Portable Cellular Phone SAR Test Report

Tests Requested By:	Motorola Mobility, Inc. 600 N. US Highway 45 Libertyville, IL 60048
Test Report #:	24868-1F Rev B.
Date of Report:	Dec 19, 2011, Revised on Dec 22, 2011
Date of Test:	Nov 24, 2011 to Dec 19, 2011
FCC ID #:	IHDT56MV2
Generic Name:	M0CBD
Test Laboratory:	Motorola Mobility, Inc. - ADR Test Services Laboratory 600 N. US Highway 45 Libertyville, IL 60048
Report Author:	Ketal Patel 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)

2404

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:

Motorola's ISO 17025 accreditation scope does not currently include SAR testing in the 5 GHz band. Therefore, SAR testing performed in this band was performed outside of our ISO 17025 accreditation. The general procedures and guidelines provided within; FCC KDB 248227 D01, FCC KDB 648474 D01, FCC KDB 865664 D01 and IEC 62209-2 were utilized for testing.

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Revision History

Revision Version	Date	Notes
Rev. 0	Dec-19-2011	Initial report release.
Rev. A	Dec-22-2011	Response to TCB inquiry. Removed footnote 2 on page 4, not applicable. Added footnote 3 on page 5. Corrected t separation distance between main and BT/Wi-Fi antenna in section 6.4 on page 18
Rev. B	Jan-13-2012	Correct Typo for tissue 2450 tissue tolerance in sections 4 and 5

1. Introduction

The Motorola Mobility ADR Test Services 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 stand-alone SAR readings for this phone are given in the table below. For ANSI / IEEE C95.1 (1 g), the final simultaneous-transmission SAR readings for this phone are 1.11 W/kg for head-adjacent use and 0.50 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.

Transmit Band	Head SAR (1 g $^{W}/_{kg}$)	Body SAR (1 g $^{W}/_{kg}$)	Mobile Hotspot SAR (1 g $^{W}/_{kg}$)
GSM 850	**0.30**	**0.43**	**0.77**
GSM 1900	**0.21**	**0.18**	**1.49**
WCDMA 850	**0.43**	**0.37**	**0.73**
WCDMA 1900	**0.50**	**0.43**	**1.07**
Wi-Fi 2.45 GHz	**0.61**	**0.07**	**0.41**

2. Description of the Device Under Test

2.1 Antenna description

Main (850/1900 MHz) Antenna

Type	Internal	
Location	Back Surface, Bottom of Transceiver	
Dimensions	Width	2.00 mm
	Length	53.00 mm

Bluetooth/Wi-Fi 2.4 GHz Antenna

Type	Internal	
Location	Back Surface, Right Edge of Transceiver	
Dimensions	Width	9.62 mm
	Length	18.0 mm

2.2 Device Signaling[1]

Serial Number(s) (Functional Use)	TA293000GI (GSM/WCDMA/Wi-Fi 2.4 GHz head/body/mobile hotspot SAR testing) 358552040024661 (GSM/WCDMA conducted power measurements) 358552040035586 (Wi-Fi 2.4 GHz conducted power measurements)
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype
Device Category	Portable (Mobile Station Class B)
RF Exposure Limits	General Population / Uncontrolled

Mode(s) of Operation	Modulation Mode(s)	Maximum Output Power Setting	Duty Cycle	Transmitting Frequency Range(s)
GSM 850	GMSK	33.2 dBm	1:8	824.2 - 848.8 MHz
GSM 1900	GMSK	30.8 dBm	1:8	1850.2 - 1909.8 MHz
WCDMA 850	QPSK	23.7 dBm	1:1	826.4 - 846.6 MHz
WCDMA 1900	QPSK	23.7 dBm	1:1	1852.4 - 1907.6 MHz
Wi-Fi 802.11b/g/n	BPSK	18.88 dBm	1:1	2412.0 - 2462.0 MHz
Bluetooth	GFSK	11.73 dBm	1:1	2402.0 – 2480.0 MHz

GSM Data Functionality	GPRS/EDGE Class 10 (2 uplink timeslots; 4 downlink timeslots; 5 total timeslots per frame)
	Class B (DTM not supported)

Mode(s) of Operation	GPRS/EDGE 850		GPRS/EDGE 1900		EDGE 850		EDGE 1900	
Modulation	GMSK		GMSK		8PSK		8PSK	
Maximum Output Power Setting (dBm)	33.2	31.2	30.8	28.8	27.7	25.7	27.0	25.0
Time Average Output Power Setting (dBm)	24.2	25.2	21.8	22.8	18.7	19.7	18.0	19.0
Duty Cycle	1:8	2:8	1:8	2:8	1:8	2:8	1:8	2:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz		1850.2 - 1909.8 MHz		824.2 - 848.8 MHz		1850.2 - 1909.8 MHz	

[1] **Bolded** entries indicate data mode configurations of highest time-average power output per band and data mode type, and thus we utilized for SAR testing in this report.

2.3 Device Conducted Power Measurements

2.3.1 GSM modes

Band	Channel	Conducted power (dBm) for GSM modes[2]		
		GSM *CS Voice* (1 Slot)	GPRS *PS Data* (2 Slots)[3]	EDGE *PS Data* (2 Slots)
GSM 850	128	33.33	**31.15**	25.81
	190	32.95	**30.67**	25.47
	251	32.81	**30.50**	25.32
GSM 1900	512	30.15	**28.27**	24.10
	661	30.08	**28.16**	24.07
	810	29.90	**28.14**	24.08

2.3.2 WCDMA modes

Per the "SAR Measurement Procedures for 3G Devices" released in October, 2007, 12.2 kbps RMC, 12.2 kbps AMR, HS-DPCCH Sub-test 1-4, and E-DCH Sub-test 1-5 modes were considered. The conducted power measurements (per section 5.2 of 3GPP TS 34.121) for each mode are shown in the table below.

Band	Channel	Conducted power (dBm) for WCDMA modes		Conducted Power (dBm) for WCDMA – HSDPA (Rel 5) Modes				Conducted Power (dBm) for WCDMA – HSPA (HSUPA/HSDPA-Rel 6) Modes				
		RMC	AMR	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 5
WCDMA 850	4132	**23.40**	23.41	23.44	23.42	23.45	23.44	23.41	23.43	23.41	23.42	23.40
	4180	**23.30**	23.31	23.33	23.32	23.35	23.34	23.30	23.32	23.31	23.32	23.29
	4233	**23.32**	23.34	23.36	23.35	23.38	23.38	23.32	23.34	23.35	23.36	23.33
WCDMA 1900	9262	**23.25**	23.20	23.20	23.23	23.34	23.46	**23.59**	23.35	23.25	23.27	23.17
	9400	**23.17**	23.12	23.14	23.15	23.24	23.33	**23.51**	23.22	23.16	23.16	23.10
	9538	**23.08**	23.04	23.06	23.05	23.08	23.22	**23.42**	23.11	23.05	23.08	23.01

Maximum Power Reduction (MPR)

According to 3GPP 25.101 sub-clause 6.2.2, the maximum output power is allowed to be reduced by following the table.

Table 6.1A: UE maximum output power with HS-DPCCH and E-DCH

UE transmit channel configuration	CM (dB)	MPR (dB)
For all combinations of; DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH	$0 \leq CM \leq 3.5$	MAX (CM-1, 0)
Note 1: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.		

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to-average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).

When E-DPDCH channels are present, the beta gains on those channels are reduced first to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

[2] *CS Voice* denotes circuit-switched transmission for voice calling, and *PS Data* denotes packet-switched transmission for data sessions.

[3] **Bolded** entries indicate data mode configurations of highest time-average power output per band and data mode type, and thus were utilized for SAR testing in this report.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done. However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a mechanism to compensate for the power back-off by increasing the gain of TX_AGC in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

2.3.3 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 average conducted power measurements for each mode are shown in the tables below. SAR testing for 802.11 was performed with the transmitter set to the lowest data rate on the default test channels **highlighted in bold** in the tables below. The head and body positions that resulted in the highest SAR values were further tested on the additional channels and higher data rates **highlighted in pink** in the tables below.

Band	Channel	Average Conducted Power (dBm)		
		802.11 b	802.11 g	802.11 n (20M)
Wi-Fi 2450 MHz	1	**15.74**	15.5	15.34
	6	**15.77**	14.73	14.84
	11	**16.22**	14.84	14.68

2.3.4 Power limit reduction for Mobile Hotspot functionality

The DUT utilizes reduced limits for the maximum transmit power when the mobile hotspot functionality is enabled. A table of the reduced limits used for testing is given below. A complete description of this functionality is provided in the "Operational Description" contained within Exhibit 12. The implementation to trigger the reduction in power requires the device to be radiating, which prevents conducted power measurements of this functionality without modification to the unit.

Mode(s) of Operation	WCDMA 1900
Modulation	1:1
Duty Cycle	1:1
Maximum Output Power Setting (dBm)	23.7
Time Average Output Power Setting (dBm)	23.7
Reduced Maximum Output Power Setting (dBm)	19.7
Reduced Time Average Output Power Setting (dBm)	19.7

3. Test Equipment Used

3.1 Dosimetric System

The Motorola Mobility ADR Test Services Laboratory utilizes a Dosimetric Assessment System (Dasy4™ v4.7) manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. All the SAR measurements are taken within a shielded enclosure. The overall 10 g RSS uncertainty of the measurement system is ±10.8% (K=1) with an expanded uncertainty of ±21.6% (K=2). The overall 1 g RSS uncertainty of the measurement system is ±11.1% (K=1) with an expanded uncertainty of ±22.2% (K=2). The measurement uncertainty budget is given in Appendix 6. Per IEEE 1528, this uncertainty budget is applicable to the SAR range of 0.4 W/kg to 10 W/kg.

The list of calibrated equipment used for the measurements is shown in the following table.

Description	Serial Number	Cal Date	Cal Due Date
DASY4™ DAE V1	690	Apr13-2011	Apr-13-2012
E-Field Probe ES3DV3	3191	Apr-07-2011	Apr-07-2012
S.A.M. Phantom used for 800/900 MHz	TP-1407		
S.A.M. Phantom used for 1800/1900/2450 MHz	TP-1160		
Dipole Validation Kit, DV835V2	421TR	Apr-04-2011	Apr-04-2013
Dipole Validation Kit, DV1800V2	2D128	Apr-06-2011	Apr-06-2013
Dipole Validation Kit, DV2450V2	788	Jul-12-2011	Jul-12-2013

3.2 Additional Equipment

Description	Serial Number	Cal Date	Cal Due Date
Signal Generator HP8648C	3847U02385	Apr-04-2011	Apr-04-2012
Power Meter E4419B	GB43310686	Feb-18-2011	Feb-18-2013
Power Sensor #1 - E9301A	MY41497905	Feb-18-2011	Feb-18-2012
Power Sensor #2 - E9301A	MY41495336	Feb-18-2011	Feb-18-2012
Network Analyzer E5071B	MY42301800	Mar-14-2011	Mar-14-2012
Dielectric Probe Kit HP85070E	MY44300245		

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].

E-field probes calibrated at 1810 MHz were used for "1900 MHz" band (1850 MHz - 1910 MHz) SAR measurements. FCC KDB 450824 provides additional requirements on page 3 of 6 for SAR testing that is performed with probe calibration points that are more than 50 MHz removed from the measured bands. The KDB requires; "(2) When nominal tissue dielectric parameters are specified in the probe calibration data, the tissue dielectric parameters measured for routine measurements should be less than the target Er and higher than the target Sigma values to minimize SAR underestimations". The 1900 MHz simulated tissues listed below meet this criteria.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Temp (°C)
835	**Head**	**Measured,** Nov-24-2011	41.5	0.9	21.6
		Measured, Nov-28-2011	40.8	0.88	21.6
		Measured, Dec-16-2011	41.1	0.89	21.8
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** Nov-24-2011	53.9	0.97	21.5
		Measured, Nov-25-2011	53.9	0.97	21.5
		Measured, Nov-29-2011	53.1	0.97	21.6
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1880	**Head**	**Measured,** Nov-29-2011	38.8	1.46	21.5
		Measured, Dec-16-2011	38.2	1.46	21.6
		Recommended Limits	40.0 ±5%	1.40 ±5%	18-25
	Body	**Measured,** Nov-30-2011	50.8	1.57	21.0
		Measured, Dec-02-2011	51.7	1.58	21.6
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25
2450	**Head**	**Measured,** Nov-28-2011	38	1.85	21.6
		Recommended Limits	39.2 ±5%	1.80 ±5%	18-25
	Body	**Measured,** Nov-28-2011	52.1	1.88	21.6
		Recommended Limits	52.7 ±5%	1.95 ±5%	18-25

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

Ingredient	782 / 835 / 900 MHz Head	782 / 835 / 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 Verifications

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 7. 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). For frequencies below 3 GHz, the simulated tissue depth was verified to be 15.0 cm ± 0.5 cm. Z-axis scans showing the SAR penetration are also included in Appendix 1.

System Accuracy Verification Measurements for Head SAR Measurements						
f (MHz)	Description	SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			ε_r	σ (S/m)		
835	**Measured,** Nov-23-2011	9.60	41.5	0.9	21.6	21.6
	Measured, Nov-28-2011	9.30	40.8	0.88	22.0	21.6
	Measured, Dec-16-2011	10.0	41.1	0.89	22.0	21.8
	Recommended Limits	9.34	41.5 ±5%	0.90 ±5%	18-25	18-25
1800	**Measured,** Nov-29-2011	37.6	39.2	1.38	22.1	21.5
	Measured, Dec-16-2011	39.55	38.6	1.37	22.9	21.6
	Recommended Limits	39.9	40.0 ±5%	1.40 ±5%	18-25	18-25
2450	**Measured,** Nov-28-2011	59.5	38	1.85	23.0	21.6
	Recommended Limits	55.2	39.2 ±5%	1.80 ±5%	18-25	18-25

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3191	835	6.15	5 of 11
		1810	5.21	5 of 11
		2450	4.49	5 of 11

System Accuracy Verification Measurements for Body SAR Measurements						
f (MHz)	Description	SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			ε_r	σ (S/m)		
835	**Measured,** Nov-24-2011	9.95	53.9	0.97	21.7	21.5
	Measured, Nov-29-2011	9.75	53.1	0.97	22.0	21.6
	Recommended Limits	9.76	55.2 ±5%	0.97 ±5%	18-25	18-25
1800	**Measured,** Nov-29-2011	40.25	51.5	1.47	22.0	21.0
	Measured, Dec-01-2011	40.8	51.7	1.58	22.0	21.6
	Recommended Limits	38.8	53.3 ±5%	1.52 ±5%	18-25	18-25
2450	**Measured,** Nov-28-2011	55.5	52.1	1.88	22.7	21.6
	Recommended Limits	51.2	52.7 ±5%	1.95 ±5%	18-25	18-25

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3191	835	6.1	6 of 11
		1810	4.76	6 of 11
		2450	4.11	6 of 11

6. Test Results

For GSM and WCDMA modes, the test sample was operated using an actual transmission through a base station simulator. Wi-Fi testing was conducted using manufacturer test mode software, per guidance given in FCC KDB 248227. The base station simulator or test software was set up for the proper channels, transmitter power levels and transmit modes 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 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 Appendices 2 through 4. Please refer to the DASY4™ manual for additional information on SAR scanning procedures and algorithms used.

The Cellular Phone model covered by this report has the following battery options:

Model SNN5892A - 1785 mAH battery

This battery was used to do all of the SAR testing. The phone was placed in the SAR measurement system with a fully charged battery.

6.1 Head Adjacent Test Results

The SAR results shown in tables 1 through 4 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 temperatures of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is:

$$\text{Extrapolated SAR} = \text{Measured SAR} * 10^{(-\text{drift}/10)}.$$

The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

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

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

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	3191	835	6.15	5 of 11
		1810	5.21	5 of 11
		2450	4.49	5 of 11

Left Head Cheek Position																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5892A	128												
			190	21.4	-0.14	32.95		0.193		0.20	0.254		0.26		
			251												
	GPRS 850, PS Data 2 Upslots		190	**21.7**	**0.07**	**30.67**		**0.228**		**0.23**	**0.303**		**0.30**	**5x5x7**	**45**
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	**21.3**	**0.413**	**23.30**		**0.278**		**0.28**	**0.434**		**0.43**	**5x5x7**	**46**
			4233												
1880	GSM 1900, CS Voice		512												
			661	20.9	-.00673	30.08		0.109		0.11	0.179		0.18		
			810												
	GPRS 1900, PS Data 2 Upslots		661	**21.3**	**-0.021**	**28.16**		**0.128**		**0.13**	**0.211**		**0.21**	**5x5x7**	**47**
	WCDMA 1900, 12.2 kbps RMC		9262												
			9400	**20.5**	**0.0691**	**23.17**		**0.297**		**0.30**	**0.496**		**0.50**	**5x5x7**	**48**
			9538												
	WCDMA 1900, HSPA Rel 6, Sub 1		9262	20.5	-0.0285	23.51		0.277		0.28	0.463		0.47		
2450	802.11b, 1 Mbps		1	20.7	-0.0537	15.74		0.219		0.22	0.48		0.49		
			6	20.7	-.00103	15.77		0.276		0.28	0.604		0.60		
			11	**20.7**	**-0.0494**	**16.22**		**0.279**		**0.28**	**0.608**		**0.61**	**5x5x7**	**49**

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)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5892A	128												
			190	20.6	0.00715	32.95		0.197		0.20	0.261		0.26		
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	21.6	-0.175	23.30		0.251		0.26	0.331		0.34		
			4233												
1880	GSM 1900, CS Voice		512												
			661	21.0	0.0751	30.08		0.0545		0.05	0.0866		0.09		
			810												
	WCDMA 1900, 12.2 kbps RMC		9262												
			9400	20.4	0.0128	23.17		0.137		0.14	0.219		0.22		
			9538												
2450	802.11b, 1 Mbps		1												
			6												
			11	21.0	0.0109	16.22		0.124		0.12	0.239		0.24		

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

Left Head 15° Tilt Position																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5892A	128												
			190	21.3	0.194	32.95		0.14		0.14	0.182		0.18		
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	**21.0**	**0.028**	**23.30**		**0.185**		**0.19**	**0.239**		**0.24**	**5x5x7**	**50**
			4233												
1880	GSM 1900, CS Voice		512												
			661	20.8	0.0614	30.08		0.0254		0.03	0.0449		0.04		
			810												
	WCDMA 1900, 12.2 kbps RMC		9262												
			9400	20.6	-0.147	23.17		0.0678		0.07	0.119		0.12		
			9538												
2450	802.11b, 1 Mbps		1												
			6												
			11	**20.8**	**0.00754**	**16.22**		**0.171**		**0.17**	**0.358**		**0.36**	**5x5x7**	**51**

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

Right Head 15° Tilt Position																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5892A	128												
			190	**20.5**	**-0.158**	**32.95**		**0.141**		**0.15**	**0.184**		**0.19**	**5x5x7**	**52**
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	21.0	-0.242	23.30		0.165		0.17	0.215		0.23		
			4233												
1880	GSM 1900, CS Voice		512												
			661	**21.0**	**-.00579**	**30.08**		**0.0293**		**0.03**	**0.0513**		**0.05**	**5x5x7**	**53**
			810												
	WCDMA 1900, 12.2 kbps RMC		9262												
			9400	**20.4**	**-0.0732**	**23.17**		**0.0854**		**0.09**	**0.15**		**0.15**	**5x5x7**	**54**
			9538												
2450	802.11b, 1 Mbps		1												
			6												
			11	20.9	0.0984	16.22		0.0896		0.09	0.178		0.18		

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

6.2 Body Worn Test Results

The SAR results shown in tables 5 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 [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is:

$$\text{Extrapolated SAR} = \text{Measured SAR} * 10^{(-\text{drift}/10)}.$$

The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

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

A "flat" phantom was for the body-worn tests. This "flat" phantom is made out of 1" thick natural High Density Polyethylene with a thickness at the bottom equal to 2.0 mm. It measures 52.7 cm(long) x 26.7 cm(wide) x 21.2 cm(tall).

The simulated tissue depth was verified to be 15.0 cm ± 0.5 cm for frequencies less than 3 GHz, or 10.0 cm ± 0.5 cm for frequencies greater than 3 GHz. The same device holder described in section 6 was used for positioning the phone. 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 25 mm between the device and the flat phantom was used for testing body-worn SAR. The chosen separation distance of 25 mm is utilized in order to support any case or holder accessories offered or to be offered by Motorola for this product. 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 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	3191	835	6.1	6 of 11
		1810	4.76	6 of 11
		2450	4.11	6 of 11

Body-Worn, Front of Phone 25 mm from Phantom																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5892A	128												
			190	21	0.0457	32.95		0.214		0.21	0.282		0.28		
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	21	-0.0206	23.30		0.238		0.24	0.314		0.32		
			4233												
1880	GSM 1900, CS Voice		512												
			661	20.8	-.00959	30.08		0.0306		0.03	0.0492		0.05		
			810												
	WCDMA 1900, 12.2 kbps RMC		9262												
			9400	21.0	-0.0189	23.17		0.0865		0.09	0.139		0.14		
			9538												
2450	802.11b, 1 Mbps		1												
			6												
			11	20.9	0.016	16.22		0.0157		0.02	0.0264		0.03		

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

Body-Worn, Back of Phone 25 mm from Phantom																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5892A	128												
			190	21.0	0.0446	32.95		0.263		0.26	0.348		0.35		
			251												
	GPRS 850, PS Data 2 Upslots		190	**21.1**	**-0.077**	**30.67**		**0.318**		**0.32**	**0.42**		**0.43**	**5x5x7**	**56**
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	**21.0**	**-.00226**	**23.30**		**0.281**		**0.28**	**0.372**		**0.37**	**5x5x7**	**57**
			4233												
1880	GSM 1900, CS Voice		512												
			661	20.8	-.00111	30.08		0.0872		0.09	0.144		0.14		
			810												
	GPRS 1900, PS Data 2 Upslots		661	**21.5**	**0.026**	**28.16**		**0.111**		**0.11**	**0.182**		**0.18**	**5x5x7**	**58**
	WCDMA 1900, 12.2 kbps RMC		9262												
			9400	**21.2**	**-0.0877**	**23.17**		**0.255**		**0.26**	**0.419**		**0.43**	**5x5x7**	**59**
			9538												
	WCDMA 1900, HSPA Rel 6, Sub 1		9262	21.2	-0.0316	23.51		0.234		0.24	0.381		0.38		
2450	802.11b, 1 Mbps		1	20.9	-0.0399	15.74		0.0274		0.03	0.046		0.05		
			6	20.9	0.0512	15.77		0.0358		0.04	0.0602		0.06		
			11	**20.9**	**-0.0921**	**16.22**		**0.0427**		**0.04**	**0.0714**		**0.07**	**5x5x7**	**60**

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

6.3 Mobile Hotspot Test Results

The DUT is capable of functioning as a Wi-Fi to Cellular mobile hotspot. Additional SAR testing was performed according to the interim test guidelines provided at the October 2010 TCB Workshop. Testing was performed with a separation of 1 cm between the DUT and the "flat" phantom. The DUT was positioned for SAR tests with the front and back surfaces facing the phantom, and also with the edges facing the phantom in which the transmitting antenna is < 2.5 cm from the edge.

Mobile Hotspot Edges/Surfaces for SAR testing		
Mode / Edge	GSM/WCDMA	Wi-Fi
Top	NO	YES
Bottom	YES	NO
Left	YES	YES
Right	YES	NO
Front	YES	YES
Back	YES	YES

ANTENNA POSITION

The SAR results shown in tables 7 through 12 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the temperatures 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 DUT utilizes a reduced limit for the maximum transmit power when the mobile hotspot functionality is enabled, as described above in 2.3.4. A complete description of this functionality is provided in the "Operational Description" contained within Exhibit 12.

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

A "flat" phantom was for the body-worn tests. This "flat" phantom is made out of 1" thick natural High Density Polyethylene with a thickness at the bottom equal to 2.0 mm. It measures 52.7 cm(long) x 26.7 cm(wide) x 21.2 cm(tall).

The simulated tissue depth was verified to be 15.0 cm ± 0.5 cm for frequencies below 3 GHz, , or 10.0 cm ± 0.5 cm for frequencies greater than 3 GHz. The same device holder described in section 6 was used for positioning the phone.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3191	835	6.1	6 of 11
		1810	4.76	6 of 11
		2450	4.11	6 of 11

Mobile Hotspot, Right Edge of Phone 10 mm from Phantom																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GPRS 850, PS Data 2 Upslots	SNN5892A	128												
			190	21.1	0.0707	30.67	0	0.196		0.20	0.282		0.28		
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	20.5	-0.0602	23.30	0	0.356		0.36	0.512		0.52		
			4233												
1880	GPRS 1900, PS Data 2 Upslots		512												
			661	21.8	-0.0851	28.16	0	0.0212		0.02	0.0367		0.04		
			810												
	WCDMA 1900, HSPA Rel 6, Sub 1		9262												
			9400	20.1	-0.0464	23.51	4.0	0.0172		0.02	0.0294		0.03		
			9538												
2450	802.11b, 1 Mbps		1												
			6												
			11	**20.3**	**-.00331**	**16.22**	**0**	**0.188**		**0.19**	**0.411**		**0.41**	**5x5x7**	**62**

Table 7: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Left Edge of Phone 10 mm from Phantom																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GPRS 850, PS Data 2 Upslots	SNN5892A	128												
			190	21	0.0453	30.67	0	0.25		0.25	0.362		0.36		
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	20.5	-0.0448	23.30	0	0.421		0.43	0.606		0.61		
			4233												
1880	GPRS 1900, PS Data 2 Upslots		512												
			661	21.6	0.0233	28.16	0	0.069		0.07	0.115		0.12		
			810												
	WCDMA 1900, HSPA Rel 6, Sub 1		9262												
			9400	20.1	-0.0223	23.51	4.0	0.071		0.07	0.121		0.12		
			9538												

Table 8: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Top Edge of Phone 10 mm from Phantom																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
2450	802.11b, 1 Mbps	SNN5892A	1												
			6												
			11	20.2	-0.0034	16.22	0	0.042		0.04	0.072		0.07		

Table 9: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Front of Phone 10 mm from Phantom																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GPRS 850, PS Data 2 Upslots	SNN5892A	128												
			190	20.9	0.0153	30.67	0	0.37		0.37	0.481		0.48		
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	20.7	.000158	23.30	0	0.376		0.38	0.49		0.49		
			4233												
1880	GPRS 1900, PS Data 2 Upslots		512												
			661	21.5	.00522	28.16	0	0.127		0.13	0.222		0.22		
			810												
	WCDMA 1900, HSPA Rel 6, Sub 1		9262												
			9400	20.2	-.00157	23.51	4.0	0.217		0.22	0.405		0.41		
			9538												
2450	802.11b, 1 Mbps		1												
			6												
			11	20.5	0.00656	16.22	0	0.0562		0.06	0.0982		0.10		

Table 10: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Back of Phone 10 mm from Phantom																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GPRS 850, PS Data 2 Upslots	SNN5892A	128												
			190	**20.9**	**0.00913**	**30.67**	**0**	**0.584**		**0.58**	**0.774**		**0.77**	**5x5x7**	**63**
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	**21.6**	**-0.0923**	**23.30**	**0**	**0.542**		**0.55**	**0.719**		**0.73**	**5x5x7**	**64**
			4233												
1880	GPRS 1900, PS Data 2 Upslots		512	21.3	0.0115	28.27	0	0.655		0.66	1.26		1.26		
			661	20.8	0.0396	28.16	0	0.552		0.55	1.08		1.08		
			810	21.1	0.0302	28.14	0	0.538		0.54	1.06		1.06		
	WCDMA 1900, HSPA Rel 6, Sub 1		9262	20.3	0.029	23.59	4.0	0.451		0.45	0.884		0.88		
			9400	**20.3**	**0.0897**	**23.51**	**4.0**	**0.539**		**0.54**	**1.07**		**1.07**	**5x5x7**	**65**
			9538	20.2	0.0336	23.42	4.0	0.462		0.46	0.923		0.92		
2450	802.11b, 1 Mbps		1												
			6												
			11	20.5	0.05	16.22	0	0.135		0.14	0.242		0.24		

Table 11: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Bottom Edge of Phone 10 mm from Phantom																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GPRS 850, PS Data 2 Upslots	SNN5892A	128												
			190	21	0.0536	30.67	0	0.0276		0.03	0.044		0.04		
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	20.5	0.0127	23.30	0	0.0293		0.03	0.0465		0.05		
			4233												
1880	GPRS 1900, PS Data 2 Upslots		512	**21.0**	**-.00527**	**28.27**	**0**	**0.765**		**0.77**	**1.49**		**1.49**	**5x5x7**	**66**
			661	21.1	0.0164	28.16	0	0.62		0.62	1.21		1.21		
			810	21.0	-.00852	28.14	0	0.613		0.61	1.21		1.21		
	WCDMA 1900, HSPA Rel 6, Sub 1		9262	20.4	0.0277	23.59	4.0	0.477		0.48	0.927		0.93		
			9400	20.5	0.0367	23.51	4.0	0.543		0.54	1.06		1.06		
			9538	20.4	0.0342	23.42	4.0	0.48		0.48	0.949		0.95		

Table 12: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

6.4 Description and Evaluation of Simultaneous Transmitters

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 licensed and unlicensed transmitters of the device under test.

By device design the GSM and WCDMA transmitters may operate simultaneously with either the Wi-Fi 802.11 transmitter or the Bluetooth transmitter. The separation distance between the Wi-Fi 802.11/Bluetooth antenna and the main antenna is 8.689 cm. Pictorial representation of the antenna locations and separation distances is given in Exhibit 7d.

The Bluetooth transmitter of the device under test can be excluded from stand-alone and simultaneous SAR evaluation, per the highlighted requirements from FCC KDB 648474, as follows:

1. The highest output conducted power measured for Bluetooth on the device under test is 14.89 mW [≤ 24 mW]
2. The separation distance between the Bluetooth antenna and the main antenna is 8.689 cm [≥ 5.0 cm]

The Wi-Fi and the Bluetooth cannot transmit simultaneously, so there is no co-location test requirement for Wi-Fi and Bluetooth. GSM supports voice and data transmission, though not simultaneously. WCDMA supports voice and data transmission simultaneously.

Description of Simultaneous Transmit Capabilities				
Transmitter Combinations		Scenario Supported?	Supported for Mobile Hotspot?	Notes
#1	GSM (CS Voice) + GSM (PS Data)	No	No	DUT system architecture does not support simultaneous voice and data (except on WCDMA), multiple voice channels, or multiple data channels during a single session on the cellular network.
#2	GSM (CS Voice) + WCDMA (Data)	No	No	
#3	WCDMA (Voice) + GSM (PS Data)	No	No	
#4	GSM (PS Data) + WCDMA (Data)	No	No	
#5	GSM (CS Voice) + WCDMA (Voice)	No	No	
#6	WCDMA (Voice) + WCDMA (Data)	Yes	Yes	Inherent ability of WCDMA protocol to allow Voice and Data on same Tx
#7	GSM (CS Voice) + Wi-Fi	Yes	No	Supported for voice plus background data.
#8	WCDMA (Voice) + Wi-Fi	Yes	No	
#9	GSM (PS Data) + Wi-Fi	Yes	Yes	Supported for mobile hotspot operation.
#10	WCDMA (Data) + Wi-Fi	Yes	Yes	

For the transmitters requiring stand-alone SAR testing (GSM, WCDMA, and Wi-Fi 802.11), the KDB guidelines direct that if the sum of the 1 g SAR measured for the simultaneously transmitting antennas is less than the SAR limit, SAR measurement for simultaneous transmission is not required. Further, if the SAR-to-peak-location separation ratio for two simultaneously transmitting antennas is less than 0.3 then SAR measurement for simultaneous transmission is likewise not required. Evaluations of the head, body, and mobile hotspot simultaneous SAR summations for the worst-case SAR transmitter configurations are presented in the tables below.

The following SAR summations for simultaneous evaluation are provided to demonstrate a GSM or WCDMA voice link with a simultaneous data link on Wi-Fi.

Evaluations for Simultaneous SAR, Head and Body positions									
	Transmitter Stand-Alone 1 g SAR Values (W/kg)					1 g SAR Summations (W/kg)			
Band / Position	GSM 850	GSM 1900	WCDMA 850	WCDMA 1900	Wi-Fi 2450	GSM 850 + Wi-Fi 2450	GSM 1900 + Wi-Fi 2450	WCDMA 850 + Wi-Fi 2450	WCDMA 1900 + Wi-Fi 2450
Left Head Cheek	0.30	0.21	0.43	0.5	0.61	0.91	0.82	1.04	1.11
Left Head 15° Tilt	0.18	0.04	0.24	0.12	0.36	0.54	0.4	0.6	0.48
Right Head Cheek	0.26	0.09	0.34	0.22	0.24	0.5	0.33	0.58	0.46
Right Head 15° Tilt	0.19	0.05	0.23	0.15	0.18	0.37	0.23	0.41	0.33
Body Worn, Front of Phone 15 mm from Phantom	0.28	0.05	0.32	0.14	0.03	0.31	0.08	0.35	0.17
Body Worn, Back of Phone 15 mm from Phantom	0.43	0.18	0.37	0.43	0.07	0.5	0.25	0.44	0.5

The following Mobile Hotspot (10 mm separation) position SAR summations for simultaneous evaluation are provided to demonstrate a data link (over GSM or WCDMA) with a simultaneous data link on Wi-Fi (to client devices).

Evaluations for Simultaneous SAR, Mobile Hotspot (10 mm separation) positions Mobile Hotspot functionality enabled									
	Transmitter Stand-Alone 1 g SAR Values (W/kg)					1 g SAR Summations (W/kg)			
Band / Position	GSM 850	GSM 1900	WCDMA 850	WCDMA 1900	Wi-Fi 2450	GSM 850 +Wi-Fi 2450	GSM 1900 + Wi-Fi 2450	WCDMA 850 +Wi-Fi 2450	WCDMA 1900 +Wi-Fi 2450
Bottom Edge of DUT 10 mm from Phantom	0.04	1.49	0.05	1.06	N/A	N/A	N/A	N/A	N/A
Right Edge of DUT 10 mm from Phantom	0.28	0.04	0.52	0.03	0.41	0.69	0.45	0.93	0.44
Left Edge of DUT 10 mm from Phantom	0.36	0.12	0.61	0.12	N/A	N/A	N/A	N/A	N/A
Front Surface of DUT 10 mm from Phantom	0.48	0.22	0.49	0.41	0.1	0.58	0.32	0.59	0.51
Back Surface of DUT 10 mm from Phantom	0.77	1.26	0.73	1.07	0.24	1.01	1.5	0.97	1.31

As no summation of transmitter SAR values results in a value greater than the compliance limit, no measurements for simultaneous SAR are required.

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 1992 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 comparisons for System Accuracy Verifications

Date/Time: 11/23/2011 6:41:08 PM

Test Laboratory: MOTOROLA MOBILITY 835 MHz System
Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:421tr;
Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = - 28.7dB Sim.Temp@SPC =21.6 Room Temp @ SPC = 21.6

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3

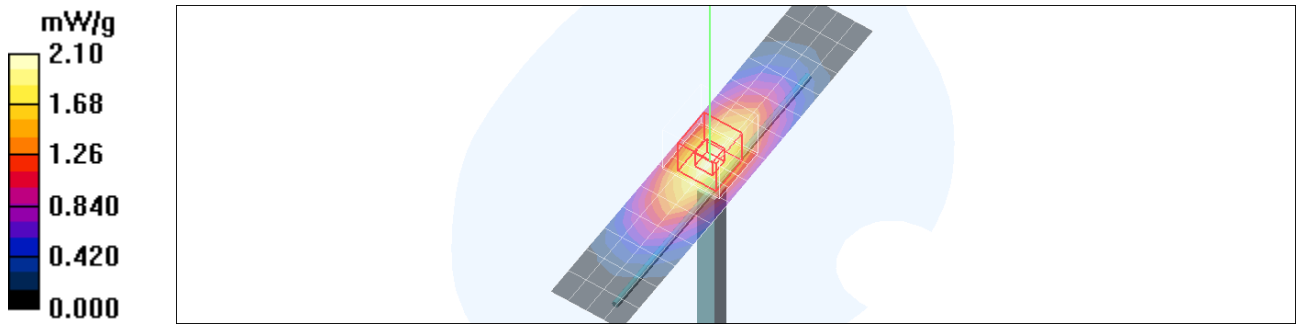
DASY4 Configuration:

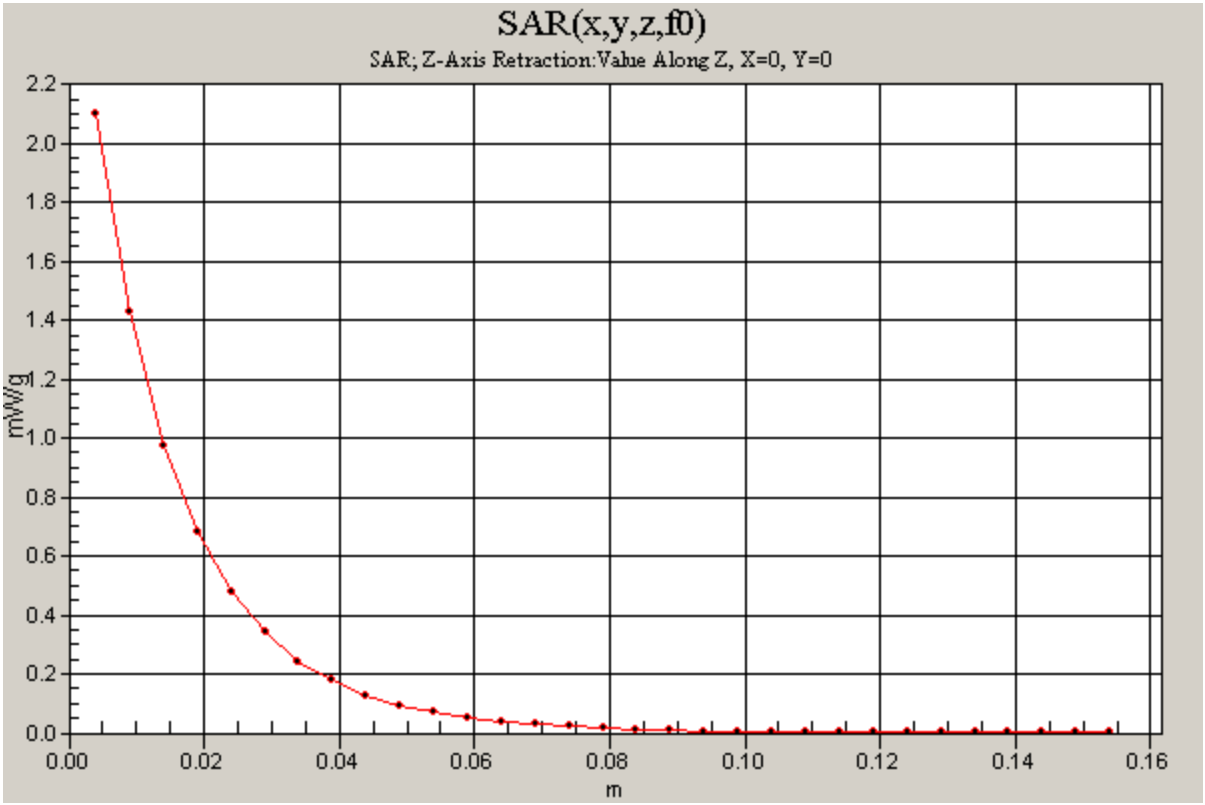
- Probe: ES3DV3 - SN3191; ConvF(6.15, 6.15, 6.15); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1407;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 2.06 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.6 V/m; Power Drift = 0.056 dB
Peak SAR (extrapolated) = 2.83 W/kg
SAR(1 g) = 1.92 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
Maximum value of SAR (measured) = 2.10 mW/g




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

Date/Time: 11/28/2011 8:33:56 PM

Test Laboratory: MOTOROLA MOBOLITY 835 MHz System
Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:421tr;
Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -27.4dB Sim.Temp@SPC =21.6 Room Temp @ SPC = 22

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.88 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3

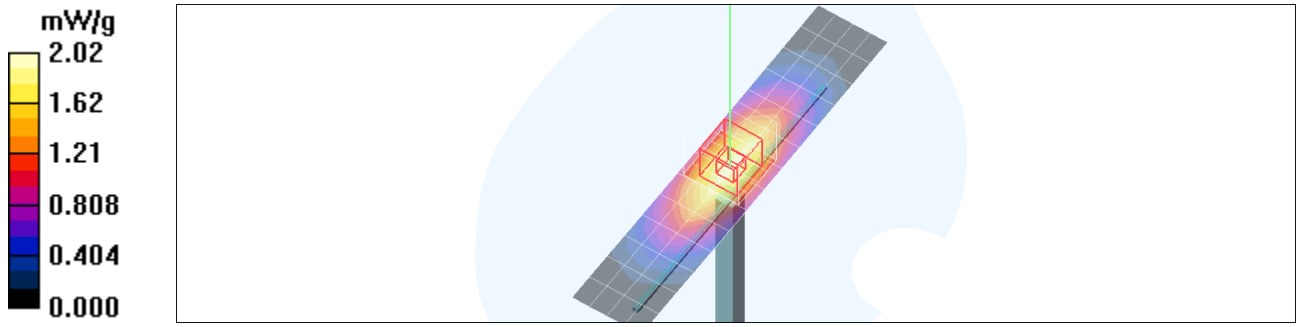
DASY4 Configuration:

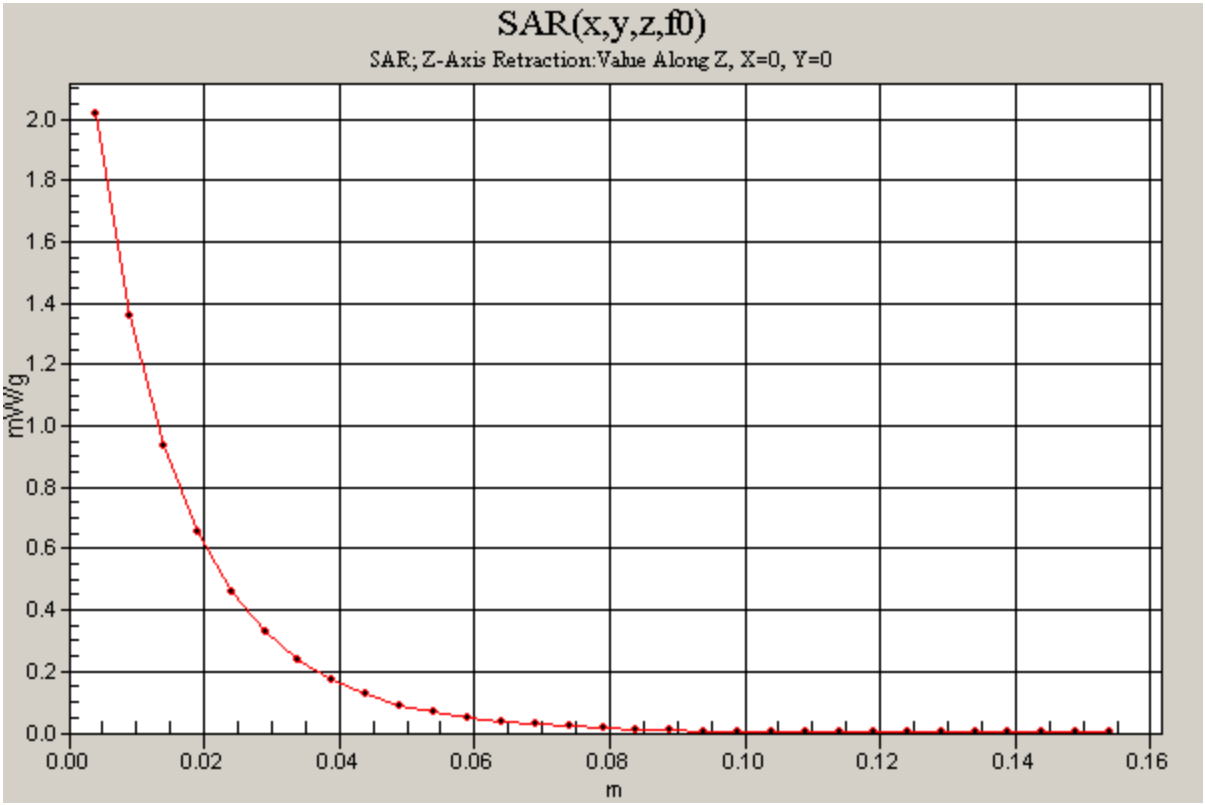
- Probe: ES3DV3 - SN3191; ConvF(6.15, 6.15, 6.15); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1407;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 2.06 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.2 V/m; Power Drift = -0.114 dB
Peak SAR (extrapolated) = 2.74 W/kg
SAR(1 g) = 1.86 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
Maximum value of SAR (measured) = 2.02 mW/g




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: 12/16/2011 2:44:54 PM

Test Laboratory: MOTOROLA 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:421tr;
Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -27 dB Sim.Temp@SPC = 21.8 Room Temp @ SPC = 22

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

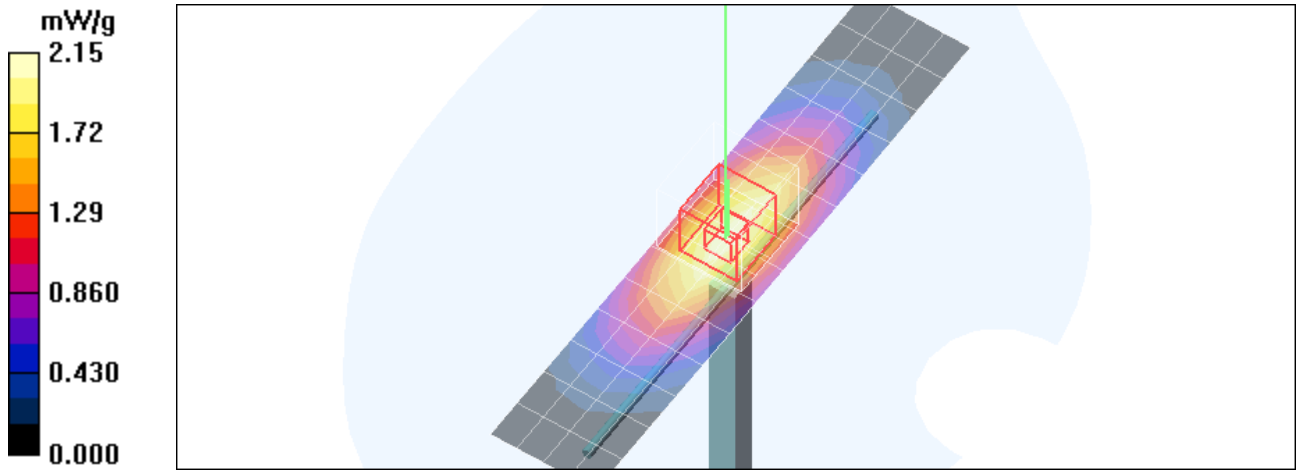
DASY4 Configuration:

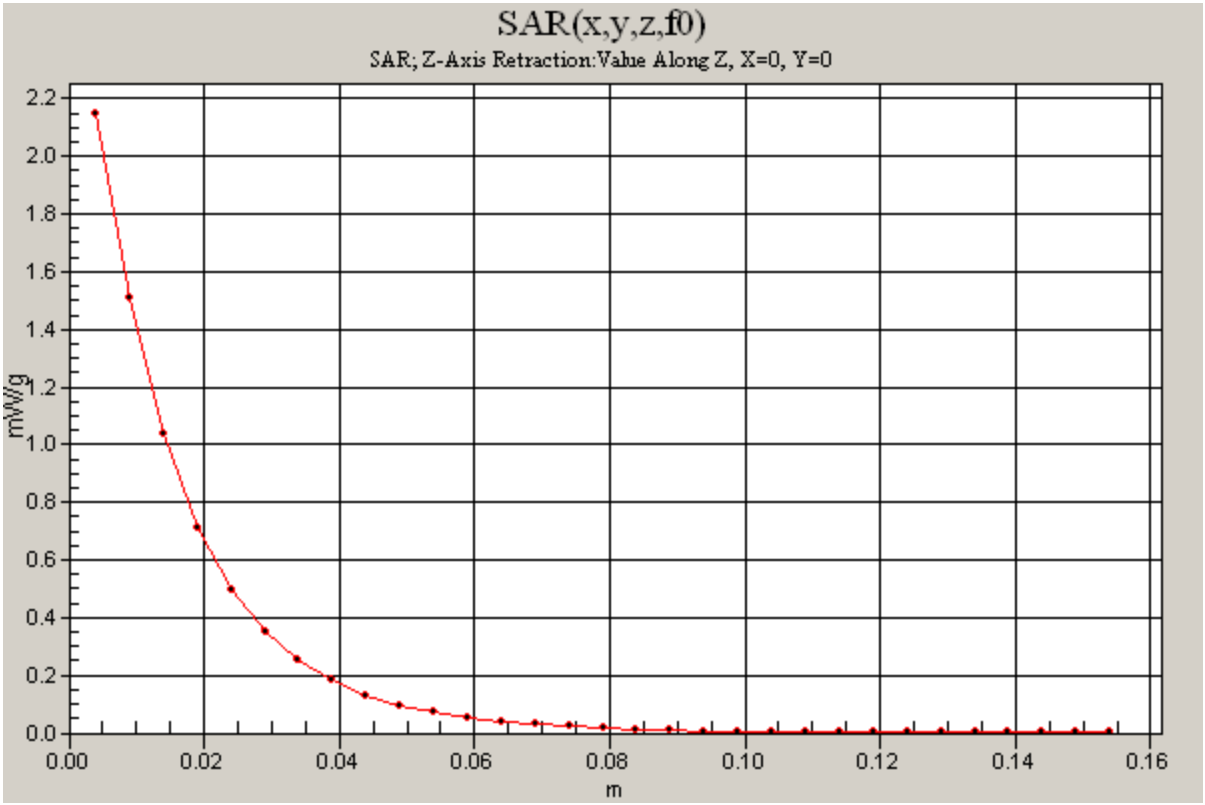
- Probe: ES3DV3 - SN3191; ConvF(6.15, 6.15, 6.15); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1407;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 2.20 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 51.0 V/m; Power Drift = -0.182 dB
Peak SAR (extrapolated) = 2.95 W/kg
SAR(1 g) = 2 mW/g; SAR(10 g) = 1.31 mW/g
Maximum value of SAR (measured) = 2.16 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.15 mW/g




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

Date/Time: 11/29/2011 2:22:27 PM

Test Laboratory: MOTOROLA MOBILITY 1800 MHz System
Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d128;
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -25.4 dB Sim.Temp@SPC = 21.5 Room Temp @ SPC = 22.1

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.38 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3

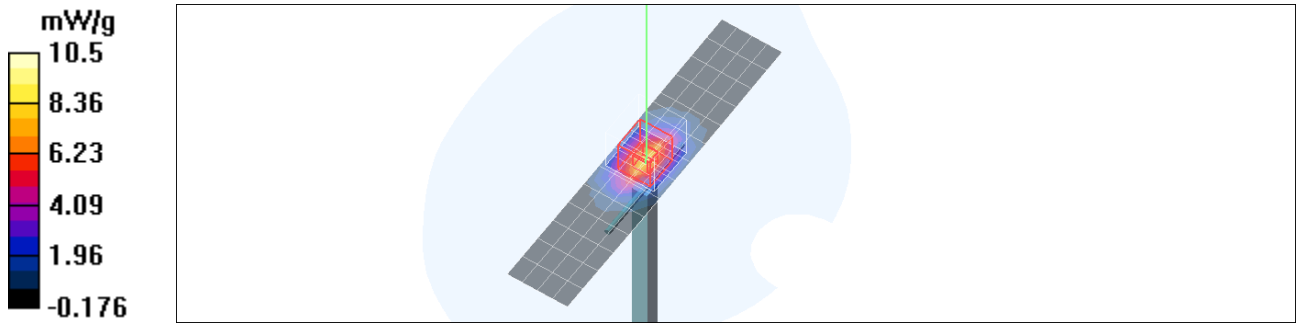
DASY4 Configuration:

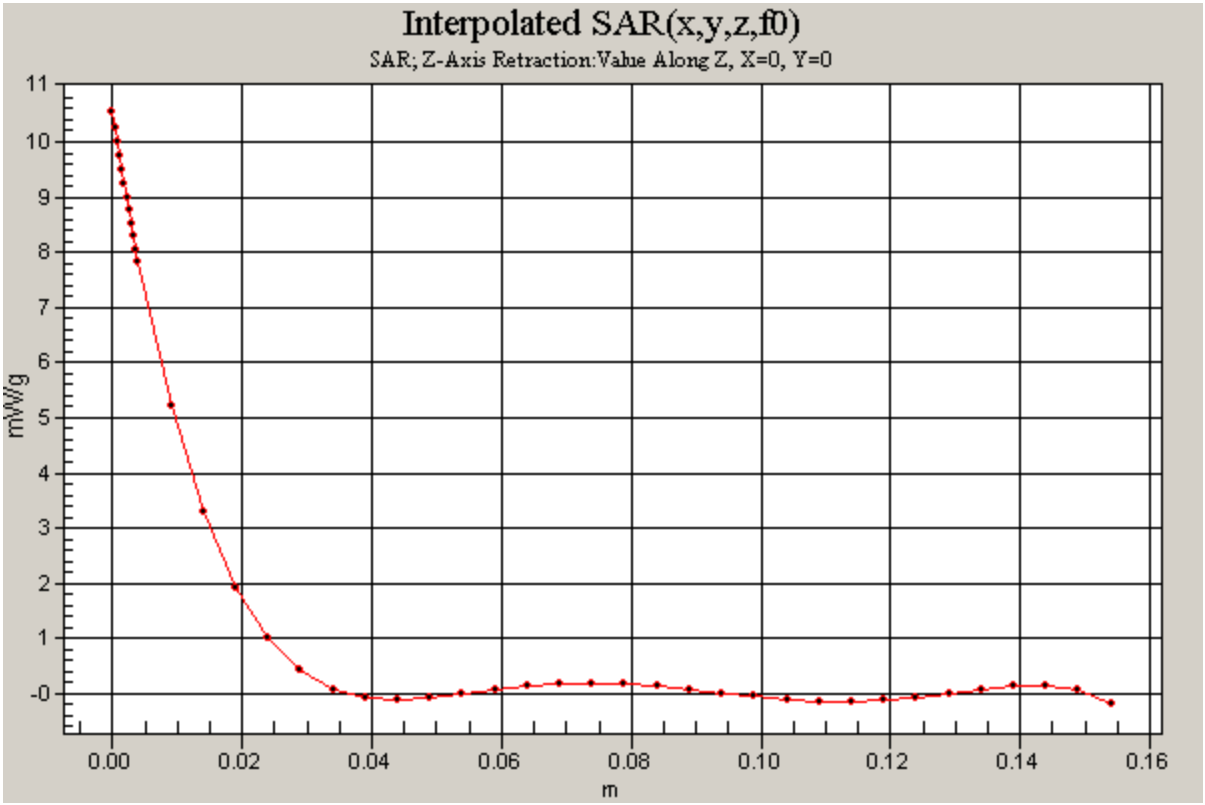
- Probe: ES3DV3 - SN3191; ConvF(5.21, 5.21, 5.21); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1160;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 8.31 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.7 V/m; Power Drift = 0.023 dB
Peak SAR (extrapolated) = 13.7 W/kg
SAR(1 g) = 7.52 mW/g; SAR(10 g) = 3.96 mW/g
Maximum value of SAR (measured) = 8.45 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x42): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (interpolated) = 10.5 mW/g




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

Date/Time: 12/16/2011 11:18:48 AM

Test Laboratory: MOTOROLA 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d128;
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -24.1dB Sim.Temp@SPC =21.6 Room Temp @ SPC =22.9

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.37 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3

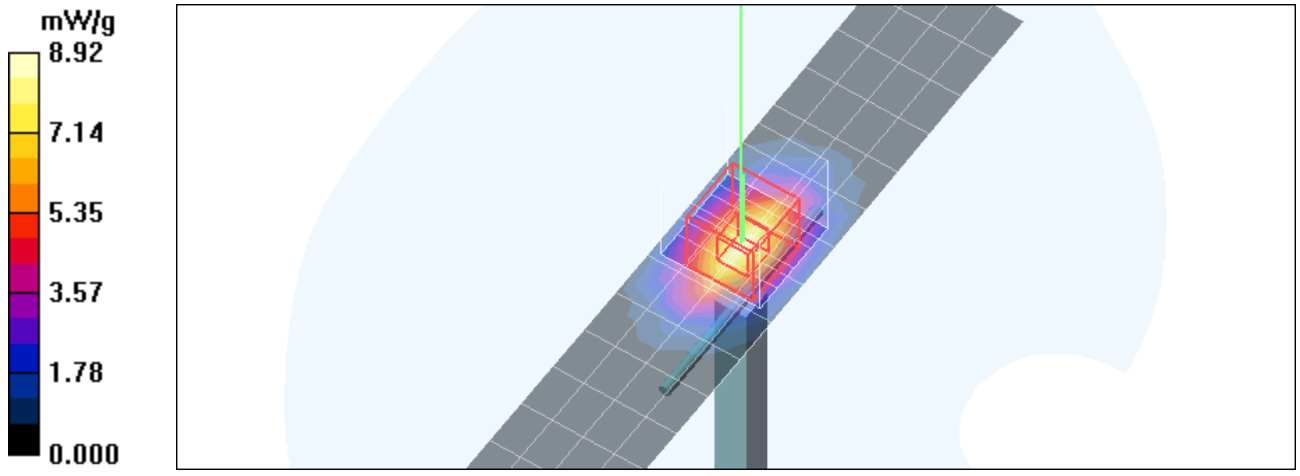
DASY4 Configuration:

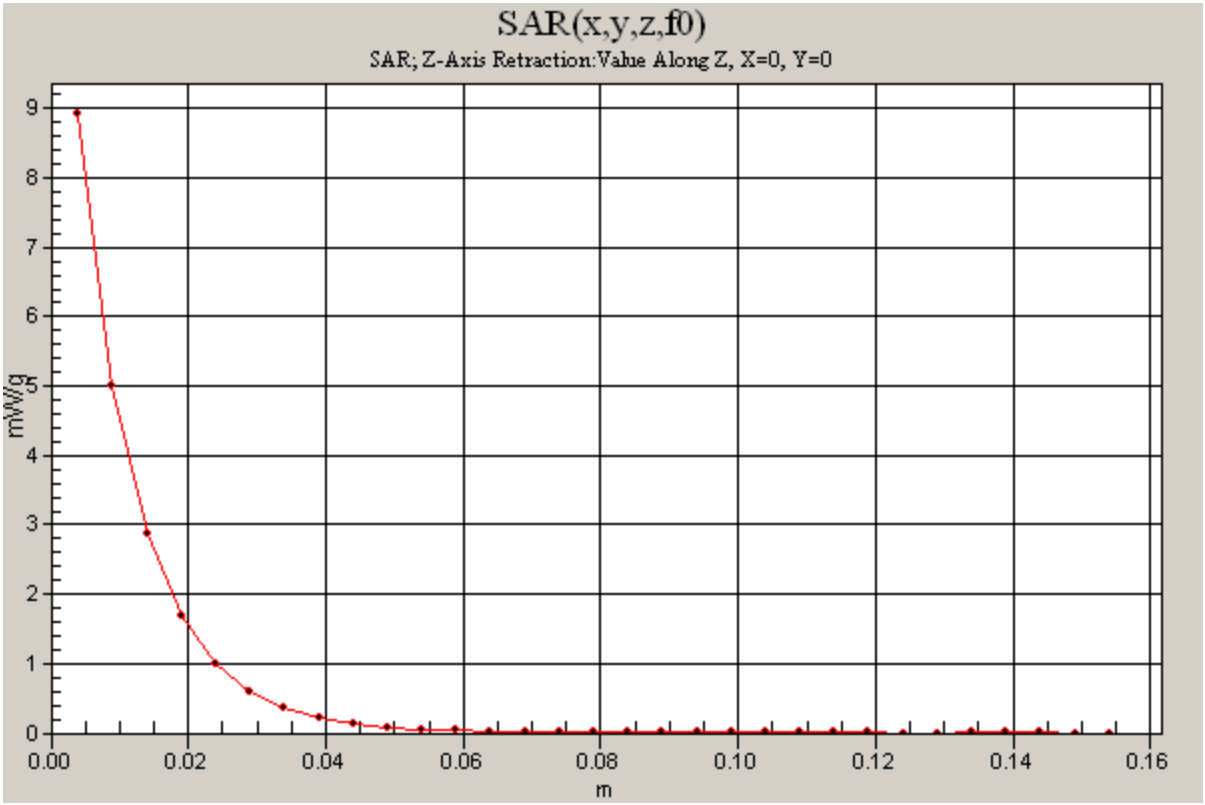
- Probe: ES3DV3 - SN3191; ConvF(5.21, 5.21, 5.21); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1160;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 8.84 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 81.5 V/m; Power Drift = 0.023 dB
Peak SAR (extrapolated) = 14.3 W/kg
SAR(1 g) = 7.91 mW/g; SAR(10 g) = 4.16 mW/g
Maximum value of SAR (measured) = 8.87 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.92 mW/g




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

Date/Time: 11/28/2011 10:47:12 AM

Test Laboratory: MOTOROLA MOBILITY 2450 MHz System
Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:788;
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -26.5 dB Sim.Temp@SPC = 21.6 Room Temp @ SPC = 23

Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 2450 MHz; σ = 1.85 mho/m; ε_r = 38; ρ = 1000 kg/m^3

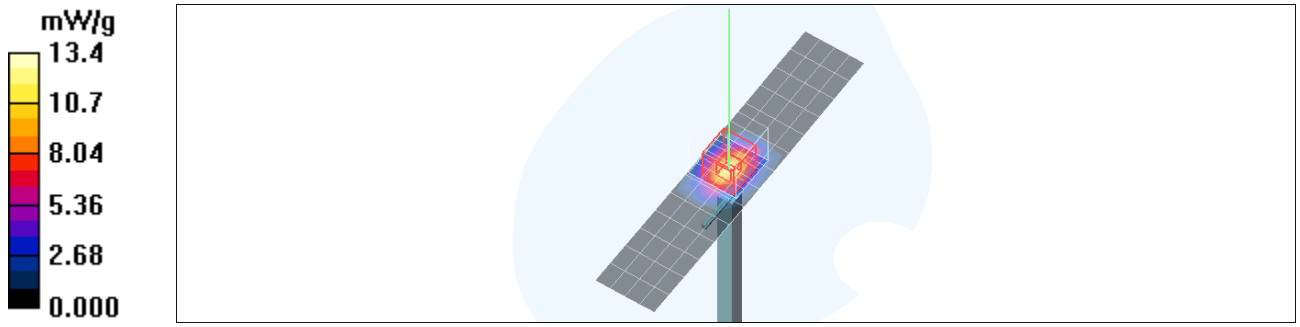
DASY4 Configuration:

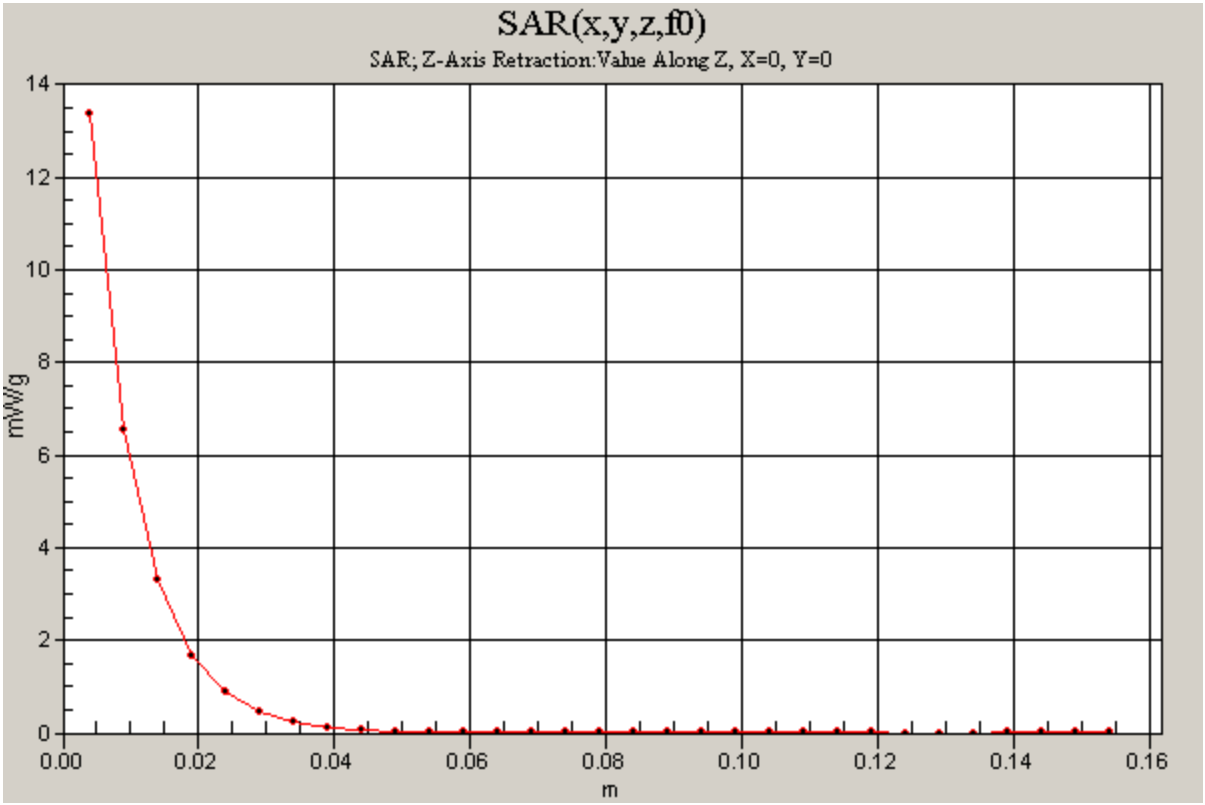
- Probe: ES3DV3 - SN3191; ConvF(4.49, 4.49, 4.49); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1160;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 12.9 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 85.5 V/m; Power Drift = -0.035 dB
Peak SAR (extrapolated) = 25.1 W/kg
SAR(1 g) = 11.9 mW/g; SAR(10 g) = 5.45 mW/g
Maximum value of SAR (measured) = 13.3 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 13.4 mW/g




SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
m
14
12
10
8
6
4
2
0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Date/Time: 11/24/2011 6:41:06 PM

Test Laboratory: MOTOROLA MOBILITY 835 MHz System
Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:421tr;
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -27.9dB Sim.Temp@SPC =21.5 Room Temp @ SPC =21.7

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.97 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3

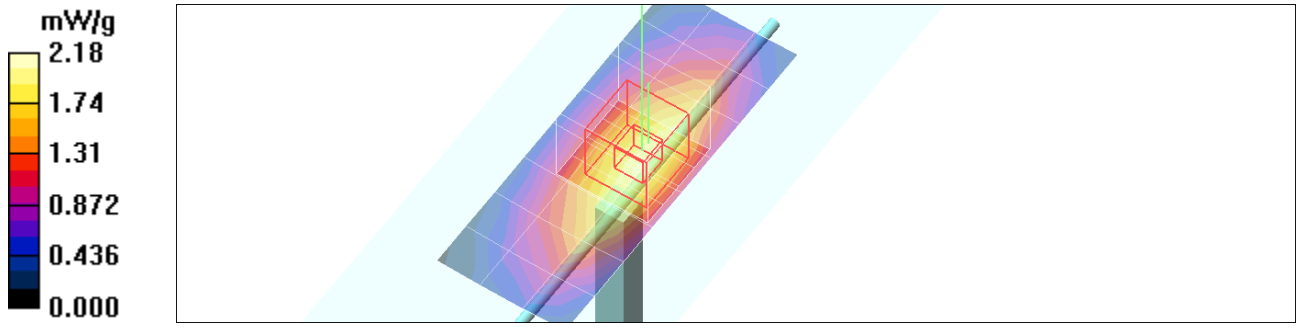
DASY4 Configuration:

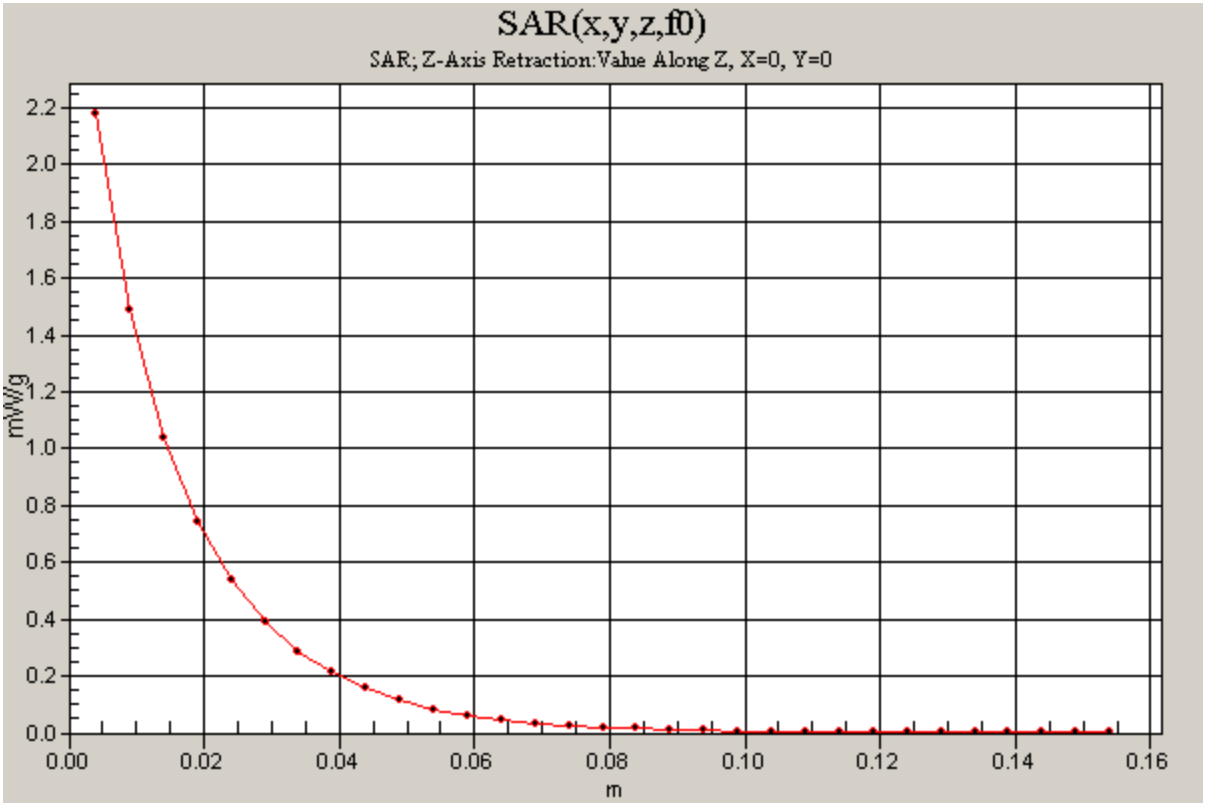
- Probe: ES3DV3 - SN3191; ConvF(6.1, 6.1, 6.1); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.11 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.3 V/m; Power Drift = -0.100 dB
Peak SAR (extrapolated) = 2.91 W/kg
SAR(1 g) = 1.99 mW/g; SAR(10 g) = 1.31 mW/g
Maximum value of SAR (measured) = 2.13 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.18 mW/g




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

Date/Time: 11/29/2011 11:01:48 AM

Test Laboratory: MOTOROLA MOBILITY 835 MHz System
Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:421tr;
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -27.8 dB Sim.Temp@SPC = 21.6 Room Temp @ SPC = 22.0

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.97 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

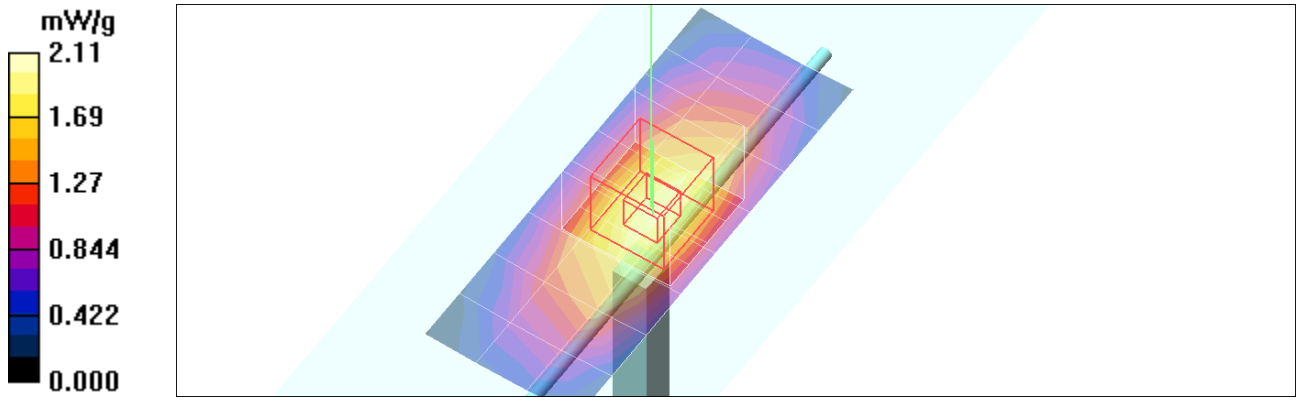
DASY4 Configuration:

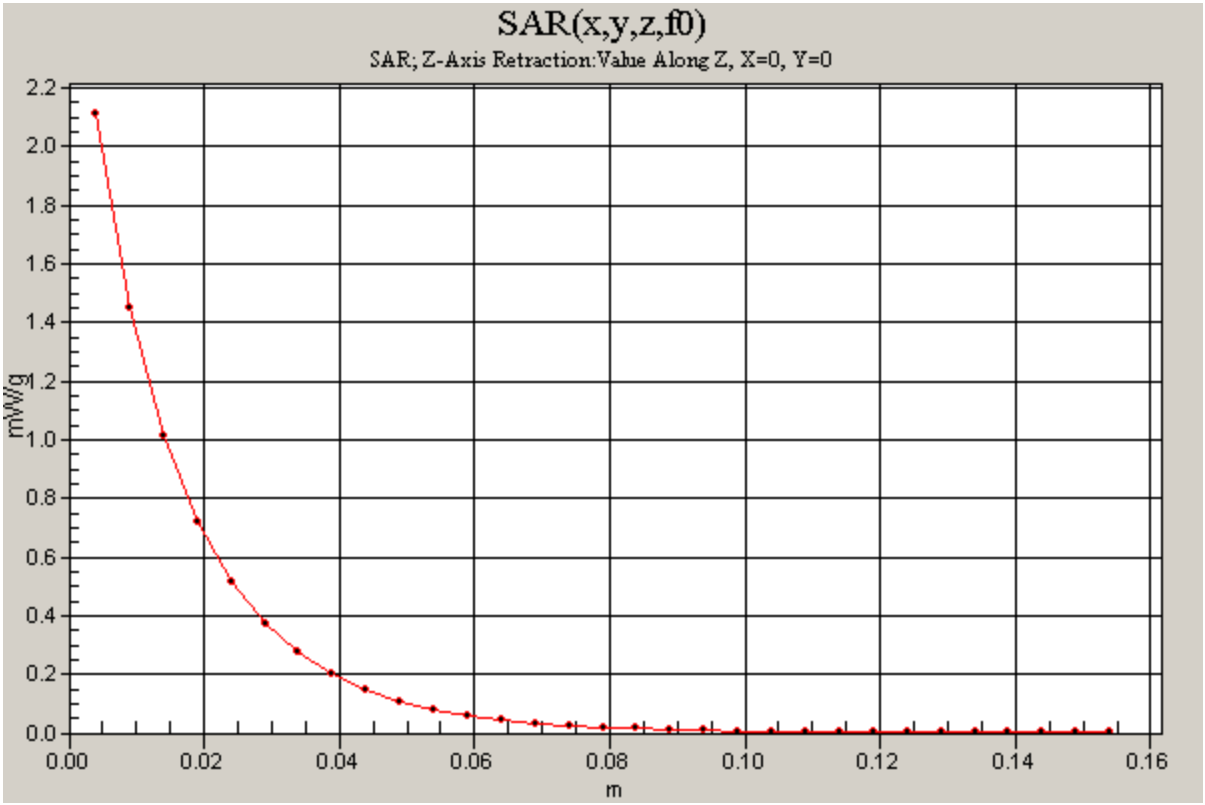
- Probe: ES3DV3 - SN3191; ConvF(6.1, 6.1, 6.1); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.93 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 46.9 V/m; Power Drift = 0.051 dB
Peak SAR (extrapolated) = 2.84 W/kg
SAR(1 g) = 1.95 mW/g; SAR(10 g) = 1.29 mW/g
Maximum value of SAR (measured) = 2.10 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.11 mW/g




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

Date/Time: 11/29/2011 9:19:01 PM

Test Laboratory: MOTOROLA MOBILIT 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d128;
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -20.5 dB Sim.Temp@SPC =21 Room Temp @ SPC =22

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.47 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3

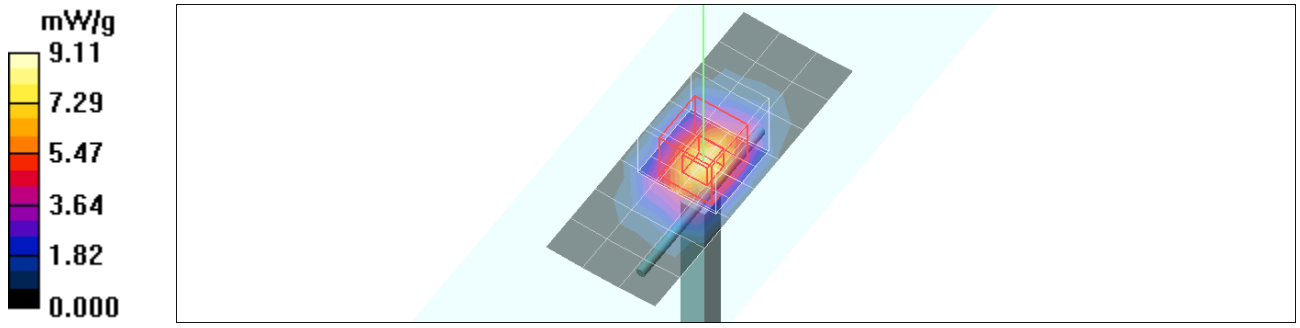
DASY4 Configuration:

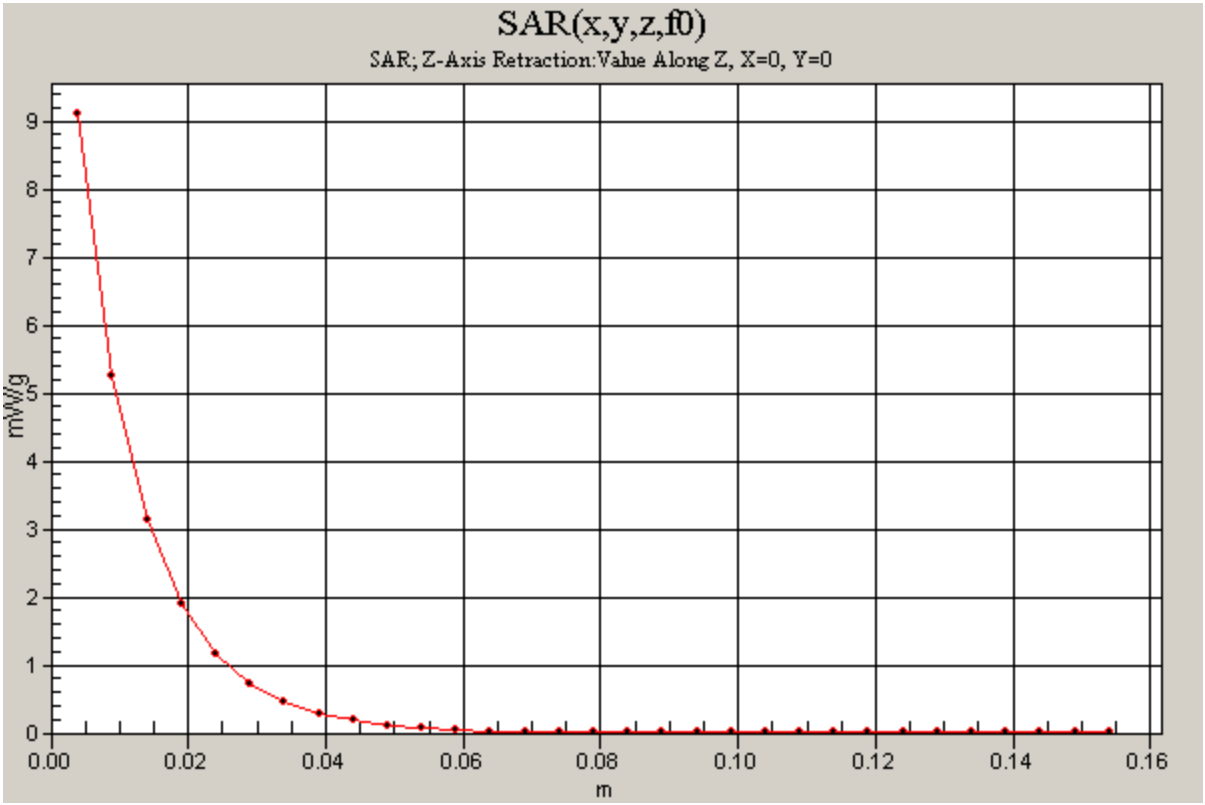
- Probe: ES3DV3 - SN3191; ConvF(4.76, 4.76, 4.76); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; 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) = 6.91 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.9 V/m; Power Drift = 0.005 dB
Peak SAR (extrapolated) = 14.5 W/kg
SAR(1 g) = 8.05 mW/g; SAR(10 g) = 4.22 mW/g
Maximum value of SAR (measured) = 9.09 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 9.11 mW/g




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

Date/Time: 12/1/2011 4:25:32 PM

Test Laboratory: MOTOROLA MOBILITY 1800 MHz System
Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d128;
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -20.1dB Sim.Temp@SPC =21.6 Room Temp @ SPC = 22

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.49 mho/m; ε_r = 52; ρ = 1000 kg/m^3

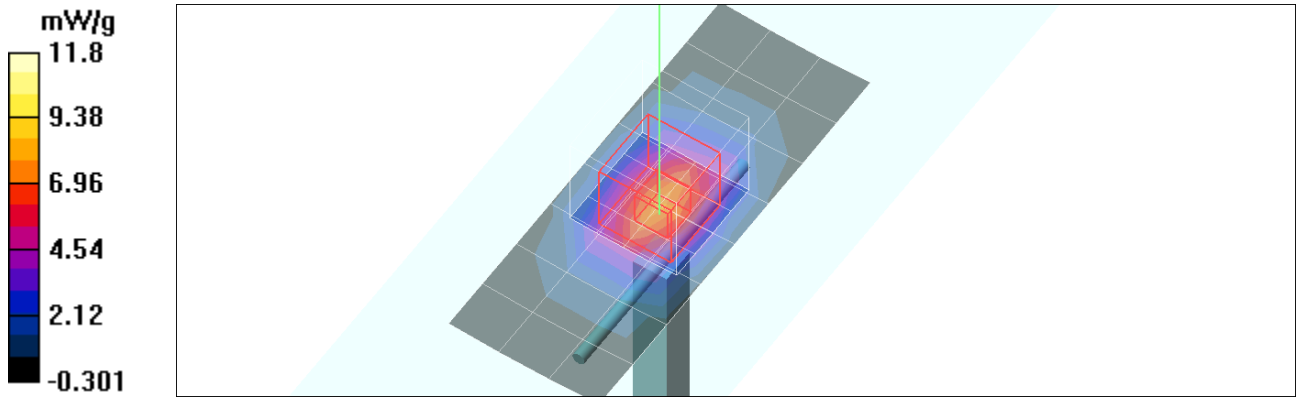
DASY4 Configuration:

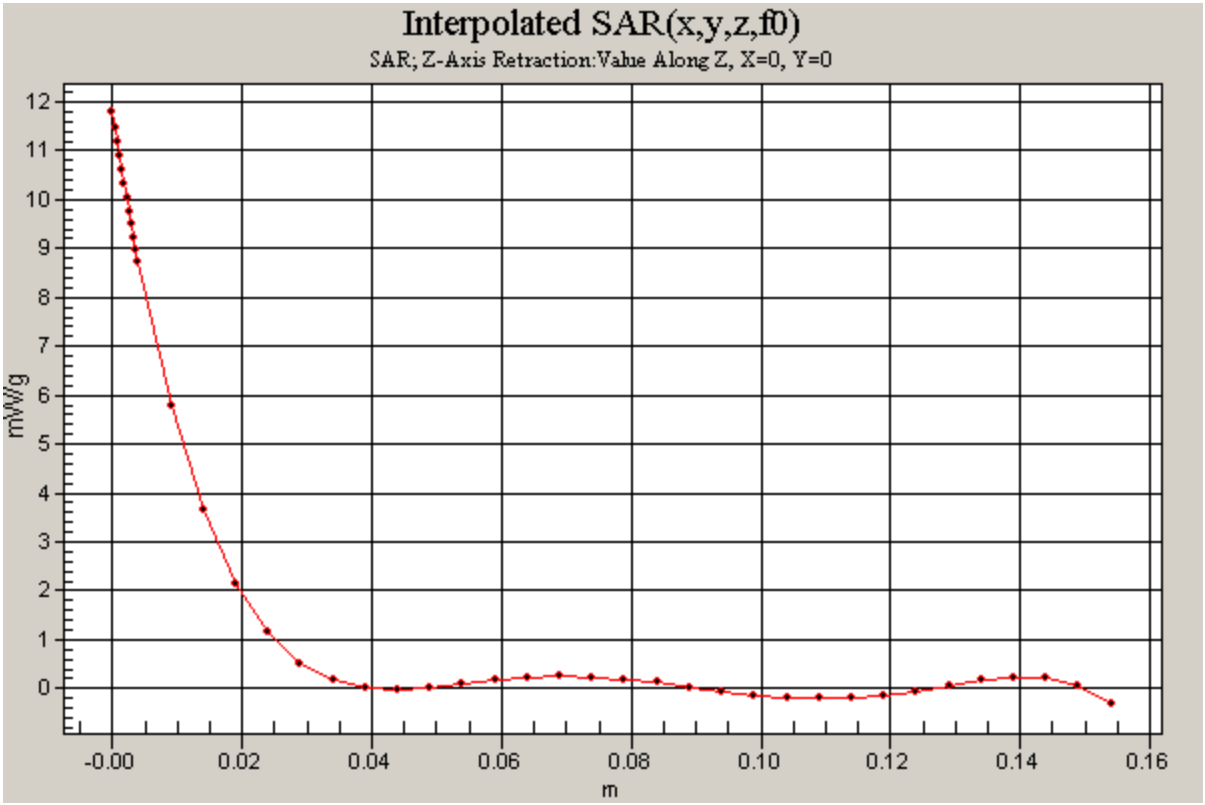
- Probe: ES3DV3 - SN3191; ConvF(4.76, 4.76, 4.76); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 55; 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) = 6.55 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.9 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 14.6 W/kg
SAR(1 g) = 8.16 mW/g; SAR(10 g) = 4.29 mW/g
Maximum value of SAR (measured) = 9.20 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x42): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (interpolated) = 11.8 mW/g




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

Date/Time: 11/28/2011 5:02:35 PM

Test Laboratory: MOTOROLA MOBILITY 2450 MHz System
Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:788;
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -29.8 dB Sim.Temp@SPC = 21.6 Room Temp @ SPC = 22.7

Communication System: CW - Dipole; Frequency: 2450 MHz Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 2450 MHz; σ = 1.88 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

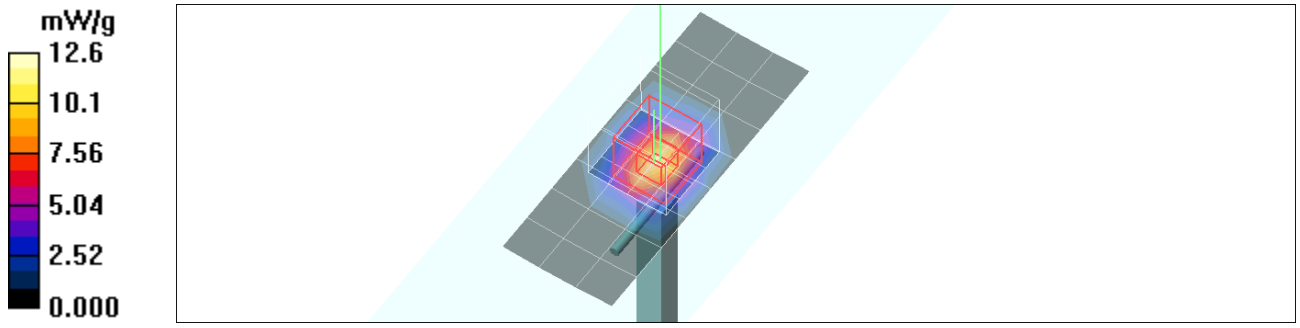
DASY4 Configuration:

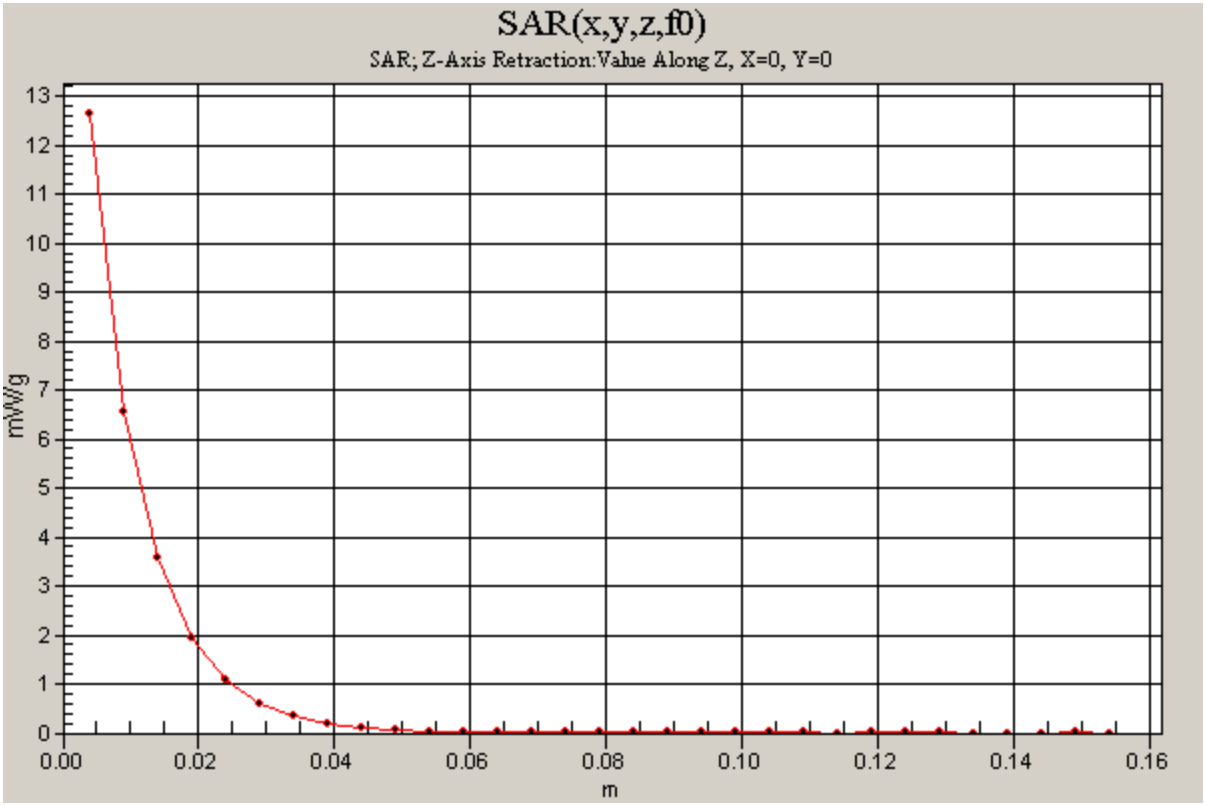
- Probe: ES3DV3 - SN3191; ConvF(4.11, 4.11, 4.11); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; 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) = 8.71 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 82.6 V/m; Power Drift = 0.043 dB
Peak SAR (extrapolated) = 22.8 W/kg
SAR(1 g) = 11.1 mW/g; SAR(10 g) = 5.17 mW/g
Maximum value of SAR (measured) = 12.5 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 12.6 mW/g




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

Appendix 2

SAR distribution plots for Head Adjacent Test Results

Date/Time: 12/16/2011 3:21:31 PM

Test Laboratory: MOTOROLA MOBILITY GPRS 850 Cheek Touch

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: 05 Battery Model #: SNN5892A_HW4X Test Configuration: Cheek

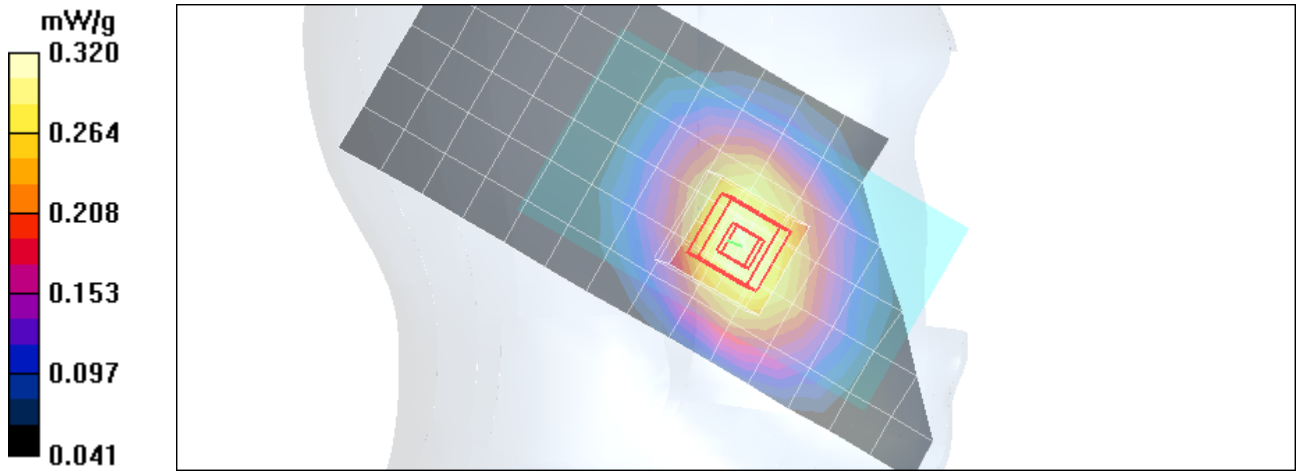
Communication System: GPRS 850 - Class 10; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:4.15
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(6.15, 6.15, 6.15); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1407;
- 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) = 0.305 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.1 V/m; Power Drift = 0.070 dB
Peak SAR (extrapolated) = 0.378 W/kg
SAR(1 g) = 0.303 mW/g; SAR(10 g) = 0.228 mW/g
Maximum value of SAR (measured) = 0.320 mW/g



Date/Time: 11/28/2011 9:49:37 PM

Test Laboratory: MOTOROLA MOBILITY WCDMA 850 Cheek Touch

DUT: Serial: TA293000GI; FCC ID: IHT56MV2
Procedure Notes: Pwr Step: All Up Battery Model #: SNN5892A_HW4X Test Configuration: Cheek

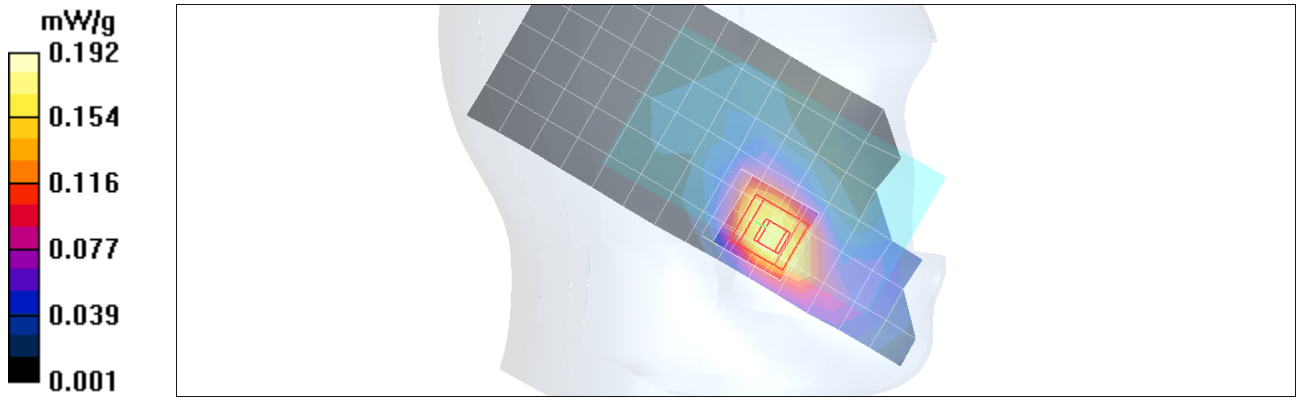
Communication System: 3G-WCDMA 850; Frequency: 836 MHz; Communication System Channel Number: 4180; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.88 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(6.15, 6.15, 6.15); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1407;
- 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) = 0.339 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.2 V/m; Power Drift = 0.041 dB
Peak SAR (extrapolated) = 0.681 W/kg
SAR(1 g) = 0.434 mW/g; SAR(10 g) = 0.278 mW/g
Maximum value of SAR (measured) = 0.345 mW/g



Date/Time: 12/16/2011 11:56:55 AM

Test Laboratory: MOTOROLA MOBILITY GPRS 1900 Cheek Touch

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: 00 Battery Model #: SNN5892A_HW4X Test Configuration: Cheek

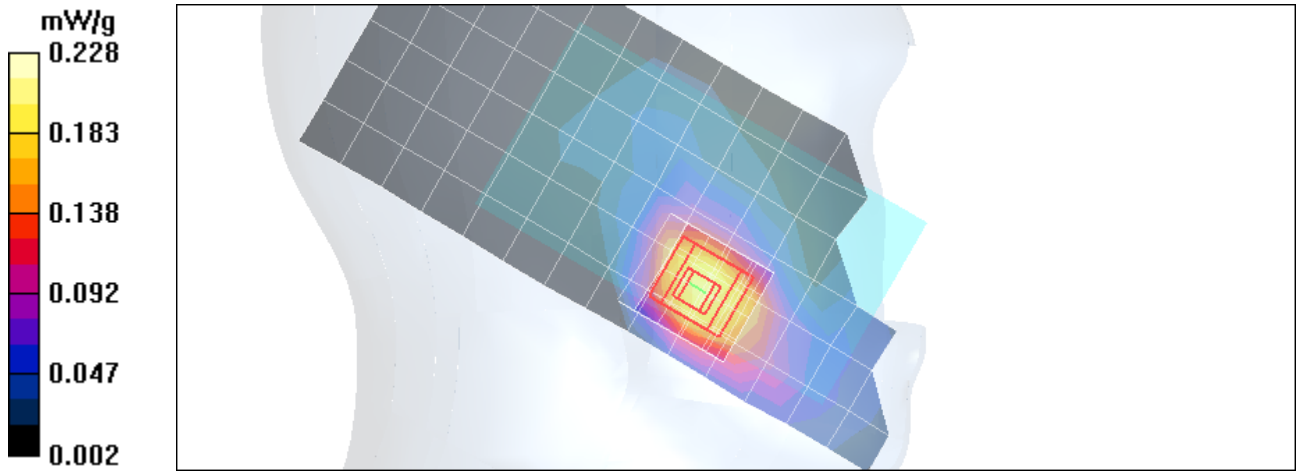
Communication System: GPRS 1900 - Class 10; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:4.15
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(5.21, 5.21, 5.21); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1160;
- 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) = 0.202 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.5 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 0.325 W/kg
SAR(1 g) = 0.211 mW/g; SAR(10 g) = 0.128 mW/g
Maximum value of SAR (measured) = 0.228 mW/g



Date/Time: 11/29/2011 5:19:24 PM

Test Laboratory: MOTOROLA MOBILITY WCDMA 1900 Cheek Touch

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step:All Up Battery Model #: SNN5892A_HW4X Test Configuration: Cheek

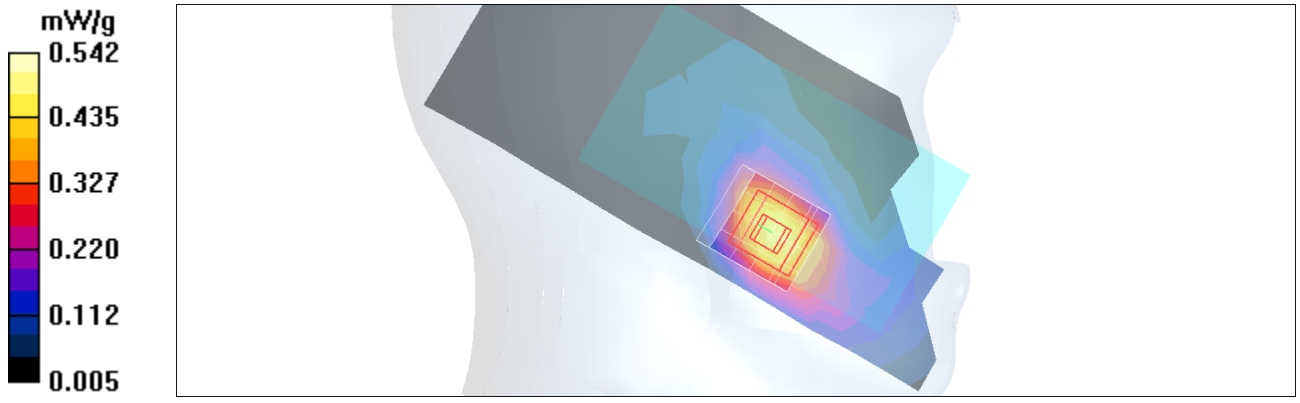
Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz; Communication System Channel Number: 9400; Duty Cycle: 1:1
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(5.21, 5.21, 5.21); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1160;
- 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) = 0.475 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.9 V/m; Power Drift = 0.069 dB
Peak SAR (extrapolated) = 0.770 W/kg
SAR(1 g) = 0.496 mW/g; SAR(10 g) = 0.297 mW/g
Maximum value of SAR (measured) = 0.542 mW/g



Date/Time: 11/28/2011 1:22:49 PM

Test Laboratory: MOTOROLA MOBILITY 2450 WiFi Cheek Touch

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: 1Mbps Battery Model #: SNN5892A_HW4X Test Configuration: Cheek Touch

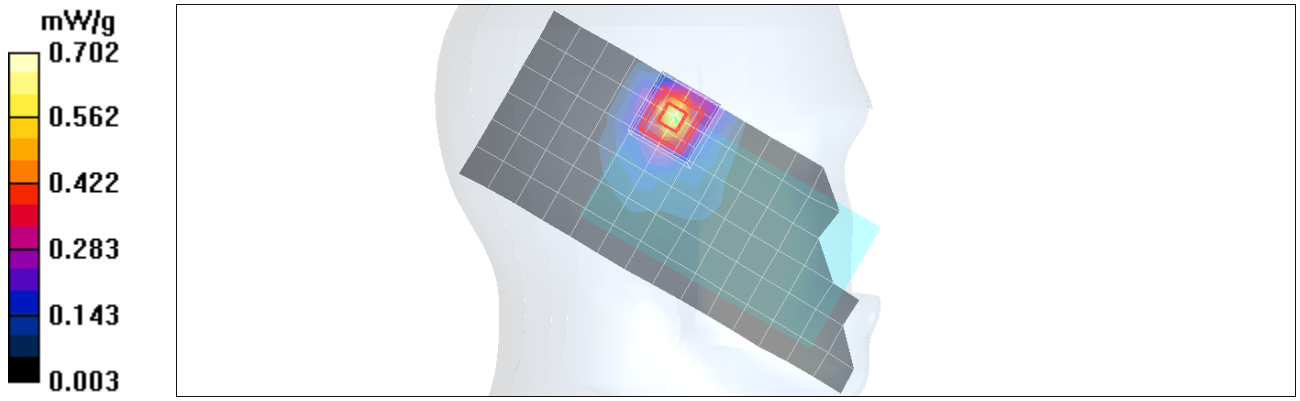
Communication System: Wi-Fi 2450; Frequency: 2462 MHz; Communication System Channel Number: 11; Duty Cycle: 1:1
Medium: 2450 Glycol Head; Medium parameters used: f = 2450 MHz; σ = 1.85 mho/m; ε_r = 38; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(4.49, 4.49, 4.49); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1160;
- 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) = 0.685 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.0 V/m; Power Drift = -0.049 dB
Peak SAR (extrapolated) = 1.37 W/kg
SAR(1 g) = 0.608 mW/g; SAR(10 g) = 0.279 mW/g
Maximum value of SAR (measured) = 0.702 mW/g



Date/Time: 11/28/2011 10:10:30 PM

Test Laboratory: MOTILITY WCDMA 850 15 Degree Tilt

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: All Up Battery Model #: SNN5892A_HW4X Test Configuration: Tilt

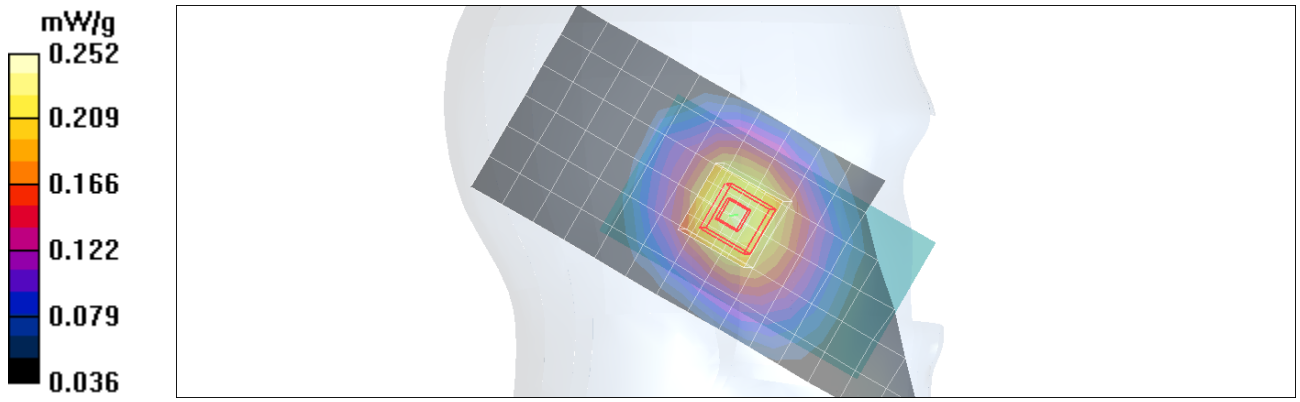
Communication System: 3G-WCDMA 850; Frequency: 836 MHz; Communication System Channel Number: 4180; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.88 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(6.15, 6.15, 6.15); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1407;
- 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) = 0.232 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) - to correct max outside (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.1 V/m; Power Drift = 0.028 dB
Peak SAR (extrapolated) = 0.291 W/kg
SAR(1 g) = 0.239 mW/g; SAR(10 g) = 0.185 mW/g
Maximum value of SAR (measured) = 0.252 mW/g



Date/Time: 11/28/2011 1:44:04 PM

Test Laboratory: MOTOROLA MOBILITY 2450 WiFi 15 Degree Tilt

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: 1Mbps Battery Model #: SNN5892A_HW4X Test Configuration: 15 Degree Tilt

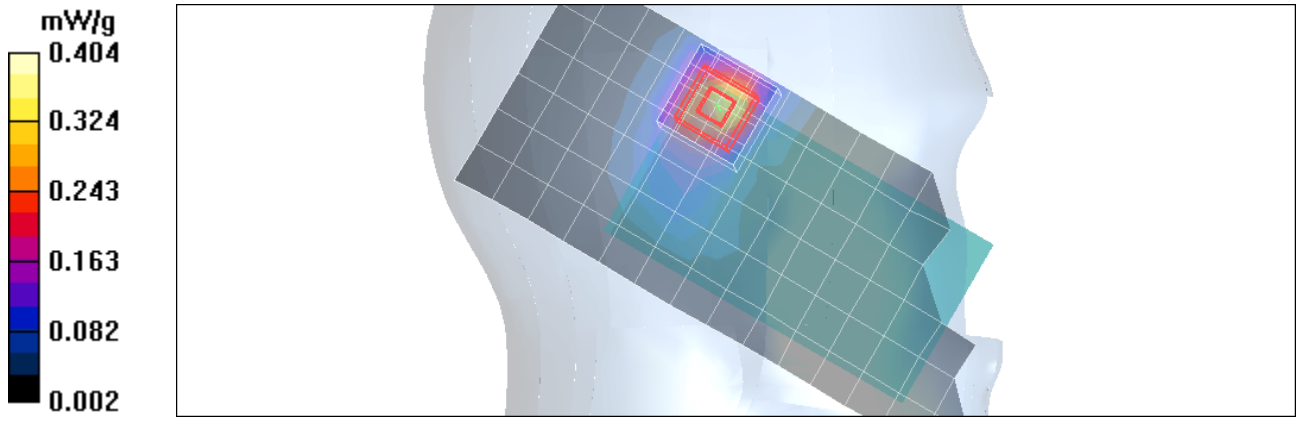
Communication System: Wi-Fi 2450; Frequency: 2462 MHz; Communication System Channel Number: 11; Duty Cycle: 1:1
Medium: 2450 Glycol Head; Medium parameters used: f = 2450 MHz; σ = 1.85 mho/m; ε_r = 38; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(4.49, 4.49, 4.49); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1160;
- 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) = 0.349 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.4 V/m; Power Drift = 0.008 dB
Peak SAR (extrapolated) = 0.735 W/kg
SAR(1 g) = 0.358 mW/g; SAR(10 g) = 0.171 mW/g
Maximum value of SAR (measured) = 0.404 mW/g



Date/Time: 11/24/2011 2:22:34 PM

Test Laboratory: MOTOROLAMOBILITY GSM 850 15 Degree Tilt

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: 05 Battery Model #: SNN5892A_HW4X Test Configuration: 15 Degree Tilt

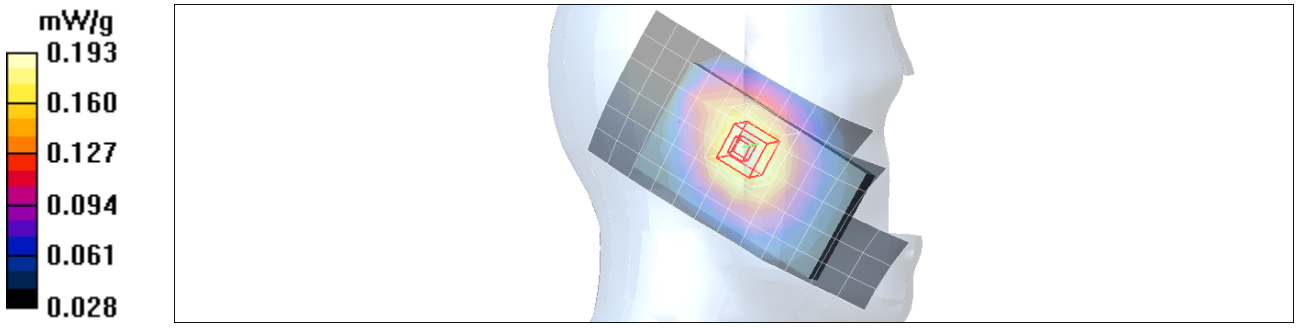
Communication System: GSM 850; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:8.3
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(6.15, 6.15, 6.15); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1407;
- 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) = 0.190 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.8 V/m; Power Drift = -0.158 dB
Peak SAR (extrapolated) = 0.223 W/kg
SAR(1 g) = 0.184 mW/g; SAR(10 g) = 0.141 mW/g
Maximum value of SAR (measured) = 0.193 mW/g



Date/Time: 11/29/2011 3:23:04 PM

Test Laboratory: MOTOROLA MOBILITY GSM 1900 15 Degree Tilt

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: 00 Battery Model #: SNN5892A_HW4X Test configuration: 15 Degree Tilt

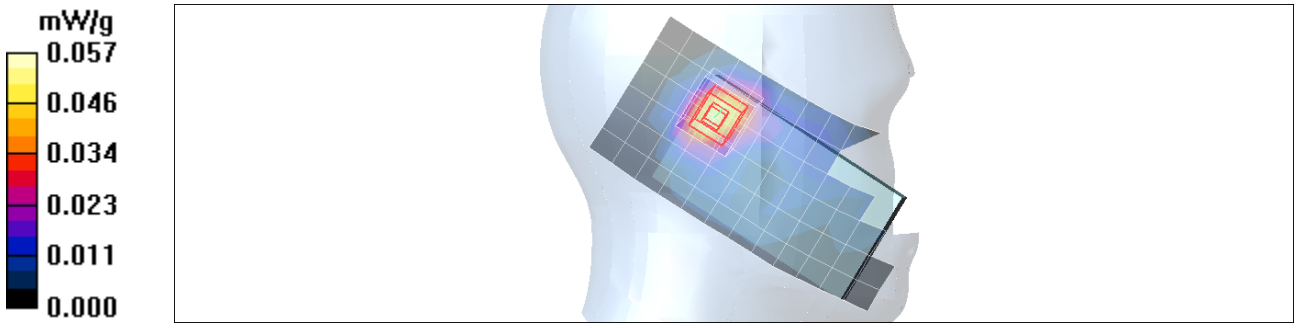
Communication System: GSM 1900; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:8.3
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(5.21, 5.21, 5.21); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1160;
- 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) = 0.051 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.96 V/m; Power Drift = -0.006 dB
Peak SAR (extrapolated) = 0.084 W/kg
SAR(1 g) = 0.051 mW/g; SAR(10 g) = 0.029 mW/g
Maximum value of SAR (measured) = 0.057 mW/g



Date/Time: 11/29/2011 6:36:09 PM

Test Laboratory: MOTOROLA MOBILITY WCDMA 1900 15 Degree Tilt

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: All Up Battery Model #: SNN5892A_HW4X Test Configuration: 15 Degree Tilt

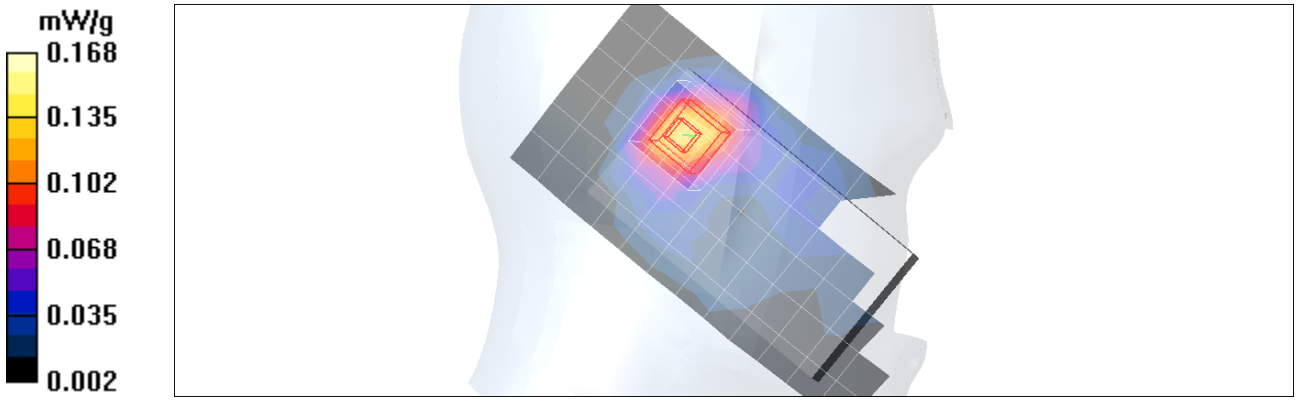
Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz; Communication System Channel Number: 9400; Duty Cycle: 1:1
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(5.21, 5.21, 5.21); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1160;
- 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) = 0.134 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.6 V/m; Power Drift = -0.073 dB
Peak SAR (extrapolated) = 0.249 W/kg
SAR(1 g) = 0.150 mW/g; SAR(10 g) = 0.085 mW/g
Maximum value of SAR (measured) = 0.168 mW/g



Appendix 3

SAR distribution plots for Body Worn Test Results

Date/Time: 11/25/2011 8:13:19 AM

Test Laboratory: MOTOROLA MOBILITY GPRS 850 Body Worn

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: 05 Battery Model #: SNN5892A_HW4X TestConfiguration: GPRS CLASS 10 (2 UP SLOTS) , BACK 25mm

Communication System: GPRS 850 - Class 10; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:4.15
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.97 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3

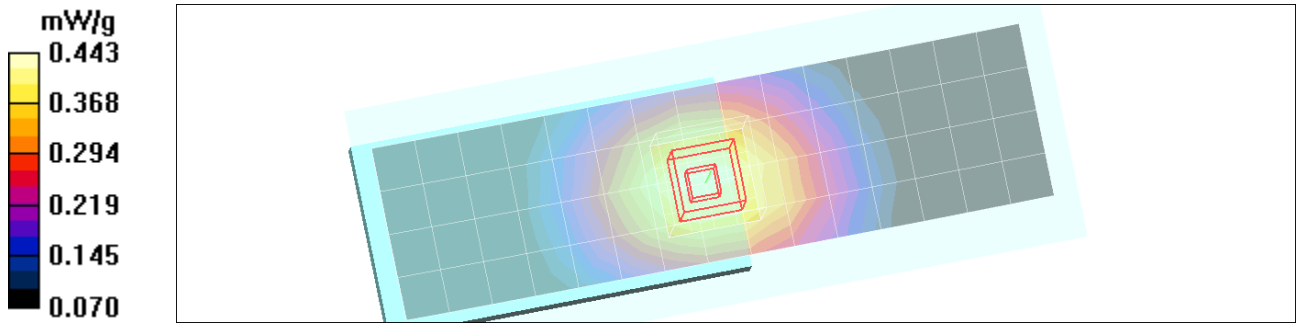
DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(6.1, 6.1, 6.1); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 1, Amy Twin, Rev3 (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 (15mm) (16x7x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.442 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.9 V/m; Power Drift = -0.077 dB
Peak SAR (extrapolated) = 0.528 W/kg
SAR(1 g) = 0.420 mW/g; SAR(10 g) = 0.318 mW/g
Maximum value of SAR (measured) = 0.443 mW/g



Date/Time: 11/24/2011 7:45:59 PM

Test Laboratory: MOTOROLA MOBILITY WCDMA 850 Body Worn

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: All UP Battery Model #: SNN5892A_HW4X Test Configuration = BACK 25MM

Communication System: 3G-WCDMA 850; Frequency: 836 MHz; Communication System Channel Number: 4180; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.97 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3

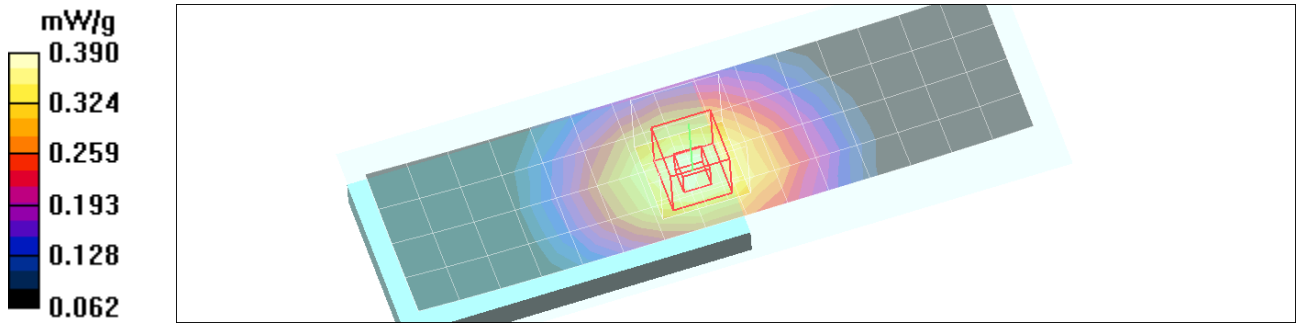
DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(6.1, 6.1, 6.1); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 1, Amy Twin, Rev3 (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 (15mm) (16x7x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.382 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.6 V/m; Power Drift = -0.002 dB
Peak SAR (extrapolated) = 0.468 W/kg
SAR(1 g) = 0.372 mW/g; SAR(10 g) = 0.281 mW/g
Maximum value of SAR (measured) = 0.390 mW/g



Date/Time: 11/30/2011 10:05:57 AM

Test Laboratory: MOTOROLA MOBILITY GPRS 1900 Body Worn

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: 00 Battery Model #: SNN5892A_HW4X Test Configuration = Back 25mm GPRS CLASS 10 (2 UP SLOTS)

Communication System: GPRS 1900 - Class 10; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:4.15
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 50.8; ρ = 1000 kg/m^3

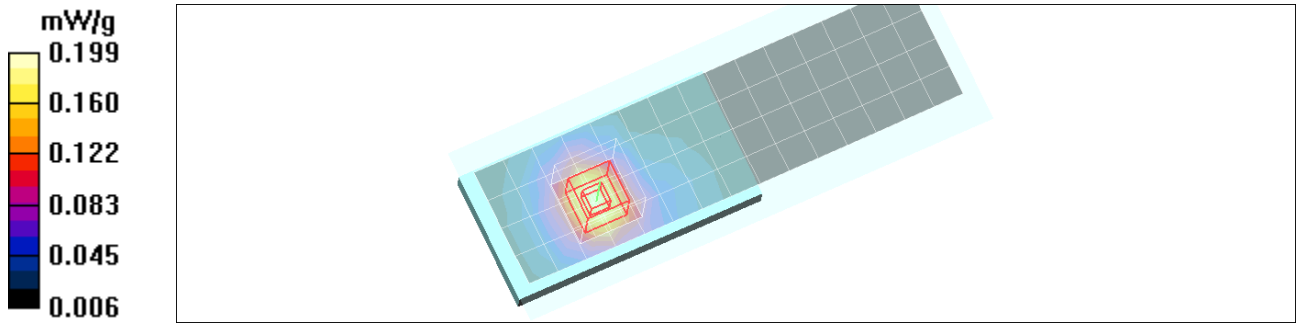
DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(4.76, 4.76, 4.76); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 1, Amy Twin, Rev3 (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 (15mm) (16x7x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.190 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.47 V/m; Power Drift = 0.026 dB
Peak SAR (extrapolated) = 0.282 W/kg
SAR(1 g) = 0.182 mW/g; SAR(10 g) = 0.111 mW/g
Maximum value of SAR (measured) = 0.199 mW/g



Date/Time: 11/30/2011 11:09:17 AM

Test Laboratory: MOTOROLA MOBILITY WCDMA 1900 Body Worn

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: All UP Battery Model #: SNN5892A_HW4X Test Configuration = BODY WORN, BACK OF PHONE 25MM FROM PHANTOM

Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz; Communication System Channel Number: 9400; Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 50.8; ρ = 1000 kg/m^3

DASY4 Configuration:

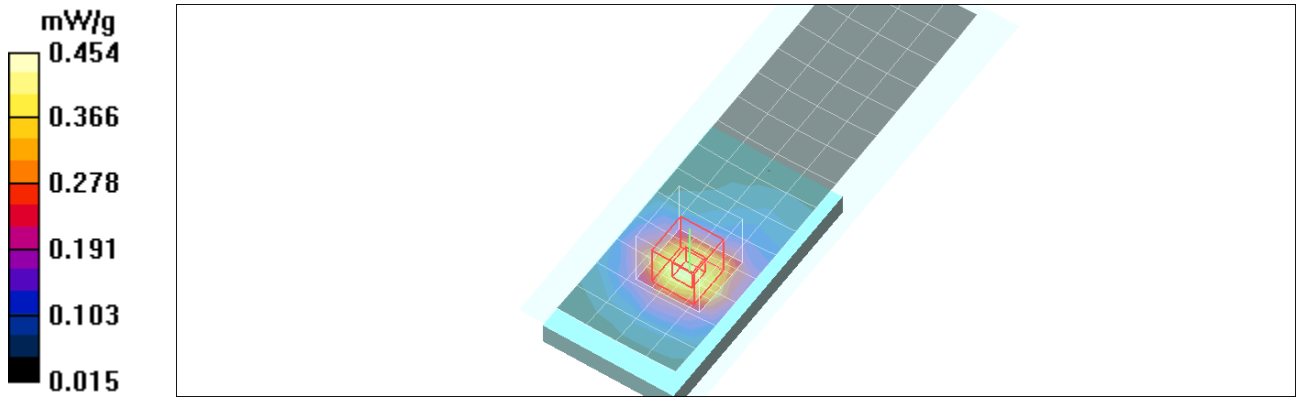
- Probe: ES3DV3 - SN3191; ConvF(4.76, 4.76, 4.76); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.438 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.7 V/m; Power Drift = -0.088 dB
Peak SAR (extrapolated) = 0.654 W/kg
SAR(1 g) = 0.419 mW/g; SAR(10 g) = 0.255 mW/g
Maximum value of SAR (measured) = 0.454 mW/g



Date/Time: 11/28/2011 5:35:27 PM

Test Laboratory: MOTOROLA MOBILITY 2450 MHz WiFi Body Worn

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: 1M Battery Model #: SNN5892A_HW4X Test Configuration = BACK 25MM

Communication System: Wi-Fi 2450; Frequency: 2462 MHz; Communication System Channel Number: 11; Duty Cycle: 1:1
Medium: 2450 Glycol Body; Medium parameters used: f = 2450 MHz; σ = 1.88 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

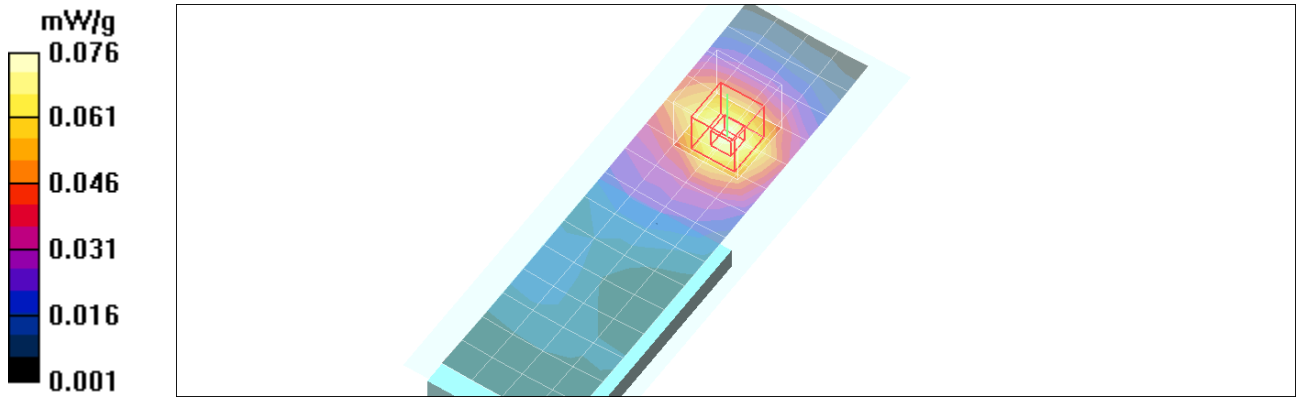
DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(4.11, 4.11, 4.11); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 2, Amy Twin, Rev3 (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 (15mm) (16x7x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.077 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.22 V/m; Power Drift = -0.092 dB
Peak SAR (extrapolated) = 0.121 W/kg
SAR(1 g) = 0.071 mW/g; SAR(10 g) = 0.043 mW/g
Maximum value of SAR (measured) = 0.076 mW/g



Appendix 4

SAR distribution plots for Mobile Hotspot Test Results

Date/Time: 11/28/2011 7:38:19 PM

Test Laboratory: MOTOROLA MOBILITY 2450 MHz WiFi Mobile Hotspot

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: 1M Battery Model #: SNN5892A_HW4X Test Configuration =Right edge10MM

Communication System: Wi-Fi 2450; Frequency: 2462 MHz; Communication System Channel Number: 11; Duty Cycle: 1:1
Medium: 2450 Glycol Body; Medium parameters used: f = 2450 MHz; σ = 1.88 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

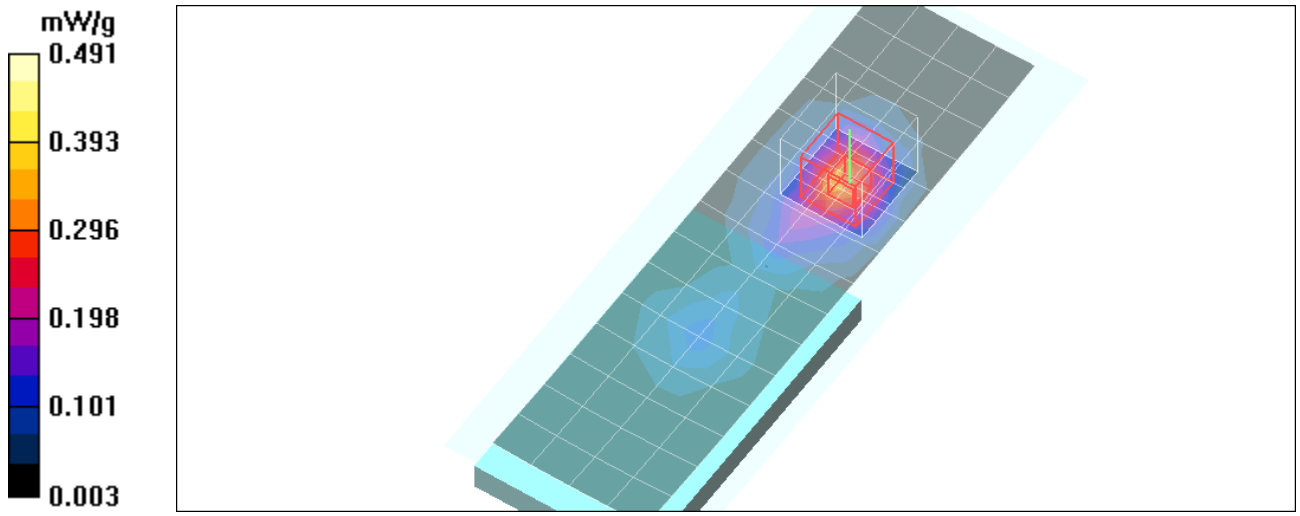
- Probe: ES3DV3 - SN3191; ConvF(4.11, 4.11, 4.11); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.333 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.3 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 0.851 W/kg
SAR(1 g) = 0.411 mW/g; SAR(10 g) = 0.188 mW/g
Maximum value of SAR (measured) = 0.491 mW/g



Date/Time: 11/25/2011 10:48:43 AM

Test Laboratory: MOTOROLA MOBILITY GPRS 850 Mobile Hotspot

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: 05 Battery Model #: SNN5892A_HW4X Test Configuration = GPRS Class 10 (2 Upslots) Body Worn, Back of Phone 10mm from Phantom

Communication System: GPRS 850 - Class 10; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:4.15
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.97 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3

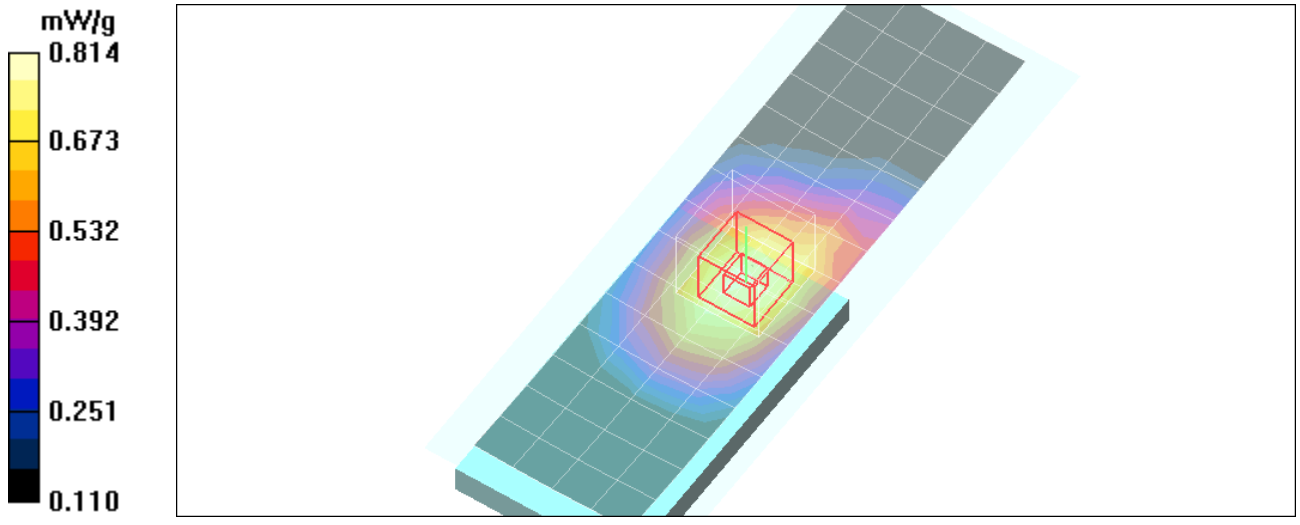
DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(6.1, 6.1, 6.1); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 1, Amy Twin, Rev3 (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 (15mm) (16x7x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.796 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.7 V/m; Power Drift = 0.009 dB
Peak SAR (extrapolated) = 0.956 W/kg
SAR(1 g) = 0.774 mW/g; SAR(10 g) = 0.584 mW/g
Maximum value of SAR (measured) = 0.814 mW/g



Date/Time: 11/29/2011 11:30:20 AM

Test Laboratory: MOTOROLA MOBILITY WCDMA 850 Mobile Hotspot

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: All UP Battery Model #: SNN5892A_HW4X Test Configuration = Body Worn, Back of Phone 10mm from Phantom

Communication System: 3G-WCDMA 850; Frequency: 836 MHz; Communication System Channel Number: 4180; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.97 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

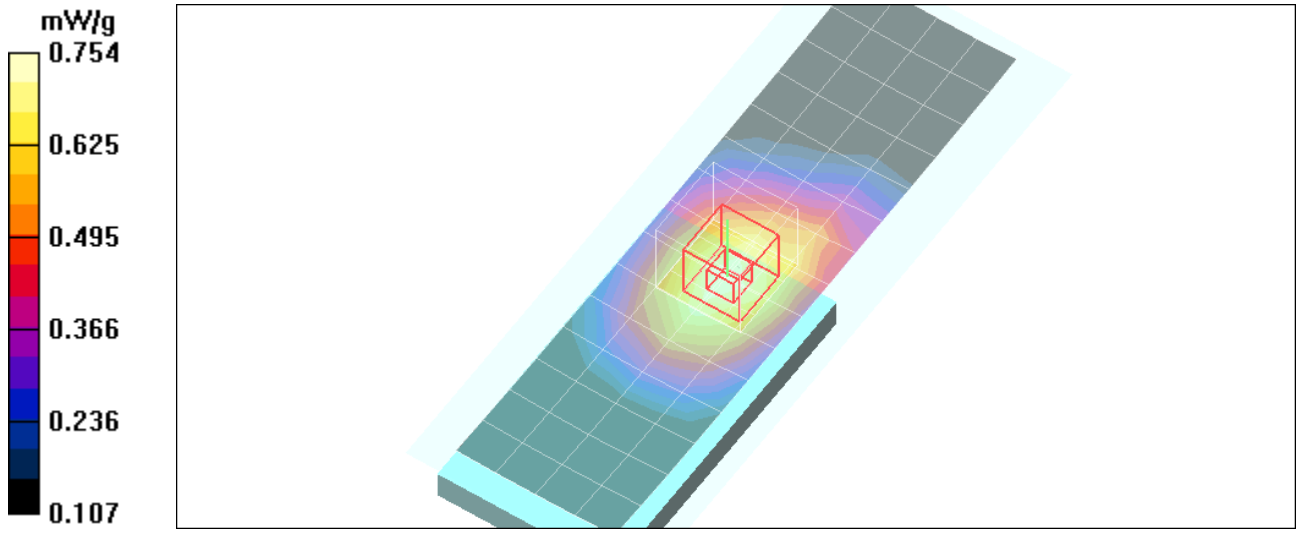
DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(6.1, 6.1, 6.1); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 1, Amy Twin, Rev3 (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 (15mm) (16x7x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.758 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 = -0.092 dB
Peak SAR (extrapolated) = 0.893 W/kg
SAR(1 g) = 0.719 mW/g; SAR(10 g) = 0.542 mW/g
Maximum value of SAR (measured) = 0.754 mW/g



Date/Time: 12/2/2011 2:49:12 PM

Test Laboratory: MOTOROLA MOBILITY WCDMA 1900 Mobile Hotspot

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Pwr Step: All UP Battery Model #: SNN5892A_HW4X Test Configuration = Body Worn, Back of Phone 10mm from Phantom, HSPA Rel6 Subtest 1

Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz; Communication System Channel Number: 9400; Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3

DASY4 Configuration:

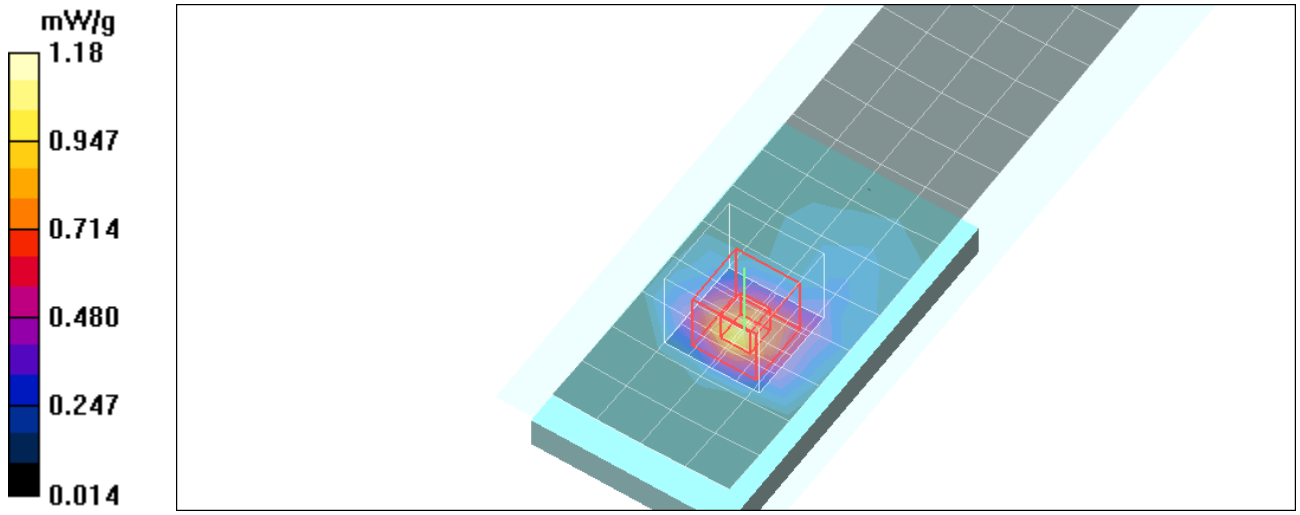
- Probe: ES3DV3 - SN3191; ConvF(4.76, 4.76, 4.76); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.918 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.2 V/m; Power Drift = 0.090 dB
Peak SAR (extrapolated) = 1.92 W/kg
SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.539 mW/g
Maximum value of SAR (measured) = 1.18 mW/g



Date/Time: 11/30/2011 1:53:47 PM

Test Laboratory: MOTOROLA MOBILITY GPRS 1900 Mobile Hotspot

DUT: Serial: TA293000GI; FCC ID: IHDT56MV2
Procedure Notes: Battery Model #: SNN5892A_HW4X Test Configuration = GPRS Class 10 (2 Upslots) Body Worn, Bottom Edge of Phone 10mm from Phantom

Communication System: GPRS 1900 - Class 10; Frequency: 1850.2 MHz; Communication System Channel Number: 512; Duty Cycle: 1:4.15
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 50.8; ρ = 1000 kg/m^3

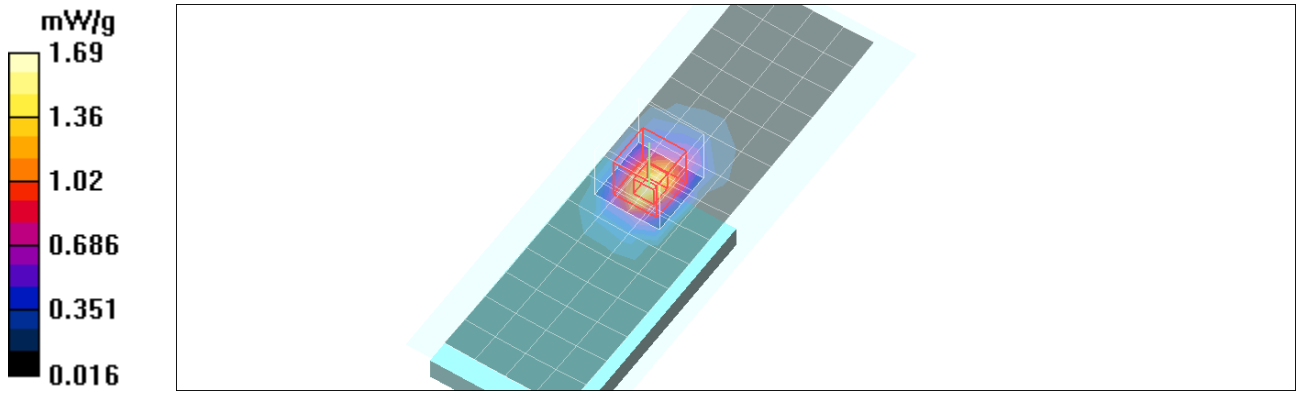
DASY4 Configuration:

- Probe: ES3DV3 - SN3191; ConvF(4.76, 4.76, 4.76); Calibrated: 4/7/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn690; Calibrated: 4/13/2011
- Phantom: R11_ Section 1, Amy Twin, Rev3 (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 (15mm) (16x7x1):

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

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.1 V/m; Power Drift = -0.005 dB
Peak SAR (extrapolated) = 2.64 W/kg
SAR(1 g) = 1.49 mW/g; SAR(10 g) = 0.765 mW/g
Maximum value of SAR (measured) = 1.69 mW/g



Appendix 6

Measurement Uncertainty Budget

Uncertainty Budget for Device Under Test, for 735 MHz to 3 GHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	Description IEEE1528(2003) / IEC62209-1(2005)	**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 [ES3DV3]	E.2.1 / 7.2.1	6.0	N	1.00	1	1	6.0	6.0	∞
Axial Isotropy	E.2.2 / 7.2.1.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2 / 7.2.1.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3 / 7.2.1.5	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4 / 7.2.1.3	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5 / 7.2.1.4	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6 / 7.2.1.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7 / 7.2.1.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8 / 7.2.1.8	1.1	R	1.73	1	1	0.6	0.6	∞
RF Ambient Conditions - Noise	E.6.1 / 7.2.3.6	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1 / 7.2.3.6	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mech. Tolerance	E.6.2 / 7.2.2.1	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t Phantom	E.6.3 / 7.2.2.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5 / 7.2.4	3.4	R	1.73	1	1	2.0	2.0	∞
Test sample Related									
Test Sample Positioning	E.4.2 / 7.2.2.4	3.4	N	1.00	1	1	3.4	3.4	79
Device Holder Uncertainty	E.4.1 / 7.2.2.4.2	4.5	N	1.00	1	1	4.5	4.5	11
SAR drift	6.6.2 / 7.2.3.5	0.0	R	1.73	1	1	0.0	0.0	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1 / 7.2.2.2	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2 / 7.2.3.3	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3 / 7.2.3.3	2.5	N	1.00	0.64	0.43	1.6	1.1	6
Liquid Permittivity (target)	E.3.2 / 7.2.3.4	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.2 / 7.2.3.4	2.3	N	1.00	0.6	0.49	1.4	1.1	6
Combined Standard Uncertainty			RSS				11	11	372
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				22	22	

Appendix 6

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 Beijing

Certificate No: ES3-3191_Apr11

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3191

Calibration procedure(s): QA CAL-01.v7, QA CAL-23.v4, QA CAL-25.v3
Calibration procedure for dosimetric E-field probes

Calibration date: April 7, 2011

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	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41495277	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	23-Apr-10 (No. DAE4-654_Apr10)	Apr-11
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 14, 2011

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

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

Accredited by the Swiss Accreditation Service (SAS)
Accreditation No.: SCS 108
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
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 affect 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 with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z* are numerical linearization parameters in dB assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media.
- *VR:* VR is the validity range of the calibration related to the average diode voltage or DAE voltage in mV.
- *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:3191

Manufactured: June 16, 2008
Calibrated: April 7, 2011

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3191

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m)^2)[A]	1.31	1.30	1.36	± 10.1 %
DCP (mV)[B]	88.8	97.6	91.4	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	107.9	±2.7 %
			Y	0.00	0.00	1.00	113.8	
			Z	0.00	0.00	1.00	113.6	

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 Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3191

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	41.5	0.90	6.15	6.15	6.15	0.99	1.11	± 12.0 %
1810	40.0	1.40	5.21	5.21	5.21	0.75	1.30	± 12.0 %
1950	40.0	1.40	5.01	5.01	5.01	0.86	1.19	± 12.0 %
2450	39.2	1.80	4.49	4.49	4.49	0.70	1.34	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

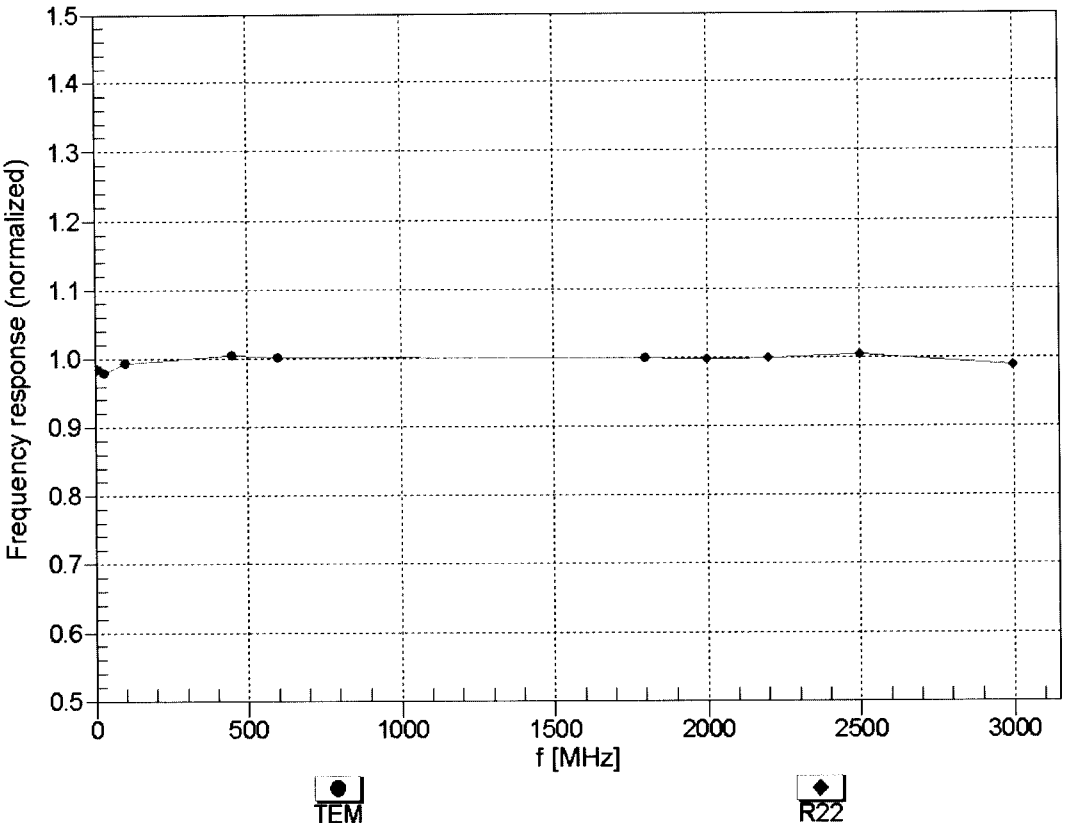
DASY/EASY - Parameters of Probe: ES3DV3- SN:3191

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	55.2	0.97	6.10	6.10	6.10	0.99	1.13	± 12.0 %
1810	53.3	1.52	4.76	4.76	4.76	0.86	1.25	± 12.0 %
1950	53.3	1.52	4.69	4.69	4.69	0.81	1.25	± 12.0 %
2450	52.7	1.95	4.11	4.11	4.11	0.88	1.10	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

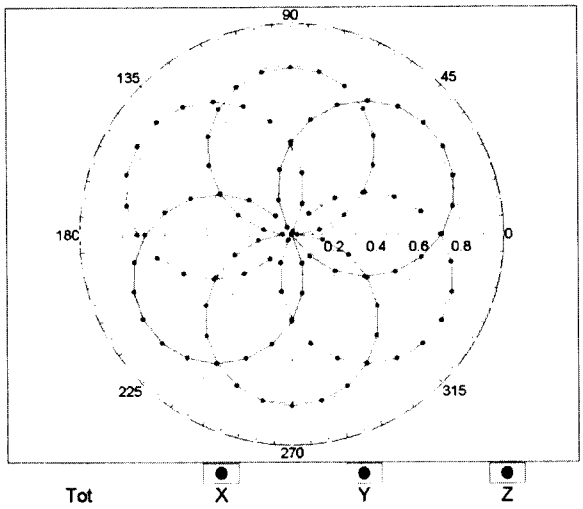
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



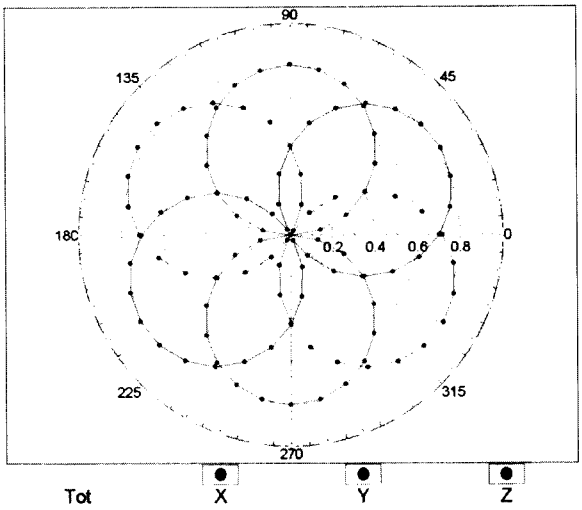
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

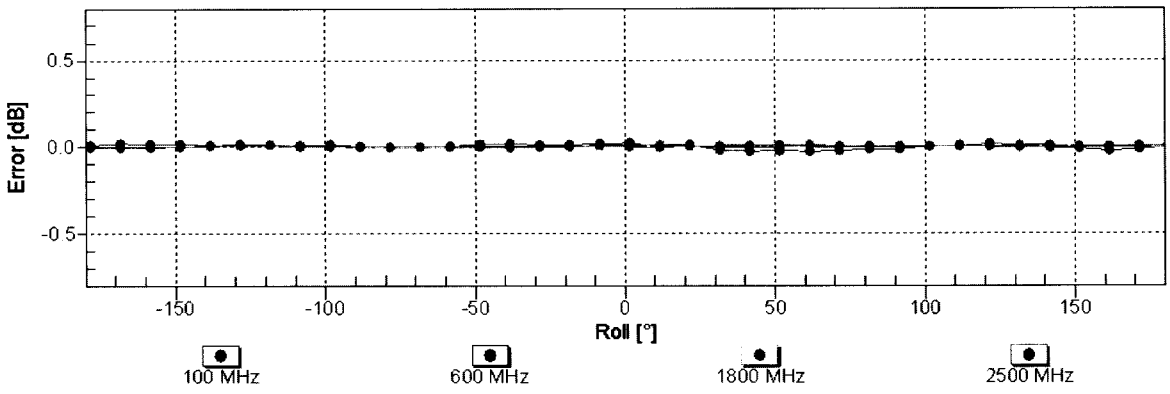
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



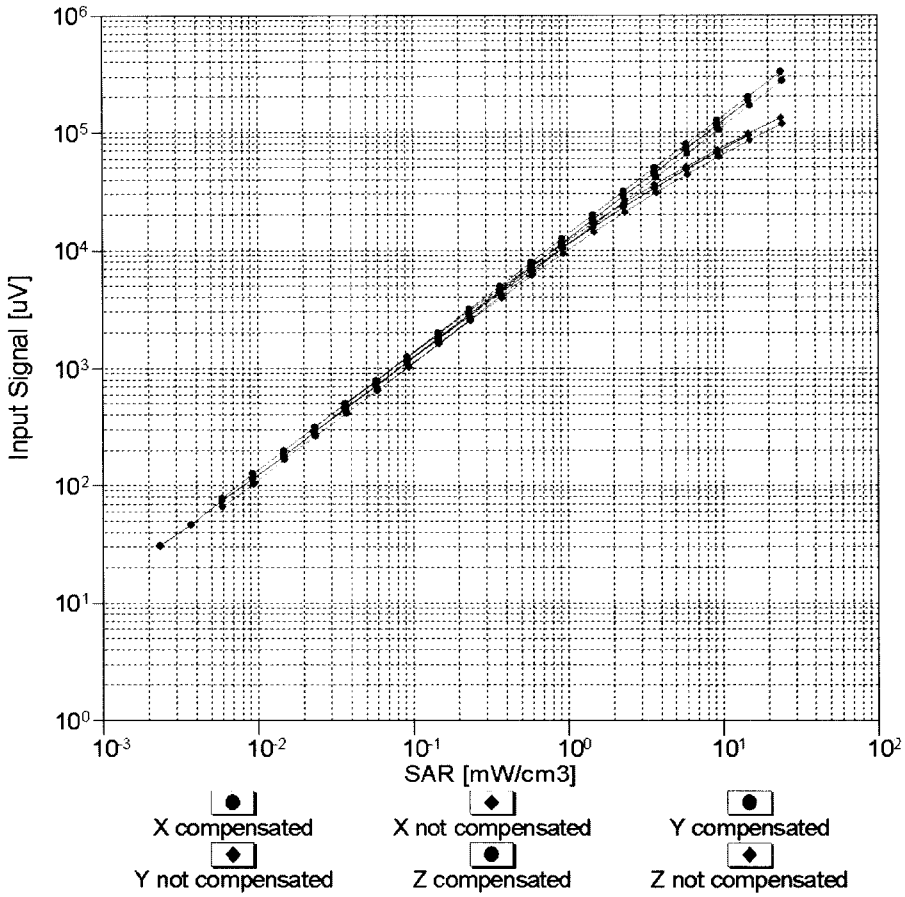
f=1800 MHz,R22

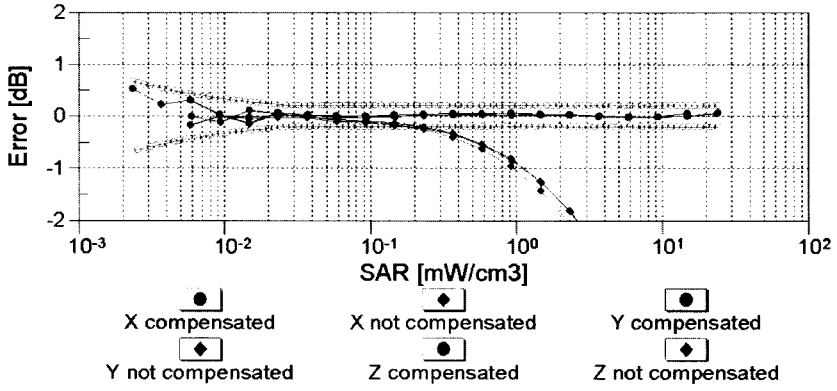




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)

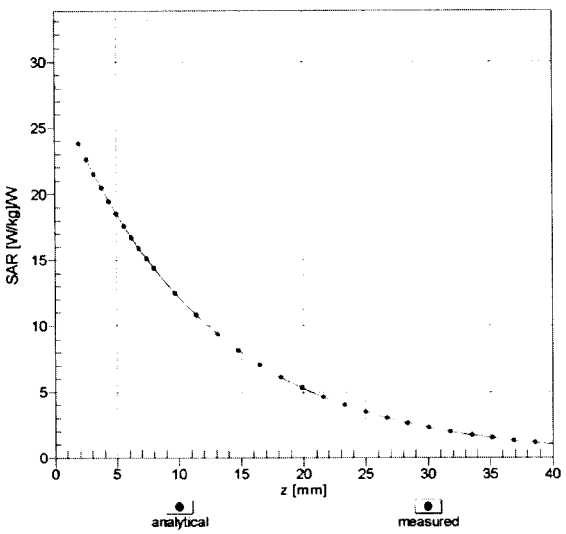




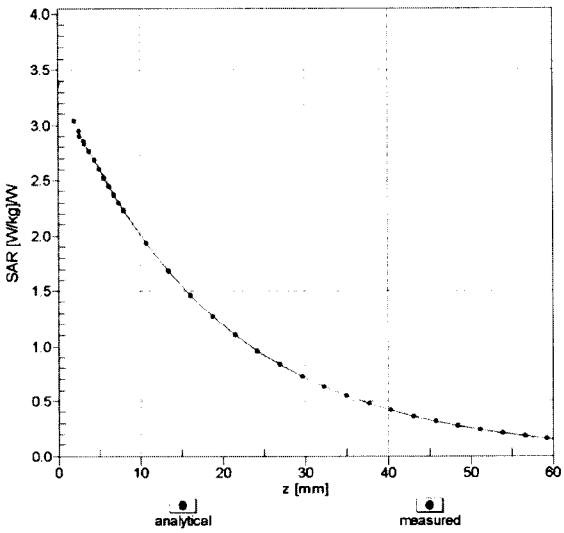
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 1950 MHz,WGLS R22 (H_convF)

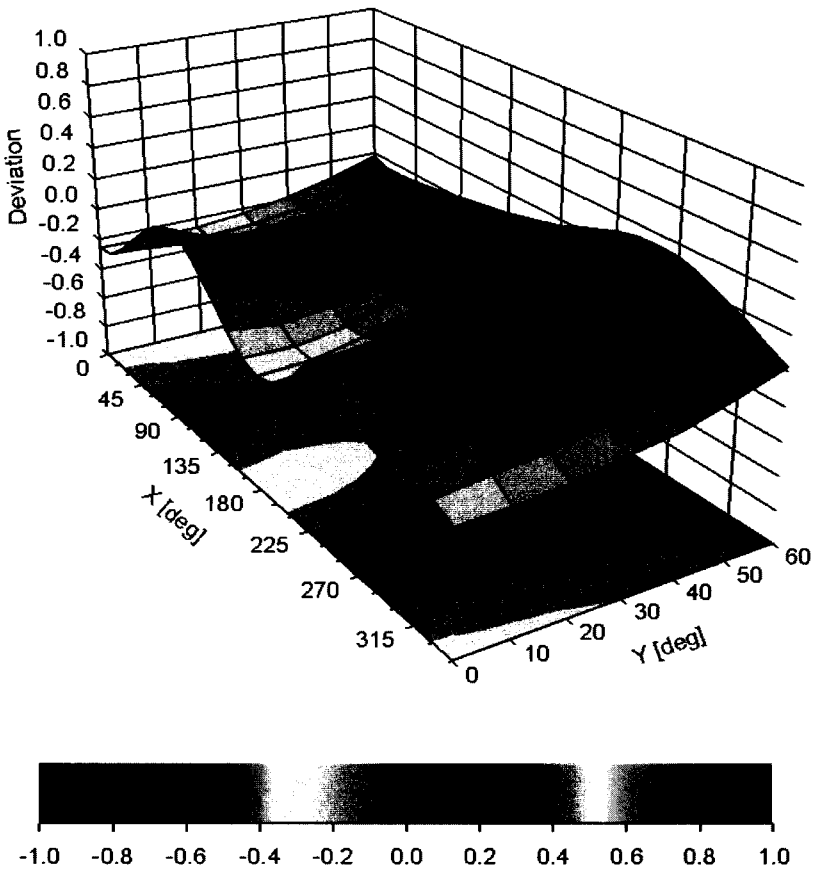


f = 835 MHz,WGLS R9 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3191

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm