MOTOROLA

Portable Cellular Phone SAR Test Report

Tests Requested By:	Motorola Mobility, Inc. 600 N. US Highway 45 Libertyville, IL 60048
Test Report #:	24228-1F Rev. A
Date of Report:	Dec-22-2010
Date of Test:	Nov-06-2010 to Dec-21-2010
FCC ID #:	IHDP56LS1
Generic Name:	MURQ5-3334411A11
Test Laboratory:	Motorola Mobility, Inc. - Product Safety & Compliance Laboratory 600 N. US Highway 45 Libertyville, IL 60048
Report Author:	Thomas Knipple Senior RF Engineer

Accreditation:

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

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

2404

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

Statement of Compliance:

Motorola declares under its sole responsibility that the portable cellular telephone model to which this declaration relates, is in conformity with the appropriate General Population/Uncontrolled RF exposure standards, recommendations and guidelines (FCC 47 CFR §2.1093) as well as with CENELEC en50360:2001 and ANSI / IEEE C95.1. It also declares that the product was tested in accordance with IEEE 1528 / CENELEC EN62209-1 (2006), 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 cellular phone covered by this test report. The Specific Absorption Rate (SAR) of this product was measured. The portable cellular phone was tested in accordance with [1], [4] and [5]. The SAR values measured for the portable cellular phone are below the maximum recommended levels of 1.6 W/kg in a 1 g average set in [3] and 2.0 W/kg in a 10 g average set in [2].

For ANSI / IEEE C95.1 (1 g), the final stand-alone SAR readings for this phone are 1.45 W/kg for head-adjacent use, 0.63 W/kg for body-worn use, and 1.25 W/kg in mobile hotspot mode. The final simultaneous-transmission SAR readings for this phone are 1.47 W/kg for head-adjacent 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

850/1900 MHz Antenna

Type	Internal	
Location	Bottom of Transceiver	
Dimensions	Width	9.5 mm
	Length	53.5 mm

Bluetooth/Wi-Fi 2 GHz Antenna

Type	Internal	
Location	Left-Side Rear of Transceiver	
Dimensions	Width	1 mm
	Length	18.4 mm

Wi-Fi 5 GHz Antenna

Type	Internal	
Location	Left-Side Rear of Transceiver	
Dimensions	Width	2 mm
	Length	7.3 mm

2.2 Device description[1, 2]

Serial Number(s) (Functional Use)	LOLAAD0136 (GSM/WCDMA conducted power measurements, GSM/WCDMA SAR testing) LOLAAD0135 (GSM/WCDMA Mobile Hotspot SAR testing) LOLAAD0042 (Wi-Fi SAR testing) LOLAAD0021 (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	GSM 850	GSM 900	GSM 1800	GSM 1900	WCDMA 850	WCDMA 1900	WCDMA 2100	Wi-Fi 802.11b/g/n	Wi-Fi 802.11a/n	Bluetooth
Modulation Mode(s)	GMSK	GMSK	GMSK	GMSK	QPSK	QPSK	QPSK	BPSK	BPSK	GFSK
Maximum Output Power Setting	33.5 dBm	33.5 dBm	30.5 dBm	30.5 dBm	24.0 dBm	24.0 dBm	24.0 dBm	20.0 dBm	13.0 dBm	10 dBm
Duty Cycle	1:8	1:8	1:8	1:8	1:1	1:1	1:1	1:1	1:1	1:1
Transmitting Frequency Range(s)	824.2 - 848.8 MHz	880.2 - 914.8 MHz	1710.2 - 1784.8 MHz	1850.2 - 1909.8 MHz	826.4 - 846.6 MHz	1852.4 - 1907.6 MHz	1922.4 - 1977.6 MHz	2412.0 - 2462.5 MHz	5180 - 5240, 5745 - 5805, MHz	2402.0 - 2483.5 MHz

Mode(s) of Operation	GPRS 850				GPRS 900				GPRS 1800				GPRS 1900			
Modulation	GMSK				GMSK				GMSK				GMSK			
Maximum Output Power Setting (dBm)	33.5	**31.5**	29.5	27.5	33.5	**31.5**	29.5	27.5	30.5	**30.0**	28.0	26.0	30.5	**30.0**	28.0	26.0
Duty Cycle	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				880.2 - 914.8 MHz				1710.2 - 1784.8 MHz				1850.2 - 1909.8 MHz			

Mode(s) of Operation	EDGE 850				EDGE 900				EDGE 1800				EDGE 1900			
Modulation	8PSK				8PSK				8PSK				8PSK			
Maximum Output Power Setting (dBm)	28.1	**26.0**	24.0	22.0	28.1	**26.0**	24.0	22.0	27.3	**26.0**	24.0	22.0	27.3	**26.0**	24.0	22.0
Duty Cycle	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				880.2 - 914.8 MHz				1710.2 - 1784.8 MHz				1850.2 - 1909.8 MHz			

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

[2] The DUT utilizes a reduced limit for the maximum transmit power when the mobile hotspot functionality is enabled. A description of this functionality is provided in the "Operational Description" contained within Exhibit 12. This description was also discussed within FCC KDB 631391.

2.3 Evaluation of WCDMA modes

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

Band	Channel	Conducted power (dBm) for WCDMA modes		Conducted Power (dBm) for WCDMA – HSDPA (Rel 5) Modes				Conducted Power (dBm) for WCDMA – HSPA (HSUPA/HSDPA-Rel 6) Modes				
		RMC	AMR	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 5
WCDMA 850	4132	23.94	23.89	23.90	24.09	24.08	24.04	23.96	24.04	24.08	24.02	24.03
	4180	24.01	24.02	24.07	24.01	24.10	24.04	24.06	23.99	24.09	23.99	24.04
	4233	23.86	23.80	23.83	23.79	23.84	23.81	23.90	23.70	23.84	23.80	23.89
WCDMA 1900	9262	23.87	23.88	23.97	24.08	24.00	24.04	24.00	24.05	23.97	24.03	24.02
	9400	24.20	24.24	24.25	24.26	24.33	24.3	24.25	24.25	24.27	24.29	24.29
	9538	23.91	23.91	23.94	23.84	24.03	23.9	23.97	23.84	23.99	23.84	23.95
WCDMA 2100	9612	23.85	23.98	24.01	23.93	24.09	24.02	24.01	23.95	24.02	24.02	24.01
	9750	23.97	24.02	24.08	23.86	24.11	24.00	24.05	23.95	24.09	24.01	24.12
	9888	23.86	23.90	23.93	23.91	23.96	23.9	23.87	23.85	23.97	23.89	23.94

Maximum Power Reduction (MPR)

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

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

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

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

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

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

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

2.4 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	**18.62**	**19.34**	**19.31**	**19.42**
	6	17.64	**18.43**	**18.77**	**18.26**
	11	16.79	**17.43**	**17.83**	**17.39**

Band	Channel	Conducted Power (dBm) for 802.11g Mode Data Rates							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
Wi-Fi 2450 MHz	1	17.52	17.48	17.33	17.06	14.56	14.91	15.04	14.99
	6	16.90	17.09	16.83	16.45	13.87	15.43	14.35	14.37
	11	16.25	16.17	16.03	15.69	13.05	14.48	14.81	13.56

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	16.25	16.04	15.87	14.59	14.60	14.61	14.40	12.75
	6	15.65	15.49	15.01	13.95	13.65	13.93	13.51	11.82
	11	14.83	14.61	14.53	13.31	13.09	13.24	13.25	11.26

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	16.05	16.12	15.66	14.35	14.63	14.23	14.52	12.51
	6	15.21	15.42	14.97	13.66	13.75	13.87	13.69	11.64
	11	14.76	14.63	14.20	13.03	12.99	13.28	12.96	11.25

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	11.22	11.27	11.32	11.06	10.85	10.98	10.82	10.81
	40	11.20	11.16	11.27	10.93	10.92	10.81	10.83	10.84
	44	**11.31**	11.39	11.25	9.88	9.72	11.15	11.07	10.98
	48	**11.31**	11.22	11.36	11.10	11.09	11.08	10.99	11.03
Wi-Fi 5775 MHz	149	**11.08**	11.18	**11.43**	9.76	9.72	10.82	11.12	10.86
	153	9.89	10.00	9.77	10.86	10.88	10.68	10.76	10.75
	157	9.67	9.76	9.69	9.56	9.46	9.65	9.54	9.53
	161	9.63	9.71	9.83	9.63	9.43	9.42	9.34	9.41

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	11.05	10.97	10.67	10.76	10.78	10.69	10.80	8.39
	40	11.17	11.09	10.72	10.74	10.88	10.83	10.82	8.63
	44	11.05	11.21	10.94	10.93	10.87	10.88	10.87	8.69
	48	11.31	11.09	10.86	11.00	10.98	10.93	10.88	8.71
Wi-Fi 5775 MHz	149	10.87	10.84	10.62	10.81	10.86	10.85	10.61	8.72
	153	10.76	10.77	10.61	10.65	10.50	10.76	10.79	8.43
	157	10.80	10.69	10.64	10.59	10.74	10.65	10.75	8.61
	161	11.02	10.99	10.64	10.63	10.66	10.74	10.51	8.62

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	**11.66**	11.31	11.63	10.85	10.98	11.04	10.84	8.50
	40	11.12	10.97	10.75	10.94	10.86	10.82	10.81	8.56
	44	11.13	11.15	10.87	10.94	10.99	10.87	10.95	8.50
	48	11.17	11.14	10.96	11.04	11.13	11.00	11.00	8.73
Wi-Fi 5775 MHz	149	**11.48**	10.73	10.56	10.86	10.87	10.83	10.86	8.72
	153	10.95	10.87	10.63	10.79	10.70	10.69	10.72	8.43
	157	10.94	10.84	10.49	10.59	10.69	10.72	10.70	8.43
	161	10.92	10.82	10.59	10.65	10.67	10.72	10.75	8.32

2.5 Evaluation of Bluetooth

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

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

Table 1 – Output Power Thresholds for Unlicensed Transmitters

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

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

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

Per the highlighted criteria:

1. The highest output conducted power measured for Bluetooth on the device under test is 10.6 mW [< 24 mW]
2. The separation distance between the Bluetooth antenna and the main antenna is 5.4 cm [> 5.0 cm]

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

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	702	May-18-2010	May-18-2011
E-Field Probe ES3DV3	3183	Jul-14-2010	Jul-14-2011
DASY4™ DAE V1	376	Jul-13-2010	Jul-13-2011
E-Field Probe EX3DV4	3730	Jul-16-2010	Jul-16-2011
S.A.M. Phantom used for 800/900 MHz	TP-1131		
S.A.M. Phantom used for 800/900 MHz	TP-1156		
S.A.M. Phantom used for 1800/1900/2450 MHz	TP-1139		
S.A.M. Phantom used for 1800/1900/2450 MHz	TP-1250		
S.A.M. Phantom used for 5210/5775 MHz	TP-1153		
Dipole Validation Kit, DV835V2	424TR	Oct-14-2010	Oct-14-2011
Dipole Validation Kit, DV1800V2	263TR	Oct-13-2010	Oct-13-2011
Dipole Validation Kit, DV1800V2	279TR	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	3847A04822	Apr-22-2009	Apr-22-2011
Power Meter E4419B	GB39511082	Apr-24-2009	Apr-24-2011
Power Sensor #1 - E9301A	US39210918	Oct-25-2010	Oct-25-2011
Power Sensor #2 - E9301A	US39210917	Oct-25-2010	Oct-25-2011
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	Head	**Measured,** Nov-07-2010	40.8	0.90	19.1
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** Nov-07-2010	55.1	0.98	18.8
		Measured, Nov-13-2010	54.7	0.98	18.8
		Measured, Dec-21-2010	53.8	0.98	18.0
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1880	Head	**Measured,** Nov-06-2010	38.5	1.46	18.6
		Measured, Nov-12-2010	38.1	1.45	18.7
		Measured, Nov-18-2010	38.2	1.46	18.5
		Measured, Nov-30-2010	38.7	1.44	19.0
		Measured, Dec-05-2010	38.2	1.47	18.7
		Recommended Limits	40.0 ±5%	1.40 ±5%	18-25
	Body	**Measured,** Nov-18-2010	50.7	1.59	19.0
		Measured, Nov-26-2010	50.7	1.57	19.3
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25
2450	Head	**Measured,** Nov-25-2010	37.6	1.80	19.4
		Measured, Nov-30-2010	37.5	1.77	19.5
		Recommended Limits	39.2 ±10%	1.80 ±5%	18-25
	Body	**Measured,** Nov-26-2010	50.0	1.90	19.8
		Measured, Nov-27-2010	50.4	1.96	20.3
		Measured, Nov-30-2010	50.1	1.87	19.5
		Recommended Limits	52.7 ±10%	1.95 ±5%	18-25
5210	Head	**Measured,** Dec-02-2010	36.1	4.96	19.8
		Recommended Limits	36.0 ±10%	4.66 ±5%	18-25
5785	Head	**Measured,** Dec-03-2010	35.0	5.64	19.8
		Measured, Dec-05-2010	32.4	5.42	19.3
		Recommended Limits	35.4 ±10%	5.25 ±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 head-adjacent configuration was performed using the HSL 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. 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 5.8 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 5.8 GHz SAR tests were also on the conservative side of their 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-07-2010	9.45	40.8	0.90	20.5	19.1
	Measured, Nov-13-2010	9.75	40.7	0.90	20.2	18.7
	Measured, Dec-21-2010	9.45	40.9	0.91	20.1	19.6
	Recommended Limits	9.49	41.5 ±5%	0.90 ±5%	18-25	18-25
1800	**Measured,** Nov-06-2010	40.80	38.9	1.38	20.2	18.6
	Measured, Nov-09-2010	39.20	38.8	1.36	20.1	18.6
	Measured, Nov-10-2010	39.25	38.4	1.37	20.0	18.7
	Measured, Nov-12-2010	39.15	38.5	1.36	20.0	18.7
	Measured, Nov-13-2010	40.10	38.9	1.37	20.1	18.7
	Measured, Nov-18-2010	38.45	38.6	1.37	20.0	18.5
	Measured, Nov-25-2010	39.70	39.0	1.35	19.8	19.4
	Measured, Dec-05-2010	39.80	38.6	1.41	20.1	18.7
	Recommended Limits	38.10	40.0 ±5%	1.40 ±5%	18-25	18-25
	Measured, Nov-30-2010	39.45	39.0	1.36	20.2	19.0
	Recommended Limits	37.80	40.0 ±5%	1.40 ±5%	18-25	18-25
2450	**Measured,** Nov-25-2010	53.5	37.6	1.80	20.3	19.4
	Measured, Nov-26-2010	53.0	37.4	1.77	19.6	20.2
	Measured, Nov-27-2010	56.0	37.3	1.84	20.0	20.6
	Measured, Nov-30-2010	54.5	37.5	1.77	20.0	19.4
	Recommended Limits	52.2	39.2 ±10%	1.80 ±5%	18-25	18-25
5200	**Measured,** Dec-02-2010	89.0	36.1	4.95	20.5	19.8
	Recommended Limits	82.4	36.0 ±10%	4.65 ±5%	18-25	18-25
5800	**Measured,** Dec-02-2010	91.5	35.0	5.65	20.5	19.8
	Measured, Dec-05-2010	91.3	32.4	5.43	19.7	19.3
	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	3183	835	6.11	5 of 11
		1810	5.05	5 of 11
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 EX3DV4	3730	5200	4.67	5 of 11
		5800	4.06	5 of 11

6. Test Results

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

The phone was tested in the configurations stipulated in [1], [4] and [5]. The phone was positioned into these configurations using the device holder supplied with the DASY4™ SAR measurement system The default settings for the "coarse" and "cube" scans were chosen and used for measurements. The grid spacing of the coarse scan was set to 15 mm or less as shown in the SAR plots included in Appendix 2, 3, and 4. Please refer to the DASY4™ manual for additional information on SAR scanning procedures and algorithms used.

The Cellular Phone model covered by this report has the following battery options:
Model SNN5880A - 1880 mAH Battery

The battery SNN5880A was used to do all of the SAR testing. The phone was placed in the SAR measurement system with a fully charged battery.

6.1 Head Adjacent Test Results

The SAR results shown in tables 1 through 12 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to the [6]. Also shown are the measured conducted output power levels, the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is Extrapolated SAR = Measured SAR * $10^{(-drift/10)}$. The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

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

The guidelines provided in "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas" (KDB publication 648474 - D01 v01r05) were utilized for evaluation of the need for simultaneous transmission SAR testing. These guidelines direct that if the sum of the 1 g SAR measured for the individual 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 simultaneous SAR sums are presented in the tables below, except as noted.

For WCDMA 1900 and Wi-Fi (2.45 GHz) in the Left Head Cheek position the SAR-to-peak-location separation ratio is 0.46. For WCDMA 1900 and Wi-Fi (5.8 GHz) in the Left Head Cheek position the SAR-to-peak-location separation ratio is 0.30. For these configurations, combined SAR measurements were required to determine the aggregate 1 g SAR for simultaneous transmission evaluation. The results of these measurements are given in the tables below where noted, 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 single transmit SAR tests.

- For WCDMA 1900 MHz + Wi-Fi (2.45 GHz), the outer dimensions of the extended zoom scan were X = 80 mm, Y = 56 mm, Z = 30 mm with a step size of X = 8 mm, Y = 8 mm, Z = 5 mm.
- For WCDMA 1900 MHz + Wi-Fi (5.8 GHz), the outer dimensions of the extended zoom scan were X = 88 mm, Y = 56 mm, Z = 30 mm with a step size of X = 4 mm, Y = 4 mm, and Z using a graded step size.

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 631391.

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

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3183	835	6.11	5 of 11
		1810	5.05	5 of 11
		1950	4.82	5 of 11
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 EX3DV4	3730	5200	4.67	5 of 11
		5800	4.06	5 of 11

Left Head Cheek Position, GSM/WCDMA Modes										
f (MHz)	Channel	Conducted Output Power (dBm)	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
GSM 850	**128**	33.65								
	190	33.50	**19.0**	**0.282**	**0.488**	**0.49**	**0.682**	**0.68**	**5x5x7**	**74**
	251	33.50								
GSM 1900	**512**	30.44								
	661	30.30	**18.7**	**0.003**	**0.334**	**0.33**	**0.580**	**0.58**	**5x5x7**	**75**
	810	30.38								
WCDMA 850	**4132**	23.94								
	4180	24.01	**18.7**	**0.000**	**0.477**	**0.48**	**0.651**	**0.65**	**5x5x7**	**76**
	4233	23.86								
WCDMA 1900	**9262**	24.29	18.6	-0.002	0.760	0.76	1.30	1.30		
	9400	24.46	18.0	0.050	0.797	0.80	1.38	1.39		
	9538	24.29	**18.6**	**-0.100**	**0.813**	**0.83**	**1.42**	**1.45**	**5x5x7**	**77**

Table 1: SAR measurement results at the highest possible output power, measured in a head cheek position against the ICNIRP and ANSI SAR Limit.

Left Head Cheek Position, Wi-Fi Modes										
f (MHz)	Mode / Data Rate	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
2450	802.11b, 1 Mbps	1	**19.4**	**-0.281**	**0.399**	**0.43**	**0.830**	**0.89**	**5x5x7**	**78**
		6	19.4	-0.209	0.360	0.38	0.754	0.79		
		11	19.4	-0.021	0.341	0.34	0.714	0.72		
	802.11b, 2 Mbps	1	20.0	-0.231	0.395	0.42	0.822	0.87		
		6	20.0	-0.287	0.343	0.37	0.718	0.77		
		11	20.0	-0.053	0.300	0.30	0.635	0.64		
	802.11b, 5.5 Mbps	1	20.0	-0.195	0.398	0.42	0.829	0.87		
		6	20.0	-0.019	0.355	0.36	0.744	0.75		
		11	20.0	-0.173	0.320	0.33	0.670	0.70		
	802.11b, 11 Mbps	1	20.0	-0.119	0.391	0.40	0.807	0.83		
		6	20.0	-0.227	0.353	0.37	0.737	0.78		
		11	20.0	-0.362	0.359	0.39	0.754	0.82		
5210	802.11a, 6 Mbps	44	**19.2**	**-0.098**	**0.042**	**0.04**	**0.124**	**0.13**	**7x7x6**	**79**
		48	19.0	-0.680	0.037	0.04	0.107	0.13		
	802.11n, 7.2 Mbps	36	19.0	0.189	0.036	0.04	0.106	0.11		
5785	802.11a, 6 Mbps	149	**19.5**	**-0.074**	**0.066**	**0.07**	**0.188**	**0.19**	**7x7x6**	**80**
	802.11n, 7.2 Mbps	149	19.0	-0.332	0.058	0.06	0.172	0.19		
	802.11a, 12 Mbps	149	18.5	0.854	0.060	0.06	0.176	0.18		

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

Evaluation for Simultaneous SAR Left Head Cheek Position Summation of Highest SAR Values[3]									
Cellular Mode	**Wi-Fi Mode**	**Cellular Mode 10 g SAR Value (W/kg)**	**Wi-Fi Mode 10 g SAR Value (W/kg)**	**Combined 10 g SAR Value (W/kg)**	**Cellular Mode 1 g SAR Value (W/kg)**	**Wi-Fi Mode 1 g SAR Value (W/kg)**	**Combined 1 g SAR Value (W/kg)**	***Test Plots***	
								Grid	**Plot Page**
GSM 850	Wi-Fi 2450 802.11b, 1 Mbps	0.49	0.43	0.92	0.68	0.89	1.57		
GSM 1900		0.33	0.43	0.76	0.58	0.89	1.47		
WCDMA 850		0.48	0.43	0.91	0.65	0.89	1.54		
WCDMA 1900 [4]		**0.748**	**0.392**	**0.776**	**1.30**	**0.825**	**1.34**	**11x8x7**	**81-83**
GSM 850	Wi-Fi 5210 802.11a, 6 Mbps	0.49	0.04	0.53	0.68	0.13	0.82		
GSM 1900		0.33	0.04	0.37	0.58	0.13	0.72		
WCDMA 850		0.48	0.04	0.52	0.65	0.13	0.78		
WCDMA 1900		0.83	0.04	0.87	1.45	0.13	1.58		
GSM 850	Wi-Fi 5785 802.11a, 6 Mbps	0.49	0.07	0.56	0.68	0.19	0.87		
GSM 1900		0.33	0.07	0.40	0.58	0.19	0.77		
WCDMA 850		0.48	0.07	0.55	0.65	0.19	0.84		
WCDMA 1900 [5]		**0.835**	**0.078**	**0.839**	**1.47**	**0.198**	**1.47**	**23x15x6**	**84-86**

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

[3] Except as noted in footnotes 3 and 4.

[4] Per KDB publication 648474 and a request for clarification in KDB inquiry 631391, simultaneous SAR evaluation was required to determine the aggregate 1 g SAR in this configuration because the simple sum SAR is greater than 1.6 $^{mW}/_{g}$ and the SAR-to-peak-location separation ratio is 0.46, not less than the 0.3 limit. See Appendix 2 for SAR plots and further information.

[5] Per KDB publication 648474 and a request for clarification in KDB inquiry 631391, simultaneous SAR evaluation was required to determine the aggregate 1 g SAR in this configuration because the simple sum SAR is greater than 1.6 $^{mW}/_{g}$ and the SAR-to-peak-location separation ratio is 0.30, not less than the 0.3 limit. See Appendix 2 for SAR plots and further information.

Right Head Cheek Position, GSM/WCDMA Modes										
f (MHz)	Channel	Conducted Output Power (dBm)	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
GSM 850	128	33.65								
	190	33.50	19.0	-0.104	0.469	0.48	0.631	0.65		
	251	33.50								
GSM 1900	512	30.44								
	661	30.30	18.7	-0.056	0.205	0.21	0.339	0.34		
	810	30.38								
WCDMA 850	4132	23.94								
	4180	24.01	19.1	0.032	0.428	0.43	0.573	0.57		
	4233	23.86								
WCDMA 1900	9262	24.29								
	9400	24.46	18.3	-0.076	0.446	0.45	0.730	0.74		
	9538	24.29								

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

Right Head Cheek Position, Wi-Fi Modes										
f (MHz)	Mode / Data Rate	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
2450	802.11b, 1 Mbps	1	19.4	0.359	0.314	0.31	0.650	0.65		
		6								
		11								
5210	802.11a, 6 Mbps	44	19.3	0.406	0.014	0.01	0.045	0.05		
		48	19.2	-0.819	0.013	0.02	0.044	0.05		
	802.11n, 7.2 Mbps	36	19.0	-0.178	0.014	0.01	0.042	0.04		
5785	802.11a, 6 Mbps	149	19.0	-0.172	0.022	0.02	0.067	0.07		
	802.11n, 7.2 Mbps	149	19.3	-0.119	0.022	0.02	0.062	0.06		
	802.11a, 12 Mbps	149	18.9	0.112	0.022	0.02	0.061	0.06		

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

Evaluation for Simultaneous SAR Right Head Cheek Position Summation of Highest SAR Values									
Cellular Mode	Wi-Fi Mode	Cellular Mode 10 g SAR Value (W/kg)	Wi-Fi Mode 10 g SAR Value (W/kg)	Combined 10 g SAR Value (W/kg)	Cellular Mode 1 g SAR Value (W/kg)	Wi-Fi Mode 1 g SAR Value (W/kg)	Combined 1 g SAR Value (W/kg)	*Test Plots*	
								Grid	Plot Page
GSM 850	Wi-Fi 2450 802.11b, 1 Mbps	0.48	0.31	0.79	0.65	0.65	1.30		
GSM 1900		0.21	0.31	0.52	0.34	0.65	0.99		
WCDMA 850		0.43	0.31	0.74	0.57	0.65	1.22		
WCDMA 1900		0.45	0.31	0.76	0.74	0.65	1.39		
GSM 850	Wi-Fi 5210 802.11a, 6 Mbps	0.48	0.02	0.50	0.65	0.05	0.70		
GSM 1900		0.21	0.02	0.23	0.34	0.05	0.39		
WCDMA 850		0.43	0.02	0.45	0.57	0.05	0.62		
WCDMA 1900		0.45	0.02	0.47	0.74	0.05	0.79		
GSM 850	Wi-Fi 5785 802.11a, 6 Mbps	0.48	0.02	0.50	0.65	0.07	0.72		
GSM 1900		0.21	0.02	0.23	0.34	0.07	0.41		
WCDMA 850		0.43	0.02	0.45	0.57	0.07	0.64		
WCDMA 1900		0.45	0.02	0.47	0.74	0.07	0.81		

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

Left Head 15° Tilt Position, GSM/WCDMA Modes										
f (MHz)	Channel	Conducted Output Power (dBm)	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
GSM 850	**128**	33.65								
	190	33.50	19.0	-0.102	0.290	0.30	0.384	0.39		
	251	33.50								
GSM 1900	**512**	30.44								
	661	30.30	18.7	-0.073	0.126	0.13	0.215	0.22		
	810	30.38								
WCDMA 850	**4132**	23.94								
	4180	24.01	**19.2**	**0.105**	**0.295**	**0.30**	**0.391**	**0.39**	**5x5x7**	**89**
	4233	23.86								
WCDMA 1900	**9262**	24.29								
	9400	24.46	18.3	-0.130	0.288	0.30	0.504	0.52		
	9538	24.29								

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

Left Head 15° Tilt Position, Wi-Fi Modes										
f (MHz)	Mode / Data Rate	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
2450	**802.11b, 1 Mbps**	1	**19.4**	**-0.027**	**0.114**	**0.11**	**0.225**	**0.23**	**5x5x7**	**91**
		6								
		11								
5210	**802.11a, 6 Mbps**	44	**19.3**	**-0.426**	**0.018**	**0.02**	**0.039**	**0.04**	**7x7x6**	**92**
		48	19.0	-0.435	0.015	0.02	0.035	0.04		
	802.11n, 7.2 Mbps	36	19.3	-0.268	0.017	0.02	0.035	0.04		
5785	**802.11a, 6 Mbps**	149	**19.3**	**-0.360**	**0.028**	**0.03**	**0.079**	**0.09**	**7x7x6**	**93**
	802.11n, 7.2 Mbps	149	19.1	0.096	0.027	0.03	0.082	0.08		
	802.11a, 12 Mbps	149	19.0	-0.208	0.020	0.02	0.074	0.08		

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

Evaluation for Simultaneous SAR Left Head 15° Tilt Position Summation of Highest SAR Values									
Cellular Mode	Wi-Fi Mode	Cellular Mode 10 g SAR Value (W/kg)	Wi-Fi Mode 10 g SAR Value (W/kg)	Combined 10 g SAR Value (W/kg)	Cellular Mode 1 g SAR Value (W/kg)	Wi-Fi Mode 1 g SAR Value (W/kg)	Combined 1 g SAR Value (W/kg)	*Test Plots*	
								Grid	Plot Page
GSM 850	Wi-Fi 2450 802.11b, 1 Mbps	0.30	0.11	0.41	0.39	0.23	0.62		
GSM 1900		0.13	0.11	0.24	0.22	0.23	0.45		
WCDMA 850		0.30	0.11	0.41	0.39	0.23	0.62		
WCDMA 1900		0.30	0.11	0.41	0.52	0.23	0.75		
GSM 850	Wi-Fi 5210 802.11a, 6 Mbps	0.30	0.02	0.32	0.39	0.04	0.43		
GSM 1900		0.13	0.02	0.15	0.22	0.04	0.26		
WCDMA 850		0.30	0.02	0.32	0.39	0.04	0.43		
WCDMA 1900		0.30	0.02	0.32	0.52	0.04	0.56		
GSM 850	Wi-Fi 5785 802.11a, 6 Mbps	0.30	0.03	0.33	0.39	0.09	0.48		
GSM 1900		0.13	0.03	0.16	0.22	0.09	0.31		
WCDMA 850		0.30	0.03	0.33	0.39	0.09	0.48		
WCDMA 1900		0.30	0.03	0.33	0.52	0.09	0.61		

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

Right Head 15° Tilt Position, GSM/WCDMA Modes										
f (MHz)	Channel	Conducted Output Power (dBm)	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
GSM 850	128	33.65								
	190	33.50	19.0	-0.148	0.286	0.30	0.383	0.40	5x5x7	87
	251	33.50								
GSM 1900	512	30.44								
	661	30.30	18.7	-0.050	0.139	0.14	0.246	0.25	5x5x7	88
	810	30.38								
WCDMA 850	4132	23.94								
	4180	24.01	19.2	0.044	0.273	0.27	0.364	0.36		
	4233	23.86								
WCDMA 1900	9262	24.29								
	9400	24.46	18.0	-0.223	0.291	0.31	0.523	0.55	5x5x7	90
	9538	24.29								

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

Right Head 15° Tilt Position, Wi-Fi Modes										
f (MHz)	Mode / Data Rate	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
2450	802.11b, 1 Mbps	1	19.4	-0.025	0.079	0.08	0.147	0.15		
		6								
		11								
5210	802.11a, 6 Mbps	44	19.6	-0.242	0.003	0.00	0.011	0.01		
		48	19.4	-0.526	0.004	0.00	0.013	0.03		
	802.11n, 7.2 Mbps	36	19.8	0.000	0.001	0.00	0.007	0.01		
5785	802.11a, 6 Mbps	149	18.8	0.060	0.010	0.01	0.032	0.03		
	802.11n, 7.2 Mbps	149	19.5	-0.046	0.004	0.00	0.021	0.02		
	802.11a, 12 Mbps	149	18.9	-0.929	0.010	0.01	0.030	0.04		

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

Evaluation for Simultaneous SAR Right Head 15° Tilt Position Summation of Highest SAR Values									
Cellular Mode	Wi-Fi Mode	Cellular Mode 10 g SAR Value (W/kg)	Wi-Fi Mode 10 g SAR Value (W/kg)	Combined 10 g SAR Value (W/kg)	Cellular Mode 1 g SAR Value (W/kg)	Wi-Fi Mode 1 g SAR Value (W/kg)	Combined 1 g SAR Value (W/kg)	*Test Plots*	
								Grid	Plot Page
GSM 850	Wi-Fi 2450 802.11b, 1 Mbps	0.30	0.08	0.38	0.40	0.15	0.55		
GSM 1900		0.14	0.08	0.22	0.25	0.15	0.40		
WCDMA 850		0.27	0.08	0.35	0.36	0.15	0.51		
WCDMA 1900		0.31	0.08	0.39	0.55	0.15	0.70		
GSM 850	Wi-Fi 5210 802.11a, 6 Mbps	0.30	0.00	0.30	0.40	0.03	0.43		
GSM 1900		0.14	0.00	0.14	0.25	0.03	0.28		
WCDMA 850		0.27	0.00	0.27	0.36	0.03	0.39		
WCDMA 1900		0.31	0.00	0.31	0.55	0.03	0.58		
GSM 850	Wi-Fi 5785 802.11a, 12 Mbps	0.30	0.01	0.31	0.40	0.04	0.44		
GSM 1900		0.14	0.01	0.15	0.25	0.04	0.29		
WCDMA 850		0.27	0.01	0.28	0.36	0.04	0.40		
WCDMA 1900		0.31	0.01	0.32	0.55	0.04	0.59		

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

6.2 Body Worn Test Results

The SAR results shown in tables 13 through 22 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the measured conducted output power levels, the temperature of the test facility during the test, the temperature of the 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 test conditions that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 3. All other test conditions measured lower SAR values than those included in Appendix 3.

The guidelines provided in "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas" (KDB publication 648474 - D01 v01r05) were utilized for evaluation of the need for simultaneous transmission SAR testing. These guidelines direct that if the sum of the 1 g SAR measured for the individual 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 simultaneous SAR summations are presented in the tables below.

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

The simulated tissue depth was verified to be 15.0 cm ± 0.5 cm for frequencies less than 3 GHz, or 10.0 cm ± 0.5 cm for frequencies greater than 3 GHz. The same device holder described in section 6 was used for positioning the phone. The functional accessories were divided into two categories, the ones with metal components and the ones with non-metal components. For non-metallic component accessories, testing was performed on the accessory that displayed the closest proximity to the flat phantom. Each metallic component accessory, if any, was checked for uniqueness of metal component so that each is tested with the device. If multiple accessories shared an identical metal component, only the accessory that dictates the closest spacing to the body was tested. The cellular phone was tested with a headset connected to the device for all body-worn SAR measurements.

There are no body-worn accessories available for this phone at the time of testing thus the device was tested per the Supplement C testing guidelines for devices that do not have body-worn accessories. A separation distance of 25 mm between the device and the flat phantom was used for testing body-worn SAR. The chosen separation distance of 25 mm is utilized in order to support any case or holder accessories offered or to be offered by Motorola for this product. The device was tested with the front and back of the device facing the phantom. Both sides of the device were tested for Body SAR for the purpose of including the SAR evaluation for body-worn accessories that support the device with the front side facing the user.

The cellular phone was also tested in data mode operations. For these tests, a separation distance of 25 mm between the device and the flat phantom was used. The device was tested in the worst-case SAR position and channel configuration from the voice-mode body-worn testing.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3183	835	6.15	6 of 11
		1810	4.84	6 of 11
		1950	4.86	6 of 11
E-Field Probe ES3DV3	3124	2450	4.19	6 of 11

The body-worn SAR test results for the 5.2 GHz and 5.8 GHz transmit bands are provided in report *FCC IHDP56LS1 EX11 SAR Report -2.pdf*, included within the Exhibit 11 documents. Evaluations for the simultaneous SAR summations including data from that report are presented in the tables below.

Body-Worn, Front of Phone 25 mm from Phantom; GSM/WCDMA Modes										
f (MHz)	Channel	Conducted Output Power (dBm)	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
GSM 850	128	33.65								
	190	33.50	19.0	-0.016	0.168	0.17	0.226	0.23		
	251	33.50								
GSM 1900	512	30.44								
	661	30.30	19.0	-0.011	0.062	0.06	0.100	0.10		
	810	30.38								
WCDMA 850	4132	23.94								
	4180	24.01	19.0	-0.113	0.086	0.09	0.116	0.12		
	4233	23.86								
WCDMA 1900	9262	24.29								
	9400	24.46	19.1	-0.009	0.118	0.12	0.189	0.19		
	9538	24.29								

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

GPRS Class 10 (2 Uplink Timeslots) Mode Body-Worn, Front of Phone 25 mm from Phantom										
f (MHz)	Channel	Conducted Output Power (dBm)	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
GSM 850	128	31.58								
	190	31.76	19.5	0.269	0.265	0.27	0.359	0.36		
	251	31.33								
GSM 1900	512	30.05								
	661	29.94	19.5	-0.007	0.054	0.05	0.088	0.09		
	810	29.84								

Table 14: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

EDGE Class 10 (2 Uplink Timeslots) Mode Body-Worn, Front of Phone 25 mm from Phantom										
f (MHz)	Channel	Conducted Output Power (dBm)	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
GSM 850	128	26.19								
	190	26.14	19.5	0.052	0.070	0.07	0.094	0.09		
	251	25.97								
GSM 1900	512	25.97								
	661	25.82	19.5	0.328	0.031	0.03	0.050	0.05		
	810	25.80								

Table 15: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn, Front of Phone 25 mm from Phantom; Wi-Fi Modes										
f (MHz)	Mode / Data Rate	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
2450	802.11b, 1 Mbps	1	19.2	0.033	0.014	0.01	0.024	0.02		
		6								
		11								

Table 16: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Evaluation for Simultaneous SAR Body-Worn, Front of Phone 25 mm from Phantom Summation of Highest SAR Values									
Cellular Mode	Wi-Fi Mode	Cellular Mode 10 g SAR Value (W/kg)	Wi-Fi Mode 10 g SAR Value (W/kg)	Combined 10 g SAR Value (W/kg)	Cellular Mode 1 g SAR Value (W/kg)	Wi-Fi Mode 1 g SAR Value (W/kg)	Combined 1 g SAR Value (W/kg)	*Test Plots*	
								Grid	Plot Page
GSM 850 (GPRS Cl. 10)	Wi-Fi 2450 802.11b, 1 Mbps	0.27	0.01	0.28	0.36	0.02	0.38		
GSM 1900		0.06	0.01	0.07	0.10	0.02	0.12		
WCDMA 850		0.09	0.01	0.10	0.12	0.02	0.14		
WCDMA 1900		0.12	0.01	0.13	0.19	0.02	0.21		
GSM 850 (GPRS Cl. 10)	Wi-Fi 5210 802.11n, 7.2 Mbps	0.27	0.013	0.283	0.36	0.020	0.380		
GSM 1900		0.06	0.013	0.073	0.10	0.020	0.120		
WCDMA 850		0.09	0.013	0.103	0.12	0.020	0.140		
WCDMA 1900		0.12	0.013	0.133	0.19	0.020	0.210		
GSM 850 (GPRS Cl. 10)	Wi-Fi 5785 802.11n, 7.2 Mbps	0.27	0.017	0.287	0.36	0.027	0.387		
GSM 1900		0.06	0.017	0.077	0.10	0.027	0.127		
WCDMA 850		0.09	0.017	0.107	0.12	0.027	0.147		
WCDMA 1900		0.12	0.017	0.137	0.19	0.027	0.217		

Table 17: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn, Back of Phone 25 mm from Phantom; GSM/WCDMA Modes										
f (MHz)	Channel	Conducted Output Power (dBm)	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
GSM 850	128	33.65								
	190	33.50	19.0	-0.080	0.209	0.21	0.285	0.29		
	251	33.50								
GSM 1900	512	30.44								
	661	30.30	19.0	-0.170	0.137	0.14	0.226	0.24		
	810	30.38								
WCDMA 850	4132	23.94								
	4180	24.01	**18.8**	**-0.053**	**0.129**	**0.13**	**0.178**	**0.18**	**5x5x7**	**97**
	4233	23.86								
WCDMA 1900	9262	24.29								
	9400	24.46	**19.0**	**-0.146**	**0.364**	**0.38**	**0.606**	**0.63**	**5x5x7**	**98**
	9538	24.29								

Table 18: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

GPRS Class 10 (2 Uplink Timeslots) Mode Body-Worn, Back of Phone 25 mm from Phantom										
f (MHz)	Channel	Conducted Output Power (dBm)	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
GSM 850	128	31.58								
	190	31.76	**18.9**	**0.400**	**0.313**	**0.31**	**0.419**	**0.42**	**5x5x7**	**95**
	251	31.33								
GSM 1900	512	30.05								
	661	29.94	**19.0**	**0.140**	**0.249**	**0.25**	**0.412**	**0.41**	**5x5x7**	**96**
	810	29.84								

Table 19: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

EDGE Class 10 (2 Uplink Timeslots) Mode Body-Worn, Back of Phone 25 mm from Phantom										
f (MHz)	Channel	Conducted Output Power (dBm)	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
GSM 850	128	26.19								
	190	26.14	18.9	0.178	0.082	0.08	0.110	0.11		
	251	25.97								
GSM 1900	512	25.97								
	661	25.82	18.9	-0.106	0.076	0.08	0.127	0.13		
	810	25.80								

Table 20: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn, Back of Phone 25 mm from Phantom; Wi-Fi Modes										
f (MHz)	Mode / Data Rate	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
2450	802.11b, 1 Mbps	1	19.2	0.049	0.020	0.02	0.032	0.03		
		6	19.5	-0.029	0.015	0.02	0.025	0.03		
		11	19.4	0.002	0.016	0.02	0.028	0.03		
	802.11b, 2 Mbps	1	19.2	-0.045	0.021	0.02	0.034	0.03		
		6	19.2	0.089	0.016	0.02	0.028	0.03		
		11	19.2	-0.014	0.017	0.02	0.029	0.03		
	802.11b, 5.5 Mbps	1	19.3	-0.055	0.021	0.02	0.035	0.04		
		6	19.8	0.042	0.019	0.02	0.031	0.03		
		11	19.8	0.010	0.019	0.02	0.032	0.03		
	802.11b, 11 Mbps	1	**19.8**	**0.065**	**0.024**	**0.02**	**0.040**	**0.04**	**5x5x7**	**99**
		6	19.8	0.089	0.019	0.02	0.033	0.03		
		11	19.8	-0.099	0.019	0.02	0.032	0.03		

Table 21: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Evaluation for Simultaneous SAR Body-Worn, Back of Phone 25 mm from Phantom Summation of Highest SAR Values									
Cellular Mode	Wi-Fi Mode	Cellular Mode 10 g SAR Value (W/kg)	Wi-Fi Mode 10 g SAR Value (W/kg)	Combined 10 g SAR Value (W/kg)	Cellular Mode 1 g SAR Value (W/kg)	Wi-Fi Mode 1 g SAR Value (W/kg)	Combined 1 g SAR Value (W/kg)	*Test Plots*	
								Grid	Plot Page
GSM 850 (GPRS Cl. 10)	Wi-Fi 2450 802.11b, 11 Mbps	0.31	0.02	0.33	0.42	0.04	0.46		
GSM 1900 (GPRS Cl. 10)		0.25	0.02	0.27	0.41	0.04	0.45		
WCDMA 850		0.13	0.02	0.15	0.18	0.04	0.22		
WCDMA 1900		0.38	0.02	0.40	0.63	0.04	0.67		
GSM 850 (GPRS Cl. 10)	Wi-Fi 5210 802.11a, 6 Mbps	0.31	0.017	0.327	0.42	0.037	0.457		
GSM 1900 (GPRS Cl. 10)		0.25	0.017	0.267	0.41	0.037	0.447		
WCDMA 850		0.13	0.017	0.147	0.18	0.037	0.217		
WCDMA 1900		0.38	0.017	0.397	0.63	0.037	0.667		
GSM 850 (GPRS Cl. 10)	Wi-Fi 5785 802.11a, 6 Mbps	0.31	0.028	0.338	0.42	0.049	0.469		
GSM 1900 (GPRS Cl. 10)		0.25	0.028	0.278	0.41	0.049	0.459		
WCDMA 850		0.13	0.028	0.158	0.18	0.049	0.229		
WCDMA 1900		0.38	0.028	0.408	0.63	0.049	0.679		

Table 22: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

6.3 Mobile Hotspot Test Results

The DUT is capable of functioning as a Wi-Fi to Cellular mobile hotspot. Additional SAR testing was performed according to the interim test guidelines provided at the October 2010 TCB Workshop. Testing was performed with a separation of 1 cm between the DUT and the "flat" phantom. The DUT was positioned for SAR tests with the front and back surfaces facing the phantom, and also with the edges facing the phantom in which the transmitting antenna is < 2.5 cm from the edge. Each transmit band was utilized for SAR testing, but only the "mode" within each band that exhibited the highest SAR results from section 6.2 was used.

The SAR results shown in tables 23 through 33 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 DUT utilizes a reduced limit for the maximum transmit power when the mobile hotspot functionality is enabled. A description of this functionality is provided in the "Operational Description" contained within Exhibit 12. This description was also discussed within FCC KDB 631391.

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

The guidelines provided in "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas" (KDB publication 648474 - D01 v01r05) were utilized for evaluation of the need for simultaneous transmission SAR testing. These guidelines direct that if the sum of the 1 g SAR measured for the individual 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 simultaneous SAR sums are presented in the tables below.

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

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

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3183	1810	4.84	6 of 11
E-Field Probe ES3DV3	3124	835	5.86	6 of 11
		2450	4.19	6 of 11

The mobile hotspot test results for the 5.2 GHz and 5.8 GHz transmit bands are provided in report *FCC_IHDP56LS1_EX11_SAR_Report_-2.pdf*, included within the Exhibit 11 documents. Evaluations for the simultaneous SAR summations including data from that report are presented in the tables below.

Body-Worn, Bottom Edge of Phone 10 mm from Phantom									
f (MHz)	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
WCDMA 850	4132								
	4180	20.0	0.051	0.058	0.06	0.092	0.09		
	4233								
WCDMA 1900	**9262**	**18.4**	**-0.181**	**0.606**	**0.63**	**1.20**	**1.25**	**5x5x7**	**102**
	9400	18.4	-0.202	0.545	0.57	1.07	1.12		
	9538	18.4	-0.165	0.588	0.61	1.23	1.23		

Table 23: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn, Left Edge of Phone 10 mm from Phantom									
f (MHz)	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
WCDMA 850	4132								
	4180	18.3	-0.116	0.314	0.32	0.457	0.47		
	4233								
WCDMA 1900	9262								
	9400	18.4	0.031	0.068	0.07	0.112	0.11		
	9538								

Table 24: 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 Phone 10 mm from Phantom									
f (MHz)	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
WCDMA 850	4132								
	4180	20.0	0.007	0.202	0.20	0.289	0.29		
	4233								
WCDMA 1900	9262								
	9400	18.4	-0.018	0.074	0.07	0.125	0.13		
	9538								

Table 25: 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 Phone 10 mm from Phantom										
f (MHz)	Mode / Data Rate	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
2450	**802.11b, 11 Mbps**	1	**20.3**	**-0.112**	**0.139**	**0.14**	**0.270**	**0.28**	**5x5x7**	**103**
		6								
		11								

Table 26: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Evaluation for Simultaneous SAR Body-Worn, Right Edge of Phone 10 mm from Phantom Summation of Highest SAR Values									
Cellular Mode	Wi-Fi Mode	Cellular Mode 10 g SAR Value (W/kg)	Wi-Fi Mode 10 g SAR Value (W/kg)	Combined 10 g SAR Value (W/kg)	Cellular Mode 1 g SAR Value (W/kg)	Wi-Fi Mode 1 g SAR Value (W/kg)	Combined 1 g SAR Value (W/kg)	*Test Plots*	
								Grid	Plot Page
WCDMA 850	Wi-Fi 2450 802.11b, 11 Mbps	0.20	0.14	0.34	0.29	0.28	0.57		
WCDMA 1900		0.07	0.14	0.21	0.13	0.28	0.41		
WCDMA 850	Wi-Fi 5210 802.11a, 6 Mbps	0.20	0.032	0.232	0.29	0.060	0.350		
WCDMA 1900		0.07	0.032	0.102	0.13	0.060	0.190		
WCDMA 850	Wi-Fi 5785 802.11n, 7.2 Mbps	0.20	0.040	0.240	0.29	0.082	0.372		
WCDMA 1900		0.07	0.040	0.110	0.13	0.082	0.212		

Table 27: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn, Front of Phone 10 mm from Phantom									
f (MHz)	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
WCDMA 850	4132								
	4180	18.1	0.060	0.433	0.43	0.585	0.59		
	4233								
WCDMA 1900	9262								
	9400	18.4	-0.121	0.162	0.17	0.302	0.31		
	9538								

Table 28: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn, Front of Phone 10 mm from Phantom										
f (MHz)	Mode / Data Rate	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
2450	802.11b, 11 Mbps	1	20.3	-0.015	0.076	0.08	0.145	0.15		
		6								
		11								

Table 29: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Evaluation for Simultaneous SAR Body-Worn, Front of Phone 10 mm from Phantom Summation of Highest SAR Values									
Cellular Mode	Wi-Fi Mode	Cellular Mode 10 g SAR Value (W/kg)	Wi-Fi Mode 10 g SAR Value (W/kg)	Combined 10 g SAR Value (W/kg)	Cellular Mode 1 g SAR Value (W/kg)	Wi-Fi Mode 1 g SAR Value (W/kg)	Combined 1 g SAR Value (W/kg)	*Test Plots*	
								Grid	Plot Page
WCDMA 850	Wi-Fi 2450 802.11b, 11 Mbps	0.43	0.08	0.51	0.59	0.15	0.74		
WCDMA 1900		0.17	0.08	0.25	0.31	0.15	0.46		
WCDMA 850	Wi-Fi 5210 802.11n, 7.2 Mbps	0.43	0.016	0.446	0.59	0.028	0.618		
WCDMA 1900		0.17	0.016	0.186	0.31	0.028	0.338		
WCDMA 850	Wi-Fi 5785 802.11a, 6 Mbps	0.43	0.021	0.451	0.59	0.039	0.629		
WCDMA 1900		0.17	0.021	0.191	0.31	0.039	0.349		

Table 30: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn, Back of Phone 10 mm from Phantom									
f (MHz)	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
WCDMA 850	4132								
	4180	18.0	0.036	0.586	0.59	0.794	0.79	5x5x7	101
	4233								
WCDMA 1900	9262	18.1	-0.195	0.535	0.56	1.04	1.09		
	9400	18.2	0.241	0.442	0.44	0.87	0.87		
	9538	18.1	-0.098	0.524	0.54	1.03	1.05		

Table 31: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn, Back of Phone 10 mm from Phantom										
f (MHz)	Mode / Data Rate	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
2450	802.11b, 11 Mbps	1	20.3	0.010	0.140	0.14	0.276	0.28	5x5x7	104
		6								
		11								

Table 32: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Evaluation for Simultaneous SAR Body-Worn, Back of Phone 10 mm from Phantom Summation of Highest SAR Values									
Cellular Mode	Wi-Fi Mode	Cellular Mode 10 g SAR Value (W/kg)	Wi-Fi Mode 10 g SAR Value (W/kg)	Combined 10 g SAR Value (W/kg)	Cellular Mode 1 g SAR Value (W/kg)	Wi-Fi Mode 1 g SAR Value (W/kg)	Combined 1 g SAR Value (W/kg)	*Test Plots*	
								Grid	Plot Page
WCDMA 850	Wi-Fi 2450 802.11b, 11 Mbps	0.59	0.14	0.73	0.79	0.28	1.07		
WCDMA 1900		0.56	0.14	0.70	1.09	0.28	1.37		
WCDMA 850	Wi-Fi 5210 802.11a, 6 Mbps	0.59	0.037	0.627	0.79	0.087	0.877		
WCDMA 1900		0.56	0.037	0.597	1.09	0.087	1.177		
WCDMA 850	Wi-Fi 5785 802.11a, 6 Mbps	0.59	0.031	0.621	0.79	0.074	0.864		
WCDMA 1900		0.56	0.031	0.591	1.09	0.074	1.164		

Table 33: 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: 11/7/2010 6:52:30 AM

Test Laboratory: Motorola - Nov-07-2010 835 Mhz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 424TR; FCC ID: IHDP56LS1
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 = 20.5*C
Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 40.8; 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):

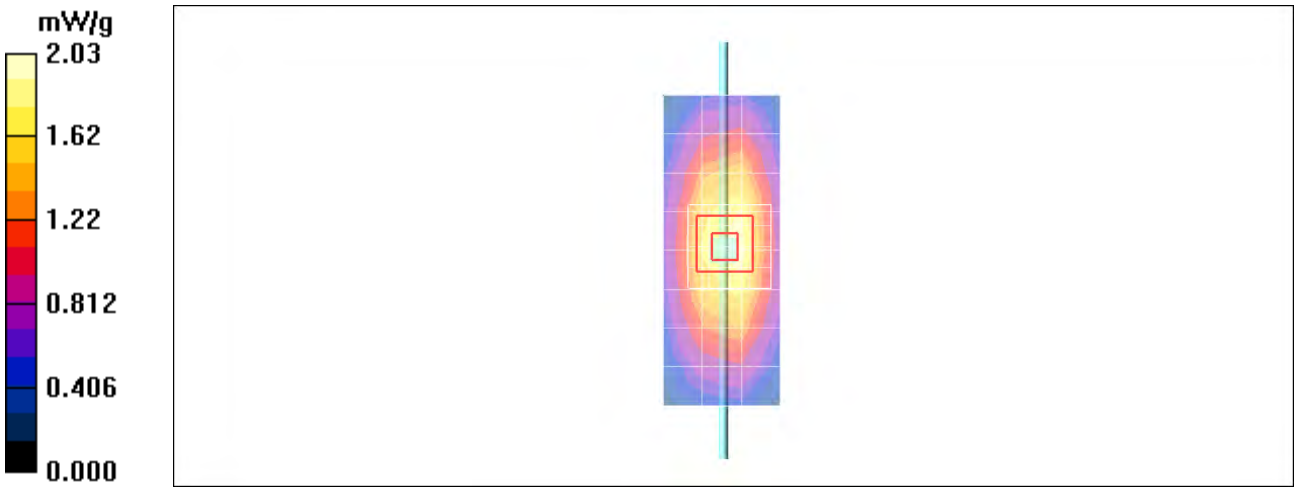
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.87 mW/g

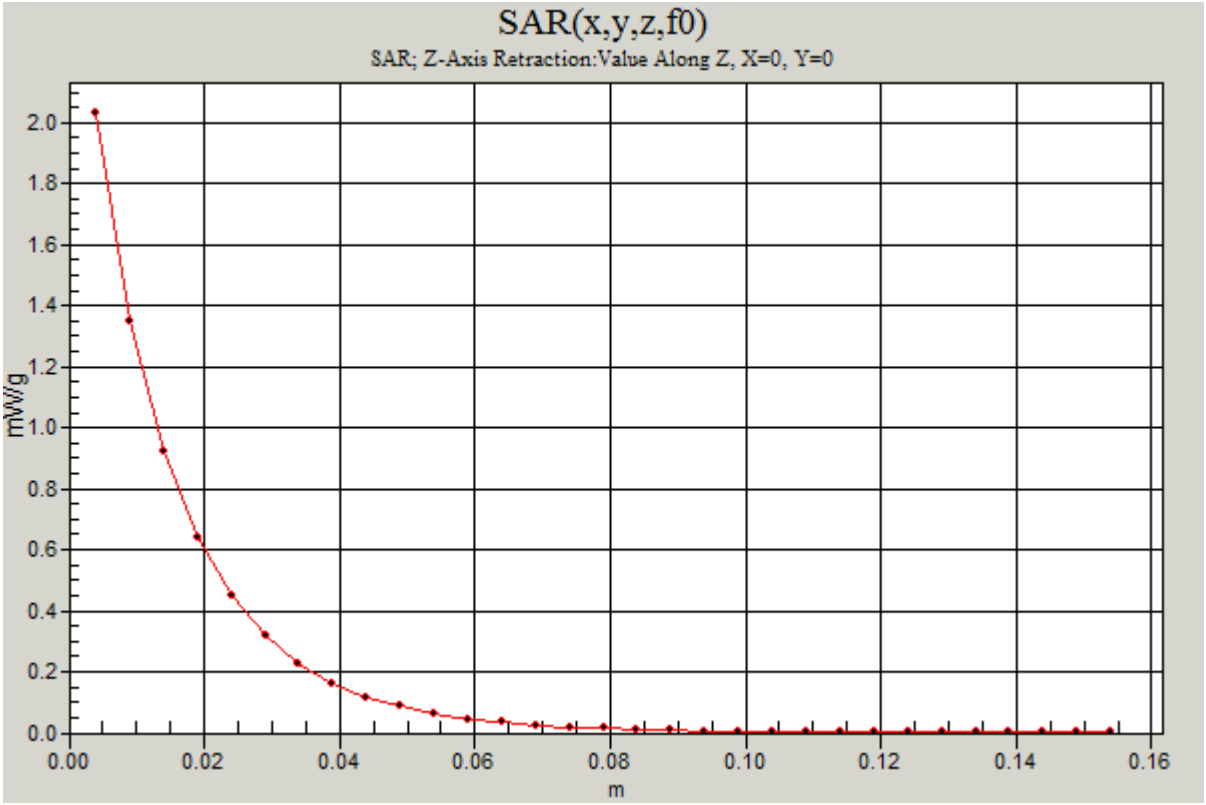
Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.3 V/m; Power Drift = -0.066 dB; Peak SAR (extrapolated) = 2.84 W/kg
SAR(1 g) = 1.89 mW/g; SAR(10 g) = 1.23 mW/g; Maximum value of SAR (measured) = 2.03 mW/g

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

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


mW/g
2.03
1.62
1.22
0.812
0.406
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: 11/13/2010 11:51:36 AM

Test Laboratory: Motorola - Nov-13-2010 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 424TR; FCC ID: IHDP56LS1
Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 424TR; Input Power = 200 mW
Sim.Temp@meas = 18.7*C; Sim.Temp@SPC = 18.7*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 = 0.9 mho/m; ε_r = 40.7; 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):

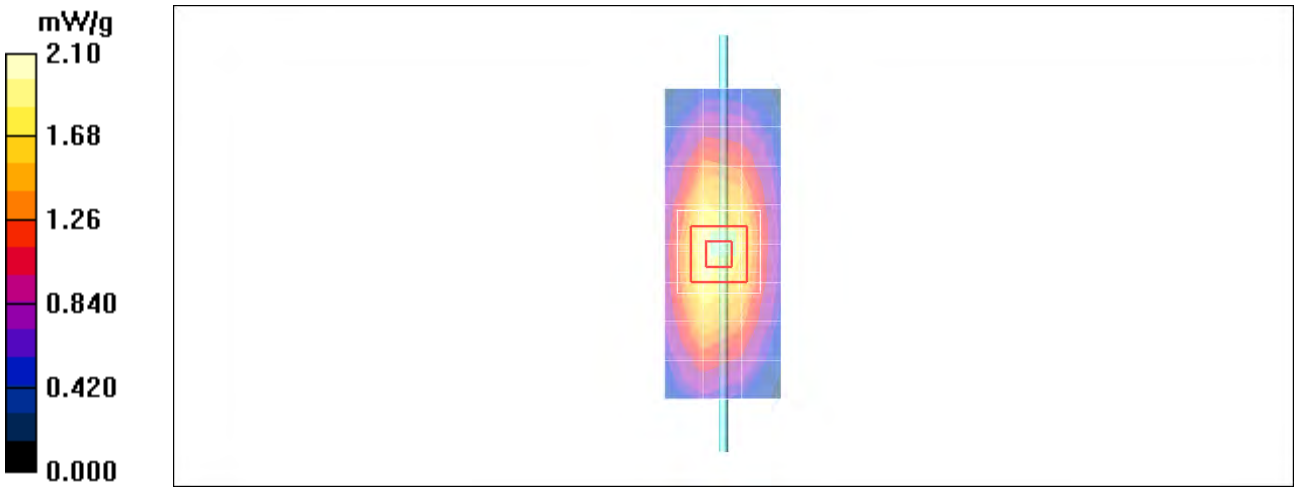
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.91 mW/g

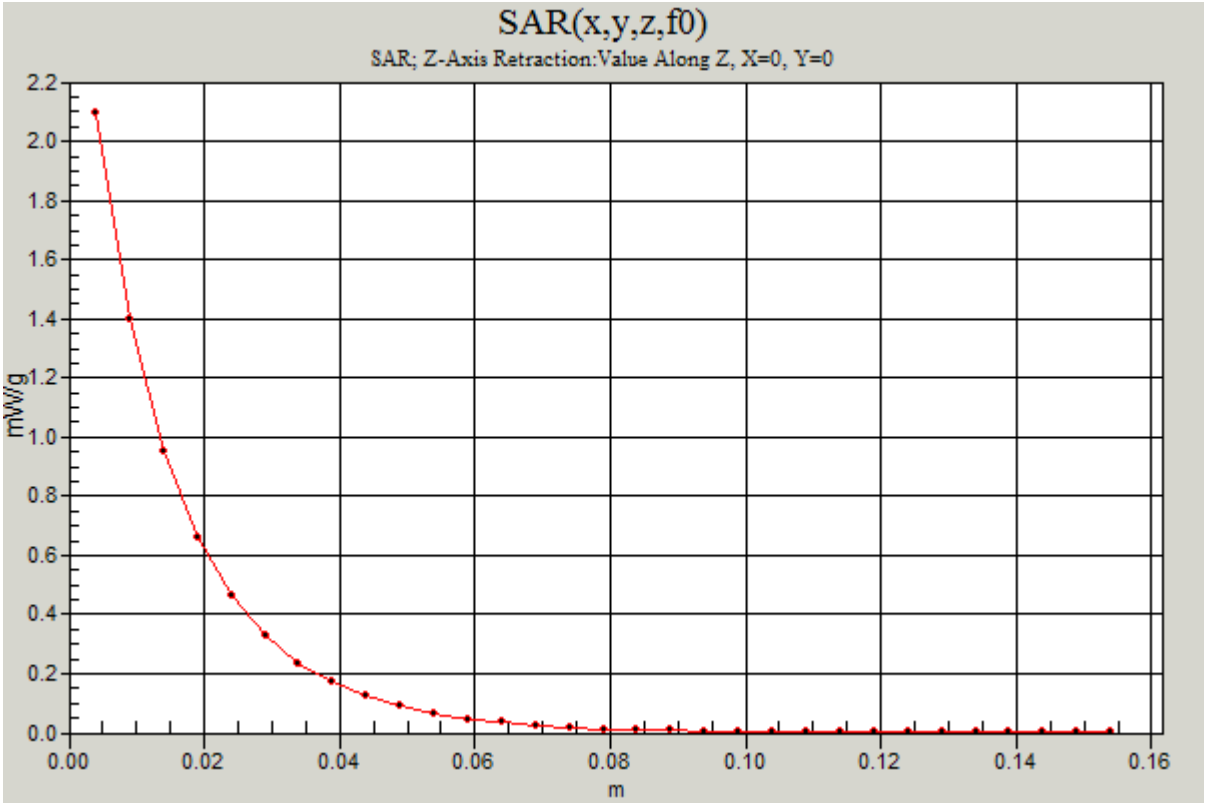
Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.4 V/m; Power Drift = -0.012 dB; Peak SAR (extrapolated) = 2.95 W/kg
SAR(1 g) = 1.95 mW/g; SAR(10 g) = 1.27 mW/g; Maximum value of SAR (measured) = 2.11 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.10 mW/g


mW/g
2.10
1.68
1.26
0.840
0.420
0.000


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

Date/Time: 12/21/2010 8:07:42 AM

Test Laboratory: Motorola - Dec-21-2010 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 424TR; FCC ID: IHDP56LS1
Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 424TR; Input Power = 200 mW
Sim.Temp@meas = 19.1*C; Sim.Temp@SPC = 19.6*C Room Temp @ SPC = 20.1*C
Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 40.9; 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):

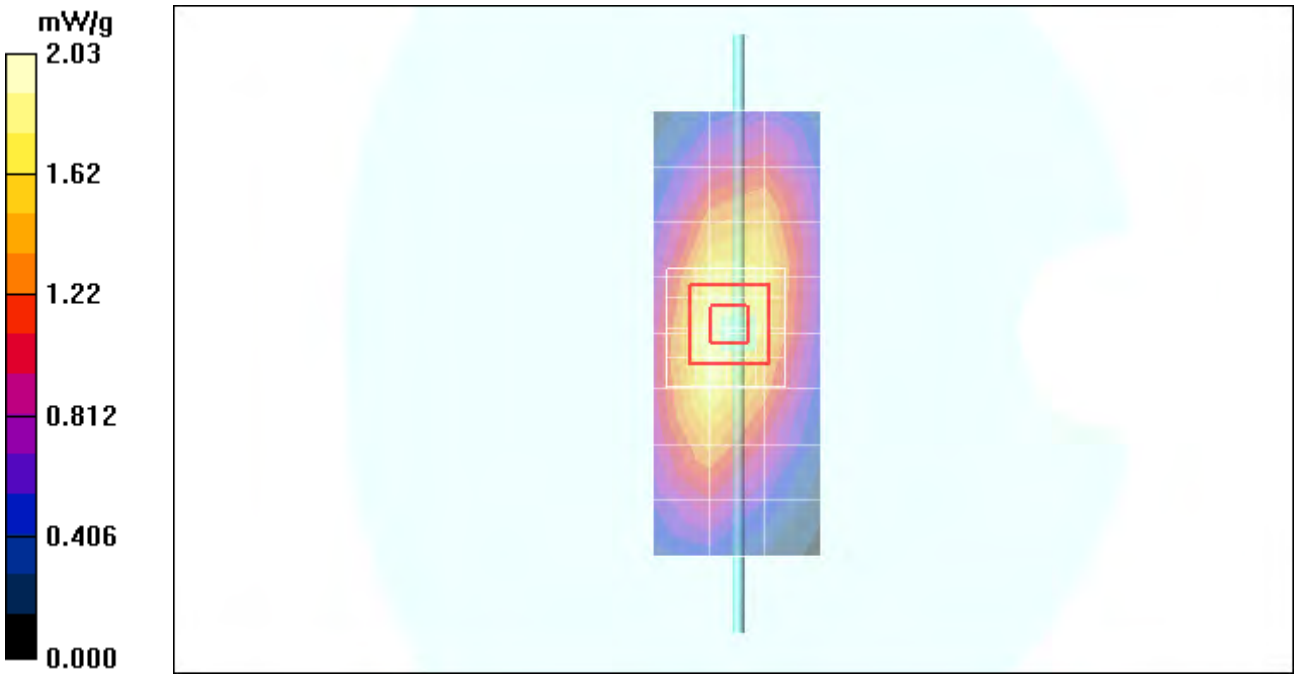
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.92 mW/g

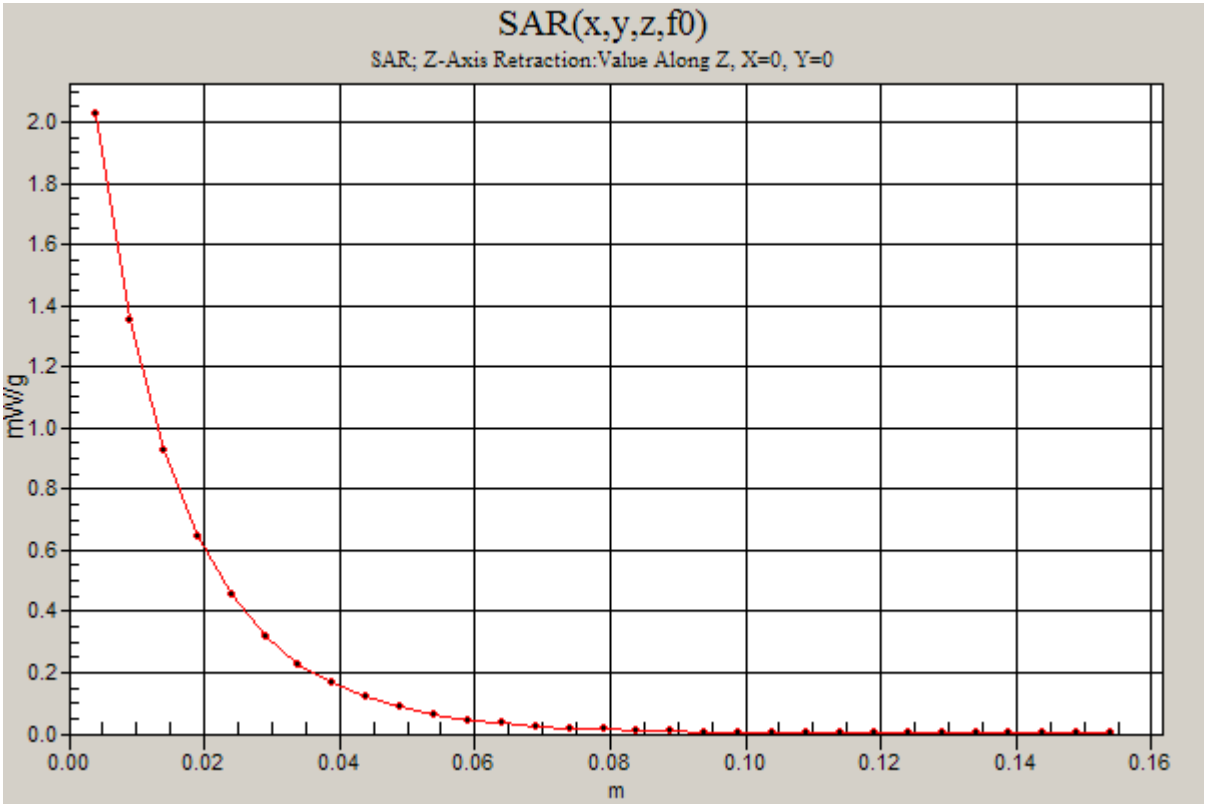
Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.4 V/m; Power Drift = -0.073 dB; Peak SAR (extrapolated) = 2.85 W/kg
SAR(1 g) = 1.89 mW/g; SAR(10 g) = 1.23 mW/g; Maximum value of SAR (measured) = 2.05 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.03 mW/g


mW/g
2.03
1.62
1.22
0.812
0.406
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: 11/6/2010 8:13:06 AM

Test Laboratory: Motorola - Nov-06-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 263TR; FCC ID: IHDP56LS1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 263TR; Input Power = 200 mW
Sim.Temp@meas = 18.6*C; Sim.Temp@SPC = 18.6*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 = 1.38 mho/m; ε_r = 38.9; 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_ 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

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

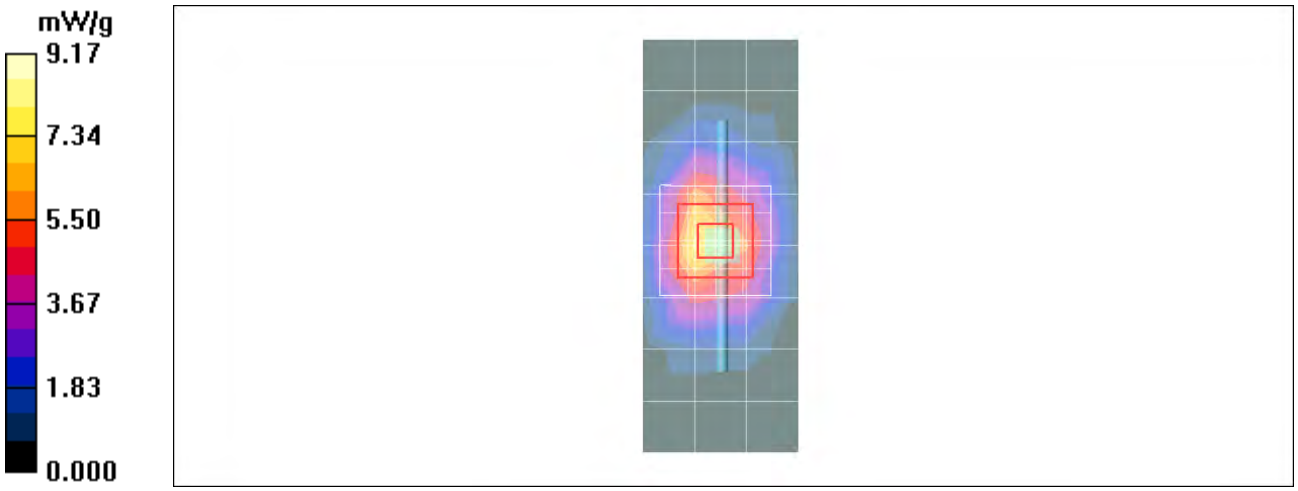
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.64 mW/g

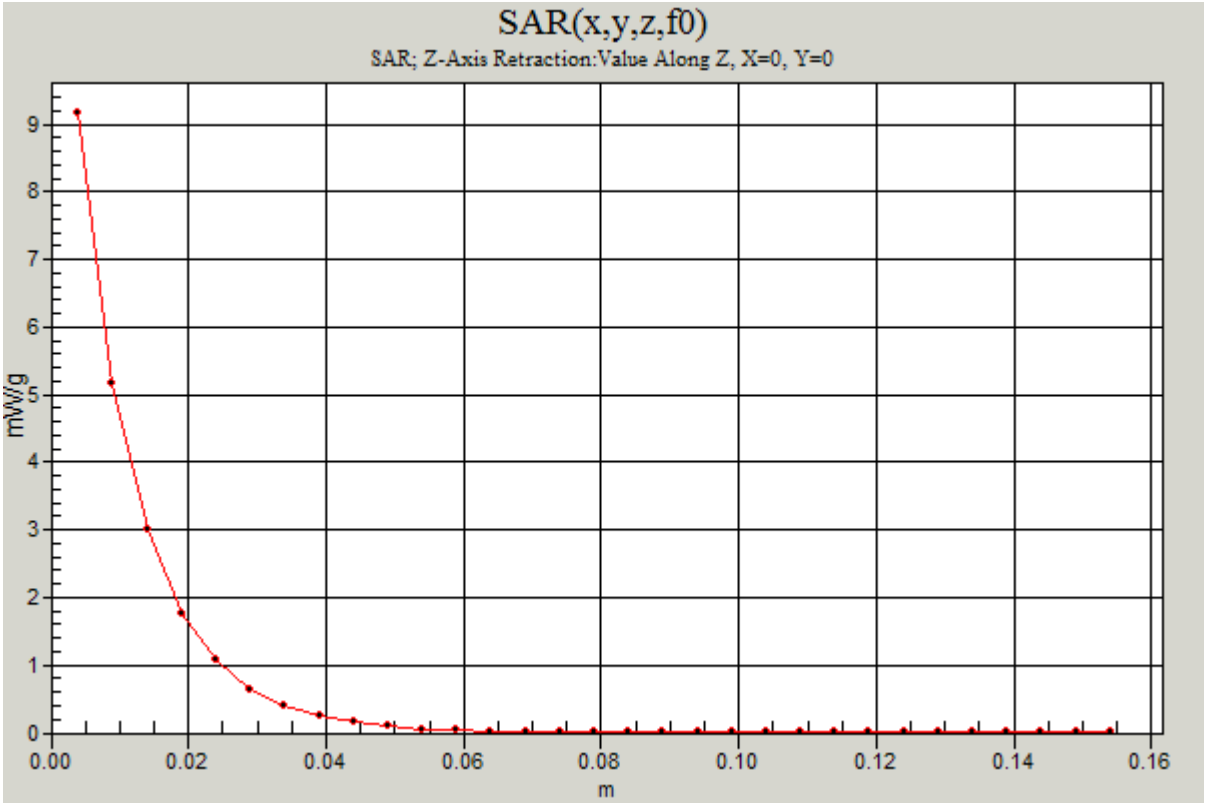
Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 81.5 V/m; Power Drift = -0.001 dB; Peak SAR (extrapolated) = 14.8 W/kg
SAR(1 g) = 8.16 mW/g; SAR(10 g) = 4.33 mW/g; Maximum value of SAR (measured) = 9.15 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 9.17 mW/g


mW/g
9.17
7.34
5.50
3.67
1.83
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: 11/9/2010 6:50:15 AM

Test Laboratory: Motorola - Nov-09-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 263TR; FCC ID: IHDP56LS1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 263TR; Input Power = 200 mW
Sim.Temp@meas = 18.6 C; Sim.Temp@SPC = 18.6 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 = 1.36 mho/m; ε_r = 38.8; 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):

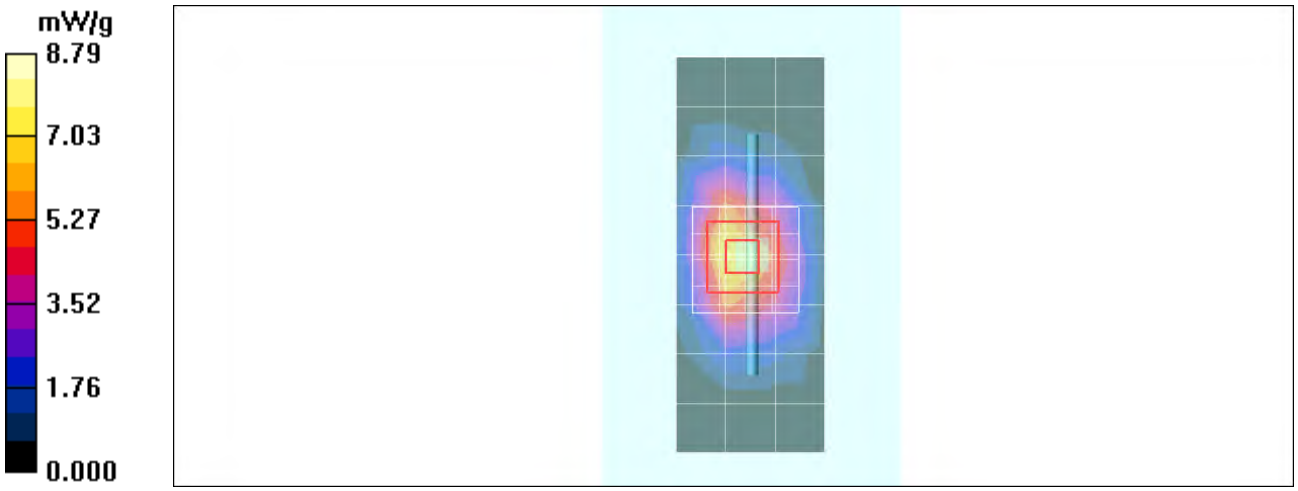
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.33 mW/g

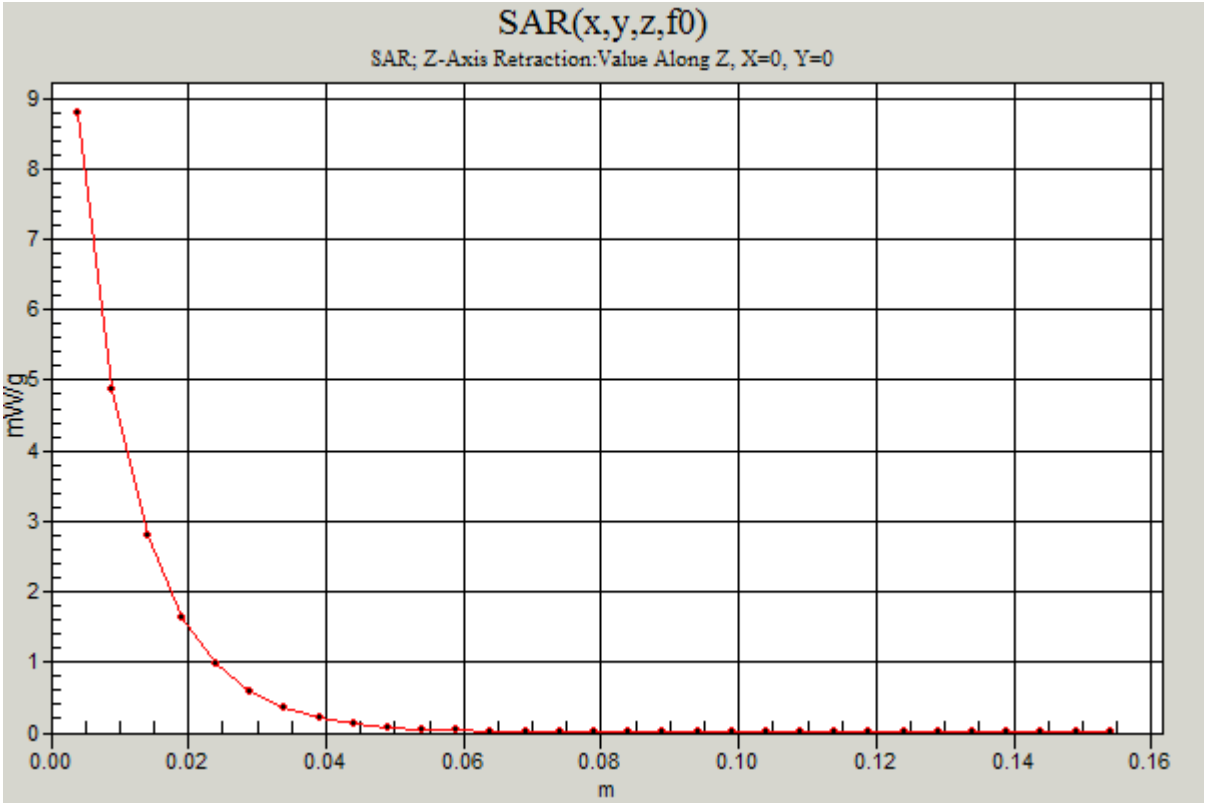
Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 80.1 V/m; Power Drift = -0.029 dB; Peak SAR (extrapolated) = 14.4 W/kg
SAR(1 g) = 7.84 mW/g; SAR(10 g) = 4.13 mW/g; Maximum value of SAR (measured) = 8.72 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.79 mW/g


mW/g
8.79
7.03
5.27
3.52
1.76
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: 11/10/2010 7:15:03 AM

Test Laboratory: Motorola - Nov-10-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 263TR; FCC ID: IHDP56LS1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 263TR; Input Power = 200 mW
Sim.Temp@meas = 18.7 C; Sim.Temp@SPC = 18.7 C; Room Temp @ SPC = 20.0 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 = 38.4; 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):

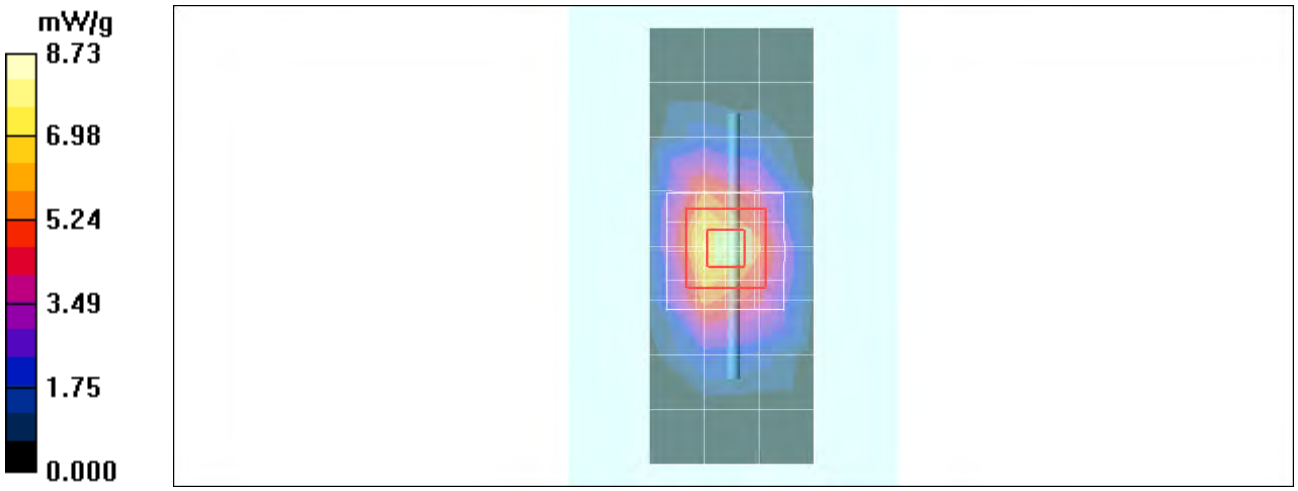
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 7.19 mW/g

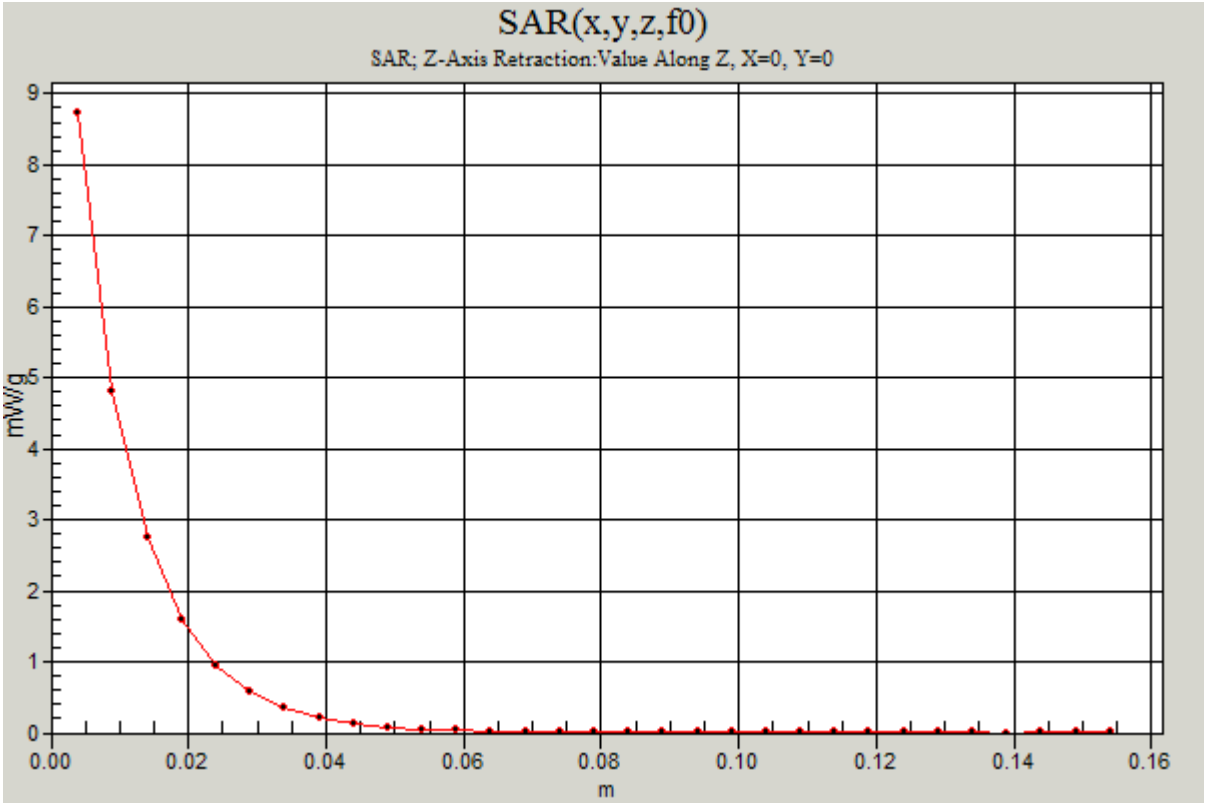
Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 80.1 V/m; Power Drift = -0.043 dB; Peak SAR (extrapolated) = 14.5 W/kg
SAR(1 g) = 7.85 mW/g; SAR(10 g) = 4.13 mW/g; Maximum value of SAR (measured) = 8.78 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.73 mW/g


mW/g
8.73
6.98
5.24
3.49
1.75
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: 11/12/2010 7:01:13 AM

Test Laboratory: Motorola - Nov-12-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 263TR; FCC ID: IHDP56LS1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 263TR; Input Power = 200 mW
Sim.Temp@meas = 18.7 C; Sim.Temp@SPC = 18.7 C; Room Temp @ SPC = 20.0 C
Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 1800 MHz; σ = 1.36 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - 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):

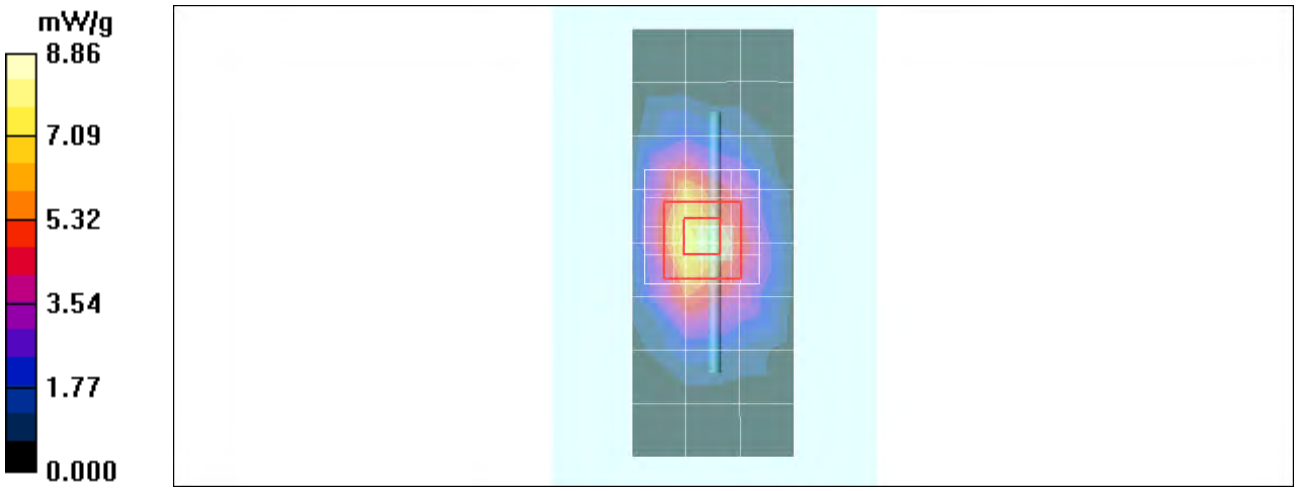
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.74 mW/g

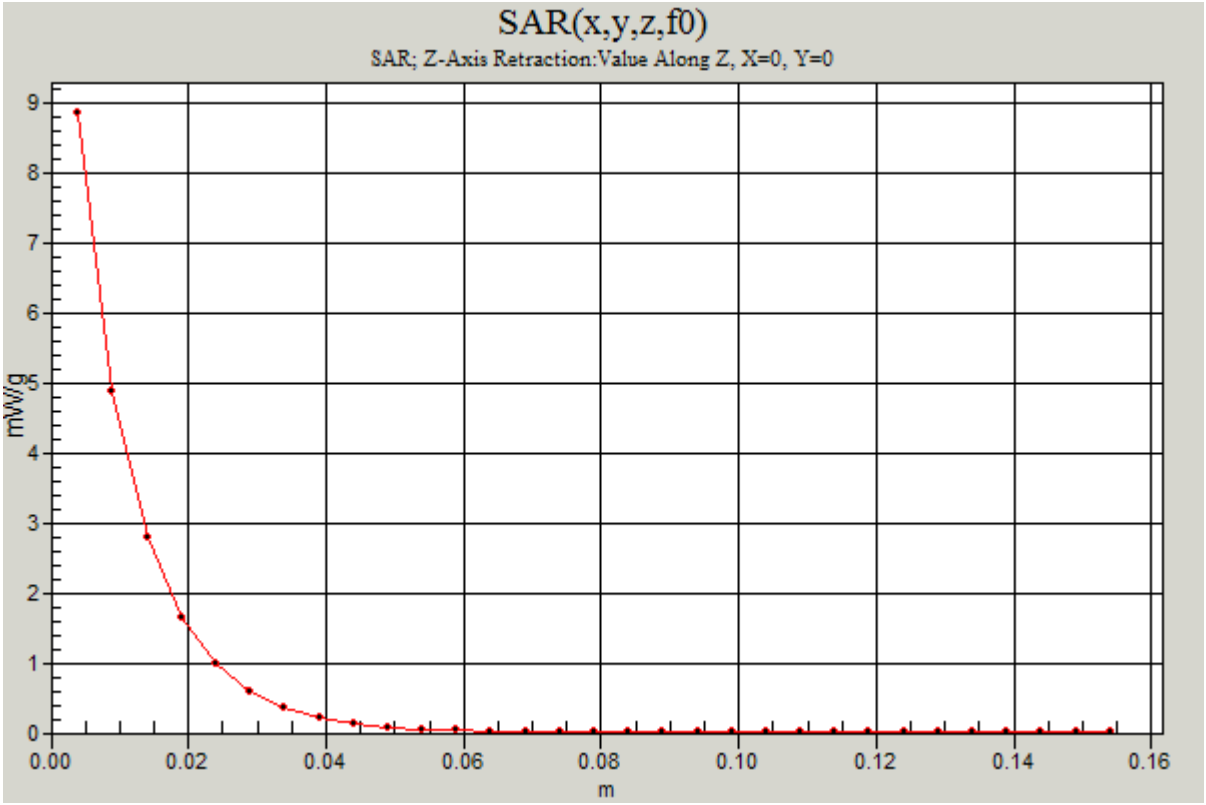
Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.3 V/m; Power Drift = -0.034 dB; Peak SAR (extrapolated) = 14.5 W/kg
SAR(1 g) = 7.83 mW/g; SAR(10 g) = 4.13 mW/g; Maximum value of SAR (measured) = 8.66 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.86 mW/g


mW/g
8.86
7.09
5.32
3.54
1.77
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: 11/13/2010 6:32:06 AM

Test Laboratory: Motorola - Nov-13-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 263TR; FCC ID: IHDP56LS1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 263TR; Input Power = 200 mW
Sim.Temp@meas = 18.7*C; Sim.Temp@SPC = 18.7*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 = 38.9; 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_ 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

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

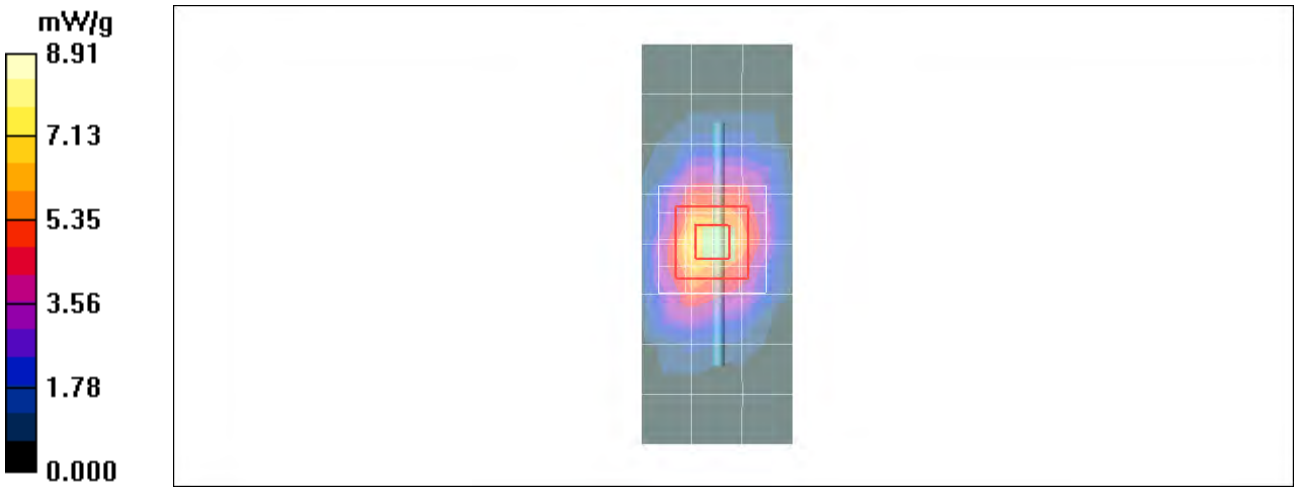
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.22 mW/g

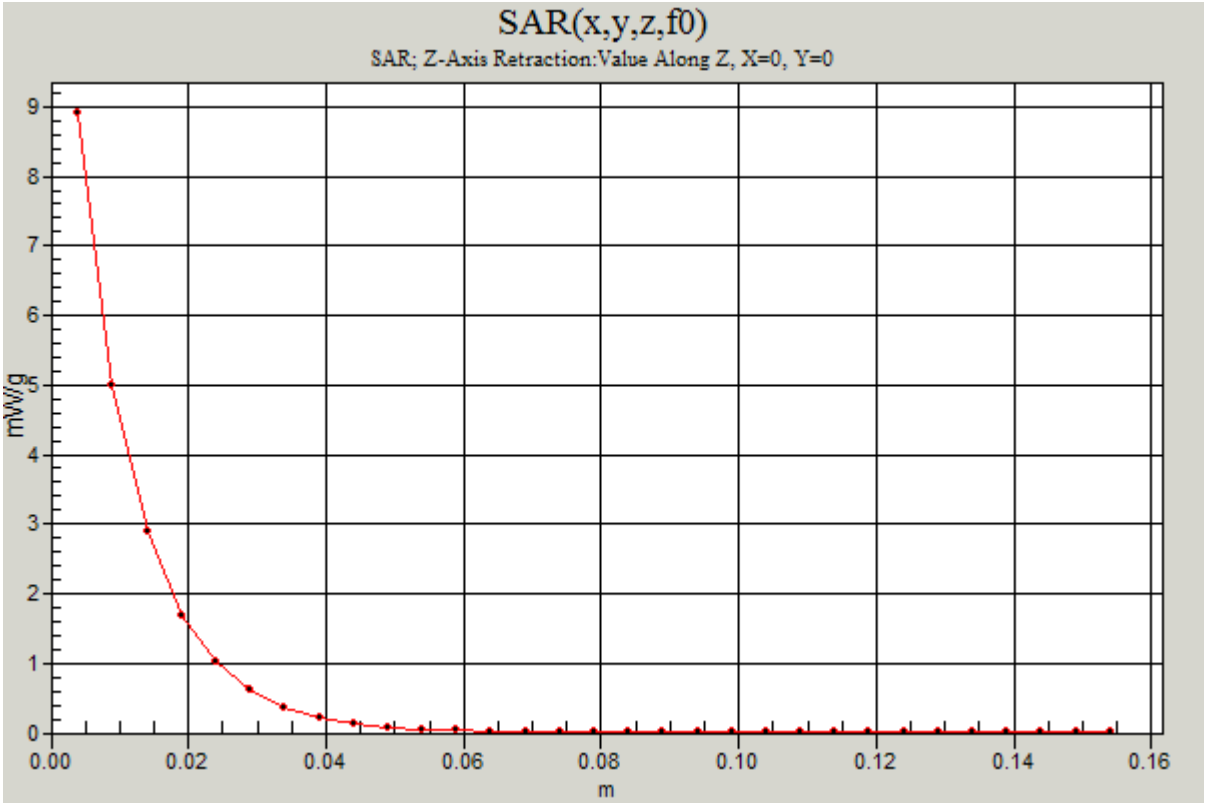
Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 81.5 V/m; Power Drift = -0.028 dB; Peak SAR (extrapolated) = 14.6 W/kg
SAR(1 g) = 8.02 mW/g; SAR(10 g) = 4.22 mW/g; Maximum value of SAR (measured) = 9.00 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.91 mW/g


mW/g
8.91
7.13
5.35
3.56
1.78
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: 11/18/2010 6:56:36 AM

Test Laboratory: Motorola - Nov-18-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 263TR; FCC ID: IHDP56LS1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 263TR; Input Power = 200 mW
Sim.Temp@meas = 18.5 C; Sim.Temp@SPC = 18.5 C; Room Temp @ SPC = 20.0 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 - 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):

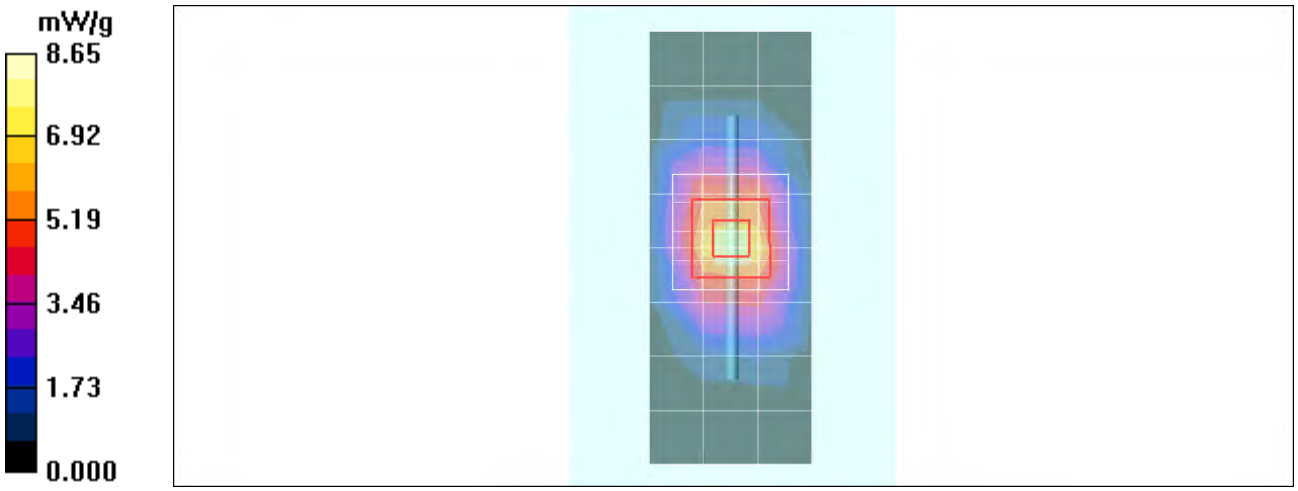
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 6.32 mW/g

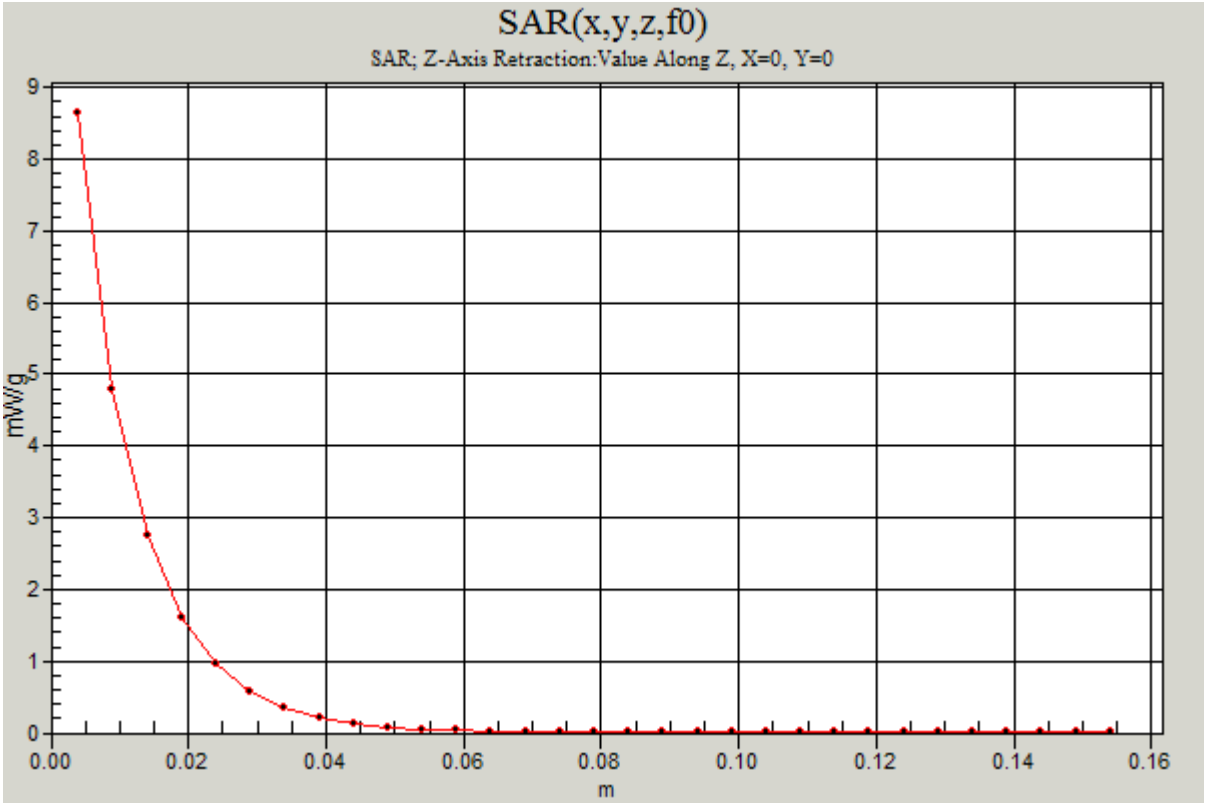
Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 80.4 V/m; Power Drift = -0.037 dB; Peak SAR (extrapolated) = 14.2 W/kg
SAR(1 g) = 7.69 mW/g; SAR(10 g) = 4.06 mW/g; Maximum value of SAR (measured) = 8.56 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.65 mW/g


mW/g
8.65
6.92
5.19
3.46
1.73
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: 11/25/2010 2:01:25 PM

Test Laboratory: Motorola - Nov-25-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 263TR; FCC ID: IHDP56LS1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 263TR; Input Power = 200 mW
Sim.Temp@meas = 19.3 C; Sim.Temp@SPC = 19.4 C; Room Temp @ SPC = 19.8 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 = 39; 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):

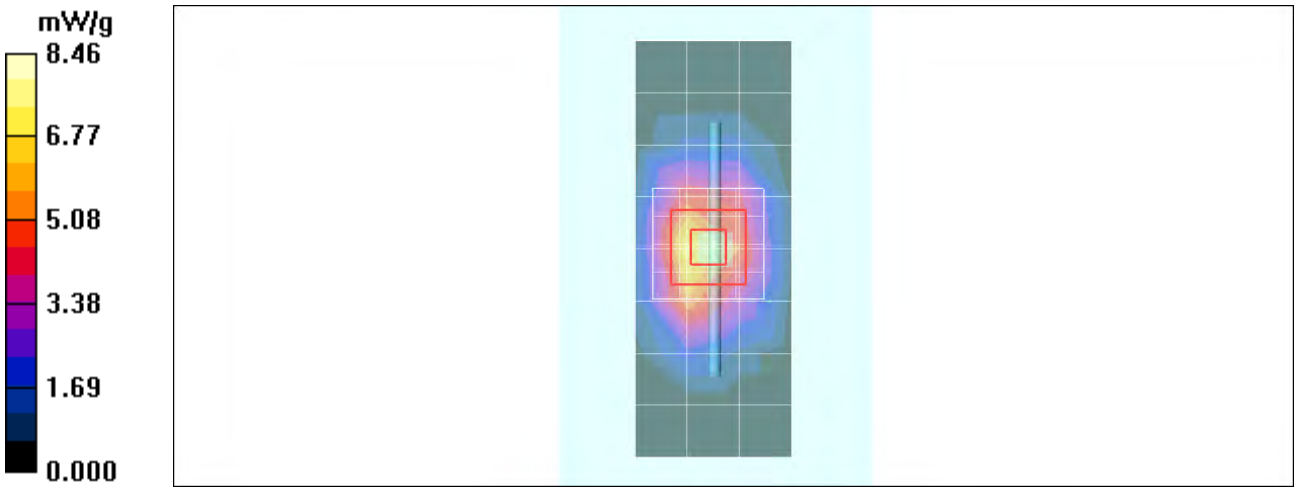
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.05 mW/g

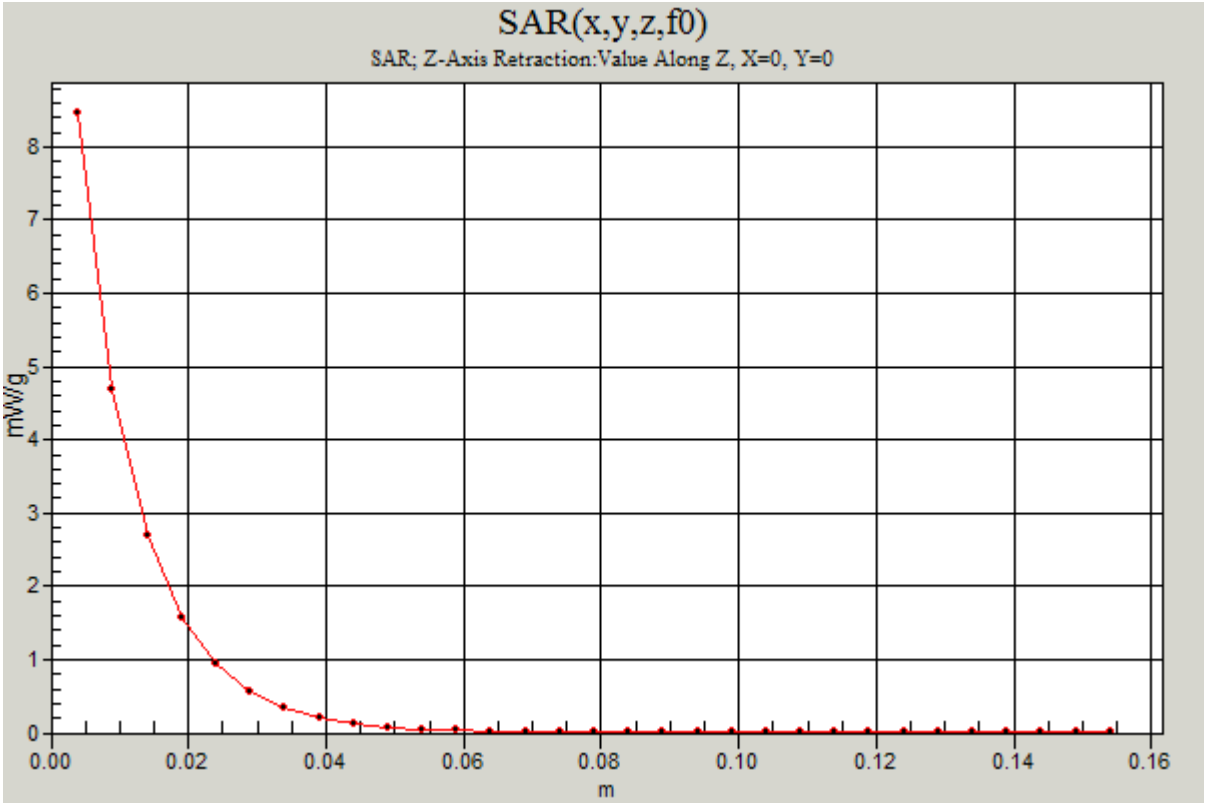
Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.1 V/m; Power Drift = -0.039 dB; Peak SAR (extrapolated) = 14.0 W/kg
SAR(1 g) = 7.58 mW/g; SAR(10 g) = 3.98 mW/g; Maximum value of SAR (measured) = 8.51 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.46 mW/g


mW/g
8.46
6.77
5.08
3.38
1.69
0.000


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

Date/Time: 12/5/2010 9:21:29 AM

Test Laboratory: Motorola - Dec-05-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 263TR; FCC ID: IHDP56LS1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 263TR; Input Power = 200 mW
Sim.Temp@meas = 18.7 C; Sim.Temp@SPC = 18.7 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 = 1.41 mho/m; ε_r = 38.6; 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_ 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

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

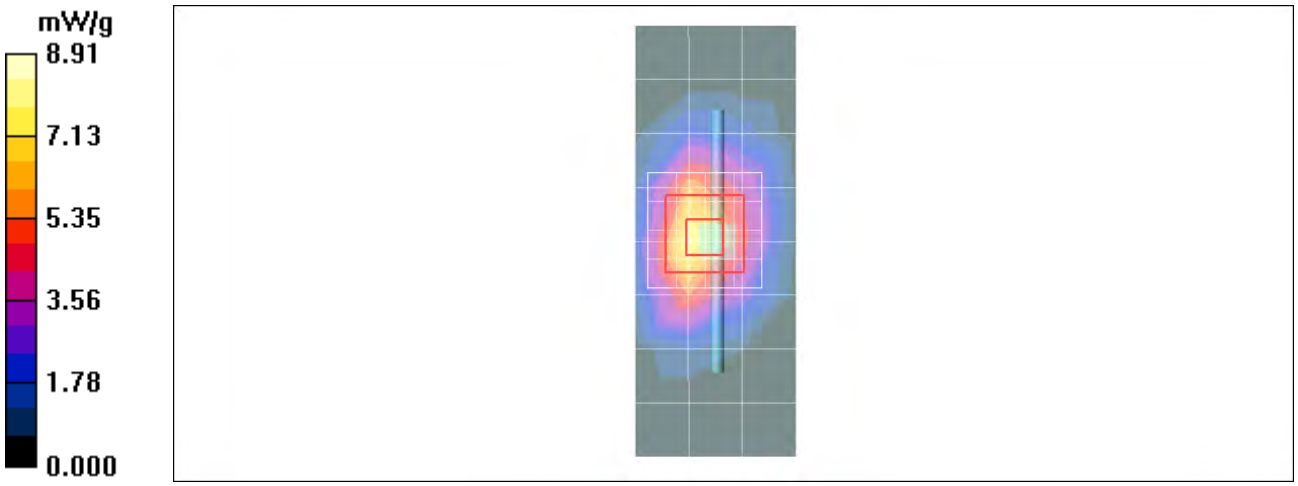
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 8.01 mW/g

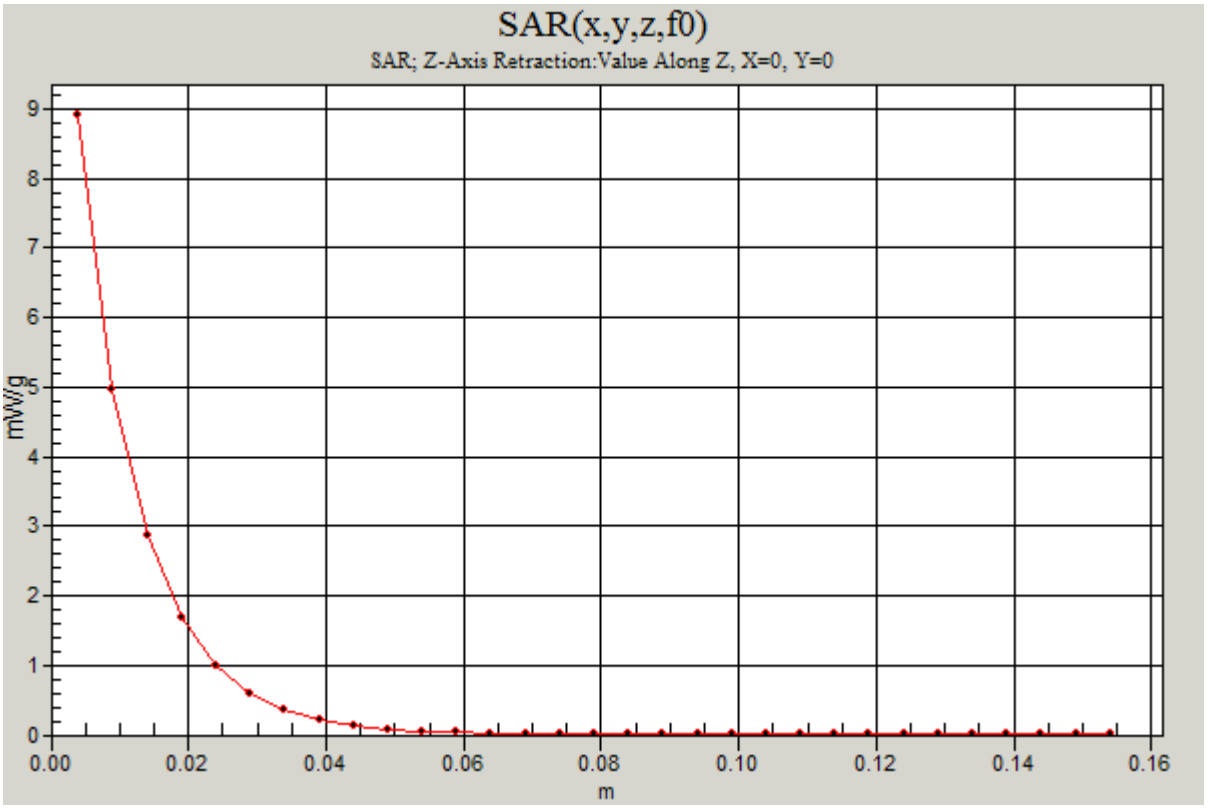
Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.3 V/m; Power Drift = 0.006 dB; Peak SAR (extrapolated) = 14.5 W/kg
SAR(1 g) = 7.96 mW/g; SAR(10 g) = 4.19 mW/g; Maximum value of SAR (measured) = 8.88 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.91 mW/g


mW/g
8.91
7.13
5.35
3.56
1.78
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: 11/30/2010 6:52:46 AM

Test Laboratory: Motorola - Nov-30-2010 1800 MHz

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 279TR; FCC ID: IHDP56LS1
Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 279TR; Input Power = 200 mW
Sim.Temp@meas = 19.0 C; Sim.Temp@SPC = 19.0 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 = 1.36 mho/m; ε_r = 39; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.89, 4.89, 4.89); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: 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):

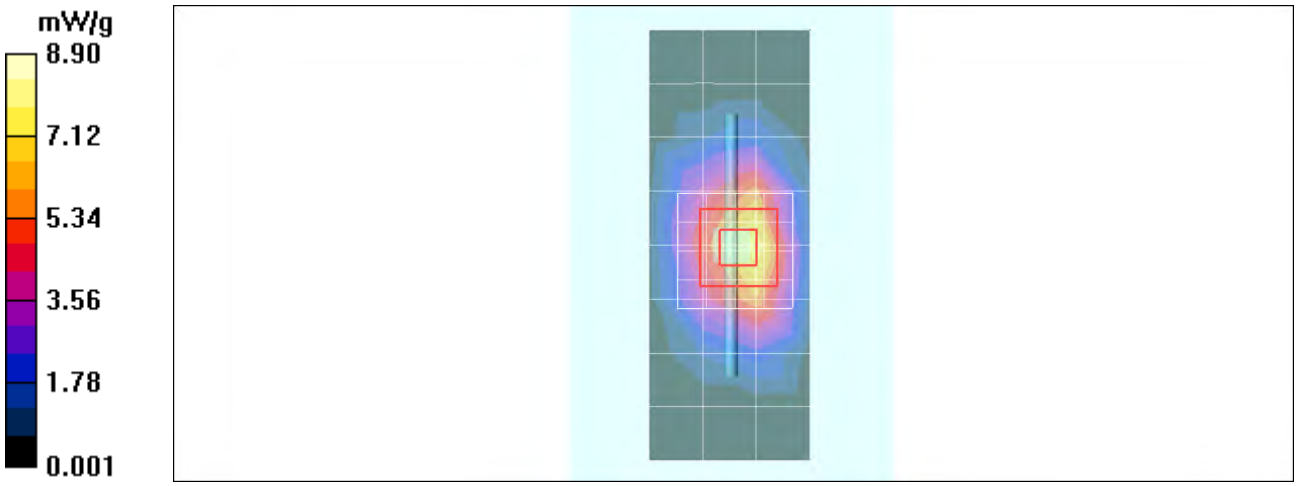
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.68 mW/g

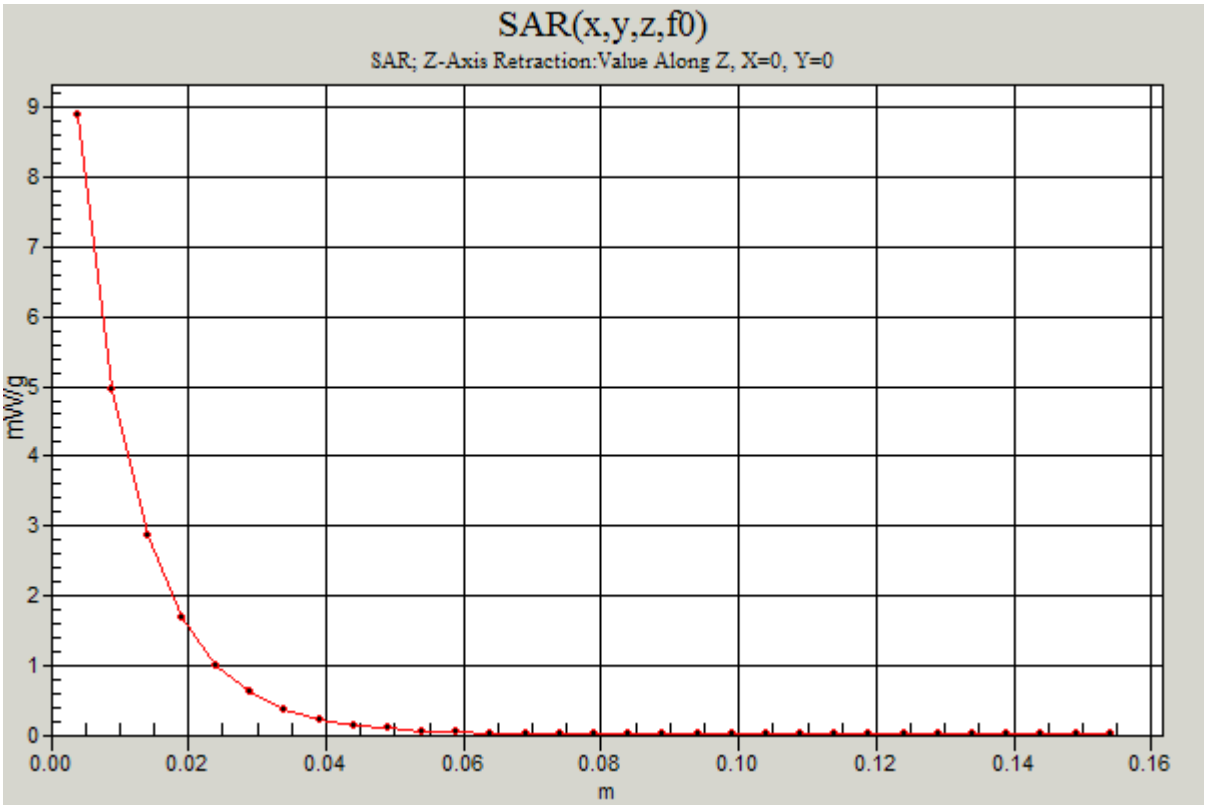
Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 81.5 V/m; Power Drift = -0.012 dB; Peak SAR (extrapolated) = 14.3 W/kg
SAR(1 g) = 7.89 mW/g; SAR(10 g) = 4.18 mW/g; Maximum value of SAR (measured) = 8.77 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 8.90 mW/g


mW/g
8.90
7.12
5.34
3.56
1.78
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: 11/25/2010 9:02:02 AM

Test Laboratory: Motorola - Nov-25-2010 2450 MHz

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 766; FCC ID: IHDP56LS1
Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 766; Input Power = 200 mW
Sim.Temp@meas = 19.4*C; Sim.Temp@SPC = 19.4*C; Room Temp @ SPC = 20.3*C
Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 2450 MHz; σ = 1.8 mho/m; ε_r = 37.6; ρ = 1000 kg/m^3

DASY4 Configuration:

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

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

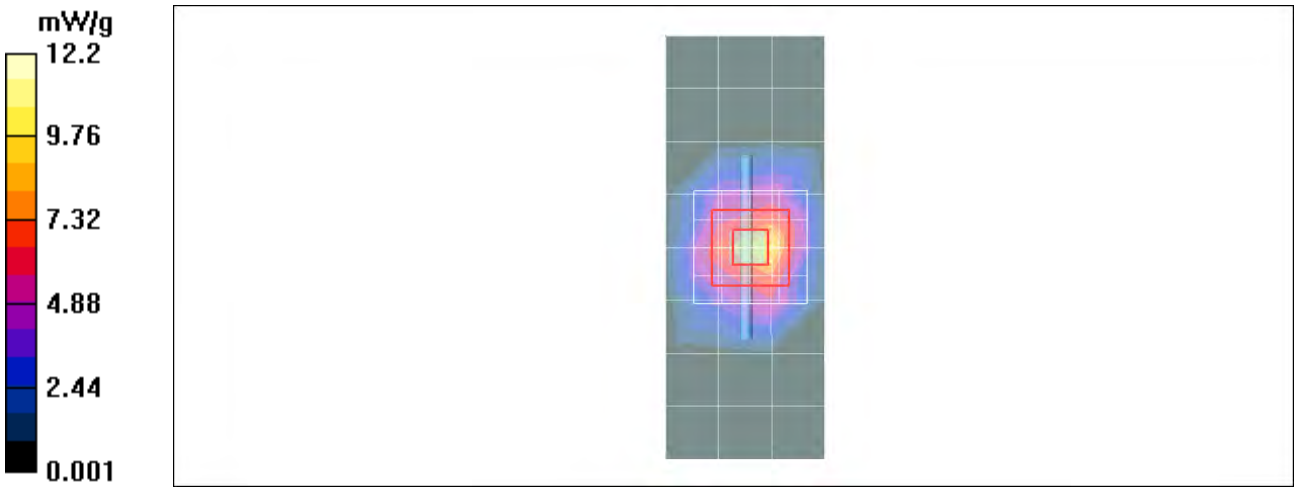
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 9.43 mW/g

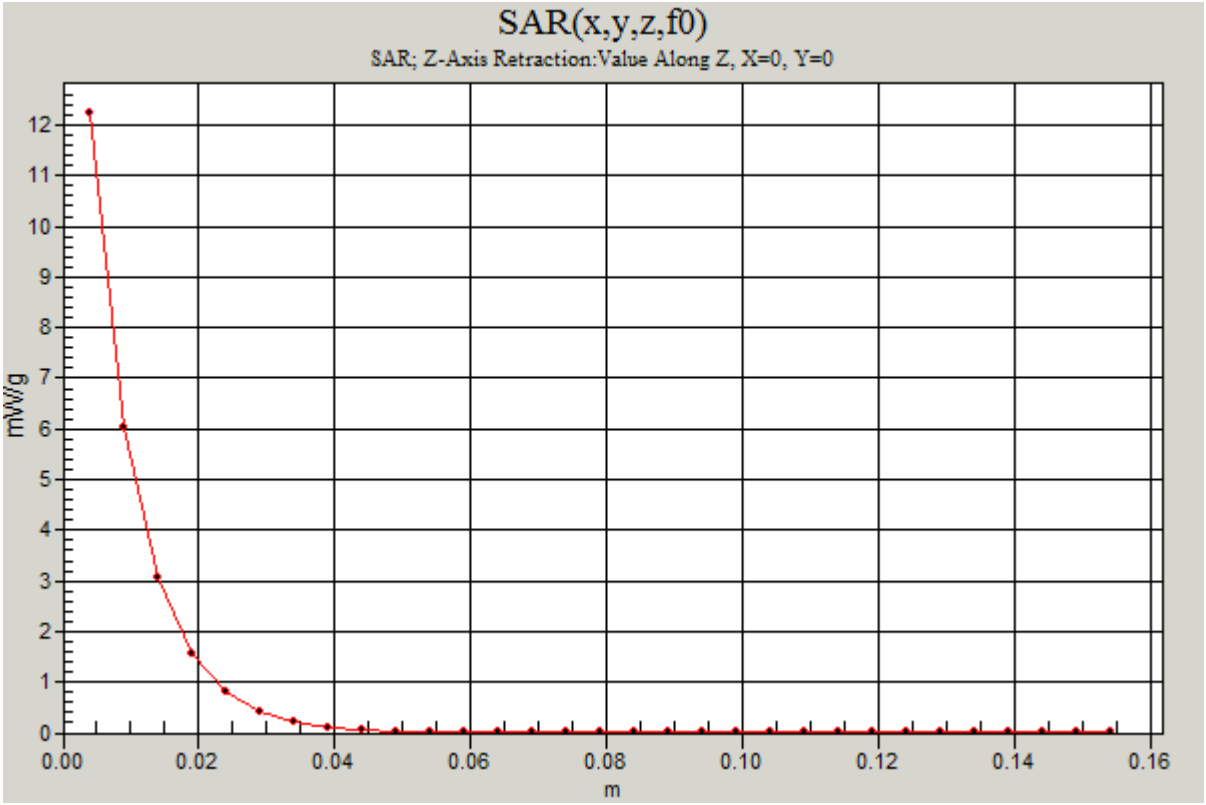
Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 84.5 V/m; Power Drift = -0.043 dB; Peak SAR (extrapolated) = 22.3 W/kg
SAR(1 g) = 10.7 mW/g; SAR(10 g) = 4.98 mW/g; Maximum value of SAR (measured) = 12.3 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 12.2 mW/g


mW/g
12.2
9.76
7.32
4.88
2.44
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: 11/26/2010 8:59:33 AM

Test Laboratory: Motorola - Nov-26-2010 2450 MHz

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 766; FCC ID: IHDP56LS1
Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 766; Input Power = 200 mW
Sim.Temp@meas = 20.2*C; Sim.Temp@SPC = 20.2*C; Room Temp @ SPC = 19.6*C
Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 2450 MHz; σ = 1.77 mho/m; ε_r = 37.4; ρ = 1000 kg/m^3

DASY4 Configuration:

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

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

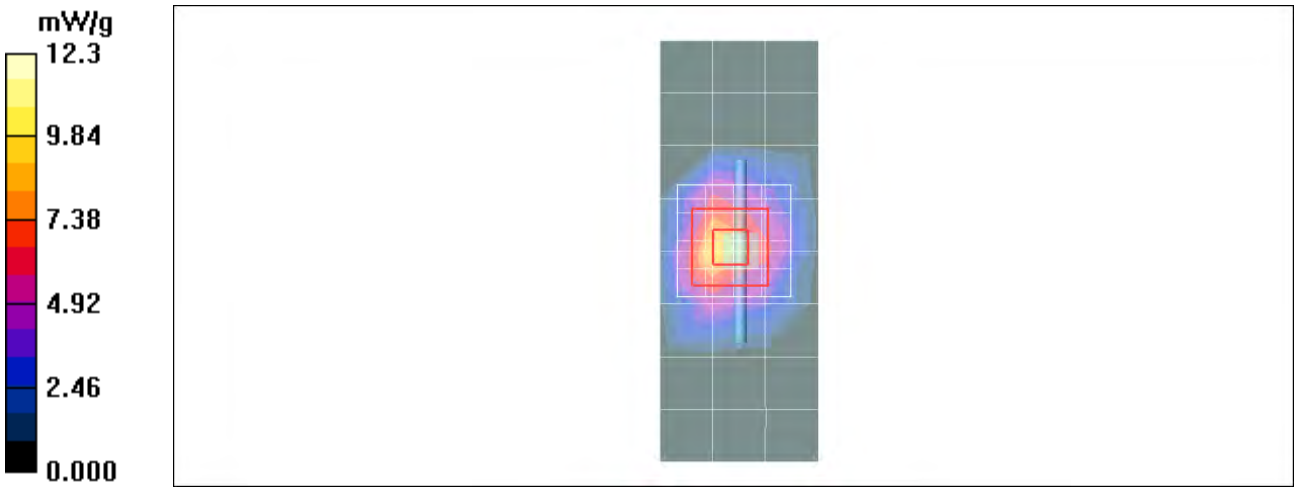
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 9.80 mW/g

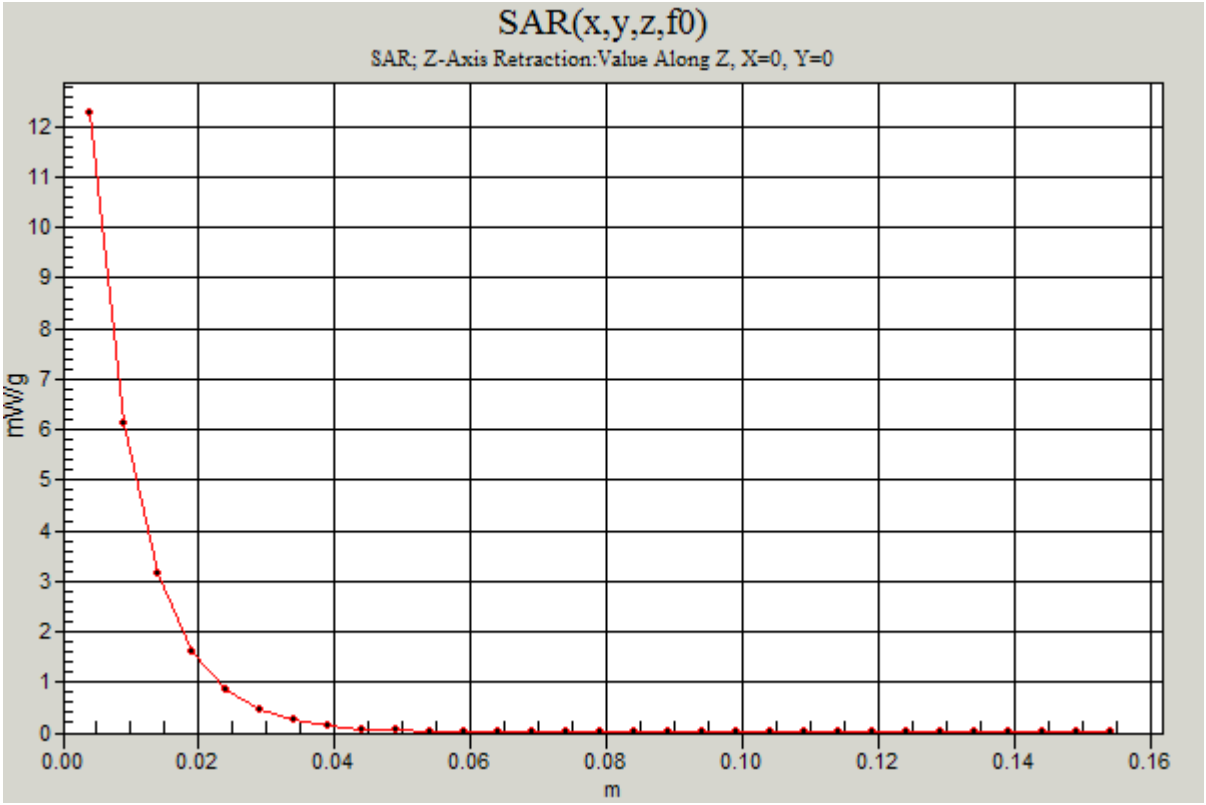
Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.0 V/m; Power Drift = -0.028 dB; Peak SAR (extrapolated) = 21.7 W/kg
SAR(1 g) = 10.6 mW/g; SAR(10 g) = 4.95 mW/g; Maximum value of SAR (measured) = 12.0 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
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
m
0
1
2
3
4
5
6
7
8
9
10
11
12
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: IHDP56LS1
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):

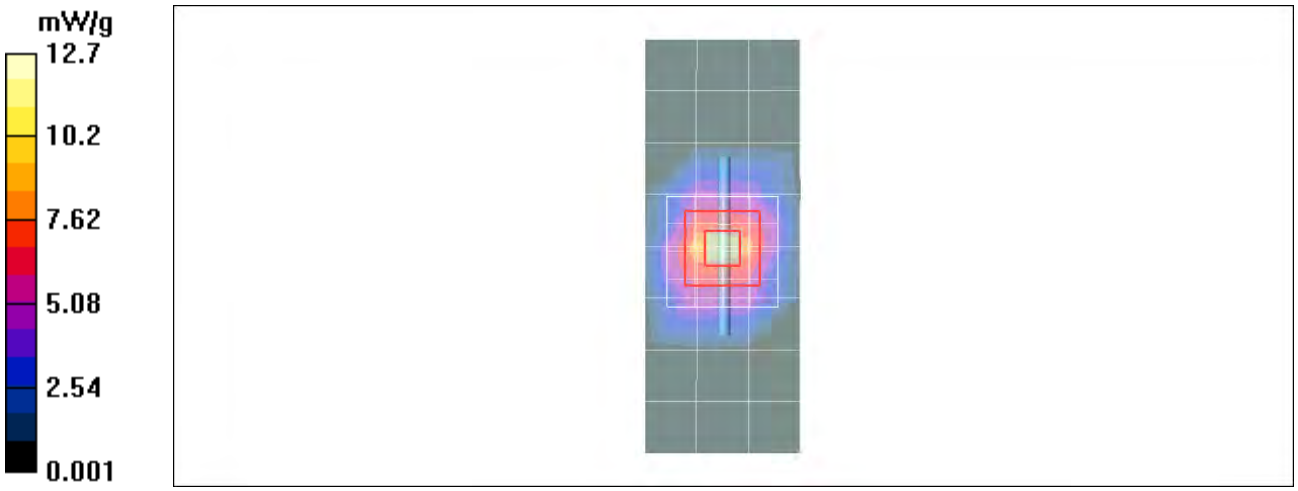
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 8.76 mW/g

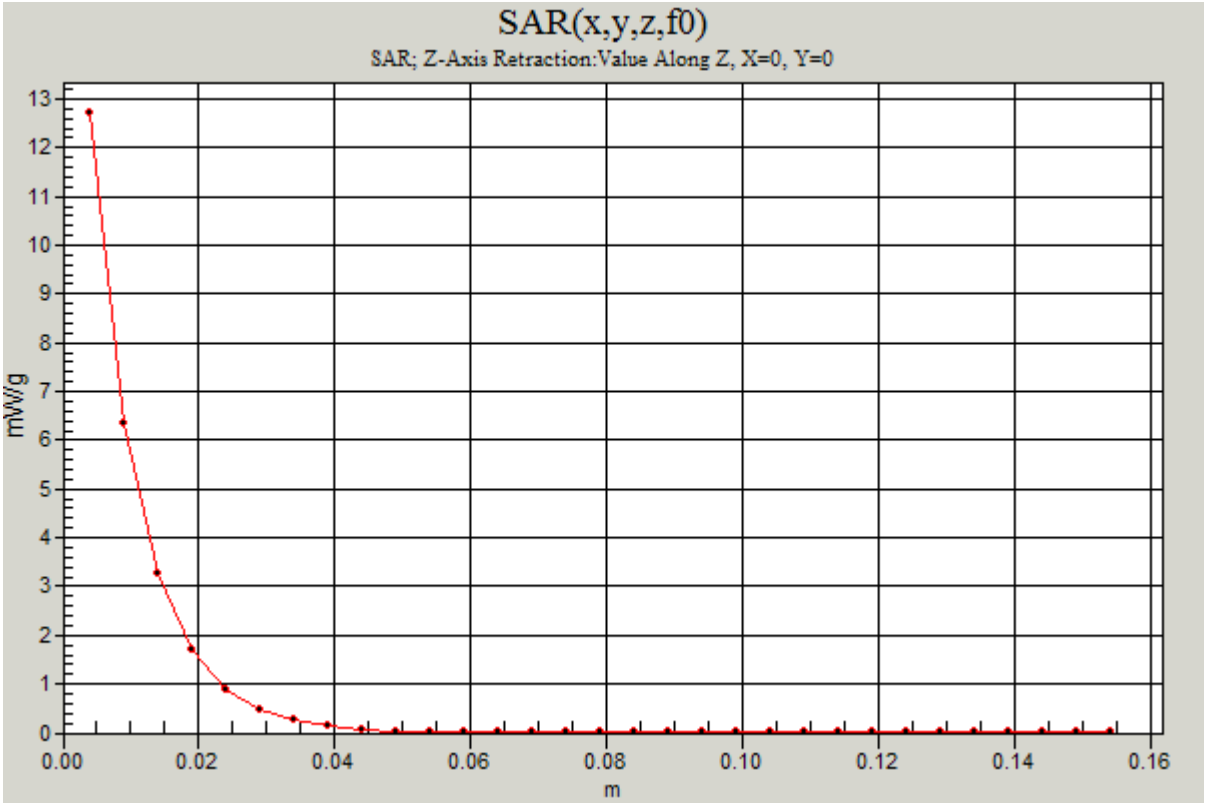
Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

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: 11/30/2010 12:05:00 PM

Test Laboratory: Motorola - Nov-30-2010 2450 MHz

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 766; FCC ID: IHDP56LS1
Procedure Notes: 1800MHz System Performance Check; Dipole Sn# 766; Input Power = 200 mW
Sim.Temp@meas = 19.4*C; Sim.Temp@SPC = 19.4*C; Room Temp @ SPC = 20*C
Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 2450 MHz; σ = 1.77 mho/m; ε_r = 37.5; 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 (9x4x1):

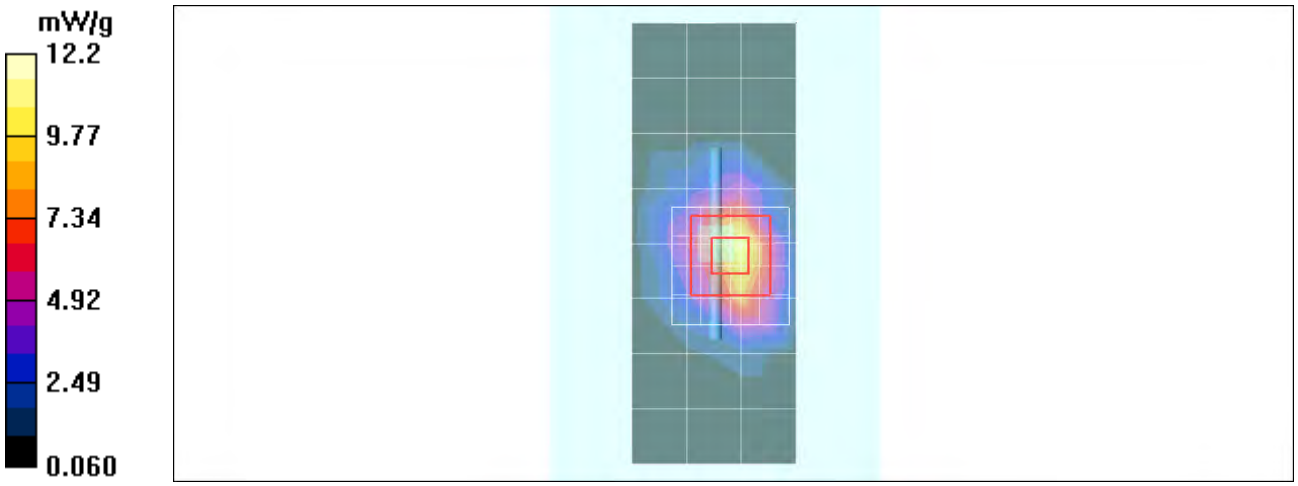
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 10.9 mW/g

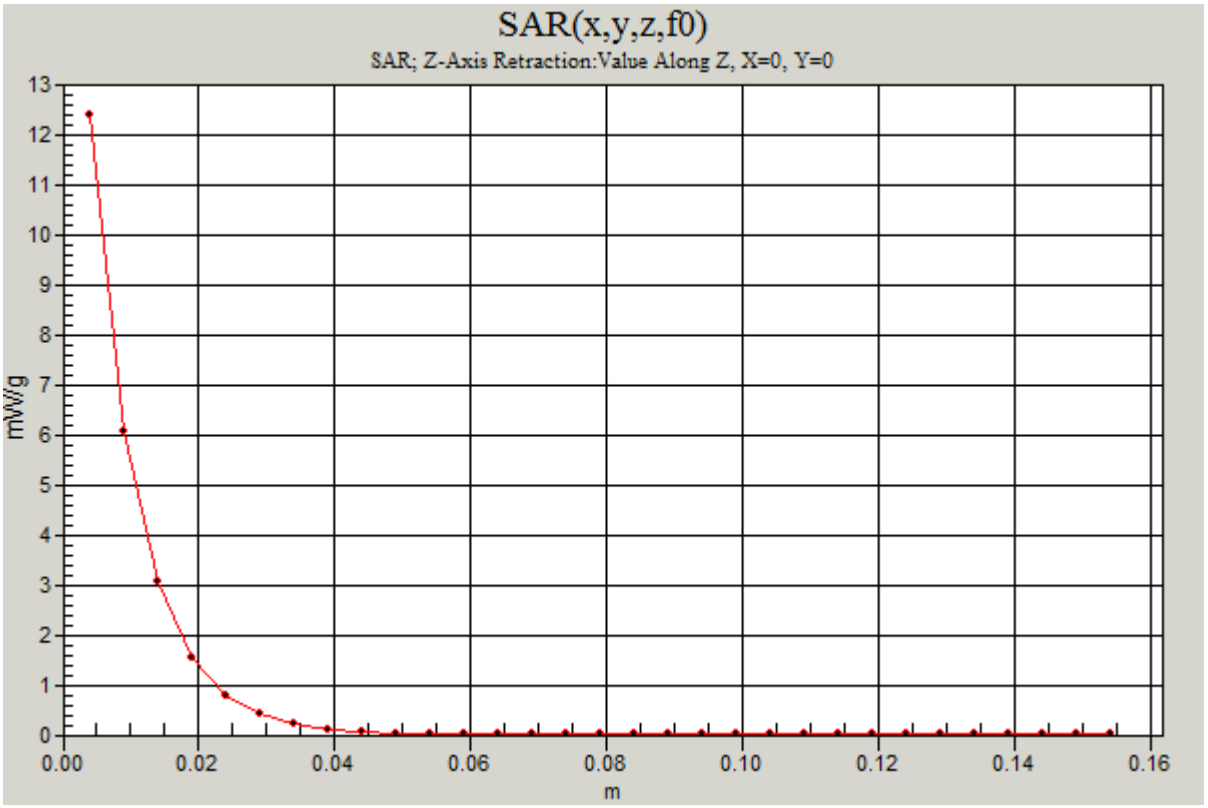
Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 81.0 V/m; Power Drift = 0.008 dB; Peak SAR (extrapolated) = 22.9 W/kg
SAR(1 g) = 10.9 mW/g; SAR(10 g) = 5 mW/g; Maximum value of SAR (measured) = 12.2 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 12.4 mW/g


mW/g
12.2
9.77
7.34
4.92
2.49
0.060


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: 12/2/2010 10:15:56 AM

Test Laboratory: Motorola - Dec-02-2010 5200 MHz

DUT: Dipole 5-6GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1088; FCC ID: IHDP56LS1
Procedure Notes: 5200 MHz System Performance Check; Dipole Sn# 1088; Input Power = 100 mW
Sim.Temp@meas = 19.8*C Sim.Temp@SPC = 19.8*C Room Temp @ SPC = 20.5*C
Communication System: CW - Dipole; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 5200 MHz; σ = 4.95 mho/m; ε_r = 36.1; 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):

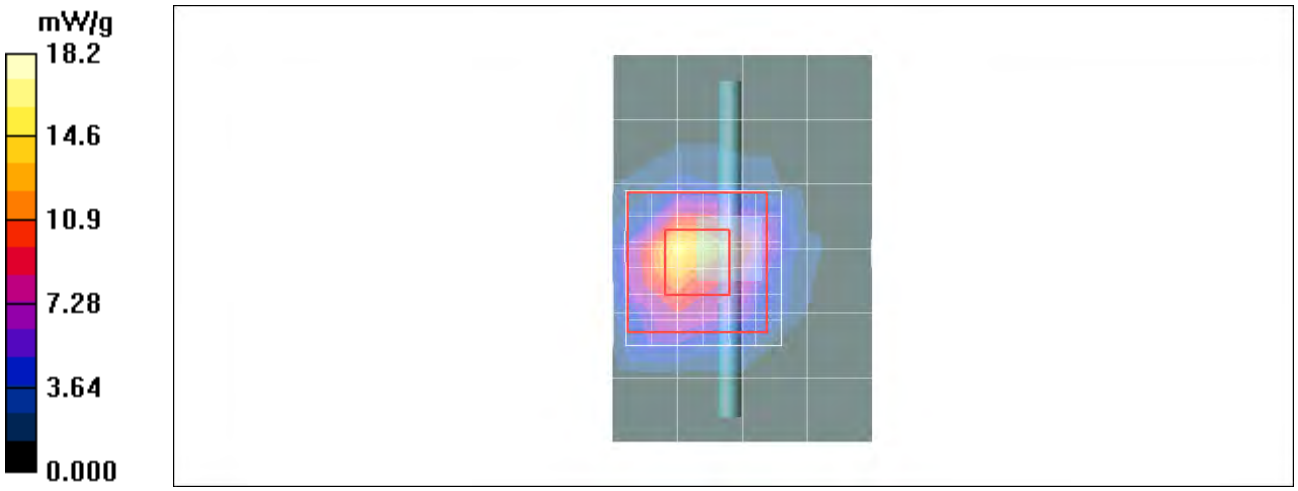
Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 15.6 mW/g

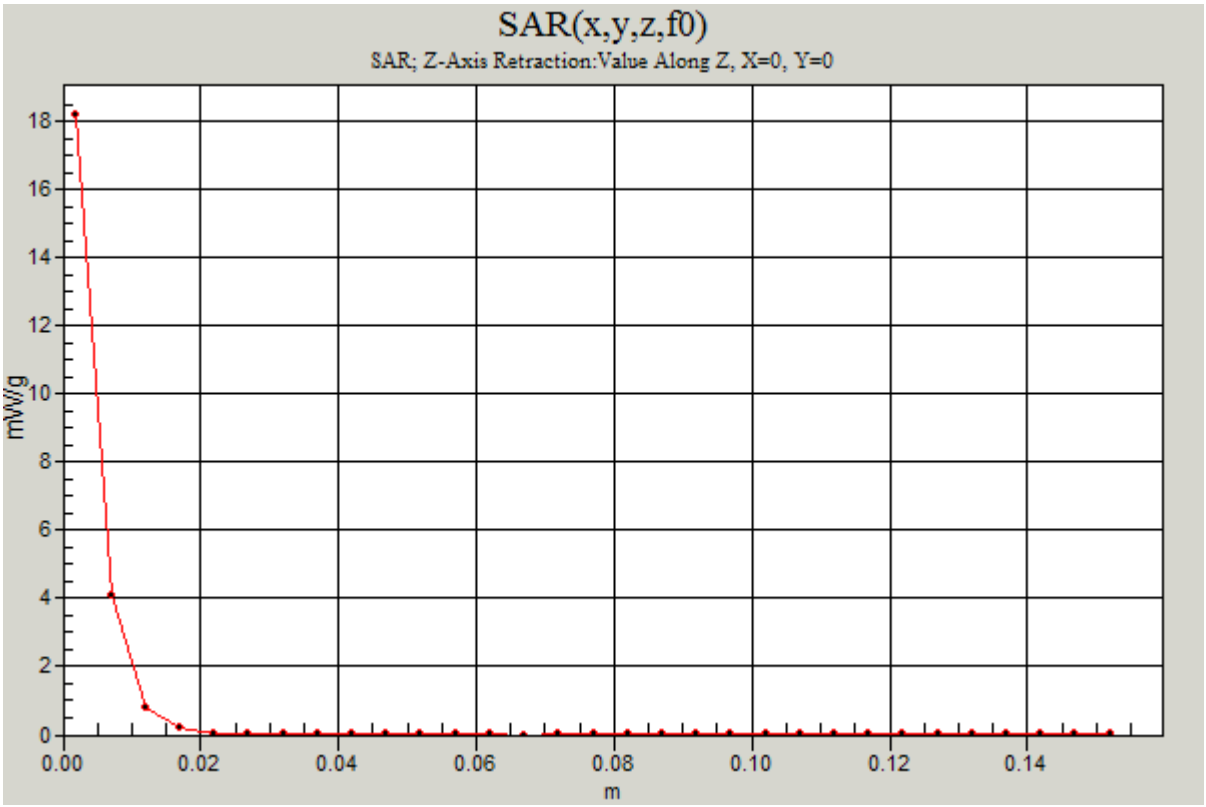
Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 53.9 V/m; Power Drift = 0.150 dB; Peak SAR (extrapolated) = 36.1 W/kg
SAR(1 g) = 8.9 mW/g; SAR(10 g) = 2.5 mW/g; Maximum value of SAR (measured) = 18.2 mW/g

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

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


mW/g
18.2
14.6
10.9
7.28
3.64
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
18
16
14
12
10
8
6
4
2
0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
m

Date/Time: 12/2/2010 8:35:42 AM

Test Laboratory: Motorola - Dec-02-2010 5800 MHz

DUT: Dipole 5-6GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1088; FCC ID: IHDP56LS1
Procedure Notes: 5800 MHz System Performance Check; Dipole Sn# 1088; Input Power = 100 mW
Sim.Temp@meas = 19.8*C; Sim.Temp@SPC = 19.8*C; Room Temp @ SPC = 20.5*C
Communication System: CW - Dipole; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only
Medium parameters used: f = 5800 MHz; σ = 5.65 mho/m; ε_r = 35; 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):

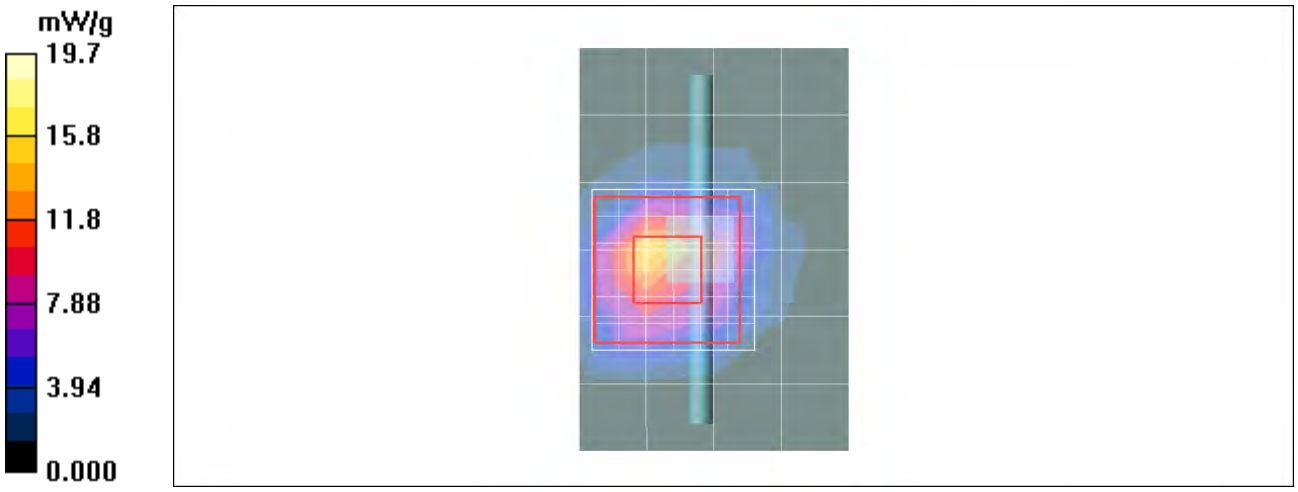
Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 15.6 mW/g

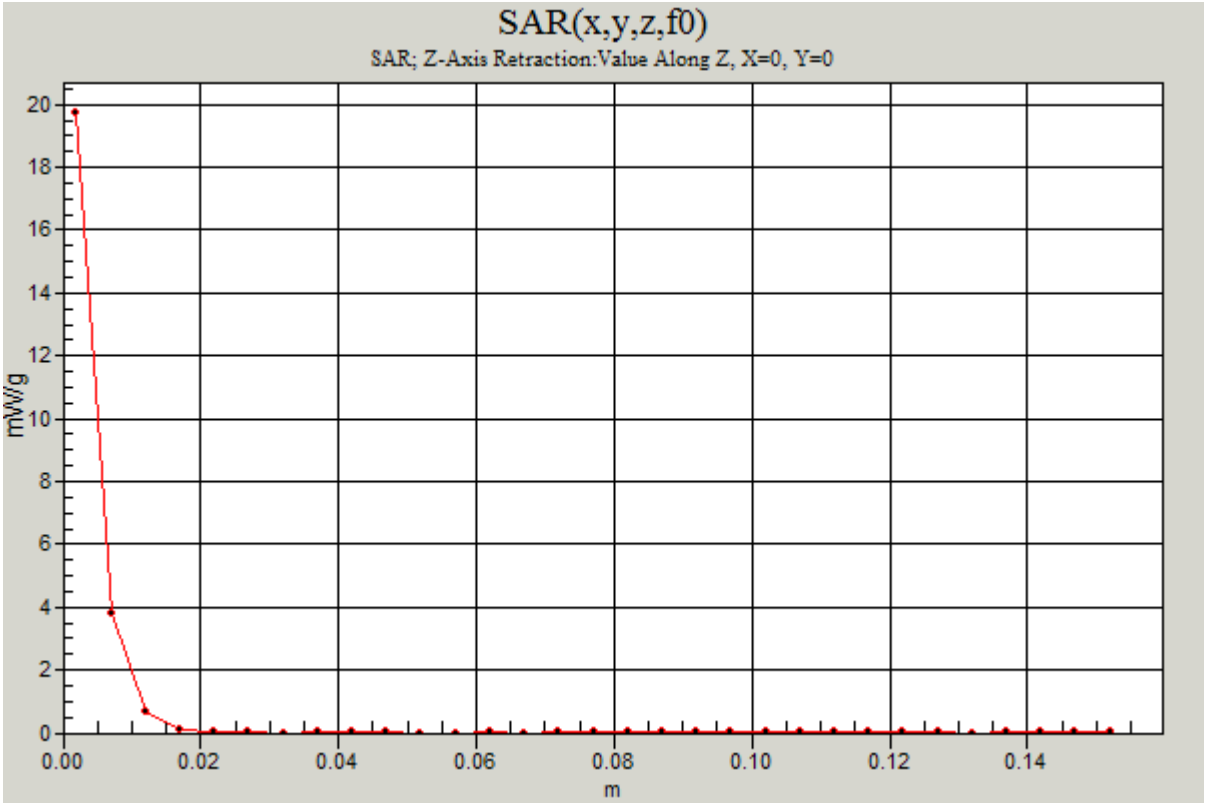
Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 53.3 V/m; Power Drift = 0.185 dB; Peak SAR (extrapolated) = 38.9 W/kg
SAR(1 g) = 9.15 mW/g; SAR(10 g) = 2.59 mW/g; Maximum value of SAR (measured) = 19.6 mW/g

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

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 19.7 mW/g


mW/g
19.7
15.8
11.8
7.88
3.94
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction:Value Along Z, X=0, Y=0
mW/g
m
0
2
4
6
8
10
12
14
16
18
20
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14

Date/Time: 12/5/2010 7:54:24 AM

Test Laboratory: Motorola - Dec-05-2010 5800 MHz

DUT: Dipole 5-6GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1088; FCC ID: IHDP56LS1
Procedure Notes: 5800 MHz System Performance Check; Dipole Sn# 1088; Input Power = 100 mw
Sim.Temp@meas = 19.3*C; Sim.Temp@SPC = 19.3*C; Room Temp @ SPC = 19.7*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 = 32.4; 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):

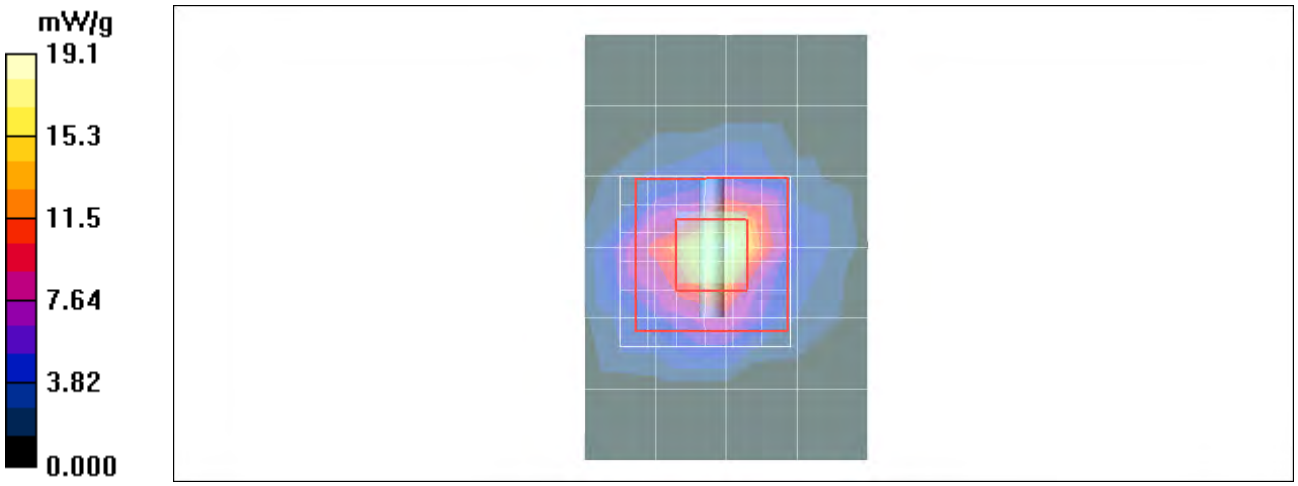
Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 18.3 mW/g

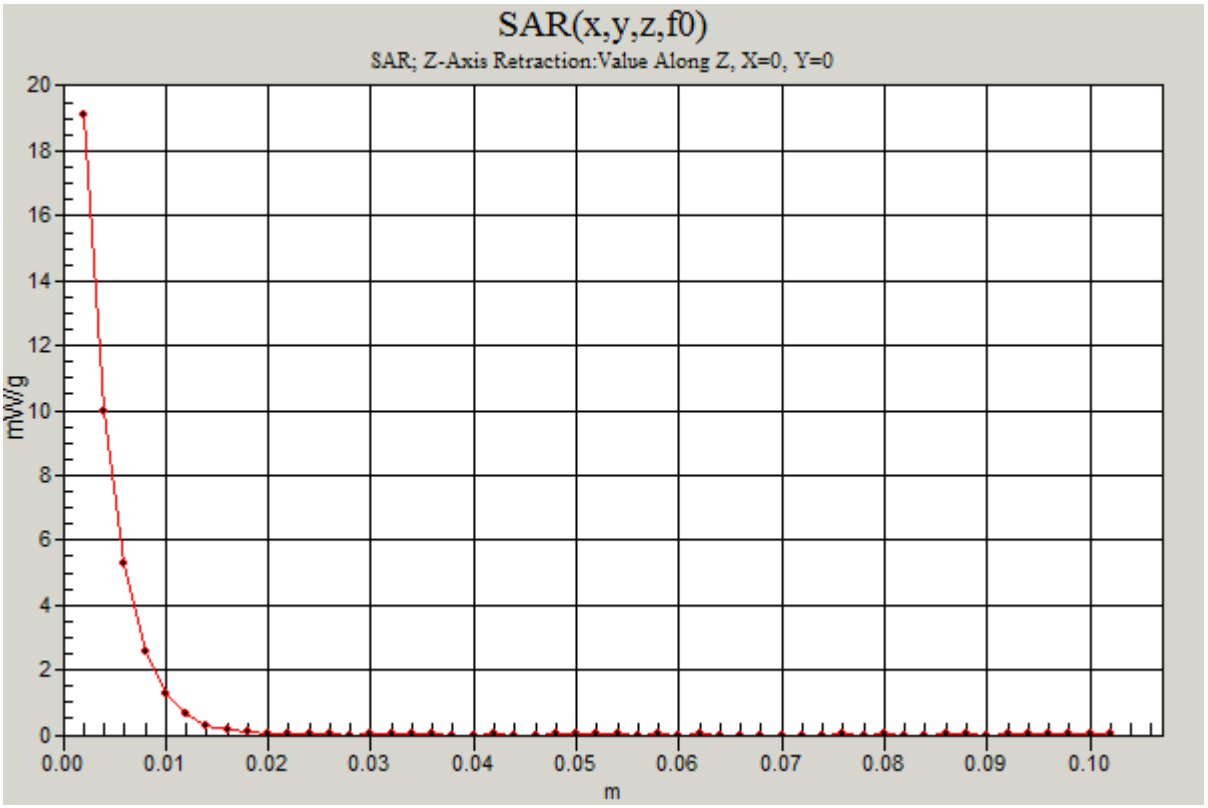
Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 66.0 V/m; Power Drift = 0.161 dB; Peak SAR (extrapolated) = 39.5 W/kg
SAR(1 g) = 9.13 mW/g; SAR(10 g) = 2.58 mW/g; Maximum value of SAR (measured) = 19.3 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x51):

Measurement grid: dx=20mm, dy=20mm, dz=2mm; Maximum value of SAR (measured) = 19.1 mW/g


mW/g
19.1
15.3
11.5
7.64
3.82
0.000


SAR(x,y,z,f0)
SAR; Z-Axis Retraction: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

Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

Date/Time: 11/7/2010 7:18:13 AM

Test Laboratory: Motorola - GSM 850 Cheek

Serial: LOLAAD0136; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5880A; DEVICE POSITION: Cheek
Communication System: GSM 850; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8.3

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

DASY4 Configuration:

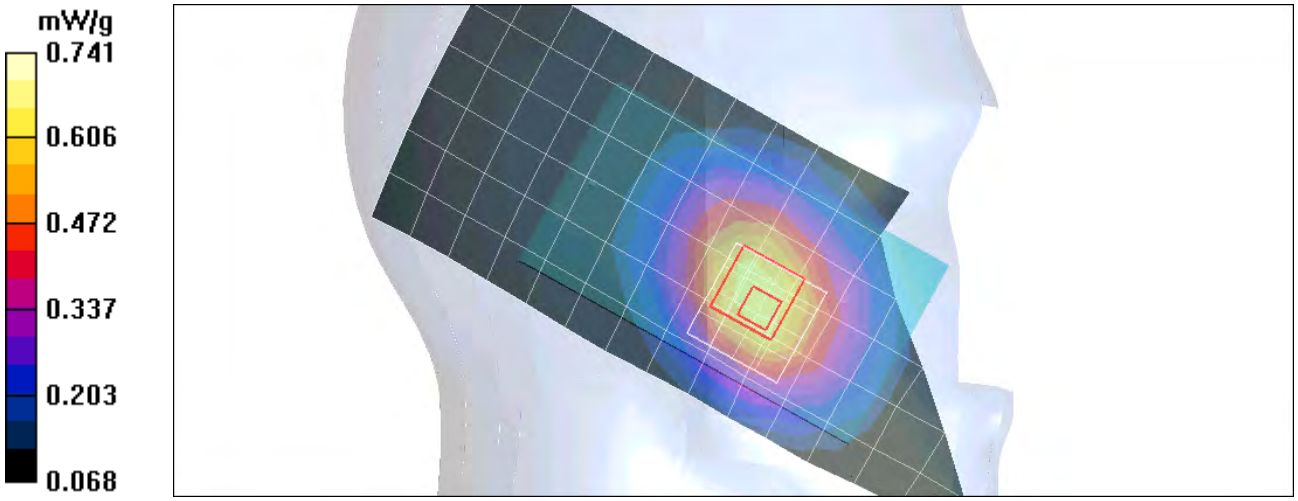
- Probe: ES3DV3 - SN3183; ConvF(6.11, 6.11, 6.11); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1156;
- Measurement SW: DASY4, V4.7 Build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

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.644 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.7 V/m; Power Drift = 0.282 dB; Peak SAR (extrapolated) = 0.908 W/kg
SAR(1 g) = 0.682 mW/g; SAR(10 g) = 0.488 mW/g; Maximum value of SAR (measured) = 0.741 mW/g



Date/Time: 11/6/2010 12:35:18 PM

Test Laboratory: Motorola - GSM 1900 Cheek

Serial: LOLAAD0136; FCC ID: IHDP56LS1
Procedure Notes: Pwr 0; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5880A; DEVICE POSITION (cheek or rotated): Cheek
Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8.3

Medium: Regular Glycol Head 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3

DASY4 Configuration:

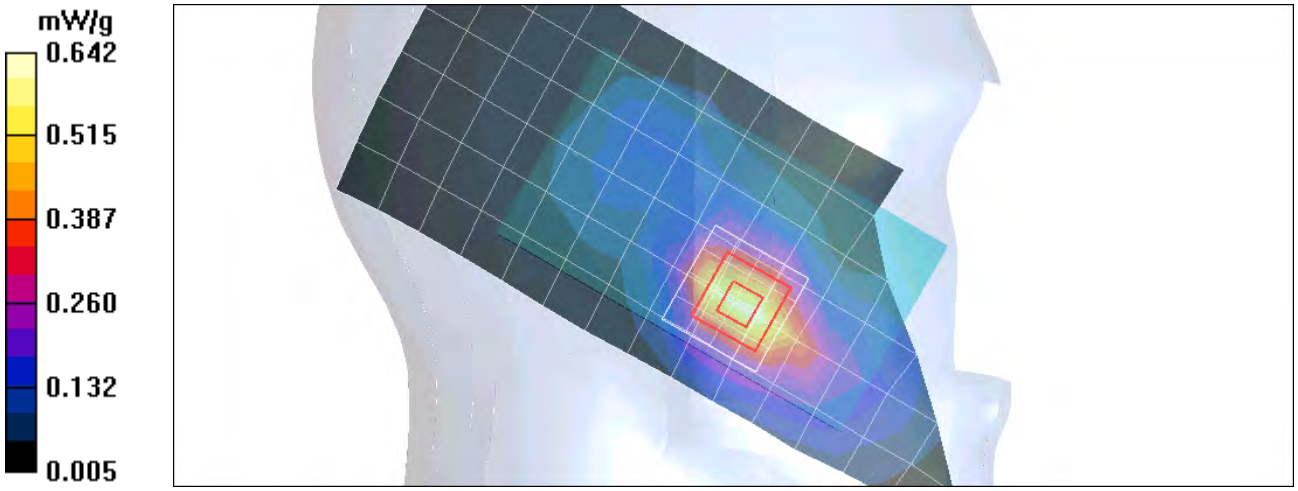
- Probe: ES3DV3 - SN3183; ConvF(5.05, 5.05, 5.05); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.608 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.1 V/m; Power Drift = 0.003 dB; Peak SAR (extrapolated) = 0.923 W/kg
SAR(1 g) = 0.580 mW/g; SAR(10 g) = 0.334 mW/g; Maximum value of SAR (measured) = 0.642 mW/g



Date/Time: 11/7/2010 11:14:55 AM

Test Laboratory: Motorola - WCDMA 850 Cheek

Serial: LOLAAD0136; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5880A; DEVICE POSITION: Cheek
Communication System: WCDMA 850; Frequency: 836 MHz; Channel Number: 4180; Duty Cycle: 1:1

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

DASY4 Configuration:

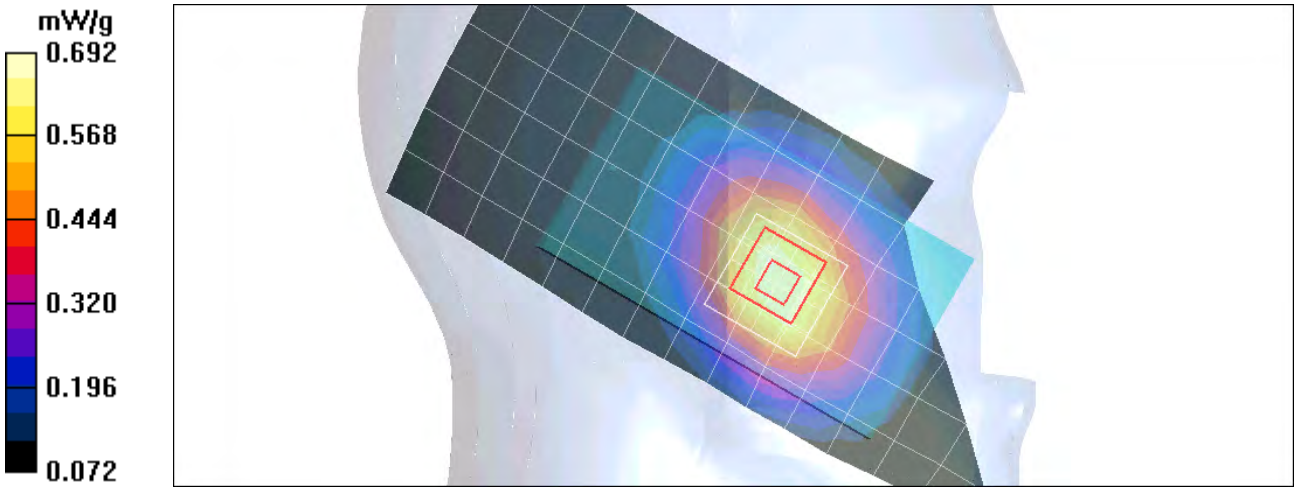
- Probe: ES3DV3 - SN3183; ConvF(6.11, 6.11, 6.11); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1156;
- Measurement SW: DASY4, V4.7 Build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

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.658 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.4 V/m; Power Drift = 0.000 dB; Peak SAR (extrapolated) = 0.837 W/kg
SAR(1 g) = 0.651 mW/g; SAR(10 g) = 0.477 mW/g; Maximum value of SAR (measured) = 0.692 mW/g



Date/Time: 11/18/2010 6:20:50 PM

Test Laboratory: Motorola - WCDMA 1900 Cheek

Serial: LOLAAD0136; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Accessory Model #: N/A/
Battery Model #: SNN5880A; DEVICE POSITION (cheek or rotated): Cheek
Communication System: WCDMA 1900; Frequency: 1907.5 MHz; Channel Number: 9538; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3

DASY4 Configuration:

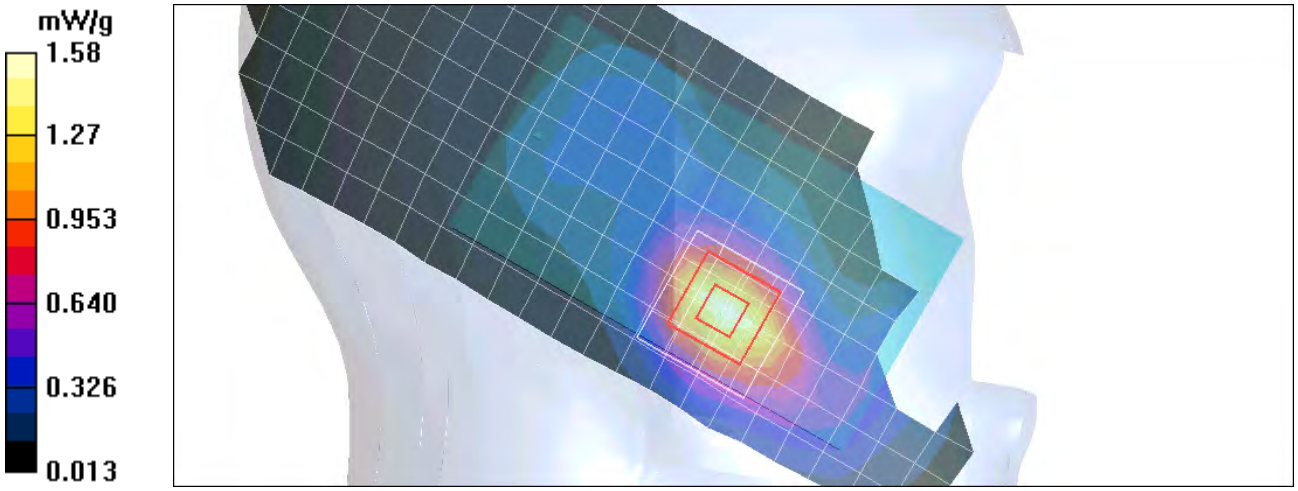
- Probe: ES3DV3 - SN3183; ConvF(5.05, 5.05, 5.05); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Head Template/Area Scan - Normal Extended (10mm) (10x25x1):

Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 1.57 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.8 V/m; Power Drift = -0.100 dB; Peak SAR (extrapolated) = 2.26 W/kg
SAR(1 g) = 1.42 mW/g; SAR(10 g) = 0.813 mW/g; Maximum value of SAR (measured) = 1.58 mW/g



Date/Time: 11/25/2010 9:34:21 AM

Test Laboratory: Motorola - Wi-Fi 2.45 GHz Cheek

Serial: LOLAAD0042; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5880A; DEVICE POSITION: Cheek
Device Mode: 802.11b mode, 1 Mbps data rate
Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Channel Number: 1; Duty Cycle: 1:1

Medium: 2450 Glycol Head
Medium parameters used: f = 2450 MHz; σ = 1.8 mho/m; ε_r = 37.6; ρ = 1000 kg/m^3

DASY4 Configuration:

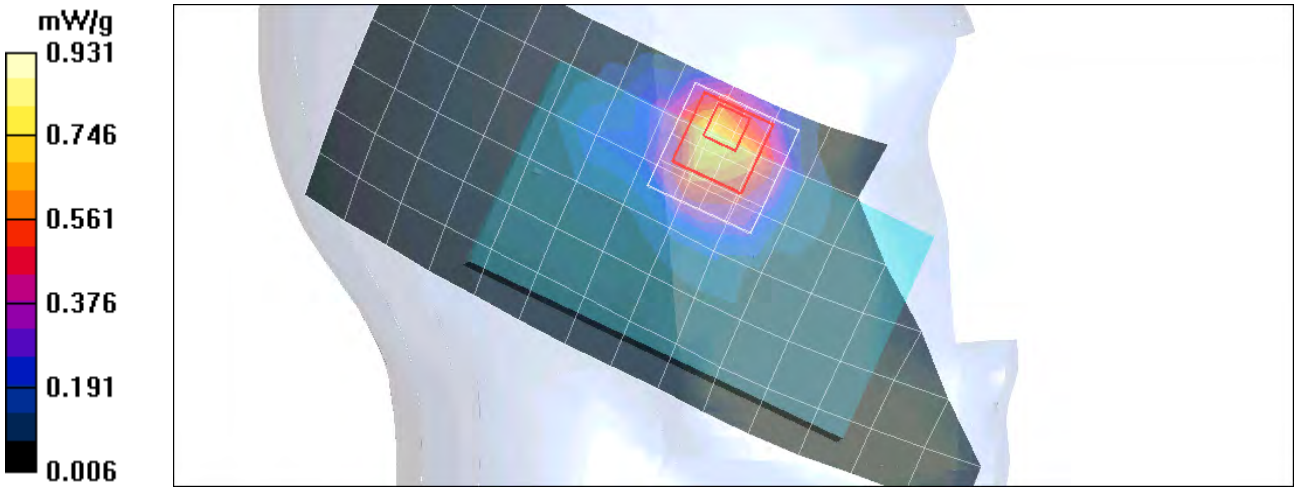
- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7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

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.792 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.2 V/m; Power Drift = -0.281 dB; Peak SAR (extrapolated) = 1.85 W/kg
SAR(1 g) = 0.830 mW/g; SAR(10 g) = 0.399 mW/g; Maximum value of SAR (measured) = 0.931 mW/g



Date/Time: 12/2/2010 11:12:26 PM

Test Laboratory: Motorola - Wi-Fi 5.2 GHz Cheek

Serial: LOLAAD0042; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5880A; DEVICE POSITION (cheek or rotated): Cheek
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 HEAD
Medium parameters used: f = 5210 MHz; σ = 4.96 mho/m; ε_r = 36.1; ρ = 1000 kg/m^3

DASY4 Configuration:

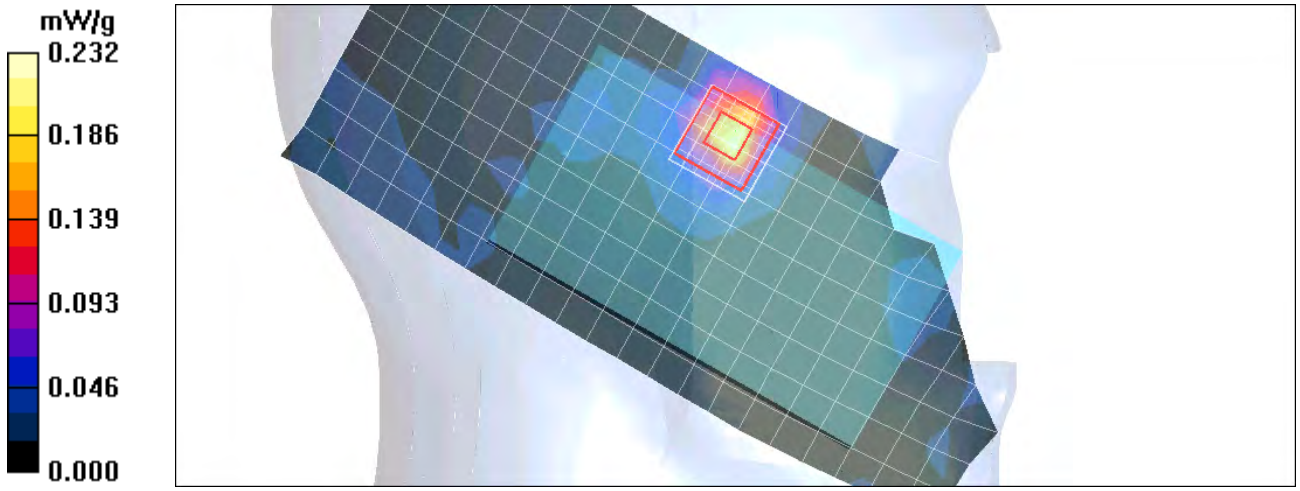
- Probe: EX3DV4 - SN3730; ConvF(4.67, 4.67, 4.67); Calibrated: 7/16/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R3, 5-6GHz SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1153;
- Measurement SW: DASY4, V4.7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

Left Head Template/Area Scan - Normal (10mm) (10x25x1):

Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.220 mW/g

Left Head Template/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.70 V/m; Power Drift = -0.098 dB; Peak SAR (extrapolated) = 0.462 W/kg
SAR(1 g) = 0.124 mW/g; SAR(10 g) = 0.042 mW/g; Maximum value of SAR (measured) = 0.232 mW/g



Date/Time: 12/3/2010 1:14:46 AM

Test Laboratory: Motorola - Wi-Fi 5.8 GHz Cheek

Serial: LOLAAD0042; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5880A; DEVICE POSITION (cheek or rotated): Cheek
Device Mode: 802.11a mode, 6 Mbps data rate
Communication System: 5785MHz Band; Frequency: 5745 MHz; Channel Number: 149; Duty Cycle: 1:1

Medium: 5-6 GHz SPEAG Tissue HEAD
Medium parameters used: f = 5785 MHz; σ = 5.64 mho/m; ε_r = 35; ρ = 1000 kg/m^3

DASY4 Configuration:

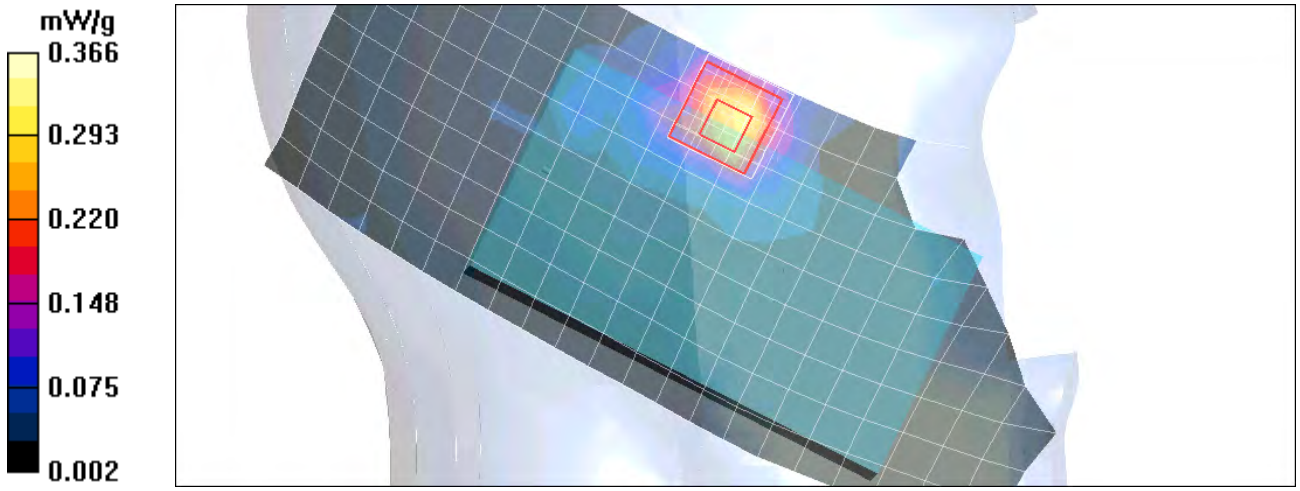
- Probe: EX3DV4 - SN3730; ConvF(4.06, 4.06, 4.06); Calibrated: 7/16/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R3, 5-6GHz SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1153;
- Measurement SW: DASY4, V4.7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

Left Head Template/Area Scan - Normal (10mm) (10x25x1):

Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.324 mW/g

Left Head Template/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.86 V/m; Power Drift = -0.074 dB; Peak SAR (extrapolated) = 0.822 W/kg
SAR(1 g) = 0.188 mW/g; SAR(10 g) = 0.066 mW/g; Maximum value of SAR (measured) = 0.366 mW/g



Test Laboratory: Motorola - WCDMA 1900 + Wi-Fi 2.45 GHz Multiband Combined Left Cheek Expanded Volumetric Measurement

DASY4 Configuration for DASY4, SAM
Phone Against LEFT Head Template - Rev.30 (Nov10)
/Left Head Template/Mega Zoom Zoom Scan (<=3GHz):

Date/Time: 11/30/2010 2:06:04 PM
Serial: LOLAAD0042; FCC ID: IHDP56LS1
Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Duty Cycle: 1:1

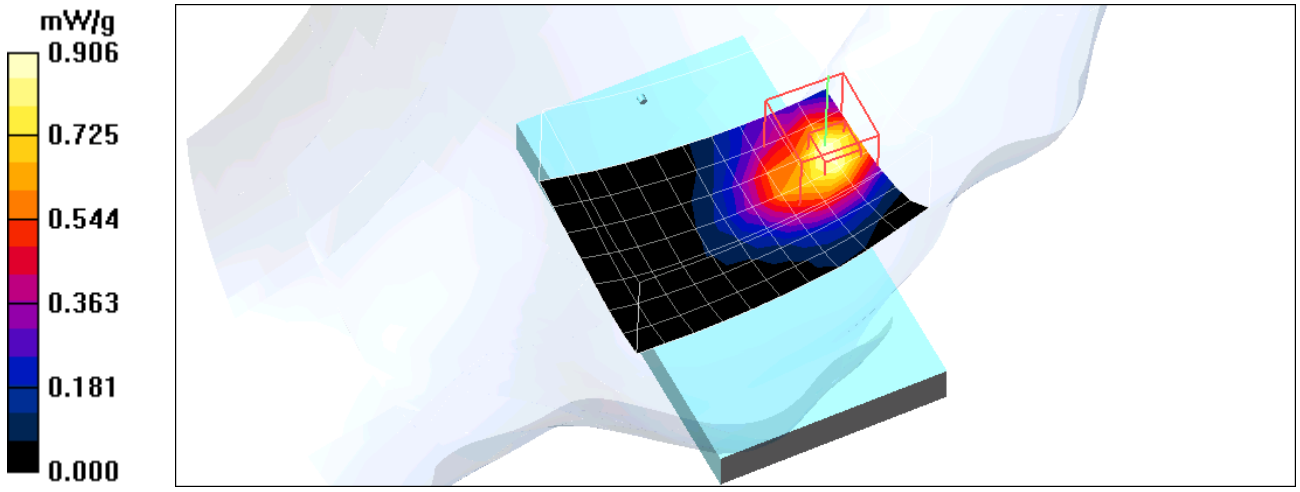
Medium: 2450 Glycol Head
Medium parameters used: f = 2450 MHz; σ = 1.77 mho/m; ε_r = 37.5; ρ = 1000 kg/m^3

Measurement Standard: DASY4 (High Precision Assessment)

- 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

Left Head Template/Mega Zoom Zoom Scan (<=3GHz) (11x8x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm; Volume Outer Dimensions: x=80mm, y=56mm, z=30mm
Reference Value = 14.4 V/m; Power Drift = -0.167 dB; Peak SAR (extrapolated) = 1.83 W/kg
SAR(1 g) = 0.825 mW/g; SAR(10 g) = 0.392 mW/g; Maximum value of SAR (measured) = 0.906 mW/g



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

DASY4 Configuration for DASY4, SAM
Phone Against LEFT Head Template - Rev.30 (Nov10)
/Left Head Template/Mega Zoom Zoom Scan (<=3GHz):

Date/Time: 11/30/2010 1:02:58 PM
Serial: LOLAAD0136; FCC ID: IHDP56LS1
Communication System: WCDMA 1900; Frequency: 1907.5 MHz; Duty Cycle: 1:1

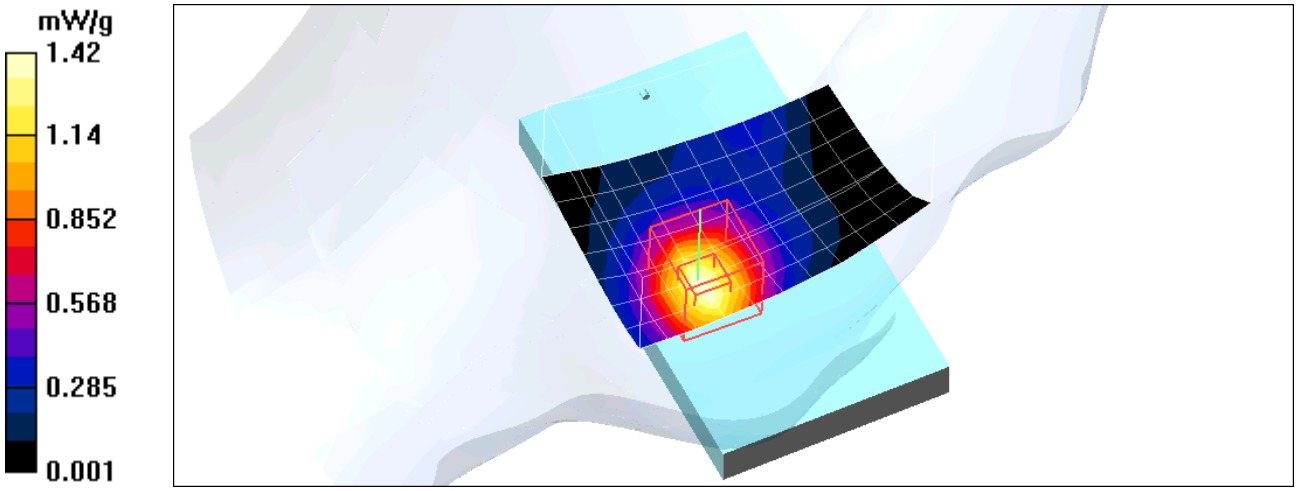
Medium: Regular Glycol Head 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3

Measurement Standard: DASY4 (High Precision Assessment)

- 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: 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

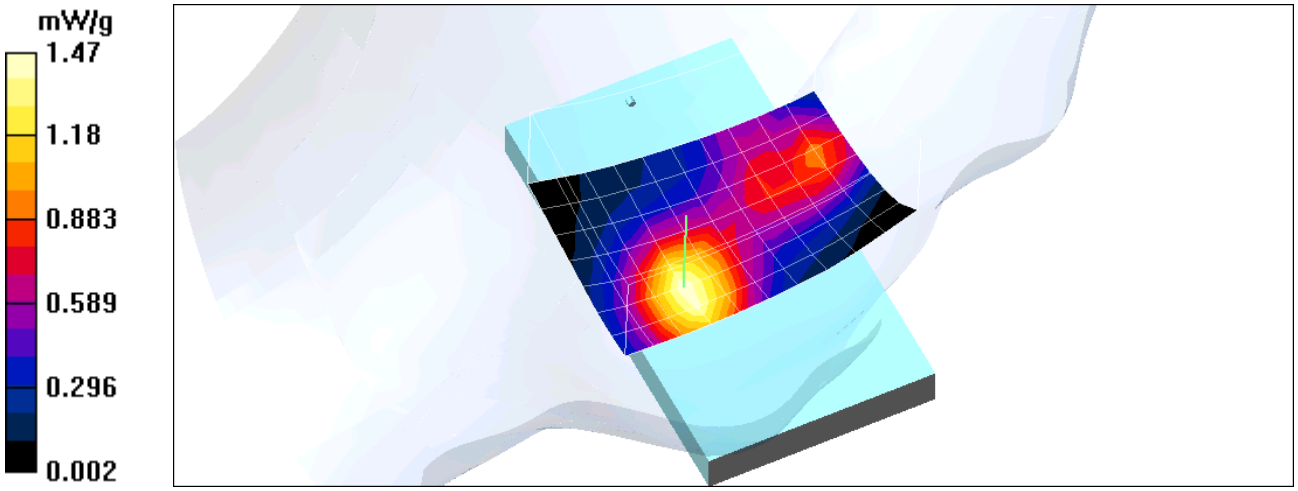
Left Head Template/Mega Zoom Zoom Scan (<=3GHz) (11x8x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm, Volume Outer Dimensions: x=80mm, y=56mm, z=30mm
Reference Value = 29.0 V/m; Power Drift = -0.055 dB; Peak SAR (extrapolated) = 2.01 W/kg
SAR(1 g) = 1.3 mW/g; SAR(10 g) = 0.748 mW/g; Maximum value of SAR (measured) = 1.42 mW/g



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

Multi Band Result:
SAR(1 g) = 1.34 mW/g; SAR(10 g) = 0.776 mW/g
Maximum value of SAR (measured) = 1.47 mW/g



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

Test Laboratory: Motorola - WCDMA 1900 + Wi-Fi 5.8 GHz Multiband Combined Left Cheek Expanded Volumetric Measurement

DASY4 Configuration for DASY4, SAM
Phone Against LEFT Head Template - Rev.3 (Dec10)
/Left Head Template/Mega Zoom Zoom Scan (5-6GHz), Sensor D=3mm:

Date/Time: 12/5/2010 12:04:05 PM
Serial: LOLAAD0042; FCC ID: IHDP56LS1
Communication System: 5785MHz Band; Frequency: 5745 MHz; Duty Cycle: 1:1

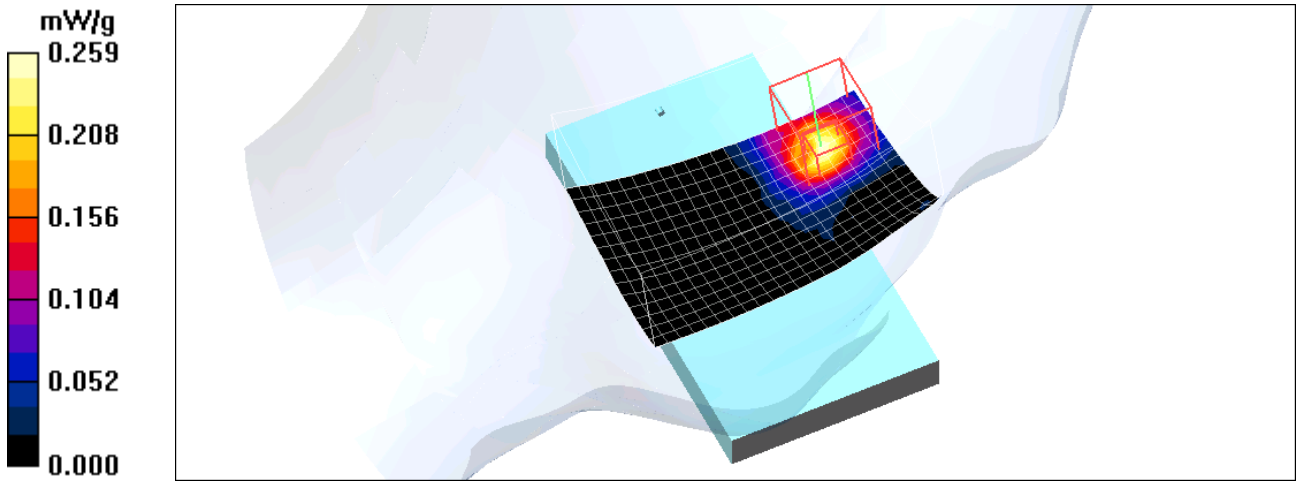
Medium: 5-6 GHz SPEAG Tissue HEAD
Medium parameters used: f = 5785 MHz; σ = 5.42 mho/m; ε_r = 32.4; ρ = 1000 kg/m^3

Measurement Standard: DASY4 (High Precision Assessment)

- Probe: EX3DV4 - SN3730; ConvF(4.06, 4.06, 4.06); Calibrated: 7/16/2010
- Sensor-Surface: 3mm (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

Left Head Template/Mega Zoom Zoom Scan (5-6GHz), Sensor D=3mm (23x15x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm, Volume Outer Dimensions: x=88mm, y=56mm, z=30mm
Reference Value = 2.75 V/m; Power Drift = -0.236 dB; Peak SAR (extrapolated) = 2.01 W/kg
SAR(1 g) = 0.198 mW/g; SAR(10 g) = 0.078 mW/g; Maximum value of SAR (measured) = 0.259 mW/g



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

DASY4 Configuration for DASY4, SAM
Phone Against LEFT Head Template - Rev.3 (Dec10)
/Left Head Template/Mega Zoom Zoom Scan (5-6GHz), Sensor D=3mm:

Date/Time: 12/5/2010 3:41:27 PM
Serial: LOLAAD0136; FCC ID: IHDP56LS1
Communication System: WCDMA 1900; Frequency: 1907.5 MHz; Duty Cycle: 1:1

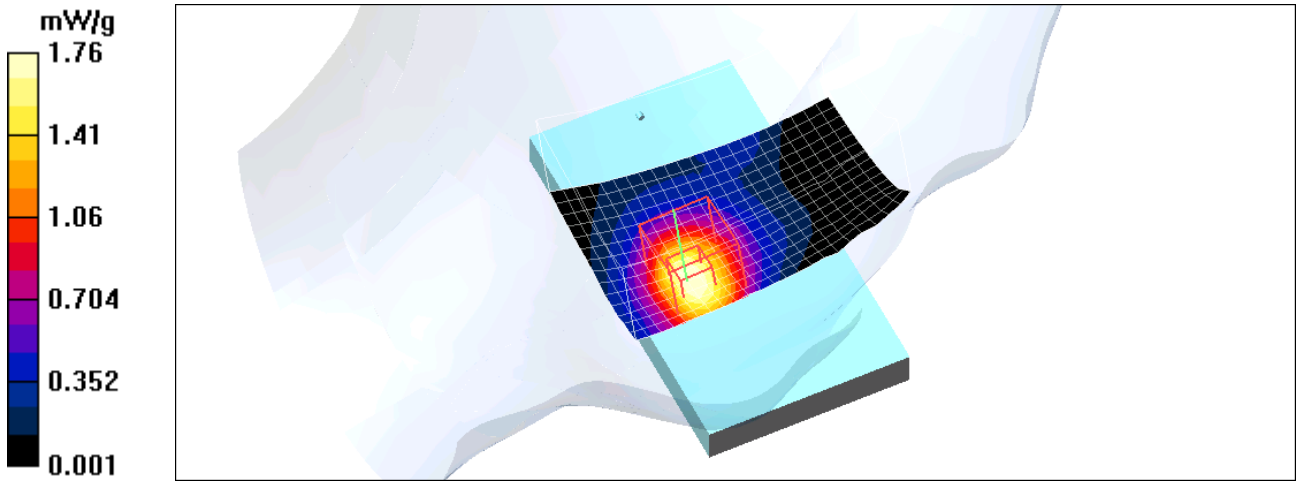
Medium: Regular Glycol Head 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3

Measurement Standard: DASY4 (High Precision Assessment)

- Probe: ES3DV3 - SN3183; ConvF(5.05, 5.05, 5.05); Calibrated: 7/14/2010
- Sensor-Surface: 3mm (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

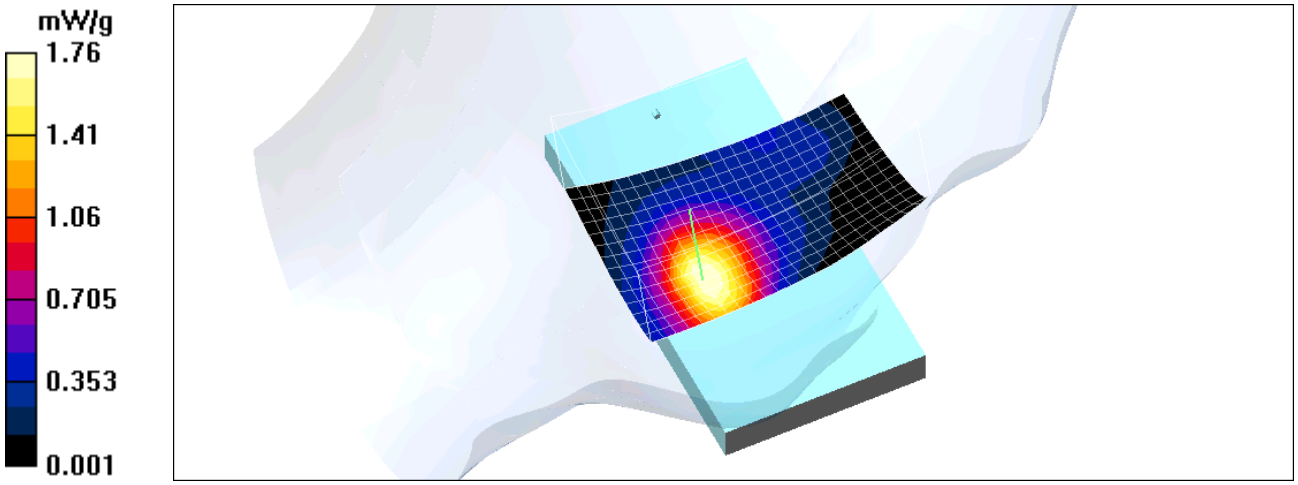
Left Head Template/Mega Zoom Zoom Scan (5-6GHz), Sensor D=3mm (23x15x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm; Volume Outer Dimensions: x=88mm, y=56mm, z=30mm
Reference Value = 34.5 V/m; Power Drift = -0.157 dB; Peak SAR (extrapolated) = 2.34 W/kg
SAR(1 g) = 1.47 mW/g; SAR(10 g) = 0.835 mW/g; Maximum value of SAR (measured) = 1.76 mW/g



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

Multi Band Result:
SAR(1 g) = 1.47 mW/g; SAR(10 g) = 0.839 mW/g
Maximum value of SAR (measured) = 1.76 mW/g



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

Date/Time: 11/7/2010 8:15:14 AM

Test Laboratory: Motorola - GSM 850 Tilt

Serial: LOLAAD0136; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5880A; DEVICE POSITION: Tilt
Communication System: GSM 850; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8.3

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

DASY4 Configuration:

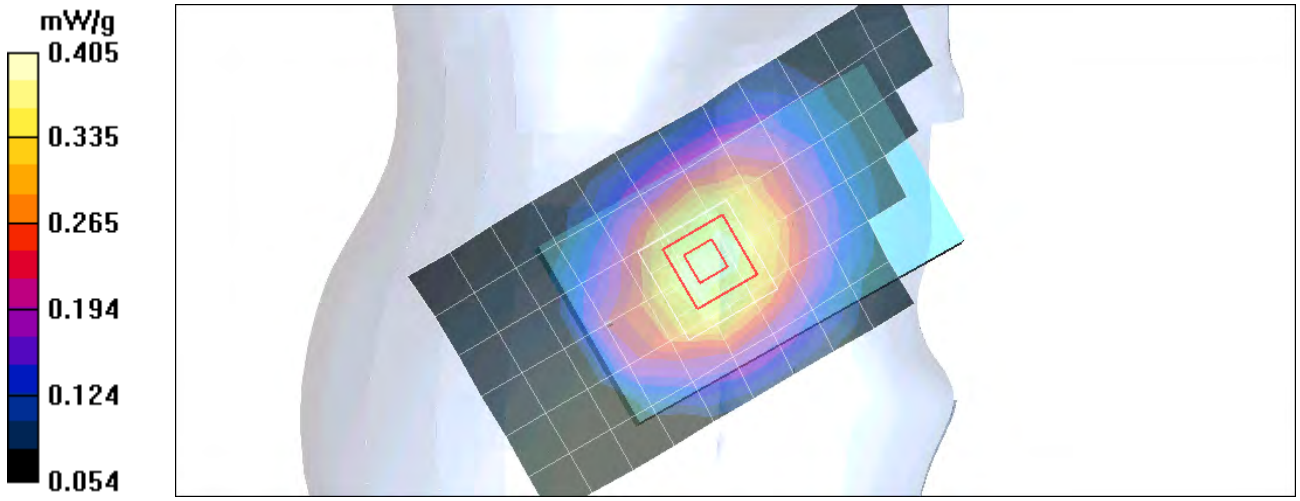
- Probe: ES3DV3 - SN3183; ConvF(6.11, 6.11, 6.11); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1156;
- Measurement SW: DASY4, V4.7 Build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

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.381 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.8 V/m; Power Drift = -0.148 dB; Peak SAR (extrapolated) = 0.487 W/kg
SAR(1 g) = 0.383 mW/g; SAR(10 g) = 0.286 mW/g; Maximum value of SAR (measured) = 0.405 mW/g



Date/Time: 11/12/2010 3:39:02 PM

Test Laboratory: Motorola - GSM 1900 Tilt

Serial: LOLAAD0136; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5880A; DEVICE POSITION (cheek or rotated): Tilt
Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8.3

Medium: Regular Glycol Head 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3

DASY4 Configuration:

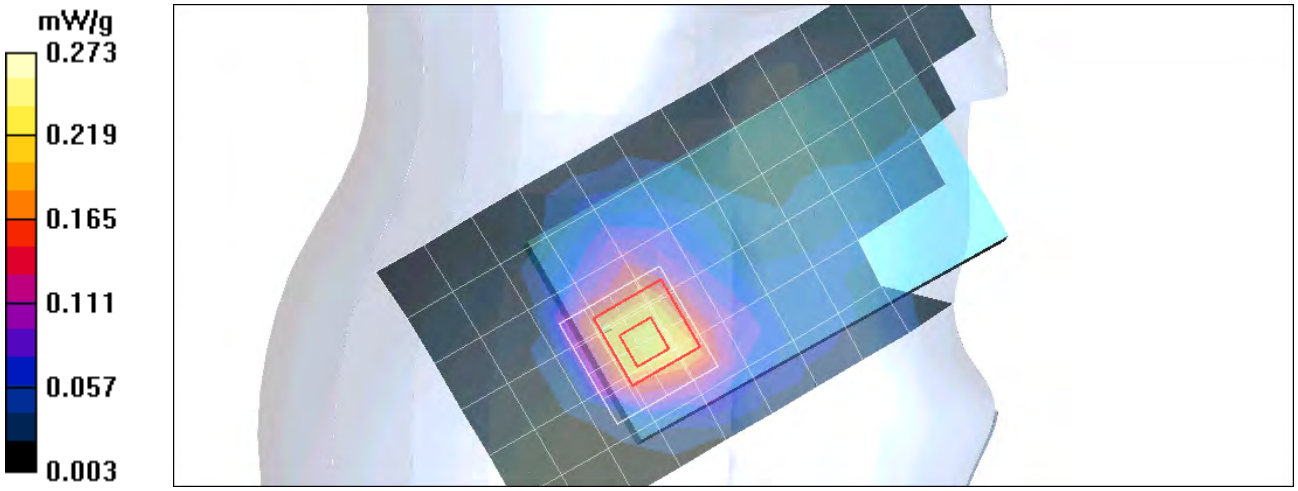
- Probe: ES3DV3 - SN3183; ConvF(5.05, 5.05, 5.05); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.220 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.8 V/m; Power Drift = -0.050 dB; Peak SAR (extrapolated) = 0.406 W/kg
SAR(1 g) = 0.246 mW/g; SAR(10 g) = 0.139 mW/g; Maximum value of SAR (measured) = 0.273 mW/g



Date/Time: 11/7/2010 11:32:15 AM

Test Laboratory: Motorola - WCDMA 850 Tilt

Serial: LOLAAD0136; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5880A; DEVICE POSITION: Tilt
Communication System: WCDMA 850; Frequency: 836 MHz; Channel Number: 4180; Duty Cycle: 1:1

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

DASY4 Configuration:

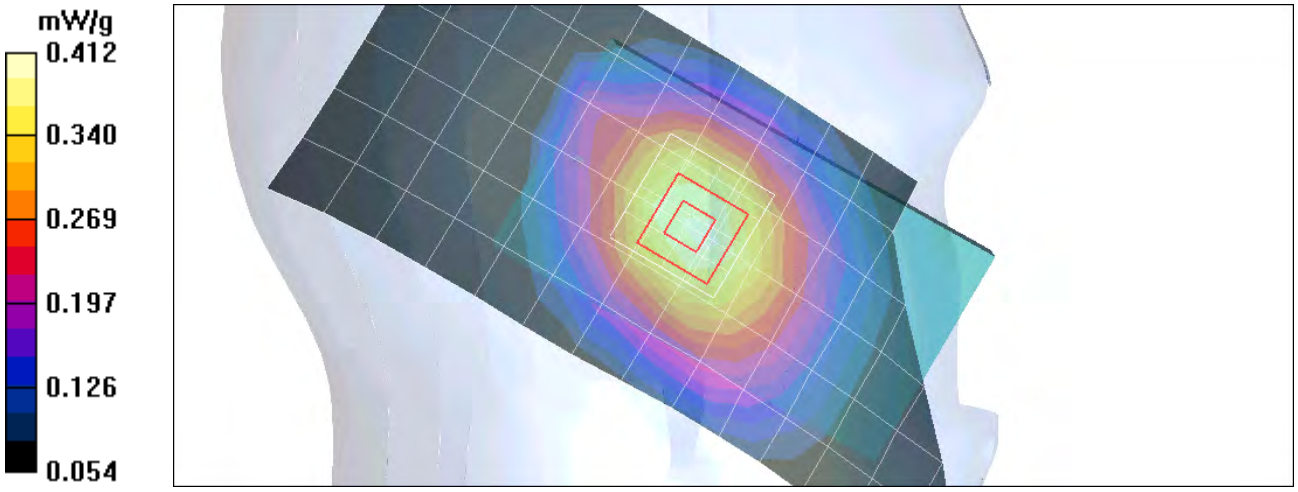
- Probe: ES3DV3 - SN3183; ConvF(6.11, 6.11, 6.11); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1156;
- Measurement SW: DASY4, V4.7 Build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

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.402 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.6 V/m; Power Drift = 0.105 dB; Peak SAR (extrapolated) = 0.492 W/kg
SAR(1 g) = 0.391 mW/g; SAR(10 g) = 0.295 mW/g; Maximum value of SAR (measured) = 0.412 mW/g



Date/Time: 11/18/2010 10:45:18 PM

Test Laboratory: Motorola - WCDMA 1900 Tilt

Serial: LOLAAD0136; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5880A; DEVICE POSITION (cheek or rotated): Rotated
Communication System: WCDMA 1900; Frequency: 1880 MHz; Channel Number: 9400; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3

DASY4 Configuration:

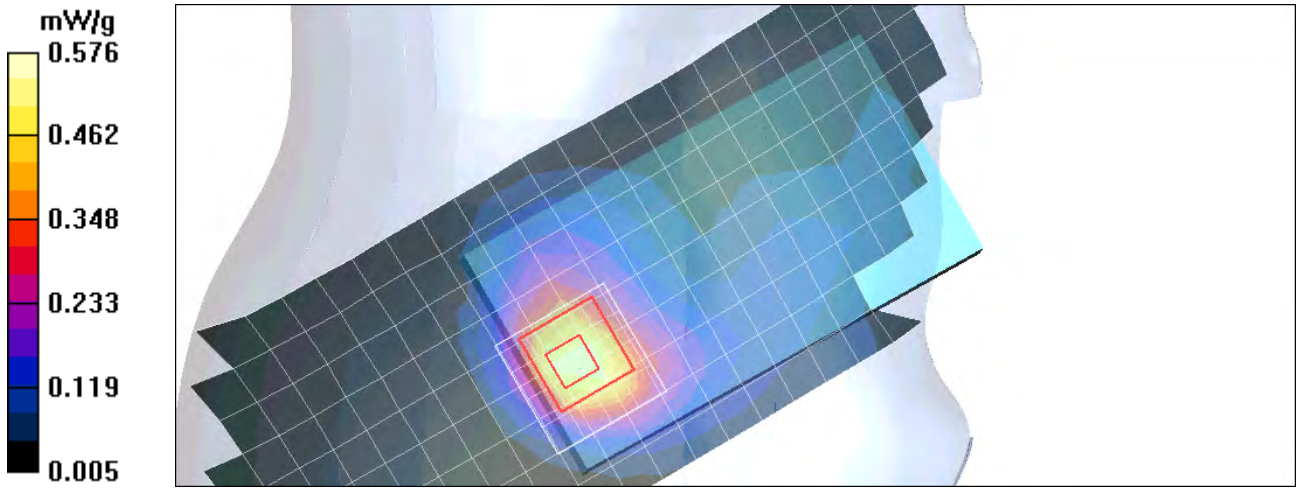
- Probe: ES3DV3 - SN3183; ConvF(5.05, 5.05, 5.05); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Head Template/Area Scan - Normal Extended (10mm) (10x25x1):

Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.524 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.4 V/m; Power Drift = -0.223 dB; Peak SAR (extrapolated) = 0.874 W/kg
SAR(1 g) = 0.523 mW/g; SAR(10 g) = 0.291 mW/g; Maximum value of SAR (measured) = 0.576 mW/g



Date/Time: 11/25/2010 9:52:19 AM

Test Laboratory: Motorola - Wi-Fi 2.45 GHz Tilt

Serial: LOLAAD0042; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5880A; DEVICE POSITION: Tilt
Device Mode: 802.11b mode, 1 Mbps data rate
Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Channel Number: 1; Duty Cycle: 1:1

Medium: 2450 Glycol Head
Medium parameters used: f = 2450 MHz; σ = 1.8 mho/m; ε_r = 37.6; ρ = 1000 kg/m^3

DASY4 Configuration:

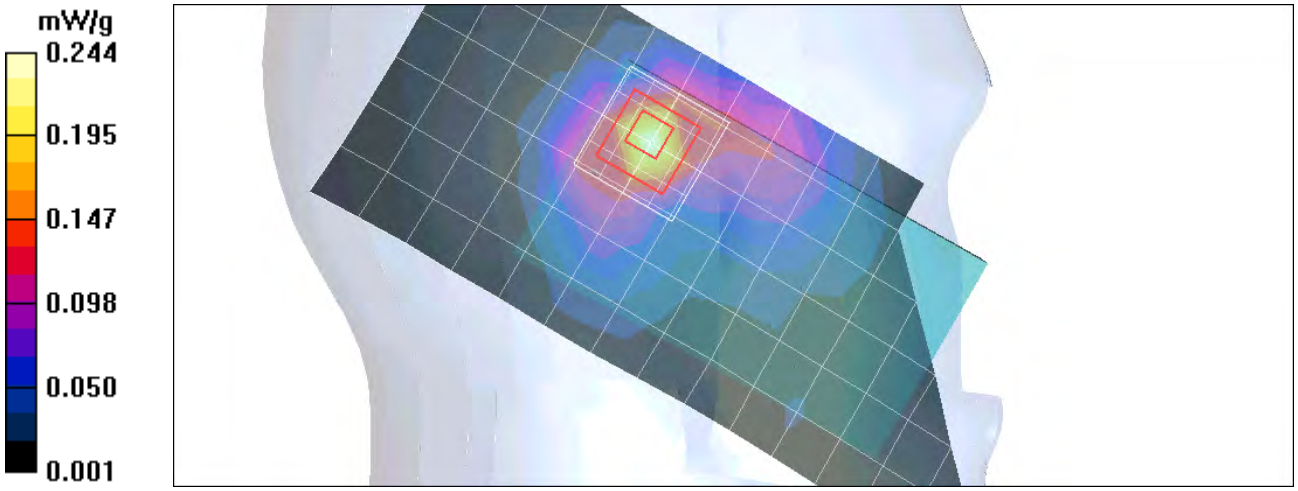
- Probe: ES3DV3 - SN3124; ConvF(4.35, 4.35, 4.35); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7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

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.245 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.4 V/m; Power Drift = -0.027 dB; Peak SAR (extrapolated) = 0.421 W/kg
SAR(1 g) = 0.225 mW/g; SAR(10 g) = 0.114 mW/g; Maximum value of SAR (measured) = 0.244 mW/g



Date/Time: 12/2/2010 11:48:43 PM

Test Laboratory: Motorola - Wi-Fi 5.2 GHz Tilt

Serial: LOLAAD0042; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5880A; DEVICE POSITION (cheek or rotated): Rotated
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 HEAD
Medium parameters used: f = 5210 MHz; σ = 4.96 mho/m; ε_r = 36.1; ρ = 1000 kg/m^3

DASY4 Configuration:

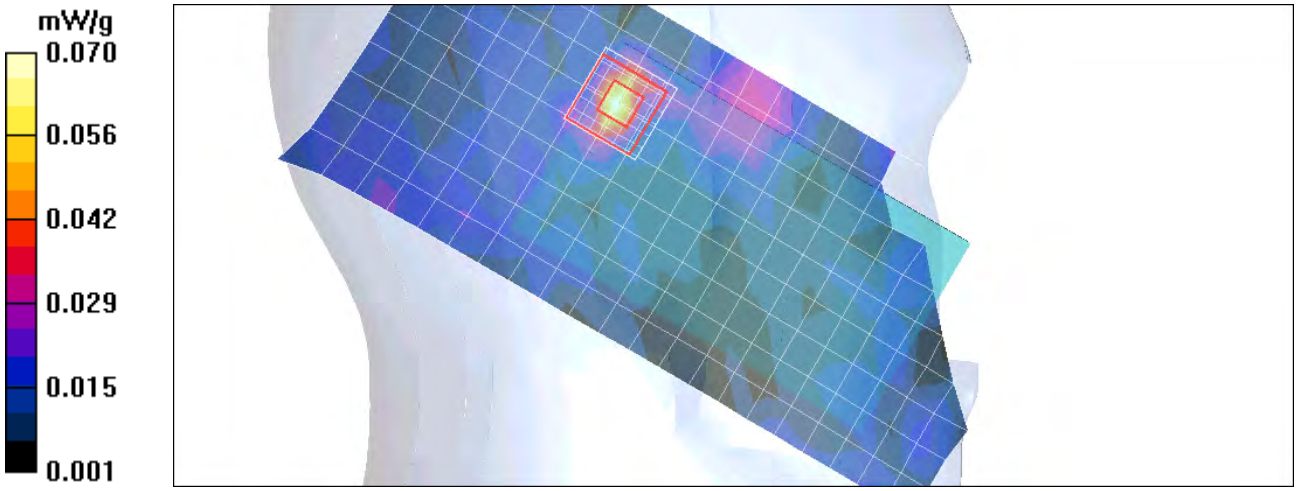
- Probe: EX3DV4 - SN3730; ConvF(4.67, 4.67, 4.67); Calibrated: 7/16/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R3, 5-6GHz SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1153;
- Measurement SW: DASY4, V4.7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

Left Head Template/Area Scan - Normal (10mm) (10x25x1):

Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.071 mW/g

Left Head Template/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.85 V/m; Power Drift = -0.426 dB; Peak SAR (extrapolated) = 0.148 W/kg
SAR(1 g) = 0.039 mW/g; SAR(10 g) = 0.018 mW/g; Maximum value of SAR (measured) = 0.070 mW/g



Date/Time: 12/3/2010 2:01:35 AM

Test Laboratory: Motorola - Wi-Fi 5.8 GHz Tilt

Serial: LOLAAD0042; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A
Battery Model #: SNN5880A; DEVICE POSITION (cheek or rotated): Rotated
Device Mode: 802.11a mode, 6 Mbps data rate
Communication System: 5785MHz Band; Frequency: 5745 MHz; Channel Number: 149; Duty Cycle: 1:1

Medium: 5-6 GHz SPEAG Tissue HEAD
Medium parameters used: f = 5785 MHz; σ = 5.64 mho/m; ε_r = 35; ρ = 1000 kg/m^3

DASY4 Configuration:

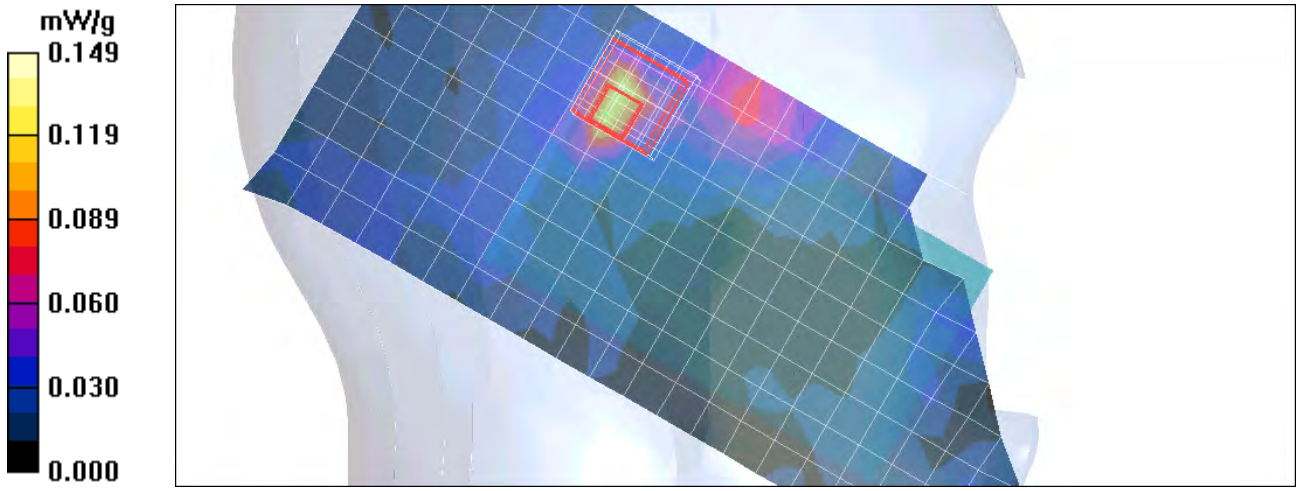
- Probe: EX3DV4 - SN3730; ConvF(4.06, 4.06, 4.06); Calibrated: 7/16/2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 7/13/2010
- Phantom: R3, 5-6GHz SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1153;
- Measurement SW: DASY4, V4.7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

Left Head Template/Area Scan - Normal (10mm) (10x25x1):

Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.134 mW/g

Left Head Template/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 4.82 V/m; Power Drift = -0.360 dB; Peak SAR (extrapolated) = 0.276 W/kg
SAR(1 g) = 0.079 mW/g; SAR(10 g) = 0.028 mW/g; Maximum value of SAR (measured) = 0.149 mW/g



Appendix 3

SAR distribution plots for Body Worn Configuration

Date/Time: 11/13/2010 1:43:08 PM

Test Laboratory: Motorola - GSM 850 Body-Worn

Serial: LOLAAD0136; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Battery Model #: SNN5880A
Device Position: Body Worn, Back of Phone 25 mm from Phantom
Communication System: GPRS 850 Cl 10; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:4.15

Medium: Low Freq Body
Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

DASY4 Configuration:

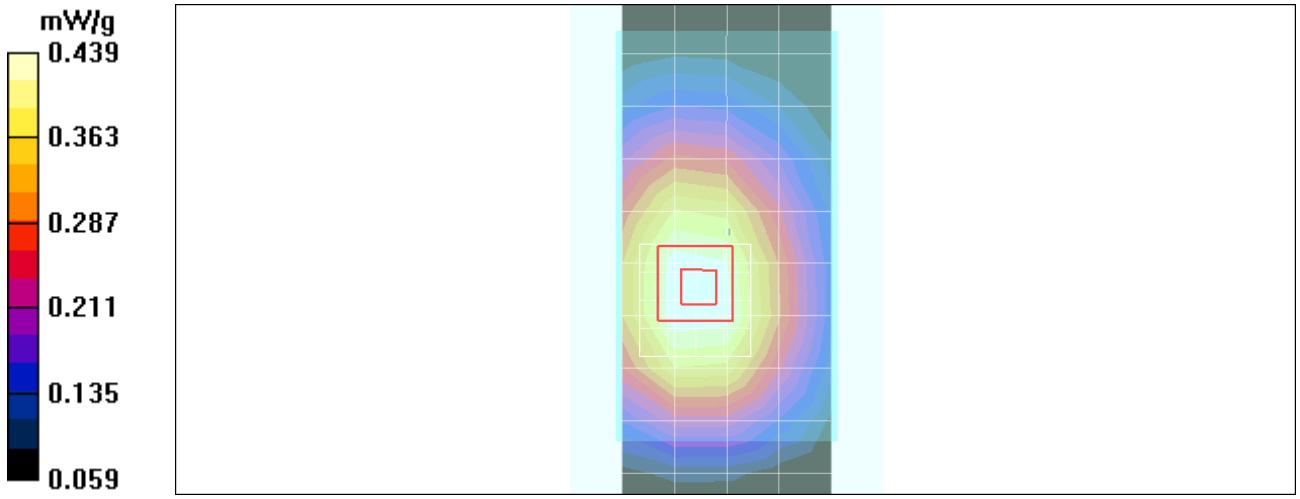
- Probe: ES3DV3 - SN3183; ConvF(6.15, 6.15, 6.15); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.437 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.9 V/m; Power Drift = 0.400 dB; Peak SAR (extrapolated) = 0.532 W/kg
SAR(1 g) = 0.419 mW/g; SAR(10 g) = 0.313 mW/g Maximum value of SAR (measured) = 0.439 mW/g



Date/Time: 11/19/2010 1:08:18 AM

Test Laboratory: Motorola - GSM 1900 Body-Worn

Serial: LOLAAD0136; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Battery Model #: SNN5880A
Device Position: Body Worn, Back of Phone 25 mm from Phantom
Communication System: GPRS 1900 Cl 10; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:4.15

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

DASY4 Configuration:

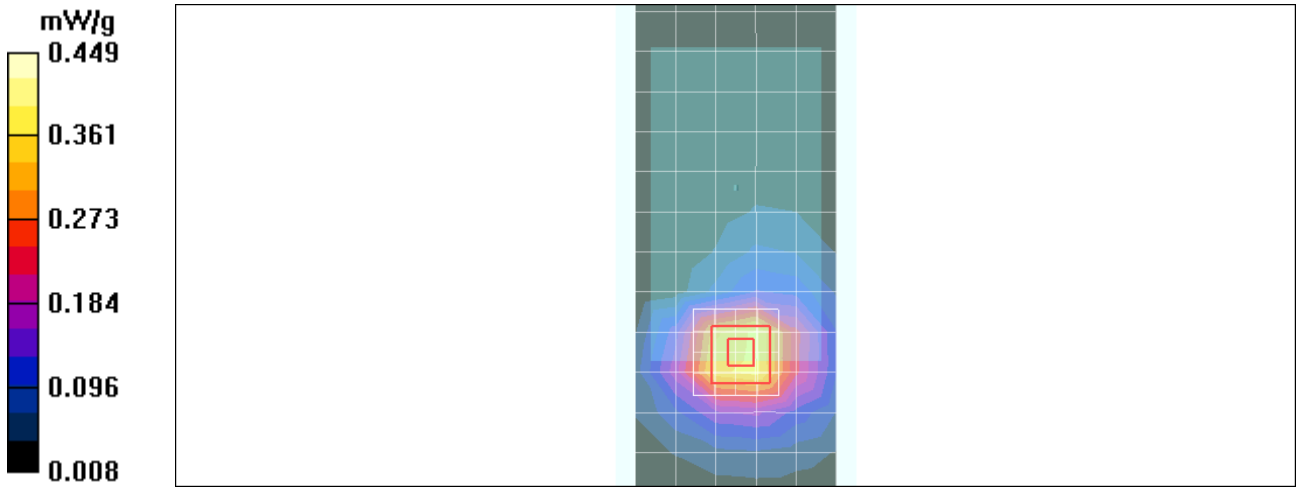
- Probe: ES3DV3 - SN3183; ConvF(4.84, 4.84, 4.84); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Full Body (15mm) (18x8x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.375 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.8 V/m; Power Drift = 0.140 dB; Peak SAR (extrapolated) = 0.636 W/kg
SAR(1 g) = 0.412 mW/g; SAR(10 g) = 0.249 mW/g; Maximum value of SAR (measured) = 0.449 mW/g



Date/Time: 11/7/2010 12:06:47 PM

Test Laboratory: Motorola - WCDMA 850 Body-Worn

Serial: LOLAAD0136; FCC ID: IHDP56LS1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5880A
Device Position: Body Worn, Back of Phone 25 mm from Phantom
Communication System: WCDMA 850; Frequency: 836 MHz; Channel Number: 4180; Duty Cycle: 1:1

Medium: Low Freq Body
Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3

DASY4 Configuration:

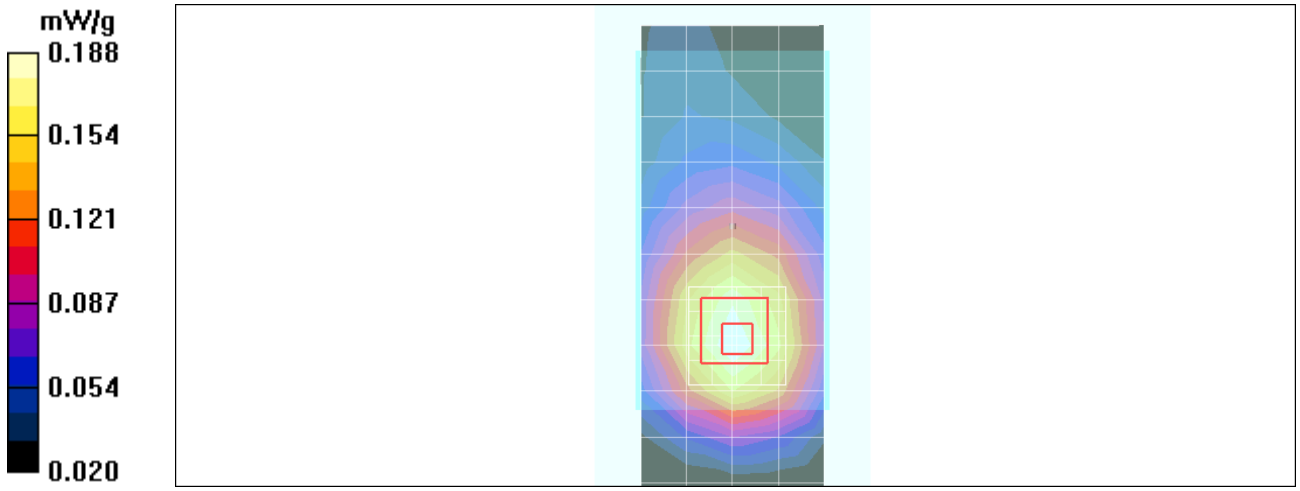
- Probe: ES3DV3 - SN3183; ConvF(6.15, 6.15, 6.15); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.189 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.4 V/m; Power Drift = -0.053 dB; Peak SAR (extrapolated) = 0.236 W/kg
SAR(1 g) = 0.178 mW/g; SAR(10 g) = 0.129 mW/g; Maximum value of SAR (measured) = 0.188 mW/g



Date/Time: 11/19/2010 12:09:03 AM

Test Laboratory: Motorola - WCDMA 1900 Body-Worn

Serial: LOLAAD0136; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Battery Model #: SNN5880A
Device Position: Body Worn, Back of Phone 25 mm from Phantom
Communication System: WCDMA 1900; Frequency: 1880 MHz; Channel Number: 9400; 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

DASY4 Configuration:

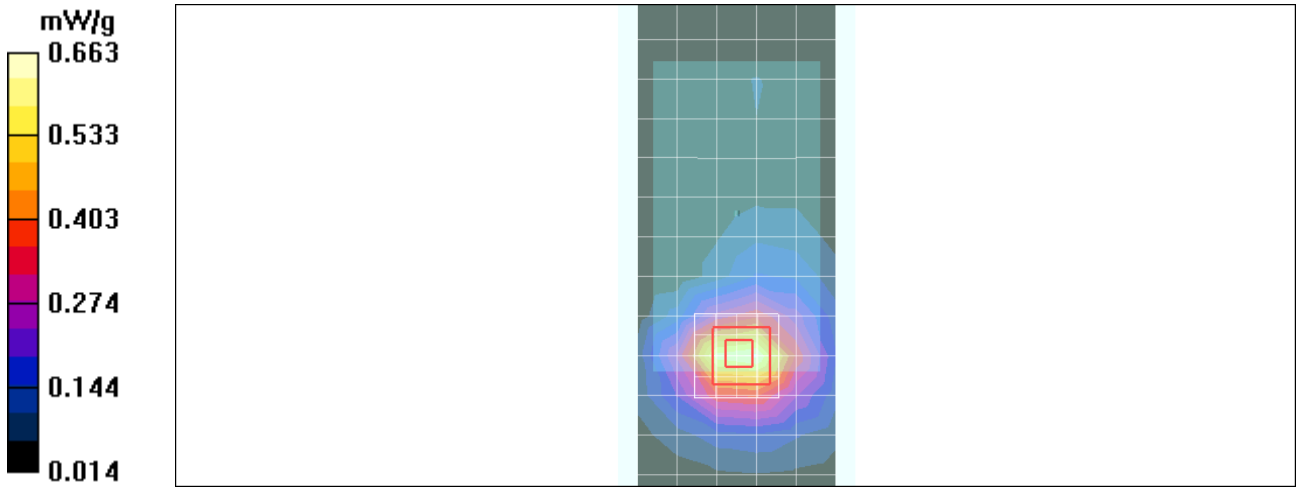
- Probe: ES3DV3 - SN3183; ConvF(4.84, 4.84, 4.84); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Full Body (15mm) (18x8x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.631 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.7 V/m; Power Drift = -0.146 dB; Peak SAR (extrapolated) = 0.936 W/kg
SAR(1 g) = 0.606 mW/g; SAR(10 g) = 0.364 mW/g; Maximum value of SAR (measured) = 0.663 mW/g



Date/Time: 11/26/2010 9:52:38 AM

Test Laboratory: Motorola - Wi-Fi 2.45 GHz Body-Worn

Serial: LOLAAD0042; FCC ID: IHDP56LS1
Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5880A
Device Position: Body Worn, Back of Phone 25 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 = 1.9 mho/m; ε_r = 50; ρ = 1000 kg/m^3

DASY4 Configuration:

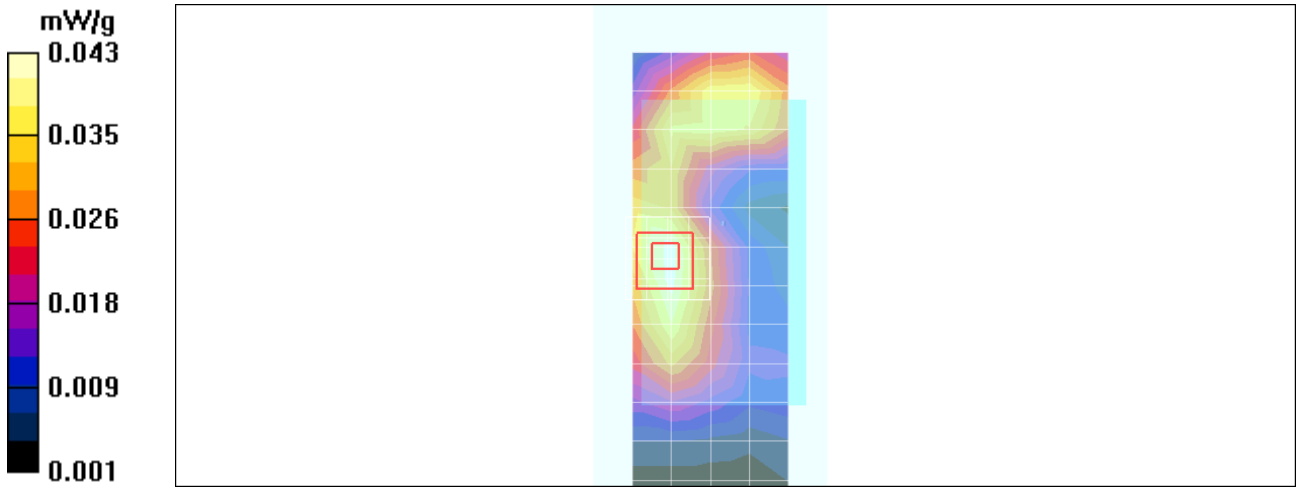
- Probe: ES3DV3 - SN3124; ConvF(4.19, 4.19, 4.19); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80;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

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.042 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.70 V/m; Power Drift = 0.065 dB; Peak SAR (extrapolated) = 0.069 W/kg
SAR(1 g) = 0.040 mW/g; SAR(10 g) = 0.024 mW/g; Maximum value of SAR (measured) = 0.043 mW/g



Appendix 4

SAR distribution plots for Mobile Hotspot Configuration

Date/Time: 12/21/2010 3:00:52 PM

Test Laboratory: Motorola - WCDMA 850 Body Worn (Mobile Hotspot)

Serial: LOLAAD0135; FCC ID: IHDP56LS1

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Battery Model #: SNN5880A
Device Position: Body Worn, Back of Phone 10 mm from Phantom
Communication System: WCDMA 850; Frequency: 836 MHz; Channel Number: 4180; Duty Cycle: 1:1

Medium: Low Freq Body
Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

DASY4 Configuration:

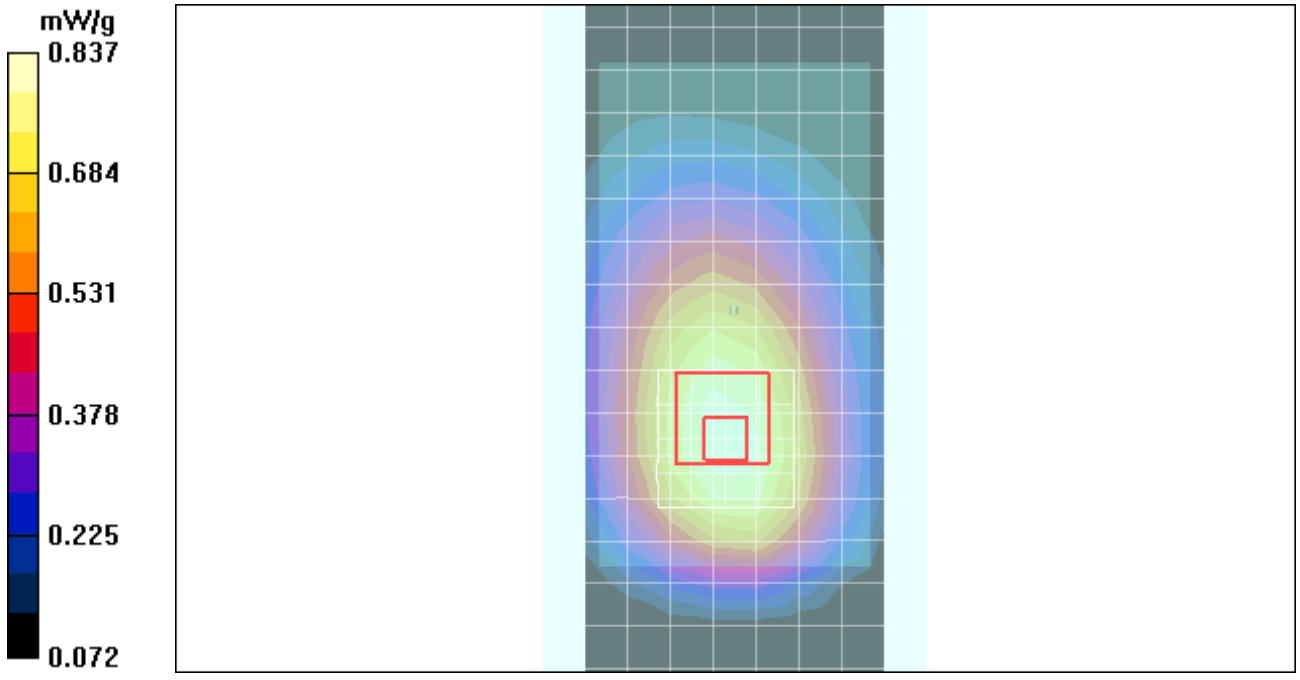
- Probe: ES3DV3 - SN3183; ConvF(6.15, 6.15, 6.15); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Normal Extended Body (10mm) (24x10x1):

Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.819 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.0 V/m; Power Drift = 0.036 dB; Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.794 mW/g; SAR(10 g) = 0.586 mW/g; Maximum value of SAR (measured) = 0.837 mW/g



Date/Time: 11/26/2010 9:03:04 AM

Test Laboratory: Motorola - WCDMA 1900 Body Worn (Mobile Hotspot)

Serial: LOLAAD0135; FCC ID: IHDP56LS1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5880A
Device Position: Body Worn, Bottom Edge of Phone 10 mm from Phantom
Communication System: WCDMA 1900; Frequency: 1852.5 MHz; Channel Number: 9262; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880
Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 50.7; ρ = 1000 kg/m^3

DASY4 Configuration:

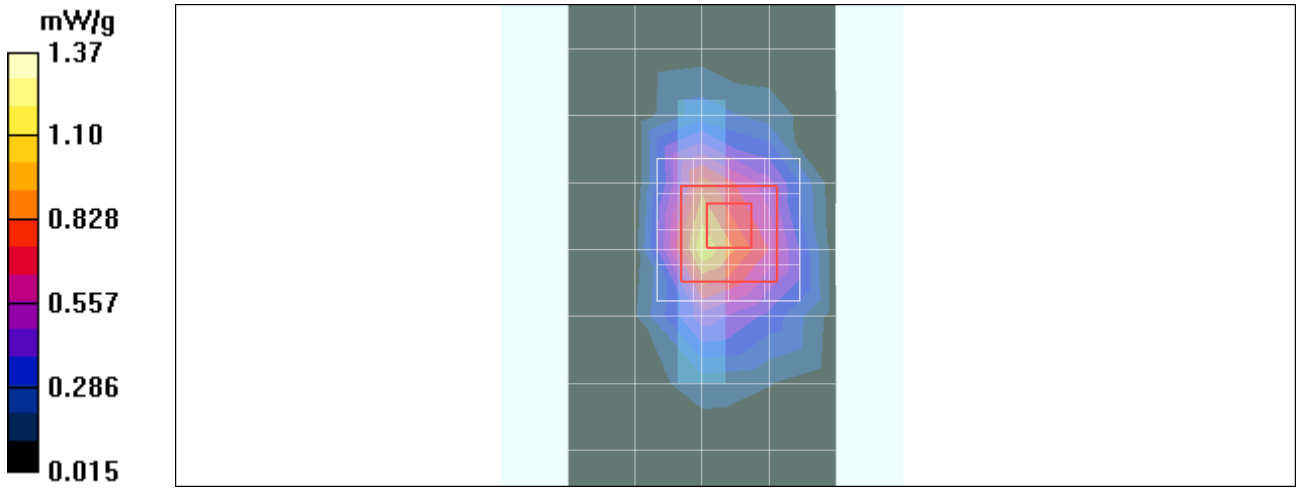
- Probe: ES3DV3 - SN3183; ConvF(4.84, 4.84, 4.84); Calibrated: 7/14/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 5/18/2010
- Phantom: R1_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 1.00 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.3 V/m; Power Drift = -0.181 dB; Peak SAR (extrapolated) = 2.10 W/kg
SAR(1 g) = 1.2 mW/g; SAR(10 g) = 0.606 mW/g; Maximum value of SAR (measured) = 1.37 mW/g



Date/Time: 11/27/2010 10:25:07 AM

Test Laboratory: Motorola - Wi-Fi 2.45 GHz Body Worn (Mobile Hotspot)

Serial: LOLAAD0042; FCC ID: IHDP56LS1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5880A
Device Position: Body Worn, Right Edge of Phone 10 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 = 1.96 mho/m; ε_r = 50.4; ρ = 1000 kg/m^3

DASY4 Configuration:

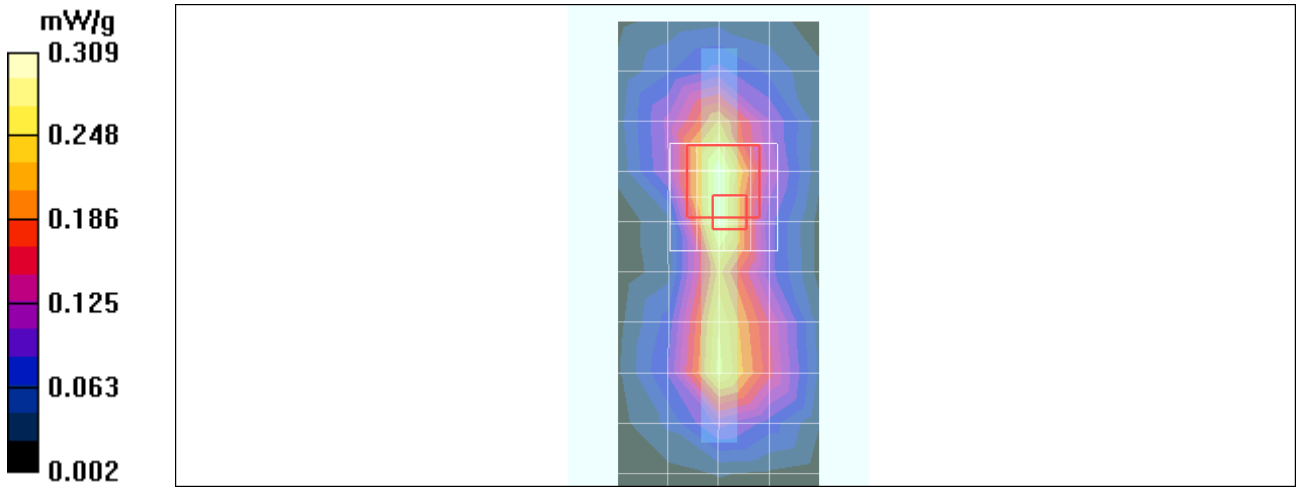
- Probe: ES3DV3 - SN3124; ConvF(4.19, 4.19, 4.19); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80;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

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.286 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.5 V/m; Power Drift = -0.112 dB; Peak SAR (extrapolated) = 0.536 W/kg
SAR(1 g) = 0.270 mW/g; SAR(10 g) = 0.139 mW/g; Maximum value of SAR (measured) = 0.309 mW/g



Date/Time: 11/27/2010 11:22:07 AM

Test Laboratory: Motorola - Wi-Fi 2.45 GHz Body Worn (Mobile Hotspot)

Serial: LOLAAD0042; FCC ID: IHDP56LS1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5880A
Device Position: Body worn, Back of Phone 10 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 = 1.96 mho/m; ε_r = 50.4; ρ = 1000 kg/m^3

DASY4 Configuration:

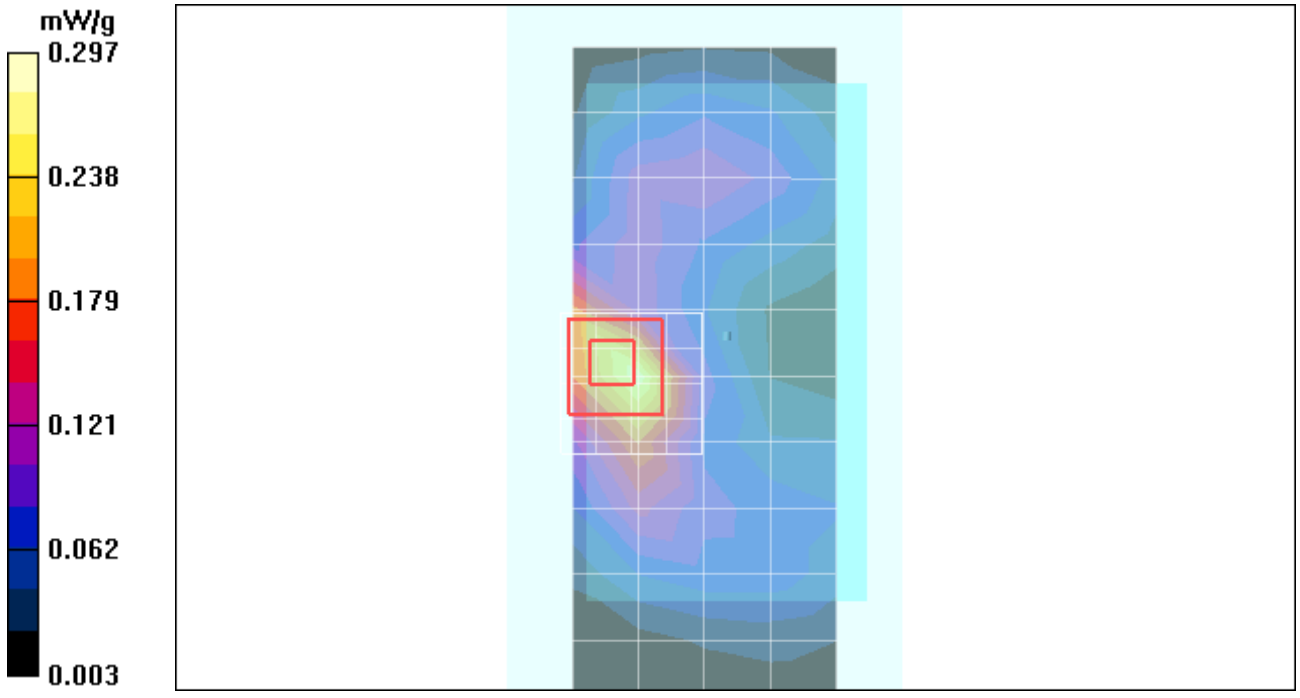
- Probe: ES3DV3 - SN3124; ConvF(4.19, 4.19, 4.19); Calibrated: 8/11/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 2/12/2010
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80;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

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

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.273 mW/g

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

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.21 V/m; Power Drift = 0.010 dB; Peak SAR (extrapolated) = 0.541 W/kg
SAR(1 g) = 0.276 mW/g; SAR(10 g) = 0.140 mW/g; Maximum value of SAR (measured) = 0.297 mW/g



Appendix 5

Probe Calibration Certificate

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

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

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

Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: ES3-3124_Aug10

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3124

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

Calibration date: August 11, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	30-Dec-09 (No. ES3-3013_Dec09)	Dec-10
DAE4	SN: 660	20-Apr-10 (No. DAE4-660_Apr10)	Apr-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10

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

Issued: August 14, 2010

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

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

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

Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ES3DV3

SN:3124

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

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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

Basic Calibration Parameters

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

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300.0	± 1.5%
			Y	0.00	0.00	1.00	300.0	
			Z	0.00	0.00	1.00	300.0	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).

[B] Numerical linearization parameter: uncertainty not required.

[E] Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

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

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
835	± 50 / ± 100	41.5 ± 5%	0.90 ± 5%	5.89	5.89	5.89	0.97	1.07 ± 11.0%
1810	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.89	4.89	4.89	0.49	1.54 ± 11.0%
1950	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.68	4.68	4.68	0.50	1.52 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	4.35	4.35	4.35	0.45	1.78 ± 11.0%

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

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

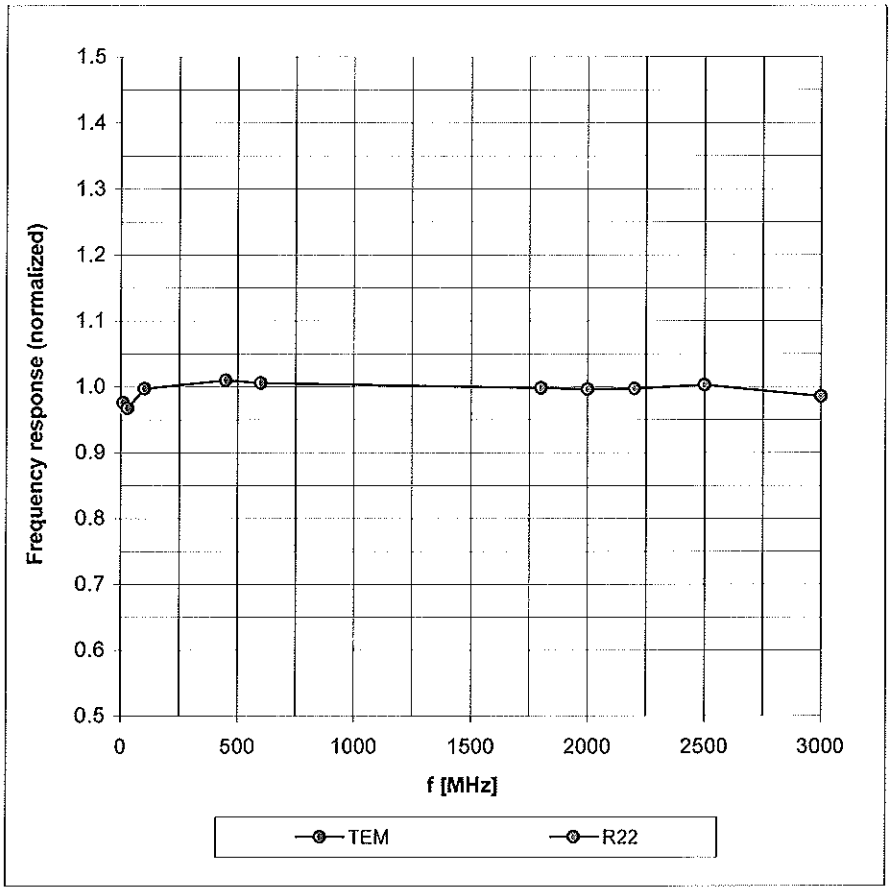
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
835	± 50 / ± 100	55.2 ± 5%	0.97 ± 5%	5.86	5.86	5.86	0.96	1.11 ± 11.0%
1810	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.76	4.76	4.76	0.41	1.84 ± 11.0%
1950	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.78	4.78	4.78	0.32	2.33 ± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	4.19	4.19	4.19	0.69	1.29 ± 11.0%

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

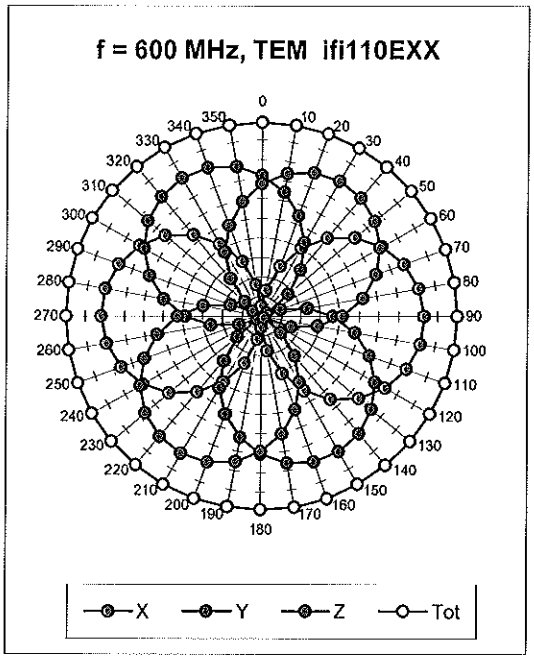
Frequency Response of E-Field

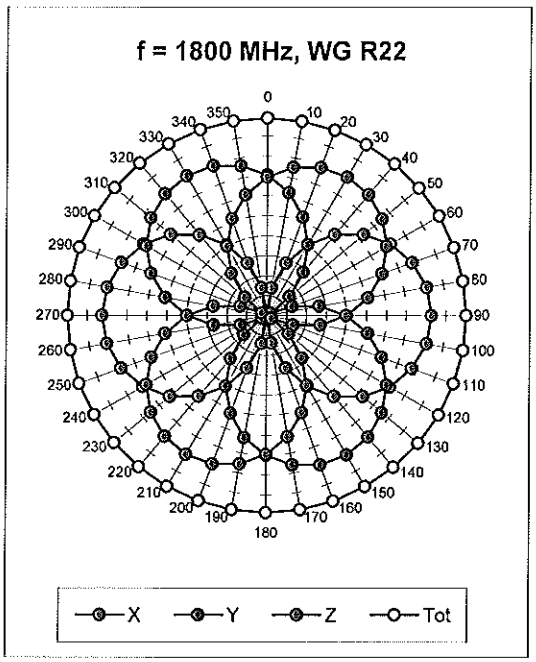
(TEM-Cell:ifi110 EXX, Waveguide: R22)

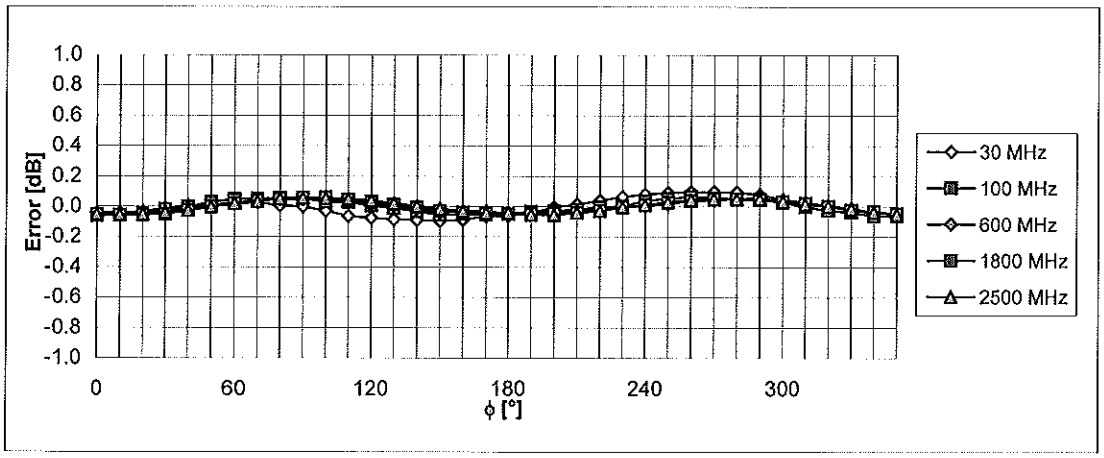


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



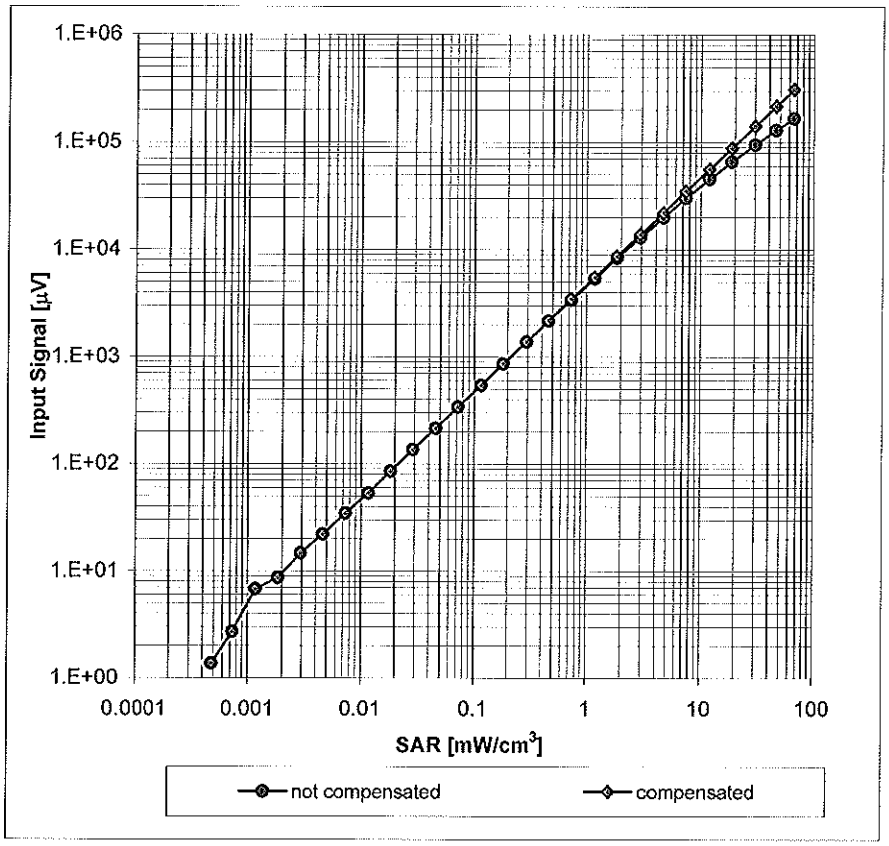


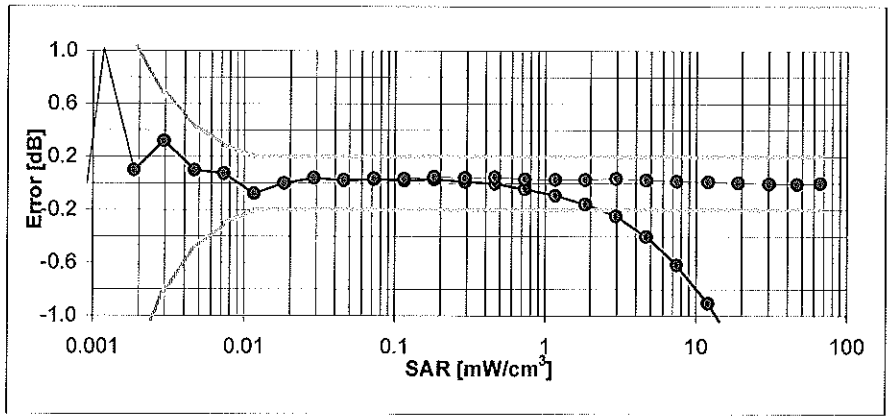


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

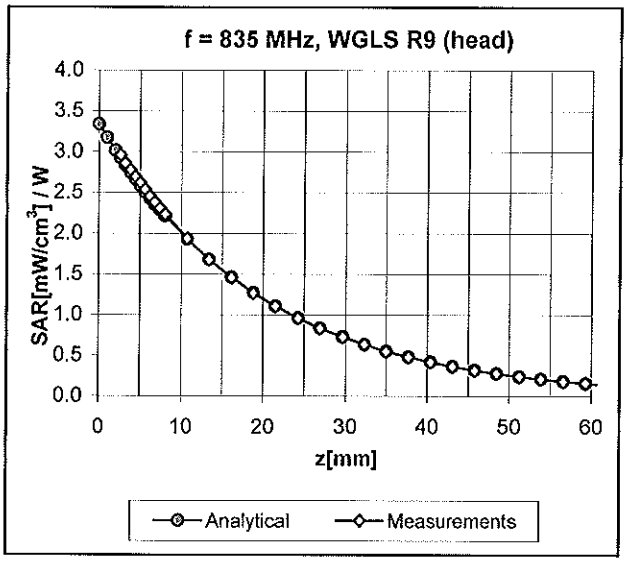
(Waveguide R22, f = 1800 MHz)

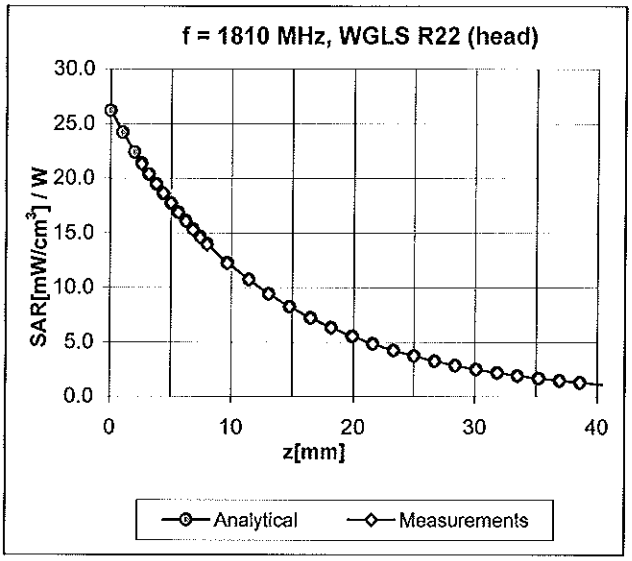




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

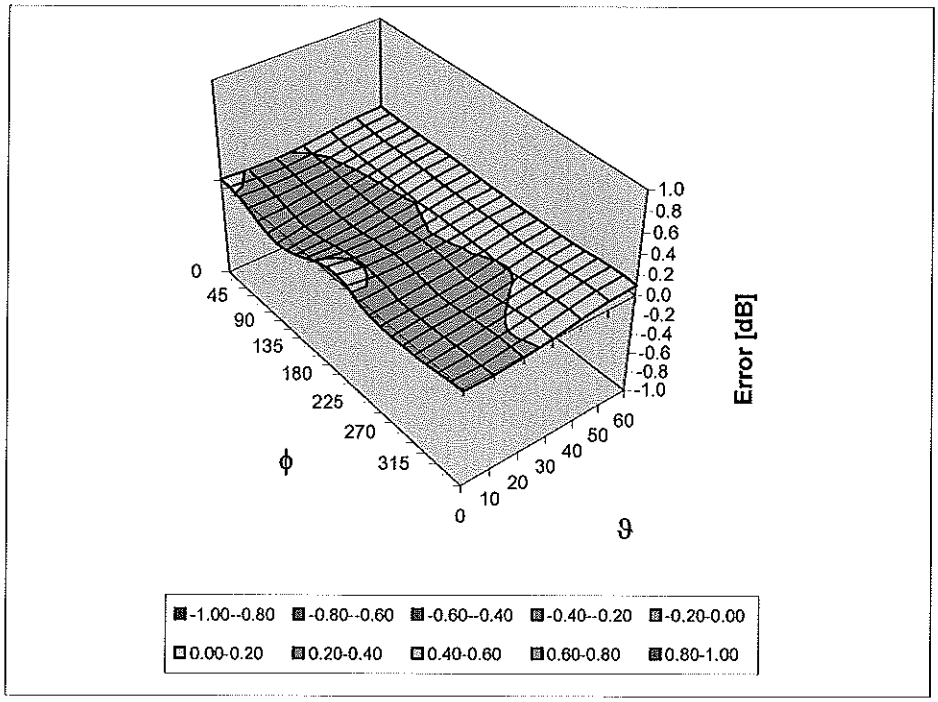
Conversion Factor Assessment





Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4.0 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

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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

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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

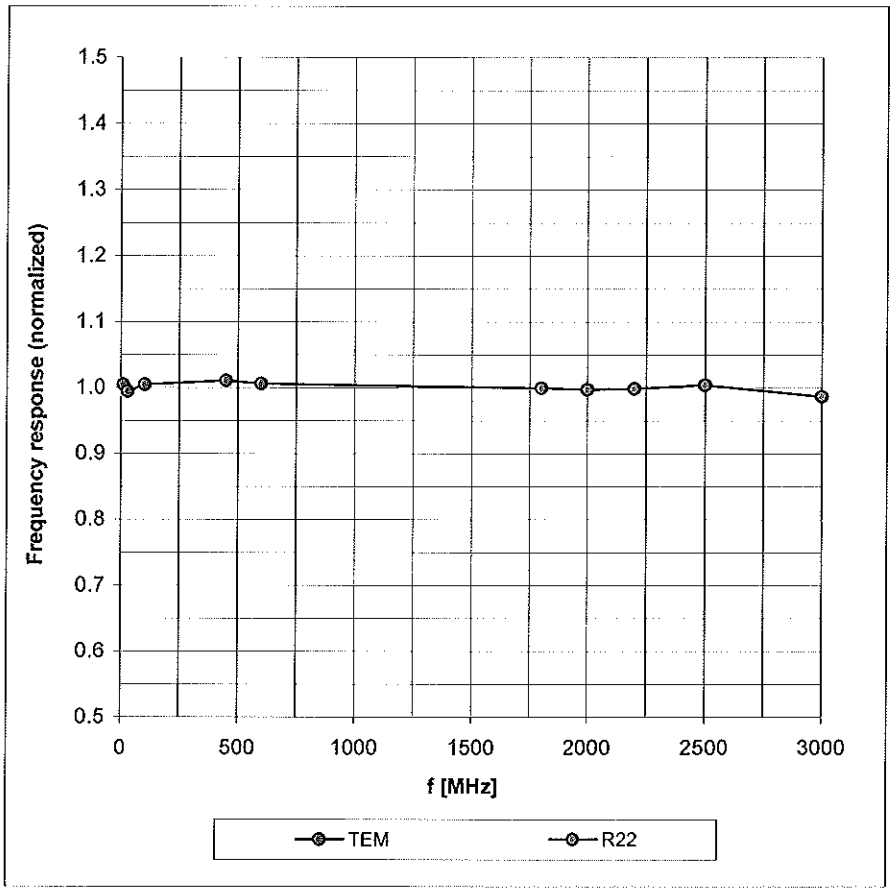
Calibration Parameter Determined in Body Tissue Simulating Media

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.

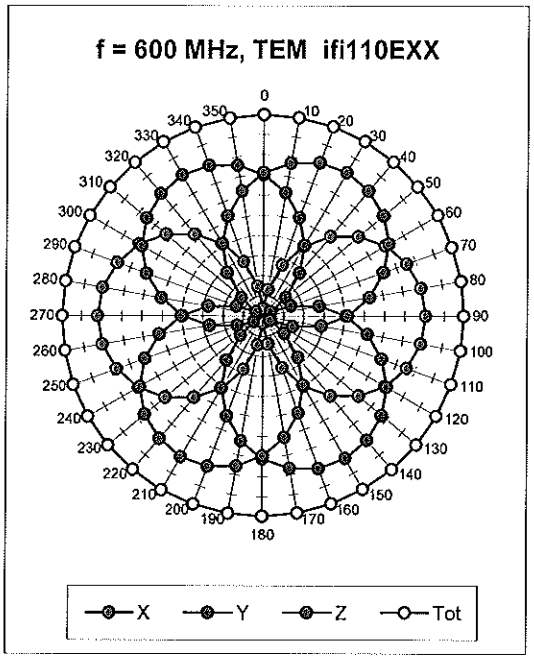
Frequency Response of E-Field

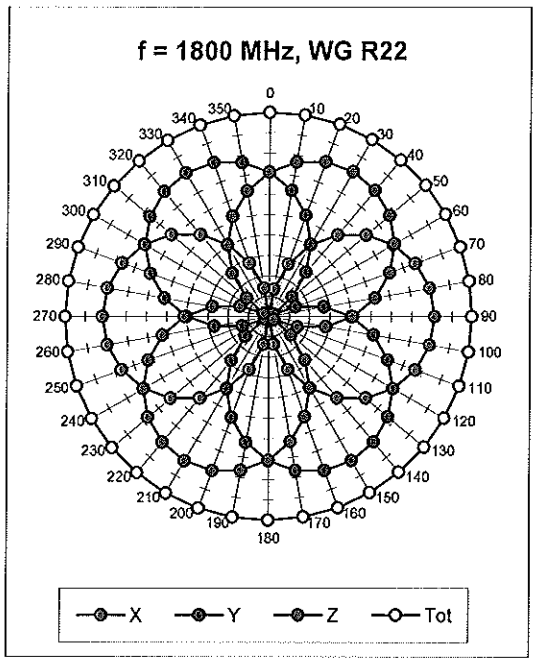
(TEM-Cell:ifi110 EXX, Waveguide: R22)

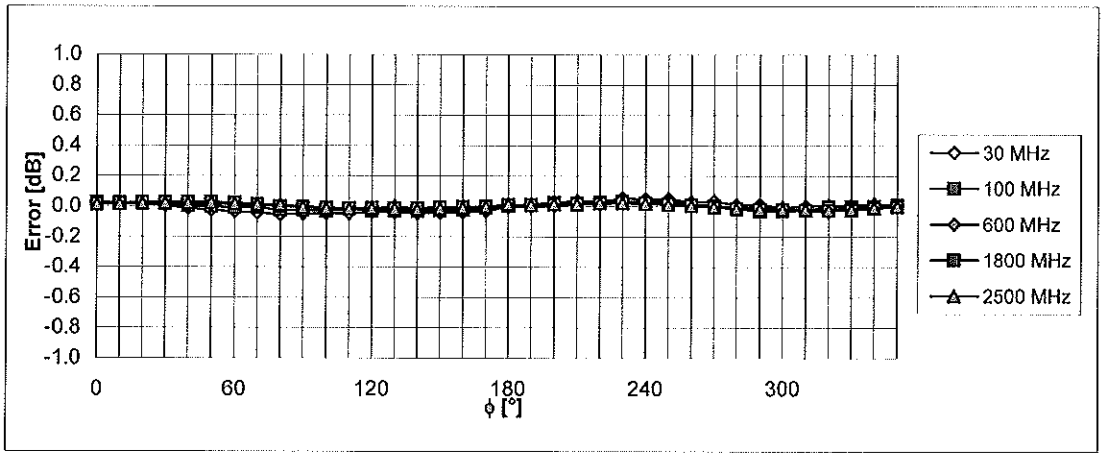


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



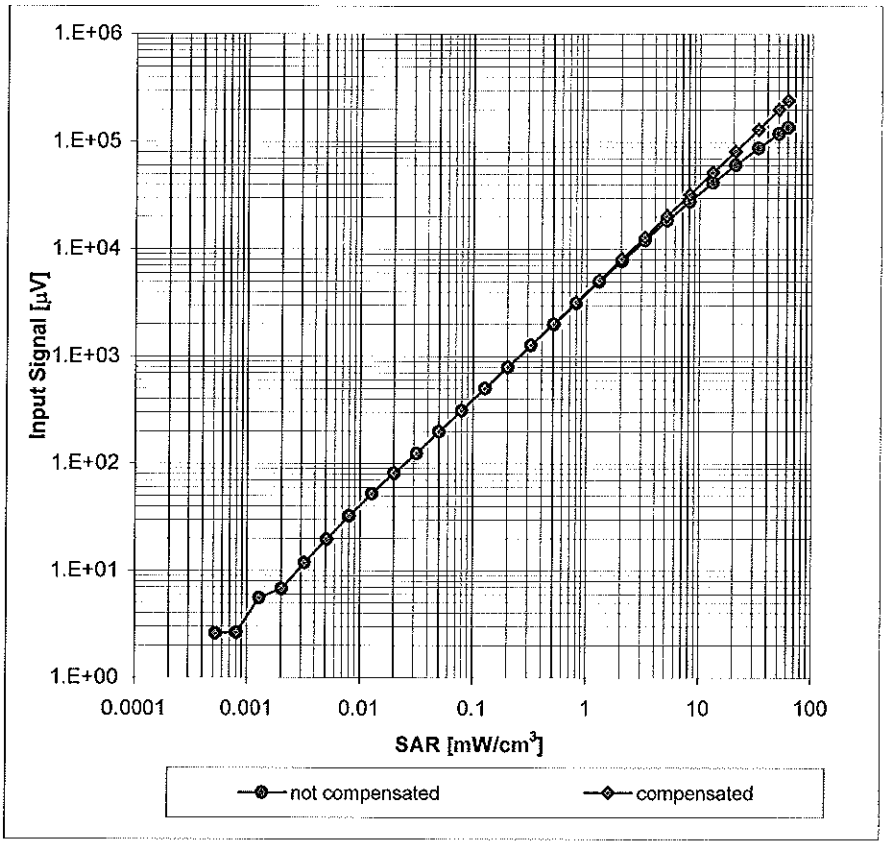


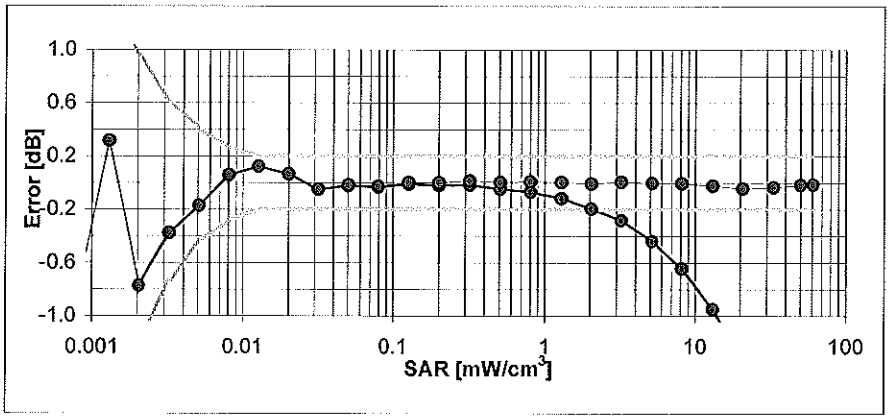


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

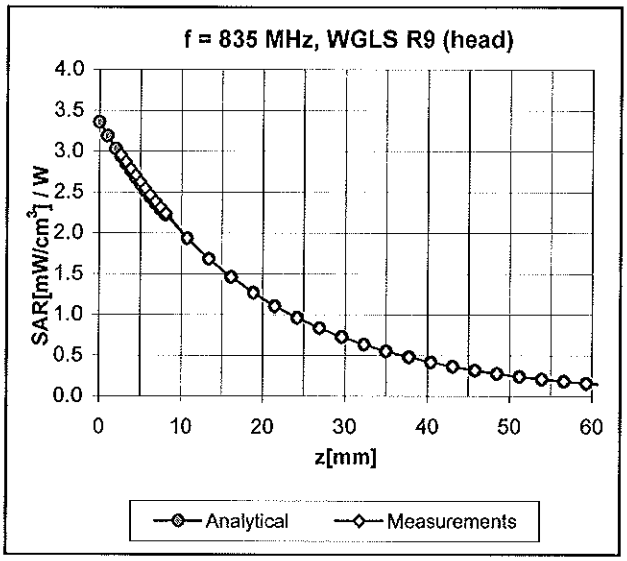
(Waveguide R22, f = 1800 MHz)

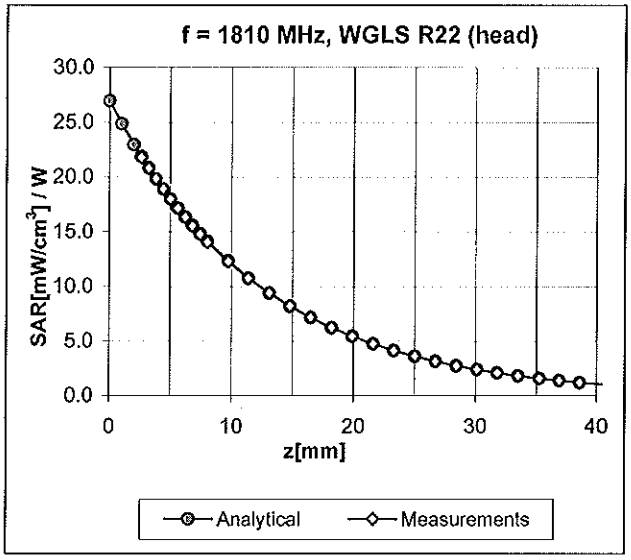




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

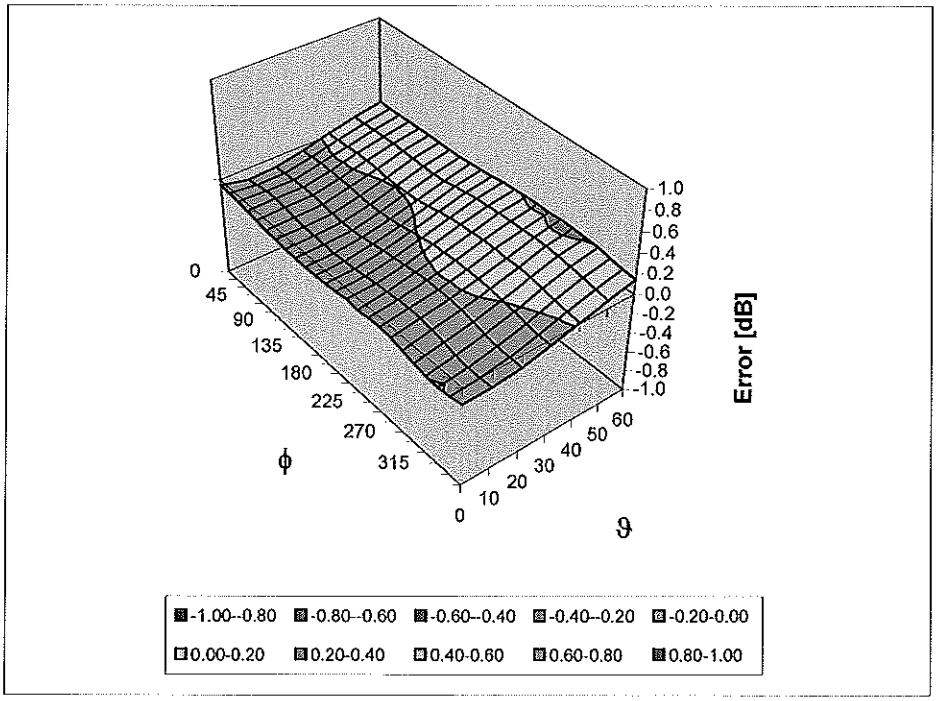
Conversion Factor Assessment





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

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Swiss Calibration Service

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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: 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

S Schweizerischer Kalibrierdienst
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S Swiss Calibration Service

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

Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe 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

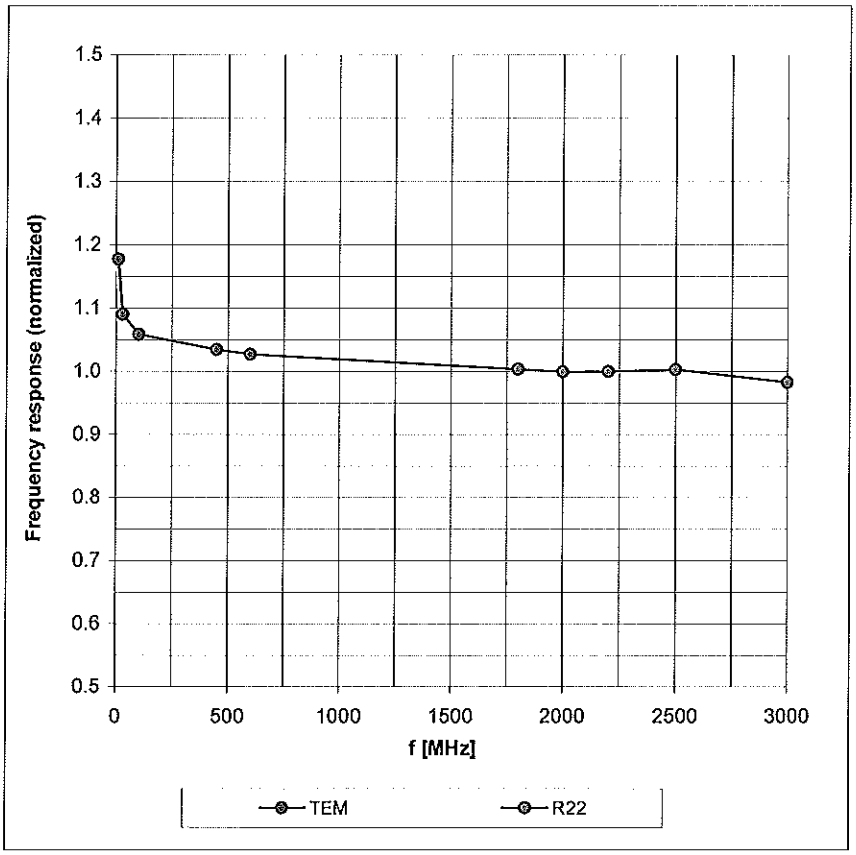
Calibration Parameter Determined in Body Tissue Simulating Media

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.

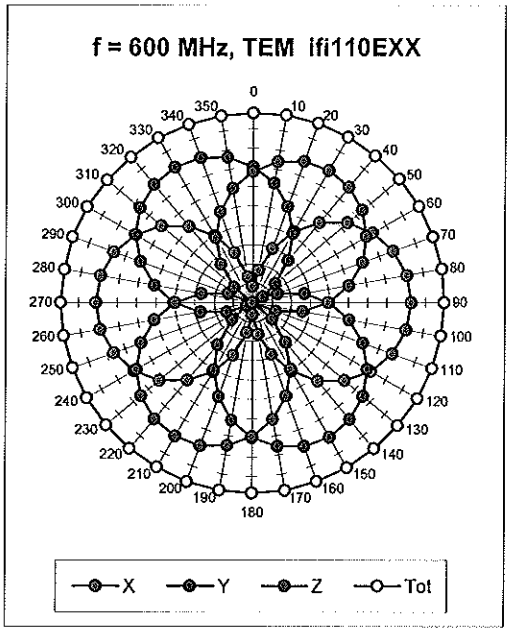
Frequency Response of E-Field

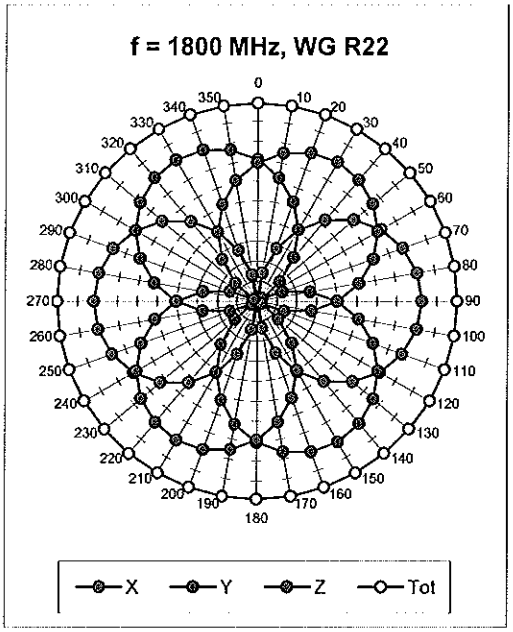
(TEM-Cell:ifi110 EXX, Waveguide: R22)

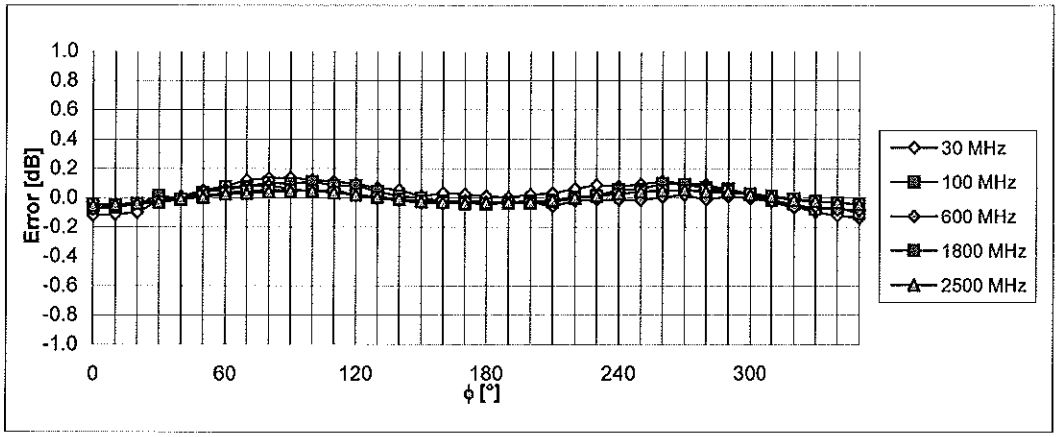


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



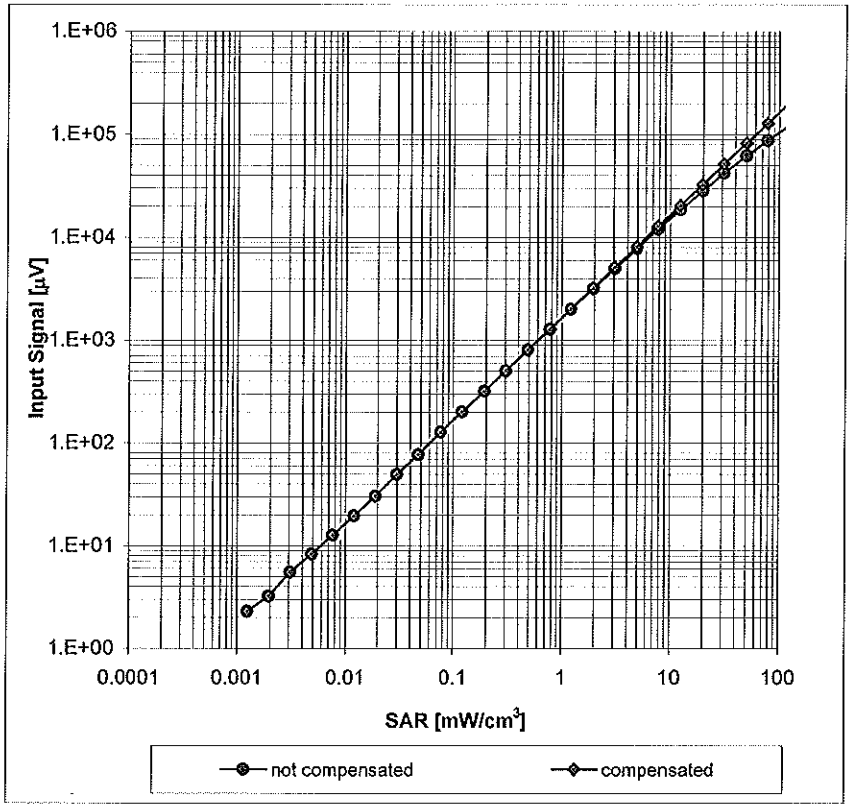


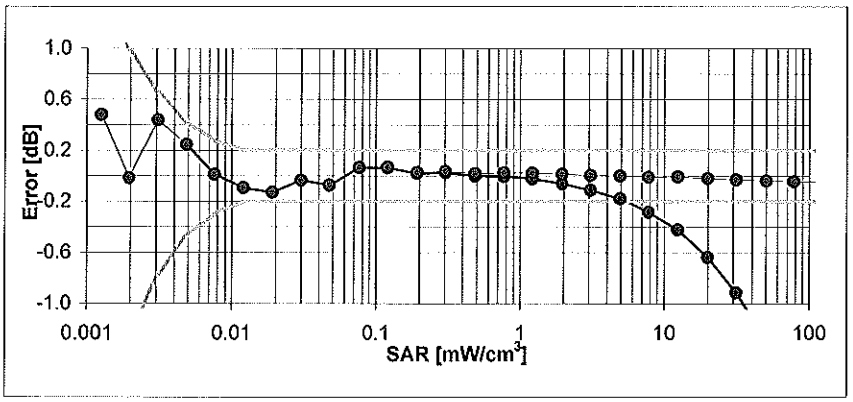


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

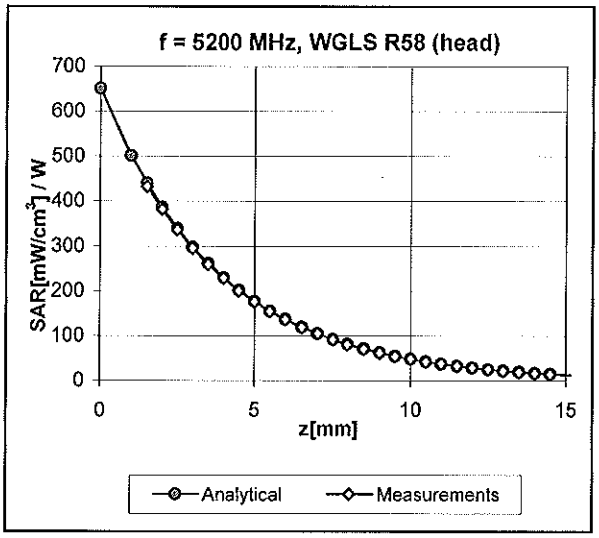
(Waveguide R22, f = 1800 MHz)

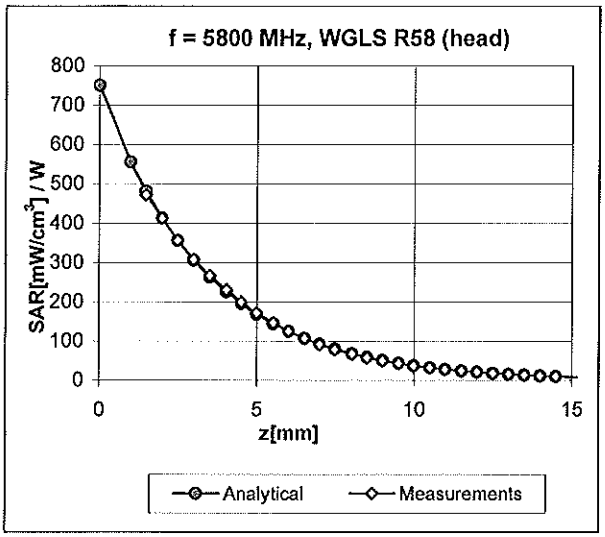




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

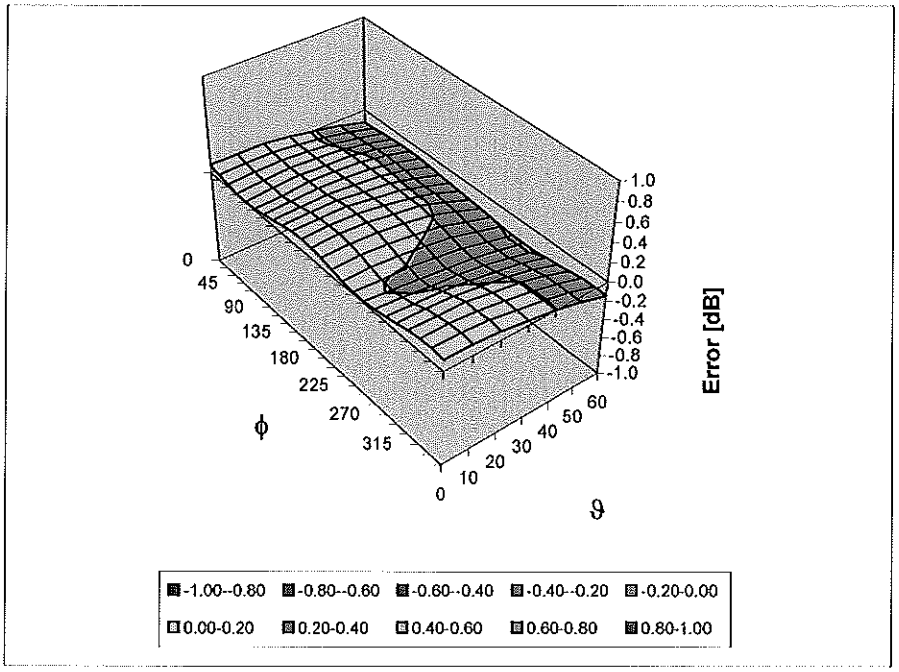
Conversion Factor Assessment





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

Appendix 6

Measurement Uncertainty Budget

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

Appendix 7

Dipole Characterization Certificate

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

S Schweizerischer Kalibrierdienst
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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: D835V2-424_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

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
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

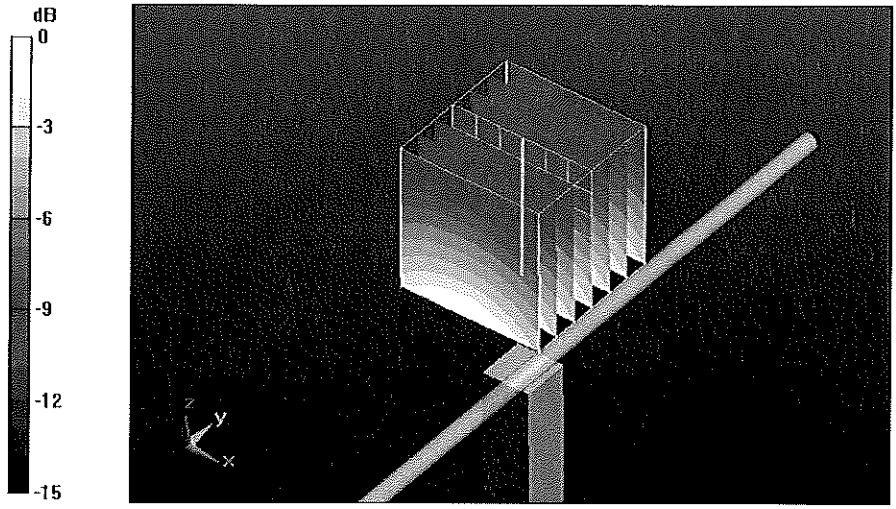
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:424

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:

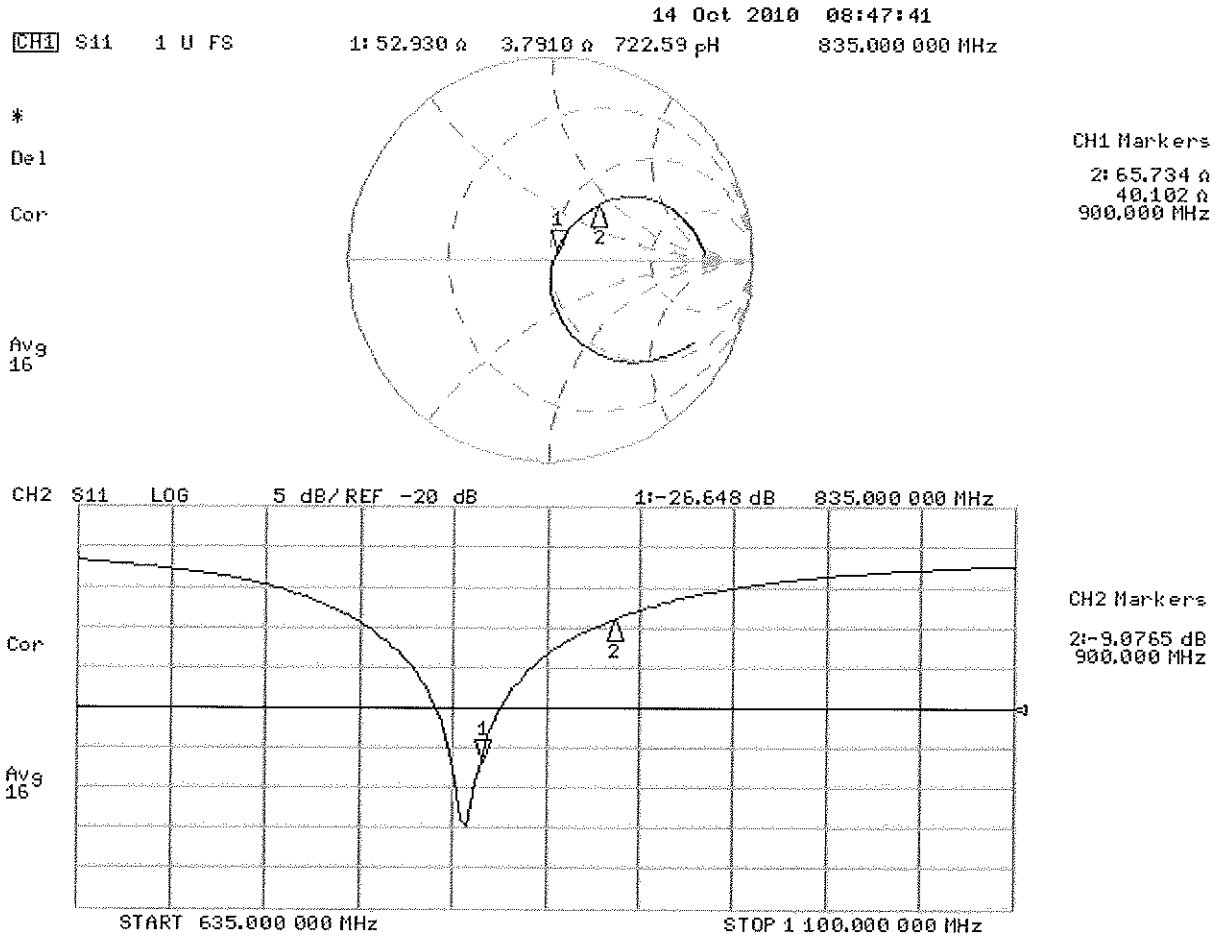
- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- 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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Accredited by the Swiss Accreditation Service (SAS)
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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)

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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

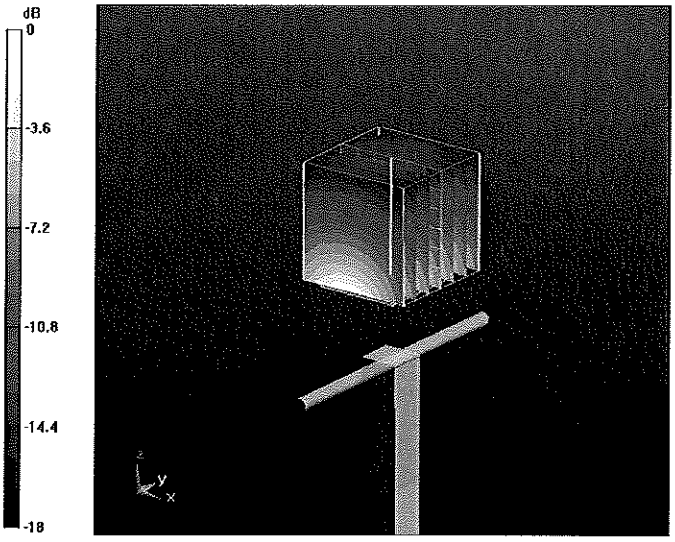
DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:263

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:

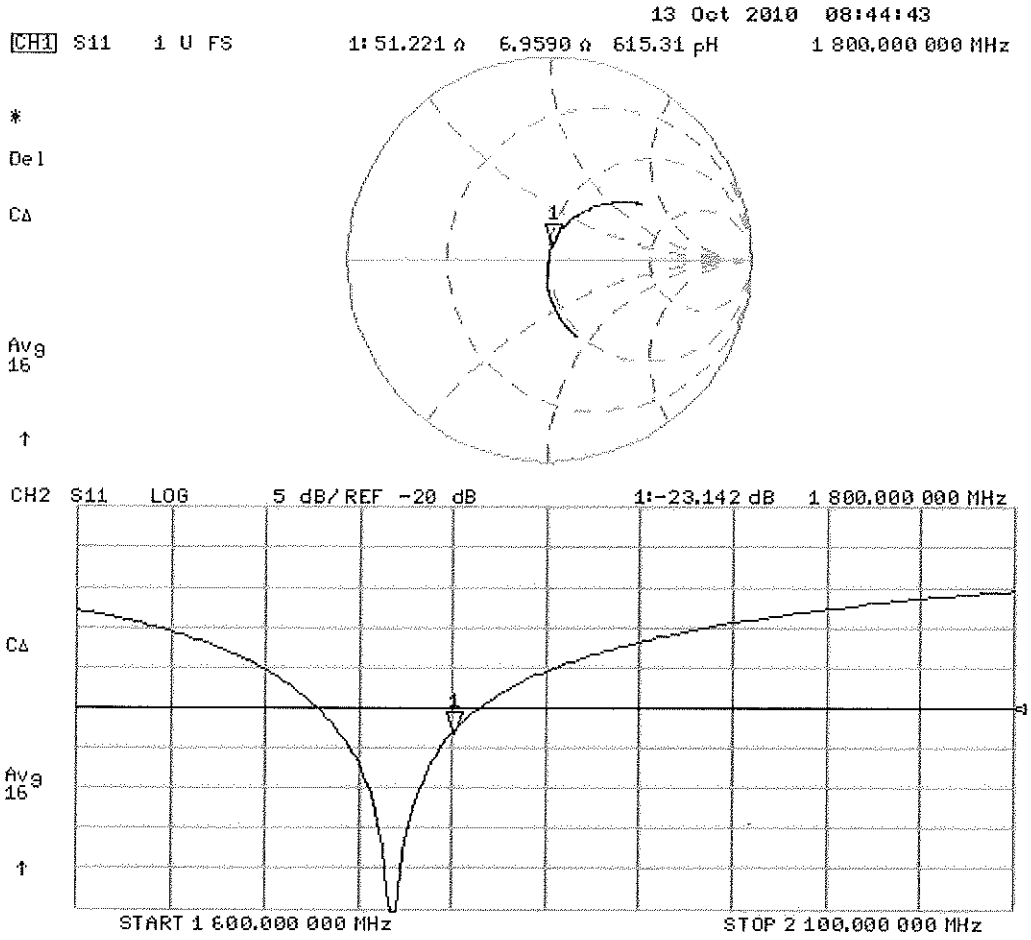
- Probe: ES3DV3 - SN3205; ConvF(5.05, 5.05, 5.05); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0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

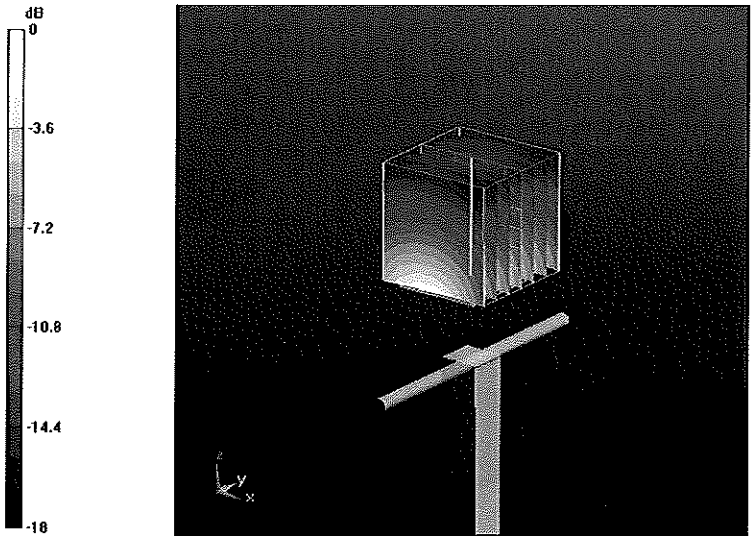
DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:279

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:

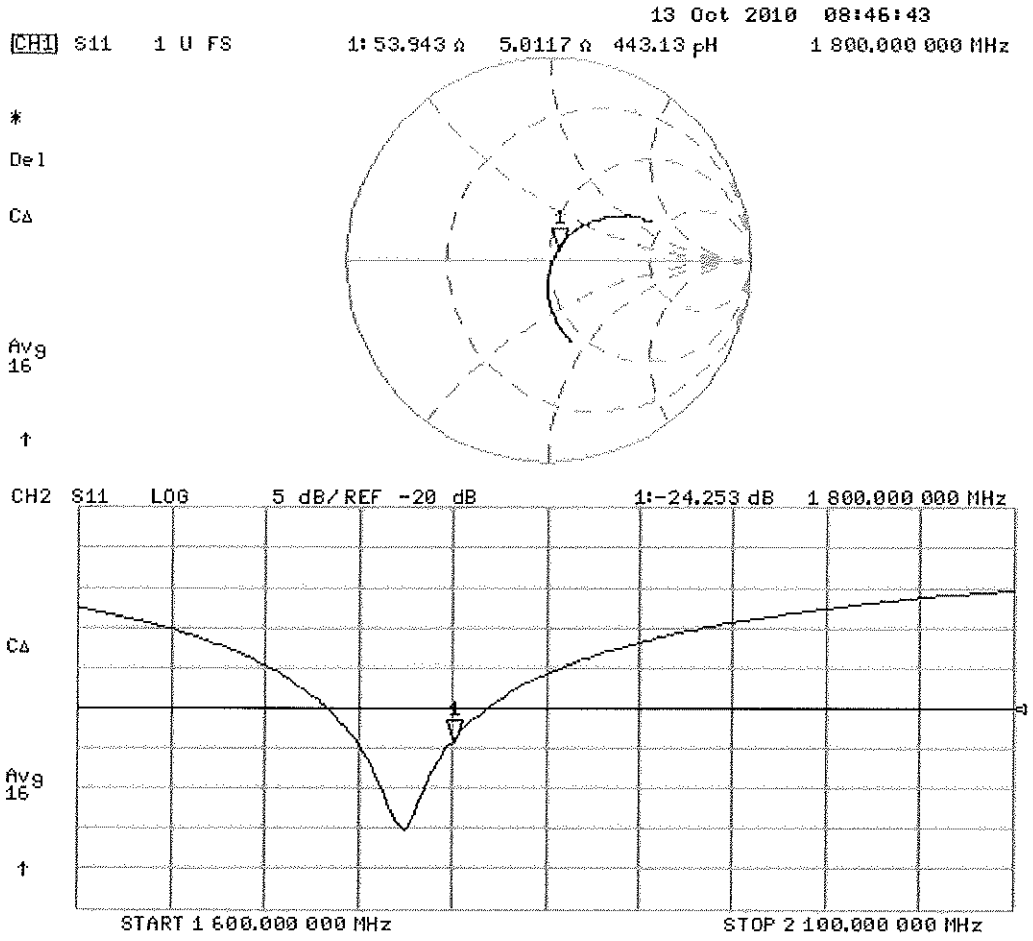
- Probe: ES3DV3 - SN3205; ConvF(5.05, 5.05, 5.05); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (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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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client Motorola MDb

Certificate No: D2450V2-766_Oct10

CALIBRATION CERTIFICATE

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

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

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

Issued: October 14, 2010

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

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

Head TSL parameters

The following parameters and calculations were applied.

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

SAR result with Head TSL

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

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

Appendix

Antenna Parameters with Head TSL

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

General Antenna Parameters and Design

Electrical Delay (one direction)	1.156 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 10, 2004

DASY5 Validation Report for Head TSL

Date/Time: 13.10.2010 14:19:04

Test Laboratory: SPEAG, Zurich, Switzerland

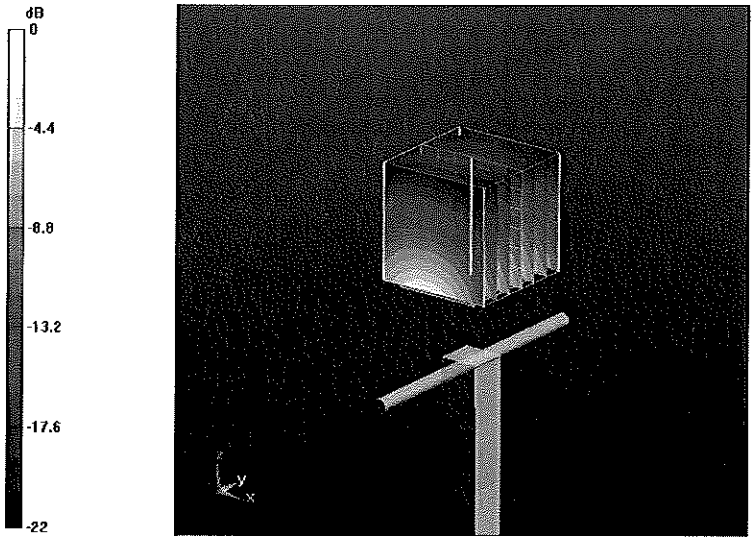
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:766

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

DASY5 Configuration:

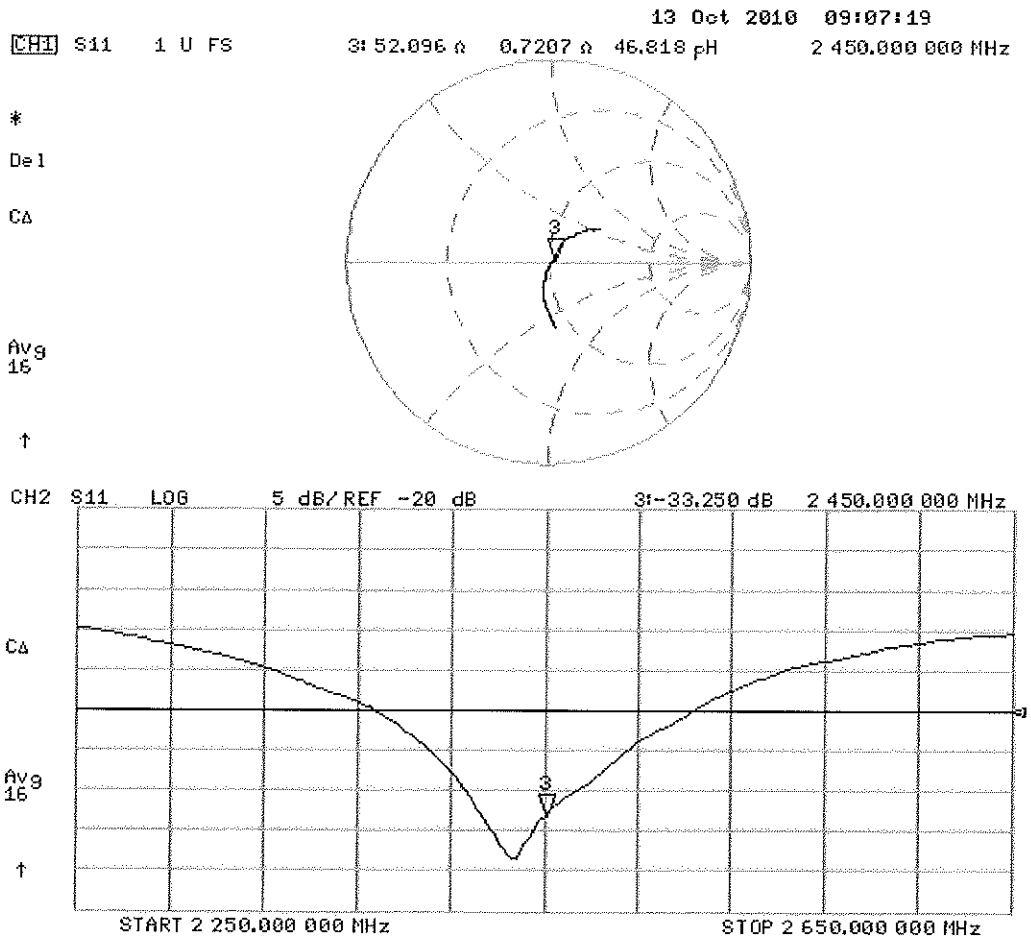
- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0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

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



0 dB = 16mW/g

Impedance Measurement Plot for Head TSL



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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: **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)

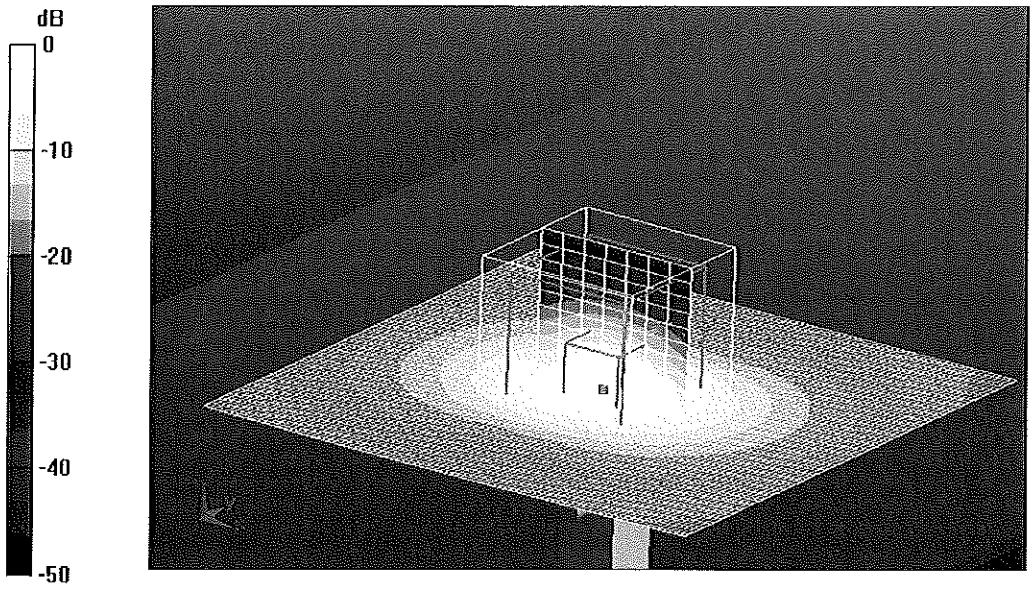
DASY5 Configuration:

- 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

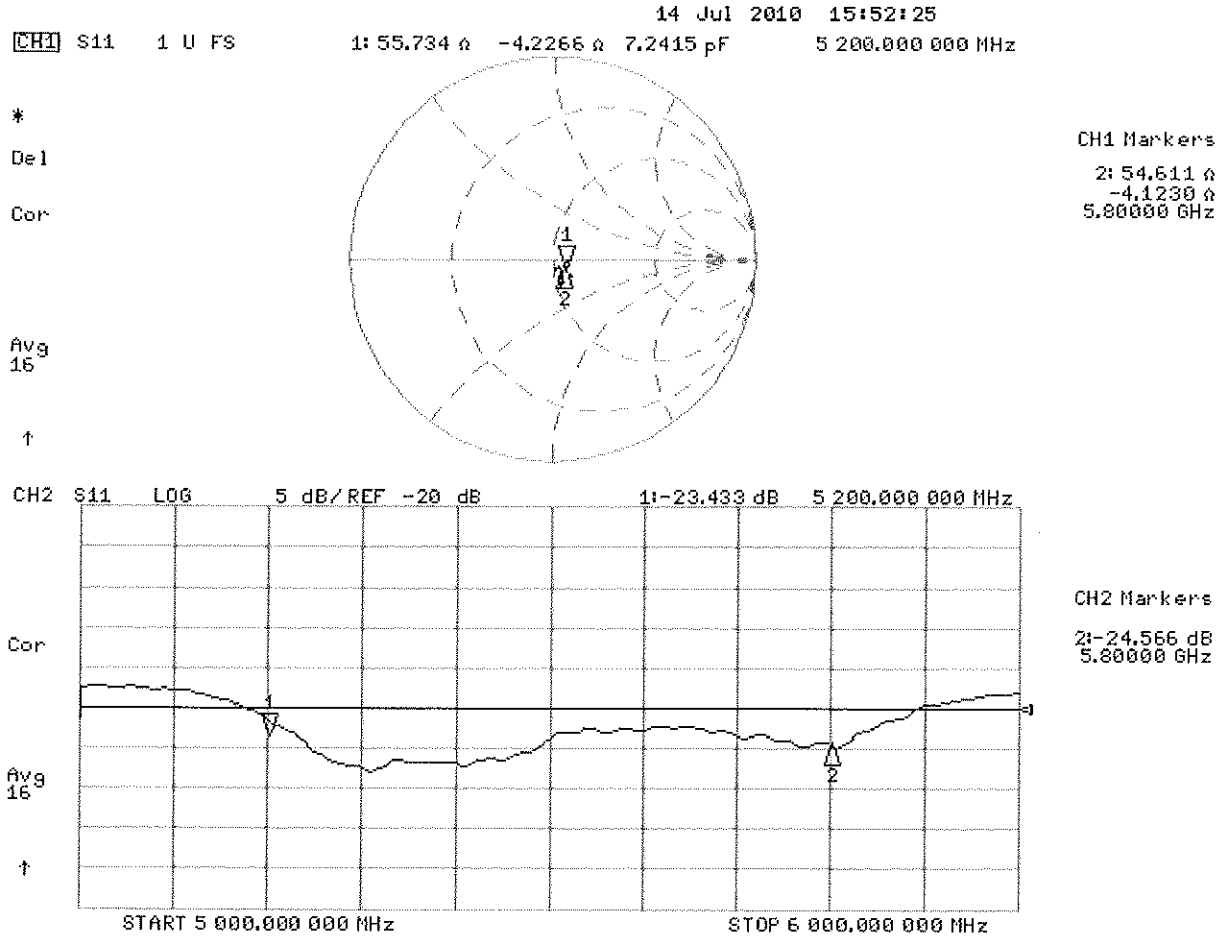
D5GHzV2 Dipole (Head)/d=10mm, Pin=100mW, f=5200 MHz/Zoom Scan (4x4x2.5mm), dist=2mm (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 65.6 V/m; Power Drift = 0.071 dB
Peak SAR (extrapolated) = 31.1 W/kg
SAR(1 g) = 8.23 mW/g; SAR(10 g) = 2.34 mW/g
Maximum value of SAR (measured)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