MOTOROLA

Portable Cellular Phone SAR Test Report

Tests Requested By:	Motorola Mobile Devices 600 N. US Highway 45 Libertyville, IL 60048
Test Report #:	24596-1F Rev. B
Date of Report:	August 8, 2011, Revised on 12 Aug, 2011
Date of Test:	July 12 – August 3, 2011
FCC ID #:	IHDP56MA2
Generic Name:	M0C22
Test Laboratory:	Motorola Mobile Devices Business ADR Test Services Laboratory 600 N. US Highway 45 Libertyville, IL 60048
Report Author:	Steven Hauswirth Distinguished Member of the Technical Staff
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)

UKAS TESTING

Testing Laboratory
No. 2404

Statement of Compliance:

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

(none)

Table of Contents

1. Introduction

The Motorola Mobile Devices Business 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 1g average set in [3] and 2.0W/kg in a 10g average set in [2].

For ANSI / IEEE C95.1 (1g), the final stand-alone SAR reading for this are shown below. 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	**0.36**	**0.41**	**0.66**
WCDMA 850	**0.44**	**0.50**	**1.11**
GSM 1900	**0.58**	**0.38**	**0.47**
WCDMA 1900	**1.09**	**0.64**	**1.38**
Wi-Fi 2.45 GHz	**0.55**	**0.22**	**0.45**

2. Description of the Device Under Test

2.1 Antenna description

Main Antenna (WCDMA/GSM)

Type	Internal	
Location	Back Surface, Bottom of the Phone	
Dimensions	Length	56 mm
	Width	10 mm

WiFi / Bluetooth Antenna

Type	Internal	
Location	Back Surface, Leftt Edge of the Phone	
Dimensions	Length	1 mm
	Width	18.4 mm

2.2 Device description

Serial Number(s)	356472040016520 (Conducted power measurements of GSM and WCDMA modes, SAR testing of GSM head / body, WCDMA head / body / WiFi Hotspot configurations) 356472040014939 (Conducted power measurements of GPRS / EDGE modes, SAR testing of all GPRS/ Edge and WiFi Head & Body configruations) 356472040014364 (Wi-Fi / Bluetooth conducted power measurements)
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype
Device Category	Portable

Mode(s) of Operation	GSM 850	GSM 1900	WCDMA 850	WCDMA 1900	Wi-Fi 802.11b/g/n	Bluetooth
Modulation Mode(s)	GMSK	GMSK	QPSK	QPSK	BPSK	GFSK
Maximum Output Power Setting	33.0 dBm	30.0 dBm	24.0 dBm	24.0 dBm	19.2 dBm	8.4 dBm
Duty Cycle	1:8	1:8	1:1	1:1	1:1	1:1
Transmitting Frequency Range(s)	824.2 - 848.8 MHz	1850.2 - 1909.8 MHz	826.4 - 846.6 MHz	1852.4 - 1907.6 MHz	2412.0 - 2462.5 MHz	2402.0 - 2483.5 MHz

GSM Data Functionality	GPRS/EDGE Class 12 (4 uplink timeslots; 4 downlink timeslots; 5 total timeslots per frame)
	Class B (DTM not supported)

The DUT utilizes a set of reduced limits for the maximum transmit when the mobile hotspot functionality is enabled. Tables of the reduced limits used for testing are given below. A complete description of this functionality is provided in the "Operational Description" contained within Exhibit 12A. 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. The power reductions levels are verified by means of the SAR measurements provided in the Supplemental SAR report.

Mode(s) of Operation	WCDMA 1900
Duty Cycle	1:1
Maximum Output Power Setting (dBm)	24.0
Time Avg Output Power Setting (dBm)	24.0
Reduced Maximum Output Power Setting (dBm)	23.2
Time Avg Output Power Setting (dBm)	23.2

2.3 Device Conducted Power Measurements

2.3.1 GSM Mode Target Power Levels[1]

Mode(s) of Operation	GPRS 850				GPRS 1900				EDGE 850				EDGE 1900			
Modulation	GMSK				GMSK				8PSK				8PSK			
Maximum Output Power Setting (dBm)	**33.0**	29.7	27.5	26.3	**30.0**	26.7	24.9	23.1	27.0	23.4	22.0	21.1	26.0	22.9	21.5	20.1
Time Average Output Power Setting (dBm)	**24.0**	23.7	23.2	23.3	**21.0**	20.7	20.6	20.1	18.0	17.4	17.7	18.1	17.0	16.9	17.2	17.1
Duty Cycle	**1:8**	2:8	3:8	4:8	**1:8**	2:8	3:8	4:8	1:8	2:8	3:8	4:8	1:8	2:8	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				1850.2 - 1909.8 MHz				824.2 - 848.8 MHz				1850.2- 1909.8 MHz			

2.3.2 Measured GSM Mode Conducted Power Levels

Band	Channel	Peak Conducted power (dBm) for GSM modes							
		GMSK *CS Voice* (1 Slot)	GMSK *PS Data* (2 Slots)	GMSK *PS Data* (3 Slots)	GMSK *PS Data* (4 Slots)	8-PSK *PS Data* (1 Slots)	8-PSK *PS Data* (2 Slots)	8-PSK *PS Data* (3 Slots)	8-PSK *PS Data* (4 Slots)
850	128	**33.18**	29.72	27.45	26.40	27.05	23.56	22.19	21.06
	190	**32.95**	29.61	27.41	26.28	26.88	23.58	21.98	20.83
	251	**32.65**	29.43	27.91	25.87	26.80	23.28	21.86	20.62
1900	512	**30.19**	26.56	24.83	22.90	26.13	22.99	21.65	19.88
	661	**30.09**	26.78	24.85	22.85	26.01	22.94	21.47	19.83
	810	**30.09**	26.35	24.51	22.50	26.01	22.77	21.34	19.61

Band	Channel	Time Averaged Conducted power (dBm) for GSM modes							
		GMSK *CS Voice* (1 Slot)	GMSK *PS Data* (2 Slots)	GMSK *PS Data* (3 Slots)	GMSK *PS Data* (4 Slots)	8-PSK *PS Data* (1 Slots)	8-PSK *PS Data* (2 Slots)	8-PSK *PS Data* (3 Slots)	8-PSK *PS Data* (4 Slots)
850	128	**24.18**	23.72	23.15	23.4	18.05	17.56	17.89	18.06
	190	**23.95**	23.61	23.11	23.28	17.88	17.58	17.68	17.83
	251	**23.65**	23.43	23.61	22.87	17.80	17.28	17.56	17.62
1900	512	**21.19**	20.56	20.53	19.9	17.13	16.99	17.35	16.88
	661	**21.09**	20.78	20.55	19.85	17.01	16.94	17.17	16.83
	810	**21.09**	20.35	20.21	19.5	17.01	16.77	17.04	16.61

[1] **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.

2.3.3 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	**24.16**	24.07	24.12	23.62	23.62	23.65	24.30	24.19	23.77	24.18	23.75
	4180	**23.97**	24.10	24.10	23.69	23.71	23.56	24.17	24.08	23.78	24.01	23.71
	4233	**24.03**	24.14	24.04	23.50	23.51	23.66	24.28	24.08	23.65	23.99	23.82
WCDMA 1900	9262	**24.09**	24.11	24.10	23.63	23.85	23.73	24.31	24.25	23.87	24.33	23.94
	9400	**24.11**	24.10	24.05	23.71	23.71	23.72	24.19	24.28	23.77	24.26	23.82
	9538	**23.94**	23.94	23.96	23.56	23.53	23.59	24.14	24.11	23.70	24.01	23.78

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.

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.

2.3.4 Wi-Fi 802.11 modes

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

Band	Channel	Conducted Power (dBm) for 802.11b Mode Data Rates			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
Wi-Fi 2450 MHz	1	**17.73**	17.88	**18.91**	**19.01**
	6	**17.97**	18.13	**19.12**	**19.17**
	11	**17.83**	17.86	**19.04**	**18.89**

Band	Channel	Conducted Power (dBm) for 802.11g Mode Data Rates							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
Wi-Fi 2450 MHz	1	17.68	17.65	17.18	17.2	15.73	15.69	14.38	14.34
	6	17.91	17.84	17.43	17.42	15.93	15.87	14.55	14.55
	11	17.63	17.71	17.27	17.37	15.82	15.85	14.38	14.75

Band	Channel	Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 800 ns Guard Interval)							
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
Wi-Fi 2450 MHz	1	17.59	17.23	17.22	15.65	15.64	14.17	14.1	13.24
	6	17.83	17.43	17.46	15.74	15.87	14.18	14.29	13.45
	11	17.68	17.16	17.36	15.74	15.75	14.14	14.15	13.23

Band	Channel	Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 400 ns Guard Interval)							
		7.2 Mbps	14.4 Mbps	21.6 Mbps	28.8 Mbps	43.3 Mbps	57.7 Mbps	65 Mbps	72.2 Mbps
Wi-Fi 2450 MHz	1	17.53	17.1	17.13	15.56	15.71	14.17	14.15	13.32
	6	17.74	17.34	17.34	15.87	15.85	14.51	14.39	13.53
	11	17.59	17.09	17.17	15.54	15.69	15.2	14.18	13.37

2.3.5 Evaluation of Bluetooth Transmitter (WCDMA / GSM and Bluetooth)

Per "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas" (FCC KDB pub. 648474), the necessity of stand-alone and simultaneous SAR testing was evaluated for the Bluetooth transmitter of the device under test. Note that Bluetooth mode is not intended for use in configurations against the head, and this evaluation considers only the body-worn configurations.

The conditions under which the device under test can be excluded from stand-alone and simultaneous SAR testing, per FCC KDB pub. 648474, are summarized as follows:

Table 1 – Output Power Thresholds for Unlicensed Transmitters

	2.45	5.15 - 5.35	5.47 - 5.85	GHz
P_{Ref}	12	6	5	mW
Device output power should be rounded to the nearest mW to compare with values specified in this table.				

Table 2 – Summary of SAR Evaluation Requirements for a Cell Phone with Multiple Transmitters

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	Routine evaluation required.	SAR not required: Unlicensed only ○ when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antennas Licensed & Unlicensed ○ when the sum of the 1-g SAR is < 1.6 W/kg for all simultaneous transmitting antennas ○ when SAR to peak location separation ratio of simultaneous transmitting antenna pair is < 0.3 SAR required: Licensed & Unlicensed antenna pairs with SAR to peak location separation ratio ≥ 0.3; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply
Unlicensed Transmitters	When there is no simultaneous transmission – ○ output ≤ 60/f: SAR not required ○ output > 60/f: stand-alone SAR required When there is simultaneous transmission – Stand-alone SAR not required when ○ output ≤ 2·P_{Ref} and antenna is ≥ 5.0 cm from other antennas ○ output ≤ P_{Ref} and antenna is ≥ 2.5 cm from other antennas ○ output ≤ P_{Ref} and antenna is < 2.5 cm from other antennas, each with either output power ≤ P_{Ref} or 1-g SAR < 1.2 W/kg Otherwise stand-alone SAR is required When stand-alone SAR is required ○ test SAR on highest output channel for each wireless mode and exposure condition ○ if SAR for highest output channel is > 50% of SAR limit, evaluate all channels according to normal procedures	

Per the highlighted criteria:

•The highest output conducted power measured for Bluetooth on the device under test is 8.4 mW [< 12 mW].
•The separation distance between the Bluetooth antenna and the main antenna is 39.85 mm [> 2.5 cm].

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

3. Test Equipment Used

3.1 Dosimetric System

The Motorola Mobile Devices Business 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 10g RSS uncertainty of the measurement system is ±10.8% (K=1) with an expanded uncertainty of ±21.6% (K=2). The overall 1g 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 7. Per IEEE 1528, this uncertainty budget is applicable to the SAR range of 0.4W/kg to 10W/kg.

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

Description	Serial Number	Cal Due Date
DASY4™ DAE V1	SN 702	14-Apr-2012
E-Field Probe ES3DV3	SN 3037	13-Apr-2012
DASY4™ DAE V1	SN 434	13-Jan-2012
E-Field Probe ES3DV3	SN 3115	12-Jan-2012
DASY4™ DAE V1	SN699	20-Sep-2011
E-Field Probe ES3DV3	SN3184	11-Mar-2012
S.A.M. Phantom used for 800 MHz	TP-1156	
S.A.M. Phantom used for 1900/2450MHz	TP-1318	
S.A.M. Phantom used for 1900/2450MHz	TP-1319	
Dipole Validation Kit, DV835V2	434tr	9-Mar-2012
Dipole Validation Kit, DV1800V2	271tr	8-Mar-2012
Dipole Validation Kit, DV2450V2	766	15-Jul-2013

3.2 Additional Equipment

Description	Serial Number	Cal Date	Cal Due Date
Signal Generator HP8648C	3847A04982	Nov-18-2009	Nov-18-2011
Power Meter E4419B	GB39510900	Mar-28-2011	Mar-28-2013
Power Sensor #1 - E9301A	US39210918	Oct-25-2010	Oct-25-2011
Power Sensor #2 - E9301A	US39210917	Oct-25-2010	Oct-25-2011
Network Analyzer HP8753ES	US39171846	May-19-2011	May-19-2012
Dielectric Probe Kit HP85070C	US99360070		

4. Electrical parameters of the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity, ε_r, and the conductivity, σ, of the tissue simulating liquids were measured with a HP85070 Dielectric Probe Kit These values, along with the temperature of the simulated tissue are shown in the table below. The recommended limits for permittivity and conductivity are also shown. A mass density of ρ=1g/cm3 was entered into the system in all the cases. It can be seen that the measured parameters are within tolerance of the recommended limits specified in [1] and [5].

E-field probes calibrated at 1810 MHz were used for "1900 MHz" band (1850 MHz - 1910 MHz) SAR measurements. FCC KDB pub. 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 these criteria.

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

Ingredient	835MHz / 900 MHz Head	835MHz / 900 MHz Body	1800MHz / 1900 MHz Head	1800 MHz / 1900 MHz Body	2450MHz 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	--

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Temp (°C)
835	Head	**Measured,** 7/12/2011	41.1	0.91	19.6
		Measured, 7/13/2011	41.1	0.91	19.4
		Recommended Limits	39.4 - 43.6	0.86 - 0.95	18-25
	Body	**Measured,** 7/16/2011	53.8	0.99	19.3
		Measured, 7/21/2011	54.5	1.00	19.8
		Measured, 7/24/2011	54.7	0.99	19.4
		Recommended Limits	52.4 - 58.0	0.92 - 1.02	18-25
1880	Head	**Measured,** 7/13/2011	39.0	1.47	19.5
		Measured, 7/14/2011	38.8	1.45	20.1
		Recommended Limits	38.0 - 40.0	1.40 - 1.47	18-25
	Body	**Measured,** 7/13/2011	52.2	1.58	19.6
		Measured, 7/23/2011	51.7	1.58	19.9
		Measured, 8/3/2011	50.8	1.55	20.1
		Recommended Limits	50.6 - 53.3	1.52 - 1.60	18-25
2450	Head	**Measured,** 7/26/2011	36.3	1.85	19.5
		Measured, 7/27/2011	36.3	1.85	19.7
		Recommended Limits	35.3 - 43.1	1.71 - 1.89	18-25
	Body	**Measured,** 7/27/2011	47.9	2.03	19.5
		Recommended Limits	47.4 - 58.0	1.85 - 2.05	18-25

5. System Accuracy Verification

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

A SAR measurement was performed to verify the measured SAR was within ±10% from the target SAR indicated in Appendix 8. 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 1W forward power delivered to the dipole. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. The distributions of SAR compare well with those of the reference measurements (see Appendix 1). The tissue stimulant depth was verified to be 15.0cm ±0.5cm. Z-axis scans showing the SAR penetration are also included in Appendix 1.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	SN 3037	835	6.15	5 of 11
		835-Body	6.08	6 of 11
		1810	5.27	5 of 11
		1810-Body	4.87	6 of 11
		2450-Body	4.24	6 of 11
	SN 3115	2450	4.39	5 of 11

f (MHz)	Description	SAR (W/kg), 1gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			ε_r	σ (S/m)		
835	**Measured,** 7/12/2011	9.65	41.1	0.91	20.8	19.0
	Measured, 7/13/2011	9.70	41.1	0.91	21.0	19.0
	Recommended Limits	9.69±10%	39.4 - 43.6	0.86 - 0.95	18-25	18-25
	Measured, 7/16/2011	9.90	53.8	0.99	21.0	18.4
	Measured, 7/21/2011	10.05	54.5	1.00	20.8	20.0
	Measured, 7/24/2011	9.80	54.7	0.99	20.7	19.7
	Recommended Limits	10.0±10%	52.4 - 58.0	0.92 - 1.02	18-25	18-25
1800	**Measured,** 7/12/2011	35.5	39.4	1.38	20.3	18.5
	Measured, 7/13/2011	35.6	39.2	1.37	21.0	19.0
	Recommended Limits	38.5±10%	38.0 - 42.0	1.33 - 1.47	18-25	18-25
	Measured, 7/13/2011	38.40	52.5	1.48	21.0	18.9
	Measured, 7/23/2011	38.80	52.0	1.48	20.8	19.8
	Measured, 8/3/2011	38.35	51.4	1.51	20.6	19.6
	Recommended Limits	37.9±10%	50.6 - 56.0	1.44 - 1.60	18-25	18-25
2450	**Measured,** 7/26/2011	57.5	36.3	1.85	21.1	20.2
	Recommended Limits	54.8±10%	35.3 - 43.1	1.71 - 1.89	18-25	18-25
	Measured, 7/27/2011	52.5	47.9	2.03	21.0	20.4
	Recommended Limits	50.4±10%	47.4 - 58.0	1.85 - 2.05	18-25	18-25

6. Test Results

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

The DUT covered by this report has the following battery options:

SNN5891A - 1600 mAH Battery

All configurations were SAR tested on Channel 6 in the WiFi mode because this channel measured the highest in conducted power. All configurations that measure > 0.8 W/kg are repeated using WiFi channels 1 & 6. In addition, is all measurements are < 0.8 W/kg, the configurations that resulted in the highest measured SAR for this channel were repeated using WiFi channels 1 & 6.

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 temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is Extrapolated SAR = Measured SAR * 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

Per "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas" (FCC KDB pub. 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 WCDMA / GSM transmitter may operate simultaneously with the Wi-Fi 802.11 transmitter. The separation distance between the Wi-Fi 802.11/Bluetooth antennas and the WCDMA / GSM antenna 39.85 mm. Pictorial representations of the antenna locations and separation distances are given in Exhibit 7d.

For the transmitters requiring stand-alone SAR testing (WCDMA / GSM and Wi-Fi 802.11), the KDB guidelines direct that if the sum of the 1g SAR measured for the simultaneously transmitting antennas is less than the SAR limit, SAR evaluation for simultaneous transmission is not required. Each of the tables below also presents the simple summation of the WCDMA or GSM and WiFi SAR values for simultaneous transmission evaluation. Each of these summations is below the SAR limit.

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

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

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	SN 3037	835	6.15	5 of 11
		1810	5.27	5 of 11
	SN 3115	2450	4.39	5 of 11

Left Head Cheek Position							
				10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850	Channel 128						
	Channel 190	18.6	-0.169	0.261	0.27	0.346	0.36
	Channel 251						
WCDMA 850	Channel 4132						
	Channel 4180	19.1	-0.119	0.295	0.30	0.394	0.40
	Channel 4233						
GSM 1900	Channel 512						
	Channel 661	18.9	-0.0334	0.28	0.28	0.455	0.46
	Channel 810						
WCDMA 1900	Channel 9262	18.9	-0.251	0.476	0.50	0.77	0.82
	Channel 9400	18.9	0.0554	0.503	0.50	0.817	0.82
	Channel 9538	18.9	-0.199	0.499	0.52	0.82	0.86
WI-FI 2450 1 Mbps	Channel 1	19.2	0.0336	0.218	0.22	0.491	0.49
	Channel 6	19.9	0.234	0.210	0.21	0.476	0.48
	Channel 11	19.2	-0.0819	0.205	0.21	0.466	0.47
WI-FI 2450 5.5 Mbps	Channel 1	19.2	-0.101	0.204	0.21	0.457	0.47
	Channel 6	19.2	-0.158	0.203	0.21	0.457	0.47
	Channel 11	19.2	0.121	0.196	0.20	0.445	0.45
WI-FI 2450 11 Mbps	Channel 1	19.2	-0.120	0.201	0.21	0.450	0.46
	Channel 6	**19.2**	**-0.178**	**0.228**	**0.24**	**0.524**	**0.55**
	Channel 11	19.2	0.0548	0.194	0.19	0.439	0.44
WIFI + GSM 850					0.51		0.91
WIFI + WCDMA 850					0.54		0.95
WIFI + GSM 1900					0.52		1.01
WIFI + WCDMA1900					0.76		1.41

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							
				10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850	Channel 128						
	Channel 190	**18.6**	**-0.113**	**0.266**	**0.27**	**0.351**	**0.36**
	Channel 251						
WCDMA 850	Channel 4132						
	Channel 4180	**19.1**	**-0.077**	**0.328**	**0.33**	**0.434**	**0.44**
	Channel 4233						
GSM 1900	Channel 512						
	Channel 661	**18.9**	**-0.012**	**0.351**	**0.35**	**0.575**	**0.58**
	Channel 810						
WCDMA 1900	Channel 9262	18.9	0.157	0.608	0.61	1.01	1.01
	Channel 9400	18.9	0.128	0.632	0.63	1.06	1.06
	Channel 9538	**18.9**	**0.0457**	**0.636**	**0.64**	**1.09**	**1.09**
WI-FI 2450 1 Mbps	Channel 1						
	Channel 6	19.9	-0.054	0.13	0.13	0.273	0.28
	Channel 11						
WIFI + GSM 850					0.40		0.64
WIFI + WCDMA 850					0.46		0.72
WIFI + GSM 1900					0.48		0.86
WIFI + WCDMA1900					0.77		1.37

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							
				10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850	Channel 128						
	Channel 190	18.6	-0.181	0.154	0.16	0.202	0.21
	Channel 251						
WCDMA 850	Channel 4132						
	Channel 4180	19.1	0.006	0.196	0.20	0.256	0.26
	Channel 4233						
GSM 1900	Channel 512						
	Channel 661	**0.189**	**0.003**	**0.138**	**0.14**	**0.217**	**0.22**
	Channel 810						
WCDMA 1900	Channel 9262						
	Channel 9400	**18.9**	**-0.072**	**0.258**	**0.26**	**0.408**	**0.41**
	Channel 9538						
WI-FI 2450 1 Mbps	Channel 1						
	Channel 6	19.2	0.080	0.0362	0.04	0.0695	0.07
	Channel 11						
WIFI + GSM 850					0.20		0.28
WIFI + WCDMA 850					0.24		0.33
WIFI + GSM 1900					0.18		0.29
WIFI + WCDMA1900					0.30		0.48

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

Right Head 15° Tilt Position							
				10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850	Channel 128						
	Channel 190	**18.6**	**0.016**	**0.165**	**0.17**	**0.216**	**0.22**
	Channel 251						
WCDMA 850	Channel 4132						
	Channel 4180	**19.1**	**0.063**	**0.205**	**0.21**	**0.271**	**0.27**
	Channel 4233						
GSM 1900	Channel 512						
	Channel 661	18.9	-0.095	0.121	0.12	0.208	0.21
	Channel 810						
WCDMA 1900	Channel 9262						
	Channel 9400	18.9	0.014	0.23	0.23	0.389	0.39
	Channel 9538						
WI-FI 2450 1 Mbps	Channel 1						
	Channel 6	**19.2**	**0.031**	**0.0349**	**0.03**	**0.0826**	**0.08**
	Channel 11						
WIFI + GSM 850					0.20		0.30
WIFI + WCDMA 850					0.24		0.35
WIFI + GSM 1900					0.15		0.29
WIFI + WCDMA1900					0.26		0.47

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

6.2 Body Worn Test Results

The SAR results shown in tables 5 and 8 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 temperature of the test facility during the test, the temperature of the tissue simulate after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is Extrapolated SAR = Measured SAR * 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

Per "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas" (FCC KDB pub. 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 WCDMA / GSM transmitter may operate simultaneously with the Wi-Fi 802.11 transmitter. The separation distance between the Wi-Fi 802.11/Bluetooth antennas and the WCDMA / GSM antenna is 39.85 mm. Pictorial representations of the antenna locations and separation distances are given in Exhibit 7d.

For the transmitters requiring stand-alone SAR testing (WCDMA / GSM and Wi-Fi 802.11), the KDB guidelines direct that if the sum of the 1g SAR measured for the simultaneously transmitting antennas is less than the SAR limit, SAR evaluation for simultaneous transmission is not required. Each of the tables below also presents the simple summation of the WCDMA or GSM and WiFi SAR values for simultaneous transmission evaluation. Each of these summations is below the SAR limit.

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

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

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

There are no Body-Worn Accessories available for this phone at the time of testing hence the device was tested per the supplement C testing guidelines for devices that do not have body worn accessories. A separation distance of 15mm between the device and the flat phantom was used for testing body-worn SAR. 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 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	SN 3037	835	6.08	6 of 11
		1810	4.87	6 of 11
		2450	4.24	6 of 11

Body-Worn; Front of Phone 15mm from Phantom							
				10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GPRS 850 Class 8	Channel 128						
	Channel 190	18.2	-0.109	0.159	0.16	0.213	0.22
	Channel 251						
WCDMA 850	Channel 4132						
	Channel 4180	18.0	0.038	0.20	0.20	0.271	0.27
	Channel 4233						
GPRS 1900 Class 8	Channel 512						
	Channel 661	18.0	-0.001	0.177	0.18	0.284	0.28
	Channel 810						
WCDMA 1900	Channel 9262						
	Channel 9400	18.0	0.0287	0.375	0.38	0.606	0.61
	Channel 9538						
WI-FI 2450 1 Mbps	Channel 1						
	Channel 6	20.0	-0.016	0.0226	0.02	0.0396	0.04
	Channel 11						
WIFI + GSM 850					0.18		0.26
WIFI + WCDMA 850					0.22		0.31
WIFI + GSM 1900					0.20		0.32
WIFI + WCDMA1900					0.40		0.65

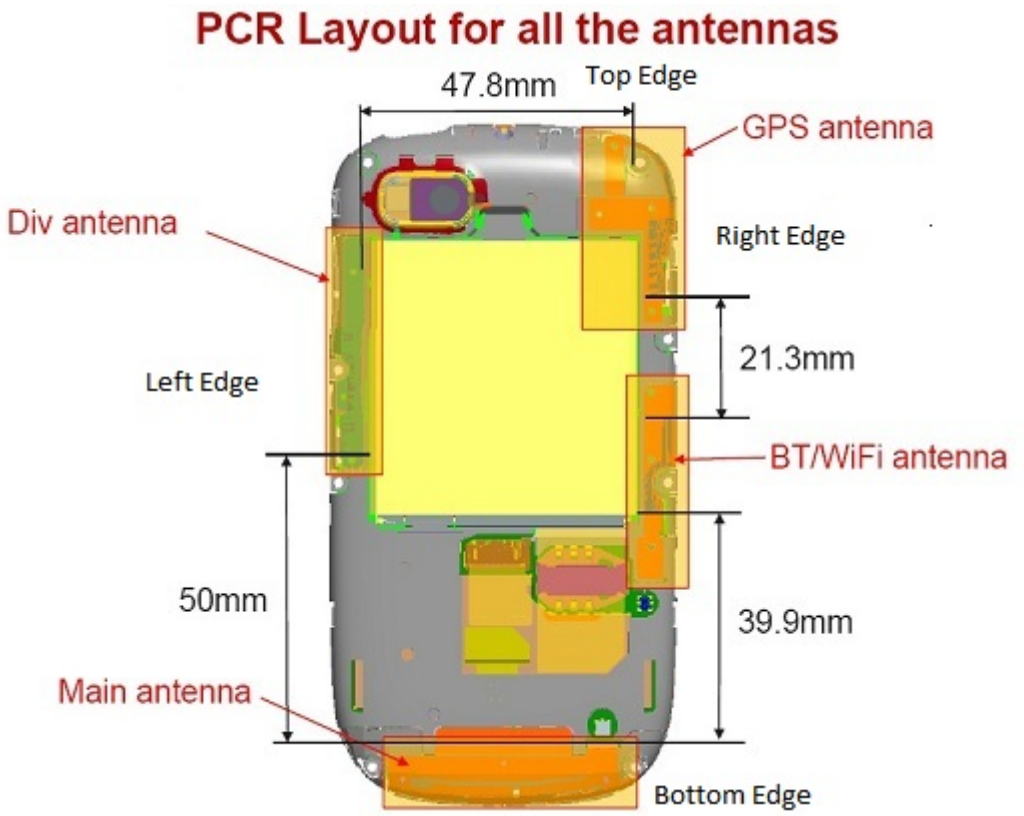
Table 5: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn; Back of Phone 15mm from Phantom							
				10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GPRS 850 Class 8	Channel 128						
	Channel 190	**18.2**	**-0.0258**	**0.295**	**0.30**	**0.406**	**0.41**
	Channel 251						
WCDMA 850	Channel 4132						
	Channel 4180	**18.0**	**-0.0536**	**0.356**	**0.36**	**0.492**	**0.50**
	Channel 4233						
GPRS 1900 Class 8	Channel 512						
	Channel 661	**18.0**	**-0.0357**	**0.229**	**0.23**	**0.377**	**0.38**
	Channel 810						
WCDMA 1900	Channel 9262						
	Channel 9400	**18.0**	**0.0209**	**0.39**	**0.39**	**0.642**	**0.64**
	Channel 9538						
WI-FI 2450 1 Mbps	Channel 1	**19.2**	**-0.0639**	**0.111**	**0.11**	**0.218**	**0.22**
	Channel 6	20.0	-0.0371	0.0892	0.09	0.178	0.18
	Channel 11	19.2	0.0113	0.108	0.11	0.215	0.22
WI-FI 2450 5.5 Mbps	Channel 1	19.2	0.0971	0.108	0.11	0.212	0.21
	Channel 6	19.2	0.0351	0.107	0.11	0.211	0.21
	Channel 11	19.2	-0.0368	0.0964	0.10	0.192	0.19
WI-FI 2450 11 Mbps	Channel 1	19.2	0.0259	0.11	0.11	0.217	0.22
	Channel 6	19.2	0.0124	0.108	0.11	0.214	0.21
	Channel 11	19.2	0.0425	0.0995	0.10	0.198	0.20
WIFI + GSM 850					0.41		0.63
WIFI + WCDMA 850					0.47		0.72
WIFI + GSM 1900					0.34		0.60
WIFI + WCDMA1900					0.50		0.86

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 KDB pub 941225 D06. 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. Each transmit band was utilized for SAR testing. The tested mode has been selected within each band that exhibits the highest time average output power shown in section 2.2.



The SAR results shown in tables 7 through 11 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is Extrapolated SAR = Measured SAR * $10^{(-drift/10)}$. The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

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

For the transmitters requiring stand-alone SAR testing (WCDMA / GSM and Wi-Fi 802.11), the KDB guidelines direct that if the sum of the 1g SAR measured for the simultaneously transmitting antennas is less than the SAR

limit, SAR evaluation 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. The distance between the hotspots was measured using SPEAG Technical Note TN-110209

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 Mobile Hotspot Mode 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. 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 Mobile Hotspot Mode measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	SN 3037	835	6.08	6 of 11
		1810	4.87	6 of 11
		2450	4.24	6 of 11

Mobile Hotspot Mode; Front Surface of Phone 10mm from Phantom									
f **(MHz)**	**Description**	**DUT Power**		**Temp (°C)**	**Drift (dB)**	***10g SAR value***		***1g SAR value***	
		Measured or Limit[2] (dBm)	**Power Reduction Limit**			**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GPRS 850 Class 8	Channel 128	33.18							
	Channel 190	32.95		19.5	-0.053	0.232	0.23	0.309	0.31
	Channel 251	32.65							
WCDMA 850	Channel 4132	24.16							
	Channel 4180	23.97		19.8	0.0068	0.419	0.42	0.554	0.55
	Channel 4233	24.03							
GPRS 1900 Class 8	Channel 512	30.19							
	Channel 661	30.09		19.6	0.003	0.21	0.21	0.341	0.34
	Channel 810	30.09							
WCDMA 1900	Channel 9262	23.29	-0.8	19.5	0.245	0.532	0.53	0.862	0.86
	Channel 9400	23.31	-0.8	19.5	-0.247	0.554	0.56	0.895	0.90
	Channel 9538	23.14	-0.8	19.5	-0.054	0.578	0.59	0.919	0.93
WI-FI 2450 1 Mbps	Channel 1	17.73							
	Channel 6	17.97		19.2	-0.183	0.0589	0.06	0.106	0.11
	Channel 11	17.83							
WIFI + GSM 850							0.29		0.42
WIFI + WCDMA 850							0.48		0.66
WIFI + GSM 1900							0.27		0.45
WIFI + WCDMA1900							0.81		1.33

Table 7: SAR measurement results at the highest possible output power, measured in a Mobile Hotspot Mode position against the ICNIRP and ANSI SAR Limit.

[2] For tests with power limit reductions employed, measured conducted power is not available by device design. Per FCC direction, measured power is replaced with the maximum power limit for the device mode under test.

Mobile Hotspot Mode; Back Surface of Phone 10mm from Phantom									
f **(MHz)**	**Description**	**DUT Power**		**DUT Power**	**Drift (dB)**	***10g SAR value***		***1g SAR value***	
		Measured or Limit (dBm)	**Power Reduction Limit**			**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GPRS 850 Class 8	Channel 128	33.18							
	Channel 190	32.95		**19.5**	**-0.0516**	**0.478**	**0.48**	**0.65**	**0.66**
	Channel 251	32.65							
WCDMA 850	Channel 4132	24.16		**19.8**	**0.0296**	**0.805**	**0.81**	**1.11**	**1.11**
	Channel 4180	23.97		19.8	-0.0054	0.825	0.83	1.14	1.14
	Channel 4233	24.03		19.8	0.0168	0.788	0.79	1.09	1.09
GPRS 1900 Class 8	Channel 512	30.19							
	Channel 661	30.09		**19.6**	**-0.0561**	**0.272**	**0.28**	**0.467**	**0.47**
	Channel 810	30.09							
WCDMA 1900	Channel 9262	23.29	-0.8	18.8	0.0031	0.723	0.72	1.28	1.28
	Channel 9400	23.31	-0.8	**18.8**	**-0.0529**	**0.724**	**0.73**	**1.28**	**1.30**
	Channel 9538	23.14	-0.8	18.8	-0.0154	0.752	0.75	1.29	1.29
WI-FI 2450 1 Mbps	Channel 1	17.73		19.2	0.158	0.204	0.20	0.44	0.44
	Channel 6	17.97		19.2	-0.0507	0.203	0.21	0.438	0.44
	Channel 11	17.83		19.2	0.035	0.202	0.20	0.438	0.44
WI-FI 2450 5.5 Mbps	Channel 1	18.91		19.2	-0.0067	0.152	0.15	0.326	0.33
	Channel 6	19.12		19.2	0.0090	0.206	0.21	0.445	0.45
	Channel 11	19.04		19.2	0.117	0.203	0.20	0.442	0.44
WI-FI 2450 11 Mbps	Channel 1	19.01		19.2	-0.0441	0.158	0.16	0.337	0.34
	Channel 6	19.17		**19.2**	**-0.0043**	**0.209**	**0.21**	**0.453**	**0.45**
	Channel 11	18.89		19.2	-0.0346	0.191	0.19	0.413	0.42
WIFI + GSM 850							0.70		1.11
WIFI + WCDMA 850							1.02		1.56
WIFI + GSM 1900							0.49		0.92
WIFI + WCDMA1900							0.94		evaluation below

Table 8: SAR measurement results at the highest possible output power, measured in a Mobile Hotspot Mode position against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot Mode; Left Edge of Phone 10mm from Phantom									
f (MHz)	Description	DUT Power		DUT Power	Drift (dB)	*10g SAR value*		*1g SAR value*	
		Measured or Limit (dBm)	Power Reduction Limit			Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
GPRS 850 Class 8	Channel 128	33.18							
	Channel 190	32.95		19.5	-0.0755	0.165	0.17	0.238	0.24
	Channel 251	32.65							
WCDMA 850	Channel 4132	24.16							
	Channel 4180	23.97		19.8	-0.0349	0.275	0.28	0.397	0.40
	Channel 4233	24.03							
GPRS 1900 Class 8	Channel 512	30.19							
	Channel 661	30.09		19.6	-0.138	0.114	0.12	0.204	0.21
	Channel 810	30.09							
WCDMA 1900	Channel 9262	23.29	-0.8						
	Channel 9400	23.31	-0.8	19.5	-0.0323	0.166	0.17	0.288	0.29
	Channel 9538	23.14	-0.8						
WI-FI 2450 1 Mbps	Channel 1	17.73							
	Channel 6	17.97		20.0	-0.0321	0.127	0.13	0.268	0.27
	Channel 11	17.83							
WIFI + GSM 850							0.30		0.51
WIFI + WCDMA 850							0.41		0.67
WIFI + GSM 1900							0.25		0.48
WIFI + WCDMA1900							0.30		0.56

Table 9: SAR measurement results at the highest possible output power, measured in a Mobile Hotspot Mode position against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot Mode; Right Edge of Phone 10mm from Phantom									
f (MHz)	Description	DUT Power		Temp (°C)	Drift (dB)	*10g SAR value*		*1g SAR value*	
		Measured or Limit (dBm)	Power Reduction Limit)			Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
GPRS 850 Class 8	Channel 128	33.18							
	Channel 190	32.95		19.5	0.0781	0.206	0.21	0.292	0.29
	Channel 251	32.65							
WCDMA 850	Channel 4132	24.16							
	Channel 4180	23.97		19.8	-0.0175	0.312	0.31	0.443	0.44
	Channel 4233	24.03							
GPRS 1900 Class 8	Channel 512	30.19							
	Channel 661	30.09		19.6	-0.113	0.0801	0.08	0.133	0.14
	Channel 810	30.09							
WCDMA 1900	Channel 9262	23.29	-0.8						
	Channel 9400	23.31	-0.8	19.5	-0.0608	0.139	0.14	0.234	0.24
	Channel 9538	23.14	-0.8						

Table 10: SAR measurement results at the highest possible output power, measured in a Mobile Hotspot Mode position against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot Mode; Bottom Edge of Phone 10mm from Phantom									
f (MHz)	Description	DUT Power		Temp (°C)	Drift (dB)	*10g SAR value*		*1g SAR value*	
		Measured or Limit (dBm)	Power Reduction Limit)			Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
GPRS 850 Class 8	Channel 128	33.18							
	Channel 190	32.95		19.5	-0.199	0.0398	0.04	0.0684	0.07
	Channel 251	32.65							
WCDMA 850	Channel 4132	24.16							
	Channel 4180	23.97		19.8	-0.128	0.06050	0.06	0.104	0.11
	Channel 4233	24.03							
GPRS 1900 Class 8	Channel 512	30.19							
	Channel 661	30.09		19.6	-0.208	0.214	0.22	0.393	0.41
	Channel 810	30.09							
WCDMA 1900	Channel 9262	23.29	-0.8	19.5	-0.155	0.579	0.60	1.05	1.09
	Channel 9400	23.31	-0.8	19.5	-0.097	0.605	0.62	1.12	1.15
	Channel 9538	23.14	-0.8	19.5	-0.14	0.538	0.56	1.01	1.04

Table 11: SAR measurement results at the highest possible output power, measured in a Mobile Hotspot Mode position against the ICNIRP and ANSI SAR Limit.

Evaluation of Simultaneous Transmitters for Mobile Hotspot

Per "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas" (FCC KDB pub. 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 WCDMA/GSM transmitter may operate simultaneously with the Wi-Fi 802.11 transmitter. The separation distance between the Wi-Fi 802.11/Bluetooth antennas and the CDMA/WCDMA/GSM antenna is 39.85 mm. Pictorial representation of the antenna locations and separation distances are given in Exhibit 7d.

For the transmitters requiring stand-alone SAR testing (WCDMA/GSM and Wi-Fi 802.11), the KDB guidelines direct that if the sum of the 1g SAR measured for the simultaneously transmitting antennas is less than the SAR limit, SAR evaluation 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. The distance between the hotspots was measured using SPEAG Technical Note TN-110209

The cases where the simple sum of the 1g SAR measured for the simultaneously transmitting antennas is greater than the SAR limit are stated below.

		WiFi 802.11b		
Chn	-----	1	6	11
WCDMA1900		0.34	0.45	0.42
9262	1.28	1.62	1.73	1.70
9400	1.30	1.64	1.75	1.72
9538	1.29	1.63	1.74	1.71

The cases where the simple summed SAR-to-peak-location separation ratio is > 0.3 are stated below.

	WiFi 802.11b		
WCDMA 800	1	6	11
9262	0.47	0.50	0.48
9400	0.45	0.48	0.46
9538	0.47	0.50	0.48

Simultaneous Transmit Measurement:

For the configurations noted as requiring simultaneous SAR evaluation, combined SAR measurements were required to determine the aggregate 1 g SAR. Because the simple summed SAR for WCDMA 1900 chn 9400 and WiFi 802.11b chn 6 resulted in the highest simple summed SAR value and will be evaluated with additional SAR measurements for simultaneous transmission evaluation.

Each of the single transmitters is measured using an extended zoom scan. This extended zoom scan was created to encompass the zoom scan volumes that were found previously in each of the stand-alone transmit SAR tests. The outer dimensions of the extended zoom scan were X = 72 mm, Y = 80 mm, Z = 30 mm with a step size of X = 8 mm, Y = 8 mm, and Z = 5 mm.

The location of these extended zoom scans was established by using X, Y grid offsets from the "Grid Reference Point" in DASY4.7. The results were then combined via the DASY4.7 Multi-Band Combiner feature. A comparison can be performed between the stand-alone measurements for each noted transmitter and the measurements provided for simultaneous transmission. The measurements were not performed sequentially and thus may show slightly different results due to a number of reasons including, but not limited to, measurement system performance, slight differences in DUT positioning, or variations in simulated tissue parameters. The results of these measurements are given in the table below, with additional SAR plots of the combined measurements provided in Appendix 5.

Measurements for Simultaneous SAR

Cellular Transmitter Mode	Wi-Fi Transmitter Mode	Configuration	Cellular Transmitter 1 g SAR Value (W/kg)	Wi-Fi Transmitter 1 g SAR Value (W/kg)	Simultaneous 1 g SAR Value (W/kg)
WCDMA 1900	Wi-Fi 2450 802.11b, 11 Mbps	Body Worn 10mm	1.22	0.42	1.38

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 (300MHz – 3GHz)”.

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

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

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

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

Appendix 1

SAR distribution comparison for the system accuracy verification

Date/Time: 7/12/2011 10:16:59 AM

Test Laboratory: Motorola 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:434TR
Procedure Notes: PM1 Power = 201mW Refl.Pwr PM3 = -26dB Sim.Temp@SPC = 19*C Room Temp @ SPC = 20.8*C
Communication System: CW - Dipole; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

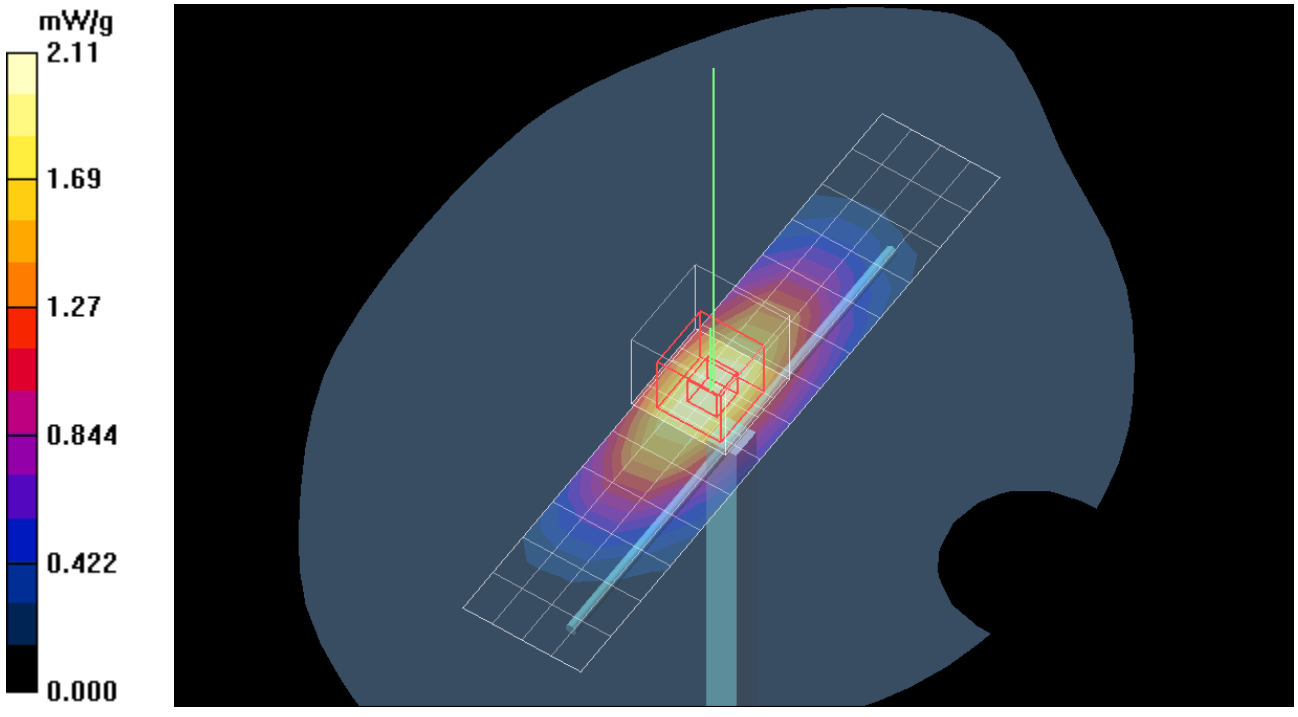
DASY4 Configuration:

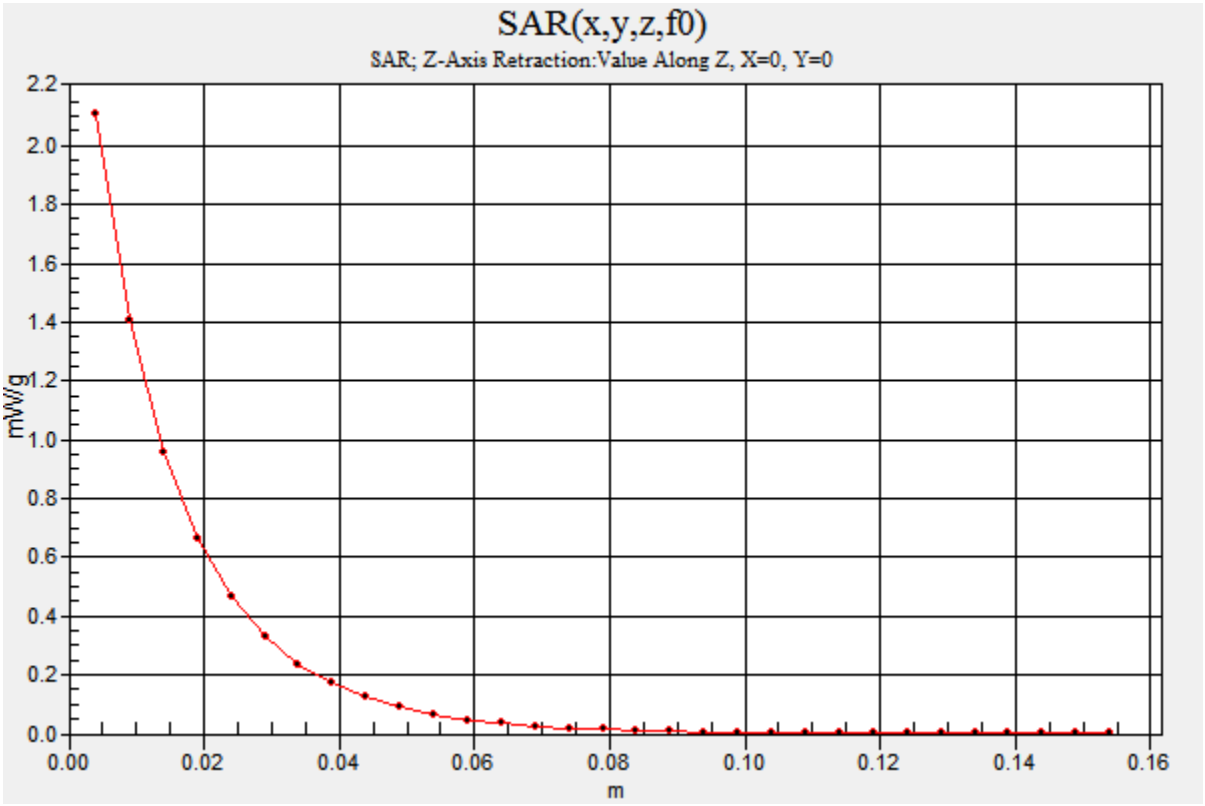
- Probe: ES3DV3 - SN3037; ConvF(6.15, 6.15, 6.15); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1156;
- Measurement SW: DASY4, V4.7 Build 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) = 1.97 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.2 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 2.88 W/kg
SAR(1 g) = 1.93 mW/g; SAR(10 g) = 1.26 mW/g
Maximum value of SAR (measured) = 2.09 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
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: 7/13/2011 9:06:53 AM

Test Laboratory: Motorola 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:434TR
Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -25.5dB Sim.Temp@SPC = 19*C Room Temp @ SPC = 21*C
Communication System: CW - Dipole; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

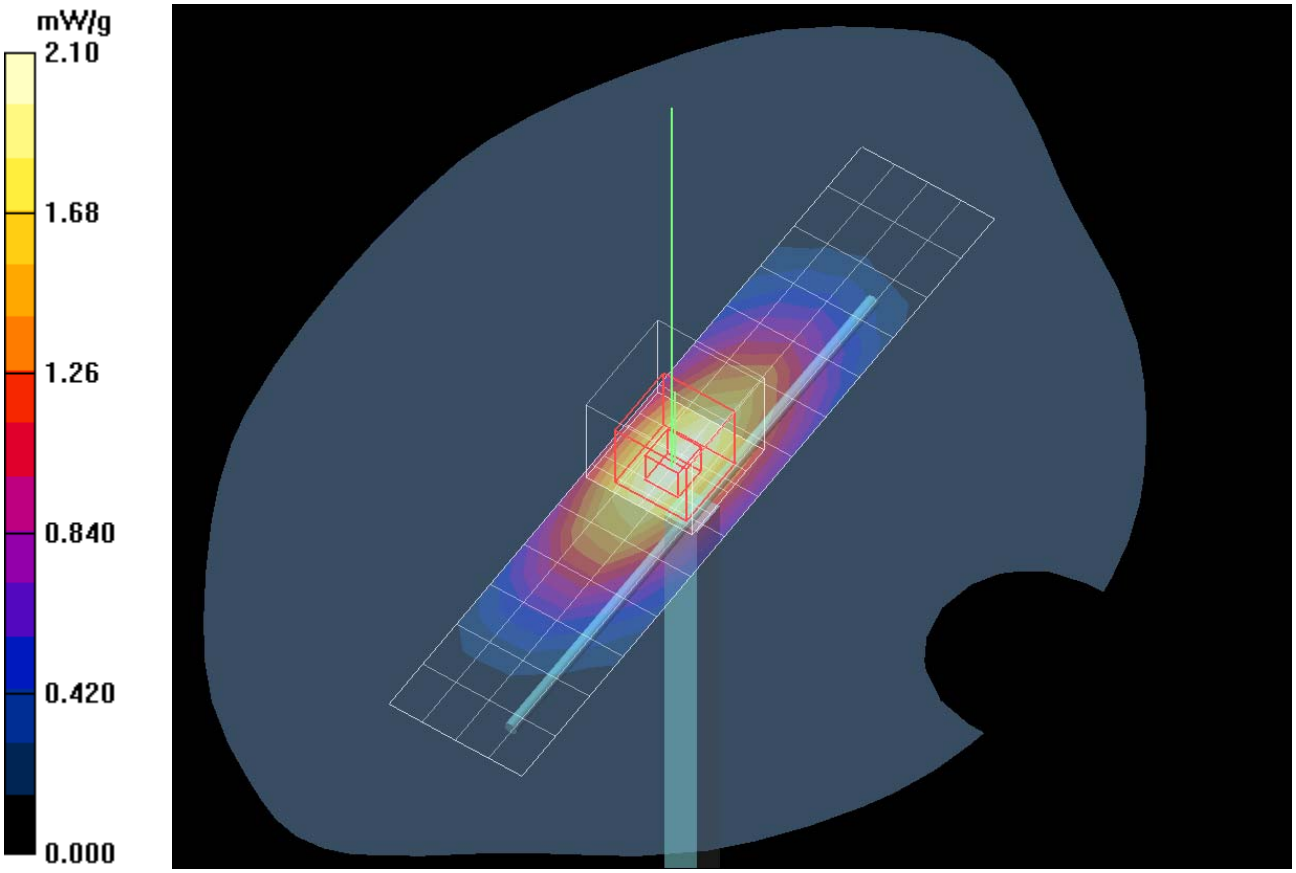
DASY4 Configuration:

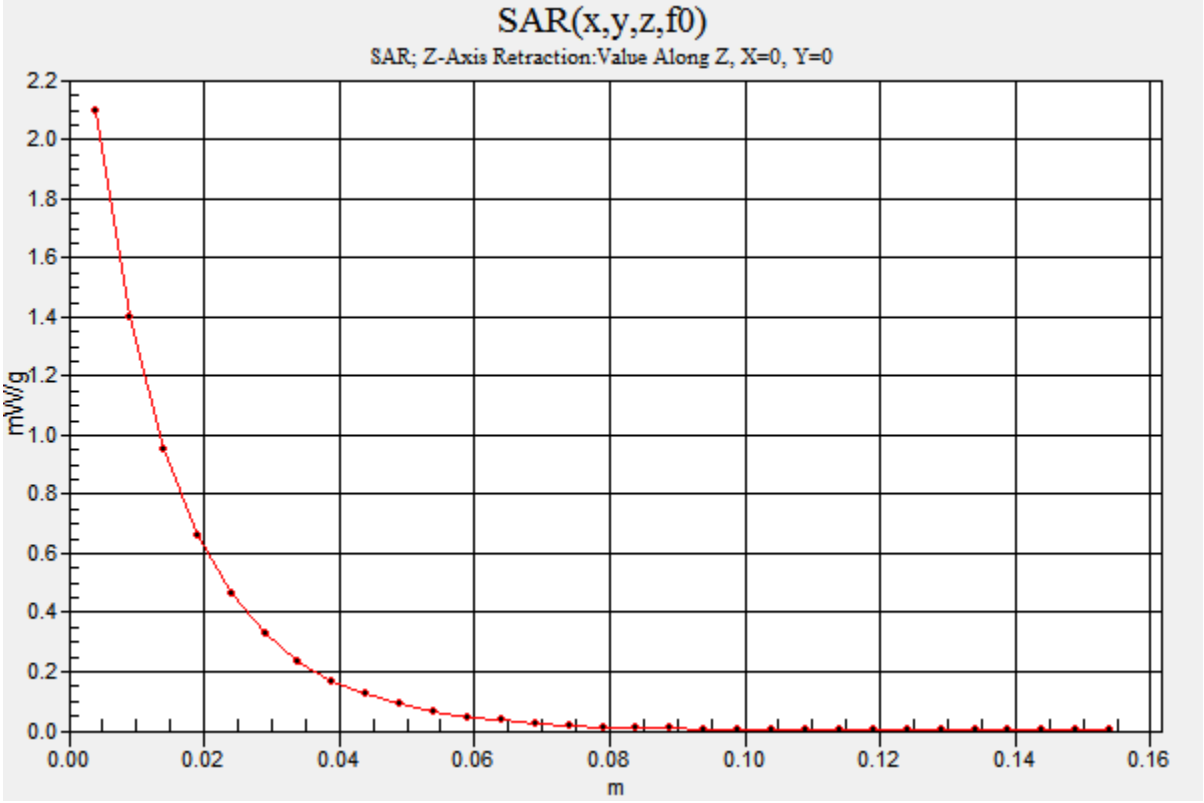
- Probe: ES3DV3 - SN3037; ConvF(6.15, 6.15, 6.15); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1156;
- Measurement SW: DASY4, V4.7 Build 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) = 2.04 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.0 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 2.90 W/kg
SAR(1 g) = 1.94 mW/g; SAR(10 g) = 1.26 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


mW/g
2.10
1.68
1.26
0.840
0.420
0.000


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: 7/16/2011 12:01:21 AM

Test Laboratory: Motorola 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:434TR
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -19.15 dB Sim.Temp@SPC = 18.4 Room Temp @ SPC = 21.0
Communication System: CW - Dipole; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

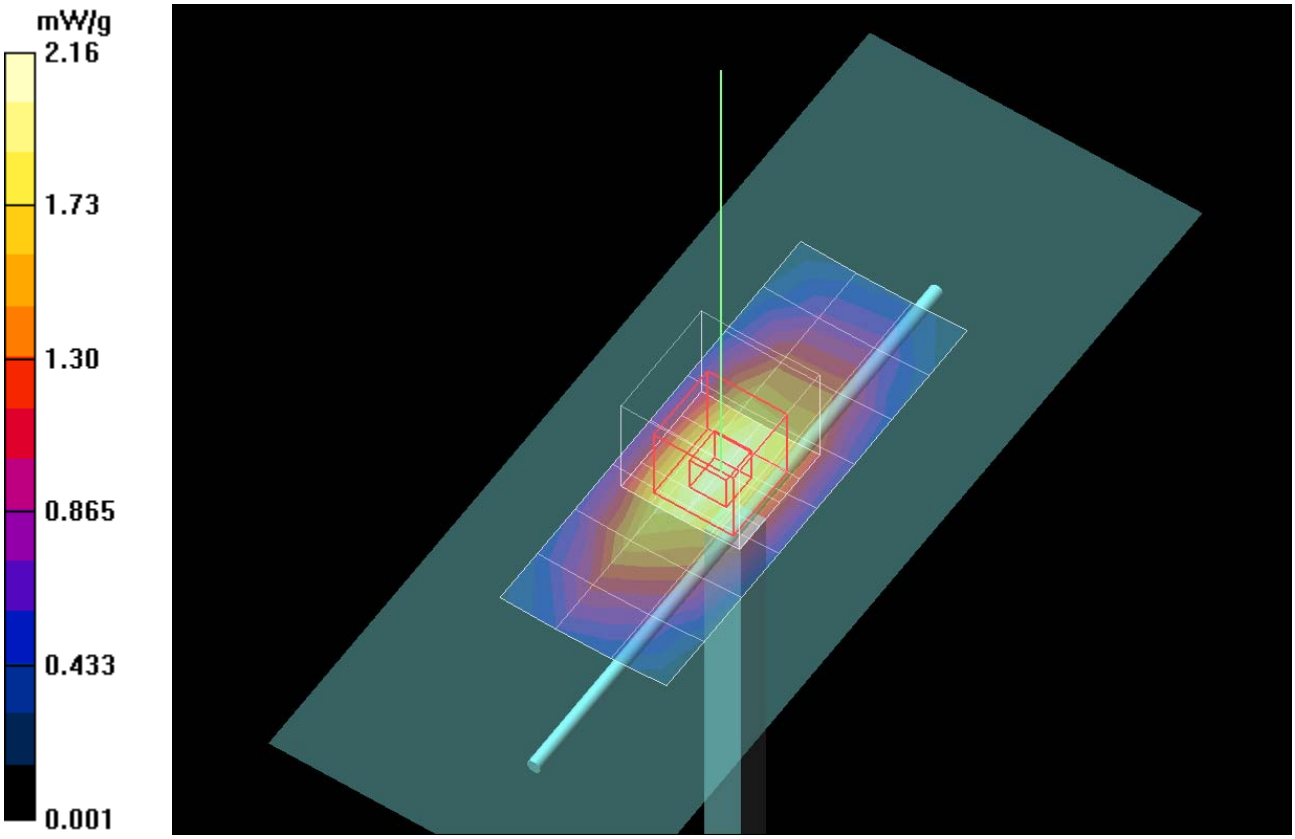
DASY4 Configuration:

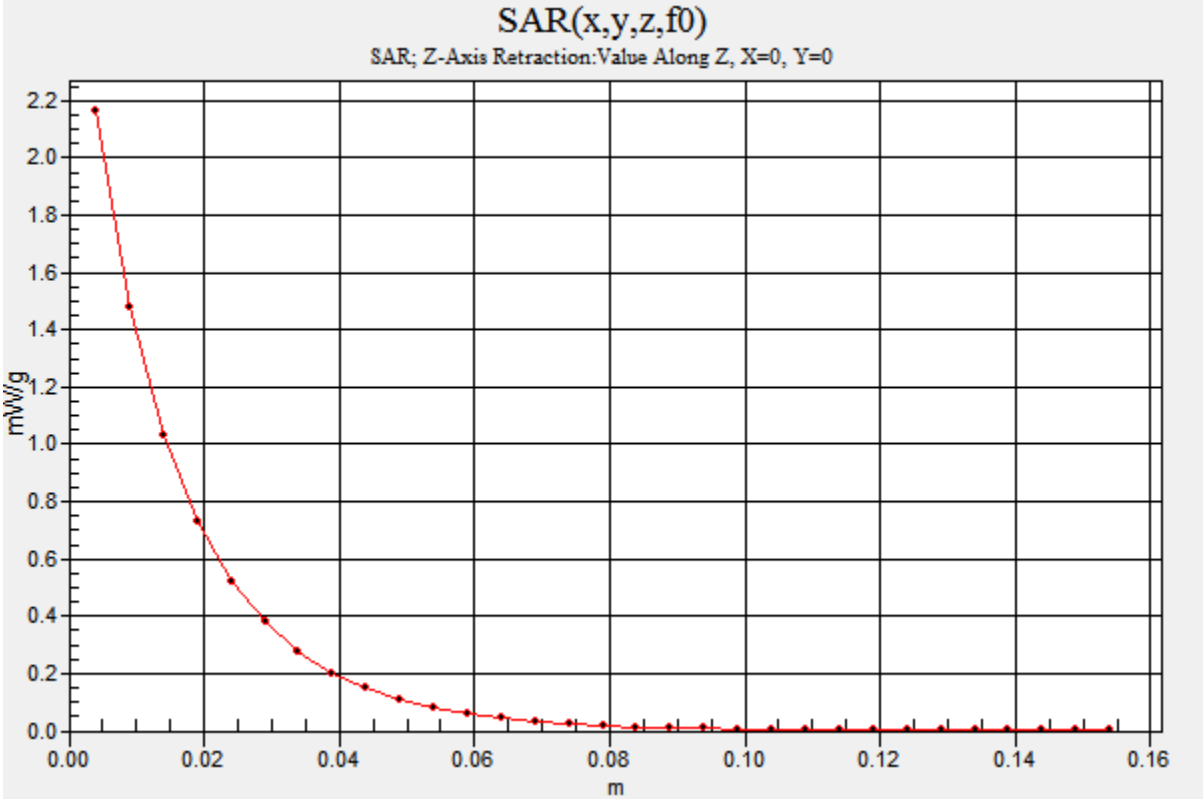
- Probe: ES3DV3 - SN3037; ConvF(6.08, 6.08, 6.08); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; 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) = 1.89 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 = -0.013 dB
Peak SAR (extrapolated) = 2.91 W/kg
SAR(1 g) = 1.98 mW/g; SAR(10 g) = 1.3 mW/g
Maximum value of SAR (measured) = 2.15 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.16 mW/g


mW/g
2.16
1.73
1.30
0.865
0.433
0.001


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: 7/21/2011 8:43:34 AM

Test Laboratory: Motorola 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:434TR
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -19.9dB Sim.Temp@SPC = 20 Room Temp @ SPC = 20.8
Communication System: CW - Dipole; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 54.5; ρ = 1000 kg/m^3

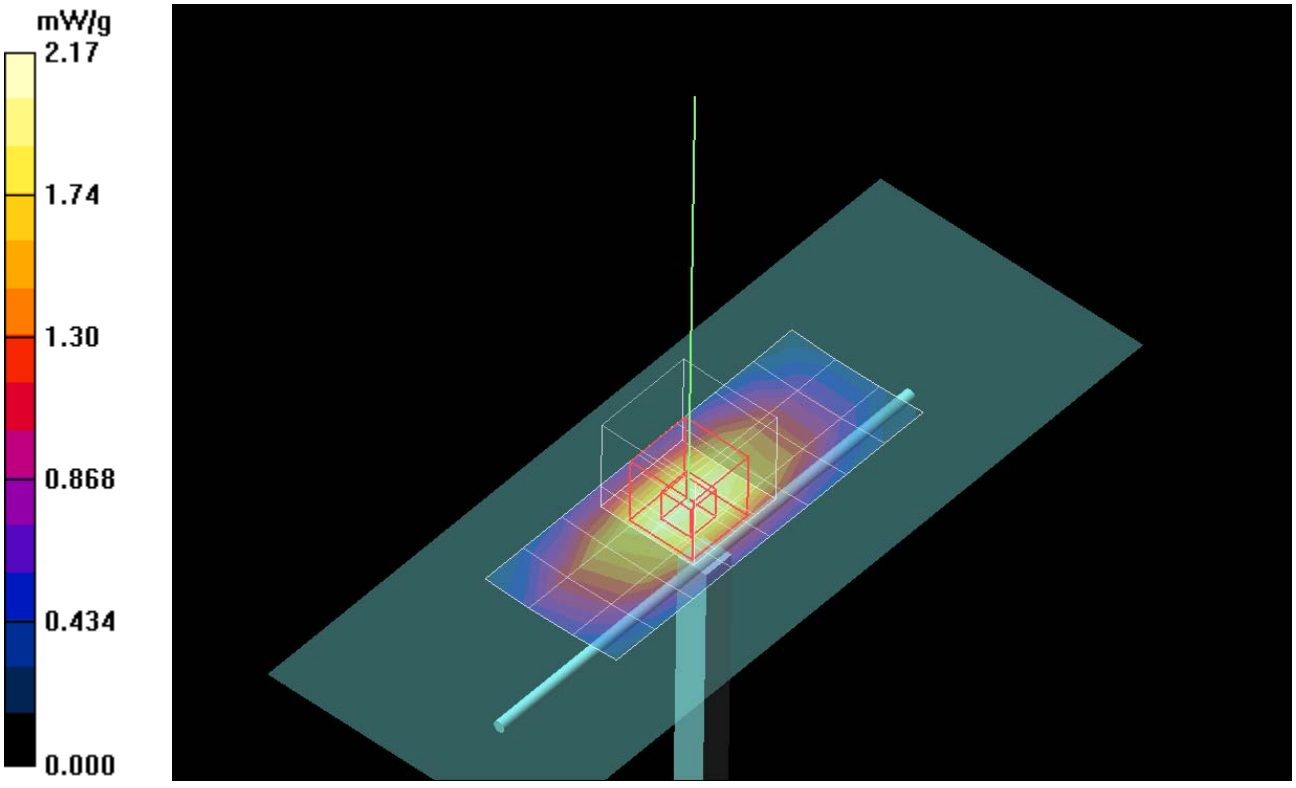
DASY4 Configuration:

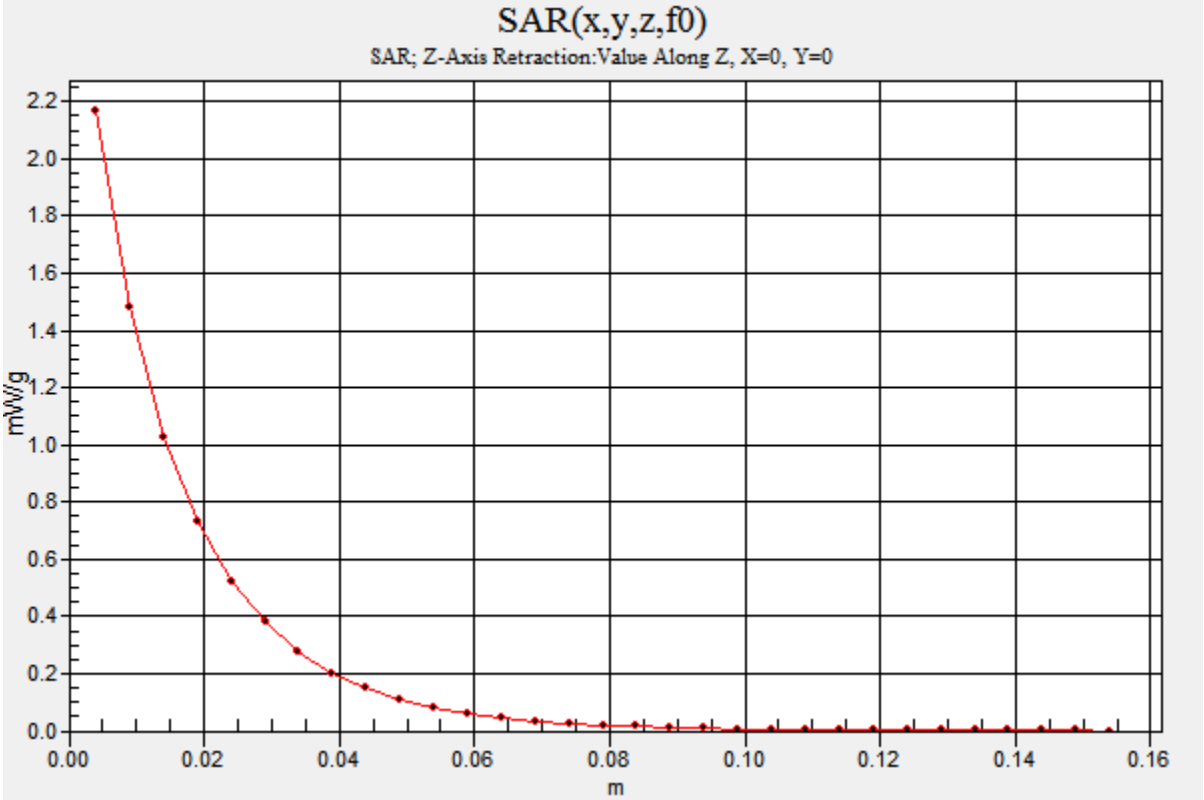
- Probe: ES3DV3 - SN3037; ConvF(6.08, 6.08, 6.08); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; 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) = 1.91 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.8 V/m; Power Drift = -0.190 dB
Peak SAR (extrapolated) = 2.93 W/kg
SAR(1 g) = 2.01 mW/g; SAR(10 g) = 1.32 mW/g
Maximum value of SAR (measured) = 2.17 mW/g

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




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: 7/24/2011 6:26:21 AM

Test Laboratory: Motorola 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:434TR
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -18.9 dB Sim.Temp@SPC = 19.7 Room Temp @ SPC = 20.7
Communication System: CW - Dipole; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

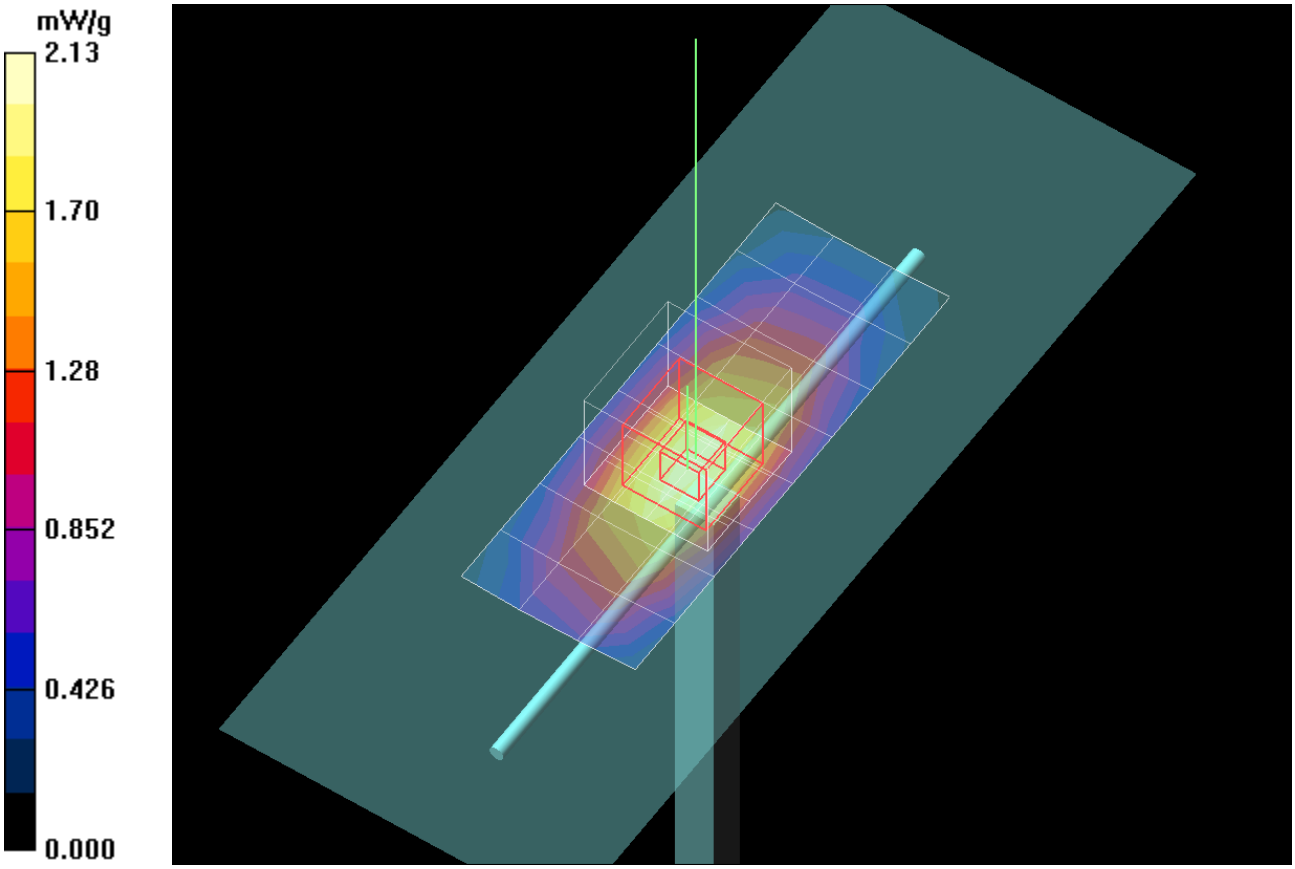
DASY4 Configuration:

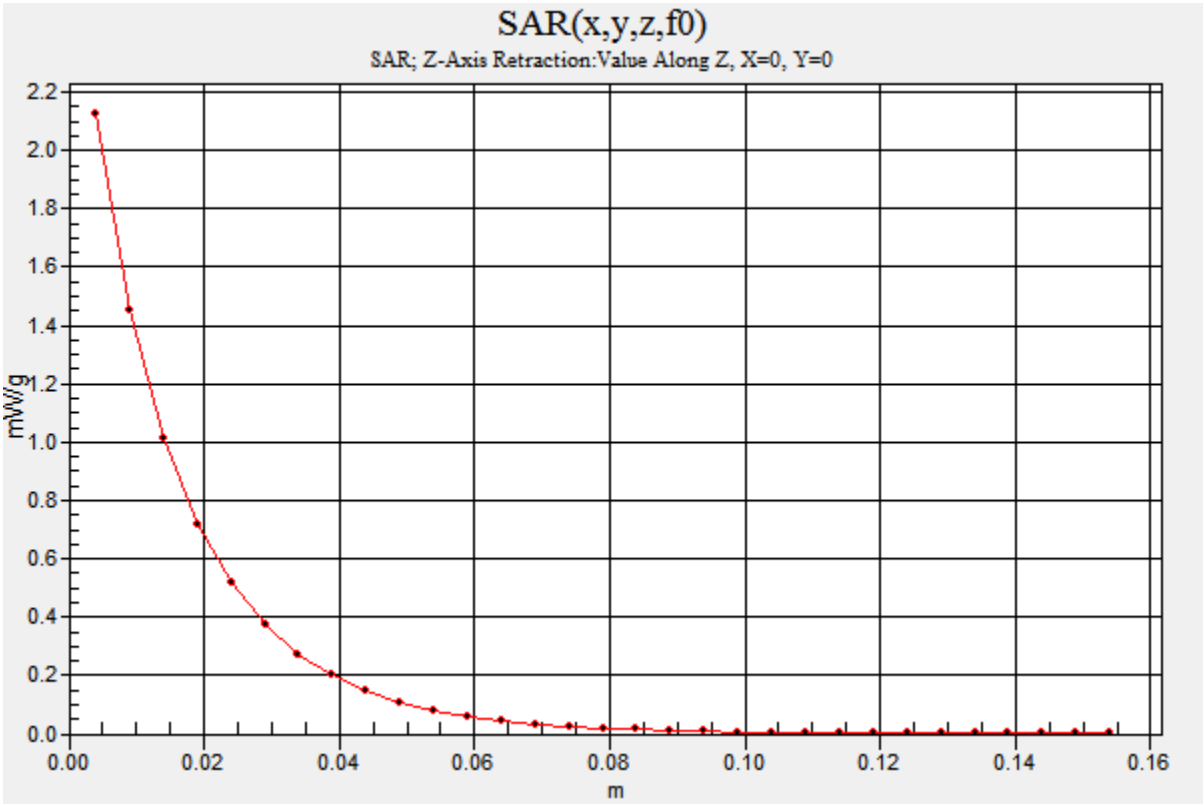
- Probe: ES3DV3 - SN3037; ConvF(6.08, 6.08, 6.08); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; 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) = 1.88 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 46.4 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 2.88 W/kg
SAR(1 g) = 1.96 mW/g; SAR(10 g) = 1.29 mW/g
Maximum value of SAR (measured) = 2.12 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.13 mW/g


mW/g
2.13
1.70
1.28
0.852
0.426
0.000


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: 7/12/2011 7:47:38 AM

Test Laboratory: Motorola 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271TR
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -28.35 dB Sim.Temp@SPC = 18.5ºC Room Temp @ SPC = 20.3ºC
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 = 39.4; ρ = 1000 kg/m^3

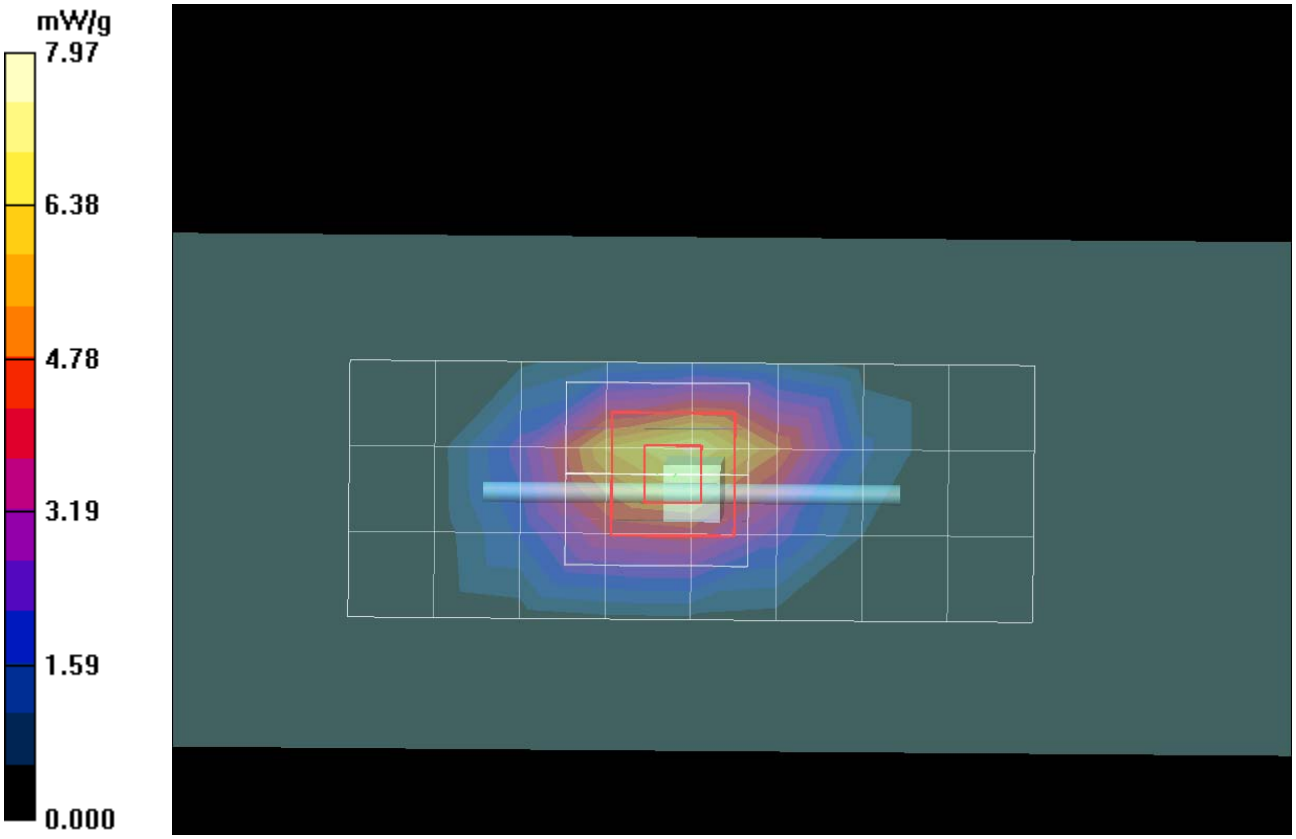
DASY4 Configuration:

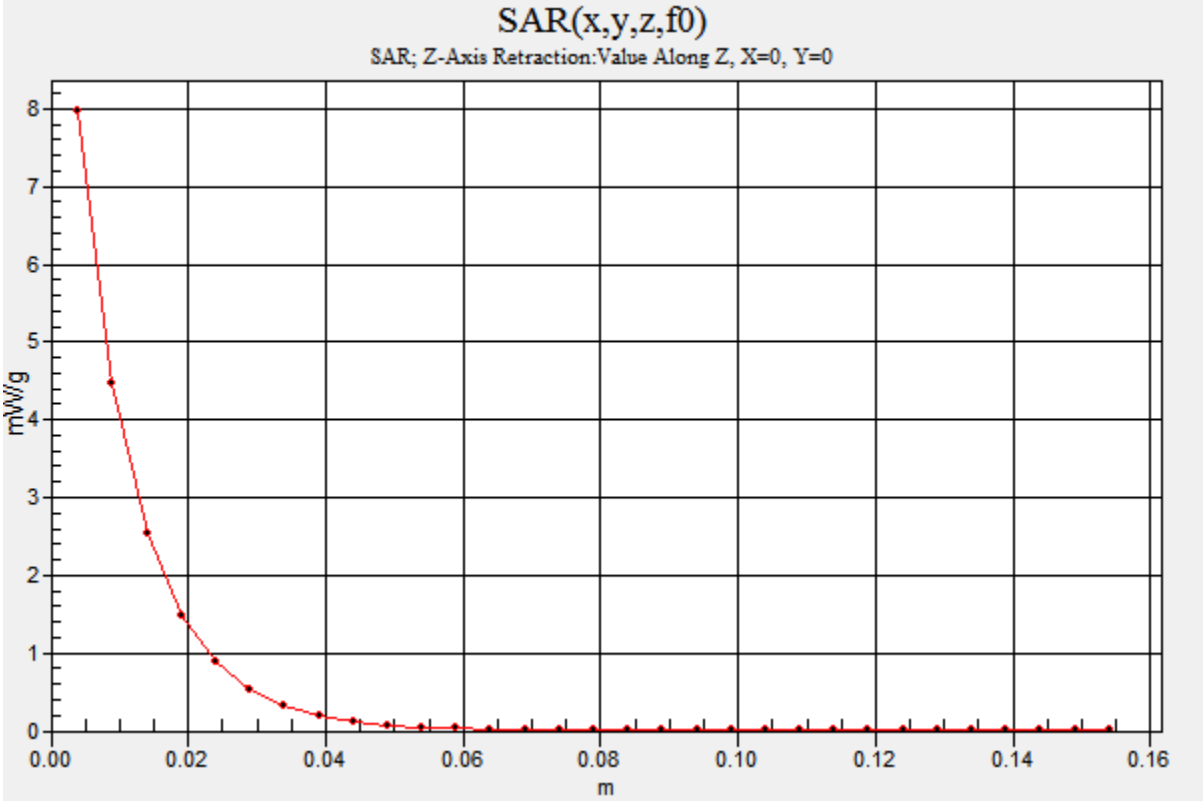
- Probe: ES3DV3 - SN3037; ConvF(5.27, 5.27, 5.27); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; 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) = 7.09 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 73.4 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 12.7 W/kg
SAR(1 g) = 7.1 mW/g; SAR(10 g) = 3.76 mW/g
Maximum value of SAR (measured) = 7.90 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 7.97 mW/g


mW/g
7.97
6.38
4.78
3.19
1.59
0.000


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

Date/Time: 7/13/2011 7:23:40 AM

Test Laboratory: Motorola 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271TRx
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -30.00 dB Sim.Temp@SPC = 19.0ºC Room Temp @ SPC = 21.0ºC
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 = 39.2; ρ = 1000 kg/m^3

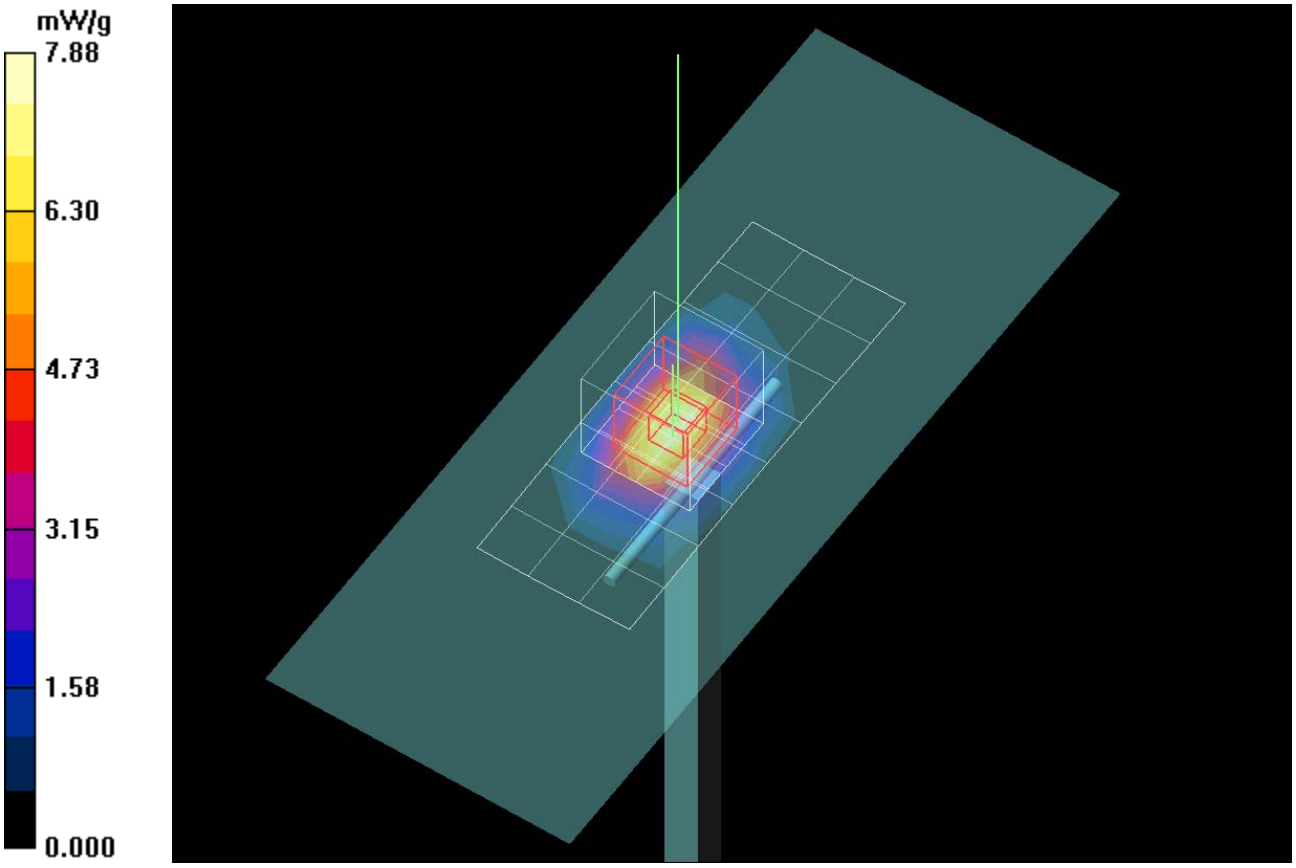
DASY4 Configuration:

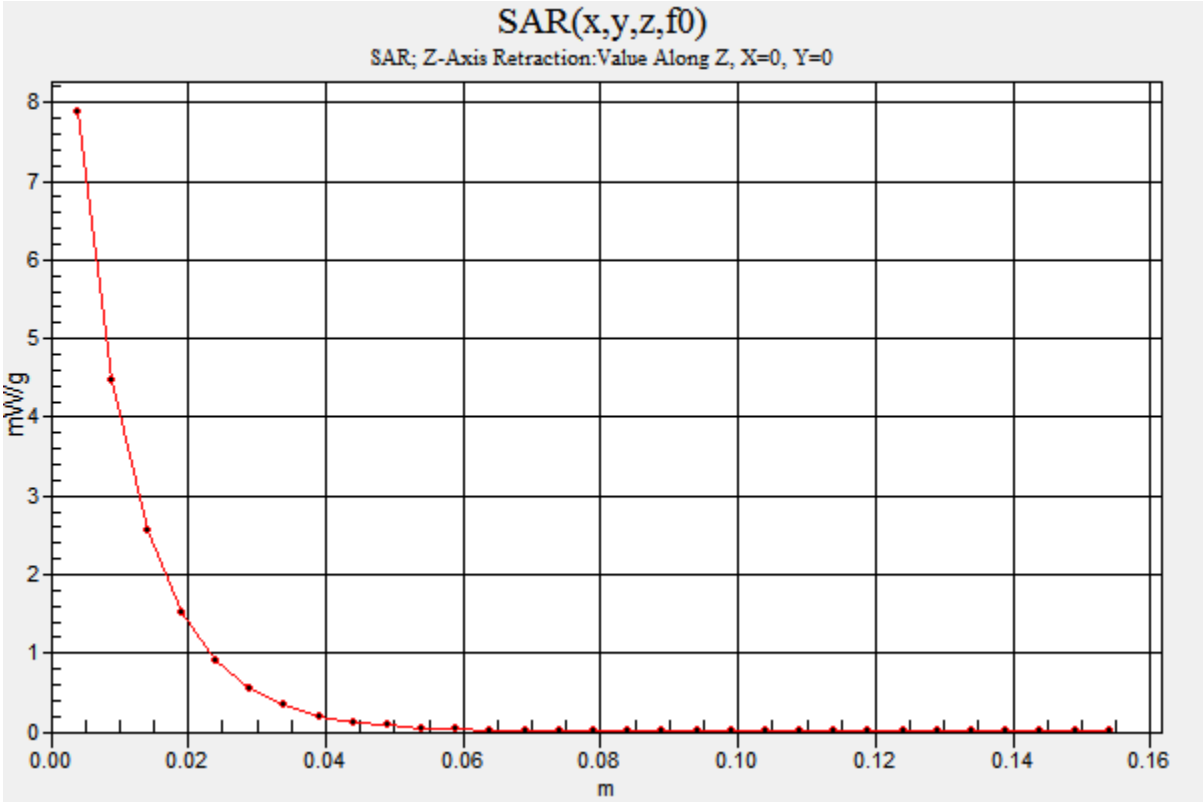
- Probe: ES3DV3 - SN3037; ConvF(5.27, 5.27, 5.27); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; 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) = 6.89 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 75.2 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 12.7 W/kg
SAR(1 g) = 7.12 mW/g; SAR(10 g) = 3.79 mW/g
Maximum value of SAR (measured) = 7.82 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 7.88 mW/g


mW/g
7.88
6.30
4.73
3.15
1.58
0.000


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

Date/Time: 7/13/2011 8:15:28 AM

Test Laboratory: Motorola 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271TR
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -22.9dB Sim.Temp@SPC = 18.9*C Room Temp @ SPC = 21*C
Communication System: CW - Dipole; Frequency: 1800 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.48 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3

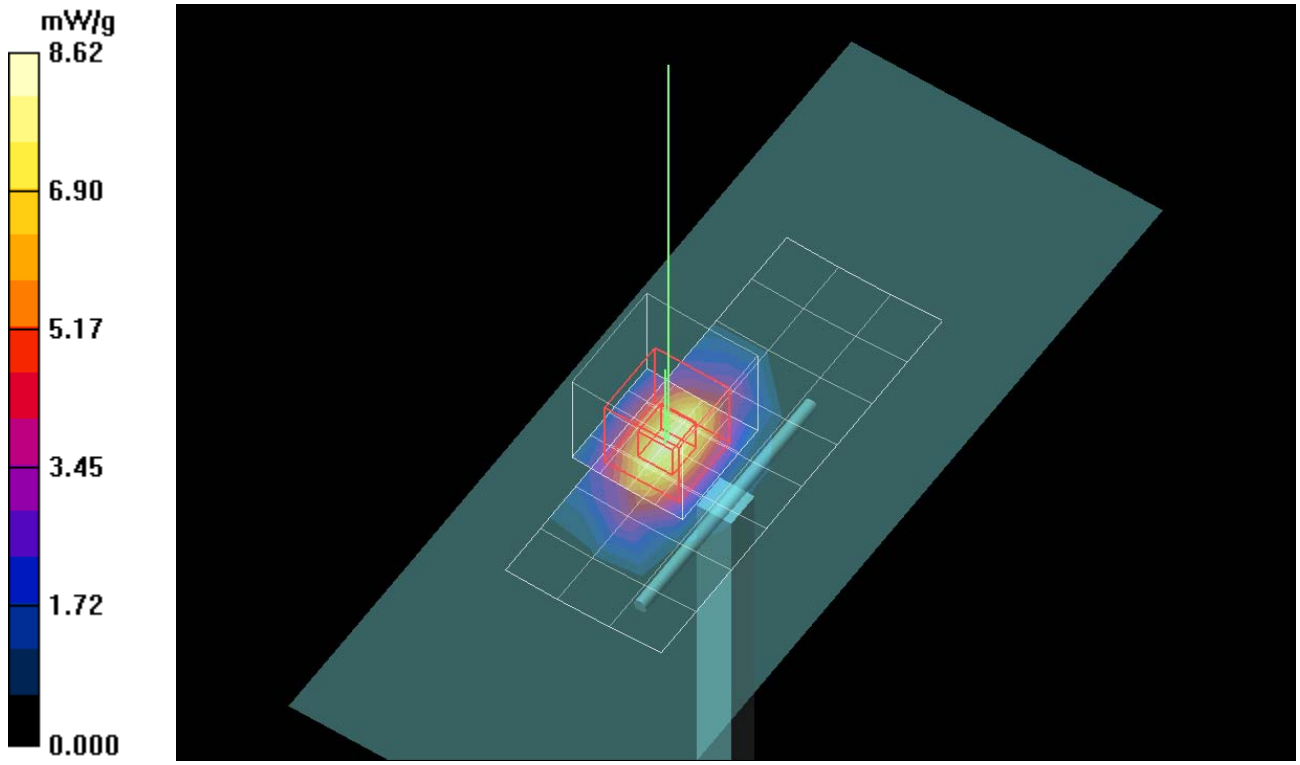
DASY4 Configuration:

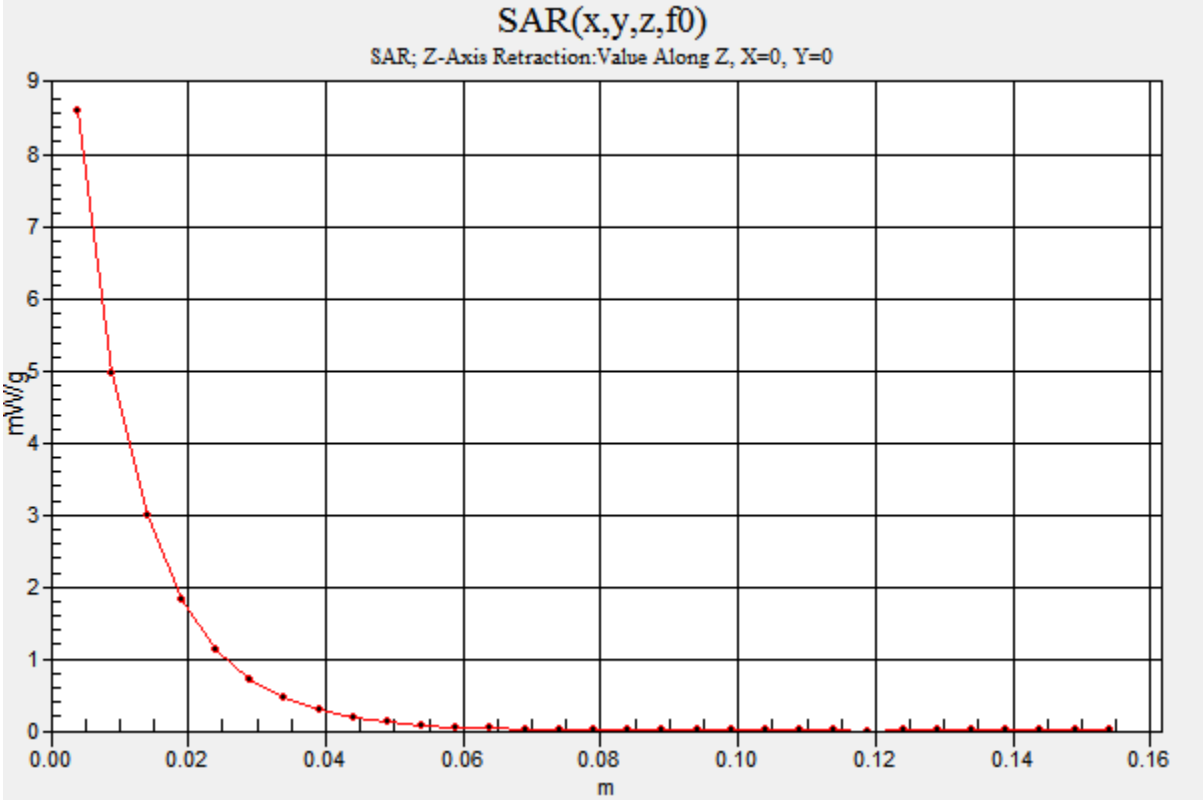
- Probe: ES3DV3 - SN3037; ConvF(4.87, 4.87, 4.87); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; 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) = 7.09 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 45.8 V/m; Power Drift = 0.061 dB
Peak SAR (extrapolated) = 13.9 W/kg
SAR(1 g) = 7.68 mW/g; SAR(10 g) = 4.08 mW/g
Maximum value of SAR (measured) = 8.59 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.62 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: 7/23/2011 8:09:52 AM

Test Laboratory: Motorola 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271TR
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -23.8Db Sim.Temp@SPC = 19.8 Room Temp @ SPC = 20.8
Communication System: CW - Dipole; Frequency: 1800 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.48 mho/m; ε_r = 52; ρ = 1000 kg/m^3

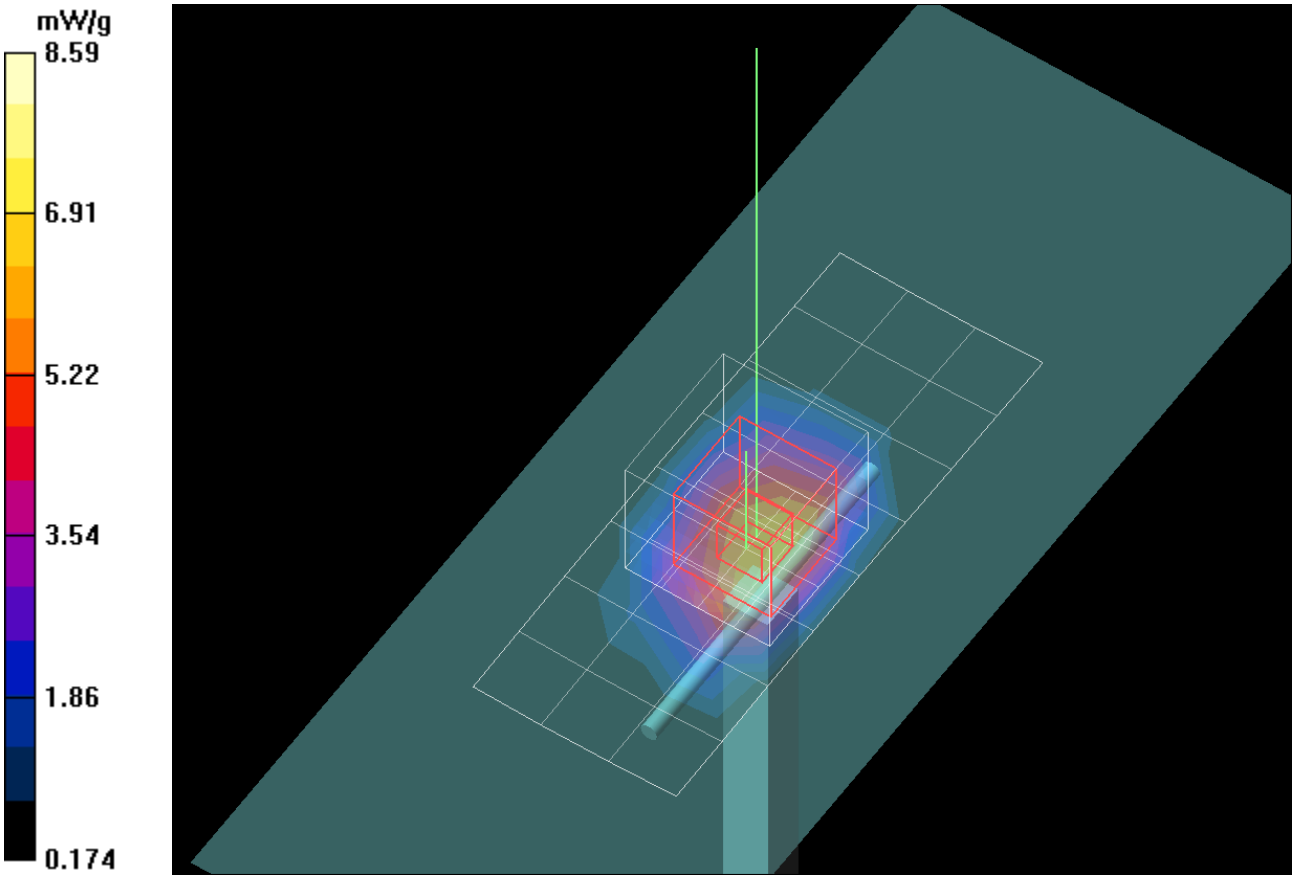
DASY4 Configuration:

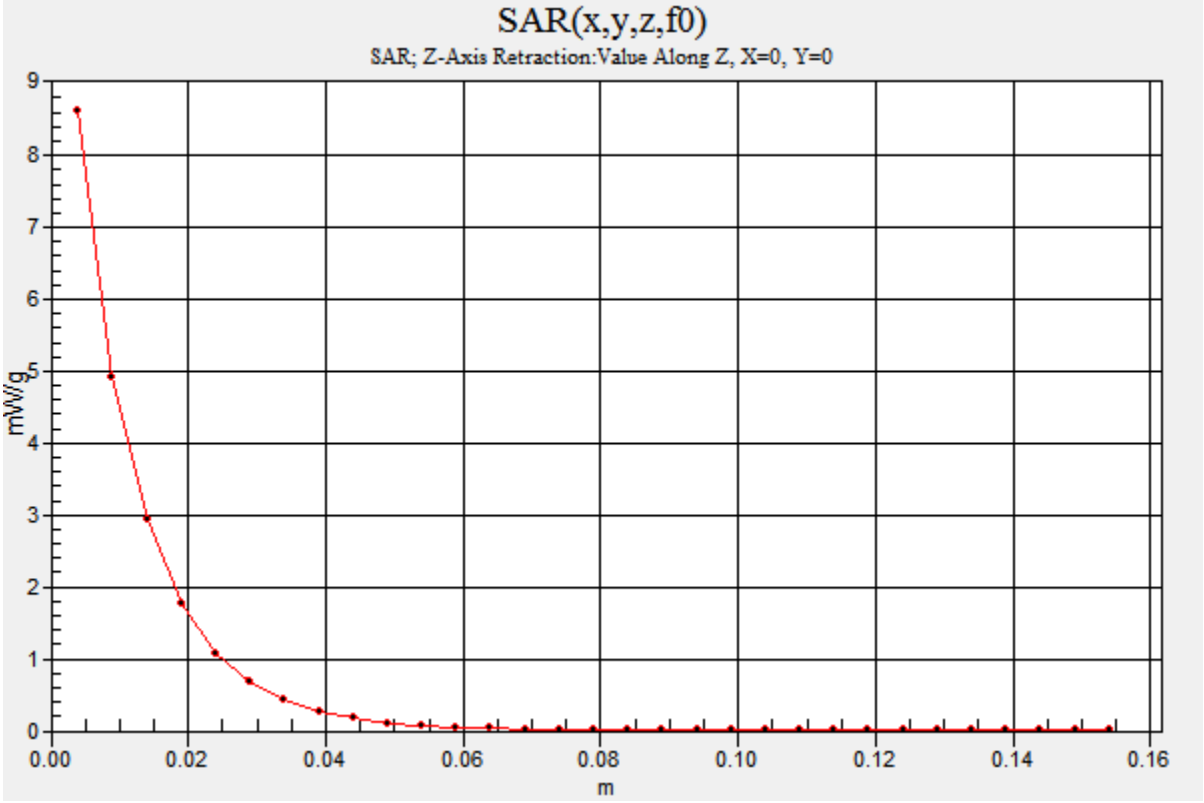
- Probe: ES3DV3 - SN3037; ConvF(4.87, 4.87, 4.87); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; 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) = 6.80 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.62 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 76.5 V/m; Power Drift = -0.031 dB
Peak SAR (extrapolated) = 14.1 W/kg
SAR(1 g) = 7.76 mW/g; SAR(10 g) = 4.1 mW/g
Maximum value of SAR (measured) = 8.59 mW/g


mW/g
8.59
6.91
5.22
3.54
1.86
0.174


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: 8/3/2011 9:12:11 AM

Test Laboratory: Motorola 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271TR
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -25.0dB Sim.Temp@SPC = 19.6 Room Temp @ SPC = 20.6
Communication System: CW - Dipole; Frequency: 1800 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.51 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3

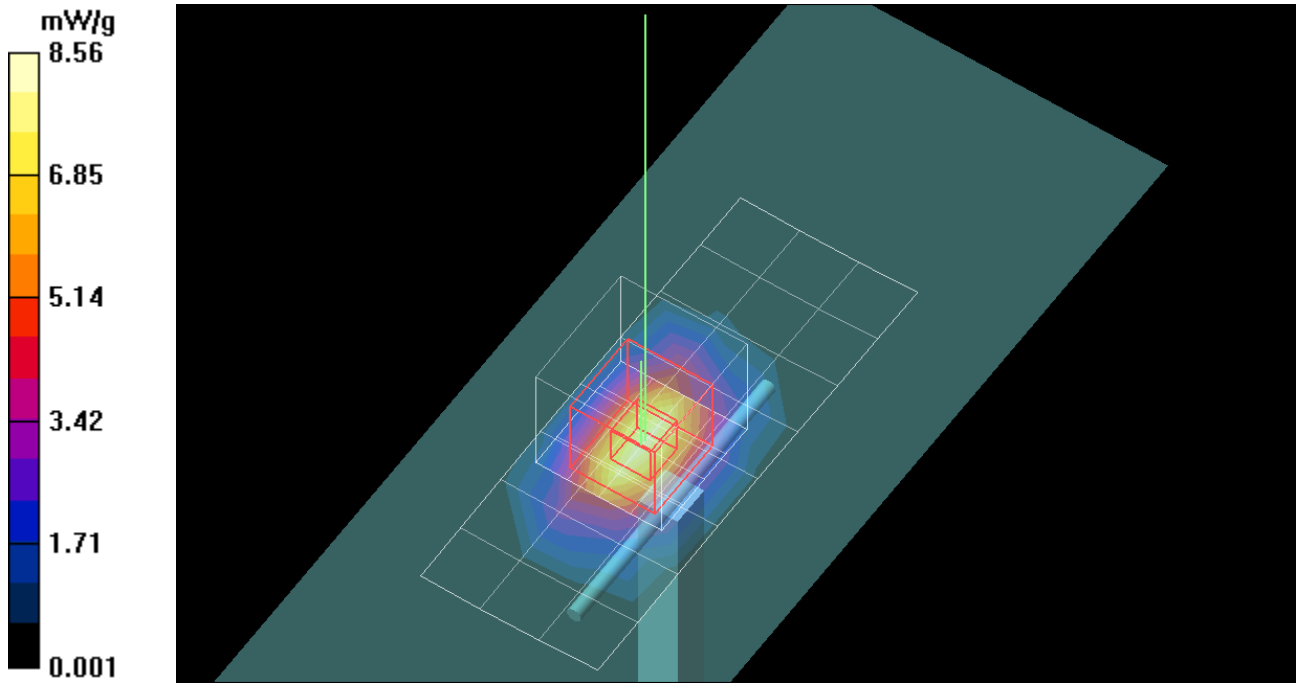
DASY4 Configuration:

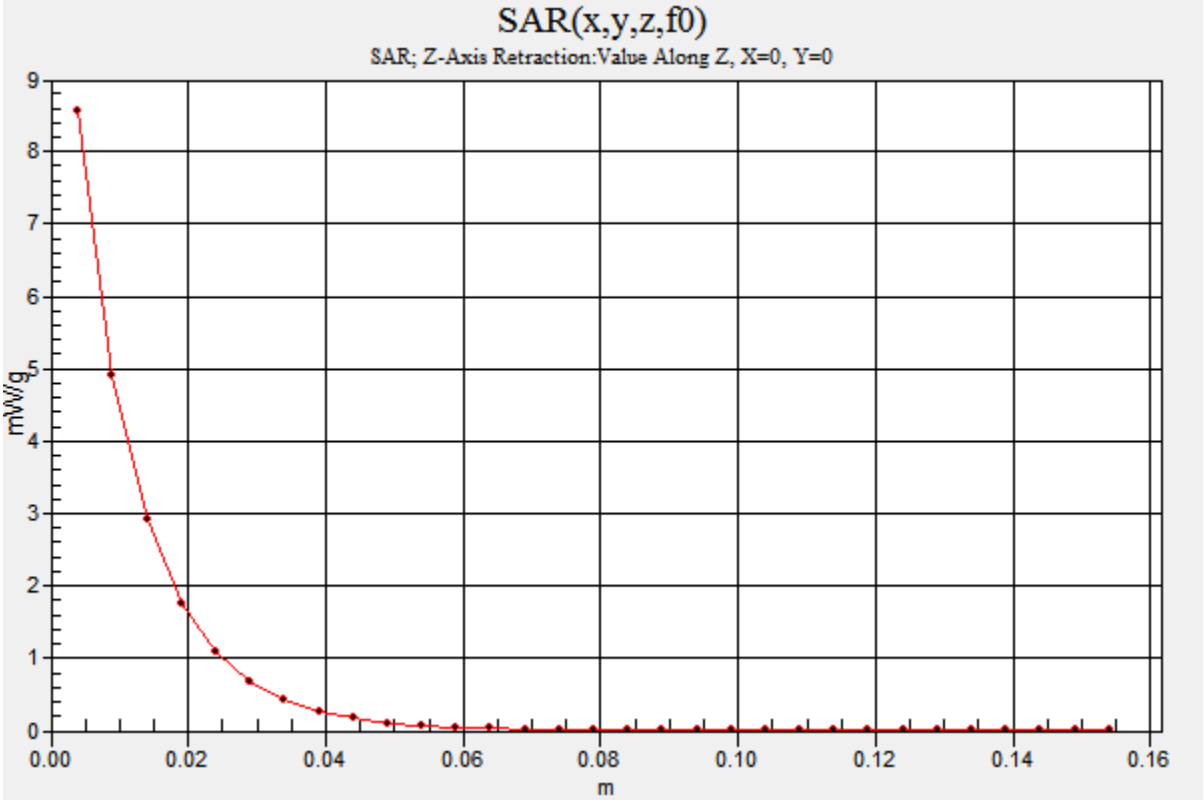
- Probe: ES3DV3 - SN3037; ConvF(4.87, 4.87, 4.87); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; 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) = 7.13 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 72.2 V/m; Power Drift = -0.005 dB
Peak SAR (extrapolated) = 13.8 W/kg
SAR(1 g) = 7.67 mW/g; SAR(10 g) = 4.09 mW/g
Maximum value of SAR (measured) = 8.55 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.56 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: 7/26/2011 3:20:13 PM

Test Laboratory: Motorola 2450 MHz System Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:766
Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -21.2dB Sim.Temp@SPC =20.2ºC Room Temp @ SPC = 21.1ºC
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 = 36.3; ρ = 1000 kg/m^3

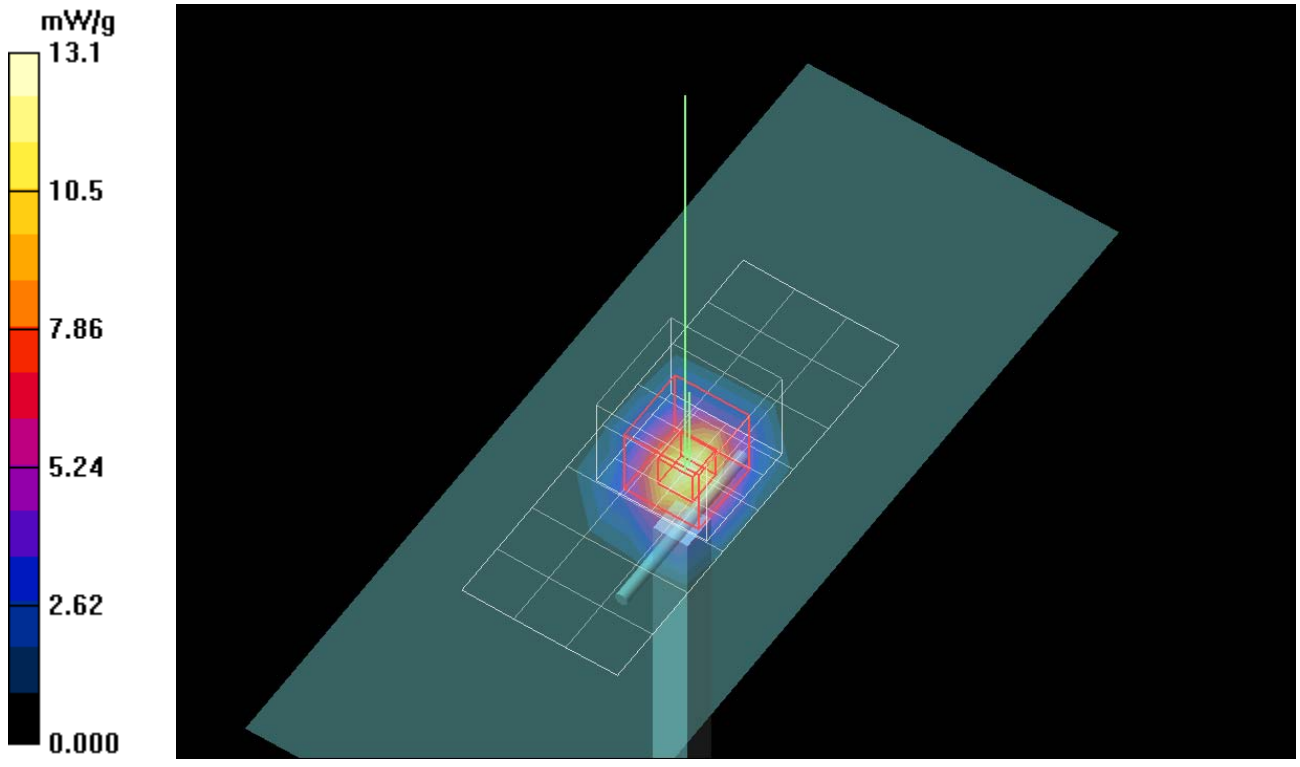
DASY4 Configuration:

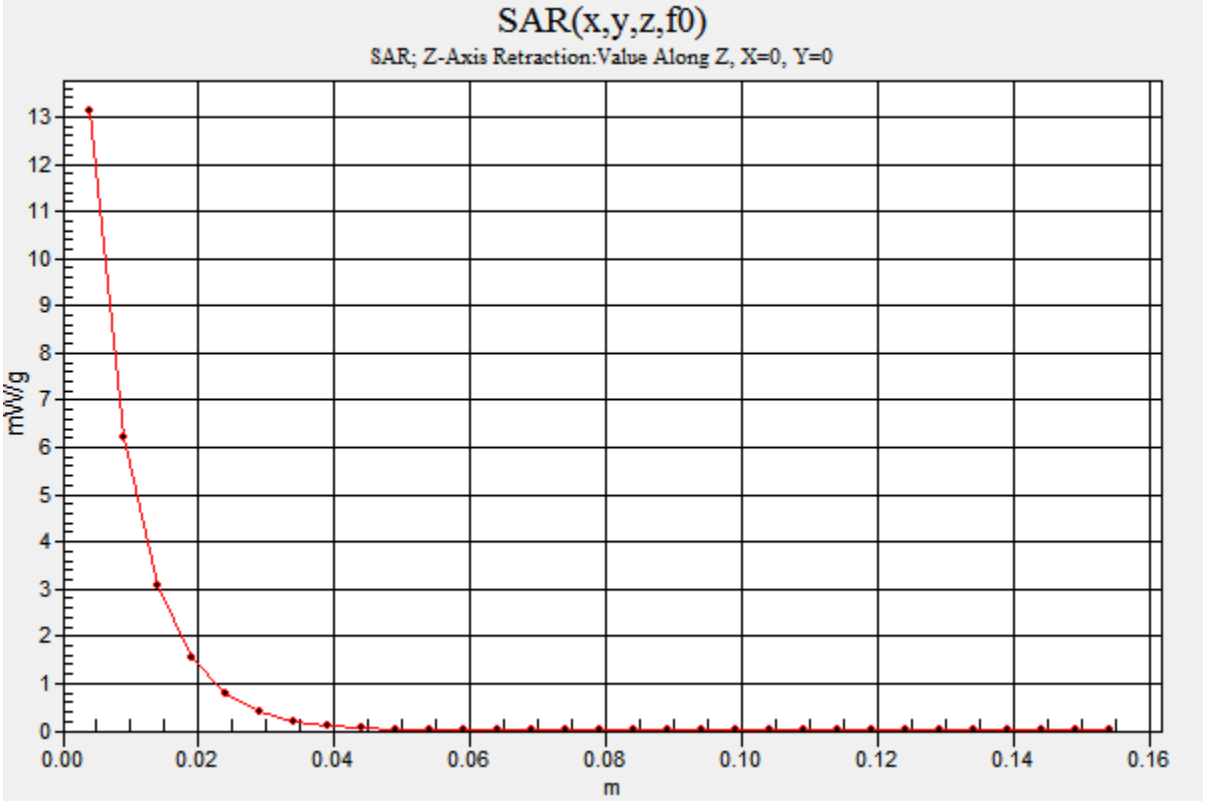
- Probe: ES3DV3 - SN3115; ConvF(4.39, 4.39, 4.39); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 10.4 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 84.7 V/m; Power Drift = 0.006 dB
Peak SAR (extrapolated) = 25.1 W/kg
SAR(1 g) = 11.5 mW/g; SAR(10 g) = 5.3 mW/g
Maximum value of SAR (measured) = 13.0 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 13.1 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

Date/Time: 7/27/2011 11:57:04 AM

Test Laboratory: Motorola 2450 MHz System Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:766
Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3= -24.95dB Sim.Temp@SPC = 20.4 Room Temp @ SPC = 21
Communication System: CW - Dipole; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 2450 MHz; σ = 2.03 mho/m; ε_r = 47.9; ρ = 1000 kg/m^3

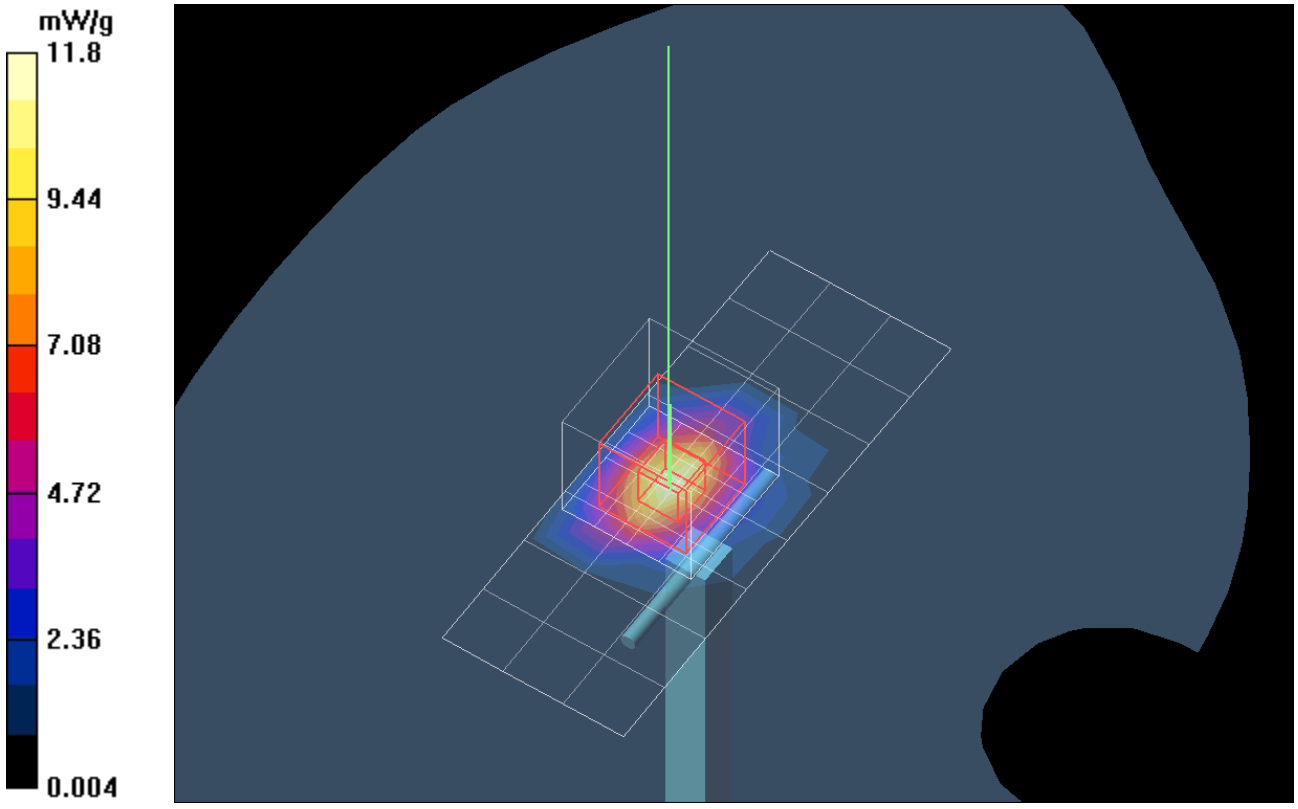
DASY4 Configuration:

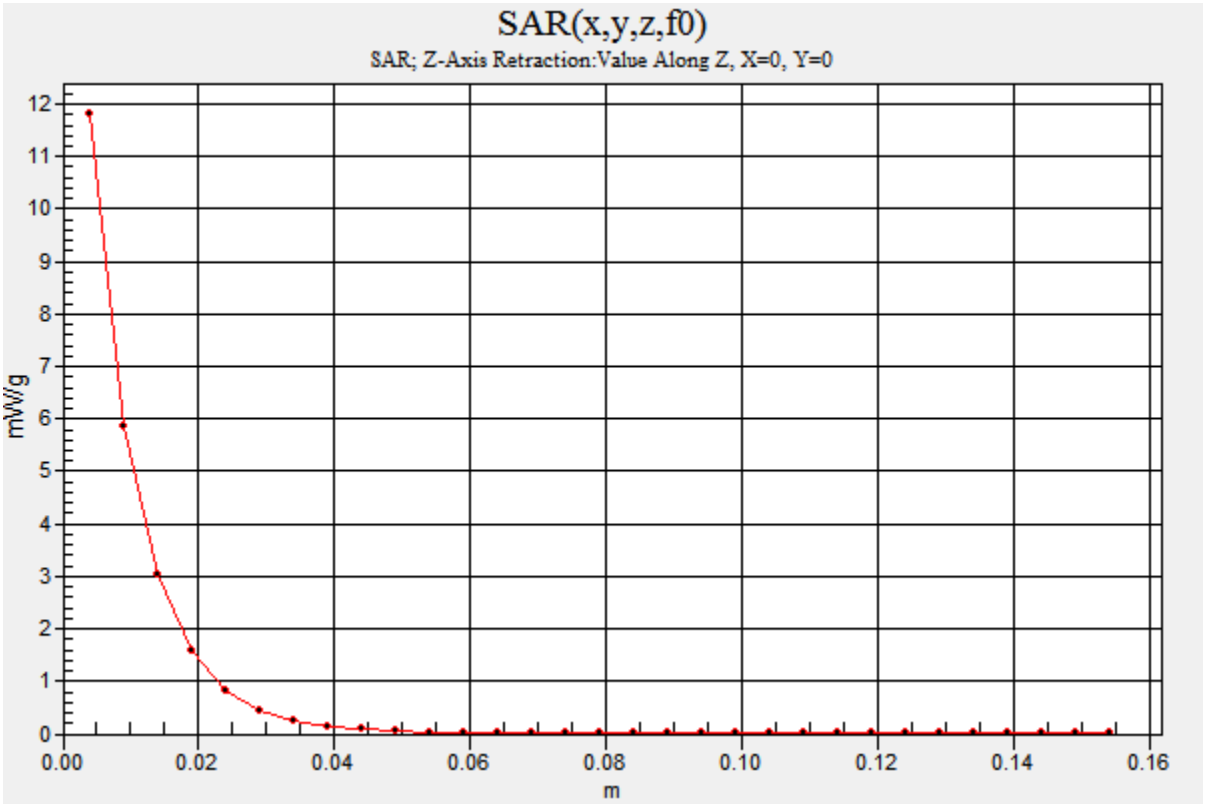
- Probe: ES3DV3 - SN3037; ConvF(4.24, 4.24, 4.24); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1319;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 11.6 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 68.0 V/m; Power Drift = 0.054 dB
Peak SAR (extrapolated) = 22.1 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 4.85 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 11.8 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
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

Date/Time: 7/12/2011 9:33:52 PM

Test Laboratory: Motorola GSM 850MHz Cheek Touch

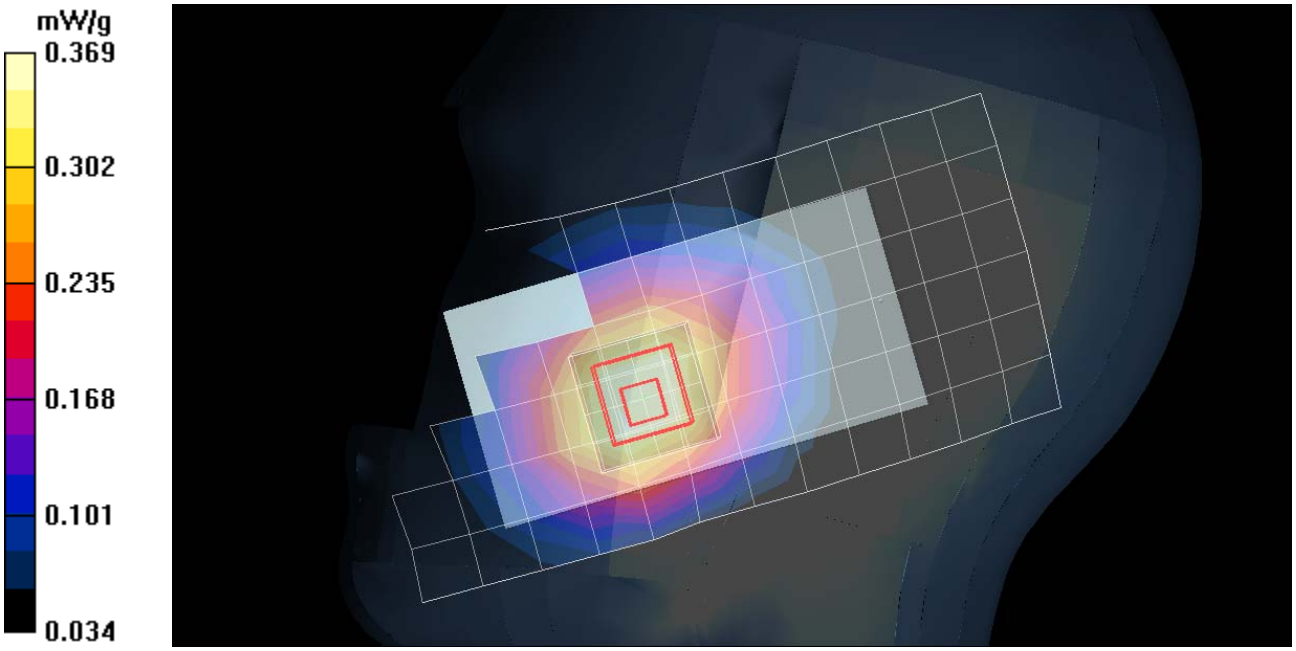
DUT: Serial: 356472040016520, FCC ID: IHDP56MA2
Procedure Notes: Pwr Step: 05 Battery Model #: SNN5891A DEVICE POSITION: cheek touch
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.15, 6.15, 6.15); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1156;
- 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) = 0.351 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.6 V/m; Power Drift = -0.113 dB
Peak SAR (extrapolated) = 0.431 W/kg
SAR(1 g) = 0.351 mW/g; SAR(10 g) = 0.266 mW/g
Maximum value of SAR (measured) = 0.369 mW/g



Date/Time: 7/12/2011 9:55:21 PM

Test Laboratory: Motorola GSM 850MHz 15 Degree Tilt

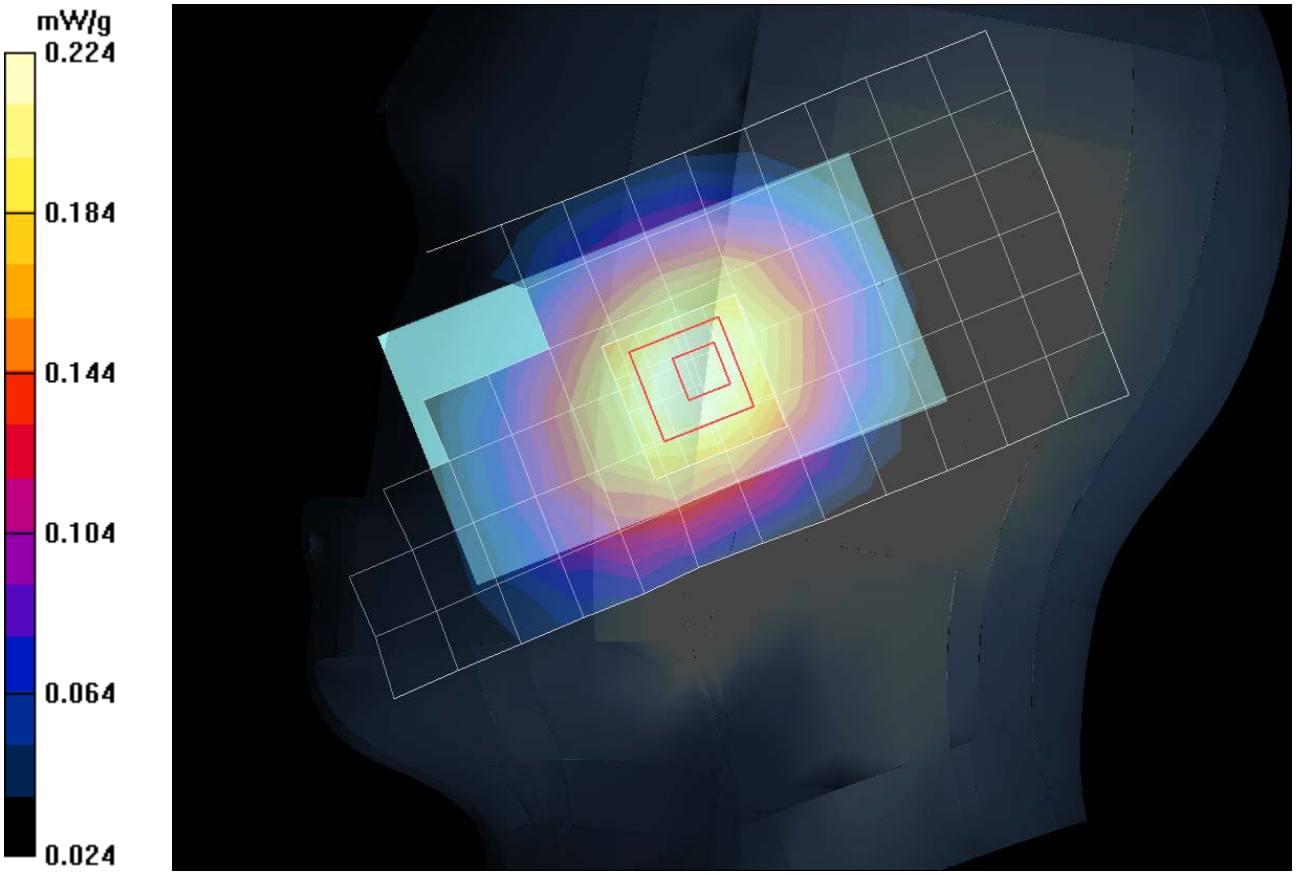
DUT: Serial: 356472040016520, FCC ID: IHDP56MA2
Procedure Notes: Pwr Step: 05 Battery Model #: SNN5891A DEVICE POSITION: 15 Degree Tilt
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.15, 6.15, 6.15); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1156;
- 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) = 0.227 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.7 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 0.267 W/kg
SAR(1 g) = 0.216 mW/g; SAR(10 g) = 0.165 mW/g
Maximum value of SAR (measured) = 0.224 mW/g



Date/Time: 7/13/2011 11:12:44 PM

Test Laboratory: Motorola **WCDMA 850MHz Cheek Touch**

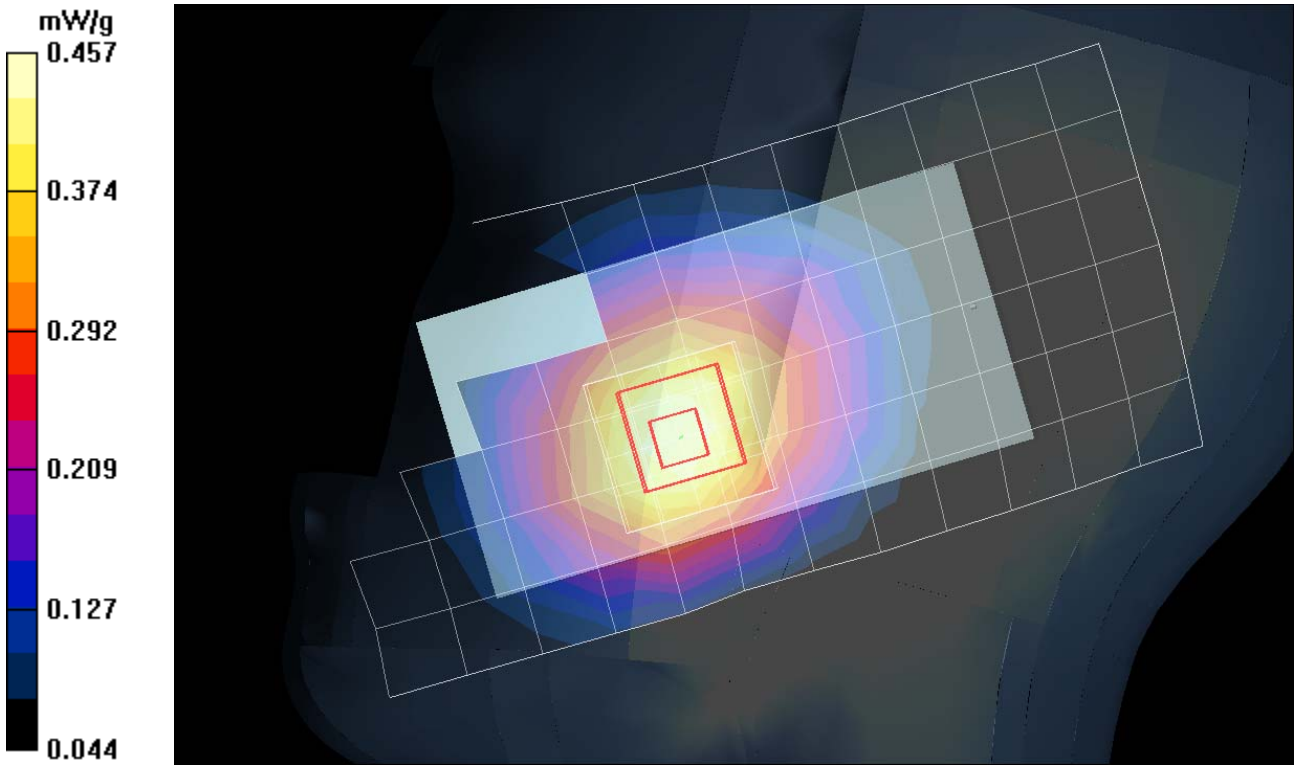
DUT: Serial: 356472040016520, FCC ID: IDHP56MA2
Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: SNN5891A DEVICE POSITION:CHEEK
Communication System: 3G-WCDMA 850; Frequency: 836 MHz;Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.15, 6.15, 6.15); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1156;
- 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) = 0.433 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.7 V/m; Power Drift = -0.077 dB
Peak SAR (extrapolated) = 0.538 W/kg
SAR(1 g) = 0.434 mW/g; SAR(10 g) = 0.328 mW/g
Maximum value of SAR (measured) = 0.457 mW/g



Date/Time: 7/13/2011 11:35:11 PM

Test Laboratory: Motorola WCDMA 850Hz 15 Degree Tilt

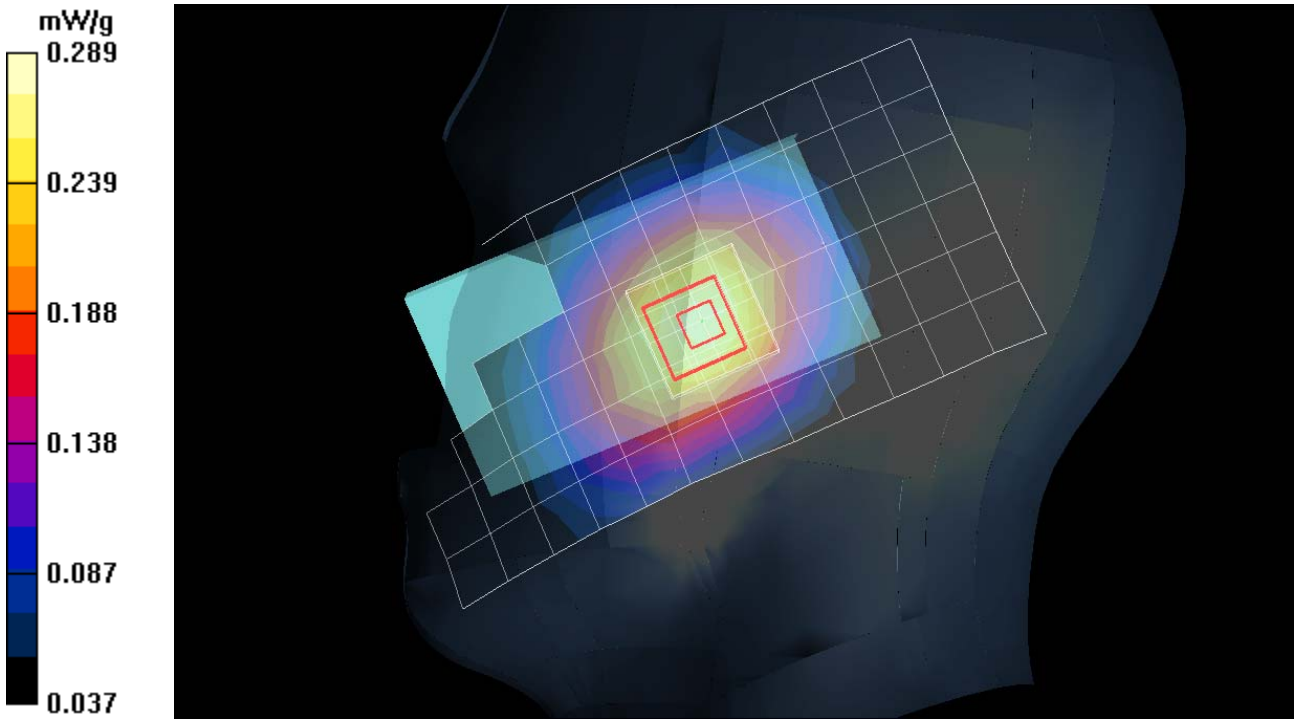
DUT: Serial: 356472040016520, FCC ID: IHDP56MA2
Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: SNN5891A DEVICE POSITION: 15 Degree Tilt
Communication System: 3G-WCDMA 850; Frequency: 836 MHz;Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.15, 6.15, 6.15); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1156;
- 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) = 0.271 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.2 V/m; Power Drift = 0.063 dB
Peak SAR (extrapolated) = 0.335 W/kg
SAR(1 g) = 0.271 mW/g; SAR(10 g) = 0.205 mW/g
Maximum value of SAR (measured) = 0.289 mW/g



Date/Time: 7/14/2011 1:27:30 AM

Test Laboratory: Motorola GSM 1900MHz Cheek Touch

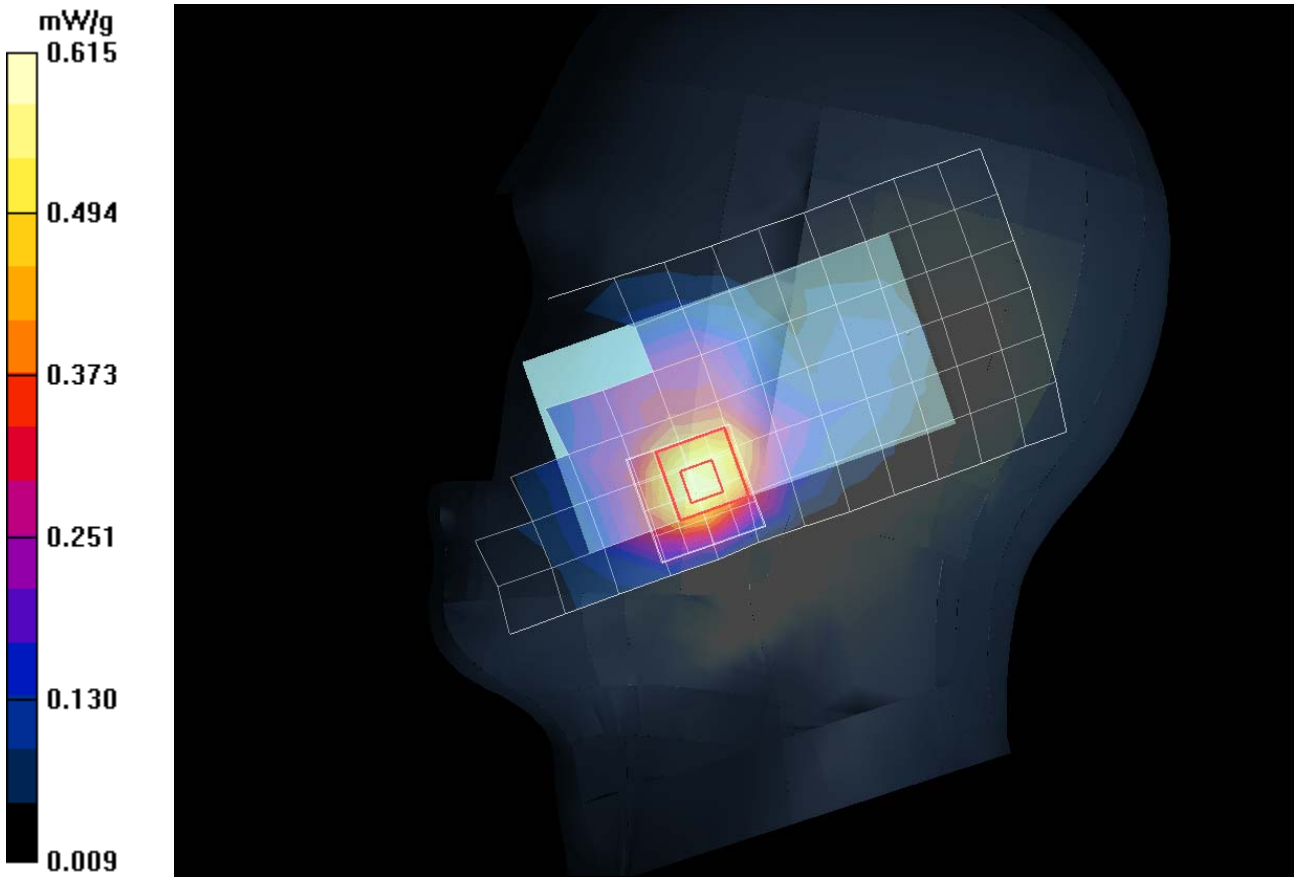
DUT: Serial: 356472040016520, FCC ID: IHDP56MA2
Procedure Notes: Pwr Step: 0 Battery Model #: SNN5891A DEVICE POSITION (cheek or rotated): CHEEK TOUCH
Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.27, 5.27, 5.27); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1319;
- 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) = 0.550 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.6 V/m; Power Drift = -0.012 dB
Peak SAR (extrapolated) = 0.877 W/kg
SAR(1 g) = 0.575 mW/g; SAR(10 g) = 0.351 mW/g
Maximum value of SAR (measured) = 0.615 mW/g



Date/Time: 7/14/2011 1:00:45 AM

Test Laboratory: Motorola GSM 1900MHz 15 Degree Tilt

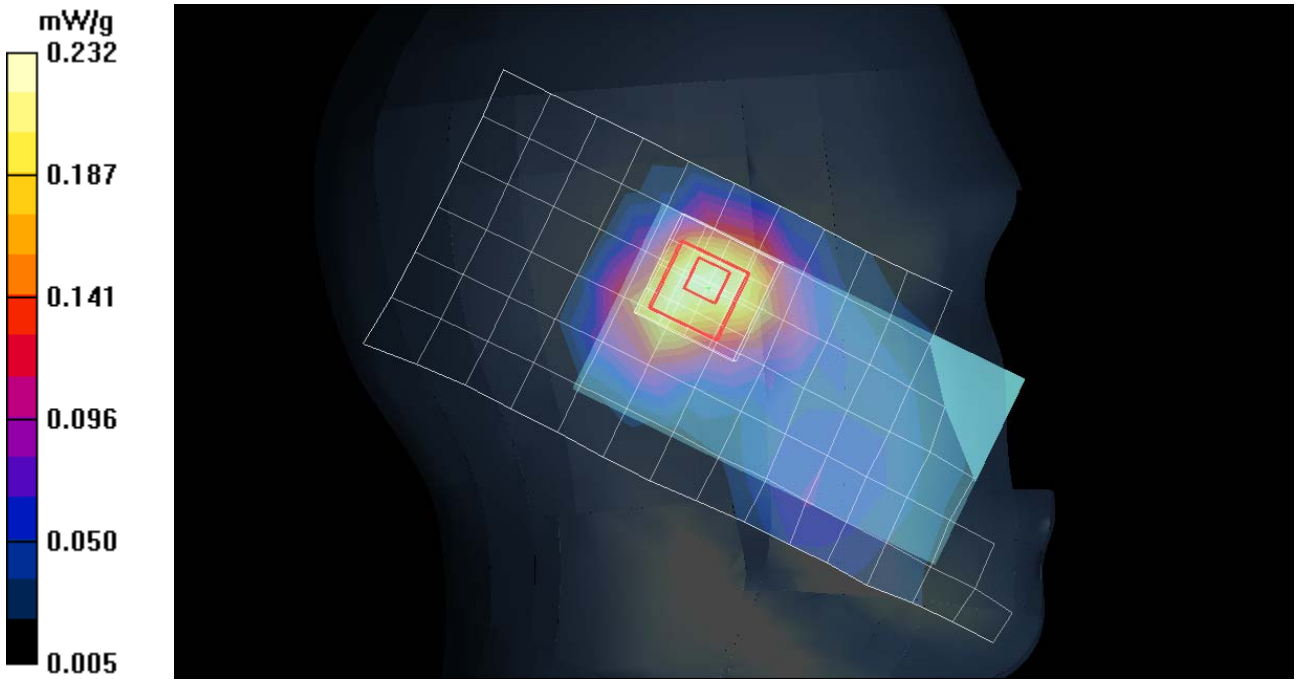
DUT: Serial: 356472040016520, FCC ID: IHDP56MA2
Procedure Notes: Pwr Step: 0 Battery Model #: SNN5891A DEVICE POSITION: 15 Degree Tilt
Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.27, 5.27, 5.27); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1319;
- 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) = 0.227 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.3 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 0.323 W/kg
SAR(1 g) = 0.217 mW/g; SAR(10 g) = 0.138 mW/g
Maximum value of SAR (measured) = 0.232 mW/g



Date/Time: 7/13/2011 2:24:55 AM

Test Laboratory: Motorola WCDMA 1900MHz Cheek Touch

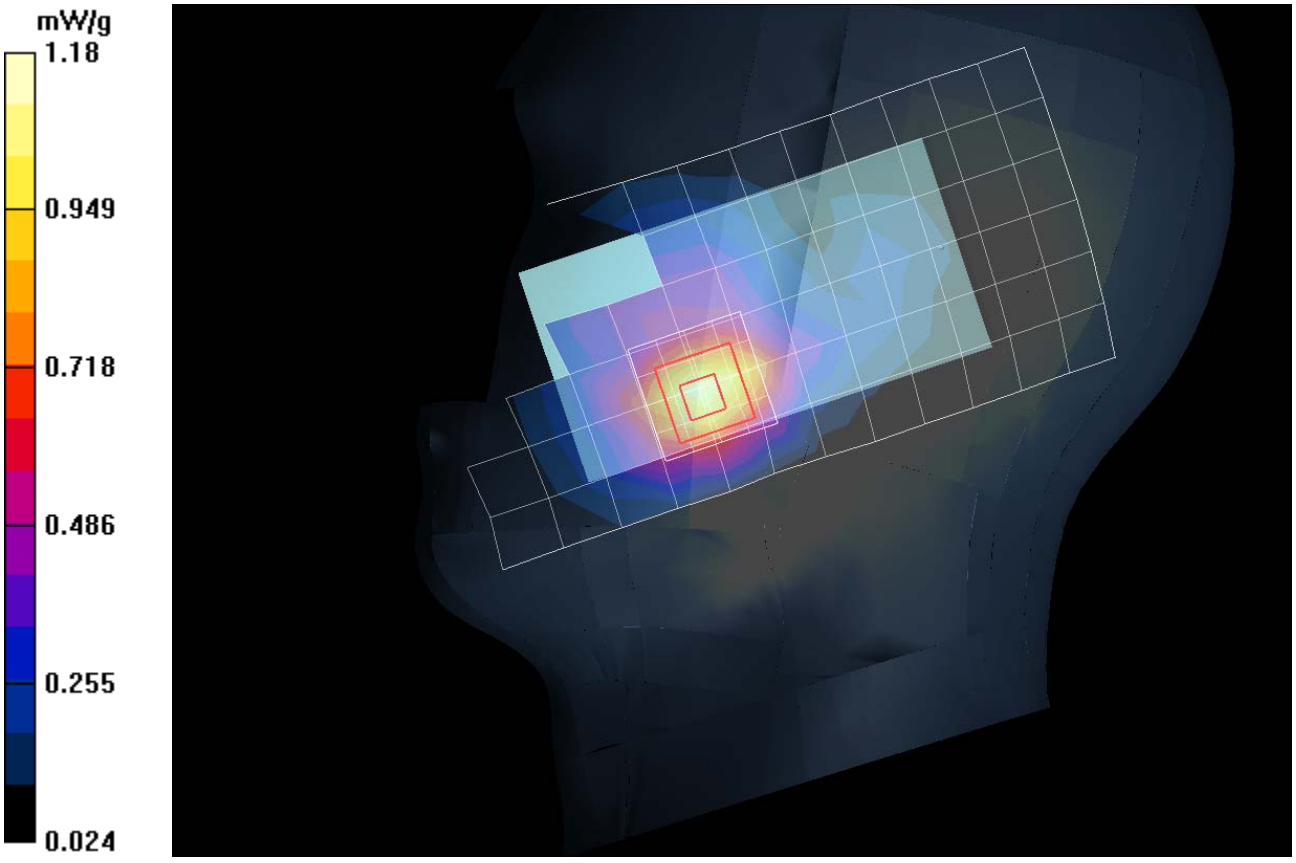
DUT: Serial: 356472040016520, FCC ID: IHDP56MA2
Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: SNN5891A DEVICE POSITION (cheek or rotated): CHEEK TOUCH
Communication System: 3G/WCDMA 1900; Frequency: 1907.5 MHz;Duty Cycle: 1:1
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.27, 5.27, 5.27); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1319;
- 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) = 1.13 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.1 V/m; Power Drift = 0.046 dB
Peak SAR (extrapolated) = 1.72 W/kg
SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.636 mW/g
Maximum value of SAR (measured) = 1.18 mW/g



Date/Time: 7/13/2011 1:15:55 AM

Test Laboratory: Motorola WCDMA 1900MHz 15 Degree Tilt

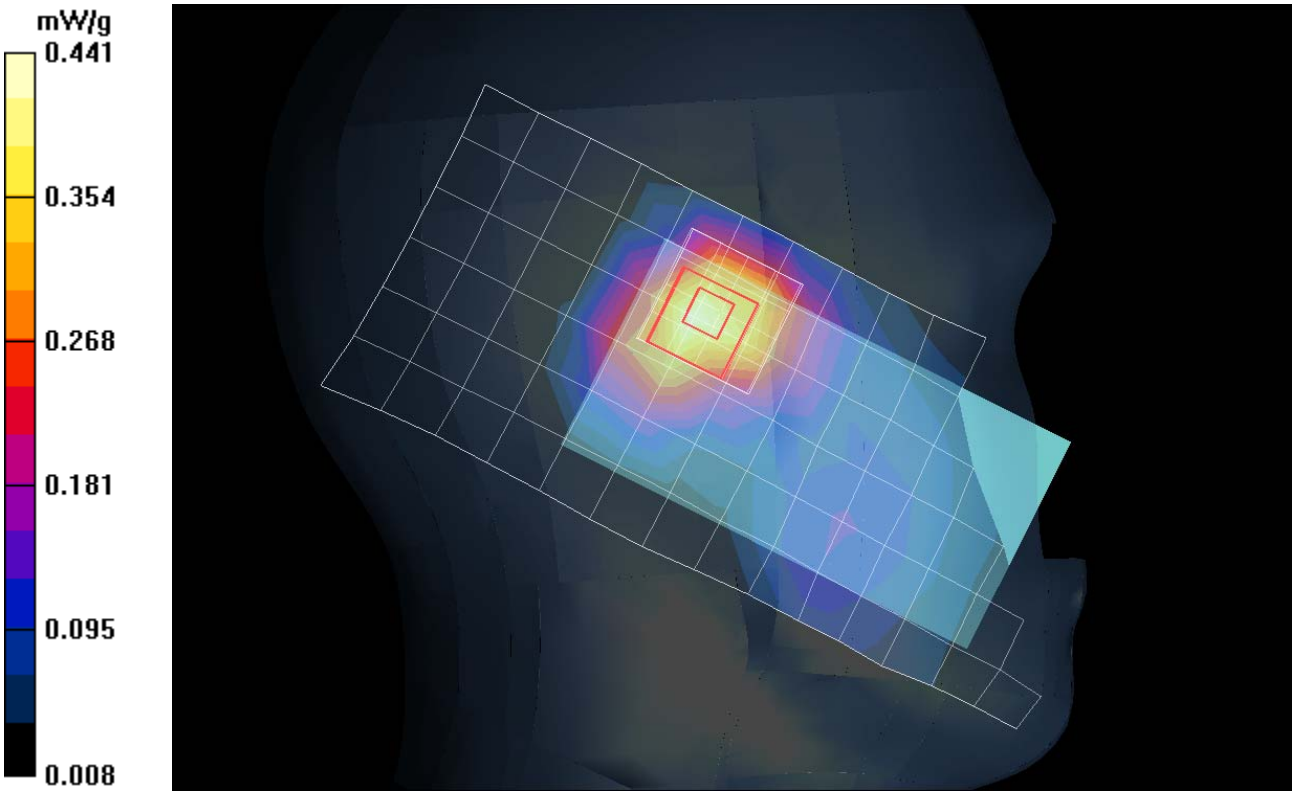
DUT: Serial: 356472040016520, FCC ID: IHDP56MA2
Procedure Notes: Pwr Step: Battery Model #: SNN5891A DEVICE POSITION: 15 Degree Tilt
Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 39; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.27, 5.27, 5.27); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1319;
- 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) = 0.439 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.6 V/m; Power Drift = -0.072 dB
Peak SAR (extrapolated) = 0.595 W/kg
SAR(1 g) = 0.408 mW/g; SAR(10 g) = 0.258 mW/g
Maximum value of SAR (measured) = 0.441 mW/g



Date/Time: 7/27/2011 12:55:40 AM

Test Laboratory: Motorola WiFi 2450 MHz Cheek Touch

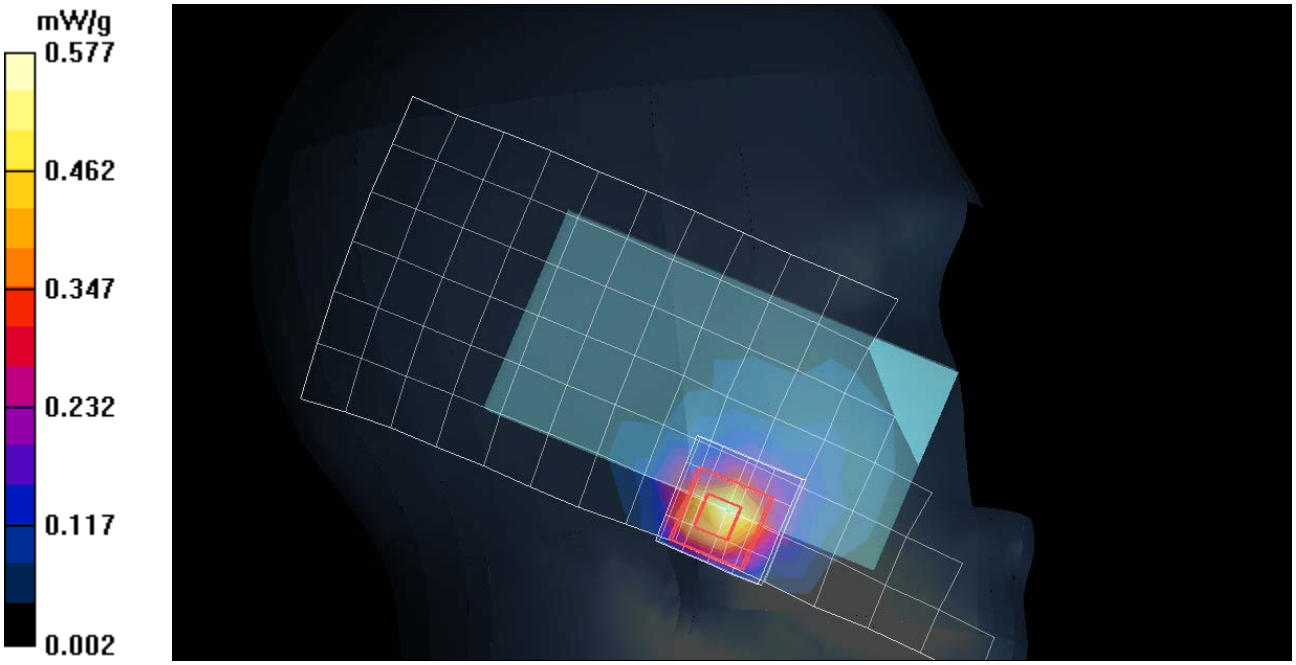
DUT: Serial: '356472040014939, FCC ID: IHDP56MA2
Procedure Notes: 802.11b 11Mbps Battery Model #: SNN5891A DEVICE POSITION: cheek touch
Communication System: Wi-Fi 2450; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450 Glycol Head; Medium parameters used: f = 2450 MHz; σ = 1.85 mho/m; ε_r = 36.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.39, 4.39, 4.39); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1318;
- 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) = 0.562 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.28 V/m; Power Drift = -0.178 dB
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.524 mW/g; SAR(10 g) = 0.228 mW/g
Maximum value of SAR (measured) = 0.577 mW/g



Date/Time: 7/26/2011 9:02:03 PM

Test Laboratory: Motorola **WiFi 2450MHz 15 Degree Tilt**

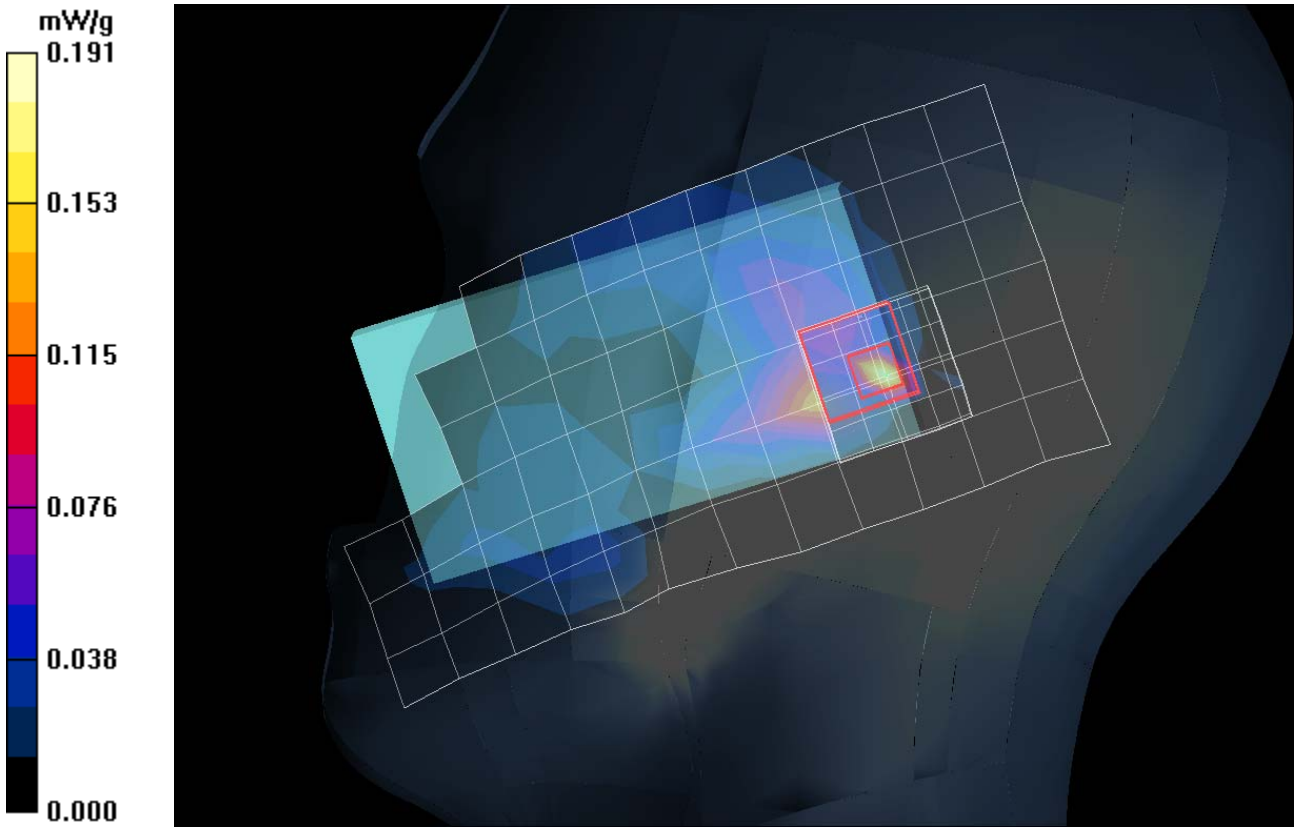
DUT: Serial: '356472040014939, FCC ID: IHDP56MA2
Procedure Notes: 802.11b 1Mbps Battery Model #: SNN5891A DEVICE POSITION: 15 Degree Tilt
Communication System: Wi-Fi 2450; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450 Glycol Head; Medium parameters used: f = 2450 MHz; σ = 1.85 mho/m; ε_r = 36.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.39, 4.39, 4.39); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1318;
- 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) = 0.131 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) - to correct max outside (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.61 V/m; Power Drift = 0.031 dB
Peak SAR (extrapolated) = 0.206 W/kg
SAR(1 g) = 0.083 mW/g; SAR(10 g) = 0.035 mW/g
Maximum value of SAR (measured) = 0.191 mW/g



Appendix 3

SAR distribution plots for Body Worn Configuration

Date/Time: 7/16/2011 1:05:17 AM

Test Laboratory: Motorola GSM 850MHz Body Worn

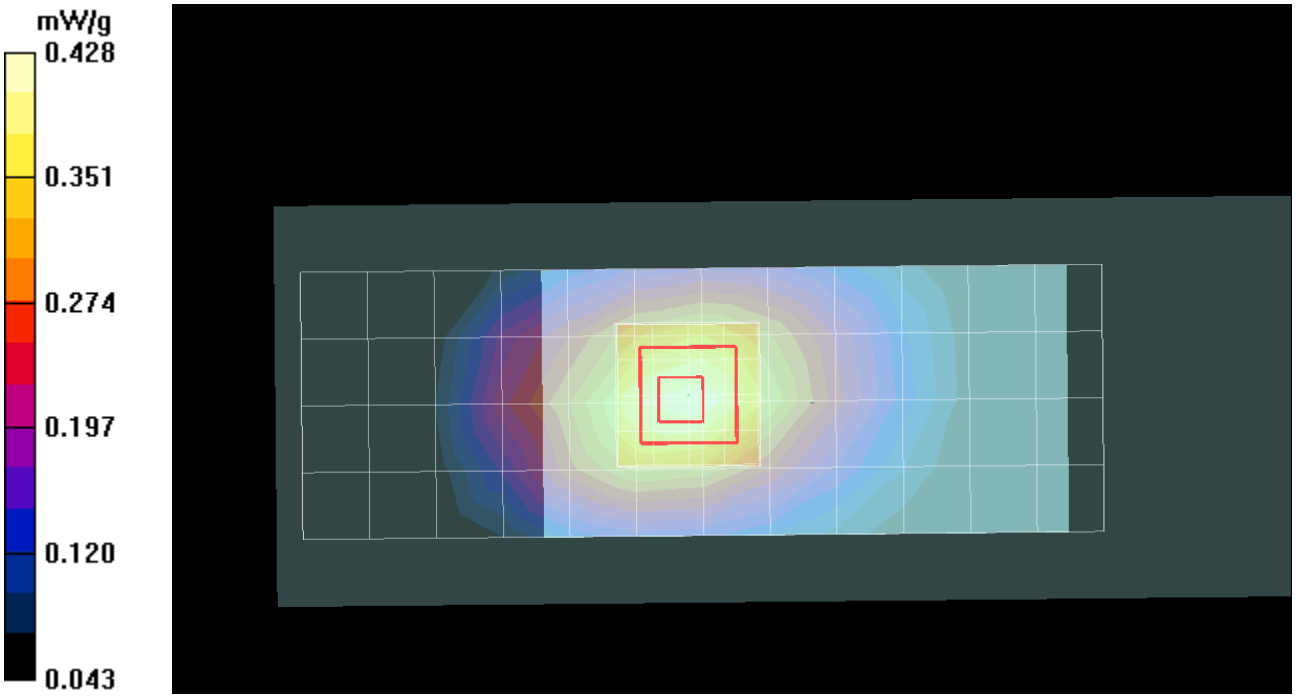
DUT: Serial: 356472040016520, FCC ID: IHDP56MA2
Procedure Notes: Pwr Step: 05 Battery Model #: SNN5891A Test Configuration: BACK OF PHONE 15MM AWAY FROM PHANTOM
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.08, 6.08, 6.08); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ 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 Body (15mm) (13x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.422 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.6 V/m; Power Drift = -0.026 dB
Peak SAR (extrapolated) = 0.531 W/kg
SAR(1 g) = 0.406 mW/g; SAR(10 g) = 0.295 mW/g
Maximum value of SAR (measured) = 0.428 mW/g



Date/Time: 7/16/2011 1:25:08 AM

Test Laboratory: Motorola WCDMA 850MHz Body Worn

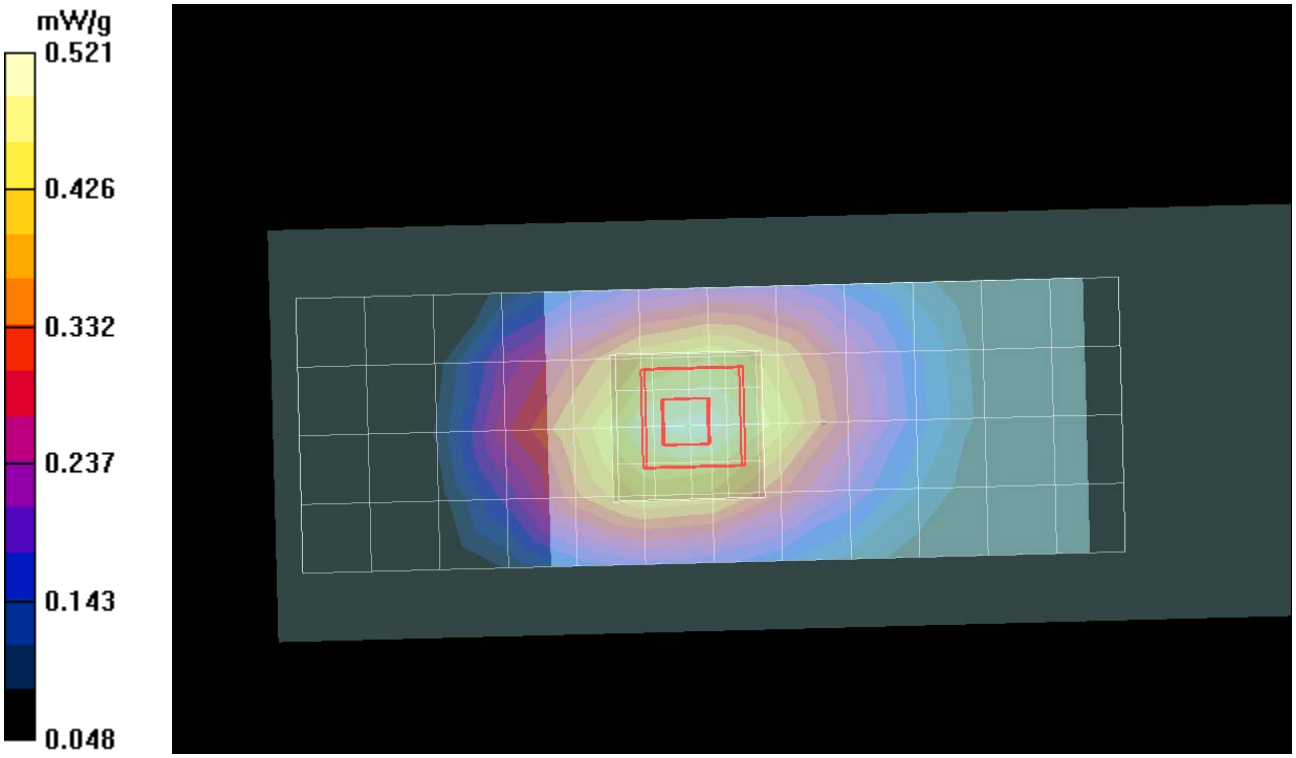
DUT: Serial: 356472040016520, FCC ID: IHDP56MA2
Procedure Notes: Pwr Step: all up bits Battery Model #: SNN5891A Test Configuration: BACK OF PHONE 15MM AWAY FROM PHANTOM
Communication System: 3G-WCDMA 850; Frequency: 836 MHz;Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.08, 6.08, 6.08); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ 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 Body (15mm) (13x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.509 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.6 V/m; Power Drift = -0.054 dB
Peak SAR (extrapolated) = 0.643 W/kg
SAR(1 g) = 0.492 mW/g; SAR(10 g) = 0.356 mW/g
Maximum value of SAR (measured) = 0.521 mW/g



Date/Time: 7/13/2011 7:52:22 PM

Test Laboratory: Motorola GSM 1900MHz Body Worn

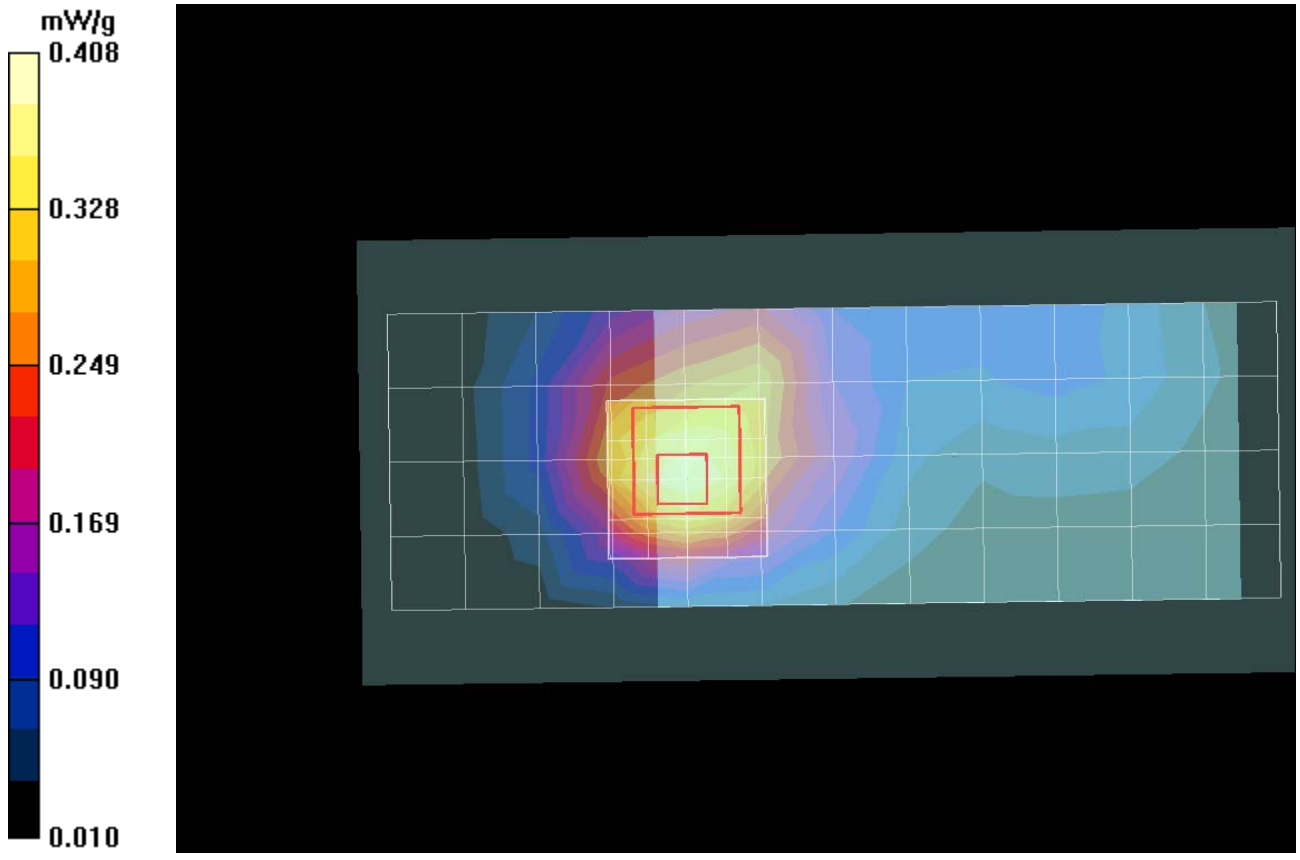
DUT: Serial: 356472040016520, FCC ID: IHDP56MA2
Procedure Notes: Pwr Step: 0 Battery Model #: SNN5891A Test Configuration: BACK OF PHONE 15MM AWAY FROM PHANTOM
Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(4.87, 4.87, 4.87); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ 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 Body (15mm) (13x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.343 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz), - to correct max out (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.9 V/m; Power Drift = -0.036 dB
Peak SAR (extrapolated) = 0.631 W/kg
SAR(1 g) = 0.377 mW/g; SAR(10 g) = 0.229 mW/g
Maximum value of SAR (measured) = 0.408 mW/g



Date/Time: 7/13/2011 4:30:54 PM

Test Laboratory: Motorola WCDMA 1900MHz Body Worn

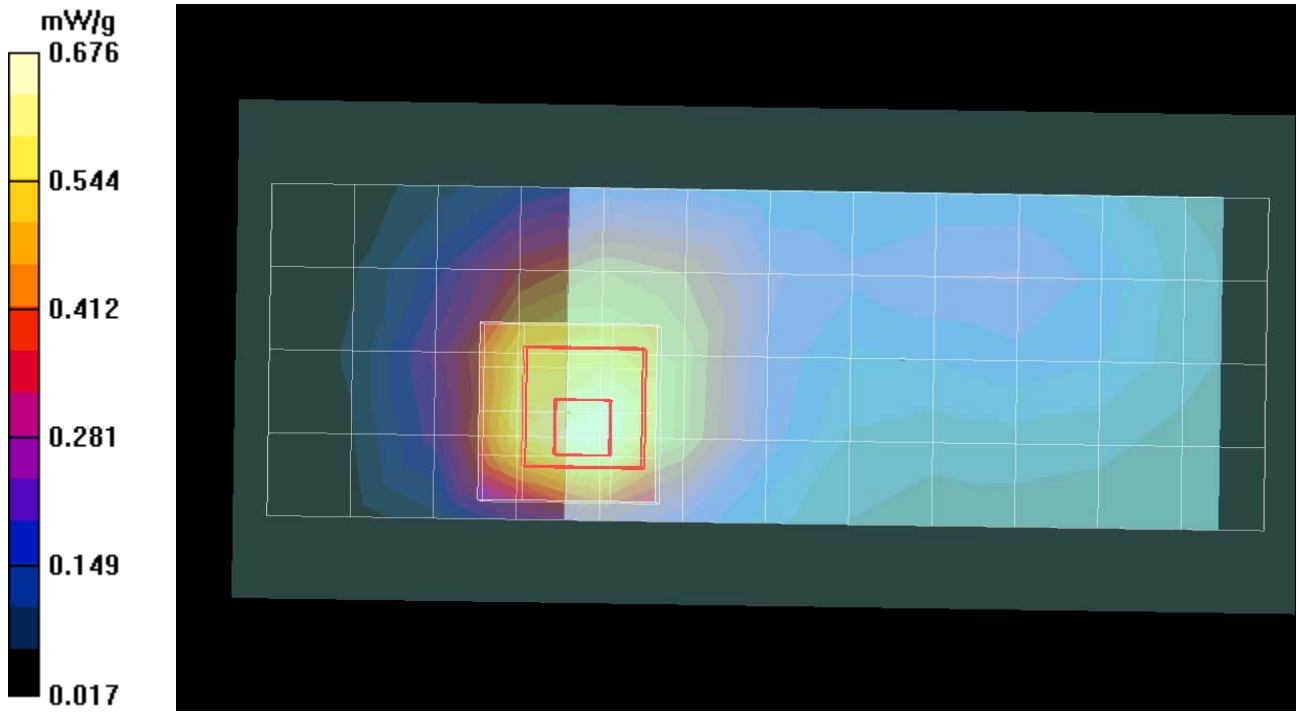
DUT: Serial: 356472040016520, FCC ID: IHDP56MA2
Procedure Notes: Pwr Step: All Bits UP Battery Model #: SNN5891A Test Configuration: BACK OF PHONE 15MM AWAY FROM PHANTOM
Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(4.87, 4.87, 4.87); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ 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 Body (15mm) (13x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.683 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.2 V/m; Power Drift = 0.021 dB
Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.642 mW/g; SAR(10 g) = 0.390 mW/g
Maximum value of SAR (measured) = 0.676 mW/g



Date/Time: 7/27/2011 10:13:08 PM

Test Laboratory: Motorola WiFi 2450MHz Body Worn

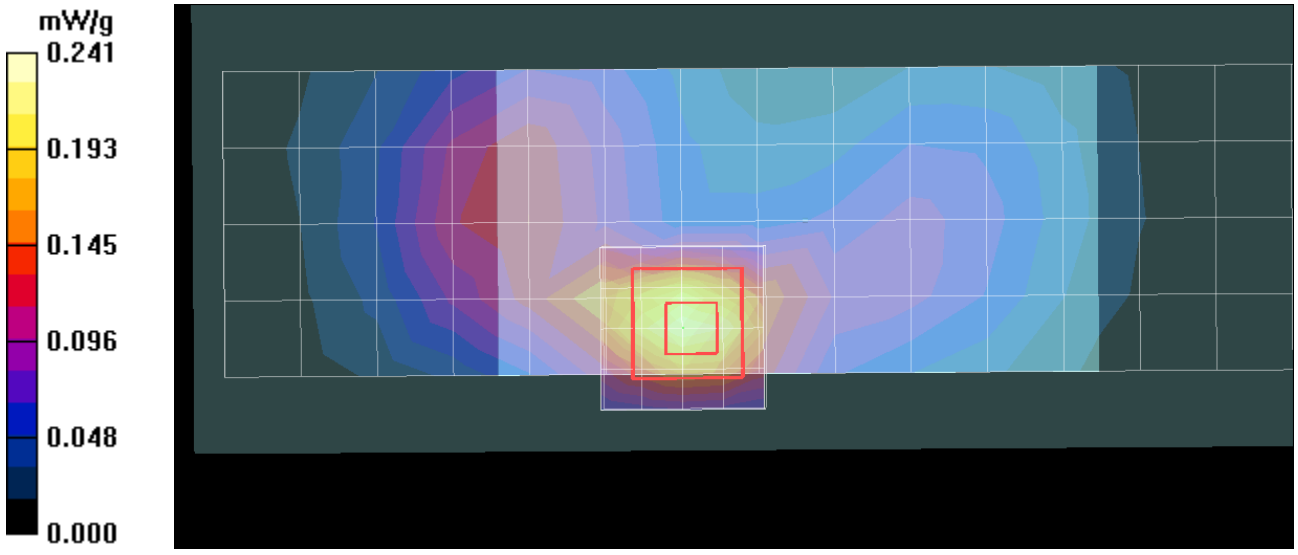
DUT: Serial: 356472040014939, FCC ID: IHDP56MA2
Procedure Notes: 802.11b 1Mbps Battery Model #: SNN5891A Test Configuration: BODY WORN, BACK OF PHONE 15MM FROM PHANTOM
Communication System: Wi-Fi 2450; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: 2450 Glycol Body; Medium parameters used: f = 2450 MHz; σ = 2.03 mho/m; ε_r = 47.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(4.24, 4.24, 4.24); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ 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) = 0.212 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.01 V/m; Power Drift = -0.064 dB
Peak SAR (extrapolated) = 0.419 W/kg
SAR(1 g) = 0.218 mW/g; SAR(10 g) = 0.111 mW/g
Maximum value of SAR (measured) = 0.241 mW/g



Appendix 4

SAR distribution plots for Mobile Hotspot Configuration

Date/Time: 7/24/2011 8:31:48 AM

Test Laboratory: Motorola GPRS 850MHz WiFi Hotspot Configuration

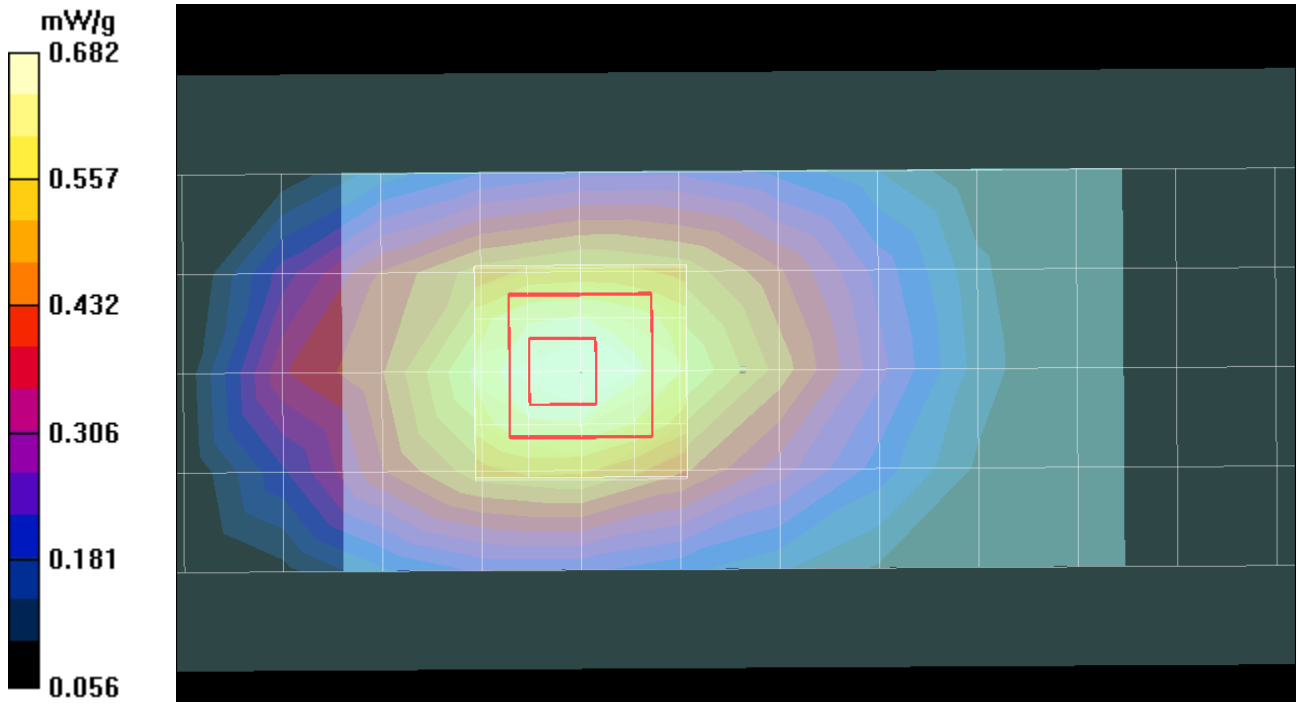
DUT: Serial: 356472040014939, FCC ID: IHDP56MA2
Procedure Notes: Pwr Step: 5 Battery Model #: SNN5891A Test Configuration: GPRS CLASS 8 (1 Upslot) BODY, BACK OF PHONE 10MM FROM PHANTOM
Communication System: GPRS 850 - Class 8; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.08, 6.08, 6.08); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ 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) = 0.688 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.5 V/m; Power Drift = -0.052 dB
Peak SAR (extrapolated) = 0.828 W/kg
SAR(1 g) = 0.650 mW/g; SAR(10 g) = 0.478 mW/g
Maximum value of SAR (measured) = 0.682 mW/g



Date/Time: 7/21/2011 11:22:16 AM

Test Laboratory: Motorola WCDMA 850MHz WiFi Hotspot Configuration

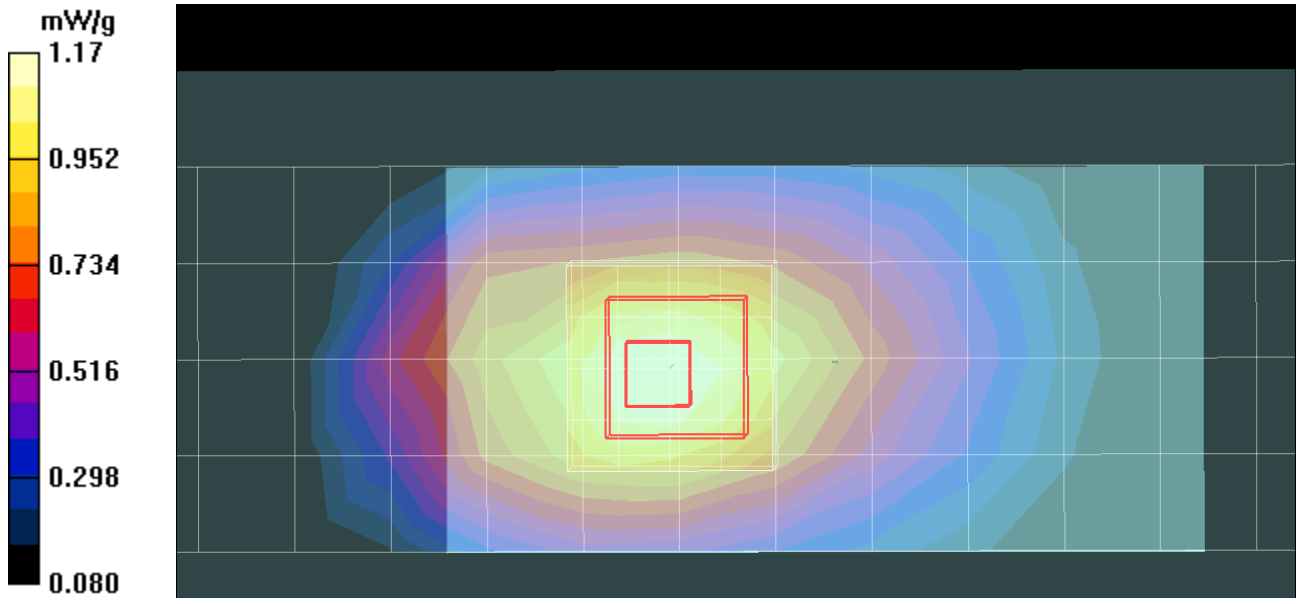
DUT: Elway; Type: Tablet/PDA; Serial: 356472040016520
Procedure Notes: Pwr Step: ALWAYS UP Battery Model #: SNN5891A Test Configuration: BACK OF PHONE 10MM FROM PHANTOM
Communication System: 3G-WCDMA 850; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 54.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.08, 6.08, 6.08); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ 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) = 1.15 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.9 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 1.45 W/kg
SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.805 mW/g
Maximum value of SAR (measured) = 1.17 mW/g



Date/Time: 7/23/2011 10:27:07 AM

Test Laboratory: Motorola GSM 1900MHz WiFi Hotspot Configuration

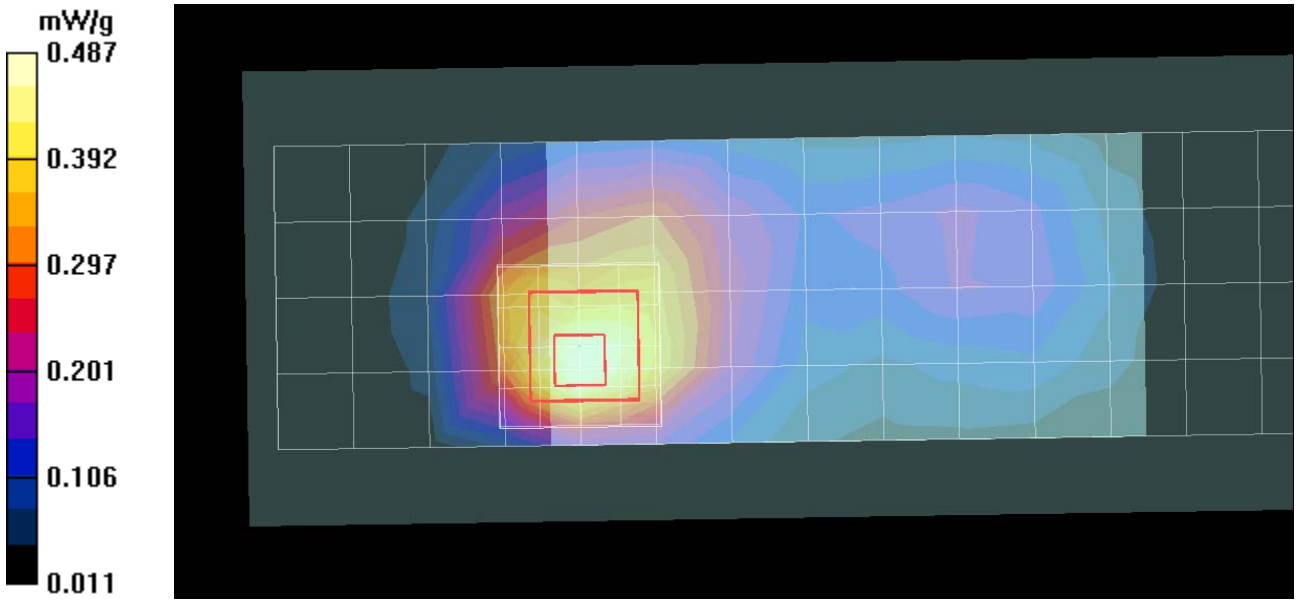
DUT: Serial: 356472040014939, FCC ID: IHDP56MA2
Procedure Notes: Pwr Step: 0 Battery Model #: SNN5891A Test Configuration: GPRS CLASS 8, BACK OF PHONE 10MM FROM PHANTOM
Communication System: GPRS 1900 - Class 8; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(4.87, 4.87, 4.87); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ 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) = 0.514 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.4 V/m; Power Drift = -0.056 dB
Peak SAR (extrapolated) = 0.824 W/kg
SAR(1 g) = 0.467 mW/g; SAR(10 g) = 0.272 mW/g
Maximum value of SAR (measured) = 0.487 mW/g



Date/Time: 8/3/2011 1:12:14 PM

Test Laboratory: Motorola WCDMA 1900MHz WiFi Hotspot Configuration

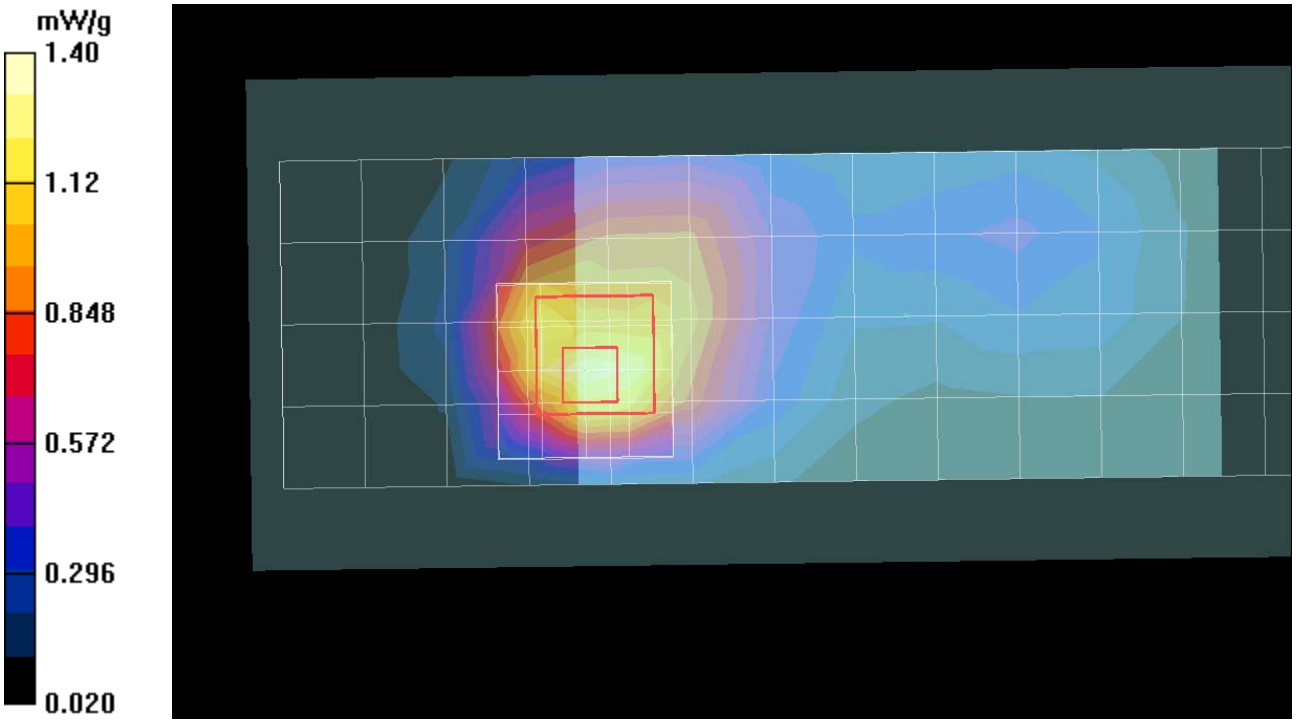
DUT: Serial: 356472040016520, FCC ID: IHDP56MA2
Procedure Notes: Pwr Step: ALWAYS UP Battery Model #: SNN5891A Test Configuration: BACK OF PHONE 10MM FROM PHANTOM
Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 50.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(4.87, 4.87, 4.87); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ 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) = 1.26 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.6 V/m; Power Drift = -0.053 dB
Peak SAR (extrapolated) = 2.37 W/kg
SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.724 mW/g
Maximum value of SAR (measured) = 1.40 mW/g



Date/Time: 7/27/2011 8:00:39 PM

Test Laboratory: Motorola WiFi 2450MHz WiFi Hotspot Configuration

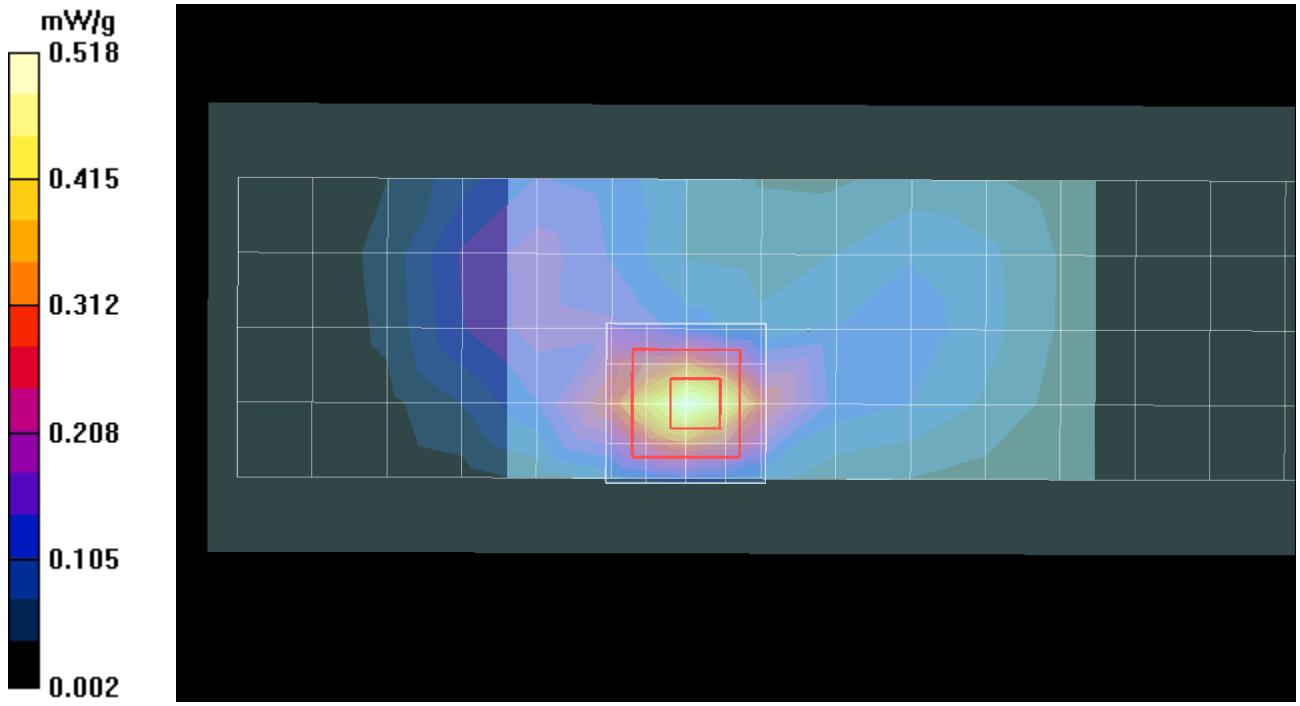
DUT: Serial: 356472040014939, FCC ID: IHDP56MA2
Procedure Notes: 802.11b 11Mbps Battery Model #: SNN5891A Test Configuration: BACK OF PHONE 10MM FROM PHANTOM
Communication System: Wi-Fi 2450; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450 Glycol Body; Medium parameters used: f = 2450 MHz; σ = 2.03 mho/m; ε_r = 47.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(4.24, 4.24, 4.24); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ 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) = 0.512 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.81 V/m; Power Drift = -0.004 dB
Peak SAR (extrapolated) = 0.953 W/kg
SAR(1 g) = 0.453 mW/g; SAR(10 g) = 0.209 mW/g
Maximum value of SAR (measured) = 0.518 mW/g



Appendix 5

SAR distribution plots for Simultaneous Evaluation

Test Laboratory: Motorola WCDMA 1900MHz and WiFi 2450 MHz Simultaneous Evaluation

DASY4 Configuration for MegaZoom, DASY4 Amy Twin Phone Template - Rev.28July11/Amy Twin Phone Template/Mega Zoom Scan (<=3GHz):

Date/Time: 7/29/2011 11:54:52 AM
DUT: Serial: 356472040014939, FCC ID: IHDP56MA2
Communication System: Wi-Fi 2450 11 Mbps; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 Glycol Body Medium parameters used: f = 2450 MHz; σ = 2.04 mho/m; ε_r = 47.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

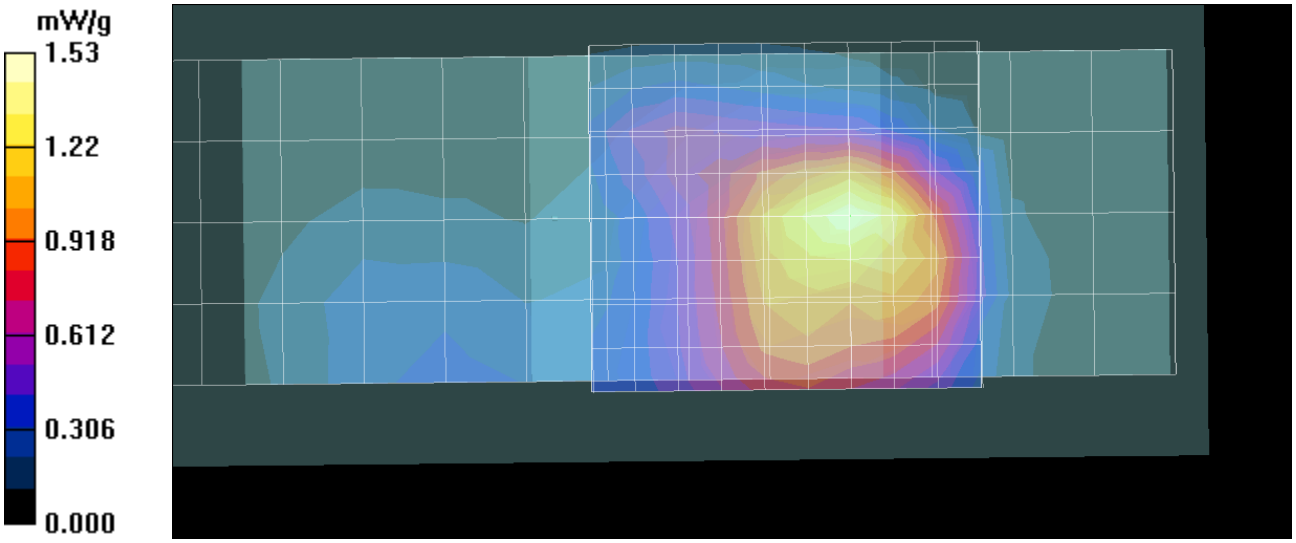
- Probe: ES3DV3 - SN3184; ConvF(4.33, 4.33, 4.33); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/20/2010
- Phantom: R#2_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a
- Measurement SW: DASY4, V4.7 Build 80

DASY4 Configuration for MegaZoom, DASY4 Amy Twin Phone Template - Rev.28July11/Amy Twin Phone Template/Mega Zoom Scan (<=3GHz):

Date/Time: 8/3/2011 9:56:59 AM
DUT: Serial: 356472040016520, FCC ID: IHDP56MA2
Communication System: 3G/WCDMA 1900 - All up bits; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880 Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 50.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

- Probe: ES3DV3 - SN3037; ConvF(4.87, 4.87, 4.87); Calibrated: 4/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R1_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a
- Measurement SW: DASY4, V4.7 Build 80

Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.31 mW/g
Multi Band Result:
SAR(1 g) = 1.38 mW/g; SAR(10 g) = 0.784 mW/g
Maximum value of SAR (measured) = 1.53 mW/g



Postprocessing SW: SEMCAD, V1.8 Build 186

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
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: ES3-3184_Mar11

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3184
Calibration procedure(s)	QA CAL-01.v7, QA CAL-23.v4, QA CAL-25.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	March 11, 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	01-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	01-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	01-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
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:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 16, 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
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

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., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not 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 ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3184

Manufactured: August 19, 2008
Calibrated: March 11, 2011

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3184

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.27	1.40	1.27	± 10.1 %
DCP (mV)[B]	96.8	98.9	99.5	

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	110.8	±3.0 %
			Y	0.00	0.00	1.00	117.2	
			Z	0.00	0.00	1.00	107.9	

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:3184

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	6.11	6.11	6.11	1.00	1.04	± 12.0 %
1810	40.0	1.40	5.11	5.11	5.11	0.93	1.08	± 12.0 %
1950	40.0	1.40	4.93	4.93	4.93	0.96	1.07	± 12.0 %
2450	39.2	1.80	4.48	4.48	4.48	0.73	1.28	± 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:3184

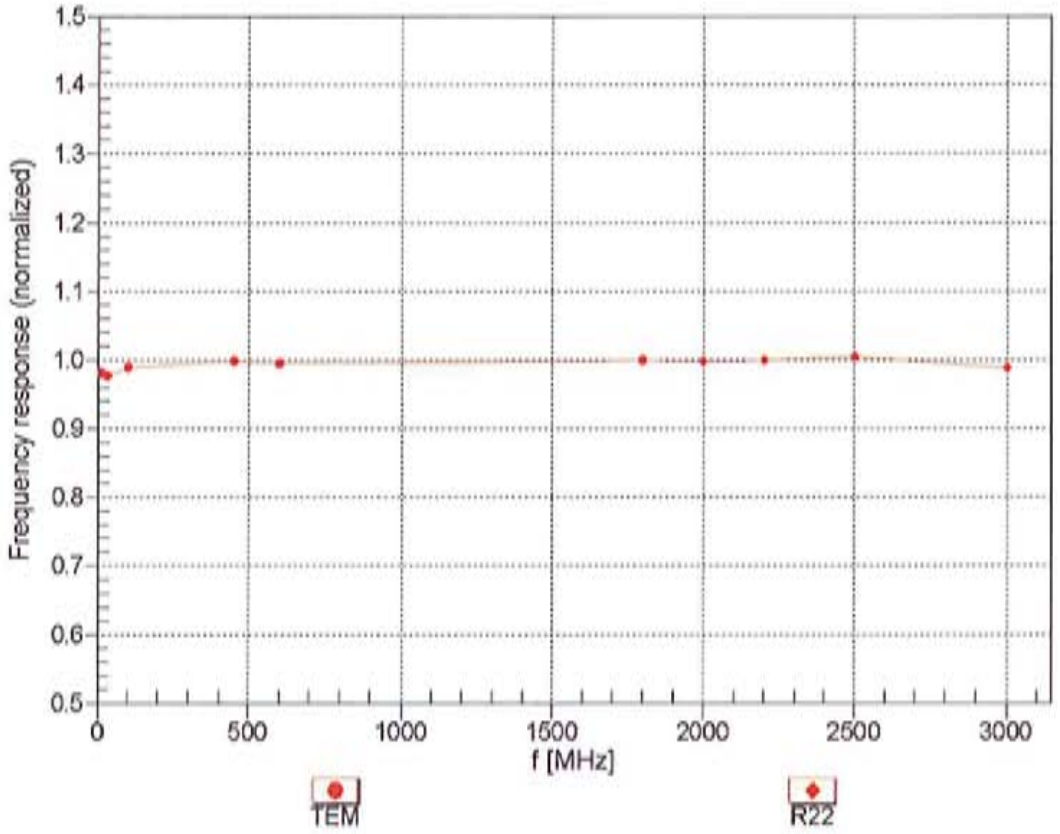
Calibration Parameter Determined in Body Tissue Simulating Media

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	1.00	1.00	± 12.0 %
1810	53.3	1.52	4.90	4.90	4.90	0.87	1.26	± 12.0 %
1950	53.3	1.52	4.86	4.86	4.86	0.73	1.38	± 12.0 %
2450	52.7	1.95	4.33	4.33	4.33	1.00	1.03	± 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

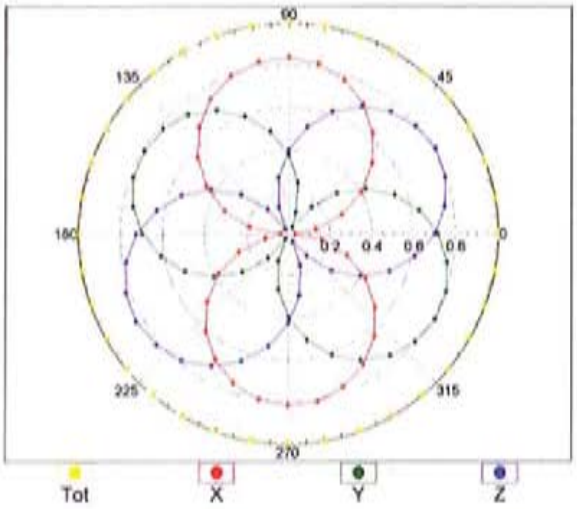
(TEM-Cell:ifi110 EXX, Waveguide: R22)



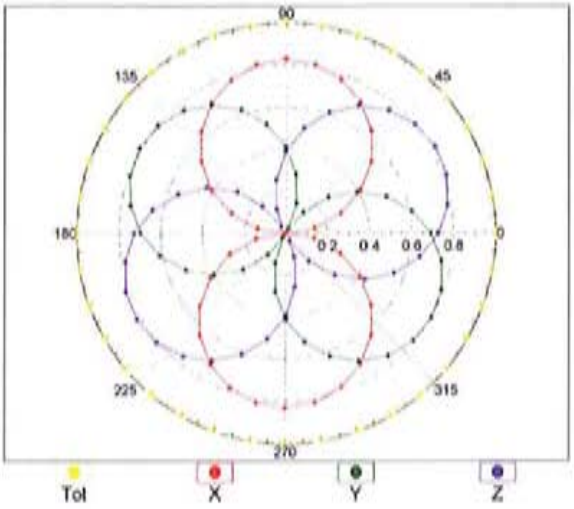
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

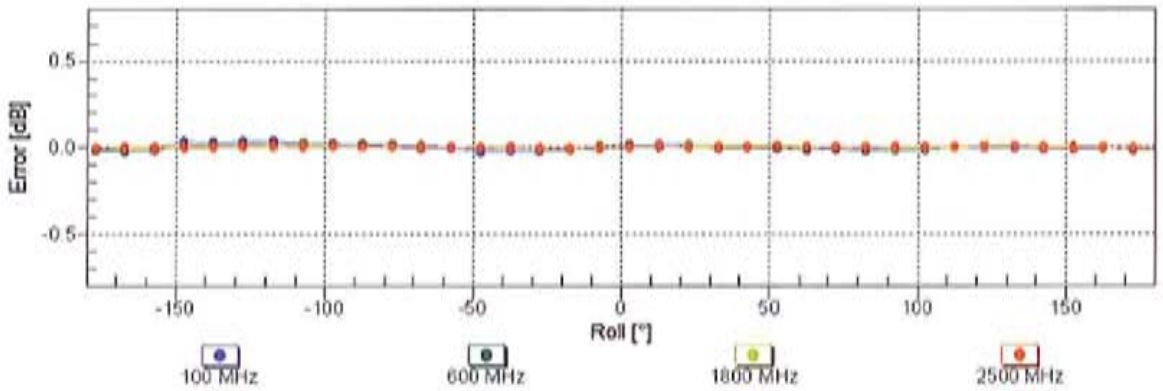
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



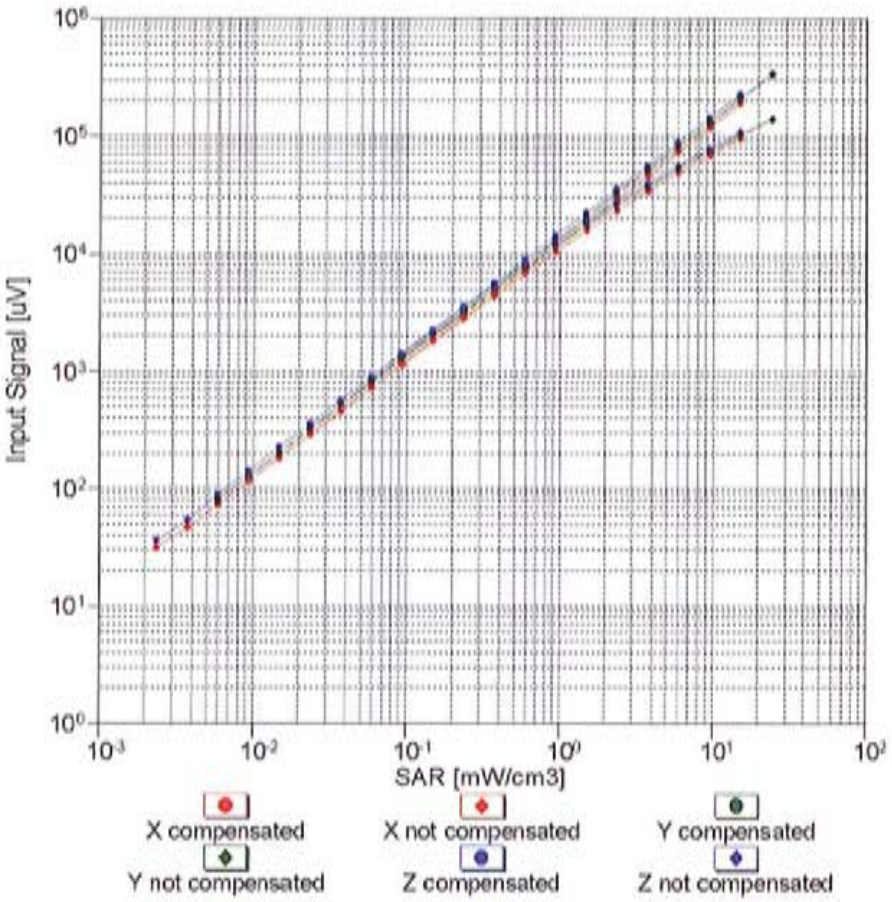
f=1800 MHz,R22

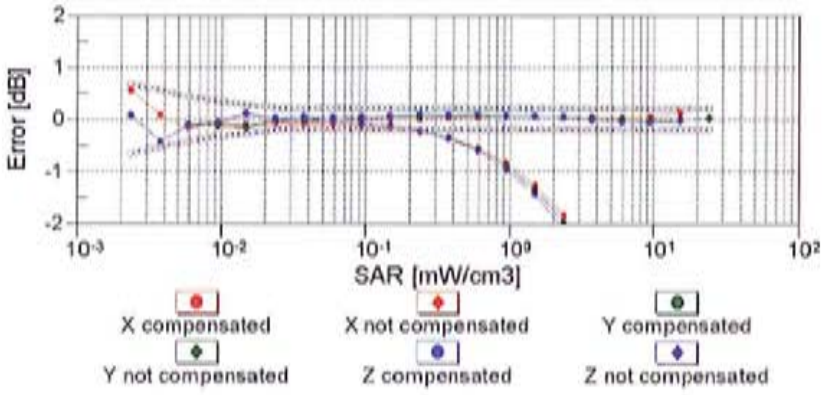




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

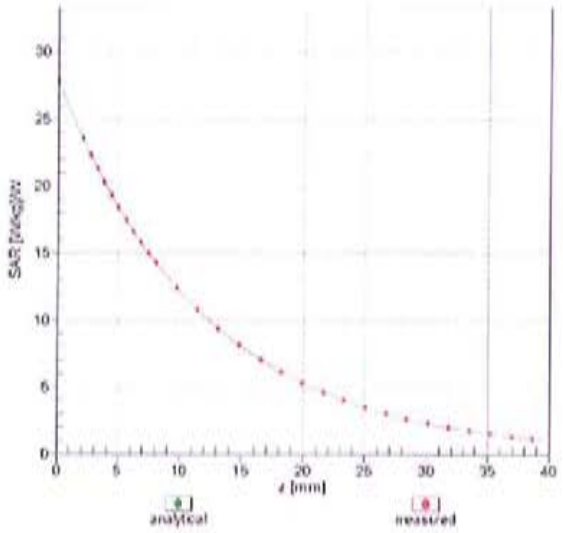




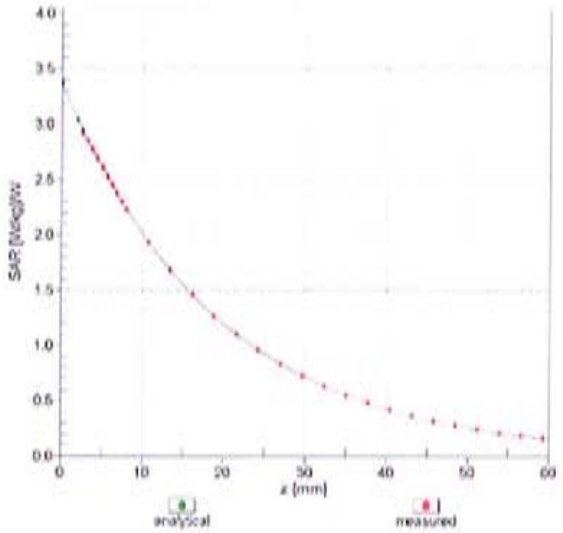
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 1950 MHz,WGLS R22 (H_convF)

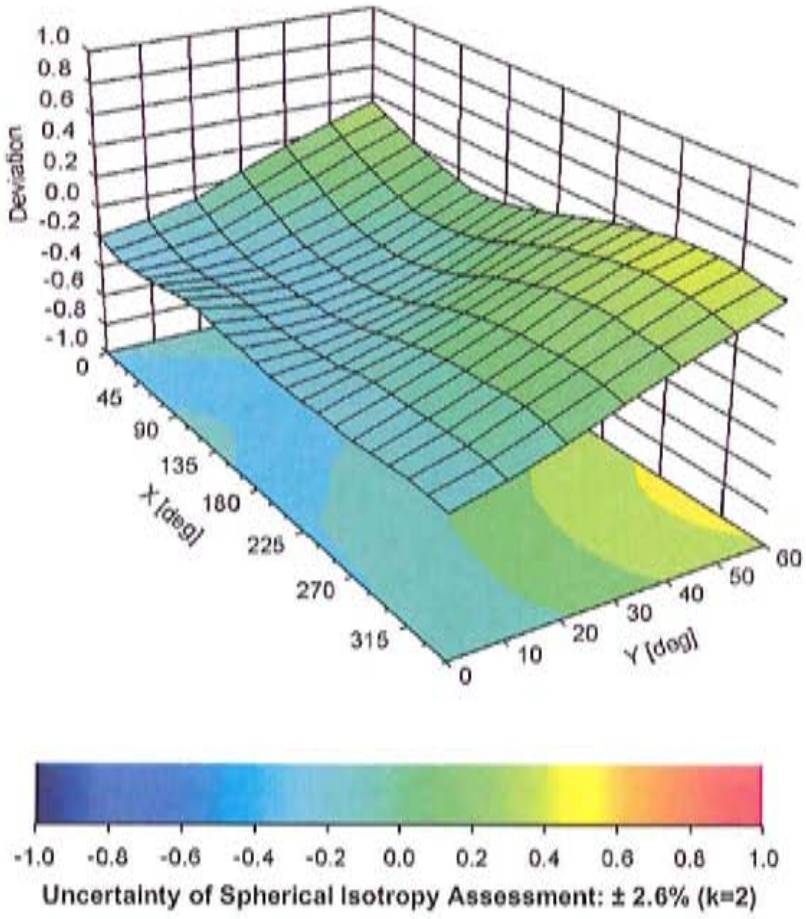


f = 835 MHz,WGLS R9 (H_convF)



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:3184

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

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

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

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: ES3-3115_Jan11

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3115

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

Calibration date: January 12, 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	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 660	20-Apr-10 (No. DAE4-660_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:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 13, 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
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

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., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

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

Probe ES3DV3

SN:3115

Manufactured:	March 6, 2006
Last calibrated:	January 19, 2010
Recalibrated:	January 12, 2011

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 SN:3115

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.29	1.30	1.18	± 10.1%
DCP (mV)[B]	100.2	102.3	101.3	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	113.4	± 2.4 %
			Y	0.00	0.00	1.00	150.5	
			Z	0.00	0.00	1.00	142.6	

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 maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 SN:3115

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
835	± 50 / ± 100	41.5 ± 5%	0.90 ± 5%	5.87	5.87	5.87	0.34	1.74 ± 11.0%
1810	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	5.02	5.02	5.02	0.43	1.62 ± 11.0%
1950	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.80	4.80	4.80	0.62	1.36 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	4.39	4.39	4.39	0.94	1.13 ± 11.0%

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

DASY/EASY - Parameters of Probe: ES3DV3 SN:3115

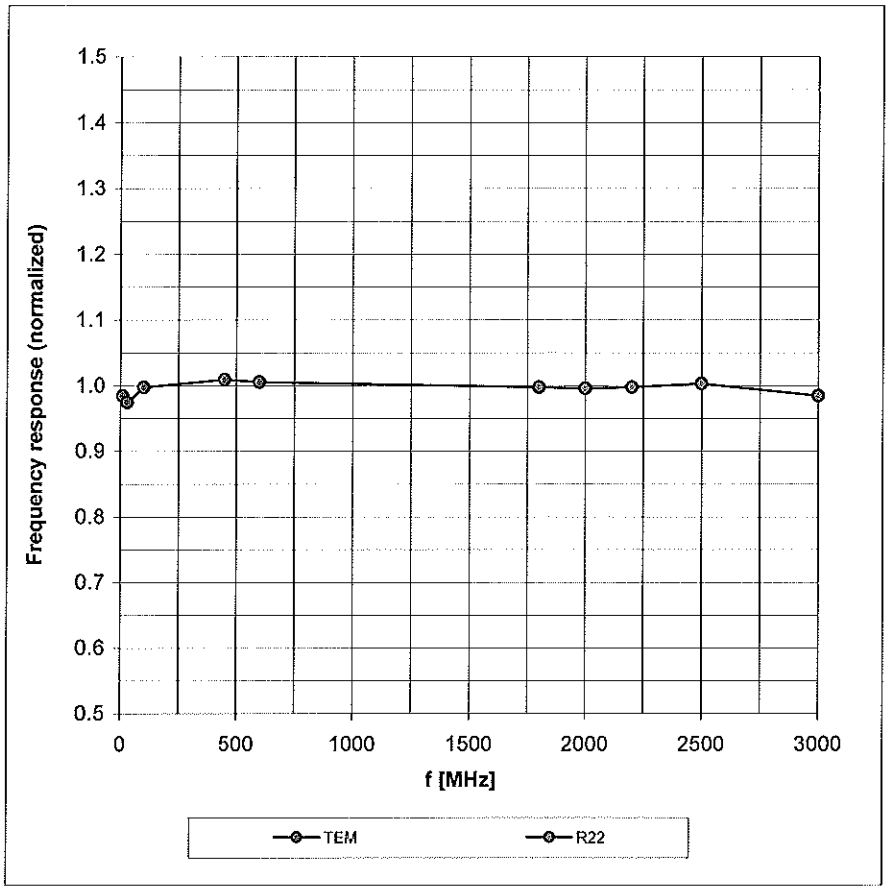
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth	Unc (k=2)
835	± 50 / ± 100	55.2 ± 5%	0.97 ± 5%	5.88	5.88	5.88	0.57	1.41	± 11.0%
1810	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.61	4.61	4.61	0.33	2.26	± 11.0%
1950	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.57	4.57	4.57	0.36	2.19	± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	4.12	4.12	4.12	0.99	0.75	± 11.0%

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

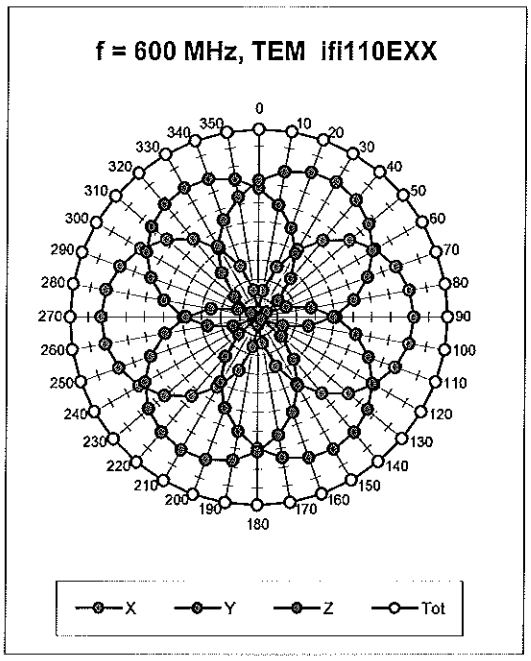
Frequency Response of E-Field

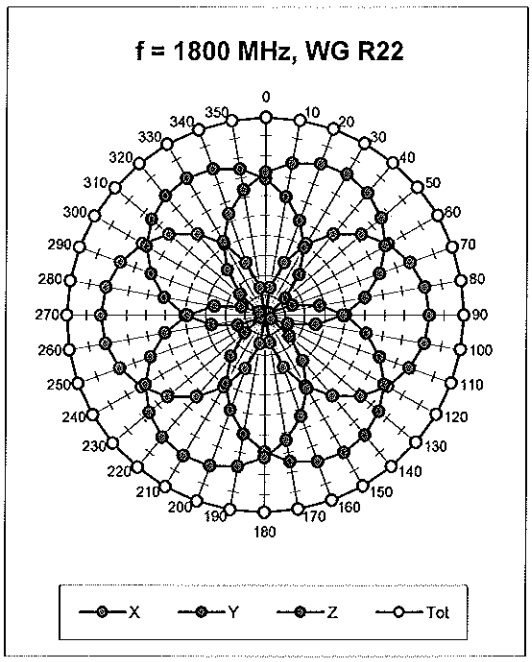
(TEM-Cell:ifi110 EXX, Waveguide: R22)

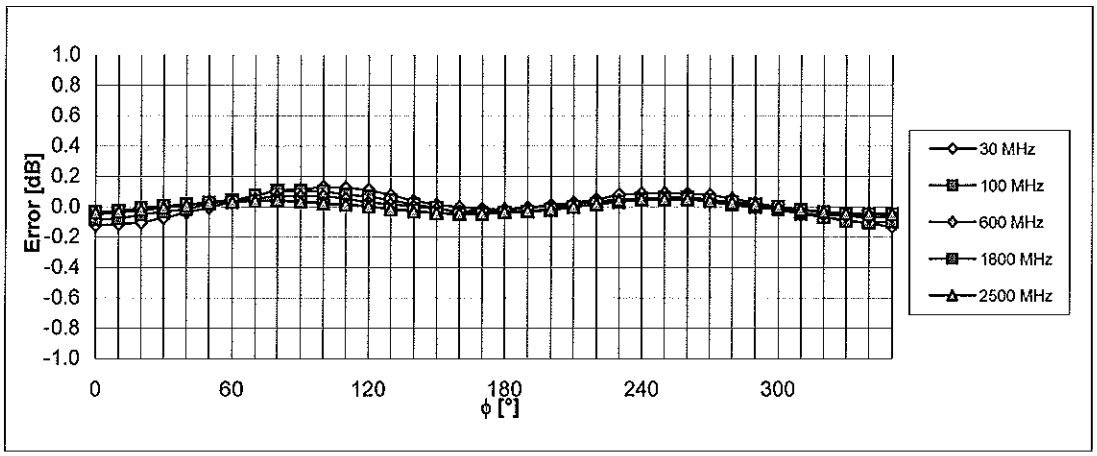


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



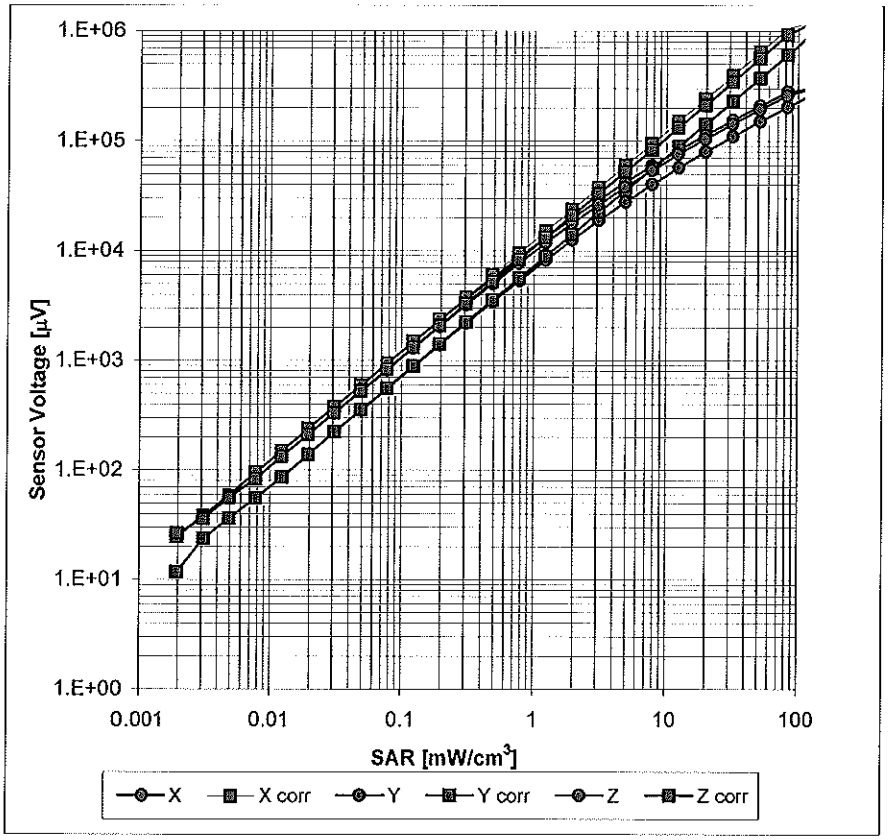


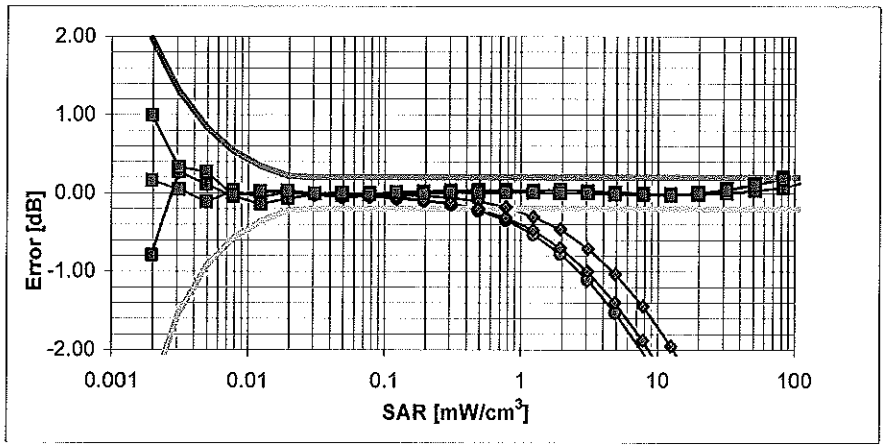


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

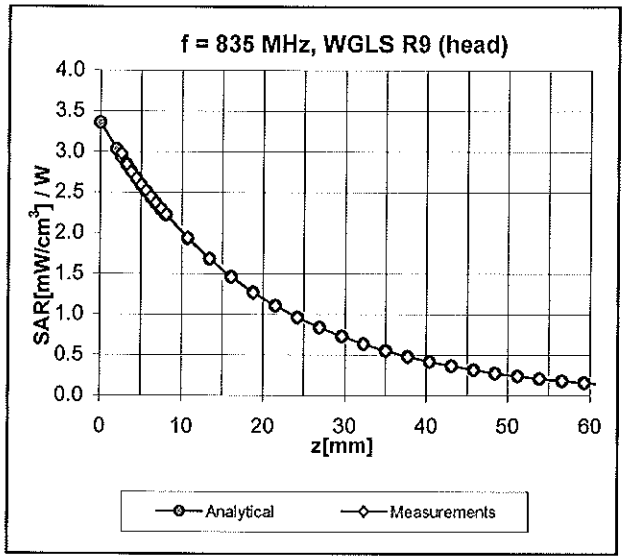
(TEM cell, f = 900 MHz)

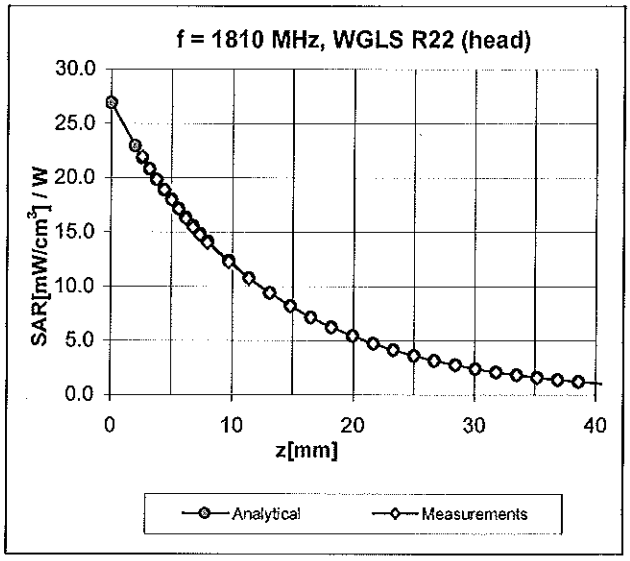




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

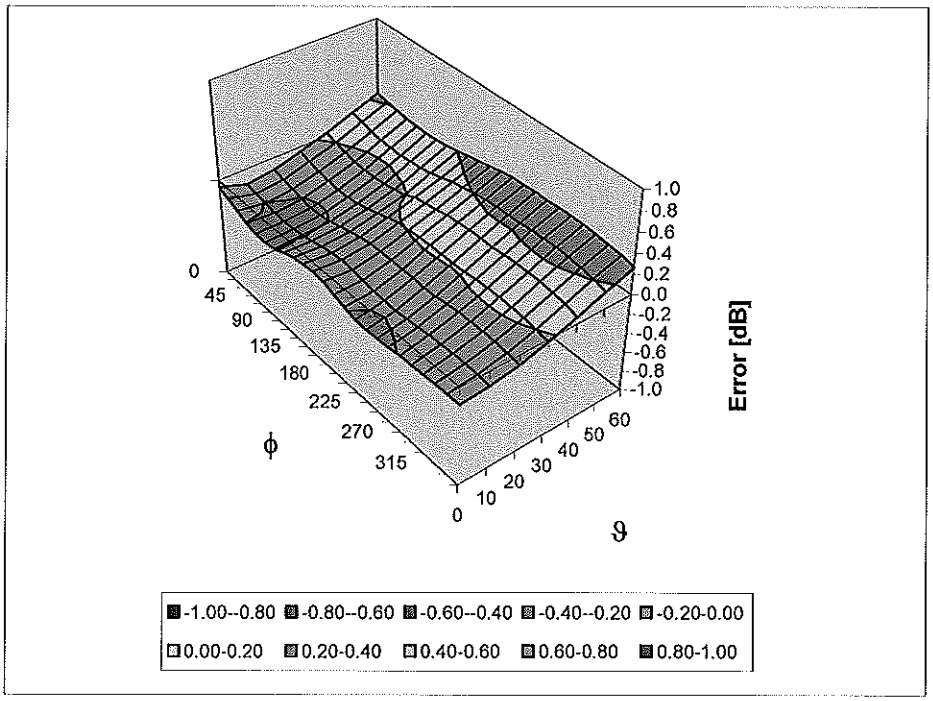
Conversion Factor Assessment





Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

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

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)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client **Motorola MDb**

Certificate No: ES3-3037_Apr11

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3037

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 13, 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:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 18, 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
S 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:3037

Manufactured: August 21, 2003
Calibrated: April 13, 2011

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3037

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.14	0.85	0.97	± 10.1 %
DCP (mV)[B]	106.0	104.5	103.5	

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	146.0	±2.5 %
			Y	0.00	0.00	1.00	119.8	
			Z	0.00	0.00	1.00	129.2	

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:3037

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	0.98	1.08	± 11.0 %
1810	40.0	1.40	5.27	5.27	5.27	0.64	1.47	± 11.0 %
1950	40.0	1.40	5.04	5.04	5.04	0.69	1.35	± 11.0 %
2450	39.2	1.80	4.49	4.49	4.49	0.65	1.36	± 11.0 %

[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:3037

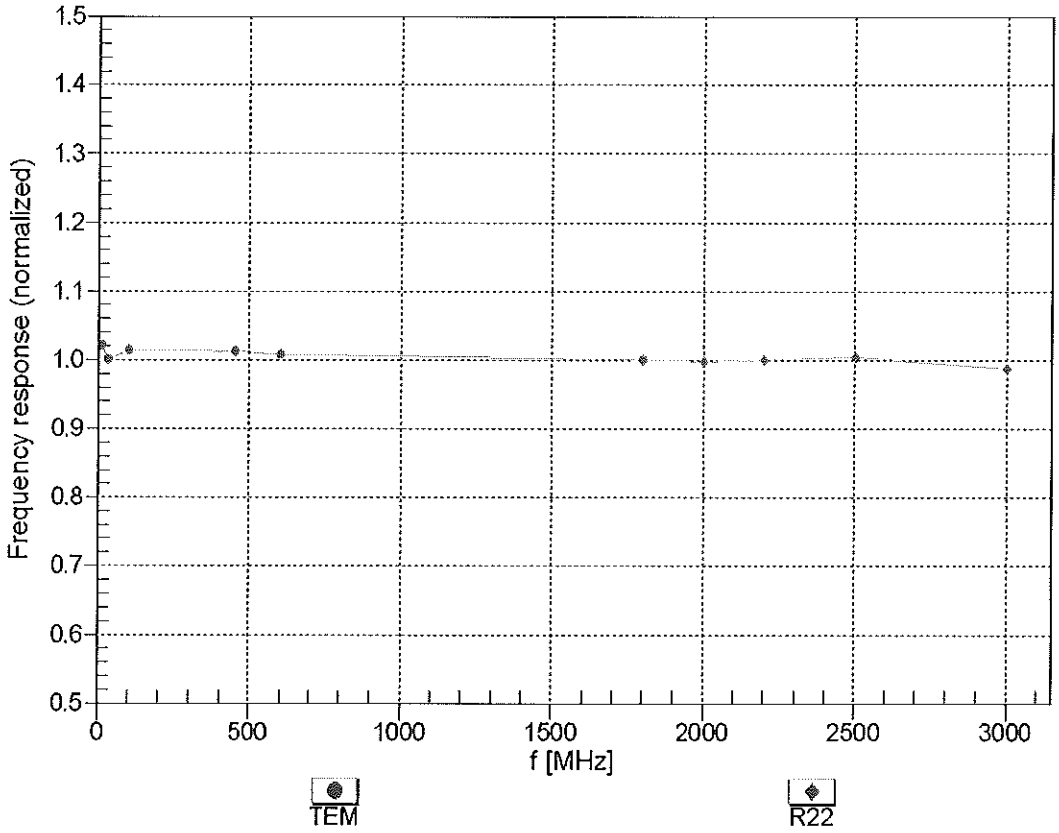
Calibration Parameter Determined in Body Tissue Simulating Media

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	6.08	6.08	6.08	1.00	1.10	± 11.0 %
1810	53.3	1.52	4.87	4.87	4.87	0.68	1.22	± 11.0 %
1950	53.3	1.52	4.83	4.83	4.83	0.80	1.25	± 11.0 %
2450	52.7	1.95	4.24	4.24	4.24	0.79	1.18	± 11.0 %

[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

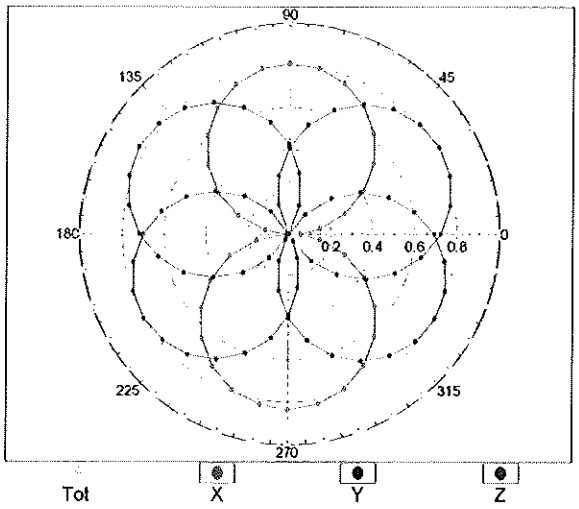
(TEM-Cell:ifi110 EXX, Waveguide: R22)



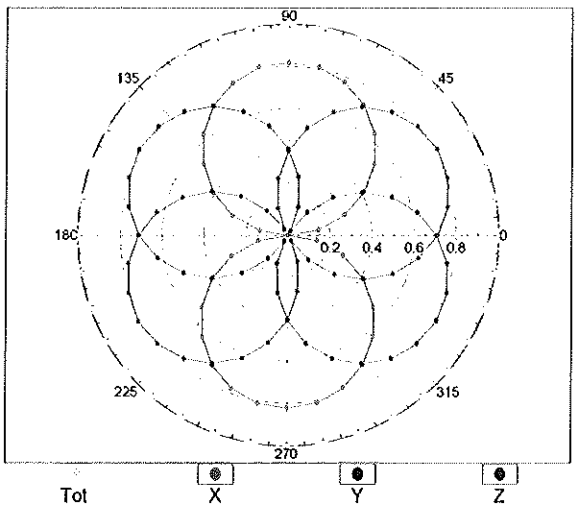
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

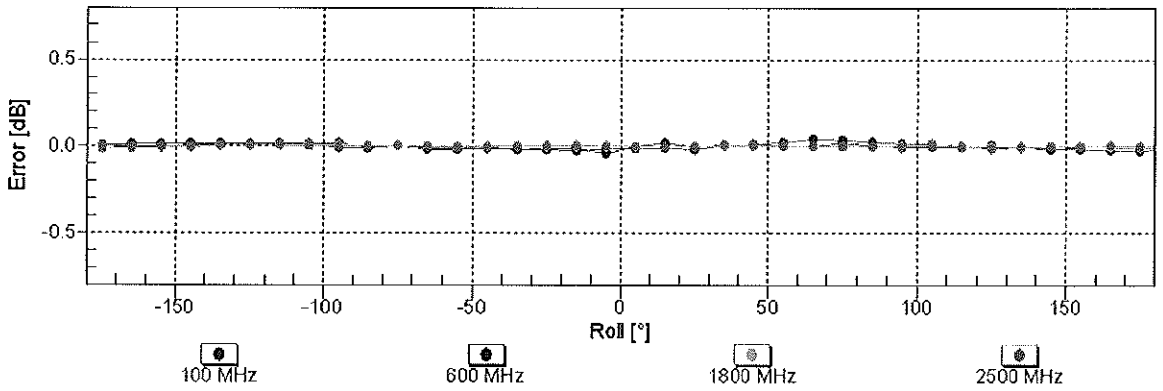
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



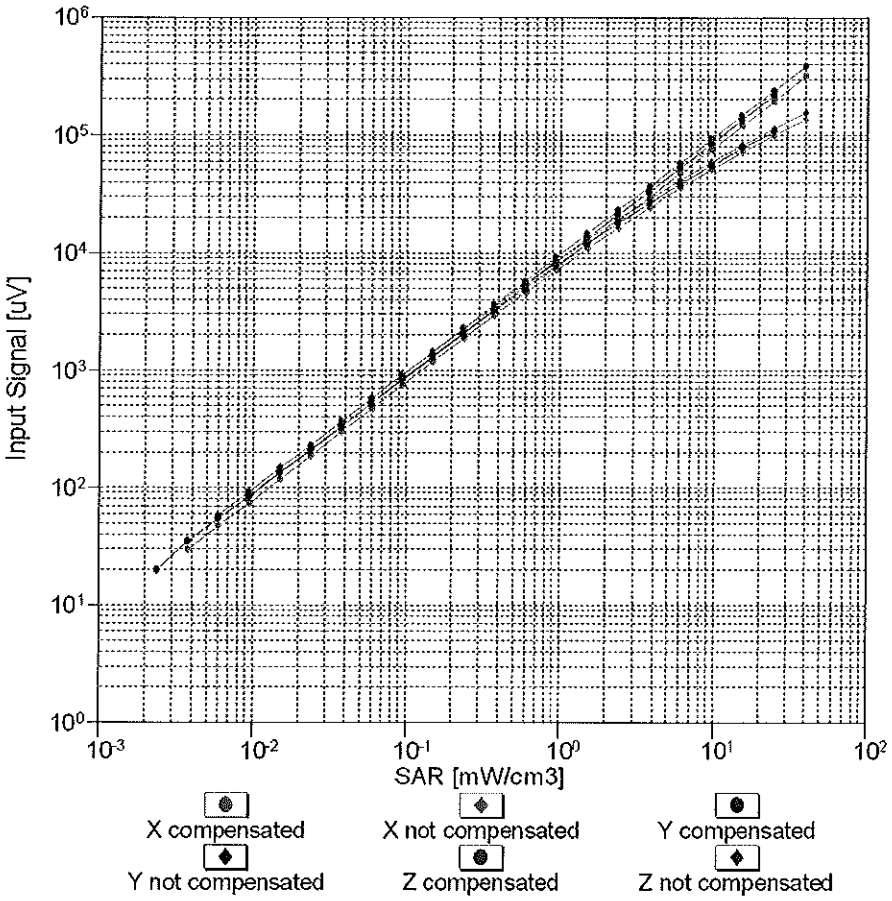
f=1800 MHz,R22

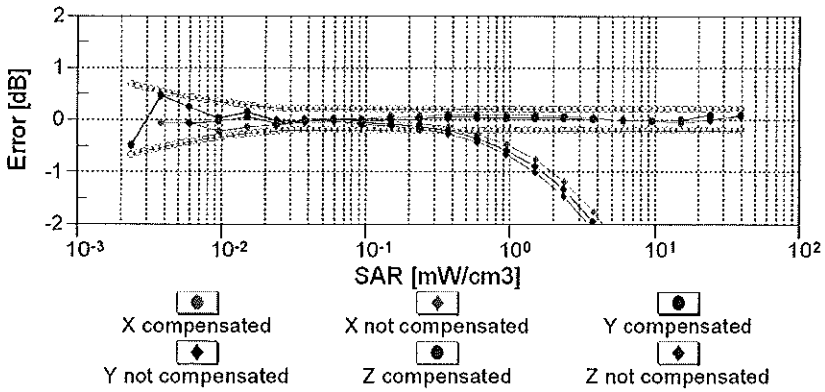




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR$_{head}$)
(TEM cell , f = 900 MHz)

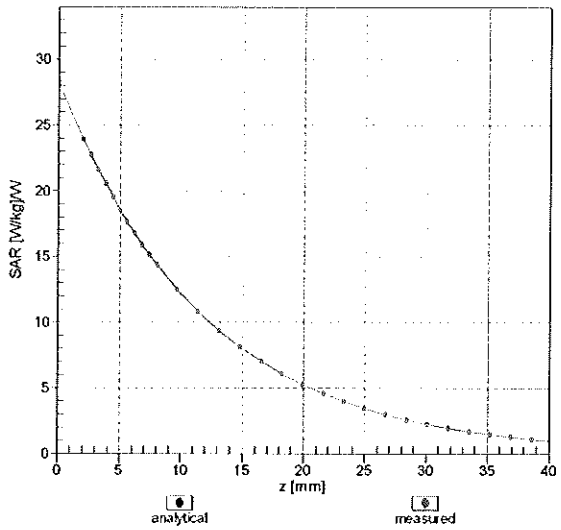




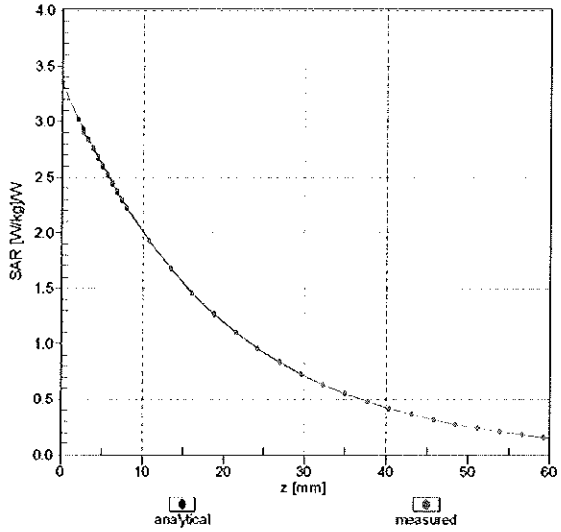
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 1950 MHz,WGLS R22 (H_convF)

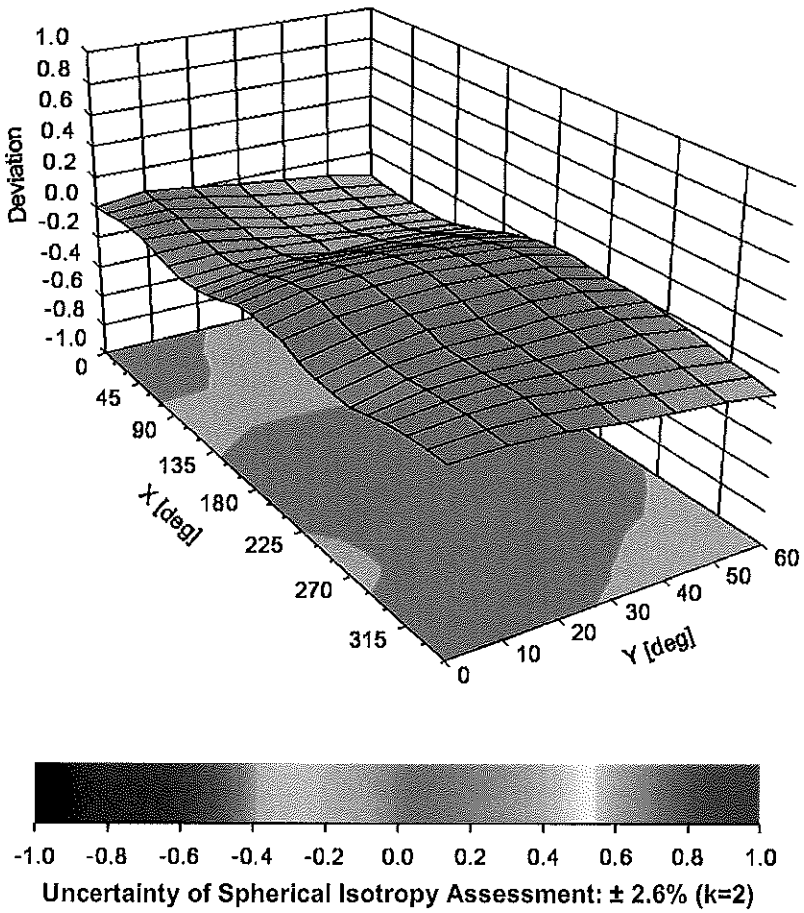


f = 835 MHz,WGLS R9 (H_convF)



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:3037

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

Appendix 7

Measurement Uncertainty Budget

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	**IEEE 1528 section**	**Tol. (± %)**	**Prob Dist**	**Div.**	**c_i (1 g)**	**c_i (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration	E.2.1	5.9	N	1.00	1	1	5.9	5.9	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8	1.1	R	1.73	1	1	0.6	0.6	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mech. Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Test sample Related									
Test Sample Positioning	E.4.2	3.2	N	1.00	1	1	3.2	3.2	29
Device Holder Uncertainty	E.4.1	4.0	N	1.00	1	1	4.0	4.0	8
SAR drift	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	3.3	N	1.00	0.64	0.43	2.1	1.4	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	1.9	N	1.00	0.6	0.49	1.1	0.9	∞
Combined Standard Uncertainty			RSS				11.1	10.8	411
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				22.2	21.6	