-27-2010	56.50	36.9	1.88	20.1	19.4
	Recommended Limits	54.55	39.2 ±10%	1.80 ±5%	18-25	18-25

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3184	835	6.26	8 of 9
		1810	5.14	8 of 9
		2450	4.44	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 coarse scan was set to 15 mm or less 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 SNN5843A - 1390 mAH Battery
Model SNN5875A - 1820 mAH Battery

The battery SNN5843A 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 battery listed above.

Evaluation of CDMA Modes

Per the "SAR Measurement Procedures for 3G Devices" released in October, 2007, RC1, RC3 and RC3 (FCH + SCH) CDMA modes, EVDO Rev O, EVDO Rev A 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						
Band	Channel	RC1		RC3		RC3 (FCH + SCH)
		SO2	SO55	SO2	SO55	
CDMA 800	1013	25.11	25.18	25.17	25.12	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	25.03	25.05	25.09	25.03	
	777	24.96	24.98	25.01	24.95	
CDMA 1900	25	25.02	25.03	24.99	24.97	
	600	24.94	24.95	24.94	24.88	
	1175	24.87	24.91	24.91	24.91	

Conducted power (dBm) for EVDO modes					
Band	Channel	Rev 0		Rev A	
		FTAP 307.2k	RTAP 153.6k	Subtest 2 FETAP	Subtest 2 RETAP
CDMA 800	1013	25.17	25.19	25.11	25.18
	384	25.21	25.26	25.22	25.12
	777	25.07	25.09	25.06	25.05
CDMA 1900	25	25.03	24.41	25.05	25.01
	600	24.96	24.77	24.97	24.96
	1175	24.94	24.79	24.86	24.82

Evaluation of Wi-Fi 802.11 Modes

Per "SAR Measurement Procedures for 802.11 a/b/g Transmitters" (FCC KDB 248227), power measurements were performed for 802.11 operational modes. The conducted power measurements for each mode are shown in the table below. SAR testing for 802.11 modes was performed with the transmitter mode and data rate set to the configurations highlighted in bold below.

Band	Channel	Conducted Power (dBm) for 802.11b Mode Data Rates			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
Wi-Fi 2450 MHz	1	**18.59**	18.63	18.56	18.70
	6	**18.56**	18.69	18.52	18.66
	11	**18.82**	18.70	18.73	18.75

Band	Channel	Conducted Power (dBm) for 802.11g Mode Data Rates							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
Wi-Fi 2450 MHz	1	14.87	15.14	14.78	14.48	14.59	14.61	12.86	13.03
	6	15.16	15.14	14.80	14.62	14.63	14.84	12.95	13.06
	11	15.10	15.31	15.03	14.81	14.76	14.52	13.15	13.10

Band	Channel	Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 800 ns Guard Interval)							
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
Wi-Fi 2450 MHz	1	14.56	14.57	14.52	14.70	14.54	12.91	13.02	12.11
	6	14.66	14.72	14.71	14.76	14.73	13.18	13.05	12.23
	11	14.79	14.76	14.96	15.02	14.81	13.40	13.42	12.37

Note: The DUT does not support 802.11n mode utilizing 400 ns Guard Interval.

Evaluation of Bluetooth

Per "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas" (FCC KDB 648474), the necessity of stand-alone and simultaneous SAR testing was evaluated for the Bluetooth transmitter of the device under test.

- The highest output conducted power measured for Bluetooth on the device under test is 7.71 mW.
- The separation distance between the Bluetooth antenna and the main antenna is 6.867 cm.

Based on the output power of the Bluetooth transmitter and its antenna separation distance from the primary antenna, neither stand-alone nor simultaneous SAR measurements are required for the device under test. Pictorial representation of the antenna locations and separation distance are given in Exhibit 7d.

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 Extrapolated SAR = Measured 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 tables below also include the highest SAR value summations for primary and secondary co-located transmitters, with the results indicated in italics.

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	3184	835	6.26	8 of 9
		1810	5.14	8 of 9
		1950	4.94	8 of 9
		2450	4.44	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)
CDMA 800	**Channel 1013**	25.12						
	Channel 384	25.03	**20.0**	**0.038**	**0.336**	**0.34**	**0.459**	**0.46**
	Channel 777	24.95						
CDMA 1900	**Channel 25**	24.97	20.1	0.030	0.743	0.74	1.21	1.21
	Channel 600	24.88	**20.2**	**-0.026**	**0.836**	**0.84**	**1.38**	**1.39**
	Channel 1175	24.91	20.0	-0.487	0.689	0.77	1.14	1.28
WI-FI 2450 802.11b 1 Mbps	**Channel 1**	18.59						
	Channel 6	18.56	20.4	0.044	0.102	0.10	0.190	0.19
	Channel 11	18.82	19.1	-0.138	0.0613	0.06	0.112	0.12
CDMA 800 + WI-FI						*0.44*		*0.65*
CDMA 1900 + WI-FI						*0.94*		*1.58*

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)
CDMA 800	**Channel 1013**	25.12						
	Channel 384	25.03	20.1	0.022	0.292	0.29	0.39	0.39
	Channel 777	24.95						
CDMA 1900	**Channel 25**	24.97	19.9	-0.064	0.607	0.62	0.921	0.93
	Channel 600	24.88	20.2	-0.087	0.592	0.60	0.925	0.94
	Channel 1175	24.91	19.9	-0.130	0.487	0.50	0.759	0.78
WI-FI 2450 802.11b 1 Mbps	**Channel 1**	18.59	20.0	-0.320	0.109	0.12	0.206	0.22
	Channel 6	18.56	20.2	-0.048	0.128	0.13	0.246	0.25
	Channel 11	18.82	20.0	0.281	0.137	0.14	0.268	0.27
CDMA 800 + WI-FI						*0.43*		*0.66*
CDMA 1900 + WI-FI						*0.76*		*1.21*

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

Noted Highest Head Cheek Position with Battery SNN5875A								
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)
CDMA 800 *Left Cheek*	**Channel 1013**	25.12						
	Channel 384	25.03	19.9	0.011	0.252	0.25	0.35	0.35
	Channel 777	24.95						
CDMA 1900 *Left Cheek*	**Channel 25**	24.97						
	Channel 600	24.88	20.0	0.066	0.788	0.79	1.31	1.31
	Channel 1175	24.91						
CDMA 1900 *Right Cheek*	**Channel 25**	24.97						
	Channel 600	24.88	19.0	-0.065	0.599	0.61	0.994	1.01
	Channel 1175	24.91						
WI-FI 2450 802.11b, 1 Mbps *Left Cheek*	**Channel 1**	18.59						
	Channel 6	18.56						
	Channel 11	18.82	19.1	-0.0214	0.0513	0.05	0.0974	0.10
WI-FI 2450 802.11b, 1 Mbps *Right Cheek*	**Channel 1**	18.59						
	Channel 6	18.56						
	Channel 11	18.82	**20.0**	**0.032**	**0.176**	**0.18**	**0.355**	**0.36**

Table 3: 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)
CDMA 800	**Channel 1013**	25.12						
	Channel 384	25.03	20.7	0.124	0.212	0.21	0.278	0.28
	Channel 777	24.95						
CDMA 1900	**Channel 25**	24.97						
	Channel 600	24.88	20.1	0.036	0.400	0.40	0.630	0.63
	Channel 1175	24.91						
WI-FI 2450 802.11b 1 Mbps	**Channel 1**	18.59						
	Channel 6	18.56	20.2	-0.371	0.080	0.09	0.150	0.16
	Channel 11	18.82						
CDMA 800 + WI-FI						*0.30*		*0.44*
CDMA 1900 + WI-FI						*0.49*		*0.79*

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.

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)
CDMA 800	**Channel 1013**	25.12						
	Channel 384	25.03	**20.3**	**0.094**	**0.258**	**0.26**	**0.337**	**0.34**
	Channel 777	24.95						
CDMA 1900	**Channel 25**	24.97	**20.3**	**-0.093**	**0.530**	**0.54**	**0.852**	**0.87**
	Channel 600	24.88	20.4	-0.551	0.454	0.52	0.735	0.83
	Channel 1175	24.91	20.4	-0.340	0.434	0.47	0.710	0.77
WI-FI 2450 802.11b 1 Mbps	**Channel 1**	18.59						
	Channel 6	18.56	20.2	-0.139	0.098	0.10	0.189	0.20
	Channel 11	18.82						
CDMA 800 + WI-FI						*0.36*		*0.54*
CDMA 1900 + WI-FI						*0.64*		*1.07*

Table 5: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.

Noted Highest Head 15° Tilt Position with Battery SNN5875A								
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)
CDMA 800 *Right Tilt*	**Channel 1013**	25.12						
	Channel 384	25.03	20.1	0.112	0.226	0.23	0.295	0.30
	Channel 777	24.95						
CDMA 1900 *Right Tilt*	**Channel 25**	24.97						
	Channel 600	24.88	19.9	-0.083	0.419	0.43	0.659	0.67
	Channel 1175	24.91						
WI-FI 2450 802.11b, 1 Mbps *Right Tilt*	**Channel 1**	18.59						
	Channel 6	18.56	**20.0**	**-0.425**	**0.098**	**0.11**	**0.187**	**0.21**
	Channel 11	18.82						

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.

6.2 Body Worn Test Results

The SAR results shown in tables 7 through 11 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, 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 Extrapolated SAR = Measured 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 tables below also include the highest SAR value summations for primary and secondary co-located transmitters, with the results indicated in italics.

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 at frequencies 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. 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 at the time of testing thus the device was tested per the Supplement C testing guidelines for devices that do not have body-worn accessories. A separation distance of 15 mm between the device and the flat phantom was used for testing body-worn SAR. Additional measurements were performed with a separation distance of 10 mm between the device and the flat phantom. The device was tested with the front and back of the device facing the phantom. Both sides of the device were tested for Body SAR for the purpose of including the SAR evaluation for body-worn accessories that support the device with the front side facing the user.

The guidelines provided in “SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas” (KDB publication 648474 - D01 v01r05) were utilized for evaluation of the need for simultaneous transmission SAR testing. For CDMA 1900 and Wi-Fi in the Body worn configuration (with 10mm separation between the device and the phantom) the SAR-to-peak-location separation ratio is 0.17, and thus no testing was performed to determine the aggregate 1 g SAR in this configuration. The results of these measurement are given in the tables below, with additional SAR plots of the separation distance provided in Appendix 2.

The cellular phone was also tested in data mode operations. For these tests, a separation distance of 25 mm between the device and the flat phantom was used. The device was tested in the worst-case SAR position and channel configuration from the voice-mode body-worn testing.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3184	835	6.08	8 of 9
		1810	4.84	8 of 9
		1950	4.81	8 of 9
		2450	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)
CDMA 800	**Channel 1013**	25.12						
	Channel 384	25.03	21.4	-0.123	0.342	0.35	0.468	0.48
	Channel 777	24.95						
CDMA 1900	**Channel 25**	24.97						
	Channel 600	24.88	20.0	0.112	0.205	0.21	0.320	0.32
	Channel 1175	24.91						
WI-FI 2450 802.11b 1 Mbps	**Channel 1**	18.59						
	Channel 6	18.56	20.4	-0.101	0.021	0.02	0.033	0.03
	Channel 11	18.82						
CDMA 800 + WI-FI						*0.37*		*0.51*
CDMA 1900 + WI-FI						*0.23*		*0.35*

Table 7: 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)
CDMA 800	**Channel 1013**	25.12						
	Channel 384	25.03	**20.7**	**0.060**	**0.576**	**0.58**	**0.778**	**0.78**
	Channel 777	24.95						
CDMA 1900	**Channel 25**	24.97						
	Channel 600	24.88	**20.2**	**-0.068**	**0.480**	**0.49**	**0.721**	**0.73**
	Channel 1175	24.91						
WI-FI 2450 802.11b 1 Mbps	**Channel 1**	18.59	20.4	-0.018	0.054	0.05	0.089	0.09
	Channel 6	18.56	20.4	-0.023	0.059	0.06	0.101	0.10
	Channel 11	18.82	20.4	-0.078	0.066	0.07	0.109	0.11
CDMA 800 + WI-FI						*0.65*		*0.89*
CDMA 1900 + WI-FI						*0.56*		*0.84*

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 with Battery SNN5875A								
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)
CDMA 800	**Channel 1013**	25.12						
	Channel 384	25.03	20.7	0.052	0.555	0.56	0.761	0.76
	Channel 777	24.95						
CDMA 1900	**Channel 25**	24.97						
	Channel 600	24.88	20.2	-0.224	0.453	0.48	0.674	0.71
	Channel 1175	24.91						
WI-FI 2450 802.11b 1 Mbps	**Channel 1**	18.59						
	Channel 6	18.56						
	Channel 11	18.82	**20.4**	**-0.125**	**0.066**	**0.07**	**0.110**	**0.11**

Table 9: 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: 7/30/2010 5:12:43 PM

Test Laboratory: Motorola - Jul-30-2010 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 436TR; FCC ID: IHDP56LV1
Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 436TR; Input Power = 200 mW
Sim.Temp@meas = 20.4*C; Sim.Temp@SPC = 20.4*C; Room Temp @ SPC = 20.2*C
Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3

DASY4 Configuration:

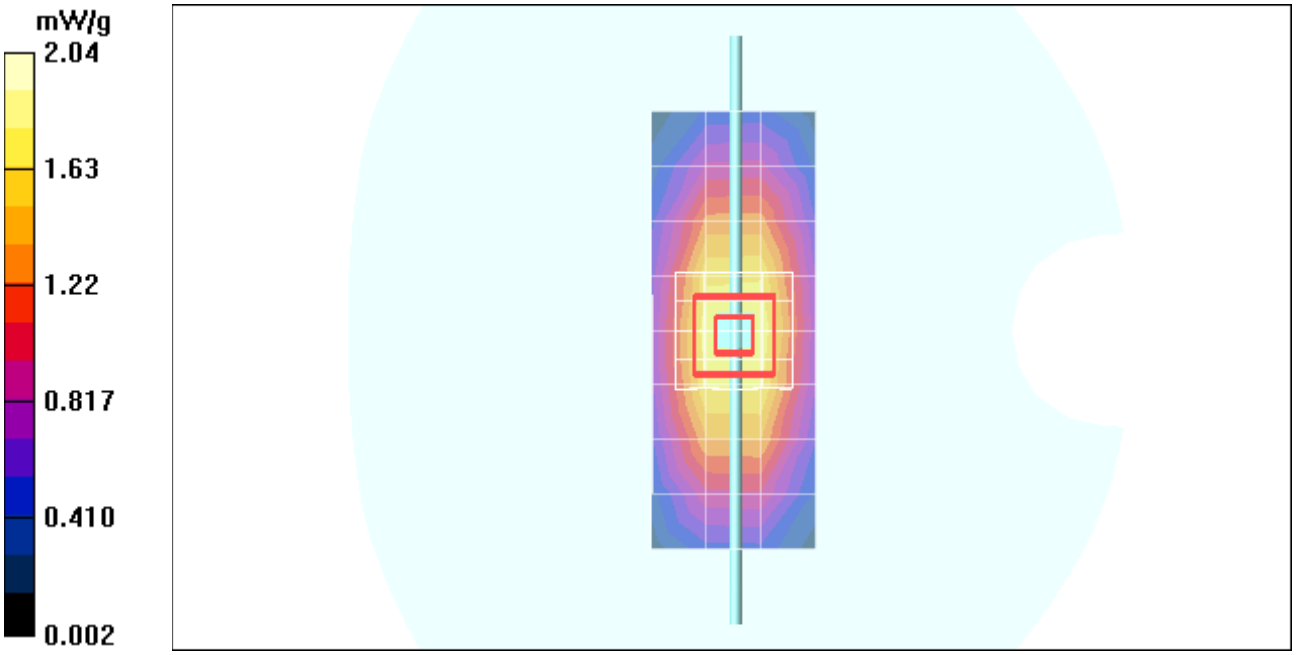
- Probe: ES3DV3 - SN3184; ConvF(6.26, 6.26, 6.26); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

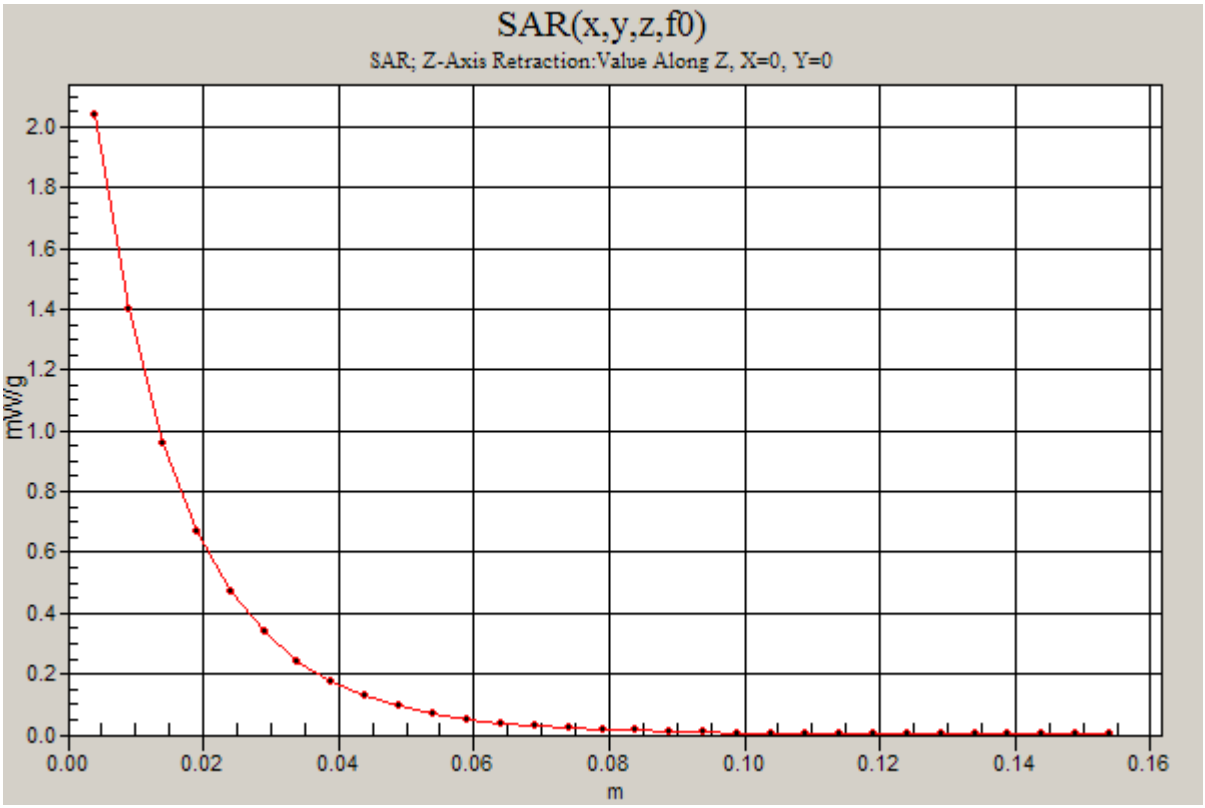
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.77 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.5 V/m; Power Drift = -0.016 dB; Peak SAR (extrapolated) = 2.68 W/kg
SAR(1 g) = 1.88 mW/g; SAR(10 g) = 1.24 mW/g; Maximum value of SAR (measured) = 2.04 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.5 V/m; Power Drift = -0.016 dB; Peak SAR (extrapolated) = 2.75 W/kg
SAR(1 g) = 1.92 mW/g; SAR(10 g) = 1.27 mW/g; Maximum value of SAR (measured) = 2.09 mW/g

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


mW/g
2.04
1.63
1.22
0.817
0.410
0.002


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
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: 8/3/2010 7:50:13 AM

Test Laboratory: Motorola - Aug-03-2010 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 436TR; FCC ID: IHDP56LV1
Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 436TR; Input Power = 200 mW
Sim.Temp@meas = 21.4 ▪ C; Sim.Temp@SPC = 21.4 ▪ C; Room Temp @ SPC = 20.6 ▪ C
Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3

DASY4 Configuration:

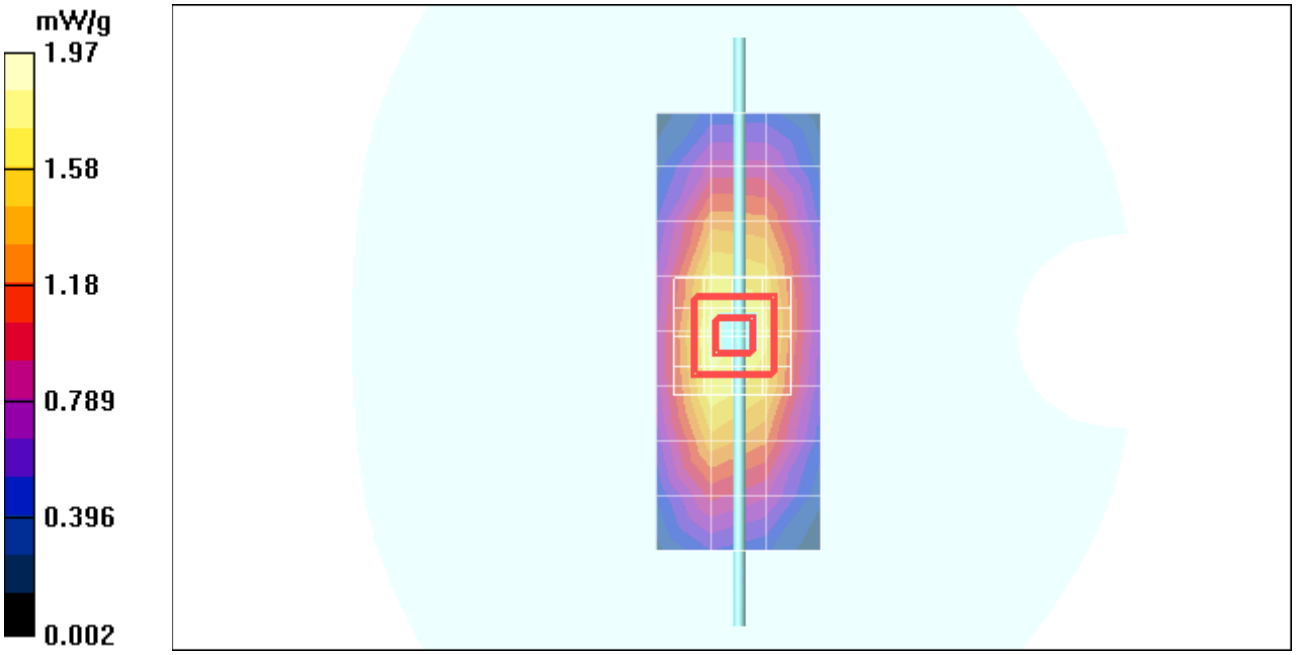
- Probe: ES3DV3 - SN3184; ConvF(6.26, 6.26, 6.26); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

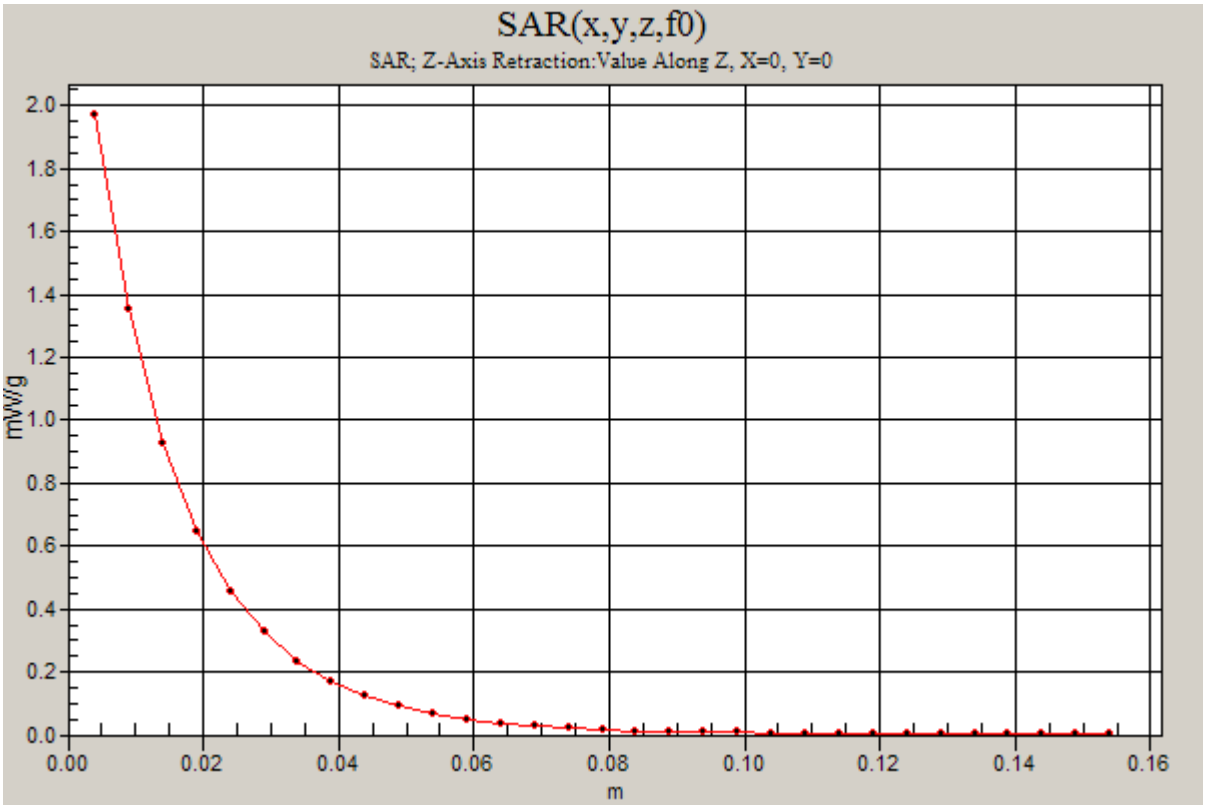
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.79 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.6 V/m; Power Drift = -0.021 dB; Peak SAR (extrapolated) = 2.58 W/kg
SAR(1 g) = 1.82 mW/g; SAR(10 g) = 1.2 mW/g; Maximum value of SAR (measured) = 1.97 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.6 V/m; Power Drift = -0.021 dB; Peak SAR (extrapolated) = 2.64 W/kg
SAR(1 g) = 1.85 mW/g; SAR(10 g) = 1.22 mW/g; Maximum value of SAR (measured) = 2.01 mW/g

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


mW/g
1.97
1.58
1.18
0.789
0.396
0.002


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
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: 8/4/2010 6:52:39 AM

Test Laboratory: Motorola - Aug-04-2010 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 436TR; FCC ID: IHDP56LV1
Procedure Notes: 835MHz System Performance Check; Dipole Sn# 436TR; Input Power = 200 mW
Sim.Temp@meas = 20.7*C; Sim.Temp@SPC = 20.7*C; Room Temp @ SPC = 20.2*C
Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3

DASY4 Configuration:

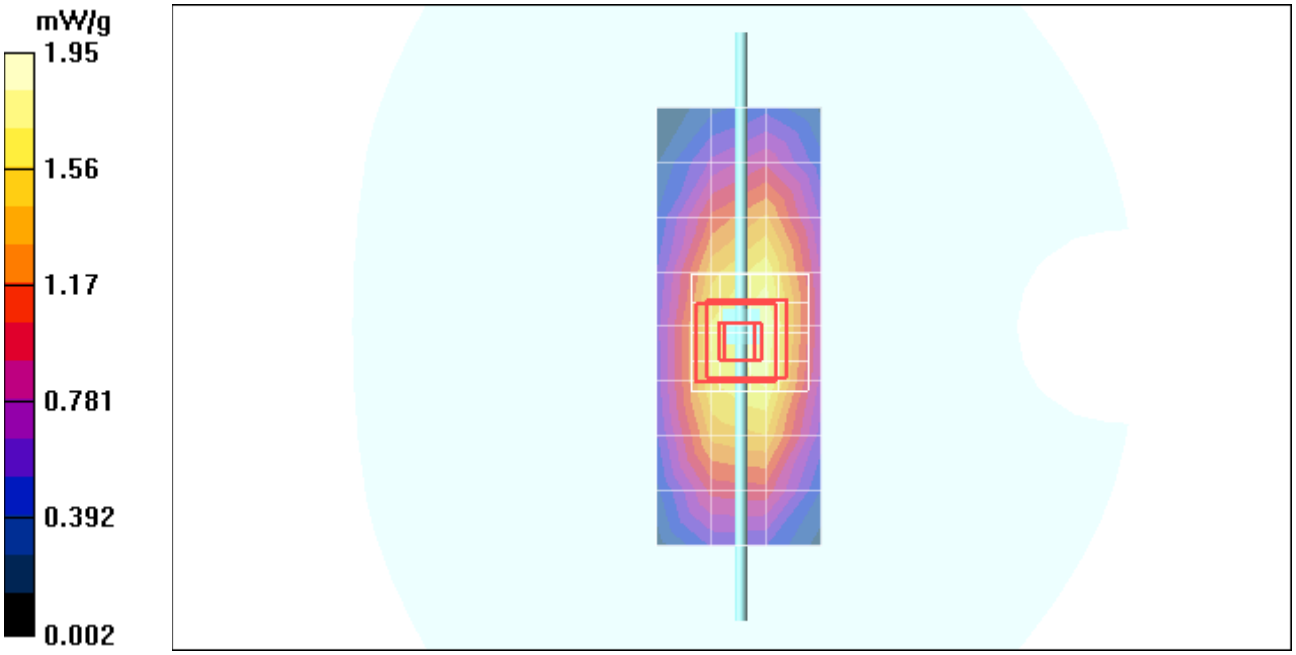
- Probe: ES3DV3 - SN3184; ConvF(6.26, 6.26, 6.26); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

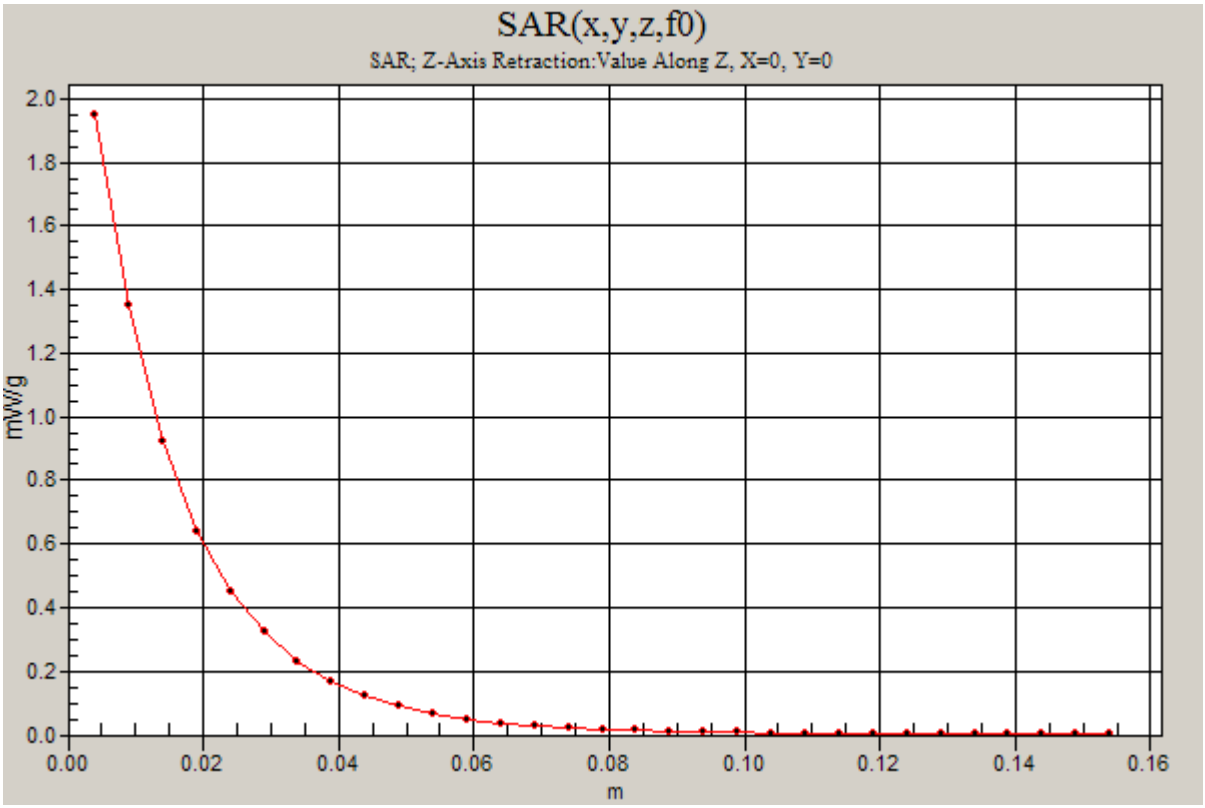
Daily SPC Check/Dipole Area Sca (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.82 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.7 V/m; Power Drift = -0.016 dB; Peak SAR (extrapolated) = 2.59 W/kg
SAR(1 g) = 1.82 mW/g; SAR(10 g) = 1.21 mW/g; Maximum value of SAR (measured) = 1.95 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.7 V/m; Power Drift = -0.016 dB; Peak SAR (extrapolated) = 2.69 W/kg
SAR(1 g) = 1.88 mW/g; SAR(10 g) = 1.23 mW/g

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


mW/g
1.95
1.56
1.17
0.781
0.392
0.002


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
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: 8/8/2010 7:01:24 AM

Test Laboratory: Motorola - Aug-08-2010 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 436TR; FCC ID: IHDP56LV1
Procedure Notes: 835MHz System Performance Check; Dipole Sn# 436TR; Input Power = 200 mW
Sim.Temp@meas = 20.7*C; Sim.Temp@SPC = 20.7*C; Room Temp @ SPC = 20.2*C
Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 835 MHz; σ = 0.92 mho/m; ε_r = 42.1; ρ = 1000 kg/m^3

DASY4 Configuration:

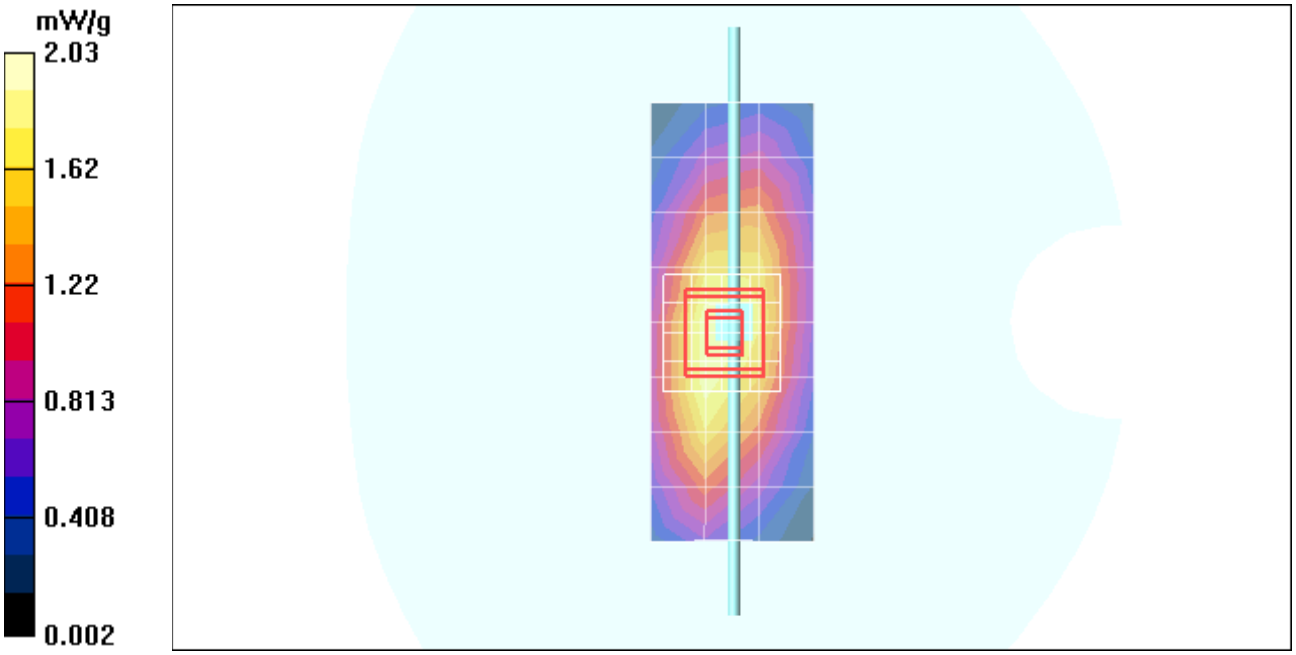
- Probe: ES3DV3 - SN3184; ConvF(6.26, 6.26, 6.26); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

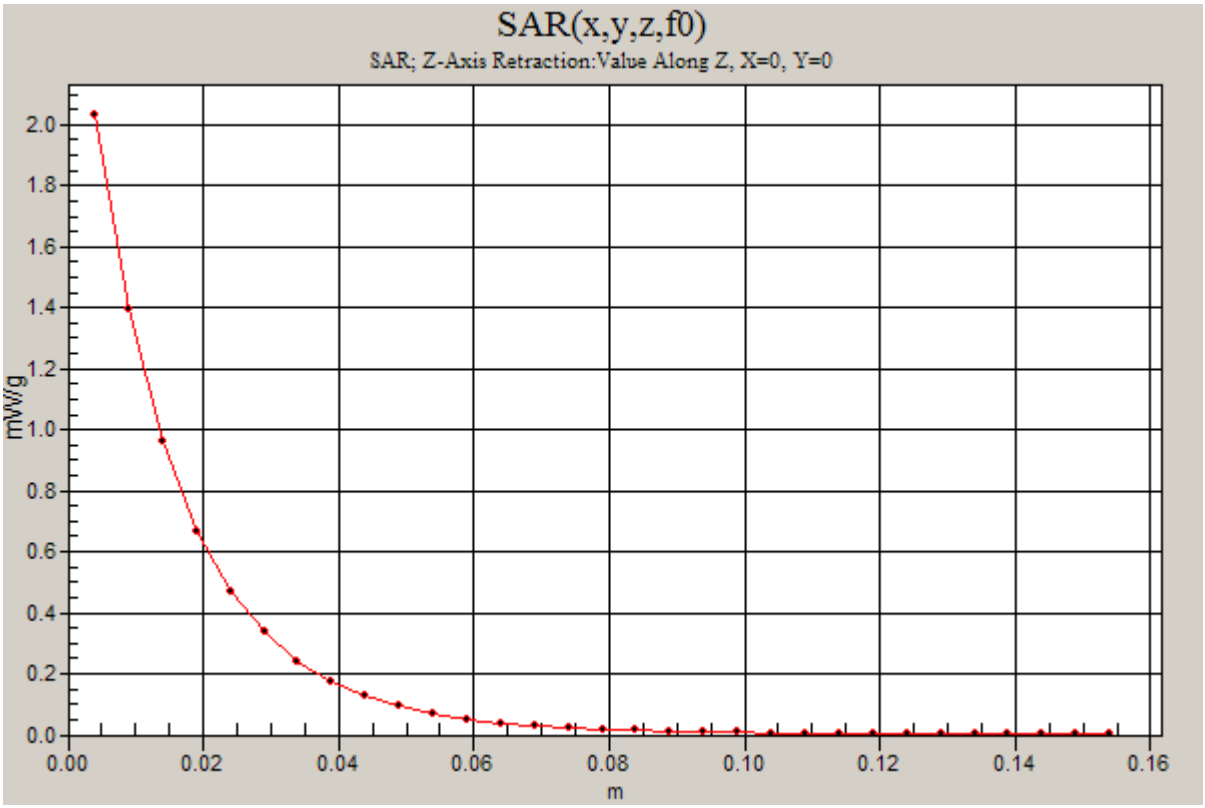
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.87 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.9 V/m; Power Drift = -0.019 dB; Peak SAR (extrapolated) = 2.66 W/kg
SAR(1 g) = 1.88 mW/g; SAR(10 g) = 1.24 mW/g; Maximum value of SAR (measured) = 2.03 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.9 V/m; Power Drift = -0.019 dB; Peak SAR (extrapolated) = 2.72 W/kg
SAR(1 g) = 1.91 mW/g; SAR(10 g) = 1.26 mW/g; Maximum value of SAR (measured) = 2.07 mW/g

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


mW/g
2.03
1.62
1.22
0.813
0.408
0.002


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
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: 8/12/2010 2:37:23 PM

Test Laboratory: Motorola - Aug-12-2010 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 436TR; FCC ID: IHDP56LV1
Procedure Notes: 835MHz System Performance Check; Dipole Sn# 436TR; Input Power = 200 mW
Sim.Temp@meas = 21.2*C; Sim.Temp@SPC = 21.4*C; Room Temp @ SPC = 20.0*C
Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41; ρ = 1000 kg/m^3

DASY4 Configuration:

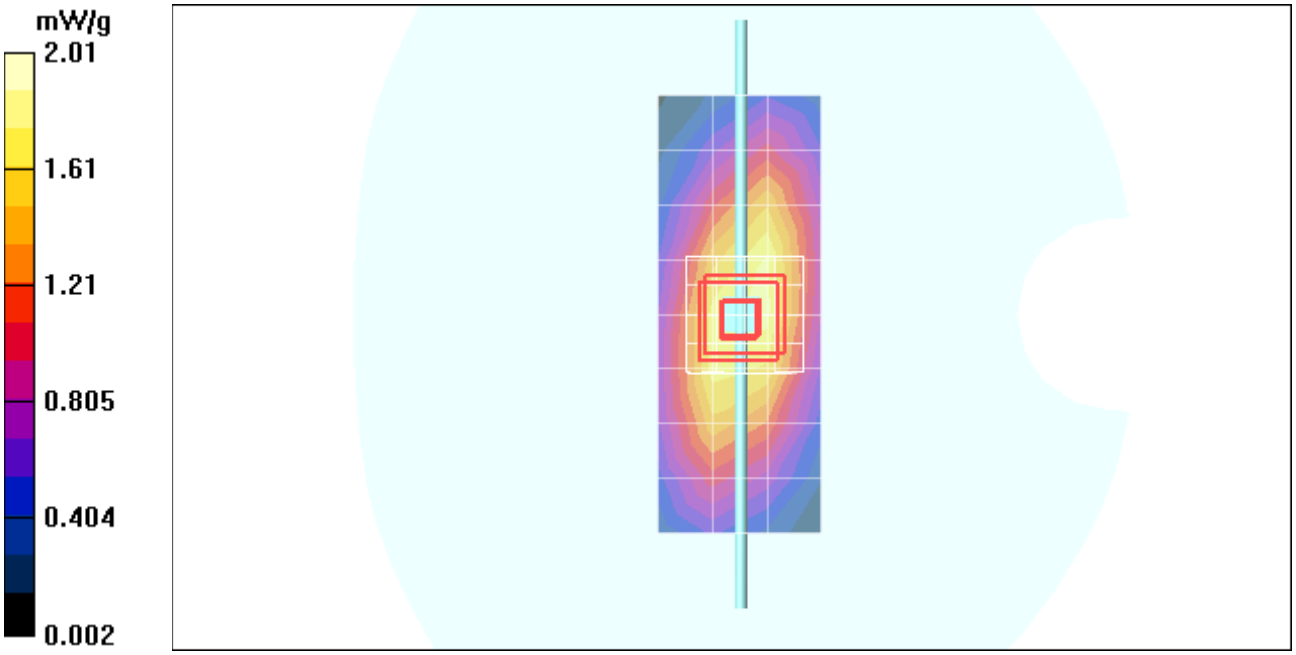
- Probe: ES3DV3 - SN3184; ConvF(6.26, 6.26, 6.26); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

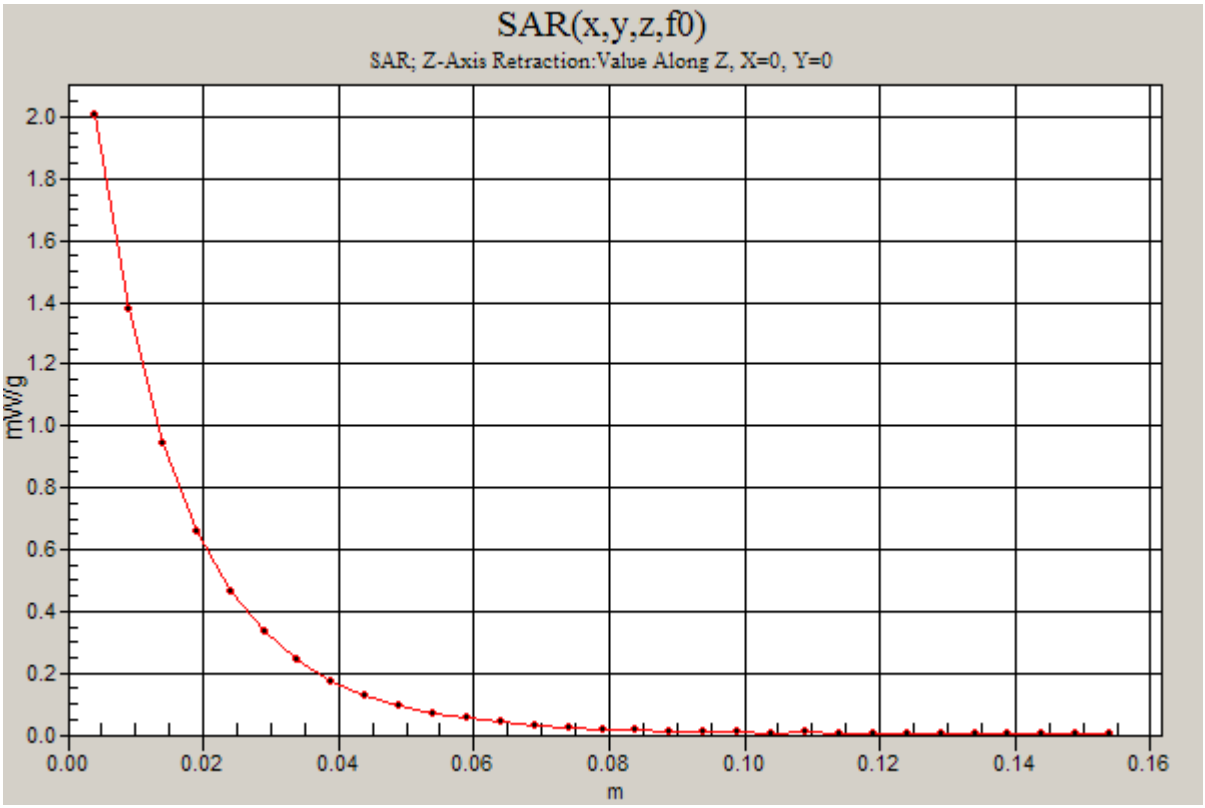
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.80 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.0 V/m; Power Drift = -0.015 dB; Peak SAR (extrapolated) = 2.63 W/kg
SAR(1 g) = 1.85 mW/g; SAR(10 g) = 1.23 mW/g; Maximum value of SAR (measured) = 2.01 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.0 V/m; Power Drift = -0.015 dB; Peak SAR (extrapolated) = 2.69 W/kg
SAR(1 g) = 1.89 mW/g; SAR(10 g) = 1.24 mW/g; Maximum value of SAR (measured) = 2.04 mW/g

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


mW/g
2.01
1.61
1.21
0.805
0.404
0.002


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
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: 8/3/2010 7:11:36 AM

Test Laboratory: Motorola - Aug-03-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 272TR; FCC ID: IHDP56LV1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272TR; Input Power = 200 mW
Sim.Temp@meas = 20.1 ▪ C; Sim.Temp@SPC = 20.1 ▪ 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 = 1.37 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3

DASY4 Configuration:

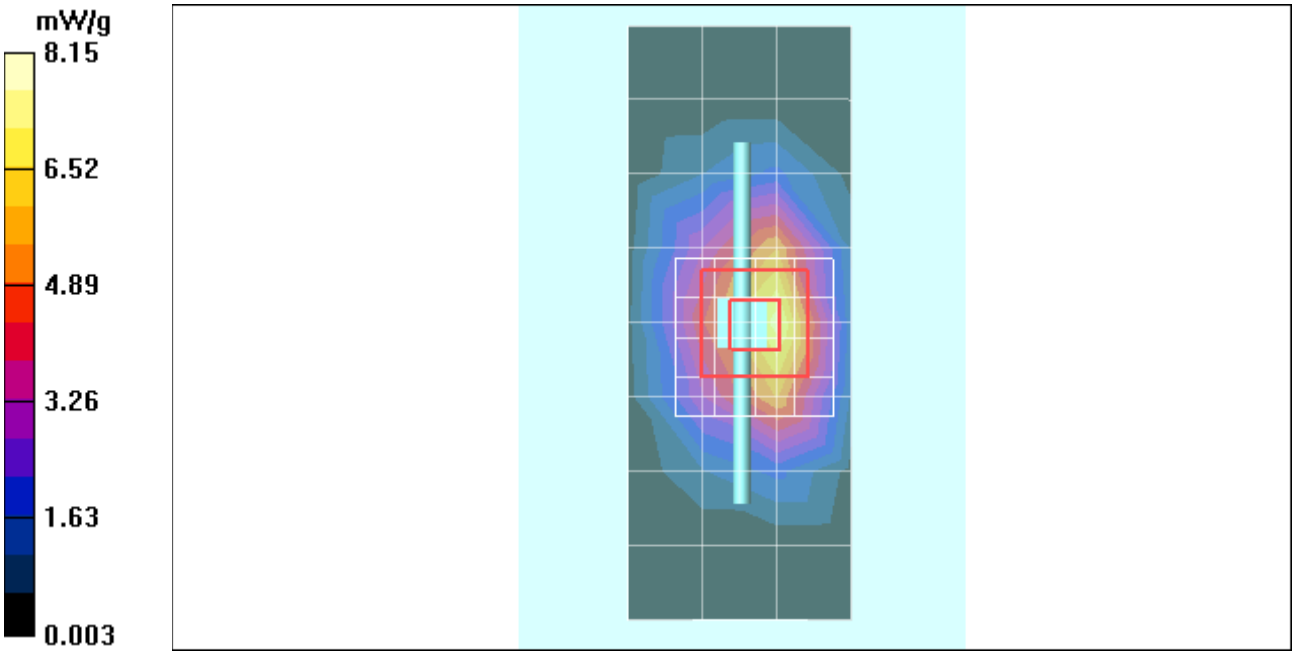
- Probe: ES3DV3 - SN3184; ConvF(5.14, 5.14, 5.14); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

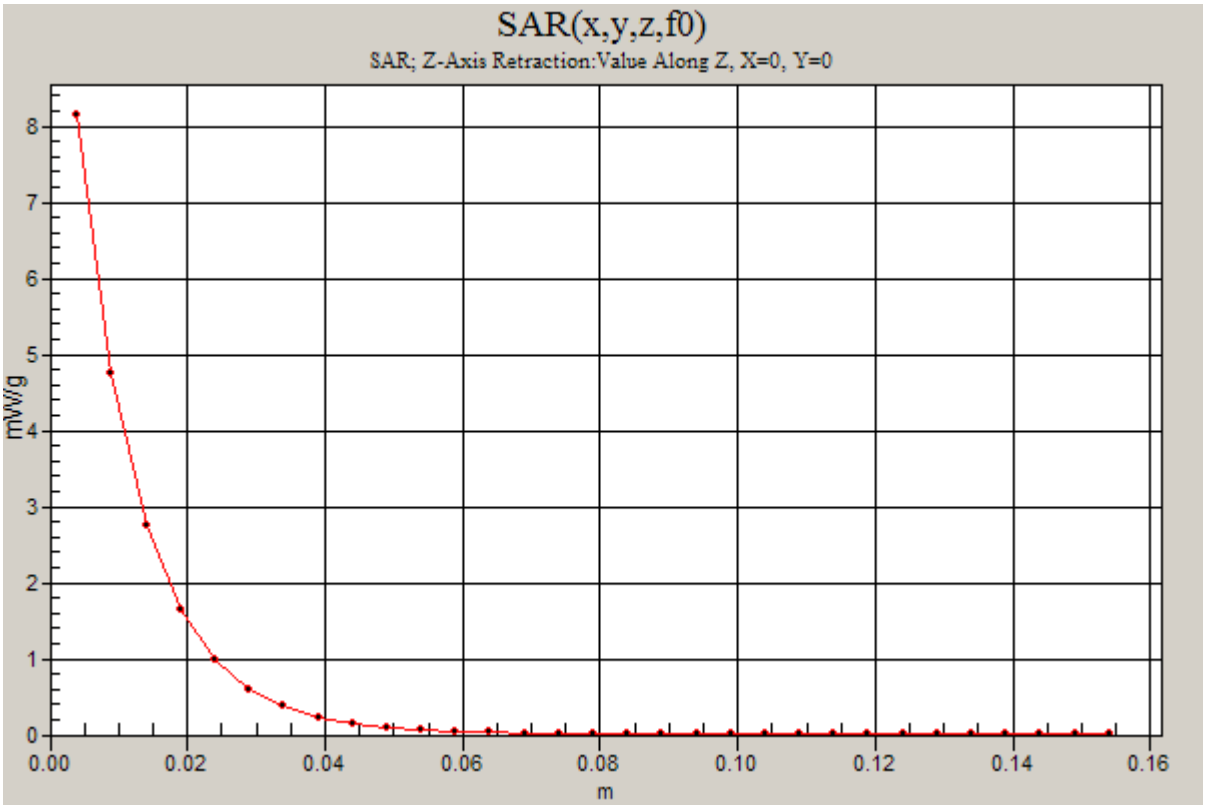
Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.38 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.8 V/m; Power Drift = -0.078 dB; Peak SAR (extrapolated) = 12.3 W/kg
SAR(1 g) = 7.27 mW/g; SAR(10 g) = 3.91 mW/g; Maximum value of SAR (measured) = 8.15 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.8 V/m; Power Drift = -0.078 dB; Peak SAR (extrapolated) = 12.7 W/kg
SAR(1 g) = 7.46 mW/g; SAR(10 g) = 4 mW/g; Maximum value of SAR (measured) = 8.35 mW/g

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


mW/g
8.15
6.52
4.89
3.26
1.63
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: 8/4/2010 6:32:30 AM

Test Laboratory: Motorola - Aug-04-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 272TR; FCC ID: IHDP56LV1
Procedure Notes: 1800MHz System Performance Check; Dipole Sn# 272TR; Input Power = 200 mW
Sim.Temp@meas = 20.0*C; Sim.Temp@SPC = 20.0*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 = 38.8; ρ = 1000 kg/m^3

DASY4 Configuration:

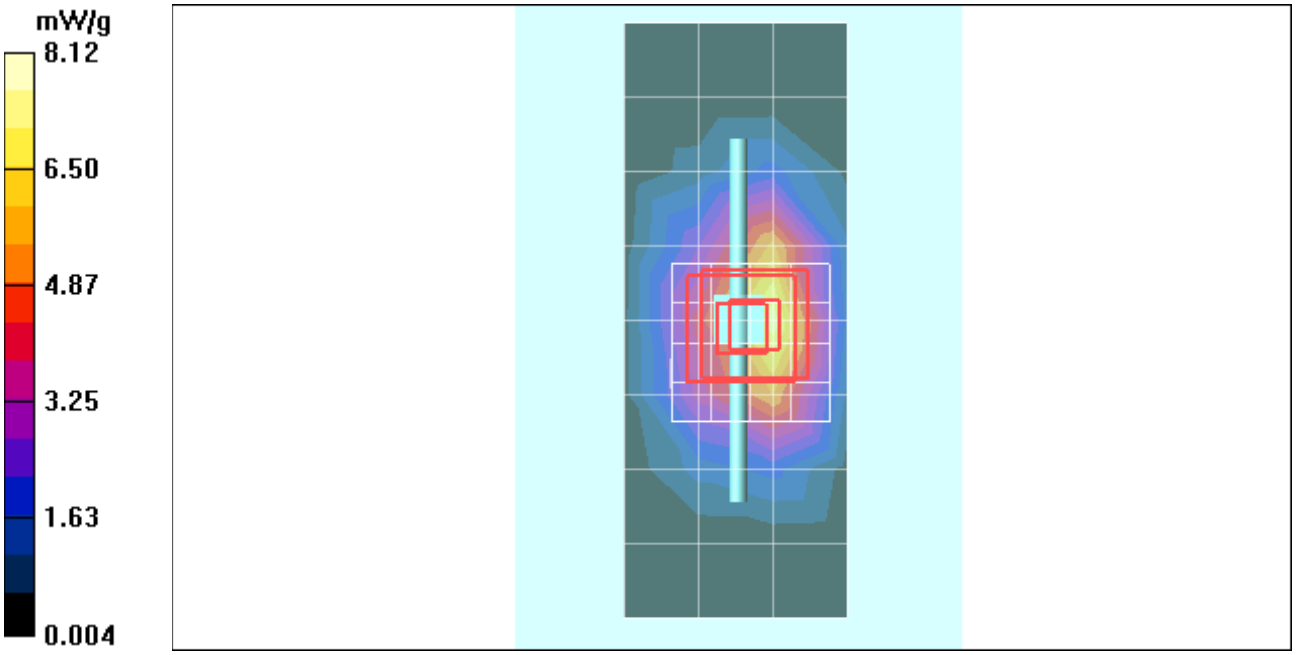
- Probe: ES3DV3 - SN3184; ConvF(5.14, 5.14, 5.14); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

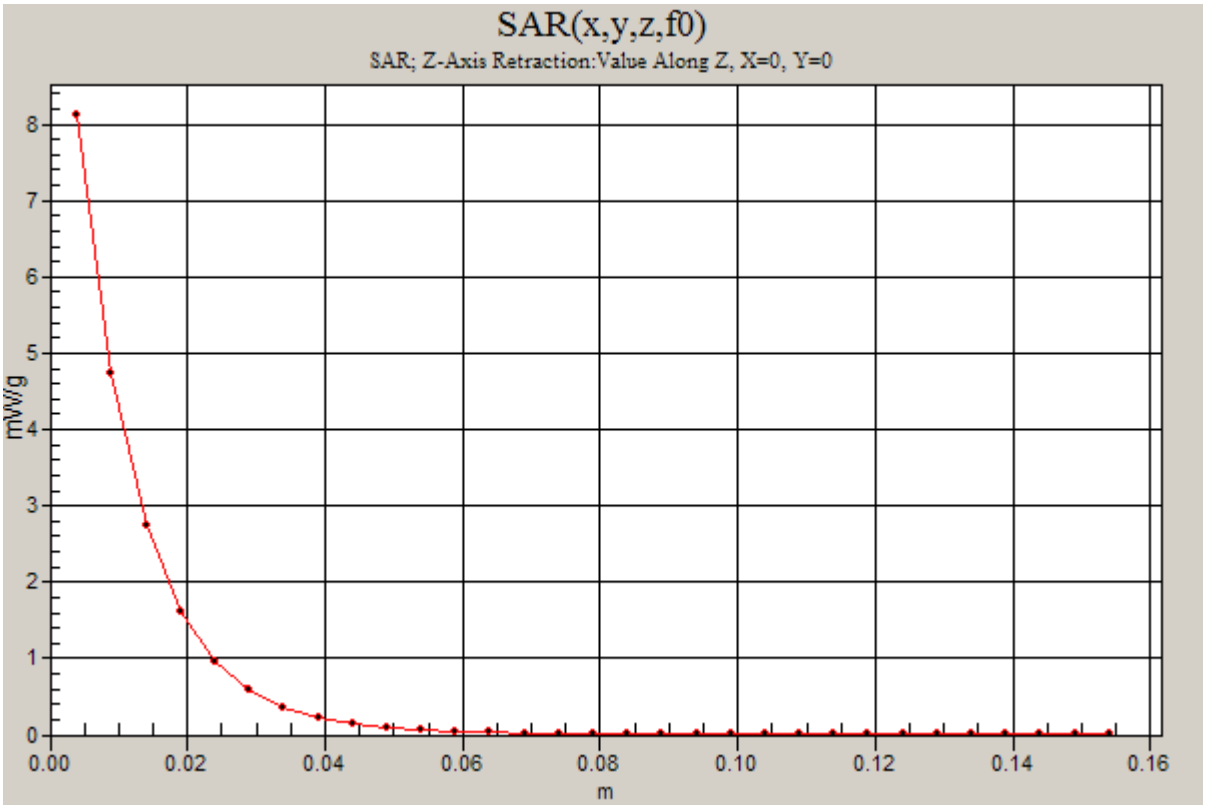
Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.47 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 76.7 V/m; Power Drift = 0.007 dB; Peak SAR (extrapolated) = 12.2 W/kg
SAR(1 g) = 7.19 mW/g; SAR(10 g) = 3.87 mW/g; Maximum value of SAR (measured) = 7.96 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 76.7 V/m; Power Drift = 0.007 dB; Peak SAR (extrapolated) = 12.6 W/kg
SAR(1 g) = 7.37 mW/g; SAR(10 g) = 3.96 mW/g; Maximum value of SAR (measured) = 8.03 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.12 mW/g


mW/g
8.12
6.50
4.87
3.25
1.63
0.004


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: 8/5/2010 6:47:45 AM

Test Laboratory: Motorola - Aug-05-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 272TR; FCC ID: IHDP56LV1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272TR; Input Power = 200 mW
Sim.Temp@meas = 20.0 ▪ C; Sim.Temp@SPC = 20.0 ▪ 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 = 1.36 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3

DASY4 Configuration:

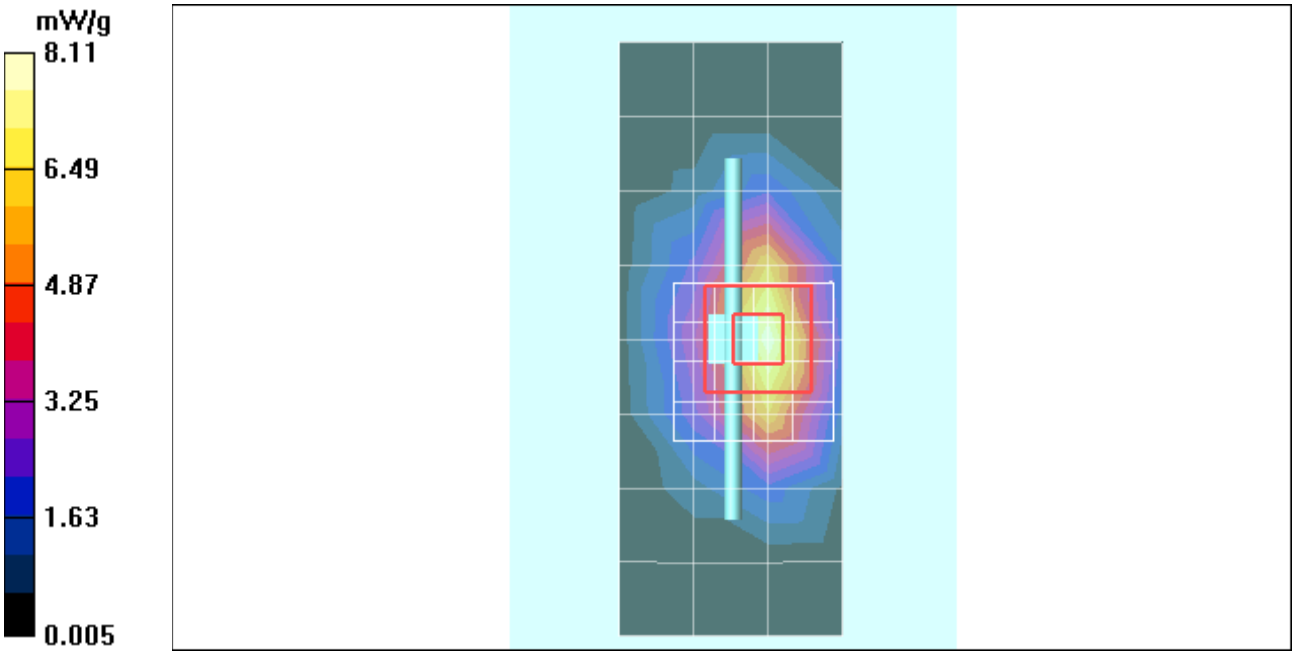
- Probe: ES3DV3 - SN3184; ConvF(5.14, 5.14, 5.14); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

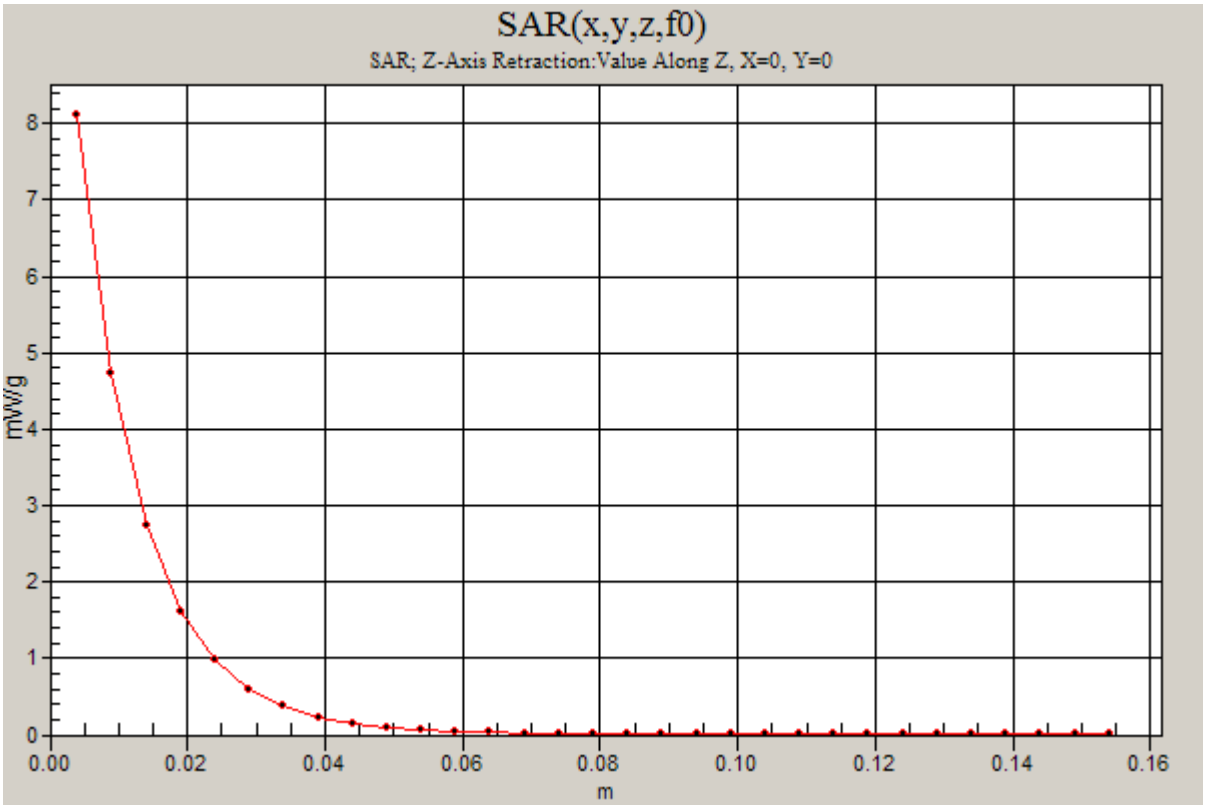
Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 8.02 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 73.8 V/m; Power Drift = -0.095 dB; Peak SAR (extrapolated) = 12.3 W/kg
SAR(1 g) = 7.23 mW/g; SAR(10 g) = 3.88 mW/g; Maximum value of SAR (measured) = 8.00 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 73.8 V/m; Power Drift = -0.095 dB; Peak SAR (extrapolated) = 12.6 W/kg
SAR(1 g) = 7.38 mW/g; SAR(10 g) = 3.96 mW/g; Maximum value of SAR (measured) = 8.12 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.11 mW/g


mW/g
8.11
6.49
4.87
3.25
1.63
0.005


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: 8/6/2010 7:18:12 AM

Test Laboratory: Motorola - Aug-06-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 272TR; FCC ID: IHDP56LV1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272TR; Input Power = 200 mW
Sim.Temp@meas = 19.9 ▪ C; Sim.Temp@SPC = 19.9 ▪ C; Room Temp @ SPC = 20.3 ▪ C
Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 1800 MHz; σ = 1.36 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3

DASY4 Configuration:

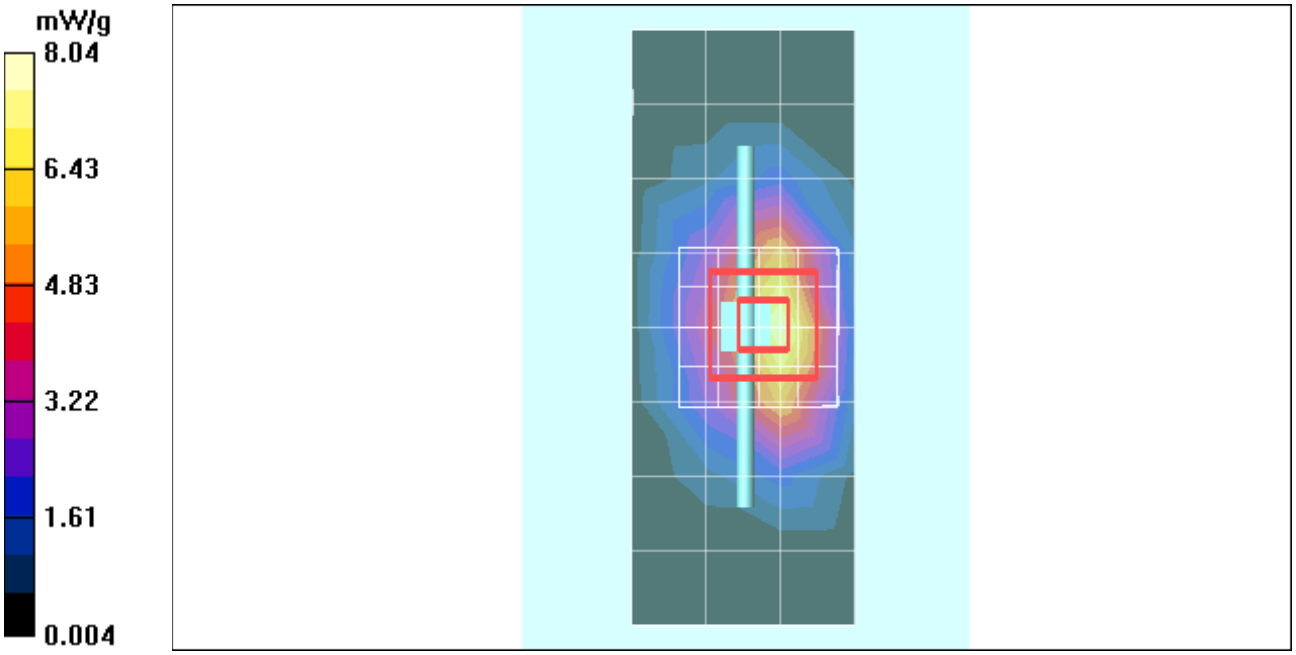
- Probe: ES3DV3 - SN3184; ConvF(5.14, 5.14, 5.14); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

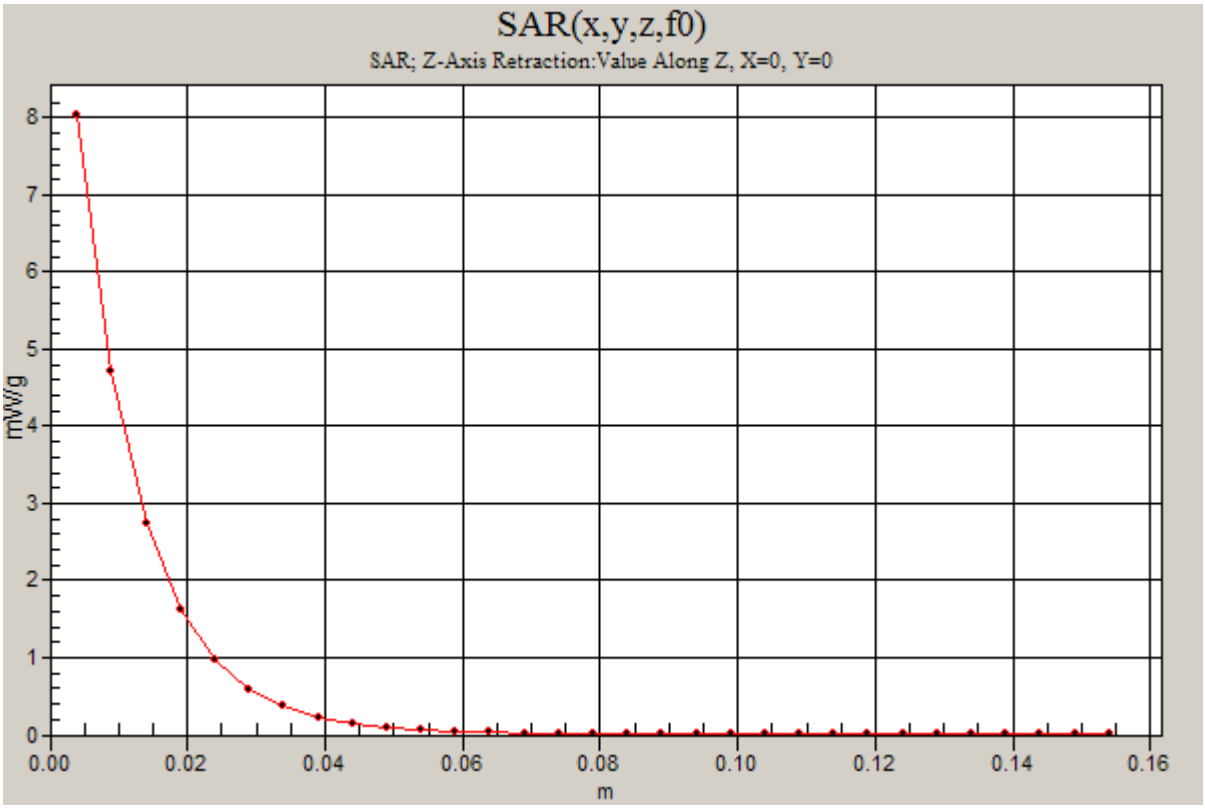
Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.67 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 76.0 V/m; Power Drift = 0.032 dB; Peak SAR (extrapolated) = 12.0 W/kg
SAR(1 g) = 7.13 mW/g; SAR(10 g) = 3.84 mW/g; Maximum value of SAR (measured) = 8.02 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 76.0 V/m; Power Drift = 0.032 dB; Peak SAR (extrapolated) = 12.3 W/kg
SAR(1 g) = 7.29 mW/g; SAR(10 g) = 3.92 mW/g; Maximum value of SAR (measured) = 8.16 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.04 mW/g


mW/g
8.04
6.43
4.83
3.22
1.61
0.004


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: 8/8/2010 6:38:39 AM

Test Laboratory: Motorola - Aug-08-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:272TR; FCC ID: IHDP56LV1
Procedure Notes: 1800MHz System Performance Check; Dipole Sn# 272TR; Input Power = 200 mW
Sim.Temp@meas = 20.0*C; Sim.Temp@SPC = 20.0*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 = 38.2; ρ = 1000 kg/m^3

DASY4 Configuration:

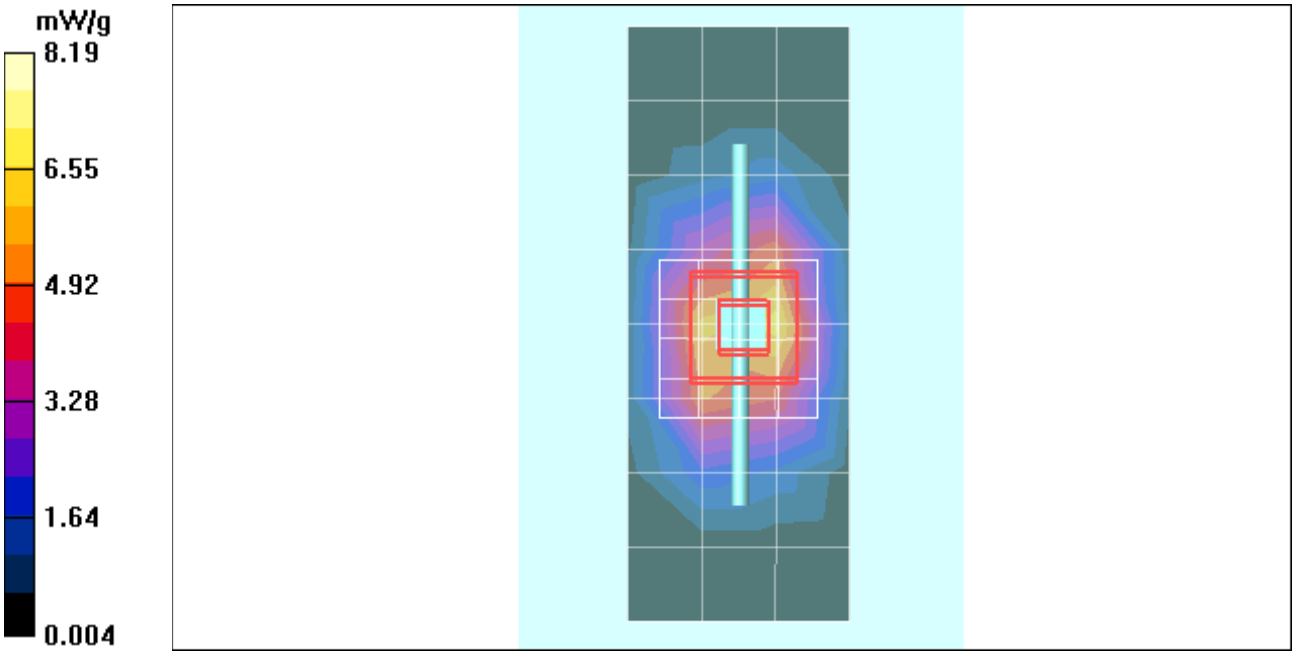
- Probe: ES3DV3 - SN3184; ConvF(5.14, 5.14, 5.14); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

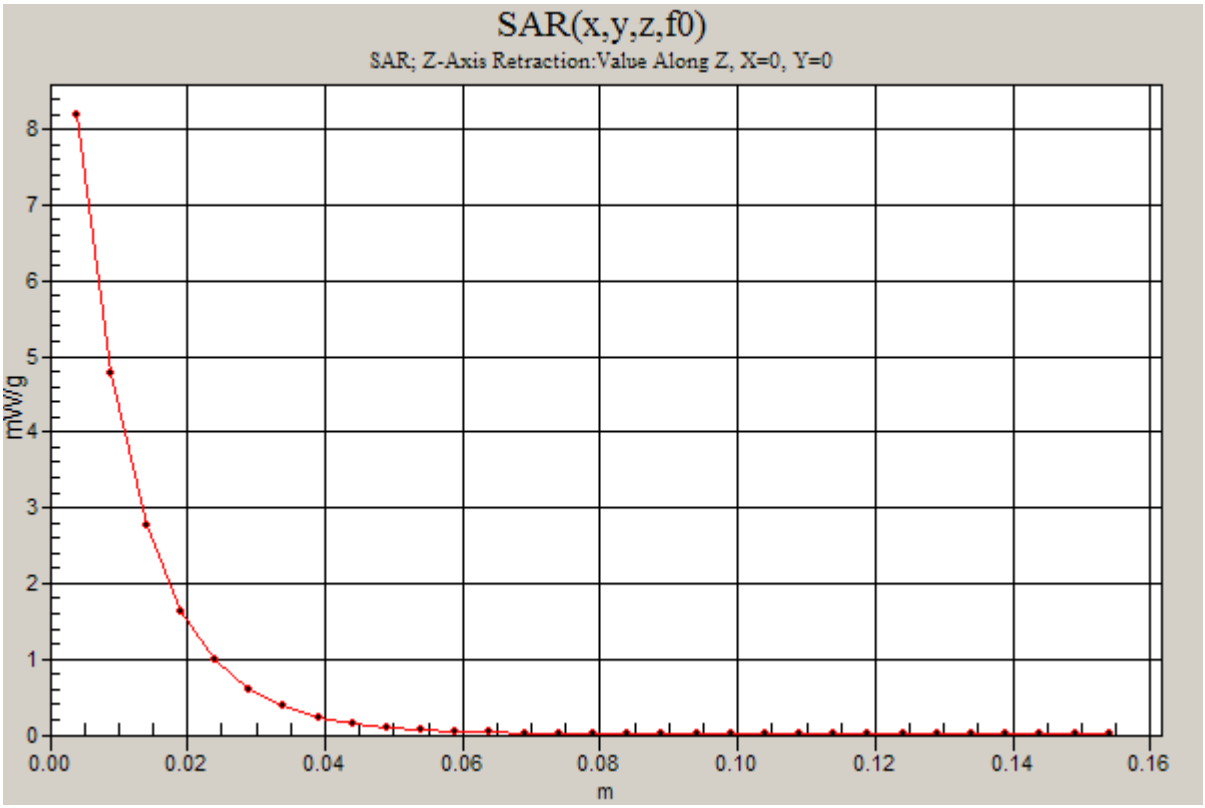
Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 6.31 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.8 V/m; Power Drift = -0.034 dB; Peak SAR (extrapolated) = 12.3 W/kg
SAR(1 g) = 7.3 mW/g; SAR(10 g) = 3.94 mW/g; Maximum value of SAR (measured) = 8.22 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.8 V/m; Power Drift = -0.034 dB; Peak SAR (extrapolated) = 12.6 W/kg
SAR(1 g) = 7.4 mW/g; SAR(10 g) = 3.97 mW/g; Maximum value of SAR (measured) = 8.31 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.19 mW/g


mW/g
8.19
6.55
4.92
3.28
1.64
0.004


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: 8/9/2010 7:47:55 AM

Test Laboratory: Motorola - Aug-09-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 272TR; FCC ID: IHDP56LV1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 272TR; Input Power = 200 mW
Sim.Temp@meas = 20.1 ▪ C; Sim.Temp@SPC = 20.1 ▪ 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 = 1.36 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3

DASY4 Configuration:

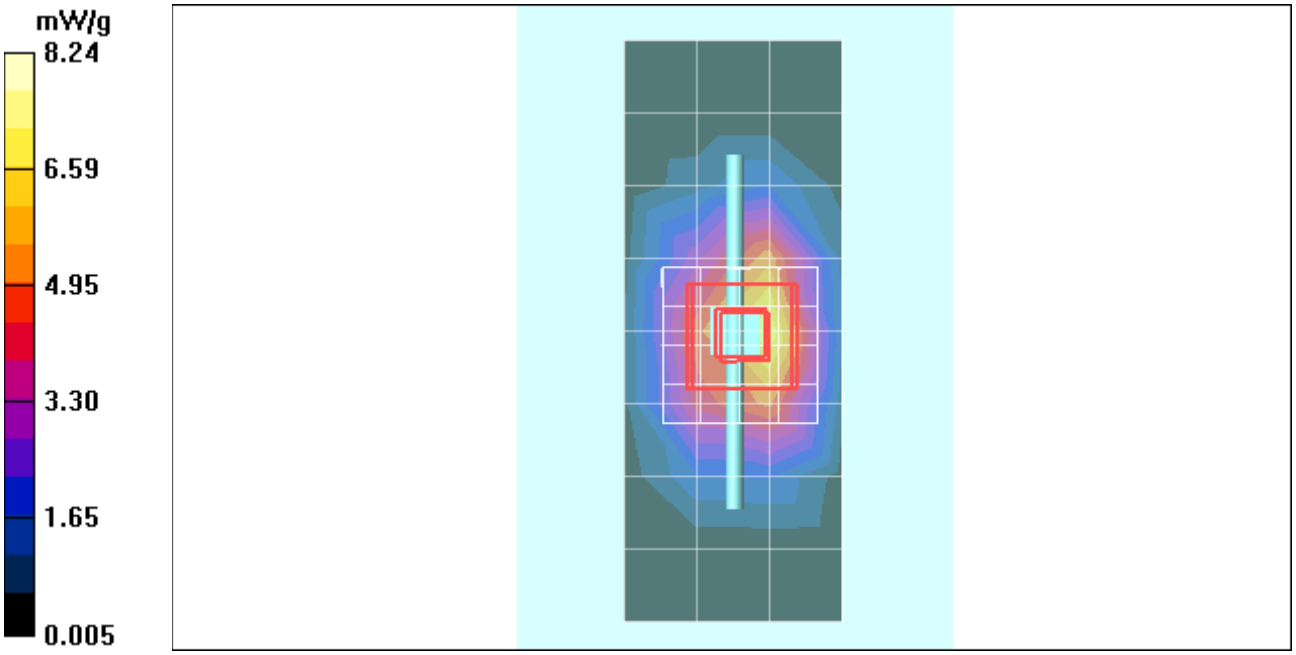
- Probe: ES3DV3 - SN3184; ConvF(5.14, 5.14, 5.14); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

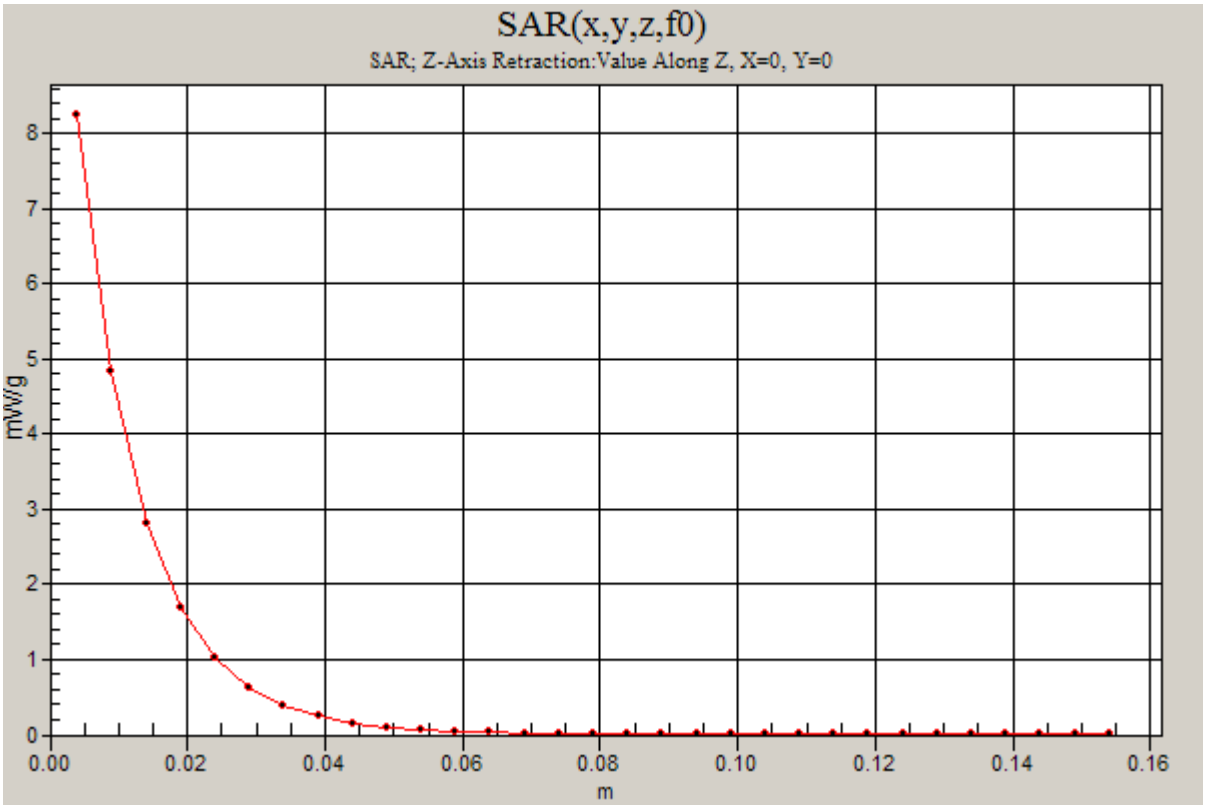
Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.18 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.7 V/m; Power Drift = -0.018 dB; Peak SAR (extrapolated) = 12.4 W/kg
SAR(1 g) = 7.39 mW/g; SAR(10 g) = 3.99 mW/g; Maximum value of SAR (measured) = 8.30 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.7 V/m; Power Drift = -0.018 dB; Peak SAR (extrapolated) = 12.9 W/kg
SAR(1 g) = 7.56 mW/g; SAR(10 g) = 4.05 mW/g; Maximum value of SAR (measured) = 8.53 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.24 mW/g


mW/g
8.24
6.59
4.95
3.30
1.65
0.005


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: 9/27/2010 7:00:03 AM

Test Laboratory: Motorola - 1800MHz System Performance Check

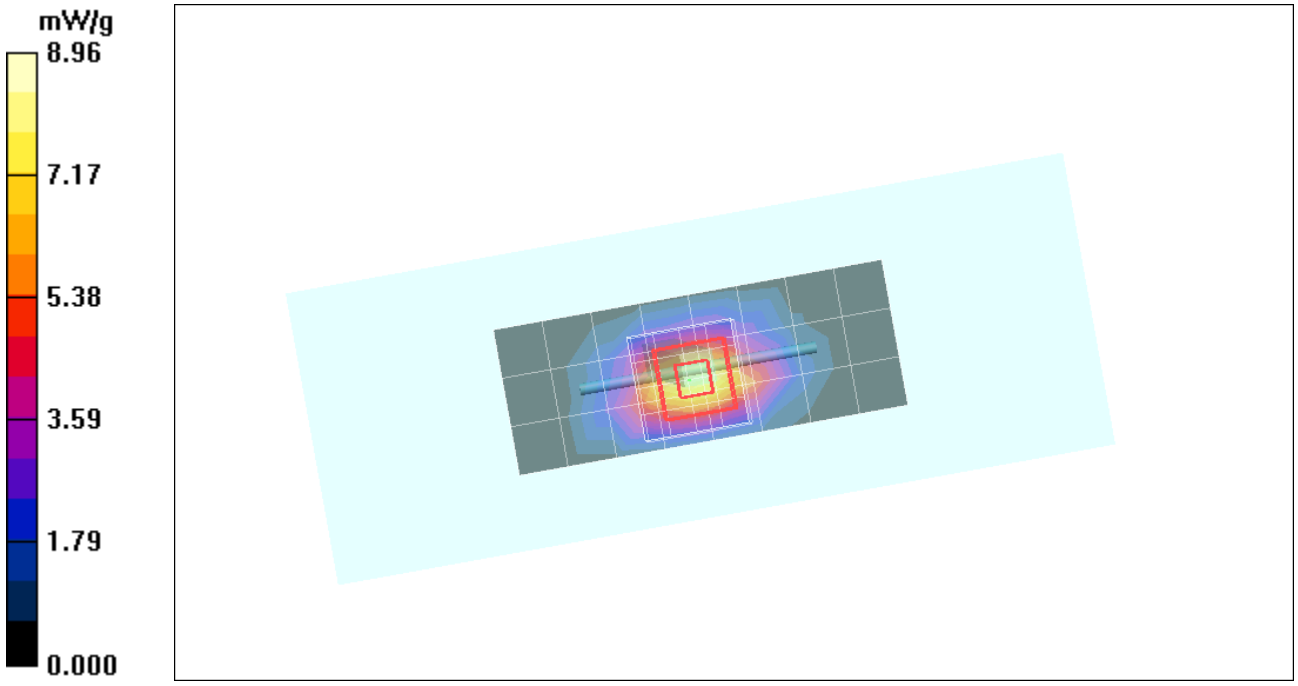
DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:272tr;
Procedure Notes: 1800 MHz System Performance Check / PM2 Power = 196 mW Refl.Pwr PM3 = -25.81 dB
Sim.Temp@SPC = 19.2ºC Room Temp @ SPC = 19.6ºC
Communication System: CW - Dipole; Frequency: 1800 MHz; Communication System Channel Number: 8; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 1800 MHz; σ = 1.39 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 7.95 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.0 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 14.5 W/kg
SAR(1 g) = 7.88 mW/g; SAR(10 g) = 4.15 mW/g
Maximum value of SAR (measured) = 8.77 mW/g



Date/Time: 8/12/2010 11:13:50 AM

Test Laboratory: Motorola - Aug-12-2010 2450 MHz

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 766; FCC ID: IHDP56LV1
Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 766; Input Power = 200 mW
Sim.Temp@meas = 20.0*C; Sim.Temp@SPC = 20.0*C; Room Temp @ SPC = 20.0*C
Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 2450 MHz; σ = 1.83 mho/m; ε_r = 36.4; ρ = 1000 kg/m^3

DASY4 Configuration:

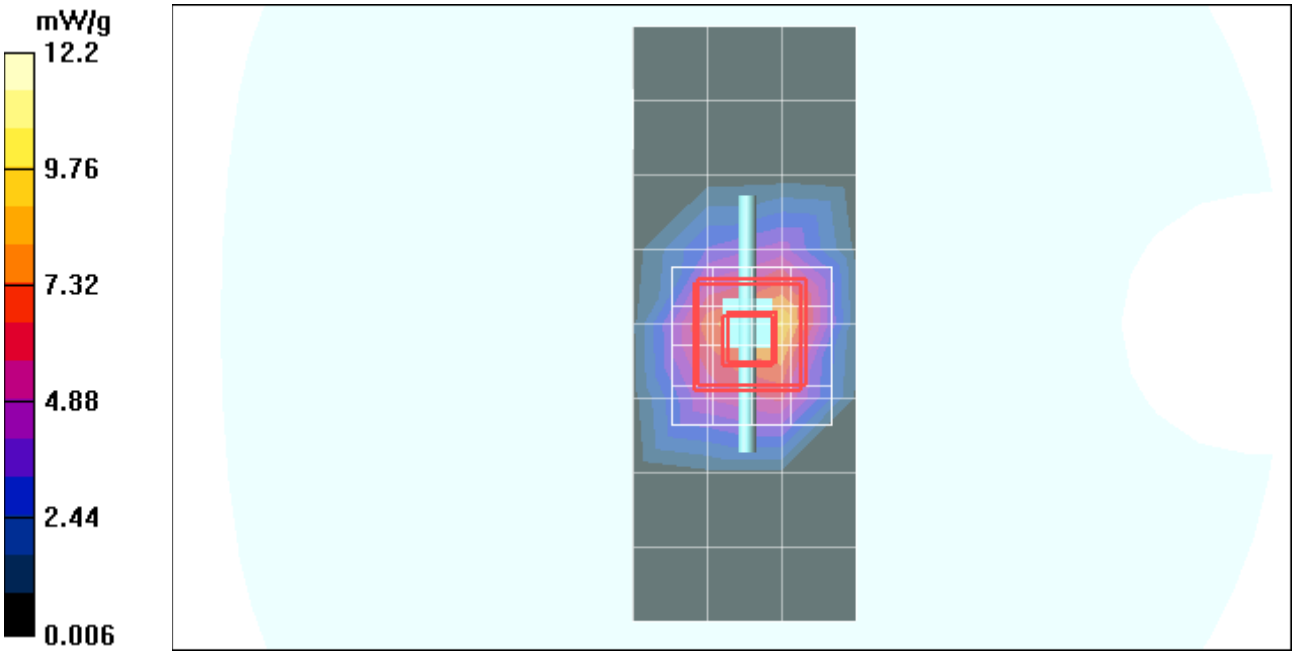
- Probe: ES3DV3 - SN3184; ConvF(4.44, 4.44, 4.44); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

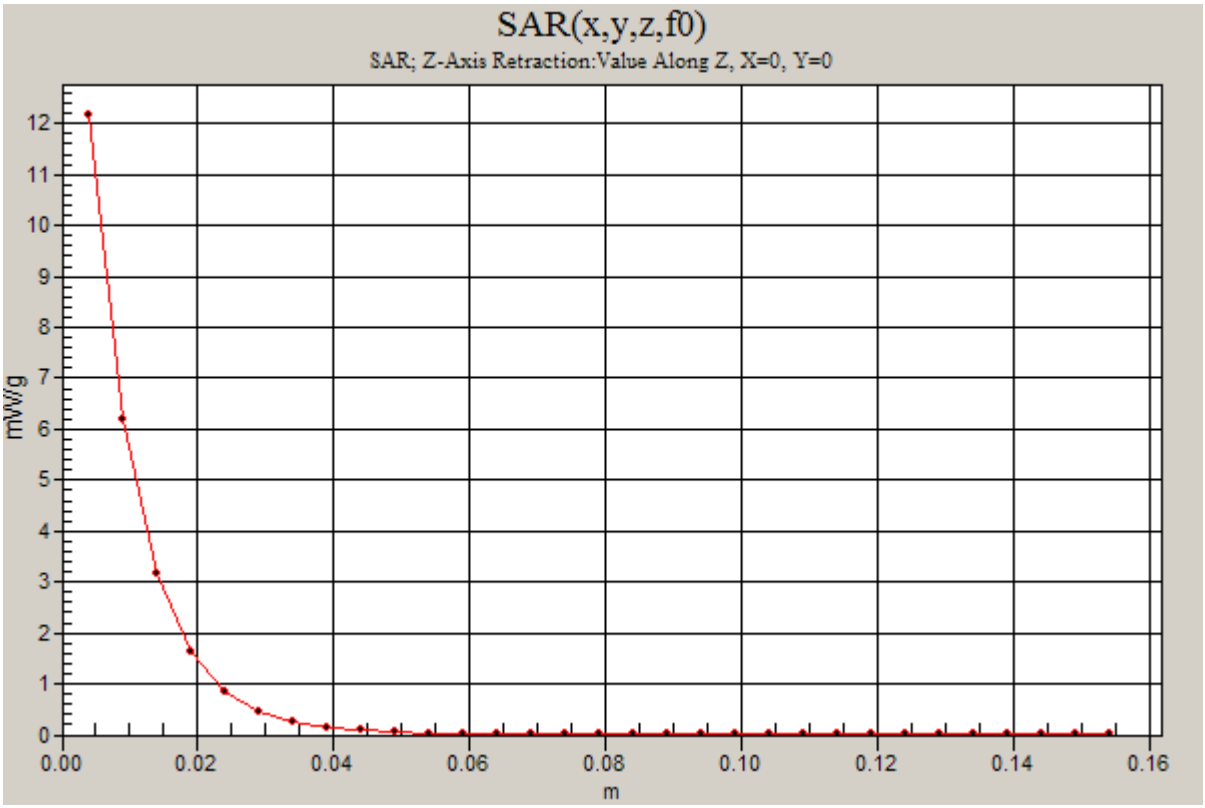
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 9.12 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.0 V/m; Power Drift = -0.015 dB; Peak SAR (extrapolated) = 21.0 W/kg
SAR(1 g) = 10.6 mW/g; SAR(10 g) = 4.99 mW/g; Maximum value of SAR (measured) = 12.0 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.0 V/m; Power Drift = -0.015 dB; Peak SAR (extrapolated) = 21.8 W/kg
SAR(1 g) = 10.9 mW/g; SAR(10 g) = 5.1 mW/g; Maximum value of SAR (measured) = 12.3 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 12.2 mW/g


mW/g
12.2
9.76
7.32
4.88
2.44
0.006


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

Date/Time: 8/13/2010 11:28:40 AM

Test Laboratory: Motorola - Aug-13-2010 2450 MHz

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 766; FCC ID: IHDP56LV1
Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 766; Input Power = 200 mW
Sim.Temp@meas = 20.4*C; Sim.Temp@SPC = 20.4*C; Room Temp @ SPC = 20.1*C
Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 2450 MHz; σ = 1.84 mho/m; ε_r = 36.8; ρ = 1000 kg/m^3

DASY4 Configuration:

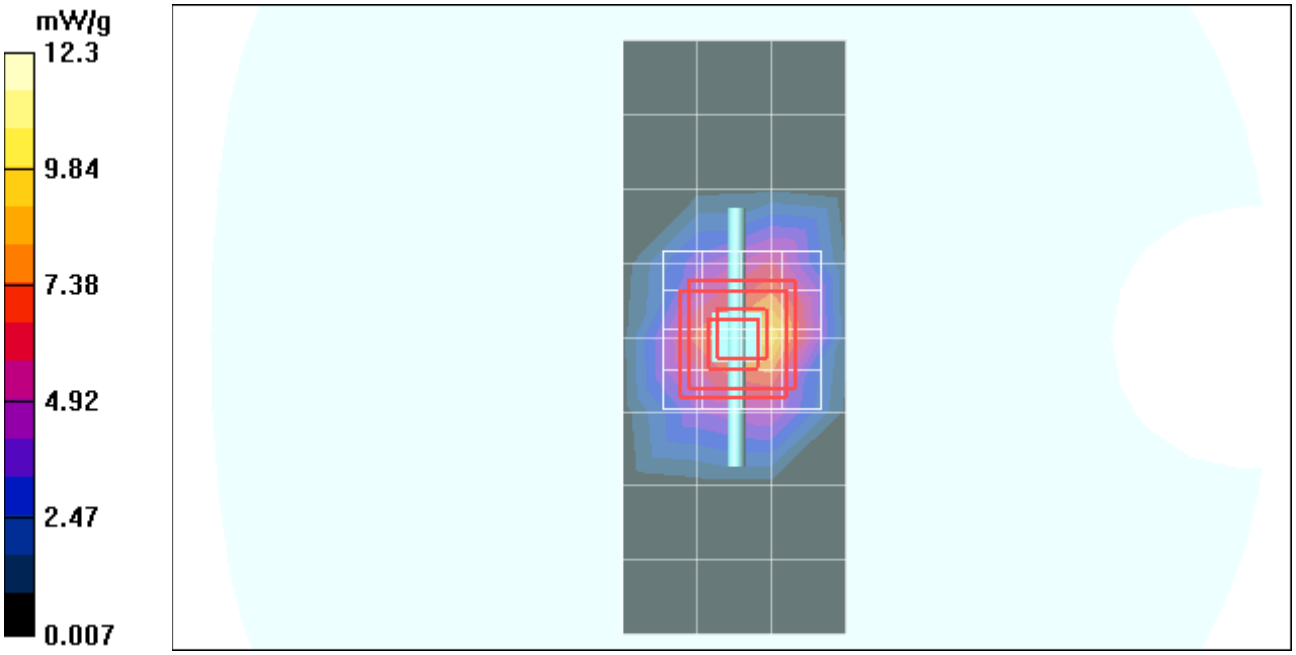
- Probe: ES3DV3 - SN3184; ConvF(4.44, 4.44, 4.44); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

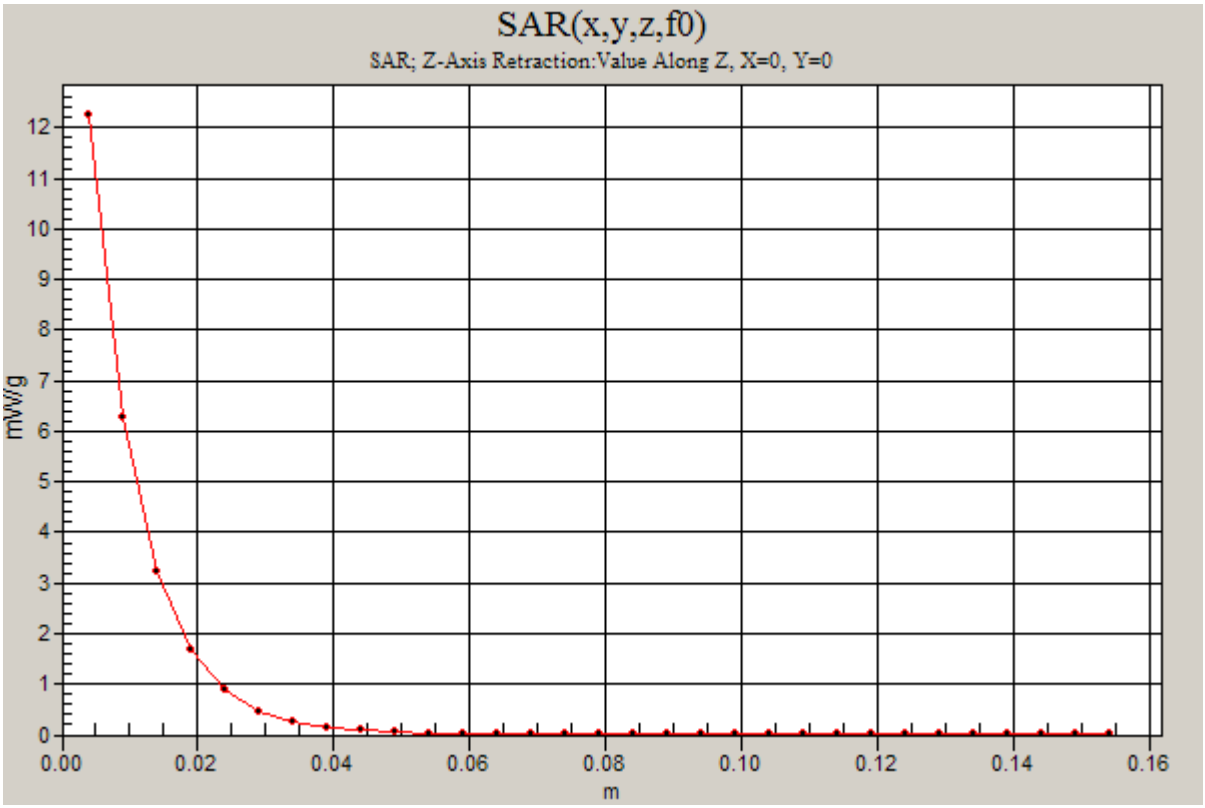
Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 9.65 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.9 V/m; Power Drift = -0.045 dB; Peak SAR (extrapolated) = 21.3 W/kg
SAR(1 g) = 10.8 mW/g; SAR(10 g) = 5.07 mW/g; Maximum value of SAR (measured) = 12.3 mW/g

Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.9 V/m; Power Drift = -0.045 dB; Peak SAR (extrapolated) = 22.0 W/kg
SAR(1 g) = 11 mW/g; SAR(10 g) = 5.15 mW/g; Maximum value of SAR (measured) = 12.1 mW/g

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


mW/g
12.3
9.84
7.38
4.92
2.47
0.007


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

Date/Time: 9/27/2010 2:30:24 PM

Test Laboratory: Motorola - 2450 MHz System Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:766;

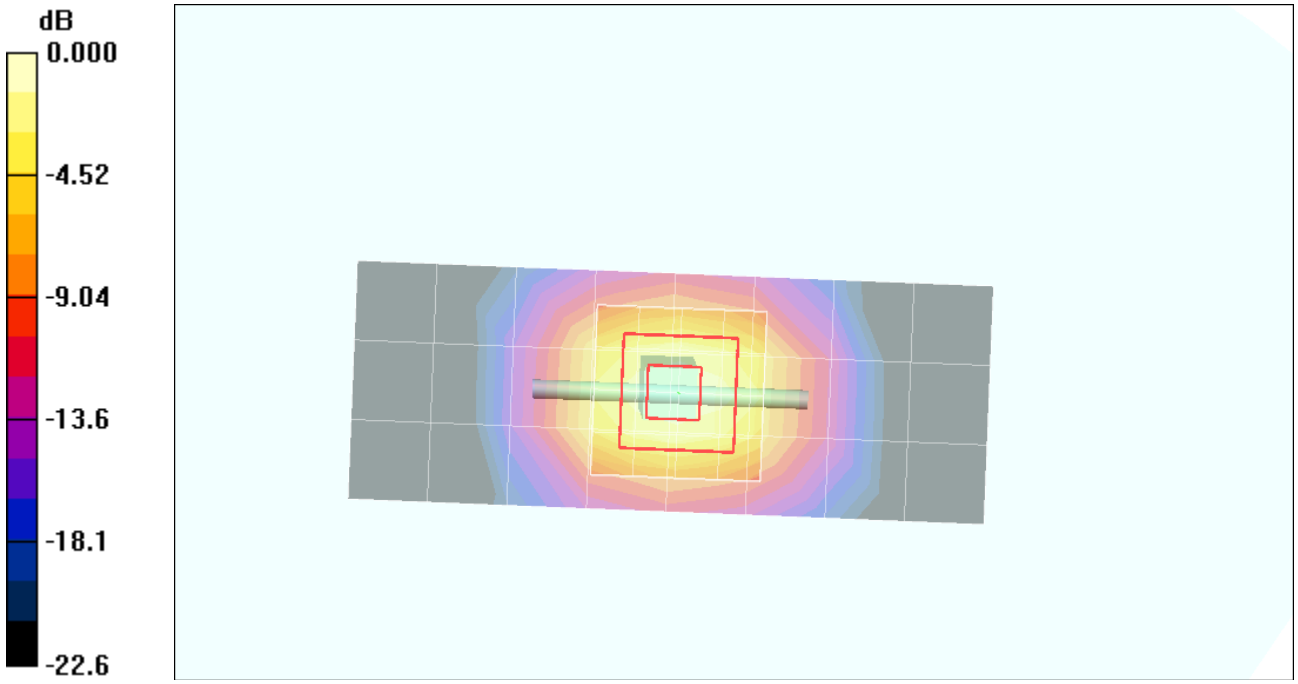
Procedure Notes: 2450 MHz System Performance Check / PM2 Power = 201 mW Refl.Pwr PM3 = -30.85dB
Sim.Temp@SPC = 19.4ºC Room Temp @ SPC = 20.1ºC
Communication System: CW - Dipole; Frequency: 2450 MHz; Communication System Channel Number: 11;
Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 2450 MHz; σ = 1.88 mho/m; ε_r = 36.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- 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 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 8.70 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 84.7 V/m; Power Drift = -0.001 dB
Peak SAR (extrapolated) = 23.7 W/kg
SAR(1 g) = 11.3 mW/g; SAR(10 g) = 5.21 mW/g
Maximum value of SAR (measured) = 12.9 mW/g



0 dB = 12.9mW/g

Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

Date/Time: 8/3/2010 9:15:15 PM

Test Laboratory: Motorola - CDMA 800 Cheek

Serial: 353650040003084; FCC ID: IHDP56LV1

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5843A; 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 = 0.9 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3

DASY4 Configuration:

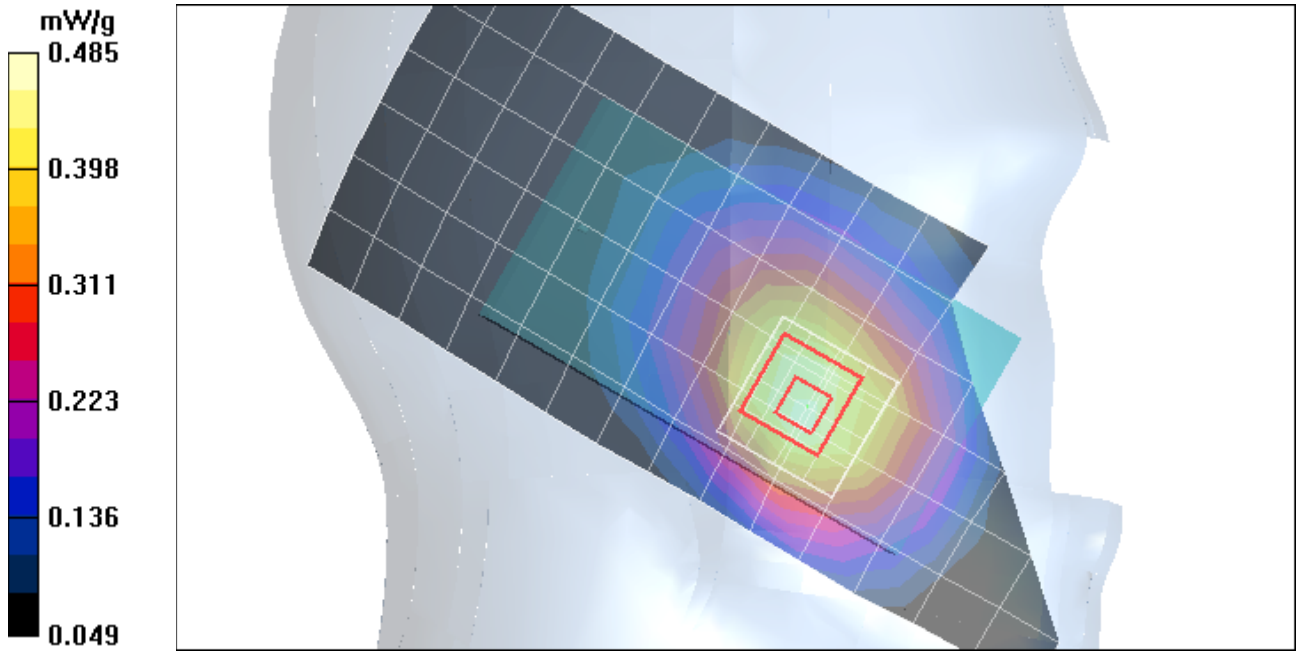
- Probe: ES3DV3 - SN3184; ConvF(6.26, 6.26, 6.26); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.474 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.0 V/m; Power Drift = 0.038 dB; Peak SAR (extrapolated) = 0.575 W/kg
SAR(1 g) = 0.459 mW/g; SAR(10 g) = 0.336 mW/g; Maximum value of SAR (measured) = 0.485 mW/g



Date/Time: 8/6/2010 3:28:59 PM

Test Laboratory: Motorola - CDMA 1900 Cheek

Serial: 353650040003084; FCC ID: IHDP56LV1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Cheek
Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3

DASY4 Configuration:

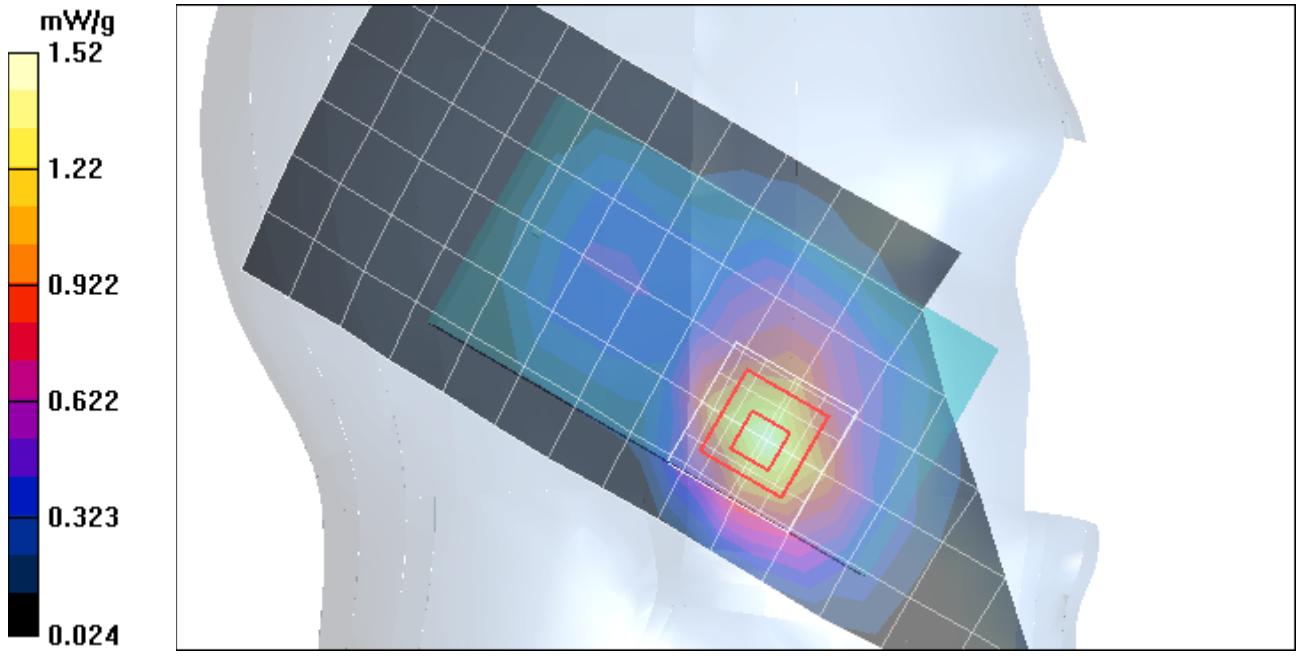
- Probe: ES3DV3 - SN3184; ConvF(5.14, 5.14, 5.14); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.50 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.1 V/m; Power Drift = -0.026 dB; Peak SAR (extrapolated) = 1.91 W/kg
SAR(1 g) = 1.38 mW/g; SAR(10 g) = 0.836 mW/g; Maximum value of SAR (measured) = 1.52 mW/g



Date/Time: 8/13/2010 9:00:34 AM

Test Laboratory: Motorola - Wi-Fi 2450 Cheek

Serial: 353650040003084; FCC ID: IHDP56LV1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5875A; DEVICE POSITION: Cheek
Device Mode: 802.11b mode, 1 Mbps data rate
Communication System: Wi-Fi 2450; Frequency: 2462 MHz; Channel Number: 11; Duty Cycle: 1:1

Medium: 2450 Glycol Head
Medium parameters used: f = 2450 MHz; σ = 1.83 mho/m; ε_r = 36.4; ρ = 1000 kg/m^3

DASY4 Configuration:

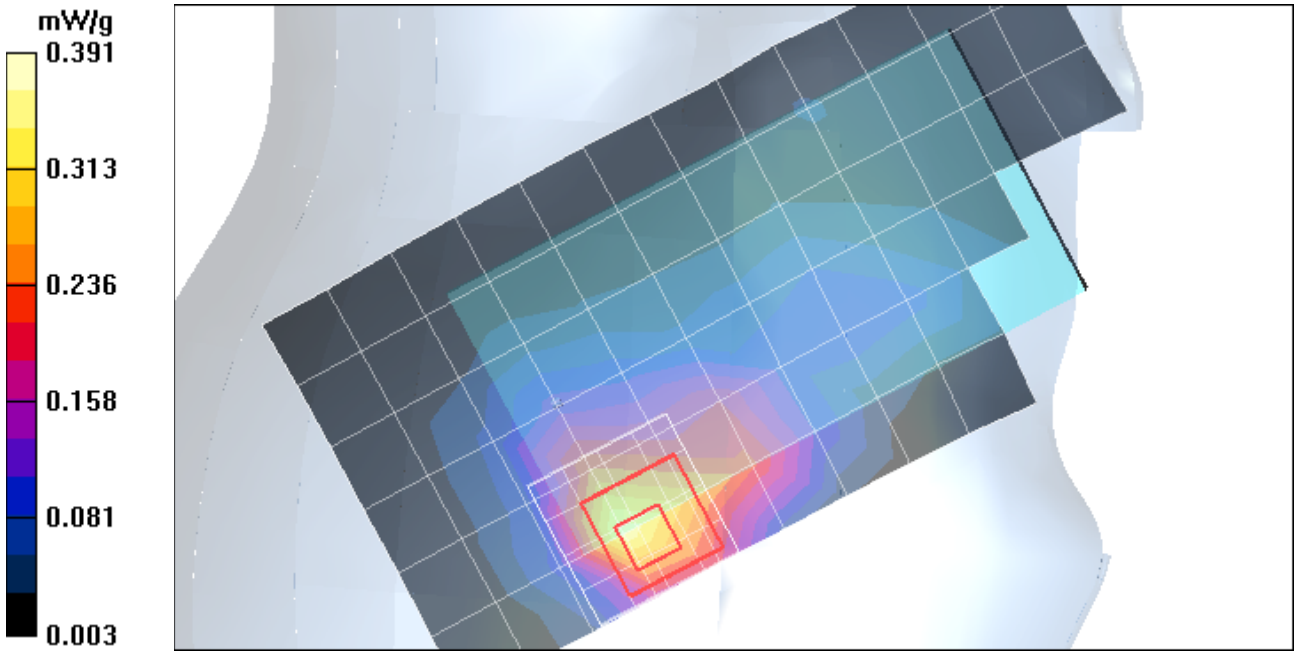
- Probe: ES3DV3 - SN3184; ConvF(4.44, 4.44, 4.44); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.363 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = 0.032 dB; Peak SAR (extrapolated) = 0.701 W/kg
SAR(1 g) = 0.355 mW/g; SAR(10 g) = 0.176 mW/g; Maximum value of SAR (measured) = 0.391 mW/g



Date/Time: 8/4/2010 12:24:54 AM

Test Laboratory: Motorola - CDMA 800 Tilt

Serial: 353650040003084; FCC ID: IHDP56LV1

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Rotated
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 = 0.9 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3

DASY4 Configuration:

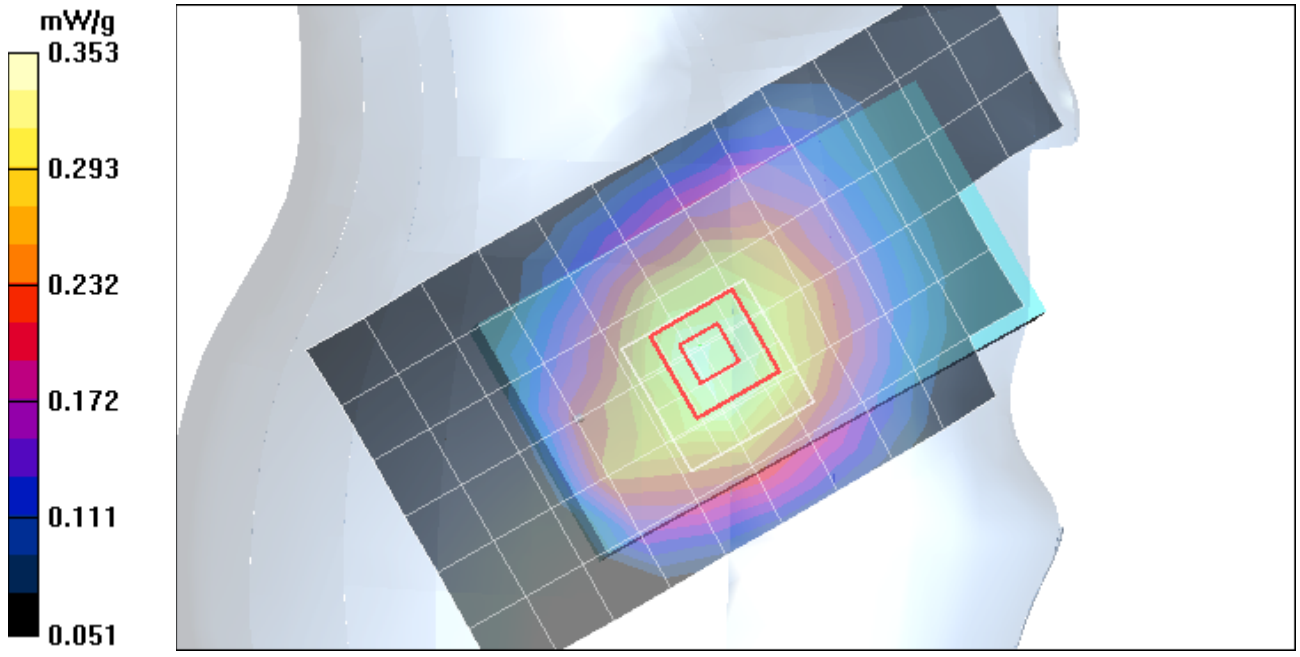
- Probe: ES3DV3 - SN3184; ConvF(6.26, 6.26, 6.26); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.340 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.1 V/m; Power Drift = 0.094 dB; Peak SAR (extrapolated) = 0.408 W/kg
SAR(1 g) = 0.337 mW/g; SAR(10 g) = 0.258 mW/g; Maximum value of SAR (measured) = 0.353 mW/g



Date/Time: 8/7/2010 12:57:19 AM

Test Laboratory: Motorola - CDMA 1900 Tilt

Serial: 353650040003084; FCC ID: IHDP56LV1

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Rotated
Communication System: CDMA 1900; Frequency: 1851.25 MHz; Channel Number: 25; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3

DASY4 Configuration:

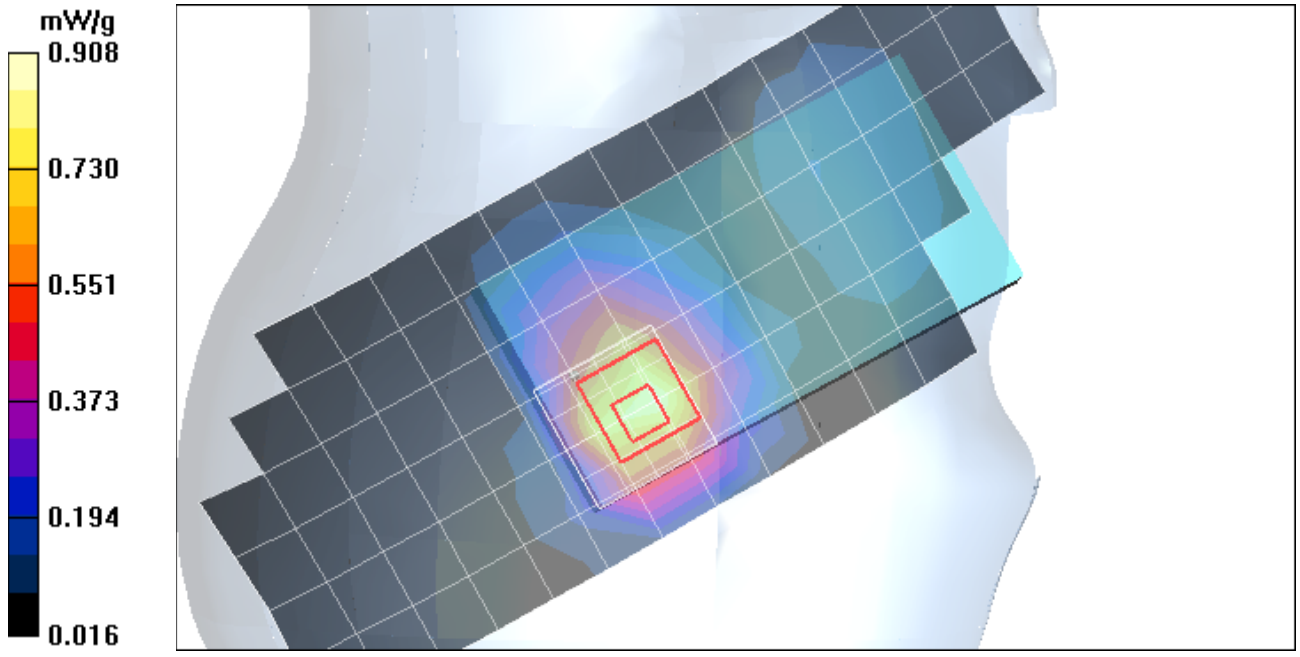
- Probe: ES3DV3 - SN3184; ConvF(5.14, 5.14, 5.14); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.866 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.4 V/m; Power Drift = -0.093 dB; Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.852 mW/g; SAR(10 g) = 0.530 mW/g; Maximum value of SAR (measured) = 0.908 mW/g



Date/Time: 8/13/2010 7:59:25 AM

Test Laboratory: Motorola - Wi-Fi 2450 Tilt

Serial: 353650040003084; FCC ID: IHDP56LV1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5875A; DEVICE POSITION: Tilt
Device Mode: 802.11b mode, 1 Mbps data rate
Communication System: Wi-Fi 2450; Frequency: 2437 MHz; Channel Number: 6; Duty Cycle: 1:1

Medium: 2450 Glycol Head
Medium parameters used: f = 2450 MHz; σ = 1.83 mho/m; ε_r = 36.4; ρ = 1000 kg/m^3

DASY4 Configuration:

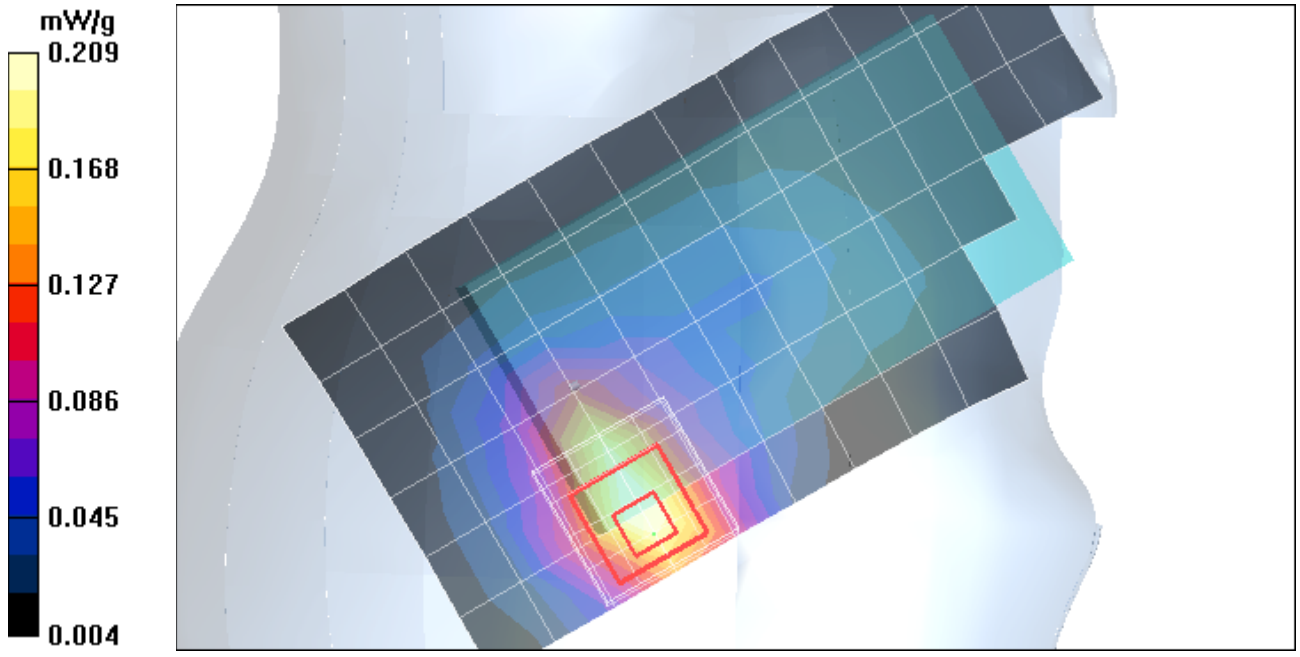
- Probe: ES3DV3 - SN3184; ConvF(4.44, 4.44, 4.44); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.229 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.15 V/m; Power Drift = -0.425 dB; Peak SAR (extrapolated) = 0.351 W/kg
SAR(1 g) = 0.187 mW/g; SAR(10 g) = 0.098 mW/g; Maximum value of SAR (measured) = 0.209 mW/g



Appendix 3

SAR distribution plots for Body Worn Configuration

Date/Time: 8/4/2010 5:45:20 PM

Test Laboratory: Motorola - CDMA 800 Body-Worn

Serial: 353650040003084; FCC ID: IHDP56LV1

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Battery Model #: SNN5843A
Device Position: Body Worn, Back of Phone 15 mm from Phantom
Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1

Medium: Low Freq Body
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.9; ρ = 1000 kg/m^3

DASY4 Configuration:

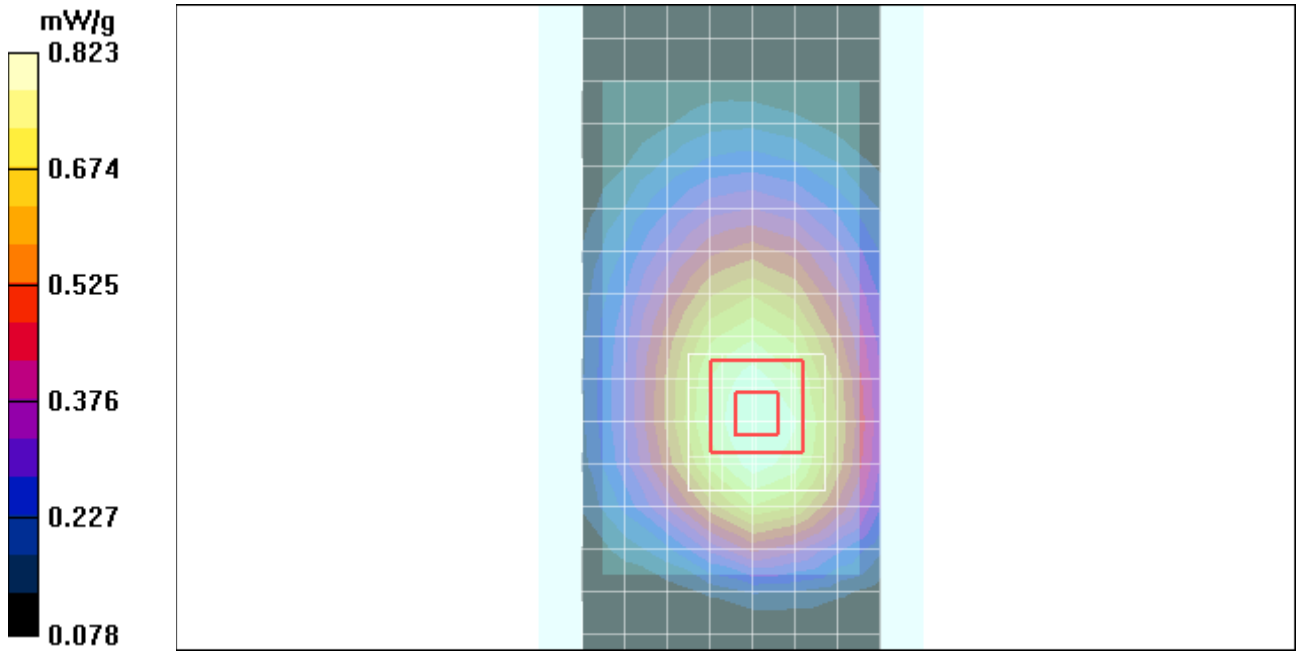
- Probe: ES3DV3 - SN3184; ConvF(6.08, 6.08, 6.08); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R4 : Sect.2, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.835 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.9 V/m; Power Drift = 0.060 dB; Peak SAR (extrapolated) = 0.968 W/kg
SAR(1 g) = 0.778 mW/g; SAR(10 g) = 0.576 mW/g; Maximum value of SAR (measured) = 0.823 mW/g



Date/Time: 8/3/2010 3:07:39 PM

Test Laboratory: Motorola - CDMA 1900 Body-Worn

Serial: 353650040003084; FCC ID: IHDP56LV1

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Battery Model #: SNN5843A
Device Position: Body Worn, Back of Phone 15 mm from Phantom
Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 51; ρ = 1000 kg/m^3

DASY4 Configuration:

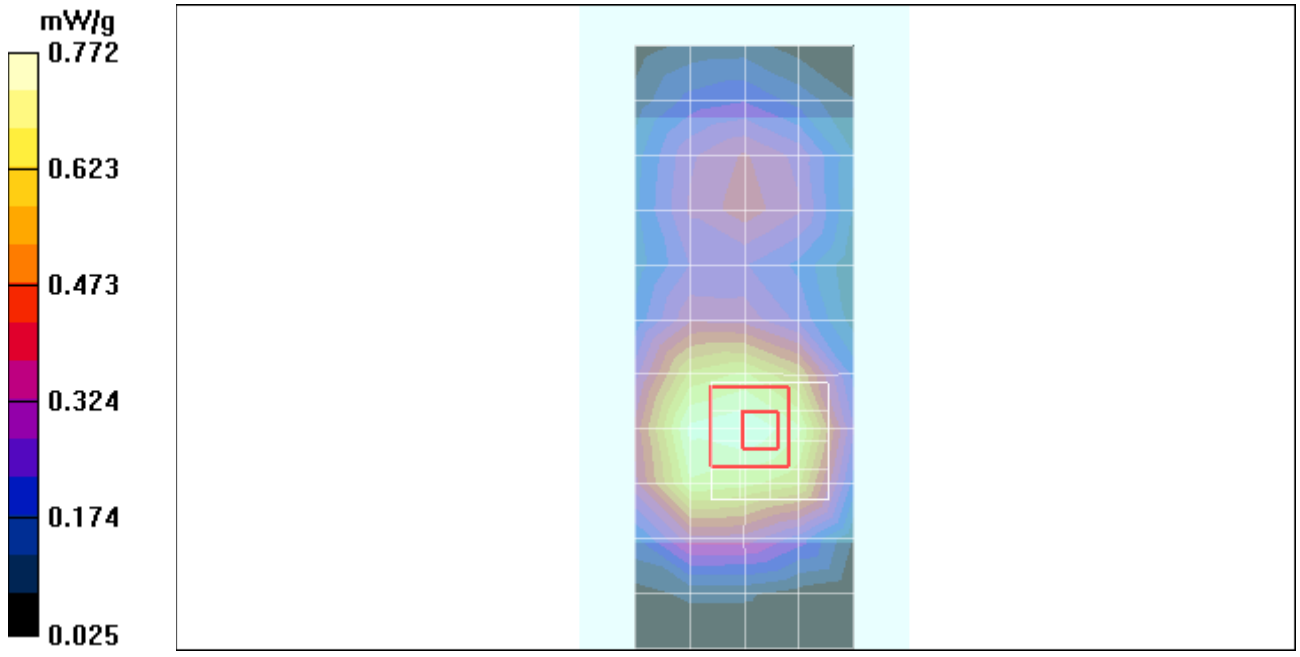
- Probe: ES3DV3 - SN3184; ConvF(4.84, 4.84, 4.84); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.775 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.3 V/m; Power Drift = -0.068 dB; Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.721 mW/g; SAR(10 g) = 0.480 mW/g; Maximum value of SAR (measured) = 0.772 mW/g



Date/Time: 8/13/2010 11:52:38 AM

Test Laboratory: Motorola - Wi-Fi 2450 Body-Worn

Serial: 353650040003084; FCC ID: IHDP56LV1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5875A
Device Position: Body Worn, Back of Phone 15 mm from Phantom
Device Mode: 802.11b Mode, 1 Mbps data rate
Communication System: Wi-Fi 2450; Frequency: 2462 MHz; Channel Number: 11; Duty Cycle: 1:1

Medium: 2450 Glycol Head
Medium parameters used: f = 2450 MHz; σ = 2.03 mho/m; ε_r = 50; ρ = 1000 kg/m^3

DASY4 Configuration:

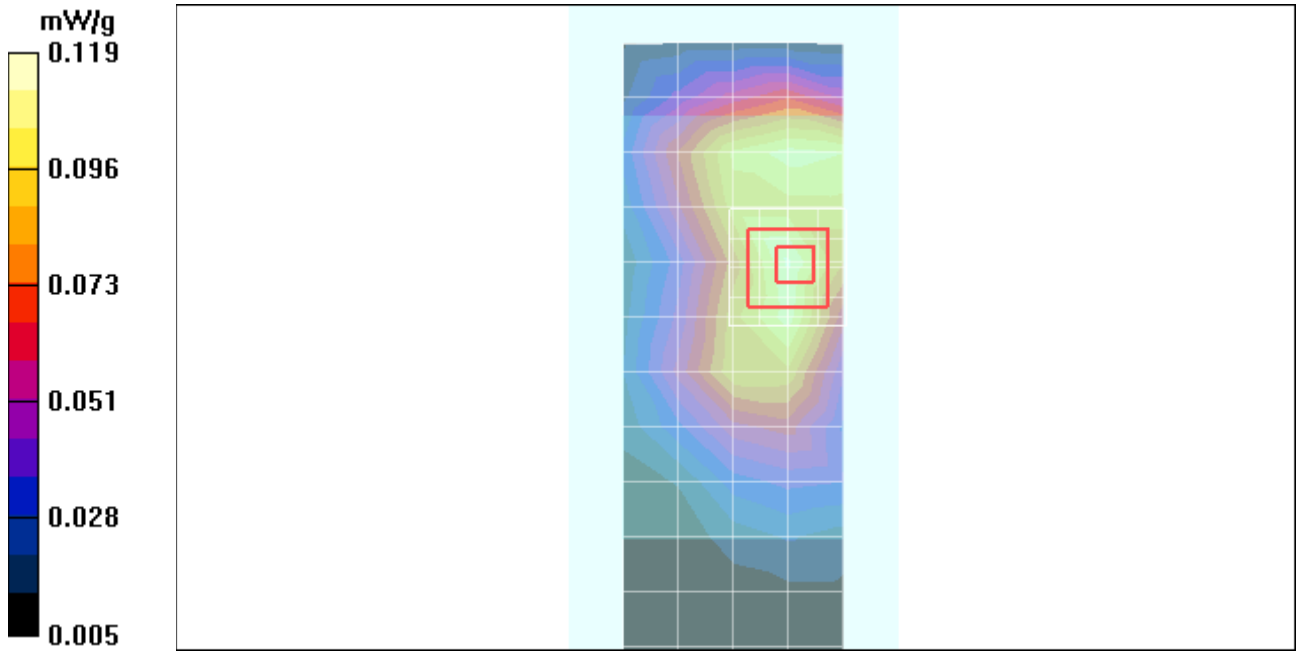
- Probe: ES3DV3 - SN3184; ConvF(4.28, 4.28, 4.28); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 2/17/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

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

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.90 V/m; Power Drift = -0.125 dB; Peak SAR (extrapolated) = 0.189 W/kg
SAR(1 g) = 0.110 mW/g; SAR(10 g) = 0.066 mW/g; Maximum value of SAR (measured) = 0.119 mW/g



Appendix 4

Probe Calibration Certificate

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

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

Accredited by the Swiss Accreditation Service (SAS)
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: ES3-3184_Sep09

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3184

Calibration procedure(s): QA CAL-01.v6, QA CAL-23.v3 and QA CAL-25.v2
Calibration procedure for dosimetric E-field probes

Calibration date: September 18, 2009

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 (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 21, 2009

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	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) 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:3184

Manufactured:	August 19, 2008
Last calibrated:	September 22, 2008
Recalibrated:	September 18, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ES3DV3 SN:3184

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

NormX	**1.28** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**91** mV
NormY	**1.36** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**92** mV
NormZ	**1.27** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**95** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **835 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	11.1	7.3
SAR_{be} [%]	With Correction Algorithm	0.8	0.5

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	12.1	8.3
SAR_{be} [%]	With Correction Algorithm	0.8	0.4

Sensor Offset

Probe Tip to Sensor Center	**2.0** mm

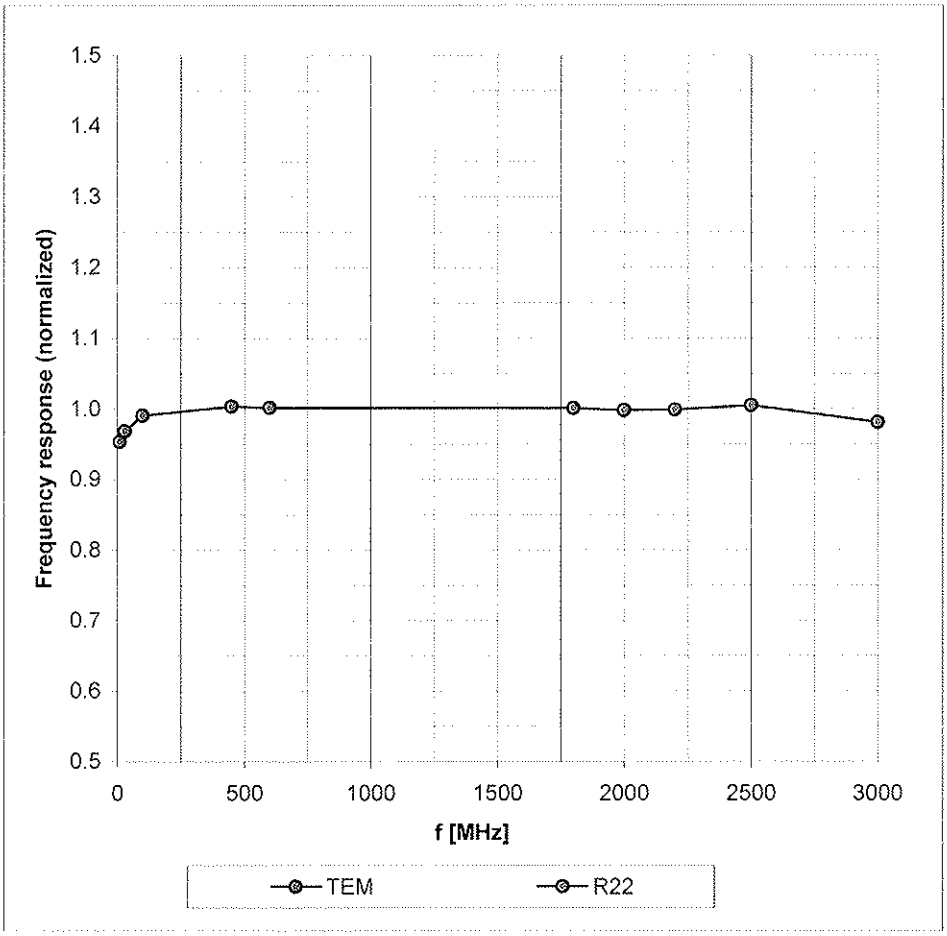
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[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.

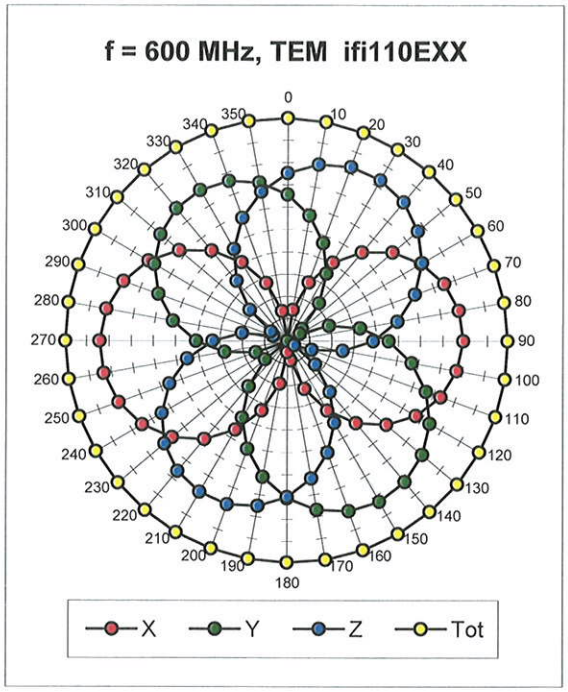
Frequency Response of E-Field

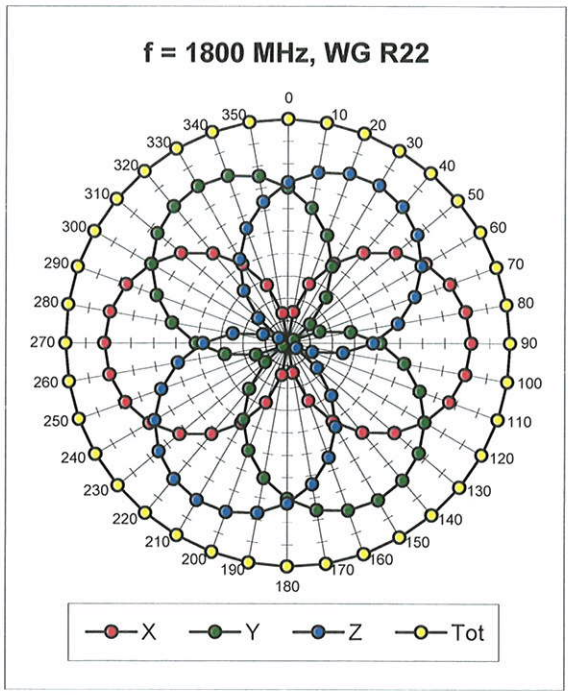
(TEM-Cell:ifi110 EXX, Waveguide: R22)

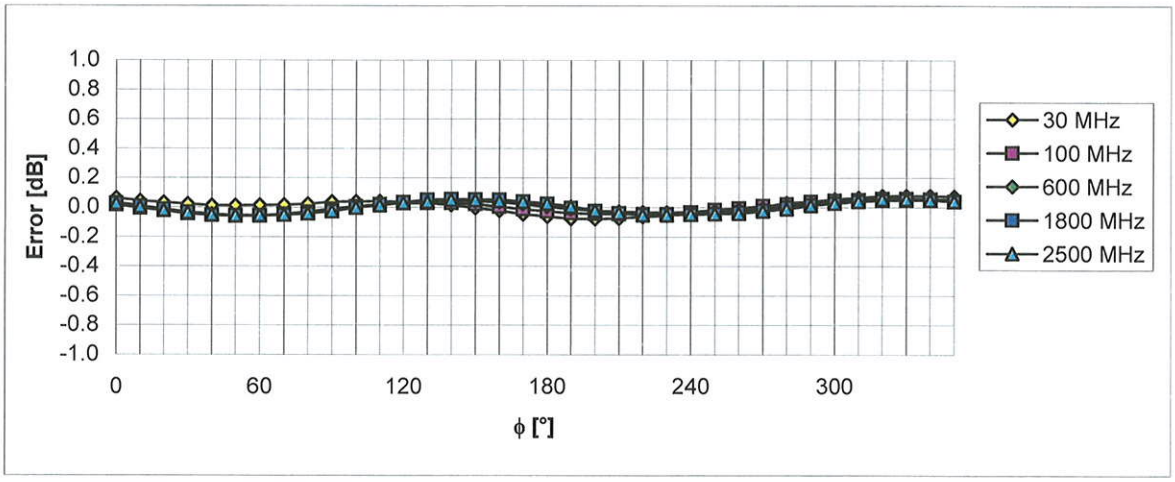


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



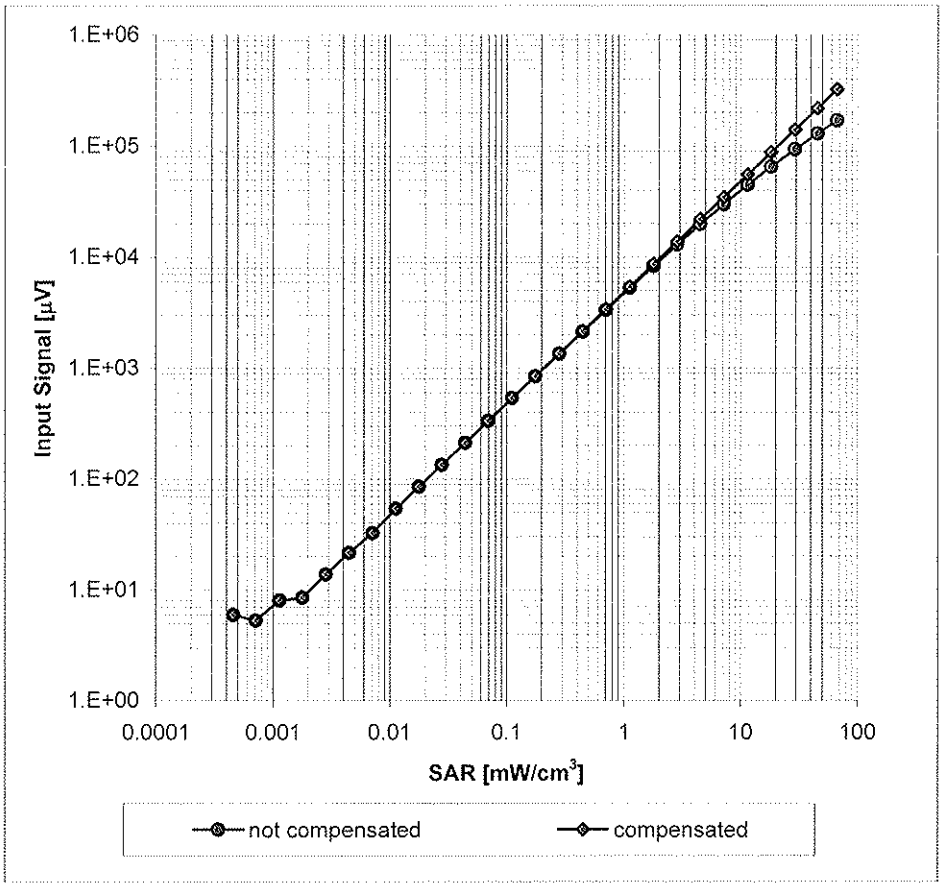


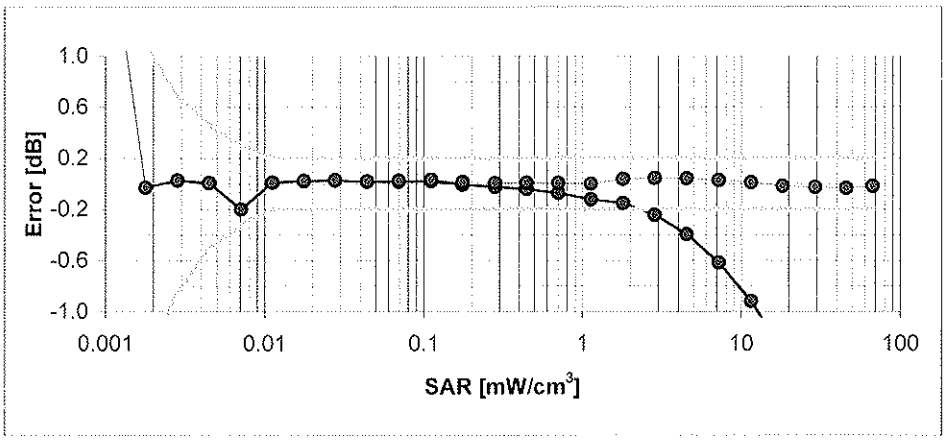


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

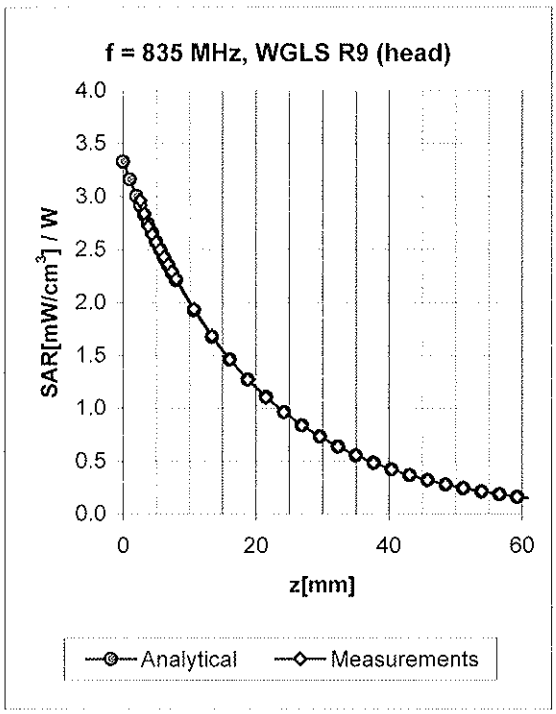
(Waveguide R22, f = 1800 MHz)

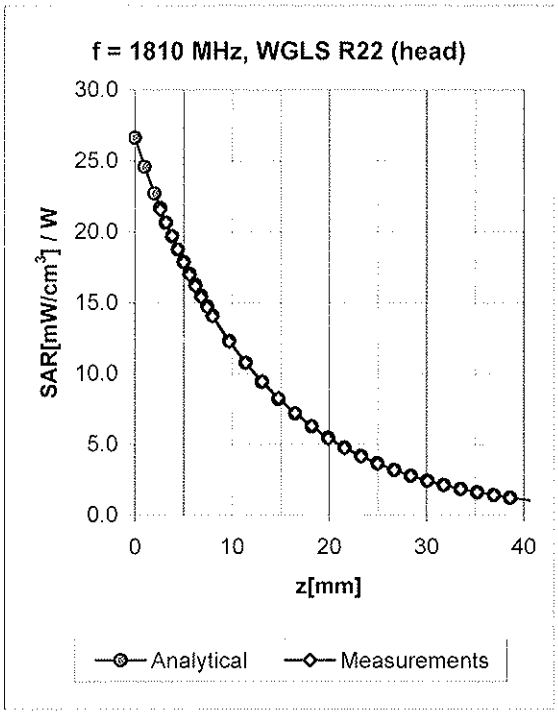




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



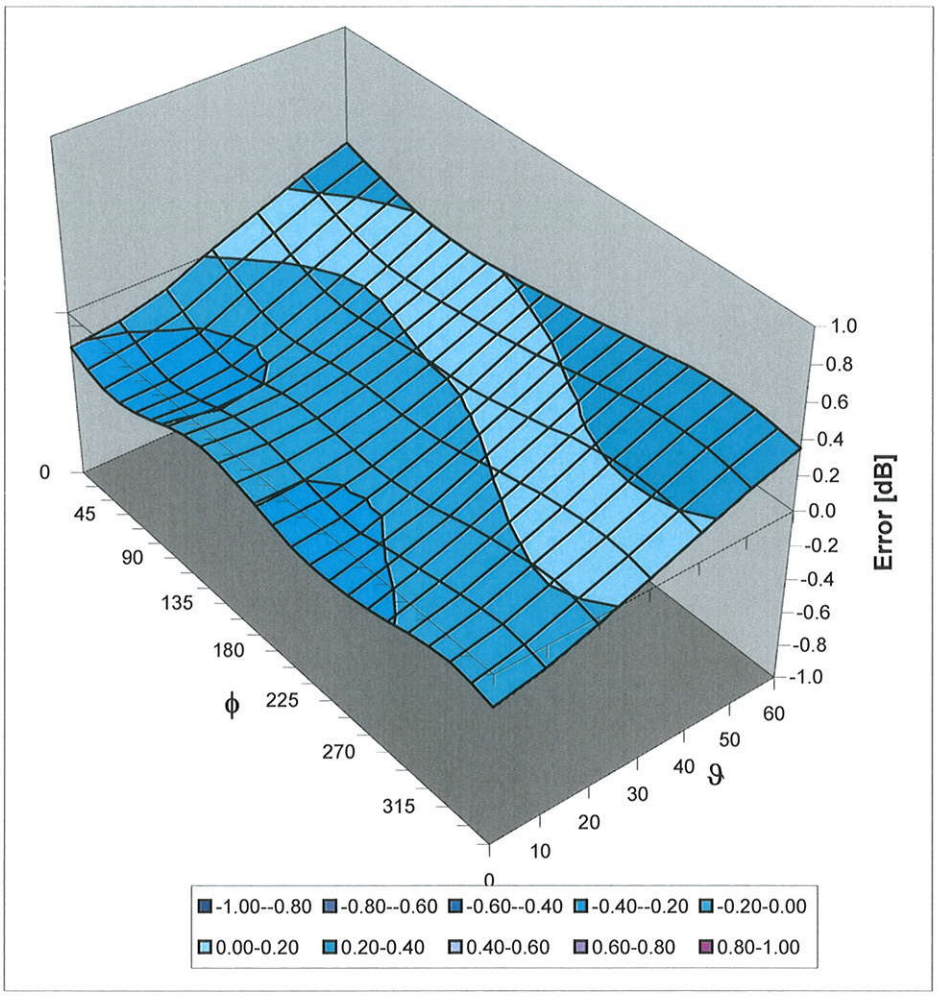


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.27	2.21	6.26 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.26	2.94	5.14 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.23	3.55	4.94 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.34	2.33	4.44 ± 11.0% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.32	1.92	6.08 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.37	2.02	4.84 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.30	2.95	4.81 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.99	1.20	4.28 ± 11.0% (k=2)

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

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

Appendix 5

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 6

Dipole Characterization Certificate

Certification of System Performance Check Targets

FCD-1806, rev-1

-Historical Data-

	835 MHz	
Reference Target:	9.56	**(W/kg)**
Measurement Uncertainty (k=1):	9.0%	
Measurement Period:	*26March09 - 15Mar10*	
# of tests performed:	244	
Grand Average:	9.59	**(W/kg)**
% Delta (Average - Reference Target)	0.3%	
Is % Delta <= Expanded Measurement Uncertainty (k=2)?	**Yes**	
Accept/Reject Average as new system performance check target?	**ACCEPT**	
	Applies to Dipole SN's: **432tr, 417tr, 420tr, 422tr, 423tr, 424tr, 425tr, 431tr, 434tr, 421tr, 436tr**	

-New System Performance Check Targets- per WI-0396

(based on analysis of historical data)

Frequency	SAR Target (W/kg)	Permittivity Target +/- %	Conductivity (S/m) Target +/- %
835 MHz	**9.59**	41.5 +/- 5%	0.90 +/- 5%

-Approvals-

Submitted by: Marge Kaunas Date: 17-Mar-10

Signed: Marge Kaunas

Comments: Data file available upon request.

Approved by: Steve Hauswirth **Date:** 17-Mar-10

Signed: Steven Hauswirth

Comments:

Certification of System Performance Check Targets

FCD-1806, rev-1

-Historical Data-

	1800 MHz	
Reference Target:	38.4	**(W/kg)**
Measurement Uncertainty (k=1):	9.0%	
Measurement Period:	*26March09 - 15Mar10*	
# of tests performed:	654	
Grand Average:	38.36	**(W/kg)**
% Delta (Average - Reference Target)	-0.1%	
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 Target +/- %	Conductivity (S/m) Target +/- %
1800 MHz	**38.36**	40.0 +/- 5%	1.40 +/- 5%

-Approvals-

Submitted by: Marge Kaunas Date: 17-Mar-10

Signed: Marge Kaunas

Comments: Data file available upon request.

Approved by: Steve Hauswirth **Date:** 17-Mar-10

Signed: Steven Hauswirth

Comments:

Certification of System Performance Check Targets

FCD-1806, rev-1

-Historical Data-

	2450 MHz	
Reference Target:	52.4	**(W/kg)**
Measurement Uncertainty (k=1):	9.0%	
Measurement Period:	*26March09 - 15Mar10*	
# of tests performed:	159	
Grand Average:	54.55	**(W/kg)**
% Delta (Average - Reference 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: **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 Target +/- %	Conductivity (S/m) Target +/- %
2450 MHz	**54.55**	39.2 +/- 10%	1.80 +/- 5%

-Approvals-

Submitted by: Marge Kaunas Date: 17-Mar-10

Signed: Marge Kaunas

Comments: Data file available upon request.

Approved by: Steve Hauswirth **Date:** 17-Mar-10

Signed: Steven Hauswirth

Comments:

END OF REPORT