MOTOROLA

Portable Hand-Held Device SAR Test Report

Tests Requested By:	Motorola Mobility, Inc. 600 N. US Highway 45 Libertyville, IL 60048
Test Report #:	24658-1F Rev E
Date of Report:	Dec 01, 2011
Date of Test:	Sep-3-2011 to Oct-4-2011
FCC ID #:	IHDP56MF1
Generic Name:	M0C62
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:

UKAS TESTING
2404

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)

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:

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	Sep-29-2011	Initial report release.
Rev. A	Oct -11-2011	Various typo corrections and explanatory statements added per TCB enquiry.
Rev. B	Oct-13-2011	Added clarification for power reduction schemes
Rev C	Nov-17-2011	Removed 5GHz SAR data. Added separate report from external test lab for 5 GHz SAR data.
Rev D	Nov-28-2011	Modified tables 1 & 2 in Section 6.1 to report reduced power for conducted power levels.
Rev. E	Dec-01-2011	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	**1.00**
CDMA 1900	**1.45**
LTE Band 13	**1.01**
Wi-Fi 2.45 GHz	**1.42**

SAR test results for body-worn testing in the Wi-Fi 5200 MHz and 5800 MHz transmit bands are provided in report *IHDP56MF1_5GWLAN_SAR_Report.pdf*, included within the Exhibit 11 documents.

2. Description of the Device Under Test

2.1 Antenna description

CDMA (850/1900 MHz) Antenna

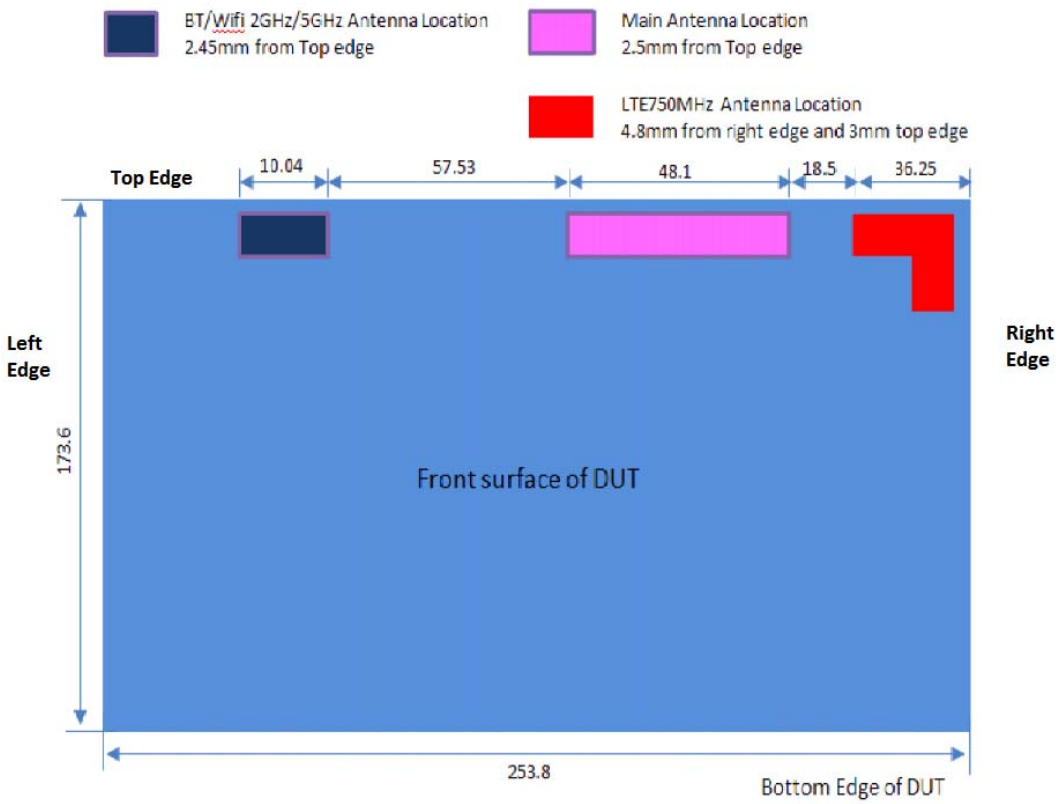
Type	Internal	
Location	Top of Transceiver	
Dimensions	Width	9.67 mm
	Length	48.1 mm

LTE (782 MHz) Antenna

Type	Internal	
Location	Top Right Corner of Transceiver	
Dimensions	Width	9.67 mm
	Length	36.25 mm

Bluetooth/Wi-Fi 2.45 / 5 GHz Antenna

Type	Internal	
Location	Top of Transceiver	
Dimensions	Width	3.67 mm
	Length	10.04 mm



2.2 Device Signaling[1]

Serial Number(s) (Functional Use)	KPE00G0040 KPE00G0052	(CDMA & LTE conducted power measurements and SAR testing) (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	777 - 787 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	14.5 dBm	1:1	2412.0 - 2462.5 MHz
Bluetooth	GFSK	7.83 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			IHDP56MF1
	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
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

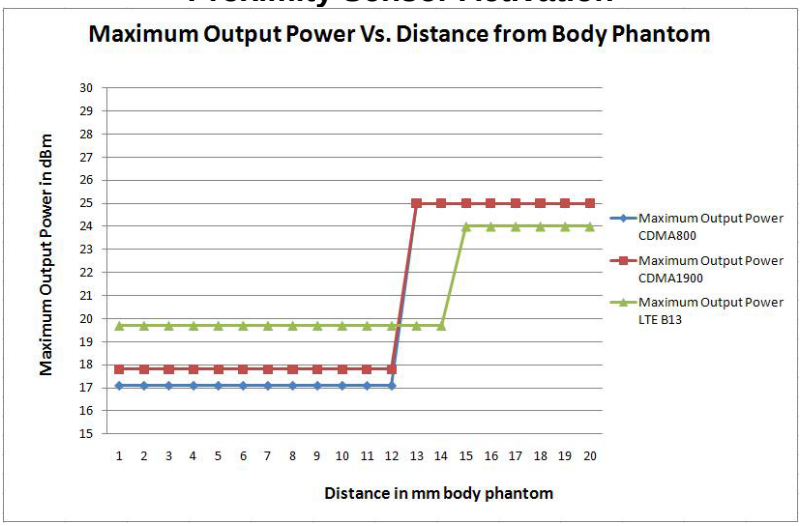
2.2.2 Power limit reduction schemes

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.

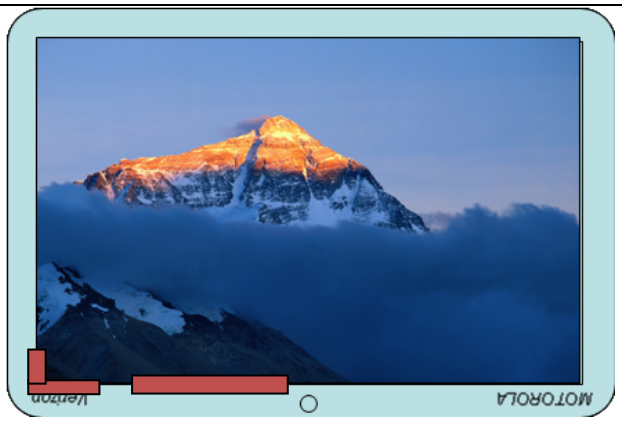
	Proximity Sensor Power Reduction		Orientation Power Reduction	
Mode(s) of Operation	CDMA 850	CDMA 1900	CDMA 850	CDMA 1900
Duty Cycle	1:1	1:1	1:1	1:1
Maximum Output Power Setting (dBm)	25	25	25	25
Time Avg Output Power Setting (dBm)	25	25	25	25
Reduced Maximum Output Power Setting (dBm)	17.1	17.8	21	18.1
Time Avg Output Power Setting (dBm)	17.1	17.8	21	18.1

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)	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Reduced Maximum Output Power Setting (dBm)	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7

Proximity Sensor Activation



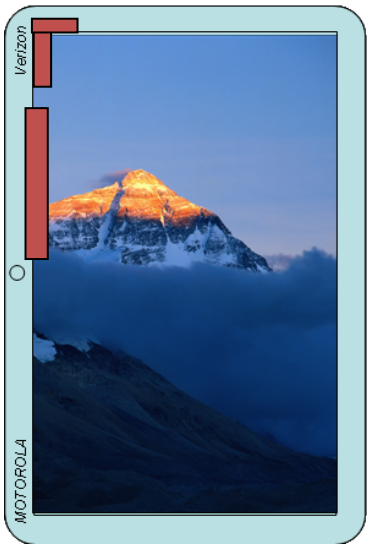
Orientation 1: There is no cutback in either the CDMA or LTE bands, unless the *proximity sensor* is activated.



Orientation 2: There is always cutback in the CDMA bands, regardless of proximity sensor state. LTE is cutback only if the proximity sensor is activated.

Figure 11.2.2.2-1: Landscape Usage Modes

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



Orientation 4: There is no cutback in the CDMA or LTE bands, 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 (Bottom Edge toward body)	N/A	N/A	N/A
Orientation 2 (Top Edge toward body)	‡	‡	N/A
Orientation 3 (Right Edge toward body)	N/A	N/A	N/A
Orientation 4 (Left Edge toward body)	N/A	N/A	N/A
Back Surface toward body	†	†	†

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

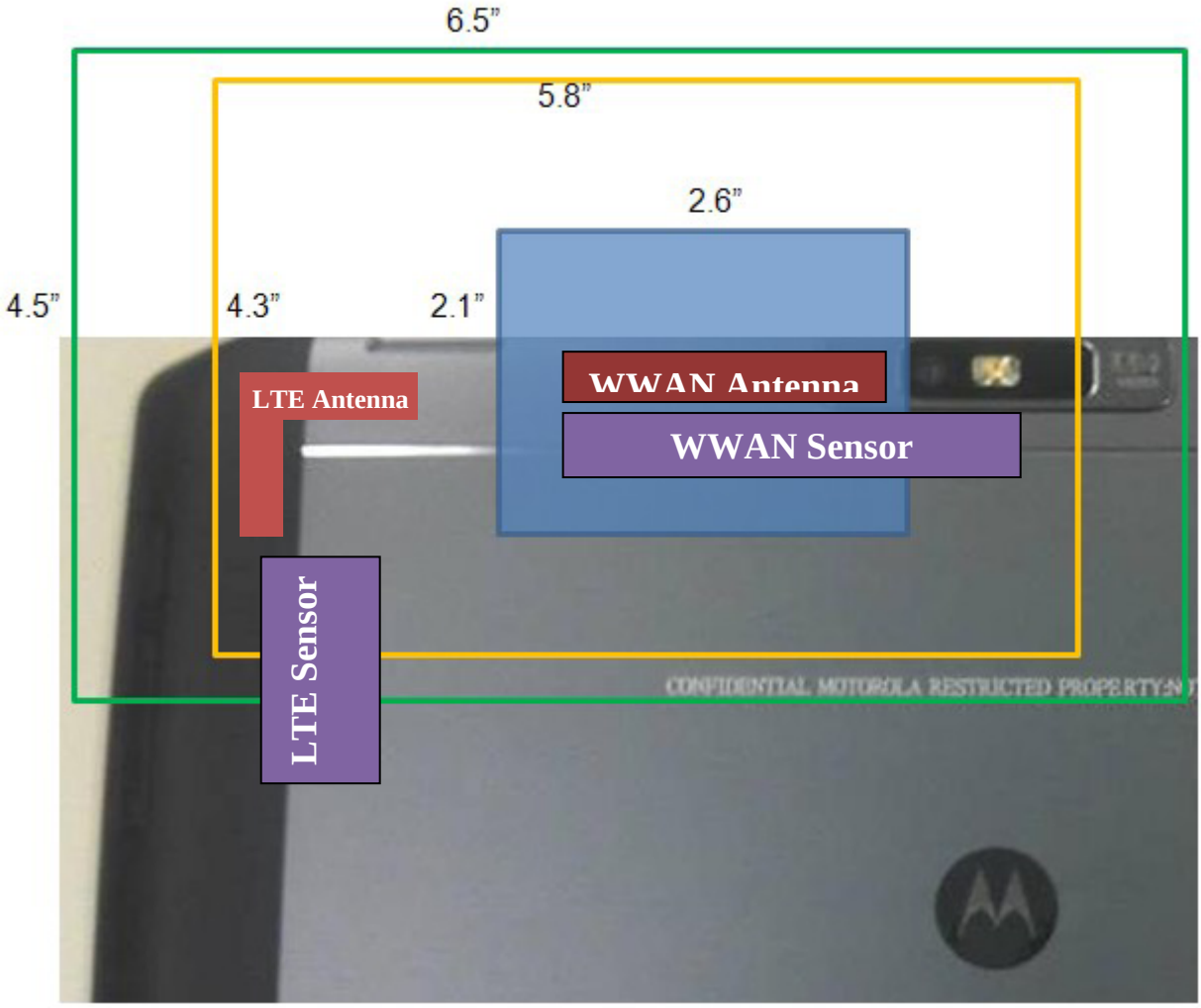


Figure 11.2.2.2-4: Proximity Detection areas (relative to Main transmitter antenna) at 12-mm threshold separation (orange square) and 1-mm separation (green square). Measurement was done using a 2.6” x 2.1” conductive surface (blue square). Device orientation shown is rear facing outward, top edge up.

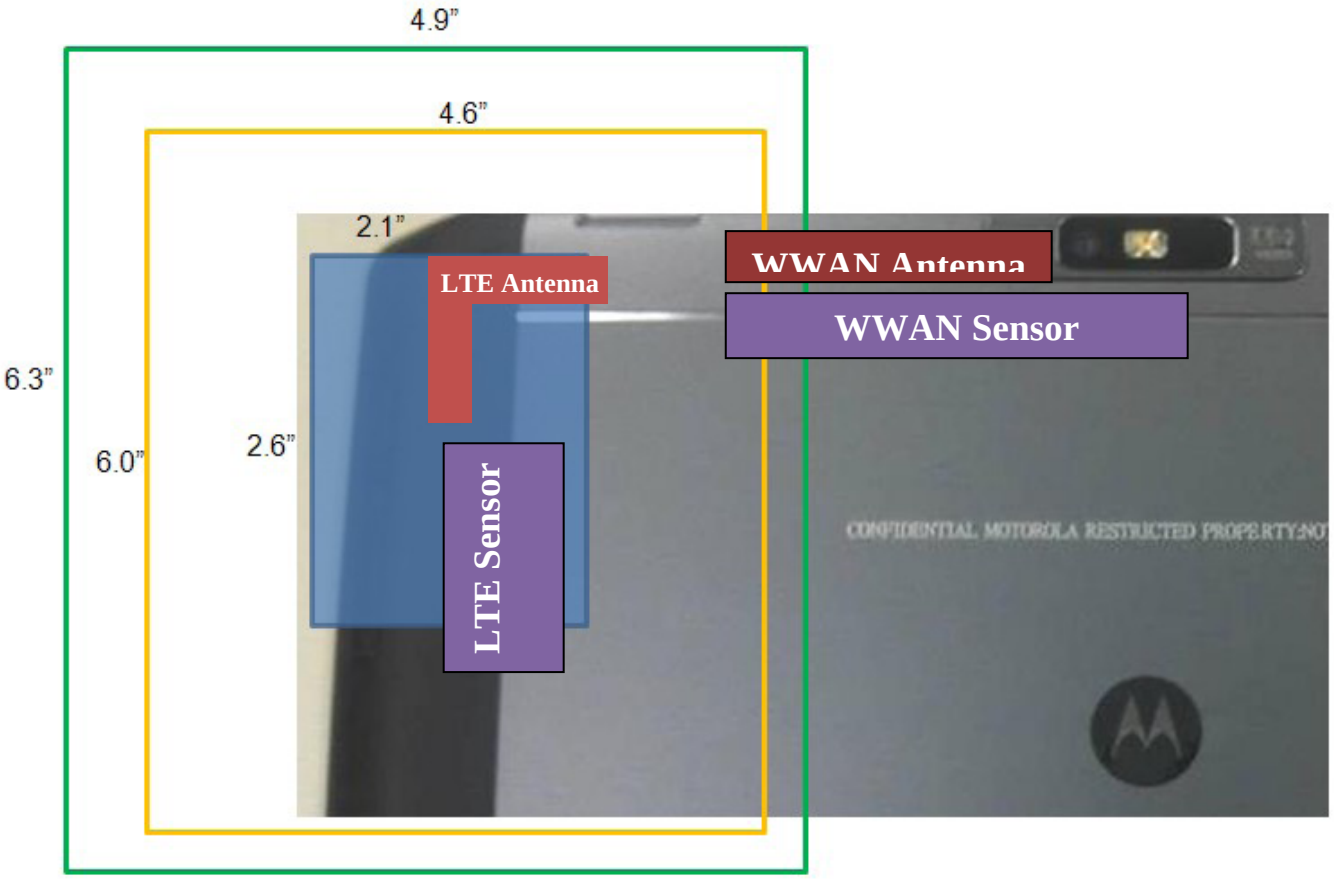


Figure 11.2.2.2-4: Proximity Detection areas (relative to LTE transmitter antenna) at 14-mm threshold separation (orange square) and 1-mm separation (green square). Measurement was done using a 2.6” x 2.1” conductive surface (blue square). Device orientation shown is rear facing outward, top edge up.

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	24.0	0	0 dB	-
		1	49	24.1	0	0 dB	-
		50%	12	23.9	0	0 dB	-
		100%	0	24.0	0	0 dB	-
16QAM	10 MHz	1	0	23.9	0	0 dB	-
		1	49	23.8	0	0 dB	-
		50%	12	22.9	1	1.1 dB	MPR enabled
		100%	0	22.9	1	1.1 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	25.01	24.94	24.88	24.73	**24.98**	24.97
	384	25.04	24.99	24.89	24.73	**25.01**	25.02
	777	24.97	24.95	24.88	24.23	**24.97**	25.04
CDMA 1900	25	24.95	24.94	23.48	21.98	**24.87**	24.93
	600	25.05	25.07	24.15	22.88	**24.96**	25.01
	1175	24.97	24.95	22.85	23.52	**24.92**	24.98

[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	**13.18**	13.24	**14.26**	**14.42**
	6	**13.17**	13.33	**14.34**	**14.23**
	11	**13.07**	13.15	**14.03**	**14.12**

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	13.43	**13.46**	**13.47**	**13.53**	**14.01**	**13.95**	13.11	13.32
	6	**13.71**	**13.55**	**13.58**	**13.59**	**14.16**	**14.04**	13.19	13.25
	11	**13.48**	**13.35**	13.31	**13.33**	**13.76**	**13.82**	12.94	12.88

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	13.33	13.37	13.42	**13.83**	**13.88**	13.04	12.89	12.15
	6	**13.43**	13.41	**13.54**	**13.99**	**14.06**	13.03	12.96	12.11
	11	13.25	13.14	13.31	**13.79**	**13.82**	12.73	12.83	11.98

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	13.33	**13.46**	**13.53**	**14.13**	**13.91**	13.01	12.94	11.98
	6	**13.43**	13.41	**13.54**	**14.15**	**14.06**	13.1	13.08	12.32
	11	13.25	13.26	**13.39**	**13.98**	**13.8**	12.94	12.92	11.93

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	699	Sep-20-2010	Sep-20-2011
DASY4™ DAE V1	702	Apr-14-2011	Apr-14-2012
E-Field Probe ES3DV3	3184	Mar-11-2011	Mar-11-2012
DASY4™ DAE V1	434	Jan-13-2011	Jan-13-2012
E-Field Probe ES3DV3	3115	Jan-12-2011	Jan-12-2012
S.A.M. Phantom used for 782/800/1900/2450 MHz	TP-1136		
S.A.M. Phantom used for 800/1900 MHz	TP-1131		
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	766	Jul-15-2011	Jul-15-2013
Dipole Validation Kit, DV2450V2	740	Mar-17-2011	Mar-17-2013

3.2 Additional Equipment

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

4. Electrical parameters of the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity, ε_r, and the conductivity, σ, of the tissue simulating liquids were measured with a HP85070 Dielectric Probe Kit These values, along with the temperature of the simulated tissue are shown in the table below. The recommended limits for permittivity and conductivity are also shown. A mass density of $\rho = 1\ ^{g}/_{cm^3}$ 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,** Sep-8-2011	56.0	0.93	19.8
		Measured, Sep-15-2011	55.5	0.93	19.9
		Measured, Sep-26-2011	56.1	0.93	20.0
		Measured, Oct-4-2011	55.6	0.93	20.3
		Recommended Limits	55.4 ±5%	0.966 ±5%	18-25
835	**Body**	**Measured,** Sep-3-2011	55.6	0.98	20.0
		Measured, Oct-4-2011	55.1	0.99	20.1
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1880	**Body**	**Measured,** Sep-6-2011	50.8	1.58	19.6
		Measured, Oct-4-2011	51.0	1.59	19.9
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25
2450	**Body**	**Measured,** Sep-21-2011	51.6	1.92	19.7
		Measured, Sep-24-2011	52.0	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	--

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. 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,** Sep-3-2011	9.80	55.6	0.98	21.2	19.7
	Recommended Limits	9.77	55.2 ±5%	0.97 ±5%	18-25	18-25
	Measured, Sep-8-2011	9.95	53.5	0.97	20.0	19.2
	Measured, Sep-15-2011	9.95	54.9	0.98	21.1	19.7
	Measured, Sep-26-2011	10.05	55.5	0.99	21.1	20.5
	Measured, Oct-4-2011	10.10	55.1	0.99	21.5	20.2
	Recommended Limits	10.10	55.2 ±5%	0.97 ±5%	18-25	18-25
1800	**Measured,** Sep-6-2011	39.5	51.1	1.47	21.2	20.5
	Recommended Limits	37.2	53.3 ±5%	1.52 ±5%	18-25	18-25
	Measured, Oct-4-2011	39.0	51.3	1.49	21.5	19.7
	Recommended Limits	37.9	53.3 ±5%	1.52 ±5%	18-25	18-25
2450	**Measured,** Sep-21-2011	49.35	51.6	1.92	21.2	20.5
	Recommended Limits	50.40	52.7 ±10%	1.95 ±5%	18-25	18-25
	Measured, Sep-24-2011	51.0	52.0	1.92	21.3	20.2
	Recommended Limits	51.3	52.7 ±10%	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
E-Field Probe ES3DV3	3184	835	6.10	6 of 11
		1810	4.90	6 of 11
		2450	4.33	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 6 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift, the measured conducted output power levels, 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). 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.

Tables 5 & 6 present SAR measurement results at a minimum separation distance in which the proximity sensor may deactivate the power reduction.

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

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. The same device holder described in section 6 was used for positioning the DUT.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3115	835	5.88	6 of 11
		1810	4.61	6 of 11
E-Field Probe ES3DV3	3184	782	6.1	6 of 11
		835	6.1	6 of 11
		1810	4.9	6 of 11
		2450	4.33	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	19.6	0.0002	23.9	0	0.161		0.16	0.312		0.31		
	LTE Band 13, QPSK (100% RB)		23230												
	LTE Band 13, QPSK (1 RB @ Low)		23230	19.6	-0.122	24.0	0	0.163		0.17	0.313		0.32		
	LTE Band 13, QPSK (1 RB @ High)		23230	19.6	-0.111	24.1	0	0.118		0.12	0.229		0.23		
	LTE Band 13, 16QAM (50% RB)		23230	20.5	-0.108	22.9	1	0.191		0.20	0.403		0.41		
	LTE Band 13, 16QAM (100% RB)		23230												
	LTE Band 13, 16QAM (1 RB @ Low)		23230	**19.6**	**0.0245**	**23.9**	0	**0.276**	**0.281**	**0.28**	**0.635**	**0.653**	**0.65**	**5x5x7**	**47**
	LTE Band 13, 16QAM (1 RB @ High)		23230	21.0	0.073	23.8	0	0.288		0.29	0.562		0.56		
835	CDMA 800, EVDO Rev 0 (RTAP)		1013												
			384	**20.2**	**0.123**	**21.01**	**4.0**	**0.227**		**0.23**	**0.448**		**0.45**	**5x5x7**	**48**
			777												
1880	CDMA 1900, EVDO Rev 0 (RTAP)		25	20.1	0.000	17.97	6.9	0.559		0.56	1.29		1.29		
			600	**20.1**	**-0.188**	**18.06**	**6.9**	**0.56**		**0.58**	**1.32**		**1.38**	**5x5x7**	**49**
			1175	18.8	-0.085	18.02	6.9	0.553		0.54	1.28		1.31		
2450	802.11b, 1 Mbps		1	**20.0**	**-0.0589**	**13.18**		**0.157**		**0.16**	**0.365**		**0.37**	**5x5x7**	**50**
			6												
			11												

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	19.1	0.0357	19.6	4.3	0.495		0.50	0.961		0.96		
	LTE Band 13, QPSK (100% RB)		23230												
	LTE Band 13, QPSK (1 RB @ Low)		23230	19.1	0.0547	19.7	4.3	0.401		0.40	0.778		0.78		
	LTE Band 13, QPSK (1 RB @ High)		23230	19.8	-0.0427	19.8	4.3	0.359		0.36	0.64		0.65		
	LTE Band 13, 16QAM (50% RB)		23230	**19.1**	**-0.016**	**18.6**	4.3	**0.531**	**0.540**	**0.54**	**0.972**	**0.999**	**1.00**	**5x5x7**	**51**
	LTE Band 13, 16QAM (100% RB)		23230												
	LTE Band 13, 16QAM (1 RB @ Low)		23230	19.1	0.0492	19.6	4.3	0.389		0.39	0.695		0.70		
	LTE Band 13, 16QAM (1 RB @ High)		23230	19.6	-0.258	19.5	4.3	0.351		0.37	0.625		0.66		
835	CDMA 800, EVDO Rev 0 (RTAP)		1013	20.8	-0.151	17.08	7.9	0.457		0.47	0.817		0.85		
			384	**20.2**	**-0.162**	**17.11**	**7.9**	**0.492**		**0.51**	**0.965**		**1.00**	**5x5x7**	**52**
			777	20.2	-0.0075	17.07	7.9	0.395		0.40	0.702		0.70		
1880	CDMA 1900, EVDO Rev 0 (RTAP)		25	19.8	-0.172	17.67	7.2	0.523		0.54	1.08		1.12		
			600	18.8	-0.105	**17.76**	7.2	0.691		0.71	1.35		1.38		
			1175	**20.1**	**-0.166**	17.72	**7.2**	**0.619**		**0.64**	**1.40**		**1.45**	**5x5x7**	**53**

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																
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	20.2	-0.111	13.18		0.513		0.53	1.19		1.22		
			6	20.0	0.0459	13.17		0.532		0.53	1.25		1.25		
			11	20.0	0.0138	13.07		0.542		0.54	1.29		1.29		
	802.11b, 5.5 Mbps		1	20.0	0.0732	14.26		0.594		0.59	1.39		1.39		
			6	20.0	0.124	14.34		0.541		0.54	1.28		1.28		
			11	20.0	-0.148	14.03		0.527		0.55	1.24		1.28		
	802.11b, 11 Mbps		1	20.0	-0.104	14.42		0.559		0.57	1.29		1.32		
			6	20.0	-0.0501	14.23		0.535		0.54	1.25		1.26		
			11	20.0	0.0862	14.12		0.532		0.53	1.28		1.28		
	802.11g, 6 Mbps		6	20.0	-0.208	13.71		0.533		0.58	1.24		1.30		
			11	20.0	-0.0731	13.48		0.52		0.53	1.23		1..25		
	802.11g, 9 Mbps		1	19.2	0.0261	13.46		0.575		0.58	1.36		1.36		
			6	19.3	-0.295	13.55		0.519		0.56	1.24		1.33		
			11	19.3	0.0172	13.35		0.552		0.55	1.31		1.31		
	802.11g, 12 Mbps		1	19.3	0.0904	13.47		0.557		0.57	1.31		1.31		
			6	19.3	-0.139	13.58		0.551		0.57	1.30		1.34		
	802.11g, 18 Mbps		1	19.3	0.0345	13.53		0.577		0.58	1.36		1.36		
			6	19.3	-0.0105	13.59		0.52		0.52	1.23		1.23		
			11	19.3	-0.0143	13.33		0.498		0.50	1.21		1.21		
	802.11g, 24 Mbps		1	19.3	-0.084	14.01		0.549		0.56	1.28		1.30		
			6	19.3	0.0708	14.16		0.512		0.51	1.21		1.21		
			11	19.3	-0.291	13.76		0.49		0.52	1.17		1.25		
	802.11g, 36 Mbps		1	19.3	0.184	13.95		0.554		0.55	1.31		1.31		
			6	19.3	0.241	14.04		0.517		0.52	1.23		1.23		
			11	19.6	-0.0794	13.82		0.475		0.48	1.12		1.14		
	802.11n, 7.2 Mbps		6	19.6	-0.129	13.43		0.507		0.52	1.19		1.23		
	802.11n, 21.7 Mbps		6	20.5	0.0626	13.54		0.513		0.51	1.20		1.20		
	802.11n, 28.9 Mbps		**1**	**20.5**	**0.0768**	**13.83**		**0.60**		**0.60**	**1.42**		**1.42**	**5x5x7**	**54**
			6	20.5	0.115	13.99		0.535		0.54	1.25		1.25		
			11	20.5	0.0835	13.79		0.459		0.46	1.09		1.09		
	802.11n, 43.3 Mbps		1	19.6	-0.0025	13.88		0.50		0.50	1.24		1.24		
			6	19.6	-0.104	14.06		0.487		0.50	1.17		1.20		
			11	19.6	-0.0702	13.82		0.465		0.47	1.17		1.19		
	802.11n, 6.5 Mbps		6	20.5	0.0324	13.43		0.519		0.52	1.21		1.21		
	802.11n, 13 Mbps		1	20.0	0.0687	13.46		0.574		0.57	1.37		1.37		
	802.11n, 19.5 Mbps		1	20.0	-0.0432	13.53		0.574		0.58	1.35		1.36		
			6	20.0	0.0578	13.54		0.518		0.52	1.21		1.21		
			11	20.0	0.0529	13.39		0.503		0.50	1.18		1.18		
	802.11n, 26 Mbps		1	20.0	0.185	14.13		0.562		0.56	1.31		1.31		
			6	20.0	0.163	14.15		0.519		0.52	1.20		1.20		
			11	19.6	-0.065	13.98		0.484		0.49	1.21		1.23		
	802.11n, 39 Mbps		1	19.6	0.0725	13.91		0.545		0.55	1.33		1.33		
			6	19.6	-0.0506	14.06		0.473		0.48	1.16		1.17		
			11	19.6	-0.073	13.80		0.482		0.49	1.20		1.22		

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

Body, Right Edge of DUT 0 mm from Phantom															
f (MHz)	Mode	Battery/ Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
782	LTE Band 13, QPSK (50% RB)	Internal	23230	**21.0**	**0.0397**	23.9		**0.498**	**0.505**	**0.51**	**0.749**	**0.766**	**0.77**	**5x5x7**	**55**
	LTE Band 13, QPSK (100% RB)		23230												
	LTE Band 13, QPSK (1 RB @ Low)		23230	21.0	0.0218	24.0		0.46		0.46	0.691		0.69		
	LTE Band 13, QPSK (1 RB @ High)		23230	21.0	0.0167	24.1		0.442		0.44	0.662		0.66		
	LTE Band 13, 16QAM (50% RB)		23230	21.0	0.0091	22.9		0.39		0.39	0.587		0.59		
	LTE Band 13, 16QAM (100% RB)		23230												
	LTE Band 13, 16QAM (1 RB @ Low)		23230	21.0	0.0411	**23.9**		0.416		0.42	0.63		0.63		
	LTE Band 13, 16QAM (1 RB @ High)		23230	21.0	0.0103	23.8		0.418		0.42	0.624		0.62		

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

Tables 5 & 6 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	**19.8**	**-0.381**	**25.01**		**0.144**		**0.16**	**0.225**		**0.25**	**5x5x7**	**56**
			777												
1880	CDMA 1900, EVDO Rev 0 (RTAP)		25												
			600												
			1175	**19.5**	**-0.32**	**24.92**		**0.70**		**0.75**	**1.28**		**1.38**	**5x5x7**	**57**

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, Back Surface of DUT 13 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, 16QAM (50% RB)	Internal	23230	**19.8**	**0.027**	**22.9**		**0.313**	**0.317**	**0.32**	**0.469**	**0.48**	**0.48**	**5x5x7**	**58**

Table 6: 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 6.07 mW [≤ 12 mW]
2. The separation distance between the Bluetooth antenna and the main antenna is 5.7 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**	***Simultaneous Measurements Required?***
CDMA 800, EVDO Rev 0 (RTAP)	Wi-Fi 2450 802.11n, 28.9 Mbps	Back Surface of DUT 0 mm from Phantom	1.00	1.42	>1.60	0.28	No
CDMA 1900, EVDO Rev 0 (RTAP)			1.45	1.42	>1.60	0.31	Yes
LTE Band 13, 16QAM (50% RB)			1.00	1.42	>1.60	0.17	No
CDMA 800, EVDO Rev 0 (RTAP)	Wi-Fi 2450 802.11b, 1 Mbps	Top Edge of DUT 0 mm from Phantom	0.45	0.37	0.82	N/A	No
CDMA 1900, EVDO Rev 0 (RTAP)			1.38	0.37	>1.60	0.19	No
LTE Band 13, 16QAM (50% RB)			0.65	0.37	1.02	N/A	No

For the configuration noted, combined SAR measurements were required to determine the aggregate 1 g SAR. The results of these measurements are given in the table below, with additional SAR plots of the combined measurements provided in Appendix 3.

Additional SAR measurements for simultaneous transmission evaluation were performed for each of the single transmitters using an extended zoom scan. This extended zoom scan was created to encompass the zoom scan volumes that were found previously in each of the stand-alone transmit SAR tests. For these tests, the outer dimensions of the extended zoom scan were X = 128 mm, Y = 40 mm, Z = 30 mm with a step size of X = 8 mm, Y = 8 mm, and Z = 5using a graded step size with a ratio of 1.5 resulting in the following step increments: 2 mm, 2.7 mm, 4.0 mm, 5.9 mm, 7.4 mm. The step sizes and arrangement of measurement points were chosen to comply with the guidance provided in FCC KDB 865664.

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

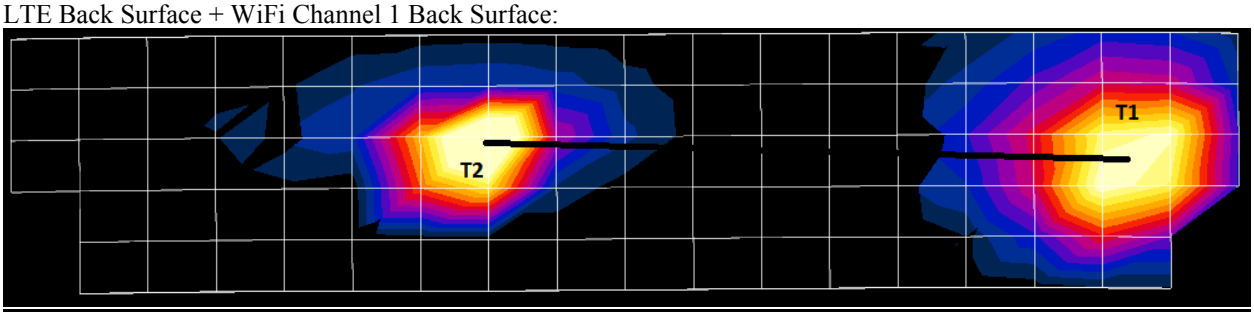
Measurements for Simultaneous SAR

Cellular Transmitter Mode	Wi-Fi Transmitter Mode	Configuration	Extrapolated Cellular Transmitter 1 g SAR Value (W/kg)	Extrapolated Wi-Fi Transmitter 1 g SAR Value (W/kg)	Simultaneous 1 g SAR Value (W/kg)	*Test Plots*	
						Grid	Plot Page
CDMA 1900, EVDO Rev 0 (RTAP)	Wi-Fi 2450 802.11n, 28.9 Mbps	Back Surface of DUT 0 mm from Phantom	1.36	1.23	1.3	**17x6x7**	**60-61**

SPLSR Calculations using SPEAG Application note TN110209:

For the LTE and WiFi combination on back surface:

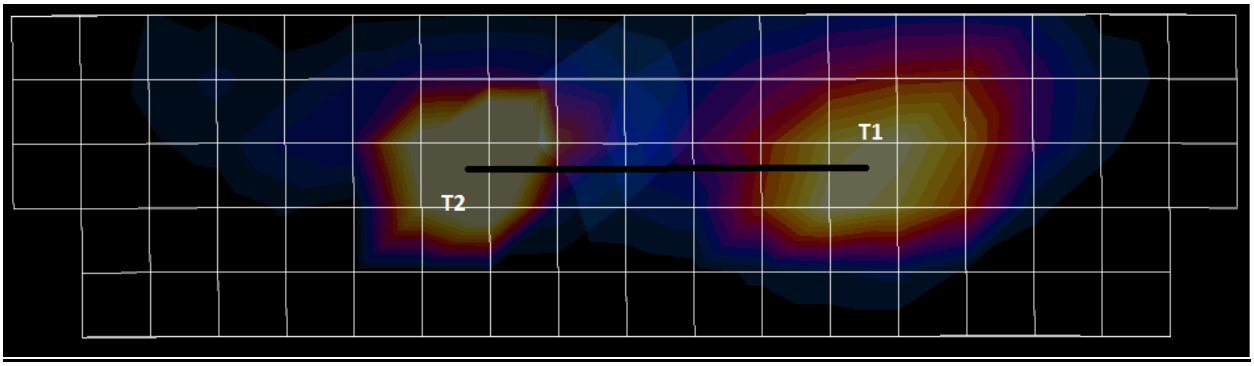
LTE Back Surface + WiFi Channel 1 Back Surface:



Peak SAR location for LTE(point T1) is (-0.0118, 0.105, -0.207)
Peak SAR location for WiFi (pont T2) is (-0.0245, -0.0345, -0.207)
Peak location spacing = 14.008cm
SPLSR = (1.01 + 1.42) / 14.008 = 0.1735 which has been rounded to 0.17 in the table above.

For the CDMA 800 and WiFi combination on back surface:

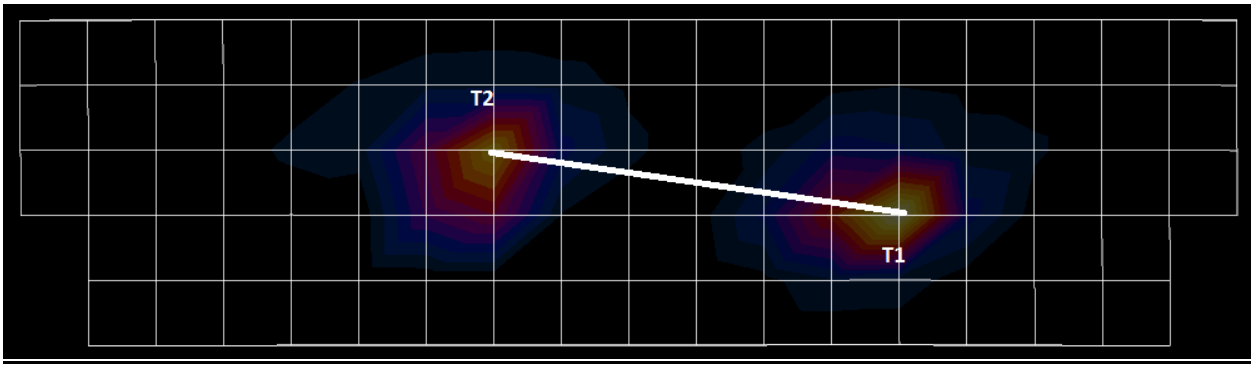
CDMA 800 Channel 384+ WiFi Channel 1 Back Surface:



Peak SAR location for CDMA 800 (point T1) is (-0.0263, 0.0511, -0.206)
Peak SAR location for WiFi (pont T2) is (-0.0245, -0.0345, -0.207)
Peak location spacing = 8.56248
SPLSR = (1.00 + 1.42) / 8.56248 = 0.2826 which has been rounded to 0.28 in the table above.

For the CDMA 1900 and WiFi combination on back surface:

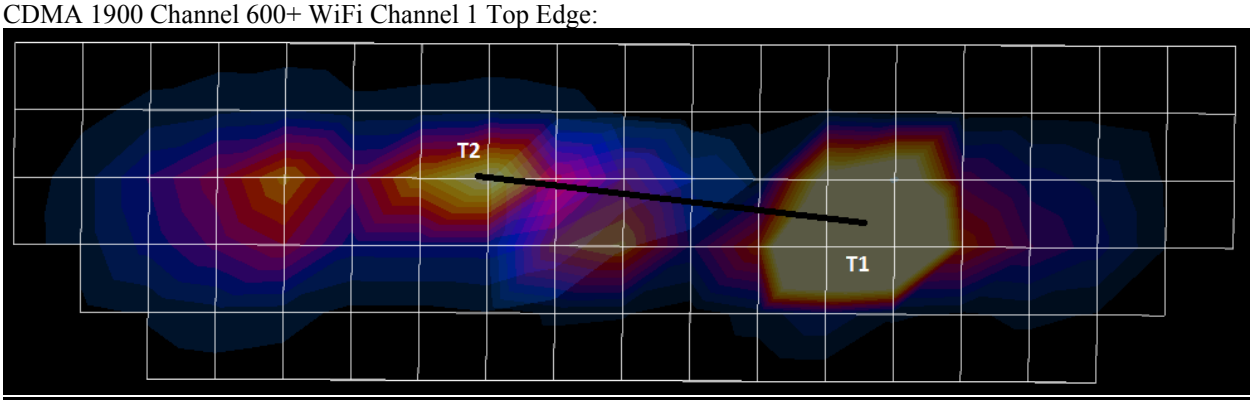
CDMA 1900 Channel 1175+ WiFi Channel 1 Back Surface:



Peak SAR location for CDMA 1900 (point T1) is (-0.0185, 0.057, -0.206)
Peak SAR location for WiFi (pont T2) is (-0.0245, -0.0345, -0.207)
Peak location spacing = 9.17
SPLSR = (1.45 + 1.42) / 9.17 = 0.313 which has been rounded to 0.31 in the table above.

For the CDMA 1900 and WiFi combination on Top Edge:

CDMA 1900 Channel 600+ WiFi Channel 1 Top Edge:



Peak SAR location for CDMA 1900 (point T1) is (-0.013, 0.0557, -0.206)
Peak SAR location for WiFi (pont T2) is (-0.0189, -0.0347, -0207)
Peak location spacing = 9.059785
SPLSR = (1.38 + 0.37) / 9.059785 = 0.19316 which has been rounded to 0.19 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: 9/3/2011 4:56:11 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 Refl.Pwr PM3 = -27.9dB Sim.Temp@SPC = 19.7ºC Room Temp @ SPC = 21.2ºC
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 = 55.6; ρ = 1000 kg/m^3

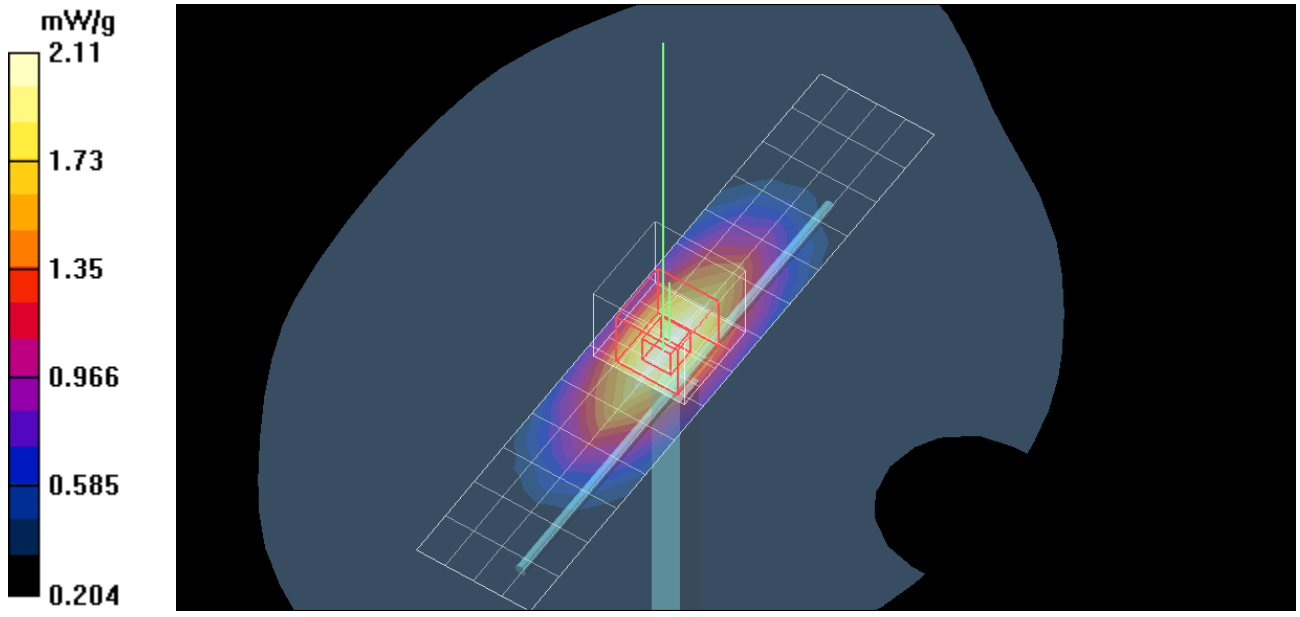
DASY4 Configuration:

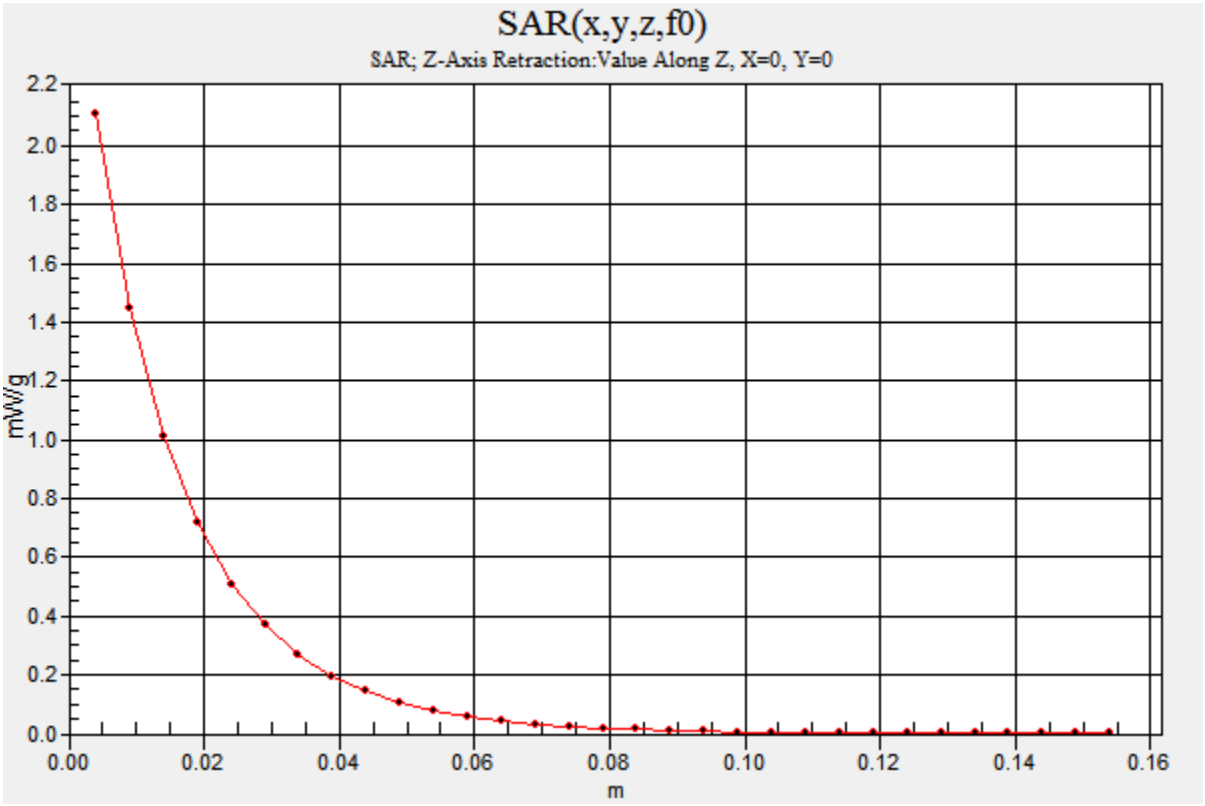
- Probe: ES3DV3 - SN3115; ConvF(5.88, 5.88, 5.88); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 2.11 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.3 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 2.83 W/kg
SAR(1 g) = 1.96 mW/g; SAR(10 g) = 1.29 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: 9/8/2011 8:24:15 AM

Test Laboratory: Motorola 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:436TR
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -21.50 dB Sim.Temp@SPC = 19.2ºC Room Temp @ SPC = 21.0ºC
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 = 53.5; ρ = 1000 kg/m^3

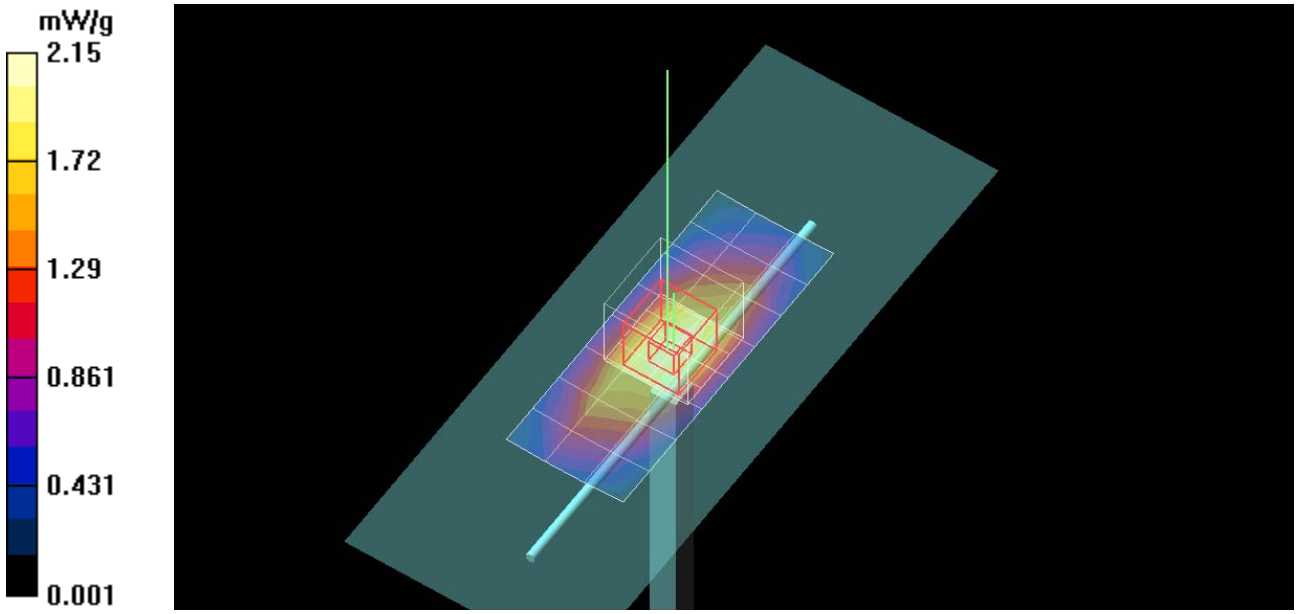
DASY4 Configuration:

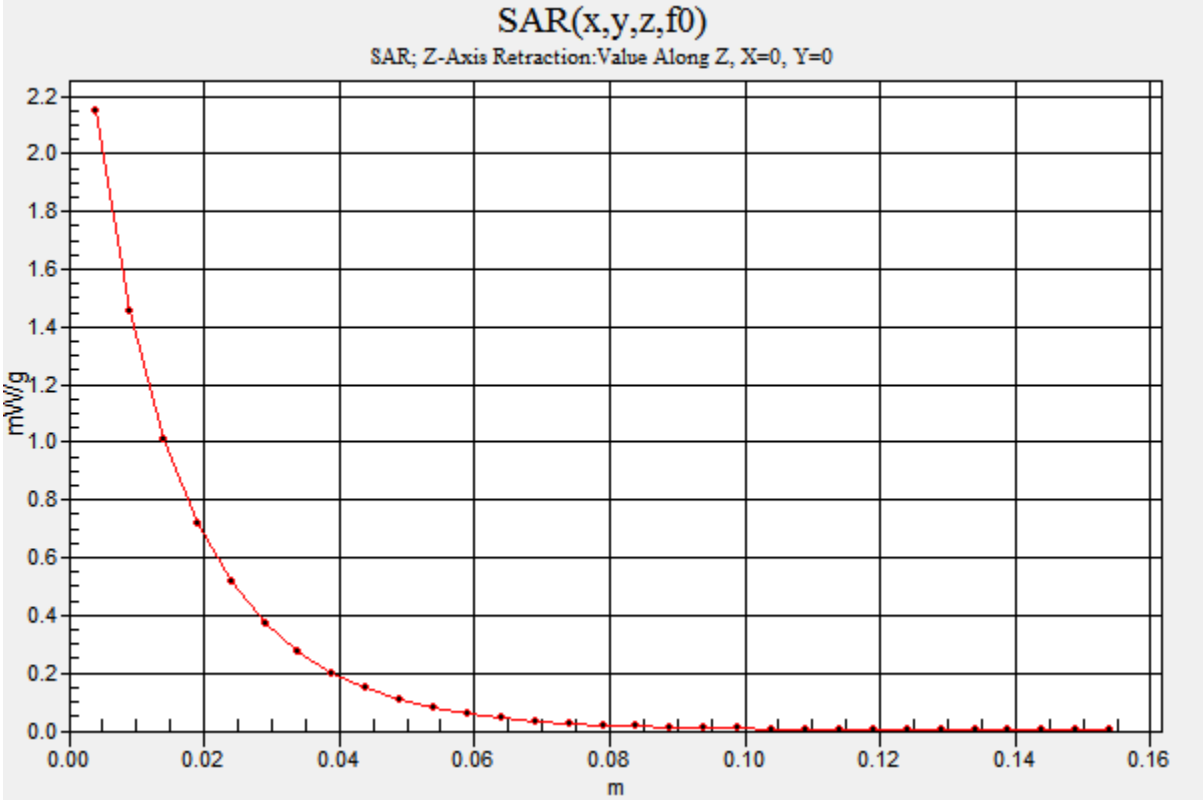
- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/20/2010
- Phantom: R#2_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.90 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.5 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 2.97 W/kg
SAR(1 g) = 1.99 mW/g; SAR(10 g) = 1.31 mW/g
Maximum value of SAR (measured) = 2.15 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
2.2
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: 9/15/2011 7:18:29 AM

Test Laboratory: Motorola 835 MHz System Configuration

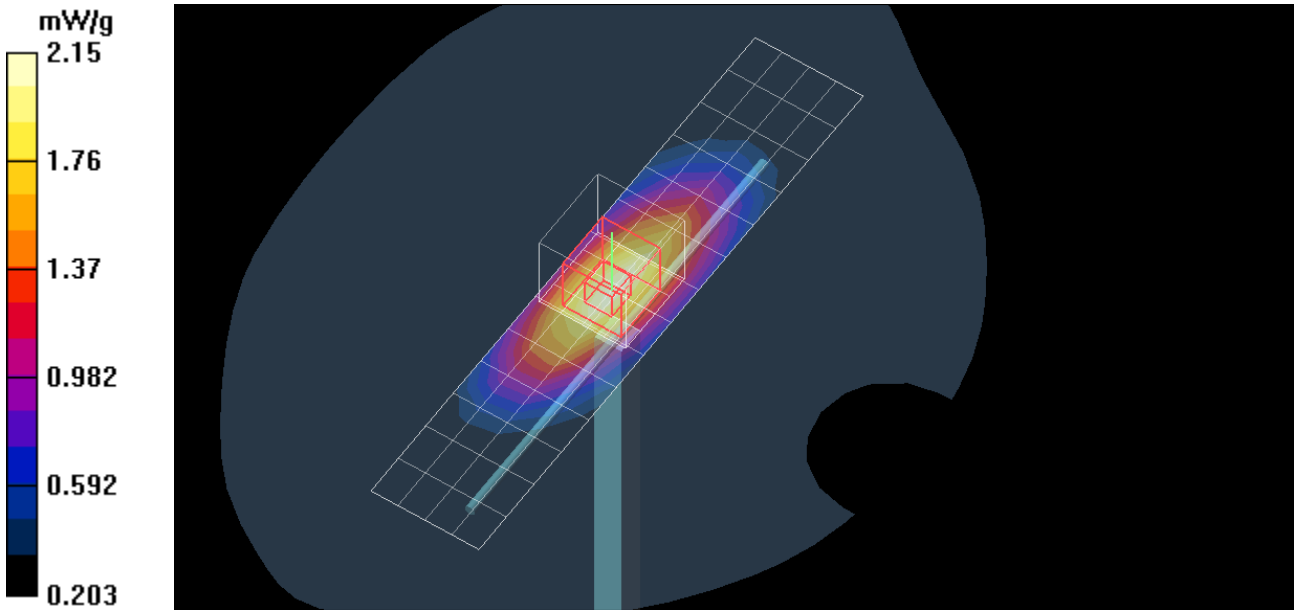
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:436tr
Procedure Notes: PM1 Power = 200 Refl.Pwr PM3 = -21.80 dB Sim.Temp@SPC = 19.7ºC Room Temp @ SPC = 21.1ºC
Communication System: CW - Dipole; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 54.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 2.12 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) = 2.93 W/kg
SAR(1 g) = 1.99 mW/g; SAR(10 g) = 1.32 mW/g
Maximum value of SAR (measured) = 2.15 mW/g



Date/Time: 9/26/2011 7:29:34 AM

Test Laboratory: Motorola 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:436TR
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -22.20 dB Sim.Temp@SPC = 20.5ºC Room Temp @ SPC = 21.1
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 = 55.5; ρ = 1000 kg/m^3

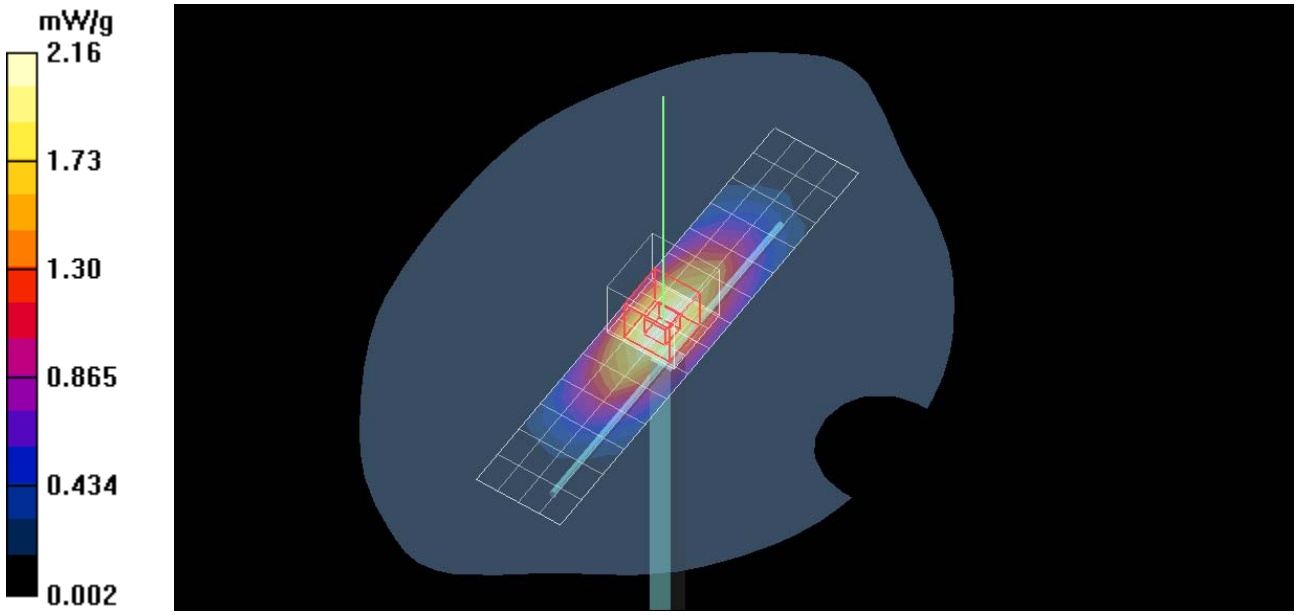
DASY4 Configuration:

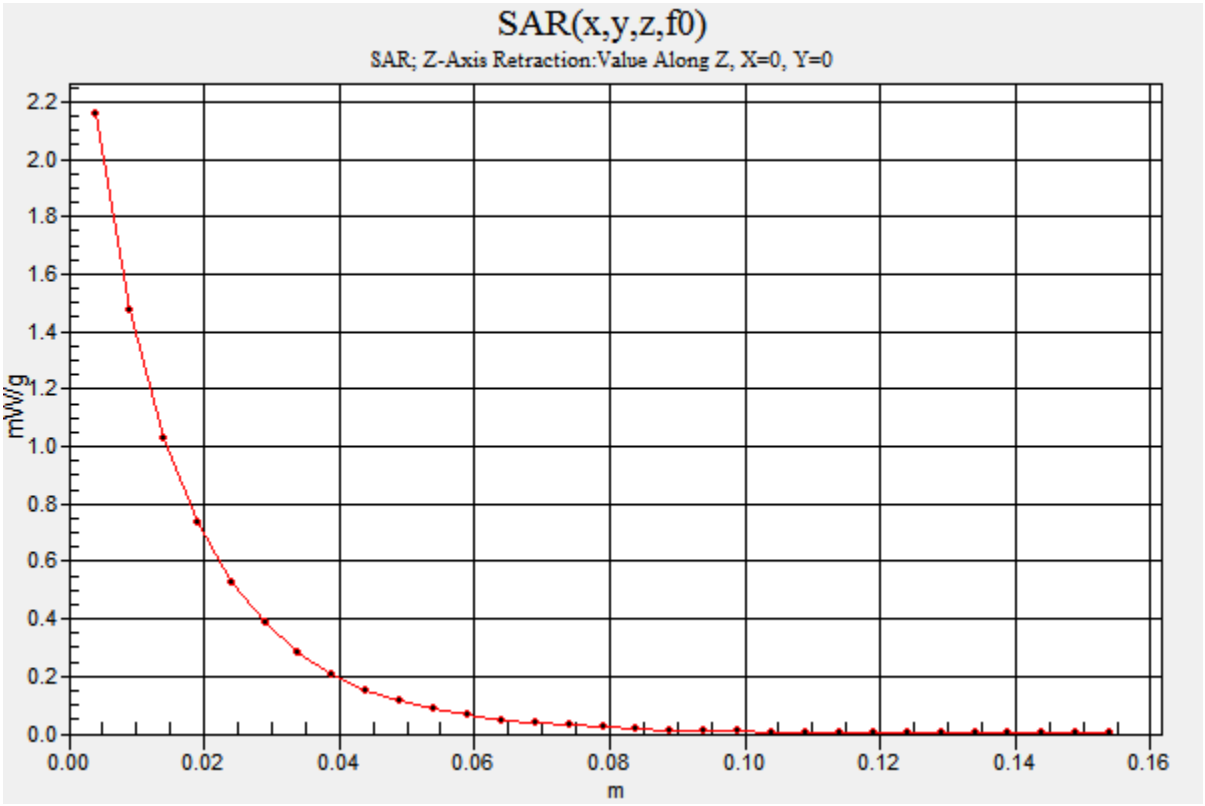
- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 2.15 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 = -0.018 dB
Peak SAR (extrapolated) = 2.95 W/kg
SAR(1 g) = 2.01 mW/g; SAR(10 g) = 1.33 mW/g
Maximum value of SAR (measured) = 2.17 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.16 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: 10/4/2011 7:24:23 AM

Test Laboratory: Motorola 835 MHz System Peformance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:436TR
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -21.15 dB Sim.Temp@SPC = 20.2ºC Room Temp @ SPC = 21.5ºC
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 = 55.1; ρ = 1000 kg/m^3

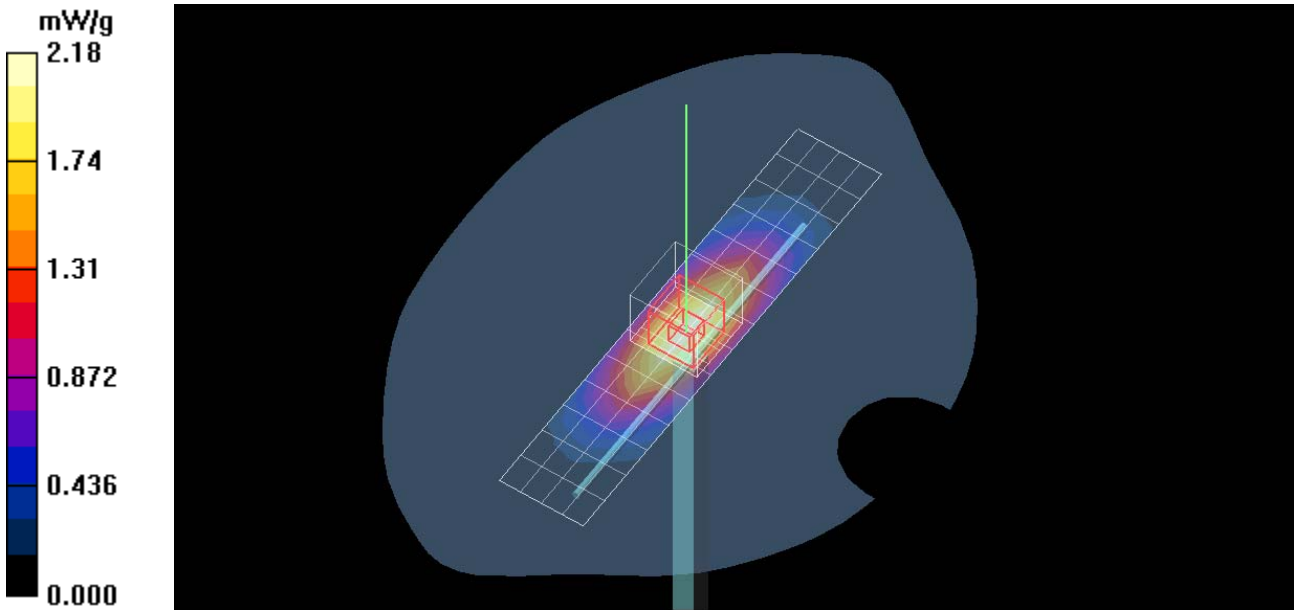
DASY4 Configuration:

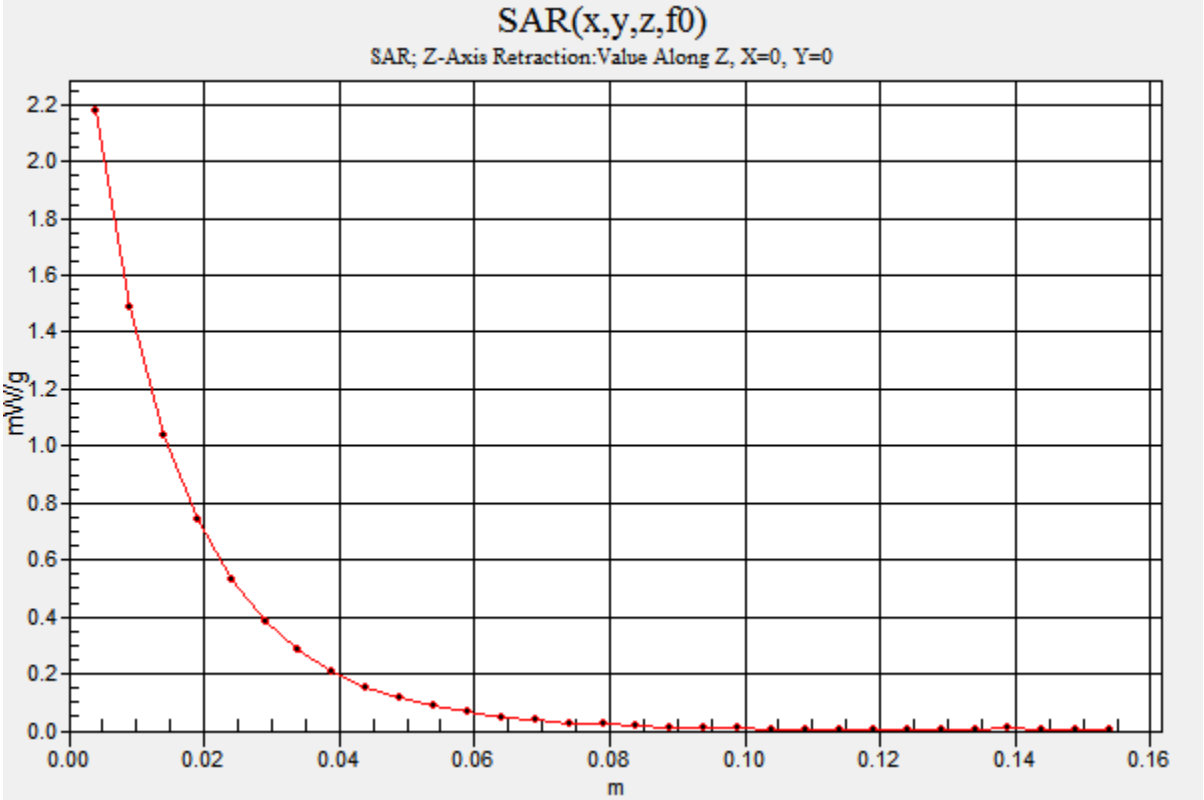
- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 2.17 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.3 V/m; Power Drift = -0.014 dB
Peak SAR (extrapolated) = 2.98 W/kg
SAR(1 g) = 2.02 mW/g; SAR(10 g) = 1.33 mW/g
Maximum value of SAR (measured) = 2.18 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
2.2
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: 9/6/2011 8:19:48 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 = -24.4dB Sim.Temp@SPC =20.5ºC Room Temp @ SPC = 21.2ºC
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 = 51.1; ρ = 1000 kg/m^3

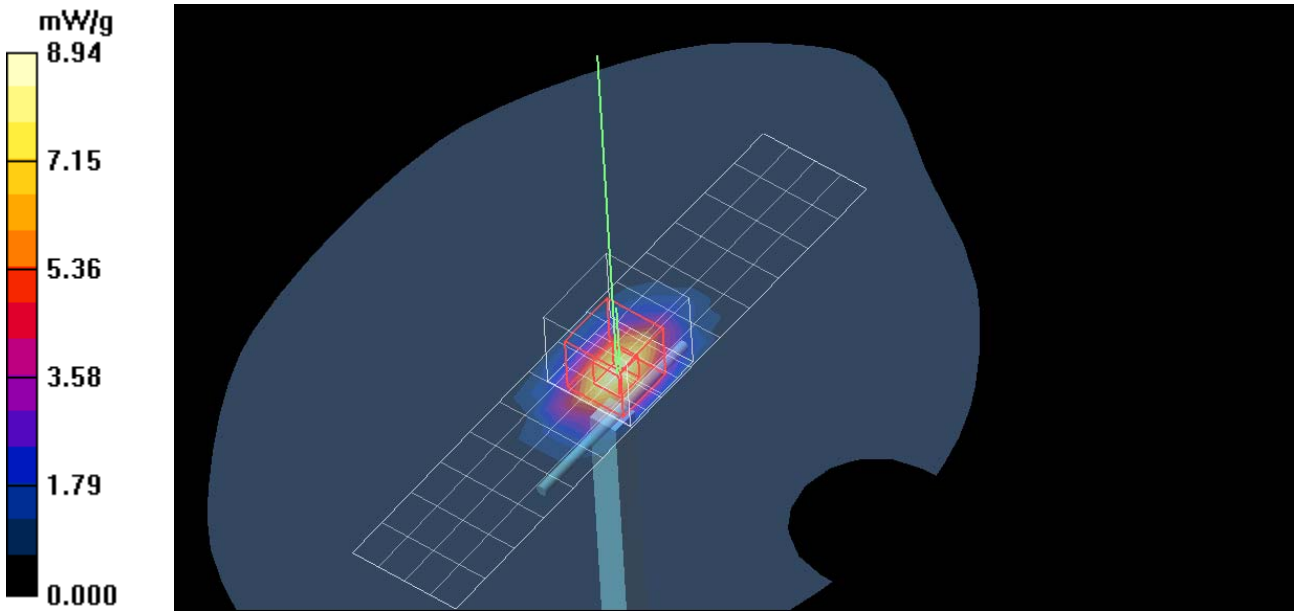
DASY4 Configuration:

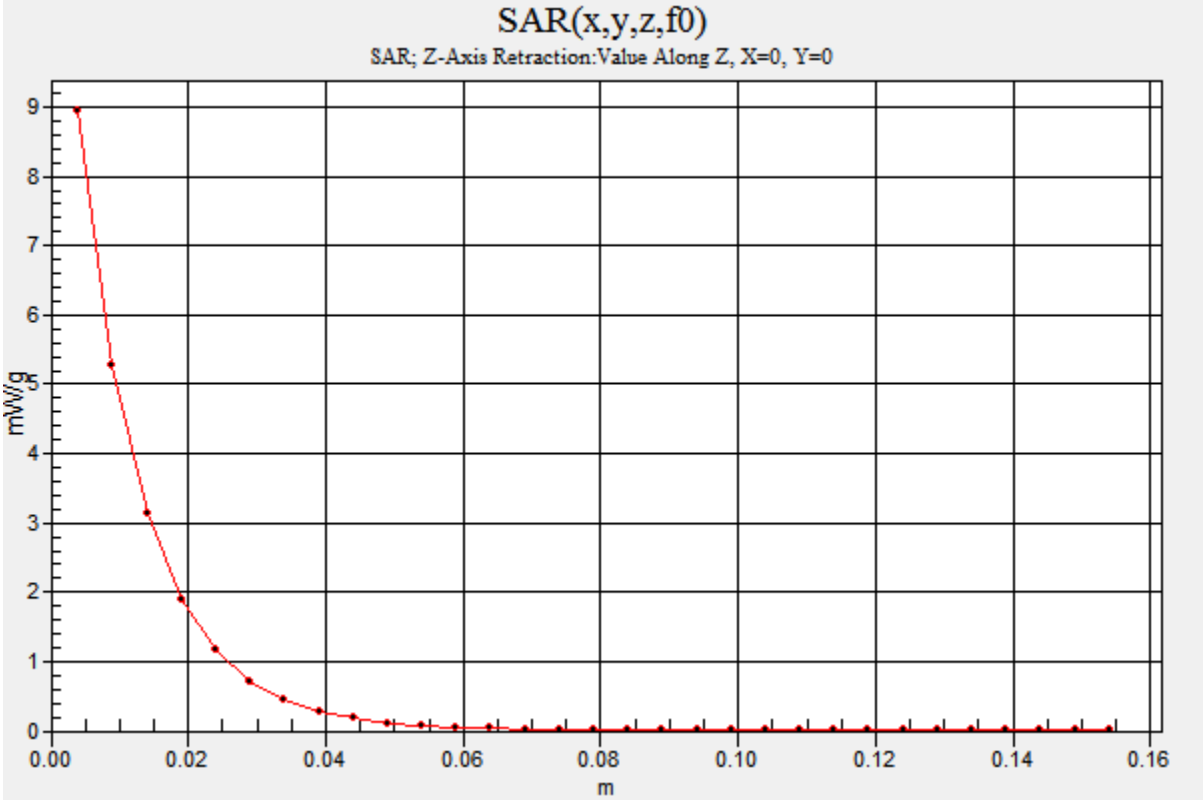
- Probe: ES3DV3 - SN3115; ConvF(4.61, 4.61, 4.61); Calibrated: 1/12/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn434; Calibrated: 1/13/2011
- Phantom: R#-6 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 8.50 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.9 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 13.5 W/kg
SAR(1 g) = 7.9 mW/g; SAR(10 g) = 4.2 mW/g
Maximum value of SAR (measured) = 8.91 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.94 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
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Date/Time: 10/4/2011 6:44:27 AM

Test Laboratory: Motorola 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271TR
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -21.05 dB Sim.Temp@SPC = 19.7ºC Room Temp @ SPC = 21.5ºC
Communication System: CW - Dipole; Frequency: 1800 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.49 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3

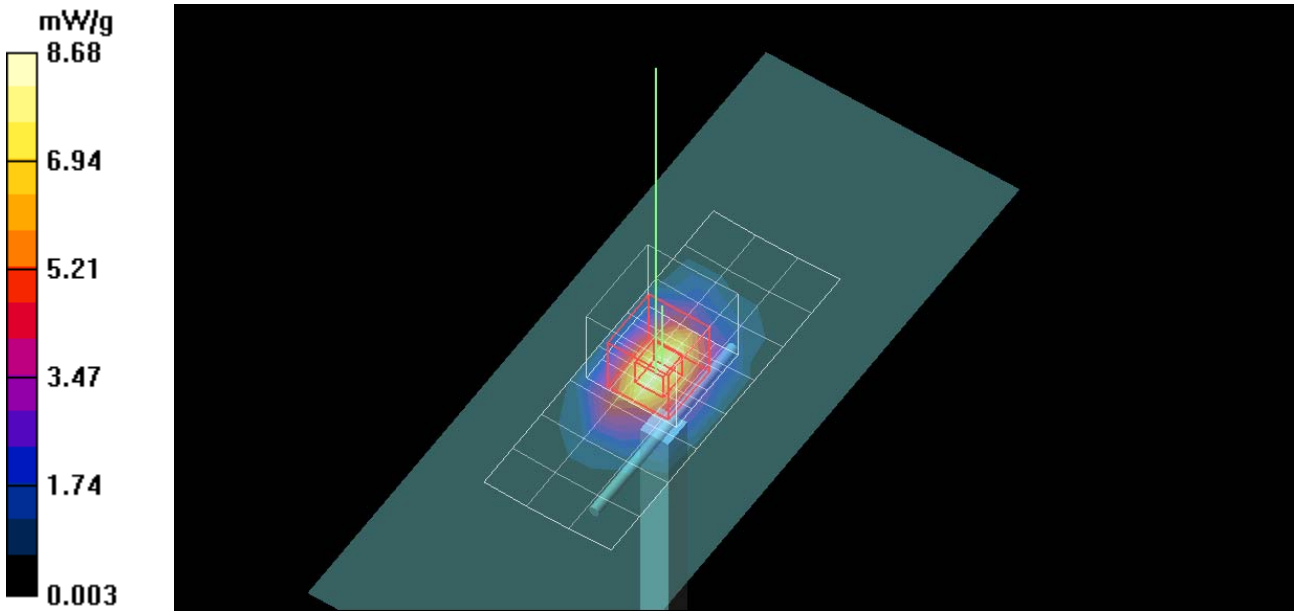
DASY4 Configuration:

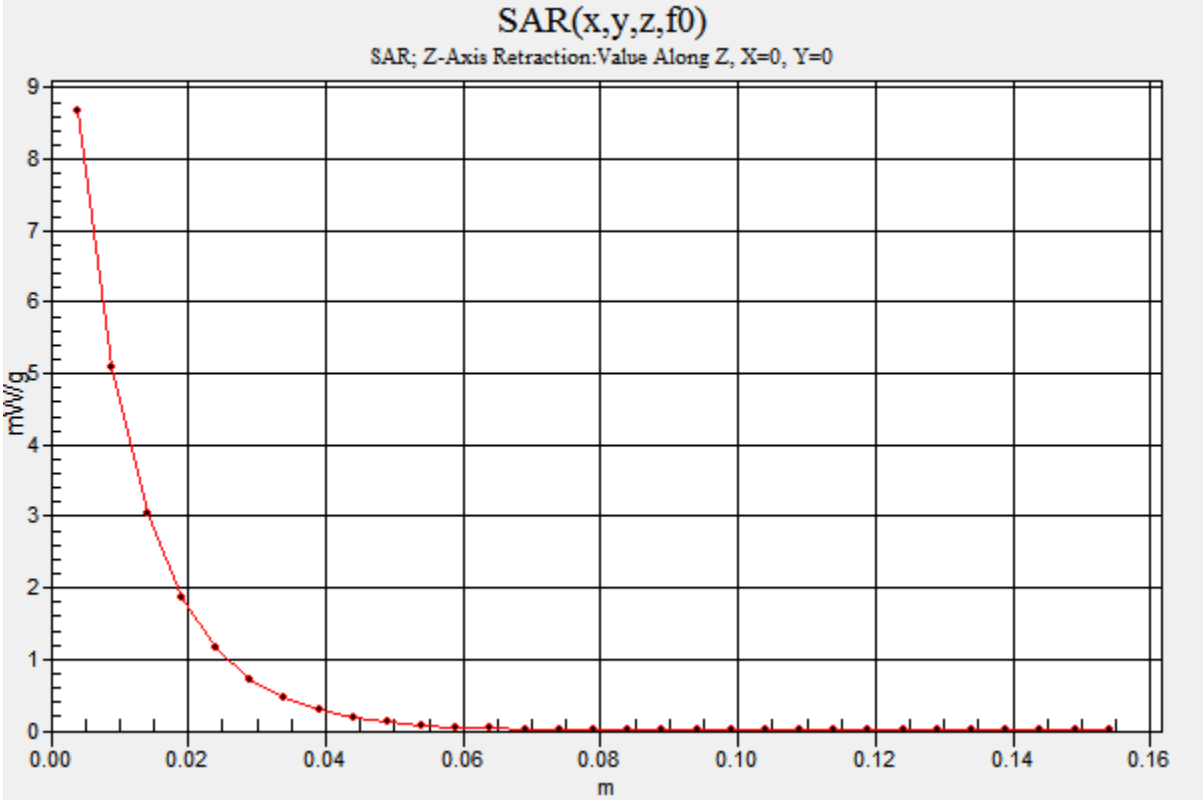
- Probe: ES3DV3 - SN3184; ConvF(4.9, 4.9, 4.9); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 7.46 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 75.3 V/m; Power Drift = -0.017 dB
Peak SAR (extrapolated) = 13.7 W/kg
SAR(1 g) = 7.8 mW/g; SAR(10 g) = 4.16 mW/g
Maximum value of SAR (measured) = 8.70 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.68 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
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Date/Time: 9/21/2011 9:18:25 AM

Test Laboratory: Motorola 2450 MHz System Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:766
Procedure Notes: PM1 Power =200 mW Refl.Pwr PM3 = -22.55B Sim.Temp@SPC = 20.5 Room Temp @ SPC = 21.2
Communication System: CW - Dipole; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 2450 MHz; σ = 1.92 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

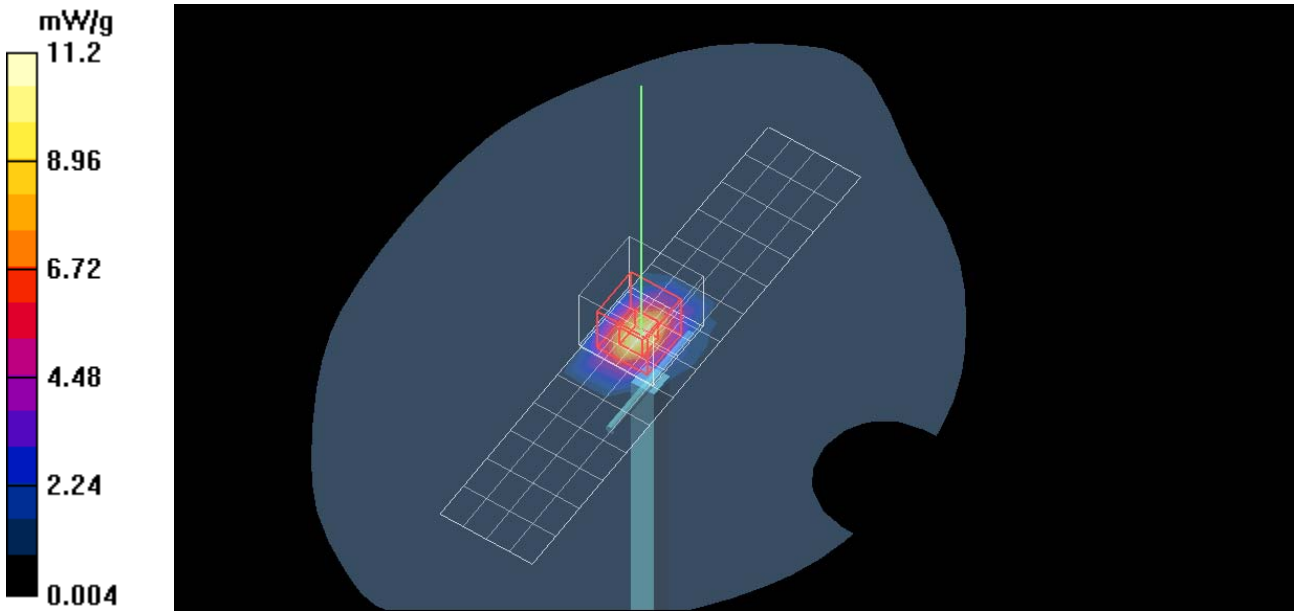
DASY4 Configuration:

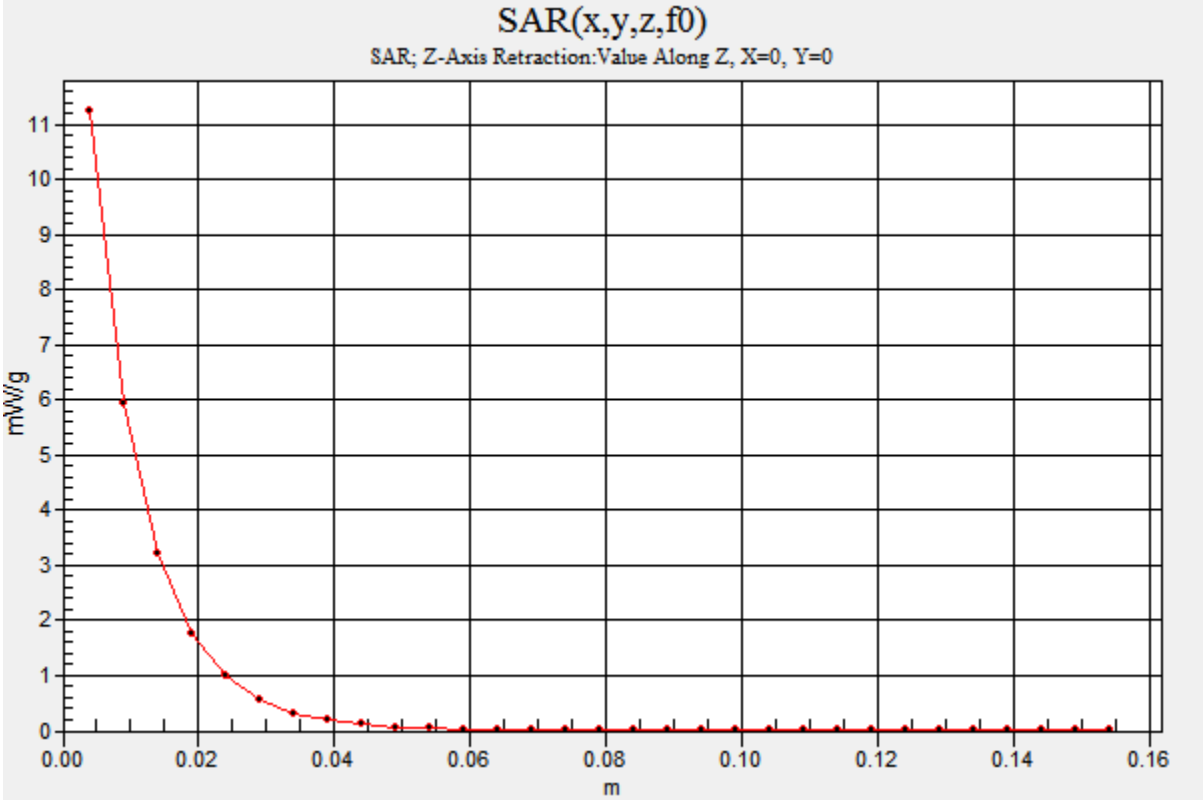
- Probe: ES3DV3 - SN3184; ConvF(4.33, 4.33, 4.33); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 9.68 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 67.8 V/m; Power Drift = 0.103 dB
Peak SAR (extrapolated) = 19.7 W/kg
SAR(1 g) = 9.87 mW/g; SAR(10 g) = 4.65 mW/g
Maximum value of SAR (measured) = 11.3 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 11.2 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
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Date/Time: 9/24/2011 6:15:53 AM

Test Laboratory: Motorola 2450 MHz System Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:740
Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -24.2dB Sim.Temp@SPC = 20.2ºC Room Temp @ SPC = 21.3ºC
Communication System: CW - Dipole; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 2450 MHz; σ = 1.92 mho/m; ε_r = 52; ρ = 1000 kg/m^3

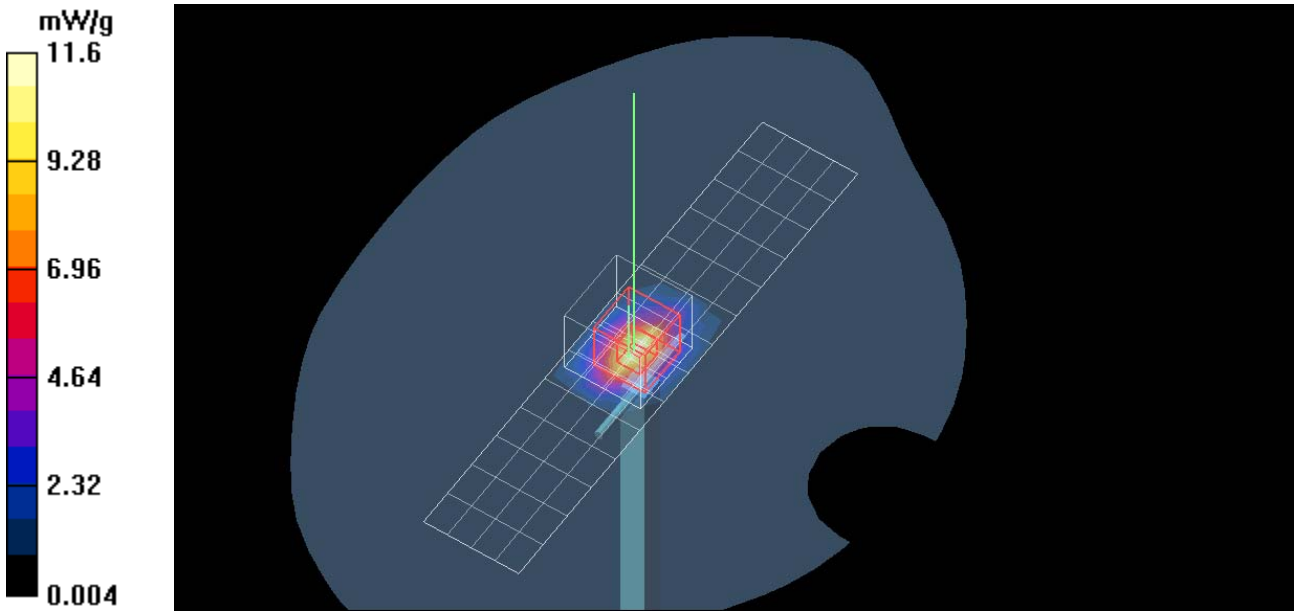
DASY4 Configuration:

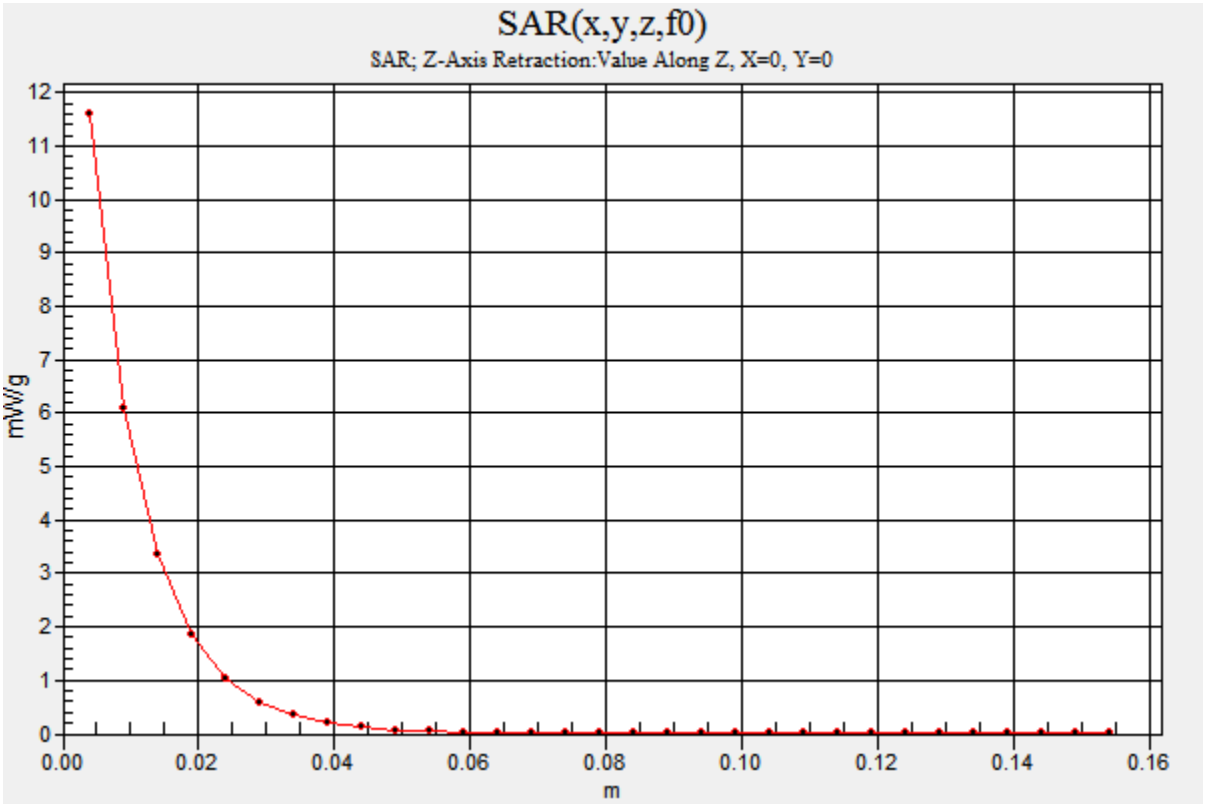
- Probe: ES3DV3 - SN3184; ConvF(4.33, 4.33, 4.33); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 11.5 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.8 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 20.3 W/kg
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 4.81 mW/g
Maximum value of SAR (measured) = 11.2 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 11.6 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
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: 9/26/2011 9:39:30 AM

Test Laboratory: Motorola LTE Band 13 - Top Edge

DUT: Serial: KPE00G0040, FCC ID: IHDP56MF1
Procedure Notes: 16QAM 1 RB Allocation Battery Model #: internal Test Configuration =Top Edge of DUT 0mm from Phantom
Communication System: LTE Band 13; Frequency: 782 MHz;Duty Cycle: 1:1
Medium: Low Freq Body (big body); Medium parameters used: f = 782 MHz; σ = 0.93 mho/m; ε_r = 56.1; ρ = 1000 kg/m^3

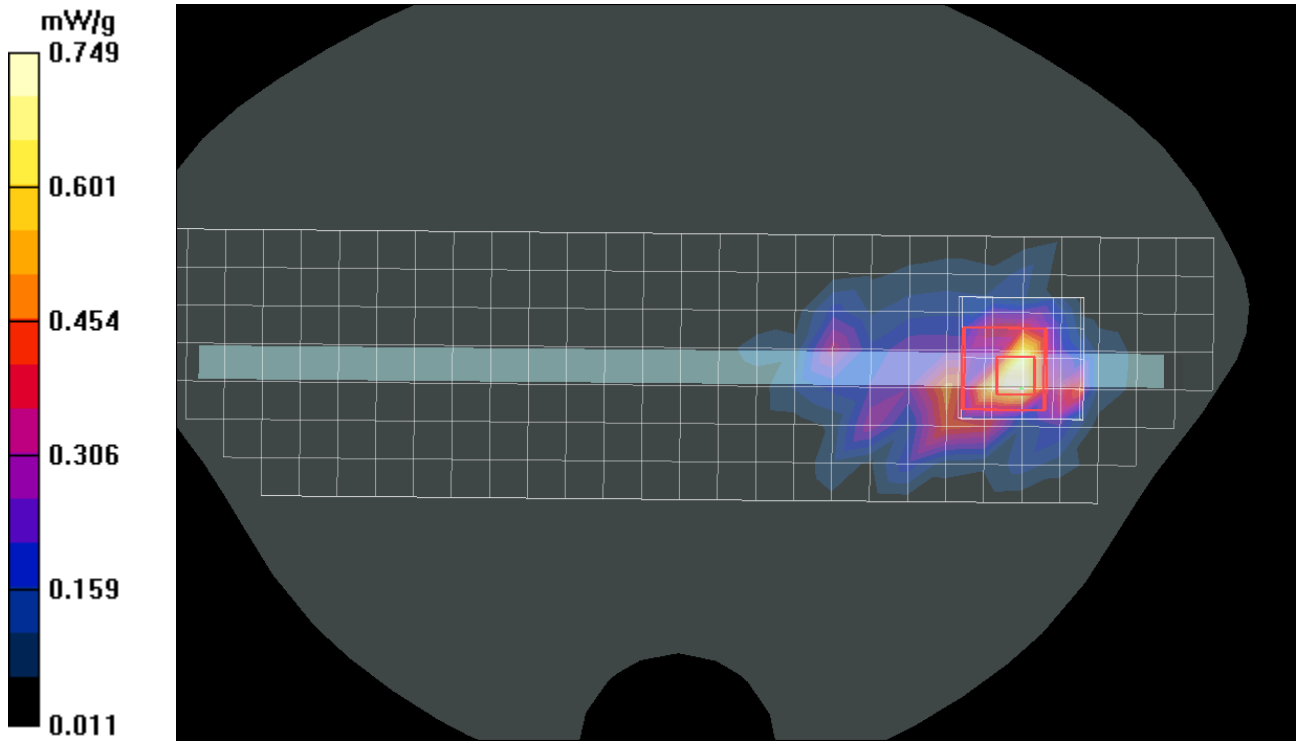
DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.640 mW/g

SAM Phone Against Flat Section/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.1 V/m; Power Drift = 0.025 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 0.635 mW/g; SAR(10 g) = 0.276 mW/g
Maximum value of SAR (measured) = 0.749 mW/g



Date/Time: 9/3/2011 6:25:45 AM

Test Laboratory: Motorola CDMA / EVDO 800 - Top Edge

DUT: Serial: KPE00G0040, FCC ID: IHDP56MF1
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: big body; Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 55.6; ρ = 1000 kg/m^3

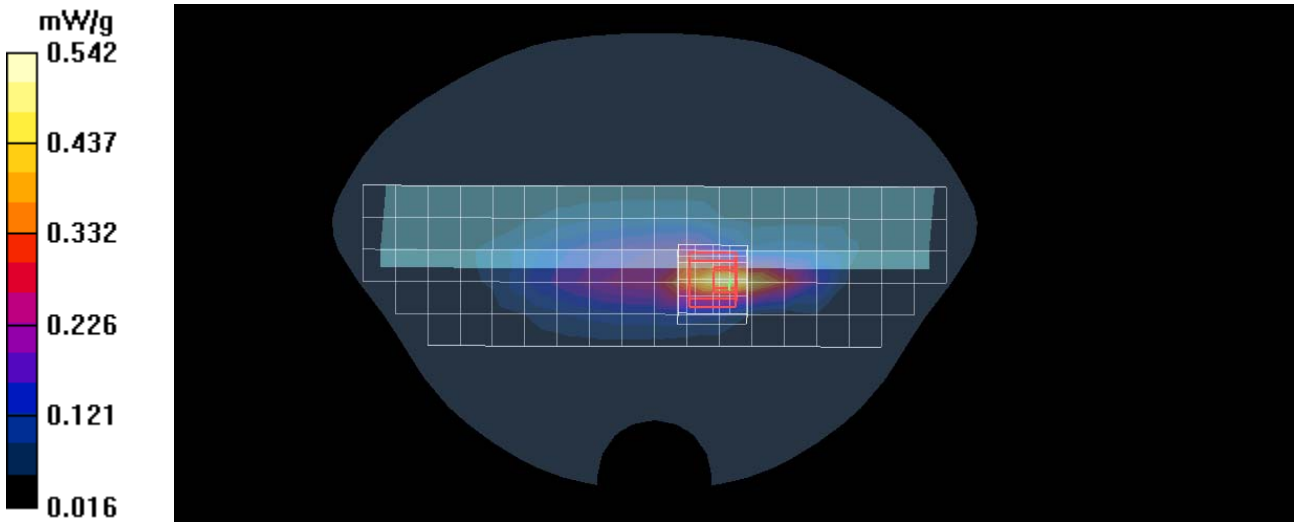
DASY4 Configuration:

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

SAM Phone Against Flat Section/Tablet Long Edge Area Scan - Body (15mm) (21x6x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.498 mW/g

SAM Phone Against Flat Section/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.2 V/m; Power Drift = 0.123 dB
Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.448 mW/g; SAR(10 g) = 0.227 mW/g
Maximum value of SAR (measured) = 0.542 mW/g



Date/Time: 9/6/2011 12:46:03 PM

Test Laboratory: Motorola CDMA / EVDO 1900 - Top Edge

DUT: Serial: KPE00G0040, FCC ID: IHDP56MF1
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 = 1.58 mho/m; ε_r = 50.8; ρ = 1000 kg/m^3

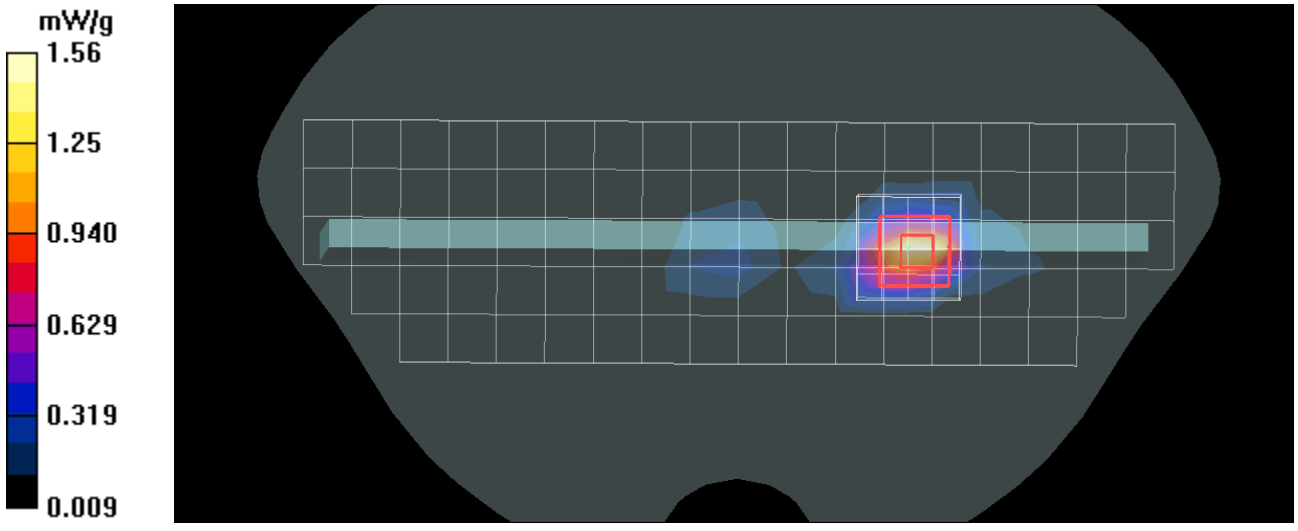
DASY4 Configuration:

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

SAM Phone Against Flat Section/Tablet Long Edge Area Scan - Body (15mm) (21x6x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.917 mW/g

SAM Phone Against Flat Section/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.0 V/m; Power Drift = -0.188 dB
Peak SAR (extrapolated) = 2.74 W/kg
SAR(1 g) = 1.32 mW/g; SAR(10 g) = 0.560 mW/g
Maximum value of SAR (measured) = 1.56 mW/g



Date/Time: 9/21/2011 9:53:12 PM

Test Laboratory: Motorola 2450 MHz WiFi - Top Edge

DUT: Serial: KPE00G0052, FCC ID: IHDP56MF1
Procedure Notes: 802.11b 1 Mbps Chn 1 Battery Model #: Internal Tester Test Configuration = Top Edge of DUT 0mm from Flat Phantom
Communication System: Wi-Fi 2450; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: 2450 Glycol Body; Medium parameters used: f = 2450 MHz; σ = 1.92 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

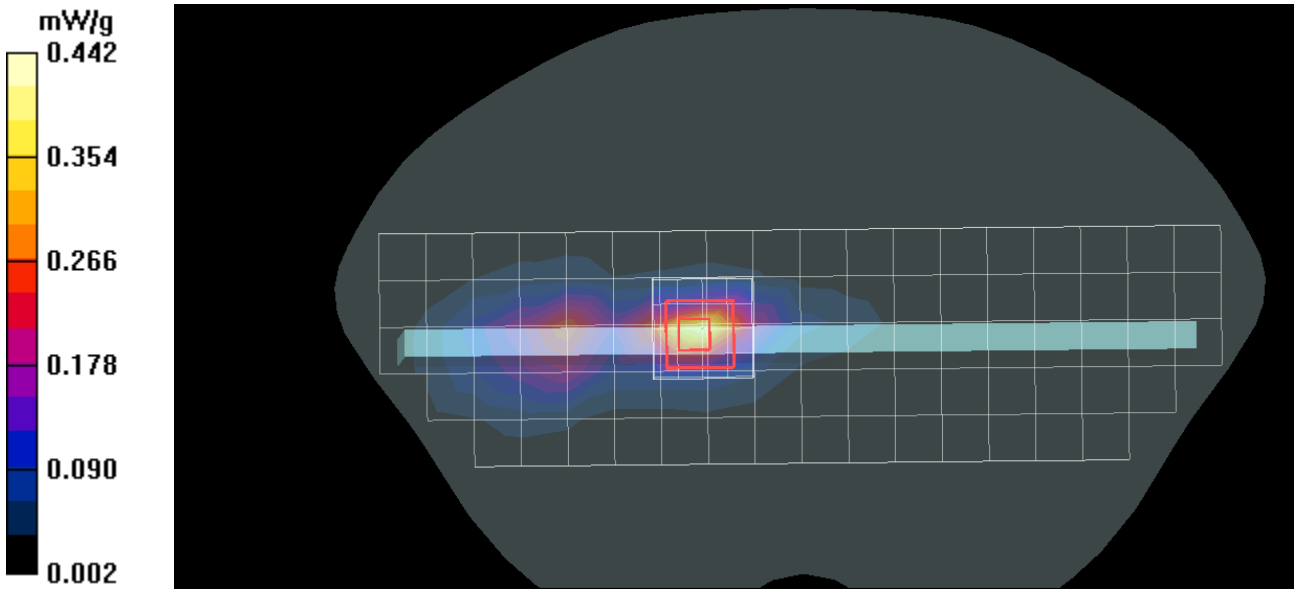
DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.33, 4.33, 4.33); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Tablet Long Edge Area Scan - Body (15mm) (21x6x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.385 mW/g

SAM Phone Against Flat Section/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.1 V/m; Power Drift = -0.086 dB
Peak SAR (extrapolated) = 0.758 W/kg
SAR(1 g) = 0.365 mW/g; SAR(10 g) = 0.157 mW/g
Maximum value of SAR (measured) = 0.442 mW/g



Date/Time: 9/8/2011 1:55:28 PM

Test Laboratory: Motorola LTE Band 13 - Back Surface

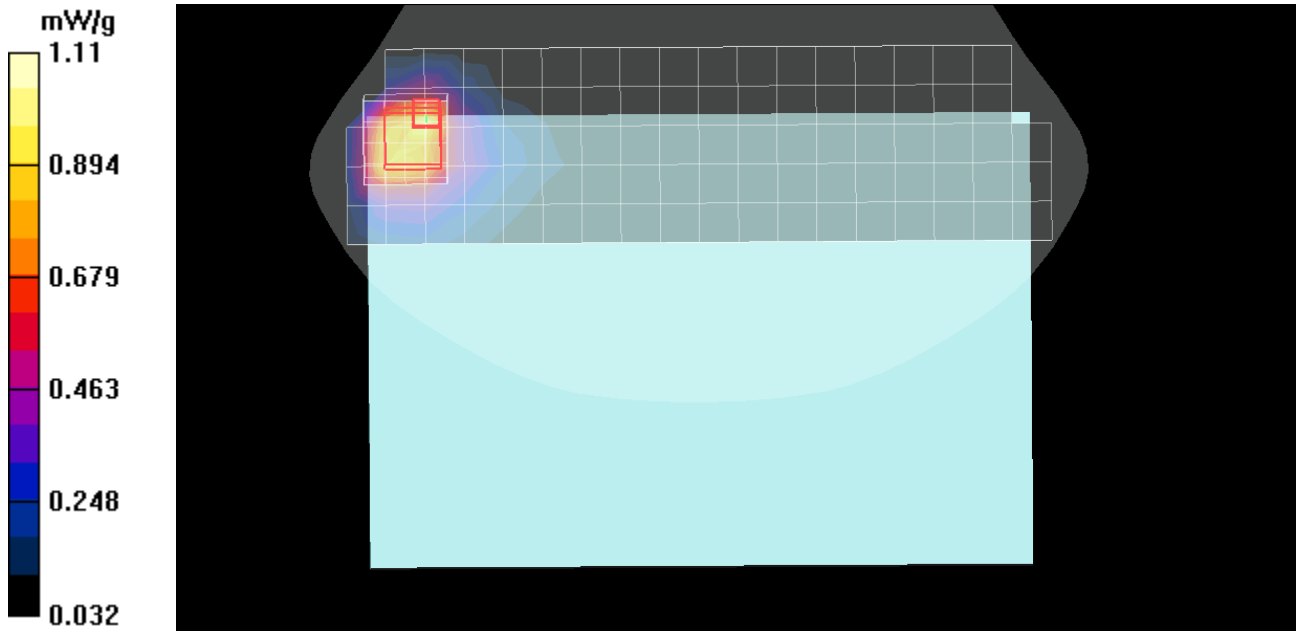
DUT: Serial: KPE00G0040, FCC ID: IHDP56MF1
Procedure Notes: 16QAM 50% RB Allocation Battery Model #: internal Test Configuration = Back Surface 0mm from Phantom
Communication System: LTE Band 13; Frequency: 782 MHz;Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 782 MHz; σ = 0.93 mho/m; ε_r = 56; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/20/2010
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Tablet Partial Face (front/back) Area Scan - Normal Body (15mm) (21x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.940 mW/g

SAM Phone Against Flat Section/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.4 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 2.20 W/kg
SAR(1 g) = 0.972 mW/g; SAR(10 g) = 0.531 mW/g
Maximum value of SAR (measured) = 1.11 mW/g



Date/Time: 9/3/2011 5:34:15 AM

Test Laboratory: Motorola CDMA / EVDO 800 - Back Surface

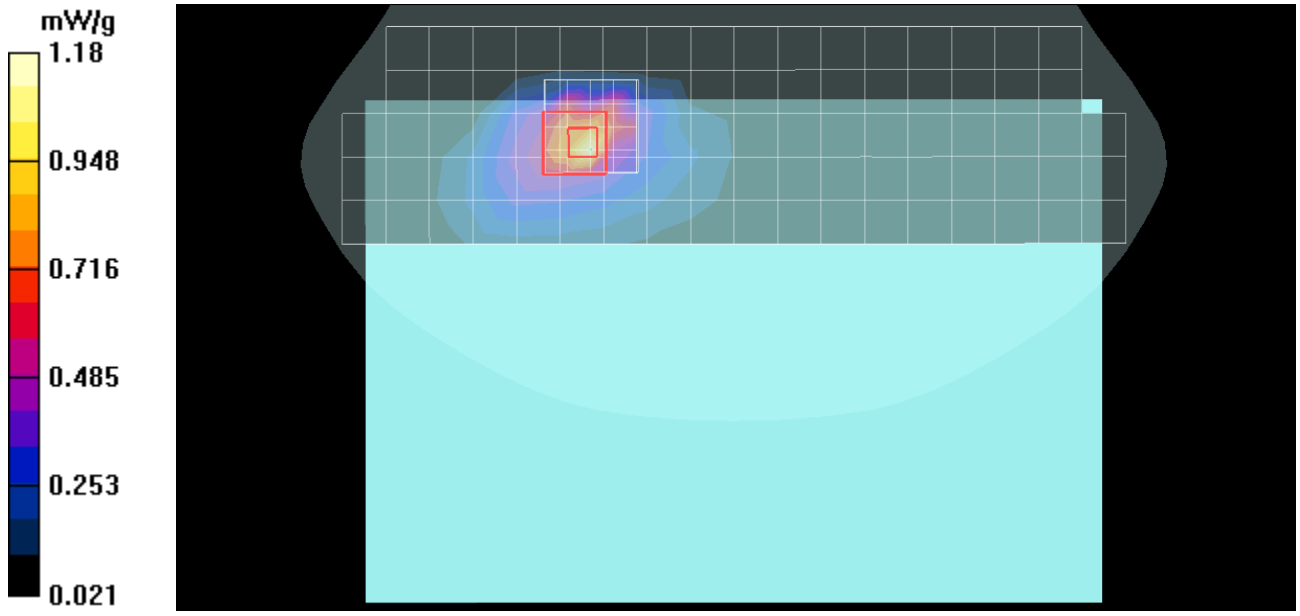
DUT: Serial: KPE00G0040, FCC ID: IHDP56MF1
Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test Configuration = Back Surface 0mm from Phantom
Communication System: CDMA 835; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: big body; Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 55.6; 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 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Tablet Partial Face (front/back) Area Scan - Normal Body (15mm) (21x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.612 mW/g

SAM Phone Against Flat Section/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.5 V/m; Power Drift = -0.162 dB
Peak SAR (extrapolated) = 2.25 W/kg
SAR(1 g) = 0.965 mW/g; SAR(10 g) = 0.492 mW/g
Maximum value of SAR (measured) = 1.18 mW/g



Date/Time: 9/6/2011 12:25:41 PM

Test Laboratory: Motorola CDMA / EVDO 1900 - Back Surface

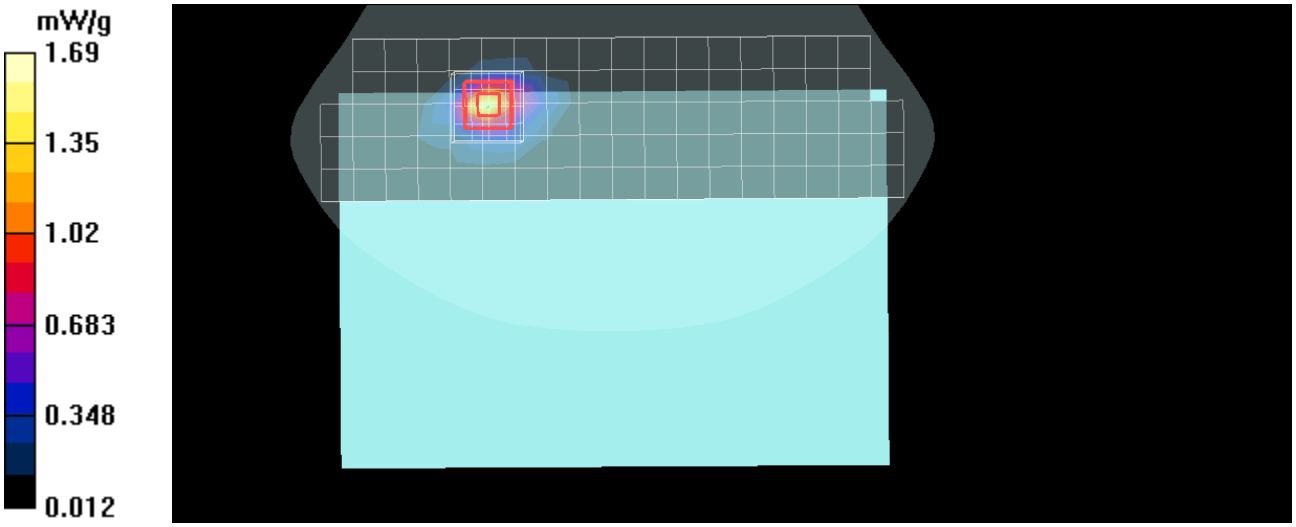
DUT: Serial: KPE00G0040, FCC ID: IHDP56MF1
Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: INTERNAL Test Configuration = Back Surface 0mm from Phantom
Communication System: CDMA 1900; Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 50.8; 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 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1131;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Tablet Partial Face (front/back) Area Scan - Normal Body (15mm) (21x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.64 mW/g

SAM Phone Against Flat Section/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.1 V/m; Power Drift = -0.166 dB
Peak SAR (extrapolated) = 2.85 W/kg
SAR(1 g) = 1.4 mW/g; SAR(10 g) = 0.619 mW/g
Maximum value of SAR (measured) = 1.69 mW/g



Date/Time: 9/24/2011 8:19:49 AM

Test Laboratory: Motorola 2450 MHz WiFi - Back Surface

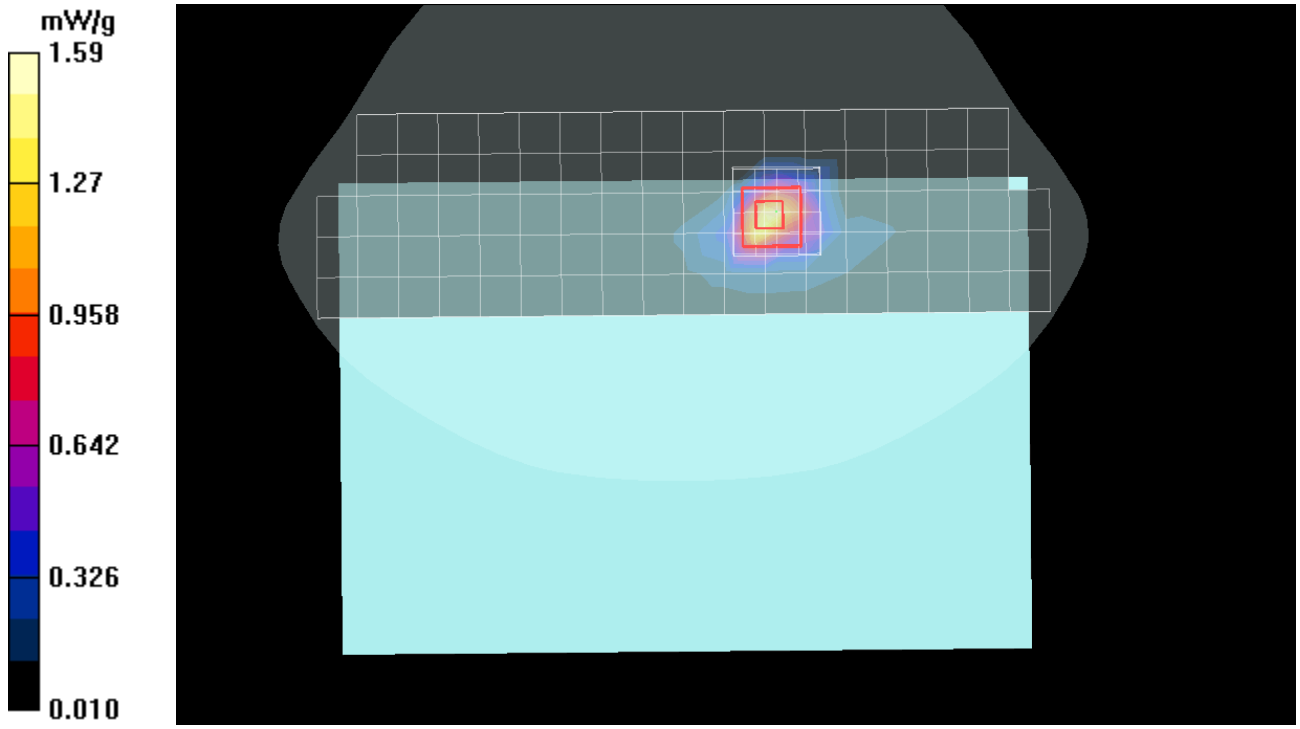
DUT: Serial: KPE00G0052, FCC ID: IHDP56MF1
Procedure Notes: 802.11n 28.9 Mbps Battery Model #: INTERNAL Accessory Model # = Back Surface 0mm from Phantom
Communication System: Wi-Fi 2450; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: 2450 Glycol Body; Medium parameters used: f = 2450 MHz; σ = 1.92 mho/m; ε_r = 52; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.33, 4.33, 4.33); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Tablet Partial Face (front/back) Area Scan - Normal Body (15mm) (21x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.32 mW/g

SAM Phone Against Flat Section/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.3 V/m; Power Drift = 0.077 dB
Peak SAR (extrapolated) = 3.68 W/kg
SAR(1 g) = 1.42 mW/g; SAR(10 g) = 0.600 mW/g
Maximum value of SAR (measured) = 1.59 mW/g



Date/Time: 9/15/2011 9:20:59 PM

Test Laboratory: Motorola LTE Band 13 - Right Edge

DUT: Serial: KPE00G0040 , FCC ID: IHDP56MF1
Procedure Notes: QPSK 50% RB Allocation Battery Model #: internal Test Configuration =Right Edge of DUT 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 = 0.93 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3

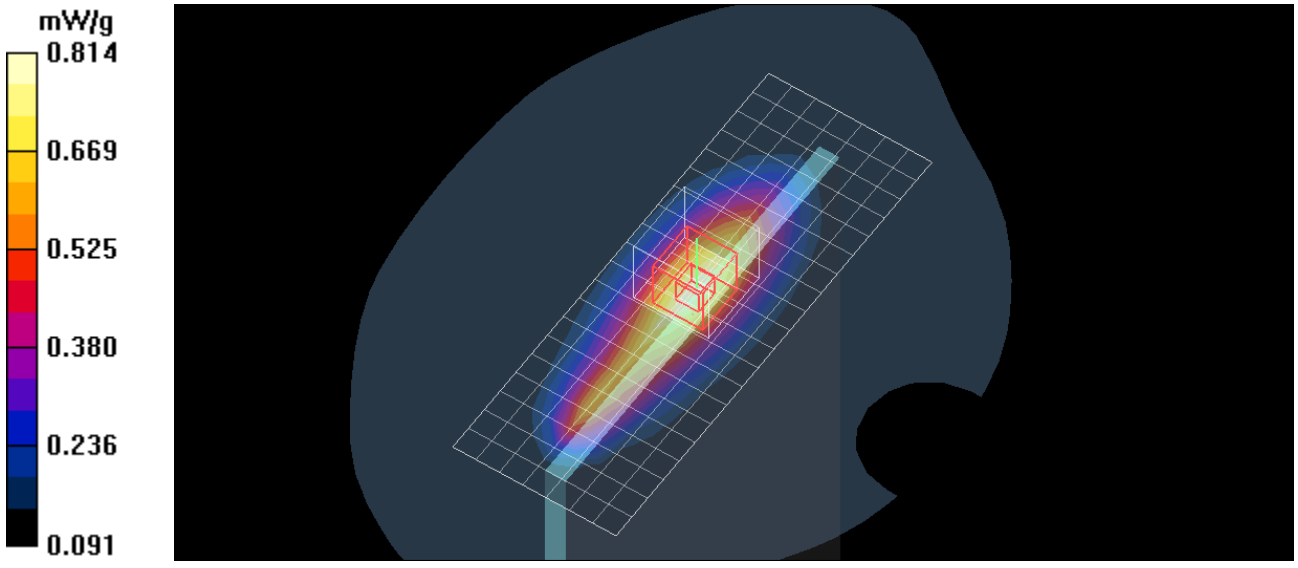
DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Tablet Short Edge Area Scan - Body (10mm) (21x8x1):

Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.797 mW/g

SAM Phone Against Flat Section/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.0 V/m; Power Drift = 0.040 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.749 mW/g; SAR(10 g) = 0.498 mW/g
Maximum value of SAR (measured) = 0.814 mW/g



Date/Time: 10/4/2011 11:54:35 AM

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

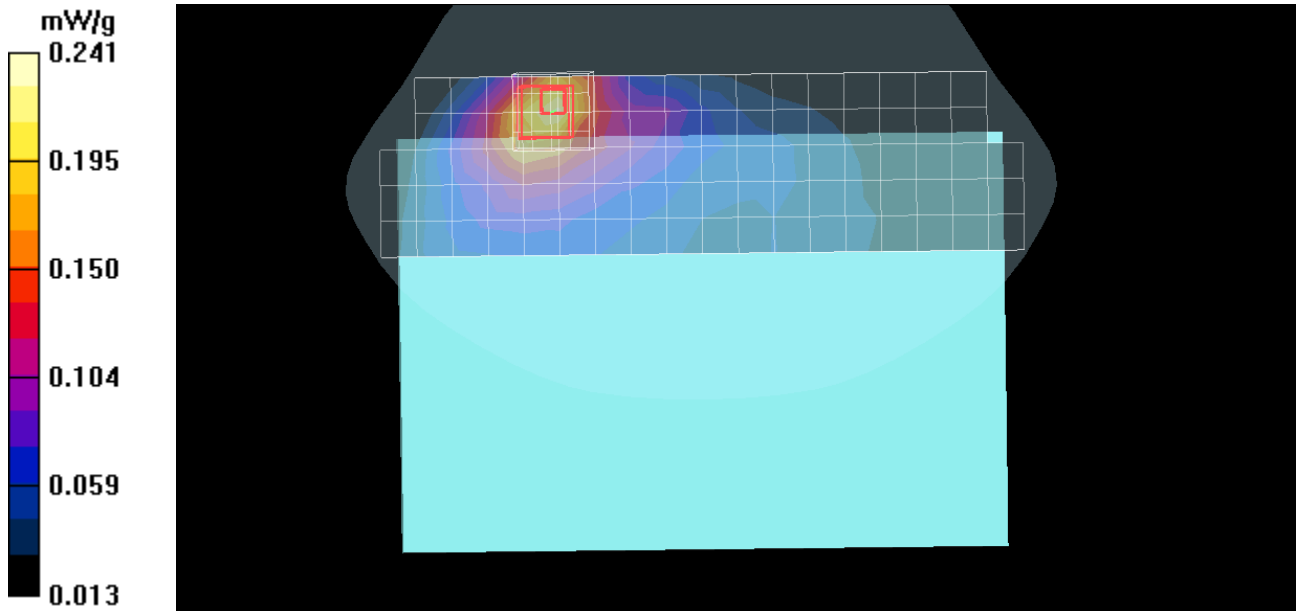
DUT: Serial: KPE00G0040, FCC ID: IHDP56MF1
Procedure Notes: Pwr Step:All up bits Battery Model #: internal Test Configuration = Back Surface 11mm from Phantom
Communication System: CDMA 835; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Tablet Partial Face (front/back) Area Scan - Normal Body (15mm) (21x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.233 mW/g

SAM Phone Against Flat Section/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.3 V/m; Power Drift = -0.381 dB
Peak SAR (extrapolated) = 0.403 W/kg
SAR(1 g) = 0.225 mW/g; SAR(10 g) = 0.144 mW/g
Maximum value of SAR (measured) = 0.241 mW/g



Date/Time: 10/4/2011 2:15:58 PM

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

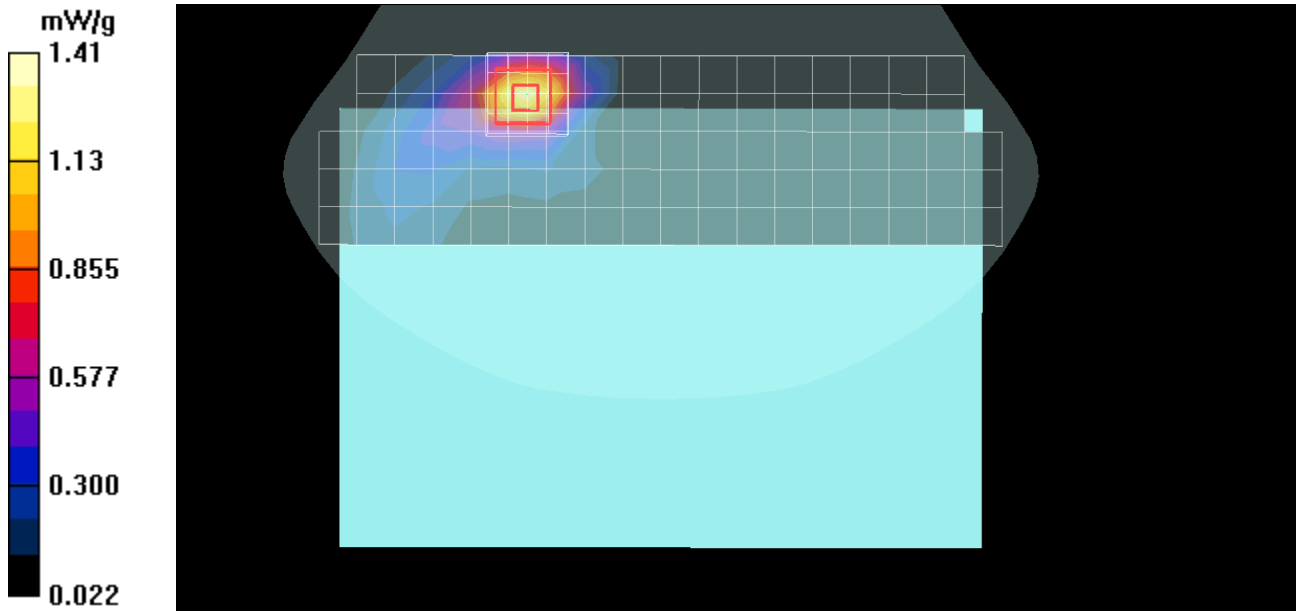
DUT: Serial: KPE00G0040, FCC ID: IHDP56MF1
Procedure Notes: Pwr Step:All up bits Battery Model #: internal Test Configuration: Back Surface 11mm from Phantom
Communication System: CDMA 1900; Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 51; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.9, 4.9, 4.9); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.6 V/m; Power Drift = -0.320 dB
Peak SAR (extrapolated) = 2.18 W/kg
SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.700 mW/g
Maximum value of SAR (measured) = 1.41 mW/g

SAM Phone Against Flat Section/Tablet Partial Face (front/back) Area Scan - Normal Body (15mm) (21x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.33 mW/g



Date/Time: 10/4/2011 11:15:31 AM

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

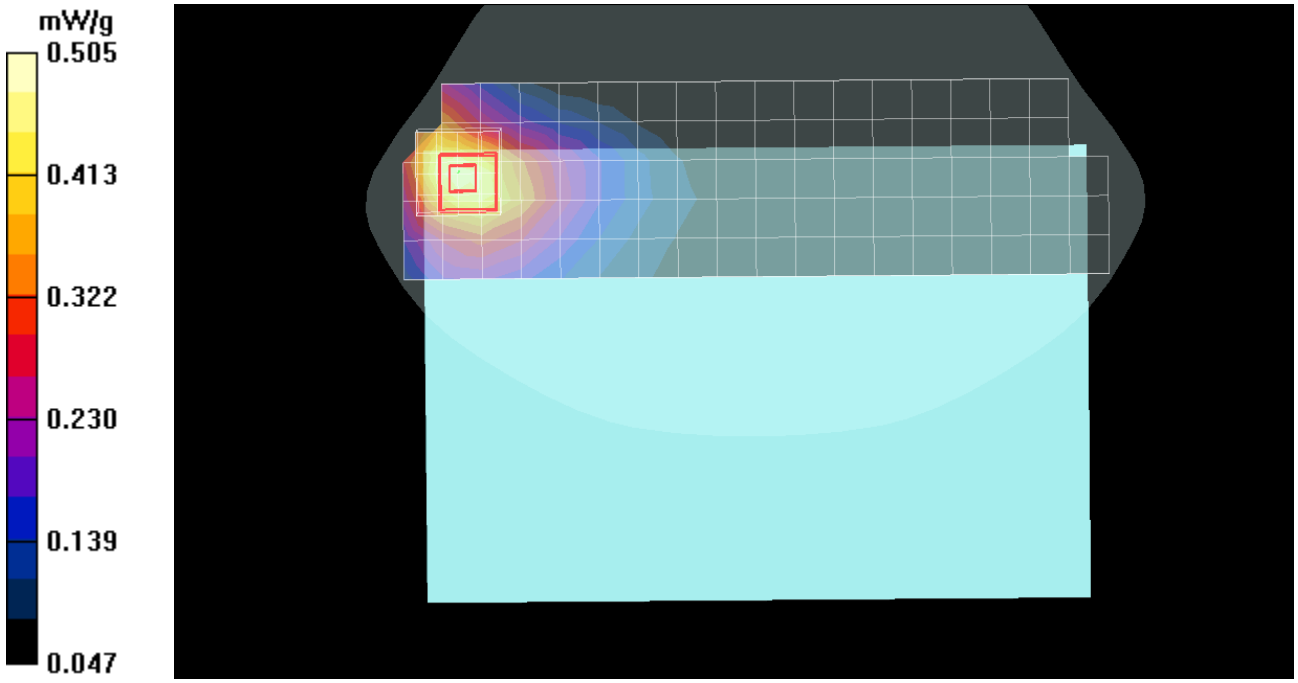
DUT: Serial: KPE00G0040, FCC ID: IHDP56MF1
Procedure Notes: 16QAM 50% RB Allocation Battery Model #: internal Test Configuration: Back surface of DUT 13mm from Phantom
Communication System: LTE Band 13; Frequency: 782 MHz;Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 782 MHz; σ = 0.93 mho/m; ε_r = 55.6; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

SAM Phone Against Flat Section/Tablet Partial Face (front/back) Area Scan - Normal Body (15mm) (21x6x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.475 mW/g

SAM Phone Against Flat Section/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.2 V/m; Power Drift = 0.027 dB
Peak SAR (extrapolated) = 0.702 W/kg
SAR(1 g) = 0.469 mW/g; SAR(10 g) = 0.313 mW/g
Maximum value of SAR (measured) = 0.505 mW/g



Appendix 3

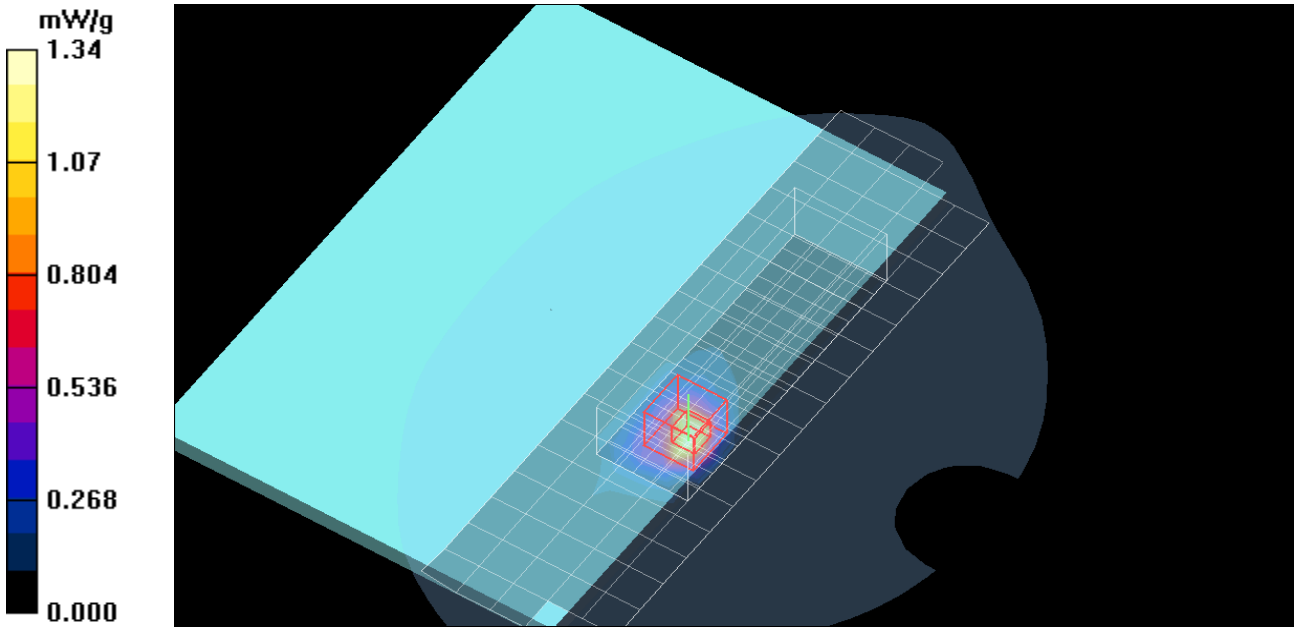
SAR distribution plots for Simultaneous Transmission

CDMA 1900 and WiFi 2.4 GHz Simultaneous Evaluation

DASY4 Configuration for MegaZoom/SAM Tablet Against Flat Section/MegaZoom Scan (<=3GHz) 2:

Date/Time: 10/7/2011 3:21:36 PM
Test Laboratory: Motorola Mobility
DUT: Serial: KPE00G0052, FCC ID: IHDP56MF1
Communication System: Wi-Fi 2450; Frequency: 2412 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
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

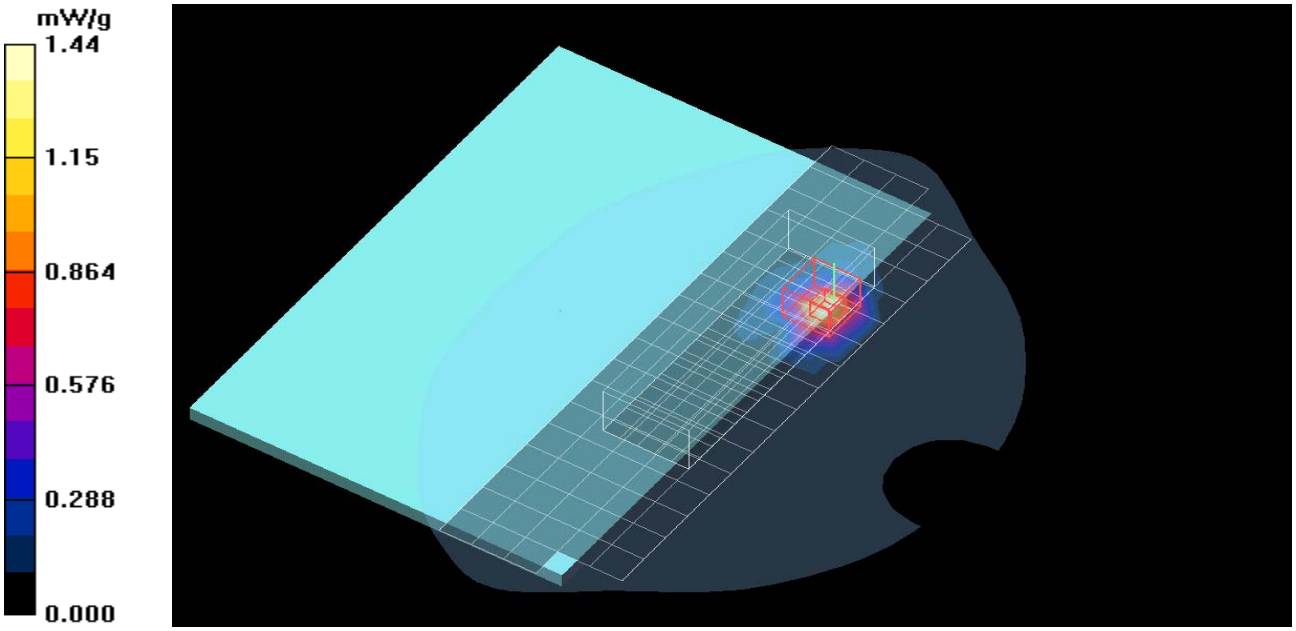
- Probe: ES3DV3 - SN3184; ConvF(4.33, 4.33, 4.33); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136
- Measurement SW: DASY4, V4.7 Build 80



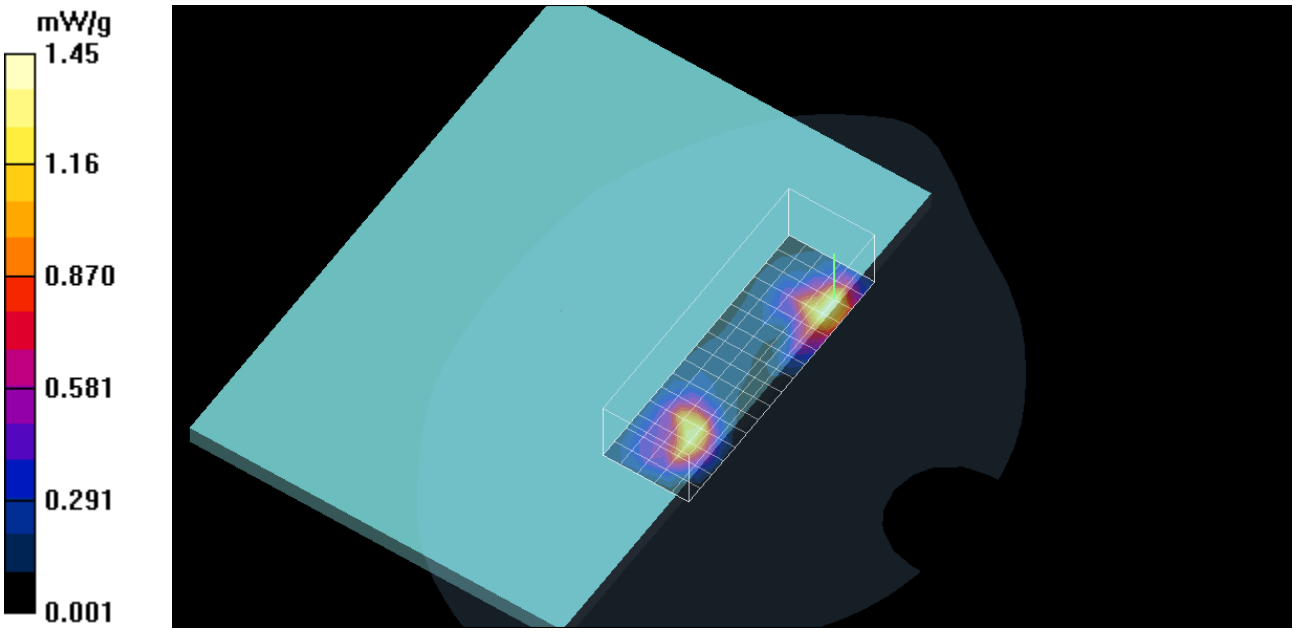
DASY4 Configuration for MegaZoom/SAM Tablet Against Flat Section/MegaZoom Scan (<=3GHz) 2:

Date/Time: 10/7/2011 2:08:51 PM
Test Laboratory: Motorola Mobility
DUT: Serial: KPE00G0040, fCC ID: IDHP56MF1
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
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

- Probe: ES3DV3 - SN3184; ConvF(4.9, 4.9, 4.9); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136
- Measurement SW: DASY4, V4.7 Build 80



Multi Band Result:
SAR(1 g) = 1.31 mW/g; SAR(10 g) = 0.574 mW/g
Maximum value of SAR (measured) = 1.45 mW/g



Appendix 4

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 5

Probe Calibration Certificate

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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: ES3-3184_Mar11

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3184
Calibration procedure(s)	QA CAL-01.v7, QA CAL-23.v4, QA CAL-25.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	March 11, 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	01-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	01-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	01-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: 654	23-Apr-10 (No. DAE4-654_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: March 16, 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 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* are numerical linearization parameters in dB assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media.
- *VR:* VR is the validity range of the calibration related to the average diode voltage or DAE voltage in mV.
- *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:3184

Manufactured: August 19, 2008
Calibrated: March 11, 2011

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3184

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.27	1.40	1.27	± 10.1 %
DCP (mV)[B]	96.8	98.9	99.5	

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	110.8	±3.0 %
			Y	0.00	0.00	1.00	117.2	
			Z	0.00	0.00	1.00	107.9	

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:3184

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)
835	41.5	0.90	6.11	6.11	6.11	1.00	1.04	± 12.0 %
1810	40.0	1.40	5.11	5.11	5.11	0.93	1.08	± 12.0 %
1950	40.0	1.40	4.93	4.93	4.93	0.96	1.07	± 12.0 %
2450	39.2	1.80	4.48	4.48	4.48	0.73	1.28	± 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:3184

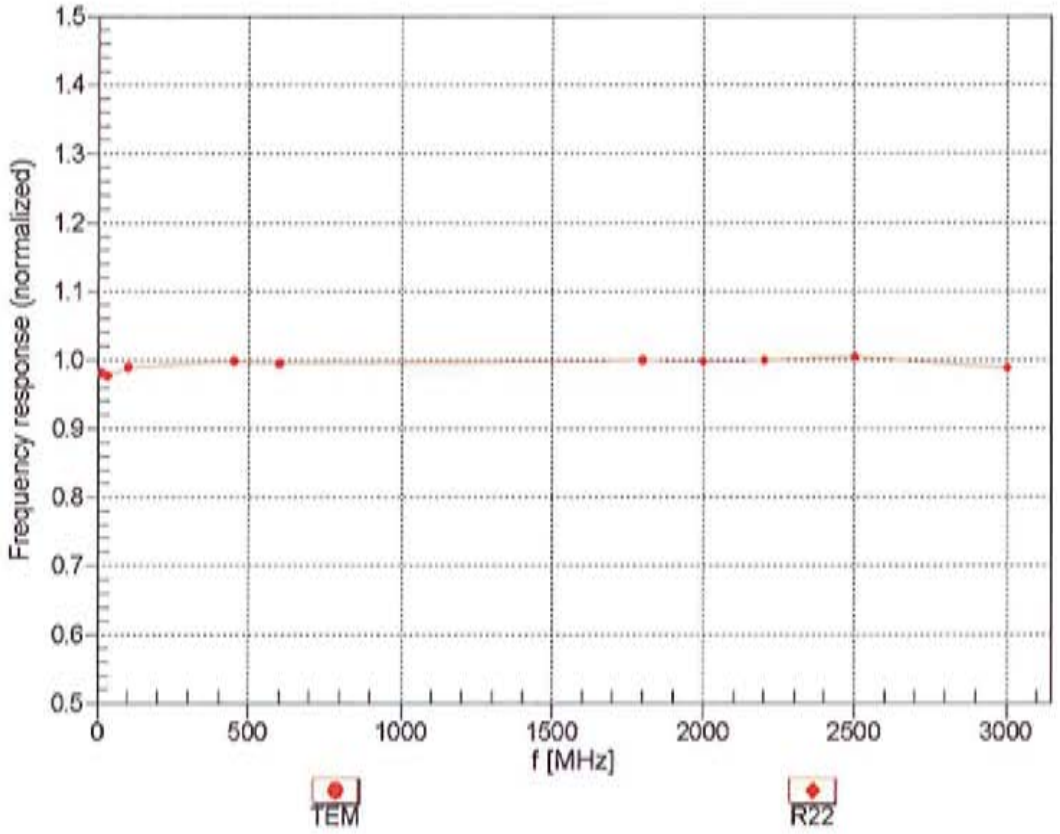
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz)[C]	Relative Permittivity[F]	Conductivity (S/m)[F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	55.2	0.97	6.10	6.10	6.10	1.00	1.00	± 12.0 %
1810	53.3	1.52	4.90	4.90	4.90	0.87	1.26	± 12.0 %
1950	53.3	1.52	4.86	4.86	4.86	0.73	1.38	± 12.0 %
2450	52.7	1.95	4.33	4.33	4.33	1.00	1.03	± 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

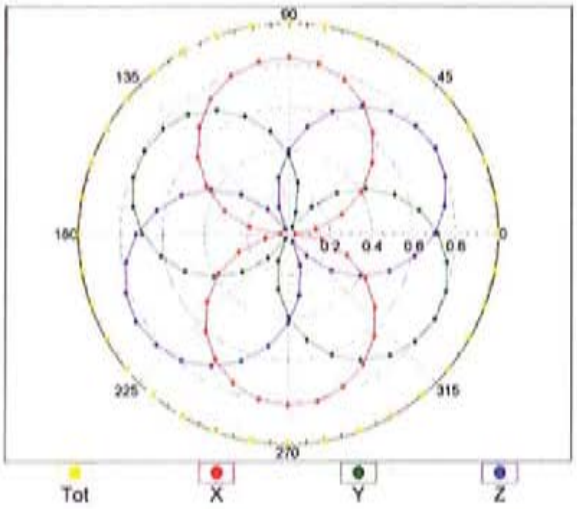
(TEM-Cell:ifi110 EXX, Waveguide: R22)



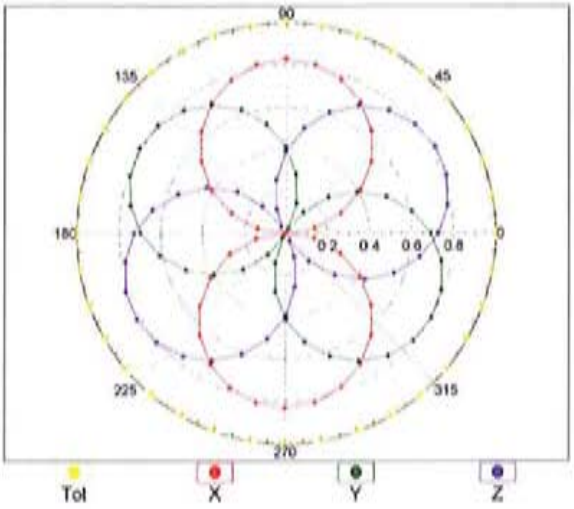
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

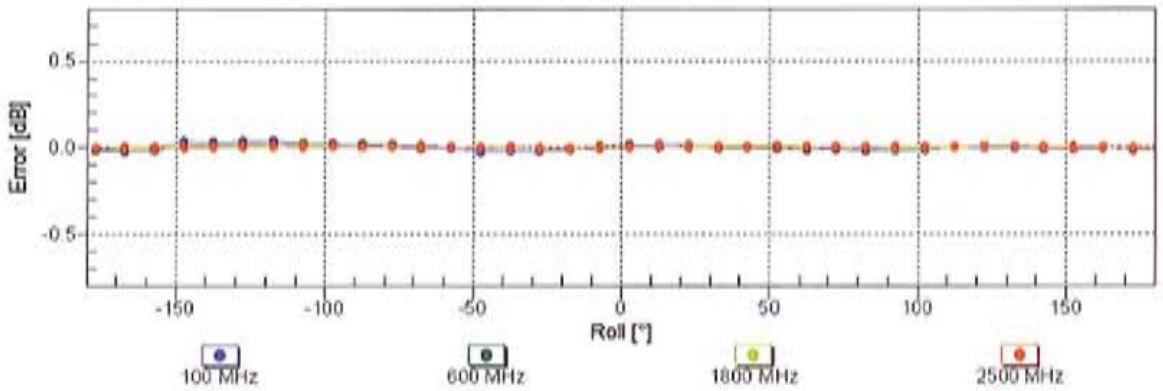
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



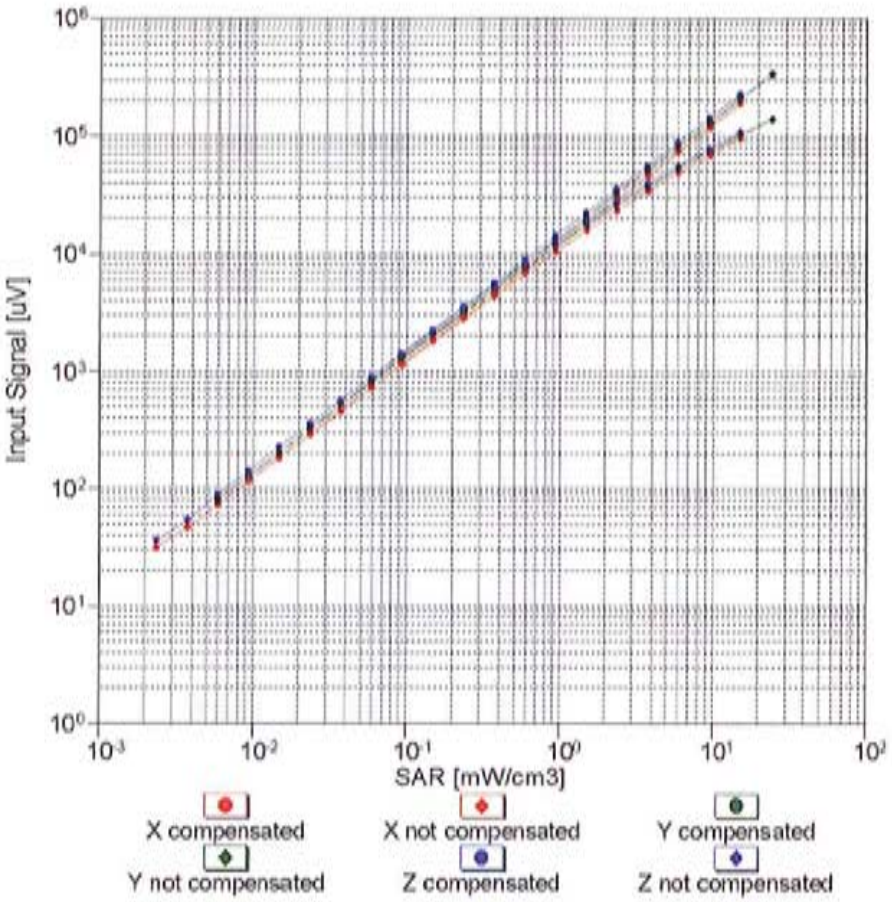
f=1800 MHz,R22

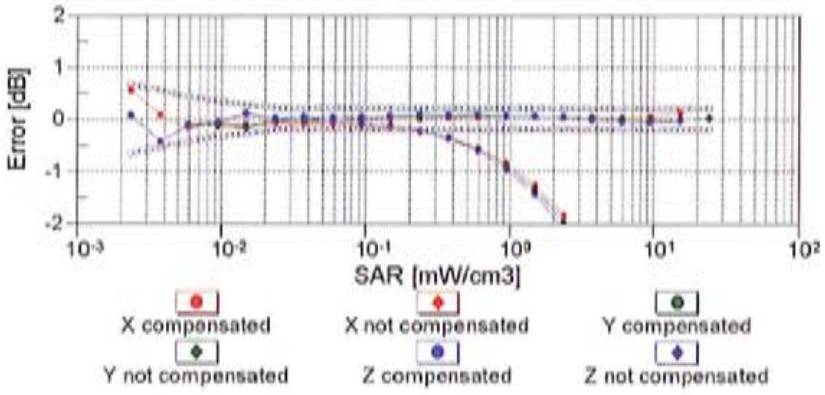




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

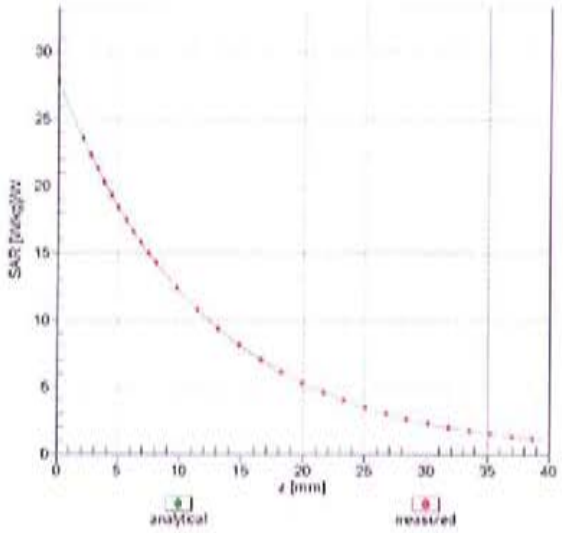




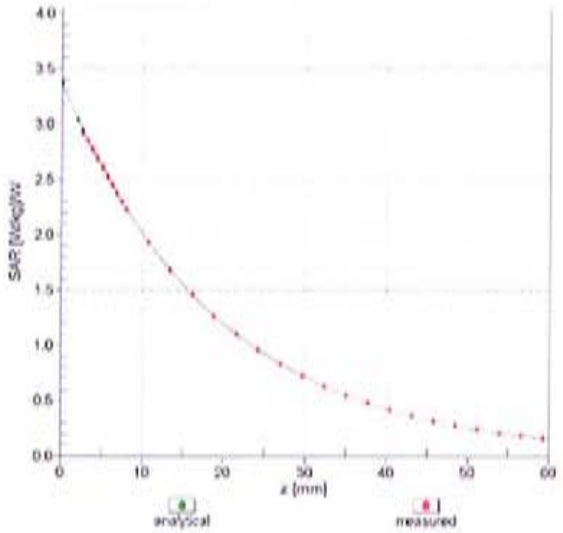
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 1950 MHz,WGLS R22 (H_convF)

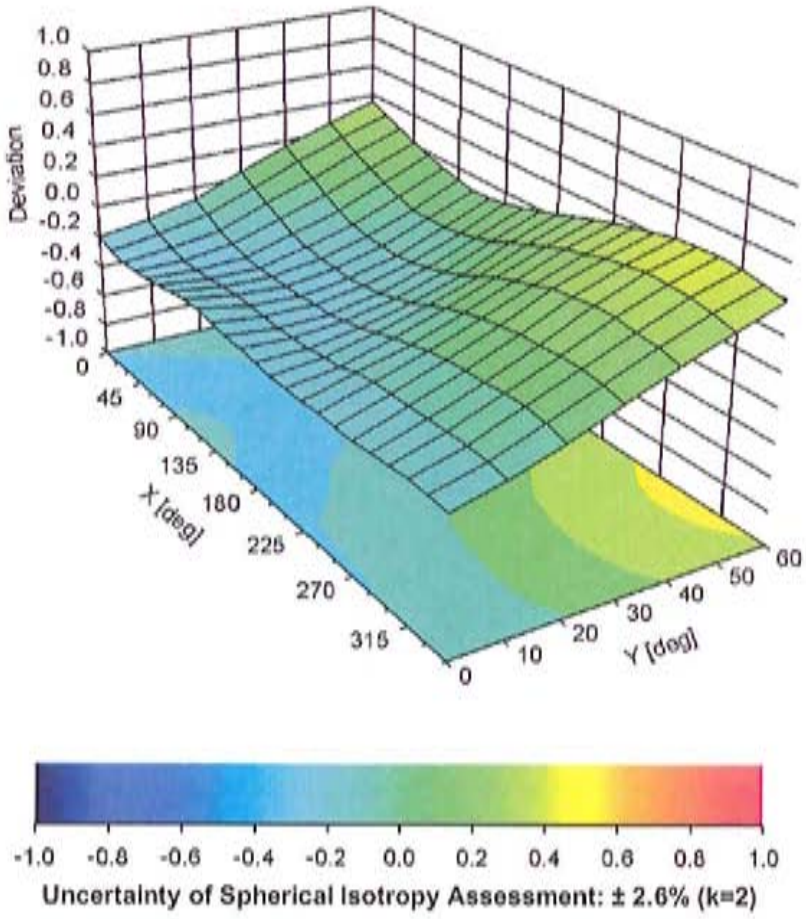


f = 835 MHz,WGLS R9 (H_convF)



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:3184

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

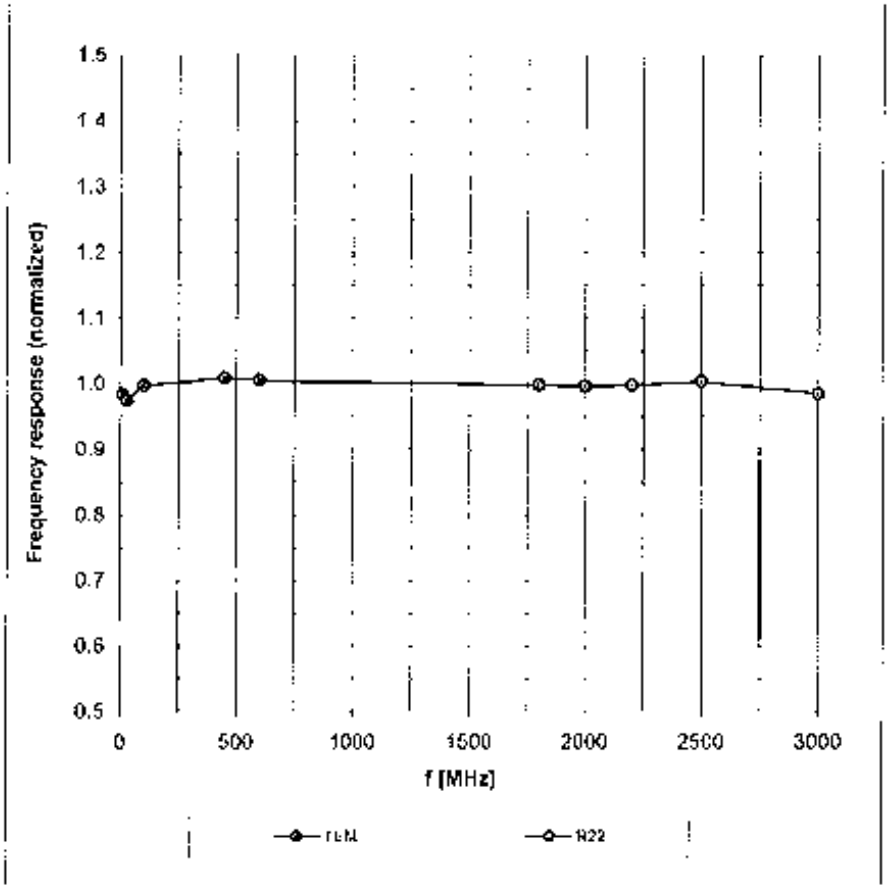
Calibration Parameter Determined in Body Tissue Simulating Media

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.

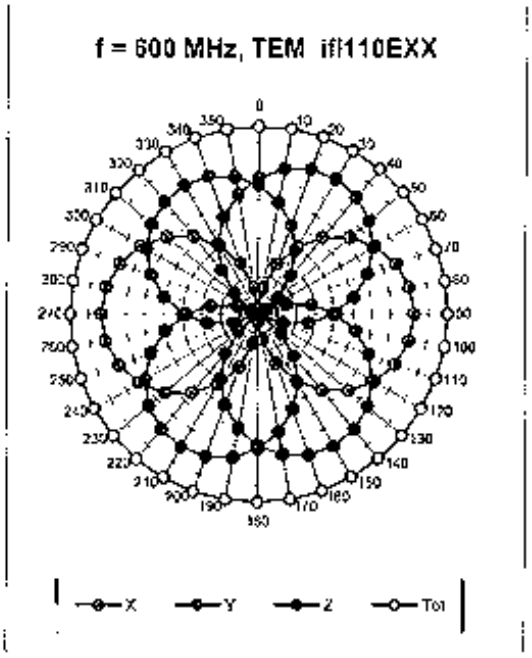
Frequency Response of E-Field

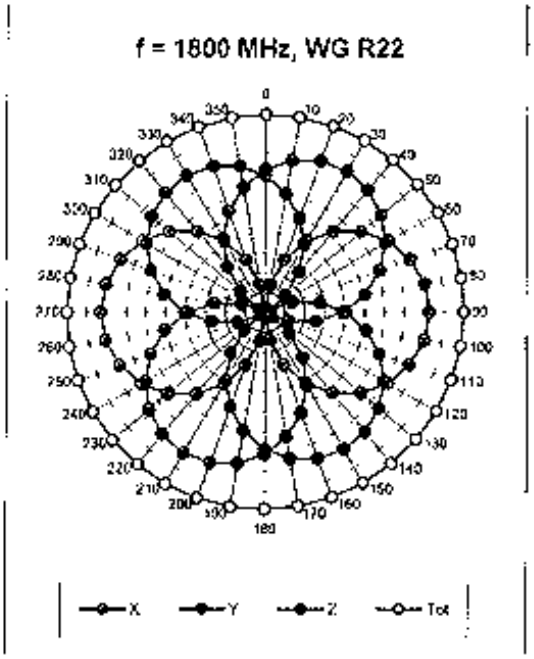
(TEM-Cell:ifi110 EXX, Waveguide: R22)

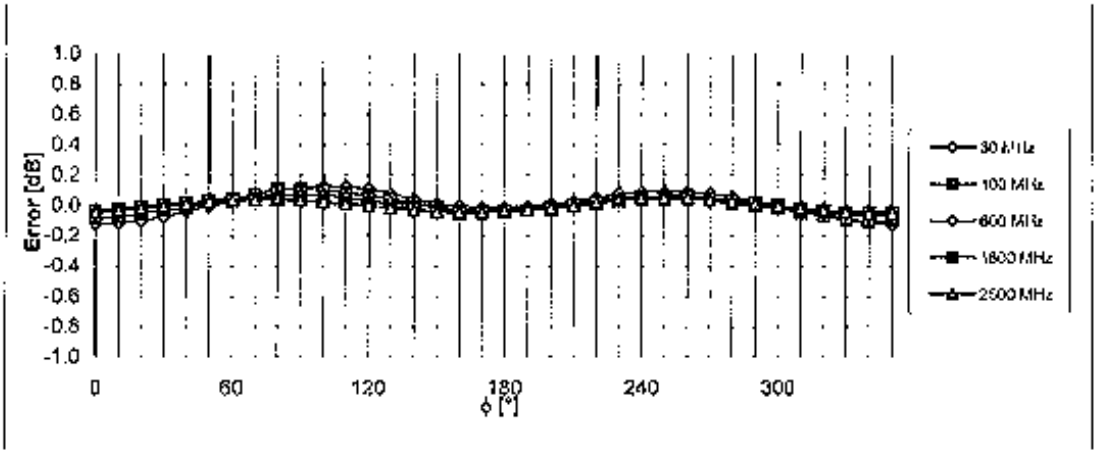


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



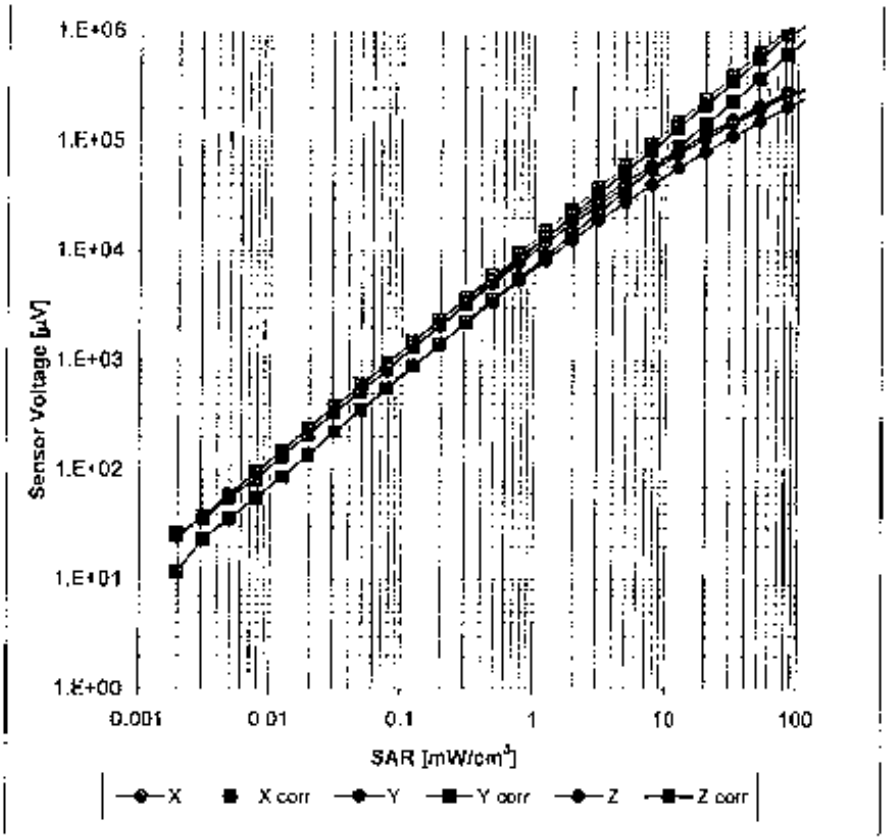


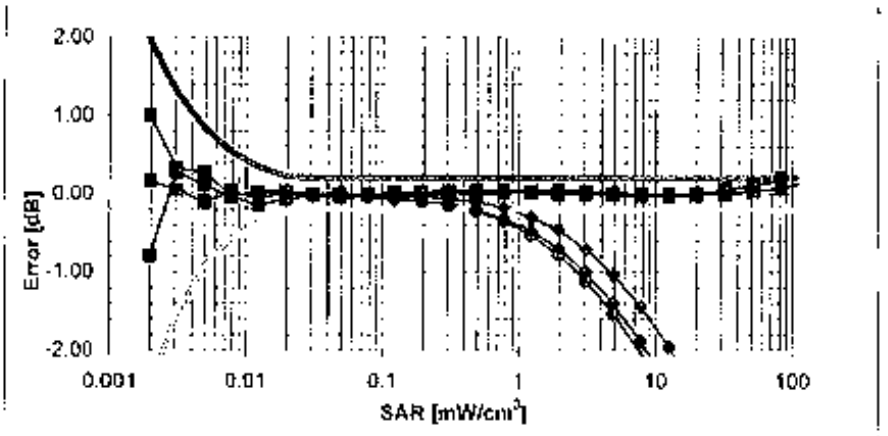


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

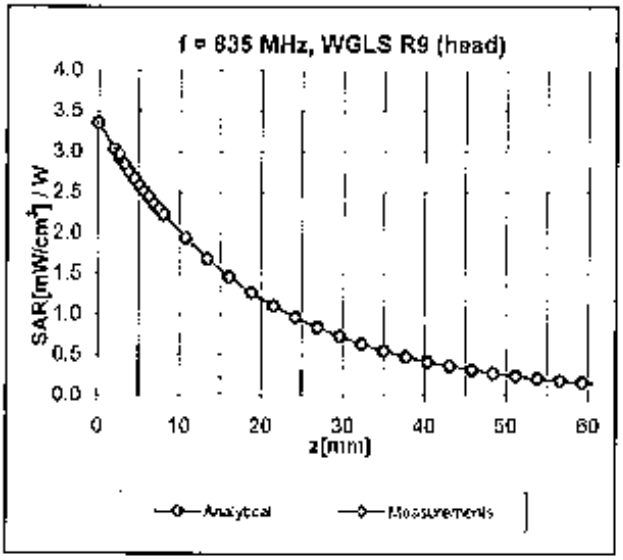
(TEM cell, f = 900 MHz)

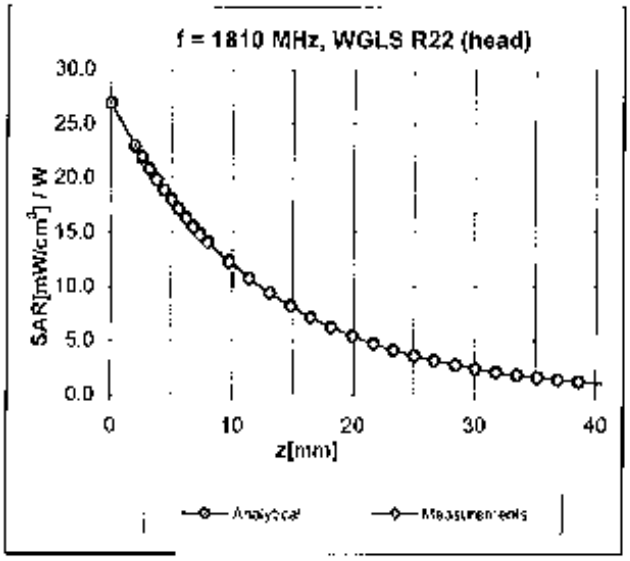




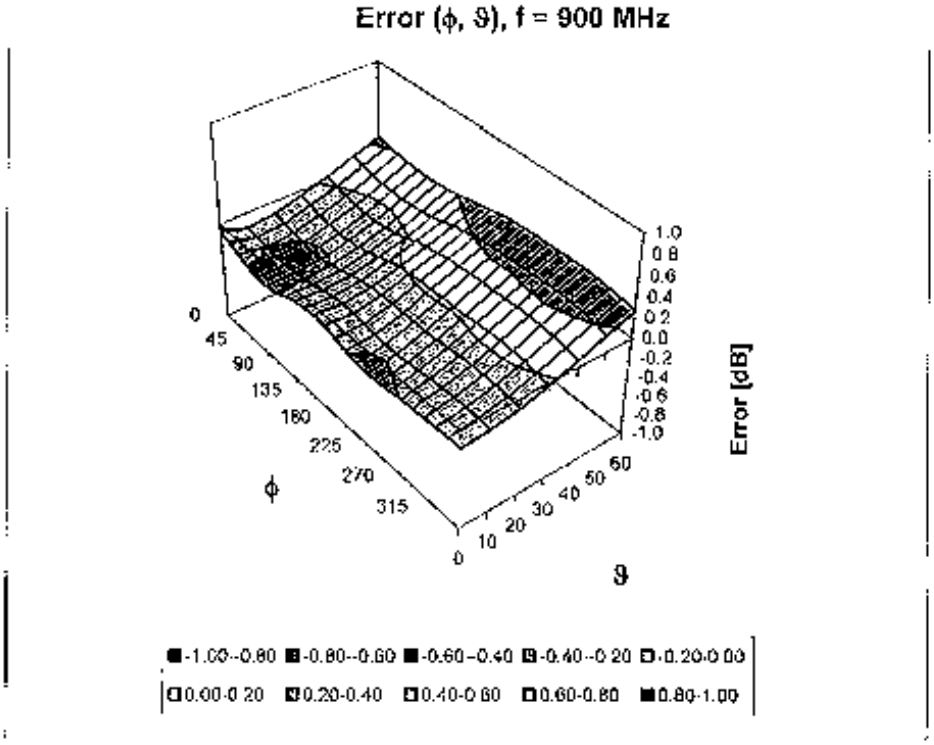
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

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