MOTOROLA

Portable Hand-Held Device SAR Test Report

Tests Requested By:	Motorola Mobility, Inc. 600 N. US Highway 45 Libertyville, IL 60048
Test Report #:	24253-1F Rev. B
Date of Report:	Dec-30-2010, revised Feb-02-2011
Date of Test:	Nov-17-2010 to Dec-19-2010, Jan-19-2011 to Jan-20-2011
FCC ID #:	IHDP56LU1
Generic Name:	N/A
Test Laboratory:	Motorola Mobility, Inc. - Product Safety & Compliance Laboratory 600 N. US Highway 45 Libertyville, IL 60048
Report Author:	Thomas Knipple Senior RF Engineer

Accreditation:

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

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

2404

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

Statement of Compliance:

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

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

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1. Introduction

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

For ANSI / IEEE C95.1 (1 g), the final stand-alone SAR readings for this hand-held device are 1.34 W/kg for body-worn use. The final simultaneous-transmission SAR readings for this hand-held device are 1.32 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

800/1900 MHz Antenna

Type	Internal	
Location	Top-Right Rear of Device	
Dimensions	Width	17 mm
	Length	42 mm

Bluetooth/Wi-Fi 2 GHz / 5 GHz Antenna

Type	Internal	
Location	Top-Center Rear of Device	
Dimensions	Width	3 mm
	Length	10 mm

2.2 Device description

Serial Number(s) (Functional Use)	99000052000858 (CDMA conducted power measurements, CDMA SAR testing) 99000052000875 (Wi-Fi SAR testing, CDMA SAR testing) 99000052000852 (Wi-Fi/Bluetooth conducted power measurements)
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype
Device Category	Portable
RF Exposure Limits	General Population / Uncontrolled

Mode(s) of Operation	CDMA 800	CDMA 1900	EV-DO Rev. A 800	EV-DO Rev. A 1900	Wi-Fi 802.11b/g/n	Wi-Fi 802.11a/n	Bluetooth
Modulation Mode(s)	QPSK	QPSK	QPSK	QPSK	BPSK	BPSK	GFSK
Maximum Output Power Setting	25.0 dBm	25.0 dBm	25.0 dBm	25.0 dBm	20.0 dBm	9.0 dBm	10 dBm
Duty Cycle	1:1	1:1	1:1	1:1	1:1	1:1	1:1
Transmitting Frequency Range(s)	824.70 - 848.31 MHz	1851.20 - 1908.75 MHz	824.70 - 848.31 MHz	1851.20 - 1908.75 MHz	2412.0 - 2462.5 MHz	5180 - 5240, 5745 - 5805, MHz	2402.0 - 2483.5 MHz

The DUT utilizes a set of reduced limits for the maximum transmit power for specified device configurations and orientations, as described by the tables and plot below. A complete description of this functionality is provided in the "Operational Description" contained within Exhibit 12.

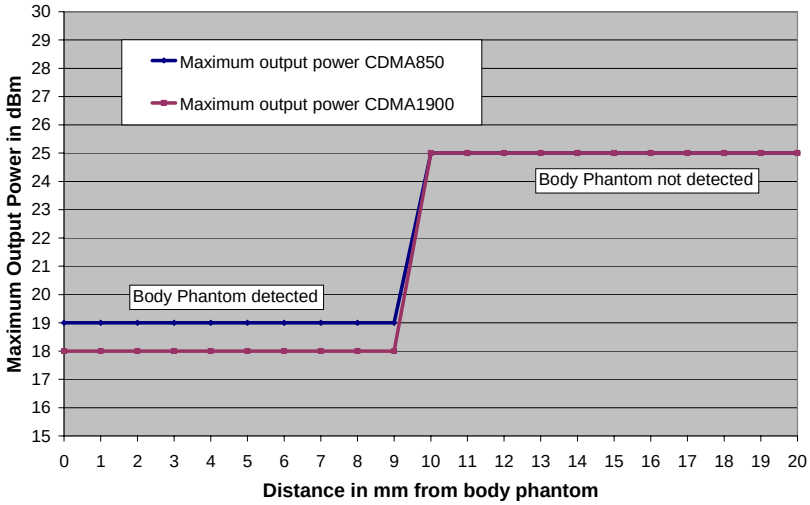
Mode(s) of Operation	CDMA 800	CDMA 1900	EV-DO Rev. A 800	EV-DO Rev. A 1900
Reduced Maximum Output Power Setting	19.0 dBm	18.0 dBm	19.0 dBm	18.0 dBm

Orientation\Mode Power Limit Activation	CDMA 800	CDMA 1900	EV-DO Rev. A 800	EV-DO Rev. A 1900
Landscape-1 (Bottom Edge down)	†	†	†	†
Landscape-2 (Top Edge down)	‡	‡	‡	‡
Portrait-1 (Right Edge down)	†	‡	†	‡
Portrait-2 (Left Edge down)	†	†	†	†

† Reduced maximum limit applied only by activation of proximity sensors.
‡ Reduced maximum limit applied by default.

Proximity Sensor Activation

Maximum Output Power vs. distance from the body phantom



2.3 Evaluation of CDMA modes

Per the "SAR Measurement Procedures for 3G Devices" (FCC KDB 941225) released in October, 2007, RC1, RC3 and RC3 (FCH + SCH) CDMA modes, EVDO Rev O, EVDO Rev A were considered. The conducted power measurements (per steps 3, 4 & 10 of section 4.4.5.2 of 3GPP2 C.5.011 / TIA -98-E) for each mode are shown in the table below.

Conducted power (dBm) for CDMA modes						
Band	Channel	RC1		RC3		RC3 (FCH + SCH)
		SO2	SO55	SO2	SO55	
CDMA 800	1013	25.18	25.27	25.23	25.24	Per Motorola designs the maximum power, when in a mode that allows supplemental channels, will always be less than the RC3/RC1 maximum conducted power limit.
	384	25.23	25.27	25.33	25.33	
	777	24.98	24.99	25.10	25.08	
CDMA 1900	25	25.02	25.06	25.10	25.07	
	600	25.07	25.16	25.17	25.15	
	1175	25.04	25.10	25.14	25.11	

Conducted power (dBm) for EVDO modes					
Band	Channel	Rev 0		Rev A	
		FTAP 307.2k	RTAP 153.6k	Subtest 2 FETAP	Subtest 2 RETAP
CDMA 800	1013	25.22	25.22	25.24	25.28
	384	25.49	25.27	25.41	25.36
	777	25.14	24.81	25.21	25.11
CDMA 1900	25	25.23	25.26	25.27	25.18
	600	25.35	25.26	25.31	25.33
	1175	25.22	25.21	25.24	25.25

2.4 Evaluation of Wi-Fi 802.11 modes

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

Band	Channel	Conducted Power (dBm) for 802.11b Mode Data Rates			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
Wi-Fi 2450 MHz	1	**16.83**	**17.38**	**17.60**	**17.67**
	6	**17.69**	**18.19**	**18.39**	**18.43**
	11	**17.45**	**18.12**	**18.19**	**18.38**

Band	Channel	Conducted Power (dBm) for 802.11g Mode Data Rates							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
Wi-Fi 2450 MHz	1	11.20	11.17	10.54	10.22	10.28	10.17	10.12	9.31
	6	17.26	17.25	17.21	16.95	14.60	14.76	14.59	14.65
	11	11.36	11.63	11.57	11.26	11.29	11.19	11.12	11.14

Band	Channel	Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 800 ns Guard Interval)							
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
Wi-Fi 2450 MHz	1	11.04	10.51	10.25	10.32	10.27	10.26	10.14	10.22
	6	15.54	15.44	15.10	13.57	13.81	13.55	13.59	12.10
	11	11.40	11.47	11.12	11.21	11.15	11.13	11.11	10.80

Band	Channel	Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 400 ns Guard Interval)							
		7.2 Mbps	14.4 Mbps	21.6 Mbps	28.8 Mbps	43.3 Mbps	57.7 Mbps	65 Mbps	72.2 Mbps
Wi-Fi 2450 MHz	1	10.65	10.49	10.22	10.25	10.36	10.32	10.18	10.15
	6	15.44	15.63	15.11	13.77	13.76	13.67	13.54	12.09
	11	11.40	11.25	10.98	11.05	11.12	10.92	10.95	10.90

Band	Channel	Conducted Power (dBm) for 802.11a Mode Data Rates							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
Wi-Fi 5210 MHz	36	7.81	7.97	8.00	7.79	7.72	7.74	7.66	7.60
	40	**8.49**	**8.76**	7.67	7.57	7.50	7.55	7.53	7.45
	44	7.78	7.86	7.74	7.55	7.51	7.56	7.50	7.51
	48	**8.93**	9.15	7.72	7.37	7.38	7.43	7.42	7.54
Wi-Fi 5775 MHz	149	8.27	8.29	8.21	8.17	8.15	8.21	8.19	8.26
	153	**8.60**	8.59	8.55	8.27	8.18	8.19	8.17	8.01
	157	8.64	8.65	8.62	8.24	8.41	8.27	8.21	8.30
	161	**8.77**	8.76	8.70	8.43	8.50	8.45	8.40	8.51

Band	Channel	Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 800 ns Guard Interval)							
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
Wi-Fi 5210 MHz	36	8.41	7.65	7.28	7.55	7.50	7.56	7.67	7.47
	40	8.00	8.10	7.75	7.63	7.59	7.85	7.74	7.70
	44	8.15	7.65	7.49	7.63	7.60	7.61	7.74	7.68
	48	8.26	8.26	8.07	8.03	8.06	8.05	8.04	7.73
Wi-Fi 5775 MHz	149	**8.78**	8.06	7.73	7.80	7.78	7.78	7.78	7.71
	153	7.93	8.07	7.70	7.72	7.90	7.68	7.66	7.68
	157	8.14	8.08	7.75	7.83	7.88	7.83	7.72	7.74
	161	8.21	8.29	7.92	8.14	8.01	7.96	7.87	7.85

Band	Channel	Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 400 ns Guard Interval)							
		7.2 Mbps	14.4 Mbps	21.6 Mbps	28.8 Mbps	43.3 Mbps	57.7 Mbps	65 Mbps	72.2 Mbps
Wi-Fi 5210 MHz	36	**8.36**	8.18	7.60	7.74	7.75	7.75	7.74	7.66
	40	7.93	7.95	7.85	7.92	7.90	7.77	7.80	7.79
	44	8.10	8.02	7.74	7.85	7.89	7.98	7.61	7.98
	48	**8.26**	8.18	7.94	8.01	8.02	7.75	7.68	7.64
Wi-Fi 5775 MHz	149	8.45	8.51	8.29	8.41	8.38	7.85	7.76	8.14
	153	**8.53**	8.33	8.35	7.61	7.83	7.86	7.76	7.68
	157	8.05	7.98	7.74	7.89	7.84	7.76	7.86	7.73
	161	**8.29**	8.06	7.85	7.98	7.90	8.02	7.90	7.79

2.5 Evaluation of Simultaneous Transmitters

Per "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas" (FCC KDB 648474) as referenced in FCC KDB 447498 D01, the necessity of stand-alone and simultaneous SAR testing was evaluated for the licensed and unlicensed transmitters of the device under test.

By device design the CDMA transmitter may operate simultaneously with either the Wi-Fi 802.11 transmitter or the Bluetooth transmitter. The separation distance between the Wi-Fi 802.11/Bluetooth antenna and the CDMA antenna is 4.2 cm. Pictorial representation of the antenna locations and separation distances are given in Exhibit 7d.

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

1. The highest output conducted power measured for Bluetooth on the device under test is 11.7 mW [≤ 12 mW]
2. The separation distance between the Bluetooth antenna and the main antenna is 4.2 cm [≥ 2.5 cm]

For the transmitters requiring stand-alone SAR testing (CDMA and Wi-Fi 802.11), the KDB guidelines direct that if the sum of the 1 g SAR measured for the simultaneously transmitting antennas is less than the SAR limit, SAR evaluation for simultaneous transmission is not required. Further, if the SAR-to-peak-location separation ratio for two simultaneously transmitting antennas is less than 0.3 then SAR evaluation for simultaneous transmission is likewise not required. Evaluations for the highest simultaneous SAR summations and separation ratios are presented in the table below, and plots of noted peak location separations are provided in Appendix 2.

Evaluation for Simultaneous SAR								
Configuration	**CDMA Mode**	**Wi-Fi Mode**	**CDMA Mode 1 g SAR Value (W/kg)**	**Wi-Fi Mode 1 g SAR Value (W/kg)**	**Summation 1 g SAR Value (W/kg)**	**SAR-to-peak-location Separation Ratio**	***Simultaneous Measurements Required?***	***Plot Page***
Back of DUT 0 mm from Phantom	CDMA 800	Wi-Fi 2450 802.11b, 11 Mbps	1.05	1.34	> 1.60	0.27	No	**63**
	CDMA 1900		1.01	1.34	> 1.60	0.26	No	**63**
	CDMA 800	Wi-Fi 5210 802.11a, 6 Mbps	1.05	0.49	1.54		No	
	CDMA 1900		1.01	0.49	1.50		No	
	CDMA 800	Wi-Fi 5785 802.11n, 7.2 Mbps	1.05	0.53	1.58		No	
	CDMA 1900		1.01	0.53	1.54		No	
Top Edge of DUT 0 mm from Phantom	CDMA 800	Wi-Fi 2450 802.11b, 1 Mbps	0.73	1.04	> 1.60	0.29	No	**64**
	CDMA 1900		1.26	1.04	> 1.60	0.28	No	**64**
	CDMA 800	Wi-Fi 5210 802.11a, 6 Mbps	0.73	1.25	> 1.60	0.33	**Yes**	
	CDMA 1900		1.26	1.25	> 1.60	0.31	**Yes**	
	CDMA 800	Wi-Fi 5785 802.11a, 6 Mbps	0.73	1.29	> 1.60	0.34	**Yes**	
	CDMA 1900		1.26	1.29	> 1.60	0.32	**Yes**	

For the configurations noted as requiring simultaneous SAR evaluation, combined SAR measurements were required to determine the aggregate 1 g SAR. The results of these measurements are given in the table below, with additional SAR plots of the combined measurements provided in Appendix 2.

Additional SAR measurements for simultaneous transmission evaluation were performed for each of the single transmitters using an extended zoom scan. This extended zoom scan was created to encompass the zoom scan volumes that were found previously in each of the stand-alone transmit SAR tests, and was used for all simultaneous transmission measurements. The outer dimensions of the extended zoom scan were X = 120 mm, Y = 36 mm, Z = 22 mm with a step size of X = 4 mm, Y = 4 mm, and Z using a graded step size with a ratio of 1.5 resulting in the following step increments: 2 mm, 2.8 mm, 3.9 mm, 5.5 mm, 7.7 mm. The step sizes and arrangement of measurement points were chosen to comply with the guidance provided in FCC KDB 865664.

The location of this extended zoom scan was established by using X, Y grid offsets from the "Grid Reference Point" in DASY4.7. The results were then combined via the DASY4.7 Multi-Band Combiner feature. A comparison can be performed between the stand-alone measurements for each noted transmitter and the measurements provided for simultaneous transmission. The measurements were not performed sequentially and thus may show slightly different results due to a number of reasons including, but not limited to, slight differences in DUT positioning.

The methods used for these additional SAR measurements for simultaneous transmission evaluation are approved per FCC consultation contained within KDB inquiry 403948.

Measurements for Simultaneous SAR							
Configuration	**CDMA Mode**	**Wi-Fi Mode**	**CDMA Mode 1 g SAR Value (W/kg)**	**Wi-Fi Mode 1 g SAR Value (W/kg)**	**Simultaneous 1 g SAR Value (W/kg)**	***Test Plots***	
						Grid	**Plot Page**
Top Edge of DUT 0 mm from Phantom	CDMA 800	Wi-Fi 5210 802.11a, 6 Mbps	**0.711**	**1.01**	**1.26**	**31x10x6**	**65-67**
	CDMA 1900		**1.23**	**1.01**	**1.32**	**31x10x6**	**68-70**
	CDMA 800	Wi-Fi 5785 802.11a, 6 Mbps	**0.711**	**0.992**	**1.25**	**31x10x6**	**71-73**
	CDMA 1900		**1.23**	**0.992**	**1.25**	**31x10x6**	**74-76**

3. Test Equipment Used

3.1 Dosimetric System

The Motorola Mobile Devices Business Product Safety & Compliance Laboratory utilizes a Dosimetric Assessment System (Dasy4™ v4.7) manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. All the SAR measurements are taken within a shielded enclosure. The overall 10 g RSS uncertainty of the measurement system is ±10.8% (K=1) with an expanded uncertainty of ±21.6% (K=2). The overall 1 g RSS uncertainty of the measurement system is ±11.1% (K=1) with an expanded uncertainty of ±22.2% (K=2). The measurement uncertainty budget is given in Appendix 5. Per IEEE 1528, this uncertainty budget is applicable to the SAR range of 0.4 W/kg to 10 W/kg.

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

Description	Serial Number	Cal Date	Cal Due Date
DASY4™ DAE V1	378	Feb-12-2010	Feb-12-2011
E-Field Probe ES3DV3	3124	Aug-11-2010	Aug-11-2011
DASY4™ DAE V1	376	Jul-13-2010	Jul-13-2011
E-Field Probe EX3DV4	3730	Jul-16-2010	Jul-16-2011
DASY4™ DAE V1	702	May-18-2010	May-18-2011
E-Field Probe ES3DV3	3183	Jul-14-2010	Jul-14-2011
S.A.M. Phantom used for 800/900 MHz	TP-1131		
S.A.M. Phantom used for 800/9001800/1900/2450 MHz	TP-1250		
S.A.M. Phantom used for 800/900/1800/1900 MHz	TP-1139		
S.A.M. Phantom used for 800/900/1800/1900 MHz	TP-1156		
S.A.M. Phantom used for 5210/5775 MHz	TP-1153		
S.A.M. Phantom used for 5210/5775 MHz	TP-1106		
Dipole Validation Kit, DV835V2	425TR	Oct-14-2010	Oct-14-2011
Dipole Validation Kit, DV835V2	424TR	Oct-14-2010	Oct-14-2011
Dipole Validation Kit, DV1800V2	279TR	Oct-13-2010	Oct-13-2011
Dipole Validation Kit, DV1800V2	263TR	Oct-13-2010	Oct-13-2011
Dipole Validation Kit, DV2450V2	766	Oct-13-2010	Oct-13-2011
Dipole Validation Kit, D5GHzV2	1088	Jul-14-2010	Jul-14-2011

3.2 Additional Equipment

Description	Serial Number	Cal Date	Cal Due Date
Signal Generator HP8648C	3847A04810	Oct-30-2009	Oct-30-2011
Power Meter E4419B	GB39511087	Dec-22-2009	Dec-22-2011
Power Sensor #1 - E9301A	US39211006	Oct-25-2010	Oct-25-2011
Power Sensor #2 - E9301A	US39210934	Oct-25-2010	Oct-25-2011
Signal Generator HP8648C	3429A00286	Nov-23-2009	Nov-23-2011
Power Meter E4419B	US39250622	Dec-22-2009	Dec-22-2011
Power Sensor #1 - E9301A	US39210931	Oct-25-2010	Oct-25-2011
Power Sensor #2 - E9301A	US39210932	Oct-25-2010	Oct-25-2011
Network Analyzer HP8753ES	US39172529	Jun-04-2001	Jun-04-2011
Dielectric Probe Kit HP85070C	US99360070		

4. Electrical parameters of the tissue simulating liquid

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

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

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Temp (°C)
835	**Body**	**Measured,** Nov-18-2010	55.0	0.99	19.8
		Measured, Dec-18-2010	54.6	0.99	20.1
		Measured, Jan-19-2011	55.2	0.98	18.8
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1880	**Body**	**Measured,** Nov-17-2010	51.9	1.59	18.8
		Measured, Dec-17-2010	50.7	1.59	19.7
		Measured, Jan-20-2011	52.9	1.59	18.5
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25
2450	**Body**	**Measured,** Nov-27-2010	50.4	1.96	20.3
		Measured, Nov-29-2010	50.1	1.92	19.2
		Recommended Limits	52.7 ±10%	1.95 ±5%	18-25
5210	**Body**	**Measured,** Dec-10-2010	45.2	5.72	19.1
		Measured, Dec-16-2010	45.8	5.71	19.8
		Measured, Dec-18-2010	45.7	5.67	19.9
		Recommended Limits	49.0 ±10%	5.31 ±5%	18-25
5785	**Body**	**Measured,** Dec-09-2010	44.4	6.54	19.3
		Measured, Dec-16-2010	44.6	6.54	19.8
		Measured, Dec-19-2010	44.5	6.49	19.9
		Recommended Limits	48.2 ±10%	5.98 ±5%	18-25

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

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

All 5.2 GHz and 5.8 GHz SAR testing for the body-worn configuration was performed using the MSL 3500/5800 tissue simulating liquid from Schmid & Partner Engineering AG. Prior to conducting SAR measurements, the relative permittivity, e_r, and the conductivity, s, of the liquid were measured. In many cases the conductivity of the purchased liquid was determined to be at the high end of the window from the target parameter. This resulted in the 5.2 GHz and 5.8 GHz System Accuracy Verifications measuring slightly above the 19.9% (k=2) window from the dipole validation target. When conductivity is normalized to the target value, the system accuracy verification is within the 19.9% (k=2) window. Because the system accuracy verifications were measured on the conservative side of the target window, all subsequent 5.2 GHz and 5.8 GHz SAR tests were also on the conservative side of the uncertainty window.

5. System Accuracy Verification

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

A SAR measurement was performed to verify the measured SAR was within ±10% from the target SAR indicated in Appendix 7. These frequencies are within ±10% of the compliance test mid-band frequency as required in [1] and [5]. The test was conducted on the same days as the measurement of the DUT. Recommended limits for permittivity and conductivity, specified in [5], are shown in the table below. The obtained results from the system accuracy verification are also displayed in the table below. SAR values are normalized to 1 W forward power delivered to the dipole. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. The distributions of SAR compare well with those of the reference measurements (see Appendix 1). For frequencies below 3 GHz, the simulated tissue depth was verified to be 15.0 cm ± 0.5 cm. For frequencies above 3 GHz, the simulated tissue depth was verified to be 10 cm ± 0.5 cm. Z-axis scans showing the SAR penetration are also included in Appendix 1.

f (MHz)	Description	SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			ε_r	σ (S/m)		
835	**Measured,** Nov-18-2010	9.70	40.8	0.90	20.1	20.2
	Measured, Dec-18-2010	9.75	41.9	0.91	20.2	20.3
	Measured, Jan-19-2011	9.50	42.9	0.92	19.9	19.1
	Recommended Limits	9.57	41.5 ±5%	0.90 ±5%	18-25	18-25
1800	**Measured,** Nov-17-2010	40.25	38.6	1.37	20.1	18.0
	Measured, Dec-17-2010	38.95	38.9	1.35	20.2	19.5
	Measured, Jan-20-2011	38.45	38.7	1.37	20.3	19.0
	Recommended Limits	37.8	40.0 ±5%	1.40 ±5%	18-25	18-25
2450	**Measured,** Nov-27-2010	56.0	37.3	1.84	20.0	20.6
	Measured, Nov-29-2010	54.5	37.3	1.80	20.2	19.2
	Recommended Limits	52.2	39.2 ±10%	1.80 ±5%	18-25	18-25
5200	**Measured,** Dec-10-2010	94.1	34.0	4.85	20.0	19.1
	Measured, Dec-16-2010	91.3	34.8	4.89	20.2	19.7
	Measured, Dec-18-2010	85.3	34.2	4.76	20.3	19.6
	Recommended Limits	82.4	36.0 ±10%	4.65 ±5%	18-25	18-25
5800	**Measured,** Dec-09-2010	89.7	33.3	5.53	20.2	19.6
	Measured, Dec-16-2010	95.8	33.6	5.57	20.2	19.7
	Measured, Dec-19-2010	94.5	33.1	5.43	20.3	20.2
	Recommended Limits	82.1	35.4 ±10%	5.27 ±5%	18-25	18-25

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3124	835	5.89	5 of 11
		1810	4.89	5 of 11
		2450	4.35	5 of 11
E-Field Probe ES3DV3	3183	835	6.11	5 of 11
		1810	5.05	5 of 11
E-Field Probe EX3DV4	3730	5200	4.67	5 of 11
		5800	4.06	5 of 11

6. Test Results

For CDMA modes, the test sample was operated using an actual transmission through a base station simulator. Wi-Fi testing was conducted using manufacturer test mode software, per guidance given in FCC KDB 248227. The base station simulator or test software was set up for the proper channels, transmitter power levels and transmit modes of operation.

The DUT was tested in the configurations stipulated in [1], [4] and [5], and per the guidance provided in FCC KDB 447498 D01. The DUT was positioned into these configurations using the device holder supplied with the DASY4™ SAR measurement system. The default settings for the "coarse" and "cube" scans were chosen and used for measurements. The grid spacing of the coarse scan was set to 15 mm or less as shown in the SAR plots included in Appendix 2. Please refer to the DASY4™ manual for additional information on SAR scanning procedures and algorithms used.

The portable hand-held device model covered by this report has an internal battery that is not replaceable by the end user. This battery was used to do all of the SAR testing. The battery was charged prior to each set of three tests.

6.1 Body Worn Test Results

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

The requisite test positions for the DUT were chosen per the guidance provided in FCC KDB 447498 D01. The DUT was tested with the back surface of the device facing the phantom with no separation for all transmitters requiring test. Additionally, the DUT was tested with the back surface of the device at 9 mm separation from the phantom, to capture compliance at the worst-case proximity sensor trigger point (i.e. the closest the DUT might come to a user without utilizing a set of reduced maximum power limits). The DUT was also tested along the edges of the device in which an antenna is located within 5 cm of that edge. Per the guidance, two of the DUT edges were excluded from testing as no antenna exists within 5 cm of those edges. Pictorial representation of the antenna locations and separation distances are given in Exhibit 7d. Additionally, the software within the DUT was set to invert the orientation results from the DUT's sensor. E.g., the DUT "top edge" facing up (away from the body) was operating instead at the "top edge" facing down (toward the body) performance levels. This inversion of the orientation ensures proper exposure conditions were measured for SAR testing of an edge using the standard DASY4 measurement setup.

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 2. All other test conditions measured lower SAR values than those included in Appendix 2.

The SAR measurements were performed using the SAM phantoms listed in section 3.1. Since the same phantoms and simulated tissue were used for the system accuracy verification and the device SAR measurements, the Z-axis scans included in Appendix 1 are applicable for verification of simulated tissue depth. The simulated tissue depth was verified to be 15.0 cm ± 0.5 cm for frequencies less than 3 GHz, or 10.0 cm ± 0.5 cm for frequencies greater than 3 GHz. The same device holder described in section 6 was used for positioning the DUT.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3124	835	5.86	6 of 11
		1810	4.76	6 of 11
		2450	4.19	6 of 11
E-Field Probe ES3DV3	3183	835	6.15	6 of 11
		1810	4.84	6 of 11
E-Field Probe EX3DV4	3730	5200	4.07	6 of 11
		5800	3.53	6 of 11

Body Worn, Back of DUT 0 mm from Phantom										
f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	**CDMA, RC3 SO55**	1013	19.8	0.018	0.480	0.48	0.884	0.88		
		384	**19.8**	**-0.064**	**0.550**	**0.56**	**1.03**	**1.05**	**5x5x7**	**49**
		777	19.8	-0.031	0.509	0.51	0.951	0.96		
1880	**CDMA, RC3 SO55**	25	19.2	0.172	0.382	0.38	0.764	0.76		
		600	19.0	0.077	0.425	0.43	0.888	0.89		
		1175	**19.1**	**-0.052**	**0.484**	**0.49**	**1.00**	**1.01**	**5x5x7**	**50**
2450	**802.11b, 1 Mbps**	1	20.0	0.186	0.470	0.47	1.17	1.17		
		6	20.0	-0.172	0.407	0.42	1.02	1.06		
		11	20.0	-0.098	0.344	0.35	0.895	0.92		
	802.11b, 2 Mbps	1	20.5	0.098	0.515	0.52	1.31	1.31		
		6	20.5	-0.033	0.413	0.42	1.05	1.06		
		11	20.3	-0.125	0.366	0.38	0.93	0.96		
	802.11b, 5.5 Mbps	1	20.5	0.046	0.497	0.50	1.26	1.26		
		6	20.3	-0.225	0.408	0.43	1.04	1.10		
		11	20.3	-0.094	0.356	0.36	0.913	0.93		
	802.11b, 11 Mbps	1	**19.5**	**-0.022**	**0.522**	**0.52**	**1.33**	**1.34**	**5x5x7**	**51**
		6	19.5	-0.151	0.429	0.44	1.08	1.12		
		11	19.5	0.301	0.384	0.38	1.00	1.00		
5210	**802.11a, 6 Mbps**	36	18.5	-0.207	0.117	0.12	0.351	0.37		
		40	18.5	-0.211	0.136	0.14	0.412	0.43		
		44	18.2	-0.203	0.135	0.14	0.412	0.43		
		48	**18.2**	**-0.344**	**0.148**	**0.16**	**0.449**	**0.49**	**7x7x6**	**52**
	802.11a, 9 Mbps	40	19.0	-0.260	0.136	0.14	0.418	0.44		
	802.11n, 7.2 Mbps	36	19.3	-0.174	0.069	0.07	0.266	0.28		
		48	19.3	-0.041	0.106	0.11	0.334	0.34		
5785	**802.11a, 6 Mbps**	153	18.2	-0.198	0.114	0.12	0.421	0.44		
		161	18.2	-0.255	0.118	0.13	0.445	0.47		
	802.11n, 7.2 Mbps	153	**18.5**	**-0.444**	**0.128**	**0.14**	**0.479**	**0.53**	**7x7x6**	**53**
		161	19.4	-0.354	0.103	0.11	0.441	0.48		
	802.11n, 6.5 Mbps	149	18.4	-0.050	0.132	0.13	0.471	0.48		

Table 1: 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 DUT 9 mm from Phantom										
f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	**CDMA, RC3 SO55**	1013								
		384	**19.2**	**-0.284**	**0.508**	**0.54**	**0.771**	**0.82**	**5x5x7**	**54**
		777								
1880	**CDMA, RC3 SO55**	25								
		600	**18.9**	**-0.002**	**0.442**	**0.44**	**0.751**	**0.75**	**5x5x7**	**55**
		1175								

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

Body Worn, Top Edge of DUT 0 mm from Phantom										
f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	**CDMA, RC3 SO55**	1013								
		384	**19.8**	**-0.106**	**0.336**	**0.34**	**0.716**	**0.73**	**5x5x7**	**56**
		777								
1880	**CDMA, RC3 SO55**	25	19.0	0.097	0.486	0.49	1.09	1.09		
		600	19.2	0.116	0.528	0.53	1.19	1.19		
		1175	**19.2**	**0.045**	**0.558**	**0.56**	**1.26**	**1.26**	**5x5x7**	**57**
	EV-DO Rev. 0, FTAP 307.2K	1175	18.9	0.393	0.215	0.22	0.457	0.46		
2450	**802.11b, 1 Mbps**	1								
		6	**20.0**	**0.267**	**0.394**	**0.39**	**1.04**	**1.04**	**5x5x7**	**58**
		11								
5210	**802.11a, 6 Mbps**	36	18.6	0.386	0.231	0.23	0.966	0.97		
		40	19.7	0.210	0.259	0.26	1.04	1.04		
		44	**18.6**	**0.080**	**0.318**	**0.32**	**1.25**	**1.25**	**7x7x6**	**59**
		48	19.6	0.142	0.264	0.26	1.09	1.09		
	802.11a, 9 Mbps	40	19.3	0.206	0.283	0.28	1.11	1.11		
	802.11n, 7.2 Mbps	36	18.5	-0.440	0.222	0.25	0.926	1.02		
		48	18.2	-0.033	0.198	0.20	0.811	0.82		
5785	**802.11a, 6 Mbps**	153	18.7	0.145	0.289	0.29	1.04	1.04		
		161	**18.2**	**-0.880**	**0.299**	**0.37**	**1.05**	**1.29**	**7x7x6**	**60**
	802.11n, 7.2 Mbps	153	19.3	0.045	0.258	0.26	0.926	0.93		
		161	19.3	-0.744	0.283	0.34	0.975	1.16		
	802.11n, 6.5 Mbps	149	18.5	0.307	0.286	0.29	1.04	1.04		

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

Body Worn, Right Edge of DUT 0 mm from Phantom										
f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	*10 g SAR value*		*1 g SAR value*		*Test Plot*	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	**CDMA, RC3 SO55**	1013								
		384	**19.8**	**-0.051**	**0.113**	**0.11**	**0.201**	**0.20**	**5x5x7**	**61**
		777								
1880	**CDMA, RC3 SO55**	25								
		600	**19.0**	**-0.019**	**0.302**	**0.30**	**0.648**	**0.65**	**5x5x7**	**62**
		1175								

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

References

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

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

[3] ANSI / IEEE, C95.1 1992 Edition “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”

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

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

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

Appendix 1

SAR distribution comparison for the system accuracy verification

Date/Time: 11/18/2010 8:23:27 AM

Test Laboratory: Motorola - Nov-18-2010 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 425TR; FCC ID: IHDP56LU1
Procedure Notes: 835MHz System Performance Check; Dipole Sn# 425TR; Input Power = 200 mW
Sim.Temp@meas = 20.2□C; Sim.Temp@SPC = 20.2□C; Room Temp @ SPC = 20.1□C
Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3

DASY4 Configuration:

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

Daily SPC Check/Dipole Area Scan (4x9x1):

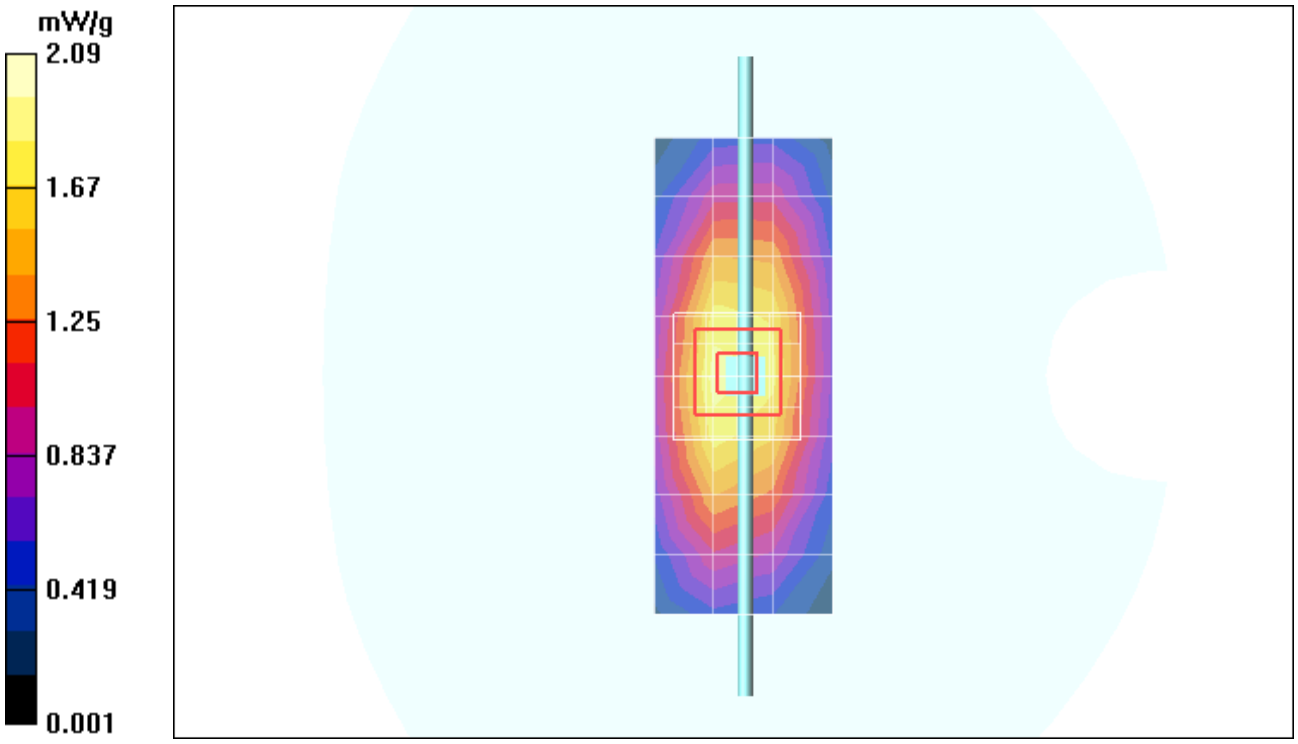
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.89 mW/g

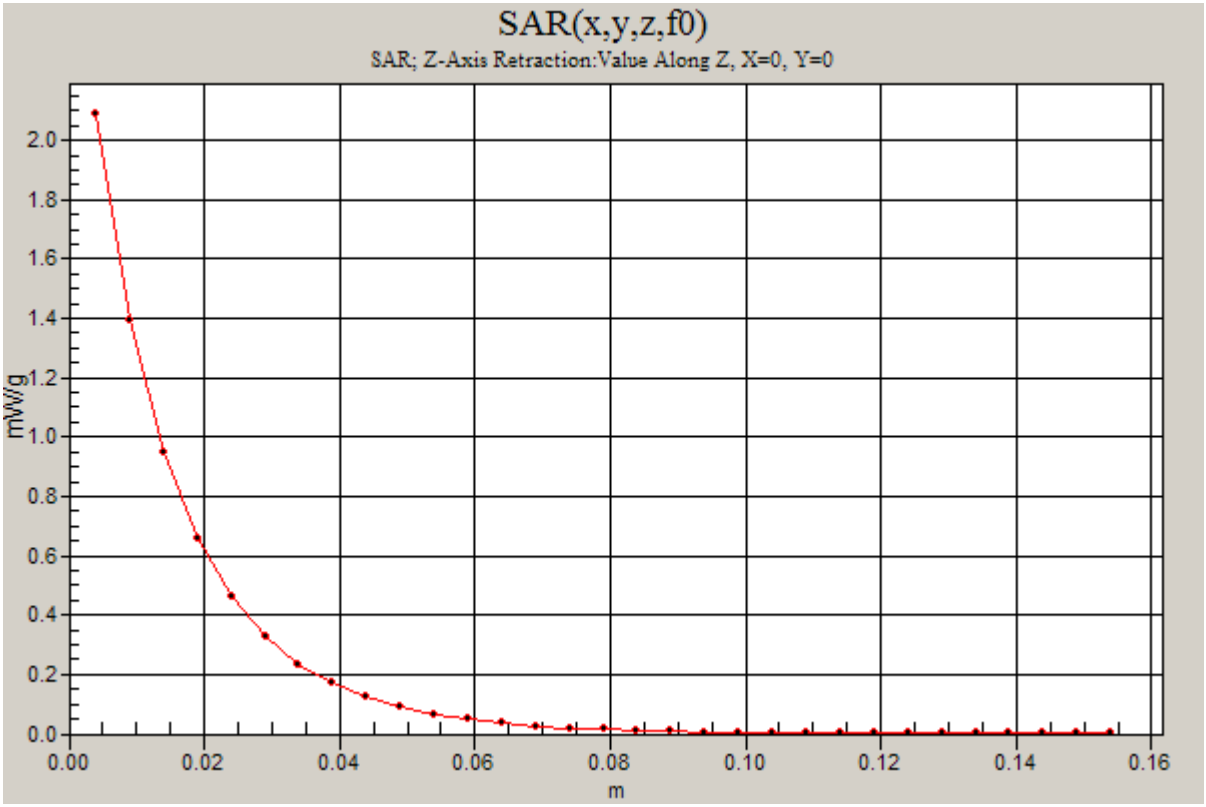
Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.7 V/m; Power Drift = -0.009 dB; Peak SAR (extrapolated) = 2.91 W/kg
SAR(1 g) = 1.94 mW/g; SAR(10 g) = 1.26 mW/g; Maximum value of SAR (measured) = 2.09 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm


mW/g
2.09
1.67
1.25
0.837
0.419
0.001


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

Date/Time: 12/18/2010 12:30:27 PM

Test Laboratory: Motorola - Dec-18-2010 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 425TR; FCC ID: IHDP56LU1
Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 425TR; Input Power = 200 mW
Sim.Temp@meas = 20.1□C; Sim.Temp@SPC = 20.3□C; Room Temp @ SPC = 20.2□C
Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.9; ρ = 1000 kg/m^3

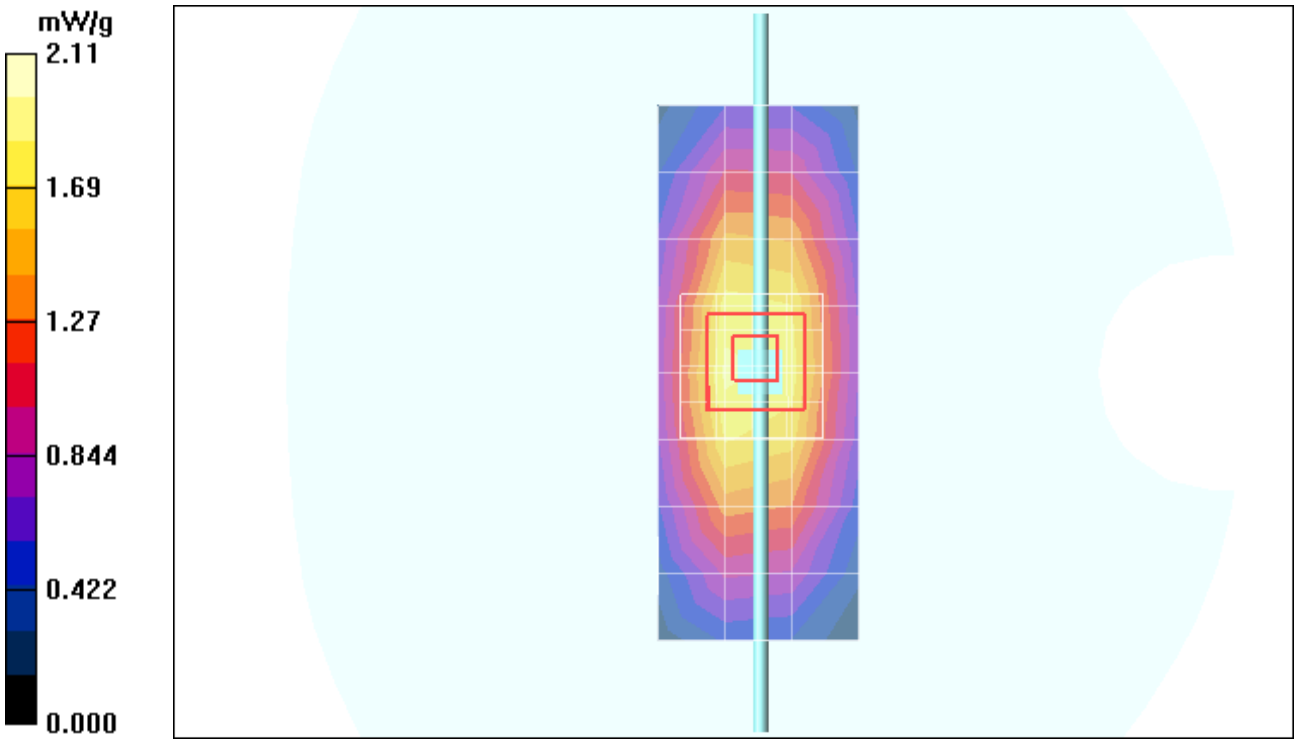
DASY4 Configuration:

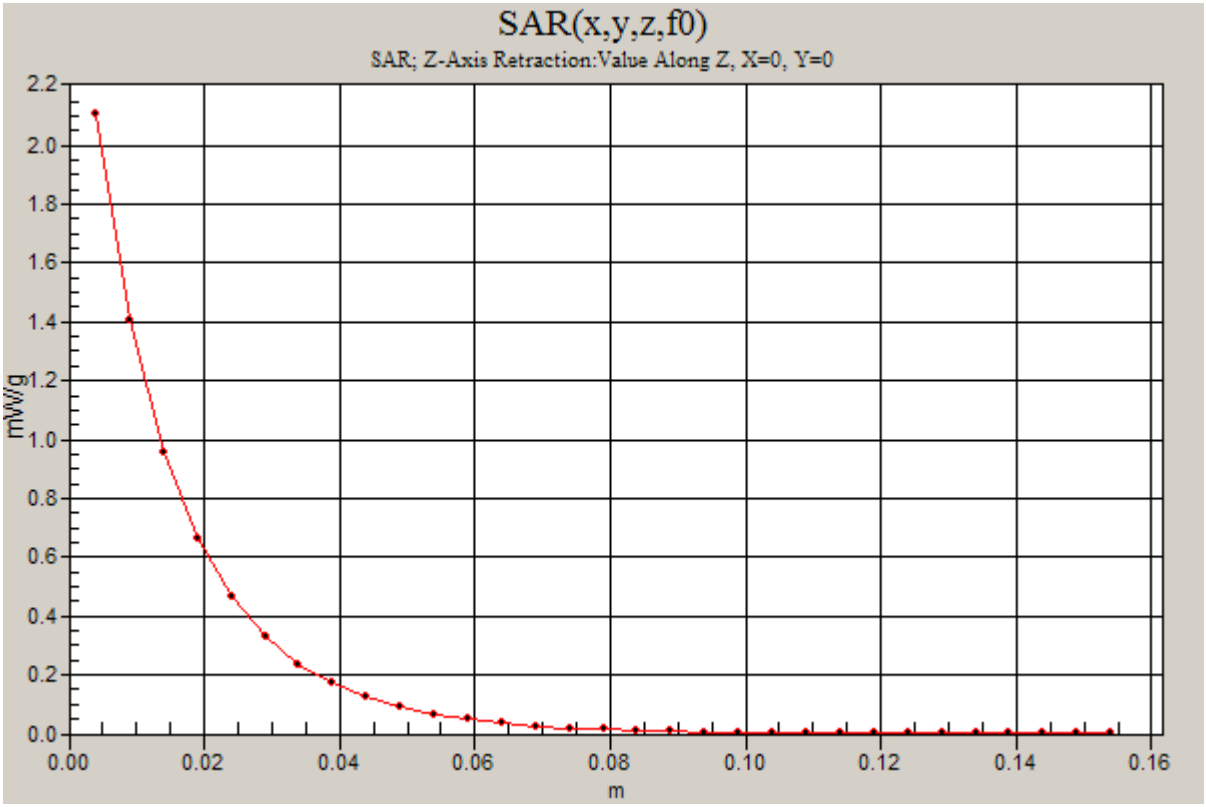
- Probe: ES3DV3 - SN3124; ConvF(5.89, 5.89, 5.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build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

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

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.5 V/m; Power Drift = -0.007 dB; Peak SAR (extrapolated) = 2.92 W/kg
SAR(1 g) = 1.95 mW/g; SAR(10 g) = 1.27 mW/g; Maximum value of SAR (measured) = 2.10 mW/g

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


mW/g
2.11
1.69
1.27
0.844
0.422
0.000


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

Date/Time: 1/19/2011 8:18:52 AM

Test Laboratory: Motorola - Jan-19-2011 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 424TR; FCC ID: IHDP56LU1
Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 424TR; Input Power = 200 mW
Sim.Temp@meas = 19.1*C; Sim.Temp@SPC = 19.1*C; Room Temp @ SPC = 19.9*C
Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 835 MHz; σ = 0.92 mho/m; ε_r = 42.9; ρ = 1000 kg/m^3

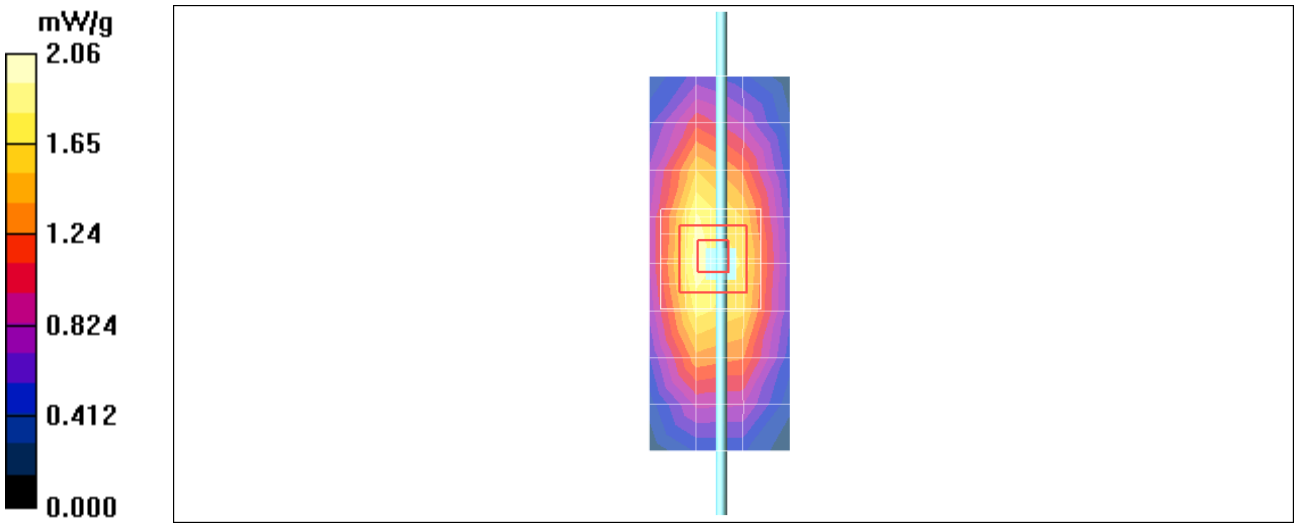
DASY4 Configuration:

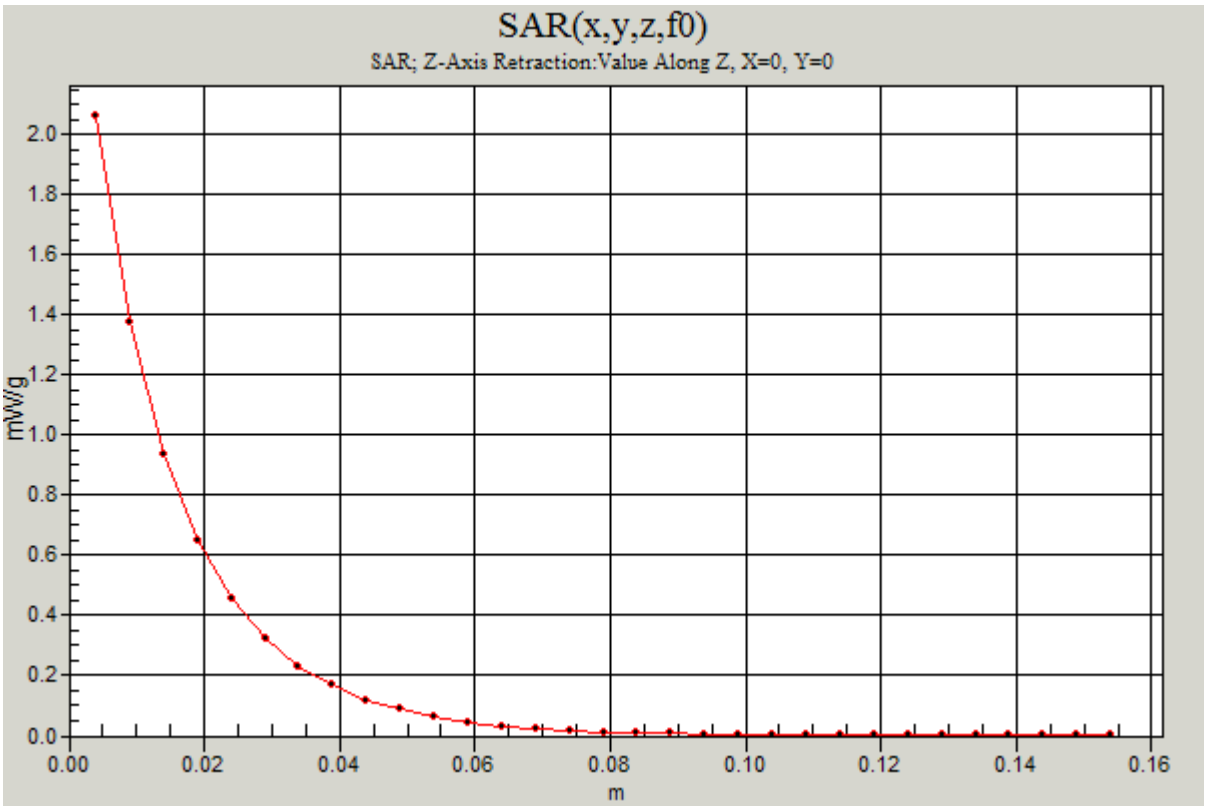
- Probe: ES3DV3 - SN3183; ConvF(6.11, 6.11, 6.11); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1156;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.88 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.4 V/m; Power Drift = -0.025 dB; Peak SAR (extrapolated) = 2.84 W/kg
SAR(1 g) = 1.9 mW/g; SAR(10 g) = 1.23 mW/g; Maximum value of SAR (measured) = 2.04 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.06 mW/g


mW/g
2.06
1.65
1.24
0.824
0.412
0.000


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

Date/Time: 11/17/2010 7:17:59 AM

Test Laboratory: Motorola - Nov-17-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 279TR; FCC ID: IHDP56LU1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 279TR; Input Power = 200 mW
Sim.Temp@meas = 18.0□C; Sim.Temp@SPC = 18.0□C; Room Temp @ SPC = 20.1□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 = 38.6; 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: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1):

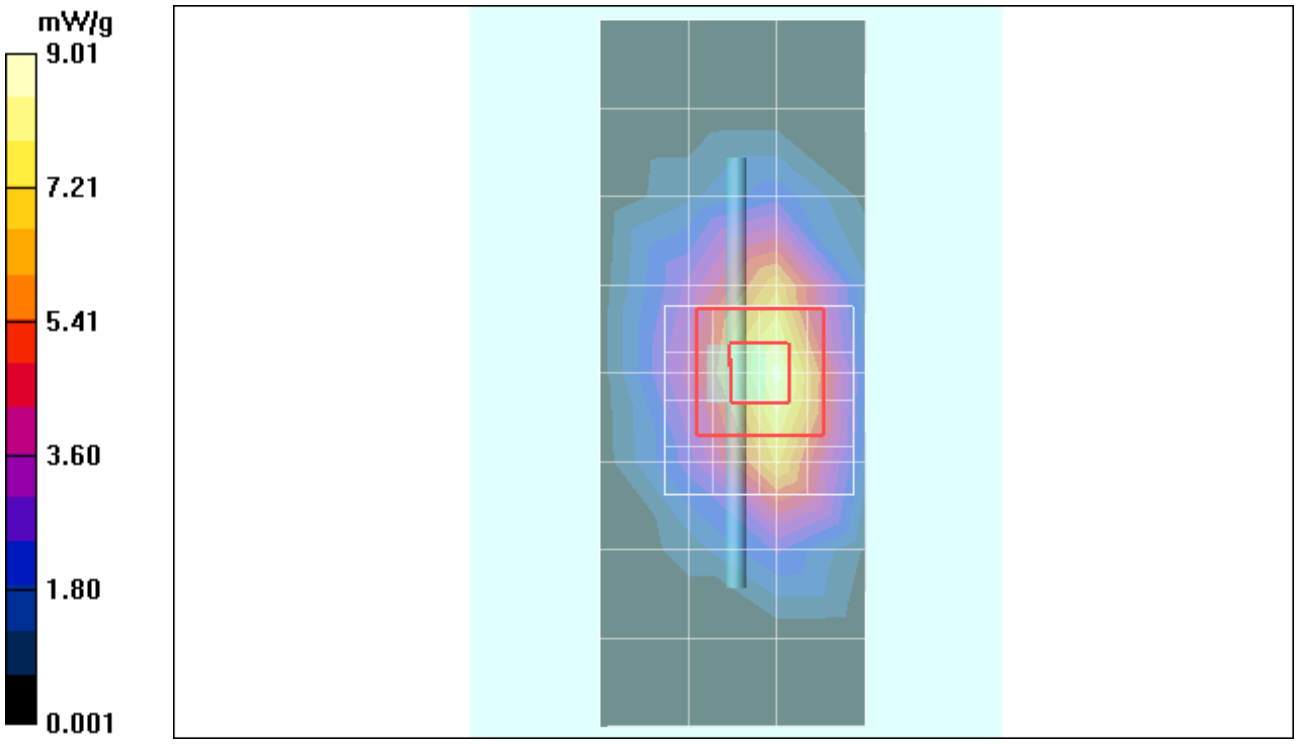
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 8.73 mW/g

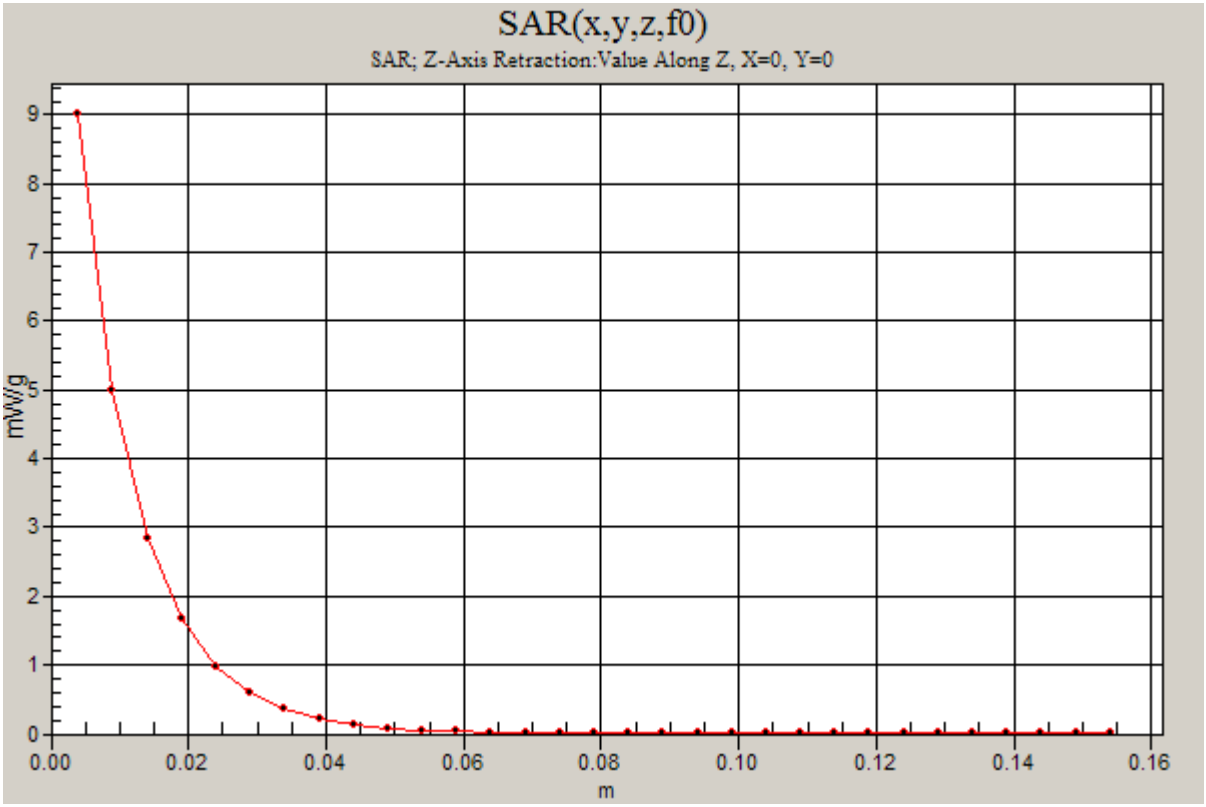
Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.9 V/m; Power Drift = -0.027 dB; Peak SAR (extrapolated) = 14.8 W/kg
SAR(1 g) = 8.05 mW/g; SAR(10 g) = 4.24 mW/g; Maximum value of SAR (measured) = 8.91 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 9.01 mW/g


mW/g
9.01
7.21
5.41
3.60
1.80
0.001


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

Date/Time: 12/17/2010 7:14:33 AM

Test Laboratory: Motorola - Dec-17-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 279TR; FCC ID: IHDP56LU1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 279TR; Input Power = 200 mW
Sim.Temp@meas = 19.5□C; Sim.Temp@SPC = 19.5□C; Room Temp @ SPC = 20.2□C
Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 1800 MHz; σ = 1.35 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3

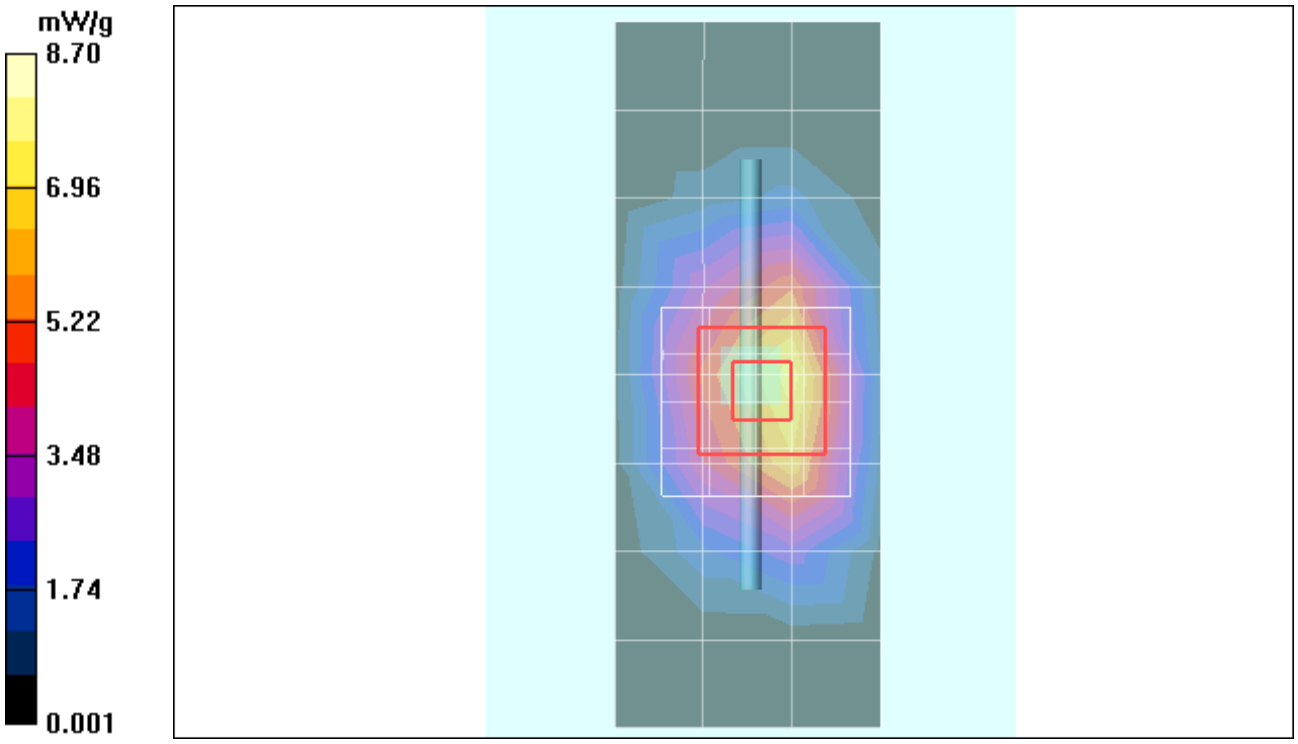
DASY4 Configuration:

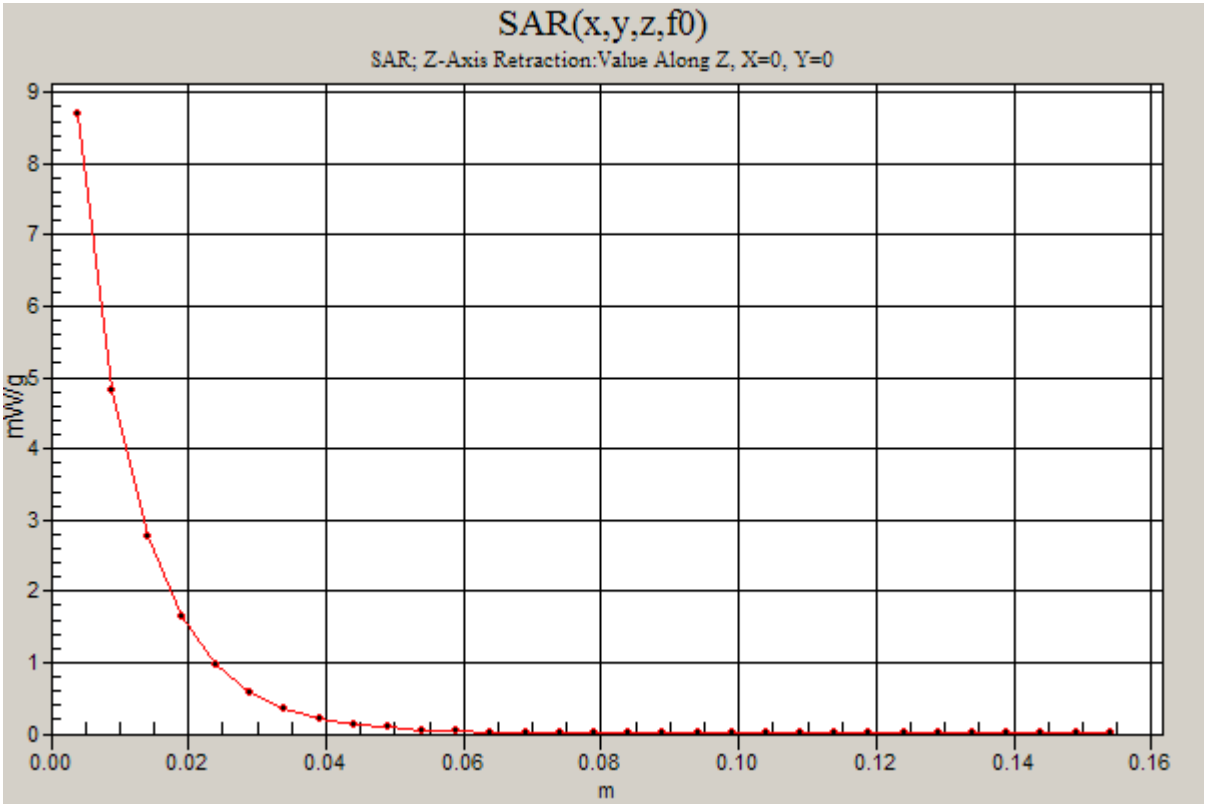
- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.36 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 = -0.032 dB; Peak SAR (extrapolated) = 14.2 W/kg
SAR(1 g) = 7.79 mW/g; SAR(10 g) = 4.12 mW/g; Maximum value of SAR (measured) = 8.65 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.70 mW/g


mW/g
8.70
6.96
5.22
3.48
1.74
0.001


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: 1/20/2011 6:48:30 AM

Test Laboratory: Motorola - Jan-20-2011 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 263TR; FCC ID: IHDP56LU1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 263TR; Input Power = 200 mW
Sim.Temp@meas = 19.0□C; Sim.Temp@SPC = 19.0□C; Room Temp @ SPC = 20.3□C
Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 1800 MHz; σ = 1.37 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3

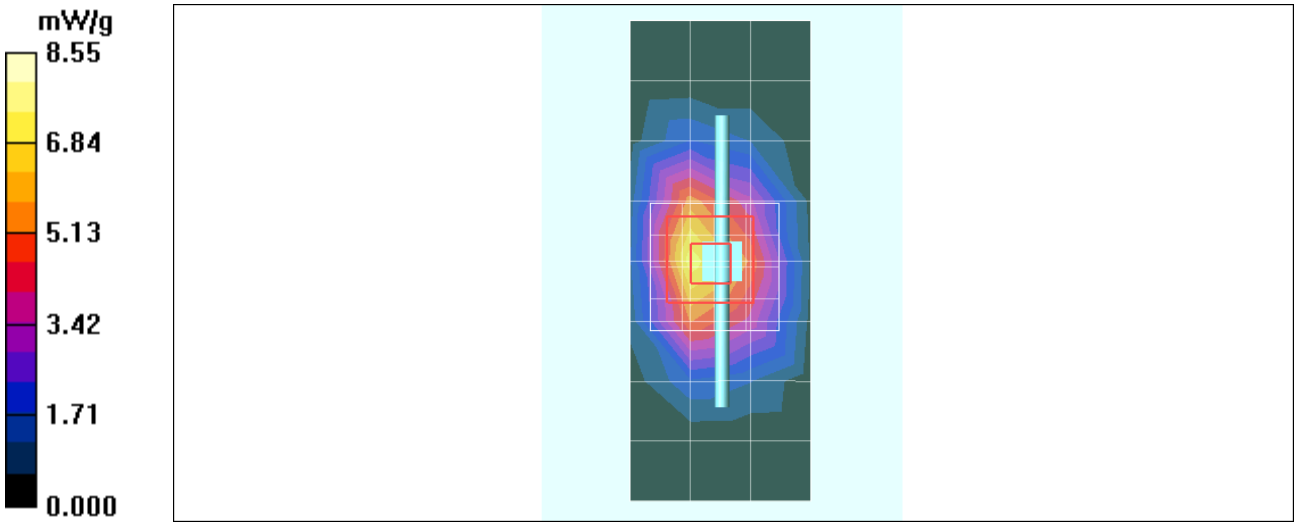
DASY4 Configuration:

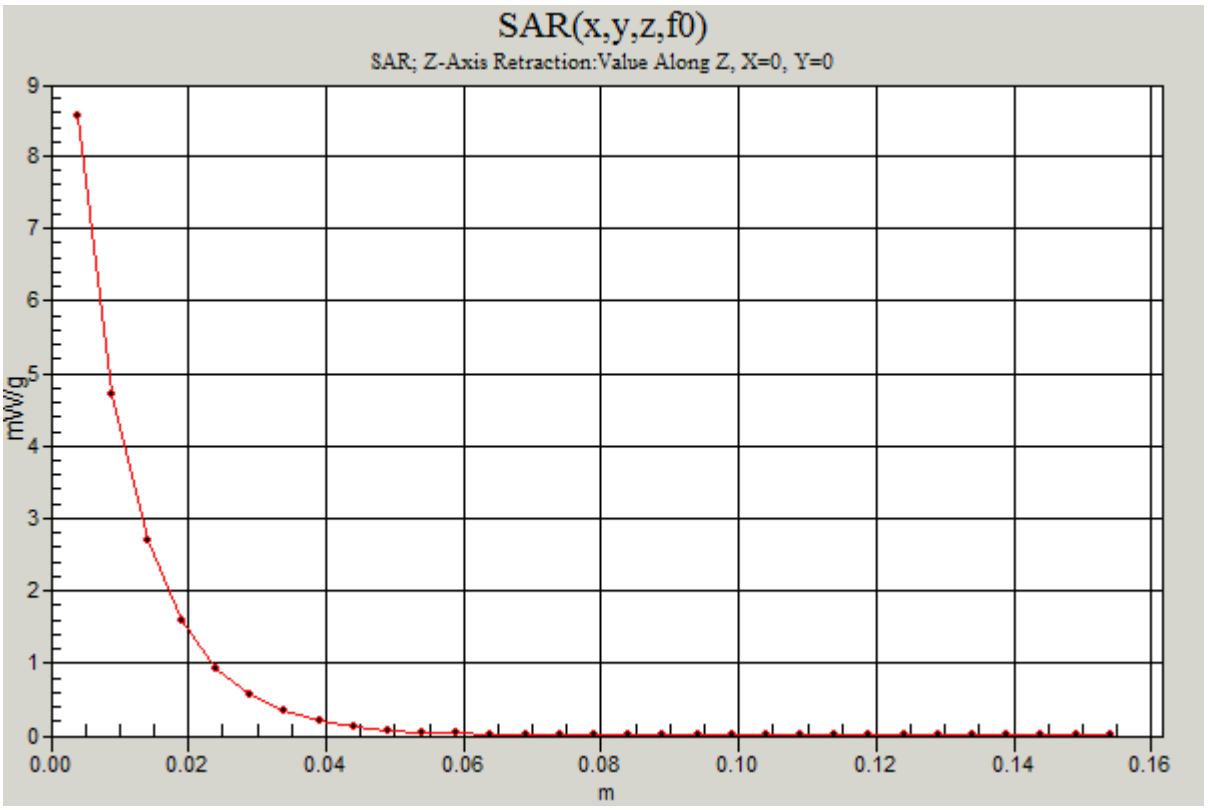
- Probe: ES3DV3 - SN3183; ConvF(5.05, 5.05, 5.05); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.27 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.4 V/m; Power Drift = -0.016 dB; Peak SAR (extrapolated) = 14.3 W/kg
SAR(1 g) = 7.69 mW/g; SAR(10 g) = 4.02 mW/g; Maximum value of SAR (measured) = 8.60 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.55 mW/g


mW/g
8.55
6.84
5.13
3.42
1.71
0.000


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

Date/Time: 11/27/2010 9:55:20 AM

Test Laboratory: Motorola - Nov-27-2010 2450 MHz

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 766; FCC ID: IHDP56LU1
Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 766; Input Power = 200 mW
Sim.Temp@meas = 20.6*C; Sim.Temp@SPC = 20.6*C; Room Temp @ SPC = 20.0*C
Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 2450 MHz; σ = 1.84 mho/m; ε_r = 37.3; ρ = 1000 kg/m^3

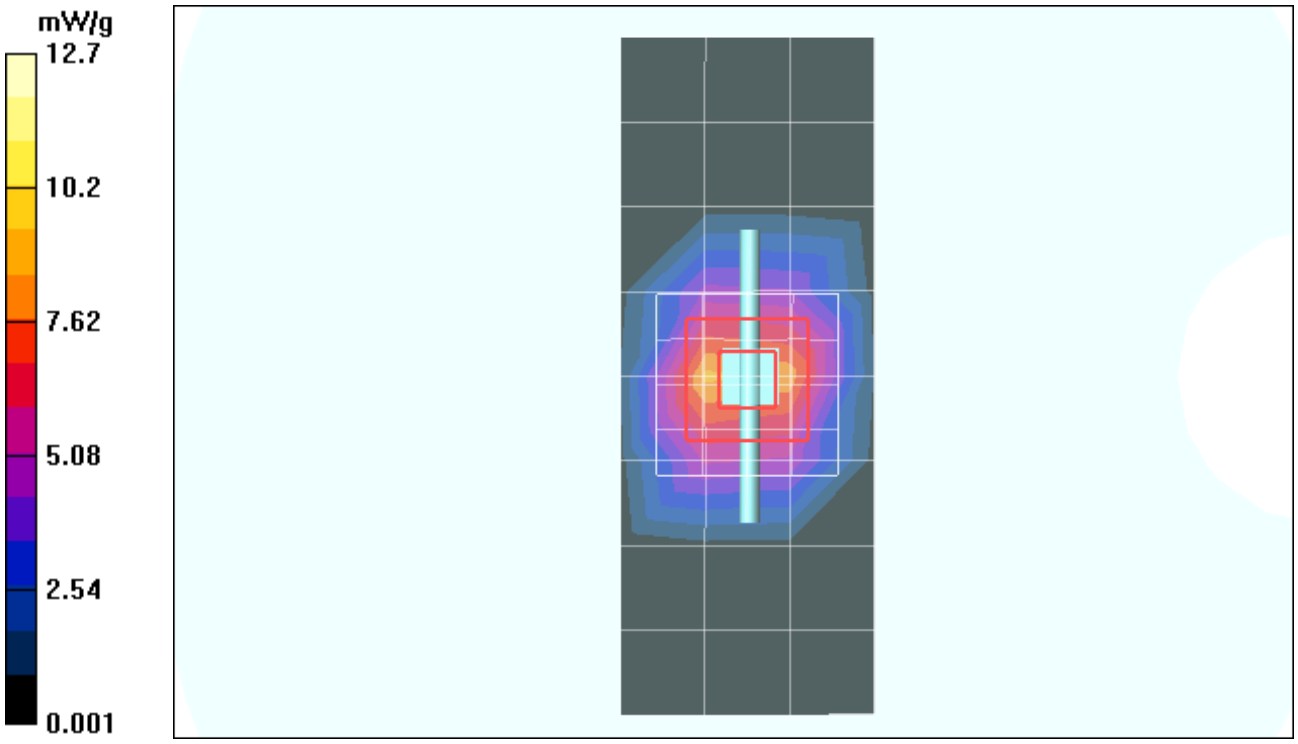
DASY4 Configuration:

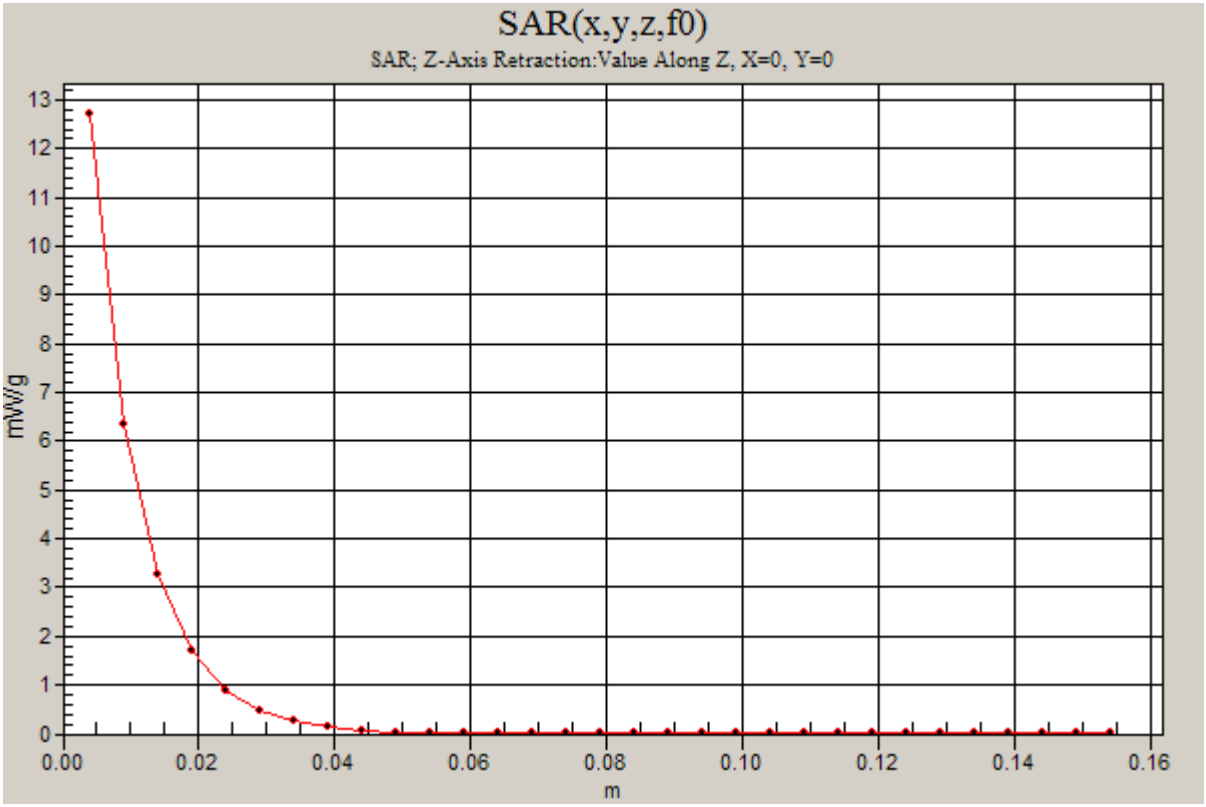
- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7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

Daily SPC Check/Dipole Area Scan (4x9x1):
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 8.76 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 84.9 V/m; Power Drift = -0.003 dB; Peak SAR (extrapolated) = 23.0 W/kg
SAR(1 g) = 11.2 mW/g; SAR(10 g) = 5.21 mW/g; Maximum value of SAR (measured) = 12.8 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):
Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 12.7 mW/g


mW/g
12.7
10.2
7.62
5.08
2.54
0.001


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: 11/29/2010 9:11:01 AM

Test Laboratory: Motorola - Nov-29-2010 2450 MHz

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 766; FCC ID: IHDP56LU1
Procedure Notes: 2450MHz System Performance Check; Dipole Sn# 766; Input Power = 200 mW
Sim.Temp@meas = 19.2*C; Sim.Temp@SPC = 19.2*C; Room Temp @ SPC = 20.2*C
Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 2450 MHz; σ = 1.8 mho/m; ε_r = 37.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: 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 (4x9x1):

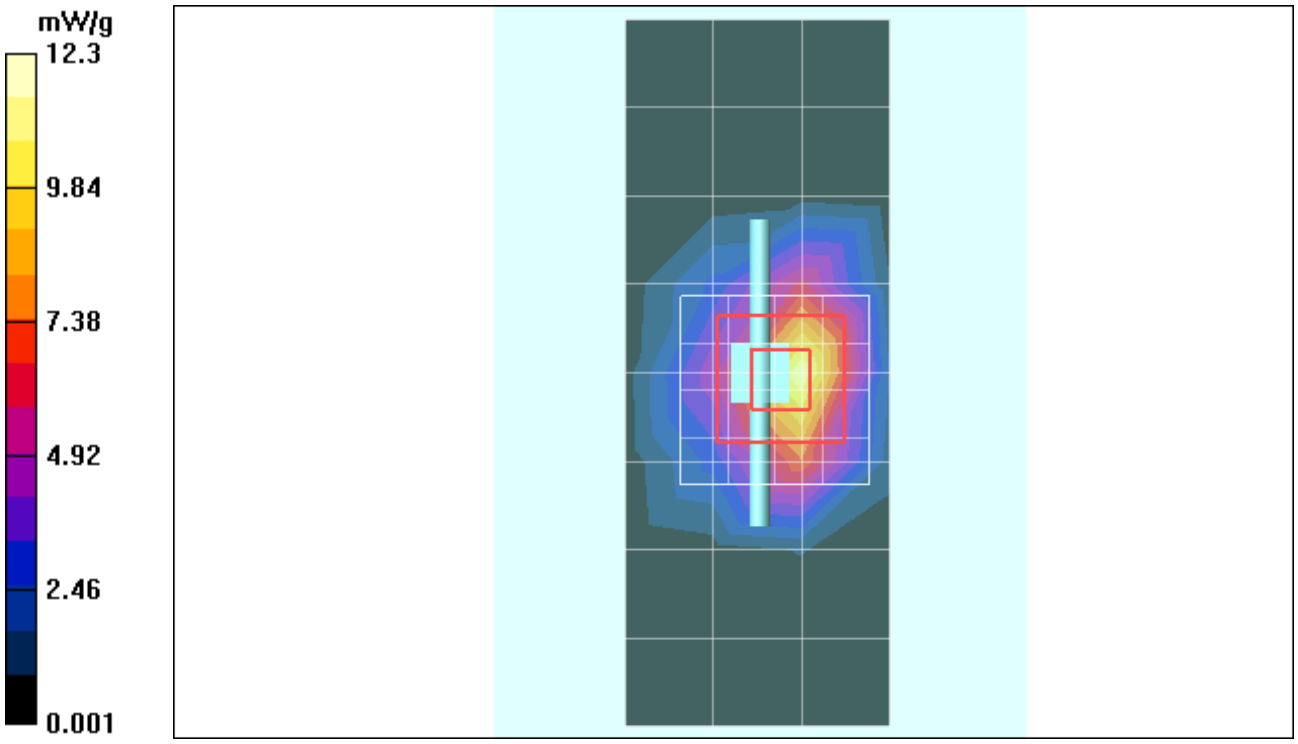
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 11.5 mW/g

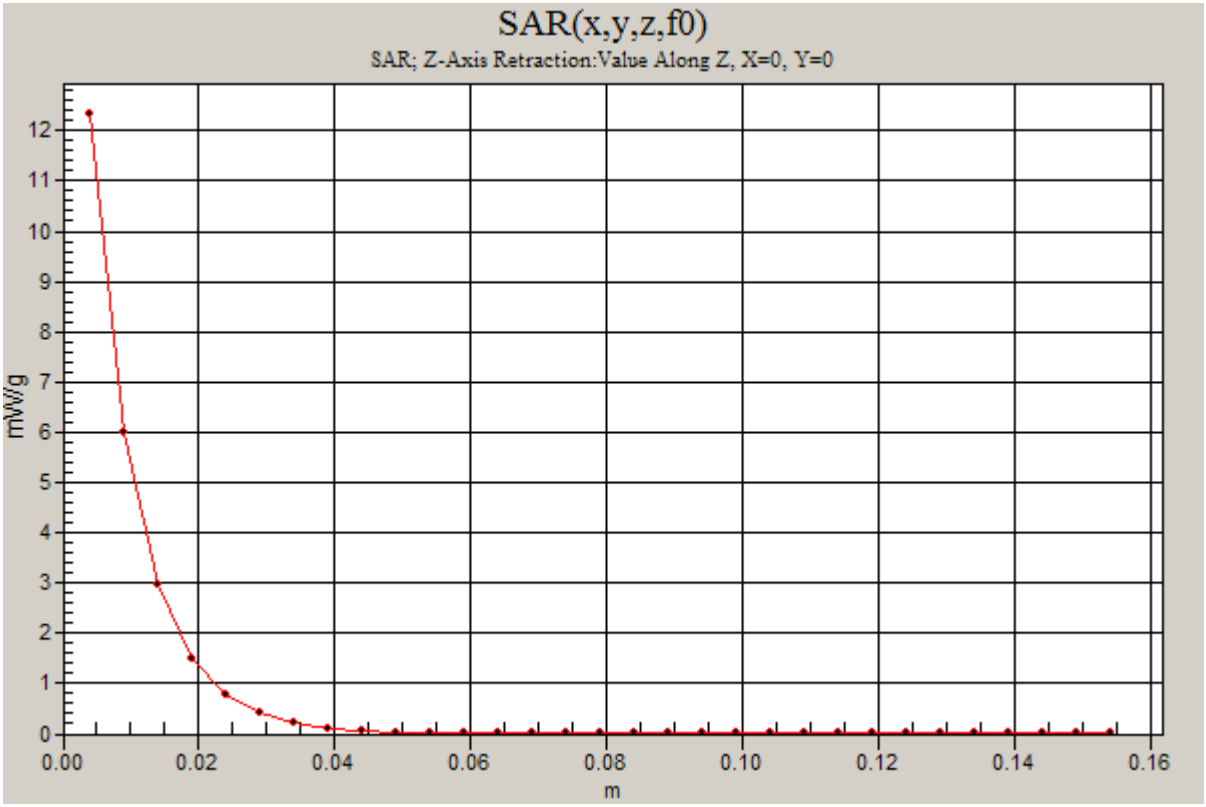
Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 80.6 V/m; Power Drift = -0.008 dB; Peak SAR (extrapolated) = 23.0 W/kg
SAR(1 g) = 10.9 mW/g; SAR(10 g) = 5.02 mW/g; Maximum value of SAR (measured) = 12.1 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 12.3 mW/g


mW/g
12.3
9.84
7.38
4.92
2.46
0.001


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

Date/Time: 12/10/2010 8:06:55 AM

Test Laboratory: Motorola - Dec-10-2010 5200 MHz

DUT: Dipole 5-6GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1088; FCC ID: IHDP56LU1
Procedure Notes: 5200 MHz System Performance Check; Dipole Sn# 1088; Input Power = 100 mw
Sim.Temp@meas = 19.1*C; Sim.Temp@SPC = 19.1*C; Room Temp @ SPC = 20.0*C
Communication System: CW - Dipole; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 5200 MHz; σ = 4.85 mho/m; ε_r = 34; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3730; ConvF(4.67, 4.67, 4.67); Calibrated: 7/16/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R3, 5-6GHz SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1153;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x7x1):

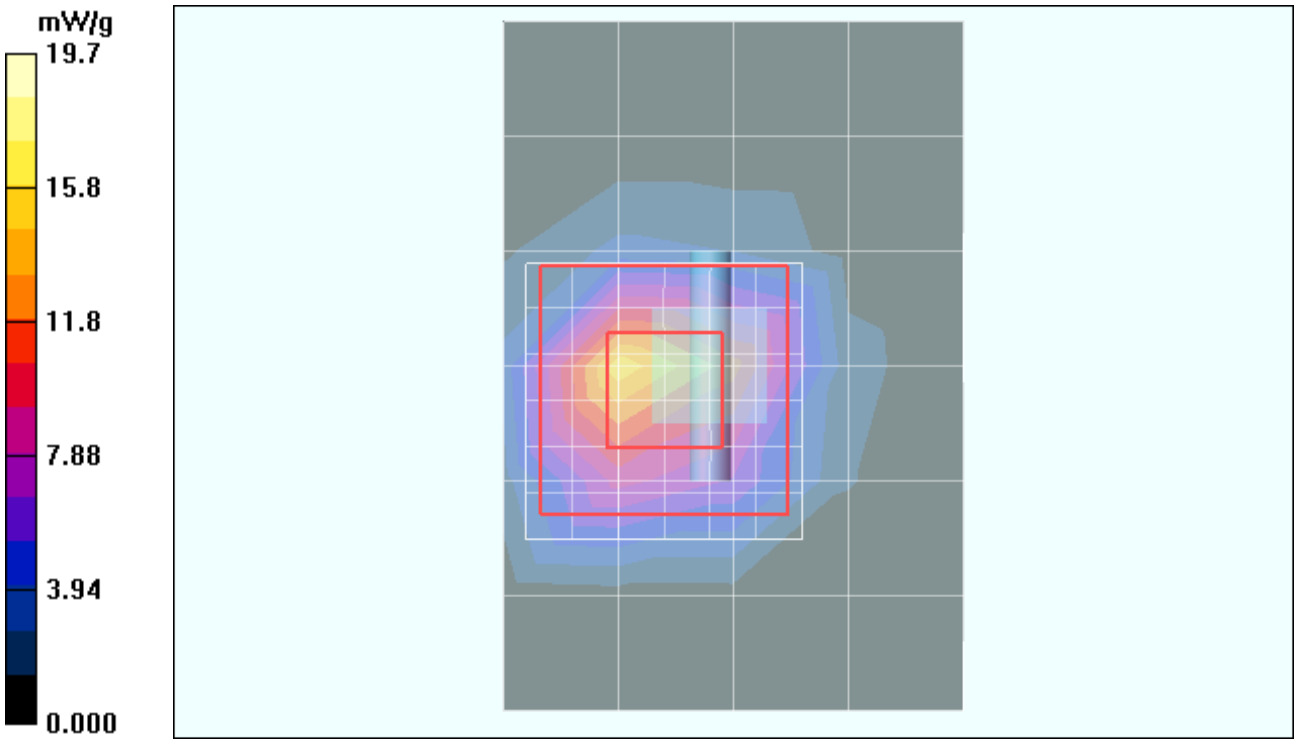
Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 15.4 mW/g

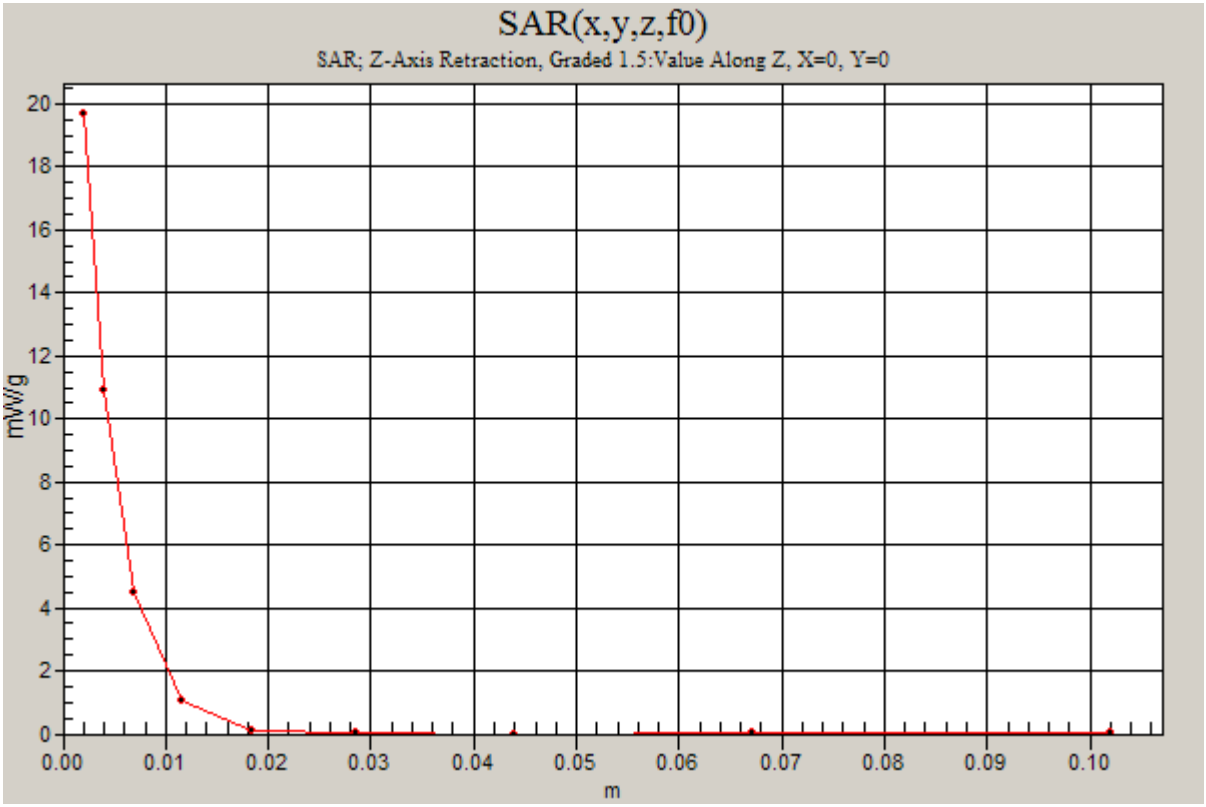
Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 59.4 V/m; Power Drift = 0.102 dB; Peak SAR (extrapolated) = 37.4 W/kg
SAR(1 g) = 9.41 mW/g; SAR(10 g) = 2.68 mW/g; Maximum value of SAR (measured) = 19.7 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9):

Measurement grid: dx=20mm, dy=20mm, dz=2mm


mW/g
19.7
15.8
11.8
7.88
3.94
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
mW/g
20
18
16
14
12
10
8
6
4
2
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 12/16/2010 9:04:38 AM

Test Laboratory: Motorola - Dec-16-2010 5200 MHz

DUT: Dipole 5-6GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1088; FCC ID: IHDP56LU1
Procedure Notes: 5200 MHz System Performance Check; Dipole Sn# 1088; Input Power = 100 mW
Sim.Temp@meas = 19.8*C; Sim.Temp@SPC = 19.7*C; Room Temp @ SPC = 20.2*C
Communication System: CW - Dipole; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 5200 MHz; σ = 4.89 mho/m; ε_r = 34.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3730; ConvF(4.67, 4.67, 4.67); Calibrated: 7/16/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R3, 5-6GHz SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1153;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x7x1):

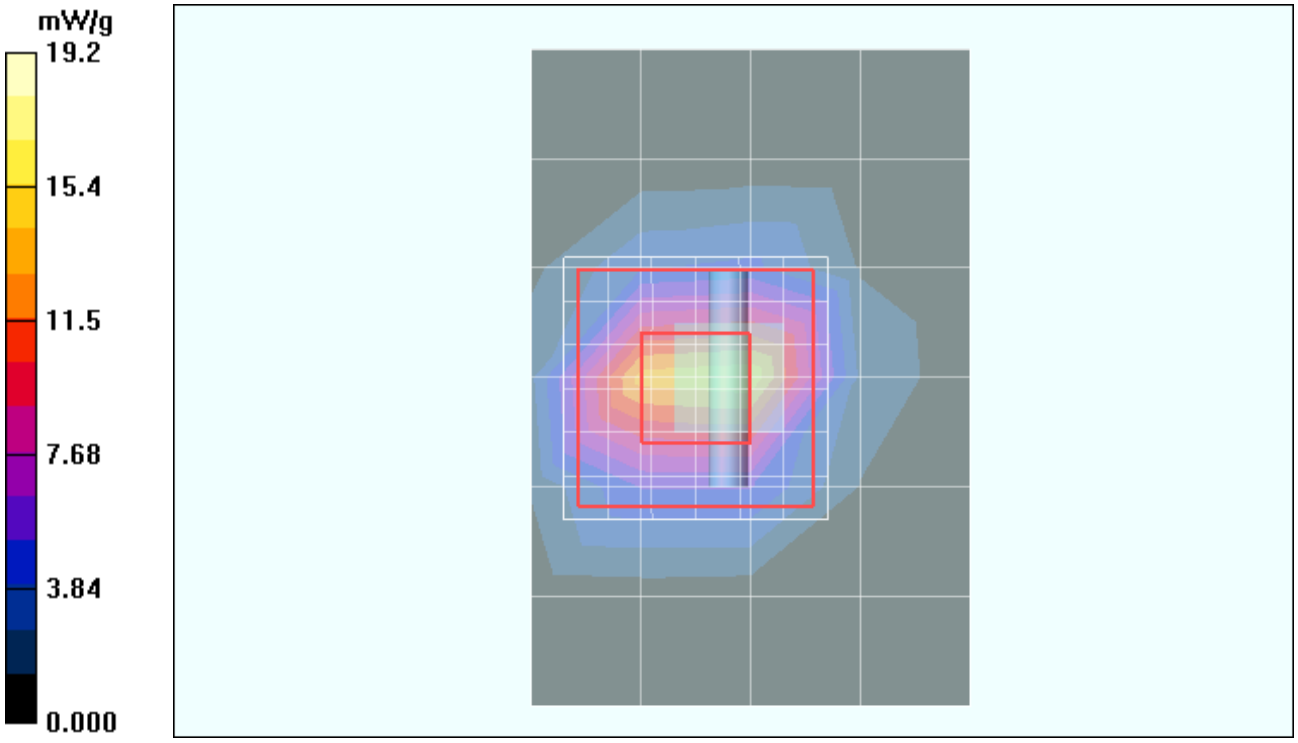
Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 14.0 mW/g

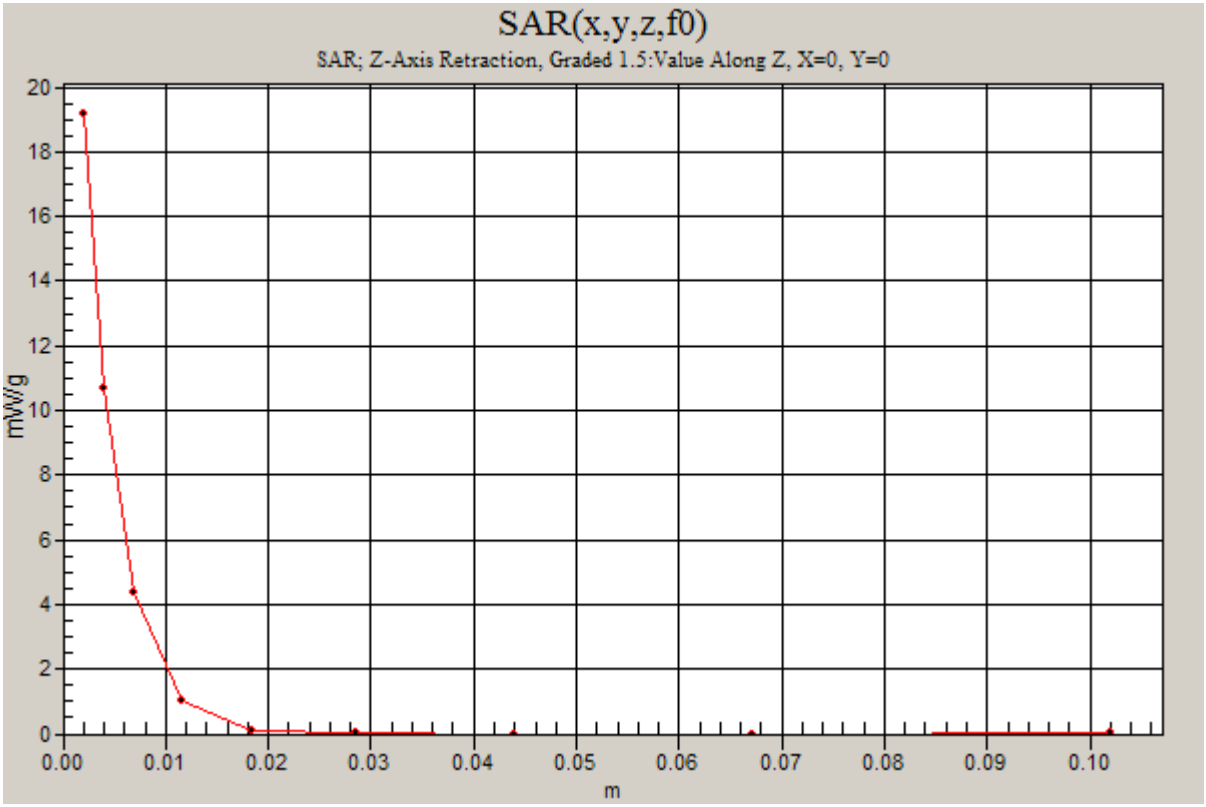
Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 64.0 V/m; Power Drift = 0.091 dB; Peak SAR (extrapolated) = 36.6 W/kg
SAR(1 g) = 9.13 mW/g; SAR(10 g) = 2.59 mW/g; Maximum value of SAR (measured) = 19.5 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9):

Measurement grid: dx=20mm, dy=20mm, dz=2mm; Maximum value of SAR (measured) = 19.2 mW/g


mW/g
19.2
15.4
11.5
7.68
3.84
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
mW/g
m
0
2
4
6
8
10
12
14
16
18
20
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10

Date/Time: 12/18/2010 1:29:57 PM

Test Laboratory: Motorola - Dec-18-2010 5200 MHz

DUT: Dipole 5-6GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1088; FCC ID: IHDP56LU1
Procedure Notes: 5200 MHz System Performance Check; Dipole Sn# 1088; Input Power = 100 mw
Sim.Temp@meas = 19.6*C; Sim.Temp@SPC = 19.6*C; Room Temp @ SPC = 20.3*C
Communication System: CW - Dipole; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 5200 MHz; σ = 4.76 mho/m; ε_r = 34.2; ρ = 1000 kg/m^3

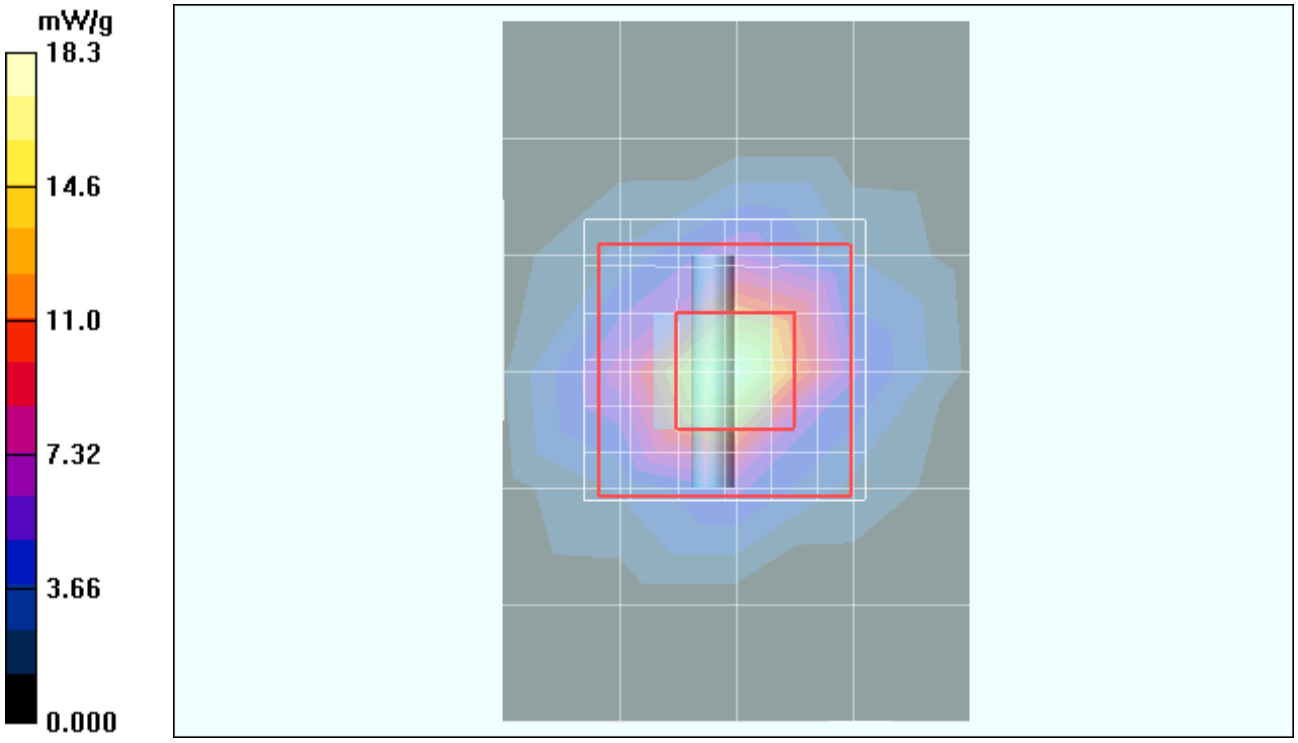
DASY4 Configuration:

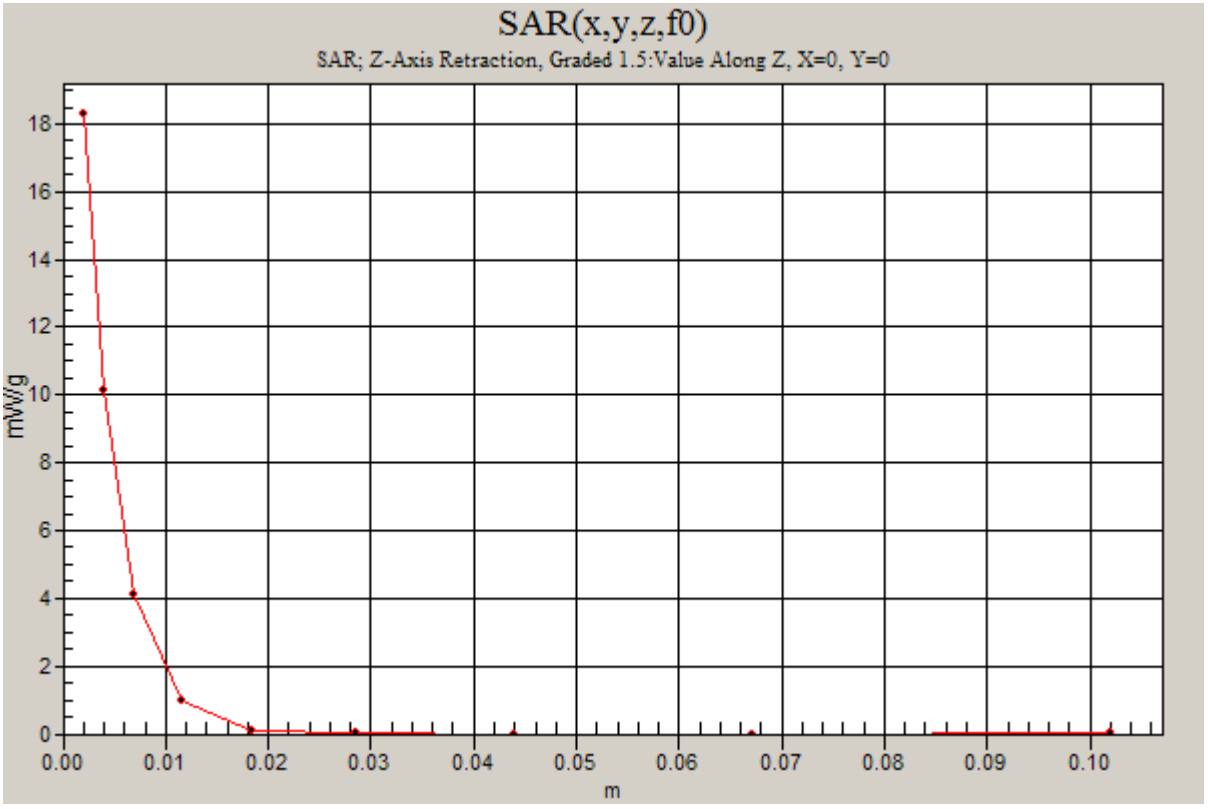
- Probe: EX3DV4 - SN3730; ConvF(4.67, 4.67, 4.67); Calibrated: 7/16/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R3, 5-6GHz SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1153;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x7x1):
Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 17.7 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 66.0 V/m; Power Drift = -0.017 dB; Peak SAR (extrapolated) = 33.5 W/kg
SAR(1 g) = 8.53 mW/g; SAR(10 g) = 2.46 mW/g; Maximum value of SAR (measured) = 17.6 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9):
Measurement grid: dx=20mm, dy=20mm, dz=2mm; Maximum value of SAR (measured) = 18.3 mW/g


mW/g
18.3
14.6
11.0
7.32
3.66
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
mW/g
m
0
2
4
6
8
10
12
14
16
18
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10

Date/Time: 12/9/2010 8:58:17 AM

Test Laboratory: Motorola - Dec-09-2010 5800 MHz

DUT: Dipole 5-6GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1088; FCC ID: IHDP56LU1
Procedure Notes: 5800 MHz System Performance Check; Dipole Sn# 1088; Input Power = 100 mw
Sim.Temp@meas = 19.6*C; Sim.Temp@SPC = 19.6*C; Room Temp @ SPC = 20.2*C
Communication System: CW - Dipole; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 5800 MHz; σ = 5.53 mho/m; ε_r = 33.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3730; ConvF(4.06, 4.06, 4.06); Calibrated: 7/16/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R3, 5-6GHz SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1153;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x7x1):

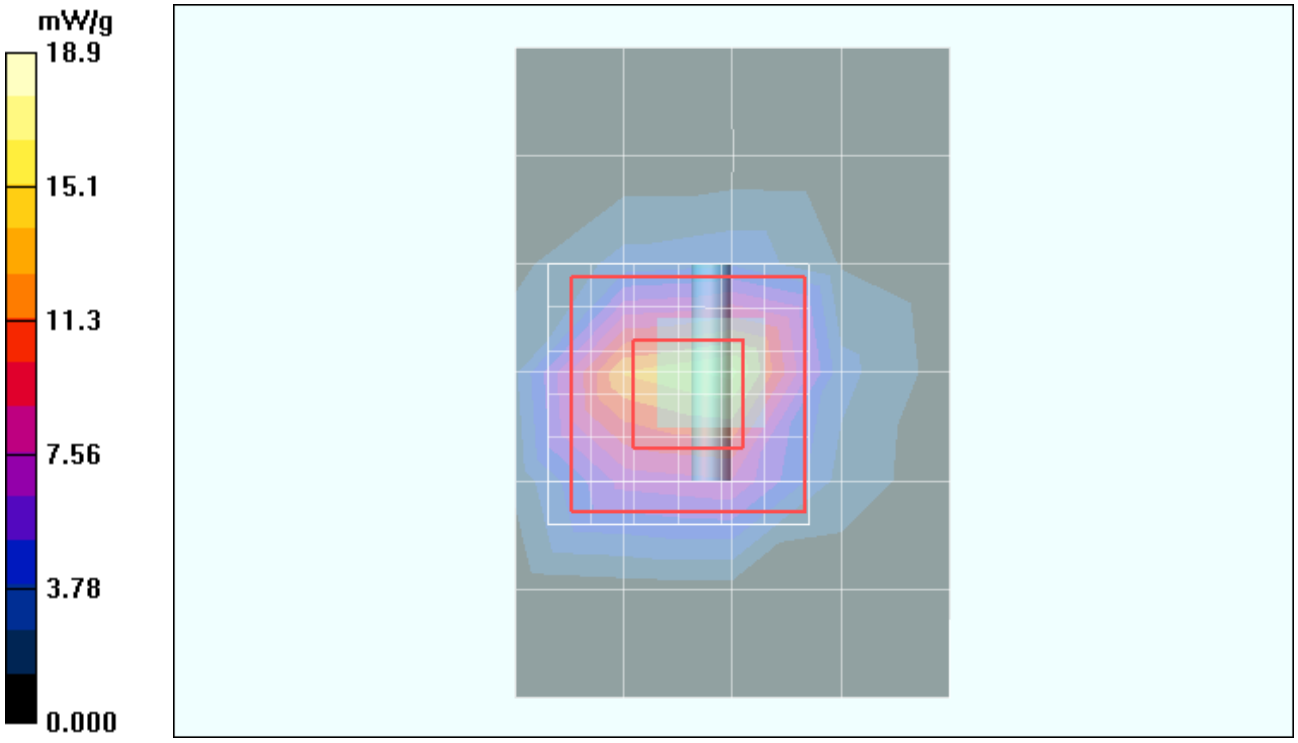
Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 14.3 mW/g

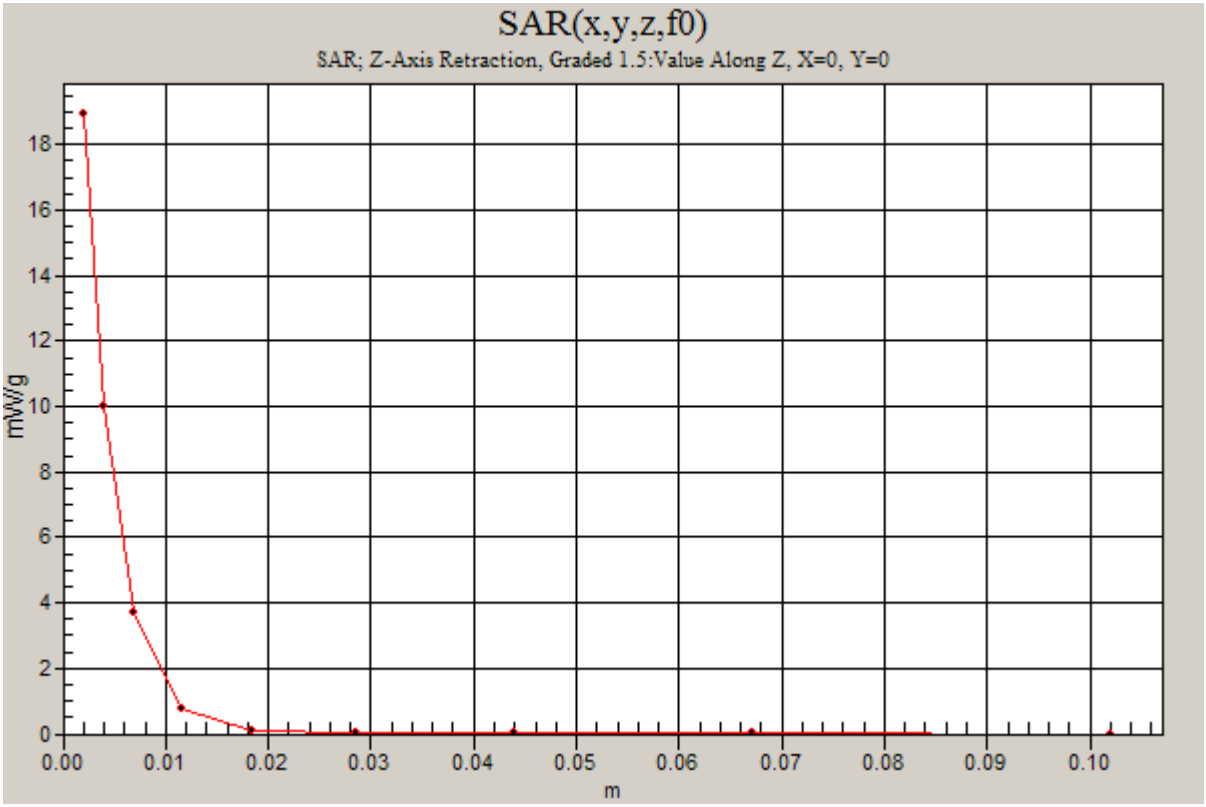
Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 60.4 V/m; Power Drift = 0.063 dB; Peak SAR (extrapolated) = 37.4 W/kg
SAR(1 g) = 8.97 mW/g; SAR(10 g) = 2.58 mW/g; Maximum value of SAR (measured) = 18.9 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9):

Measurement grid: dx=20mm, dy=20mm, dz=2mm


mW/g
18.9
15.1
11.3
7.56
3.78
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
mW/g
m
0
2
4
6
8
10
12
14
16
18
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10

Date/Time: 12/16/2010 9:36:55 AM

Test Laboratory: Motorola - Dec-16-2010 5800 MHz

DUT: Dipole 5-6GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1088; FCC ID: IHDP56LU1
Procedure Notes: 5800 MHz System Performance Check; Dipole Sn# 1088; Input Power = 100 mW
Sim.Temp@meas = 19.8*C; Sim.Temp@SPC = 19.7*C; Room Temp @ SPC = 20.2*C
Communication System: CW - Dipole; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 5800 MHz; σ = 5.57 mho/m; ε_r = 33.6; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3730; ConvF(4.06, 4.06, 4.06); Calibrated: 7/16/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R3, 5-6GHz SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1153;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x7x1):

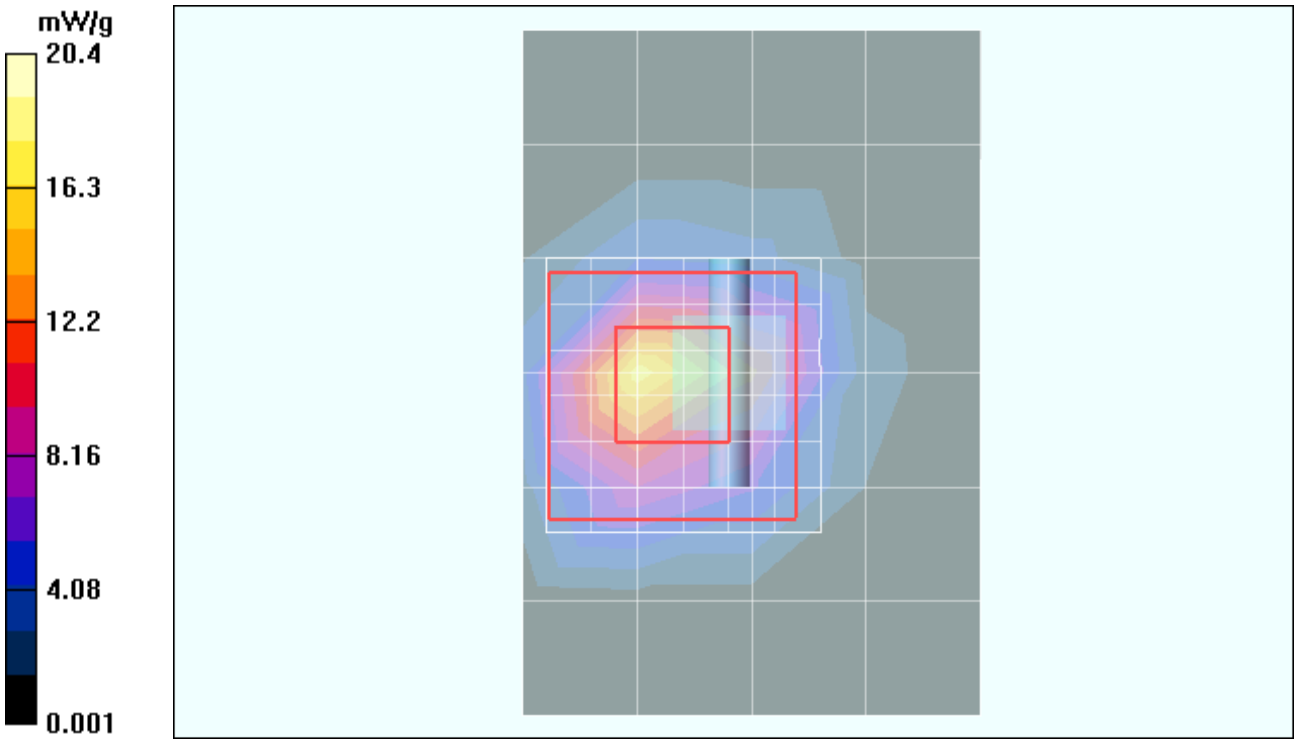
Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 17.2 mW/g

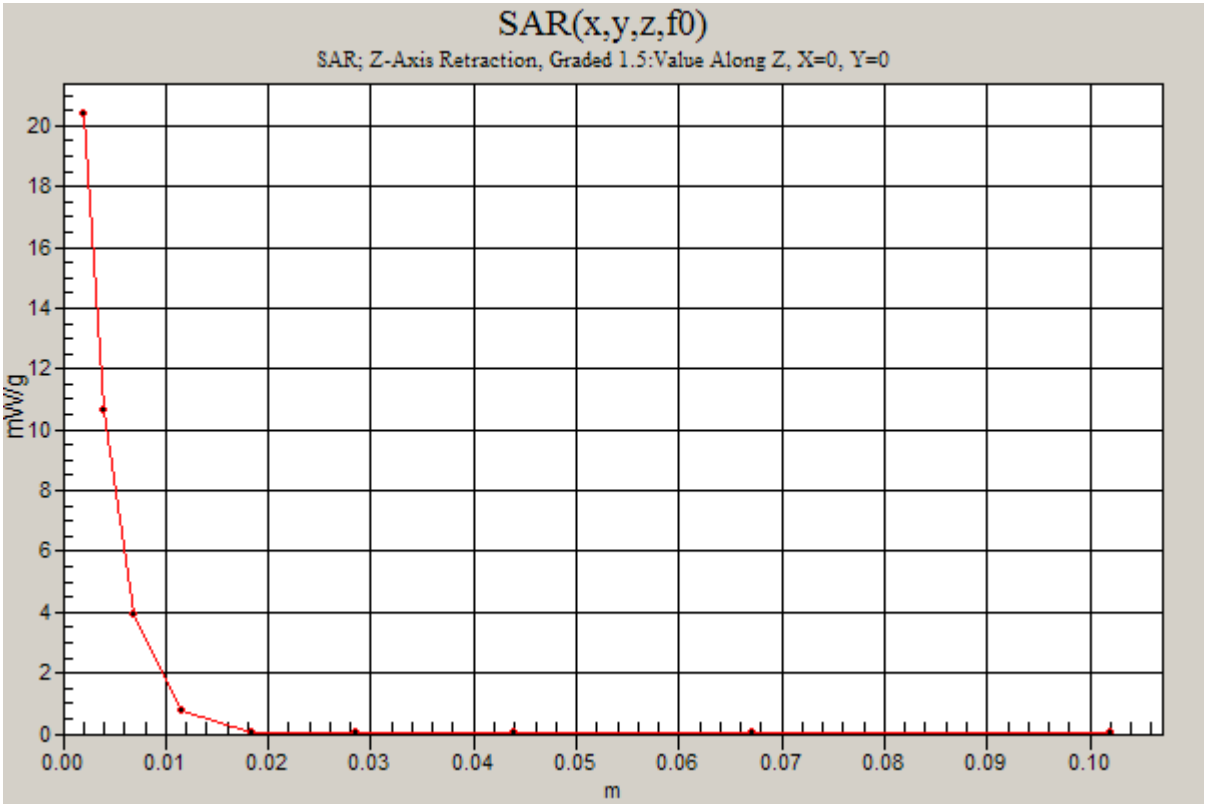
Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 56.2 V/m; Power Drift = 0.134 dB; Peak SAR (extrapolated) = 39.6 W/kg
SAR(1 g) = 9.58 mW/g; SAR(10 g) = 2.72 mW/g; Maximum value of SAR (measured) = 20.1 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9):

Measurement grid: dx=20mm, dy=20mm, dz=2mm; Maximum value of SAR (measured) = 20.4 mW/g


mW/g
20.4
16.3
12.2
8.16
4.08
0.001


SAR(x,y,z,f0)
SAR; Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
mW/g
m
0
2
4
6
8
10
12
14
16
18
20
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10

Date/Time: 12/19/2010 8:46:43 AM

Test Laboratory: Motorola - Dec-19-2010 5800 MHz

DUT: Dipole 5-6GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1088; FCC ID: IHDP56LU1
Procedure Notes: 5800 MHz System Performance Check; Dipole Sn# 1088; Input Power = 100 mw
Sim.Temp@meas = 19.6*C; Sim.Temp@SPC = 20.2*C; Room Temp @ SPC = 20.3*C
Communication System: CW - Dipole; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 5800 MHz; σ = 5.43 mho/m; ε_r = 33.1; ρ = 1000 kg/m^3

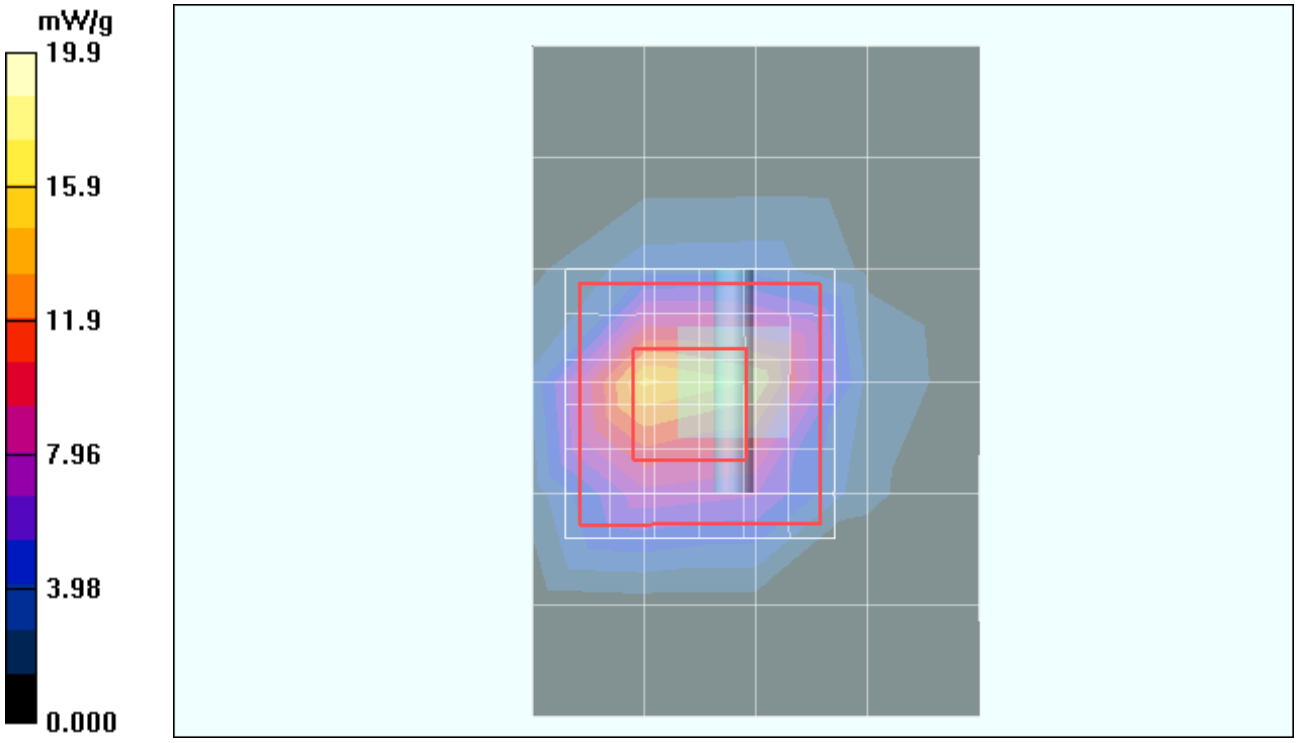
DASY4 Configuration:

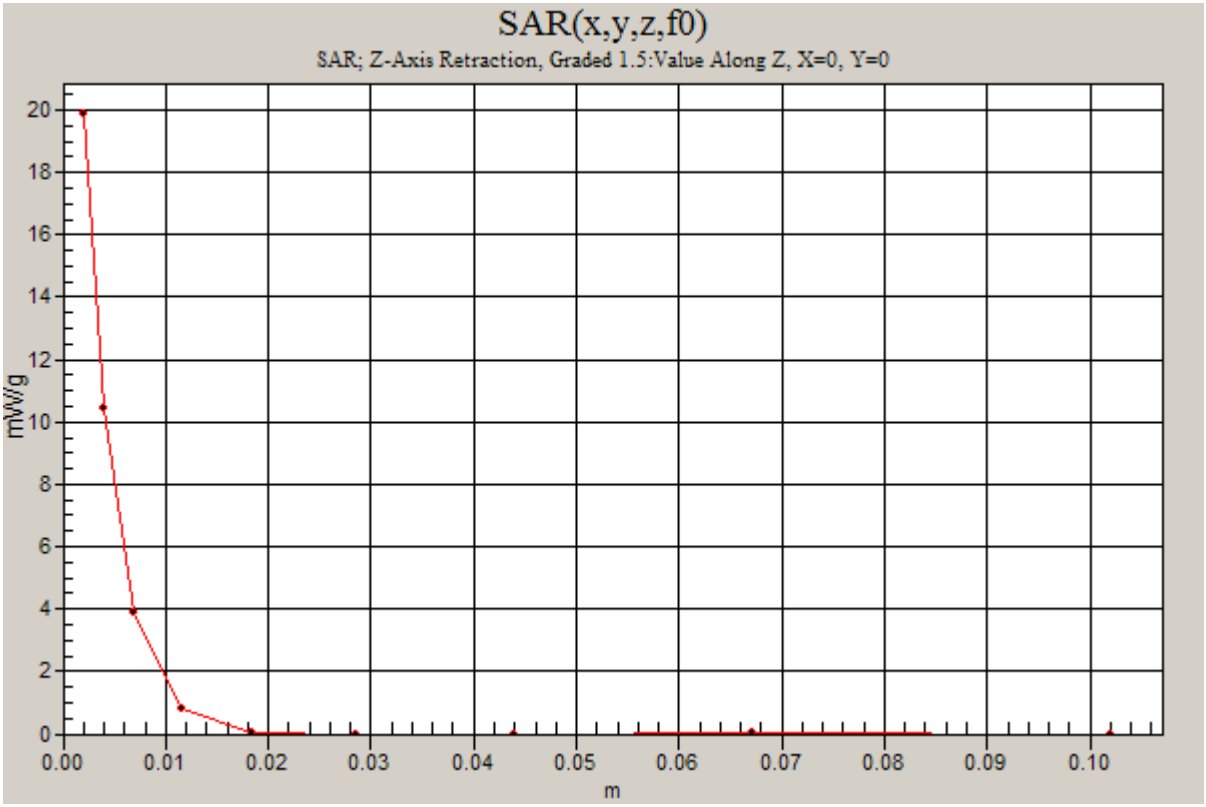
- Probe: EX3DV4 - SN3730; ConvF(4.06, 4.06, 4.06); Calibrated: 7/16/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R3, 5-6GHz SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1153;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x7x1):
Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 14.9 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 60.0 V/m; Power Drift = 0.109 dB; Peak SAR (extrapolated) = 39.4 W/kg
SAR(1 g) = 9.45 mW/g; SAR(10 g) = 2.69 mW/g; Maximum value of SAR (measured) = 20.0 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9):
Measurement grid: dx=20mm, dy=20mm, dz=2mm; Maximum value of SAR (measured) = 19.9 mW/g


mW/g
19.9
15.9
11.9
7.96
3.98
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
mW/g
20
18
16
14
12
10
8
6
4
2
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Appendix 2

SAR distribution plots for Body Worn Configuration

Date/Time: 11/18/2010 9:59:11 AM

Test Laboratory: Motorola - CDMA 800 - Back Surface of DUT

Serial: 99000052000858; FCC ID: IHDP56LU1
Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: Internal
Device Position: Body Worn, Back of DUT 0 mm from Phantom
Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1

Medium: Low Freq Body
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 55; ρ = 1000 kg/m^3

DASY4 Configuration:

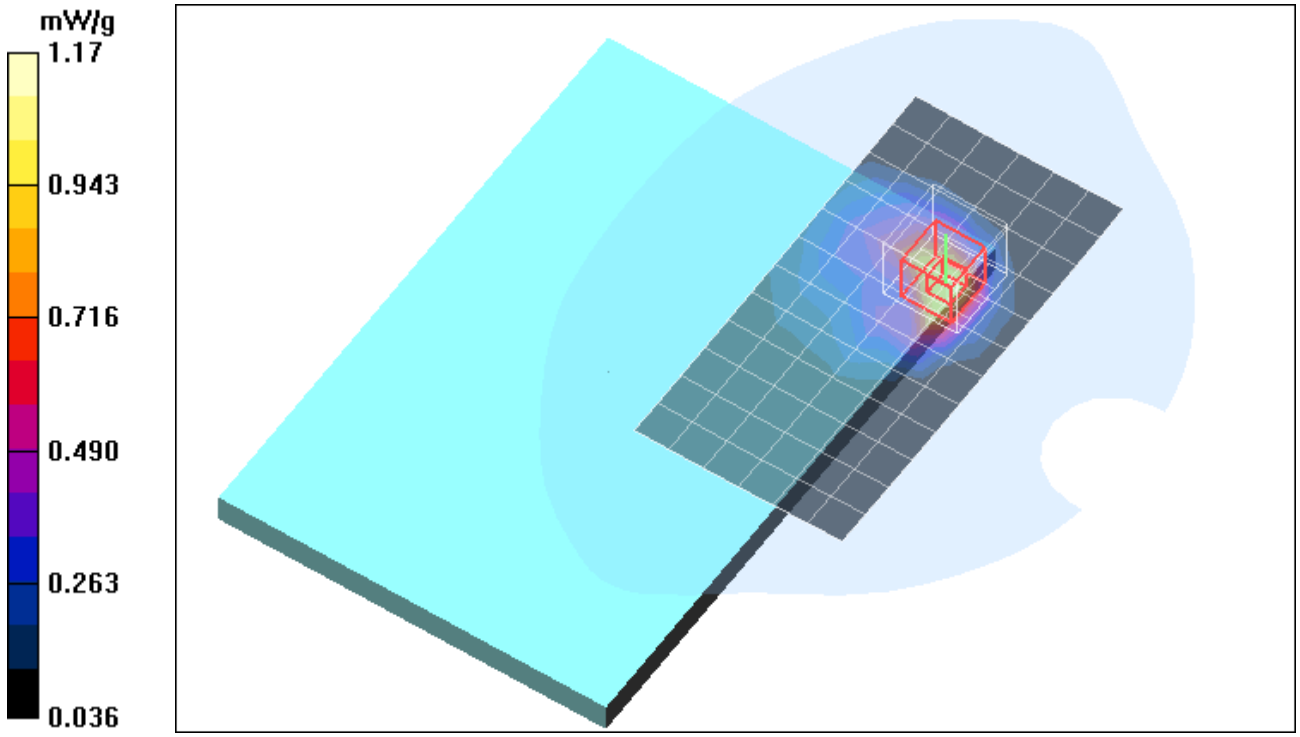
- Probe: ES3DV3 - SN3124; ConvF(5.86, 5.86, 5.86); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.977 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.3 V/m; Power Drift = -0.064 dB; Peak SAR (extrapolated) = 2.04 W/kg
SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.550 mW/g; Maximum value of SAR (measured) = 1.17 mW/g



Date/Time: 11/17/2010 11:30:47 PM

Test Laboratory: Motorola - CDMA 1900 - Back Surface of DUT

Serial: 99000052000858; FCC ID: IHDP56LU1
Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Battery Model #: Internal
Device Position: Body Worn, Back of DUT 0 mm from Phantom
Communication System: CDMA 1900; Frequency: 1908.75 MHz; Channel Number: 1175; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3

DASY4 Configuration:

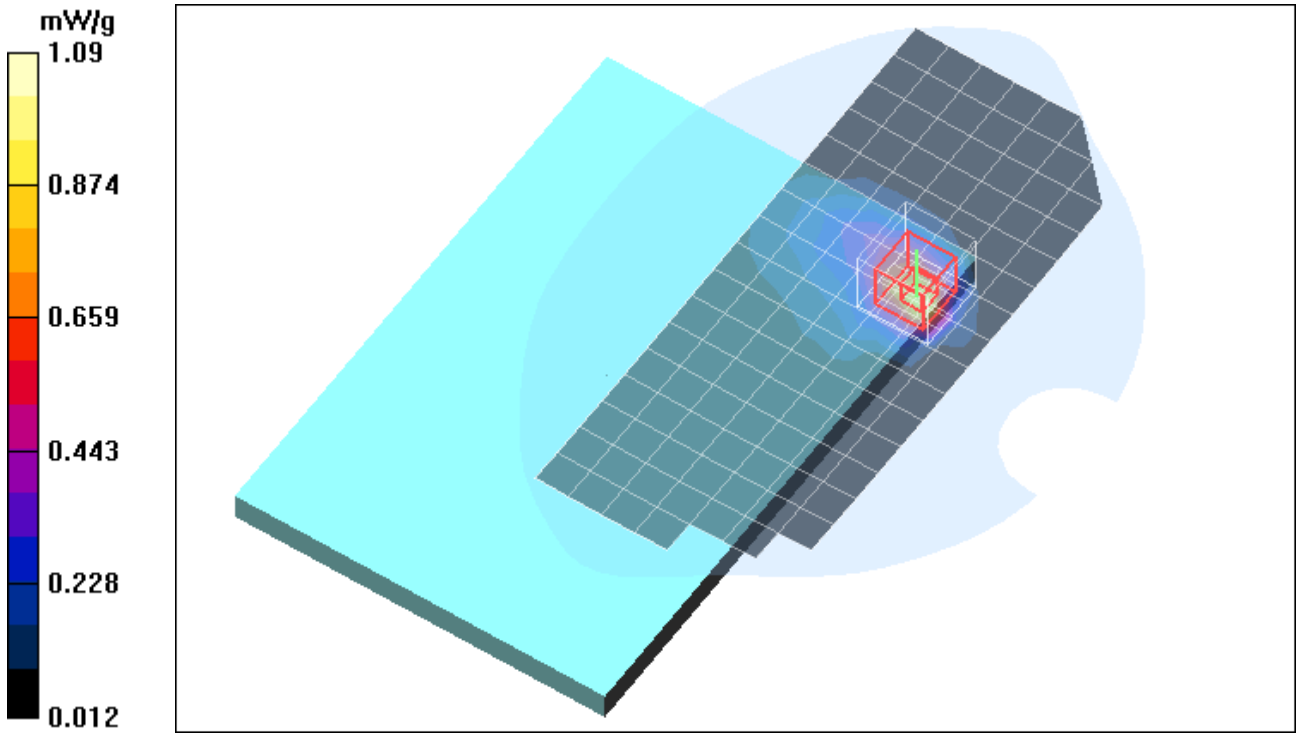
- Probe: ES3DV3 - SN3124; ConvF(4.76, 4.76, 4.76); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM DUT Template/Area Scan - Full Body (15mm) (18x8x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.970 mW/g

SAM DUT Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.5 V/m; Power Drift = -0.052 dB; Peak SAR (extrapolated) = 2.13 W/kg
SAR(1 g) = 1 mW/g; SAR(10 g) = 0.484 mW/g; Maximum value of SAR (measured) = 1.09 mW/g



Date/Time: 11/29/2010 9:55:10 AM

Test Laboratory: Motorola - Wi-Fi 2.45 GHz - Back Surface of DUT

Serial: 99000052000875; FCC ID: IHDP56LU1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: Internal
Device Position: Body Worn, Back of DUT 0 mm from Phantom
Device Mode: 802.11b mode, 11 Mbps data rate
Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Channel Number: 1; Duty Cycle: 1:1

Medium: 2450 Glycol Body
Medium parameters used: f = 2450 MHz; σ = 1.92 mho/m; ε_r = 50.1; ρ = 1000 kg/m^3

DASY4 Configuration:

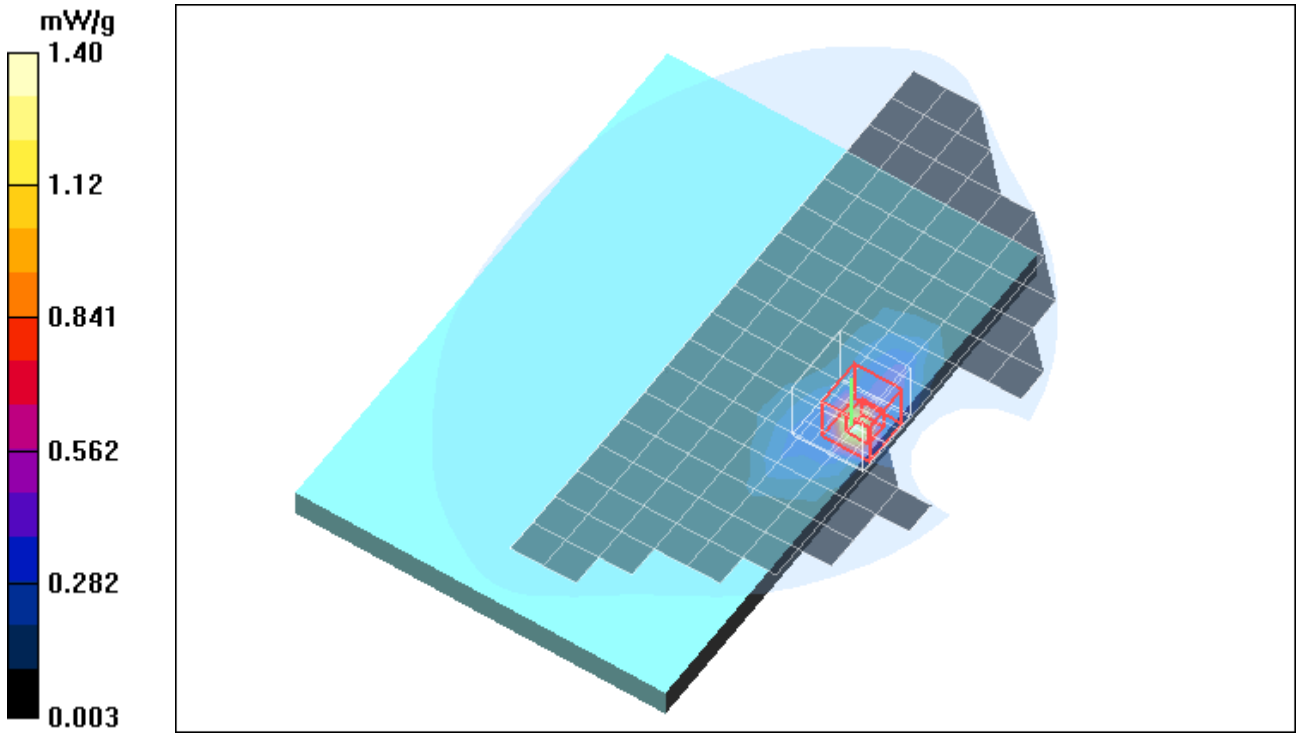
- Probe: ES3DV3 - SN3124; ConvF(4.19, 4.19, 4.19); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM DUT Against Flat Section/Area Scan - Normal Body (15mm) (21x9x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.43 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.96 V/m; Power Drift = -0.022 dB; Peak SAR (extrapolated) = 3.37 W/kg
SAR(1 g) = 1.33 mW/g; SAR(10 g) = 0.522 mW/g; Maximum value of SAR (measured) = 1.40 mW/g



Date/Time: 12/16/2010 9:13:39 PM

Test Laboratory: Motorola - Wi-Fi 5.21 GHz - Back Surface of DUT

Serial: 99000052000875; FCC ID: IHDP56LU1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: Internal
Device Position: Body Worn, Back of DUT 0 mm from Phantom
Device Mode: 802.11a mode, 6 Mbps data rate
Communication System: 5210MHz Band; Frequency: 5240 MHz; Channel Number: 48; Duty Cycle: 1:1

Medium: 5-6 GHz SPEAG Tissue BODY
Medium parameters used: f = 5210 MHz; σ = 5.71 mho/m; ε_r = 45.8; ρ = 1000 kg/m^3

DASY4 Configuration:

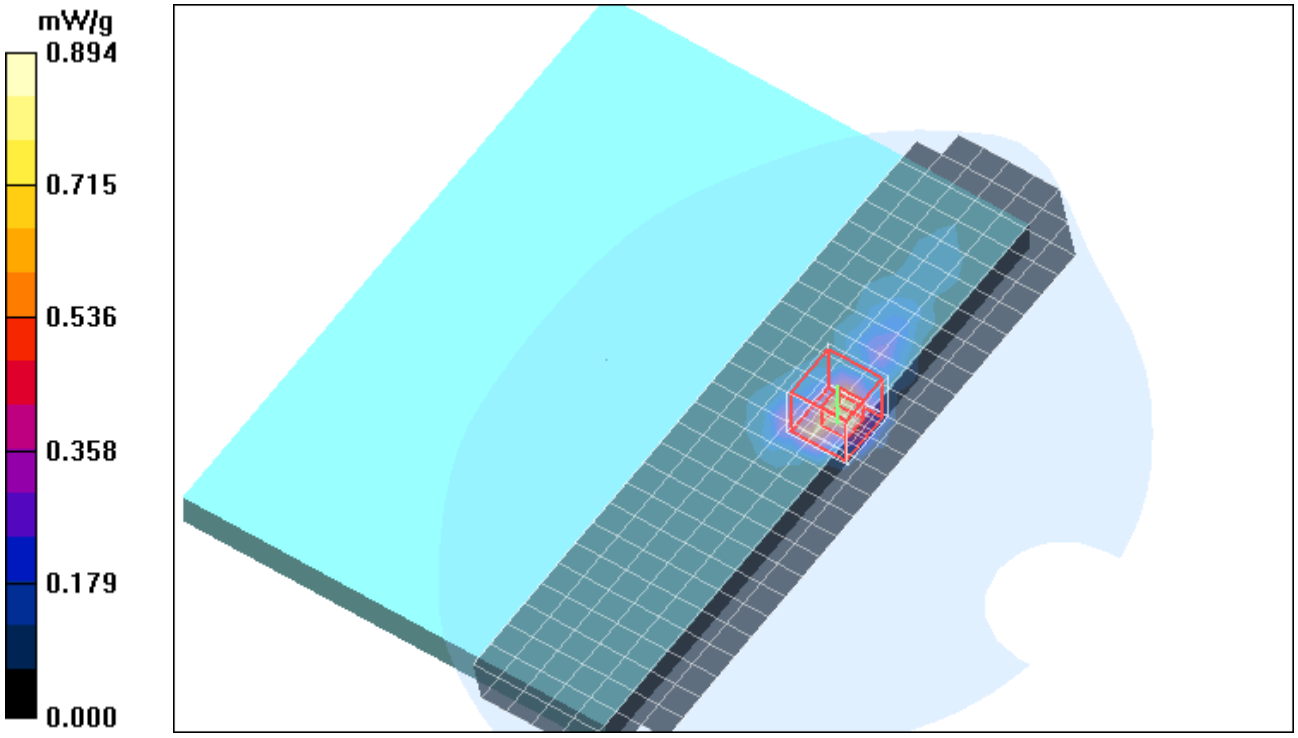
- Probe: EX3DV4 - SN3730; ConvF(4.07, 4.07, 4.07); Calibrated: 7/16/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#3 5Ghz BODY SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1106;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM DUT Against Flat Section/Partial Face Area Scan - Normal Body (10mm) (31x8x1):

Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.635 mW/g

SAM DUT Against Flat Section/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 13.9 V/m; Power Drift = -0.344 dB; Peak SAR (extrapolated) = 1.83 W/kg
SAR(1 g) = 0.449 mW/g; SAR(10 g) = 0.148 mW/g; Maximum value of SAR (measured) = 0.894 mW/g



Date/Time: 12/16/2010 11:21:05 PM

Test Laboratory: Motorola - Wi-Fi 5.785 GHZ - Back Surface of DUT

Serial: 99000052000875; FCC ID: IHDP56LU1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: Internal
Device Position: Body Worn, Back of DUT 0 mm from Phantom
Device Mode: 802.11n mode, 7.2 Mbps data rate
Communication System: 5785MHz Band; Frequency: 5765 MHz; Channel Number: 153; Duty Cycle: 1:1

Medium: 5-6 GHz SPEAG Tissue BODY
Medium parameters used: f = 5785 MHz; σ = 6.54 mho/m; ε_r = 44.6; ρ = 1000 kg/m^3

DASY4 Configuration:

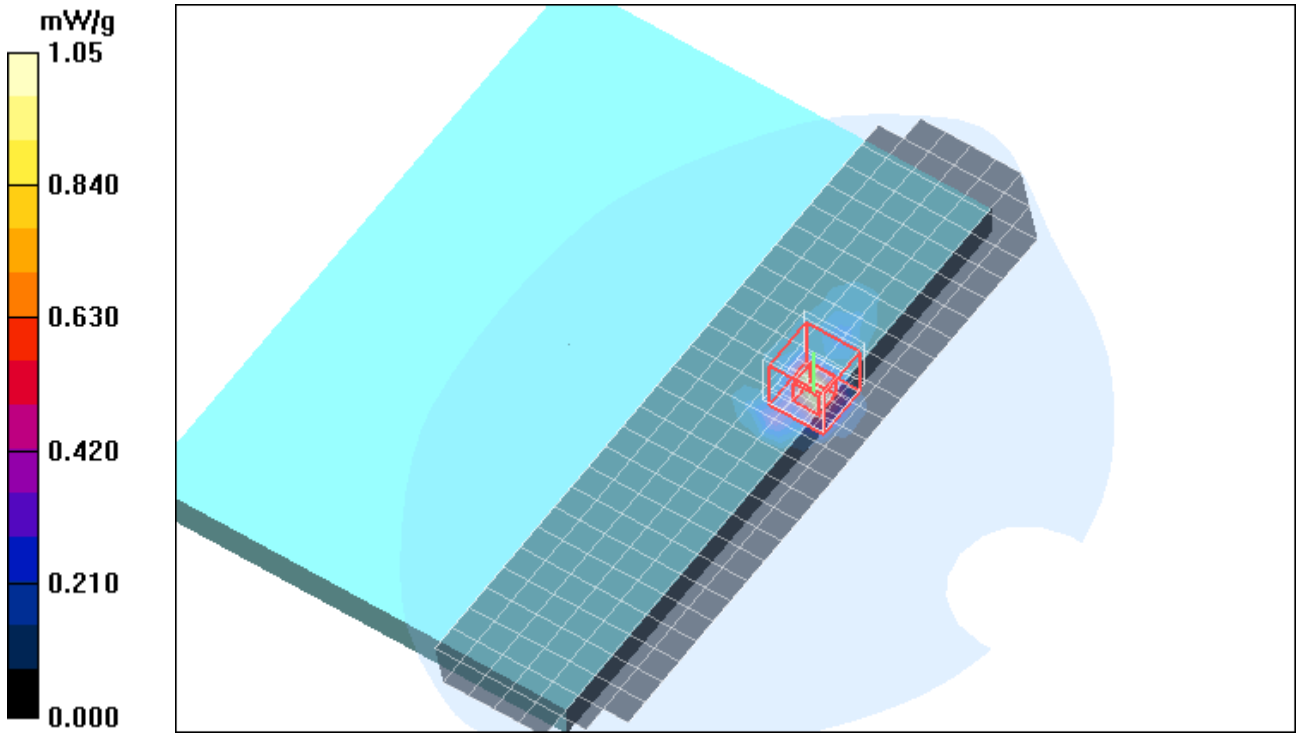
- Probe: EX3DV4 - SN3730; ConvF(3.53, 3.53, 3.53); Calibrated: 7/16/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#3 5Ghz BODY SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1106;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM DUT Against Flat Section/Partial Face Area Scan - Normal Body (10mm) (31x8x1):

Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.799 mW/g

SAM DUT Against Flat Section/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 14.9 V/m; Power Drift = -0.444 dB; Peak SAR (extrapolated) = 2.03 W/kg
SAR(1 g) = 0.479 mW/g; SAR(10 g) = 0.128 mW/g; Maximum value of SAR (measured) = 1.05 mW/g



Date/Time: 1/20/2011 9:21:55 AM

Test Laboratory: Motorola - CDMA 800 Back Surface of DUT

Serial: 990005200875; FCC ID: IHDP56LU1
Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: Internal
Device Position: Body Worn, Back of DUT 9 mm from Phantom
Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1

Medium: Low Freq Body
Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 55.2; ρ = 1000 kg/m^3

DASY4 Configuration:

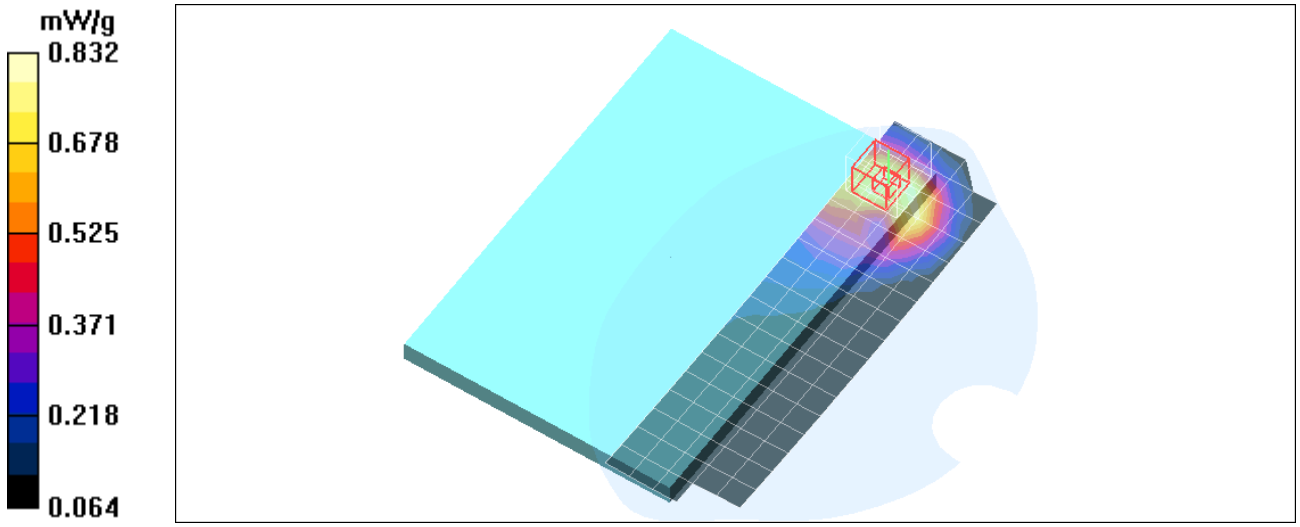
- Probe: ES3DV3 - SN3183; ConvF(6.15, 6.15, 6.15); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM DUT Against Flat Section/Partial Face Area Scan - Normal Body (15mm) (21x6x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.774 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.8 V/m; Power Drift = -0.284 dB; Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.771 mW/g; SAR(10 g) = 0.508 mW/g; Maximum value of SAR (measured) = 0.832 mW/g



Date/Time: 1/19/2011 12:45:31 PM

Test Laboratory: Motorola - CDMA 1900 Back Surface of DUT

Serial: 990005200875; FCC ID: IHDP56LU1
Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: Internal
Device Position: Body Worn, Back of DUT 9 mm from Phantom
Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

DASY4 Configuration:

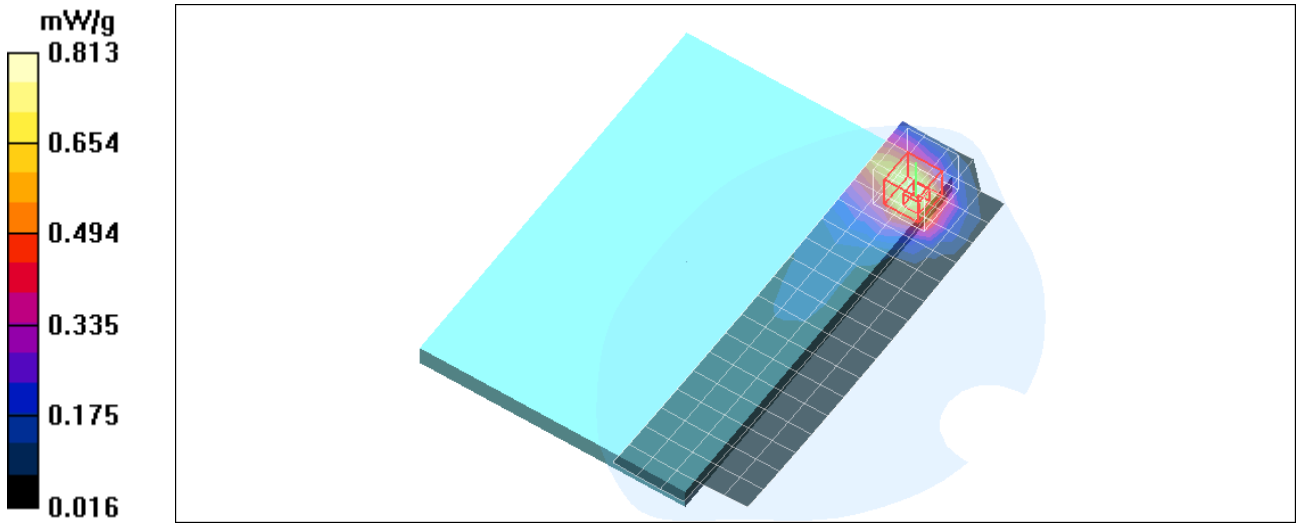
- Probe: ES3DV3 - SN3183; ConvF(4.84, 4.84, 4.84); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM DUT Against Flat Section/Partial Face Area Scan - Normal Body (15mm) (21x6x1): /

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.759 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.5 V/m; Power Drift = -0.002 dB; Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.751 mW/g; SAR(10 g) = 0.442 mW/g; Maximum value of SAR (measured) = 0.813 mW/g



Date/Time: 11/18/2010 11:15:28 AM

Test Laboratory: Motorola - CDMA 800 - Top Edge of DUT

Serial: 99000052000858; FCC ID: IHDP56LU1
Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: Internal
Device Position: Body Worn, Top Edge of DUT 0 mm from Phantom
Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1

Medium: Low Freq Body
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 55; ρ = 1000 kg/m^3

DASY4 Configuration:

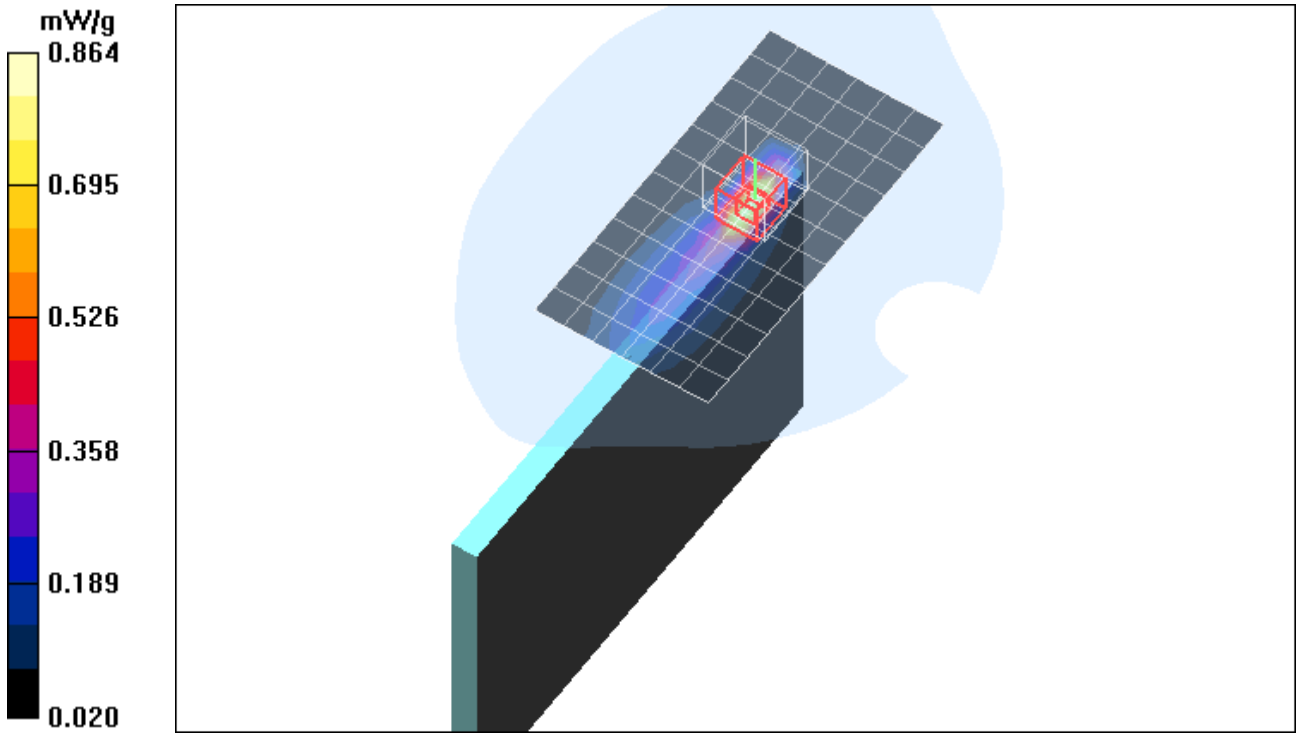
- Probe: ES3DV3 - SN3124; ConvF(5.86, 5.86, 5.86); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.839 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.4 V/m; Power Drift = -0.106 dB; Peak SAR (extrapolated) = 1.53 W/kg
SAR(1 g) = 0.716 mW/g; SAR(10 g) = 0.336 mW/g; Maximum value of SAR (measured) = 0.864 mW/g



Date/Time: 11/17/2010 6:20:28 PM

Test Laboratory: Motorola - CDMA 1900 - Top Edge of DUT

Serial: 99000052000858; FCC ID: IHDP56LU1
Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Battery Model #: Internal
Device Position: Body Worn, Top Edge of DUT 0 mm from Phantom
Communication System: CDMA 1900; Frequency: 1908.75 MHz; Channel Number: 1175; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3

DASY4 Configuration:

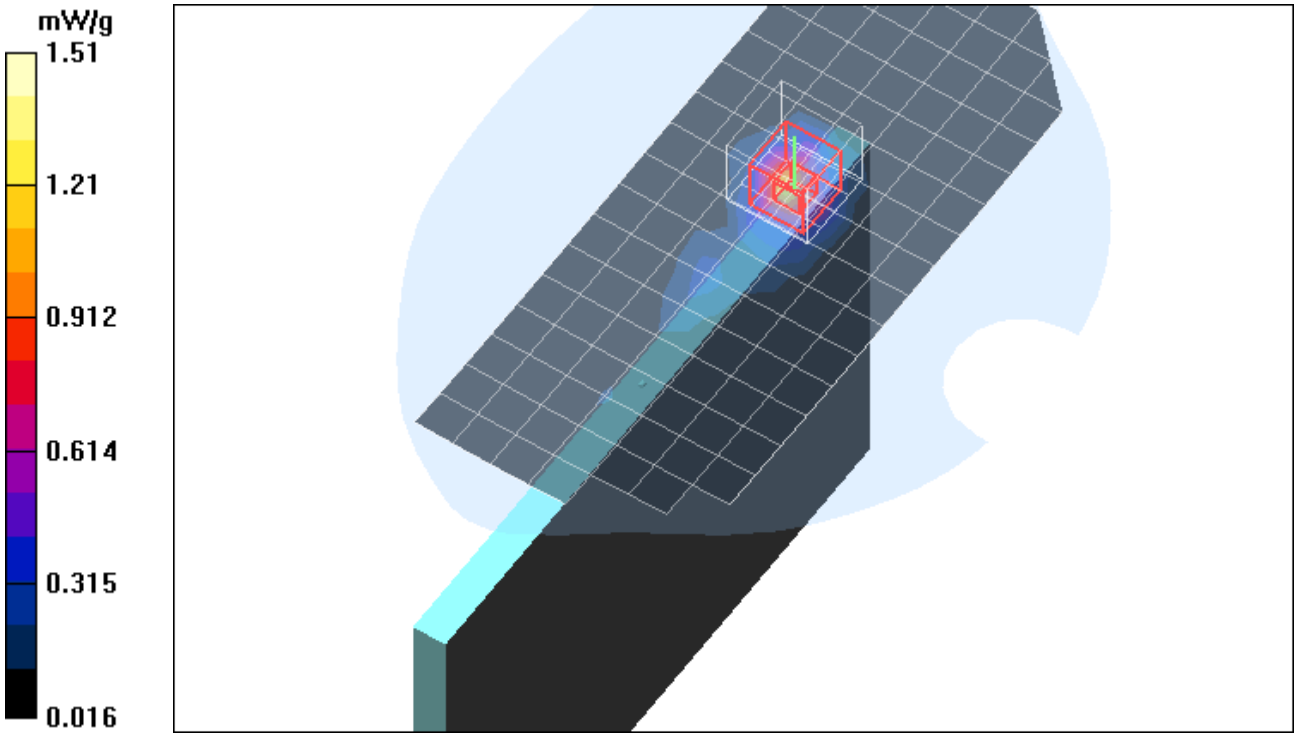
- Probe: ES3DV3 - SN3124; ConvF(4.76, 4.76, 4.76); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM DUT Template/Area Scan - Full Body (15mm) (18x8x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.20 mW/g

SAM DUT Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm;
Reference Value = 26.1 V/m; Power Drift = 0.045 dB; Peak SAR (extrapolated) = 2.85 W/kg
SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.558 mW/g; Maximum value of SAR (measured) = 1.51 mW/g



Date/Time: 11/27/2010 1:29:55 PM

Test Laboratory: Motorola - Wi-Fi 2.45 GHz - Top Edge of DUT

Serial: 99000052000875; FCC ID: IHDP56LU1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: Internal
Device Position: Body Worn, Top Edge of DUT 0 mm from Phantom
Device Mode: 802.11b mode, 1 Mbps data rate
Communication System: Wi-Fi 2450; Frequency: 2437 MHz; Channel Number: 6; Duty Cycle: 1:1

Medium: 2450 Glycol Body
Medium parameters used: f = 2450 MHz; σ = 1.96 mho/m; ε_r = 50.4; ρ = 1000 kg/m^3

DASY4 Configuration:

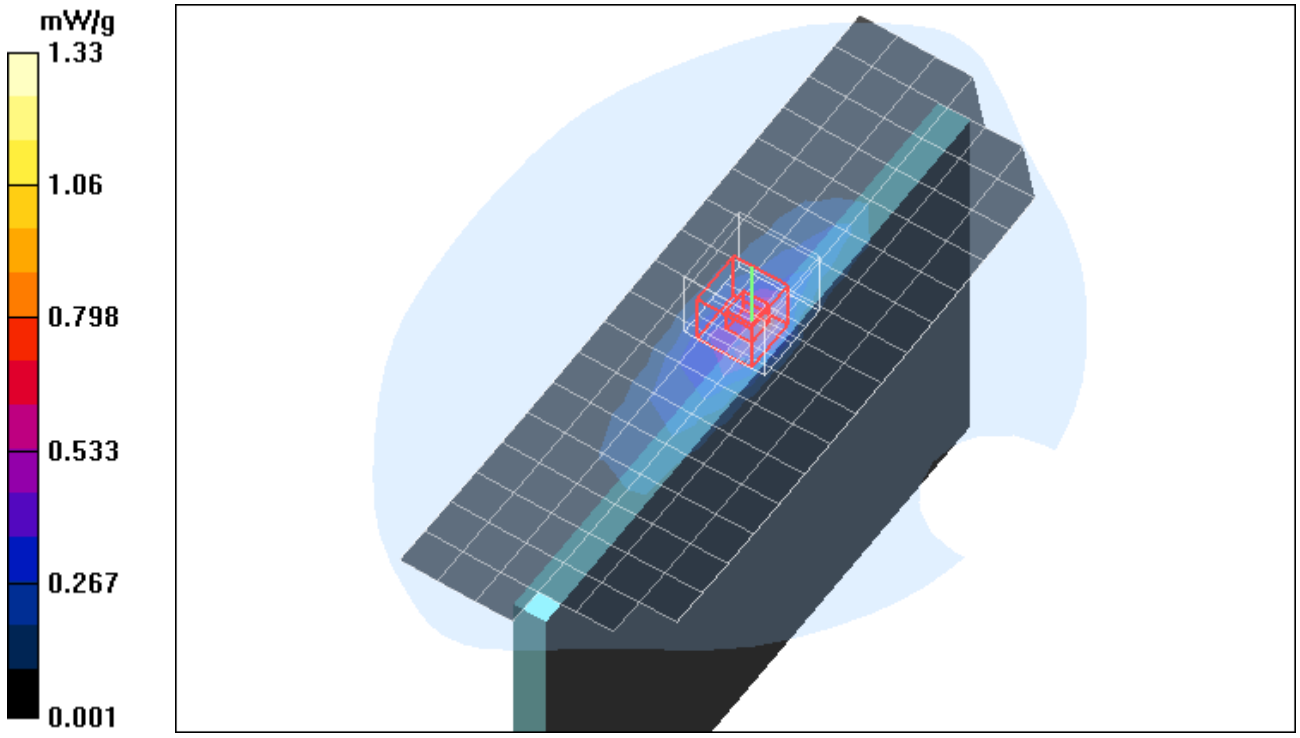
- Probe: ES3DV3 - SN3124; ConvF(4.19, 4.19, 4.19); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM DUT Against Flat Section/Area Scan - Normal Body (15mm) (21x7x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.711 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.3 V/m; Power Drift = 0.267 dB; Peak SAR (extrapolated) = 2.53 W/kg
SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.394 mW/g; Maximum value of SAR (measured) = 1.33 mW/g



Date/Time: 12/10/2010 11:24:07 PM

Test Laboratory: Motorola - Wi-Fi 5.21 GHz - Top Edge of DUT

Serial: 99000052000875; FCC ID: IHDP56LU1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: Internal
Device Position: Body Worn, Top Edge of DUT 0 mm from Phantom
Device Mode: 802.11a mode, 6 Mbps data rate
Communication System: 5210MHz Band; Frequency: 5220 MHz; Channel Number: 44; Duty Cycle: 1:1

Medium: 5-6 GHz SPEAG Tissue BODY
Medium parameters used: f = 5210 MHz; σ = 5.72 mho/m; ε_r = 45.2; ρ = 1000 kg/m^3

DASY4 Configuration:

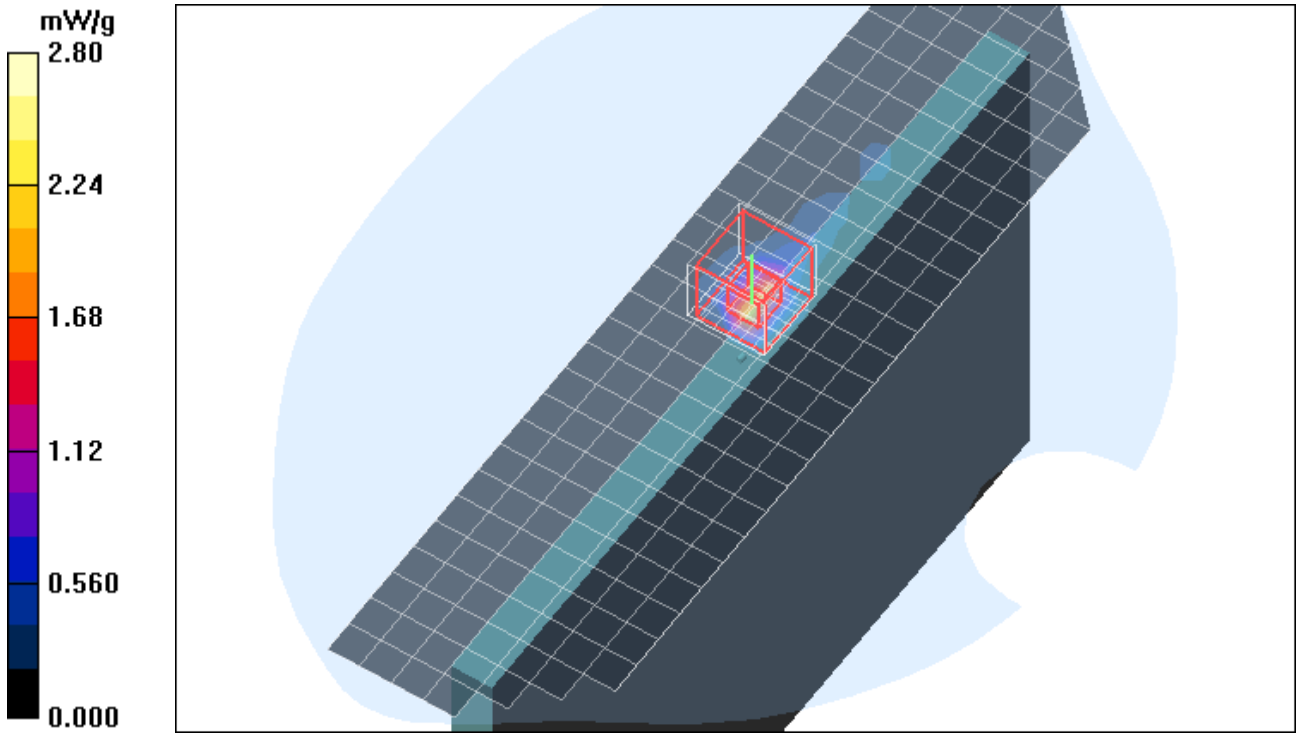
- Probe: EX3DV4 - SN3730; ConvF(4.07, 4.07, 4.07); Calibrated: 7/16/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#3 5Ghz BODY SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1106;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM DUT Against Flat Section/Long Edge Area Scan - Body (10mm) (31x8x1):

Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 2.12 mW/g

SAM DUT Against Flat Section/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 11.3 V/m; Power Drift = 0.080 dB; Peak SAR (extrapolated) = 5.79 W/kg
SAR(1 g) = 1.25 mW/g; SAR(10 g) = 0.318 mW/g; Maximum value of SAR (measured) = 2.80 mW/g



Date/Time: 12/9/2010 6:58:39 PM

Test Laboratory: Motorola - Wi-Fi 5.785 GHz - Top Edge of DUT

Serial: 99000052000875; FCC ID: IHDP56LU1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: Internal
Device Position: Body Worn, Top Edge of DUT 0 mm from Phantom
Device Mode: 802.11a mode, 6 Mbps data rate
Communication System: 5785MHz Band; Frequency: 5805 MHz; Channel Number: 161; Duty Cycle: 1:1

Medium: 5-6 GHz SPEAG Tissue BODY
Medium parameters used: f = 5785 MHz; σ = 6.54 mho/m; ε_r = 44.4; ρ = 1000 kg/m^3

DASY4 Configuration:

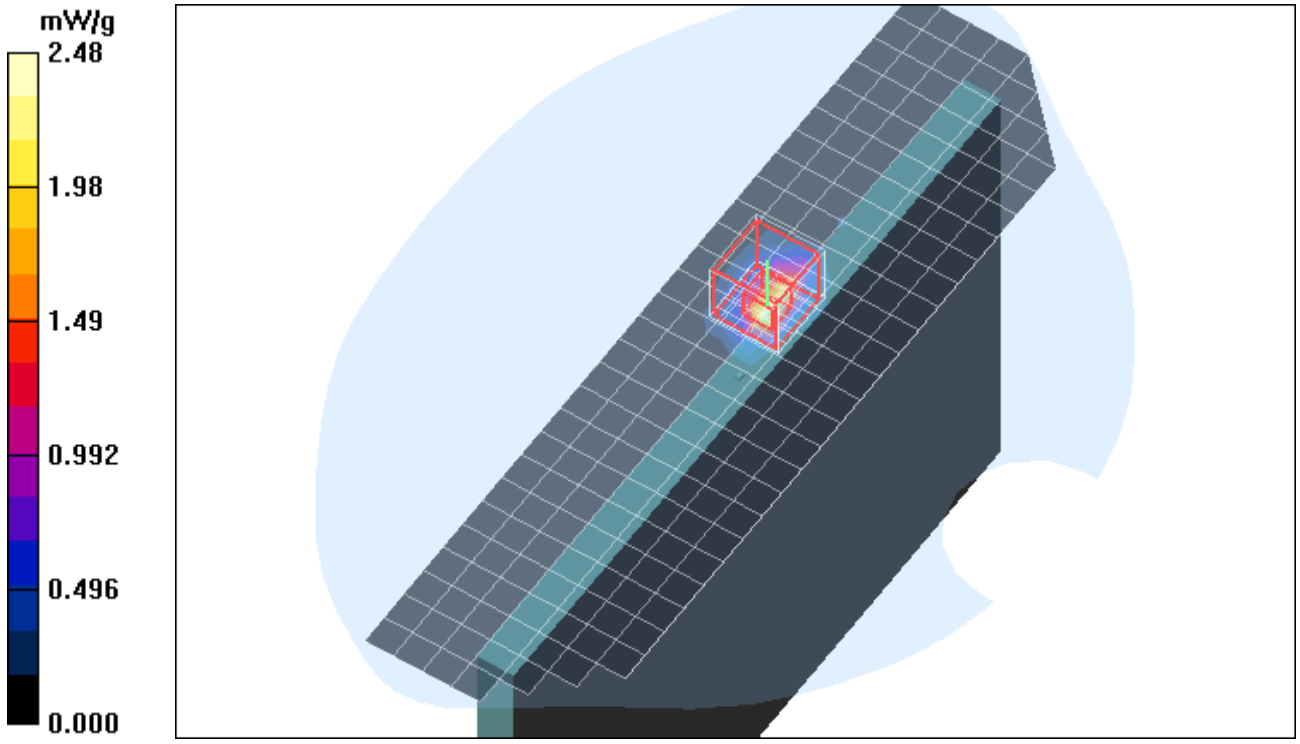
- Probe: EX3DV4 - SN3730; ConvF(3.53, 3.53, 3.53); Calibrated: 7/16/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#3 5Ghz BODY SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1106;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM DUT Against Flat Section/Long Edge Area Scan - Body (10mm) (31x8x1):

Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 2.41 mW/g

SAM DUT Against Flat Section/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 15.6 V/m; Power Drift = -0.880 dB; Peak SAR (extrapolated) = 5.25 W/kg
SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.299 mW/g; Maximum value of SAR (measured) = 2.48 mW/g



Date/Time: 11/18/2010 10:56:42 AM

Test Laboratory: Motorola - CDMA 800 - Right Edge of DUT

Serial: 99000052000858; FCC ID: IHDP56LU1
Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: Internal
Device Position: Body Worn, Right Edge of DUT 0 mm from Phantom
Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1

Medium: Low Freq Body
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 55; ρ = 1000 kg/m^3

DASY4 Configuration:

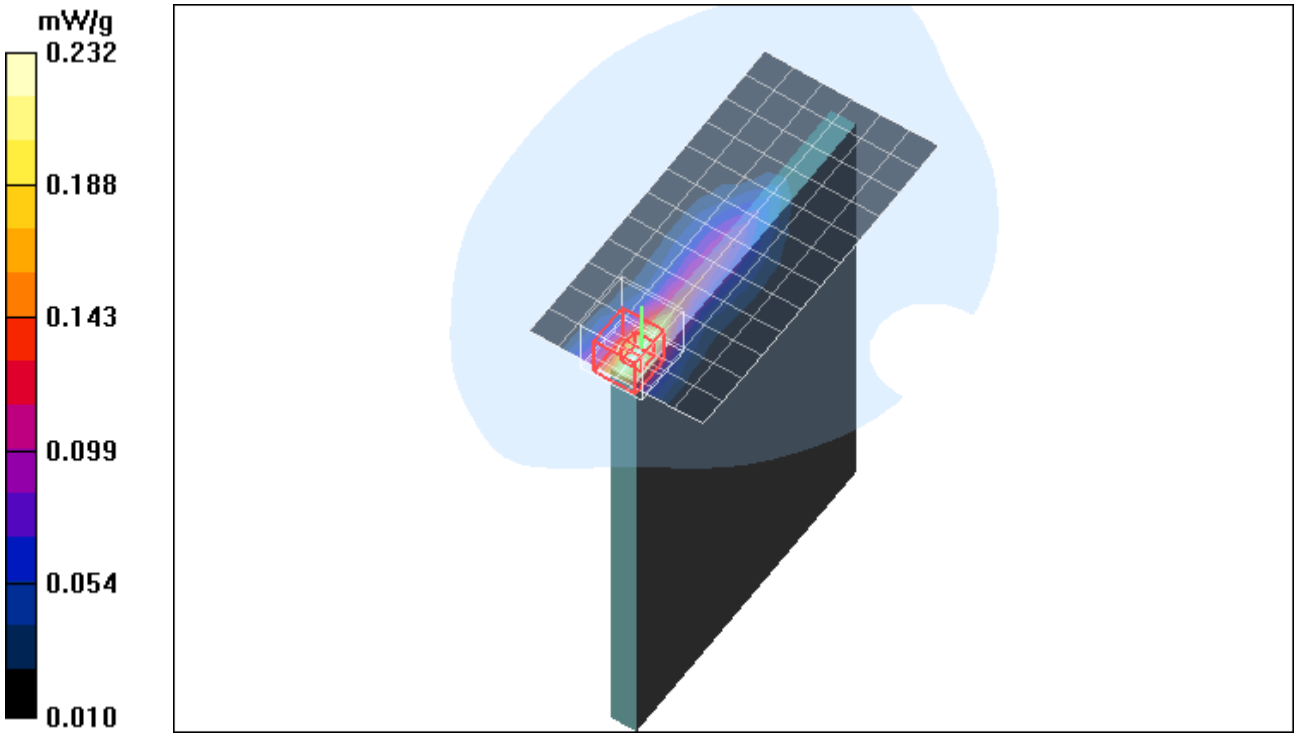
- Probe: ES3DV3 - SN3124; ConvF(5.86, 5.86, 5.86); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.239 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.7 V/m; Power Drift = -0.051 dB; Peak SAR (extrapolated) = 0.385 W/kg
SAR(1 g) = 0.201 mW/g; SAR(10 g) = 0.113 mW/g; Maximum value of SAR (measured) = 0.232 mW/g



Date/Time: 11/17/2010 9:30:47 PM

Test Laboratory: Motorola - CDMA 1900 - Right Edge of DUT

Serial: 99000052000858; FCC ID: IHDP56LU1
Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Battery Model #: Internal
Device Position: Body Worn, Right Edge of DUT 0 mm from Phantom
Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3

DASY4 Configuration:

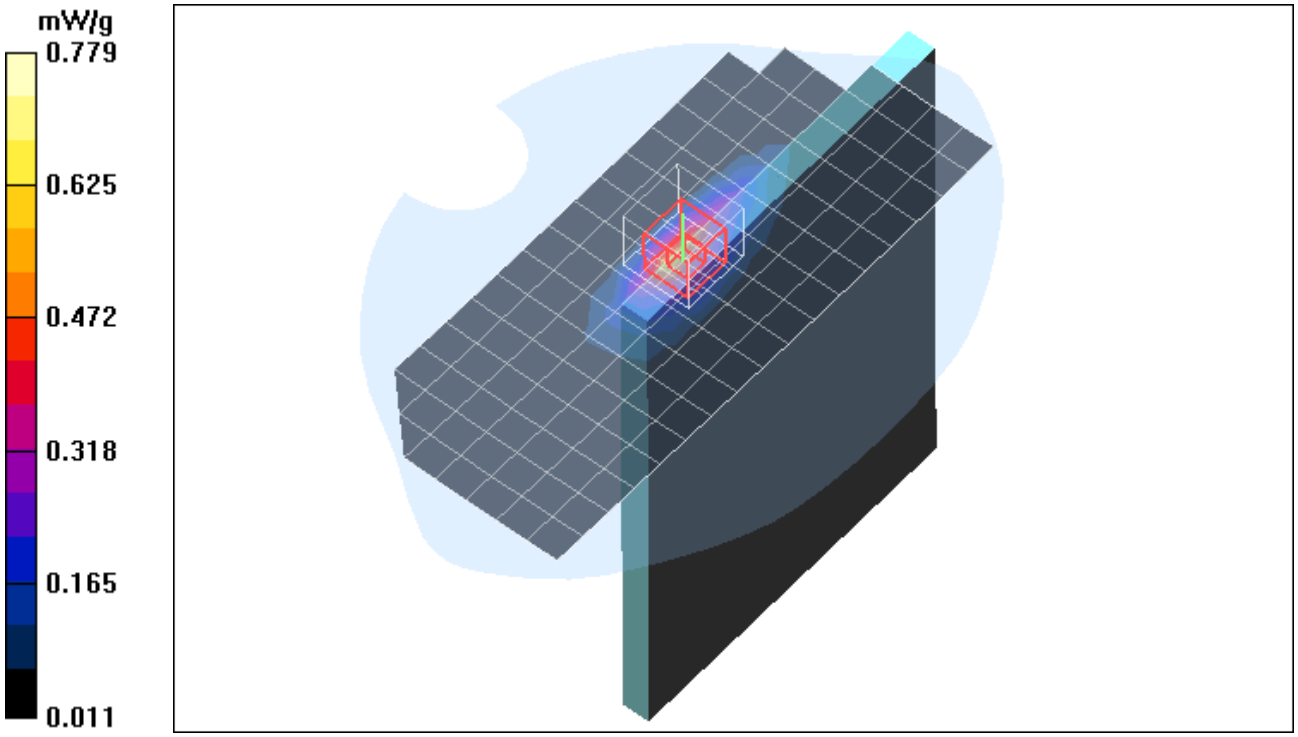
- Probe: ES3DV3 - SN3124; ConvF(4.76, 4.76, 4.76); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

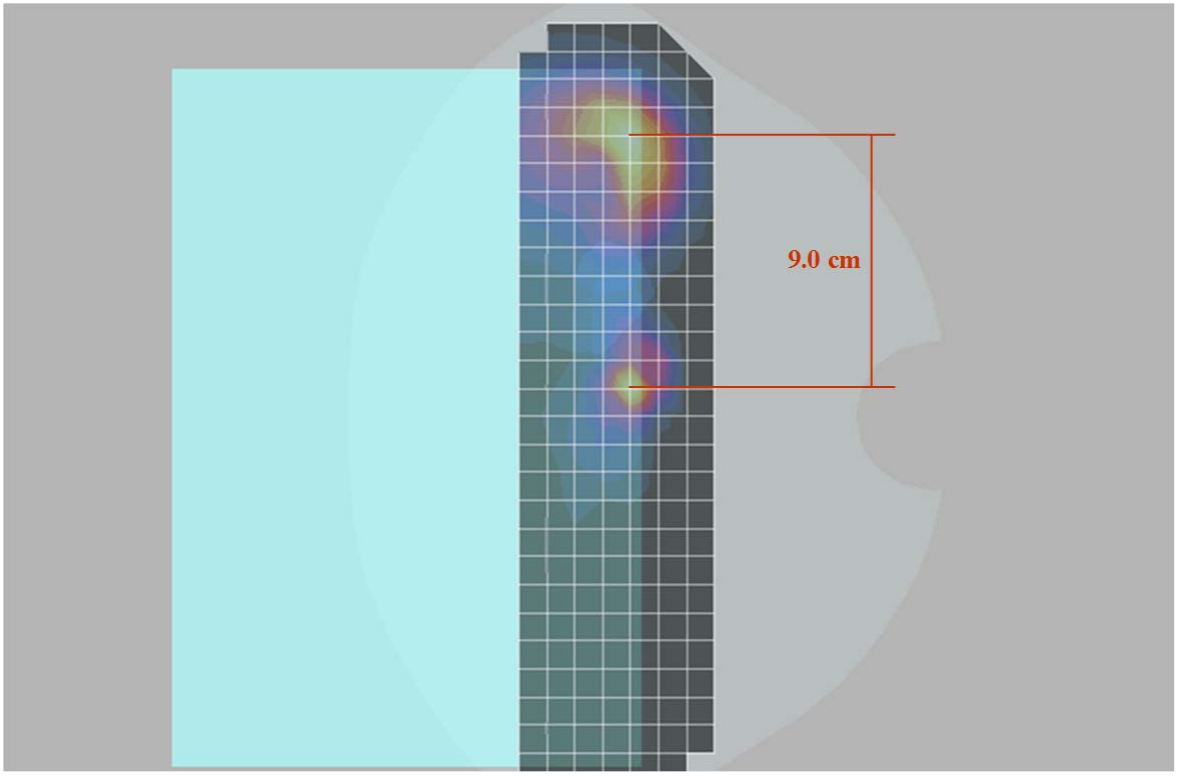
SAM DUT Template/Area Scan - Full Body (15mm) (18x8x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.547 mW/g

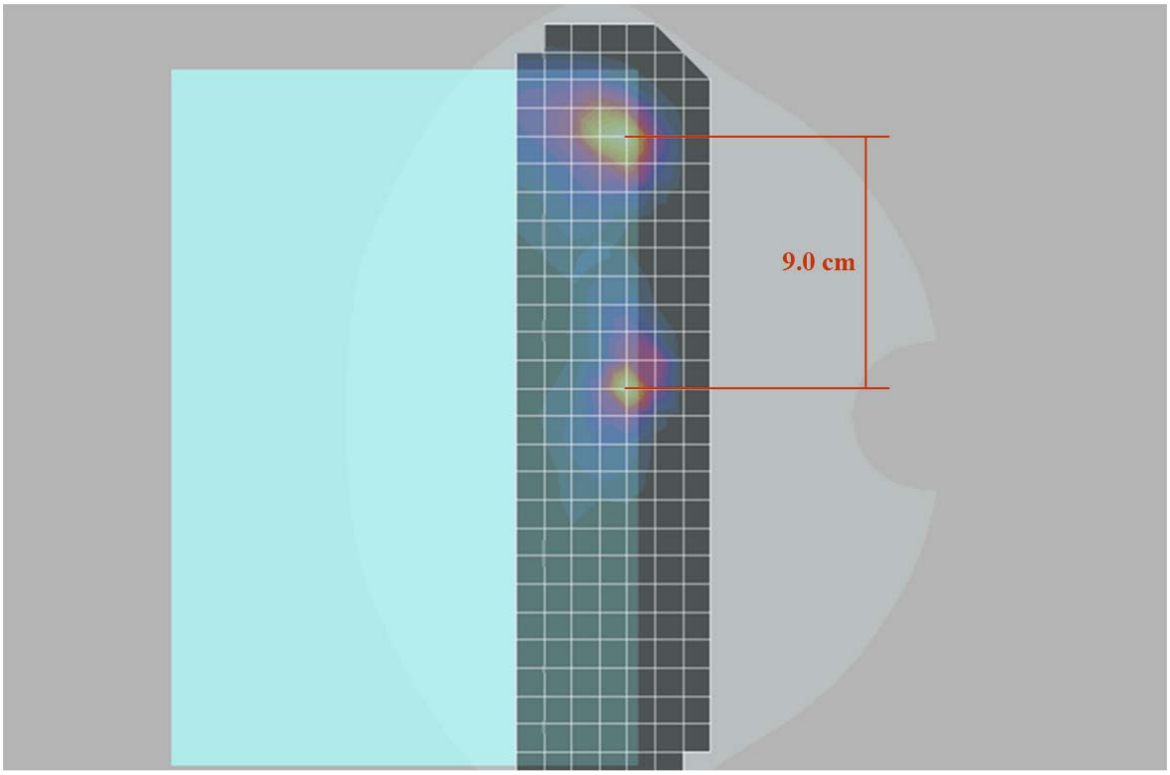
SAM DUT Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.1 V/m; Power Drift = -0.019 dB; Peak SAR (extrapolated) = 1.35 W/kg
SAR(1 g) = 0.648 mW/g; SAR(10 g) = 0.302 mW/g; Maximum value of SAR (measured) = 0.779 mW/g

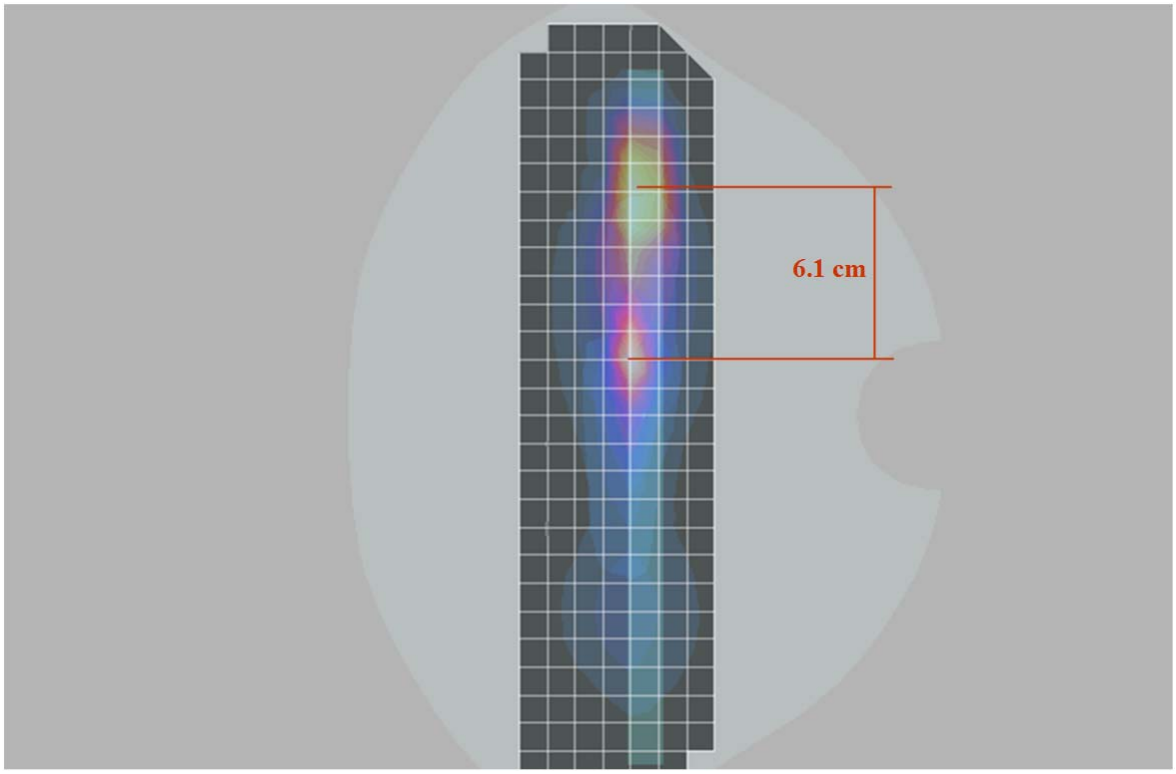




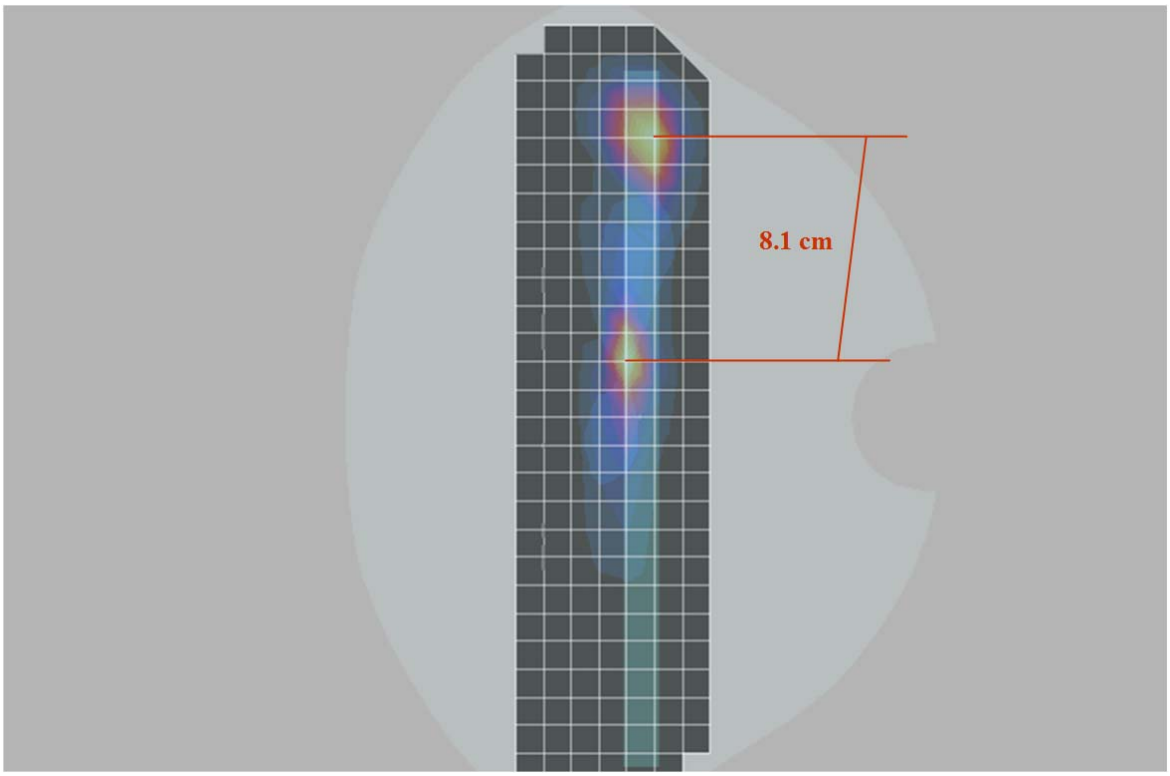
Plot A2.1 - CDMA 800 Back of DUT SAR overlaid with Wi-Fi 2.45 GHz Back of DUT SAR



Plot A2.2 - CDMA 1900 Back of DUT SAR overlaid with Wi-Fi 2.45 GHz Back of DUT SAR



Plot A2.3 - CDMA 800 Top Edge of DUT SAR overlaid with Wi-Fi 2.45 GHz Top Edge of DUT SAR



Plot A2.4 - CDMA 1900 Top Edge of DUT SAR overlaid with Wi-Fi 2.45 GHz Top Edge of DUT SAR

Test Laboratory: Motorola - CDMA 800 + Wi-Fi 5.21 GHz Multiband Combined Body Worn Expanded Volumetric Measurement

DASY4 Configuration DASY, SAM Flat Section
Top Edge of DUT 0 mm from Phantom
/SAM DUT Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm):

Date/Time: 12/18/2010 2:53:15 PM
Serial: 99000052000858; FCC ID: IHDP56LU1
Communication System: CDMA 835; Frequency: 836.52 MHz; Duty Cycle: 1:1

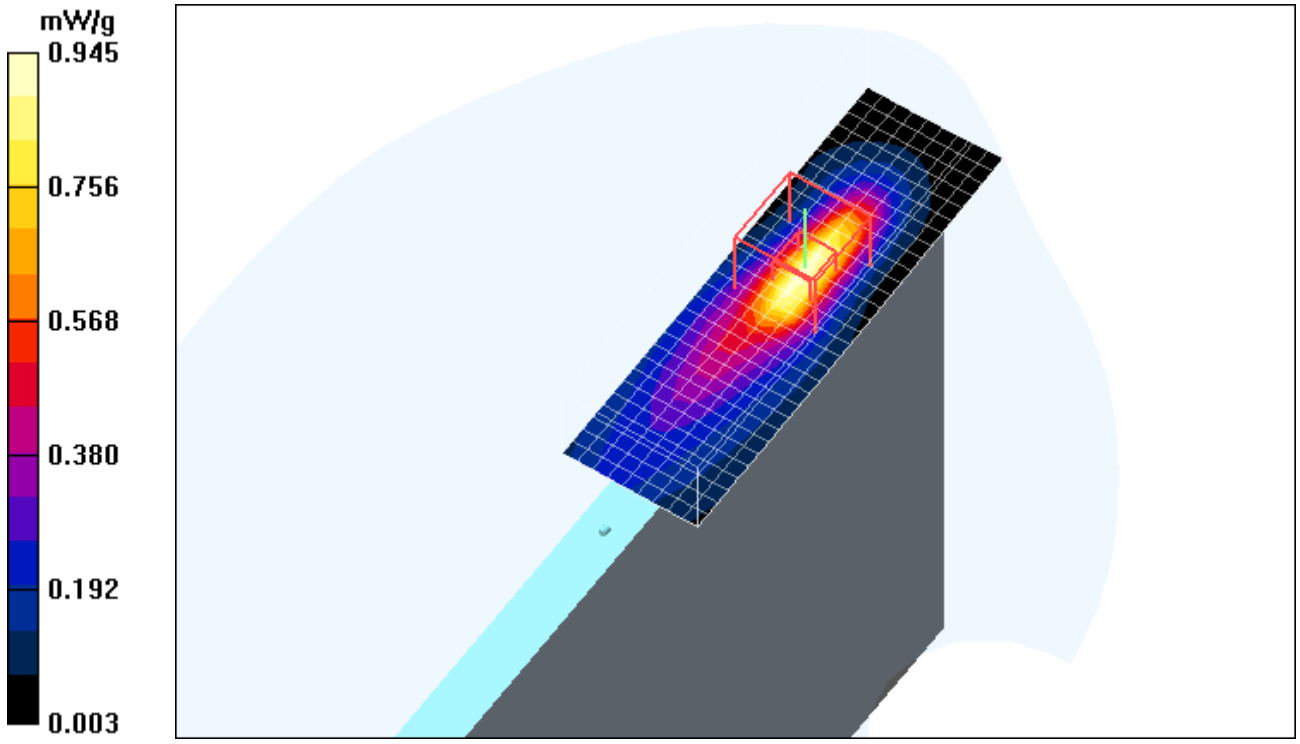
Medium: Low Freq Body
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3

Measurement Standard: DASY4 (High Precision Assessment)

- Probe: ES3DV3 - SN3124; ConvF(5.86, 5.86, 5.86); Calibrated: 8/11/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250
- Measurement SW: DASY4, V4.7 Build 80

SAM DUT Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm) (31x10x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm; Volume Outer Dimensions: x=120mm, y=36mm, z=22mm
Reference Value = 12.5 V/m; Power Drift = 0.027 dB; Peak SAR (extrapolated) = 1.85 W/kg
SAR(1 g) = 0.711 mW/g; SAR(10 g) = 0.335 mW/g; Maximum value of SAR (measured) = 0.945 mW/g



2D Plot showing z-axis @ 0 mm layer of measurement volume

DASY4 Configuration DASY, SAM Flat Section
Top Edge of DUT 0 mm from Phantom
/SAM DUT Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm):

Date/Time: 12/18/2010 3:45:57 PM
Serial: 99000052000875; FCC ID: IHDP56LU1
Communication System: 5210MHz Band; Frequency: 5220 MHz; Duty Cycle: 1:1

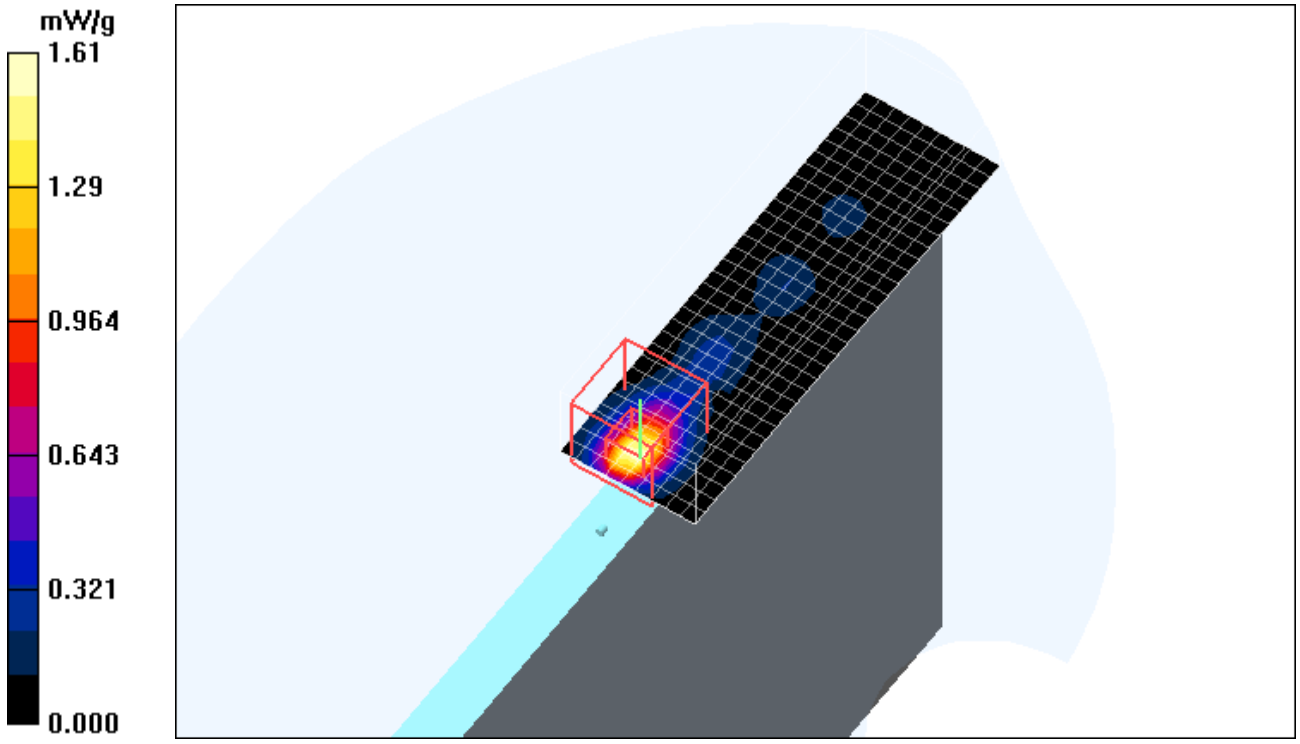
Medium: 5-6 GHz SPEAG Tissue BODY
Medium parameters used: f = 5210 MHz; σ = 5.67 mho/m; ε_r = 45.7; ρ = 1000 kg/m^3

Measurement Standard: DASY4 (High Precision Assessment)

- Probe: EX3DV4 - SN3730; ConvF(4.07, 4.07, 4.07); Calibrated: 7/16/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#3 5Ghz BODY SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1106
- Measurement SW: DASY4, V4.7 Build 80

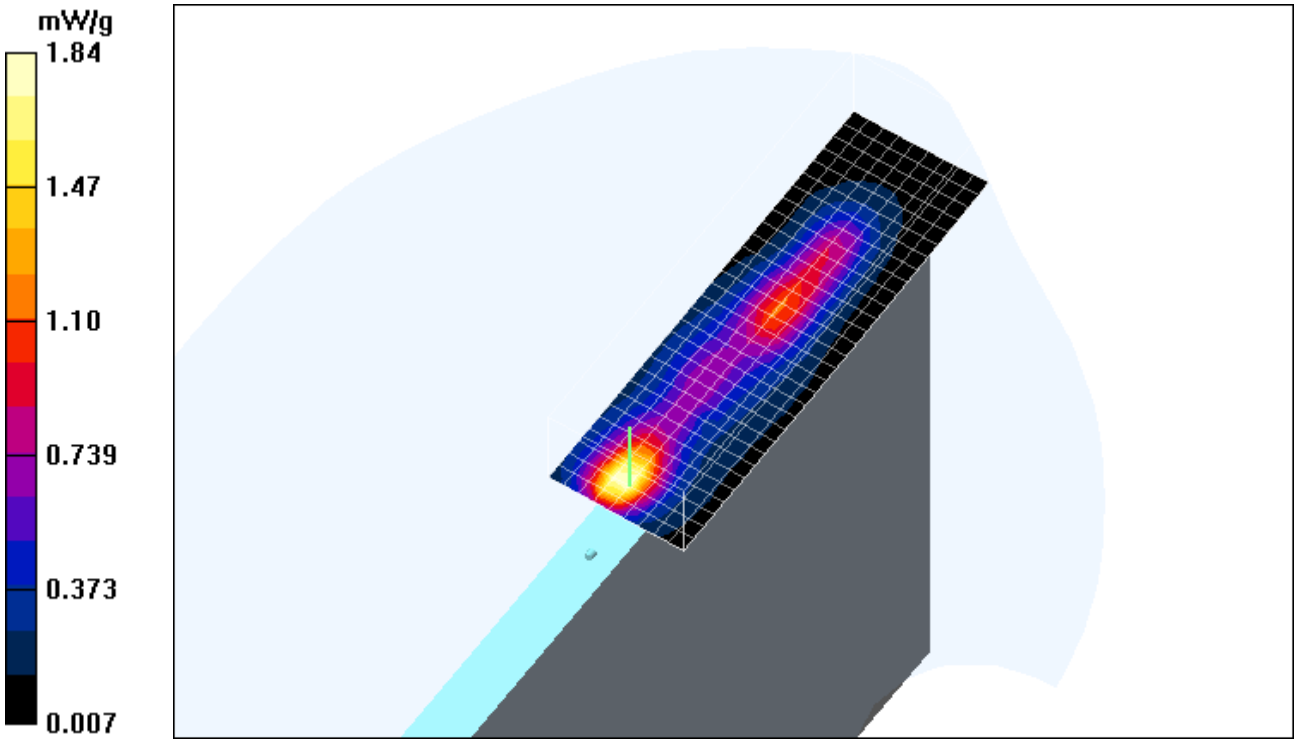
SAM Phone Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm) (31x10x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm; Volume Outer Dimensions: x=120mm, y=36mm, z=22mm
Reference Value = 13.8 V/m; Power Drift = -0.049 dB; Peak SAR (extrapolated) = 3.81 W/kg
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.252 mW/g; Maximum value of SAR (measured) = 1.61 mW/g



2D Plot showing z-axis @ 0 mm layer of measurement volume

Multi Band Result:
SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.410 mW/g
Maximum value of SAR (measured) = 1.84 mW/g



2D Plots showing z-axis @ 0 mm layer of measurement volume

Test Laboratory: Motorola-CDMA 1900 + Wi-Fi 5.21 GHz Multiband Combined Body Worn Expanded Volumetric Measurement

DASY4 Configuration DASY, SAM Flat Section
Top Edge of DUT 0 mm from Phantom
/SAM DUT Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm):

Date/Time: 12/17/2010 1:54:56 PM
Serial: 99000052000858; FCC ID: IHDP56LU1
Communication System: CDMA 1900; Frequency: 1908.75 MHz; Duty Cycle: 1:1

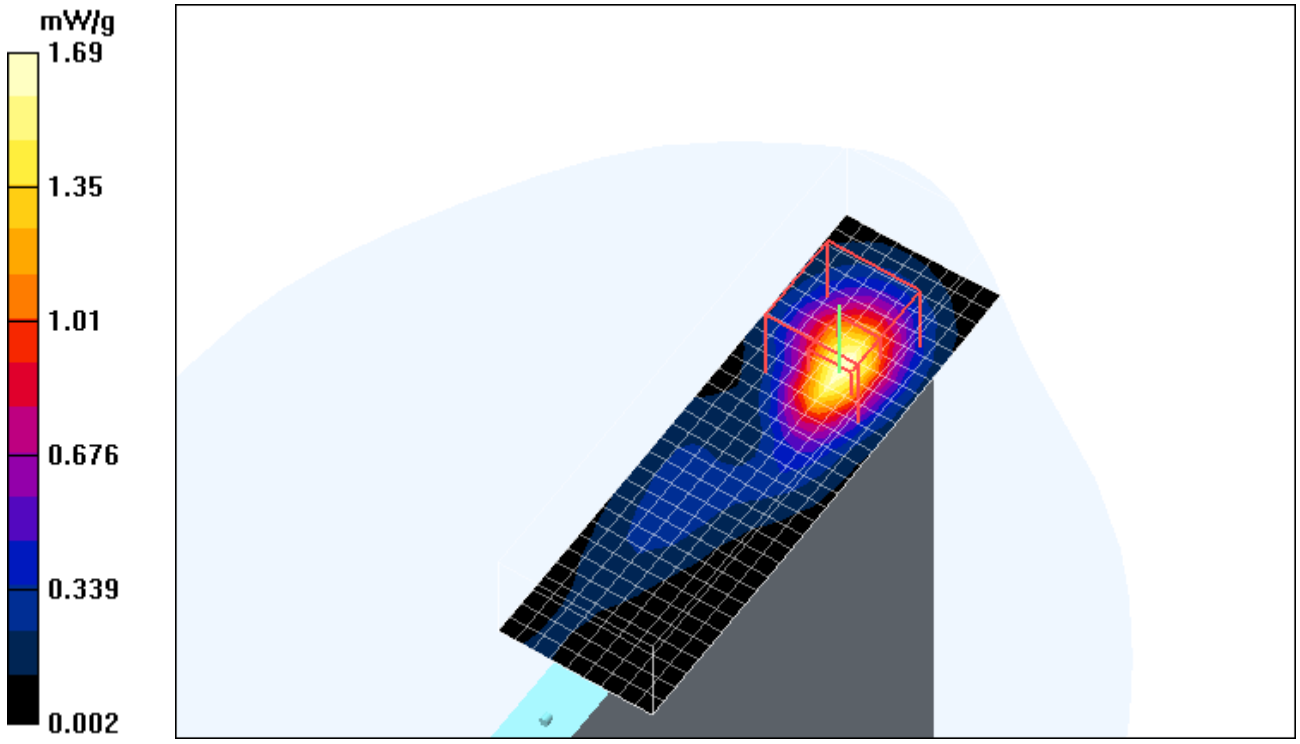
Medium: Regular Glycol Body 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 50.7; ρ = 1000 kg/m^3

Measurement Standard: DASY4 (High Precision Assessment)

- Probe: ES3DV3 - SN3124; ConvF(4.76, 4.76, 4.76); Calibrated: 8/11/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250
- Measurement SW: DASY4, V4.7 Build 80

SAM DUT Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm) (31x10x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm; Volume Outer Dimensions: x=120mm, y=36mm, z=22mm
Reference Value = 13.9 V/m; Power Drift = -0.013 dB; Peak SAR (extrapolated) = 3.35 W/kg
SAR(1 g) = 1.23 mW/g; SAR(10 g) = 0.536 mW/g; Maximum value of SAR (measured) = 1.69 mW/g



2D Plot showing z-axis @ 0 mm layer of measurement volume

DASY4 Configuration DASY, SAM Flat Section
Top Edge of DUT 0 mm from Phantom
/SAM DUT Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm):

Date/Time: 12/18/2010 3:45:57 PM
Serial: 99000052000875; FCC ID: IHDP56LU1
Communication System: 5210MHz Band; Frequency: 5220 MHz; Duty Cycle: 1:1

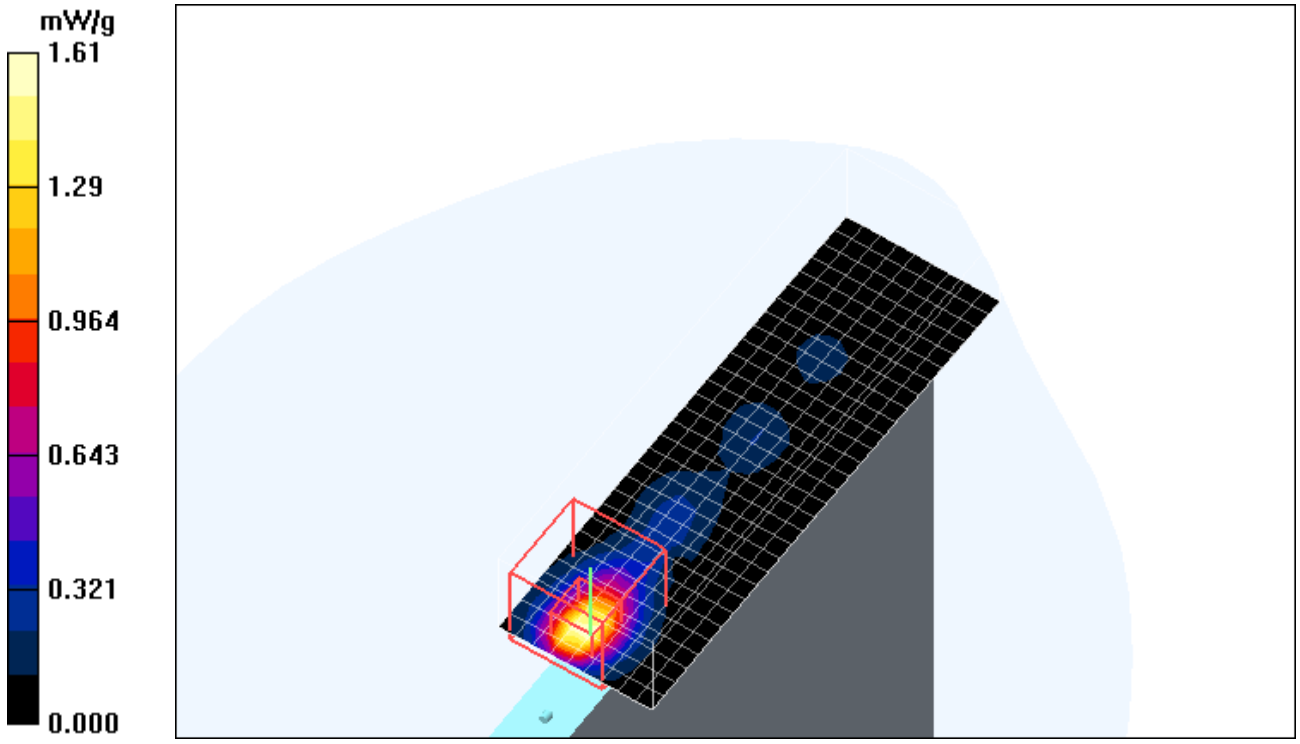
Medium: 5-6 GHz SPEAG Tissue BODY
Medium parameters used: f = 5210 MHz; σ = 5.67 mho/m; ε_r = 45.7; ρ = 1000 kg/m^3

Measurement Standard: DASY4 (High Precision Assessment)

- Probe: EX3DV4 - SN3730; ConvF(4.07, 4.07, 4.07); Calibrated: 7/16/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#3 5Ghz BODY SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1106
- Measurement SW: DASY4, V4.7 Build 80

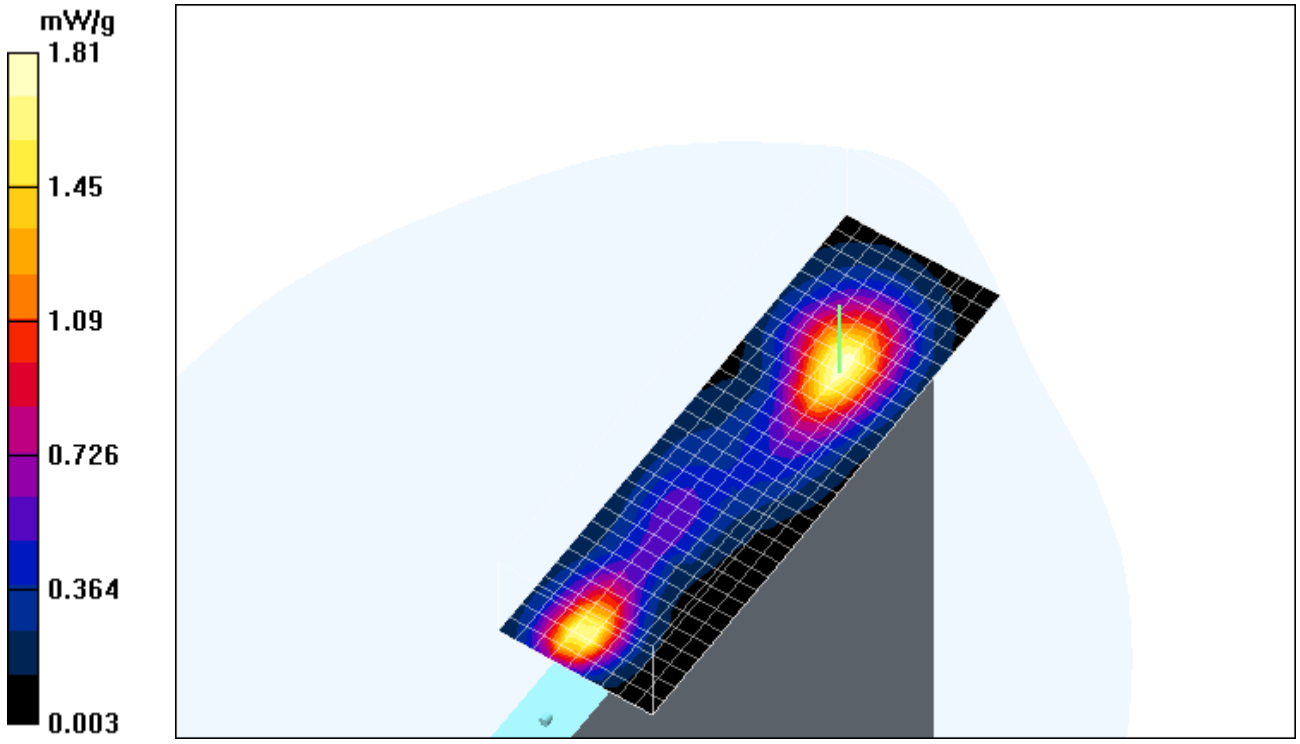
SAM Phone Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm) (31x10x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm; Volume Outer Dimensions: x=120mm, y=36mm, z=22mm
Reference Value = 13.8 V/m; Power Drift = -0.049 dB; Peak SAR (extrapolated) = 3.81 W/kg
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.252 mW/g; Maximum value of SAR (measured) = 1.61 mW/g



2D Plot showing z-axis @ 0 mm layer of measurement volume

Multi Band Result:
SAR(1 g) = 1.32 mW/g; SAR(10 g) = 0.565 mW/g
Maximum value of SAR (measured) = 1.81 mW/g



2D Plot showing z-axis @ 0 mm layer of measurement volume

Test Laboratory: Motorola: CDMA 800+Wi-Fi 5.785 GHz Multiband Combined Body Worn Expanded Volumetric Measurement

DASY4 Configuration DASY, SAM Flat Section
Top Edge of DUT 0 mm from Phantom
/SAM DUT Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm):

Date/Time: 12/18/2010 2:53:15 PM
Serial: 99000052000858; FCC ID: IHDP56LU1
Communication System: CDMA 835; Frequency: 836.52 MHz; Duty Cycle: 1:1

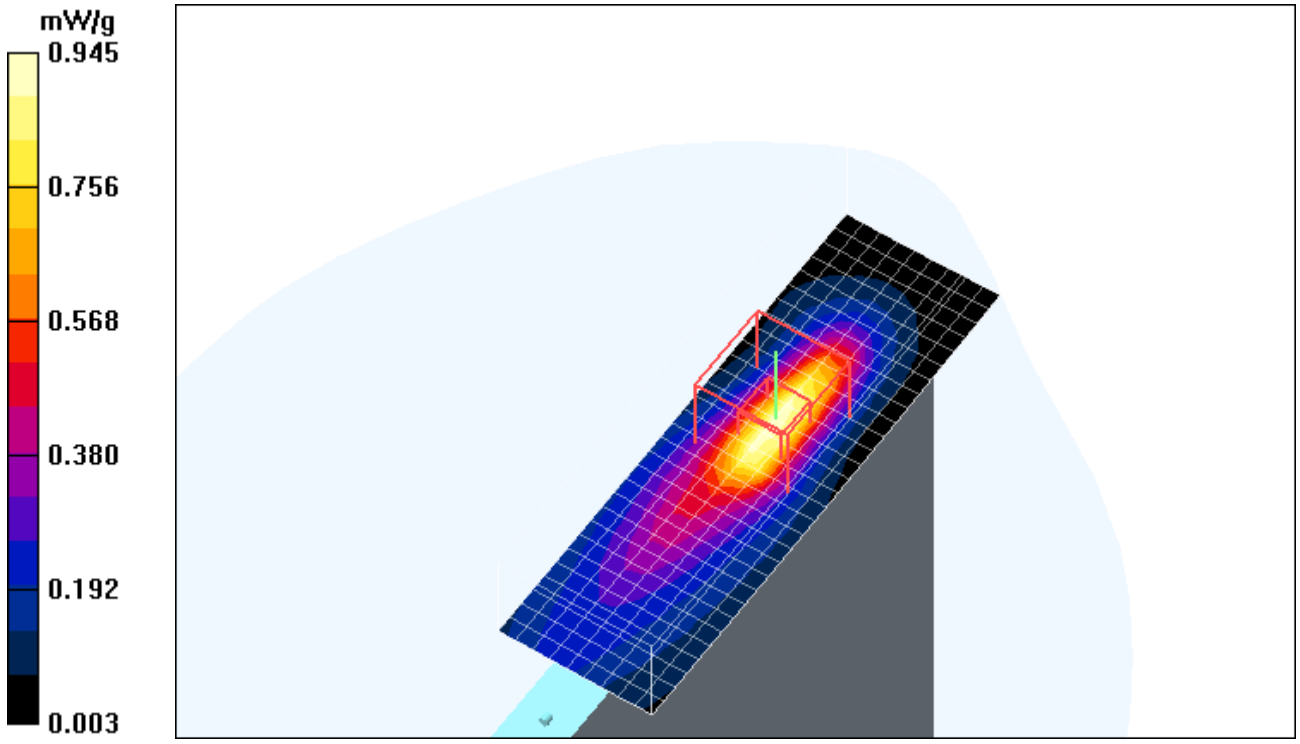
Medium: Low Freq Body (big body)
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3

Measurement Standard: DASY4 (High Precision Assessment)

- Probe: ES3DV3 - SN3124; ConvF(5.86, 5.86, 5.86); Calibrated: 8/11/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250
- Measurement SW: DASY4, V4.7 Build 80

SAM Phone Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm) (31x10x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm; Volume Outer Dimensions: x=120mm, y=36mm, z=22mm
Reference Value = 12.5 V/m; Power Drift = 0.027 dB; Peak SAR (extrapolated) = 1.85 W/kg
SAR(1 g) = 0.711 mW/g; SAR(10 g) = 0.335 mW/g; Maximum value of SAR (measured) = 0.945 mW/g



2D Plot showing z-axis @ 0 mm layer of measurement volume

DASY4 Configuration DASY, SAM Flat Section
Top Edge of DUT 0 mm from Phantom
/SAM DUT Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm):

Date/Time: 12/19/2010 10:58:55 AM
Serial: 99000052000875; FCC ID: IHDP56LU1
Communication System: 5785MHz Band; Frequency: 5805 MHz; Duty Cycle: 1:1

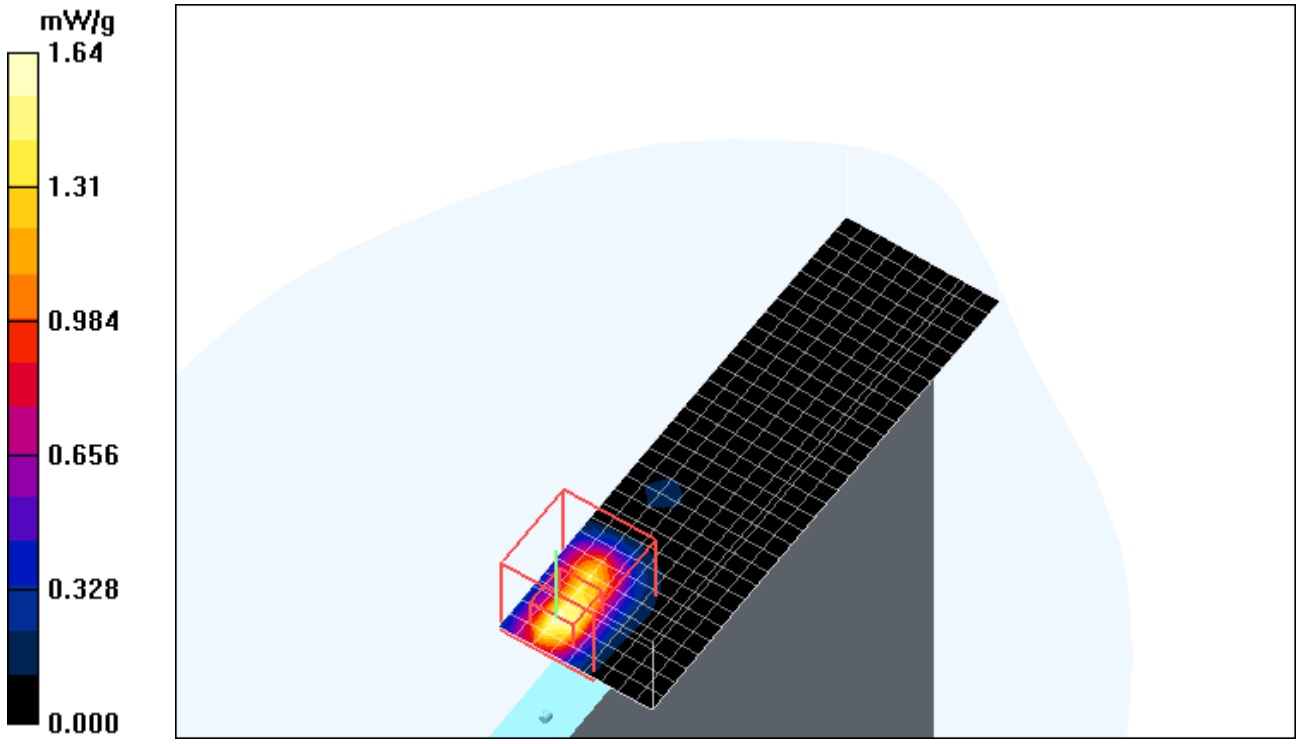
Medium: 5-6 GHz SPEAG Tissue BODY
Medium parameters used: f = 5785 MHz; σ = 6.49 mho/m; ε_r = 44.5; ρ = 1000 kg/m^3

Measurement Standard: DASY4 (High Precision Assessment)

- Probe: EX3DV4 - SN3730; ConvF(3.53, 3.53, 3.53); Calibrated: 7/16/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#3 5Ghz BODY SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1106
- Measurement SW: DASY4, V4.7 Build 80

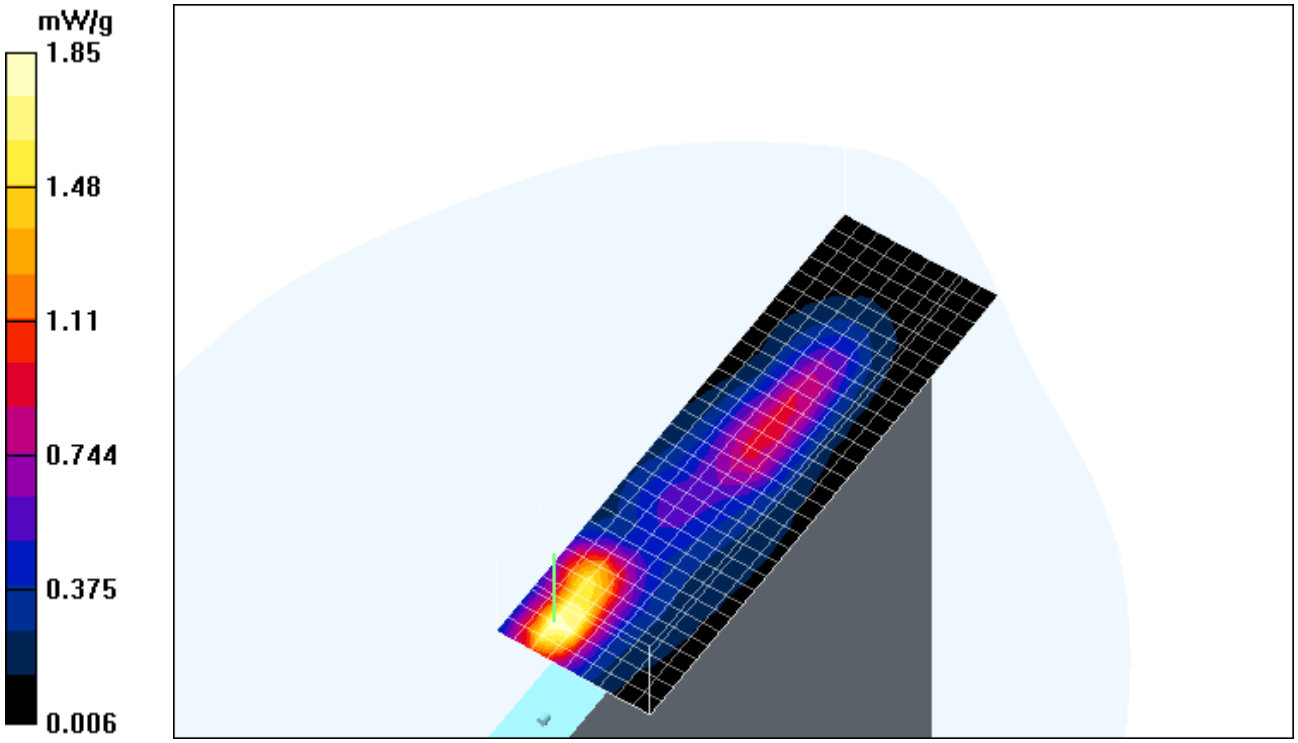
SAM Phone Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm) (31x10x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm; Volume Outer Dimensions: x=120mm, y=36mm, z=22mm
Reference Value = 7.93 V/m; Power Drift = 0.307 dB; Peak SAR (extrapolated) = 4.09 W/kg
SAR(1 g) = 0.992 mW/g; SAR(10 g) = 0.285 mW/g; Maximum value of SAR (measured) = 1.64 mW/g



2D Plot showing z-axis @ 0 mm layer of measurement volume

Multi Band Result:
SAR(1 g) = 1.25 mW/g; SAR(10 g) = 0.438 mW/g
Maximum value of SAR (measured) = 1.85 mW/g



2D Plot showing z-axis @ 0 mm layer of measurement volume

Test Laboratory: Motorola-CDMA 1900+Wi-Fi 5.785 GHz Multiband Combined Body Worn Expanded Volumetric Measurement

DASY4 Configuration DASY, SAM Flat Section
Top Edge of DUT 0 mm from Phantom
/SAM DUT Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm):

Date/Time: 12/17/2010 1:54:56 PM
Serial: 99000052000858; FCC ID: IHDP56LU1
Communication System: CDMA 1900; Frequency: 1908.75 MHz; Duty Cycle: 1:1

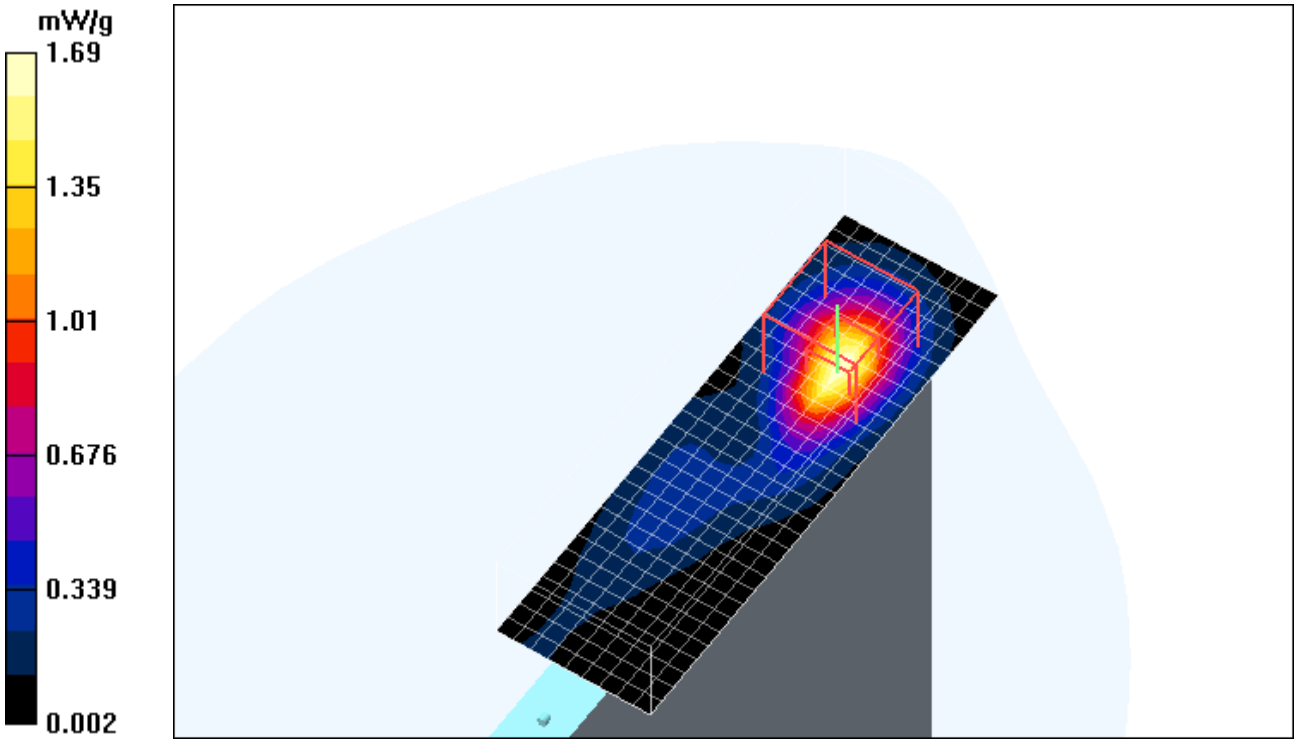
Medium: Regular Glycol Body 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 50.7; ρ = 1000 kg/m^3

Measurement Standard: DASY4 (High Precision Assessment)

- Probe: ES3DV3 - SN3124; ConvF(4.76, 4.76, 4.76); Calibrated: 8/11/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250
- Measurement SW: DASY4, V4.7 Build 80

SAM Phone Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm) (31x10x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm; Volume Outer Dimensions: x=120mm, y=36mm, z=22mm
Reference Value = 13.9 V/m; Power Drift = -0.013 dB; Peak SAR (extrapolated) = 3.35 W/kg
SAR(1 g) = 1.23 mW/g; SAR(10 g) = 0.536 mW/g; Maximum value of SAR (measured) = 1.69 mW/g



2D Plot showing z-axis @ 0 mm layer of measurement volume

DASY4 Configuration DASY, SAM Flat Section
Top Edge of DUT 0 mm from Phantom
/SAM DUT Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm):

Date/Time: 12/19/2010 10:58:55 AM
Serial: 99000052000875; FCC ID: IHDP56LU1
Communication System: 5785MHz Band; Frequency: 5805 MHz; Duty Cycle: 1:1

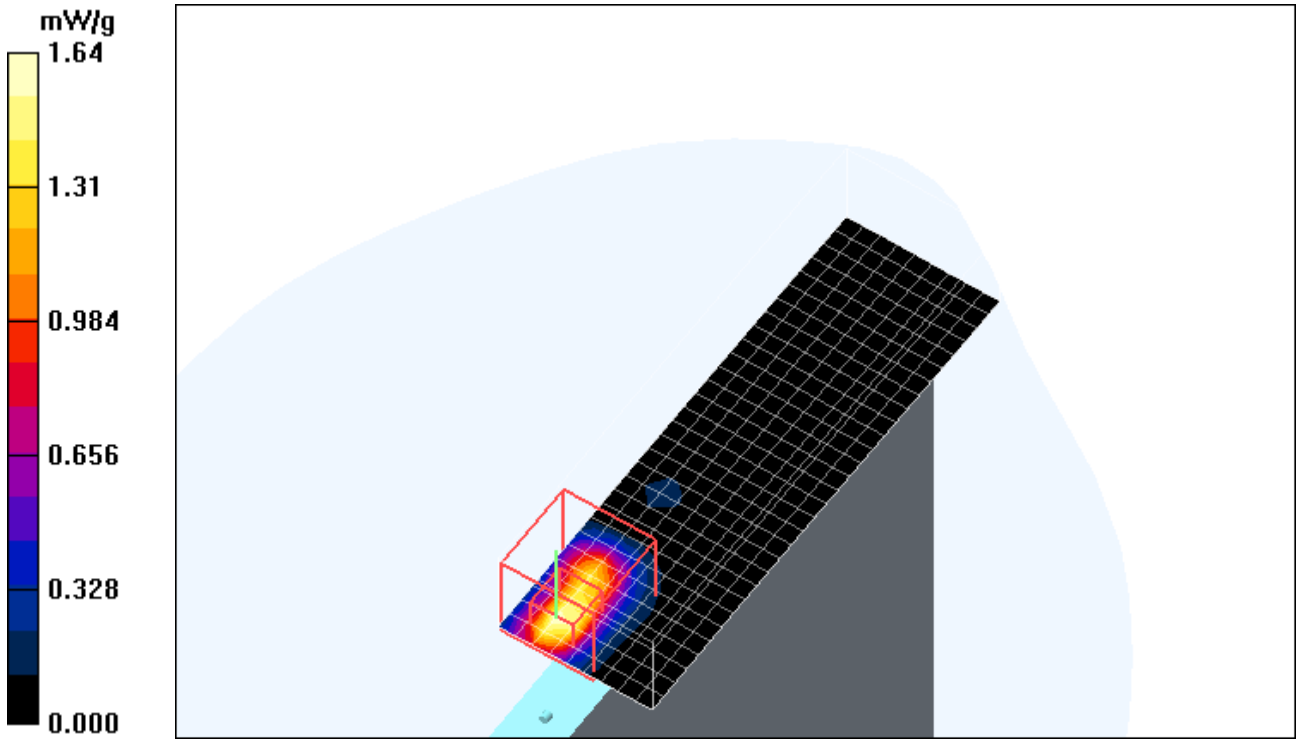
Medium: 5-6 GHz SPEAG Tissue BODY
Medium parameters used: f = 5785 MHz; σ = 6.49 mho/m; ε_r = 44.5; ρ = 1000 kg/m^3

Measurement Standard: DASY4 (High Precision Assessment)

- Probe: EX3DV4 - SN3730; ConvF(3.53, 3.53, 3.53); Calibrated: 7/16/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R#3 5Ghz BODY SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1106
- Measurement SW: DASY4, V4.7 Build 80

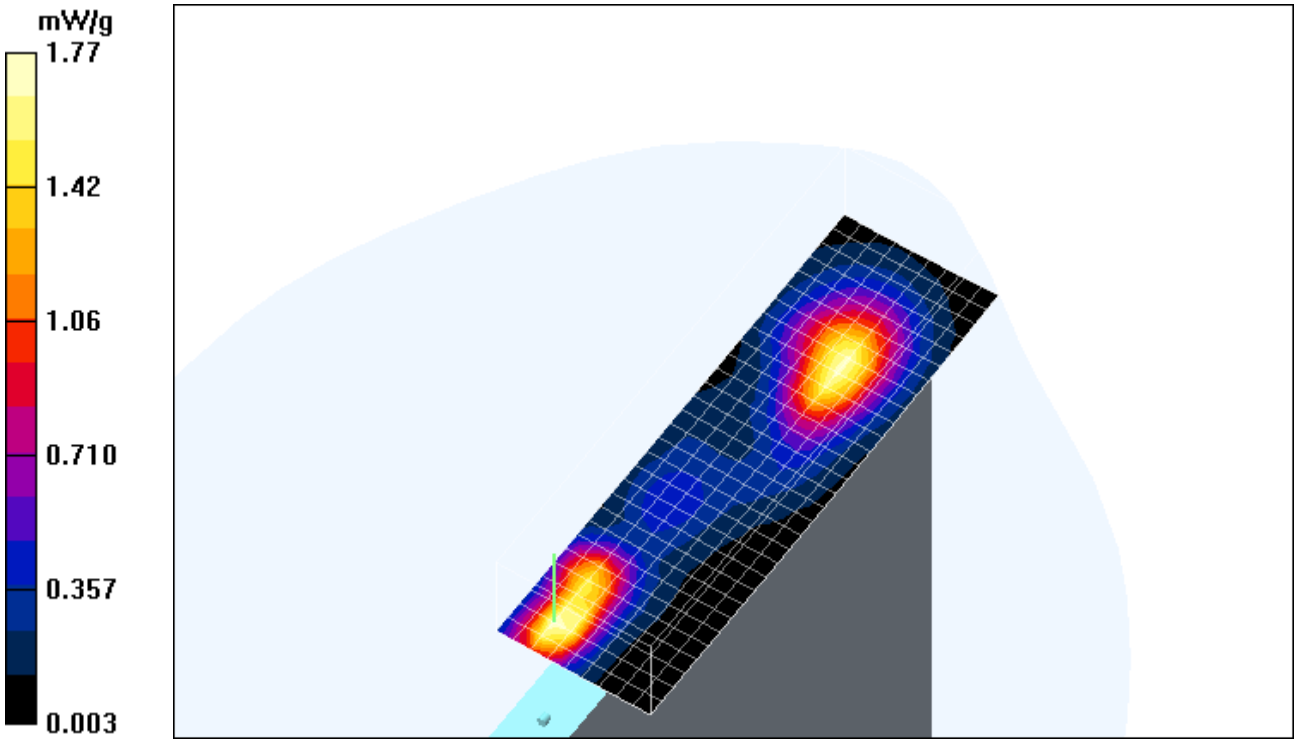
SAM Phone Against Flat Section/MegaZoom, Zoom Scan (Probe separation 3mm) (31x10x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm; Volume Outer Dimensions: x=120mm, y=36mm, z=22mm
Reference Value = 7.93 V/m; Power Drift = 0.307 dB; Peak SAR (extrapolated) = 4.09 W/kg
SAR(1 g) = 0.992 mW/g; SAR(10 g) = 0.285 mW/g; Maximum value of SAR (measured) = 1.64 mW/g



2D Plot showing z-axis @ 0 mm layer of measurement volume

Multi Band Result:
SAR(1 g) = 1.25 mW/g; SAR(10 g) = 0.546 mW/g
Maximum value of SAR (measured) = 1.77 mW/g



2D Plot showing z-axis @ 0 mm layer of measurement volume

Appendix 3

Probe Calibration Certificate

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

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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

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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

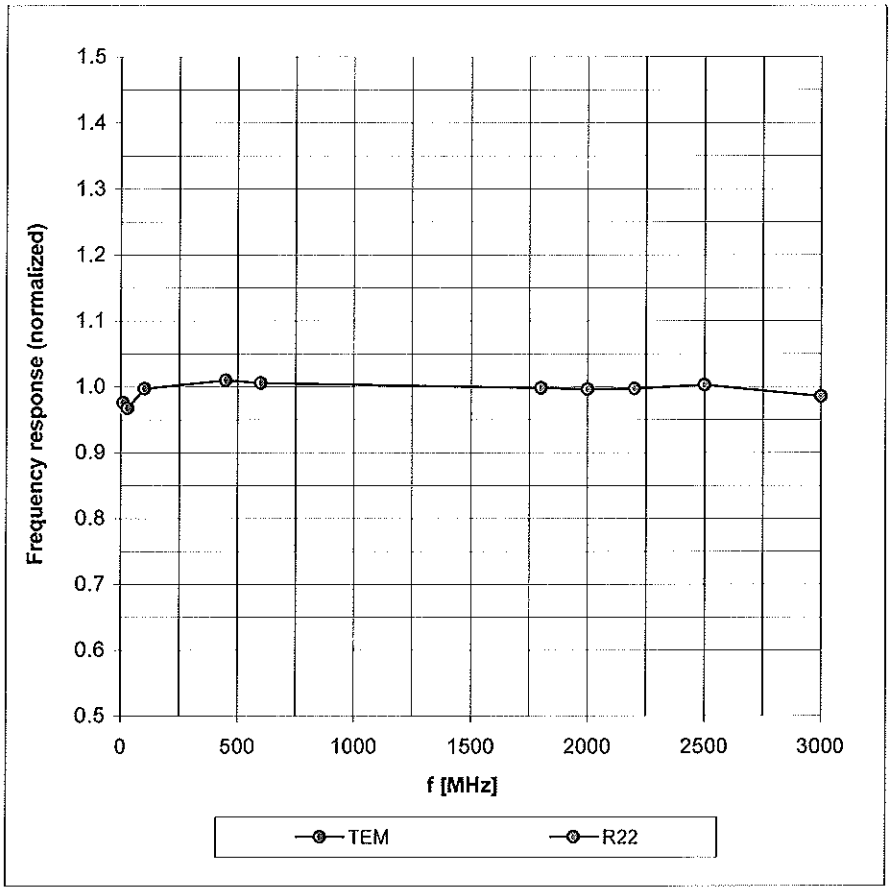
Calibration Parameter Determined in Body Tissue Simulating Media

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.

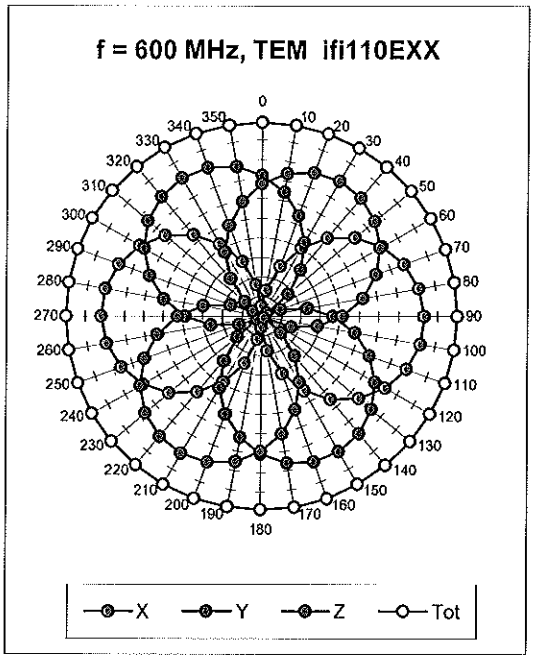
Frequency Response of E-Field

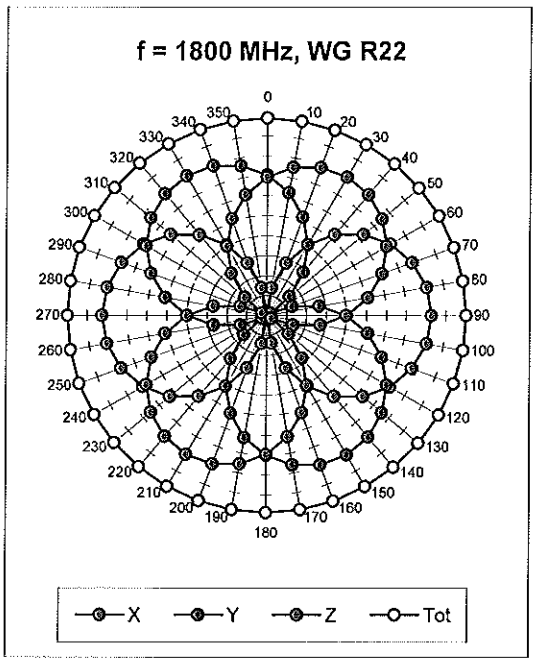
(TEM-Cell:ifi110 EXX, Waveguide: R22)

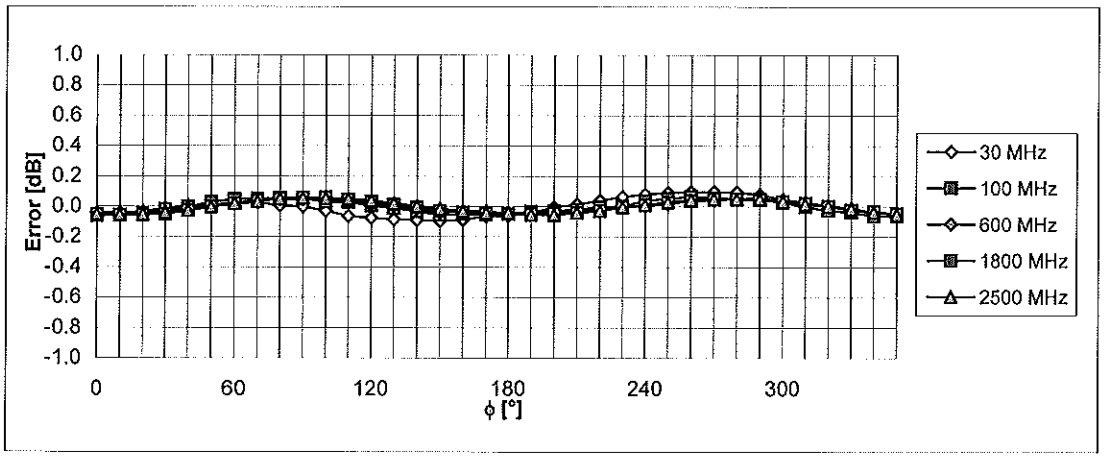


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



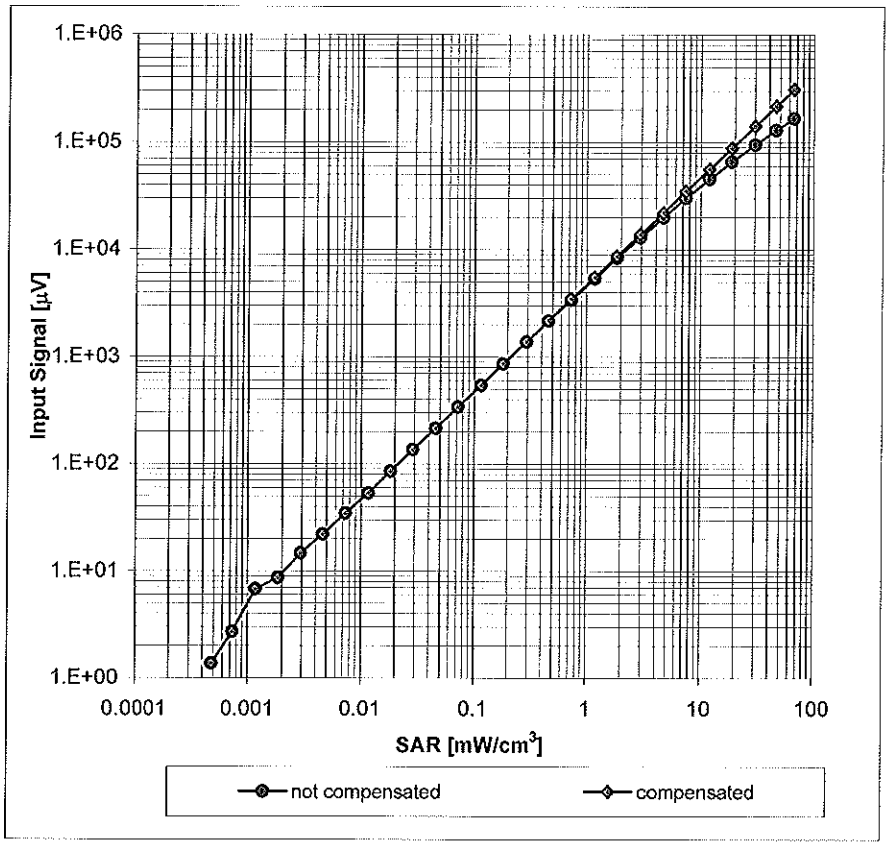


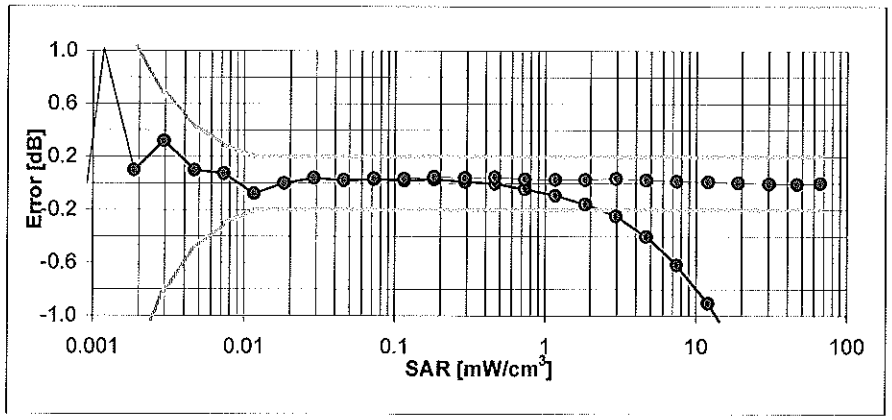


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

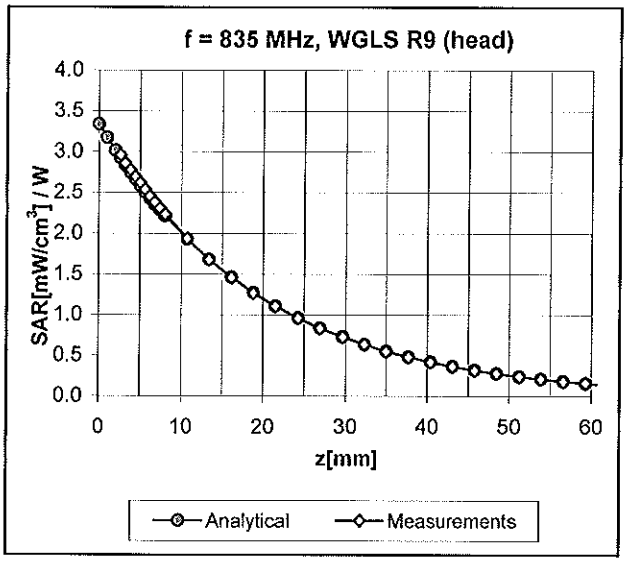
(Waveguide R22, f = 1800 MHz)

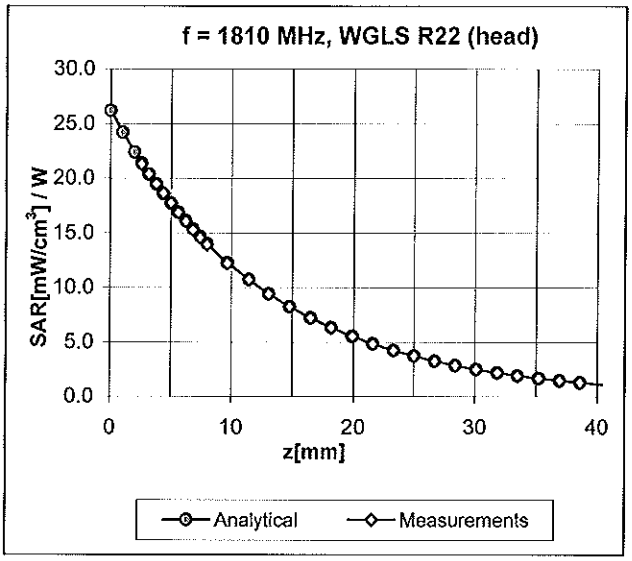




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

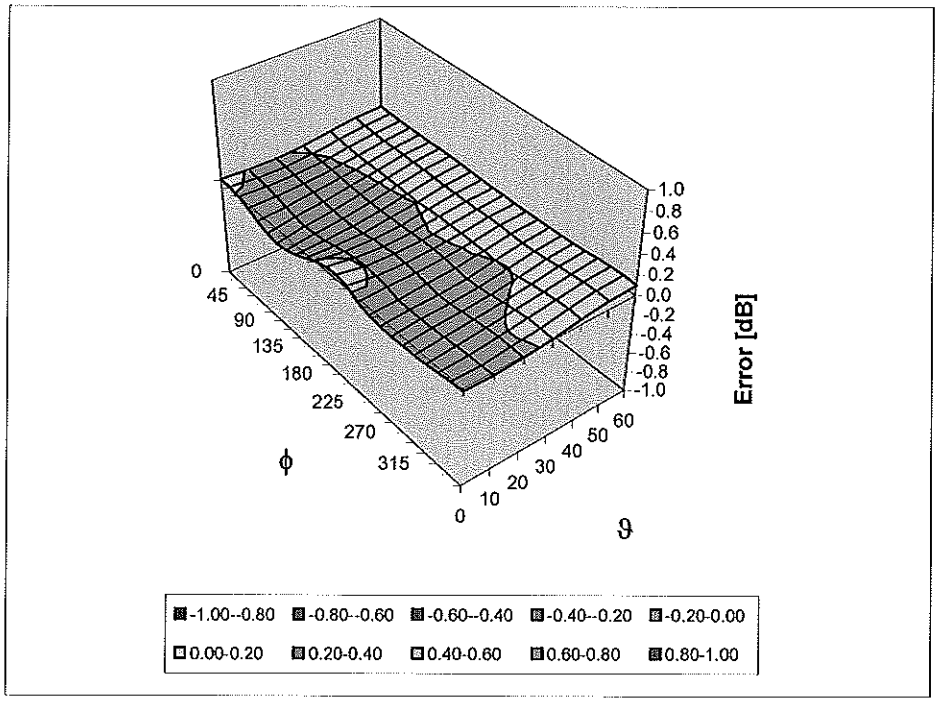
Conversion Factor Assessment





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

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Swiss Calibration Service

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Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: EX3-3730_Jul10/2

CALIBRATION CERTIFICATE (Replacement of No: EX3-3730_Jul10

Object	EX3DV4 - SN:3730
Calibration procedure(s)	QA CAL-01.v6, QA CAL-14.v3, QA CAL-23.v3 and QA CAL-25.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	July 16, 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:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: September 4, 2010

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

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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 EX3DV4

SN:3730

Manufactured: October 19, 2009
Calibrated: July 16, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 SN:3730

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.41	0.53	0.50	± 10.1%
DCP (mV)[B]	87.3	92.6	93.4	

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	± 1.5%
			Y	0.00	0.00	1.00	300	
			Z	0.00	0.00	1.00	300	

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: EX3DV4 SN:3730

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)
5200	± 50 / ± 100	36.0 ± 5%	4.66 ± 5%	4.67	4.67	4.67	0.45	1.80	± 13.1%
5300	± 50 / ± 100	35.9 ± 5%	4.76 ± 5%	4.38	4.38	4.38	0.45	1.80	± 13.1%
5600	± 50 / ± 100	35.5 ± 5%	5.07 ± 5%	4.14	4.14	4.14	0.45	1.80	± 13.1%
5800	± 50 / ± 100	35.3 ± 5%	5.27 ± 5%	4.06	4.06	4.06	0.50	1.80	± 13.1%

[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: EX3DV4 SN:3730

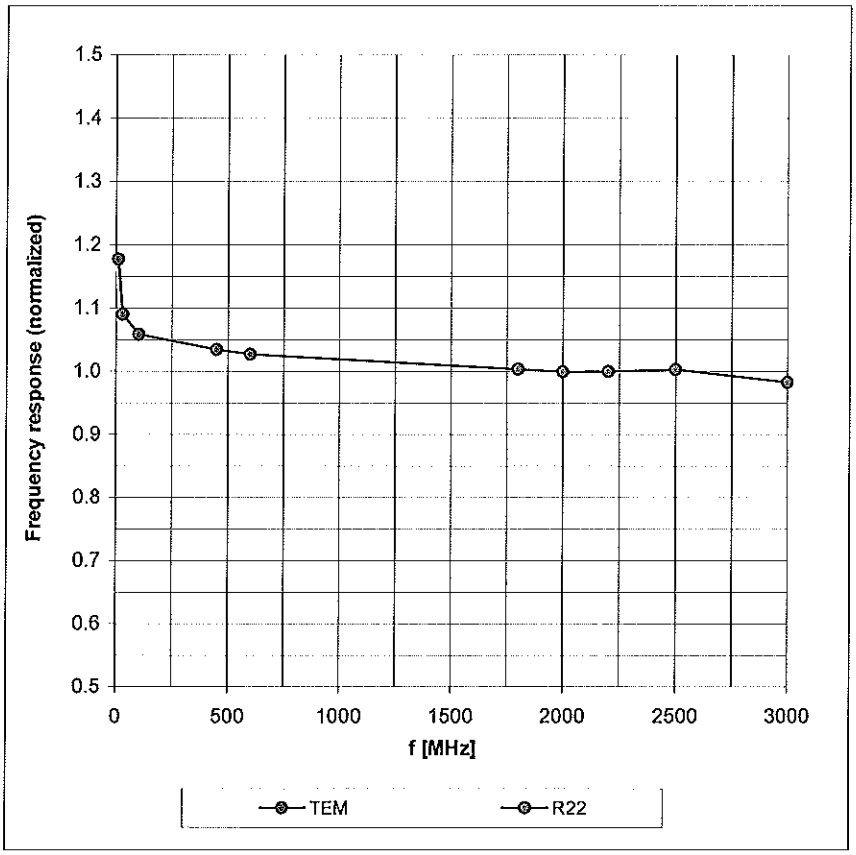
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
5200	± 50 / ± 100	49.0 ± 5%	5.30 ± 5%	4.07	4.07	4.07	0.50	1.90 ± 13.1%
5300	± 50 / ± 100	48.9 ± 5%	5.42 ± 5%	3.81	3.81	3.81	0.55	1.90 ± 13.1%
5600	± 50 / ± 100	48.5 ± 5%	5.77 ± 5%	3.33	3.33	3.33	0.60	1.90 ± 13.1%
5800	± 50 / ± 100	48.2 ± 5%	6.00 ± 5%	3.53	3.53	3.53	0.60	1.90 ± 13.1%

[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.

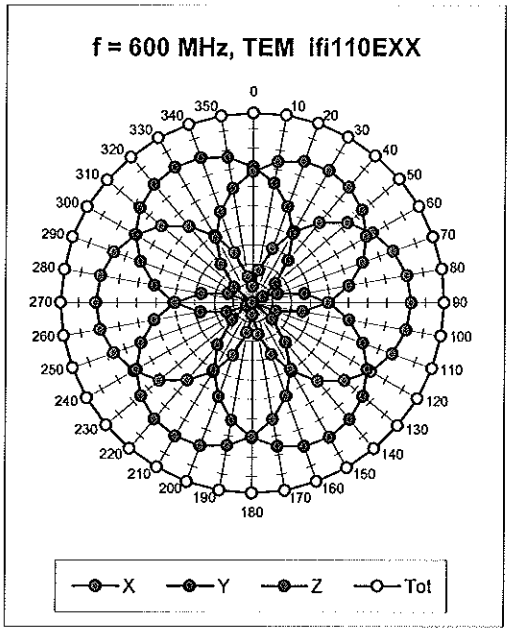
Frequency Response of E-Field

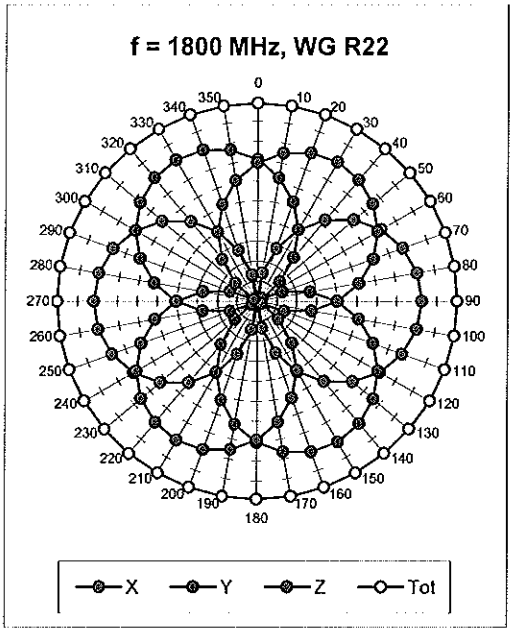
(TEM-Cell:ifi110 EXX, Waveguide: R22)

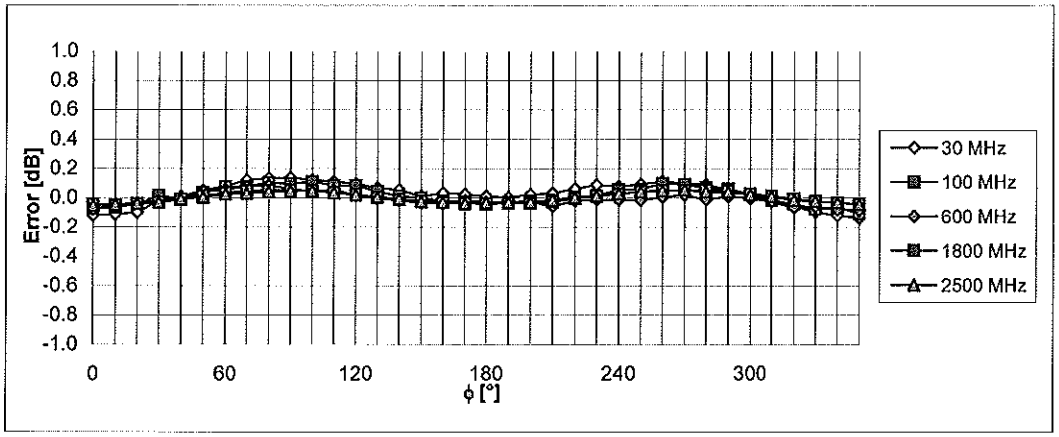


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



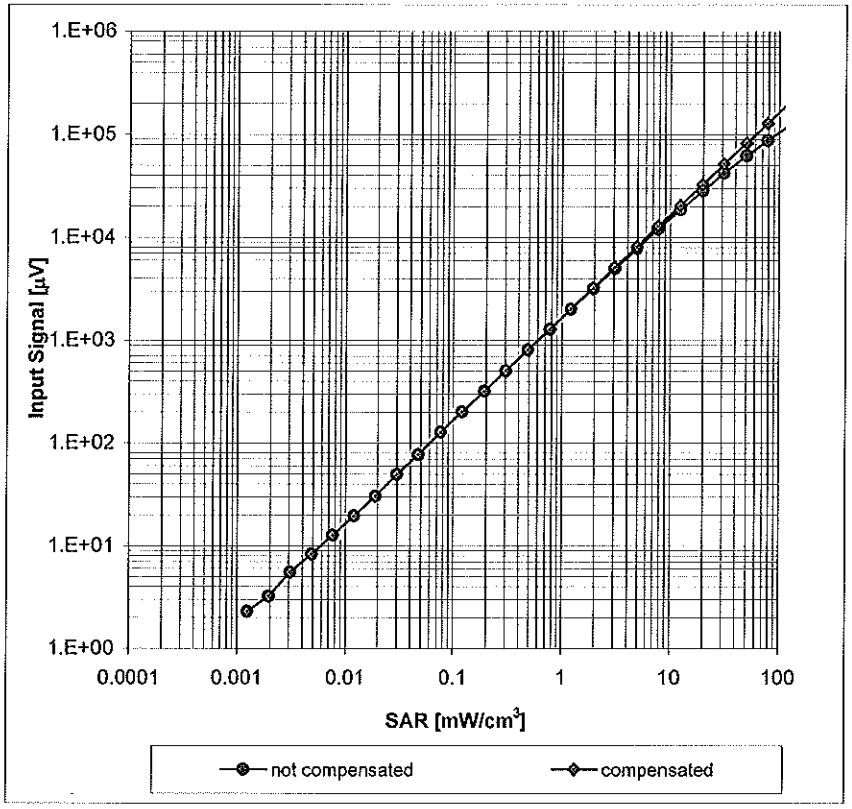


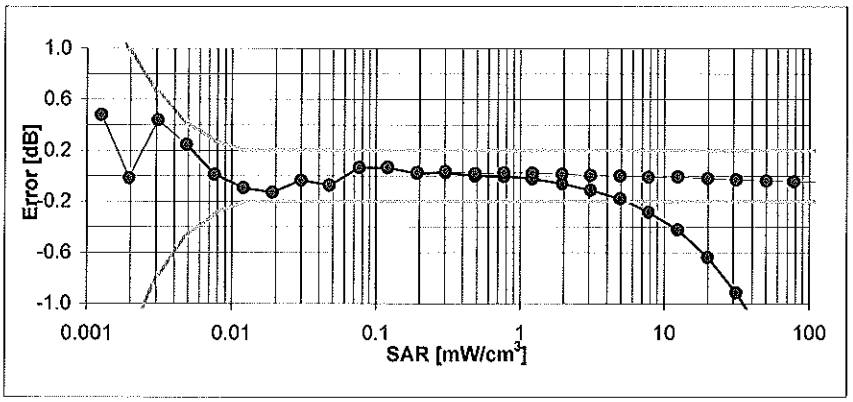


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

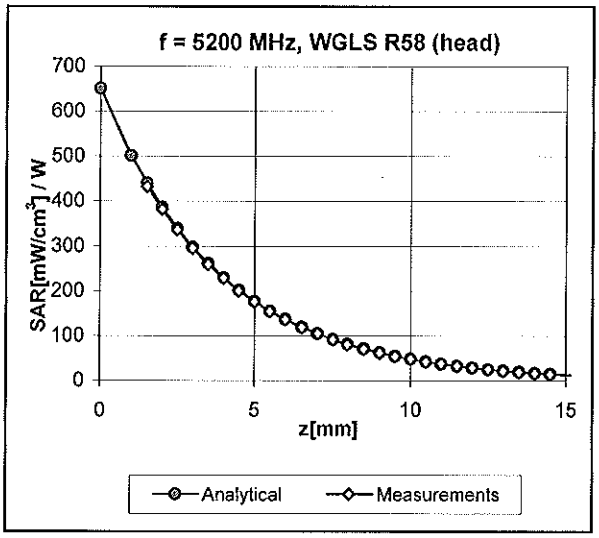
(Waveguide R22, f = 1800 MHz)

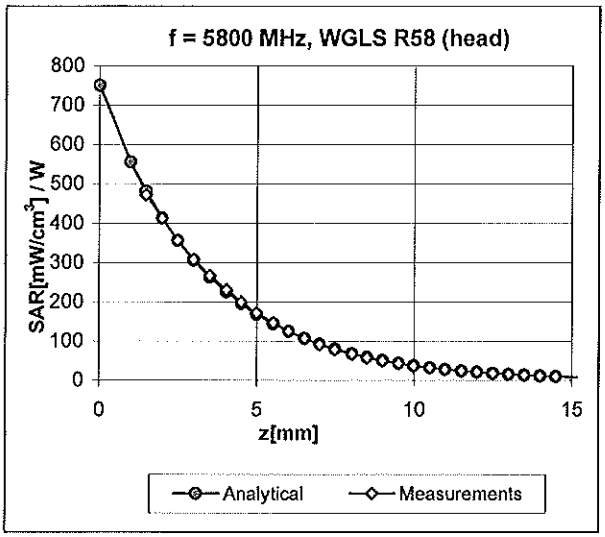




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

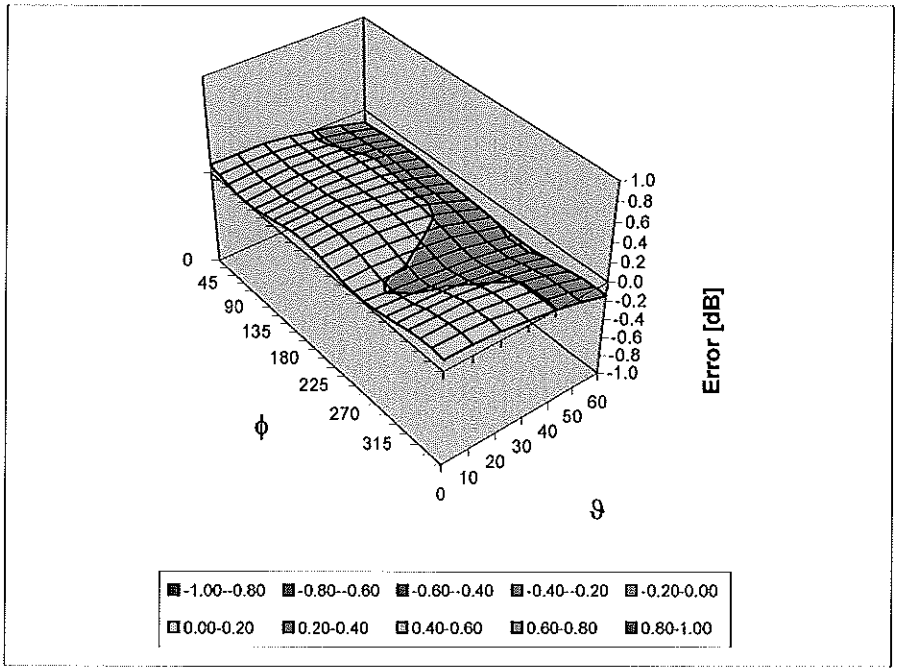
Conversion Factor Assessment





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	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

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

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

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

Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: ES3-3183_Jul10

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3183

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: July 14, 2010

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter 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:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 15, 2010

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

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

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

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ES3DV3

SN:3183

Manufactured:	March 25, 2008
Last calibrated:	August 17, 2009
Recalibrated:	July 14, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 SN:3183

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.21	1.15	1.07	± 10.1%
DCP (mV)[B]	88.6	86.9	89.5	

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:3183

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%	6.11	6.11	6.11	0.99	1.04 ± 11.0%
1810	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	5.05	5.05	5.05	0.58	1.33 ± 11.0%
1950	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.82	4.82	4.82	0.54	1.37 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	4.49	4.49	4.49	0.44	1.70 ± 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:3183

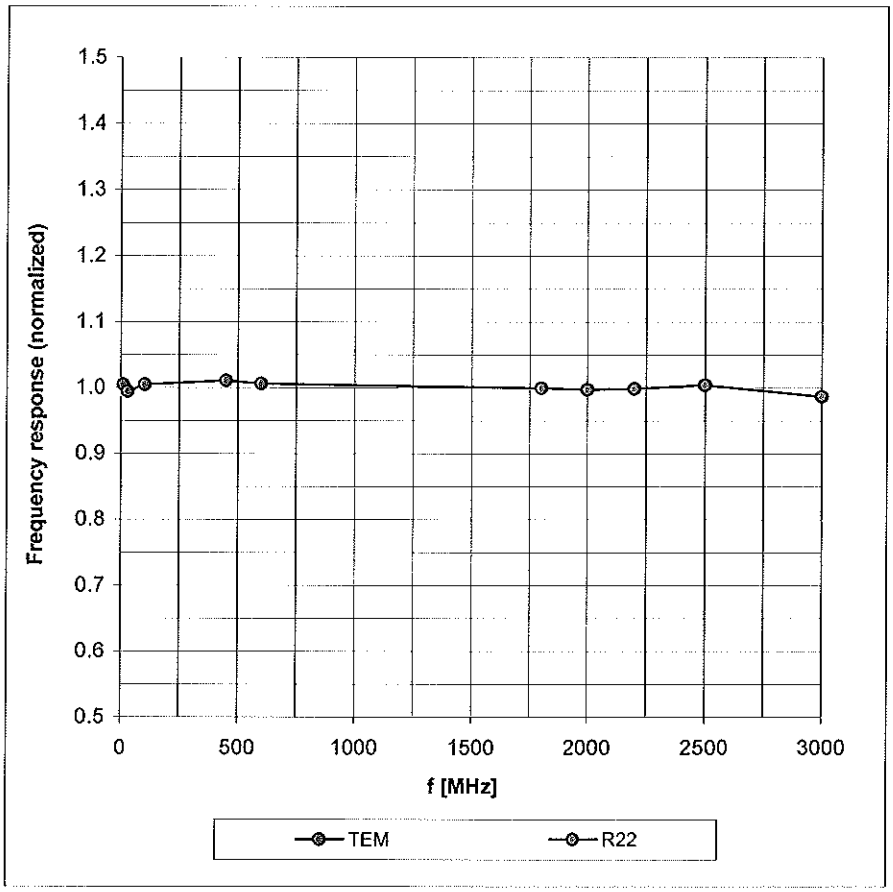
Calibration Parameter Determined in Body Tissue Simulating Media

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%	6.15	6.15	6.15	0.95	1.10 ± 11.0%
1810	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.84	4.84	4.84	0.39	1.87 ± 11.0%
1950	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.86	4.86	4.86	0.28	2.80 ± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	4.36	4.36	4.36	0.69	1.31 ± 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.

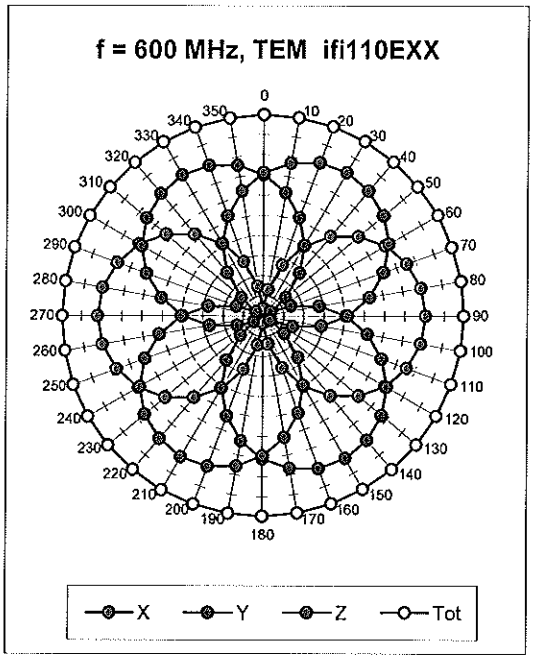
Frequency Response of E-Field

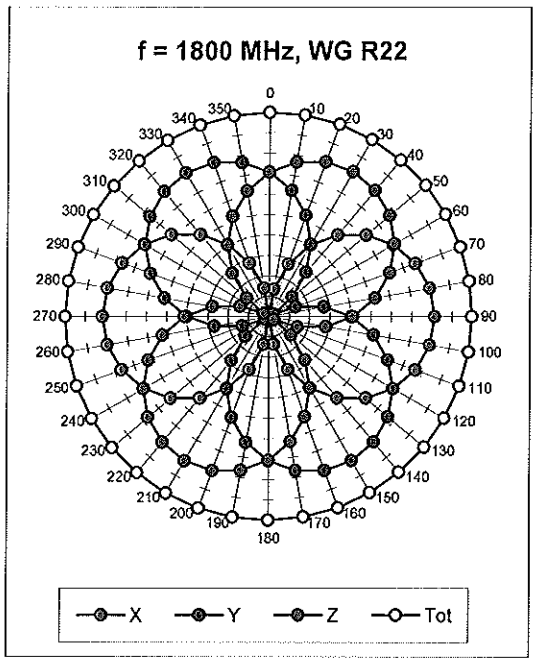
(TEM-Cell:ifi110 EXX, Waveguide: R22)

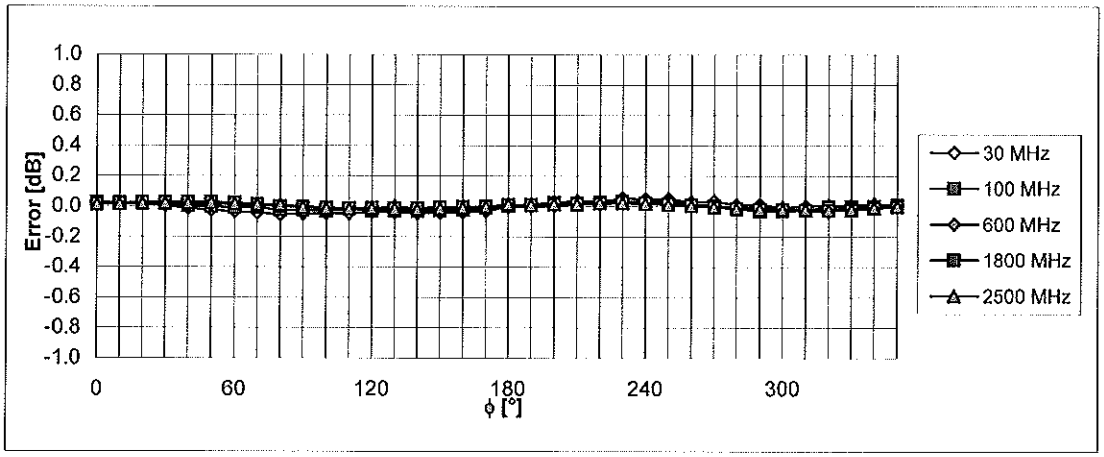


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



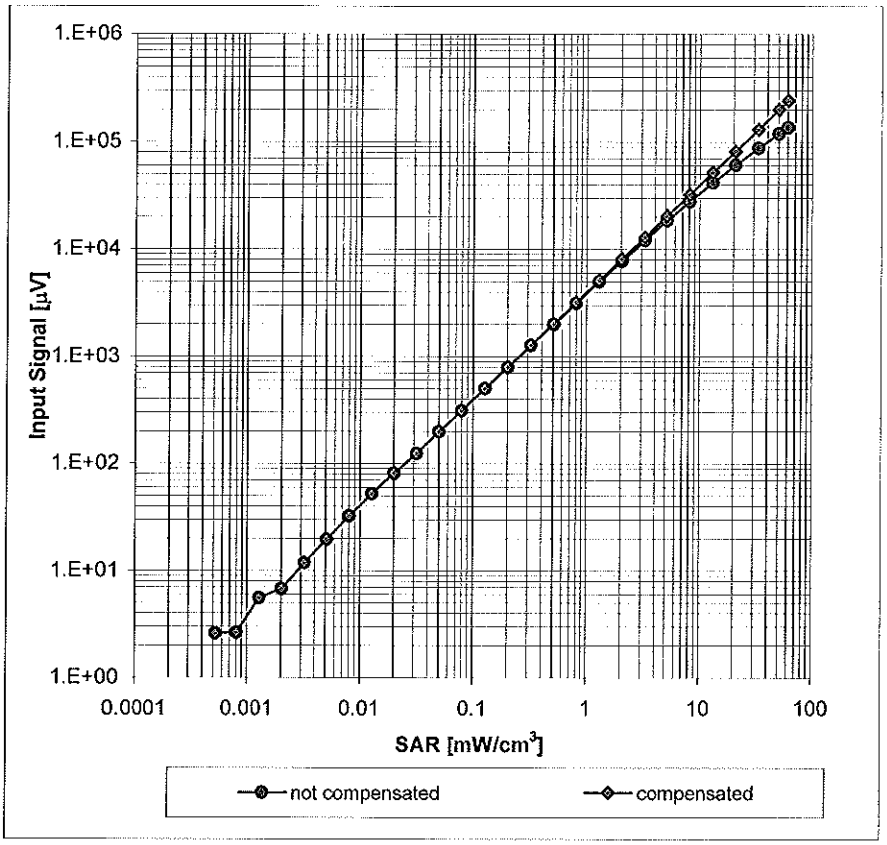


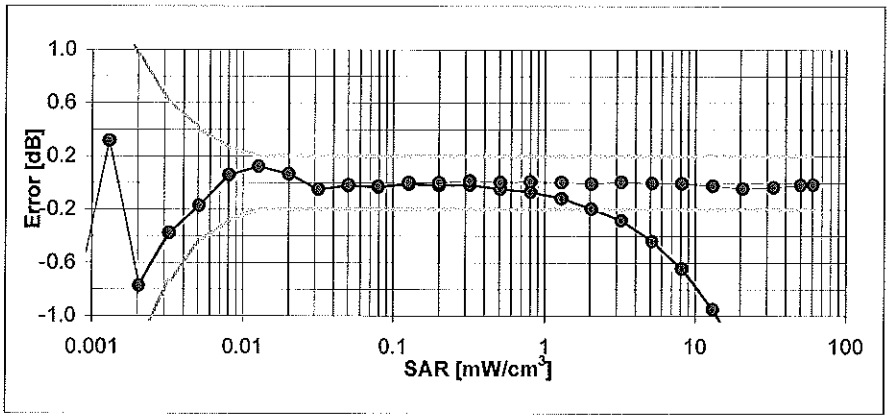


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

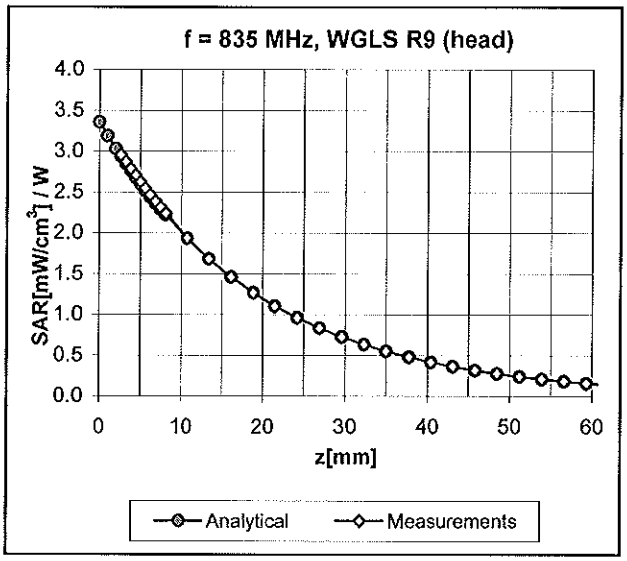
(Waveguide R22, f = 1800 MHz)

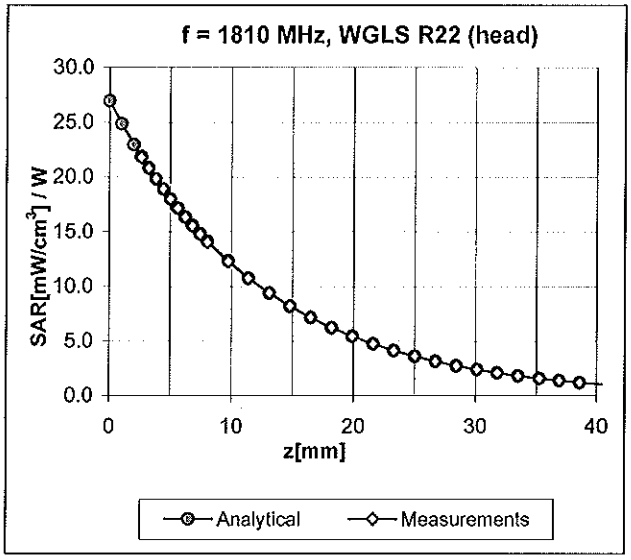




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

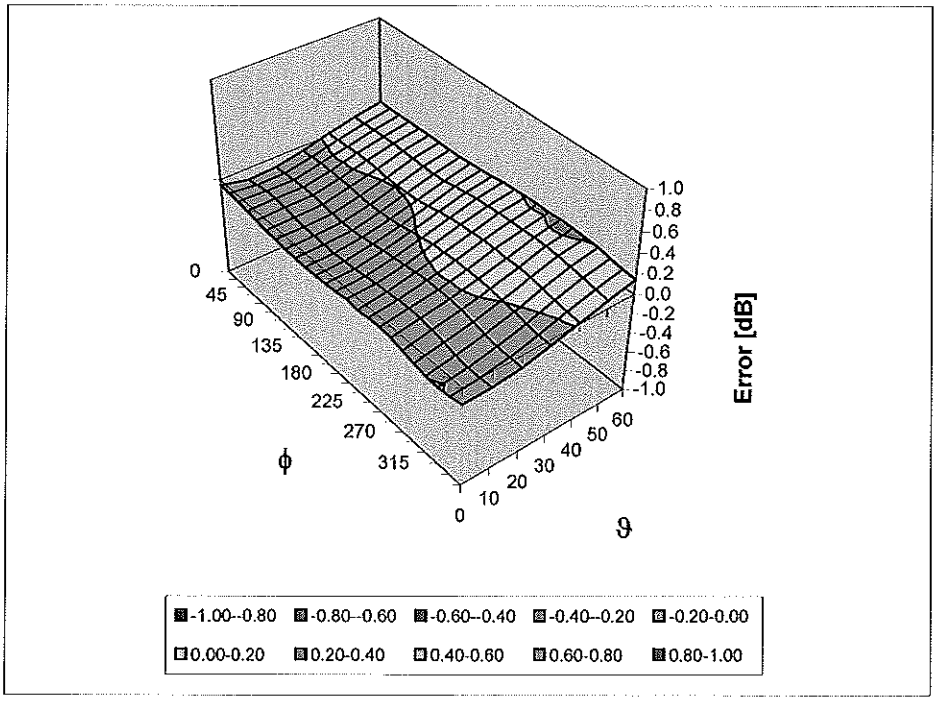
Conversion Factor Assessment





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 4

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 5

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 Motorola MDb

Certificate No: D835V2-425_Oct10

CALIBRATION CERTIFICATE

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

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

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

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

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

Issued: October 14, 2010

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

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

Head TSL parameters

The following parameters and calculations were applied.

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

SAR result with Head TSL

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

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

Appendix

Antenna Parameters with Head TSL

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

General Antenna Parameters and Design

Electrical Delay (one direction)	1.396 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 24, 2000

DASY5 Validation Report for Head TSL

Date/Time: 14.10.2010 10:27:24

Test Laboratory: SPEAG, Zurich, Switzerland

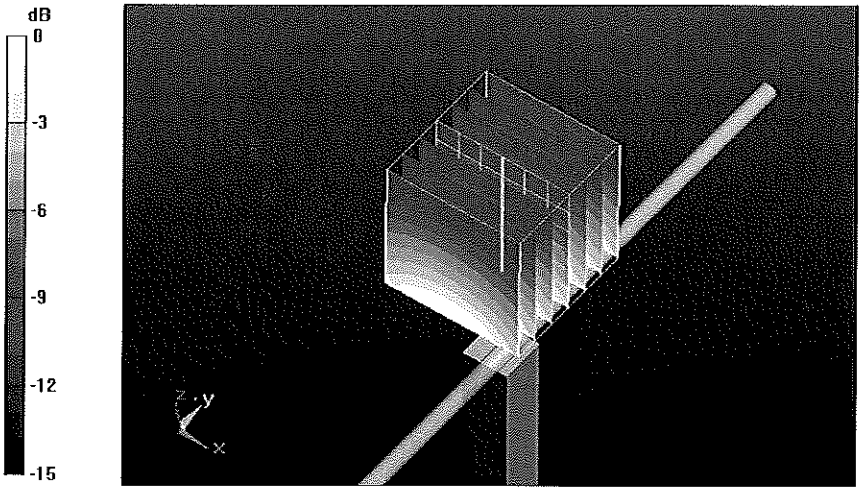
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:425

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

DASY5 Configuration:

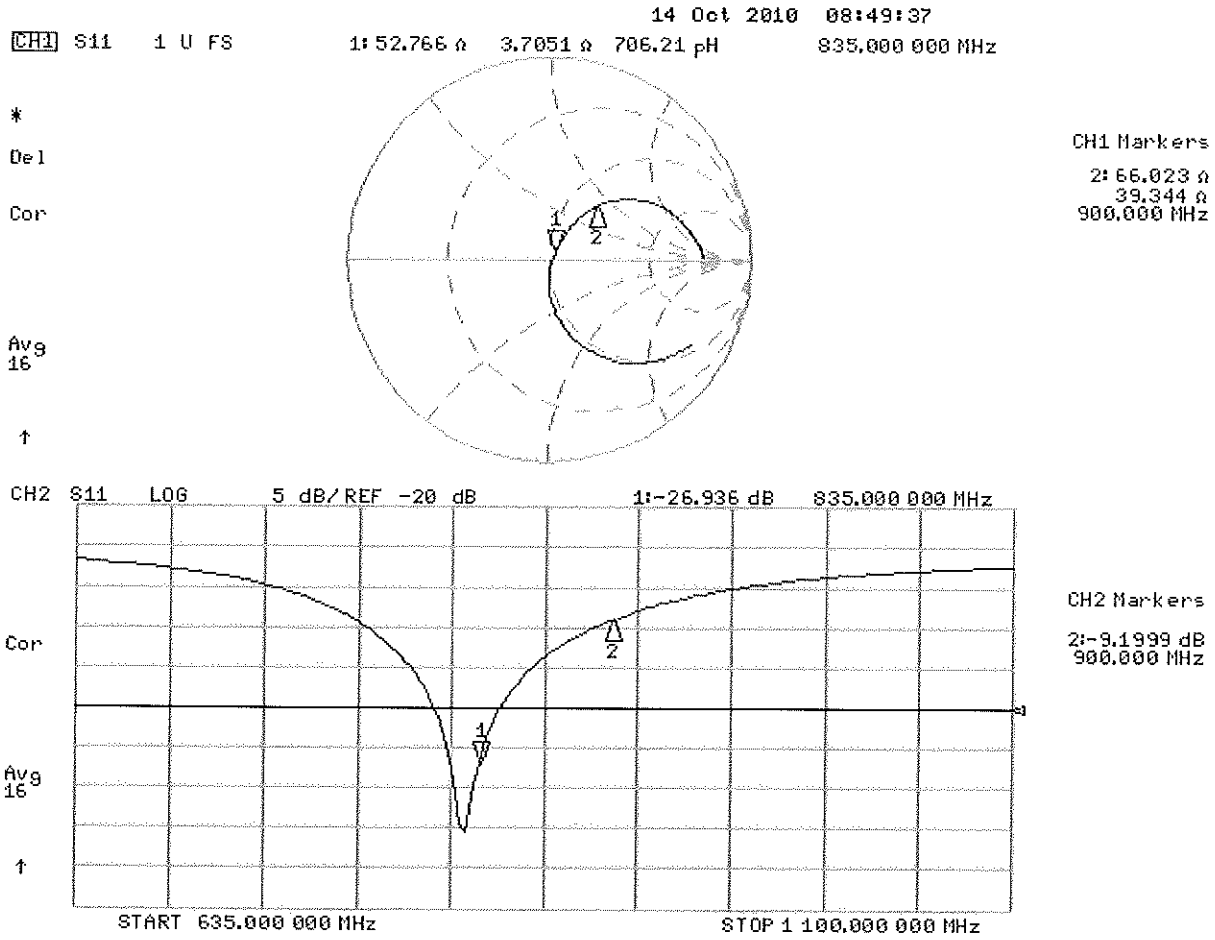
- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
-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

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



0 dB = 2.76mW/g

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: D835V2-424_Oct10

CALIBRATION CERTIFICATE

Object: D835V2 - SN: 424

Calibration procedure(s): QA CAL-05.v7
Calibration procedure for dipole validation kits

Calibration date: October 14, 2010

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

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

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

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

Issued: October 14, 2010

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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

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

Head TSL parameters

The following parameters and calculations were applied.

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

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.36 mW / g
SAR normalized	normalized to 1W	9.44 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.49 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 mW / g
SAR normalized	normalized to 1W	6.16 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.18 mW /g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9 Ω + 3.8 jΩ
Return Loss	- 26.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.393 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 24, 2000

DASY5 Validation Report for Head TSL

Date/Time: 14.10.2010 10:07:31

Test Laboratory: SPEAG, Zurich, Switzerland

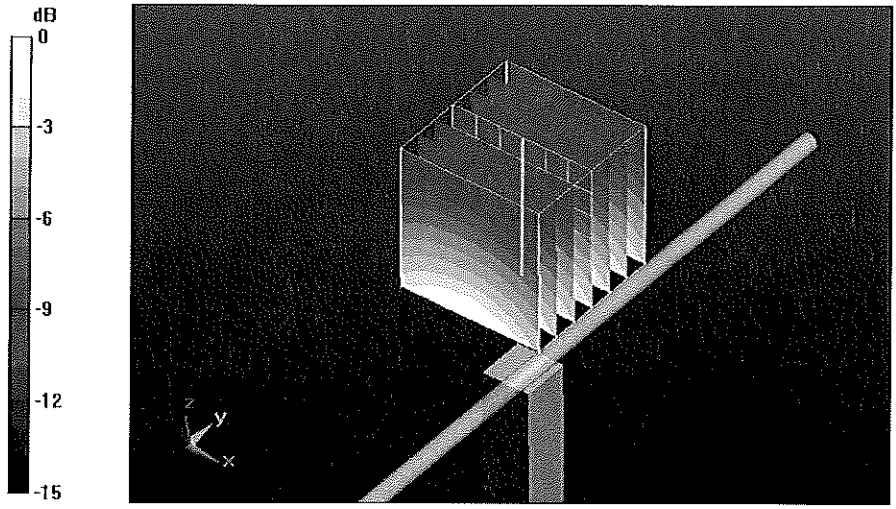
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:424

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

DASY5 Configuration:

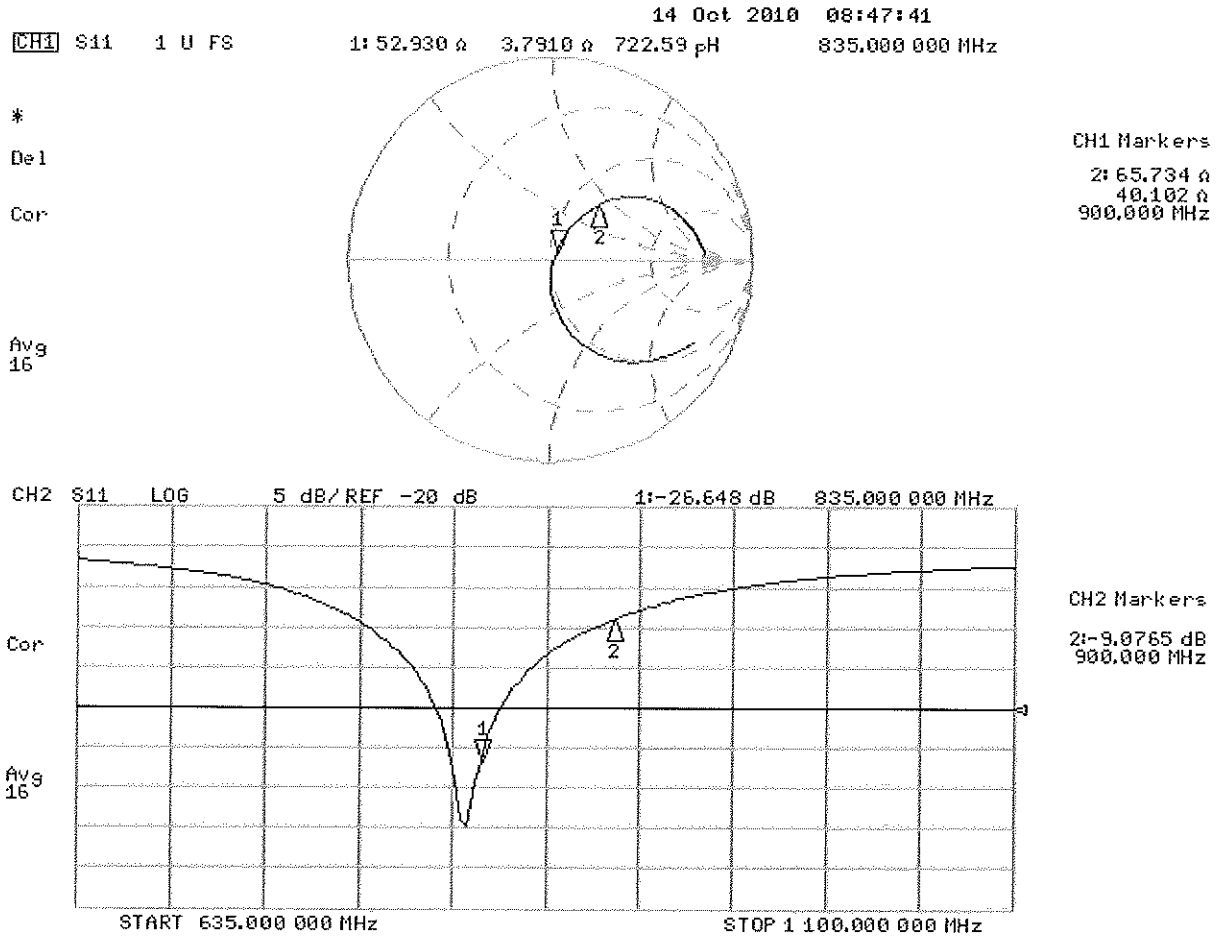
- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
-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

Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.7 V/m; Power Drift = 0.045 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 2.36 mW/g; SAR(10 g) = 1.54 mW/g
Maximum value of SAR (measured) = 2.75 mW/g



0 dB = 2.75mW/g

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: D1800V2-279_Oct10

CALIBRATION CERTIFICATE

Object	D1800V2 - SN: 279
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	October 13, 2010

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

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

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

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

Issued: October 14, 2010

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	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	38.9 ± 6 %	1.35 mho/m ± 6 %
Head TSL temperature during test	(21.8 ± 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	9.31 mW / g
SAR normalized	normalized to 1W	37.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**37.8 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.92 mW / g
SAR normalized	normalized to 1W	19.7 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**19.8 mW /g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.9 Ω + 5.0 jΩ
Return Loss	- 24.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.194 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 25, 2000

DASY5 Validation Report for Head TSL

Date/Time: 13.10.2010 11:49:44

Test Laboratory: SPEAG, Zurich, Switzerland

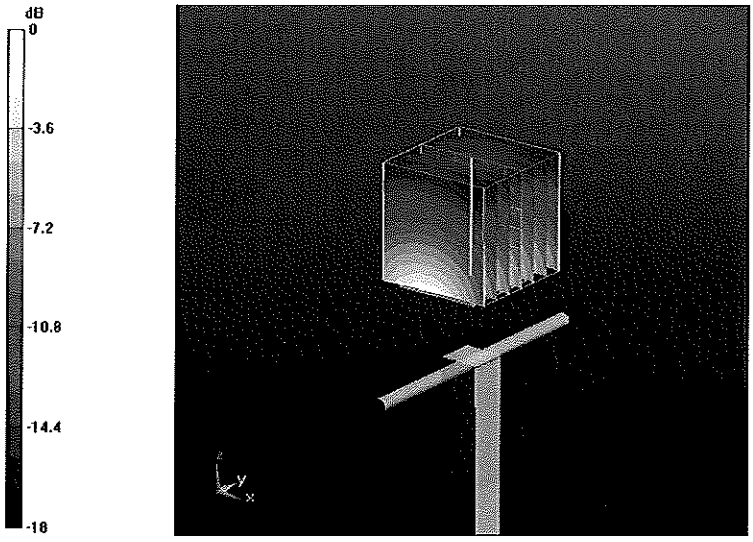
DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:279

Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: HSL U12 BB
Medium parameters used: f = 1800 MHz; σ = 1.35 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:

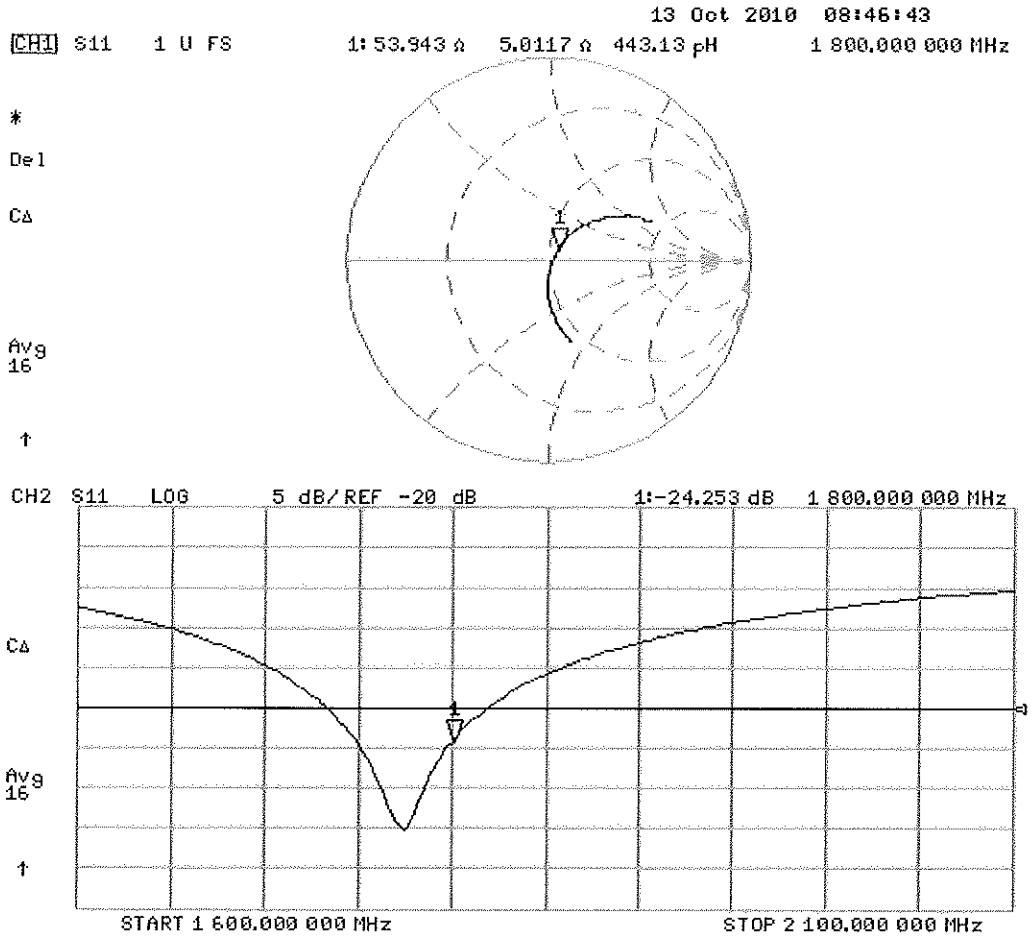
- Probe: ES3DV3 - SN3205; ConvF(5.05, 5.05, 5.05); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0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

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95 V/m; Power Drift = 0.038 dB
Peak SAR (extrapolated) = 16.9 W/kg
SAR(1 g) = 9.31 mW/g; SAR(10 g) = 4.92 mW/g
Maximum value of SAR (measured) = 11.4 mW/g



0 dB = 11.4mW/g

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: D1800V2-263_Oct10

CALIBRATION CERTIFICATE

Object: D1800V2 - SN: 263

Calibration procedure(s): QA CAL-05.v7
Calibration procedure for dipole validation kits

Calibration date: October 13, 2010

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

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

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

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

Issued: October 14, 2010

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003

b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	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	38.9 ± 6 %	1.35 mho/m ± 6 %
Head TSL temperature during test	(21.9 ± 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	9.38 mW / g
SAR normalized	normalized to 1W	37.5 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**38.1 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.95 mW / g
SAR normalized	normalized to 1W	19.8 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**19.9 mW /g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.2 Ω + 7.0 jΩ
Return Loss	- 23.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.206 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	March 05, 2000

DASY5 Validation Report for Head TSL

Date/Time: 13.10.2010 11:30:21

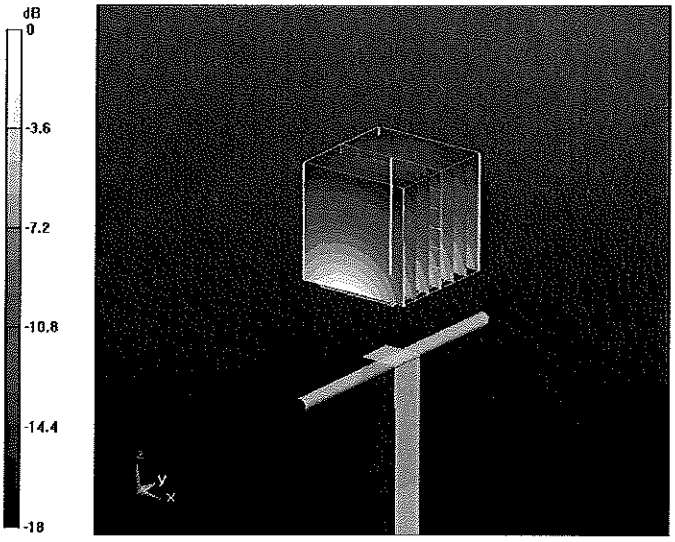
DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:263

Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: HSL U12 BB
Medium parameters used: f = 1800 MHz; σ = 1.35 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:

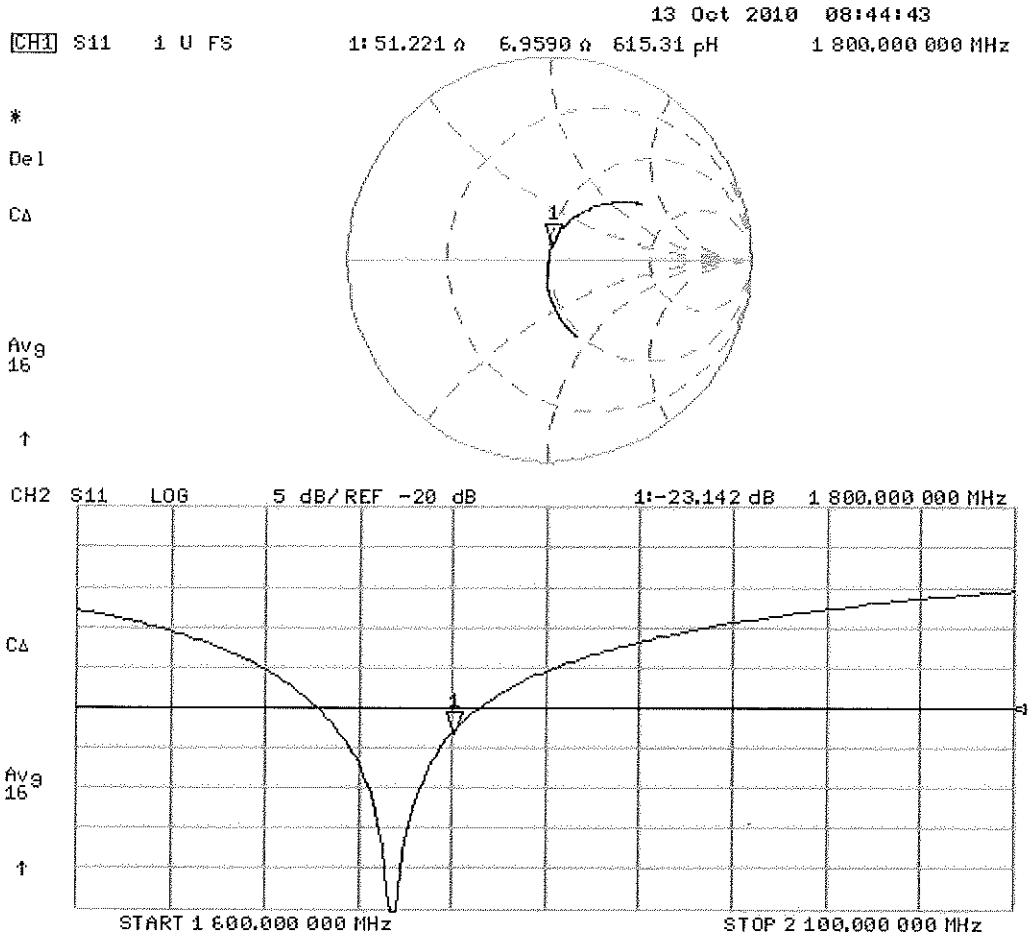
- Probe: ES3DV3 - SN3205; ConvF(5.05, 5.05, 5.05); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0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

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.5 V/m; Power Drift = 0.064 dB
Peak SAR (extrapolated) = 17 W/kg
SAR(1 g) = 9.38 mW/g; SAR(10 g) = 4.95 mW/g
Maximum value of SAR (measured) = 11.5 mW/g



0 dB = 11.5mW/g

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: D2450V2-766_Oct10

CALIBRATION CERTIFICATE

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

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

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

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

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

Issued: October 14, 2010

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

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

Head TSL parameters

The following parameters and calculations were applied.

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

SAR result with Head TSL

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

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

Appendix

Antenna Parameters with Head TSL

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

General Antenna Parameters and Design

Electrical Delay (one direction)	1.156 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 10, 2004

DASY5 Validation Report for Head TSL

Date/Time: 13.10.2010 14:19:04

Test Laboratory: SPEAG, Zurich, Switzerland

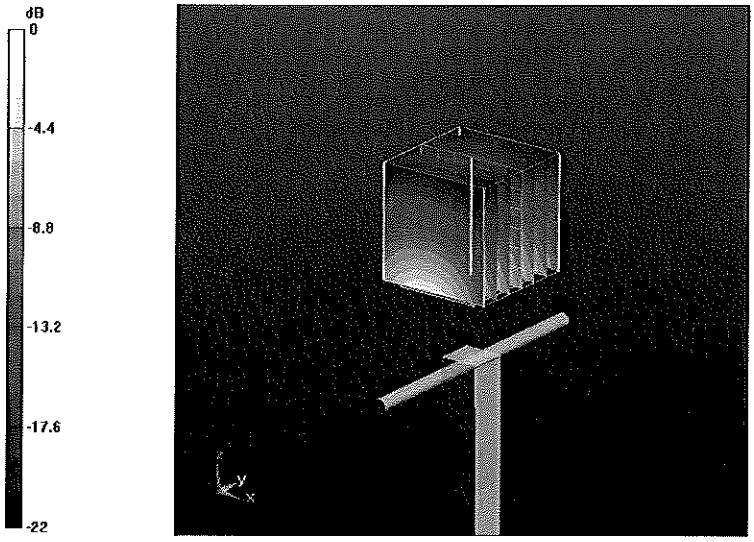
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:766

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

DASY5 Configuration:

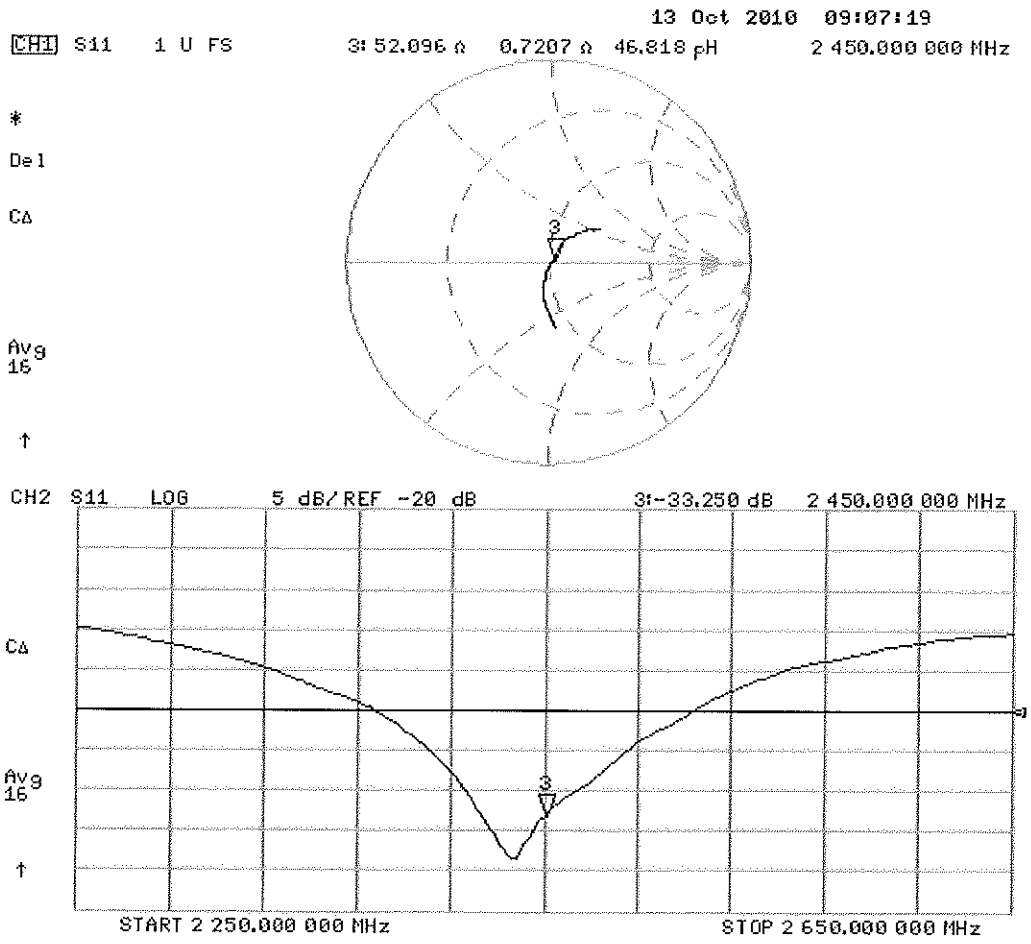
- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0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

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



0 dB = 16mW/g

Impedance Measurement Plot for Head TSL



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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: **D5GHzV2-1088_Jul10**

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN: 1088
Calibration procedure(s)	QA CAL-22.v1 Calibration procedure for dipole validation kits between 3-6 GHz
Calibration date:	July 14, 2010

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-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 EX3DV4	SN: 3503	05-Mar-10 (No. EX3-3503_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: July 15, 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) IEC Std 62209 Part 2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", Draft Version 0.9, December 2004

b) 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:

c) 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
Area Scan resolution	dx, dy = 10 mm	
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 2.5 mm	
Frequency	5200 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	36.2 ± 6 %	4.52 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	condition	
SAR measured	100 mW input power	8.23 mW / g
SAR normalized	normalized to 1W	82.3 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**82.4 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.34 mW / g
SAR normalized	normalized to 1W	23.4 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**23.4 mW / g ± 19.5 % (k=2)**

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.2 ± 6 %	5.02 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	condition	
SAR measured	100 mW input power	8.23 mW / g
SAR normalized	normalized to 1W	82.3 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**82.1 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.32 mW / g
SAR normalized	normalized to 1W	23.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**23.1 mW / g ± 19.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	55.7 Ω - 4.2 jΩ
Return Loss	-23.4 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	54.6 Ω - 4.1 jΩ
Return Loss	-24.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.206 ns

After long term use with 40 W 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	December 21, 2009

DASY5 Validation Report for Head TSL

Date/Time: 14.07.2010 15:46:24

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1088

Communication System: CW; Frequency: 5200 MHz, Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: HSL 5000
Medium parameters used: f = 5200 MHz; σ = 4.52 mho/m; ε_r = 36.2; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 5.02 mho/m; ε_r = 35.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

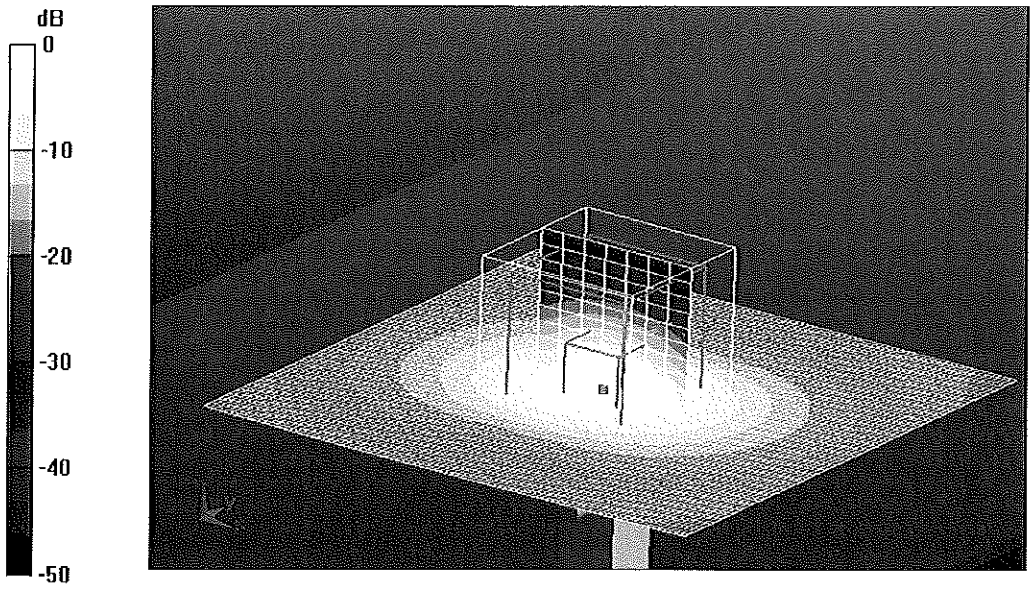
DASY5 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.36, 5.36, 5.36), ConvF(4.74, 4.74, 4.74); Calibrated: 05.03.2010
- Sensor-Surface: 2mm (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)

D5GHzV2 Dipole (Head)/d=10mm, Pin=100mW, f=5200 MHz/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 16.2 mW/g

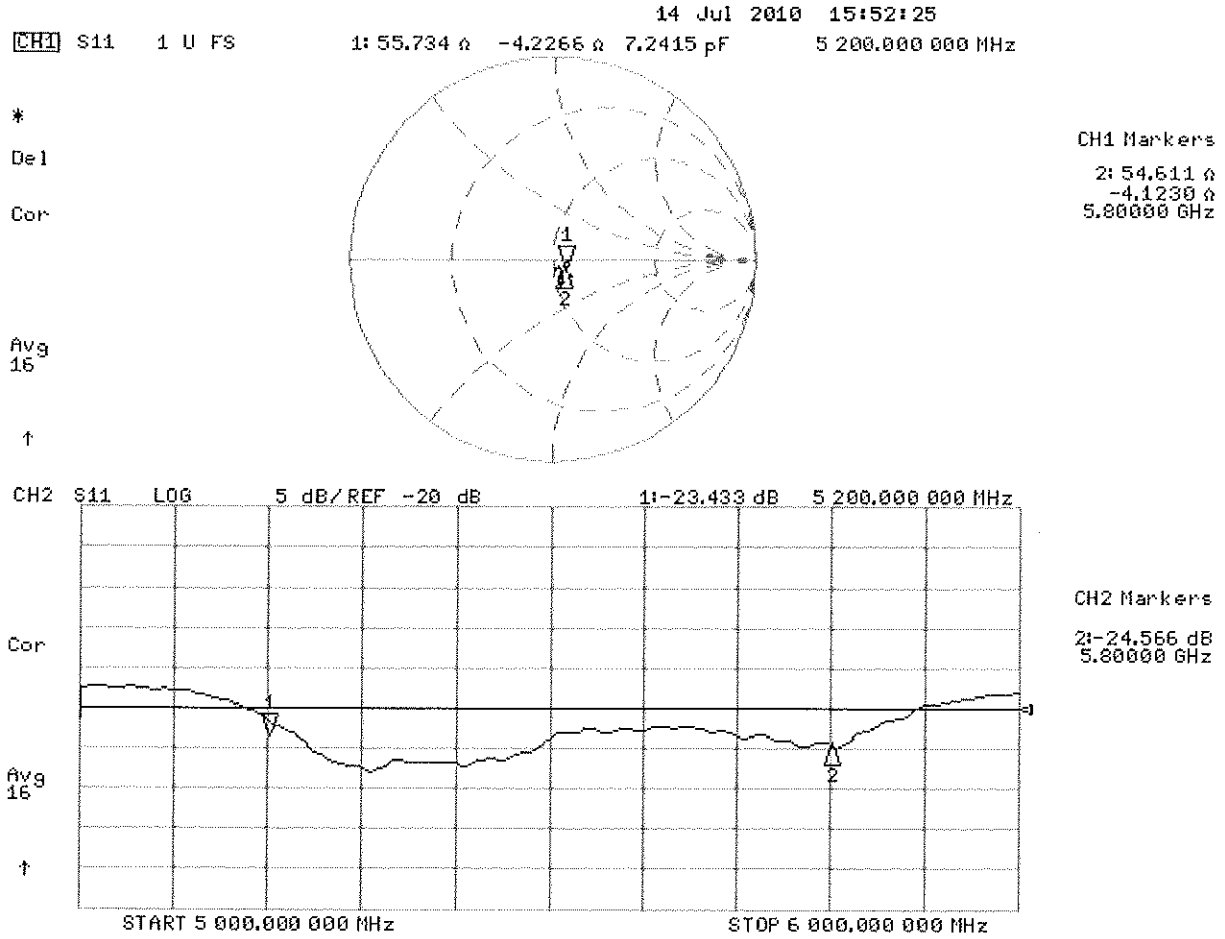
D5GHzV2 Dipole (Head)/d=10mm, Pin=100mW, f=5200 MHz/Zoom Scan (4x4x2.5mm), dist=2mm (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 65.6 V/m; Power Drift = 0.071 dB
Peak SAR (extrapolated) = 31.1 W/kg
SAR(1 g) = 8.23 mW/g; SAR(10 g) = 2.34 mW/g
Maximum value of SAR (measured) = 16.1 mW/g

D5GHzV2 Dipole (Head)/d=10mm, Pin=100mW, f=5800 MHz/Zoom Scan (4x4x2.5mm), dist=2mm (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 63.2 V/m; Power Drift = 0.077 dB
Peak SAR (extrapolated) = 34.2 W/kg
SAR(1 g) = 8.23 mW/g; SAR(10 g) = 2.32 mW/g
Maximum value of SAR (measured) = 16.6 mW/g



0 dB = 16.6mW/g

Impedance Measurement Plot for Head TSL



END OF REPORT