MOTOROLA

Portable Cellular Phone SAR Test Report

Tests Requested By:	Motorola Mobility, Inc. 600 N. US Highway 45 Libertyville, IL 60048
Test Report #:	24347-1
Date of Report:	Feb-16-2011
Date of Test:	Jan-22-2011 to Feb-09-2011
FCC ID #:	IHDT56MH1
Generic Name:	N/A
Test Laboratory:	Motorola Mobility, Inc. - Product Safety & Compliance Laboratory 600 N. US Highway 45 Libertyville, IL 60048
Report Author:	Thomas Knipple Senior RF Engineer

Accreditation:

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

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

2404

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

Statement of Compliance:

Motorola declares under its sole responsibility that the portable cellular telephone model to which this declaration relates, is in conformity with the appropriate General Population/Uncontrolled RF exposure standards, recommendations and guidelines (FCC 47 CFR §2.1093) as well as with CENELEC en50360:2001 and ANSI / IEEE C95.1. It also declares that the product was tested in accordance with IEEE 1528 / CENELEC EN62209-1 (2006) / IEC 62209-2 (2010-03), as well as other appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

(none)

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1. Introduction

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

For ICNIRP (10g), the final stand-alone SAR readings for this phone are 0.48 W/kg for head-adjacent use, 0.99 W/kg for dispatch use, and 1.09 W/kg for body-worn use. For ANSI / IEEE C95.1 (1 g), the final stand-alone SAR readings for this phone are 0.68 W/kg for head-adjacent use, 1.37 W/kg for dispatch use, and 1.48 W/kg for body-worn use. These measurements were performed using a Dasy4™ v4.7 system manufactured by Schmid & Partner Engineering AG (SPEAG), of Zurich Switzerland.

2. Description of the Device Under Test

2.1 Antenna description

Antenna for 800/900 MHz Bands

Type	Internal	
Location	Bottom of Transceiver	
Dimensions	Length	45 mm
	Width	8 mm

Antenna for Wi-Fi/Bluetooth

Type	Internal	
Location	Right Side of Transceiver	
Dimensions	Length	13.5 mm
	Width	5.09 mm

2.2 Device description

Information for the Device Under Test							
Serial number (Used For)	**364VLYK6YW** (iDEN/Wi-Fi SAR testing, conducted power measurements) **364VLYK6LX** (MOTOtalk SAR testing, conducted power measurements)						
Mode(s) of Operation	800 iDEN (Interconnect / Dispatch)	800 iDEN (Packet Data)	900 iDEN (Interconnect/ Dispatch)	900 iDEN (Packet Data)	MOTOtalk (Dispatch)	Wi-Fi 802.11b/g	Bluetooth
Modulation Mode(s)	M16-QAM	M64-QAM, M16-QAM, QPSK	M16-QAM	M64-QAM, M16-QAM, QPSK	8FSK	BPSK	GFSK
Maximum Output Power Setting	28.06 dBm		28.06 dBm		29.0 dBm	19.0 dBm	10.0 dBm
Duty Cycle	2:6 / 1:6	81:120	2:6 / 1:6	81:120	114:120	1:1	1:1
Transmitting Frequency Range(s)	806.0125 – 824.9875 MHz		896.01875 – 901.98125 MHz		902.525 – 927.475 MHz	2412.0 - 2462.5 MHz	2400.0 – 2483.5 MHz
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype						
Device Category	Portable						

The Device Under Test (DUT) is a digital multi-service data-capable device that employs time division multiplexing (TDMA) with duty cycles of 16.67% (Dispatch), 16.67% or 33.00% (Interconnect or Circuit Data), and up to 67.50% (Packet Data) operation. Possible modulation formats are QPSK, M16-QAM, or M64-QAM.

All voice modes employ M16-QAM modulation and are interleaved as 1:6 (for Dispatch or Interconnect) or 1:3 (Interconnect only). Split 1:3 Interconnect is operated at 16.67% duty cycle, but because there will be two pulses in each 90 ms frame, the overall interleave is 2:6.

Data transmissions employ QPSK, M16-QAM, or M64-QAM modulations and have a maximum duty cycle of 67.50% (Packet Data). Packet Data operation is possible with and without connection to an external data device (via data cable or Bluetooth link).

All iDEN modes (Interconnect, Dispatch, and Data) are available in both the 800 and 900 MHz SMR bands.

This device also possesses MOTOtalk, which is a Part 15 service employing Frequency Hopping Spread Spectrum (FHSS) technology in the 900 MHz ISM band. MOTOtalk emissions have a duty cycle of 95% and use 8FSK modulation. Only Dispatch operation is possible when operating in this mode. The unit may be used at the abdomen in this mode (with applicable audio accessories) or held in front of the face. The low-audio earpiece mode has been locked out in software.

2.3 Evaluation of Wi-Fi 802.11 modes

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

Band	Channel	Conducted Power (dBm) for 802.11b Mode Data Rates			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
Wi-Fi 2450 MHz	1	**18.16**	18.25	18.41	**18.61**
	6	**18.72**	18.63	18.72	18.91
	11	**18.43**	17.85	18.01	18.28

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	15.85	15.90	15.88	15.93	15.87	15.85	15.90	15.80
	6	16.54	16.20	16.44	16.24	16.60	16.40	16.55	16.46
	11	15.43	15.74	15.42	15.72	15.65	15.54	15.62	15.50

2.4 Evaluation of Simultaneous Transmitters

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

By device design, the transmitters may operate simultaneously as noted in the following table. Note that simultaneous operation of Wi-Fi and iDEN Packet Data is not supported.

Simultaneous Operation			
	MOTOtalk	Wi-Fi 802.11b/g	Bluetooth
iDEN 800/900	No	Yes	Yes
MOTOtalk		Yes	No
Wi-Fi 802.11b/g			No

By device design the iDEN transmitter may operate simultaneously with either the Wi-Fi 802.11 transmitter or the Bluetooth transmitter. The separation distance between the Wi-Fi 802.11/Bluetooth antenna and the iDEN antenna is 2.8 cm. Pictorial representation of the antenna locations and separation distances are given in Exhibit 7d.

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

1. The highest output conducted power measured for Bluetooth on the device under test is 9.3 mW [≤ 12 mW]
2. The separation distance between the Bluetooth antenna and the main antenna is 2.8 cm [≥ 2.5 cm]

For the transmitters requiring stand-alone SAR testing (iDEN/MOTOtalk and Wi-Fi 802.11), the KDB guidelines direct that if the sum of the 1 g SAR measured for the simultaneously transmitting antennas is less than the SAR limit, SAR measurements for simultaneous transmission are not required. Evaluations of the highest simultaneous SAR summations are presented with the stand-alone SAR measurement results in the tables in Section 6. As all configurations result in SAR value summations less the SAR limit, no simultaneous measurements are required.

3. Test Equipment Used

3.1 Dosimetric System

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

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

Description	Serial Number	Cal Date	Cal Due Date
DASY4™ DAE V1	378	Feb-12-2010	Feb-12-2011
DASY4™ DAE V1	434	Jan-13-2011	Jan-11-2012
E-Field Probe ES3DV3	3124	Aug-11-2010	Aug-11-2011
S.A.M. Phantom used for 800/900/2450 MHz	TP-1250		
S.A.M. Phantom used for 800/900 MHz	TP-1131		
Dipole Validation Kit, DV835V2	425TR	Oct-14-2010	Oct-14-2011
Dipole Validation Kit, DV2450V2	766	Oct-13-2010	Oct-13-2011

3.2 Additional Equipment

Description	Serial Number	Cal Date	Cal Due Date
Signal Generator HP8648C	3847A04810	Oct-30-2009	Oct-30-2011
Power Meter E4419B	GB39511087	Dec-22-2009	Dec-22-2011
Power Sensor #1 - E9301A	US39210934	Oct-25-25010	Oct-25-2011
Power Sensor #2 - E9301A	US39211006	Oct-25-25010	Oct-25-2011
Network Analyzer HP8753ES	US39172529	Jun-04-2010	Jun-04-2011
Dielectric Probe Kit HP85070C	US99360070		

4. Electrical parameters of the tissue simulating liquid

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

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Temp (°C)
815	Head	**Measured** Jan-23-2011	42.2	0.90	20.5
		Recommended Limits	41.6 ±5%	0.898 ±5%	18-25
	Body	**Measured** Jan-24-2011	55.7	0.96	19.8
		Recommended Limits	55.3 ±5%	0.968 ±5%	18-25
899	Head	**Measured** Jan-23-2011	41.2	0.98	20.5
		Measured Jan-27-2011	40.7	0.97	20.5
		Recommended Limits	41.5 ±5%	0.97 ±5%	18-25
	Body	**Measured** Jan-24-2011	54.8	1.08	19.8
		Recommended Limits	55.0 ±5%	1.05 ±5%	18-25
915	Head	**Measured** Feb-09-2011	40.2	0.98	20.2
		Recommended Limits	41.47 ±5%	0.98 ±5%	18-25
	Body	**Measured** Feb-09-2011	53.9	1.06	20.1
		Recommended Limits	54.97 ±5%	1.06 ±5%	18-25
2450	Head	**Measured** Jan-22-2011	36.3	1.84	19.5
		Recommended Limits	39.2 ±10%	1.80 ±5%	18-25
	Body	**Measured** Jan-22-2011	49.4	1.99	20.0
		Recommended Limits	52.7 ±10%	1.95 ±5%	18-25

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

Ingredient	835 MHz / 900 MHz Head	835 MHz / 900 MHz Body	1800 MHz / 1900 MHz Head	1800 MHz / 1900 MHz Body	2450 MHz Head	2450 MHz Body
Sugar	57	44.9	--	--	--	--
DGBE	--	--	47	30.8	--	30
Diacetin	--	--	--	--	51	
Water	40.45	53.06	52.62	68.8	48.75	70
Salt	1.45	0.94	0.38	0.4	0.15	--
HEC	1	1	--	--	--	--
Bact.	0.1	0.1	--	--	0.1	--

5. System Accuracy Verification

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

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

f (MHz)	Description	SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			ε_r	σ (S/m)		
835	**Measured,** Jan-22-2011	9.85	42.0	0.92	20.2	20.5
	Measured, Jan-24-2011	9.75	41.1	0.91	20.1	19.9
	Measured, Jan-27-2011	9.85	41.4	0.91	20.5	20.5
	Measured, Feb-09-2011	9.90	41.1	0.91	20.1	20.2
	Recommended Limits	9.57	41.5 ±5%	0.90 ±5%	18-25	18-25
2450	**Measured,** Jan-22-2011	56.0	36.3	1.84	20.2	19.5
	Recommended Limits	52.2	39.2 ±10%	1.80 ±5%	18-25	18-25

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3124	835	5.89	5 of 11
		2450	4.35	5 of 11

6. Test Results

The DUT is capable of operation in a test mode that allows control of the transmitter without the need to place actual phone calls. This guarantees that the unit does not change its transmitter power, and that the resultant measured field values will not be affected by external connections. For the purposes of this testing the unit is commanded to test mode and manually set 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 default settings for the "coarse" and "cube" scans were chosen and used for measurements. The grid spacing of the course scan was set to 15 mm or less as shown in the SAR plots included in Appendices 2, 3, and 4. Please refer to the DASY4™ manual for additional information on SAR scanning procedures and algorithms used.

The Cellular Phone model covered by this report has the following battery options:
Model SNN5875A - 1820 mAH Battery
Model SNN5843A - 1390 mAH Battery

The battery with the highest capacity is the SNN5875A. This battery was used to do most of the SAR testing. The phone was placed in the SAR measurement system with a fully charged battery. The configurations that resulted in the highest SAR values were tested using the other battery listed above.

6.1 Head Adjacent Test Results

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

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

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

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3124	835	5.89	5 of 11
		2450	4.35	5 of 11

Left Head Cheek Position								
Band/ Mode	**Channel or *f* (MHz)**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	***10 g SAR value***		***1 g SAR value***	
					Measured (W/kg)	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
iDEN 800 *Interconnect 2:6*	**806.0125**	28.00						
	815.5125	28.00	20.3	-0.098	0.335	0.34	0.440	0.45
	824.9875	28.04						
iDEN 900 *Interconnect 2:6*	**896.01875**	28.04						
	898.99375	28.07	20.3	0.068	0.222	0.22	0.292	0.29
	901.98125	28.09						
Wi-Fi 2450 *802.11b 1 Mbps*	**Channel 1**	18.16	19.6	-0.035	0.240	0.24	0.483	0.49
	Channel 6	18.72	19.6	0.132	0.227	0.23	0.471	0.47
	Channel 11	18.43	19.6	-0.020	0.146	0.15	0.288	0.29
Wi-Fi 2450 *802.11b 11 Mbps*	**Channel 1**	18.61	**19.7**	**-0.976**	**0.262**	**0.33**	**0.547**	**0.68**
iDEN 800 + Wi-Fi						*0.67*		*1.13*
iDEN 900 + Wi-Fi						*0.55*		*0.97*

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								
Band/ Mode	**Channel or *f* (MHz)**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	***10 g SAR value***		***1 g SAR value***	
					Measured (W/kg)	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
iDEN 800 *Interconnect 2:6*	**806.0125**	28.00						
	815.5125	28.00	**20.3**	**0.035**	**0.344**	**0.34**	**0.459**	**0.46**
	824.9875	28.04						
iDEN 900 *Interconnect 2:6*	**896.01875**	28.04						
	898.99375	28.07	20.3	0.078	0.222	0.22	0.307	0.31
	901.98125	28.09						
Wi-Fi 2450 *802.11b 1 Mbps*	**Channel 1**	18.16						
	Channel 6	18.72	19.6	-0.189	0.089	0.09	0.168	0.18
	Channel 11	18.43						
iDEN 800 + Wi-Fi						*0.43*		*0.64*
iDEN 900 + Wi-Fi						*0.31*		*0.49*

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

Highest *Noted* Head Cheek Position with Battery SNN5843A								
Band/ Mode	**Channel or *f* (MHz)**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	***10 g SAR value***		***1 g SAR value***	
					Measured (W/kg)	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
iDEN 800 *Interconnect 2:6 Right Cheek*	**806.0125**	28.00						
	815.5125	28.00	20.3	0.066	0.173	0.17	0.228	0.23
	824.9875	28.04						
iDEN 900 *Interconnect 2:6 Right Cheek*	**896.01875**	28.04						
	898.99375	28.07	**20.3**	**-0.140**	**0.462**	**0.48**	**0.639**	**0.66**
	901.98125	28.09						
Wi-Fi 2450 *802.11b 1 Mbps Left Cheek*	**Channel 1**	18.16	19.8	-0.024	0.226	0.23	0.454	0.46
	Channel 6	18.72						
	Channel 11	18.43						
Wi-Fi 2450 *802.11b 11 Mbps Left Cheek*	**Channel 1**	18.61	20.6	-0.620	0.252	0.29	0.503	0.58

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

Left Head 15° Tilt Position								
Band/ Mode	Channel or *f* (MHz)	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
iDEN 800 *Interconnect 2:6*	**806.0125**	28.00						
	815.5125	28.00	20.3	0.052	0.211	0.21	0.273	0.27
	824.9875	28.04						
iDEN 900 *Interconnect 2:6*	**896.01875**	28.04						
	898.99375	28.07	20.3	0.009	0.140	0.14	0.187	0.19
	901.98125	28.09						
Wi-Fi 2450 *802.11b 1 Mbps*	**Channel 1**	18.16						
	Channel 6	18.72	19.6	-0.090	0.035	0.04	0.065	0.07
	Channel 11	18.43						
iDEN 800 + Wi-Fi						*0.25*		*0.34*
iDEN 900 + Wi-Fi						*0.18*		*0.26*

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

Right Head 15° Tilt Position								
Band/ Mode	Channel or *f* (MHz)	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
iDEN 800 *Interconnect 2:6*	**806.0125**	28.00						
	815.5125	28.00	**20.3**	**-0.055**	**0.224**	**0.23**	**0.291**	**0.29**
	824.9875	28.04						
iDEN 900 *Interconnect 2:6*	**896.01875**	28.04						
	898.99375	28.07	20.3	-0.021	0.137	0.14	0.177	0.18
	901.98125	28.09						
Wi-Fi 2450 *802.11b 1 Mbps*	**Channel 1**	18.16						
	Channel 6	18.72	19.6	-0.041	0.038	0.04	0.071	0.07
	Channel 11	18.43						
iDEN 800 + Wi-Fi						*0.27*		*0.36*
iDEN 900 + Wi-Fi						*0.18*		*0.25*

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

Highest *Noted* Head 15° Tilt Position with Battery SNN5843A								
Band/ Mode	Channel or *f* (MHz)	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
iDEN 800 *Interconnect 2:6 Right Tilt*	**806.0125**	28.00						
	815.5125	28.00	20.3	0.063	0.115	0.12	0.148	0.15
	824.9875	28.04						
iDEN 900 *Interconnect 2:6 Left Tilt*	**896.01875**	28.04						
	898.99375	28.07	**20.3**	**-0.053**	**0.288**	**0.29**	**0.377**	**0.38**
	901.98125	28.09						
Wi-Fi 2450 *802.11b 1 Mbps Right Cheek*	**Channel 1**	18.16						
	Channel 6	18.72	**19.6**	**-0.060**	**0.048**	**0.05**	**0.094**	**0.10**
	Channel 11	18.43						

Table 6: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.

6.2 Dispatch/Push-to-Talk Test Results

The SAR results shown in tables 7 through 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 measured conducted output powers, the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is 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.

A full data set output of one test condition per band with the highest SAR values from the DASY™ measurement system is included as Appendix 3. The test conditions included are indicated as bold numbers in the following tables. All other test conditions measured lower SAR values than those included. The tables below also include SAR value summations for simultaneous transmission evaluation, with the results indicated in italics.

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

For the purposes of these tests the DUT is commanded to the proper channel, transmitter power level and transmit mode of operation. The DUT was placed in the SAR measurement system with a fully charged battery. The DUT was placed with the front of the device positioned at 2.5 cm from the flat portion of the SAM phantom, as per Supplement C 01-01.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3124	835	5.89	5 of 11
		2450	4.35	5 of 11

Dispatch/Push-To-Talk, Front of Phone 25 mm from Phantom								
Band/ Mode	**Channel or *f* (MHz)**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	***10 g SAR value***		***1 g SAR value***	
					Measured (W/kg)	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
iDEN 800 *Dispatch 1:6*	**806.0125**	28.12						
	815.5125	27.94	20.3	-0.028	0.105	0.11	0.141	0.14
	824.9875	28.18						
iDEN 900 *Dispatch 1:6*	**896.01875**	28.13						
	898.99375	28.13	**20.3**	**-0.166**	**0.147**	**0.15**	**0.202**	**0.21**
	901.98125	28.07						
MOTOtalk 915	**902.525**	29.18	20.2	0.026	0.973	0.97	1.34	1.34
	915.525	29.12	**20.2**	**-0.047**	**0.982**	**0.99**	**1.36**	**1.37**
	927.475	28.99	20.2	-0.022	0.978	0.98	1.36	1.37
Wi-Fi 2450 *802.11b 1 Mbps*	**Channel 1**	18.16	**19.7**	**-0.041**	**0.021**	**0.02**	**0.036**	**0.04**
	Channel 6	18.72	19.6	-0.062	0.021	0.02	0.036	0.04
	Channel 11	18.43	19.6	0.035	0.016	0.02	0.028	0.04
Wi-Fi 2450 *802.11b 11 Mbps*	**Channel 1**	18.61	19.6	0.115	0.023	0.02	0.040	0.04
iDEN 800 + Wi-Fi						*0.13*		*0.18*
iDEN 900 + Wi-Fi						*0.17*		*0.25*
MOTOtalk + Wi-Fi						*1.01*		*1.41*

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

Highest Dispatch/Push-To-Talk, Front of Phone 25 mm from Phantom with Battery SNN5843A								
Band/ Mode	**Channel or *f* (MHz)**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	***10 g SAR value***		***1 g SAR value***	
					Measured (W/kg)	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
iDEN 800 *Dispatch 1:6*	**806.0125**	28.12						
	815.5125	27.94	**20.3**	**0.052**	**0.108**	**0.11**	**0.145**	**0.15**
	824.9875	28.18						
iDEN 900 *Dispatch 1:6*	**896.01875**	28.13						
	898.99375	28.13	20.3	-0.013	0.147	0.15	0.200	0.20
	901.98125	28.07						
MOTOtalk 915	**902.525**	29.18						
	915.525	29.12	20.2	0.051	0.984	0.98	1.36	1.36
	927.475	28.99						
Wi-Fi 2450 *802.11b 1 Mbps*	**Channel 1**	18.16	19.6	0.105	0.020	0.02	0.034	0.03
	Channel 6	18.72						
	Channel 11	18.43						

Table 8: SAR measurement results at the highest possible output power, measured in a Push-To-Talk position against the ICNIRP and ANSI SAR Limit.

6.3 Body Worn Test Results

The SAR results shown in tables 9 through 13 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the measured conducted output power levels, the temperature of the test facility during the test, the temperature of the tissue simulate after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is Extrapolated SAR = Measured SAR * $10^{(-drift/10)}$. The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

The test conditions that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 4. All other test conditions measured lower SAR values than those included in Appendix 4. The tables below also include SAR value summations for simultaneous transmission evaluation, with the results indicated in italics.

A "flat" phantom was for the body-worn tests. This "flat" phantom is made out of 1" thick natural High Density Polyethylene with a thickness at the bottom equal to 2.0 mm. It measures 52.7 cm(long) x 26.7 cm(wide) x 21.2 cm(tall). The tissue stimulant depth was verified to be 15.0 cm ± 0.5 cm. The same device holder described in section 6 was used for positioning the phone.

The device was tested per the Supplement C testing guidelines for devices that do not have body-worn accessories. A separation distance of 15 mm between the device and the flat phantom was used for testing body-worn SAR. The device was tested with the front and back of the device facing the phantom. Both sides of the device were tested for Body SAR for the purpose of including the SAR evaluation for body-worn accessories that support the device with the front side facing the user. The cellular phone was tested with a headset connected to the device for all body-worn SAR measurements.

The cellular phone was also tested in data mode and MOTOtalk operations. For these tests, a separation distance of 25 mm between the device and the flat phantom was used.

Additional 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.

There are no body-worn accessories available for this phone at the time of test.

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	3124	835	5.86	6 of 11
		2450	4.19	6 of 11

Body-Worn; Front of Phone 15 mm from Phantom								
Band/ Mode	**Channel or *f* (MHz)**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	***10 g SAR value***		***1 g SAR value***	
					Measured (W/kg)	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
iDEN 800 *Interconnect 2:6*	**806.0125**	28.00						
	815.5125	28.00	19.8	0.036	0.405	0.41	0.537	0.54
	824.9875	28.04						
iDEN 900 *Interconnect 2:6*	**896.01875**	28.04						
	898.99375	28.07	19.8	-0.052	0.223	0.23	0.294	0.30
	901.98125	28.09						
Wi-Fi 2450 *802.11b 1 Mbps*	**Channel 1**	18.16						
	Channel 6	18.72	19.3	-0.366	0.034	0.04	0.062	0.07
	Channel 11	18.43						
iDEN 800 + Wi-Fi						*0.45*		*0.61*
iDEN 900 + Wi-Fi						*0.27*		*0.37*

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

Body-Worn; Front of Phone 25 mm from Phantom								
Band/ Mode	**Channel or *f* (MHz)**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	***10 g SAR value***		***1 g SAR value***	
					Measured (W/kg)	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
iDEN 800 *Packet Data*	**806.0125**	27.95						
	815.5125	27.97	19.8	0.020	0.107	0.11	0.137	0.14
	824.9875	28.03						
iDEN 900 *Packet Data*	**896.01875**	28.03						
	898.99375	28.06	19.8	-0.039	0.128	0.13	0.175	0.18
	901.98125	28.03						
MOTOtalk 915	**902.525**	29.18	20.1	0.102	0.903	0.90	1.22	1.22
	915.525	29.12	20.0	-0.168	0.796	0.83	1.08	1.12
	927.475	28.99	20.1	0.062	0.674	0.67	0.919	0.92
Wi-Fi 2450 *802.11b 1 Mbps*	**Channel 1**	18.16						
	Channel 6	18.72	19.6	0.054	0.012	0.01	0.020	0.02
	Channel 11	18.43						
iDEN 800 + Wi-Fi						*0.12*		*0.16*
iDEN 900 + Wi-Fi						*0.14*		*0.20*
MOTOtalk + Wi-Fi						*0.91*		*1.24*

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

Body-Worn; Back of Phone 15 mm from Phantom								
Band/ Mode	Channel or *f* (MHz)	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
iDEN 800 *Interconnect 2:6*	**806.0125**	28.00						
	815.5125	28.00	**19.8**	**-0.003**	**0.435**	**0.44**	**0.578**	**0.58**
	824.9875	28.04						
iDEN 900 *Interconnect 2:6*	**896.01875**	28.04						
	898.99375	28.07	**19.8**	**-0.138**	**0.238**	**0.25**	**0.325**	**0.34**
	901.98125	28.09						
Wi-Fi 2450 *802.11b 1 Mbps*	**Channel 1**	18.16	19.3	-0.062	0.078	0.08	0.144	0.15
	Channel 6	18.72	19.3	0.010	0.075	0.07	0.132	0.13
	Channel 11	18.43	19.3	-0.232	0.060	0.06	0.104	0.11
Wi-Fi 2450 *802.11b 11 Mbps*	**Channel 1**	18.61	19.7	-0.011	0.070	0.07	0.129	0.13
iDEN 800 + Wi-Fi						*0.52*		*0.73*
iDEN 900 + Wi-Fi						*0.33*		*0.49*

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

Body-Worn; Back of Phone 25 mm from Phantom								
Band/ Mode	Channel or *f* (MHz)	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
iDEN 800 *Packet Data*	**806.0125**	27.95						
	815.5125	27.97	19.8	0.086	0.109	0.11	0.149	0.15
	824.9875	28.03						
iDEN 900 *Packet Data*	**896.01875**	28.03						
	898.99375	28.06	19.8	-0.161	0.129	0.13	0.185	0.19
	901.98125	28.03						
MOTOtalk 915	**902.525**	29.18	20.1	0.023	0.895	0.90	1.22	1.22
	915.525	29.12	20.1	-0.068	0.757	0.77	1.03	1.05
	927.475	28.99	20.1	-0.032	0.686	0.69	0.935	0.94
Wi-Fi 2450 *802.11b 1 Mbps*	**Channel 1**	18.16						
	Channel 6	18.72	19.2	-0.163	0.025	0.03	0.042	0.04
	Channel 11	18.43						
iDEN 800 + Wi-Fi						*0.14*		*0.19*
iDEN 900 + Wi-Fi						*0.16*		*0.23*
MOTOtalk + Wi-Fi						*0.93*		*1.26*

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

Noted Highest Body-Worn with Battery SNN5843A								
Band/ Mode	Configuration	Conducted Output Power (dBm)	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)
iDEN 800 *Interconnect 2:6*	*Back of Phone 15 mm from Phantom, at 815.5125 MHz*	28.00	19.9	-0.049	0.210	0.21	0.276	0.28
iDEN 900 *Interconnect 2:6*	*Back of Phone 15 mm from Phantom, at 898.99375 MHz*	28.06	19.9	-0.024	0.243	0.24	0.329	0.33
MOTOtalk 915	*Back of Phone 25 mm from Phantom, at 902.525 MHz*	29.18	**20.2**	**0.065**	**1.09**	**1.09**	**1.48**	**1.48**
Wi-Fi 2450 *802.11b 1 Mbps*	*Back of Phone 15 mm from Phantom, on Channel 1*	18.16	**20.0**	**-0.322**	**0.078**	**0.08**	**0.146**	**0.16**

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

References

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

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

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

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

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

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

[7] IEC 62209-2 “Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)”

Appendix 1

SAR distribution comparison for the system accuracy verification

Date/Time: 1/22/2011 1:00:29 PM

Test Laboratory: Motorola - Jan-22-2011 835 Mhz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 425TR; FCC ID: IHDT56MH1
Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 425TR; Input Power = 200 mW
Sim.Temp@meas = 20.5□C; Sim.Temp@SPC = 20.5□C; Room Temp @ SPC = 20.2□C
Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 835 MHz; σ = 0.92 mho/m; ε_r = 42; ρ = 1000 kg/m^3

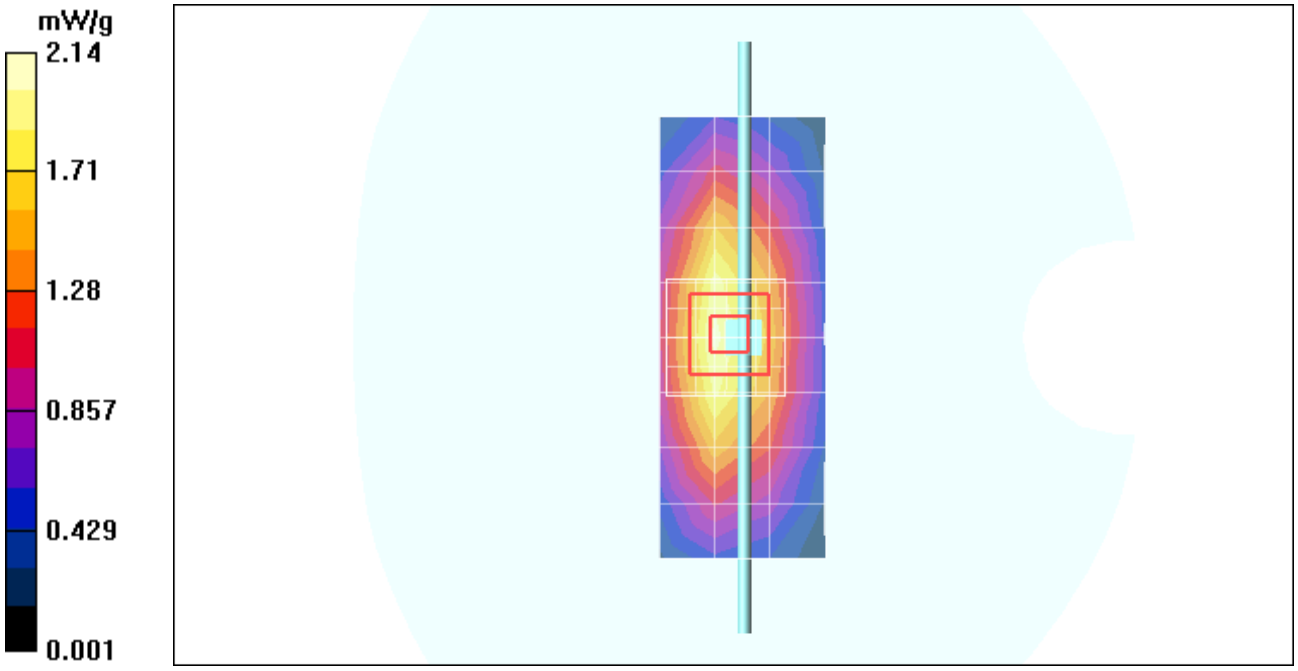
DASY4 Configuration:

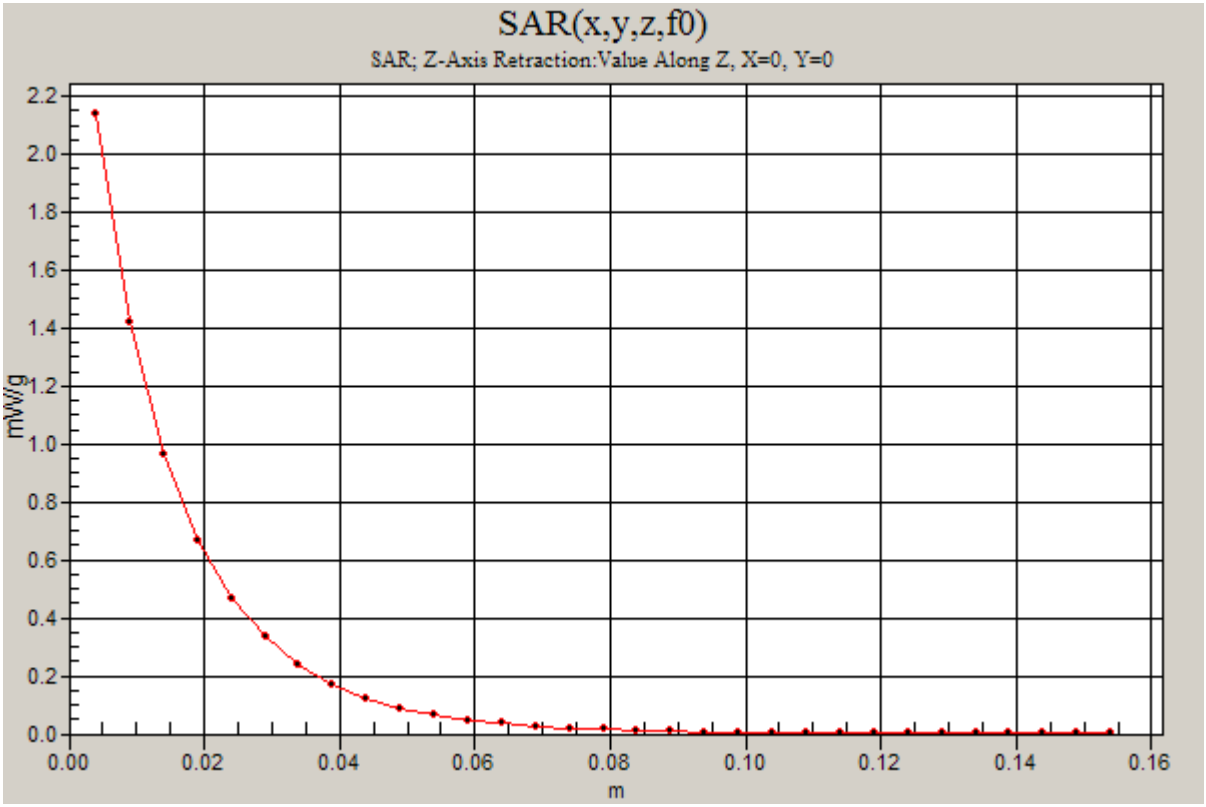
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 2.06 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.4 V/m; Power Drift = 0.003 dB; Peak SAR (extrapolated) = 2.97 W/kg
SAR(1 g) = 1.97 mW/g; SAR(10 g) = 1.27 mW/g; Maximum value of SAR (measured) = 2.13 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.14 mW/g


mW/g
2.14
1.71
1.28
0.857
0.429
0.001


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: 1/24/2011 8:42:37 AM

Test Laboratory: Motorola - Jan-24-2011 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 425TR; FCC ID: IHDT56MH1
Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 425TR; Input Power = 200 mW
Sim.Temp@meas = 19.9□C; Sim.Temp@SPC = 19.9□C; Room Temp @ SPC = 20.1□C
Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

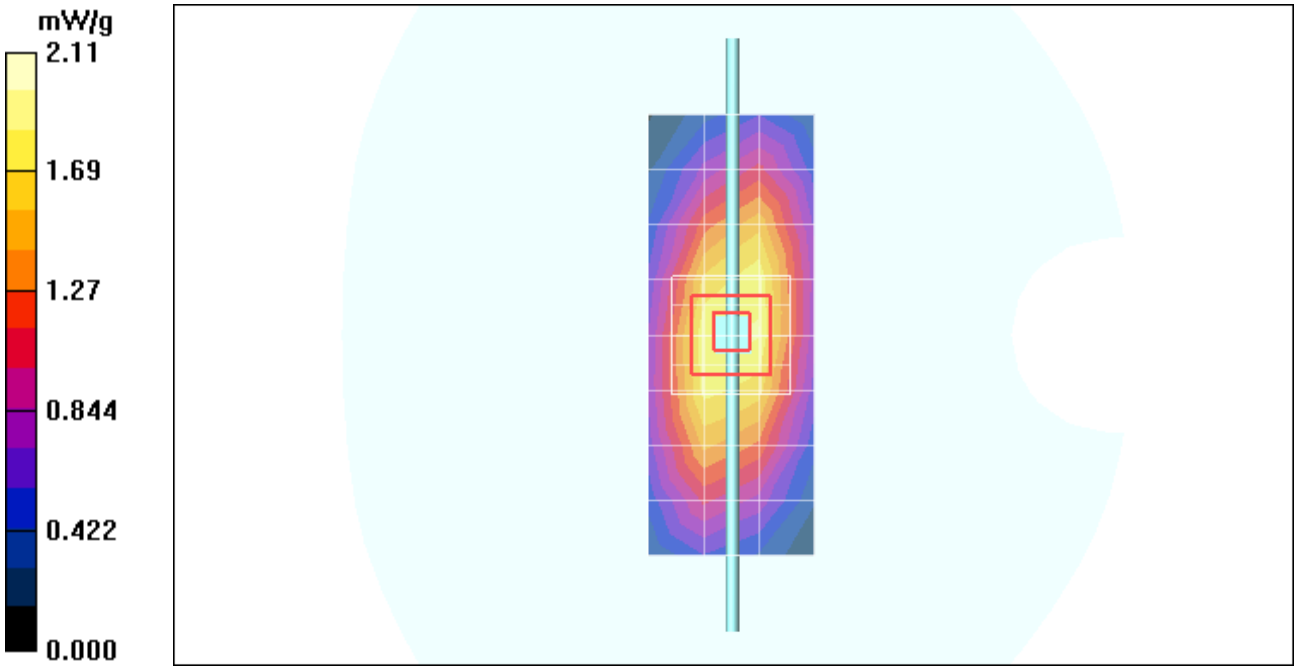
DASY4 Configuration:

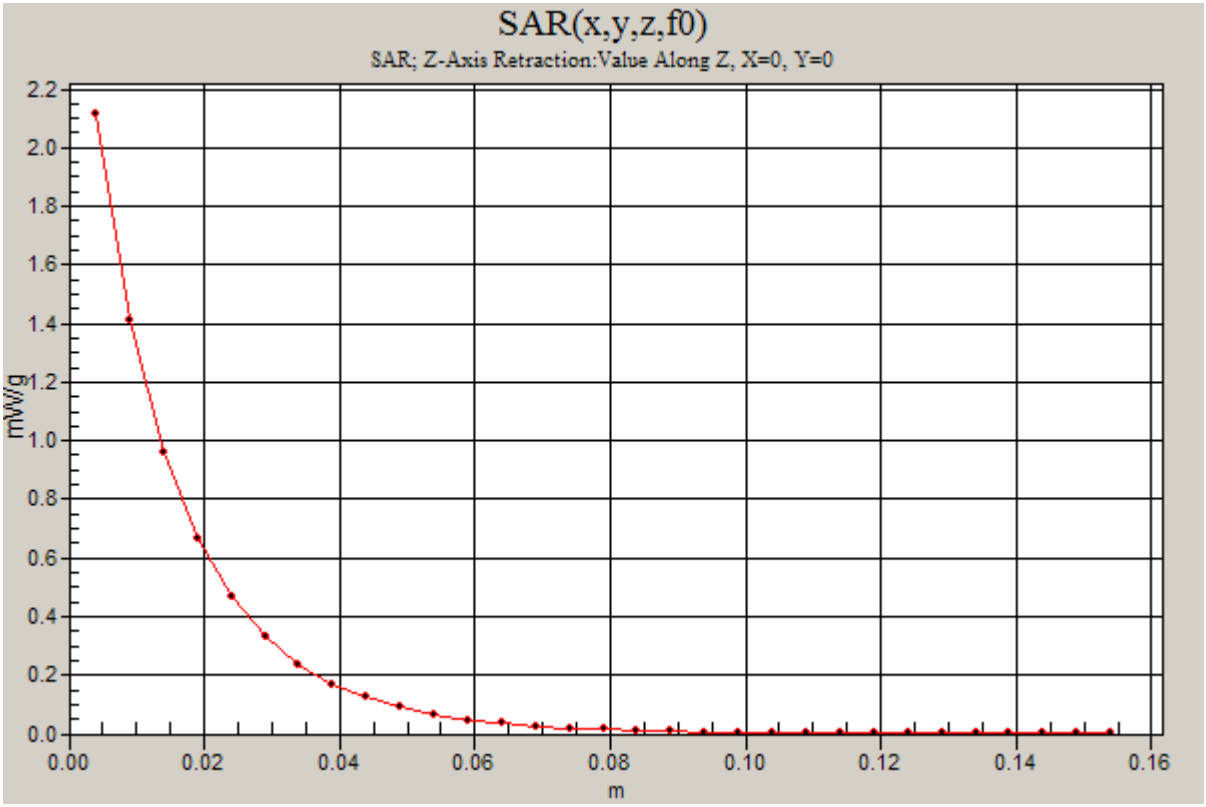
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.84 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.6 V/m; Power Drift = -0.028 dB; Peak SAR (extrapolated) = 2.92 W/kg
SAR(1 g) = 1.95 mW/g; SAR(10 g) = 1.27 mW/g; Maximum value of SAR (measured) = 2.10 mW/g

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


mW/g
2.11
1.69
1.27
0.844
0.422
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: 1/27/2011 8:37:20 AM

Test Laboratory: Motorola - Jan-27-2011 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 425TR; FCC ID: IHDT56MH1
Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 425TR; Input Power = 200 mW
Sim.Temp@meas = 20.5□C; Sim.Temp@SPC = 20.5□C; Room Temp @ SPC = 20.5□C
Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3

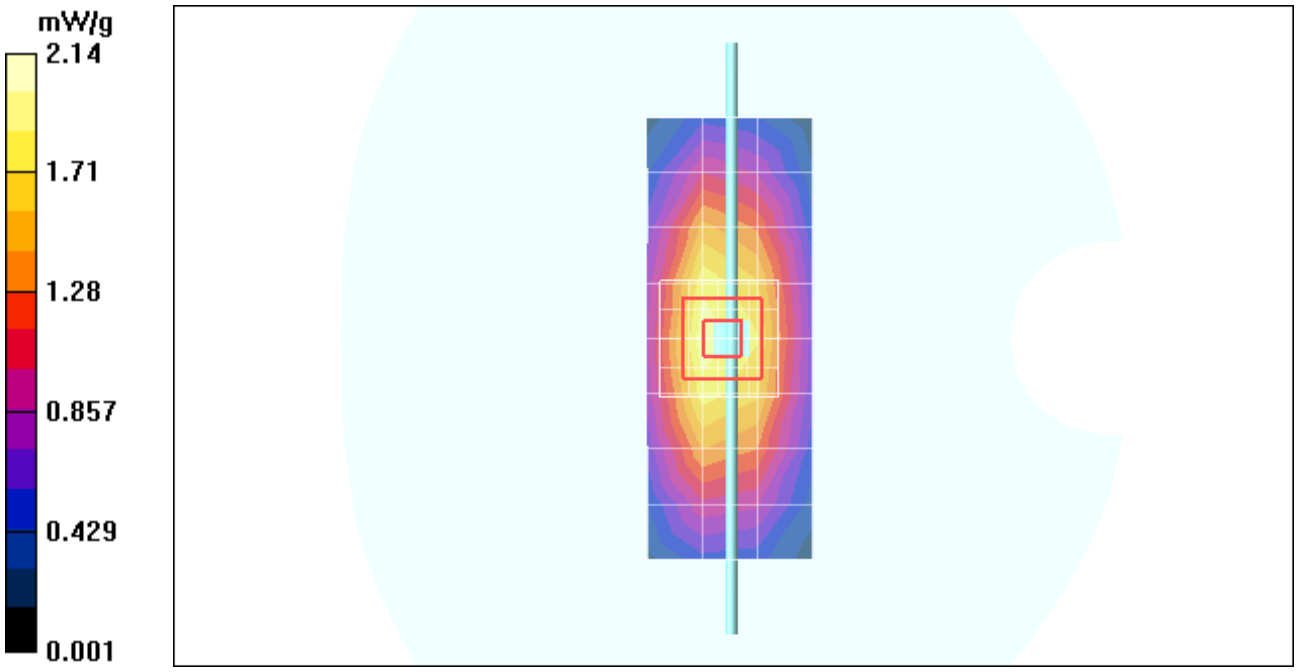
DASY4 Configuration:

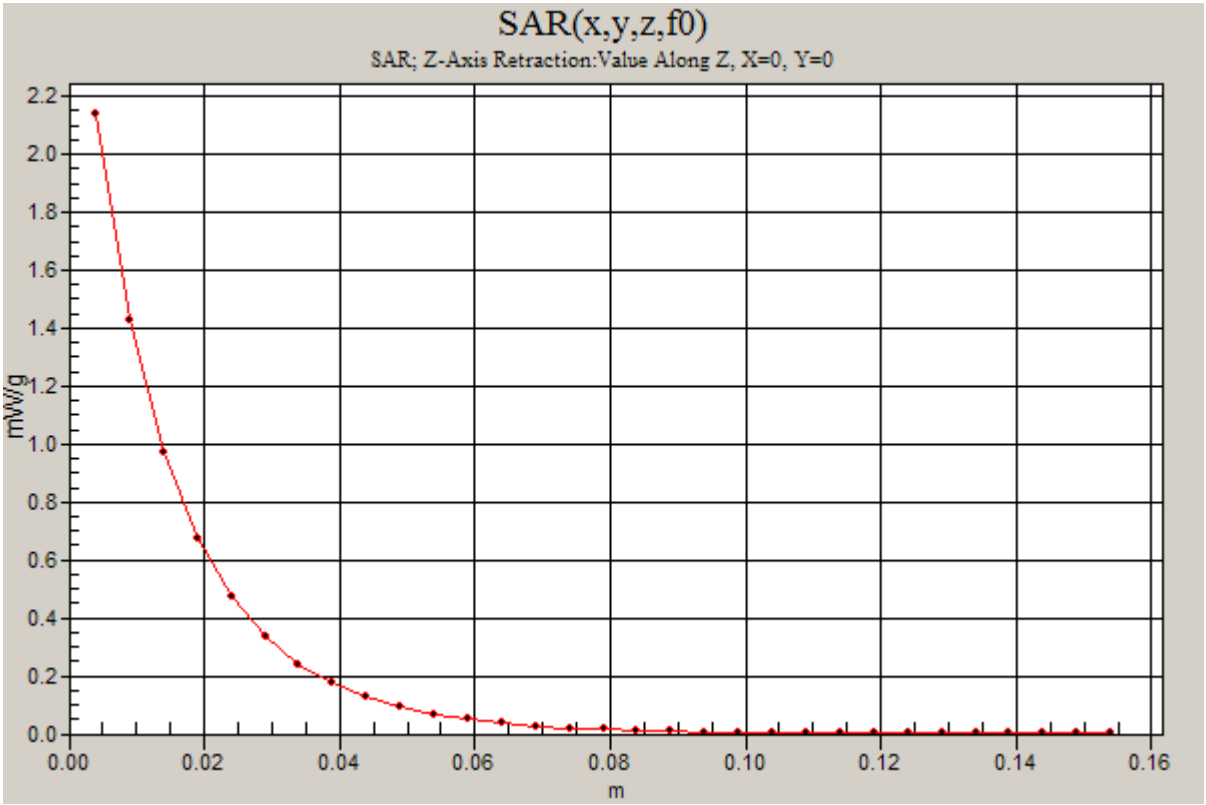
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.96 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.9 V/m; Power Drift = -0.036 dB; Peak SAR (extrapolated) = 2.97 W/kg
SAR(1 g) = 1.97 mW/g; SAR(10 g) = 1.28 mW/g; Maximum value of SAR (measured) = 2.13 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.14 mW/g


mW/g
2.14
1.71
1.28
0.857
0.429
0.001


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: 2/9/2011 9:15:11 AM

Test Laboratory: Motorola - Feb-09-2011 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 425TR; FCC ID: IHDT56MH1
Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 425TR; Input Power = 200 mW
Sim.Temp@meas = 20.2□C; Sim.Temp@SPC = 20.2□C; Room Temp @ SPC = 20.1□C
Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

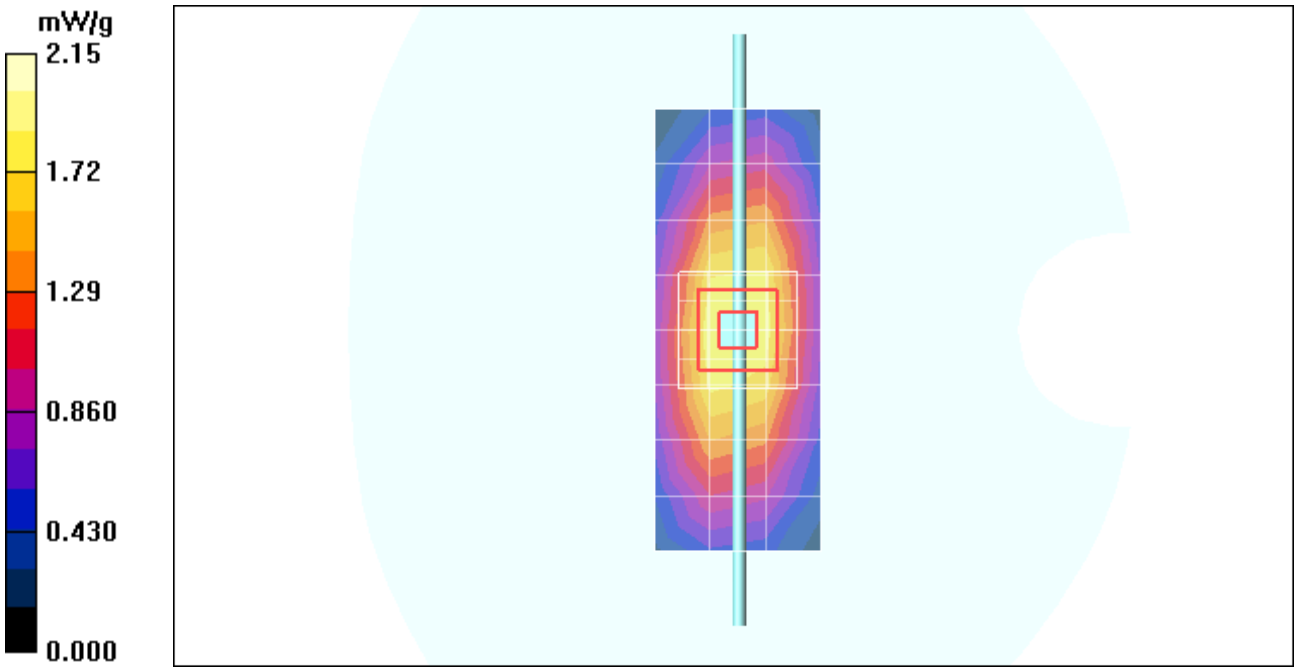
DASY4 Configuration:

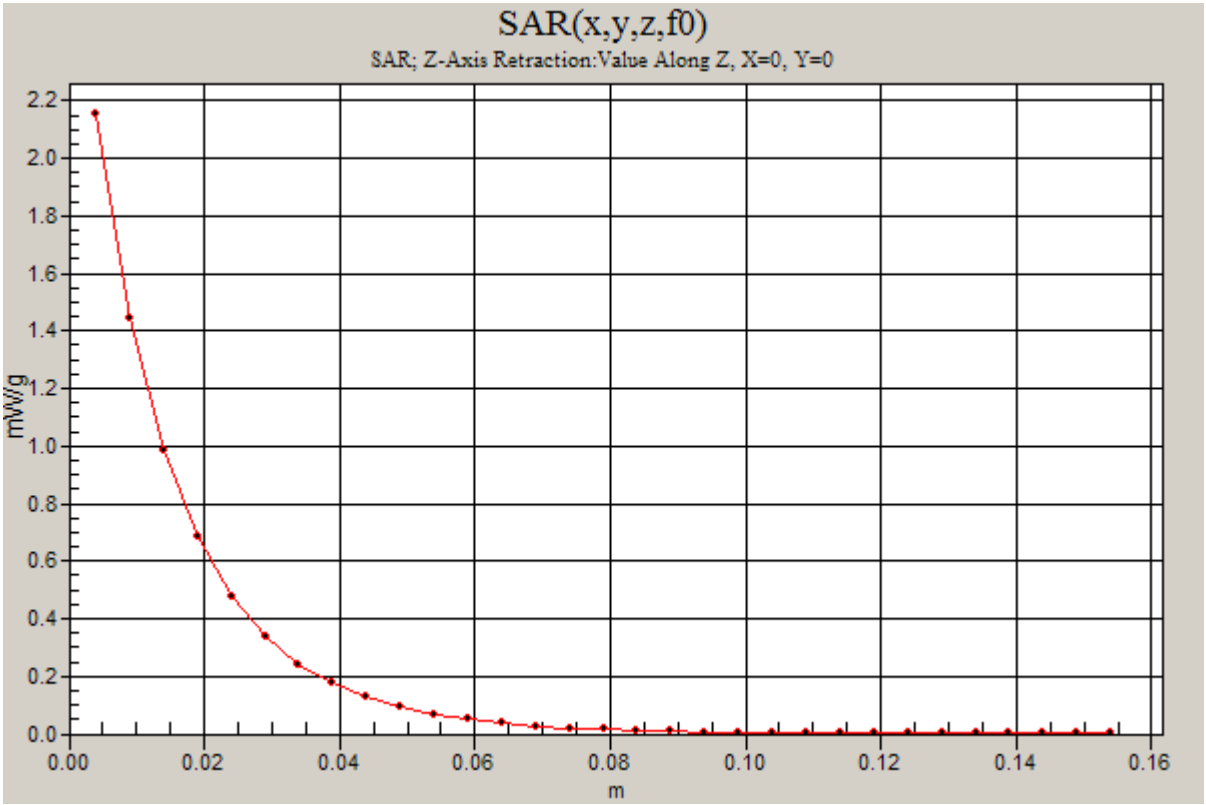
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.2 V/m; Power Drift = -0.053 dB; Peak SAR (extrapolated) = 2.95 W/kg
SAR(1 g) = 1.98 mW/g; SAR(10 g) = 1.29 mW/g; Maximum value of SAR (measured) = 2.14 mW/g

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


mW/g
2.15
1.72
1.29
0.860
0.430
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: 1/22/2011 6:34:25 AM

Test Laboratory: Motorola - Jan-22-2011 2450 MHz

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 766; FCC ID: IHDT56MH1
Procedure Notes: 2450MHz System Performance Check; Dipole Sn# 766; Input Power = 200 mW
Sim.Temp@meas = 19.5*C; Sim.Temp@SPC = 19.5*C; Room Temp @ SPC = 20.2*C
Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 2450 MHz; σ = 1.84 mho/m; ε_r = 36.3; ρ = 1000 kg/m^3

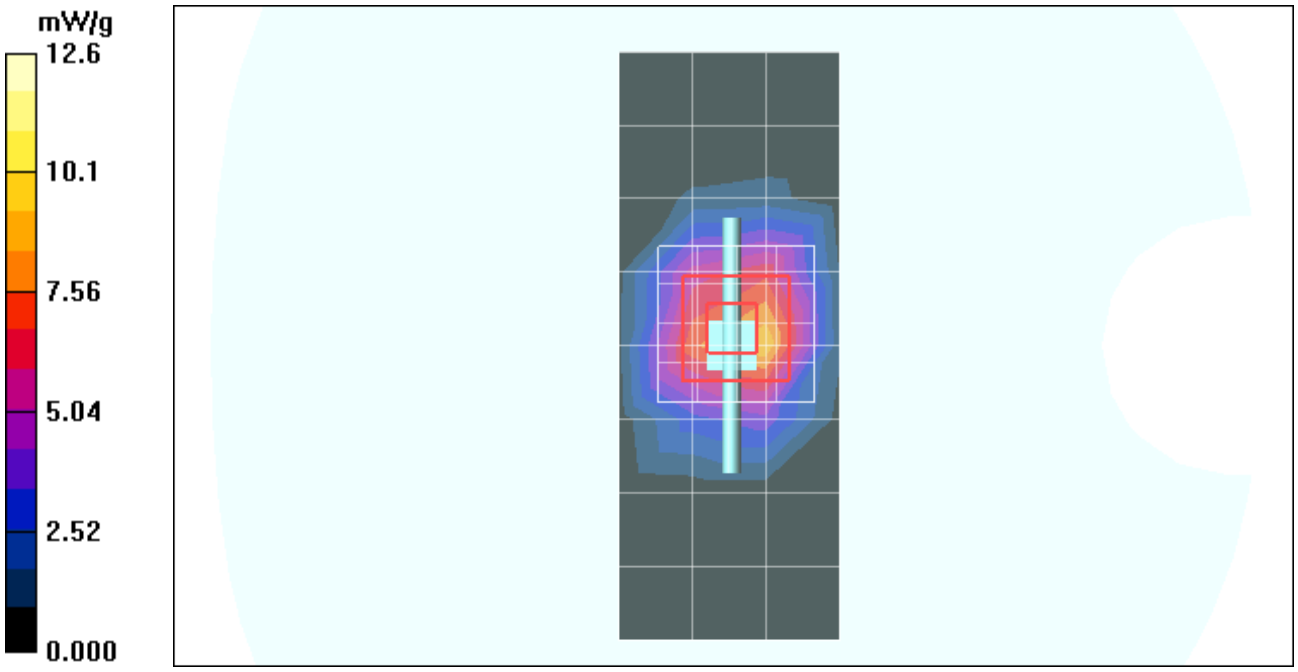
DASY4 Configuration:

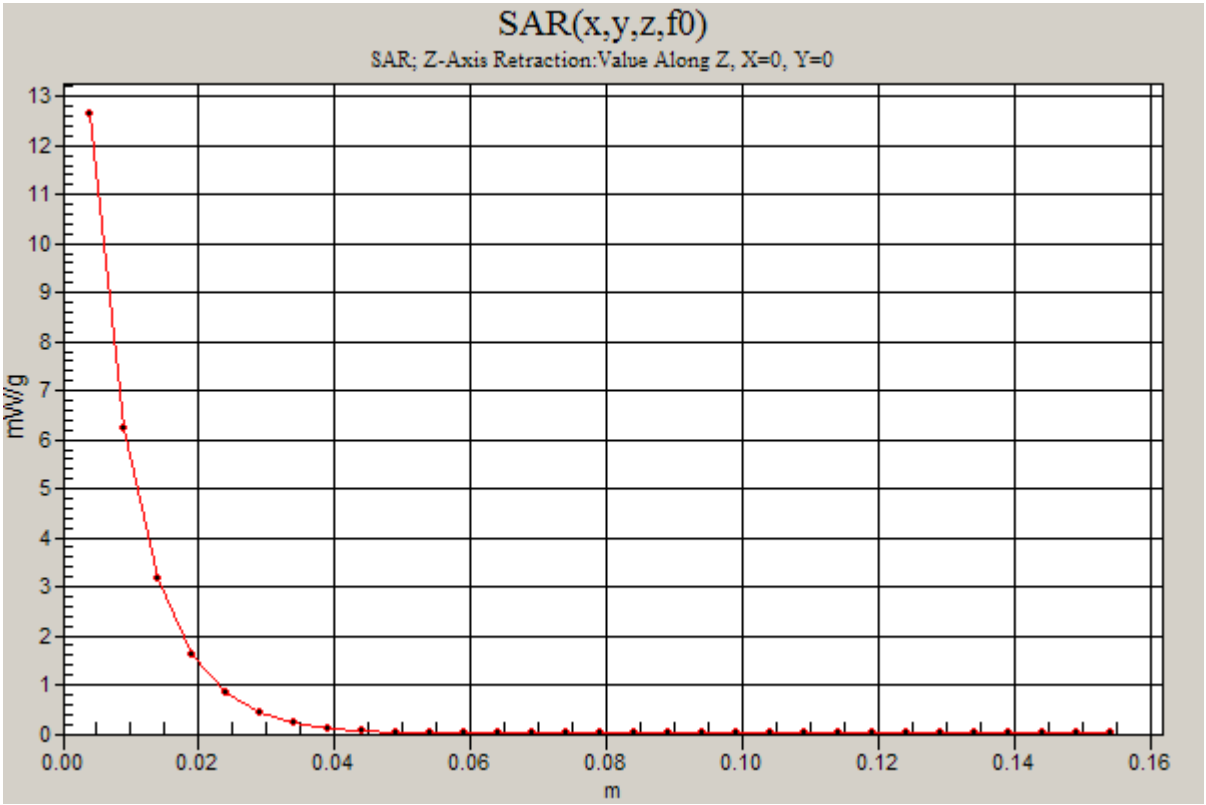
- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 9.22 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 84.5 V/m; Power Drift = -0.032 dB; Peak SAR (extrapolated) = 23.3 W/kg
SAR(1 g) = 11.2 mW/g; SAR(10 g) = 5.17 mW/g; Maximum value of SAR (measured) = 12.8 mW/g

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


mW/g
12.6
10.1
7.56
5.04
2.52
0.000


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

Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

Date/Time: 1/23/2011 6:40:52 AM

Test Laboratory: Motorola - iDEN 800 Cheek

Serial: 364VLYK6YW; FCC ID: IHDT56MH1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5875A; DEVICE POSITION: Cheek
Communication System: iDEN 800; Frequency: 815.51 MHz; Duty Cycle: 1:3

Medium: iDEN Sugar Head
Medium parameters used: f = 815 MHz; σ = 0.9 mho/m; ε_r = 42.2; ρ = 1000 kg/m^3

DASY4 Configuration:

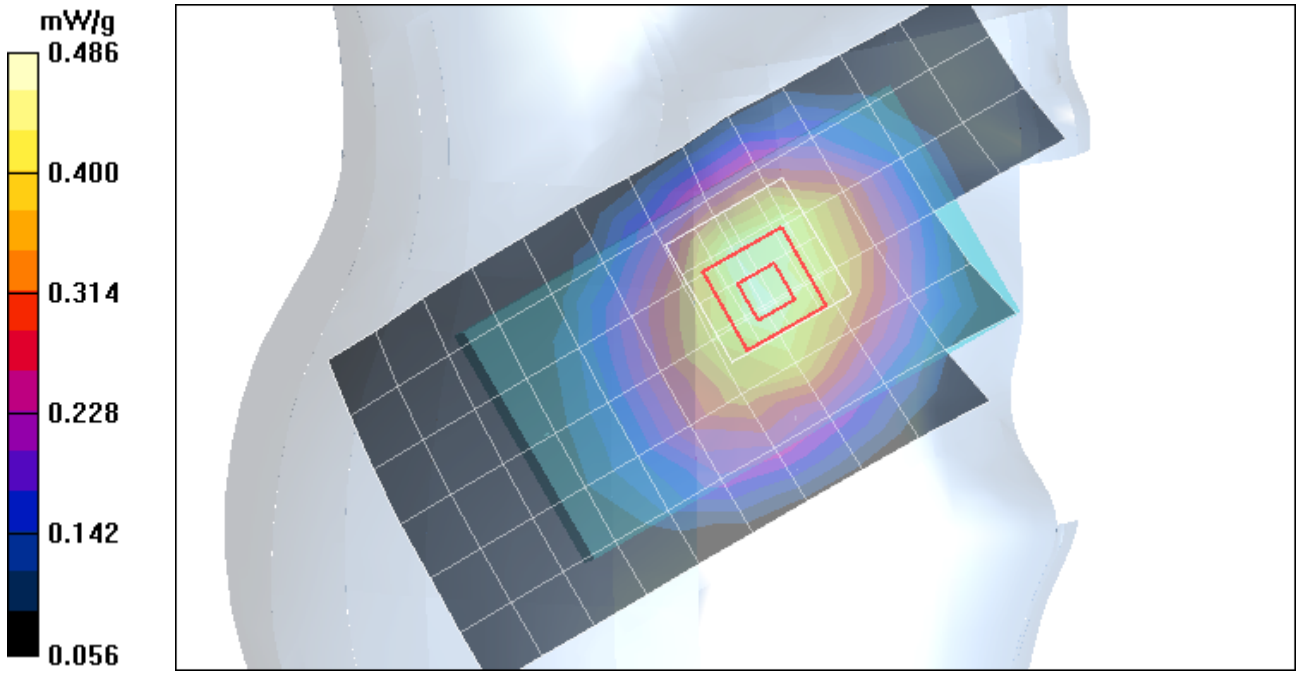
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.470 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.9 V/m; Power Drift = 0.035 dB; Peak SAR (extrapolated) = 0.603 W/kg
SAR(1 g) = 0.459 mW/g; SAR(10 g) = 0.344 mW/g; Maximum value of SAR (measured) = 0.486 mW/g



Date/Time: 1/23/2011 11:57:03 AM

Test Laboratory: Motorola - iDEN 900 Cheek

Serial: 364VLYK6YW; FCC ID: IHDT56MH1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5843A; DEVICE POSITION: Cheek
Communication System: iDEN 900; Frequency: 898.99 MHz; Duty Cycle: 1:3

Medium: iDEN Sugar Head
Medium parameters used: f = 899 MHz; σ = 0.98 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3

DASY4 Configuration:

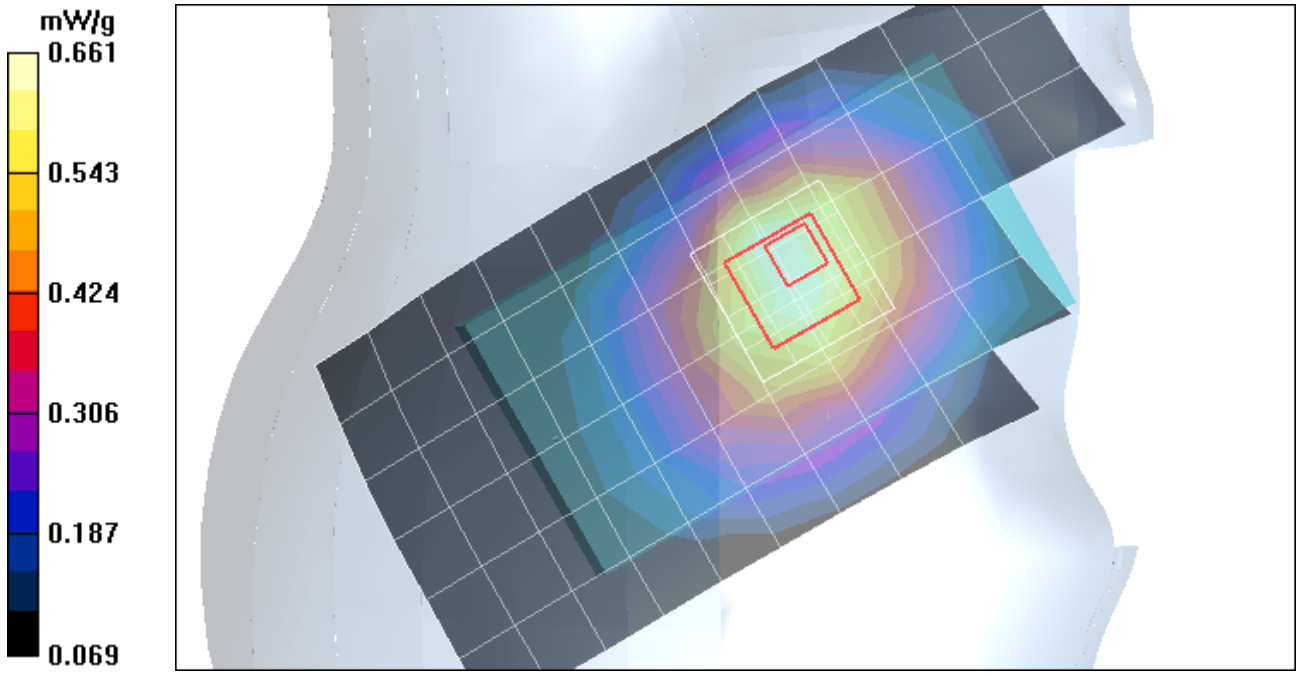
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.675 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.4 V/m; Power Drift = -0.140 dB; Peak SAR (extrapolated) = 0.900 W/kg
SAR(1 g) = 0.639 mW/g; SAR(10 g) = 0.462 mW/g; Maximum value of SAR (measured) = 0.661 mW/g



Date/Time: 1/22/2011 12:02:48 PM

Test Laboratory: Motorola - Wi-Fi 2450 Cheek

Serial: 364VLYK6YW; FCC ID: IHDT56MH1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5875A; DEVICE POSITION: Cheek
Device Mode: 802.11b mode, 11 Mbps data rate
Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Glycol Head
Medium parameters used: f = 2450 MHz; σ = 1.84 mho/m; ε_r = 36.3; ρ = 1000 kg/m^3

DASY4 Configuration:

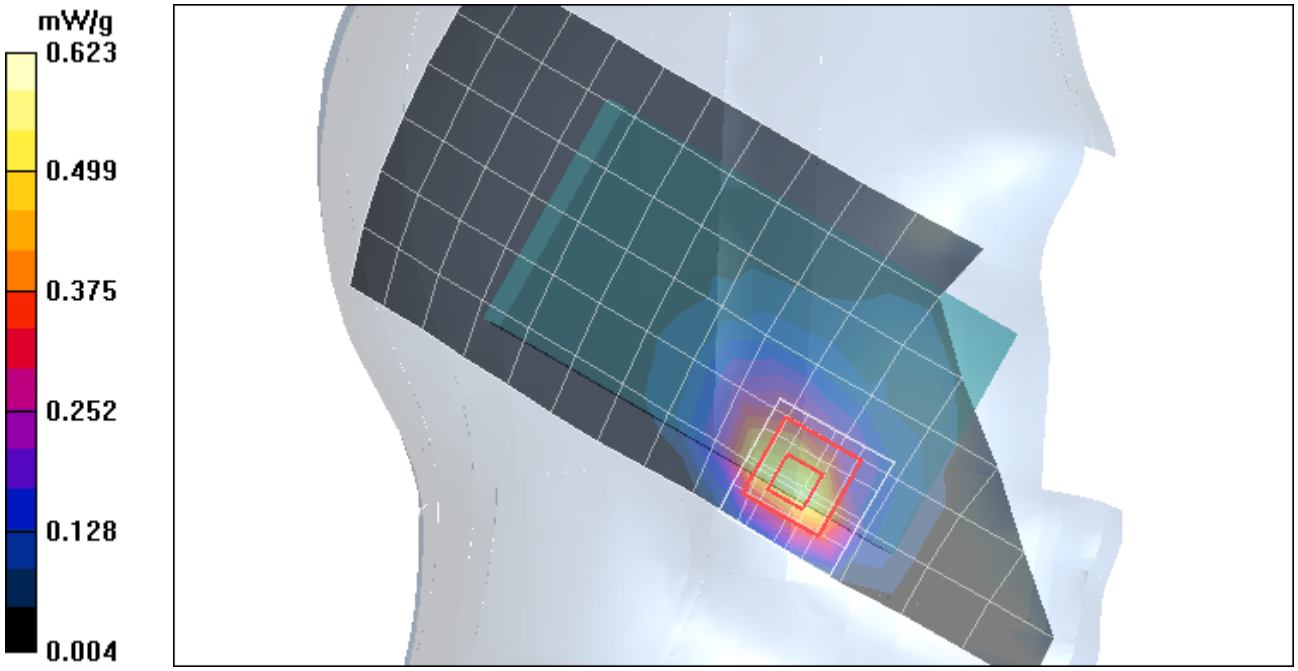
- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.583 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.0 V/m; Power Drift = -0.976 dB; Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.547 mW/g; SAR(10 g) = 0.262 mW/g; Maximum value of SAR (measured) = 0.623 mW/g



Date/Time: 1/23/2011 6:57:55 AM

Test Laboratory: Motorola - iDEN 800 Tilt

Serial: 364VLYK6YW; FCC ID: IHDT56MH1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5875A; DEVICE POSITION: Tilt
Communication System: iDEN 800; Frequency: 815.51 MHz; Duty Cycle: 1:3

Medium: iDEN Sugar Head
Medium parameters used: f = 815 MHz; σ = 0.9 mho/m; ε_r = 42.2; ρ = 1000 kg/m^3

DASY4 Configuration:

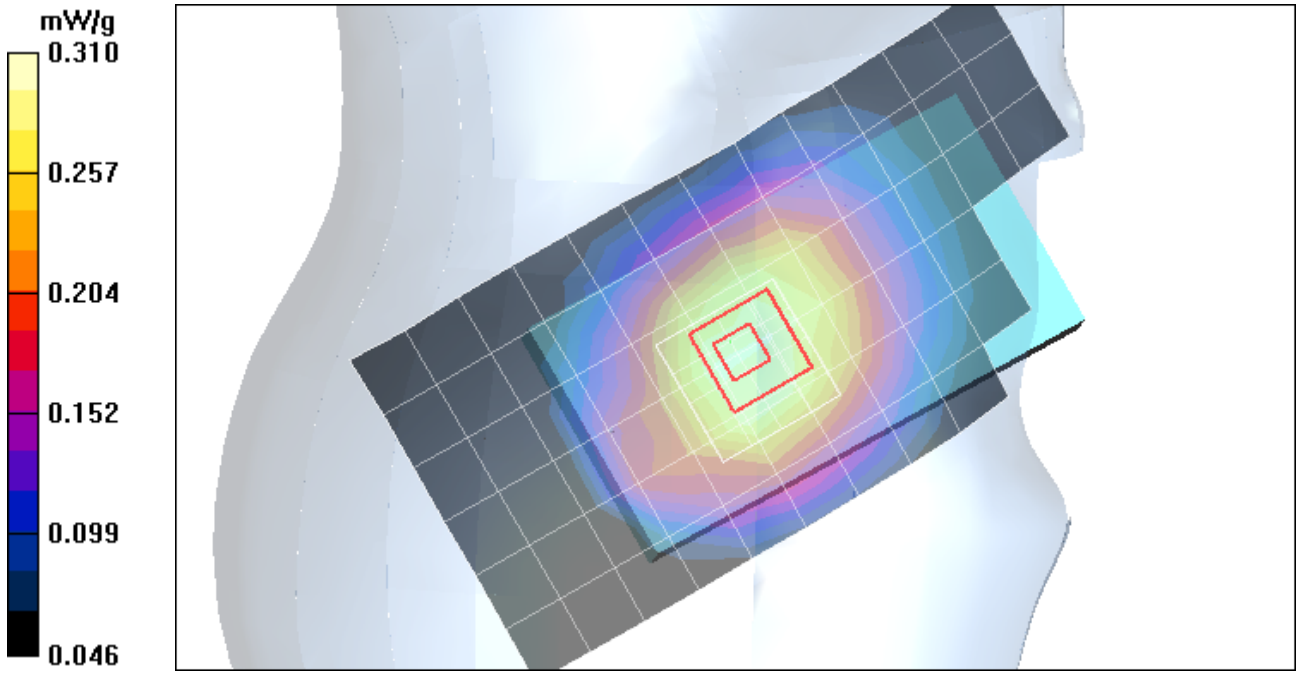
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.296 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.1 V/m; Power Drift = -0.055 dB; Peak SAR (extrapolated) = 0.357 W/kg
SAR(1 g) = 0.291 mW/g; SAR(10 g) = 0.224 mW/g; Maximum value of SAR (measured) = 0.310 mW/g



Date/Time: 1/23/2011 12:22:28 PM

Test Laboratory: Motorola - iDEN 900 Tilt

Serial: 364VLYK6YW; FCC ID: IHDT56MH1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5843A; DEVICE POSITION: Tilt
Communication System: iDEN 900; Frequency: 898.99 MHz; Duty Cycle: 1:3

Medium: iDEN Sugar Head
Medium parameters used: f = 899 MHz; σ = 0.98 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3

DASY4 Configuration:

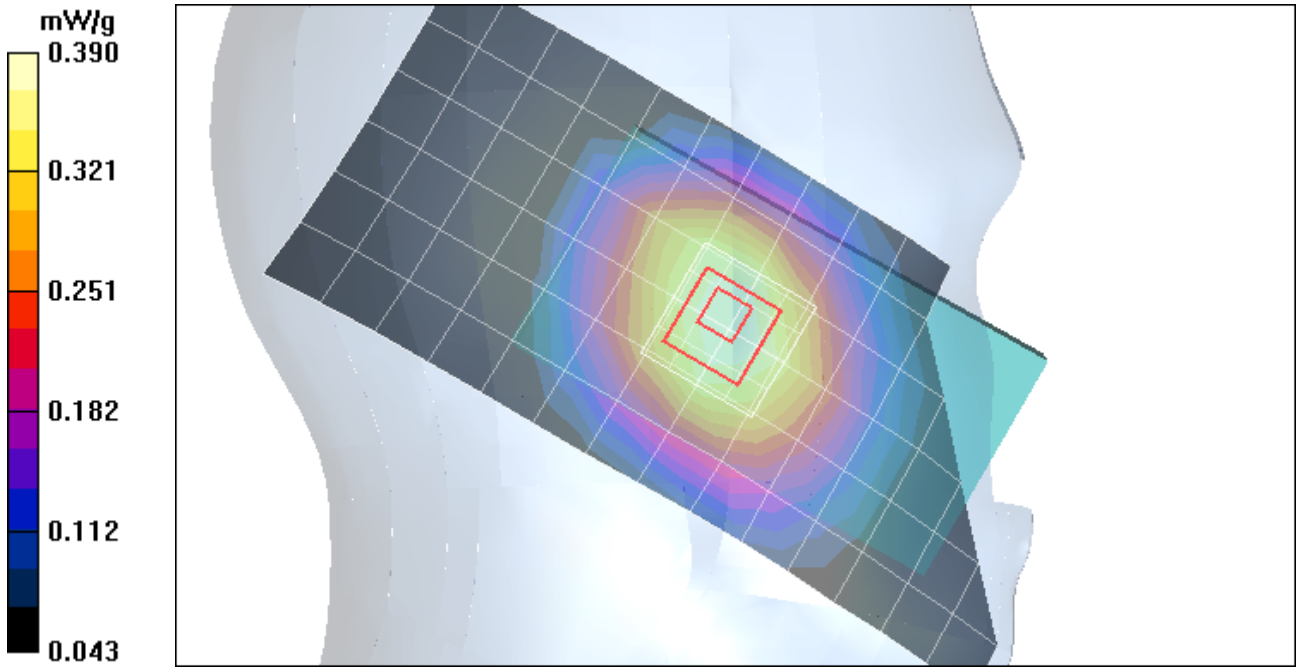
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.409 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.9 V/m; Power Drift = -0.053 dB; Peak SAR (extrapolated) = 0.472 W/kg
SAR(1 g) = 0.377 mW/g; SAR(10 g) = 0.288 mW/g; Maximum value of SAR (measured) = 0.390 mW/g



Date/Time: 1/22/2011 11:40:21 AM

Test Laboratory: Motorola - Wi-Fi 2450 Tilt

Serial: 364VLYK6YW; FCC ID: IHDT56MH1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5843A; DEVICE POSITION: Tilt
Device Mode: 802.11b mode, 1 Mbps data rate
Communication System: Wi-Fi 2450; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Glycol Head
Medium parameters used: f = 2450 MHz; σ = 1.84 mho/m; ε_r = 36.3; ρ = 1000 kg/m^3

DASY4 Configuration:

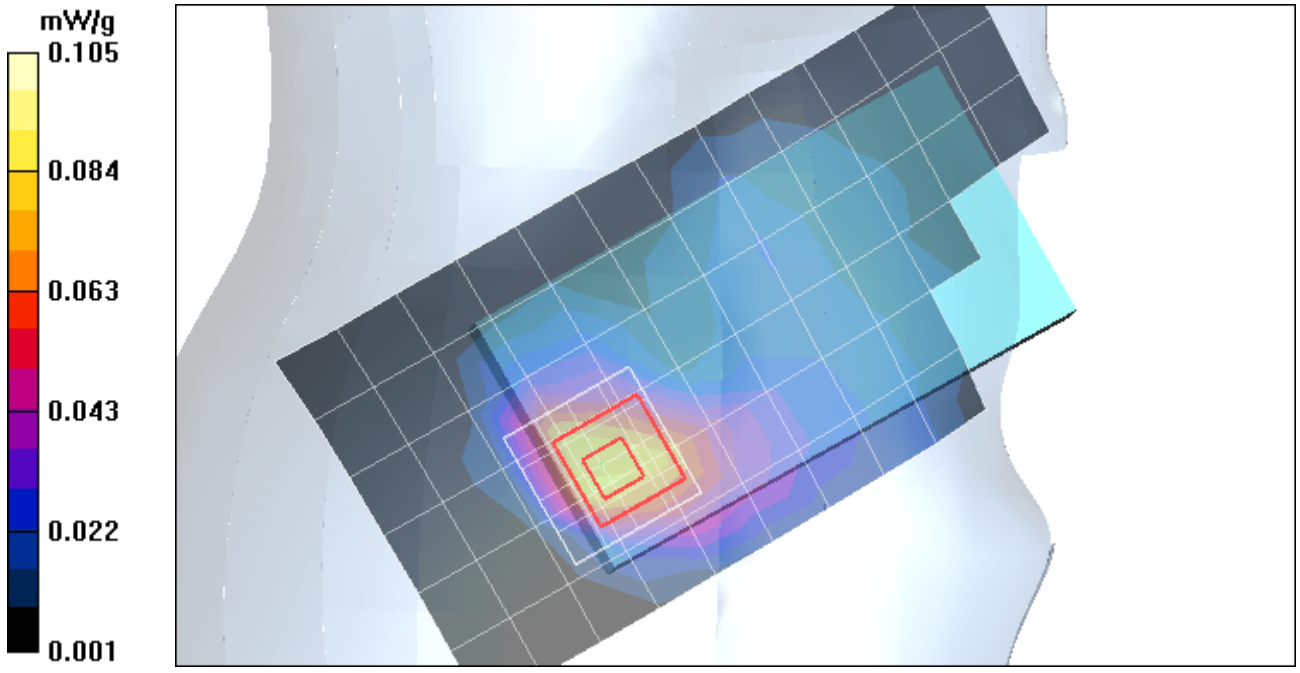
- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.079 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.39 V/m; Power Drift = -0.060 dB; Peak SAR (extrapolated) = 0.170 W/kg
SAR(1 g) = 0.094 mW/g; SAR(10 g) = 0.048 mW/g; Maximum value of SAR (measured) = 0.105 mW/g



Appendix 3

SAR distribution plots for Dispatch/Push-to-Talk Use

Date/Time: 1/23/2011 10:34:41 AM

Test Laboratory: Motorola - iDEN 800 Push-to-Talk

Serial: 364VLYK6YW; FCC ID: IHDT56MH1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5843A
Device Position: Push-to-Talk Position, Front of Phone 25 mm from Phantom
Communication System: iDEN 800; Frequency: 815.51 MHz; Duty Cycle: 1:6

Medium: iDEN Sugar Head
Medium parameters used: f = 815 MHz; σ = 0.9 mho/m; ε_r = 42.2; ρ = 1000 kg/m^3

DASY4 Configuration:

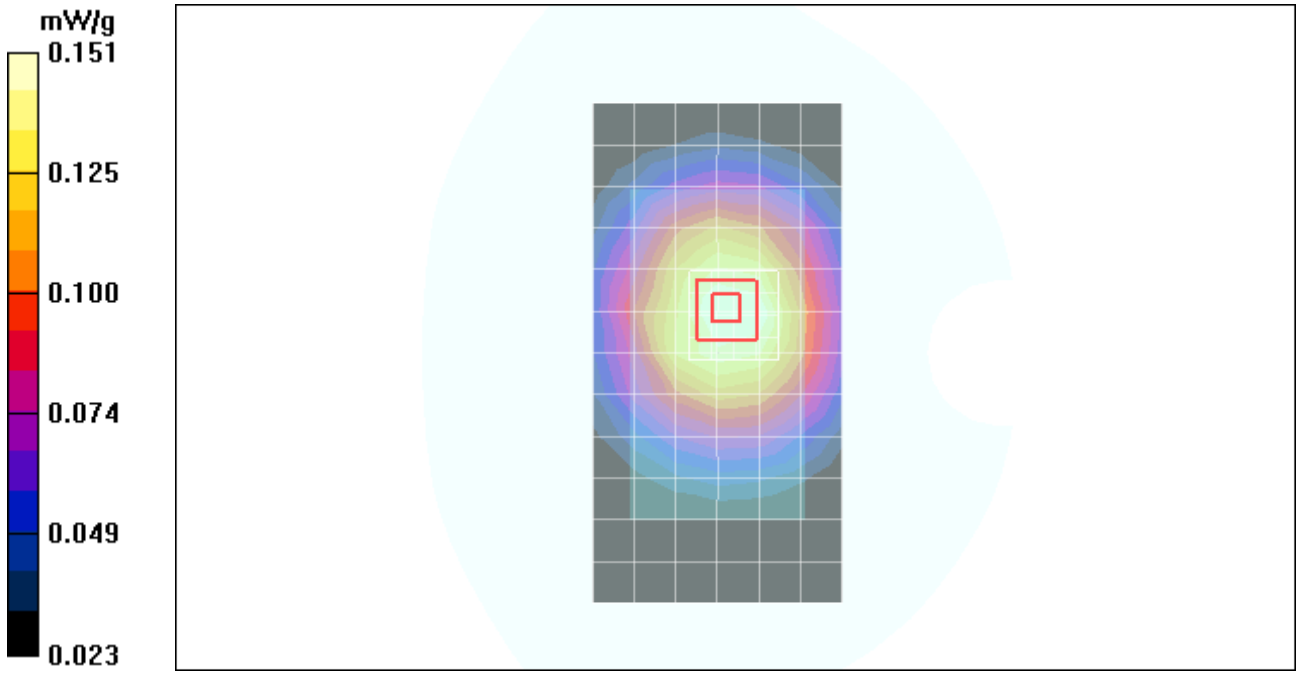
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Area Scan - Normal Body (15mm) (13x7x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.156 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.0 V/m; Power Drift = 0.052 dB; Peak SAR (extrapolated) = 0.183 W/kg
SAR(1 g) = 0.145 mW/g; SAR(10 g) = 0.108 mW/g; Maximum value of SAR (measured) = 0.151 mW/g



Date/Time: 1/27/2011 9:57:19 AM

Test Laboratory: Motorola - iDEN 900 Push-to-Talk

Serial: 364VLYK6YW; FCC ID: IHDT56MH1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5875A
Device Position: Push-to-Talk Position, Front of Phone 25 mm from Phantom
Communication System: iDEN 900; Frequency: 898.99 MHz; Duty Cycle: 1:6

Medium: iDEN Sugar Head
Medium parameters used: f = 899 MHz; σ = 0.97 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

DASY4 Configuration:

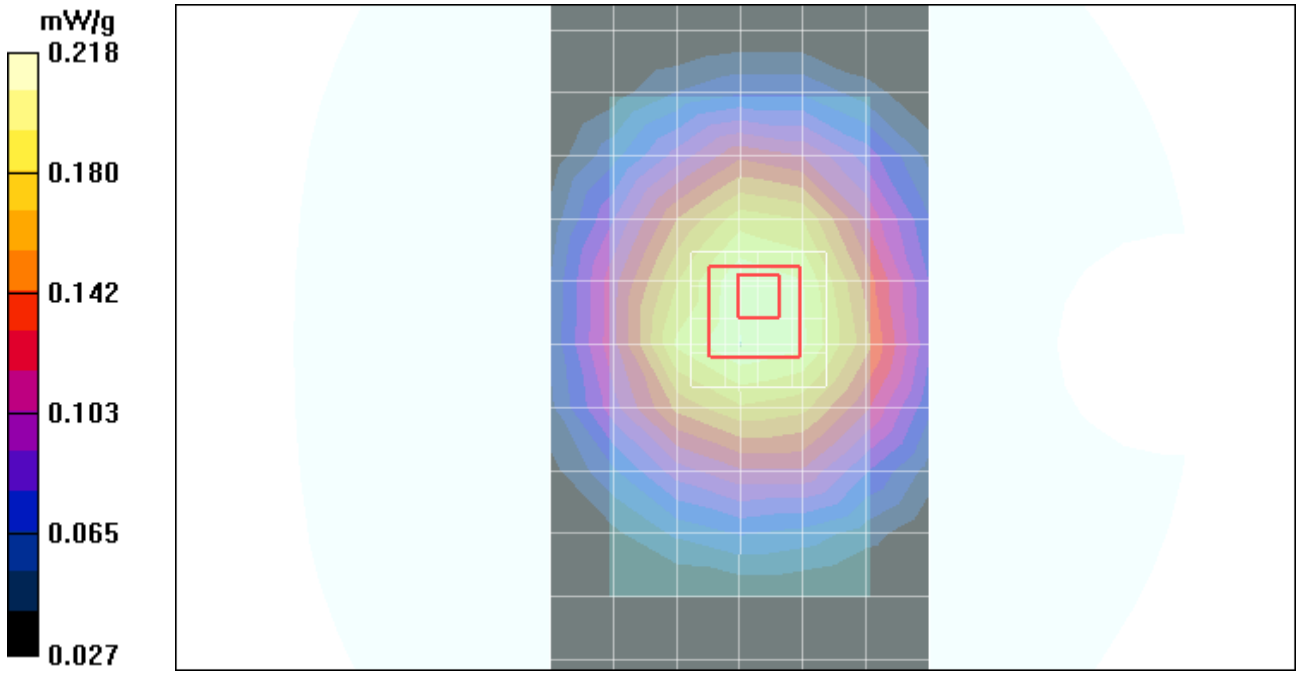
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Area Scan - Normal Body (15mm) (13x7x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.206 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.9 V/m; Power Drift = -0.166 dB; Peak SAR (extrapolated) = 0.278 W/kg
SAR(1 g) = 0.202 mW/g; SAR(10 g) = 0.147 mW/g; Maximum value of SAR (measured) = 0.218 mW/g



Date/Time: 2/9/2011 9:46:24 AM

Test Laboratory: Motorola - MOTOtalk Push-to-Talk

Serial: 364VLYK6LX; FCC ID: IHDT56MH1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5875A
Device Position: Push-to-Talk Position, Front of Phone 25 mm from Phantom
Communication System: MotoTalk; Frequency: 915.525 MHz; Duty Cycle: 1:1.05

Medium: MotoTalk Sugar Head
Medium parameters used: f = 915 MHz; σ = 0.98 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3

DASY4 Configuration:

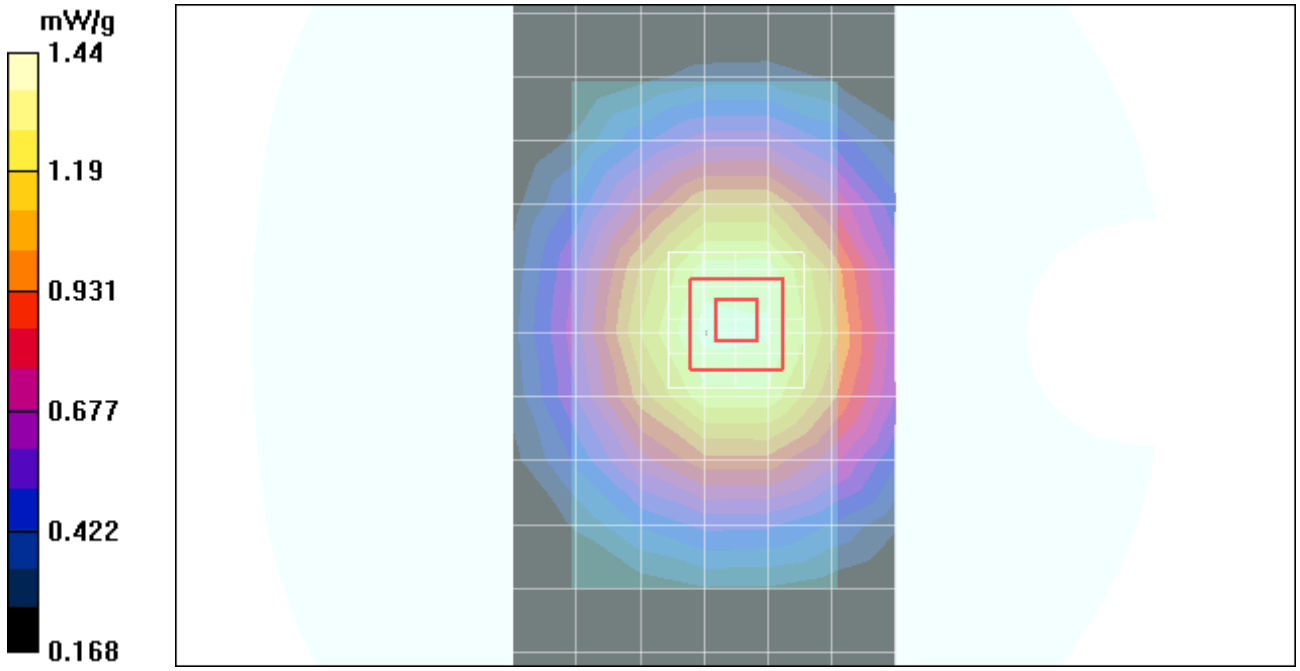
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Area Scan - Normal Body (15mm) (13x7x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.39 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 37.1 V/m; Power Drift = -0.047 dB; Peak SAR (extrapolated) = 1.79 W/kg
SAR(1 g) = 1.36 mW/g; SAR(10 g) = 0.982 mW/g; Maximum value of SAR (measured) = 1.44 mW/g



Date/Time: 1/22/2011 10:15:28 AM

Test Laboratory: Motorola - Wi-Fi 2450 Push-to-Talk

Serial: 364VLYK6YW; FCC ID: IHDT56MH1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5875A
Device Position; Push-to-Talk Position, Front of Phone 25 mm from Phantom
Device Mode: 802.11b mode, 1 Mbps data rate
Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Glycol Head
Medium parameters used: f = 2450 MHz; σ = 1.84 mho/m; ε_r = 36.3; ρ = 1000 kg/m^3

DASY4 Configuration:

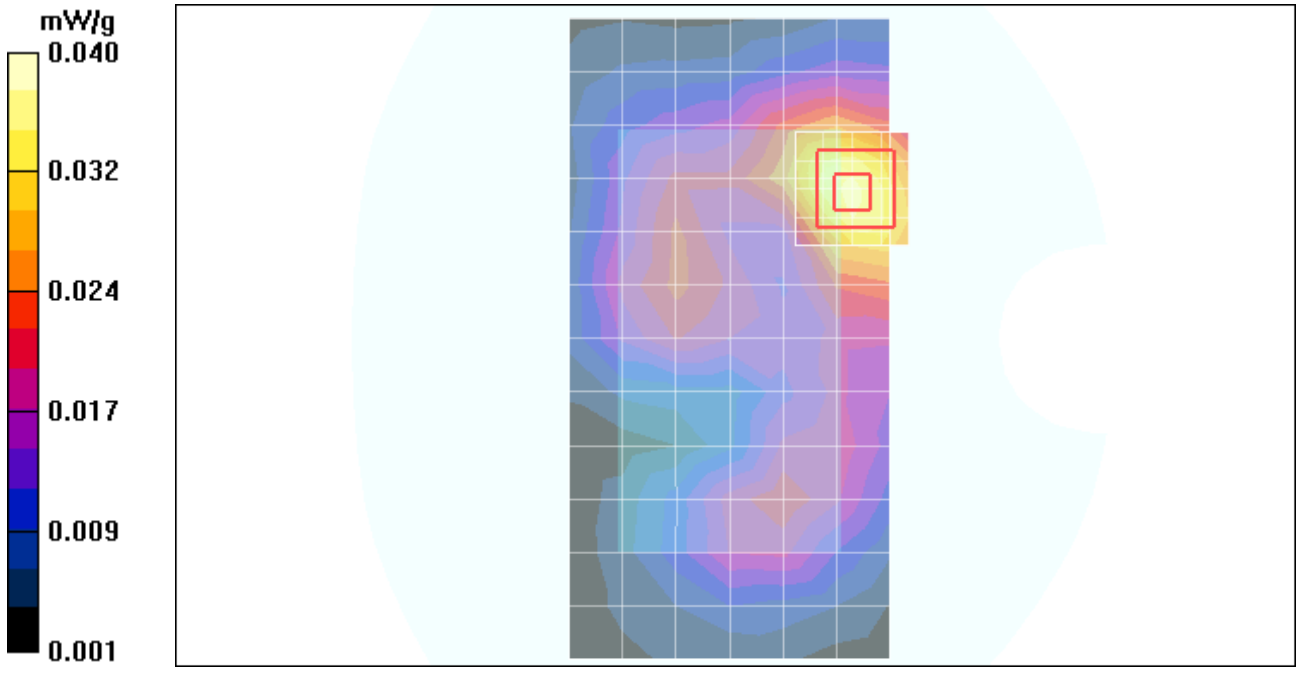
- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Area Scan - Normal Body (15mm) (13x7x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.038 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.66 V/m; Power Drift = -0.041 dB; Peak SAR (extrapolated) = 0.062 W/kg
SAR(1 g) = 0.036 mW/g; SAR(10 g) = 0.021 mW/g;



Appendix 4

SAR distribution plots for Body Worn Configurations

Date/Time: 1/24/2011 9:31:01 AM

Test Laboratory: Motorola - iDEN 800 Body-Worn

Serial: 364VLYK6YW; FCC ID: IHDT56MH1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5875A
Device Position: Body Worn, Back of Phone 15 mm from Phantom
Communication System: iDEN 800; Frequency: 815.51 MHz; Duty Cycle: 1:3

Medium: iDEN Sugar Body
Medium parameters used: f = 815 MHz; σ = 0.96 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3

DASY4 Configuration:

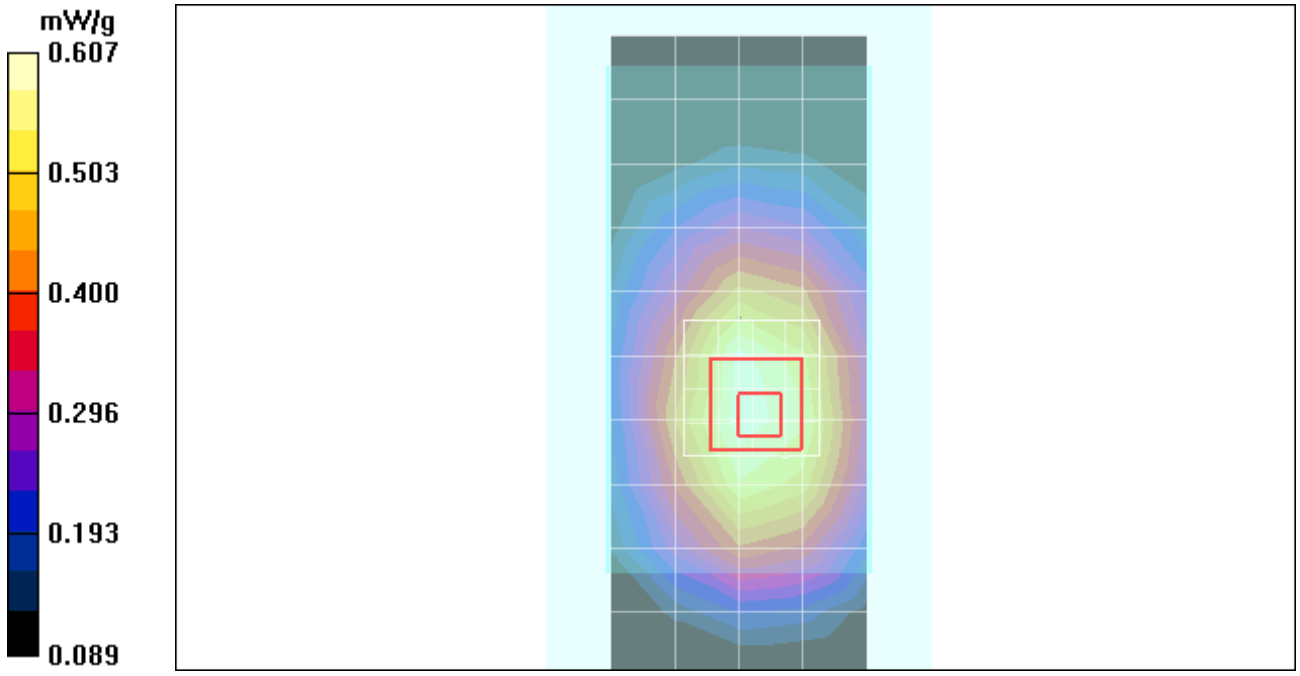
- Probe: ES3DV3 - SN3124; ConvF(5.86, 5.86, 5.86); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R4 : Sect.2, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.597 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.4 V/m; Power Drift = -0.003 dB; Peak SAR (extrapolated) = 0.716 W/kg
SAR(1 g) = 0.578 mW/g; SAR(10 g) = 0.435 mW/g; Maximum value of SAR (measured) = 0.607 mW/g



Date/Time: 1/24/2011 10:46:07 AM

Test Laboratory: Motorola - iDEN 900 Body-Worn

Serial: 364VLYK6YW; FCC ID: IHDT56MH1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5875A
Device Position: Body Worn, Back of Phone 15 mm from Phantom
Communication System: iDEN 900; Frequency: 898.99 MHz; Duty Cycle: 1:3

Medium: iDEN Sugar Body
Medium parameters used: f = 899 MHz; σ = 1.08 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

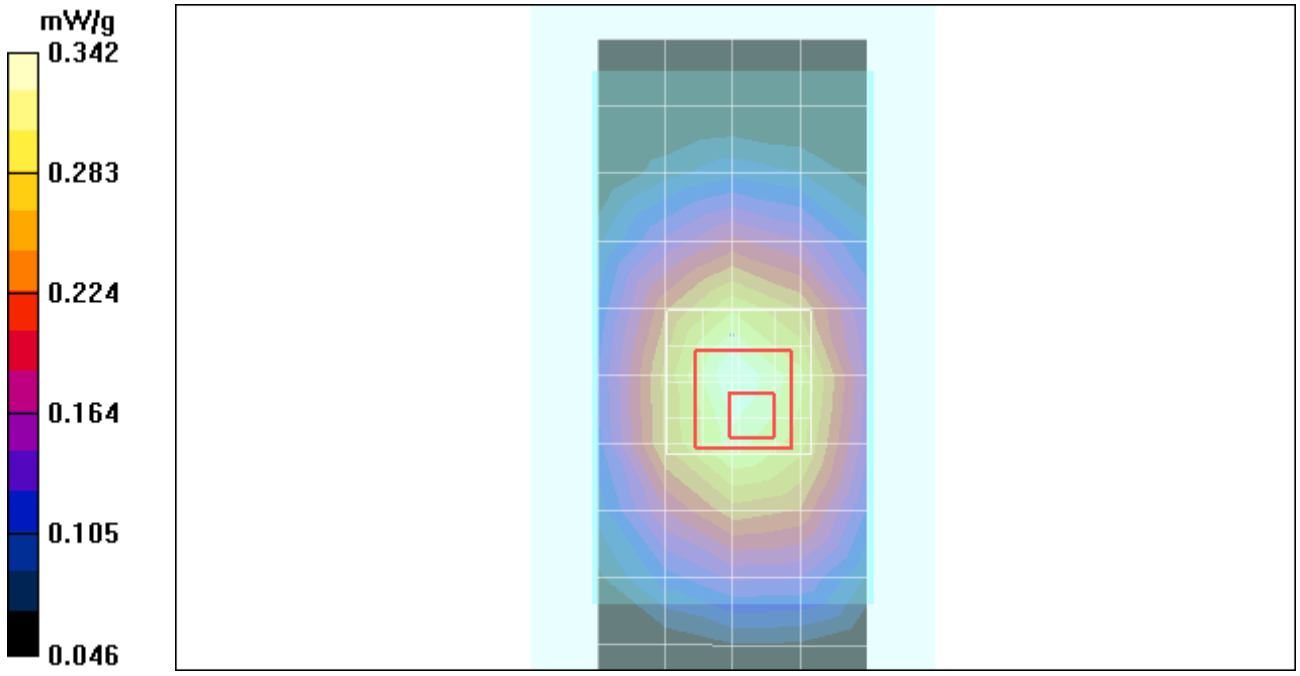
- Probe: ES3DV3 - SN3124; ConvF(5.86, 5.86, 5.86); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R4 : Sect.2, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.346 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.9 V/m; Power Drift = -0.138 dB; Peak SAR (extrapolated) = 0.444 W/kg
SAR(1 g) = 0.325 mW/g; SAR(10 g) = 0.238 mW/g; Maximum value of SAR (measured) = 0.342 mW/g



Date/Time: 2/9/2011 1:38:48 PM

Test Laboratory: Motorola - MOTOtalk Body-Worn

Serial: 364VLYK6LX; FCC ID: IHDT56MH1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5843A
Device Position: Body Worn, Front of Phone 25 mm from Phantom
Communication System: MotoTalk; Frequency: 902.525 MHz; Duty Cycle: 1:1.05

Medium: MotoTalk Sugar Body
Medium parameters used: f = 915 MHz; σ = 1.06 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3

DASY4 Configuration:

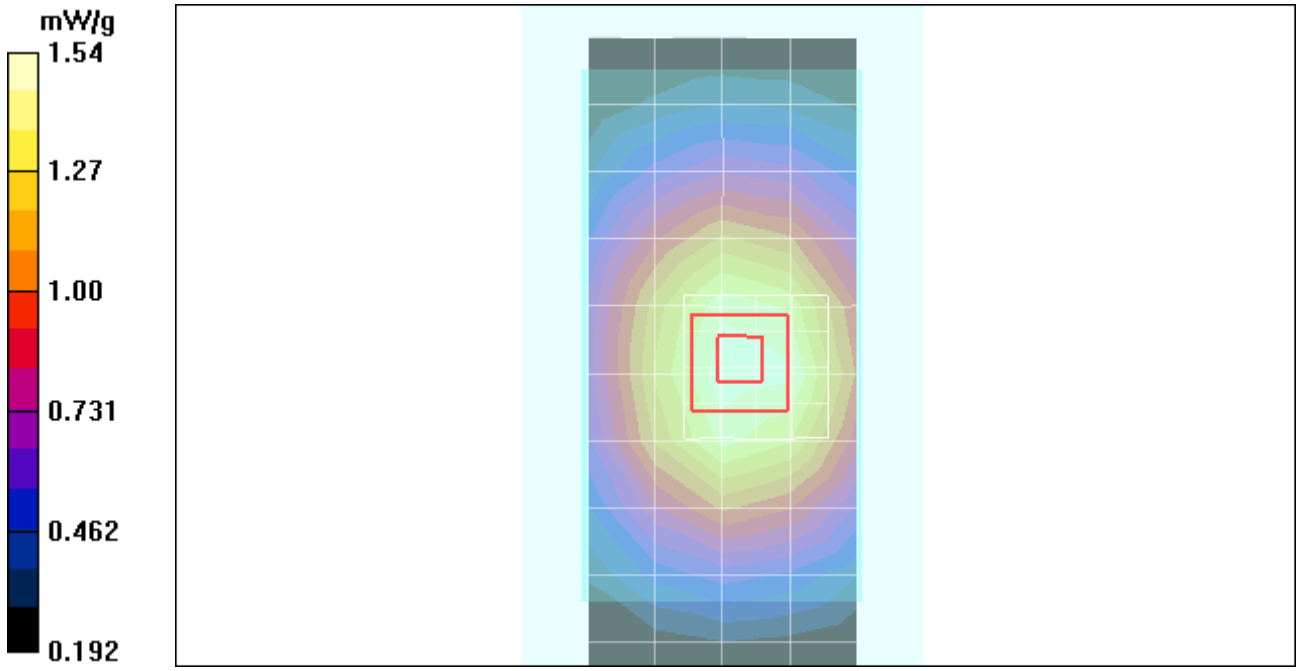
- Probe: ES3DV3 - SN3124; ConvF(5.86, 5.86, 5.86); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R4 : Sect.2, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.52 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 38.2 V/m; Power Drift = 0.065 dB; Peak SAR (extrapolated) = 1.88 W/kg
SAR(1 g) = 1.48 mW/g; SAR(10 g) = 1.09 mW/g; Maximum value of SAR (measured) = 1.54 mW/g



Date/Time: 1/22/2011 6:56:43 AM

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

Serial: 364VLYK6YW; FCC ID: IHDT56MH1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5843A
Device Position: Body Worn, Back of Phone 15 mm from Phantom
Device Mode: 802.11b mode, 1 Mbps data rate
Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Glycol Body
Medium parameters used: f = 2450 MHz; σ = 1.99 mho/m; ε_r = 49.4; ρ = 1000 kg/m^3

DASY4 Configuration:

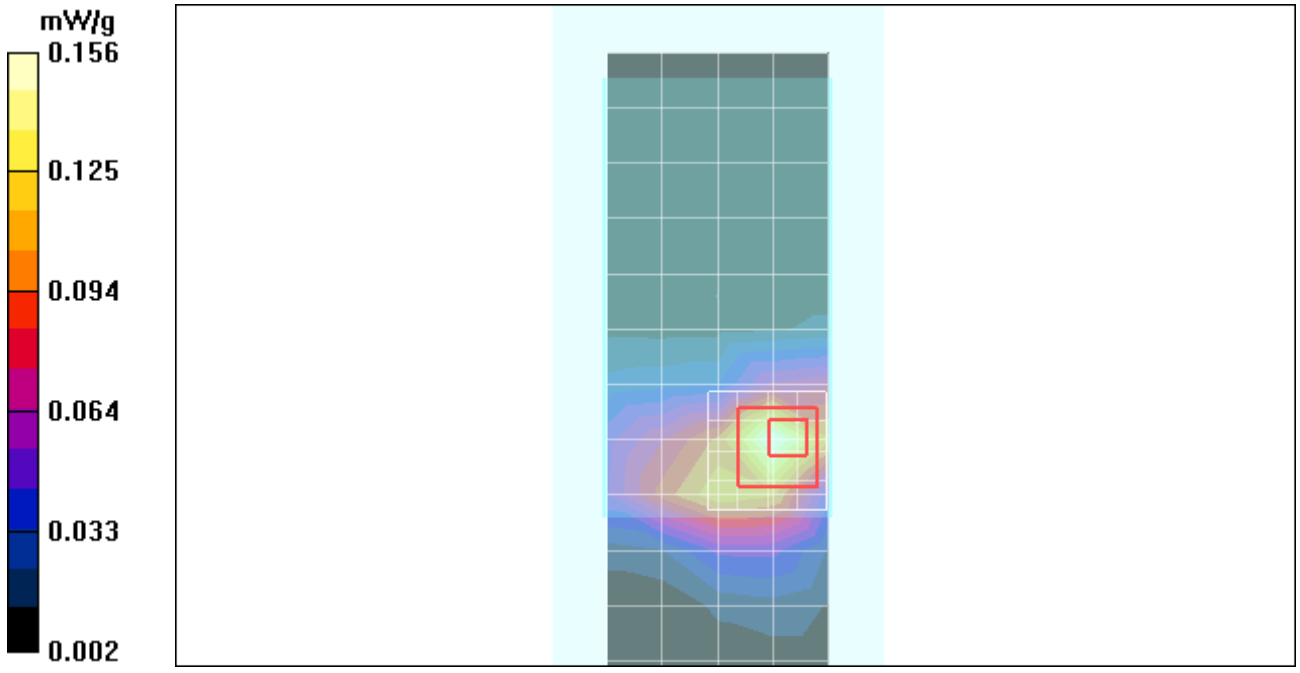
- Probe: ES3DV3 - SN3124; ConvF(4.19, 4.19, 4.19); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.161 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.99 V/m; Power Drift = -0.322 dB; Peak SAR (extrapolated) = 0.274 W/kg
SAR(1 g) = 0.146 mW/g; SAR(10 g) = 0.078 mW/g; Maximum value of SAR (measured) = 0.156 mW/g



Appendix 5

Probe Calibration Certificates

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: ES3-3124_Aug10

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3124

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

Calibration date: August 11, 2010

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	30-Dec-09 (No. ES3-3013_Dec09)	Dec-10
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-09)	In house check: Oct10

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 14, 2010

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., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep 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 $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3124

Manufactured:	July 11, 2006
Last calibrated:	April 21, 2009
Recalibrated:	August 11, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 SN:3124

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.26	1.33	1.34	± 10.1%
DCP (mV)[B]	92.9	96.4	96.7	

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	300.0	± 1.5%
			Y	0.00	0.00	1.00	300.0	
			Z	0.00	0.00	1.00	300.0	

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:3124

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%	5.89	5.89	5.89	0.97	1.07 ± 11.0%
1810	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.89	4.89	4.89	0.49	1.54 ± 11.0%
1950	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.68	4.68	4.68	0.50	1.52 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	4.35	4.35	4.35	0.45	1.78 ± 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:3124

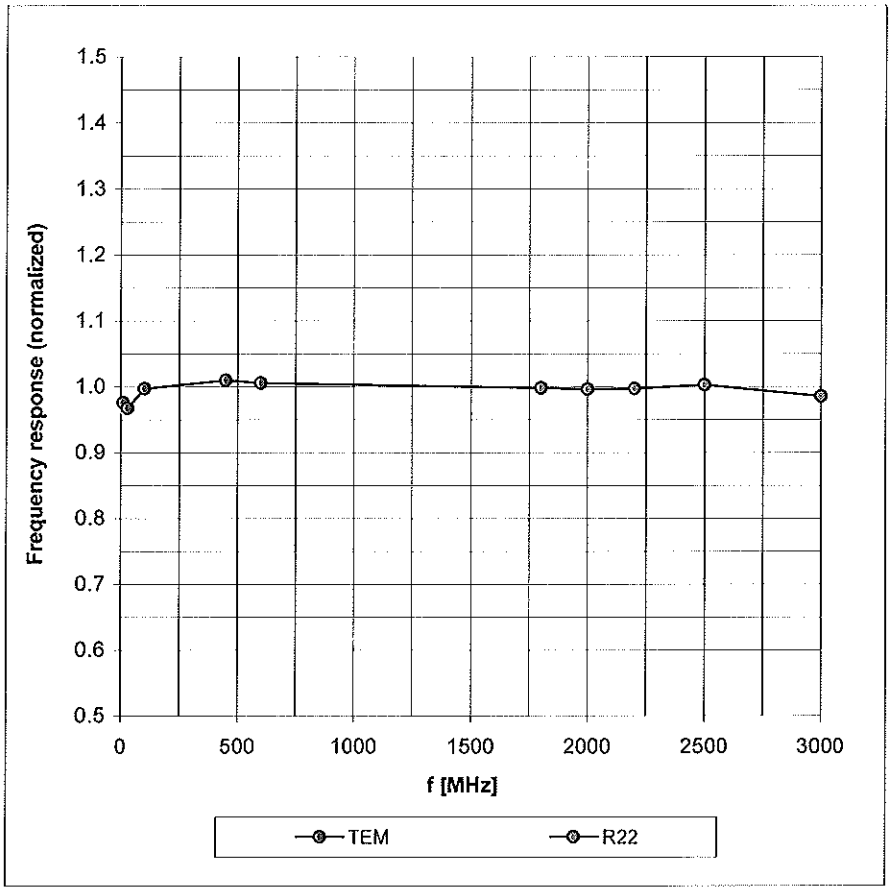
Calibration Parameter Determined in Body Tissue Simulating Media

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%	5.86	5.86	5.86	0.96	1.11 ± 11.0%
1810	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.76	4.76	4.76	0.41	1.84 ± 11.0%
1950	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.78	4.78	4.78	0.32	2.33 ± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	4.19	4.19	4.19	0.69	1.29 ± 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.

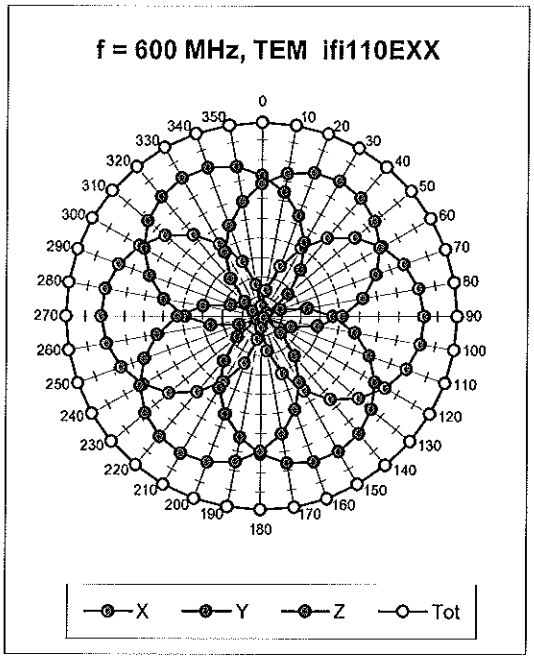
Frequency Response of E-Field

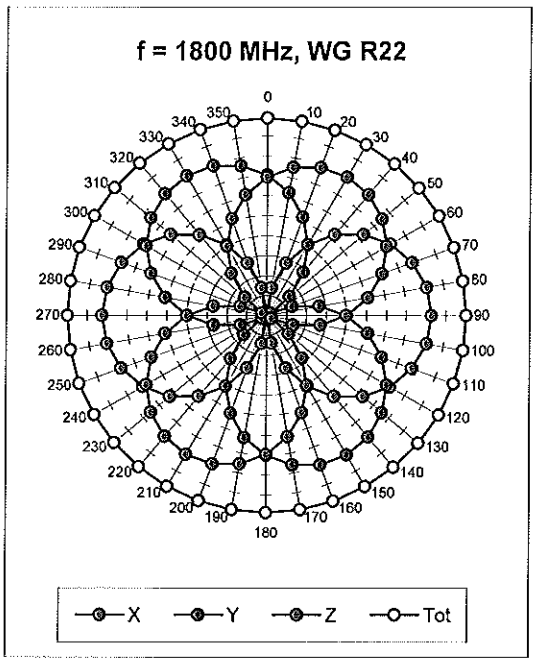
(TEM-Cell:ifi110 EXX, Waveguide: R22)

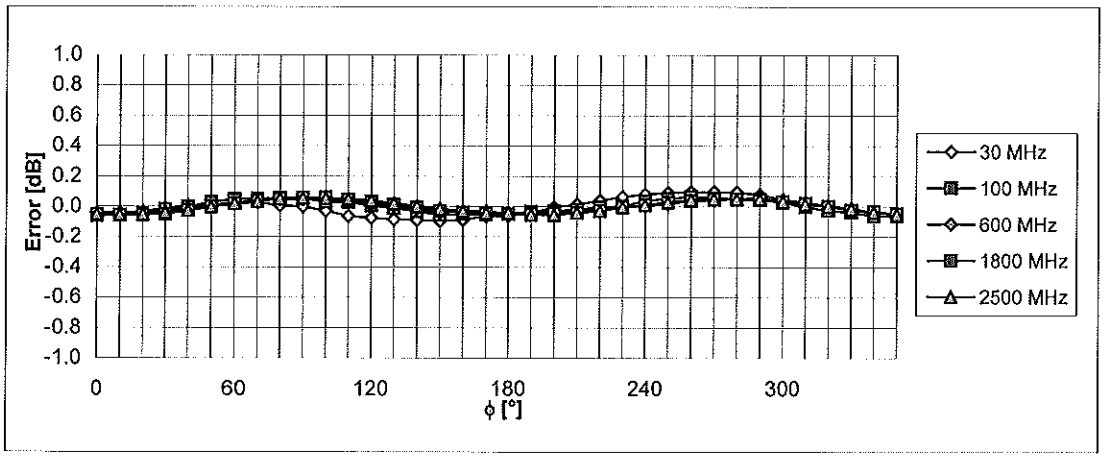


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



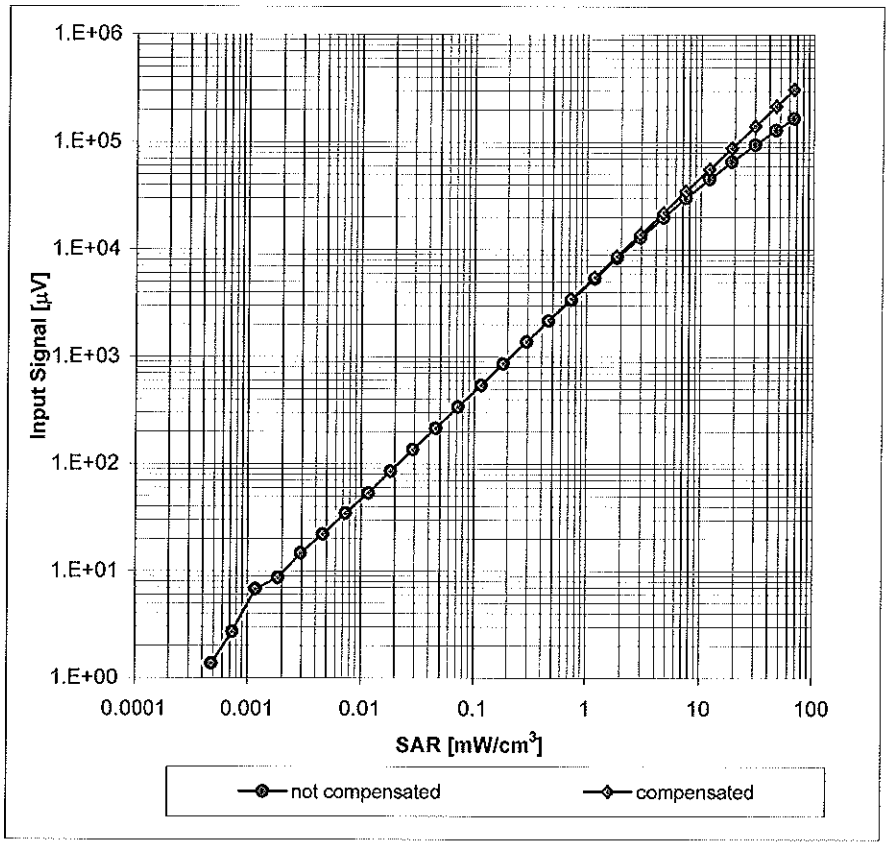


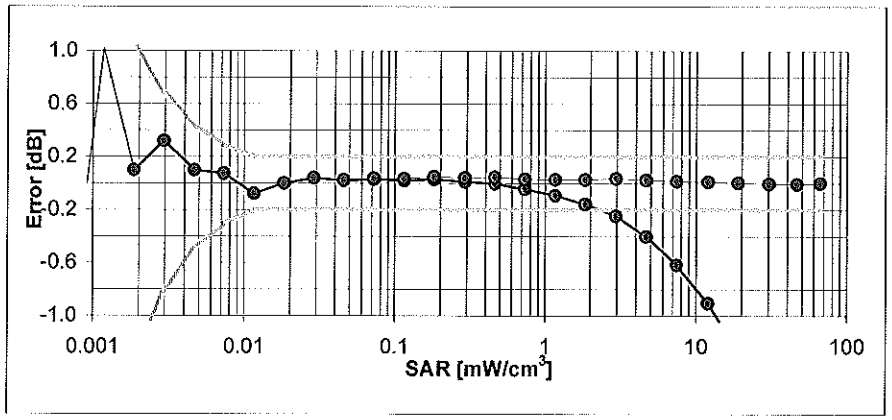


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

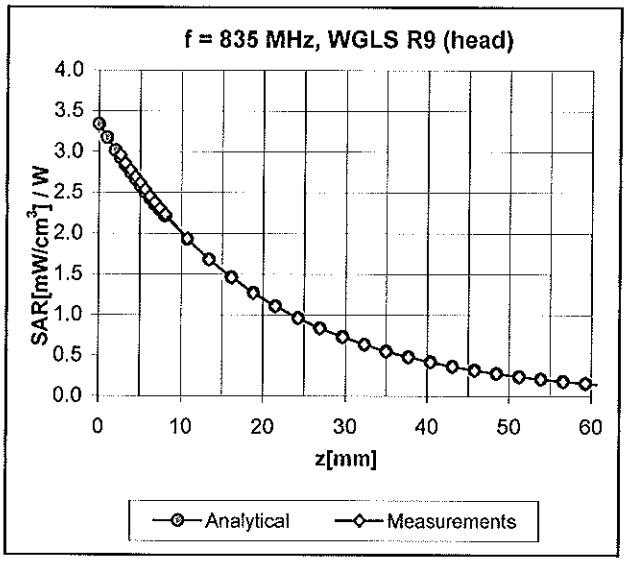
(Waveguide R22, f = 1800 MHz)

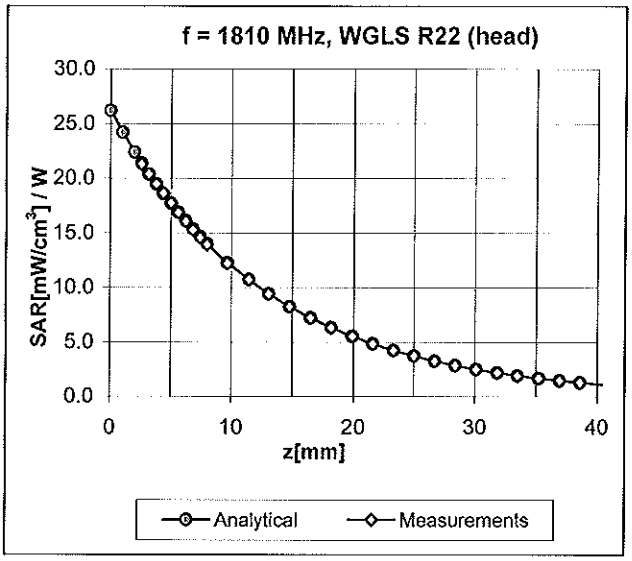




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

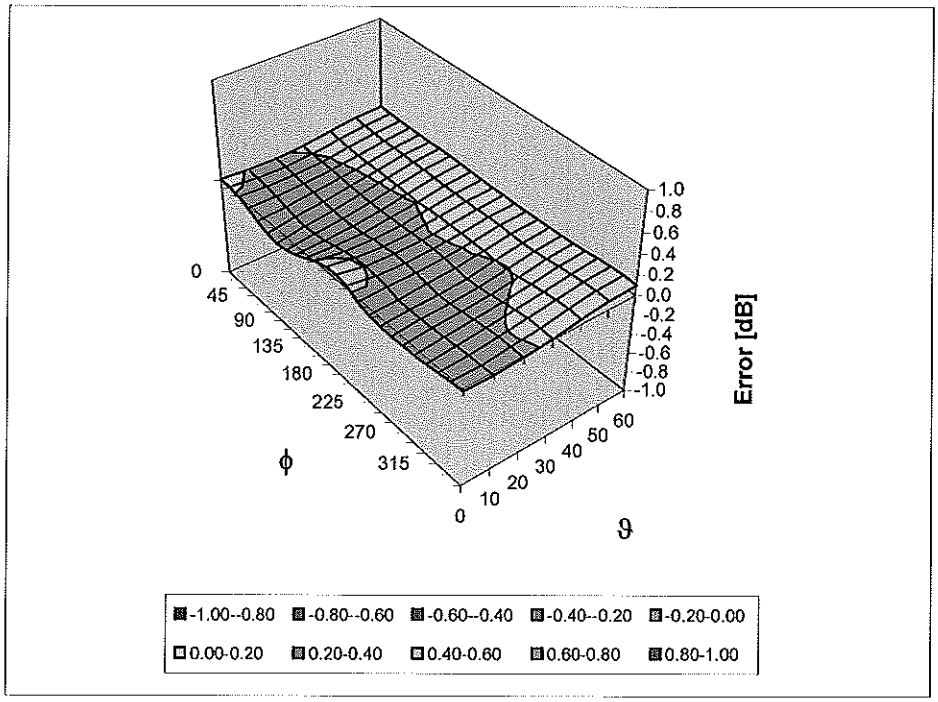
Conversion Factor Assessment





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	4.0 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 6

Measurement Uncertainty Budget

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

Appendix 7

Dipole Characterization Certificates

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: D835V2-425_Oct10

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 425
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	October 14, 2010

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 EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	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: October 14, 2010

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

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
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.3 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature during test	(22.5 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.38 mW / g
SAR normalized	normalized to 1W	9.52 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.57 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.55 mW / g
SAR normalized	normalized to 1W	6.20 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.22 mW /g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.8 Ω + 3.7 jΩ
Return Loss	- 26.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.396 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 24, 2000

DASY5 Validation Report for Head TSL

Date/Time: 14.10.2010 10:27:24

Test Laboratory: SPEAG, Zurich, Switzerland

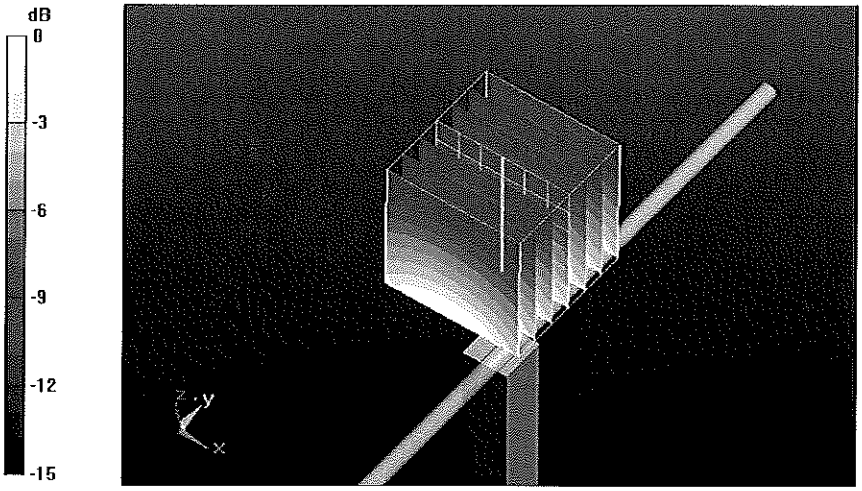
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:425

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL900
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 42.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

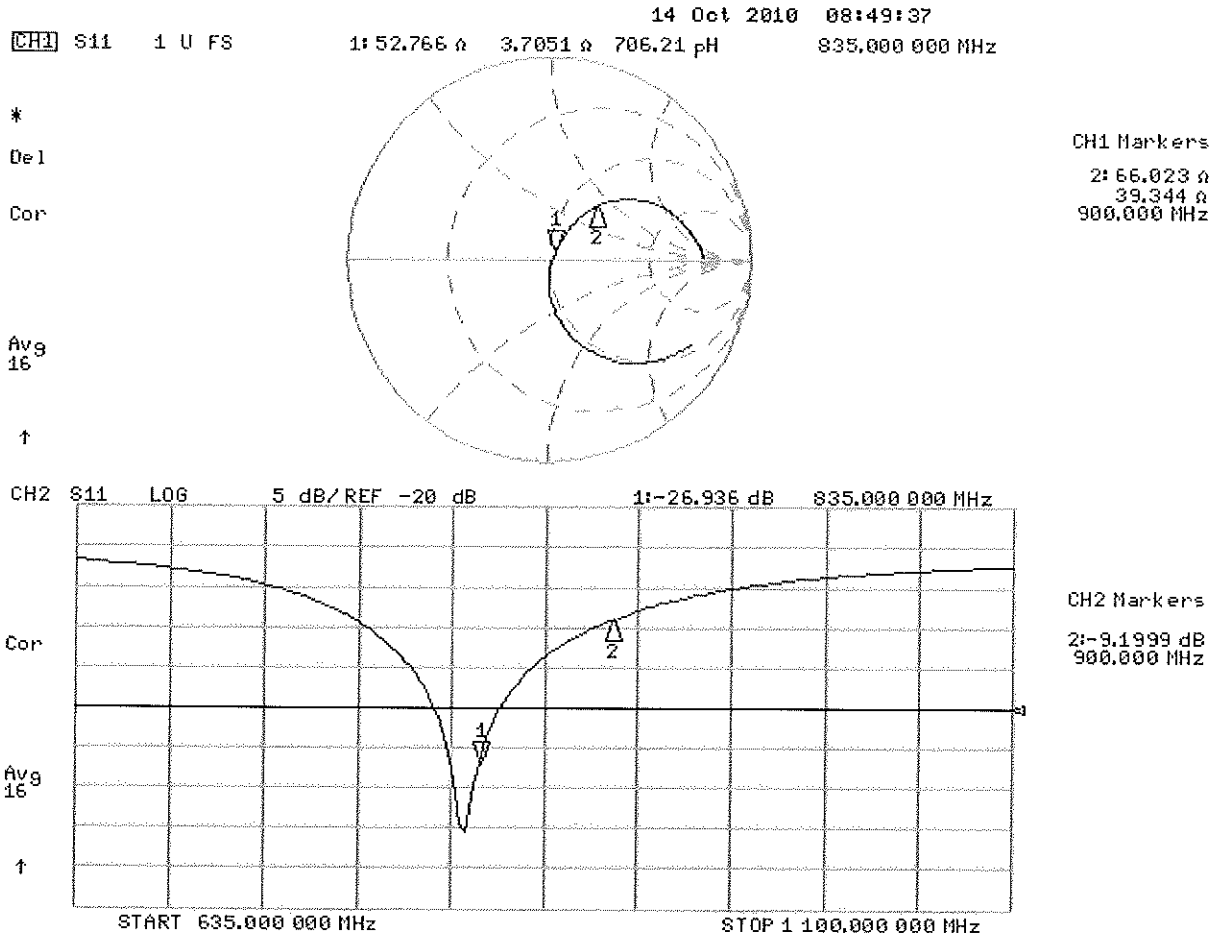
- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57 V/m; Power Drift = 0.010 dB
Peak SAR (extrapolated) = 3.59 W/kg
SAR(1 g) = 2.38 mW/g; SAR(10 g) = 1.55 mW/g
Maximum value of SAR (measured) = 2.76 mW/g



0 dB = 2.76mW/g

Impedance Measurement Plot for Head TSL



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: D2450V2-766_Oct10

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 766
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	October 13, 2010

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 EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: October 14, 2010

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

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
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.3 ± 6 %	1.71 mho/m ± 6 %
Head TSL temperature during test	(21.4 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	12.8 mW / g
SAR normalized	normalized to 1W	51.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**52.2 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.98 mW / g
SAR normalized	normalized to 1W	23.9 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.0 mW /g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.1 Ω + 0.7 jΩ
Return Loss	- 33.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.156 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 10, 2004

DASY5 Validation Report for Head TSL

Date/Time: 13.10.2010 14:19:04

Test Laboratory: SPEAG, Zurich, Switzerland

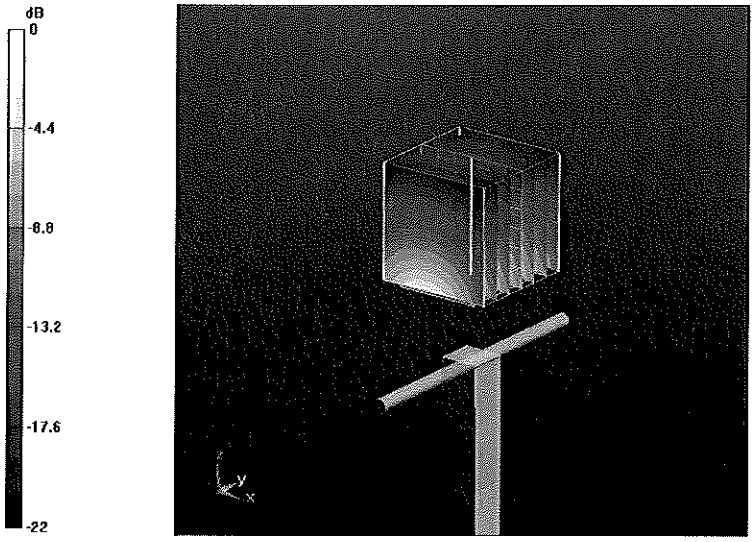
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:766

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL U12 BB
Medium parameters used: f = 2450 MHz; σ = 1.71 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

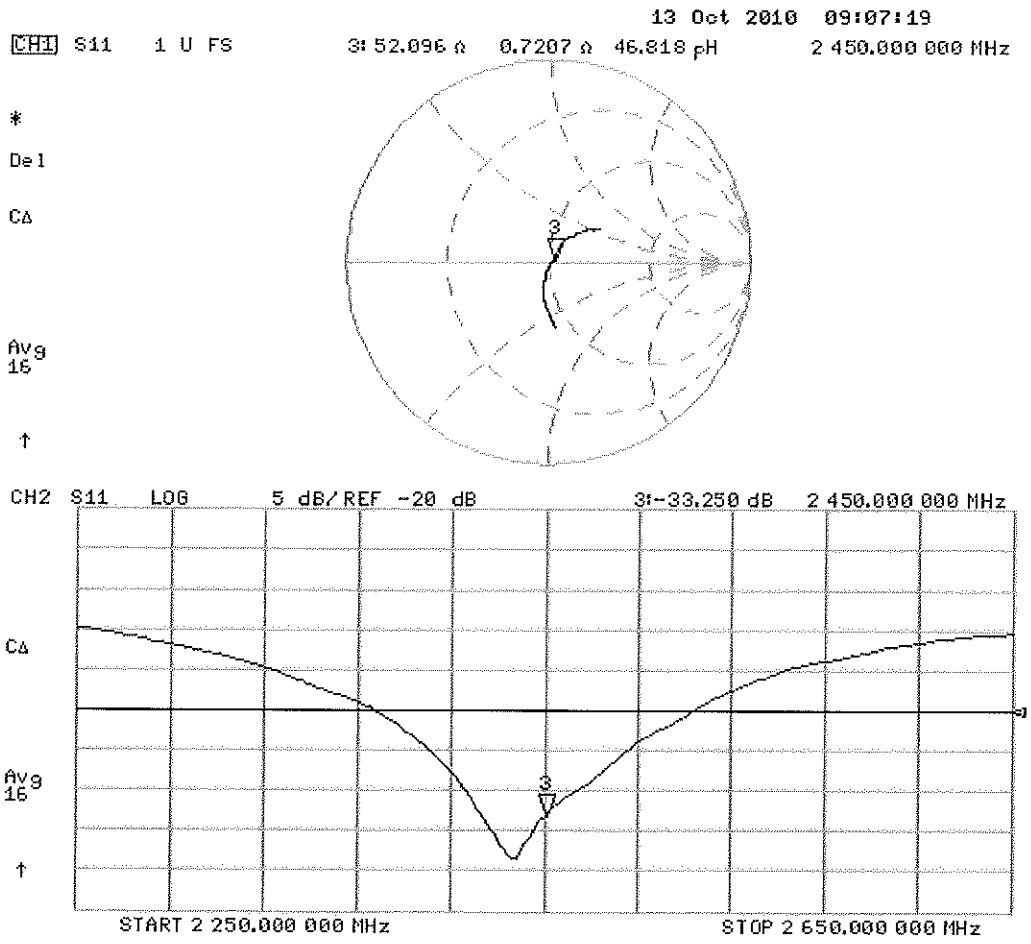
- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 100.6 V/m; Power Drift = 0.045 dB
Peak SAR (extrapolated) = 26 W/kg
SAR(1 g) = 12.8 mW/g; SAR(10 g) = 5.98 mW/g
Maximum value of SAR (measured) = 16 mW/g



0 dB = 16mW/g

Impedance Measurement Plot for Head TSL



END OF REPORT