MOTOROLA

Portable Hand-Held Device SAR Test Report

Tests Requested By:	Motorola Mobility, Inc. 600 N. US Highway 45 Libertyville, IL 60048
Test Report #:	24640-1F Rev E
Date of Report:	Dec 1, 2011
Date of Test:	Aug-20-2011 to Oct-5-2011
FCC ID #:	IHDP56MJ2
Generic Name:	M0C09
Test Laboratory:	Motorola Mobility, Inc. - ADR Test Services Laboratory 600 N. US Highway 45 Libertyville, IL 60048
Report Author:	Steven Hauswirth Distinguished Member of the Technical Staff

Accreditation:

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

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

2404

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

Statement of Compliance:

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

Therefore, SAR testing performed in this band was performed outside of our ISO 17025 accreditation. The general procedures and guidelines provided within; FCC KDB 248227 D01, FCC KDB 648474 D01, FCC KDB 865664 D01 and IEC 62209-2 were utilized for testing.

Table of Contents

Revision History

Revision Version	Date	Notes
Rev. 0	Oct 10, 2011	Initial report release.
Rev. A	Oct 13, 2011	Clarification on Power Reduction Schemes
Rev. B	Oct 17, 2011	Further Clarification on Power Reduction Schemes
Rev. C	Nov 18, 2011	Removed 5GHz SAR data. Added separate report from external test lab for 5 GHz SAR data.
Rev. D	Nov 28, 2011	Modified tables in Section 6.1 to report reduced power for conducted power levels.
Rev. E	Dec 1, 2011	Included pictures for orientation and proximity sensor effective area to section 2.2.2

1. Introduction

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

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

Summary of Stand-Alone SAR Results	
Transmit Band	**Body SAR (1 g $^{W}/_{kg}$)**
CDMA 850	**1.46**
CDMA 1900	**1.39**
LTE Band 13	**1.16**
Wi-Fi 2.45 GHz	**1.39**

SAR test results for body-worn testing in the Wi-Fi 5200 MHz and 5800 MHz transmit bands are provided in report *IHDP56MJ2_5GWLAN_SAR_Report.pdf*, included within the Exhibit 11 documents.

2. Description of the Device Under Test

2.1 Antenna description

Main (CDMA 850/1900 MHz) Antenna

Type	Internal	
Location	Top of Left Transceiver	
Dimensions	Width	25 mm
	Length	28 mm

LTE (782 MHz) Antenna

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

Bluetooth/Wi-Fi 2.45 / 5 GHz Antenna

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

2.2 Device Signaling[1]

Serial Number(s) (Functional Use)	KFLC110065 (CDMA & LTE conducted power measurements and SAR testing) KFLC110069 (Wi-Fi SAR testing)
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype
Device Category	Portable / Mobile Station
RF Exposure Limits	General Population / Uncontrolled

Mode(s) of Operation	Modulation Mode(s)	Maximum Output Power Setting	Duty Cycle	Transmitting Frequency Range(s)
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	1851.20 - 1908.75 MHz
2.45 GHz Wi-Fi 802.11b/g/n	BPSK	15.5 dBm	1:1	2412.0 - 2462 MHz
5 GHz Wi-Fi 802.11a/n	BPSK	16.4 dBm	1:1	5180.0 - 5240.0 MHz, 5745.0 - 5805.0 MHz
Bluetooth	GFSK	7.71 dBm	1:1	2402.0 - 2483.5 MHz

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

2.2.1 LTE Device Description

LTE Summary Information per FCC KDB 941225

	FCC ID			IHDP56MJ2
	Form Factor			Hand-Held Tablet Device
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?**			No
	Hotspot with LTE + Wi-Fi?			Yes
	Hotspot with LTE + Wi-Fi active with 1x Voice sessions?			No
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
	Power Reduction used for CDMA?			Yes
	Power Reduction used for LTE?			Yes
	Power Reduction used for svLTE?			No, svLTE not supported
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 employed whenever allowed. Per the chart above, for a 10 MHz bandwidth the following MPR is used:

Modulation	# of RBs	MPR (dB)
QPSK	>12	0
16 QAM	<= 12	0
16 QAM	> 12	1

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%	24
QPSK, Start RB: 0, RB Alloc 100%	24
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%	23
16QAM, Start RB: 0, RB Alloc 100%	23
16QAM, Start RB: 49, RB Alloc: 1 RB @ high channel edge	24
16QAM, Start RB: 0, RB Alloc: 1 RB @ low channel edge	24

2.2.2 Power limit reduction schemes

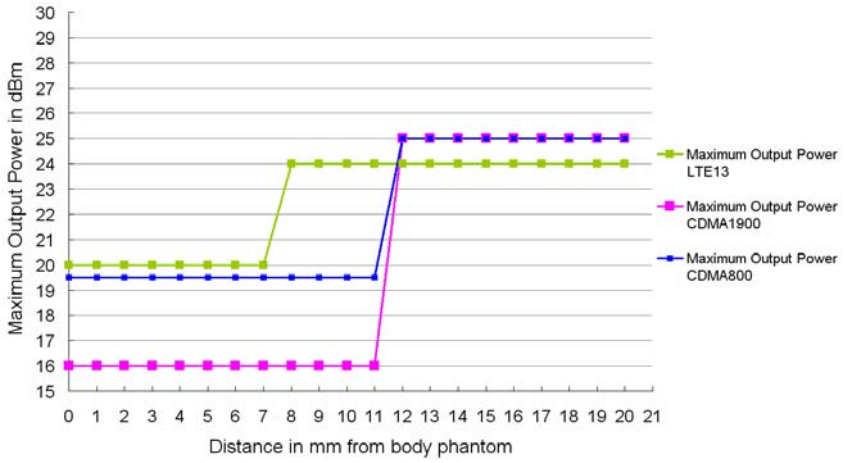
The DUT utilizes a set of reduced limits for the maximum transmit power for specified device configurations and orientations, as described by the tables and plot below. A complete description of this functionality is provided in the "Operational Description" contained within Exhibit 12A. The implementation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

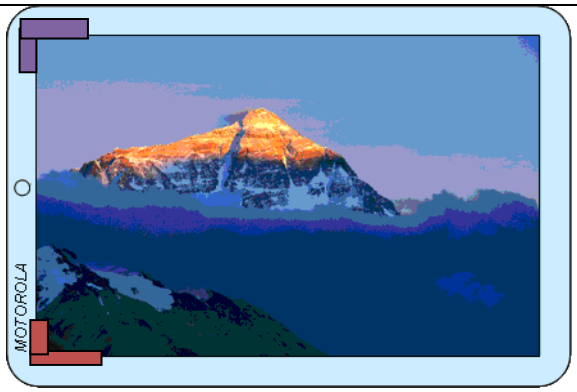
	Proximity Sensor Power Reduction		Orientation Power Reduction	
Mode(s) of Operation	CDMA 850	CDMA 1900	CDMA 850	CDMA 1900
Duty Cycle	1:1	1:1	1:1	1:1
Maximum Output Power Setting (dBm)	25	25	25	25
Time Avg Output Power Setting (dBm)	25	25	25	25
Reduced Maximum Output Power Setting (dBm)	19.5	16.0	25	18.0
Time Avg Output Power Setting (dBm)	19.5	16.0	25	18.0

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 active (dBm)	24.0	24.0	24.0	24.0	23.0	23.0	24.0	24.0
Total Power Reduction (dB)	4.0	4.0	4.0	4.0	3.0	3.0	4.0	4.0
Reduced Maximum Output Power Setting (dBm)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

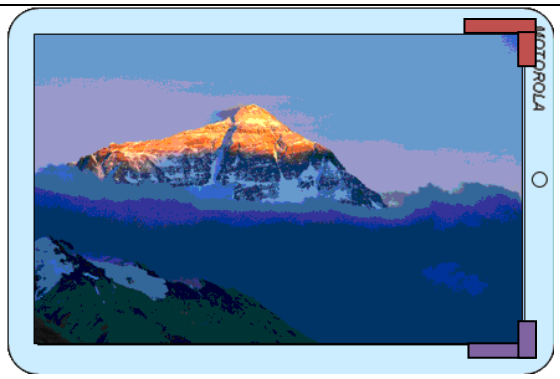
Proximity Sensor Activation

Maximum Output Power Vs. Distance from Body Phantom



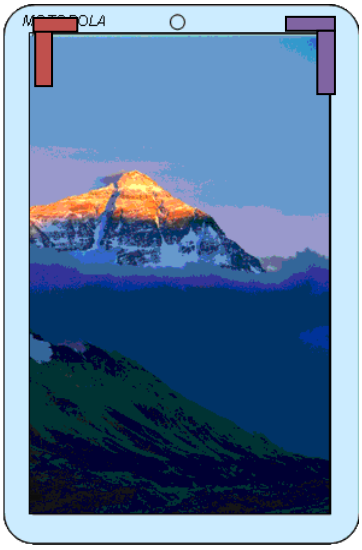


Orientation 1: There is always cutback in the CDMA1900 band, regardless of proximity sensor state; And there is no cutback in the LTE and CDMA800 band, unless the *proximity sensor* is activated.

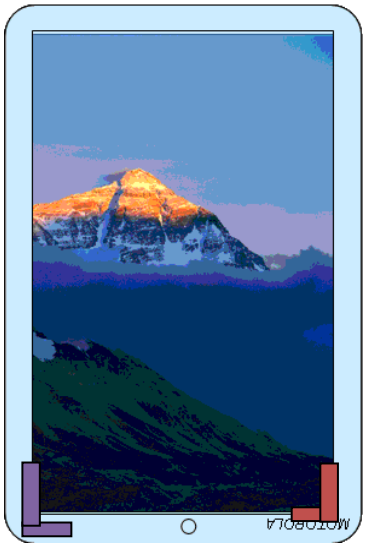


Orientation 2: There is no cutback in the LTE and CDMA band, unless the *proximity sensor* is activated.

Figure 11.2.2.2-1: Landscape Usage Modes



Orientation 3: There is no cutback in the LTE and CDMA band, unless the *proximity sensor* is activated.



Orientation 4: There is no cutback in the LTE and CDMA band, unless the *proximity sensor* is activated.

Figure 11.2.2.2-2: Portrait Usage Modes

Orientation\Mode Power Limit Activation	CDMA 850	CDMA 1900	LTE Band 13
Orientation #1 (Left Edge toward body)	N/A	‡	N/A
Orientation #2 (Right Edge toward body)	N/A	N/A	N/A
Orientation #3 (Bottom Edge toward body)	N/A	N/A	N/A
Orientation #4 (Top Edge toward body)	N/A	N/A	N/A
Back Surface toward the body	†	†	†

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

WWAN (CDMA) Antenna Area

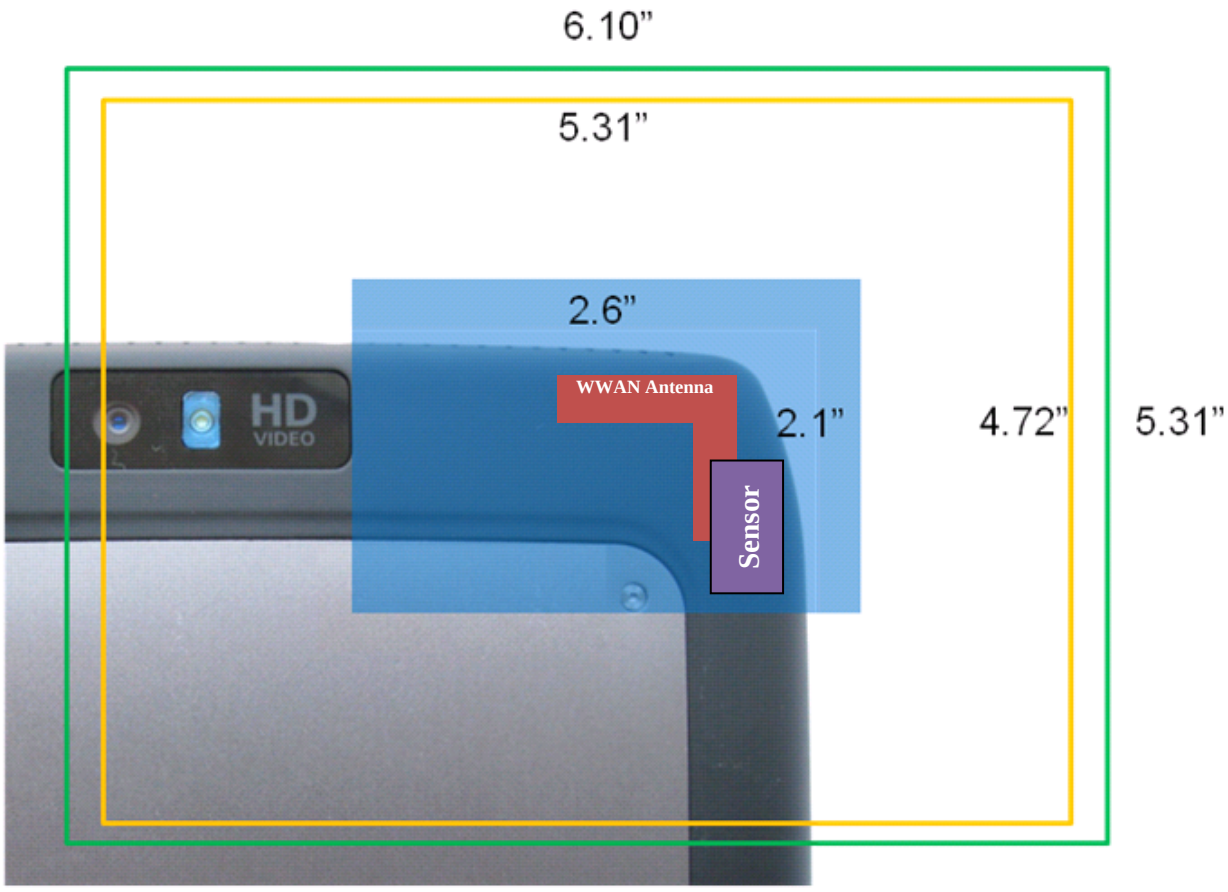


Figure 11.2.2.2-3: Proximity detection areas (relative to transmitter antenna) at 12-mm threshold separation (Orange square) and 1-mm separation (Green square). Measurement was done using a 2.6” x 2.1” conductive surface (Blue square). View is of the rear of the device.

LTE B13 Antenna Area

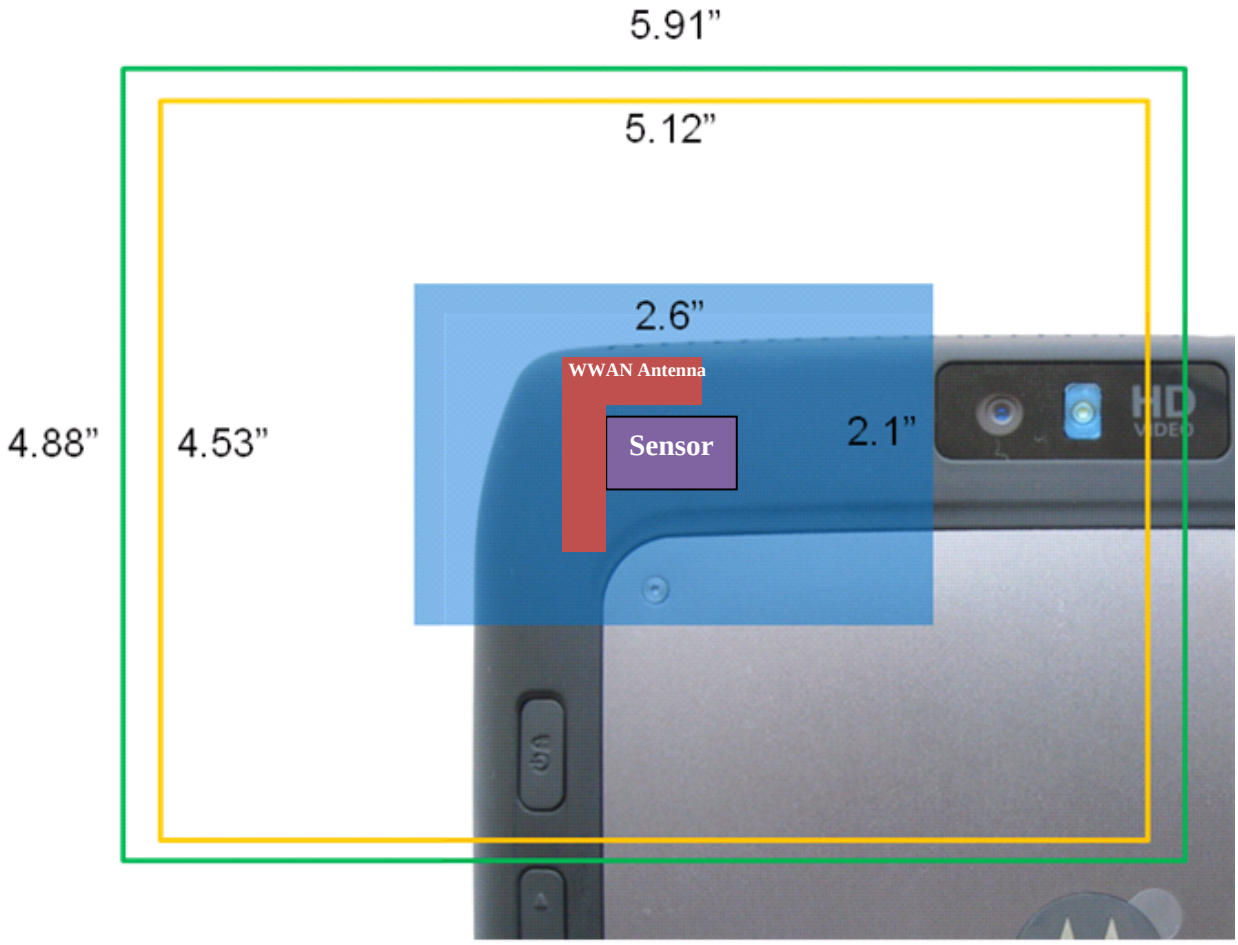


Figure 11.2.2.2-4: Proximity detection areas (relative to transmitter antenna) at 6-mm threshold separation (Orange square) and 1-mm separation (Green square). Measurement was done using a 2.6” x 2.1” conductive surface (Blue square).

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 (dB)	MPR Target (dB)	Measured reduction from 24 dBm target	Notes
QPSK	10 MHz	1	0	24.1	0	0 dB	-
		1	49	24.2	0	0 dB	-
		50%	12	23.8	0	0 dB	-
		100%	0	23.8	0	0 dB	-
16QAM	10 MHz	1	0	23.8	0	0 dB	-
		1	49	24.2	0	0 dB	-
		50%	12	22.9	1	1.1 dB	MPR enabled
		100%	0	22.8	1	1.2 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. Per guidance in KDB 941225 D01 for 1x Ev-Do Data Devices, SAR testing will be performed in Ev-Do Rev 0 mode (**highlighted in bold** in the table below) and in any mode with measured conducted power higher than Rev 0 by 0.25 dB.

Measured Conducted Power (dBm) for CDMA modes							
		Loopback		Data[2]		EVDO Rev. O	EVDO Rev. A
Band	Channel	RC1 SO55	RC3 SO55	TDSO SO32 + FCH-SCH	TDSO SO32 + SCH	RTAP 153.6k	Subtype 2 RETAP
CDMA 800	1013	24.97	25.01	23.78	23.20	25.11	25.12
	384	25.03	25.08	24.15	23.21	25.19	25.22
	777	24.89	24.94	24.04	23.36	25.19	25.14
CDMA 1900	25	24.97	25.09	21.08	17.27	25.23	25.21
	600	25.13	25.15	23.04	19.17	25.25	25.29
	1175	24.94	24.97	24.15	19.96	25.20	25.20

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

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

Band	Channel	Conducted Power (Max AVG in dBm) for 802.11g Mode Data Rates							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
Wi-Fi 2450 MHz	1	12.48	12.50	12.44	12.50	11.36	11.34	11.92	12.00
	6	**12.80**	**12.78**	**12.82**	**12.80**	11.92	11.87	**12.63**	12.49
	11	**13.51**	**13.67**	**13.66**	**13.66**	12.57	12.59	13.15	13.23

Band	Channel	Conducted Power (Max AVG in dBm) for 802.11n Mode Data Rates (20 MHz Channel, 400 ns Guard Interval)							
		7.2 Mbps	14.4 Mbps	21.6 Mbps	28.8 Mbps	43.3 Mbps	57.7 Mbps	65 Mbps	72.2 Mbps
Wi-Fi 2450 MHz	1	**15.06**	**14.87**	**14.93**	**14.42**	**14.54**	**12.9**	**12.79**	11.46
	6	**15.12**	**14.97**	**14.99**	**14.64**	**14.73**	**13.22**	**13.18**	11.87
	11	**15.45**	**15.36**	**15.43**	**15.07**	**15.13**	**13.74**	**13.54**	12.10

Band	Channel	Conducted Power (Max AVG in dBm) for 802.11n Mode Data Rates (20 MHz Channel, 800 ns Guard Interval)							
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
Wi-Fi 2450 MHz	1	**15.06**	**14.79**	**14.85**	**14.49**	**14.36**	**12.96**	**12.91**	11.50
	6	**15.12**	**14.96**	**15.19**	**14.69**	**14.75**	**13.28**	**13.27**	11.92
	11	**15.45**	**15.34**	**15.51**	**14.97**	**14.98**	**13.72**	**13.68**	12.16

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

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

Description	Serial Number	Cal Date	Cal Due Date
DASY4™ DAE V1	376	Aug-31-2011	Aug-31-2011
E-Field Probe ES3DV3	3124	Aug-23-2011	Aug-23-2012
DASY4™ DAE V1	434	Jan-13-2011	Jan-13-2012
E-Field Probe ES3DV3	3115	Jan-12-2011	Jan-12-2012
Dipole Validation Kit, DV835V2	422	Mar-18-2011	Mar-18-2013
Dipole Validation Kit, DV835V2	436	Mar-18-2011	Mar-18-2013
Dipole Validation Kit, DV1800V2	250	Mar-17-2011	Mar-17-2013
Dipole Validation Kit, DV1800V2	271	Mar-8-2011	Mar-8-2013
Dipole Validation Kit, DV2450V2	863	Mar-17-2011	Mar-17-2013
Dipole Validation Kit, DV2450V2	740	Mar-17-2011	Mar-17-2013
Dipole Validation Kit, D5GHzV2	1098	Jan-07-2011	Jan-07-2012

3.2 Additional Equipment

Description	Serial Number	Cal Date	Cal Due Date
Signal Generator HP8648C	3847A04982	Nov-18-2009	Nov-18-2011
Power Meter E4419B	GB39510900	Mar-28-2011	Mar-28-2013
Power Sensor #1 - E9301A	US39211007	Aug-16-2011	Aug-16-2012
Power Sensor #2 - E9301A	US39211008	Aug-16-2011	Aug-16-2012
Signal Generator HP8648C	3847A04632	Aug-13-2011	Aug-13-2013
Power Meter E4419B	GB39511087	Dec-22-2009	Dec-22-2011
Power Sensor #1 - E9301A	US39211006	Oct-25-2010	Oct-25-2011
Power Sensor #2 - E9301A	US39210934	Oct-25-2010	Oct-25-2011
Signal Generator HP8648C	3847A04843	Mar-28-2011	Mar-28-2013
Power Meter E4419B	GB39511084	Mar-28-2011	Mar-28-2013
Power Sensor #1 - E9301A	US39210929	Mar-31-2011	Mar-31-2012
Power Sensor #2 - E9301A	US39210930	Mar-31-2011	Mar-31-2012
Network Analyzer HP8753ES	US39171846	May-19-2011	May-19-2012
Dielectric Probe Kit HP85070C	US99360070		

4. Electrical parameters of the tissue simulating liquid

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

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

The probe calibration frequency and the system accuracy verification 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:

$$\Delta SAR = S_\varepsilon \Delta\varepsilon + S_\sigma \Delta\sigma$$

Here, $S_\varepsilon = \partial SAR/\partial\varepsilon$ 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:

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

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

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Temp (°C)
782	**Body**	**Measured,** Aug-26-2011	55.0	0.92	19.8
		Measured, Aug-27-2011	54.8	0.92	19.9
		Measured, Aug-28-2011	54.9	0.92	19.9
		Measured, Oct-5-2011	55.4	0.93	20.3
		Recommended Limits	55.4 ±5%	0.966 ±5%	18-25
835	**Body**	**Measured,** Aug-20-2011	54.8	0.99	20.0
		Measured, Aug-21-2011	54.6	0.99	20.1
		Measured, Oct-5-2011	55.3	0.98	19.9
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1880	**Body**	**Measured,** Aug-25-2011	51.0	1.57	19.6
		Measured, Sep-30-2011	50.7	1.58	19.9
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25
2450	**Body**	**Measured,** Sep-6-2011	52.1	1.90	19.7
		Measured, Oct-7-2011	51.1	1.92	19.9
		Recommended Limits	52.7 ±5%	1.95 ±5%	18-25

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

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

All 5.2 GHz and 5.8 GHz SAR testing was performed using HSL 3500/5800 and MSL 3500/5800 tissue simulating liquids from Schmid & Partner Engineering AG. Prior to conducting SAR measurements, the relative permittivity, ε_r, and the conductivity, σ, of the liquids was measured. The conductivity of the purchased liquids was determined to be at the high compared to the target parameter. SPEAG is investigating why the values consistently measure high. Since they measured on the conservative side of the target window, all subsequent 5.2 GHz and 5.8 GHz SAR tests were also on the conservative side of their uncertainty window.

5. System Accuracy Verification

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

A SAR measurement was performed to verify the measured SAR was within ±10% from the target SAR indicated in Appendix 6. These frequencies are within ±10% of the compliance test mid-band frequency as required in [1] and [5]. The test was conducted on the same days as the measurement of the DUT. Recommended limits for permittivity and conductivity, specified in [5], are shown in the table below. The obtained results from the system accuracy verification are also displayed in the table below. SAR values are normalized to 1 W forward power delivered to the dipole. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. The distributions of SAR compare well with those of the reference measurements (see Appendix 1). For frequencies below 3 GHz, the simulated tissue depth was verified to be 15.0 cm ± 0.5 cm. For frequencies above 3 GHz, the simulated tissue depth was verified to be 10 cm ± 0.5 cm. Z-axis scans showing the SAR penetration are also included in Appendix 1.

f (MHz)	Description	SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
			ε_r	σ (S/m)		
835	**Measured,** Aug-20-2011	9.70	54.8	0.99	21.1	20.4
	Measured, Aug-21-2011	9.70	54.6	0.99	21.1	20.4
	Measured, Aug-26-2011	9.50	54.5	0.98	21.0	20.2
	Measured, Aug-27-2011	9.55	54.1	0.98	20.1	20.2
	Measured, Aug-28-2011	9.50	54.3	0.97	20.8	19.3
	Measured, Oct-5-2011	9.45	54.8	0.99	21.1	20.3
	Recommended Limits	9.77	55.2 ±5%	0.97 ±5%	18-25	18-25
	Measured, Oct-5-2011	10.25	55.3	0.98	21.2	20.8
	Recommended Limits	10.10	55.2 ±5%	0.97 ±5%	18-25	18-25
1800	**Measured,** Aug-25-2011	36.65	51.3	1.47	20.7	20.0
	Recommended Limits	37.2	53.3 ±5%	1.52 ±5%	18-25	18-25
	Measured, Sep-30-2011	39.25	51.2	1.49	21.3	20.3
	Recommended Limits	37.9	53.3 ±5%	1.52 ±5%	18-25	18-25
2450	**Measured,** Sep-6-2011	55.0	52.1	1.90	21.1	19.8
	Recommended Limits	52.8	52.7 ±10%	1.95 ±5%	18-25	18-25
	Measured, Oct-7-2011	55.0	51.1	1.92	21.2	21.0
	Recommended Limits	51.3	52.7 ±5%	1.95 ±5%	18-25	18-25

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

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

6. Test Results

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

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

6.1 Body Test Results

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

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

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

The requisite test positions for the DUT were chosen per the guidance provided in FCC KDB 447498 D01. The DUT was tested with the back surface of the device facing the phantom with no separation for all transmitters requiring test. Additionally, the DUT was tested with the back surface of the device at an appropriate separation from the phantom to capture compliance at the worst-case proximity sensor trigger point (i.e. the closest the DUT might come to a user without utilizing a set of reduced maximum power limits), these results are presented in tables 7 & 8. The DUT was also tested along the edges of the device in which an antenna is located within 5 cm of that edge. Pictorial representation of the antenna locations and separation distances are given in section 1 above. Additionally, the software within the DUT was set to invert the orientation results from the DUT's sensor. E.g., the DUT "top edge" facing up (away from the body) was operating instead at the "top edge" facing down (toward the body) performance levels. This inversion of the orientation ensures proper exposure conditions were measured for SAR testing of an edge using the standard DASY4 measurement setup.

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

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

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3115	782	5.88	6 of 11
		835	5.88	6 of 11
		1810	4.61	6 of 11
		2450	4.12	6 of 11
E-Field Probe ES3DV3	3124	835	6.04	6 of 11
		1810	4.69	6 of 11
		2450	4.21	6 of 11

Body, Top Edge of DUT 0 mm from Phantom																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)[3]	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	Internal	23230	20.1	-0.0472	23.8	0	0.341		0.34	0.719		0.73		
	LTE Band 13, QPSK (100% RB)		23230												
	LTE Band 13, QPSK (1 RB @ Low)		23230	20.2	0.0375	24.1	0	0.345		0.35	0.746		0.75		
	LTE Band 13, QPSK (1 RB @ High)		23230	20.2	0.0081	24.2	0	0.485		0.49	0.991		0.99		
	LTE Band 13, 16QAM (50% RB)		23230	20.0	0.0114	22.9	1 (MPR)	0.273		0.27	0.578		0.58		
	LTE Band 13, 16QAM (100% RB)		23230												
	LTE Band 13, 16QAM (1 RB @ Low)		23230	20.2	0.0182	23.8	0	0.336		0.34	0.727		0.73		
	LTE Band 13, 16QAM (1 RB @ High)		23230	**20.2**	**0.0336**	**24.2**	**0**	**0.498**	**0.506**	**0.51**	**1.04**	**1.069**	**1.07**	**5x5x7**	**52**
835	CDMA 800, EVDO Rev 0 (RTAP)		1013												
			384	**19.8**	**-0.761**	**25.19**	**0**	**0.0212**		**0.03**	**0.0339**		**0.04**	**5x5x7**	**53**
			777												
1880	CDMA 1900, EVDO Rev 0 (RTAP)		25												
			600	**20.1**	**0.0491**	**25.25**	**0**	**0.0979**		**0.10**	**0.194**		**0.19**	**5x5x7**	**54**
			1175												

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

Body, Back Surface of DUT 0 mm from Phantom																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	Internal	23230	20.2	-0.0123	19.8	4.0	0.494		0.50	0.819		0.82		
	LTE Band 13, QPSK (100% RB)		23230												
	LTE Band 13, QPSK (1 RB @ Low)		23230	20.0	-0.0874	20.1	4.0	0.589		0.60	0.974		0.99		
	LTE Band 13, QPSK (1 RB @ High)		23230	**20.0**	**0.0172**	**20.2**	**4.0**	**0.689**	**0.700**	**0.70**	**1.13**	**1.161**	**1.16**	**5x5x7**	**55**
	LTE Band 13, 16QAM (50% RB)		23230	20.2	0.0245	19.9	3.0	0.499		0.50	0.831		0.83		
	LTE Band 13, 16QAM (100% RB)		23230												
	LTE Band 13, 16QAM (1 RB @ Low)		23230	20.0	-0.0426	19.8	4.0	0.54		0.55	0.872		0.88		
	LTE Band 13, 16QAM (1 RB @ High)		23230	20.0	0.0296	20.2	4.0	0.619		0.62	1.04		1.04		
835	CDMA 800, EVDO Rev 0 (RTAP)		1013	19.9	-0.0235	19.61	5.5	0.806		0.81	1.3		1.31		
			384	**20.0**	**-0.0971**	19.69	**5.5**	**0.829**		**0.85**	**1.43**		**1.46**	**5x5x7**	**56**
			777	20.2	-0.0539	19.69	5.5	0.794		0.80	1.32		1.34		
1880	CDMA 1900, EVDO Rev 0 (RTAP)		25	20.2	-0.0105	16.23	9.0	0.681		0.68	1.34		1.34		
			600	20.1	-0.0024	16.25	9.0	0.696		0.70	1.37		1.36		
			1175	**20.2**	**0.0633**	16.20	**9.0**	**0.709**		**0.71**	**1.39**		**1.39**	**5x5x7**	**57**

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

[3] Correction applied via method provided in Section 4.0 above.

Body, Back Surface of DUT 0 mm from Phantom (continued)																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
2450	802.11b, 1 Mbps	Internal	1	20.5	0.0143	12.36		0.348		0.35	0.82		0.82		
			6	20.5	0.024	12.24		0.379		0.38	0.895		0.90		
			11	20.5	-0.107	13.20		0.471		0.48	1.13		1.16		
	802.11b, 5.5 Mbps		1	20.5	0.0253	13.55		0.385		0.39	0.92		0.92		
			6	19.8	0.0795	13.33		0.435		0.44	1.05		1.05		
			11	19.9	-0.154	14.30		0.486		0.50	1.18		1.22		
	802.11b, 11 Mbps		1	20.0	0.0262	13.43		0.344		0.34	0.812		0.81		
			6	20.0	0.0211	13.42		0.385		0.39	0.923		0.92		
			11	20.0	0.0356	14.40		0.448		0.45	1.07		1.07		
	802.11g, 6 Mbps		6	20.5	-0.184	12.80		0.344		0.36	0.809		0.84		
			11	20.6	0.0373	13.51		0.459		0.46	1.13		1.13		
	802.11g, 9 Mbps		**6**	**20.0**	**-0.039**	**12.78**		**0.509**		**0.51**	**1.38**		**1.39**	**5x5x7**	**58**
			11	20.0	-0.0428	13.67		0.496		0.50	1.21		1.22		
	802.11g, 12 Mbps		6	20.0	0.0832	12.82		0.379		0.38	0.904		0.90		
			11	20.5	0.122	13.66		0.427		0.43	1.03		1.03		
	802.11g, 18 Mbps		6	20.2	0.003	12.80		0.367		0.37	0.881		0.88		
			11	20.2	-0.0668	13.66		0.46		0.47	1.12		1.14		
	802.11g, 48 Mbps		6	20.0	-0.0183	12.63		0.299		0.30	0.717		0.72		
	802.11n, 7.2 Mbps		1	20.5	-0.0052	15.06		0.345		0.35	0.821		0.82		
			6	20.5	0.0937	15.12		0.386		0.39	0.927		0.93		
			11	20.2	0.0156	15.45		0.435		0.44	1.04		1.04		
	802.11n, 14.4 Mbps		1	19.9	0.0393	14.87		0.333		0.33	0.808		0.81		
			6	20.0	0.0218	14.97		0.404		0.40	0.995		1.00		
			11	20.0	0.0548	15.36		0.425		0.43	1.04		1.04		
	802.11n, 21.7 Mbps		1	19.7	0.107	14.93		0.314		0.31	0.75		0.75		
			6	19.7	0.0696	14.99		0.345		0.35	0.83		0.83		
			11	19.7	0.194	15.43		0.432		0.43	1.06		1.06		
	802.11n, 28.9 Mbps		1	19.7	-0.0152	14.42		0.252		0.25	0.606		0.61		
			6	19.7	0.106	14.64		0.277		0.28	0.674		0.67		
			11	19.7	0.017	15.07		0.291		0.29	0.706		0.71		
	802.11n, 43.3 Mbps		1	19.7	0.0012	14.54		0.218		0.22	0.52		0.52		
			6	20.2	-0.0416	14.73		0.272		0.27	0.653		0.66		
			11	20.2	-0.118	15.13		0.322		0.33	0.779		0.80		
	802.11n, 57.8 Mbps		1	20.2	0.0316	12.90		0.374		0.37	0.901		0.90		
			6	20.0	0.0346	13.22		0.271		0.27	0.65		0.65		
			11	20.2	0.0208	13.74		0.522		0.52	1.29		1.29		
	802.11n, 65 Mbps		1	20.5	0.0112	12.79		0.373		0.37	0.901		0.90		
			6	20.2	-0.0786	13.18		0.275		0.28	0.657		0.67		
			11	20.1	-0.0601	13.54		0.289		0.29	0.705		0.71		
	802.11n, 6.5 Mbps		1	20.5	0.0067	15.06		0.35		0.35	0.835		0.84		
			6	20.5	0.0449	15.12		0.387		0.39	0.932		0.93		
			11	20.5	0.0526	15.45		0.379		0.38	0.901		0.90		
	802.11n, 13 Mbps		1	20.2	0.0296	14.79		0.33		0.33	0.792		0.79		
			6	20.0	-0.0445	14.96		0.357		0.36	0.855		0.86		
			11	20.2	-0.063	15.34		0.446		0.45	1.08		1.10		
	802.11n, 19.5 Mbps		1	20.2	0.0135	14.85		0.331		0.33	0.803		0.80		
			6	20.0	0.199	15.19		0.385		0.39	0.93		0.93		
			11	20.2	0.0699	15.51		0.408		0.41	0.993		0.99		

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

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

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

Body, Left Edge of DUT 0 mm from Phantom															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	CDMA 800, EVDO Rev 0 (RTAP)	Internal	1013												
			384	**19.9**	**0.0186**	**25.19**		**0.0217**		**0.02**	**0.031**		**0.03**	**5x5x7**	**59**
			777												
1880	CDMA 1900, EVDO Rev 0 (RTAP)	Internal	25												
			600	**20.2**	**-0.0814**	**18.25**	**7.0**	**0.30**		**0.31**	**0.576**		**0.59**	**5x5x7**	**60**
			1175												

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

Body, Right Edge of DUT 0 mm from Phantom																
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	Internal	23230	20.2	0.0435	23.8	0	0.281		0.28	0.603		0.60		
	LTE Band 13, QPSK (100% RB)		23230												
	LTE Band 13, QPSK (1 RB @ Low)		23230	**19.5**	**-0.171**	**24.1**	**0**	**0.277**	**0.282**	**0.29**	**0.599**	**0.616**	**0.64**	**5x5x7**	**61**
	LTE Band 13, QPSK (1 RB @ High)		23230	20.0	-0.0313	24.2	0	0.213		0.21	0.449		0.45		
	LTE Band 13, 16QAM (50% RB)		23230	20.0	-0.0208	22.9	1 (MPR)	0.221		0.22	0.471		0.47		
	LTE Band 13, 16QAM (100% RB)		23230												
	LTE Band 13, 16QAM (1 RB @ Low)		23230	20.1	0.027	23.8	0	0.263		0.26	0.572		0.57		
	LTE Band 13, 16QAM (1 RB @ High)		23230	20.0	-0.02	24.2	0	0.187		0.19	0.384		0.39		
2450	802.11b, 1 Mbps		1												
			6												
			11	**19.6**	**0.0578**	**13.20**		**0.131**		**0.13**	**0.31**		**0.31**	**5x5x7**	**62**

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

Tables 7 & 8 present SAR measurement results at a minimum separation distance in which the proximity sensor may deactivate the power reduction.

Body, Back Surface of DUT 11 mm from Phantom															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	CDMA 800, EVDO Rev 0 (RTAP)	Internal	1013												
			384	**20.0**	**-0.23**	**25.19**		**0.408**		**0.43**	**0.627**		**0.66**	**5x5x7**	**63**
			777												
1880	CDMA 1900, EVDO Rev 0 (RTAP)		25												
			600												
			1175	**20.0**	**0.031**	**25.20**		**0.896**		**0.90**	**1.56**		**1.56**	**5x5x7**	**64**

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

Body, Back Surface of DUT 7 mm from Phantom															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (1 RB @ High)	Internal	23230	**20.5**	**-0.0185**	**22.9**		**0.556**	**0.563**	**0.57**	**0.837**	**0.855**	**0.86**	**5x5x7**	**65**

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

6.2 Evaluation of Simultaneous Transmitters

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

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

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

1. The highest output conducted power measured for Bluetooth on the device under test is 5.97 mW [≤ 12 mW]
2. The separation distance between the Bluetooth antenna and the main antenna is 17.8 cm [≥ 2.5 cm]
3. The separation distance between the Bluetooth antenna and the LTE antenna is 11.4 cm [≥ 2.5 cm]

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

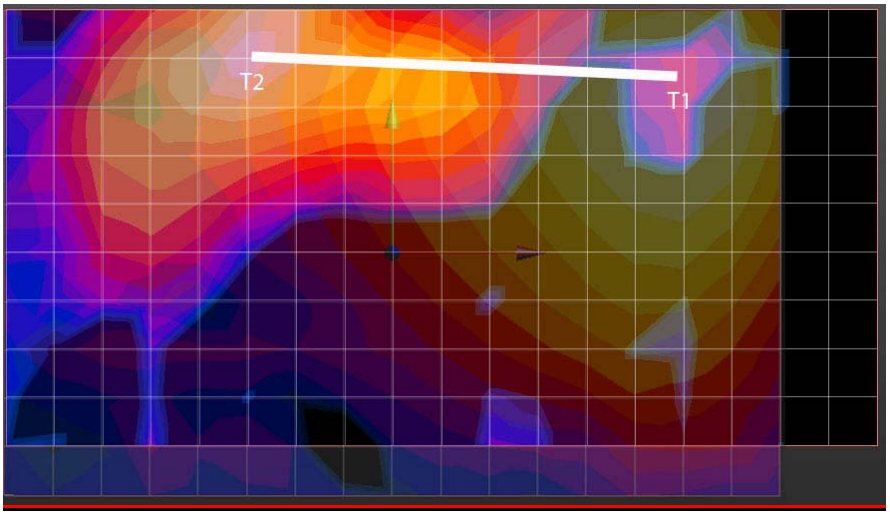
Evaluations for Simultaneous SAR

Cellular Transmitter Mode	Wi-Fi Transmitter Mode	Configuration	Cellular Transmitter 1 g SAR Value (W/kg)	Wi-Fi Transmitter 1 g SAR Value (W/kg)	Summation 1 g SAR Value (W/kg)	SAR-to-peak-location Separation Ratio	*Plot Page*	*Simultaneous Measurements Required?*
CDMA 800, EVDO Rev 0 (RTAP)	Wi-Fi 2450 802.11g, 9 Mbps	Back Surface of DUT 0 mm from Phantom	1.46	1.39	>1.60	0.15		No
CDMA 1900, EVDO Rev 0 (RTAP)			1.39	1.39	>1.60	0.15		No
LTE Band 13, QPSK (1 RB @ High)			1.16	1.39	>1.60	0.17		No
LTE Band 13, QPSK (1 RB @ Low)	Wi-Fi 2450 802.11b, 1 Mbps	Right Edge of DUT 0 mm from Phantom	0.64	0.31	0.95	N/A		No

SPLSR Calculations using SPEAG Application note TN110209:

For the LTE and WiFi combination on back surface:

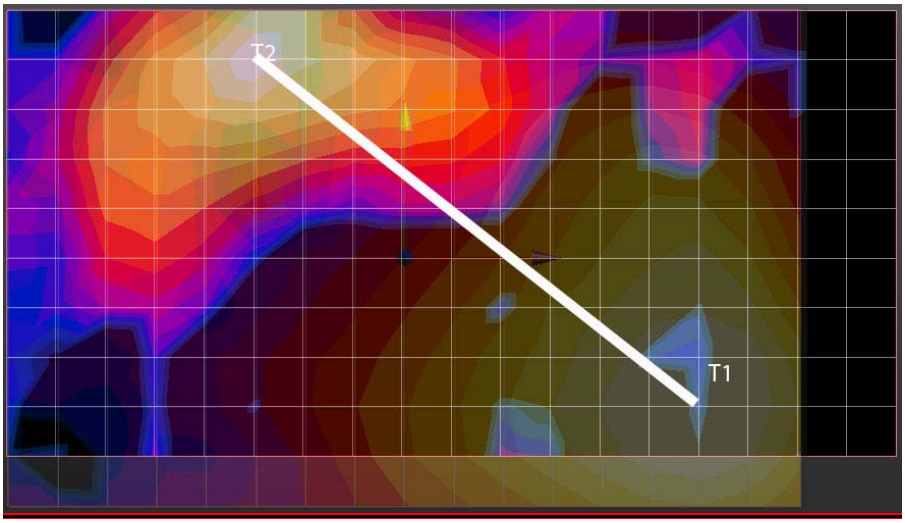
LTE Back Surface + WiFi Channel 6 Back Surface:



Peak SAR location for LTE(point T1) is (0.0932, 0.0525, -0.177)
Peak SAR location for WiFi (pont T2) is (-0.569, 0.061, -0.173)
Peak location spacing = 15.03937 cm
SPLSR = (1.16 + 1.39) / 15.03937 = 0.1696 which has been rounded to 0.17 in the table above.

For the CDMA 800 and WiFi combination on back surface:

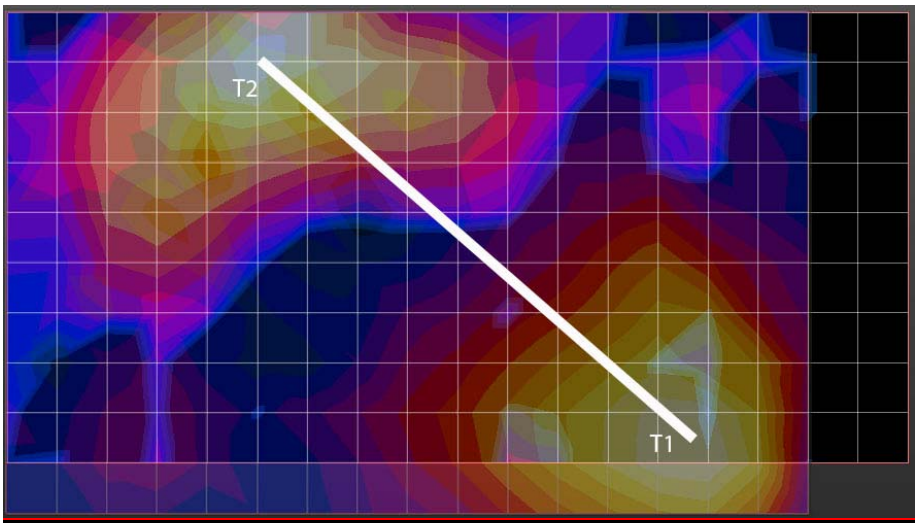
CDMA 800 Channel 384+ WiFi Channel 6 Back Surface:



Peak SAR location for CDMA 800 (point T1) is (-0.0901, -0.0555, -0.178)
Peak SAR location for WiFi (pont T2) is (-0.569, 0.061, -0.173)
Peak location spacing = 18.763 cm
SPLSR = (1.46 + 1.39) / 18.763 = 0.1519 which has been rounded to 0.16 in the table above.

For the CDMA 1900 and WiFi combination on back surface:

CDMA 1900 Channel 1175+ WiFi Channel 6 Back Surface:



Peak SAR location for CDMA 1900 (point T1) is (0.0872, -0.056, -0.177)
Peak SAR location for WiFi (pont T2) is (-0.569, 0.061, -0.173)
Peak location spacing = 18.56605
SPLSR = (1.39 + 1.39) /18.56605 = 0.1497 which has been rounded to 0.15 in the table above.

References

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

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

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

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

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

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

Appendix 1

SAR distribution comparison for the system accuracy verification

Date/Time: 8/20/2011 8:04:30 AM

Test Laboratory: Motorola 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:422
Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -22.7dB Sim.Temp@SPC =20.4ºC Room Temp @ SPC = 21º1C
Communication System: CW - Dipole; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

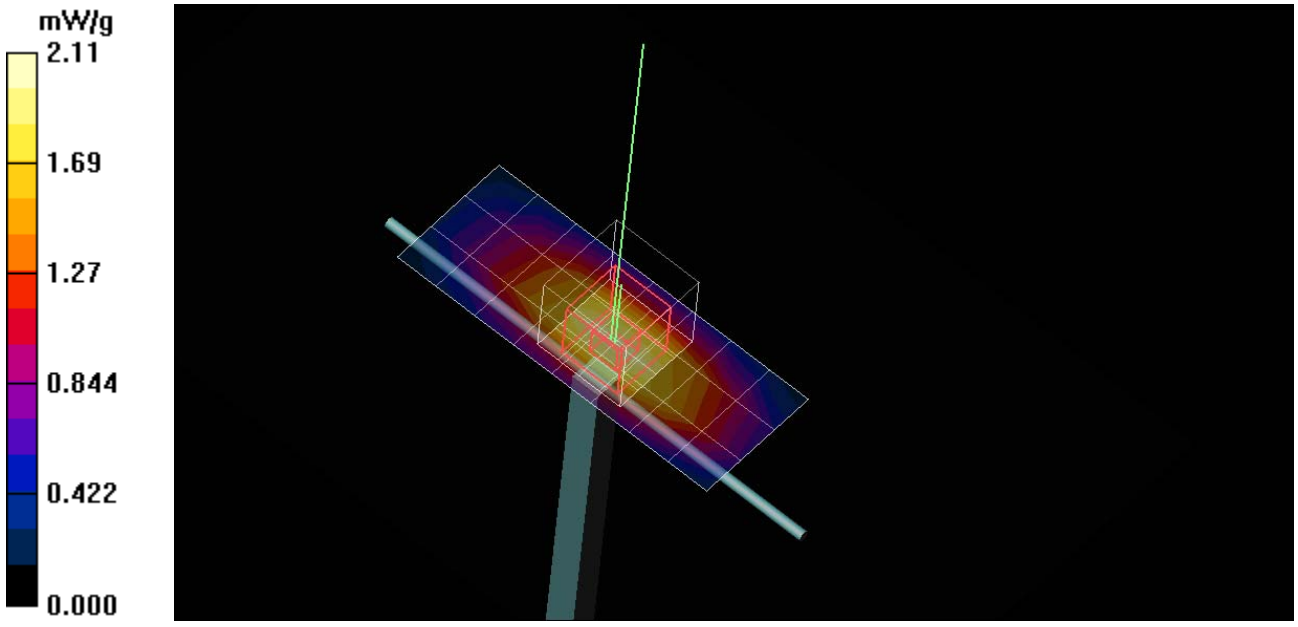
DASY4 Configuration:

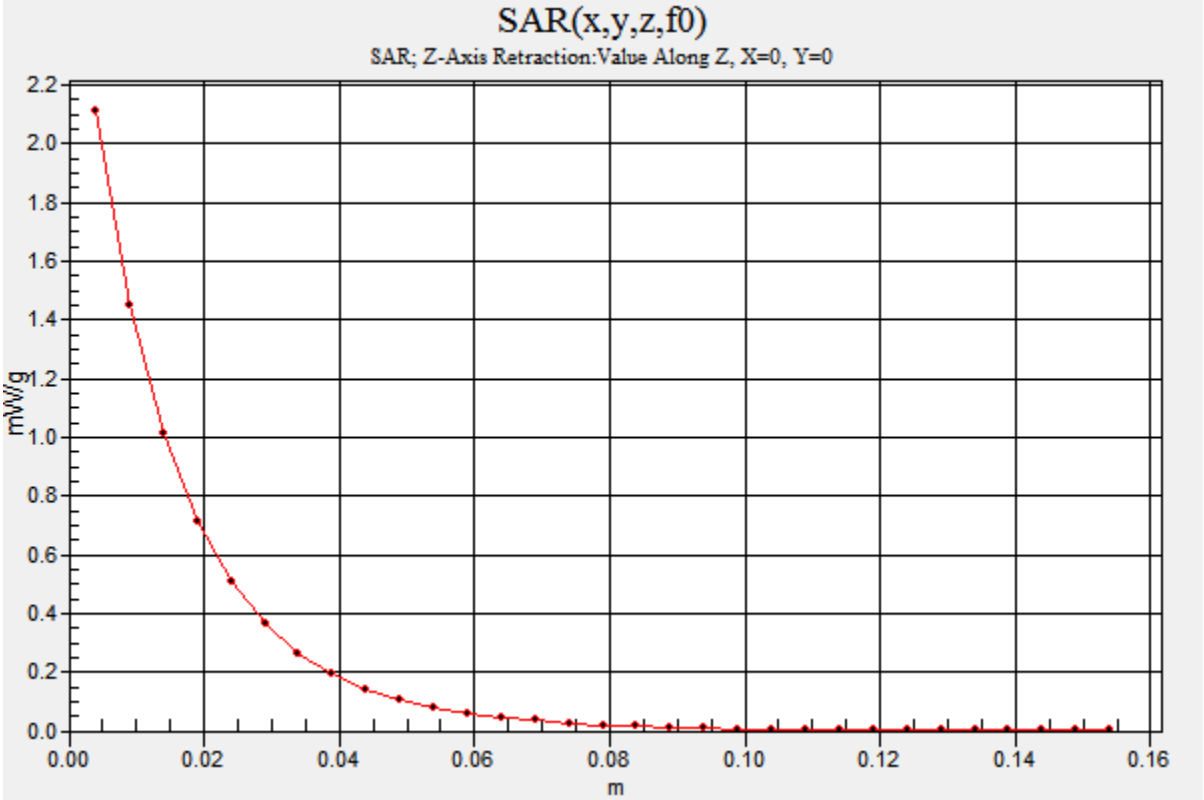
- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.86 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 46.5 V/m; Power Drift = 0.007 dB
Peak SAR (extrapolated) = 2.80 W/kg
SAR(1 g) = 1.94 mW/g; SAR(10 g) = 1.28 mW/g
Maximum value of SAR (measured) = 2.10 mW/g

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




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

Date/Time: 8/21/2011 6:39:06 AM

Test Laboratory: Motorola 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:422
Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -22.7dB Sim.Temp@SPC =20.4ºC Room Temp @ SPC = 21ºC
Communication System: CW - Dipole; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3

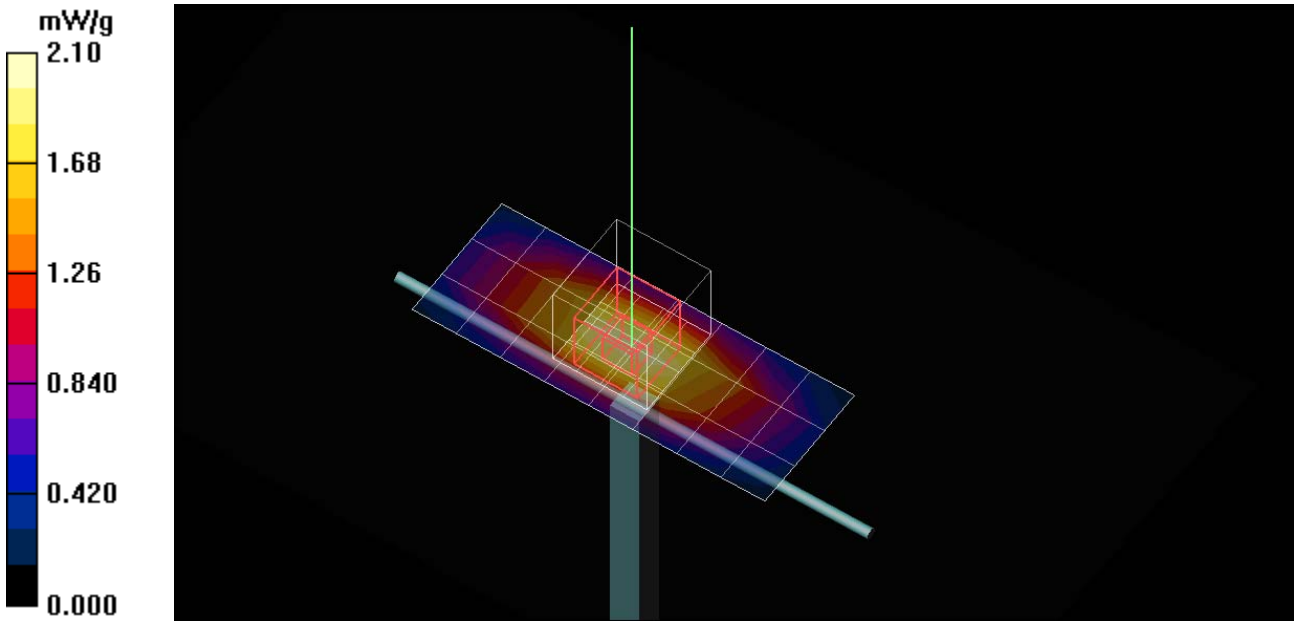
DASY4 Configuration:

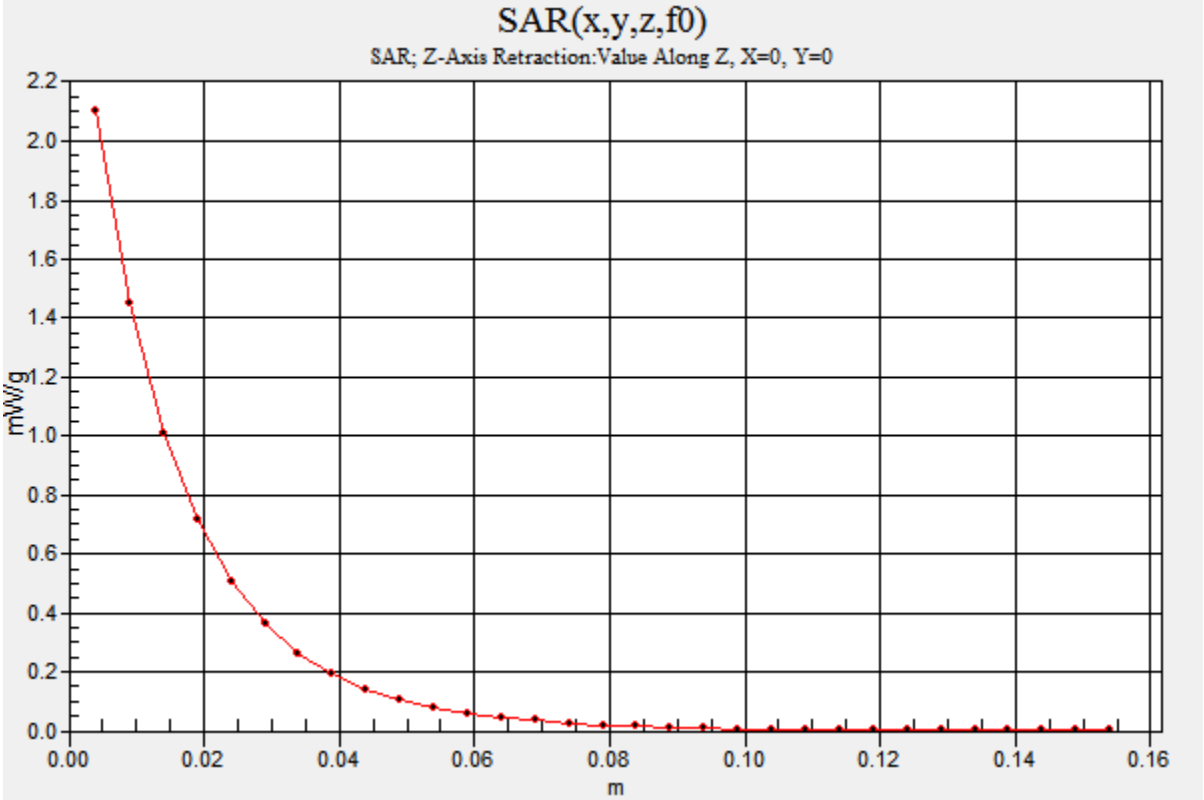
- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.85 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 46.9 V/m; Power Drift = -0.007 dB
Peak SAR (extrapolated) = 2.80 W/kg
SAR(1 g) = 1.94 mW/g; SAR(10 g) = 1.28 mW/g
Maximum value of SAR (measured) = 2.10 mW/g

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




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

Date/Time: 8/26/2011 9:32:20 AM

Test Laboratory: Motorola 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:422
Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -22.1dB Sim.Temp@SPC =20.2ºC Room Temp @ SPC = 21ºC
Communication System: CW - Dipole; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 54.5; ρ = 1000 kg/m^3

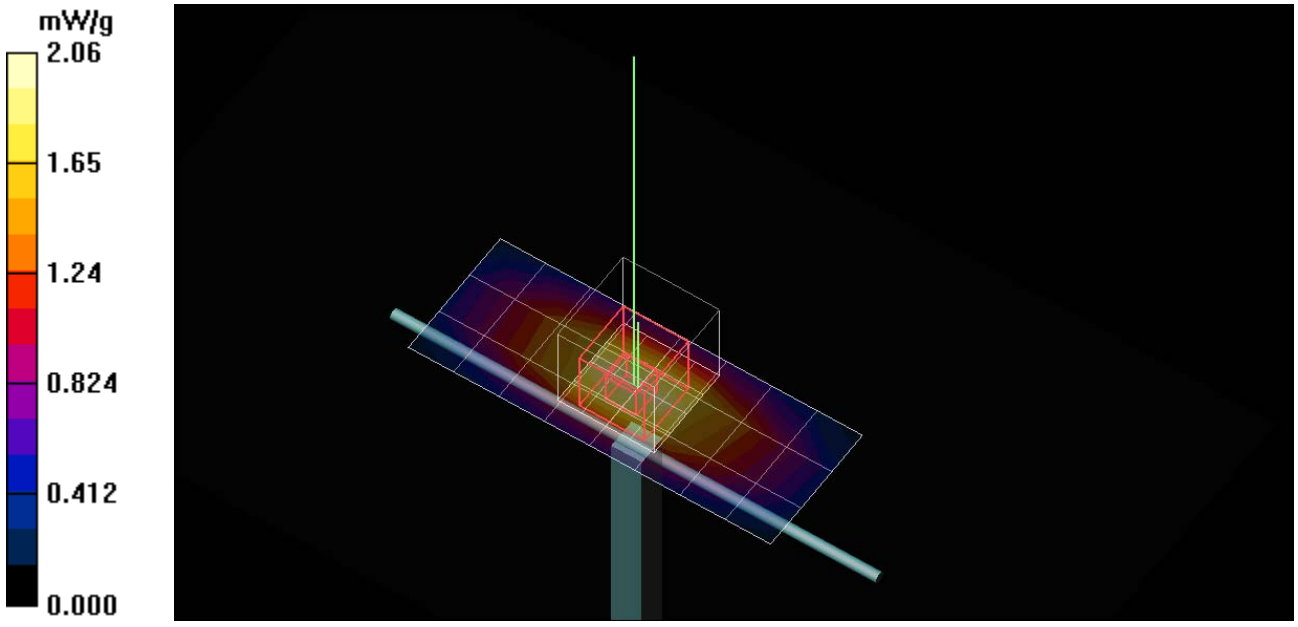
DASY4 Configuration:

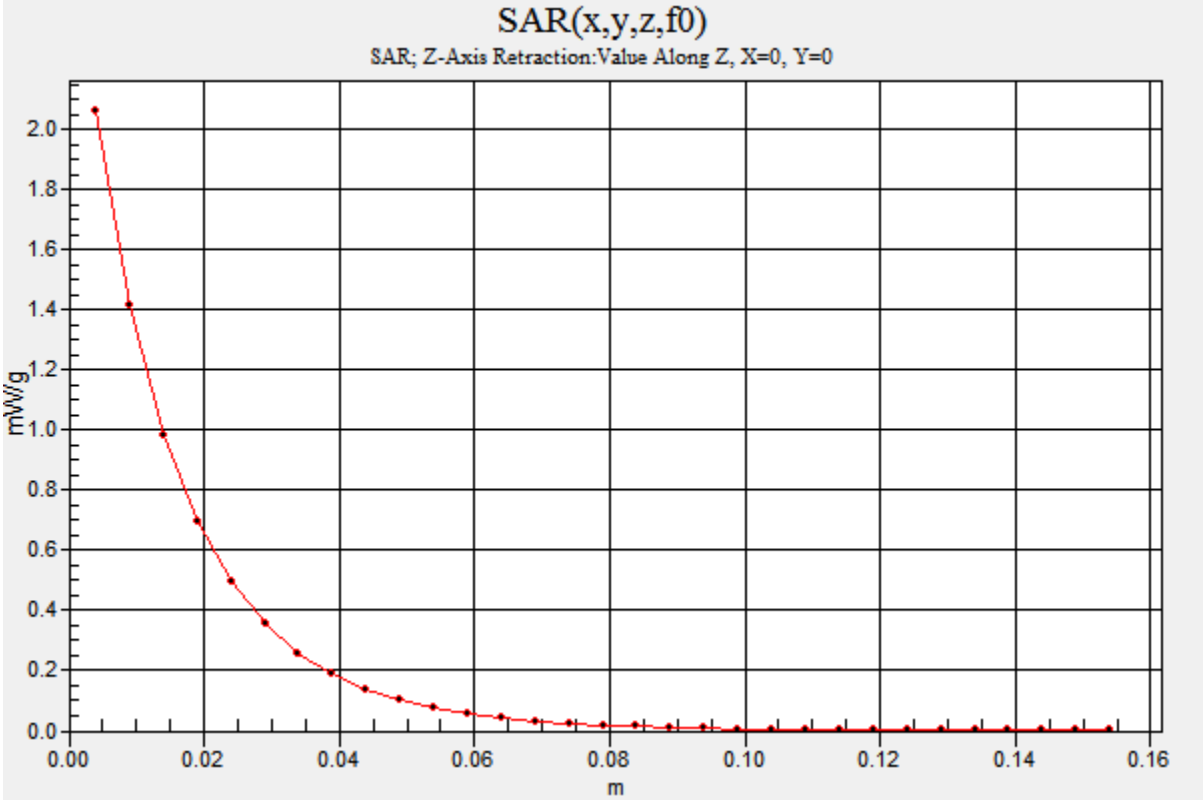
- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing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

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.81 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 46.6 V/m; Power Drift = -0.062 dB
Peak SAR (extrapolated) = 2.74 W/kg
SAR(1 g) = 1.9 mW/g; SAR(10 g) = 1.25 mW/g
Maximum value of SAR (measured) = 2.05 mW/g

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




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

Date/Time: 8/27/2011 4:32:55 AM

Test Laboratory: Motorola 835 MHz System Performance

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:422tr
Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -22.1dB Sim.Temp@SPC =20.2ºC Room Temp @ SPC = 20.1ºC
Communication System: CW - Dipole; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3

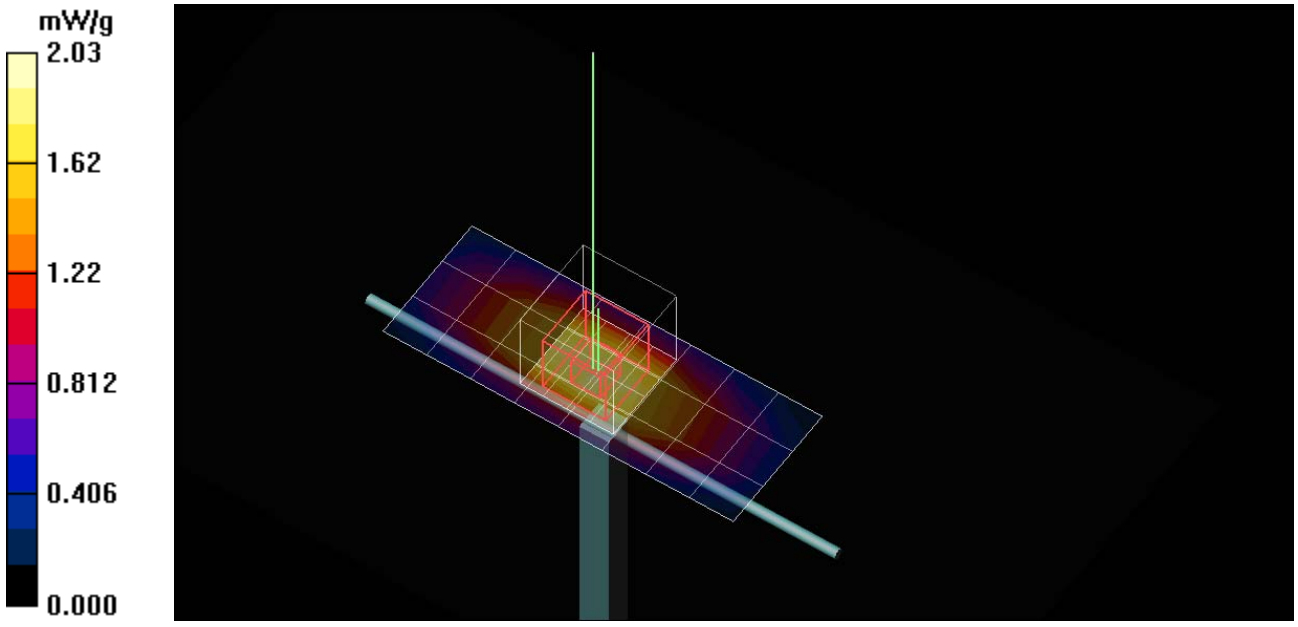
DASY4 Configuration:

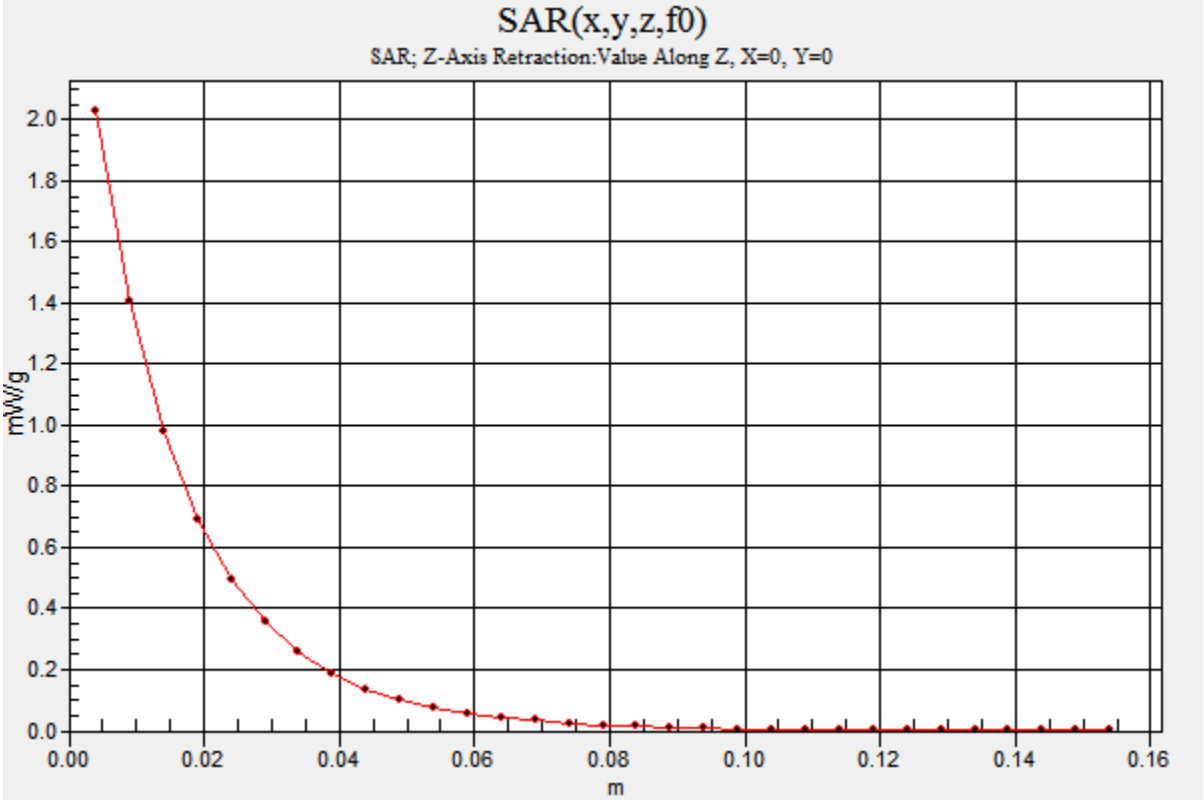
- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing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

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.79 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 46.7 V/m; Power Drift = -0.083 dB
Peak SAR (extrapolated) = 2.76 W/kg
SAR(1 g) = 1.91 mW/g; SAR(10 g) = 1.26 mW/g
Maximum value of SAR (measured) = 2.06 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.03 mW/g




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

Date/Time: 8/28/2011 7:58:56 AM

Test Laboratory: Motorola 835 MHz System Performance

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:422
Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -22.7dB Sim.Temp@SPC =19.3ºC Room Temp @ SPC = 20.8ºC
Communication System: CW - Dipole; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.97 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

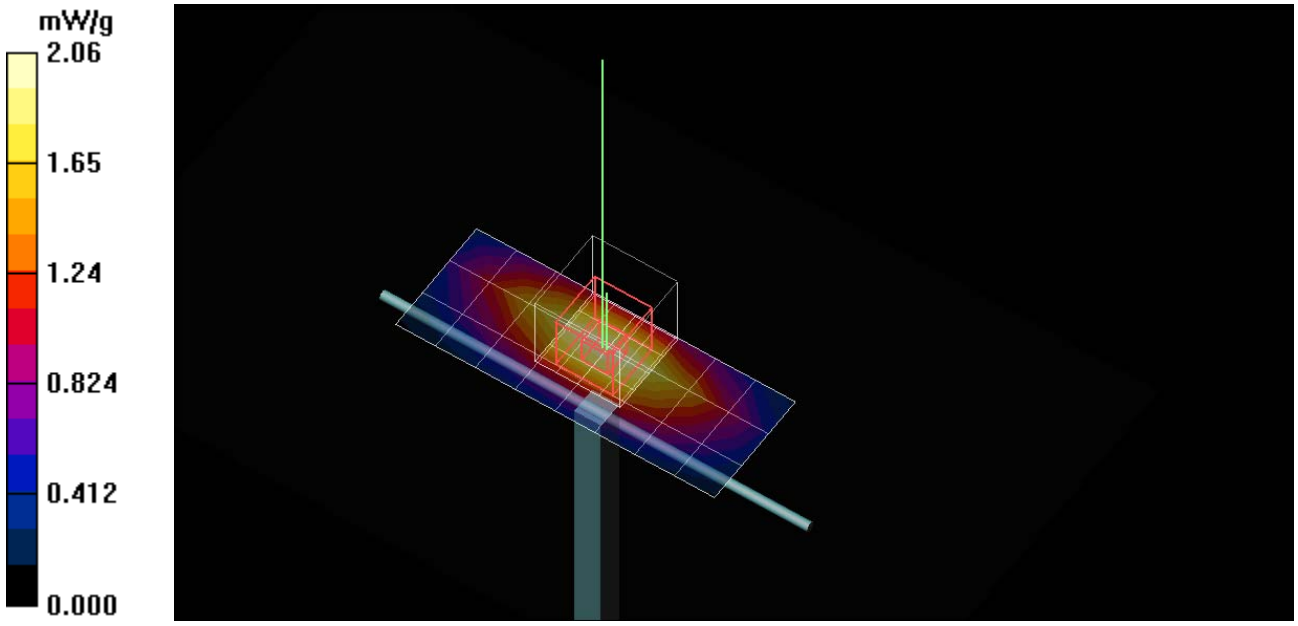
DASY4 Configuration:

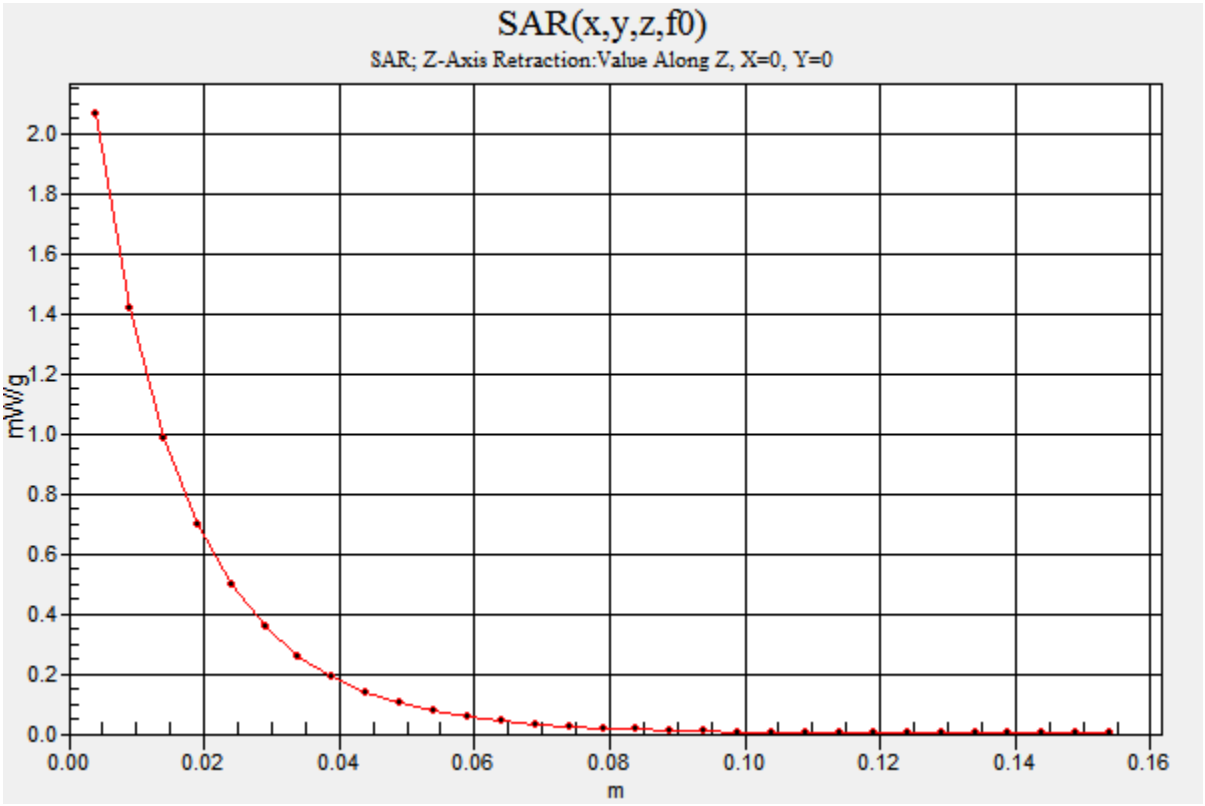
- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing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

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.04 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 45.3 V/m; Power Drift = -0.043 dB
Peak SAR (extrapolated) = 2.76 W/kg
SAR(1 g) = 1.9 mW/g; SAR(10 g) = 1.25 mW/g
Maximum value of SAR (measured) = 2.06 mW/g

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




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

Date/Time: 10/5/2011 8:27:56 AM

Test Laboratory: Motorola 835 MHz system Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:422
Procedure Notes: PM1 Power = 200 mW .Pwr PM3 = -22.2dB Sim.Temp@SPC = 20.3ºC Room Temp @ SPC = 21.1ºC
Communication System: CW - Dipole; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

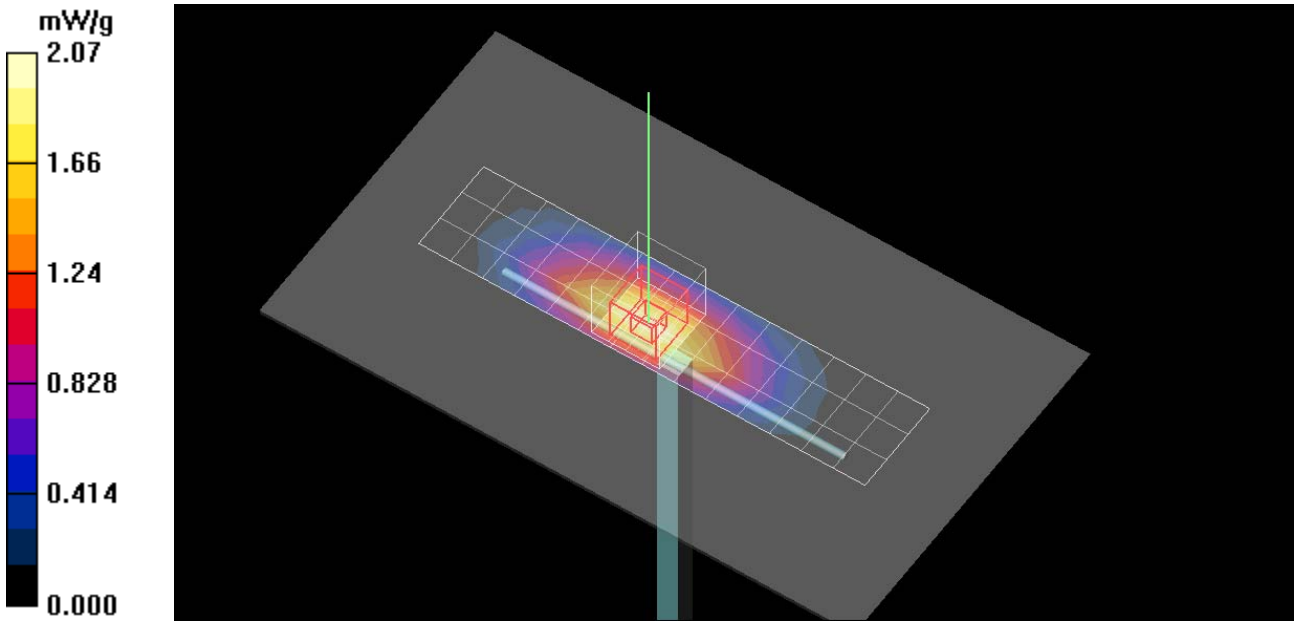
DASY4 Configuration:

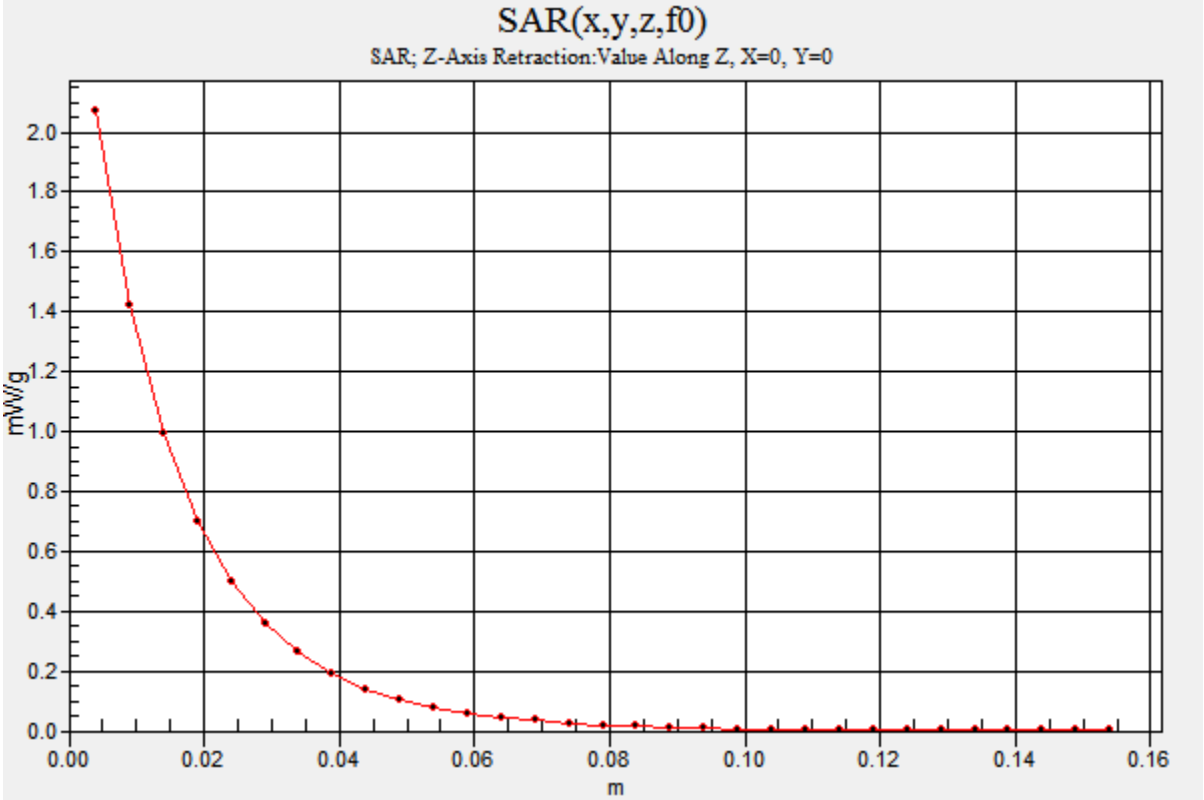
- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.97 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 44.0 V/m; Power Drift = -0.008 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) = 2.05 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.07 mW/g




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

Date/Time: 10/5/2011 7:55:32 AM

Test Laboratory: Motorola Mobility 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:436tr
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -27.80 dB Sim.Temp@SPC = 20.8ºC Room Temp @ SPC = 21.2ºC
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 55.3; ρ = 1000 kg/m^3

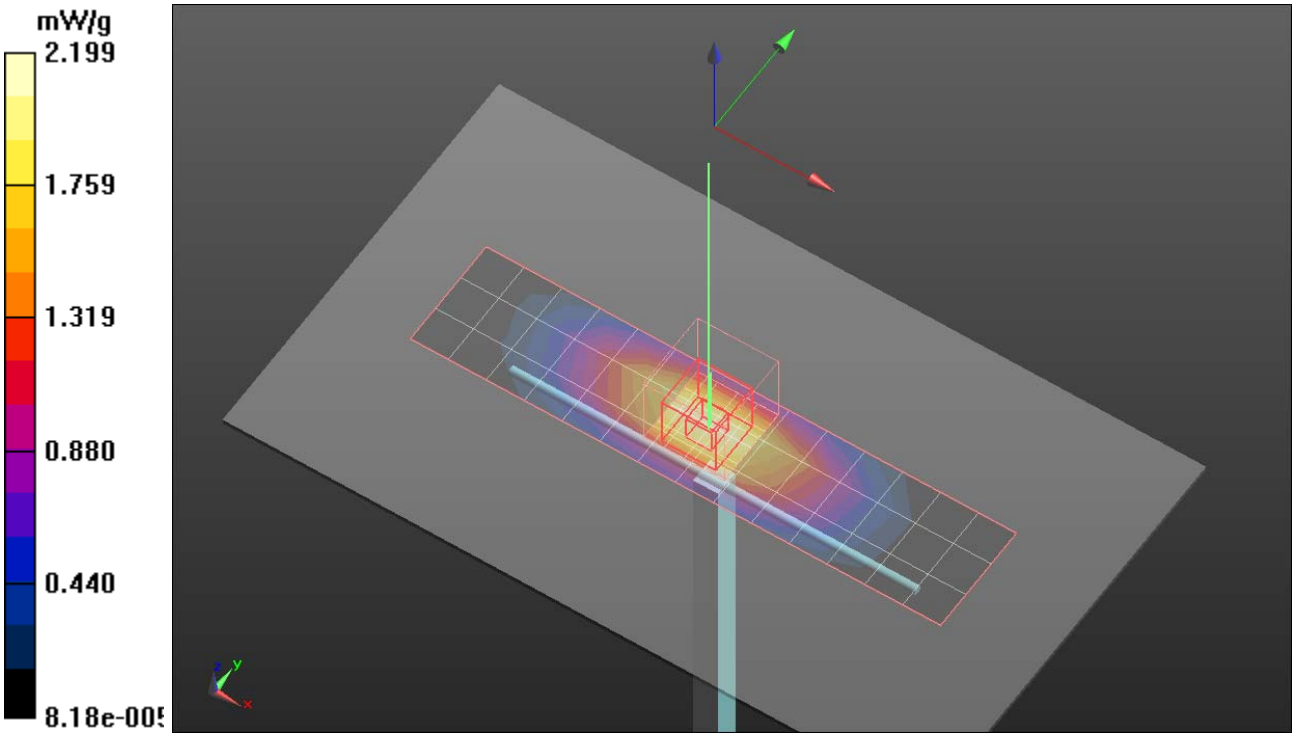
DASY4 Configuration:

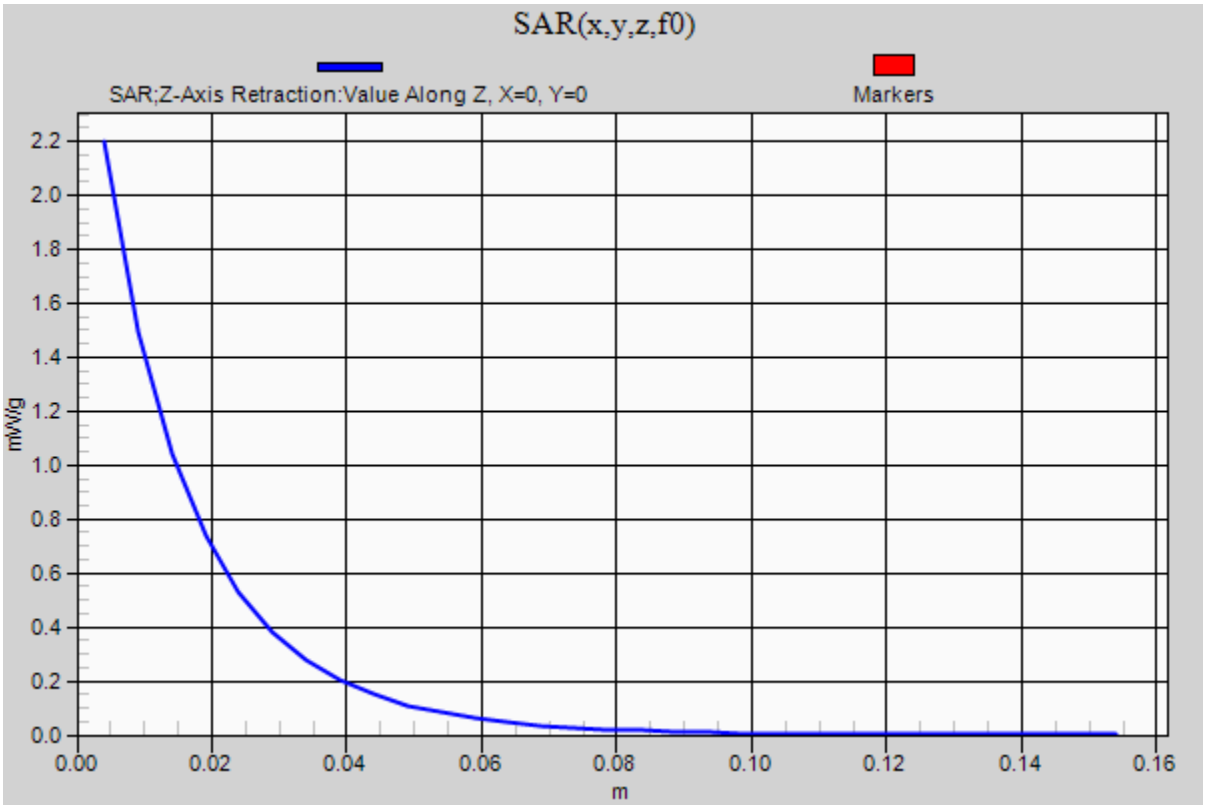
- Probe: ES3DV3 - SN3124; ConvF(6.04, 6.04, 6.04); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- SEMCAD X Version 14.4.5 (3634)

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.031 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.741 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 3.029 W/kg
SAR(1 g) = 2.05 mW/g; SAR(10 g) = 1.35 mW/g
Maximum value of SAR (measured) = 2.212 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.199 mW/g


mW/g
2.199
1.759
1.319
0.880
0.440
8.18e-005


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

Date/Time: 8/25/2011 9:20:04 AM

Test Laboratory: Motorola 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:250tr
Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -25.6dB Sim.Temp@SPC = 20ºC Room Temp @ SPC = 20.7ºC
Communication System: CW - Dipole; Frequency: 1800 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.47 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3

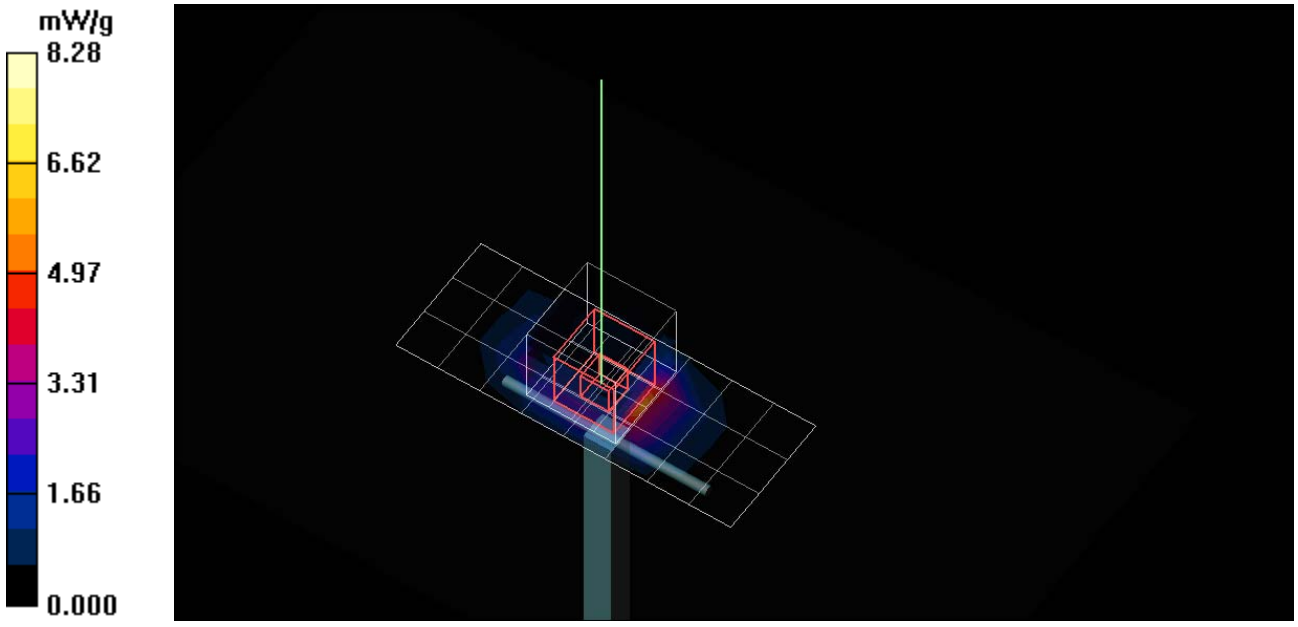
DASY4 Configuration:

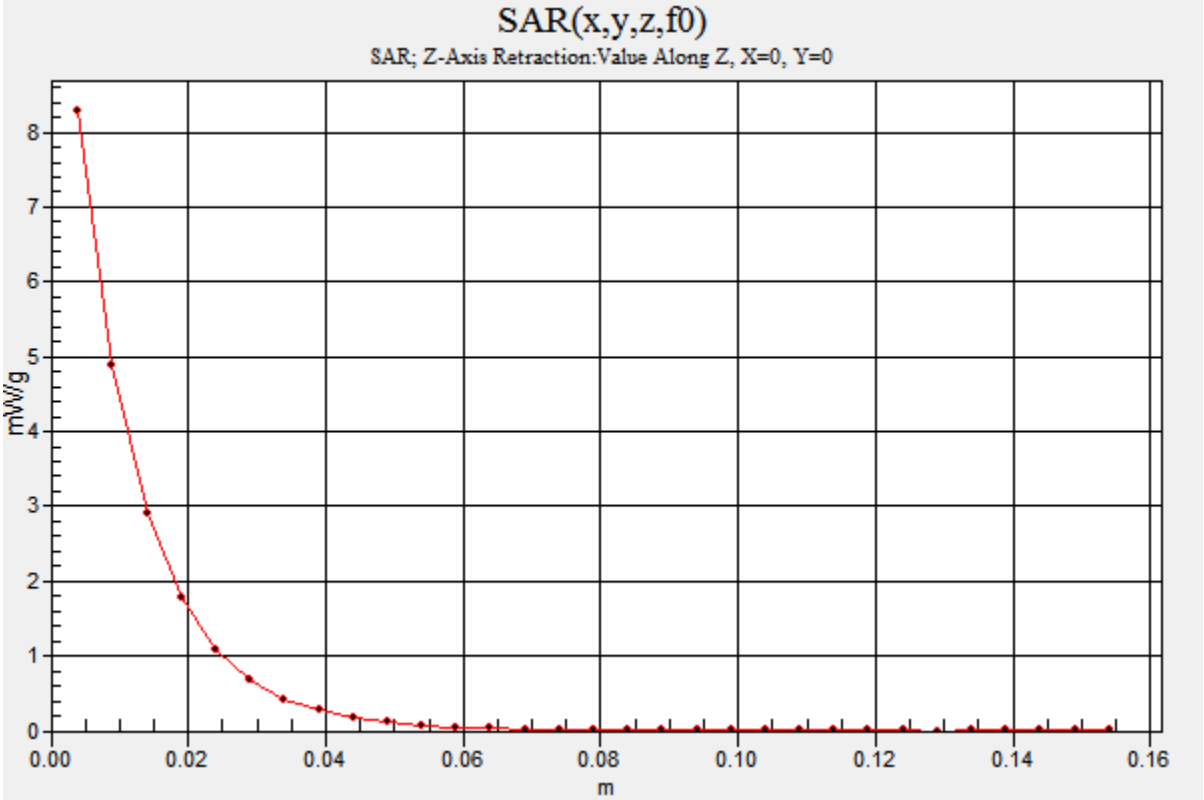
- Probe: ES3DV3 - SN3115; ConvF(4.61, 4.61, 4.61); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing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

Daily SPC Check/Dipole Area Scan (4x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 5.74 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.0 V/m; Power Drift = -0.040 dB
Peak SAR (extrapolated) = 12.6 W/kg
SAR(1 g) = 7.33 mW/g; SAR(10 g) = 3.92 mW/g
Maximum value of SAR (measured) = 8.30 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.28 mW/g




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

Date/Time: 9/30/2011 1:05:20 AM

Test Laboratory: Motorola Mobility 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -19.9 dB Sim.Temp@SPC = 20.3 Room Temp @ SPC = 21.3
Communication System: CW; Frequency: 1800 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.49 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3

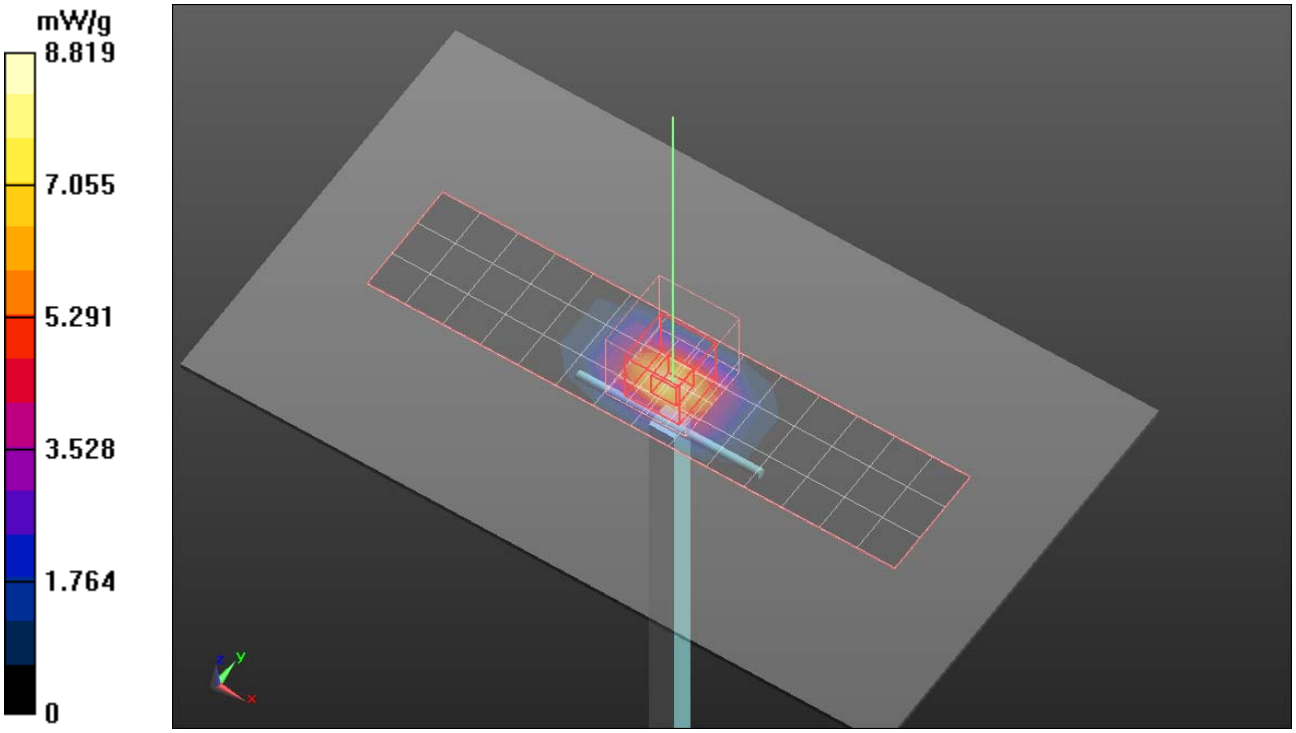
DASY4 Configuration:

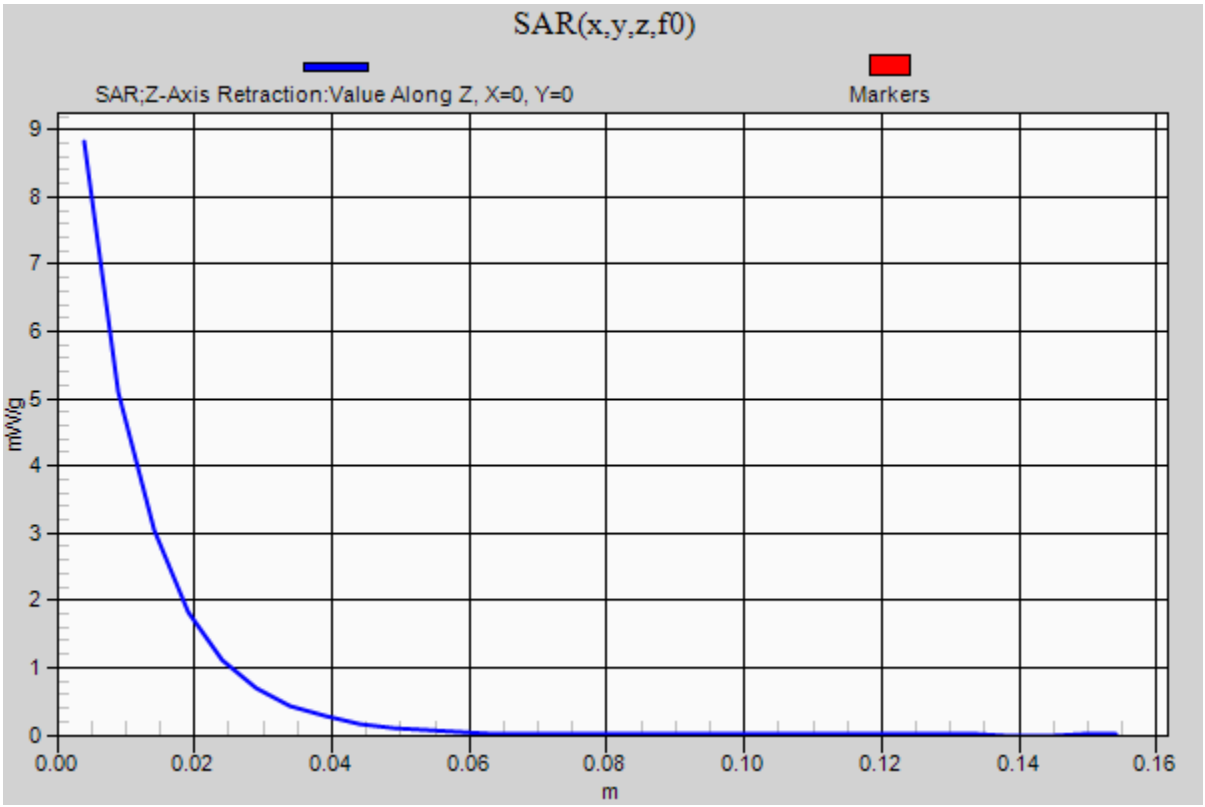
- Probe: ES3DV3 - SN3124; ConvF(4.69, 4.69, 4.69); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- SEMCAD X Version 14.4.5 (3634)

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.400 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.023 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 13.907 W/kg
SAR(1 g) = 7.85 mW/g; SAR(10 g) = 4.18 mW/g
Maximum value of SAR (measured) = 8.810 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.819 mW/g


mW/g
8.819
7.055
5.291
3.528
1.764
0


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

Date/Time: 9/6/2011 9:19:27 PM

Test Laboratory: Motorola 2450 MHz System Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:863
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -19.04 dB Sim.Temp@SPC = 19.8C Room Temp @ SPC = 21.1C
Communication System: CW - Dipole; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 2450 MHz; σ = 1.9 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

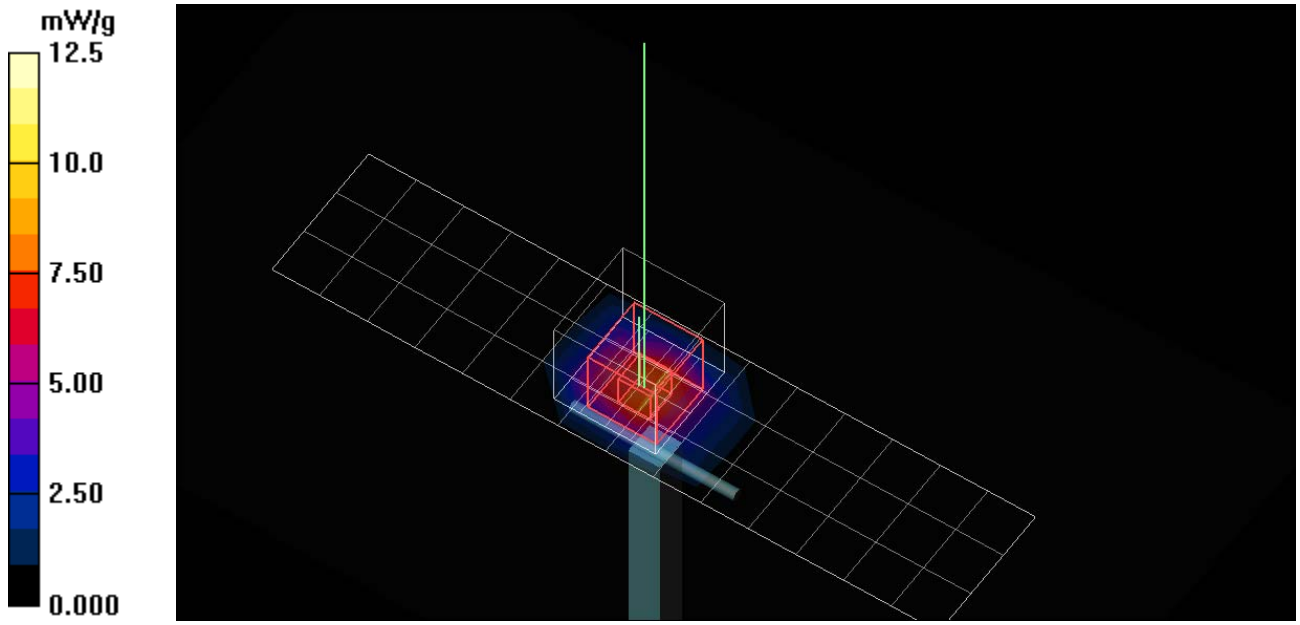
DASY4 Configuration:

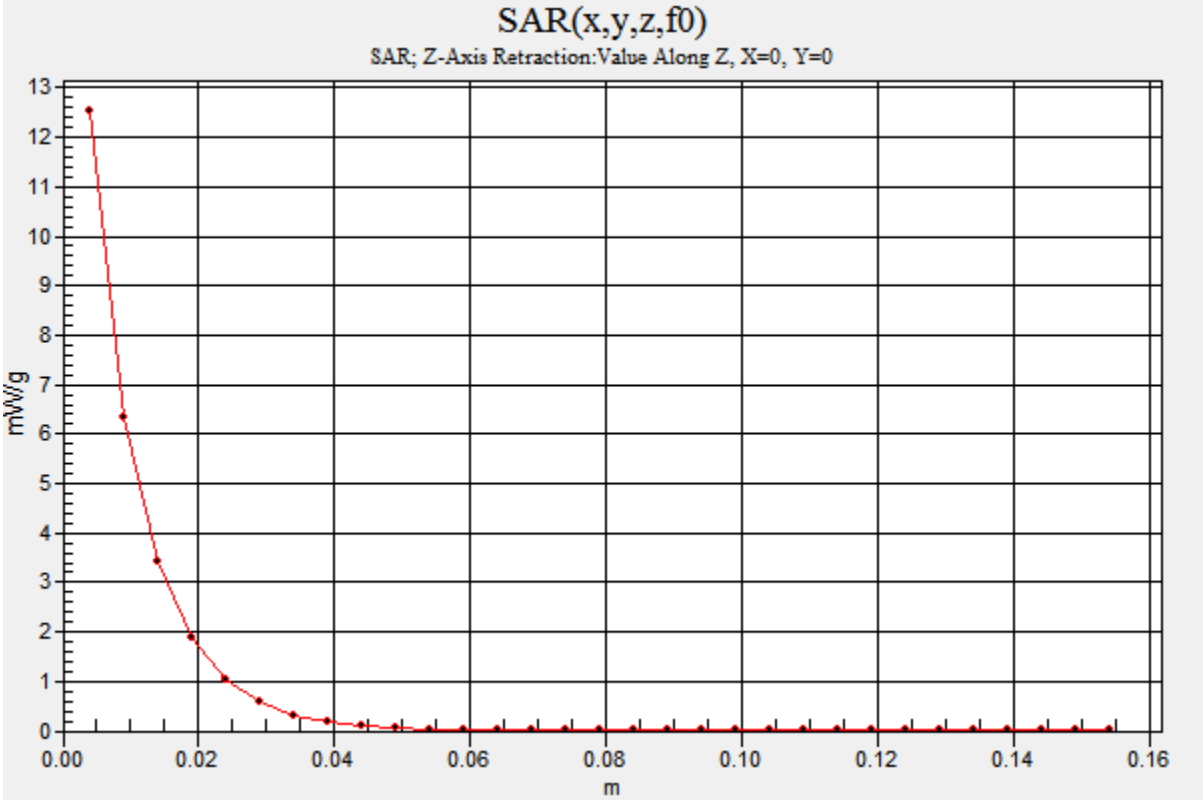
- Probe: ES3DV3 - SN3115; ConvF(4.12, 4.12, 4.12); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#_6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing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

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 7.82 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 80.4 V/m; Power Drift = -0.001 dB
Peak SAR (extrapolated) = 23.6 W/kg
SAR(1 g) = 11 mW/g; SAR(10 g) = 5.07 mW/g
Maximum value of SAR (measured) = 12.4 mW/g

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




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

Date/Time: 10/7/2011 11:12:10 AM

Test Laboratory: Motorola Mobility 2450 MHz System Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:740
Procedure Notes: PM1 Power =200 mW Refl.Pwr PM3 = -23.20 dB Sim.Temp@SPC = 21.0C Room Temp @ SPC = 21.2C
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 2450 MHz; σ = 1.92 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3

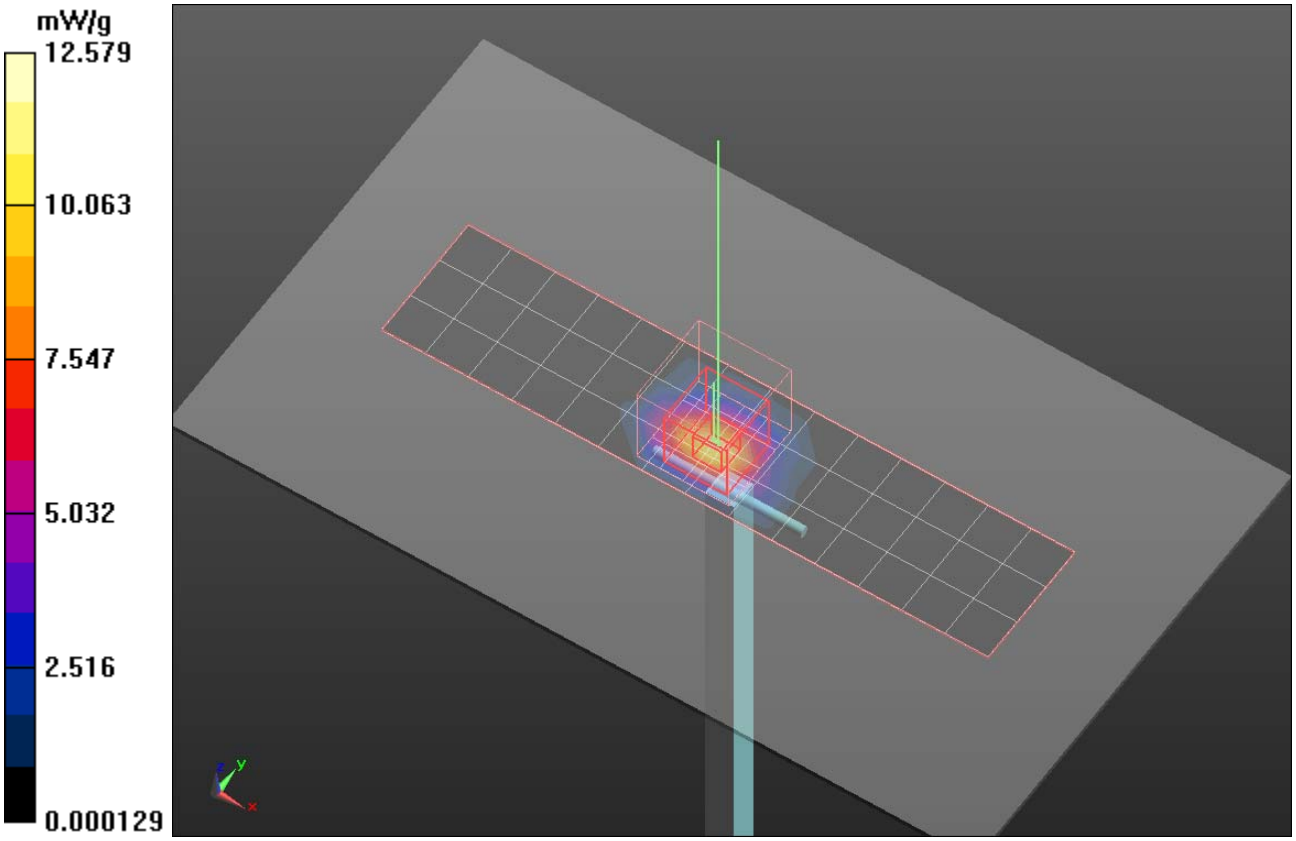
DASY4 Configuration:

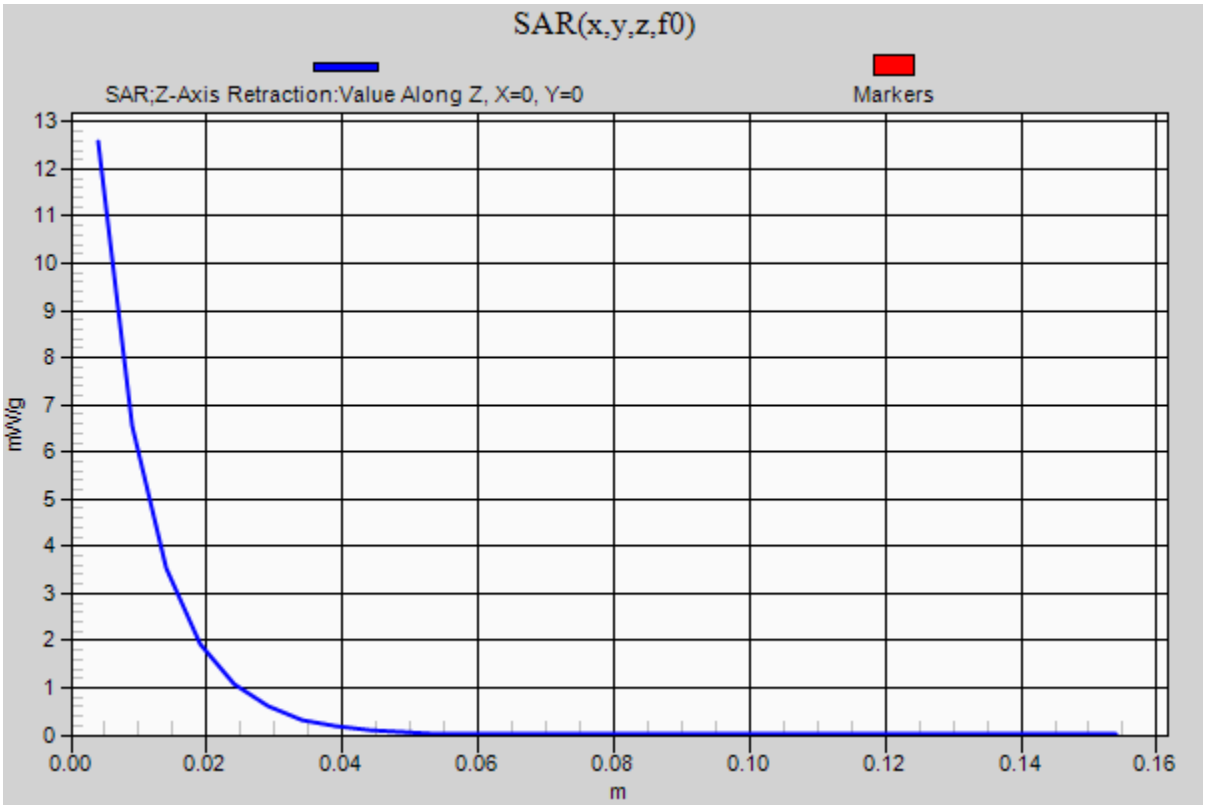
- Probe: ES3DV3 - SN3124; ConvF(4.21, 4.21, 4.21); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.3); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.4.5 (3634)

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 10.871 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 76.695 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 22.374 W/kg
SAR(1 g) = 11 mW/g; SAR(10 g) = 5.17 mW/g
Maximum value of SAR (measured) = 12.604 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 12.579 mW/g


mW/g
12.579
10.063
7.547
5.032
2.516
0.000129


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

Appendix 2

SAR distribution plots for Body Configuration

Date/Time: 8/27/2011 7:16:35 AM

Test Laboratory: Motorola Mobility - LTE Band 13 - Top Edge

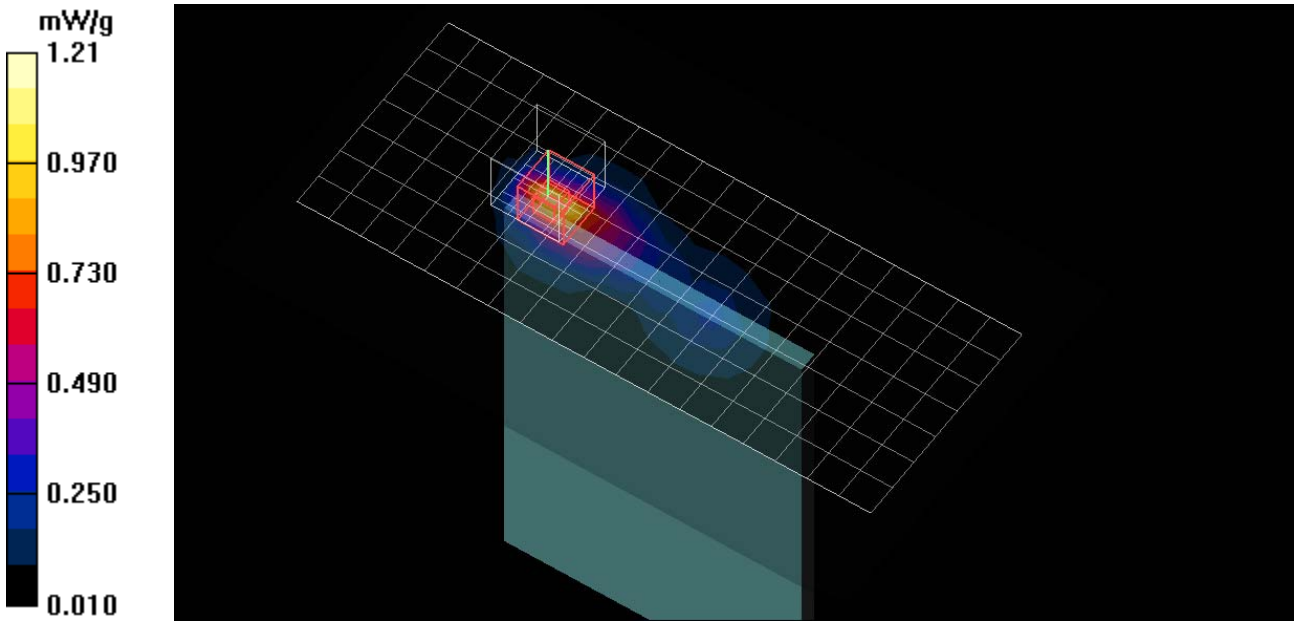
DUT: Serial: KFLC110065, FCC ID: IHDP56MJ2
Procedure Notes: 16QAM, 1 RB @ High End Start RB: 49 # RBs: 1 Battery Model #: INTERNAL Test Configuration = Top Edge 0mm from Phantom
Communication System: LTE Band 13; Frequency: 782 MHz;Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 782 MHz; σ = 0.92 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

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

Triple Flat Phone Template/Area Scan - Extended Phone (15mm) (8x23x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.850 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.3 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 2.75 W/kg
SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.498 mW/g
Maximum value of SAR (measured) = 1.21 mW/g



Date/Time: 8/21/2011 11:36:49 AM

Test Laboratory: Motorola Mobility - CDMA / EVDO 800 Top Edge

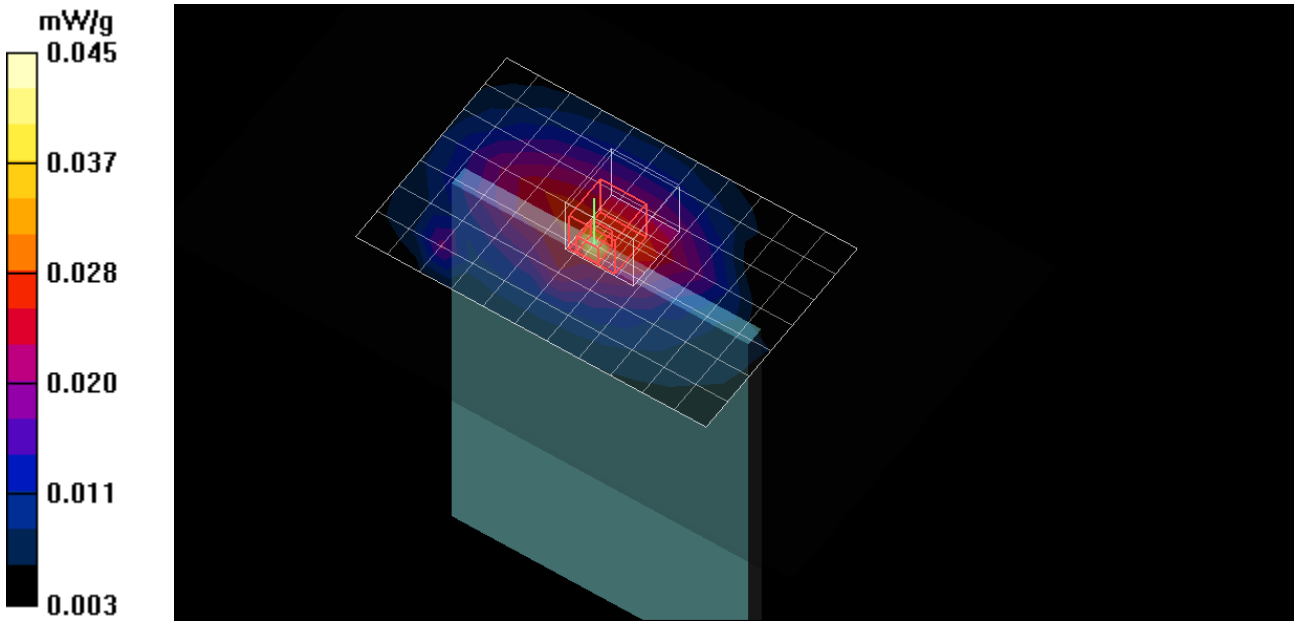
DUT: Serial: KFLC110065, FCC ID: IHDP56MJ2
Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test Configuration = Top Edge 0mm from Phantom
Communication System: CDMA 835; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Normal Phone (15mm) (8x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.028 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.77 V/m; Power Drift = -0.761 dB
Peak SAR (extrapolated) = 0.071 W/kg
SAR(1 g) = 0.034 mW/g; SAR(10 g) = 0.021 mW/g
Maximum value of SAR (measured) = 0.045 mW/g



Date/Time: 8/25/2011 12:22:54 PM

Test Laboratory: Motorola Mobility - CDMA / EVDO 1900 Top Edge

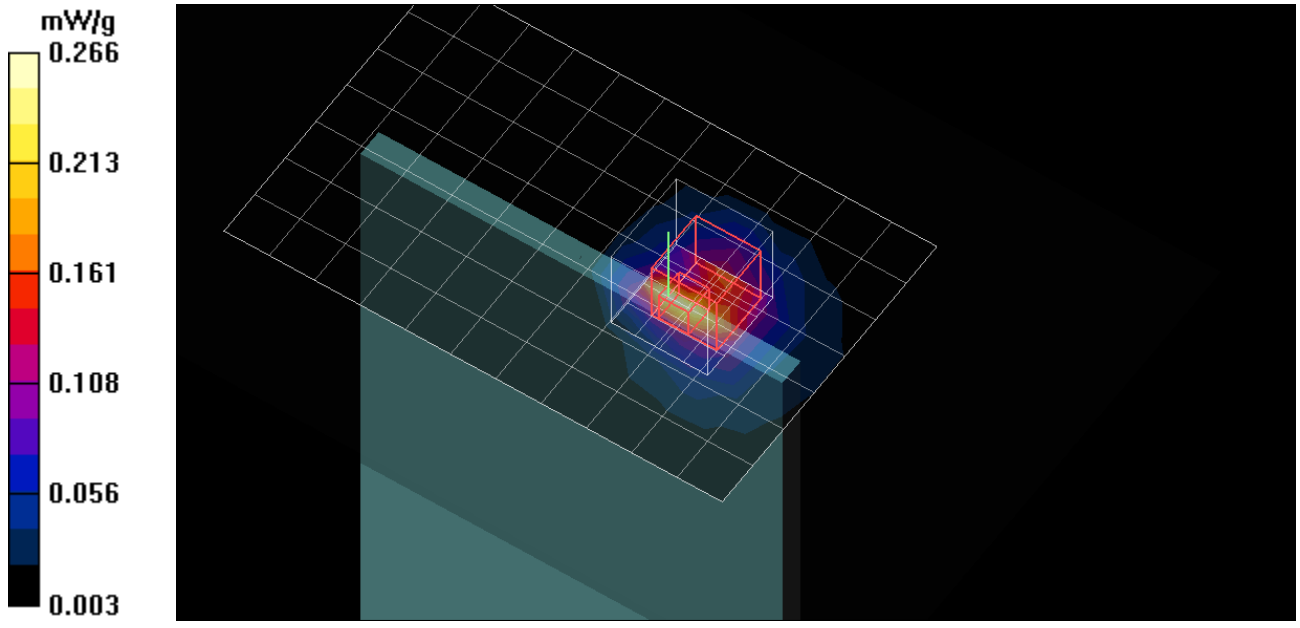
DUT: Serial: KFLC110065, FCC ID: IHDP56MU2
Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test Configuration = Top Edge 0mm from Phantom
Communication System: CDMA 1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 51; ρ = 1000 kg/m^3

DASY4 Configuration:

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

Triple Flat Phone Template/Area Scan - Normal Phone (15mm) (8x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.173 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.0 V/m; Power Drift = 0.049 dB
Peak SAR (extrapolated) = 0.335 W/kg
SAR(1 g) = 0.194 mW/g; SAR(10 g) = 0.098 mW/g
Maximum value of SAR (measured) = 0.266 mW/g



Date/Time: 8/26/2011 2:11:44 PM

Test Laboratory: Motorola Mobility - LTE Band 13 - Back Surface

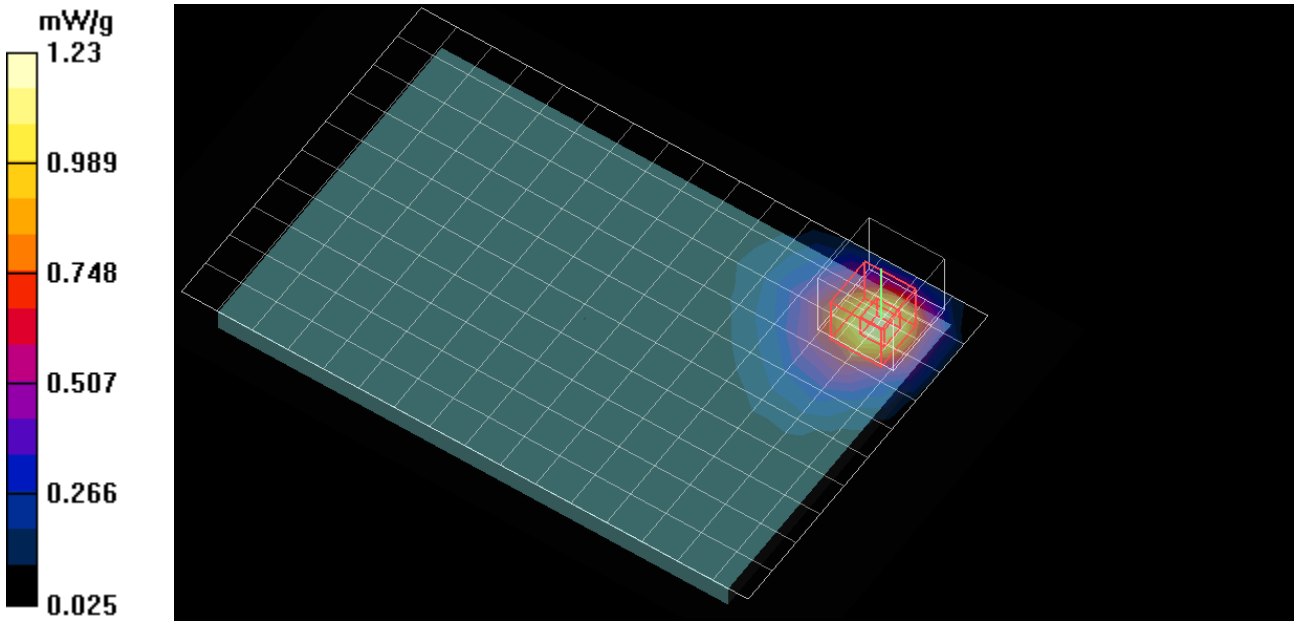
DUT: Serial: KFLC110065, FCC ID: IHDP56MJ2
Procedure Notes: QPSK, 1 RB @ High End Start RB: 49 # RBs: 1 Battery Model #: INTERNAL Test Configuration = Back Surface 0mm from Phantom
Communication System: LTE Band 13; Frequency: 782 MHz;Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 782 MHz; σ = 0.92 mho/m; ε_r = 55; ρ = 1000 kg/m^3

DASY4 Configuration:

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

Triple Flat Phone Template/Area Scan - Entire Section (15mm) (11x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.15 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.4 V/m; Power Drift = 0.017 dB
Peak SAR (extrapolated) = 1.82 W/kg
SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.689 mW/g
Maximum value of SAR (measured) = 1.23 mW/g



Date/Time: 8/20/2011 1:02:54 PM

Test Laboratory: Motorola Mobility - CDMA / EVDO 800 Back Surface

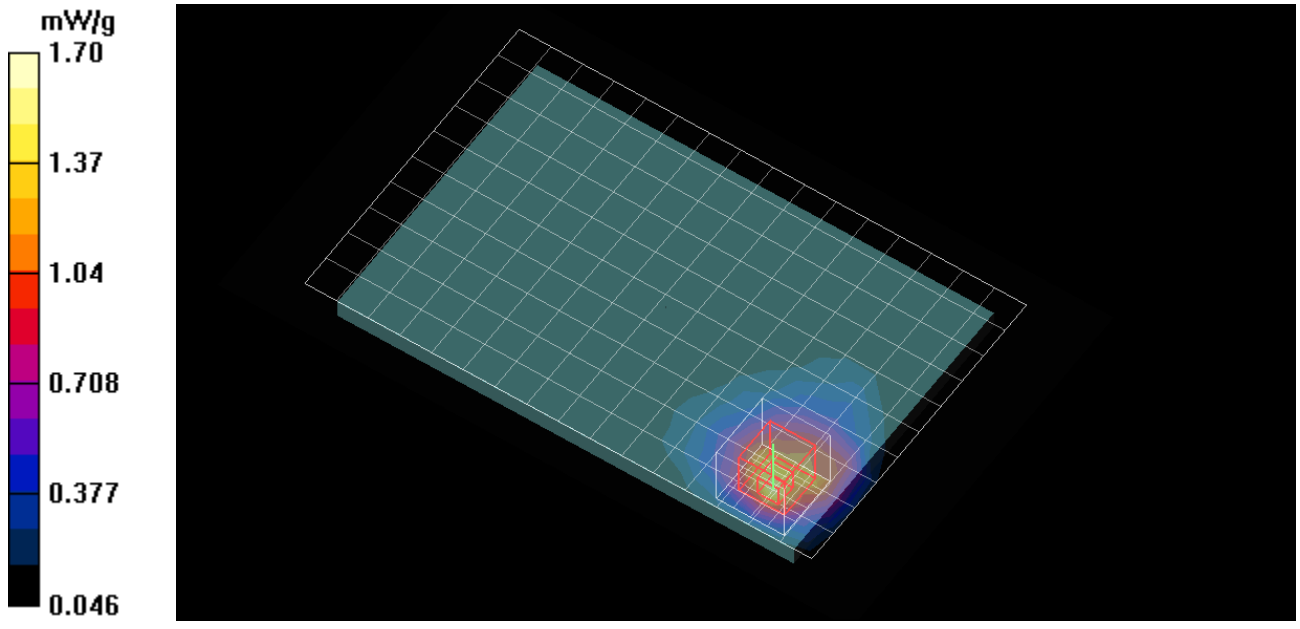
DUT: Serial: KFLC110065, FCC ID: IHDP56MJ2
Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test Configuration = Back Surface 0mm from Phantom
Communication System: CDMA 835; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Entire Section (15mm (11x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.23 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.7 V/m; Power Drift = -0.097 dB
Peak SAR (extrapolated) = 3.01 W/kg
SAR(1 g) = 1.43 mW/g; SAR(10 g) = 0.829 mW/g
Maximum value of SAR (measured) = 1.70 mW/g



Date/Time: 8/25/2011 11:18:12 AM

Test Laboratory: Motorola Mobility - CDMA / EVDO 1900 Back Surface

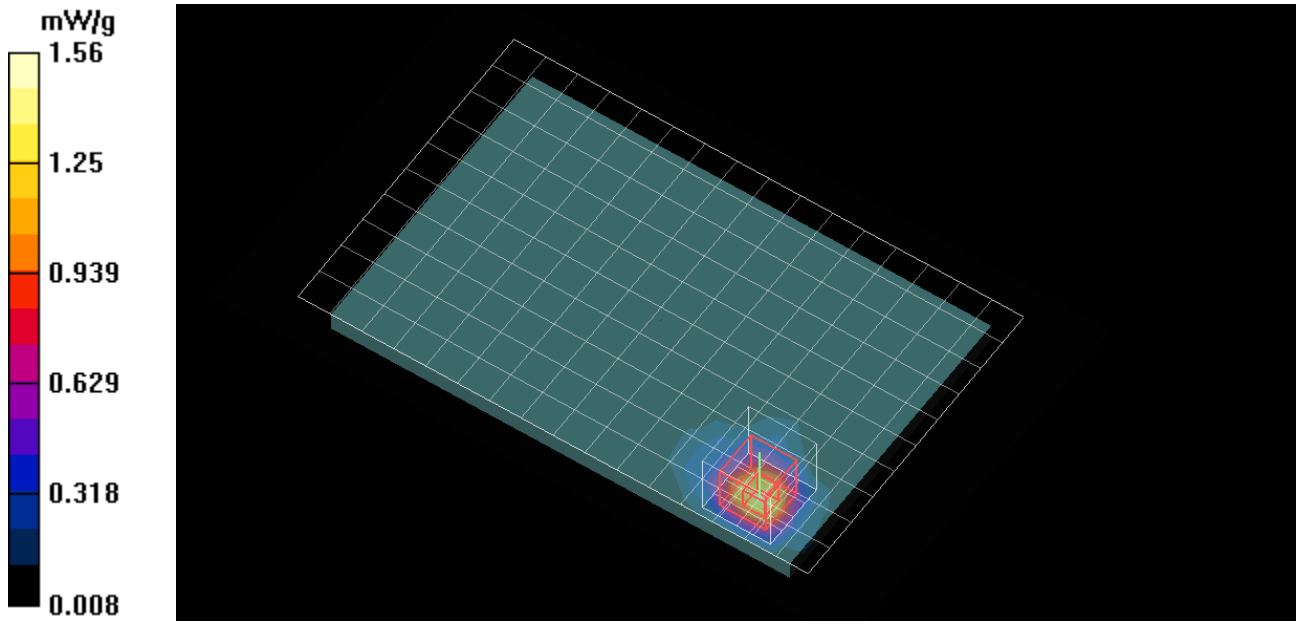
DUT: Serial: KFLC110065, FCC ID: IHDP56MJ2
Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test Configuration = Back Surface 0mm from Phantom
Communication System: CDMA 1900; Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 51; ρ = 1000 kg/m^3

DASY4 Configuration:

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

Triple Flat Phone Template/Area Scan - Entire Section (15mm) (11x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.29 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.3 V/m; Power Drift = 0.063 dB
Peak SAR (extrapolated) = 2.65 W/kg
SAR(1 g) = 1.39 mW/g; SAR(10 g) = 0.709 mW/g
Maximum value of SAR (measured) = 1.56 mW/g



Date/Time: 10/7/2011 4:09:30 PM

Test Laboratory: Motorola Mobility - 2450 MHz WiFi Back Surface

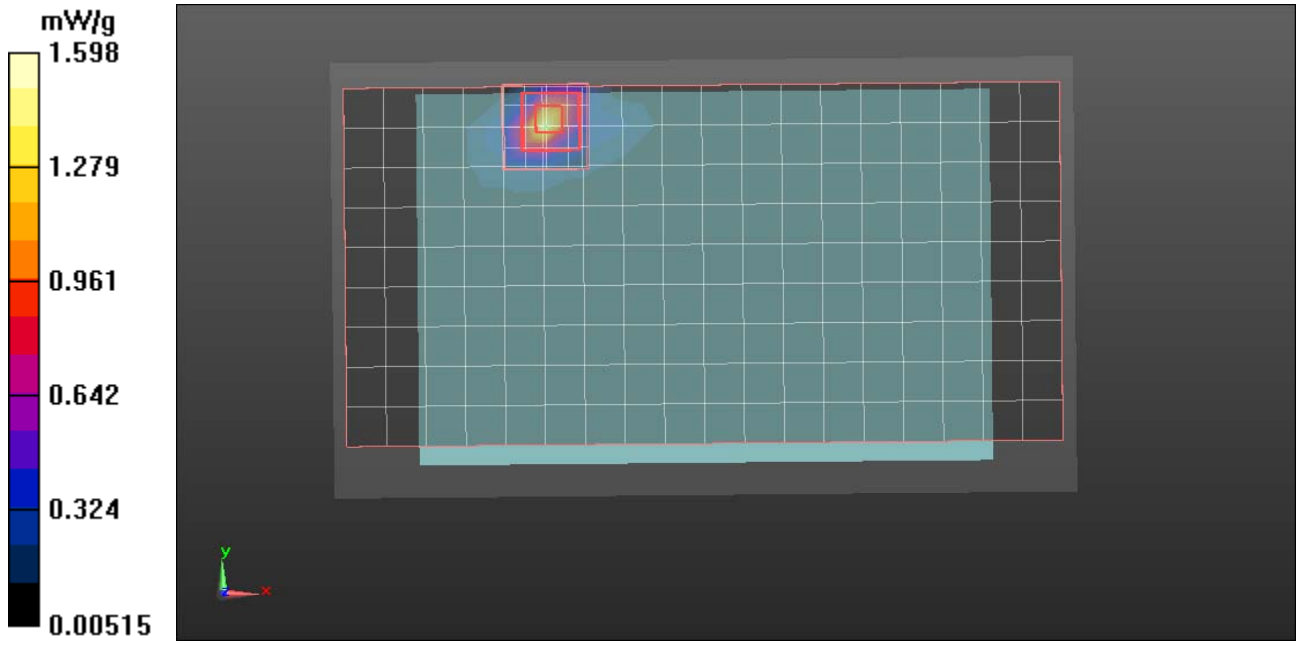
DUT: Serial: KFLC110069, FCC ID: IHDP56MJ2
Procedure 802.11g 9Mbps Chn 6 Battery Model #: INTERNAL Test Configuration = Back surface of DUT 0mm from Phantom
Communication System: Custom IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: 2450 Glycol Body; Medium parameters used: f = 2450 MHz; σ = 1.92 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3

DASY4 Configuration:

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

DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/Area Scan - Full Body (15mm) (19x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.479 mW/g

DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.650 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 4.298 W/kg
SAR(1 g) = 1.38 mW/g; SAR(10 g) = 0.509 mW/g
Maximum value of SAR (measured) = 1.598 mW/g



Date/Time: 8/21/2011 11:14:19 AM

Test Laboratory: Motorola Mobility - CDMA / EVDO 800 Left Edge

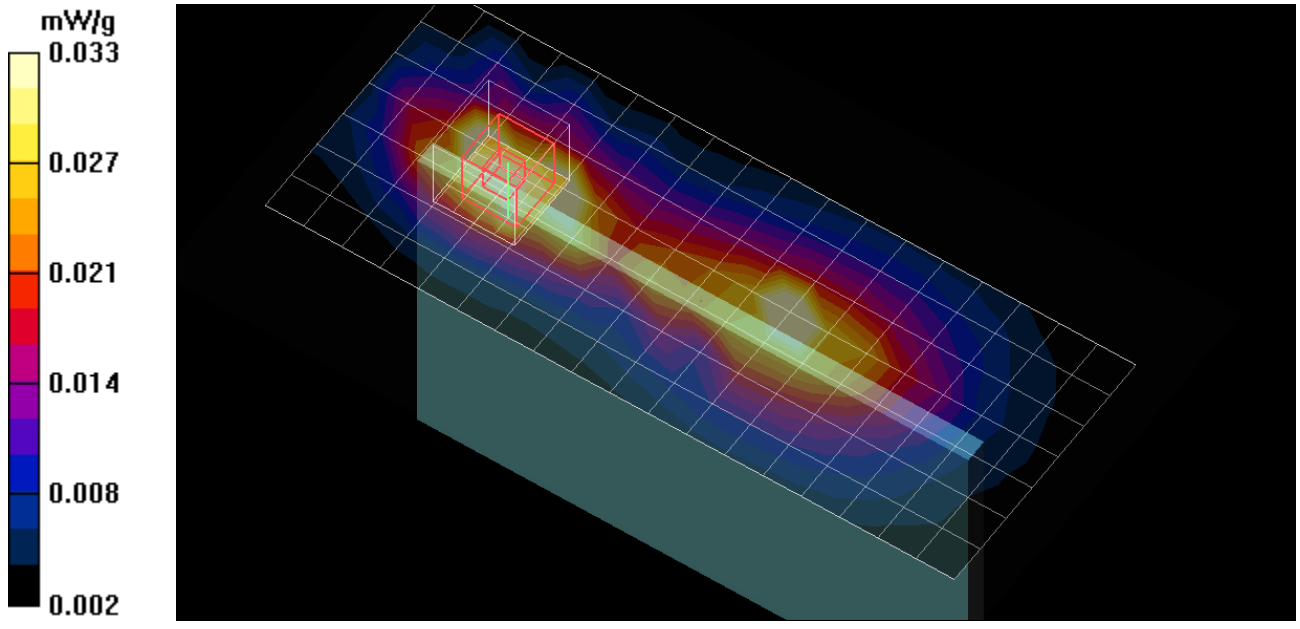
DUT: Serial: KFLC110065, FCC ID: IHDP56MU2
Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test Configuration = Left Edge 0mm from Phantom
Communication System: CDMA 835; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#6 - Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Area Scan - Extended Phone (15mm) (8x23x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.052 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.49 V/m; Power Drift = 0.019 dB
Peak SAR (extrapolated) = 0.048 W/kg
SAR(1 g) = 0.031 mW/g; SAR(10 g) = 0.022 mW/g
Maximum value of SAR (measured) = 0.033 mW/g



Date/Time: 8/25/2011 12:01:03 PM

Test Laboratory: Motorola Mobility - CDMA / EVDO 1900 Left Edge

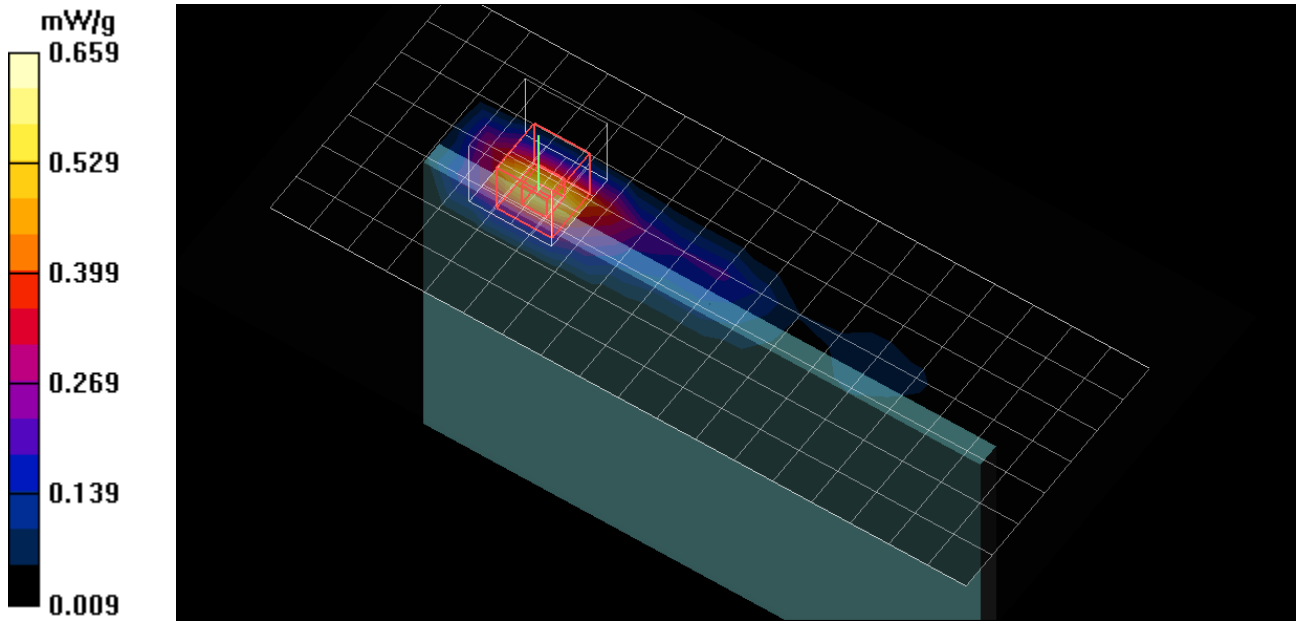
DUT: Serial: KFLC110065, FCC ID: IHDP56MJ2
Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test Configuration = Left Edge 0mm from Phantom
Communication System: CDMA 1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 51; ρ = 1000 kg/m^3

DASY4 Configuration:

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

Triple Flat Phone Template/Area Scan - Extended Phone (15mm) (8x23x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.484 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.7 V/m; Power Drift = -0.081 dB
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.576 mW/g; SAR(10 g) = 0.300 mW/g
Maximum value of SAR (measured) = 0.659 mW/g



Date/Time: 8/28/2011 8:48:30 AM

Test Laboratory: Motorola Mobility - LTE Band 13 Right Edge

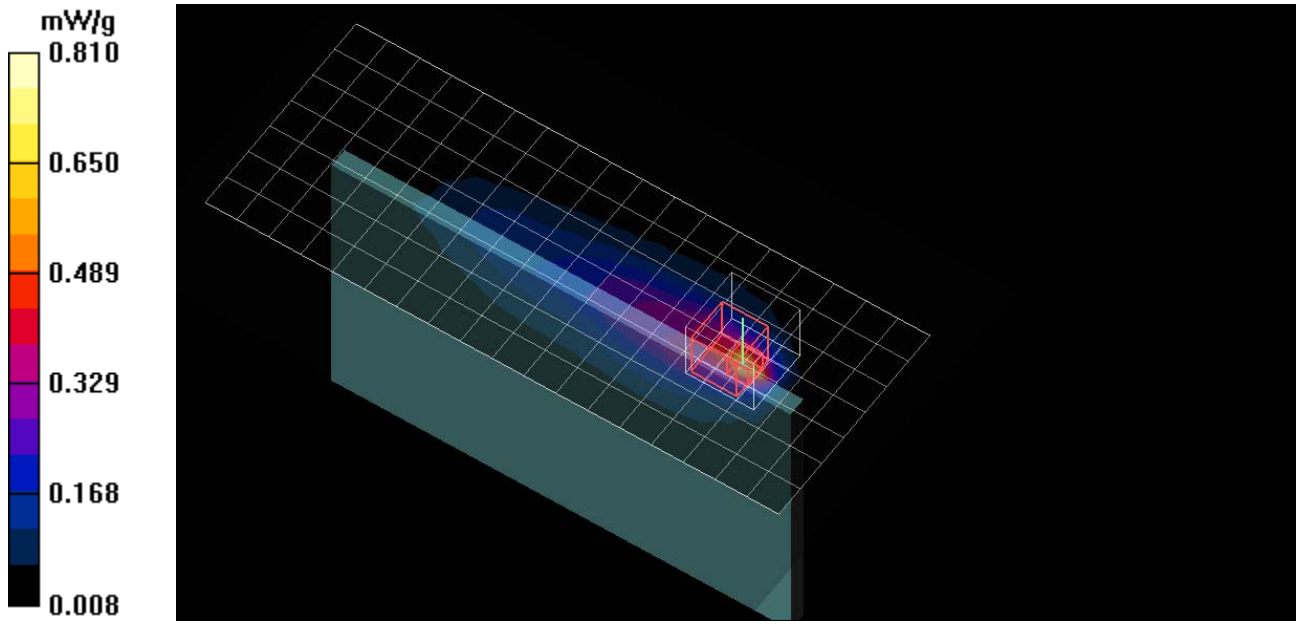
DUT: Serial: KFLC110065, FCC ID: IHDP56MJ2
Procedure Notes: QPSK, 1 RB @ Low End Start RB: 0 # RBs: 1 Battery Model #: INTERNAL Test Configuration = Right Edge 0mm from Phantom
Communication System: LTE Band 13; Frequency: 782 MHz;Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 782 MHz; σ = 0.92 mho/m; ε_r = 54.9; ρ = 1000 kg/m^3

DASY4 Configuration:

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

Triple Flat Phone Template/Area Scan - Extended Phone (15mm) (8x23x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.363 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.3 V/m; Power Drift = -0.171 dB
Peak SAR (extrapolated) = 1.64 W/kg
SAR(1 g) = 0.599 mW/g; SAR(10 g) = 0.277 mW/g
Maximum value of SAR (measured) = 0.810 mW/g



Date/Time: 9/6/2011 11:16:47 PM

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

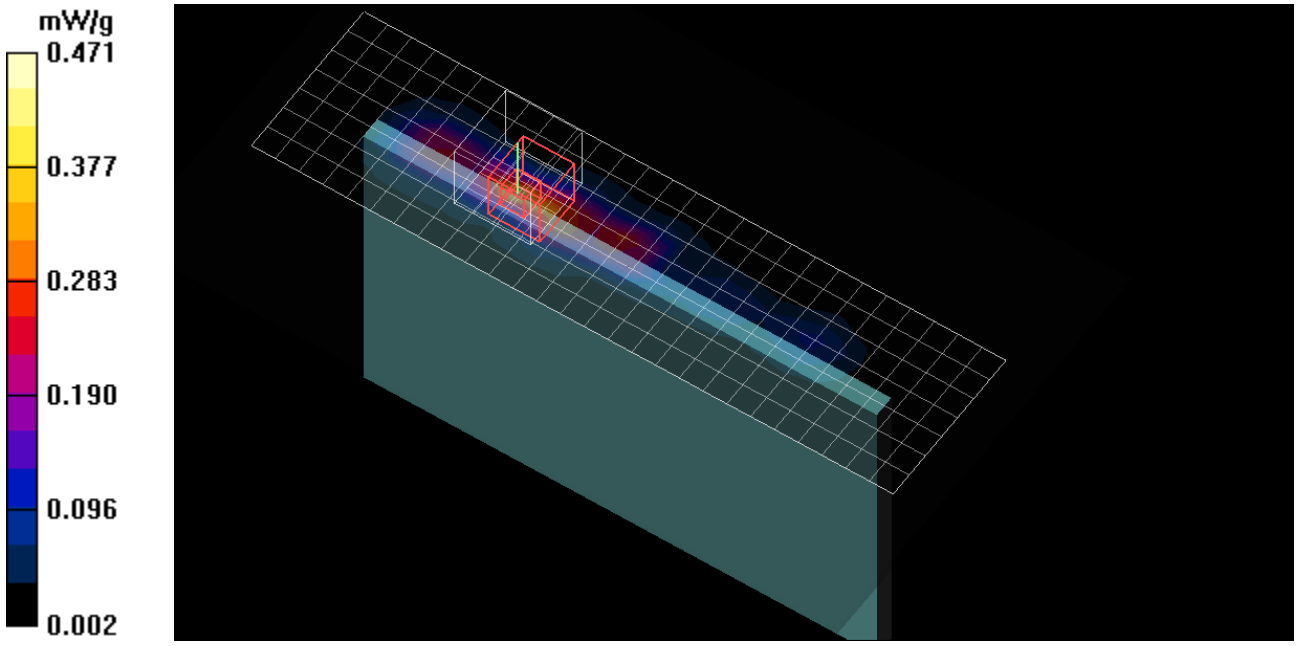
DUT: Serial: KFLC110069, FCC ID: IHDP56MJ2
Procedure Notes: 802.11b 1 Mbps Chn 11 Battery Model #: Internal Test Configuration: Right Edge 0mm from Flat Phantom
Communication System: Wi-Fi 2450; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: 2450 Glycol Body; Medium parameters used: f = 2450 MHz; σ = 1.9 mho/m; ε_r = 52.1; ρ = 1000 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 5.1; Type: Triple Flat Phantom 5.1;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Triple Flat Phone Template/Tablet Long Edge Area Scan - Body (10mm) (28x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.278 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz), - to correct max out (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.6 V/m; Power Drift = 0.058 dB
Peak SAR (extrapolated) = 0.790 W/kg
SAR(1 g) = 0.310 mW/g; SAR(10 g) = 0.131 mW/g
Maximum value of SAR (measured) = 0.471 mW/g



Date/Time: 10/5/2011 10:32:48 AM

Test Laboratory: Motorola Mobility - CDMA / EVDO 800 - Back Surface w/o Pwr Reduction

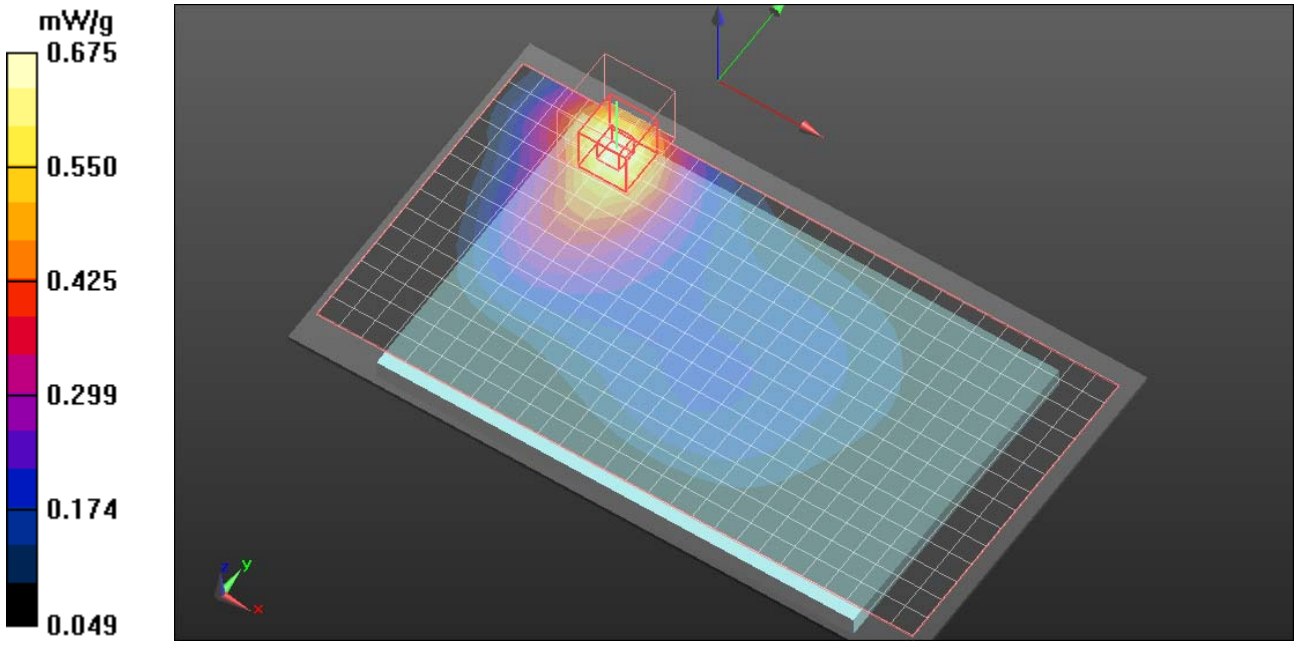
DUT: Serial: KFLC110065, FCC ID: IHDP56MJ2
Procedure Notes: EV-DO REV. O (RTAP) Battery Model #:INTERNAL Test Configuration = Back of Tablet 11mm from Phantom
Communication System: Custom CDMA2000 (1xEV-DO, 153.6 kbps) for MMI; Frequency: 835.52 MHz;Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 55.3; ρ = 1000 kg/m^3

DASY4 Configuration:

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

DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/Area Scan - Full Body (10mm) (28x17x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.665 mW/g

DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.846 V/m; Power Drift = -0.23 dB
Peak SAR (extrapolated) = 1.003 W/kg
SAR(1 g) = 0.627 mW/g; SAR(10 g) = 0.408 mW/g
Maximum value of SAR (measured) = 0.675 mW/g



Test Laboratory: Motorola Mobility - CDMA / EVDO 1900 - Back Surface w/o Pwr Reduction

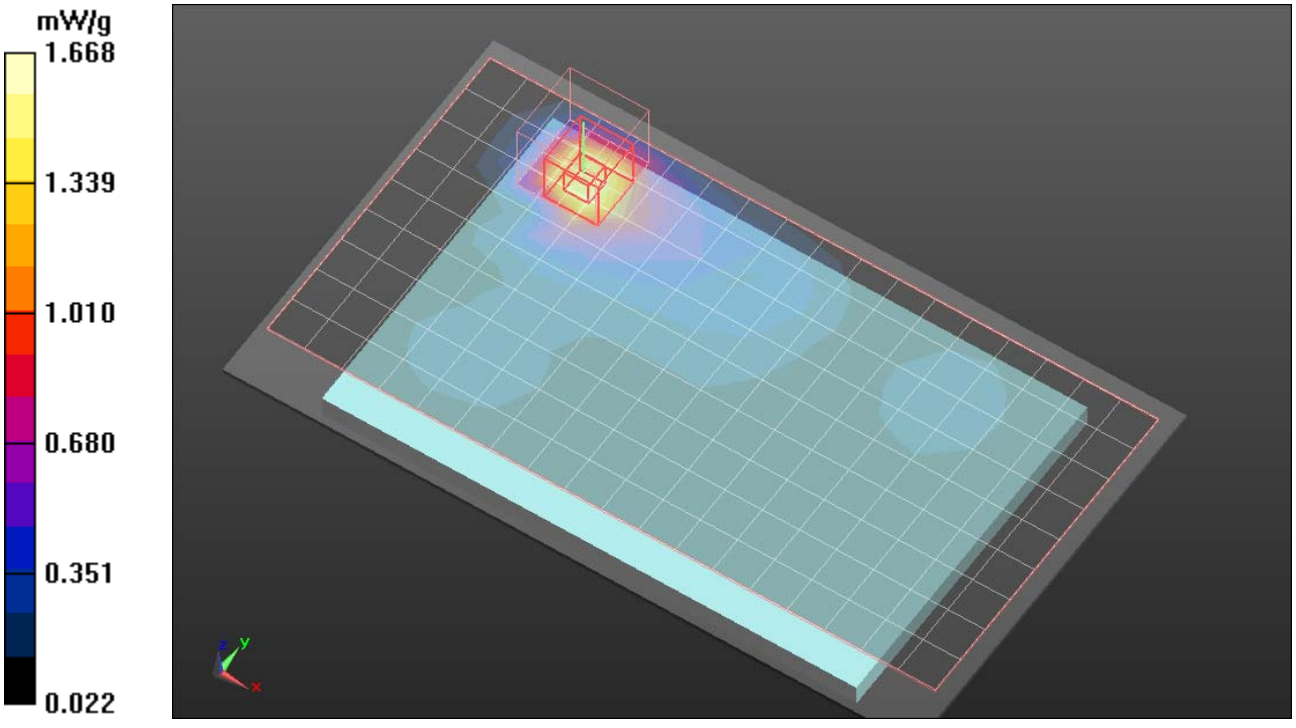
DUT: Serial: KFLC110065, FCC ID: IHDP56MJ2
Procedure Notes: EV-DO REV. O (RTAP) Battery Model #: INTERNAL Test Configuration = Back of Tablet 11mm from Phantom
Communication System: Custom CDMA2000 (1xEV-DO, 153.6 kbps) for MMI; Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 50.7; ρ = 1000 kg/m^3

DASY4 Configuration:

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

DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/Area Scan - Full Body (15mm) (19x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.548 mW/g

DASY5, Triple Flat Phone Template - Rev.3 (19-Sept-11)/Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.873 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 2.703 W/kg
SAR(1 g) = 1.56 mW/g; SAR(10 g) = 0.896 mW/g
Maximum value of SAR (measured) = 1.668 mW/g



Date/Time: 10/5/2011 3:36:59 PM

Test Laboratory: Motorola Mobility - LTE Band 13 - Back Surface w/o Pwr Reduction

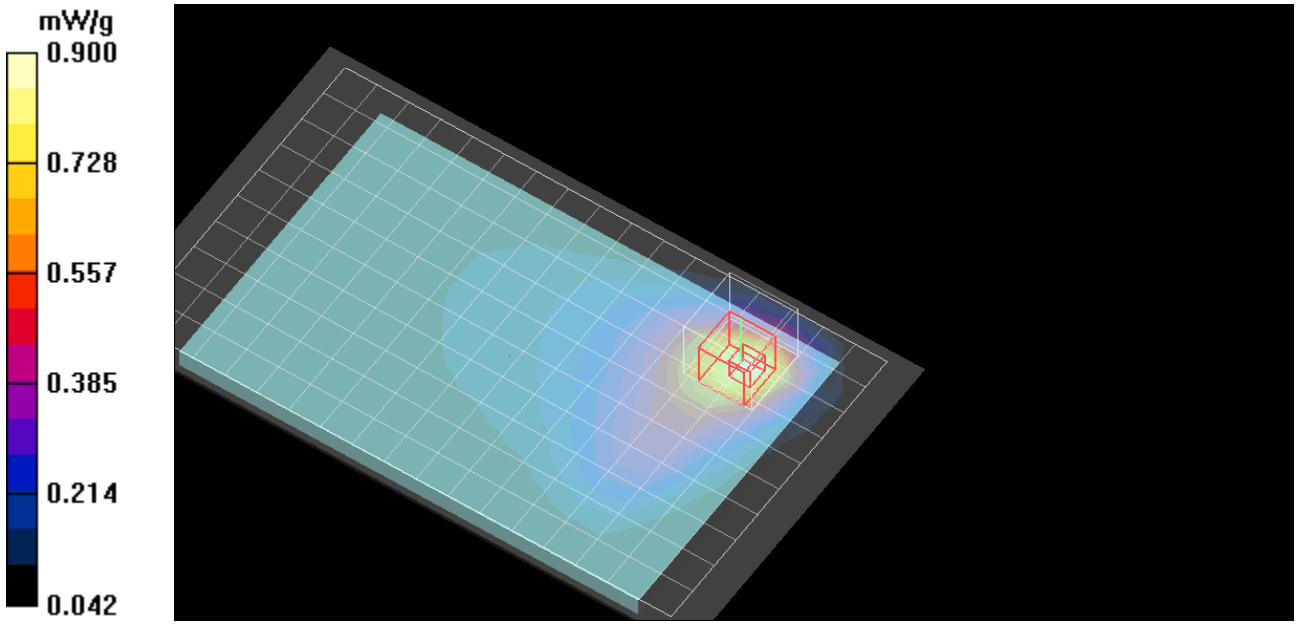
DUT: Serial: KFLC110065, FCC ID: IHDP56MJ2
Procedure Notes: QPSK 1 RB @ High End Start RB: 49 # RBs: 1 Battery Model #: INTERNAL Test Configuration = back surface 7mm from phantom
Communication System: LTE Band 13; Frequency: 782 MHz;Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 782 MHz; σ = 0.93 mho/m; ε_r = 55.4; ρ = 1000 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=15mm, dy=15mm
Maximum value of SAR (measured) = 0.905 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.7 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 1.20 W/kg
SAR(1 g) = 0.837 mW/g; SAR(10 g) = 0.556 mW/g
Maximum value of SAR (measured) = 0.900 mW/g



Appendix 3

Measurement Uncertainty Budget

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

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

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

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	Description IEEE1528(2003) / IEC62209-1(2005)	**Tol. (± %)**	**Prob Dist**	**Div.**	**c_i (1 g)**	**c_i (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration [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)			*k*=2				22	22	

Uncertainty Budget for Device Under Test for 3 to 6 GHz

a	*b*	*c*	*d*	*e = f(d,k)*	*f*	*g*	*h = c x f / e*	*i = c x g / e*	*k*
Uncertainty Component	Description IEC62209-2(2010)	**Tol. (± %)**	**Prob Dist**	**Div.**	**c_i (1 g)**	**c_i (10 g)**	**1 g u_i (±%)**	**10 g u_i (±%)**	**v_i**
Measurement System									
Probe Calibration [EX3DV4]	7.2.2.1	6.6	N	1.00	1	1	6.6	6.6	∞
Axial Isotropy	7.2.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	7.2.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	7.2.2.6	2.0	R	1.73	1	1	1.2	1.2	∞
Linearity	7.2.2.5	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	7.2.2	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	7.2.2.7	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	7.2.2.8	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	7.2.2.9	1.1	R	1.73	1	1	0.6	0.6	∞
RF Ambient Conditions - Noise	7.2.4.5	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	7.2.4.5	3.0	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mech. Tolerance	7.2.3.1	1.0	R	1.73	1	1	0.6	0.6	∞
Probe Positioning w.r.t Phantom	7.2.3.3	4.0	R	1.73	1	1	2.3	2.3	∞
Max. SAR Evaluation (ext., int., avg.)	7.2.5.3	4.0	R	1.73	1	1	2.3	2.3	∞
Test sample Related									
Test Sample Positioning	7.2.3.4	3.4	N	1.00	1	1	3.4	3.4	79
Device Holder Uncertainty	7.2.3.4	4.5	N	1.00	1	1	4.5	4.5	11
SAR drift	7.2.2.10	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	7.2.3.2	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)		5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	7.2.4.3	3.4	N	1.00	0.64	0.43	2.2	1.5	6
Liquid Permittivity (target)		10.0	R	1.73	0.6	0.49	3.5	2.8	∞
Liquid Permittivity (measurement)	7.2.4.3	2.6	N	1.00	0.6	0.49	1.6	1.3	6
Combined Standard Uncertainty			RSS				13	12	566
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				25	24	

Appendix 4

Probe Calibration Certificate

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

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

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

Accreditation No.: **SCS 108**

Client **Motorola MDb**

Certificate No: **ES3-3124_Aug11**

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3124

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

Calibration date: August 23, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

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

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: August 23, 2011

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

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

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ES3DV3

SN:3124

Manufactured: July 11, 2006
Calibrated: August 23, 2011

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.26	1.30	1.30	± 10.1 %
DCP (mV)[B]	100.9	98.2	100.9	

Modulation Calibration Parameters

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

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

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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

Calibration Parameter Determined in Head Tissue Simulating Media

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

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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

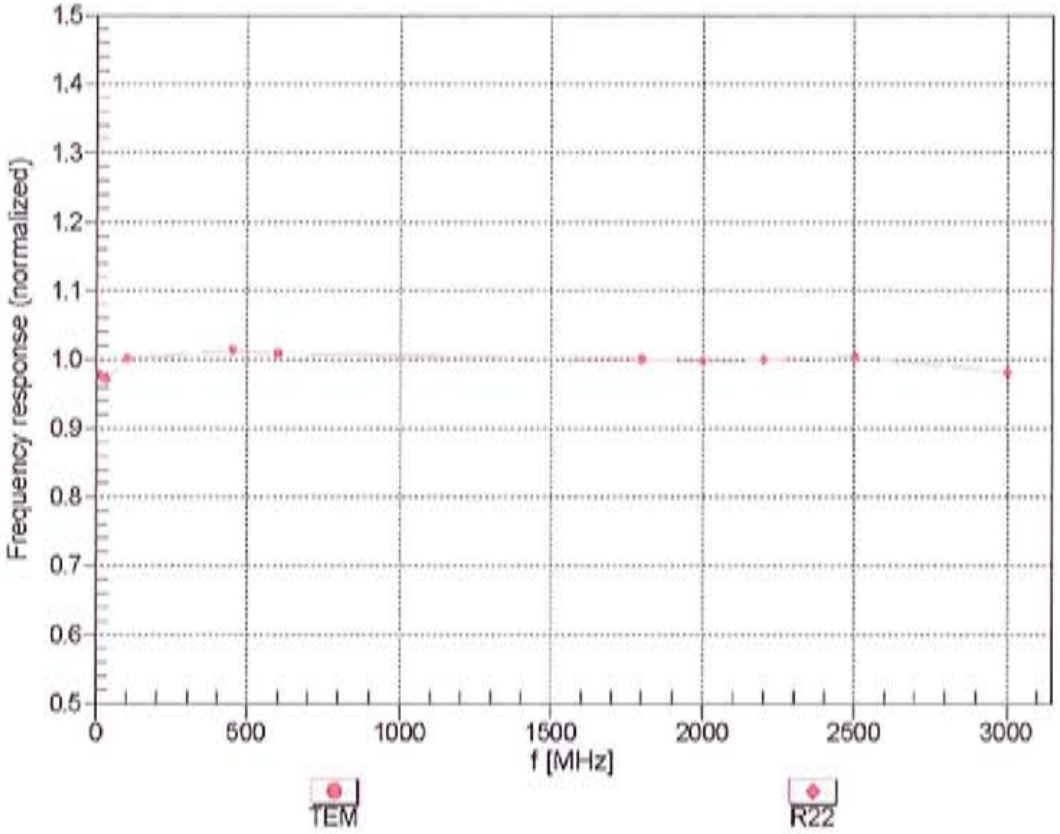
Calibration Parameter Determined in Body Tissue Simulating Media

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

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

Frequency Response of E-Field

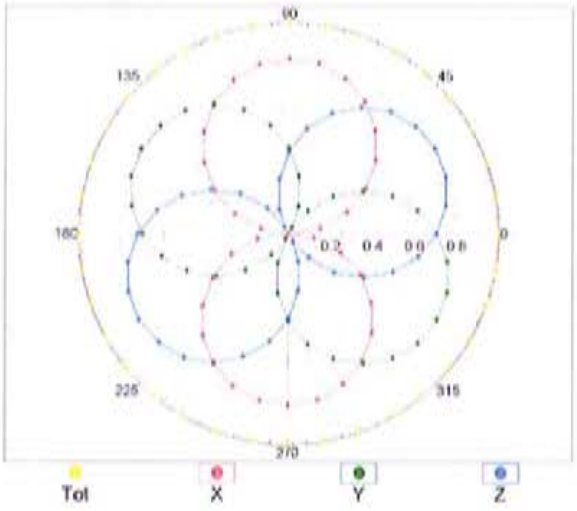
(TEM-Cell:ifi110 EXX, Waveguide: R22)



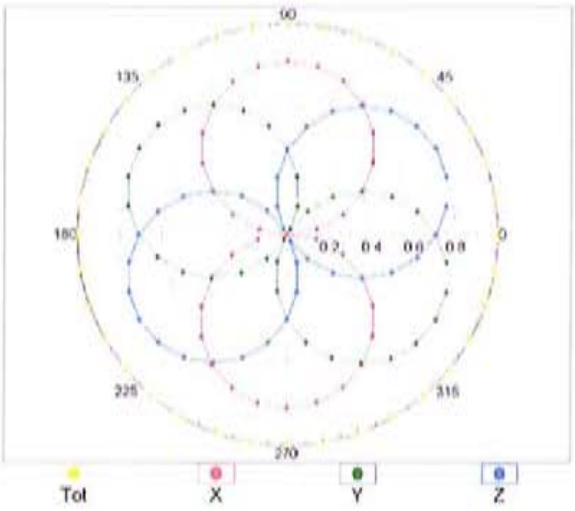
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

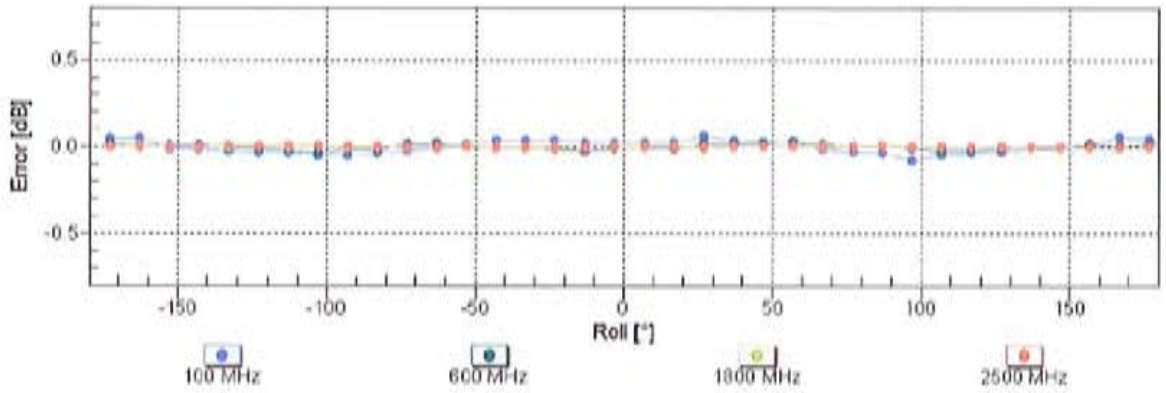
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



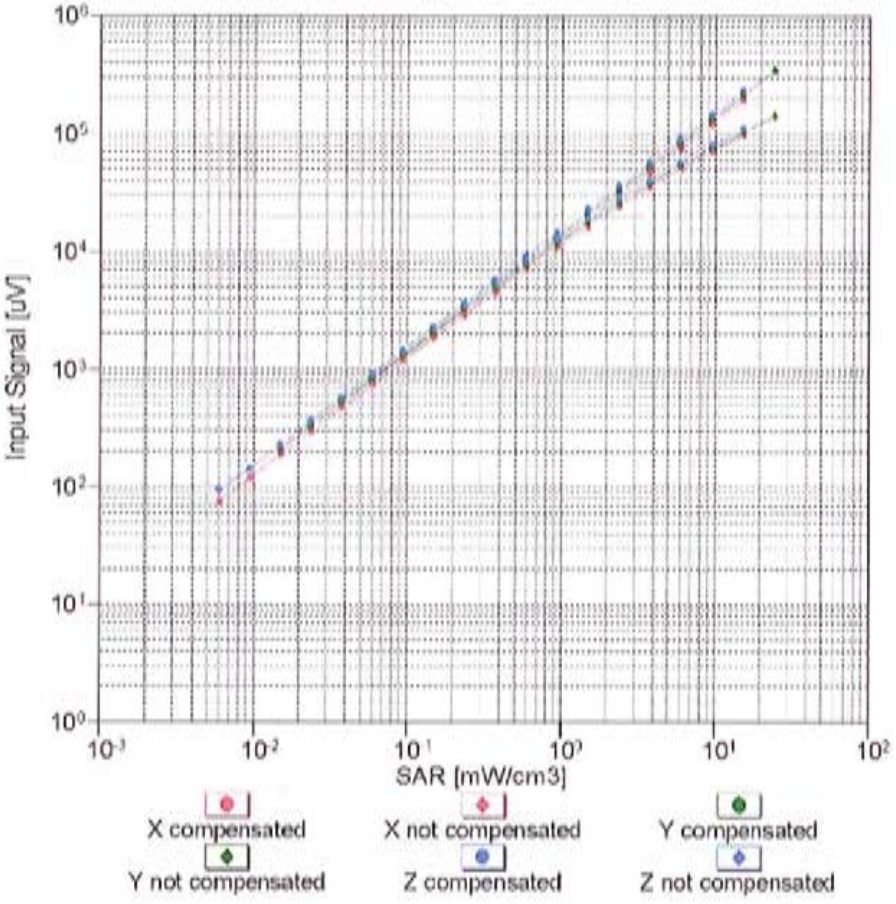
f=1800 MHz,R22

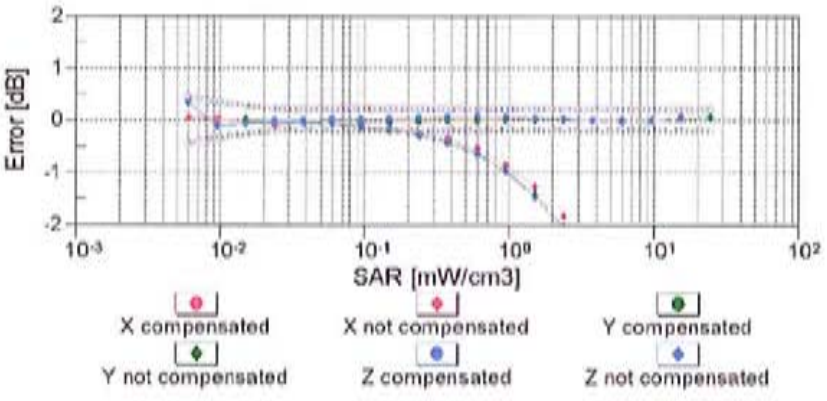




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR$_{head}$)
(TEM cell , f = 900 MHz)

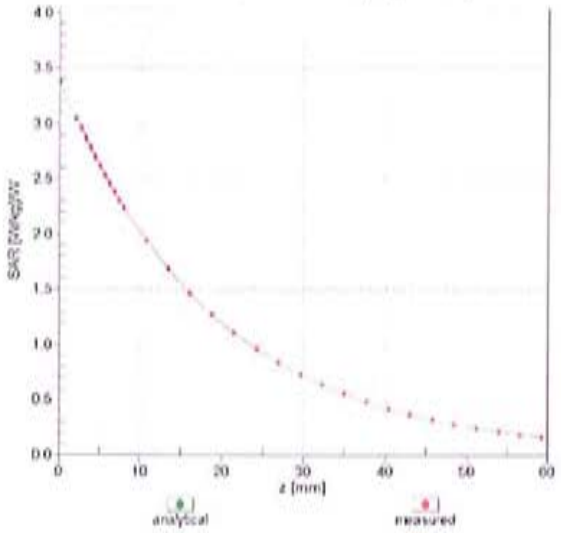




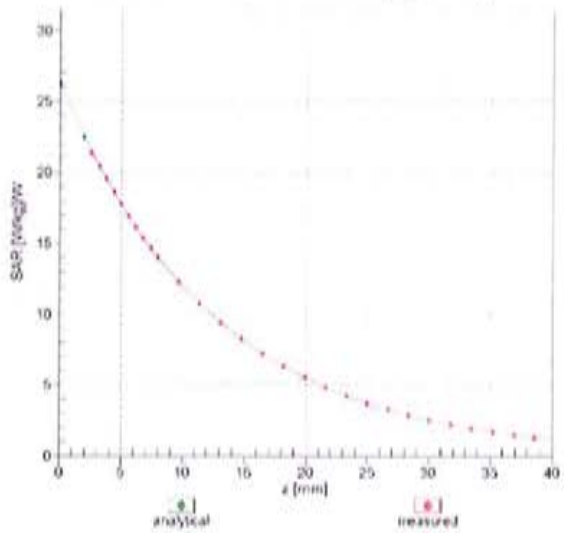
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

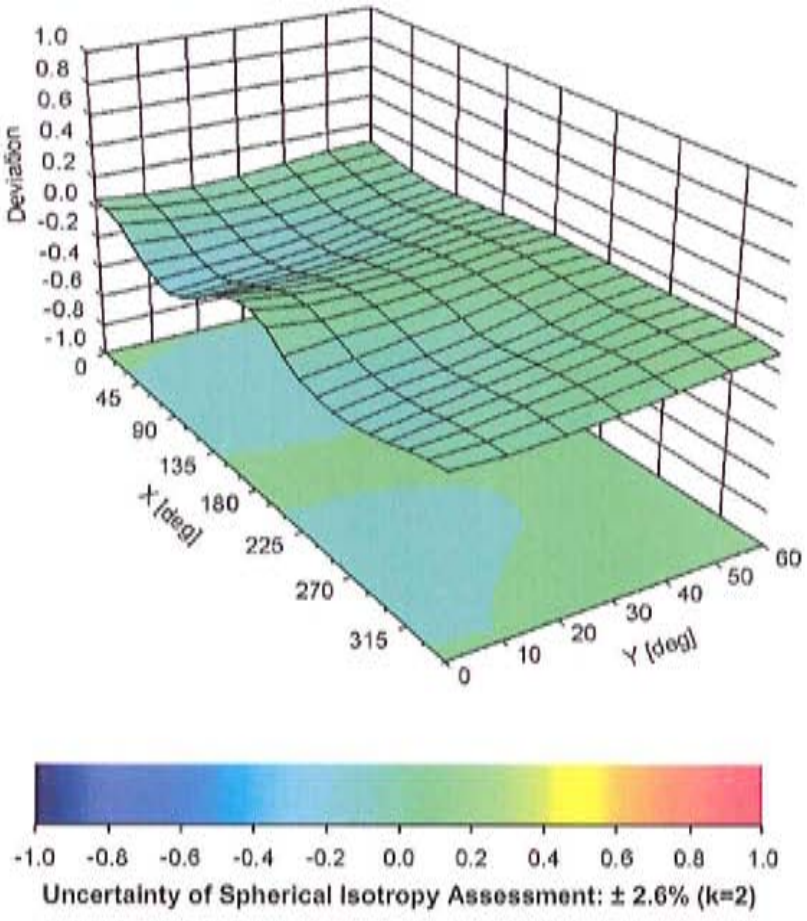


f = 1810 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

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

Other Probe Parameters

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

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

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

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

Accreditation No.: SCS 108

Client **Motorola MDb**

Certificate No: ES3-3115_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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

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

Issued: January 13, 2011

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

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

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

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ES3DV3

SN: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 ($\mu V/(V/m)^2$)[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 E²-field uncertainty inside TSL (see Pages 5 and 6).

[B] Numerical linearization parameter: uncertainty not required.

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

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

Calibration Parameter Determined in Head Tissue Simulating Media

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

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

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

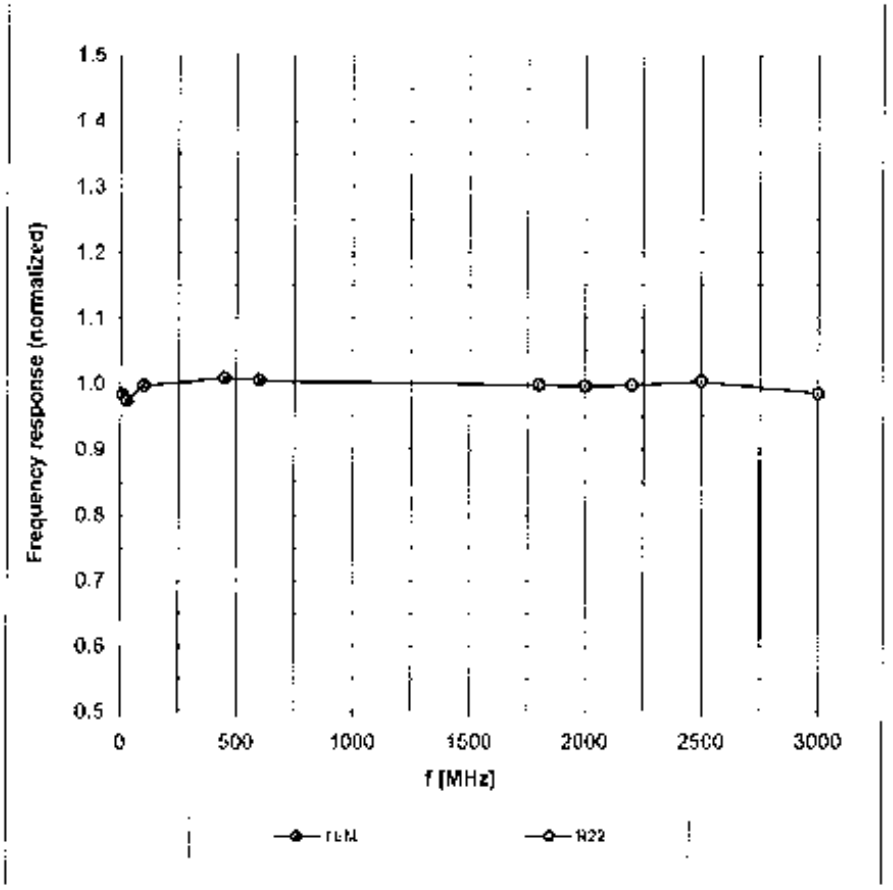
Calibration Parameter Determined in Body Tissue Simulating Media

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

[C] The validity of ± 100 MHz only applies for DASY V4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

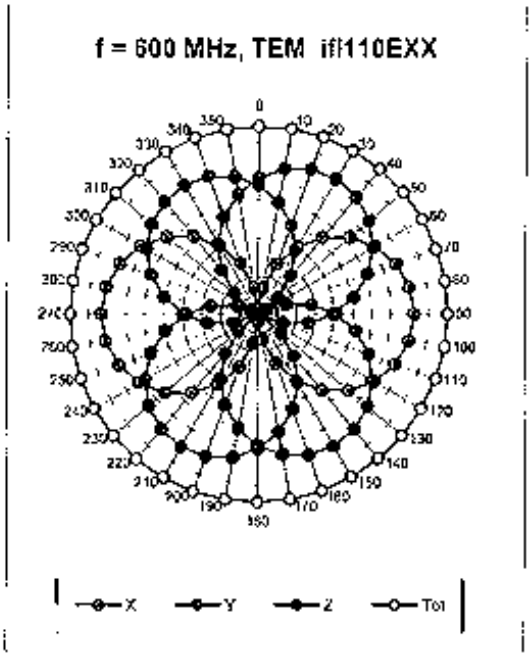
Frequency Response of E-Field

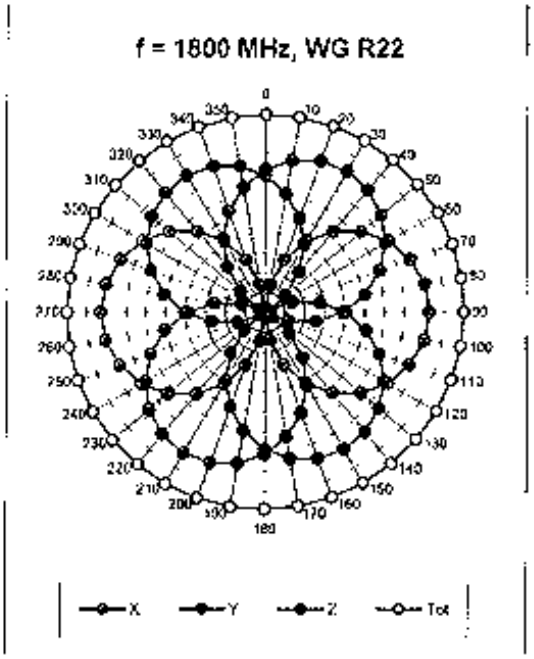
(TEM-Cell:ifi110 EXX, Waveguide: R22)

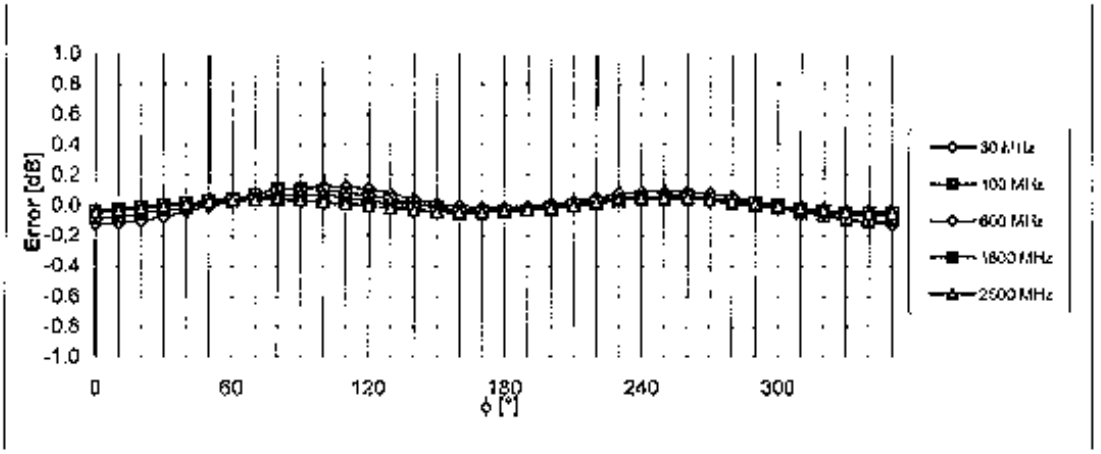


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



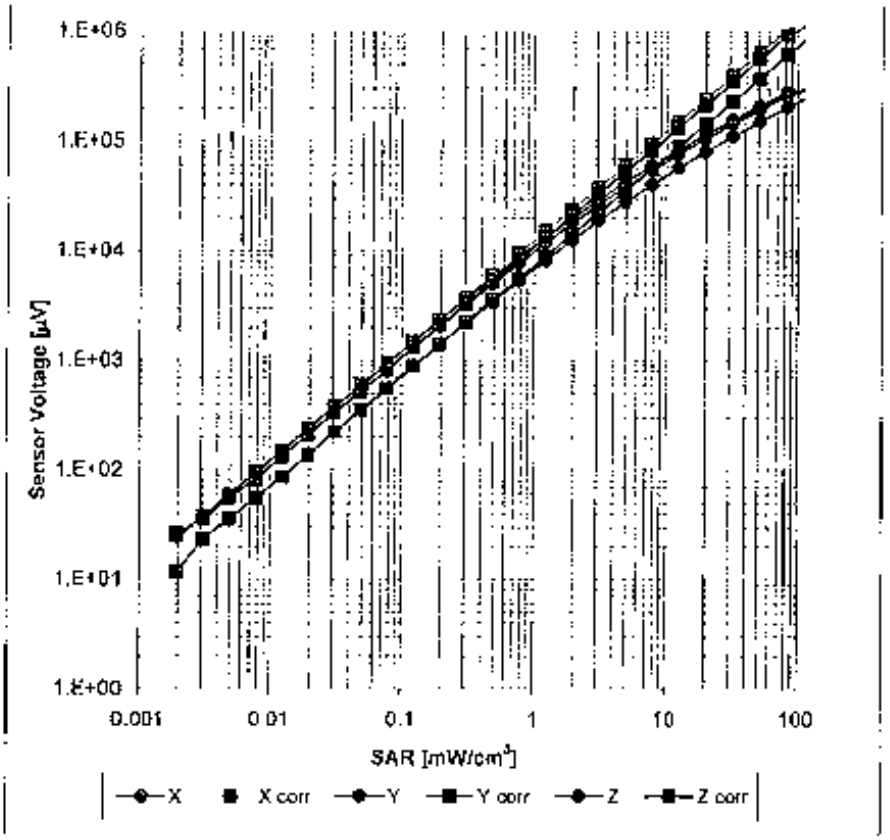


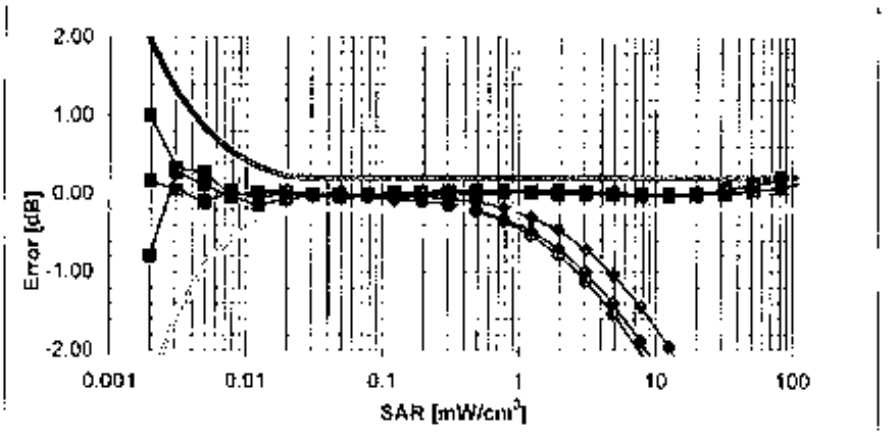


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

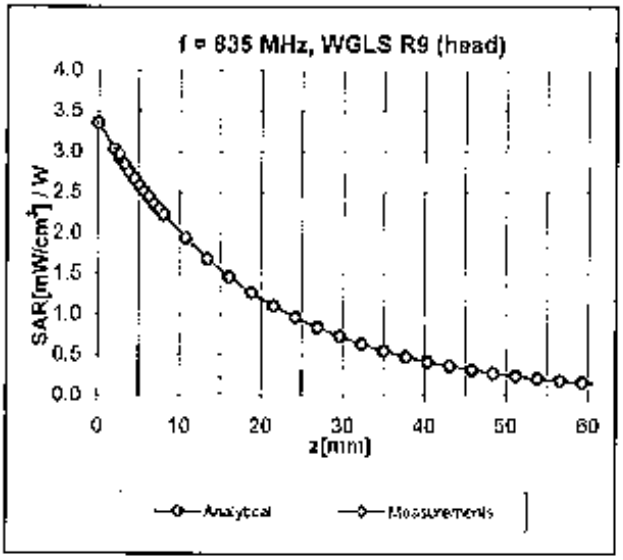
(TEM cell, f = 900 MHz)

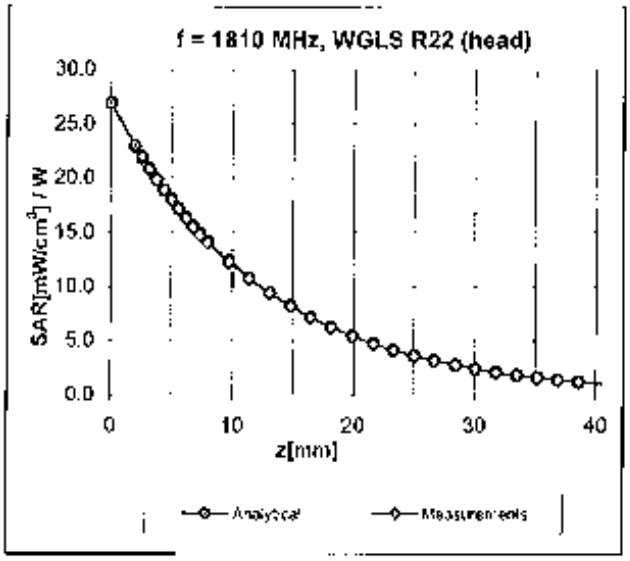




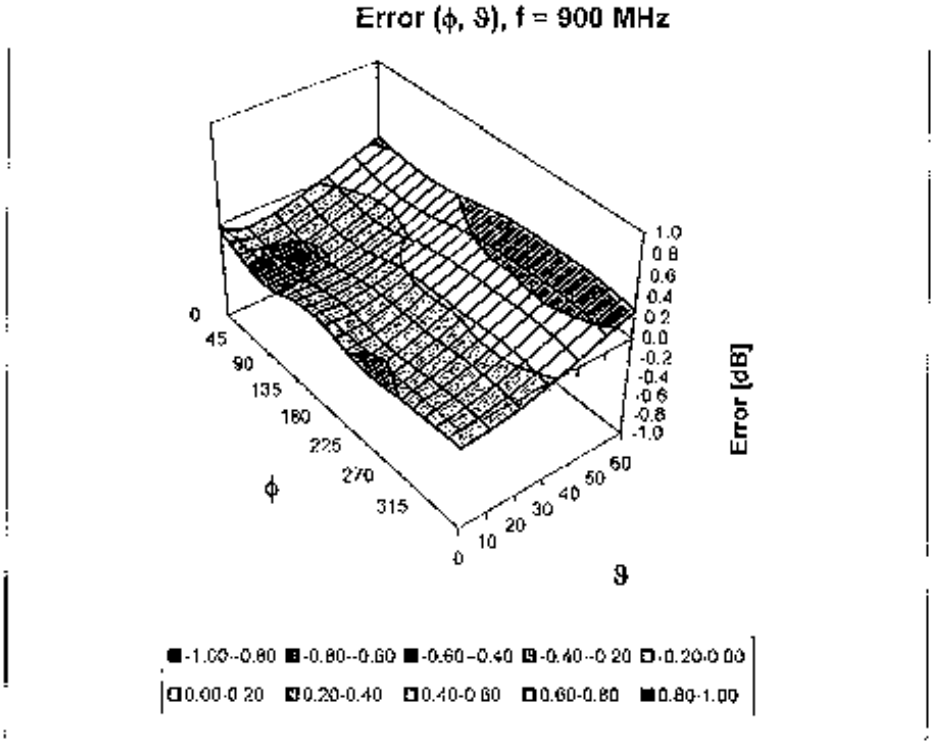
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment





Deviation from Isotropy in HSL



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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 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