

**MOTOROLA**

Portable Hand-Held Device SAR Test Report

Tests Requested By: Motorola Mobility, Inc.
600 N. US Highway 45
Libertyville, IL 60048

Test Report #: 24668-1F Rev E
Date of Report: Dec 2, 2011
Date of Test: Aug 27, 2011 to Sep 6, 2011, Sep 21 2011, Sep 28 – 30, 2011, Oct, 7, 2011
FCC ID #: IHDP56MJ1
Generic Name: M0C44

Test Laboratory: Motorola Mobility, Inc. - ADR Test Services Laboratory
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This laboratory is accredited to ISO/IEC 17025-2005 to perform the following tests:

Accreditation:



2404

Tests:

Electromagnetic Specific Absorption Rate

Procedures:

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)

On the following products or types of products:

Wireless Communications Devices (Examples): Two Way Radios; Portable Phones (including Cellular, Licensed Non-Broadcast and PCS); Low Frequency Readers; and Pagers

Statement of Compliance:

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

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

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This test report shall not be reproduced except in full, without written approval of the laboratory. The results and statements contained herein relate only to the items tested. The names of individuals involved may be mentioned only in connection with the statements or results from this report. Motorola encourages all feedback, both positive and negative, on this test report.

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Revision History

Revision Version	Date	Notes
Rev. 0	Oct 17, 2011	Initial report release.
Rev. A	Oct 31, 2011	Correction to typo in GPRS Class 11 power measurements.
Rev. B	Nov 18, 2011	Removed 5GHz SAR data. Added separate report from external test lab for 5 GHz SAR data.
Rev. C	Nov 28, 2011	Modified tables in Section 6.1 to report reduced power for conducted power levels.
Rev. D	Nov 30, 2011	Correction of GSM 850 power typo in section 2.4
Rev. E	Dec 2, 2011	Included pictures for orientation and proximity sensor effective area to section 2.4

1. Introduction

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

For ANSI / IEEE C95.1 (1 g), the final stand-alone SAR readings for this device are given in the table below. These measurements were performed using a Dasy4™ v4.7 system manufactured by Schmid & Partner Engineering AG (SPEAG), of Zurich Switzerland.

Summary of Stand-Alone SAR Results	
Transmit Band	Body SAR (1g ^W /kg)
GPRS 850	1.41
WCDMA 850	1.16
GPRS 1900	0.71
WCDMA 1900	1.35
Wi-Fi 2.45 GHz	1.39

SAR test results for body-worn testing in the Wi-Fi 5200 MHz and 5800 MHz transmit bands are provided in report [IHDP56MJ1_5GWLAN_SAR_Report.pdf](#), included within the Exhibit 11 documents.

2. Description of the Device Under Test

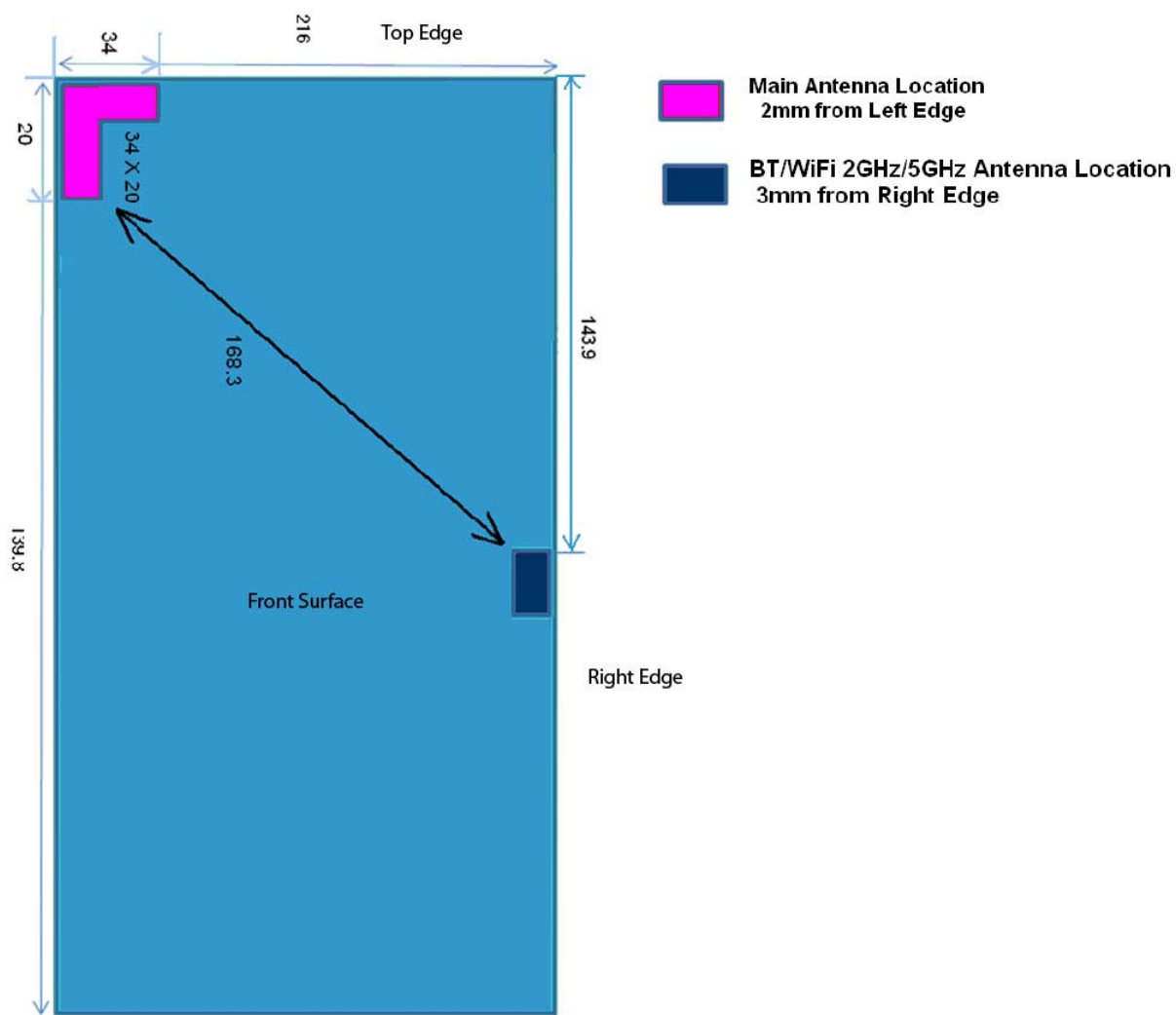
2.1 Antenna description

Main (GSM / WCDMA 850/1900 MHz) Antenna

Type	Internal	
Location	Top of Left Transceiver	
Dimensions	Width	34 mm
	Length	20 mm

Bluetooth/Wi-Fi 2.45 / 5 GHz Antenna

Type	Internal	
Location	Right Edge of Transceiver	
Dimensions	Width	3.67 mm
	Length	18.9 mm



2.2 Device Signaling¹

Serial Number(s) (Functional Use)	KFUD010138 (GPRS & WCDMA conducted power measurements and SAR testing) KFLC110069 (Wi-Fi SAR testing)
Production Unit or Identical Prototype (47 CFR §2.908)	Identical Prototype
Device Category	Portable / Mobile Station
RF Exposure Limits	General Population / Uncontrolled

Mode(s) of Operation	Modulation Mode(s)	Maximum Output Power Setting	Duty Cycle	Transmitting Frequency Range(s)
GSM 850	GMSK	33.5 dBm	1:8	824.2 - 848.8 MHz
WCDMA 850	QPSK	24.0 dBm	1:1	826.4 - 846.6 MHz
GSM 1900	GMSK	30.5 dBm	1:8	1850.2 - 1909.8 MHz
WCDMA 1900	QPSK	24.0 dBm	1:1	1852.4 - 1907.6 MHz
2.45 GHz Wi-Fi 802.11b/g/n	BPSK	15.5 dBm	1:1	2412 - 2462 MHz
5 GHz Wi-Fi 802.11a/n	BPSK	16.4 dBm	1:1	5180 - 5240 MHz, 5745 - 5805 MHz
Bluetooth	GFSK	7.71 dBm	1:1	2402.0 - 2483.5 MHz

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

Mode(s) of Operation	GPRS/EDGE 850				GPRS/EDGE 1900			
Modulation	GMSK				GMSK			
Maximum Output Power Setting (dBm)	33.5	31.5	29.5	27.5	30.5	30.0	28.0	26.0
Time Average Output Power Setting (dBm)	24.5	25.5	25.2	24.5	21.5	24.0	23.7	23.0
Duty Cycle	1:8	2:8	3:8	4:8	1:8	2:8	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				1850.2 - 1909.8 MHz			

Mode(s) of Operation	EDGE 850				EDGE 1900			
Modulation	8PSK				8PSK			
Maximum Output Power Setting (dBm)	27.5	26.5	24.5	22.5	26.5	25.5	23.5	21.5
Time Average Output Power Setting (dBm)	18.5	20.5	20.2	19.5	17.5	19.5	19.2	18.5
Duty Cycle	1:8	2:8	3:8	4:8	1:8	2:8	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				1850.2 - 1909.8 MHz			

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

2.3 Device Conducted Power Measurements

2.3.1 GSM/GPRS modes

Band	Channel	Conducted power (dBm) for GSM modes ²								
		GSM CS Voice (1 Slot)	GPRS PS Data (1 Slot)	GPRS PS Data (2 Slots) ³	GPRS PS Data (3 Slots)	GPRS PS Data (4 Slots)	EDGE PS Data (1 Slot)	EDGE PS Data (2 Slots)	EDGE PS Data (3 Slots)	EDGE PS Data (4 Slots)
GSM 850	128	N/A	33.43	31.42	29.32	27.40	25.57	26.29	24.57	22.43
	190	N/A	33.45	31.41	29.50	27.55	25.51	26.24	24.51	22.68
	251	N/A	33.38	31.49	29.43	27.56	25.42	26.08	24.30	22.48
GSM 1900	512	N/A	30.30	29.80	28.08	26.16	25.16	25.48	23.48	21.56
	661	N/A	30.70	30.13	28.07	26.09	25.29	25.54	23.51	21.61
	810	N/A	30.43	29.87	28.08	25.80	25.07	25.32	23.30	21.39

² CS Voice denotes circuit-switched transmission for voice calling, and PS Data denotes packet-switched transmission for data sessions.

³ **Bolded** entries indicate data mode configurations of highest time-average power output per band and data mode type, and thus were utilized for SAR testing in this report.

2.3.2 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	23.99	23.96	23.99	23.99	24.01	23.98	24.05	24.01	24.00	23.98	24.00
	4180	23.98	23.91	23.90	23.93	23.98	23.94	23.94	23.94	23.94	23.95	23.95
	4233	23.88	23.83	23.80	23.81	23.86	23.81	23.87	23.81	23.88	23.84	23.86
WCDMA 1900	9262	23.82	23.81	23.87	23.88	23.88	23.85	23.87	23.88	23.92	23.88	23.99
	9400	23.87	23.81	23.81	23.82	23.85	23.84	23.86	23.87	23.87	23.92	23.89
	9538	23.82	23.77	23.83	23.84	23.84	23.83	23.89	23.84	23.86	23.85	23.90

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	$0 \leq \text{CM} \leq 3.5$	MAX (CM-1, 0)
Note 1: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.		

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

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

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

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

2.3.3 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 tables below. SAR testing for 802.11 was performed within the 2.45 GHz transmit band with the transmitter set to the lowest data rate on the default test channels **highlighted in bold** in the tables below. The body positions that resulted in the highest SAR values were further tested on the additional channels within that sub-transmit band. Also the body positions that resulted in the highest SAR values were further tested with the higher data rates **highlighted in blue** in the tables below because of the conducted power difference. Due to the relatively large number of data rates with measured conducted power exceeding the lowest data rate conducted power by more than 0.25 dB, there will be a large number of tests performed on the configuration that results in the highest measured SAR for the lowest data rate.

Band	Channel	Conducted Power (Max AVG in dBm) for 802.11b Mode Data Rates			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
Wi-Fi 2450 MHz	1	12.36	12.50	13.55	13.43
	6	12.24	12.32	13.33	13.42
	11	13.20	13.38	14.30	14.40

Band	Channel	Conducted Power (Max AVG in 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	12.48	12.50	12.44	12.50	11.36	11.34	11.92	12.00
	6	12.80	12.78	12.82	12.80	11.92	11.87	12.63	12.49
	11	13.51	13.67	13.66	13.66	12.57	12.59	13.15	13.23

Band	Channel	Conducted Power (Max AVG in 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	15.06	14.87	14.93	14.42	14.54	12.9	12.79	11.46
	6	15.12	14.97	14.99	14.64	14.73	13.22	13.18	11.87
	11	15.45	15.36	15.43	15.07	15.13	13.74	13.54	12.10

Band	Channel	Conducted Power (Max AVG in 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	15.06	14.79	14.85	14.49	14.36	12.96	12.91	11.50
	6	15.12	14.96	15.19	14.69	14.75	13.28	13.27	11.92
	11	15.45	15.34	15.51	14.97	14.98	13.72	13.68	12.16

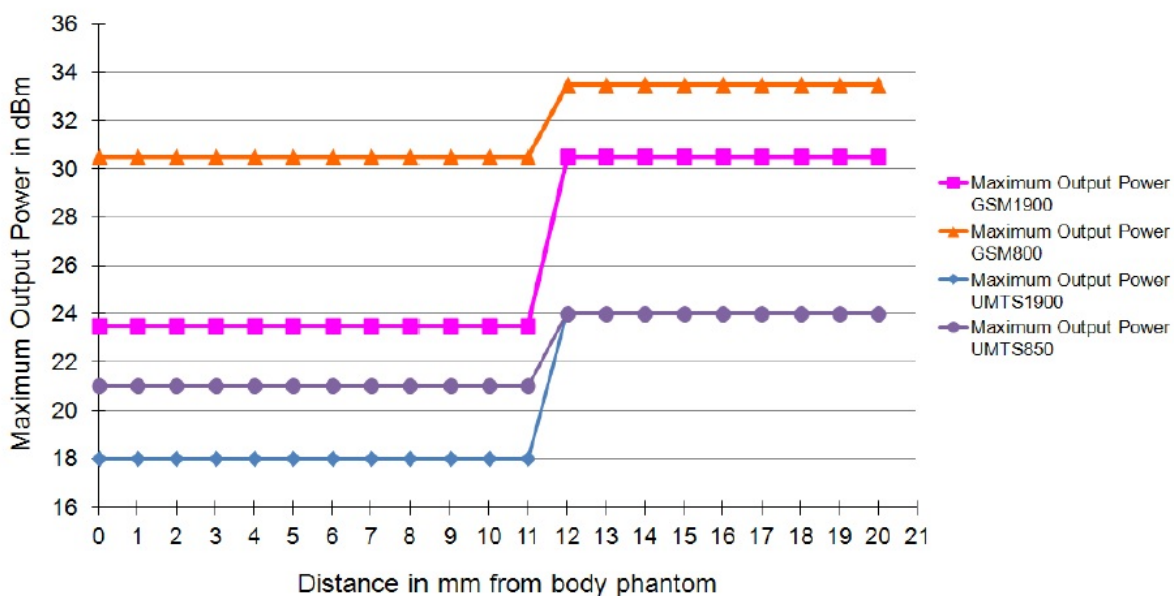
2.4 Power limit reduction schemes

The DUT utilizes a set of reduced limits for the maximum transmit power for specified device configurations and orientations, as described by the tables and plot below. A complete description of this functionality is provided in the “Operational Description” contained within Exhibit 12A. The implementation to trigger the reduction in power requires the device to be radiating, which prevents a conducted power measurement without modification to the unit.

	Proximity Sensor Power Reduction				Orientation Power Reduction			
Mode(s) of Operation	GPRS 850	WCDMA 850	GPRS 1900	WCDMA 1900	GPRS 850	WCDMA 850	GPRS 1900	WCDMA 1900
Duty Cycle	1:2	1:1	1:2	1:1	1:2	1:1	1:2	1:1
Maximum Output Power Setting (dBm)	33.5	24.0	30.0	24.0	33.5	24.0	30.0	24.0
Time Avg Output Power Setting (dBm)	27.5	24.0	24.0	24.0	27.5	24.0	24.0	24.0
Reduced Maximum Output Power Setting (dBm)	30.5	21.0	23.0	18.0	33.5	24.0	24.0	19.0
Time Avg Output Power Setting (dBm)	24.5	21.0	17.0	18.0	27.5	24.0	18.0	19.0

Proximity Sensor Activation

Maximum Output Power Vs. Distance from Body Phantom



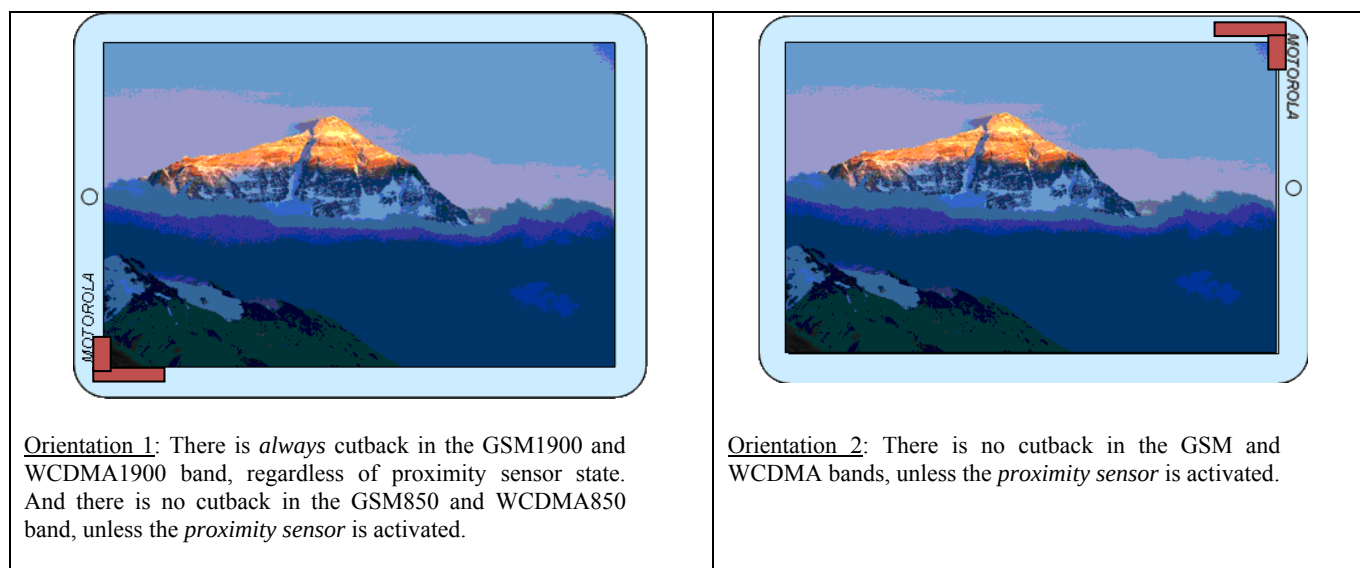


Figure 11.2.4-1: Landscape Usage Modes

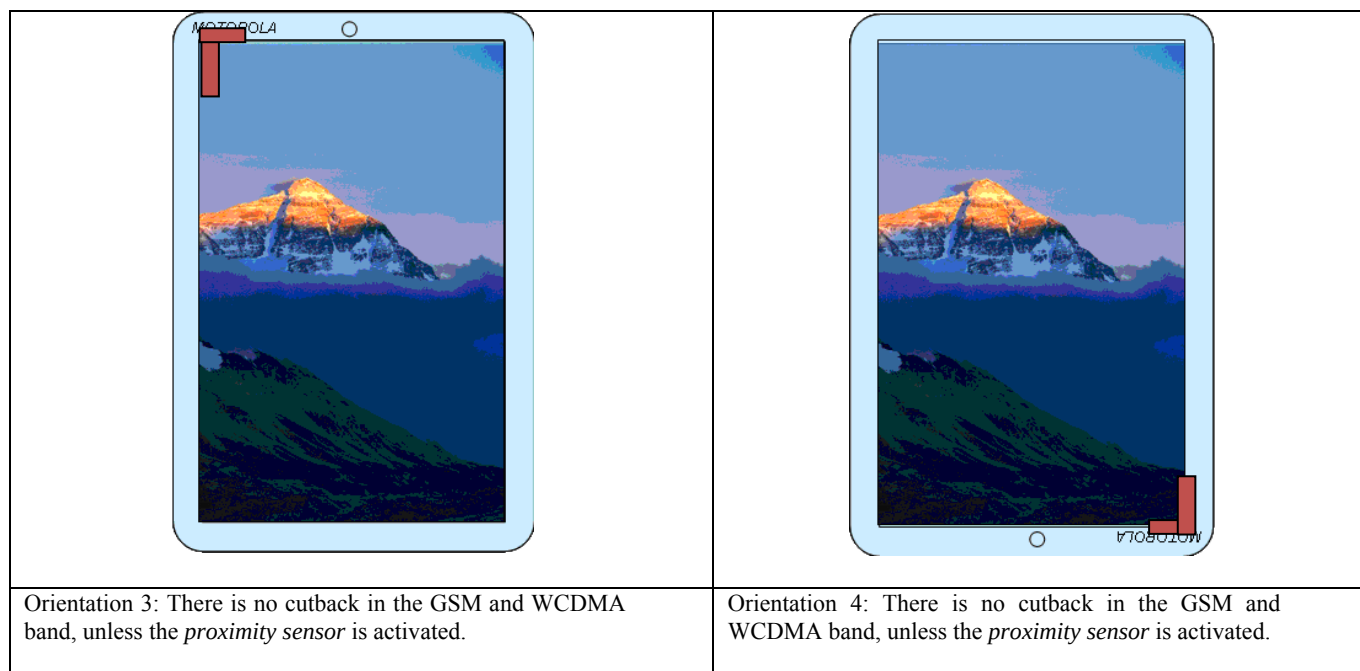


Figure 11.2.4-2: Portrait Usage Modes

Orientation/Mode Power Limit Activation	GPRS 850	WCDMA 850	GPRS 1900	WCDMA 1900
Orientation 1 (Left Edge toward body)	N/A	N/A	‡	‡
Orientation 2 (Right Edge toward body)	N/A	N/A	N/A	N/A
Orientation 3 (Bottom Edge toward body)	N/A	N/A	N/A	N/A
Orientation 4 (Top Edge toward body)	N/A	N/A	N/A	N/A
Back Surface toward the body	†	†	†	†

† Reduced maximum limit applied only by activation of proximity sensor.

‡ Reduced maximum limit applied by orientation of device.

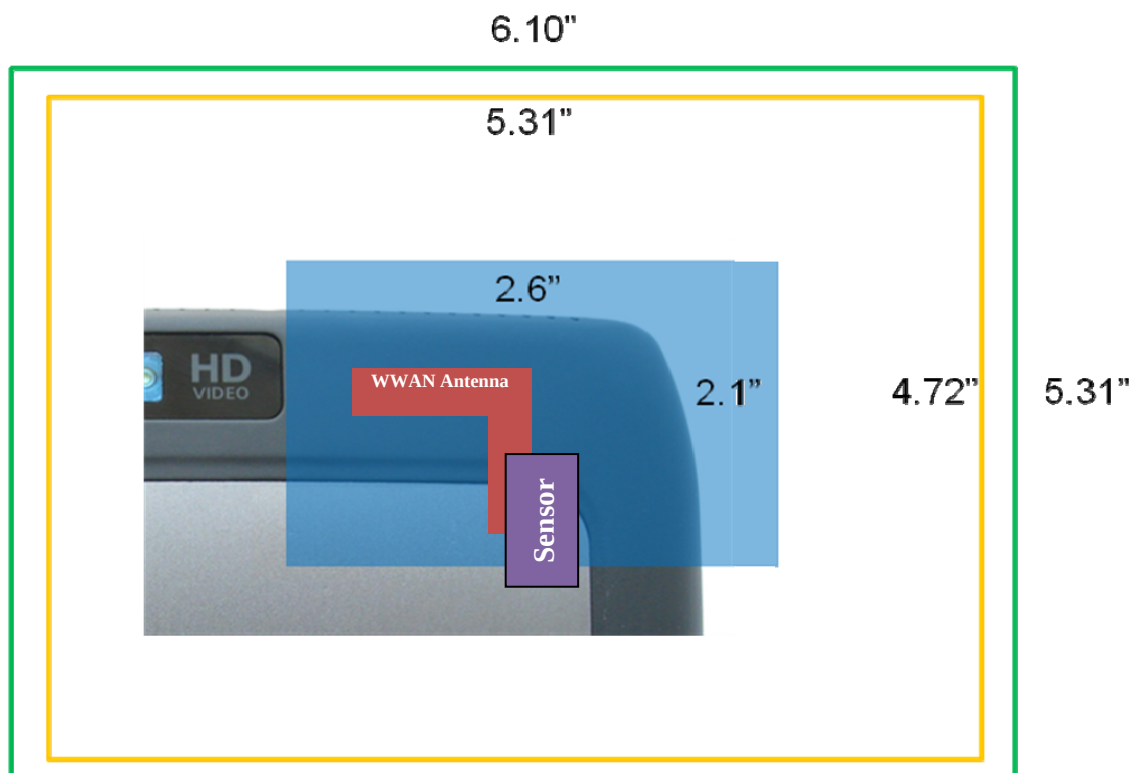


Figure 11.2.4-3: Proximity Detection areas (relative to transmitter antenna) at 12-mm threshold separation (orange square) and 1-mm separation (green square). Measurement was done using a 2.6" x 2.1" conductive surface (blue square).

3. Test Equipment Used

3.1 Dosimetric System

The Motorola Mobility ADR Test Services Laboratory utilizes a Dosimetric Assessment System (Dasy4™ v4.7) manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. All the SAR measurements are taken within a shielded enclosure. The overall 10 g RSS uncertainty of the measurement system is $\pm 10.8\%$ (K=1) with an expanded uncertainty of $\pm 21.6\%$ (K=2). The overall 1 g RSS uncertainty of the measurement system is $\pm 11.1\%$ (K=1) with an expanded uncertainty of $\pm 22.2\%$ (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	376	Aug-31-2011	Aug-31-2011
E-Field Probe ES3DV3	3124	Aug-23-2011	Aug-23-2012
DASY4™ DAE V1	434	Jan-13-2011	Jan-13-2012
E-Field Probe ES3DV3	3115	Jan-12-2011	Jan-12-2012
Dipole Validation Kit, DV835V2	422	Mar-18-2011	Mar-18-2013
Dipole Validation Kit, DV835V2	434	Mar-9-2011	Mar-9-2013
Dipole Validation Kit, DV1800V2	250	Mar-17-2011	Mar-17-2013
Dipole Validation Kit, DV1800V2	271	Mar-8-2011	Mar-8-2013
Dipole Validation Kit, DV2450V2	863	Mar-17-2011	Mar-17-2013
Dipole Validation Kit, DV2450V2	740	Mar-17-2011	Mar-17-2013

3.2 Additional Equipment

Description	Serial Number	Cal Date	Cal Due Date
Signal Generator HP8648C	3847A04982	Nov-18-2009	Nov-18-2011
Power Meter E4419B	GB39510900	Mar-28-2011	Mar-28-2013
Power Sensor #1 - E9301A	US39211007	Aug-16-2011	Aug-16-2012
Power Sensor #2 - E9301A	US39211008	Aug-16-2011	Aug-16-2012
Signal Generator HP8648C	3847A04632	Aug-13-2011	Aug-13-2013
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	3847A04843	Mar-28-2011	Mar-28-2013
Power Meter E4419B	GB39511084	Mar-28-2011	Mar-28-2013
Power Sensor #1 - E9301A	US39210929	Mar-31-2011	Mar-31-2012
Power Sensor #2 - E9301A	US39210930	Mar-31-2011	Mar-31-2012
Network Analyzer HP8753ES	US39171846	May-19-2011	May-19-2012
Dielectric Probe Kit HP85070C	US99360070		

4. Electrical parameters of the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity, ϵ_r , and the conductivity, σ , of the tissue simulating liquids were measured with a HP85070 Dielectric Probe Kit. These values, along with the temperature of the simulated tissue are shown in the table below. The recommended limits for permittivity and conductivity are also shown. A mass density of $\rho = 1 \text{ g/cm}^3$ 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 ϵ_r and higher than the target Sigma values to minimize SAR underestimations". The 1900 MHz simulated tissues listed below meet this criteria.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ϵ_r	σ (S/m)	Temp (°C)
835	Body	Measured, Aug-27-2011	54.1	0.98	20.0
		Measured, Aug-28-2011	54.3	0.97	20.1
		Measured, Sep-29-2011	55.8	0.99	19.9
		Recommended Limits	55.2 $\pm$ 5%	0.97 $\pm$ 5%	18-25
1880	Body	Measured, Aug-29-2011	50.8	1.59	19.6
		Measured, Aug-30-2011	50.9	1.58	19.8
		Measured, Sep-1-2011	51.3	1.58	19.9
		Measured, Sep-29-2011	50.9	1.59	20.1
		Measured, Sep-30-2011	50.7	1.58	20.0
		Recommended Limits	53.3 $\pm$ 5%	1.52 $\pm$ 5%	18-25
2450	Body	Measured, Sep-6-2011	52.1	1.90	19.7
		Measured, Oct-7-2011	51.1	1.92	19.9
		Recommended Limits	52.7 $\pm$ 5%	1.95 $\pm$ 5%	18-25

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

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

5. System Accuracy Verification

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

A SAR measurement was performed to verify the measured SAR was within $\pm 10\%$ from the target SAR indicated in Appendix 6. These frequencies are within $\pm 10\%$ 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 $15.0 \text{ cm} \pm 0.5 \text{ cm}$. For frequencies above 3 GHz, the simulated tissue depth was verified to be $10 \text{ cm} \pm 0.5 \text{ cm}$. 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, Aug-27-2011	9.55	54.1	0.98	20.1	20.2
	Measured, Aug-28-2011	9.50	54.3	0.97	20.8	19.3
	Recommended Limits	9.77	$55.2 \pm 5\%$	$0.97 \pm 5\%$	18-25	18-25
	Measured, Sep-29-2011	10.25	55.8	0.99	21.3	20.7
	Recommended Limits	10.00	$55.2 \pm 5\%$	$0.97 \pm 5\%$	18-25	18-25
1800	Measured, Aug-29-2011	37.3	51.1	1.49	20.6	20.1
	Measured, Aug-30-2011	37.0	51.2	1.48	21.1	20.0
	Measured, Sep-1-2011	36.65	51.6	1.48	20.8	20.0
	Recommended Limits	37.2	$53.3 \pm 5\%$	$1.52 \pm 5\%$	18-25	18-25
	Measured, Sep-30-2011	39.25	51.2	1.49	21.3	20.3
	Recommended Limits	37.9	$53.3 \pm 5\%$	$1.52 \pm 5\%$	18-25	18-25
2450	Measured, Sep-6-2011	55.0	52.1	1.90	21.1	19.8
	Recommended Limits	52.8	$52.7 \pm 10\%$	$1.95 \pm 5\%$	18-25	18-25
	Measured, Oct-7-2011	55.0	51.1	1.92	21.2	21.0
	Recommended Limits	51.3	$52.7 \pm 5\%$	$1.95 \pm 5\%$	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	3115	835	5.88	6 of 11
		1810	4.61	6 of 11
		2450	4.12	6 of 11
E-Field Probe ES3DV3	3124	835	6.04	6 of 11
		1810	4.69	6 of 11
		2450	4.21	6 of 11

6. Test Results

For GPRS 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 portable hand-held device was tested in the configurations stipulated in [1], [4] and [5]. The portable hand-held device 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 Appendices 2 through 4. Please refer to the DASY4™ manual for additional information on SAR scanning procedures and algorithms used.

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

6.1 Body Test Results

The SAR results shown in tables 1 through 5 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, the measured conducted output power levels, power reduction amount (when applicable), the measured SAR corrected for probe calibration (when applicable), and the extrapolated SAR. The exact method of extrapolation is:

$$\text{Extrapolated SAR} = (\text{Measured or Corrected SAR}) * 10^{(-\text{drift}/10)}$$

The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

The requisite test positions for the DUT were chosen per the guidance provided in FCC KDB 447498 D01. The DUT was tested with the back surface of the device facing the phantom with no separation for all transmitters requiring test. Additionally, the DUT was tested with the back surface of the device at an appropriate separation from the phantom to capture compliance at the worst-case proximity sensor trigger point (i.e. the closest the DUT might come to a user without utilizing a set of reduced maximum power limits). The DUT was also tested along the edges of the device in which an antenna is located within 5 cm of that edge. Pictorial representation of the antenna locations and separation distances are given in section 1 above. Additionally, the software within the DUT was set to invert the orientation results from the DUT's sensor. E.g., the DUT "top edge" facing up (away from the body) was operating instead at the "top edge" facing down (toward the body) performance levels. This inversion of the orientation ensures proper exposure conditions were measured for SAR testing of an edge using the standard DASY4 measurement setup.

Table 5 presents SAR measurement results at a minimum separation distance in which the proximity sensor may deactivate the power reduction.

The test conditions that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 2. All other test conditions measured lower SAR values than those included in Appendix 2.

A SPEAG™ MFP V5.1 C Triple Modular Phantom was used for the body-worn tests. The triple modular phantom consists of three identical modules that can be installed and removed separately without emptying the liquid. Each module of the triple phantom is constructed of glass-fiber reinforced vinylester (VG-GF) with a thickness at the bottom of 2.0 mm. It measures 29.2 cm(long) by 17.8 cm(wide) by 17.8 cm(tall). Alternately, a “flat” phantom was used for the body-worn tests. This “flat” phantom is made out of 1” thick natural High Density Polyethylene with a thickness at the bottom of 2.0 mm. It measures 52.7 cm(long) by 26.7 cm(wide) by 21.2 cm(tall). The simulated

tissue depth was verified to be 15.0 cm $\pm$ 0.5 cm for frequencies less than 3 GHz, or 10.0 cm $\pm$ 0.5 cm for frequencies greater than 3 GHz. The same device holder described in section 6 was used for positioning the DUT.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3115	835	5.88	6 of 11
		1810	4.61	6 of 11
		2450	4.12	6 of 11
E-Field Probe ES3DV3	3124	835	6.04	6 of 11
		1810	4.69	6 of 11
		2450	4.21	6 of 11

Body, Top Edge of DUT 0 mm from Phantom															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg) ^d	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
850	GPRS 850, Class 10	Internal	128												
			190	19.7	-0.0377	31.41		0.39		0.39	0.711		0.72	5x5x7	43
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	20.0	0.0231	23.98		0.301		0.30	0.542		0.54	5x5x7	44
1880	GPRS 1900, Class 10		4233												
			512												
			661	19.0	0.271	30.13		0.0343		0.03	0.0633		0.06	5x5x7	45
	WCDMA 1900, 12.2 kbps RMC		810												
			9262												
			9400	20.0	0.00938	23.87		0.332		0.33	0.611		0.61	5x5x7	46
			9538												

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

Body, Back Surface of DUT 0 mm from Phantom															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
850	GPRS 850, Class 10	Internal	128	19.5	-0.0737	28.42	3.0	0.769		0.78	1.30		1.32		
			190	19.5	0.225	29.41	3.0	0.795		0.80	1.31		1.31		
			251	19.5	-0.0568	28.49	3.0	0.804		0.81	1.39		1.41	5x5x7	47
	WCDMA 850, 12.2 kbps RMC		4132	19.9	-0.0707	20.99	3.0	0.621		0.63	1.06		1.08		
			4180	20.0	-0.0845	20.98	3.0	0.665		0.68	1.14		1.16	5x5x7	48
1880	GPRS 1900, Class 10		4233	20.0	0.0063	20.88	3.0	0.662		0.66	1.14		1.14		
			512												
			661	20.2	-0.0882	23.13	7.0	0.367		0.37	0.696		0.71	5x5x7	49
	WCDMA 1900, 12.2 kbps RMC		810												
			9262	20.0	0.0253	17.82	6.0	0.697		0.70	1.35		1.35	5x5x7	50
			9400	20.1	-0.0846	17.87	6.0	0.684		0.70	1.31		1.34		
			9538	20.1	-0.0032	17.82	6.0	0.699		0.70	1.33		1.33		

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

Body, Back Surface of DUT 0 mm from Phantom (continued)															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
2450	802.11b, 1 Mbps	Internal	1	20.5	0.0143	12.36		0.348		0.35	0.82		0.82		
			6	20.5	0.024	12.24		0.379		0.38	0.895		0.90		
			11	20.5	-0.107	13.20		0.471		0.48	1.13		1.16		
	802.11b, 5.5 Mbps		1	20.5	0.0253	13.55		0.385		0.39	0.92		0.92		
			6	19.8	0.0795	13.33		0.435		0.44	1.05		1.05		
			11	19.9	-0.154	14.30		0.486		0.50	1.18		1.22		
	802.11b, 11 Mbps		1	20.0	0.0262	13.43		0.344		0.34	0.812		0.81		
			6	20.0	0.0211	13.42		0.385		0.39	0.923		0.92		
			11	20.0	0.0356	14.40		0.448		0.45	1.07		1.07		
	802.11g, 6 Mbps		6	20.5	-0.184	12.80		0.344		0.36	0.809		0.84		
			11	20.6	0.0373	13.51		0.459		0.46	1.13		1.13		
	802.11g, 9 Mbps		6	20.0	-0.039	12.78		0.509		0.51	1.38		1.39	5x5x7	51
			11	20.0	-0.0428	13.67		0.496		0.50	1.21		1.22		
	802.11g, 12 Mbps		6	20.0	0.0832	12.82		0.379		0.38	0.904		0.90		
			11	20.5	0.122	13.66		0.427		0.43	1.03		1.03		
	802.11g, 18 Mbps		6	20.2	0.003	12.80		0.367		0.37	0.881		0.88		
			11	20.2	-0.0668	13.66		0.46		0.47	1.12		1.14		
	802.11g, 48 Mbps		6	20.0	-0.0183	12.63		0.299		0.30	0.717		0.72		
			1	20.5	-0.0052	15.06		0.345		0.35	0.821		0.82		
	802.11n, 7.2 Mbps		6	20.5	0.0937	15.12		0.386		0.39	0.927		0.93		
			11	20.2	0.0156	15.45		0.435		0.44	1.04		1.04		
			1	19.9	0.0393	14.87		0.333		0.33	0.808		0.81		
	802.11n, 14.4 Mbps		6	20.0	0.0218	14.97		0.404		0.40	0.995		1.00		
			11	20.0	0.0548	15.36		0.425		0.43	1.04		1.04		
			1	19.7	0.107	14.93		0.314		0.31	0.75		0.75		
	802.11n, 21.7 Mbps		6	19.7	0.0696	14.99		0.345		0.35	0.83		0.83		
			11	19.7	0.194	15.43		0.432		0.43	1.06		1.06		
			1	19.7	-0.0152	14.42		0.252		0.25	0.606		0.61		
	802.11n, 28.9 Mbps		6	19.7	0.106	14.64		0.277		0.28	0.674		0.67		
			11	19.7	0.017	15.07		0.291		0.29	0.706		0.71		
			1	19.7	0.0012	14.54		0.218		0.22	0.52		0.52		
	802.11n, 43.3 Mbps		6	20.2	-0.0416	14.73		0.272		0.27	0.653		0.66		
			11	20.2	-0.118	15.13		0.322		0.33	0.779		0.80		
			1	20.2	0.0316	12.90		0.374		0.37	0.901		0.90		
	802.11n, 57.8 Mbps		6	20.0	0.0346	13.22		0.271		0.27	0.65		0.65		
			11	20.2	0.0208	13.74		0.522		0.52	1.29		1.29		
			1	20.5	0.0112	12.79		0.373		0.37	0.901		0.90		
	802.11n, 65 Mbps		6	20.2	-0.0786	13.18		0.275		0.28	0.657		0.67		
			11	20.1	-0.0601	13.54		0.289		0.29	0.705		0.71		
			1	20.5	0.0067	15.06		0.35		0.35	0.835		0.84		
	802.11n, 6.5 Mbps		6	20.5	0.0449	15.12		0.387		0.39	0.932		0.93		
			11	20.5	0.0526	15.45		0.379		0.38	0.901		0.90		
			1	20.2	0.0296	14.79		0.33		0.33	0.792		0.79		
	802.11n, 13 Mbps		6	20.0	-0.0445	14.96		0.357		0.36	0.855		0.86		
			11	20.2	-0.063	15.34		0.446		0.45	1.08		1.10		
			1	20.2	0.0135	14.85		0.331		0.33	0.803		0.80		
	802.11n, 19.5 Mbps		6	20.0	0.199	15.19		0.385		0.39	0.93		0.93		
			11	20.2	0.0699	15.51		0.408		0.41	0.993		0.99		

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

Body, Back Surface of DUT 0 mm from Phantom (continued)															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
2450	802.11n, 26 Mbps	Internal	1	20.2	0.0503	14.49		0.251		0.25	0.606		0.61		
			6	20.0	0.0172	14.69		0.381		0.38	0.927		0.93		
			11	20.5	0.0606	14.97		0.341		0.34	0.833		0.83		
	802.11n, 39 Mbps		1	20.0	0.11	14.36		0.197		0.20	0.467		0.47		
			6	20.8	0.11	14.75		0.227		0.23	0.669		0.67		
			11	20.0	-0.0661	14.98		0.217		0.22	0.511		0.52		
	802.11n, 39 Mbps		1	20.5	-0.0965	12.96		0.269		0.28	0.653		0.67		
			6	20.0	0.0124	13.28		0.276		0.28	0.664		0.67		
			11	20.0	0.02	13.72		0.375		0.38	0.921		0.92		
	802.11n, 39 Mbps		1	20.0	-0.0568	12.91		0.239		0.24	0.573		0.58		
			6	20.0	0.155	13.27		0.319		0.32	0.787		0.79		
			11	20.0	-0.031	13.68		0.285		0.29	0.688		0.69		

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

Body, Left Edge of DUT 0 mm from Phantom															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
850	GPRS 850, Class 10	Internal	128												
			190	19.5	-0.163	31.41		0.23		0.24	0.389		0.40	5x5x7	52
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	20.2	0.055	23.98		0.225		0.23	0.376		0.38	5x5x7	53
1880	GPRS 1900, Class 10		4233												
			512												
			661	20.0	-0.186	24.13	6.0	0.174		0.19	0.334		0.36	5x5x7	54
	WCDMA 1900, 12.2 kbps RMC		810												
			9262	20.0	-0.0954	18.82	5.0	0.510		0.52	0.967		0.99		
			9400	20.1	0.0216	18.87	5.0	0.565		0.57	1.09		1.09		
			9538	20.0	0.0039	18.82	5.0	0.584		0.58	1.12		1.12	5x5x7	55

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

Body, Right Edge of DUT 0 mm from Phantom															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
2450	802.11b, 1 Mbps	Internal	1												
			6												
			11	19.6	0.0578	13.20		0.131		0.13	0.31		0.31	5x5x7	56

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

Table 5 presents SAR measurement results at a minimum separation distance in which the proximity sensor may deactivate the power reduction.

Body, Back Surface of DUT 11 mm from Phantom															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
850	GPRS 850, Class 10	Internal	128												
			190												
			251	20.7	-0.14	31.49	0.0	0.421		0.43	0.629		0.65	5x5x7	57
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	20.7	0.11	23.98	0.0	0.308		0.31	0.463		0.46	5x5x7	58
			4233												
1880	GPRS 1900, Class 10		512												
			661	20.3	-0.058	30.13	0.0	0.59		0.60	1.00		1.01	5x5x7	59
			810												
	WCDMA 1900, 12.2 kbps RMC		9262	20.0	-0.061	23.82	0.0	0.464		0.47	0.815		0.83	5x5x7	60
			9400												
			9538												

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

6.2 Evaluation of Simultaneous Transmitters

The necessity of stand-alone and simultaneous SAR testing was evaluated for the licensed and unlicensed transmitters of the device per FCC KDB 447498 D01, which refers to "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas" (FCC KDB 648474).

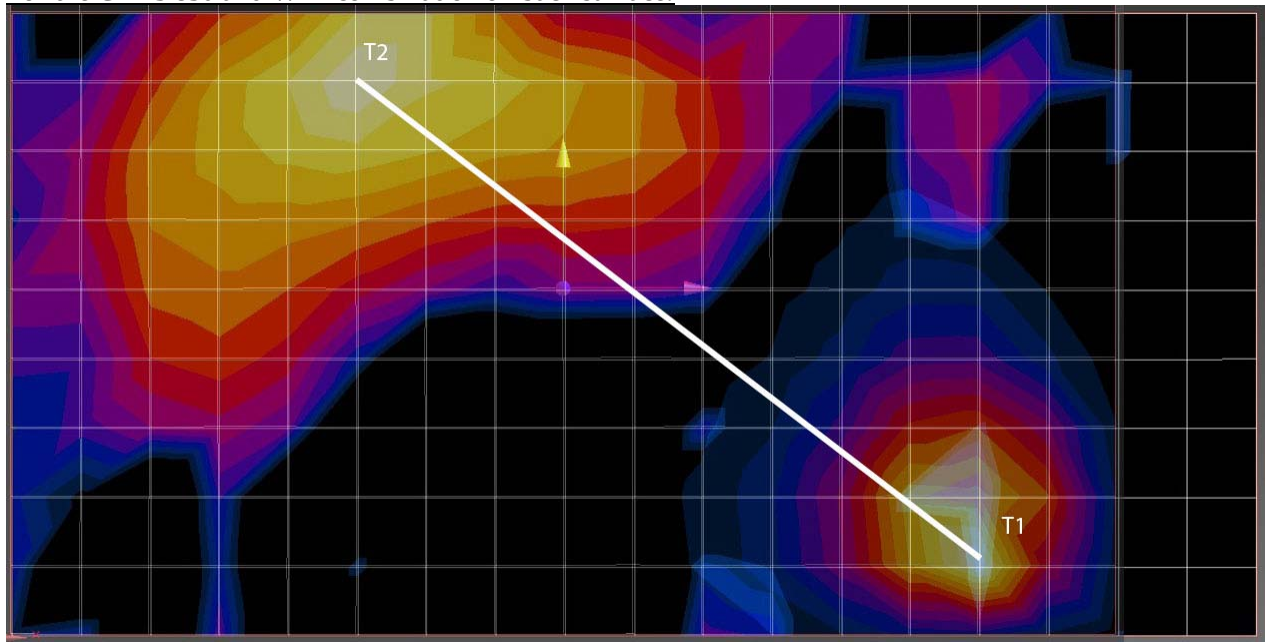
By device design the CDMA /LTE transmitter may operate simultaneously with either the Wi-Fi 802.11 transmitter (as a mobile hotspot) or the Bluetooth transmitter. Only the 2.4 GHz Wi-Fi mode is available for clients when operating in the Mobile Hotspot mode, the 5 GHz is not enabled via firmware.

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

1. The highest output conducted power measured for Bluetooth on the device under test is 5.97 mW [≤ 12 mW]
2. The separation distance between the Bluetooth antenna and the main antenna is 17.8 cm [≥ 2.5 cm]

For the transmitters requiring stand-alone SAR testing (CDMA/LTE and Wi-Fi 802.11), the KDB guidelines direct that if the sum of the 1 g SAR measured for the simultaneously transmitting antennas is less than the SAR limit, SAR measurements for simultaneous transmission is not required. Further, if the SAR-to-peak-location separation ratio for two simultaneously transmitting antennas is less than 0.3 then SAR measurement for simultaneous transmission is likewise not required. Evaluations of the worst-case body simultaneous SAR summations and separation ratios are presented in the table below.

Evaluations for Simultaneous SAR								
Cellular Transmitter Mode	Wi-Fi Transmitter Mode	Configuration	Cellular Transmitter 1 g SAR Value (W/kg)	Wi-Fi Transmitter 1 g SAR Value (W/kg)	Summation 1 g SAR Value (W/kg)	SAR-to-peak-location Separation Ratio	Plot Page	Simultaneous Measurements Required?
GPRS 850, Class 10	Wi-Fi 2450 802.11n, 28.9 Mbps	Back Surface of DUT 0 mm from Phantom	1.41	1.39	>1.60	0.15	18	No
WCDMA 850, 12.2 kbps RMC			1.16	1.39	>1.60	0.14	18	No
GPRS 1900, Class 10			0.71	1.39	>1.60	0.12	19	No
WCDMA 1900, 12.2 kbps RMC			1.35	1.39	>1.60	0.15	19	No

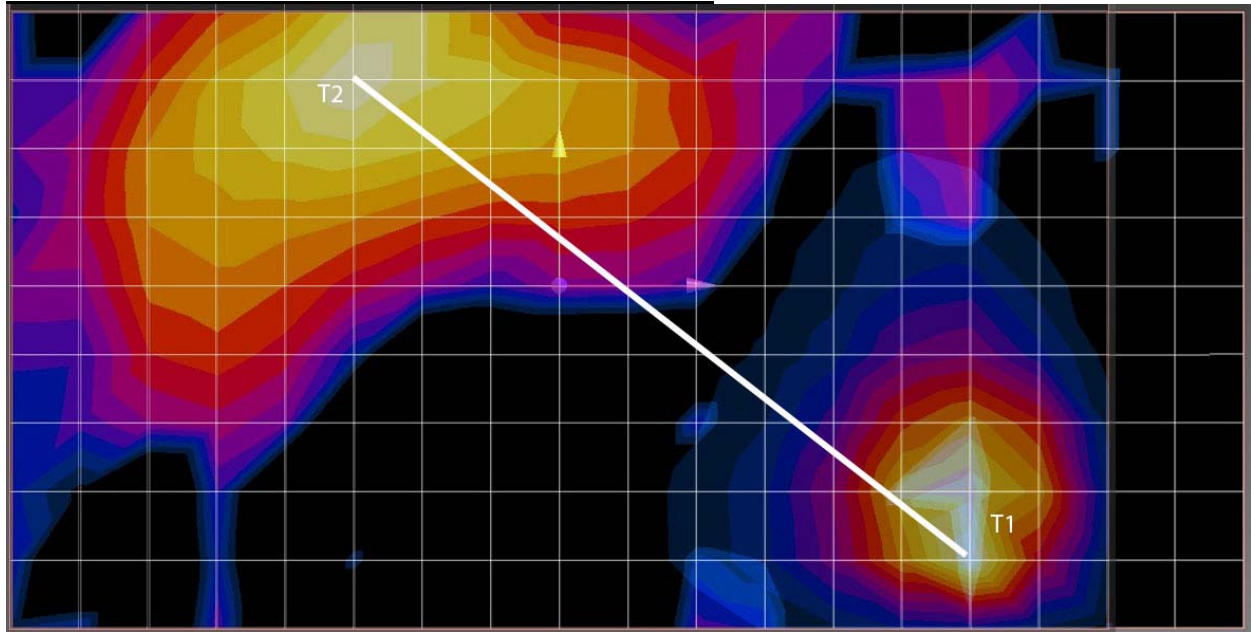
SPLSR Calculations using SPEAG Application note TN110209:**For the GPRS 850 and WiFi combination on back surface:**

Peak SAR location for GPRS 850 (point T1) is (0.0933, -0.057, -0.177)

Peak SAR location for WiFi (point T2) is (-0.0569, 0.061, -0.173)

Peak location spacing = 19.10498 cm

SPLSR = $(1.41 + 1.39) / 19.10498 = 0.1466$ which has been rounded to 0.15 in the table above.

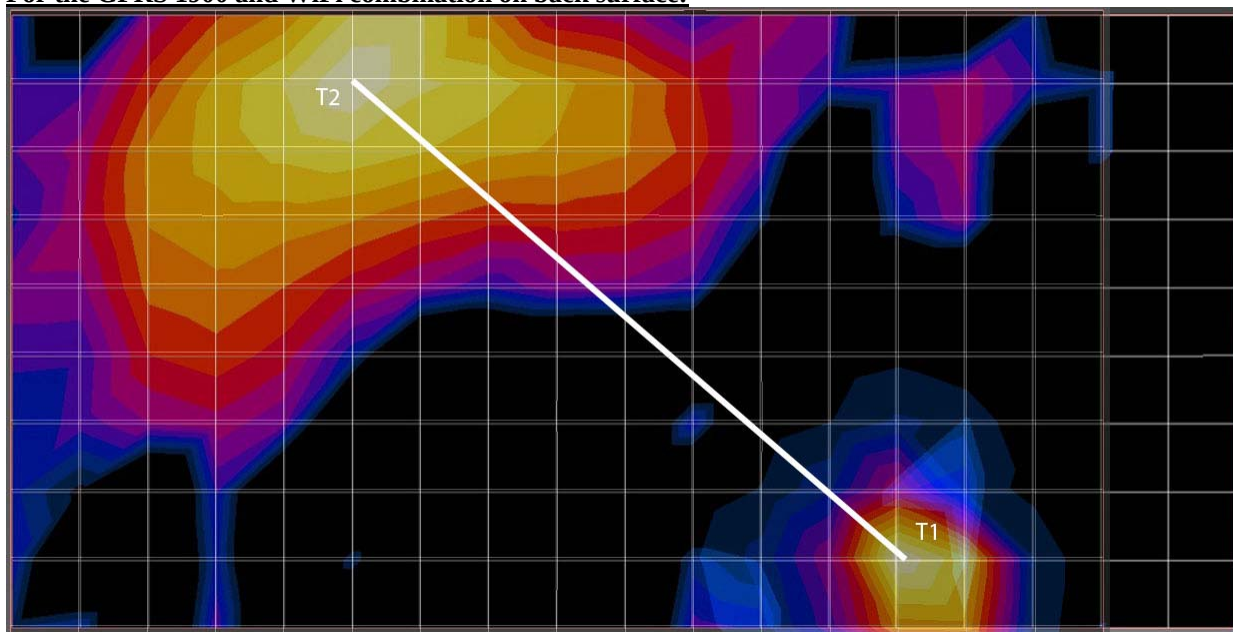
For the WCDMA 850 and WiFi combination on back surface:

Peak SAR location for WCDMA 850 (point T1) is (0.0885, -0.055, -0.177)

Peak SAR location for WiFi (point T2) is (-0.0569, 0.061, -0.173)

Peak location spacing = 18.63583

SPLSR = $(1.16 + 1.39) / 18.63583 = 0.13683$ which has been rounded to 0.14 in the table above.

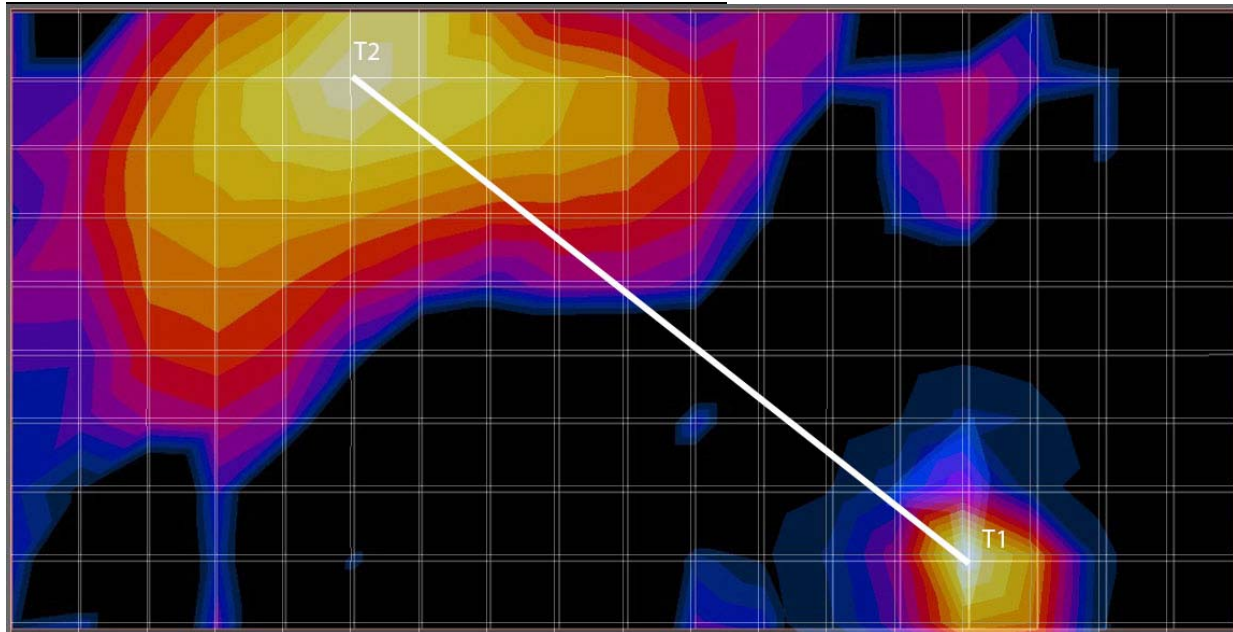
For the GPRS 1900 and WiFi combination on back surface:

Peak SAR location for GPRS 1900 (point T1) is (0.0857,-0.053,-0.177)

Peak SAR location for WiFi (point T2) is (-0.0569, 0.061, -0.173)

Peak location spacing = 18.2611

SPLSR = $(0.71 + 1.39) / 18.2611 = 0.11500$ which has been rounded to 0.12 in the table above.

For the WCDMA 1900 and WiFi combination on back surface:

Peak SAR location for WCDMA 1900 (point T1) is (0.0841,-0.055,-0.177)

Peak SAR location for WiFi (point T2) is (-0.0569, 0.061, -0.173)

Peak location spacing = 18.2628

SPLSR = $(1.35 + 1.39) / 18.2628 = 0.1500$ which has been rounded to 0.15 in the table above.

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

Test Laboratory: Motorola Mobility 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:422

Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -22.1dB [Sim.Temp@SPC](#) = 20.2°C Room Temp @ SPC = 20.1°C

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue* ; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- 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) = 1.79 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 46.7 V/m; Power Drift = -0.083 dB

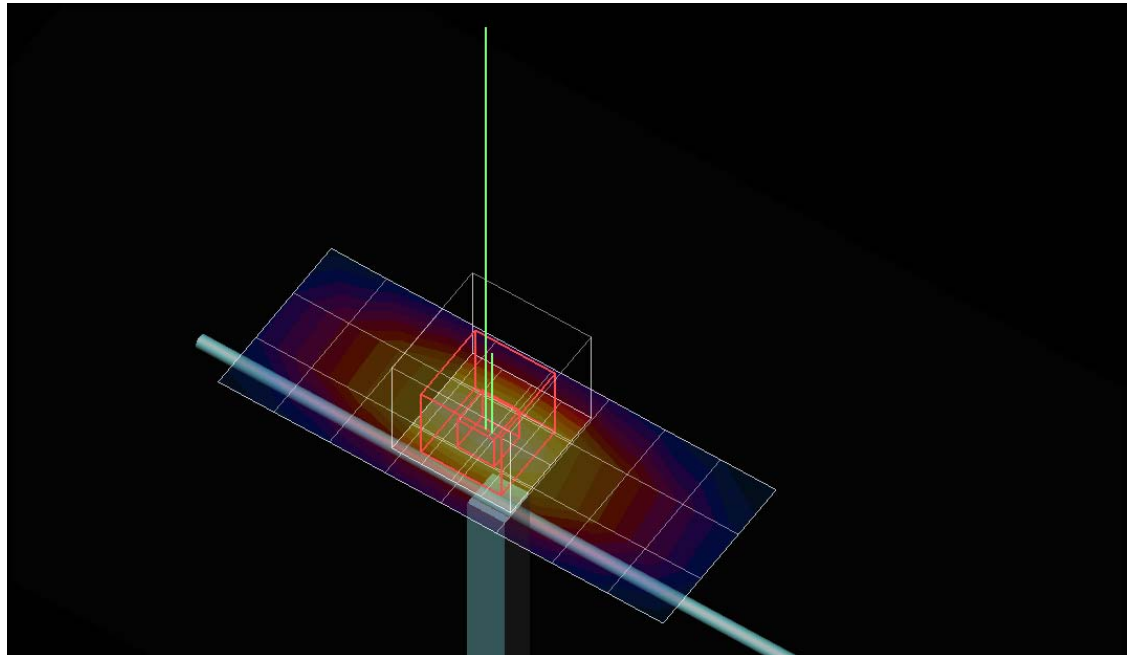
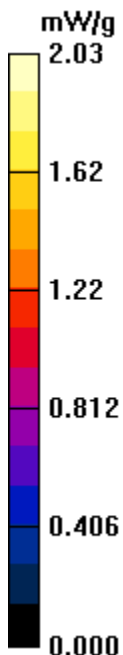
Peak SAR (extrapolated) = 2.76 W/kg

SAR(1 g) = 1.91 mW/g; SAR(10 g) = 1.26 mW/g

Maximum value of SAR (measured) = 2.06 mW/g

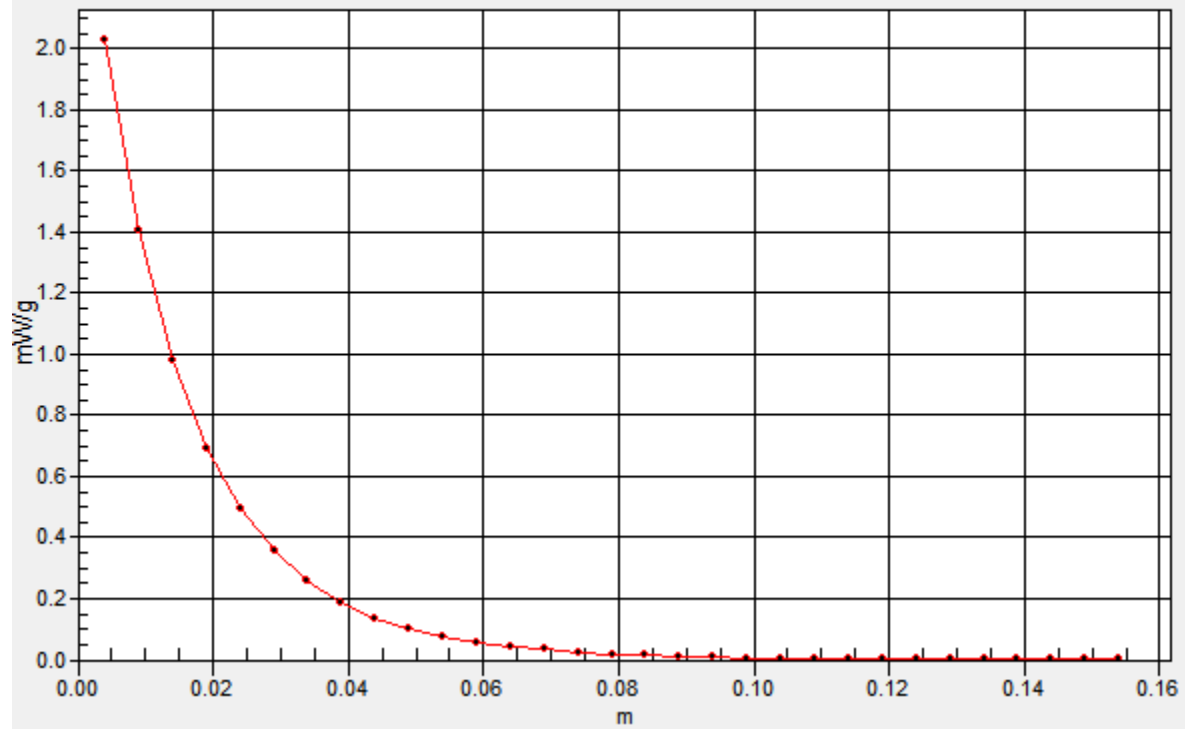
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 2.03 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:422

Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -22.7dB [Sim.Temp@SPC](#) = 19.3°C Room Temp @ SPC = 20.8°C

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue* ; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: **Not Specified**;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 2.04 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

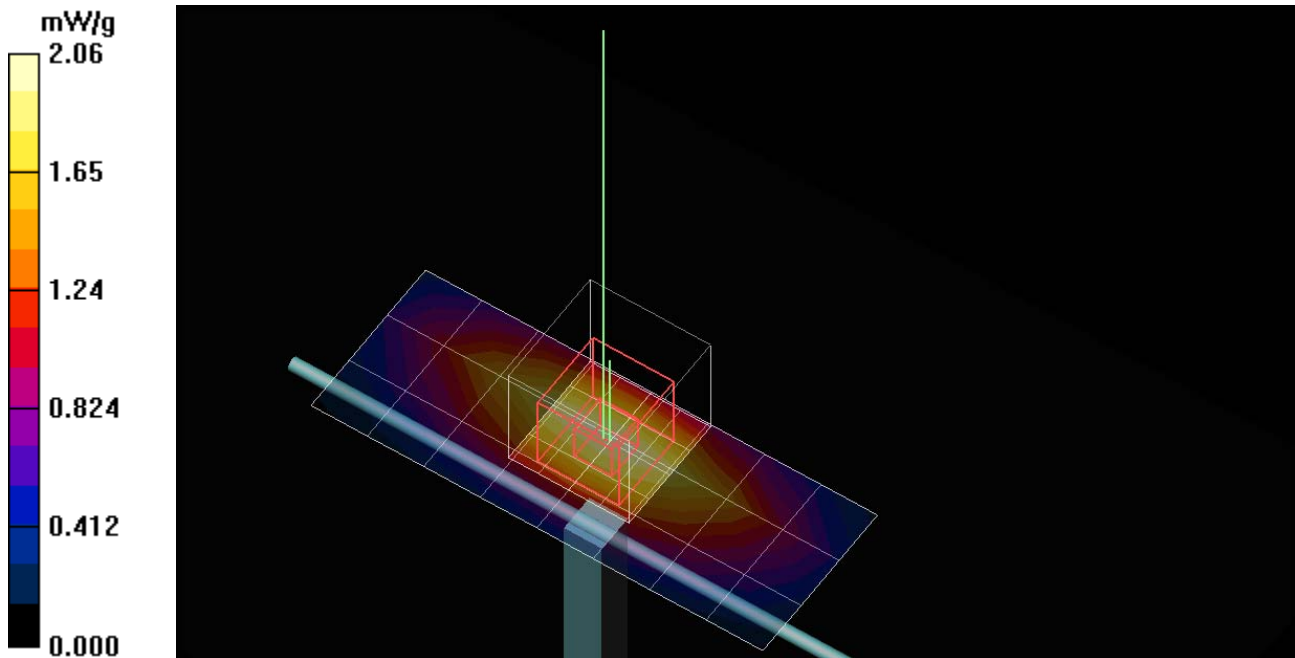
Reference Value = 45.3 V/m; Power Drift = -0.043 dB

Peak SAR (extrapolated) = 2.76 W/kg

SAR(1 g) = 1.9 mW/g; SAR(10 g) = 1.25 mW/g

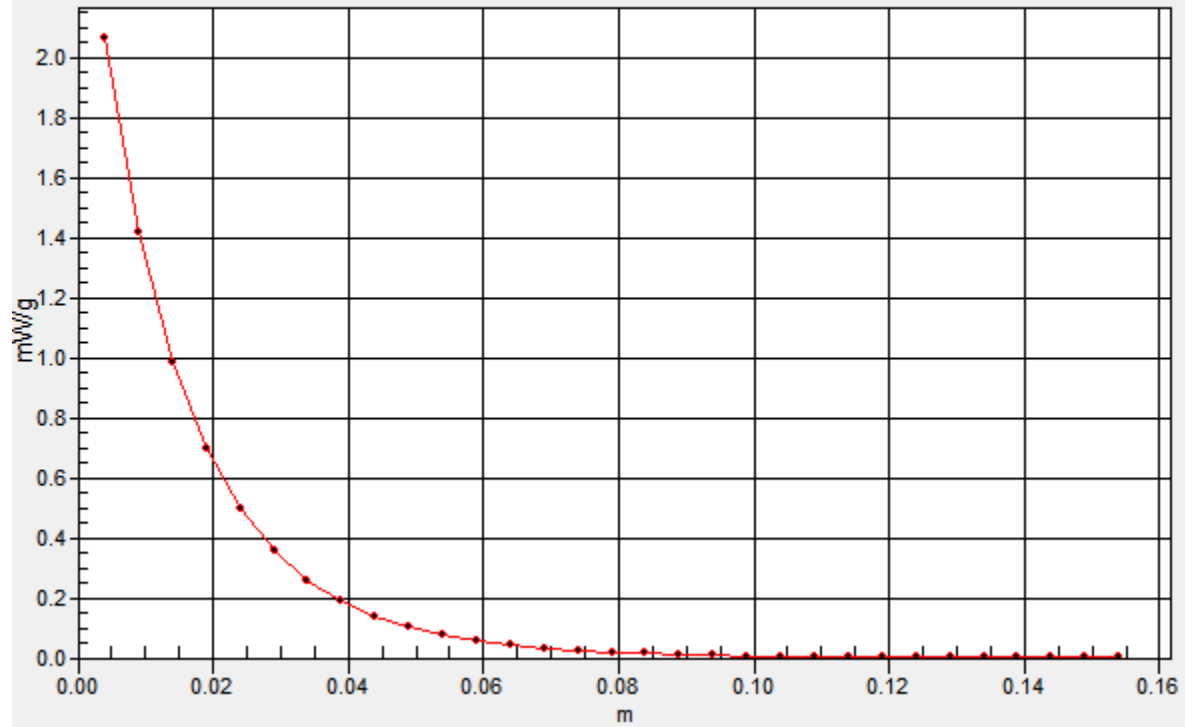
Maximum value of SAR (measured) = 2.06 mW/g

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



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:434

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -21.75 dB [Sim.Temp@SPC](#) = 20.7 Room Temp @ SPC = 21.3

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue* ; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 55.8$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(6.04, 6.04, 6.04); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- SEMCAD X Version 14.4.5 (3634)

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC

Check/Dipole Area Scan (4x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.945 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC

Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 48.057 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 3.026 W/kg

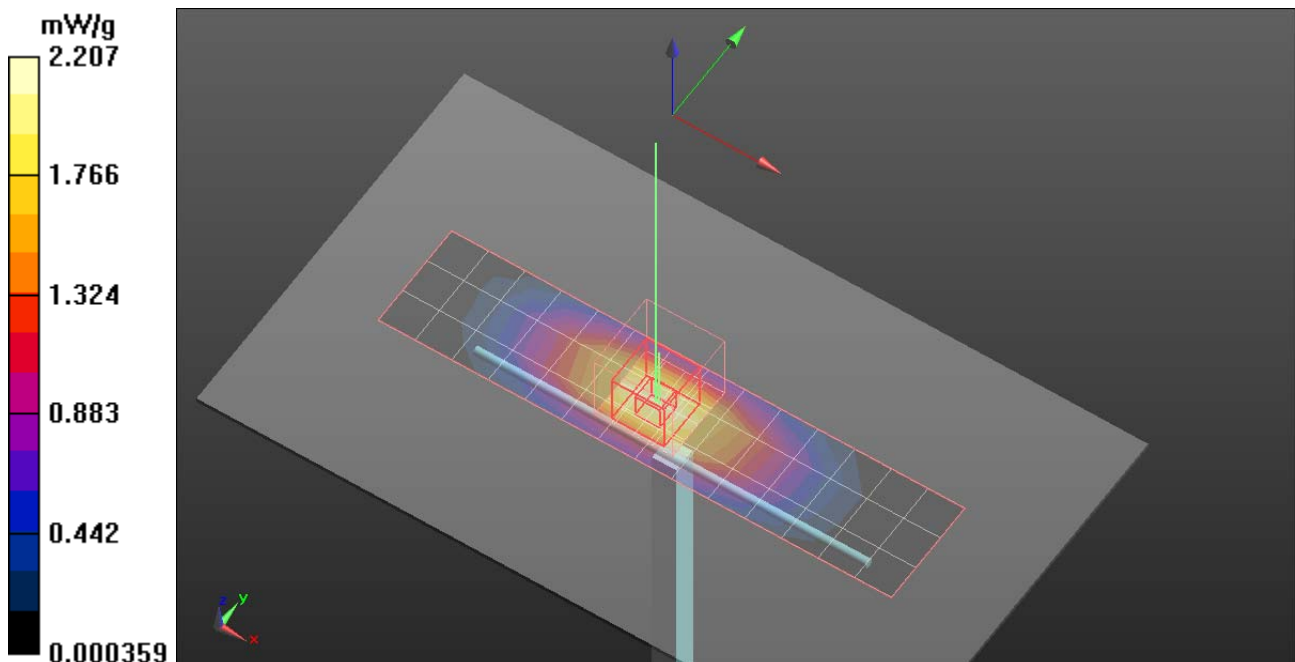
SAR(1 g) = 2.05 mW/g; SAR(10 g) = 1.34 mW/g

Maximum value of SAR (measured) = 2.208 mW/g

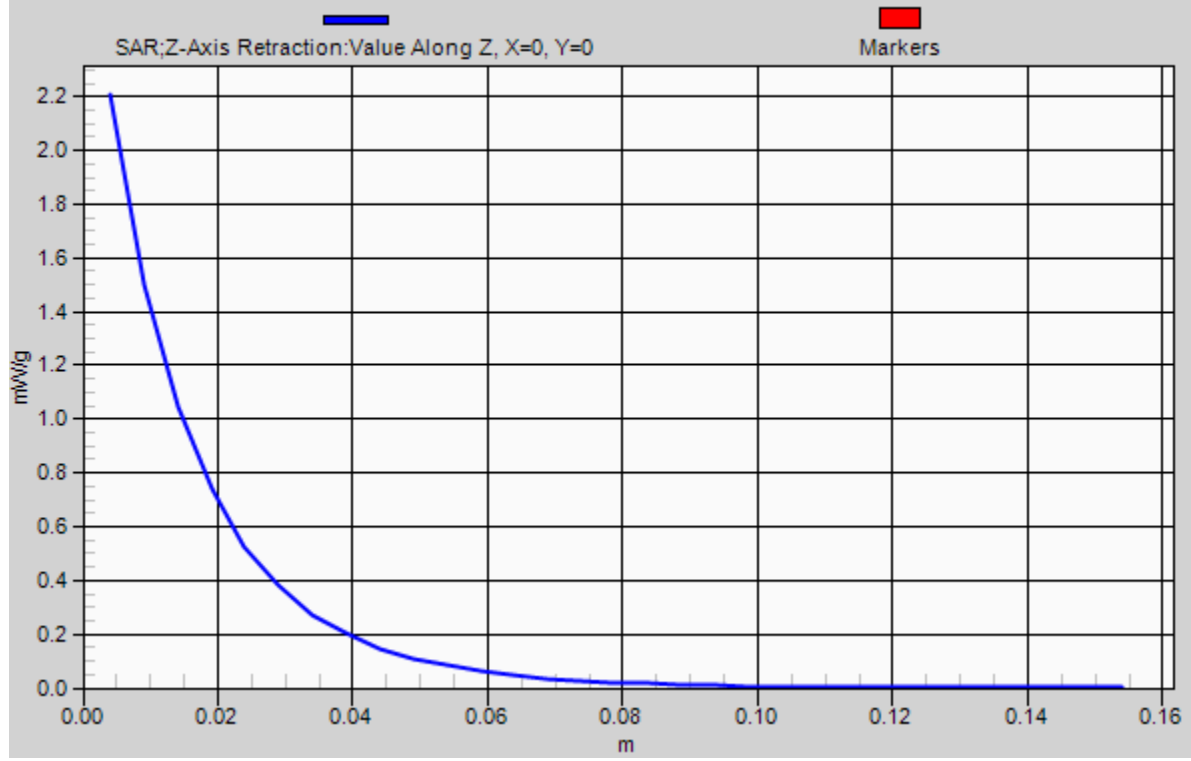
DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC

Check/Z-Axis Retraction (1x1x31): Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$, $dz=5\text{mm}$

Maximum value of SAR (measured) = 2.207 mW/g



SAR(x,y,z,f0)



Test Laboratory: Motorola Mobility 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:250

Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -25.3dB Sim.Temp@SPC = 20.1°C Room Temp @ SPC = 20.6°C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue* ; Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.49 \text{ mho/m}$; $\epsilon_r = 51.1$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.61, 4.61, 4.61); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: **Not Specified**;
- 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) = 7.01 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

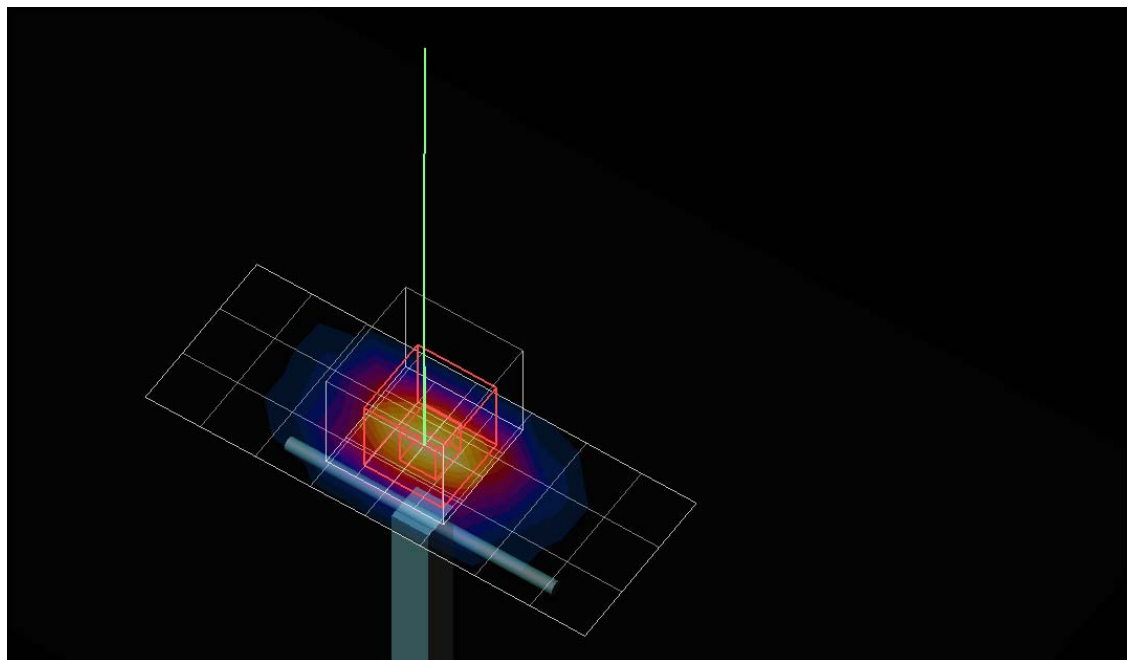
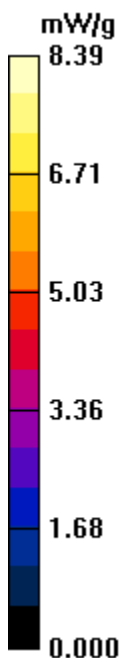
Reference Value = 77.3 V/m; Power Drift = -0.081 dB

Peak SAR (extrapolated) = 12.7 W/kg

SAR(1 g) = 7.46 mW/g; SAR(10 g) = 4.01 mW/g

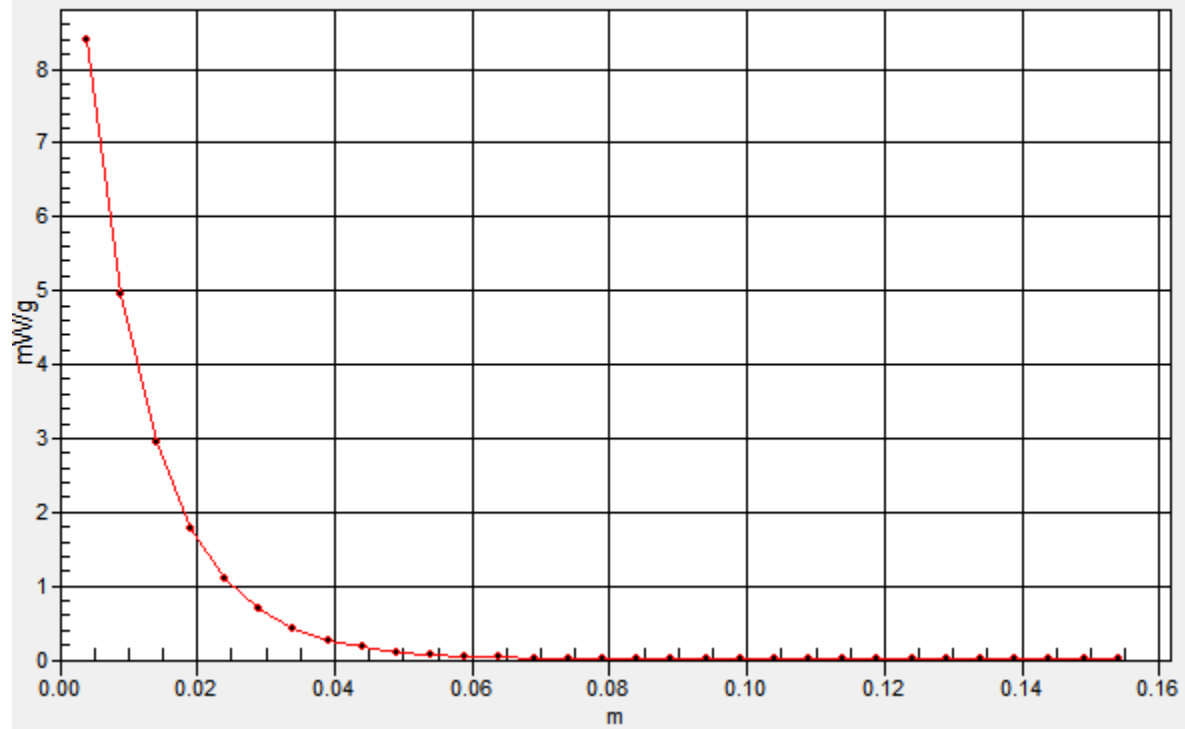
Maximum value of SAR (measured) = 8.39 mW/g

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



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:250

Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -25.7dB [Sim.Temp@SPC](#) = 20.8°C Room Temp @ SPC = 21.1°C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue* body glycol backup; Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 51.2$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.61, 4.61, 4.61); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: **Not Specified**;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 6.18 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 77.1 V/m; Power Drift = 0.002 dB

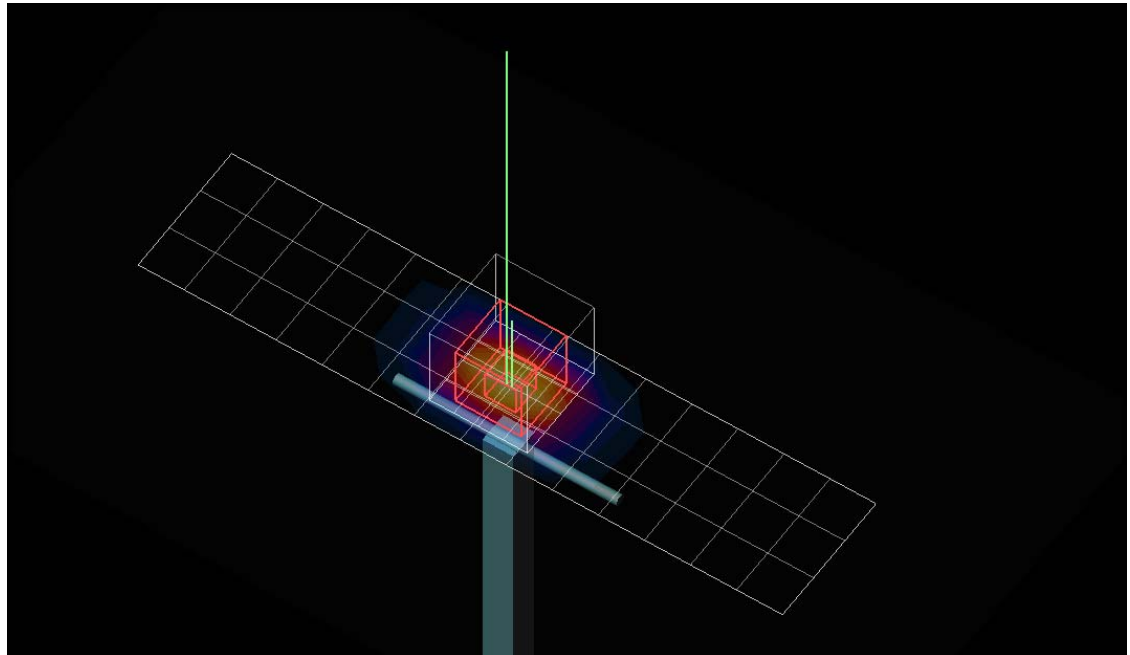
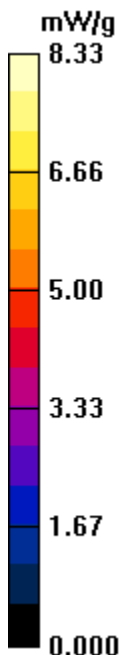
Peak SAR (extrapolated) = 12.6 W/kg

SAR(1 g) = 7.4 mW/g; SAR(10 g) = 3.97 mW/g

Maximum value of SAR (measured) = 8.31 mW/g

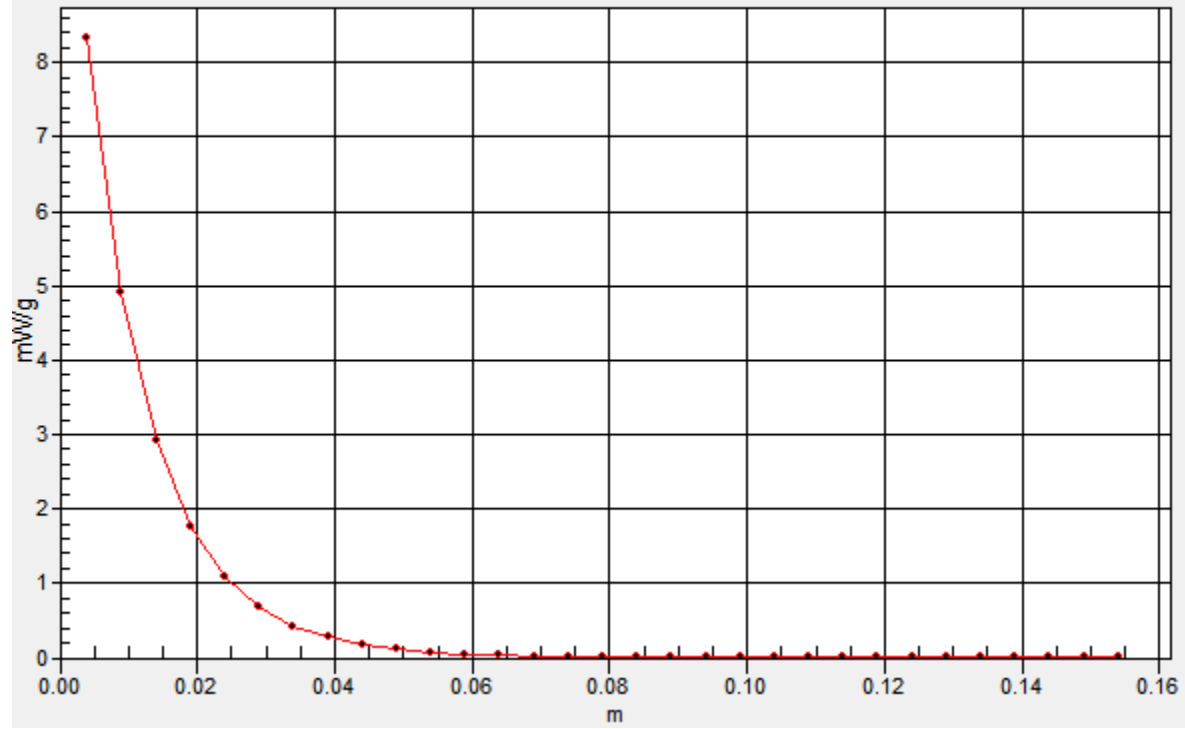
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$, $dz=5\text{mm}$

Maximum value of SAR (measured) = 8.33 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:250

Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -25.4dB Sim.Temp@SPC = 20.8°C Room Temp @ SPC = 20.8°C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue* body glycol backup; Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.61, 4.61, 4.61); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: **Not Specified**;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 7.09 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 75.6 V/m; Power Drift = -0.028 dB

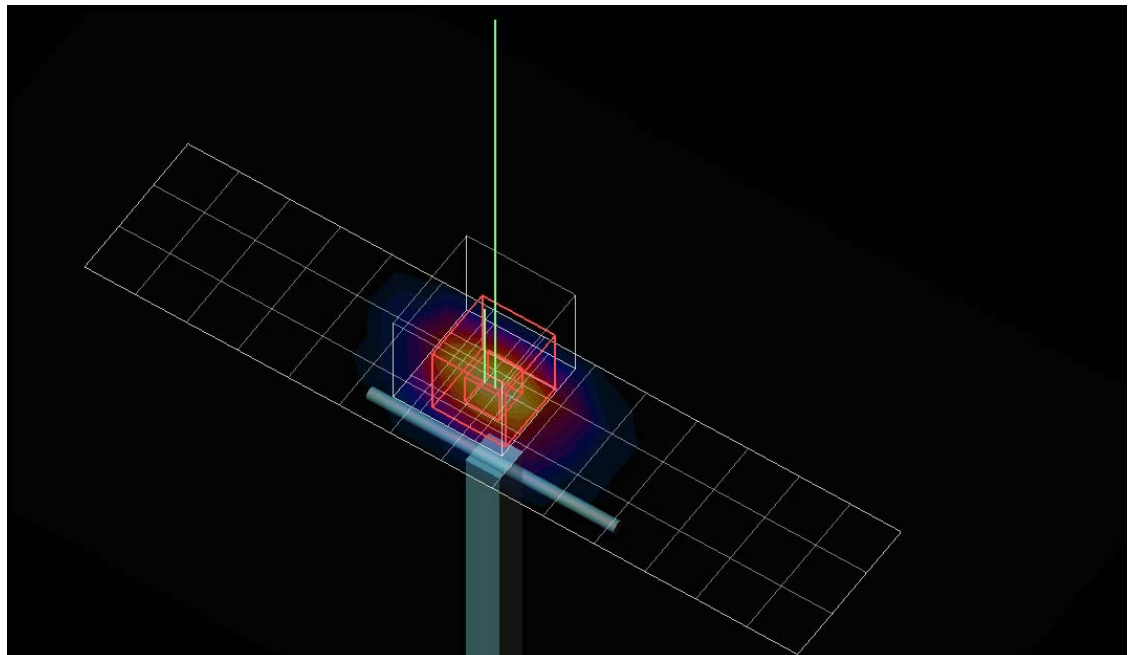
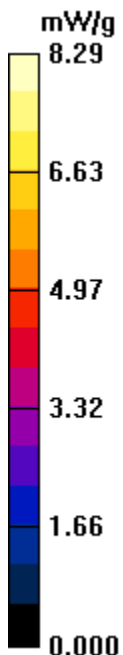
Peak SAR (extrapolated) = 12.6 W/kg

SAR(1 g) = 7.33 mW/g; SAR(10 g) = 3.94 mW/g

Maximum value of SAR (measured) = 8.21 mW/g

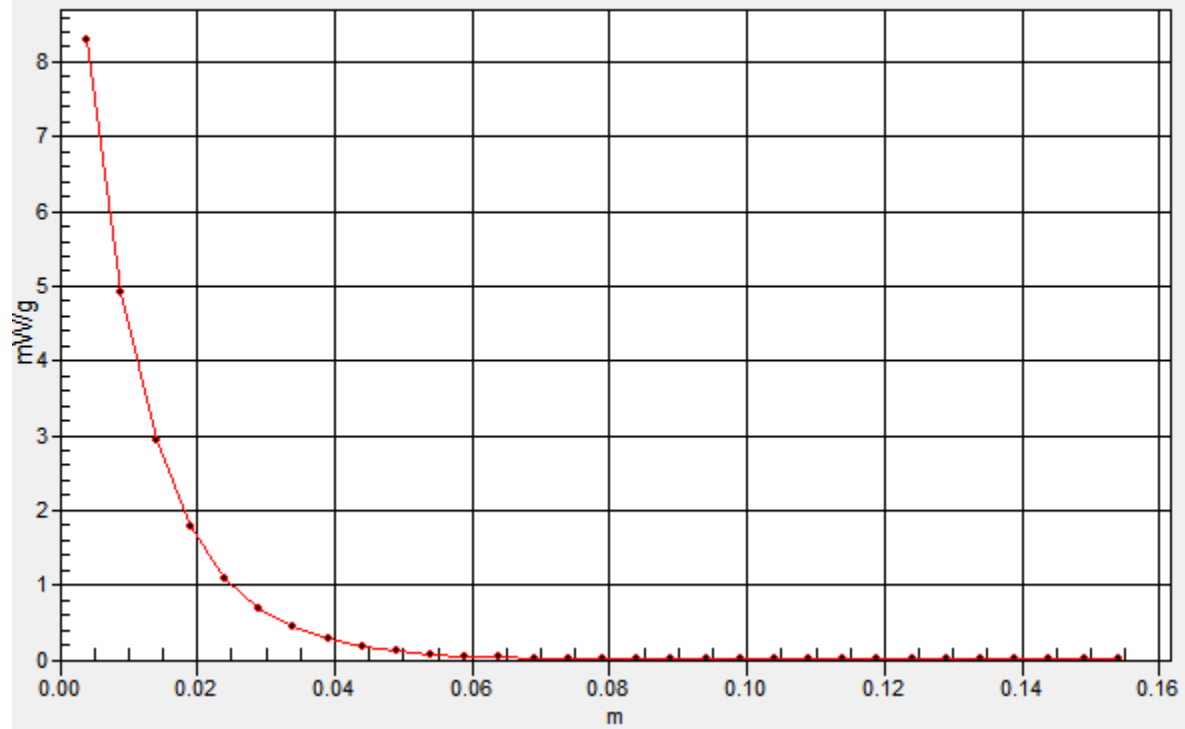
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$, $dz=5\text{mm}$

Maximum value of SAR (measured) = 8.29 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -19.9 [dB Sim.Temp@SPC](#) = 20.3 Room Temp @ SPC = 21.3

Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue* ; Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.49 \text{ mho/m}$; $\epsilon_r = 51.2$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.69, 4.69, 4.69); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- SEMCAD X Version 14.4.5 (3634)

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC

Check/Dipole Area Scan (4x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 6.400 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC

Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 78.023 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 13.907 W/kg

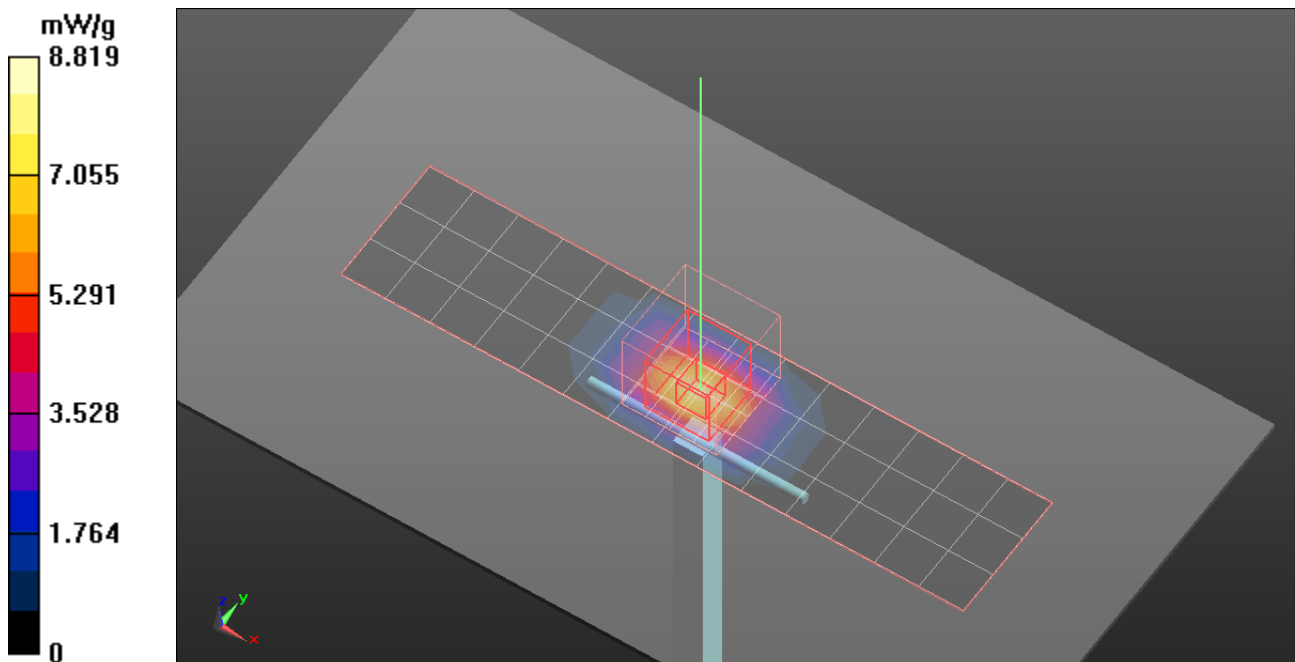
SAR(1 g) = 7.85 mW/g; SAR(10 g) = 4.18 mW/g

Maximum value of SAR (measured) = 8.810 mW/g

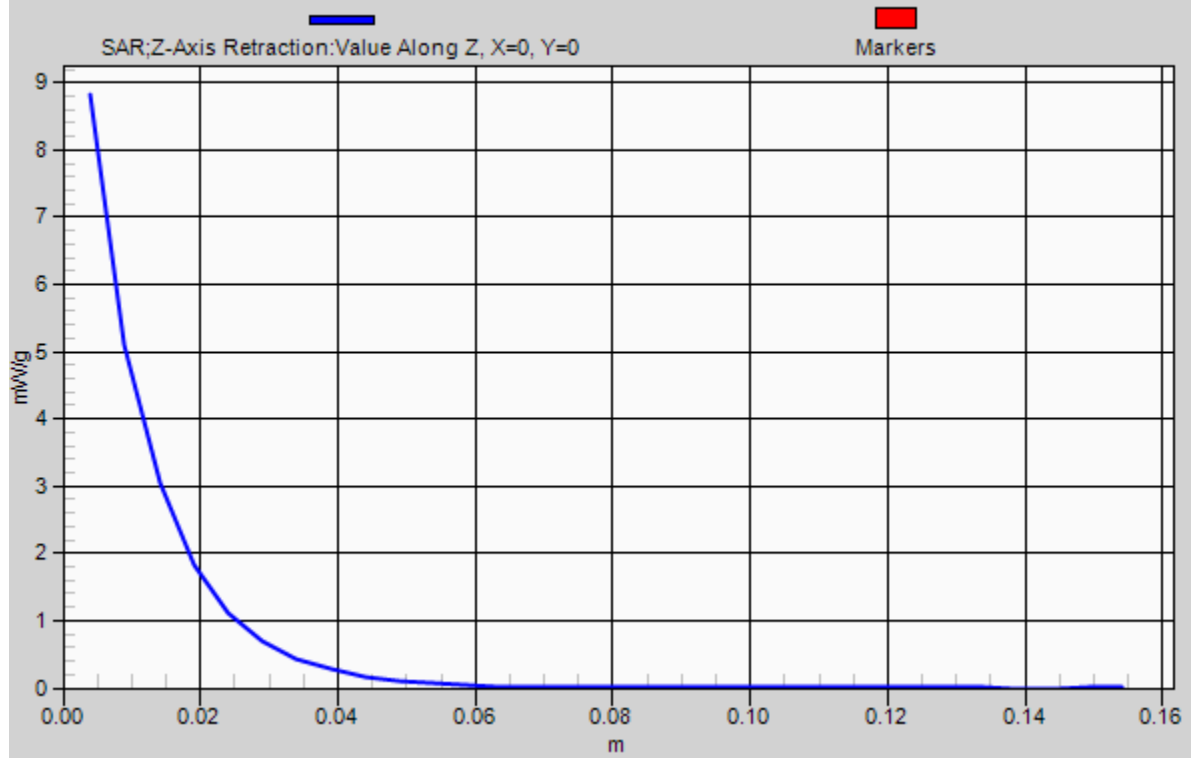
DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC

Check/Z-Axis Retraction (1x1x31): Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$, $dz=5\text{mm}$

Maximum value of SAR (measured) = 8.819 mW/g



SAR(x,y,z,f0)



Test Laboratory: Motorola 2450 MHz System Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:863

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -19.04 dB [Sim.Temp@SPC](#) = 19.8C Room Temp @ SPC = 21.1C

Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue* ; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.9$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.12, 4.12, 4.12); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 7.82 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 = -0.001 dB

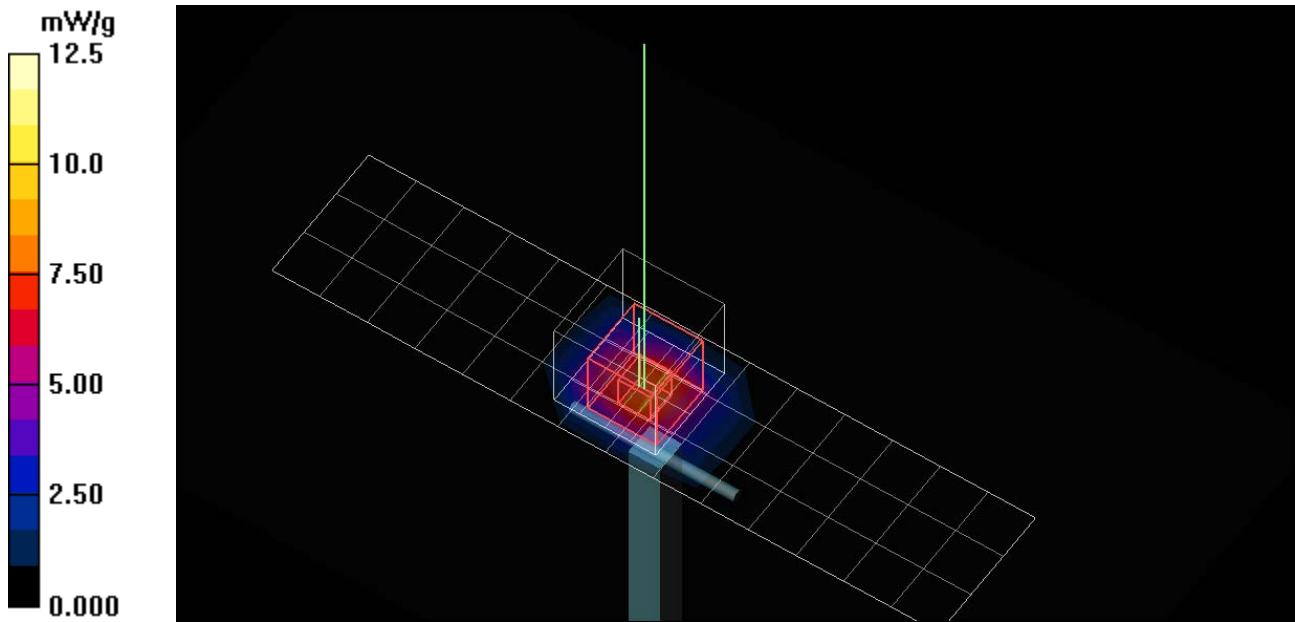
Peak SAR (extrapolated) = 23.6 W/kg

SAR(1 g) = 11 mW/g; SAR(10 g) = 5.07 mW/g

Maximum value of SAR (measured) = 12.4 mW/g

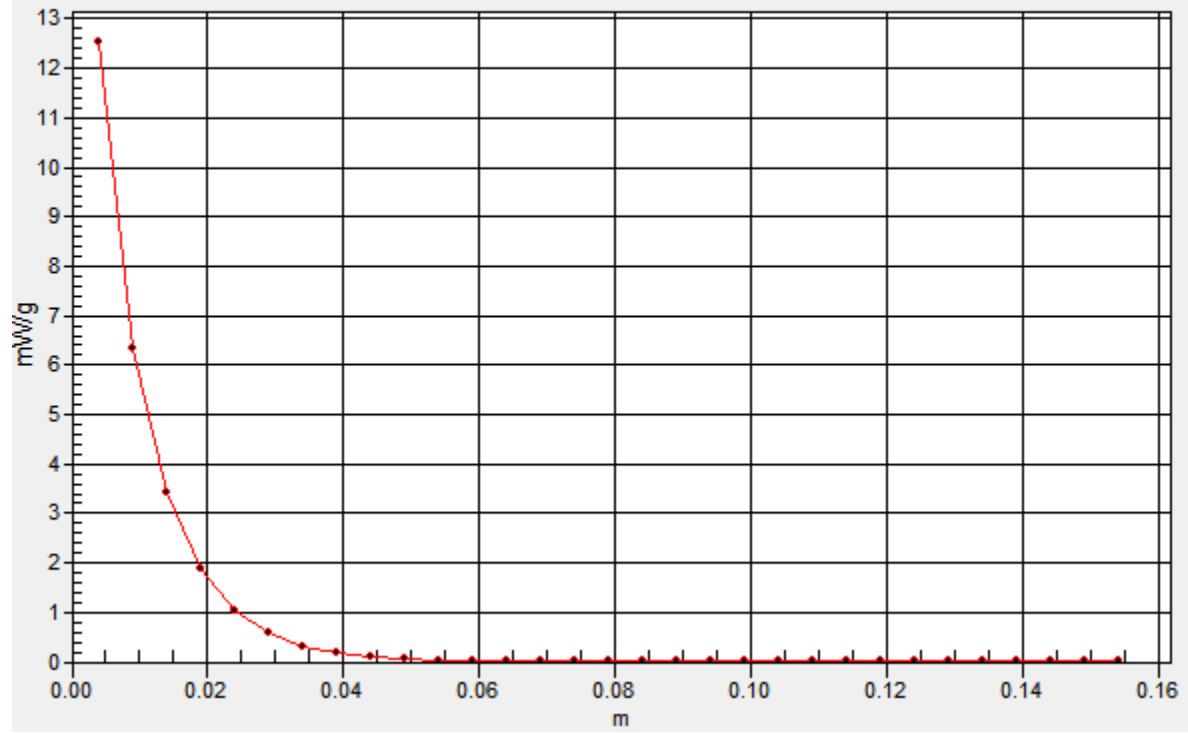
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 12.5 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 2450 MHz System Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:740

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -23.20 dB [Sim.Temp@SPC](#) = 21.0C Room Temp @ SPC = 21.2C

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue* ; Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.92 \text{ mho/m}$; $\epsilon_r = 51.1$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.21, 4.21, 4.21); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC

Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 10.871 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC

Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 76.695 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 22.374 W/kg

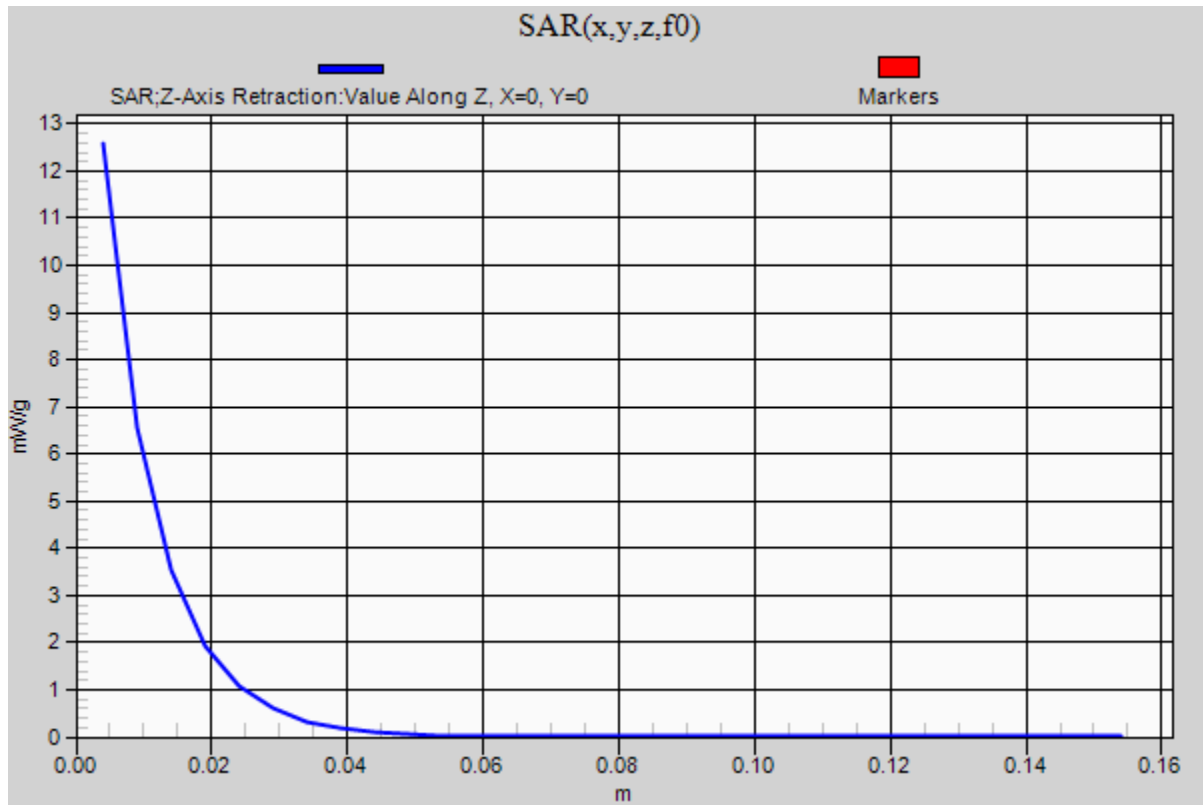
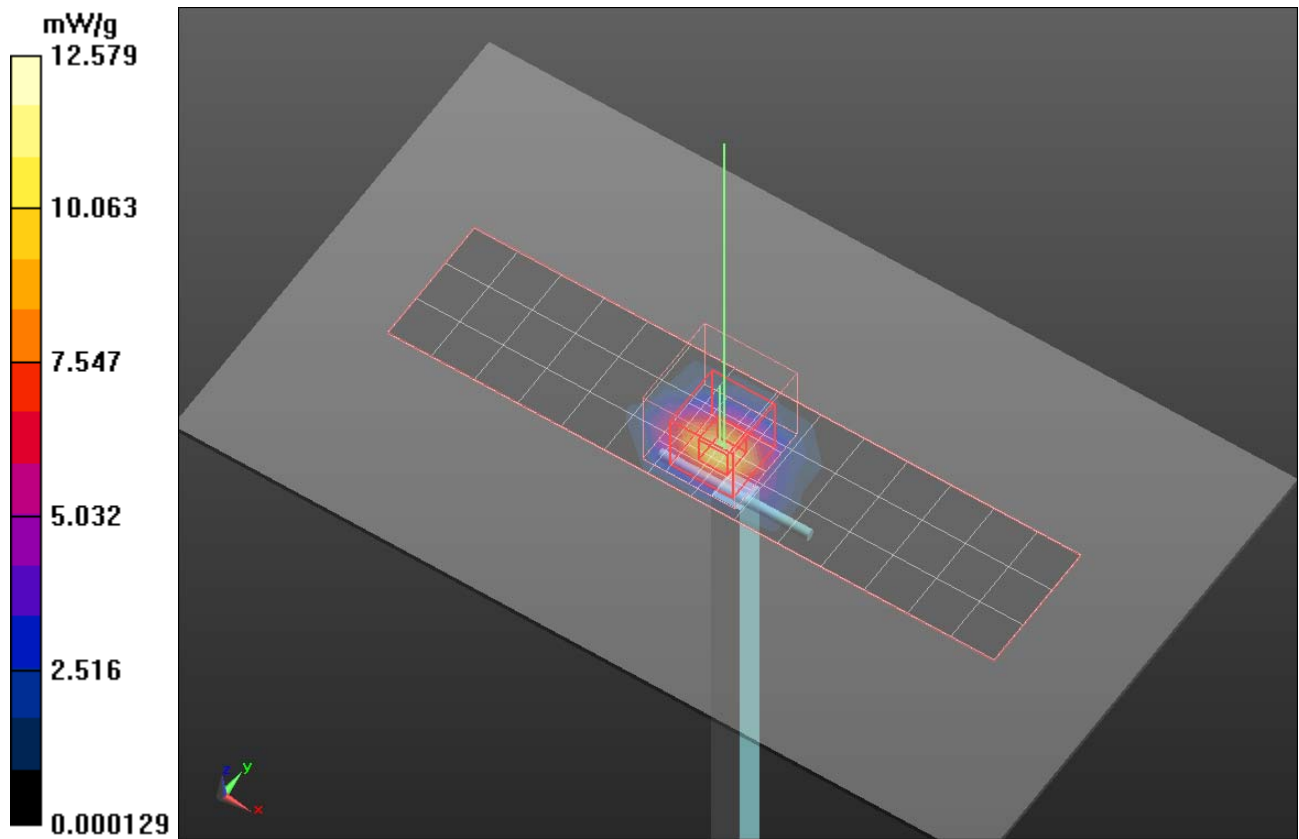
SAR(1 g) = 11 mW/g; SAR(10 g) = 5.17 mW/g

Maximum value of SAR (measured) = 12.604 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC

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

Maximum value of SAR (measured) = 12.579 mW/g



Appendix 2

SAR distribution plots for Body Configuration

Test Laboratory: Motorola Mobility GPRS 850 Top Edge

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: 5 Battery Model #: INTERNAL Test Configuration = Top Edge 0mm from Phantom
Communication System: GPRS 850 - Class 10; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium: Low Freq Body; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Normal Phone (15mm) (8x12x1): Measurement grid:

$dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.680 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$,

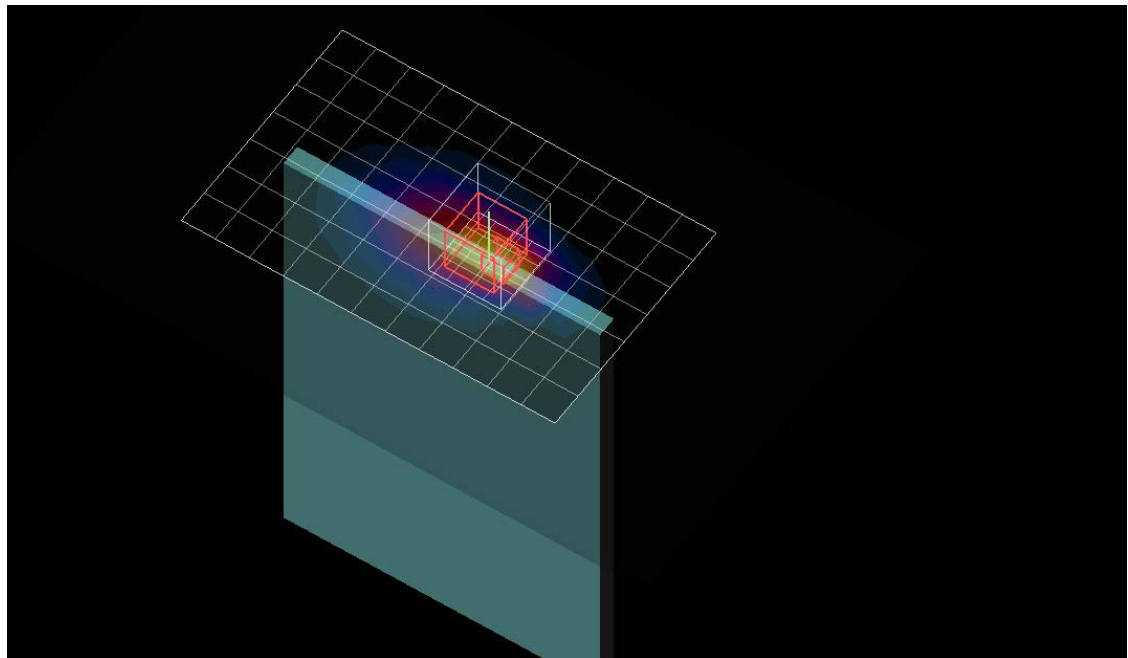
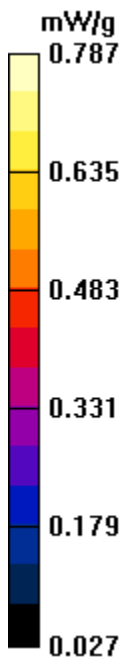
$dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 25.3 V/m; Power Drift = -0.038 dB

Peak SAR (extrapolated) = 1.46 W/kg

SAR(1 g) = 0.711 mW/g; SAR(10 g) = 0.390 mW/g

Maximum value of SAR (measured) = 0.787 mW/g



Test Laboratory: Motorola Mobility WCDMA 850 Top Edge

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test configuration = Top Edge 0mm from Phantom

Communication System: 3G-WCDMA 850; Frequency: 836 MHz; Duty Cycle: 1:1

Medium: Low Freq Body; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Normal Phone (15mm) (8x12x1): Measurement grid:

$dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.485 mW/g

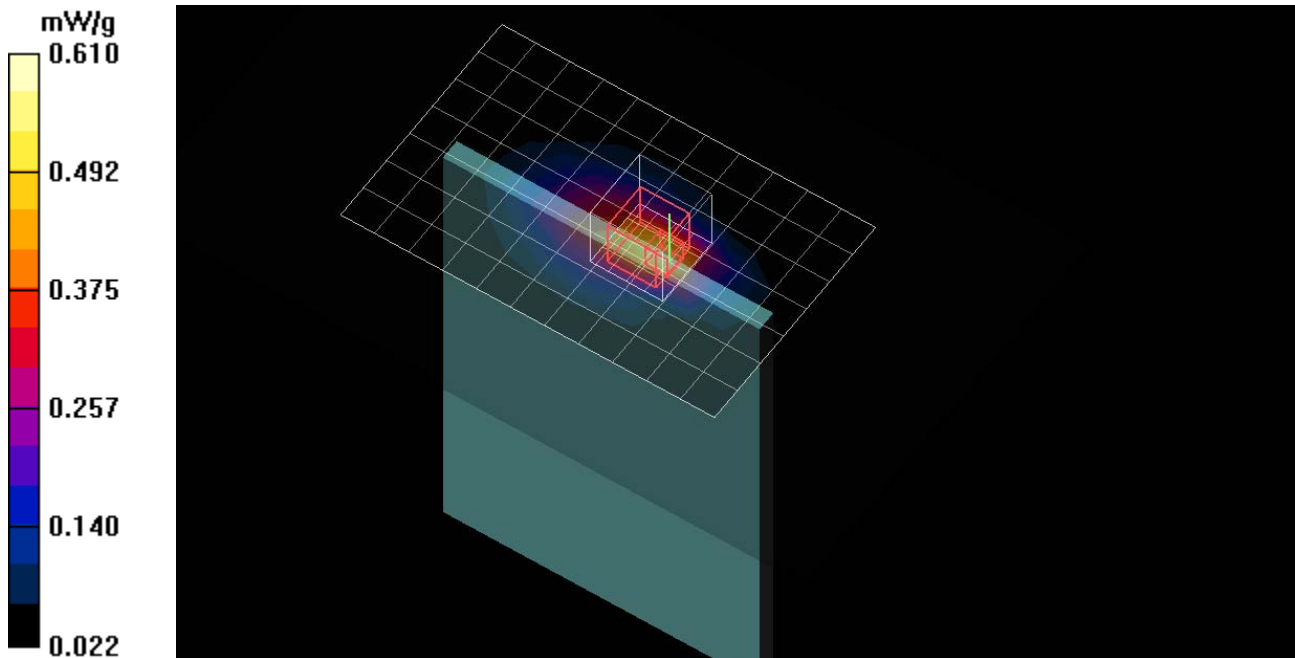
Triple Flat Phone Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 22.1 V/m; Power Drift = 0.023 dB

Peak SAR (extrapolated) = 1.07 W/kg

SAR(1 g) = 0.542 mW/g; SAR(10 g) = 0.301 mW/g

Maximum value of SAR (measured) = 0.610 mW/g



Test Laboratory: Motorola Mobility GPRS 1900 Top Edge

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: 0 Battery Model #: Internal Test Configuration = Top Edge 0mm from Phantom

Communication System: GPRS 1900 - Class 10; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium: Regular Glycol Body 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.58$ mho/m; $\epsilon_r = 51.3$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.61, 4.61, 4.61); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Tablet Short Edge Area Scan - Body (10mm) (21x8x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.068 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (≤ 3 GHz), - to correct max out (5x5x7)/Cube 0:

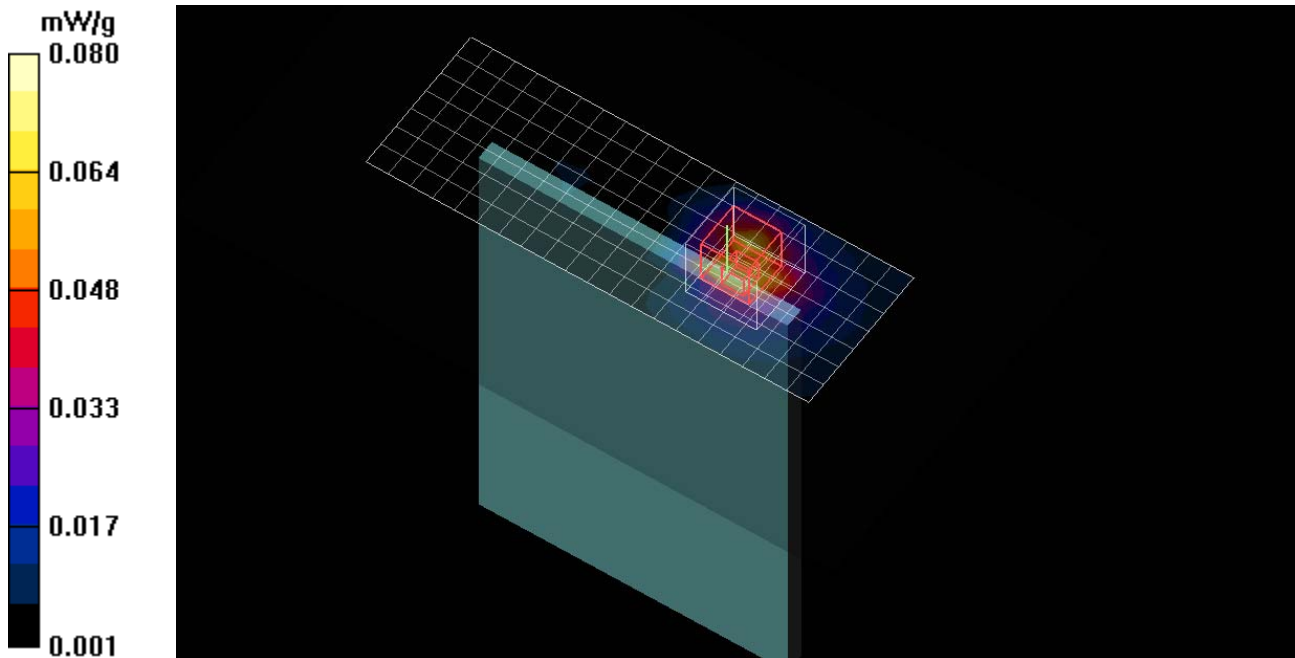
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.88 V/m; Power Drift = 0.271 dB

Peak SAR (extrapolated) = 0.126 W/kg

SAR(1 g) = 0.063 mW/g; SAR(10 g) = 0.034 mW/g

Maximum value of SAR (measured) = 0.080 mW/g



Test Laboratory: Motorola Mobility WCDMA 1900 Top Edge

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test Configuration = Top Edge 0mm from Phantom

Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.58$ mho/m; $\epsilon_r = 50.9$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.61, 4.61, 4.61); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Normal Phone (15mm) (8x12x1): Measurement grid:

$dx=15$ mm, $dy=15$ mm

Maximum value of SAR (measured) = 0.603 mW/g

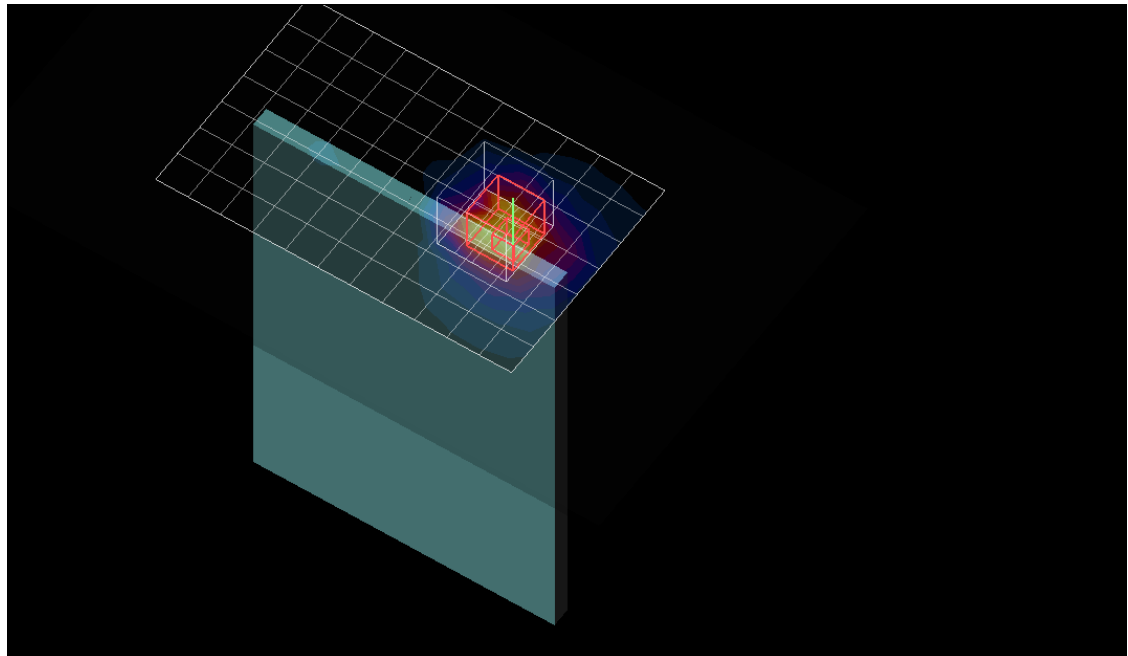
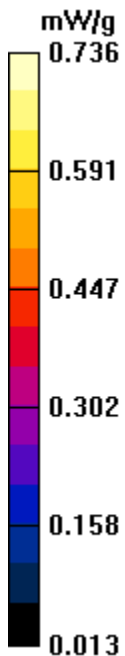
Triple Flat Phone Template/5x5x7 Zoom Scan (≤ 3 GHz) (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 19.3 V/m; Power Drift = 0.009 dB

Peak SAR (extrapolated) = 1.19 W/kg

SAR(1 g) = 0.611 mW/g; SAR(10 g) = 0.332 mW/g

Maximum value of SAR (measured) = 0.736 mW/g



Test Laboratory: Motorola Mobility GPRS 850 Back Surface

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: 5 Battery Model #: INTERNAL Test Configuration = Back Surface 0mm from Phantom

Communication System: GPRS 850 - Class 10; Frequency: 848.8 MHz; Duty Cycle: 1:4.15

Medium: Low Freq Body; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Entire Section (15mm) (11x17x1): Measurement grid:

$dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.43 mW/g

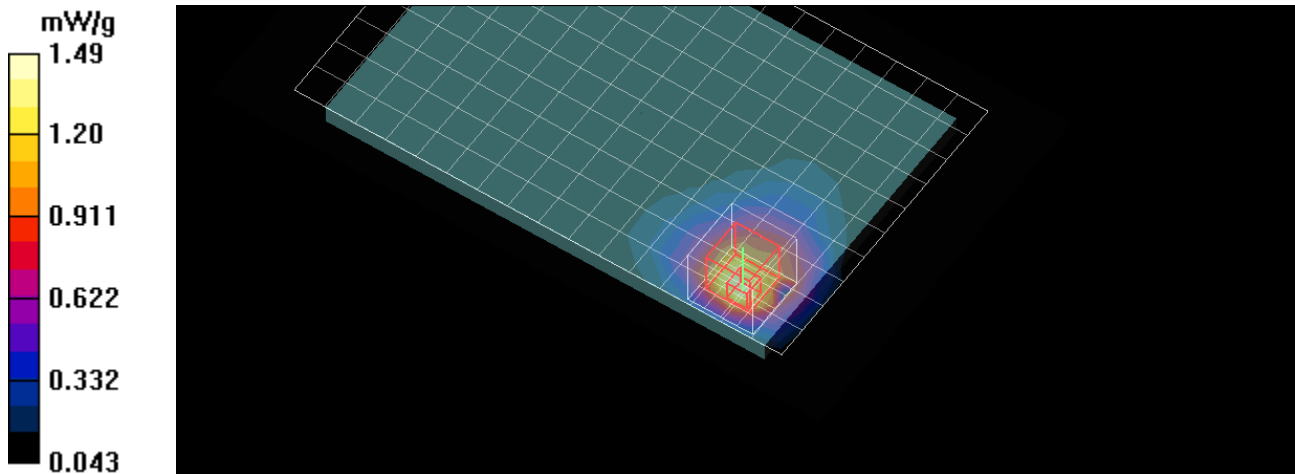
Triple Flat Phone Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 31.4 V/m; Power Drift = -0.057 dB

Peak SAR (extrapolated) = 3.07 W/kg

SAR(1 g) = 1.39 mW/g; SAR(10 g) = 0.804 mW/g

Maximum value of SAR (measured) = 1.49 mW/g



Test Laboratory: Motorola Mobility WCDMA 850 Back Surface

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test Configuration = Back Surface 0mm from Phantom

Communication System: 3G-WCDMA 850; Frequency: 836 MHz; Duty Cycle: 1:1

Medium: Low Freq Body; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Entire Section (15mm) (11x17x1): Measurement grid:

$dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.15 mW/g

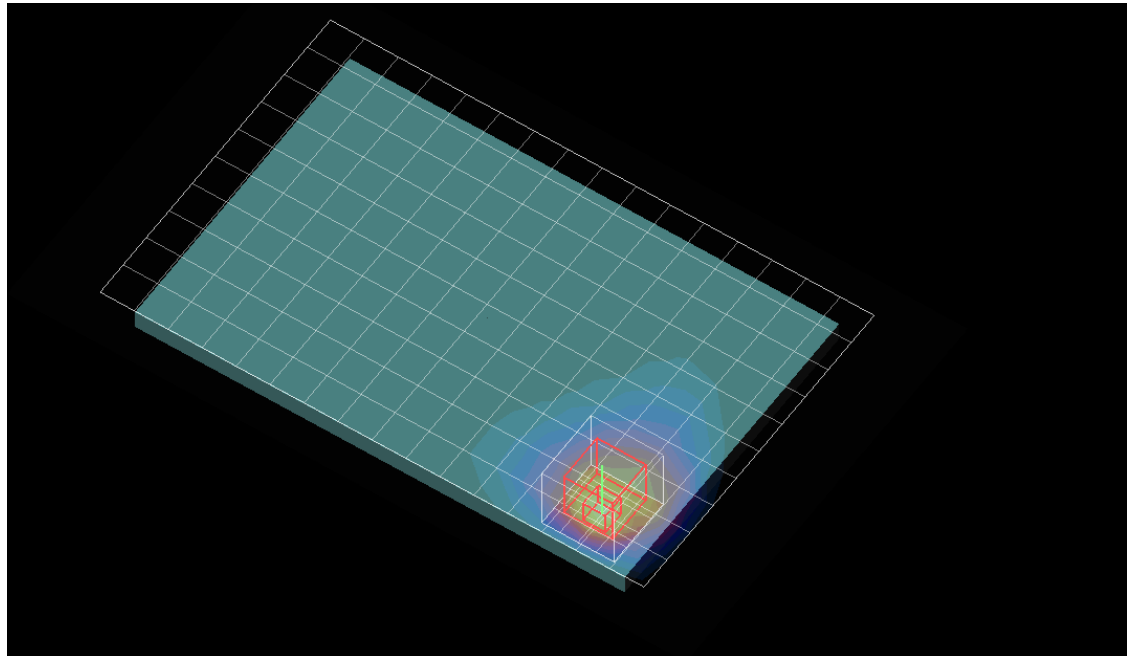
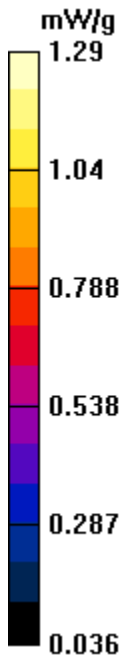
Triple Flat Phone Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 30.1 V/m; Power Drift = -0.085 dB

Peak SAR (extrapolated) = 2.17 W/kg

SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.665 mW/g

Maximum value of SAR (measured) = 1.29 mW/g



Test Laboratory: Motorola Mobility GPRS 1900 Back Surface

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: 0 Battery Model #: INTERNAL Test Configuration = Back Surface 0mm from Phantom
Communication System: GPRS 1900 - Class 10; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium: Regular Glycol Body 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.59$ mho/m; $\epsilon_r = 50.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.61, 4.61, 4.61); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Entire Section (15mm) (11x17x1): Measurement grid:

$dx=15$ mm, $dy=15$ mm

Maximum value of SAR (measured) = 0.636 mW/g

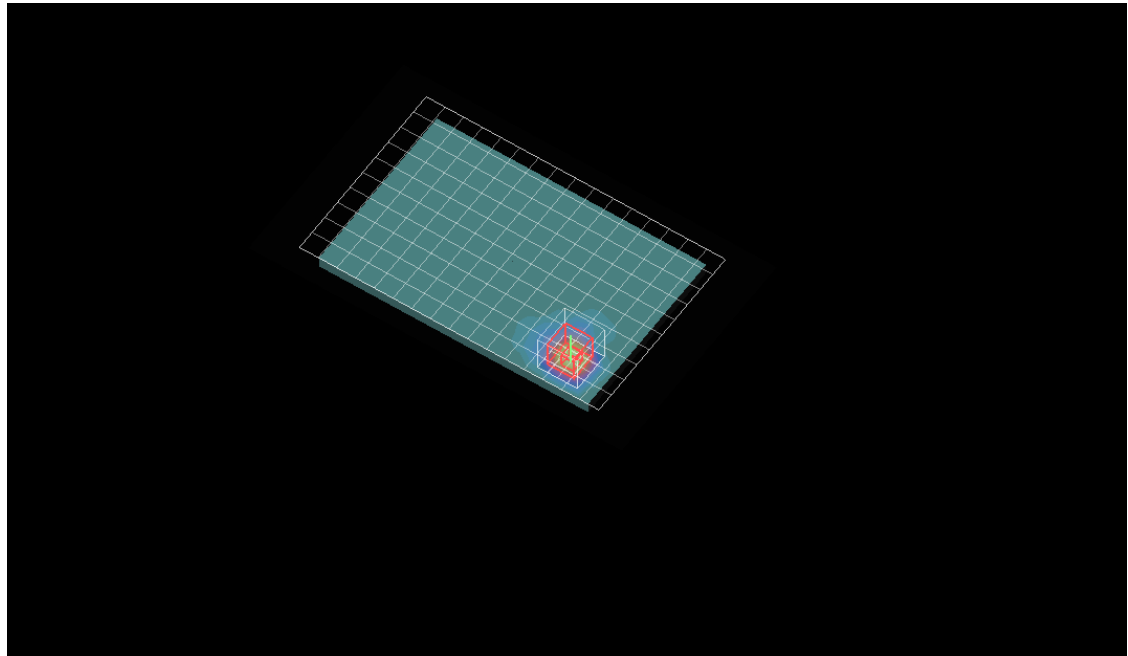
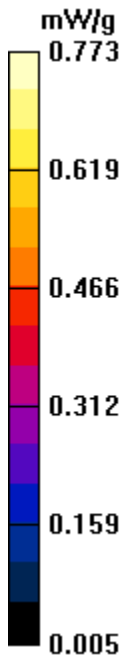
Triple Flat Phone Template/5x5x7 Zoom Scan (≤ 3 GHz) (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 12.6 V/m; Power Drift = -0.088 dB

Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.696 mW/g; SAR(10 g) = 0.367 mW/g

Maximum value of SAR (measured) = 0.773 mW/g



Test Laboratory: Motorola Mobility WCDMA 1900 Back Surface

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test Configuration = Back Surface 0mm from Phantom

Communication System: 3G/WCDMA 1900; Frequency: 1852.5 MHz; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.58$ mho/m; $\epsilon_r = 50.9$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.61, 4.61, 4.61); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Entire Section (15mm) (11x19x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.20 mW/g

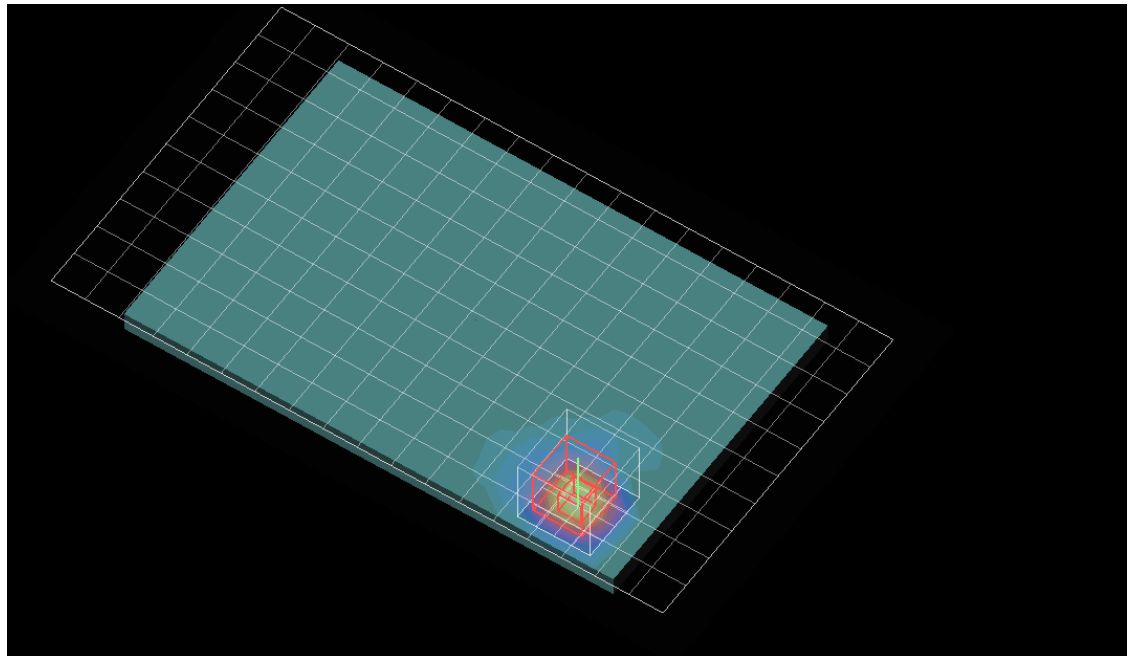
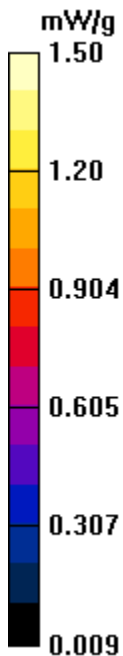
Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.6 V/m; Power Drift = 0.025 dB

Peak SAR (extrapolated) = 2.52 W/kg

SAR(1 g) = 1.35 mW/g; SAR(10 g) = 0.697 mW/g

Maximum value of SAR (measured) = 1.50 mW/g



Test Laboratory: Motorola Mobility - 2450 MHz WiFi Back Surface

DUT: Serial: KFLC110069, FCC ID: IHDP56MU2

Procedure 802.11g 9Mbps Chn 6 Battery Model #: INTERNAL Test Configuration = Back surface of DUT 0mm from Phantom

Communication System: Custom IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps); Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Glycol Body; Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.92 \text{ mho/m}$; $\epsilon_r = 51.1$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.21, 4.21, 4.21); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- SEMCAD X Version 14.4.5 (3634)

DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/Area Scan - Full Body (15mm) (19x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.479 mW/g

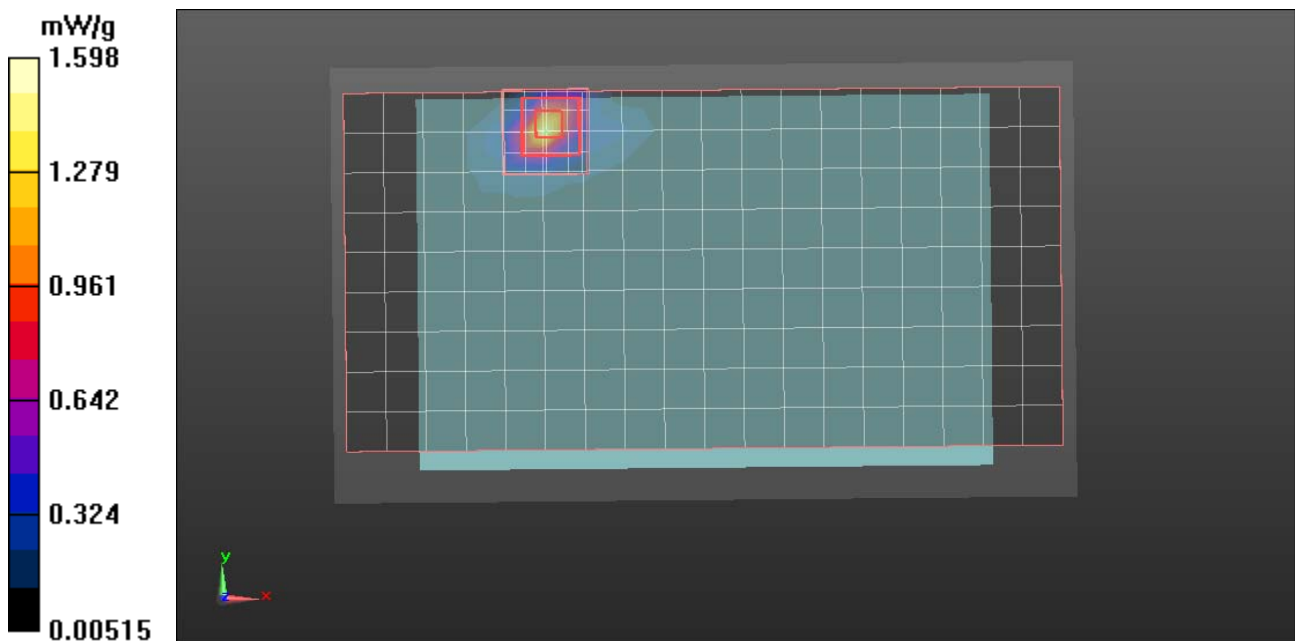
DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 5.650 V/m ; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 4.298 W/kg

SAR(1 g) = 1.38 mW/g ; SAR(10 g) = 0.509 mW/g

Maximum value of SAR (measured) = 1.598 mW/g



Test Laboratory: Motorola Mobility GPRS 850 Left Edge

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: 5 Battery Model #: INTERNAL Test Configuration = Left Edge 0mm from Phantom
Communication System: GPRS 850 - Class 10; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium: Low Freq Body; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Extended Phone (15mm) (8x23x1): Measurement grid:

$dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.351 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$,

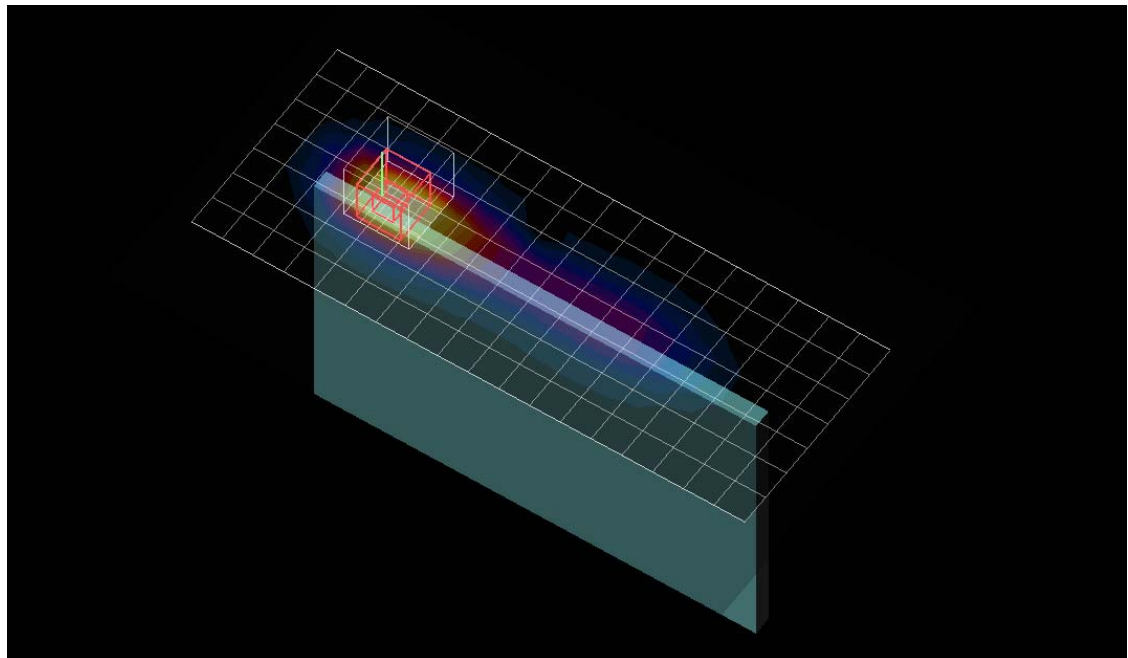
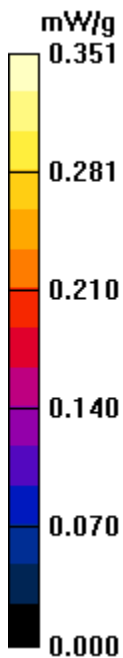
$dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 21.6 V/m; Power Drift = -0.163 dB

Peak SAR (extrapolated) = 0.636 W/kg

SAR(1 g) = 0.389 mW/g; SAR(10 g) = 0.230 mW/g

Maximum value of SAR (measured) = 0.434 mW/g



Test Laboratory: Motorola Mobility WCDMA 850 Left Edge

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test Configuration = Left Edge 0mm from Phantom

Communication System: 3G-WCDMA 850; Frequency: 836 MHz; Duty Cycle: 1:1

Medium: Low Freq Body; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 54.1$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Extended Phone (15mm) (8x23x1): Measurement grid:

$dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.336 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$), - to correct max out (5x5x7)/Cube 0:

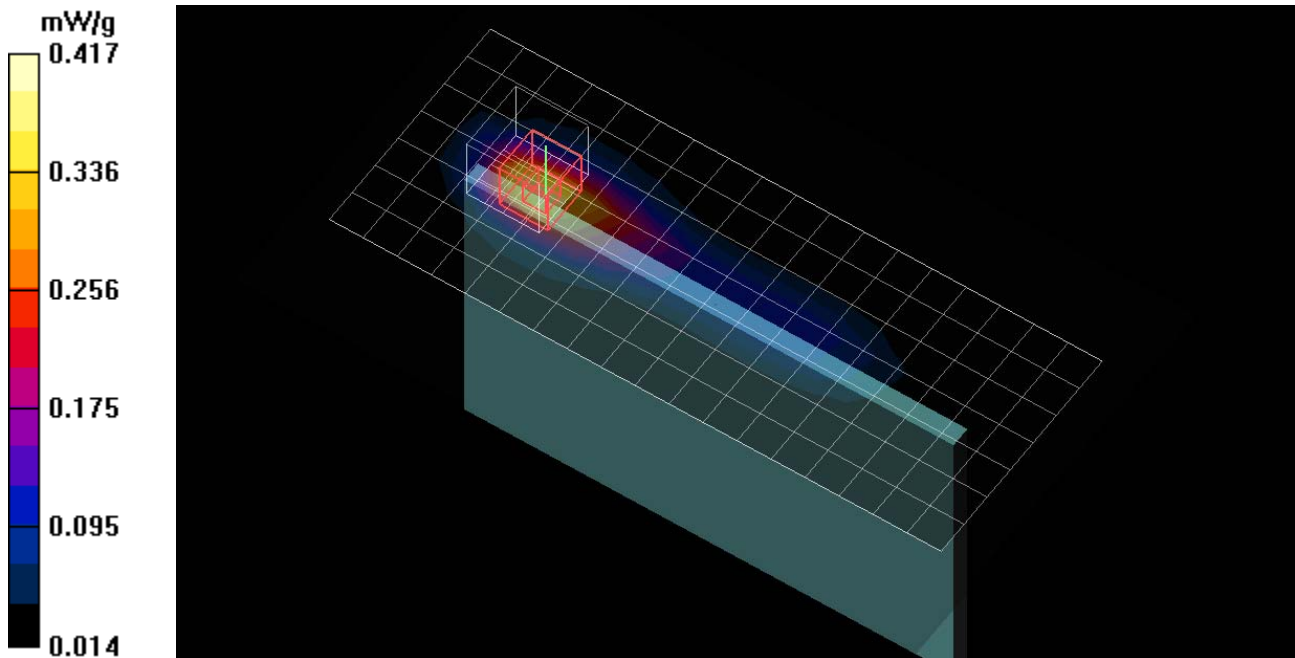
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 20.7 V/m; Power Drift = 0.055 dB

Peak SAR (extrapolated) = 0.612 W/kg

SAR(1 g) = 0.376 mW/g; SAR(10 g) = 0.225 mW/g

Maximum value of SAR (measured) = 0.417 mW/g



Test Laboratory: Motorola Mobility GPRS 1900 Left Edge

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: 0 Battery Model #: INTERNAL Test Configuration = Left Edge 0mm from Phantom

Communication System: GPRS 1900 - Class 10; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium: Regular Glycol Body 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.59$ mho/m; $\epsilon_r = 50.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.61, 4.61, 4.61); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Extended Phone (15mm) (8x23x1): Measurement grid:

$dx=15$ mm, $dy=15$ mm

Maximum value of SAR (measured) = 0.352 mW/g

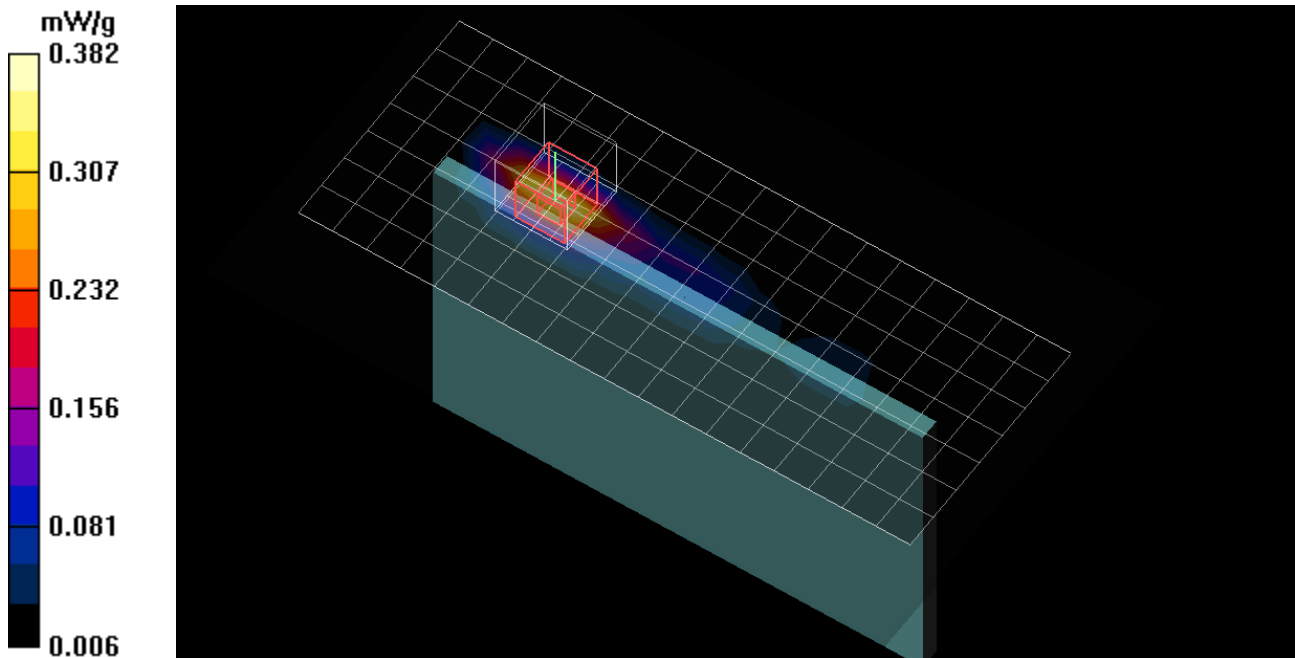
Triple Flat Phone Template/5x5x7 Zoom Scan (≤ 3 GHz) (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 15.1 V/m; Power Drift = -0.186 dB

Peak SAR (extrapolated) = 0.598 W/kg

SAR(1 g) = 0.334 mW/g; SAR(10 g) = 0.174 mW/g

Maximum value of SAR (measured) = 0.382 mW/g



Test Laboratory: Motorola Mobility WCDMA 1900 Left Edge

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test Configuration = Left Edge 0mm from Phantom

Communication System: 3G/WCDMA 1900; Frequency: 1907.5 MHz; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.58$ mho/m; $\epsilon_r = 50.9$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.61, 4.61, 4.61); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Extended Phone (15mm) (8x23x1): Measurement grid:

dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.00 mW/g

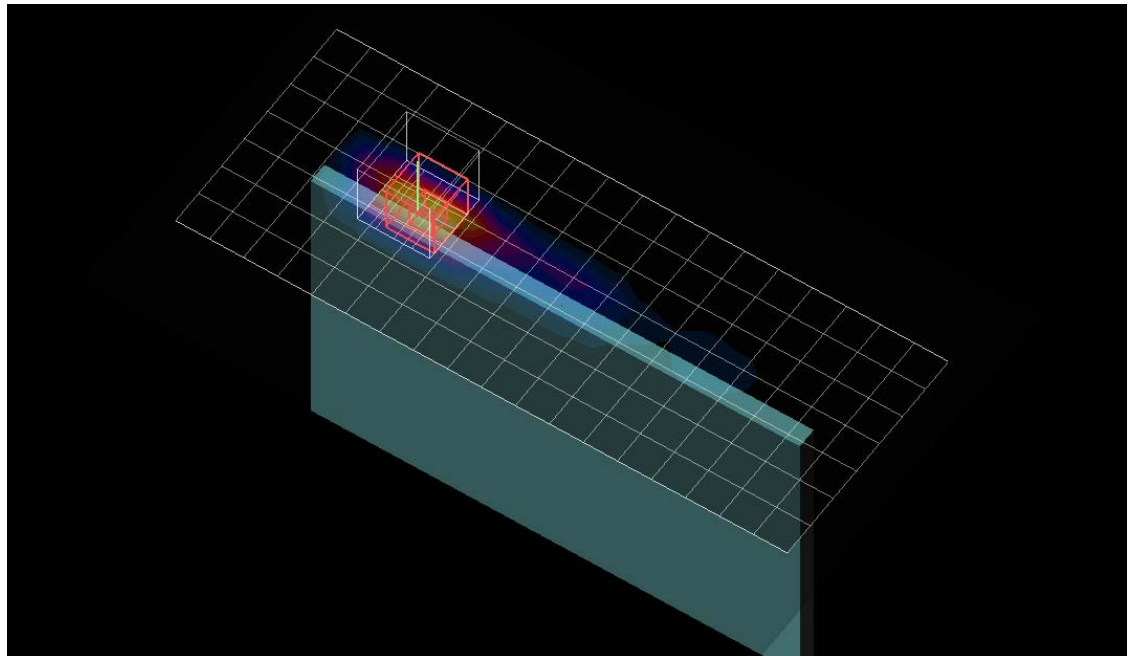
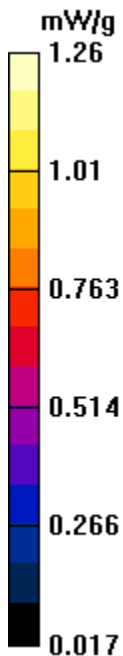
Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 27.5 V/m; Power Drift = 0.004 dB

Peak SAR (extrapolated) = 2.05 W/kg

SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.584 mW/g

Maximum value of SAR (measured) = 1.26 mW/g



Test Laboratory: Motorola Mobility - 2450 MHz WiFi - Right Edge

DUT: Serial: KFLC110069, FCC ID: IHDP56MU2

Procedure Notes: 802.11b 1 Mbps Chn 11 Battery Model #: Internal Test Configuration: Right Edge 0mm from Flat Phantom

Communication System: Wi-Fi 2450; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Glycol Body; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.9$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.12, 4.12, 4.12); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Tablet Long Edge Area Scan - Body (10mm) (28x8x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.278 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (≤ 3 GHz), - to correct max out (5x5x7)/Cube 0:

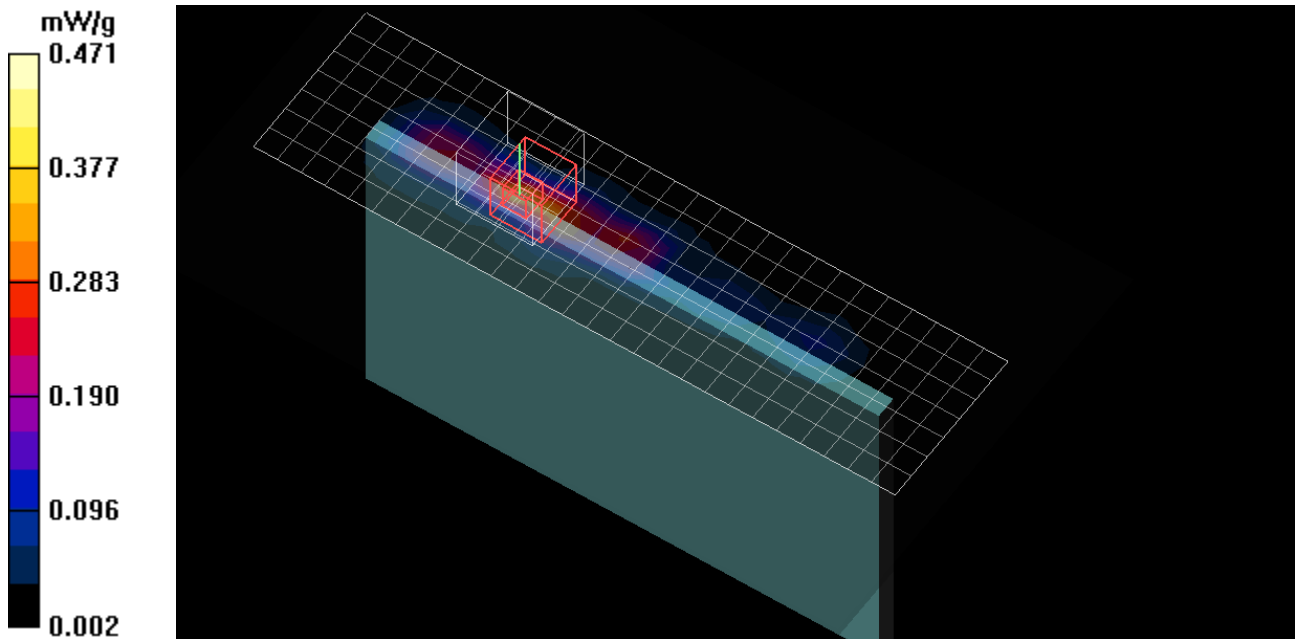
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.6 V/m; Power Drift = 0.058 dB

Peak SAR (extrapolated) = 0.790 W/kg

SAR(1 g) = 0.310 mW/g; SAR(10 g) = 0.131 mW/g

Maximum value of SAR (measured) = 0.471 mW/g



Test Laboratory: Motorola Mobility GPRS 850 Back Surface w/o Pwr Reduction

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: 5 Battery Model #: INTERNAL Test Configuration = Back of Tablet 11mm from Phantom
Communication System: GPRS Class 10; Frequency: 848.8 MHz; Duty Cycle: 1:4.15

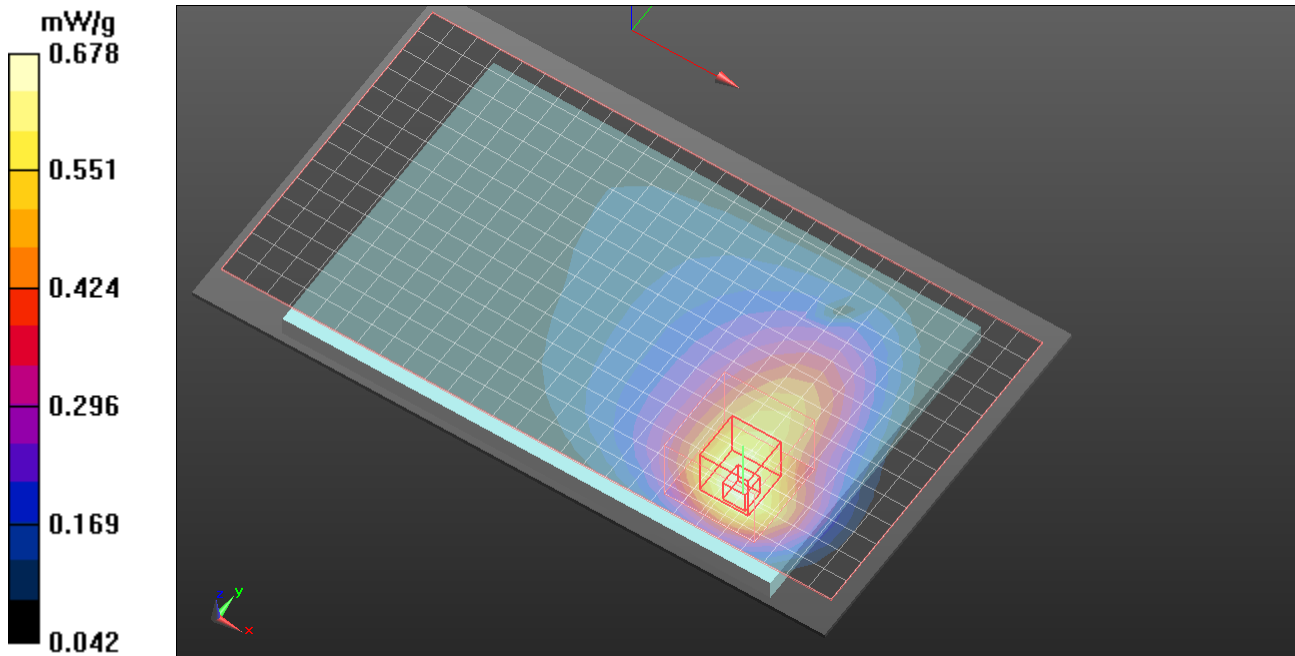
Medium: Low Freq Body; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 55.8$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(6.04, 6.04, 6.04); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/Area Scan - Full Body (10mm) (28x17x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$
Maximum value of SAR (measured) = 0.667 mW/g

DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) (6x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 25.166 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.946 W/kg
SAR(1 g) = 0.629 mW/g; SAR(10 g) = 0.421 mW/g
Maximum value of SAR (measured) = 0.678 mW/g



Test Laboratory: Motorola Mobility WCDMA 850 Back Surface w/o Pwr

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test Configuration = Back of Tablet 11mm from Phantom

Communication System: UMTS-FDD (WCDMA); Frequency: 836 MHz; Duty Cycle: 1:1

Medium: Low Freq Body; Medium parameters used: $f = 835$ MHz; $\sigma = 0.99$ mho/m; $\epsilon_r = 55.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(6.04, 6.04, 6.04); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- SEMCAD X Version 14.4.5 (3634)

DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/Area Scan - Full Body (15mm) (19x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.470 mW/g

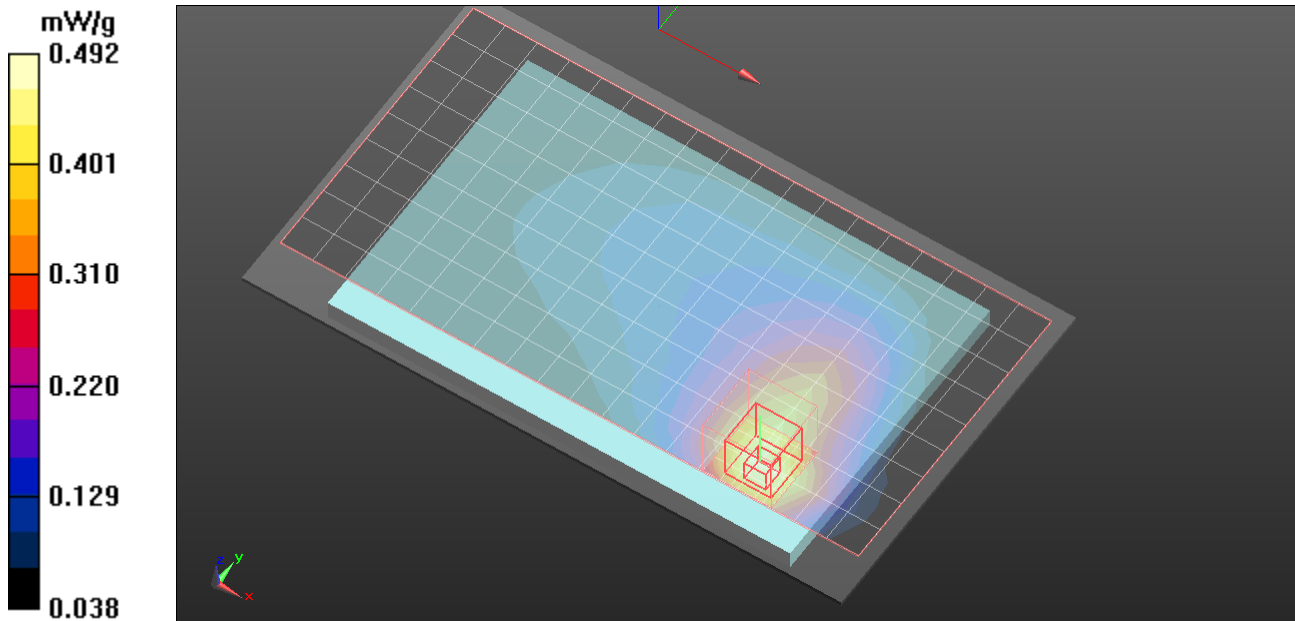
DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/5x5x7 Zoom Scan (≤ 3 GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.600 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.696 W/kg

SAR(1 g) = 0.463 mW/g; SAR(10 g) = 0.308 mW/g

Maximum value of SAR (measured) = 0.492 mW/g



Test Laboratory: Motorola Mobility GPRS 1900 Back Surface w/o Pwr Reduction

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: 0 Battery Model #: INTERNAL Test Configuration = Back of Tablet 11mm from Phantom

Communication System: GPRS Class 10; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium: Regular Glycol Body 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.59$ mho/m; $\epsilon_r = 50.9$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.69, 4.69, 4.69); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/Area Scan - Full Body (15mm) (19x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.985 mW/g

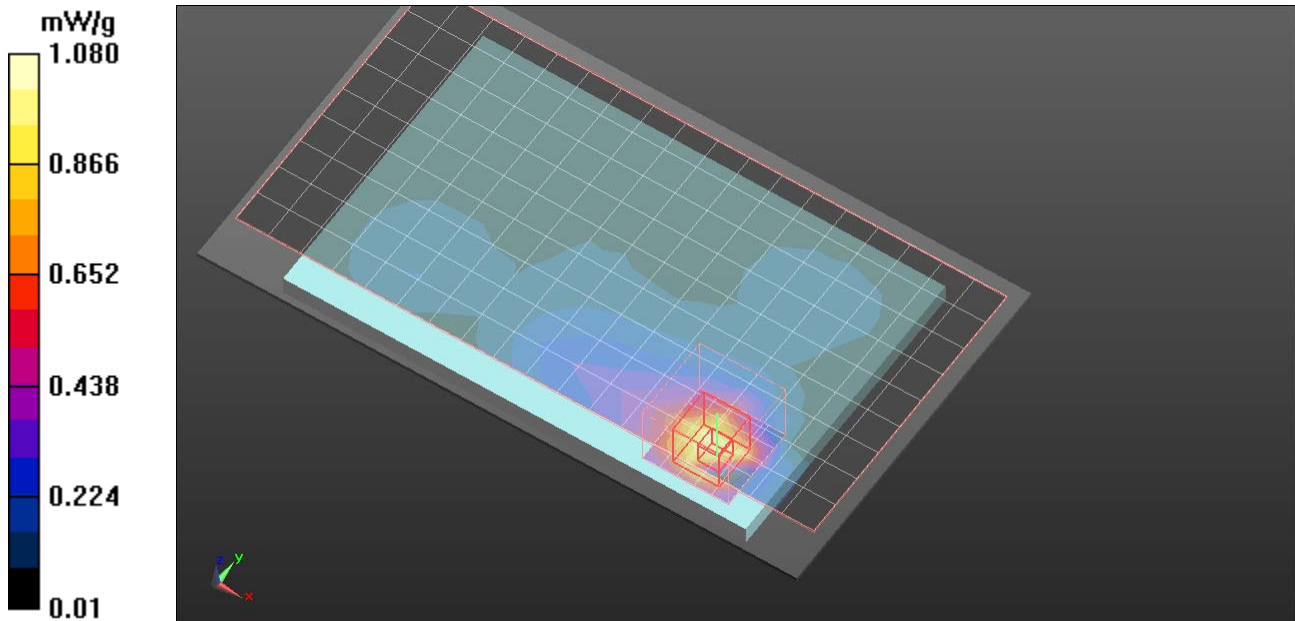
DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/5x5x7 Zoom Scan (≤ 3 GHz) (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.421 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.693 W/kg

SAR(1 g) = 1 mW/g; SAR(10 g) = 0.590 mW/g

Maximum value of SAR (measured) = 1.080 mW/g



Test Laboratory: Motorola Mobility WCDMA 1900 Back Surface w/o Pwr Reduction

DUT: Serial: KFUD010138, FCC ID: IHDP56MJ1

Procedure Notes: Pwr Step: 0 Battery Model #: INTERNAL Test Configuration = Back of Tablet 11mm from Phantom

Communication System: UMTS-FDD (WCDMA); Frequency: 1852.4 MHz; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.58$ mho/m; $\epsilon_r = 50.7$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.69, 4.69, 4.69); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- SEMCAD X Version 14.4.5 (3634)

DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/Area Scan - Full Body (15mm) (19x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.804 mW/g

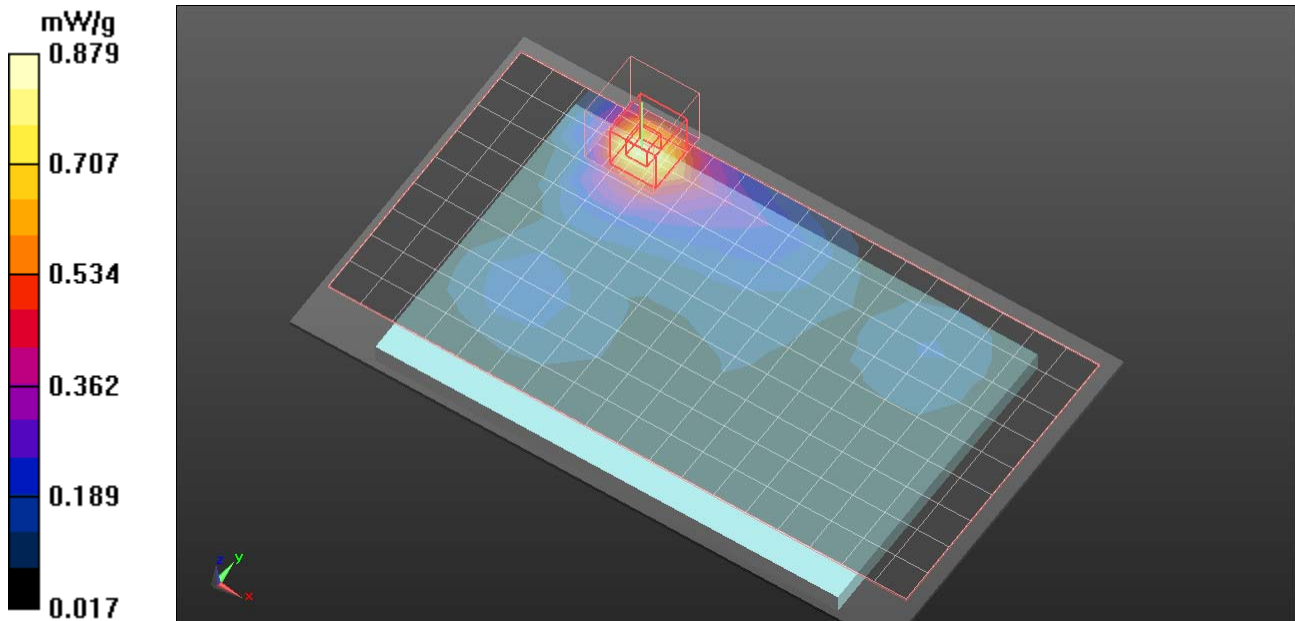
DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/5x5x7 Zoom Scan (≤ 3 GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.449 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.429 W/kg

SAR(1 g) = 0.815 mW/g; SAR(10 g) = 0.464 mW/g

Maximum value of SAR (measured) = 0.879 mW/g



Appendix 3

Measurement Uncertainty Budget

Uncertainty Budget for Device Under Test, for 735 MHz to 2 GHz

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i> = <i>f</i> (<i>d</i> , <i>k</i>)	<i>f</i>	<i>g</i>	<i>h</i> = <i>c</i> × <i>f</i> / <i>e</i>	<i>i</i> = <i>c</i> × <i>g</i> / <i>e</i>	<i>k</i>
Uncertainty Component	Description IEEE1528(2003) / IEC62209-1(2005)	Tol. (± %)	Prob Dist	Div.	<i>c_i</i> (1 g)	<i>c_i</i> (10 g)	1 g <i>u_i</i> (±%)	10 g <i>u_i</i> (±%)	<i>v_i</i>
Measurement System									
Probe Calibration [ES3DV3]	E.2.1 / 7.2.1	6.0	N	1.00	1	1	6.0	6.0	∞
Axial Isotropy	E.2.2 / 7.2.1.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2 / 7.2.1.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3 / 7.2.1.5	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4 / 7.2.1.3	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5 / 7.2.1.4	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6 / 7.2.1.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7 / 7.2.1.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8 / 7.2.1.8	1.1	R	1.73	1	1	0.6	0.6	∞
RF Ambient Conditions - Noise	E.6.1 / 7.2.3.6	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1 / 7.2.3.6	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mech. Tolerance	E.6.2 / 7.2.2.1	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t Phantom	E.6.3 / 7.2.2.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5 / 7.2.4	3.4	R	1.73	1	1	2.0	2.0	∞
Test sample Related									
Test Sample Positioning	E.4.2 / 7.2.2.4	3.4	N	1.00	1	1	3.4	3.4	79
Device Holder Uncertainty	E.4.1 / 7.2.2.4.2	4.5	N	1.00	1	1	4.5	4.5	11
SAR drift	6.6.2 / 7.2.3.5	0.0	R	1.73	1	1	0.0	0.0	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1 / 7.2.2.2	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2 / 7.2.3.3	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3 / 7.2.3.3	2.5	N	1.00	0.64	0.43	1.6	1.1	6
Liquid Permittivity (target)	E.3.2 / 7.2.3.4	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.2 / 7.2.3.4	2.3	N	1.00	0.6	0.49	1.4	1.1	6
Combined Standard Uncertainty									
			RSS				11	11	424
Expanded Uncertainty (95% CONFIDENCE LEVEL)									
			<i>k</i> =2				22	21	

Uncertainty Budget for Device Under Test, for 2 GHz to 3 GHz

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i> = <i>f</i> (<i>d</i> , <i>k</i>)	<i>f</i>	<i>g</i>	<i>h</i> = <i>c</i> × <i>f</i> / <i>e</i>	<i>i</i> = <i>c</i> × <i>g</i> / <i>e</i>	<i>k</i>
Uncertainty Component	Description IEEE1528(2003) / IEC62209-1(2005)	Tol. (± %)	Prob Dist	Div.	<i>c_i</i> (1 g)	<i>c_i</i> (10 g)	1 g <i>u_i</i> (±%)	10 g <i>u_i</i> (±%)	<i>v_i</i>
Measurement System									
Probe Calibration [ES3DV3]	E.2.1 / 7.2.1	5.5	N	1.00	1	1	5.5	5.5	∞
Axial Isotropy	E.2.2 / 7.2.1.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2 / 7.2.1.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3 / 7.2.1.5	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4 / 7.2.1.3	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5 / 7.2.1.4	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6 / 7.2.1.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7 / 7.2.1.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8 / 7.2.1.8	1.1	R	1.73	1	1	0.6	0.6	∞
RF Ambient Conditions - Noise	E.6.1 / 7.2.3.6	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1 / 7.2.3.6	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mech. Tolerance	E.6.2 / 7.2.2.1	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t Phantom	E.6.3 / 7.2.2.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5 / 7.2.4	3.4	R	1.73	1	1	2.0	2.0	∞
Test sample Related									
Test Sample Positioning	E.4.2 / 7.2.2.4	3.4	N	1.00	1	1	3.4	3.4	79
Device Holder Uncertainty	E.4.1 / 7.2.2.4.2	4.5	N	1.00	1	1	4.5	4.5	11
SAR drift	6.6.2 / 7.2.3.5	0.0	R	1.73	1	1	0.0	0.0	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1 / 7.2.2.2	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2 / 7.2.3.3	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3 / 7.2.3.3	2.5	N	1.00	0.64	0.43	1.6	1.1	6
Liquid Permittivity (target)	E.3.2 / 7.2.3.4	10.0	R	1.73	0.6	0.49	3.5	2.8	∞
Liquid Permittivity (measurement)	E.3.2 / 7.2.3.4	2.3	N	1.00	0.6	0.49	1.4	1.1	6
Combined Standard Uncertainty									
			RSS				11	11	392
Expanded Uncertainty (95% CONFIDENCE LEVEL)									
			<i>k</i> =2				22	22	

Appendix 4

Probe Calibration Certificate



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_Aug11**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3124**

Calibration procedure(s) **QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes**

Calibration date: **August 23, 2011**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	
Issued: August 23, 2011			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			



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
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,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:

- 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
- 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:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,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.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,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 NORM_{x,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
Calibrated: August 23, 2011

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 ($\mu\text{V}/(\text{V/m})^2$) ^A	1.26	1.30	1.30	$\pm 10.1 \%$
DCP (mV) ^B	100.9	98.2	100.9	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	116.0	$\pm 2.7 \%$
			Y	0.00	0.00	1.00	109.7	
			Z	0.00	0.00	1.00	115.4	

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

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

^B Numerical linearization parameter; uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^c	Relative Permittivity ^f	Conductivity (S/m) ^f	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.26	6.26	6.26	1.00	1.00	± 12.0 %
835	41.5	0.90	6.08	6.08	6.08	1.00	1.00	± 12.0 %
1810	40.0	1.40	5.03	5.03	5.03	1.00	1.12	± 12.0 %
1950	40.0	1.40	4.83	4.83	4.83	1.00	1.12	± 12.0 %
2450	39.2	1.80	4.40	4.40	4.40	1.00	1.12	± 12.0 %

^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^f At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

Calibration Parameter Determined in Body Tissue Simulating Media

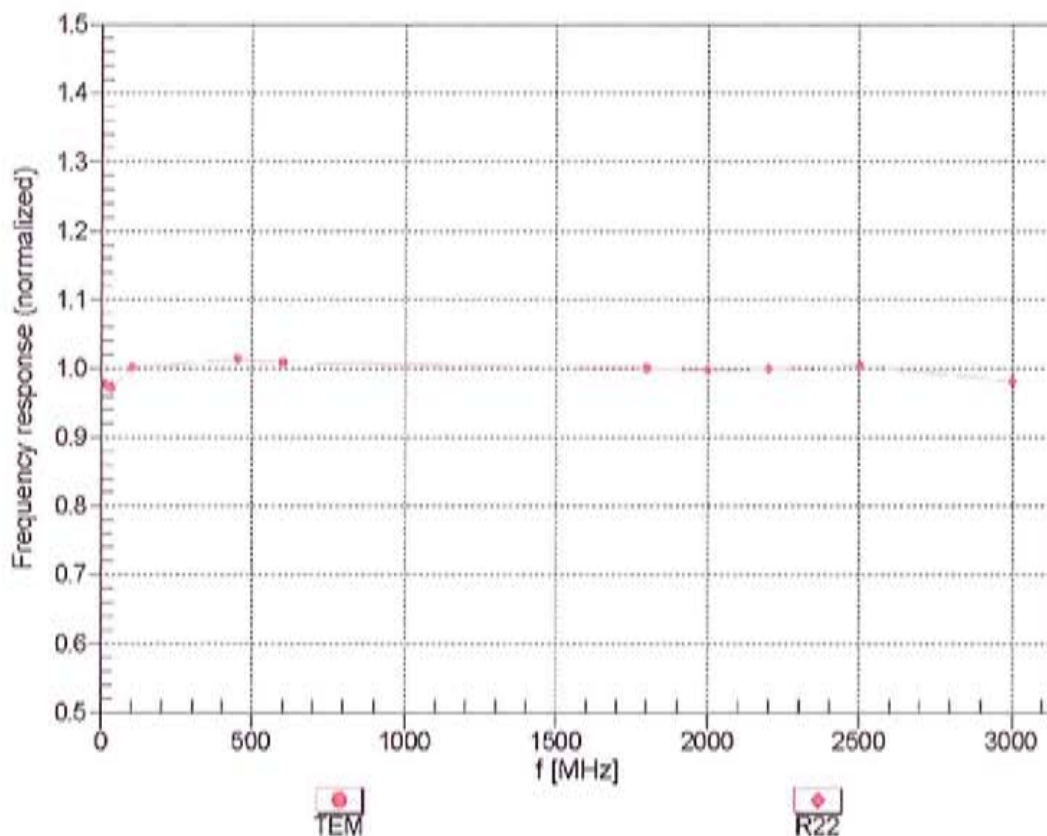
f (MHz) ^c	Relative Permittivity ^f	Conductivity (S/m) ^f	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.09	6.09	6.09	1.00	1.00	± 12.0 %
835	55.2	0.97	6.04	6.04	6.04	1.00	1.00	± 12.0 %
1810	53.3	1.52	4.69	4.69	4.69	1.00	1.18	± 12.0 %
1950	53.3	1.52	4.70	4.70	4.70	1.00	1.16	± 12.0 %
2450	52.7	1.95	4.21	4.21	4.21	1.00	1.00	± 12.0 %

^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^f At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

Frequency Response of E-Field

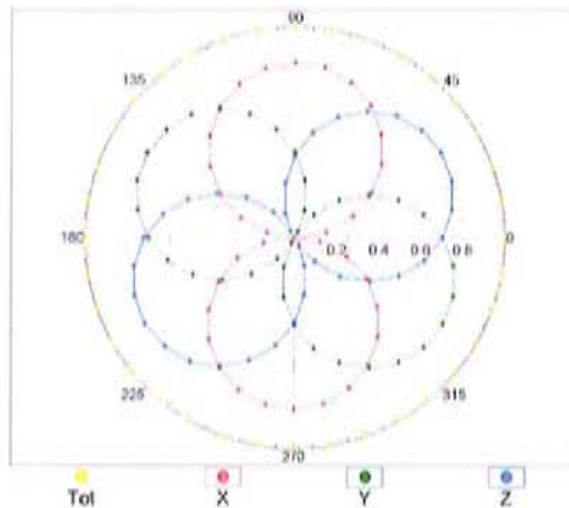
(TEM-Cell: ifi110 EXX, Waveguide: R22)



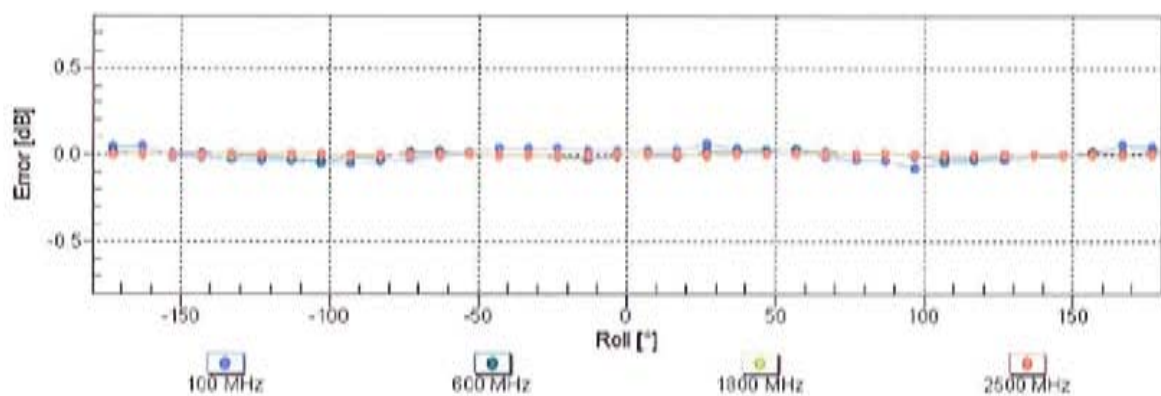
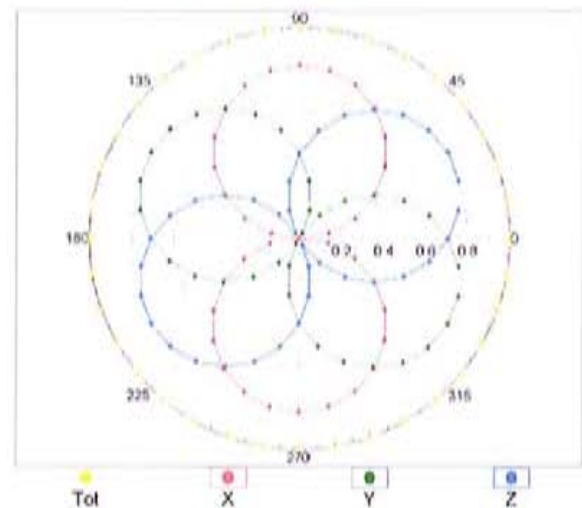
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

Receiving Pattern (ϕ), $\theta = 0^\circ$

f=600 MHz, TEM

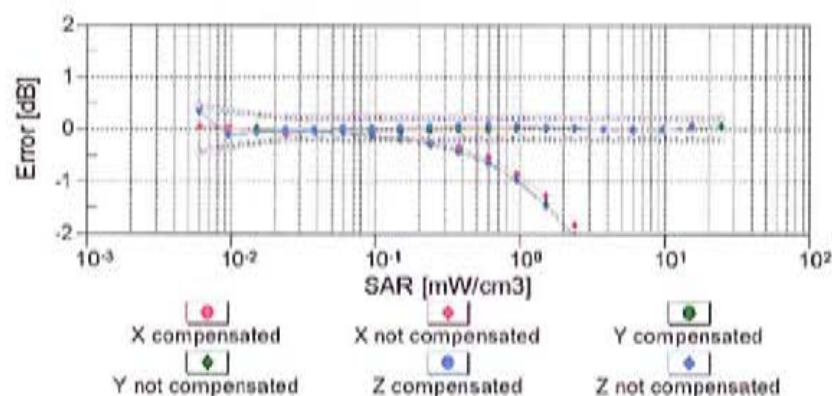
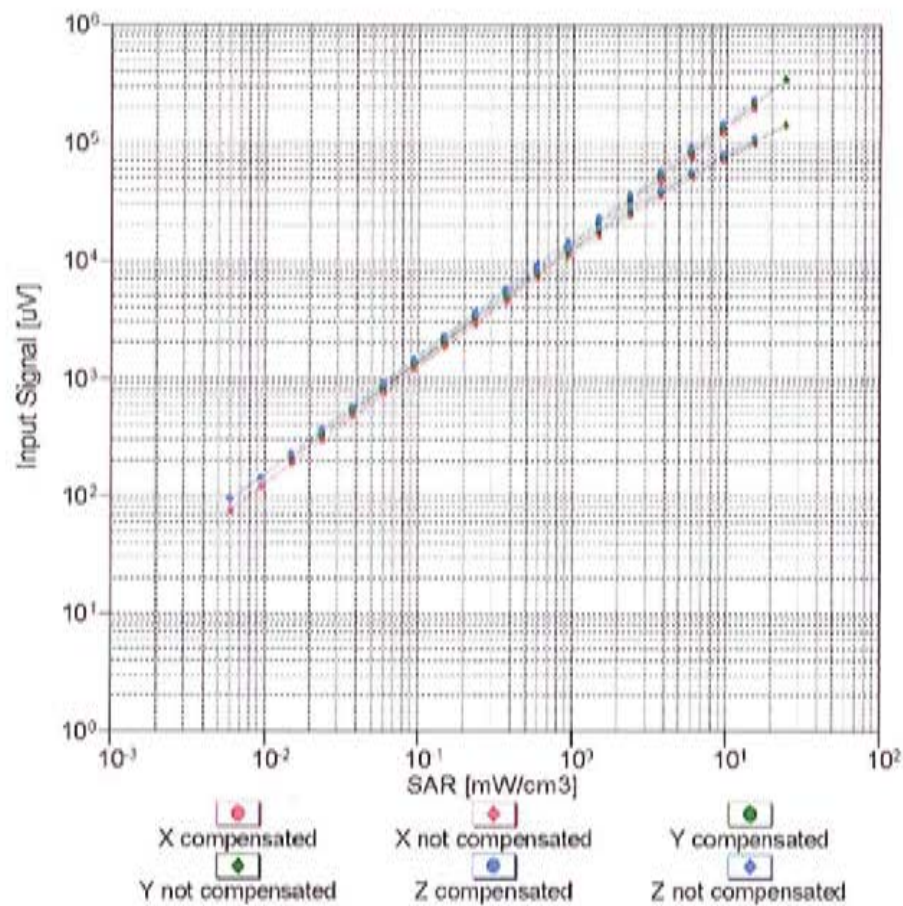


f=1800 MHz, R22



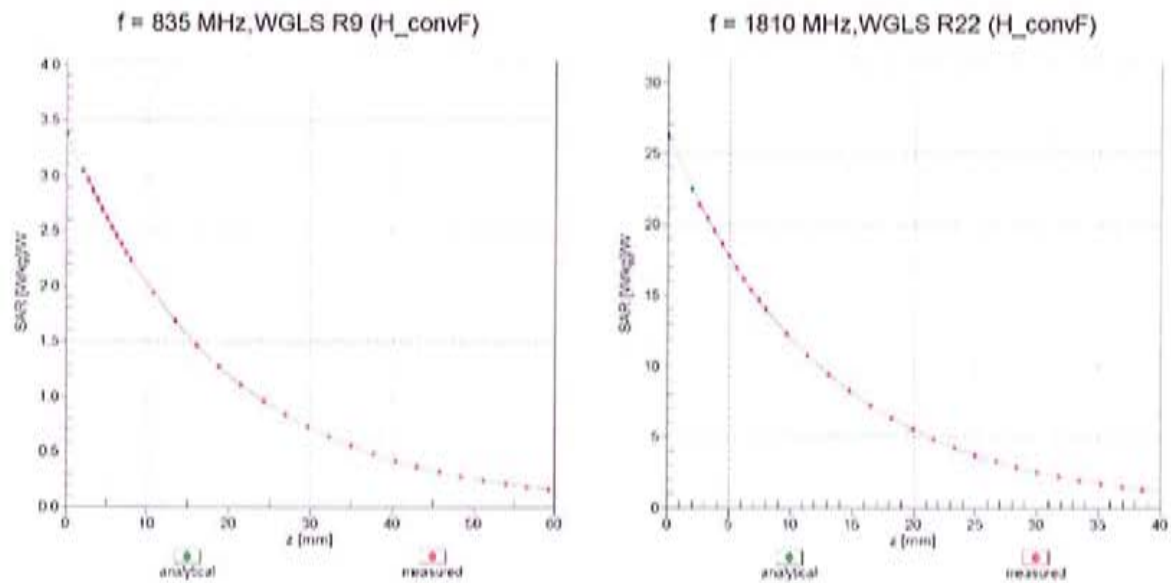
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

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



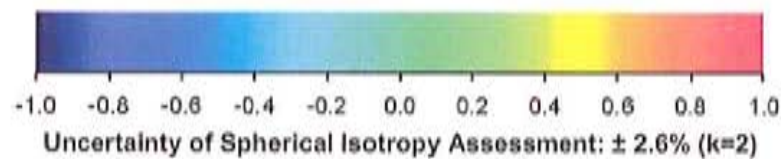
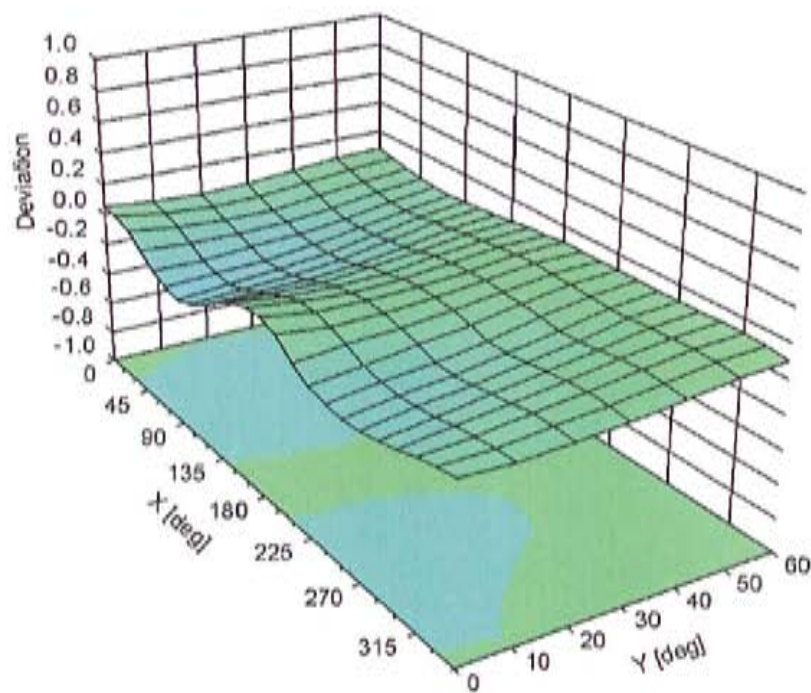
Uncertainty of Linearity Assessment: $\pm 0.6\%$ (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ , θ), $f = 900 \text{ MHz}$



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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm



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

Accreditation No.: **SCS 108**

Client **Motorola MDb**

Certificate No: **ES3-3115_Jan11**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3115**

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

Calibration date: **January 12, 2011**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 660	20-Apr-10 (No. DAE4-660_Apr10)	Apr-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: January 13, 2011

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,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:

- 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
- 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:

- NORM_{x,y,z}:** Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E^2 -field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,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.
- DCP_{x,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.
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,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 NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy):** in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset:** The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3115

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

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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

Basic Calibration Parameters

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

Modulation Calibration Parameters

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

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

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

^B Numerical linearization parameter: uncertainty not required.

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

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

Calibration Parameter Determined in Head Tissue Simulating Media

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

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

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

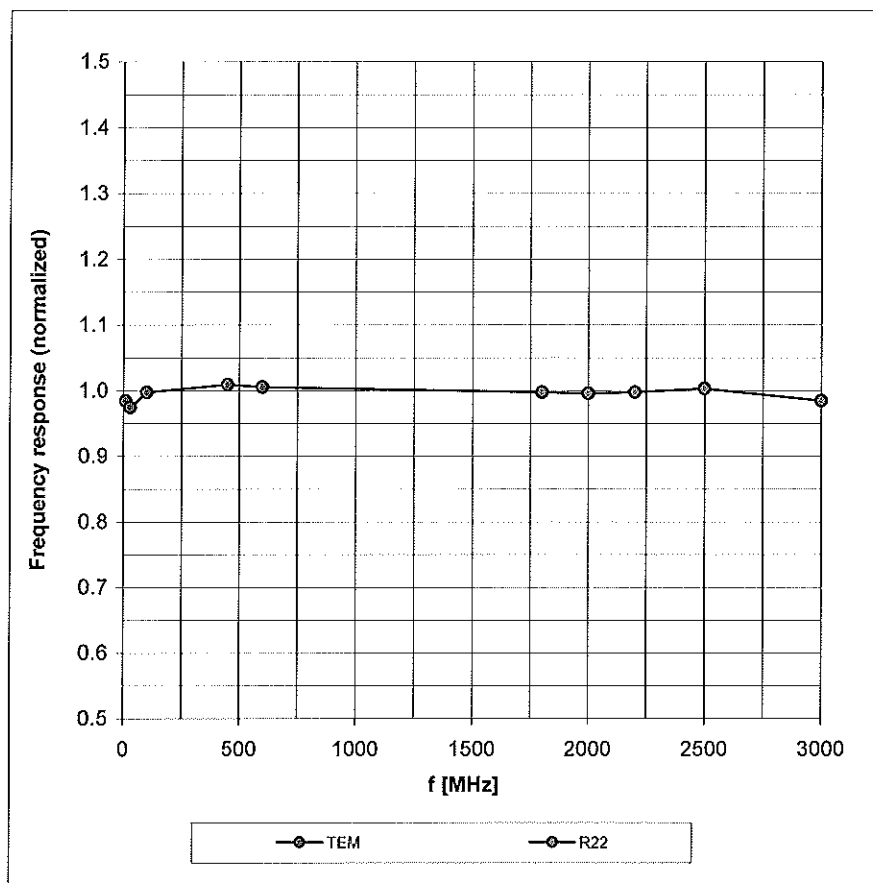
Calibration Parameter Determined in Body Tissue Simulating Media

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

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

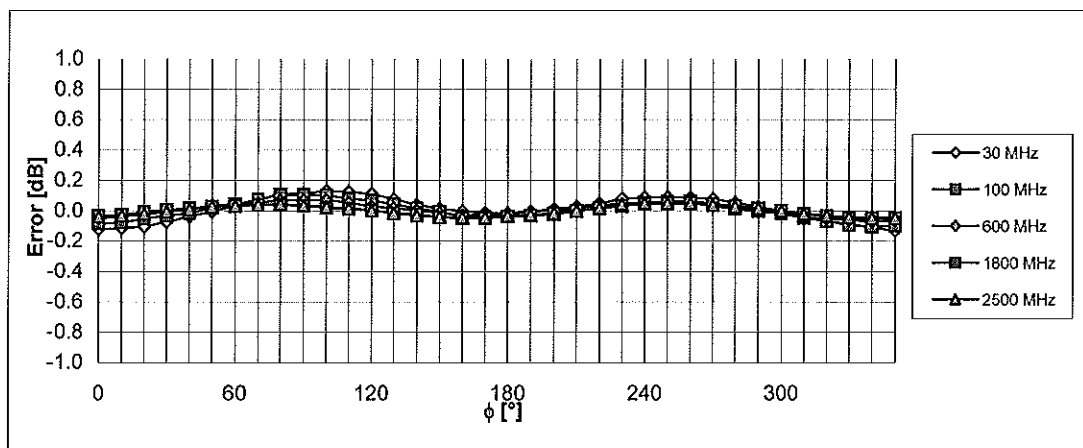
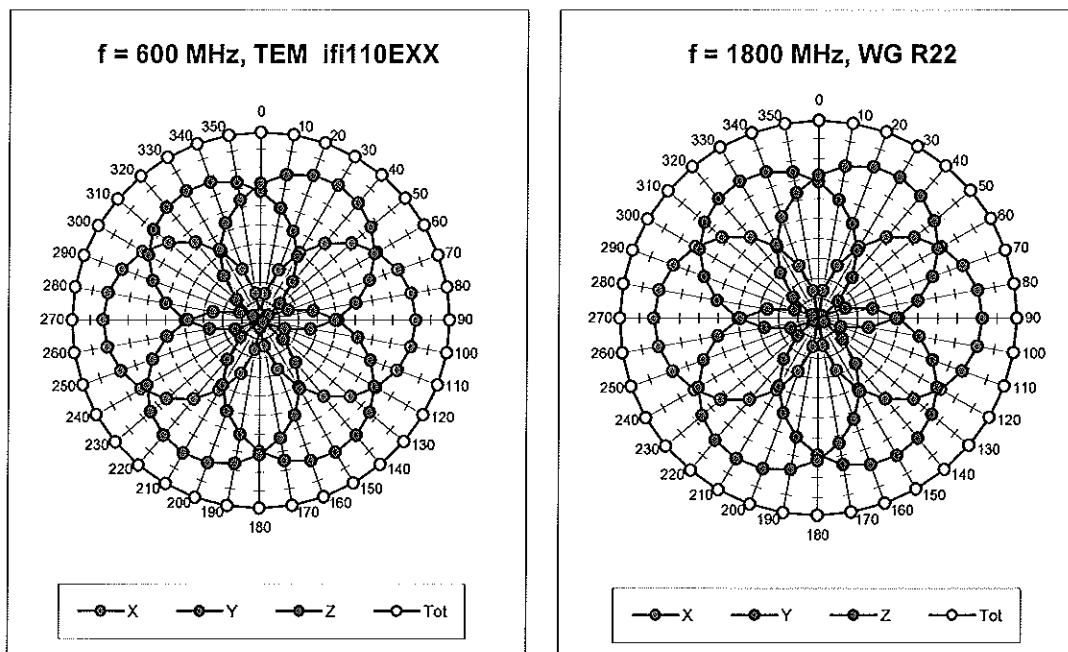
Frequency Response of E-Field

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



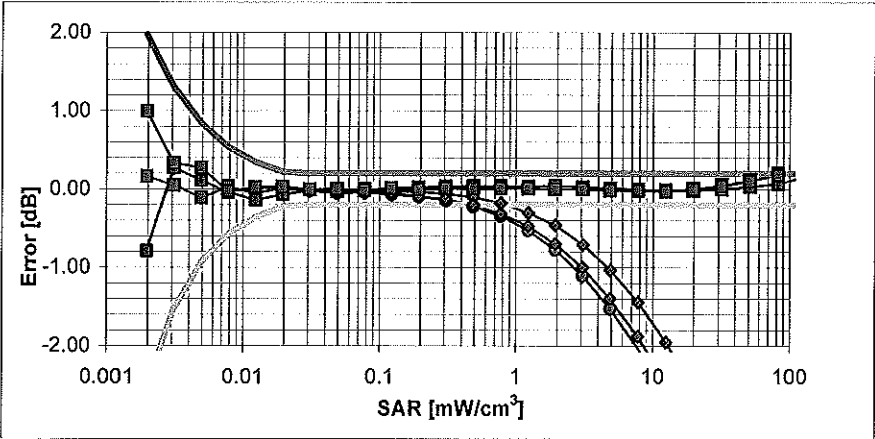
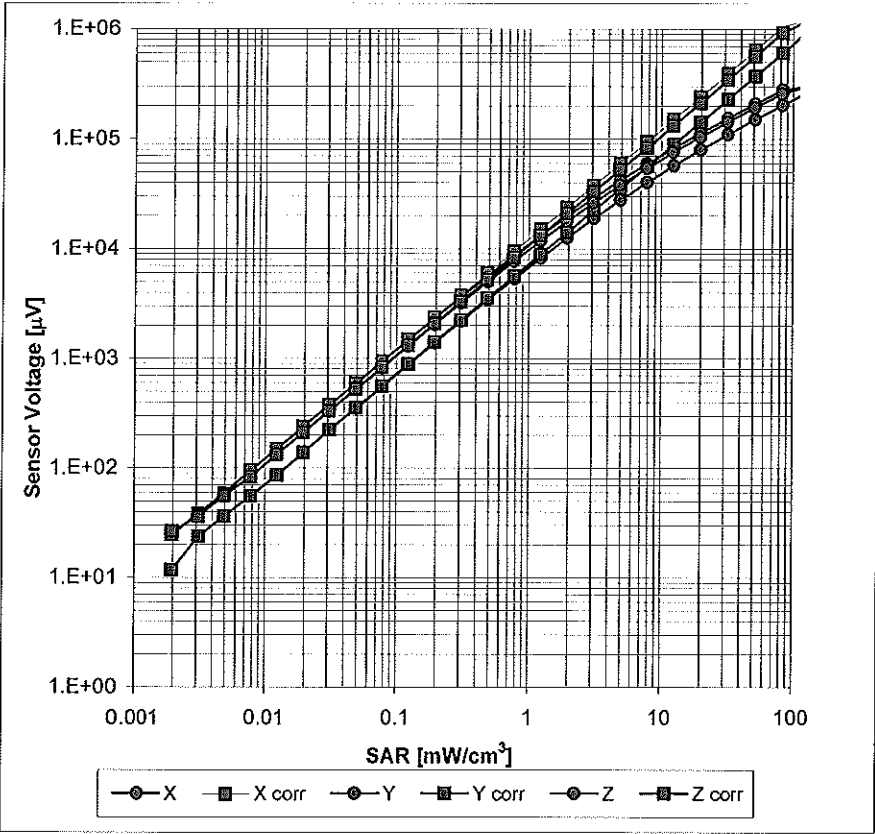
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

Receiving Pattern (ϕ), $\vartheta = 0^\circ$



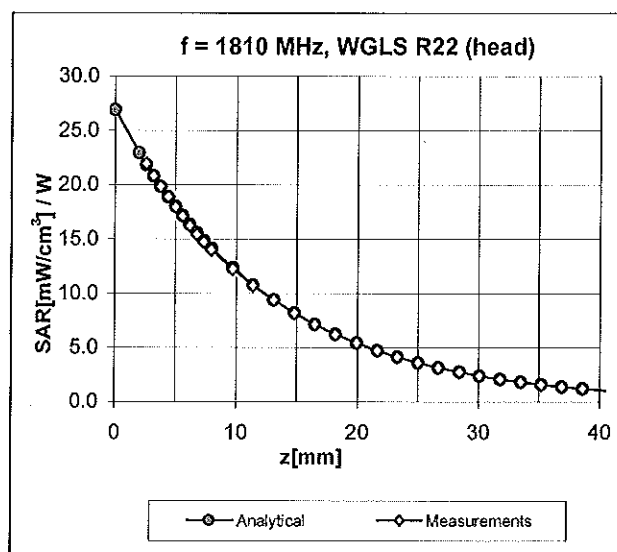
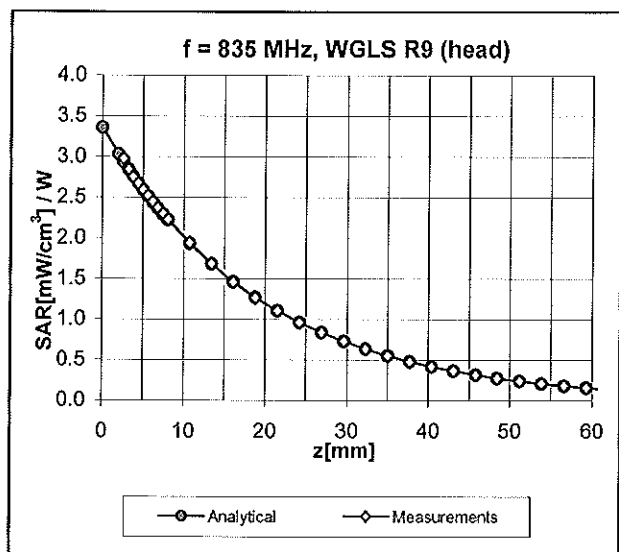
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

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



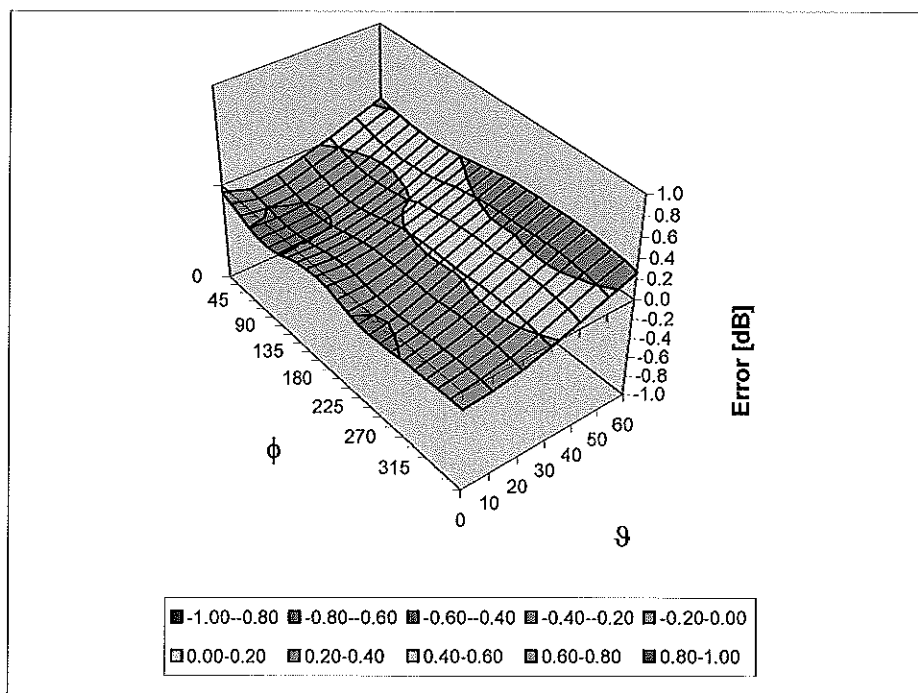
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in HSL

Error (ϕ , θ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ (k=2)

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm