MOTOROLA

Portable Cellular Phone SAR Test Report

Tests Requested By:	Motorola Mobile Devices 600 N. US Highway 45 Libertyville, IL 60048
Test Report #:	24127-1F *Rev 2*
Date of Report:	Oct 15, 2010
Date of Test:	Sept 25, 2010 – Oct 14, 2010
FCC ID #:	IHDP56LQ1
Generic Name:	WKQ7-334411A11
Test Laboratory:	Motorola Mobile Devices Business Product Safety & Compliance Laboratory 600 N. US Highway 45 Libertyville, IL 60048
Report Author:	Katerina Bruggemann Engineer

Accreditation:

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

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

Testing Laboratory No. 2404

Statement of Compliance:

On the following products or types of products:

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

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

(none)

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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 1g average set in [3] and 2.0W/kg in a 10g average set in [2].

For ANSI / IEEE C95.1 (1g), the final SAR reading for this phone is 1.28 W/kg for head adjacent use and 0.78 W/kg for body worn use. These measurements were performed using a Dasy4™ v4.7 system manufactured by Schmid & Partner Engineering AG (SPEAG), of Zurich Switzerland.

2. Description of the Device Under Test

2.1 Antenna description

Type	Internal	
Location	Bottom of the Phone	
Dimensions	Length	15 mm
	Width	58 mm
Configuration	PIFA	

2.2 Device description

Serial Number	352795040045444, 352795040045451							
Mode(s) of Operation*	GSM 850	GSM 900	GSM 1800	GSM 1900	WCDMA 1700	WCDMA 2100	Wi-Fi 802.11 b/g	Blue Tooth
Modulation Mode(s)	GMSK	GMSK	GMSK	GMSK	QPSK	QPSK	BPSK	GFSK
Maximum Output Power Setting	32.7 dBm	32.5 dBm	30.0 dBm	30.0 dBm	23.5 dBm	23.5 dBm	16.5 dBm	9.0 dBm
Duty Cycle	1:8	1:8	1:8	1:8	1:1	1:1	1:1	1:1
Transmitting Frequency Range(s)	824.2 - 848.8 MHz	880.2 - 914.8 MHz	1710.2 - 1784.8 MHz	1850.20 - 1909.80 MHz	1712.4 - 1752.6 MHz	1922.4 - 1977.6 MHz	1710.2 - 1784.8 MHz	2400 - 2483.5 MHz
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype							
Device Category	Portable							
RF Exposure Limits	General Population / Uncontrolled							

Mode(s) of Operation	GPRS 850				GPRS 900				GPRS 1800				GPRS 1900			
Modulation	GMSK				GMSK				GMSK				GMSK			
Maximum Output Power Setting	32.7	**30.5**	28.5	26.5	32.5	**30.5**	28.5	26.5	30.0	**29.0**	27.0	25.0	30.0	**29.0**	27.0	25.0
Duty Cycle	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				880.2 - 914.8 MHz				1710.2 - 1784.8 MHz				1850.2 - 1909.8 MHz			
Mode(s) of Operation	EDGE 850				EDGE 900				EDGE 1800				EDGE 1900			
Modulation	8PSK				8PSK				8PSK				8PSK			
Maximum Output Power Setting	28.0	**25.0**	23.0	21.0	28.0	**25.0**	23.0	21.0	27.0	**25.0**	23.0	21.0	27.0	**25.0**	23.0	21.0
Duty Cycle	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				880.2 - 914.8 MHz				1710.2 - 1784.8 MHz				1850.2 - 1909.8 MHz			

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 10g RSS uncertainty of the measurement system is ±10.8% (K=1) with an expanded uncertainty of ±21.6% (K=2). The overall 1g RSS uncertainty of the measurement system is ±11.1% (K=1) with an expanded uncertainty of ±22.2% (K=2). The measurement uncertainty budget is given in Appendix 5. Per IEEE 1528, this uncertainty budget is applicable to the SAR range of 0.4W/kg to 10W/kg.

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

Description	Serial Number	Cal Due Date
DASY4™ DAE V1	SN 376	7/13/2011
DASY4™ DAE V1	SN 699	9/20/2011
E-Field Probe ETDV6	SN 3124	8/11/2011
S.A.M. Phantom used for 800/900MHz	TP-1131	
S.A.M. Phantom used for 1700/1800/1900/2450MHz	TP-1250	
Dipole Validation Kit, DV835V2	436tr	3/17/2011
	4d003	6/21/2011
Dipole Validation Kit, DV1800V2	272tr	3/17/2011
	2d160	6/15/2011
Dipole Validation Kit, DV2450V2	808	6/17/2011

3.2 Additional Equipment

Description	Serial Number	Cal Due Date
Signal Generator HP8648C	3847A04810	Oct-30-2011
Power Meter E4419B	GB39511087	Dec-22-2011
Power Sensor #1 - E9301A	US39211007	Dec-04-2010
Power Sensor #2 - E9301A	US39211008	Dec-04-2010
Network Analyzer HP8753ES	US39172529	Jun-04-2011
Dielectric Probe Kit HP85070C	US99360070	

4. Electrical parameters of the tissue simulating liquid

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

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Temp (°C)
835	Head	**Measured,** 9/27/2010	40.7	0.90	19.9
		Measured, 10/08/2010	41.4	0.91	20.0
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** 09/26/2010	54.4	0.99	19.4
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1730	Head	**Measured,** 9/26/2010	38.4	1.40	19.3
		Measured, 9/30/2010	39.0	1.39	19.3
		Recommended Limits	40.1 ±5%	1.36 ±5%	18-25
	Body	**Measured,** 9/26/2010	51.4	1.51	19.3
		Recommended Limits	53.5 ±5%	1.48 ±5%	18-25
1880	Head	**Measured,** 9/29/2010	38.1	1.45	19.9
		Recommended Limits	40.0 ±5%	1.40 ±5%	18-25
	Body	**Measured,** 9/26/2010	50.7	1.52	19.2
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25
2450	Head	**Measured,** 10/12/2010	37.1	1.84	19.6
		Measured, 10/13/2010	37.4	1.83	19.6
		Recommended Limits	39.2 ±10%	1.80 ±5%	18-25
	Body	**Measured,** 10/14/2010	50.1	2.03	18.6
		Recommended Limits	52.7 ±10%	1.95 ±5%	18-25

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

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

5. System Accuracy Verification

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

A SAR measurement was performed to verify the measured SAR was within ±10% from the target SAR indicated in Appendix 6. These frequencies are within ±10% of the compliance test mid-band frequency as required in [1] and [5]. The test was conducted on the same days as the measurement of the DUT. Recommended limits for permittivity and conductivity, specified in [5], are shown in the table below. The obtained results from the system accuracy verification are also displayed in the table below. SAR values are normalized to 1W forward power delivered to the dipole. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. The distributions of SAR compare well with those of the reference measurements (see Appendix 1). The tissue stimulant depth was verified to be 15.0cm ±0.5cm. Z-axis scans showing the SAR penetration are also included in Appendix 1.

f (MHz)	Description	SAR (W/kg), 1gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			ε_r	σ (S/m)		
835	**Measured,** 9/25/2010	9.85	41.3	0.91	19.7	20.4
	Measured, 9/27/2010	9.80	40.7	0.90	19.7	20.3
	Measured, 10/01/2010	9.75	40.6	0.90	20.3	21.1
	Measured, 10/03/2010	9.85	40.1	0.90	20.0	20.4
	Measured, 10/07/2010	9.90	41.4	0.91	20.1	20.3
	Recommended Limits Dipole 436tr / 4d003	9.59 / 9.54	41.5 ±5%	0.97 ±5%	18-25	18-25
1800	**Measured,** 9/26/2010	39.05	38.3	1.38	19.6	19.2
	Measured, 9/29/2010	39.20	38.5	1.36	19.7	19.5
	Measured, 9/30/2010	39.40	38.8	1.37	19.9	19.8
	Measured, 10/02/2010	40.85	38.1	1.38	19.9	19.6
	Measured, 10/07/2010	39.55	39.1	1.38	19.9	18.6
	Measured, 10/08/2010	39.0	38.9	1.36	19.7	18.7
	Recommended Limits Dipole 272tr / 2d160	38.36 / 38.50	40.0 ±5%	1.4 ±5%	18-25	18-25
2450	**Measured,** 10/12/2010	55.00	37.1	1.84	20.1	19.1
	Measured, 10/13/2010	55.00	37.4	1.83	20.1	19.6
	Measured, 10/14/2010	57.50	37.0	1.88	20.3	19.2
	Recommended Limits	52.60	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	SN 3124	835	5.89	5 of 11
		1810	4.89	5 of 11
		1950	4.68	5 of 11
		2450	4.35	5 of 11

6. Test Results

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

The Cellular Phone model covered by this report has the following battery options:
SNN5819B - 1130 mAH Battery

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

Evaluation of WCDMA Modes

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

Band	Channel	Conducted power (dBm) for WCDMA modes		Conducted Power (dBm) for WCDMA – HSDPA (Rel 5) Modes				Conducted Power (dBm) for WCDMA – HSPA (HSUPA/HSDPA-Rel 6) Modes				
		RMC	AMR	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 5
WCDMA 1700	1312	23.76	23.86	23.78	23.89	**24.03**	24	23.65	23.81	23.95	23.81	24
	1413	23.6	23.58	23.6	23.64	23.7	23.71	23.6	23.65	23.66	23.51	23.71
	1513	23.89	23.9	24.05	24.1	23.99	24.06	23.89	24.09	23.97	24.05	23.99
WCDMA 2100	9612	23.61	23.65	23.96	23.86	23.87	23.75	23.81	23.71	23.97	23.77	23.86
	9750	23.58	23.6	23.75	23.78	23.68	23.67	23.67	23.7	23.77	23.74	23.72
	9888	23.75	23.76	24.02	24.04	23.98	24.03	23.8	23.87	23.97	24.03	23.95

Evaluation of Bluetooth Mode

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

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

Table 1 – Output Power Thresholds for Unlicensed Transmitters

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

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

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

Per the highlighted criteria:

•The highest output conducted power measured for Bluetooth on the device under test is 7.94 mW [< 12 mW].
•The separation distance between the Bluetooth antenna and the main antenna is 4.6 cm [> 2.5 cm].

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

6.1 Head Adjacent Test Results

The SAR results shown in tables 1 through 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 power levels for the CDMA RC3/SO55 mode, the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is New SAR = Old SAR * 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

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

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

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	SN 3124	835	5.89	5 of 11
		1810	4.89	5 of 11
		1950	4.68	5 of 11
		2450	4.35	5 of 11

Left Head Cheek Position (Open)								
					10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850MHz	Channel 128	33.28						
	Channel 190	33.12	**20.0**	**0.036**	**0.300**	**0.30**	**0.394**	**0.39**
	Channel 251	32.77						
GSM 1900MHz	Channel 512	30.20						
	Channel 661	30.36	**19.8**	**-0.008**	**0.219**	**0.22**	**0.364**	**0.36**
	Channel 810	30.06						
WCDMA 1700	Channel 1312	23.76						
	Channel 1413	23.60	**18.8**	**0.252**	**0.433**	**0.43**	**0.684**	**0.68**
	Channel 1513	23.89						
WI-FI 2450 802.11b 1 Mbps	Channel 1	16.50	19.6	-0.002	0.260	0.26	0.492	0.49
	Channel 6	16.50						
	Channel 11	16.50						
GSM 850 +WI-FI						0.56		0.88
GSM 1900 WI-FI						0.48		0.85
WCDMA 1700 +WI-FI						0.69		1.17

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 (Open)								
					10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850MHz	Channel 128	33.28						
	Channel 190	33.12	19.7	-0.057	0.281	0.28	0.382	0.39
	Channel 251	32.77						
GSM 1900MHz	Channel 512	30.20						
	Channel 661	30.36	19.9	-0.015	0.166	0.17	0.266	0.27
	Channel 810	30.06						
WCDMA 1700	Channel 1312	23.76						
	Channel 1413	23.60	19.3	0.010	0.410	0.41	0.640	0.64
	Channel 1513	23.89						
WI-FI 2450 802.11b 1 Mbps	Channel 1	16.50	**19.6**	**0.165**	**0.295**	**0.30**	**0.592**	**0.59**
	Channel 6	16.50	19.6	0.129	0.240	0.24	0.484	0.48
	Channel 11	16.50	19.6	-0.111	0.143	0.15	0.289	0.30
GSM 850 +WI-FI						0.58		0.98
GSM 1900 WI-FI						0.47		0.86
WCDMA 1700 +WI-FI						0.71		1.23

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

Left Head Cheek Position (Closed)								
					10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850MHz	Channel 128	33.28						
	Channel 190	33.12	19.8	-0.070	0.248	0.25	0.334	0.34
	Channel 251	32.77						
GSM 1900MHz	Channel 512	30.20						
	Channel 661	30.36	**19.6**	**0.071**	**0.315**	**0.32**	**0.555**	**0.56**
	Channel 810	30.06						
WCDMA 1700	Channel 1312	23.76	18.8	-0.529	0.558	0.63	0.947	1.07
	Channel 1413	23.60	**18.8**	**0.017**	**0.739**	**0.74**	**1.28**	**1.28**
	Channel 1513	23.89	18.8	0.199	0.665	0.67	1.16	1.16
WI-FI 2450 802.11b 1 Mbps	Channel 1	16.50	**19.6**	**-0.297**	**0.290**	**0.31**	**0.579**	**0.62**
	Channel 6	16.50	19.6	-0.302	0.242	0.26	0.482	0.52
	Channel 11	16.50	19.6	-0.467	0.130	0.14	0.256	0.29
GSM 850 +WI-FI						0.56		0.96
GSM 1900 WI-FI						0.63		1.18
WCDMA 1700 +WI-FI						---		---[1]

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

[1] Per KDB publication 648474, no evaluation was performed to determine the aggregate 1-g SAR in this configuration as the SAR-to-peak-location separation ratio is 0.272. See Appendix 2 for further information.

Right Head Cheek Position (Closed)								
					10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850MHz	Channel 128	33.28						
	Channel 190	33.12	**19.1**	**-0.009**	**0.304**	**0.30**	**0.404**	**0.40**
	Channel 251	32.77						
GSM 1900MHz	Channel 512	30.20						
	Channel 661	30.36	20.0	-0.075	0.259	0.26	0.428	0.44
	Channel 810	30.06						
WCDMA 1700	Channel 1312	23.76	19.3	0.076	0.506	0.51	0.797	0.80
	Channel 1413	23.60	19.3	0.117	0.533	0.53	0.856	0.86
	Channel 1513	23.89	19.3	-0.118	0.514	0.53	0.832	0.85
WI-FI 2450 802.11b 1 Mbps	Channel 1	16.50	19.6	0.266	0.254	0.25	0.461	0.46
	Channel 6	16.50						
	Channel 11	16.50						
GSM 850 +WI-FI						0.55		0.86
GSM 1900 WI-FI						0.51		0.90
WCDMA 1700 +WI-FI						0.78		1.32

Table 4: 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 (Open)								
					10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850MHz	Channel 128	33.28						
	Channel 190	33.12	20.0	0.052	0.141	0.14	0.184	0.18
	Channel 251	32.77						
GSM 1900MHz	Channel 512	30.20						
	Channel 661	30.36	**19.5**	**-0.009**	**0.164**	**0.16**	**0.258**	**0.26**
	Channel 810	30.06						
WCDMA 1700	Channel 1312	23.76						
	Channel 1413	23.60	**18.8**	**0.027**	**0.331**	**0.33**	**0.517**	**0.52**
	Channel 1513	23.89						
WI-FI 2450 802.11b 1 Mbps	Channel 1	16.50	19.6	0.031	0.157	0.16	0.293	0.29
	Channel 6	16.50						
	Channel 11	16.50						
GSM 850 +WI-FI						0.30		0.47
GSM 1900 WI-FI						0.32		0.55
WCDMA 1700 +WI-FI						0.49		0.81

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.

Right Head 15° Tilt Position (Open)								
					10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850MHz	Channel 128	33.28						
	Channel 190	33.12	**18.8**	**0.041**	**0.159**	**0.16**	**0.211**	**0.21**
	Channel 251	32.77						
GSM 1900MHz	Channel 512	30.20						
	Channel 661	30.36	19.4	0.027	0.152	0.15	0.247	0.25
	Channel 810	30.06						
WCDMA 1700	Channel 1312	23.76						
	Channel 1413	23.60	19.3	-0.027	0.292	0.29	0.463	0.47
	Channel 1513	23.89						
WI-FI 2450 802.11b 1 Mbps	Channel 1	16.50	**19.6**	**0.023**	**0.165**	**0.17**	**0.314**	**0.31**
	Channel 6	16.50						
	Channel 11	16.50						
GSM 850 +WI-FI						0.33		0.52
GSM 1900 WI-FI						0.32		0.56
WCDMA 1700 +WI-FI						0.46		0.78

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.

Left Head 15° Tilt Position (Closed)								
					10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850MHz	Channel 128	33.28						
	Channel 190	33.12	19.9	-0.016	0.179	0.18	0.237	0.24
	Channel 251	32.77						
GSM 1900MHz	Channel 512	30.20						
	Channel 661	30.36	20.1	-0.055	0.238	0.24	0.404	0.41
	Channel 810	30.06						
WCDMA 1700	Channel 1312	23.76						
	Channel 1413	23.60	18.8	0.096	0.483	0.48	0.784	0.78
	Channel 1513	23.89						
WI-FI 2450 802.11b 1 Mbps	Channel 1	16.50	19.6	-0.301	0.236	0.25	0.443	0.47
	Channel 6	16.50						
	Channel 11	16.50						
GSM 850 +WI-FI						0.43		0.71
GSM 1900 WI-FI						0.49		0.88
WCDMA 1700 +WI-FI						0.73		1.25

Table 7: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.

Right Head 15° Tilt Position (Closed)								
					10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850MHz	Channel 128	33.28						
	Channel 190	33.12	**19.1**	**0.051**	**0.194**	**0.19**	**0.257**	**0.26**
	Channel 251	32.77						
GSM 1900MHz	Channel 512	30.20						
	Channel 661	30.36	**20.4**	**-0.082**	**0.242**	**0.25**	**0.419**	**0.43**
	Channel 810	30.06						
WCDMA 1700	Channel 1312	23.76	19.3	0.208	0.417	0.42	0.690	0.69
	Channel 1413	23.60	**19.3**	**-0.063**	**0.540**	**0.55**	**0.901**	**0.91**
	Channel 1513	23.89	19.3	0.103	0.450	0.45	0.761	0.76
WI-FI 2450 802.11b 1 Mbps	Channel 1	16.50	**19.2**	**0.695**	**0.286**	**0.29**	**0.557**	**0.56**
	Channel 6	16.50						
	Channel 11	16.50						
GSM 850 +WI-FI						0.48		0.82
GSM 1900 WI-FI						0.54		0.99
WCDMA 1700 +WI-FI						0.84		1.47

Table 8: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.

6.2 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 the [6]. Also shown are the measured conducted output power levels for the CDMA RC3/SO55 mode, 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 New SAR = Old SAR * 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

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

A “flat” phantom was for the body-worn tests. This “flat” phantom is made out of 1” thick natural High Density Polyethylene with a thickness at the bottom equal to 2.0mm. It measures 52.7cm(long) x 26.7cm(wide) x 21.2cm(tall). The measured dielectric constant of the material used is less than 2.3 and the loss tangent is less than 0.0046 all the way up to 2.184GHz.

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

There are no Body-Worn Accessories available for this phone at the time of testing hence the device was tested per the supplement C testing guidelines for devices that do not have body worn accessories. A separation distance of 15mm between the device and the flat phantom was used for testing body-worn SAR. The device was tested with the front and back of the device facing the phantom. Both sides of the device were tested for Body SAR for the purpose of including the SAR evaluation for body-worn accessories that support the device with the front side facing the user.

In addition to accessory testing, the cellular phone was tested in data mode operations with the front and back of the phone facing the phantom. For these tests, a separation distance of 25mm between the device and the flat phantom was used. The device was tested with the front and back of the device facing the phantom.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	SN 3124	835	5.86	6 of 11
		1810	4.76	6 of 11
		1950	4.78	6 of 11
		2450	4.19	6 of 11

Body-Worn; Front of Phone 15mm from Phantom (Closed)								
					10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850MHz	Channel 128	33.28						
	Channel 190	33.12	19.4	-0.013	0.127	0.13	0.173	0.17
	Channel 251	32.77						
GSM 1900MHz	Channel 512	30.20						
	Channel 661	30.36	19.2	-0.038	0.063	0.06	0.102	0.10
	Channel 810	30.06						
WCDMA 1700	Channel 1312	23.76						
	Channel 1413	23.60	19.0	0.006	0.143	0.14	0.214	0.21
	Channel 1513	23.89						
WI-FI 2450 802.11b 1 Mbps	Channel 1	16.50	18.6	-0.111	0.022	0.02	0.044	0.05
	Channel 6	16.50						
	Channel 11	16.50						
GSM 850 +WI-FI						0.15		0.22
GSM 1900 WI-FI						0.08		0.15
WCDMA 1700 +WI-FI						0.16		0.26

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; Back of Phone 15mm from Phantom (Closed)								
					10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GSM 850MHz	Channel 128	33.28						
	Channel 190	33.12	**19.4**	**0.080**	**0.266**	**0.27**	**0.389**	**0.39**
	Channel 251	32.77						
GSM 1900MHz	Channel 512	30.20						
	Channel 661	30.36	**19.1**	**-0.030**	**0.152**	**0.15**	**0.262**	**0.26**
	Channel 810	30.06						
WCDMA 1700	Channel 1312	23.76						
	Channel 1413	23.60	**19.0**	**-0.090**	**0.453**	**0.46**	**0.764**	**0.78**
	Channel 1513	23.89						
WI-FI 2450 802.11b 1 Mbps	Channel 1	16.50	**18.6**	**0.262**	**0.092**	**0.09**	**0.159**	**0.16**
	Channel 6	16.50	18.6	0.123	0.090	0.09	0.155	0.16
	Channel 11	16.50	18.6	0.049	0.079	0.08	0.136	0.14
GSM 850 +WI-FI						0.36		0.55
GSM 1900 WI-FI						0.24		0.42
WCDMA 1700 +WI-FI						0.55		0.94

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 25mm from Phantom GPRS Class 10 (Closed)								
					10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
GPRS 850MHz	Channel 128	30.85						
	Channel 190	30.69	19.4	-0.027	0.164	0.17	0.229	0.23
	Channel 251	30.37						
GPRS 1900MHz	Channel 512	29.12						
	Channel 661	29.17	19.2	-0.072	0.076	0.08	0.125	0.13
	Channel 810	28.88						

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 25mm from Phantom EDGE Class 10 (Closed)								
					10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
EDGE 850MHz	Channel 128	25.41						
	Channel 190	25.24	19.4	0.086	0.047	0.05	0.065	0.07
	Channel 251	24.94						
EDGE 1900MHz	Channel 512	25.02						
	Channel 661	25.10	19.2	0.101	0.031	0.03	0.051	0.05
	Channel 810	24.82						

Table 12: 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 25mm from Phantom HSDPA / HSPA (Closed)								
					10g SAR value		*1g SAR value*	
f **(MHz)**	**Description**	**Conducted Output Power (dBm)**	**Temp (°C)**	**Drift (dB)**	**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
HSDPA Subtest 3 1700	Channel 1312	24.03	19.3	0.052	0.0796	0.08	0.126	0.13
	Channel 1413							
	Channel 1513							

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 (300MHz – 3GHz)”.

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

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

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

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

Appendix 1

SAR distribution comparison for the system accuracy verification

Date/Time: 9/25/2010 8:48:31 AM

DUT: Dipole 835 MHz; Type: D835V2; Procedure Notes: 835MHz System Performance Check / Dipole Sn# 436tr; PM1 Power = 200mW;
Sim.Temp@ meas = 20.4*C; Sim.Temp@ SPC = 20.4*C; Room Temp@ SPC = 19.7*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 = 41.3; ρ = 1000 kg/m^3

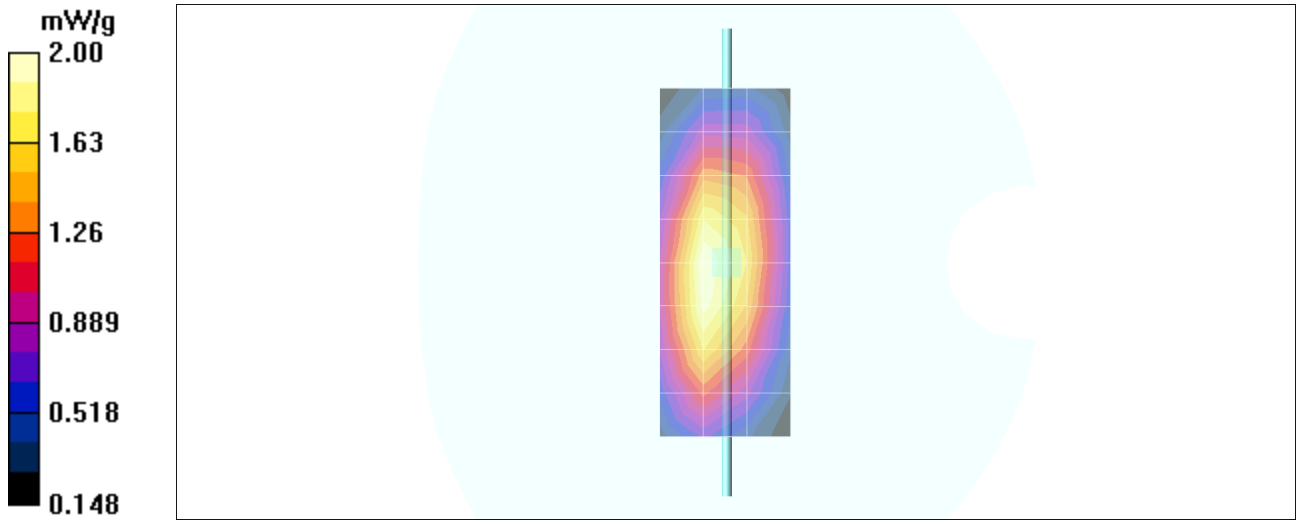
DASY4 Configuration:

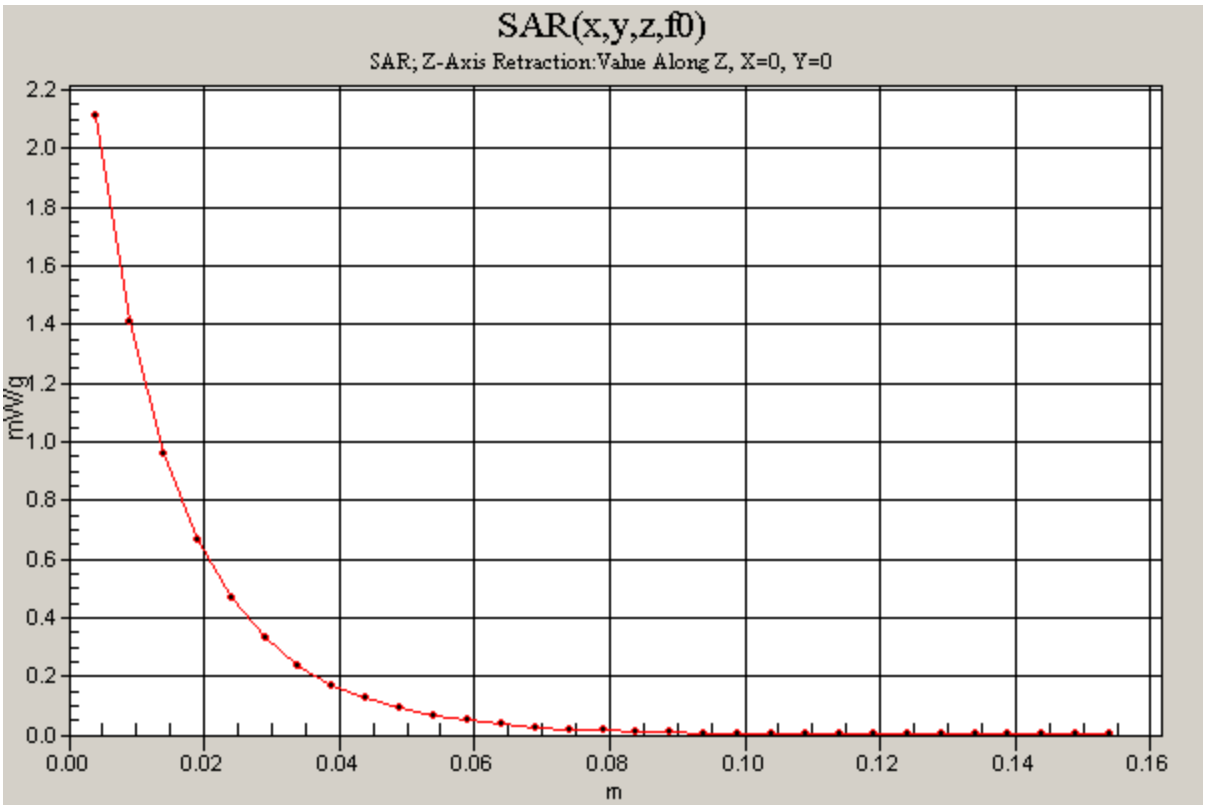
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 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) = 2.00 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.2 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 2.96 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) = 2.11 mW/g




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

Date/Time: 9/27/2010 8:30:32 AM

DUT: Dipole 835 MHz; Type: D835V2; Procedure Notes: 835 MHz System Performance Check / Dipole Sn# 436tr; PM1 Power = 200 mW;
Sim.Temp@ meas = 20.3*C; Sim.Temp@ SPC = 20.3*C; Room Temp@ SPC = 19.7*C

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

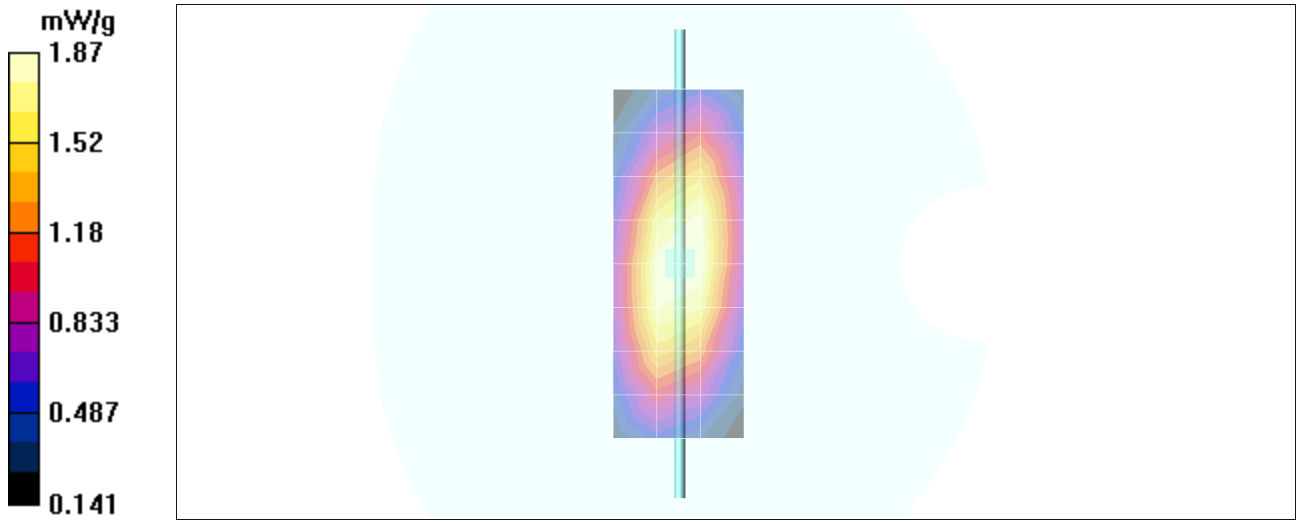
DASY4 Configuration:

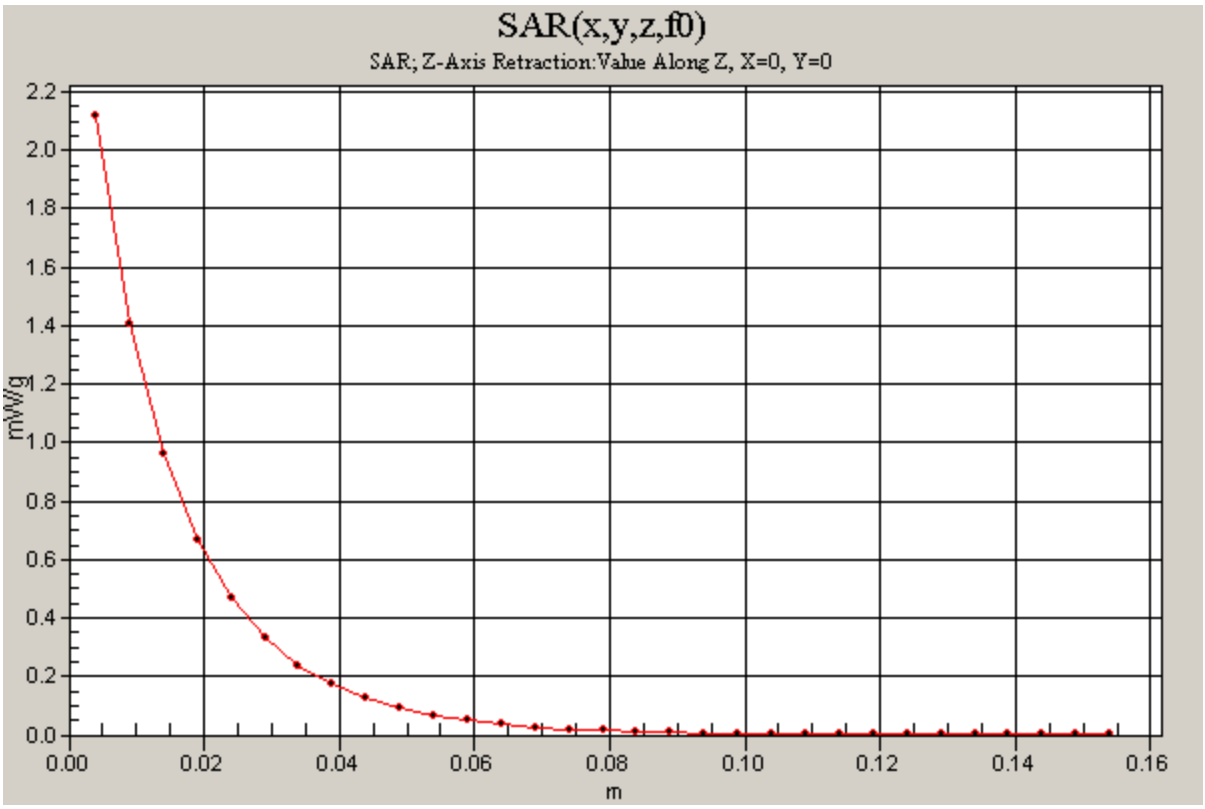
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.3 V/m; Power Drift = -0.036 dB
Peak SAR (extrapolated) = 2.94 W/kg
SAR(1 g) = 1.96 mW/g; SAR(10 g) = 1.27 mW/g
Maximum value of SAR (measured) = 2.12 mW/g

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




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: 10/1/2010 8:17:04 AM

DUT: Dipole 835 MHz; Type: D835V2; Procedure Notes: 835 MHz System Performance Check / Dipole Sn# 436tr; PM1 Power = 200 mW
Sim.Temp@ meas = 21.1*C; Sim.Temp@ SPC = 21.1*C; Room Temp@ SPC = 20.3*C

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3

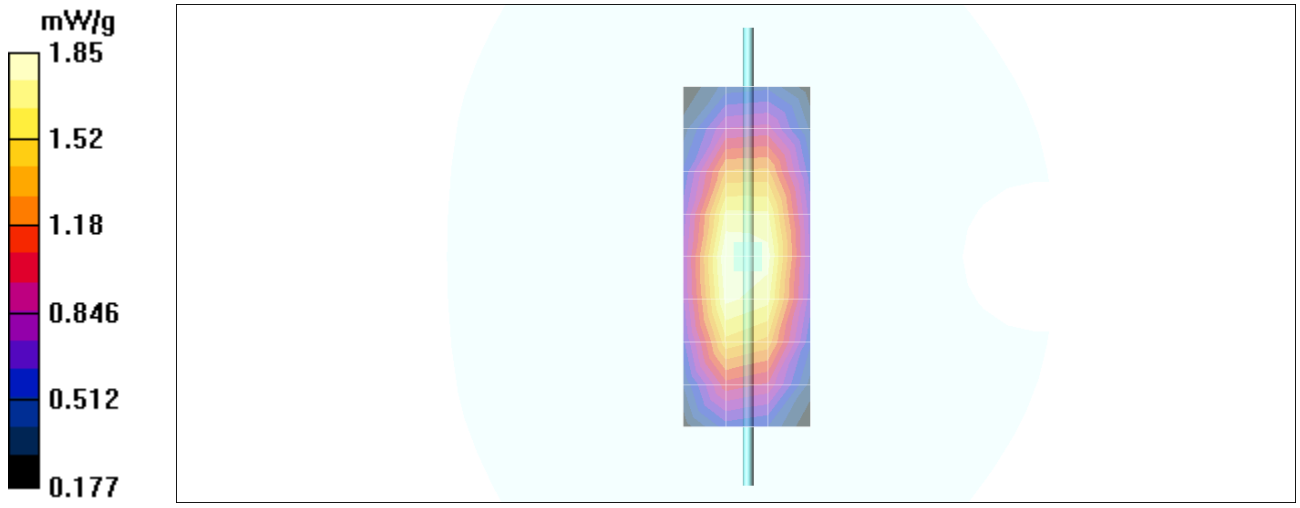
DASY4 Configuration:

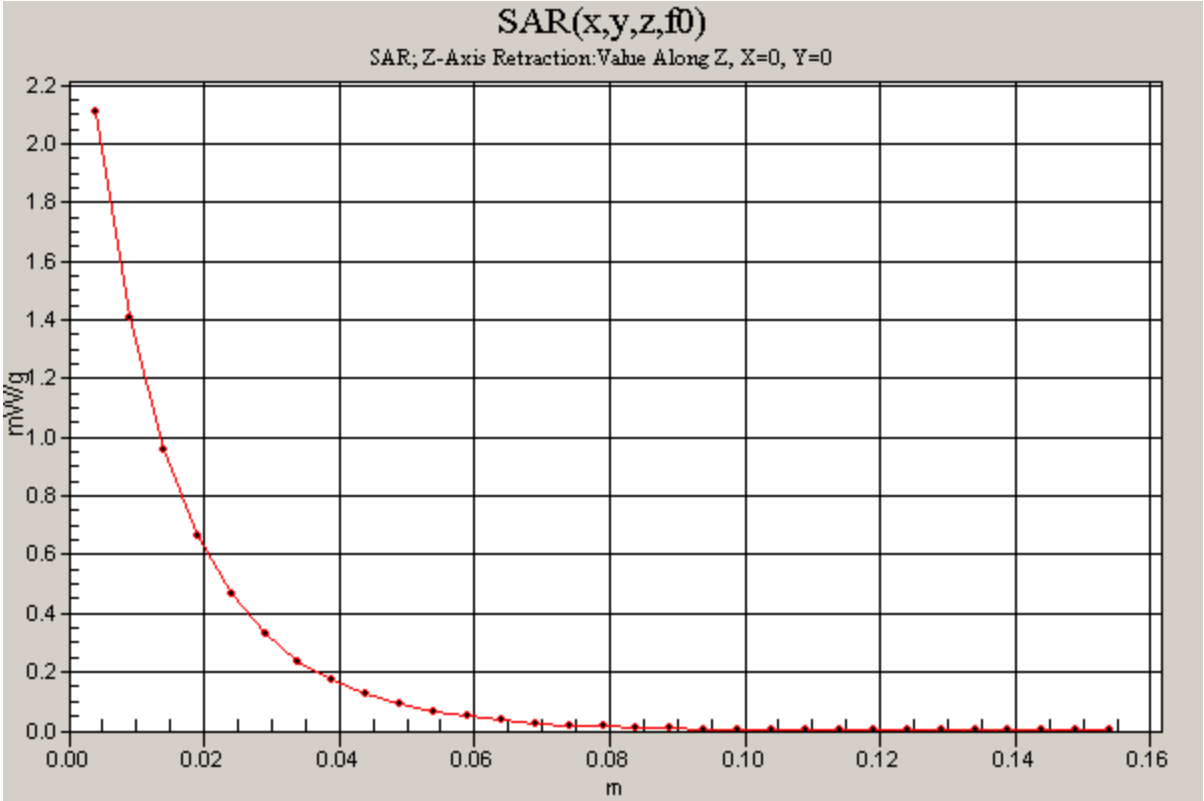
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 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) = 1.85 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.0 V/m; Power Drift = -0.011 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) = 2.11 mW/g

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




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

Date/Time: 10/3/2010 4:42:17 AM

DUT: Dipole 835 MHz; Type: D835V2; Procedure Notes: 835MHz System Performance Check / Dipole Sn# 4d003; PM1 Power = 200mW
Sim.Temp@ meas = 20.4*C; Sim.Temp@ SPC = 20.4*C; Room Temp@ SPC = 20.0*C

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3

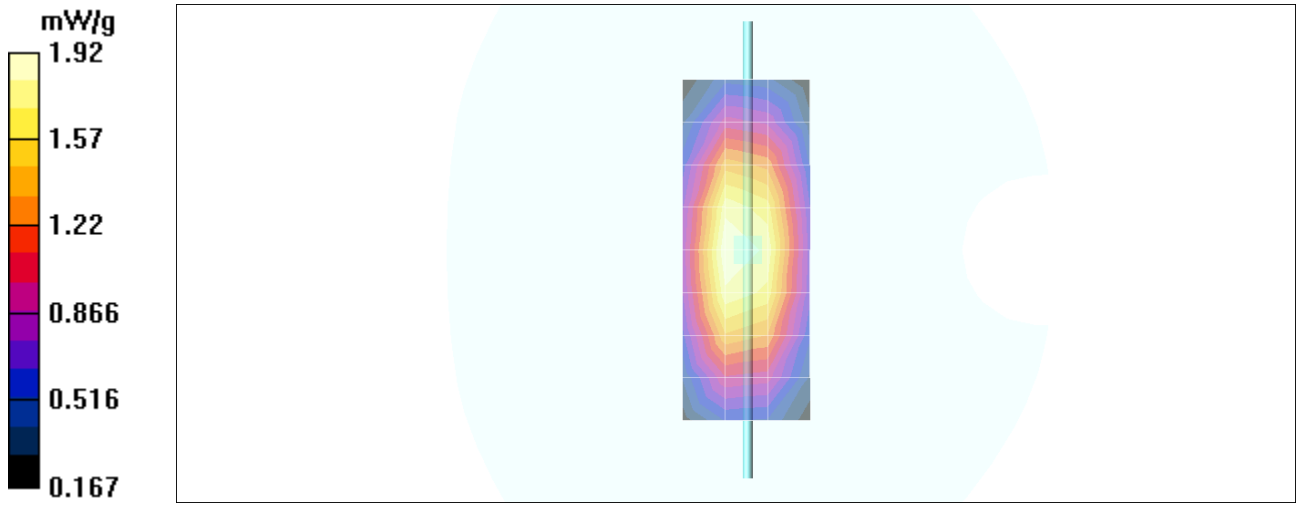
DASY4 Configuration:

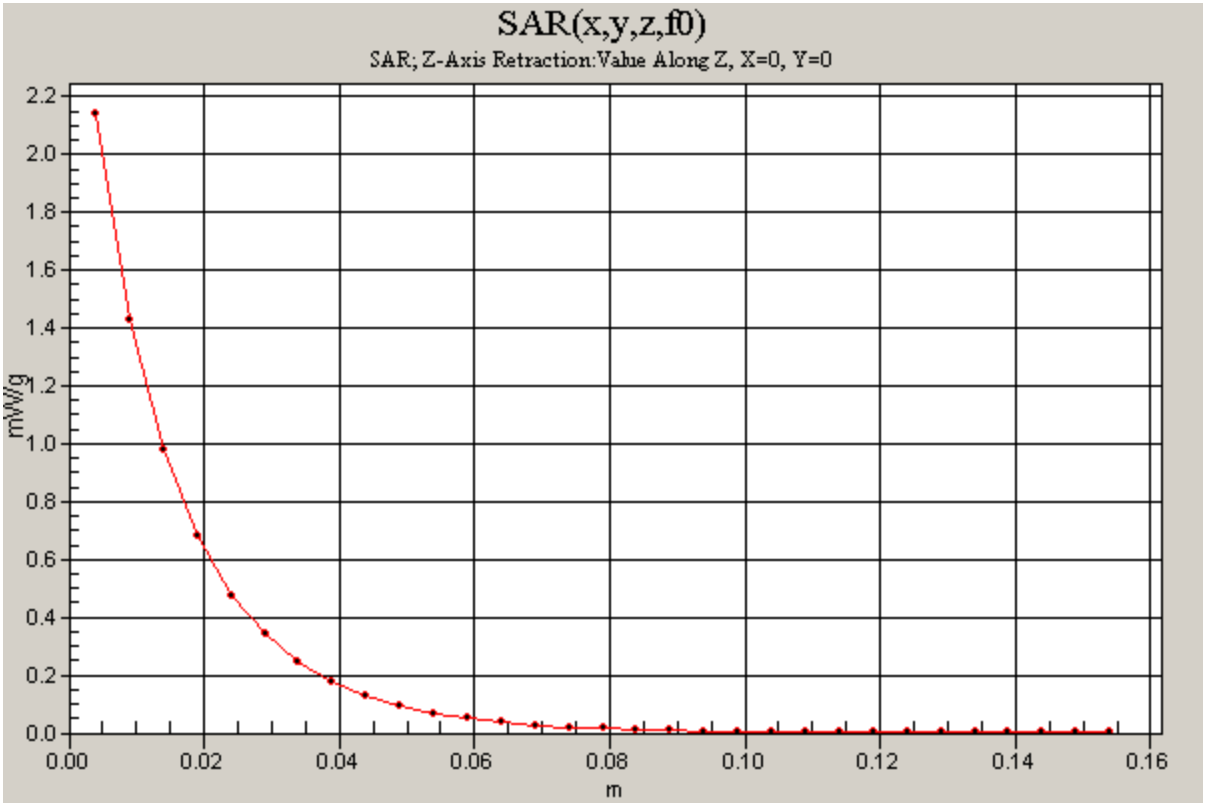
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 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) = 1.92 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.3 V/m; Power Drift = -0.055 dB
Peak SAR (extrapolated) = 2.95 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




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: 10/7/2010 8:15:22 AM

DUT: Dipole 835 MHz; Type: D835V2; Procedure Notes: 835MHz System Performance Check / Dipole Sn# 4d003; PM1 Power = 200mW
Sim.Temp@ meas = 20.3*C; Sim.Temp@ SPC = 20.3*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 = 41.4; ρ = 1000 kg/m^3

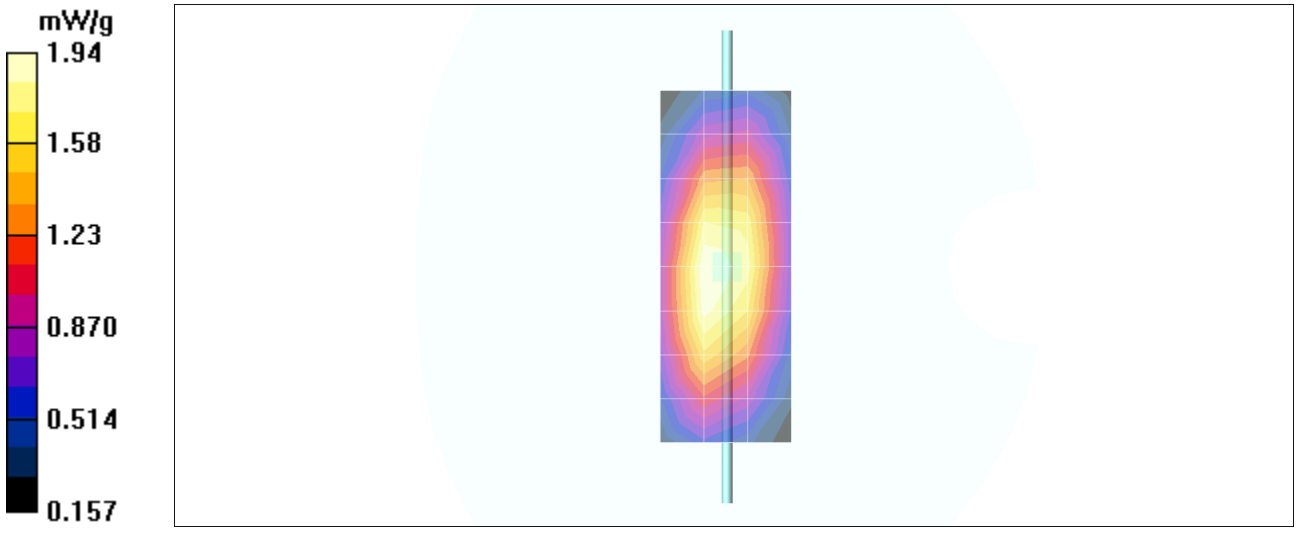
DASY4 Configuration:

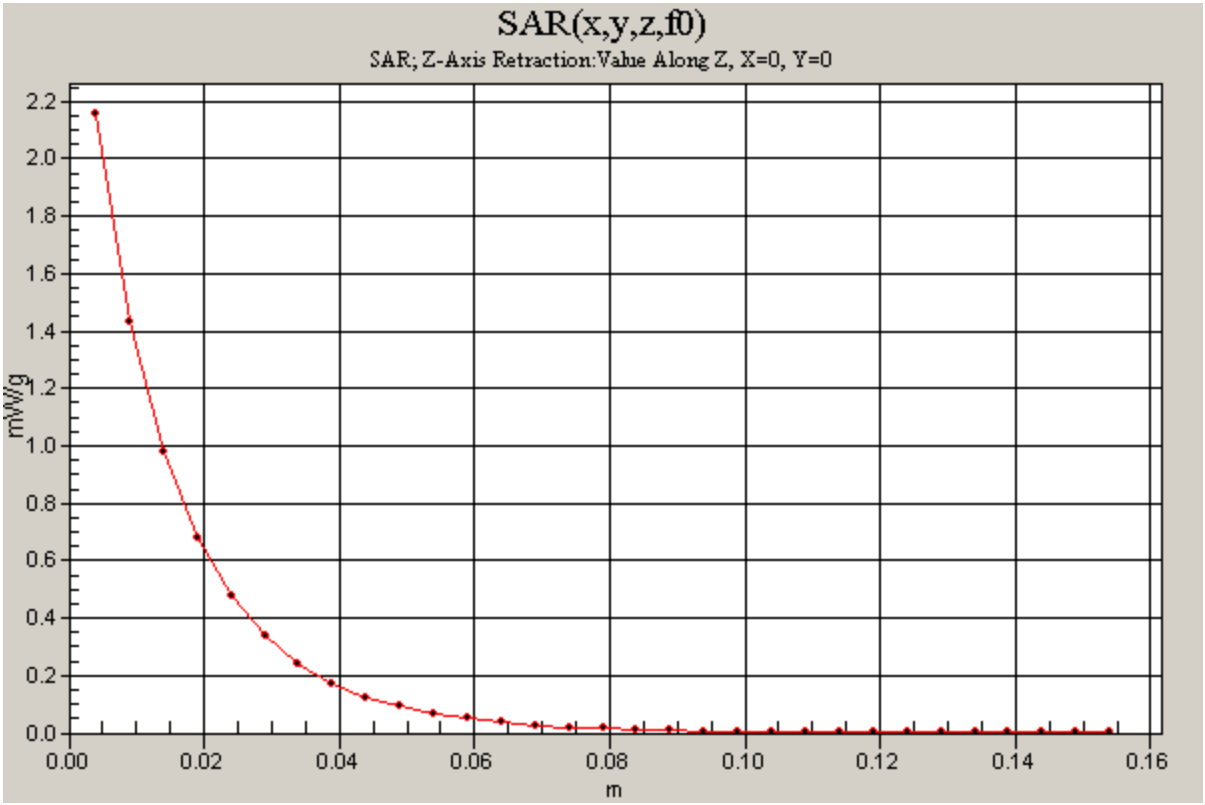
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 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) = 1.94 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.7 V/m; Power Drift = 0.008 dB
Peak SAR (extrapolated) = 2.99 W/kg
SAR(1 g) = 1.98 mW/g; SAR(10 g) = 1.29 mW/g
Maximum value of SAR (measured) = 2.15 mW/g

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




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: 9/26/2010 5:38:05 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800MHz System Performance Check / Dipole Sn# 272tr; PM1 Power = 200mW
Sim.Temp@ meas = 19.7*C; Sim.Temp@ SPC = 19.2*C; Room Temp@ SPC = 19.6*C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 1800 MHz; σ = 1.38 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3

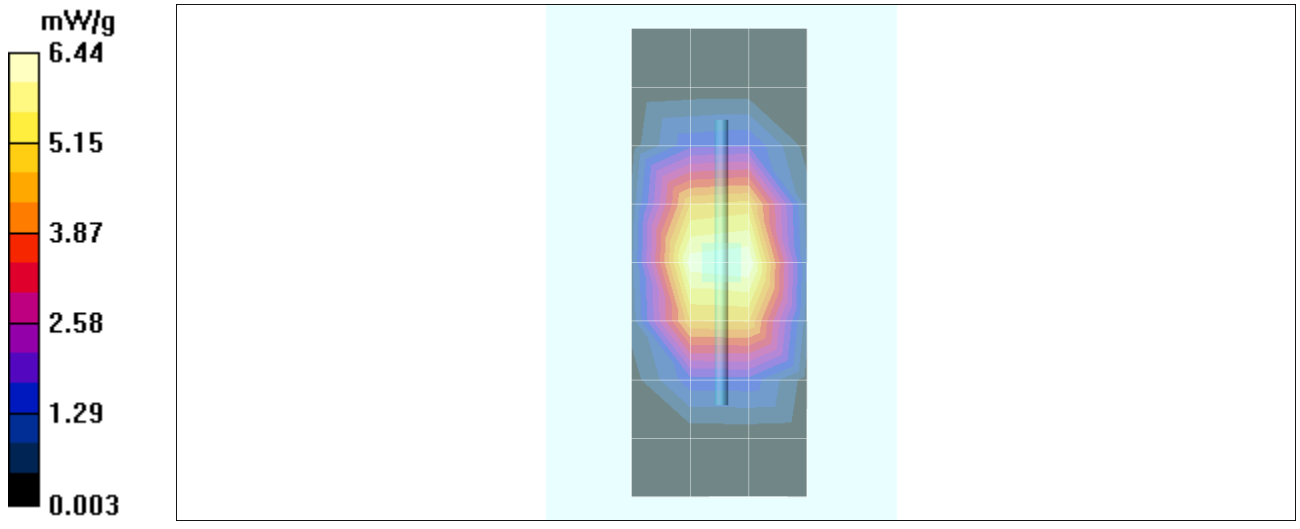
DASY4 Configuration:

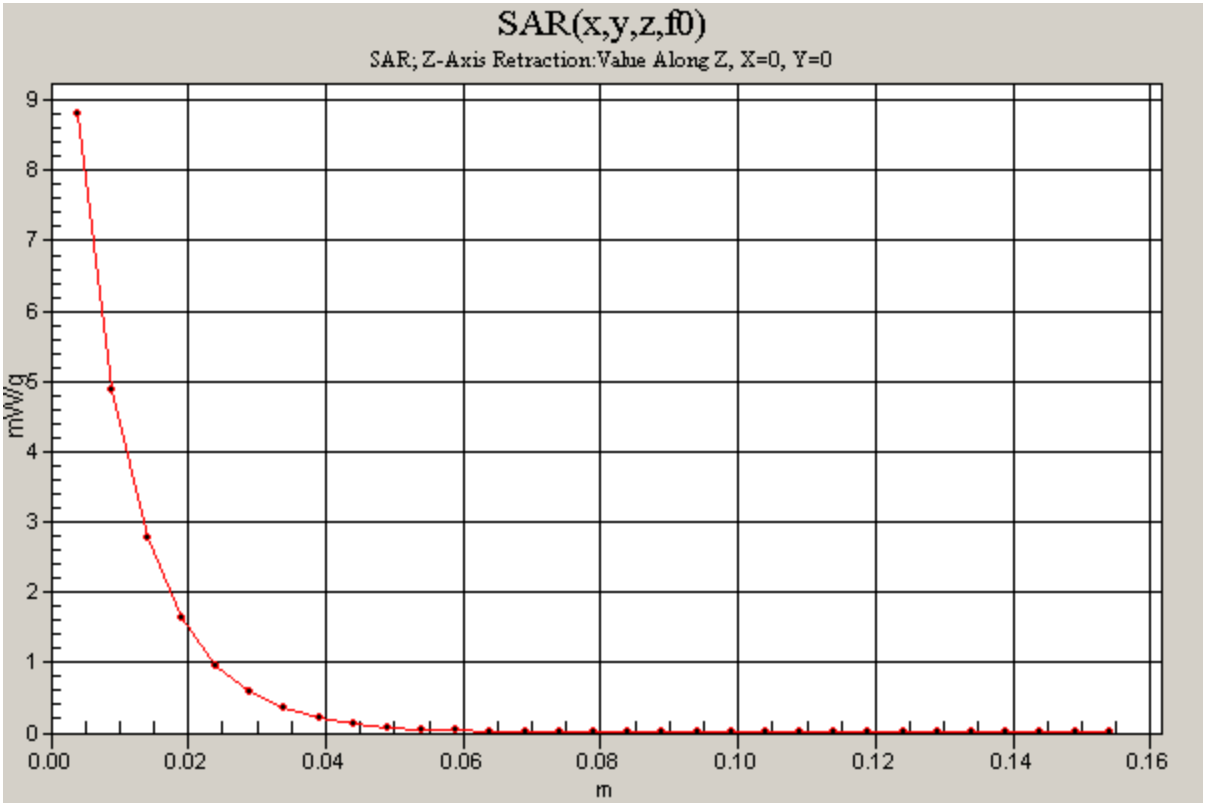
- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80;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

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.44 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 81.3 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 14.2 W/kg
SAR(1 g) = 7.81 mW/g; SAR(10 g) = 4.12 mW/g
Maximum value of SAR (measured) = 8.76 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.81 mW/g




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

Date/Time: 9/29/2010 7:16:56 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 272tr; PM1 Power = 200 mW;
Sim.Temp@ meas = 19.5*C; Sim.Temp@ SPC = 19.5*C; Room Temp@ SPC = 19.7*C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 1800 MHz; σ = 1.36 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3

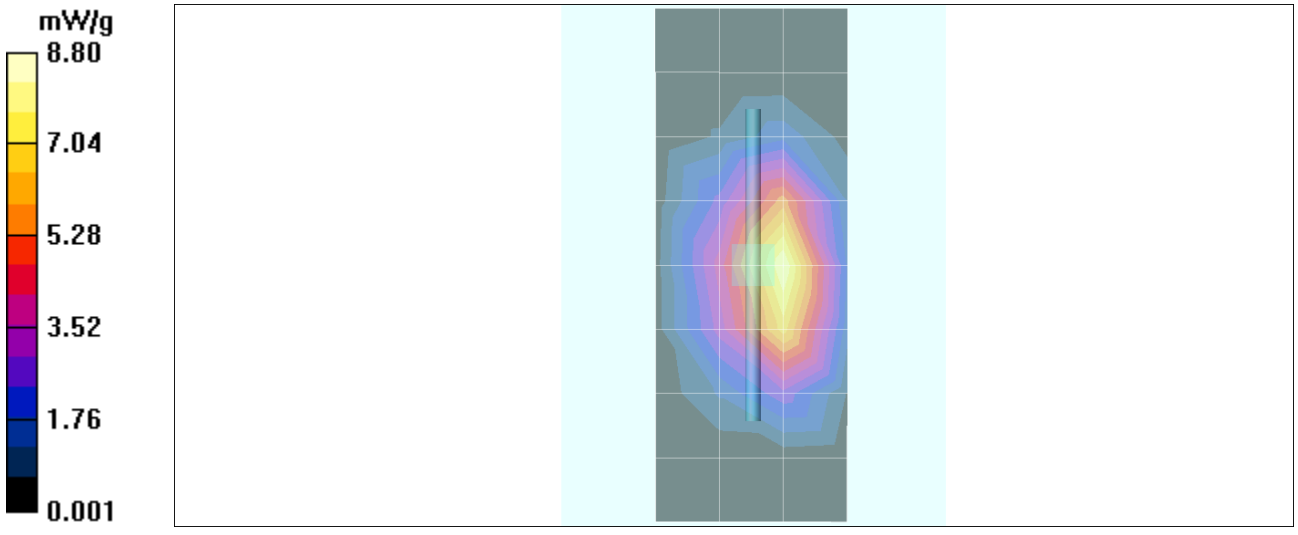
DASY4 Configuration:

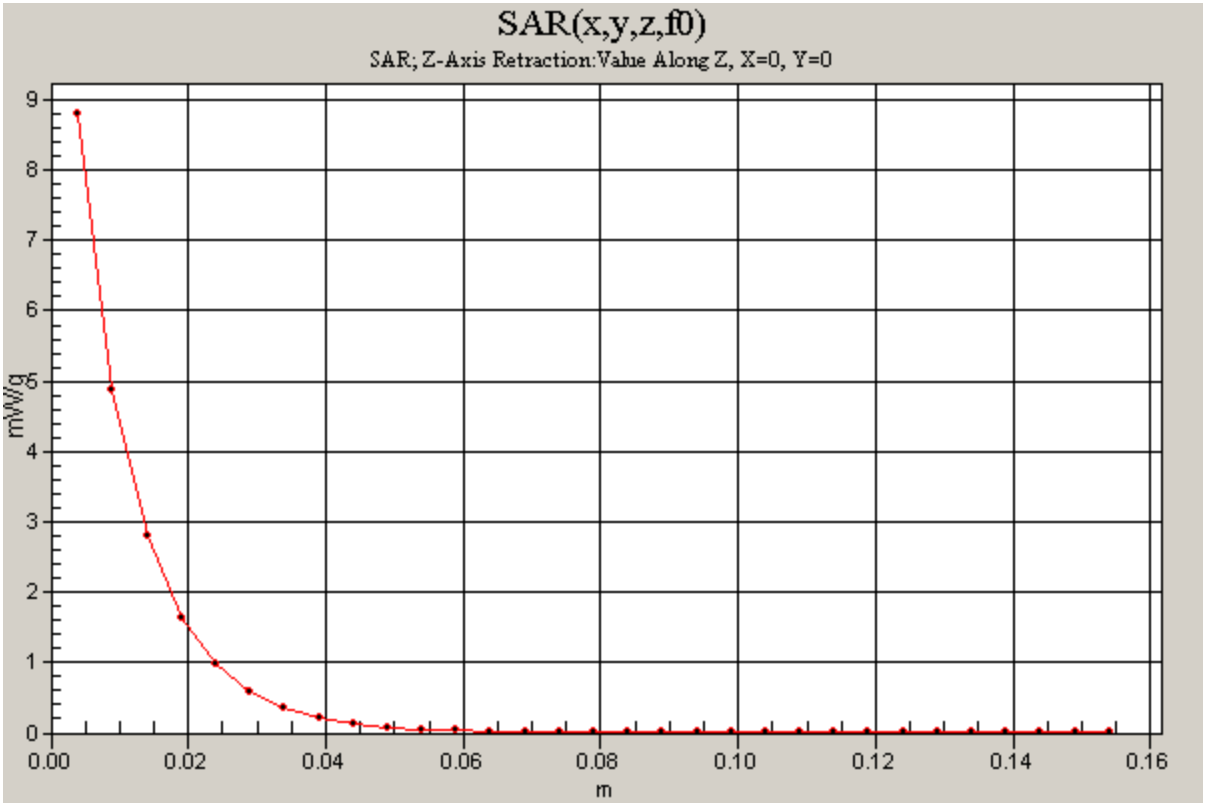
- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80;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

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 8.28 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.3 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 14.3 W/kg
SAR(1 g) = 7.84 mW/g; SAR(10 g) = 4.12 mW/g
Maximum value of SAR (measured) = 8.71 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.80 mW/g




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

Date/Time: 9/30/2010 7:36:04 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 272tr; PM1 Power = 200 mW
Sim.Temp@ meas = 19.8*C; Sim.Temp@ SPC = 19.8*C; Room Temp@ SPC = 19.9*C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 1800 MHz; σ = 1.37 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3

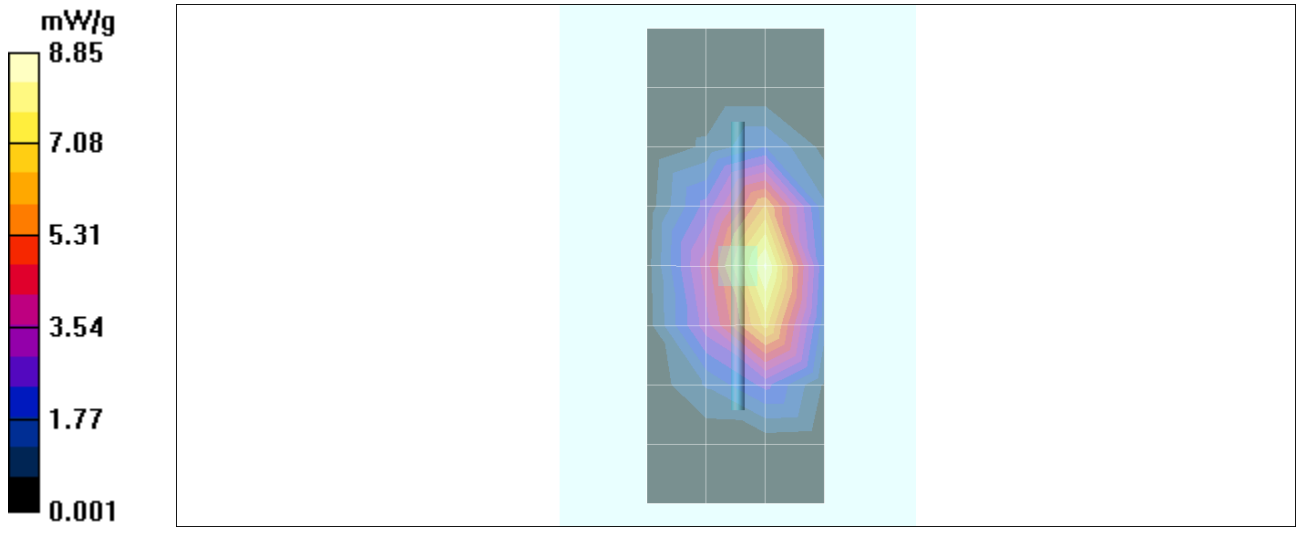
DASY4 Configuration:

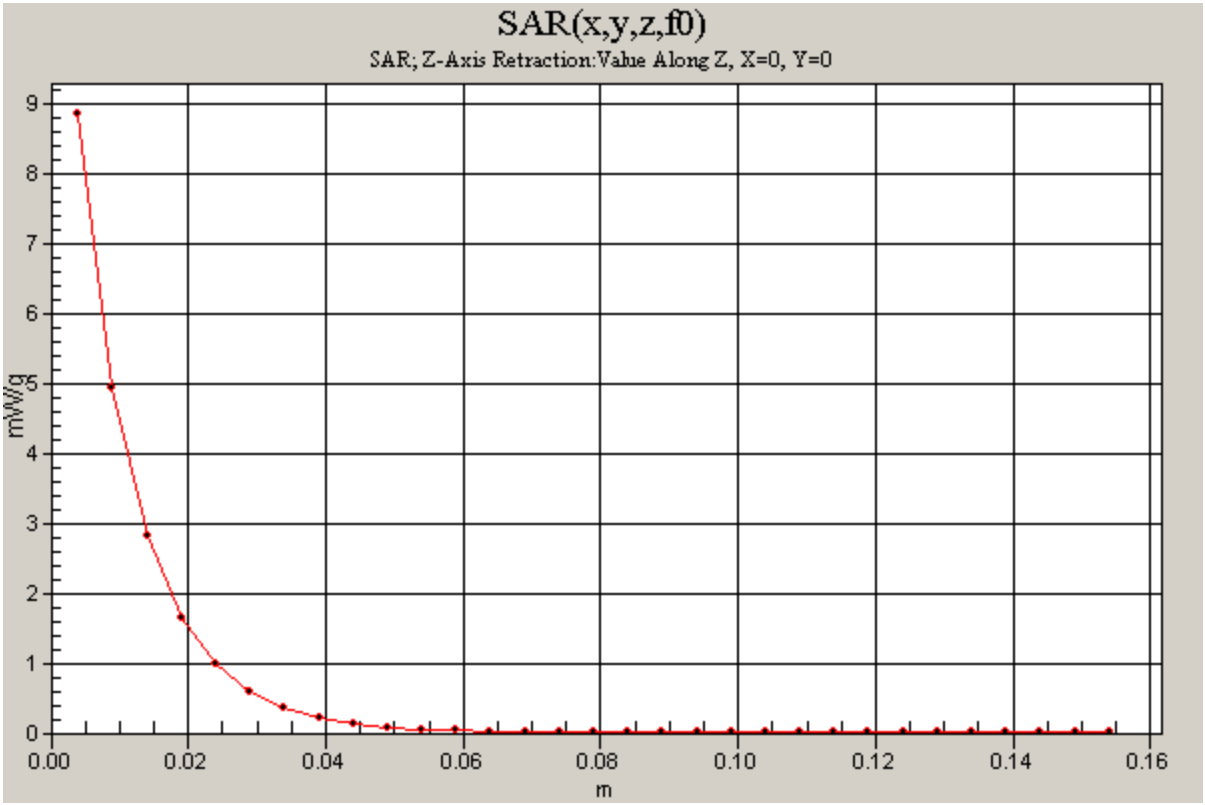
- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80;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

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 8.42 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.5 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 14.4 W/kg
SAR(1 g) = 7.88 mW/g; SAR(10 g) = 4.15 mW/g
Maximum value of SAR (measured) = 8.72 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.85 mW/g




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

Date/Time: 10/2/2010 4:38:42 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800MHz System Performance Check / Dipole Sn# 2d160; PM1 Power = 200mW
Sim.Temp@ meas = 19.6*C; Sim.Temp@ SPC = 19.6*C; Room Temp@ SPC = 19.9*C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 1800 MHz; σ = 1.38 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3

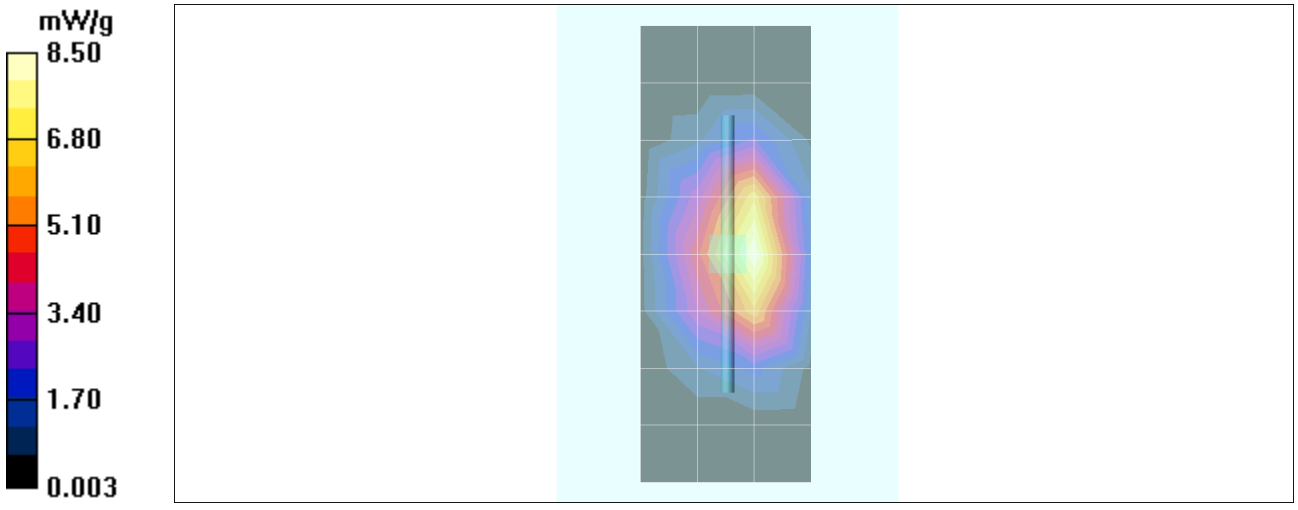
DASY4 Configuration:

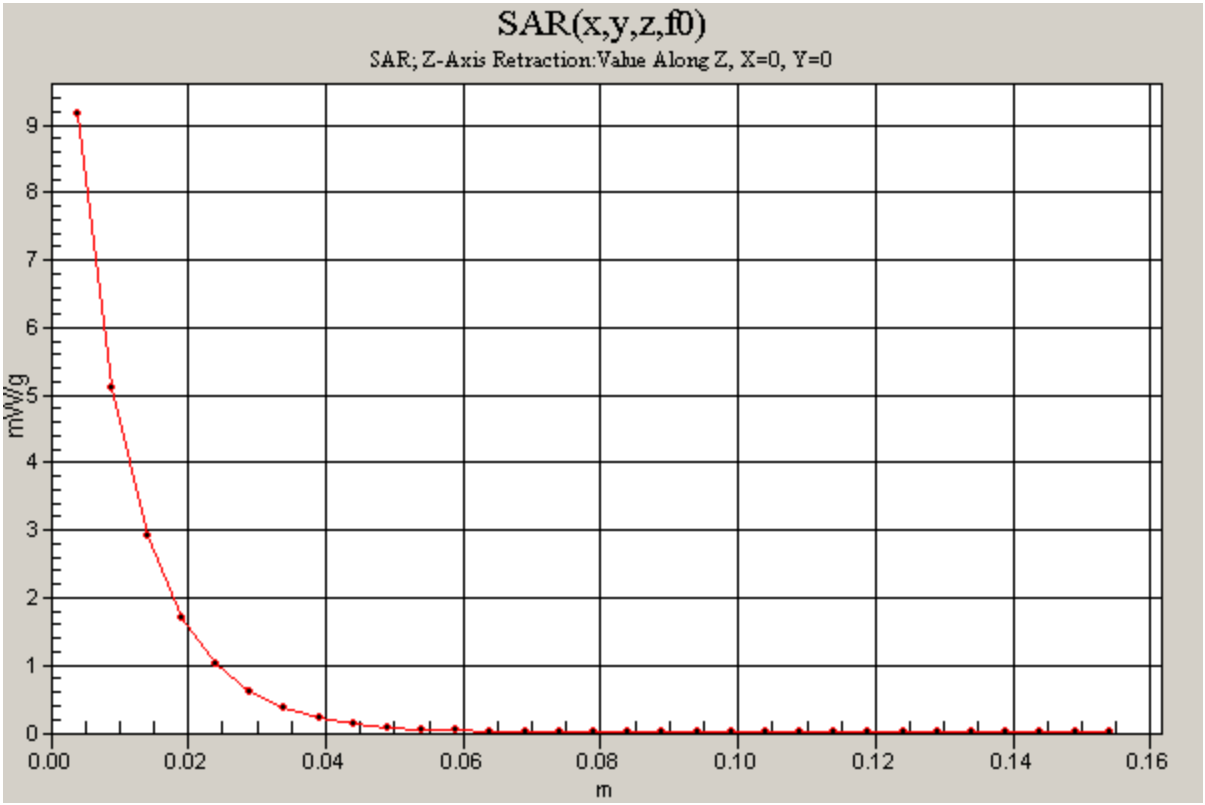
- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80;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

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 8.50 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 80.3 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 14.9 W/kg
SAR(1 g) = 8.17 mW/g; SAR(10 g) = 4.3 mW/g
Maximum value of SAR (measured) = 8.98 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 9.16 mW/g




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

Date/Time: 10/7/2010 7:03:09 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 2d160; PM1 Power = 200 mW
Sim.Temp@ meas = 18.6*C; Sim.Temp@ SPC = 18.6*C; Room Temp@ SPC = 19.9*C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 1800 MHz; σ = 1.38 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3

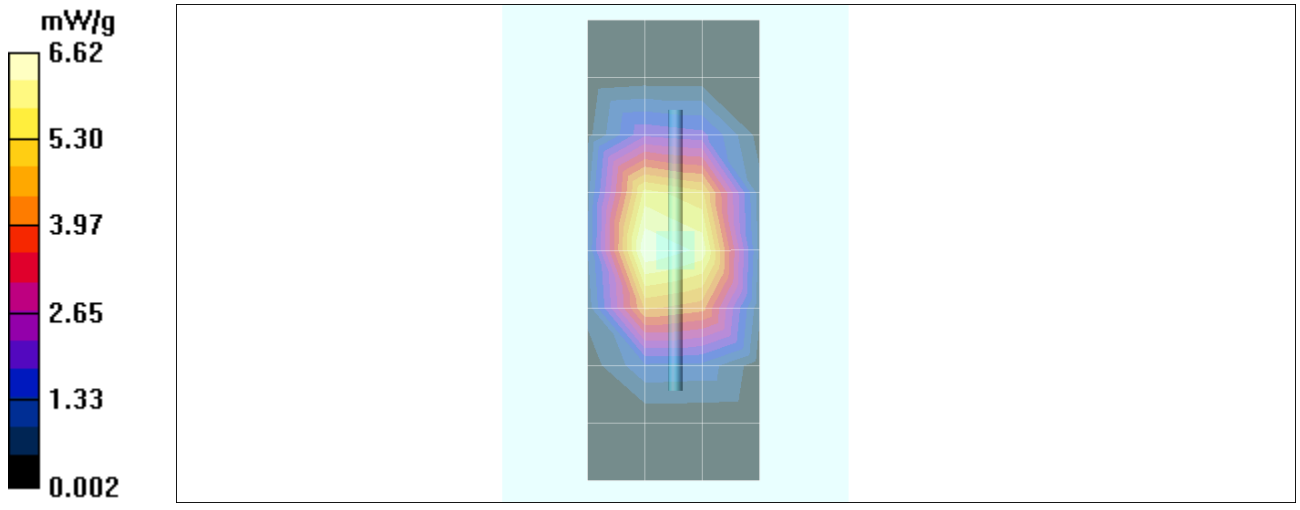
DASY4 Configuration:

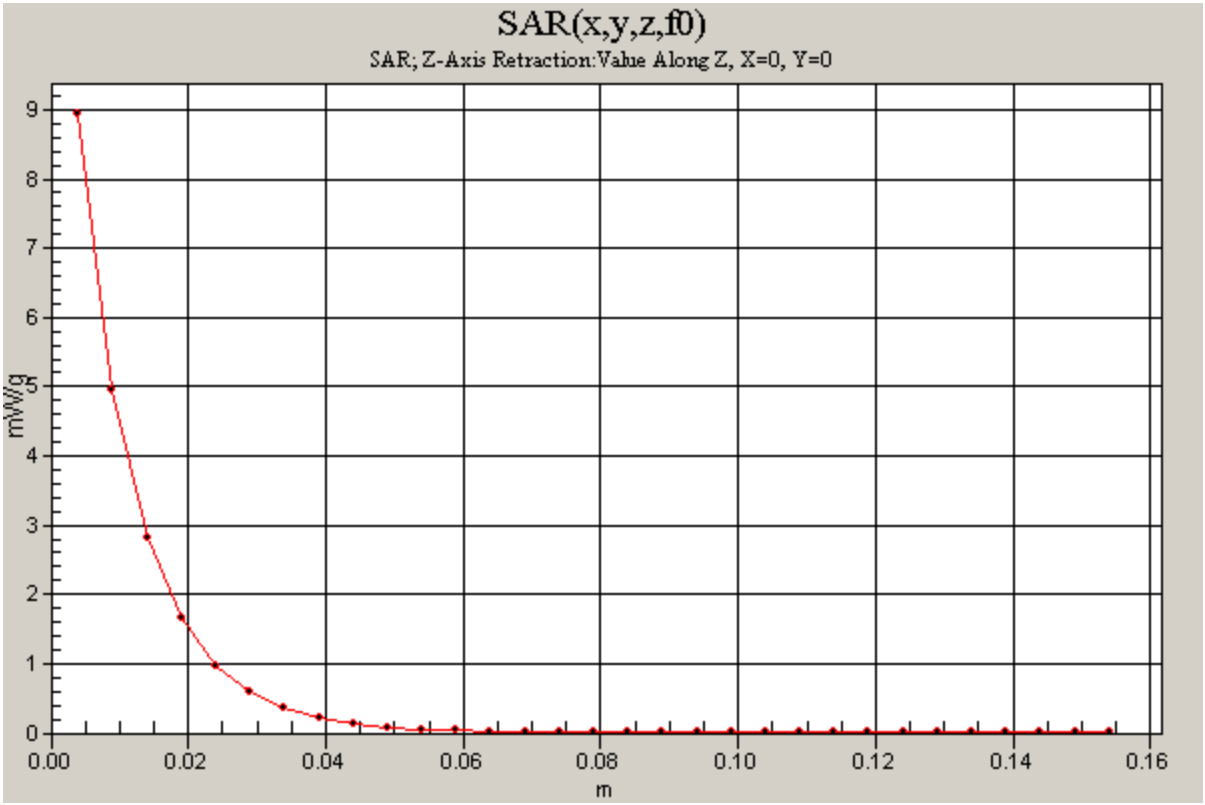
- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80;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

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.62 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 81.2 V/m; Power Drift = -0.030 dB
Peak SAR (extrapolated) = 14.5 W/kg
SAR(1 g) = 7.91 mW/g; SAR(10 g) = 4.17 mW/g
Maximum value of SAR (measured) = 8.79 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.94 mW/g




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

Date/Time: 10/8/2010 7:07:21 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 2d160; PM1 Power = 200 mW
Sim.Temp@ meas = 18.7*C; Sim.Temp@ SPC = 18.7*C; Room Temp@ SPC = 19.7*C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 1800 MHz; σ = 1.36 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3

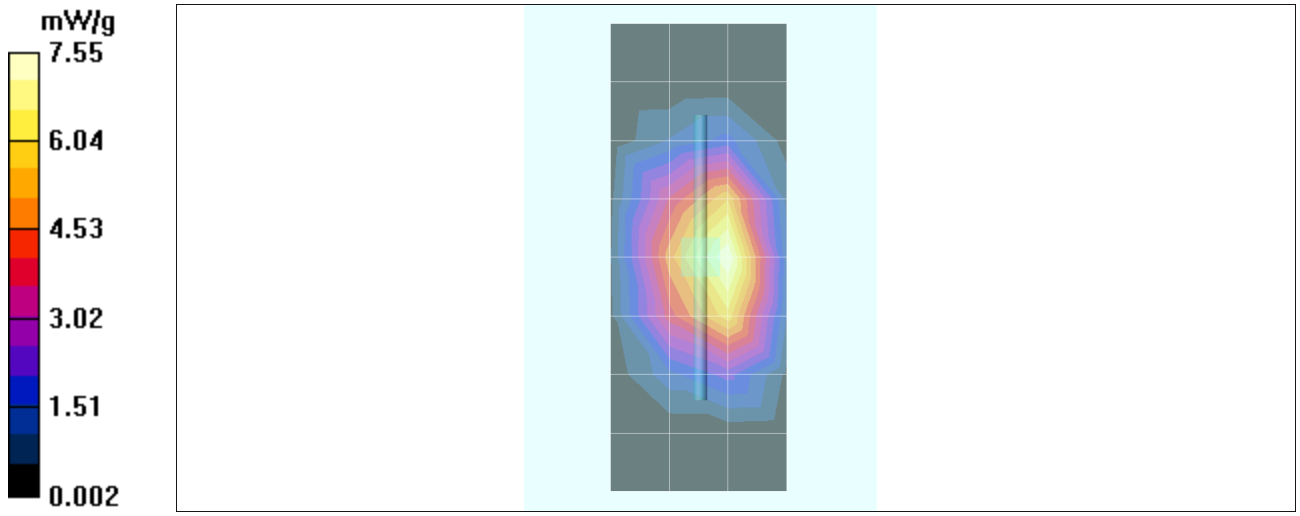
DASY4 Configuration:

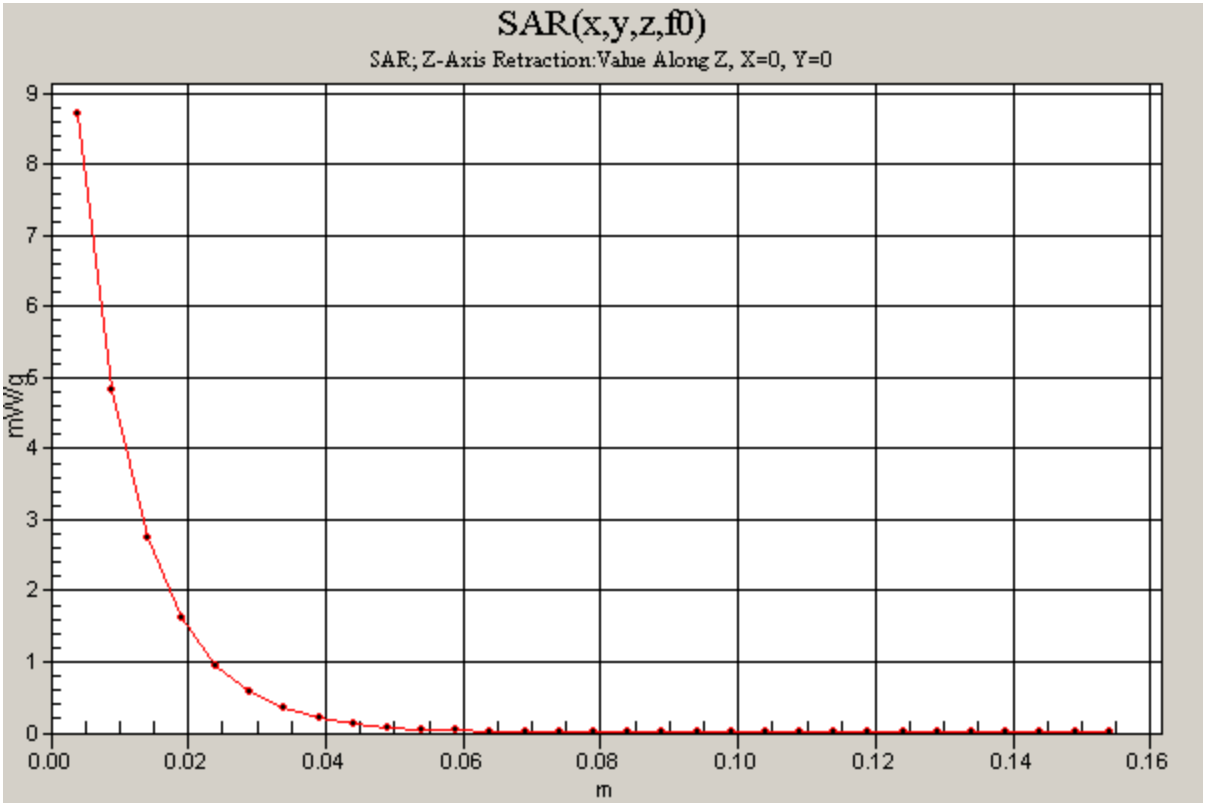
- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80;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

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 7.55 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 80.5 V/m; Power Drift = 0.008 dB
Peak SAR (extrapolated) = 14.2 W/kg
SAR(1 g) = 7.8 mW/g; SAR(10 g) = 4.11 mW/g
Maximum value of SAR (measured) = 8.70 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.71 mW/g




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

Date/Time: 10/12/2010 9:51:11 AM

DUT: Dipole 2450 MHz; Type: D2450V2; Procedure Notes: 2450MHz System Performance Check / Dipole Sn# 808; PM1 Power = 200 mW
Sim.Temp@ meas = 19.1*C; Sim.Temp@ SPC = 19.1*C; Room Temp@ SPC = 20.1*C

Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 2450 MHz; σ = 1.84 mho/m; ε_r = 37.1; ρ = 1000 kg/m^3

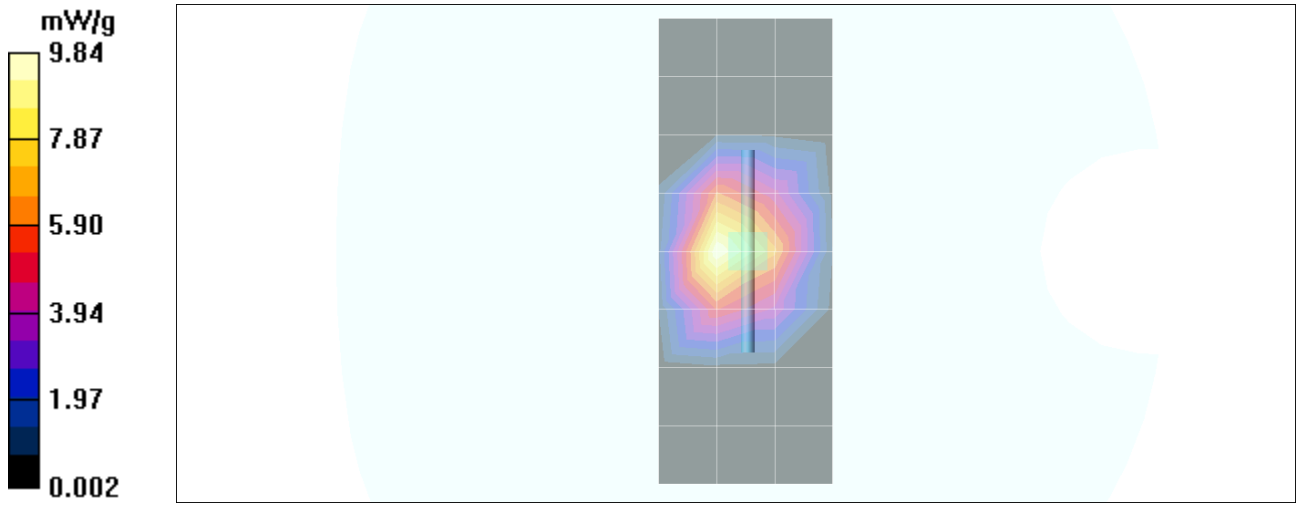
DASY4 Configuration:

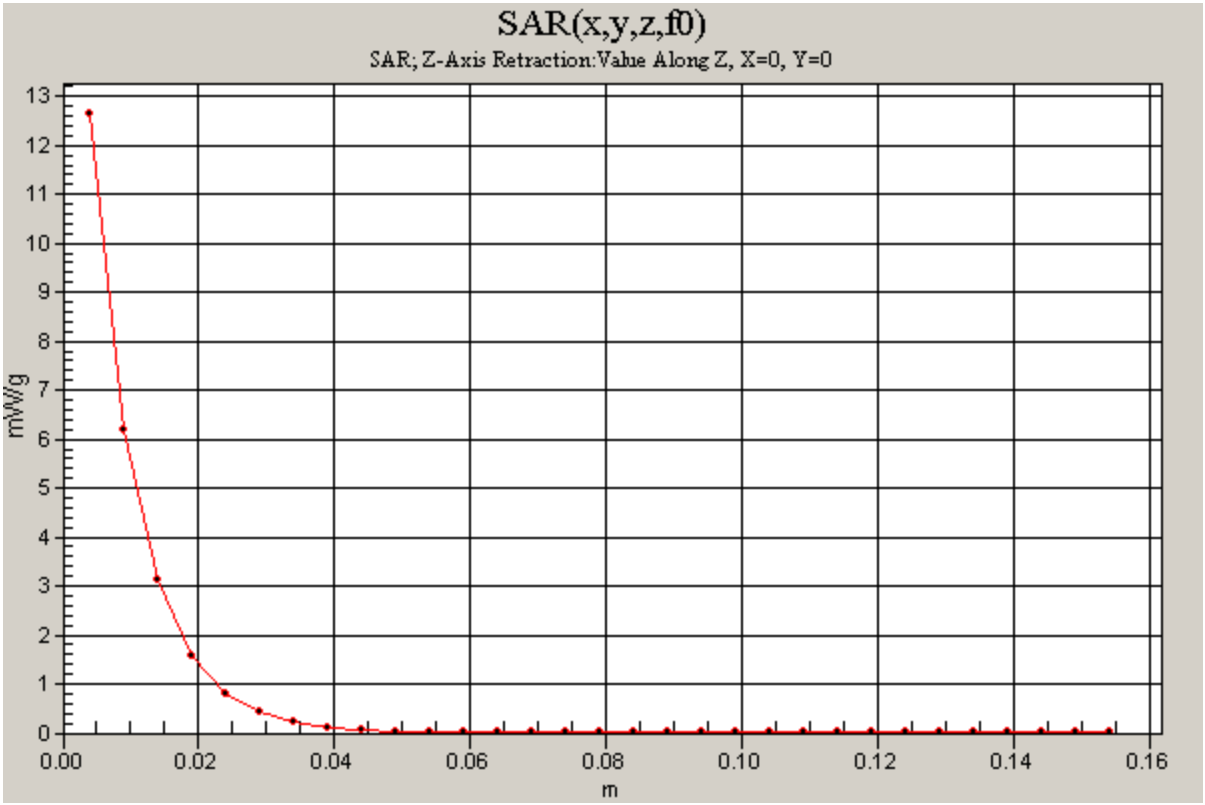
- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/20/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 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) = 9.84 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.2 V/m; Power Drift = -0.002 dB
Peak SAR (extrapolated) = 23.0 W/kg
SAR(1 g) = 11 mW/g; SAR(10 g) = 5.11 mW/g
Maximum value of SAR (measured) = 12.5 mW/g

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




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

Date/Time: 10/13/2010 9:19:00 AM

DUT: Dipole 2450 MHz; Type: D2450V2; Procedure Notes: 2450MHz System Performance Check / Dipole Sn# 808; PM1 Power = 200mW
Sim.Temp@ meas = 19.6*C; Sim.Temp@ SPC = 19.6*C; Room Temp@ SPC = 20.1*C

Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 2450 MHz; σ = 1.83 mho/m; ε_r = 37.4; ρ = 1000 kg/m^3

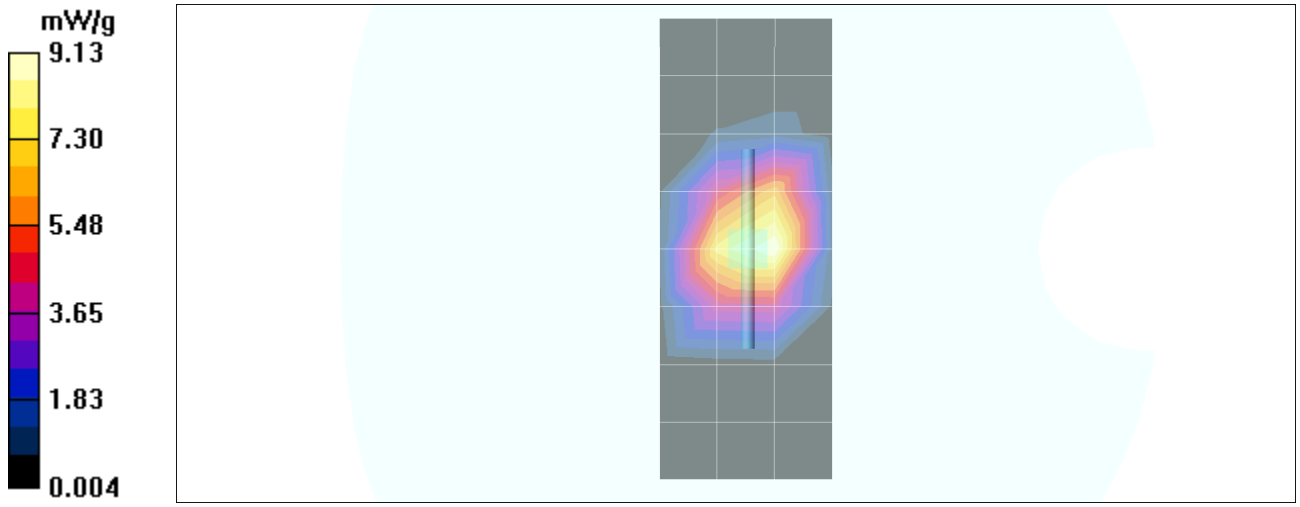
DASY4 Configuration:

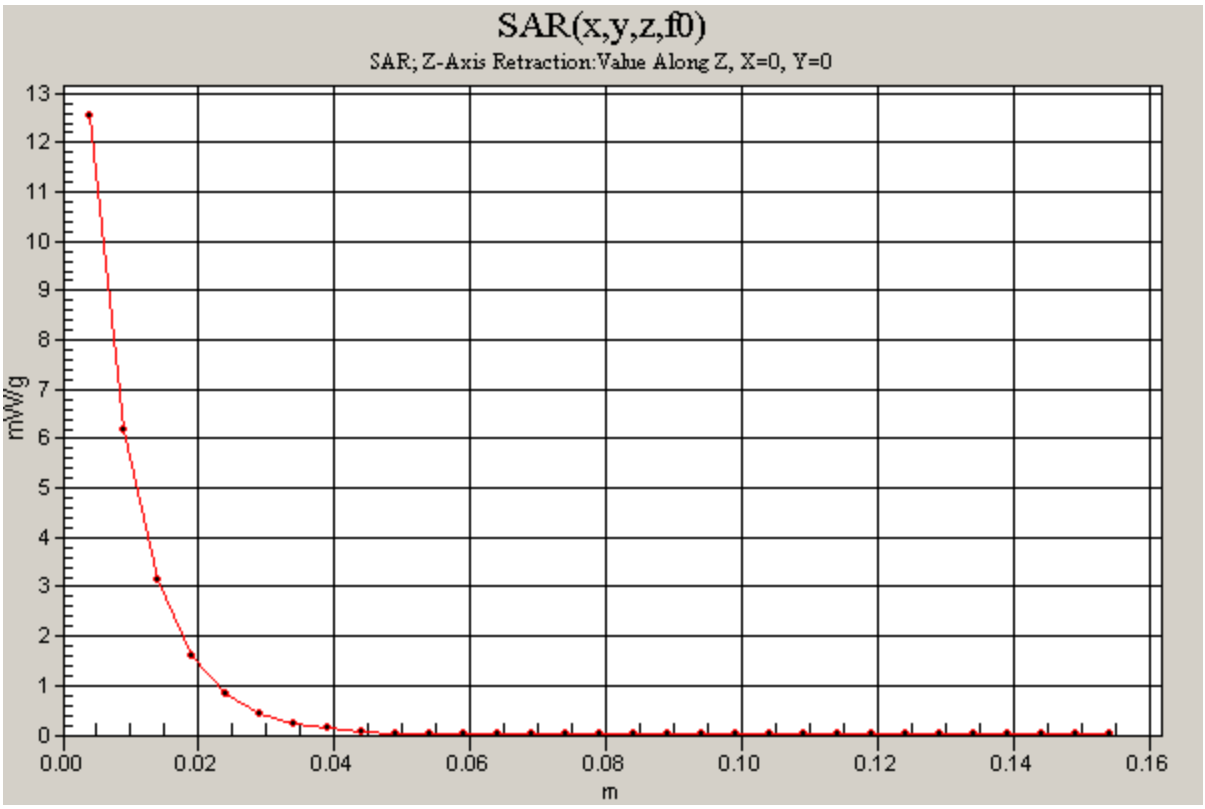
- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/20/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 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) = 9.13 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 84.7 V/m; Power Drift = -0.024 dB
Peak SAR (extrapolated) = 22.9 W/kg
SAR(1 g) = 11 mW/g; SAR(10 g) = 5.12 mW/g
Maximum value of SAR (measured) = 12.6 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 12.5 mW/g




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

Date/Time: 10/14/2010 10:31:42 AM

DUT: Dipole 2450 MHz; Type: D2450V2; Procedure Notes: 2450 MHz System Performance Check / Dipole Sn# 808; PM1 Power = 200 mW
Sim.Temp@ meas = 19.2*C; Sim.Temp@ SPC = 19.2*C; Room Temp@ SPC = 20.3*C

Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: VALIDATION Only; Medium parameters used: f = 2450 MHz; σ = 1.88 mho/m; ε_r = 37; ρ = 1000 kg/m^3

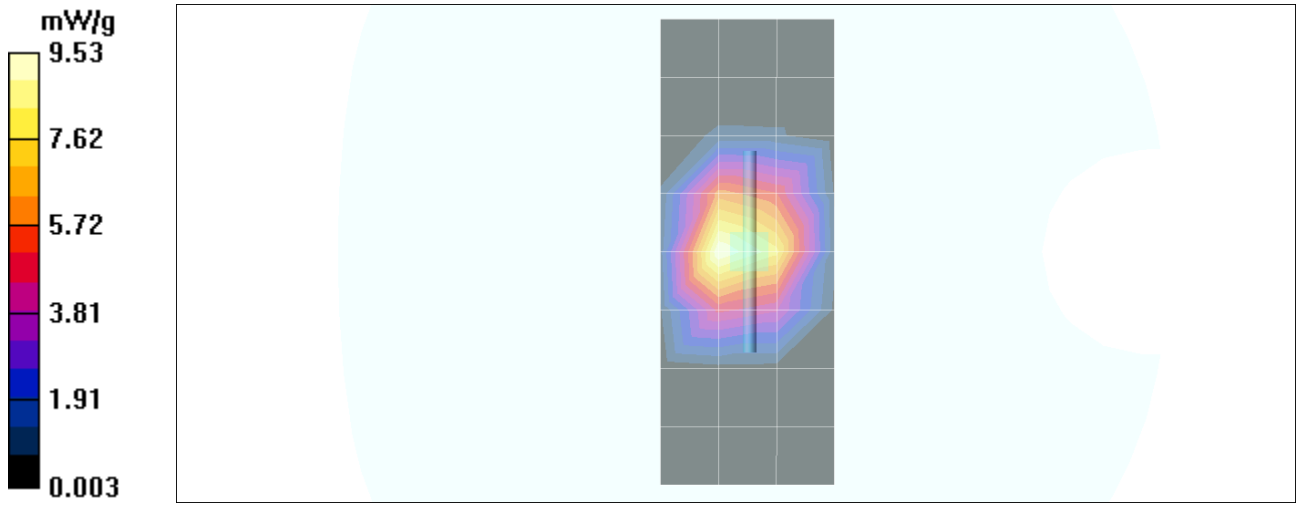
DASY4 Configuration:

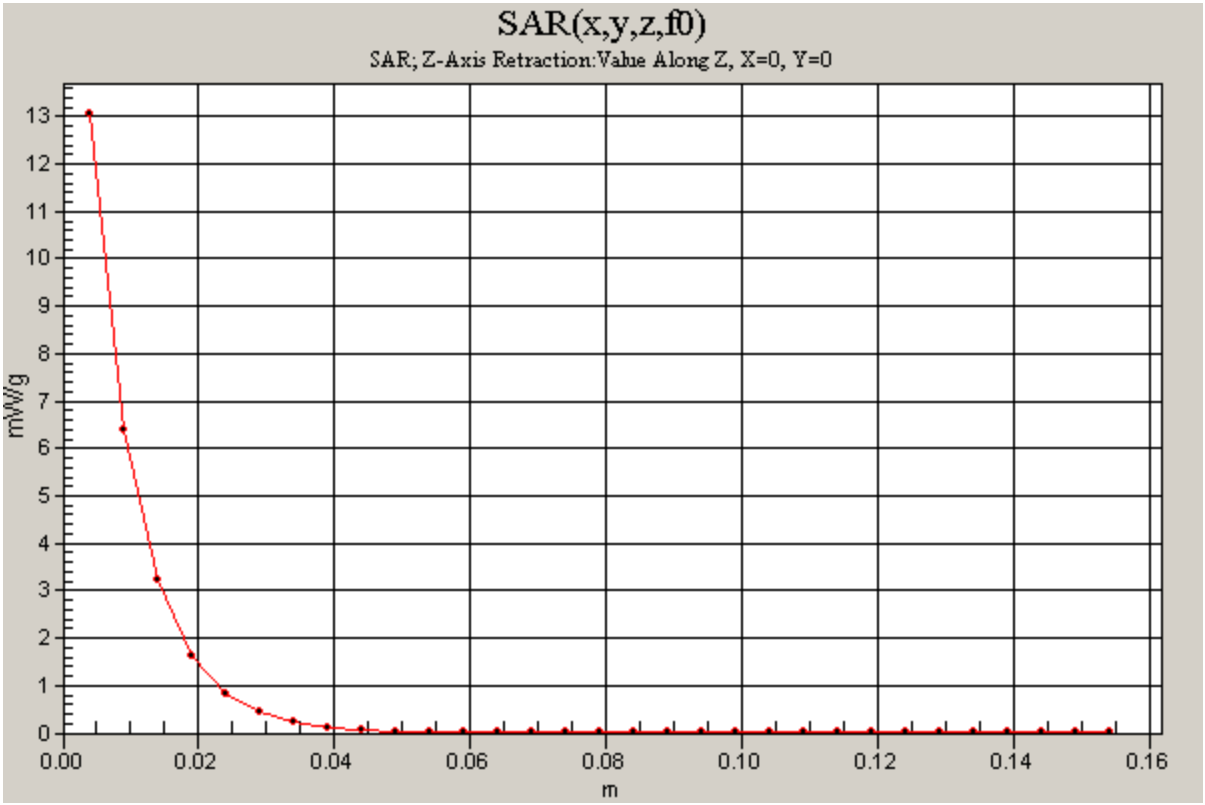
- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/20/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 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) = 9.53 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 84.3 V/m; Power Drift = 0.002 dB
Peak SAR (extrapolated) = 24.1 W/kg
SAR(1 g) = 11.5 mW/g; SAR(10 g) = 5.29 mW/g
Maximum value of SAR (measured) = 13.0 mW/g

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




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

Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

Date/Time: 10/8/2010 12:48:57 AM

Serial: 352795040045444; Slider: Closed; Procedure Notes: Pwr Step: 5; Battery Model #: SNN5819B; DEVICE POSITION: Cheek

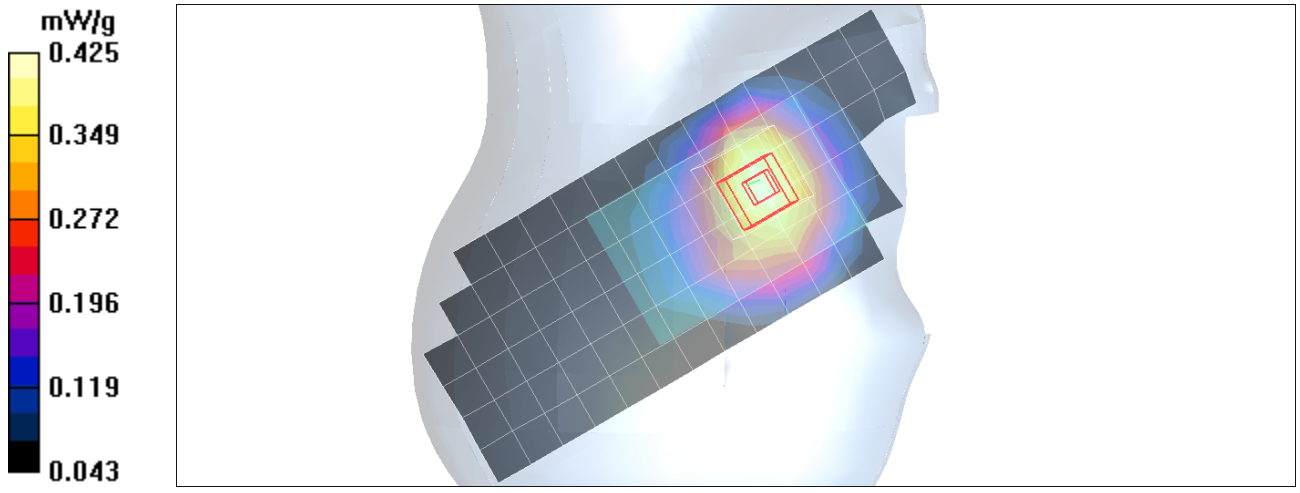
Communication System: GSM 850; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:8.3
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- 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 Extended (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.418 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) - to correct max outside (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.8 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 0.502 W/kg
SAR(1 g) = 0.404 mW/g; SAR(10 g) = 0.304 mW/g
Maximum value of SAR (measured) = 0.425 mW/g



Cheek; Slider Closed; GSM 850

Date/Time: 9/27/2010 9:08:52 AM

Serial: 352795040045444; Procedure Notes: Pwr Step: 5; Slider: Open; Battery Model #: SNN5819B; DEVICE POSITION: Cheek

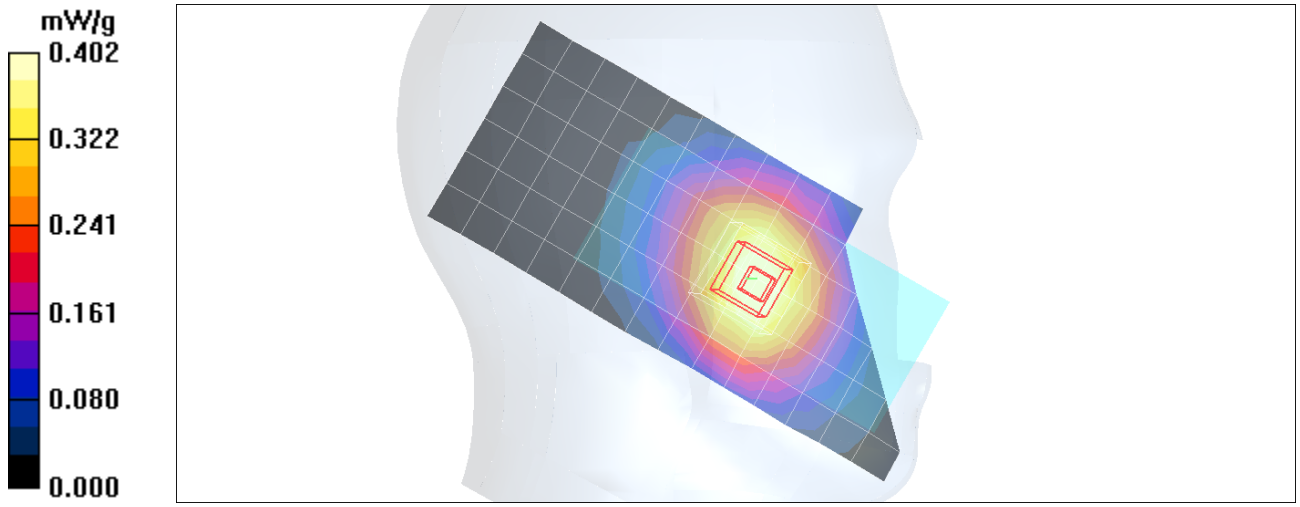
Communication System: GSM 850; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:8.3
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- 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) = 0.402 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.1 V/m; Power Drift = 0.036 dB
Peak SAR (extrapolated) = 0.488 W/kg
SAR(1 g) = 0.394 mW/g; SAR(10 g) = 0.300 mW/g
Maximum value of SAR (measured) = 0.416 mW/g



Cheek; Slider Open; GSM 850

Date/Time: 10/8/2010 1:39:29 AM

Serial: 352795040045444; Slider: Closed; Procedure Notes: Pwr Step: 5; Battery Model #: SNN5819B; DEVICE POSITION: Tilt

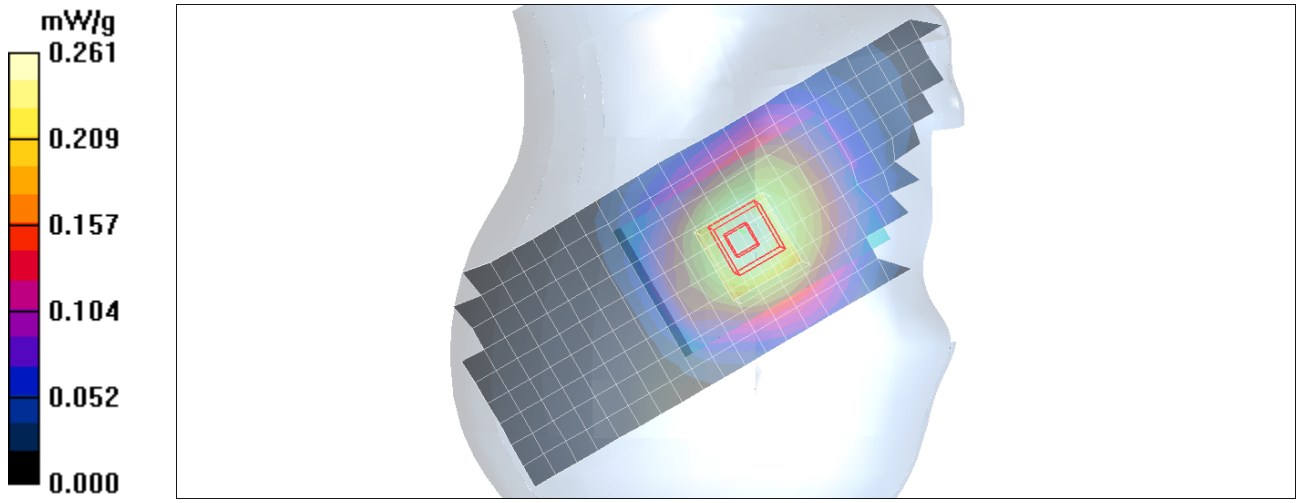
Communication System: GSM 850; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:8.3
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- 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 Extended (10mm) (10x25x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.261 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.8 V/m; Power Drift = 0.051 dB
Peak SAR (extrapolated) = 0.323 W/kg
SAR(1 g) = 0.257 mW/g; SAR(10 g) = 0.194 mW/g
Maximum value of SAR (measured) = 0.269 mW/g



Tilt; Slider Closed; GSM 850

Date/Time: 10/8/2010 2:31:44 AM

Serial: 352795040045444; Slider: Open; Procedure Notes: Pwr Step: 5; Battery Model #: SNN5819B; DEVICE POSITION: Tilt

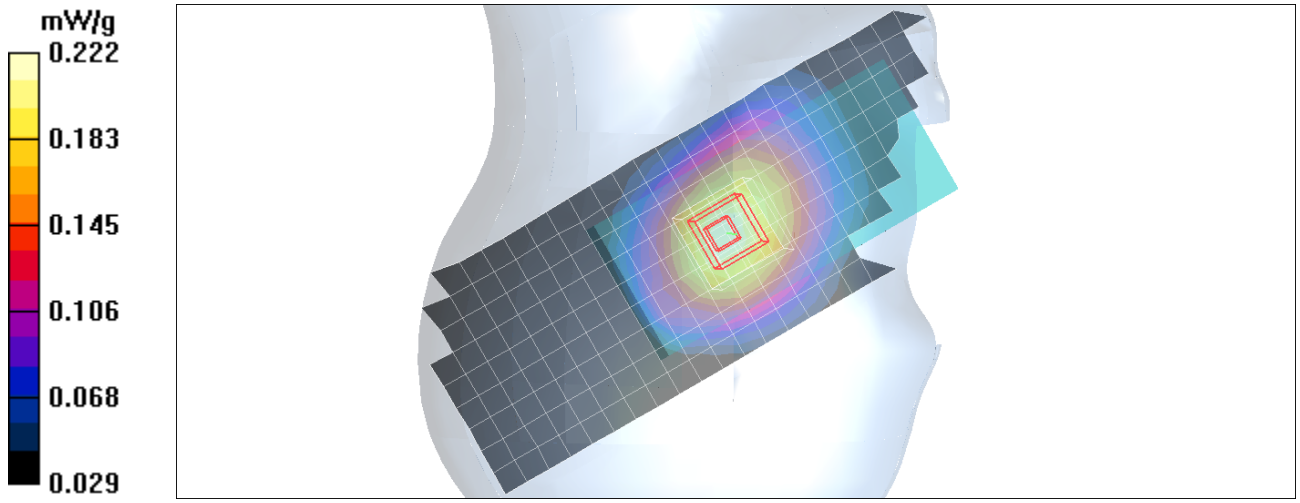
Communication System: GSM 850; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:8.3
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- 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 Extended (10mm) (10x25x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.221 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.1 V/m; Power Drift = 0.041 dB
Peak SAR (extrapolated) = 0.263 W/kg
SAR(1 g) = 0.211 mW/g; SAR(10 g) = 0.159 mW/g
Maximum value of SAR (measured) = 0.222 mW/g



Tilt; Slider Open; GSM 850

Date/Time: 9/29/2010 6:51:14 PM

Serial: 352795040045444; Slider: Closed; Procedure Notes: Pwr Step: 0; Battery Model #: SNN5819B; DEVICE POSITION: Cheek

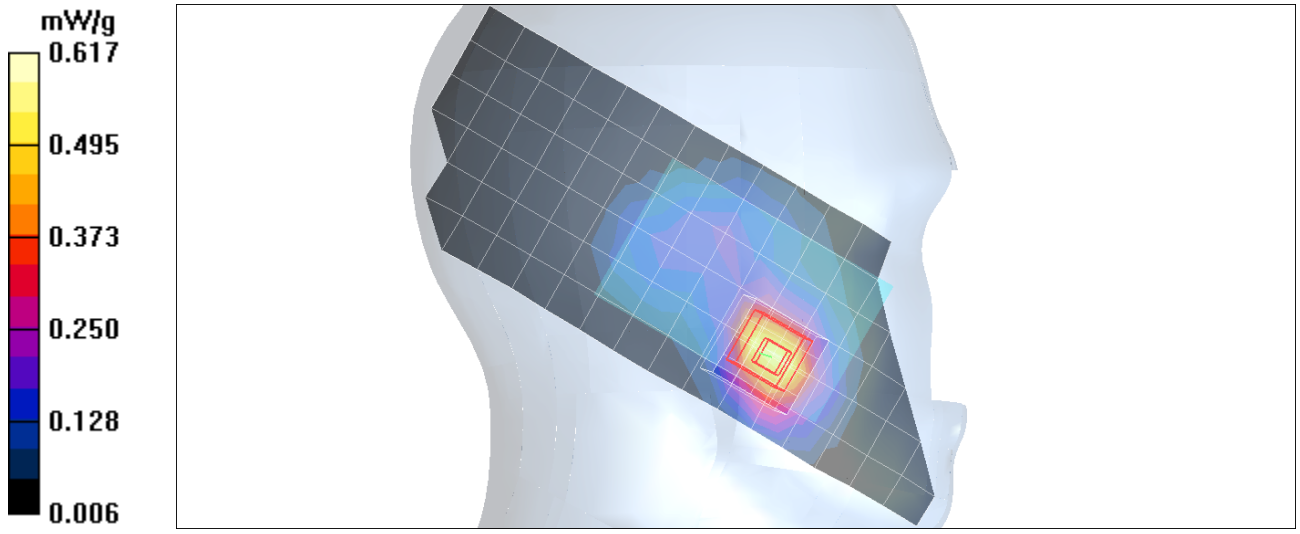
Communication System: GSM 1900; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:8.3
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: 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 Extended (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.557 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.3 V/m; Power Drift = 0.071 dB
Peak SAR (extrapolated) = 0.899 W/kg
SAR(1 g) = 0.555 mW/g; SAR(10 g) = 0.315 mW/g
Maximum value of SAR (measured) = 0.617 mW/g



Cheek; Slider Closed; GSM 1900

Date/Time: 9/29/2010 9:47:11 PM

Serial: 352795040045444; Procedure Notes: Pwr Step: 0; Slider: Open; Battery Model #: SNN5819B; DEVICE POSITION: Cheek

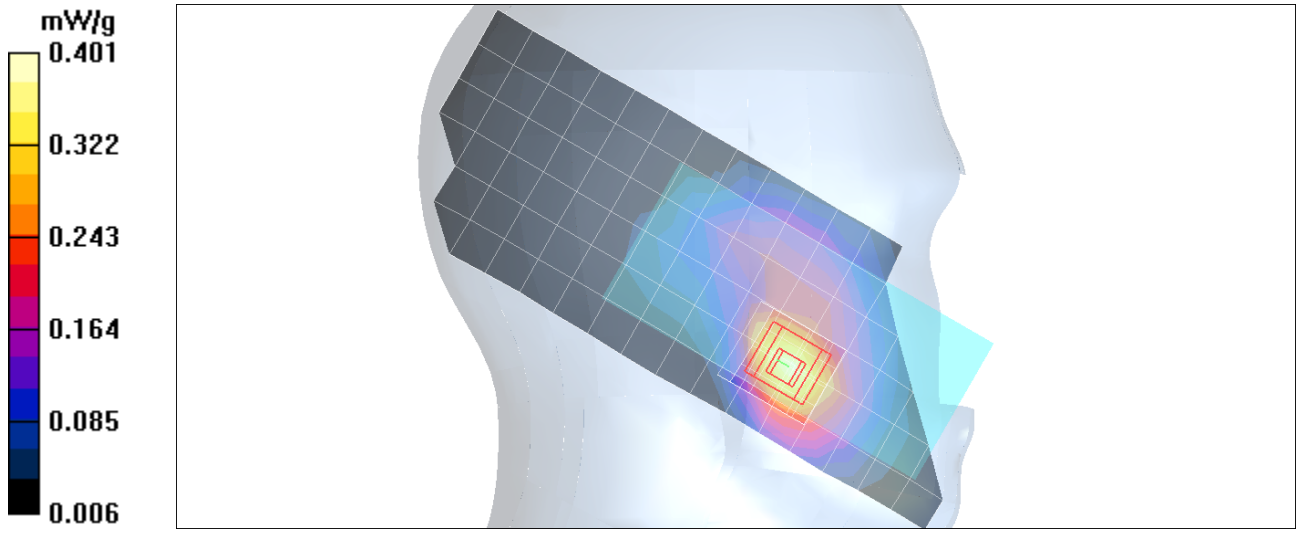
Communication System: GSM 1900; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:8.3
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: 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 Extended (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.387 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.3 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 0.568 W/kg
SAR(1 g) = 0.364 mW/g; SAR(10 g) = 0.219 mW/g
Maximum value of SAR (measured) = 0.401 mW/g



Cheek; Slider Open; GSM 1900

Date/Time: 9/30/2010 12:40:06 AM

Serial: 352795040045444; Slider: Closed; Procedure Notes: Pwr Step: 0; Battery Model #: SNN5819B; DEVICE POSITION: Tilt

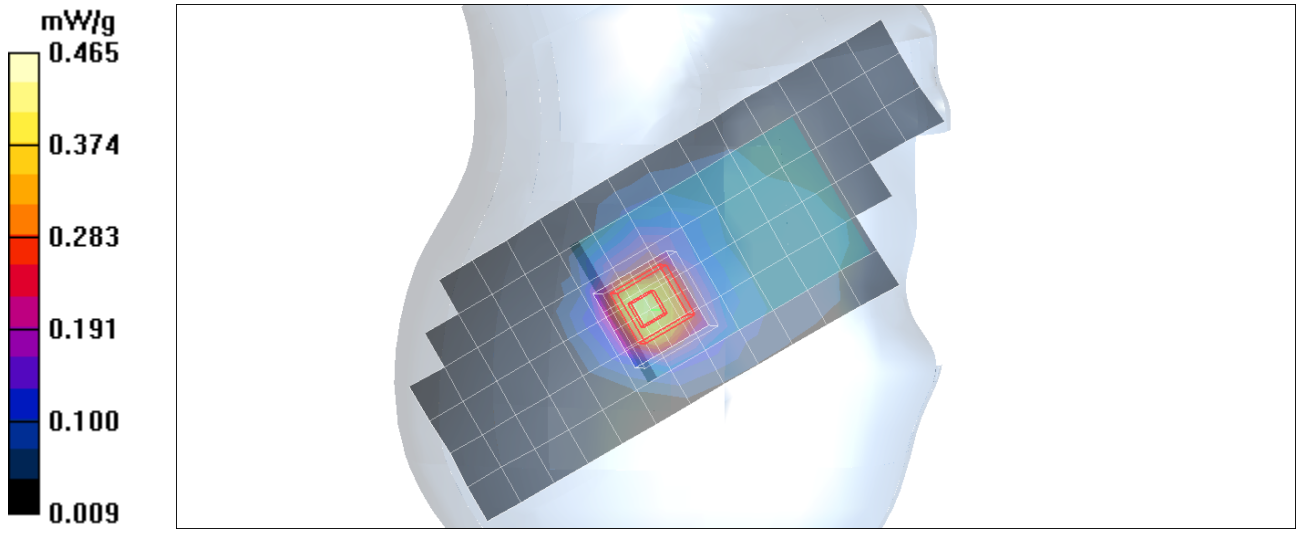
Communication System: GSM 1900; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:8.3
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Head Template/Area Scan - Normal Extended (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.416 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.9 V/m; Power Drift = -0.082 dB
Peak SAR (extrapolated) = 0.671 W/kg
SAR(1 g) = 0.419 mW/g; SAR(10 g) = 0.242 mW/g
Maximum value of SAR (measured) = 0.465 mW/g



Tilt; Slider Closed; GSM 1900

Date/Time: 9/29/2010 10:28:49 PM

Serial: 352795040045444; Procedure Notes: Pwr Step: 0; Slider: Open; Battery Model #: SNN5819B; DEVICE POSITION: Tilt

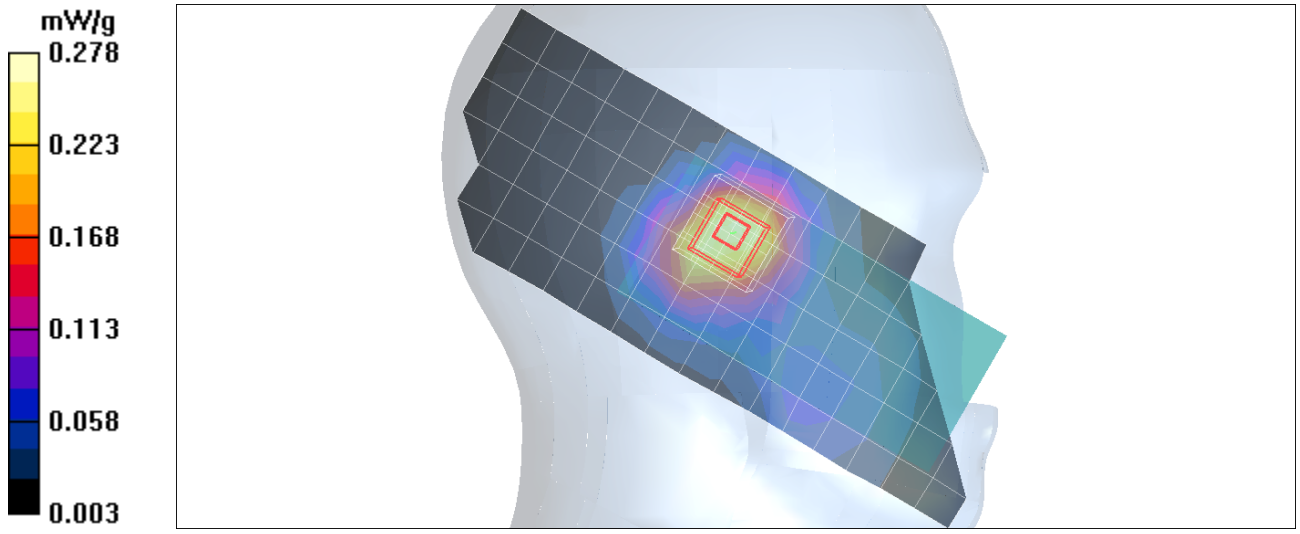
Communication System: GSM 1900; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:8.3
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: 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 Extended (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.255 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.9 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 0.380 W/kg
SAR(1 g) = 0.258 mW/g; SAR(10 g) = 0.164 mW/g
Maximum value of SAR (measured) = 0.278 mW/g



Tilt; Slider Open; GSM 1900

Date/Time: 9/26/2010 12:16:18 PM

Serial: 352795040045444; Slider: Closed; Procedure Notes: Pwr Step: ALL UP; Battery Model #: SNN5819B; DEVICE POSITION: CHEEK

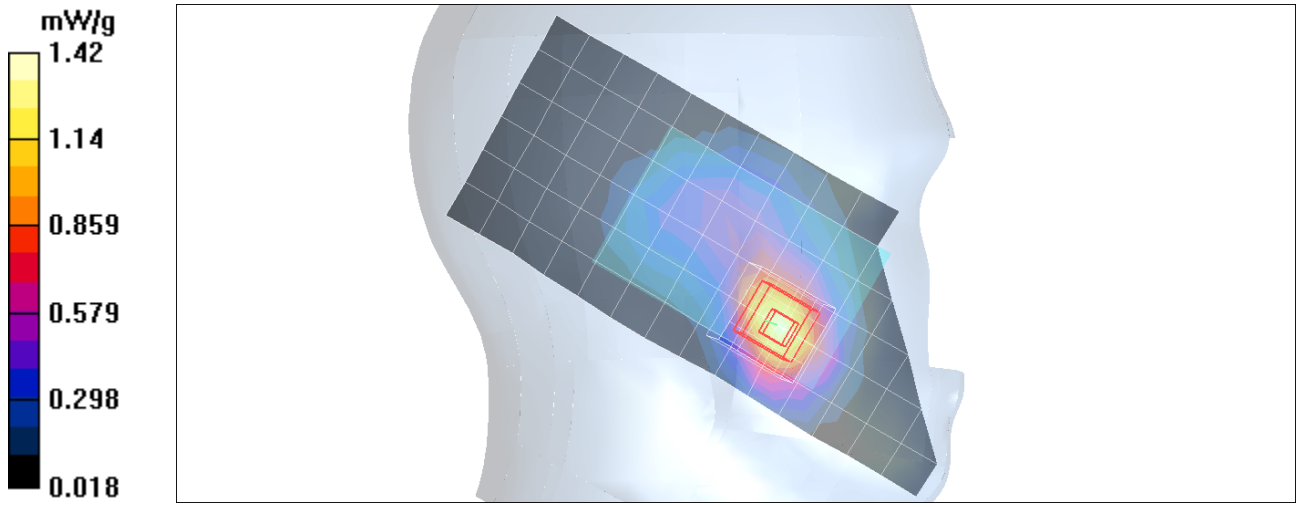
Communication System: 3G/WCDMA 1700; Frequency: 1732.5 MHz; Communication System Channel Number: 1413; Duty Cycle: 1:1
Medium: 1730 Glycol Head; Medium parameters used: f = 1730 MHz; σ = 1.4 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.41 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.6 V/m; Power Drift = 0.017 dB
Peak SAR (extrapolated) = 2.09 W/kg
SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.739 mW/g
Maximum value of SAR (measured) = 1.42 mW/g



Cheek; Slider Closed; WCDMA 1700

Date/Time: 9/26/2010 11:39:01 AM

Serial: 352795040045444; Slider: Open; Procedure Notes: Pwr Step: ALL UP; Battery Model #: SNN5819B; DEVICE POSITION: CHEEK

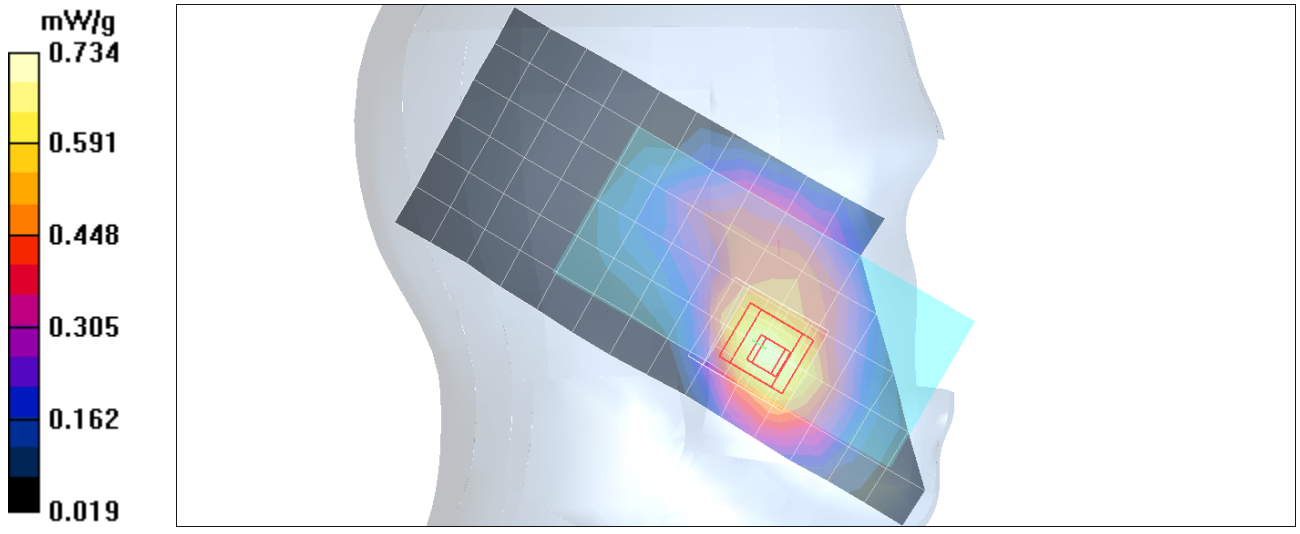
Communication System: 3G/WCDMA 1700; Frequency: 1732.5 MHz; Communication System Channel Number: 1413; Duty Cycle: 1:1
Medium: 1730 Glycol Head; Medium parameters used: f = 1730 MHz; σ = 1.4 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: 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) = 0.693 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.6 V/m; Power Drift = 0.252 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.684 mW/g; SAR(10 g) = 0.433 mW/g
Maximum value of SAR (measured) = 0.734 mW/g



Cheek; Slider Open; WCDMA 1700

Date/Time: 9/30/2010 1:43:13 PM

Serial: 352795040045444; Slider: Closed; Procedure Notes: Pwr Step: ALL UP; Battery Model #: SNN5819B; DEVICE POSITION: Tilt

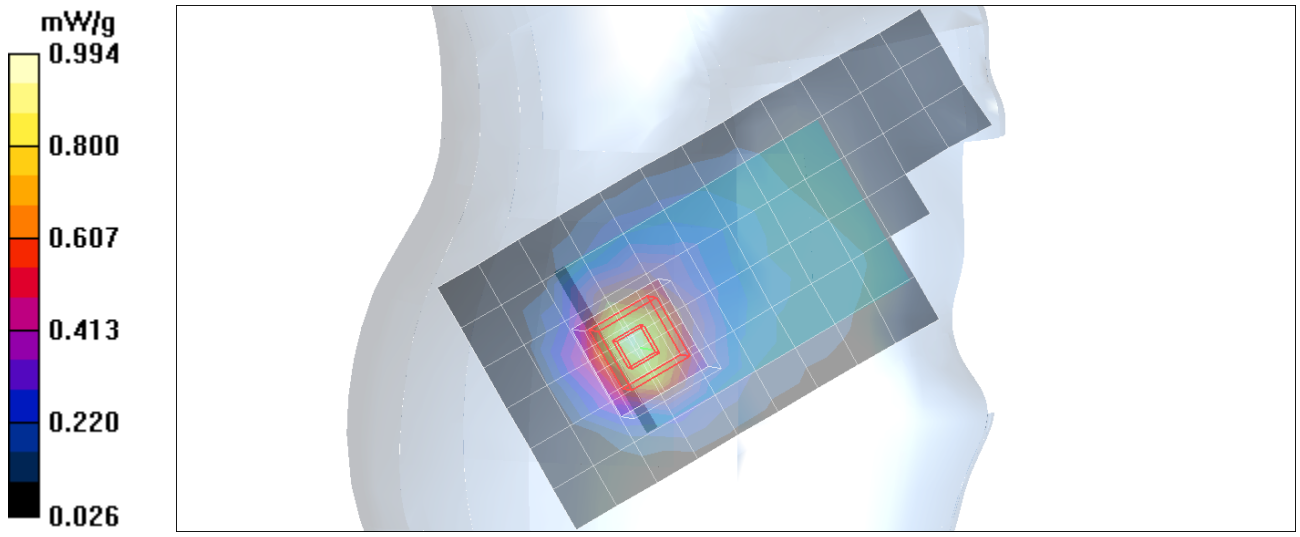
Communication System: 3G/WCDMA 1700; Frequency: 1732.5 MHz; Communication System Channel Number: 1413; Duty Cycle: 1:1
Medium: 1730 Glycol Head; Medium parameters used: f = 1730 MHz; σ = 1.39 mho/m; ε_r = 39; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: 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) = 0.983 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.4 V/m; Power Drift = -0.063 dB
Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 0.901 mW/g; SAR(10 g) = 0.540 mW/g
Maximum value of SAR (measured) = 0.994 mW/g



Tilt; Slider Closed; WCDMA 1700

Date/Time: 9/26/2010 11:57:19 AM

Serial: 352795040045444; Slider: Open; Procedure Notes: Pwr Step: ALL UP; Battery Model #: SNN5819B; DEVICE POSITION: TILT

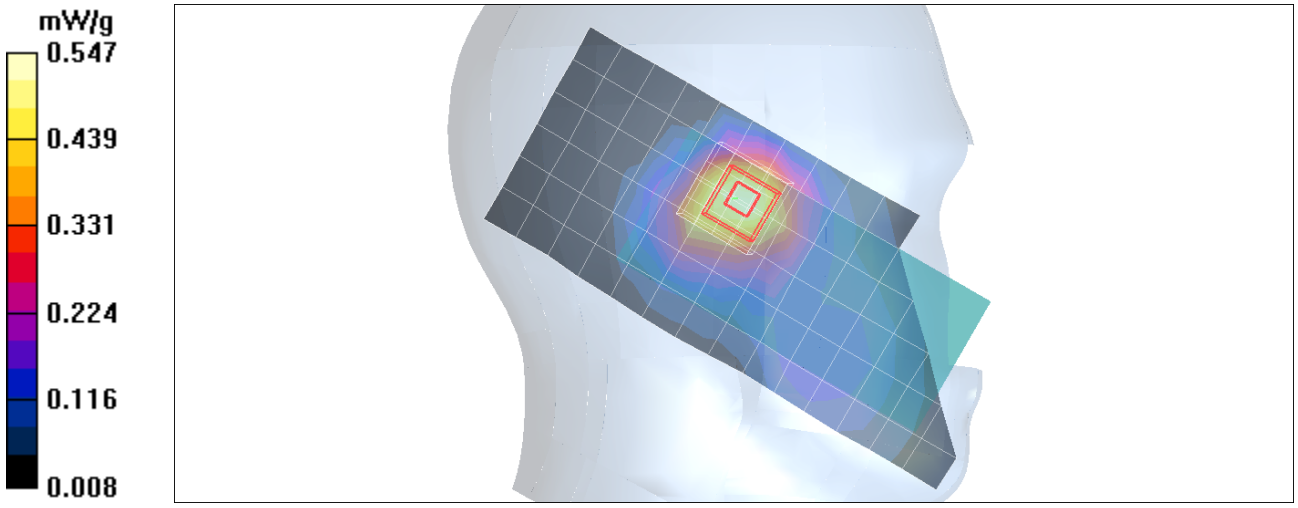
Communication System: 3G/WCDMA 1700; Frequency: 1732.5 MHz; Communication System Channel Number: 1413; Duty Cycle: 1:1
Medium: 1730 Glycol Head; Medium parameters used: f = 1730 MHz; σ = 1.4 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: 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) = 0.549 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.8 V/m; Power Drift = 0.027 dB
Peak SAR (extrapolated) = 0.755 W/kg
SAR(1 g) = 0.517 mW/g; SAR(10 g) = 0.331 mW/g
Maximum value of SAR (measured) = 0.547 mW/g



Tilt; Slider Open; WCDMA 1700

Date/Time: 10/13/2010 11:09:21 AM

Serial: 352795040045451; Slider: Closed; Procedure Notes: Pwr Step: continuous; Battery Model #: SNN5819B; DEVICE POSITION: CHEEK

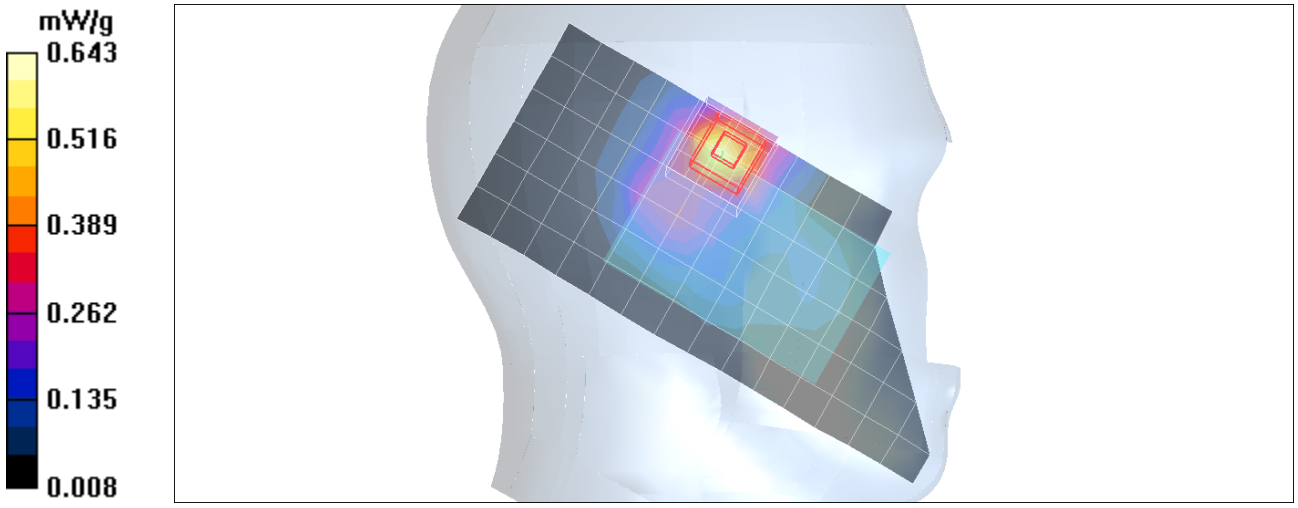
Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Communication System Channel Number: 1; Duty Cycle: 1:1
Medium: 2450 Glycol Head; Medium parameters used: f = 2450 MHz; σ = 1.83 mho/m; ε_r = 37.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/20/2010
- 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) = 0.624 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.4 V/m; Power Drift = -0.297 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.579 mW/g; SAR(10 g) = 0.290 mW/g
Maximum value of SAR (measured) = 0.643 mW/g



Cheek; Slider Closed; WI-FI

Date/Time: 10/13/2010 11:56:54 AM

Serial: 352795040045451; Slider: Open; Procedure Notes: Pwr Step: continuous; Battery Model #: SNN5819B; DEVICE POSITION: CHEEK;

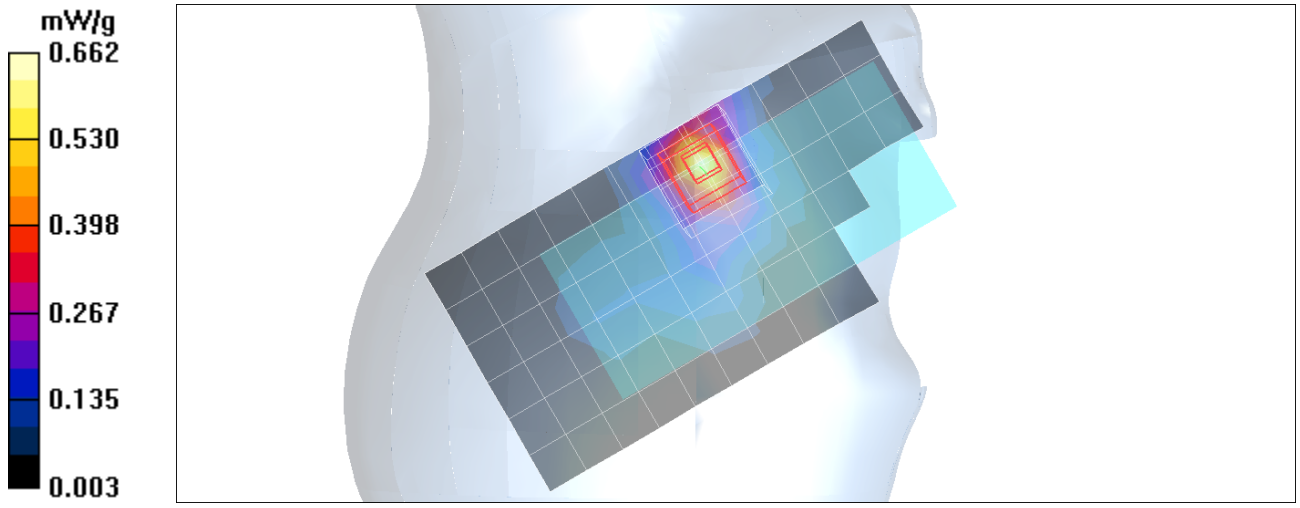
Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Communication System Channel Number: 1; Duty Cycle: 1:1
Medium: 2450 Glycol Head; Medium parameters used: f = 2450 MHz; σ = 1.83 mho/m; ε_r = 37.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/20/2010
- 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) = 0.648 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.1 V/m; Power Drift = 0.165 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.592 mW/g; SAR(10 g) = 0.295 mW/g
Maximum value of SAR (measured) = 0.662 mW/g



Cheek; Slider Open; WI-FI

Date/Time: 10/12/2010 10:45:18 AM

Serial: 352795040045451; Slider: Closed; Procedure Notes: Pwr Step: continuous; Battery Model #: SNN5819B; DEVICE POSITION: Tilt

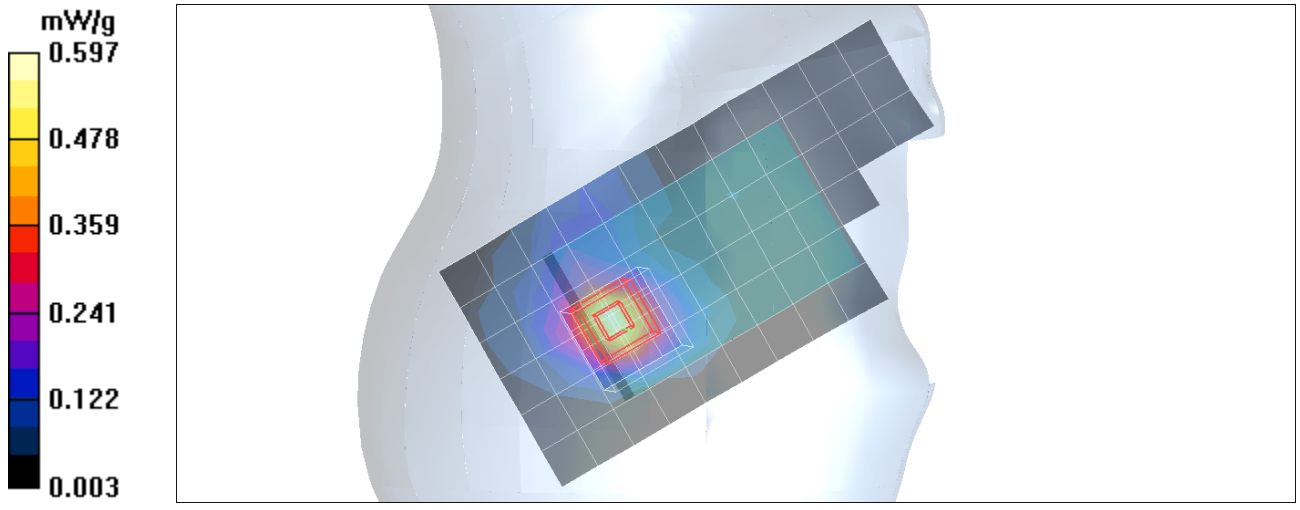
Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Communication System Channel Number: 1; Duty Cycle: 1:1
Medium: 2450 Glycol Head; Medium parameters used: f = 2450 MHz; σ = 1.84 mho/m; ε_r = 37.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/20/2010
- 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) = 0.571 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.2 V/m; Power Drift = 0.695 dB
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.557 mW/g; SAR(10 g) = 0.286 mW/g
Maximum value of SAR (measured) = 0.597 mW/g



Tilt; Slider Closed; WI-FI

Date/Time: 10/13/2010 12:14:43 PM

Serial: 352795040045451; Slider: Open; Procedure Notes: Pwr Step: continuous; Battery Model #: SNN5819B; DEVICE POSITION: TILT

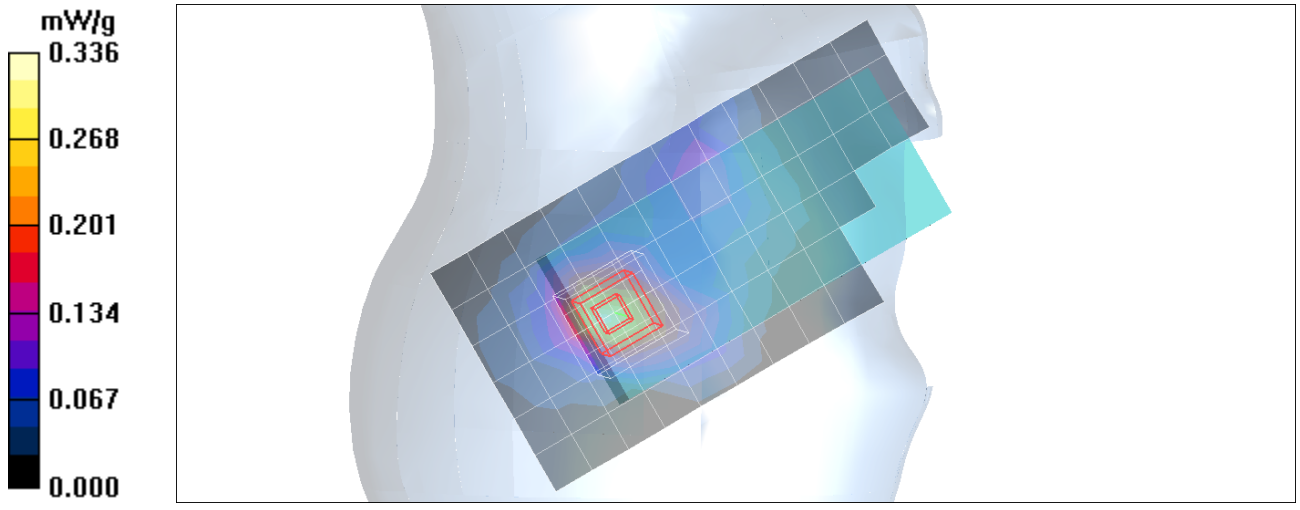
Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Communication System Channel Number: 1; Duty Cycle: 1:1
Medium: 2450 Glycol Head; Medium parameters used: f = 2450 MHz; σ = 1.83 mho/m; ε_r = 37.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/20/2010
- 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) = 0.336 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.9 V/m; Power Drift = 0.023 dB
Peak SAR (extrapolated) = 0.559 W/kg
SAR(1 g) = 0.314 mW/g; SAR(10 g) = 0.165 mW/g
Maximum value of SAR (measured) = 0.350 mW/g



Tilt; Slider Open; WI-FI

The guidelines provided in "SAR Evaluation Consideration for Handsets with Multiple Transmitters and Antennas" (KDB publication 648474 - D01 v01r05) were utilized for evaluation of the need for simultaneous transmission SAR testing. These guidelines direct that if the SAR-to-peak location separation ratio for two simultaneously transmitting antennas is < 0.3 then SAR evaluation for simultaneous transmission is not required. For CDMA 800 and Wi-Fi in the Left Head Cheek position the SAR-to-peak-location separation is 0.295, and thus no testing was performed to determine the aggregate 1 g SAR in this configuration. SAR plots with the Wi-Fi SAR overlaid upon the CDMA 800 SAR are provided below.

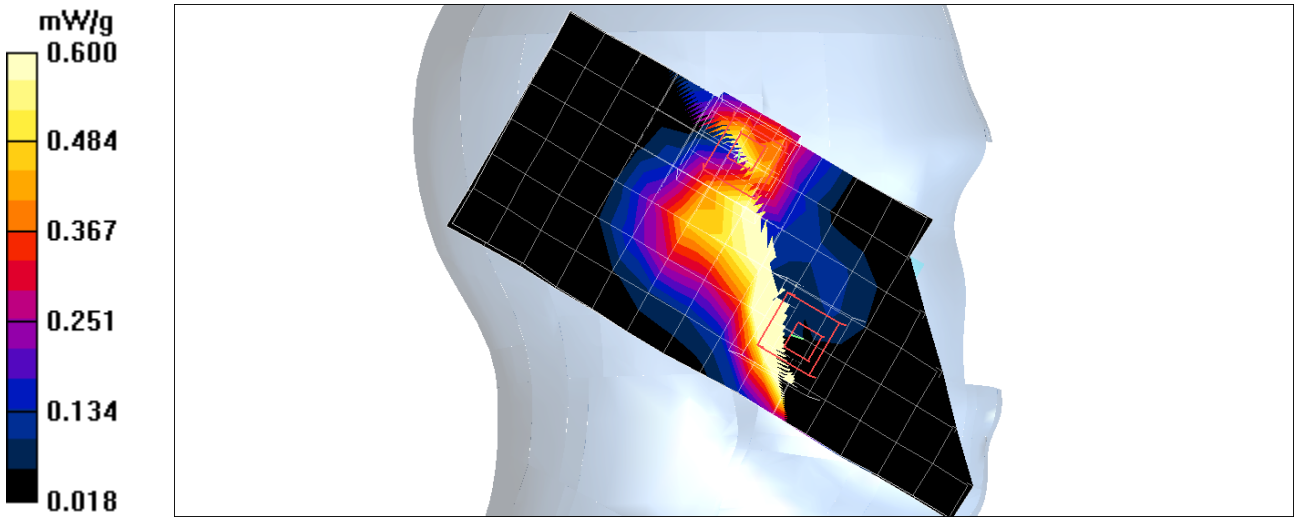
Serial: 352795040045451; Slider: Closed; Procedure Notes: Pwr Step: Continuous; Battery Model #: SNN5819B DEVICE POSITION: CHEEK; Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Communication System Channel Number: 1; Duty Cycle: 1:1; Medium: 2450 Glycol Head; Medium parameters used: f = 2450 MHz; σ = 1.83 mho/m; ε_r = 37.4; ρ = 1000 kg/m^3

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 29.6 V/m; Power Drift = 0.017 dB; Peak SAR (extrapolated) = 2.09 W/kg; **SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.739 mW/g;** Maximum value of SAR (measured) = 1.42 mW/g **(X=0.065 m, Y=0.263 m, Z= -0.172 m)**

Serial: 352795040045444; Slider Closed; Procedure Notes: Pwr Step: All up; Battery Model #: SNN5819B DEVICE POSITION CHEEK; Communication System: 3G/WCDMA 1700; Frequency: 1732.5 MHz; Communication System Channel Number: 1413; Duty Cycle: 1:1; Medium: 1730 Glycol Head; Medium parameters used: f = 1730 MHz; σ = 1.4 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm; Reference Value = 14.4 V/m; Power Drift = -0.297 dB; Peak SAR (extrapolated) = 1.14 W/kg; **SAR(1 g) = 0.579 mW/g; SAR(10 g) = 0.290 mW/g;** Maximum value of SAR (measured) = 0.643 mW/g **(X=0.0419 m, Y=0.329 m, Z= -0.171 m)**

Distance between the peaks = 6.99 cm
SAR-to-peak location separation ratio = (1.28 + 0.62) / 6.99 = 0.272



WCDMA 1700 WIFI SAR-to-peak-location separation ratio

Appendix 3

SAR distribution plots for Body Worn Configuration

Date/Time: 9/26/2010 6:42:06 AM

Serial: 352795040045444; Slider: Closed; Procedure Notes: Pwr Step: 5; Battery Model #: SNN5819B; DEVICE POSITION: Back of Phone 15mm away from phantom

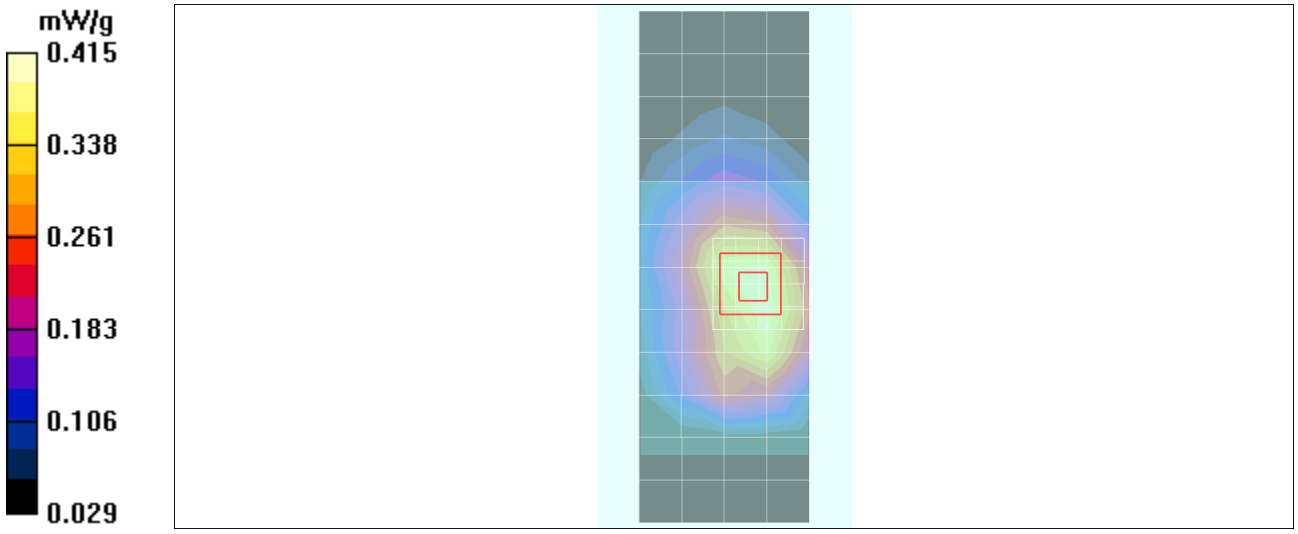
Communication System: GSM 850; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:8.3
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(5.86, 5.86, 5.86); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- 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) = 0.390 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.6 V/m; Power Drift = 0.080 dB
Peak SAR (extrapolated) = 0.543 W/kg
SAR(1 g) = 0.389 mW/g; SAR(10 g) = 0.266 mW/g
Maximum value of SAR (measured) = 0.415 mW/g



Date/Time: 9/26/2010 10:11:35 AM

Serial: 352795040045444; Slider: Closed; Procedure Notes: Pwr Step: 0; Battery Model #: SNN5819B; DEVICE POSITION: Back of the Phone 15mm away from phantom

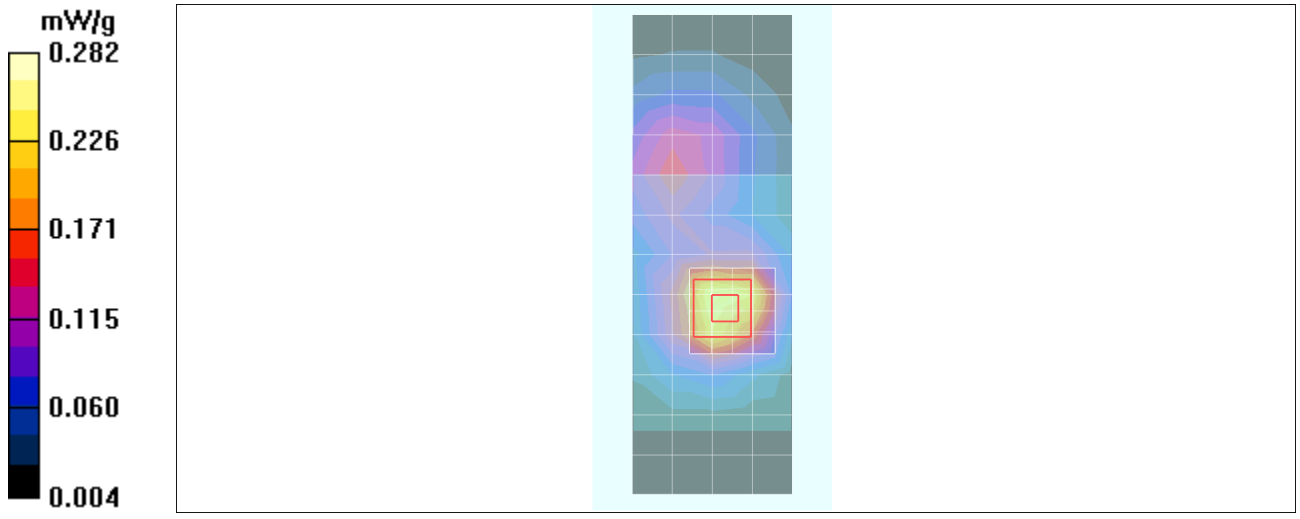
Communication System: GSM 1900; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:8.3
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 50.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.76, 4.76, 4.76); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Normal Body (15mm) (13x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.253 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.3 V/m; Power Drift = -0.029 dB
Peak SAR (extrapolated) = 0.430 W/kg
SAR(1 g) = 0.262 mW/g; SAR(10 g) = 0.152 mW/g
Maximum value of SAR (measured) = 0.282 mW/g



Date/Time: 9/26/2010 6:10:28 AM

Serial: 352795040045444; Slider: Closed; Procedure Notes: Pwr Step: ALL UP; Battery Model #: SNN5819B; DEVICE POSITION: Back of Phone 15mm away from Phantom

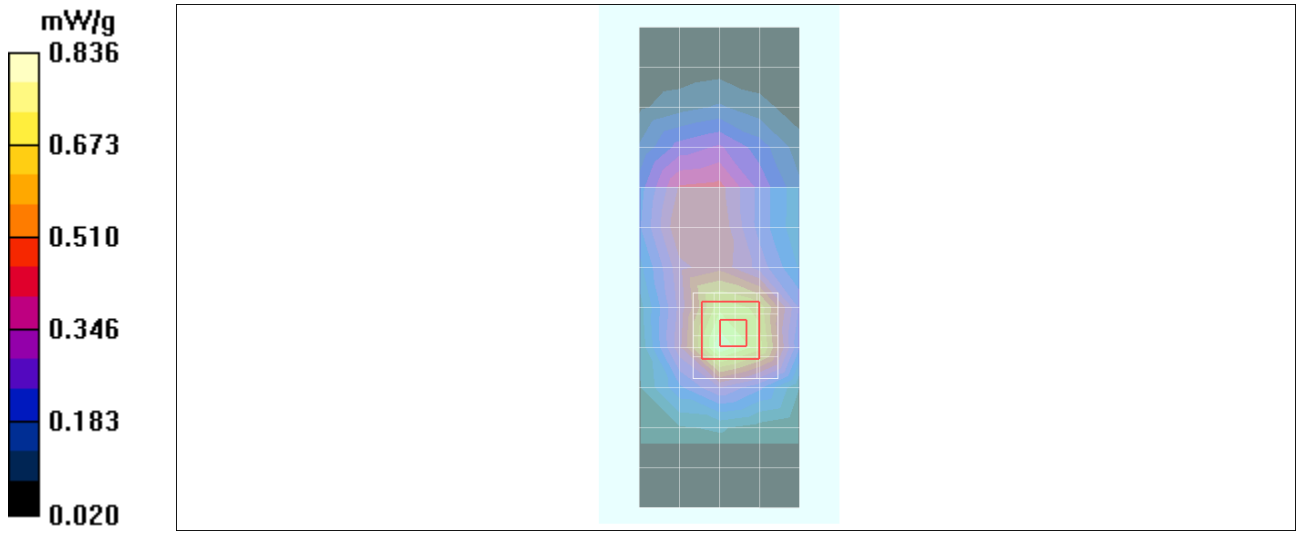
Communication System: 3G/WCDMA 1700; Frequency: 1732.5 MHz; Communication System Channel Number: 1413; Duty Cycle: 1:1
Medium: 1730 Glycol Body; Medium parameters used: f = 1730 MHz; σ = 1.51 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.76, 4.76, 4.76); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Normal Body (15mm) (13x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.776 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.6 V/m; Power Drift = -0.090 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.764 mW/g; SAR(10 g) = 0.453 mW/g
Maximum value of SAR (measured) = 0.836 mW/g



Body; Slider Closed; WCDMA 1700

Date/Time: 10/14/2010 12:51:00 PM

Serial: 352795040045451; Slider: Closed; Procedure Notes: Pwr Step: continuous; Battery Model #: SNN5819B; DEVICE POSITION: Back of Phone 15mm away from Phantom

Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Communication System Channel Number: 1; Duty Cycle: 1:1
Medium: 2450 Glycol Body; Medium parameters used: f = 2450 MHz; σ = 2.03 mho/m; ε_r = 50.1; ρ = 1000 kg/m^3

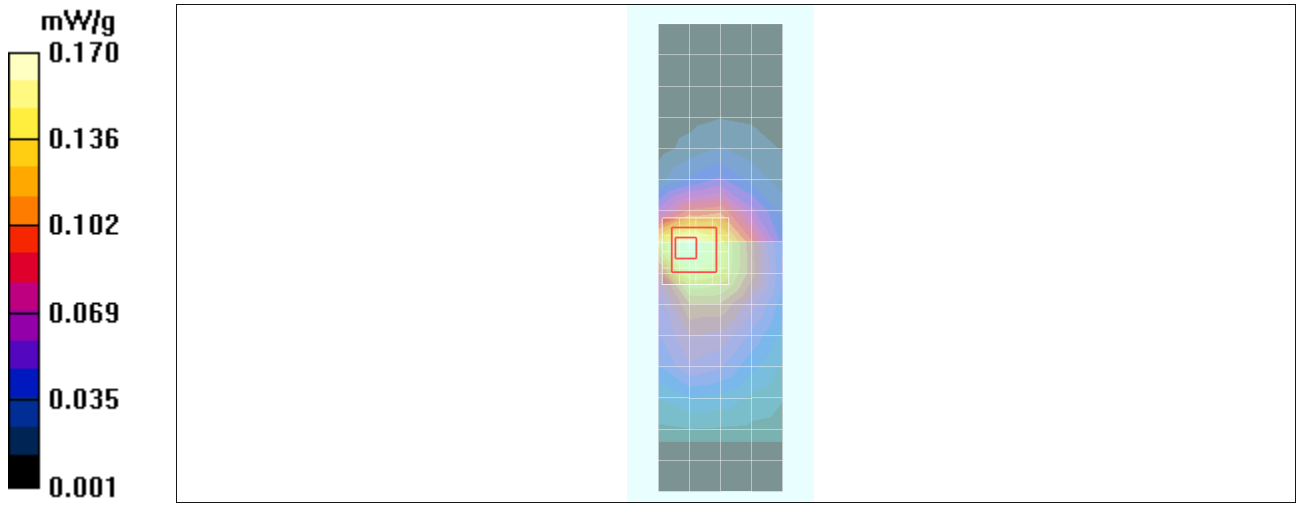
DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.19, 4.19, 4.19); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/20/2010
- 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 Extended Body (15mm) (16x7x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.164 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.23 V/m; Power Drift = 0.262 dB
Peak SAR (extrapolated) = 0.294 W/kg
SAR(1 g) = 0.159 mW/g; SAR(10 g) = 0.092 mW/g
Maximum value of SAR (measured) = 0.170 mW/g



Appendix 4

Probe Calibration Certificate

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

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

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

Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: ES3-3124_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

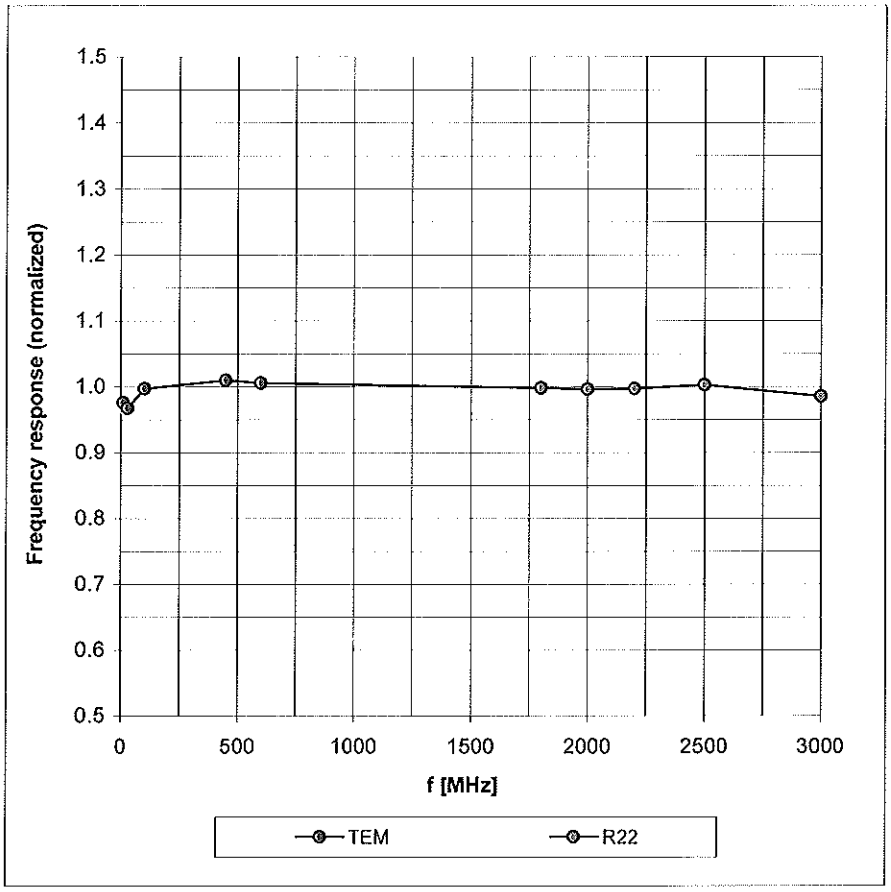
Calibration Parameter Determined in Body Tissue Simulating Media

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.

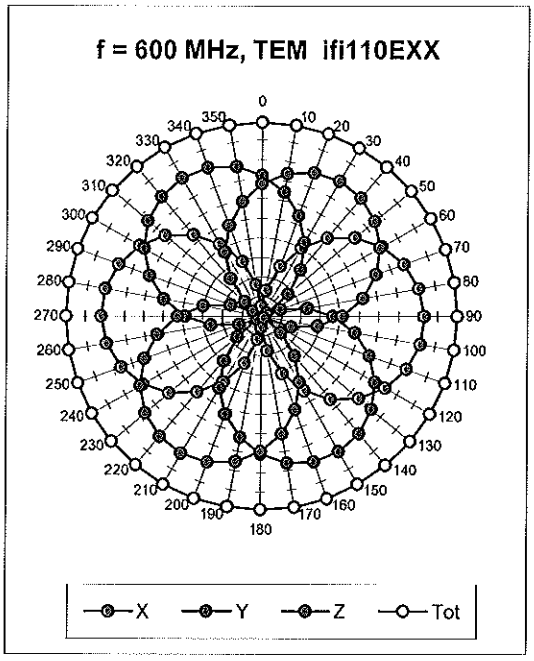
Frequency Response of E-Field

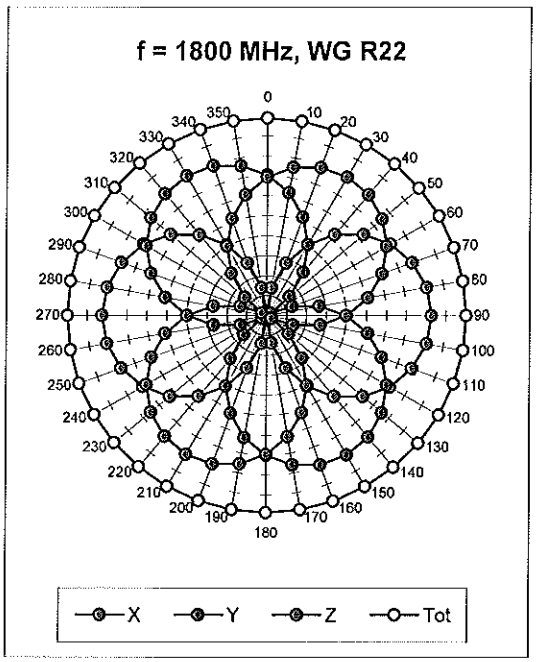
(TEM-Cell:ifi110 EXX, Waveguide: R22)

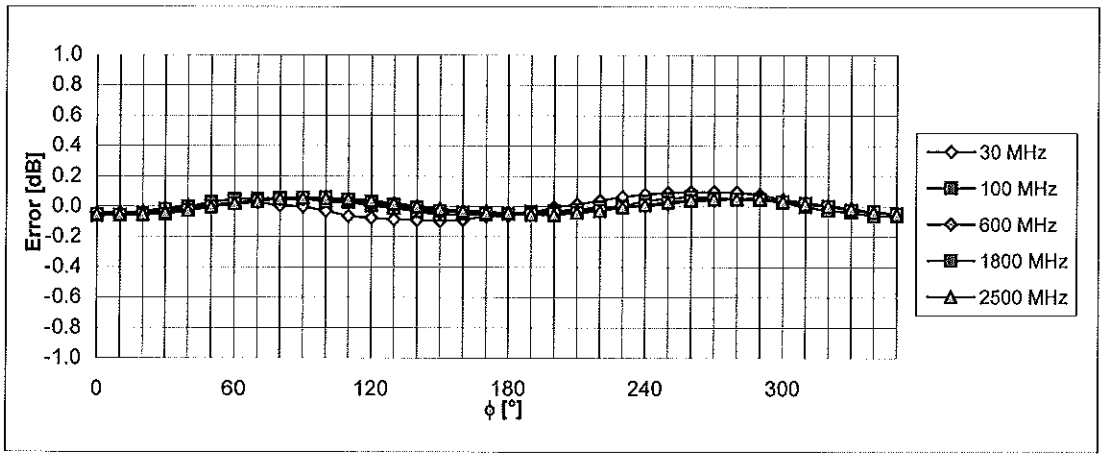


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



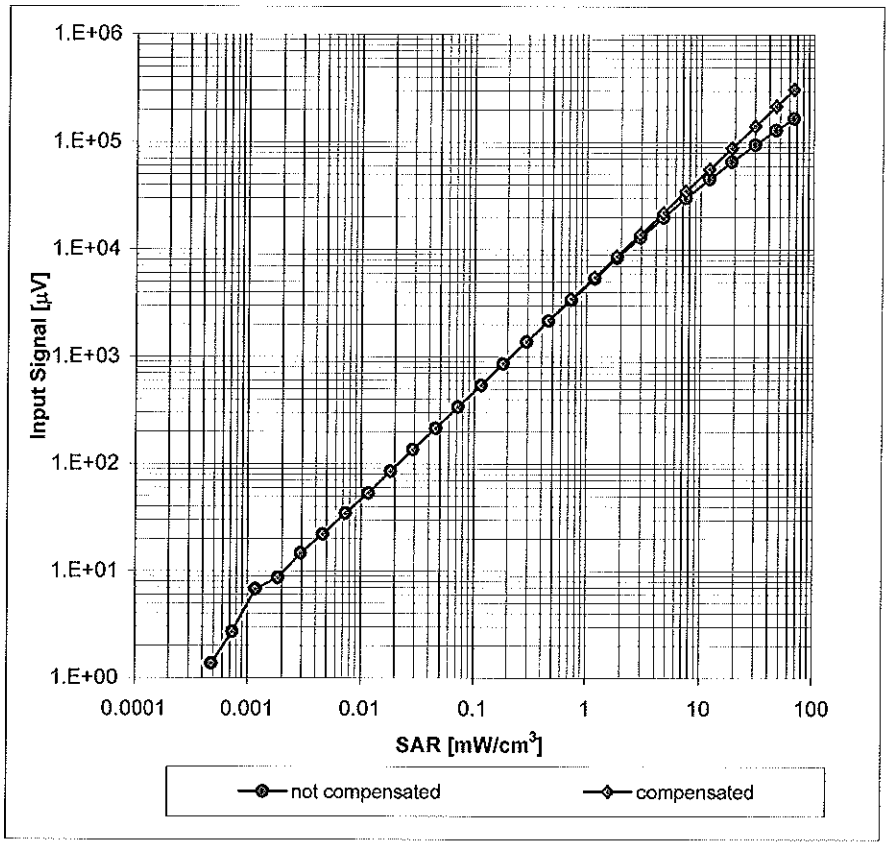


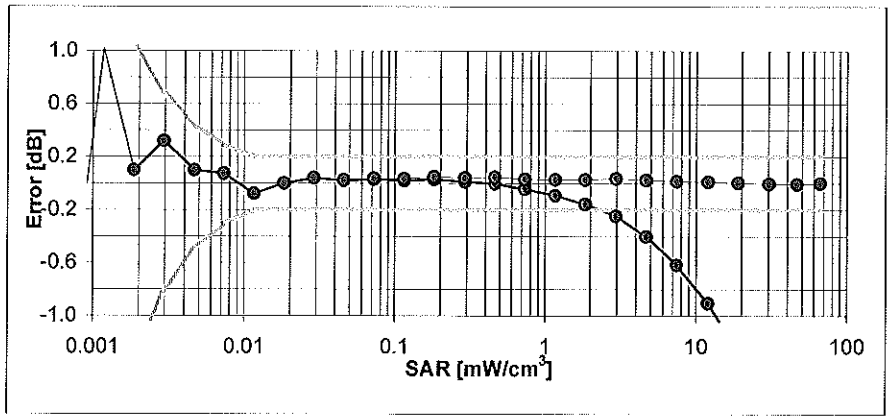


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

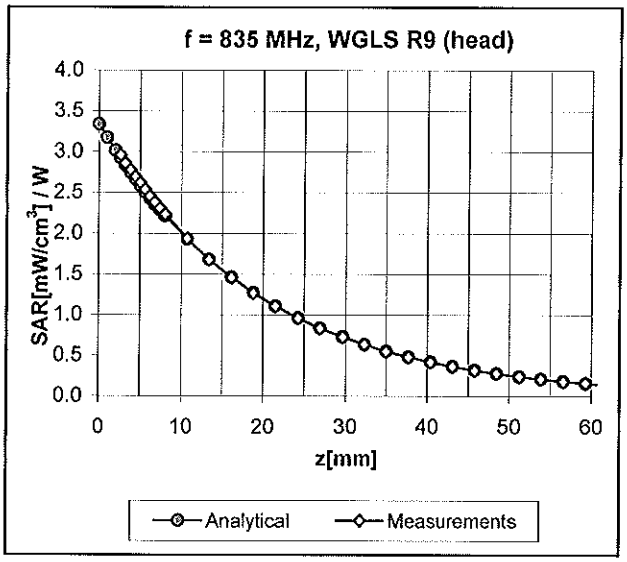
(Waveguide R22, f = 1800 MHz)

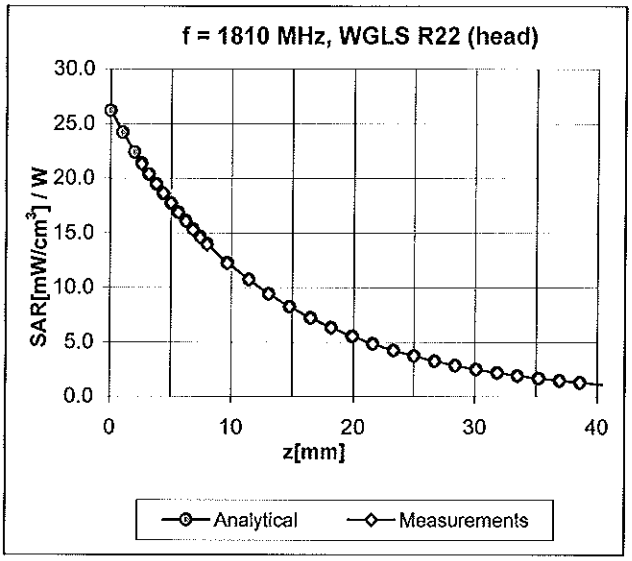




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

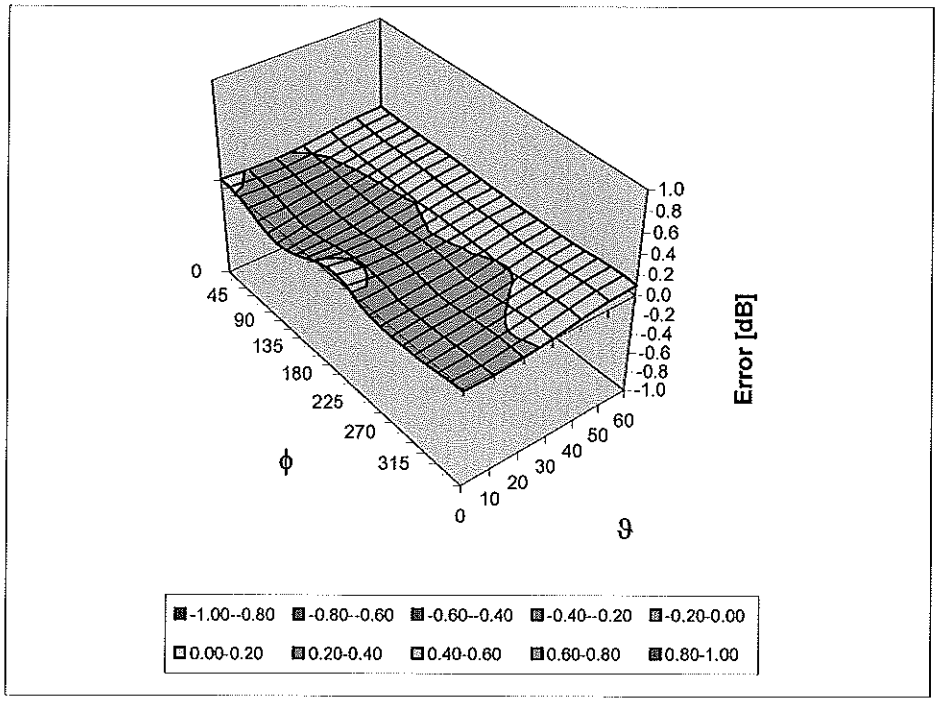
Conversion Factor Assessment





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 5

Measurement Uncertainty Budget

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

Appendix 6

Dipole Characterization Certificate

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 SPEAG Replacement

Certificate No: D835V2-4d003_Jun10

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d003
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	June 21, 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-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
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	02-Mar-10 (No. DAE4-601_Mar10)	Mar-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-09)	In house check: Oct-10

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

Issued: September 24, 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	41.2 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 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	2.37 mW / g
SAR normalized	normalized to 1W	9.48 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.54 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	**6.23 mW /g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.1 Ω - 3.9 jΩ
Return Loss	- 27.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.390 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	July 11, 2003

DASY5 Validation Report for Head TSL

Date/Time: 21.06.2010 10:59:08

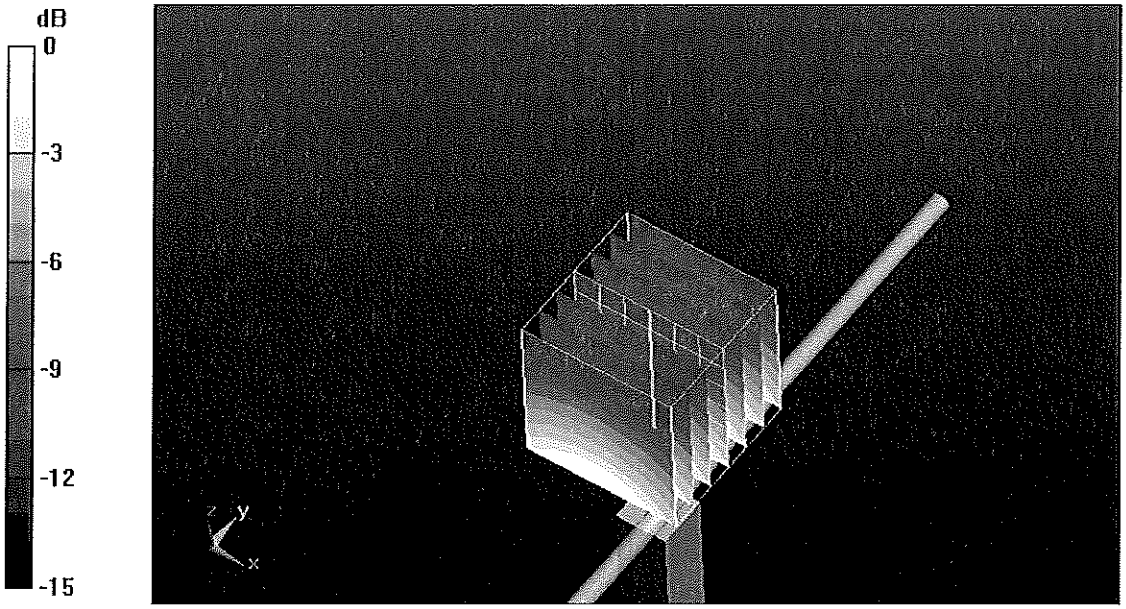
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d003

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL900
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

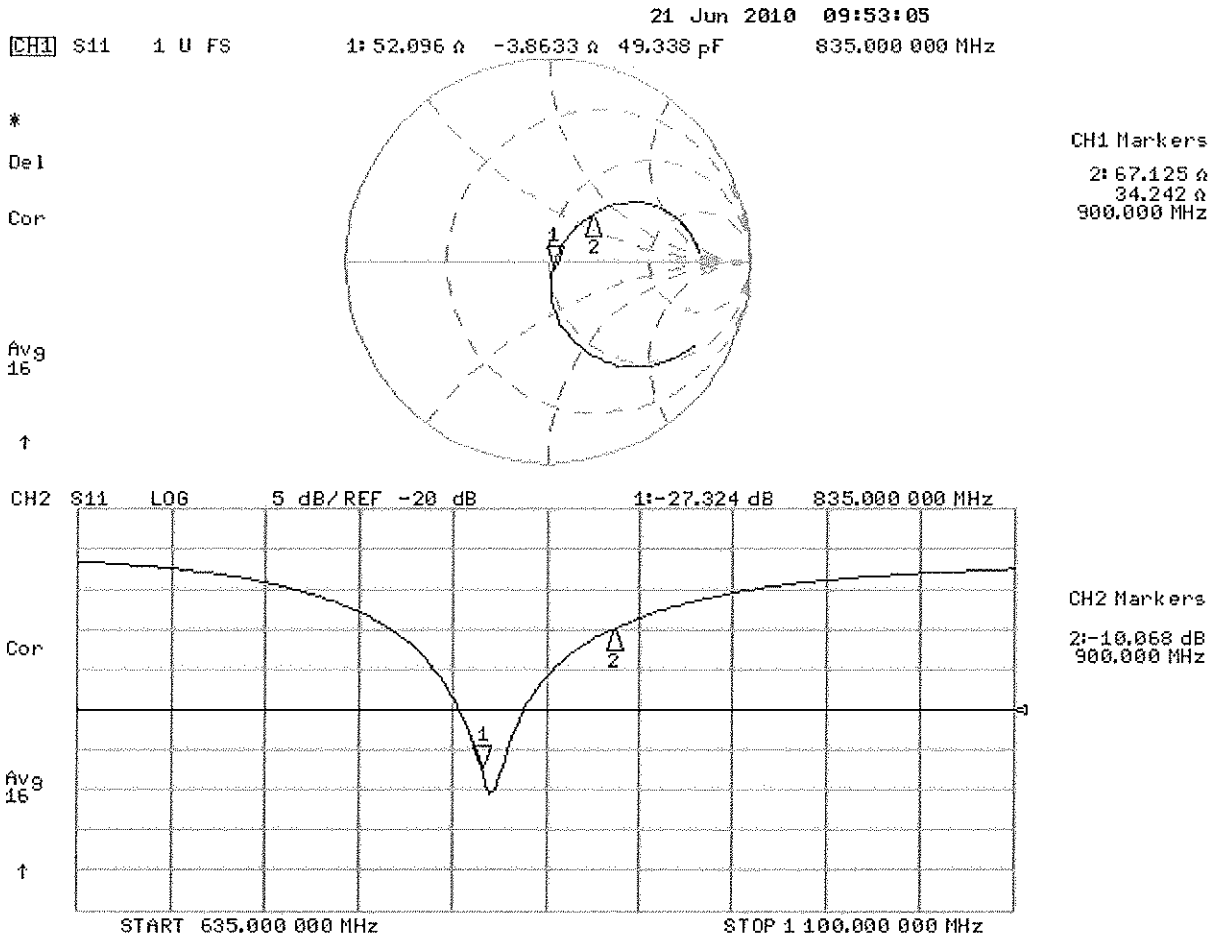
- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- 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 = 0.044 dB
Peak SAR (extrapolated) = 3.58 W/kg
SAR(1 g) = 2.37 mW/g; SAR(10 g) = 1.55 mW/g
Maximum value of SAR (measured) = 2.75 mW/g



0 dB = 2.75mW/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 SPEAG Replacement

Certificate No: D1800V2-2d160_Jun10

CALIBRATION CERTIFICATE

Object	D1800V2 - SN: 2d160
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	June 15, 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
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Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
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-09)	In house check: Oct-10

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

Issued: September 24, 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	1800 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.8 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature during test	(22.3 ± 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	9.57 mW / g
SAR normalized	normalized to 1W	38.3 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**38.5 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.04 mW / g
SAR normalized	normalized to 1W	20.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.2 mW /g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.6 Ω - 1.9 jΩ
Return Loss	- 32.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.214 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	November 30, 2007

DASY5 Validation Report for Head TSL

Date/Time: 14.06.2010 12:22:37

Test Laboratory: SPEAG, Zurich, Switzerland

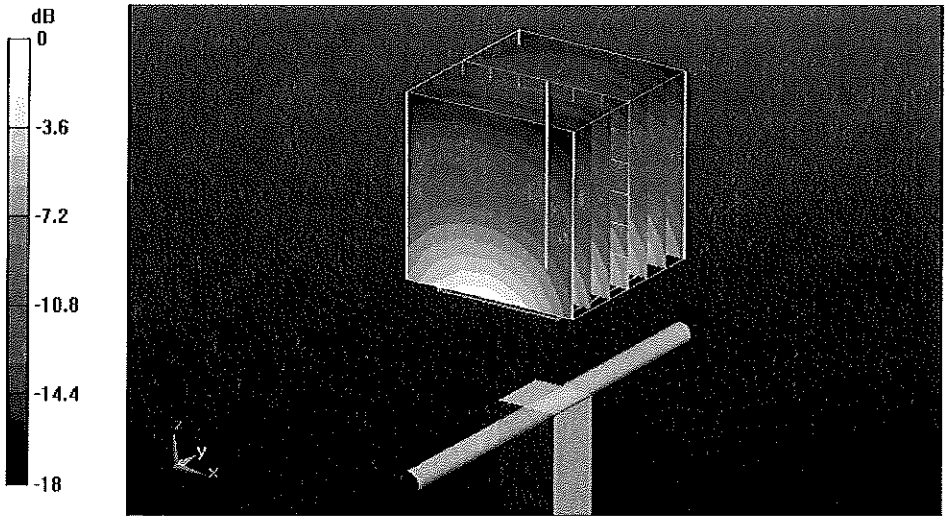
DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d160

Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: HSL U11 BB
Medium parameters used: f = 1800 MHz; σ = 1.38 mho/m; ε_r = 39.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

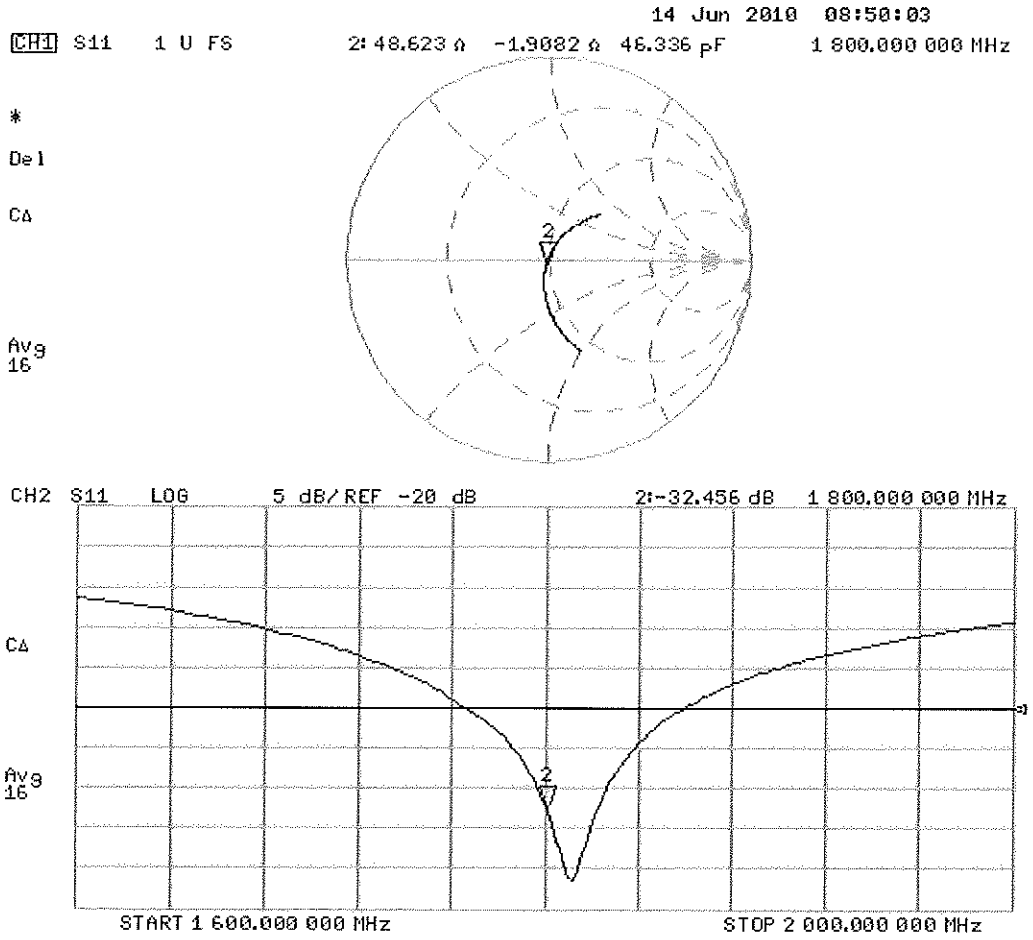
- Probe: ES3DV3 - SN3205; ConvF(5.05, 5.05, 5.05); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe) 2/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.3 V/m; Power Drift = 0.017 dB
Peak SAR (extrapolated) = 17.5 W/kg
SAR(1 g) = 9.57 mW/g; SAR(10 g) = 5.04 mW/g
Maximum value of SAR (measured) = 12 mW/g



0 dB = 12mW/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 **SPEAG Replacement** **Certificate No: D2450V2-808_Jun10**

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 808
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	June 17, 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-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
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-09)	In house check: Oct-10

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

Issued: September 24, 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	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	38.9 ± 6 %	1.78 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 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	13.1 mW / g
SAR normalized	normalized to 1W	52.4 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**52.6 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.12 mW / g
SAR normalized	normalized to 1W	24.5 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.5 mW /g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9 Ω + 3.1 jΩ
Return Loss	- 27.7 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	October 23, 2007

DASY5 Validation Report for Head TSL

Date/Time: 16.06.2010 12:00:26

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:808

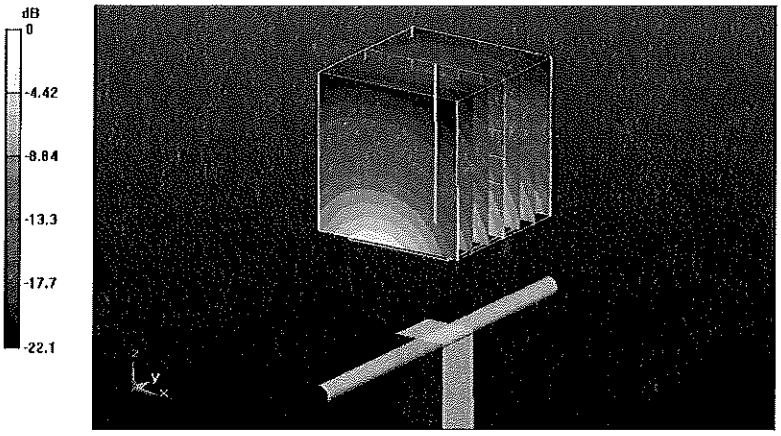
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL U11 BB
Medium parameters used: f = 2450 MHz; σ = 1.78 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

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)

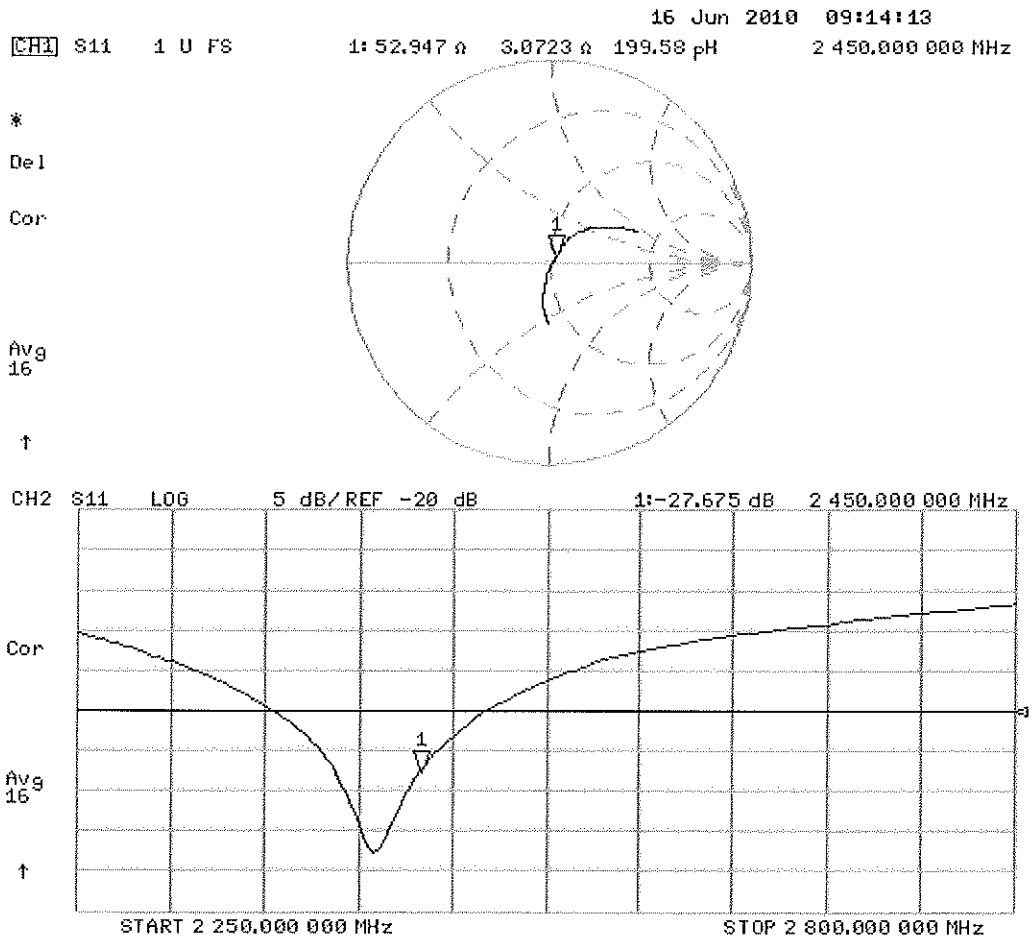
Head/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.9 V/m; Power Drift = 0.038 dB
Peak SAR (extrapolated) = 26.7 W/kg
SAR(1 g) = 13.1 mW/g; SAR(10 g) = 6.12 mW/g
Maximum value of SAR (measured) = 16.5 mW/g



0 dB = 16.5mW/g

Impedance Measurement Plot for Head TSL



Certification of System Performance Check Targets

FCD-1806, rev-1

-Historical Data-

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

-New System Performance Check Targets- per WI-0396

(based on analysis of historical data)

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

-Approvals-

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

Signed: Marge Kaunas

Comments: Data file available upon request.

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

Signed: Steven Hauswirth

Comments:

Certification of System Performance Check Targets

FCD-1806, rev-1

-Historical Data-

	1800 MHz	
Reference Target:	38.4	**(W/kg)**
Measurement Uncertainty (k=1):	9.0%	
Measurement Period:	*26March09 - 15Mar10*	
# of tests performed:	654	
Grand Average:	38.36	**(W/kg)**
% Delta (Average - Reference Target)	-0.1%	
Is % Delta <= Expanded Measurement Uncertainty (k=2)?	**Yes**	
Accept/Reject Average as new system performance check target?	**ACCEPT**	
	Applies to Dipole SN's: 246tr, 250tr, 251tr, 259tr, 263tr, 271tr, 272tr, 276tr, 277tr, 279tr, 280tr, 281tr, 283tr, 284tr, 2d128, 2d129	

-New System Performance Check Targets- per WI-0396

(based on analysis of historical data)

Frequency	SAR Target (W/kg)	Permittivity Target +/- %	Conductivity (S/m) Target +/- %
1800 MHz	**38.36**	40.0 +/- 5%	1.40 +/- 5%

-Approvals-

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

Signed: Marge Kaunas

Comments: Data file available upon request.

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

Signed: Steven Hauswirth

Comments:

END OF REPORT