Portable Cellular Phone SAR Test Report

Tests Requested By:	Motorola Mobility, Inc. 600 N. US Highway 45 Libertyville, IL 60048
Test Report #:	24933-1F, REV 5
Date of Report:	June 20, 2012
Date of Test:	Feb 23, 2012 – April 24, 2012, May 8, 2012 - May 10, 2012
FCC ID #:	IHDP56MB4
Generic Name:	N/A
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 Issue 4 HCSC 6 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:

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

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Revision History

Revision Version	Date	Notes
Rev. 0	25-Apr-2012	Initial report release
Rev. 1	17-May-2012	Updated
Rev. 2	01-June-2012	Updated
Rev. 3	01-June-2012	Updated
Rev. 4	14-June-2012	Updated
Rev. 5	20-June-2012	Updated

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 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 $^{W}/_{kg}$)
LTE Band 4	**1.02**	**0.67**	**1.33**
LTE Band 17	**1.10**	**0.45**	**1.00**
GSM 850	**0.63**	**0.62**	**1.31**
GSM 1900	**0.68**	**0.42**	**1.31**
WCDMA 850	**0.39**	**0.39**	**0.70**
WCDMA 1700	**0.65**	**0.47**	**1.35**
WCDMA 1900	**1.34**	**0.61**	**1.49**
Wi-Fi 2.45 GHz	**0.59**	**0.05**	**0.36**
Wi-Fi 5.2 GHz	**0.33**	**0.01**	
Wi-Fi 5.3 GHz	**0.24**	**0.03**	
Wi-Fi 5.6 GHz	**0.23**	**0.04**	
Wi-Fi 5.8 GHz	**0.44**	**0.06**	**0.11**

2. Description of the Device Under Test

2.1 Antenna description

Main (850/1700/1900 MHz) Antenna

Type	Internal	
Location	Bottom of Transceiver	
Dimensions	Width	4.0 mm
	Length	53.0 mm

LTE Band 17 Antenna

Type	Internal	
Location	Top Left of the Transceiver	
Dimensions	Width	27.0 mm
	Length	30.0 mm

Bluetooth / Wi-Fi Antenna

Type	Internal	
Location	Top Right of the Transceiver	
Dimensions	Width	7.0 mm
	Length	17.0 mm

2.2 Device Signaling[1]

Serial Number(s) (Functional Use)	LDNB270018	(GSM / WCDMA conducted power measurements, GSM / WCDMA head/body SAR testing, GPRS 800 / WCDMA 850 mobile hotspot SAR testing)
	LDNB2B0016	(Wi-Fi 2.4 GHz conducted power measurements)
	LDNB270029	(LTE Band 4 conducted power measurements, LTE head/body SAR testing)
	LDNB260041	(Wi-Fi 2.4 GHz SAR testing, Wi-Fi 5 GHz SAR testing, LTE Band 17 conducted power measurements, LTE Band 17 head/body/mobile hotspot SAR testing)
	LDUB2M0130	(GPRS 1900, WCDMA 1700, WDMA 1900, LTE Band 4 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)
LTE Band 17	QPSK, 16QAM	24.5 dBm	1:1	710 MHz
LTE Band 4	QPSK, 16QAM	24.0 dBm	1:1	1717.5-1747.5 MHz
GSM 850	GMSK	33.5 dBm	1:8	824.2 - 848.8 MHz
GSM 900	GMSK	33.5 dBm	1:8	880.2 - 914.8 MHz
GSM 1800	GMSK	30.5 dBm	1:8	1710.2 - 1784.8 MHz
GSM 1900	GMSK	30.5 dBm	1:8	1850.2 - 1909.8 MHz
WCDMA 850	QPSK	24.0 dBm	1:1	826.4 - 846.6 MHz
WCDMA 1700	QPSK	24.0 dBm	1:1	1712.4 – 1752.6 MHz
WCDMA 1900	QPSK	24.0 dBm	1:1	1852.4 - 1907.6 MHz
WCDMA 2100	QPSK	24.0 dBm	1:1	1922.4 - 1977.6 MHz
Wi-Fi 802.11b/g/n	BPSK	20.99 dBm	1:1	2412.0 - 2462.0 MHz
Wi-Fi 802.11a/n	BPSK	15.28 dBm	1:1	5180.0 - 5240.0 MHz, 5260.0 - 5320.0 MHz, 5500.0 - 5700.0 MHz, 5745.0 - 5825.0 MHz
Bluetooth	GFSK	9.00 dBm	1:1	2402.0 – 2480.0 MHz

[1] LTE Band 17 is not operational in Canada.
Bolded entries indicate data mode configurations of highest time-average power output per band and data mode type, and thus were utilized for SAR testing in this report.

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

Mode(s) of Operation	GPRS/EDGE 850				GPRS/EDGE 900				GPRS/EDGE 1800				GPRS/EDGE 1900			
Modulation	GMSK				GMSK				GMSK				GMSK			
Maximum Output Power Setting (dBm)	33.5	**32.5**	29.5	27.5	33.5	**32.5**	29.5	27.5	30.5	**29.5**	26.5	24.5	30.5	**29.5**	26.5	24.5
Time Average Output Power Setting (dBm)	24.5	**26.5**	25.2	24.5	24.5	**26.5**	25.2	24.5	21.5	**23.5**	22.2	21.5	21.5	**23.5**	22.2	21.5
Duty Cycle	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				880.2 - 914.8 MHz				1710.2 - 1784.8 MHz				1850.2 - 1909.8 MHz			

Mode(s) of Operation	EDGE 850				EDGE 900				EDGE 1800				EDGE 1900			
Modulation	8PSK				8PSK				8PSK				8PSK			
Maximum Output Power Setting (dBm)	29.0	**28.0**	25.0	23.0	29.0	**28.0**	25.0	23.0	28.0	**27.0**	24.0	22.0	28.0	**27.0**	24.0	22.0
Time Average Output Power Setting (dBm)	20.0	**22.0**	20.7	20.0	20.0	**22.0**	20.7	20.0	19.0	**21.0**	19.7	19.0	19.0	**21.0**	19.7	19.0
Duty Cycle	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8	1:8	**2:8**	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				880.2 - 914.8 MHz				1710.2 - 1784.8 MHz				1850.2 - 1909.8 MHz			

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

2.2.1 LTE power limits and MPR description

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.

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

Thus, given a maximum power of 24 dBm in LTE Band 4, and the MPR described above, the max power for the SAR test cases is as follows:

15 MHz Bandwidth

Test Case	Max Power (dBm)
QPSK, Start RB: 19, RB Alloc 50%	23
QPSK, Start RB: 0, RB Alloc 100%	23
QPSK, Start RB: 74, RB Alloc: 1 RB @ high channel edge	24
QPSK, Start RB: 0, RB Alloc: 1 RB @ low channel edge	24
16QAM, Start RB: 19, RB Alloc 50%	22
16QAM, Start RB: 0, RB Alloc 100%	22
16QAM, Start RB: 74, RB Alloc: 1 RB @ high channel edge	23
16QAM, Start RB: 0, RB Alloc: 1 RB @ low channel edge	23

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

Given a maximum power of 24.5 dBm in LTE Band 17, 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%	23.5
QPSK, Start RB: 0, RB Alloc 100%	23.5
QPSK, Start RB: 49, RB Alloc: 1 RB @ high channel edge	24.5
QPSK, Start RB: 0, RB Alloc: 1 RB @ low channel edge	24.5
16QAM, Start RB: 12, RB Alloc 50%	22.5
16QAM, Start RB: 0, RB Alloc 100%	22.5
16QAM, Start RB: 49, RB Alloc: 1 RB @ high channel edge	23.5
16QAM, Start RB: 0, RB Alloc: 1 RB @ low channel edge	23.5

5 MHz Bandwidth

Test Case	**Max Power (dBm)**
QPSK, Start RB: 6, RB Alloc 50%	23.5
QPSK, Start RB: 0, RB Alloc 100%	23.5
QPSK, Start RB: 24, RB Alloc: 1 RB @ high channel edge	24.5
QPSK, Start RB: 0, RB Alloc: 1 RB @ low channel edge	24.5
16QAM, Start RB: 6, RB Alloc 50%	22.5
16QAM, Start RB: 0, RB Alloc 100%	22.5
16QAM, Start RB: 24, RB Alloc: 1 RB @ high channel edge	23.5
16QAM, Start RB: 0, RB Alloc: 1 RB @ low channel edge	23.5

2.2.2 Power limit reduction for Mobile Hotspot functionality

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	WCDMA 1700		
Test Channel	1312	1413	1513
Reduced Maximum Output Power Setting (dBm)	21.0	21.0	21.0
Duty Cycle	1:1	1:1	1:1

Mode(s) of Operation	WCDMA 1900		
Test Channel	9262	9400	9538
Reduced Maximum Output Power Setting (dBm)	18.0	18.0	18.0
Duty Cycle	1:1	1:1	1:1

Mode(s) of Operation	GPRS 1900			
Modulation	GMSK			
Duty Cycle	1:8	**2:8**	3:8	4:8
Maximum Output Power Setting (dBm)	30.5	**29.5**	26.5	24.5
Time Average Output Power Setting (dBm)	21.5	**23.5**	22.2	21.5
Reduced Maximum Output Power Setting (dBm)	27.5	**25.0**	22.0	21.0
Reduced Time Average Output Power Setting (dBm)	18.5	**19.0**	17.7	18.0

Mode(s) of Operation	LTE Band 4		
Test Channel	20025	20175	20325
Maximum Output Power Setting (dBm)	24.0	24.0	24.0
Reduced Maximum Output Power Setting (dBm)	21.0	21.0	21.0

2.3 Device Conducted Power Measurements

2.3.1 LTE modes

Conducted Power for LTE modes (dBm)								
Band/Mode	Band 4 (15 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 20025	24.20	24.08	23.61	23.67	23.35	23.22	22.57	22.59
Channel 20175	24.22	24.03	23.20	23.25	23.25	23.00	22.11	22.24
Channel 20325	24.24	24.09	23.38	23.33	23.18	22.99	22.38	22.54

Conducted Power for LTE modes (dBm)								
Band/Mode	Band 4 (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 20000	23.93	24.25	23.69	23.66	22.91	23.20	22.64	22.80
Channel 20175	23.97	23.96	23.26	23.22	22.76	22.84	22.17	22.46
Channel 20350	24.20	23.83	23.38	23.43	22.99	22.60	22.97	22.71

Conducted Power for LTE modes (dBm)								
Band/Mode	Band 4 (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 19975	24.09	24.37	23.65	23.77	23.24	23.45	22.52	23.22
Channel 20175	23.97	23.88	23.09	23.17	22.90	22.85	22.01	22.02
Channel 20375	24.16	23.82	23.20	23.24	23.29	22.89	22.15	22.81

Conducted Power for LTE modes (dBm)								
Band/Mode	Band 17 (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 23790	24.50	24.52	23.88	23.88	23.40	23.44	22.86	22.97

Conducted Power for LTE modes (dBm)								
Band/Mode	Band 17 (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 23755	24.30	24.61	23.69	23.79	23.43	23.55	22.49	23.13
Channel 23825	24.55	24.39	24.11	24.18	23.82	23.47	22.96	23.67

2.3.2 GSM modes

Band	Channel	Conducted power (dBm) for GSM modes[2] (Burst Average Power)								
		GSM *CS Voice* (1 Slot)	GPRS *PS Data* (1 Slot)	EDGE *PS Data* (1 Slot)	GPRS *PS Data* (2 Slots)	EDGE *PS Data* (2 Slots)	GPRS *PS Data* (3 Slots)	EDGE *PS Data* (3 Slots)	GPRS *PS Data* (4 Slots)	EDGE *PS Data* (4 Slots)
GSM 850	128	33.32	33.45	28.97	32.43	28.16	29.40	25.06	27.63	22.99
	190	33.51	33.47	29.04	32.54	28.07	29.39	25.15	27.43	23.20
	251	33.36	33.31	28.81	32.33	27.83	29.30	24.89	27.50	22.94
GSM 900	975	33.51	33.31	29.08	32.67	27.94	29.56	24.73	27.64	22.85
	1	33.39	33.40	29.15	32.58	28.06	29.53	24.93	27.51	22.91
	62	33.46	33.30	29.14	32.56	28.16	29.44	25.00	27.47	23.02
	124	33.36	33.47	28.91	32.64	27.86	29.60	25.20	27.57	22.73
GSM 1800	512	30.58	30.60	27.95	29.64	26.92	26.23	24.17	24.34	22.18
	700	30.51	30.55	27.98	29.67	26.90	26.30	24.18	24.37	22.19
	885	30.35	30.39	27.93	29.67	26.86	26.44	24.18	24.59	22.06
GSM 1900	512	30.49	30.65	27.98	29.33	27.03	26.39	23.91	24.69	22.05
	661	30.60	30.55	27.98	29.32	27.09	26.30	24.03	24.25	22.04
	810	30.62	30.67	27.94	29.33	27.13	26.50	23.90	24.16	22.00

Band	Channel	Conducted power (dBm) for GSM modes[2] (Source-Based Time-Averaged Power)								
		GSM *CS Voice* (1 Slot)	GPRS *PS Data* (1 Slot)	EDGE *PS Data* (1 Slot)	GPRS *PS Data* (2 Slots)	EDGE *PS Data* (2 Slots)	GPRS *PS Data* (3 Slots)	EDGE *PS Data* (3 Slots)	GPRS *PS Data* (4 Slots)	EDGE *PS Data* (4 Slots)
GSM 850	128	24.32	24.45	19.97	26.43	22.16	25.14	20.80	24.63	19.99
	190	24.51	24.47	20.04	26.54	22.07	25.13	20.89	24.43	20.20
	251	24.36	24.31	19.81	26.33	21.83	25.04	20.63	24.50	19.94
GSM 900	975	24.51	24.31	20.08	26.67	21.94	25.3	20.47	24.64	19.85
	1	24.39	24.40	20.15	26.58	22.06	25.27	20.67	24.51	19.91
	62	24.46	24.30	20.14	26.56	22.16	25.18	20.74	24.47	20.02
	124	24.36	24.47	19.91	26.64	21.86	25.34	20.94	24.57	19.73
GSM 1800	512	21.58	21.60	18.95	23.64	20.92	21.97	19.91	21.34	19.18
	700	21.51	21.55	18.98	23.67	20.90	22.04	19.92	21.37	19.19
	885	21.35	21.39	18.93	23.67	20.86	22.18	19.92	21.59	19.06
GSM 1900	512	21.49	21.65	18.98	23.33	21.03	22.13	19.65	21.69	19.05
	661	21.60	21.55	18.98	23.32	21.09	22.04	19.77	21.25	19.04
	810	21.62	21.67	18.94	23.33	21.13	22.24	19.64	21.16	19.00

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

2.3.3 WCDMA modes

Per the "SAR Measurement Procedures for 3G Devices" released in October, 2007, 12.2 kbps RMC, 12.2 kbps AMR, HS-DPCCH Sub-test 1-4, and E-DCH Sub-test 1-5 modes were considered. The conducted power measurements (per section 5.2 of 3GPP TS 34.121) for each mode are shown in the table below.

Band	Channel	Conducted power (dBm) for WCDMA modes		Conducted Power (dBm) for WCDMA – HSDPA (Rel 5) Modes				Conducted Power (dBm) for WCDMA – HSPA (HSUPA/HSDPA-Rel 6) Modes				
		RMC	AMR	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 5
WCDMA 850	4132	24.03	23.98	23.92	24.00	24.03	24.07	23.99	24.10	24.09	24.06	24.06
	4180	24.05	24.01	24.04	24.08	24.07	24.12	24.07	24.07	24.12	24.05	24.08
	4233	23.82	23.84	23.82	23.81	23.87	23.82	23.75	23.79	23.80	23.80	23.82
WCDMA 1700	1312	24.10	24.04	24.06	24.06	24.12	24.11	24.01	24.00	24.08	24.04	24.01
	1413	24.02	23.99	23.93	23.89	23.90	24.00	23.88	23.93	23.97	23.92	23.95
	1513	23.96	24.01	24.00	24.02	24.01	24.05	24.01	24.01	24.00	23.96	24.03
WCDMA 1900	9262	23.87	23.97	23.99	23.99	24.04	24.04	23.99	23.94	24.00	23.97	24.02
	9400	23.95	23.89	23.90	23.99	23.98	23.92	23.90	23.94	23.92	23.92	23.96
	9538	23.96	23.95	23.93	24.08	24.10	24.05	23.96	24.07	23.99	23.95	23.93
WCDMA 2100	9612	24.03	24.12	24.10	24.11	24.15	24.07	24.07	24.08	24.07	23.98	23.99
	9750	24.01	24.03	23.97	23.96	24.11	23.94	24.00	23.91	24.01	23.99	24.09
	9888	23.91	23.86	23.82	23.81	23.86	23.81	23.83	23.81	23.82	23.77	23.87

Maximum Power Reduction (MPR)

According to 3GPP 25.101 sub-clause 6.2.2, the maximum output power is allowed to be reduced by following the table.

Table 6.1A: UE maximum output power with HS-DPCCH and E-DCH

UE transmit channel configuration	CM (dB)	MPR (dB)
For all combinations of; DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH	$0 \leq CM \leq 3.5$	MAX (CM-1, 0)
Note 1: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.		

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

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

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

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

2.3.4 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	**18.86**	18.88	18.87	19.07
	6	**18.88**	18.93	18.97	19.04
	11	**19.1**	19.1	**19.81**	19.29

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	15.35	14.4	14.44	14.43	13.36	13.43	13.35	12.38
	6	17.1	16.61	16.6	16.58	15.24	15.73	15.69	14.38
	11	17.31	16.46	16.43	16.42	15.23	15.4	15.44	14.22

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	14.95	14.38	14.37	14.17	13.1	13.12	13.28	12.24
	6	17	17.02	16.17	16.06	15.05	15.23	15.18	14.86
	11	16.56	17.17	16.34	16.27	15.24	15.39	15.32	14.21

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	14.28	14.15	13.96	14.54	13.49	13	12.9	12.02
	6	16.24	16.13	15.98	15.48	15.09	15.01	14.48	13.84
	11	15.76	15.76	16.2	15.78	15.45	14.91	15.35	14.01

Band	Channel	Conducted Power (dBm) for 802.11a Mode Data Rates							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
Wi-Fi 5210 MHz	36	13.95	13.94	12.12	12.14	12.11	12.07	11.42	11.18
	40	**14.64**	14.54	12.74	12.63	12.52	12.76	11.29	11.79
	44	13.96	13.92	12.98	12.89	12.68	13.03	12.02	11.92
	48	14.02	13.98	12.82	12.89	12.66	12.96	12.01	11.84
Wi-Fi 5290 MHz	52	14.14	14.17	13.01	13.04	12.88	13.06	11.68	12.11
	56	14.24	14.36	13.06	12.94	13.03	13.14	12.09	12.01
	60	**15.23**	15.28	13.10	13.11	12.97	13.06	11.91	12.07
	64	12.03	12.08	12.07	12.01	12.12	12.04	11.81	12.13
Wi-Fi 5600 MHz	100	13.97	13.94	13.31	13.22	13.09	13.36	12.41	12.62
	104	14.49	14.52	12.91	12.84	12.65	12.88	11.92	11.86
	108	14.37	14.35	12.99	12.91	12.75	13.06	12.06	12.04
	112	14.25	14.27	12.84	12.77	12.67	12.94	11.93	12.14
	116	14.20	14.21	12.73	12.67	12.56	12.81	11.80	12.03
	132	**14.59**	14.63	13.25	13.15	13.06	13.30	12.35	12.56
	136	14.49	14.52	13.14	13.32	13.16	13.39	12.37	12.61
	140	13.84	13.85	13.79	13.77	13.82	13.74	13.76	13.83
Wi-Fi 5785 MHz	149	**14.27**	14.29	12.90	12.84	12.69	12.98	12.01	12.19
	153	14.21	14.19	12.78	12.72	12.57	12.86	11.86	12.06
	157	14.06	14.09	12.64	12.57	12.48	12.72	11.71	11.91
	161	13.16	13.15	12.51	12.43	12.29	12.23	11.55	11.76
	165	12.98	13.01	12.22	12.18	12.11	12.37	11.34	11.53

Band	Channel	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 5210 MHz	36	14.26	14.42	12.64	12.66	12.61	12.37	11.46	11.51
	40	14.78	14.83	12.95	13.22	13.01	12.95	12.34	12.11
	44	14.39	14.29	13.15	13.27	13.18	13.01	12.32	12.18
	48	14.89	14.28	13.07	13.31	13.27	12.91	12.02	12.28
Wi-Fi 5290 MHz	52	14.22	14.21	13.26	13.67	13.29	13.11	12.26	12.42
	56	14.63	14.39	13.24	13.52	13.41	13.08	12.34	12.31
	60	15.10	15.18	13.37	13.48	13.46	13.29	12.38	12.47
	64	12.63	12.61	12.67	12.48	12.49	12.57	12.57	12.51
Wi-Fi 5600 MHz	100	13.84	13.91	13.01	13.19	13.28	12.95	12.28	12.39
	104	14.44	14.51	13.29	13.38	13.21	13.08	12.09	12.24
	108	14.34	14.43	12.78	13.07	12.88	12.69	11.95	12.11
	112	14.31	14.36	12.67	12.87	12.78	12.58	11.86	12.15
	116	14.19	14.26	12.50	12.74	12.66	12.59	11.64	11.89
	132	14.63	14.73	13.08	13.27	13.19	13.15	12.27	12.42
	136	14.56	14.61	12.97	13.15	13.09	12.88	12.19	12.38
	140	13.73	13.72	13.75	13.58	13.61	13.71	13.67	13.64
Wi-Fi 5785 MHz	149	14.31	14.39	12.71	12.91	12.83	12.79	11.92	12.09
	153	14.12	14.06	12.57	12.77	12.71	12.53	11.81	11.94
	157	14.17	14.13	12.64	12.73	12.69	12.49	11.81	11.94
	161	13.15	13.28	12.17	12.44	12.37	12.22	11.51	11.66
	165	12.97	13.02	12.10	12.29	12.24	12.04	11.34	11.39

Band	Channel	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 5210 MHz	36	14.51	14.62	13.23	12.96	12.98	12.91	12.02	12.49
	40	14.35	14.39	13.09	12.81	12.83	12.84	11.83	12.36
	44	14.19	14.26	13.02	12.77	12.71	12.75	11.81	12.18
	48	14.04	13.94	12.70	12.62	12.59	12.46	11.55	12.01
Wi-Fi 5290 MHz	52	14.41	14.49	13.14	13.04	12.98	12.92	12.12	12.43
	56	14.08	14.20	12.94	12.71	12.68	12.64	11.72	12.17
	60	13.85	13.96	12.74	12.46	12.49	12.36	11.49	11.78
	64	11.82	11.13	11.19	11.32	11.41	11.46	11.34	11.22
Wi-Fi 5600 MHz	100	13.82	14.01	13.31	13.23	13.09	13.04	12.24	12.61
	104	13.64	13.74	13.24	13.01	12.99	12.98	12.08	12.44
	108	13.55	13.59	13.03	12.79	12.81	12.79	11.91	12.26
	112	13.41	13.46	12.94	12.61	12.69	12.60	11.74	12.23
	116	13.34	13.42	12.84	12.64	12.57	12.55	11.61	12.03
	132	13.81	13.85	13.31	13.05	13.11	13.16	12.29	12.49
	136	13.72	13.88	13.24	13.02	12.94	12.96	12.06	12.56
	140	13.64	13.75	13.22	12.96	12.91	12.87	12.03	12.37
Wi-Fi 5785 MHz	149	14.16	14.21	12.94	12.71	12.72	12.66	11.81	12.21
	153	14.06	14.17	12.82	12.61	12.53	12.67	11.68	12.09
	157	13.98	14.08	12.83	12.51	12.45	12.36	11.49	11.91
	161	13.06	13.10	12.28	12.37	12.31	12.33	11.34	11.79
	165	12.89	12.98	12.34	12.10	12.17	12.13	11.29	11.60

Band	Channel	Conducted Power (dBm) for 802.11n Mode Data Rates (40 MHz Channel, 400 ns Guard Interval)							
		6.5/ 7.2	13/ 14.4	19.5/ 21.7	26/ 28.9	39/ 43.4	52/ 57.8	58.5/ 65	65/ 72.2
Wi-Fi 5210 MHz	38	11.19	11.36	11.32	11.24	11.21	11.17	11.35	11.34
	46	12.26	12.14	12.33	12.08	12.13	12.17	12.31	11.91
Wi-Fi 5290 MHz	54	12.63	12.68	12.64	12.57	12.51	12.54	12.68	12.31
	62	12.56	12.54	12.55	12.53	12.61	12.52	12.59	12.62
Wi-Fi 5600 MHz	102	12.27	12.31	12.26	12.22	12.26	12.19	12.30	12.21
	110	12.03	12.01	12.04	12.02	11.98	11.96	12.01	12.07
	118	11.77	11.84	11.86	11.83	11.77	11.75	11.87	11.76
	126	12.46	12.49	12.54	12.51	12.47	12.48	12.61	12.48
	134	12.31	12.32	12.34	12.37	12.39	12.28	12.36	12.24
	138	12.28	12.31	12.32	12.34	12.30	12.24	12.38	12.33
Wi-Fi 5785 MHz	151	12.01	12.03	12.07	12.02	11.93	11.89	12.04	11.97
	155	12.21	12.22	12.23	12.15	12.12	12.14	12.17	12.04
	159	12.11	12.17	12.19	12.16	12.08	12.06	12.14	11.99
	163	11.63	11.57	11.61	11.52	11.47	11.45	11.59	11.51

Band	Channel	Conducted Power (dBm) for 802.11n Mode Data Rates (40 MHz Channel, 800 ns Guard Interval)							
		6.5/ 7.2	13/ 14.4	19.5/ 21.7	26/ 28.9	39/ 43.4	52/ 57.8	58.5/ 65	65/ 72.2
Wi-Fi 5210 MHz	38	12.12	11.98	12.03	11.97	12.05	11.94	11.96	11.83
	46	11.81	11.78	11.82	11.77	11.79	11.74	11.80	11.76
Wi-Fi 5290 MHz	54	11.24	11.23	11.26	11.27	11.29	11.21	11.28	11.22
	62	10.61	10.59	10.64	10.58	10.60	10.56	10.57	10.63
Wi-Fi 5600 MHz	102	12.51	12.53	12.58	12.46	12.49	12.52	12.44	12.39
	110	12.08	12.07	12.04	11.98	12.03	12.01	11.97	11.96
	118	11.78	11.75	11.81	11.79	11.80	11.77	11.73	11.76
	126	12.55	12.52	12.56	12.47	12.41	12.51	12.44	12.39
	134	12.38	12.36	12.39	12.33	12.35	12.27	12.31	12.29
	138	12.19	12.17	12.20	12.15	12.19	12.14	12.21	12.18
Wi-Fi 5785 MHz	151	12.03	12.09	12.07	11.99	11.94	11.89	12.08	11.92
	155	12.19	12.16	12.21	12.18	12.11	12.14	12.13	12.09
	159	12.09	12.11	12.17	12.19	12.07	12.08	12.13	12.04
	163	11.57	11.61	11.56	11.49	11.48	11.52	11.61	11.47

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	440	Jan-16-2012	Jan-16-2013
E-Field Probe ES3DV3	3284	Jan-10-2012	Jan-10-2013
DASY4™ DAE V1	376	Aug-31-2011	Aug-31-2012
E-Field Probe ES3DV3	3124	Aug-23-2011	Aug-23-2012
DASY4™ DAE V1	703	Oct-17-2011	Oct-17-2012
E-Field Probe EX3DV4	3730	Aug-29-2011	Aug-29-2012
S.A.M. Phantom used for 800/900 MHz	TP-1132		
S.A.M. Phantom used for 710 MHz	TP-1162		
S.A.M. Phantom used for 1800/1900/2450 MHz	TP-1162		
S.A.M. Phantom used for 1800/1900/2450 MHz	TP-1319		
S.A.M. Phantom used for 5 GHz	TP-1106		
Dipole Validation Kit, DV750V3	1040	Aug-10-2011	Aug-10-2012
Dipole Validation Kit, DV835V2	422TR	Mar-18-2011	Mar-18-2012
Dipole Validation Kit, DV835V2	4d129	Jan-11-2012	Jan-11-2013
Dipole Validation Kit, DV1800V2	250TR	Mar-17-2011	Mar-17-2012
Dipole Validation Kit, DV1800V2	259TR	Mar-17-2011	Mar-17-2012
Dipole Validation Kit, DV1800V2	2d191	Jan-05-2012	Jan-05-2013
Dipole Validation Kit, DV2450V2	877	Jan-10-2012	Jan-10-2013
Dipole Validation Kit, D5GHzV2	1088	May-20-2011	May-20-2012

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
Signal Generator N5181A	MY50143026	Oct-27-2011	Oct-27-2014
Power Meter E4419B	GB39511088	Aug-11-2011	Aug-11-2013
Power Sensor #1 - E9301A	US39211009	Aug-16-2011	Aug-16-2012
Power Sensor #2 - E9301A	US39211013	Aug-16-2011	Aug-16-2012
Network Analyzer HP8753ES	US39171846	May-19-2011	May-19-2012
Dielectric Probe Kit HP85070C	US99360070		

4. Electrical parameters of the tissue simulating liquid

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

E-field probes calibrated at 1810 MHz were used for "1900 MHz" band (1850 MHz - 1910 MHz) SAR measurements and "1700 MHz" band (1712.4 MHz – 1752.6 MHz). 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 1880 MHz and 1730 MHz simulated tissues listed below meet this criteria.

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

Ingredient	710 / 750 / 770 MHz Head	710 / 750 / 770 MHz Body	835 / 900 MHz Head	835 / 900 MHz Body	1800 / 1900 MHz Head	1800 / 1900 MHz Body	2450 MHz Head	2450 MHz Body
Sugar	57	46	57	44.9	--	--	--	--
DGBE	--	--	--	--	47	30.8	--	30
Diacetin	--	--	--	--	--	--	51	--
Water	40.12	51.8	40.45	53.06	52.62	68.8	48.75	70
Salt	1.78	1.1	1.45	0.94	0.38	0.4	0.15	--
HEC	1	1	1	1	--	--	--	--
Bact.	0.1	0.1	0.1	0.1	--	--	0.1	--

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Temp (°C)
710	Head	**Measured,** 3-15-2012	42.7	0.85	19.8
		Recommended Limits	42.1±5%	0.89 ±5%	18-25
	Body	**Measured,** 3-16-2012	56.4	0.95	21.3
		Recommended Limits	55.7 ±5%	0.960 ±5%	18-25
835	Head	**Measured,** 2-24-2012	40.9	0.92	20.3
		Measured, 3-5-2012	40.7	0.91	20.3
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** 2-24-2012	54.6	0.99	20.2
		Measured, 2-25-2012	54.3	0.98	20.3
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1730	Head	**Measured,** 2-28-2012	38.5	1.37	19.8
		Measured, 3-6-2012	39.4	1.36	19.7
		Recommended Limits	40.1 ±5%	1.36 ±5%	18-25
	Body	**Measured,** 2-28-2012	52.4	1.50	19.8
		Measured, 3-07-2012	52.2	1.48	19.9
		Measured, 3-29-2012	51.0	1.48	19.8
		Measured, 4-4-2012	53.3	1.49	19.8
		Recommended Limits	53.5 ±5%	1.48 ±5%	18-25
1880	Head	**Measured,** 2-23-2012	38.5	1.45	20.1
		Measured, 2-24-2012	38.2	1.45	20.1
		Measured, 2-27-2012	38.5	1.47	19.6
		Measured, 2-28-2012	38.3	1.46	19.6
		Recommended Limits	40.0 ±5%	1.40 ±5%	18-25
	Body	**Measured,** 2-23-2012	51.6	1.57	19.5
		Measured, 2-26-2012	51.6	1.59	19.8
		Measured, 2-28-2012	52.7	1.57	19.0
		Measured, 3-30-2012	52.0	1.59	19.7
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25
2450	Head	**Measured,** 3-21-2012	38.3	1.80	18.9
		Recommended Limits	39.2 ±5%	1.80 ±5%	18-25
	Body	**Measured,** 3-20-2012	54.2	1.94	20.0
		Recommended Limits	52.7 ±5%	1.95 ±5%	18-25
5210	Head	**Measured,** 3-28-2012	34.5	4.60	19.9
		Measured, 4-04-2012	33.2	4.53	19.9
		Recommended Limits	36.0 ±10%	4.427-5.126	18-25
	Body	**Measured,** 3-29-2012	47.2	5.56	19.0
		Recommended Limits	49.0 ±10%	5.045-5.841	18-25
5290	Head	**Measured,** 3-29-2012	33.5	4.59	19.9
		Measured, 4-20-2012	33.3	4.52	18.0
		Recommended Limits	35.9 ±10%	4.503-5.214	18-25
	Body	**Measured,** 3-29-2012	47.0	5.67	19.0
		Measured, 3-30-2012	47.1	5.74	19.1
		Measured, 4-23-2012	47.6	5.62	19.7
		Measured, 4-24-2012	47.2	5.54	19.2
		Recommended Limits	48.9 ±10%	5.140-5.951	18-25
5600	Head	**Measured,** 5-08-2012	32.5	4.92	19.9
		Recommended Limits	35.5 ±10%	4.807-5.566	18-25
	Body	**Measured,** 5-08-2012	47.4	6.03	19.0
		Measured, 5-10-2012	47.5	6.04	20.1
		Recommended Limits	48.5 ±10%	5.482-6.347	18-25
5785	Head	**Measured,** 4-01-2012	33.2	5.09	19.2
		Recommended Limits	35.4 ±10%	4.988-5.775	18-25
	Body	**Measured,** 3-31-2012	46.4	6.52	19.0
		Measured, 4-01-2012	45.6	6.27	19.0
		Recommended Limits	48.2 ±10%	5.681-6.578	18-25

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. For frequencies above 3 GHz, the simulated tissue depth was verified to be 10 cm ± 0.5 cm. Z-axis scans showing the SAR penetration are also included in Appendix 1.

1800 System Verification covers both AWS and PCS bands.
5200 System Verification covers both UNII Subband 1 and Subband 2.
5800 System Verification covers both UNII Subband 3 and Subband 4.

System Accuracy Verification Measurements for Head SAR Measurements								
f (MHz)	Description	Dipole	Measured SAR (1 gram)	Normalized SAR (1 gram)	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
					ε_r	σ (S/m)		
750	**Measured,** 3-15-2012	1040	1.63	8.15	42.2	0.88	22.0	19.6
	Recommended Limits	1040		8.40	41.94 ±5%	0.893 ±5%	18-25	18-25
835	**Measured,** 2-23-2012	422	1.92	9.60	41.6	0.92	21.8	19.6
	Recommended Limits	422		9.33	41.5 ±5%	0.90 ±5%	18-25	18-25
	Measured, 3-05-2012	4d129	1.96	9.80	40.7	0.91	22.5	20.8
	Recommended Limits	4d129		9.41	41.5 ±5%	0.90 ±5%	18-25	18-25
1800	**Measured,** 2-23-2012	250	7.35	36.8	38.9	1.36	21.8	19.5
	Measured, 2-27-2012	250	7.60	38.0	38.9	1.38	21.8	19.6
	Measured, 2-28-2012	250	7.55	37.8	38.7	1.38	22.1	20.2
	Recommended Limits	250		39.2	40.0 ±5%	1.40 ±5%	18-25	18-25
	Measured, 3-6-2012	259	7.70	38.5	39.1	1.43	22.3	19.8
	Recommended Limits	259		38.1	40.0 ±5%	1.40 ±5%	18-25	18-25
2450	**Measured,** 3-21-2012	877	10.6	53.0	38.3	1.80	21.4	20.2
	Recommended Limits	877		54.2	39.2 ±10%	1.80 ±5%	18-25	18-25
5200	**Measured,** 3-28-2012	1088	8.34	83.4	34.5	4.59	20.3	19.9
	Measured, 4-4-2012	1088	8.46	84.6	33.2	4.52	21.1	18.8
	Measured, 4-20-2012	1088	8.26	82.6	33.4	4.44	20.2	19.3
	Recommended Limits	1088		80.2	36.0 ±10%	4.65 (-5/+10%) 4.418-5.115	18-25	18-25
5800	**Measured,** 4-1-2012	1088	8.06	80.6	33.2	5.10	19.9	19.0
	Measured, 5-8-2012	1088	8.00	80.0	32.2	5.13	20.3	18.3
	Recommended Limits	1088		79.0	35.4 ±10%	5.27 (-5/+10%) 5.007-5.797	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	750	6.44	5 of 11
		835	6.18	5 of 11
		1810	5.33	5 of 11
		2450	4.56	5 of 11
	3124	1810	5.03	5 of 11
E-Field Probe EX3DV4	3730	5200	4.72	5 of 11
		5300	4.48	5 of 11
		5600	4.21	5 of 11
		5800	4.16	5 of 11

System Accuracy Verification Measurements for Body SAR Measurements								
f (MHz)	Description	Dipole	Measured SAR (1 gram)	Normalized SAR (1 gram)	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
					ε_r	(S/m)		
750	**Measured,** 3-16-2012	1040	1.79	8.95	55.9	0.99	22.1	20.2
	Recommended Limits	1040		8.80	55.53 ±5%	0.963 ±5%	18-25	18-25
835	**Measured,** 2-24-2012	422	2.00	10.0	54.6	0.99	22.6	20.2
	Recommended Limits	422		9.77	55.2 ±5%	0.97 ±5%	18-25	18-25
1800	**Measured,** 2-23-2012	250	6.75	33.8	51.9	1.48	21.8	19.5
	Measured, 2-26-2012	250	7.13	35.7	52.0	1.49	21.7	19.7
	Measured, 2-28-2012	250	7.19	36.0	52.1	1.49	22.2	20.5
	Recommended Limits	250		37.2	53.3 ±5%	1.52 ±5%	18-25	18-25
	Measured, 3-28-2012	2d191	7.05	35.3	53.0	1.48	20.6	19.2
	Measured, 3-29-2012	2d191	7.07	35.4	52.7	1.49	21.3	19.0
	Measured, 3-30-2012	2d191	7.02	35.1	52.4	1.50	20.2	18.3
	Measured, 4-4-2012	2d191	7.21	36.1	53.1	1.57	20.9	19.0
	Recommended Limits	2d191		37.8	53.3 ±5%	1.52 ±5%	18-25	18-25
	Measured, 3-7-2012	259tr	8.20	41.0	51.8	1.57	22.2	20.0
	Recommended Limits	259tr		39.1	53.3 ±5%	1.52 ±5%	18-25	18-25
2450	**Measured,** 3-20-2012	877	9.63	48.2	54.2	1.94	21.7	20.2
	Recommended Limits	877		52.3	52.7 ±10%	1.95 ±5%	18-25	18-25
5200	**Measured,** 3-29-2012	1088	7.89	78.9	47.2	5.56	20.7	19.1
	Measured, 3-30-2012	1088	8.28	82.8	47.3	5.61	21.2	19.1
	Measured, 4-23-2012	1088	8.18	81.8	47.8	5.49	20.1	18.8
	Measured, 4-24-2012	1088	8.12	81.2	47.4	5.40	20.7	19.7
	Recommended Limits	1088		75.5	49.03 ±10%	5.30 (-5/+10%) 5.038-5.830	18-25	18-25
5800	**Measured,** 3-30-2012	1088	7.70	77.0	46.2	6.47	20.3	18.7
	Measured, 4-1-2012	1088	7.52	75.2	45.6	6.28	19.9	18.7
	Measured, 5-8-2012	1088	6.89	68.9	46.9	6.36	21.5	19.0
	Measured, 5-10-2012	1088	6.95	69.5	47.0	6.36	21.2	20.1
	Recommended Limits	1088		75.4	48.2 ±10%	6.00 (-5/+10%) 5.700-6.600	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	750	6.36	6 of 11
		835	6.28	6 of 11
		1810	5.28	6 of 11
		2450	4.56	6 of 11
	3124	1810	4.69	6 of 11
E-Field Probe EX3DV4	3730	5200	4.01	6 of 11
		5300	3.79	6 of 11
		5600	3.25	6 of 11
		5800	3.63	6 of 11

6. Test Results

For GSM / WCDMA / LTE 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.

For SAR testing in the WCDMA 1700 band, the probe calibration frequency and the system accuracy verification were performed at 1810 MHz. The center of the WCDMA 1700 transmit band is 1730 MHz. The difference exceeds the ± 50 MHz window specified in FCC KDB 450824 D01. Therefore calculations are provided to perform SAR corrections for deviations of the complex permittivity and conductivity from simulated tissue targets if the deviation is in the direction that does not result in a "conservative" SAR result.

The percentage change in SAR due to correction of the dielectric parameter values can be found using the following formula, provided in Annex F of IEC 62209-2:

$$\Delta SAR = c_{\varepsilon}\Delta\varepsilon_r + c_{\sigma}\Delta\sigma$$

Here, c_ε and c_σ are coefficients representing the sensitivity of SAR to permittivity and conductivity, respectively. $\Delta\varepsilon_r$ and $\Delta\sigma$ represent the percentage difference between the measured permittivity and conductivity and their targets, respectively.

In the SAR correction calculations performed in this report, the sensitivity coefficients for frequencies within "Attachment 1: Tissue Parameter Variations" of KDB publication 450824 were used.

This attachment provides:

1450 MHz tissue has sensitivity coefficients for ε_r of -0.55 and for σ of +0.55
1800 MHz tissue has sensitivity coefficients for ε_r of -0.52 and for σ of +0.51

A linear interpolation to calculate the values for 1730 MHz (the frequency of the center of the transmit band) was performed. The sensitivity coefficients found for 1730 MHz were c_ε of -0.526 for ε_r, and c_σ of +0.518 for σ.

For SAR test results where the simulated tissue parameters are not “conservative” per KDb 450824, the SAR value is corrected by the ΔSAR to compensate for the change in tissue parameters using the following scaling formula:

$$SAR_{Corrected} = SAR_{Extrapolated} - (SAR_{Extrapolated} \times \Delta SAR)$$

For the AWS band, head tissue fluid measured on 3/6/12, and the body tissue fluid measured on 3/7/12 and 3/29/12 are not higher than the target sigma. The corrected SAR is given in the table below.

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	1 g SAR value		
					Measured (W/kg)	Extrapolated (W/kg)	Corrected (W/kg)
Right Head Cheek	LTE Band 4, 16QAM (1 RB @ Low)	20025	19.1	-0.089	0.996	1.02	1.02
Left Head 15° Tilt	LTE Band 4, 16QAM (1 RB @ Low	20025	19.6	0.11	0.327	0.33	0.33
BodyWorn Back 25mm	LTE Band 4, QPSK (1 RB @ High)	20325	19.2	-0.066	0.657	0.67	0.67
Mobile Hotspot Back 10mm	WCDMA 1700 12.2 kbps RMC	1513	19.1	-0.028	1.34	1.35	1.35

6.1 Head Adjacent Test Results

The SAR results shown in tables 1 through 6 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to 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:

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

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 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	750	6.44	5 of 11
		835	6.18	5 of 11
		1810	5.33	5 of 11
		2450	4.56	5 of 11
	3124	1810	5.03	5 of 11
E-Field Probe EX3DV4	3730	5200	4.72	5 of 11
		5300	4.48	5 of 11
		5600	4.21	5 of 11
		5800	4.16	5 of 11

Left Head Cheek Position

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	DUT Power	10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
710	LTE Band 17, QPSK (50% RB)	23790	19.8	0.028	23.9	0.398	0.40	0.546	0.55		
	LTE Band 17, QPSK (1 RB @ Low)	23790	19.8	-0.041	24.5	0.383	0.39	0.525	0.53		
	LTE Band 17, QPSK (1 RB @ High)	23790	19.8	0.005	24.5	0.508	0.51	0.698	0.70		
	LTE Band 17, 16QAM (50% RB)	23790	19.8	0.007	22.9	0.307	0.31	0.425	0.43		
	LTE Band 17, 16QAM (1 RB @ Low)	23790	19.8	-0.013	23.4	0.302	0.30	0.417	0.42		
	LTE Band 17, 16QAM (1 RB @ High)	23790	19.8	-0.001	23.4	0.410	0.41	0.57	0.57		
835	WCDMA 850 12.2 kbps RMC	4132									
		4180	**20.2**	**0.037**	24.05	**0.291**	**0.29**	**0.387**	**0.39**	**5x5x7**	**A-64**
		4233									
	GSM 850 CS Voice	128									
		190	**20.3**	**-0.055**	**33.51**	**0.306**	**0.31**	**0.420**	**0.43**	**5x5x7**	**A-65**
		251									
1732	LTE Band 4, QPSK (50% RB)	20175	19.7	-0.15	23.2	0.289	0.30	0.454	0.47		
	LTE Band 4, QPSK (1 RB @ Low)	20325	19.3	-0.19	24.2	0.349	0.36	0.561	0.59		
	LTE Band 4, QPSK (1 RB @ High)	20325	19.3	-0.03	24.1	0.293	0.30	0.469	0.47		
	LTE Band 4, 16QAM (50% RB)	20175	19.7	0.003	22.1	0.24	0.24	0.373	0.37		
	LTE Band 4, 16QAM (1 RB @ Low)	20025	19.3	-0.170	23.4	0.274	0.28	0.433	0.45		
	LTE Band 4, 16QAM (1 RB @ High)	20025	19.3	0.032	23.2	0.232	0.23	0.371	0.37		
	WCDMA 1700 12.2 kbps RMC	1312									
		1413	19.6	0.140	24.02	0.332	0.33	0.527	0.53		
		1513									
1880	WCDMA 1900 12.2 kbps RMC	9262	19.6	-0.014	23.87	0.440	0.44	0.734	0.74		
		9400	19.1	-0.039	23.95	0.563	0.57	0.956	0.96		
		9538	**19.6**	**0.002**	23.96	**0.763**	**0.76**	**1.34**	**1.34**	**5x5x7**	**A-68**
	GSM 1900 CS Voice	512									
		661	20.1	0.110	30.60	0.284	0.28	0.486	0.49		
		810									
2450	802.11b, 1 Mbps	1	18.9	**0.068**	18.86	**0.260**	**0.26**	**0.593**	**0.59**	**5x5x7**	**A-70**
		6	18.9	0.120	18.88	0.146	0.15	0.332	0.33		
		11	18.6	-0.003	19.1	0.148	0.15	0.343	0.34		
	802.11b, 2 Mbps	11	18.6	-0.032	19.1	0.153	0.15	0.355	0.36		
	802.11b, 5.5 Mbps	1	18.6	0.068	18.87	0.181	0.18	0.409	0.41		
		6	18.6	-0.072	18.97	0.124	0.13	0.284	0.29		
		11	18.6	0.060	19.81	0.155	0.16	0.358	0.36		
	802.11b, 11 Mbps	1	18.6	0.200	19.07	0.210	0.21	0.476	0.48		
		6	18.6	0.140	19.04	0.139	0.14	0.317	0.32		
		11	18.6	0.013	19.29	0.146	0.15	0.332	0.33		
5210	802.11a, 6 Mbps	40	**19.9**	**0.680**	14.64	**0.055**	**0.06**	**0.139**	**0.14**	**7x7x12**	**A-71**
5290	802.11a, 6 Mbps	60	**18.0**	**-0.029**	15.23	**0.062**	**0.06**	**0.198**	**0.20**	**7x7x12**	**A-72**
5600	802.11a, 6 Mbps	132	**18.3**	**-0.410**	14.59	**0.057**	**0.06**	**0.193**	**0.21**	**7x7x12**	**A-73**
5785	802.11a, 6 Mbps	149	**18.5**	**-0.013**	14.27	**0.139**	**0.14**	**0.442**	**0.44**	**7x7x12**	**A-74**

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)	DUT Power	10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
710	LTE Band 17, QPSK (50% RB)	23790	19.7	-0.340	23.9	0.615	0.67	0.945	1.02		
	LTE Band 17, QPSK (1 RB @ Low)	23790	19.7	0.023	24.5	0.662	0.66	1.02	1.02		
	LTE Band 17, QPSK (1 RB @ High)	23790	**19.8**	**0.006**	**24.5**	**0.720**	**0.72**	**1.10**	**1.10**	**5x5x7**	**A-63**
	LTE Band 17, 16QAM (50% RB)	23790	20.0	0.071	22.9	0.469	0.47	0.715	0.72		
	LTE Band 17, 16QAM (1 RB @ Low)	23790	20.0	0.068	23.4	0.473	0.47	0.714	0.71		
	LTE Band 17, 16QAM (1 RB @ High)	23790	19.9	0.048	23.4	0.550	0.55	0.839	0.84		
835	WCDMA 850 12.2 kbps RMC	4132									
		4180	20.4	0.046	24.05	0.287	0.29	0.383	0.38		
		4233									
	GSM 850 CS Voice	128									
		190	20.3	-0.037	33.51	0.311	0.31	0.416	0.42		
		251									
1732	LTE Band 4, QPSK (50% RB)	20175	19.6	0.015	23.2	0.439	0.44	0.692	0.69		
	LTE Band 4, QPSK (1 RB @ Low)	20325	19.6	-0.009	24.2	0.45	0.45	0.701	0.70		
	LTE Band 4, QPSK (1 RB @ High)	20325	19.6	0.044	24.1	0.399	0.40	0.624	0.62		
	LTE Band 4, 16QAM (50% RB)	20175	19.8	0.110	22.1	0.410	0.41	0.657	0.66		
	LTE Band 4, 16QAM (1 RB @ Low)	20025	**19.1**	**-0.089**	**23.4**	**0.634**	**0.65**	**0.996**	**1.02**	**5x5x7**	**A-66**
	LTE Band 4, 16QAM (1 RB @ High)	20025	19.1	0.033	23.2	0.53	0.53	0.829	0.83		
	WCDMA 1700 12.2 kbps RMC	1312									
		1413	**19.6**	**0.190**	24.02	**0.404**	**0.40**	**0.648**	**0.65**	**5x5x7**	**A-67**
		1513									
1880	WCDMA 1900 12.2 kbps RMC	9262									
		9400	19.1	-0.094	23.95	0.293	0.30	0.490	0.50		
		9538									
	GSM 1900 CS Voice	512									
		661	20.1	-0.065	30.60	0.148	0.15	0.249	0.25		
		810									
2450	802.11b, 1 Mbps	1									
		6	18.9	-0.059	18.88	0.067	0.07	0.125	0.13		
		11									
5210	802.11a, 6 Mbps	40	19.9	0.150	14.64	0.026	0.03	0.068	0.07		
5290	802.11a, 6 Mbps	60	17.9	0.092	15.23	0.003	0.03	0.082	0.08		
5600	802.11a, 6 Mbps	132	18.4	0.240	14.59	0.026	0.03	0.079	0.08		
5785	802.11a, 6 Mbps	149	19.0	-0.230	14.27	0.058	0.06	0.154	0.16		

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)	DUT Power	10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
710	LTE Band 17, QPSK (50% RB)	23790	19.8	0.039	23.9	0.282	0.28	0.379	0.38		
	LTE Band 17, QPSK (1 RB @ Low)	23790	19.7	-0.072	24.5	0.300	0.31	0.396	0.40		
	LTE Band 17, QPSK (1 RB @ High)	23790	19.7	0.023	24.5	0.361	0.36	0.477	0.48		
	LTE Band 17, 16QAM (50% RB)	23790	19.8	-0.290	22.9	0.242	0.26	0.319	0.34		
	LTE Band 17, 16QAM (1 RB @ Low)	23790	19.8	0.088	23.4	0.230	0.23	0.301	0.30		
	LTE Band 17, 16QAM (1 RB @ High)	23790	19.8	-0.020	23.4	0.268	0.27	0.352	0.35		
835	WCDMA 850 12.2 kbps RMC	4132									
		4180	**20.2**	**0.049**	24.05	**0.193**	**0.19**	**0.256**	**0.26**	**5x5x7**	**A-76**
		4233									
	GSM 850 CS Voice	128									
		190	**20.3**	**0.110**	**33.51**	**0.194**	**0.19**	**0.258**	**0.26**	**5x5x7**	**A-77**
		251									
1732	LTE Band 4, QPSK (50% RB)	20175	19.3	0.15	23.2	0.158	0.16	0.254	0.25		
	LTE Band 4, QPSK (1 RB @ Low)	20325	19.5	0.085	24.2	0.144	0.14	0.227	0.23		
	LTE Band 4, QPSK (1 RB @ High)	20325	19.5	0.006	24.1	0.131	0.13	0.206	0.21		
	LTE Band 4, 16QAM (50% RB)	20175	19.5	-0.012	22.1	0.098	0.10	0.153	0.15		
	LTE Band 4, 16QAM (1 RB @ Low)	20025	**19.6**	**0.11**	**23.4**	**0.206**	**0.21**	**0.327**	**0.33**	**5x5x7**	**A-78**
	LTE Band 4, 16QAM (1 RB @ High)	20025	19.5	0.17	23.2	0.144	0.14	0.227	0.23		
	WCDMA 1700 12.2 kbps RMC	1312									
		1413	19.6	-0.024	24.02	0.145	0.15	0.224	0.23		
		1513									
1880	WCDMA 1900 12.2 kbps RMC	9262									
		9400	19.1	0.026	23.95	0.201	0.20	0.342	0.34		
		9538									
	GSM 1900 CS Voice	512									
		661	20.1	-0.026	30.60	0.091	0.09	0.152	0.15		
		810									
2450	802.11b, 1 Mbps	1									
		6	18.9	**0.120**	18.88	**0.033**	**0.03**	**0.067**	**0.07**	**5x5x7**	**A-82**
		11									
5210	802.11a, 6 Mbps	40	19.9	0.110	14.64	0.060	0.06	0.153	0.15		
	802.11n, 6.5 Mbps	48	**18.9**	**-0.100**	14.89	**0.106**	**0.11**	**0.321**	**0.33**	**7x7x12**	**A-83**
5290	802.11a, 6 Mbps	60	**17.9**	**0.030**	15.23	**0.067**	**0.07**	**0.238**	**0.24**	**7x7x12**	**A-84**
5600	802.11a, 6 Mbps	132	**18.4**	**-0.440**	14.59	**0.060**	**0.07**	**0.205**	**0.23**	**7x7x12**	**A-85**
5785	802.11a, 6 Mbps	149	**19.2**	**0.048**	14.27	**0.123**	**0.12**	**0.366**	**0.37**	**7x7x12**	**A-86**

Table 3: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.

Right Head 15° Tilt Position

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	DUT Power	10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
710	LTE Band 17, QPSK (50% RB)	23790	19.9	0.016	23.9	0.412	0.41	0.571	0.57		
	LTE Band 17, QPSK (1 RB @ Low)	23790	19.9	-0.003	24.5	0.445	0.45	0.615	0.62		
	LTE Band 17, QPSK (1 RB @ High)	23790	**19.9**	**0.140**	**24.5**	**0.514**	**0.51**	**0.732**	**0.73**	**5x5x7**	**A-75**
	LTE Band 17, 16QAM (50% RB)	23790	20.0	-0.019	22.9	0.316	0.32	0.437	0.44		
	LTE Band 17, 16QAM (1 RB @ Low)	23790	20.0	-0.150	23.4	0.329	0.34	0.462	0.48		
	LTE Band 17, 16QAM (1 RB @ High)	23790	19.5	-0.056	23.4	0.375	0.38	0.543	0.55		
835	WCDMA 850 12.2 kbps RMC	4132									
		4180	20.4	0.069	24.05	0.176	0.18	0.230	0.23		
		4233									
	GSM 850 CS Voice	128									
		190	20.3	-0.063	33.51	0.173	0.18	0.228	0.23		
		251									
1732	LTE Band 4, QPSK (50% RB)	20175	19.2	0.013	23.2	0.118	0.12	0.202	0.20		
	LTE Band 4, QPSK (1 RB @ Low)	20325	19.1	-0.067	24.2	0.150	0.15	0.243	0.25		
	LTE Band 4, QPSK (1 RB @ High)	20325	19	0.032	24.1	0.145	0.15	0.241	0.24		
	LTE Band 4, 16QAM (50% RB)	20175	19.8	-0.04	22.1	0.0946	0.10	0.162	0.16		
	LTE Band 4, 16QAM (1 RB @ Low)	20025	19	-0.11	23.4	0.144	0.15	0.248	0.25		
	LTE Band 4, 16QAM (1 RB @ High)	20025	20.2	-0.31	23.2	0.122	0.13	0.227	0.24		
	WCDMA 1700 12.2 kbps RMC	1312									
		1413	**19.6**	**0.089**	24.02	**0.139**	**0.14**	**0.256**	**0.26**	**5x5x7**	**A-79**
		1513									
1880	WCDMA 1900 12.2 kbps RMC	9262									
		9400	**19.1**	**0.064**	23.95	**0.212**	**0.21**	**0.361**	**0.36**	**5x5x7**	**A-80**
		9538									
	GSM 1900 CS Voice	512									
		661	**20.1**	**0.050**	30.60	**0.097**	**0.10**	**0.165**	**0.17**	**5x5x7**	**A-81**
		810									
2450	802.11b, 1 Mbps	1									
		6	18.9	0.140	18.88	0.021	0.02	0.042	0.04		
		11									
5210	802.11a, 6 Mbps	40	19.9	-0.170	14.64	0.031	0.03	0.091	0.09		
5290	802.11a, 6 Mbps	60	17.7	-0.250	15.23	0.042	0.04	0.126	0.13		
5600	802.11a, 6 Mbps	132	18.3	1.00	14.59	0.019	0.02	0.085	0.08		
5785	802.11a, 6 Mbps	149	18.8	0.065	14.27	0.069	0.07	0.227	0.23		

Table 4: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.

Highest Head, GPRS Class 10

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	DUT Power	10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GPRS 850	128									
		190	**19.7**	**-0.044**	32.54	**0.458**	**0.46**	**0.625**	**0.63**	**5x5x7**	**A-65**
		251									
1880	GSM 1900	512									
		661	**19.6**	**-0.036**	**29.32**	**0.396**	**0.40**	**0.676**	**0.68**	**5x5x7**	**A-69**
		810									

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

Highest Head, EDGE Class 10

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	DUT Power	10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	EDGE 850	128									
		190	19.7	0.100	28.07	0.204	0.20	0.277	0.28		
		251									
1880	EDGE 1900	512									
		661	19.6	0.240	27.09	0.197	0.20	0.332	0.33		
		810									

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

6.2 Body Worn Test Results

The SAR results shown in tables 7 through 10 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:

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

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

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

tissue depth was verified to be 15.0 cm ± 0.5 cm. The same device holder described in section 6 was used for positioning the phone.

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 cellular phone was also tested in data mode operations. For these tests, a separation distance of 25 mm between the device and the flat phantom was used. The device was tested in the worst-case SAR position and channel configuration from the voice-mode body-worn testing.

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	750	6.36	6 of 11
		835	6.28	6 of 11
		1810	5.28	6 of 11
		2450	4.56	6 of 11
	3124	1810	4.69	6 of 11
E-Field Probe EX3DV4	3730	5200	4.01	6 of 11
		5300	3.79	6 of 11
		5600	3.25	6 of 11
		5800	3.63	6 of 11

Body-Worn, Front of Phone 25 mm from Phantom

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	DUT Power	10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
710	LTE Band 17, QPSK (50% RB)	23790	20.2	-0.200	23.9	0.183	0.19	0.243	0.25		
	LTE Band 17, QPSK (1 RB @ Low)	23790	20.2	0.028	24.5	0.183	0.18	0.242	0.24		
	LTE Band 17, QPSK (1 RB @ High)	23790	20.2	0.063	24.5	0.242	0.24	0.319	0.32		
	LTE Band 17, 16QAM (50% RB)	23790	20.2	0.097	22.9	0.148	0.15	0.195	0.20		
	LTE Band 17, 16QAM (1 RB @ Low)	23790	20.2	0.049	23.4	0.146	0.15	0.193	0.19		
	LTE Band 17, 16QAM (1 RB @ High)	23790	20.2	0.007	23.4	0.194	0.19	0.257	0.26		
835	WCDMA 850 12.2 kbps RMC	4132									
		4180	**20.2**	**-0.022**	24.05	**0.288**	**0.29**	**0.385**	**0.39**	**5x5x7**	**A-89**
		4233									
	GSM 850 CS Voice	128									
		190	19.8	-0.043	33.51	0.318	0.32	0.425	0.43		
		251									
1732	LTE Band 4, QPSK (50% RB)	20175	19.9	0.043	23.2	0.155	0.16	0.243	0.24		
	LTE Band 4, QPSK (1 RB @ Low)	20325	19.9	0.013	24.2	0.206	0.21	0.328	0.33		
	LTE Band 4, QPSK (1 RB @ High)	20325	19.9	-0.058	24.1	0.187	0.19	0.297	0.30		
	LTE Band 4, 16QAM (50% RB)	20175	19	-0.029	22.1	0.137	0.14	0.218	0.22		
	LTE Band 4, 16QAM (1 RB @ Low)	20025	19.2	-0.006	23.4	0.175	0.18	0.274	0.27		
	LTE Band 4, 16QAM (1 RB @ High)	20025	19.2	-0.110	23.2	0.188	0.19	0.298	0.31		
	WCDMA 1700 12.2 kbps RMC	1312									
		1413	20.6	-0.055	24.02	0.202	0.20	0.319	0.32		
		1513									
1880	WCDMA 1900 12.2 kbps RMC	9262									
		9400	19.0	0.022	23.95	0.166	0.17	0.268	0.27		
		9538									
	GSM 1900 CS Voice	512									
		661	19.5	-0.084	30.60	0.096	0.10	0.154	0.16		
		810									
2450	802.11b, 1 Mbps	1									
		6	20.0	0.180	18.88	0.004	0.00	0.008	0.01		
		11									
5210	802.11a, 6 Mbps	40	**19.0**	**0.270**	14.64	**0.001**	**0.00**	**0.005**	**0.01**	**7x7x12**	**A-96**
	802.11n, 6.5 Mbps	48	19.0	-0.780	14.89	0.001	0.00	0.002	0.00		
5290	802.11a, 6 Mbps	60	19.7	0.320	15.23	0.001	0.00	0.007	0.01		
5600	802.11a, 6 Mbps	132	19.8	-0.620	14.59	0.000	0.00	0.003	0.00		
5785	802.11a, 6 Mbps	149	19.0	0.180	14.27	0.014	0.01	0.036	0.04		

Table 7: 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)	DUT Power	10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
710	LTE Band 17, QPSK (50% RB)	23790	20	-0.035	23.9	0.276	0.28	0.367	0.37		
	LTE Band 17, QPSK (1 RB @ Low)	23790	20	0.063	24.5	0.295	0.30	0.391	0.39		
	LTE Band 17, QPSK (1 RB @ High)	23790	**20**	**-0.007**	**24.5**	**0.334**	**0.33**	**0.447**	**0.45**	**5x5x7**	**A-88**
	LTE Band 17, 16QAM (50% RB)	23790	20	0.030	22.9	0.224	0.22	0.299	0.30		
	LTE Band 17, 16QAM (1 RB @ Low)	23790	20	-0.039	23.4	0.23	0.23	0.307	0.31		
	LTE Band 17, 16QAM (1 RB @ High)	23790	20	-0.030	23.4	0.269	0.27	0.359	0.36		
835	WCDMA 850 12.2 kbps RMC	4132									
		4180	18.9	0.010	24.05	0.262	0.26	0.350	0.35		
		4233									
	GSM 850 CS Voice	128									
		190	19.8	-0.050	33.51	0.301	0.30	0.404	0.41		
		251									
1732	LTE Band 4, QPSK (50% RB)	20175	19.1	0.008	23.2	0.297	0.30	0.477	0.48		
	LTE Band 4, QPSK (1 RB @ Low)	20325	19.1	-0.015	24.2	0.386	0.39	0.623	0.63		
	LTE Band 4, QPSK (1 RB @ High)	**20325**	**19.2**	**-0.066**	**24.1**	**0.404**	**0.41**	**0.657**	**0.67**	**5x5x7**	**A-91**
	LTE Band 4, 16QAM (50% RB)	20175	19	0.018	22.1	0.18	0.18	0.286	0.29		
	LTE Band 4, 16QAM (1 RB @ Low)	20025	19.1	0.062	23.4	0.288	0.29	0.457	0.46		
	LTE Band 4, 16QAM (1 RB @ High)	20025	19.1	0.029	23.2	0.301	0.30	0.477	0.48		
	WCDMA 1700 12.2 kbps RMC	1312									
		1413	**20.6**	**0.053**	24.02	**0.301**	**0.30**	**0.474**	**0.47**	**5x5x7**	**A-92**
		1513									
1880	WCDMA 1900 12.2 kbps RMC	9262									
		9400	**19.0**	**-0.017**	23.95	**0.367**	**0.37**	**0.603**	**0.61**	**5x5x7**	**A-93**
		9538									
	GSM 1900 CS Voice	512									
		661	19.5	-0.024	30.60	0.125	0.13	0.203	0.20		
		810									
2450	802.11b, 1 Mbps	1	**20.0**	**0.045**	18.86	**0.028**	**0.03**	**0.047**	**0.05**	**5x5x7**	**A-95**
		6	20.0	0.034	18.88	0.017	0.02	0.029	0.03		
		11	20.0	-0.035	19.1	0.019	0.02	0.033	0.03		
	802.11b, 2 Mbps	11	19.6	0.270	19.1	0.018	0.02	0.031	0.03		
	802.11b, 5.5 Mbps	1	19.6	0.100	18.87	0.008	0.01	0.013	0.01		
		6	19.6	0.210	18.97	0.019	0.02	0.032	0.03		
		11	19.6	0.038	19.81	0.020	0.02	0.034	0.03		
	802.11b, 11 Mbps	1	19.6	-0.430	19.07	0.008	0.01	0.013	0.01		
		6	19.6	-0.100	19.04	0.019	0.02	0.032	0.03		
		11	19.6	-0.150	19.29	0.018	0.02	0.031	0.03		
5210	802.11a, 6 Mbps	40	19.0	-0.200	14.64	0.000	0.00	0.001	0.00		
5290	802.11a, 6 Mbps	60	**19.7**	**-0.610**	15.23	**0.014**	**0.02**	**0.030**	**0.03**	**7x7x12**	**A-97**
5600	802.11a, 6 Mbps	132	**19.8**	**-0.470**	14.59	**0.013**	**0.01**	**0.033**	**0.04**	**7x7x12**	**A-98**
5785	802.11a, 6 Mbps	149	**19.0**	**0.007**	14.27	**0.027**	**0.03**	**0.063**	**0.06**	**7x7x12**	**A-99**

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

Highest Body, GPRS Class 10

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	DUT Power	10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	**GPRS 850 (Front)**	128									
		190	**20.0**	**-0.130**	32.54	**0.446**	**0.46**	**0.599**	**0.62**	**5x5x7**	**A-90**
		251									
1880	**GSM 1900 (Back)**	512									
		661	**19.5**	**-0.099**	**29.32**	**0.251**	**0.26**	**0.412**	**0.42**	**5x5x7**	**A-94**
		810									

Table 9: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Highest Body, EDGE Class 10

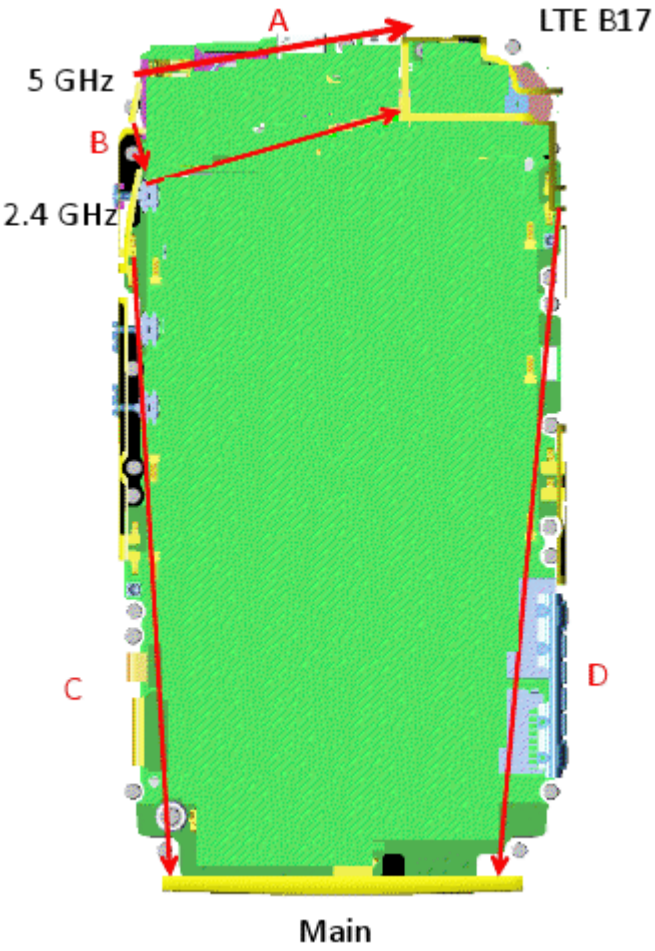
f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	DUT Power	10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	**EDGE 850 (Front)**	128									
		190	20.1	-0.053	28.07	0.203	0.21	0.271	0.27		
		251									
1880	**EDGE 1900 (Back)**	512									
		661	19.5	0.044	27.09	0.173	0.17	0.282	0.28		
		810									

Table 10: 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 interim test guidelines provided at the October 2010 TCB Workshop. 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 < 2.5 cm from the edge.

Back Surface of DUT



Distance between adjacent Tx Antennas
A: 40 mm = 5 GHz wifi to LTE Band 17
B: 7.5 mm = 5 GHz wifi to 2.4 GHz wifi
C: 92.4 mm = 2.4 GHz wifi to Main
D: 101.7 mm = LTE Band 17 to Main
E: 40 mm = 2.4 GHz wifi to LTE Band 17

Distance from Antenna To Edge (looking at the Back of DUT)
5 GHz Wifi:
(top = 8.4 mm)(bottom = 119 mm)
(right side= 65.3 mm)(left side = na)
2.4 GHz Wifi:
(top = 25 mm)(bottom = 95.4 mm)
(right side= 65 mm)(left side = na)
Main
(top = 129.3 mm)(bottom = na)
(right side= 7.6 mm)(left side = 7.2 mm)
LTE Band 17
(top = na)(bottom = 104.3 mm)
(right side= na mm)(left side = 43.3 mm)

Mobile Hotspot Surfaces for SAR testing (looking at the Front of DUT)						
Mode	Front	Back	Left	Right	Top	Bottom
WCDMA/ GSM / LTE Band 4	Yes	Yes	Yes	Yes	No	Yes
LTE Band 17	Yes	Yes	Yes	No	Yes	No
Wi-Fi	Yes	Yes	No	Yes	Yes	No

The SAR results shown in tables 11 through 16 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:

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

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). Alternately, a "flat" phantom was used for the body-worn tests. This "flat" phantom is made out of 1" thick natural High Density Polyethylene with a thickness at the bottom of 2.0 mm. It measures 52.7 cm(long) by 26.7 cm(wide) by 21.2 cm(tall). The simulated tissue depth was verified to be 15.0 cm ± 0.5 cm. The same device holder described in section 6 was used for positioning the phone.

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	750	6.36	6 of 11
		835	6.28	6 of 11
		1810	5.28	6 of 11
		2450	4.56	6 of 11
	3124	1810	4.69	6 of 11
E-Field Probe EX3DV4	3730	5200	4.01	6 of 11
		5300	3.79	6 of 11
		5600	3.25	6 of 11
		5800	3.63	6 of 11

Mobile Hotspot, Front of Phone 10 mm from Phantom

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
710	LTE Band 17, QPSK (50% RB)	23790	19.8	0.032	23.9		0.315	0.32	0.433	0.43		
	LTE Band 17, QPSK (1 RB @ Low)	23790	19.8	-0.076	24.5		0.318	0.32	0.439	0.45		
	LTE Band 17, QPSK (1 RB @ High)	23790	19.7	-0.081	24.5		0.417	0.42	0.577	0.59		
	LTE Band 17, 16QAM (50% RB)	23790	19.7	0.011	22.9		0.269	0.27	0.373	0.37		
	LTE Band 17, 16QAM (1 RB @ Low)	23790	19.7	-0.021	23.4		0.247	0.25	0.344	0.35		
	LTE Band 17, 16QAM (1 RB @ High)	23790	19.7	-0.001	23.4		0.318	0.32	0.442	0.44		
835	WCDMA 850 12.2 kbps RMC	4132										
		4180	20.1	0.021	24.05		0.463	0.46	0.611	0.61		
		4233										
	GPRS 850	128	19.9	0.005	32.43		0.576	0.58	0.757	0.76		
		190	19.9	-0.200	32.54		0.717	0.75	0.944	0.99		
		251	19.7	-0.051	32.33		0.809	0.82	1.07	1.08		
1732	LTE Band 4, QPSK (50% RB)	20025	19.3	-0.15	23.54	-3.0	0.579	0.60	1.09	1.13		
		20175	19.4	0.005	23.40	-3.0	0.555	0.56	1.07	1.07		
		20325	19.4	-0.058	23.03	-3.0	0.588	0.60	1.13	1.15		
	LTE Band 4, QPSK (1 RB @ Low)	20025	19.0	-0.130	24.20	-3.0	0.434	0.45	0.785	0.81		
	LTE Band 4, QPSK (1 RB @ High)	20325	19.3	-0.210	23.46	-3.0	0.511	0.54	0.974	1.02		
	LTE Band 4, 16QAM (50% RB)	20325	19.3	-0.083	21.99	-3.0	0.55	0.56	1.05	1.07		
	LTE Band 4, 16QAM (1 RB @ Low)	20025	19.3	-0.027	23.43	-3.0	0.513	0.52	0.951	0.96		
	LTE Band 4, 16QAM (1 RB @ High)	20025	19.4	-0.200	23.23	-3.0	0.492	0.52	0.921	0.96		
	WCDMA 1700 12.2 kbps RMC	1312	18.3	-0.068	24.10	-3.0	0.503	0.51	0.936	0.95		
		1413	19.2	-0.009	24.02	-3.0	0.442	0.44	0.828	0.83		
		1513	19.0	-0.071	23.96	-3.0	0.334	0.34	0.646	0.66		
1880	WCDMA 1900 12.2 kbps RMC	9262				-6.0						
		9400	19.7	0.061	23.95	-6.0	0.392	0.39	0.763	0.76		
		9538				-6.0						
	GPRS 1900	512				-4.5						
		661	19.7	0.024	29.32	-4.5	0.365	0.37	0.668	0.67		
		810				-4.5						
2450	802.11b, 1 Mbps	1										
		6	20.0	0.054	18.88		0.027	0.03	0.054	0.05		
		11										
5785	802.11a, 6 Mbps	149	18.6	-0.190	14.27		0.020	0.02	0.055	0.06		

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

Mobile Hotspot, Back of Phone 10 mm from Phantom

f (MHz)	Mode	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
710	LTE Band 17, QPSK (50% RB)	23790	19.8	0.022	23.9		0.638	0.64	0.876	0.88		
	LTE Band 17, QPSK (1 RB @ Low)	**23790**	**19.7**	**0.052**	**24.5**		**0.730**	**0.73**	**1.00**	**1.00**	**5x5x7**	**A-101**
	LTE Band 17, QPSK (1 RB @ High)	23790	19.7	-0.180	24.5		0.690	0.72	0.949	0.99		
	LTE Band 17, 16QAM (50% RB)	23790	19.8	0.087	22.9		0.526	0.53	0.720	0.72		
	LTE Band 17, 16QAM (1 RB @ Low)	23790	19.8	-0.042	23.4		0.543	0.55	0.763	0.77		
	LTE Band 17, 16QAM (1 RB @ High)	23790	19.8	0.063	23.4		0.513	0.51	0.697	0.70		
835	WCDMA 850 12.2 kbps RMC	4132										
		4180	**20.1**	**0.012**	24.05		**0.529**	**0.53**	**0.704**	**0.70**	**5x5x7**	**A-102**
		4233										
	GPRS 850	128	19.8	-0.016	32.43		0.686	0.69	0.904	0.91		
		190	20.3	-0.340	32.54		0.860	0.93	1.14	1.23		
		251	**20.3**	**0.017**	32.33		**0.981**	**0.98**	**1.31**	**1.31**	**5x5x7**	**A-103**
1732	LTE Band 4, QPSK (50% RB)	20025	18.9	-0.13	23.54	-3.0	0.524	0.54	0.929	0.96		
		20175	19.0	-0.055	23.40	-3.0	0.509	0.52	0.911	0.92		
		20325	19.0	-0.061	23.03	-3.0	0.538	0.55	0.98	0.99		
	LTE Band 4, QPSK (1 RB @ Low)	20025	19.0	-0.031	24.20	-3.0	0.516	0.52	0.908	0.91		
	LTE Band 4, QPSK (1 RB @ High)	20325	19.0	-0.041	23.46	-3.0	0.492	0.50	0.896	0.90		
	LTE Band 4, 16QAM (50% RB)	20325	19.4	-0.035	21.99	-3.0	0.534	0.54	1.03	1.04		
	LTE Band 4, 16QAM (1 RB @ Low)	20025	19.4	-0.05	23.43	-3.0	0.495	0.50	0.868	0.88		
	LTE Band 4, 16QAM (1 RB @ High)	20025	19.4	-0.067	23.23	-3.0	0.510	0.52	0.901	0.92		
	WCDMA 1700 12.2 kbps RMC	1312	19.2	-0.120	24.10	-3.0	0.472	0.49	0.826	0.85		
		1413	19.0	-0.047	24.02	-3.0	0.461	0.47	0.817	0.83		
		1513	19.2	-0.100	23.96	-3.0	0.524	0.54	0.952	0.97		
1880	WCDMA 1900 12.2 kbps RMC	9262	19.7	-0.025	23.87	-6.0	0.394	0.40	0.751	0.76		
		9400	19.8	0.011	23.95	-6.0	0.452	0.45	0.867	0.87		
		9538	19.5	-0.016	23.96	-6.0	0.516	0.52	0.996	1.00		
	GPRS 1900	512	19.2	0.009	29.33	-4.5	0.521	0.52	1.02	1.02		
		661	19.5	-0.150	29.32	-4.5	0.495	0.51	0.963	1.00		
		810	19.2	-0.067	29.33	-4.5	0.530	0.54	1.03	1.05		
2450	802.11b, 1 Mbps	1										
		6	20.0	0.031	18.88		0.081	0.08	0.153	0.15		
		11										
5785	802.11a, 6 Mbps	149	18.6	-0.085	14.27		0.034	0.03	0.085	0.09		

Table 12: SAR measurement results at the highest possible output power, measured in a mobile hotspot position 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)	DUT Power		10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	WCDMA 850 12.2 kbps RMC	4132										
		4180	20.1	0.006	24.05		0.028	0.03	0.044	0.04		
		4233										
	GPRS 850	128										
		190	20.1	-0.19	32.54		0.040	0.04	0.063	0.07		
		251										
1732	LTE Band 4, QPSK (50% RB)	20025	19.3	-0.031	23.54	-3.0	0.644	0.65	1.25	1.26		
		20175	19.3	-0.016	23.40	-3.0	0.566	0.57	1.10	1.10		
		20325	**19.3**	**-0.230**	**23.03**	-3.0	**0.643**	**0.68**	**1.26**	**1.33**	**5x5x7**	**A-104**
	LTE Band 4, QPSK (1 RB @ Low)	20025	19.0	0.011	24.20	-3.0	0.577	0.58	1.11	1.11		
	LTE Band 4, QPSK (1 RB @ High)	20325	19.2	-0.033	23.46	-3.0	0.620	0.62	1.22	1.23		
	LTE Band 4, 16QAM (50% RB)	20325	19.6	-0.019	21.99	-3.0	0.633	0.64	1.24	1.25		
	LTE Band 4, 16QAM (1 RB @ Low)	20025	19.6	-0.022	23.43	-3.0	0.598	0.60	1.15	1.16		
	LTE Band 4, 16QAM (1 RB @ High)	20025	19.6	-0.037	23.23	-3.0	0.582	0.59	1.12	1.13		
	WCDMA 1700 12.2 kbps RMC	1312	19.1	-0.006	24.10	-3.0	0.587	0.59	1.14	1.14		
		1413	19.2	0.020	24.02	-3.0	0.552	0.55	1.08	1.08		
		1513	**19.1**	**-0.028**	23.96	-3.0	**0.684**	**0.69**	**1.34**	**1.35**	**5x5x7**	**A-105**
1880	WCDMA 1900 12.2 kbps RMC	9262	19.0	-0.014	23.87	-6.0	0.526	0.53	1.03	1.03		
		9400	19.0	-0.004	23.95	-6.0	0.596	0.60	1.18	1.18		
		9538	18.3	**-0.005**	23.96	-6.0	**0.751**	**0.75**	**1.49**	**1.49**	**5x5x7**	**A-106**
	GPRS 1900	512	19.7	-0.018	29.33	-4.5	0.594	0.60	1.13	1.13		
		661	19.7	-0.250	29.32	-4.5	0.626	0.66	1.24	1.31		
		810	**19.7**	**-0.067**	29.33	-4.5	**0.653**	**0.66**	**1.29**	**1.31**	**5x5x7**	**A-107**

Table 13: SAR measurement results at the highest possible output power, measured in a mobile hotspot position 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)	DUT Power		10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
710	LTE Band 17, QPSK (50% RB)	23790	19.9	0.048	23.9		0.563	0.56	0.867	0.87		
	LTE Band 17, QPSK (1 RB @ Low)	23790	19.9	0.030	24.5		0.602	0.60	0.92	0.92		
	LTE Band 17, QPSK (1 RB @ High)	23790	19.9	-0.044	24.5		0.587	0.59	0.89	0.90		
	LTE Band 17, 16QAM (50% RB)	23790	19.8	-0.003	22.9		0.44	0.44	0.674	0.67		
	LTE Band 17, 16QAM (1 RB @ Low)	23790	19.8	-0.069	23.4		0.493	0.50	0.755	0.77		
	LTE Band 17, 16QAM (1 RB @ High)	23790	19.7	-0.020	23.4		0.381	0.38	0.568	0.57		
835	WCDMA 850 12.2 kbps RMC	4132										
		4180	20.0	0.061	24.05		0.315	0.32	0.451	0.45		
		4233										
	GPRS 850	128										
		190	20.1	-0.061	32.54		0.470	0.48	0.676	0.69		
		251										
1732	LTE Band 4, QPSK (50% RB)	20025	19.6	0.047	23.54	-3.0	0.0462	0.05	0.0745	0.07		
	LTE Band 4, QPSK (1 RB @ Low)	20025	19.2	-0.019	24.20	-3.0	0.0424	0.04	0.0686	0.07		
	LTE Band 4, QPSK (1 RB @ High)	20025	19.2	0.073	24.04	-3.0	0.0393	0.04	0.0639	0.06		
	LTE Band 4, 16QAM (50% RB)	20025	19.2	-0.051	22.45	-3.0	0.0415	0.04	0.0674	0.07		
	LTE Band 4, 16QAM (1 RB @ Low)	20025	19.2	0.024	23.43	-3.0	0.044	0.04	0.0716	0.07		
	LTE Band 4, 16QAM (1 RB @ High)	20025	19.2	-0.037	23.23	-3.0	0.0386	0.04	0.0622	0.06		
	WCDMA 1700 12.2 kbps RMC	1312				-3.0						
		1413	19.0	0.079	24.02	-3.0	0.040	0.04	0.067	0.07		
		1513				-3.0						
1880	WCDMA 1900 12.2 kbps RMC	9262				-6.0						
		9400	19.0	0.110	23.95	-6.0	0.063	0.06	0.109	0.11		
		9538				-6.0						
	GPRS 1900	512				-4.5						
		661	19.1	0.018	29.32	-4.5	0.072	0.07	0.124	0.12		
		810				-4.5						

Table 14: SAR measurement results at the highest possible output power, measured in a mobile hotspot position 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)	DUT Power		10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	WCDMA 850 12.2 kbps RMC	4132										
		4180	20.0	-0.009	24.05		0.325	0.33	0.463	0.46		
		4233										
	GPRS 850	128										
		190	20.1	-0.025	32.54		0.490	0.49	0.702	0.71		
		251										
1732	LTE Band 4, QPSK (50% RB)	20025	19.2	0.039	23.54	-3.0	0.164	0.16	0.279	0.28		
	LTE Band 4, QPSK (1 RB @ Low)	20025	19.2	0.076	24.20	-3.0	0.156	0.16	0.262	0.26		
	LTE Band 4, QPSK (1 RB @ High)	20025	19.2	0.037	24.04	-3.0	0.280	0.28	0.475	0.48		
	LTE Band 4, 16QAM (50% RB)	20025	19.2	-0.000	22.45	-3.0	0.197	0.20	0.335	0.34		
	LTE Band 4, 16QAM (1 RB @ Low)	20025	19.2	-0.001	23.43	-3.0	0.242	0.24	0.414	0.41		
	LTE Band 4, 16QAM (1 RB @ High)	20025	19.0	0.040	23.23	-3.0	0.239	0.24	0.388	0.39		
	WCDMA 1700 12.2 kbps RMC	1312				-3.0						
		1413	19.0	0.050	24.02	-3.0	0.131	0.13	0.223	0.22		
		1513				-3.0						
1880	WCDMA 1900 12.2 kbps RMC	9262				-6.0						
		9400	19.2	0.160	23.95	-6.0	0.056	0.06	0.093	0.09		
		9538				-6.0						
	GPRS 1900	512				-4.5						
		661	19.0	0.330	29.32	-4.5	0.012	0.01	0.021	0.02		
		810				-4.5						
2450	802.11b, 1 Mbps	1	19.9	0.049	18.86		0.164	0.16	0.336	0.34		
		6	20.0	-0.004	18.88		0.101	0.10	0.213	0.21		
		11	19.8	0.038	19.1		0.108	0.11	0.220	0.22		
	802.11b, 2 Mbps	11	19.8	0.047	19.1		0.108	0.11	0.230	0.23		
	802.11b, 5.5 Mbps	1	**19.7**	**-0.030**	18.87		**0.177**	**0.18**	**0.362**	**0.36**	**5x5x7**	**A-108**
		6	19.7	0.022	18.97		0.108	0.11	0.221	0.22		
		11	19.7	0.070	19.81		0.109	0.11	0.223	0.22		
	802.11b, 11 Mbps	1	19.7	0.180	19.07		0.173	0.17	0.353	0.35		
		6	19.7	-0.039	19.04		0.107	0.11	0.222	0.22		
		11	19.8	-0.069	19.29		0.110	0.11	0.224	0.22		
5785	802.11a, 6 Mbps	149	19.0	-0.160	14.27		0.021	0.02	0.053	0.05		

Table 15: SAR measurement results at the highest possible output power, measured in a mobile hotspot position 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)	DUT Power		10 g SAR value		1 g SAR value		Test Plot	
					Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
710	LTE Band 17, QPSK (50% RB)	23790	19.8	-0.028	23.9		0.113	0.11	0.188	0.19		
	LTE Band 17, QPSK (1 RB @ Low)	23790	19.8	-0.029	24.5		0.121	0.12	0.201	0.20		
	LTE Band 17, QPSK (1 RB @ High)	23790	19.8	0.016	24.5		0.147	0.15	0.244	0.24		
	LTE Band 17, 16QAM (50% RB)	23790	19.8	0.049	22.9		0.0916	0.09	0.152	0.15		
	LTE Band 17, 16QAM (1 RB @ Low)	23790	19.8	-0.025	23.4		0.0939	0.09	0.156	0.16		
	LTE Band 17, 16QAM (1 RB @ High)	23790	19.5	-0.1	23.4		0.110	0.11	0.178	0.18		
2450	802.11b, 1 Mbps	1										
		6	20.0	-0.017	18.88		0.016	0.02	0.030	0.03		
		11										
5785	802.11a, 6 Mbps	149	**18.9**	**0.040**	14.27		**0.036**	**0.04**	**0.105**	**0.11**	**7x7x12**	**A-112**

Table 16: SAR measurement results at the highest possible output power, measured in a mobile hotspot position 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 WCDMA/GSM/LTE transmitters may operate simultaneously with either the Wi-Fi transmitter or the Bluetooth transmitter. The separation distance between the Wi-Fi/Bluetooth antenna and the main antenna is 9.226 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 7.94 mW [≤ 24 mW]
2. The separation distance between the Bluetooth antenna and the main antenna is 9.226 cm. [≥ 5.0 cm]

BT power is below the 20 mW power limit specified in RSS-102 section 2.5.1.

For the transmitters requiring stand-alone SAR testing (WCDMA/GSM/LTE, and Wi-Fi), 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 (LTE Band 17)											
Position	Transmitter Stand-Alone 1 g SAR Values (W/kg)						1 g SAR Summations (W/kg)				
	LTE Band 17	Wi-Fi 2450	Wi-Fi 5210 GHz	Wi-Fi 5290 GHz	Wi-Fi 5600 GHz	Wi-Fi 5785 GHz	LTE Band 17+ Wi-Fi 2450	LTE Band 17+ Wi-Fi 5210 GHz	LTE Band 17+ Wi-Fi 5290 GHz	LTE Band 17+ Wi-Fi 5600 GHz	LTE Band 17+ Wi-Fi 5785 GHz
Left Head Cheek	0.70	0.59	0.33	0.20	0.21	0.44	1.29	1.03	0.90	0.91	1.14
Right Head Cheek	1.10	0.13	0.07	0.08	0.08	0.16	1.23	1.17	1.18	1.18	1.26
Left Head 15° Tilt	0.48	0.07	0.15	0.24	0.23	0.37	0.55	0.63	0.72	0.71	0.85
Right Head 15° Tilt	0.73	0.04	0.09	0.13	0.08	0.23	0.77	0.82	0.86	0.81	0.96
Body Worn, Front of Phone 25 from Phantom	0.32	0.01	0.01	0.01	0.00	0.04	0.33	0.33	0.33	0.32	0.36
Body Worn, Back of Phone 25 from Phantom	0.45	0.05	0.00	0.03	0.04	0.06	0.5	0.45	0.48	0.49	0.51
Mobile Hotspot, Front of Phone 10mm from Phantom	0.59	0.05				0.06	0.64				0.65
Mobile Hotspot, Back of Phone 10mm from Phantom	1.00	0.15				0.09	1.15				1.09
Mobile Hotspot, Top Edge of Phone 10mm from Phantom	0.24	0.03				0.11	0.27				0.35

Evaluations for Simultaneous SAR (WCDMA 850)											
Position	**Transmitter Stand-Alone 1 g SAR Values (W/kg)**						**1 g SAR Summations (W/kg)**				
	WCDMA 850	**Wi-Fi 2450**	**Wi-Fi 5210 GHz**	**Wi-Fi 5290 GHz**	**Wi-Fi 5600 GHz**	**Wi-Fi 5785 GHz**	**WCDMA 850+ Wi-Fi 2450**	**WCDMA 850+ Wi-Fi 5210 GHz**	**WCDMA 850+ Wi-Fi 5290 GHz**	**WCDMA 850+ Wi-Fi 5600 GHz**	**WCDMA 850+ Wi-Fi 5785 GHz**
Left Head Cheek	0.39	0.59	0.33	0.20	0.21	0.44	0.98	0.72	0.59	0.60	0.83
Right Head Cheek	0.38	0.13	0.07	0.08	0.08	0.16	0.51	0.45	0.46	0.46	0.54
Left Head 15° Tilt	0.26	0.07	0.15	0.24	0.23	0.37	0.33	0.41	0.50	0.49	0.63
Right Head 15° Tilt	0.23	0.04	0.09	0.13	0.08	0.23	0.27	0.32	0.36	0.31	0.46
Body Worn, Front of Phone 25 from Phantom	0.39	0.01	0.01	0.01	0.00	0.04	0.4	0.4	0.40	0.39	0.43
Body Worn, Back of Phone 25 from Phantom	0.35	0.05	0.00	0.03	0.04	0.06	0.4	0.35	0.38	0.39	0.41
Mobile Hotspot, Front of Phone 10mm from Phantom	0.61	0.05				0.06	0.66				0.67
Mobile Hotspot, Back of Phone 10mm from Phantom	0.70	0.15				0.09	0.85				0.79
Mobile Hotspot, Right Edge of Phone 10mm from Phantom	0.46	0.36				0.05	0.82				0.51

Evaluations for Simultaneous SAR (GSM 850)											
Position	**Transmitter Stand-Alone 1 g SAR Values (W/kg)**						**1 g SAR Summations (W/kg)**				
	GSM 850	**Wi-Fi 2450**	**Wi-Fi 5210 GHz**	**Wi-Fi 5290 GHz**	**Wi-Fi 5600 GHz**	**Wi-Fi 5785 GHz**	**GSM 850+ Wi-Fi 2450**	**GSM 850+ Wi-Fi 5210 GHz**	**GSM 850+ Wi-Fi 5290 GHz**	**GSM 850+ Wi-Fi 5600 GHz**	**GSM 850+ Wi-Fi 5785 GHz**
Left Head Cheek (GPRS for 850)	0.63	0.59	0.33	0.20	0.21	0.44	1.22	0.96	0.83	0.84	1.07
Right Head Cheek	0.42	0.13	0.07	0.08	0.08	0.16	0.55	0.49	0.50	0.50	0.58
Left Head 15° Tilt	0.26	0.07	0.15	0.24	0.23	0.37	0.33	0.41	0.50	0.49	0.63
Right Head 15° Tilt	0.23	0.04	0.09	0.13	0.08	0.23	0.27	0.32	0.36	0.31	0.46
Body Worn, Front of Phone 25 from Phantom (GPRS for 850)	0.62	0.01	0.01	0.01	0.00	0.04	0.63	0.63	0.63	0.62	0.66
Body Worn, Back of Phone 25 from Phantom	0.41	0.05	0.00	0.03	0.04	0.06	0.46	0.41	0.44	0.45	0.47
Mobile Hotspot, Front of Phone 10mm from Phantom	1.08	0.05				0.06	1.13				1.14
Mobile Hotspot, Back of Phone 10mm from Phantom	1.31	0.15				0.09	1.46				1.4
Mobile Hotspot, Right Edge of Phone 10mm from Phantom	0.71	0.36				0.05	1.07				0.76

Evaluations for Simultaneous SAR (LTE Band 4)											
Position	Transmitter Stand-Alone 1 g SAR Values (W/kg)						1 g SAR Summations (W/kg)				
	LTE Band 4	Wi-Fi 2450	Wi-Fi 5210 GHz	Wi-Fi 5290 GHz	Wi-Fi 5600 GHz	Wi-Fi 5785 GHz	LTE Band 4+ Wi-Fi 2450	LTE Band 4+ Wi-Fi 5210 GHz	LTE Band 4+ Wi-Fi 5290 GHz	LTE Band 4+ Wi-Fi 5600 GHz	LTE Band 4+ Wi-Fi 5785 GHz
Left Head Cheek	0.59	0.59	0.33	0.20	0.21	0.44	1.18	0.92	0.79	0.80	1.03
Right Head Cheek	1.02	0.13	0.07	0.08	0.08	0.16	1.15	1.09	1.10	1.10	1.18
Left Head 15° Tilt	0.33	0.07	0.15	0.24	0.23	0.37	0.4	0.48	0.57	0.56	0.7
Right Head 15° Tilt	0.25	0.04	0.09	0.13	0.08	0.23	0.29	0.34	0.38	0.33	0.48
Body Worn, Front of Phone 25 from Phantom	0.33	0.01	0.01	0.01	0.00	0.04	0.34	0.34	0.34	0.33	0.37
Body Worn, Back of Phone 25 from Phantom	0.67	0.05	0.00	0.03	0.04	0.06	0.72	0.67	0.70	0.71	0.73
Mobile Hotspot, Front of Phone 10mm from Phantom	1.15	0.05				0.06	1.2				1.21
Mobile Hotspot, Back of Phone 10mm from Phantom	1.04	0.15				0.09	1.19				1.13
Mobile Hotspot, Right Edge of Phone 10mm from Phantom	0.48	0.36				0.05	0.84				0.53

Evaluations for Simultaneous SAR (WCDMA 1700)											
Position	Transmitter Stand-Alone 1 g SAR Values (W/kg)						1 g SAR Summations (W/kg)				
	WCDMA 1700	Wi-Fi 2450	Wi-Fi 5210 GHz	Wi-Fi 5290 GHz	Wi-Fi 5600 GHz	Wi-Fi 5785 GHz	WCDMA 1700+ Wi-Fi 2450	WCDMA 1700+ Wi-Fi 5210 GHz	WCDMA 1700+ Wi-Fi 5290 GHz	WCDMA 1700+ Wi-Fi 5600 GHz	WCDMA 1700+ Wi-Fi 5785 GHz
Left Head Cheek	0.53	0.59	0.33	0.20	0.21	0.44	1.12	0.86	0.73	0.74	0.97
Right Head Cheek	0.65	0.13	0.07	0.08	0.08	0.16	0.78	0.72	0.73	0.73	0.81
Left Head 15° Tilt	0.23	0.07	0.15	0.24	0.23	0.37	0.3	0.38	0.47	0.46	0.6
Right Head 15° Tilt	0.26	0.04	0.09	0.13	0.08	0.23	0.3	0.35	0.39	0.34	0.49
Body Worn, Front of Phone 25 from Phantom	0.32	0.01	0.01	0.01	0.00	0.04	0.33	0.33	0.33	0.32	0.36
Body Worn, Back of Phone 25 from Phantom	0.47	0.05	0.00	0.03	0.04	0.06	0.52	0.47	0.50	0.51	0.53
Mobile Hotspot, Front of Phone 10mm from Phantom	0.95	0.05				0.06	1				1.01
Mobile Hotspot, Back of Phone 10mm from Phantom	0.97	0.15				0.09	1.12				1.06
Mobile Hotspot, Right Edge of Phone 10mm from Phantom	0.22	0.36				0.05	0.58				0.27

Evaluations for Simultaneous SAR (WCDMA 1900)											
Position	Transmitter Stand-Alone 1 g SAR Values (W/kg)						1 g SAR Summations (W/kg)				
	WCDMA 1900	Wi-Fi 2450	Wi-Fi 5210 GHz	Wi-Fi 5290 GHz	Wi-Fi 5600 GHz	Wi-Fi 5785 GHz	WCDMA 1900+ Wi-Fi 2450	WCDMA 1900+ Wi-Fi 5210 GHz	WCDMA 1900+ Wi-Fi 5290 GHz	WCDMA 1900+ Wi-Fi 5600 GHz	WCDMA 1900+ Wi-Fi 5785 GHz
Left Head Cheek	1.34	0.59	0.33	0.20	0.21	0.44	<1.60	<1.60	1.54	1.55	<1.60
Right Head Cheek	0.50	0.13	0.07	0.08	0.08	0.16	0.63	0.57	0.58	0.58	0.66
Left Head 15° Tilt	0.34	0.07	0.15	0.24	0.23	0.37	0.41	0.49	0.58	0.57	0.71
Right Head 15° Tilt	0.36	0.04	0.09	0.13	0.08	0.23	0.4	0.45	0.49	0.44	0.59
Body Worn, Front of Phone 25 from Phantom	0.27	0.01	0.01	0.01	0.00	0.04	0.28	0.28	0.28	0.27	0.31
Body Worn, Back of Phone 25 from Phantom	0.61	0.05	0.00	0.03	0.04	0.06	0.66	0.61	0.64	0.65	0.67
Mobile Hotspot, Front of Phone 10mm from Phantom	0.76	0.05				0.06	0.81				0.82
Mobile Hotspot, Back of Phone 10mm from Phantom	1.00	0.15				0.09	1.15				1.09
Mobile Hotspot, Right Edge of Phone 10mm from Phantom	0.09	0.36				0.05	0.45				0.14

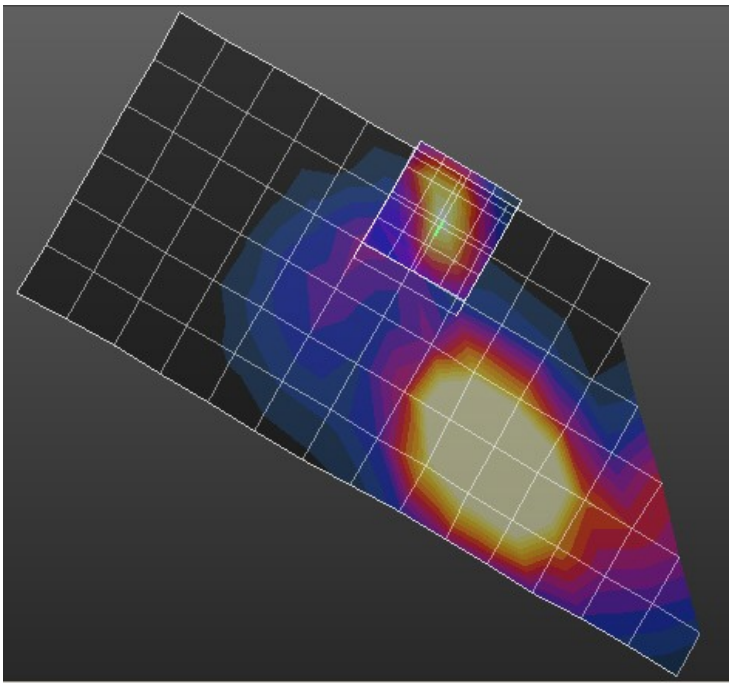
Evaluations for Simultaneous SAR (GSM 1900)											
Position	Transmitter Stand-Alone 1 g SAR Values (W/kg)						1 g SAR Summations (W/kg)				
	GSM 1900	Wi-Fi 2450	Wi-Fi 5210 GHz	Wi-Fi 5290 GHz	Wi-Fi 5600 GHz	Wi-Fi 5785 GHz	GSM 1900+ Wi-Fi 2450	GSM 1900+ Wi-Fi 5210 GHz	GSM 1900+ Wi-Fi 5290 GHz	GSM 1900+ Wi-Fi 5600 GHz	GSM 1900+ Wi-Fi 5785 GHz
Left Head Cheek (GPRS for 1900)	0.68	0.59	0.33	0.20	0.21	0.44	1.27	1.01	0.88	0.89	1.12
Right Head Cheek	0.25	0.13	0.07	0.08	0.08	0.16	0.38	0.32	0.33	0.33	0.41
Left Head 15° Tilt	0.15	0.07	0.15	0.24	0.23	0.37	0.22	0.3	0.39	0.38	0.52
Right Head 15° Tilt	0.17	0.04	0.09	0.13	0.08	0.23	0.21	0.26	0.30	0.25	0.4
Body Worn, Front of Phone 25 from Phantom	0.16	0.01	0.01	0.01	0.00	0.04	0.17	0.17	0.17	0.16	0.2
Body Worn, Back of Phone 25 from Phantom (GPRS for 1900)	0.42	0.05	0.00	0.03	0.04	0.06	0.47	0.42	0.45	0.46	0.48
Mobile Hotspot, Front of Phone 10mm from Phantom	0.67	0.05				0.06	0.72				0.73
Mobile Hotspot, Back of Phone 10mm from Phantom	1.05	0.15				0.09	1.2				1.14
Mobile Hotspot, Right Edge of Phone 10mm from Phantom	0.02	0.36				0.05	0.38				0.07

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

A. Left Cheek, WCDMA 1900 + WI-FI 2450
B. Left Cheek, WCDMA 1900 + WI-FI 5210
C. Left Cheek, WCDMA 1900 + WI-FI 5785

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.

Case A: Left Cheek, WCDMA 1900 + WI-FI 2450



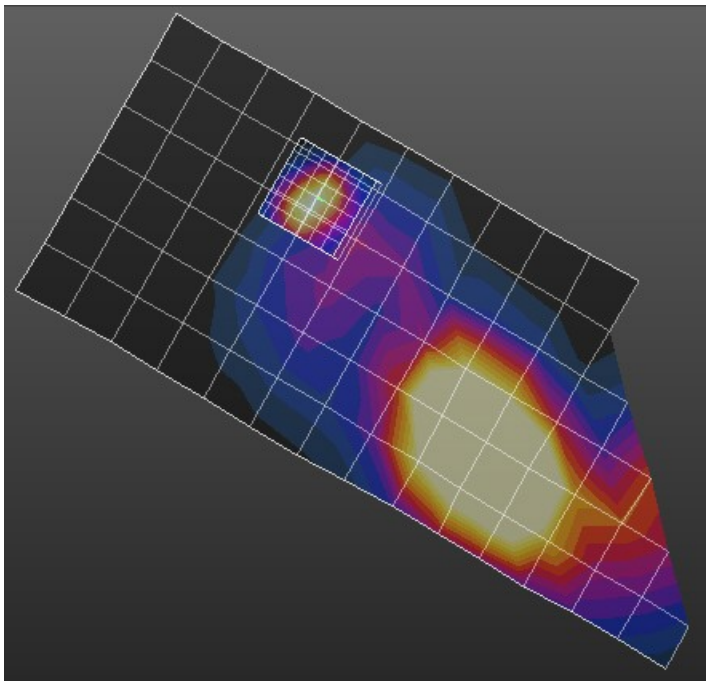
WCDMA 1900 Left Head Cheek SAR overlaid WI-FI 2450 Left Head Cheek SAR

Transmitter	1-g SAR	Peak Location	Distance (cm)
CDMA 1900	1.34	0.0657, 0.257, -0.173	6.795
WI-FI 5785	0.59	0.0544, 0.324, -0.174	
Sum	1.93		
Peak separation distance	6.795 cm		
SPLSR (Sum / separation distance)	*0.28 (1.93/6.795)*		

Distance is found using $d = \sqrt[2]{(X1 - X2)^2 + (Y1 - Y2)^2 + (Z1 - Z2)^2}$
As the SPLSR is below 0.30, no measurements to determine the aggregate 1-g SAR were required for this case.

[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: Left Cheek, WCDMA 1900 + WI-FI 5210



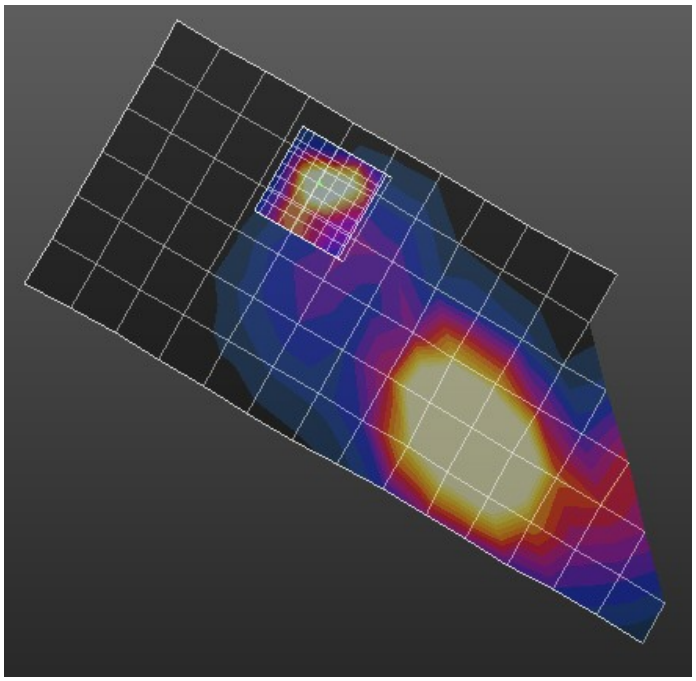
WCDMA 1900 Left Head Cheek SAR overlaid WI-FI 5210 Left Head Cheek SAR

Transmitter	1-g SAR	Peak Location	Distance (cm)
CDMA 1900	1.34	0.0657, 0.257, -0.173	8.493
WI-FI 5785	0.33	0.0191, 0.328, -0.174	
Sum	1.67		
Peak separation distance	8.493 cm		
SPLSR (Sum / separation distance)	*0.20 (1.67/8.493)*		

Distance is found using $d = \sqrt[2]{(X1 - X2)^2 + (Y1 - Y2)^2 + (Z1 - Z2)^2}$

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

Case C: Left Cheek, WCDMA 1900 + WI-FI 5785



WCDMA 1900 Left Head Cheek SAR overlaid WI-FI 5785 Left Head Cheek SAR

Transmitter	1-g SAR	Peak Location	Distance (cm)
CDMA 1900	1.34	0.0657, 0.257, -0.173	8.616 cm
WI-FI 5785	0.44	0.0233, 0.332, -0.174	
Sum	1.78		
Peak separation distance	8.616 cm		
SPLSR (Sum / separation distance)	*0.21 (1.78/8.616)*		

Distance is found using $d = \sqrt[2]{(X1 - X2)^2 + (Y1 - Y2)^2 + (Z1 - Z2)^2}$

As 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)”

System Accuracy Verification Measurements for Head SAR Measurements

Date/Time: 3/15/2012 8:29:15 AM

DUT: Dipole 750 MHz; Type: D750V3; Procedure Notes: 750 MHz System Performance Check / Dipole Sn# 1040; PM1 Power = 200 mW
Sim.Temp@ meas = 20.0*C; Sim.Temp@ SPC = 19.6*C; Room Temp@ SPC = 22.0*C

Communication System: _CW - Dipole; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 750 MHz; σ = 0.88 mho/m; ε_r = 42.2; ρ = 1000 kg/m^3

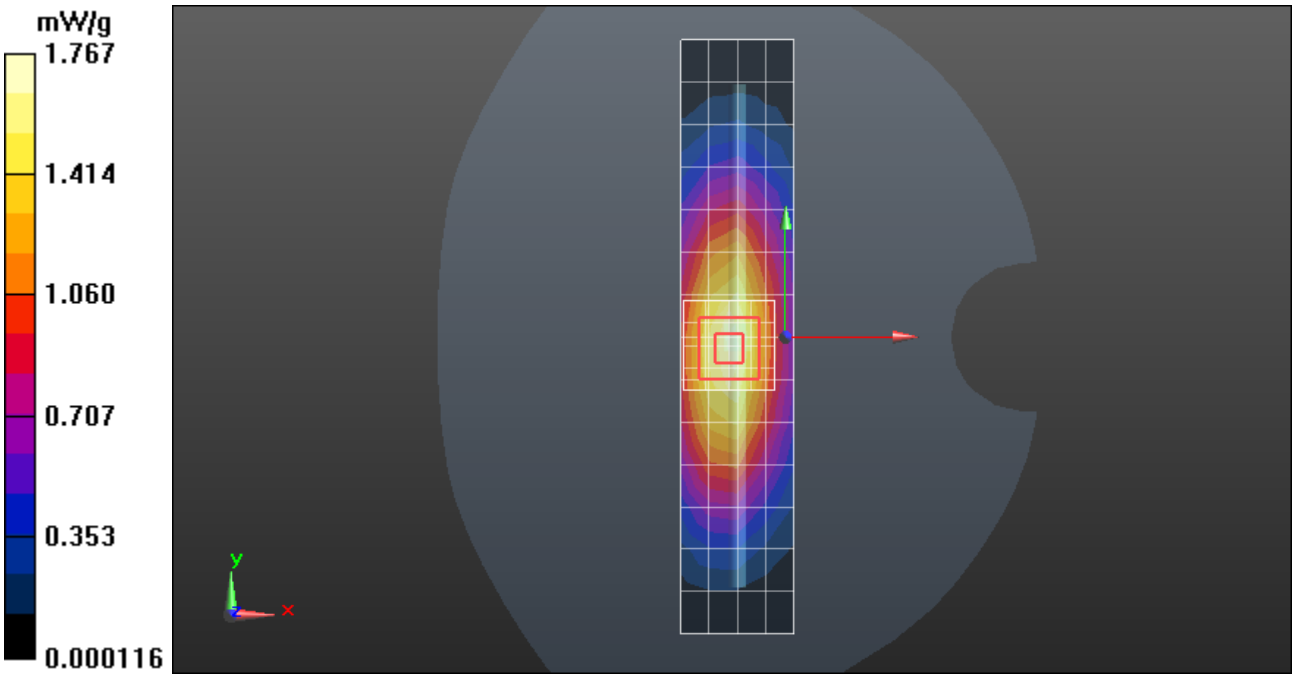
DASY4 Configuration:

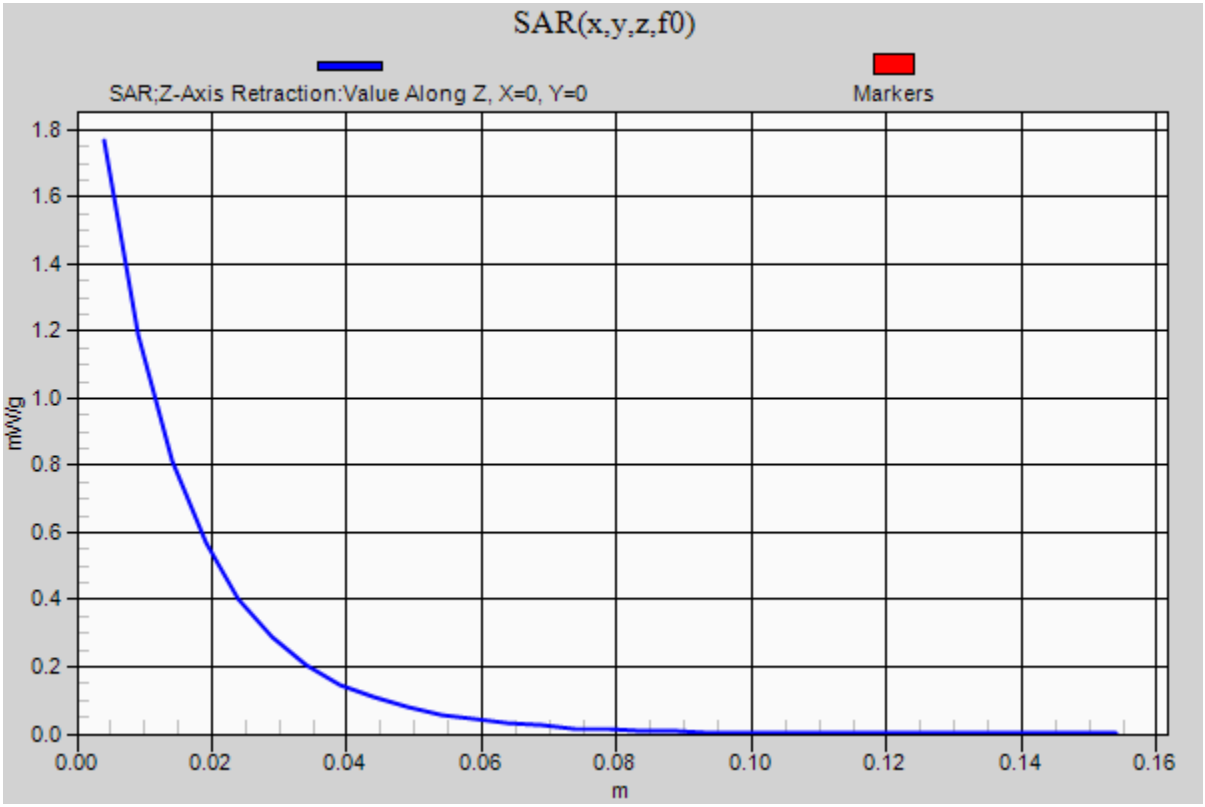
- Probe: ES3DV3 - SN3284; ConvF(6.44, 6.44, 6.44); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Glycol,SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 1.711 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 44.921 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 2.4100
SAR(1 g) = 1.63 mW/g; SAR(10 g) = 1.07 mW/g
Maximum value of SAR (measured) = 1.760 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 1.767 mW/g


mW/g
1.767
1.414
1.060
0.707
0.353
0.000116
y
x


SAR(x,y,z,f0)
SAR;Z-Axis Retraction:Value Along Z, X=0, Y=0
Markers
mW/g
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: 2/23/2012 4:47:14 PM

DUT: Dipole 835 MHz; Type: D835V2; Procedure Notes: 835 MHz System Performance Check / Dipole Sn# 422TR; PM1 Power = 200 mW
Sim.Temp@ meas = 19.6*C; Sim.Temp@ SPC = 19.6*C; Room Temp@ SPC = 21.8*C

Communication System: _CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.92 mho/m; ε_r = 41.6; ρ = 1000 kg/m^3

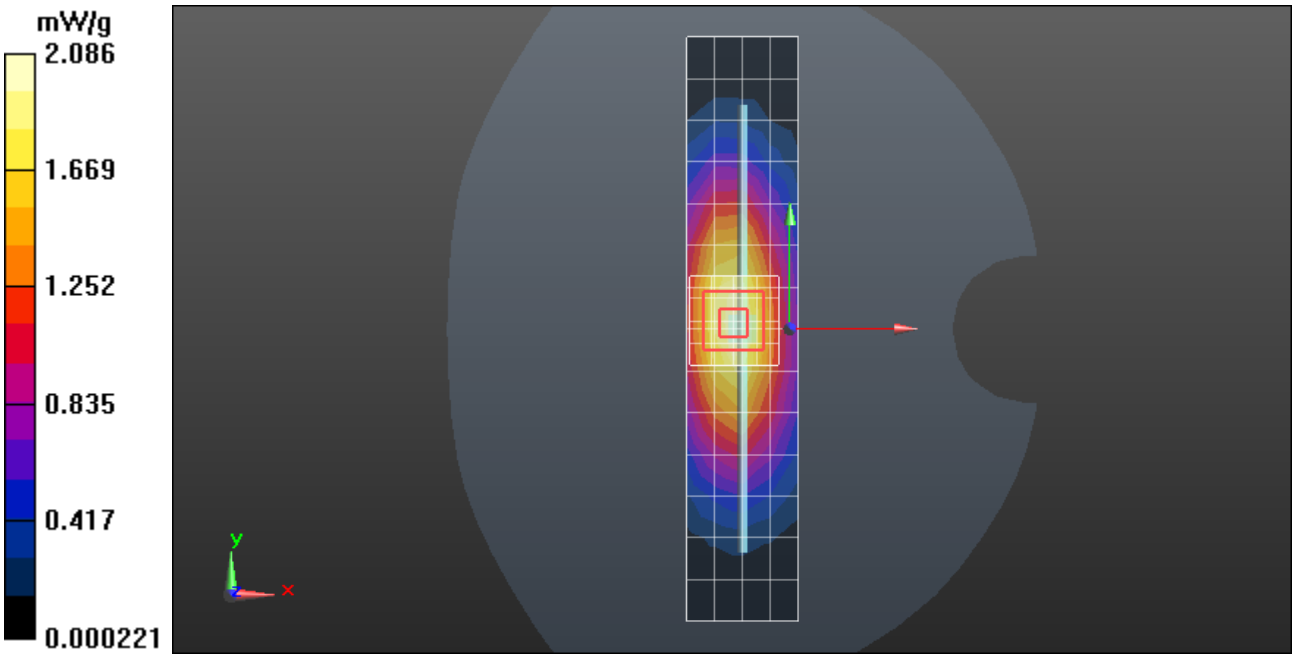
DASY4 Configuration:

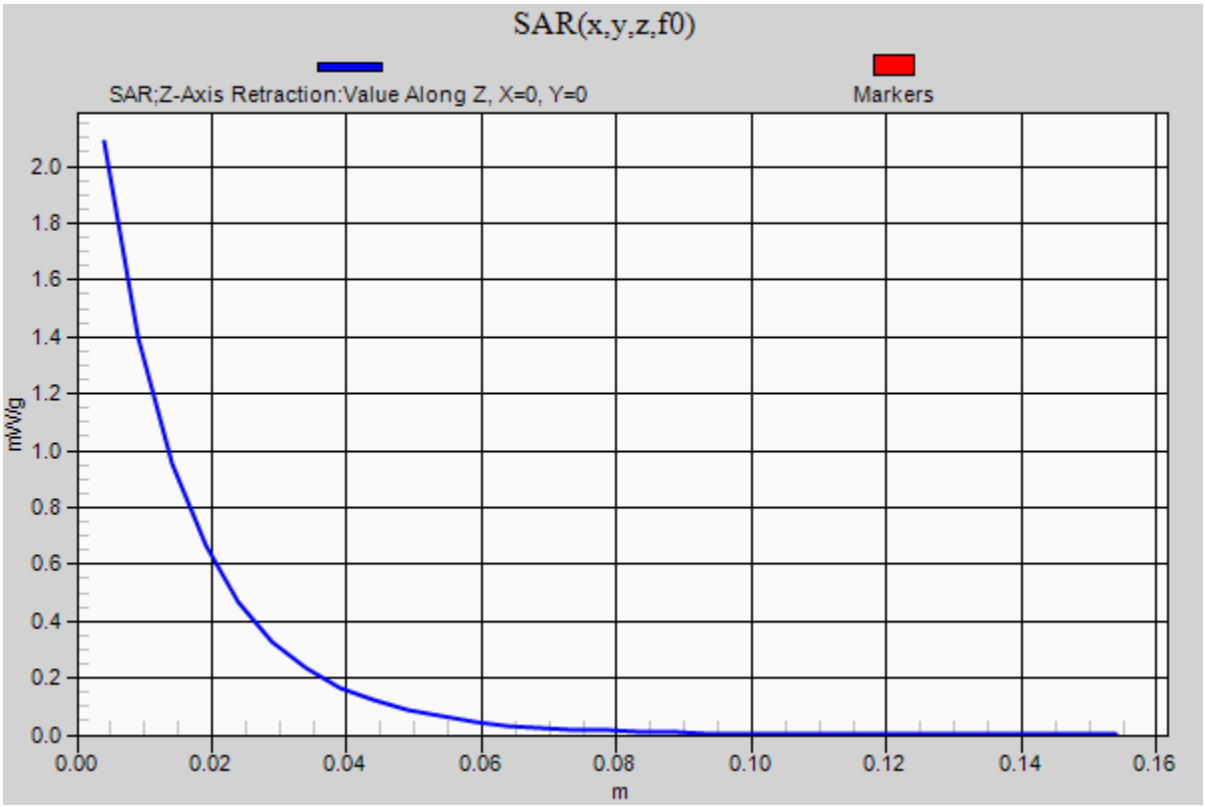
- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 2.024 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.570 V/m; Power Drift = 0.0085 dB
Peak SAR (extrapolated) = 2.8370
SAR(1 g) = 1.92 mW/g; SAR(10 g) = 1.26 mW/g
Maximum value of SAR (measured) = 2.076 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.086 mW/g


mW/g
2.086
1.669
1.252
0.835
0.417
0.000221
y
x


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

Date/Time: 3/5/2012 8:20:26 AM

DUT: Dipole 835 MHz; Type: D835V2; Procedure Notes: 835 MHz System Performance Check / Dipole Sn# 4d129; PM1 Power = 200 mW;
Sim.Temp@ meas = 19.6*C; Sim.Temp@ SPC = 20.8*C; Room Temp@ SPC = 22.5*C

Communication System: _CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

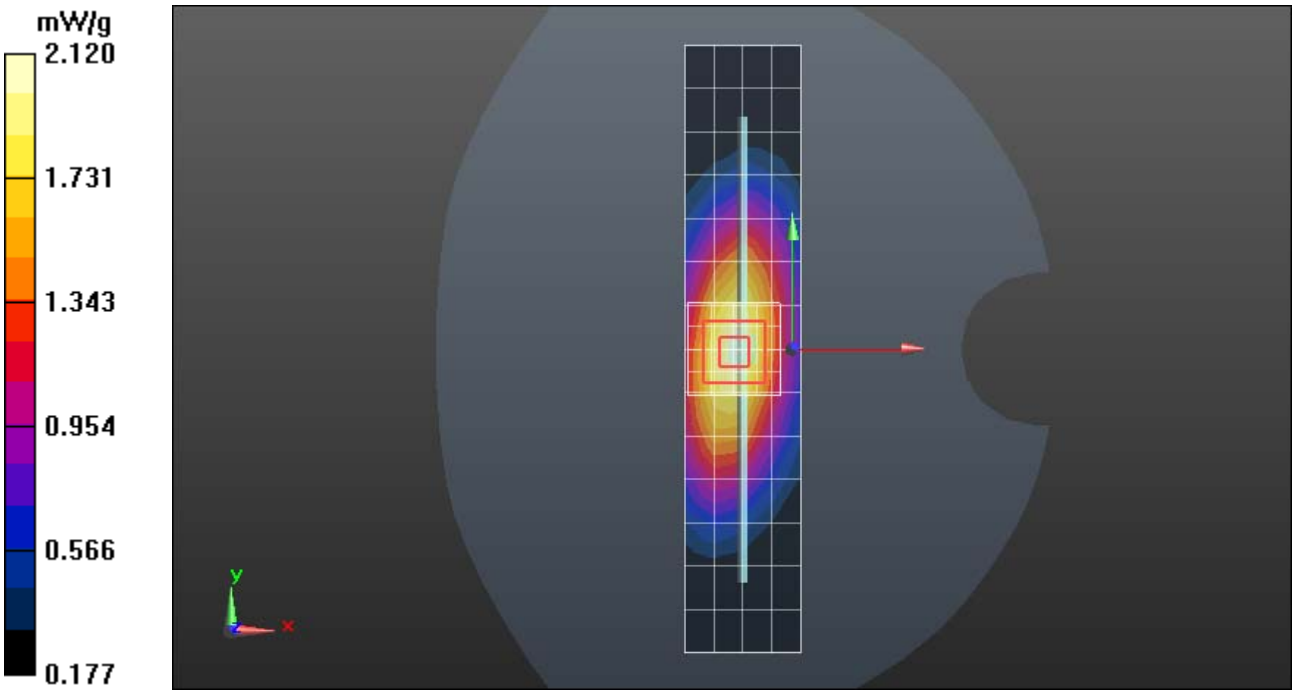
DASY4 Configuration:

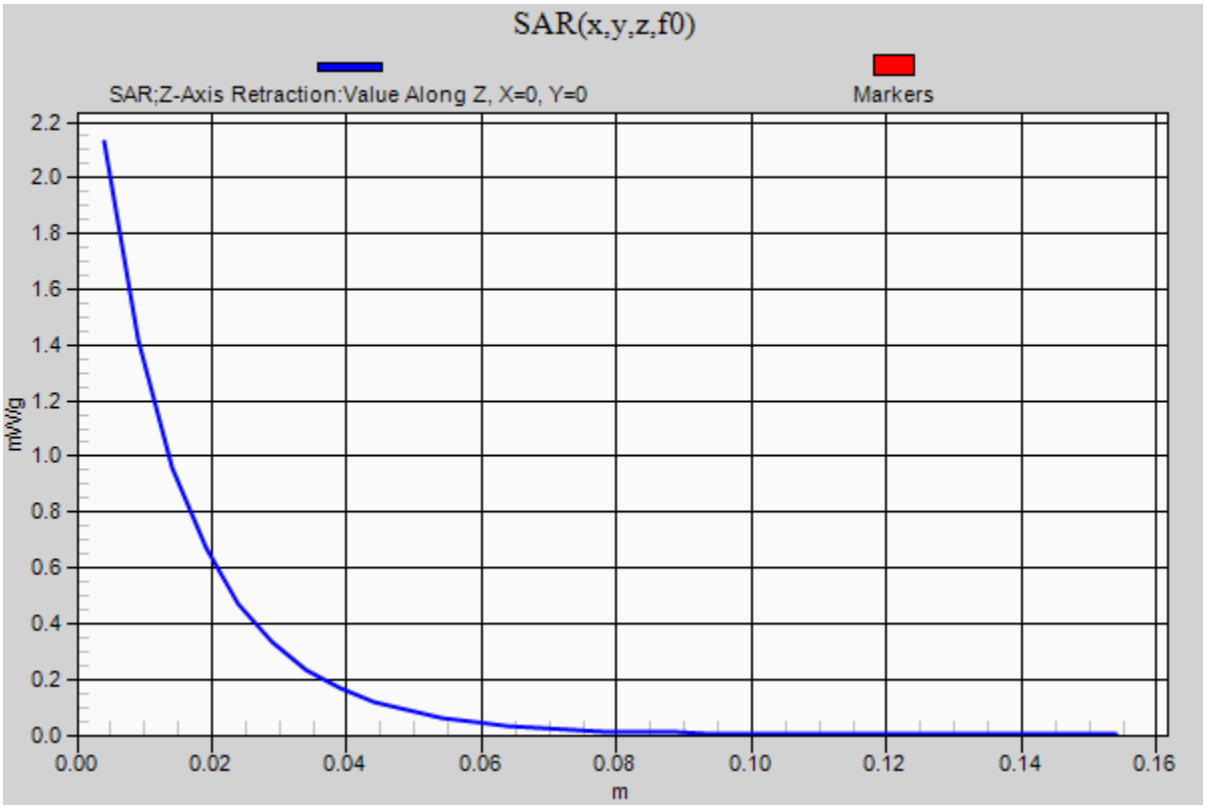
- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 2.086 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.442 V/m; Power Drift = 0.0053 dB
Peak SAR (extrapolated) = 2.9220
SAR(1 g) = 1.96 mW/g; SAR(10 g) = 1.28 mW/g
Maximum value of SAR (measured) = 2.120 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 2.130 mW/g


mW/g
2.120
1.731
1.343
0.954
0.566
0.177
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: 2/23/2012 8:11:47 PM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 250TR; PM1 Power = 200 mW
Sim.Temp@ meas = 19.6*C; Sim.Temp@ SPC = 19.5*C; Room Temp@ SPC = 21.8*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 = 38.9; ρ = 1000 kg/m^3

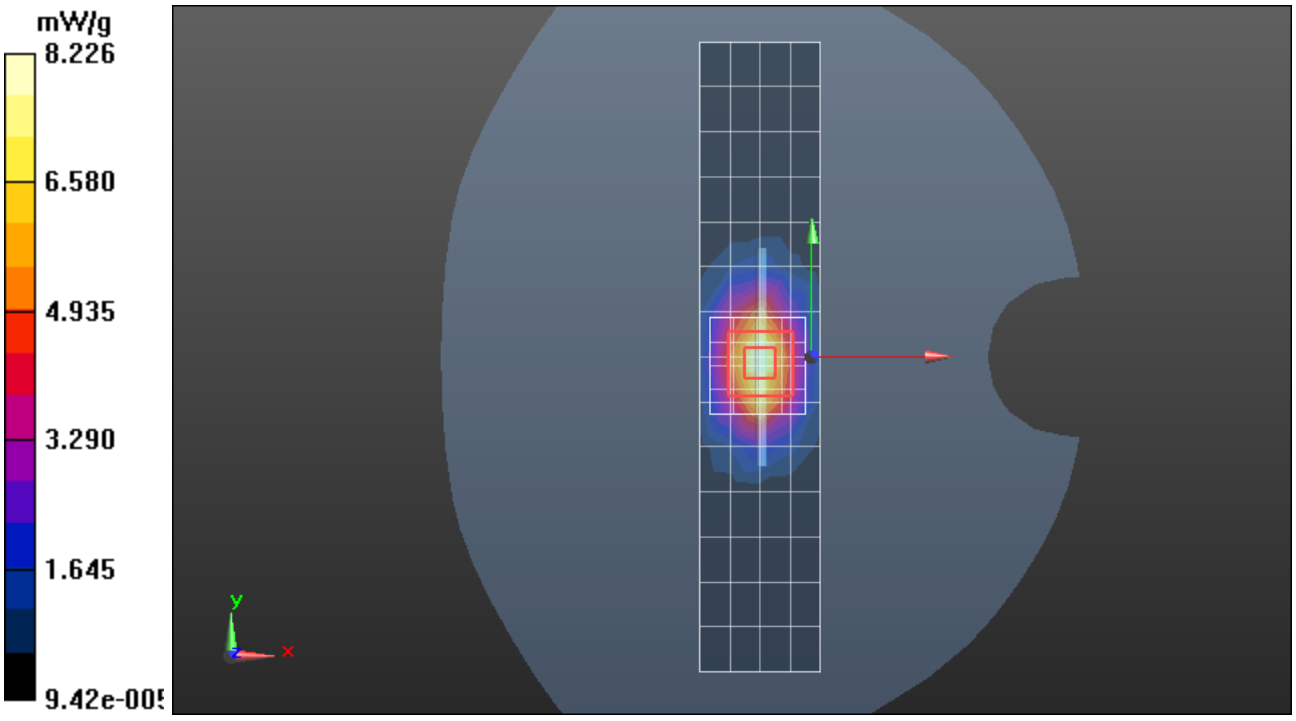
DASY4 Configuration:

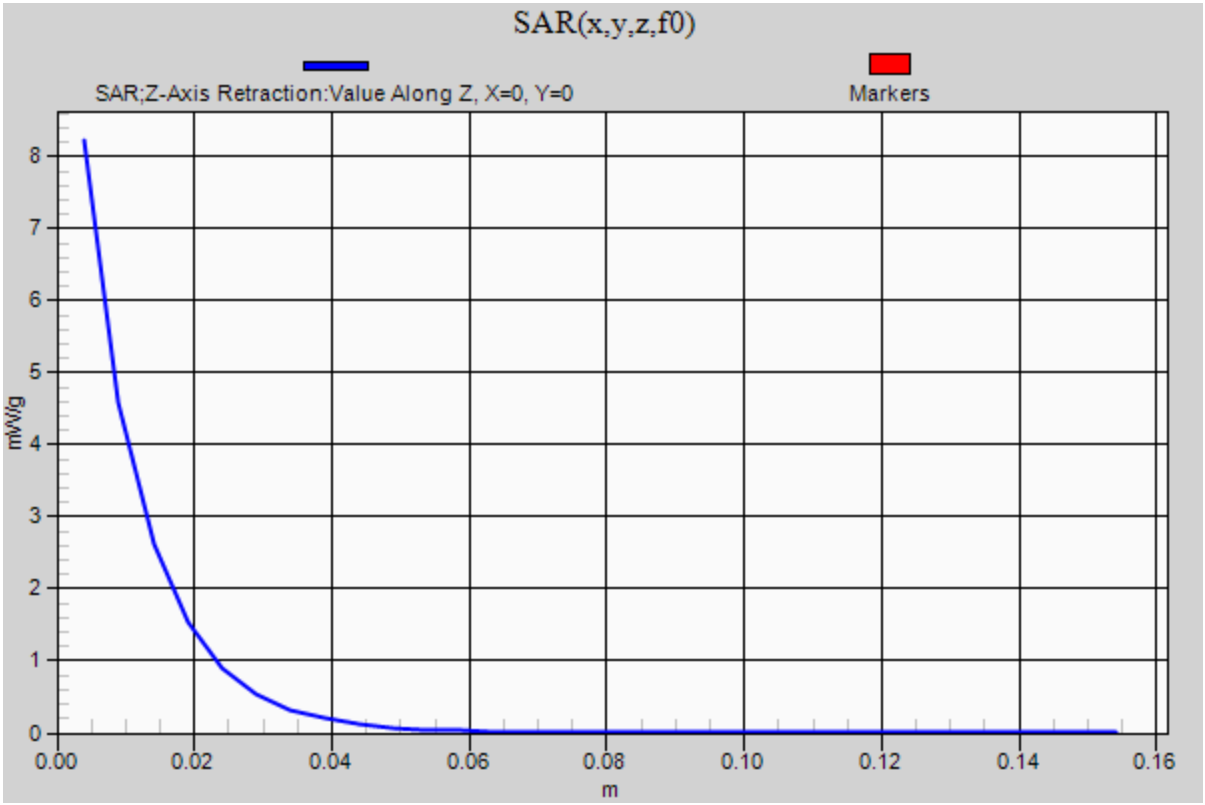
- Probe: ES3DV3 - SN3284; ConvF(5.33, 5.33, 5.33); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Glycol,SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 8.182 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.865 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 13.3710
SAR(1 g) = 7.35 mW/g; SAR(10 g) = 3.86 mW/g
Maximum value of SAR (measured) = 8.256 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.226 mW/g


mW/g
8.226
6.580
4.935
3.290
1.645
9.42e-005
y
x


SAR(x,y,z,f0)
SAR;Z-Axis Retraction:Value Along Z, X=0, Y=0
Markers
mW/g
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
m

Date/Time: 2/27/2012 7:32:23 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 250TR; PM1 Power = 200 mW
Sim.Temp@ meas = 19.5*C; Sim.Temp@ SPC = 19.6*C; Room Temp@ SPC = 21.8*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.38 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3

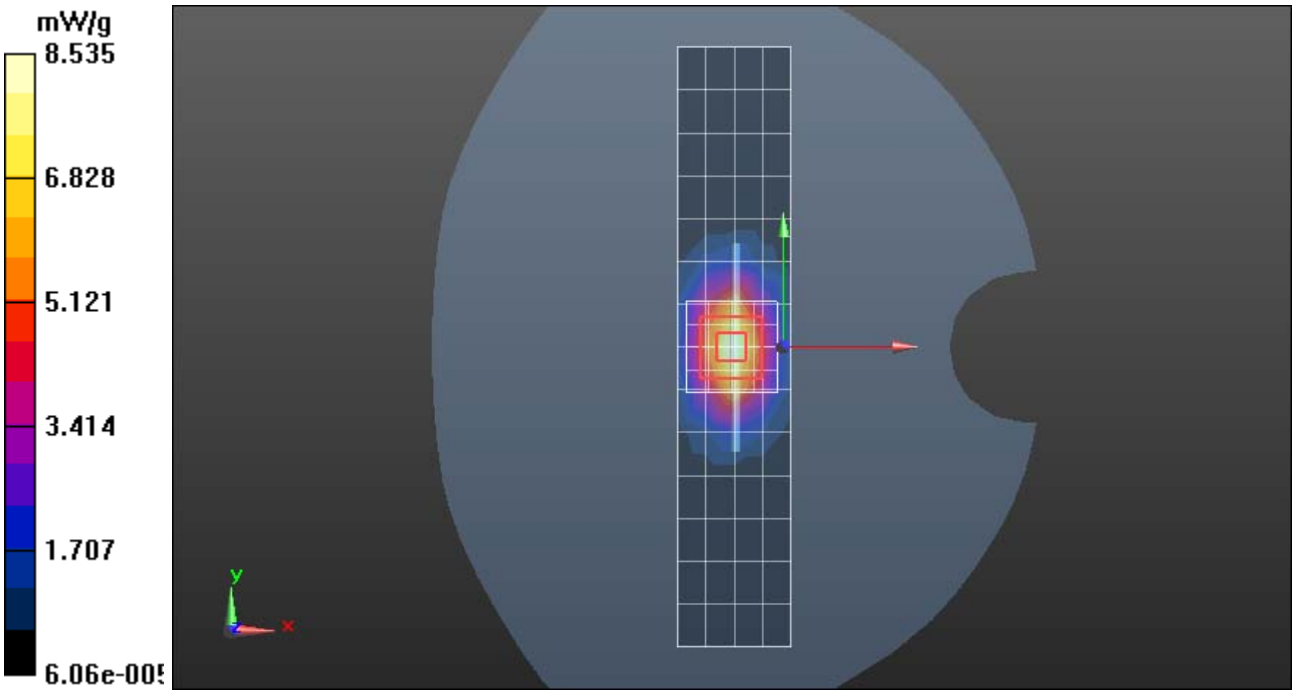
DASY4 Configuration:

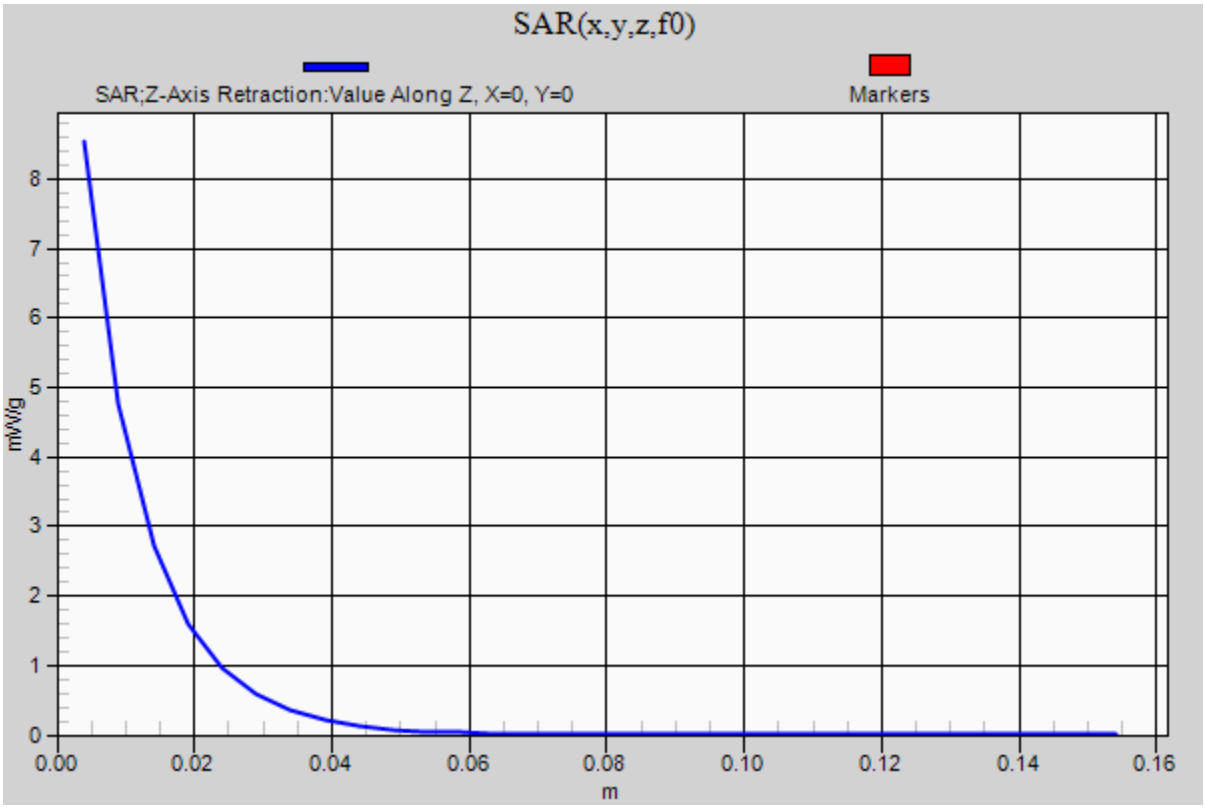
- Probe: ES3DV3 - SN3284; ConvF(5.33, 5.33, 5.33); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Glycol,SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 8.475 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 79.472 V/m; Power Drift = 0.0098 dB
Peak SAR (extrapolated) = 13.7830
SAR(1 g) = 7.6 mW/g; SAR(10 g) = 4.01 mW/g
Maximum value of SAR (measured) = 8.534 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.535 mW/g


mW/g
8.535
6.828
5.121
3.414
1.707
6.06e-005
y
x


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: 2/28/2012 8:24:14 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 250TR; PM1 Power = 200 mW
Sim.Temp@ meas = 19.4*C; Sim.Temp@ SPC = 20.2*C; Room Temp@ SPC = 22.1*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.38 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3

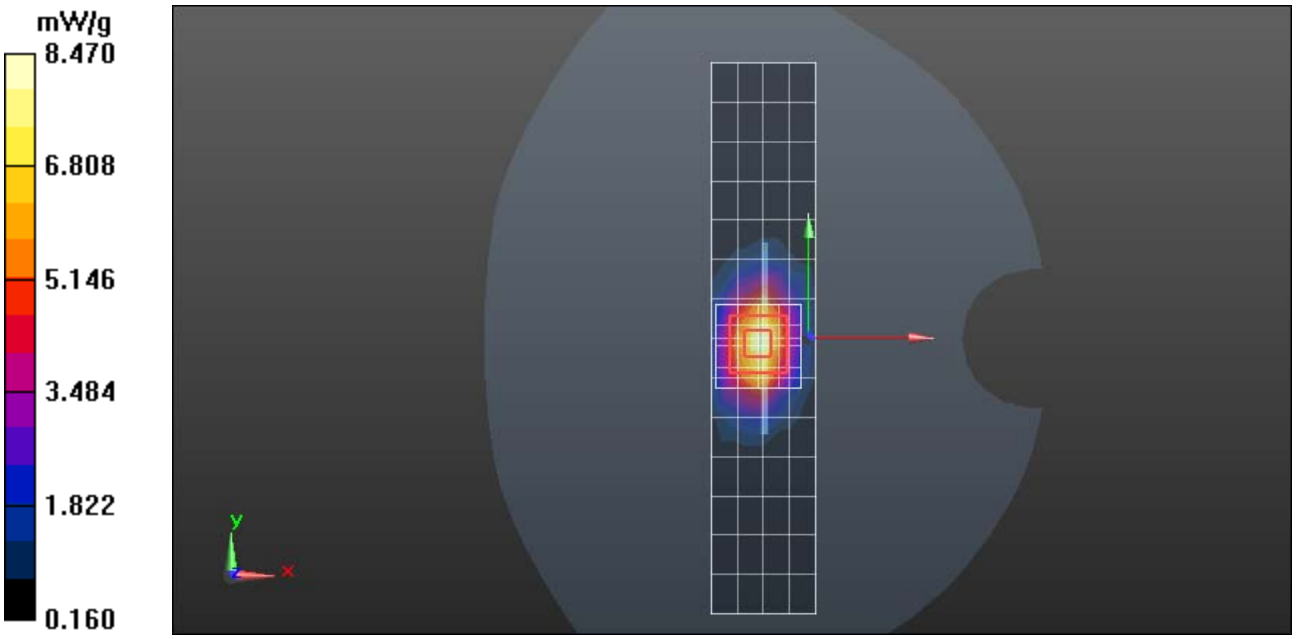
DASY4 Configuration:

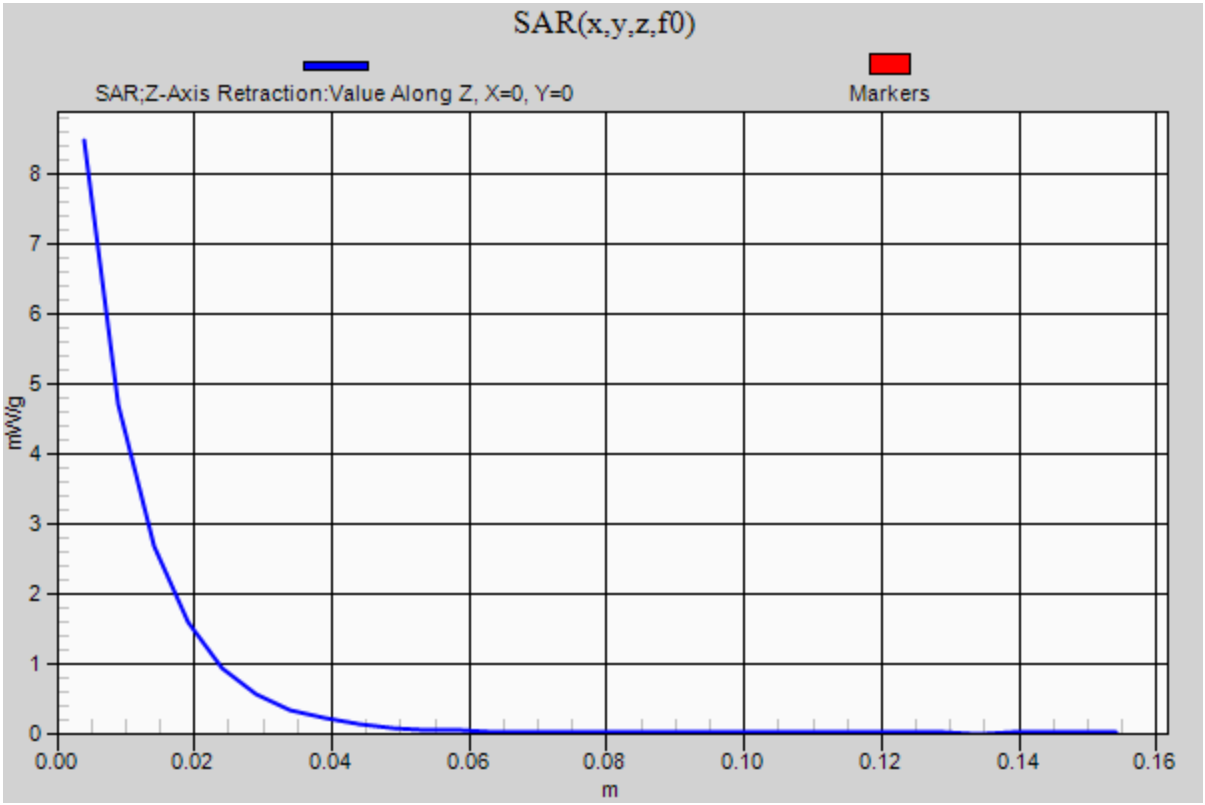
- Probe: ES3DV3 - SN3284; ConvF(5.33, 5.33, 5.33); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Glycol,SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 8.258 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 78.441 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 13.7660
SAR(1 g) = 7.55 mW/g; SAR(10 g) = 3.98 mW/g
Maximum value of SAR (measured) = 8.470 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.486 mW/g


mW/g
8.470
6.808
5.146
3.484
1.822
0.160
y
x


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: 3/6/2012 7:10:32 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 259tr; PM1 Power = 200 mW
Sim.Temp@ meas = 19.8*C; Sim.Temp@ SPC = 19.8*C; Room Temp@ SPC = 22.3*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Communication System Channel Number: 8; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.43 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3

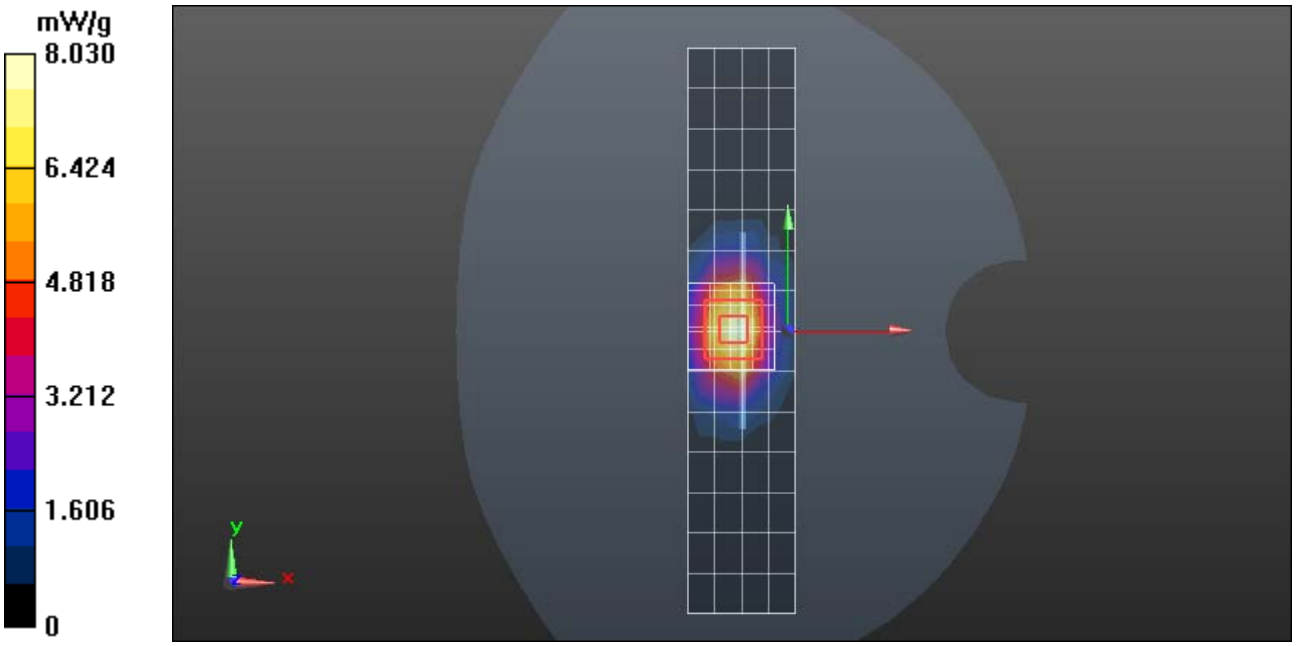
DASY4 Configuration:

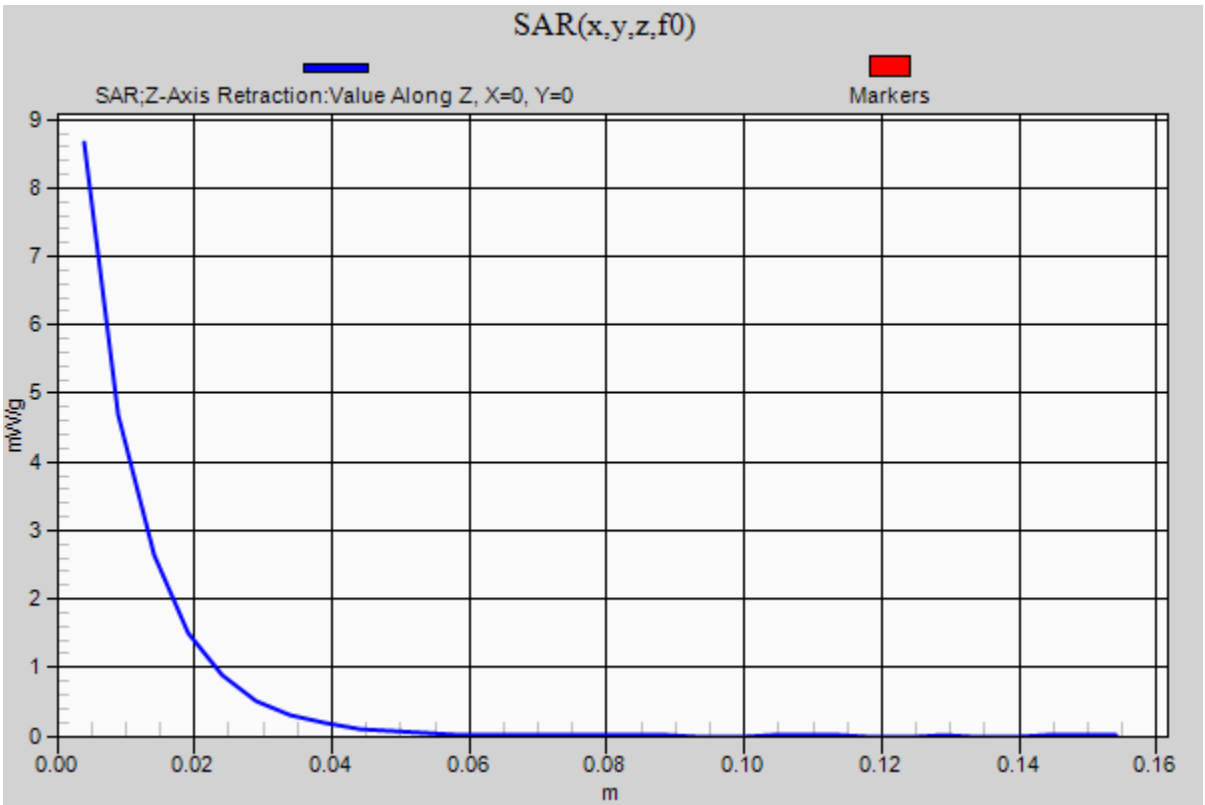
- Probe: ES3DV3 - SN3124; ConvF(5.03, 5.03, 5.03); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#1 - Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1319;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 8.030 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 75.663 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 14.3760
SAR(1 g) = 7.7 mW/g; SAR(10 g) = 4 mW/g
Maximum value of SAR (measured) = 8.616 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.660 mW/g


mW/g
8.030
6.424
4.818
3.212
1.606
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
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Date/Time: 3/21/2012 6:48:49 AM

DUT: Dipole 2450 MHz; Type: D2450V2; Procedure Notes: 2450 MHz System Performance Check / Dipole Sn# 877; PM1 Power = 200 mW
Sim.Temp@ meas = 20.2*C; Sim.Temp@ SPC = 20.2*C; Room Temp@ SPC = 21.4*C

Communication System: _CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 2450 MHz; σ = 1.8 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3

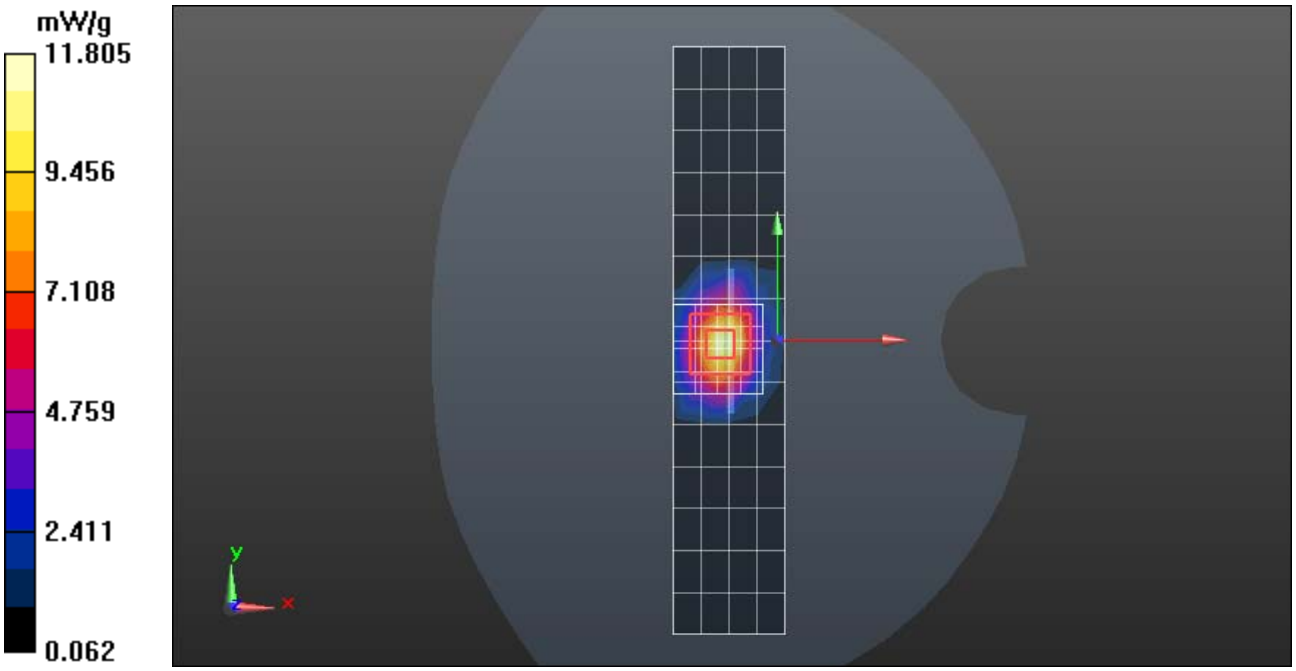
DASY4 Configuration:

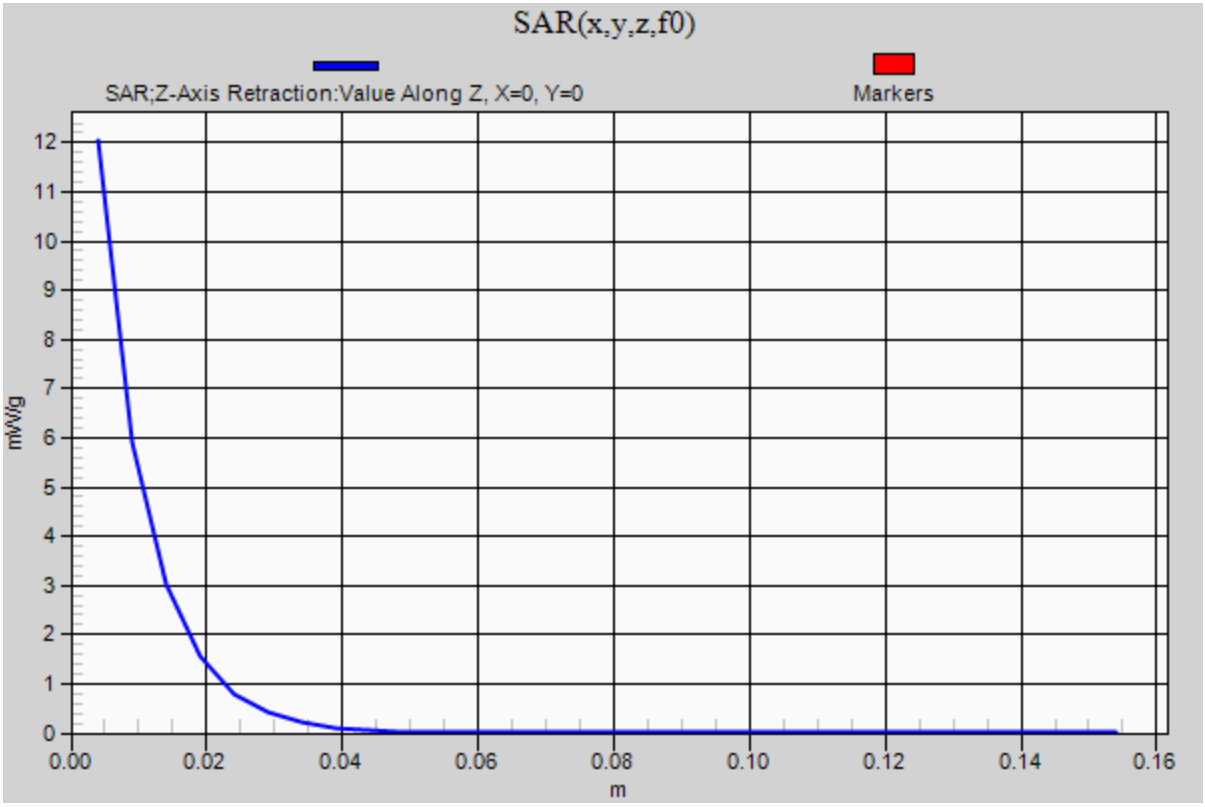
- Probe: ES3DV3 - SN3284; ConvF(4.56, 4.56, 4.56); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 11.357 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 80.619 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 22.4710
SAR(1 g) = 10.6 mW/g; SAR(10 g) = 4.9 mW/g
Maximum value of SAR (measured) = 11.805 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 12.042 mW/g


mW/g
11.805
9.456
7.108
4.759
2.411
0.062
y
x


SAR(x,y,z,f0)
SAR;Z-Axis Retraction:Value Along Z, X=0, Y=0
Markers
mW/g
12
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: 3/28/2012 7:32:46 PM

DUT: Dipole 5-6GHz; Type: D5GHzV2; Procedure Notes: 5200 MHz System Performance Check / Dipole Sn# 1088-5200; PM1 Power = 100mW
Sim.Temp@ meas =18.7*C; Sim.Temp@ SPC = 19.9*C; Room Temp@ SPC =20.3*C

Communication System: _CW - Dipole; Frequency: 5200 MHz; Communication System Channel Number: 15; Duty Cycle: 1:1; Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 5200 MHz; σ = 4.59 mho/m; ε_r = 34.5; ρ = 1000 kg/m^3

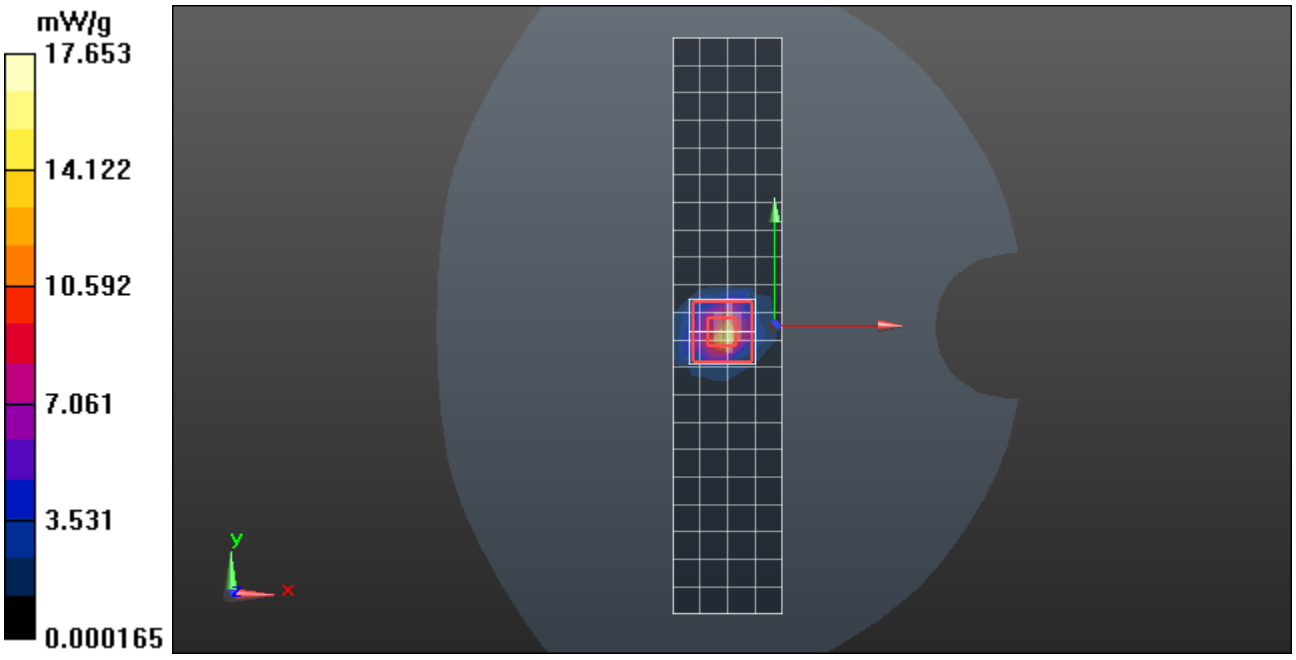
DASY4 Configuration:

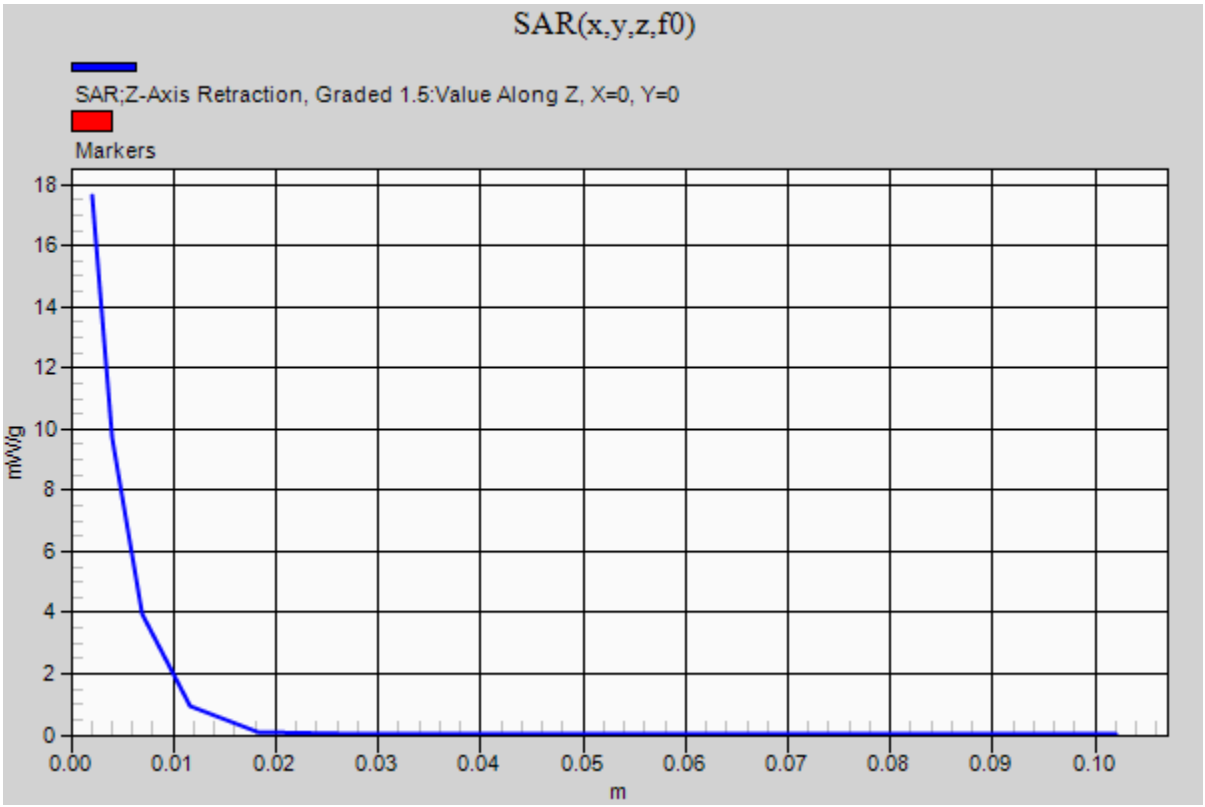
- Probe: EX3DV4 - SN3730; ConvF(4.72, 4.72, 4.72); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (5x22x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 14.412 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 62.897 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 33.3280
SAR(1 g) = 8.34 mW/g; SAR(10 g) = 2.37 mW/g
Maximum value of SAR (measured) = 17.575 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9): Measurement grid: dx=20mm, dy=20mm, dz=2mm
Maximum value of SAR (measured) = 17.653 mW/g


mW/g
17.653
14.122
10.592
7.061
3.531
0.000165
y
x


SAR(x,y,z,f0)
SAR;Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
Markers
mW/g
18
16
14
12
10
8
6
4
2
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 4/4/2012 11:52:36 AM

DUT: Dipole 5-6GHz; Type: D5GHzV2; Procedure Notes: 5200 MHz System Performance Check / Dipole Sn# 1088-5200; PM1 Power = 100mW
Sim.Temp@ meas =18.8*C; Sim.Temp@ SPC = 18.8*C; Room Temp@ SPC =21.1*C

Communication System: _CW - Dipole; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 5200 MHz; σ = 4.52 mho/m; ε_r = 33.2; ρ = 1000 kg/m^3

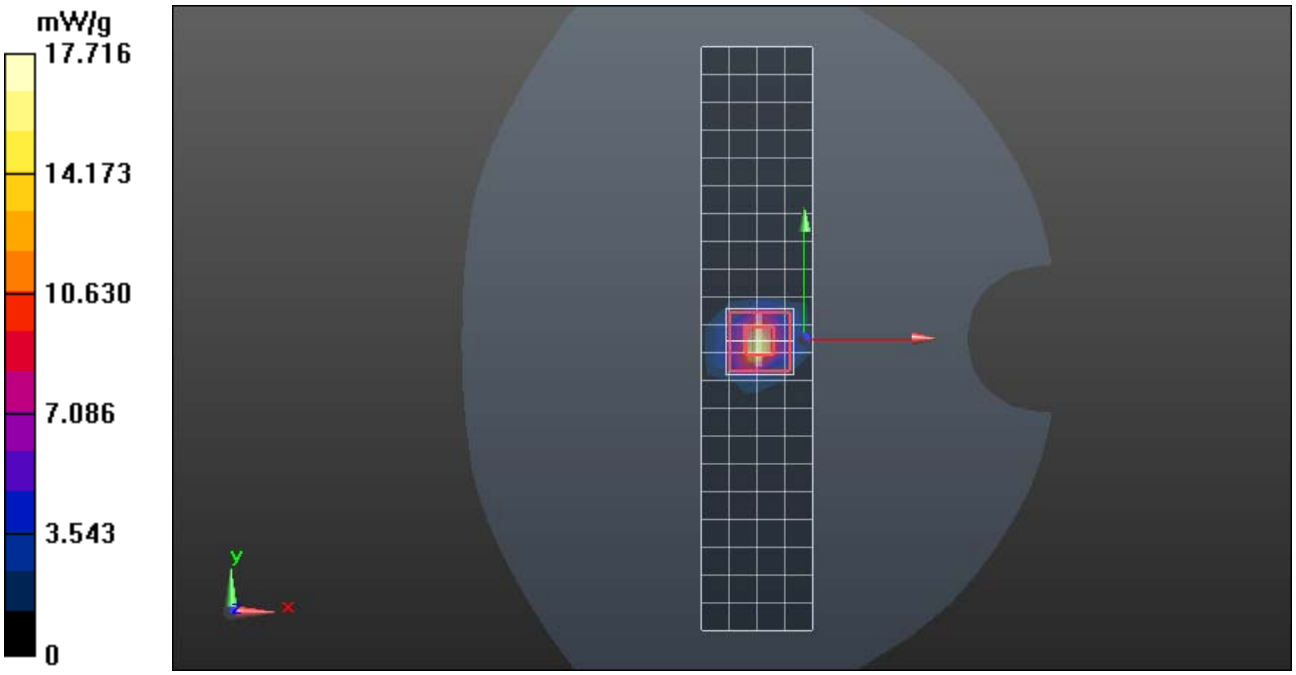
DASY4 Configuration:

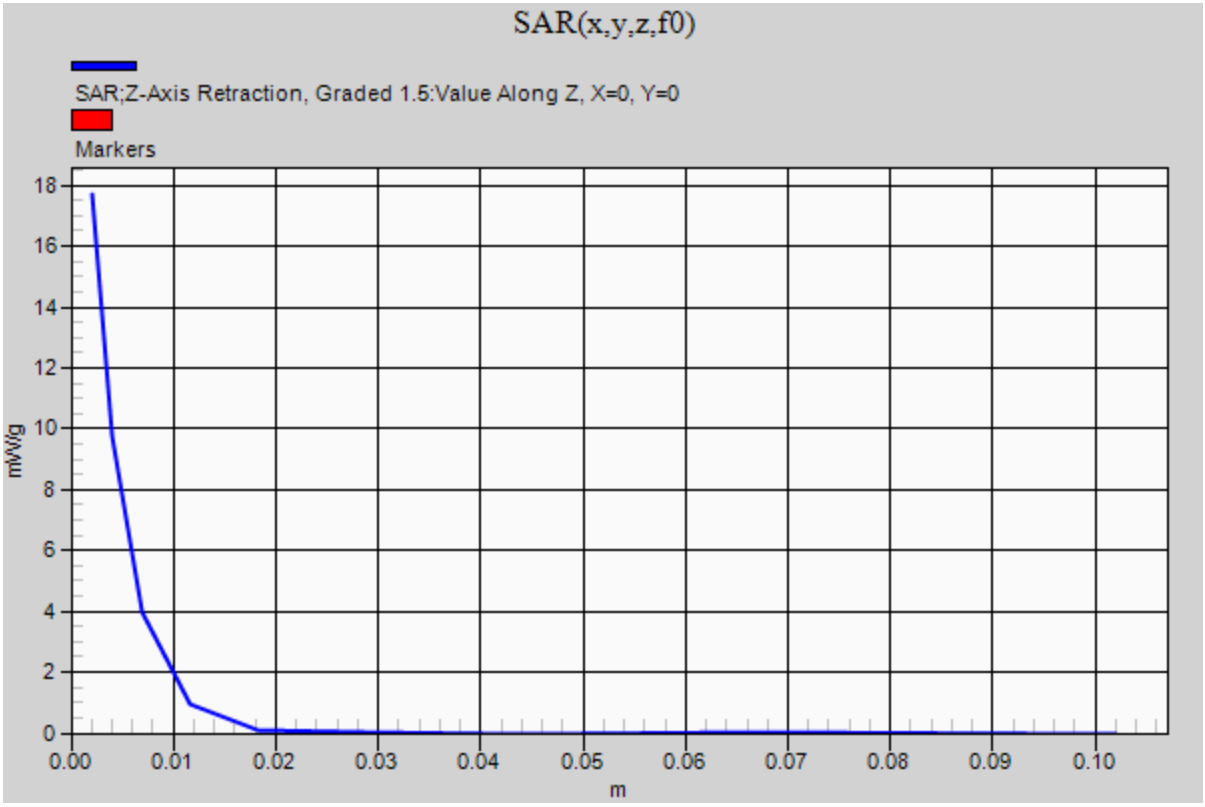
- Probe: EX3DV4 - SN3730; ConvF(4.72, 4.72, 4.72); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (5x22x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 15.059 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 66.433 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 33.4760
SAR(1 g) = 8.46 mW/g; SAR(10 g) = 2.42 mW/g
Maximum value of SAR (measured) = 17.636 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9): Measurement grid: dx=20mm, dy=20mm, dz=2mm
Maximum value of SAR (measured) = 17.716 mW/g


mW/g
17.716
14.173
10.630
7.086
3.543
0
y
x


SAR(x,y,z,f0)
SAR;Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
Markers
mW/g
18
16
14
12
10
8
6
4
2
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 4/20/2012 12:05:01 PM

DUT: Dipole 5-6GHz; Type: D5GHzV2; Procedure Notes: 5200 MHz System Performance Check / Dipole Sn# 1088-5200; PM1 Power = 100mW
Sim.Temp@ meas =19.3*C; Sim.Temp@ SPC = 19.3*C; Room Temp@ SPC =20.2*C

Communication System: _CW - Dipole; Frequency: 5200 MHz; Communication System Channel Number: 15; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 5200 MHz; σ = 4.44 mho/m; ε_r = 33.4; ρ = 1000 kg/m^3

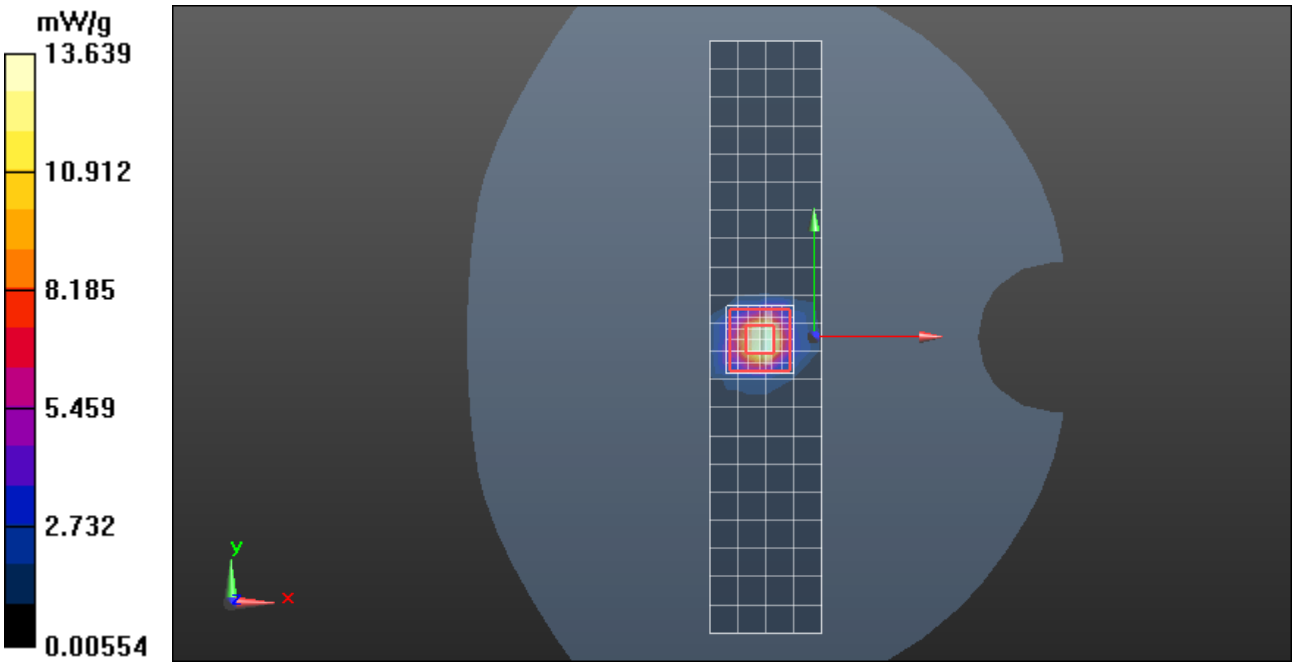
DASY4 Configuration:

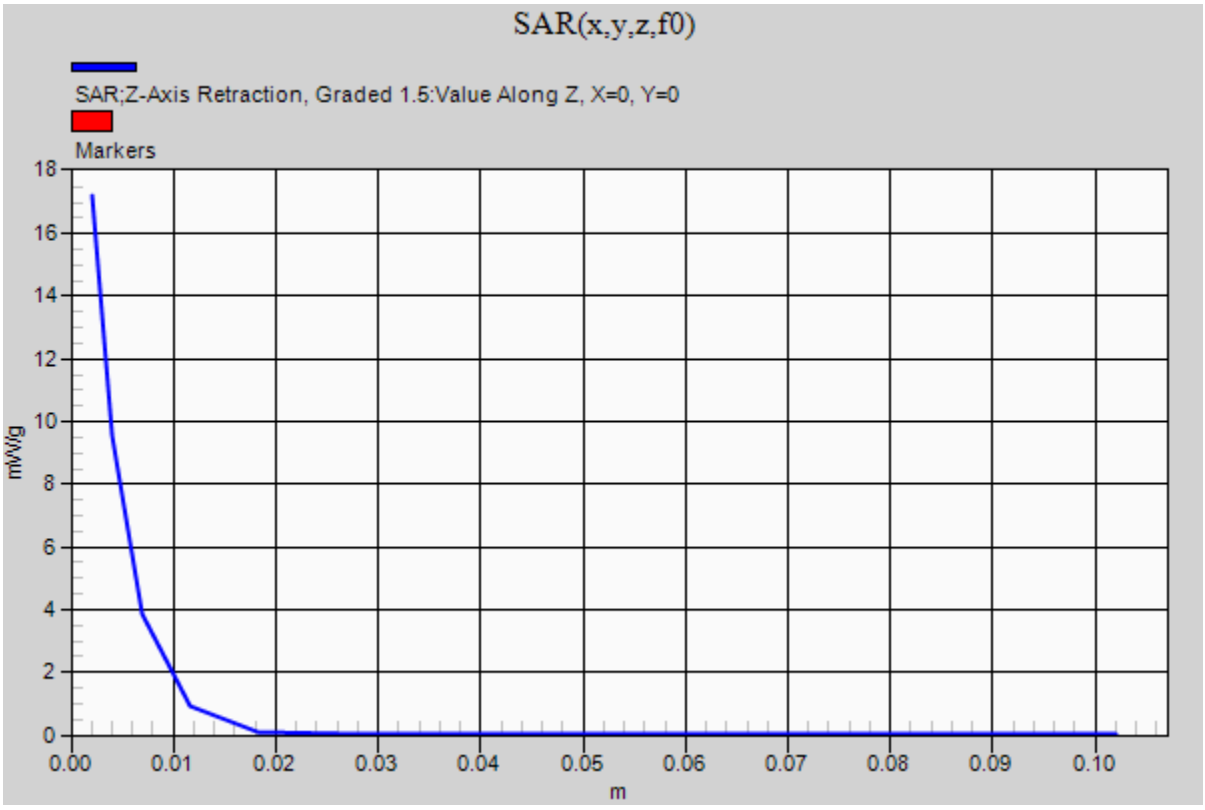
- Probe: EX3DV4 - SN3730; ConvF(4.72, 4.72, 4.72); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (5x22x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 13.639 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 65.458 V/m; Power Drift = -0.0069 dB
Peak SAR (extrapolated) = 32.2730
SAR(1 g) = 8.26 mW/g; SAR(10 g) = 2.36 mW/g
Maximum value of SAR (measured) = 17.233 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9): Measurement grid: dx=20mm, dy=20mm, dz=2mm
Maximum value of SAR (measured) = 17.226 mW/g


mW/g
13.639
10.912
8.185
5.459
2.732
0.00554
y
x


SAR(x,y,z,f0)
SAR;Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
Markers
mW/g
18
16
14
12
10
8
6
4
2
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 4/1/2012 11:46:16 AM

DUT: Dipole 5-6GHz; Type: D5GHzV2; Procedure Notes: 5800 MHz System Performance Check / Dipole Sn# 1088-5800; PM1 Power = 100 mW;
Sim.Temp@ meas = 18.8*C; Sim.Temp@ SPC = 19.0*C; Room Temp@ SPC = 19.9*C

Communication System: _CW - Dipole; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 5800 MHz; σ = 5.1 mho/m; ε_r = 33.2; ρ = 1000 kg/m^3

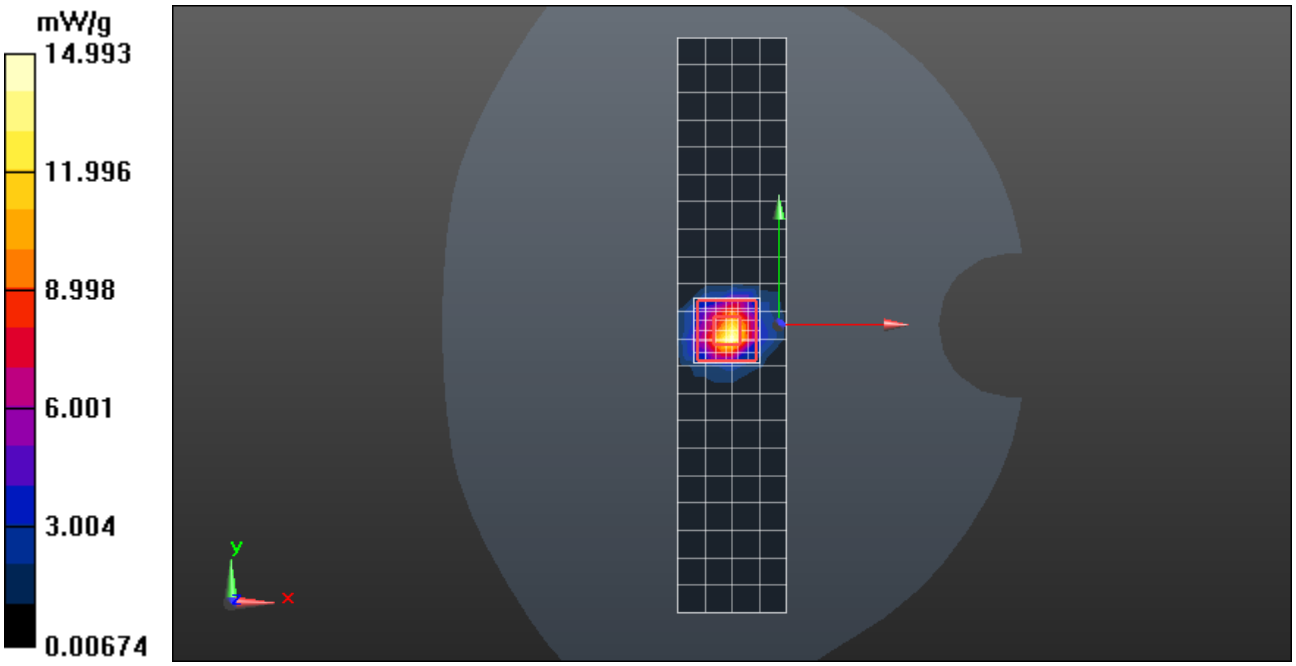
DASY4 Configuration:

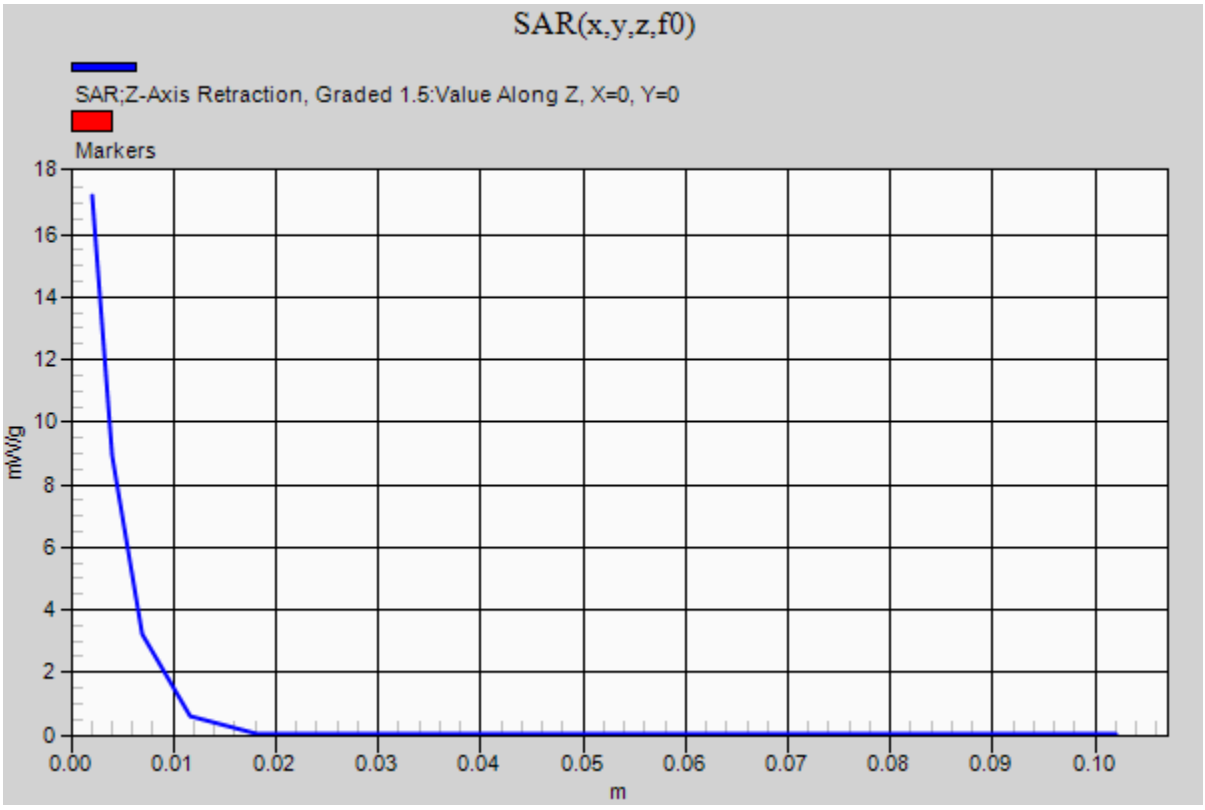
- Probe: EX3DV4 - SN3730; ConvF(4.16, 4.16, 4.16); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (5x22x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 14.993 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 61.132 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 35.1340
SAR(1 g) = 8.06 mW/g; SAR(10 g) = 2.28 mW/g
Maximum value of SAR (measured) = 17.375 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9): Measurement grid: dx=20mm, dy=20mm, dz=2mm
Maximum value of SAR (measured) = 17.257 mW/g


mW/g
14.993
11.996
8.998
6.001
3.004
0.00674
y
x


SAR(x,y,z,f0)
SAR;Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
Markers
mW/g
18
16
14
12
10
8
6
4
2
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 5/8/2012 12:32:07 AM

DUT: Dipole 5-6GHz; Type: D5GHzV2; Procedure Notes: 5800 MHz System Performance Check / Dipole Sn# 1088-5800; PM1 Power = 100 mW
Sim.Temp@ meas = 18.3*C; Sim.Temp@ SPC = 18.3*C; Room Temp@ SPC = 20.3*C

Communication System: _CW - Dipole; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 5800 MHz; σ = 5.13 mho/m; ε_r = 32.2; ρ = 1000 kg/m^3

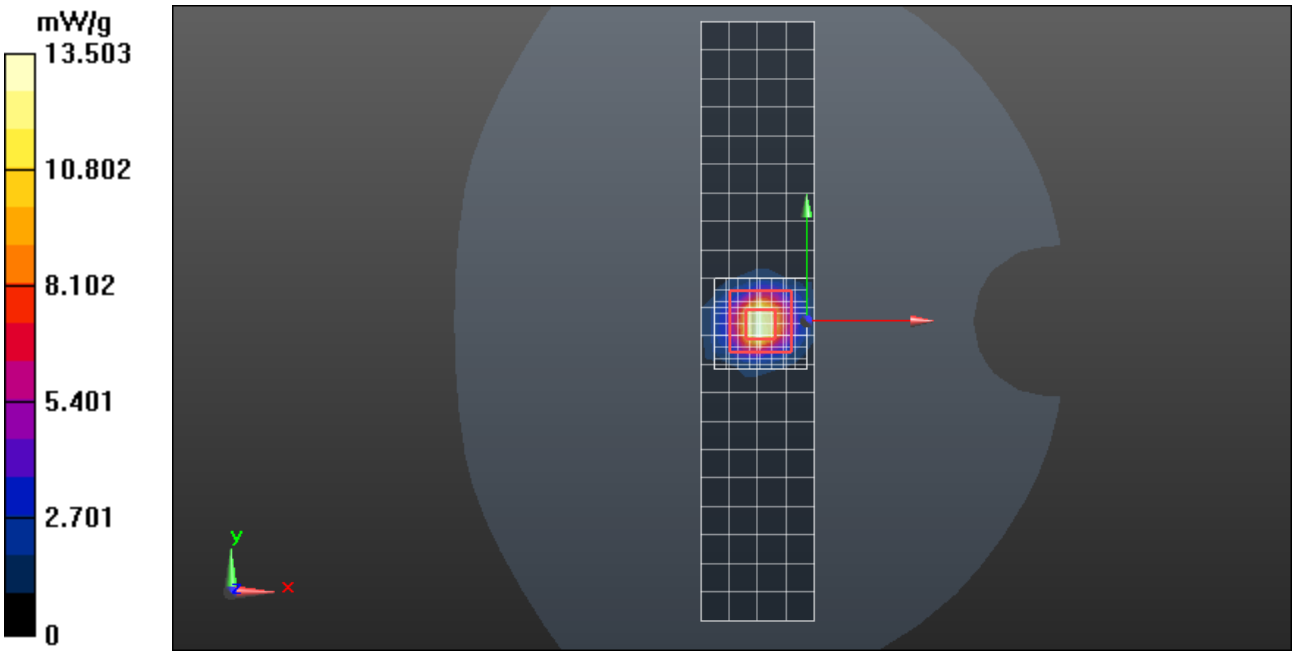
DASY4 Configuration:

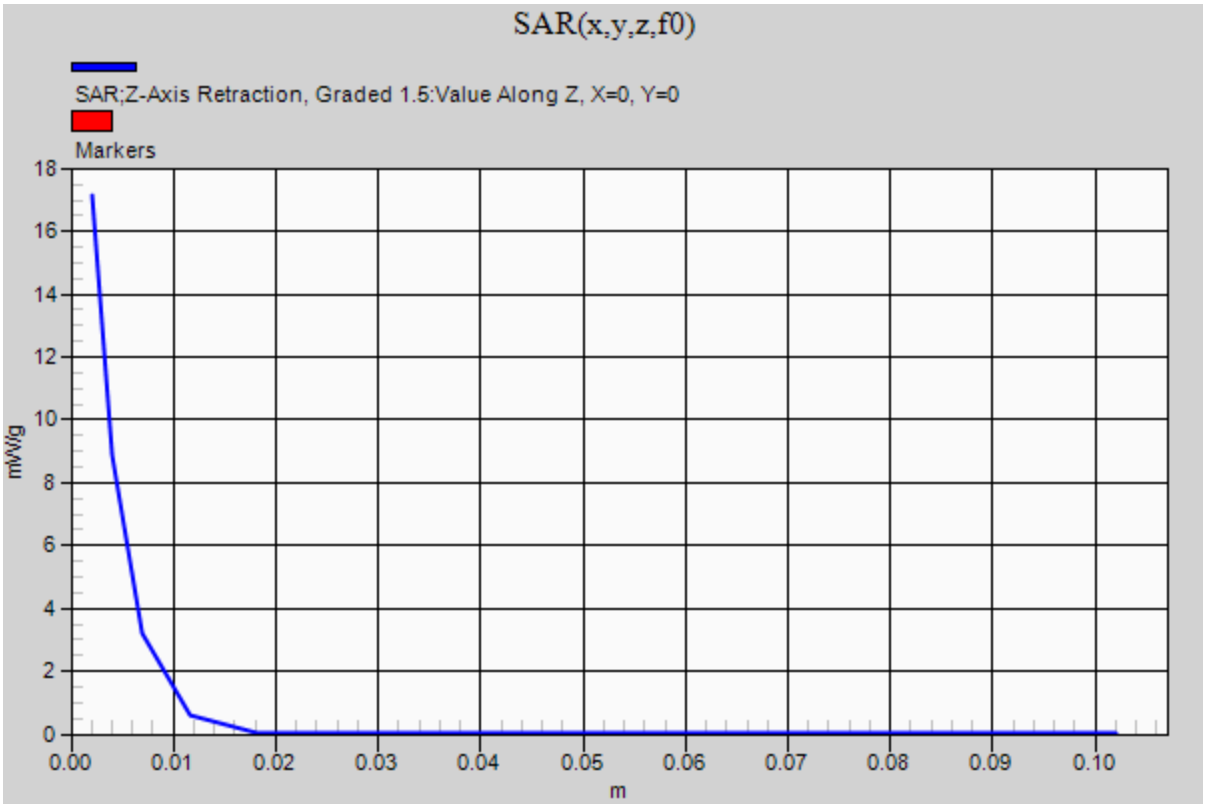
- Probe: EX3DV4 - SN3728; ConvF(4.23, 4.23, 4.23); Calibrated: 4/24/2012
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/17/2012
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (5x22x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 13.503 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (9x9x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 62.153 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 33.9680
SAR(1 g) = 8 mW/g; SAR(10 g) = 2.26 mW/g
Maximum value of SAR (measured) = 17.033 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9): Measurement grid: dx=20mm, dy=20mm, dz=2mm
Maximum value of SAR (measured) = 17.162 mW/g


mW/g
13.503
10.802
8.102
5.401
2.701
0
y
x


SAR(x,y,z,f0)
SAR;Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
Markers
mW/g
18
16
14
12
10
8
6
4
2
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

System Accuracy Verification Measurements for Body SAR Measurements

Date/Time: 3/16/2012 8:07:18 AM

DUT: Dipole 750 MHz; Type: D750V3; Procedure Notes: 750 MHz System Performance Check / Dipole Sn# 1040; PM1 Power = 200 mW
Sim.Temp@ meas = 21.3*C; Sim.Temp@ SPC = 20.2*C; Room Temp@ SPC = 22.1*C

Communication System: _CW - Dipole; Frequency: 750 MHz; Communication System Channel Number: 2; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 750 MHz; σ = 0.99 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3

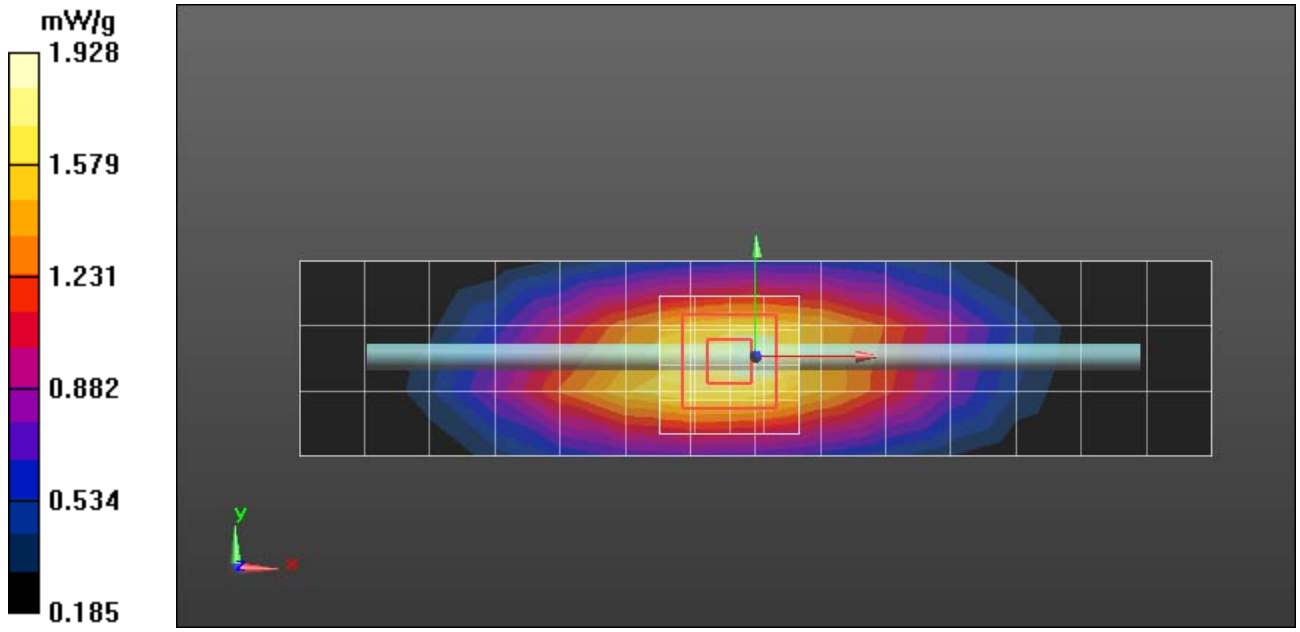
DASY4 Configuration:

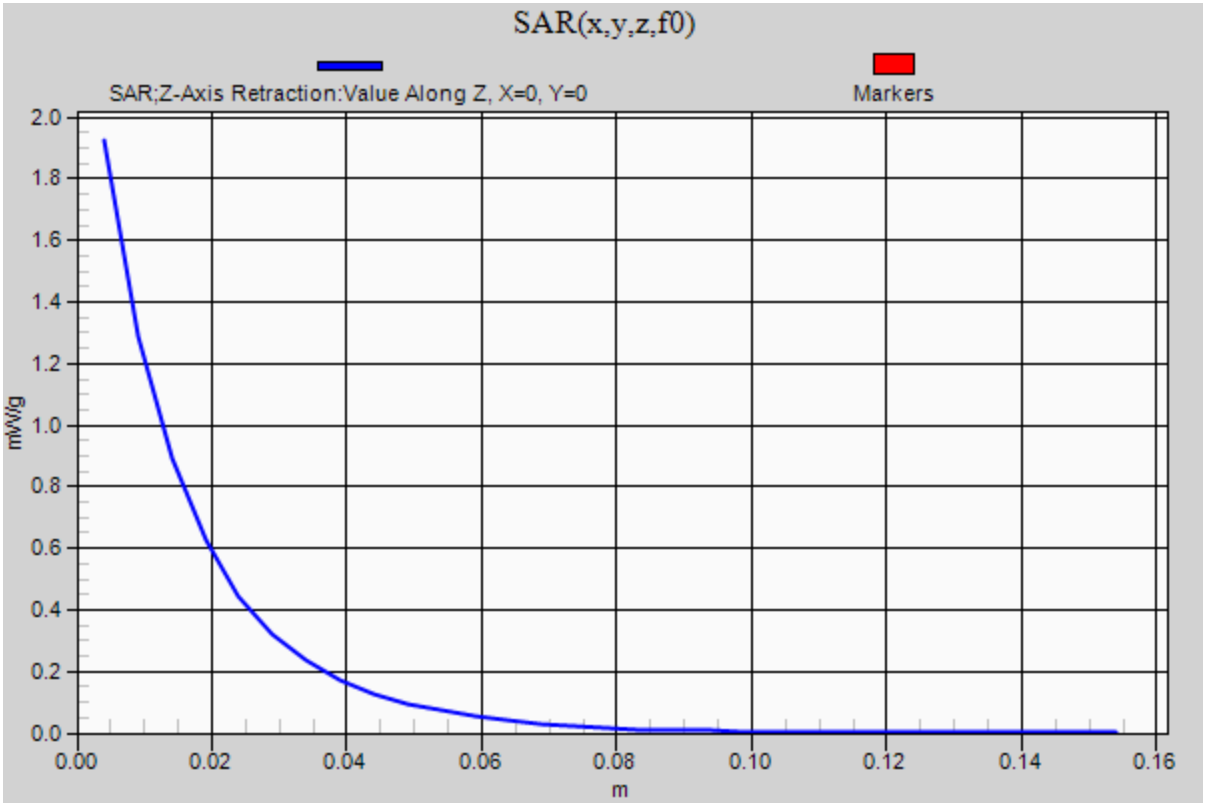
- Probe: ES3DV3 - SN3284; ConvF(6.36, 6.36, 6.36); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.713 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 44.523 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 2.6770
SAR(1 g) = 1.79 mW/g; SAR(10 g) = 1.17 mW/g
Maximum value of SAR (measured) = 1.928 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 1.925 mW/g




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

Date/Time: 2/24/2012 5:52:52 PM

DUT: Dipole 835 MHz; Type: D835V2; Procedure Notes: 835 MHz System Performance Check / Dipole Sn# 422(TR); PM1 Power = 200 mW
Sim.Temp@ meas = 20.1*C; Sim.Temp@ SPC = 20.2*C; Room Temp@ SPC = 22.6*C

Communication System: _CW - Dipole; Frequency: 835 MHz; Communication System Channel Number: 3; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3

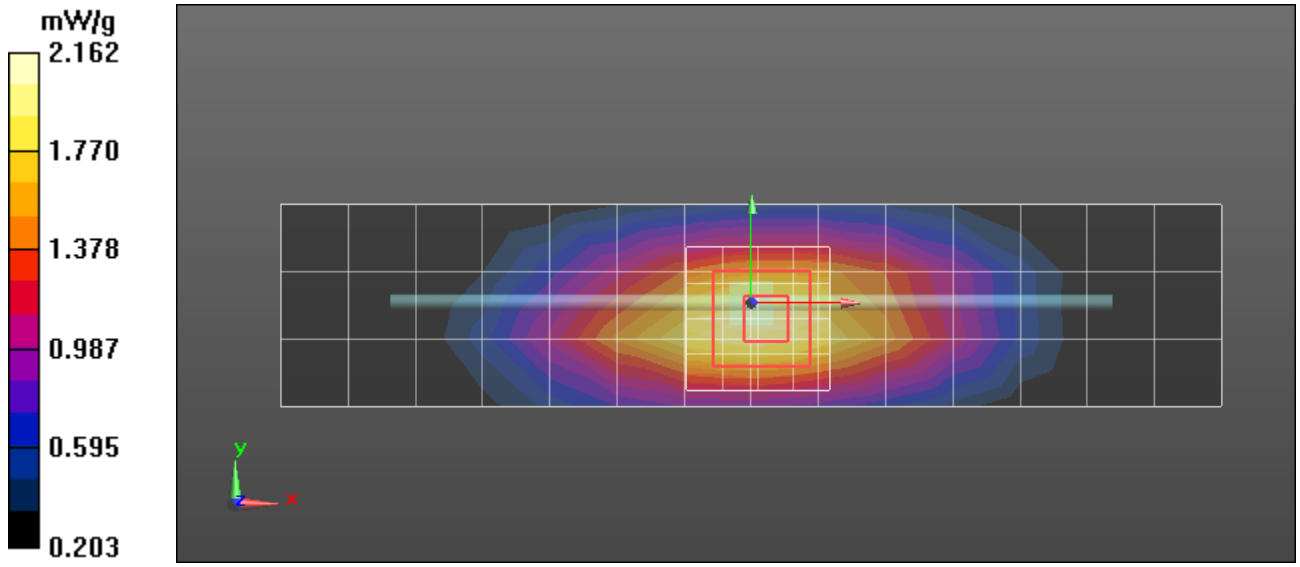
DASY4 Configuration:

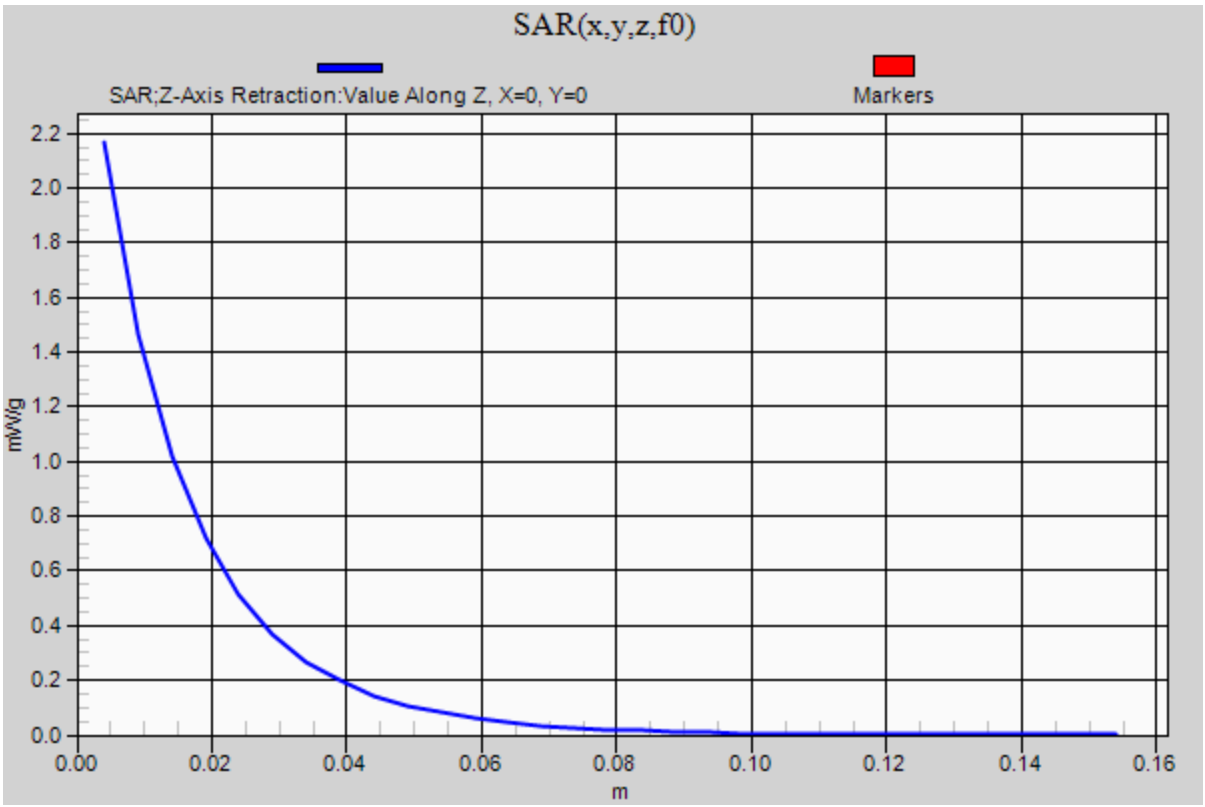
- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.057 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 46.232 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 2.9710
SAR(1 g) = 2 mW/g; SAR(10 g) = 1.32 mW/g
Maximum value of SAR (measured) = 2.162 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 2.166 mW/g




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: 2/23/2012 7:44:40 PM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 250TR; PM1 Power = 200 mW
Sim.Temp@ meas = 19.7*C; Sim.Temp@ SPC = 19.5*C; Room Temp@ SPC = 21.8*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Communication System Channel Number: 8; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.48 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3

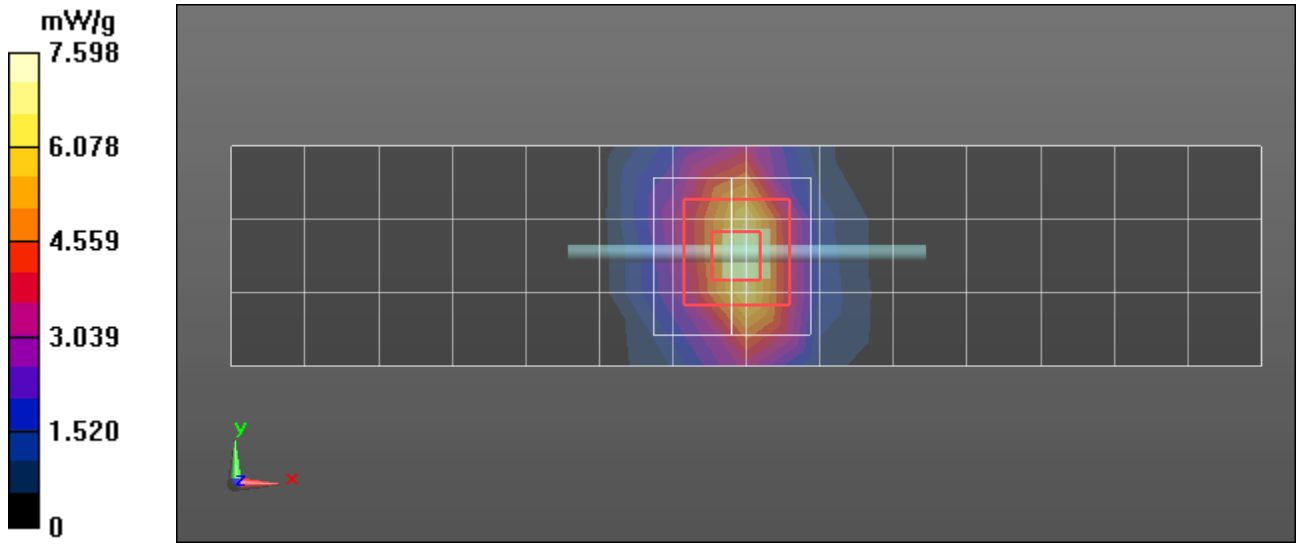
DASY4 Configuration:

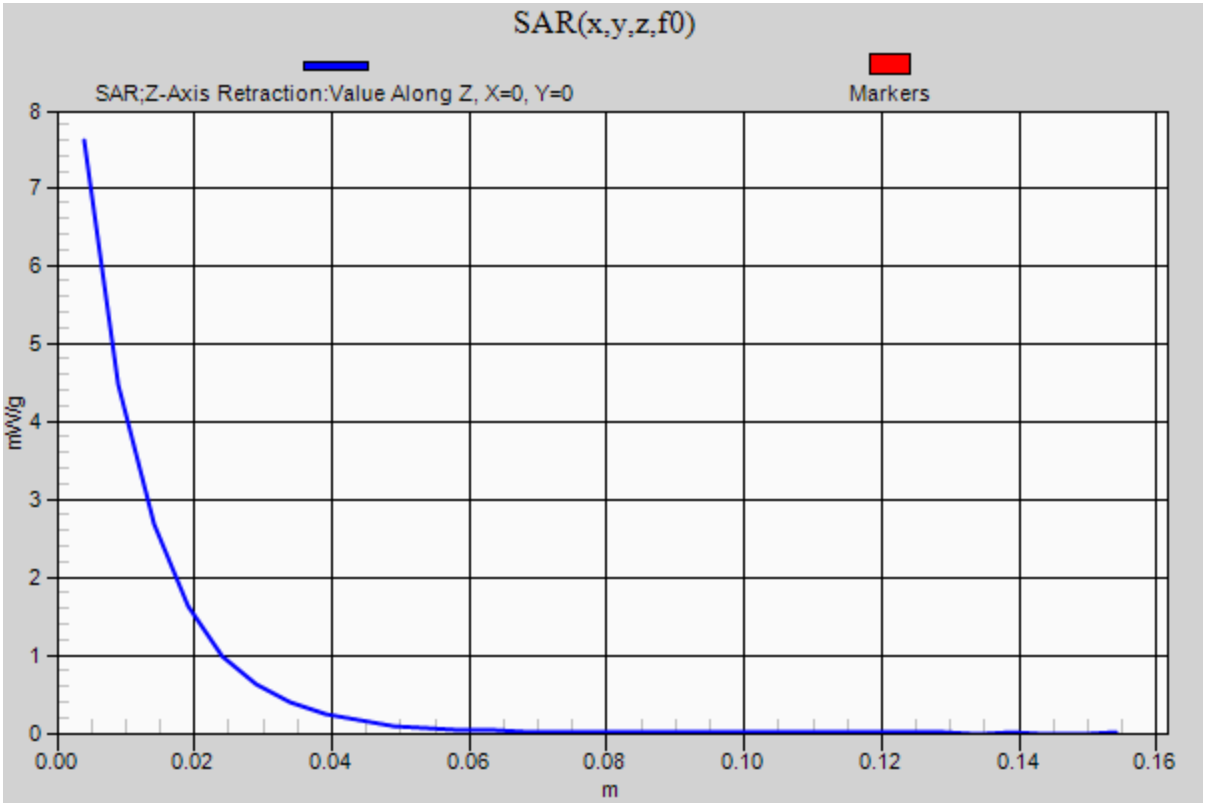
- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.794 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 71.984 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 11.6520
SAR(1 g) = 6.75 mW/g; SAR(10 g) = 3.62 mW/g
Maximum value of SAR (measured) = 7.581 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 7.598 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: 2/26/2012 6:56:59 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 250TR; PM1 Power = 200 mW
Sim.Temp@ meas = 19.7*C; Sim.Temp@ SPC = 19.7*C; Room Temp@ SPC = 21.7*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Communication System Channel Number: 8; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.49 mho/m; ε_r = 52; ρ = 1000 kg/m^3

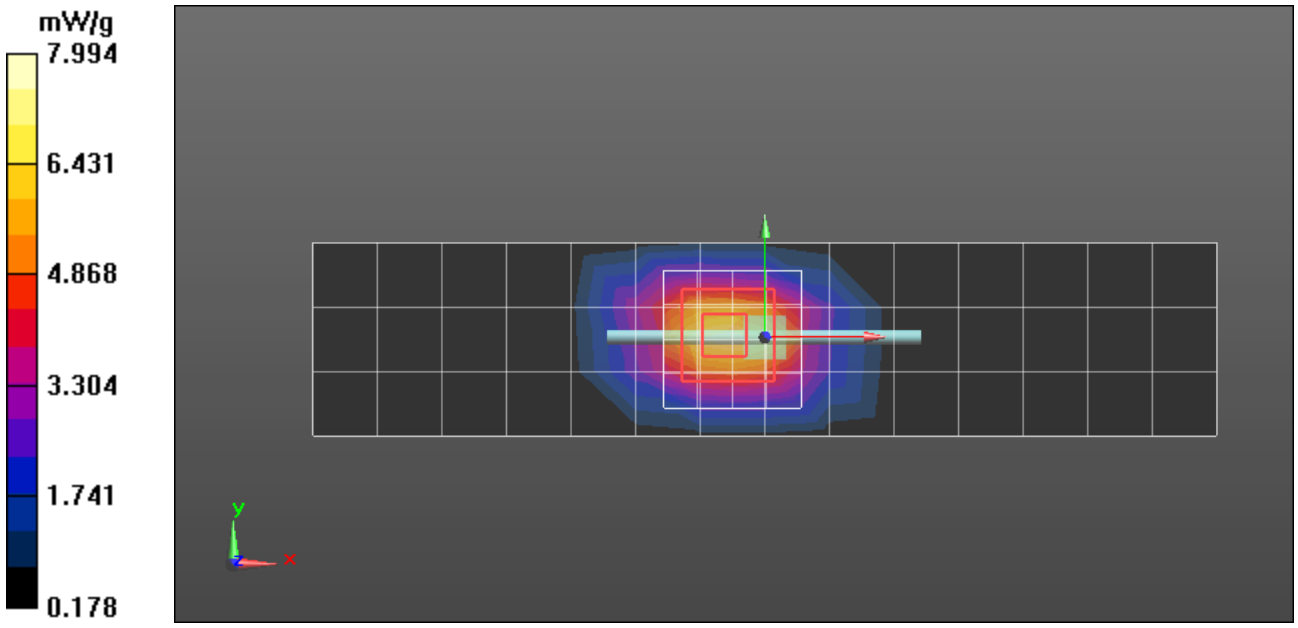
DASY4 Configuration:

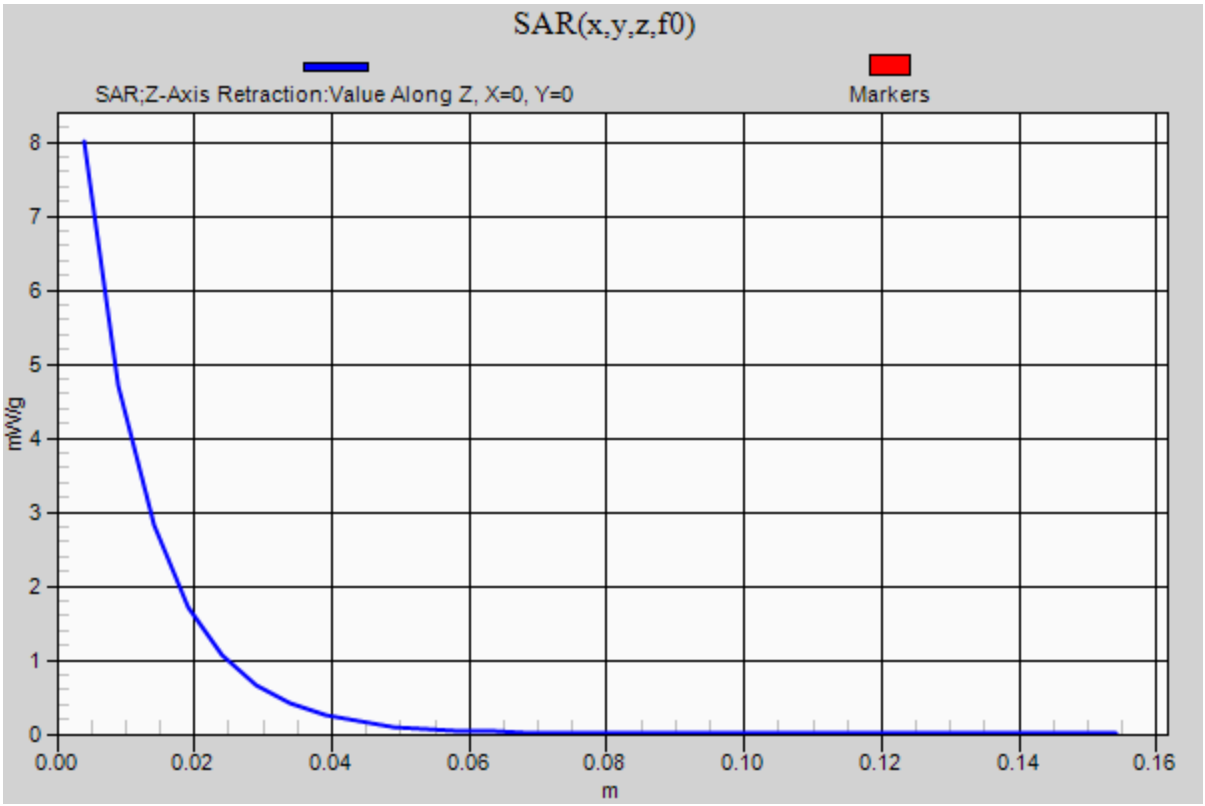
- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 5.732 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 71.318 V/m; Power Drift = -0.0059 dB
Peak SAR (extrapolated) = 12.3040
SAR(1 g) = 7.13 mW/g; SAR(10 g) = 3.83 mW/g
Maximum value of SAR (measured) = 7.994 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.008 mW/g


mW/g
7.994
6.431
4.868
3.304
1.741
0.178
y
x


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: 2/28/2012 8:54:42 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 250TR; PM1 Power = 200 mW
Sim.Temp@ meas = 19.5*C; Sim.Temp@ SPC = 20.5*C; Room Temp@ SPC = 22.2*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Communication System Channel Number: 8; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.49 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

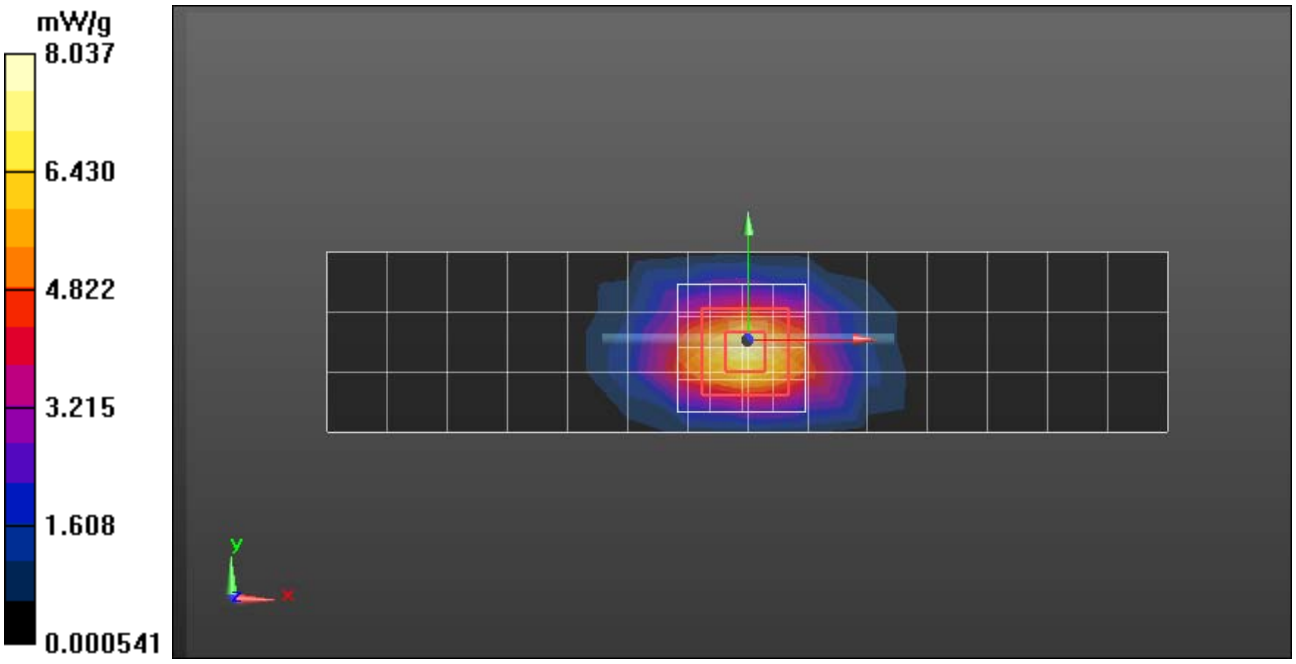
DASY4 Configuration:

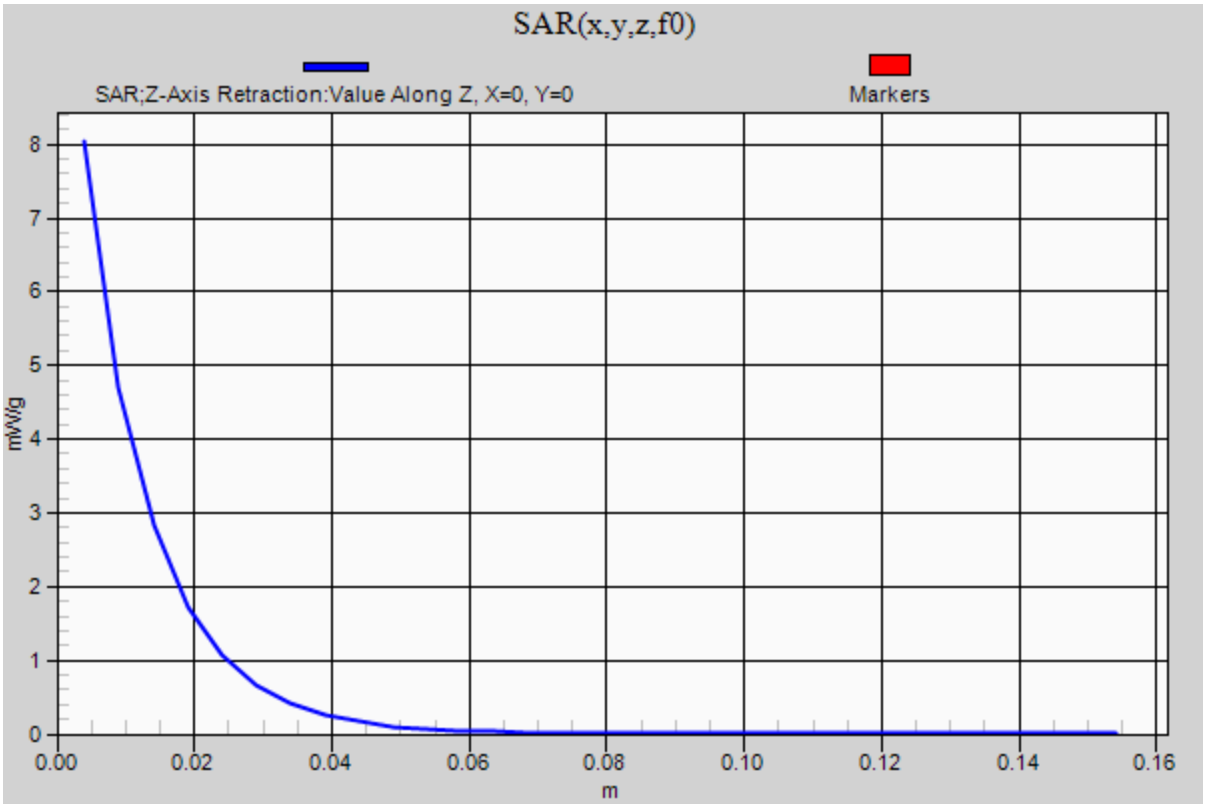
- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.803 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 73.760 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 12.4310
SAR(1 g) = 7.19 mW/g; SAR(10 g) = 3.85 mW/g
Maximum value of SAR (measured) = 8.048 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.037 mW/g


mW/g
8.037
6.430
4.822
3.215
1.608
0.000541
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: 3/28/2012 12:35:43 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 2D191; PM1 Power = 200 mW
Sim.Temp@ meas = 19.1*C; Sim.Temp@ SPC =19.2*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 = 1.48 mho/m; ε_r = 53; ρ = 1000 kg/m^3

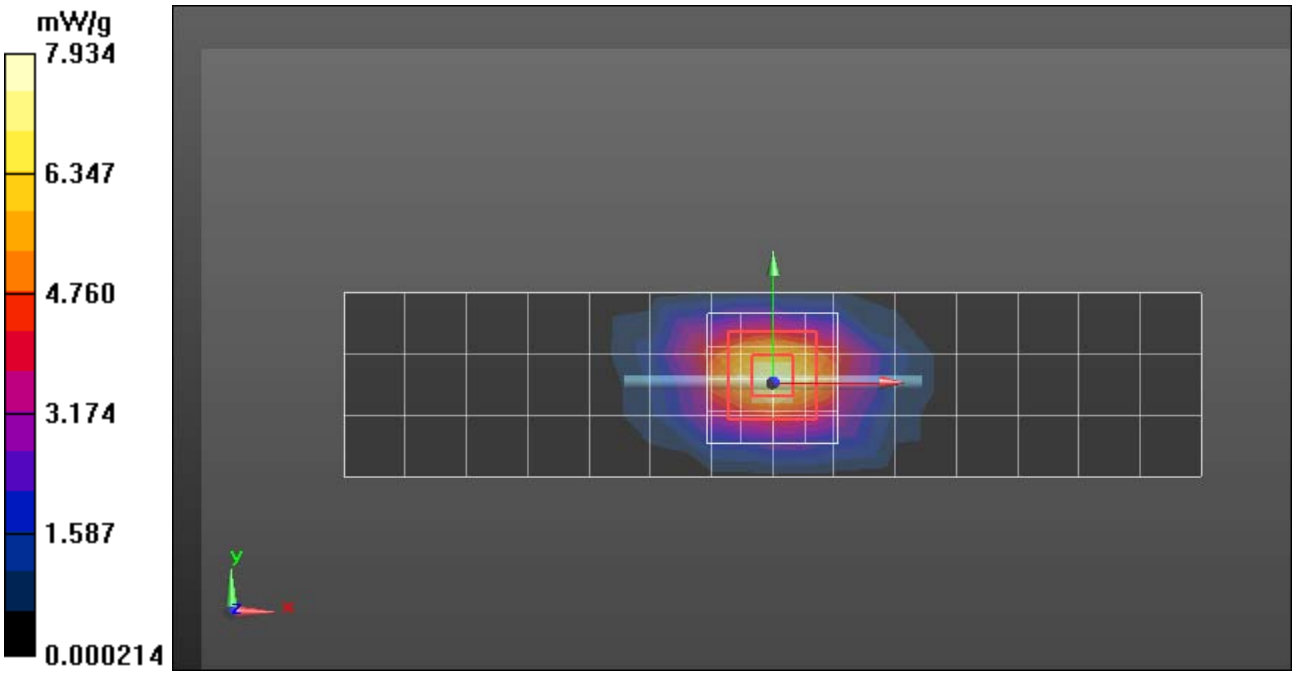
DASY4 Configuration:

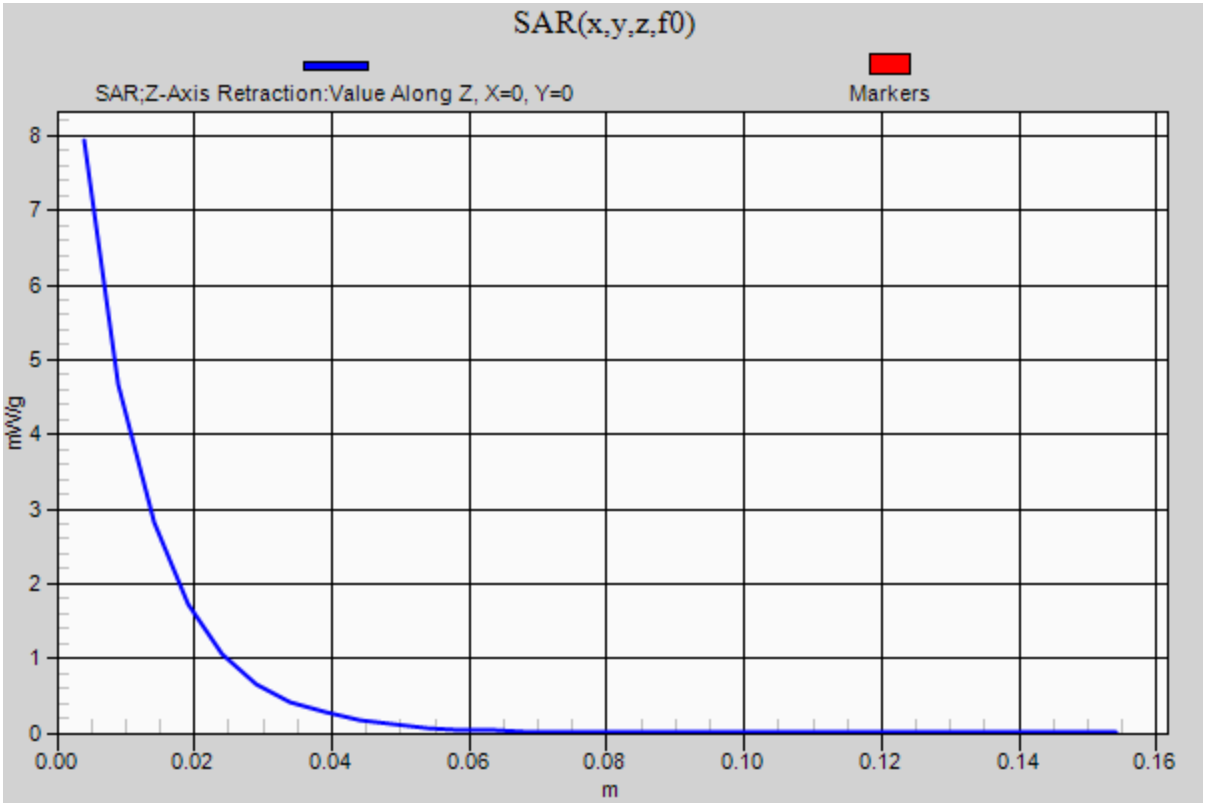
- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.560 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 74.537 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 12.1960
SAR(1 g) = 7.05 mW/g; SAR(10 g) = 3.77 mW/g
Maximum value of SAR (measured) = 7.944 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 7.934 mW/g


mW/g
7.934
6.347
4.760
3.174
1.587
0.000214


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: 3/29/2012 8:19:20 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 =19.0*C; Room Temp@ SPC = 21.3*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.49 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3

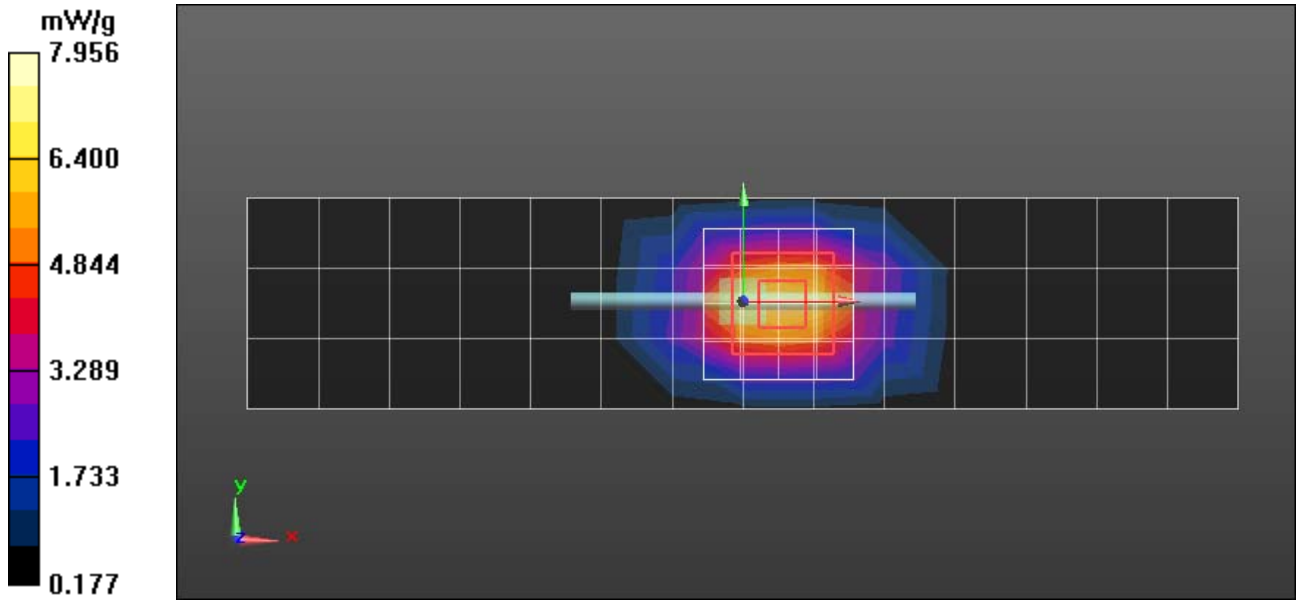
DASY4 Configuration:

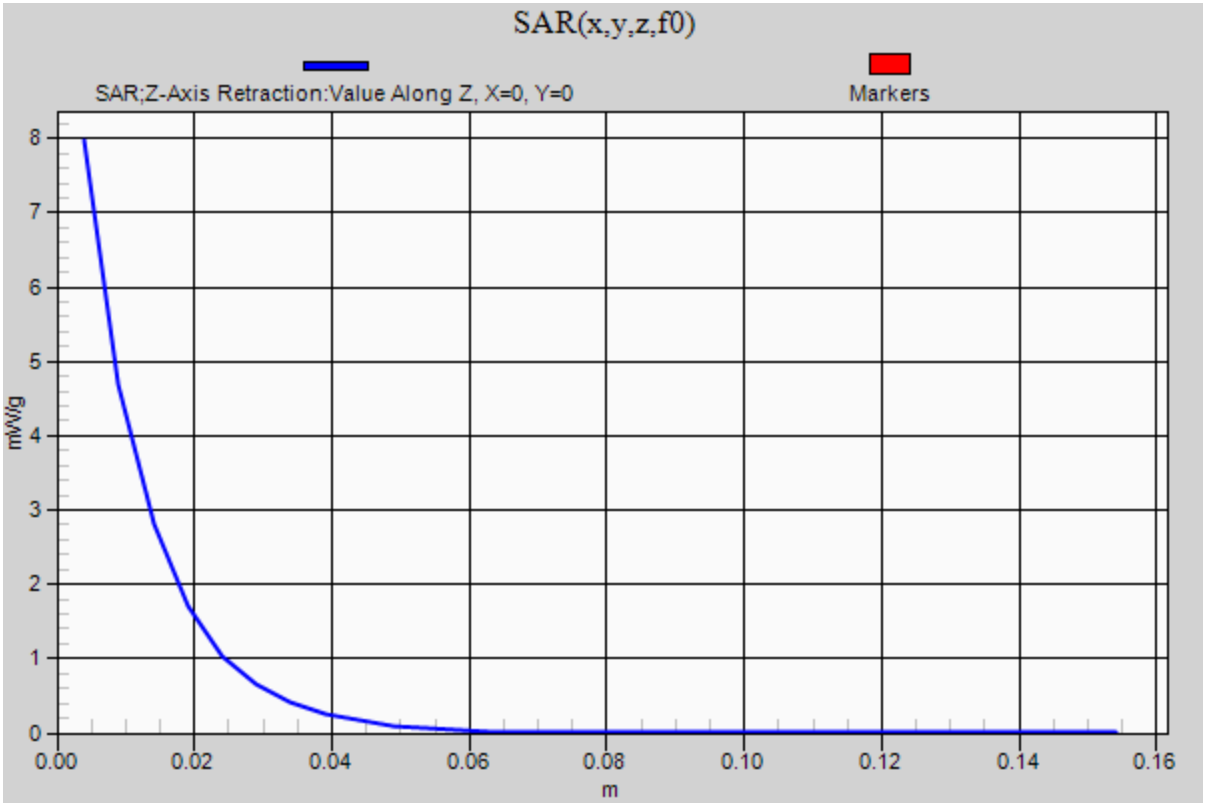
- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 5.286 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 70.786 V/m; Power Drift = 0.0037 dB
Peak SAR (extrapolated) = 12.2460
SAR(1 g) = 7.07 mW/g; SAR(10 g) = 3.77 mW/g
Maximum value of SAR (measured) = 7.956 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 7.974 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: 3/30/2012 8:29:26 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 2D191; PM1 Power = 200 mW
Sim.Temp@ meas = 18.3*C; Sim.Temp@ SPC =18.3*C; Room Temp@ SPC = 20.2*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 = 52.4; ρ = 1000 kg/m^3

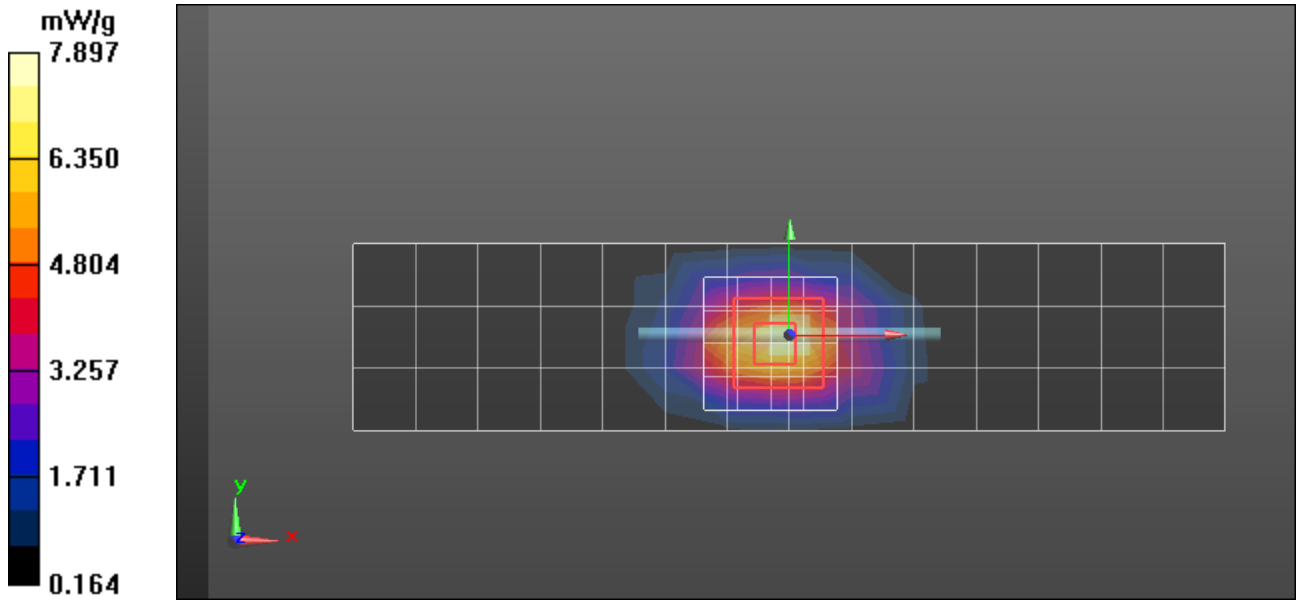
DASY4 Configuration:

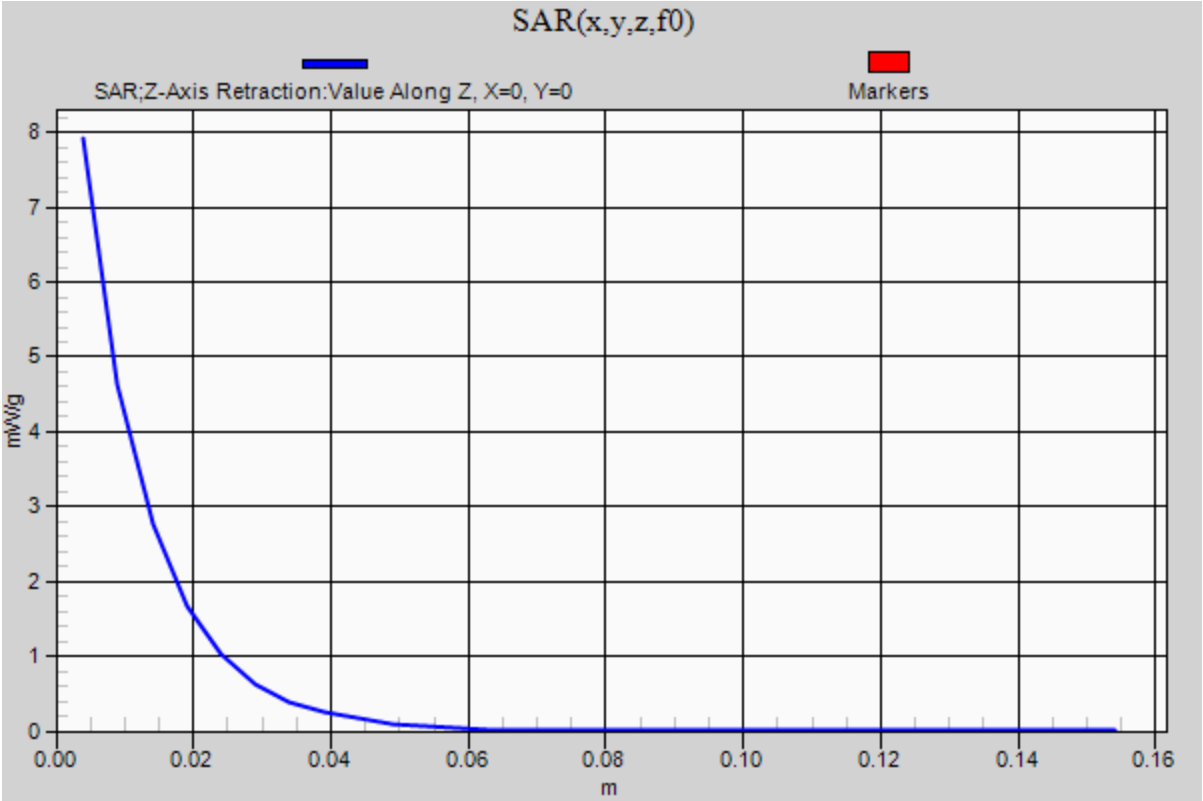
- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.081 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 73.110 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 12.2230
SAR(1 g) = 7.02 mW/g; SAR(10 g) = 3.75 mW/g
Maximum value of SAR (measured) = 7.897 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 7.919 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: 3/7/2012 9:16:59 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 259TR; PM1 Power =200 mW
Sim.Temp@ meas = 20.3*C; Sim.Temp@ SPC = 20.0*C; Room Temp@ SPC = 22.2*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.57 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3

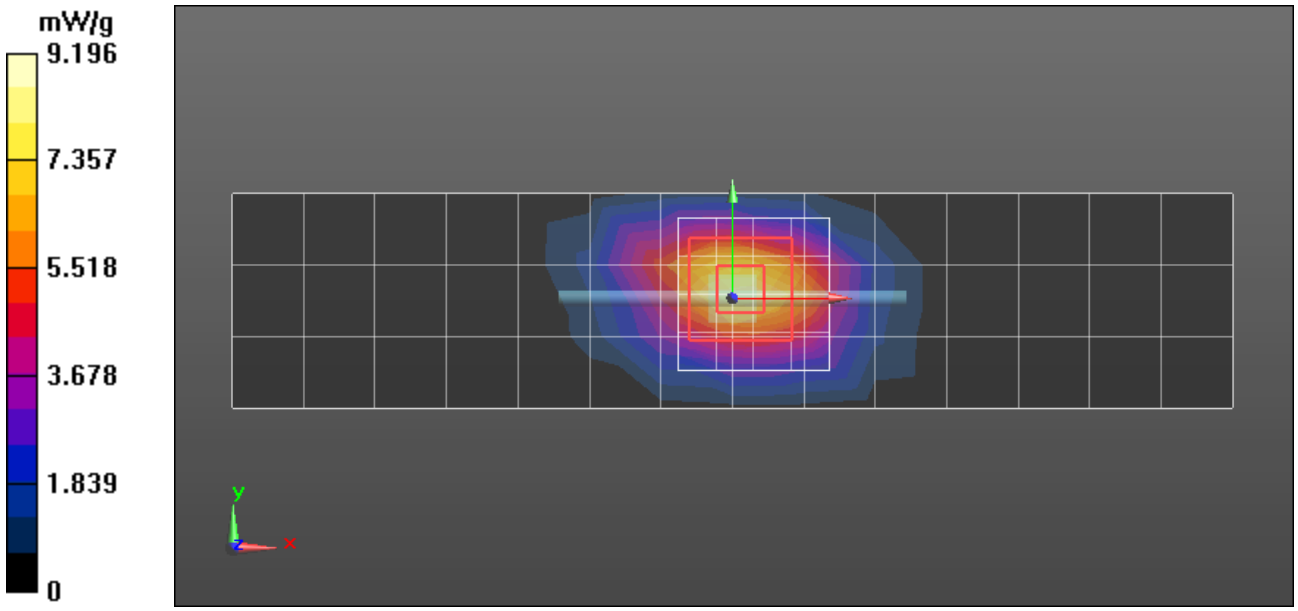
DASY4 Configuration:

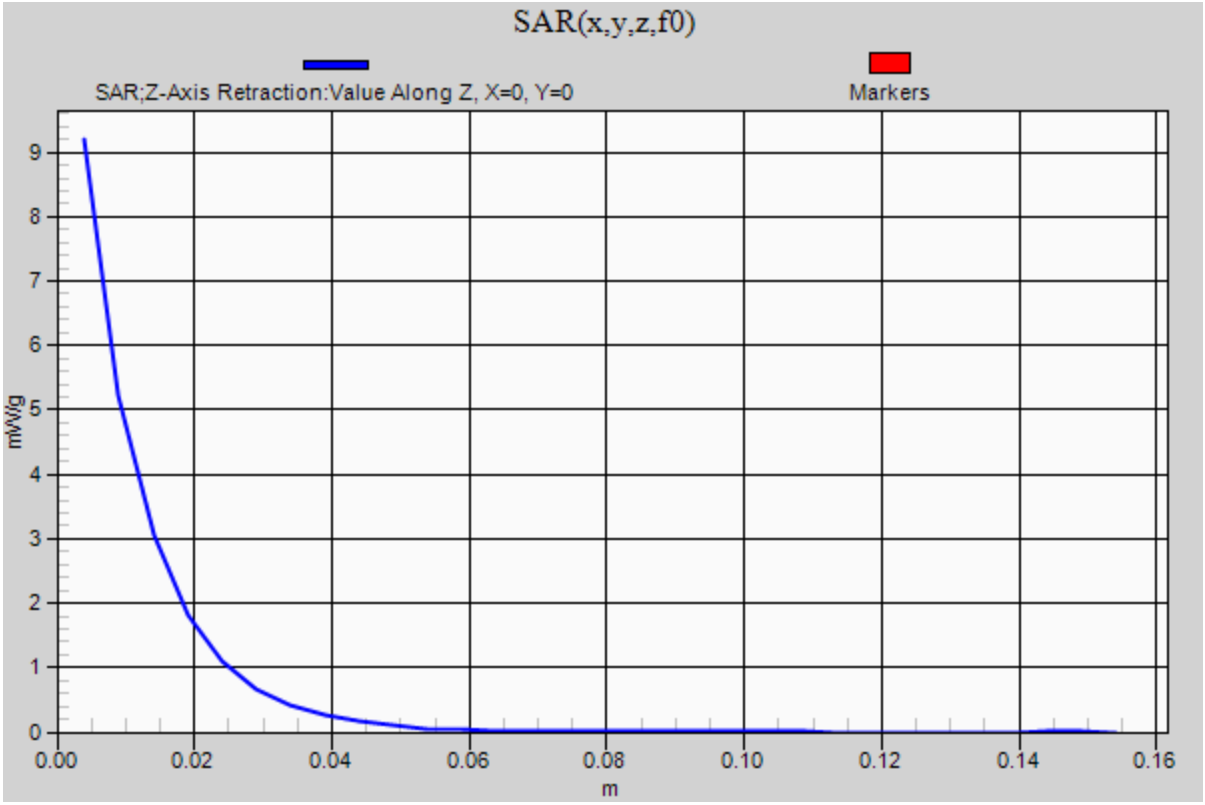
- Probe: ES3DV3 - SN3124; ConvF(4.69, 4.69, 4.69); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 7.686 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.294 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 14.8490
SAR(1 g) = 8.2 mW/g; SAR(10 g) = 4.31 mW/g
Maximum value of SAR (measured) = 9.126 mW/g

DASY5, Triple Flat System Performance Check Template - Rev.3 (19-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 9.196 mW/g


mW/g
9.196
7.357
5.518
3.678
1.839
0
y
x


SAR(x,y,z,f0)
SAR;Z-Axis Retraction:Value Along Z, X=0, Y=0
Markers
mW/g
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
m

Date/Time: 4/4/2012 9:15:56 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 =19.0*C; Room Temp@ SPC = 20.9*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* (1730 simulate); Medium parameters used: f = 1800 MHz; σ = 1.57 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

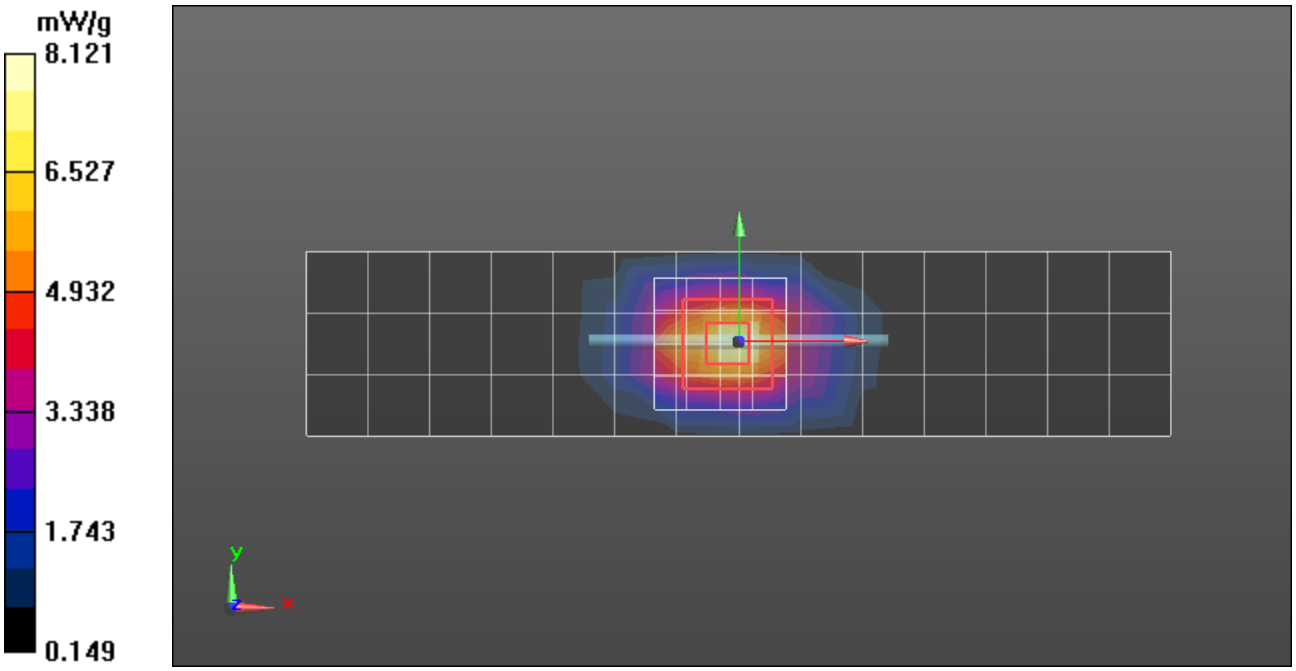
DASY4 Configuration:

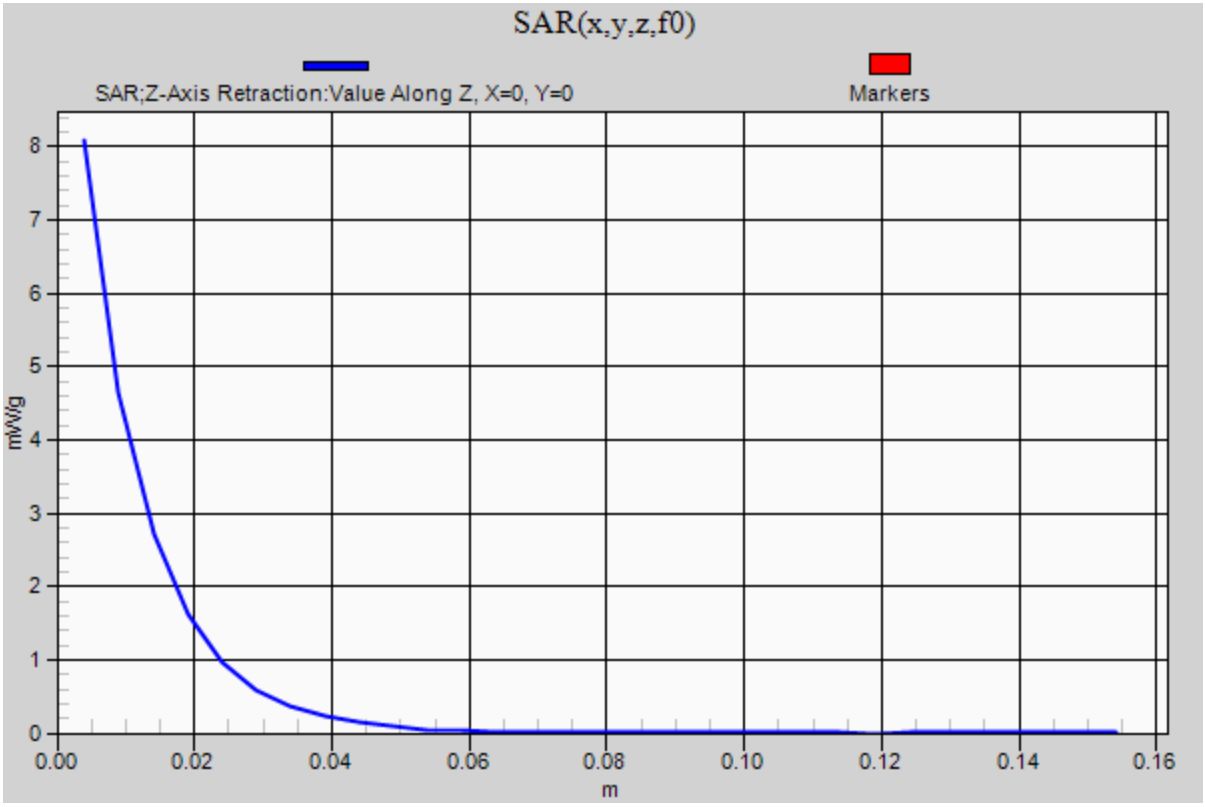
- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 5.667 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 73.302 V/m; Power Drift = 0.0047 dB
Peak SAR (extrapolated) = 12.8080
SAR(1 g) = 7.21 mW/g; SAR(10 g) = 3.8 mW/g
Maximum value of SAR (measured) = 8.121 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.086 mW/g


mW/g
8.121
6.527
4.932
3.338
1.743
0.149
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: 3/20/2012 1:33:20 PM

DUT: Dipole 2450 MHz; Type: D2450V2; Procedure Notes: 2450 MHz System Performance Check / Dipole Sn# 877; PM1 Power = 200 mW
Sim.Temp@ meas = 20.3*C; Sim.Temp@ SPC = 20.2*C; Room Temp@ SPC = 21.7*C

Communication System: _CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 2450 MHz; σ = 1.94 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3

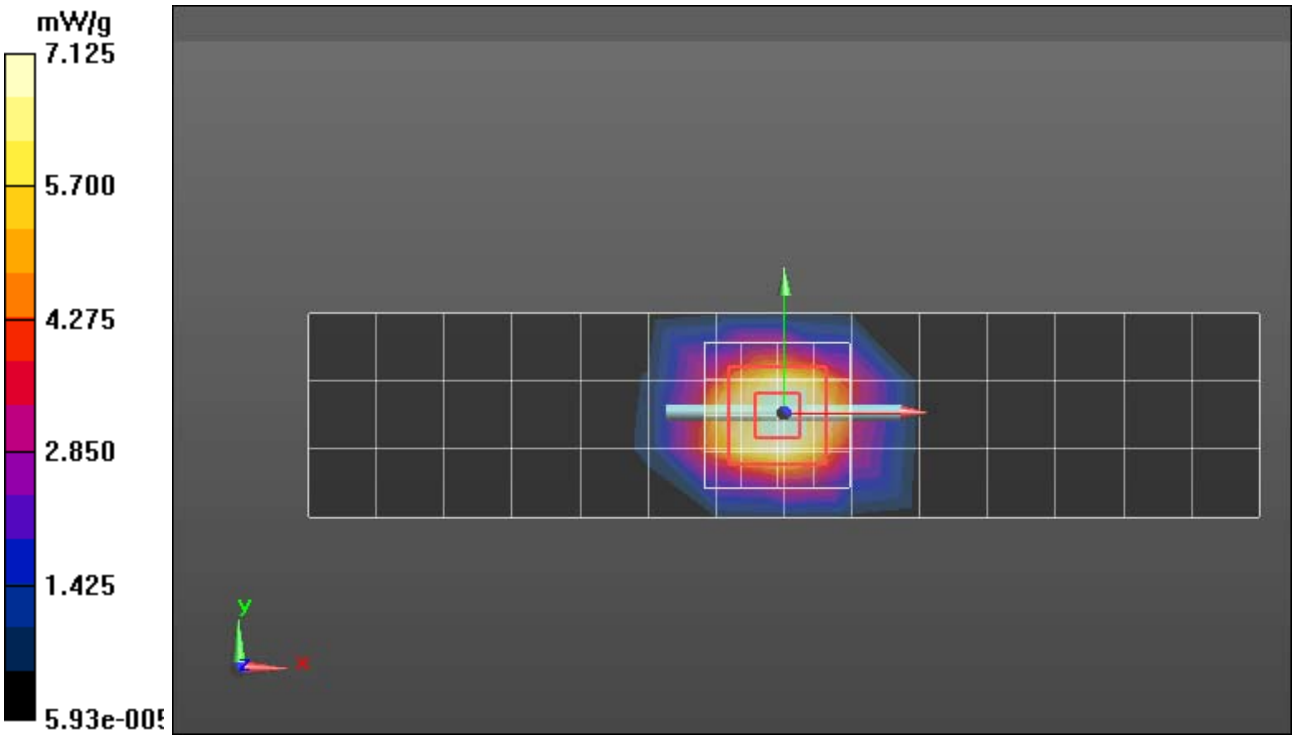
DASY4 Configuration:

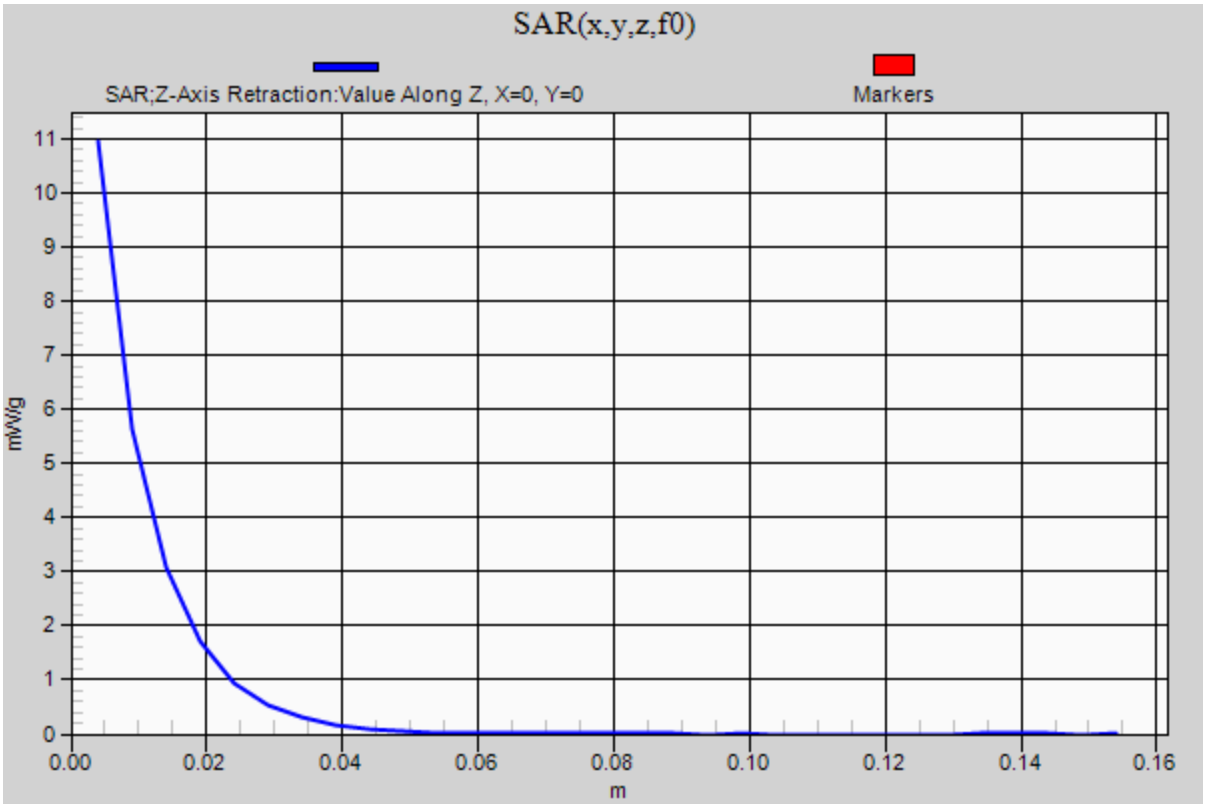
- Probe: ES3DV3 - SN3284; ConvF(4.56, 4.56, 4.56); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 7.125 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 75.575 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 19.8500
SAR(1 g) = 9.63 mW/g; SAR(10 g) = 4.51 mW/g
Maximum value of SAR (measured) = 10.966 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 10.950 mW/g


mW/g
7.125
5.700
4.275
2.850
1.425
5.93e-005
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: 3/29/2012 12:50:26 PM

DUT: Dipole 5-6GHz; Type: D5GHzV2; Procedure Notes: 5200 MHz System Performance Check / Dipole Sn# 1088-5200; PM1 Power = 100 mW
Sim.Temp@ meas = 18.7*C; Sim.Temp@ SPC = 19.1*C; Room Temp@ SPC = 20.7*C

Communication System: _CW - Dipole; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 5200 MHz; σ = 5.56 mho/m; ε_r = 47.2; ρ = 1000 kg/m^3

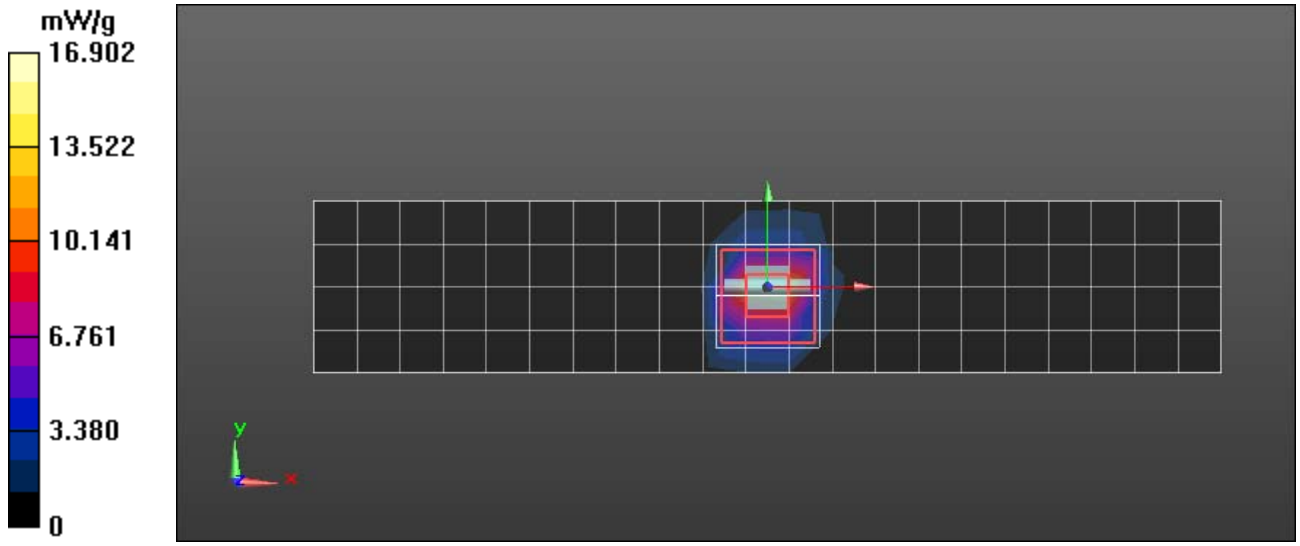
DASY4 Configuration:

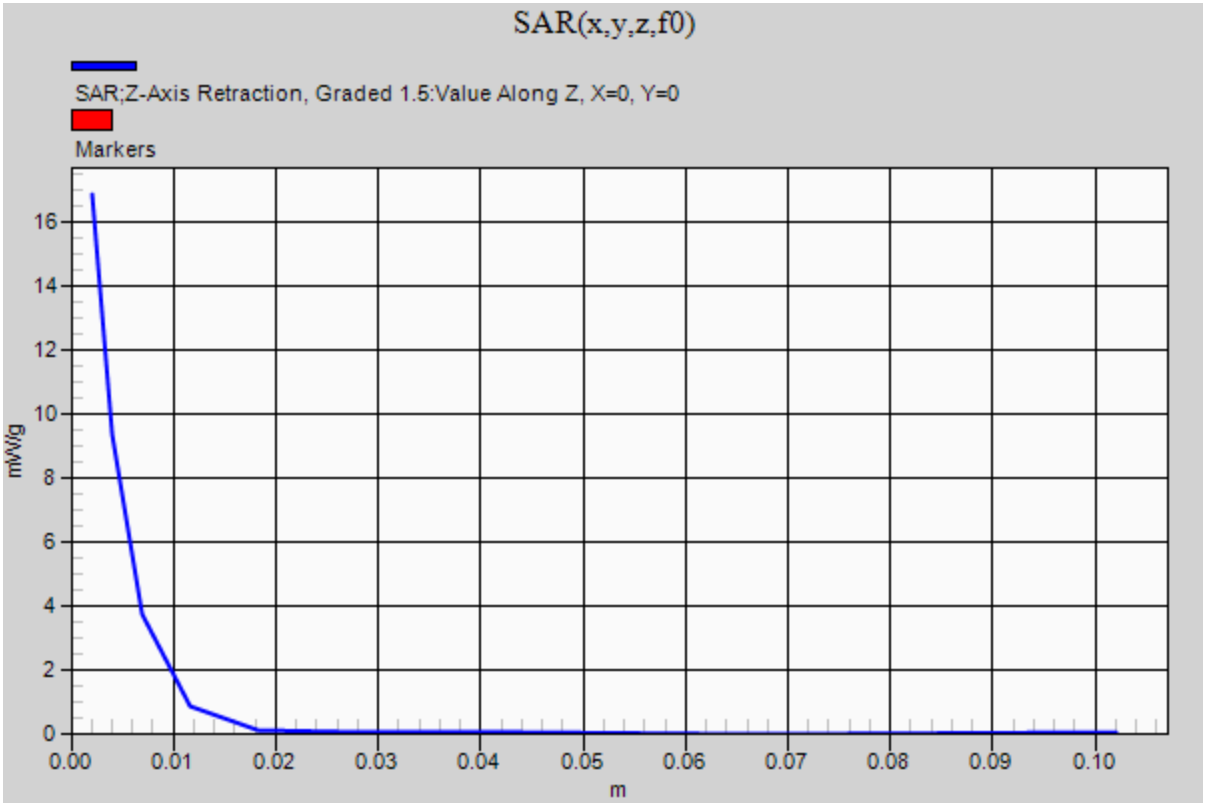
- Probe: EX3DV4 - SN3730; ConvF(4.01, 4.01, 4.01); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (22x5x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 12.173 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 59.580 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 30.8420
SAR(1 g) = 7.89 mW/g; SAR(10 g) = 2.23 mW/g
Maximum value of SAR (measured) = 16.835 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9): Measurement grid: dx=20mm, dy=20mm, dz=2mm
Maximum value of SAR (measured) = 16.902 mW/g




SAR(x,y,z,f0)
SAR;Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
Markers
mW/g
16
14
12
10
8
6
4
2
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 3/30/2012 10:34:15 AM

DUT: Dipole 5-6GHz; Type: D5GHzV2; Procedure Notes: 5200 MHz System Performance Check / Dipole Sn# 1088-5200; PM1 Power = 100 mW;
Sim.Temp@ meas = 18.7*C; Sim.Temp@ SPC = 19.1*C; Room Temp@ SPC = 21.2*C

Communication System: _CW - Dipole; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 5200 MHz; σ = 5.61 mho/m; ε_r = 47.3; ρ = 1000 kg/m^3

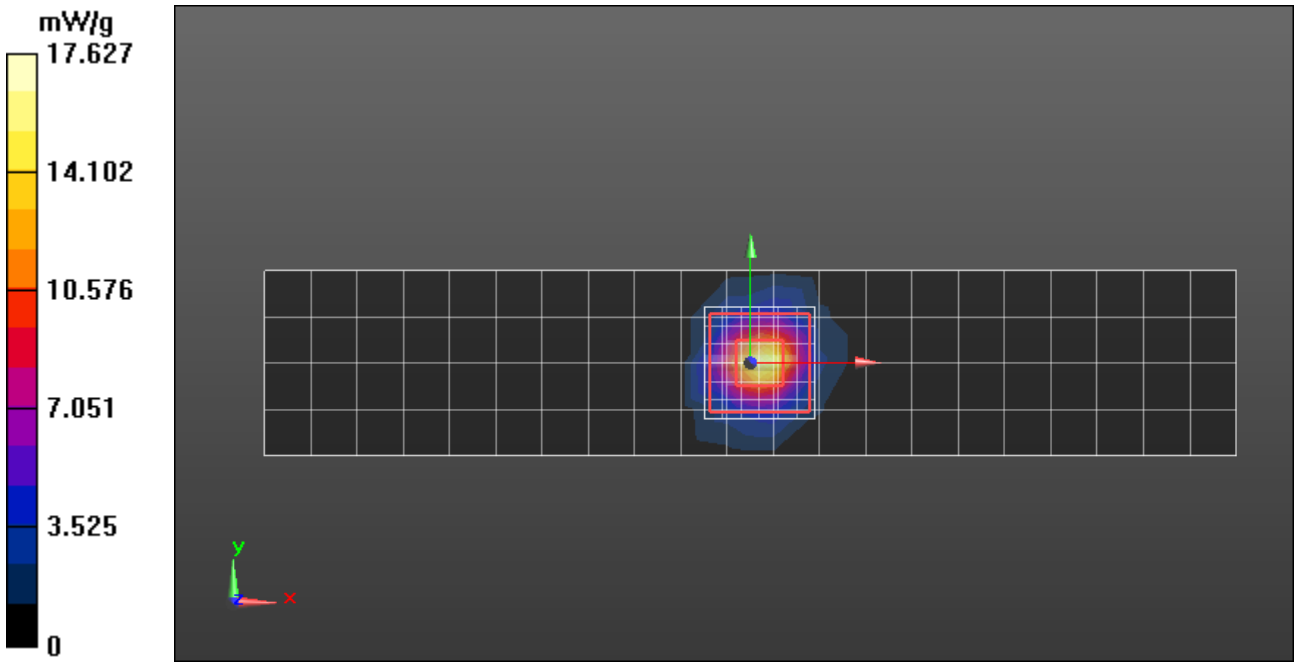
DASY4 Configuration:

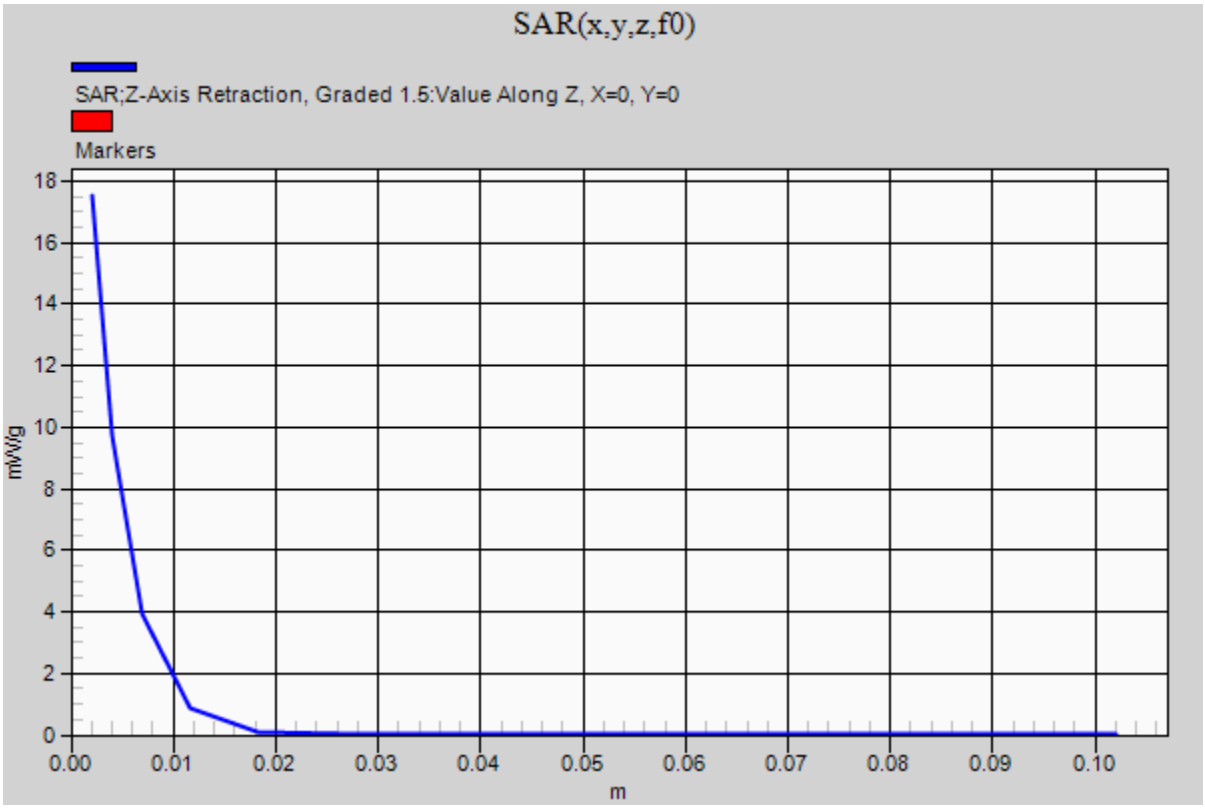
- Probe: EX3DV4 - SN3730; ConvF(4.01, 4.01, 4.01); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (22x5x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 15.862 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 60.609 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 32.5220
SAR(1 g) = 8.28 mW/g; SAR(10 g) = 2.32 mW/g
Maximum value of SAR (measured) = 17.627 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9): Measurement grid: dx=20mm, dy=20mm, dz=2mm
Maximum value of SAR (measured) = 17.544 mW/g


mW/g
17.627
14.102
10.576
7.051
3.525
0
y
x


SAR(x,y,z,f0)
SAR;Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
Markers
mW/g
18
16
14
12
10
8
6
4
2
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 4/23/2012 3:30:38 PM

DUT: Dipole 5-6GHz; Type: D5GHzV2; Procedure Notes: 5200 MHz System Performance Check / Dipole Sn# 1088-5200; PM1 Power = 100 mW
Sim.Temp@ meas = 19.2*C; Sim.Temp@ SPC = 18.8*C; Room Temp@ SPC = 20.1*C

Communication System: _CW - Dipole; Frequency: 5200 MHz; Communication System Channel Number: 15; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 5200 MHz; σ = 5.49 mho/m; ε_r = 47.8; ρ = 1000 kg/m^3

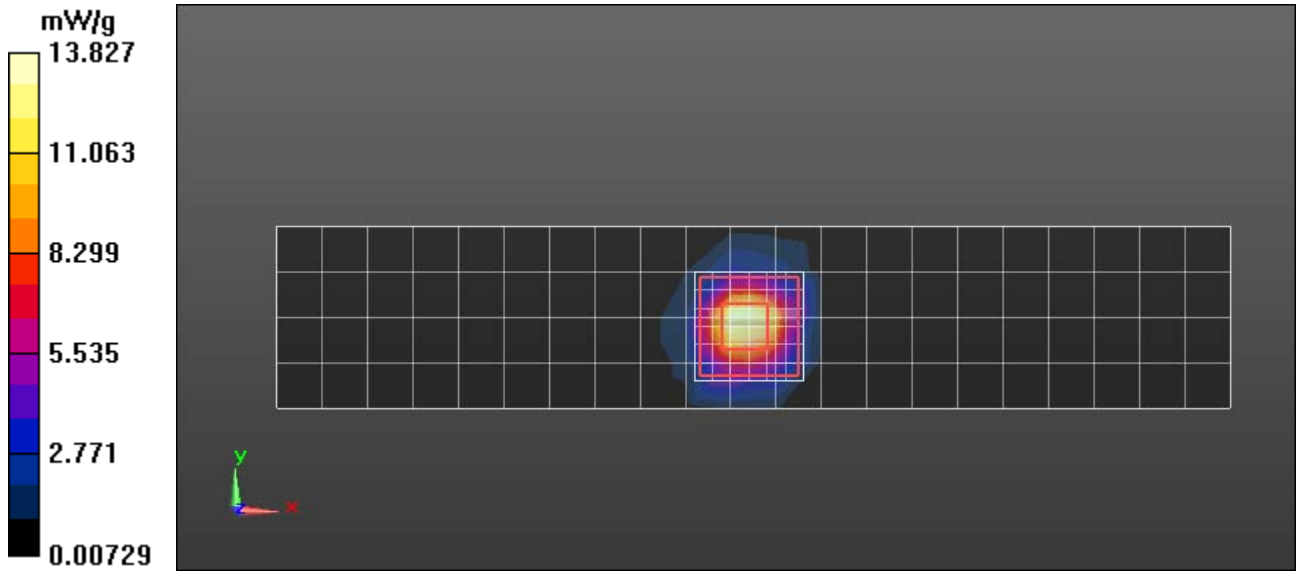
DASY4 Configuration:

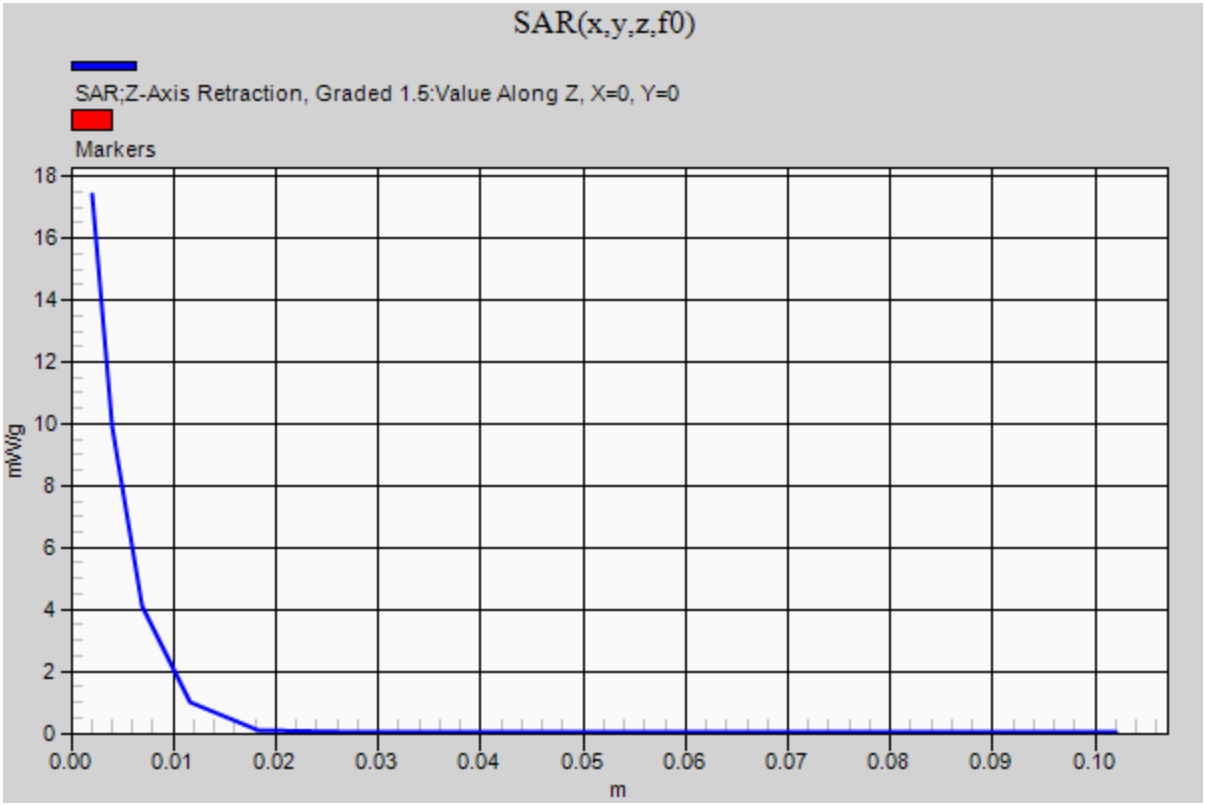
- Probe: EX3DV4 - SN3730; ConvF(4.01, 4.01, 4.01); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (22x5x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 13.827 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 59.297 V/m; Power Drift = 0.0029 dB
Peak SAR (extrapolated) = 30.7550
SAR(1 g) = 8.18 mW/g; SAR(10 g) = 2.3 mW/g
Maximum value of SAR (measured) = 17.226 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9): Measurement grid: dx=20mm, dy=20mm, dz=2mm
Maximum value of SAR (measured) = 17.439 mW/g




SAR(x,y,z,f0)
SAR;Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
Markers
mW/g
18
16
14
12
10
8
6
4
2
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 4/24/2012 6:00:24 PM

DUT: Dipole 5-6GHz; Type: D5GHzV2; Procedure Notes: 5200 MHz System Performance Check / Dipole Sn# 1088-5200; PM1 Power = 100 mW;
Sim.Temp@ meas = 18.8*C; Sim.Temp@ SPC =19.7*C; Room Temp@ SPC = 20.7*C

Communication System: _CW - Dipole; Frequency: 5200 MHz; Communication System Channel Number: 15; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 5200 MHz; σ = 5.4 mho/m; ε_r = 47.4; ρ = 1000 kg/m^3

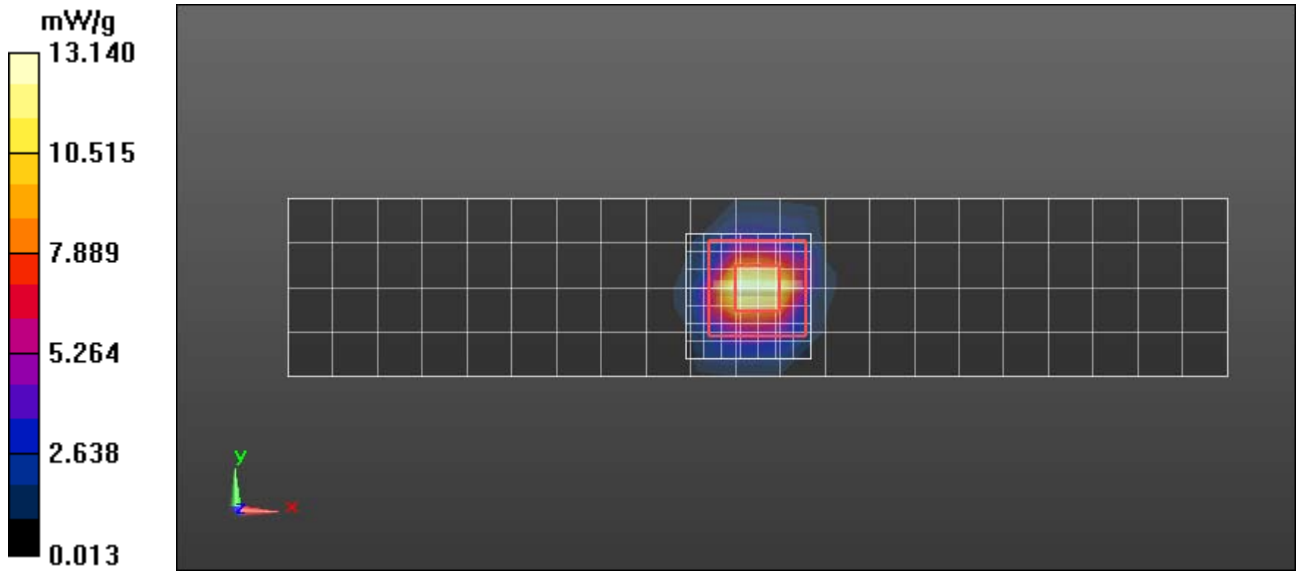
DASY4 Configuration:

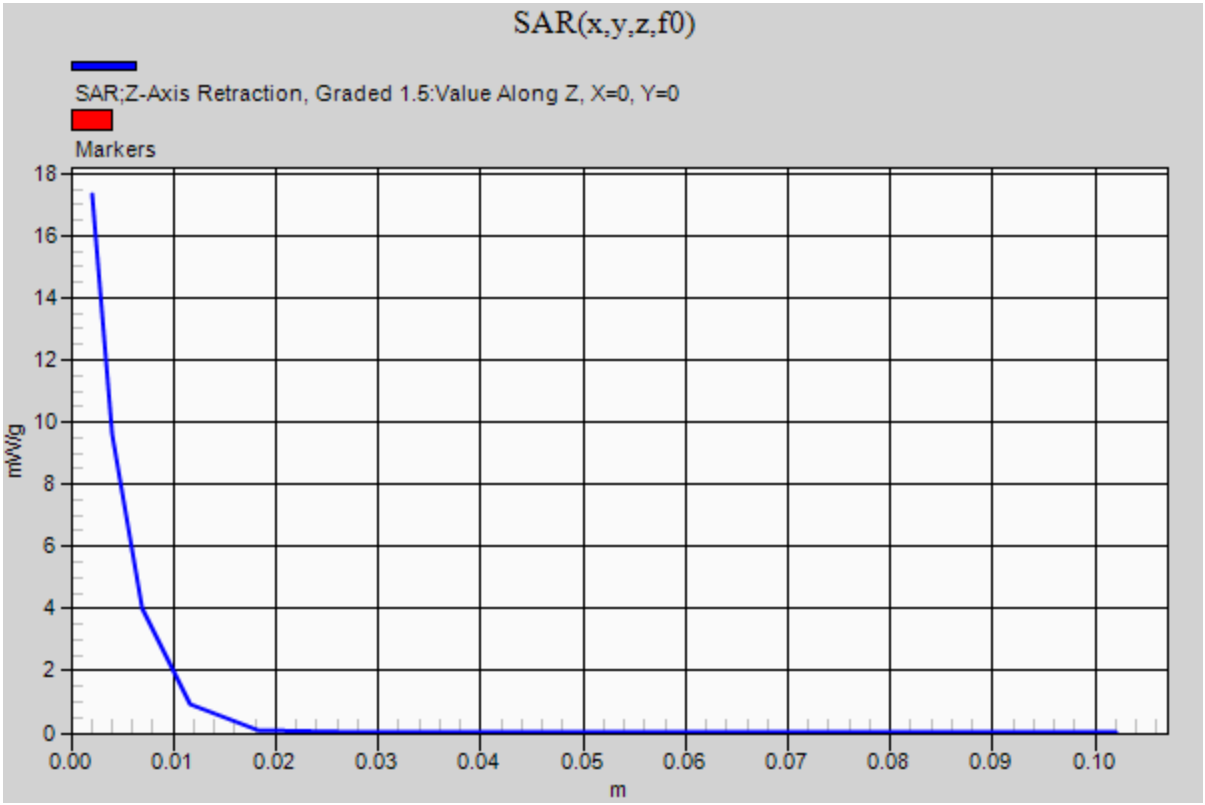
- Probe: EX3DV4 - SN3730; ConvF(4.01, 4.01, 4.01); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (22x5x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 13.140 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (8x8x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 62.899 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 31.0960
SAR(1 g) = 8.12 mW/g; SAR(10 g) = 2.27 mW/g
Maximum value of SAR (measured) = 17.295 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9): Measurement grid: dx=20mm, dy=20mm, dz=2mm
Maximum value of SAR (measured) = 17.343 mW/g




SAR(x,y,z,f0)
SAR;Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
Markers
mW/g
18
16
14
12
10
8
6
4
2
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 3/30/2012 6:09:34 PM

DUT: Dipole 5-6GHz; Type: D5GHzV2; Procedure Notes: 5800 MHz System Performance Check / Dipole Sn# 1088-5800; PM1 Power = 100 mW
Sim.Temp@ meas = 18.7*C; Sim.Temp@ SPC = 18.7*C; Room Temp@ SPC = 20.3*C

Communication System: _CW - Dipole; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 5800 MHz; σ = 6.47 mho/m; ε_r = 46.2; ρ = 1000 kg/m^3

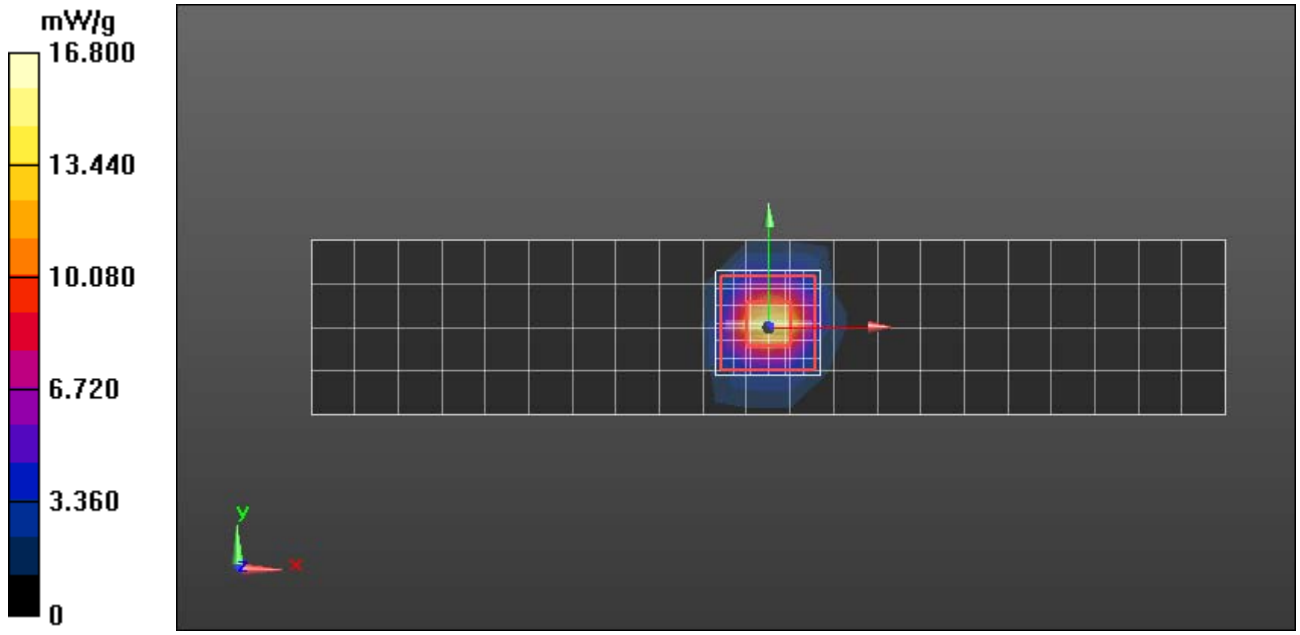
DASY4 Configuration:

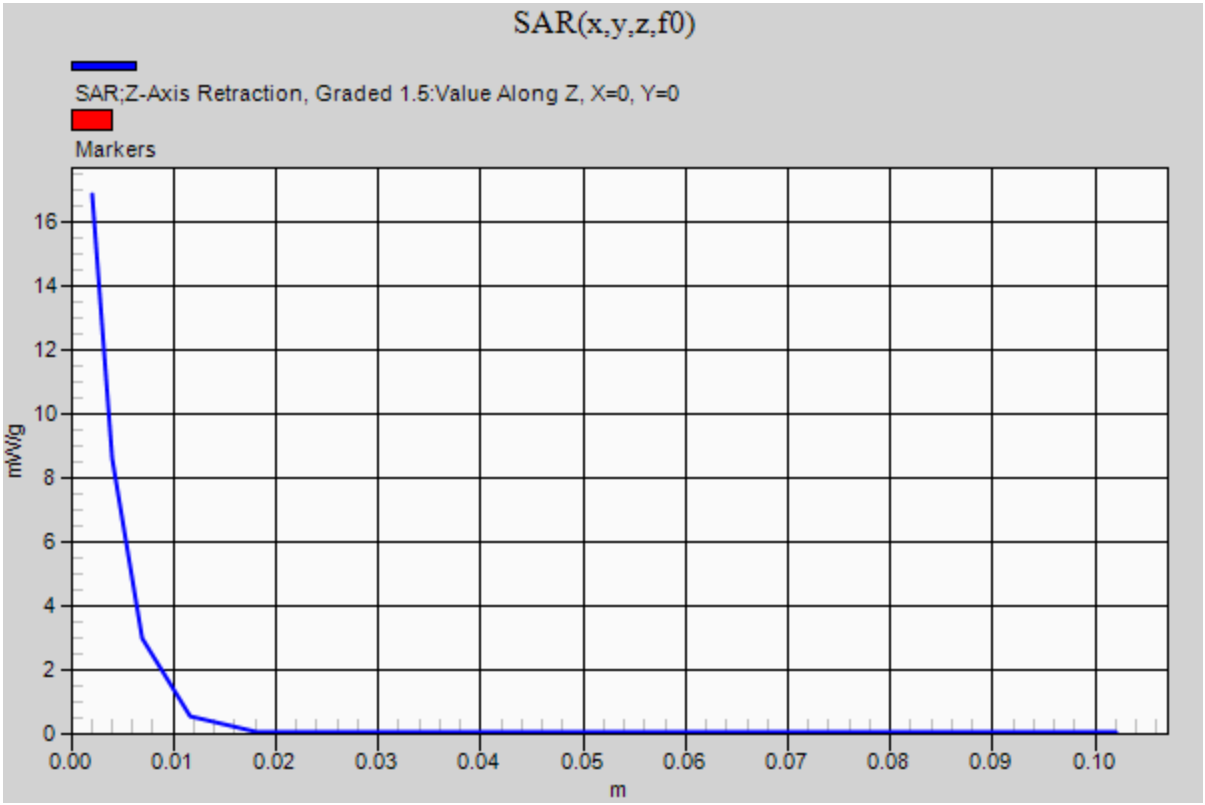
- Probe: EX3DV4 - SN3730; ConvF(3.63, 3.63, 3.63); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (22x5x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 12.776 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 56.061 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 33.5720
SAR(1 g) = 7.7 mW/g; SAR(10 g) = 2.16 mW/g
Maximum value of SAR (measured) = 16.800 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9): Measurement grid: dx=20mm, dy=20mm, dz=2mm
Maximum value of SAR (measured) = 16.862 mW/g




SAR(x,y,z,f0)
SAR;Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
Markers
mW/g
16
14
12
10
8
6
4
2
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 4/1/2012 7:04:17 AM

DUT: Dipole 5-6GHz; Type: D5GHzV2; Procedure Notes: 5800 MHz System Performance Check / Dipole Sn# 1088-5800; PM1 Power = 100 mW
Sim.Temp@ meas = 18.7*C; Sim.Temp@ SPC = 18.7*C; Room Temp@ SPC = 19.9*C

Communication System: _CW - Dipole; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 5800 MHz; σ = 6.28 mho/m; ε_r = 45.6; ρ = 1000 kg/m^3

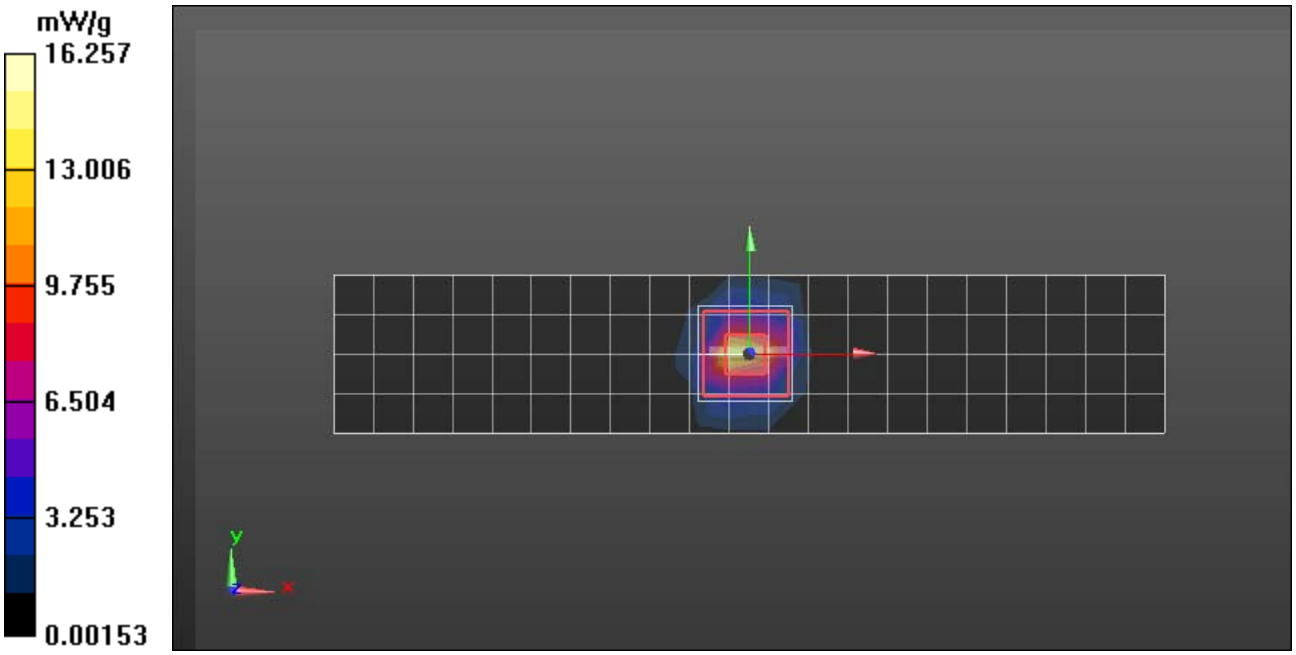
DASY4 Configuration:

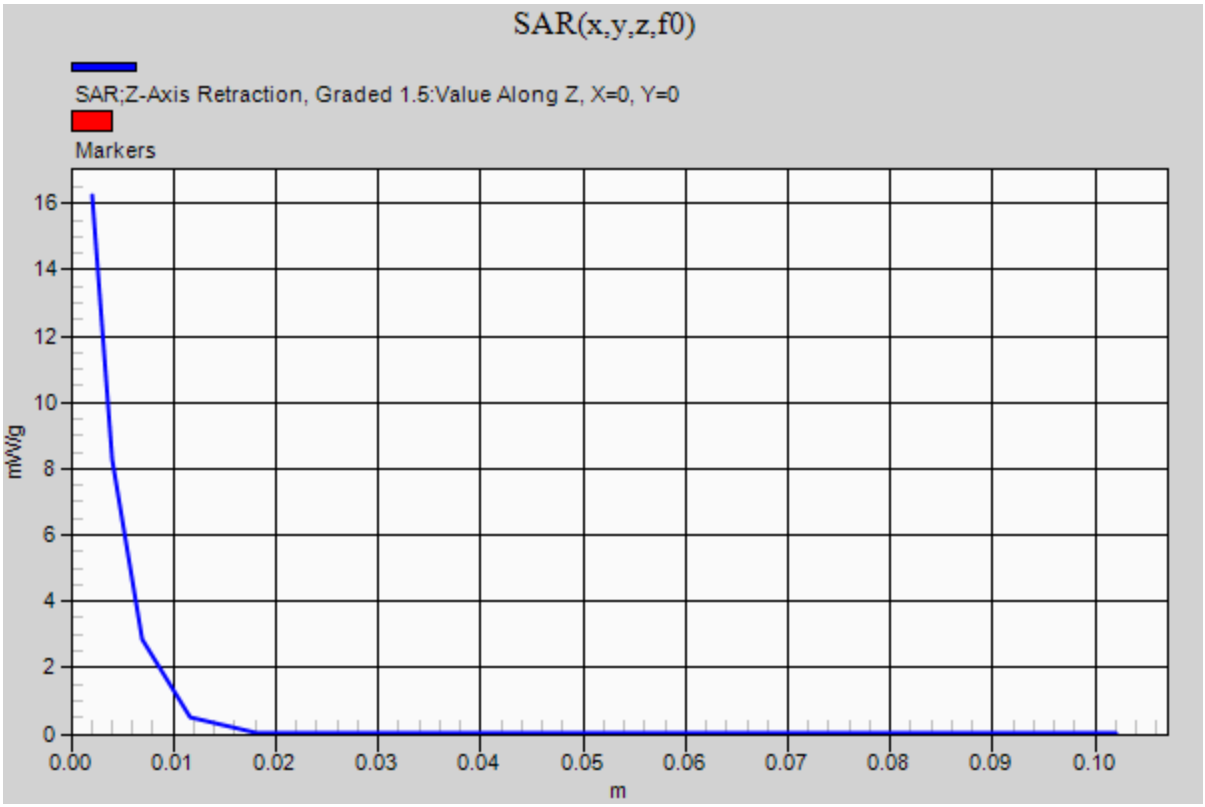
- Probe: EX3DV4 - SN3730; ConvF(3.63, 3.63, 3.63); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (22x5x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 13.219 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 56.483 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 32.7660
SAR(1 g) = 7.52 mW/g; SAR(10 g) = 2.12 mW/g
Maximum value of SAR (measured) = 16.294 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9): Measurement grid: dx=20mm, dy=20mm, dz=2mm
Maximum value of SAR (measured) = 16.257 mW/g


mW/g
16.257
13.006
9.755
6.504
3.253
0.00153
y
x


SAR(x,y,z,f0)
SAR;Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
Markers
mW/g
16
14
12
10
8
6
4
2
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 5/8/2012 10:12:41 AM

DUT: Dipole 5-6GHz; Type: D5GHzV2; Procedure Notes: 5800 MHz System Performance Check / Dipole Sn# 1088-5800; PM1 Power = 100mW;
Sim.Temp@ meas = 19.1*C; Sim.Temp@ SPC = 19.0*C; Room Temp@ SPC = 21.5*C

Communication System: _CW - Dipole; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: Validation *TRITON BODY Tissue* ; Medium parameters used: f = 5800 MHz; σ = 6.36 mho/m; ε_r = 46.9; ρ = 1000 kg/m^3

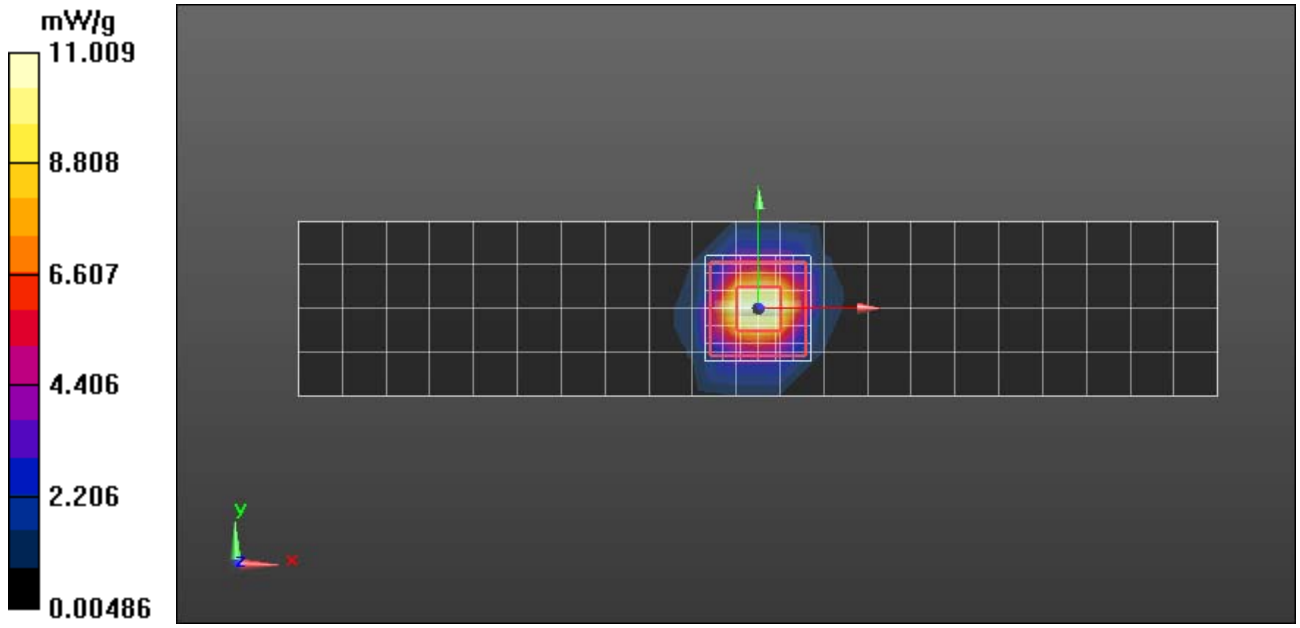
DASY4 Configuration:

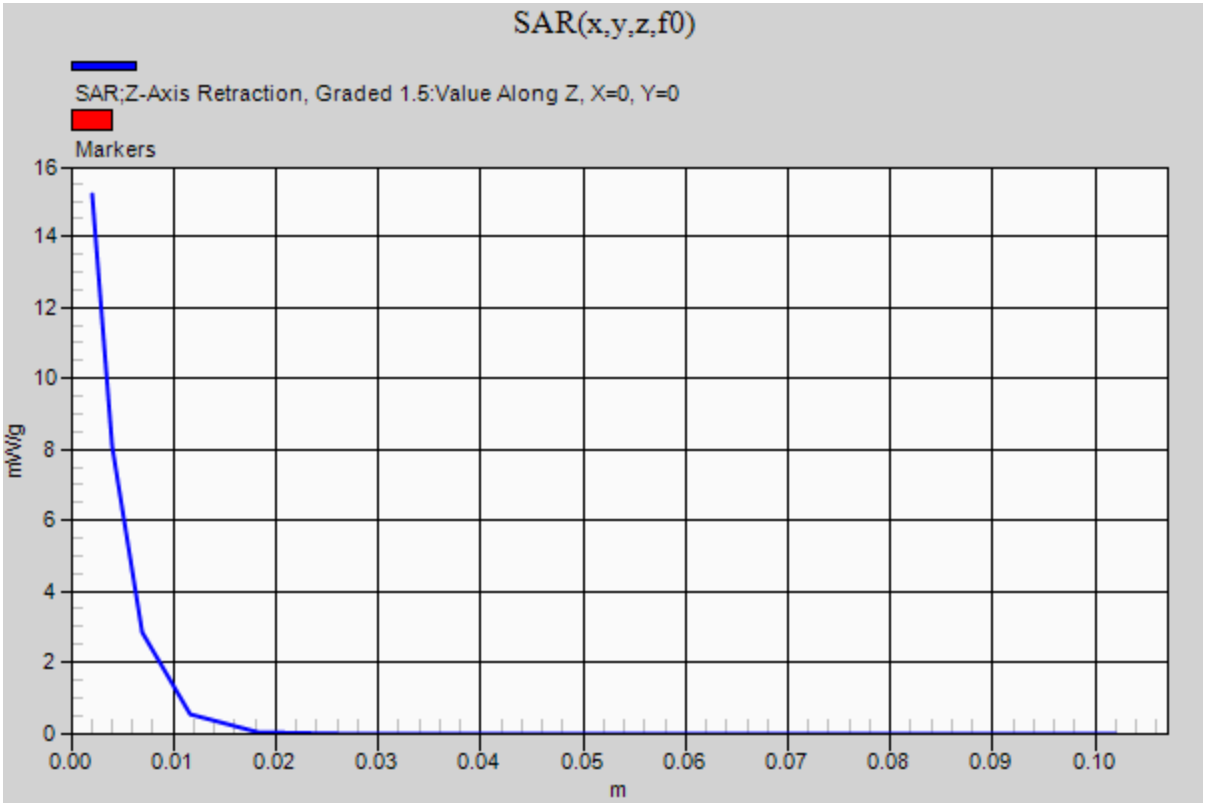
- Probe: EX3DV4 - SN3728; ConvF(3.71, 3.71, 3.71); Calibrated: 4/24/2012
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/17/2012
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (22x5x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 11.009 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 54.667 V/m; Power Drift = 0.002 dB
Peak SAR (extrapolated) = 27.8430
SAR(1 g) = 6.89 mW/g; SAR(10 g) = 1.93 mW/g
Maximum value of SAR (measured) = 15.079 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9): Measurement grid: dx=20mm, dy=20mm, dz=2mm
Maximum value of SAR (measured) = 15.203 mW/g




SAR(x,y,z,f0)
SAR;Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
Markers
16
14
12
10
8
6
4
2
0
mW/g
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Date/Time: 5/10/2012 8:40:02 AM

DUT: Dipole 5-6GHz; Type: D5GHzV2; Procedure Notes: 5800 MHz System Performance Check / Dipole Sn# 1088-5800; PM1 Power = 100mW
Sim.Temp@ meas = 20.1*C; Sim.Temp@ SPC = 20.1*C; Room Temp@ SPC = 21.2*C

Communication System: _CW - Dipole; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* (triton); Medium parameters used: f = 5800 MHz; σ = 6.36 mho/m; ε_r = 47; ρ = 1000 kg/m^3

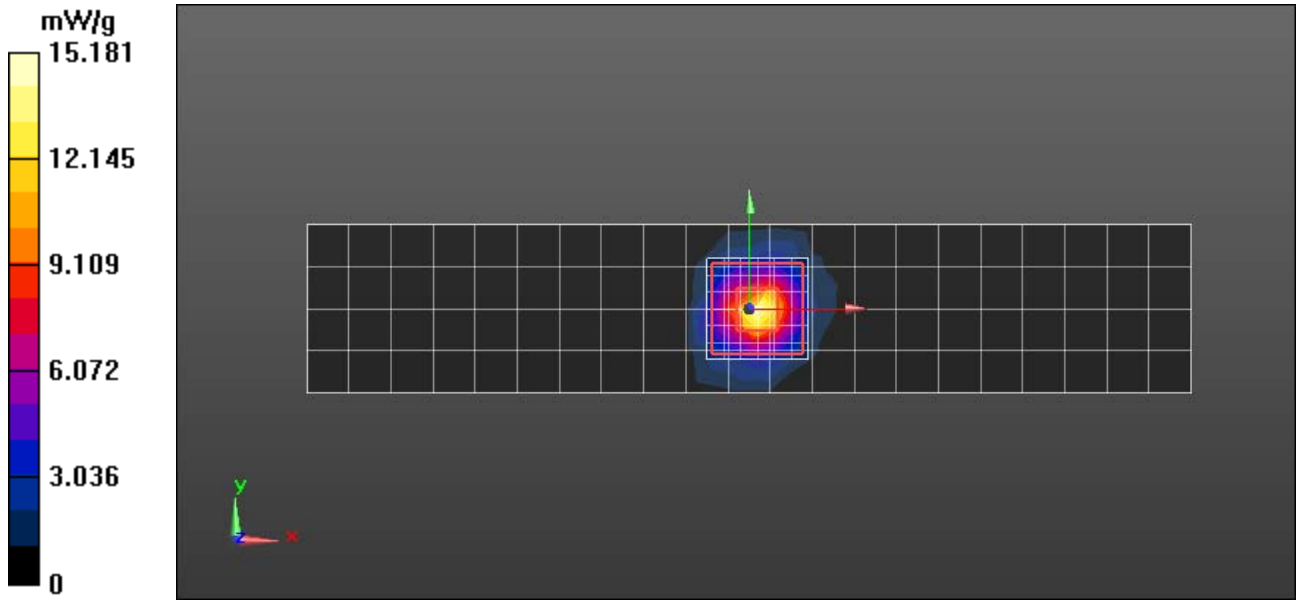
DASY4 Configuration:

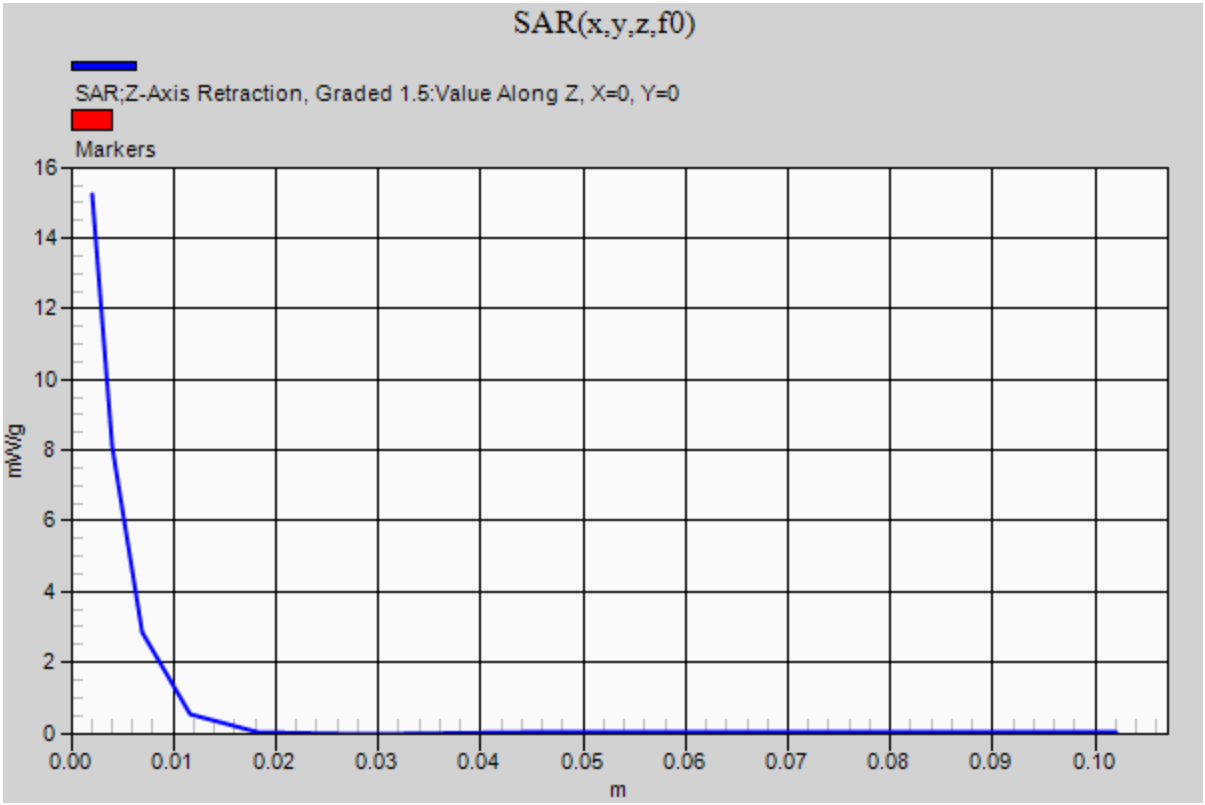
- Probe: EX3DV4 - SN3728; ConvF(3.71, 3.71, 3.71); Calibrated: 4/24/2012
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/17/2012
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Daily SPC Check/Dipole Area Scan (22x5x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 13.573 mW/g

Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 53.750 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 28.0040
SAR(1 g) = 6.95 mW/g; SAR(10 g) = 1.95 mW/g
Maximum value of SAR (measured) = 15.181 mW/g

Daily SPC Check/Z-Axis Retraction, Graded 1.5 (1x1x9): Measurement grid: dx=20mm, dy=20mm, dz=2mm
Maximum value of SAR (measured) = 15.252 mW/g




SAR(x,y,z,f0)
SAR;Z-Axis Retraction, Graded 1.5:Value Along Z, X=0, Y=0
Markers
16
14
12
10
8
6
4
2
0
mW/g
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.10
m

Appendix 2

SAR distribution plots for Head Adjacent Test Results

Date/Time: 3/15/2012 11:32:25 PM

Serial: LDNB260041; Procedure Notes: Modulation: QPSK; Channel BW: 15MHz, RB config: RB High; DEVICE POSITION: CHEEK

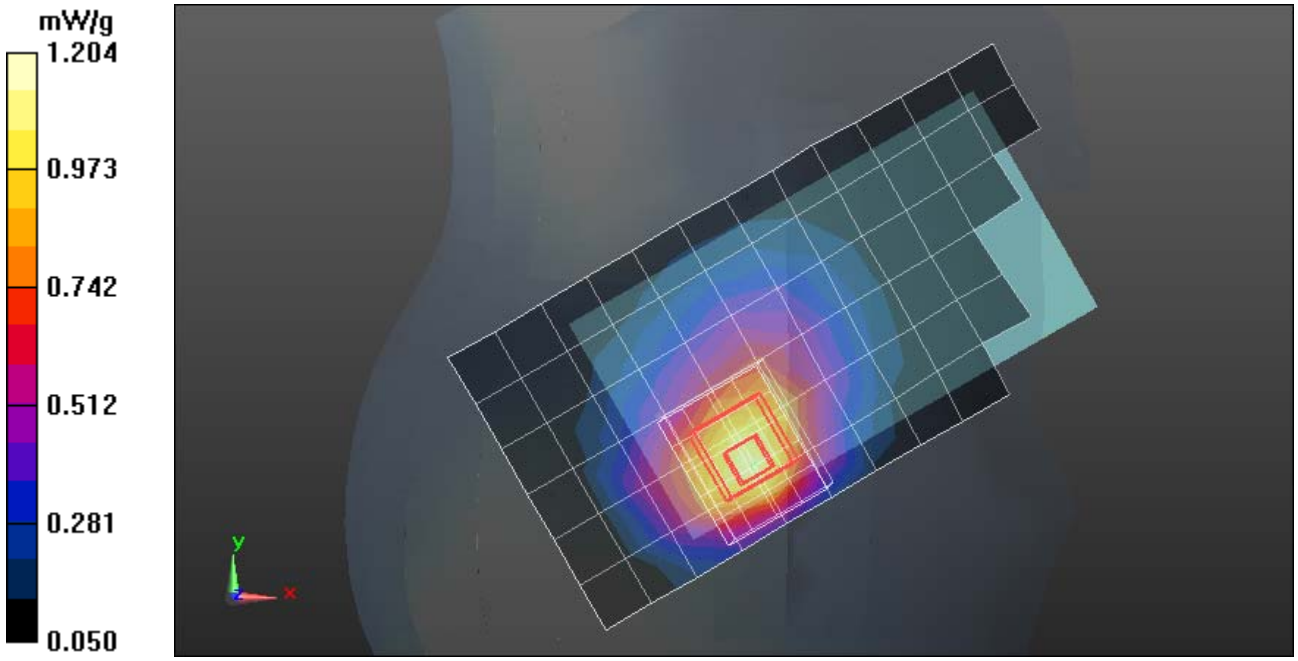
ommunication System: _LTE Band 17; Frequency: 710 MHz; Communication System Channel Number: 23790; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 710 MHz; σ = 0.85 mho/m; ε_r = 42.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.44, 6.44, 6.44); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4 SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.068 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.096 V/m; Power Drift = 0.0064 dB
Peak SAR (extrapolated) = 1.7440
SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.720 mW/g
Maximum value of SAR (measured) = 1.204 mW/g



Cheek LTE Band 17

Date/Time: 2/24/2012 11:47:42 AM

Serial: LDNB270018; Procedure Notes: Pwr Step: All Bits UP; Antenna Position: INTERNAL; DEVICE POSITION: CHEEK

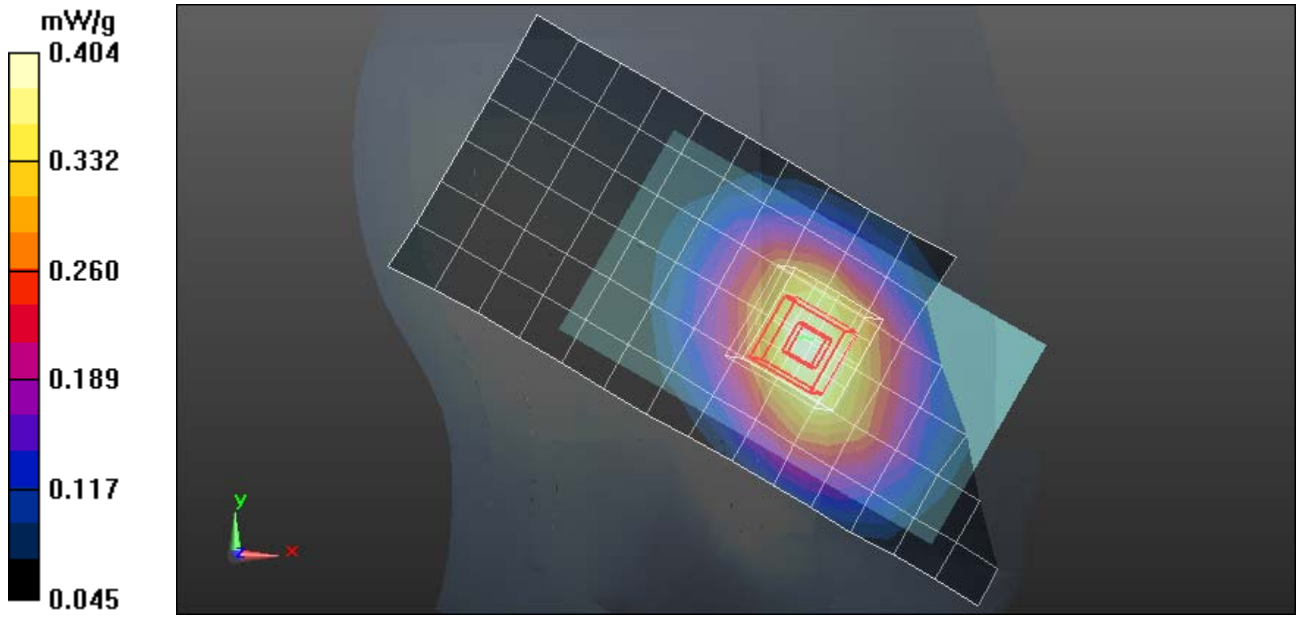
Communication System: _WCDMA; Frequency: 836 MHz; Communication System Channel Number: 4180; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.92 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.401 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.015 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.4770
SAR(1 g) = 0.387 mW/g; SAR(10 g) = 0.291 mW/g
Maximum value of SAR (measured) = 0.404 mW/g



Cheek, WCDMA 850

Date/Time: 3/5/2012 5:14:56 PM

Serial: LDNB270018; Procedure Notes: Pwr Step: 5; DEVICE POSITION: Cheek

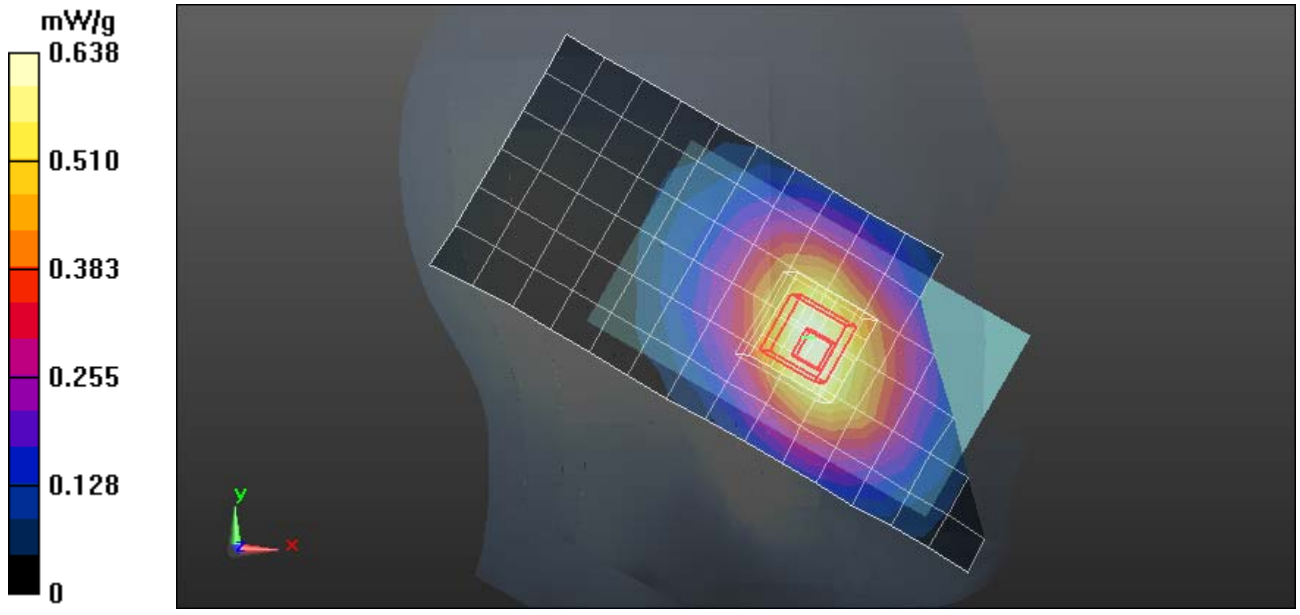
Communication System: _GPRS Class 10; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:4.14954
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.638 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.203 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.4510
SAR(1 g) = 0.625 mW/g; SAR(10 g) = 0.458 mW/g
Maximum value of SAR (measured) = 0.648 mW/g



Date/Time: 3/6/2012 9:46:26 PM

Serial: LDNB270029; Procedure Notes: Pwr Step: MODULATION TYPE = 16QAM, CHANNEL BANDWIDTH = 15 MHZ, RB CONFIG = 1 RB Low; DEVICE POSITION: CHEEK

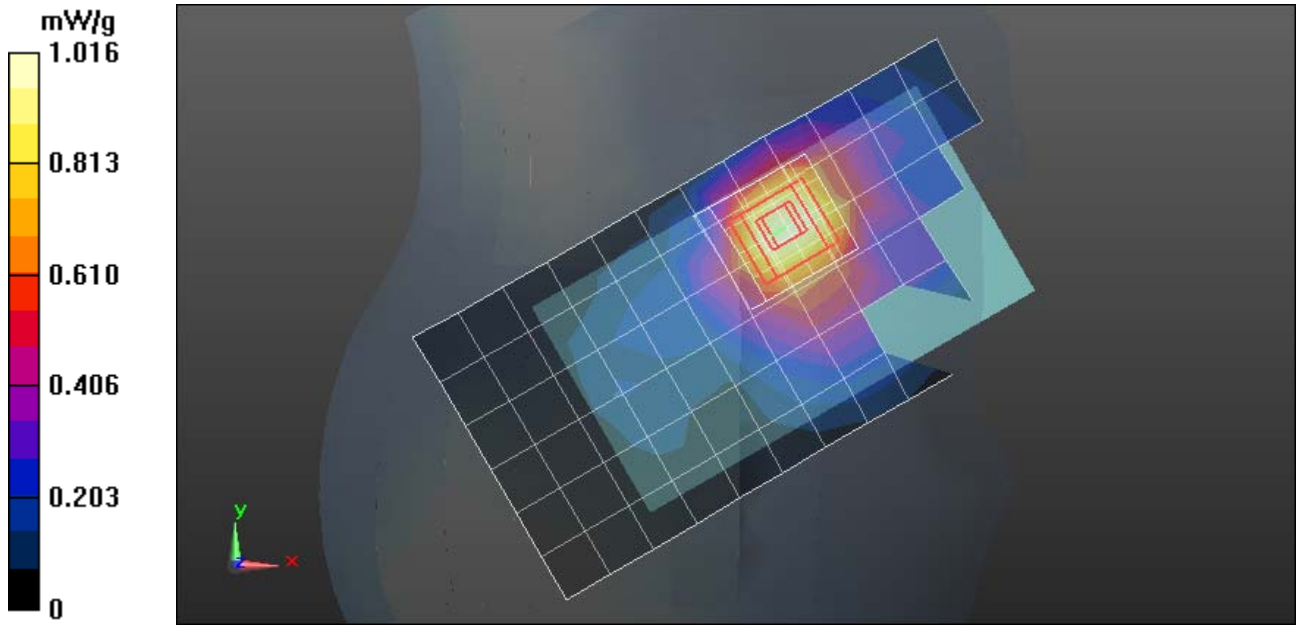
Communication System: _LTE Band 04; Frequency: 1717.5 MHz; Communication System Channel Number: 20025; Duty Cycle: 1:1
Medium: 1730 Glycol Head; Medium parameters used: f = 1730 MHz; σ = 1.36 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(5.03, 5.03, 5.03); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#1 - Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1319;
- ; SEMCAD X Version 14.6.4 (4989)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.016 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.810 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 1.3940
SAR(1 g) = 0.996 mW/g; SAR(10 g) = 0.634 mW/g
Maximum value of SAR (measured) = 1.065 mW/g



Date/Time: 2/28/2012 2:17:08 PM

Serial: LDNB270018; Procedure Notes: Pwr Step: ALL UP BITS; DEVICE POSITION: CHEEK

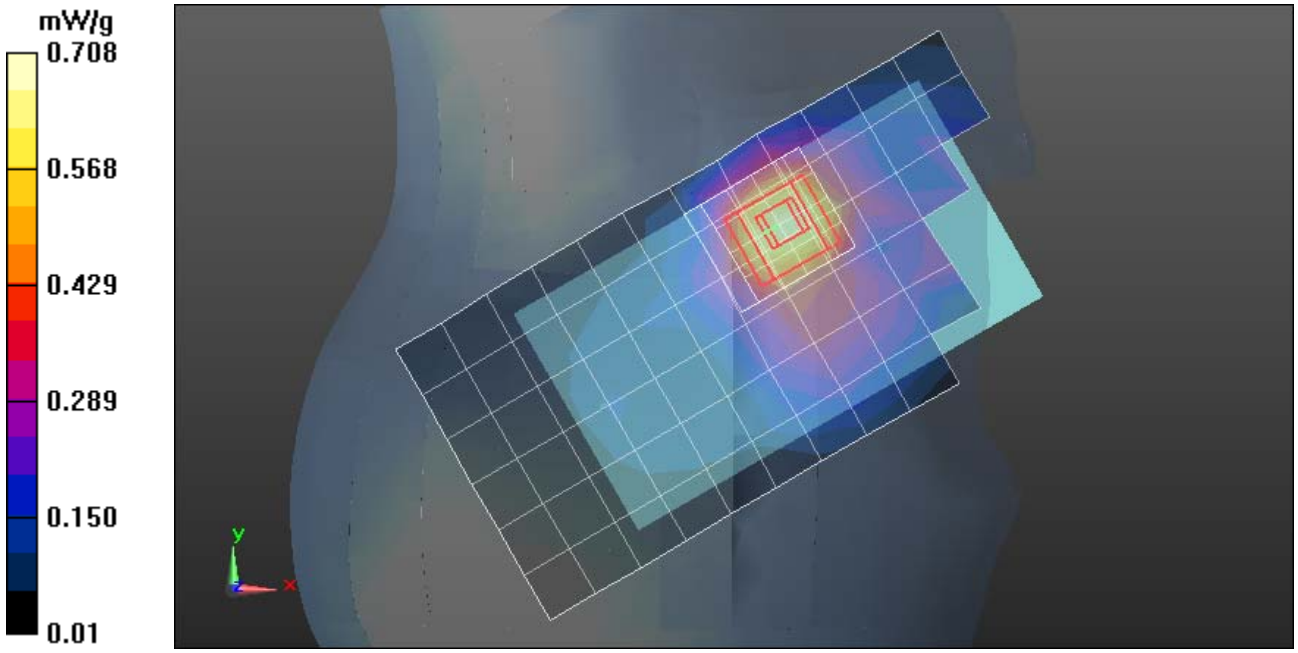
Communication System: _WCDMA; Frequency: 1732 MHz; Communication System Channel Number: 1413; Duty Cycle: 1:1
Medium: 1730 Glycol Head; Medium parameters used: f = 1730 MHz; σ = 1.37 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.33, 5.33, 5.33); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Glycol,SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.646 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.246 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.9560
SAR(1 g) = 0.648 mW/g; SAR(10 g) = 0.404 mW/g
Maximum value of SAR (measured) = 0.708 mW/g



Cheek, WCDMA 1700

Date/Time: 2/27/2012 9:05:26 AM

Serial: LDNB270018; Procedure Notes: Pwr Step: All Bits UP; DEVICE POSITION: CHEEK

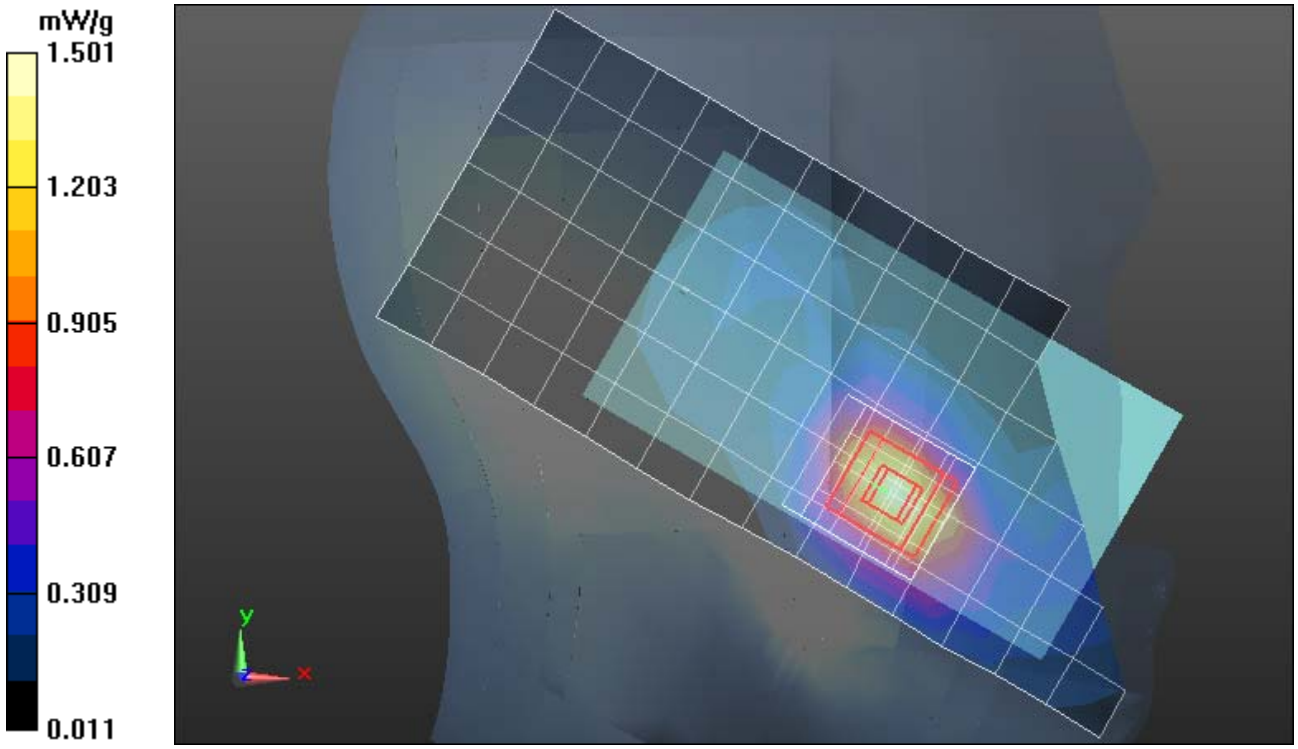
Communication System: _WCDMA; Frequency: 1907.6 MHz; Communication System Channel Number: 9538; Duty Cycle: 1:1
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.47 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.33, 5.33, 5.33); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Glycol,SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.442 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.562 V/m; Power Drift = 0.0022 dB
Peak SAR (extrapolated) = 2.2520
SAR(1 g) = 1.34 mW/g; SAR(10 g) = 0.763 mW/g
Maximum value of SAR (measured) = 1.501 mW/g



Cheek, WCDMA 1900

Date/Time: 2/28/2012 9:37:03 AM

Serial: LDNB270018; Procedure Notes: Pwr Step: 0; Antenna Position: INTERNAL; DEVICE POSITION: CHEEK

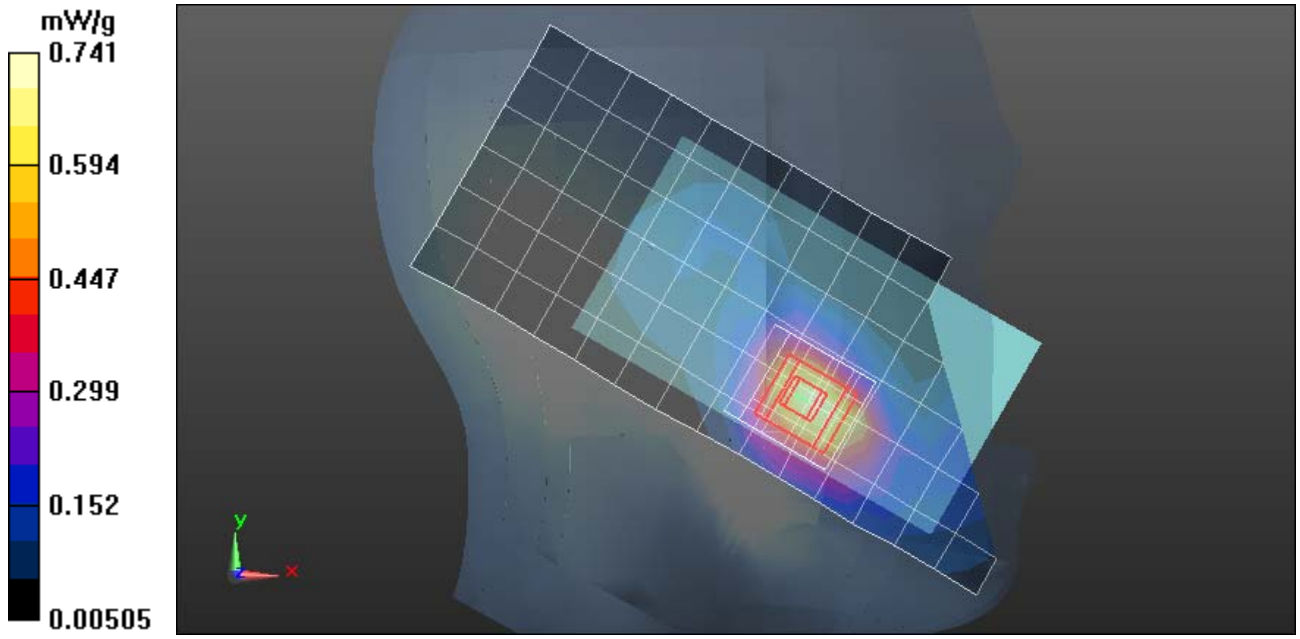
Communication System: _GPRS Class 10; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:4.14954
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.46 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.33, 5.33, 5.33); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Glycol,SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.693 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.642 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 2.1190
SAR(1 g) = 0.676 mW/g; SAR(10 g) = 0.396 mW/g
Maximum value of SAR (measured) = 0.741 mW/g



Cheek, GPRS 1900

Date/Time: 3/21/2012 3:52:45 PM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: CHEEK

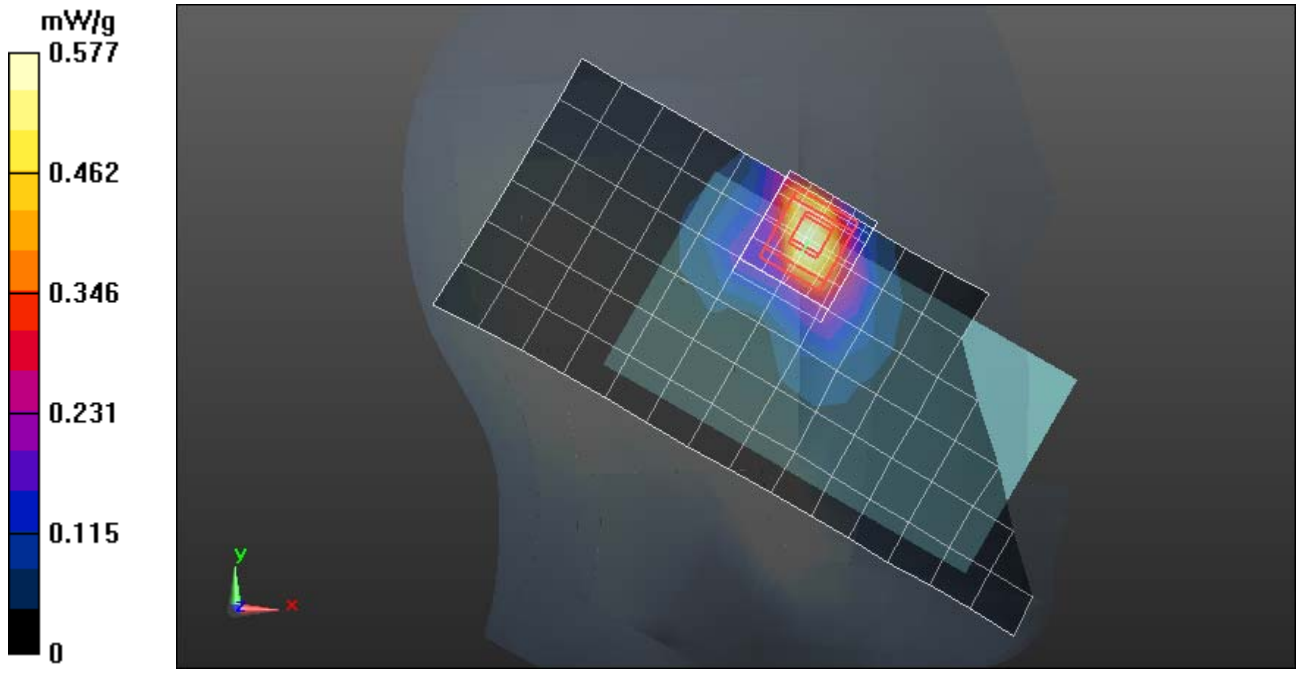
Communication System: _Wi-Fi 2450MHz; Frequency: 2412 MHz; Communication System Channel Number: 1; Duty Cycle: 1:1
Medium: 2450 Glycol Head; Medium parameters used: f = 2450 MHz; σ = 1.8 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(4.56, 4.56, 4.56); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.577 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.484 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.4820
SAR(1 g) = 0.593 mW/g; SAR(10 g) = 0.260 mW/g
Maximum value of SAR (measured) = 0.706 mW/g



Cheek WIFI 2450 MHz

Date/Time: 3/28/2012 10:13:17 PM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: CHEEK

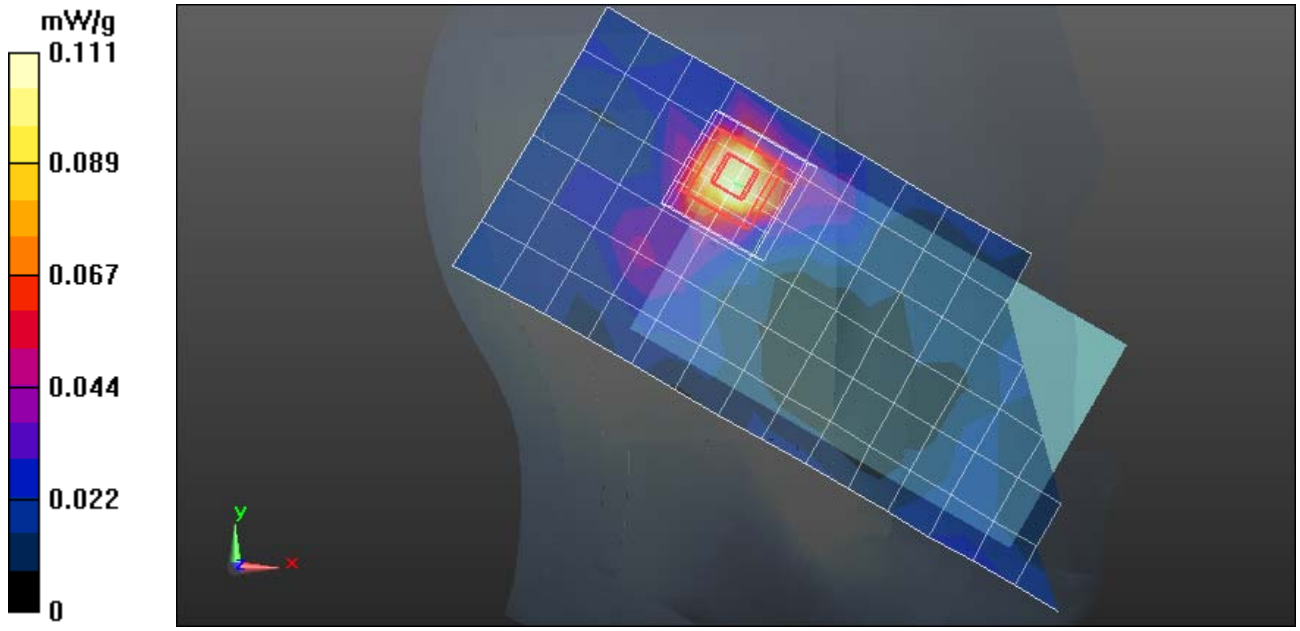
Communication System: _WIFI 5-6GHz; Frequency: 5200 MHz; Communication System Channel Number: 40; Duty Cycle: 1:1
Medium: 5-6 GHz SPEAG Tissue HEAD; Medium parameters used: f = 5210 MHz; σ = 4.6 mho/m; ε_r = 34.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3730; ConvF(4.72, 4.72, 4.72); Calibrated: 8/29/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.111 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.276 V/m; Power Drift = 0.68 dB
Peak SAR (extrapolated) = 0.3890
SAR(1 g) = 0.139 mW/g; SAR(10 g) = 0.055 mW/g
Maximum value of SAR (measured) = 0.178 mW/g



Cheek 5210

Date/Time: 4/20/2012 5:28:24 PM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: CHEEK

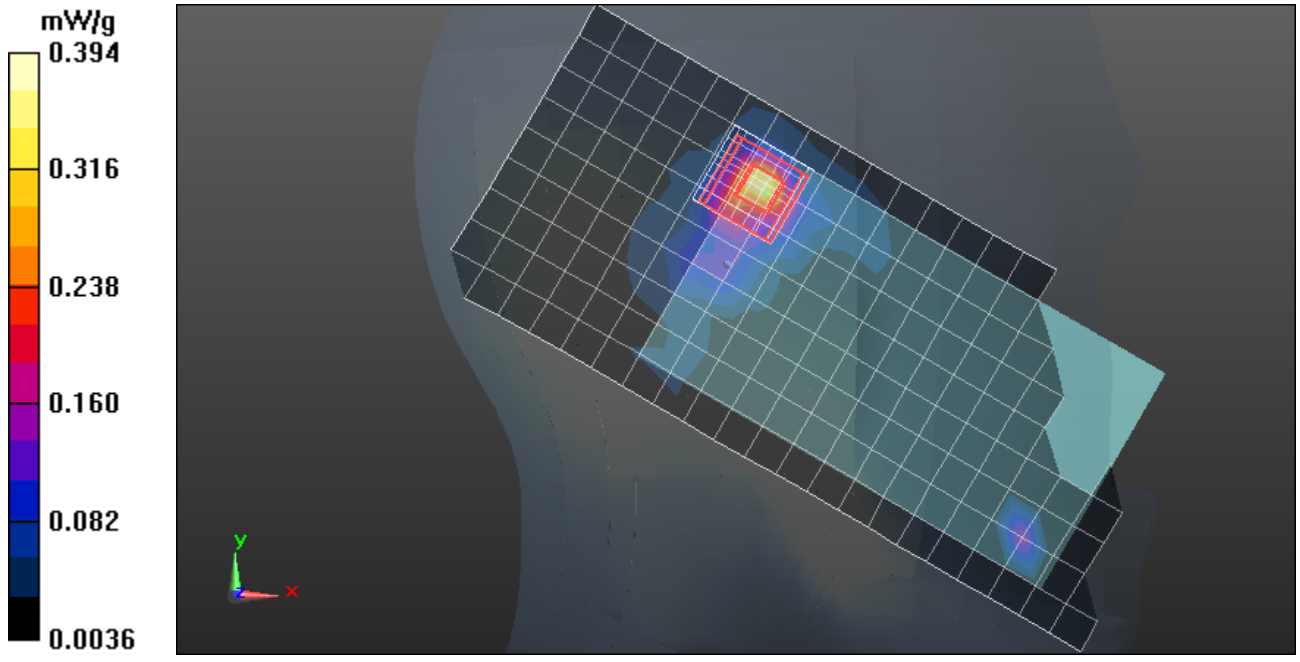
Communication System: _WIFI 5-6GHz; Frequency: 5300 MHz; Communication System Channel Number: 60; Duty Cycle: 1:1
Medium: 5-6 GHz SPEAG Tissue HEAD; Medium parameters used: f = 5290 MHz; σ = 4.52 mho/m; ε_r = 33.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3730; ConvF(4.48, 4.48, 4.48); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (10mm) (10x25x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.304 mW/g

Left Head Template/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm; Reference Value = 6.489 V/m; Power Drift = -0.03 dB; Peak SAR (extrapolated) = 0.9070; **SAR(1 g) = 0.198 mW/g; SAR(10 g) = 0.062 mW/g;** Maximum value of SAR (measured) = 0.394 mW/g



Cheek 5290 MHz

Date/Time: 5/8/2012 1:21:04 AM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: CHEEK

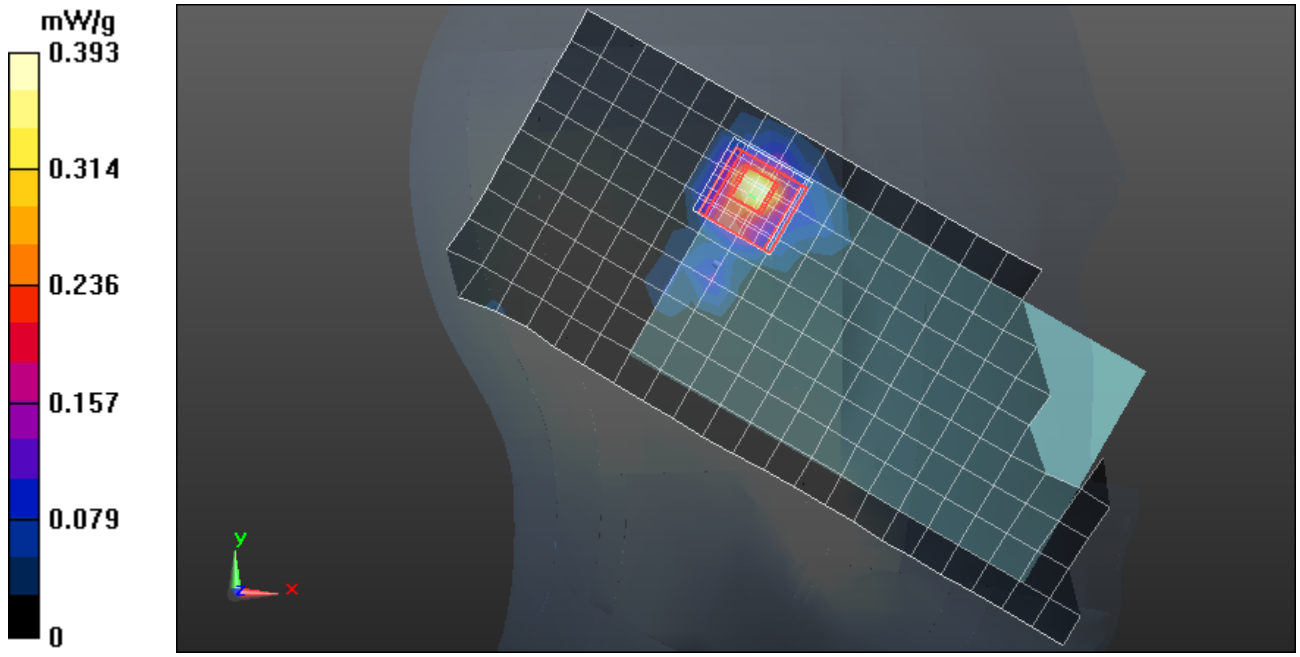
Communication System: _WIFI 5-6GHz; Frequency: 5660 MHz; Communication System Channel Number: 132; Duty Cycle: 1:1
Medium: 5-6 GHz SPEAG Tissue HEAD; Medium parameters used: f = 5600 MHz; σ = 4.92 mho/m; ε_r = 32.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3728; ConvF(4.14, 4.14, 4.14); Calibrated: 4/24/2012
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/17/2012
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (10mm) (10x25x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.393 mW/g

Left Head Template/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 7.567 V/m; Power Drift = -0.41 dB
Peak SAR (extrapolated) = 0.8090
SAR(1 g) = 0.193 mW/g; SAR(10 g) = 0.057 mW/g
Maximum value of SAR (measured) = 0.436 mW/g



Cheek 5600

Date/Time: 4/1/2012 1:04:38 PM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: CHEEK

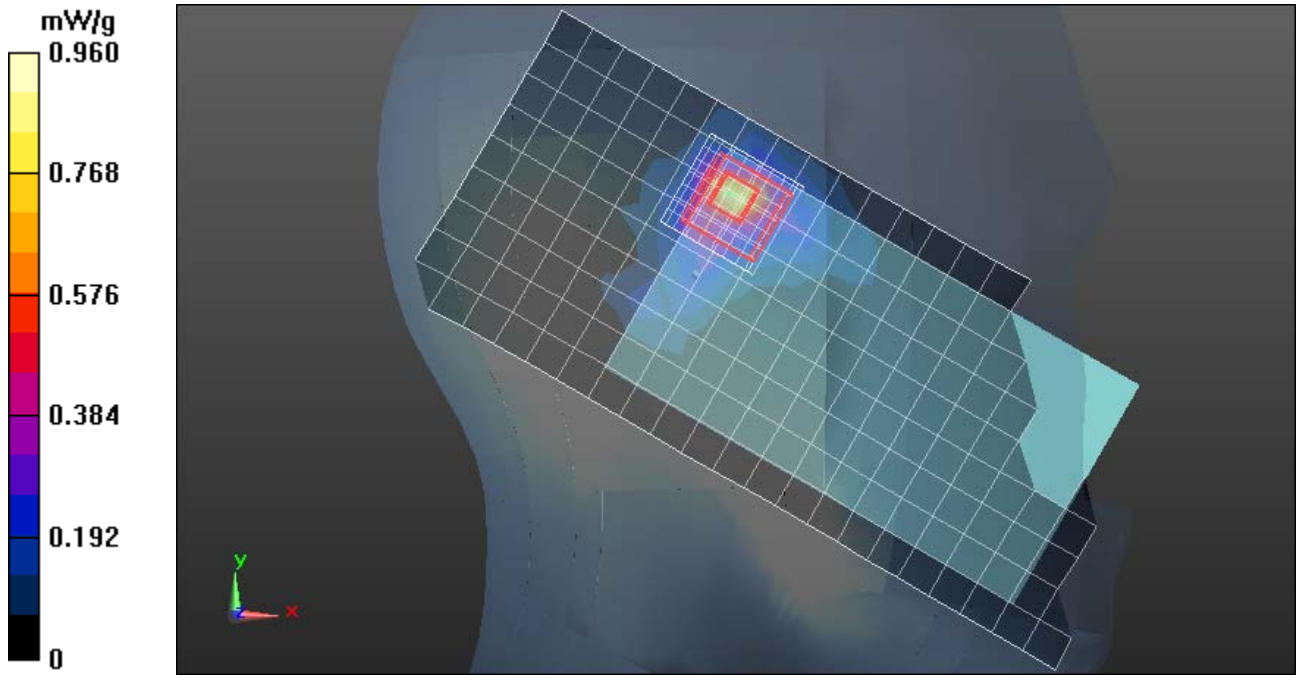
Communication System: _WIFI 5-6GHz; Frequency: 5745 MHz; Communication System Channel Number: 149; Duty Cycle: 1:1; Medium: 5-6 GHz SPEAG Tissue HEAD; Medium parameters used: f = 5785 MHz; σ = 5.09 mho/m; ε_r = 33.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3730; ConvF(4.16, 4.16, 4.16); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (10mm) (10x25x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.785 mW/g

Left Head Template/7x7x12 Zoom Scan (5-6GHz) (8x8x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 10.044 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.9790
SAR(1 g) = 0.442 mW/g; SAR(10 g) = 0.139 mW/g
Maximum value of SAR (measured) = 0.960 mW/g



Cheek 5785

Date/Time: 3/16/2012 4:06:05 AM

Serial: LDNB260041; Procedure Notes: Modulation: QPSK, Channel BW: 15MHz, RB Config: RB High; DEVICE POSITION: TILT

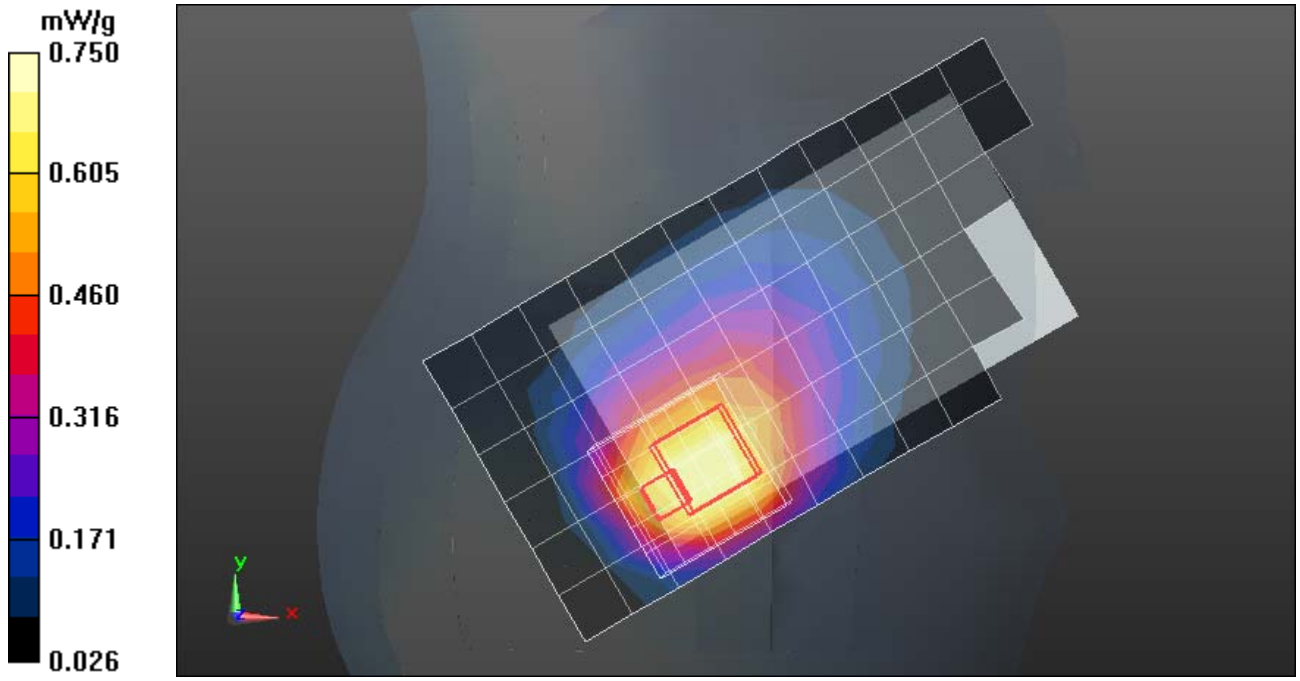
Communication System: _LTE Band 17; Frequency: 710 MHz; Communication System Channel Number: 23790; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 710 MHz; σ = 0.85 mho/m; ε_r = 42.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.44, 6.44, 6.44); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4 SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.689 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.643 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.3190
SAR(1 g) = 0.732 mW/g; SAR(10 g) = 0.514 mW/g
Maximum value of SAR (measured) = 0.750 mW/g



Date/Time: 2/24/2012 12:05:35 PM

Serial: LDNB270018; Procedure Notes: Pwr Step: All Bits UP; DEVICE POSITION: TILT

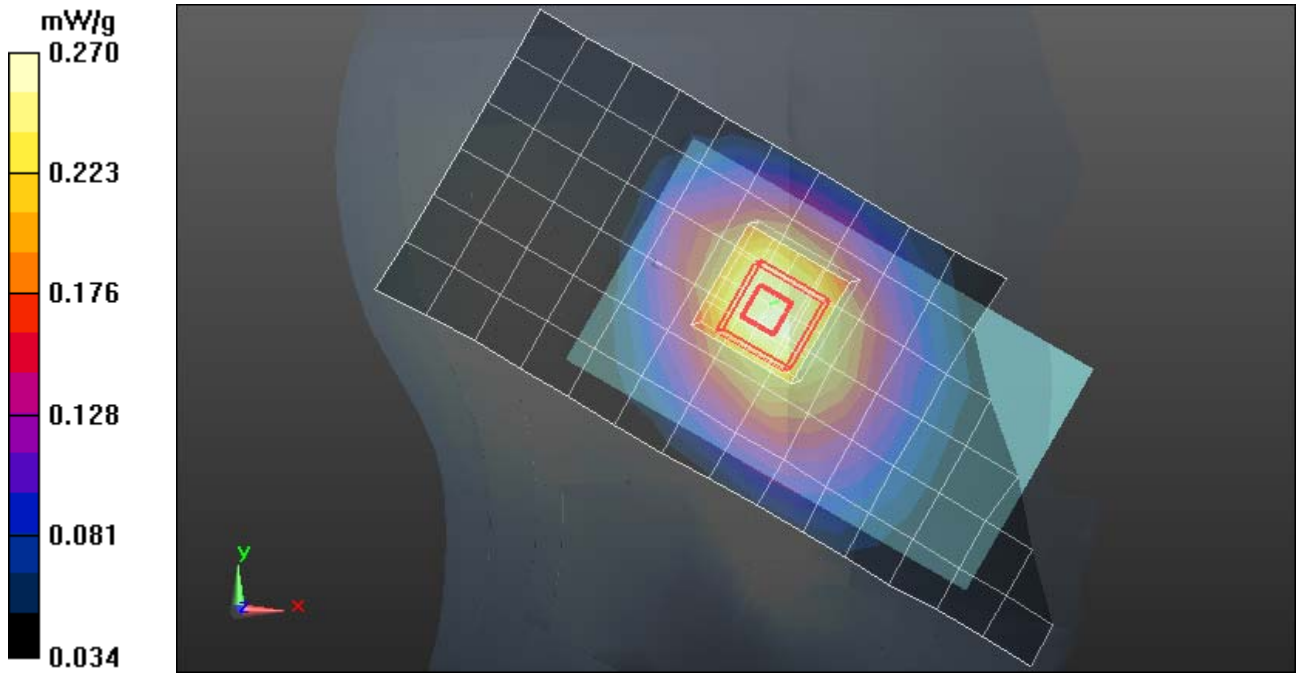
Communication System: _WCDMA; Frequency: 836 MHz; Communication System Channel Number: 4180; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.92 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.258 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.706 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.3210
SAR(1 g) = 0.256 mW/g; SAR(10 g) = 0.193 mW/g
Maximum value of SAR (measured) = 0.270 mW/g



Tilt, WCDMA 850

Date/Time: 2/24/2012 4:32:42 PM

Serial: LDNB270018; Procedure Notes: Pwr Step: All Bits UP; DEVICE POSITION: TILT

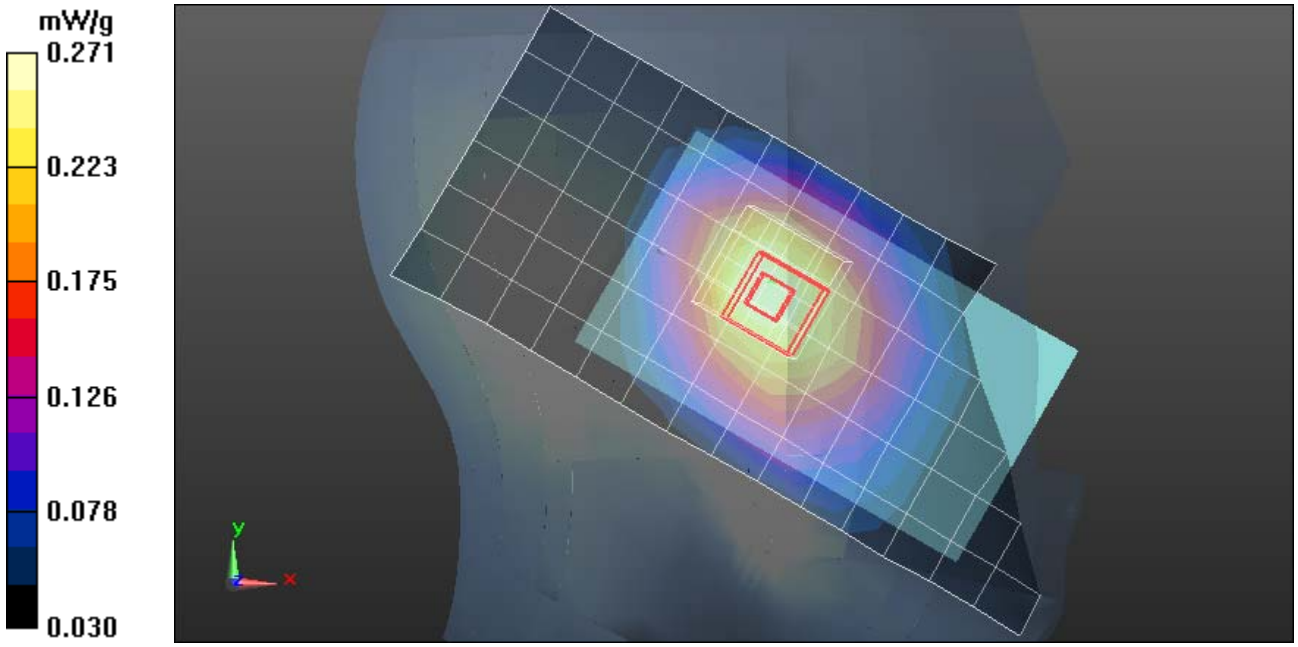
Communication System: _GSM; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:8.30042
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.92 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.18, 6.18, 6.18); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1132;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.256 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.459 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.3210
SAR(1 g) = 0.258 mW/g; SAR(10 g) = 0.194 mW/g
Maximum value of SAR (measured) = 0.271 mW/g



Date/Time: 3/6/2012 11:54:35 AM

Serial: LDNB270029; Procedure Notes: Modulation: 16QAM, RB config: RB Low; DEVICE POSITION: TILT

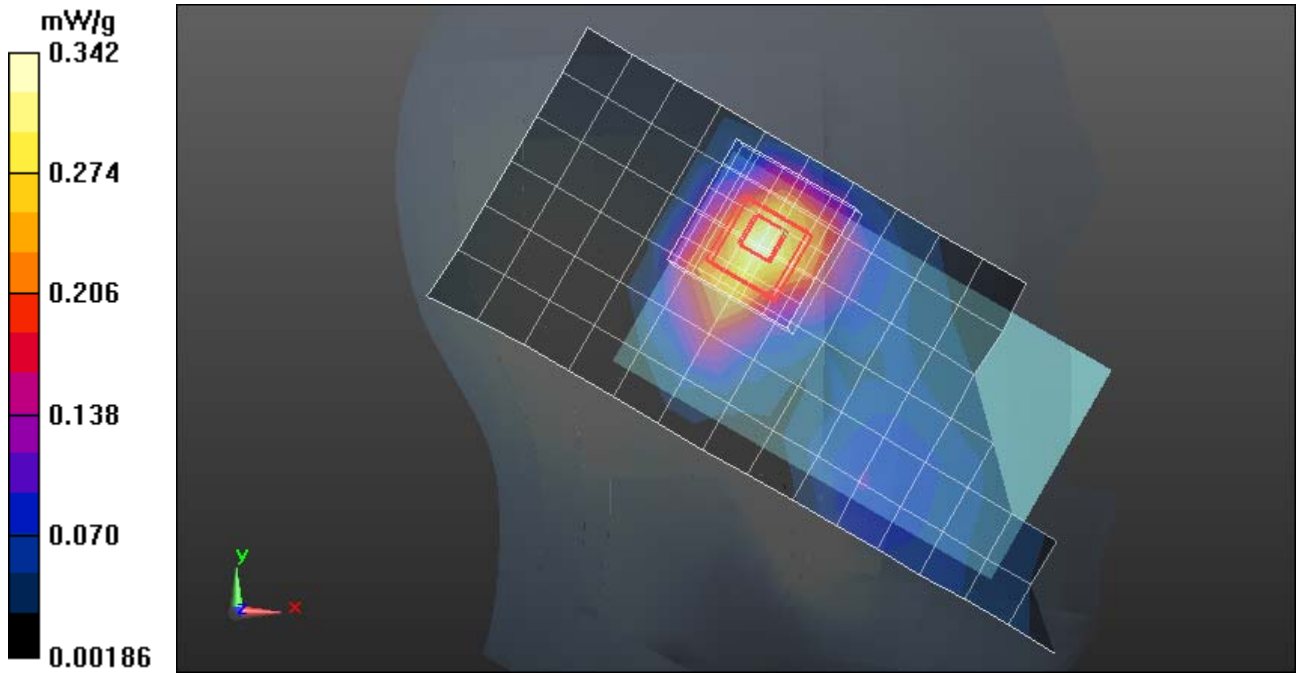
Communication System: _LTE; Frequency: 1717.5 MHz; Communication System Channel Number: 20025; Duty Cycle: 1:1
Medium: 1730 Glycol Head; Medium parameters used: f = 1730 MHz; σ = 1.36 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(5.03, 5.03, 5.03); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#1 - Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1319;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.338 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.304 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.4890
SAR(1 g) = 0.327 mW/g; SAR(10 g) = 0.206 mW/g
Maximum value of SAR (measured) = 0.342 mW/g



Date/Time: 2/28/2012 2:35:37 PM

Serial: LDNB270018; Procedure Notes: Pwr Step: ALL UP BITS; DEVICE POSITION: TILT

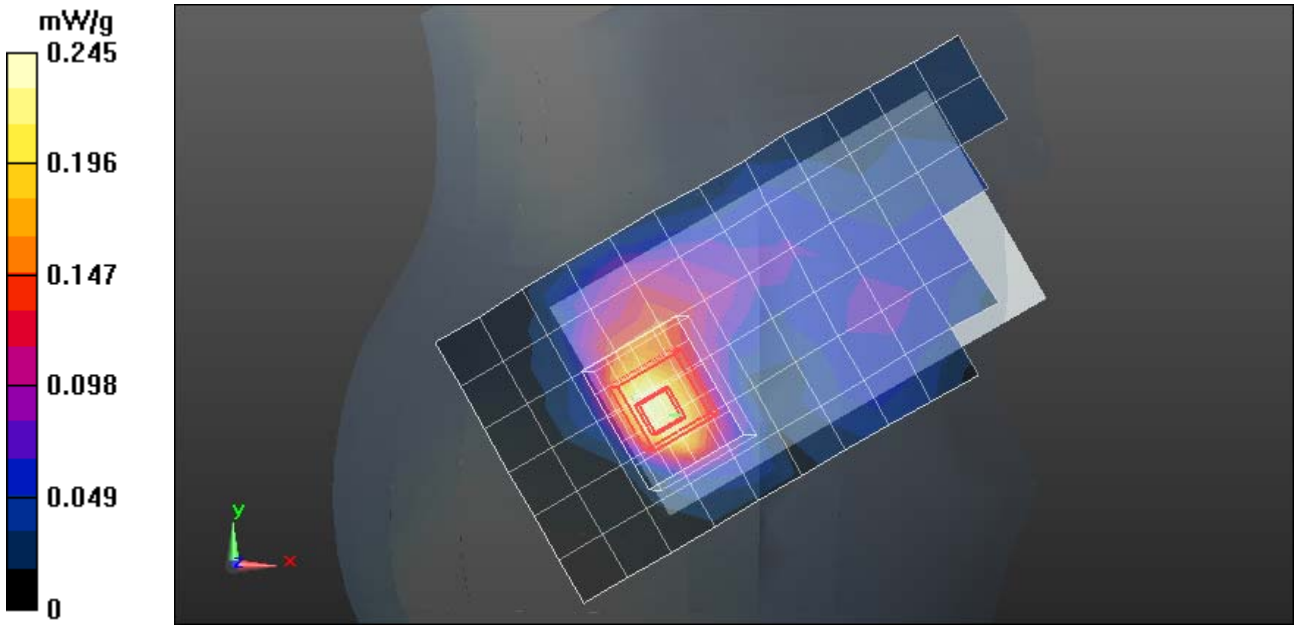
Communication System: _WCDMA; Frequency: 1732 MHz; Communication System Channel Number: 1413; Duty Cycle: 1:1
Medium: 1730 Glycol Head; Medium parameters used: f = 1730 MHz; σ = 1.37 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.33, 5.33, 5.33); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Glycol,SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.245 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.570 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.4540
SAR(1 g) = 0.256 mW/g; SAR(10 g) = 0.139 mW/g
Maximum value of SAR (measured) = 0.281 mW/g



Tilt, WCDMA 1700

Date/Time: 2/23/2012 10:13:09 PM

Serial: LDNB270018; Procedure Notes: Pwr Step: All up bits; DEVICE POSITION: Tilt

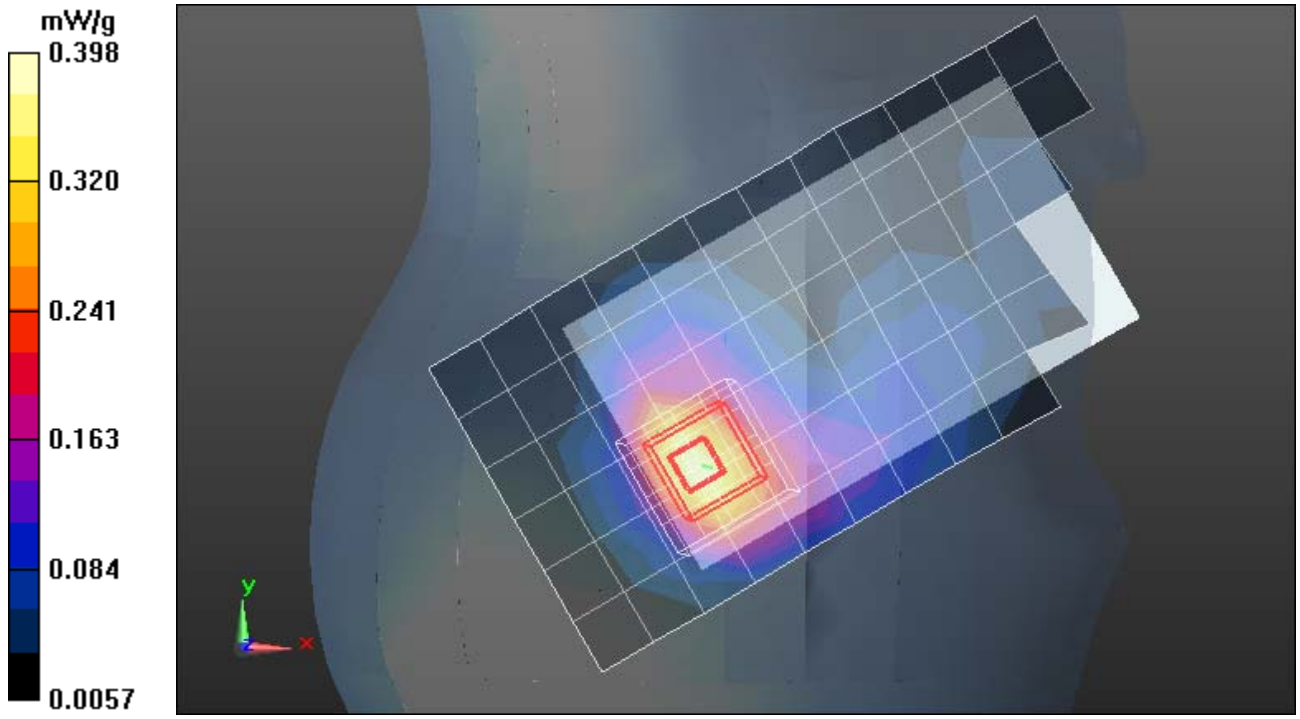
Communication System: _WCDMA; Frequency: 1880 MHz; Communication System Channel Number: 9400; Duty Cycle: 1:1
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.33, 5.33, 5.33); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Glycol,SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.383 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.756 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.5680
SAR(1 g) = 0.361 mW/g; SAR(10 g) = 0.212 mW/g
Maximum value of SAR (measured) = 0.398 mW/g



Tilt, WCDMA 1900

Date/Time: 2/24/2012 9:58:13 AM

Serial: LDNB270018; Procedure Notes: Pwr Step: 0; Antenna Position: INTERNAL; DEVICE POSITION: TILT

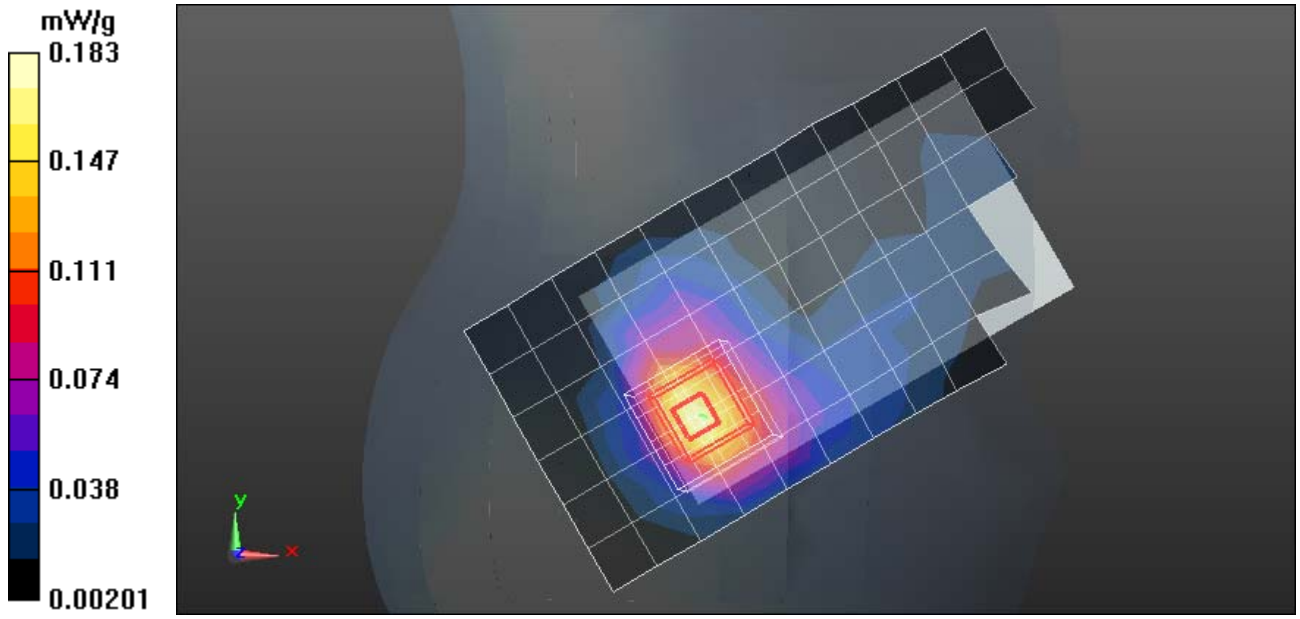
Communication System: _GSM; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:8.30042
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.33, 5.33, 5.33); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#_ 4 Glycol,SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.173 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.021 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.2630
SAR(1 g) = 0.165 mW/g; SAR(10 g) = 0.096 mW/g
Maximum value of SAR (measured) = 0.183 mW/g



Tilt, GSM 1900

Date/Time: 3/21/2012 2:21:27 PM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: TILT;

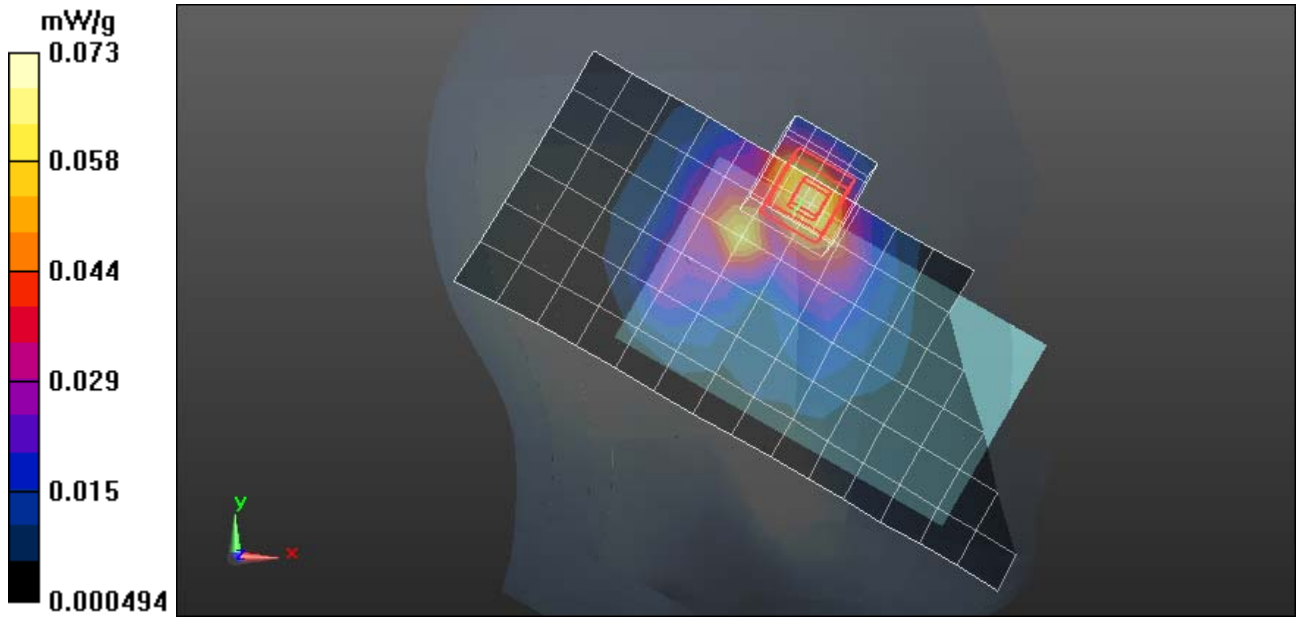
Communication System: _Wi-Fi 2450MHz; Frequency: 2437 MHz; Communication System Channel Number: 6; Duty Cycle: 1:1
Medium: 2450 Glycol Head; Medium parameters used: f = 2450 MHz; σ = 1.8 mho/m; ε_r = 38.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(4.56, 4.56, 4.56); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1162;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.065 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.425 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.1320
SAR(1 g) = 0.067 mW/g; SAR(10 g) = 0.033 mW/g
Maximum value of SAR (measured) = 0.073 mW/g



Tilt WIFI 2450 MHz

Date/Time: 4/4/2012 12:58:02 PM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: TILT

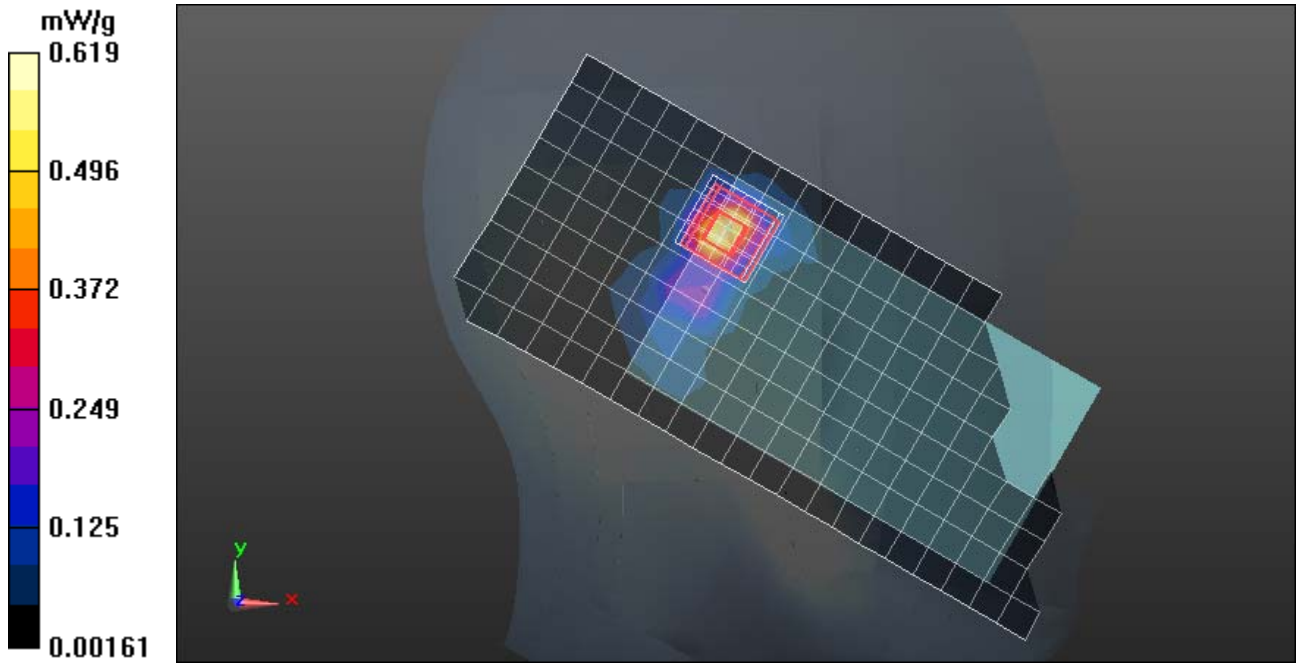
Communication System: _WIFI 5-6GHz; Frequency: 5240 MHz; Communication System Channel Number: 48; Duty Cycle: 1:1
Medium: 5-6 GHz SPEAG Tissue HEAD; Medium parameters used: f = 5210 MHz; σ = 4.53 mho/m; ε_r = 33.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3730; ConvF(4.72, 4.72, 4.72); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (10mm) (10x25x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.489 mW/g

Left Head Template/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 8.699 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.1850
SAR(1 g) = 0.321 mW/g; SAR(10 g) = 0.106 mW/g
Maximum value of SAR (measured) = 0.619 mW/g



Tilt 5210

Date/Time: 4/20/2012 6:42:26 PM

Serial: LDNB260041; Procedure Notes: Pwr Step: continous; DEVICE POSITION: Tilt

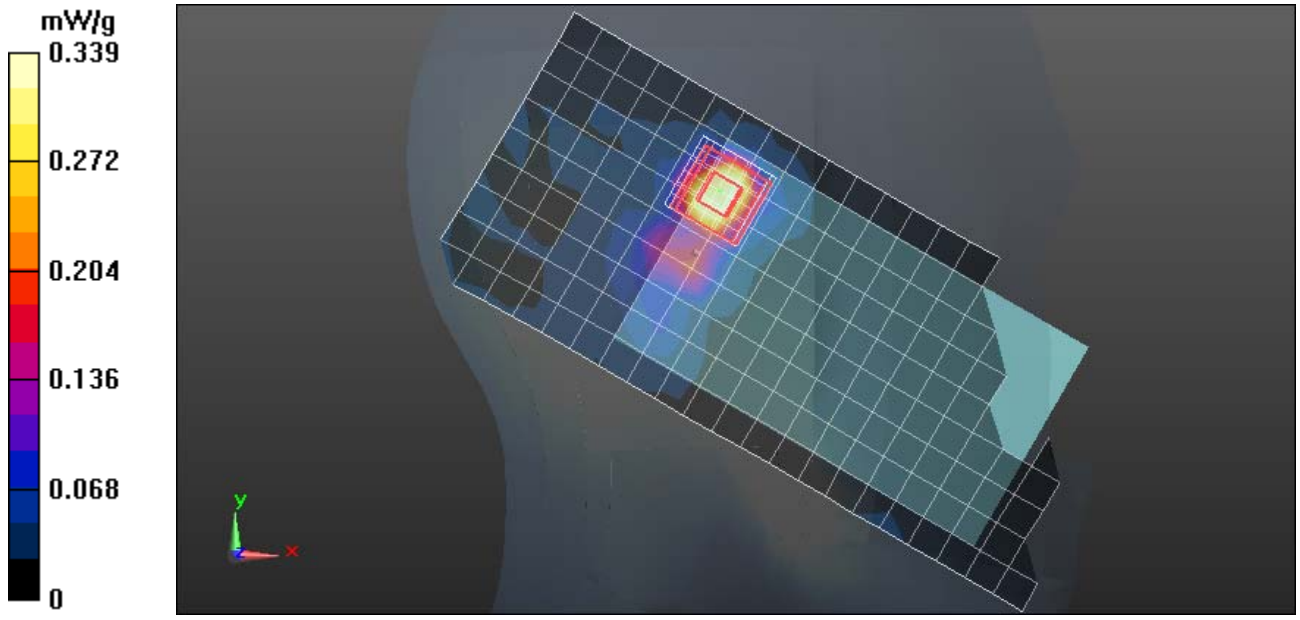
Communication System: _WIFI 5-6GHz; Frequency: 5300 MHz; Communication System Channel Number: 60; Duty Cycle: 1:1
Medium: 5-6 GHz SPEAG Tissue HEAD; Medium parameters used: f = 5290 MHz; σ = 4.52 mho/m; ε_r = 33.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3730; ConvF(4.48, 4.48, 4.48); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (10mm) (10x25x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.339 mW/g

Left Head Template/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm; Reference Value = 7.825 V/m; Power Drift = 0.03 dB; Peak SAR (extrapolated) = 0.8330; **SAR(1 g) = 0.238 mW/g; SAR(10 g) = 0.067 mW/g;** Maximum value of SAR (measured) = 0.504 mW/g



Tilt 5290 MHz

Date/Time: 5/8/2012 1:56:29 AM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: Tilt

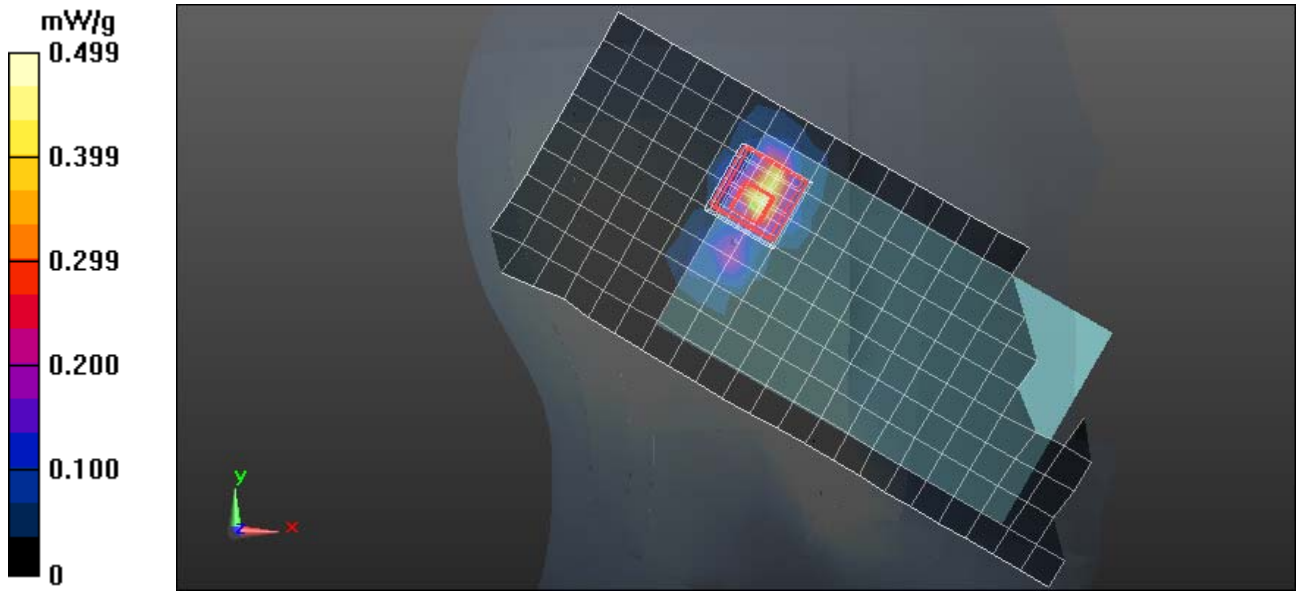
Communication System: _WIFI 5-6GHz; Frequency: 5660 MHz; Communication System Channel Number: 132; Duty Cycle: 1:1
Medium: 5-6 GHz SPEAG Tissue HEAD; Medium parameters used: f = 5600 MHz; σ = 4.92 mho/m; ε_r = 32.5; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3728; ConvF(4.14, 4.14, 4.14); Calibrated: 4/24/2012
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/17/2012
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (10mm) (10x25x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.472 mW/g

Left Head Template/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 9.019 V/m; Power Drift = -0.44 dB
Peak SAR (extrapolated) = 1.3790
SAR(1 g) = 0.205 mW/g; SAR(10 g) = 0.060 mW/g.
Maximum value of SAR (measured) = 0.499 mW/g



Tilt 5600

Date/Time: 4/1/2012 8:49:44 PM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: Tilt

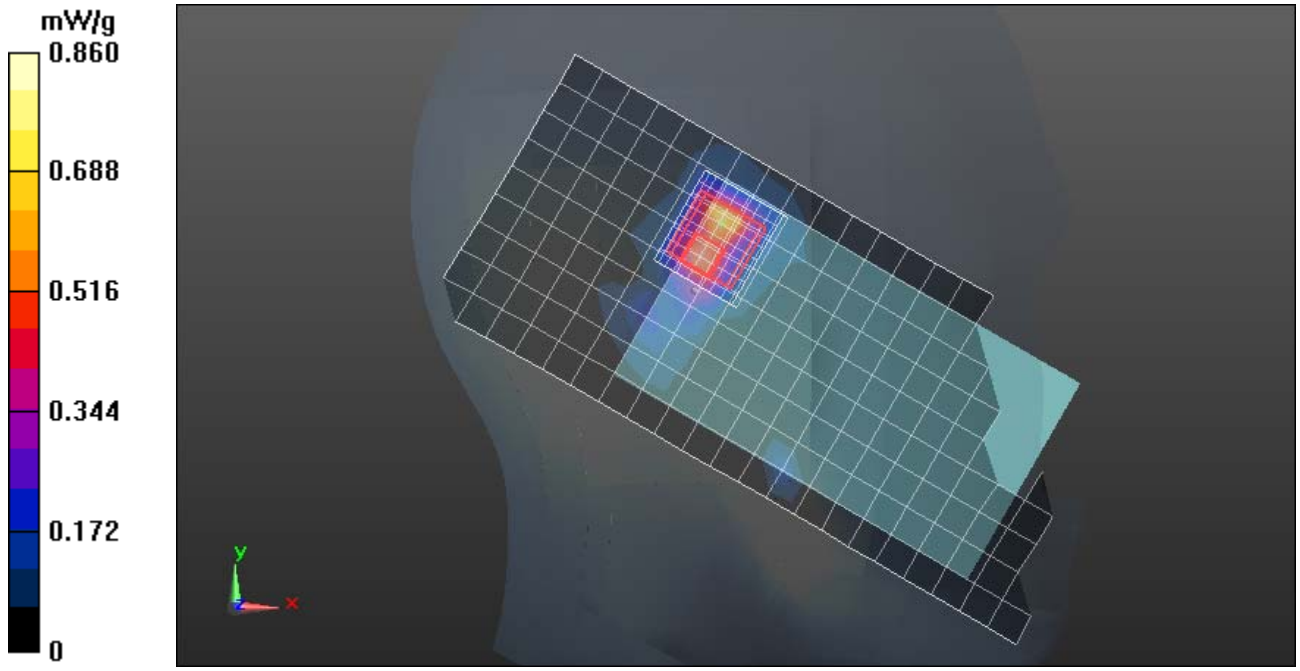
Communication System: _WIFI 5-6GHz; Frequency: 5745 MHz; Communication System Channel Number: 149; Duty Cycle: 1:1
Medium: 5-6 GHz SPEAG Tissue HEAD; Medium parameters used: f = 5785 MHz; σ = 5.09 mho/m; ε_r = 33.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3730; ConvF(4.16, 4.16, 4.16); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.4 (4989)

Left Head Template/Area Scan - Normal (10mm) (10x25x1): Measurement grid: dx=10mm, dy=10mm; Maximum value of SAR (measured) = 0.574 mW/g

Left Head Template/7x7x12 Zoom Scan (5-6GHz) (9x8x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 11.772 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.5270
SAR(1 g) = 0.366 mW/g; SAR(10 g) = 0.123 mW/g
Maximum value of SAR (measured) = 0.860 mW/g



Tilt 5785

Appendix 3

SAR distribution plots for Body Worn Test Results

Date/Time: 3/16/2012 1:39:57 PM

Serial: LDNB260041; Procedure Notes: Modulation: QPSK, Channel BW: 15MHz, RB config: 1RB High; DEVICE POSITION: BODY WORN, BACK OF PHONE 25MM FROM PHANTOM

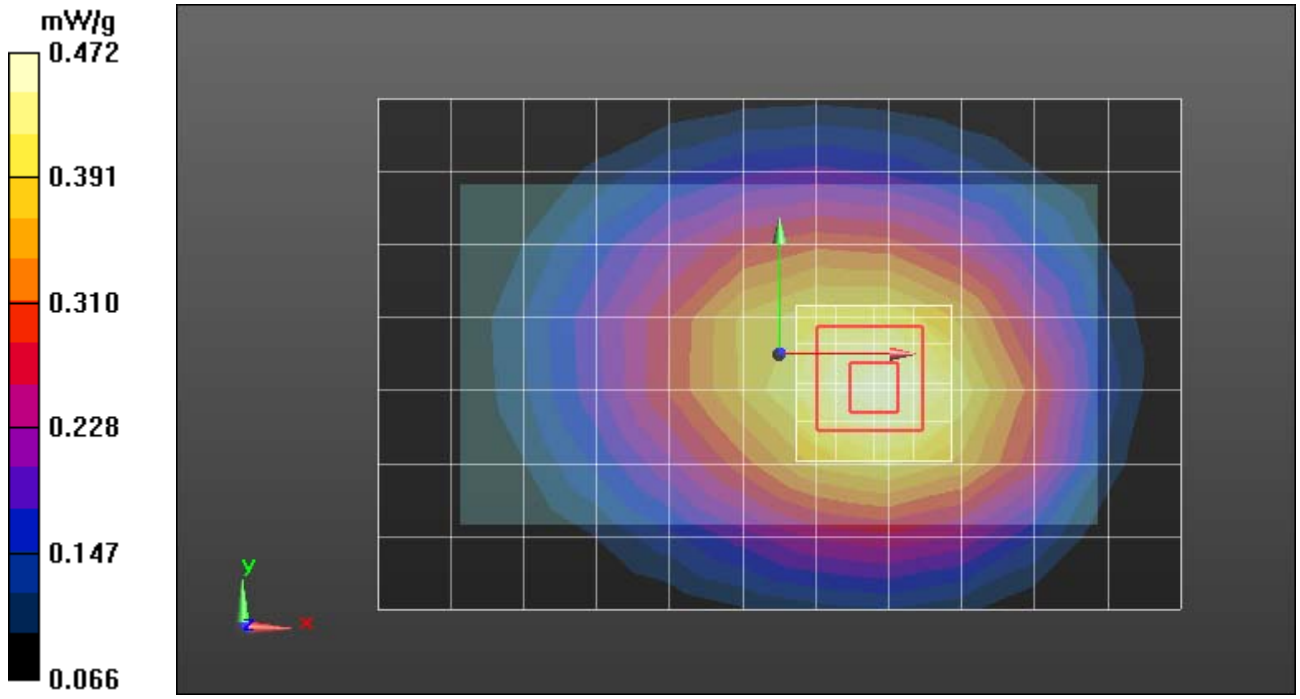
Communication System: _LTE Band 17; Frequency: 710 MHz; Communication System Channel Number: 23790; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 710 MHz; σ = 0.95 mho/m; ε_r = 56.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.36, 6.36, 6.36); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.464 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.078 V/m; Power Drift = -0.0073 dB
Peak SAR (extrapolated) = 0.5930
SAR(1 g) = 0.447 mW/g; SAR(10 g) = 0.334 mW/g
Maximum value of SAR (measured) = 0.472 mW/g



Date/Time: 2/25/2012 10:19:23 AM

Serial: LDNB270018; Procedure Notes: Pwr Step: All Bits UP; DEVICE POSITION: FRONT OF PHONE 25MM FROM PHANTOM

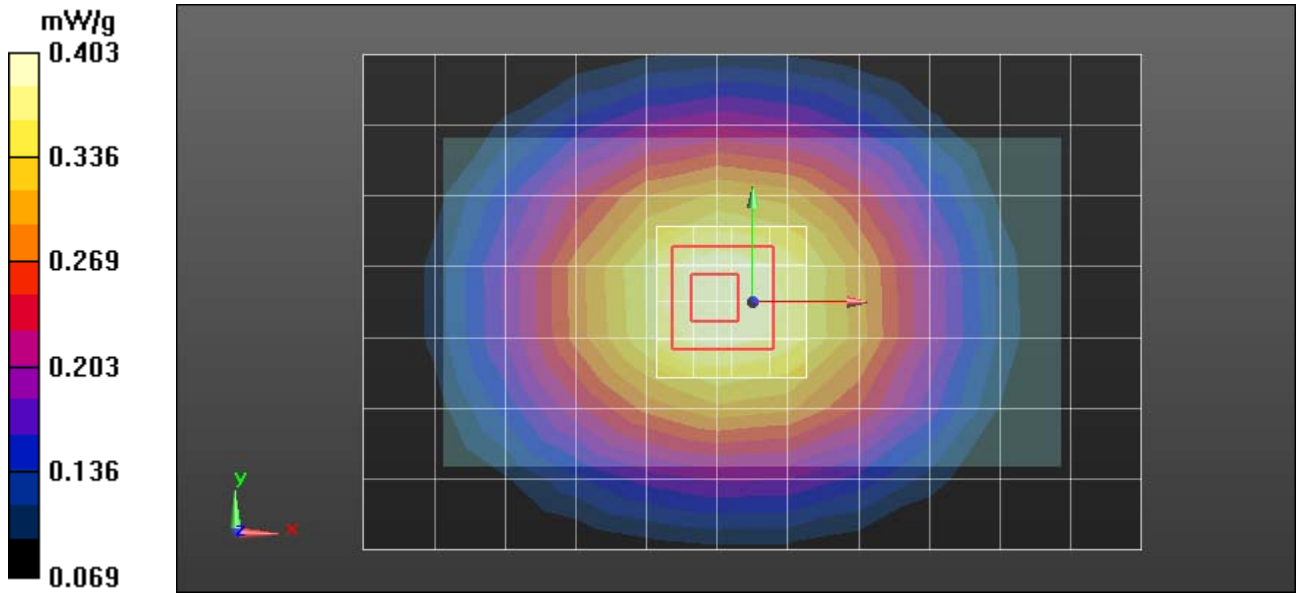
Communication System: _WCDMA; Frequency: 836 MHz; Communication System Channel Number: 4180; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.399 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.280 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.4990
SAR(1 g) = 0.385 mW/g; SAR(10 g) = 0.288 mW/g
Maximum value of SAR (measured) = 0.403 mW/g



Date/Time: 2/25/2012 8:16:17 AM

Serial: LDNB270018; Procedure Notes: Pwr Step: 05; Antenna Position: INTERNAL; DEVICE POSITION: FRONT OF PHONE 25MM FROM PHANTOM

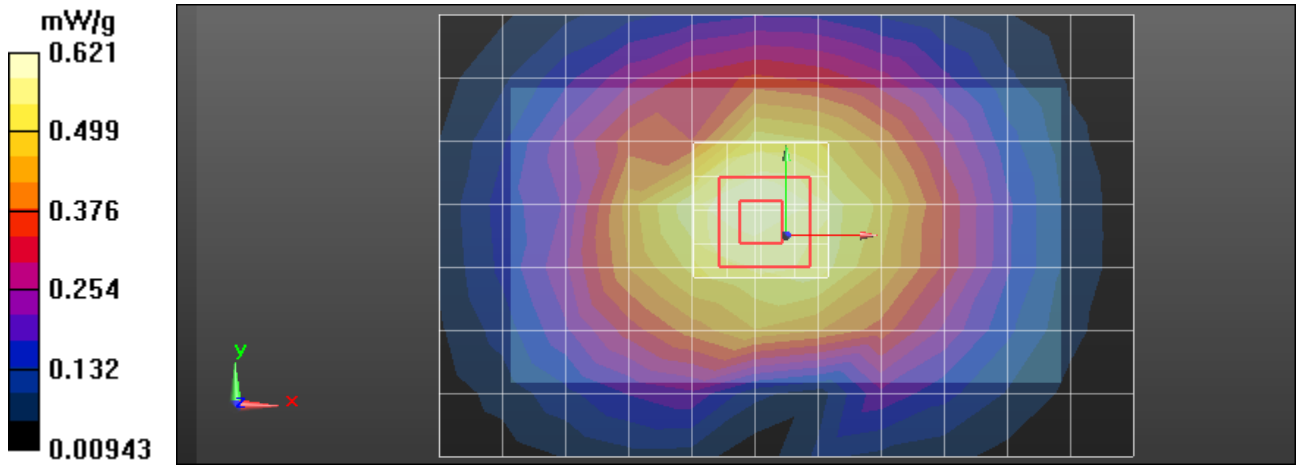
Communication System: _GPRS Class 10; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:4.14954
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.621 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.349 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.8030
SAR(1 g) = 0.599 mW/g; SAR(10 g) = 0.446 mW/g
Maximum value of SAR (measured) = 0.625 mW/g



Date/Time: 3/7/2012 8:55:09 PM

Serial: LDNB270029; Procedure Notes: MODULATION TYPE = QPSK, CHANNEL BANDWIDTH = 15 MHZ, RB CONFIG = 1 RB High, DEVICE POSITION: BODY WORN, BACK OF PHONE 25MM FROM PHANTOM

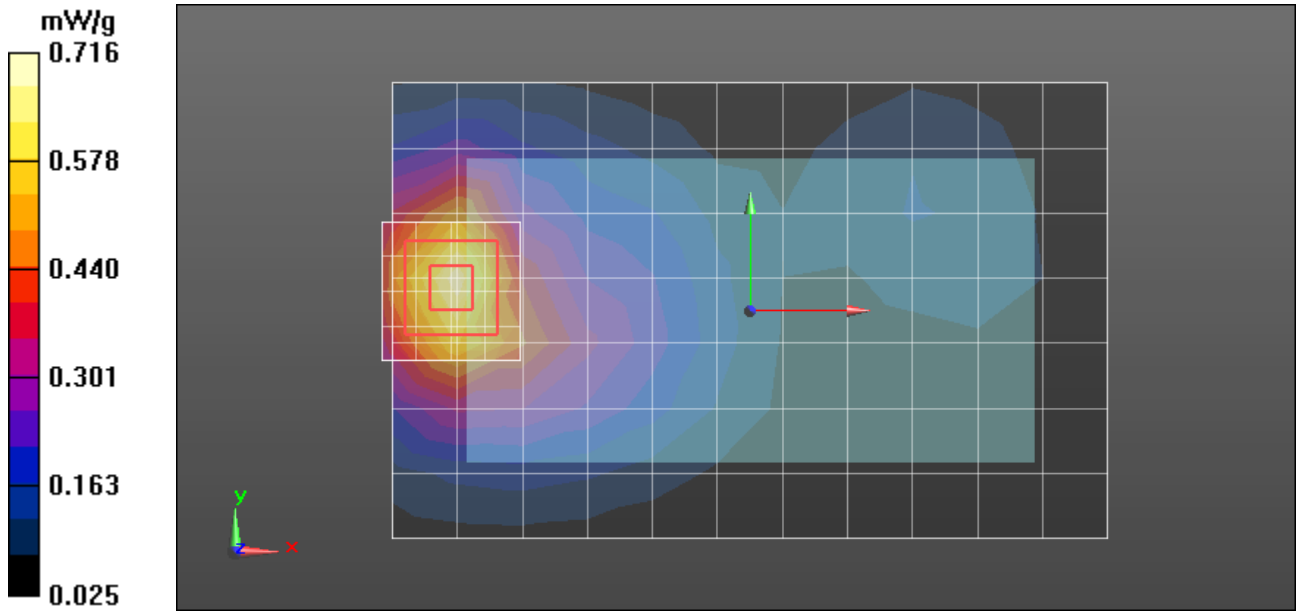
Communication System: _LTE Band 04; Frequency: 1747.5 MHz; Communication System Channel Number: 20325; Duty Cycle: 1:1
Medium: 1730 Glycol Body; Medium parameters used: f = 1730 MHz; σ = 1.48 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3124; ConvF(4.69, 4.69, 4.69); Calibrated: 8/23/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn376; Calibrated: 8/31/2011
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.706 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.805 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.0190
SAR(1 g) = 0.657 mW/g; SAR(10 g) = 0.404 mW/g
Maximum value of SAR (measured) = 0.716 mW/g



Date/Time: 2/28/2012 4:00:27 PM

Serial: LDNB270018; Procedure Notes: Pwr Step: ALL UP BITS; DEVICE POSITION: BODY WORN, BACK OF PHONE 25MM FROM PHANTOM

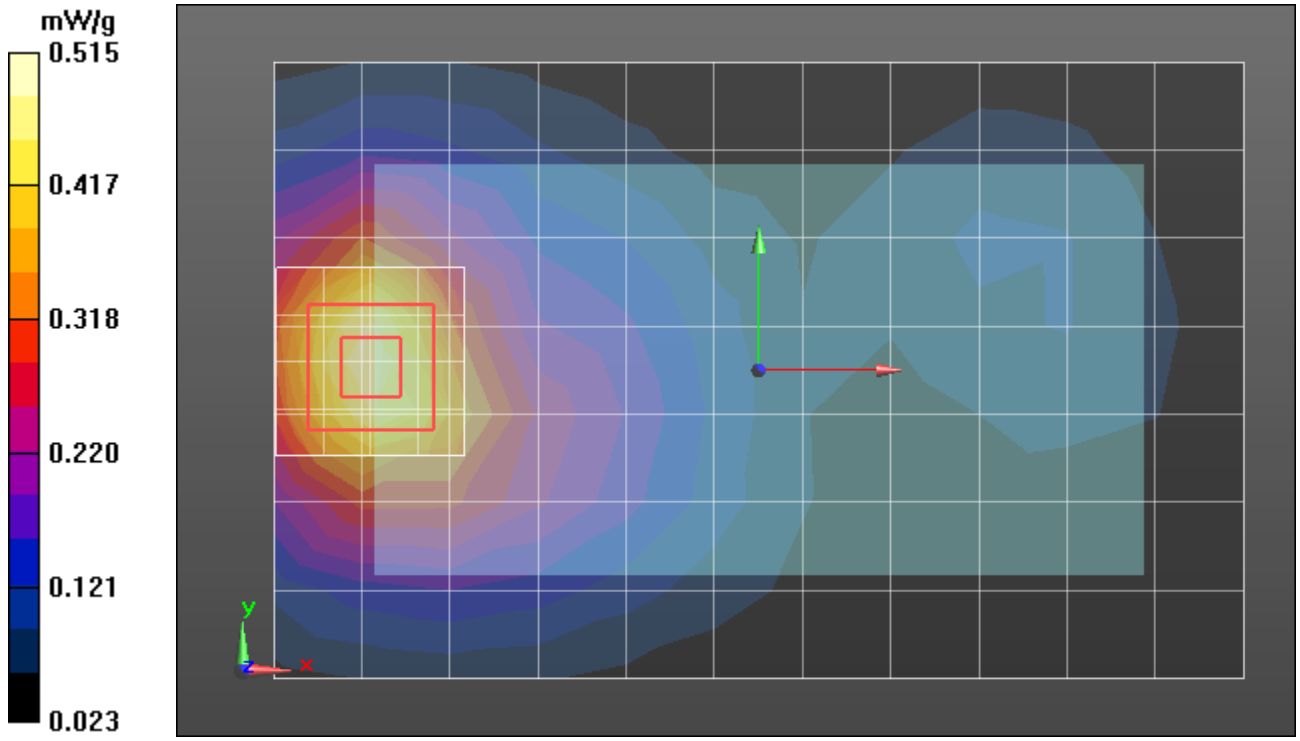
Communication System: _WCDMA; Frequency: 1732 MHz; Communication System Channel Number: 1413; Duty Cycle: 1:1
Medium: 1730 Glycol Body; Medium parameters used: f = 1730 MHz; σ = 1.5 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.493 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.321 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.7070
SAR(1 g) = 0.474 mW/g; SAR(10 g) = 0.301 mW/g
Maximum value of SAR (measured) = 0.515 mW/g



Body, WCDMA 1700

Date/Time: 2/23/2012 10:59:19 PM

Serial: LDNB270018; Procedure Notes: Pwr Step: All up bits; DEVICE POSITION: BODY WORN, BACK OF PHONE 25MM FROM PHANTOM

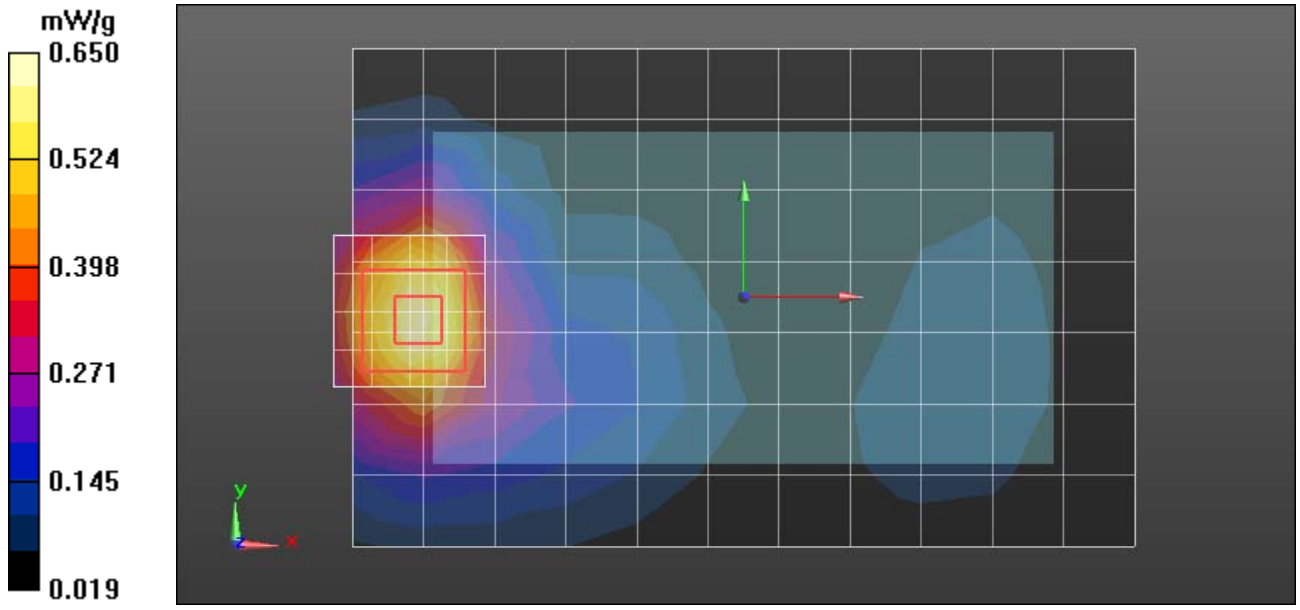
Communication System: _WCDMA; Frequency: 1880 MHz; Communication System Channel Number: 9400; Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.646 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.794 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.9450
SAR(1 g) = 0.603 mW/g; SAR(10 g) = 0.367 mW/g
Maximum value of SAR (measured) = 0.650 mW/g



Date/Time: 2/26/2012 7:38:15 AM

Serial: LDNB270018; Procedure Notes: Pwr Step: 0; Antenna Position: INTERNAL; DEVICE POSITION: BODY WORN,BACK OF PHONE 25MM FROM PHANTOM

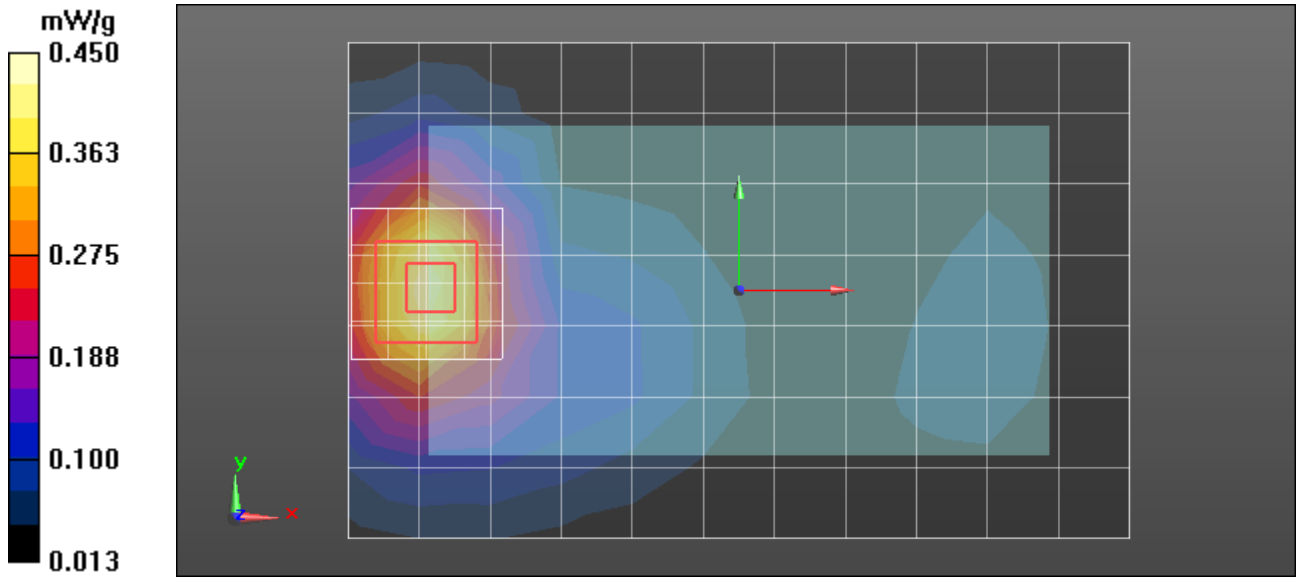
Communication System: _GPRS Class 10; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:4.14954
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.422 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.675 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.6460
SAR(1 g) = 0.412 mW/g; SAR(10 g) = 0.251 mW/g
Maximum value of SAR (measured) = 0.450 mW/g



Date/Time: 3/20/2012 3:31:46 PM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: BACK OF PHONE 25MM AWAY FROM PHANTOM

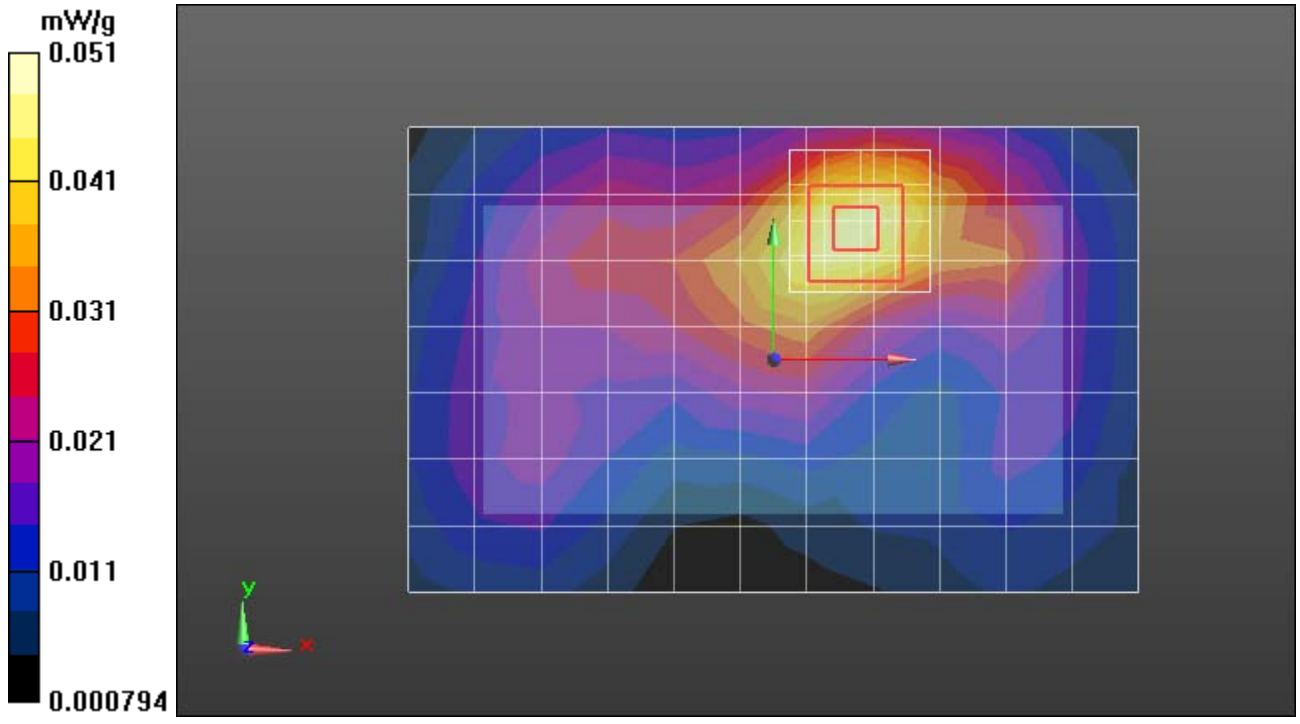
Communication System: _Wi-Fi 2450MHz; Frequency: 2412 MHz; Communication System Channel Number: 1; Duty Cycle: 1:1
Medium: 2450 Glycol Body; Medium parameters used: f = 2450 MHz; σ = 1.94 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(4.56, 4.56, 4.56); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.046 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.143 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.0810
SAR(1 g) = 0.047 mW/g; SAR(10 g) = 0.028 mW/g
Maximum value of SAR (measured) = 0.051 mW/g



Body WIFI 2450 MHz

Date/Time: 3/29/2012 1:29:47 PM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: Front of Phone 25mm away from phantom

Communication System: _WIFI 5-6GHz; Frequency: 5200 MHz; Communication System Channel Number: 40; Duty Cycle: 1:1
Medium: 5-6 GHz SPEAG Tissue BODY; Medium parameters used: f = 5210 MHz; σ = 5.56 mho/m; ε_r = 47.2; ρ = 1000 kg/m^3

DASY4 Configuration:

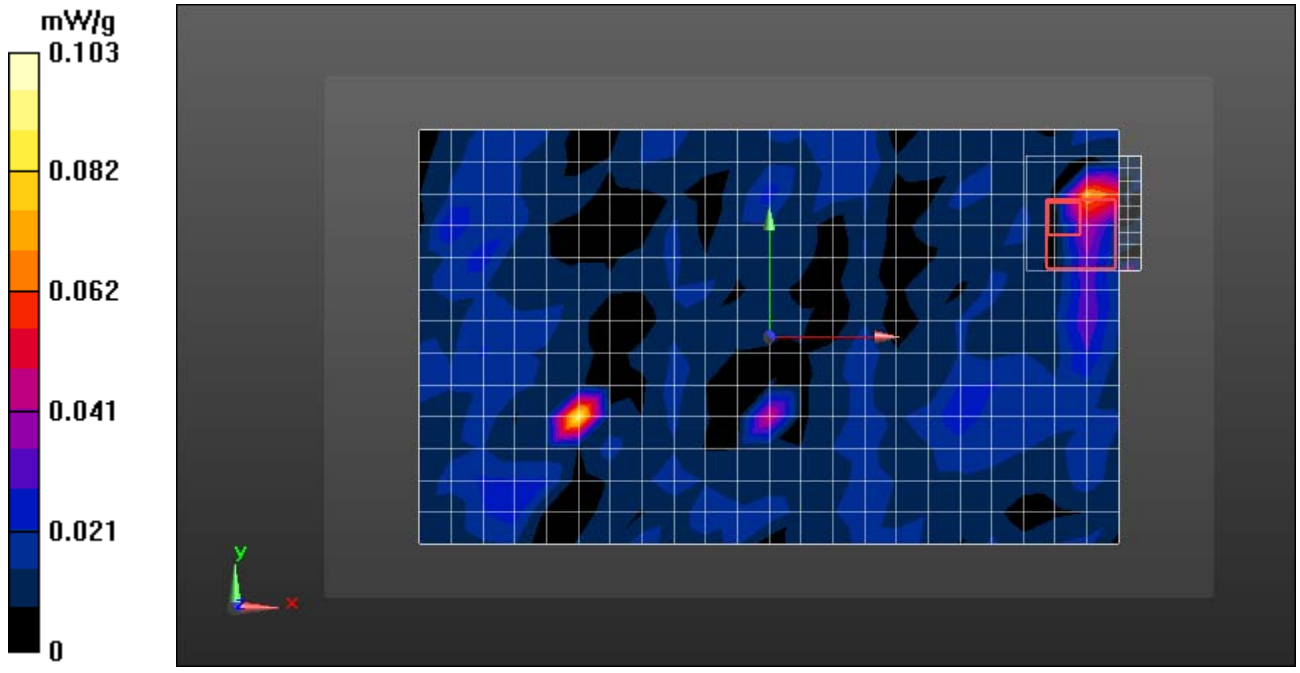
- Probe: EX3DV4 - SN3730; ConvF(4.01, 4.01, 4.01); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

TRIPLE Flat Phone Against Flat Section/Area Scan - Extended Body (10mm) (23x14x1):

Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.091 mW/g

TRIPLE Flat Phone Against Flat Section/7x7x12 Zoom Scan (5-6GHz) (10x10x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.809 V/m; Power Drift = 1.12 dB
Peak SAR (extrapolated) = 0.3450
SAR(1 g) = 0.00538 mW/g; SAR(10 g) = 0.000556 mW/g
Maximum value of SAR (measured) = 0.103 mW/g



Body 5200

Date/Time: 4/24/2012 8:12:53 PM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: Back of Phone 25 mm from Phantom

Communication System: _WIFI 5-6GHz; Frequency: 5300 MHz; Communication System Channel Number: 60; Duty Cycle: 1:1
Medium: 5-6 GHz SPEAG Tissue BODY; Medium parameters used: f = 5290 MHz; σ = 5.54 mho/m; ε_r = 47.2; ρ = 1000 kg/m^3

DASY4 Configuration:

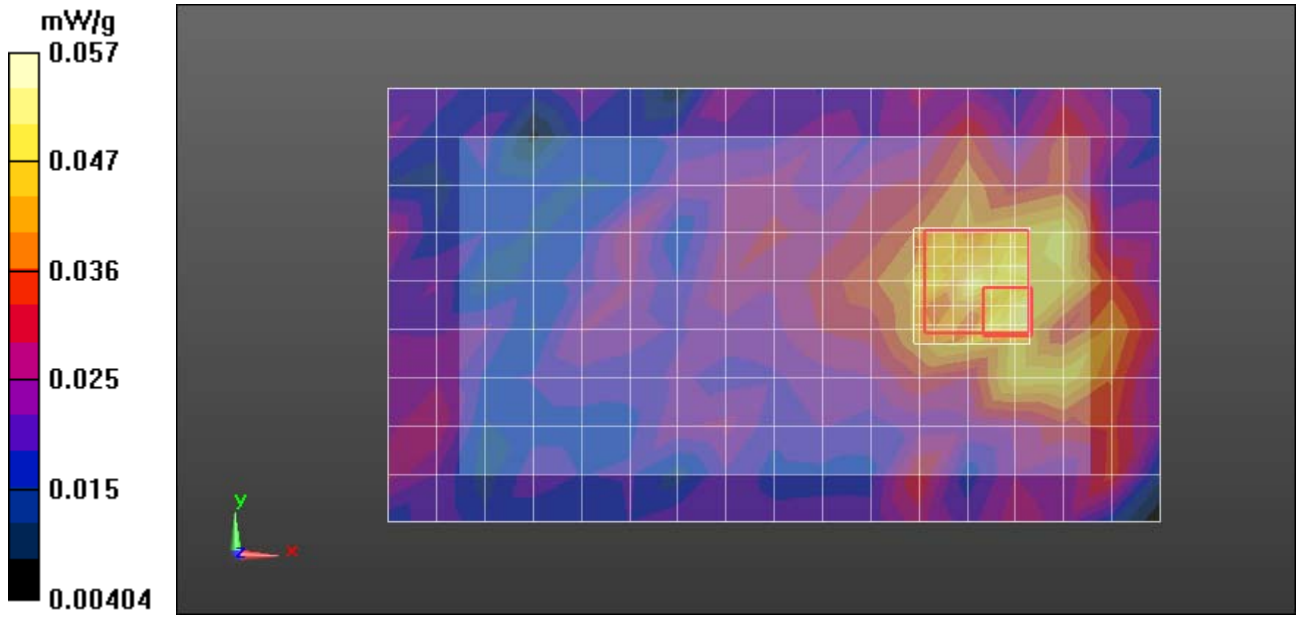
- Probe: EX3DV4 - SN3730; ConvF(3.79, 3.79, 3.79); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

TRIPLE Flat Phone Against Flat Section/Phone Area Scan - Normal Body (10mm) (17x10x1):

Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.057 mW/g

TRIPLE Flat Phone Against Flat Section/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.082 V/m; Power Drift = -0.60 dB
Peak SAR (extrapolated) = 0.1000
SAR(1 g) = 0.030 mW/g; SAR(10 g) = 0.014 mW/g



Body 5290 MHz

Date/Time: 5/8/2012 11:11:27 AM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: Back of Phone 25mm from Phantom

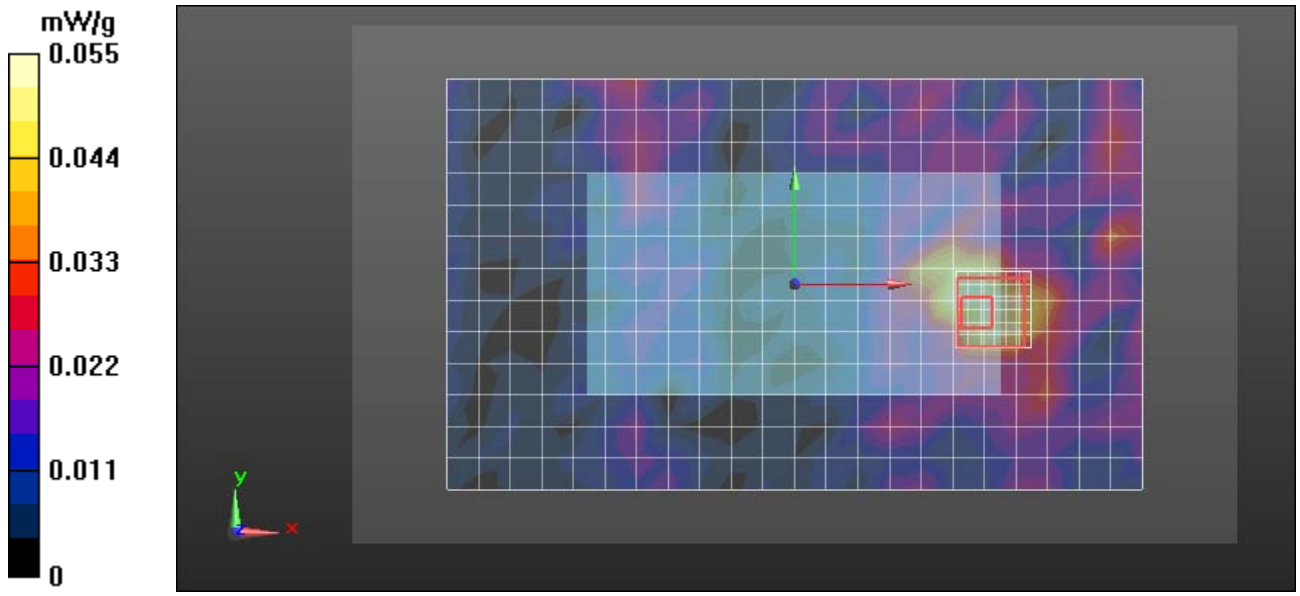
Communication System: _WIFI 5-6GHz; Frequency: 5660 MHz; Communication System Channel Number: 132; Duty Cycle: 1:1
Medium: 5-6 GHz TRITON Tissue BODY; Medium parameters used: f = 5600 MHz; σ = 6.03 mho/m; ε_r = 47.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3728; ConvF(3.37, 3.37, 3.37); Calibrated: 4/24/2012
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/17/2012
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

TRIPLE Flat Phone Against Flat Section/Area Scan - Extended Body (10mm) (23x14x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.055 mW/g

TRIPLE Flat Phone Against Flat Section/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.137 V/m; Power Drift = -0.47 dB
Peak SAR (extrapolated) = 0.3880
SAR(1 g) = 0.033 mW/g; SAR(10 g) = 0.013 mW/g
Maximum value of SAR (measured) = 0.112 mW/g



Date/Time: 3/31/2012 12:36:38 PM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: Back of Phone 25mm away from Phantom

Communication System: _WIFI 5-6GHz; Frequency: 5745 MHz; Communication System Channel Number: 149; Duty Cycle: 1:1; Medium: 5-6 GHz SPEAG Tissue BODY; Medium parameters used: f = 5785 MHz; σ = 6.52 mho/m; ε_r = 46.4; ρ = 1000 kg/m^3

DASY4 Configuration:

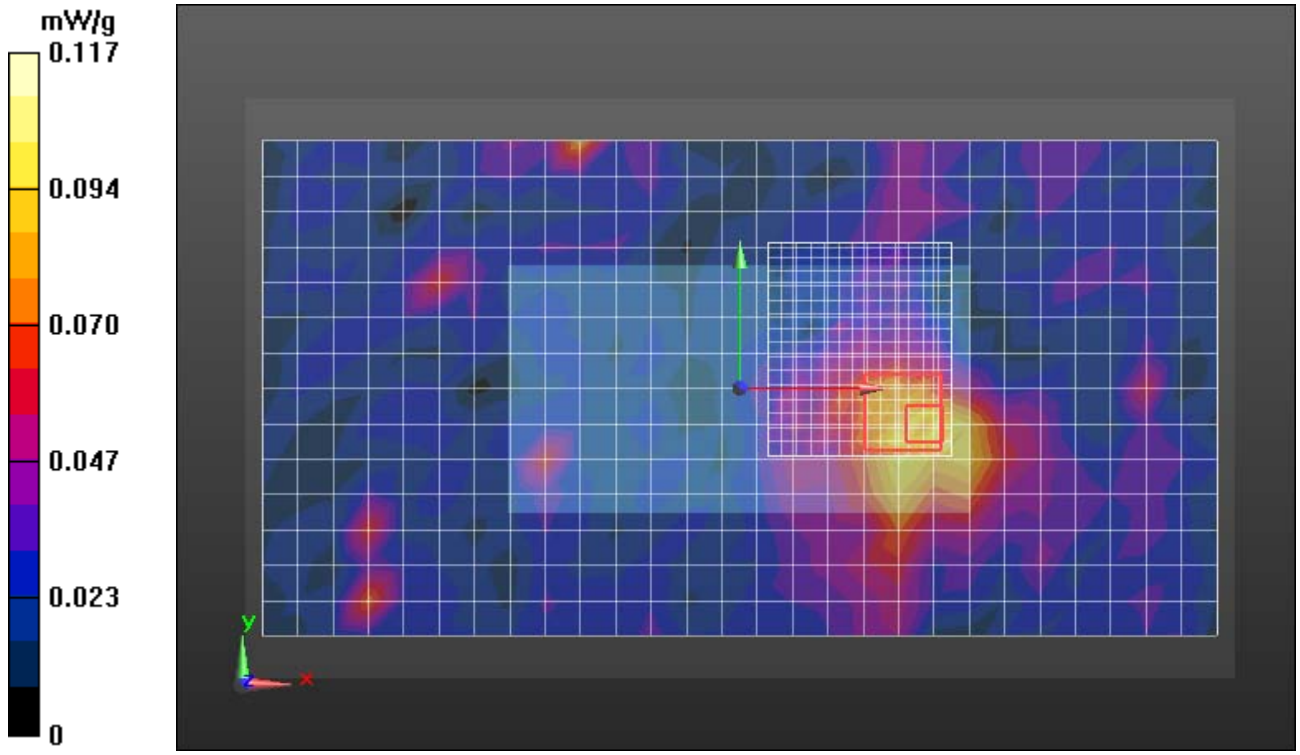
- Probe: EX3DV4 - SN3730; ConvF(3.63, 3.63, 3.63); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

TRIPLE Flat Phone Against Flat Section/Area Scan - Full Body (10mm) (28x17x1):

Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.109 mW/g

TRIPLE Flat Phone Against Flat Section/7x7x12 Zoom Scan (5-6GHz) (14x16x6)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.289 V/m; Power Drift = 0.0066 dB
Peak SAR (extrapolated) = 0.7030
SAR(1 g) = 0.063 mW/g; SAR(10 g) = 0.027 mW/g
Maximum value of SAR (measured) = 0.117 mW/g



Body 5785

Appendix 4

SAR distribution plots for Mobile Hotspot Test Results

Date/Time: 3/16/2012 11:39:00 PM

Serial: LDNB260041; Procedure Notes: Pwr Step: Modulation: QPSK, Channel BW: 15MHz, RB config: 1RB Low; DEVICE POSITION: MOBILE HOTSPOT POSITION, BACK OF PHONE 10MM FROM PHANTOM

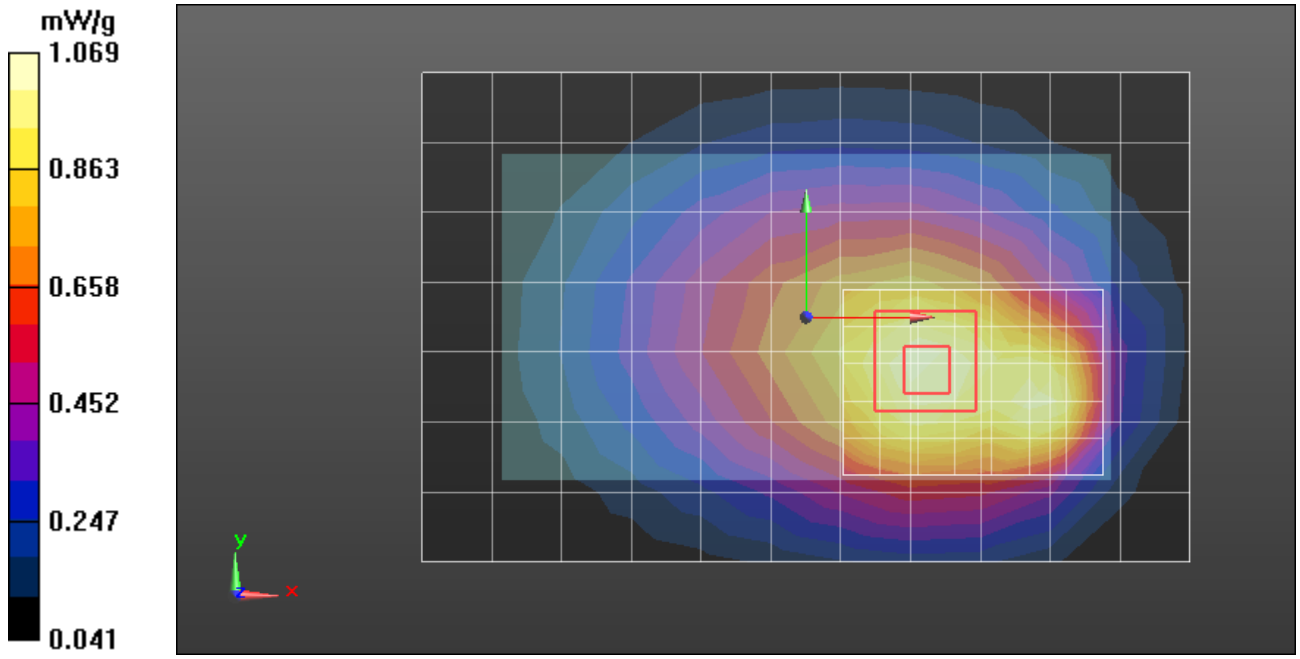
Communication System: _LTE Band 17; Frequency: 710 MHz; Communication System Channel Number: 23790; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 710 MHz; σ = 0.95 mho/m; ε_r = 56.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.36, 6.36, 6.36); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.036 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (8x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.225 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.5830
SAR(1 g) = 1 mW/g; SAR(10 g) = 0.730 mW/g
Maximum value of SAR (measured) = 1.069 mW/g



Date/Time: 2/25/2012 11:00:27 AM

Serial: LDNB270018; Procedure Notes: Pwr Step: All Bits UP; DEVICE POSITION: BACK OF PHONE 10MM FROM PHANTOM

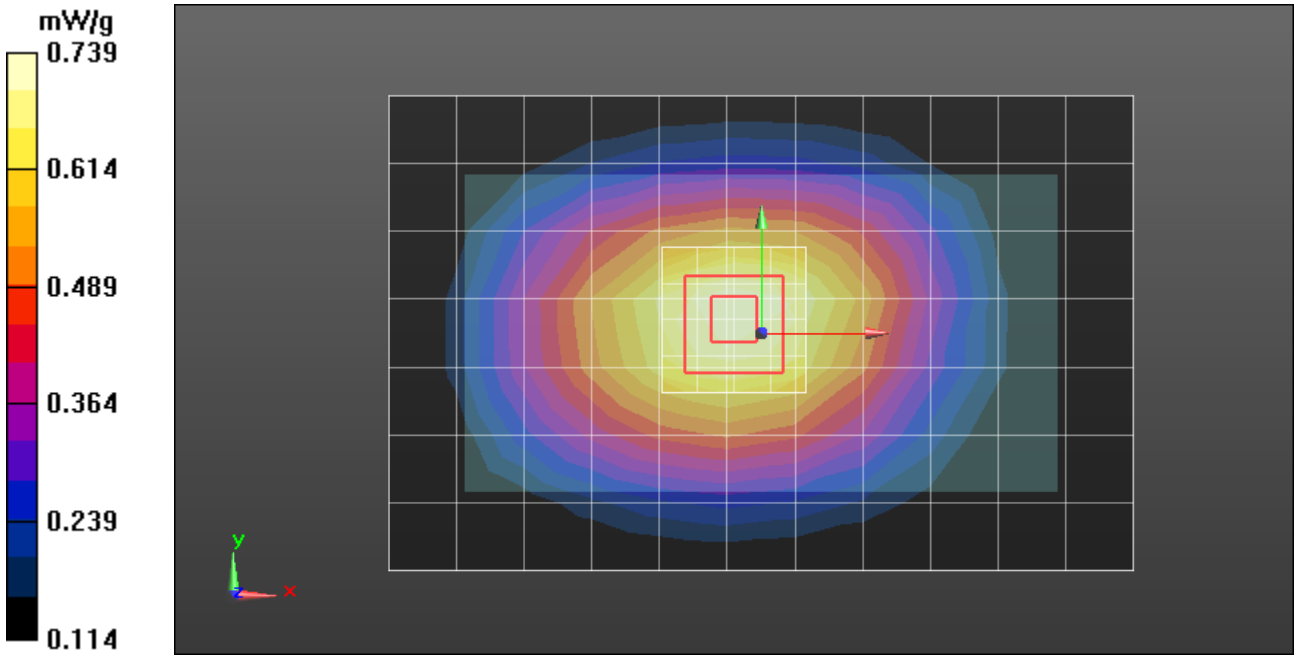
Communication System: _WCDMA; Frequency: 836 MHz; Communication System Channel Number: 4180; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.727 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.177 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.9010
SAR(1 g) = 0.704 mW/g; SAR(10 g) = 0.529 mW/g
Maximum value of SAR (measured) = 0.739 mW/g



Date/Time: 2/24/2012 8:23:47 PM

Serial: LDNB270018; Procedure Notes: Pwr Step: 5; DEVICE POSITION: Back of Phone 10mm from Flat Phantom

Communication System: _GPRS Class 10; Frequency: 848.8 MHz; Communication System Channel Number: 251; Duty Cycle: 1:4.14954
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3

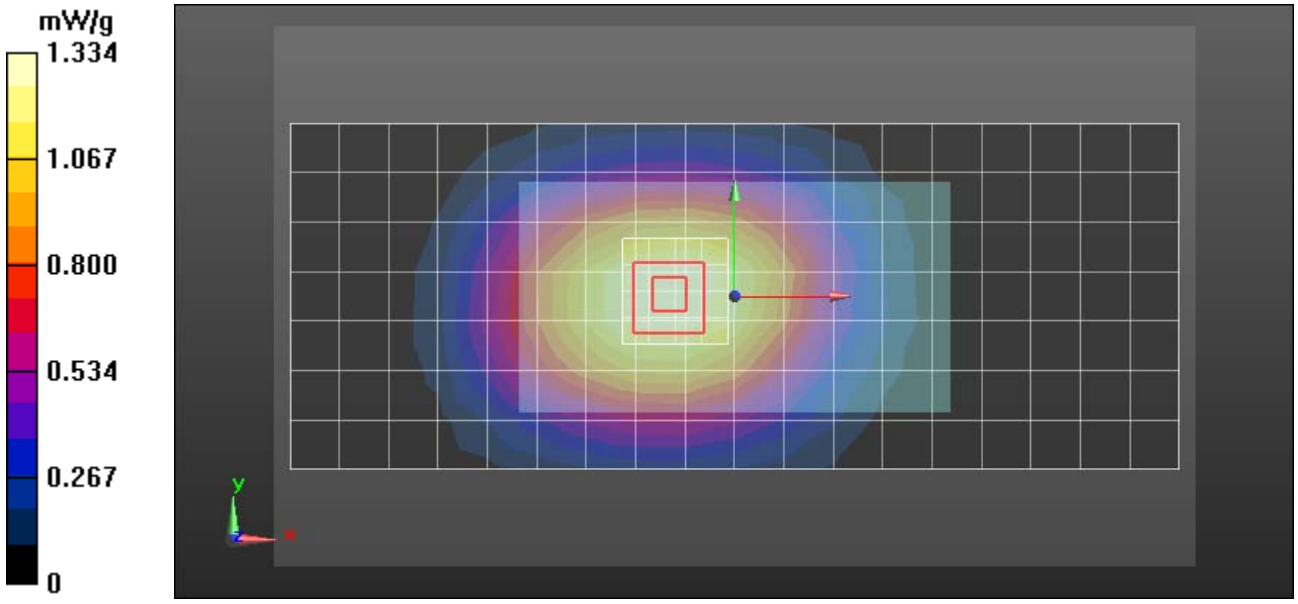
DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(6.28, 6.28, 6.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Extended Phone (15mm) (19x8x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.334 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 37.386 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.7100
SAR(1 g) = 1.31 mW/g; SAR(10 g) = 0.981 mW/g
Maximum value of SAR (measured) = 1.366 mW/g



Date/Time: 4/4/2012 11:20:13 AM

Serial: LDUB2M0130; Procedure Notes: Channel BW: 15 MHz; Modulation: QPSK; RB config: 50%; DEVICE POSITION: Bottom of Phone 10mm away from phantom \

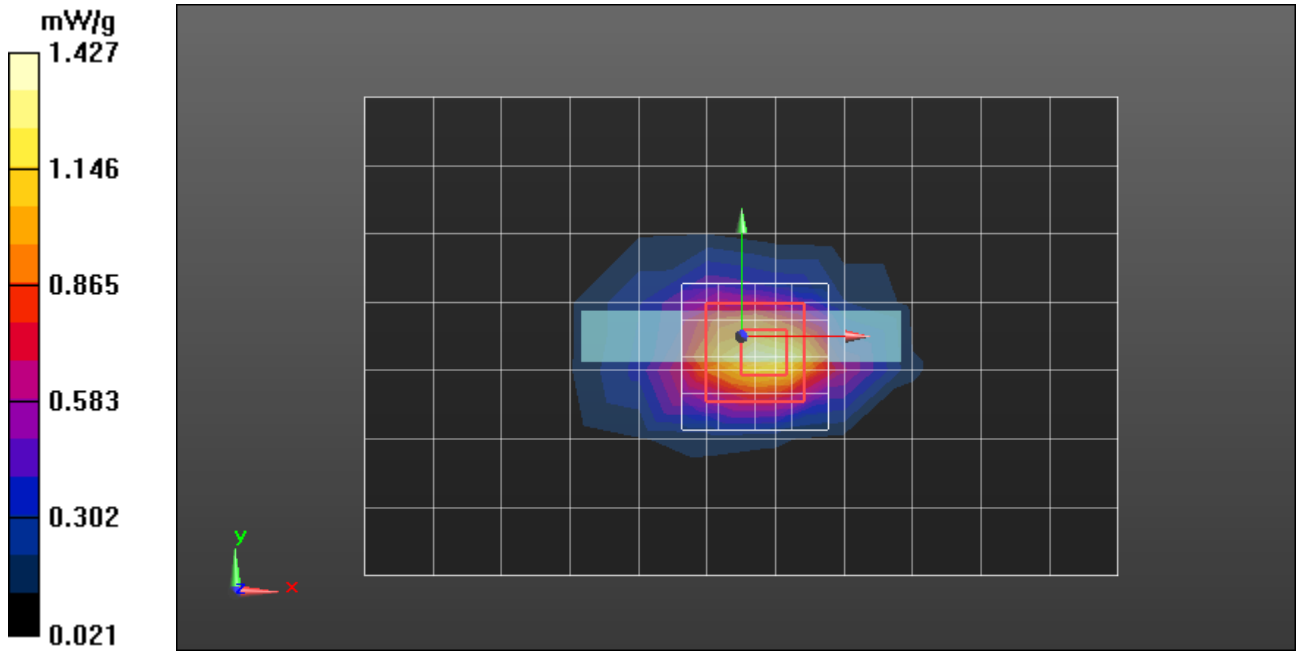
Communication System: _LTE Band 04; Frequency: 1747.5 MHz; Communication System Channel Number: 20325; Duty Cycle: 1:1
Medium: 1730 Glycol Body; Medium parameters used: f = 1730 MHz; σ = 1.49 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.263 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.940 V/m; Power Drift = -0.23 dB
Peak SAR (extrapolated) = 2.2390
SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.643 mW/g
Maximum value of SAR (measured) = 1.427 mW/g



Date/Time: 3/29/2012 11:51:53 PM

Serial: LDUB2M0130; Procedure Notes: Pwr Step: All Up; DEVICE POSITION: Bottom Edge of Phone 10mm from Flat Phantom

Communication System: _WCDMA; Frequency: 1752 MHz; Communication System Channel Number: 1513; Duty Cycle: 1:1
Medium: 1730 Glycol Body; Medium parameters used: f = 1730 MHz; σ = 1.48 mho/m; ε_r = 51; ρ = 1000 kg/m^3

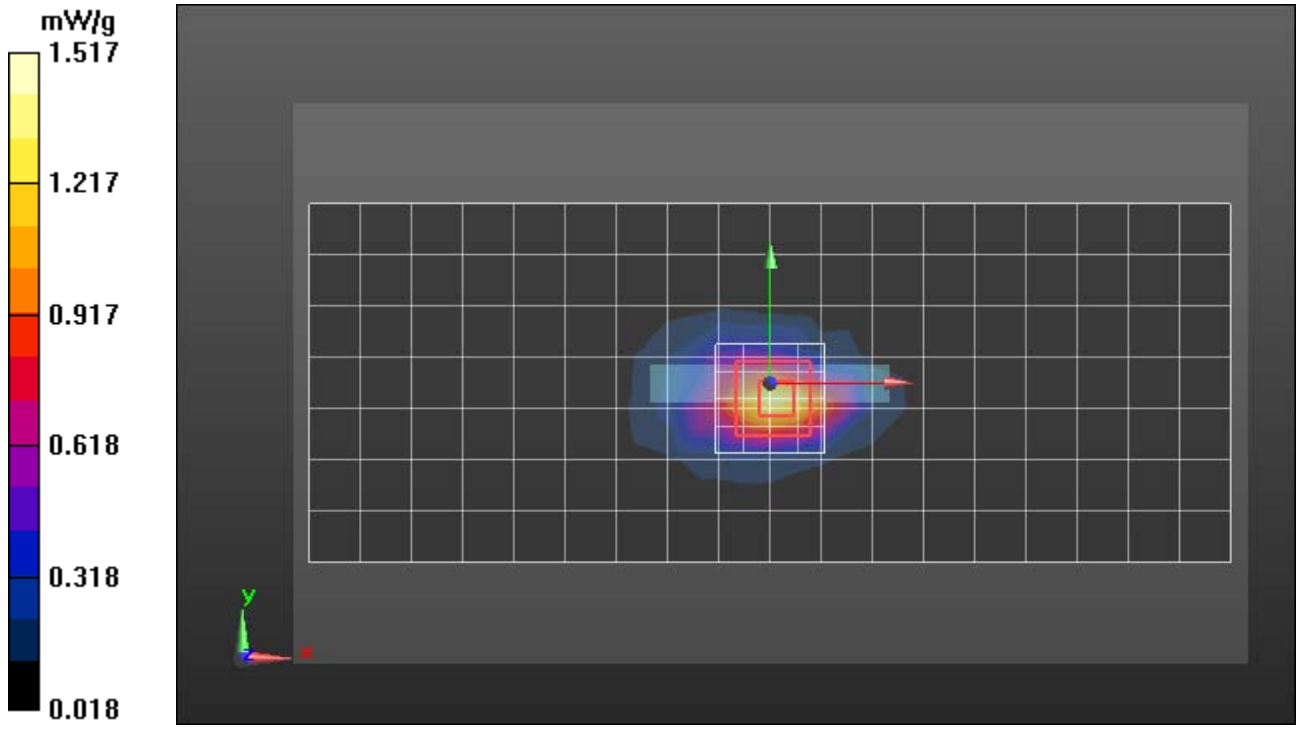
DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Extended Phone (15mm) (19x8x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.437 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.091 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 2.4080
SAR(1 g) = 1.34 mW/g; SAR(10 g) = 0.684 mW/g
Maximum value of SAR (measured) = 1.517 mW/g



Date/Time: 3/30/2012 11:15:03 AM

Serial: LDUB2M0130; Procedure Notes: Pwr Step: ALL BITS UP; DEVICE POSITION: Bottom of the Phone 10mm from flat phantom

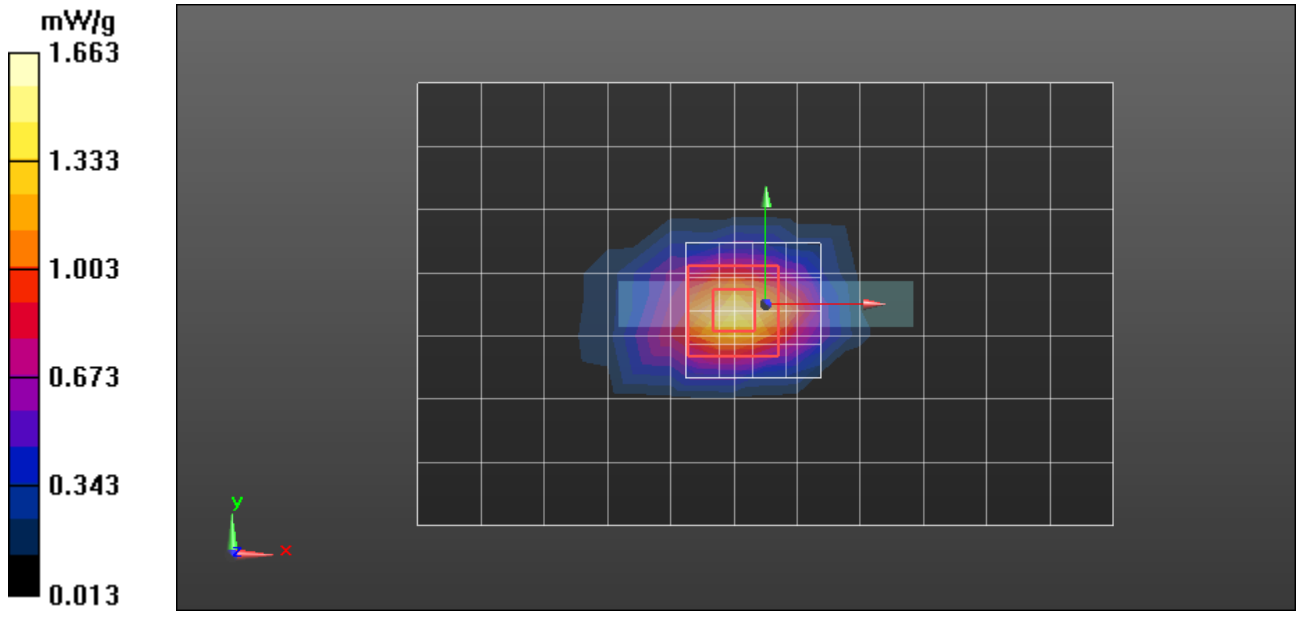
Communication System: _WCDMA; Frequency: 1907.6 MHz; Communication System Channel Number: 9538; Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 52; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.287 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.640 V/m; Power Drift = -0.0046 dB
Peak SAR (extrapolated) = 2.6570
SAR(1 g) = 1.49 mW/g; SAR(10 g) = 0.751 mW/g
Maximum value of SAR (measured) = 1.663 mW/g



Date/Time: 3/28/2012 10:49:44 AM

Serial: LDUB2M0130; Procedure Notes: Pwr Step: 0; DEVICE POSITION: Bottom of Phone 10mm away from phantom

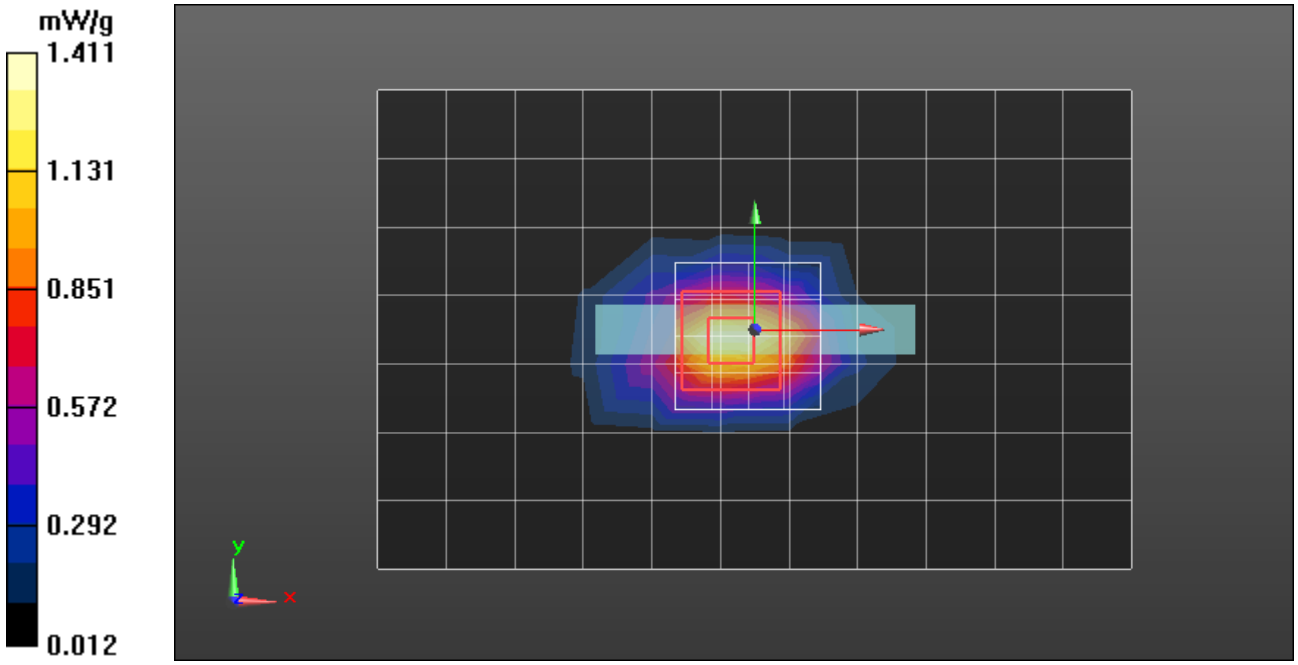
Communication System: _GPRS Class 10; Frequency: 1909.8 MHz; Communication System Channel Number: 810; Duty Cycle: 1:4.14954
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.164 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.940 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 2.2710
SAR(1 g) = 1.29 mW/g; SAR(10 g) = 0.653 mW/g
Maximum value of SAR (measured) = 1.411 mW/g



Date/Time: 3/20/2012 10:37:33 PM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: RIGHT EDGE OF PHONE 10MM FROM PHANTOM

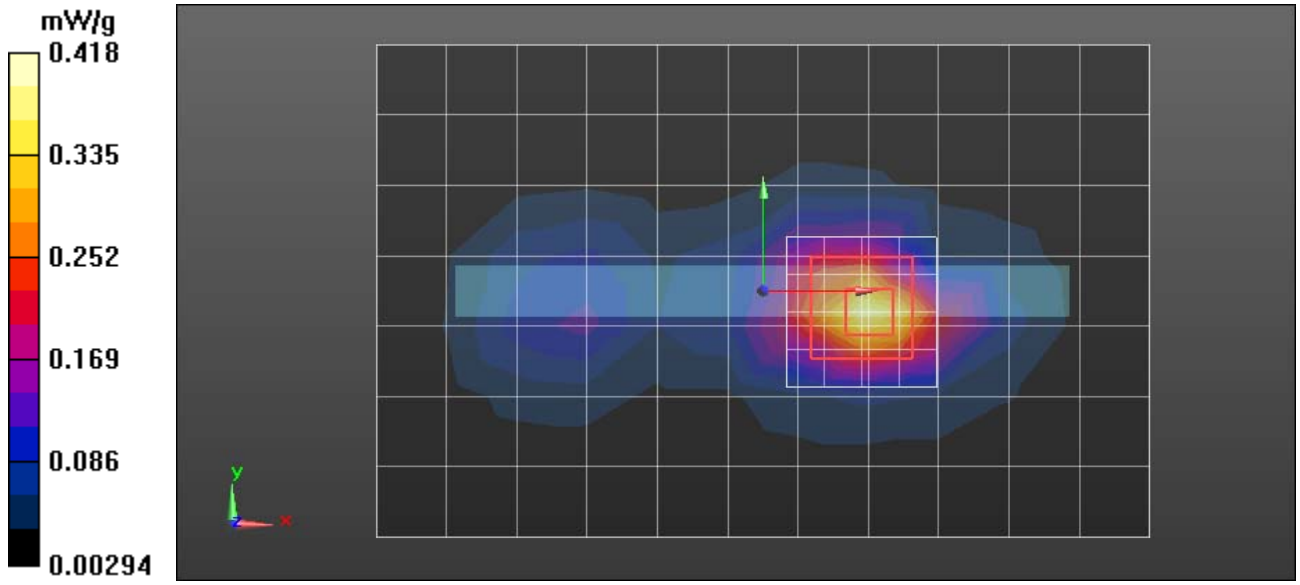
Communication System: _Wi-Fi 2450MHz; Frequency: 2412 MHz; Communication System Channel Number: 1; Duty Cycle: 1:1
Medium: 2450 Glycol Body; Medium parameters used: f = 2450 MHz; σ = 1.94 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3284; ConvF(4.56, 4.56, 4.56); Calibrated: 1/10/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 1/16/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (12x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.393 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.412 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.6820
SAR(1 g) = 0.362 mW/g; SAR(10 g) = 0.177 mW/g
Maximum value of SAR (measured) = 0.418 mW/g



Date/Time: 4/1/2012 9:59:42 AM

Serial: LDNB260041; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: Top of Phone 10mm away from phantom

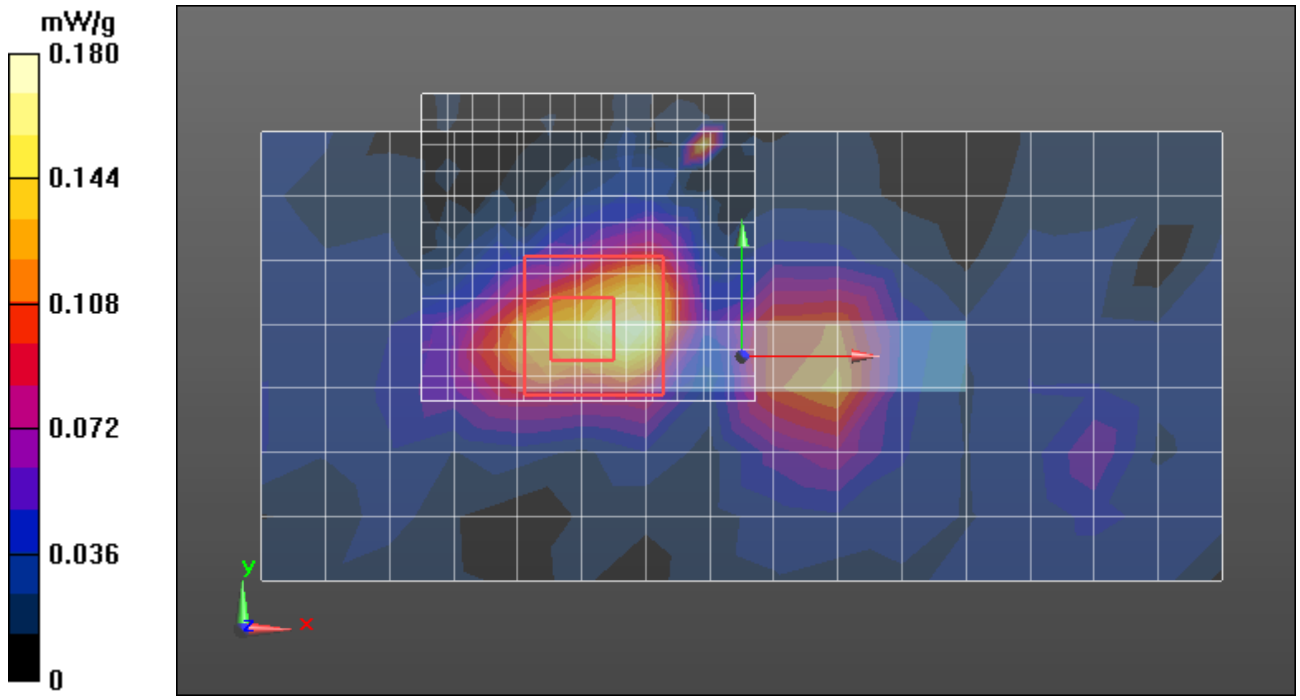
Communication System: _WIFI 5-6GHz; Frequency: 5745 MHz; Communication System Channel Number: 149; Duty Cycle: 1:1; Medium: 5-6 GHz SPEAG Tissue BODY; Medium parameters used: f = 5785 MHz; σ = 6.27 mho/m; ε_r = 45.6; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3730; ConvF(3.63, 3.63, 3.63); Calibrated: 8/29/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 10/17/2011
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.4 (4989)

TRIPLE Flat Phone Against Flat Section/Tablet Short Edge Area Scan - Body (10mm) (16x8x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.186 mW/g

TRIPLE Flat Phone Against Flat Section/7x7x12 Zoom Scan (5-6GHz) (14x13x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 4.772 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.1570
SAR(1 g) = 0.105 mW/g; SAR(10 g) = 0.036 mW/g
Maximum value of SAR (measured) = 0.180 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

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

Accreditation No.: SCS 108

Client **Motorola MDb**

Certificate No: 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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S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS) **Accreditation No.: SCS 108**
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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

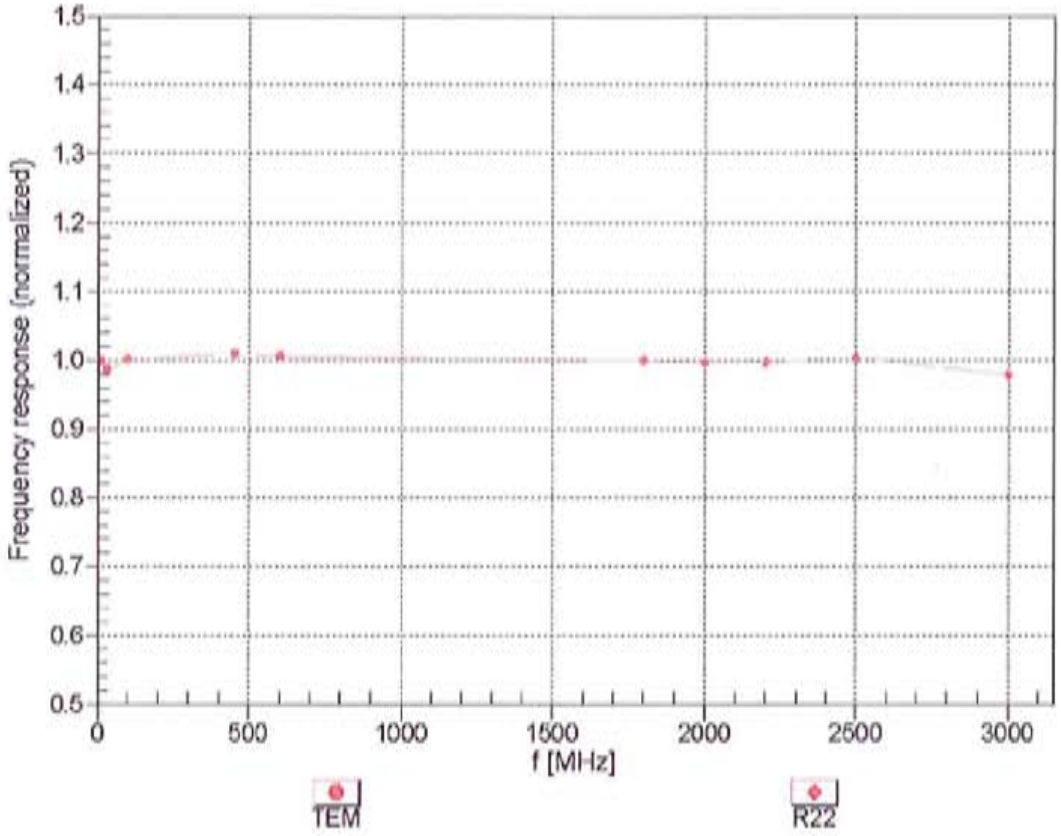
Calibration Parameter Determined in Body Tissue Simulating Media

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

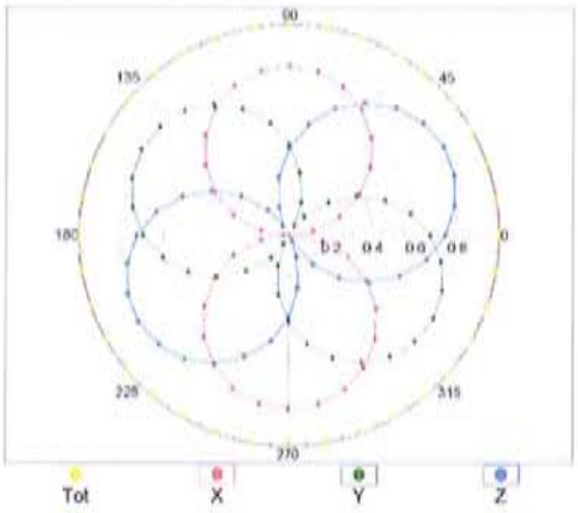
(TEM-Cell:ifi110 EXX, Waveguide: R22)



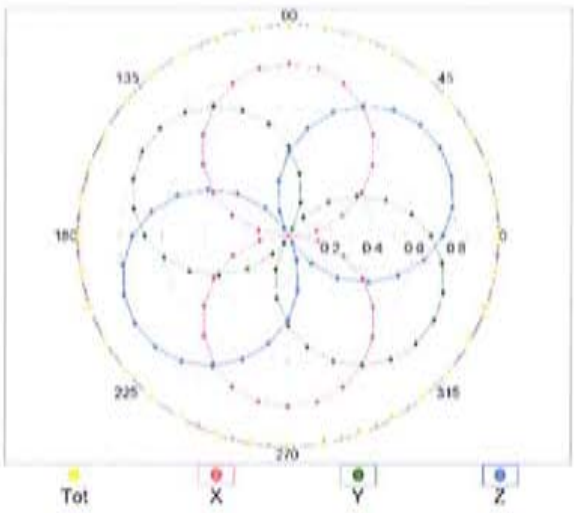
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

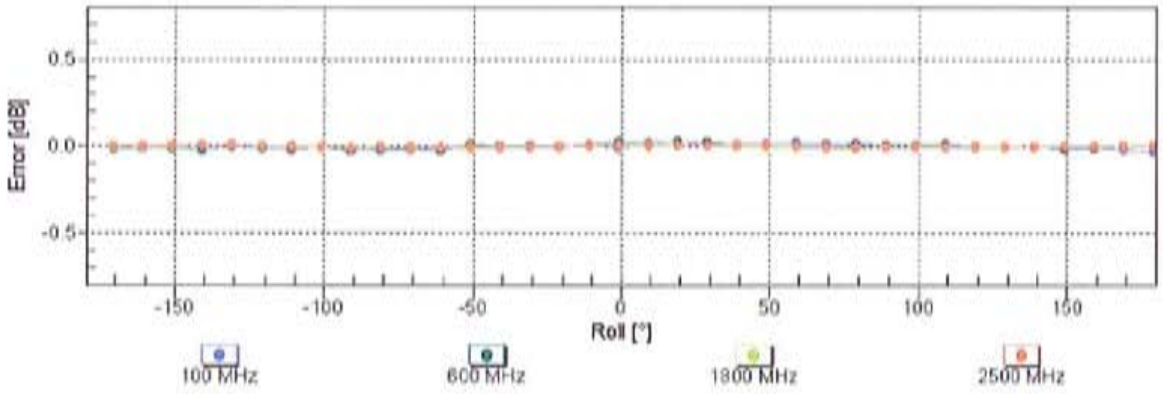
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



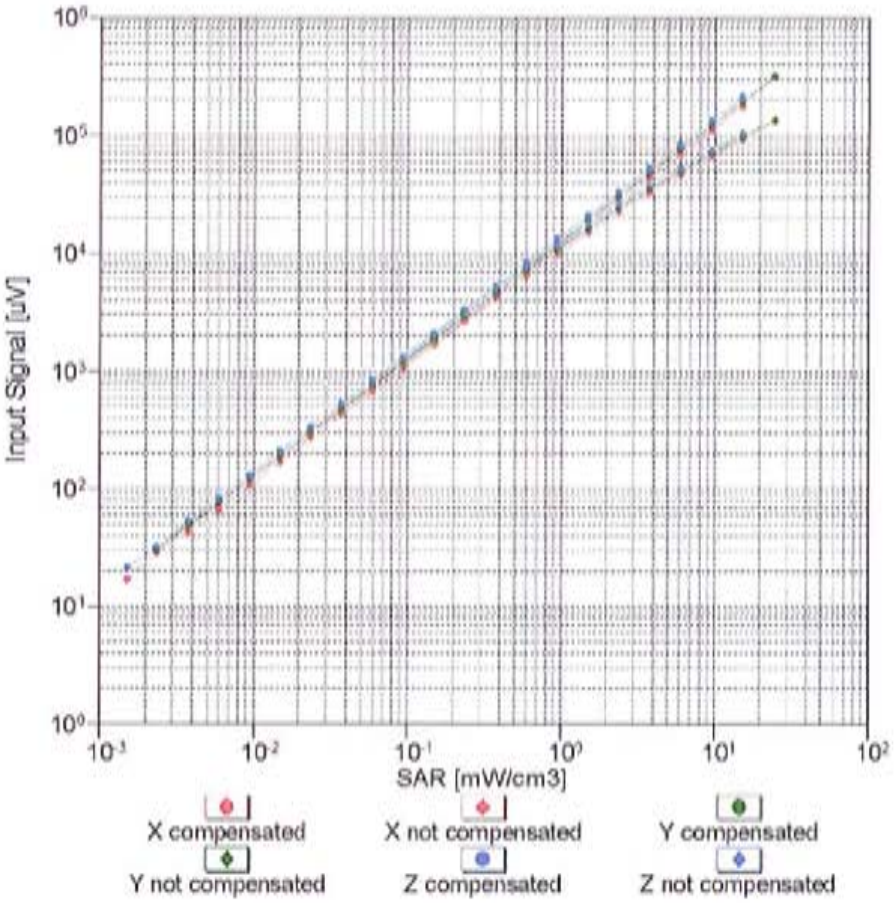
f=1800 MHz,R22

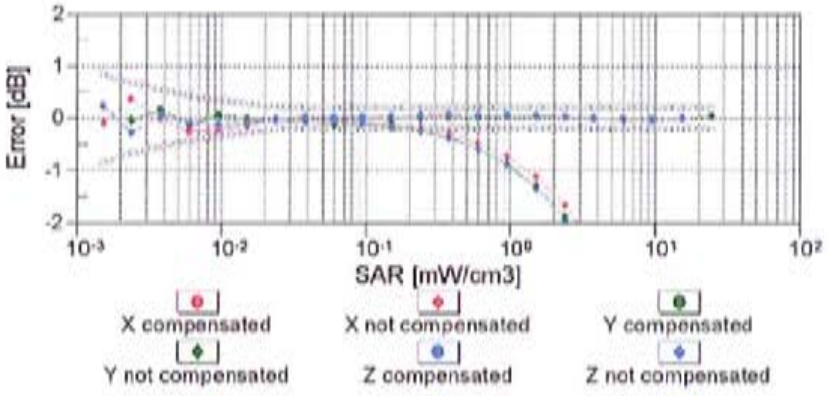




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

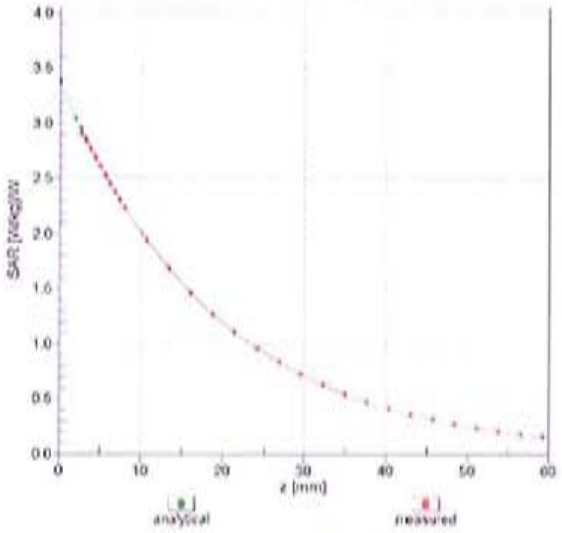




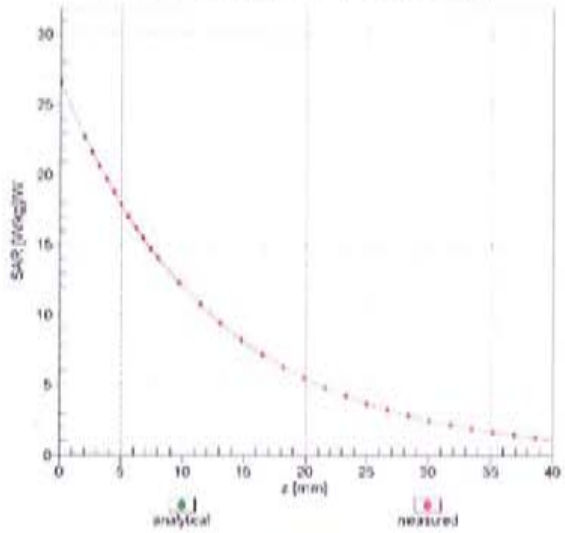
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

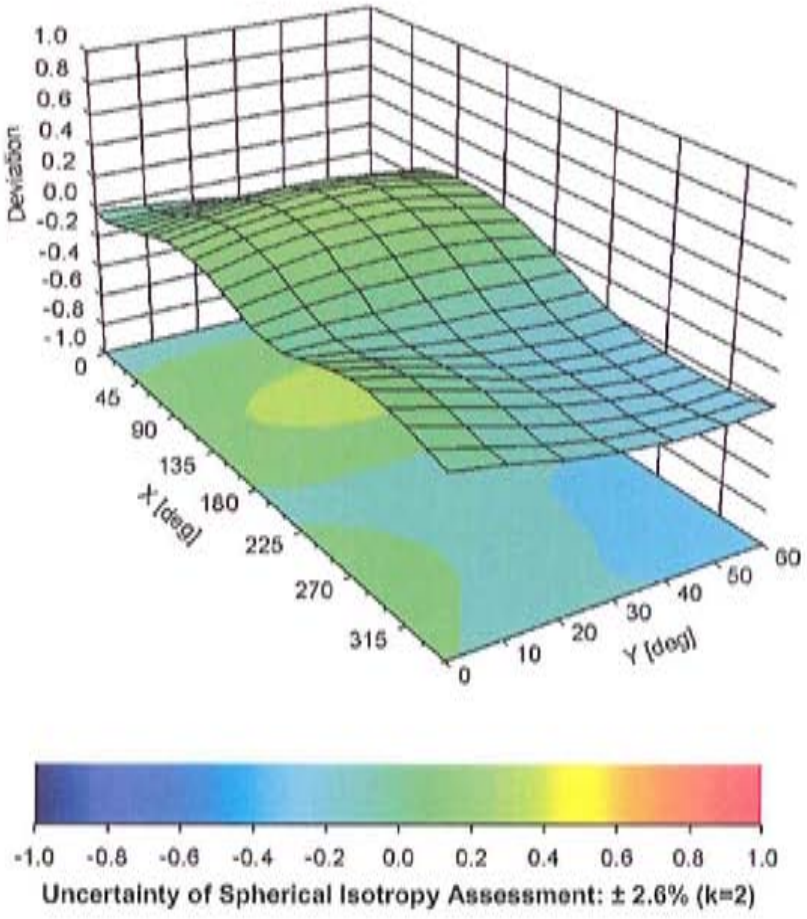


f = 1810 MHz,WGLS R22 (H_convF)



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: **ES3-3124_Aug11**

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3124

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

Calibration date: August 23, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

Issued: August 23, 2011

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

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Accredited by the Swiss Accreditation Service (SAS) **Accreditation No.: SCS 108**
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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:3124

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

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

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

Basic Calibration Parameters

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

Modulation Calibration Parameters

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

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

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

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

Calibration Parameter Determined in Head Tissue Simulating Media

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

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

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

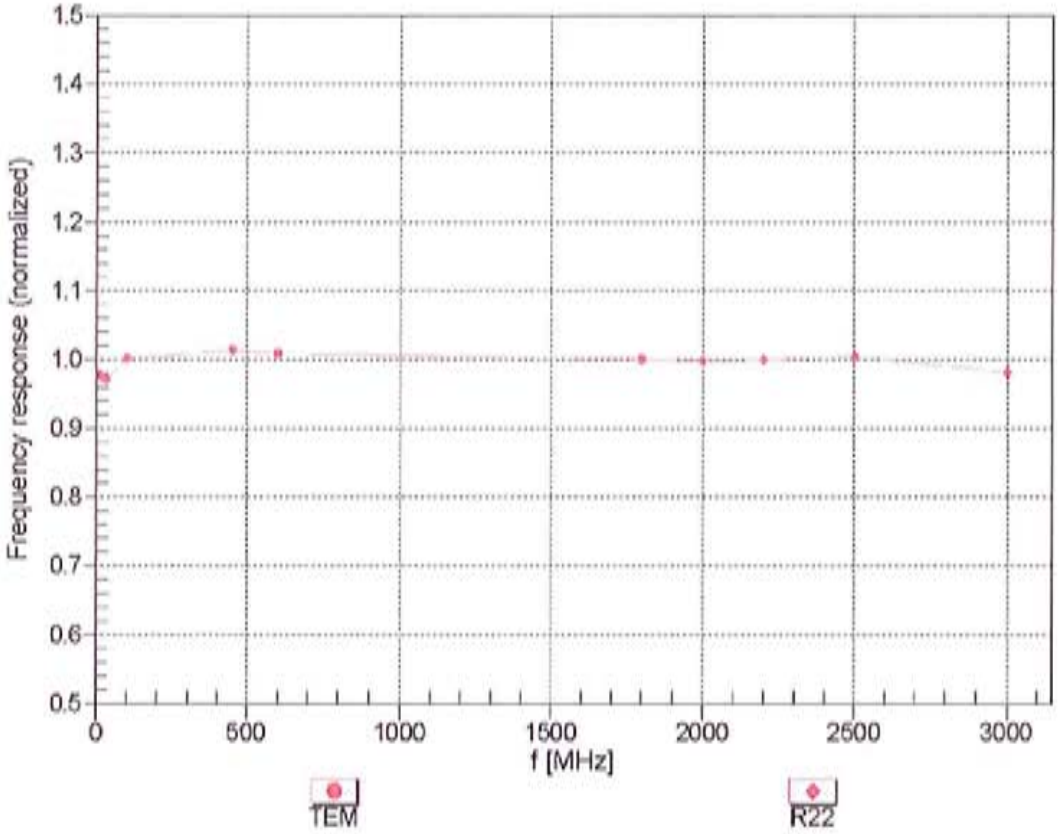
Calibration Parameter Determined in Body Tissue Simulating Media

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

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

Frequency Response of E-Field

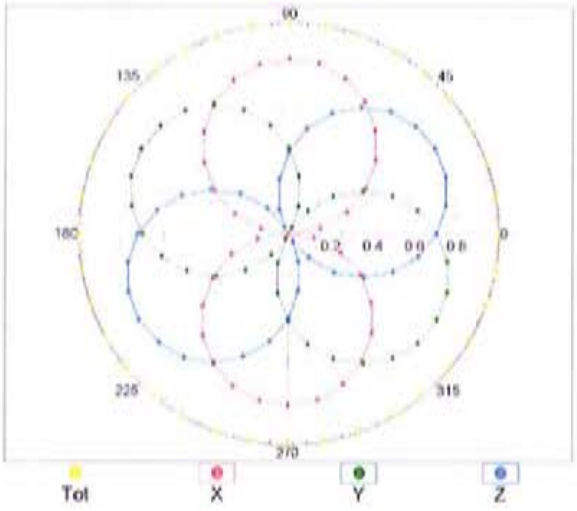
(TEM-Cell:ifi110 EXX, Waveguide: R22)



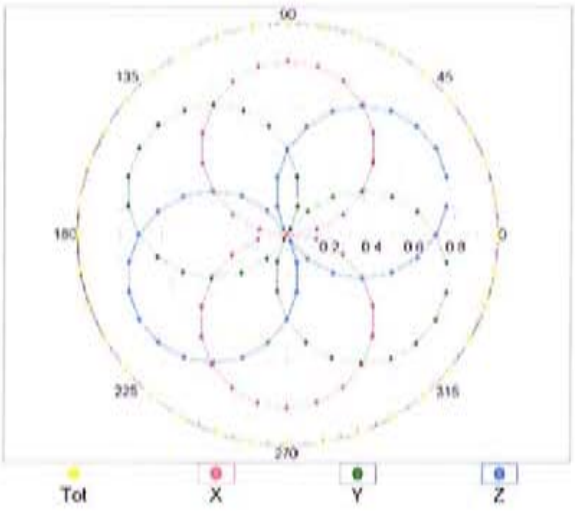
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

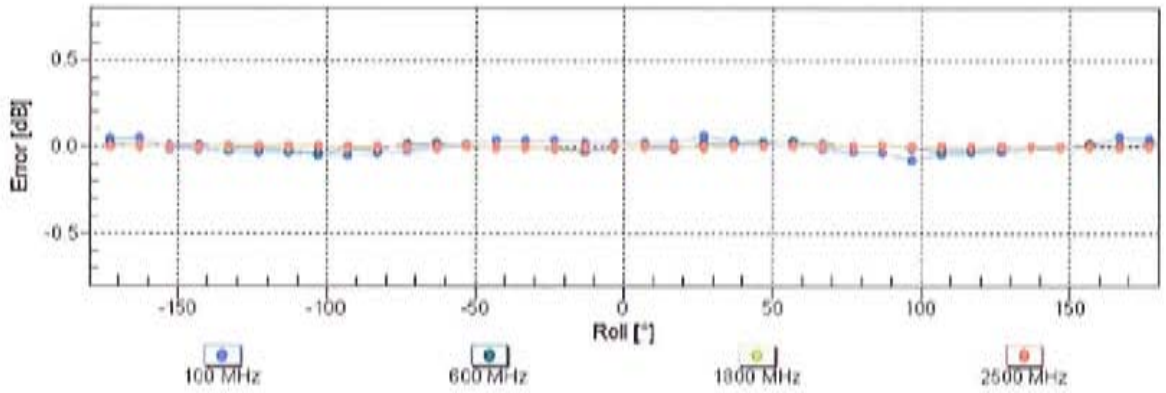
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



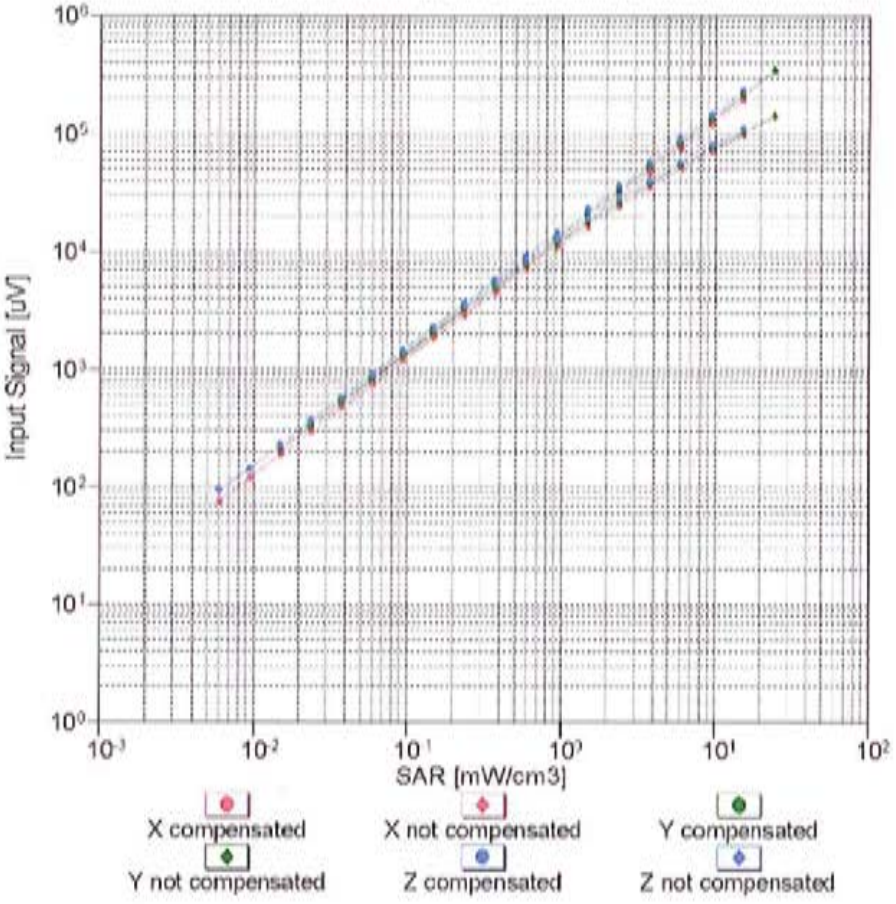
f=1800 MHz,R22

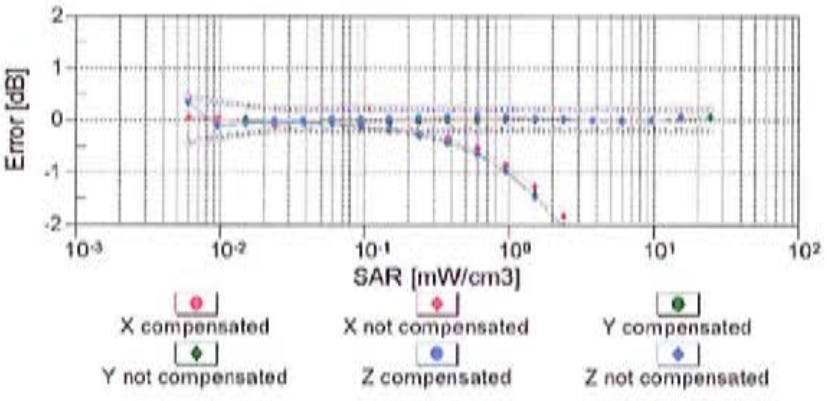




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

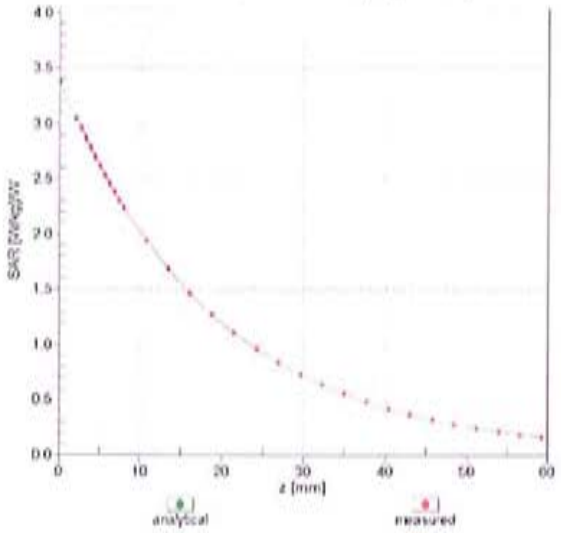




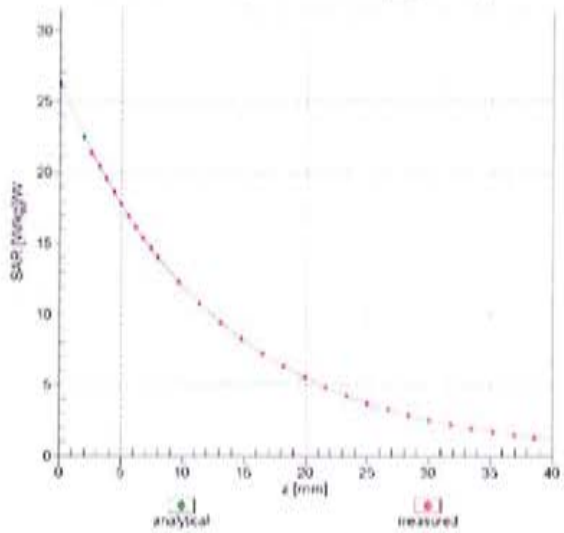
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

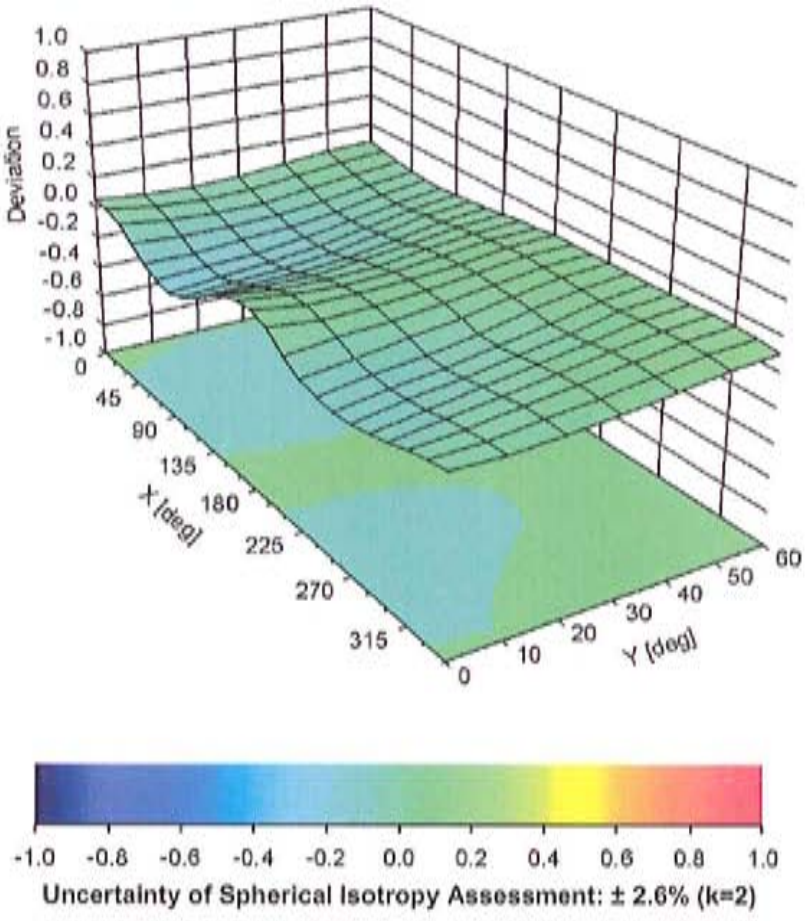


f = 1810 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

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

Other Probe Parameters

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

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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: EX3-3730_Aug11

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3730

Calibration procedure(s) QA CAL-01.v8, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: August 29, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

Issued: August 29, 2011

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 $\vartheta = 0$ ($f \le 900$ 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 $f \le 800$ 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 EX3DV4

SN:3730

Manufactured: October 19, 2009
Calibrated: August 29, 2011

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3730

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.41	0.52	0.50	± 10.1 %
DCP (mV)[B]	100.5	100.8	98.3	

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	101.6	±3.0 %
			Y	0.00	0.00	1.00	120.4	
			Z	0.00	0.00	1.00	111.4	

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3730

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)
5200	36.0	4.66	4.72	4.72	4.72	0.42	1.80	± 13.1 %
5300	35.9	4.76	4.48	4.48	4.48	0.45	1.80	± 13.1 %
5600	35.5	5.07	4.21	4.21	4.21	0.50	1.80	± 13.1 %
5800	35.3	5.27	4.16	4.16	4.16	0.50	1.80	± 13.1 %

[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: EX3DV4- SN:3730

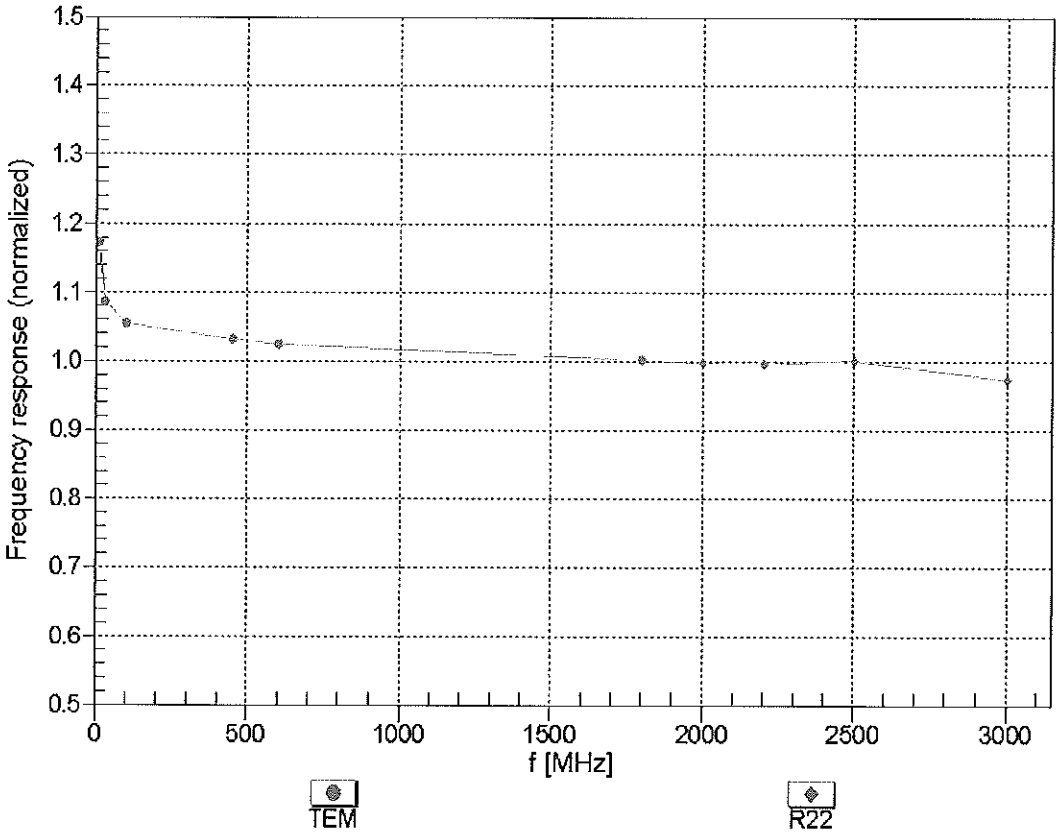
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
5200	49.0	5.30	4.01	4.01	4.01	0.53	1.95	± 13.1 %
5300	48.9	5.42	3.79	3.79	3.79	0.55	1.95	± 13.1 %
5600	48.5	5.77	3.25	3.25	3.25	0.60	1.95	± 13.1 %
5800	48.2	6.00	3.63	3.63	3.63	0.55	1.95	± 13.1 %

[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

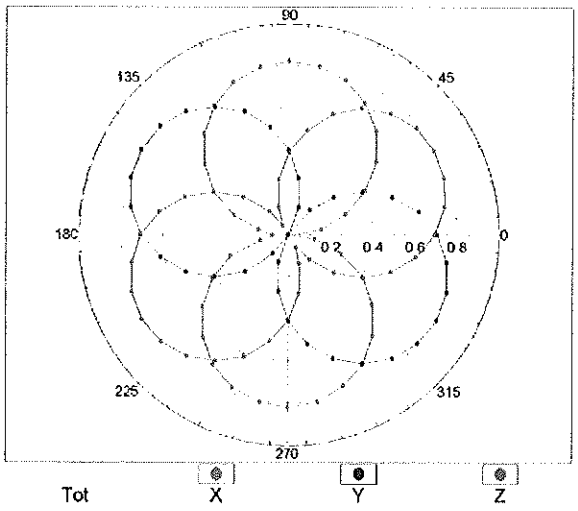
(TEM-Cell:ifi110 EXX, Waveguide: R22)



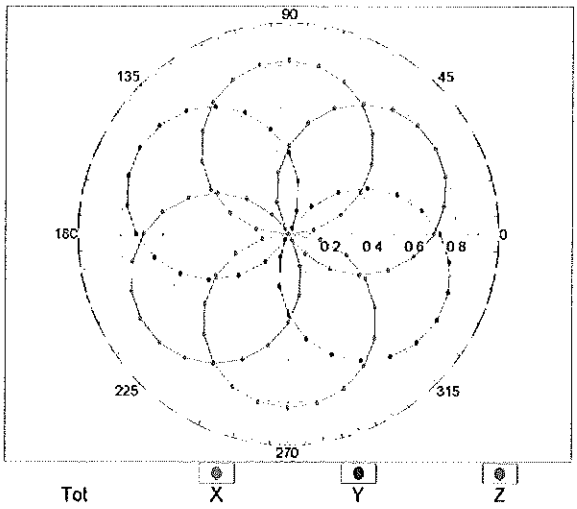
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

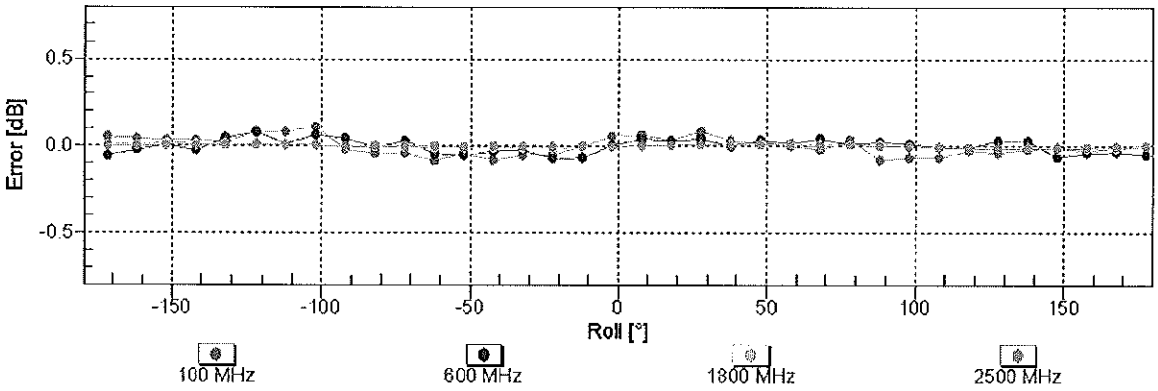
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



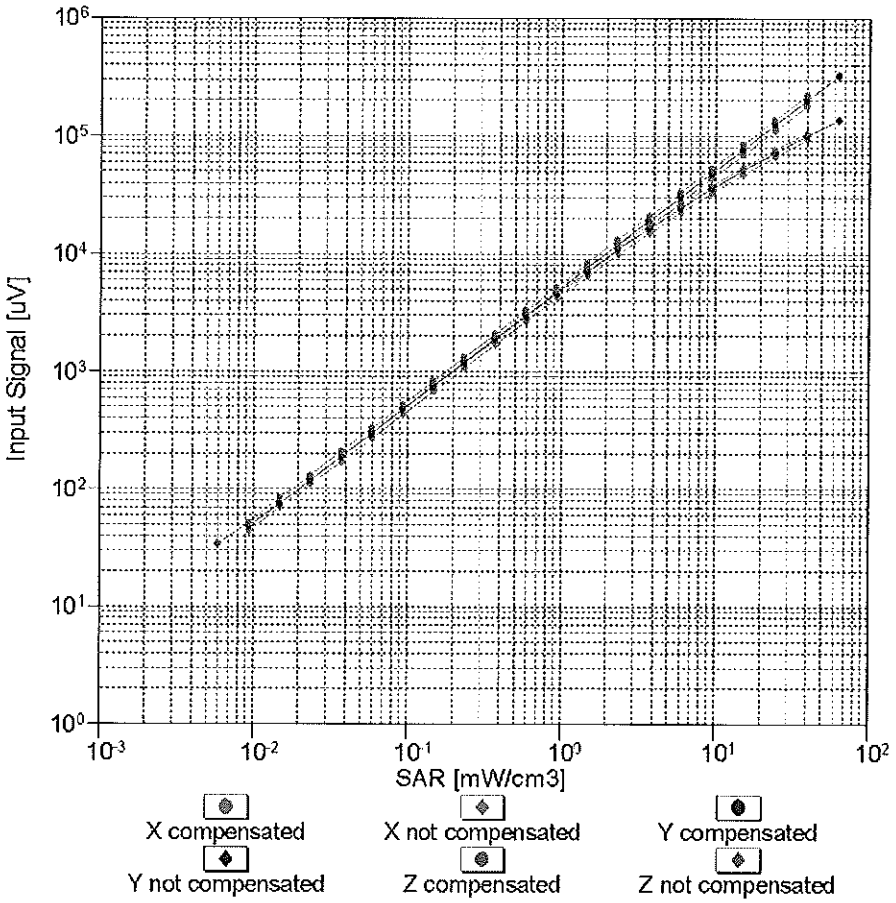
f=1800 MHz,R22

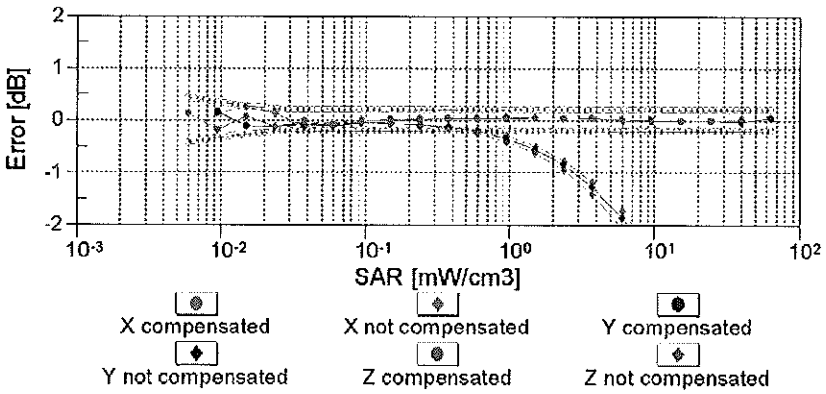




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

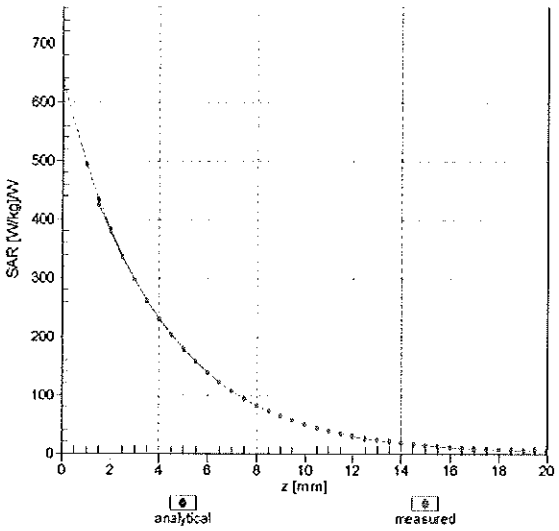




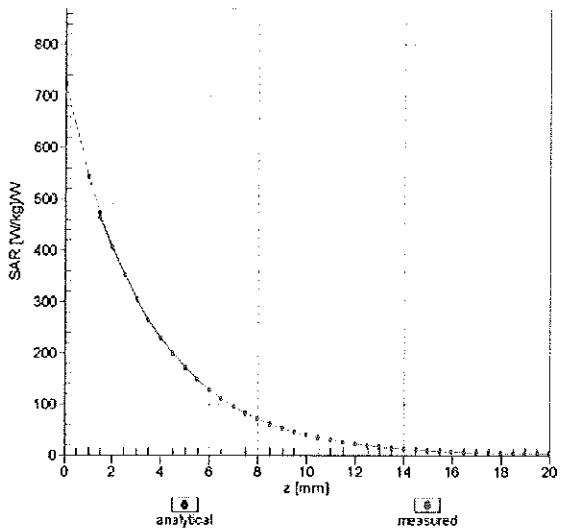
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 5200 MHz,WGLS R58 (H_convF)-SCS

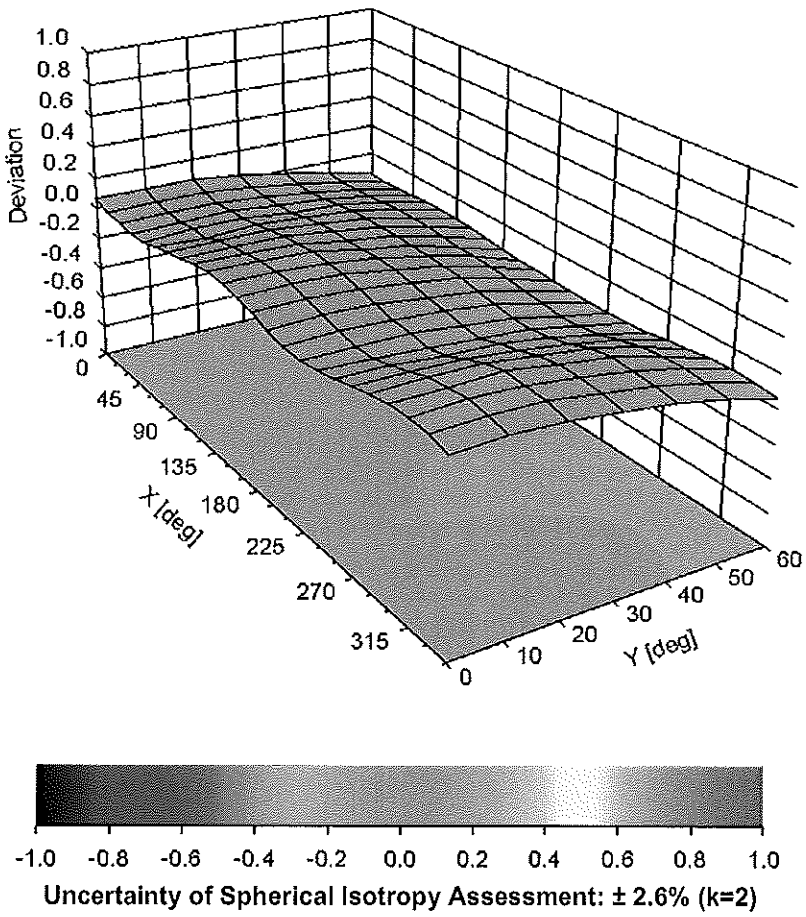


f = 5800 MHz,WGLS R58 (H_convF)-SCS



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: EX3DV4 - SN:3730

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	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm