Portable Cellular Phone SAR Test Report

Tests Requested By:	Motorola Mobility, Inc. 600 N. US Highway 45 Libertyville, IL 60048
Test Report #:	25014-1F
Date of Report:	June 5, 2012
Date of Test:	May 8 – May 25, 2012
FCC ID #:	IHDT56NL2
Generic Name:	
Test Laboratory:	Motorola Mobility, Inc. - ADR Test Services Laboratory 600 N. US Highway 45 Libertyville, IL 60048
Report Author:	Katerina Bruggemann Engineer

Accreditation:

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

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

2404

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

Statement of Compliance:

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

(none)

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Revision History

Revision Version	Date	Notes
Rev. 0	5-June-2012	Initial report release

1. Introduction

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

For ANSI / IEEE C95.1 (1 g), the final stand-alone SAR readings for this phone are given in the table below. These measurements were performed using a DASY4™ v4.7 or DASY52™ system manufactured by Schmid & Partner Engineering AG (SPEAG), of Zurich Switzerland.

Transmit Band	Head SAR (1 g $^{W}/_{kg}$)	Body SAR (1 g $^{W}/_{kg}$)	Mobile Hotspot SAR (1 g $^{W}/_{kg}$)
CDMA BC 10	**0.53**	**0.44**	**0.84**
CDMA 800	**0.59**	**0.47**	**0.97**
CDMA 1900	**0.64**	**0.77**	**1.14**
LTE Band 25	**0.89**	**0.30**	**0.42**
Wi-Fi 2.45 GHz	**0.12**	**0.05**	**0.13**

2. Description of the Device Under Test

2.1 Antenna description

Main Antenna (1X)

Type	Internal	
Location	Bottom of Transceiver	
Dimensions	Width	5.84 mm
	Length	53.68 mm

Data Antenna (EVDO, LTE)

Type	Internal	
Location	Top of the Transceiver	
Dimensions	Width	43.22 mm
	Length	11.22 mm

Bluetooth / Wi-Fi Antenna

Type	Internal	
Location	Bottom of Transceiver	
Dimensions	Width	15.90 mm
	Length	2.54 mm

2.2 Device Signaling[1]

Serial Number(s) (Functional Use)	LA8Z210039 LA8Z210049 LA8Z270068	(CDMA conducted power measurements, CDMA head/body SAR testing, CDMA 800 mobile hotspot SAR testing, Wi-Fi 2.4 GHz SAR testing) (LTE conducted power measurements, LTE head/body SAR testing) (CDMA 1900 / LTE mobile hotspot SAR testing)
Production Unit or Identical Prototype (47 CFR §2..908)	Identical Prototype	
Device Category	Portable (Mobile Station Class B)	
RF Exposure Limits	General Population / Uncontrolled	

Mode(s) of Operation	Modulation Mode(s)	Maximum Output Power Setting	Duty Cycle	Transmitting Frequency Range(s)
CDMA BC 10	QPSK	25.0 dBm	1:1	817.90 - 823.10 MHz
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
EVDO BC 10	QPSK	24.0 dBm	1:1	817.90 - 823.10 MHz
EVDO 800	QPSK	24.0 dBm	1:1	824.70 - 848.31 MHz
EVDO 1900	QPSK	24.0 dBm	1:1	1851.20 - 1908.75 MHz
LTE Band 25	QPSK, 16QAM	24.0 dBm	1:1	1850.0 – 1915.0 MHz
Wi-Fi 802.11b/g/n	BPSK	19.97 dBm	1:1	2412.0 - 2462.0 MHz
Bluetooth	GFSK	9.98 dBm	1:1	2402.0 – 2480.0 MHz

[1] The GSM and WCDMA network functions have been disabled by firmware and are SIM locked for all US operators. GSM/WCDMA data is not included in this report.

2.2.1 LTE Device Description

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.

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

10 MHz Bandwidth

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

5 MHz Bandwidth

Test Case	Max Power (dBm)
QPSK, Start RB: 6, RB Alloc 50%	23
QPSK, Start RB: 0, RB Alloc 100%	23
QPSK, Start RB: 24, RB Alloc: 1 RB @ high channel edge	24
QPSK, Start RB: 0, RB Alloc: 1 RB @ low channel edge	24
16QAM, Start RB: 6, RB Alloc 50%	22
16QAM, Start RB: 0, RB Alloc 100%	22
16QAM, Start RB: 24, RB Alloc: 1 RB @ high channel edge	23
16QAM, Start RB: 0, RB Alloc: 1 RB @ low channel edge	23

2.2.2 Transmitter power reduction conditions and modes

The DUT utilizes reduced limits for the maximum transmit power when the mobile hotspot functionality is enabled. A table of the reduced limits used for testing are given below. A complete description of this functionality is provided in the "Operational Description" contained within Exhibit 12. The implementation to trigger the reduction in power requires the device to be radiating, which prevents conducted power measurements of this functionality without modification to the unit.

Mode(s) of Operation	CDMA 1900		
Test Channel	25	600	1175
Maximum Output Power Setting (dBm)	25.0	25.0	25.0
Reduced Maximum Output Power Setting (dBm)	20.0	20.0	20.0

Mode(s) of Operation	EVDO 1900		
Test Channel	25	600	1175
Maximum Output Power Setting (dBm)	24.0	24.0	24.0
Reduced Maximum Output Power Setting (dBm)	19.0	19.0	19.0

Mode(s) of Operation	LTE Band 25		
Test Channel	26090	26365	26640
Maximum Output Power Setting (dBm)	24.0	24.0	24.0
Reduced Maximum Output Power Setting (dBm)	19.0	19.0	19.0

Mode(s) of Operation	WIFI		
Test Channel	1	6	11
Maximum Output Power Setting (dBm)	18.0	18.0	18.0
Reduced Maximum Output Power Setting (dBm)	15.0	15.0	15.0

2.3 Device Conducted Power Measurements

2.3.1 LTE modes

Conducted Power for LTE modes (dBm)								
Band/Mode	Band 25 (10 MHz Channel Bandwidth)							
Modulation	QPSK				16QAM			
RB Allocation	1 RB @LOW EDGE	1 RB @HIGH EDGE	50%	100%	1 RB @LOW EDGE	1 RB @HIGH EDGE	50%	100%
Channel 26090	23.89	23.95	23.36	23.35	23.68	23.65	23.33	23.44
Channel 26365	23.85	23.70	23.06	23.03	23.50	23.48	23.04	23.20
Channel 26640	23.52	23.30	22.88	22.78	23.45	23.14	22.84	22.92

Conducted Power for LTE modes (dBm)								
Band/Mode	Band 25 (5 MHz Channel Bandwidth)							
Modulation	QPSK				16QAM			
RB Allocation	1 RB @LOW EDGE	1 RB @HIGH EDGE	50%	100%	1 RB @LOW EDGE	1 RB @HIGH EDGE	50%	100%
Channel 26065	24.05	23.95	23.15	23.32	24.15	24.00	23.02	23.75
Channel 26365	23.80	23.62	23.04	23.03	23.88	23.75	22.83	23.55
Channel 26665	23.70	23.15	22.60	22.78	23.75	23.20	22.44	23.18

2.3.2 CDMA modes

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

Measured Conducted Power (dBm) for CDMA modes							
		Loopback		Data[2]		EVDO Rev. O[2]	EVDO Rev. A[2]
Band	Channel	RC3 SO55	RC1 SO55	TDSO SO32 + FCH-SCH	TDSO SO32 + SCH	RTAP 153.6k	Subtype 2 RETAP
CDMA BC 10	564	25.2	25.27	25.15	25.1	24.56	24.56
CDMA 800	1013	25.11	25.15	24.19	25.07	24.37	24.53
	384	25.07	25.08	24.82	25.03	24.53	24.6
	777	25.07	25.06	24.98	25.02	24.26	24.32
CDMA 1900	25	24.74	24.7	24.71	24.67	24.45	24.51
	600	24.99	25	24.98	24.99	24.42	24.44
	1175	24.96	24.91	24.88	24.84	24.32	24.28

2.3.3 Wi-Fi 802.11 modes

Per "SAR Measurement Procedures for 802.11 a/b/g Transmitters" (FCC KDB 248227), power measurements were performed for 802.11 operational modes. The average conducted power measurements for each mode are shown in the tables below. SAR testing for 802.11 was performed with the transmitter set to the lowest data rate on the default test channels **highlighted in bold** in the tables below. The head and body positions that resulted in the highest SAR values were further tested on the additional channels and higher data rates **highlighted in pink** in the tables below.

Band	Channel	Average Conducted Power (dBm) for 802.11b Mode Data Rates			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
Wi-Fi 2450 MHz	1	**19.96**	19.94	19.97	19.89
	6	**19.88**	19.89	19.97	19.87
	11	**19.94**	19.93	19.92	19.66

Band	Channel	Average Conducted Power (dBm) for 802.11g Mode Data Rates							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
Wi-Fi 2450 MHz	1	12.86	12.89	12.81	12.67	12.77	12.71	12.79	12.82
	6	16.69	15.87	15.74	15.67	15.76	15.75	15.56	15.83
	11	12.84	12.88	12.71	12.62	12.76	12.62	12.67	12.69

Band	Channel	Average Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 800 ns Guard Interval)							
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
Wi-Fi 2450 MHz	1	12.78	12.69	12.67	12.53	12.54	12.76	12.62	12.60
	6	16.79	15.81	15.87	15.57	14.57	14.78	14.81	14.56
	11	12.81	12.85	12.82	12.70	12.65	12.63	12.59	12.42

Band	Channel	Average Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 400 ns Guard Interval)							
		7.2 Mbps	14.4 Mbps	21.6 Mbps	28.8 Mbps	43.3 Mbps	57.7 Mbps	65 Mbps	72.2 Mbps
Wi-Fi 2450 MHz	1	12.79	12.83	12.70	12.58	12.66	12.69	12.64	12.61
	6	16.67	15.84	15.72	15.86	14.82	14.87	14.91	13.64
	11	12.85	12.78	12.73	12.75	12.72	12.69	12.57	12.29

3. Test Equipment Used

3.1 Dosimetric System

The Motorola Mobility ADR Test Services Laboratory utilizes a Dosimetric Assessment System (DASY4™ v4.7 or DASY52™) 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	1310	Jan-11-2012	Jan-11-2013
E-Field Probe ES3DV3	3284	Jan-10-2012	Jan-10-2013
DASY4™ DAE V1	699	Sept-22-2011	Sept-22-2012
E-Field Probe ES3DV3	3115	Jan-11-2012	Jan-11-2013
S.A.M. Phantom used for 800/900 MHz	TP-1132		
S.A.M. Phantom used for 1800/1900/2450 MHz	TP-1162		
S.A.M. Phantom used for 1800/1900/2450 MHz	TP-1136		
Dipole Validation Kit, DV835V2	436TR	Mar-18-2011	Mar-18-2013
Dipole Validation Kit, DV835V2	4d129	Jan-11-2012	Jan-11-2013
Dipole Validation Kit, DV1800V2	2d191	Jan-05-2012	Jan-05-2013
Dipole Validation Kit, DV1800V2	2d190	Jan-05-2012	Jan-05-2013
Dipole Validation Kit, DV2450V2	877	Jan-10-2012	Jan-10-2013

3.2 Additional Equipment

Description	Serial Number	Cal Date	Cal Due Date
Signal Generator HP8648C	3847A04810	Sept-26-2011	Sept-26-2013
Power Meter E4419B	GB39511090	Aug-12-2011	Aug-12-2013
Power Sensor #1 - E9301A	US39210917	Nov-16-2011	Nov-16-2012
Power Sensor #2 - E9301A	US39210918	Nov-16-2011	Nov-16-2012
Network Analyzer HP8753ES	MY46212851	May-10-2012	May-10-2013
Dielectric Probe Kit DAK-3.5	1030		

4. Electrical parameters of the tissue simulating liquid

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

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

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Temp (°C)
815	**Head**	**Measured,** May-14-2012	40.5	0.91	19.5
		Measured, May-15-2012	40.9	0.91	18.5
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** May-14-2012	53.5	0.97	19.5
		Measured, May-15-2012	53.1	0.97	19.8
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
835	**Head**	**Measured,** May-14-2012	40.3	0.93	19.8
		Measured, May-15-2012	40.9	0.91	18.3
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** May-14-2012	53.3	0.99	19.5
		Measured, May-15-2012	52.9	0.99	18.8
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1880	**Head**	**Measured,** May-08-2012	39.1	1.45	19.7
		Measured, May-15-2012	38.2	1.46	19.7
		Recommended Limits	40.0 ±5%	1.40 ±5%	18-25
	Body	**Measured,** May-09-2012	52.2	1.58	20.2
		Measured, May-18-2012	51.3	1.59	20.2
		Measured, May-23-2012	51.2	1.59	18.7
		Measured, May-25-2012	51.1	1.59	19.9
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25
2450	**Head**	**Measured,** May-24-2012	38.7	1.89	20.2
		Recommended Limits	39.2 ±10%	1.80 ±5%	18-25
	Body	**Measured,** May-25-2012	50.8	1.95	19.1
		Measured, May-25-2012	50.9	1.97	20.5
		Recommended Limits	52.7 ±10%	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	782 / 835 / 900 MHz Head	782 / 835 / 900 MHz Body	1800 MHz / 1900 MHz Head	1800 MHz / 1900 MHz Body	2450 MHz Head	2450 MHz Body
Sugar	57	44.9	--	--	--	--
DGBE	--	--	47	30.8	--	30
Diacetin	--	--	--	--	51	--
Water	40.45	53.06	52.62	68.8	48.75	70
Salt	1.45	0.94	0.38	0.4	0.15	--
HEC	1	1	--	--	--	--
Bact.	0.1	0.1	--	--	0.1	--

5. System Accuracy Verifications

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

A SAR measurement was performed to verify the measured SAR was within ±10% from the target SAR indicated in Appendix 7. These frequencies are within ±10% of the compliance test mid-band frequency as required in [1] and [5]. The test was conducted on the same days as the measurement of the DUT. Recommended limits for permittivity and conductivity, specified in [5], are shown in the table below. The obtained results from the system accuracy verification are also displayed in the table below. SAR values are normalized to 1 W forward power delivered to the dipole. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. The distributions of SAR compare well with those of the reference measurements (see Appendix 1). For frequencies below 3 GHz, the simulated tissue depth was verified to be 15.0 cm ± 0.5 cm. Z-axis scans showing the SAR penetration are also included in Appendix 1.

System Accuracy Verification Measurements for Head SAR Measurements								
f **(MHz)**	**Description**	**Dipole**	**SAR (W/kg)**	**SAR (W/kg), 1 gram**	**Dielectric Parameters**		**Ambient Temp (°C)**	**Tissue Temp (°C)**
					ε_r	σ (S/m)		
835	**Measured,** May-14-2012	4d129	2.06	10.3	40.3	0.93	21.0	19.5
	Measured, May-15-2012	4d129	2.07	10.4	40.7	0.93	20.8	19.2
	Recommended Limits			9.41	41.5 ±5%	0.90 ±5%	18-25	18-25
1800	**Measured,** May-08-2012	2d191	7.26	36.3	39.5	1.36	21.2	19.0
	Recommended Limits			39.2	40.0 ±5%	1.40 ±5%	18-25	18-25
	Measured, May-15-2012	2d190	7.25	36.3	38.6	1.37	20.7	18.5
	Recommended Limits			39.3	40.0 ±5%	1.40 ±5%	18-25	18-25
2450	**Measured,** May-23-2012	877	11.0	55.0	38.7	1.89	20.8	21.1
	Recommended Limits			52.1	39.2 ±10%	1.80 ±5%	18-25	18-25

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3284	835	6.18	5 of 11
		1810	5.33	5 of 11
		2450	4.56	5 of 11
E-Field Probe ES3DV3	3115	1810	5.17	6 of 11

System Accuracy Verification Measurements for Body SAR Measurements								
f (MHz)	Description	Dipole	SAR (W/kg)	SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
					ε_r	σ (S/m)		
835	**Measured,** May-14-2012	4d129	2.06	10.3	53.3	0.99	20.8	19.9
	Recommended Limits			9.41	55.2 ±5%	0.97 ±5%	18-25	18-25
	Measured, May-15-2012	436	2.07	10.4	52.9	0.99	20.3	19.0
	Recommended Limits			10.1	55.2 ±5%	0.97 ±5%	18-25	18-25
1800	**Measured,** May-09-2012	2d191	7.17	35.9	52.3	1.50	20.6	18.7
	Measured, May-23-2012	2d191	7.19	36.0	51.5	1.49	21.1	18.9
	Recommended Limits			37.8	53.3 ±5%	1.52 ±5%	18-25	18-25
	Measured, May-18-2012	2d190	7.69	38.5	51.7	1.50	21.5	18.6
	Measured, May-25-2012	2d190	7.67	38.4	51.4	1.49	21.1	18.7
	Recommended Limits			37.8	53.3 ±5%	1.52 ±5%	18-25	18-25
2450	**Measured,** May-24-2012	877	9.92	49.6	50.8	1.95	20.6	19.8
	Measured, May-25-2012	877	10.00	50.0	50.9	1.97	21.4	19.3
	Recommended Limits			52.3	52.7 ±10%	1.95 ±5%	18-25	18-25

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3284	835	6.28	5 of 11
		1810	5.28	5 of 11
		2450	4.56	5 of 11
E-Field Probe ES3DV3	3115	1810	4.72	6 of 11

6. Test Results

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

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

6.1 Head Adjacent Test Results

The SAR results shown in tables 1 through 4 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to the [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is:

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

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

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

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

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3284	835	6.18	5 of 11
		1810	5.33	5 of 11
		2450	4.56	5 of 11
E-Field Probe ES3DV3	3115	1810	5.17	6 of 11

Left Head Cheek Position

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Test Plot	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
820	BC 10, RC3 SO55	564	19.5	**0.02**	**0.216**	**0.22**	**0.300**	**0.30**	**5x5x7**	**A-31**
	EVDO Rev O RTAP 153.6K	564	18.5	-0.14	0.241	0.25	0.355	0.37		
835	CDMA 800, RC3 SO55	1013								
		384	19.8	-0.07	0.419	0.43	0.561	0.57		
		777								
	EVDO Rev O RTAP 153.6K	1013								
		384	18.3	-0.37	0.208	0.23	0.305	0.33		
		777								
1880	LTE Band 25, QPSK (1 RB @ Low)	26090	18.2	0.06	0.226	0.23	0.356	0.36		
	LTE Band 25, QPSK (1 RB @ High)	26090	18.2	-0.05	0.262	0.27	0.422	0.43		
	LTE Band 25, QPSK (50% RB)	26365	18.2	0.11	0.21	0.21	0.339	0.34		
	LTE Band 25, 16QAM (1 RB @ Low)	26090	18.9	-0.26	0.177	0.19	0.278	0.30		
	LTE Band 25, 16QAM (1 RB @ High)	26090	18.9	0.21	0.226	0.23	0.365	0.37		
	LTE Band 25, 16QAM (50% RB)	26365	18.8	0.02	0.179	0.18	0.284	0.28		
	CDMA 1900, RC3 SO55	25								
		600	19.7	-0.02	0.171	0.17	0.276	0.28		
		1175								
	EVDO Rev O RTAP 153.6K	25								
		600	19.7	-0.05	0.268	0.27	0.442	0.45		
		1175								
2450	802.11b, 1 Mbps	1	20.2	0.03	0.044	0.04	0.082	0.08		
		6								
		11								

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

Right Head Cheek Position

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Test Plot	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
820	BC 10, RC3 SO55	564	19.5	0.69	0.072	0.07	0.098	0.10		
	EVDO Rev O RTAP 153.6K	564	**18.5**	**-0.05**	**0.323**	**0.33**	**0.520**	**0.53**	**5x5x7**	**A-32**
835	CDMA 800, RC3 SO55	1013								
		384	19.5	**-0.21**	**0.42**	**0.44**	**0.559**	**0.59**	**5x5x7**	**A-33**
		777								
	EVDO Rev O RTAP 153.6K	1013								
		384	18.1	**0.07**	**0.282**	**0.28**	**0.453**	**0.45**	**5x5x7**	**A-34**
		777								
1880	LTE Band 25, QPSK (1 RB @ Low)	26090	18.2	0.05	0.359	0.36	0.672	0.67		
	LTE Band 25, QPSK (1 RB @ High)	26090	**18.2**	**0.08**	**0.47**	**0.47**	**0.893**	**0.89**	**5x5x7**	**A-35**
	LTE Band 25, QPSK (50% RB)	26365	18.2	-0.04	0.362	0.37	0.689	0.70		
	LTE Band 25, 16QAM (1 RB @ Low)	26090	18.3	-0.31	0.324	0.35	0.622	0.67		
	LTE Band 25, 16QAM (1 RB @ High)	26090	18.3	-0.01	0.377	0.38	0.717	0.72		
	LTE Band 25, 16QAM (50% RB)	26365	18.3	0.06	0.329	0.33	0.631	0.63		
	CDMA 1900, RC3 SO55	25								
		600	**19.7**	**-0.13**	**0.329**	**0.34**	**0.560**	**0.58**	**5x5x7**	**A-36**
		1175								
	EVDO Rev O RTAP 153.6K	25								
		600	**19.7**	**0.24**	**0.340**	**0.34**	**0.638**	**0.64**	**5x5x7**	**A-37**
		1175								
2450	802.11b, 1 Mbps	1	20.1	-0.04	0.061	0.06	0.111	0.11		
		6	**19.8**	**0.18**	**0.063**	**0.06**	**0.115**	**0.12**	**5x5x7**	**A-38**
		11	19.6	-0.10	0.051	0.05	0.095	0.10		

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

Left Head 15° Tilt Position

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Test Plot	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
820	**BC 10, RC3 SO55**	564	19.5	**0.53**	**0.103**	**0.10**	**0.143**	**0.14**	**5x5x7**	**A-39**
	EVDO Rev O RTAP 153.6K	564	18.5	-0.08	0.165	0.17	0.252	0.26		
835	**CDMA 800, RC3 SO55**	1013								
		384	19.3	0.10	0.319	0.32	0.420	0.42		
		777								
	EVDO Rev O RTAP 153.6K	1013								
		384	18.3	0.01	0.140	0.14	0.214	0.21		
		777								
1880	**LTE Band 25, QPSK (1 RB @ Low)**	26090	18.1	-0.06	0.195	0.20	0.311	0.32		
	LTE Band 25, QPSK (1 RB @ High)	26090	18.1	0.03	0.19	0.19	0.301	0.30		
	LTE Band 25, QPSK (50% RB)	26365	18.1	-0.03	0.209	0.21	0.34	0.34		
	LTE Band 25, 16QAM (1 RB @ Low)	26090	18.3	0.09	0.195	0.20	0.313	0.31		
	LTE Band 25, 16QAM (1 RB @ High)	26090	18.3	-0.04	0.223	0.23	0.365	0.37		
	LTE Band 25, 16QAM (50% RB)	26365	18.3	-0.07	0.23	0.23	0.379	0.39		
	CDMA 1900, RC3 SO55	25								
		600	**19.7**	**-0.06**	**0.161**	**0.16**	**0.271**	**0.27**	**5x5x7**	**A-44**
		1175								
	EVDO Rev O RTAP 153.6K	25								
		600	19.7	0.00	0.230	0.23	0.368	0.37		
		1175								
2450	**802.11b, 1 Mbps**	1	**20.2**	**0.14**	**0.026**	**0.03**	**0.047**	**0.05**	**5x5x7**	**A-46**
		6								
		11								

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

Right Head 15° Tilt Position

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Test Plot	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
820	BC 10, RC3 SO55	564	19.5	0.30	0.023	0.02	0.030	0.03		
	EVDO Rev O RTAP 153.6K	564	18.5	**0.11**	**0.224**	**0.22**	**0.372**	**0.37**	5x5x7	**A-40**
835	CDMA 800, RC3 SO55	1013								
		384	19.2	**0.09**	**0.327**	**0.33**	**0.429**	**0.43**	5x5x7	**A-41**
		777								
	EVDO Rev O RTAP 153.6K	1013								
		384	18.2	**0.04**	**0.198**	**0.20**	**0.334**	**0.33**	5x5x7	**A-42**
		777								
1880	LTE Band 25, QPSK (1 RB @ Low)	26090	18.2	-0.05	0.293	0.30	0.564	0.57		
	LTE Band 25, QPSK (1 RB @ High)	26090	**18.2**	**0.05**	**0.35**	**0.35**	**0.676**	**0.68**	5x5x7	**A-43**
	LTE Band 25, QPSK (50% RB)	26365	19.7	0.01	0.234	0.23	0.445	0.45		
	LTE Band 25, 16QAM (1 RB @ Low)	26090	18.2	0.23	0.247	0.25	0.471	0.47		
	LTE Band 25, 16QAM (1 RB @ High)	26090	18.2	-0.11	0.299	0.31	0.572	0.59		
	LTE Band 25, 16QAM (50% RB)	26365	18.2	-0.04	0.252	0.25	0.49	0.49		
	CDMA 1900, RC3 SO55	25								
		600	19.7	-0.02	0.130	0.13	0.215	0.22		
		1175								
	EVDO Rev O RTAP 153.6K	25								
		600	**19.7**	**-0.10**	**0.251**	**0.26**	**0.480**	**0.49**	5x5x7	**A-45**
		1175								
2450	802.11b, 1 Mbps	1	20.0	-0.20	0.023	0.02	0.045	0.05		
		6								
		11								

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

6.2 Body Worn Test Results

The SAR results shown in tables 5 through 6 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is:

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

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

The test conditions that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 3. All other test conditions measured lower SAR values than those included in Appendix 3.

A SPEAG™ MFP V5.1 C Triple Modular Phantom was used for the body-worn tests. The triple modular phantom consists of three identical modules that can be installed and removed separately without emptying the liquid. Each module of the triple phantom is constructed of glass-fiber reinforced vinylester (VG-GF) with a thickness at the bottom of 2.0 mm. It measures 29.2 cm(long) by 17.8 cm(wide) by 17.8 cm(tall).

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

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

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3284	835	6.28	5 of 11
		1810	5.28	5 of 11
		2450	4.56	5 of 11
E-Field Probe ES3DV3	3115	1810	4.72	6 of 11

Body-Worn, Front of Phone 25 mm from Phantom

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Test Plot	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
820	BC 10, RC3 SO55	564	19.5	-0.43	0.292	0.32	0.387	0.43		
	EVDO Rev O RTAP 153.6K	564	18.8	-0.02	0.142	0.14	0.189	0.19		
835	CDMA 800, RC3 SO55	1013								
		384	19.5	-0.17	0.311	0.32	0.415	0.43		
		777								
	EVDO Rev O RTAP 153.6K	1013								
		384	18.8	-0.02	0.111	0.11	0.149	0.15		
		777								
1880	LTE Band 25, QPSK (1 RB @ Low)	26090	19.1	-0.01	0.0469	0.05	0.072	0.07		
	LTE Band 25, QPSK (1 RB @ High)	26090	19	-0.13	0.0596	0.06	0.0932	0.10		
	LTE Band 25, QPSK (50% RB)	26365	19	-0.07	0.0549	0.06	0.0854	0.09		
	LTE Band 25, 16QAM (1 RB @ Low)	26090	19	-0.26	0.0443	0.05	0.0675	0.07		
	LTE Band 25, 16QAM (1 RB @ High)	26090	19	-0.06	0.0571	0.06	0.0894	0.09		
	LTE Band 25, 16QAM (50% RB)	26365	19	0.04	0.159	0.16	0.252	0.25		
	CDMA 1900, RC3 SO55	25								
		600	20.2	-0.140	0.075	0.08	0.120	0.12		
		1175								
	EVDO Rev O RTAP 153.6K	25								
		600	20.2	-0.160	0.075	0.08	0.116	0.12		
		1175								
2450	802.11b, 1 Mbps	1	19.1	0.21	0.0036	0.00	0.0077	0.01		
		6								
		11								

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

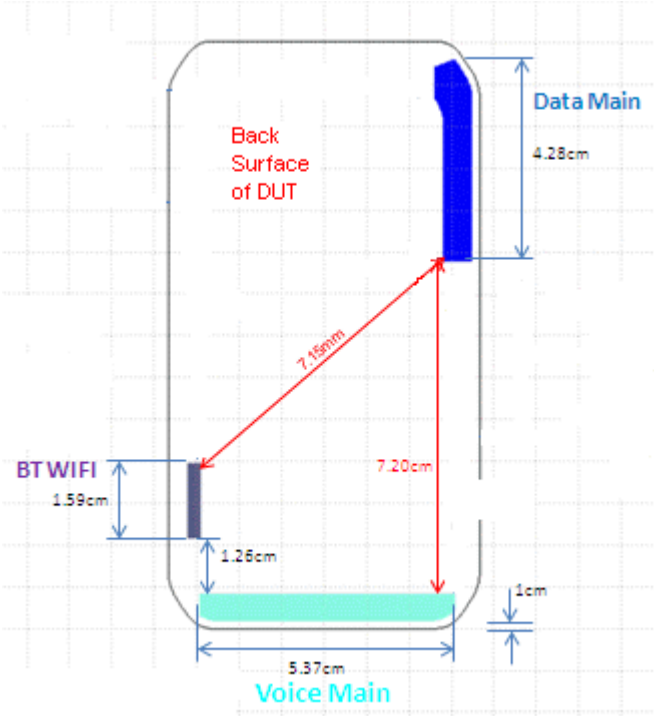
Body-Worn, Back of Phone 25 mm from Phantom

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Test Plot	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
820	BC 10, RC3 SO55	564	**19.5**	**-0.09**	**0.323**	**0.33**	**0.431**	**0.44**	5x5x7	A-48
	EVDO Rev O RTAP 153.6K	564	**18.8**	**-0.06**	**0.184**	**0.19**	**0.248**	**0.25**	5x5x7	A-49
835	CDMA 800, RC3 SO55	1013								
		384	**19.5**	**-0.04**	**0.344**	**0.35**	**0.463**	**0.47**	5x5x7	A-50
		777								
	EVDO Rev O RTAP 153.6K	1013								
		384	**18.8**	**-0.04**	**0.136**	**0.14**	**0.184**	**0.19**	5x5x7	A-51
		777								
1880	LTE Band 25, QPSK (1 RB @ Low)	26090	18.9	0.06	0.149	0.15	0.234	0.23		
	LTE Band 25, QPSK (1 RB @ High)	26090	**18.9**	**-0.06**	**0.188**	**0.19**	**0.297**	**0.30**	5x5x7	A-52
	LTE Band 25, QPSK (50% RB)	26365	18.9	-0.03	0.146	0.15	0.23	0.23		
	LTE Band 25, 16QAM (1 RB @ Low)	26090	18.9	0.01	0.148	0.15	0.237	0.24		
	LTE Band 25, 16QAM (1 RB @ High)	26090	18.9	0.04	0.179	0.18	0.278	0.28		
	LTE Band 25, 16QAM (50% RB)	26365	18	-0.01	0.15	0.15	0.237	0.24		
	CDMA 1900, RC3 SO55	25								
		600	**20.2**	**-0.04**	**0.463**	**0.47**	**0.760**	**0.77**	5x5x7	A-53
		1175								
	EVDO Rev O RTAP 153.6K	25								
		600	**20.2**	**0.00**	**0.186**	**0.19**	**0.292**	**0.29**	5x5x7	A-54
		1175								
2450	802.11b, 1 Mbps	1	19.1	-0.20	0.021	0.02	0.038	0.04		
		6	**19.1**	**0.03**	**0.029**	**0.03**	**0.052**	**0.05**	5x5x7	A-55
		11	19.1	0.06	0.028	0.03	0.050	0.05		

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

6.4 Mobile Hotspot Test Results

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



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

The SAR results shown in tables 7 through 12 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is:

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

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 DUT utilizes a reduced limit for the maximum transmit power when the mobile hotspot functionality is enabled, as described above in 2.2.2. A complete description of this functionality is provided in the "Operational Description" contained within Exhibit 12.

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

A SPEAG™ MFP V5.1 C Triple Modular Phantom was used for the body-worn tests. The triple modular phantom consists of three identical modules that can be installed and removed separately without emptying the liquid. Each module of the triple phantom is constructed of glass-fiber reinforced vinylester (VG-GF) with a thickness at the bottom of 2.0 mm. It measures 29.2 cm(long) by 17.8 cm(wide) by 17.8 cm(tall).

The simulated tissue depth was verified to be 15.0 cm ± 0.5 cm for frequencies below 3 GHz, or 10.0 cm ± 0.5 cm for frequencies greater than 3 GHz. The same device holder described in section 6 was used for positioning the phone.

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3284	835	6.28	5 of 11
		1810	5.28	5 of 11
		2450	4.56	5 of 11
E-Field Probe ES3DV3	3115	1810	4.72	6 of 11

Mobile Hotspot, Front of Phone 10 mm from Phantom

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Test Plot	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
820	BC 10, RC3 SO55	564	19.5	-0.13	0.455	0.47	0.592	0.61		
	EVDO Rev O RTAP 153.6K	564	19.5	0.00	0.211	0.21	0.277	0.28		
835	CDMA 800, RC3 SO55	1013								
		384	19.2	0.08	0.478	0.48	0.626	0.63		
		777								
	EVDO Rev O RTAP 153.6K	1013								
		384	19.2	-0.01	0.179	0.18	0.236	0.24		
		777								
1880	LTE Band 25, QPSK (1 RB @ Low)	26090	18.3	0.01	0.0591	0.06	0.0929	0.09		
	LTE Band 25, QPSK (1 RB @ High)	26090	18.2	-0.07	0.07	0.07	0.11	0.11		
	LTE Band 25, QPSK (50% RB)	26365	18.3	-0.14	0.0699	0.07	0.11	0.11		
	LTE Band 25, 16QAM (1 RB @ Low)	26090	18.3	-0.43	0.055	0.06	0.0863	0.10		
	LTE Band 25, 16QAM (1 RB @ High)	26090	18.2	-0.06	0.0632	0.06	0.103	0.10		
	LTE Band 25, 16QAM (50% RB)	26365	18.2	0.03	0.0678	0.07	0.106	0.11		
	CDMA 1900, RC3 SO55	25								
		600	18.7	-0.20	0.125	0.13	0.230	0.24		
		1175								
	EVDO Rev O RTAP 153.6K	25								
		600	19.5	-0.06	0.041	0.04	0.065	0.07		
		1175								
2450	802.11b, 1 Mbps	1	20.5	0.17	0.010	0.01	0.0198	0.02		
		6								
		11								

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

Mobile Hotspot, Back of Phone 10 mm from Phantom

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Test Plot	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
820	BC 10, RC3 SO55	564	**19.5**	**-0.02**	**0.632**	**0.63**	**0.840**	**0.84**	5x5x7	A-57
	EVDO Rev O RTAP 153.6K	564	19.5	-0.03	0.362	0.36	0.557	0.56		
835	CDMA 800, RC3 SO55	1013	19.5	-0.08	0.610	0.62	0.819	0.83		
		384	19.2	-0.03	0.658	0.66	0.883	0.89		
		777	**19.5**	**-0.04**	**0.713**	**0.72**	**0.964**	**0.97**	5x5x7	A-59
	EVDO Rev O RTAP 153.6K	1013								
		384	19.2	-0.14	0.353	0.36	0.543	0.56		
		777								
1880	LTE Band 25, QPSK (1 RB @ Low)	26090	18.4	0.03	0.224	0.22	0.374	0.37		
	LTE Band 25, QPSK (1 RB @ High)	26090	**18.5**	**-0.04**	**0.25**	**0.25**	**0.415**	**0.42**	5x5x7	A-61
	LTE Band 25, QPSK (50% RB)	26365	18.4	0.02	0.229	0.23	0.381	0.38		
	LTE Band 25, 16QAM (1 RB @ Low)	26090	18.4	0.06	0.212	0.21	0.352	0.35		
	LTE Band 25, 16QAM (1 RB @ High)	26090	18.5	-0.14	0.234	0.24	0.393	0.41		
	LTE Band 25, 16QAM (50% RB)	26365	18.5	-0.02	0.239	0.24	0.396	0.40		
	CDMA 1900, RC3 SO55	25	18.7	0.08	0.294	0.29	0.538	0.54		
		600	18.7	-0.09	0.442	0.45	0.845	0.86		
		1175	18.7	-0.11	0.536	0.55	1.04	1.07		
	EVDO Rev O RTAP 153.6K	25								
		600	**19.6**	**-0.11**	**0.192**	**0.20**	**0.317**	**0.33**	5x5x7	A-63
		1175								
2450	802.11b, 1 Mbps	1	**20.5**	**-0.06**	**0.059**	**0.06**	**0.127**	**0.13**	5x5x7	A-64
		6	20.3	-0.08	0.056	0.06	0.125	0.13		
		11	20.2	-0.07	0.056	0.06	0.123	0.12		

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

Mobile Hotspot, Left Edge of Phone 10 mm from Phantom

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Test Plot	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
820	BC 10, RC3 SO55	564	19.0	-0.18	0.280	0.29	0.403	0.42		
	EVDO Rev O RTAP 153.6K	564	**19.5**	**-0.04**	**0.435**	**0.44**	**0.649**	**0.66**	**5x5x7**	**A-58**
835	CDMA 800, RC3 SO55	1013								
		384	19.2	-0.34	0.331	0.36	0.481	0.52		
		777								
	EVDO Rev O RTAP 153.6K	1013								
		384	**19.5**	**0.01**	**0.385**	**0.39**	**0.580**	**0.58**	**5x5x7**	**A-60**
		777								
1880	LTE Band 25, QPSK (1 RB @ Low)	26090	18.5	-0.06	0.0941	0.10	0.169	0.17		
	LTE Band 25, QPSK (1 RB @ High)	26090	18.4	-0.07	0.101	0.10	0.18	0.18		
	LTE Band 25, QPSK (50% RB)	26365	18.5	-0.11	0.0909	0.09	0.158	0.16		
	LTE Band 25, 16QAM (1 RB @ Low)	26090	18.5	-0.19	0.0835	0.09	0.144	0.15		
	LTE Band 25, 16QAM (1 RB @ High)	26090	18.5	-0.31	0.0956	0.10	0.163	0.18		
	LTE Band 25, 16QAM (50% RB)	26365	18.4	-0.03	0.0957	0.10	0.17	0.17		
	CDMA 1900, RC3 SO55	25								
		600	18.7	0.04	0.153	0.15	0.271	0.27		
		1175								
	EVDO Rev O RTAP 153.6K	25								
		600	19.8	-0.01	0.171	0.17	0.292	0.29		
		1175								

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

Mobile Hotspot, Right Edge of Phone 10 mm from Phantom

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Test Plot	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
820	BC 10, RC3 SO55	564	19.0	-0.05	0.466	0.47	0.676	0.68		
835	CDMA 800, RC3 SO55	1013	19.5	-0.12	0.434	0.45	0.629	0.65		
		384	19.2	-0.09	0.544	0.56	0.788	0.80		
		777	19.5	-0.02	0.481	0.48	0.701	0.70		
1880	CDMA 1900, RC3 SO55	25								
		600	18.6	0.01	0.236	0.24	0.401	0.40		
		1175								
2450	802.11b, 1 Mbps	1	20.4	0.10	0.062	0.06	0.125	0.13		
		6								
		11								

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

Mobile Hotspot, Bottom Edge of Phone 10 mm from Phantom

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Test Plot	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
820	BC 10, RC3 SO55	564	19.0	0.12	0.053	0.05	0.083	0.08		
835	CDMA 800, RC3 SO55	1013								
		384	19.2	-0.13	0.073	0.08	0.117	0.12		
		777								
1880	CDMA 1900, RC3 SO55	25	18.7	-0.01	0.342	0.34	0.662	0.66		
		600	18.6	-0.10	0.427	0.44	0.826	0.85		
		1175	**18.6**	**-0.04**	**0.580**	**0.59**	**1.13**	**1.14**	**5x5x7**	**A-62**
2450	802.11b, 1 Mbps	1	20.4	-0.11	0.011	0.01	0.020	0.02		
		6								
		11								

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

Mobile Hotspot, Top Edge of Phone 10 mm from Phantom

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	10 g SAR value		1 g SAR value		Test Plot	
					Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
820	EVDO Rev O RTAP 153.6K	564	19.5	-0.01	0.108	0.11	0.173	0.17		
835	EVDO Rev O RTAP 153.6K	1013								
		384	19.5	0.10	0.105	0.11	0.168	0.17		
		777								
1880	LTE Band 25, QPSK (1 RB @ Low)	26090	19.8	0.07	0.0374	0.04	0.0632	0.06		
	LTE Band 25, QPSK (1 RB @ High)	26090	19.8	-0.14	0.0424	0.04	0.0713	0.07		
	LTE Band 25, QPSK (50% RB)	26365	19.8	-0.08	0.047	0.05	0.0793	0.08		
	LTE Band 25, 16QAM (1 RB @ Low)	26090	19.8	0.01	0.0383	0.04	0.0642	0.06		
	LTE Band 25, 16QAM (1 RB @ High)	26090	19.8	-0.01	0.0436	0.04	0.0732	0.07		
	LTE Band 25, 16QAM (50% RB)	26365	19.8	-0.02	0.049	0.05	0.0835	0.08		
	EVDO Rev O RTAP 153.6K	25								
		600	19.9	0.04	0.159	0.16	0.268	0.27		
		1175								

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

6.5 Description and Evaluation of Simultaneous Transmitters

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

By device design the CDMA, EVOD and LTE transmitters may operate simultaneously with either the Wi-Fi 802.11 transmitter or the Bluetooth transmitter. The Wi-Fi and the Bluetooth cannot transmit simultaneously, so there is no co-location test requirement for Wi-Fi and Bluetooth. CDMA supports both voice and data transmission, though not simultaneously. LTE, EVDO, Wi-Fi support data transmission only.

The separation distance between the Wi-Fi 802.11/Bluetooth antenna and the main voice antenna is 1.26 cm. The separation distance between the Wi-Fi 802.11/Bluetooth antenna and the main data antenna is 7.15 cm. Pictorial representation of the antenna locations and separation distances are given in Exhibit 7d.

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

1. The highest output conducted power measured for Bluetooth on the device under test is 9.954 mW [≤ 12 mW]
2. The separation distance between the Bluetooth antenna and the main data antenna is 7.15 cm. [> 2.5 cm]
3. The separation distance between the Bluetooth antenna and the main voice antenna is 1.26 cm. [< 2.5 cm]
4. The highest 1-g Body-Worn SAR values for primary transmitters are:
   CDMA BC 10 (0.44 W/kg); CDMA 800 (0.47 W/kg), CDMA 1900 (0.77 W/kg) [< 1.2 W/kg]

For the transmitters requiring stand-alone SAR testing (CDMA, EVDO, LTE, and Wi-Fi 802.11), the KDB guidelines direct that if the sum of the 1 g SAR measured for the simultaneously transmitting antennas is less than the SAR limit, SAR measurement for simultaneous transmission is not required. Further, if the SAR-to-peak-location separation ratio for two simultaneously transmitting antennas is less than 0.3 then SAR measurement for simultaneous transmission is likewise not required.

Evaluations for Simultaneous SAR (CDMA BC10)										
Position	**Transmitter Stand-Alone 1 g SAR Values (W/kg)**						**1 g SAR Summations (W/kg)**			
	CDMA BC 10	**WIFI 2450**	**EVDO BC10**	**EVDO BC0**	**EVDO BC1**	**LTE Band 25**	**CDMA BC10+ WIFI+ EVDO BC10**	**CDMA BC10+ WIFI+ EVDO BC0**	**CDMA BC10+ WIFI+ EVDO BC1**	**CDMA BC10+ WIFI+ LTE**
Left Head Cheek	0.30	0.08	0.37	0.33	0.45	0.43	0.75	0.71	0.83	0.81
Right Head Cheek	0.10	0.12	0.53	0.45	0.64	0.89	0.75	0.67	0.86	1.11
Left Head 15° Tilt	0.14	0.05	0.26	0.21	0.37	0.39	0.45	0.4	0.56	0.58
Right Head 15° Tilt	0.03	0.05	0.37	0.33	0.49	0.68	0.45	0.41	0.57	0.76
Body Worn, Front of Phone 25 from Phantom	0.43	0.01	0.19	0.15	0.12	0.25	0.63	0.59	0.56	0.69
Body Worn, Back of Phone 25 from Phantom	0.44	0.05	0.25	0.19	0.29	0.30	0.74	0.68	0.78	0.79
Mobile Hotspot, Front of Phone 10mm from Phantom	0.61	0.02	0.28	0.24	0.07	0.11	0.91	0.87	0.7	0.74
Mobile Hotspot, Back of Phone 10mm from Phantom	0.84	0.13	0.56	0.56	0.33	0.42	1.53	1.53	1.3	1.39
	CDMA BC 10	**WIFI 2450**	**EVDO BC10**	**EVDO BC0**	**EVDO BC1**	**LTE Band 25**	**CDMA BC10+ EVDO BC10**	**CDMA BC10+ EVDO BC0**	**CDMA BC10+ EVDO BC1**	**CDMA BC10+ LTE**
Mobile Hotspot, Left Edge of Phone 10mm from Phantom	0.42		0.66	0.58	0.29	0.18	1.08	1	0.71	0.6
	CDMA BC 10	**WIFI 2450**	**EVDO BC10**	**EVDO BC0**	**EVDO BC1**	**LTE Band 25**	**CDMA BC10+ WIFI**	**CDMA BC10+ WIFI**	**CDMA BC10+ WIFI**	**CDMA BC10+ WIFI**
Mobile Hotspot, Right Edge of Phone 10mm from Phantom	0.68	0.13					0.81			
Mobile Hotspot, Bottom Edge of Phone 10mm from Phantom	0.08	0.02					0.1			

Evaluations for Simultaneous SAR (CDMA 800)										
Position	**Transmitter Stand-Alone 1 g SAR Values (W/kg)**						**1 g SAR Summations (W/kg)**			
	CDMA 800	**WIFI 2450**	**EVDO BC10**	**EVDO BC0**	**EVDO BC1**	**LTE Band 25**	**CDMA 800+ WIFI+ EVDO BC10**	**CDMA 800+ WIFI+ EVDO BC0**	**CDMA 800+ WIFI+ EVDO BC1**	**CDMA 800+ WIFI+ LTE**
Left Head Cheek	0.57	0.08	0.37	0.33	0.45	0.43	1.02	0.98	1.1	1.08
Right Head Cheek	0.59	0.12	0.53	0.45	0.64	0.89	1.24	1.16	1.35	1.6
Left Head 15° Tilt	0.42	0.05	0.26	0.21	0.37	0.39	0.73	0.68	0.84	0.86
Right Head 15° Tilt	0.43	0.05	0.37	0.33	0.49	0.68	0.85	0.81	0.97	1.16
Body Worn, Front of Phone 25 from Phantom	0.43	0.01	0.19	0.15	0.12	0.25	0.63	0.59	0.56	0.69
Body Worn, Back of Phone 25 from Phantom	0.47	0.05	0.25	0.19	0.29	0.30	0.77	0.71	0.81	0.82
Mobile Hotspot, Front of Phone 10mm from Phantom	0.63	0.02	0.28	0.24	0.07	0.11	0.93	0.89	0.72	0.76
Mobile Hotspot, Back of Phone 10mm from Phantom	0.97	0.13	0.56	0.56	0.33	0.42	>1.60	>1.60	1.43	1.52
	CDMA 800	**WIFI 2450**	**EVDO BC10**	**EVDO BC0**	**EVDO BC1**	**LTE Band 25**	**CDMA 800+ EVDO BC10**	**CDMA 800+ EVDO BC0**	**CDMA 800+ EVDO BC1**	**CDMA 800+ LTE**
Mobile Hotspot, Left Edge of Phone 10mm from Phantom	0.52		0.66	0.58	0.29	0.18	1.18	1.1	0.81	0.7
	CDMA 800	**WIFI 2450**	**EVDO BC10**	**EVDO BC0**	**EVDO BC1**	**LTE Band 25**	**CDMA 800+ WIFI**	**CDMA 800+ WIFI**	**CDMA 800+ WIFI**	**CDMA 800+ WIFI**
Mobile Hotspot, Right Edge of Phone 10mm from Phantom	0.80	0.13					0.93			
Mobile Hotspot, Bottom Edge of Phone 10mm from Phantom	0.12	0.02					0.14			

Evaluations for Simultaneous SAR (CDMA 1900)										
Position	**Transmitter Stand-Alone 1 g SAR Values (W/kg)**						**1 g SAR Summations (W/kg)**			
	CDMA 1900	**WIFI 2450**	**EVDO BC10**	**EVDO BC0**	**EVDO BC1**	**LTE Band 25**	**CDMA 1900+ WIFI+ EVDO BC10**	**CDMA 1900+ WIFI+ EVDO BC0**	**CDMA 1900+ WIFI+ EVDO BC1**	**CDMA 1900+ WIFI+ LTE**
Left Head Cheek	0.28	0.08	0.37	0.33	0.45	0.43	0.73	0.69	0.81	0.79
Right Head Cheek	0.58	0.12	0.53	0.45	0.64	0.89	1.23	1.15	1.34	1.59
Left Head 15° Tilt	0.27	0.05	0.26	0.21	0.37	0.39	0.58	0.53	0.69	0.71
Right Head 15° Tilt	0.22	0.05	0.37	0.33	0.49	0.68	0.64	0.6	0.76	0.95
Body Worn, Front of Phone 25 from Phantom	0.12	0.01	0.19	0.15	0.12	0.25	0.32	0.28	0.25	0.38
Body Worn, Back of Phone 25 from Phantom	0.77	0.05	0.25	0.19	0.29	0.30	1.07	1.01	1.11	1.12
Mobile Hotspot, Front of Phone 10mm from Phantom	0.24	0.02	0.28	0.24	0.07	0.11	0.54	0.5	0.33	0.37
Mobile Hotspot, Back of Phone 10mm from Phantom	1.07	0.13	0.56	0.56	0.33	0.42	>1.60	>1.60	1.53	>1.60
	CDMA 1900	**WIFI 2450**	**EVDO BC10**	**EVDO BC0**	**EVDO BC1**	**LTE Band 25**	**CDMA 1900+ EVDO BC10**	**CDMA 1900+ EVDO BC0**	**CDMA 1900+ EVDO BC1**	**CDMA 1900+ LTE**
Mobile Hotspot, Left Edge of Phone 10mm from Phantom	0.27		0.66	0.58	0.29	0.18	0.93	0.85	0.56	0.45
	CDMA 1900	**WIFI 2450**	**EVDO BC10**	**EVDO BC0**	**EVDO BC1**	**LTE Band 25**	**CDMA 1900+ WIFI**	**CDMA 1900+ WIFI**	**CDMA 1900+ WIFI**	**CDMA 1900+ WIFI**
Mobile Hotspot, Right Edge of Phone 10mm from Phantom	0.40	0.13					0.53			
Mobile Hotspot, Bottom Edge of Phone 10mm from Phantom	1.14	0.02					1.16			

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

A. Mobile Hotspot, Back of Phone 10mm from Phantom, CDMA 1900 + EVDO BC 10 + WIFI
B. Mobile Hotspot, Back of Phone 10mm from Phantom, CDMA 1900 + EVDO 800 + WIFI
C. Mobile Hotspot, Back of Phone 10mm from Phantom, CDMA 1900 + LTE + WIFI
D. Mobile Hotspot, Back of Phone 10mm from Phantom, CDMA 800 + EVDO BC 10 + WIFI
E. Mobile Hotspot, Back of Phone 10mm from Phantom, CDMA 800 + EVDO 800 + WIFI

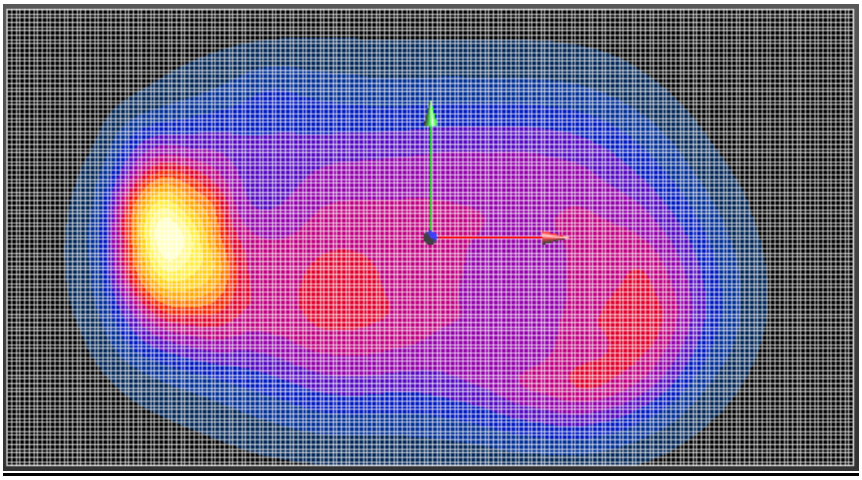
The guidelines provided in "SAR for Handsets with Multiple Transmitters" (KDB publication 648474 - D01 v01r03) were utilized for evaluation of the need for simultaneous transmission SAR testing. These guidelines direct that if the SAR-to-peak location separation ratio (SPLSR) for a pair of antennas is < 0.3 then SAR evaluation for simultaneous transmission is not required. Overlaid SAR plots, separation distances between RF peaks[3], and demonstration of these calculations are provided below for each noted case.

The steps below outline the analysis between CDMA, WIFI, EVDO hotspots

1) Determine the distance between CDMA hotspot and EVDO hotspot
2) Determine the distance between WIFI hotspot and EVDO hotspot
3) Take the smallest distance from steps 1) and 2)
4) Use SPLSR analysis between sum of (CDMA+WIFI) and EVDO using the distance from step 3

In case C, we use LTE hotspot instead of EVDO hotspot

Case A: Mobile Hotspot, Back of Phone 10mm from Phantom, CDMA 1900 + EVDO BC 10 + WIFI

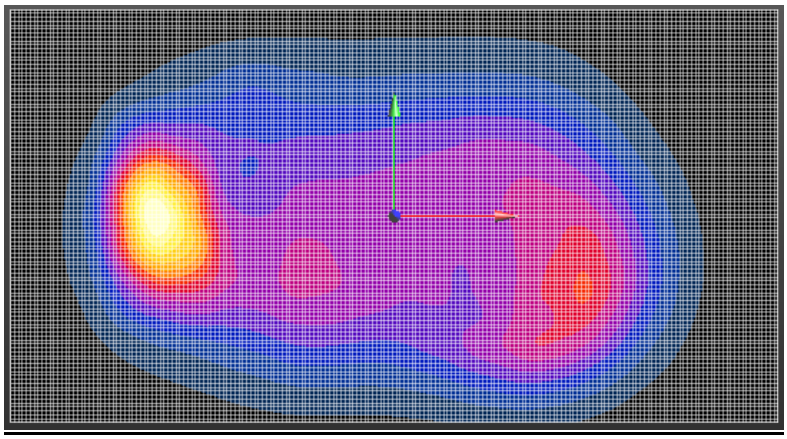


Transmitter	1-g SAR	Peak Location	Distance
CDMA 1900	1.07	-0.0599, 0, -0.173	10.82
EVDO BC 10	0.56	0.0448, -0.0274, -0.173	
WIFI	0.13	-0.036, 0.0298, -0.173	9.90
EVDO BC 10	0.56	0.0448, -0.0274, -0.173	

	1-g SAR	Closet Distance
CDMA 1900 + WIFI	1.2	9.90
EVDO BC 10	0.56	
Sum	1.76	
Smallest Peak Separation Distance	9.90	
SPLSR	0.178	

[3] Calculations of peak separation distances were evaluated per SPEAG Technical Note "Calculation of the Distance between Two Hotspot", *TN_110209_DASY_Calculate_HotSpot_Distance.pdf.*

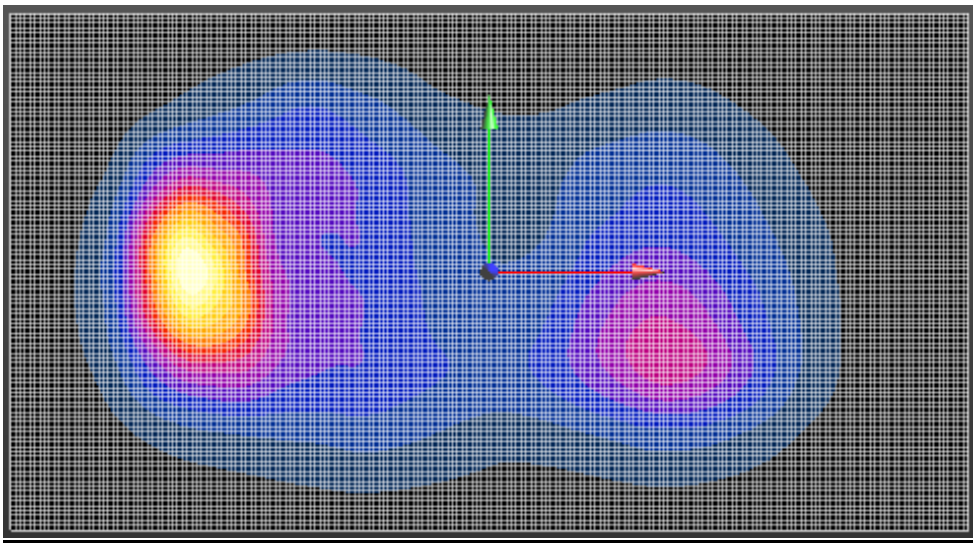
Case B: Mobile Hotspot, Back of Phone 10mm from Phantom, CDMA 1900 + EVDO 800 + WIFI



Transmitter	1-g SAR	Peak Location	Distance
CDMA 1900	1.07	-0.0599, 0, -0.173	10.90
EVDO 800	0.56	0.0464, -0.0243, -0.174	
WIFI	0.13	-0.036, 0.0298, -0.173	9.86
EVDO 800	0.56	0.0464, -0.0243, -0.174	

	1-g SAR	Closet Distance
CDMA 1900 + WIFI	1.2	9.86
EVDO 800	0.56	
Sum	1.76	
Smallest Peak Separation Distance	9.86	
SPLSR	0.178	

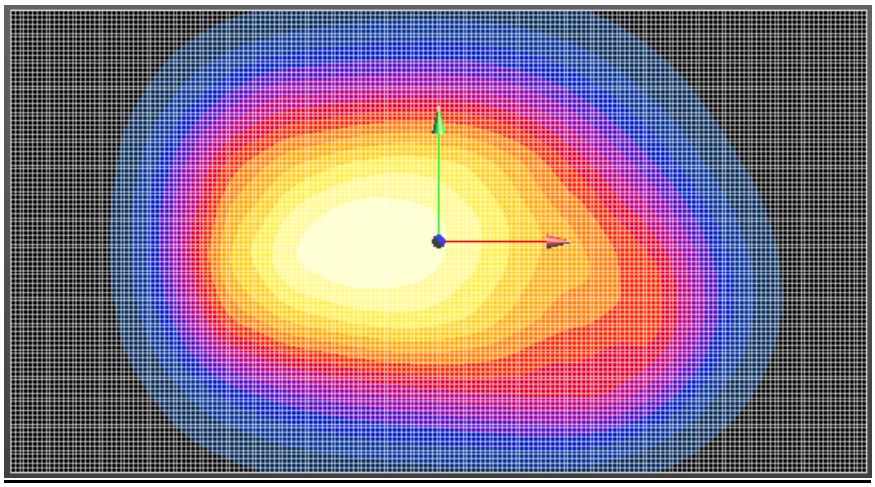
Case C: Mobile Hotspot, Back of Phone 10mm from Phantom, CDMA 1900 + LTE + WIFI



Transmitter	1-g SAR	Peak Location	Distance
CDMA 1900	1.07	-0.0599, 0, -0.173	9.77
LTE	0.42	0.0361, -0.0181, -0.173	
WIFI	0.13	-0.036, 0.0298, -0.173	8.66
LTE	0.42	0.0361, -0.0181, -0.173	

	1-g SAR	Closet Distance
CDMA 1900 + WIFI	1.2	8.66
LTE	0.42	
Sum	1.62	
Smallest Peak Separation Distance	8.66	
SPLSR	0.187	

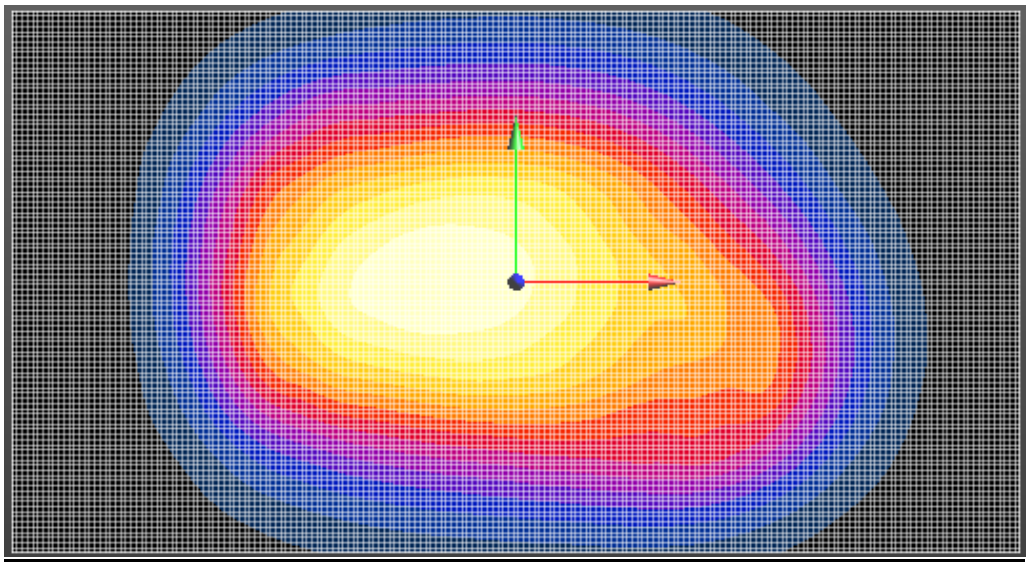
Case D: Mobile Hotspot, Back of Phone 10mm from Phantom, CDMA 800 + EVDO BC 10 + WIFI



Transmitter	1-g SAR	Peak Location	Distance
CDMA 800	0.97	-0.021, 0.0014, -0.173	7.18
EVDO BC 10	0.56	0.0448, -0.0274, -0.173	
WIFI	0.13	-0.036, 0.0298, -0.173	9.90
EVDO BC 10	0.56	0.0448, -0.0274, -0.173	

	1-g SAR	Closet Distance
CDMA 800 + WIFI	1.1	7.18
EVDO BC 10	0.56	
Sum	1.66	
Smallest Peak Separation Distance	7.18	
SPLSR	0.231	

Case E: Mobile Hotspot, Back of Phone 10mm from Phantom, CDMA 800 + EVDO 800 + WIFI



Transmitter	1-g SAR	Peak Location	Distance
CDMA 800	0.97	-0.021, 0.0014, -0.173	7.21
EVDO 800	0.56	0.0464, -0.0243, -0.174	
WIFI	0.13	-0.036, 0.0298, -0.173	9.86
EVDO 800	0.56	0.0464, -0.0243, -0.174	

	1-g SAR	Closet Distance
CDMA 1900 + WIFI	1.2	7.21
EVDO 800	0.56	
Sum	1.66	
Smallest Peak Separation Distance	7.21	
SPLSR	0.230	

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

References

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

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

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

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

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

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

Appendix 1

SAR distribution comparisons for System Accuracy Verifications

System Accuracy Verification Measurements for Head SAR Measurements

Date/Time: 5/14/2012 8:11:30 AM

DUT: Dipole 835 MHz; Type: D835V2; Procedure Notes: 835 MHz System Performance Check / Dipole Sn# 4d129; PM1 Power = 200 mW P
Sim.Temp@ meas = 18.8*C; Sim.Temp@ SPC = 19.5*C; Room Temp@ SPC = 21.0*C

Communication System: _CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.93 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3

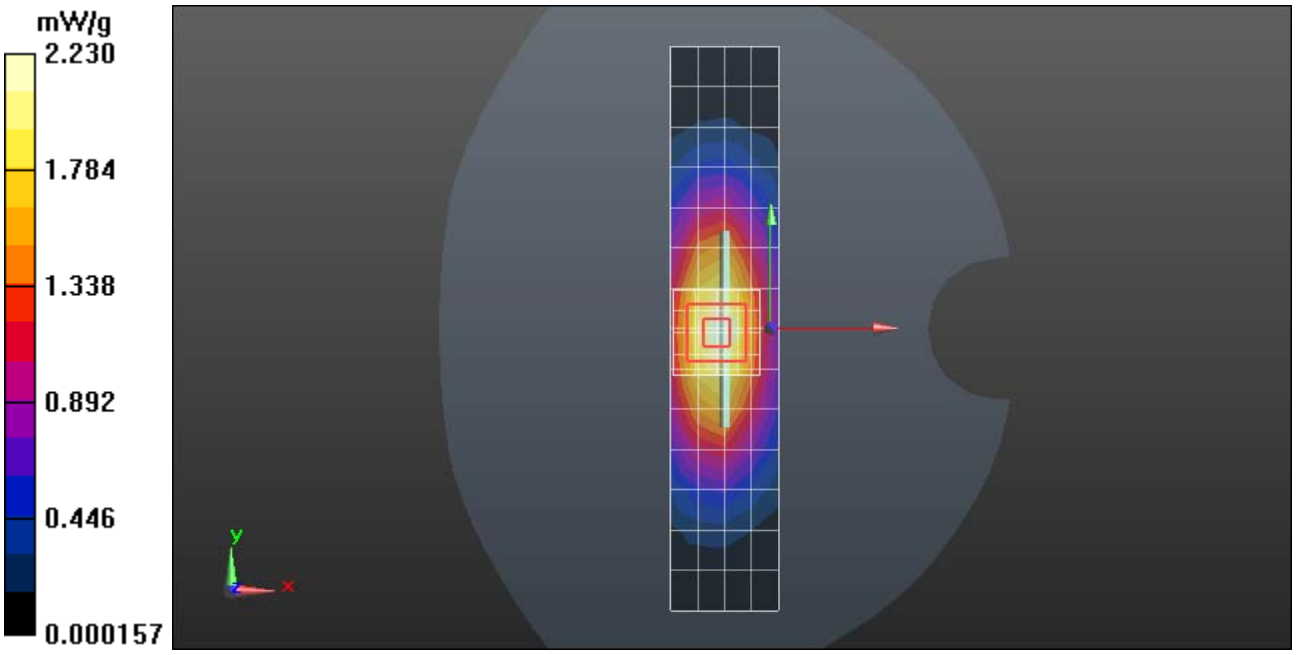
DASY4 Configuration:

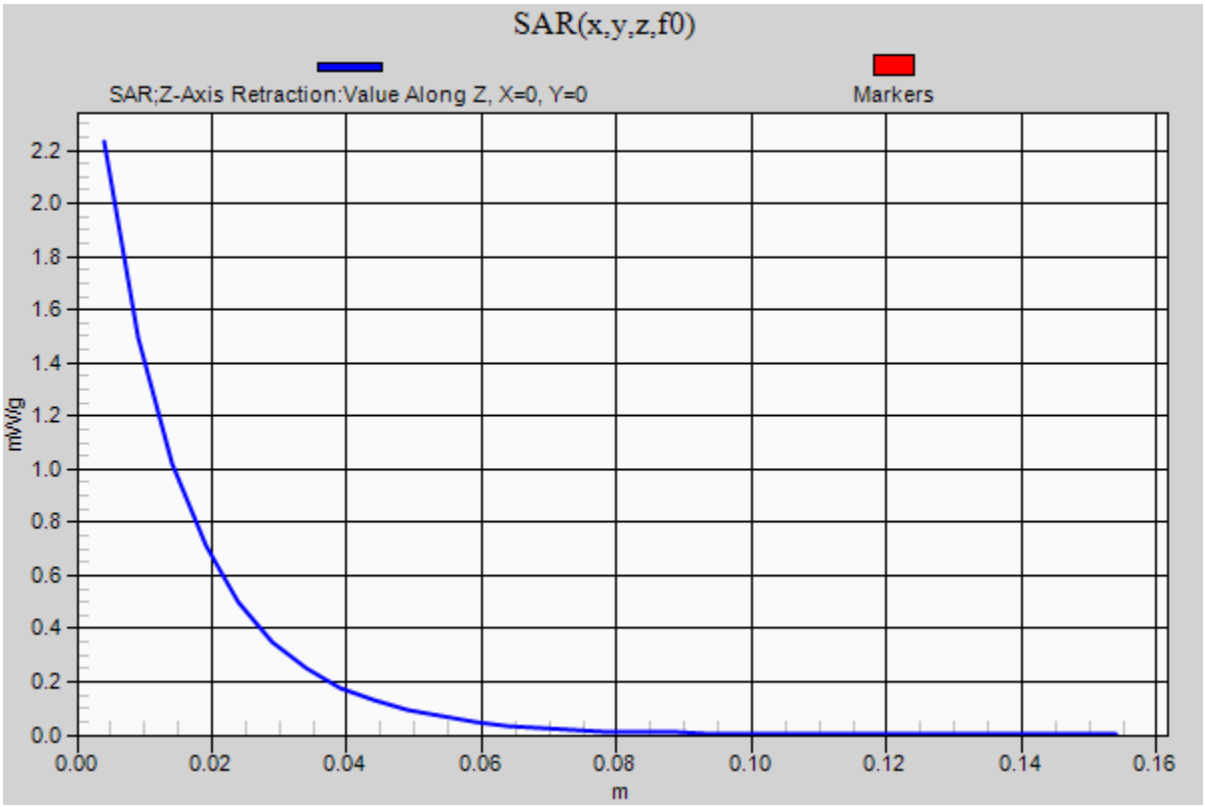
- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.5 (6469)

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 2.19 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.429 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.051 mW/g
SAR(1 g) = 2.06 mW/g; SAR(10 g) = 1.35 mW/g
Maximum value of SAR (measured) = 2.23 mW/g

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


mW/g
2.230
1.784
1.338
0.892
0.446
0.000157
y
x


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

Date/Time: 5/15/2012 8:30:29 AM

DUT: Dipole 835 MHz; Type: D835V2; Procedure Notes: 835 MHz System Performance Check / Dipole Sn# 4d129; PM1 Power = 200 mW
Sim.Temp@ meas = 18.7*C; Sim.Temp@ SPC = 19.2*C; Room Temp@ SPC = 20.8*C

Communication System: _CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.93 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

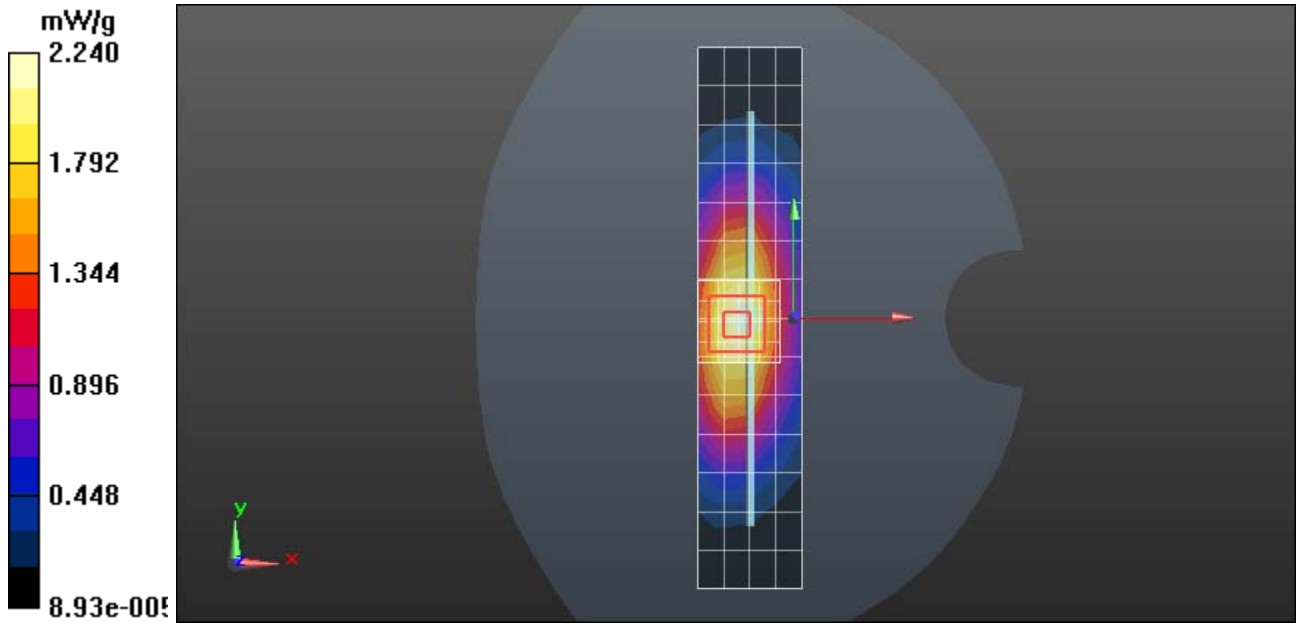
DASY4 Configuration:

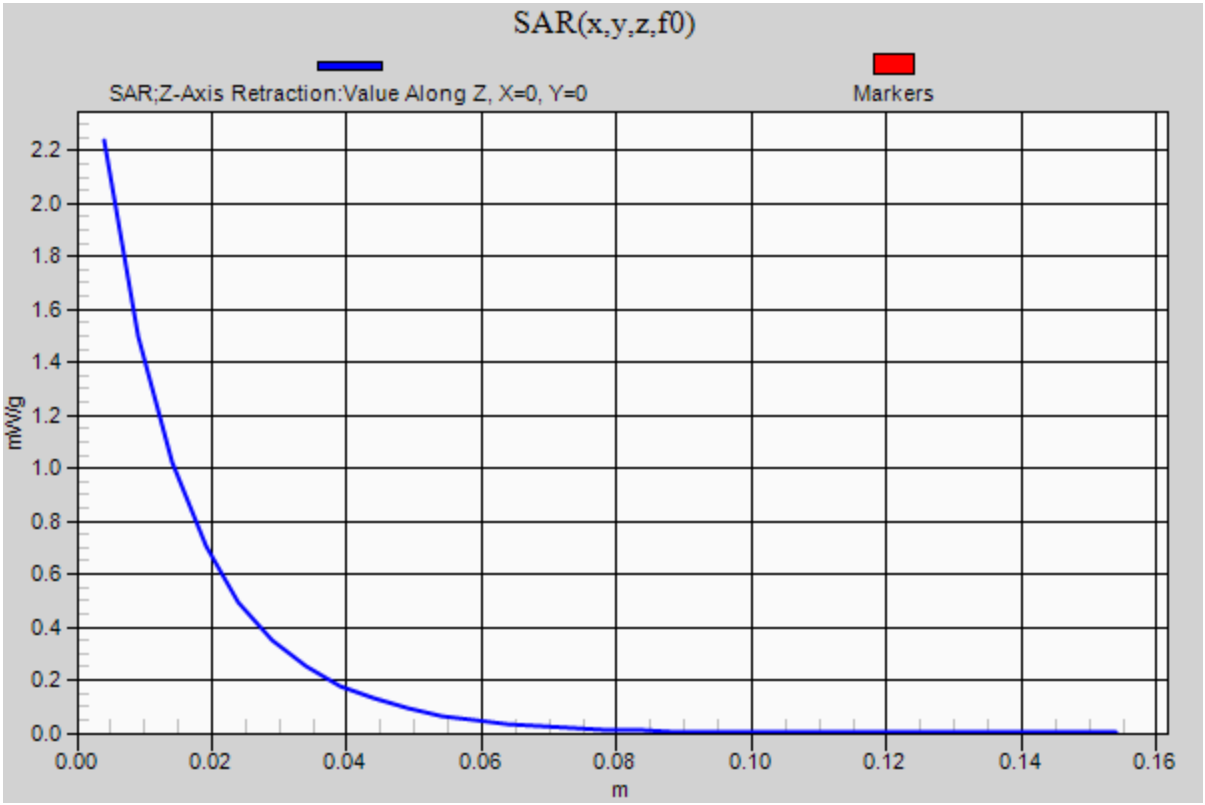
- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.5 (6469)

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 2.14 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.108 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 3.063 mW/g
SAR(1 g) = 2.07 mW/g; SAR(10 g) = 1.35 mW/g
Maximum value of SAR (measured) = 2.24 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
Markers
mW/g
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date/Time: 5/8/2012 7:20:47 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 2D191; PM1 Power = 200 mW;
Sim.Temp@ meas = 19.0*C; Sim.Temp@ SPC = 19.0*C; Room Temp@ SPC = 21.2*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.36 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3

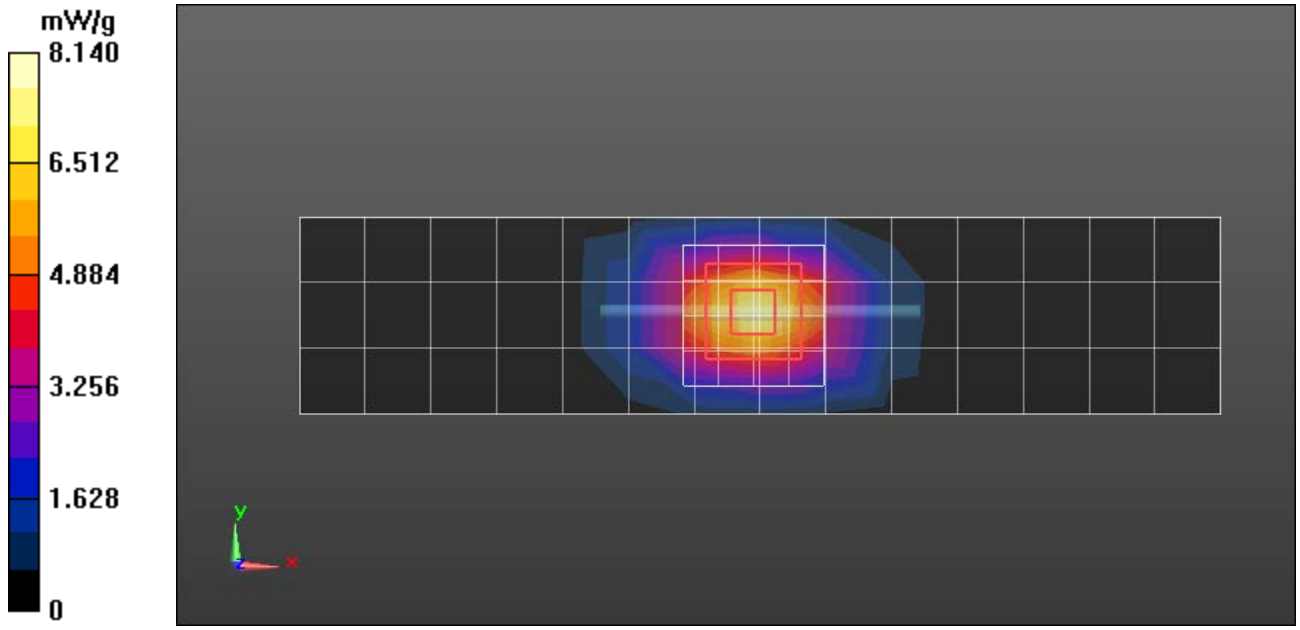
DASY4 Configuration:

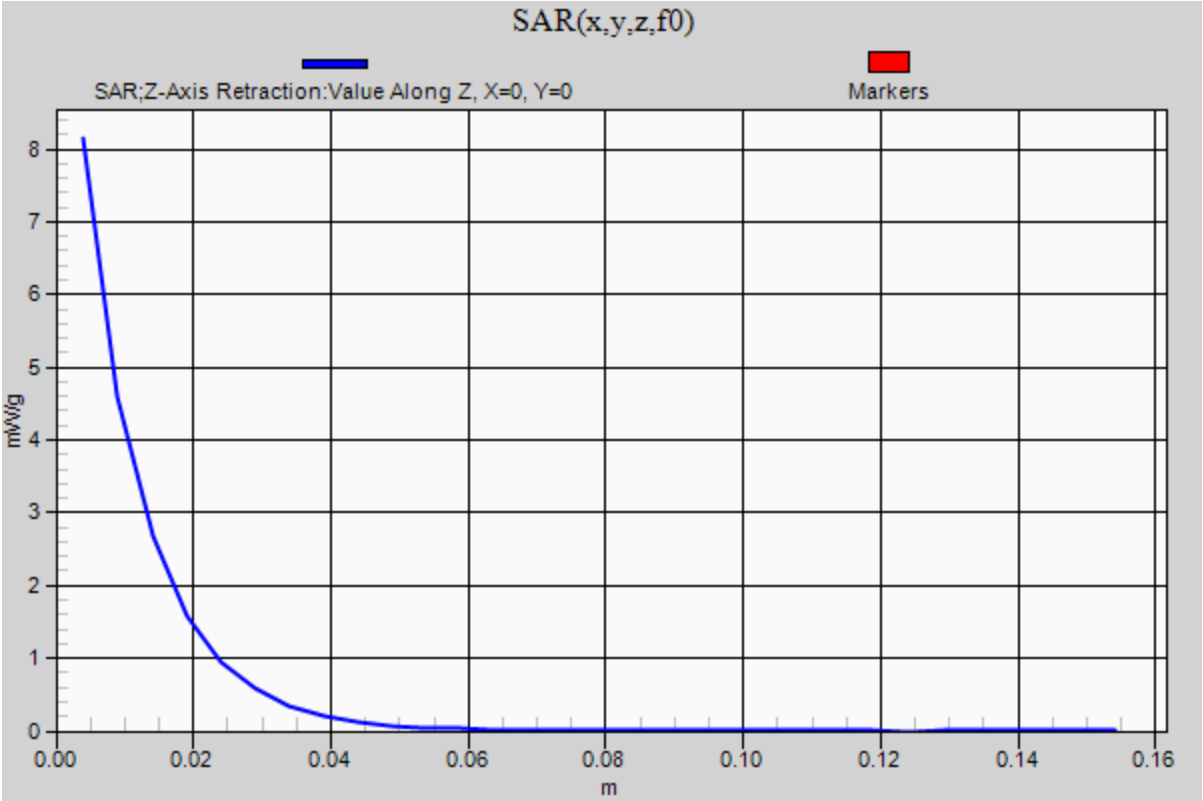
- Probe: ES3DV3 - SN3284; ConvF(5.33, 5.33, 5.33); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.02 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.546 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 13.060 mW/g
SAR(1 g) = 7.26 mW/g; SAR(10 g) = 3.84 mW/g
Maximum value of SAR (measured) = 8.15 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.14 mW/g




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

Date/Time: 5/15/2012 6:58:28 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 2d190; PM1 Power = 200 mW
Sim.Temp@ meas = 18.5*C; Sim.Temp@ SPC = 18.5*C; Room Temp@ SPC = 20.7*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.37 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3

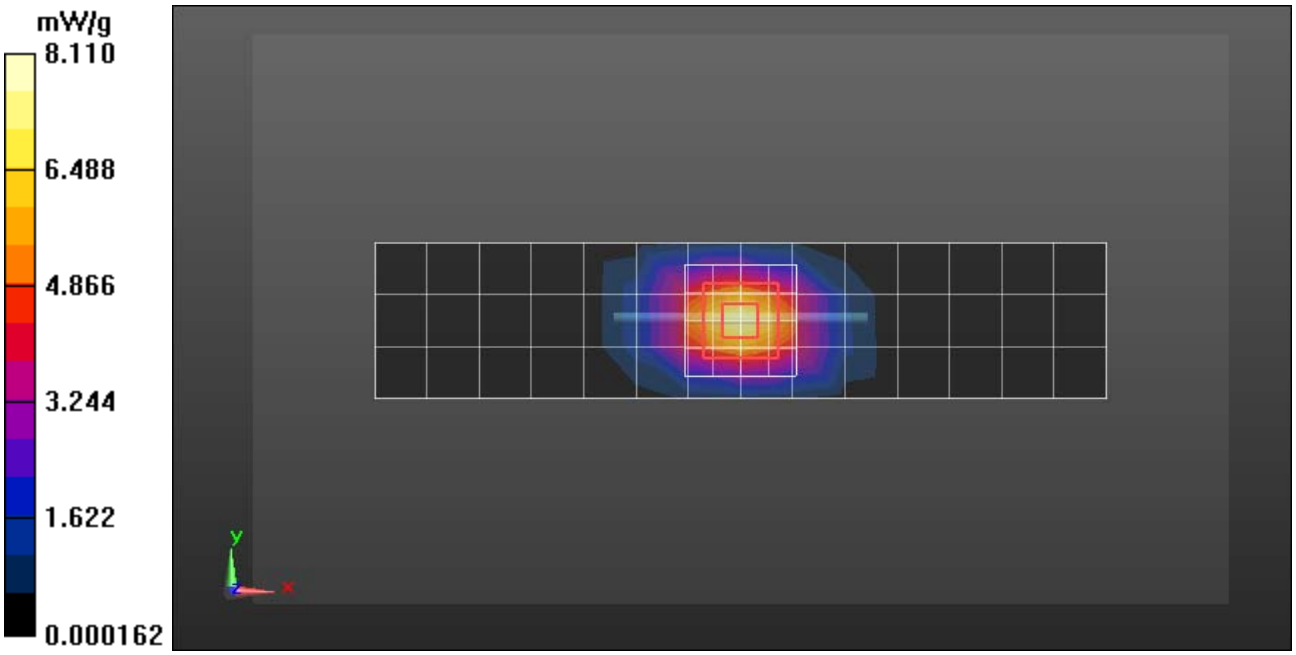
DASY4 Configuration:

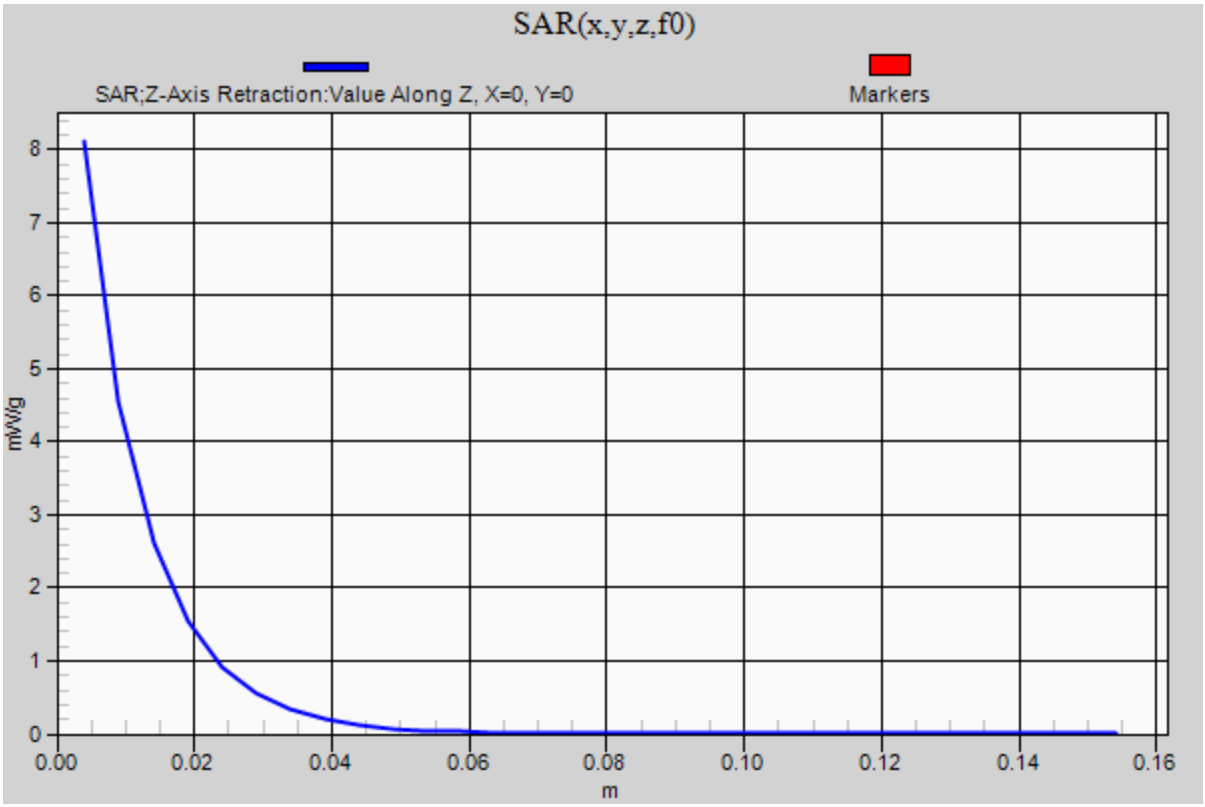
- Probe: ES3DV3 - SN3115; ConvF(5.17, 5.17, 5.17); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 1/11/2012
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 5.94 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.102 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 13.154 mW/g
SAR(1 g) = 7.25 mW/g; SAR(10 g) = 3.83 mW/g
Maximum value of SAR (measured) = 8.14 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.11 mW/g


mW/g
8.110
6.488
4.866
3.244
1.622
0.000162
y
x


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

Date/Time: 5/23/2012 6:59:02 PM

DUT: Dipole 2450 MHz; Type: D2450V2; Procedure Notes: 2450 MHz System Performance Check / Dipole Sn# 877; PM1 Power = 200 mW
Sim.Temp@ meas = 21.3*C; Sim.Temp@ SPC = 21.1*C; Room Temp@ SPC = 20.8*C

Communication System: _CW - Dipole; Frequency: 2450 MHz; Communication System Channel Number: 11; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 2450 MHz; σ = 1.89 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3

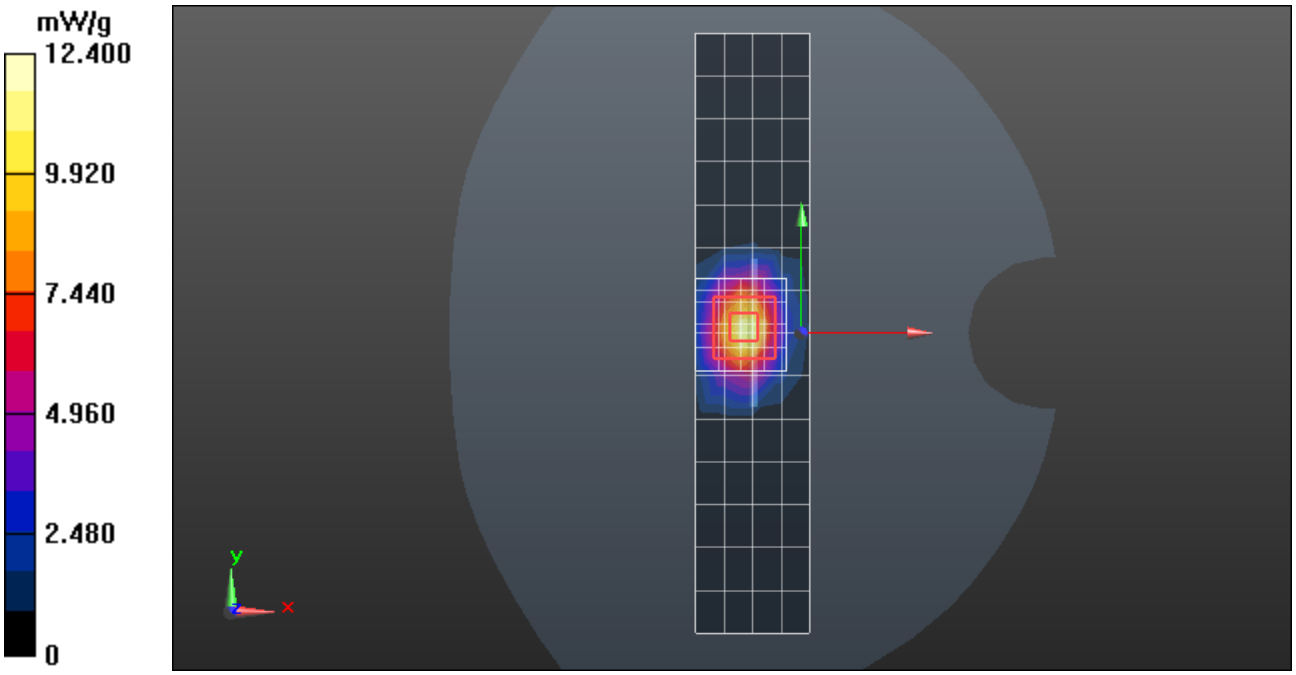
DASY4 Configuration:

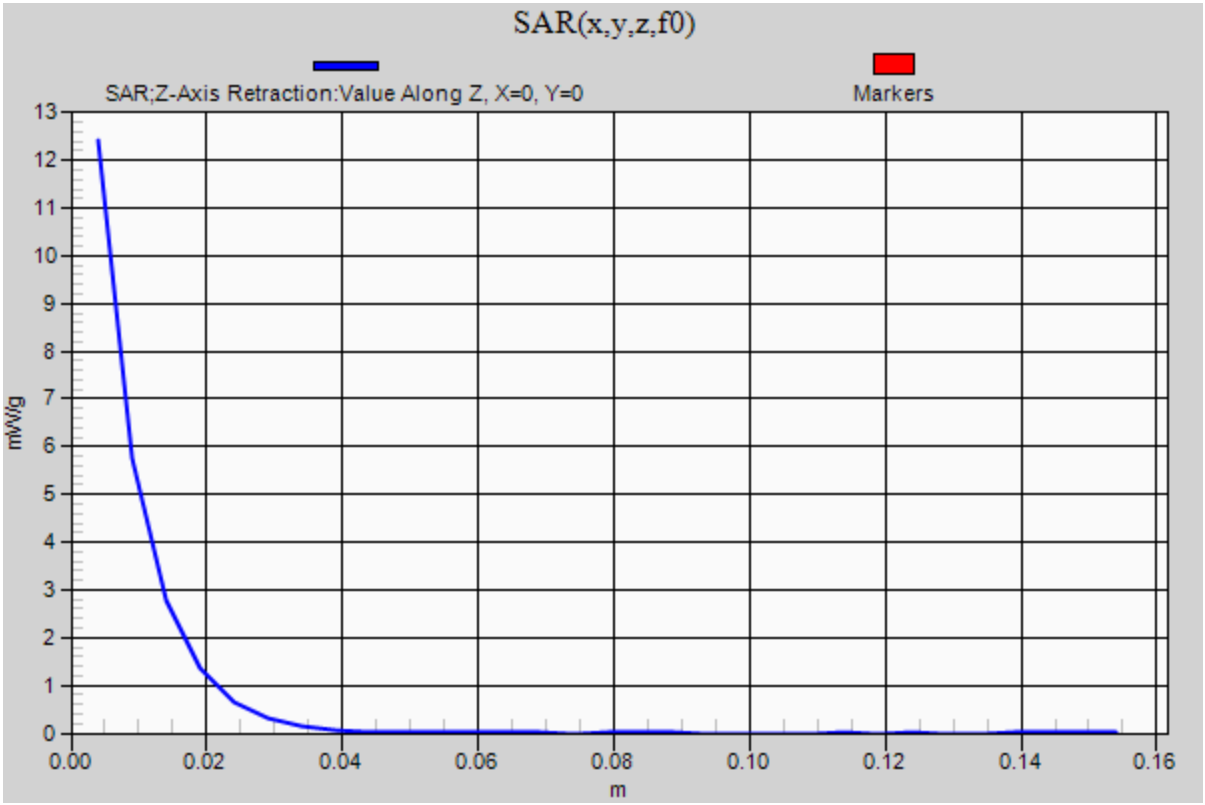
- Probe: ES3DV3 - SN3284; ConvF(4.56, 4.56, 4.56); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.5 (6469)

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 11.4 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.758 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 24.315 mW/g
SAR(1 g) = 11 mW/g; SAR(10 g) = 4.94 mW/g
Maximum value of SAR (measured) = 12.3 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 12.4 mW/g


mW/g
12.400
9.920
7.440
4.960
2.480
0
y
x


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

System Accuracy Verification Measurements for Body SAR Measurements

Date/Time: 5/14/2012 3:58:37 PM

DUT: Dipole 835 MHz; Type: D835V2; Procedure Notes: 835 MHz System Performance Check / Dipole Sn# 4d129; PM1 Power = 200 mW
Sim.Temp@ meas = 19.0*C; Sim.Temp@ SPC = 19.9*C; Room Temp@ SPC = 20.8*C

Communication System: _CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3

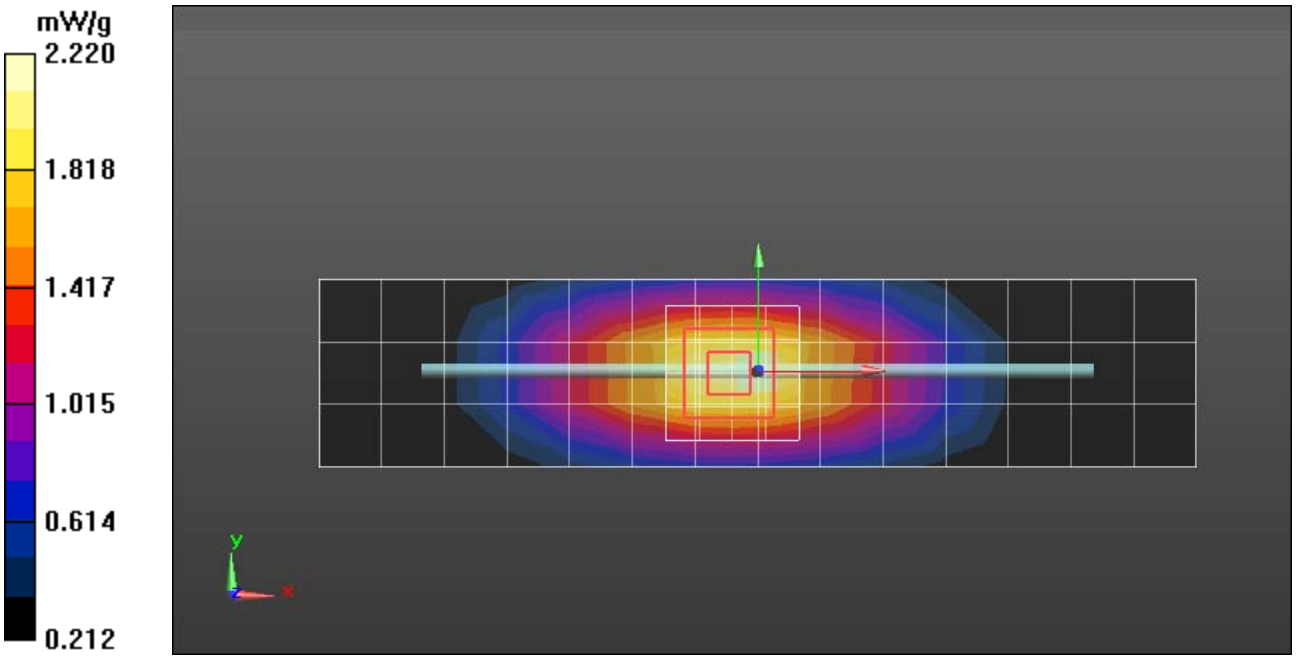
DASY4 Configuration:

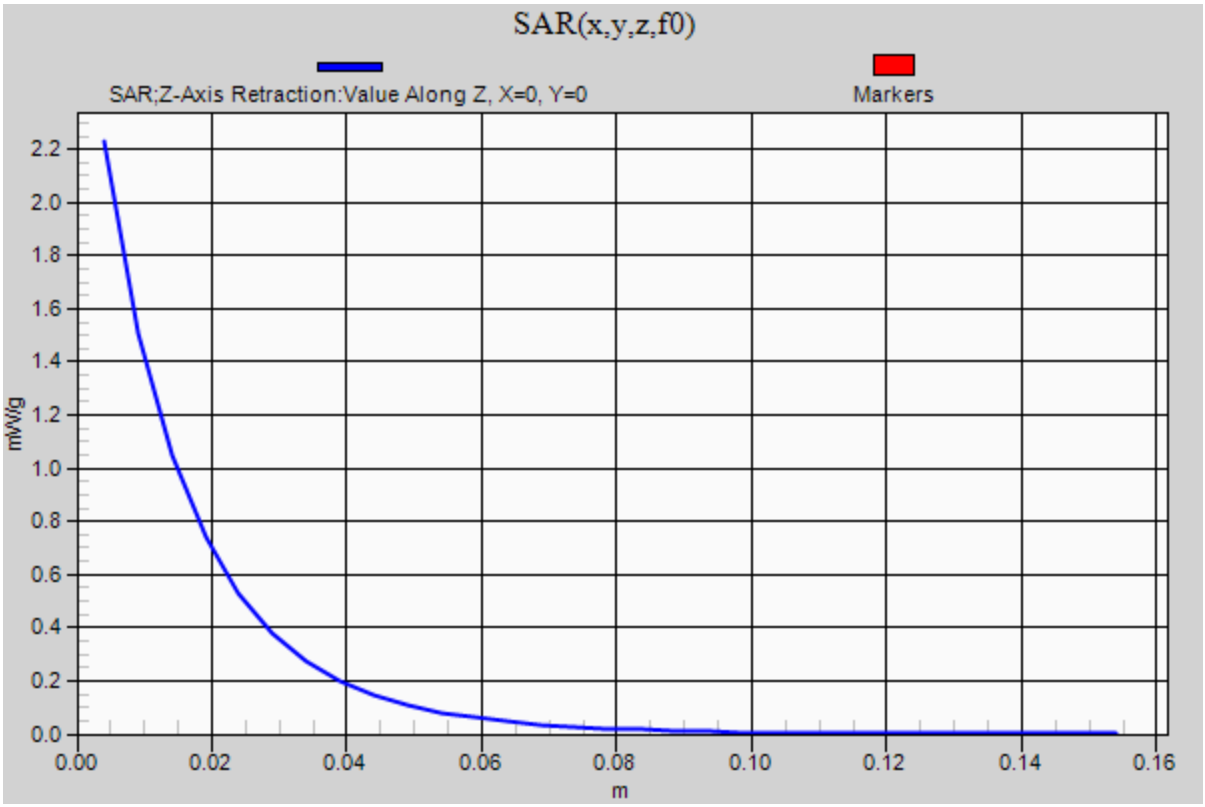
- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.89 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.283 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.075 mW/g
SAR(1 g) = 2.06 mW/g; SAR(10 g) = 1.35 mW/g
Maximum value of SAR (measured) = 2.22 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.23 mW/g


mW/g
2.220
1.818
1.417
1.015
0.614
0.212
y
x


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

Date/Time: 5/15/2012 3:27:50 PM

DUT: Dipole 835 MHz; Type: D835V2; Procedure Notes: 835 MHz System Performance Check / Dipole Sn# 436(TR); PM1 Power = 200 mW
Sim.Temp@ meas = 18.5*C; Sim.Temp@ SPC = 19.0*C; Room Temp@ SPC = 20.3*C

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 = 52.9; ρ = 1000 kg/m^3

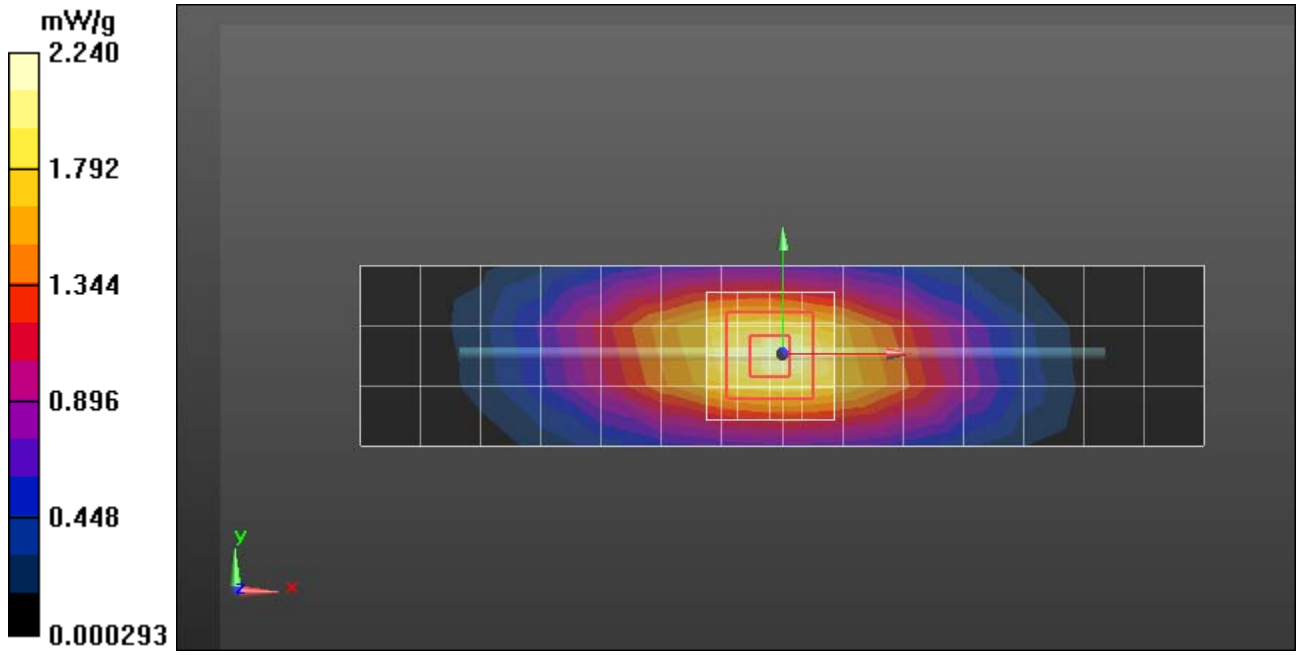
DASY4 Configuration:

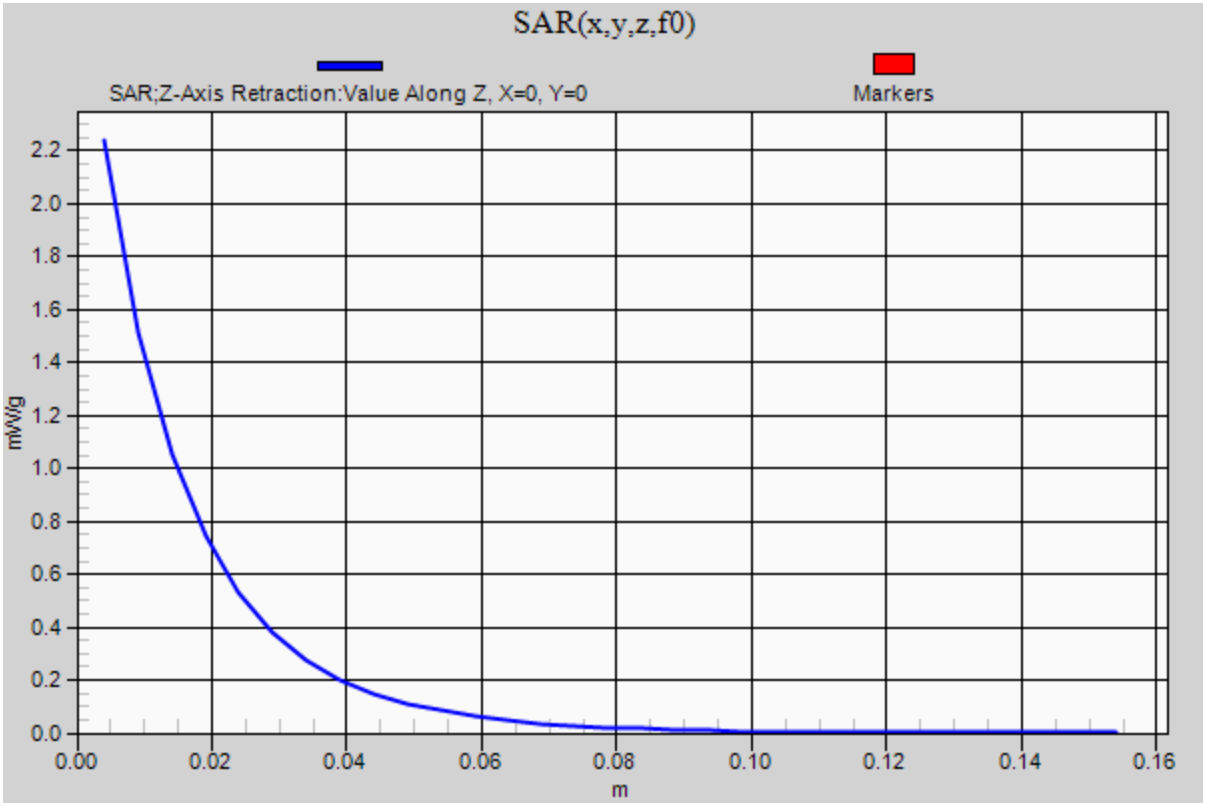
- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.92 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.825 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 3.089 mW/g
SAR(1 g) = 2.07 mW/g; SAR(10 g) = 1.36 mW/g
Maximum value of SAR (measured) = 2.24 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
Markers
mW/g
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
m

Date/Time: 5/9/2012 7:34:25 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 2D191; PM1 Power = 200 mW
Sim.Temp@ meas = 18.7*C; Sim.Temp@ SPC = 18.7*C; Room Temp@ SPC = 20.6*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.5 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3

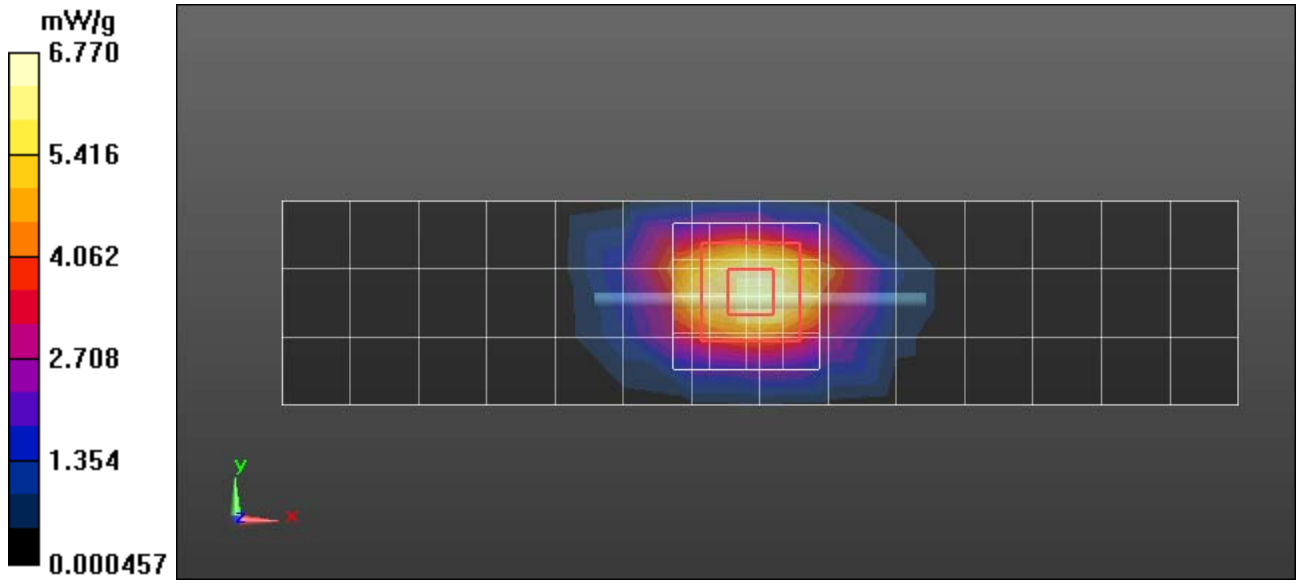
DASY4 Configuration:

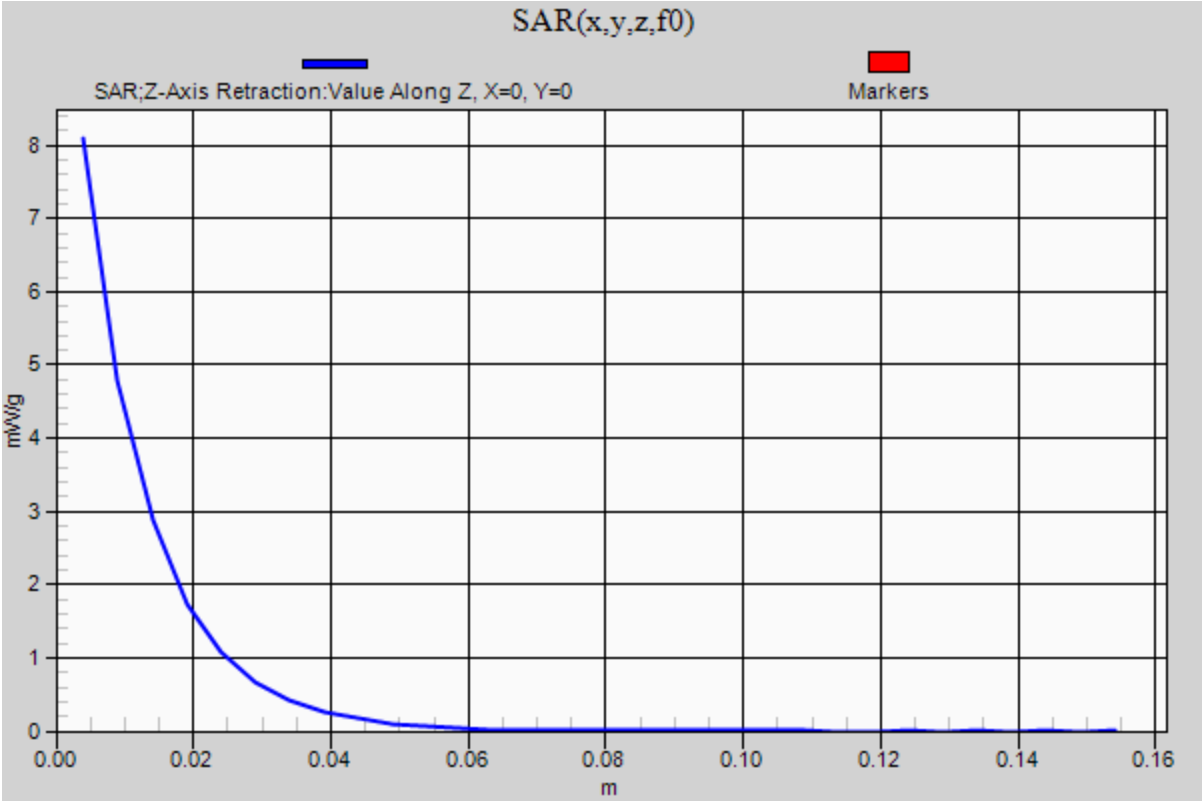
- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.77 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 74.062 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 12.378 mW/g
SAR(1 g) = 7.17 mW/g; SAR(10 g) = 3.83 mW/g
Maximum value of SAR (measured) = 8.03 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.09 mW/g




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

Date/Time: 5/18/2012 7:50:12 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 2D190; PM1 Power = 200 mW;
Sim.Temp@ meas = 18.6*C; Sim.Temp@ SPC = 18.6*C; Room Temp@ SPC = 21.5*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.5 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3

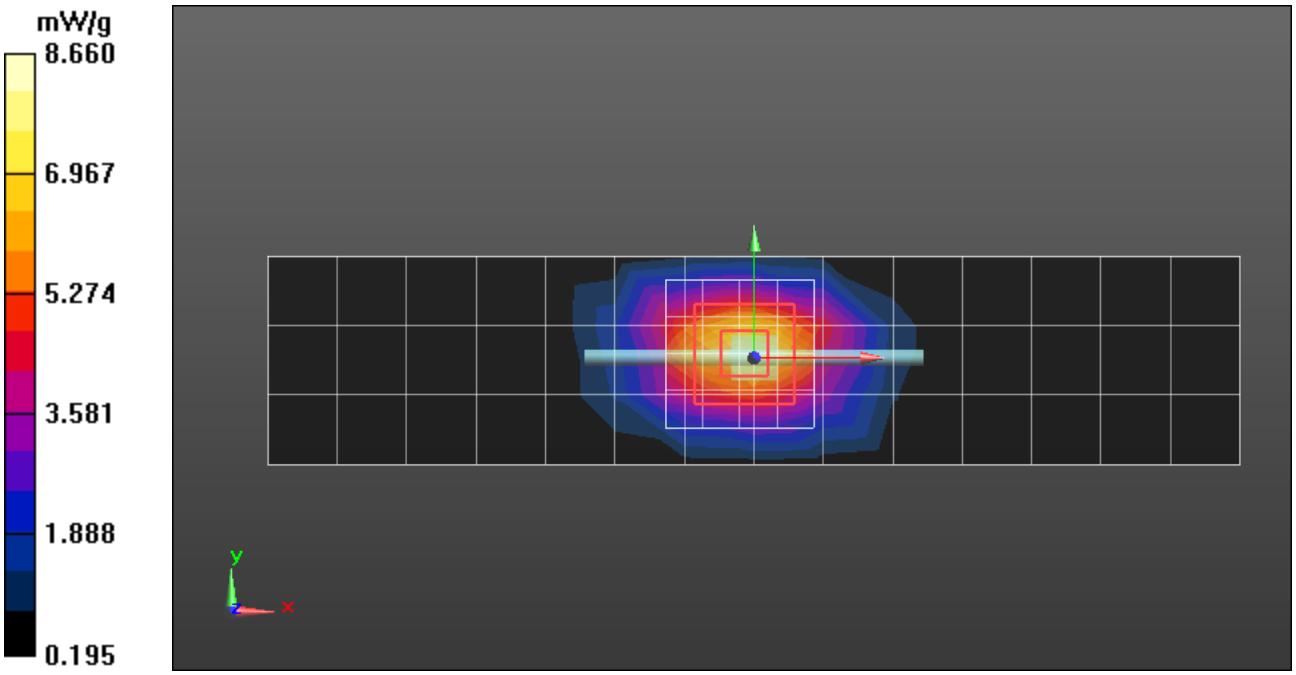
DASY4 Configuration:

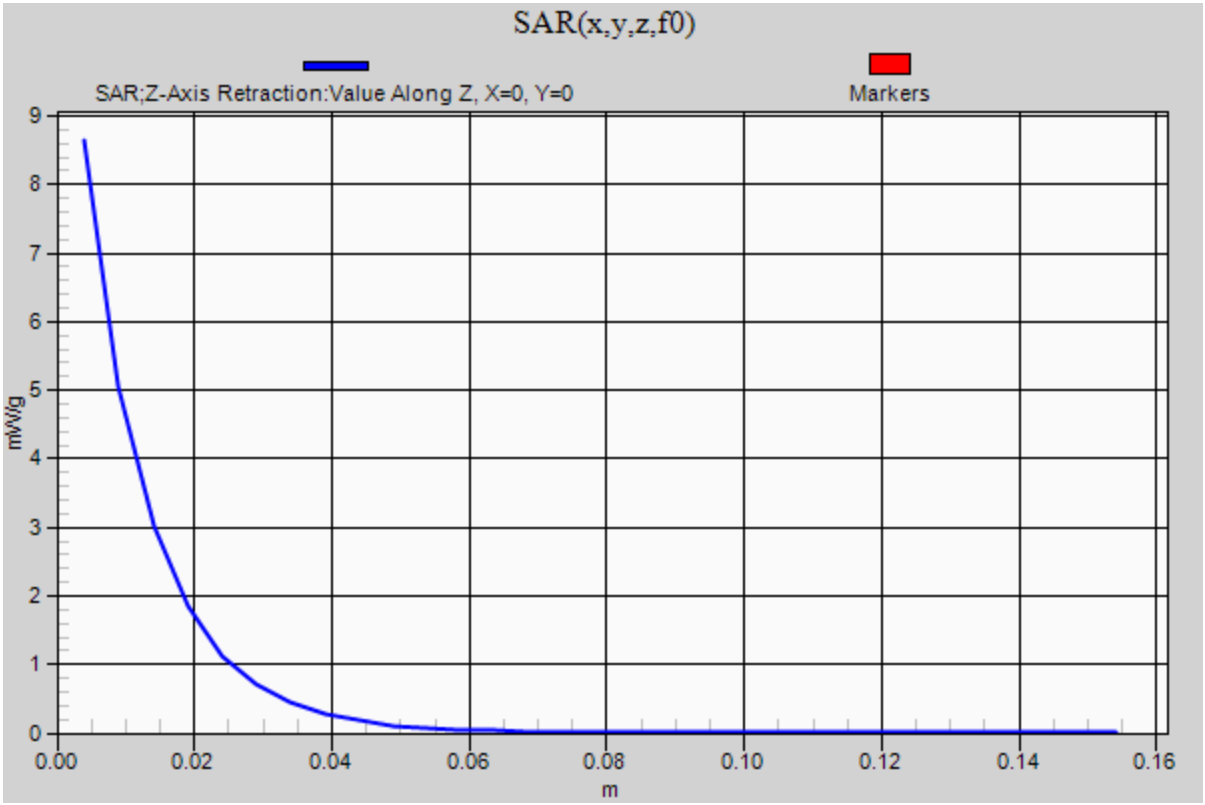
- Probe: ES3DV3 - SN3115; ConvF(4.72, 4.72, 4.72); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/22/2011
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.93 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.005 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 13.529 mW/g
SAR(1 g) = 7.69 mW/g; SAR(10 g) = 4.09 mW/g
Maximum value of SAR (measured) = 8.66 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.64 mW/g


mW/g
8.660
6.967
5.274
3.581
1.888
0.195
y
x


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

Date/Time: 5/23/2012 7:45:48 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 2d191; PM1 Power = 200 mW
Sim.Temp@ meas = 18.8*C; Sim.Temp@ SPC = 18.9*C; Room Temp@ SPC = 21.1*C

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 = 51.5; ρ = 1000 kg/m^3

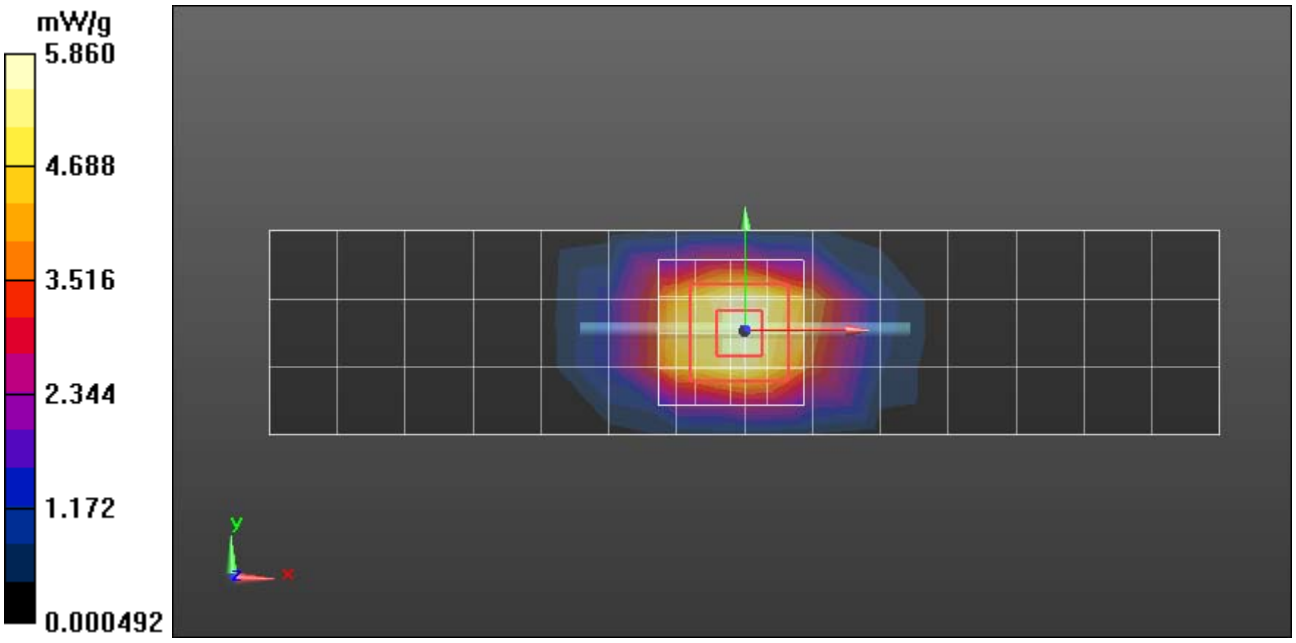
DASY4 Configuration:

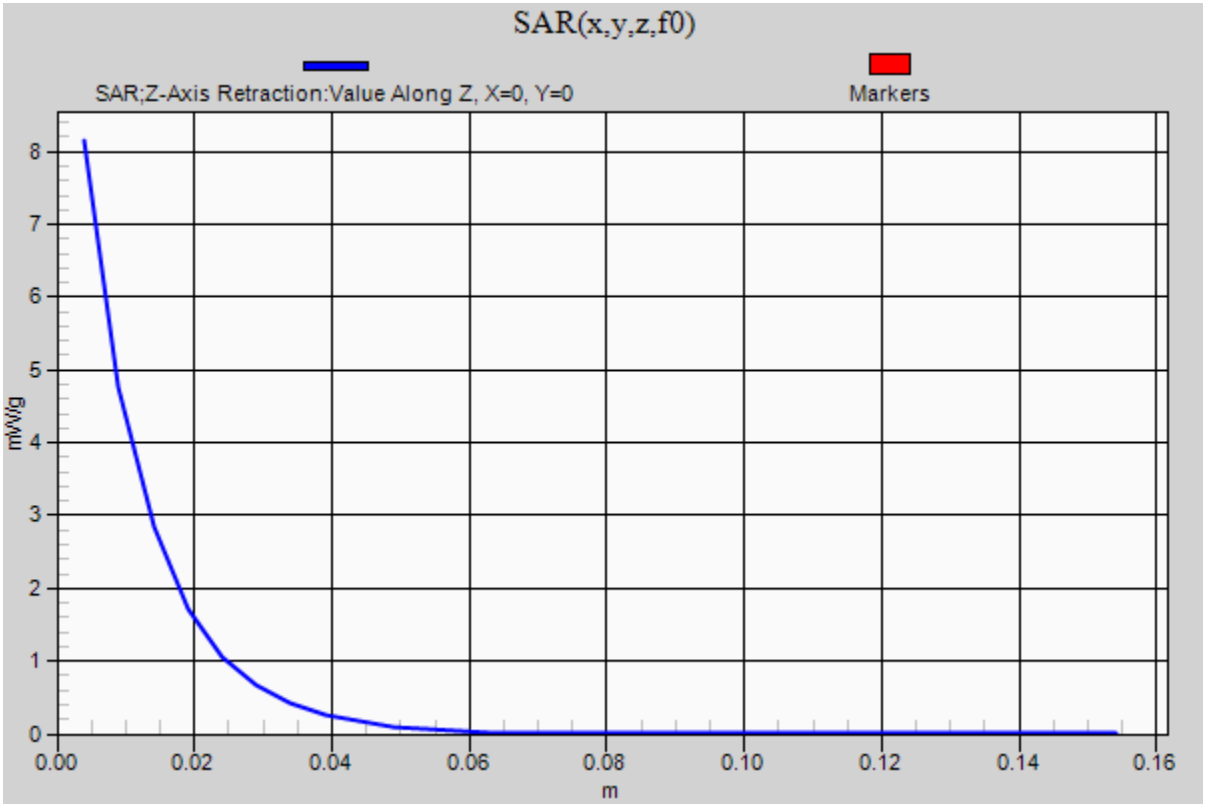
- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 5.86 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 75.897 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 12.519 mW/g
SAR(1 g) = 7.19 mW/g; SAR(10 g) = 3.84 mW/g
Maximum value of SAR (measured) = 8.08 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.15 mW/g


mW/g
5.860
4.688
3.516
2.344
1.172
0.000492
y
x


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

Date/Time: 5/25/2012 6:58:41 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 2D190; PM1 Power = 200 mW
Sim.Temp@ meas = 18.7*C; Sim.Temp@ SPC = 18.7*C; Room Temp@ SPC = 21.1*C

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 = 51.4; ρ = 1000 kg/m^3

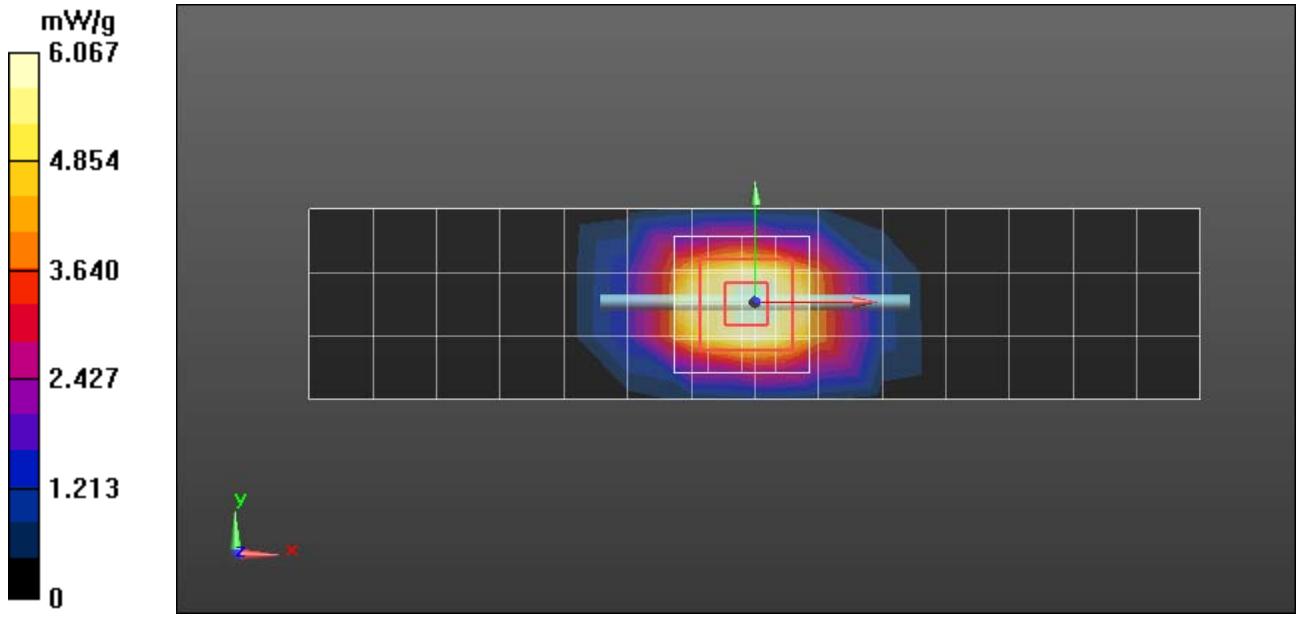
DASY4 Configuration:

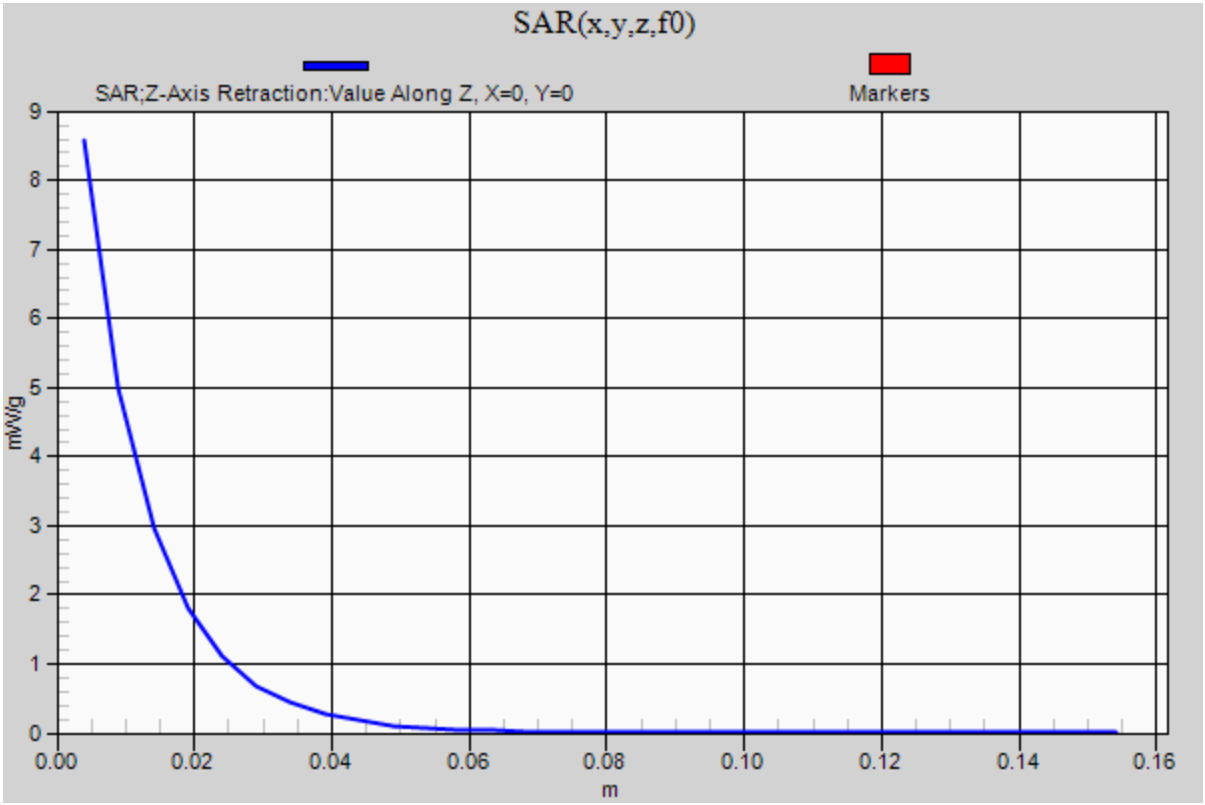
- Probe: ES3DV3 - SN3115; ConvF(4.72, 4.72, 4.72); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/22/2011
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.07 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.215 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 13.567 mW/g
SAR(1 g) = 7.67 mW/g; SAR(10 g) = 4.07 mW/g
Maximum value of SAR (measured) = 8.64 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.58 mW/g




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

Date/Time: 5/24/2012 4:16:31 PM

DUT: Dipole 2450 MHz; Type: D2450V2; Procedure Notes: 2450 MHz System Performance Check / Dipole Sn# 877; PM1 Power = 200 mW
Sim.Temp@ meas = 19.8*C; Sim.Temp@ SPC = 19.8*C; Room Temp@ SPC = 20.6*C

Communication System: _CW - Dipole; Frequency: 2450 MHz; Communication System Channel Number: 11; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.8; ρ = 1000 kg/m^3

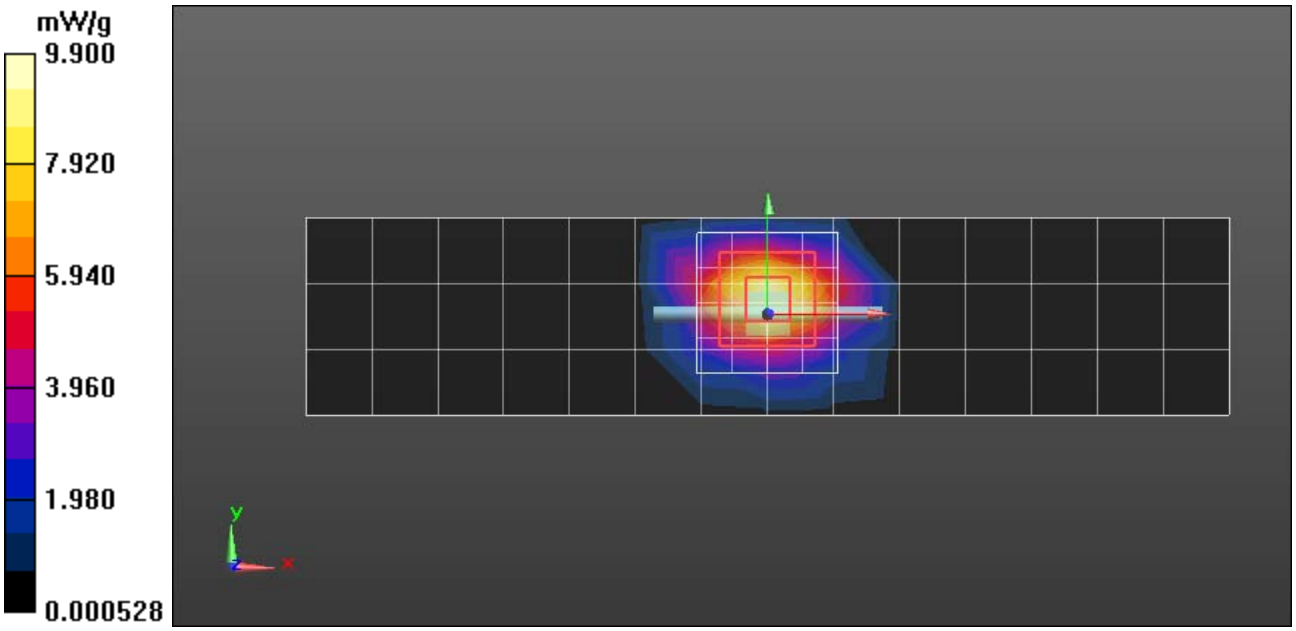
DASY4 Configuration:

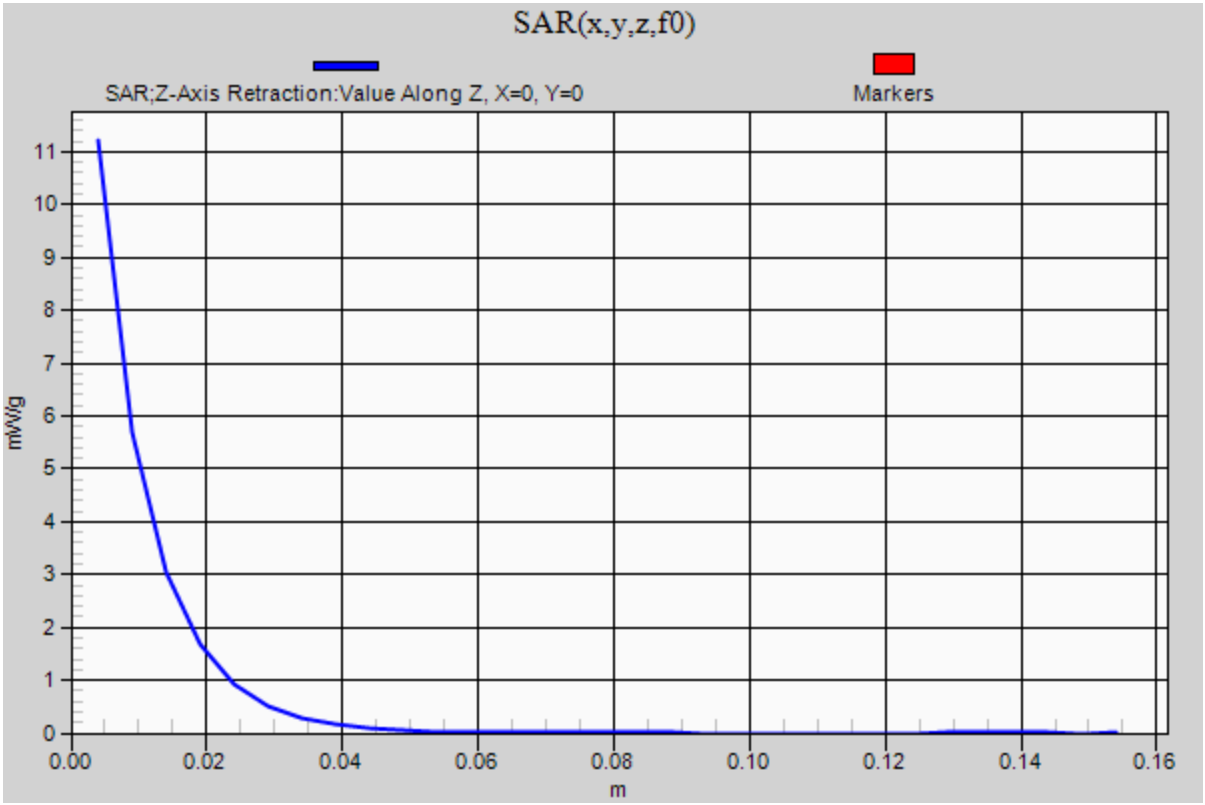
- Probe: ES3DV3 - SN3284; ConvF(4.56, 4.56, 4.56); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 9.90 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 73.876 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 20.781 mW/g
SAR(1 g) = 9.92 mW/g; SAR(10 g) = 4.63 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


mW/g
9.900
7.920
5.940
3.960
1.980
0.000528
y
x


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

Date/Time: 5/25/2012 8:33:22 AM

DUT: Dipole 2450 MHz; Type: D2450V2; Procedure Notes: 2450 MHz System Performance Check / Dipole Sn# 877; PM1 Power = 200 mW
Sim.Temp@ meas = 19.3*C; Sim.Temp@ SPC = 19.3*C; Room Temp@ SPC = 21.4*C

Communication System: _CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 50.9; ρ = 1000 kg/m^3

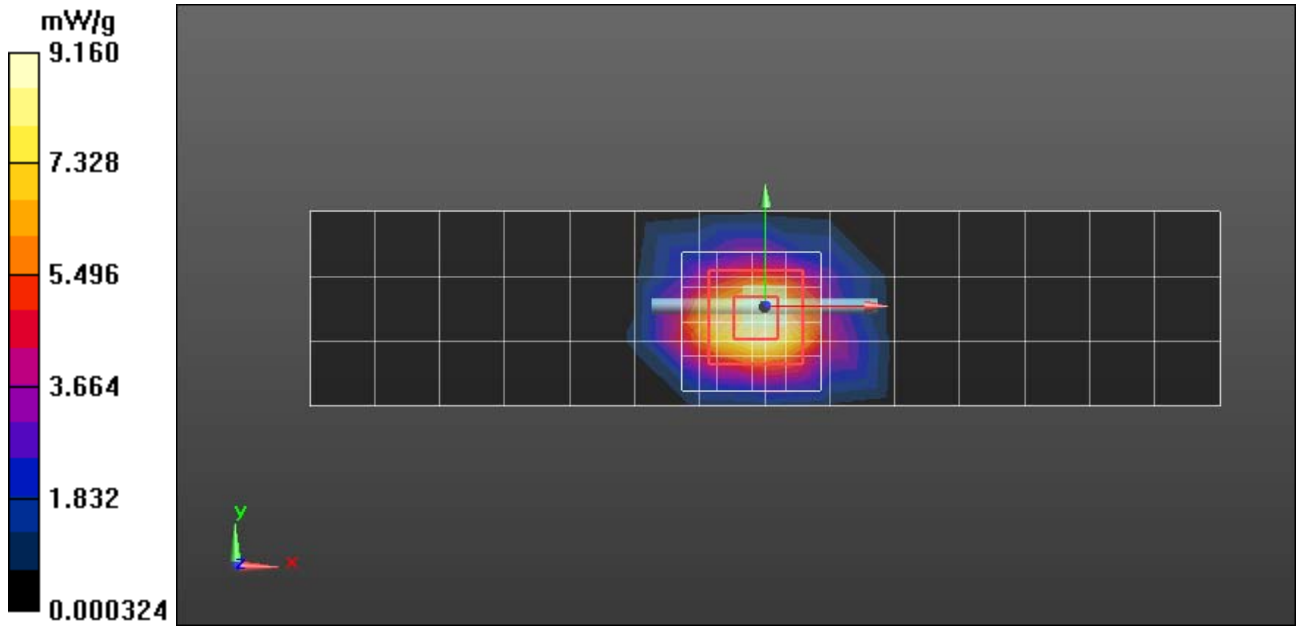
DASY4 Configuration:

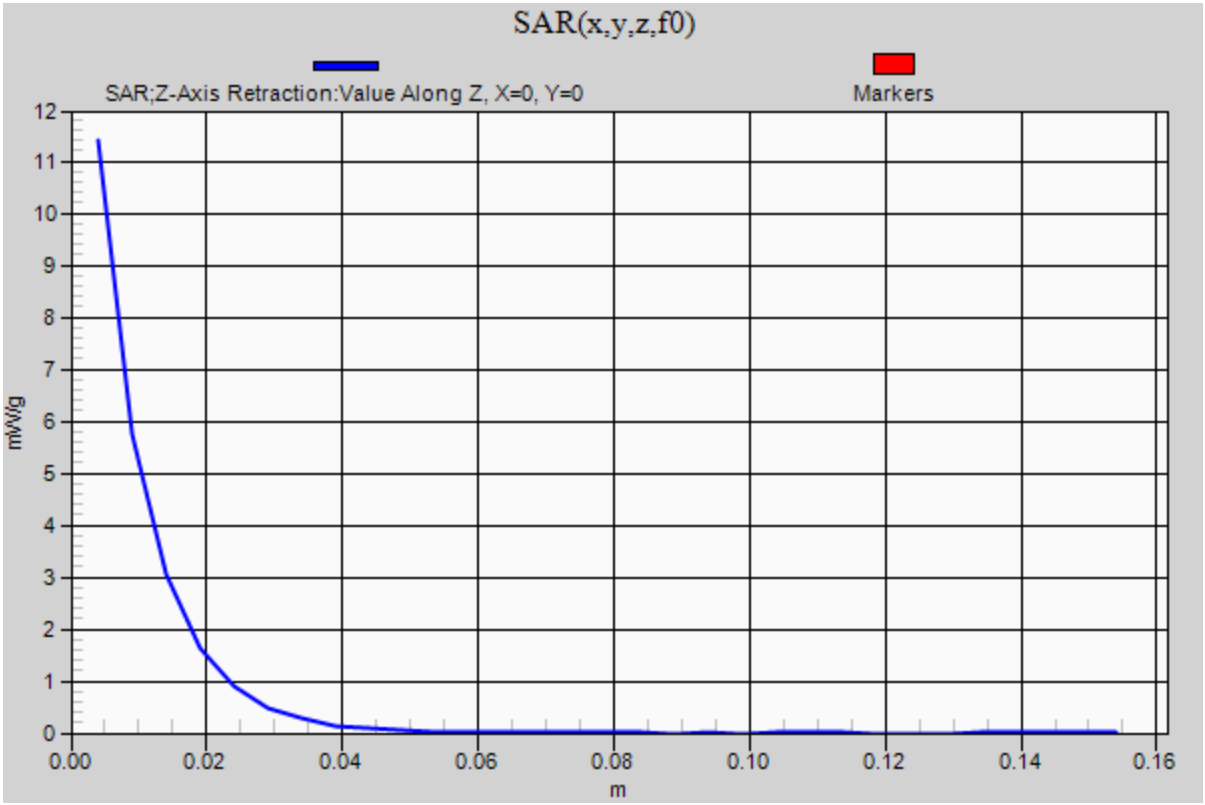
- Probe: ES3DV3 - SN3284; ConvF(4.56, 4.56, 4.56); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 9.16 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 73.452 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 21.099 mW/g
SAR(1 g) = 10 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) = 11.4 mW/g




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

Appendix 2

SAR distribution plots for Head Adjacent Test Results

Date/Time: 5/14/2012 5:37:03 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: ALL UP; DEVICE POSITION: CHEEK

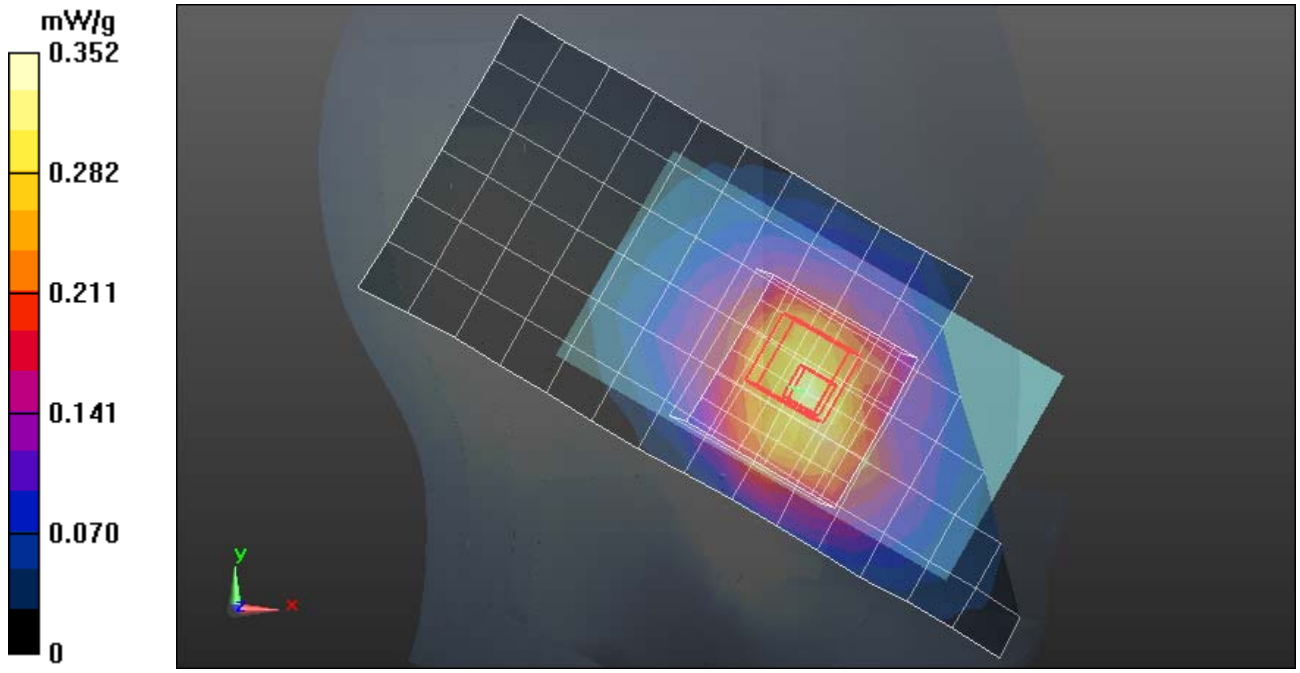
Communication System: _CDMA; Frequency: 820.1 MHz; Communication System Channel Number: 564; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 815 MHz; σ = 0.91 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.5 (6469)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.352 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.944 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.392 mW/g
SAR(1 g) = 0.300 mW/g; SAR(10 g) = 0.216 mW/g
Maximum value of SAR (measured) = 0.344 mW/g



Date/Time: 5/15/2012 1:24:07 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: EVDO REV 0 RTAP 153.6Kbps; DEVICE POSITION: Cheek

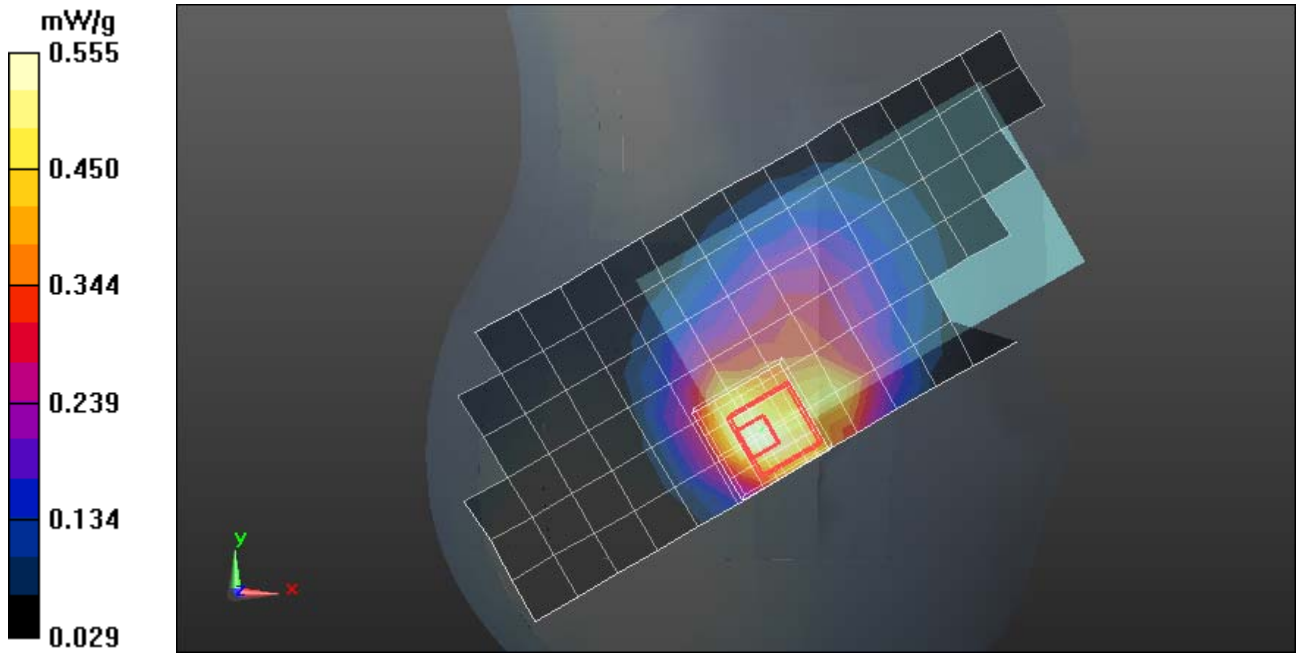
Communication System: _CDMA; Frequency: 820.1 MHz; Communication System Channel Number: 564; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 815 MHz; σ = 0.91 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal Extended (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.559 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.583 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.892 mW/g
SAR(1 g) = 0.520 mW/g; SAR(10 g) = 0.323 mW/g
Maximum value of SAR (measured) = 0.555 mW/g



Date/Time: 5/14/2012 1:43:43 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: All Up; DEVICE POSITION: Cheek

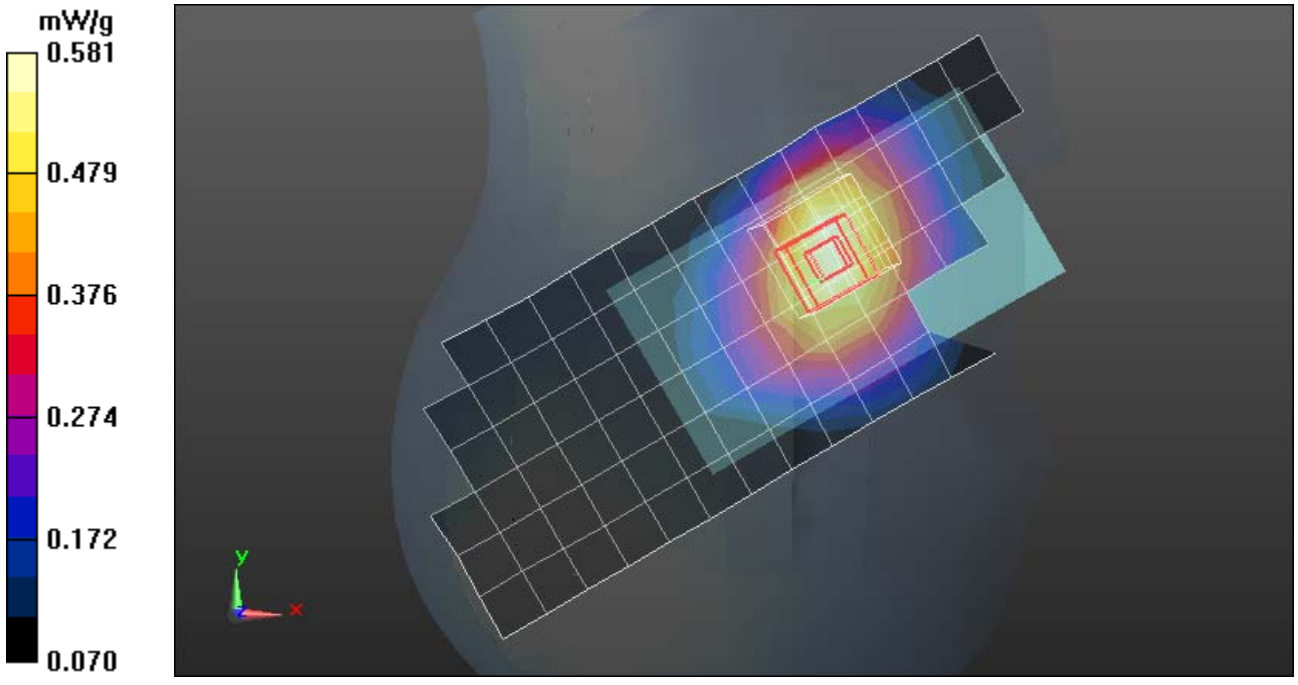
Communication System: _CDMA; Frequency: 836.52 MHz; Communication System Channel Number: 384; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.93 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal Extended (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.589 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.076 V/m; Power Drift = -0.20 dB
Peak SAR (extrapolated) = 0.704 mW/g
SAR(1 g) = 0.559 mW/g; SAR(10 g) = 0.420 mW/g
Maximum value of SAR (measured) = 0.581 mW/g



Date/Time: 5/15/2012 10:08:26 AM

Serial: LA8Z210039; Procedure Notes: Pwr Step: EVDO REV 0 RTAP 153.6Kbps; DEVICE POSITION: Cheek

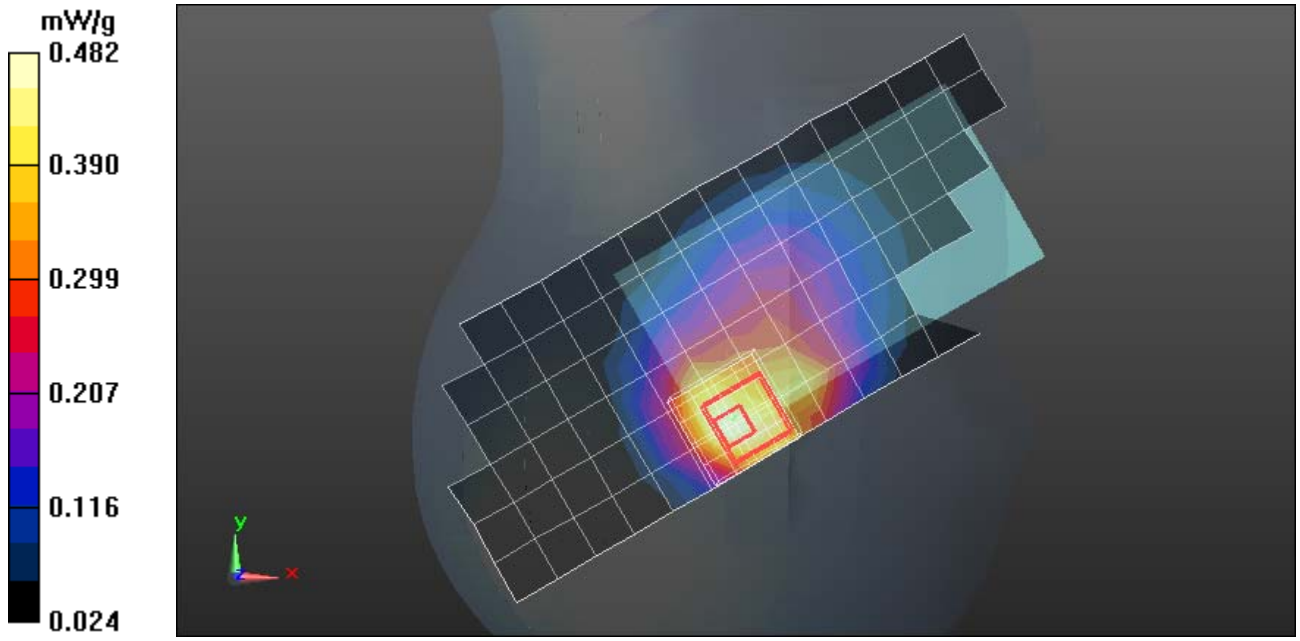
Communication System: _CDMA; Frequency: 836.52 MHz; Communication System Channel Number: 384; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.93 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal Extended (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.491 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.949 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.759 mW/g
SAR(1 g) = 0.453 mW/g; SAR(10 g) = 0.282 mW/g
Maximum value of SAR (measured) = 0.482 mW/g



EVDO 800 Cheek

Date/Time: 5/15/2012 9:14:53 PM

Serial: LA8Z210049; Procedure Notes: Pwr Step: MAX; DEVICE POSITION: CHEEK; Modulation: QPSK; Channel BW 10; RB config: 1 RB High

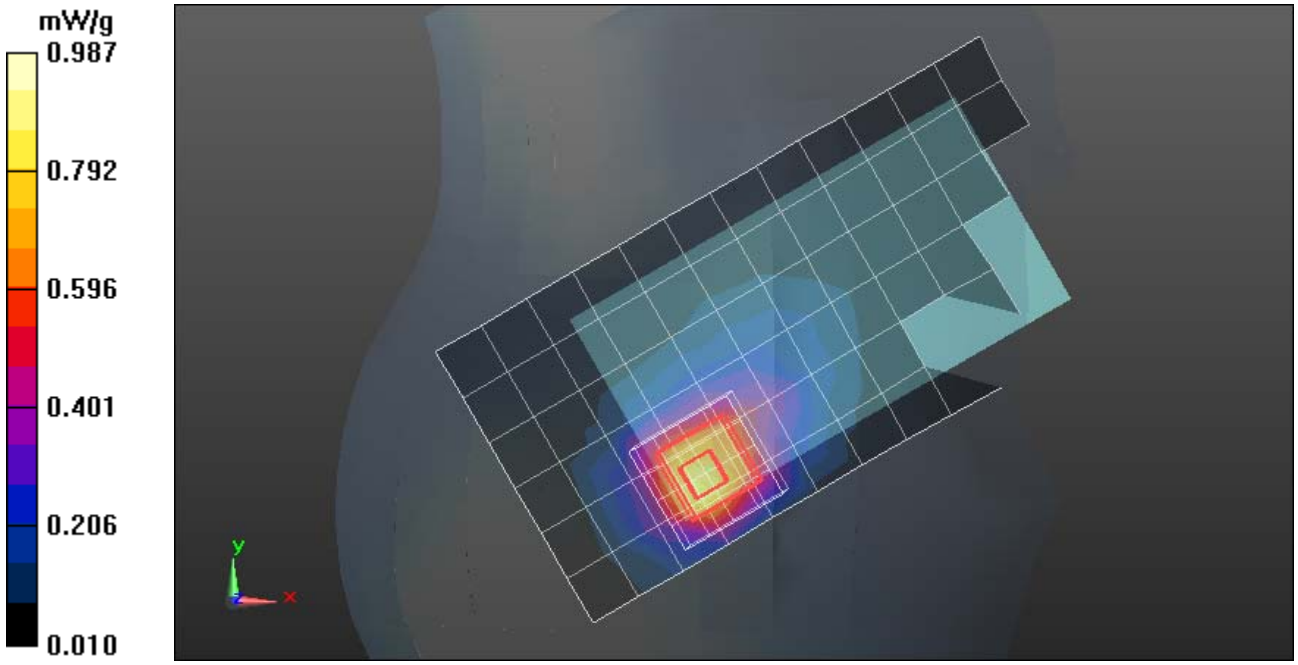
Communication System: _LTE Band 25; Frequency: 1855 MHz; Communication System Channel Number: 26090; Duty Cycle: 1:1
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.17, 5.17, 5.17); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 1/11/2012
- Phantom: R#2 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1136;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.857 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.076 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 1.737 mW/g
SAR(1 g) = 0.893 mW/g; SAR(10 g) = 0.470 mW/g
Maximum value of SAR (measured) = 0.987 mW/g



Cheek LTE

Date/Time: 5/8/2012 7:29:21 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: ALL UP; DEVICE POSITION: CHEEK

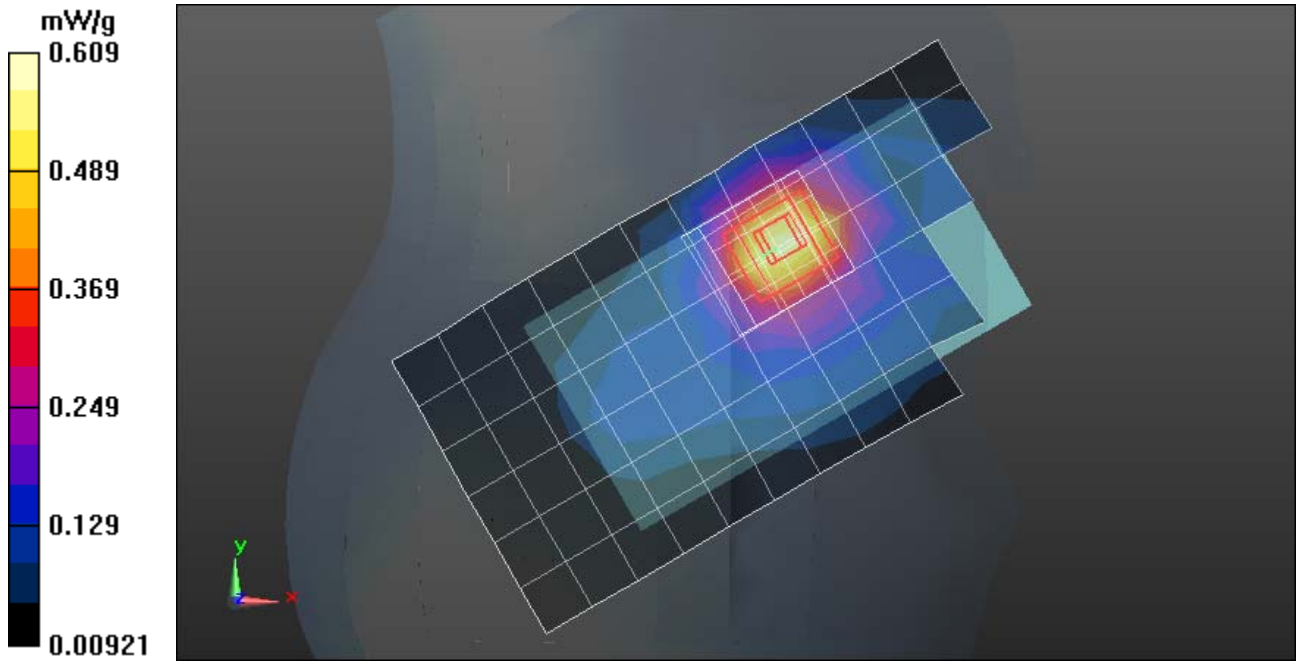
Communication System: _CDMA; Frequency: 1880 MHz; Communication System Channel Number: 600; Duty Cycle: 1:1
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.33, 5.33, 5.33); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.566 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.030 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.885 mW/g
SAR(1 g) = 0.560 mW/g; SAR(10 g) = 0.329 mW/g
Maximum value of SAR (measured) = 0.609 mW/g



Date/Time: 5/9/2012 1:01:21 AM

Serial: LA8Z210039; Procedure Notes: Pwr Step: EVDO REV O, RTAP 153.6K; DEVICE POSITION: CHEEK

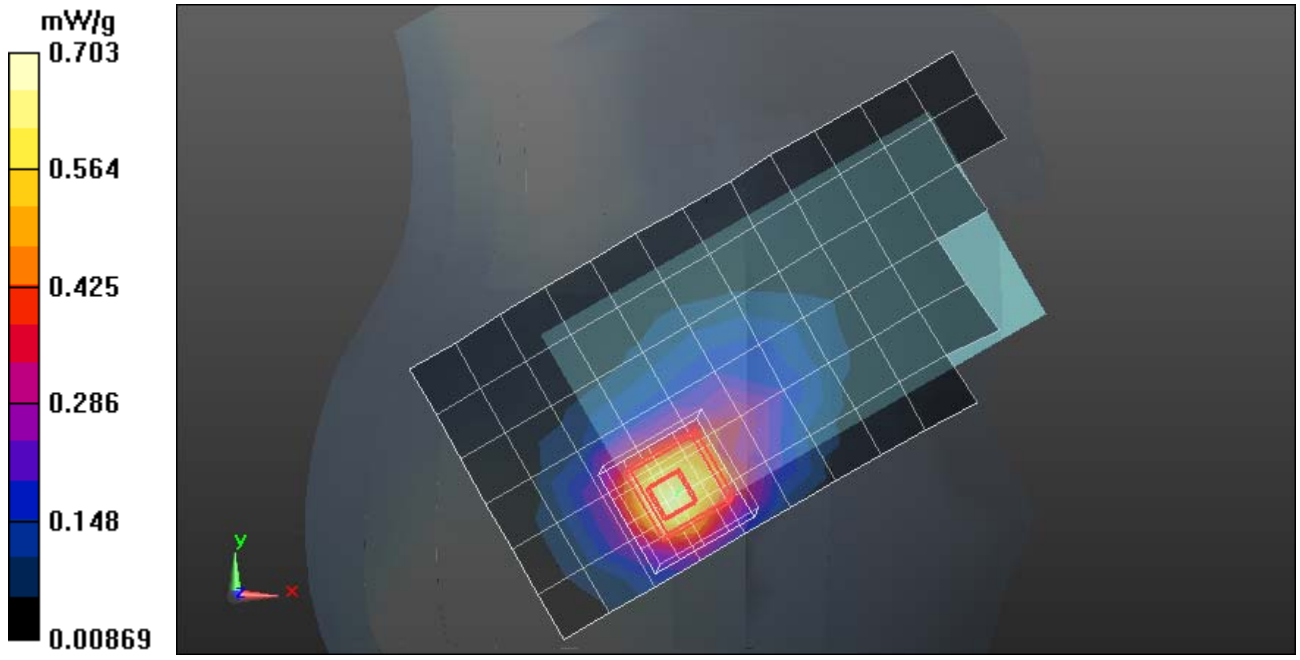
Communication System: _CDMA; Frequency: 1880 MHz; Communication System Channel Number: 600; Duty Cycle: 1:1
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.33, 5.33, 5.33); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.649 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.994 V/m; Power Drift = 0.25 dB
Peak SAR (extrapolated) = 1.220 mW/g
SAR(1 g) = 0.638 mW/g; SAR(10 g) = 0.340 mW/g
Maximum value of SAR (measured) = 0.703 mW/g



Date/Time: 5/24/2012 11:02:19 AM

Serial: LA8Z210039; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: CHEEK

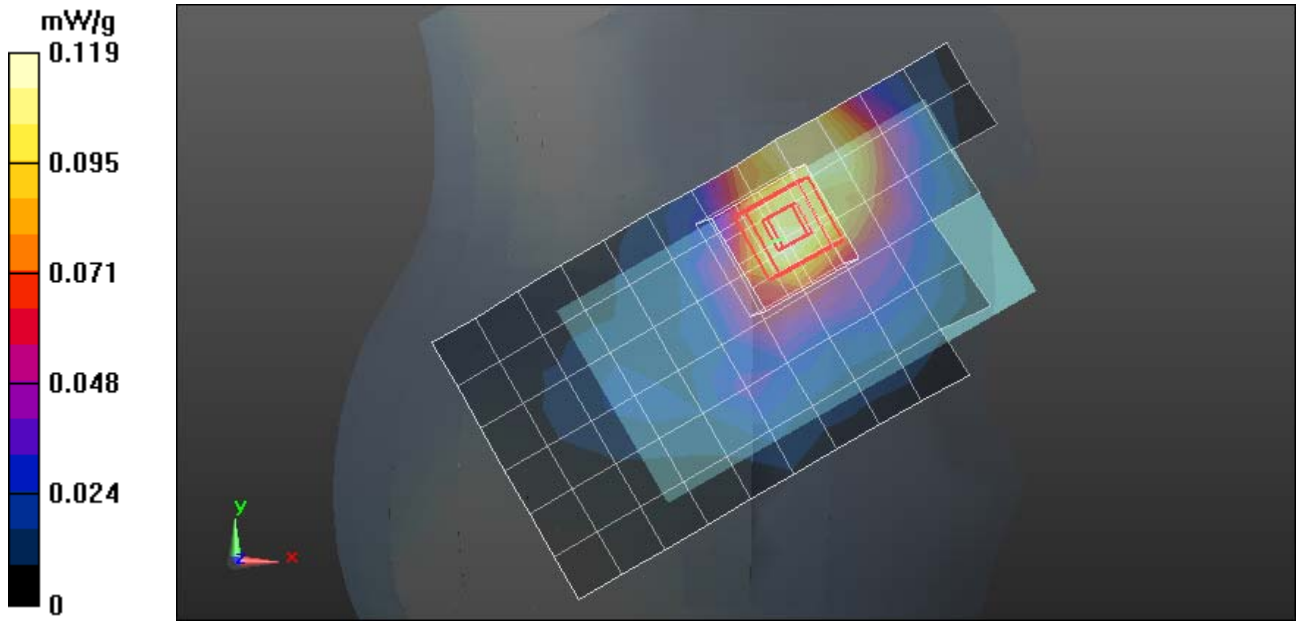
Communication System: _Wi-Fi 2450MHz; Frequency: 2437 MHz; Communication System Channel Number: 6; Duty Cycle: 1:1
Medium: 2450 Diacetin Head; Medium parameters used: f = 2450 MHz; σ = 1.89 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(4.56, 4.56, 4.56); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.119 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.845 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.223 mW/g
SAR(1 g) = 0.115 mW/g; SAR(10 g) = 0.063 mW/g
Maximum value of SAR (measured) = 0.123 mW/g



Cheek WIFI

Date/Time: 5/14/2012 6:03:49 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: ALL UP; DEVICE POSITION: TILT

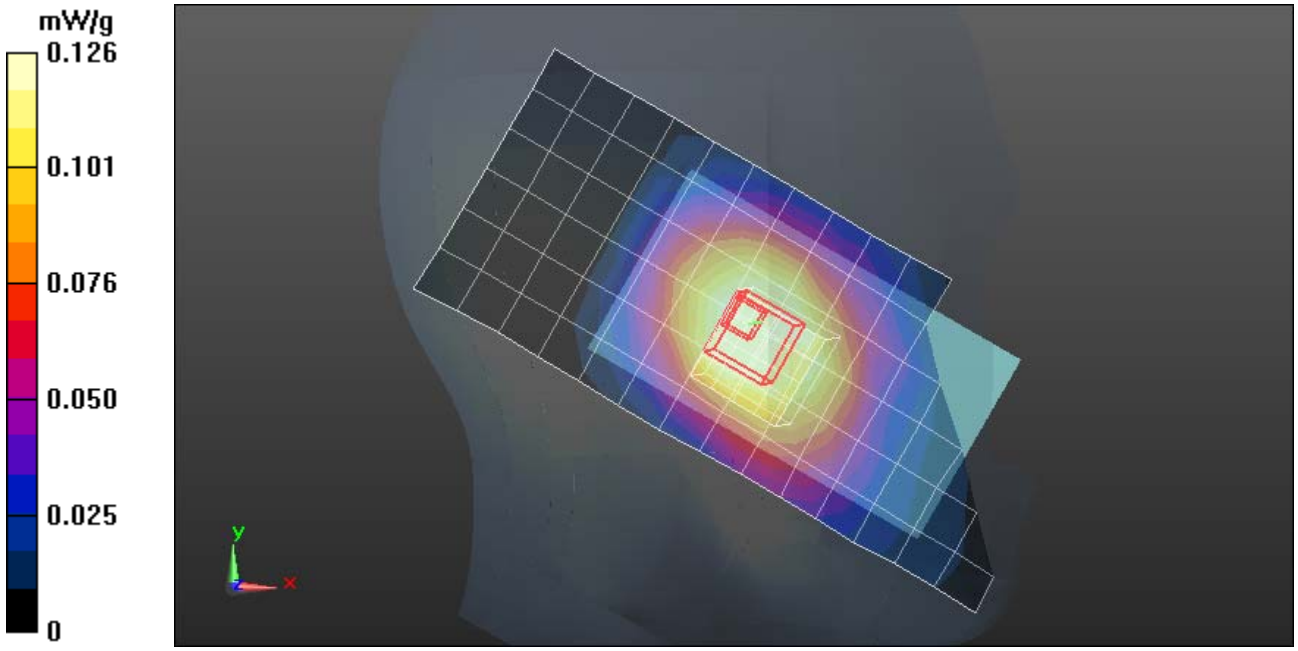
Communication System: _CDMA; Frequency: 820.1 MHz; Communication System Channel Number: 564; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 815 MHz; σ = 0.91 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.5 (6469)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.126 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.576 V/m; Power Drift = 0.53 dB
Peak SAR (extrapolated) = 0.186 mW/g
SAR(1 g) = 0.143 mW/g; SAR(10 g) = 0.103 mW/g
Maximum value of SAR (measured) = 0.156 mW/g



Date/Time: 5/15/2012 1:46:47 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: EVDO REV 0 RTAP 153.6Kbps; DEVICE POSITION: Tilt

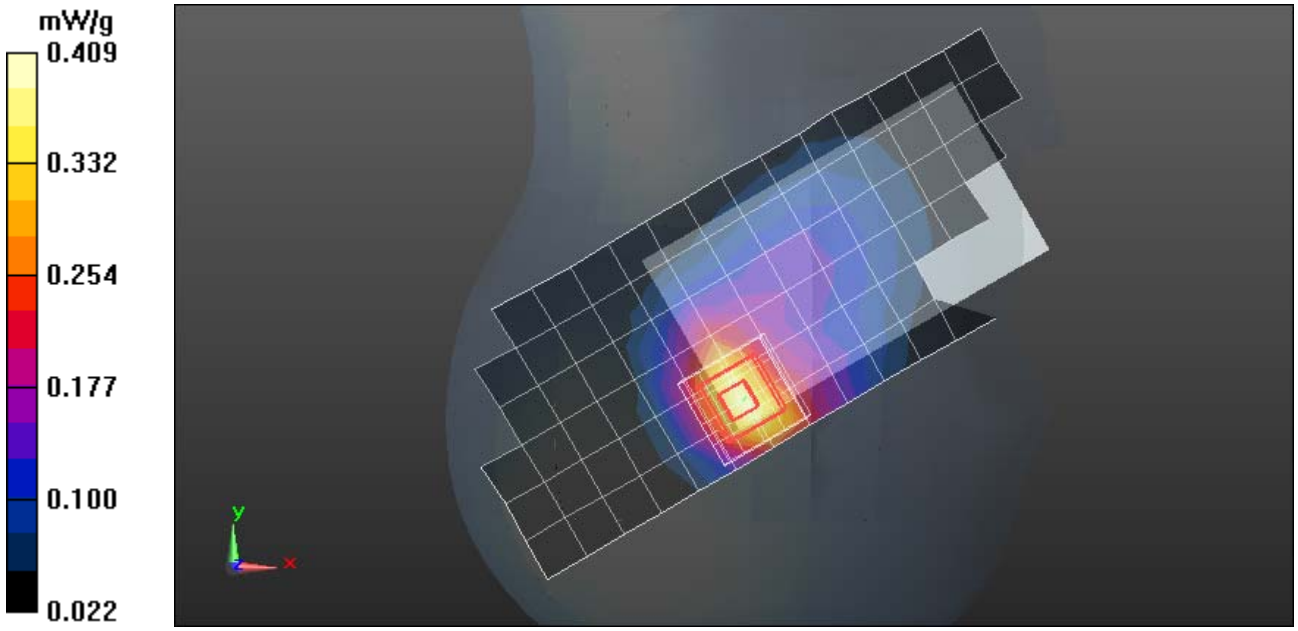
Communication System: _CDMA; Frequency: 820.1 MHz; Communication System Channel Number: 564; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 815 MHz; σ = 0.91 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal Extended (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.398 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.401 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.627 mW/g
SAR(1 g) = 0.372 mW/g; SAR(10 g) = 0.224 mW/g
Maximum value of SAR (measured) = 0.409 mW/g



Date/Time: 5/14/2012 2:05:42 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: All Up; DEVICE POSITION: Tilt

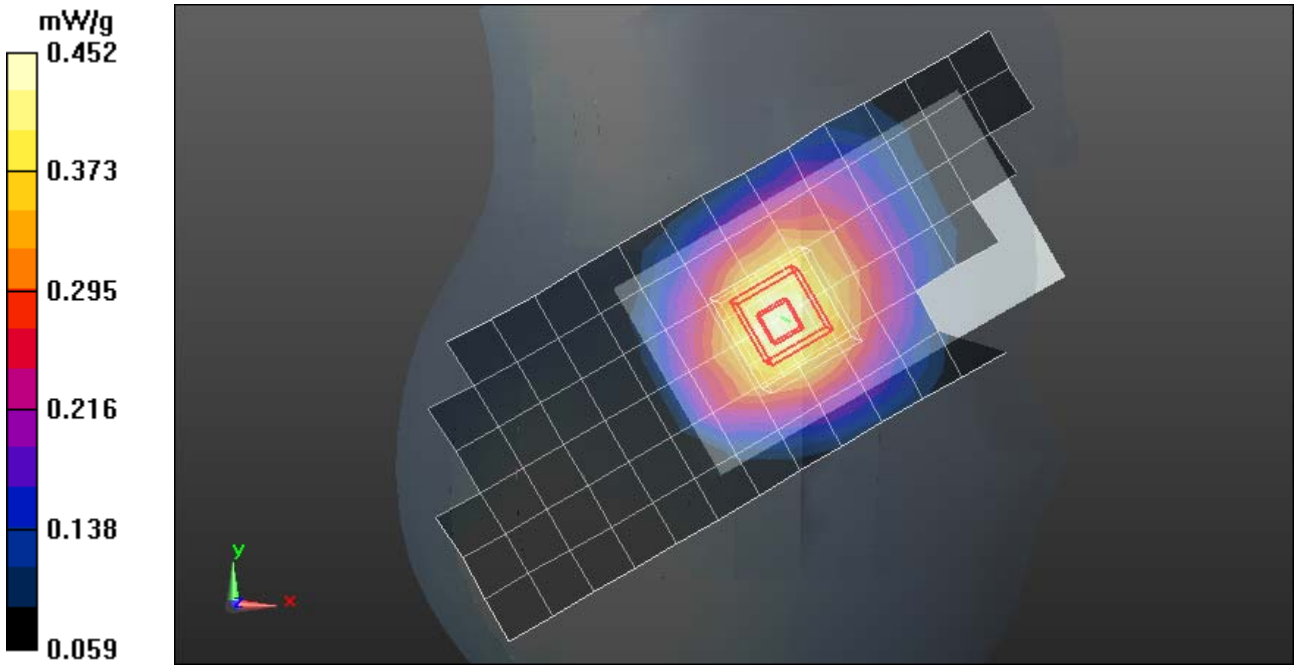
Communication System: _CDMA; Frequency: 836.52 MHz; Communication System Channel Number: 384; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.93 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal Extended (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.448 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.259 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.517 mW/g
SAR(1 g) = 0.429 mW/g; SAR(10 g) = 0.327 mW/g
Maximum value of SAR (measured) = 0.452 mW/g



Date/Time: 5/15/2012 10:31:18 AM

Serial: LA8Z210039; Procedure Notes: Pwr Step: EVDO REV 0 RTAP 153.6Kbps; DEVICE POSITION: Tilt

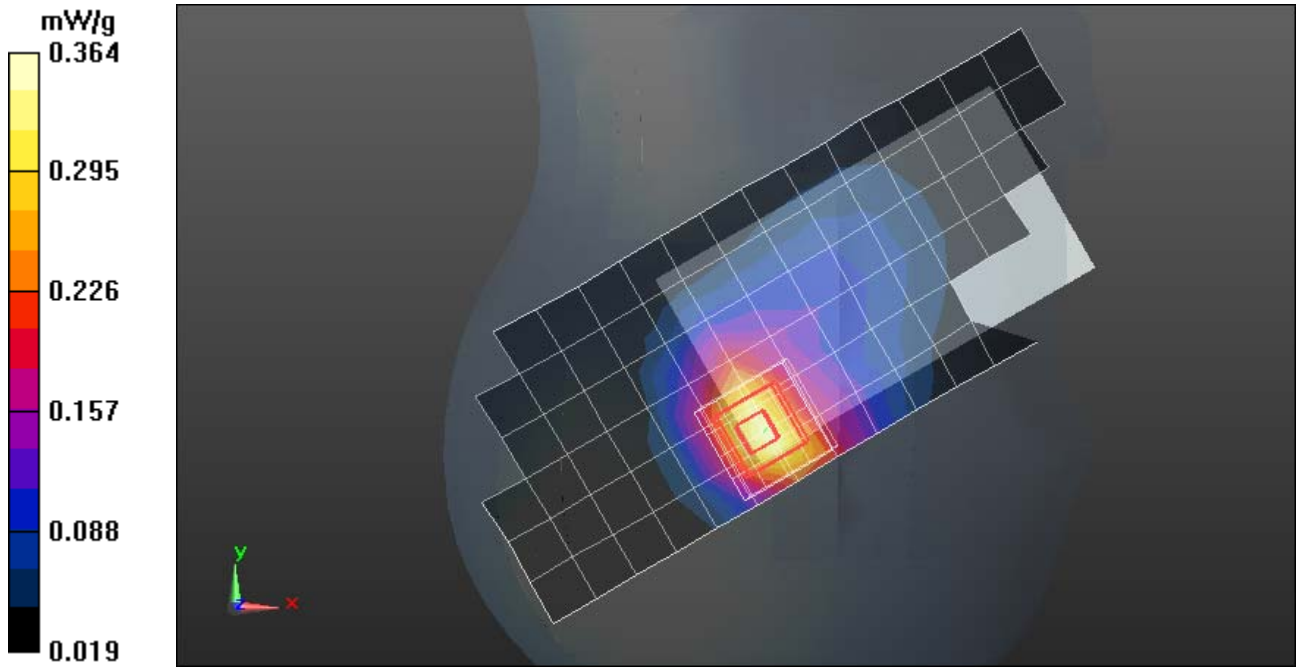
Communication System: _CDMA; Frequency: 836.52 MHz; Communication System Channel Number: 384; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.93 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal Extended (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.347 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.600 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.557 mW/g
SAR(1 g) = 0.334 mW/g; SAR(10 g) = 0.198 mW/g
Maximum value of SAR (measured) = 0.364 mW/g



EVDO 800 Tilt

Date/Time: 5/15/2012 11:11:55 PM

Serial: LA8Z210049; Procedure Notes: DEVICE POSITION: TILT; Modulation: QPSK; Channel BW: 10; RB config: 1 RB High

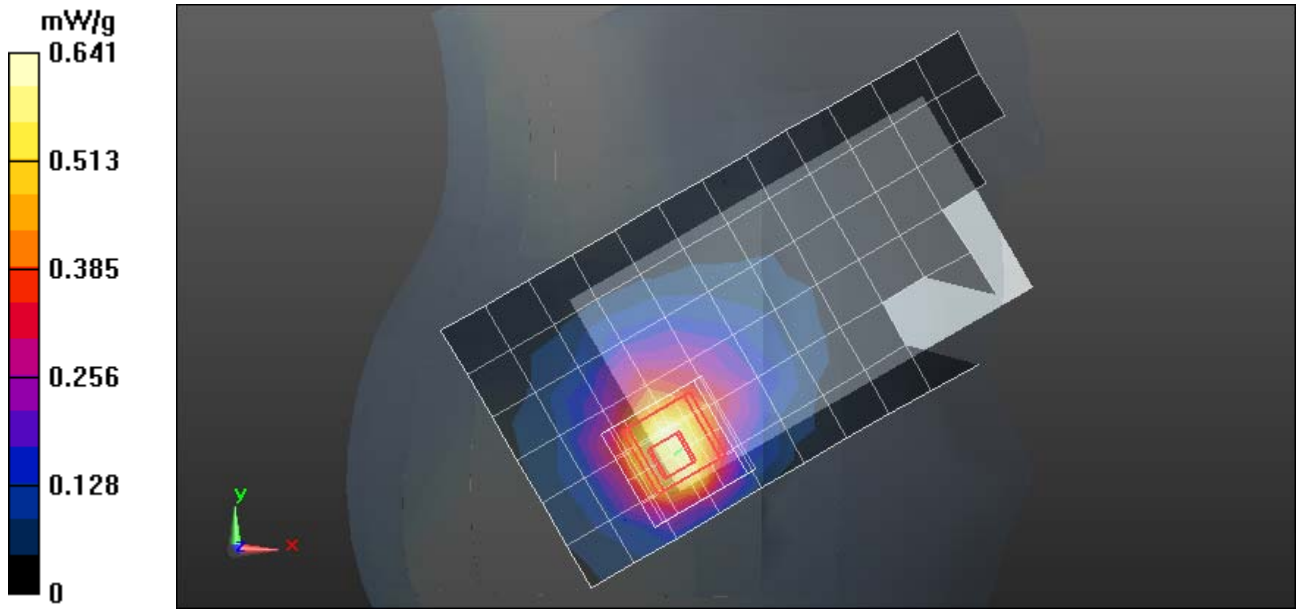
Communication System: _LTE Band 25; Frequency: 1855 MHz; Communication System Channel Number: 26090; Duty Cycle: 1:1
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.17, 5.17, 5.17); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 1/11/2012
- Phantom: R#2 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1136;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.641 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.463 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.343 mW/g
SAR(1 g) = 0.676 mW/g; SAR(10 g) = 0.350 mW/g
Maximum value of SAR (measured) = 0.770 mW/g



Date/Time: 5/8/2012 9:48:19 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: ALL UP; DEVICE POSITION: TILT

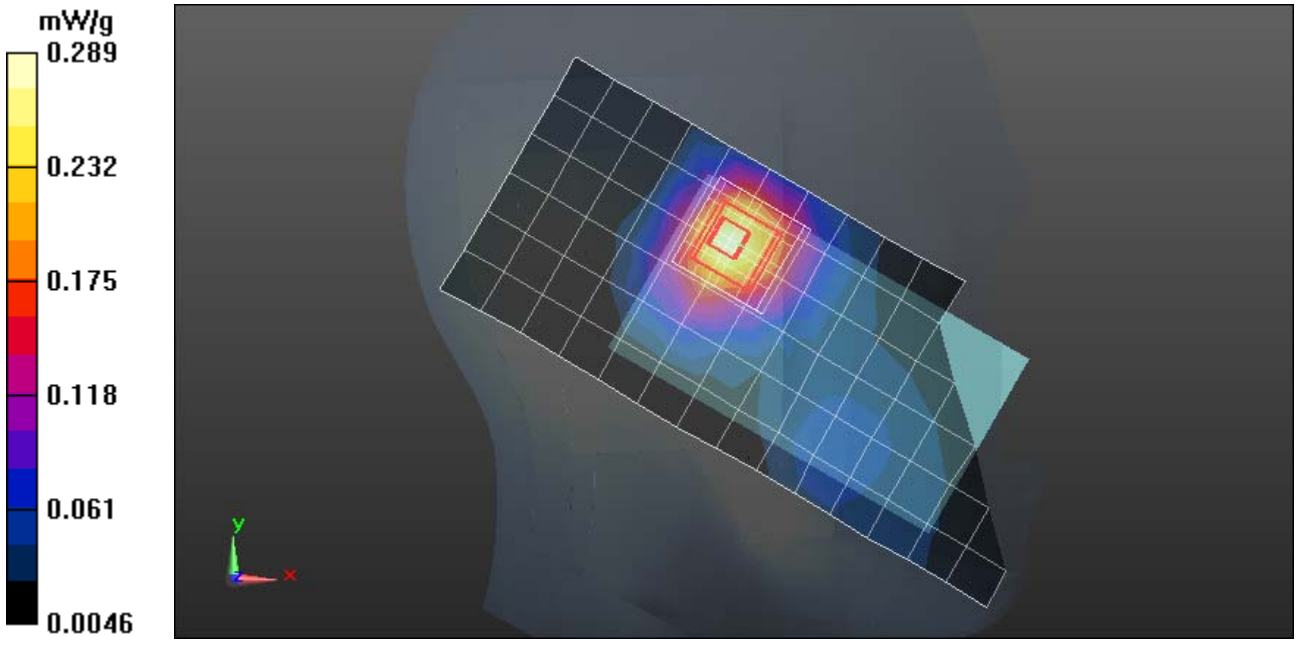
Communication System: _CDMA; Frequency: 1880 MHz; Communication System Channel Number: 600; Duty Cycle: 1:1
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.33, 5.33, 5.33); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.5 (6469)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.297 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.114 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.426 mW/g
SAR(1 g) = 0.271 mW/g; SAR(10 g) = 0.161 mW/g
Maximum value of SAR (measured) = 0.289 mW/g



Date/Time: 5/9/2012 1:19:28 AM

Serial: LA8Z210039; Procedure Notes: Pwr Step: EVDO REV O, RTAP 153.6K; DEVICE POSITION: TILT

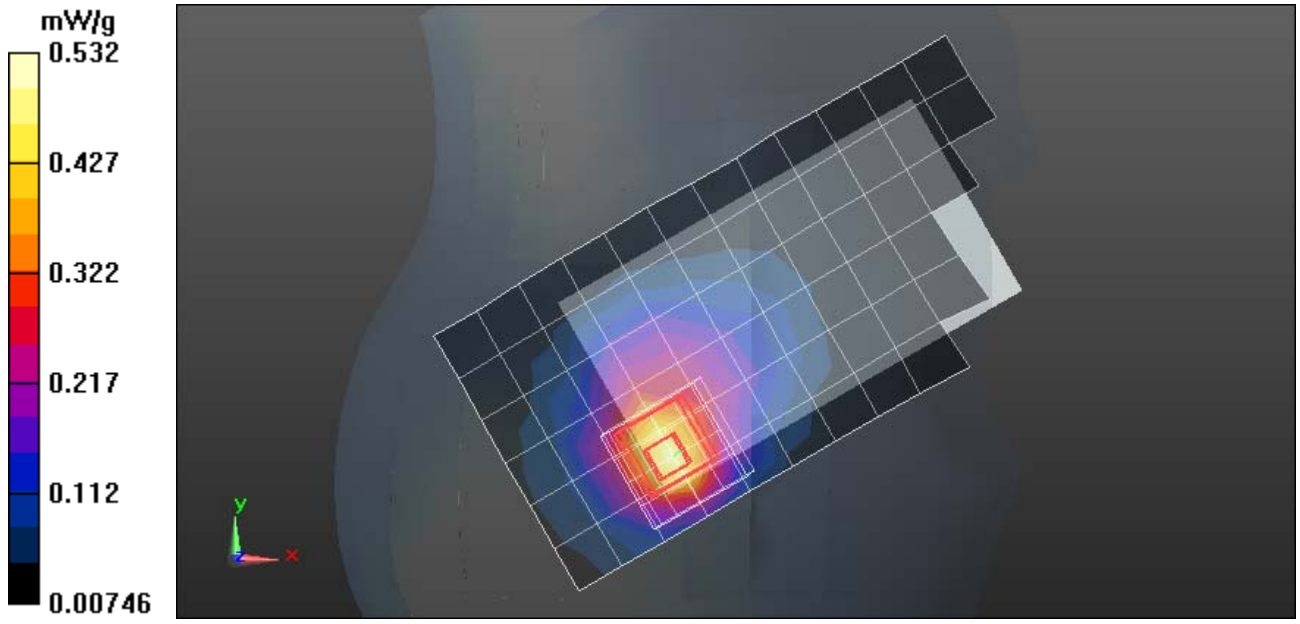
Communication System: _CDMA; Frequency: 1880 MHz; Communication System Channel Number: 600; Duty Cycle: 1:1
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.33, 5.33, 5.33); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.468 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.932 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.958 mW/g
SAR(1 g) = 0.480 mW/g; SAR(10 g) = 0.251 mW/g
Maximum value of SAR (measured) = 0.532 mW/g



Tilt EVDO 1900

Date/Time: 5/24/2012 8:51:26 AM

Serial: LA8Z210039; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: TILT

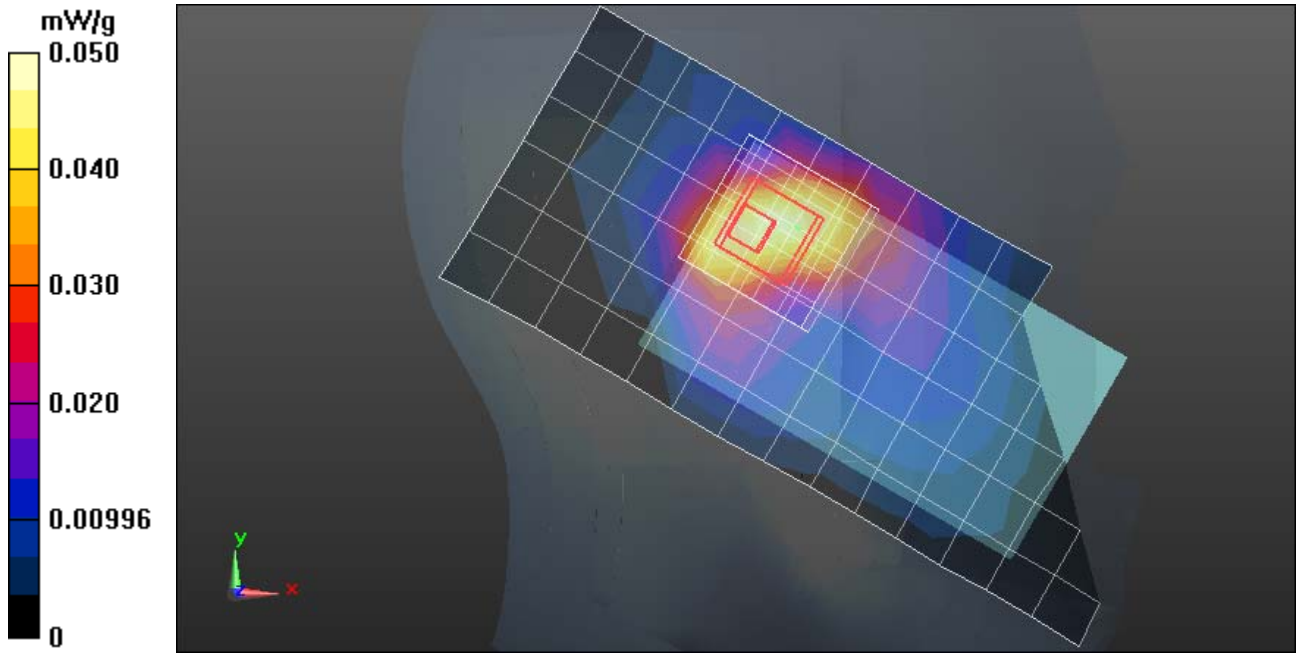
Communication System: _Wi-Fi 2450MHz; Frequency: 2412 MHz; Communication System Channel Number: 1; Duty Cycle: 1:1
Medium: 2450 Diacetin Head; Medium parameters used: f = 2450 MHz; σ = 1.89 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(4.56, 4.56, 4.56); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.5 (6469)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0465 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.032 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.093 mW/g
SAR(1 g) = 0.047 mW/g; SAR(10 g) = 0.026 mW/g
Maximum value of SAR (measured) = 0.0498 mW/g



Tilt WIFI

Appendix 3

SAR distribution plots for Body Worn Test Results

Date/Time: 5/14/2012 7:52:28 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: ALL UP; DEVICE POSITION: BACK OF PHONE 25MM AWAY FROM PHANTOM

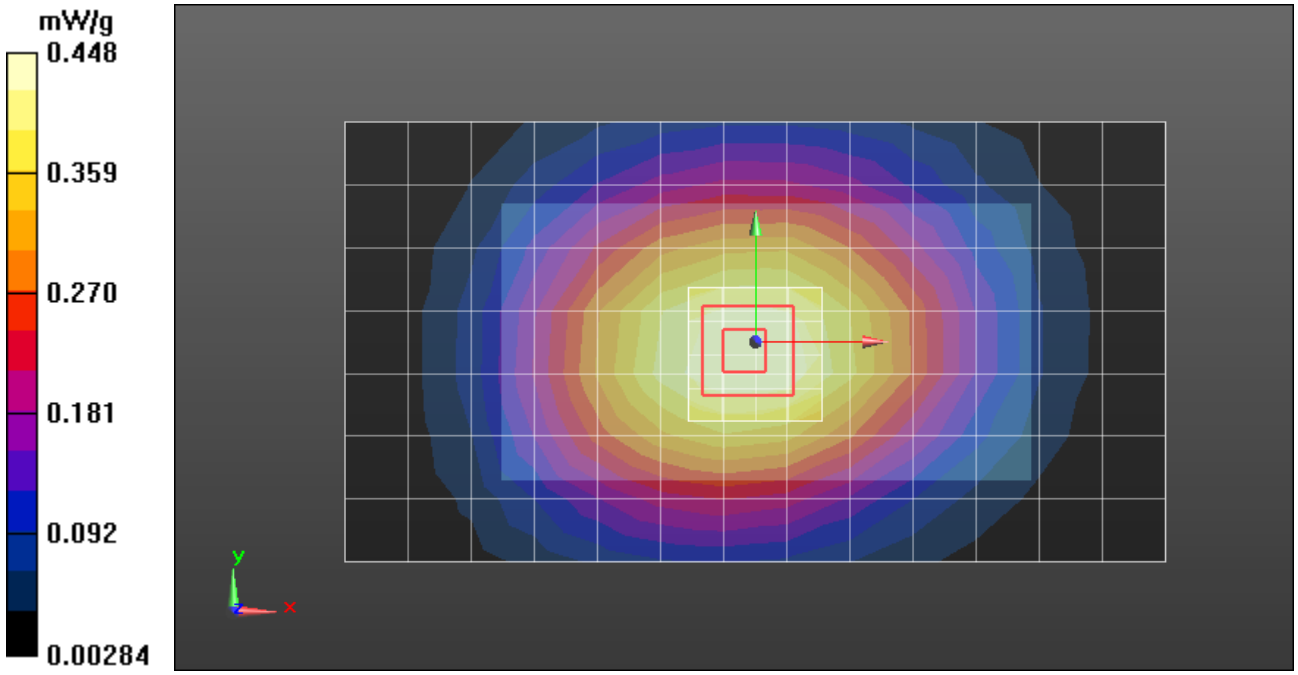
Communication System: _CDMA; Frequency: 820.1 MHz; Communication System Channel Number: 564; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 815 MHz; σ = 0.97 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.448 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.459 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.558 mW/g
SAR(1 g) = 0.431 mW/g; SAR(10 g) = 0.323 mW/g
Maximum value of SAR (measured) = 0.451 mW/g



Date/Time: 5/15/2012 6:31:41 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: EVDO REV O, RTAP 153.6K; DEVICE POSITION: BACK OF PHONE 25MM AWAY FROM PHANTOM

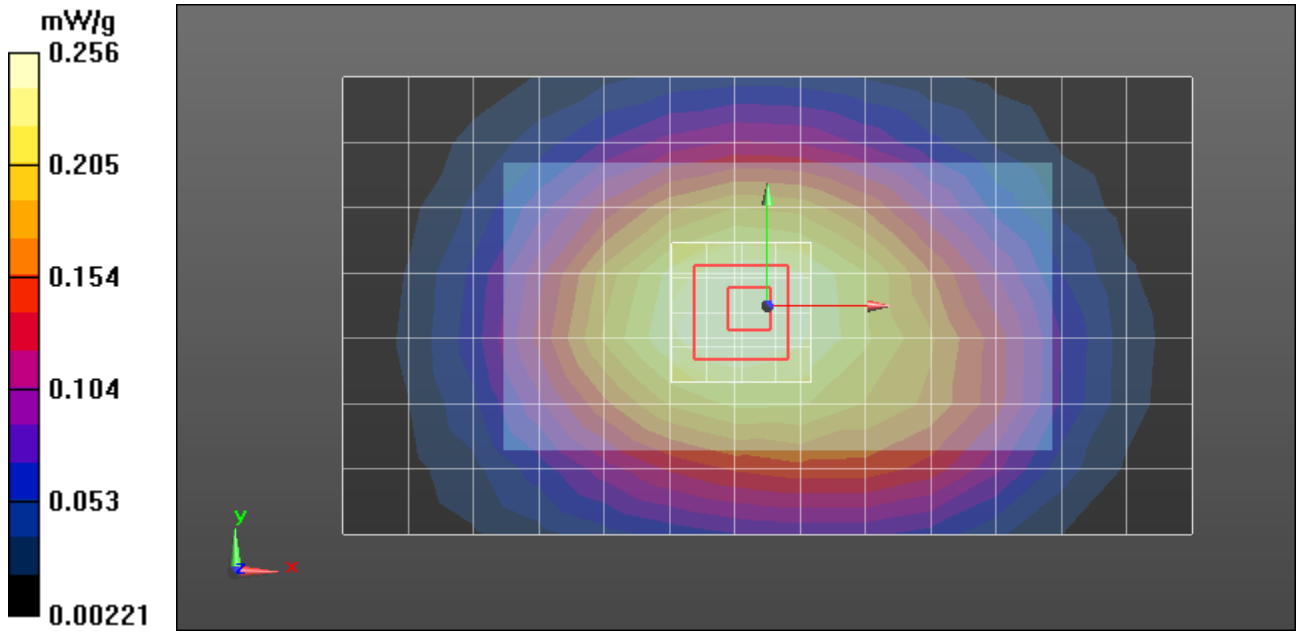
Communication System: _CDMA; Frequency: 820.1 MHz; Communication System Channel Number: 564; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 815 MHz; σ = 0.97 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.256 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.346 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.326 mW/g
SAR(1 g) = 0.248 mW/g; SAR(10 g) = 0.184 mW/g
Maximum value of SAR (measured) = 0.260 mW/g



Date/Time: 5/14/2012 10:04:32 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: ALL UP; DEVICE POSITION: BACK OF PHONE 25MM AWAY FROM PHANTOM

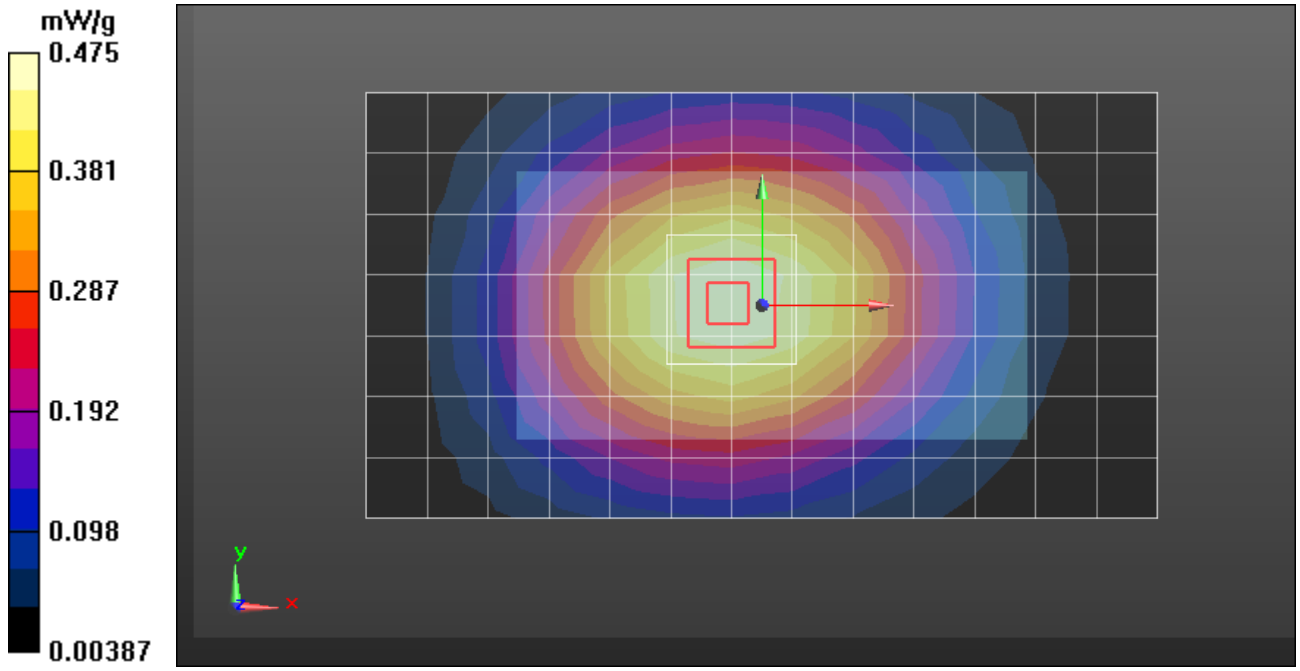
Communication System: _CDMA; Frequency: 836.52 MHz; Communication System Channel Number: 384; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.475 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.367 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.601 mW/g
SAR(1 g) = 0.463 mW/g; SAR(10 g) = 0.344 mW/g
Maximum value of SAR (measured) = 0.488 mW/g



Date/Time: 5/15/2012 6:52:35 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: EVDO REV O, RTAP 153.6K; DEVICE POSITION: BACK OF PHONE 25MM AWAY FROM PHANTOM

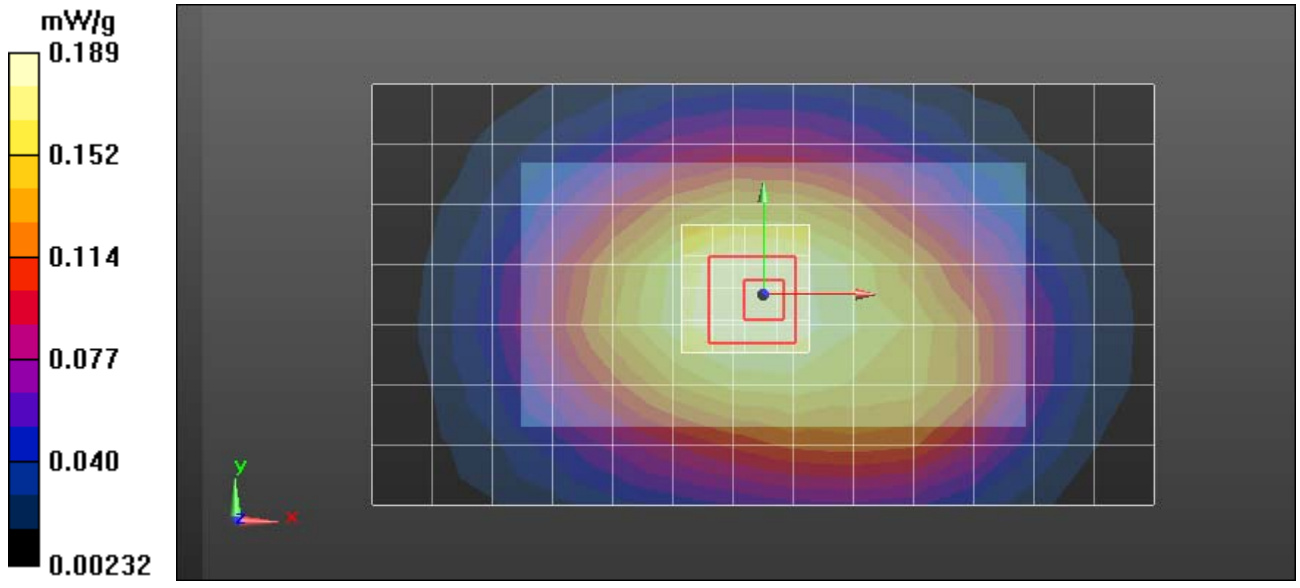
Communication System: _CDMA; Frequency: 836.52 MHz; Communication System Channel Number: 384; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.189 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.830 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.246 mW/g
SAR(1 g) = 0.184 mW/g; SAR(10 g) = 0.136 mW/g
Maximum value of SAR (measured) = 0.193 mW/g



Date/Time: 5/18/2012 1:47:16 PM

Serial: LA8Z210049; Procedure Notes: Modulation: QPSK; Channel BW: 10; RB config: l RB High; DEVICE POSITION: BODY WORN,BACK OF PHONE 25MM FROM PHANTOM

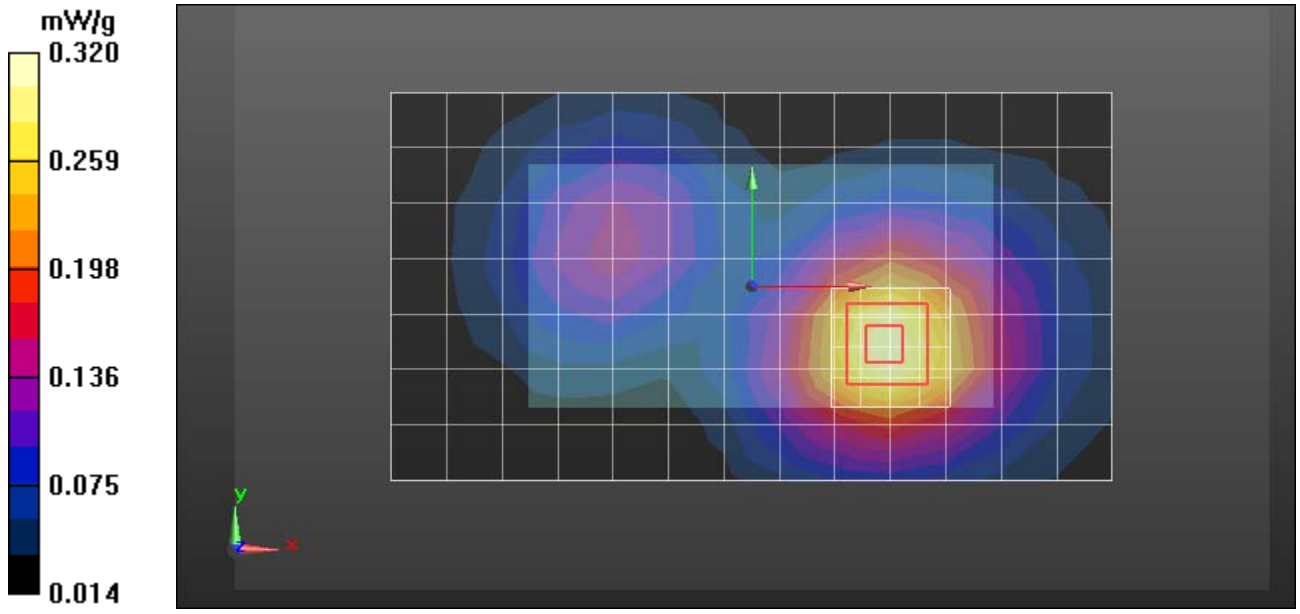
Communication System: _LTE Band 25; Frequency: 1855 MHz; Communication System Channel Number: 26090; Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.72, 4.72, 4.72); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/22/2011
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.303 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.651 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.457 mW/g
SAR(1 g) = 0.297 mW/g; SAR(10 g) = 0.188 mW/g
Maximum value of SAR (measured) = 0.320 mW/g



Date/Time: 5/9/2012 7:08:22 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: ALL UP; DEVICE POSITION: BACK OF PHONE 25MM FROM PHANTOM

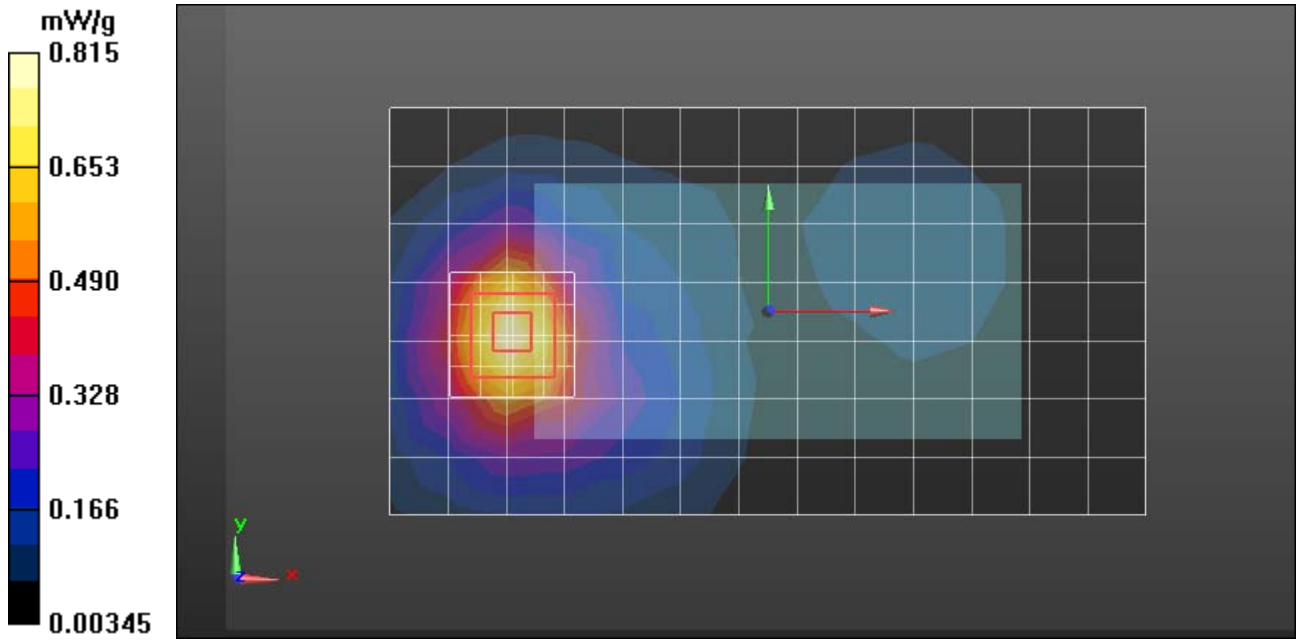
Communication System: _CDMA; Frequency: 1880 MHz; Communication System Channel Number: 600; Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.815 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.637 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.164 mW/g
SAR(1 g) = 0.760 mW/g; SAR(10 g) = 0.463 mW/g
Maximum value of SAR (measured) = 0.826 mW/g



Date/Time: 5/9/2012 9:46:55 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: EVDO REV O, RTAP 153.6K; DEVICE POSITION: BACK OF PHONE 25MM FROM PHANTOM

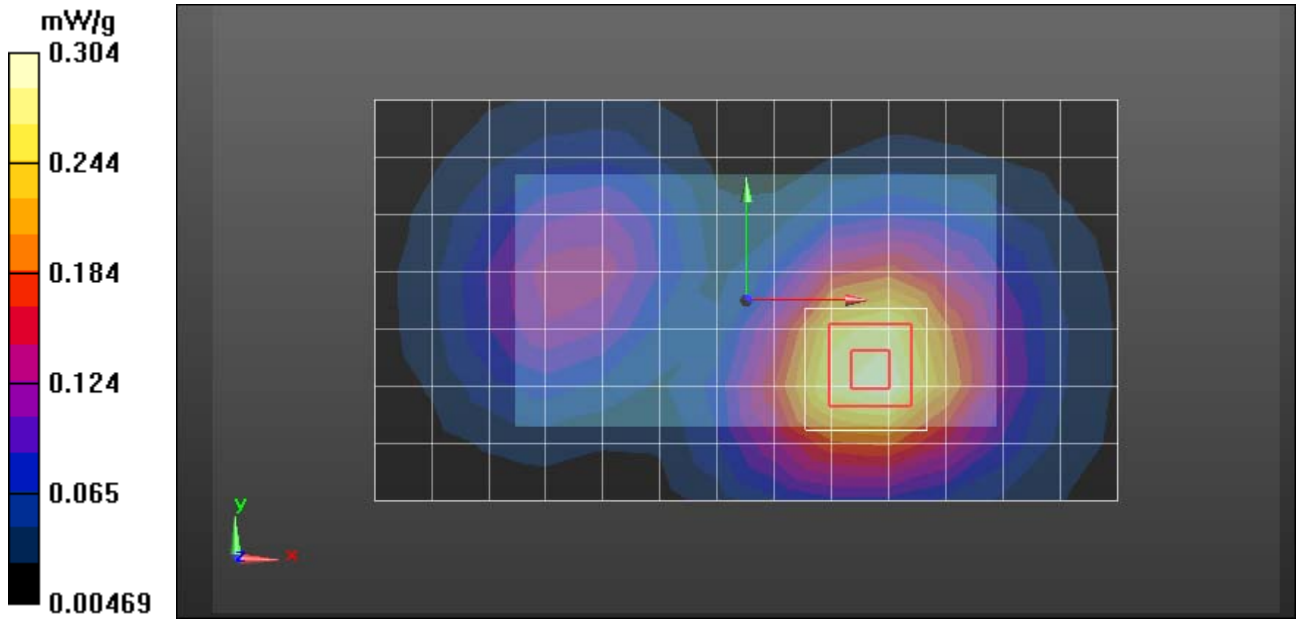
Communication System: _CDMA; Frequency: 1880 MHz; Communication System Channel Number: 600; Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.304 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.413 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.444 mW/g
SAR(1 g) = 0.292 mW/g; SAR(10 g) = 0.186 mW/g
Maximum value of SAR (measured) = 0.313 mW/g



Date/Time: 5/25/2012 12:13:07 AM

Serial: LA8Z210039; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: BACK OF PHONE 25MM AWAY FROM PHANTOM

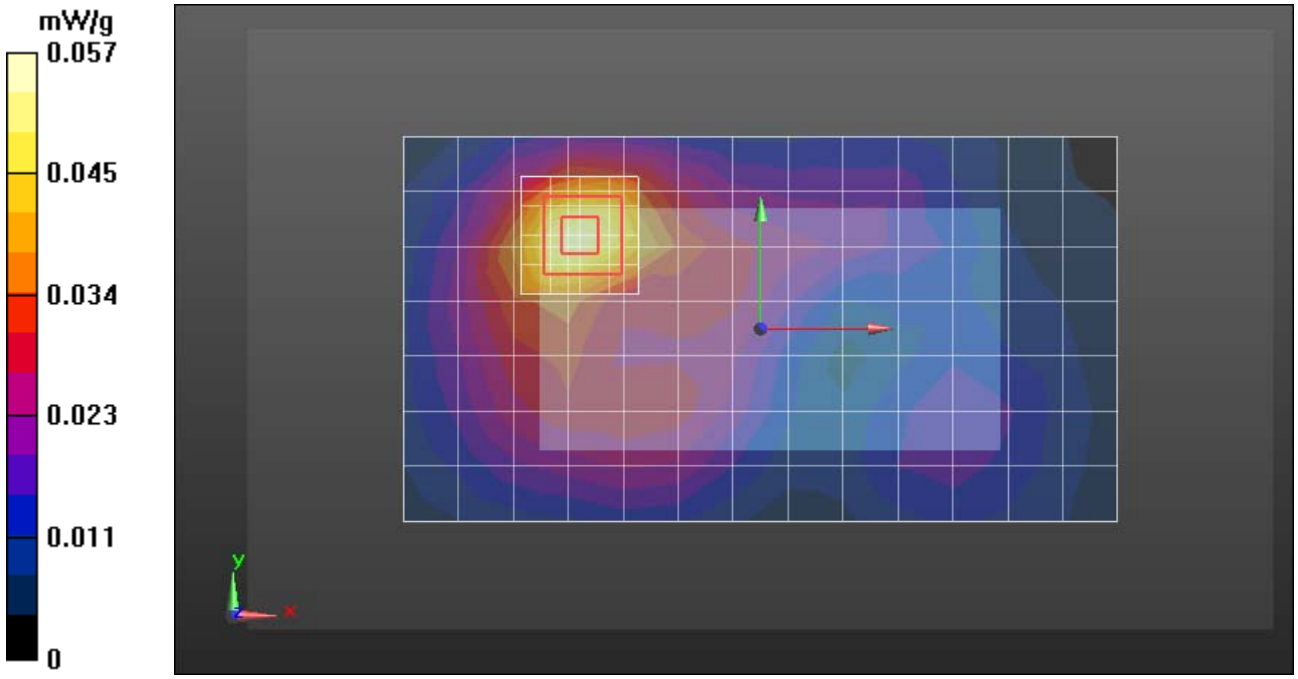
Communication System: _Wi-Fi 2450MHz; Frequency: 2437 MHz; Communication System Channel Number: 6; Duty Cycle: 1:1
Medium: 2450 Triton Body; Medium parameters used: f = 2450 MHz; σ = 1.95 mho/m; ε_r = 50.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(4.56, 4.56, 4.56); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0540 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.221 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.095 mW/g
SAR(1 g) = 0.052 mW/g; SAR(10 g) = 0.029 mW/g
Maximum value of SAR (measured) = 0.0568 mW/g



Appendix 4

SAR distribution plots for Mobile Hotspot Test Results

Date/Time: 5/16/2012 1:43:26 AM

Serial: LA8Z210039; Procedure Notes: Pwr Step: ALL UP; DEVICE POSITION: Back of Phone 10mm away from phantom

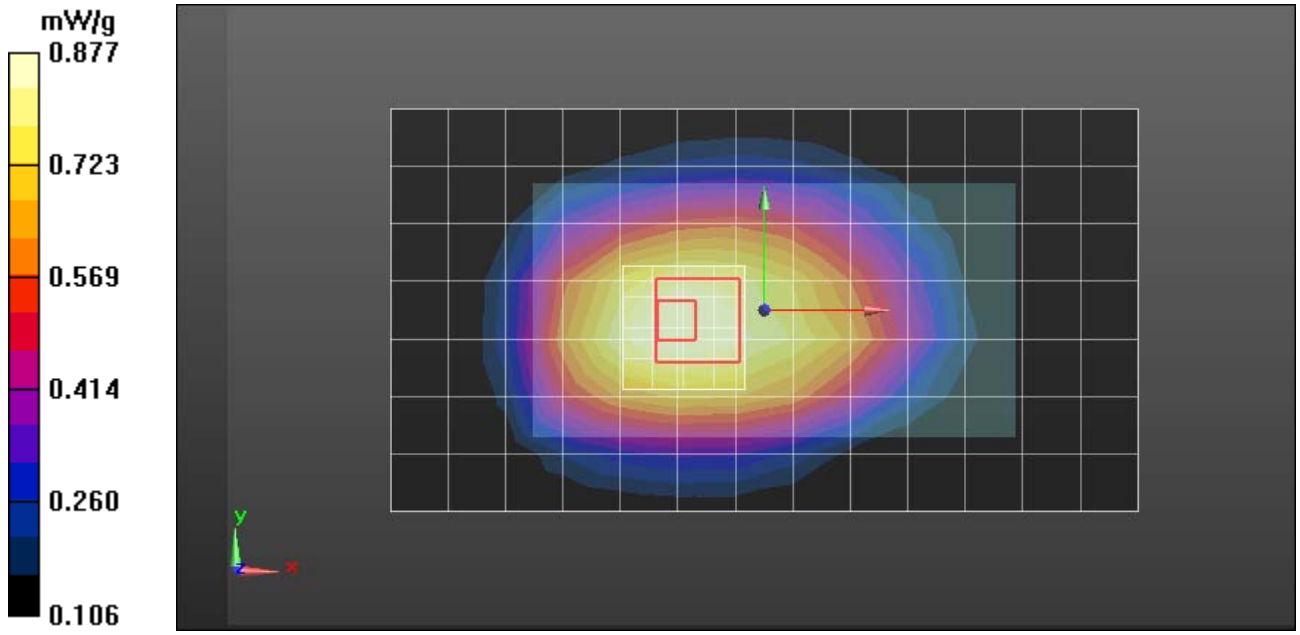
Communication System: _CDMA; Frequency: 820.1 MHz; Communication System Channel Number: 564; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 815 MHz; σ = 0.97 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.882 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.133 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.089 mW/g
SAR(1 g) = 0.840 mW/g; SAR(10 g) = 0.632 mW/g
Maximum value of SAR (measured) = 0.877 mW/g



Date/Time: 5/15/2012 9:31:26 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: EVDO REV O, RTAP 153.6K; DEVICE POSITION: Left EDGE of Phone 10mm away from phantom

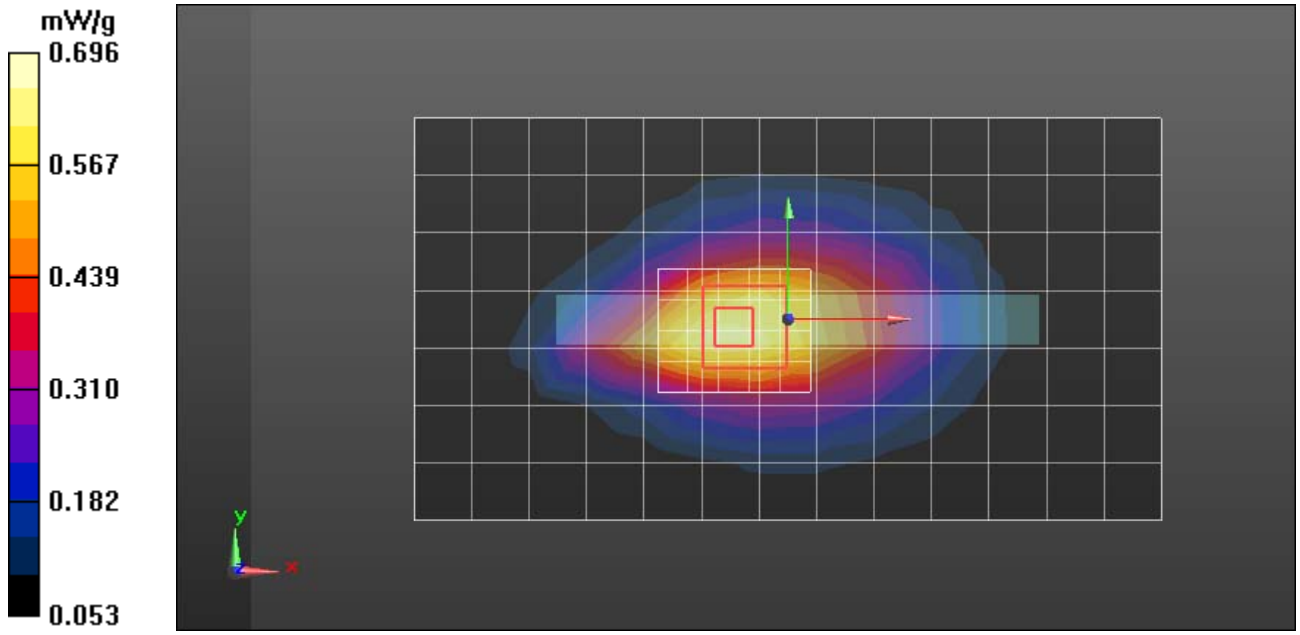
Communication System: _CDMA; Frequency: 820.1 MHz; Communication System Channel Number: 564; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 815 MHz; σ = 0.97 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.642 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.995 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.958 mW/g
SAR(1 g) = 0.649 mW/g; SAR(10 g) = 0.435 mW/g
Maximum value of SAR (measured) = 0.696 mW/g



Date/Time: 5/14/2012 11:53:46 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: ALL UP; DEVICE POSITION: BACK OF PHONE 10MM FROM PHANTOM

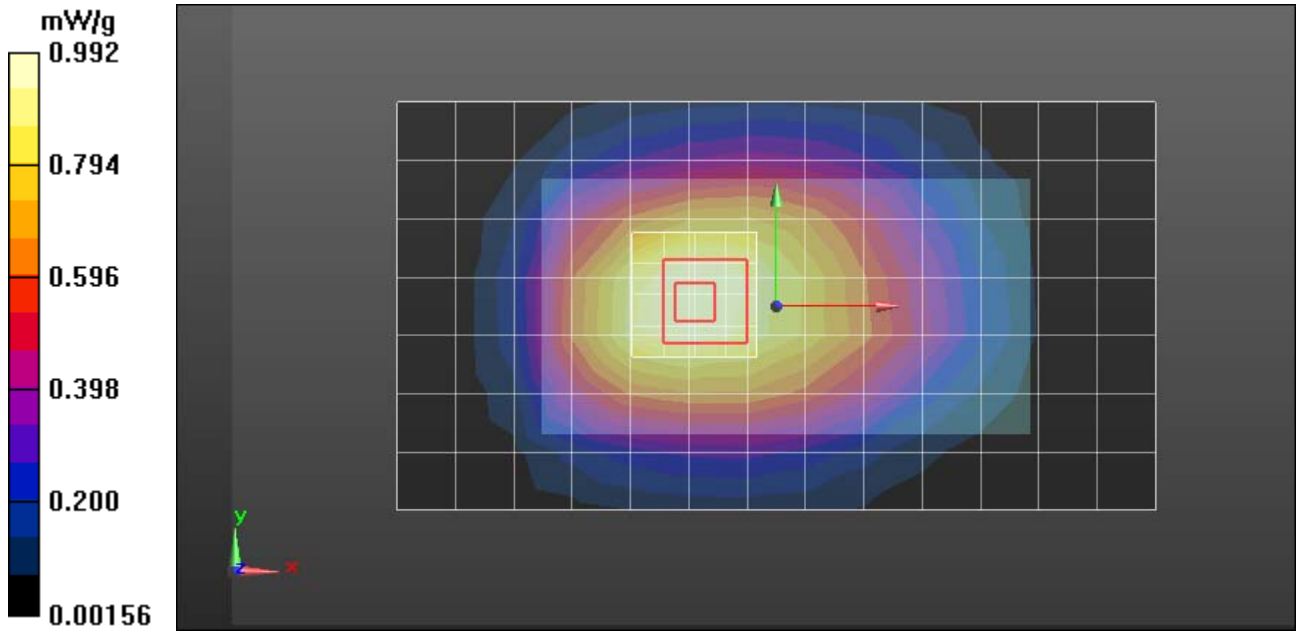
Communication System: _CDMA; Frequency: 848.31 MHz; Communication System Channel Number: 777; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.992 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.040 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.262 mW/g
SAR(1 g) = 0.964 mW/g; SAR(10 g) = 0.713 mW/g
Maximum value of SAR (measured) = 1.01 mW/g



Date/Time: 5/15/2012 8:56:44 PM

Serial: LA8Z210039; Procedure Notes: Pwr Step: EVDO REV O, RTAP 153.6K; DEVICE POSITION: Left EDGE of Phone 10mm away from phantom

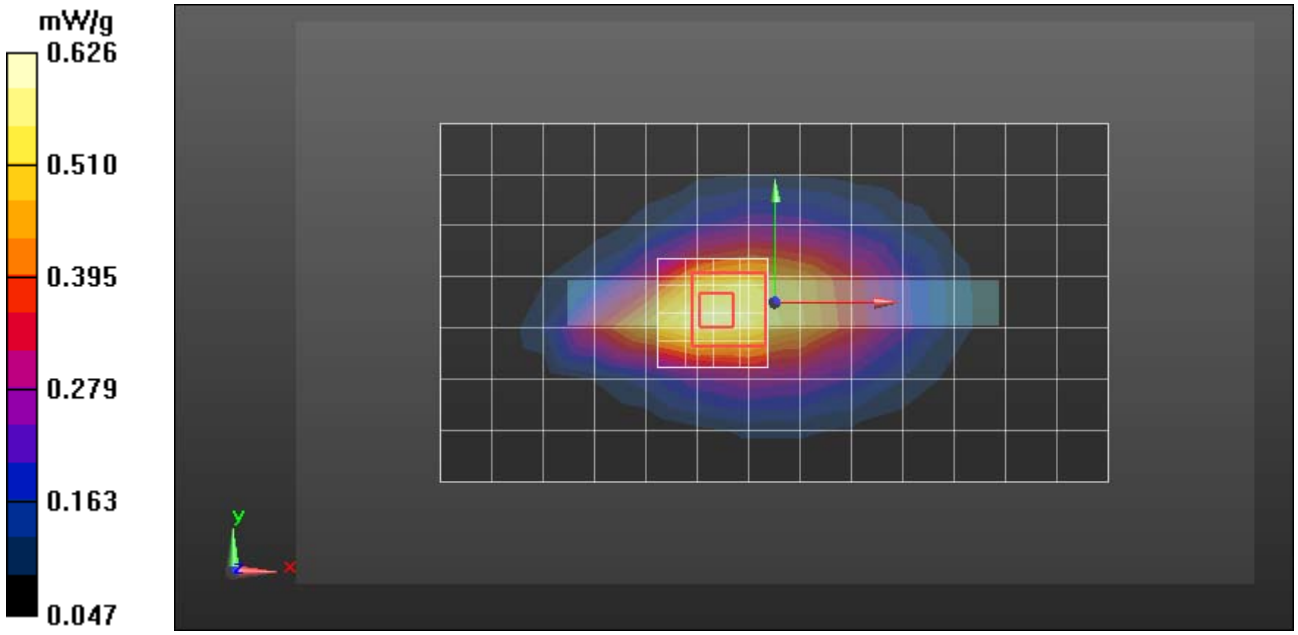
Communication System: _CDMA; Frequency: 836.52 MHz; Communication System Channel Number: 384; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.584 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.183 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.862 mW/g
SAR(1 g) = 0.580 mW/g; SAR(10 g) = 0.385 mW/g
Maximum value of SAR (measured) = 0.626 mW/g



Date/Time: 5/25/2012 10:48:09 PM

Serial: LA8Z270068; Procedure Notes: Modulation QPSK; Channel BW: 10; RB config: 1 RB High; DEVICE POSITION: BACK OF PHONE 10MM FROM PHANTOM

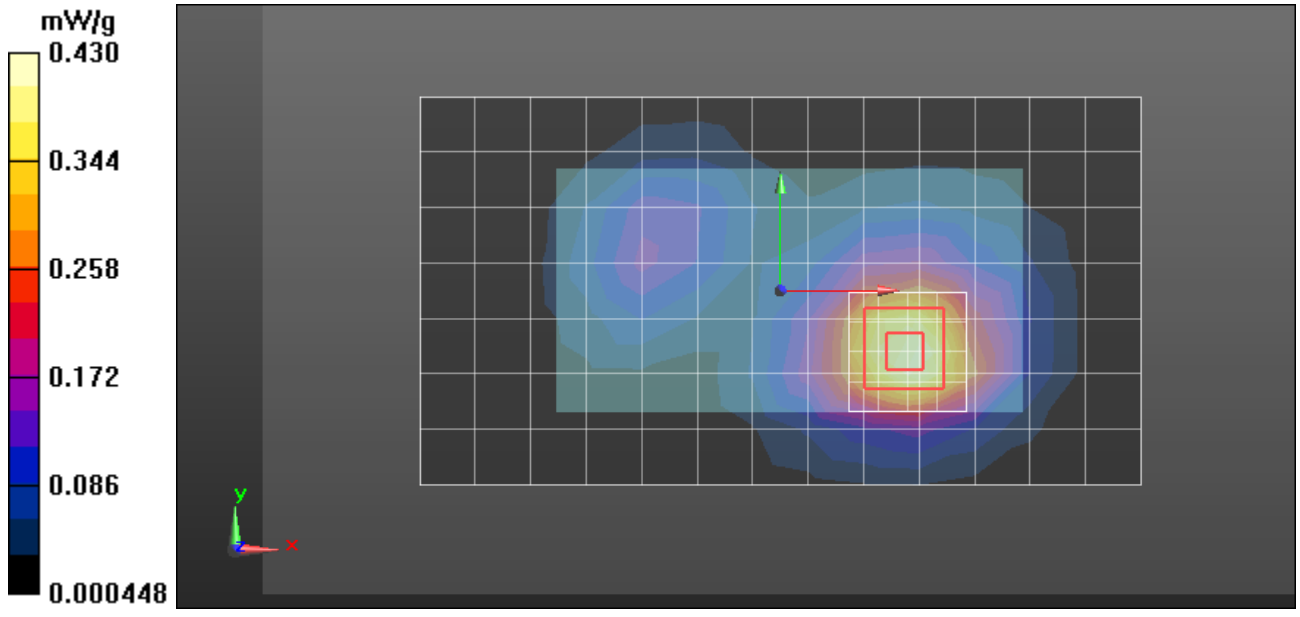
Communication System: _LTE Band 25; Frequency: 1855 MHz; Communication System Channel Number: 26090; Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.72, 4.72, 4.72); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn699; Calibrated: 9/22/2011
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.430 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.210 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.666 mW/g
SAR(1 g) = 0.415 mW/g; SAR(10 g) = 0.250 mW/g
Maximum value of SAR (measured) = 0.449 mW/g



Date/Time: 5/23/2012 11:45:46 AM

Serial: LA8Z270068; Procedure Notes: Pwr Step: All Up; DEVICE POSITION: Bottom Edge of Phone 10mm from Flat Phantom

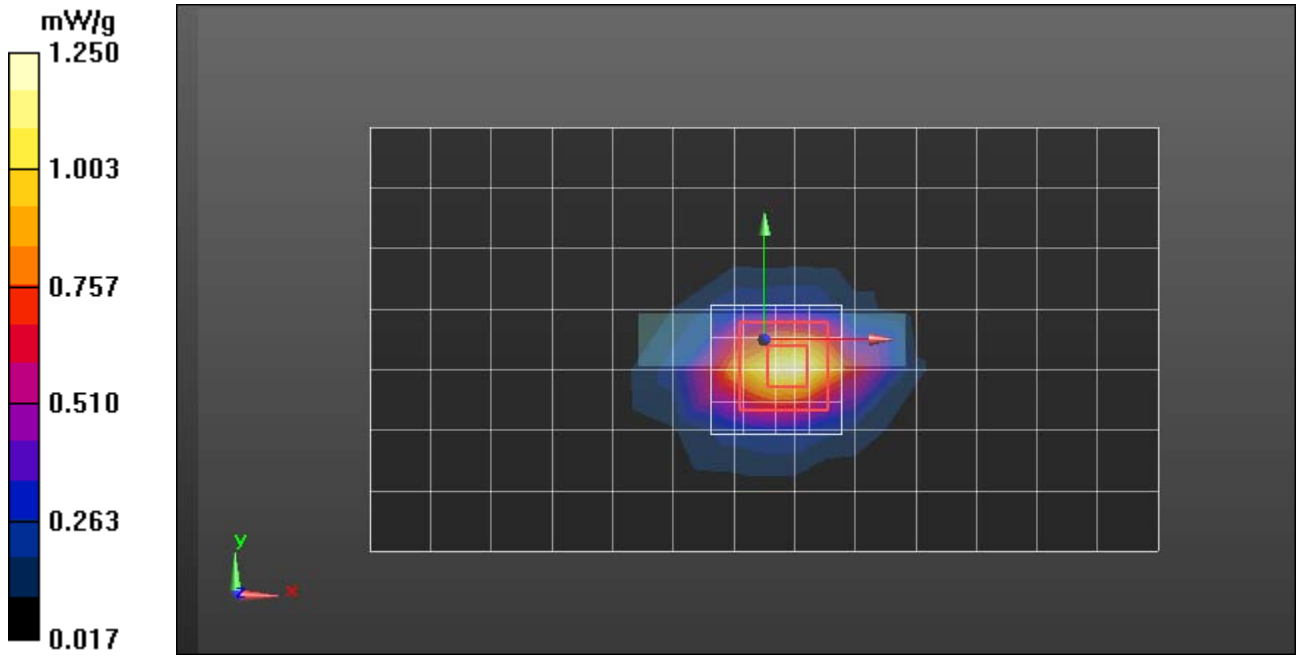
Communication System: _CDMA; Frequency: 1908.75 MHz; Communication System Channel Number: 1175; Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.26 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.706 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.985 mW/g
SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.580 mW/g
Maximum value of SAR (measured) = 1.25 mW/g



Date/Time: 5/23/2012 3:30:40 PM

Serial: LA8Z270068; Procedure Notes: Pwr Step: EVDO REV 0 (RTAP) 153.6Kbps; DEVICE POSITION: Back of Phone 10mm from Flat Phantom

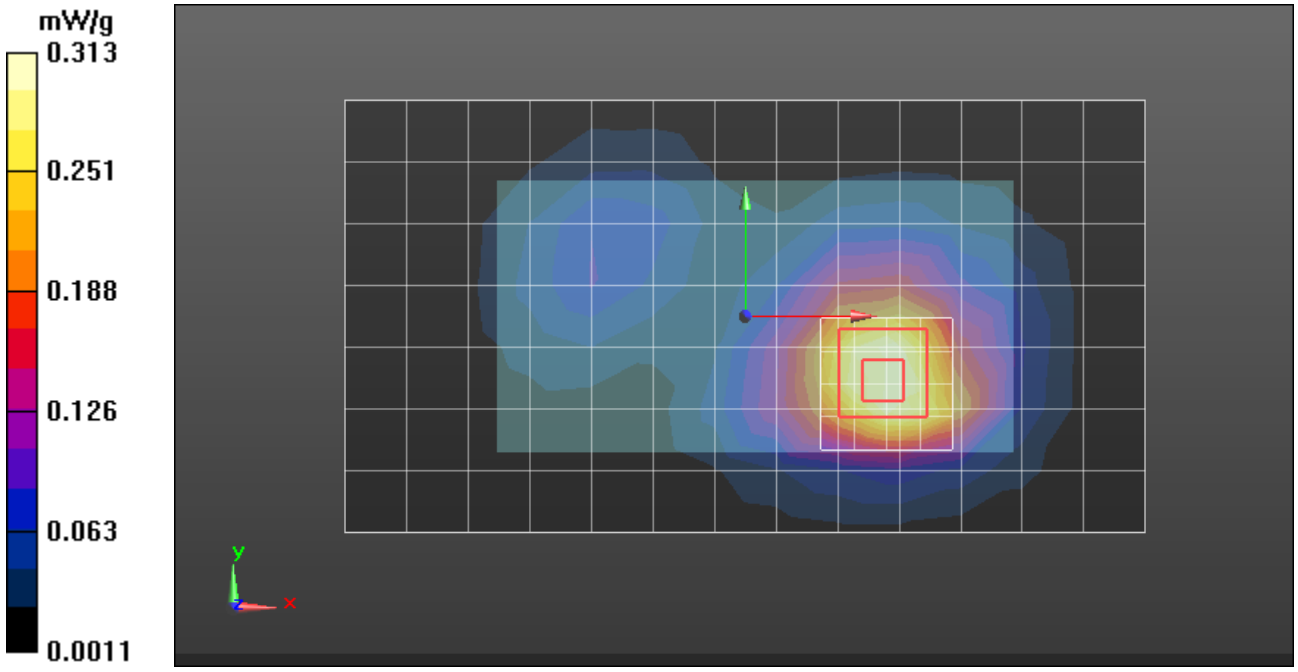
Communication System: _CDMA; Frequency: 1880 MHz; Communication System Channel Number: 600; Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.313 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.573 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.498 mW/g
SAR(1 g) = 0.317 mW/g; SAR(10 g) = 0.192 mW/g
Maximum value of SAR (measured) = 0.344 mW/g



Date/Time: 5/25/2012 9:51:48 AM

Serial: LA8Z210039; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: MOBILE HOTSPOT, BACK OF PHONE 10MM FROM PHANTOM

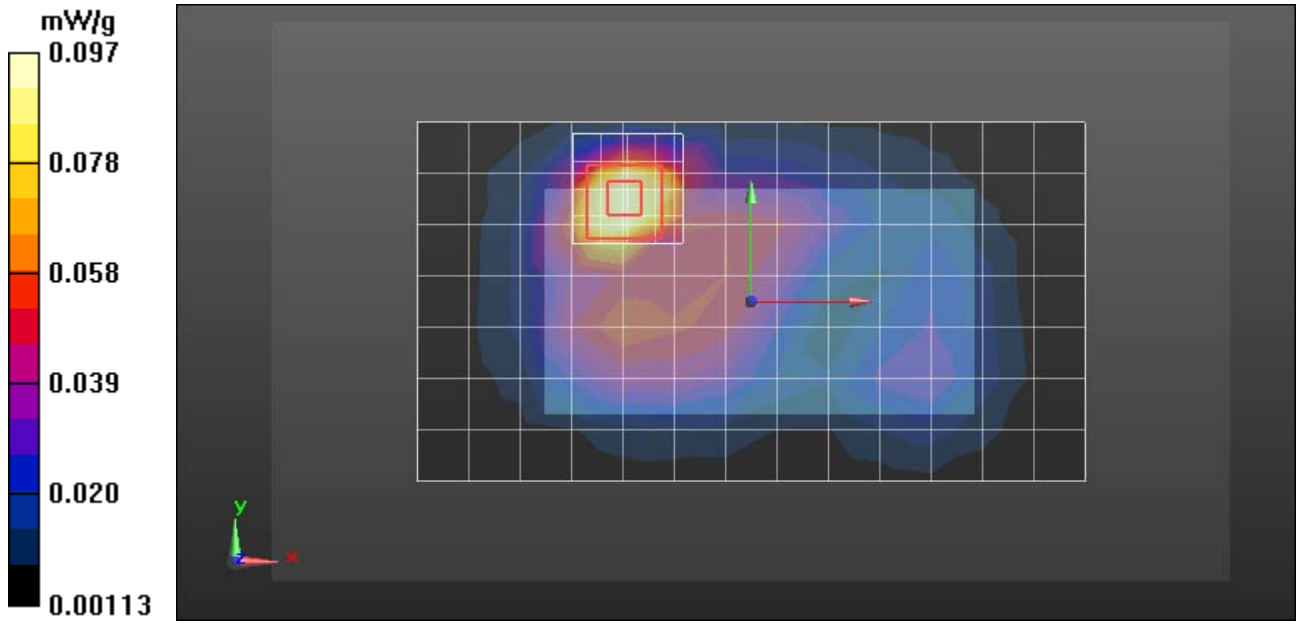
Communication System: _Wi-Fi 2450MHz; Frequency: 2412 MHz; Communication System Channel Number: 1; Duty Cycle: 1:1
Medium: 2450 Diacetin Body; Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 50.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(4.56, 4.56, 4.56); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0967 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.574 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.267 mW/g
SAR(1 g) = 0.127 mW/g; SAR(10 g) = 0.058 mW/g
Maximum value of SAR (measured) = 0.141 mW/g



Appendix 5

Measurement Uncertainty Budget

{note: SAR drift = 0% due to correction for drift in SAR results, fcd being updated}

Uncertainty Budget for Device Under Test, for 735 MHz 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	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	372
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	0.0	R	1.73	1	1	0.0	0.0	∞
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				12	12	508
Expanded Uncertainty (95% CONFIDENCE LEVEL)			*k*=2				24	24	

Appendix 6

Probe Calibration Certificate

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

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S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
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: ES3-3284_Jan12

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3284

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

Calibration date: January 10, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: January 10, 2012

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

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Swiss Calibration Service

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Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ES3DV3

SN:3284

Manufactured: June 7, 2010
Calibrated: January 10, 2012

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3284

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.24	1.22	1.10	± 10.1 %
DCP (mV)[B]	104.0	99.5	102.4	

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	109.4	±2.5 %
			Y	0.00	0.00	1.00	110.9	
			Z	0.00	0.00	1.00	105.7	

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:3284

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.44	6.44	6.44	0.80	1.20	± 12.0 %
835	41.5	0.90	6.18	6.18	6.18	0.80	1.18	± 12.0 %
1810	40.0	1.40	5.33	5.33	5.33	0.80	1.22	± 12.0 %
1950	40.0	1.40	5.08	5.08	5.08	0.80	1.24	± 12.0 %
2450	39.2	1.80	4.56	4.56	4.56	0.80	1.25	± 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:3284

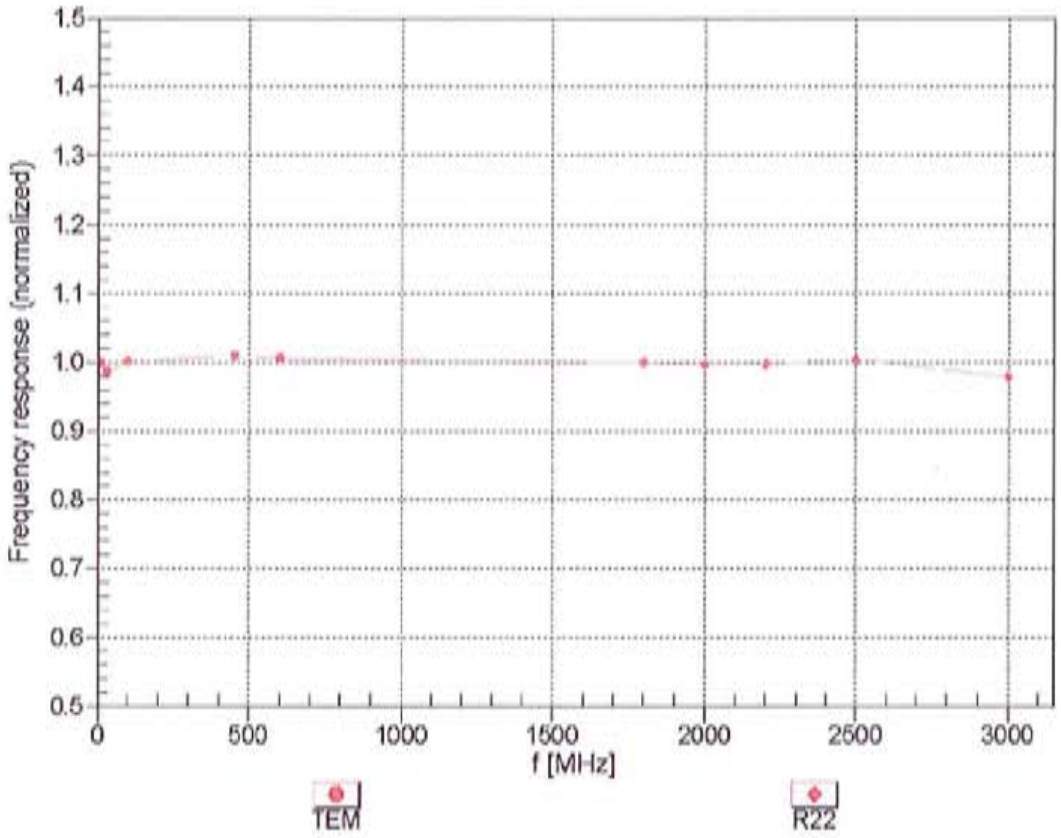
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.36	6.36	6.36	0.80	1.00	± 12.0 %
835	55.2	0.97	6.28	6.28	6.28	0.80	1.00	± 12.0 %
1810	53.3	1.52	5.28	5.28	5.28	0.80	1.40	± 12.0 %
1950	53.3	1.52	5.20	5.20	5.20	0.69	1.49	± 12.0 %
2450	52.7	1.95	4.56	4.56	4.56	0.80	1.00	± 12.0 %

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

Frequency Response of E-Field

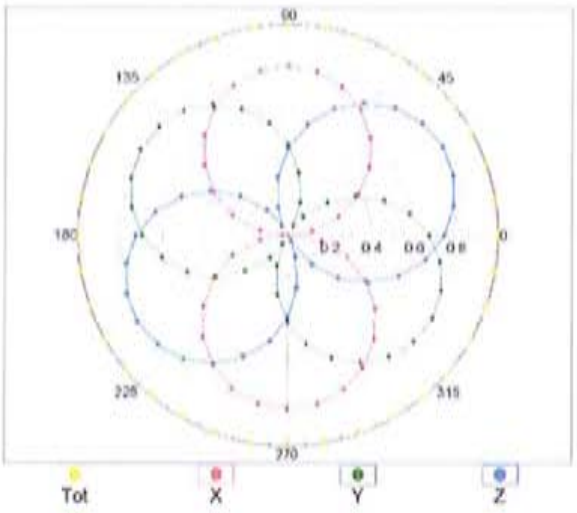
(TEM-Cell:ifi110 EXX, Waveguide: R22)



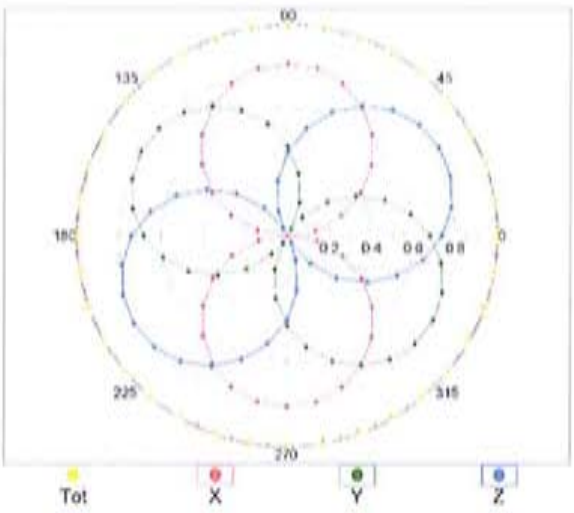
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

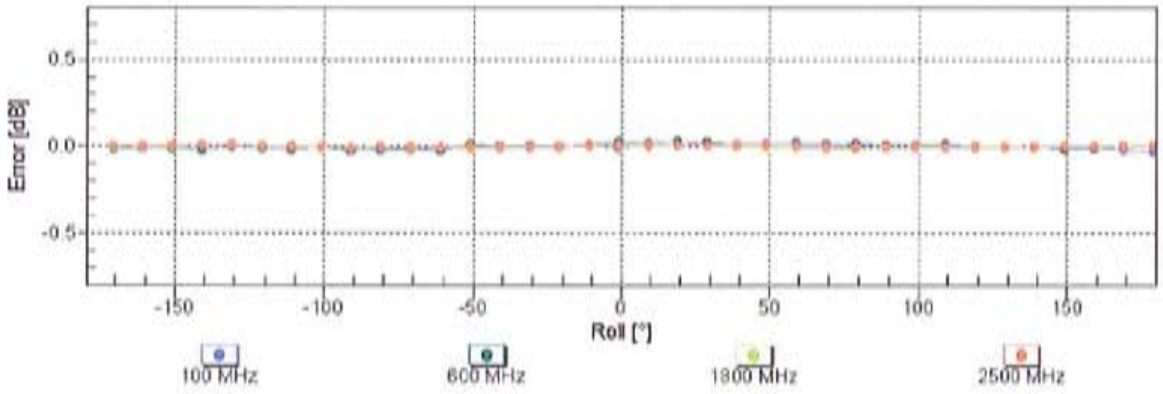
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



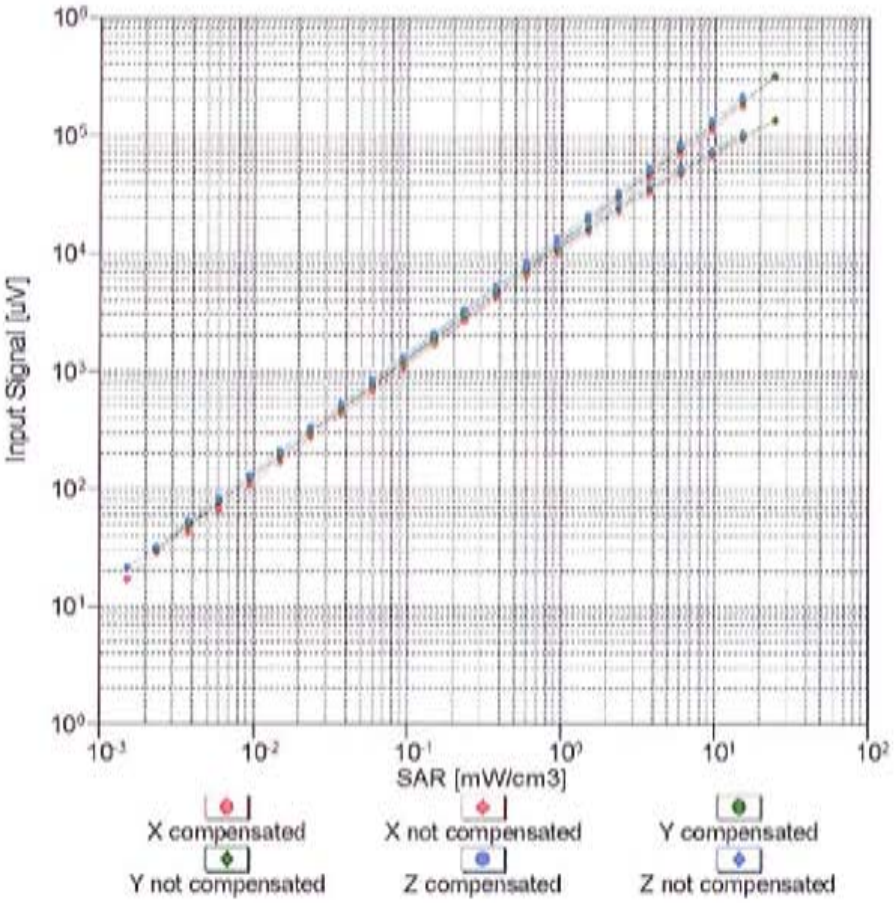
f=1800 MHz,R22

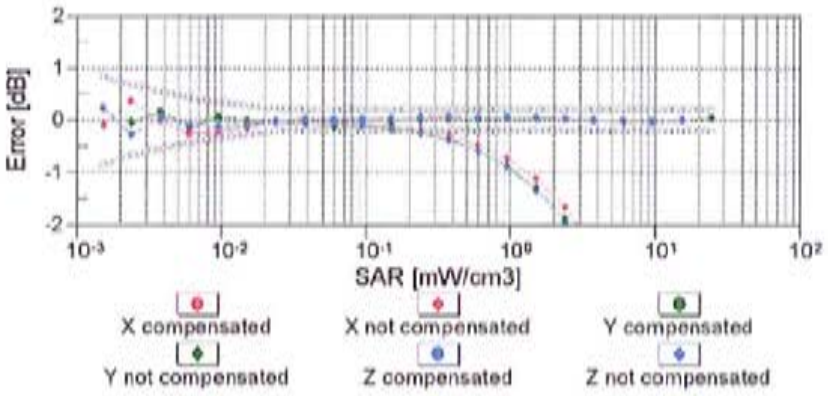




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

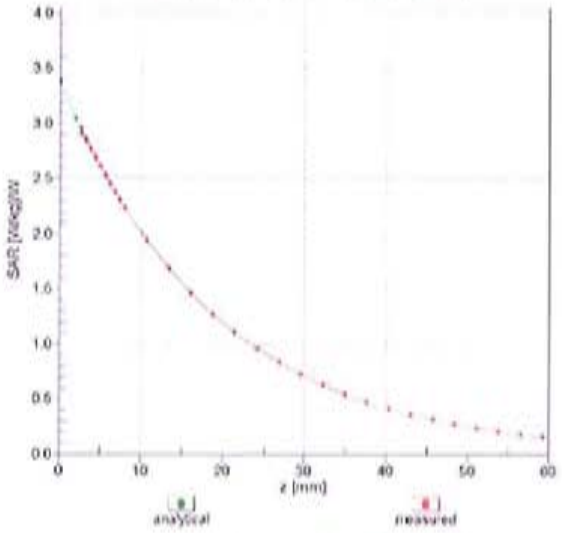




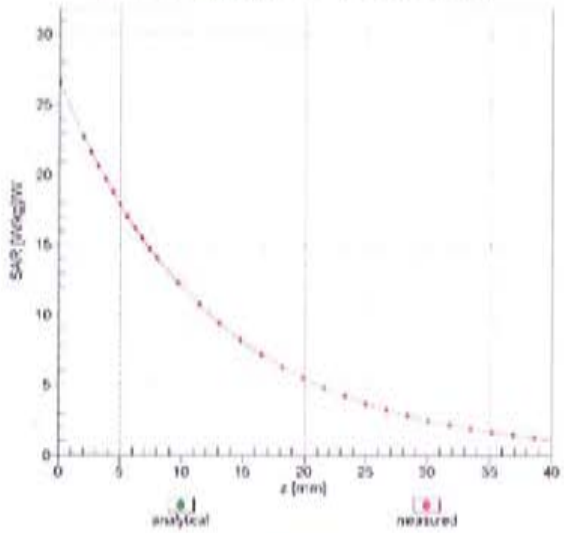
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

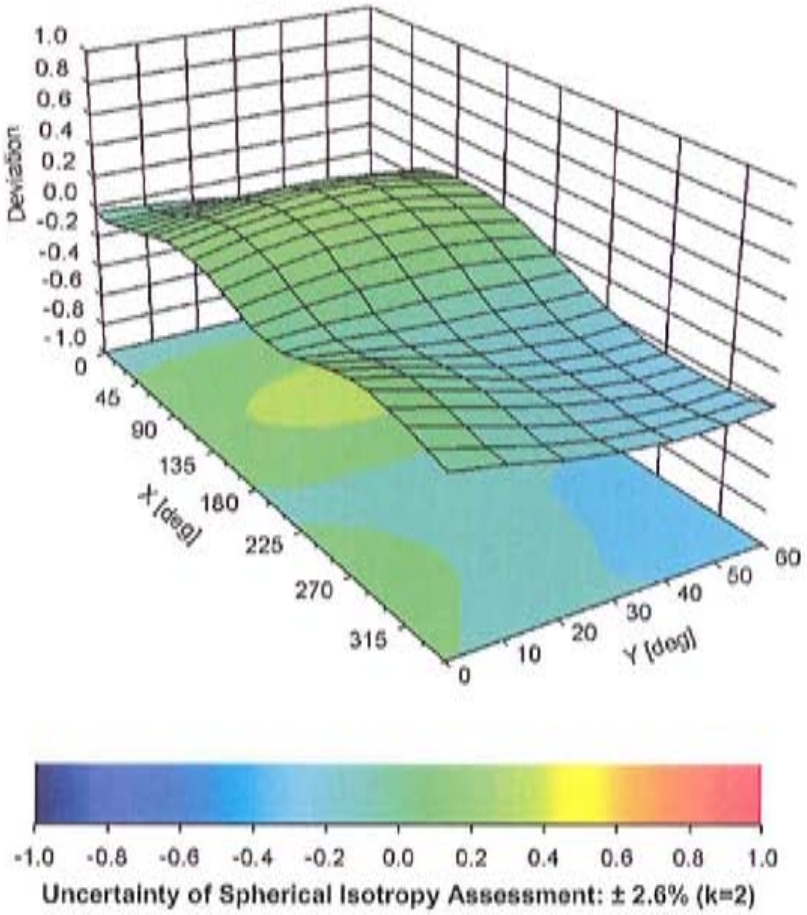


f = 1810 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3284

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

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Accreditation No.: SCS 108

Client: Motorola MDb

Certificate No: ES3-3115_Jan12

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3115

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

Calibration date: January 11, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: January 12, 2012

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

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ES3DV3

SN:3115

Manufactured: March 6, 2006
Calibrated: January 11, 2012

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]	1.30	1.26	1.17	± 10.1 %
DCP (mV)[B]	105.1	102.3	102.4	

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	118.8	±3.0 %
			Y	0.00	0.00	1.00	107.0	
			Z	0.00	0.00	1.00	110.1	

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:3115

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.05	6.05	6.05	0.35	1.73	± 12.0 %
835	41.5	0.90	5.83	5.83	5.83	0.69	1.20	± 12.0 %
1810	40.0	1.40	5.17	5.17	5.17	0.80	1.19	± 12.0 %
1950	40.0	1.40	4.81	4.81	4.81	0.72	1.26	± 12.0 %
2450	39.2	1.80	4.35	4.35	4.35	0.80	1.32	± 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:3115

Calibration Parameter Determined in Body Tissue Simulating Media

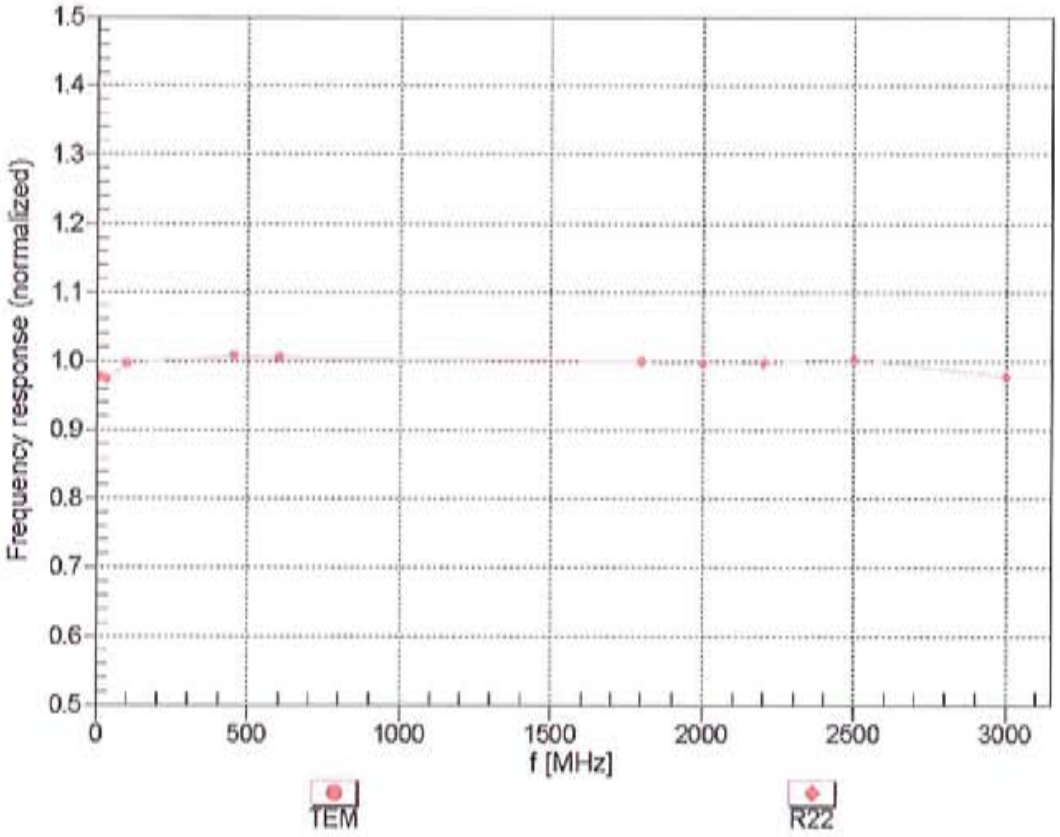
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	5.97	5.97	5.97	0.43	1.57	± 12.0 %
835	55.2	0.97	5.89	5.89	5.89	0.67	1.27	± 12.0 %
1810	53.3	1.52	4.72	4.72	4.72	0.56	1.49	± 12.0 %
1950	53.3	1.52	4.67	4.67	4.67	0.37	1.87	± 12.0 %
2450	52.7	1.95	4.12	4.12	4.12	0.80	1.05	± 12.0 %

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

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

Frequency Response of E-Field

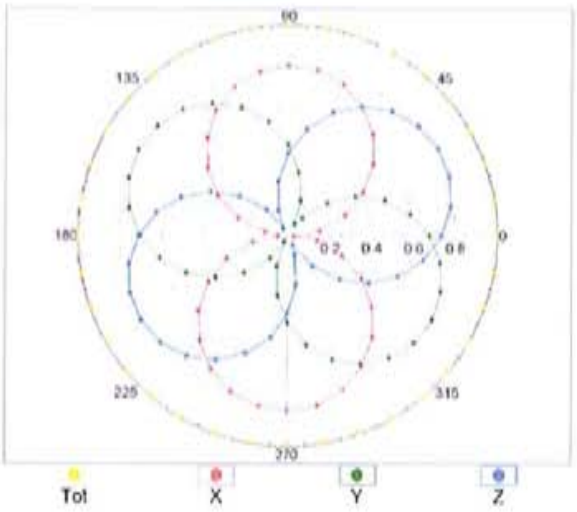
(TEM-Cell:ifi110 EXX, Waveguide: R22)



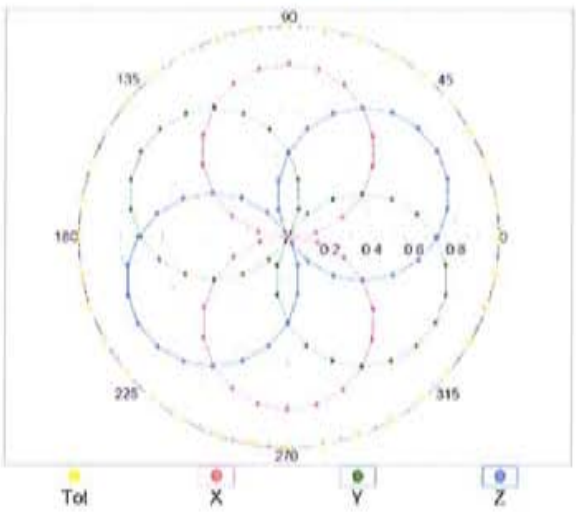
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

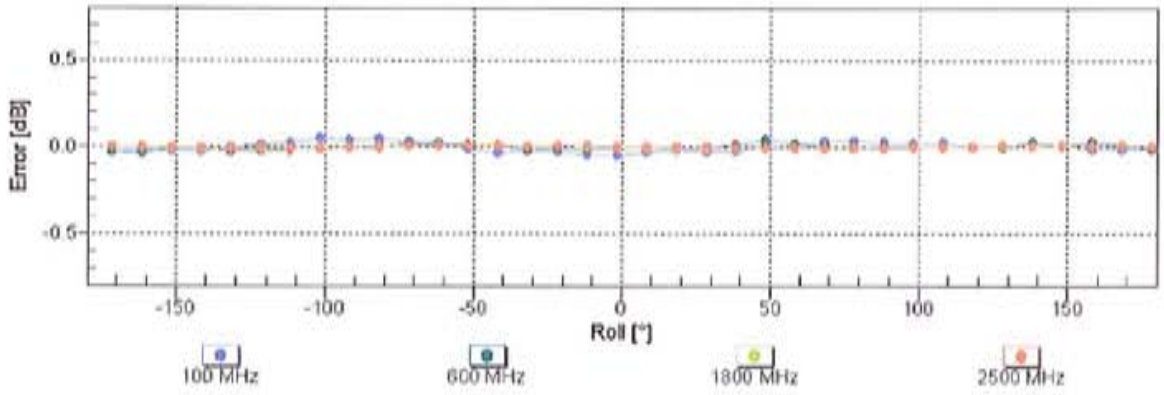
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



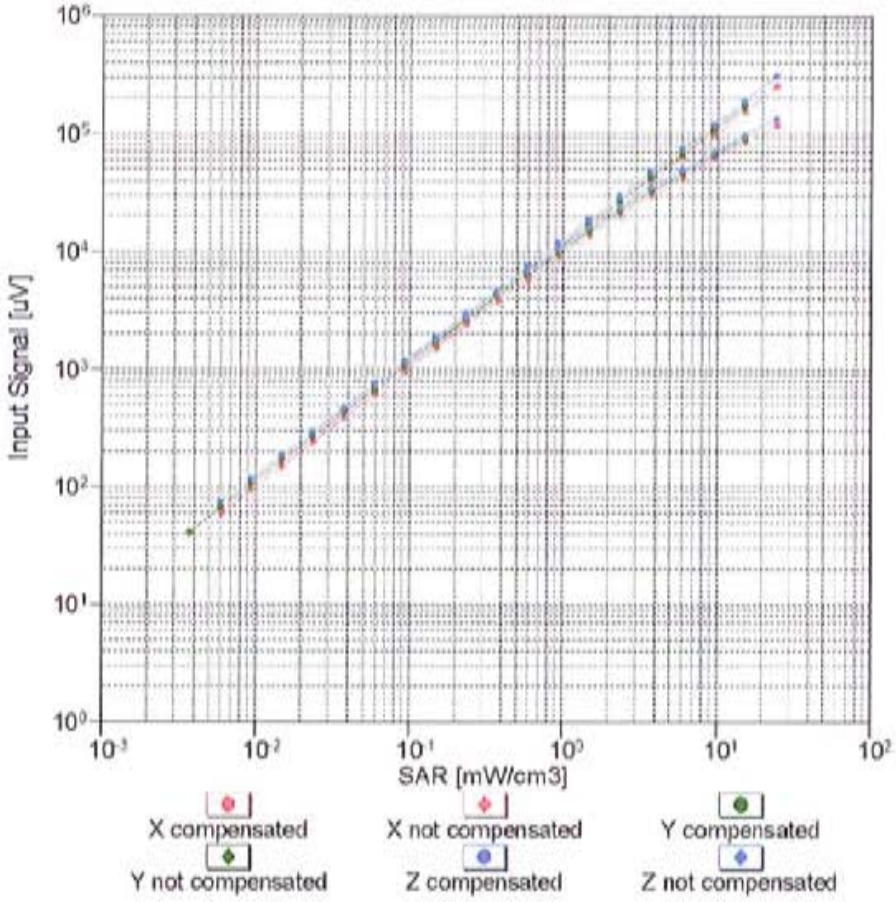
f=1800 MHz,R22

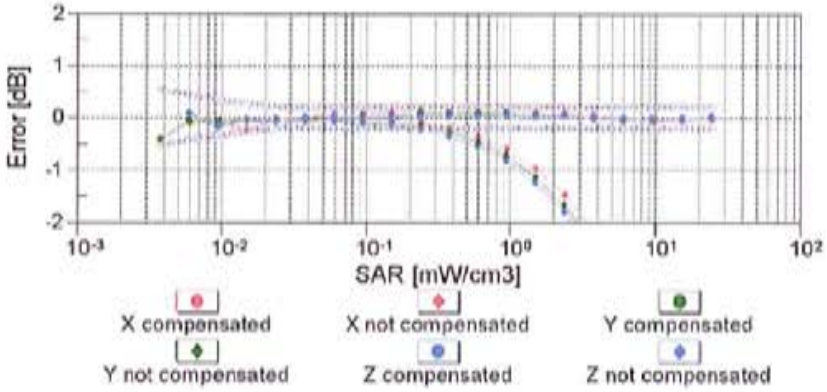




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

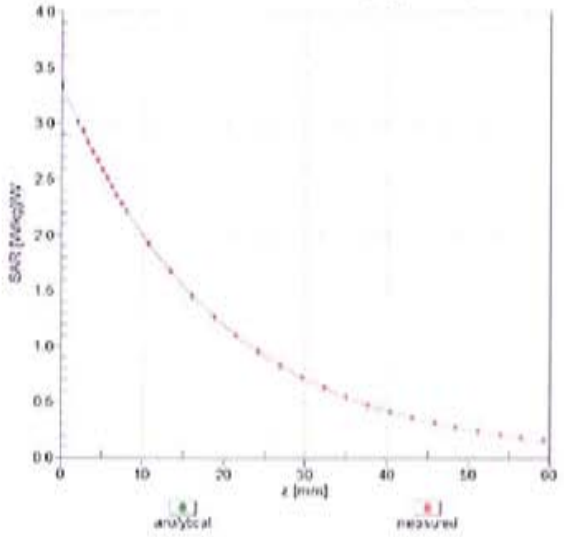




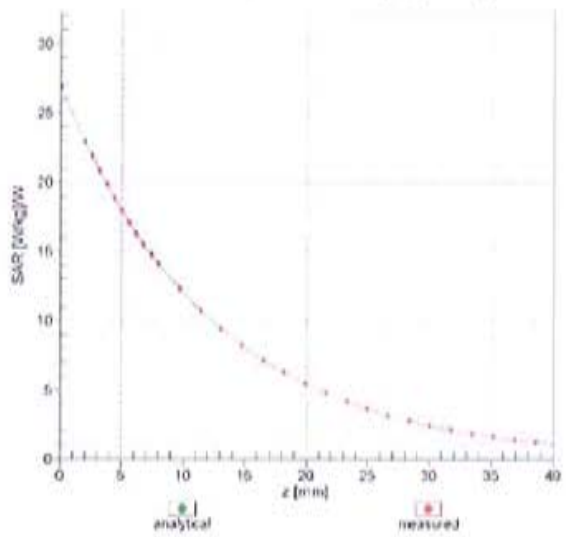
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

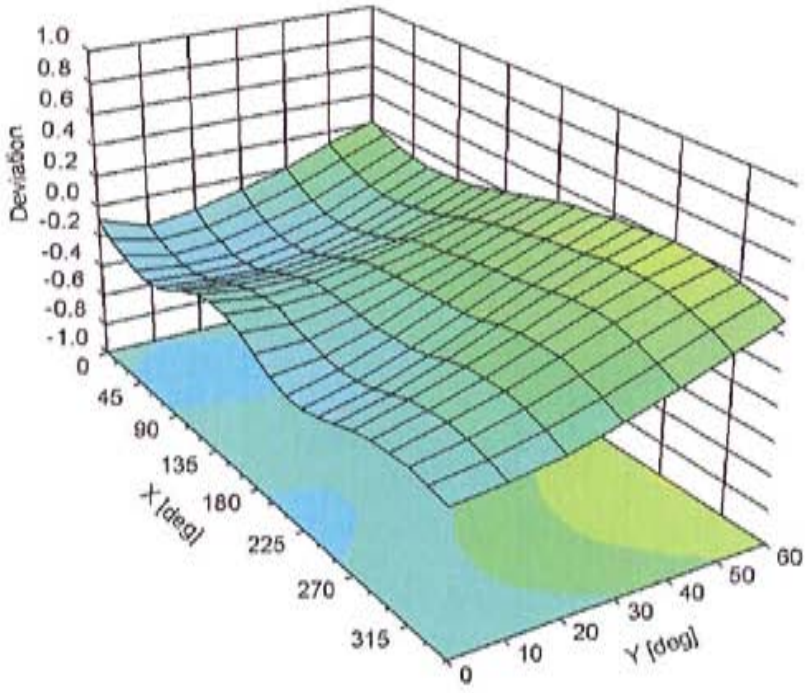


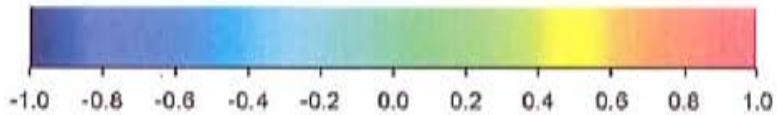
f = 1810 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

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

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