

**MOTOROLA**

Portable Cellular Phone SAR Test Report

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

Test Report #: 24754-1F Rev. B
Date of Report: Oct-18-2011, revised on Nov-1-2011
Date of Test: Sep-28-2011 to Oct-14-2011
FCC ID #: IHDP56MN1
Generic Name: M0C1C

Test Laboratory: Motorola Mobility, Inc. - ADR Test Services Laboratory
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A handwritten signature in black ink, appearing to read 'Thomas Knipple'.

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

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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Appendix 6: Measurement Uncertainty Budget

Appendix 7: Probe Calibration Certificate

Appendix 8: Dipole Characterization Certificate

Revision History

Revision Version	Date	Notes
Rev. 0	18-Oct-2011	Initial report release
Rev. A	2-Nov-2011	Various modifications to address TCB inquiries.

1. Introduction

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

For ICNIRP (10 g), the final SAR reading for this phone is 0.54 W/kg for head-adjacent use and 0.41 W/kg for body-worn use. For ANSI / IEEE C95.1 (1 g), the final stand-alone SAR readings for this phone 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.

Transmit Band	Head SAR (1 g ^W/kg)	Body-Worn SAR (1 g ^W/kg)	Mobile Hotspot SAR (1 g ^W/kg)
LTE Band 13	0.70	0.55	1.28
CDMA 800	0.46	0.43	0.87
CDMA 1900	0.31	0.58	1.00

SAR test results for head, body-worn, and mobile hotspot testing in the Wi-Fi 2450 MHz transmit band are provided in report [IHDP56MN1_WLAN_SAR_Report.pdf](#), included within the Exhibit 11 documents.

2. Description of the Device Under Test

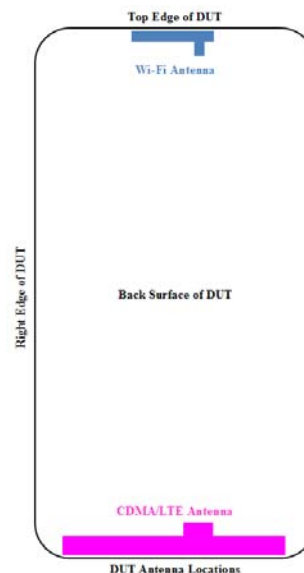
2.1 Antenna description

CDMA/LTE (782/800/1900 MHz) Antenna

Type	Internal	
Location	Bottom Rear of Transceiver	
Dimensions	Width	7.53 mm
	Length	58.06 mm

Bluetooth/Wi-Fi 2 GHz Antenna

Type	Internal	
Location	Top Rear of Transceiver	
Dimensions	Width	8.80 mm
	Length	18.70 mm



2.2 Device Signaling

Serial Number(s) (Functional Use)	LM5V160008	(CDMA conducted power measurements, CDMA SAR testing,)
	99000052958492	(LTE conducted power measurements, LTE SAR testing, Wi-Fi SAR testing)
	99000052952365	(Wi-Fi conducted power measurements, Bluetooth conducted power measurements)
Production Unit or Identical Prototype (47 CFR §2.908)	Identical Prototype	
Device Category	Portable	
RF Exposure Limits	General Population / Uncontrolled	

Mode(s) of Operation	Modulation Mode(s)	Maximum Output Power Setting	Duty Cycle	Transmitting Frequency Range(s)
LTE Band 13	QPSK, 16QAM	24.0 dBm	1:1	782 MHz (1 Channel, 10 MHz wide)
CDMA 800	QPSK	25.0 dBm	1:1	824.70 - 848.31 MHz
CDMA 1900	QPSK	25.0 dBm	1:1	1851.25 - 1908.75 MHz
Wi-Fi 802.11b/g/n	BPSK	20.1 dBm	1:1	2412.0 - 2462 MHz
Bluetooth	GFSK	9.5 dBm	1:1	2402.0 - 2483.5 MHz

Note: This device supports voice call functionality over GSM and WCDMA on non-US cellular networks. The GSM/WCDMA network functions have been disabled by firmware and are SIM locked for all US operators. Further information regarding this functionality is contained within Exhibit 12.

2.2.1 LTE Device Description

LTE Summary Information per FCC KDB 941225

	FCC ID			IHDP56MN1
	Form Factor			Handset
1	Frequency Range			777 MHz - 787 MHz
2	Channel Bandwidths			10 MHz
3	L,M,H Channel Numbers and Frequencies			
	Low	Mid	High	
	N/A	23230 (782 MHz)	N/A	
4	UE Category			1
	Modulations Supported			QPSK, 16QAM
5	Description of LTE Tx and Antenna Implementation			1 TX/RX Antenna; 1 RX Antenna
6	LTE Voice Available?			Yes (VOIP Only)
	Hotspot with LTE + Wi-Fi?			Yes
	Hotspot with LTE + Wi-Fi active with 1x Voice sessions?			Yes
7 (a)	LTE MPR Permanently Implemented per 3GPP TS 36.101?			Yes
7 (b)	A-MPR disabled (by setting NS=01 on the R&S CMW500)?			Yes
8	Conducted power table providing 1 RB (lower and upper edge), 50% RB (centered) and 100% RB			Yes
9	Table provided specifying other US wireless operating modes?			Yes
10	Table provided specifying maximum average conducted power for these other wireless modes			Yes
11	Table provided identifying simultaneous transmission conditions?			Yes
12	Power Reduction used for SAR compliance?			Yes (see section 2.2.2)
	Power Reduction used for CDMA?			Yes
	Power Reduction used for LTE?			Yes
	Power Reduction used for svLTE?			Yes
13	Test Equipment used			CMW500 SW version 2.0.20.10

LTE Maximum Power Reduction (MPR) conditions are defined in 3GPP 36-521, section 6.2.3.3:

6.2.3.3 Minimum conformance requirements

For UE Power Class 3, the allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2.2.3-1 due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3.3-1.

Table 6.2.3.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

For the UE maximum output power modified by MPR, the power limits specified in subclause 6.2.5.3 apply. The normative reference for this requirement is TS 36.101 clause 6.2.3.

For the DUT architecture, MPR is permanently implemented. Per the chart above, for a 10 MHz bandwidth the following MPR is used:

Modulation	# of RBs	MPR (dB)
QPSK	>12	1
16 QAM	≤ 12	1
16 QAM	> 12	2

The table applies for any RB start value. RBs are assigned contiguously.

Thus, given a maximum power of 24 dBm and the MPR described above, the power for the SAR test cases are as follows:

Test Case	Max Power (dBm)
QPSK, Start RB: 12, RB Alloc 50%	23
QPSK, Start RB: 0, RB Alloc 100%	23
QPSK, Start RB: 49, RB Alloc: 1 RB @ high channel edge	24
QPSK, Start RB: 0, RB Alloc: 1 RB @ low channel edge	24
16QAM, Start RB: 12, RB Alloc 50%	22
16QAM, Start RB: 0, RB Alloc 100%	22
16QAM, Start RB: 49, RB Alloc: 1 RB @ high channel edge	23
16QAM, Start RB: 0, RB Alloc: 1 RB @ low channel edge	23

2.2.2 Power limit reduction schemes

For specified modes of operation, the DUT utilizes reduced maximum power limits to maintain compliance to SAR exposure limits. Complete descriptions of the following functionalities are provided in the Operational Description contained within Exhibit 12. The implementations to trigger the reductions in power require the device to be radiating, which prevents conducted power measurements of these functionalities without modification of the DUT.

The DUT supports Simultaneous Voice and LTE (svLTE), allowing a CDMA voice call while simultaneously providing an LTE link for data transport on the cellular network. When operating in svLTE, a reduced maximum LTE transmit power limit is enforced to ensure SAR exposure compliance is maintained. When these combinations of functionalities are not in use, the LTE transmitter operates at full maximum power. A table of the reduced limits used for testing are given below.

Mode(s) of Operation	LTE Band 13							
Test Channel	23230							
Modulation	QPSK				16QAM			
RB Allocation	50%	100%	1 RB @HIGH EDGE	1 RB @LOW EDGE	50%	100%	1 RB @HIGH EDGE	1 RB @LOW EDGE
Maximum Output Power Setting (dBm)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Output Power Setting with MPR (dBm)	23.0	23.0	24.0	24.0	22.0	22.0	23.0	23.0
svLTE (without hotspot active) Reduced Maximum Output Power Setting (dBm)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Reduction Target (dB)	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0

The svLTE feature may also operate concurrently during a mobile hotspot session. When operating in svLTE during a mobile hotspot session, an alternate reduced maximum LTE transmit power limit is enforced to ensure SAR exposure compliance is maintained. When these combinations of functionalities are not in use, the LTE transmitter operates at full maximum power. A table of the reduced limits used for testing are given below.

Mode(s) of Operation	LTE Band 13							
Test Channel	23230							
Modulation	QPSK				16QAM			
RB Allocation	50%	100%	1 RB @HIGH EDGE	1 RB @LOW EDGE	50%	100%	1 RB @HIGH EDGE	1 RB @LOW EDGE
Maximum Output Power Setting (dBm)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Output Power Setting with MPR (dBm)	23.0	23.0	24.0	24.0	22.0	22.0	23.0	23.0
svLTE during Mobile Hotspot Reduced Maximum Output Power Setting (dBm)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Reduction Target (dB)	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0

The DUT utilizes reduced limits for the maximum CDMA band transmit power when the mobile hotspot functionality is enabled. These limits are utilized when in a data connection during a mobile hotspot session, and also when in a voice connection for svLTE during a mobile hotspot session. A table of the reduced limits used for testing are given below.

Mode(s) of Operation	CDMA 850	CDMA 1900
Channel Ranges	1013 - 777	25 - 1175
Maximum Output Power Setting (dBm)	25.0	25.0
Reduced Maximum Output Power Setting (dBm)	23.5	17.5
Reduction Target (dB)	-1.5	-7.5

2.3 Device Conducted Power Measurements

2.3.1 LTE modes

Measured Conducted Power (dBm) for LTE modes								
Modulation	Channel Bandwidth	RB Allocation Size	RB Offset	Measured Power (dBm)	Power Limit with MPR (dBm)	MPR Target (dB)	Measured reduction from maximum limit	Notes
QPSK	10 MHz	1	0	24.17	24.0	0	0 dB	-
		1	49	23.80	24.0	0	0 dB	-
		50%	12	22.65	23.0	-1	-1.35 dB	MPR enabled
		100%	0	22.80	23.0	-1	-1.20 dB	MPR enabled
16QAM	10 MHz	1	0	22.90	23.0	-1	-1.10 dB	MPR enabled
		1	49	23.20	23.0	-1	-0.80 dB	MPR enabled
		50%	12	21.95	22.0	-2	-2.05 dB	MPR enabled
		100%	0	22.20	22.0	-2	-1.80 dB	MPR enabled

2.3.2 CDMA modes

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

Measured Conducted Power (dBm) for CDMA modes							
Band	Channel	Loopback		Data ¹		EVDO Rev. O ¹	EVDO Rev. A ¹
		RC3 SO55	RC1 SO55	TDSO SO32 + FCH-SCH	TDSO SO32 + SCH	RTAP 153.6k	Subtype 2 RETAP
CDMA 800	1013	25.13	25.06	23.94	25.21	25.32	25.19
	384	25.14	25.07	23.84	25.22	25.19	25.19
	777	24.87	24.82	23.35	24.96	24.98	24.92
CDMA 1900	25	24.91	25.24	23.05	24.99	25.27	25.07
	600	25.06	25.09	24.38	25.07	25.21	25.07
	1175	25.05	24.87	22.74	22.29	25.20	25.00

¹ The DUT system architecture does not support simultaneous voice and data during a single CDMA session to the cellular network. Operation in this mode is for data transmission only.

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 average conducted power measurements for each mode are shown in the tables below. SAR testing for 802.11 was performed within each transmit band (2.5 GHz) with the transmitter set to the lowest data rate on the default test channels **highlighted in bold** in the tables below. The head and body positions that resulted in the highest SAR values were further tested on the additional channels and higher data rates **highlighted in pink** in the tables below.

SAR test results for head, body-worn, and mobile hotspot testing in the Wi-Fi 2450 MHz transmit band are provided in report [IHDP56MN1 WLAN SAR Report.pdf](#), included within the Exhibit 11 documents.

Band	Channel	Measured Average Conducted Power (dBm) for 802.11b Mode Data Rates			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
Wi-Fi 2450 MHz	1	18.05	18.19	19.33	19.45
	6	18.74	18.84	19.94	20.08
	11	18.81	19.01	20.09	20.09

Band	Channel	Measured Average Conducted Power (dBm) for 802.11g Mode Data Rates							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
Wi-Fi 2450 MHz	1	18.02	18.13	17.62	17.66	16.35	16.36	14.94	15.06
	6	18.71	18.68	18.22	18.32	16.84	16.82	15.52	15.56
	11	18.84	18.85	18.44	18.39	17.13	17.06	15.71	15.74

Band	Channel	Measured Average Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 800 ns Guard Interval)							
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
Wi-Fi 2450 MHz	1	17	17.58	17.58	16.22	16.25	14.71	14.66	13.92
	6	17.66	18.27	18.28	16.79	16.73	15.17	15.19	14.43
	11	17.85	18.34	18.39	16.89	16.91	15.32	15.33	14.44

Band	Channel	Measured Average Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 400 ns Guard Interval)							
		7.2 Mbps	14.4 Mbps	21.6 Mbps	28.8 Mbps	43.3 Mbps	57.7 Mbps	65 Mbps	72.2 Mbps
Wi-Fi 2450 MHz	1	16.95	17.52	17.67	16.25	16.36	14.91	14.58	14.06
	6	17.64	18.15	18.17	16.89	16.88	15.47	15.28	14.68
	11	17.77	18.27	18.42	16.98	17.11	15.59	15.37	14.82

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 6. Per IEEE 1528, this uncertainty budget is applicable to the SAR range of 0.4 W/kg to 10 W/kg.

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

Description	Serial Number	Cal Date	Cal Due Date
DASY4™ DAE V1	434	Jan-13-2011	Jan-13-2012
E-Field Probe ES3DV3	3115	Jan-12-2011	Jan-12-2012
S.A.M. Phantom used for 782/835/1900/2450 MHz	TP-1131		
SPEAG MFP V5.1 Triple Modular Phantom	N/A		
Dipole Validation Kit, DV835V2	422TR	Mar-18-2011	Mar-18-2012
Dipole Validation Kit, DV1800V2	250TR	Mar-17-2011	Mar-17-2012
Dipole Validation Kit, DV2450V2	863	Mar-17-2011	Mar-17-2012

3.2 Additional Equipment

Description	Serial Number	Cal Date	Cal Due Date
Rohde & Schwarz CMW500 SW version 2.0.20.10 Used for LTE testing	103402	Dec-01-2010	Dec-01-2012
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
Network Analyzer HP8753ES	US39172529	Sep-12-2011	Sep-12-2012
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.

The probe calibration frequency and the system accuracy verifications were performed at 835 MHz. The center of the LTE Band 13 transmit band is 782 MHz. The difference exceeds the ± 50 MHz window specified in FCC KDB 450824 D01. Therefore calculations are given to perform a SAR correction for deviations of the complex permittivity and conductivity from simulated tissue targets if the deviation is in the direction that does not result in a "conservative" SAR result. The sensitivity coefficients for frequencies within "Attachment 1: Tissue Parameter Variations" of FCC KDB 450824 were used.

This attachment provides:

450 MHz tissue has sensitivity coefficients for ϵ_r of -0.46 and for σ of +0.43

800 MHz tissue has sensitivity coefficients for ϵ_r of -0.57 and for σ of +0.59

A linear approximation to get the values for 782 MHz (the frequency of the center of the transmit band) were performed. The sensitivity coefficients used for 782 MHz were: ϵ_r of -0.56434 and σ of +0.581771.

These coefficients were then applied to the delta between the measured conductivity and the target conductivity using the formula:

$$\Delta SAR = S_{\epsilon} \Delta \epsilon + S_{\sigma} \Delta \sigma$$

Here, $S_{\epsilon} = \partial SAR / \partial \epsilon$ and $S_{\sigma} = \partial SAR / \partial \sigma$ are sensitivity coefficients, representing the sensitivity of SAR to permittivity and conductivity, respectively.

The measured SAR is then corrected by the delta SAR to compensate for the change in conductivity using the formula:

$$SAR_{Corrected} = \frac{SAR_{Measured}}{(1 + \Delta SAR)}$$

This correction has been applied to the conditions resulting in the worst-case SAR values found in testing (to maintain conservativeness), and can be seen in the data tables provided in section 6 below.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ϵ_r	σ (S/m)	Temp (°C)
782	Head	Measured, Oct-08-2011	42.0	0.86	20.3
		Measured, Oct-12-2011	43.8	0.87	20.6
		Recommended Limits	41.78 $\pm$ 5%	0.896 $\pm$ 5%	18-25
	Body	Measured, Oct-10-2011	55.2	0.93	20.3
		Measured, Oct-12-2011	54.0	0.92	20.3
		Measured, Oct-13-2011	56.4	0.93	20.5
		Recommended Limits	55.4 $\pm$ 5%	0.966 $\pm$ 5%	18-25
835	Head	Measured, Sep-28-2011	42.0	0.92	21.6
		Measured, Oct-11-2011	41.2	0.90	20.5
		Recommended Limits	41.5 $\pm$ 5%	0.90 $\pm$ 5%	18-25
	Body	Measured, Sep-28-2011	55.3	0.98	20.3
		Measured, Oct-11-2011	54.2	0.97	20.2
		Measured, Oct-12-2011	53.4	0.97	20.3
		Measured, Oct-13-2011	53.9	0.96	20.0
		Measured, Oct-14-2011	56.3	0.98	20.5
		Recommended Limits	55.2 $\pm$ 5%	0.97 $\pm$ 5%	18-25
1880	Head	Measured, Sep-28-2011	39.0	1.46	20.6
		Measured, Oct-14-2011	38.1	1.46	20.5
		Recommended Limits	40.0 $\pm$ 5%	1.40 $\pm$ 5%	18-25
	Body	Measured, Sep-28-2011	51.4	1.58	21.0
		Measured, Oct-11-2011	50.9	1.58	20.5
		Measured, Oct-13-2011	50.9	1.58	20.5
		Measured, Oct-14-2011	50.8	1.59	20.5
		Recommended Limits	53.3 $\pm$ 5%	1.52 $\pm$ 5%	18-25
2450	Body	Measured, Oct-14-2011	51.1	1.94	20.1
		Recommended Limits	52.7 $\pm$ 5%	1.95 $\pm$ 5%	18-25

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

Ingredient	782 / 835 / 900 MHz Head	782 / 835 / 900 MHz Body	1800 MHz / 1900 MHz Head	1800 MHz / 1900 MHz Body	2450 MHz Head	2450 MHz Body
Sugar	57	44.9	--	--	--	--
DGBE	--	--	47	30.8	--	30
Diacetin	--	--	--	--	51	--
Water	40.45	53.06	52.62	68.8	48.75	70
Salt	1.45	0.94	0.38	0.4	0.15	--
HEC	1	1	--	--	--	--
Bact.	0.1	0.1	--	--	0.1	--

5. System Accuracy Verifications

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 7. 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). The simulated tissue depth was verified to be 15.0 cm $\pm$ 0.5 cm. Z-axis scans showing the SAR penetration are also included in Appendix 1.

System Accuracy Verification Measurements for Head SAR Measurements						
f (MHz)	Description	SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			ϵ_r	σ (S/m)		
835	Measured, Sep-28-2011	10.00	42.0	0.92	21.3	20.0
	Measured, Oct-08-2011	9.70	41.4	0.91	21.1	20.3
	Measured, Oct-11-2011	9.65	41.2	0.90	20.8	20.5
	Measured, Oct-12-2011	9.80	43.1	0.92	20.1	20.6
	Recommended Limits	9.33	41.5 $\pm 5\%$	0.90 $\pm 5\%$	18-25	18-25
1800	Measured, Sep-28-2011	38.00	39.4	1.37	21.3	20.2
	Measured, Oct-13-2011	40.75	38.3	1.45	21.5	20.5
	Recommended Limits	38.6	40.0 $\pm 5\%$	1.40 $\pm 5\%$	18-25	18-25

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3115	835	5.87	5 of 11
		1810	5.02	5 of 11

System Accuracy Verification Measurements for Body SAR Measurements						
f (MHz)	Description	SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			ϵ_r	σ (S/m)		
835	Measured, Sep-28-2011	9.40	55.3	0.98	21.6	20.3
	Measured, Oct-10-2011	9.45	54.7	0.98	21.1	20.3
	Measured, Oct-11-2011	9.35	54.2	0.97	20.8	20.2
	Measured, Oct-12-2011	9.30	53.4	0.97	21.1	20.3
	Measured, Oct-13-2011	9.90	55.8	0.98	21.2	20.5
	Measured, Oct-14-2011	9.95	56.3	0.98	21.1	20.5
	Recommended Limits	9.77	55.2 $\pm$ 5%	0.97 $\pm$ 5%	18-25	18-25
1800	Measured, Sep-28-2011	36.50	51.6	1.48	21.3	20.6
	Measured, Oct-11-2011	36.60	51.2	1.48	20.8	20.5
	Measured, Oct-13-2011	36.70	51.2	1.48	21.5	20.5
	Measured, Oct-14-2011	40.05	51.1	1.49	21.3	20.5
	Recommended Limits	37.2	53.3 $\pm$ 5%	1.52 $\pm$ 5%	18-25	18-25
2450	Measured, Oct-13-2011	55.0	50.5	1.91	21.6	20.5
	Recommended Limits	52.8	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 with the system accuracy verification measurements for body SAR 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

6. Test Results

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

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

The DUT covered by this report has a integrated battery (p/n SNN5905A) that is not intended for removal by the end user.

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

The DUT tested in this report has an optional battery door:

Inductive Charging Door: SJHN0813A

The inductive charging door serves as the Wireless Power Receiver in an Inductive Charging System. The receiver is a Wireless Power Consortium (WPC) compliant receiver and requires a WPC compliant transmitter to create the appropriate magnetic field in order to function. The receiver is designed to apply power to the phone when placed in the appropriate magnetic field. The inductive charging door was tested per guidance given in KDB inquiry 335470. Please see a more detailed description in the Operational Description given in Exhibit 12. Please see Exhibit 3 for external photos of the inductive charging door.

All tests will be performed with the plastic door shipped with the DUT. The configurations that result in the highest measured SAR for the head, body-worn and mobile hotspot tests will be repeated with the inductive charging battery door installed.

6.1 Head Adjacent Test Results

The SAR results shown in tables 1 through 4 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, target 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 left head and right head SAR contour distributions are similar. Because of this similarity, the cheek/touch and 15° tilt test conditions with the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 2. All other test conditions measured lower SAR values than those included in Appendix 2.

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

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3115	835	5.87	5 of 11
		1810	5.02	5 of 11

The head-adjacent SAR test results for the Wi-Fi 2450 MHz transmit band are provided in report [IHDP56MN1 WLAN SAR Report.pdf](#), included within the Exhibit 11 documents.

Left Head Cheek Position															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	20.1	-0.461	22.65	-1.0	0.356		0.40	0.458		0.51		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	19.8	-0.415	24.17	0.0	0.461	0.468	0.52	0.593	0.609	0.67	5x5x7	A39
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	19.8	0.024	23.80	0.0	0.364		0.36	0.462		0.46		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.5	0.378	21.95	-2.0	0.281		0.28	0.369		0.37		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.5	-0.444	23.20	-1.0	0.254		0.28	0.333		0.37		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	19.9	-0.374	22.90	-1.0	0.267		0.29	0.350		0.38		
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A/ SJHN0813A	23230	20.0	-0.317	24.17	0.0	0.486	0.501	0.54	0.621	0.648	0.70	5x5x7	A40
835	CDMA 800, RC3 SO55	SNN5905A	1013												
			384	20.5	-0.483	25.14		0.324		0.36	0.416		0.46	5x5x7	A41
			777												
	CDMA 800, RC3 SO55	SNN5905A/ SJHN0813A	384	20.3	-0.095	25.14		0.338		0.35	0.447		0.46	5x5x7	A42
1880	CDMA 1900, RC3 SO55	SNN5905A	25												
			600	20.0	-0.211	25.06		0.142		0.15	0.255		0.27		
			1175												

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

Right Head Cheek Position															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	19.8	-0.193	22.65	-1.0	0.333		0.35	0.425		0.44		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	19.8	-0.302	24.17	0.0	0.456		0.49	0.578		0.62		
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	19.8	-0.226	23.80	0.0	0.384		0.40	0.503		0.53		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.5	-0.462	21.95	-2.0	0.237		0.26	0.302		0.34		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.5	-0.475	23.20	-1.0	0.247		0.28	0.315		0.35		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	19.9	-0.412	22.90	-1.0	0.273		0.30	0.347		0.38		
835	CDMA 800, RC3 SO55	SNN5905A	1013												
			384	20.5	-0.025	25.14		0.341		0.34	0.443		0.45		
			777												
1880	CDMA 1900, RC3 SO55	SNN5905A	25												
			600	20.5	0.130	25.06		0.163		0.16	0.311		0.31	5x5x7	A43
			1175												
	CDMA 1900, RC3 SO55	SNN5905A/ SJHN0813A	600	20.5	-0.117	25.06		0.158		0.16	0.293		0.30	5x5x7	A44
	CDMA 1900, RC1 SO55	SNN5905A	25	20.0	-0.117	25.24		0.151		0.16	0.267		0.27		
	CDMA 1900, EVDO Rev. O	SNN5905A	25	20.0	-0.235	25.27		0.120		0.13	0.218		0.23		

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

Left Head 15° Tilt Position															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	20.1	0.093	22.65	-1.0	0.255		0.26	0.325		0.33		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	19.8	0.028	24.17	0.0	0.303	0.308	0.31	0.389	0.399	0.40	5x5x7	A45
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	19.8	0.145	23.80	0.0	0.251		0.25	0.319		0.32		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.5	-0.033	21.95	-2.0	0.199		0.20	0.254		0.26		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.5	0.131	23.20	-1.0	0.170		0.17	0.218		0.22		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	19.9	-0.110	22.90	-1.0	0.194		0.20	0.247		0.25		
835	CDMA 800, RC3 SO55	SNN5905A	1013												
			384	20.5	0.021	25.14		0.260		0.26	0.342		0.34		
			777												
1880	CDMA 1900, RC3 SO55	SNN5905A	25												
			600	20.0	-0.280	25.06		0.031		0.03	0.054		0.06		
			1175												

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

Right Head 15° Tilt Position															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	19.8	0.196	22.65	-1.0	0.247		0.25	0.315		0.32		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	19.8	-0.003	24.17	0.0	0.296		0.30	0.381		0.38		
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	19.8	-0.039	23.80	0.0	0.251		0.25	0.318		0.32		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.5	-0.488	21.95	-2.0	0.172		0.19	0.223		0.25		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.5	-0.078	23.20	-1.0	0.154		0.16	0.198		0.20		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	19.9	-0.036	22.90	-1.0	0.178		0.18	0.226		0.23		
835	CDMA 800, RC3 SO55	SNN5905A	1013												
			384	20.5	0.240	25.14		0.276		0.28	0.364		0.36	5x5x7	A46
			777												
1880	CDMA 1900, RC3 SO55	SNN5905A	25												
			600	19.8	-0.373	25.06		0.040		0.04	0.069		0.08	5x5x7	A47
			1175												

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

6.2 Body-Worn Test Results

The SAR results shown in tables 5 through 6 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift, the measured conducted output power levels, target 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 test conditions that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 3. All other test conditions measured lower SAR values than those included in Appendix 3.

A 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 ± 0.5 cm. The same device holder described in section 6 was used for positioning the phone.

Functional accessories were divided into two categories, the ones with metal components and the ones with non-metal components. For non-metallic component accessories, testing was performed on the accessory that displayed the closest proximity to the flat phantom. Each metallic component accessory, if any, was checked for uniqueness of metal component so that each is tested with the device. If multiple accessories shared an identical metal component, only the accessory that dictates the closest spacing to the body was tested. The cellular phone was tested with a headset connected to the device for all body-worn SAR measurements.

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

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

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

The body-worn SAR test results for the Wi-Fi 2450 MHz transmit band are provided in report [IHDP56MN1 WLAN SAR Report.pdf](#), included within the Exhibit 11 documents.

Body-Worn, Front of Phone 25 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)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	20.1	0.046	22.65	-1.0	0.194		0.19	0.256		0.26		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	20.1	-0.442	24.17	0.0	0.287		0.32	0.374		0.41		
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	20.1	0.013	23.80	0.0	0.237		0.24	0.310		0.31		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.1	-0.353	21.95	-2.0	0.122		0.13	0.160		0.17		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.1	0.034	23.20	-1.0	0.152		0.15	0.199		0.20		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	20.1	0.119	22.90	-1.0	0.171		0.17	0.223		0.22		
835	CDMA 800, RC3 SO55	SNN5905A	1013												
			384	20.3	-0.374	25.14		0.247		0.27	0.327		0.36		
			777												
1880	CDMA 1900, RC3 SO55	SNN5905A	25												
			600	19.8	-0.107	25.06		0.114		0.12	0.180		0.18		
			1175												

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

Body-Worn, Back of Phone 25 mm from Phantom															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	20.1	-0.009	22.65	-1.0	0.243		0.24	0.324		0.32		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	20.1	-0.462	24.17	0.0	0.364	0.369	0.41	0.485	0.496	0.55	5x5x7	A49
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	20.1	-0.194	23.80	0.0	0.303		0.32	0.403		0.42		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.1	-0.017	21.95	-2.0	0.184		0.18	0.245		0.25		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.1	-0.179	23.20	-1.0	0.235		0.24	0.313		0.33		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	20.1	-0.391	22.90	-1.0	0.264		0.29	0.352		0.39		
835	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A/ SJHN0813A	23230	19.9	-0.110	24.17	0.0	0.285	0.290	0.30	0.378	0.389	0.40	5x5x7	A50
	CDMA 800, RC3 SO55	SNN5905A	1013												
			384	20.1	-0.125	25.14		0.289		0.30	0.386		0.40	5x5x7	A51
			777												
1880	CDMA 800, RC3 SO55	SNN5905A/ SJHN0813A	384	20.3	0.158	25.14		0.320		0.32	0.430		0.43	5x5x7	A52
			25												
			600	19.8	-0.133	25.06		0.346		0.36	0.566		0.58	5x5x7	A53
	CDMA 1900, RC3 SO55	SNN5905A	1175												
			600	19.6	-0.039	25.06		0.237		0.24	0.384		0.39	5x5x7	A54
1880	CDMA 1900, RC1 SO55	SNN5905A	25	20.0	-0.169	25.24		0.312		0.32	0.506		0.53		
	CDMA 1900, EVDO Rev. O	SNN5905A	25	20.0	-0.378	25.27		0.327		0.36	0.532		0.58		

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

6.3 LapDock™ Accessory Test Results

The DUT supports the use of the Motorola LapDock™. The body-worn SAR results above were utilized to determine the channels and modes that result in the highest measured SAR value when in proximity of the user's body. SAR testing was performed with the DUT placed into the LapDock™ and the LapDock™ placed for testing per FCC KDB 616217. For LTE and CDMA modes, the test sample was operated using an actual transmission through a base station simulator. Wi-Fi testing was conducted using manufacturer test mode software, per guidance given in FCC KDB 248227. The base station simulator or test software was set up for the proper channels, transmitter power levels and transmit modes of operation.

The SAR results shown in tables 7 and 8 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift, the measured conducted output power levels, target 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 test conditions that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 4.

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

The simulated tissue depth was verified to be 15.0 cm ± 0.5 cm. The DUT and LapDock™ were placed using a Laptop Extension Kit available from SPEAG™ that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.). The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin-SAM Phantoms.

The following probe conversion factors were used on the E-Field probe(s) used for the LapDock™ 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

LapDock™ against Body, Bottom Surface of LapDock™ 0 mm from Phantom, Screen opened 90 degrees															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	20.9	-0.221		-1.0	0.394		0.41	0.529		0.59		
	LTE Band 13, QPSK (100% RB)														
	LTE Band 13, QPSK (1 RB @ Low)		23230	20.2	-0.444	24.17	0.0	0.716	0.731	0.81	0.924	0.954	1.06	5x5x7	A56
	LTE Band 13, QPSK (1 RB @ High)		23230	20.9	-0.332		0.0	0.546		0.59	0.722		0.78		
	LTE Band 13, 16QAM (50% RB)		23230	20.9	-0.124		-2.0	0.31		0.32	0.403		0.41		
	LTE Band 13, 16QAM (100% RB)														
	LTE Band 13, 16QAM (1 RB @ Low)		23230	20.9	0.00536		-1.0	0.493		0.49	0.641		0.64		
	LTE Band 13, 16QAM (1 RB @ High)		23230	20.9	-0.368		-1.0	0.445		0.48	0.604		0.66		
835	CDMA 1900, EVDO Rev. O	1013	20.0	0.001	25.32		0.647		0.65	0.892		0.89			
		384	20.0	-0.085	25.19		0.591		0.60	0.824		0.84			
		777	20.0	-0.091	24.98		0.509		0.52	0.715		0.73			
	CDMA 800, RC3 SO55 ²	384	20.2	-0.058	25.14		0.623		0.63	0.903		0.92	5x5x7	A57	
1880	CDMA 1900, EVDO Rev. O	25													
		600	20.2	-0.021	25.21		0.453		0.46	0.769		0.77	5x5x7	A58	
		1175													
2450	CDMA 1900, RC3 SO55 ²	600	20.2	-0.158	25.06		0.410		0.43	0.676		0.70			
		1													
		6													
	802.11b, 1 Mbps	11	20.0	-0.008	18.81		0.081		0.08	0.153		0.15	5x5x7	A59	

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

The DUT supports Simultaneous Voice and LTE (svLTE), allowing a CDMA voice call while simultaneously providing an LTE link for data transport on the cellular network. When operating with svLTE, a reduced maximum LTE transmit power limit is enforced to ensure SAR exposure compliance is maintained.

The measurement data in the following table is provided to demonstrate SAR performance for LTE when this functionality is enabled, for the purpose of evaluating simultaneous SAR cases. See section 6.5 for further information.

LapDock™ against Body, Bottom Surface of LapDock 0 mm from Phantom, Screen opened 90 degrees															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Limit ³ (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	20.8	-0.452	20.0	-4.0	0.234		0.26	0.307		0.34		

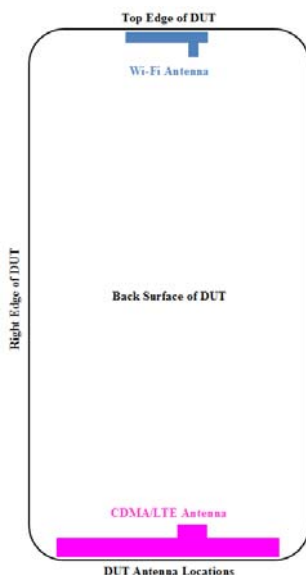
Table 8: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

² The measurement data for CDMA in RC3 SO55 Loopback mode is provided to demonstrate SAR performance for the purpose of evaluating simultaneous SAR during svLTE. See section 6.5 for further information.

³ For tests with power limit reductions employed (excluding MPR in LTE), measured conducted power is not available by device design. Per FCC direction, measured power is replaced with the reduced maximum power limit for the device mode under test.

6.4 Mobile Hotspot Test Results

The DUT is capable of functioning as a Wi-Fi to Cellular mobile hotspot. Additional SAR testing was performed according to the test guidelines provided per FCC KDB 941225 D06. Testing was performed with a separation of 1 cm between the DUT and the “flat” phantom. The DUT was positioned for SAR tests with the front and back surfaces facing the phantom, and also with the edges facing the phantom in which the transmitting antenna is less than 2.5 cm from the edge.



Mobile Hotspot Surfaces for SAR testing						
Mode	Front	Back	Left	Right	Top	Bottom
CDMA	Yes	Yes	Yes	Yes	No	Yes
LTE	Yes	Yes	Yes	Yes	No	Yes
Wi-Fi	Yes	Yes	Yes	Yes	Yes	No

The SAR results shown in tables 9 through 18 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, target 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 DUT utilizes reduced limits for maximum transmit power when the mobile hotspot functionality is enabled, as described above in 2.2.2. A complete description of this functionality is provided in the Operational Description contained within Exhibit 12.

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 5. All other test conditions measured lower SAR values than those included in Appendix 5.

A SPEAG™ MFP V5.1 C Triple Modular Phantom was used for the mobile hotspot 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 mobile hotspot 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 ± 0.5 cm. The same device holder described in section 6 was used for positioning the phone.

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

The mobile hotspot SAR test results for the Wi-Fi 2450 MHz transmit band are provided in report [IHDP56MN1 WLAN SAR Report.pdf](#), included within the Exhibit 11 documents.

Mobile Hotspot, Bottom Edge of Phone 10 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 or Limit (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	19.9	-0.285	22.65	-1.0	0.038		0.04	0.062		0.07		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	19.9	0.027	24.17	0.0	0.047		0.05	0.076		0.08		
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	19.9	0.029	23.80	0.0	0.039		0.04	0.064		0.06		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.1	-0.306	21.95	-2.0	0.031		0.03	0.052		0.06		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.3	-0.451	23.20	-1.0	0.034		0.04	0.057		0.06		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	20.3	-0.404	22.90	-1.0	0.038		0.04	0.061		0.07		
835	CDMA 800, RC3 SO55	SNN5905A	1013												
			384	20.0	0.045	23.5	-1.5	0.038		0.04	0.064		0.06		
			777												
1880	CDMA 1900, RC3 SO55	SNN5905A	25	20.1	-0.005	17.5	-7.5	0.325		0.33	0.624		0.62		
			600	20.1	-0.014	17.5	-7.5	0.325		0.33	0.627		0.63		
			1175	20.1	-0.044	17.5	-7.5	0.493		0.50	0.933		0.94		
	CDMA 1900, EVDO Rev. O ⁵	SNN5905A	1175	20.5	0.125	17.5	-7.5	0.518		0.52	0.994		0.99	5x5x7	A65
	CDMA 1900, RC3 SO55	SNN5905A/ SJHN0813A	1175	20.6	0.077	17.5	-7.5	0.518		0.52	0.995		1.00	5x5x7	A66

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

⁴ For tests with power limit reductions employed (excluding MPR in LTE), measured conducted power is not available by device design. Per FCC direction, measured power is replaced with the reduced maximum power limit for the device mode under test.

⁵ CDMA testing for Mobile Hotspot was conducted using 1x mode. Per guidance from the FCC, additional testing was conducted using EVDO Rev. O mode and is presented here.

Mobile Hotspot, Left Edge of Phone 10 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 or Limit ⁴ (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	19.9	-0.007	22.65	-1.0	0.281		0.28	0.400		0.40		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	19.9	-0.183	24.17	0.0	0.405		0.42	0.579		0.60		
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	19.9	-0.238	23.80	0.0	0.339		0.36	0.479		0.51		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.3	-0.205	21.95	-2.0	0.217		0.23	0.308		0.32		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.3	-0.085	23.20	-1.0	0.282		0.29	0.402		0.41		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	20.3	-0.373	22.90	-1.0	0.290		0.32	0.410		0.45		
835	CDMA 800, RC3 SO55	SNN5905A	1013												
			384	20.0	-0.004	23.5	-1.5	0.352		0.35	0.504		0.50		
			777												
1880	CDMA 1900, RC3 SO55	SNN5905A	25												
			600	20.1	0.078	17.5	-7.5	0.042		0.04	0.075		0.08		
			1175												

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

Mobile Hotspot, Right Edge of Phone 10 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 or Limit ⁴ (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	20.1	-0.245	22.65	-1.0	0.310		0.33	0.444		0.47		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	20.1	0.027	24.17	0.0	0.423		0.42	0.602		0.60		
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	20.1	0.069	23.80	0.0	0.357		0.36	0.509		0.51		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.3	-0.158	21.95	-2.0	0.225		0.23	0.322		0.33		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.3	-0.563	23.20	-1.0	0.296		0.34	0.421		0.48		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	20.2	-0.440	22.90	-1.0	0.319		0.35	0.452		0.50		
835	CDMA 800, RC3 SO55	SNN5905A	1013												
			384	20.0	-0.045	23.5	-1.5	0.307		0.31	0.442		0.45		
			777												
1880	CDMA 1900, RC3 SO55	SNN5905A	25												
			600	20.1	0.042	17.5	-7.5	0.018		0.02	0.031		0.03		
			1175												

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

Mobile Hotspot, Front of Phone 10 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 or Limit ⁶ (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	20.1	-0.111	22.65	-1.0	0.375		0.38	0.486		0.50		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	20.1	-0.019	24.17	0.0	0.543		0.55	0.693		0.70		
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	20.1	-0.082	23.80	0.0	0.473		0.48	0.605		0.62		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.3	-0.468	21.95	-2.0	0.238		0.27	0.304		0.34		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.3	-0.104	23.20	-1.0	0.300		0.31	0.381		0.39		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	20.3	0.104	22.90	-1.0	0.326		0.33	0.416		0.42		
835	CDMA 800, RC3 SO55	SNN5905A	1013												
			384	20.0	0.252	23.5	-1.5	0.341		0.34	0.442		0.44		
			777												
1880	CDMA 1900, RC3 SO55	SNN5905A	25												
			600	20.1	-0.105	17.5	-7.5	0.281		0.29	0.556		0.57		
			1175												

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

Mobile Hotspot, Back of Phone 10 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 or Limit ⁶ (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	20.1	0.022	22.65	-1.0	0.373		0.37	0.480		0.48		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	20.1	-0.291	24.17	0.0	0.874	0.885	0.95	1.17	1.20	1.28	5x5x7	A61
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	20.1	-0.167	23.80	0.0	0.740		0.77	0.998		1.04		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.3	-0.229	21.95	-2.0	0.413		0.44	0.556		0.59		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.3	-0.060	23.20	-1.0	0.539		0.55	0.727		0.74		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	20.3	0.076	22.90	-1.0	0.596		0.60	0.798		0.80		
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A/ SJHN0813A	23230	19.9	-0.051	24.17	0.0	0.643	0.654	0.66	0.863	0.887	0.90	5x5x7	A62
835	CDMA 800, RC3 SO55	SNN5905A	1013	20.0	-0.146	23.5	-1.5	0.591		0.61	0.786		0.81		
			384	20.0	-0.122	23.5	-1.5	0.547		0.56	0.732		0.75		
			777	20.0	0.124	23.5	-1.5	0.439		0.44	0.591		0.59		
	CDMA 800, EVDO Rev. O ⁶	SNN5905A	1013	20.0	-0.229	23.5	-1.5	0.618		0.65	0.826		0.87	5x5x7	A63
	CDMA 800, RC3 SO55	SNN5905A/ SJHN0813A	1013	20.0	-0.045	23.5	-1.5	0.458		0.46	0.618		0.62	5x5x7	A64
1880	CDMA 1900, RC3 SO55	SNN5905A	25	20.1	-0.146	17.5	-7.5	0.260		0.27	0.494		0.51		
			600	20.1	-0.110	17.5	-7.5	0.305		0.31	0.597		0.61		
			1175	20.1	-0.145	17.5	-7.5	0.440		0.45	0.844		0.87		

Table 13: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

⁶ CDMA testing for Mobile Hotspot was conducted using 1x mode. Per guidance from the FCC, additional testing was conducted using EVDO Rev. O mode and is presented here.

The DUT supports Simultaneous Voice and LTE (svLTE), allowing a CDMA voice call while simultaneously providing an LTE link for data transport on the cellular network. When operating with svLTE during a mobile hotspot session, a reduced maximum LTE transmit power limit is enforced to ensure SAR exposure compliance is maintained.

The measurement data in the following tables is provided to demonstrate SAR performance for LTE when this functionality is enabled, for the purpose of evaluating simultaneous SAR cases. See section 6.5 for further information.

Mobile Hotspot, Bottom Edge of Phone 10 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	
						Limit ^d (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	20.8	0.210	14.0	-10.0	0.004		0.00	0.007		0.01		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	20.8	-0.143	14.0	-10.0	0.004		0.00	0.007		0.01		
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	20.8	0.006	14.0	-10.0	0.004		0.00	0.006		0.01		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.7	0.036	14.0	-10.0	0.004		0.00	0.007		0.01		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.7	0.159	14.0	-10.0	0.004		0.00	0.007		0.01		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	20.8	-0.031	14.0	-10.0	0.004		0.00	0.006		0.01		

Table 14: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Left Edge of Phone 10 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	
						Limit ^d (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	20.5	-0.046	14.0	-10.0	0.030		0.03	0.043		0.04		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	20.6	0.017	14.0	-10.0	0.033		0.03	0.047		0.05		
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	20.5	-0.022	14.0	-10.0	0.029		0.03	0.041		0.04		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.7	0.007	14.0	-10.0	0.031		0.03	0.044		0.04		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.7	-0.136	14.0	-10.0	0.037		0.04	0.052		0.05		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	20.5	0.130	14.0	-10.0	0.033		0.03	0.046		0.05		

Table 15: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Right Edge of Phone 10 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	
						Limit ^d (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	20.5	0.054	14.0	-10.0	0.034		0.03	0.049		0.05		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	20.5	-0.063	14.0	-10.0	0.039		0.04	0.055		0.06		
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	20.6	0.080	14.0	-10.0	0.035		0.04	0.051		0.05		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.5	-0.009	14.0	-10.0	0.034		0.03	0.049		0.05		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.5	-0.004	14.0	-10.0	0.040		0.04	0.058		0.06		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	20.5	-0.081	14.0	-10.0	0.037		0.04	0.053		0.05		

Table 16: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Front of Phone 10 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	
						Limit ⁴ (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	20.5	0.315	14.0	-10.0	0.039		0.04	0.050		0.05		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	20.6	0.035	14.0	-10.0	0.043		0.04	0.056		0.06		
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	20.5	-0.071	14.0	-10.0	0.038		0.04	0.050		0.05		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.6	0.198	14.0	-10.0	0.036		0.04	0.047		0.05		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.5	-0.067	14.0	-10.0	0.049		0.05	0.062		0.06		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	20.7	-0.341	14.0	-10.0	0.039		0.04	0.050		0.05		

Table 17: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Back of Phone 10 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	
						Limit ⁴ (dBm)	Reduction Target (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	SNN5905A	23230	19.9	0.006	14.0	-10.0	0.073		0.07	0.098		0.10		
	LTE Band 13, QPSK (100% RB)	SNN5905A	23230												
	LTE Band 13, QPSK (1 RB @ Low)	SNN5905A	23230	20.0	-0.065	14.0	-10.0	0.086		0.09	0.115		0.12		
	LTE Band 13, QPSK (1 RB @ High)	SNN5905A	23230	19.4	0.090	14.0	-10.0	0.082		0.08	0.110		0.11		
	LTE Band 13, 16QAM (50% RB)	SNN5905A	23230	20.5	-0.044	14.0	-10.0	0.071		0.07	0.096		0.10		
	LTE Band 13, 16QAM (100% RB)	SNN5905A	23230												
	LTE Band 13, 16QAM (1 RB @ Low)	SNN5905A	23230	20.6	-0.145	14.0	-10.0	0.088		0.09	0.118		0.12		
	LTE Band 13, 16QAM (1 RB @ High)	SNN5905A	23230	20.1	0.121	14.0	-10.0	0.086		0.09	0.116		0.12		

Table 18: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

6.5 Description and Evaluation of Simultaneous Transmitters

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

By device design the CDMA and LTE transmitters may operate simultaneously with either the Wi-Fi 802.11 transmitter or the Bluetooth transmitter. The separation distance between the Wi-Fi 802.11/Bluetooth antenna and the CDMA/LTE antenna is 10.73 cm. Pictorial representation of the antenna locations and separation distances are given in Exhibit 7d.

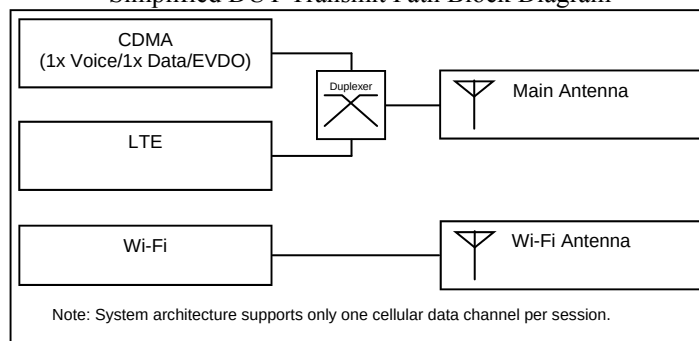
The Bluetooth transmitter of the device under test can be excluded from stand-alone and simultaneous SAR evaluation, per the **highlighted** requirements from FCC KDB 648474, as follows.

1. The highest output conducted power measured for Bluetooth on the device under test is 8.85 mW [$\leq 24 \text{ mW}$]
2. The separation distance between the Bluetooth antenna and the CDMA antenna is 10.73 cm [$\geq 5.0 \text{ cm}$]

The Wi-Fi and the Bluetooth cannot transmit simultaneously, so there is no co-location test requirement for Wi-Fi and Bluetooth. CDMA supports both voice and data transmission, though not simultaneously. LTE and Wi-Fi support data transmission only.

Description of Simultaneous Transmit Capabilities				
Transmitter Combinations		Scenario Supported?	Supported for Mobile Hotspot?	Notes
#1	CDMA (1x Voice) + CDMA (1x Data)	No	No	DUT system architecture does not support simultaneous voice and data during a CDMA session on the cellular network
#2	CDMA (1x Voice) + CDMA (EVDO)	No	No	
#3	CDMA (1x Data) + CDMA (EVDO)	No	No	
#4	CDMA (1x Voice) + LTE	Yes	No	svLTE – LTE operates at reduced power, see section 2.2.2
#5	CDMA (1x Data) + LTE	No	No	DUT system architecture supports only one data link per cellular session
	CDMA (EVDO) + LTE	No	No	DUT system architecture supports only one data link per cellular session
#6	CDMA (1x Voice) + Wi-Fi	Yes	No	Supported for voice plus background data
#7	CDMA (1x Data) + Wi-Fi	Yes	Yes	CDMA operates at reduced power during mobile hotspot operation, See section 2.2.2
	CDMA (EVDO) + Wi-Fi	Yes	Yes	
#8	LTE + Wi-Fi	Yes	Yes	Supported for mobile hotspot operation only.
#9	CDMA (1x Voice) + LTE + Wi-Fi	Yes	Yes	CDMA operates at reduced power during mobile hotspot operation; svLTE during Mobile Hotspot – LTE operates at reduced power See section 2.2.2

Simplified DUT Transmit Path Block Diagram



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 measurement 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 head, body, and mobile hotspot simultaneous SAR summations for the worst-case SAR transmitter configurations are presented in tables 19 through 26 below.

The following Head position SAR summations for simultaneous evaluation are provided to demonstrate a CDMA voice link with a simultaneous data link on LTE or Wi-Fi.⁷ Please note that while svLTE does have a reduced power limit, this reduced power is not required to demonstrate SAR compliance for the below conditions. Therefore, the below evaluation is presented using full power CDMA and LTE SAR measurements results given in tables 1 – 4 from section 6.1

Evaluations for Simultaneous SAR, Head positions								
Transmitter Stand-Alone 1 g SAR Values (W/kg)					1 g SAR Summations (W/kg)			
Transmitter Combination					#4	#4	#6	#6
Band Position	CDMA 800	CDMA 1900	LTE Band 13	Wi-Fi 2450	CDMA 800 + LTE Band 13	CDMA 1900 + LTE Band 13	CDMA 800 + Wi-Fi 2450	CDMA 1900 + Wi-Fi 2450
Left Head Cheek	0.46	0.27	0.67	0.227	1.13	0.94	0.69	0.50
Left Head 15° Tilt	0.34	0.06	0.40	0.322	0.74	0.46	0.66	0.38
Right Head Cheek	0.45	0.31	0.62	0.214	1.07	0.93	0.66	0.52
Right Head 15° Tilt	0.36	0.08	0.38	0.301	0.74	0.46	0.66	0.38

Table 19: SAR summations for simultaneous evaluation

The following Head position SAR summations for simultaneous evaluation are provided to demonstrate a CDMA voice link with simultaneous data links for LTE (to the cellular network) and Wi-Fi (to client devices), which can occur while the mobile hotspot functionality is enabled.^{7,8} Please note that while svLTE does have a reduced power limit, this reduced power is not required to demonstrate SAR compliance for the below conditions. Therefore, the below evaluation is presented using full power CDMA and LTE SAR measurements results given in tables 1 – 4 from section 6.1

Evaluations for Simultaneous SAR, Head positions Mobile Hotspot functionality enabled						
Transmitter Stand-Alone 1 g SAR Values (W/kg)					1 g SAR Summations (W/kg)	
Transmitter Combination					#9	#9
Band Position	CDMA 800	CDMA 1900	LTE Band 13	Wi-Fi 2450	CDMA 800 + LTE Band 13 + Wi-Fi 2450	CDMA 1900 + LTE Band 13 + Wi-Fi 2450
Left Head Cheek	0.46	0.27	0.67	0.227	1.36	1.17
Left Head 15° Tilt	0.34	0.06	0.40	0.322	1.06	0.78
Right Head Cheek	0.45	0.31	0.62	0.214	1.28	1.14
Right Head 15° Tilt	0.36	0.08	0.38	0.301	1.04	0.76

Table 20: SAR summations for simultaneous evaluation

⁷ Note that during typical operation, the LTE transmitter power is reduced for svLTE operation or svLTE operation during a mobile hotspot session. The summations given are shown without LTE power reduction enabled. As the SAR summations show results below the compliance limit using SAR values from higher-power configurations than used during typical operation, compliance with those reductions employed is implied.

⁸ Note that during typical operation, the CDMA transmitter power is reduced for mobile hotspot operation. The summations given are shown without CDMA power reduction enabled. As the SAR summations show results below the compliance limit using SAR values from higher-power configurations than used during typical operation, compliance with those reductions employed is implied.

The following Body-Worn position SAR summations for simultaneous evaluation are provided to demonstrate a CDMA voice link with a simultaneous data link on LTE or Wi-Fi.⁷ Please note that while svLTE does have a reduced power limit, this reduced power is not required to demonstrate SAR compliance for the below conditions. Therefore, the below evaluation is presented using full power CDMA and LTE SAR measurements results given in tables 5 & 6 from section 6.2

Evaluations for Simultaneous SAR, Body-Worn positions								
Transmitter Stand-Alone 1 g SAR Values (W/kg)					1 g SAR Summations (W/kg)			
Transmitter Combination					#4	#4	#6	#6
Band Position	CDMA 800	CDMA 1900	LTE Band 13	Wi-Fi 2450	CDMA 800 + LTE Band 13	CDMA 1900 + LTE Band 13	CDMA 800 + Wi-Fi 2450	CDMA 1900 + Wi-Fi 2450
Body Worn, Front of Phone 25 from Phantom	0.36	0.18	0.41	0.037	0.77	0.59	0.397	0.217
Body Worn, Back of Phone 25 from Phantom	0.43	0.58	0.55	0.105	0.98	1.13	0.51	0.69

Table 21: SAR summations for simultaneous evaluation

The following Body-Worn position SAR summations for simultaneous evaluation are provided to demonstrate a CDMA voice link with simultaneous data links for LTE (to the cellular network) and Wi-Fi (to client devices), which can occur while the mobile hotspot functionality is enabled.^{8,8} Please note that while svLTE does have a reduced power limit, this reduced power is not required to demonstrate SAR compliance for the below conditions. Therefore, the below evaluation is presented using full power CDMA and LTE SAR measurements results given in tables 5 & 6 from section 6.2

Evaluations for Simultaneous SAR, Body-Worn positions Mobile Hotspot functionality enabled						
Transmitter Stand-Alone 1 g SAR Values (W/kg)					1 g SAR Summations (W/kg)	
Transmitter Combination					#9	#9
Band Position	CDMA 800	CDMA 1900	LTE Band 13	Wi-Fi 2450	CDMA 800 + LTE Band 13 + Wi-Fi 2450	CDMA 1900 + LTE Band 13 + Wi-Fi 2450
Body Worn, Front of Phone 25 from Phantom	0.36	0.18	0.41	0.037	0.807	0.627
Body Worn, Back of Phone 25 from Phantom	0.40	0.58	0.55	0.105	1.06	1.24

Table 22: SAR summations for simultaneous evaluation

The following Mobile Hotspot (10 mm separation) position SAR summations for simultaneous evaluation are provided to demonstrate a data link (over CDMA or LTE) with a simultaneous data link on Wi-Fi (to client devices).

Evaluations for Simultaneous SAR, Mobile Hotspot (10 mm separation) positions Mobile Hotspot functionality enabled							
		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)	
Transmitter Combination						#7	#8
Band Position		CDMA 800 (Mobile Hotspot)	CDMA 1900 (Mobile Hotspot)	LTE Band 13	Wi-Fi 2450	CDMA 800 + Wi-Fi 2450	CDMA 1900 + Wi-Fi 2450
Bottom Edge of DUT 10 mm from Phantom		0.06	0.99	0.08	0	0.06	0.99
Top Edge of DUT 10 mm from Phantom		0	0	0	0.396	0.40	0.40
Left Edge of DUT 10 mm from Phantom		0.50	0.08	0.60	0.062	0.56	0.14
Right Edge of DUT 10 mm from Phantom		0.45	0.03	0.60	0.063	0.51	0.09
Front Surface of DUT 10 mm from Phantom		0.44	0.57	0.70	0.107	0.55	0.68
Back Surface of DUT 10 mm from Phantom		0.87	0.87	1.28	0.524	1.39	1.39

Table 23: SAR summations for simultaneous evaluation

The following Mobile Hotspot (10 mm separation) position SAR summations for simultaneous evaluation are provided to demonstrate a CDMA voice link with simultaneous data links for LTE (to the cellular network) and Wi-Fi (to client devices), which can occur while the mobile hotspot functionality is enabled.

Evaluations for Simultaneous SAR, Mobile Hotspot (10 mm) positions Mobile Hotspot functionality enabled w/ svLTE							
		Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)	
Transmitter Combination						#9	#9
Band Position		CDMA 800 (Mobile Hotspot)	CDMA 1900 (Mobile Hotspot)	LTE Band 13 (svLTE with Mobile Hotspot)	Wi-Fi 2450	CDMA 800 + LTE Band 13 + Wi-Fi 2450	CDMA 1900 + LTE Band 13 + Wi-Fi 2450
Bottom Edge of DUT 10 mm from Phantom		0.06	0.99	0.01	0	0.07	1.00
Top Edge of DUT 10 mm from Phantom		0	0	0	0.396	0.40	0.40
Left Edge of DUT 10 mm from Phantom		0.50	0.08	0.05	0.062	0.61	0.19
Right Edge of DUT 10 mm from Phantom		0.45	0.03	0.06	0.063	0.57	0.15
Front Surface of DUT 10 mm from Phantom		0.44	0.57	0.06	0.107	0.61	0.74
Back Surface of DUT 10 mm from Phantom		0.87	0.87	0.12	0.524	1.51	1.51

Table 24: SAR summations for simultaneous evaluation

The following body-adjacent position SAR summations with LapDock™ for simultaneous evaluation are provided to demonstrate a cellular link with Wi-Fi for mobile hotspot operation.⁸

Evaluations for Simultaneous SAR, LapDock™ against Body Mobile Hotspot functionality enabled							
	Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)		
Transmitter Combination					#7	#7	#8
Band Position	CDMA 800 (EVDO Rev. O)	CDMA 1900 (EVDO Rev. O)	LTE Band 13	Wi-Fi 2450	CDMA 800 + Wi-Fi 2450	CDMA 1900 + Wi-Fi 2450	LTE Band 13 + Wi-Fi 2450
Bottom Surface of LapDock™ 0 mm from Phantom	0.89	0.77	1.06	0.15	1.04	0.92	1.21

Table 25: SAR summations for simultaneous evaluation

The following body-adjacent position SAR summations with LapDock™ for simultaneous evaluation are provided to demonstrate a CDMA voice link with Wi-Fi, CDMA and LTE during svLTE, and CDMA with LTE and Wi-Fi (to client devices) which can occur while the mobile hotspot functionality is enabled.^{8,9}

Please note that while the DUT has the mobile hotspot functionality enabled, but placed into a Lapdock, the mobile hotspot unique power reductions are disabled. When operating in this configuration the svLTE firmware power reduction of 4 dB (described in section 2.2.2 above) is still enforced.

Evaluations for Simultaneous SAR, LapDock™ against Body svLTE and/or Mobile Hotspot enabled where applicable										
	Transmitter Stand-Alone 1 g SAR Values (W/kg)				1 g SAR Summations (W/kg)					
Transmitter Combination					#6	#6	#4	#4	#9	#9
Band Position	CDMA 800 (RC3 SO55)	CDMA 1900 (RC3 SO55)	LTE Band 13 (svLTE)	Wi-Fi 2450	CDMA 800 + Wi-Fi 2450	CDMA 1900 + Wi-Fi 2450	CDMA 800 + LTE Band 13	CDMA 1900 + LTE Band 13	CDMA 800 + LTE Band 13 + Wi-Fi 2450	CDMA 1900 + LTE Band 13 + Wi-Fi 2450
Bottom Surface of LapDock™ 0 mm from Phantom	0.92	0.77	0.34	0.15	1.07	0.92	1.26	1.11	1.41	1.26

Table 26: SAR summations for simultaneous evaluation

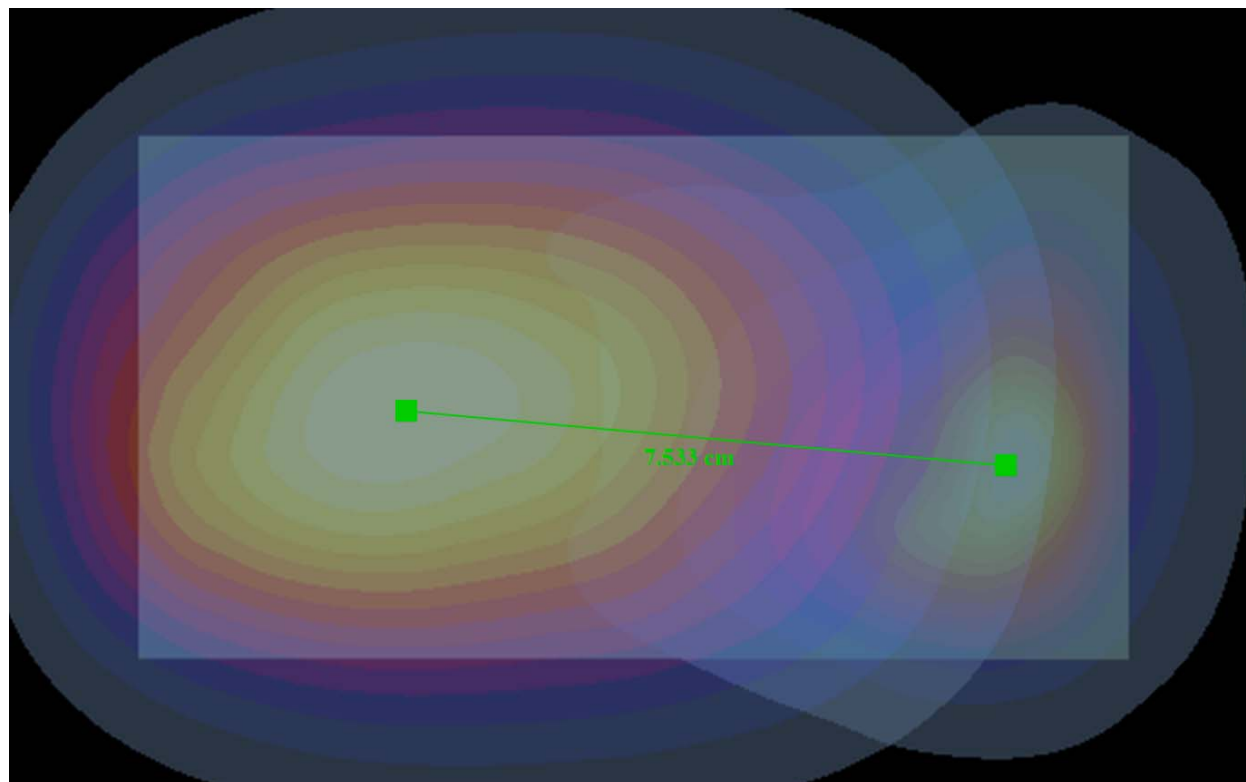
⁹ For the combination of three transmitters for svLTE during a mobile hotspot session, the summations given are shown with the LTE power reduction for svLTE (4 dB), and not the full power reduction for svLTE during mobile hotspot operation (10 dB). As the SAR summations show results below the compliance limit using SAR values from a higher-power configuration than used during typical operation, compliance with those reductions employed is implied.

Per the preceding analysis, the following configurations and transmitter combinations required further investigation:

A. Mobile Hotspot, Back Surface of DUT 10 mm from Phantom, LTE Band 13 + Wi-Fi 2450

The guidelines provided in “SAR for Handsets with Multiple Transmitters” (KDB publication 648474 - D01 v01r03) were utilized for evaluation of the need for simultaneous transmission SAR testing. These guidelines direct that if the SAR-to-peak location separation ratio (SPLSR) for a pair of antennas is < 0.3 then SAR evaluation for simultaneous transmission is not required. Overlaid SAR plots, separation distances between RF peaks¹⁰, and demonstration of these calculations are provided below for each noted case.

Case A: Mobile Hotspot, Back Surface of DUT 10 mm from Phantom, LTE Band 13 + Wi-Fi 2450



LTE Band 13 overlaid with Wi-Fi 2450, Back Surface of DUT 10 mm from Phantom

Peak SAR location for CDMA(point T1) is (-0.027, -0.00198, -0.169)

Peak SAR location for WiFi (pont T2) is (0.048, -0.00898, -0.169)

Peak location spacing = 7.533 cm

$SPLSR = (1.28 + 0.52) / 7.533 = 0.239$ which has been rounded to 0.24 in the table above.

As the SPLSR is below 0.30, no measurements to determine the aggregate 1-g SAR were required for this case.

¹⁰ Calculations of peak separation distances were evaluated per SPEAG Technical Note “Calculation of the Distance between Two Hotspot”, [TN_110209_DASY_Calculate_HotSpot_Distance.pdf](#).

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 comparisons for System Accuracy Verifications

System Accuracy Verification Measurements for Head SAR Measurements

Date/Time: 9/28/2011 9:38:47 AM

Test Laboratory: Motorola - Sep-28-2011 835 MHz Head

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 422TR; FCC ID: IHDP56MN1

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 422TR; Input Power = 200 mW

Sim.Temp@meas = 20.0 °C; Sim.Temp@SPC = 20.0 °C; Room Temp @ SPC = 21.3 °C

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

Medium: Validation *HEAD Tissue*

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.92 \text{ mho/m}$; $\epsilon_r = 42$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.87, 5.87, 5.87); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 SUGAR SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1):

Measurement grid: $dx=10\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 2.16 mW/g

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

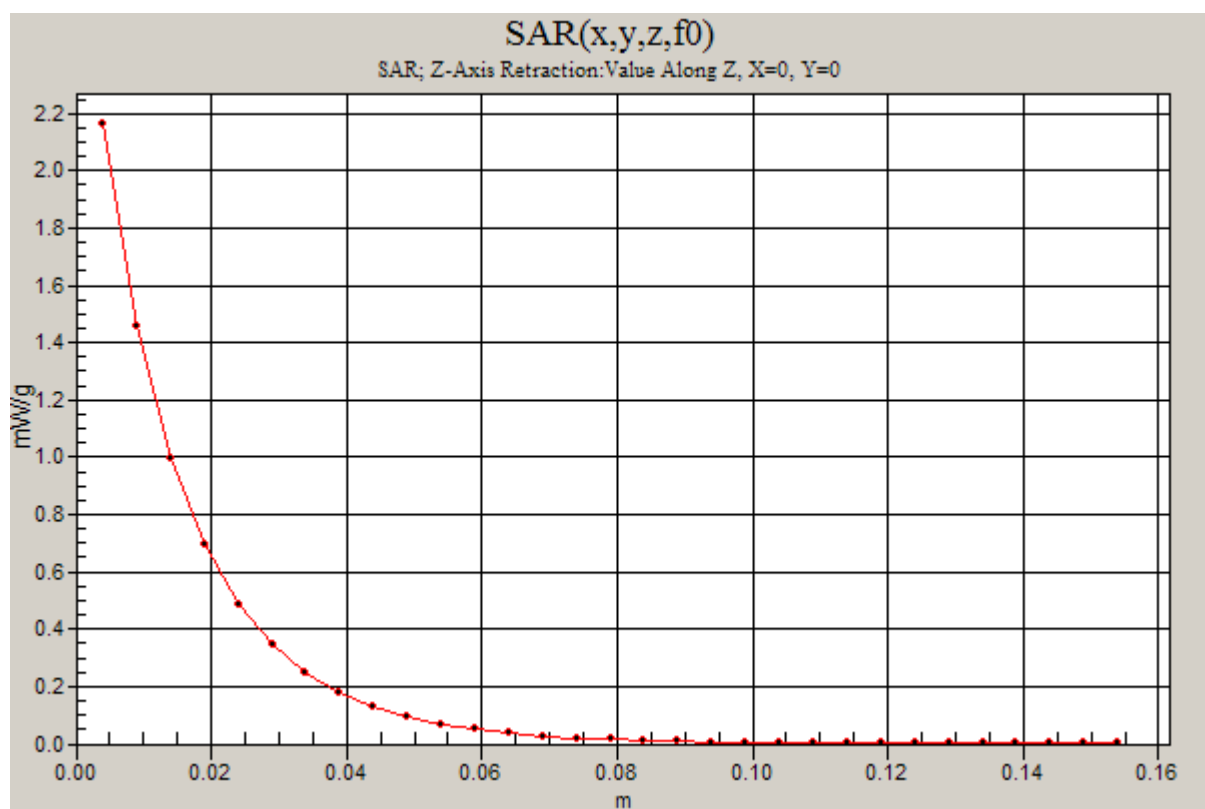
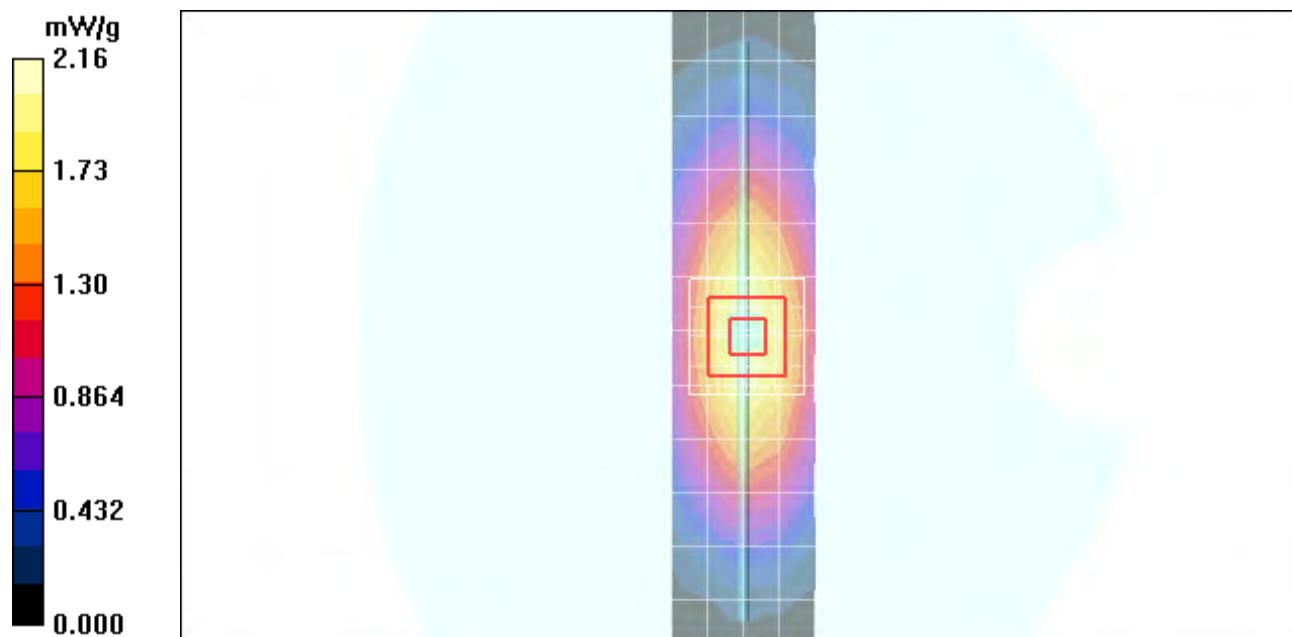
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 49.4 V/m; Power Drift = -0.029 dB; Peak SAR (extrapolated) = 2.93 W/kg

SAR(1 g) = 2 mW/g; SAR(10 g) = 1.31 mW/g; Maximum value of SAR (measured) = 2.17 mW/g

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

Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$, $dz=5\text{mm}$



Date/Time: 10/8/2011 7:25:42 AM

Test Laboratory: Motorola - Oct-08-2011 835 MHz Head

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 422TR; FCC ID: IHDP56MN1

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 422TR; Input Power = 200 mW

Sim.Temp@meas = 20.3°C; Sim.Temp@SPC = 20.3°C; Room Temp @ SPC = 21.1°C

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

Medium: Validation *HEAD Tissue*

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.91 \text{ mho/m}$; $\epsilon_r = 41.4$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.87, 5.87, 5.87); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 SUGAR SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1):

Measurement grid: $dx=10\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 2.09 mW/g

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

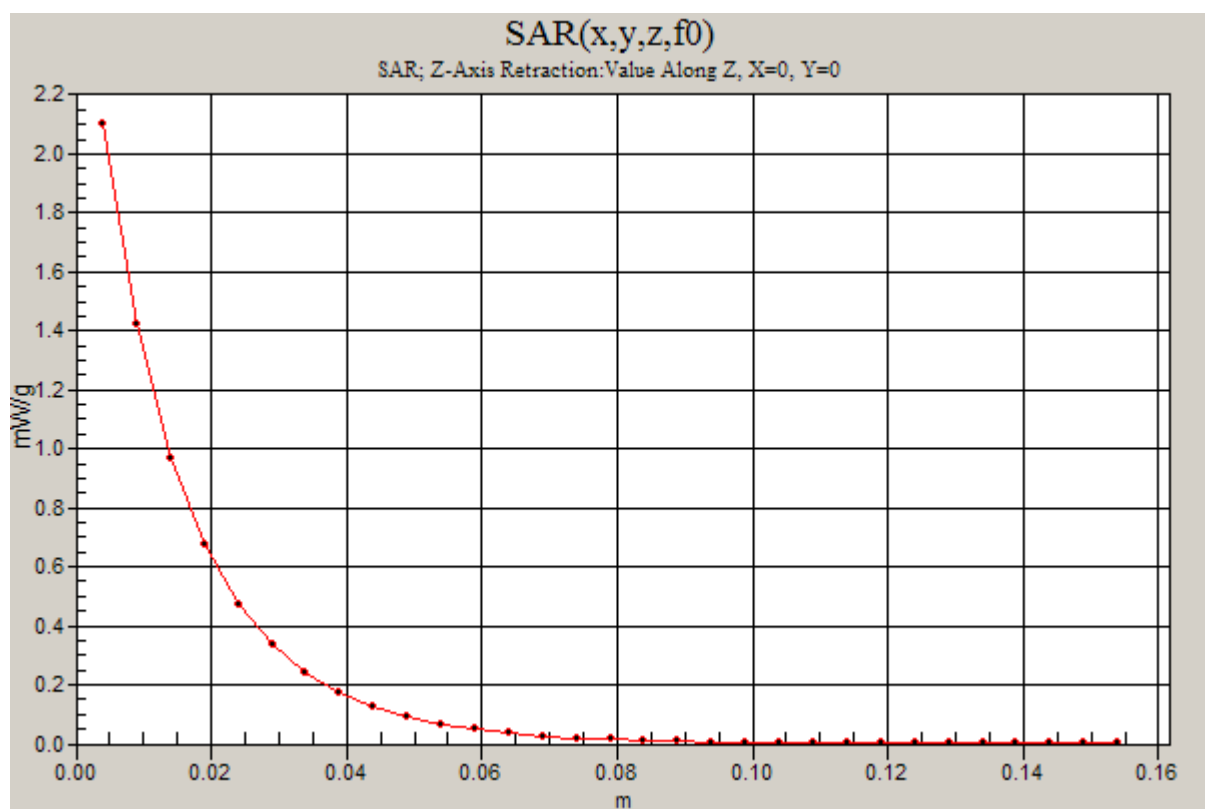
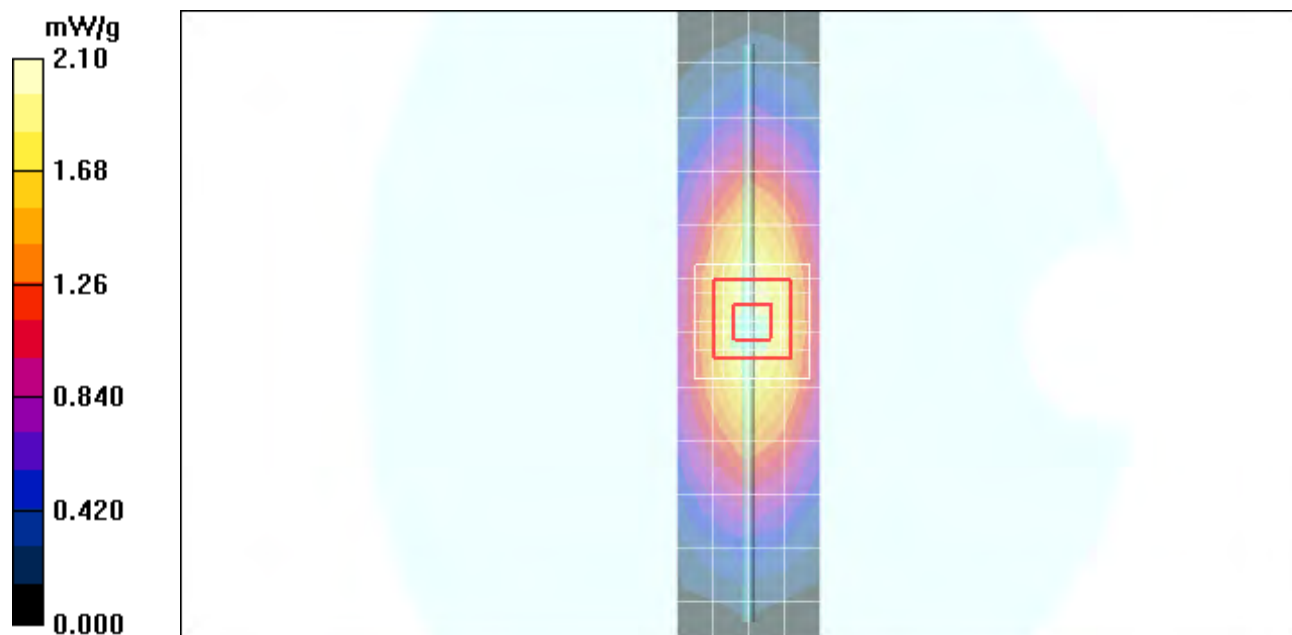
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 48.6 V/m; Power Drift = 0.015 dB; Peak SAR (extrapolated) = 2.85 W/kg

SAR(1 g) = 1.94 mW/g; SAR(10 g) = 1.27 mW/g; Maximum value of SAR (measured) = 2.11 mW/g

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

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



Date/Time: 10/11/2011 9:23:31 AM

Test Laboratory: Motorola - Oct-11-2011 835 MHz Head

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 422TR; FCC ID: IHDP56MN1

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 422TR; Input Power = 200 mW

Sim.Temp@meas = 20.5°C; Sim.Temp@SPC = 20.5°C; Room Temp @ SPC = 20.8°C

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

Medium: Validation *HEAD Tissue*

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.9 \text{ mho/m}$; $\epsilon_r = 41.2$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.87, 5.87, 5.87); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 SUGAR SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1):

Measurement grid: $dx=10\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 2.06 mW/g

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

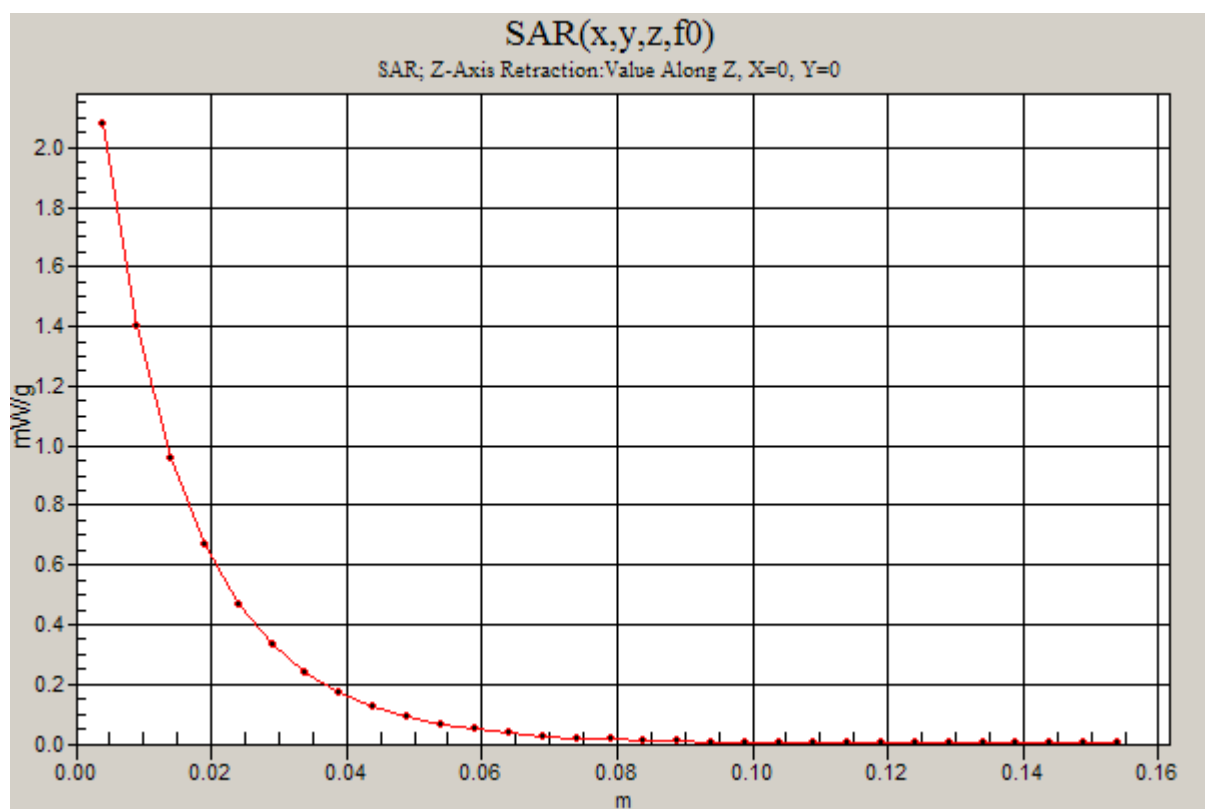
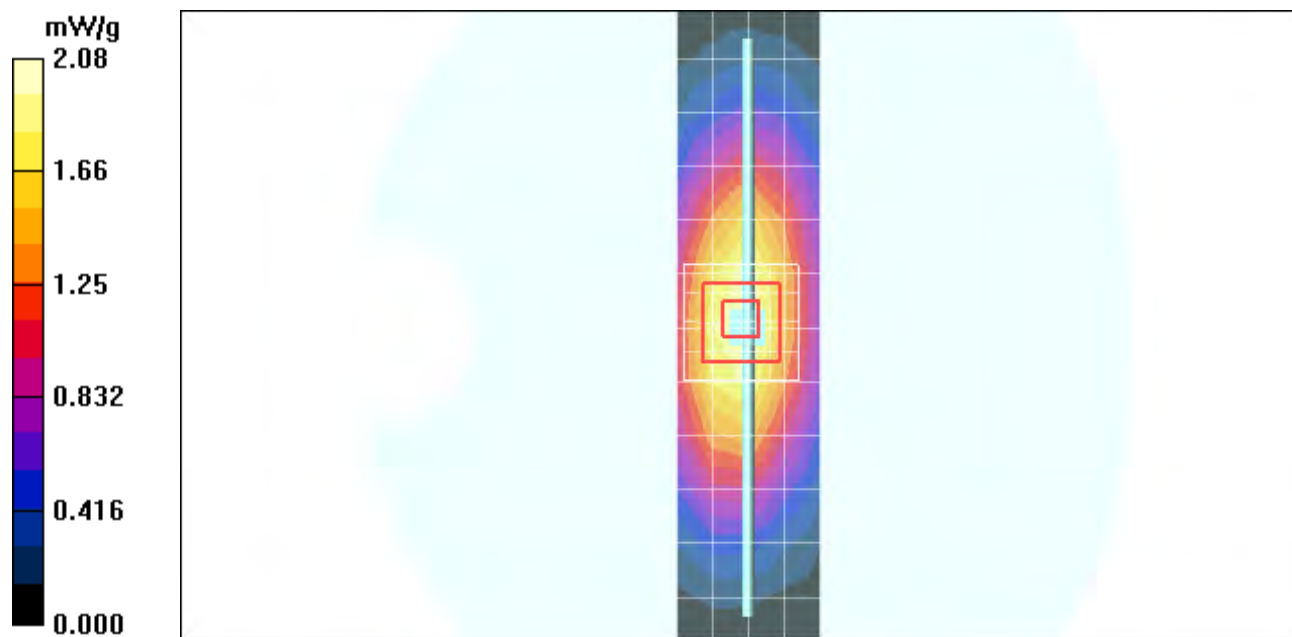
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 48.8 V/m; Power Drift = -0.022 dB; Peak SAR (extrapolated) = 2.82 W/kg

SAR(1 g) = 1.93 mW/g; SAR(10 g) = 1.26 mW/g; Maximum value of SAR (measured) = 2.08 mW/g

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

Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$, $dz=5\text{mm}$



Date/Time: 10/12/2011 11:28:16 AM

Test Laboratory: Motorola - Oct-12-2011 835 MHz Head

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 422TR; FCC ID: IHDP56MN1

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 422TR; Input Power = 200 mW

Sim.Temp@meas = 20.6°C; Sim.Temp@SPC = 20.6°C; Room Temp @ SPC = 20.1°C

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

Medium: Validation *HEAD Tissue*

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.92 \text{ mho/m}$; $\epsilon_r = 43.1$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.87, 5.87, 5.87); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 SUGAR SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1):

Measurement grid: $dx=10\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 2.13 mW/g

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

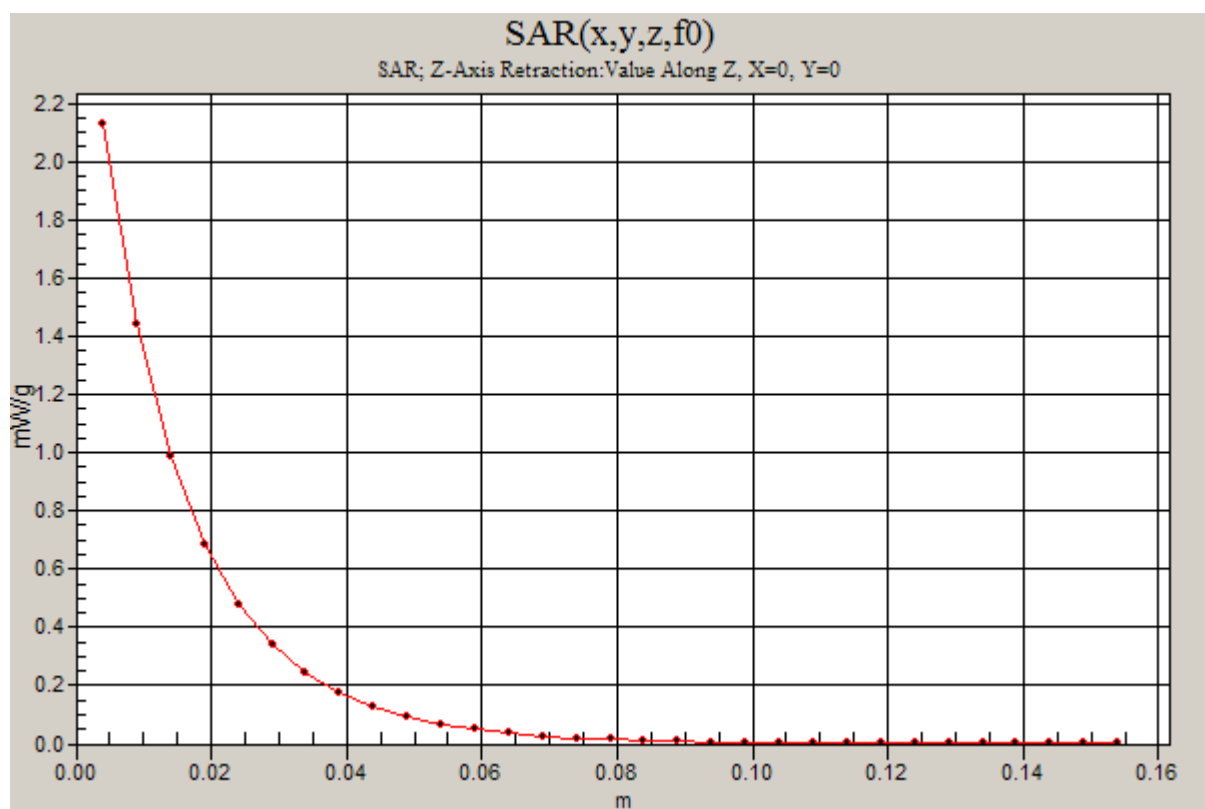
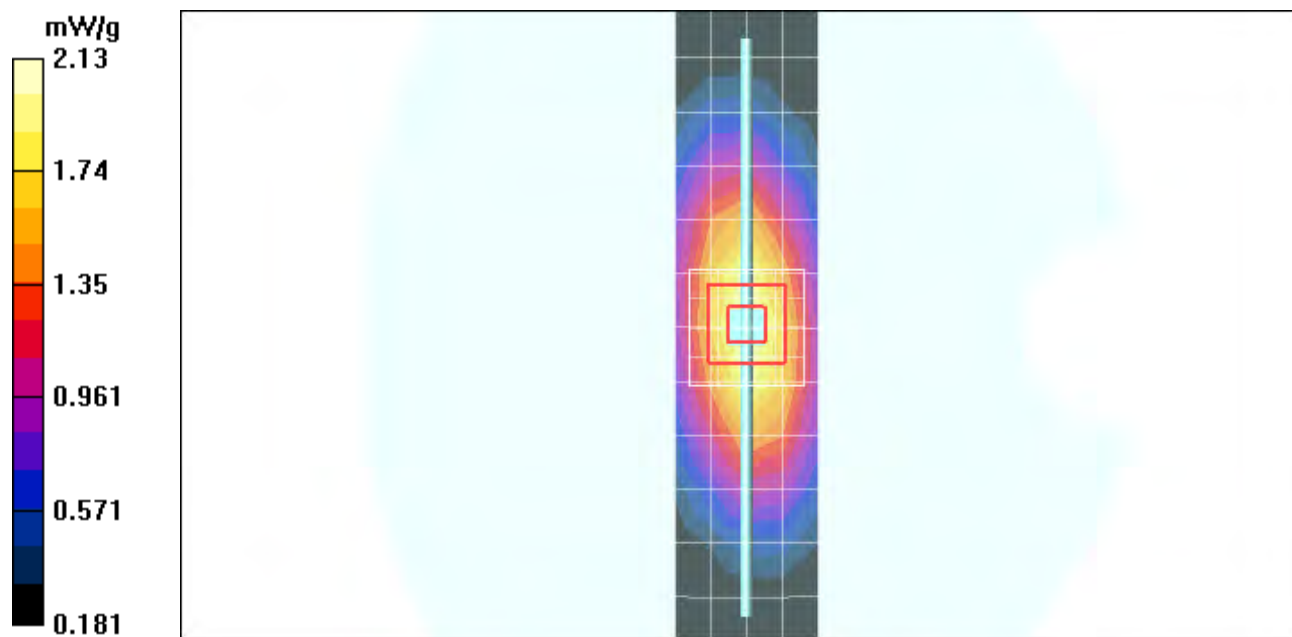
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 48.8 V/m; Power Drift = 0.014 dB; Peak SAR (extrapolated) = 2.85 W/kg

SAR(1 g) = 1.96 mW/g; SAR(10 g) = 1.28 mW/g

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

Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$, $dz=5\text{mm}$



Date/Time: 9/28/2011 1:52:41 PM

Test Laboratory: Motorola - Sep-28-2011 1800 MHz Head

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 250TR; FCC ID: IHDP56MN1

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 250TR; Input Power = 200 mW

Sim.Temp@meas = 20.6 °C; Sim.Temp@SPC = 20.2 °C; Room Temp @ SPC = 21.3 °C

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

Medium: Validation *HEAD Tissue*

Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 39.4$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.02, 5.02, 5.02); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1):

Measurement grid: $dx=10\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 8.39 mW/g

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

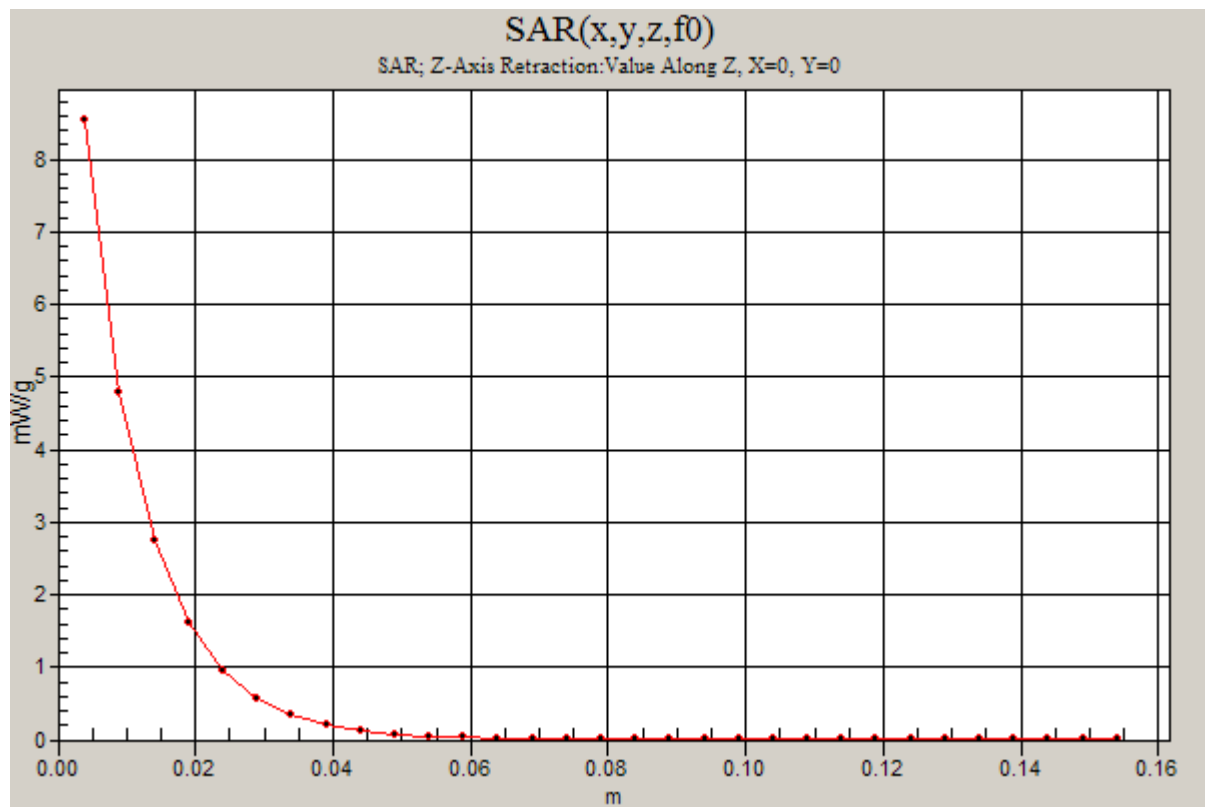
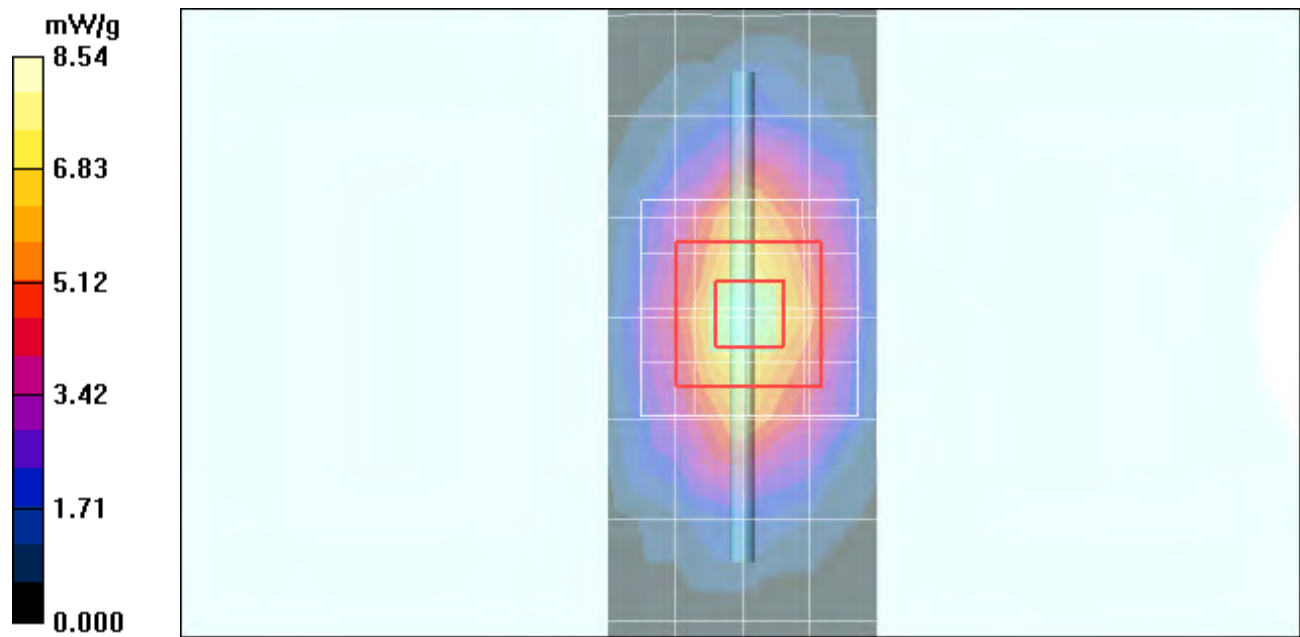
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 80.3 V/m; Power Drift = -0.031 dB; Peak SAR (extrapolated) = 13.7 W/kg

SAR(1 g) = 7.6 mW/g; SAR(10 g) = 4.01 mW/g; Maximum value of SAR (measured) = 8.56 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) = 8.54 mW/g



Date/Time: 10/13/2011 11:09:33 PM

Test Laboratory: Motorola - Oct-13-2011 1800 MHz Head

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 250TR; FCC ID: IHDP56MN1

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 250TR; Input Power = 200 mW

Sim.Temp@meas = 20.5°C; Sim.Temp@SPC = 20.5°C; Room Temp @ SPC = 21.5°C

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

Medium: Validation *HEAD Tissue*

Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.45 \text{ mho/m}$; $\epsilon_r = 38.3$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.02, 5.02, 5.02); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1):

Measurement grid: $dx=10\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 8.84 mW/g

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

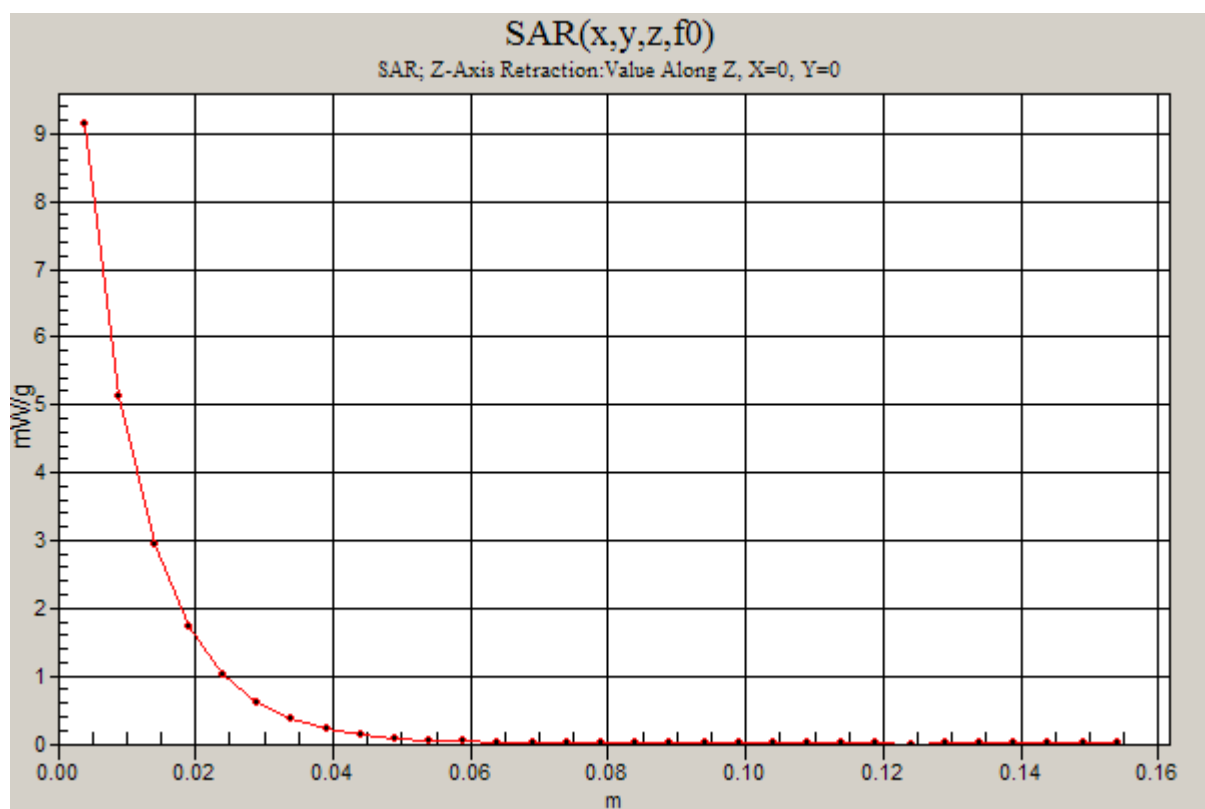
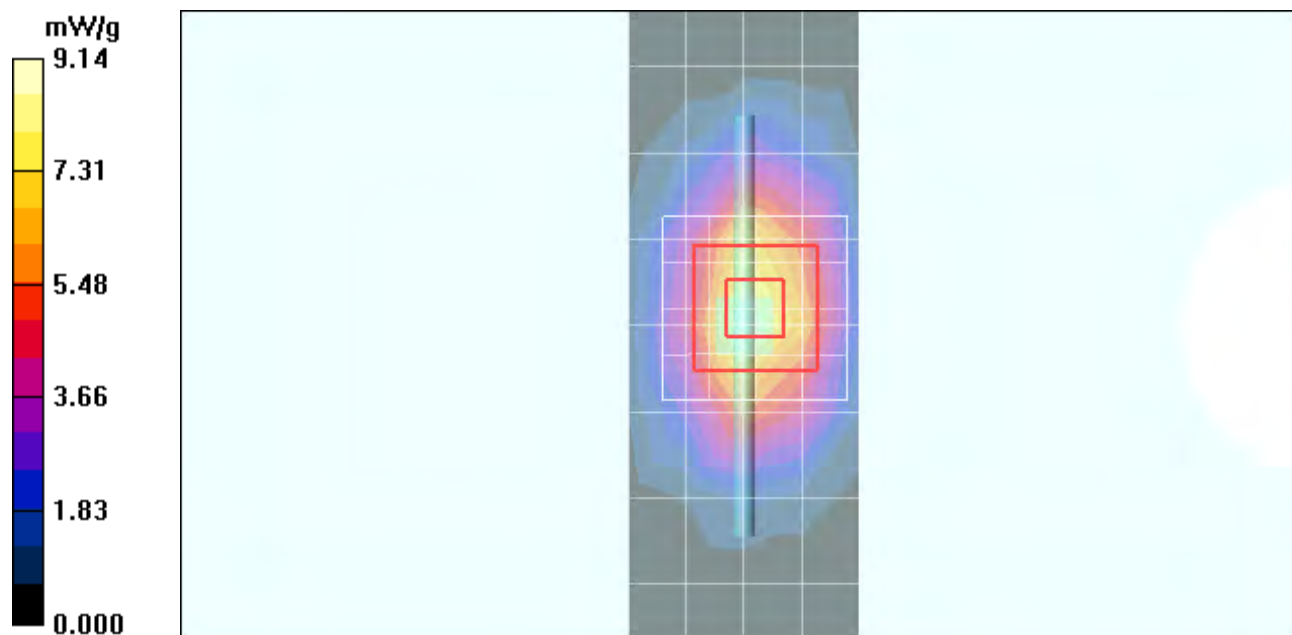
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 79.5 V/m; Power Drift = 0.005 dB; Peak SAR (extrapolated) = 14.7 W/kg

SAR(1 g) = 8.15 mW/g; SAR(10 g) = 4.3 mW/g; Maximum value of SAR (measured) = 9.20 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) = 9.14 mW/g



System Accuracy Verification Measurements for Body SAR Measurements

Date/Time: 9/28/2011 12:11:59 PM

Test Laboratory: Motorola - Sep-28-2011 835 MHz Body

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:422TR; FCC ID: IHDP56MN1

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 422TR; Input Power = 200 mW

Sim.Temp@meas = 20.3 °C; Sim.Temp@SPC = 20.3 °C; Room Temp @ SPC = 21.6 °C

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

Medium: Validation *BODY Tissue*

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 55.3$; $\rho = 1000 \text{ kg/m}^3$

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#-?, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- 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) = 1.79 mW/g

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

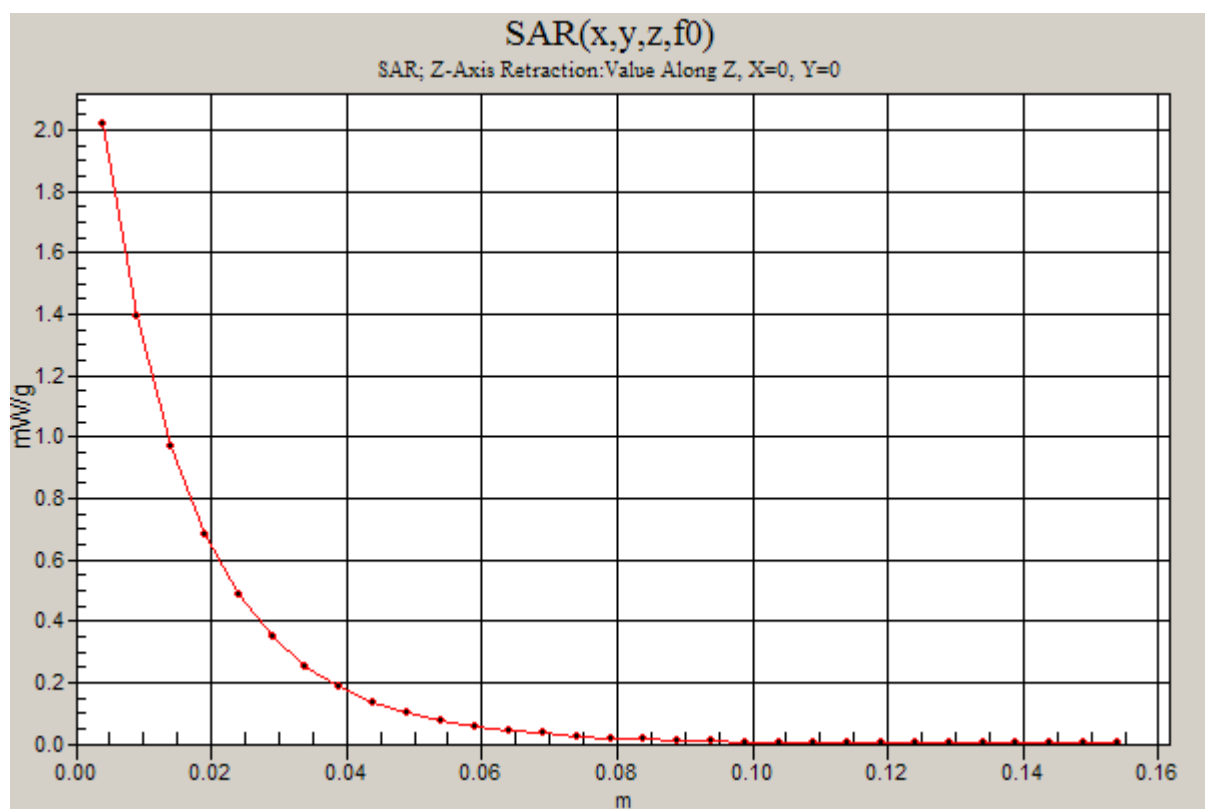
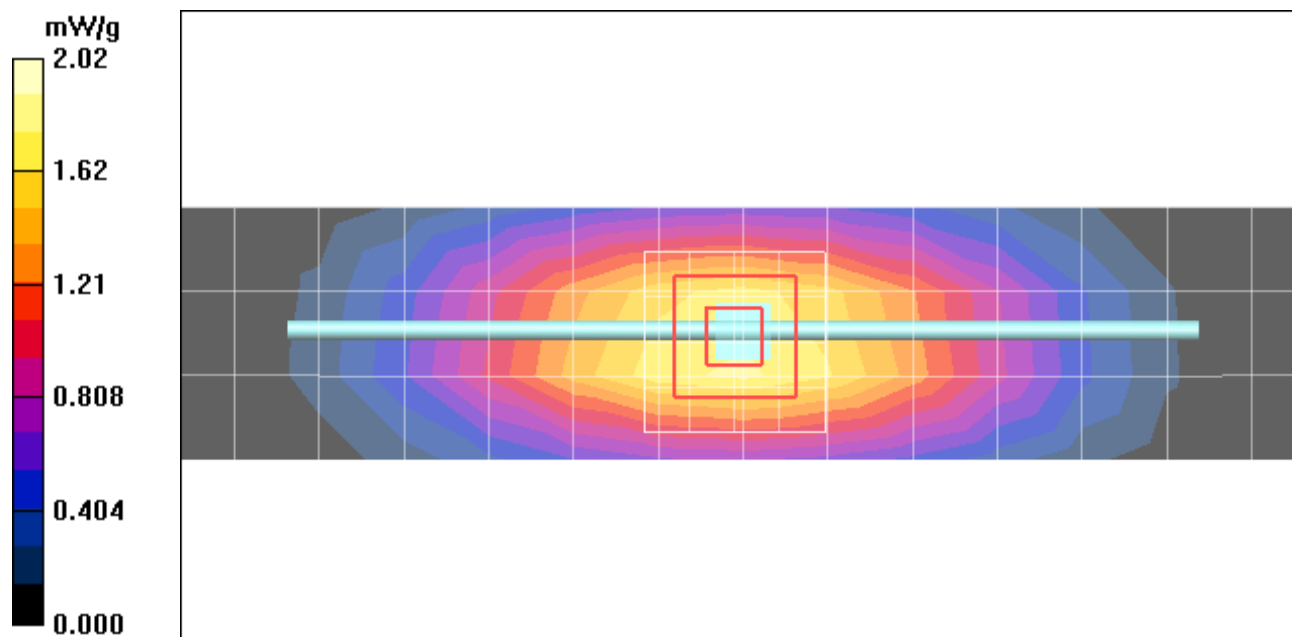
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 46.2 V/m; Power Drift = -0.025 dB; Peak SAR (extrapolated) = 2.70 W/kg

SAR(1 g) = 1.88 mW/g; SAR(10 g) = 1.24 mW/g; Maximum value of SAR (measured) = 2.03 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) = 2.02 mW/g



Date/Time: 10/10/2011 8:21:43 AM

Test Laboratory: Motorola - Oct-10-2011 835 MHz Body

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 422TR; FCC ID: IHDP56MN1

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 422TR; Input Power = 200 mW

Sim.Temp@meas = 20.3°C; Sim.Temp@SPC = 20.3°C; Room Temp @ SPC = 21.1°C

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

Medium: Validation *BODY Tissue*

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 54.7$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- 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) = 2.01 mW/g

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

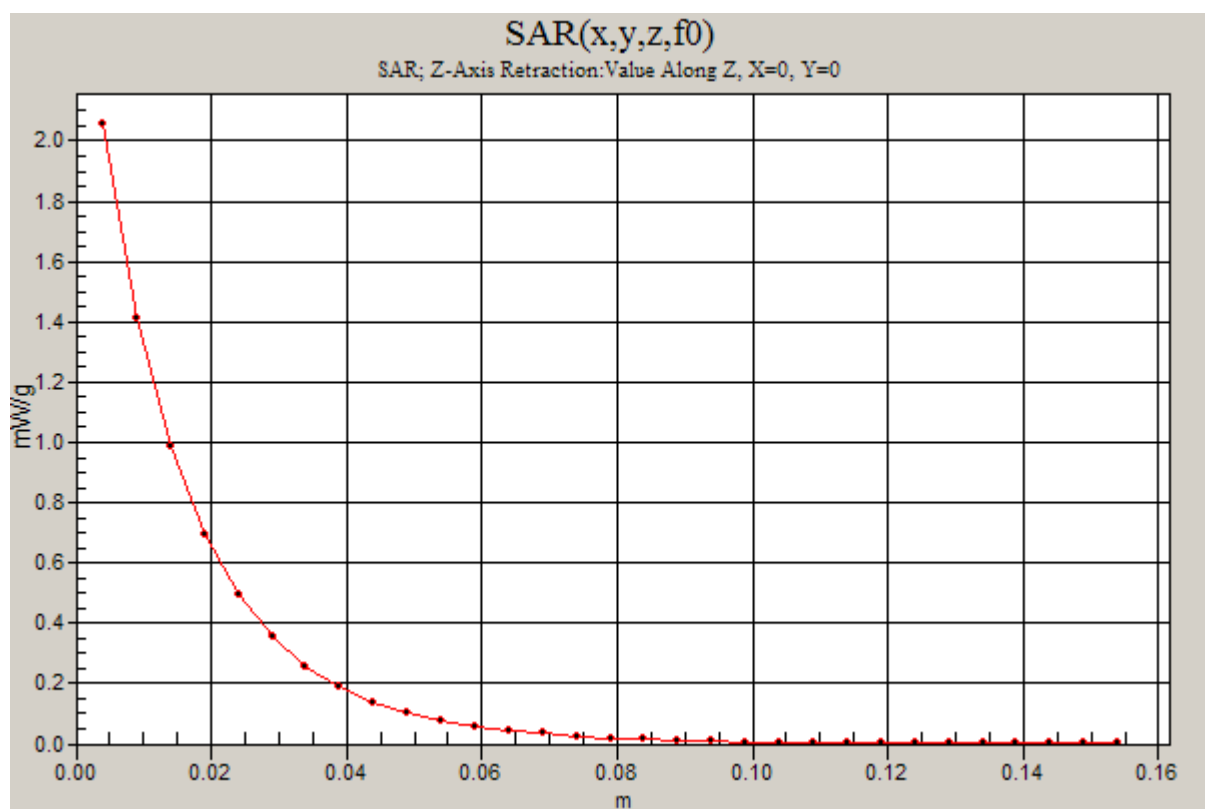
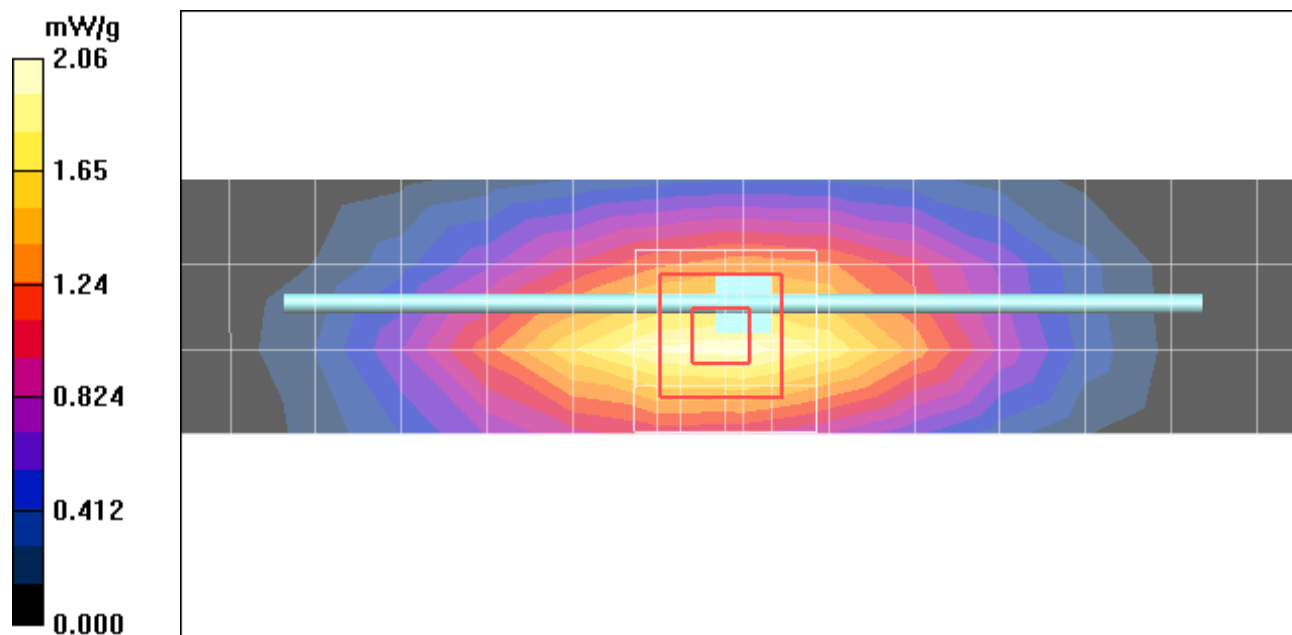
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 44.3 V/m; Power Drift = -0.016 dB; Peak SAR (extrapolated) = 2.72 W/kg

SAR(1 g) = 1.89 mW/g; SAR(10 g) = 1.25 mW/g; Maximum value of SAR (measured) = 2.04 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) = 2.06 mW/g



Date/Time: 10/11/2011 8:32:30 AM

Test Laboratory: Motorola - Oct-11-2011 835 MHz Body

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 422TR; FCC ID: IHDP56MN1

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 422TR; Input Power = 200 mW

Sim.Temp@meas = 20.2°C; Sim.Temp@SPC = 20.2°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: $f = 835 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 54.2$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- 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) = 1.86 mW/g

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

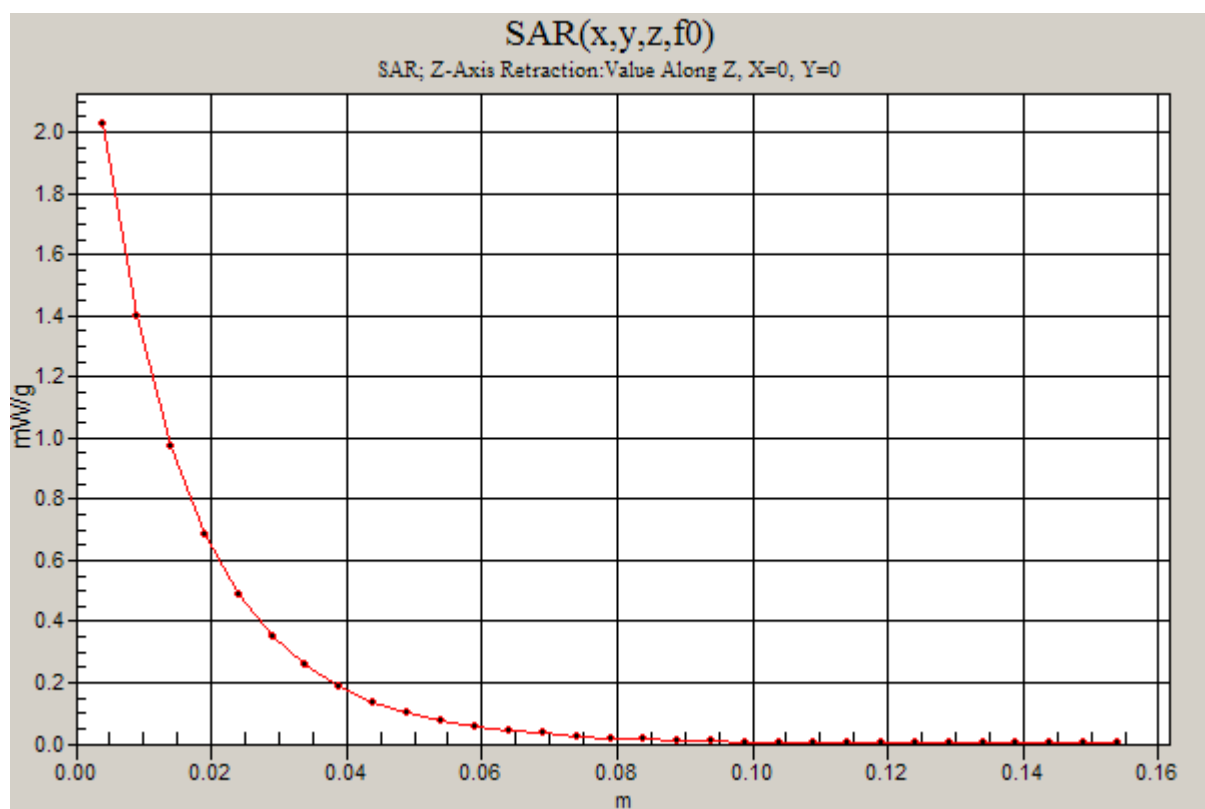
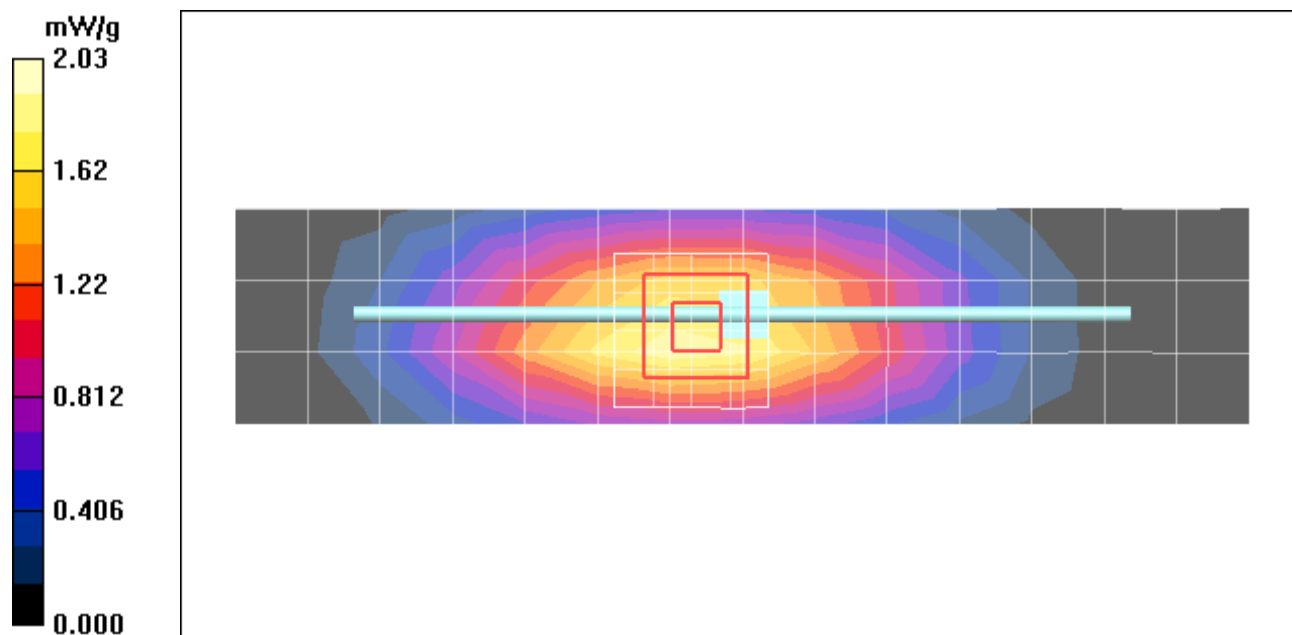
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 45.6 V/m; Power Drift = -0.024 dB; Peak SAR (extrapolated) = 2.68 W/kg

SAR(1 g) = 1.87 mW/g; SAR(10 g) = 1.24 mW/g; Maximum value of SAR (measured) = 2.01 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) = 2.03 mW/g



Date/Time: 10/12/2011 9:44:20 AM

Test Laboratory: Motorola - Oct-12-2011 835 MHz Body

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 422TR; FCC ID: IHDP56MN1

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 422TR; Input Power = 200 mW

Sim.Temp@meas = 20.3°C; Sim.Temp@SPC = 20.3°C; Room Temp @ SPC = 21.1°C

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

Medium: Validation *BODY Tissue*

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 53.4$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- 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) = 1.98 mW/g

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

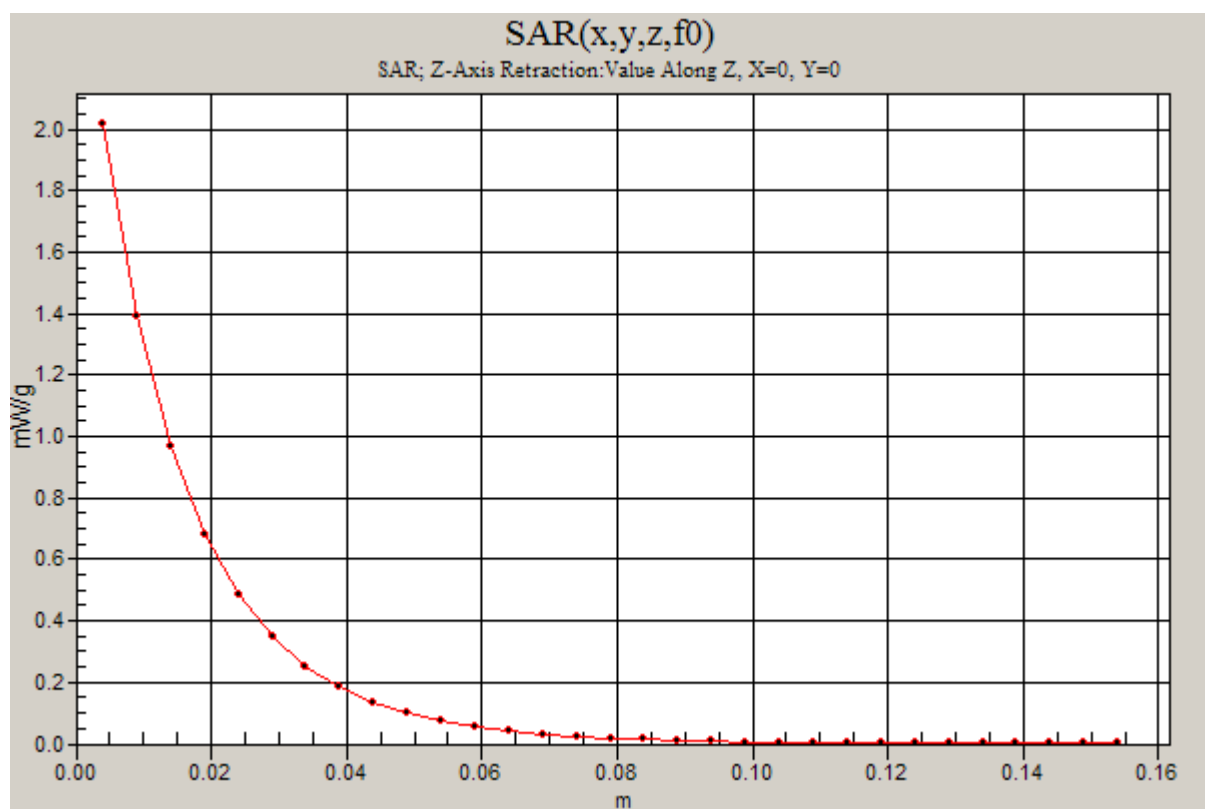
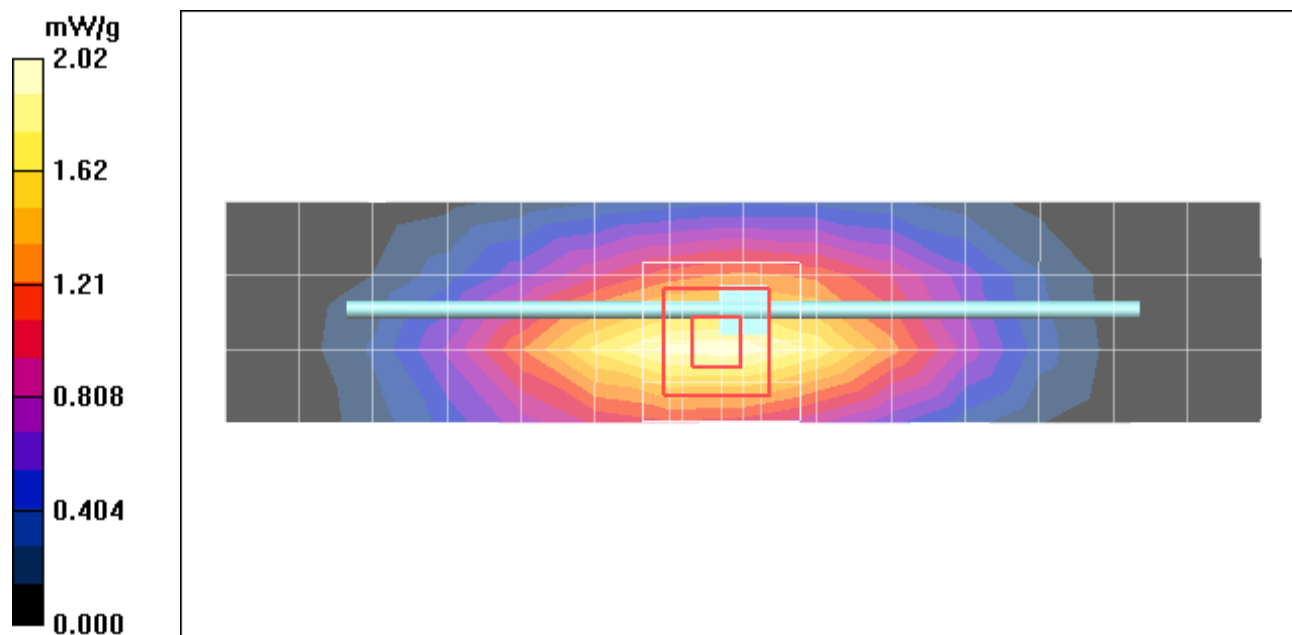
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 43.5 V/m; Power Drift = -0.014 dB; Peak SAR (extrapolated) = 2.68 W/kg

SAR(1 g) = 1.86 mW/g; SAR(10 g) = 1.23 mW/g; Maximum value of SAR (measured) = 2.01 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) = 2.02 mW/g



Date/Time: 10/13/2011 8:42:53 AM

Test Laboratory: Motorola - Oct-13-2011 835 MHz Body

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 422TR; FCC ID: IHDP56MN1

Procedure Notes: 835MHz System Performance Check; Dipole Sn# 422TR; Input Power = 200 mW

Sim.Temp@meas = 20.5 °C; Sim.Temp@SPC = 20.5 °C; Room Temp @ SPC = 21.2 °C

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

Medium: Validation *BODY Tissue* BIG BODY

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 55.8$; $\rho = 1000 \text{ kg/m}^3$

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 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1):

Measurement grid: $dx=10\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 2.14 mW/g

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

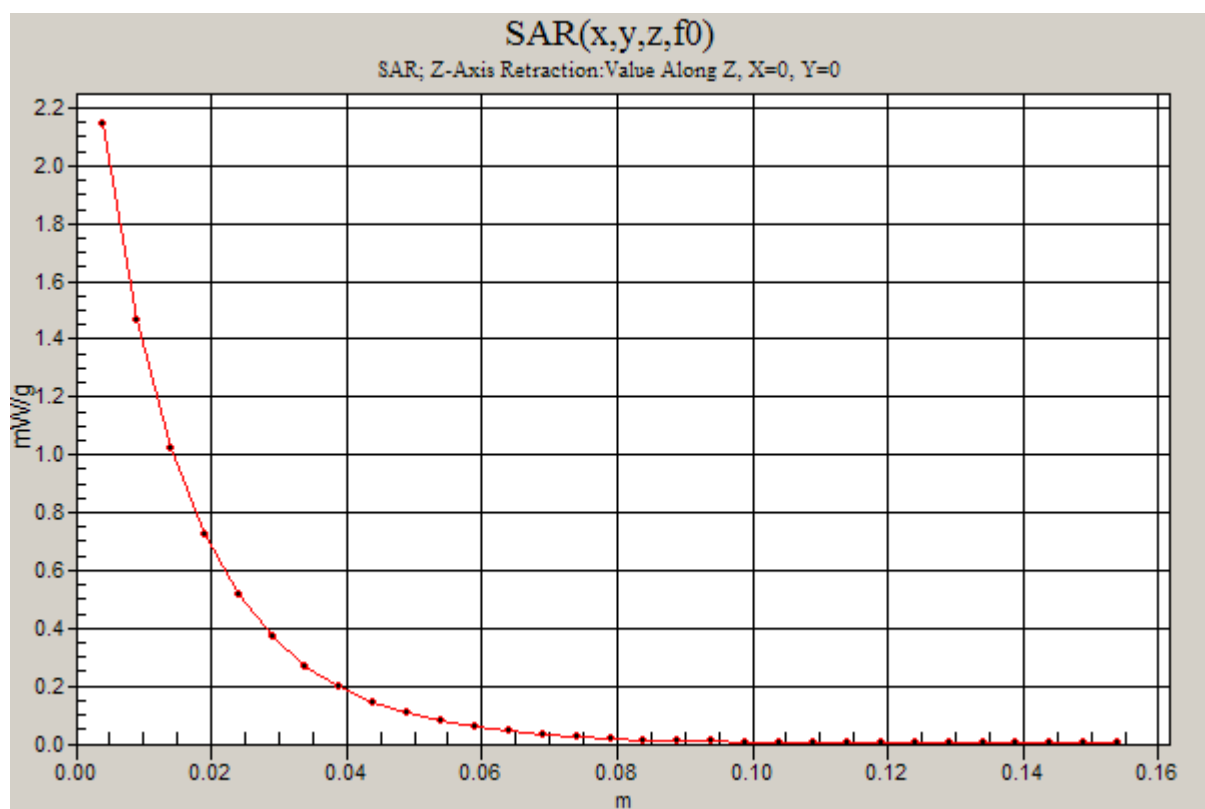
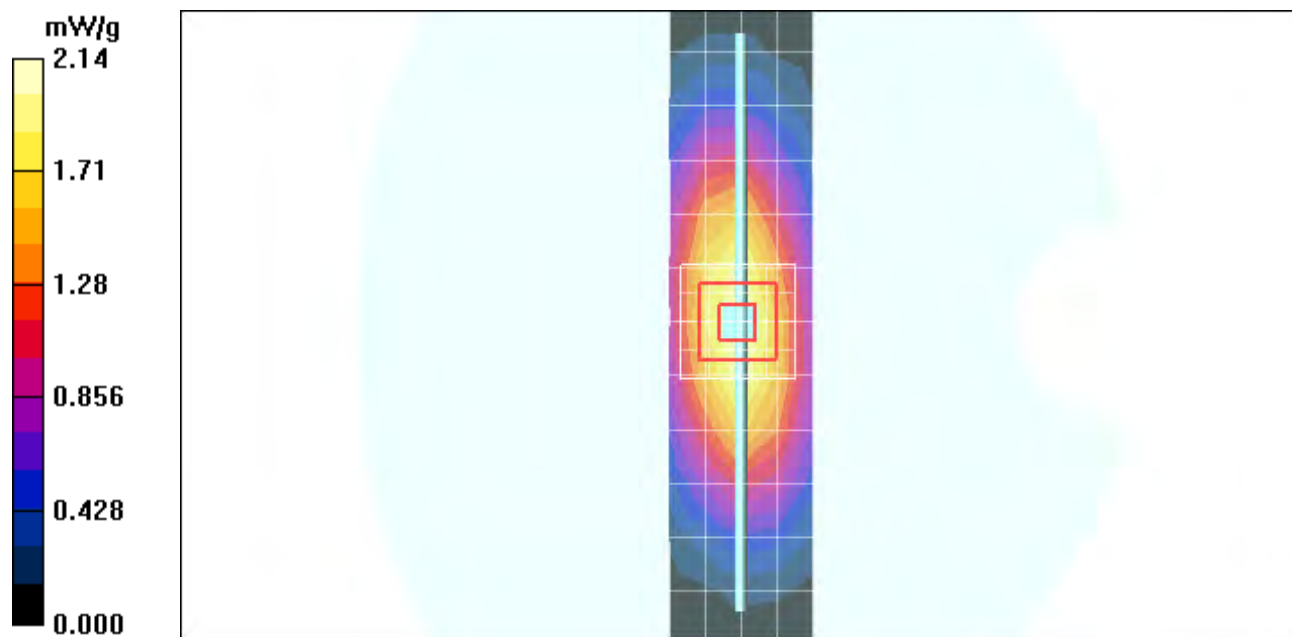
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 47.5 V/m; Power Drift = -0.006 dB; Peak SAR (extrapolated) = 2.87 W/kg

SAR(1 g) = 1.98 mW/g; SAR(10 g) = 1.31 mW/g

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

Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$, $dz=5\text{mm}$



Date/Time: 10/14/2011 2:53:32 PM

Test Laboratory: Motorola - Oct-14-2011 835 MHz Body

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 422TR; FCC ID: IHDP56MN1

Procedure Notes: 835MHz System Performance Check; Dipole Sn# 422TR; Input Power = 200 mW

Sim.Temp@meas = 20.5 °C; Sim.Temp@SPC = 20.5 °C; Room Temp @ SPC = 21.1 °C

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

Medium: Validation *BODY Tissue* BIG BODY

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 56.3$; $\rho = 1000 \text{ kg/m}^3$

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 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1):

Measurement grid: $dx=10\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 2.09 mW/g

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

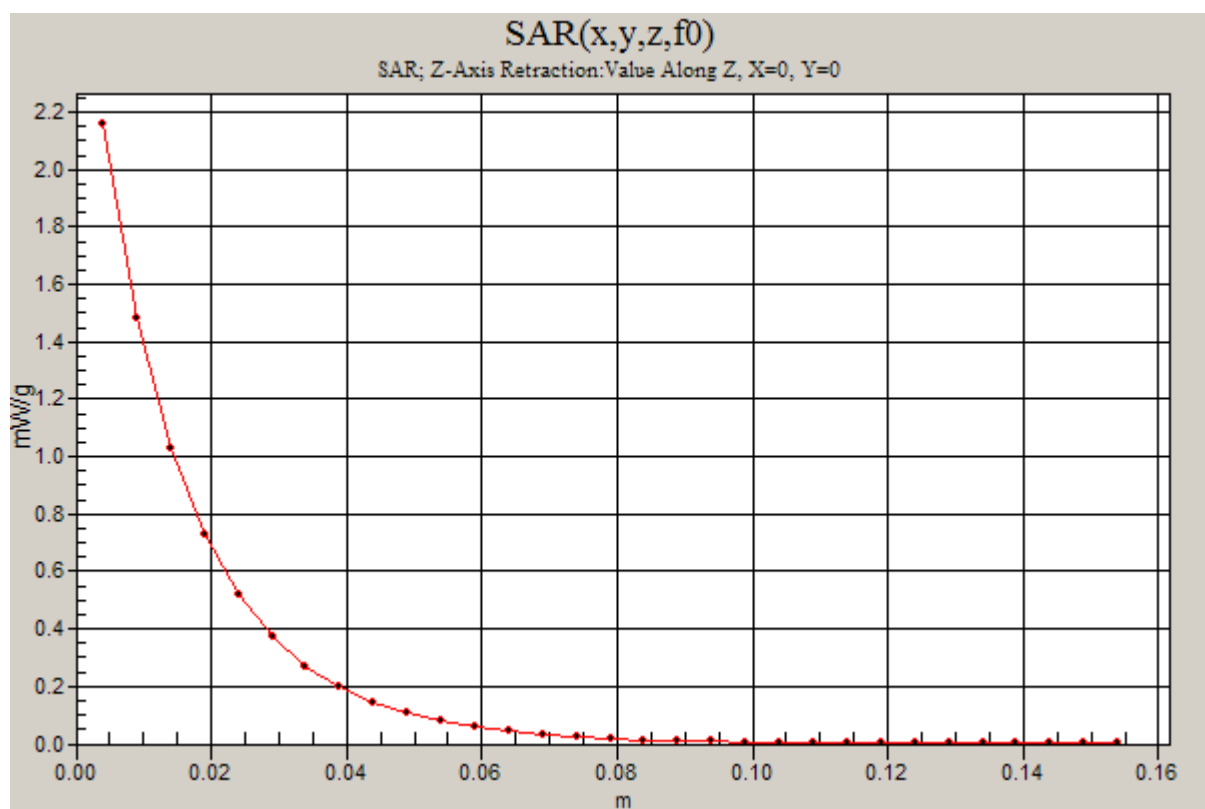
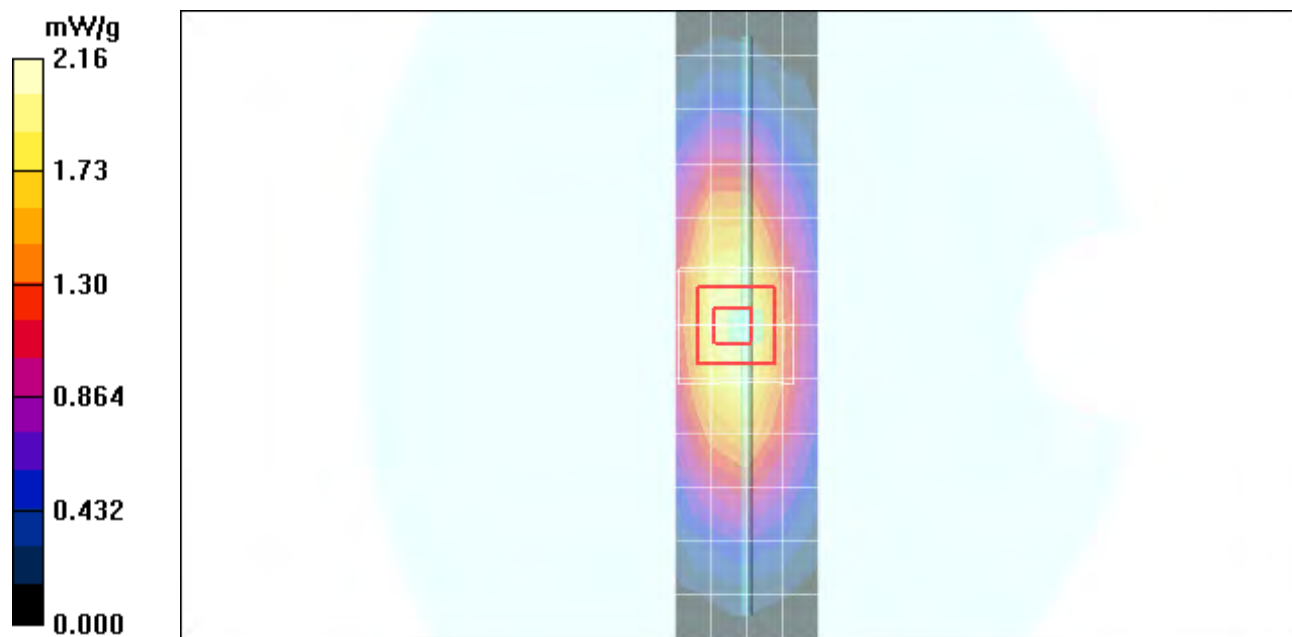
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 47.0 V/m; Power Drift = -0.004 dB; Peak SAR (extrapolated) = 2.89 W/kg

SAR(1 g) = 1.99 mW/g; SAR(10 g) = 1.32 mW/g; Maximum value of SAR (measured) = 2.16 mW/g

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

Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$, $dz=5\text{mm}$



Date/Time: 9/28/2011 2:20:11 PM

Test Laboratory: Motorola - Sep-28-2011 1800 MHz Body

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 250TR; FCC ID: IHDP56MN1

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 250TR; Input Power = 200 mW

Sim.Temp@meas = 21.0 °C; Sim.Temp@SPC = 20.6 °C; Room Temp @ SPC = 21.3 °C

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

Medium: Validation *BODY Tissue*

Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

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#-?, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- 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) = 7.83 mW/g

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

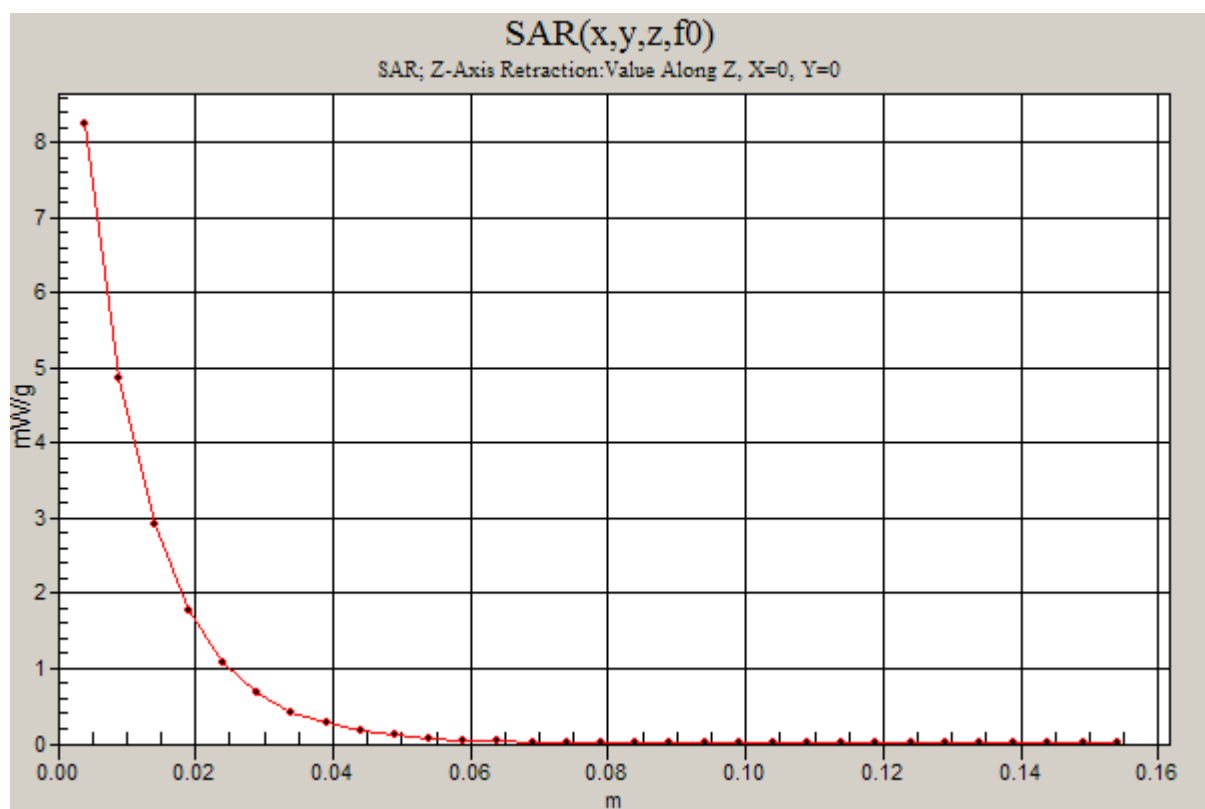
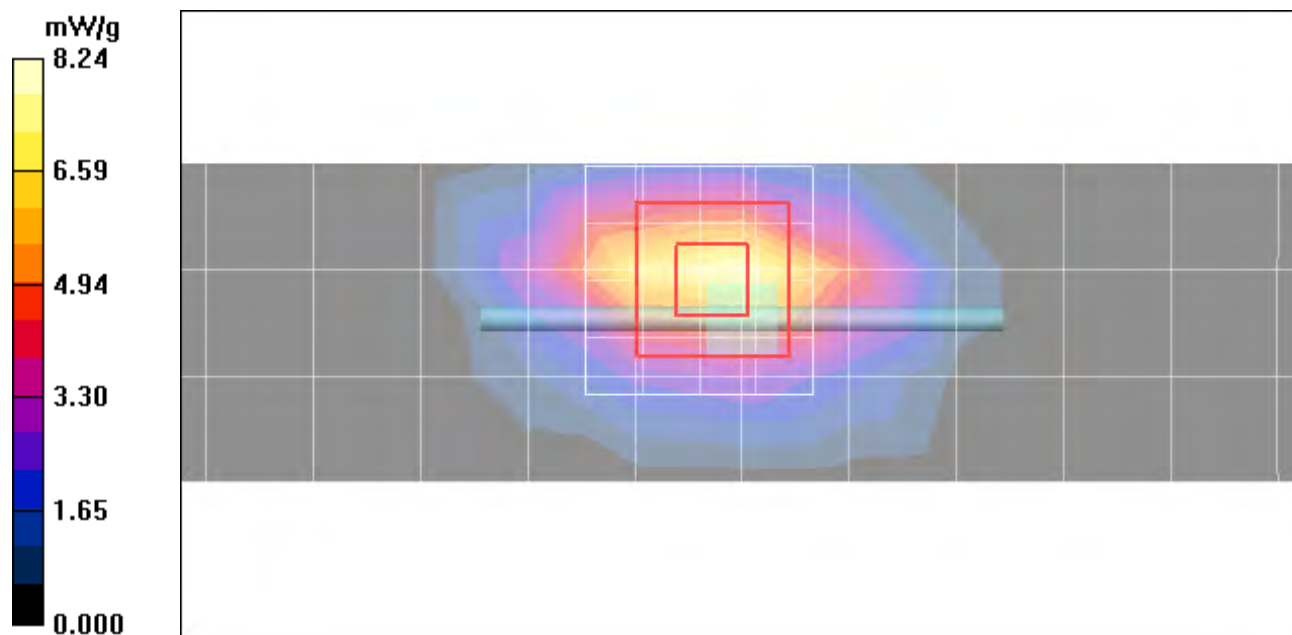
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 69.7 V/m; Power Drift = -0.051 dB; Peak SAR (extrapolated) = 12.5 W/kg

SAR(1 g) = 7.3 mW/g; SAR(10 g) = 3.92 mW/g; Maximum value of SAR (measured) = 8.22 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) = 8.24 mW/g



Date/Time: 10/11/2011 10:33:23 AM

Test Laboratory: Motorola - Oct-11-2011 1800 MHz Body

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 250TR; FCC ID: IHDP56MN1

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 250TR; Input Power = 200 mW

Sim.Temp@meas = 20.5°C; Sim.Temp@SPC = 20.5°C; Room Temp @ SPC = 20.8°C

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

Medium: Validation *BODY Tissue*

Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 51.2$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- 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) = 7.36 mW/g

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

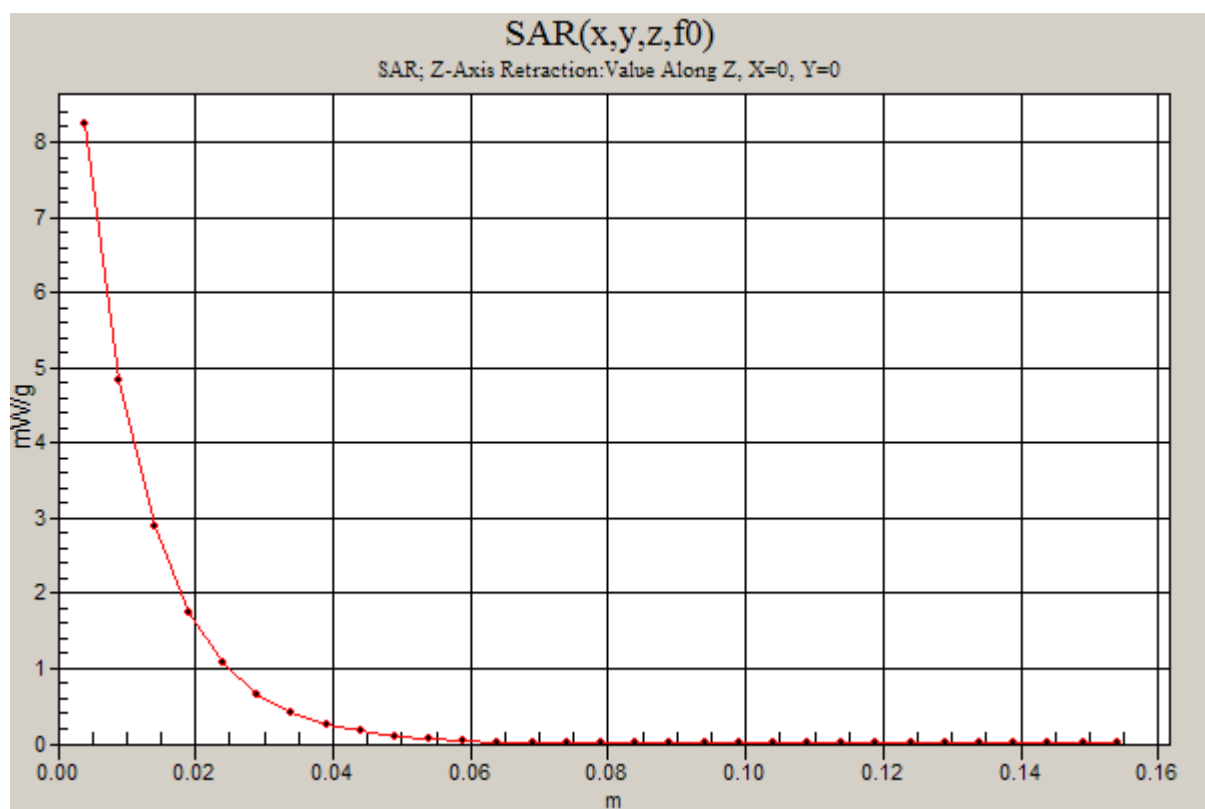
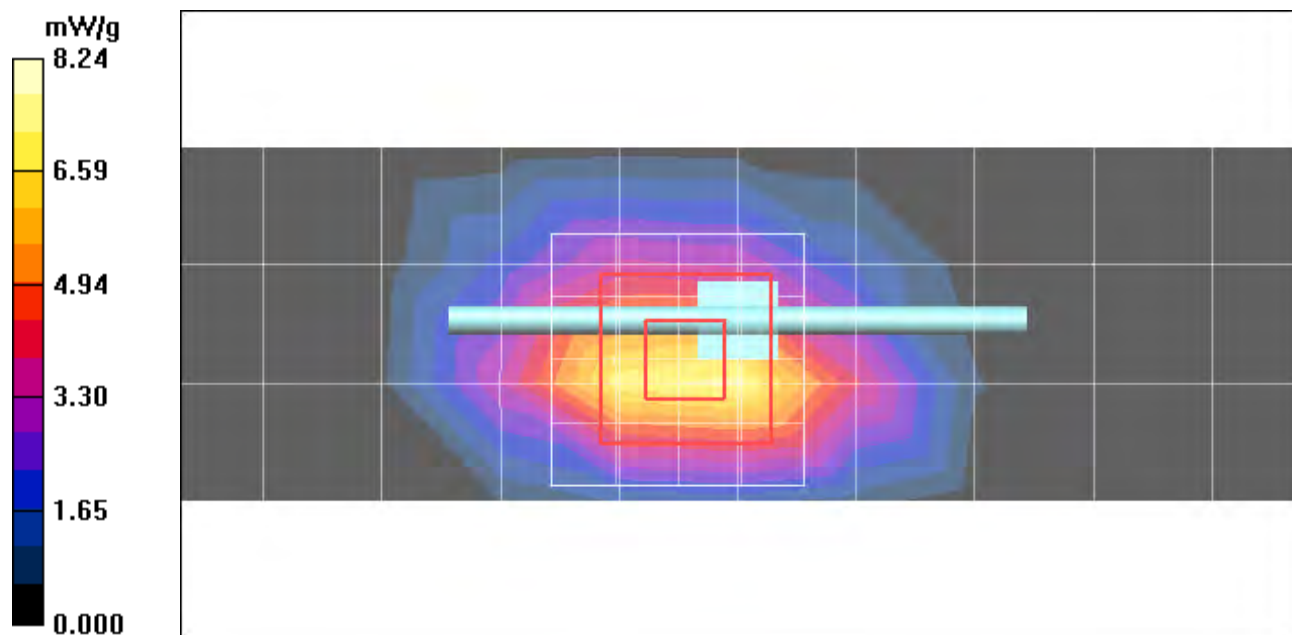
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 68.7 V/m; Power Drift = -0.048 dB; Peak SAR (extrapolated) = 12.5 W/kg

SAR(1 g) = 7.32 mW/g; SAR(10 g) = 3.92 mW/g; Maximum value of SAR (measured) = 8.27 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) = 8.24 mW/g



Date/Time: 10/13/2011 2:44:54 PM

Test Laboratory: Motorola - Oct-13-2011 1800 MHz Body

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 250TR; FCC ID: IHDP56MN1

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 250TR; Input Power = 200 mW

Sim.Temp@meas = 20.5 °C; Sim.Temp@SPC = 20.5 °C; Room Temp @ SPC = 21.5 °C

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

Medium: Validation *BODY Tissue*

Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.48 \text{ mho/m}$; $\epsilon_r = 51.2$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- 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) = 7.47 mW/g

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

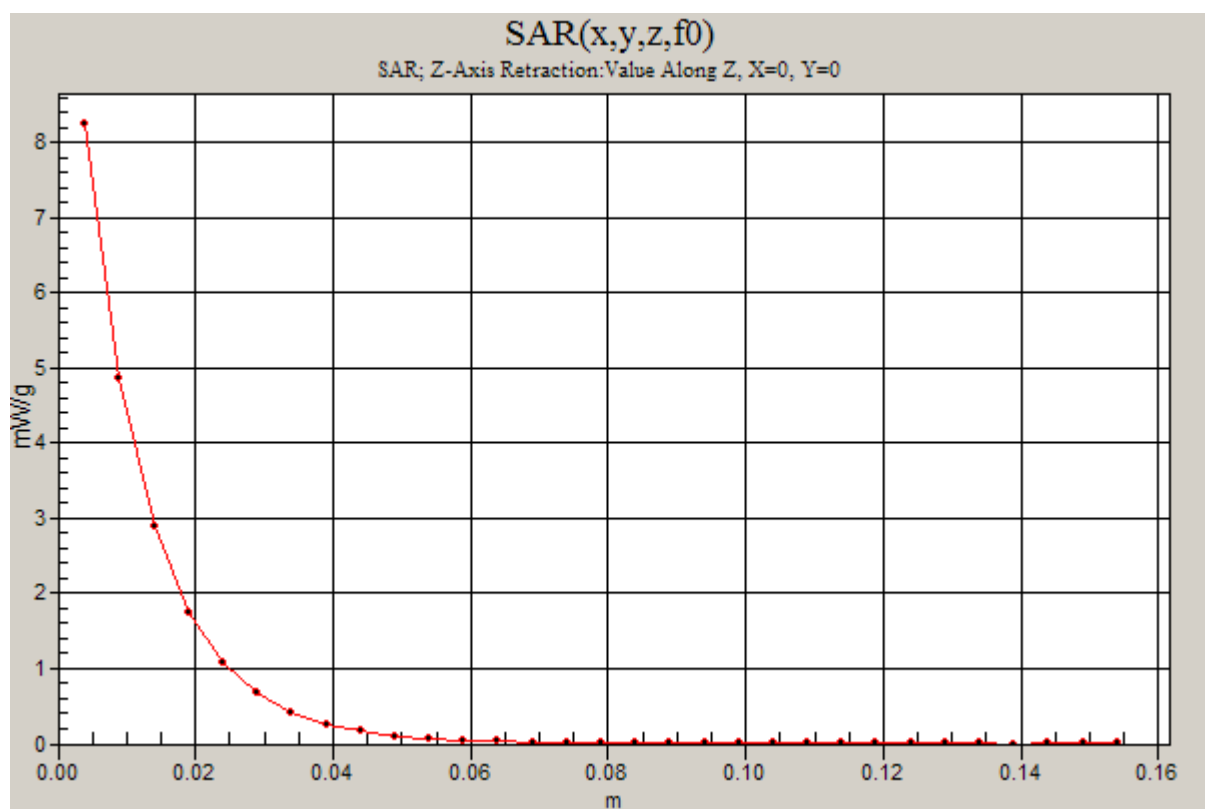
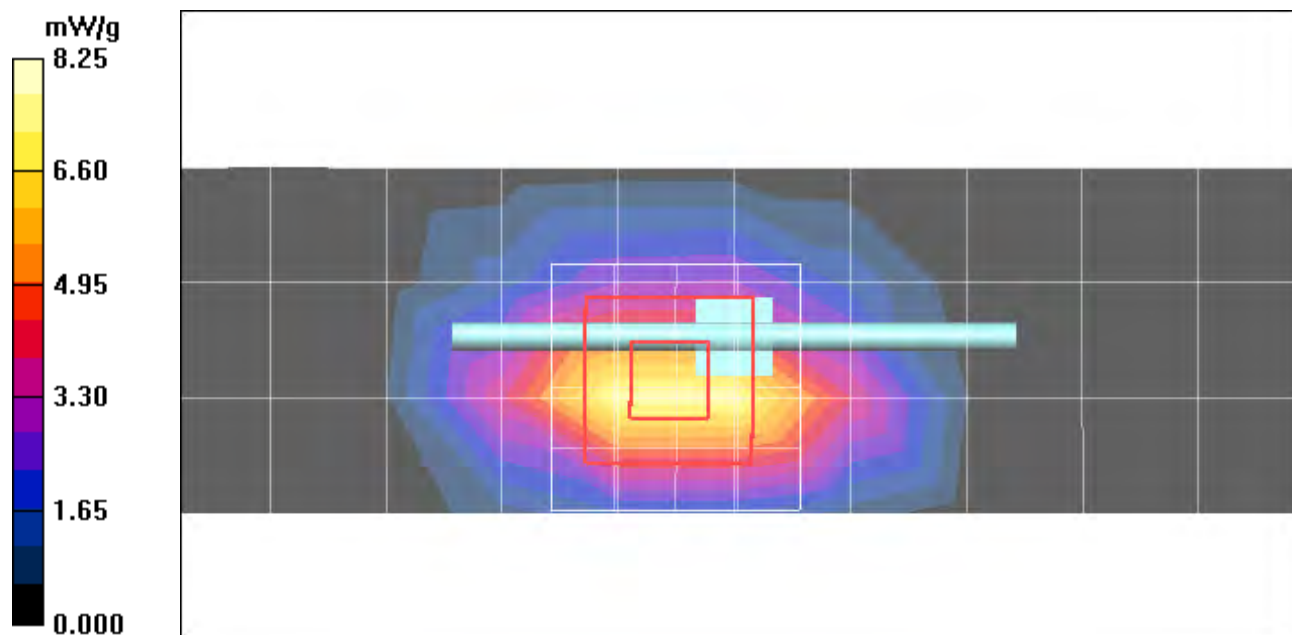
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 66.1 V/m; Power Drift = 0.066 dB; Peak SAR (extrapolated) = 12.5 W/kg

SAR(1 g) = 7.34 mW/g; SAR(10 g) = 3.97 mW/g; Maximum value of SAR (measured) = 8.19 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) = 8.25 mW/g



Date/Time: 10/14/2011 11:27:02 AM

Test Laboratory: Motorola - Oct-14-2011 1800 MHz Body

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 250TR; FCC ID: IHDP56MN1

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 250TR; Input Power = 200 mW

Sim.Temp@meas = 20.5 °C; Sim.Temp@SPC = 20.5 °C; Room Temp @ SPC = 21.3 °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 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1):

Measurement grid: $dx=10\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 7.96 mW/g

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

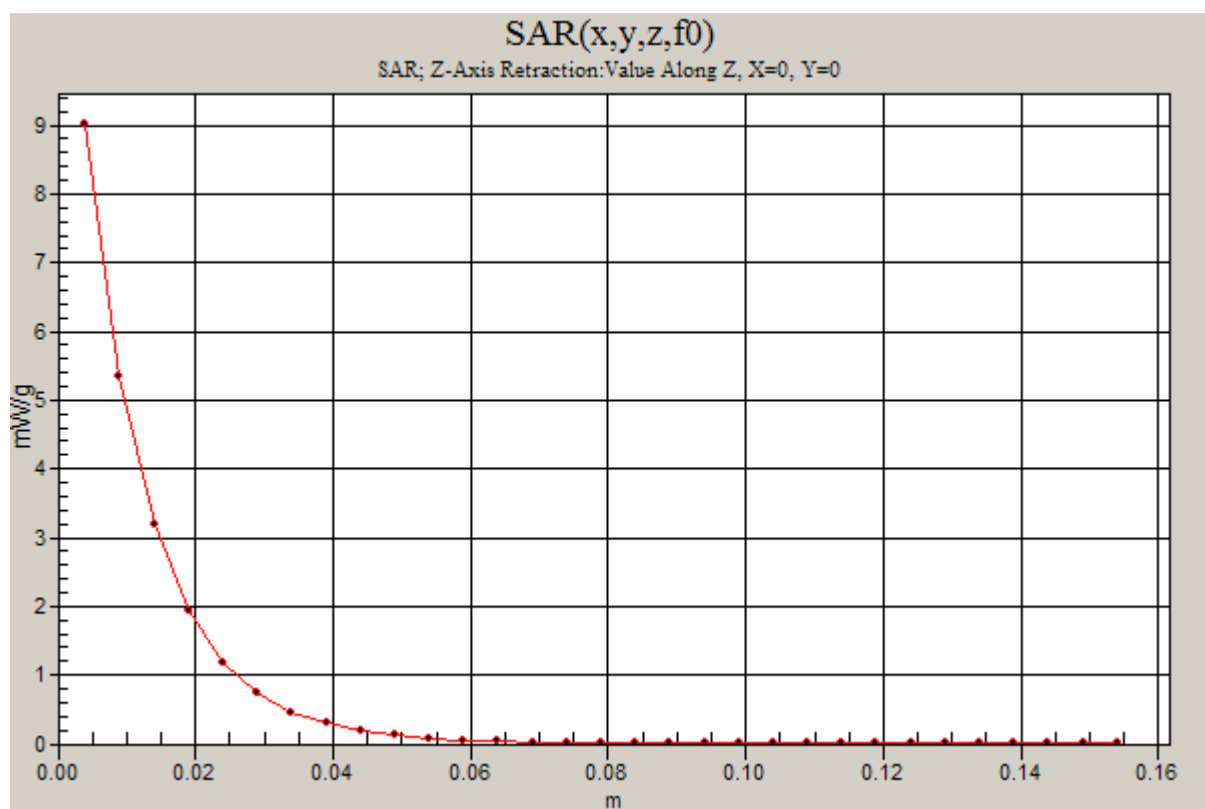
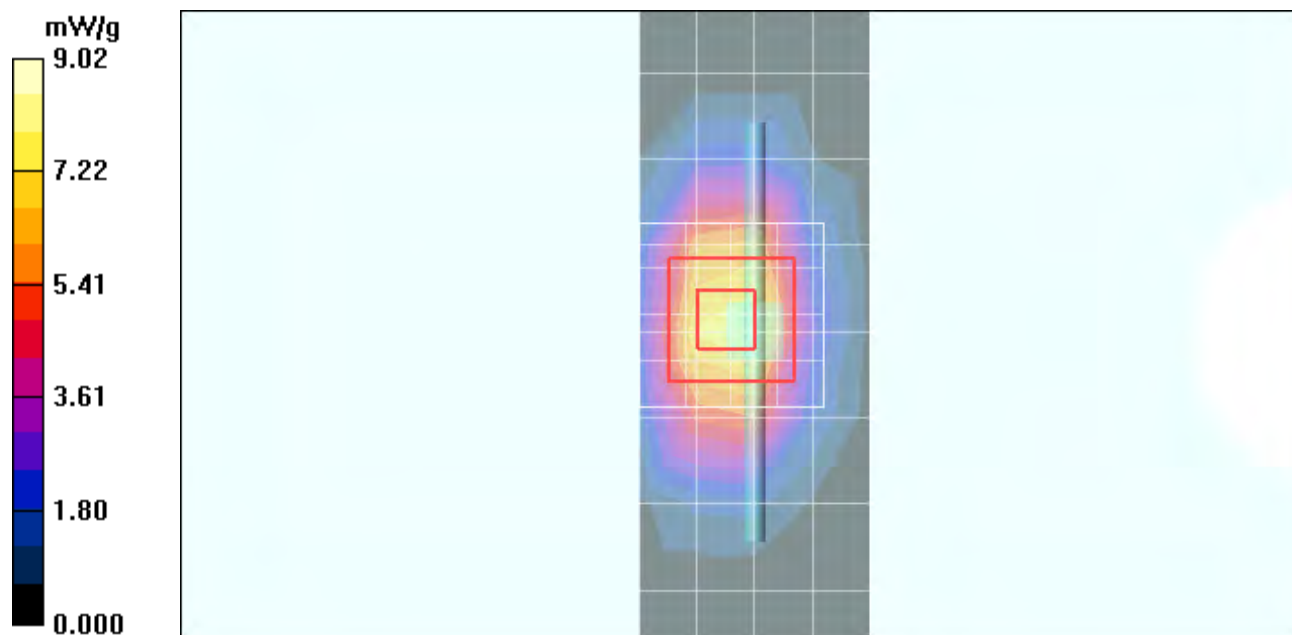
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 74.1 V/m; Power Drift = 0.040 dB; Peak SAR (extrapolated) = 13.6 W/kg

SAR(1 g) = 8.01 mW/g; SAR(10 g) = 4.29 mW/g; Maximum value of SAR (measured) = 9.02 mW/g

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

Measurement grid: $dx=20\text{mm}$, $dy=20\text{mm}$, $dz=5\text{mm}$



Date/Time: 10/13/2011 5:20:42 PM

Test Laboratory: Motorola - Oct-13-2011 2450 MHz Body

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 863; FCC ID: IHDP56MN1

Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 863; Input Power = 200 mW

Sim.Temp@meas = 20.7°C; Sim.Temp@SPC = 20.5°C; Room Temp @ SPC = 21.6°C

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

Medium: Validation *BODY Tissue*

Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.91 \text{ mho/m}$; $\epsilon_r = 50.5$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- 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) = 9.77 mW/g

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

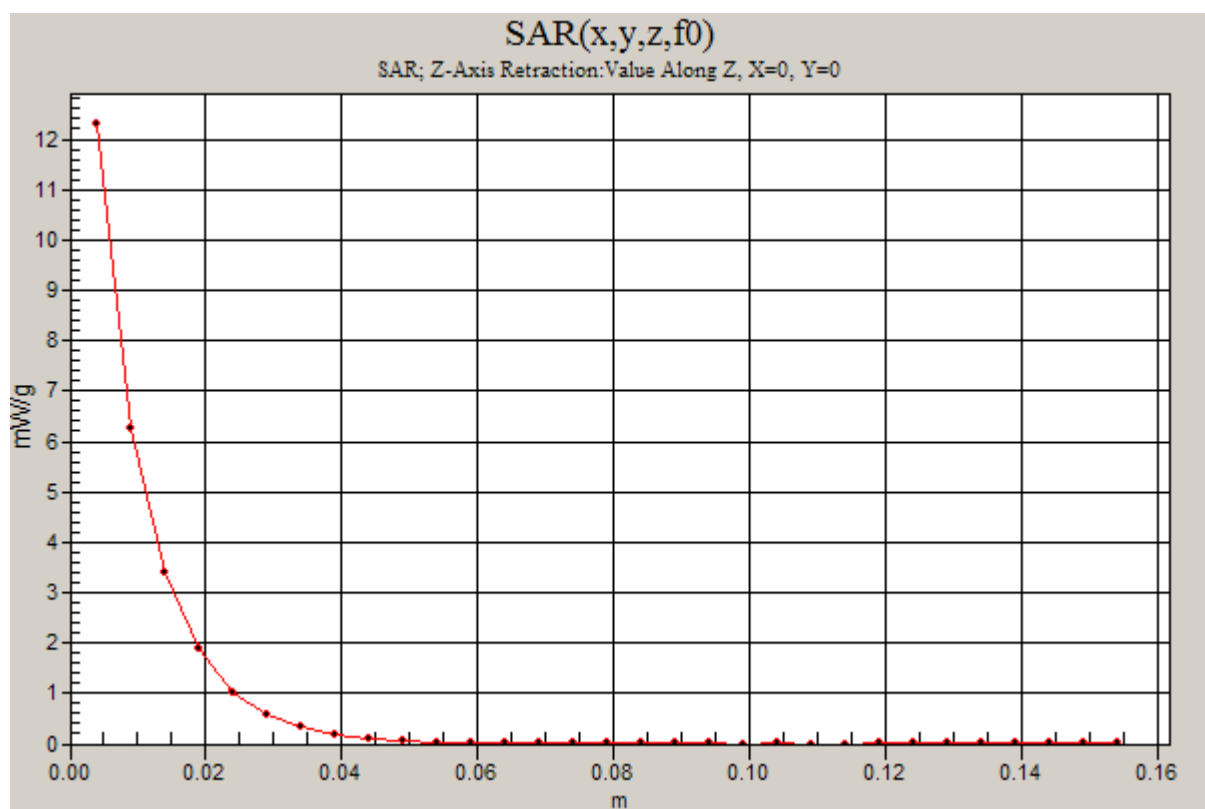
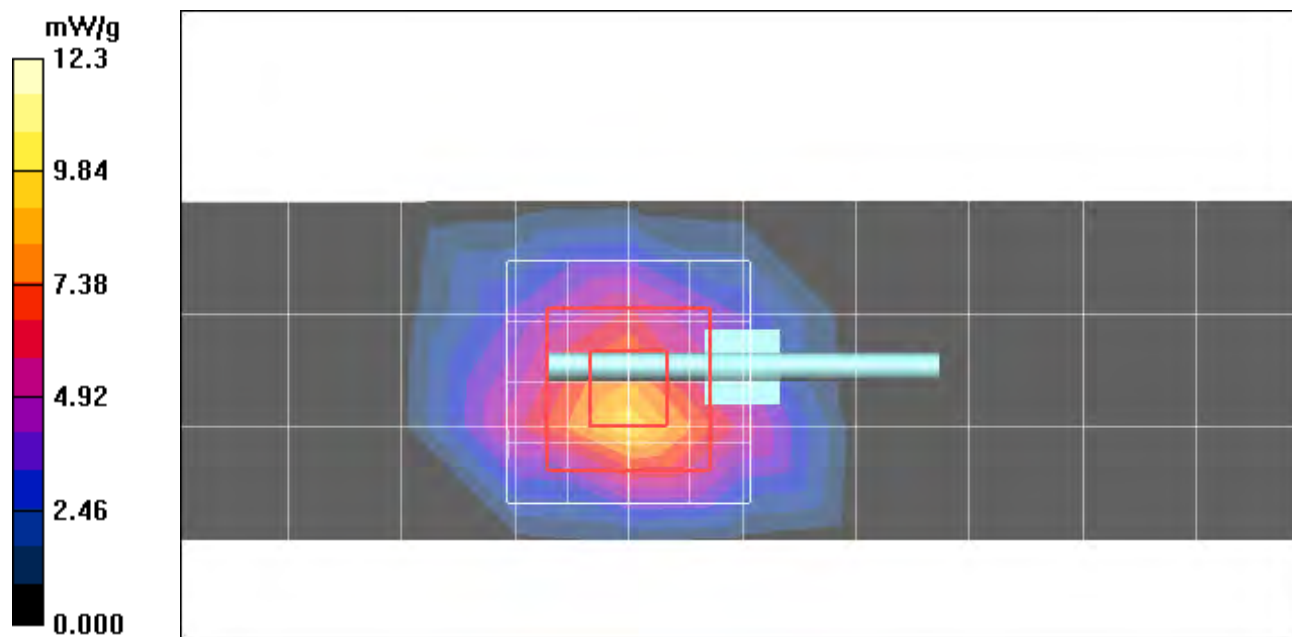
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 58.2 V/m; Power Drift = 0.066 dB; Peak SAR (extrapolated) = 23.5 W/kg

SAR(1 g) = 11 mW/g; SAR(10 g) = 5.11 mW/g; Maximum value of SAR (measured) = 12.5 mW/g

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

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



Appendix 2

SAR distribution plots for Head Adjacent Test Results

Date/Time: 10/8/2011 11:40:36 AM

Test Laboratory: Motorola - LTE Band 13 Cheek

Serial: 99000052958492; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5905A; DEVICE POSITION (cheek or rotated): Cheek

Device Mode: QPSK mode, 1 RB @ Low Channel Edge

Communication System: LTE Band 13; Frequency: 782 MHz; Channel Number: 23230; Duty Cycle: 1:1

Medium: Low Freq Head

Medium parameters used: $f = 782 \text{ MHz}$; $\sigma = 0.86 \text{ mho/m}$; $\epsilon_r = 42$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.87, 5.87, 5.87); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 SUGAR SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

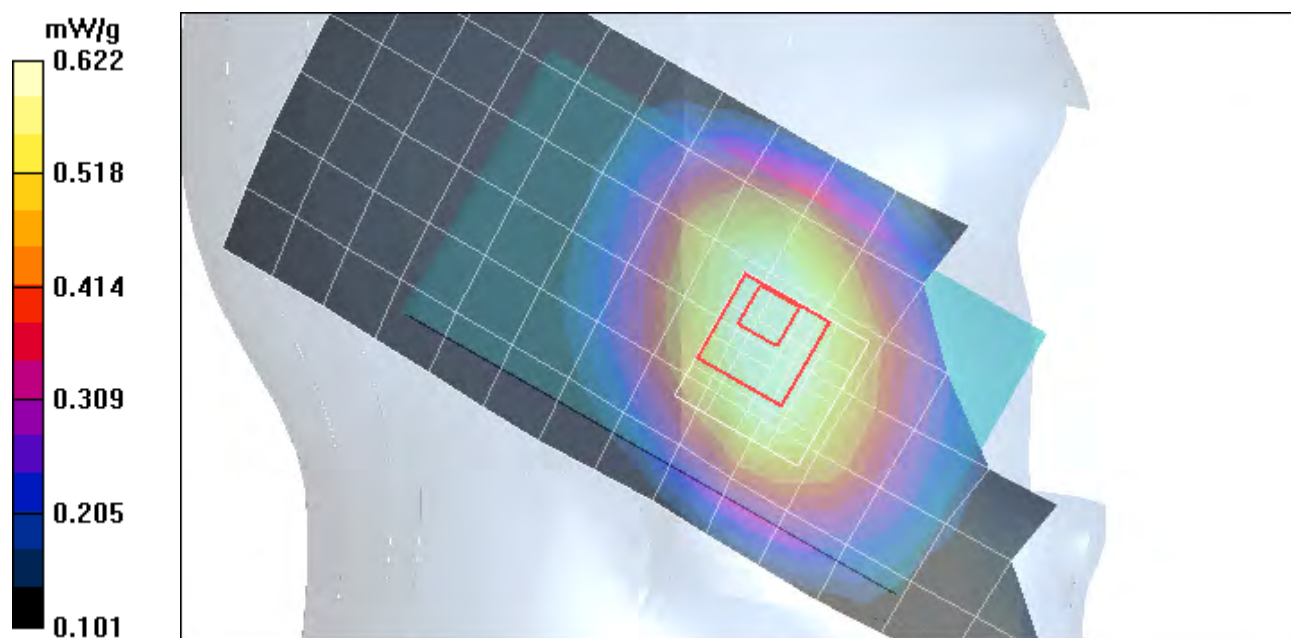
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.643 mW/g

Left Head 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 = 28.6 V/m ; Power Drift = -0.415 dB ; Peak SAR (extrapolated) = 0.714 W/kg

SAR(1 g) = 0.593 mW/g ; SAR(10 g) = 0.461 mW/g ; Maximum value of SAR (measured) = 0.622 mW/g



Date/Time: 10/12/2011 12:18:28 PM

Test Laboratory: Motorola - LTE Band 13 Cheek

Serial: 99000052958492; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal;

Battery Model #: SNN5905A; DEVICE POSITION (cheek or rotated): Cheek

Accessory Model #: Inductive Charging Door SJHN0813A

Device Mode: QPSK mode, 1 RB @ Low Channel Edge

Communication System: LTE Band 13; Frequency: 782 MHz; Channel Number: 23230; Duty Cycle: 1:1

Medium: Low Freq Head

Medium parameters used: $f = 782 \text{ MHz}$; $\sigma = 0.87 \text{ mho/m}$; $\epsilon_r = 43.8$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.87, 5.87, 5.87); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 SUGAR SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

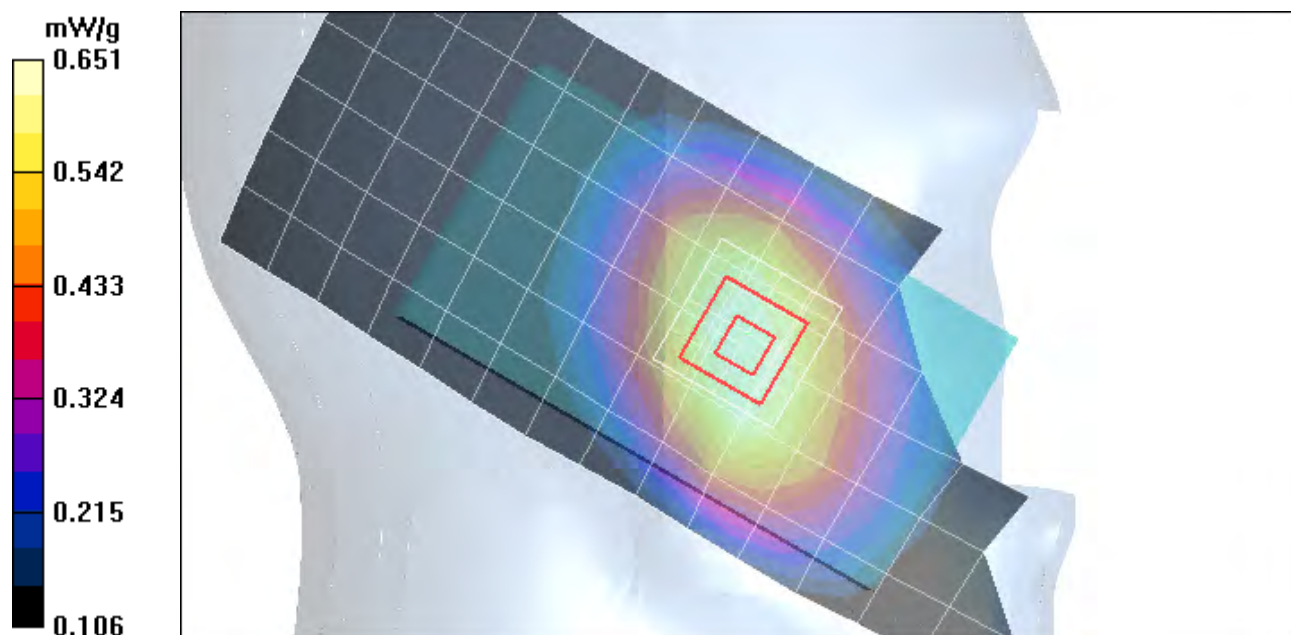
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.647 mW/g

Left Head 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 = 27.6 V/m ; Power Drift = -0.317 dB ; Peak SAR (extrapolated) = 0.738 W/kg

SAR(1 g) = 0.621 mW/g ; SAR(10 g) = 0.486 mW/g ; Maximum value of SAR (measured) = 0.651 mW/g



Date/Time: 9/28/2011 10:27:45 AM

Test Laboratory: Motorola - CDMA 800 Cheek

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5905A; DEVICE POSITION: Cheek

Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1

Medium: Low Freq Head

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.92 \text{ mho/m}$; $\epsilon_r = 42$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.87, 5.87, 5.87); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 SUGAR SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

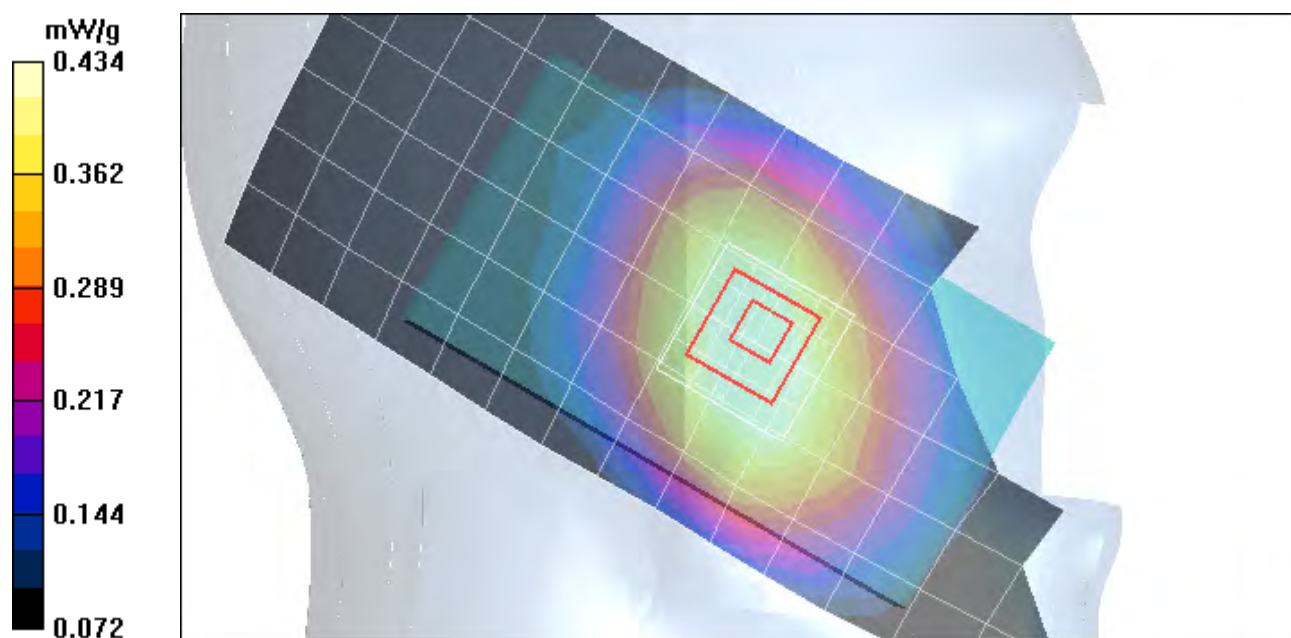
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.459 mW/g

Left Head 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 = 22.9 V/m; Power Drift = -0.483 dB; Peak SAR (extrapolated) = 0.496 W/kg

SAR(1 g) = 0.416 mW/g; SAR(10 g) = 0.324 mW/g; Maximum value of SAR (measured) = 0.434 mW/g



Date/Time: 10/11/2011 9:34:49 PM

Test Laboratory: Motorola - CDMA 800 Cheek

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal;

Accessory Model #: Inductive Battery Door SNJHN0813A

Battery Model #: SNN5905A; DEVICE POSITION (cheek or rotated): Cheek

Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1

Medium: Low Freq Head

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.9 \text{ mho/m}$; $\epsilon_r = 41.2$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.87, 5.87, 5.87); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 SUGAR SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

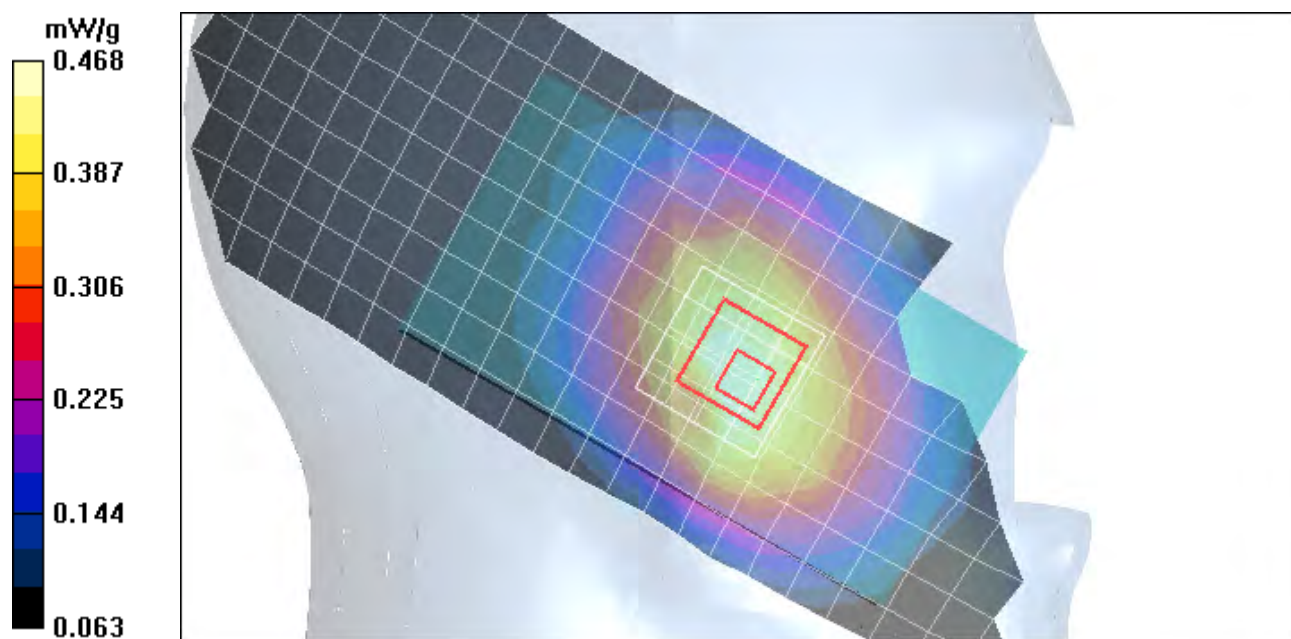
Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$; Maximum value of SAR (measured) = 0.480 mW/g

Left Head 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 = 22.9 V/m; Power Drift = -0.095 dB; Peak SAR (extrapolated) = 0.580 W/kg

SAR(1 g) = 0.447 mW/g; SAR(10 g) = 0.338 mW/g; Maximum value of SAR (measured) = 0.468 mW/g



Date/Time: 10/14/2011 9:52:57 AM

Test Laboratory: Motorola - CDMA 1900 Cheek

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5905A; DEVICE POSITION: Cheek

Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.46 \text{ mho/m}$; $\epsilon_r = 38.1$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.02, 5.02, 5.02); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Head Template/Area Scan - Normal (10mm) (10x24x1):

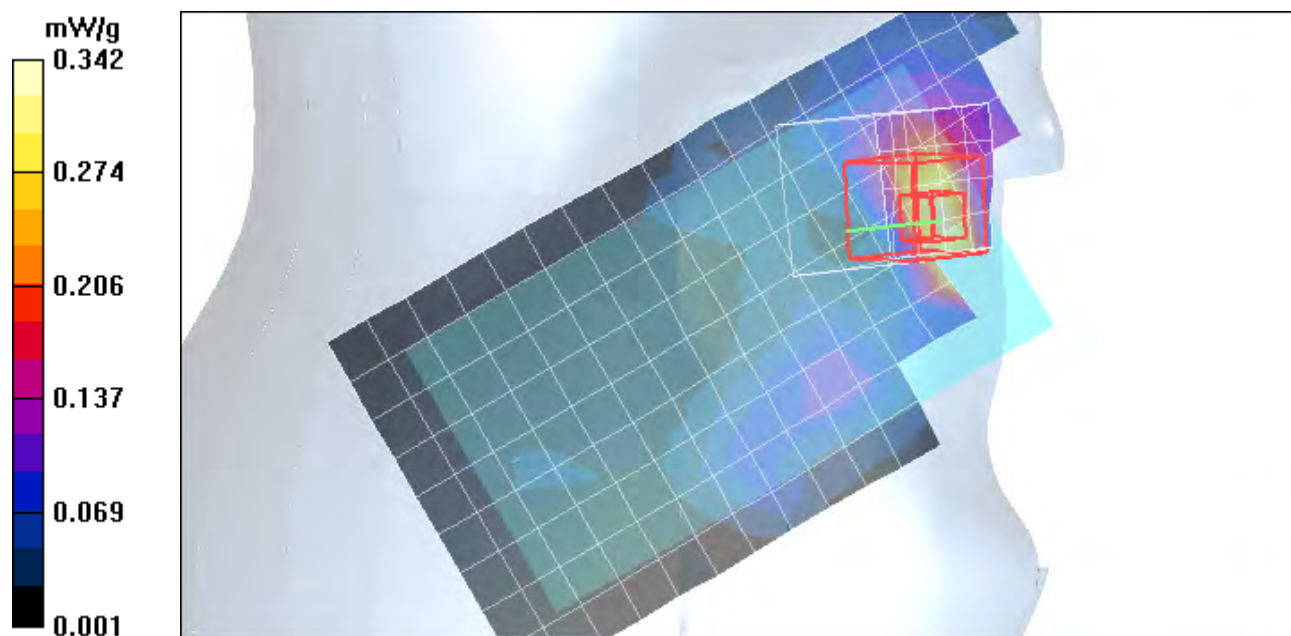
Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$; Maximum value of SAR (measured) = 0.286 mW/g

Right Head Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) - shifted (5x5x7)/Cube 0:

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

Reference Value = 13.6 V/m; Power Drift = 0.130 dB; Peak SAR (extrapolated) = 0.567 W/kg

SAR(1 g) = 0.311 mW/g; SAR(10 g) = 0.163 mW/g; Maximum value of SAR (measured) = 0.342 mW/g



Date/Time: 10/14/2011 10:34:33 AM

Test Laboratory: Motorola - CDMA 1900 Cheek

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal;

Accessory Model #: Inductive Charging Door SJHN0813A

Battery Model #: SNN5905A; DEVICE POSITION : Cheek

Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.46 \text{ mho/m}$; $\epsilon_r = 38.1$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.02, 5.02, 5.02); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Head Template/Area Scan - Normal (10mm) (10x24x1):

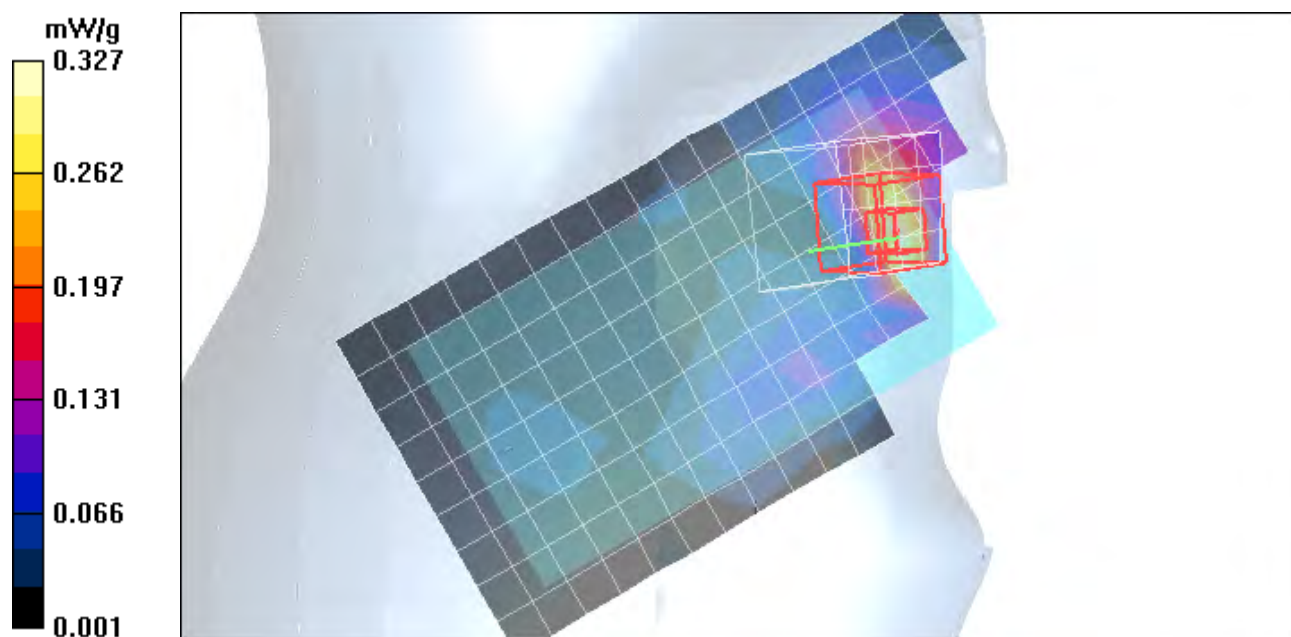
Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$; Maximum value of SAR (measured) = 0.268 mW/g

Right Head Template/5x5x7 Zoom Scan ($\leq 3\text{GHz}$) - shifted (5x5x7)/Cube 0:

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

Reference Value = 13.4 V/m; Power Drift = -0.117 dB; Peak SAR (extrapolated) = 0.548 W/kg

SAR(1 g) = 0.293 mW/g; SAR(10 g) = 0.158 mW/g; Maximum value of SAR (measured) = 0.327 mW/g



Date/Time: 10/8/2011 12:33:21 PM

Test Laboratory: Motorola - LTE Band 13 Tilt

Serial: 99000052958492; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5905A; DEVICE POSITION (cheek or rotated): Tilt

Device Mode: QPSK mode, 1 RB @ Low Channel Edge

Communication System: LTE Band 13; Frequency: 782 MHz; Channel Number: 23230; Duty Cycle: 1:1

Medium: Low Freq Head

Medium parameters used: $f = 782 \text{ MHz}$; $\sigma = 0.86 \text{ mho/m}$; $\epsilon_r = 42$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.87, 5.87, 5.87); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 SUGAR SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

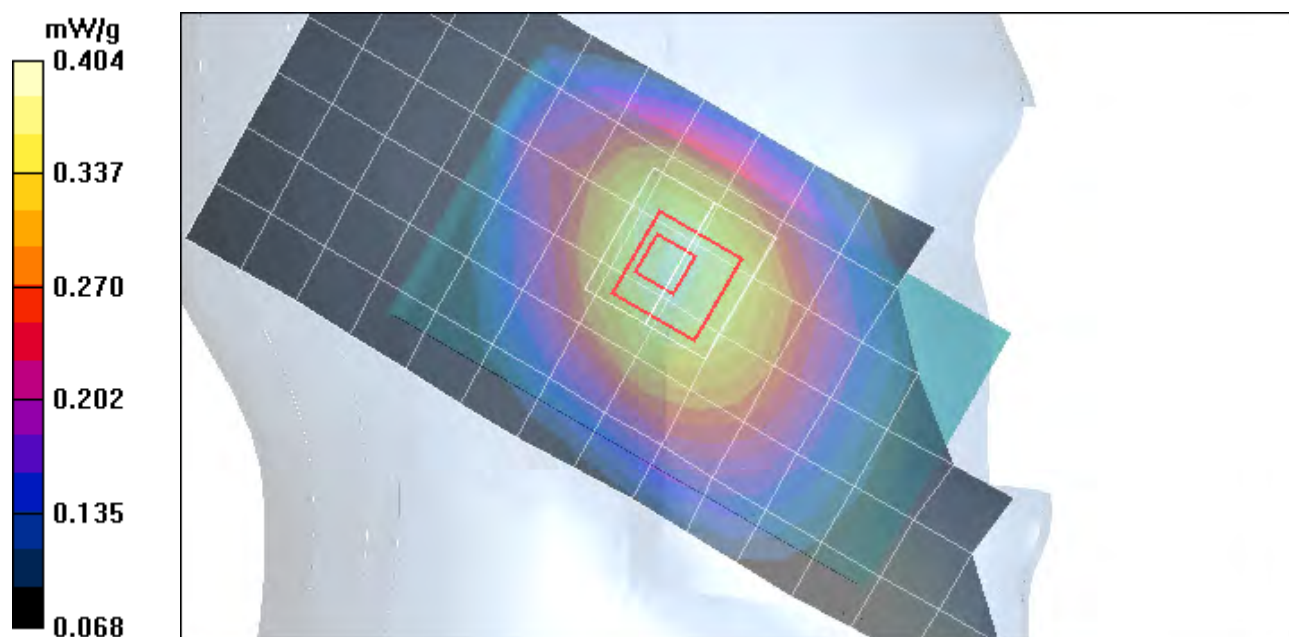
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.391 mW/g

Left Head 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 = 21.8 V/m; Power Drift = 0.028 dB; Peak SAR (extrapolated) = 0.471 W/kg

SAR(1 g) = 0.389 mW/g; SAR(10 g) = 0.303 mW/g; Maximum value of SAR (measured) = 0.404 mW/g



Date/Time: 9/28/2011 11:27:38 AM

Test Laboratory: Motorola - CDMA 800 Tilt

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5905A; DEVICE POSITION : Tilt

Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1

Medium: Low Freq Head

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.92 \text{ mho/m}$; $\epsilon_r = 42$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.87, 5.87, 5.87); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 SUGAR SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

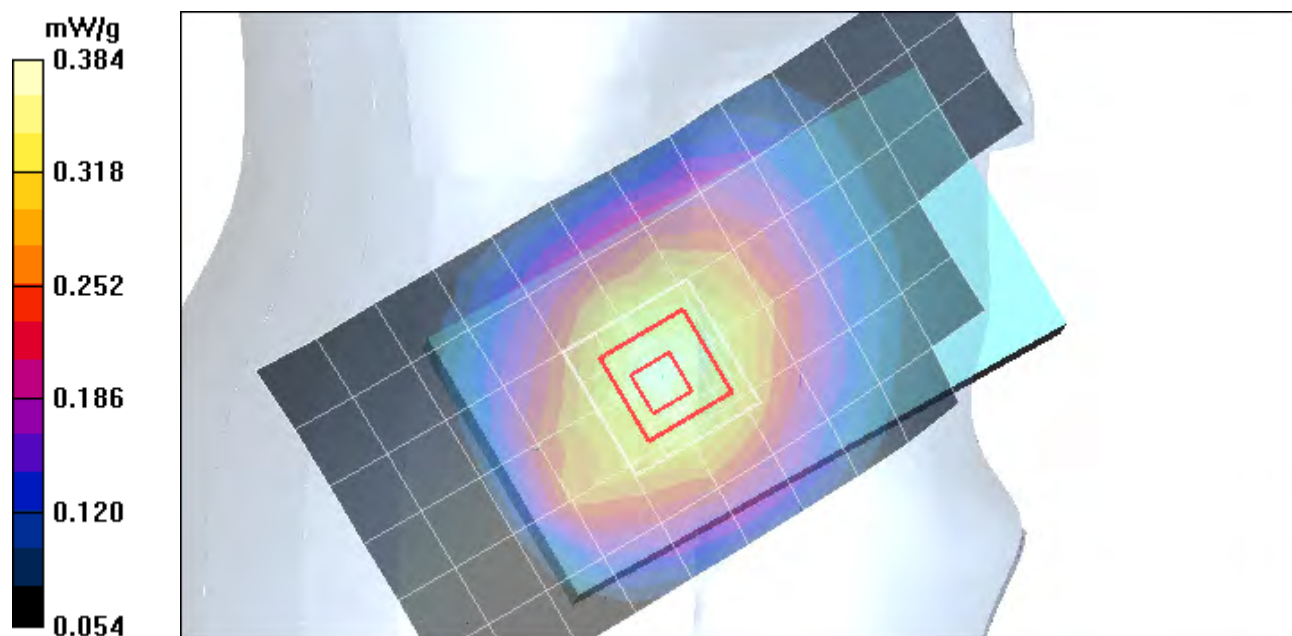
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.381 mW/g

Right Head 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 = 20.0 V/m; Power Drift = 0.240 dB; Peak SAR (extrapolated) = 0.447 W/kg

SAR(1 g) = 0.364 mW/g; SAR(10 g) = 0.276 mW/g; Maximum value of SAR (measured) = 0.384 mW/g



Date/Time: 9/28/2011 9:14:53 PM

Test Laboratory: Motorola - CDMA 1900 Tilt

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5905A; DEVICE POSITION (cheek or rotated): Rotated

Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.46 \text{ mho/m}$; $\epsilon_r = 39$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.02, 5.02, 5.02); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

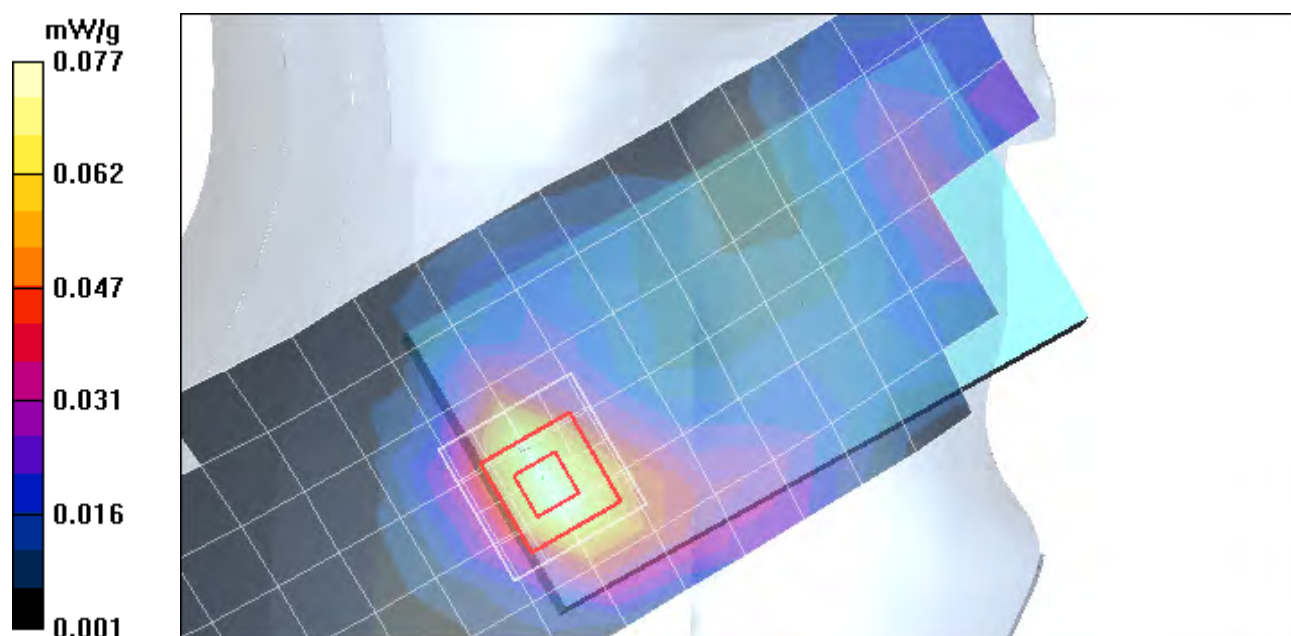
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.079 mW/g

Right Head 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 = 6.48 V/m ; Power Drift = -0.373 dB ; Peak SAR (extrapolated) = 0.113 W/kg

SAR(1 g) = 0.069 mW/g ; SAR(10 g) = 0.040 mW/g ; Maximum value of SAR (measured) = 0.077 mW/g



Appendix 3

SAR distribution plots for Body Worn Test Results

Date/Time: 10/10/2011 5:56:21 PM

Test Laboratory: Motorola - LTE Band 13 Body-Worn

Serial: 99000052958492; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5905A

Device Position: Body Worn, Back of Phone 25 mm from Phantom

Device Mode: QPSK mode, 1 RB @ Low Channel Edge

Communication System: LTE Band 13; Frequency: 782 MHz; Channel Number: 23230; Duty Cycle: 1:1

Medium: Low Freq Body

Medium parameters used: $f = 782 \text{ MHz}$; $\sigma = 0.93 \text{ mho/m}$; $\epsilon_r = 55.2$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Normal Body (10mm) (17x11x1):

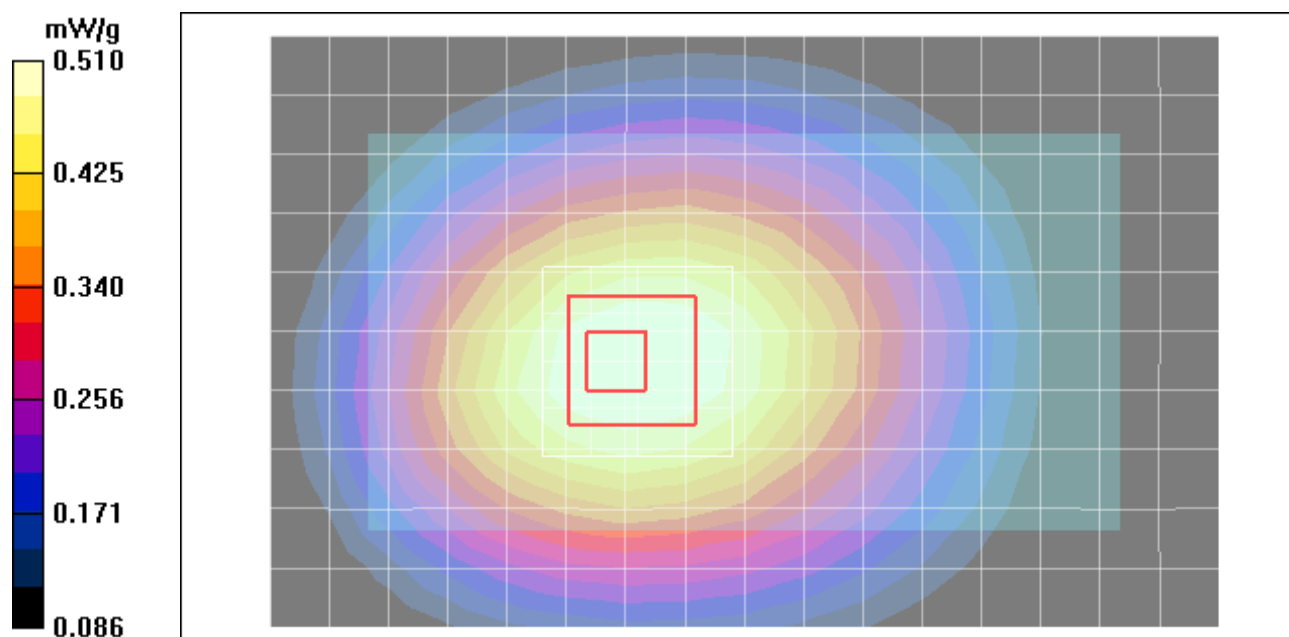
Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$; Maximum value of SAR (measured) = 0.519 mW/g

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 = 24.7 V/m; Power Drift = -0.462 dB; Peak SAR (extrapolated) = 0.610 W/kg

SAR(1 g) = 0.485 mW/g; SAR(10 g) = 0.364 mW/g; Maximum value of SAR (measured) = 0.510 mW/g



Date/Time: 10/12/2011 10:40:07 AM

Test Laboratory: Motorola - LTE Band 13 Body-Worn

Serial: 99000052958492; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5905A

Accessory Model #: Inductive Charging Door SJHN0813A

Device Mode: QPSK mode, 1 RB @ Low Channel Edge

Device Position: Body Worn, Back of Phone 25 mm from Phantom

Communication System: LTE Band 13; Frequency: 782 MHz; Channel Number: 23230; Duty Cycle: 1:1

Medium: Low Freq Body

Medium parameters used: $f = 782 \text{ MHz}$; $\sigma = 0.92 \text{ mho/m}$; $\epsilon_r = 54$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1):

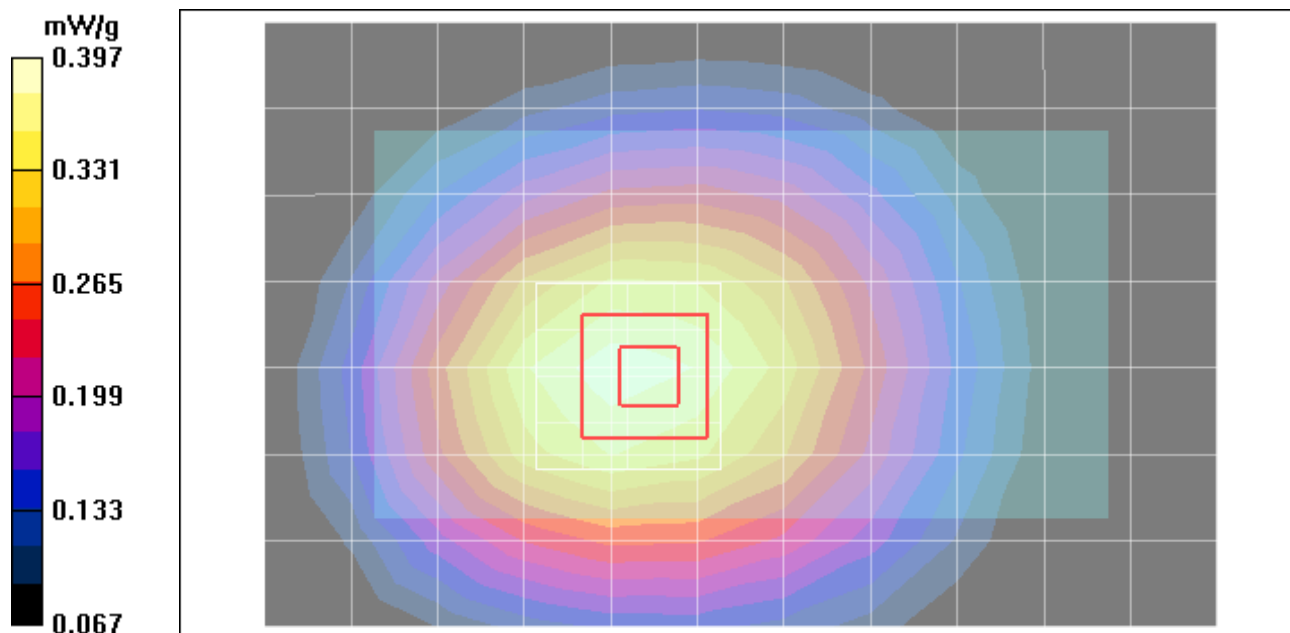
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.392 mW/g

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 = 20.8 V/m; Power Drift = -0.110 dB; Peak SAR (extrapolated) = 0.475 W/kg

SAR(1 g) = 0.378 mW/g; SAR(10 g) = 0.285 mW/g; Maximum value of SAR (measured) = 0.397 mW/g



Date/Time: 9/28/2011 11:26:14 PM

Test Laboratory: Motorola - CDMA 800 Body-Worn

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Battery Model #: SNN5905A

Device Position: Body Worn, Back of Phone 25 mm from Phantom

Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1

Medium: Low Freq Body

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 55.3$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Full Body (15mm) 2 (18x11x1):

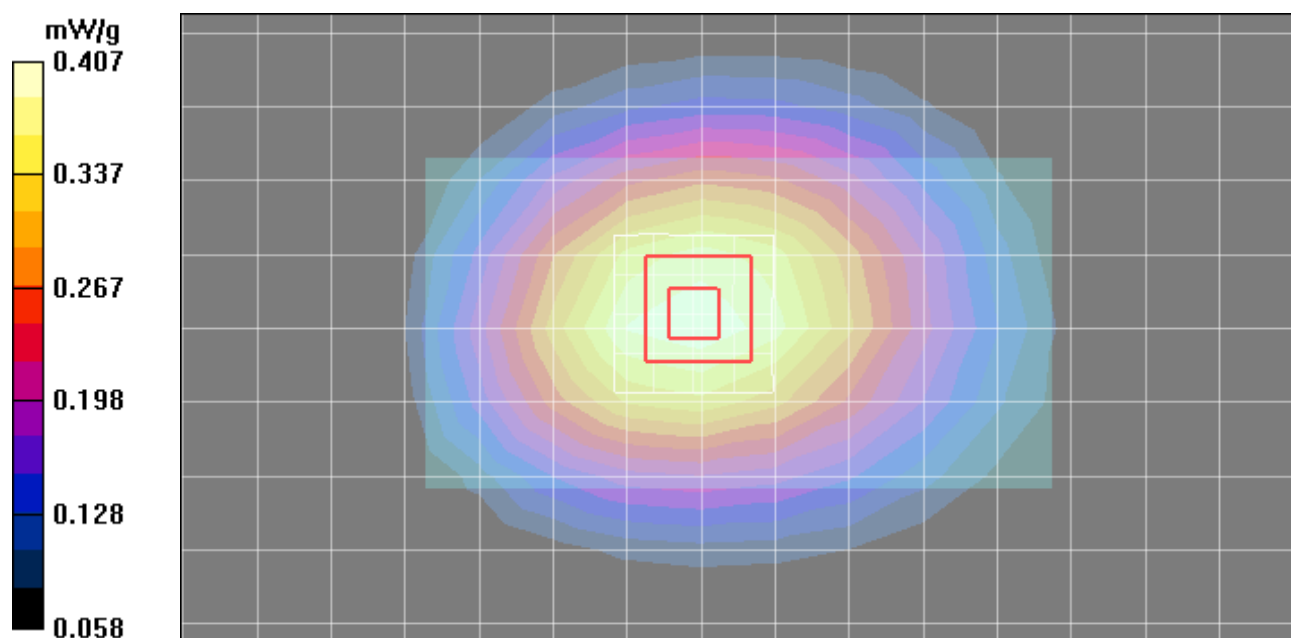
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.404 mW/g

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 = 20.9 V/m ; Power Drift = -0.125 dB ; Peak SAR (extrapolated) = 0.494 W/kg

SAR(1 g) = 0.386 mW/g ; SAR(10 g) = 0.289 mW/g ; Maximum value of SAR (measured) = 0.407 mW/g



Date/Time: 10/11/2011 5:04:39 PM

Test Laboratory: Motorola - CDMA 800 Body-Worn

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5905A

Accessory Model #: Inductive Charging Door SJHN0813A

Device Position: Body Worn, Back of Phone 25 mm from PHantom

Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1

Medium: Low Freq Body

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 54.2$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1):

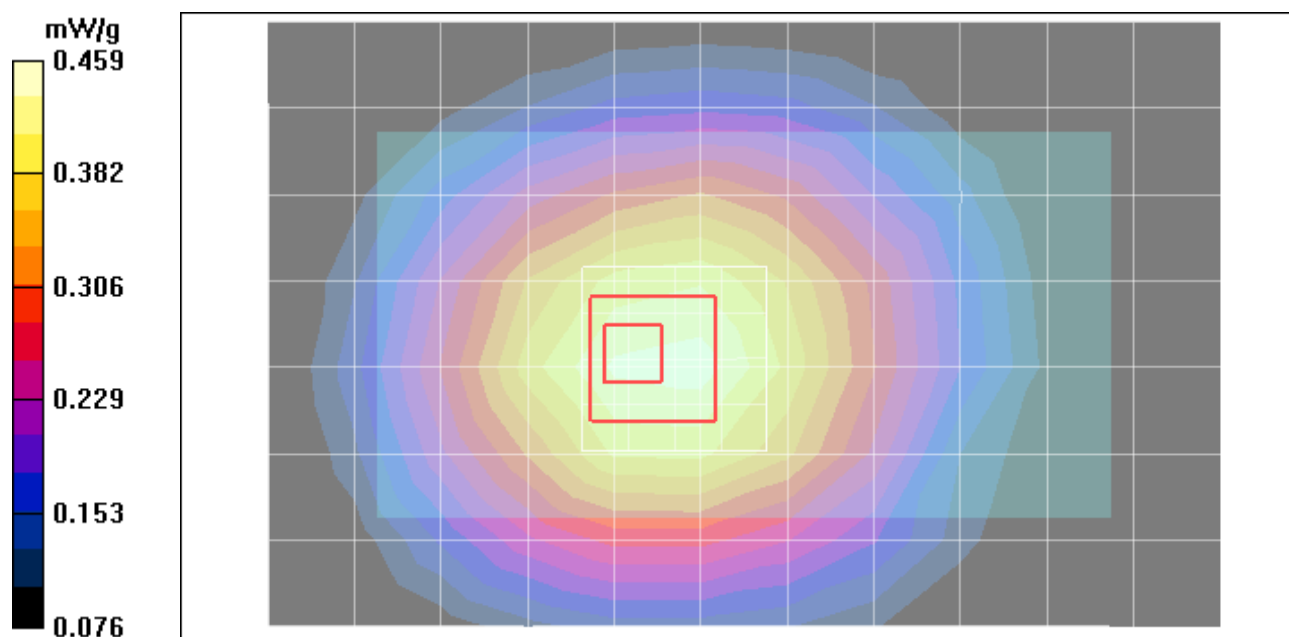
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.449 mW/g

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 = 21.5 V/m ; Power Drift = 0.158 dB ; Peak SAR (extrapolated) = 0.551 W/kg

SAR(1 g) = 0.430 mW/g ; SAR(10 g) = 0.320 mW/g ; Maximum value of SAR (measured) = 0.459 mW/g



Date/Time: 9/28/2011 10:39:34 PM

Test Laboratory: Motorola - CDMA 1900 Body-Worn

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Battery Model #: SNN5905A

Device Position: Body Worn, Back of Phone 25 mm from Phantom

Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.58 \text{ mho/m}$; $\epsilon_r = 51.4$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Extended Phone (15mm) (18x8x1):

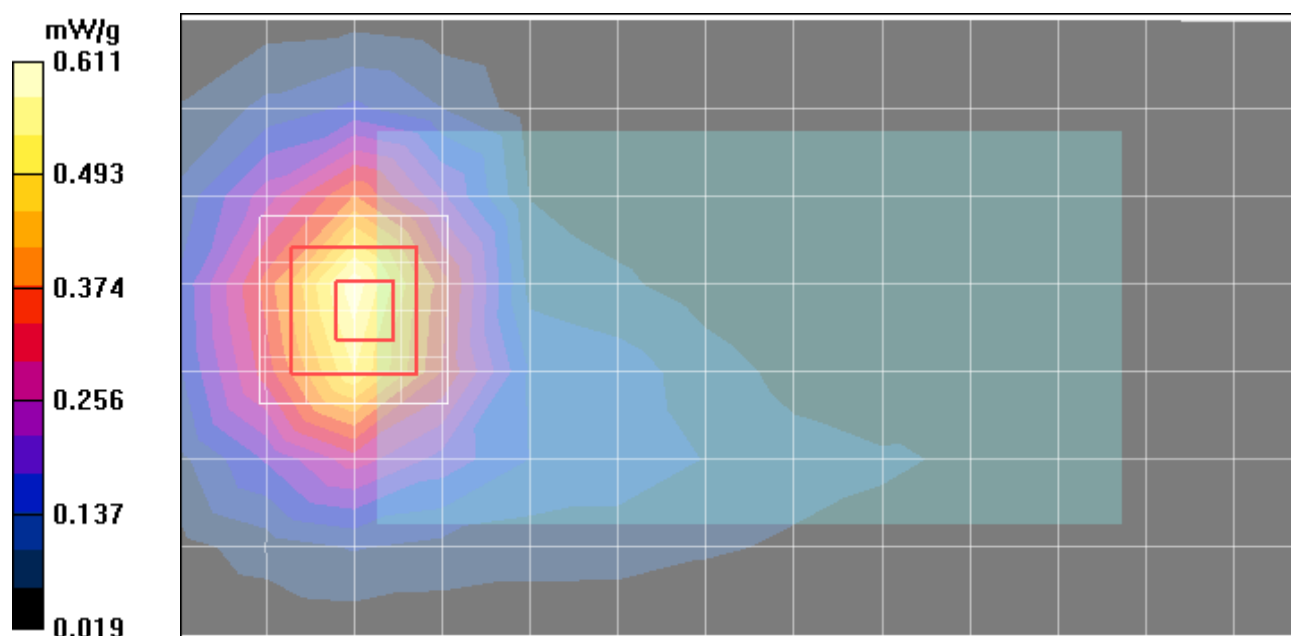
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.601 mW/g

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 = 18.7 V/m ; Power Drift = -0.133 dB ; Peak SAR (extrapolated) = 0.845 W/kg

SAR(1 g) = 0.566 mW/g ; SAR(10 g) = 0.346 mW/g ; Maximum value of SAR (measured) = 0.611 mW/g



Date/Time: 10/11/2011 4:23:52 PM

Test Laboratory: Motorola - CDMA 1900 Body-Worn

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5905A

Accessory Model #: Inductive Charging Door SJHN0813A

Device Position: Body Worn, Back of Phone 25 mm from Phantom

Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.58$ 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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1):

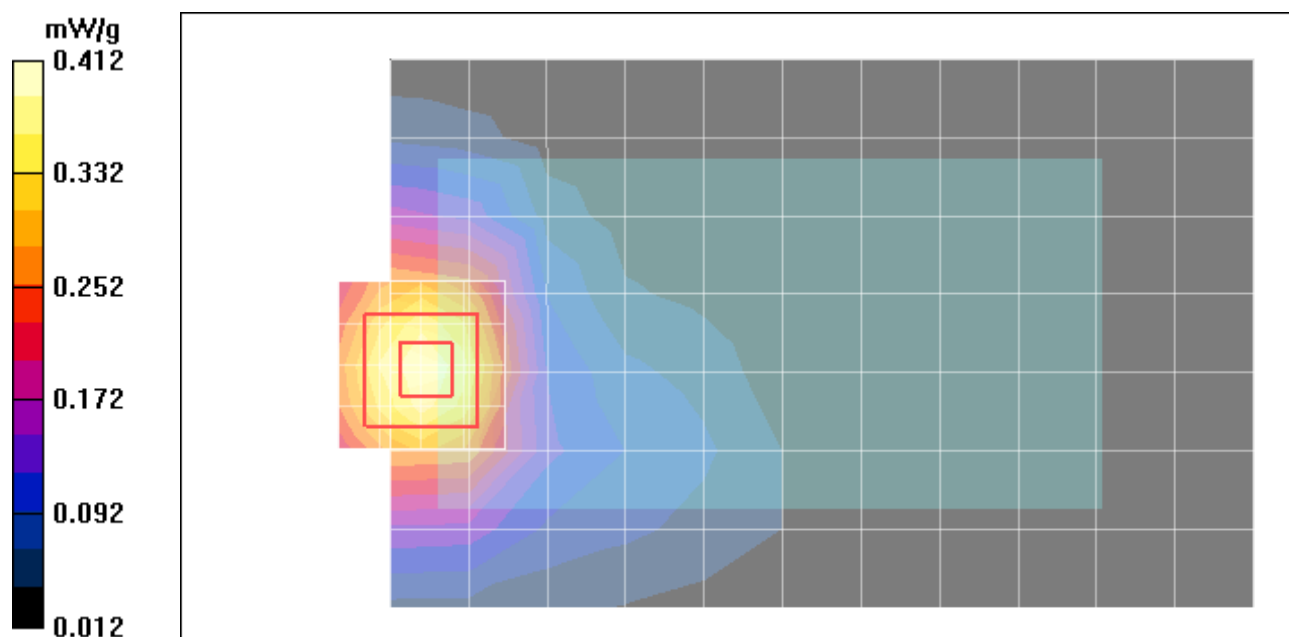
Measurement grid: $dx=15$ mm, $dy=15$ mm; Maximum value of SAR (measured) = 0.389 mW/g

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 = 16.3 V/m; Power Drift = -0.039 dB; Peak SAR (extrapolated) = 0.584 W/kg

SAR(1 g) = 0.384 mW/g; SAR(10 g) = 0.237 mW/g; Maximum value of SAR (measured) = 0.412 mW/g



Appendix 4

SAR distribution plots for Lapdock Accessory Test Results

Date/Time: 10/13/2011 1:03:34 PM

Test Laboratory: Motorola - LTE Band 13 with Lapdock

Serial: 99000052958492; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5905A

Device Position: Phone mounted in Lapdock, Bottom Surface of Lapdock 0 mm from Phantom

Device Mode: QPSK mode, 1 RB @ Low Channel Edge

Communication System: LTE Band 13; Frequency: 782 MHz; Channel Number: 23230; Duty Cycle: 1:1

Medium: Low Freq Body BIG BODY

Medium parameters used: $f = 782 \text{ MHz}$; $\sigma = 0.93 \text{ mho/m}$; $\epsilon_r = 56.4$; $\rho = 1000 \text{ kg/m}^3$

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 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Lapdock Area Scan - Body (15mm) (21x11x1):

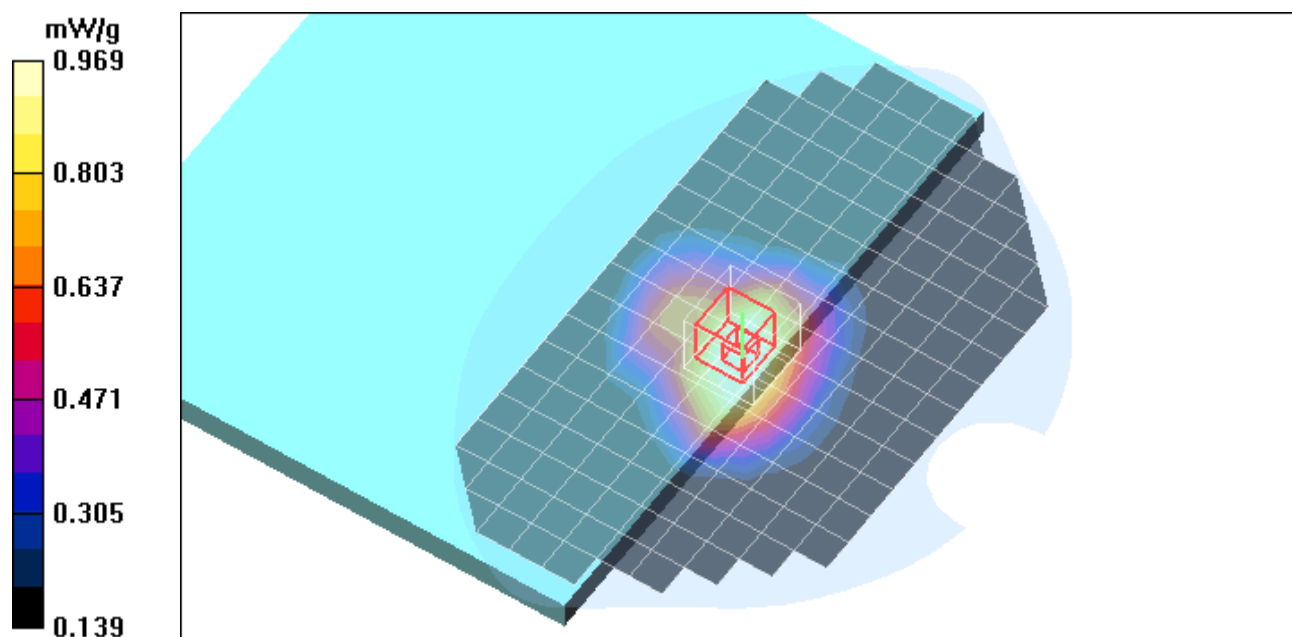
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 1.01 mW/g

SAM Phone Against Flat Section/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 = 33.3 V/m; Power Drift = -0.444 dB; Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.924 mW/g; SAR(10 g) = 0.716 mW/g; Maximum value of SAR (measured) = 0.969 mW/g



Date/Time: 10/14/2011 4:28:01 PM

Test Laboratory: Motorola - CDMA 800 with Lapdock

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5905A

Device Position: Phone mounted in Lapdock, Bottom Surface of Lapdock 0 mm from Phantom

Device Mode: RC3 SO55 mode

Communication System: CDMA 835; Frequency: 836.52 MHz; Channel Number: 384; Duty Cycle: 1:1

Medium: Low Freq Body BIG BODY

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 56.3$; $\rho = 1000 \text{ kg/m}^3$

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 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Lapdock Area Scan - Body (15mm) (21x11x1):

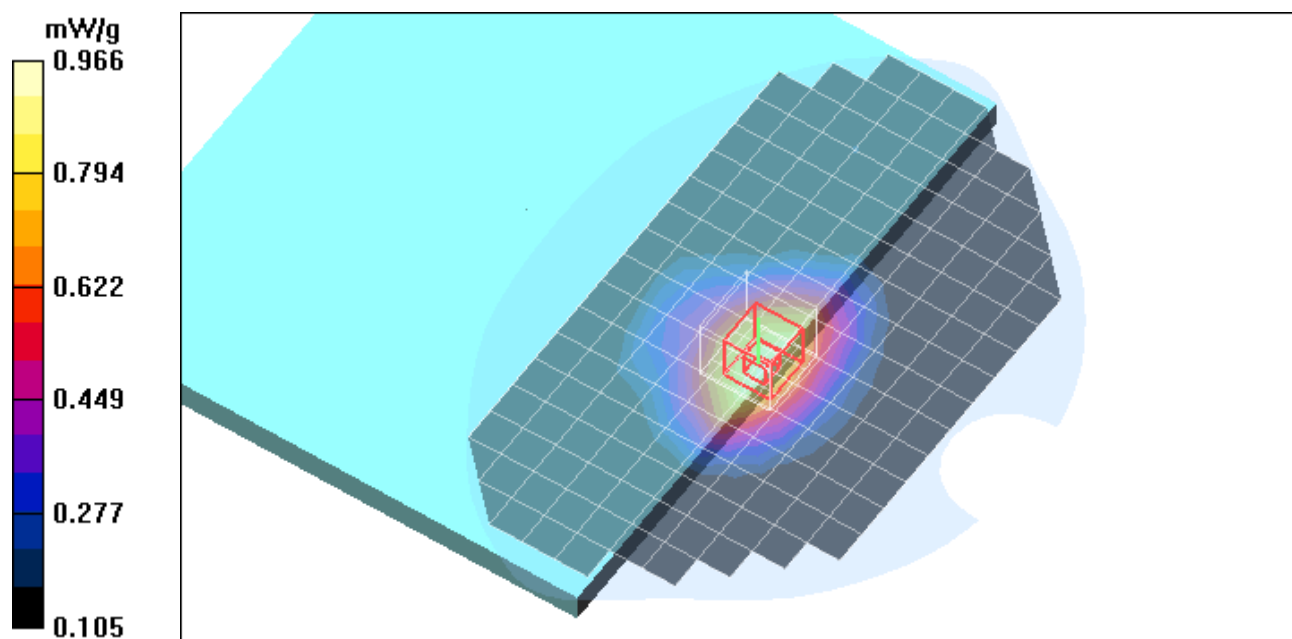
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.944 mW/g

SAM Phone Against Flat Section/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 = 31.9 V/m; Power Drift = -0.058 dB; Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.903 mW/g; SAR(10 g) = 0.623 mW/g; Maximum value of SAR (measured) = 0.966 mW/g



Date/Time: 10/14/2011 1:11:30 PM

Test Laboratory: Motorola - CDMA 1900 with Lapdock

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5905A

Device Position: Phone mounted in Lapdock, Bottom Surface of Lapdock 0 mm from Phantom

Device Mode: EVDO Rev. O mode

Communication System: CDMA 1900; Frequency: 1880 MHz; Channel Number: 600; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880

Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.59 \text{ mho/m}$; $\epsilon_r = 50.8$; $\rho = 1000 \text{ kg/m}^3$

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 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Lapdock Area Scan - Body (15mm) (21x11x1):

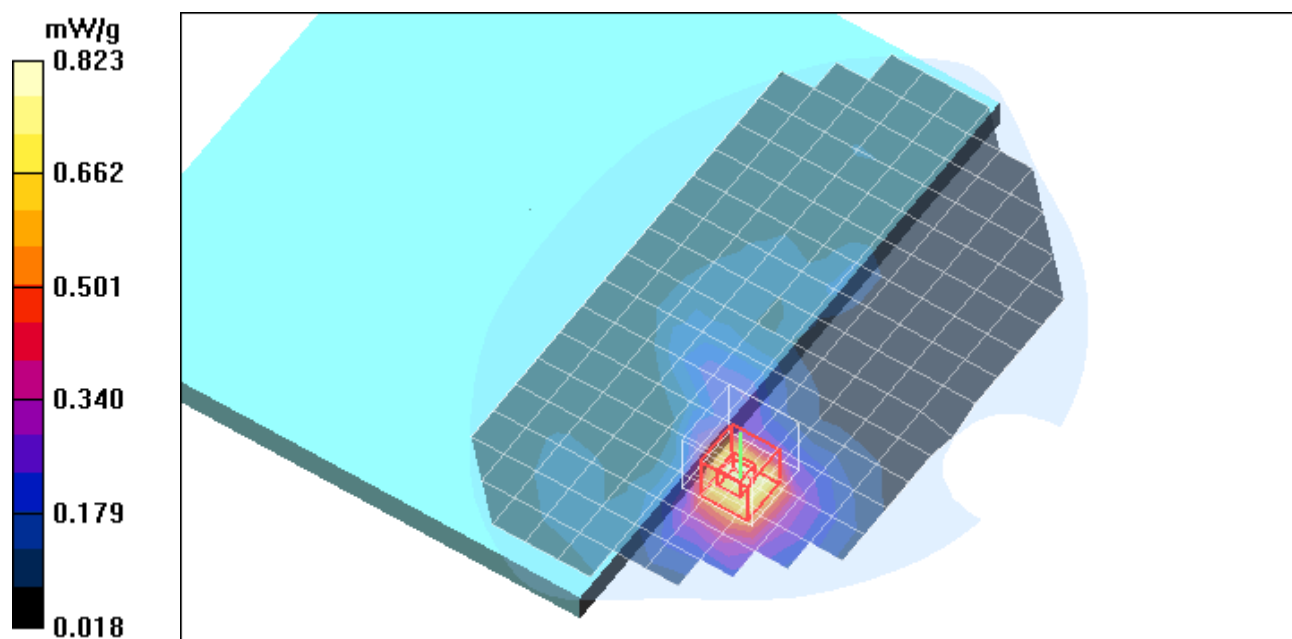
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.794 mW/g

SAM Phone Against Flat Section/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 = 20.0 V/m ; Power Drift = -0.021 dB ; Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.769 mW/g ; SAR(10 g) = 0.453 mW/g ; Maximum value of SAR (measured) = 0.823 mW/g



Date/Time: 10/14/2011 8:27:59 AM

Test Laboratory: Motorola - Wi-Fi 2450 with Lapdock

Serial: 99000052958492; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5905A

Device Position: Phone mounted in Lapdock, Bottom Surface of Lapdock 0 mm from Phantom

Device Mode: 802.11b mode, 1 Mbps data rate

Communication System: Wi-Fi 2450; Frequency: 2462 MHz; Channel Number: 11; Duty Cycle: 1:1

Medium: 2450 Glycol Body

Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.94 \text{ mho/m}$; $\epsilon_r = 51.1$; $\rho = 1000 \text{ kg/m}^3$

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 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Lapdock Area Scan - Body (15mm) (21x11x1):

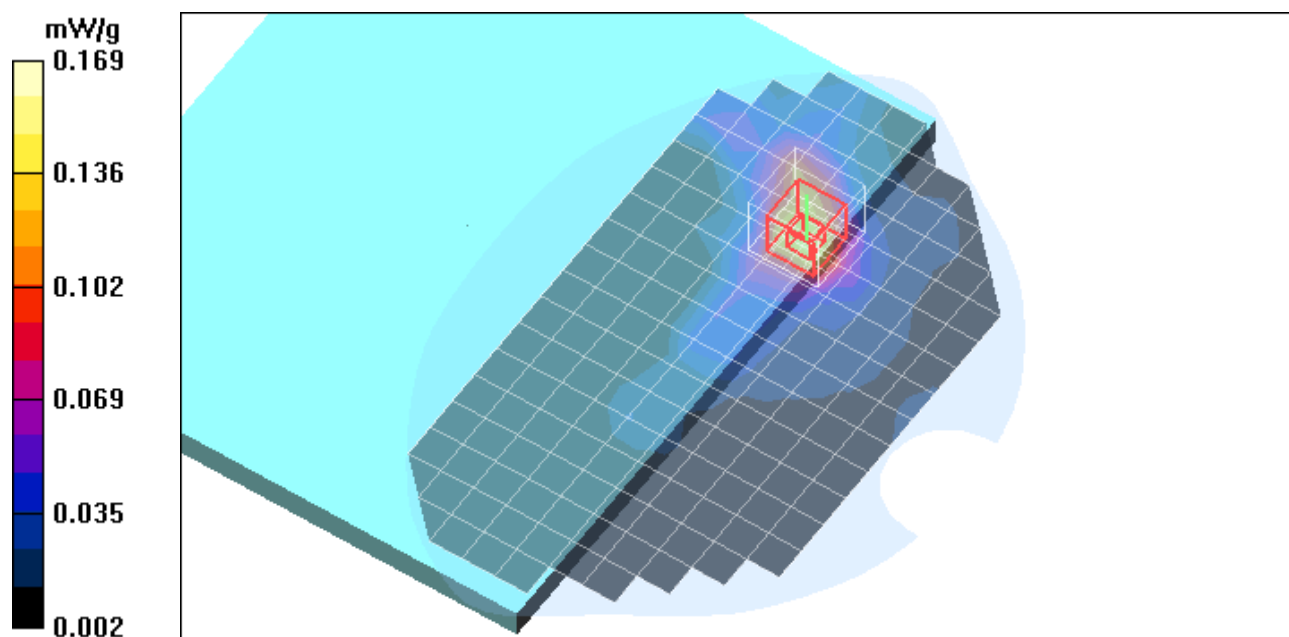
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.147 mW/g

SAM Phone Against Flat Section/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 = 7.12 V/m; Power Drift = -0.008 dB; Peak SAR (extrapolated) = 0.290 W/kg

SAR(1 g) = 0.153 mW/g; SAR(10 g) = 0.081 mW/g; Maximum value of SAR (measured) = 0.169 mW/g



Appendix 5

SAR distribution plots for Mobile Hotspot Test Results

Date/Time: 10/10/2011 2:18:42 PM

Test Laboratory: Motorola - LTE Band 13 Mobile Hotspot

Serial: 99000052958492; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5905A

Device Position: Mobile Hotspot (Body-Adjacent) position, Back of Phone 10 mm from Phantom

Device Mode: QPSK mode, 1 RB @ Low Channel Edge

Communication System: LTE Band 13; Frequency: 782 MHz; Channel Number: 23230; Duty Cycle: 1:1

Medium: Low Freq Body

Medium parameters used: $f = 782 \text{ MHz}$; $\sigma = 0.93 \text{ mho/m}$; $\epsilon_r = 55.2$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Normal Body (10mm) (17x11x1):

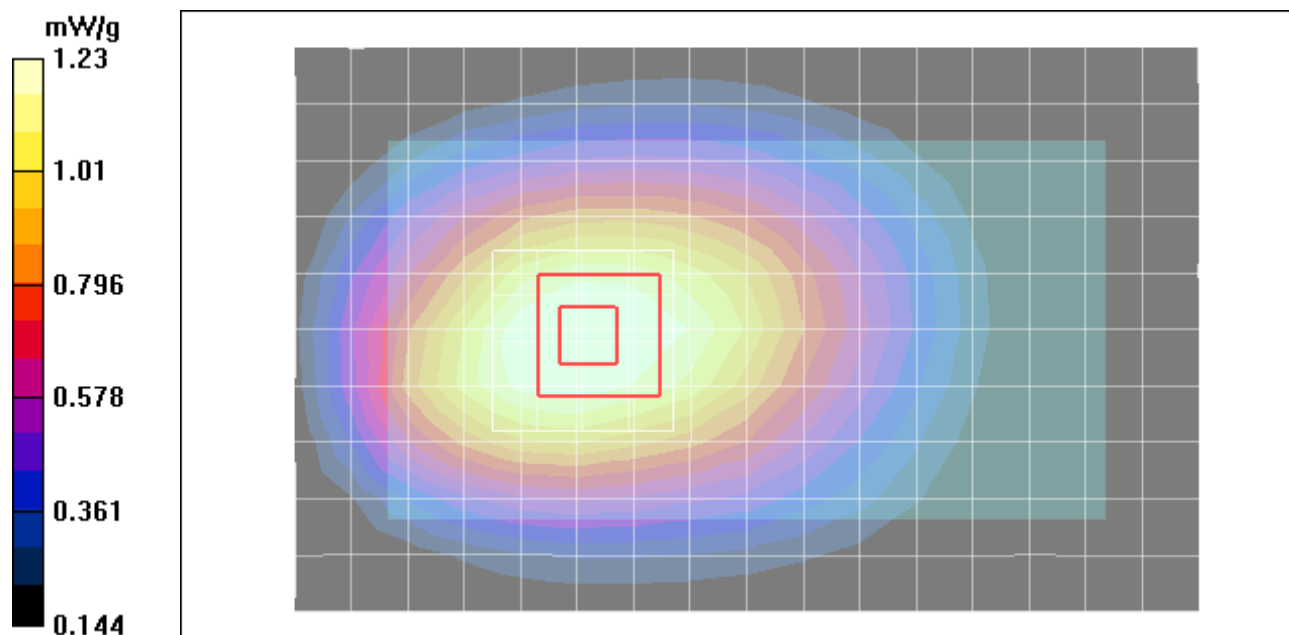
Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$; Maximum value of SAR (measured) = 1.28 mW/g

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 = 37.1 V/m; Power Drift = -0.291 dB; Peak SAR (extrapolated) = 1.47 W/kg

SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.874 mW/g; Maximum value of SAR (measured) = 1.23 mW/g



Date/Time: 10/12/2011 11:04:51 AM

Test Laboratory: Motorola - LTE Band 13 Mobile Hotspot

Serial: 99000052958492; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5905A

Accessory Model #: Inductive Charging Door SJHN0813A

Device Mode: QPSK mode, 1 RB @ Low Channel Edge

Device Position: Mobile Hotspot (body-adjacent) position, Back of Phone 10 mm from Phantom

Communication System: LTE Band 13; Frequency: 782 MHz; Channel Number: 23230; Duty Cycle: 1:1

Medium: Low Freq Body

Medium parameters used: $f = 782 \text{ MHz}$; $\sigma = 0.92 \text{ mho/m}$; $\epsilon_r = 54$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1):

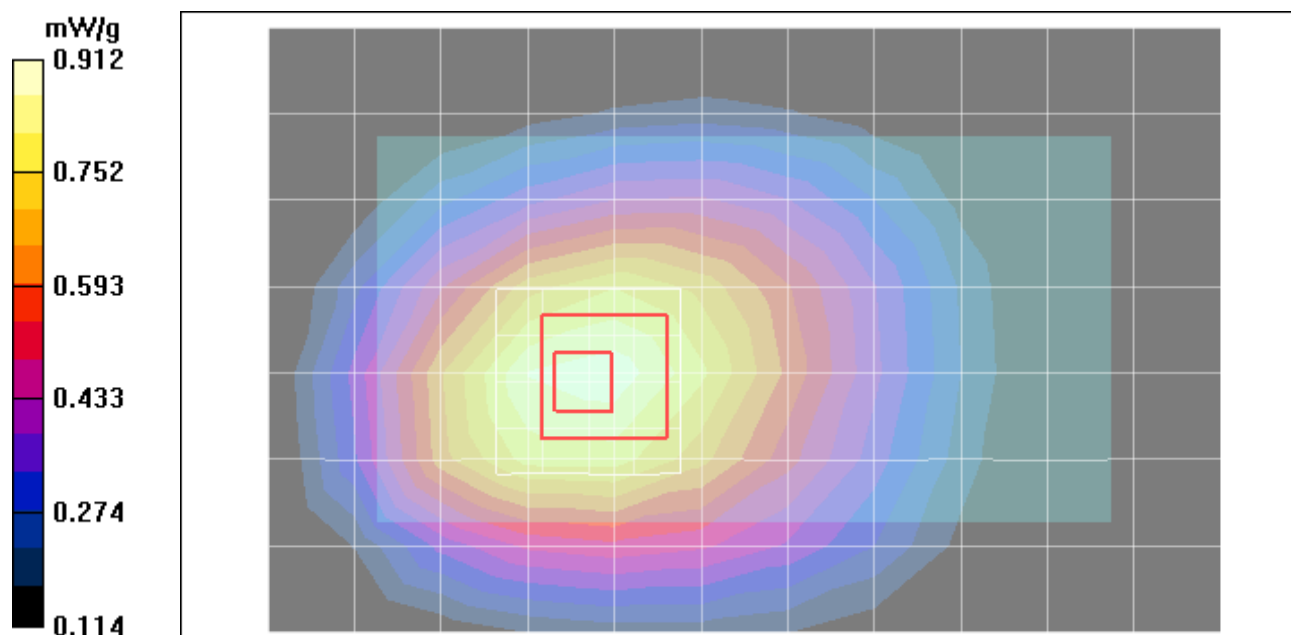
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.898 mW/g

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 = 30.7 V/m ; Power Drift = -0.051 dB ; Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.863 mW/g ; SAR(10 g) = 0.643 mW/g ; Maximum value of SAR (measured) = 0.912 mW/g



Date/Time: 10/13/2011 2:20:16 PM

Test Laboratory: Motorola - CDMA 800 Mobile Hotspot

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5905A

Device Position: Mobile Hotspot (Body-adjacent) positioni, Back of Phone 10 mm from Phantom

Device Mode: EVDO Rev. O mode

Communication System: CDMA 835; Frequency: 824.7 MHz; Channel Number: 1013; Duty Cycle: 1:1

Medium: Low Freq Body

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.96 \text{ mho/m}$; $\epsilon_r = 53.9$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Extended Phone (15mm) (18x8x1):

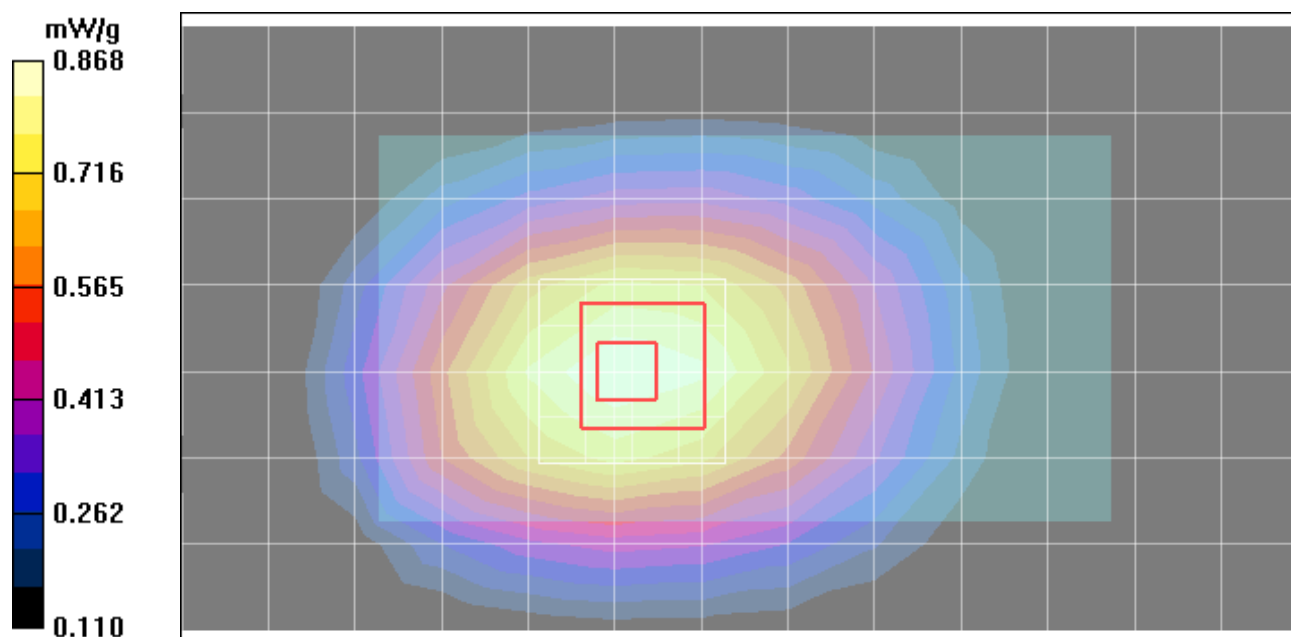
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.877 mW/g

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 = 30.4 V/m ; Power Drift = -0.229 dB ; Peak SAR (extrapolated) = 1.03 W/kg

SAR(1 g) = 0.826 mW/g ; SAR(10 g) = 0.618 mW/g ; Maximum value of SAR (measured) = 0.868 mW/g



Date/Time: 10/13/2011 1:18:08 AM

Test Laboratory: Motorola - CDMA 800 Mobile Hotspot

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5905A

Accessory Model #: Inductive Charging Door SJHN0813A

Device Position: Mobile Hotspot (body-adjacent) position, Back of Phone 10 mm from Phantom

Communication System: CDMA 835; Frequency: 824.7 MHz; Channel Number: 1013; Duty Cycle: 1:1

Medium: Low Freq Body

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 53.4$; $\rho = 1000 \text{ kg/m}^3$

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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1):

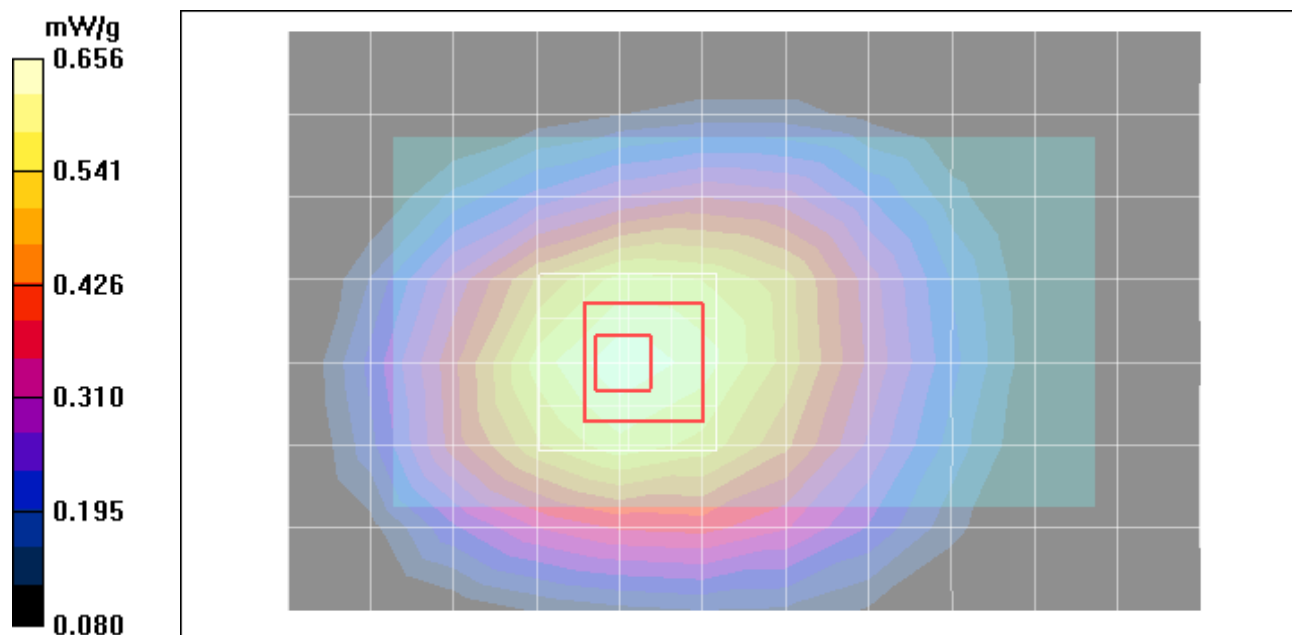
Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$; Maximum value of SAR (measured) = 0.651 mW/g

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 = 25.9 V/m ; Power Drift = -0.045 dB ; Peak SAR (extrapolated) = 0.767 W/kg

SAR(1 g) = 0.618 mW/g ; SAR(10 g) = 0.458 mW/g ; Maximum value of SAR (measured) = 0.656 mW/g



Date/Time: 10/13/2011 4:13:18 PM

Test Laboratory: Motorola - CDMA 1900 Mobile Hotspot

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5905A

Device Position: Mobile Hotspot (Body-adjacent) position, Bottom Edge of Phone 10 mm from Phantom

Device Mode: EVDO Rev. O mode

Communication System: CDMA 1900; Frequency: 1908.75 MHz; Channel Number: 1175; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.58$ 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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1):

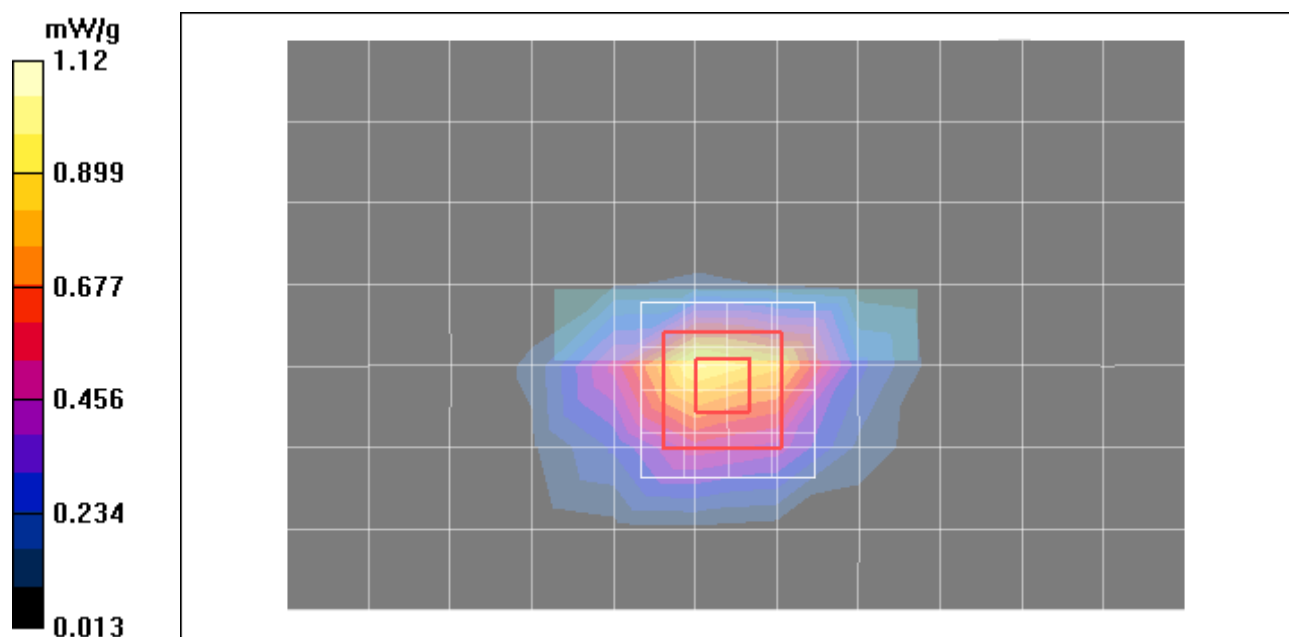
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.998 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (≤ 3 GHz) (5x5x7)/Cube 0:

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

Reference Value = 16.0 V/m; Power Drift = 0.125 dB; Peak SAR (extrapolated) = 1.69 W/kg

SAR(1 g) = 0.994 mW/g; SAR(10 g) = 0.518 mW/g; Maximum value of SAR (measured) = 1.12 mW/g



Date/Time: 10/13/2011 7:22:45 PM

Test Laboratory: Motorola - CDMA 1900 Mobile Hotspot

Serial: LM5V160008; FCC ID: IHDP56MN1

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5905A

Accessory Model #: Inductive Charging Door SJHN0813A

Device Position: Mobile Hotspot (body-adjacent) position, Bottom Edge of Phone 10 mm from Phantom

Communication System: CDMA 1900; Frequency: 1908.75 MHz; Channel Number: 1175; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.58$ 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 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Normal Body (10mm) (17x11x1):

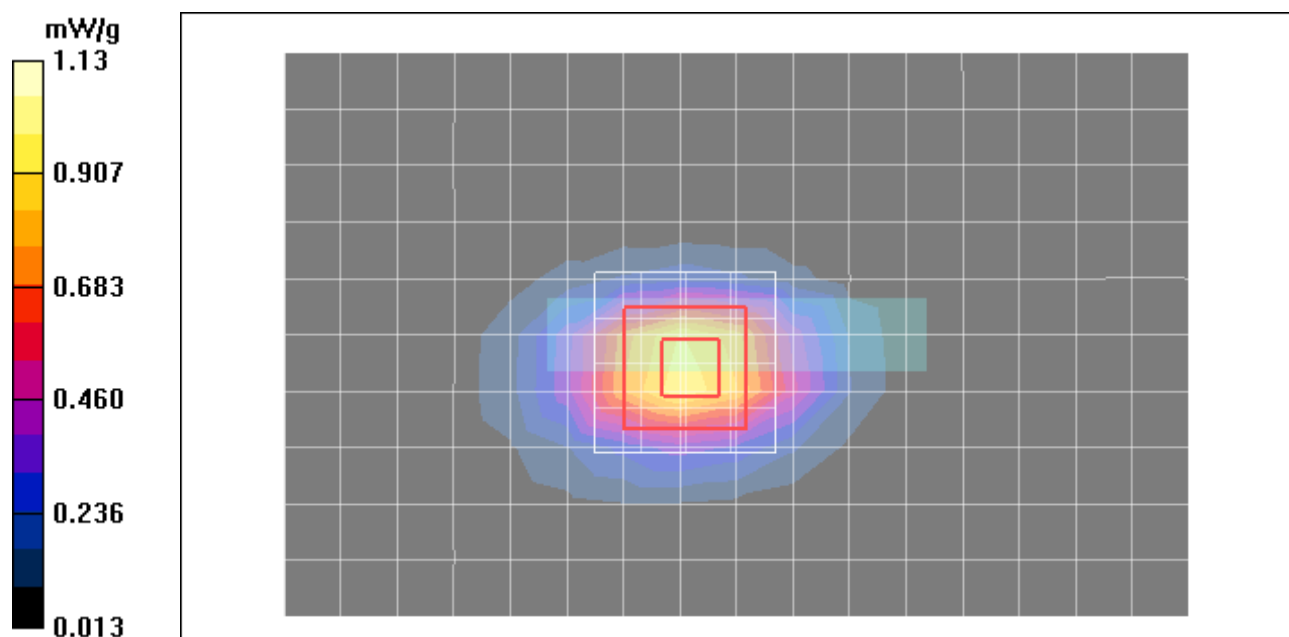
Measurement grid: $dx=10$ mm, $dy=10$ mm; Maximum value of SAR (measured) = 0.970 mW/g

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 = 23.6 V/m; Power Drift = 0.077 dB; Peak SAR (extrapolated) = 1.64 W/kg

SAR(1 g) = 0.995 mW/g; SAR(10 g) = 0.518 mW/g; Maximum value of SAR (measured) = 1.13 mW/g



Appendix 6

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>	$e = f(d,k)$	<i>f</i>	<i>g</i>	$h = c \times f / e$	$i = c \times g / e$	<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	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	338
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>	$e = f(d,k)$	<i>f</i>	<i>g</i>	$h = c \times f / e$	$i = c \times g / e$	<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 7

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: **ES3-3115_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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The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
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	± 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	± 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 recatangular 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

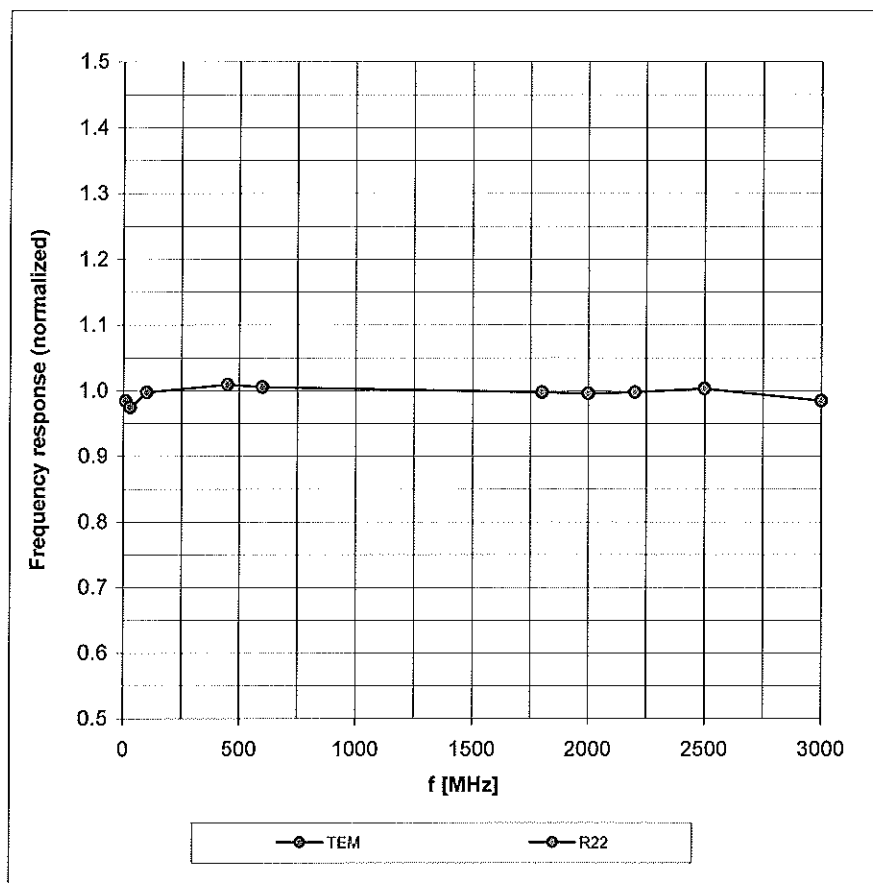
Calibration Parameter Determined in Body Tissue Simulating Media

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.

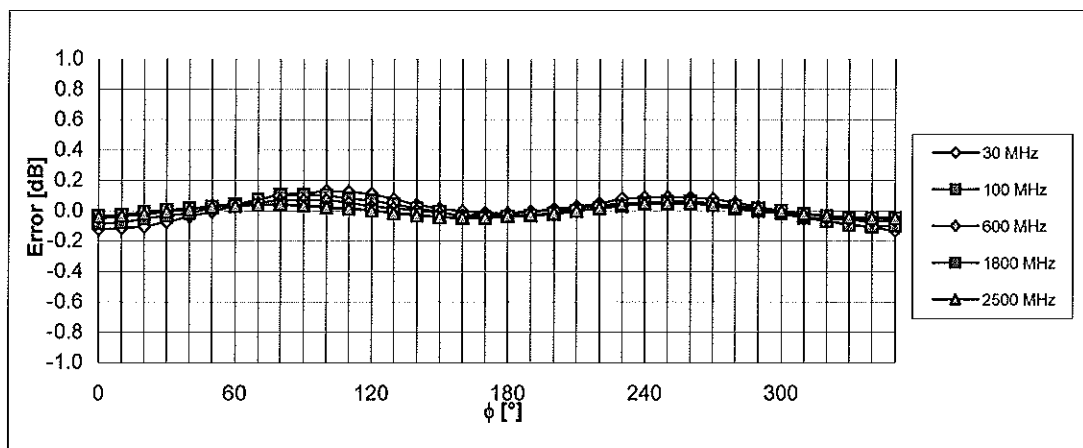
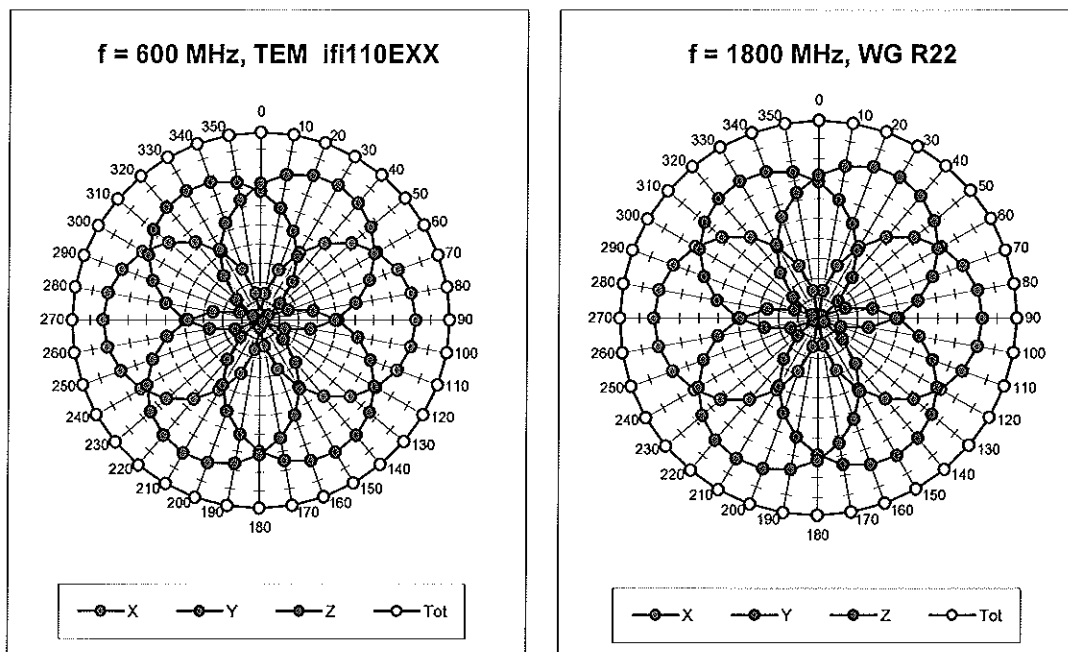
Frequency Response of E-Field

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



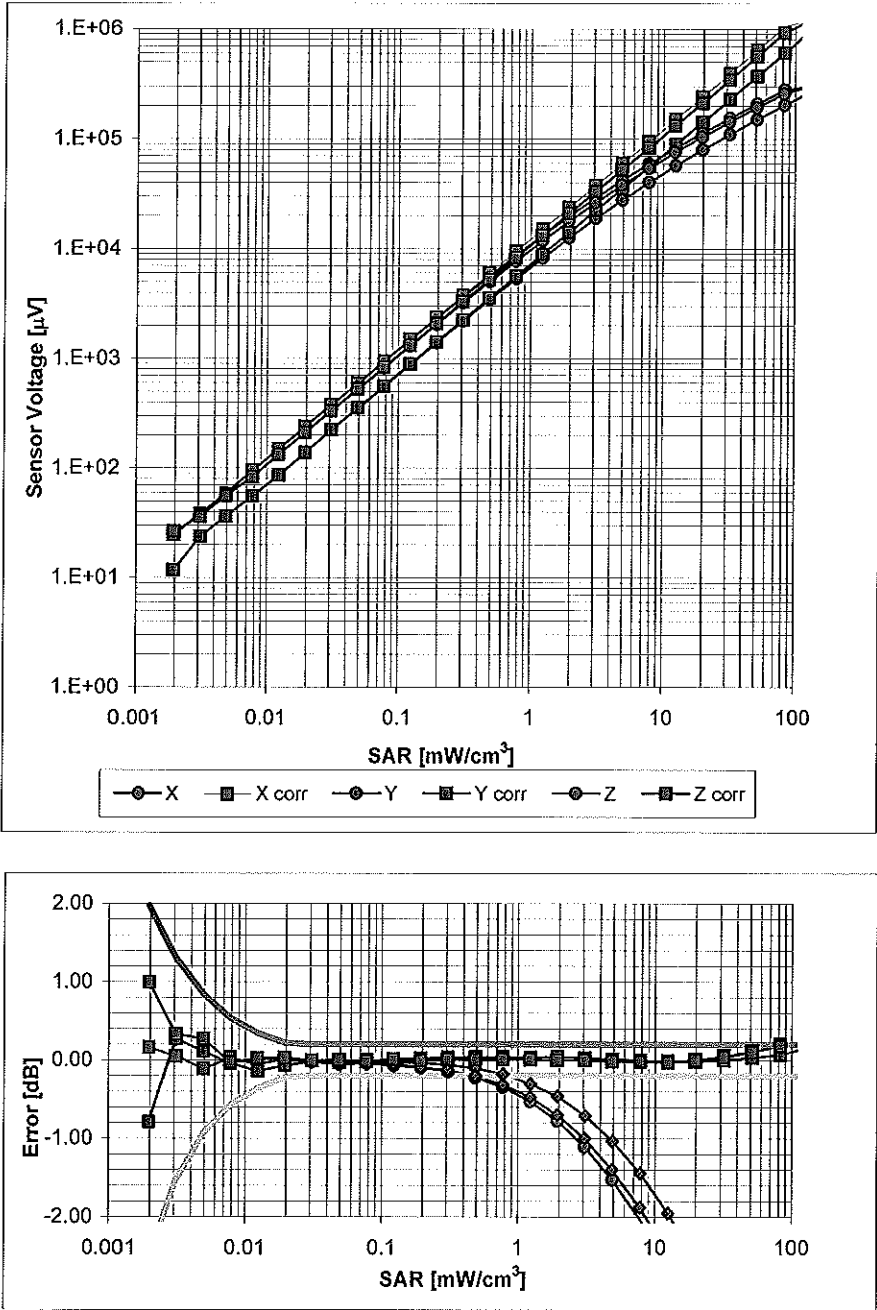
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

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



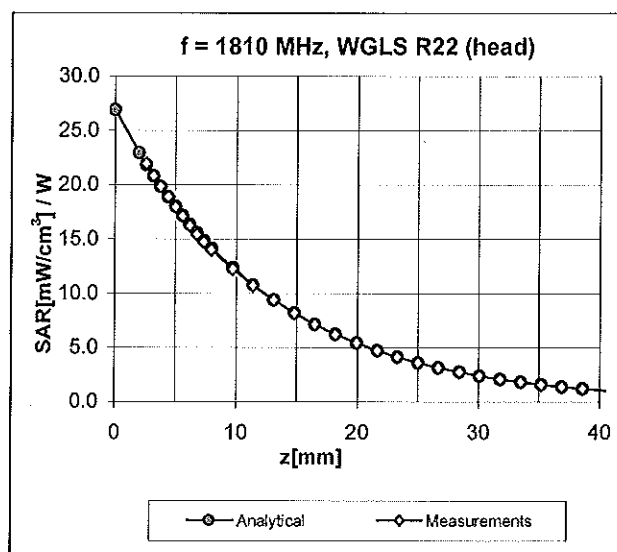
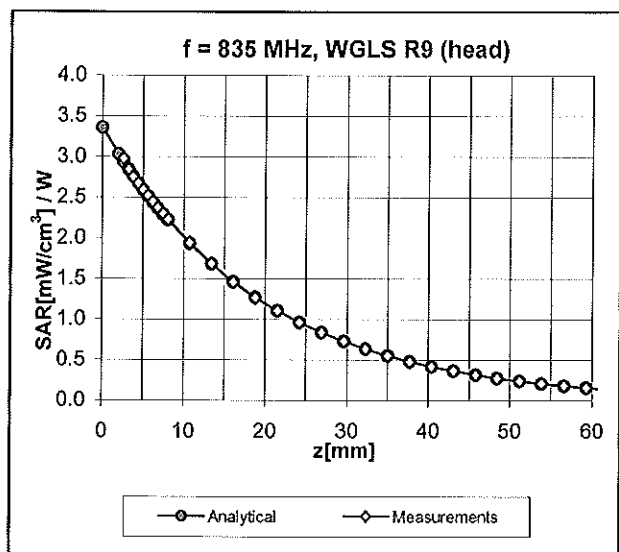
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

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



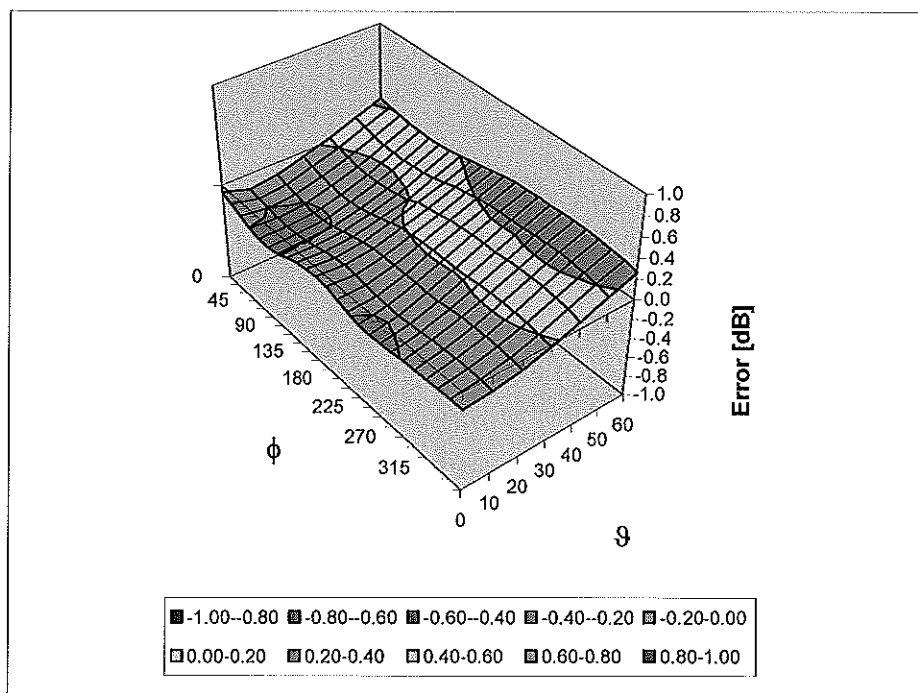
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

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

Appendix 8

Dipole Characterization Certificate



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

Client **Motorola MDb**

Certificate No: **D835V2-422_Mar11**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 422**

Calibration procedure(s) **QA CAL-05.v8
Calibration procedure for dipole validation kits**

Calibration date: **March 18, 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 EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4208	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: March 18, 2011

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



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	41.0 $\pm$ 6 %	0.89 mho/m $\pm$ 6 %
Head TSL temperature during test	(22.0 $\pm$ 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.32 mW / g
SAR normalized	normalized to 1W	9.28 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	9.33 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.52 mW / g
SAR normalized	normalized to 1W	6.08 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	6.11 mW / g $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.3 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature during test	(22.2 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.49 mW / g
SAR normalized	normalized to 1W	10.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	9.77 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.63 mW / g
SAR normalized	normalized to 1W	6.52 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	6.43 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$53.3 \Omega + 3.3 j\Omega$
Return Loss	- 26.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$48.8 \Omega + 1.8 j\Omega$
Return Loss	- 33.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.427 ns
----------------------------------	----------

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Design Modification by End User

The dipole has been modified with Teflon Rings (TR) placed within identified markings close to the end of each dipole arm. Calibration has been performed with TR attached to the dipole.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 24, 2000

DASY5 Validation Report for Head TSL

Date/Time: 18.03.2011 10:31:11

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL900

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.89 \text{ mho/m}$; $\epsilon_r = 41$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

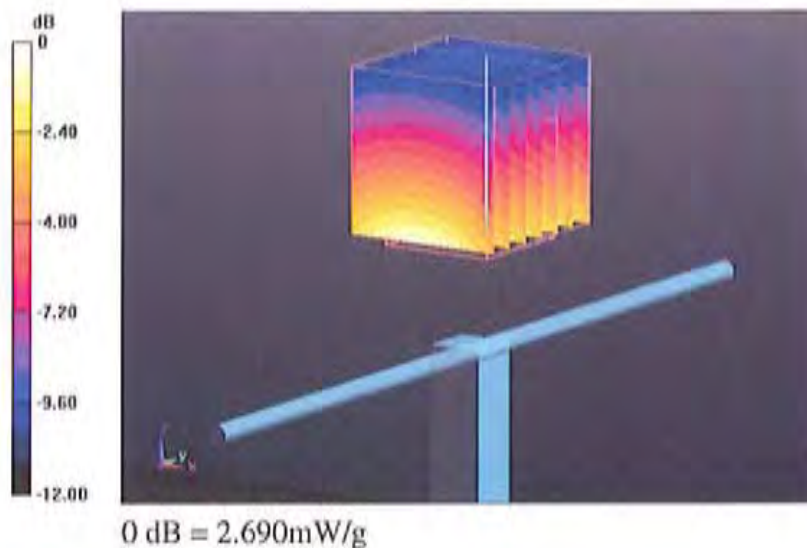
Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.580 V/m; Power Drift = 0.02 dB

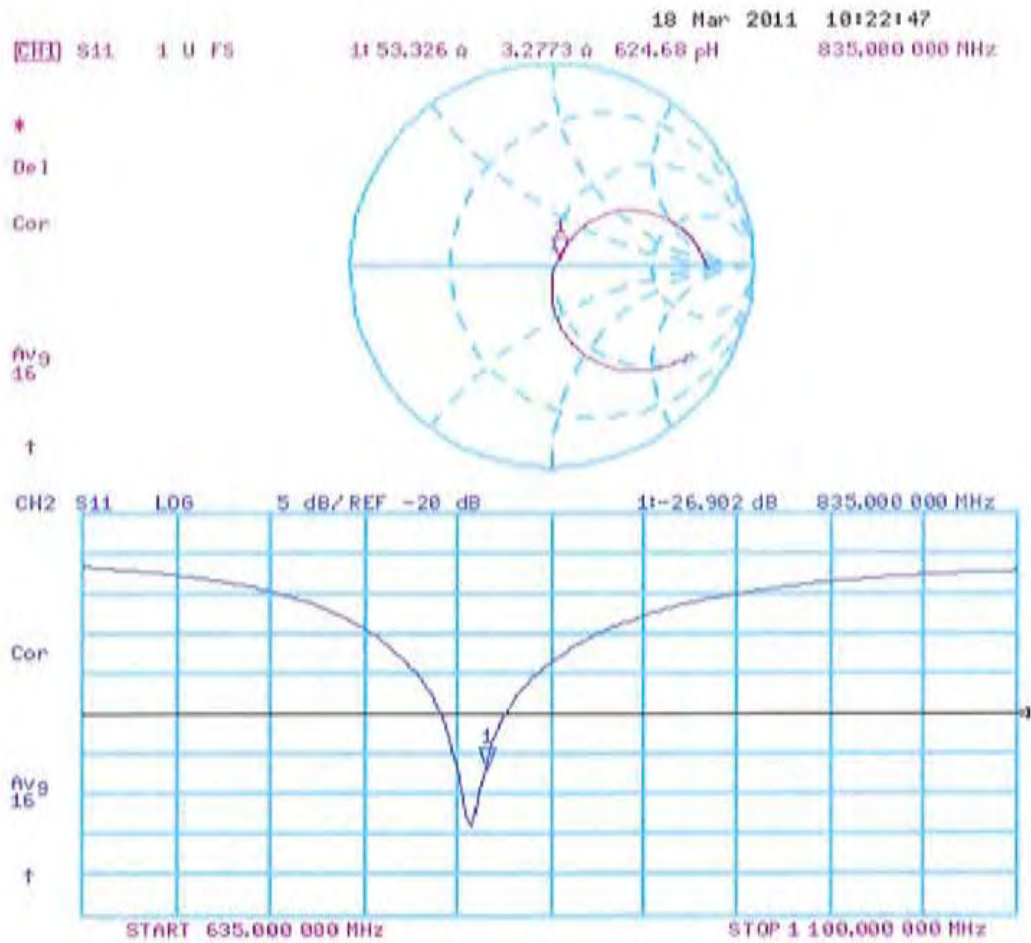
Peak SAR (extrapolated) = 3.476 W/kg

SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.52 mW/g

Maximum value of SAR (measured) = 2.692 mW/g



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date/Time: 16.03.2011 15:51:37

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: MSL900

Medium parameters used: $f = 835$ MHz; $\sigma = 0.99$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

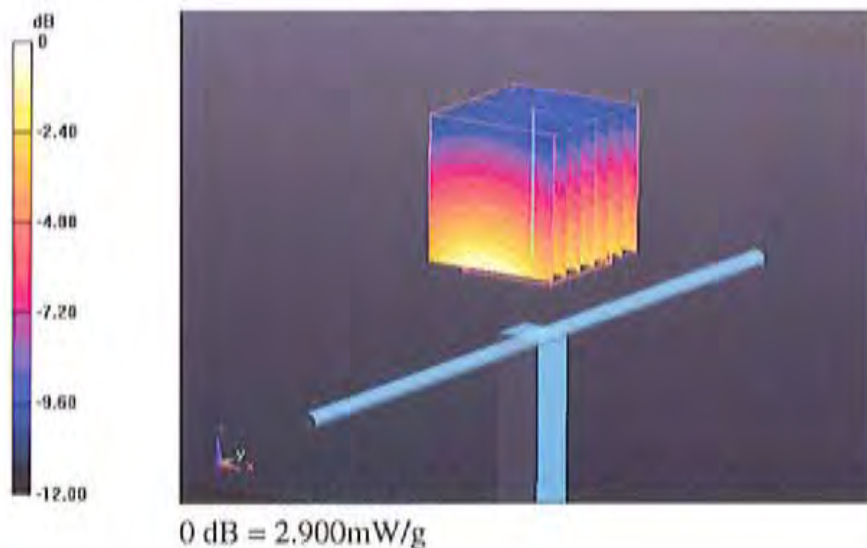
Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.816 V/m; Power Drift = 0.02 dB

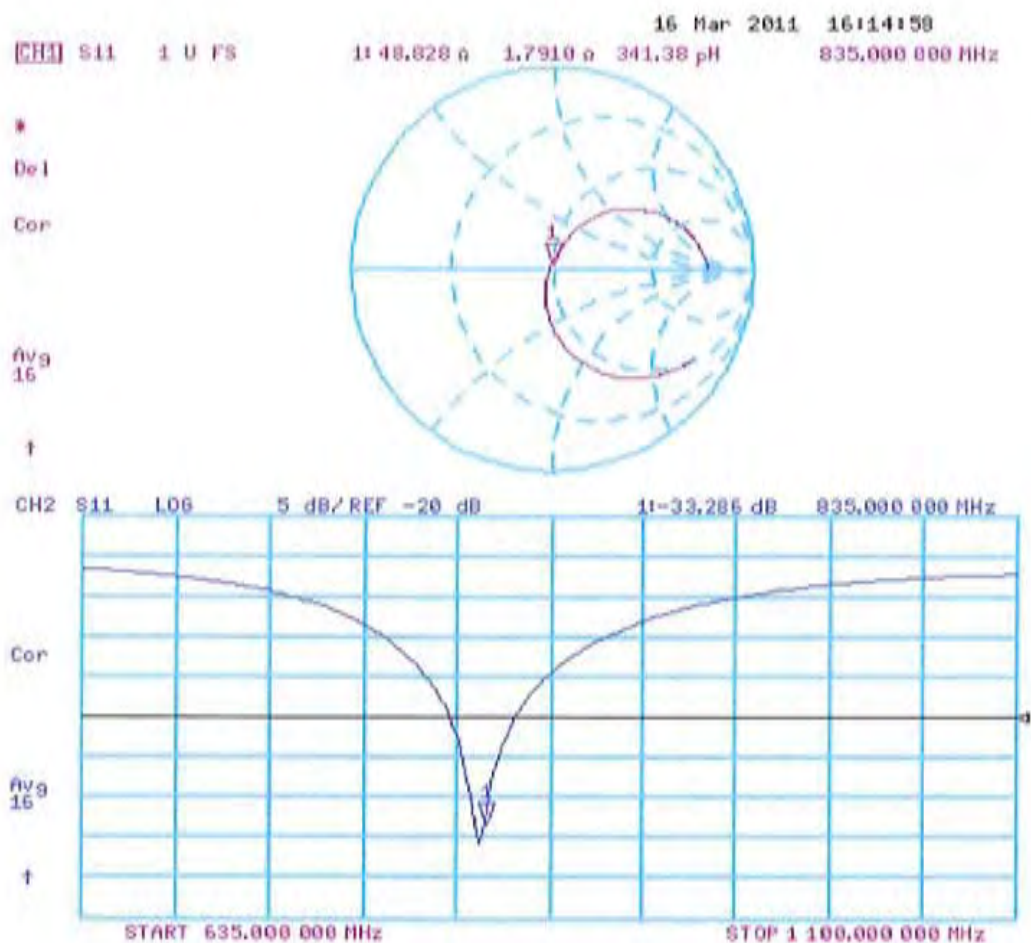
Peak SAR (extrapolated) = 3.673 W/kg

SAR(1 g) = 2.49 mW/g; SAR(10 g) = 1.63 mW/g

Maximum value of SAR (measured) = 2.900 mW/g



Impedance Measurement Plot for Body TSL





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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Motorola MDb**

Certificate No: **D1800V2-250_Mar11**

CALIBRATION CERTIFICATE

Object **D1800V2 - SN: 250**

Calibration procedure(s) **QA CAL-05.v8**
Calibration procedure for dipole validation kits

Calibration date: **March 17, 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 EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

Calibrated by: **Claudio Leubler** **Laboratory Technician**

Approved by: **Katja Pokovic** **Technical Manager**

Signature

Issued: March 18, 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
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

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

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.4 $\pm$ 6 %	1.35 mho/m $\pm$ 6 %
Head TSL temperature during test	(22.0 $\pm$ 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.47 mW / g
SAR normalized	normalized to 1W	37.9 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	38.6 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.99 mW / g
SAR normalized	normalized to 1W	20.0 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	20.1 mW / g $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.2 ± 6 %	1.45 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.08 mW / g
SAR normalized	normalized to 1W	36.3 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	37.2 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.81 mW / g
SAR normalized	normalized to 1W	19.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	19.4 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$50.8 \Omega + 5.5 j\Omega$
Return Loss	- 25.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$46.1 \Omega + 5.6 j\Omega$
Return Loss	- 23.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.208 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Design Modification by End User

The dipole has been modified with Teflon Rings (TR) placed within identified markings close to the end of each dipole arm. Calibration has been performed with TR attached to the dipole.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 25, 1999

DASY5 Validation Report for Head TSL

Date/Time: 17.03.2011 11:03:14

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL U12 BB

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.05, 5.05, 5.05); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

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

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

Reference Value = 95.117 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 17.216 W/kg

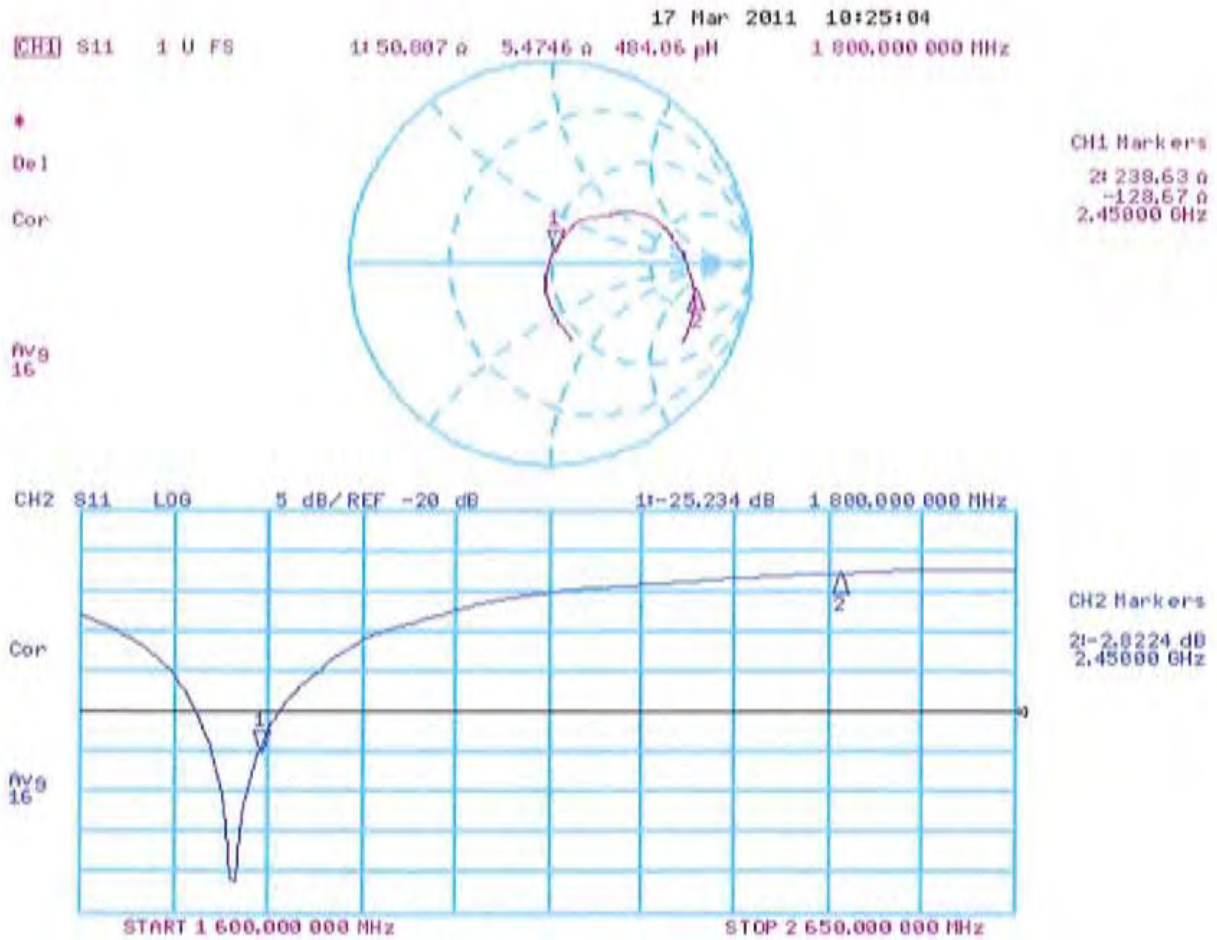
SAR(1 g) = 9.47 mW/g; SAR(10 g) = 4.99 mW/g

Maximum value of SAR (measured) = 11.641 mW/g



0 dB = 11.640mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date/Time: 17.03.2011 15:52:49

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: MSL U12 BB

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.74, 4.74, 4.74); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

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

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

Reference Value = 93.370 V/m; Power Drift = -0.01 dB

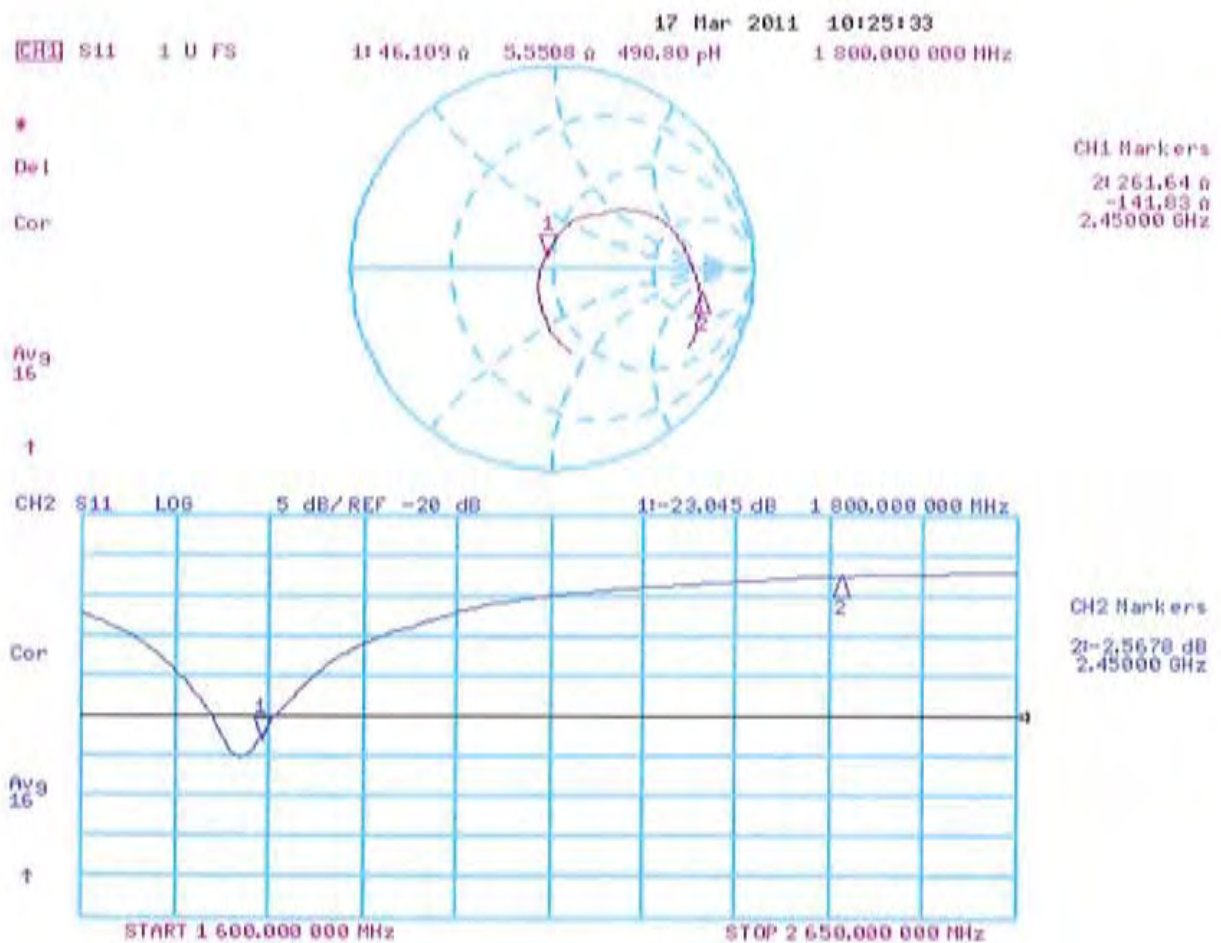
Peak SAR (extrapolated) = 15.727 W/kg

SAR(1 g) = 9.08 mW/g; SAR(10 g) = 4.81 mW/g

Maximum value of SAR (measured) = 11.477 mW/g



Impedance Measurement Plot for Body TSL





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The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Motorola MDb**

Certificate No: **D2450V2-863_Mar11**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 863**

Calibration procedure(s) **QA CAL-05.v8
Calibration procedure for dipole validation kits**

Calibration date: **March 17, 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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

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

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

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

Issued: March 17, 2011

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



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The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.7 $\pm$ 6 %	1.72 mho/m $\pm$ 6 %
Head TSL temperature during test	(22.0 $\pm$ 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.3 mW / g
SAR normalized	normalized to 1W	53.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	54.2 mW / g $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.23 mW / g
SAR normalized	normalized to 1W	24.9 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	25.1 mW / g $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.5 ± 6 %	1.92 mho/m ± 6 %
Body TSL temperature during test	(21.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.2 mW / g
SAR normalized	normalized to 1W	52.8 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	52.8 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.11 mW / g
SAR normalized	normalized to 1W	24.4 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	24.4 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$53.1 \Omega + 2.9 j\Omega$
Return Loss	- 27.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$48.5 \Omega + 5.2 j\Omega$
Return Loss	- 25.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.165 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	April 23, 2010

DASY5 Validation Report for Head TSL

Date/Time: 17.03.2011 13:48:21

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL U12 BB

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.72$ mho/m; $\epsilon_r = 38.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe) /Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 104.8 V/m; Power Drift = -0.11 dB

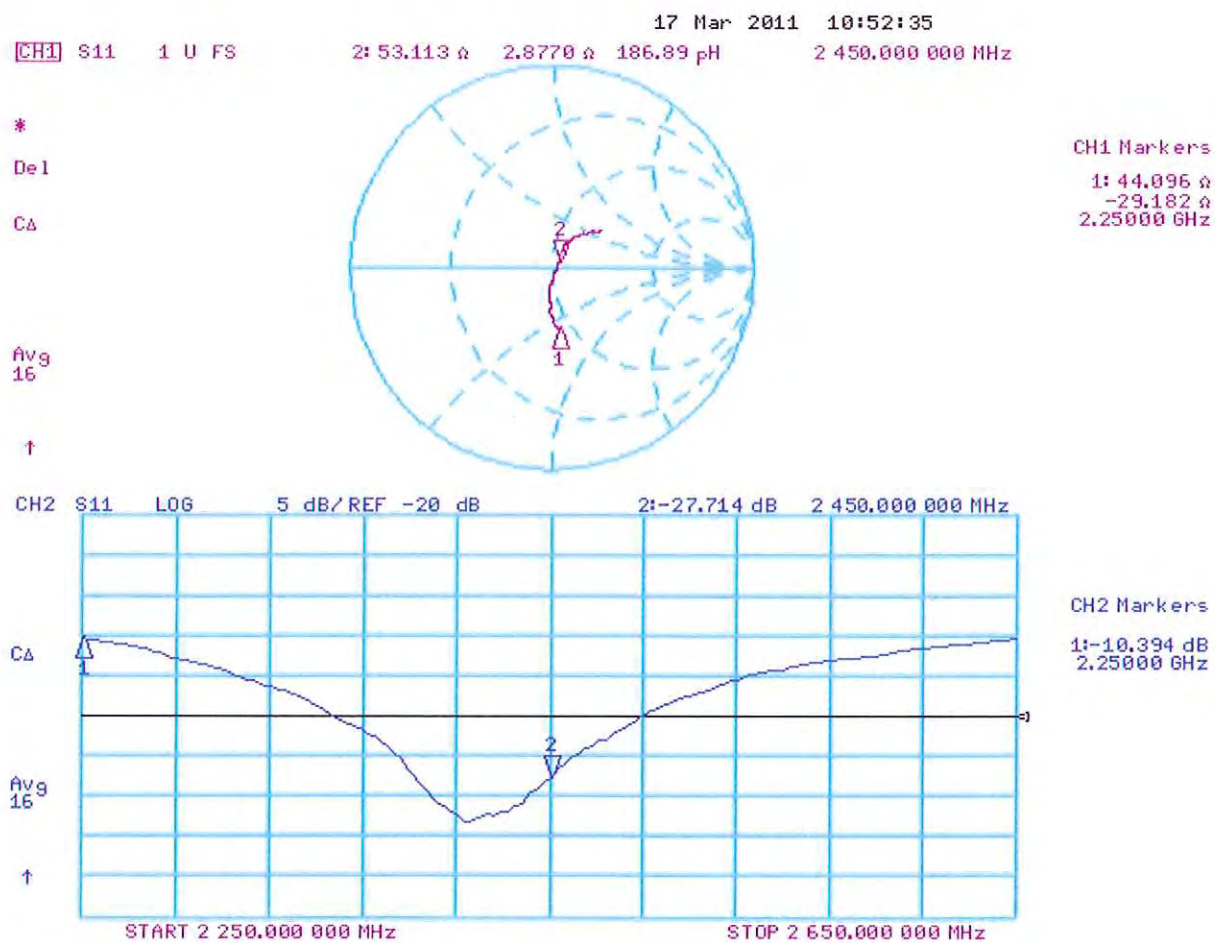
Peak SAR (extrapolated) = 27.215 W/kg

SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.23 mW/g

Maximum value of SAR (measured) = 17.128 mW/g



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date/Time: 08.03.2011 15:14:58

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: MSL U12 BB

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.93$ mho/m; $\epsilon_r = 51.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.31, 4.31, 4.31); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

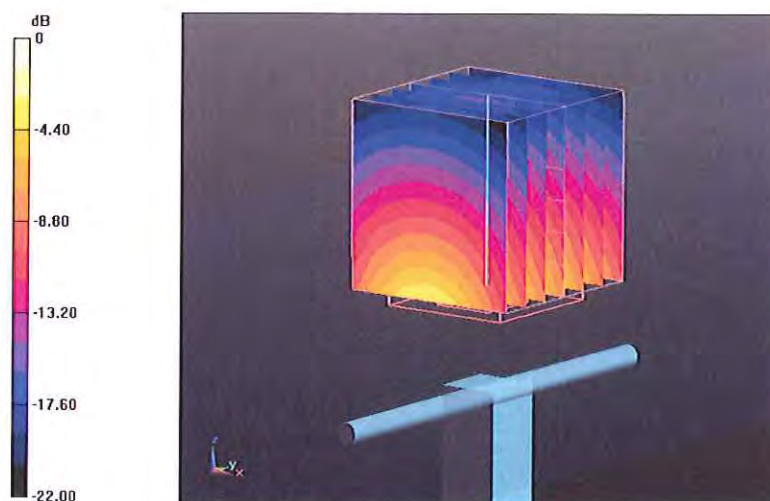
Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.651 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 27.947 W/kg

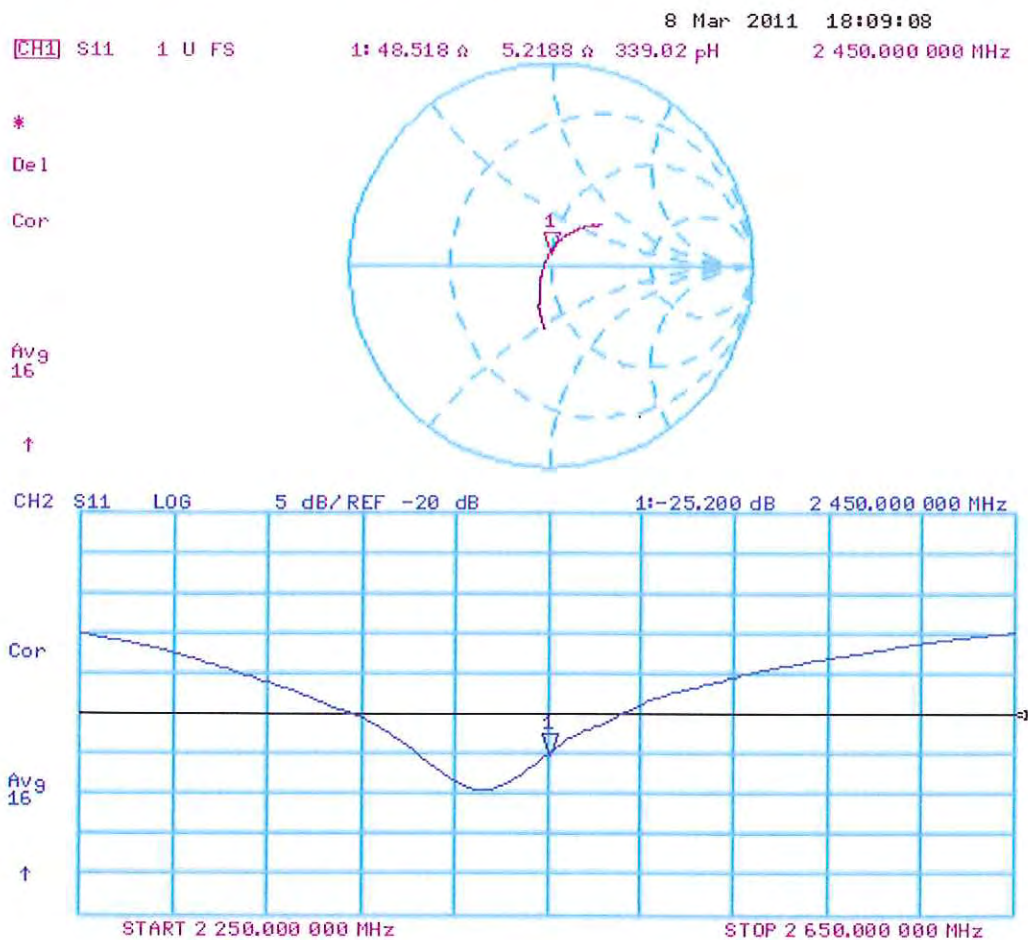
SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.11 mW/g

Maximum value of SAR (measured) = 17.459 mW/g



0 dB = 17.460mW/g

Impedance Measurement Plot for Body TSL



END OF REPORT