Portable Cellular Phone SAR Test Report

Tests Requested By:	Motorola Mobility, Inc. 600 N. US Highway 45 Libertyville, IL 60048
Test Report #:	25140-1F Rev 1
Date of Report:	Sept 12, 2012
Date of Test:	Aug 2, 2012 – Aug 14, 2012
FCC ID #:	IHDT56NS4
IC ID #:	N/A
Generic Name:	M0D5D
Test Laboratory:	Motorola Mobility, Inc. - ADR Test Services Laboratory 600 N. US Highway 45 Libertyville, IL 60048
Report Author:	Katerina Bruggemann Engineer

Accreditation:

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

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

2404

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

Statement of Compliance:

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

(none)

Table of Contents

Revision History

Revision Version	Date	Notes
Rev. 0	29-Aug-2012	Initial report release
Rev. 1	12-Sept-2012	update

1. Introduction

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

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

Transmit Band	Head SAR (1 g $^{W}/_{kg}$)	Body SAR (1 g $^{W}/_{kg}$)	Mobile Hotspot SAR (1 g $^{W}/_{kg}$)
GSM 850	**0.62**	**0.66**	**1.19**
GSM 1900	**0.65**	**0.48**	**1.24**
WCDMA 850	**0.28**	**0.32**	**0.57**
WCDMA 1900	**1.11**	**0.50**	**1.11**
Wi-Fi 2.45 GHz	**0.77**	**0.04**	**0.22**
Wi-Fi 5.2 GHz	**0.22**	**0.06**	
Wi-Fi 5.8 GHz	**0.35**	**0.10**	**0.31**

2. Description of the Device Under Test

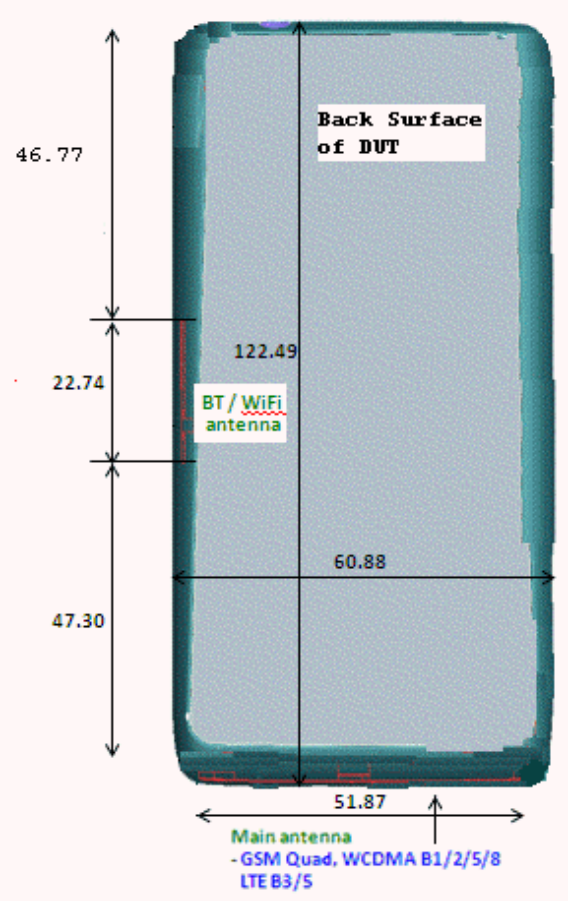
2.1 Antenna description

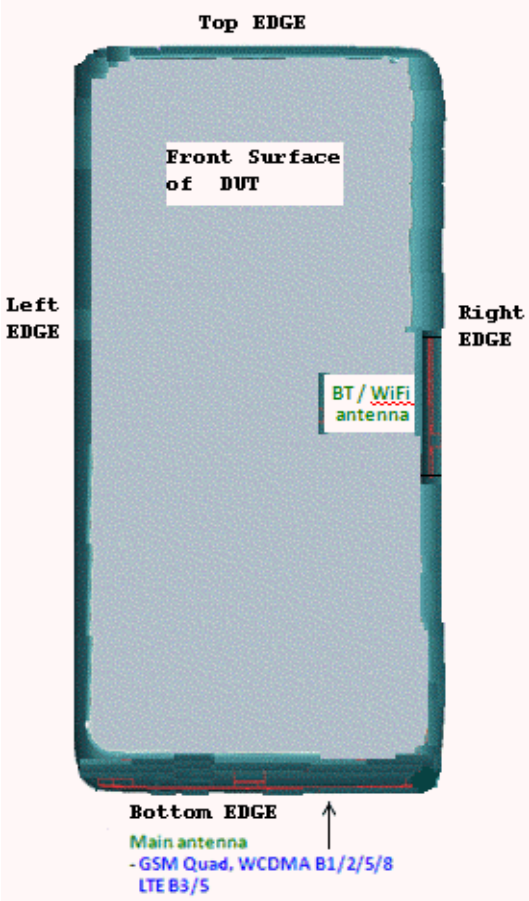
Main (850/1900 MHz) Antenna

Type	Internal	
Location	Bottom of Transceiver	
Dimensions	Width	3.74 mm
	Length	51.87 mm

Bluetooth/Wi-Fi 2 GHz Antenna

Type	Internal	
Location	Right-Side Rear of Transceiver	
Dimensions	Width	2.00 mm
	Length	22.74 mm





2.2 Device Signaling[1,2]

Serial Number(s) (Functional Use)	KSRC060054 KSRB090169 KSRB090078	(WCDMA/GSM conducted power measurements, WCDMA/GSM SAR testing) (Wi-Fi 2450 SAR measurements) (Wi-Fi 5 GHz SAR measurements)
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)
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 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	19.39 dBm	1:1	2412.0 - 2462.0 MHz
Wi-Fi 802.11a/n	BPSK	15.89 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	9.36 dBm	1:1	2402.0 – 2480.0 MHz

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

[2] This device contains an integrated Near Field Communications (NFC) module. Evaluation of SAR test requirements for the NFC transmitter was performed per the guidance in FCC KDB 447498, FCC KDB 865664 and FCC KDB 648474. FCC KDB 865664 specifies that the FCC SAR test requirements are applicable to 100 MHz - 6 GHZ only, but states that numerical SAR simulation may be appropriate for transmit frequencies below 100 MHz. Additionally, KDB 447498 provides guidance on test exclusion based on maximum transmit power capabilities, which this NFC transmitter falls into. Finally, KDB 648474 states that "phones with built-in NFC, wireless charging or similar functions that do not require separate SAR testing for these specific capabilities can generally be tested according to the normally required SAR measurement procedures. The SAR influence of the additional accessory hardware and functionality to the transmitters and antennas that require SAR Testing are considered during the required SAR testing; therefore, it is transparent to the testing process." Therefore, no SAR measurements of the NFC transmitter are required.

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 850				GPRS 900				GPRS 1800				GPRS 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)	27.5	**27.0**	24.0	22.0	27.5	**27.0**	24.0	22.0	26.5	**26.0**	23.0	21.0	26.5	**26.0**	23.0	21.0
Time Average Output Power Setting (dBm)	18.5	**21.0**	19.7	19.0	18.5	**21.0**	19.7	19.0	17.5	**20.0**	18.7	18.0	17.5	**20.0**	18.7	18.0
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			

2.2.1 Transmitter power reduction conditions and modes

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

Mode(s) of Operation	WCDMA 1900		
Test Channel	9262	9400	9538
Channel Ranges	9262-9367	9368-9455	9456-9538
Reduced Maximum Output Power Setting (dBm)	17.5	17.5	17.5
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)	26.0	**25.0**	22.0	20.0
Reduced Time Average Output Power Setting (dBm)	17.0	**19.0**	17.7	17.0

For the Wi-Fi transmitter, reduced power limits are enforced under any condition where the Wi-Fi transmitter is operating simultaneously with any other transmitter(s). A table of the reduced limits used for testing is given below.

Mode(s) of Operation	Wi-Fi 2.4 GHz
Channel Ranges	1-11
Maximum Output Power Target (dBm)	19.39
Reduced Maximum Output Power Target (dBm)	14.39

2.3 Device Conducted Power Measurements

2.3.1 GSM modes

Band	Channel	Conducted power (dBm) for GSM modes[3] (Burst Average Power)								
		GSM *CS Voice* (1 Slot)	GPRS *PS Data* (1 Slot)	GPRS *PS Data* (2 Slots)	GPRS *PS Data* (3 Slots)	GPRS *PS Data* (4 Slots)	EDGE *PS Data* (1 Slot)	EDGE *PS Data* (2 Slots)	EDGE *PS Data* (3 Slots)	EDGE *PS Data* (4 Slots)
GSM 850	128	33.55	33.47	32.38	29.34	27.35	27.60	27.03	24.00	21.80
	190	33.42	33.39	32.46	29.42	27.31	27.54	27.04	23.96	21.86
	251	33.38	33.33	32.50	29.33	27.35	27.54	27.08	23.95	21.88
GSM 900	975	33.30	33.35	32.30	29.53	27.51	27.44	27.16	23.97	21.96
	1	33.41	33.39	32.52	29.64	27.58	27.51	27.20	24.03	22.09
	62	33.48	33.25	32.48	29.47	27.65	27.51	27.16	24.15	22.18
	124	33.31	33.20	32.34	29.45	27.44	27.50	27.07	23.94	21.96
GSM 1800	512	30.30	30.23	29.41	26.43	24.32	26.39	25.84	22.80	20.80
	700	30.36	30.36	29.28	26.42	24.69	26.48	25.90	23.11	20.90
	885	30.55	30.55	29.31	26.59	24.51	26.45	25.89	22.80	20.80
GSM 1900	512	30.34	30.32	29.47	26.43	24.55	26.58	26.12	22.94	20.95
	661	30.49	30.52	29.39	26.48	24.70	26.65	26.10	22.94	20.91
	810	30.39	30.33	29.33	26.33	24.41	26.43	25.96	22.83	20.90

Band	Channel	Conducted power (dBm) for GSM modes[3] (Source-Based Time-Averaged Power)								
		GSM *CS Voice* (1 Slot)	GPRS *PS Data* (1 Slot)	GPRS *PS Data* (2 Slots)	GPRS *PS Data* (3 Slots)	GPRS *PS Data* (4 Slots)	EDGE *PS Data* (1 Slot)	EDGE *PS Data* (2 Slots)	EDGE *PS Data* (3 Slots)	EDGE *PS Data* (4 Slots)
GSM 850	128	24.55	24.47	26.38	25.04	24.35	18.6	21.03	19.7	18.8
	190	24.42	24.39	26.46	25.12	24.31	18.54	21.04	19.66	18.86
	251	24.38	24.33	26.5	25.03	24.35	18.54	21.08	19.65	18.88
GSM 900	975	24.3	24.35	26.3	25.23	24.51	18.44	21.16	19.67	18.96
	1	24.41	24.39	26.52	25.34	24.58	18.51	21.2	19.73	19.09
	62	24.48	24.25	26.48	25.17	24.65	18.51	21.16	19.85	19.18
	124	24.31	24.2	26.34	25.15	24.44	18.5	21.07	19.64	18.96
GSM 1800	512	21.3	21.23	23.41	22.13	21.32	17.39	19.84	18.5	17.8
	700	21.36	21.36	23.28	22.12	21.69	17.48	19.9	18.81	17.9
	885	21.55	21.55	23.31	22.29	21.51	17.45	19.89	18.5	17.8
GSM 1900	512	21.34	21.32	23.47	22.13	21.55	17.58	20.12	18.64	17.95
	661	21.49	21.52	23.39	22.18	21.7	17.65	20.1	18.64	17.91
	810	21.39	21.33	23.33	22.03	21.41	17.43	19.96	18.53	17.9

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

2.3.2 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	24.11	24.08	24.02	24.09	24.1	24.12	24.06	24.02	24.04	24.03	24.03
	4180	24.01	23.99	23.98	24.05	24.03	24.08	24.03	23.98	24.02	24.05	23.96
	4233	24.02	24	24.08	24.06	23.98	23.99	24.04	23.96	24.03	24	23.98
WCDMA 900	2712	23.94	23.93	23.96	23.91	23.94	23.95	23.9	23.92	23.96	23.92	23.92
	2787	23.99	24.03	24.02	24.02	23.99	24.02	24.04	24	24.04	23.98	24.03
	2863	24.05	24.06	24.05	23.99	24.08	23.99	24.11	24.02	24.09	23.96	24.03
	2712	23.94	23.93	23.96	23.91	23.94	23.95	23.9	23.92	23.96	23.92	23.92
WCDMA 1900	9262	24.03	24	24.11	24.06	24.03	24.03	24.09	24.05	24.13	24.06	24.04
	9400	24.13	24.11	24.13	24.15	24.1	24.12	24.15	24.15	24.18	24.19	24.16
	9538	24.11	24.12	24.14	24.01	24.1	24.11	24.14	24.08	24.19	24.09	24.14
WCDMA 2100	9612	23.91	23.89	23.9	23.92	23.88	23.85	23.93	23.91	23.94	23.93	23.89
	9750	24.07	24.01	24.03	24.04	24.1	24.12	24.07	24.05	24.06	24.07	24.09
	9888	23.95	23.94	23.88	23.93	23.92	23.91	23.94	23.9	23.99	23.94	23.93

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.

2.3.3 Wi-Fi 802.11 modes

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

Band	Channel	Average Conducted Power (dBm) for 802.11b Mode Data Rates			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
Wi-Fi 2450 MHz	1	**16.13**	16.11	**19.09**	19.00
	6	**15.76**	15.72	**18.85**	18.91
	11	**15.16**	15.19	**19.39**	19.37

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	14.43	12.25	12.15	12.10	12.34	10.94	11.02	10.10
	6	16.97	15.02	14.94	14.93	15.02	13.95	14.00	13.47
	11	14.11	12.46	12.41	12.38	12.41	11.02	10.97	10.30

Band	Channel	Average Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 800 ns Guard Interval)							
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
Wi-Fi 2450 MHz	1	12.18	11.06	11.07	10.01	10.09	9.07	9.03	8.78
	6	14.94	14.13	14.12	12.97	13.28	12.03	12.08	10.69
	11	12.48	10.99	11.00	9.60	9.87	8.51	8.54	7.85

Band	Channel	Average Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 400 ns Guard Interval)							
		7.2 Mbps	14.4 Mbps	21.6 Mbps	28.8 Mbps	43.3 Mbps	57.7 Mbps	65 Mbps	72.2 Mbps
Wi-Fi 2450 MHz	1	12.21	11.49	11.72	10.12	10.04	8.87	8.89	7.70
	6	15.49	14.47	14.49	13.36	13.27	12.11	12.09	10.91
	11	12.47	11.57	11.48	10.33	10.29	8.52	8.67	7.68

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	15.14	14.95	15.10	13.92	13.88	11.91	11.9	11.33
	40	15.12	14.88	14.93	13.89	13.91	11.96	11.93	11.28
	44	**15.18**	14.90	15.01	13.92	13.92	11.87	11.89	11.24
	48	15.15	14.93	15.00	13.78	13.80	11.84	11.85	11.21
Wi-Fi 5775 MHz	149	15.77	14.75	14.92	13.67	13.67	12.78	12.67	10.53
	153	15.87	14.84	14.86	13.77	13.64	12.94	12.88	10.54
	157	15.86	14.77	14.99	13.85	13.83	12.89	12.79	10.56
	161	**15.89**	14.88	14.96	13.76	13.77	12.87	12.64	10.49
	165	15.83	14.78	14.99	13.71	13.73	12.85	12.7	10.41

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	12.85	12.65	11.73	11.81	10.80	10.66	9.73	9.47
	40	12.89	12.64	11.81	11.85	10.85	10.64	9.77	9.51
	44	12.90	12.63	11.77	11.86	10.79	10.58	9.84	9.44
	48	12.95	12.58	11.63	11.75	10.93	10.74	9.81	9.43
Wi-Fi 5775 MHz	149	12.77	12.54	11.74	11.80	10.82	10.65	9.69	9.22
	153	12.78	12.62	11.69	11.86	10.82	10.57	9.78	9.31
	157	12.81	12.49	11.84	11.92	10.75	10.56	9.66	9.36
	161	12.82	12.66	11.77	11.79	10.86	10.66	9.69	9.41
	165	12.74	12.57	11.73	11.83	10.85	10.61	9.67	9.37

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	12.99	13.00	11.94	11.91	10.97	11.08	9.93	9.26
	40	13.06	13.07	11.92	11.86	11.04	10.87	9.79	9.14
	44	13.03	13.11	11.98	11.75	10.91	10.93	10.10	9.41
	48	13.14	13.18	11.89	11.69	11.00	10.96	9.94	9.27
Wi-Fi 5775 MHz	149	12.90	12.76	11.95	11.86	10.74	10.59	10.77	9.28
	153	13.01	12.97	11.82	11.82	10.86	10.69	10.74	9.19
	157	12.98	12.87	12.02	11.88	10.88	10.74	10.53	9.18
	161	12.99	12.85	12.01	11.98	10.88	10.59	10.67	9.48
	165	12.89	12.78	11.93	11.92	10.94	10.76	10.58	9.22

2.3.4 Bluetooth modes and test exclusion

Frequency [MHz]	Data Rate [Mbps]	Channel Number	Average Conducted Power [mW]
2402	1.0	0	7.261
2441	1.0	39	8.630
2480	1.0	78	6.918
2402	2.0	0	5.224
2441	2.0	39	6.266
2480	2.0	78	4.977
2402	3.0	0	5.236
2441	3.0	39	6.237
2480	3.0	78	5.000

Frequency [MHz]	Mode	Channel Number	Average Conducted Power [mW]
2402	LE	0	6.095
2441	LE	39	7.031
2480	LE	78	5.093

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 D01 as described below[4].

1. The highest output conducted power measured for Bluetooth on the device under test is 8.630 mW [≤ 12 mW]
2. The separation distance between the Bluetooth antenna and the main antenna is 4.73 cm [≥ 2.5 cm]

Pictorial representation of the antenna locations and separation distances are given in Exhibit 7d.

[4] Per RSS-102 section 2.5.1, the Bluetooth transmitter of the DUT is further exempted from routine SAR evaluation as the output conducted power demonstrated by the device is less than 20 mW.

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	378	Apr-11-2012	Apr-11-2013
E-Field Probe ES3DV3	3184	Apr-25-2012	Apr-25-2013
DASY4™ DAE V1	1311	Jul-12-2012	Jul-12-2013
E-Field Probe ES3DV3	3115	Jan-11-2012	Jan-11-2013
DASY4™ DAE V1	440	May-23-2012	May-23-2013
E-Field Probe EX3DV4	3728	Apr-24-2012	Apr-24-2013
DASY4™ DAE V1	1310	Jan-11-2012	Jan-11-2013
E-Field Probe ES3DV3	3284	Jan-10-2012	Jan-10-2013
S.A.M. Phantom used for 800/900 MHz	TP-1235		
.A.M. Phantom used for 1800/1900/2450 MHz	TP-1136		
S.A.M. Phantom used for 1800/1900/2450 MHz	TP-1319		
S.A.M. Phantom used for 1800/1900/2450 MHz	TP-1106		
Dipole Validation Kit, DV835V2	436tr	Mar-18-2011	Mar-18-2013
Dipole Validation Kit, DV1800V2	2d191	Jan-05-2012	Jan-05-2013
Dipole Validation Kit, DV1800V2	259tr	Oct-20-2011	Oct-20-2013
Dipole Validation Kit, DV2450V2	863	Mar-17-2011	Mar-17-2013
Dipole Validation Kit, D5GHzV2	1088	May-20-2011	May-20-2013
Dipole Validation Kit, D5GHzV2	1098	Jan-17-2012	Jan-17-2013

3.2 Additional Equipment

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

4. Electrical parameters of the tissue simulating liquid

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

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

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ε_r	σ (S/m)	Temp (°C)
835	**Head**	**Measured,** Aug-6-2012	41.8	0.94	20.0
		Recommended Limits	41.5 ±5%	0.90 ±5%	18-25
	Body	**Measured,** Aug-7-2012	54.7	1.00	19.0
		Recommended Limits	55.2 ±5%	0.97 ±5%	18-25
1880	**Head**	**Measured,** Aug-8-2012	38.7	1.45	19.2
		Recommended Limits	40.0 ±5%	1.40 ±5%	18-25
	Body	**Measured,** Aug-8-2012	51.6	1.59	19.6
		Measured, Aug-10-2012	51.2	1.56	19.7
		Measured, Aug-14-2012	51.6	1.59	19.2
		Recommended Limits	53.3 ±5%	1.52 ±5%	18-25
2450	**Head**	**Measured,** Aug-03-2012	40.7	1.8	19.0
		Recommended Limits	39.2 ±5%	1.80 ±5%	18-25
	Body	**Measured,** Aug-04-2012	51.1	2.02	19.3
		Recommended Limits	52.7 ±5%	1.95 ±5%	18-25
5210	**Head**	**Measured,** Aug-10-2012	35.3	4.52	19.6
		Recommended Limits	36.0 ±10%	4.66 ±5%	18-25
	Body	**Measured,** Aug-11-2012	45.8	5.15	19.5
		Recommended Limits	49.0 ±10%	5.31 ±5%	18-25
5785	**Head**	**Measured,** Aug-04-2012	35.4	5.28	19.6
		Recommended Limits	35.4 ±10%	5.25 ±5%	18-25
	Body	**Measured,** Aug-04-2012	44.8	6.19	19.8
		Recommended Limits	48.2 ±10%	5.98 ±5%	18-25

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

Ingredient	782 / 835 / 900 MHz Head	782 / 835 / 900 MHz Body	1800 MHz / 1900 MHz Head	1800 MHz / 1900 MHz Body	2450 MHz Head	2450 MHz Body	5 GHz Body
Sugar	57	44.9	--	--	--	--	--
DGBE	--	--	47	30.8	6.89	8	--
Diacetin	--	--	--	--	--	--	--
Water	40.45	53.06	52.62	68.8	57.95	71.8	78.66
Salt	1.45	0.94	0.38	0.4	0.15	0.2	--
HEC	1	1	--	--	--	--	--
Bact.	0.1	0.1	--	--	--	--	--
Triton X-100	--	--	--	--	35.02	20	10.67
Di(ethylene glycol) Hexyl Ether	--	--	--	--	--	--	10.67

All 5 GHz Head SAR testing was performed using HBBL3500-5800V5 tissue simulating liquids from Schmid & Partner Engineering AG. Prior to conducting SAR measurements, the relative permittivity, ε_r, and the conductivity, σ, of the liquids were measured as shown above.

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.

System Accuracy Verification Measurements for Head SAR Measurements								
f (MHz)	Description	Dipole	Measured SAR (W/kg), 1 gram	Normalized SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
					ε_r	σ (S/m)		
835	**Measured,** Aug-06-2012	436tr	2.08	10.4	41.8	0.94	20.9	19.8
	Recommended Limits			9.73	41.5 ±5%	0.90 ±5%	18-25	18-25
1800	**Measured,** Aug-08-2012	259tr	7.35	36.8	39.1	1.37	21.1	19.0
	Recommended Limits			38.1	40.0 ±5%	1.40 ±5%	18-25	18-25
2450	**Measured,** Aug-03-2012	863	10.7	53.5	40.7	1.8	20.5	19.0
	Recommended Limits			54.2	39.2 ±5%	1.80 ±5%	18-25	18-25
5200	**Measured,** Aug-10-2012	1098	7.65	76.5	35.3	4.51	20.8	19.6
	Recommended Limits			79.2	36.0 ±10%	4.65 ±5%	18-25	18-25
5800	**Measured,** Aug-04-2012		7.34	73.4	35.4	5.3	20.5	18.9
	Recommended Limits			78.2	35.4 ±10%	5.27 ±5%	18-25	18-25

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3184	835	6.15	5 of 11
		1810	5.48	5 of 11
		2450	4.61	5 of 11
E- Field Probe ES3DV3	3115	835	5.83	5 of 11
		1810	5.17	5 of 11
		2450	4.35	5 of 11
E- Field Probe ES3DV3	3284	835	6.18	5 of 11
		1810	5.33	5 of 11
		2450	4.56	5 of 11
E-Field Probe EX3DV4	3728	2450	6.86	5 of 11
		5200	4.74	5 of 11
		5800	4.23	5 of 11

System Accuracy Verification Measurements for Body SAR Measurements								
f (MHz)	Description	Dipole	Measured SAR (W/kg), 1 gram	Normalized SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
					ε_r	σ (S/m)		
835	**Measured,** Aug-07-2012	436tr	2.07	10.4	54.7	1.00	20.8	19.8
	Recommended Limits			10.1	55.2 ±5%	0.97 ±5%	18-25	18-25
1800	**Measured,** Aug-08-2012	259tr	7.72	38.6	51.9	1.49	21.0	19.2
	Measured, Aug-10-2012		7.66	38.3	51.6	1.48	21.1	20.0
	Recommended Limits			39.1	53.3 ±5%	1.52 ±5%	18-25	18-25
	Measured, Aug-14-2012	2d191	7.34	36.7	51.9	1.49	20.8	19.1
	Recommended Limits			37.8	53.3 ±5%	1.52 ±5%	18-25	18-25
2450	**Measured,** Aug-04-2012	863	11.6	58.0	51.1	2.02	21.1	19.3
	Recommended Limits			52.8	52.7 ±5%	1.95 ±5%	18-25	18-25
5200	**Measured,** Aug-11-2012	1098	7.62	76.2	45.8	5.14	20.4	19.5
	Recommended Limits			73.7	49.03 ±10%	5.30 ±5%	18-25	18-25
5800	**Measured,** Aug-02-2012		6.99	69.9	44.2	5.94	21.2	20.3
	Recommended Limits			71.1	48.2 ±10%	6.00 ±5%	18-25	18-25
	Measured, Aug-04-2012	1088	7.3	73.0	44.8	6.21	20.1	19.0
	Recommended Limits			75.4	48.2 ±10%	6.00 ±5%	18-25	18-25

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3184	835	6.19	6 of 11
		1810	4.88	6 of 11
		2450	4.33	6 of 11
E- Field Probe ES3DV3	3115	835	5.89	6 of 11
		1810	4.72	6 of 11
		2450	4.12	6 of 11
E- Field Probe ES3DV3	3284	835	6.28	6 of 11
		1810	5.28	6 of 11
		2450	4.56	6 of 11
E-Field Probe EX3DV4	3728	2450	6.84	6 of 11
		5200	4.22	6 of 11
		5800	3.71	6 of 11

6. Test Results

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

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

6.1 Head Adjacent Test Results

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

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

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

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

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

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

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	3184	835	6.15	5 of 11
		1810	5.48	5 of 11
		2450	4.61	5 of 11
E- Field Probe ES3DV3	3115	835	5.83	5 of 11
		1810	5.17	5 of 11
		2450	4.35	5 of 11
E- Field Probe ES3DV3	3284	835	6.18	5 of 11
		1810	5.33	5 of 11
		2450	4.56	5 of 11
E-Field Probe EX3DV4	3728	2450	6.86	5 of 11
		5200	4.74	5 of 11
		5800	4.23	5 of 11

Left Head Cheek Position

f (MHz)	Mode	Channel	DUT Power	Temp (°C)	Drift (dB)	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	WCDMA 850 12.2 kbps RMC	4132	24.11								
		4180	24.01	**20.1**	**-0.04**	**0.207**	**0.21**	**0.281**	**0.28**	**5x5x7**	**A-24**
		4233	24.02								
	GSM 850 CS Voice	128	33.55								
		190	33.42	20.1	-0.10	0.279	0.29	0.372	0.38		
		251	33.38								
1880	WCDMA 1900 12.2 kbps RMC	9262	24.03								
		9400	24.13	20.2	-0.06	0.285	0.29	0.449	0.46		
		9538	24.11								
	GSM 1900 CS Voice	512	30.34								
		661	30.49	20.0	0.07	0.133	0.13	0.216	0.22		
		810	30.39								
2450	802.11b, 1 Mbps	1	16.13	19.4	-0.33	0.093	0.10	0.177	0.19		
		6	15.76								
		11	15.16								
	802.11b, 5.5 Mbps	1	19.09								
		6	18.85								
		11	19.39	18.8	-0.35	0.196	0.21	0.380	0.41		
5210	802.11a, 6 Mbps	44	15.18	19.1	0.09	0.023	0.02	0.065	0.06		
5785	802.11a, 6 Mbps	161	15.89	18.6	-0.48	0.030	0.03	0.083	0.09		

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	DUT Power	Temp (°C)	Drift (dB)	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	WCDMA 850 12.2 kbps RMC	4132	24.11								
		4180	24.01	20.1	-0.08	0.198	0.20	0.261	0.27		
		4233	24.02								
	GSM 850 CS Voice	128	33.55								
		190	33.42	20.1	-0.12	0.267	0.27	0.348	0.36		
		251	33.38								
1880	WCDMA 1900 12.2 kbps RMC	9262	24.03	20.1	0.06	0.506	0.51	0.828	0.83		
		9400	24.13	20.1	0.05	0.617	0.62	1.02	1.02		
		9538	24.11	**20.1**	**-0.02**	**0.673**	**0.68**	**1.10**	**1.11**	**5x5x7**	**A-26**
	GSM 1900 CS Voice	512	30.34								
		661	30.49	20.0	0.19	0.242	0.24	0.398	0.40		
		810	30.39								
2450	802.11b, 1 Mbps	1	16.13	19.2	0.03	0.136	0.14	0.313	0.31		
		6	15.76	19.6	0.06	0.161	0.16	0.352	0.35		
		11	15.16	19.0	0.00	0.162	0.16	0.353	0.35		
	802.11b, 5.5 Mbps	1	19.09	19.0	0.10	0.317	0.32	0.689	0.69		
		6	18.85	19.0	-0.10	0.268	0.27	0.605	0.62		
		11	19.39	**19.0**	**0.04**	**0.350**	**0.35**	**0.771**	**0.77**	**5x5x7**	**A-28**
5210	802.11a, 6 Mbps	44	15.18	**19.0**	**-0.19**	**0.063**	**0.07**	**0.209**	**0.22**	**7x7x12**	**A-29**
5785	802.11a, 6 Mbps	161	15.89	**19.0**	**-0.23**	**0.105**	**0.11**	**0.329**	**0.35**	**7x7x12**	**A-30**

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	DUT Power	Temp (°C)	Drift (dB)	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	WCDMA 850 12.2 kbps RMC	4132	24.11								
		4180	24.01	20.1	-0.05	0.130	0.13	0.169	0.17		
		4233	24.02								
	GSM 850 CS Voice	128	33.55								
		190	33.42	**20.1**	**0.05**	**0.191**	**0.19**	**0.248**	**0.25**	**5x5x7**	**A-32**
		251	33.38								
1880	WCDMA 1900 12.2 kbps RMC	9262	24.03								
		9400	24.13	**20.1**	**0.03**	**0.194**	**0.19**	**0.324**	**0.32**	**5x5x7**	**A-33**
		9538	24.11								
	GSM 1900 CS Voice	512	30.34								
		661	30.49	20.0	0.07	0.104	0.10	0.179	0.18		
		810	30.39								
2450	802.11b, 1 Mbps	1	16.13	19.2	-0.02	0.024	0.02	0.045	0.04		
		6	15.76								
		11	15.16								
	802.11b, 5.5 Mbps	1	19.09								
		6	18.85								
		11	19.39	18.7	-0.16	0.063	0.07	0.123	0.13		
5210	802.11a, 6 Mbps	44	15.18	**19.1**	**0.57**	**0.006**	**0.01**	**0.015**	**0.02**	**7x7x12**	**A-36**
5785	802.11a, 6 Mbps	161	15.89	19.0	-0.22	0.012	0.01	0.029	0.03		

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

Right Head 15° Tilt Position

f (MHz)	Mode	Channel	DUT Power	Temp (°C)	Drift (dB)	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	WCDMA 850 12.2 kbps RMC	4132	24.11								
		4180	24.01	**20.1**	**0.00**	**0.137**	**0.14**	**0.181**	**0.18**	**5x5x7**	**A-31**
		4233	24.02								
	GSM 850 CS Voice	128	33.55								
		190	33.42	20.1	0.05	0.182	0.18	0.238	0.24		
		251	33.38								
1880	WCDMA 1900 12.2 kbps RMC	9262	24.03								
		9400	24.13	20.1	0.00	0.194	0.19	0.316	0.32		
		9538	24.11								
	GSM 1900 CS Voice	512	30.34								
		661	30.49	**20.0**	**0.17**	**0.110**	**0.11**	**0.184**	**0.18**	**5x5x7**	**A-34**
		810	30.39								
2450	802.11b, 1 Mbps	1	16.13	19.2	-0.02	0.022	0.02	0.044	0.04		
		6	15.76								
		11	15.16								
	802.11b, 5.5 Mbps	1	19.09								
		6	18.85								
		11	19.39	**18.9**	**-0.28**	**0.061**	**0.06**	**0.125**	**0.13**	**5x5x7**	**A-35**
5210	802.11a, 6 Mbps	44	15.18	18.9	-1.37	0.003	0.00	0.012	0.02		
5785	802.11a, 6 Mbps	161	15.89	**19.0**	**-0.03**	**0.014**	**0.01**	**0.041**	**0.04**	**7x7x12**	**A-37**

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

Highest Head, GPRS Class 10

f (MHz)	Mode	Channel	DUT Power	Temp (°C)	Drift (dB)	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 CS Voice (LH Cheek)**	128	32.38								
		190	32.46	**20.1**	**0.02**	**0.457**	**0.46**	**0.616**	**0.62**	**5x5x7**	**A-25**
		251	32.50								
1880	**GPRS 1900 CS Voice (RH Cheek)**	512	29.47								
		661	29.39	**20.0**	**0.07**	**0.389**	**0.39**	**0.646**	**0.65**	**5x5x7**	**A-27**
		810	29.33								

Table 5: 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 6 through 8 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is:

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

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

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

A SPEAG™ MFP V5.1 C Triple Modular Phantom was used for the body-worn tests. The triple modular phantom consists of three identical modules that can be installed and removed separately without emptying the liquid. Each module of the triple phantom is constructed of glass-fiber reinforced vinylester (VG-GF) with a thickness at the bottom of 2.0 mm. It measures 29.2 cm(long) by 17.8 cm(wide) by 17.8 cm(tall). The 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	3184	835	6.19	6 of 11
		1810	4.88	6 of 11
		2450	4.33	6 of 11
E- Field Probe ES3DV3	3115	835	5.89	6 of 11
		1810	4.72	6 of 11
		2450	4.12	6 of 11
E- Field Probe ES3DV3	3284	835	6.28	6 of 11
		1810	5.28	6 of 11
		2450	4.56	6 of 11
E-Field Probe EX3DV4	3728	2450	6.84	6 of 11
		5200	4.22	6 of 11
		5800	3.71	6 of 11

Body-Worn, Front of Phone 25 mm from Phantom

f (MHz)	Mode	Channel	DUT Power	Temp (°C)	Drift (dB)	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	**WCDMA 850 12.2 kbps RMC**	4132	24.11								
		4180	24.01	**19.8**	**0.02**	**0.243**	**0.24**	**0.322**	**0.32**	**5x5x7**	**A-39**
		4233	24.02								
	GSM 850 CS Voice	128	33.55								
		190	33.42	19.8	-0.01	0.303	0.30	0.401	0.40		
		251	33.38								
1880	**WCDMA 1900 12.2 kbps RMC**	9262	24.03								
		9400	24.13	20.0	-0.05	0.192	0.19	0.318	0.32		
		9538	24.11								
	GSM 1900 CS Voice	512	30.34								
		661	30.49	20.2	0.11	0.122	0.12	0.204	0.20		
		810	30.39								
2450	**802.11b, 1 Mbps**	1	16.13	20.0	0.14	0.003	0.00	0.007	0.01		
		6	15.76								
		11	15.16								
	802.11b, 5.5 Mbps	1	19.09								
		6	18.85								
		11	19.39	20.0	0.27	0.015	0.02	0.027	0.03		
5210	**802.11a, 6 Mbps**	44	15.18	19.2	0.36	0.006	0.01	0.013	0.01		
5785	**802.11a, 6 Mbps**	161	15.89	19.0	-0.15	0.011	0.01	0.026	0.03		

Table 6: 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	DUT Power	Temp (°C)	Drift (dB)	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	WCDMA 850 12.2 kbps RMC	4132	24.11								
		4180	24.01	19.8	0.00	0.237	0.24	0.318	0.32		
		4233	24.02								
	GSM 850 CS Voice	128	33.55								
		190	33.42	19.8	-0.02	0.307	0.31	0.410	0.41		
		251	33.38								
1880	WCDMA 1900 12.2 kbps RMC	9262	24.03								
		9400	24.13	**20.0**	**-0.06**	**0.292**	**0.30**	**0.490**	**0.50**	**5x5x7**	**A-41**
		9538	24.11								
	GSM 1900 CS Voice	512	30.34								
		661	30.49	20.1	-0.09	0.194	0.20	0.329	0.34		
		810	30.39								
2450	802.11b, 1 Mbps	1	16.13	20.0	0.66	0.003	0.00	0.007	0.01		
		6	15.76	20.0	0.10	0.004	0.00	0.008	0.01		
		11	15.16	20.0	0.50	0.004	0.00	0.009	0.01		
	802.11b, 5.5 Mbps	1	19.09	**19.9**	**0.41**	**0.023**	**0.02**	**0.039**	**0.04**	**5x5x7**	**A-43**
		6	18.85	19.9	0.09	0.015	0.01	0.026	0.03		
		11	19.39	20.0	-0.03	0.021	0.02	0.038	0.04		
5210	802.11a, 6 Mbps	44	15.18	**19.2**	**-0.03**	**0.026**	**0.03**	**0.061**	**0.06**	**7x7x12**	**A-44**
5785	802.11a, 6 Mbps	161	15.89	**18.9**	**0.10**	**0.043**	**0.04**	**0.100**	**0.10**	**7x7x12**	**A-45**

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

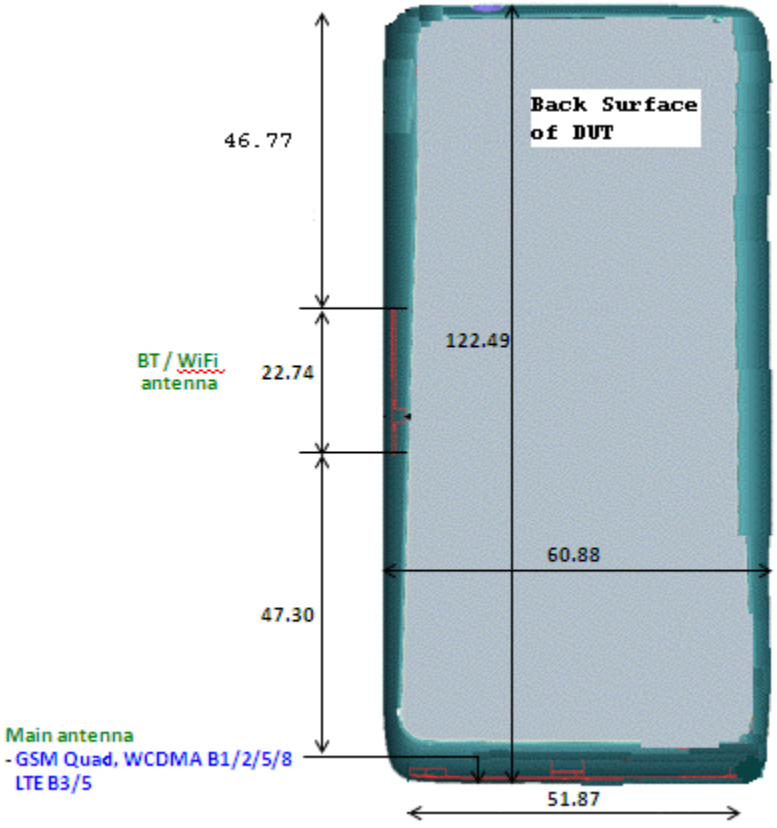
Highest Body, GPRS Class 10

f (MHz)	Mode	Channel	DUT Power	Temp (°C)	Drift (dB)	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 CS Voice	128	32.38								
		190	32.46	**19.8**	**-0.18**	**0.473**	**0.49**	**0.632**	**0.66**	**5x5x7**	**A-40**
		251	32.50								
1880	GPRS 1900 CS Voice	512	29.47								
		661	29.39	**20.0**	**-0.17**	**0.277**	**0.29**	**0.466**	**0.48**	**5x5x7**	**A-42**
		810	29.33								

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

6.4 Mobile Hotspot Test Results

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



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

The SAR results shown in tables 9 through 13 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). 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	3184	835	6.19	6 of 11
		1810	4.88	6 of 11
		2450	4.33	6 of 11
E- Field Probe ES3DV3	3115	835	5.89	6 of 11
		1810	4.72	6 of 11
		2450	4.12	6 of 11
E- Field Probe ES3DV3	3284	835	6.28	6 of 11
		1810	5.28	6 of 11
		2450	4.56	6 of 11
E-Field Probe EX3DV4	3728	2450	6.84	6 of 11
		5200	4.22	6 of 11
		5800	3.71	6 of 11

Mobile Hotspot, Front of Phone 10 mm from Phantom

f (MHz)	Mode	Channel	DUT Power		Temp (°C)	Drift (dB)	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	24.11	0.0								
		4180	24.01	0.0	19.8	-0.01	0.374	0.37	0.485	0.49		
		4233	24.02	0.0								
	GPRS 850 Class 10	128	32.38	0.0	19.9	0.01	0.616	0.62	0.796	0.80		
		190	32.46	0.0	20.0	-0.40	0.765	0.84	0.985	1.08		
		251	32.50	0.0	19.6	0.06	0.799	0.80	1.03	1.03		
1880	WCDMA 1900 12.2 kbps RMC	9262	24.03	-6.5								
		9400	24.13	-6.5	19.5	-0.15	0.262	0.27	0.509	0.53		
		9538	24.11	-6.5								
	GPRS 1900 Class 10	512	29.47	-4.5								
		661	29.39	-4.5	19.5	0.01	0.247	0.25	0.485	0.49		
		810	29.33	-4.5								
2450	802.11b, 1 Mbps	1	16.13	0.0	19.8	0.24	0.021	0.02	0.044	0.04		
		6	15.76	0.0								
		11	15.16	0.0								
	802.11b, 5.5 Mbps	1	19.09	0.0								
		6	18.85	0.0								
		11	19.39	0.0	19.8	0.16	0.048	0.05	0.095	0.10		
5785	802.11a, 6 Mbps	161	15.89	0.0	18.9	0.01	0.019	0.02	0.053	0.05		

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

Mobile Hotspot, Back of Phone 10 mm from Phantom

f (MHz)	Mode	Channel	DUT Power		Temp (°C)	Drift (dB)	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	24.11	0.0								
		4180	24.01	0.0	**19.8**	**-0.02**	**0.426**	**0.43**	**0.564**	**0.57**	**5x5x7**	**A-47**
		4233	24.02	0.0								
	GPRS 850 Class 10	128	32.38	0.0	19.5	0.05	0.688	0.69	0.910	0.91		
		190	32.46	0.0	**19.6**	**-0.33**	**0.832**	**0.90**	**1.10**	**1.19**	**5x5x7**	**A-48**
		251	32.50	0.0	19.7	0.05	0.865	0.87	1.14	1.14		
1880	WCDMA 1900 12.2 kbps RMC	9262	24.03	-6.5								
		9400	24.13	-6.5	19.5	-0.08	0.385	0.39	0.761	0.78		
		9538	24.11	-6.5								
	GPRS 1900 Class 10	512	29.47	-4.5								
		661	29.39	-4.5	19.6	-0.15	0.334	0.35	0.670	0.69		
		810	29.33	-4.5								
2450	802.11b, 1 Mbps	1	16.13	0.0	19.8	0.12	0.043	0.04	0.092	0.09		
		6	15.76	0.0	19.8	0.05	0.038	0.04	0.083	0.08		
		11	15.16	0.0	19.8	0.05	0.035	0.03	0.071	0.07		
	802.11b, 5.5 Mbps	1	19.09	0.0	**19.7**	**0.13**	**0.106**	**0.11**	**0.222**	**0.22**	**5x5x7**	**A-51**
		6	18.85	0.0	19.6	0.04	0.087	0.09	0.184	0.18		
		11	19.39	0.0	19.8	0.03	0.107	0.11	0.219	0.22		
5785	802.11a, 6 Mbps	161	15.89	0.0	20.3	-0.09	0.080	0.08	0.264	0.27		

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

Mobile Hotspot, Bottom Edge of Phone 10 mm from Phantom

f (MHz)	Mode	Channel	DUT Power		Temp (°C)	Drift (dB)	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	24.11	0.0								
		4180	24.01	0.0	19.8	0.06	0.019	0.02	0.033	0.03		
		4233	24.02	0.0								
	GPRS 850 Class 10	128	32.38	0.0								
		190	32.46	0.0	19.9	-0.04	0.042	0.04	0.070	0.07		
		251	32.50	0.0								
1880	WCDMA 1900 12.2 kbps RMC	9262	24.03	-6.5	19.5	0.01	0.402	0.40	0.824	0.82		
		9400	24.13	-6.5	19.5	0.17	0.495	0.50	1.01	1.01		
		9538	24.11	-6.5	**19.5**	**0.08**	**0.536**	**0.54**	**1.11**	**1.11**	**5x5x7**	**A-49**
	GPRS 1900 Class 10	512	29.47	-4.5	19.5	0.07	0.406	0.41	0.836	0.84		
		661	29.39	-4.5	19.5	-0.03	0.402	0.40	0.827	0.83		
		810	29.33	-4.5	**19.5**	**0.03**	**0.604**	**0.60**	**1.24**	**1.24**	**5x5x7**	**A-50**

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

Mobile Hotspot, Right Edge of Phone 10 mm from Phantom

f (MHz)	Mode	Channel	DUT Power		Temp (°C)	Drift (dB)	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	24.11	0.0								
		4180	24.01	0.0	19.8	0.02	0.296	0.30	0.428	0.43		
		4233	24.02	0.0								
	GPRS 850 Class 10	128	32.38	0.0	19.9	-0.12	0.523	0.54	0.778	0.80		
		190	32.46	0.0	19.7	-0.34	0.728	0.79	1.06	1.15		
		251	32.50	0.0	19.9	0.08	0.754	0.75	1.10	1.10		
1880	WCDMA 1900 12.2 kbps RMC	9262	24.03	-6.5								
		9400	24.13	-6.5	19.7	-0.01	0.063	0.06	0.106	0.11		
		9538	24.11	-6.5								
	GPRS 1900 Class 10	512	29.47	-4.5								
		661	29.39	-4.5	19.6	0.13	0.038	0.04	0.064	0.06		
		810	29.33	-4.5								
2450	802.11b, 1 Mbps	1	16.13	0.0	19.8	-0.03	0.038	0.04	0.071	0.07		
		6	15.76	0.0								
		11	15.16	0.0								
	802.11b, 5.5 Mbps	1	19.09	0.0								
		6	18.85	0.0								
		11	19.39	0.0	19.7	0.06	0.085	0.08	0.160	0.16		
5785	802.11a, 6 Mbps	161	15.89	0.0	**20.3**	**-0.16**	**0.094**	**0.10**	**0.302**	**0.31**	**7x7x12**	**A-52**

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

Mobile Hotspot, Left Edge of Phone 10 mm from Phantom

f (MHz)	Mode	Channel	DUT Power		Temp (°C)	Drift (dB)	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	24.11	0.0								
		4180	24.01	0.0	19.8	0.01	0.276	0.28	0.398	0.40		
		4233	24.02	0.0								
	GPRS 850 Class 10	128	32.38	0.0	19.8	0.10	0.498	0.50	0.724	0.72		
		190	32.46	0.0	19.8	-0.06	0.616	0.62	0.901	0.91		
		251	32.50	0.0	19.8	0.07	0.715	0.72	1.05	1.05		
1880	WCDMA 1900 12.2 kbps RMC	9262	24.03	-6.5								
		9400	24.13	-6.5	19.7	0.10	0.029	0.03	0.049	0.05		
		9538	24.11	-6.5								
	GPRS 1900 Class 10	512	29.47	-4.5								
		661	29.39	-4.5	19.6	0.11	0.061	0.06	0.103	0.10		
		810	29.33	-4.5								

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

6.5 Description and Evaluation of Simultaneous Transmitters

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

By device design the GSM and WCDMA transmitters may operate simultaneously with either the Wi-Fi 802.11 transmitter or the Bluetooth transmitter. The separation distance between the Wi-Fi 802.11/Bluetooth antenna and the main antenna is 4.73 cm. Pictorial representation of the antenna locations and separation distances are given in section 2. The Bluetooth transmitter of the device under test can be excluded from stand-alone and simultaneous SAR evaluation as evaluated in section 2.

For the transmitters requiring stand-alone SAR testing (WCDMA, GSM, and Wi-Fi 802.11), the KDB guidelines direct that if the sum of the 1 g SAR measured for the simultaneously transmitting antennas is less than the SAR limit, SAR measurement for simultaneous transmission is not required. Evaluations of the head, body, and mobile hotspot simultaneous SAR summations are presented in the tables below.

For simultaneous transmission, the WIFI 2450 power is reduced by at least 5 dB. The table below shows SAR measurements for the power reduced by 5dB in WIFI 2450. These SAR measurements are used in this section for evaluation of simultaneous transmission against the head.

Wi-Fi 2.4 GHz Power Reduced by 5 dB										
	Mode	**Channel**	**DUT Power**		**Temp (°C)**	**Drift (dB)**	**10 g SAR value**		**1 g SAR value**	
			Measured (dBm)	**Power Reduction (dB)**			**Measured (W/kg)**	**Extrapolated (W/kg)**	**Measured (W/kg)**	**Extrapolated (W/kg)**
Left Head Cheek	**802.11b, 5.5 Mbps**	1	19.09	-5.0						
		6	18.85	-5.0						
		11	19.39	-5.0	19.9	0.22	0.059	0.06	0.126	0.13
Left Head 15° Tilt	**802.11b, 5.5 Mbps**	1	19.09	-5.0						
		6	18.85	-5.0						
		11	19.39	-5.0	19.9	-0.12	0.011	0.01	0.021	0.02
Right Head Cheek	**802.11b, 5.5 Mbps**	1	19.09	-5.0	19.9	-0.07	0.104	0.11	0.232	0.24
		6	18.85	-5.0	20.1	-0.23	0.097	0.10	0.214	0.23
		11	19.39	-5.0	19.9	-0.25	0.087	0.09	0.214	0.23
Right Head 15° Tilt	**802.11b, 5.5 Mbps**	1	19.09	-5.0						
		6	18.85	-5.0						
		11	19.39	-5.0	19.9	0.28	0.013	0.01	0.025	0.03

Evaluations for Simultaneous SAR (WCDMA)											
Position	**Transmitter Stand-Alone 1 g SAR Values (W/kg)**					**1 g SAR Summations (W/kg)**					
	WCDMA 850	**WCDMA 1900**	**Wi-Fi 2450**	**Wi-Fi 5210**	**Wi-Fi 5785**	**WCDMA 850+ Wi-Fi 2450**	**WCDMA 1900+ Wi-Fi 2450**	**WCDMA 850+ Wi-Fi 5210**	**WCDMA 1900+ Wi-Fi 5210**	**WCMDA 850+ Wi-Fi 5785**	**WCDMA 1900+ Wi-Fi 5785**
Left Head Cheek	0.28	0.46	0.13	0.06	0.09	0.41	0.59	0.34	0.52	0.37	0.55
Right Head Cheek	0.27	1.11	0.24	0.22	0.35	0.51	1.35	0.49	1.33	0.62	1.46
Left Head 15° Tilt	0.17	0.32	0.02	0.02	0.03	0.19	0.34	0.19	0.34	0.2	0.35
Right Head 15° Tilt	0.18	0.32	0.03	0.02	0.04	0.21	0.35	0.2	0.34	0.22	0.36
Body Worn, Front of Phone 25 from Phantom	0.32	0.32	0.03	0.01	0.03	0.35	0.35	0.33	0.33	0.35	0.35
Body Worn, Back of Phone 25 from Phantom	0.32	0.50	0.04	0.06	0.10	0.36	0.54	0.38	0.56	0.42	0.6
Mobile Hotspot, Front of Phone 10mm from Phantom	0.49	0.53	0.10		0.05	0.59	0.63			0.54	0.58
Mobile Hotspot, Back of Phone 10mm from Phantom	0.57	0.78	0.22		0.27	0.79	1.0			0.84	1.05
Mobile Hotspot, Right Edge of Phone 10mm from Phantom	0.43	0.11	0.16		0.31	0.59	0.27			0.74	0.42

Evaluations for Simultaneous SAR (GSM)											
Position	**Transmitter Stand-Alone 1 g SAR Values (W/kg)**					**1 g SAR Summations (W/kg)**					
	GSM 850	**GSM 1900**	**Wi-Fi 2450**	**Wi-Fi 5210**	**Wi-Fi 5785**	**GSM 850+ Wi-Fi 2450**	**GSM 1900+ Wi-Fi 2450**	**GSM 850+ Wi-Fi 5210**	**GSM 1900+ Wi-Fi 5210**	**GSM 850+ Wi-Fi 5785**	**GSM 1900+ Wi-Fi 5785**
Left Head Cheek (GPRS for 850)	0.62	0.22	0.13	0.06	0.09	0.75	0.35	0.68	0.28	0.71	0.31
Right Head Cheek (GPRS for 1900)	0.36	0.65	0.24	0.22	0.35	0.6	0.89	0.58	0.87	0.71	1.0
Left Head 15° Tilt	0.25	0.18	0.02	0.02	0.03	0.27	0.2	0.27	0.2	0.28	0.21
Right Head 15° Tilt	0.24	0.18	0.03	0.02	0.04	0.27	0.21	0.26	0.2	0.28	0.22
Body Worn, Front of Phone 25 from Phantom	0.40	0.20	0.03	0.01	0.03	0.43	0.23	0.41	0.21	0.43	0.23
Body Worn, Back of Phone 25 from Phantom (GPRS)	0.66	0.48	0.04	0.06	0.10	0.7	0.52	0.72	0.54	0.76	0.58
Mobile Hotspot, Front of Phone 10mm from Phantom	1.08	0.49	0.10		0.05	1.18	0.59			1.13	0.54
Mobile Hotspot, Back of Phone 10mm from Phantom	1.19	0.69	0.22		0.27	1.41	0.91			1.46	0.96
Mobile Hotspot, Right Edge of Phone 10mm from Phantom	1.15	0.06	0.16		0.31	1.31	0.22			1.46	0.37

References

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

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

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

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

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

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

Appendix 1

SAR distribution comparisons for System Accuracy Verifications

System Accuracy Verification Measurements for Head SAR Measurements

A-3

Date/Time: 8/6/2012 9:50:34 PM

DUT: Dipole 835 MHz; Type: D835V2;
Procedure Notes: 200 MHz System Performance Check / Dipole Sn# 436TR; PM1 Power = 200 mW
Sim.Temp@ meas = 19.7*C; Sim.Temp@ SPC = 19.8*C; Room Temp@ SPC = 20.9*C

Communication System: _CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 835 MHz; σ = 0.94 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3

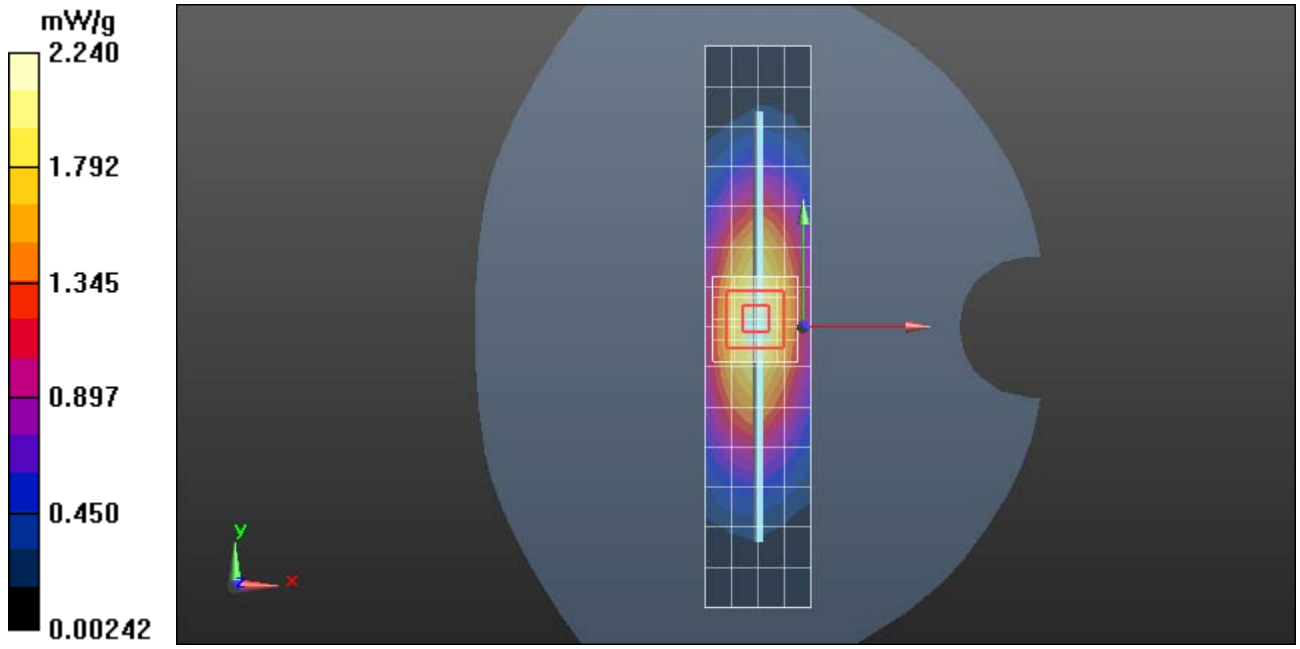
DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.83, 5.83, 5.83); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1235;
- ; SEMCAD X Version 14.6.5 (6469)

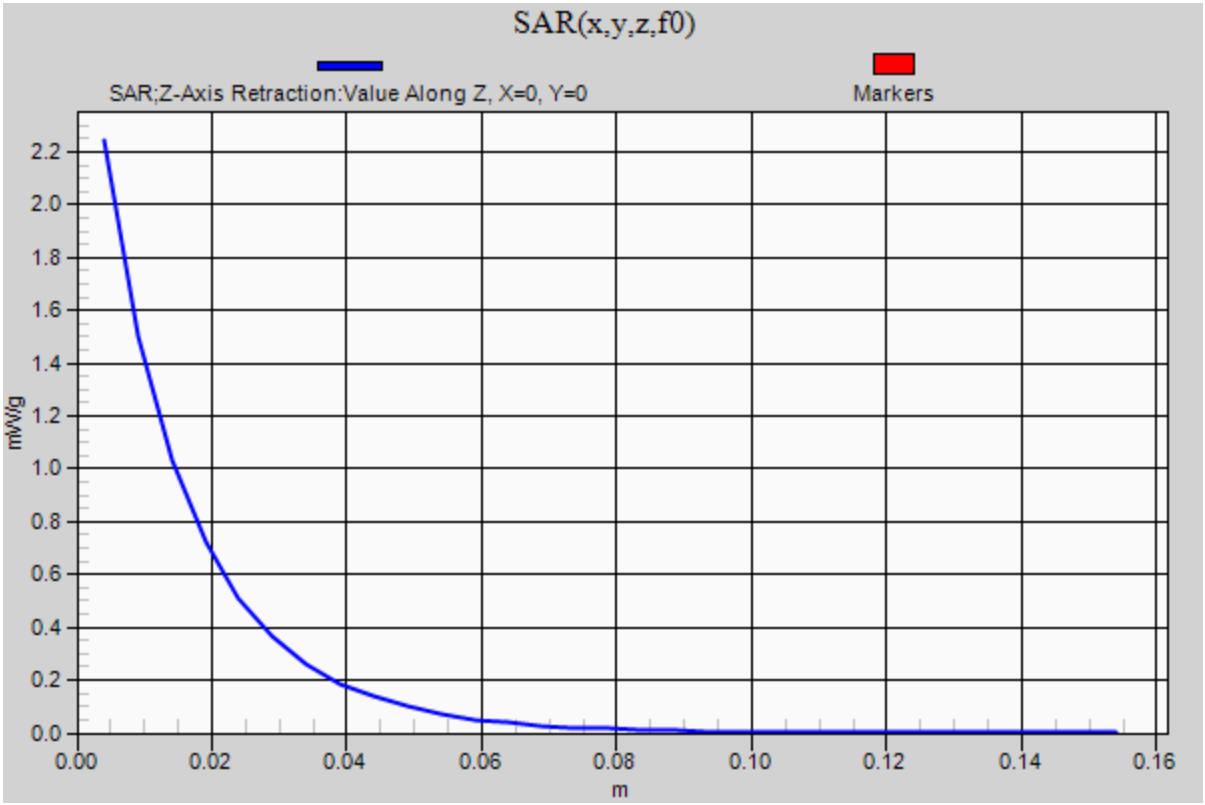
Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 2.24 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.502 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.088 mW/g
SAR(1 g) = 2.08 mW/g; SAR(10 g) = 1.36 mW/g

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



A-4


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

A-5

Date/Time: 8/8/2012 7:10:30 AM

DUT: Dipole 1800 MHz; Type: D1800V2;
Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 259TR; PM1 Power = 200 mW
Sim.Temp@ meas = 19.0*C; Sim.Temp@ SPC = 19.2*C; Room Temp@ SPC = 21.1*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.37 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3

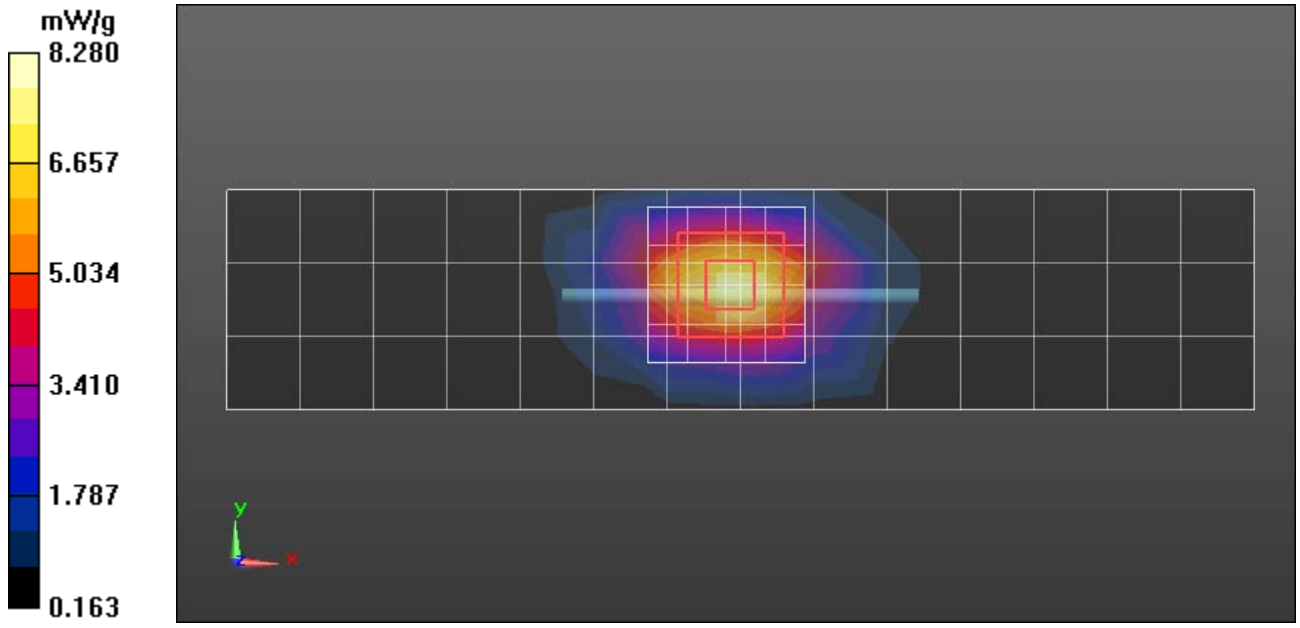
DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.17, 5.17, 5.17); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

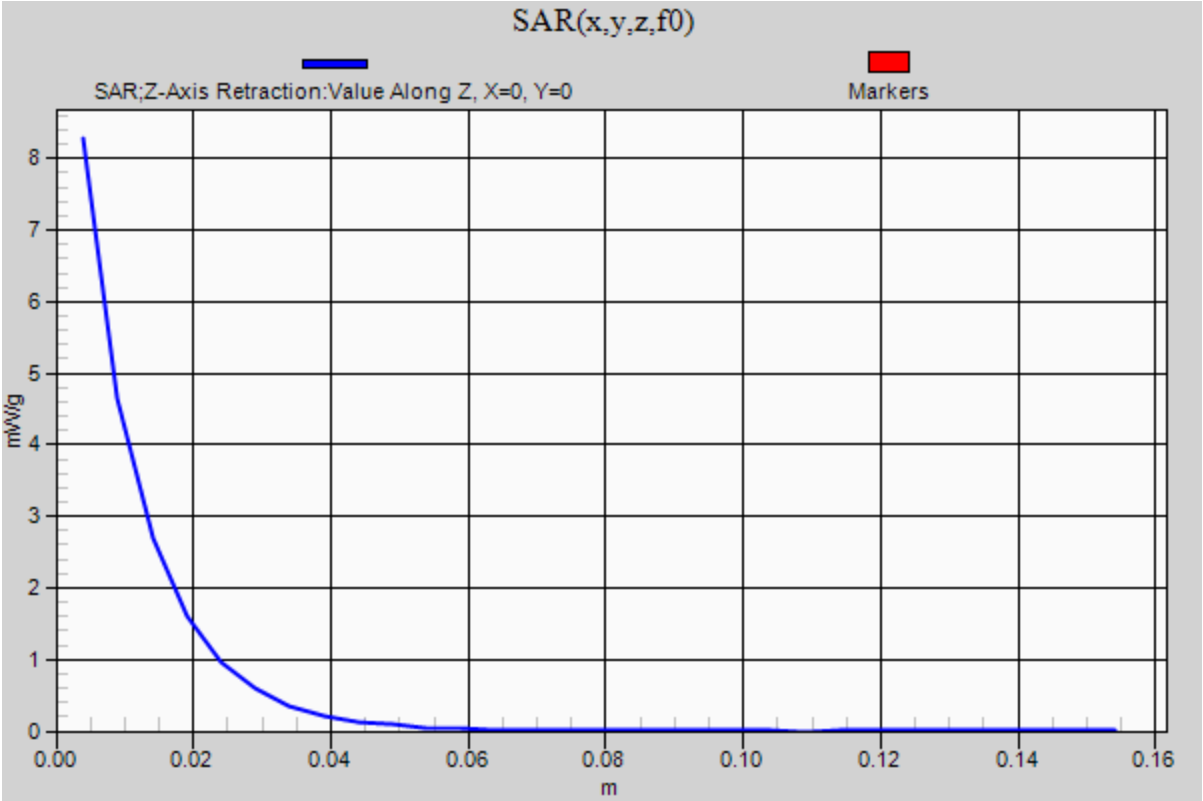
Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 7.15 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 76.954 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 13.363 mW/g
SAR(1 g) = 7.35 mW/g; SAR(10 g) = 3.89 mW/g
Maximum value of SAR (measured) = 8.28 mW/g

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



A-6


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

Test Laboratory: Motorola Mobility - 2450MHz System Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:863;
Procedure Notes: Input Power = 200 mW Refl.Pwr = -27.51 dB V
Sim.Temp@meas = 20.7 Sim.Temp@SPC = 19.0 Room Temp @ SPC = 20.5
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 = 40.7; ρ = 1000 kg/m^3

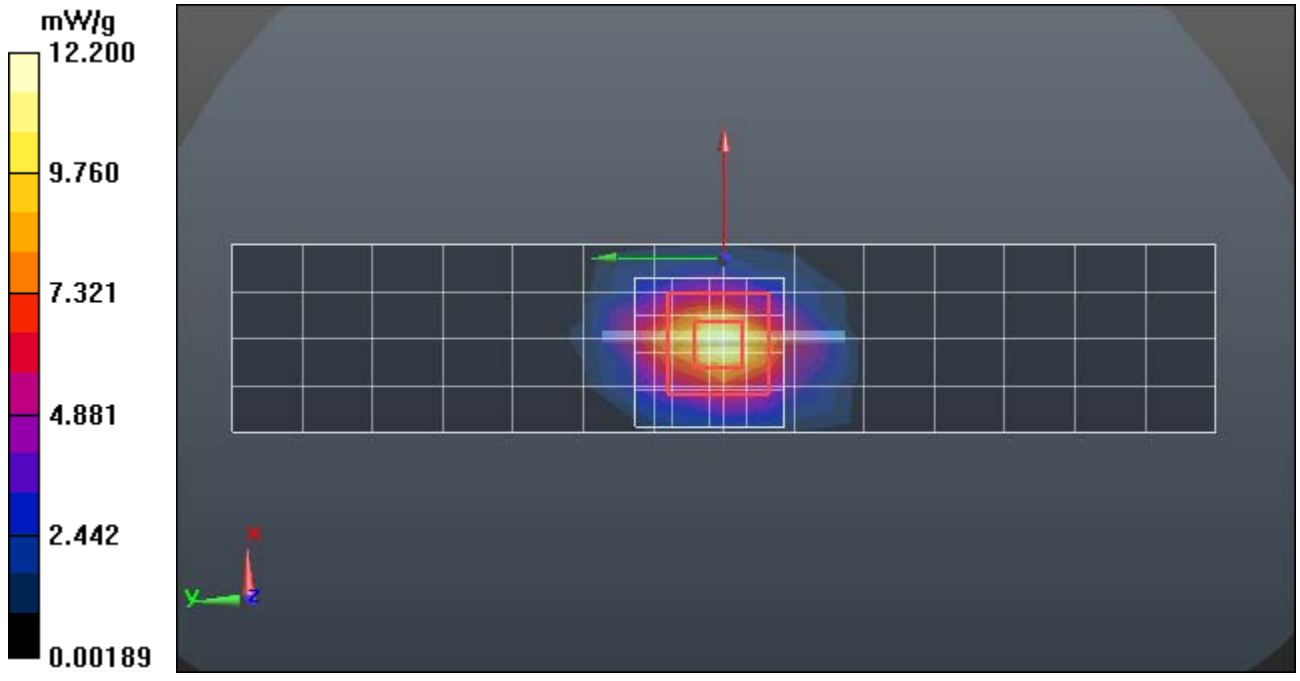
DASY4 Configuration:

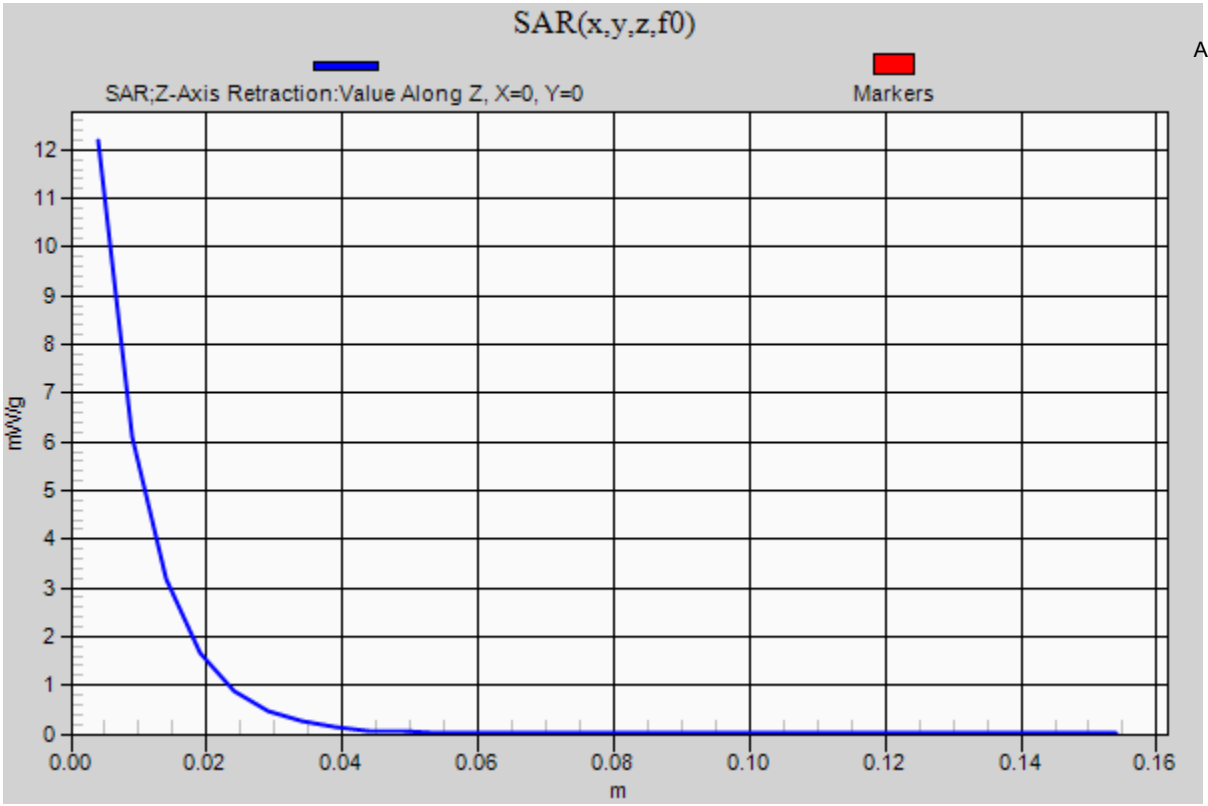
- Probe: ES3DV3 - SN3184; ConvF(4.61, 4.61, 4.61); Calibrated: 4/25/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 4/11/2012
- Phantom: R#1 - Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1319;
- ; SEMCAD X Version 14.6.5 (6469)

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm
Maximum value of SAR (measured) = 12.0 mW/g

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.013 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 22.222 mW/g
SAR(1 g) = 10.7 mW/g; SAR(10 g) = 5 mW/g
Maximum value of SAR (measured) = 11.8 mW/g

DASY5, SAM - System Performance Check Template, Rev.2 (12-Sept-11)/Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 12.2 mW/g




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

Test Laboratory: Motorola Mobility - 5200Mhz System Performance Check

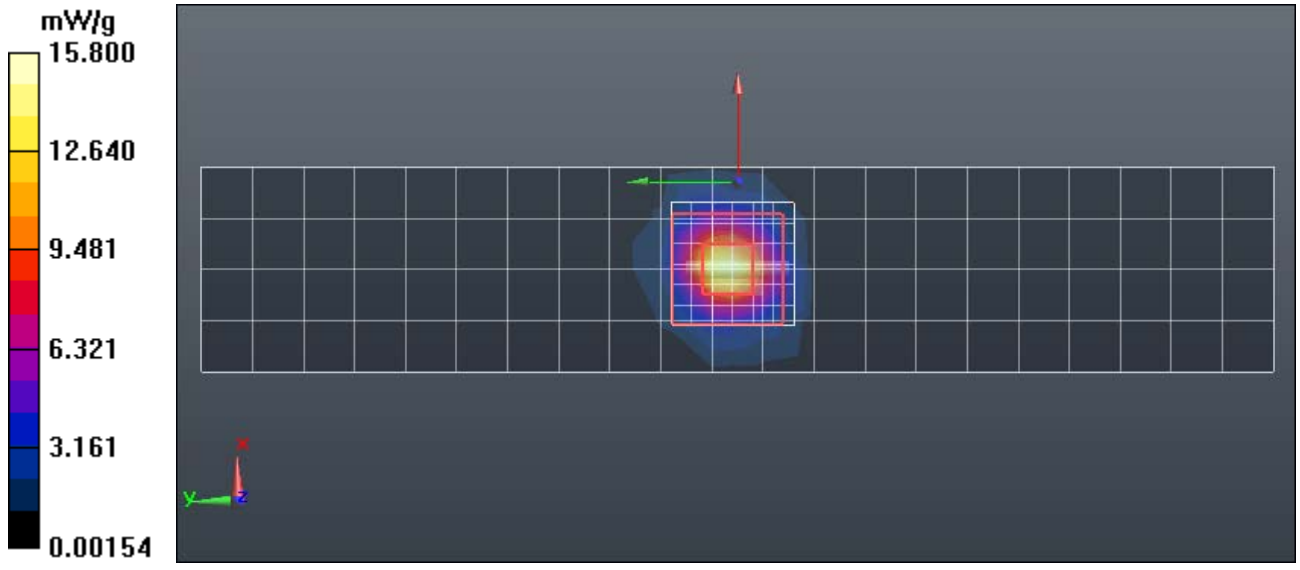
DUT: Dipole 5-6GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1098;
Procedure Notes: Input Power = 100 mW Refl.Pwr = -19.07 dB
Sim.Temp@meas = 19.2 Sim.Temp@SPC = 19.6 Room Temp @ SPC = 20.8
Communication System: _CW - Dipole; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 5200 MHz; σ = 4.51 mho/m; ε_r = 35.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3728; ConvF(4.74, 4.74, 4.74); Calibrated: 4/24/2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 5/23/2012
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.5 (6469)

DASY5 - 5-6GHz, SAM System Performance Check Template - Rev.3 (15-may-12)/Daily SPC Check/Dipole Area Scan (5x22x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 14.1 mW/g

DASY5 - 5-6GHz, SAM System Performance Check Template - Rev.3 (15-may-12)/Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 62.458 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 30.227 mW/g
SAR(1 g) = 7.65 mW/g; SAR(10 g) = 2.19 mW/g
Maximum value of SAR (measured) = 15.8 mW/g



Test Laboratory: Motorola Mobility - 5800Mhz System Perfoarmance Check

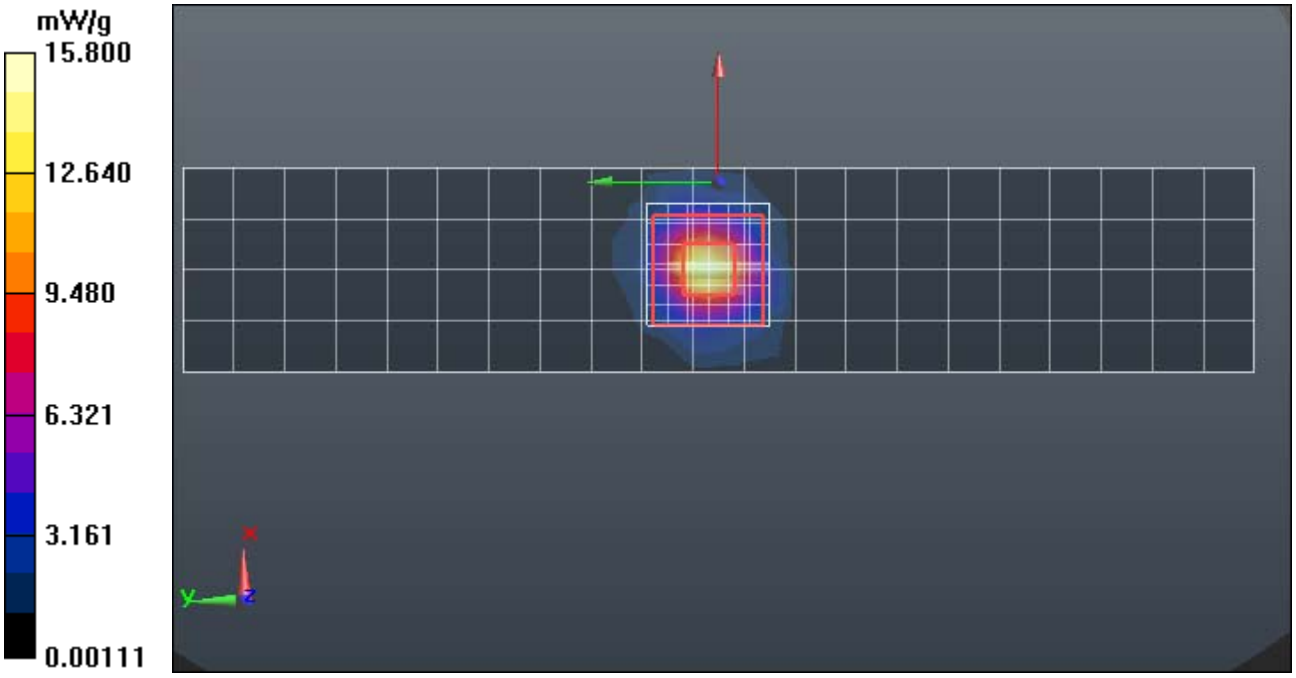
DUT: Dipole 5-6GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1098;
Procedure Notes: Input Power = 100 mW Refl.Pwr = -24.62 dB
Sim.Temp@meas = 19.0 Sim.Temp@SPC = 18.9 Room Temp @ SPC = 20.5
Communication System: _CW - Dipole; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: Validation *HEAD Tissue* ; Medium parameters used: f = 5800 MHz; σ = 5.3 mho/m; ε_r = 35.4; 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: DAE3 Sn440; Calibrated: 5/23/2012
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.5 (6469)

DASY5 - 5-6GHz, SAM System Performance Check Template - Rev.3 (15-may-12)/Daily SPC Check/Dipole Area Scan (5x22x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 14.2 mW/g

DASY5 - 5-6GHz, SAM System Performance Check Template - Rev.3 (15-may-12)/Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 57.733 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 32.477 mW/g
SAR(1 g) = 7.34 mW/g; SAR(10 g) = 2.07 mW/g
Maximum value of SAR (measured) = 15.8 mW/g



System Accuracy Verification Measurements for Body SAR Measurements

A-12

Date/Time: 8/7/2012 10:58:20 AM

DUT: Dipole 835 MHz; Type: D835V2;
Procedure Notes: 835 MHz System Performance Check / Dipole Sn# 436(TR); PM1 Power = 200 mW
Sim.Temp@ meas = 19.5*C; Sim.Temp@ SPC = 19.8*C; Room Temp@ SPC = 20.8*C

Communication System: _CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

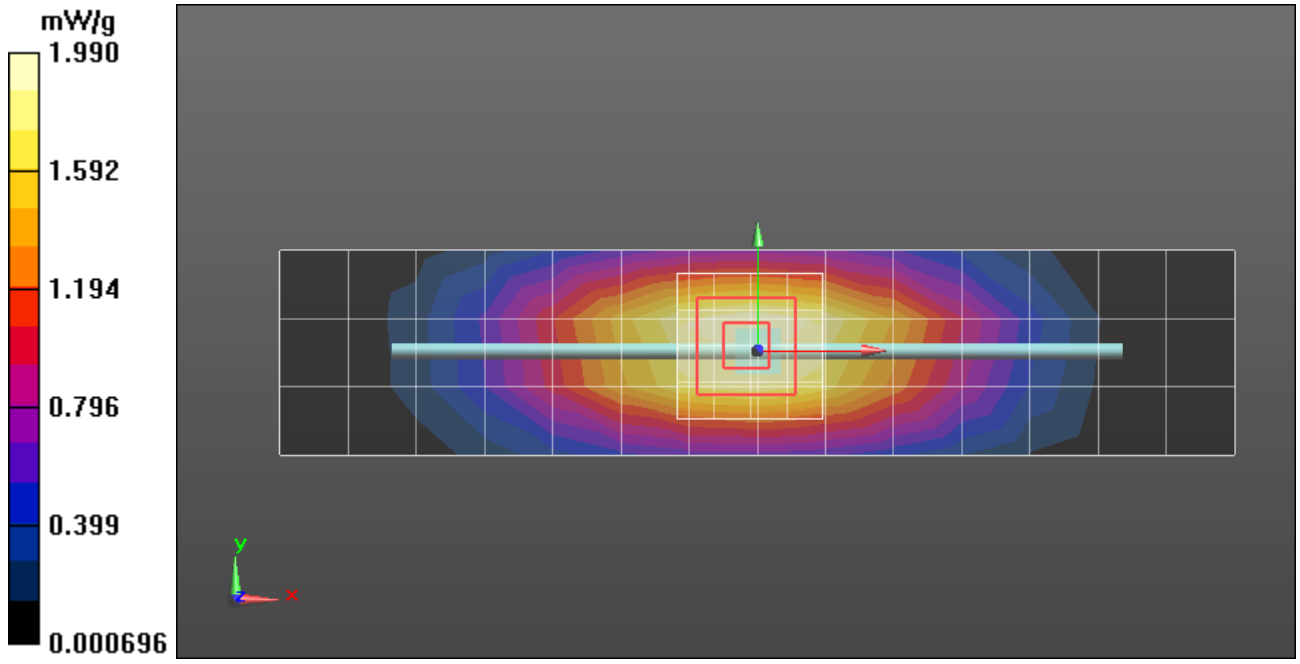
DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.89, 5.89, 5.89); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

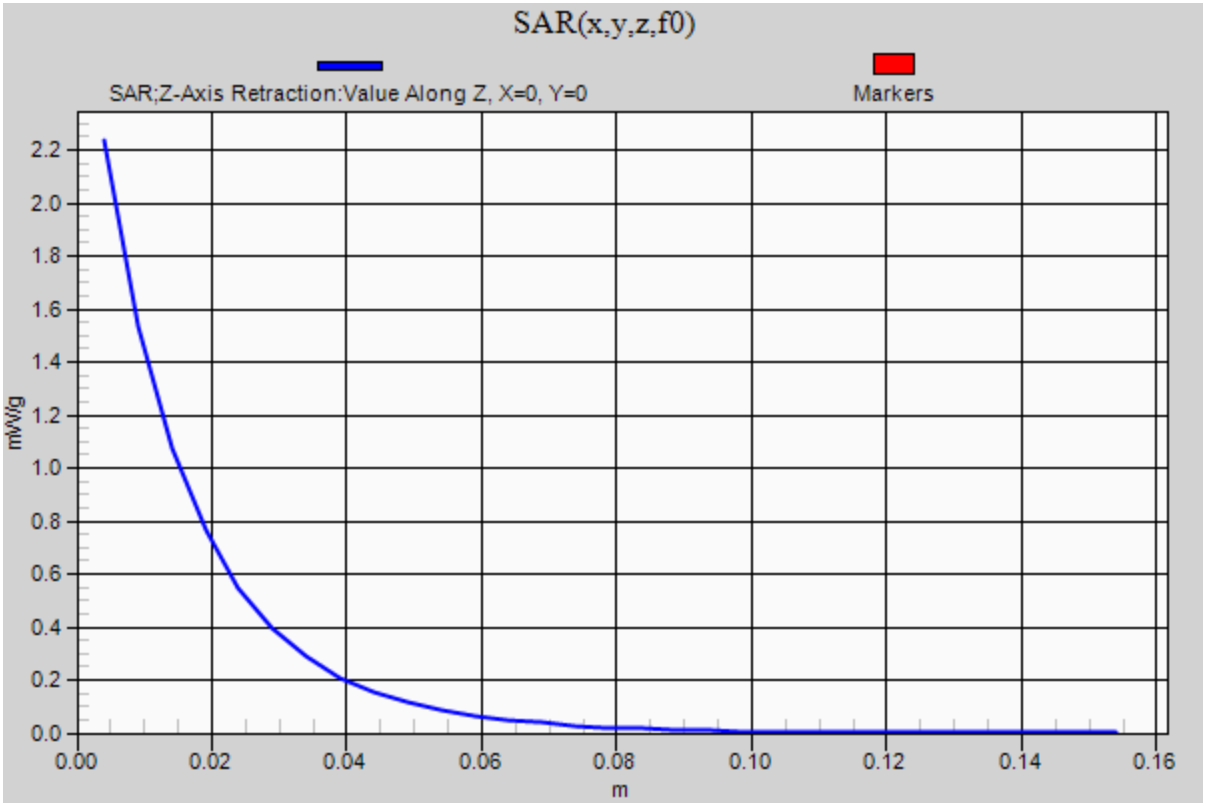
Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.99 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 47.884 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 2.994 mW/g
SAR(1 g) = 2.07 mW/g; SAR(10 g) = 1.37 mW/g
Maximum value of SAR (measured) = 2.24 mW/g

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



A-13


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

A-14

Date/Time: 8/8/2012 7:39:48 AM

DUT: Dipole 1800 MHz; Type: D1800V2; Procedure Notes: 1800 MHz System Performance Check / Dipole Sn# 259TR; PM1 Power = 200 mW;
Sim.Temp@ meas = 19.1*C; Sim.Temp@ SPC = 19.2*C; Room Temp@ SPC = 21.0*C

Communication System: _CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 1800 MHz; σ = 1.49 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3

DASY4 Configuration:

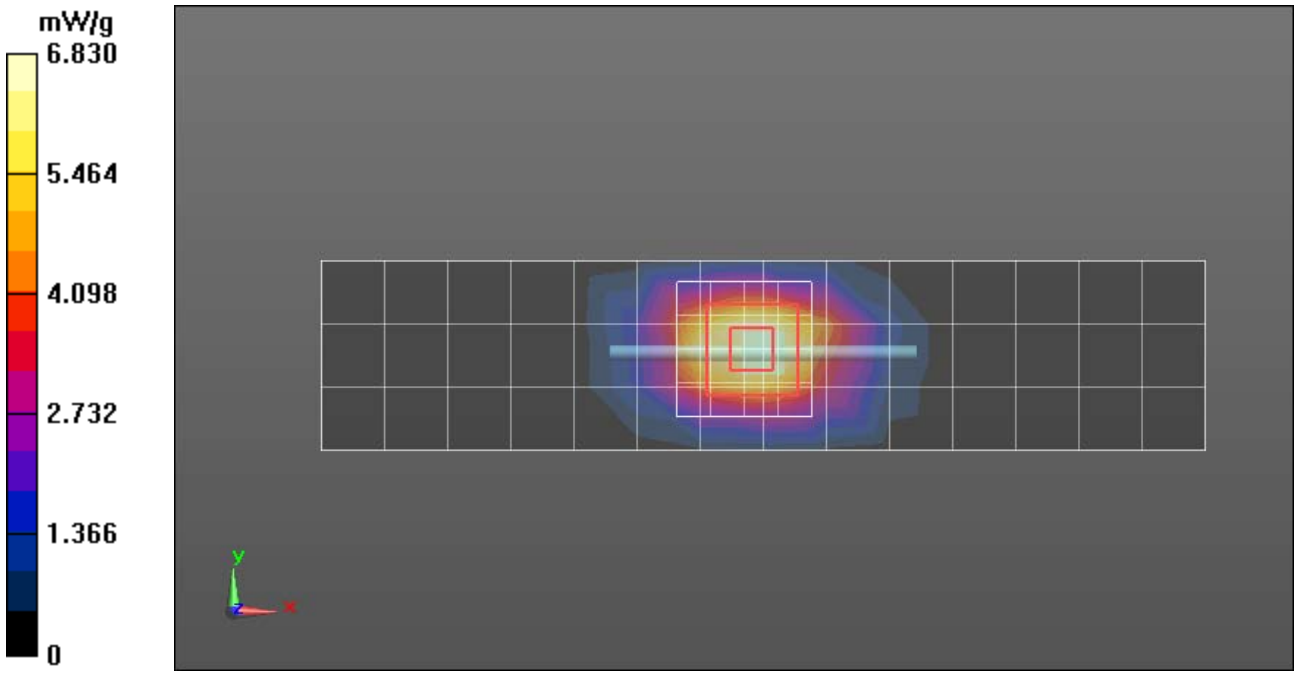
- Probe: ES3DV3 - SN3115; ConvF(4.72, 4.72, 4.72); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

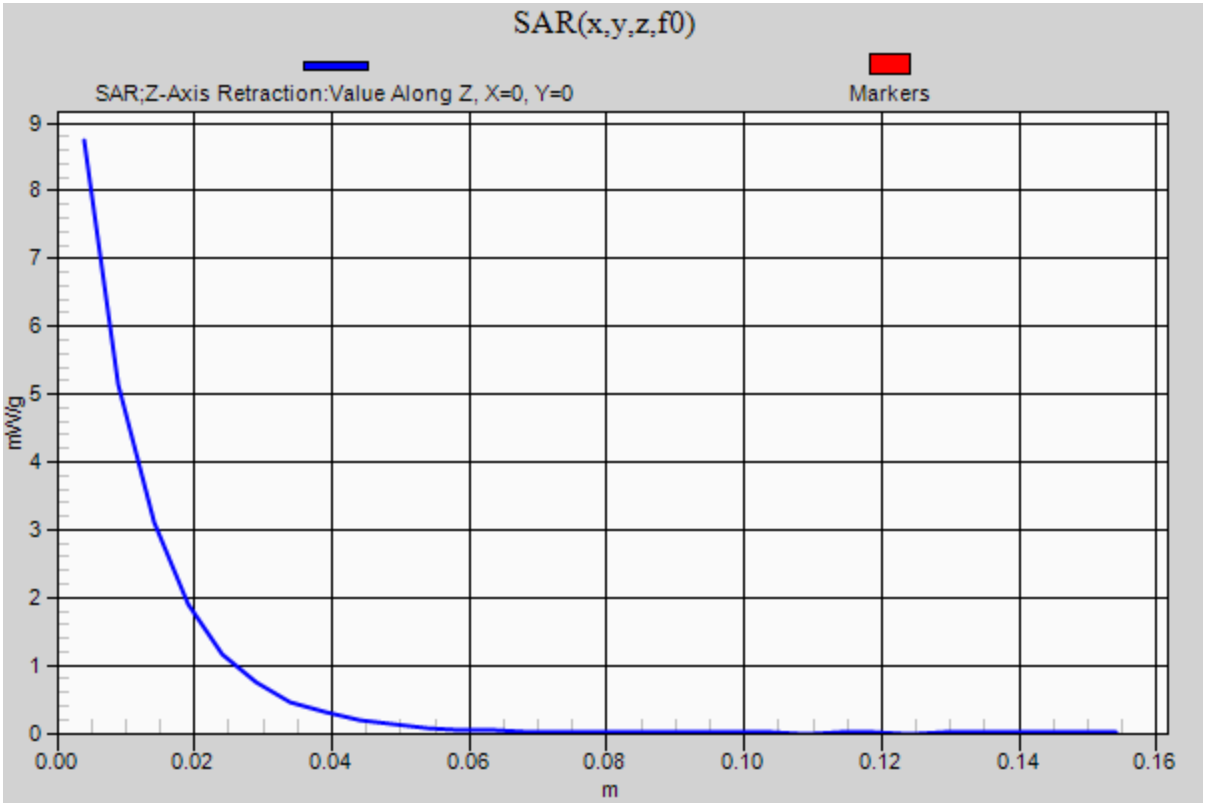
Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 6.83 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 77.325 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 13.472 mW/g
SAR(1 g) = 7.72 mW/g; SAR(10 g) = 4.14 mW/g
Maximum value of SAR (measured) = 8.64 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.74 mW/g

A-15


mW/g
6.830
5.464
4.098
2.732
1.366
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

A-16

Date/Time: 8/14/2012 12:25:39 PM

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 = 19.1*C; Room Temp@ SPC = 20.8*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 = 1.49 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3

DASY4 Configuration:

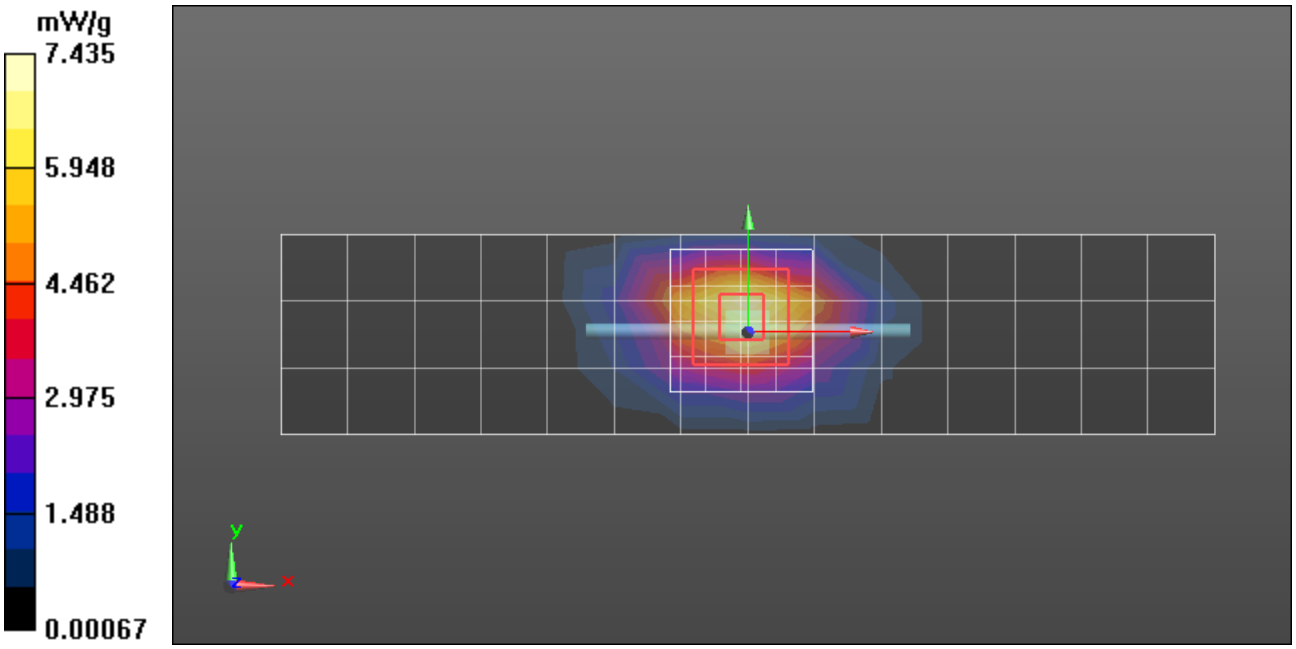
- Probe: ES3DV3 - SN3284; ConvF(5.28, 5.28, 5.28); Calibrated: 1/10/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1310; Calibrated: 1/11/2012
- Phantom: R#4, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

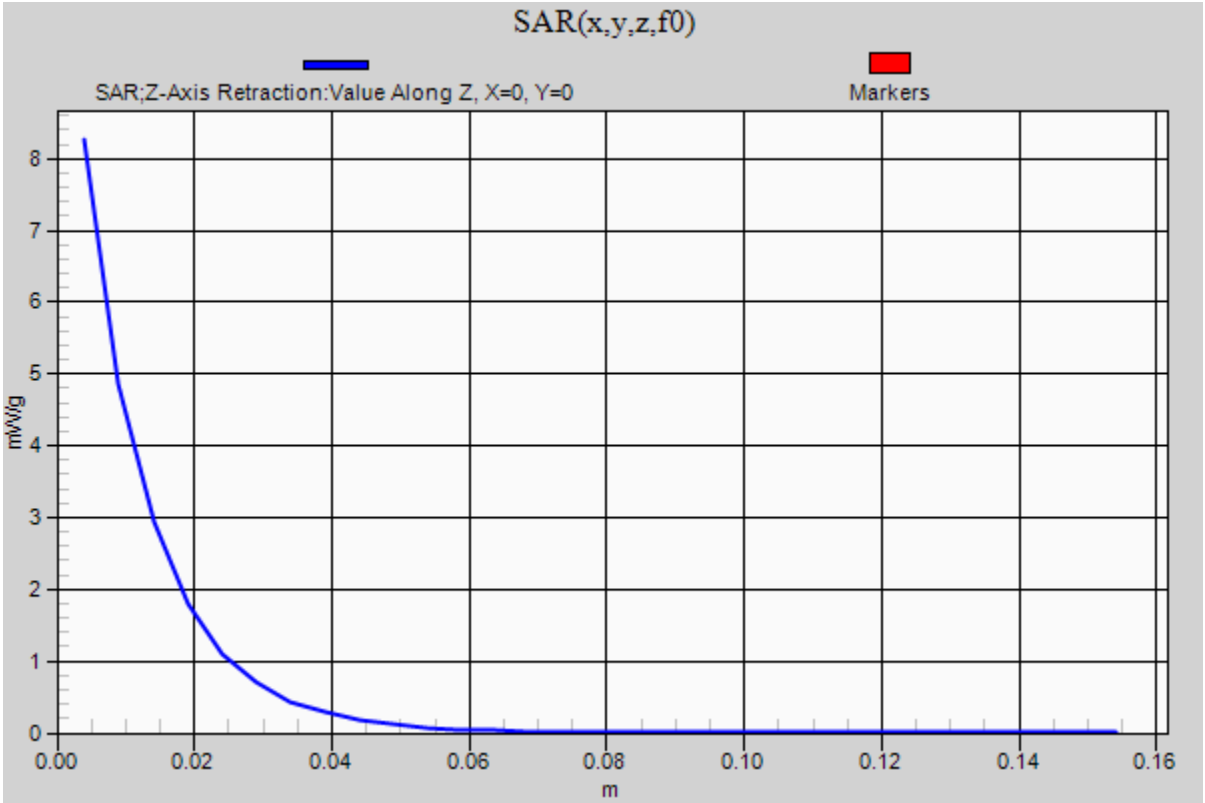
Daily SPC Check/Dipole Area Scan (4x15x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 7.44 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 74.418 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 12.694 mW/g
SAR(1 g) = 7.34 mW/g; SAR(10 g) = 3.93 mW/g
Maximum value of SAR (measured) = 8.28 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of SAR (measured) = 8.27 mW/g

A-17


mW/g
7.435
5.948
4.462
2.975
1.488
0.00067
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

Test Laboratory: Motorola Mobility - 2450MHz System Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:863;
Procedure Notes: Input Power =200 mW Refl.Pwr = -24.8 dB
Sim.Temp@meas = 19.3 Sim.Temp@SPC =19.3 Room Temp @ SPC = 21.1
Communication System: _CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 Triton Body; Medium parameters used: f = 2450 MHz; σ = 2.02 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3

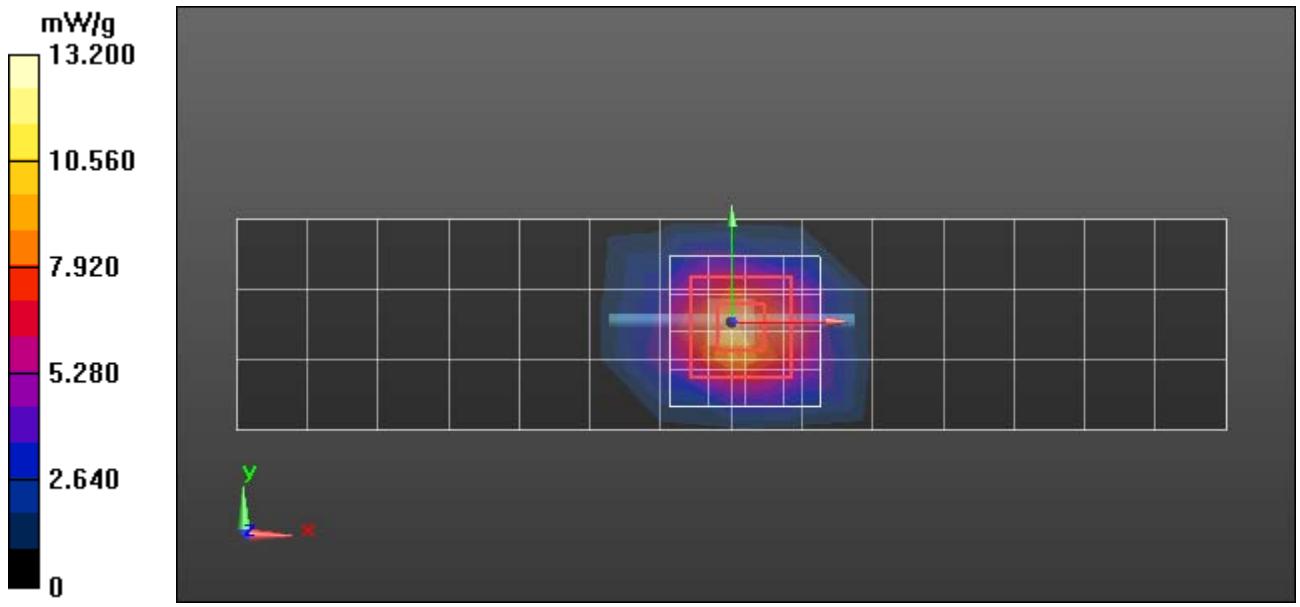
DASY4 Configuration:

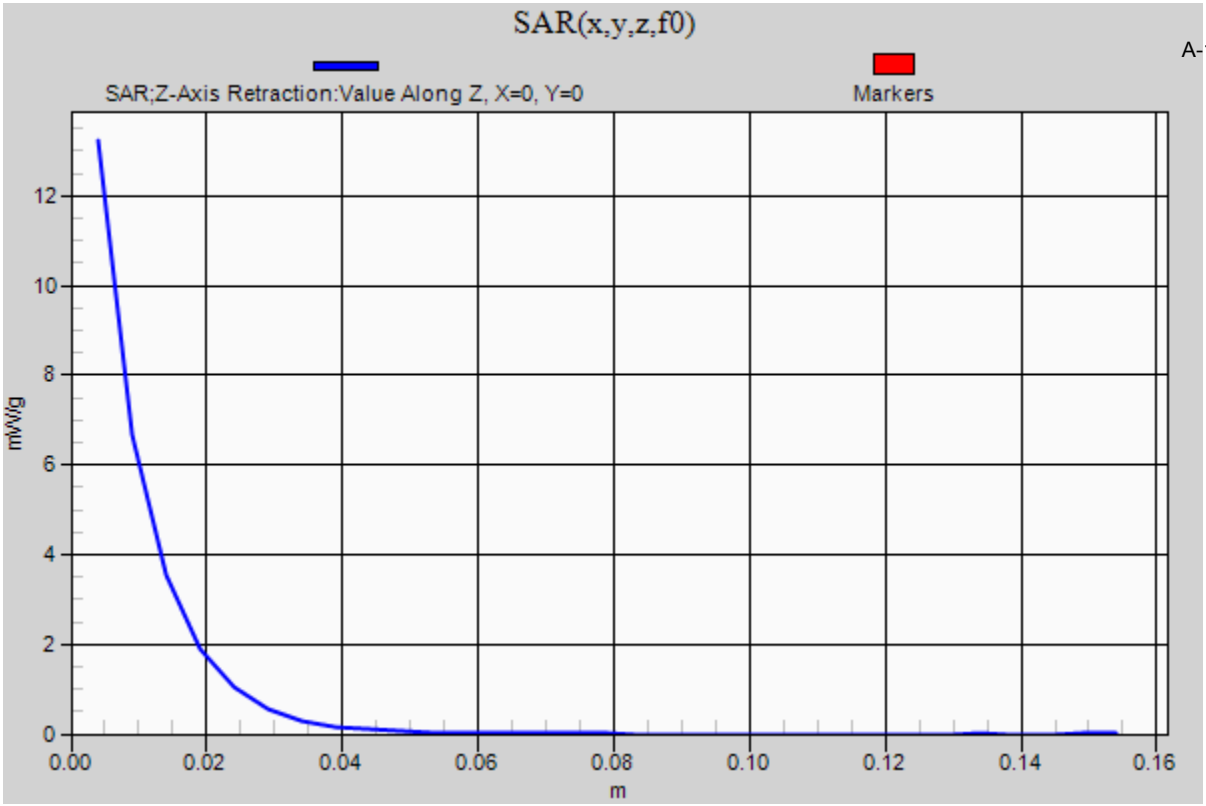
- Probe: ES3DV3 - SN3115; ConvF(4.12, 4.12, 4.12); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

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) = 9.15 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 = 80.767 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 24.449 mW/g
SAR(1 g) = 11.6 mW/g; SAR(10 g) = 5.35 mW/g
Maximum value of SAR (measured) = 13.2 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




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

Test Laboratory: Motorola Mobility - 5200Mhz System Performance Check

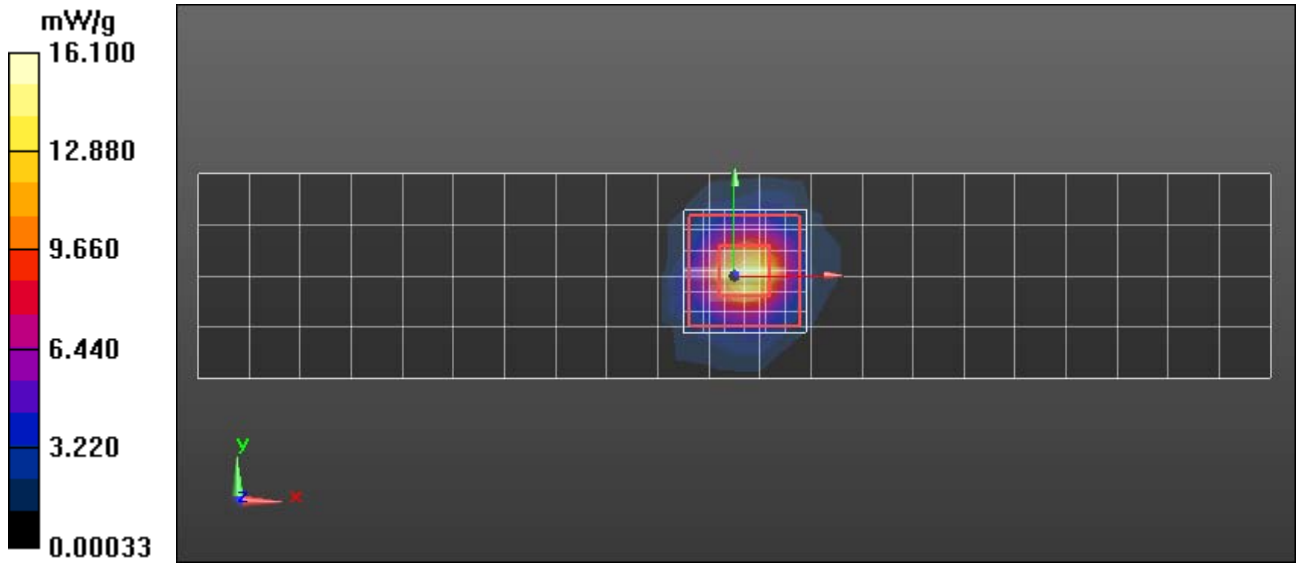
DUT: Dipole 5-6GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1098;
Procedure Notes: Input Power = 100 mW Refl.Pwr = -20.18 dB
Sim.Temp@meas = 20.0 Sim.Temp@SPC = 19.5 Room Temp @ SPC = 20.4
Communication System: _CW - Dipole; Frequency: 5200 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 5200 MHz; σ = 5.14 mho/m; ε_r = 45.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3728; ConvF(4.22, 4.22, 4.22); Calibrated: 4/24/2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 5/23/2012
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

DASY5 - 5-6GHz, Triple Flat System Performance Check Template, Rev.3 (15-May-12)/Daily SPC Check/Dipole Area Scan (22x5x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 14.4 mW/g

DASY5 - 5-6GHz, Triple Flat System Performance Check Template, Rev.3 (15-May-12)/Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 59.516 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 28.935 mW/g
SAR(1 g) = 7.62 mW/g; SAR(10 g) = 2.14 mW/g
Maximum value of SAR (measured) = 16.1 mW/g



Test Laboratory: Motorola Mobility - 5800Mhz System Perfoarmance Check

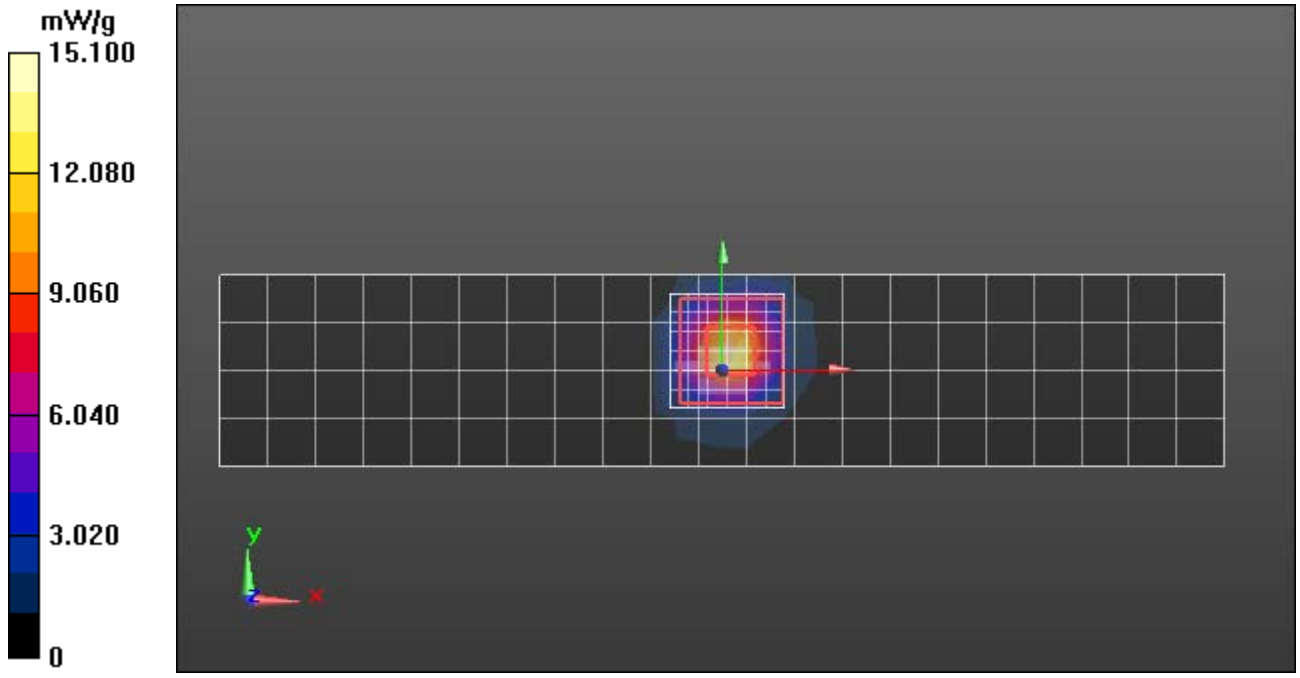
DUT: Dipole 5-6GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1098;
Procedure Notes: Input Power =100mW Refl.Pwr = -21.15 dB
Sim.Temp@meas = 19.2 Sim.Temp@SPC =20.3 Room Temp @ SPC =21.2
Communication System: _CW - Dipole; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* ; Medium parameters used: f = 5800 MHz; σ = 5.94 mho/m; ε_r = 44.2; 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: DAE3 Sn440; Calibrated: 5/23/2012
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

DASY5 - 5-6GHz, Triple Flat System Performance Check Template, Rev.3 (15-May-12)/Daily SPC Check/Dipole Area Scan (22x5x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 10.3 mW/g

DASY5 - 5-6GHz, Triple Flat System Performance Check Template, Rev.3 (15-May-12)/Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 48.376 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 28.692 mW/g
SAR(1 g) = 6.99 mW/g; SAR(10 g) = 1.97 mW/g
Maximum value of SAR (measured) = 15.1 mW/g



Test Laboratory: Motorola Mobility - 5800Mhz System Perfoarmance Check

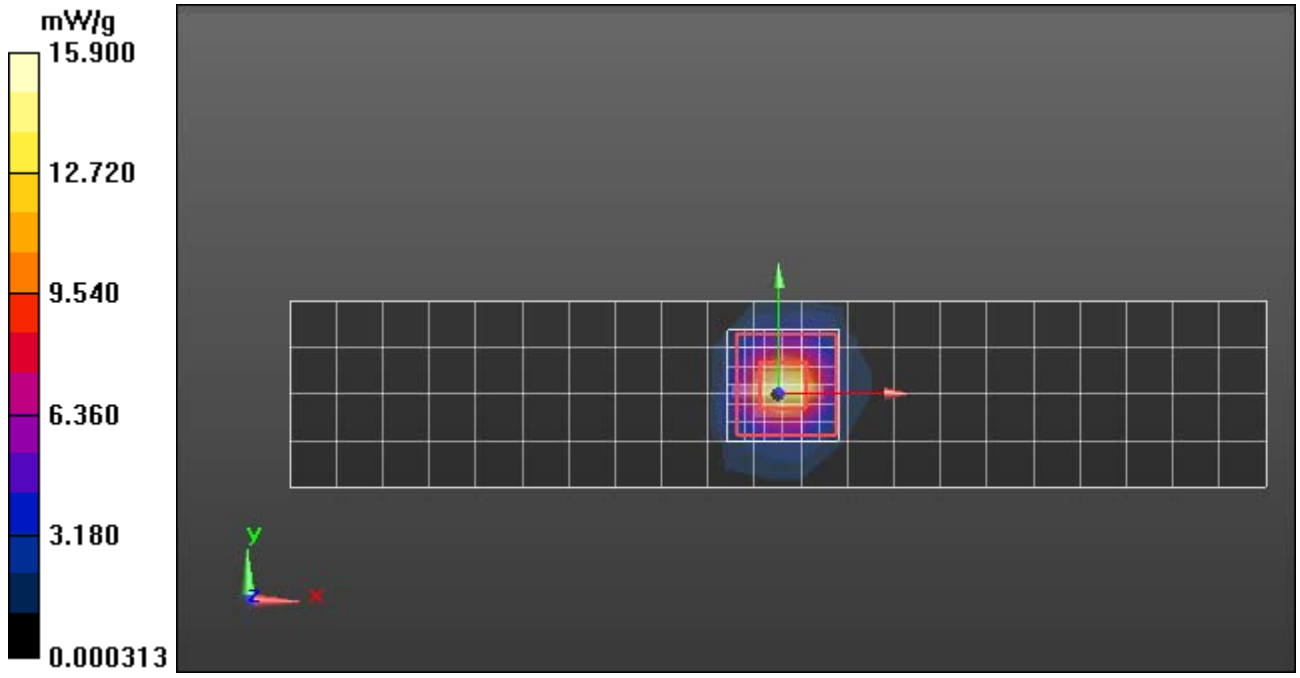
DUT: Dipole 5-6GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1088;
Procedure Notes: Power = 100mW Refl.Pwr = -23.9dB
Sim.Temp@meas = 19.3*C Sim.Temp@SPC = 19*C Room Temp @ SPC = 20.1*C
Communication System: _CW - Dipole; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: Validation *BODY Tissue* TRITON; Medium parameters used: f = 5800 MHz; σ = 6.21 mho/m; ε_r = 44.8; 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: DAE3 Sn440; Calibrated: 5/23/2012
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

DASY5 - 5-6GHz, Triple Flat System Performance Check Template, Rev.3 (15-May-12)/Daily SPC Check/Dipole Area Scan (22x5x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 12.8 mW/g

DASY5 - 5-6GHz, Triple Flat System Performance Check Template, Rev.3 (15-May-12)/Daily SPC Check/0-Degree, 7x7x12 Cube (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 55.040 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 30.035 mW/g
SAR(1 g) = 7.3 mW/g; SAR(10 g) = 2.06 mW/g
Maximum value of SAR (measured) = 15.9 mW/g



Appendix 2

SAR distribution plots for Head Adjacent Test Results

Date/Time: 8/7/2012 12:02:15 AM

Serial: KSRC060054; Procedure Notes: Pwr Step: ALL UP; DEVICE POSITION: CHEEK

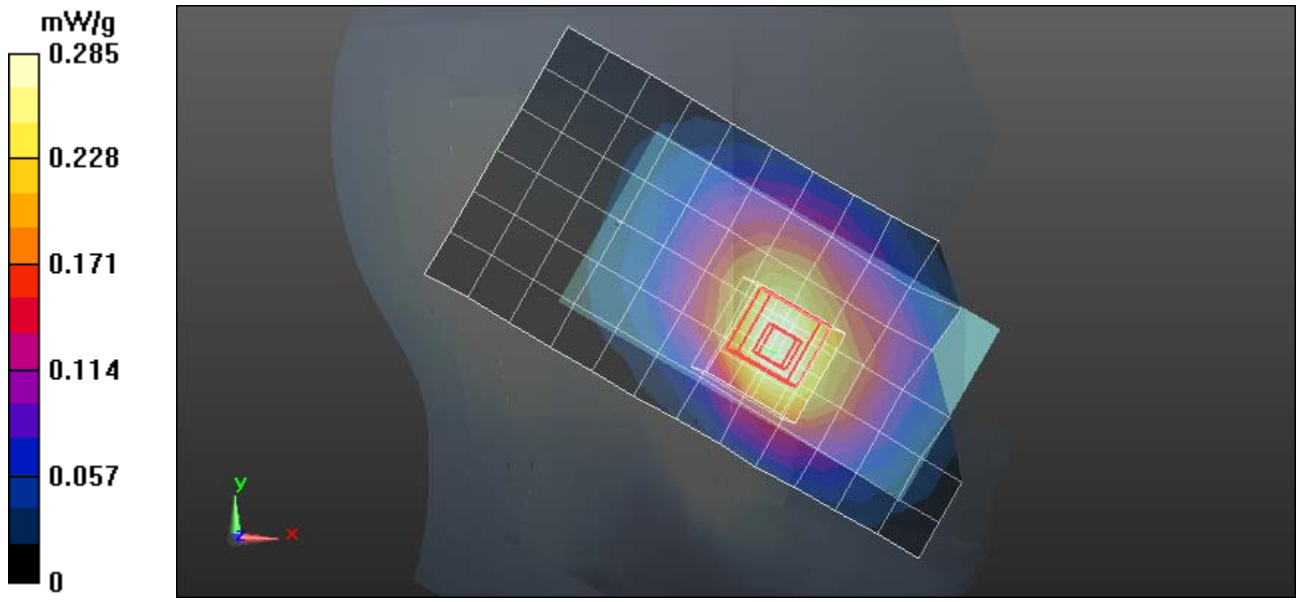
Communication System: _WCDMA; Frequency: 836 MHz; Communication System Channel Number: 4180; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.94 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.83, 5.83, 5.83); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1235;
- ; SEMCAD X Version 14.6.5 (6469)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.285 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.944 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.372 mW/g
SAR(1 g) = 0.281 mW/g; SAR(10 g) = 0.207 mW/g
Maximum value of SAR (measured) = 0.301 mW/g



A-25

Date/Time: 8/7/2012 1:44:34 AM

Serial: KSRC060054; Procedure Notes: Pwr Step: 05; DEVICE POSITION: CHEEK

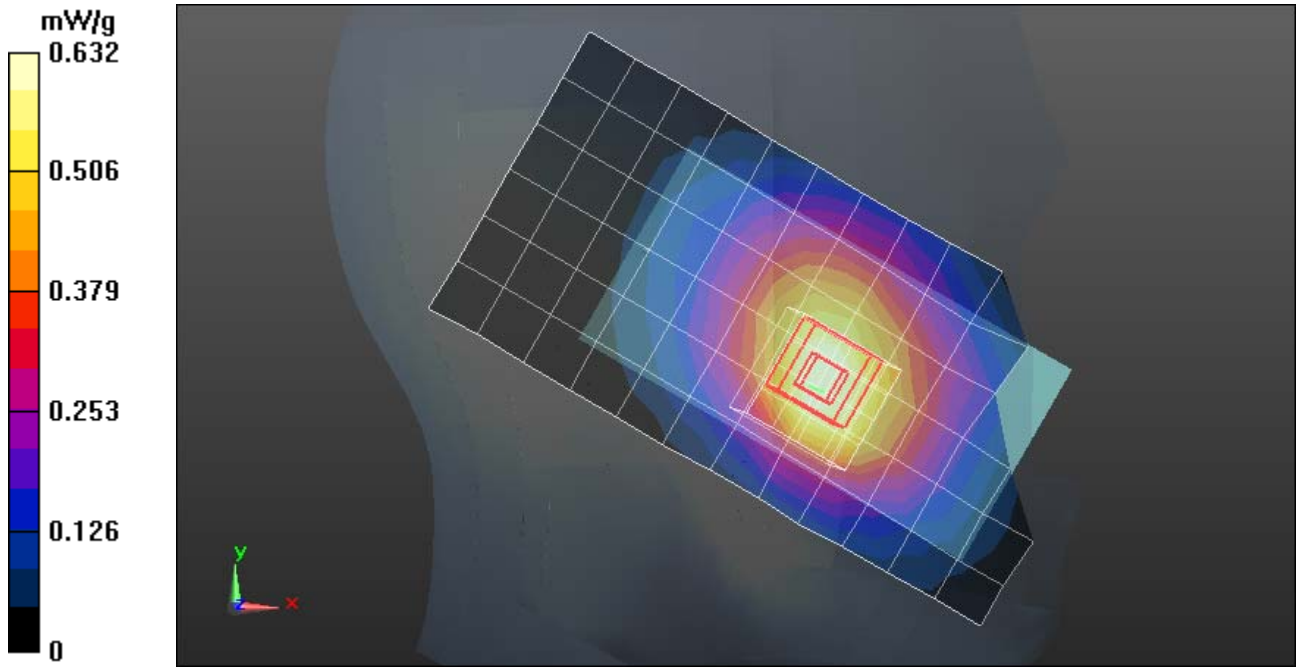
Communication System: _GPRS Class 10; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:4.14954
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.94 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.83, 5.83, 5.83); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1235;
- ; SEMCAD X Version 14.6.5 (6469)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.632 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.631 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.807 mW/g
SAR(1 g) = 0.616 mW/g; SAR(10 g) = 0.457 mW/g
Maximum value of SAR (measured) = 0.646 mW/g



Date/Time: 8/8/2012 2:50:00 PM

Serial: KSRC060054; Procedure Notes: Pwr Step: ALL UP; DEVICE POSITION: CHEEK

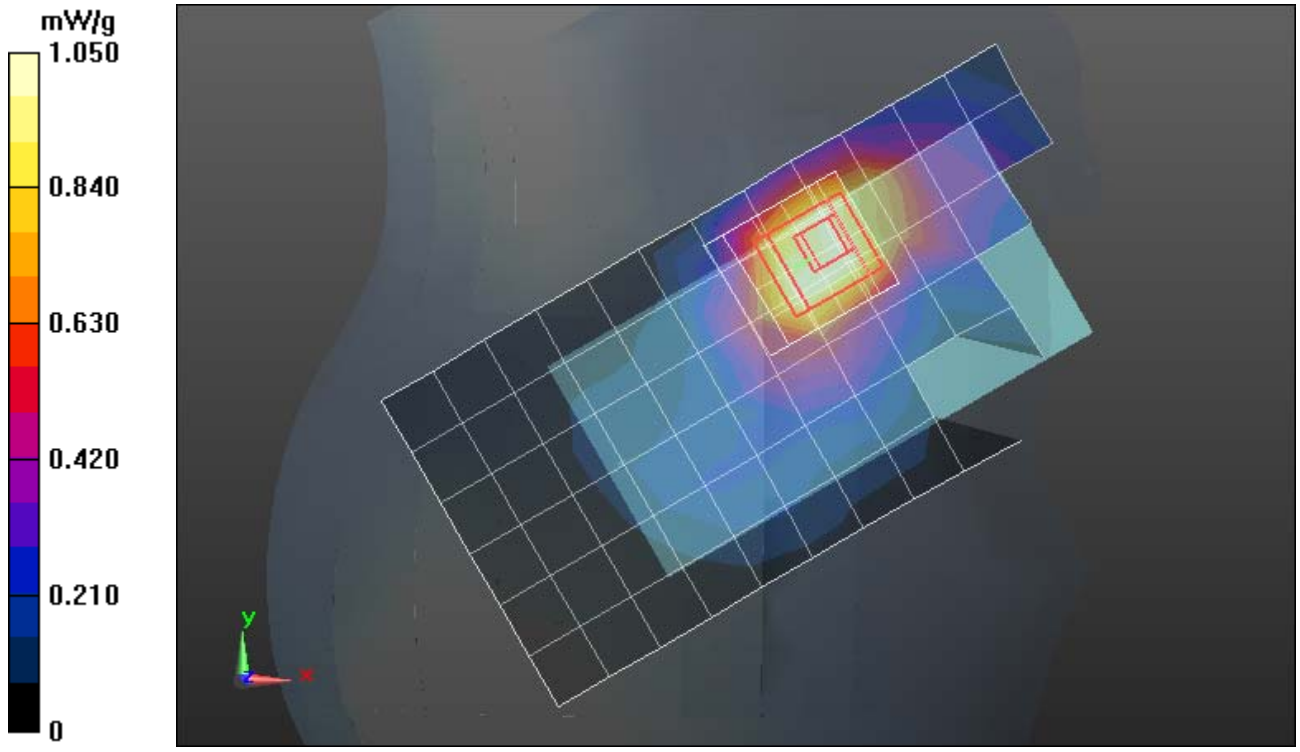
Communication System: _WCDMA; Frequency: 1907.6 MHz; Communication System Channel Number: 9538; Duty Cycle: 1:1
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.17, 5.17, 5.17); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1136;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.05 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.477 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.778 mW/g
SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.673 mW/g
Maximum value of SAR (measured) = 1.17 mW/g



Cheek WCDMA 1900

A-27

Date/Time: 8/8/2012 5:04:28 PM

Serial: KSRC060054; Procedure Notes: Pwr Step: 0; DEVICE POSITION: CHEEK

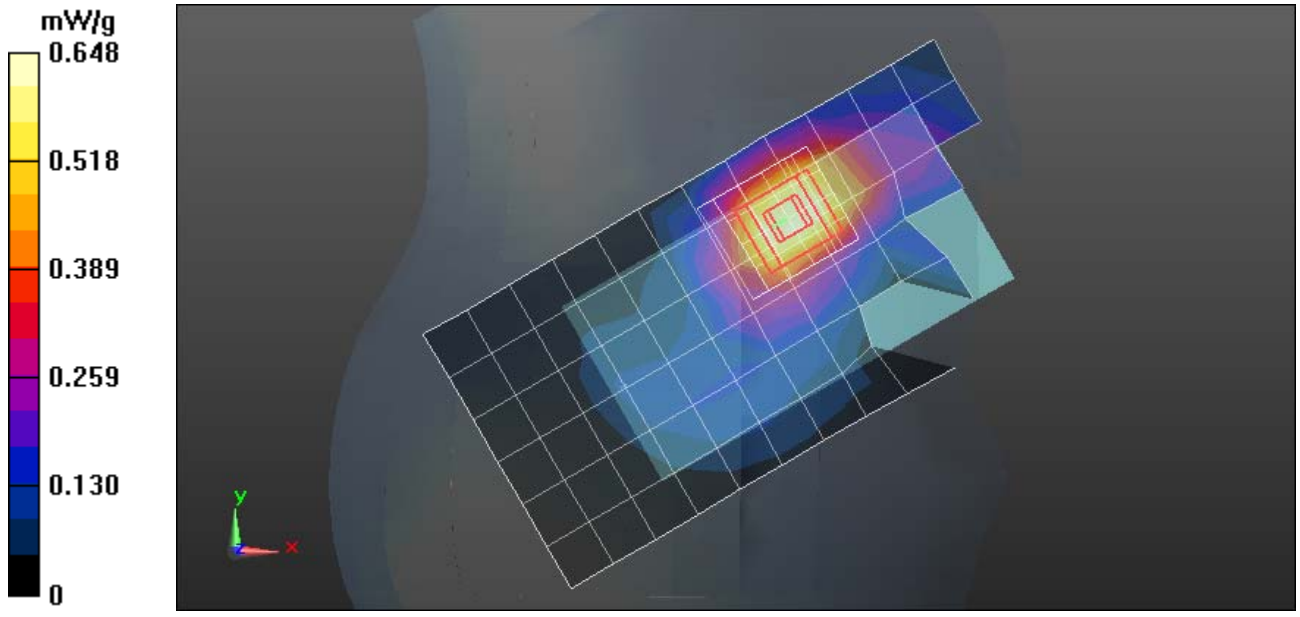
Communication System: _GPRS Class 10; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:4.14954
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.17, 5.17, 5.17); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1136;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.648 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.954 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.057 mW/g
SAR(1 g) = 0.646 mW/g; SAR(10 g) = 0.389 mW/g
Maximum value of SAR (measured) = 0.717 mW/g



Test Laboratory: Motorola Mobility - WiFi 2450 Cheek Touch

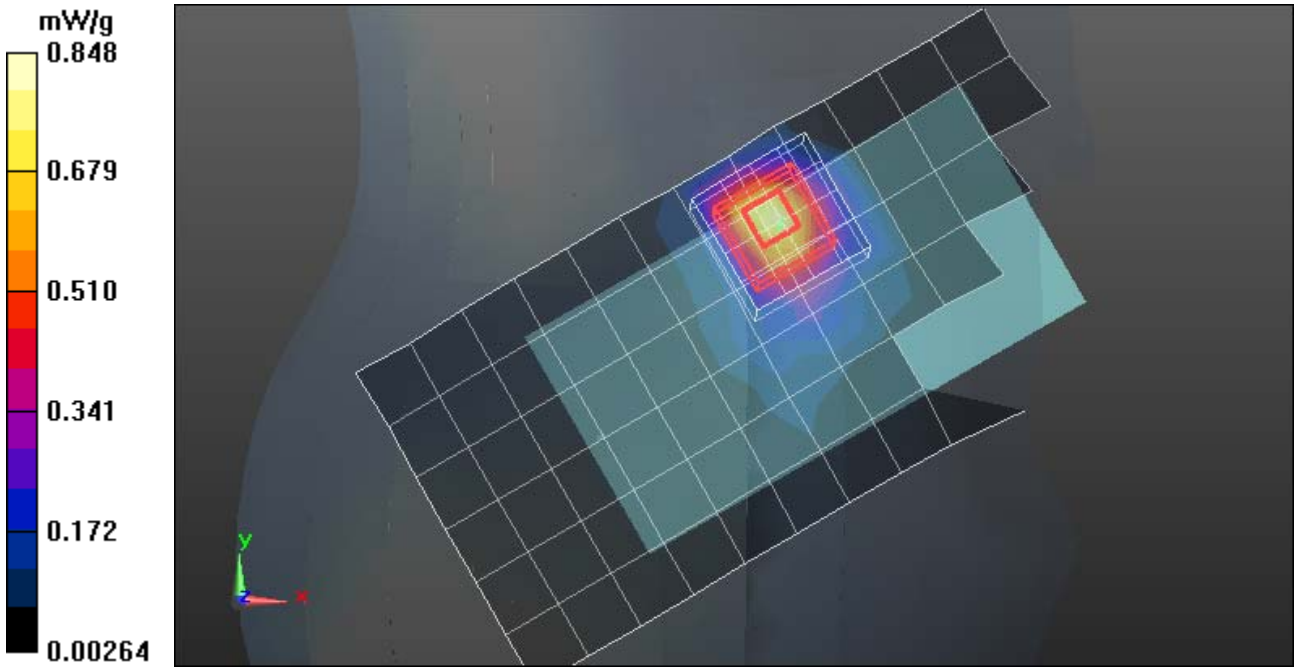
Serial: KSRB090169; FCC ID: IHDT56NS4
Procedure Notes: Battery Model #: INTERNAL DEVICE POSITION: CHEEK, Rate = 5.5 Mbps / Output Power = 18 / Duty Cycle = 90%
Communication System: _Wi-Fi 2450MHz; Frequency: 2462 MHz; Communication System Channel Number: 11; Duty Cycle: 1:1
Medium: 2450 Triton Head; Medium parameters used: f = 2450 MHz; σ = 1.8 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.61, 4.61, 4.61); Calibrated: 4/25/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 4/11/2012
- Phantom: R#1 - Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1319;
- ; SEMCAD X Version 14.6.5 (6469)

DASY5, SAM - Phone against RIGHT head template - Rev.2 (29-Sept-11)/Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.758 mW/g

DASY5, SAM - Phone against RIGHT head template - Rev.2 (29-Sept-11)/Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.620 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.686 mW/g
SAR(1 g) = 0.771 mW/g; SAR(10 g) = 0.350 mW/g
Maximum value of SAR (measured) = 0.848 mW/g



Test Laboratory: Motorola Mobility - WiFi 5210 Cheek Touch

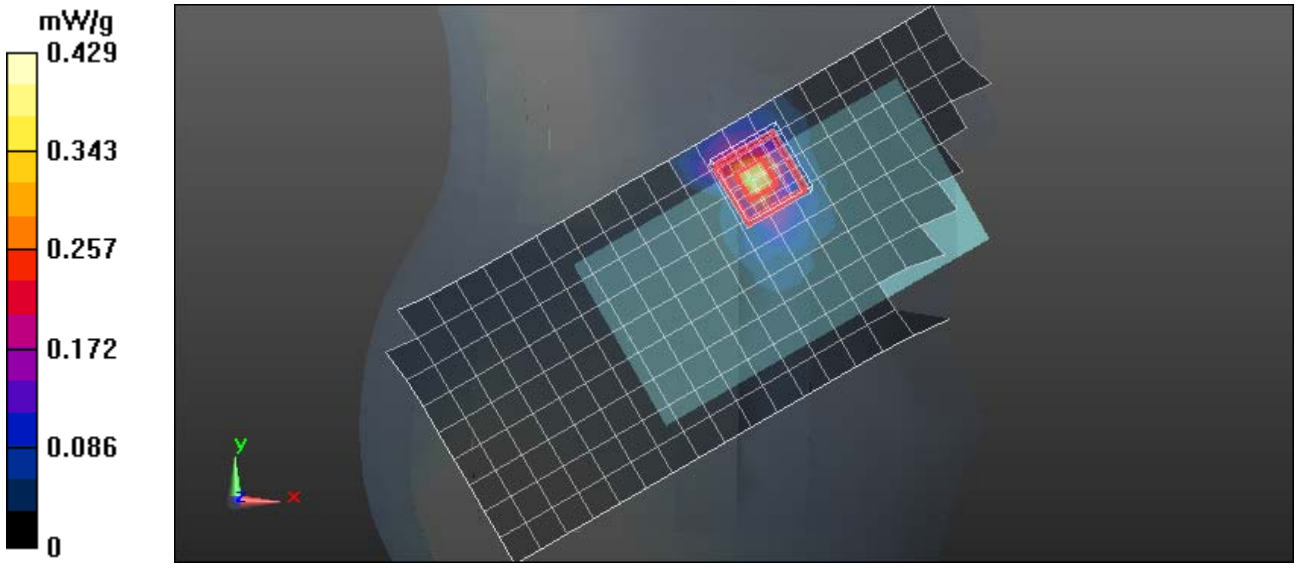
Serial: KSRB090078; FCC ID: IHDT56NS4
Procedure Notes: Battery Model #: INTERNAL DEVICE POSITION: CHEEK
Data Rate = 6Mbps / Duty Cycle = 90% / Pwr: 15dBm
Communication System: _WIFI 5-6GHz; Frequency: 5220 MHz; Communication System Channel Number: 44; Duty Cycle: 1:1
Medium: 5.2 - 5.6 GHz HEAD; Medium parameters used: f = 5210 MHz; σ = 4.52 mho/m; ε_r = 35.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3728; ConvF(4.74, 4.74, 4.74); Calibrated: 4/24/2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 5/23/2012
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.5 (6469)

DASY5 - 5-6GHz, Right Head SAM Template - Rev.3 (4-April-12)/Right Head Template/Area Scan - Normal (10mm) (10x25x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.312 mW/g

DASY5 - 5-6GHz, Right Head SAM Template - Rev.3 (4-April-12)/Right Head Template/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 4.498 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.817 mW/g
SAR(1 g) = 0.209 mW/g; SAR(10 g) = 0.063 mW/g
Maximum value of SAR (measured) = 0.429 mW/g



Date/Time: 8/4/2012 2:25:02 PM

Serial: KSRB090078; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: CHEEK

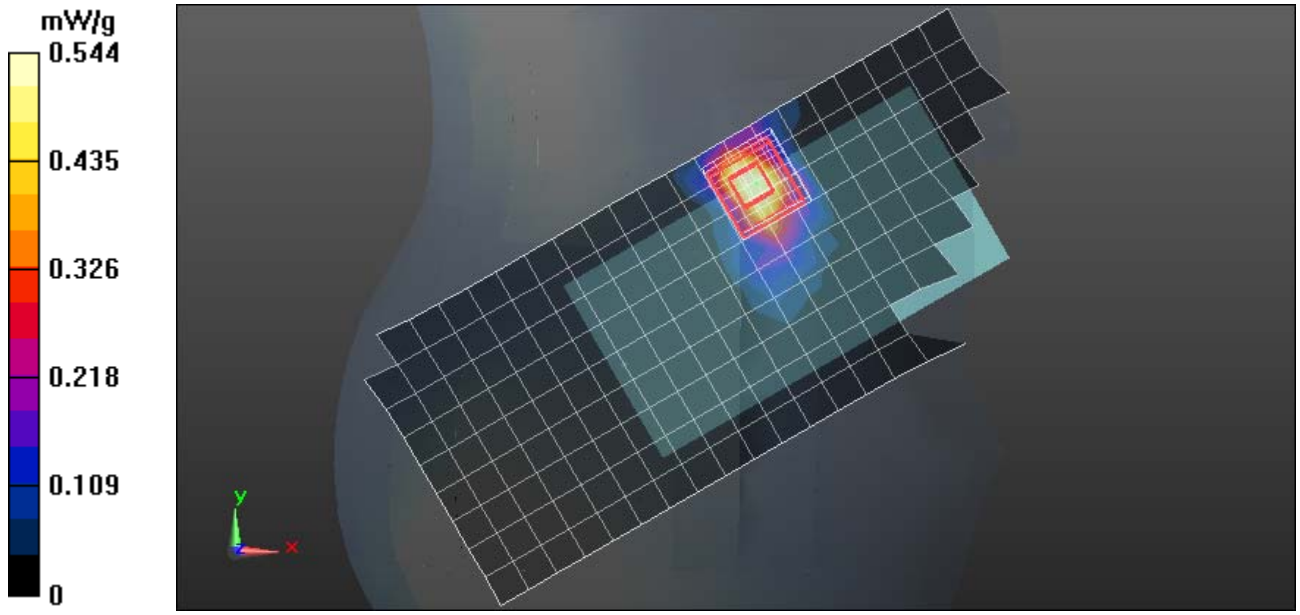
Communication System: _WIFI 5-6GHz; Frequency: 5805 MHz; Communication System Channel Number: 161; Duty Cycle: 1:1
Medium: 5.785 GHz HEAD; Medium parameters used: f = 5785 MHz; σ = 5.28 mho/m; ε_r = 35.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3728; ConvF(4.23, 4.23, 4.23); Calibrated: 4/24/2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 5/23/2012
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal (10mm) (10x25x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.544 mW/g

Right Head Template/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 5.061 V/m; Power Drift = -0.23 dB
Peak SAR (extrapolated) = 1.240 mW/g
SAR(1 g) = 0.329 mW/g; SAR(10 g) = 0.105 mW/g
Maximum value of SAR (measured) = 0.651 mW/g



Cheek 5785

Date/Time: 8/7/2012 1:15:58 AM

Serial: KSRC060054; Procedure Notes: Pwr Step: ALL UP; DEVICE POSITION: TILT

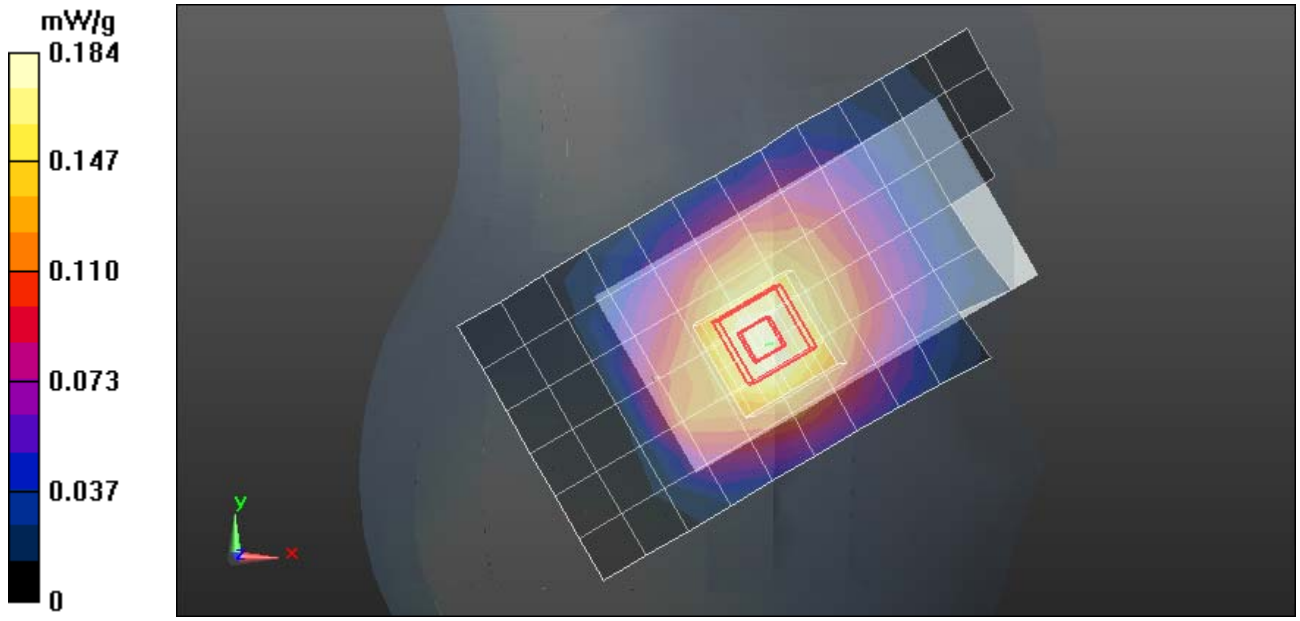
Communication System: _WCDMA; Frequency: 836 MHz; Communication System Channel Number: 4180; Duty Cycle: 1:1
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.94 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.83, 5.83, 5.83); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1235;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.184 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.331 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.226 mW/g
SAR(1 g) = 0.181 mW/g; SAR(10 g) = 0.137 mW/g
Maximum value of SAR (measured) = 0.193 mW/g



A-32

Date/Time: 8/6/2012 10:58:18 PM

Serial: KSRC060054; Procedure Notes: Pwr Step: 5; DEVICE POSITION: TILT

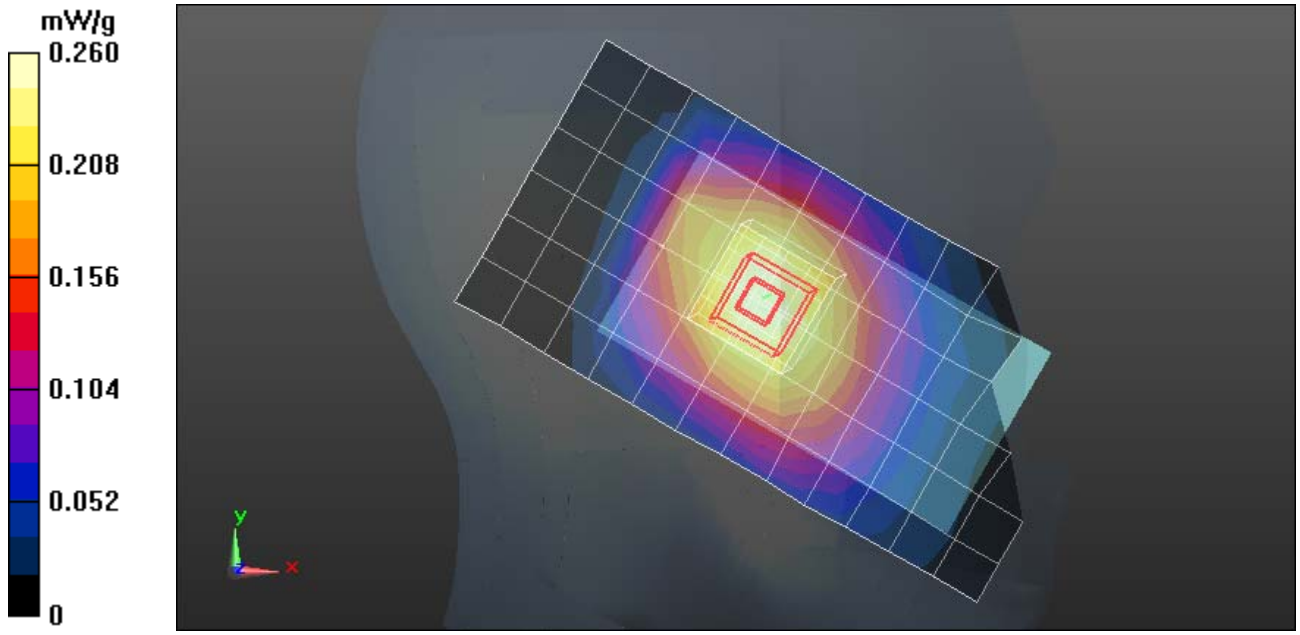
Communication System: _GSM; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:8.30042
Medium: Low Freq Head; Medium parameters used: f = 835 MHz; σ = 0.94 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.83, 5.83, 5.83); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Sugar SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1235;
- ; SEMCAD X Version 14.6.5 (6469)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.260 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.104 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.302 mW/g
SAR(1 g) = 0.248 mW/g; SAR(10 g) = 0.191 mW/g
Maximum value of SAR (measured) = 0.262 mW/g



Date/Time: 8/8/2012 11:17:16 AM

Serial: KSRC060054; Procedure Notes: Pwr Step: All Up; DEVICE POSITION: Tilt

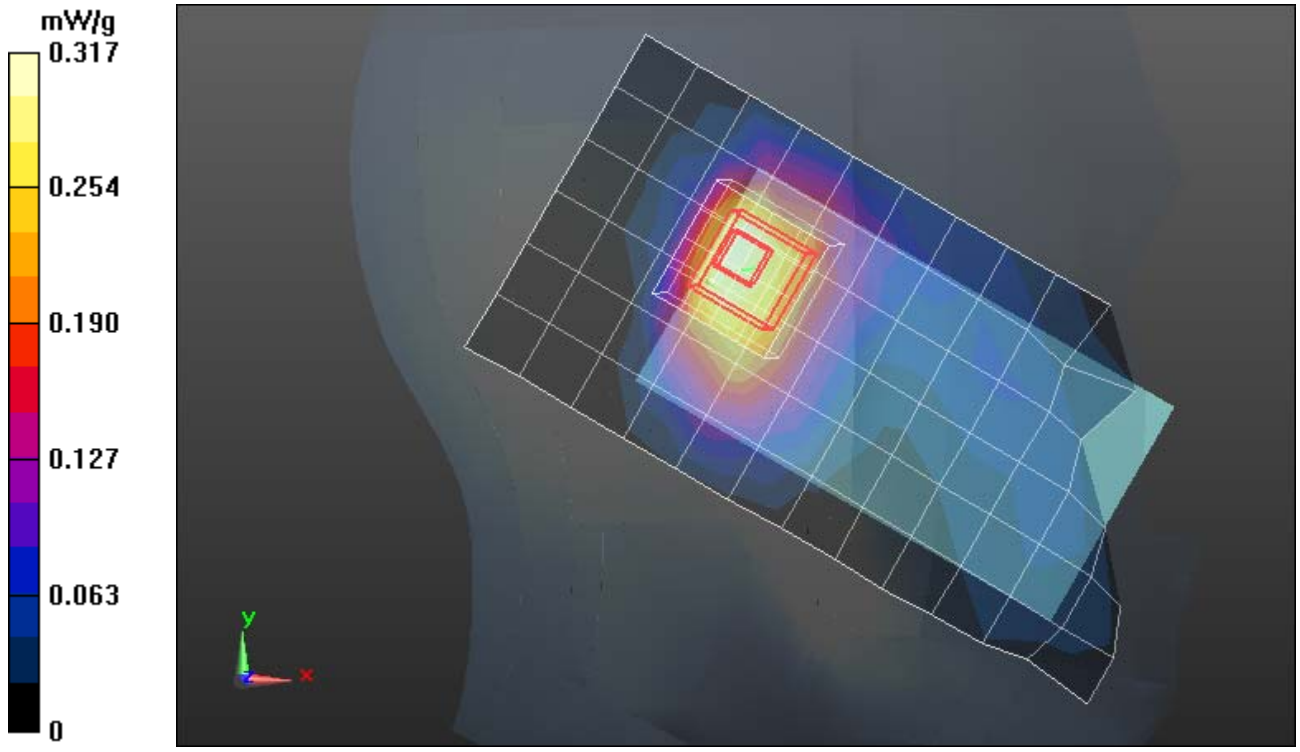
Communication System: _WCDMA; Frequency: 1880 MHz; Communication System Channel Number: 9400; Duty Cycle: 1:1
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.17, 5.17, 5.17); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1136;
- ; SEMCAD X Version 14.6.5 (6469)

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.317 mW/g

Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.586 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.521 mW/g
SAR(1 g) = 0.324 mW/g; SAR(10 g) = 0.194 mW/g
Maximum value of SAR (measured) = 0.351 mW/g



Tilt WCDMA 1900

Date/Time: 8/8/2012 4:43:31 PM

Serial: KSRC060054; Procedure Notes: Pwr Step: 0; DEVICE POSITION: TILT

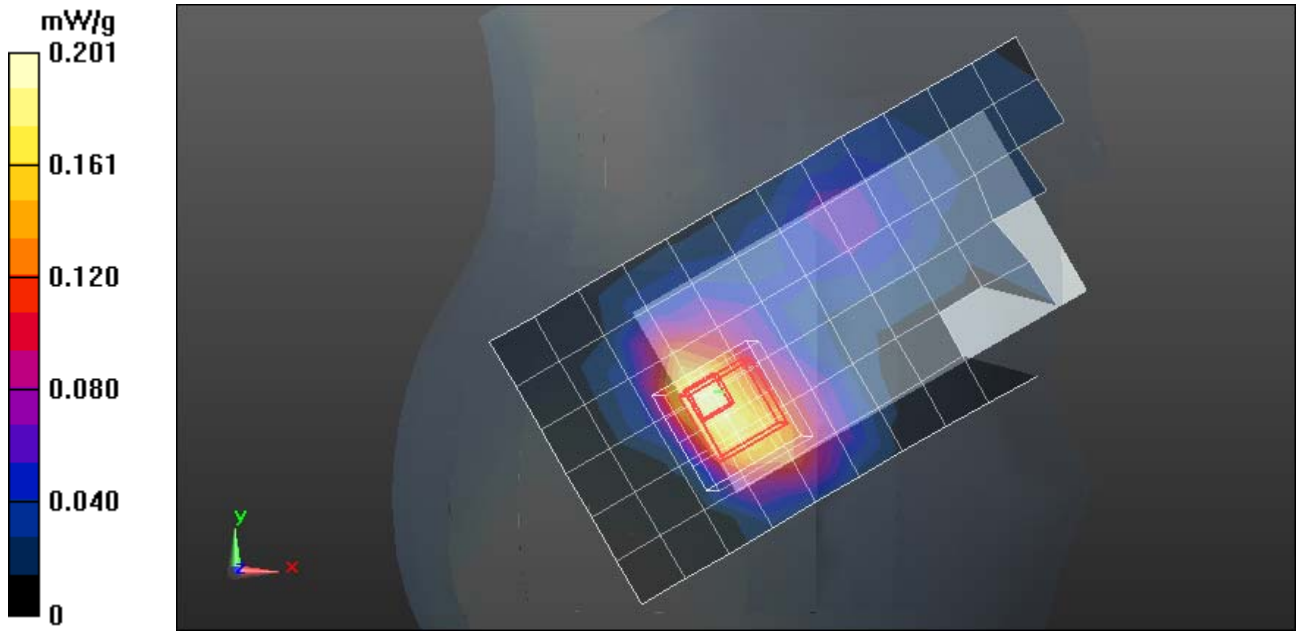
Communication System: _GSM; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:8.30042
Medium: Regular Glycol Head 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.45 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.17, 5.17, 5.17); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1136;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.201 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.696 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.310 mW/g
SAR(1 g) = 0.184 mW/g; SAR(10 g) = 0.110 mW/g
Maximum value of SAR (measured) = 0.199 mW/g



Test Laboratory: Motorola Mobility - WiFi 2450 Tilt

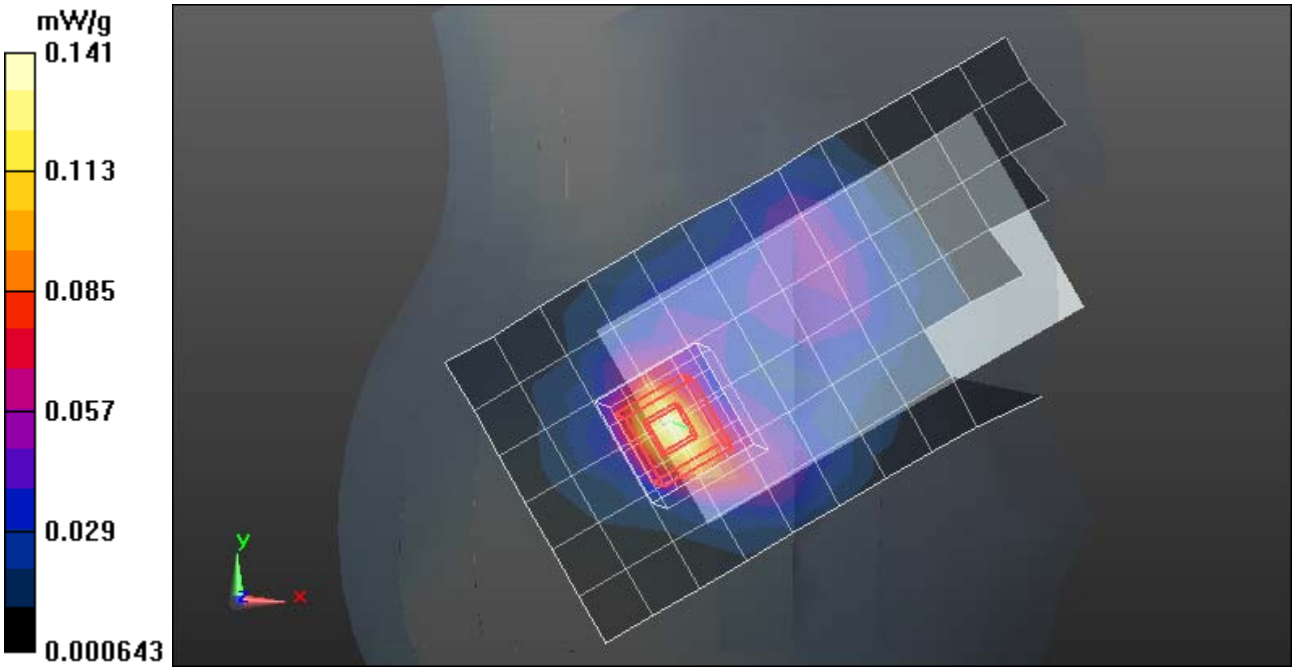
Serial: KSRB090169; FCC ID: IHDT56NS4
Procedure Notes: Battery Model #: INTERNAL DEVICE POSITION: Tilt, Rate = 5.5 Mbps / Output Power = 18 / Duty Cycle = 90%
Communication System: _Wi-Fi 2450MHz; Frequency: 2462 MHz; Communication System Channel Number: 11; Duty Cycle: 1:1
Medium: 2450 Triton Head; Medium parameters used: f = 2450 MHz; σ = 1.8 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.61, 4.61, 4.61); Calibrated: 4/25/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 4/11/2012
- Phantom: R#1 - Glycol SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1319;
- ; SEMCAD X Version 14.6.5 (6469)

DASY5, SAM - Phone against RIGHT head template - Rev.2 (29-Sept-11)/Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.143 mW/g

DASY5, SAM - Phone against RIGHT head template - Rev.2 (29-Sept-11)/Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.011 V/m; Power Drift = -0.28 dB
Peak SAR (extrapolated) = 0.248 mW/g
SAR(1 g) = 0.125 mW/g; SAR(10 g) = 0.060 mW/g
Maximum value of SAR (measured) = 0.141 mW/g



Test Laboratory: Motorola Mobility - WiFi 5210 Tilt

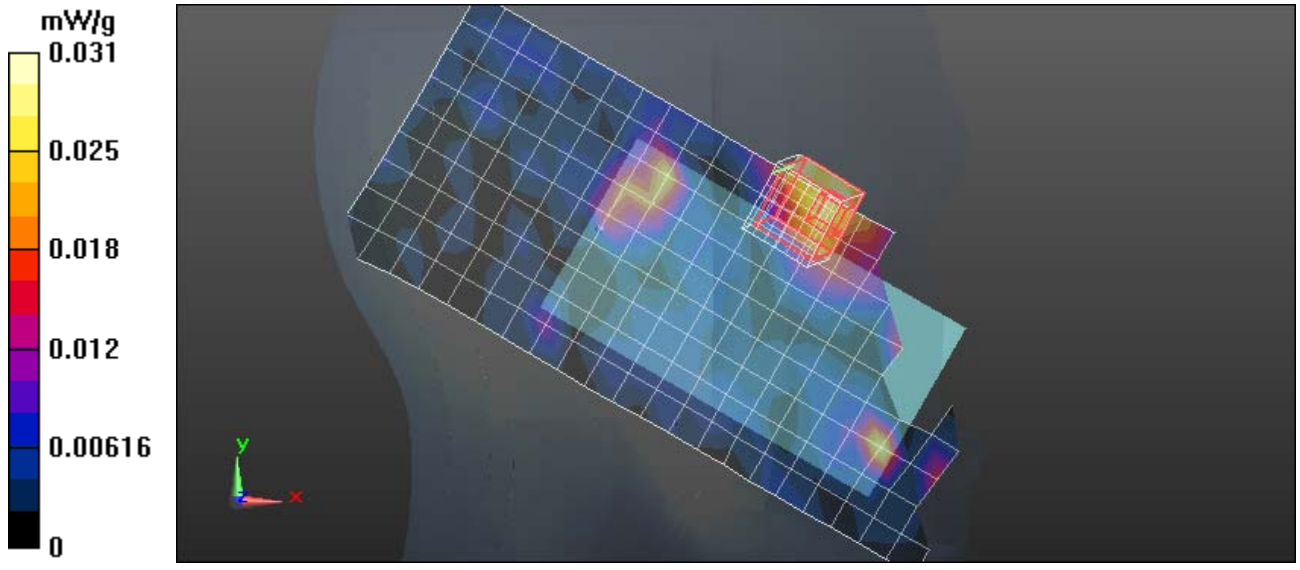
Serial: KSRB090078; FCC ID: IHDT56NS4
Procedure Notes: Battery Model #: INTERNAL DEVICE POSITION: TILT
Data Rate = 6Mbps / Duty Cycle = 90% / Pwr: 15dBm
Communication System: _WIFI 5-6GHz; Frequency: 5220 MHz; Communication System Channel Number: 44; Duty Cycle: 1:1
Medium: 5.2 - 5.6 GHz HEAD; Medium parameters used: f = 5210 MHz; σ = 4.52 mho/m; ε_r = 35.3; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3728; ConvF(4.74, 4.74, 4.74); Calibrated: 4/24/2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 5/23/2012
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.5 (6469)

DASY5 - 5-6GHz, Left Head SAM Template - Rev.3 (4-April-12)/Left Head Template/Area Scan - Normal (10mm) (10x25x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.0282 mW/g

DASY5 - 5-6GHz, Left Head SAM Template - Rev.3 (4-April-12)/Left Head Template/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.117 V/m; Power Drift = 0.57 dB
Peak SAR (extrapolated) = 0.084 mW/g
SAR(1 g) = 0.015 mW/g; SAR(10 g) = 0.00648 mW/g
Maximum value of SAR (measured) = 0.0308 mW/g



A-37

Date/Time: 8/4/2012 3:28:52 PM

Serial: KSRB090078; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: TILT

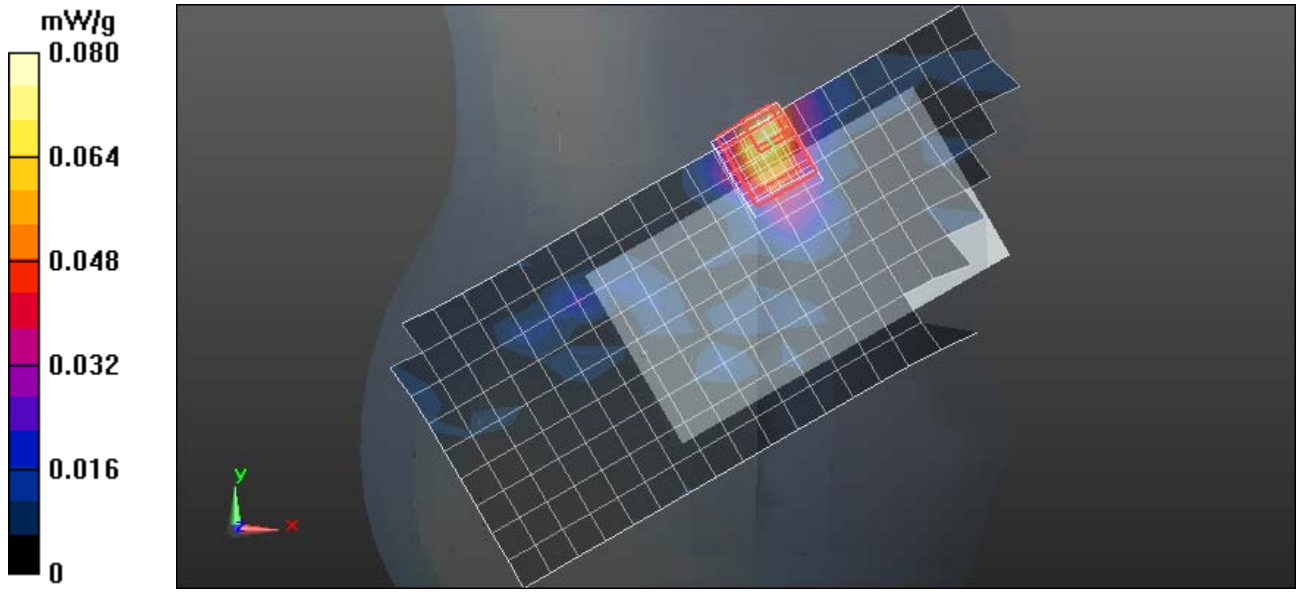
Communication System: _WIFI 5-6GHz; Frequency: 5805 MHz; Communication System Channel Number: 161; Duty Cycle: 1:1
Medium: 5.785 GHz HEAD; Medium parameters used: f = 5785 MHz; σ = 5.28 mho/m; ε_r = 35.4; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3728; ConvF(4.23, 4.23, 4.23); Calibrated: 4/24/2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 5/23/2012
- Phantom: R#3 5 GHz HEAD SAM (extended range), Rev.2 (24-Feb-12); Type: SAM v4.0; Serial: TP-1106;
- ; SEMCAD X Version 14.6.5 (6469)

Right Head Template/Area Scan - Normal (10mm) (10x25x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.0757 mW/g

Right Head Template/7x7x12 Zoom Scan (5-6GHz) (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.945 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.986 mW/g
SAR(1 g) = 0.041 mW/g; SAR(10 g) = 0.014 mW/g
Maximum value of SAR (measured) = 0.0797 mW/g



Tilt 5785

Appendix 3

SAR distribution plots for Body Worn Test Results

Date/Time: 8/8/2012 2:10:46 AM

Serial: KSRC060054; Procedure Notes: Pwr Step: ALL UP; DEVICE POSITION: FRONT OF PHONE 25MM AWAY FROM PHANTOM

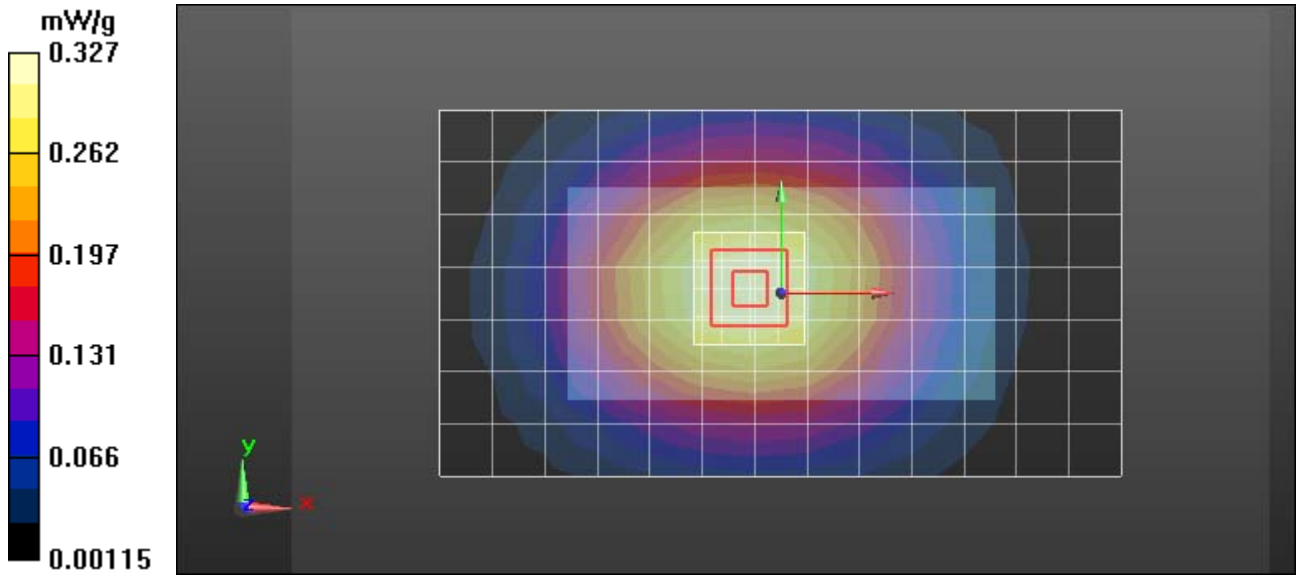
Communication System: _WCDMA; Frequency: 836 MHz; Communication System Channel Number: 4180; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.89, 5.89, 5.89); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.327 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.545 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.403 mW/g
SAR(1 g) = 0.322 mW/g; SAR(10 g) = 0.243 mW/g
Maximum value of SAR (measured) = 0.339 mW/g



A-40

Date/Time: 8/8/2012 1:21:00 AM

Serial: KSRC060054; Procedure Notes: Pwr Step: 5; DEVICE POSITION: BACK OF PHONE 25MM AWAY FROM PHANTOM

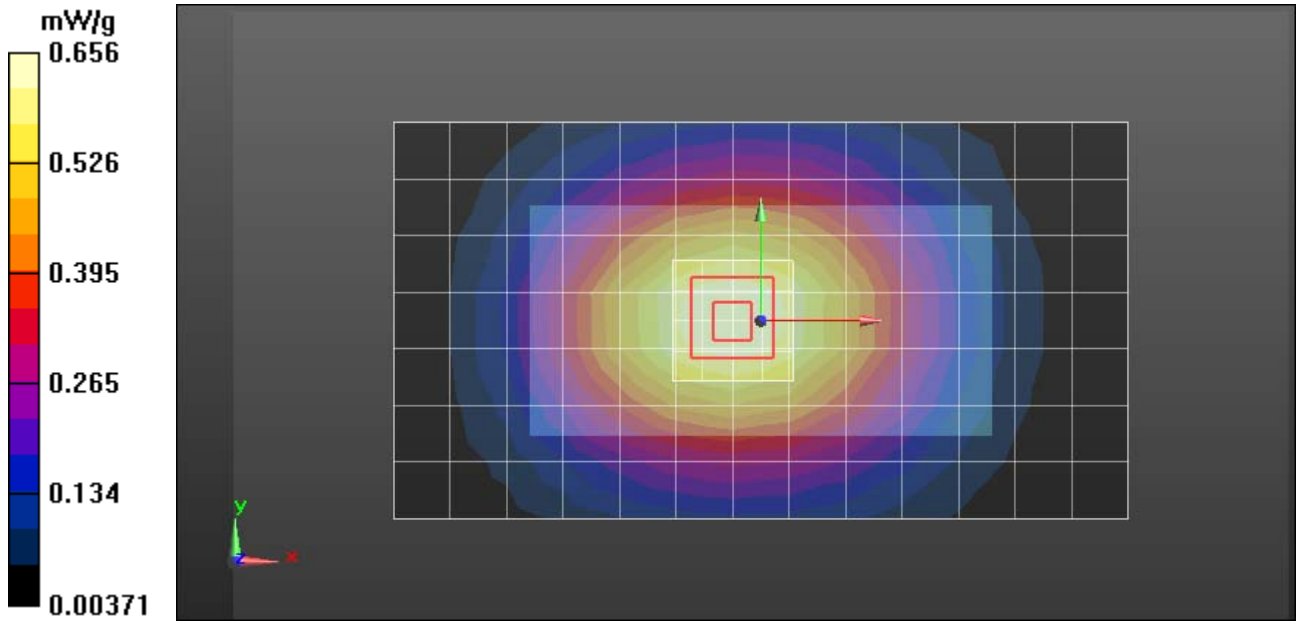
Communication System: _GPRS Class 10; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:4.14954
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.89, 5.89, 5.89); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.656 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.462 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.810 mW/g
SAR(1 g) = 0.632 mW/g; SAR(10 g) = 0.473 mW/g
Maximum value of SAR (measured) = 0.665 mW/g



A-41

Date/Time: 8/8/2012 9:55:57 AM

Serial: KSRC060054; Procedure Notes: Pwr Step: All Up; DEVICE POSITION: Back of Phone 25mm from Flat Phantom

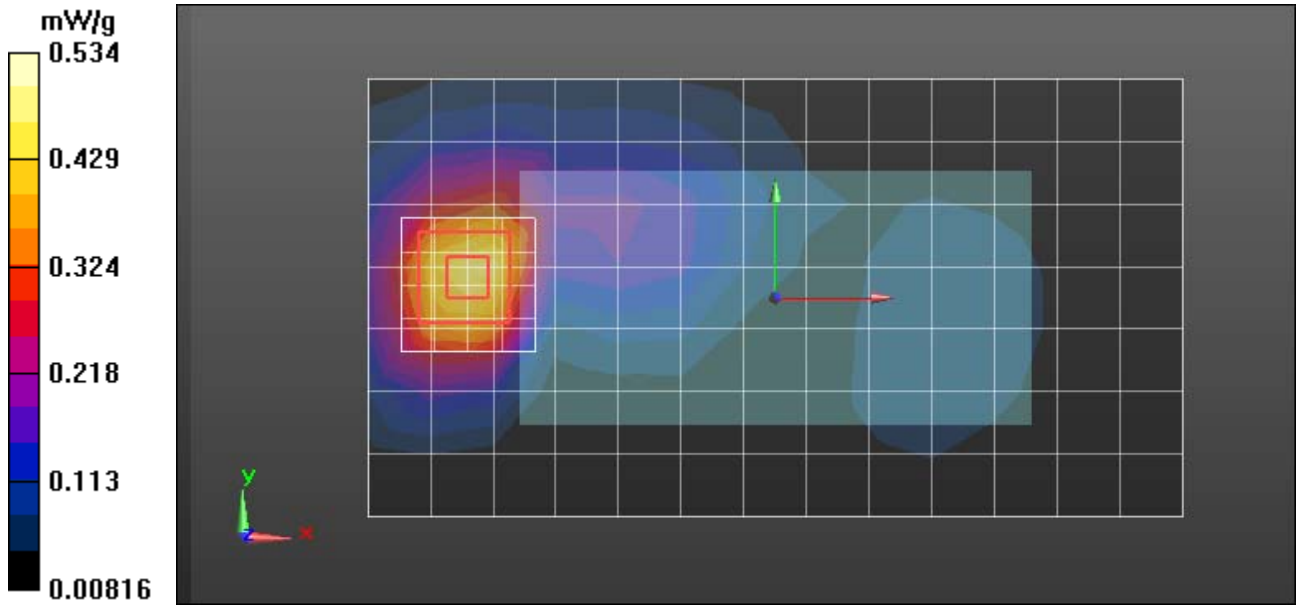
Communication System: _WCDMA; Frequency: 1880 MHz; Communication System Channel Number: 9400; Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.72, 4.72, 4.72); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.485 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.615 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.773 mW/g
SAR(1 g) = 0.490 mW/g; SAR(10 g) = 0.292 mW/g
Maximum value of SAR (measured) = 0.534 mW/g



A-42

Date/Time: 8/8/2012 9:28:10 AM

Serial: KSRC060054; Procedure Notes: Pwr Step: 0; DEVICE POSITION: Back of Phone 25mm from Flat Phantom

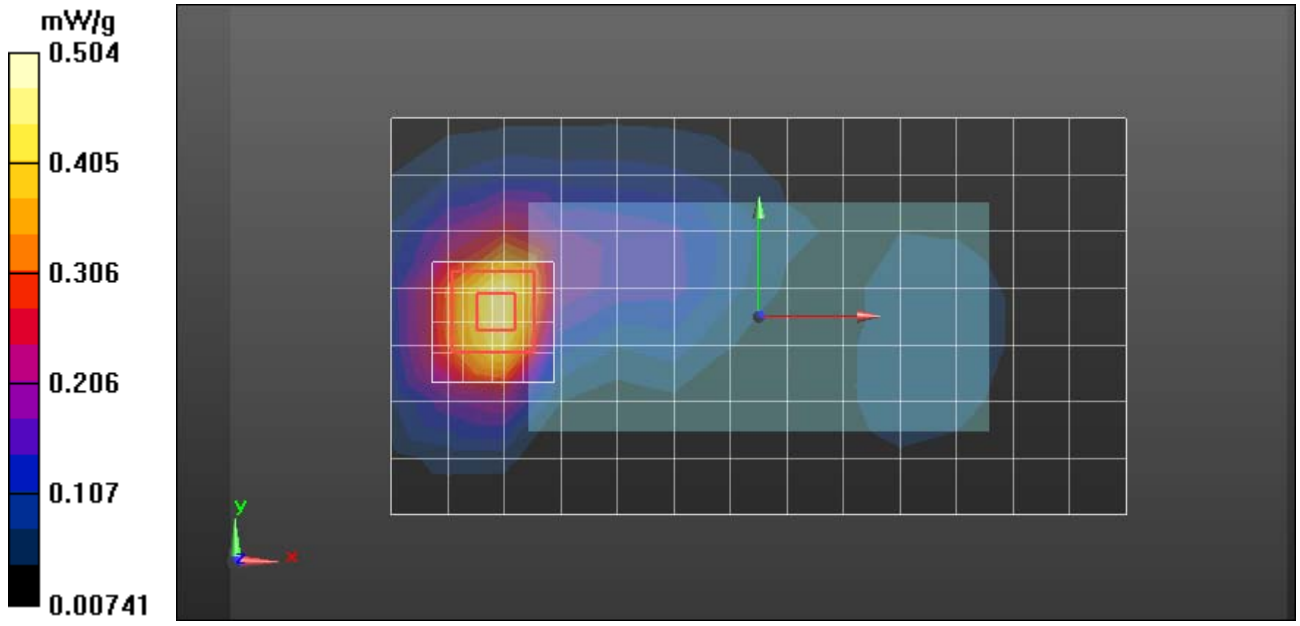
Communication System: _GPRS Class 10; Frequency: 1880 MHz; Communication System Channel Number: 661; Duty Cycle: 1:4.14954
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.72, 4.72, 4.72); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.480 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.816 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.738 mW/g
SAR(1 g) = 0.466 mW/g; SAR(10 g) = 0.277 mW/g
Maximum value of SAR (measured) = 0.504 mW/g



Test Laboratory: Motorola Mobility - WiFi 2450 Body Worn

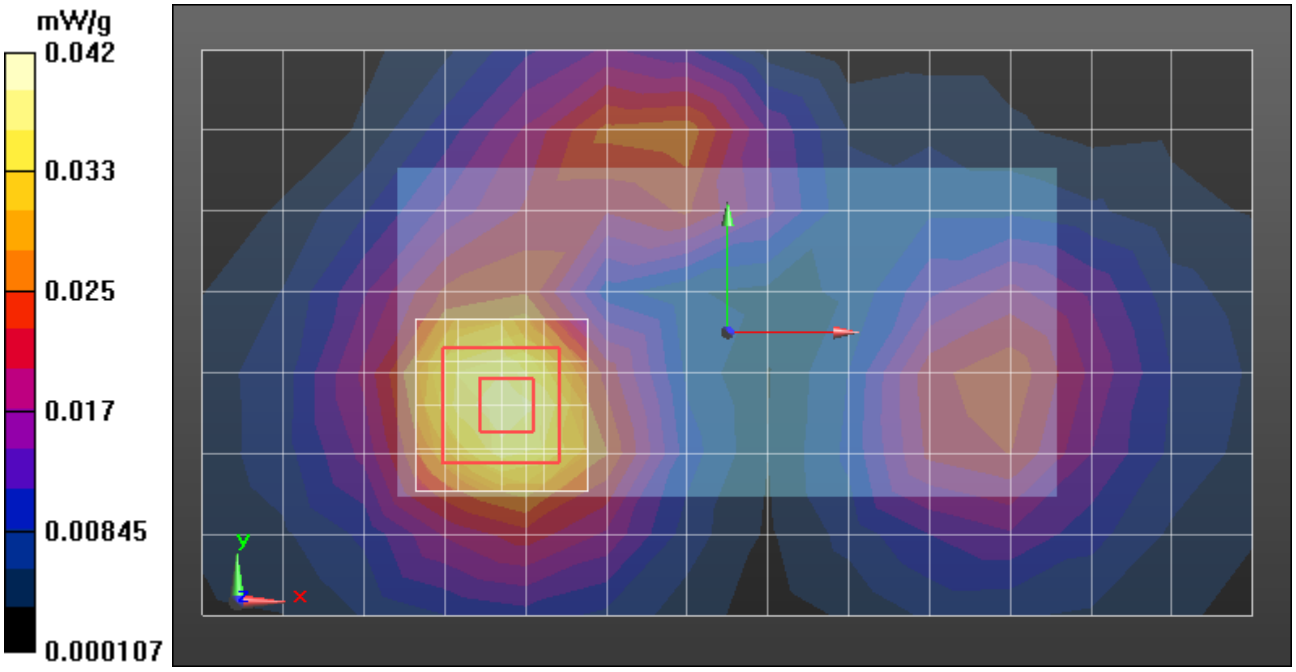
Serial: KSRB090169; FCC ID: IHDT56NS4
Procedure Notes: Battery Model #: INTERNAL Device Position: BODY WORN, BACK OF PHONE 25MM FROM PHANTOM Wi-Fi 802.11b / 5.5 Mbps / Output Power = 18 / Duty Cycle = 90%
Communication System: _Wi-Fi 2450MHz; Frequency: 2412 MHz; Communication System Channel Number: 1; Duty Cycle: 1:1
Medium: 2450 Triton Body; Medium parameters used: f = 2450 MHz; σ = 2.02 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.12, 4.12, 4.12); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

DASY5, Triple Flat Phone Template - Rev.5 (6-April-12)/Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0367 mW/g

DASY5, Triple Flat Phone Template - Rev.5 (6-April-12)/Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.012 V/m; Power Drift = 0.41 dB
Peak SAR (extrapolated) = 0.068 mW/g
SAR(1 g) = 0.039 mW/g; SAR(10 g) = 0.023 mW/g
Maximum value of SAR (measured) = 0.0418 mW/g



Test Laboratory: Motorola Mobility - WiFi 5210 Body Worn

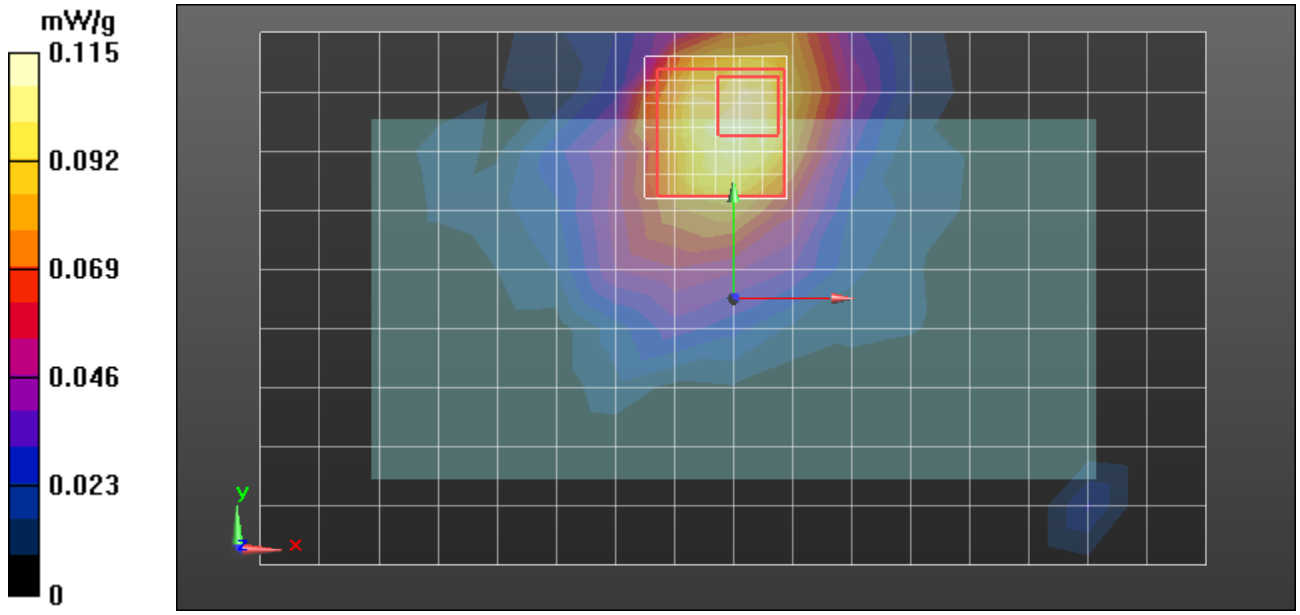
Serial: KSRB090078; FCC ID: IHDT56NS4
Procedure Notes: Battery Model #: INTERNAL DEVICE POSITION: BODY WORN, BACK OF PHONE 25MM FROM PHANTOM
Data Rate = 6Mbps / Duty Cycle = 90% / Pwr: 15dBm
Communication System: _WIFI 5-6GHz; Frequency: 5220 MHz; Communication System Channel Number: 44; Duty Cycle: 1:1
Medium: 5.2 - 5.6 GHz BODY; Medium parameters used: f = 5210 MHz; σ = 5.15 mho/m; ε_r = 45.8; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: EX3DV4 - SN3728; ConvF(4.22, 4.22, 4.22); Calibrated: 4/24/2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 5/23/2012
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

DASY5 - 5-6GHz, TRIPLE Flat Phone Template, Rev.2 (4-April-12)/TRIPLE Flat Phone Against Flat Section/Phone Area Scan - Normal Body (10mm) (17x10x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.114 mW/g

DASY5 - 5-6GHz, TRIPLE Flat Phone Template, Rev.2 (4-April-12)/TRIPLE Flat Phone Against Flat Section/7x7x12 Zoom Scan (5-6GHz) - to correct max on border (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 5.067 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.182 mW/g
SAR(1 g) = 0.061 mW/g; SAR(10 g) = 0.026 mW/g
Maximum value of SAR (measured) = 0.115 mW/g



Date/Time: 8/4/2012 10:20:19 PM

Serial: KSRB090078; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: BODY WORN, BACK OF PHONE 25MM FROM PHANTOM

Communication System: _WIFI 5-6GHz; Frequency: 5805 MHz; Communication System Channel Number: 161; Duty Cycle: 1:1
Medium: 5.785 GHz BODY; Medium parameters used: f = 5785 MHz; σ = 6.19 mho/m; ε_r = 44.8; ρ = 1000 kg/m^3

DASY4 Configuration:

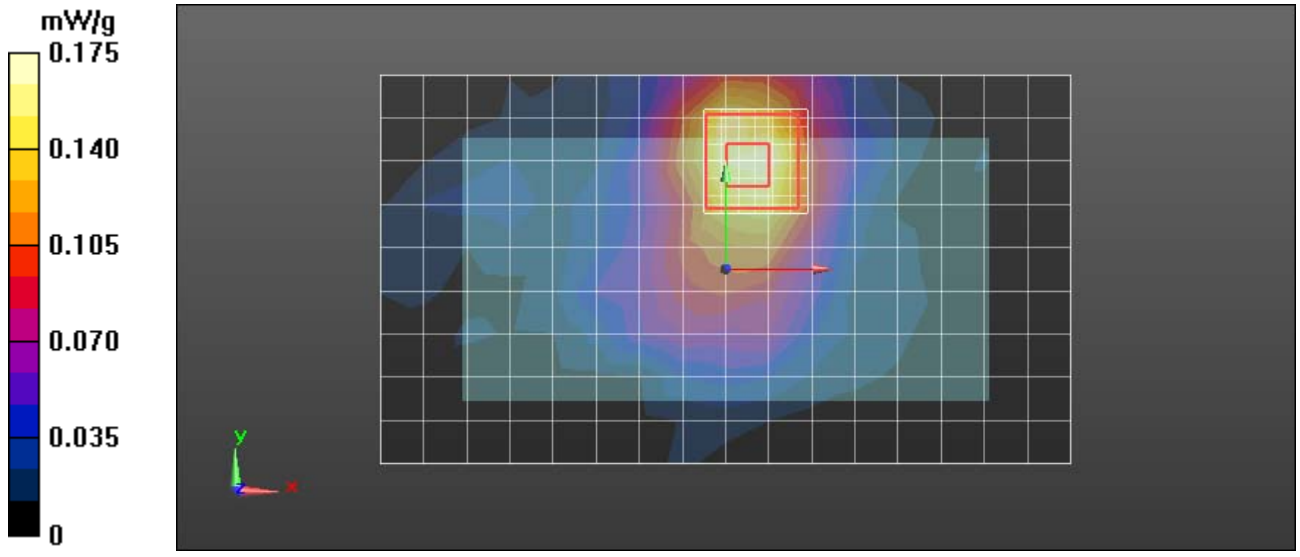
- Probe: EX3DV4 - SN3728; ConvF(3.71, 3.71, 3.71); Calibrated: 4/24/2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 5/23/2012
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

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

Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.175 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 = 5.630 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.350 mW/g
SAR(1 g) = 0.100 mW/g; SAR(10 g) = 0.043 mW/g
Maximum value of SAR (measured) = 0.195 mW/g



Appendix 4

SAR distribution plots for Mobile Hotspot Test Results

Date/Time: 8/7/2012 9:51:37 PM

Serial: KSRC060054; Procedure Notes: Pwr Step: ALL UP; DEVICE POSITION: Back of the Phone 10mm away from phantom

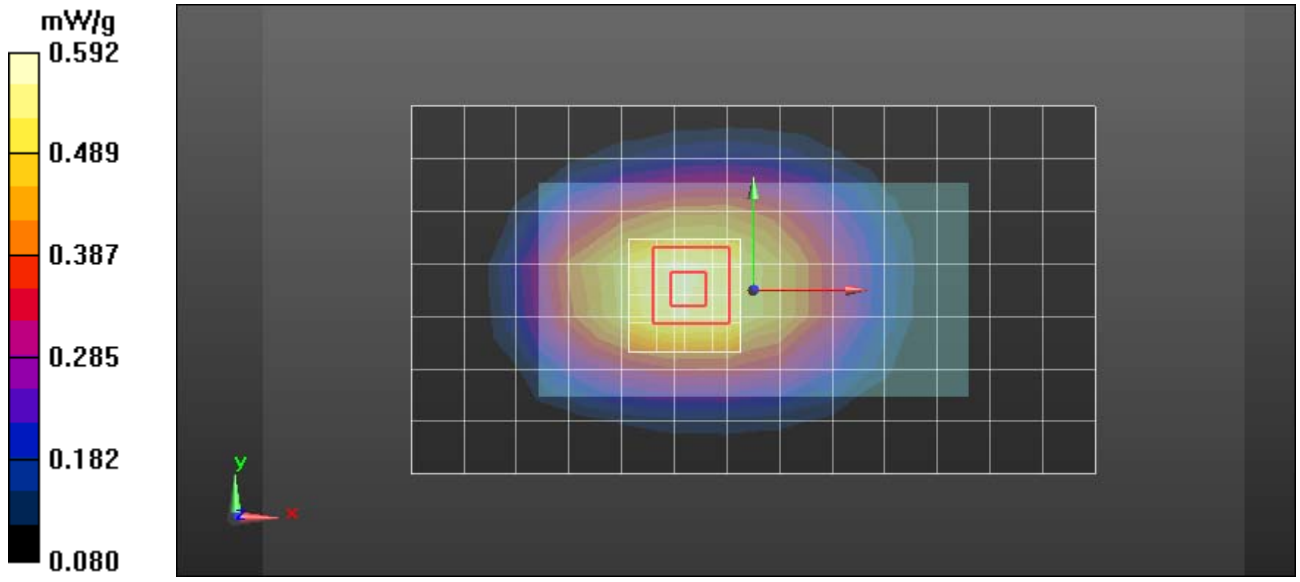
Communication System: _WCDMA; Frequency: 836 MHz; Communication System Channel Number: 4180; Duty Cycle: 1:1
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.89, 5.89, 5.89); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.570 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.725 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.697 mW/g
SAR(1 g) = 0.564 mW/g; SAR(10 g) = 0.426 mW/g
Maximum value of SAR (measured) = 0.592 mW/g



Date/Time: 8/7/2012 1:31:46 PM

Serial: KSRC060054; Procedure Notes: Pwr Step: 5; DEVICE POSITION: Back of Phone 10mm from Flat Phantom

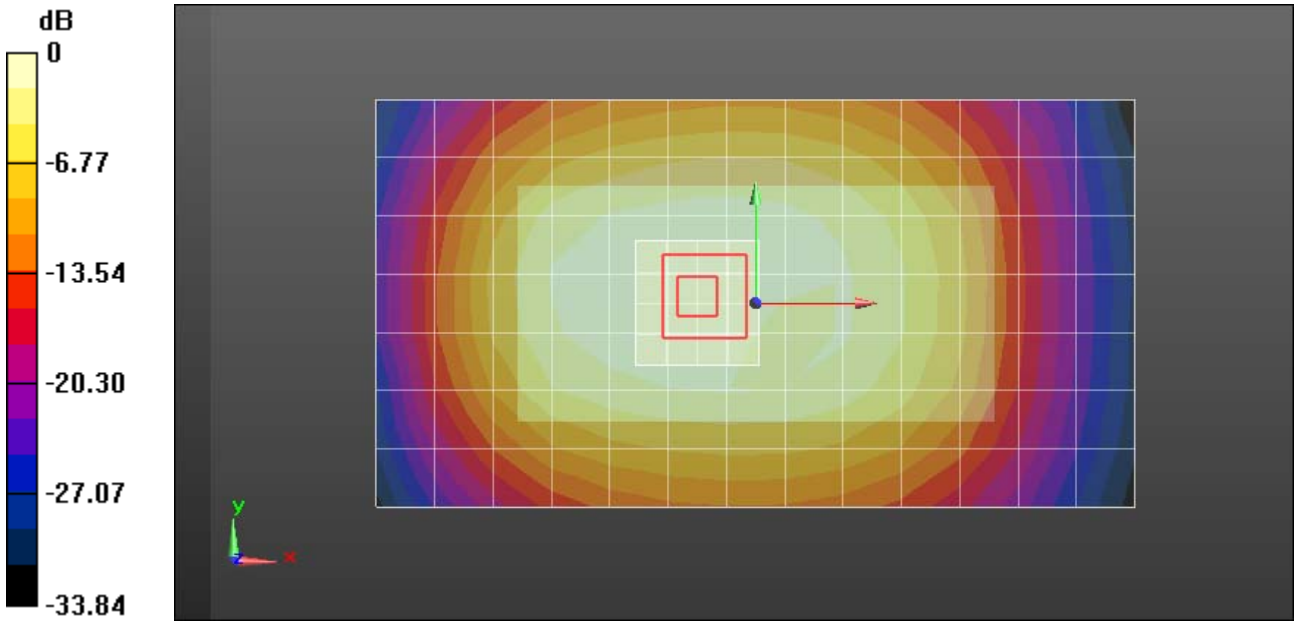
Communication System: _GPRS Class 10; Frequency: 836.6 MHz; Communication System Channel Number: 190; Duty Cycle: 1:4.14954
Medium: Low Freq Body; Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(5.89, 5.89, 5.89); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.14 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.638 V/m; Power Drift = -0.33 dB
Peak SAR (extrapolated) = 1.353 mW/g
SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.832 mW/g
Maximum value of SAR (measured) = 1.15 mW/g



0 dB = 1.15 mW/g = 1.21 dB mW/g

A-49

Date/Time: 8/11/2012 1:56:23 AM

Serial: KSRC060054; Procedure Notes: Pwr Step: All Bits UP; DEVICE POSITION: Mobile Hotspot, Bottom EDGE of the Phone 10mm away from phantom

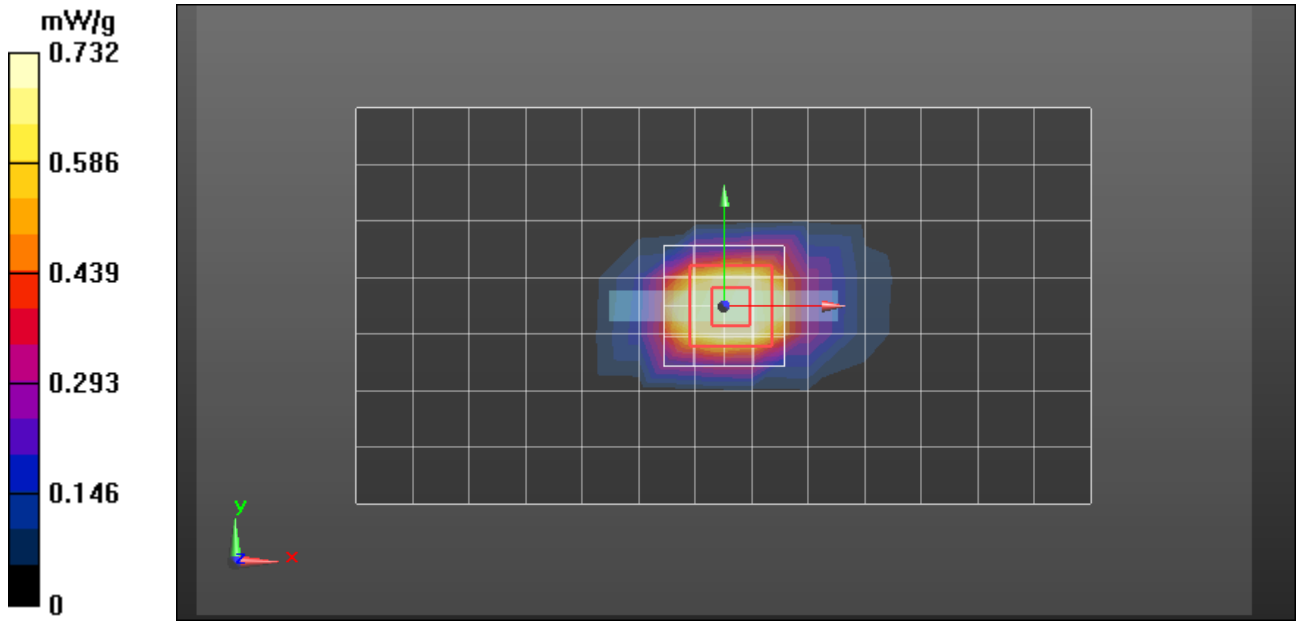
Communication System: _WCDMA; Frequency: 1907.6 MHz; Communication System Channel Number: 9538; Duty Cycle: 1:1
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.56 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.88, 4.88, 4.88); Calibrated: 4/25/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn378; Calibrated: 4/11/2012
- Phantom: R#-1, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.732 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.659 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 2.043 mW/g
SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.536 mW/g
Maximum value of SAR (measured) = 1.26 mW/g



Date/Time: 8/14/2012 1:41:28 PM

Serial: KSRC060054; Procedure Notes: Pwr Step: 0; DEVICE POSITION: Bottom EDGE of the Phone 10mm away from phantom

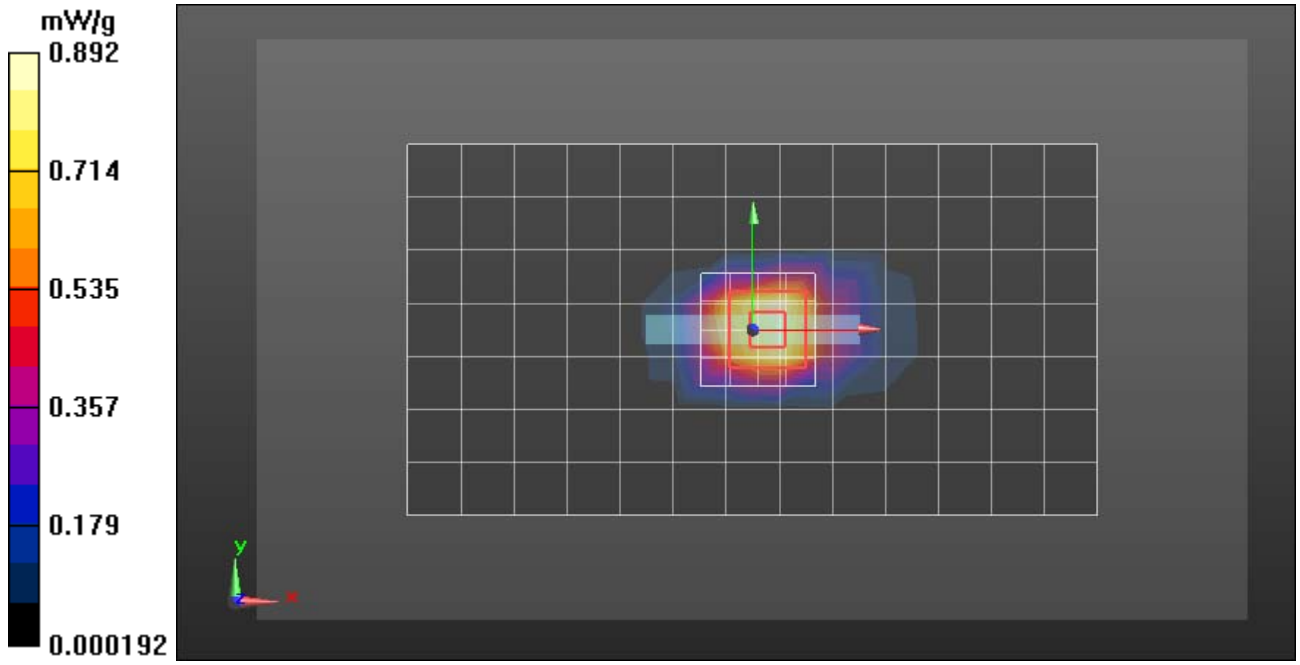
Communication System: _GPRS Class 10; Frequency: 1909.8 MHz; Communication System Channel Number: 810; Duty Cycle: 1:4.14954
Medium: Regular Glycol Body 1750/1880; Medium parameters used: f = 1880 MHz; σ = 1.59 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

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

Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.892 mW/g

Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.868 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 2.240 mW/g
SAR(1 g) = 1.24 mW/g; SAR(10 g) = 0.604 mW/g
Maximum value of SAR (measured) = 1.38 mW/g



Test Laboratory: Motorola Mobility - WiFi 2450 Mobile Hotspot

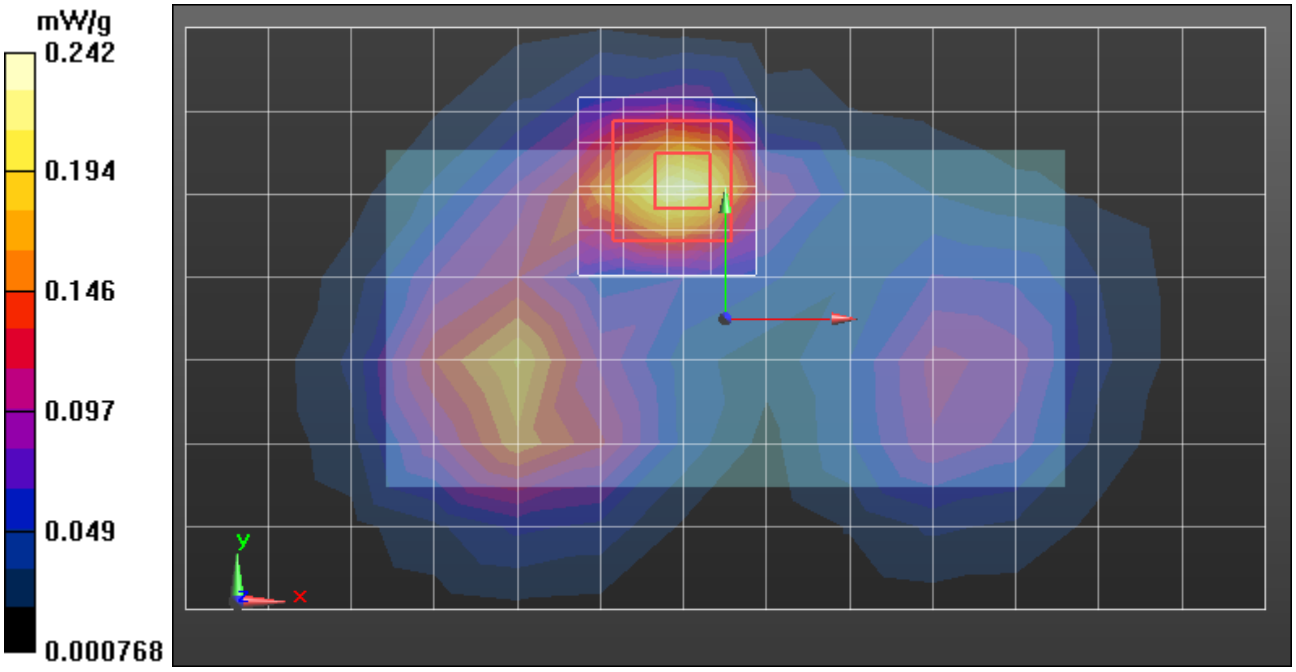
Serial: KSRB090169; FCC ID: IHDT56NS4
Procedure Notes: Battery Model #: INTERNAL DEVICE POSITION: HOTSPOT POSITION, BACK OF PHONE 10MM FROM PHANTOM Wi-Fi 802.11b / 5.5 Mbps / Output Power = 18 / Duty Cycle = 90%
Communication System: _Wi-Fi 2450MHz; Frequency: 2412 MHz; Communication System Channel Number: 1; Duty Cycle: 1:1
Medium: 2450 Triton Body; Medium parameters used: f = 2450 MHz; σ = 2.02 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3

DASY4 Configuration:

- Probe: ES3DV3 - SN3115; ConvF(4.12, 4.12, 4.12); Calibrated: 1/11/2012;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1311; Calibrated: 7/12/2012
- Phantom: R#2 Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

DASY5, Triple Flat Phone Template - Rev.5 (6-April-12)/Triple Flat Phone Template/Area Scan - Normal Body (15mm) (14x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.238 mW/g

DASY5, Triple Flat Phone Template - Rev.5 (6-April-12)/Triple Flat Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.528 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.465 mW/g
SAR(1 g) = 0.222 mW/g; SAR(10 g) = 0.106 mW/g
Maximum value of SAR (measured) = 0.242 mW/g



Date/Time: 8/3/2012 12:57:35 AM

Serial: KSRB090078; Procedure Notes: Pwr Step: continuous; DEVICE POSITION: HOTSPOT POSITION, RIGHT EDGE OF PHONE 10MM FROM PHANTOM

Communication System: _WIFI 5-6GHz; Frequency: 5805 MHz; Communication System Channel Number: 161; Duty Cycle: 1:1
Medium: 5.785 GHz BODY; Medium parameters used: f = 5785 MHz; σ = 5.92 mho/m; ε_r = 44.2; ρ = 1000 kg/m^3

DASY4 Configuration:

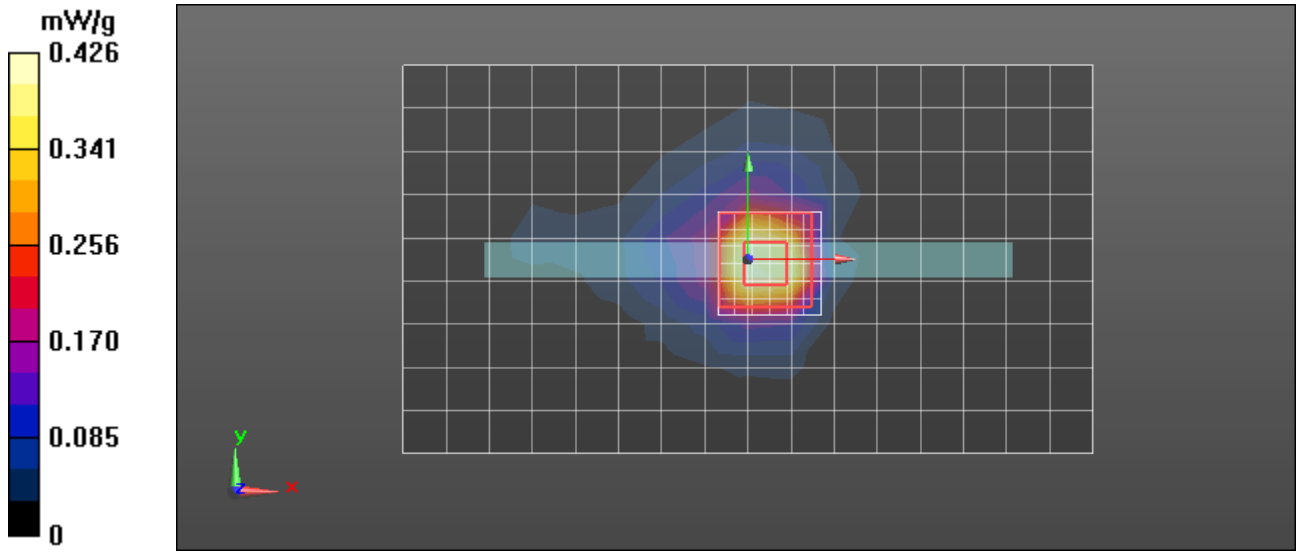
- Probe: EX3DV4 - SN3728; ConvF(3.71, 3.71, 3.71); Calibrated: 4/24/2012;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn440; Calibrated: 5/23/2012
- Phantom: R#-3, Triple Flat Phantom 5.1C (Rev.4); Type: QD 000 P51 CA; Serial: n/a;
- ; SEMCAD X Version 14.6.5 (6469)

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

Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.426 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 = 8.296 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 1.112 mW/g
SAR(1 g) = 0.302 mW/g; SAR(10 g) = 0.094 mW/g
Maximum value of SAR (measured) = 0.610 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

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

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

Accreditation No.: SCS 108

Client **Motorola MDb**

Certificate No: ES3-3284_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

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

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ES3DV3

SN: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

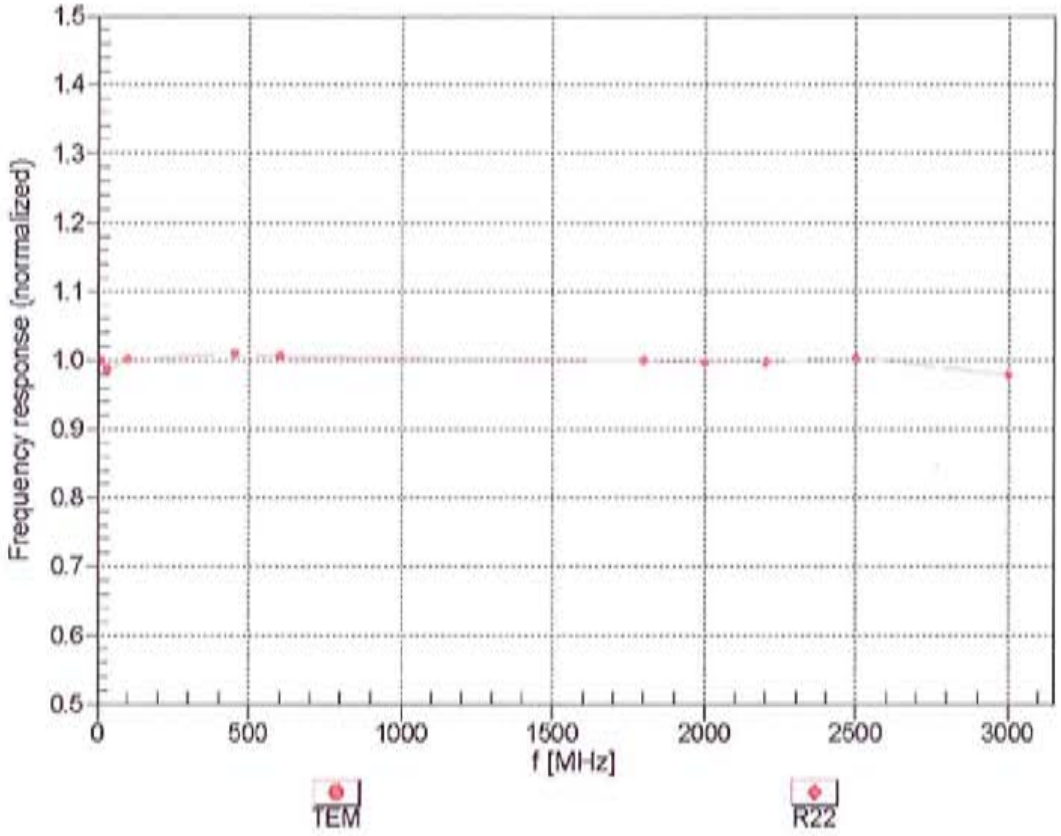
Calibration Parameter Determined in Body Tissue Simulating Media

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

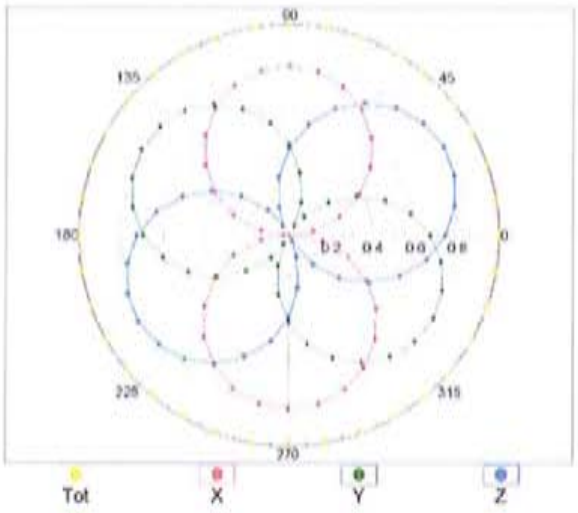
(TEM-Cell:ifi110 EXX, Waveguide: R22)



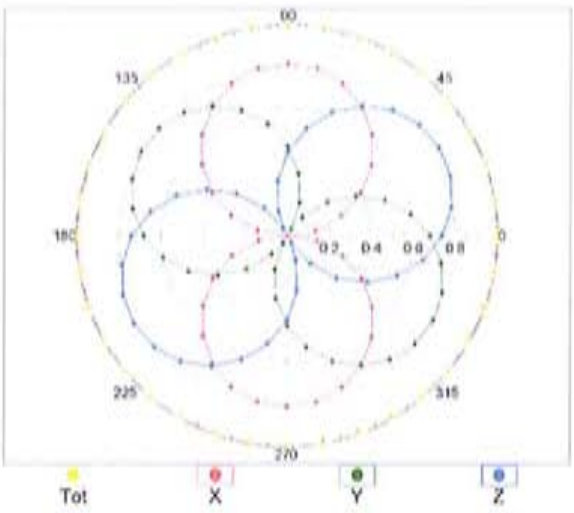
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

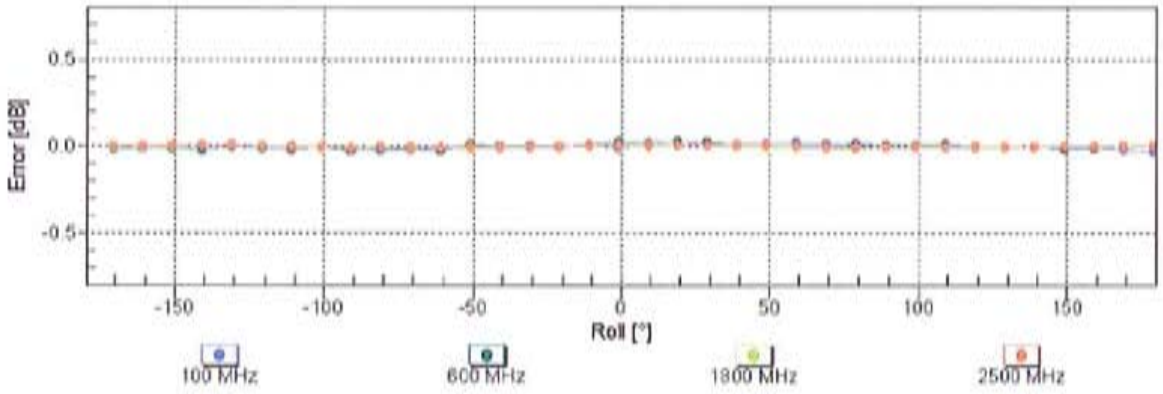
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



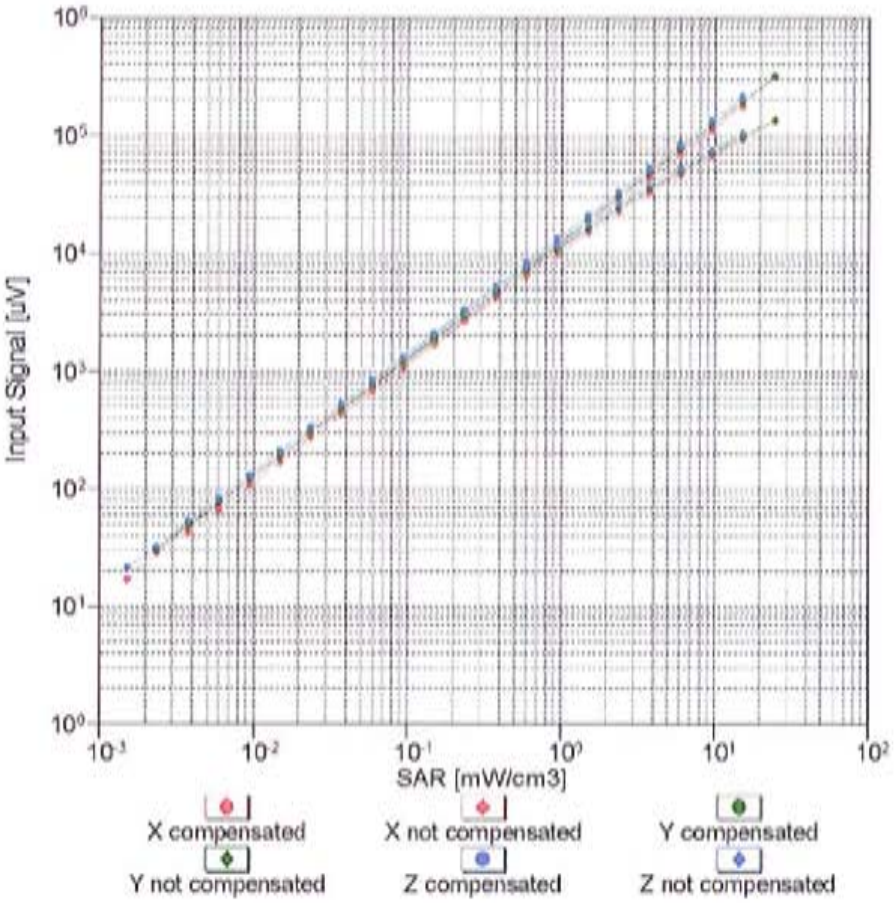
f=1800 MHz,R22

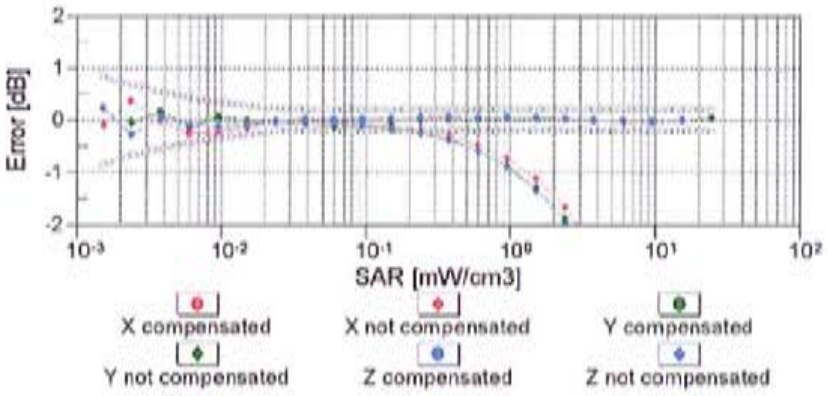




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

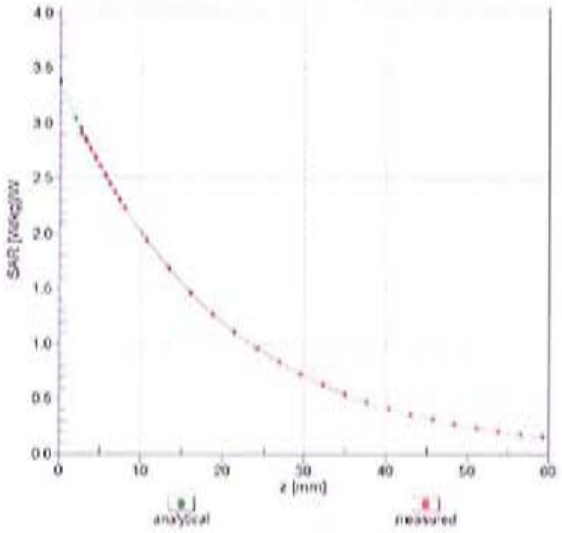




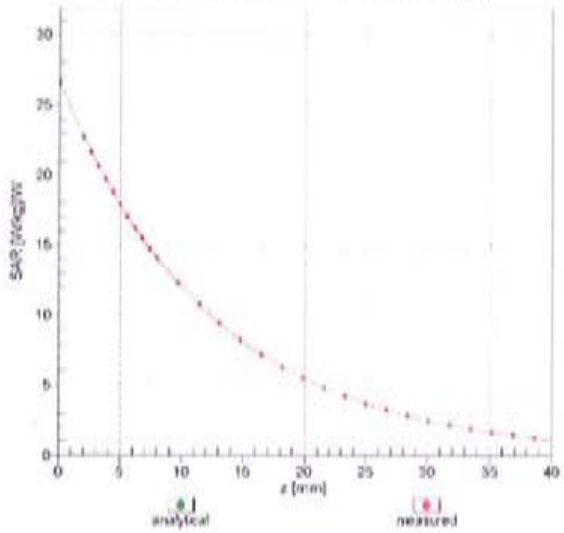
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

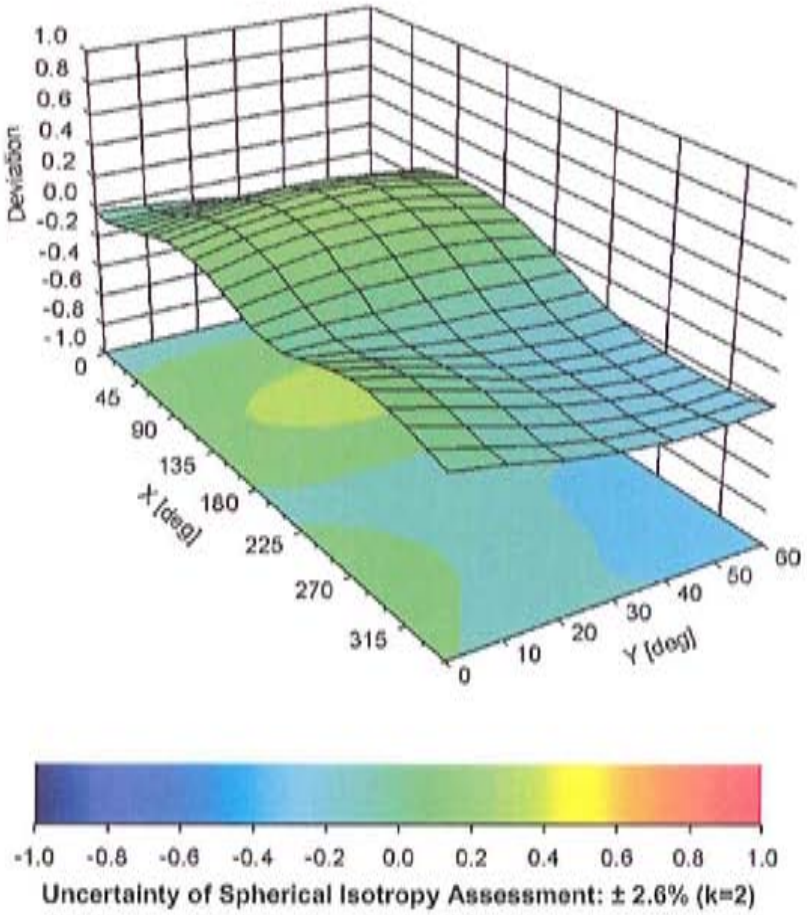


f = 1810 MHz,WGLS R22 (H_convF)



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

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

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Accreditation No.: **SCS 108**

Client **Motorola MDb**

Certificate No: **ES3-3184_Apr12**

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3184

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

Calibration date: April 25, 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	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	10-Jan-12 (No. DAE4-660_Jan12)	Jan-13
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:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 25, 2012

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

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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:3184

Manufactured: August 19, 2008
Calibrated: April 25, 2012

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

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.24	1.38	1.25	± 10.1 %
DCP (mV)[B]	101.9	99.5	100.6	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
0	CW	0.00	X	0.00	0.00	1.00	158.6	±3.0 %
			Y	0.00	0.00	1.00	163.2	
			Z	0.00	0.00	1.00	156.8	

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

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

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.38	6.38	6.38	0.24	2.29	± 12.0 %
835	41.5	0.90	6.15	6.15	6.15	0.70	1.20	± 12.0 %
1810	40.0	1.40	5.48	5.48	5.48	0.80	1.28	± 12.0 %
1950	40.0	1.40	5.19	5.19	5.19	0.65	1.38	± 12.0 %
2450	39.2	1.80	4.61	4.61	4.61	0.80	1.32	± 12.0 %
2600	39.0	1.96	4.40	4.40	4.40	0.80	1.35	± 12.0 %

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

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

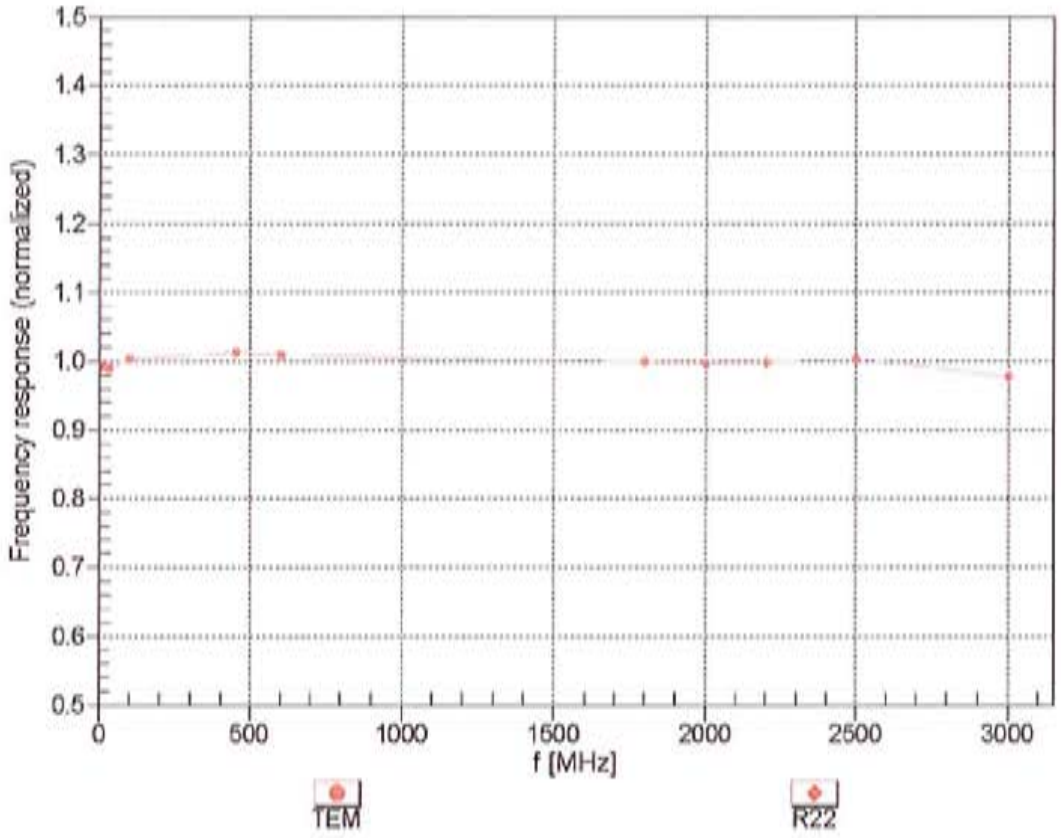
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.28	6.28	6.28	0.53	1.40	± 12.0 %
835	55.2	0.97	6.19	6.19	6.19	0.53	1.40	± 12.0 %
1810	53.3	1.52	4.88	4.88	4.88	0.55	1.49	± 12.0 %
1950	53.3	1.52	4.87	4.87	4.87	0.53	1.57	± 12.0 %
2450	52.7	1.95	4.33	4.33	4.33	0.80	0.96	± 12.0 %
2600	52.5	2.16	4.13	4.13	4.13	0.80	0.99	± 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

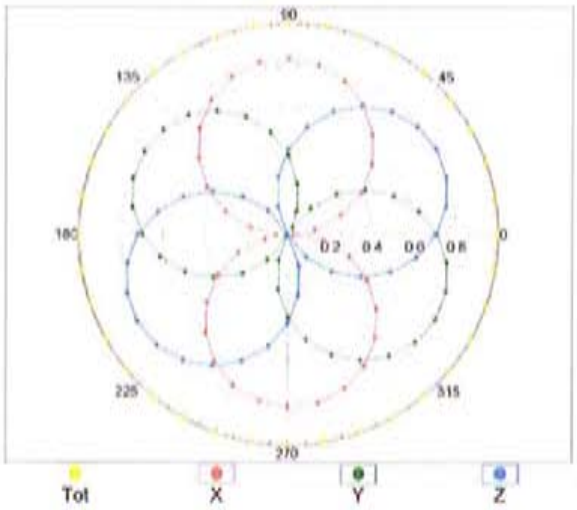
(TEM-Cell:ifi110 EXX, Waveguide: R22)



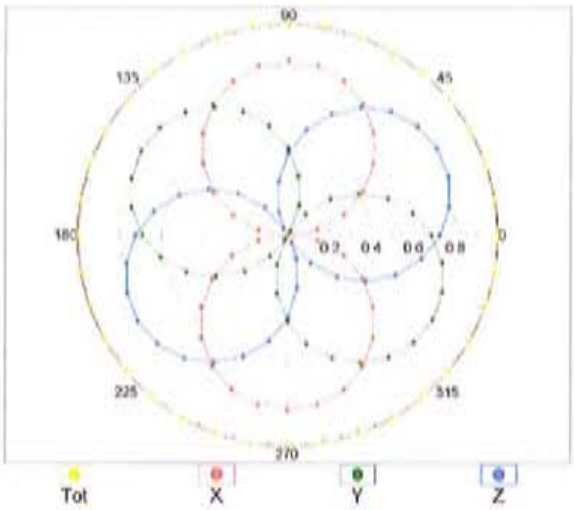
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

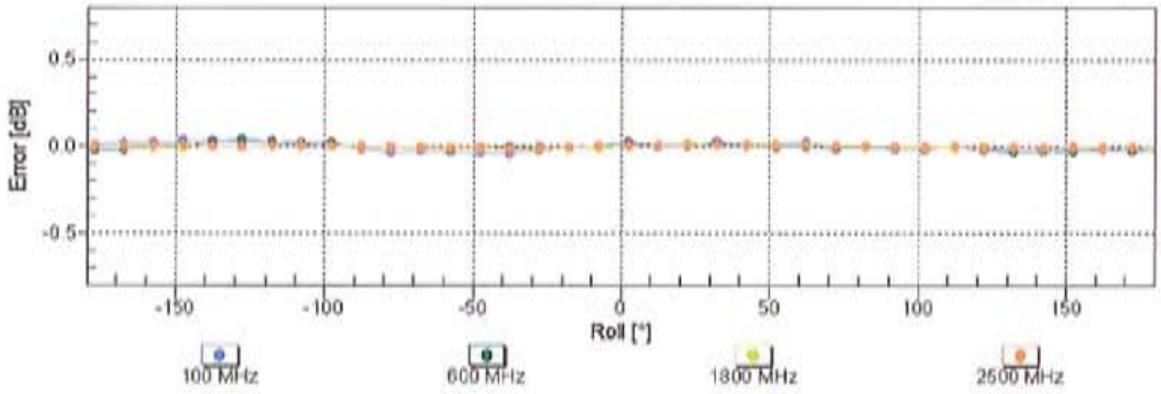
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



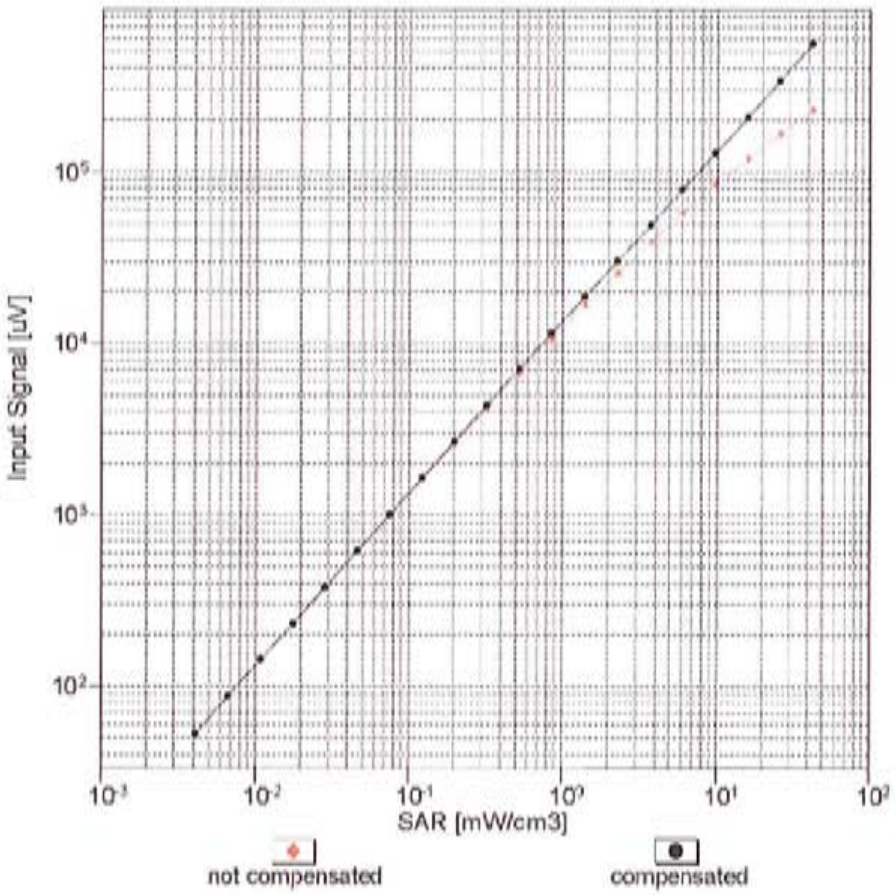
f=1800 MHz,R22

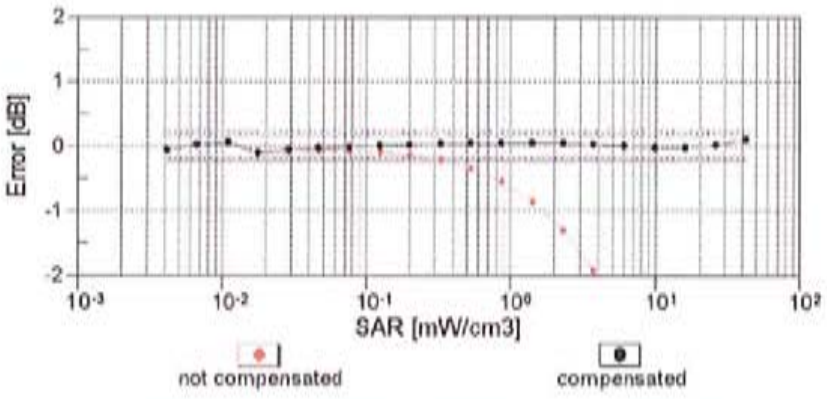




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

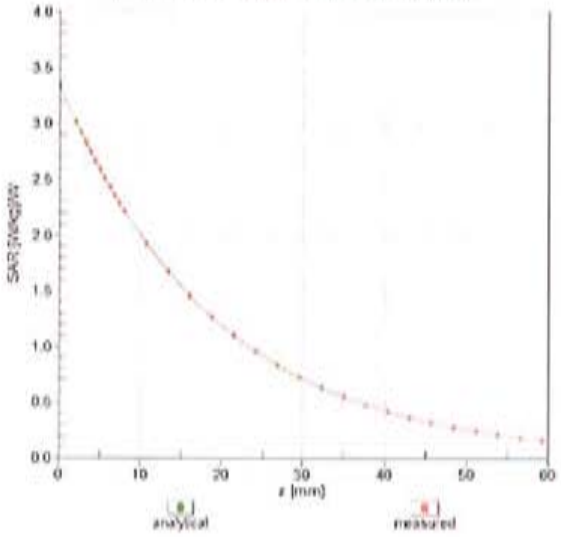




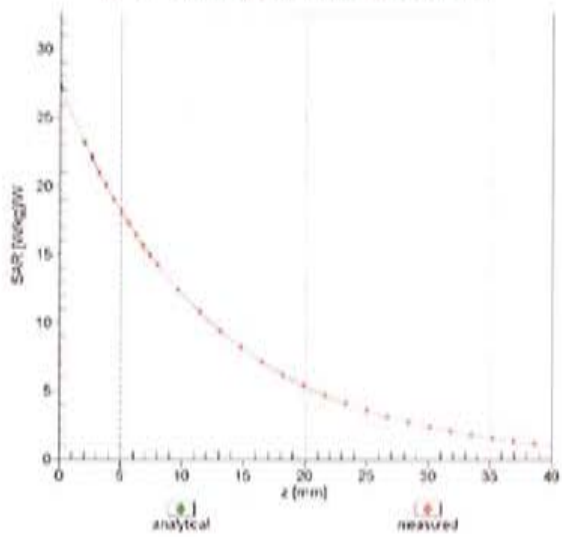
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

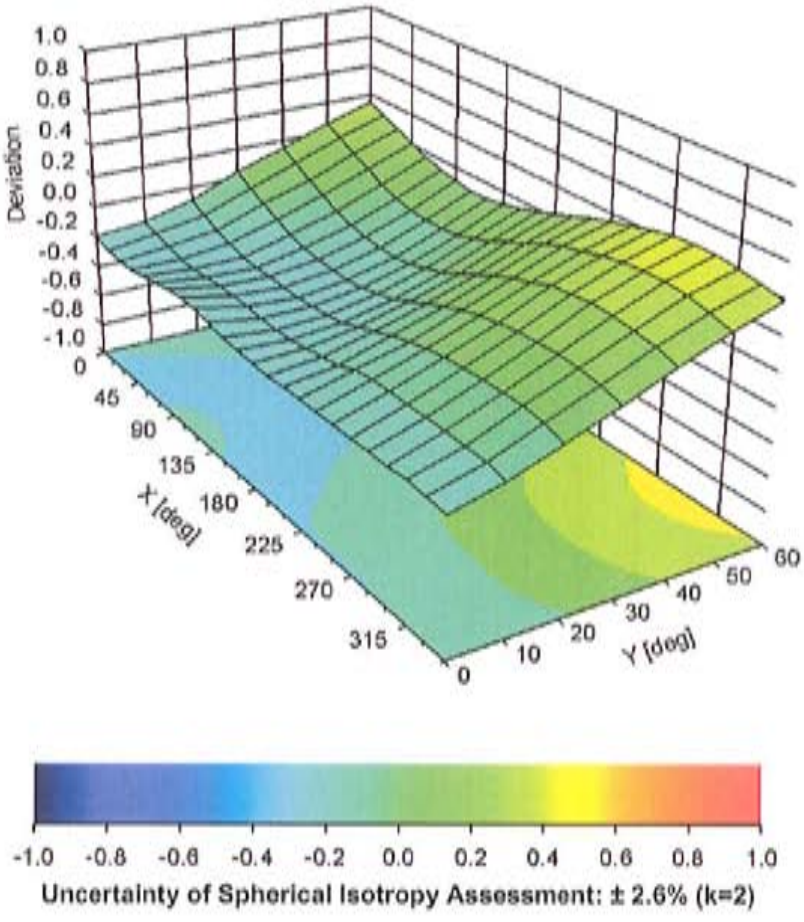


f = 1810 MHz,WGLS R22 (H_convF)



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:3184

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	132.3
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

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Accreditation No.: SCS 108

Client: Motorola MDb

Certificate No: ES3-3115_Jan12

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3115

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

Calibration date: January 11, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

Issued: January 12, 2012

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

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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ES3DV3

SN:3115

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

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

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.30	1.26	1.17	± 10.1 %
DCP (mV)[B]	105.1	102.3	102.4	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	118.8	±3.0 %
			Y	0.00	0.00	1.00	107.0	
			Z	0.00	0.00	1.00	110.1	

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

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

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

Calibration Parameter Determined in Head Tissue Simulating Media

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

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

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

Calibration Parameter Determined in Body Tissue Simulating Media

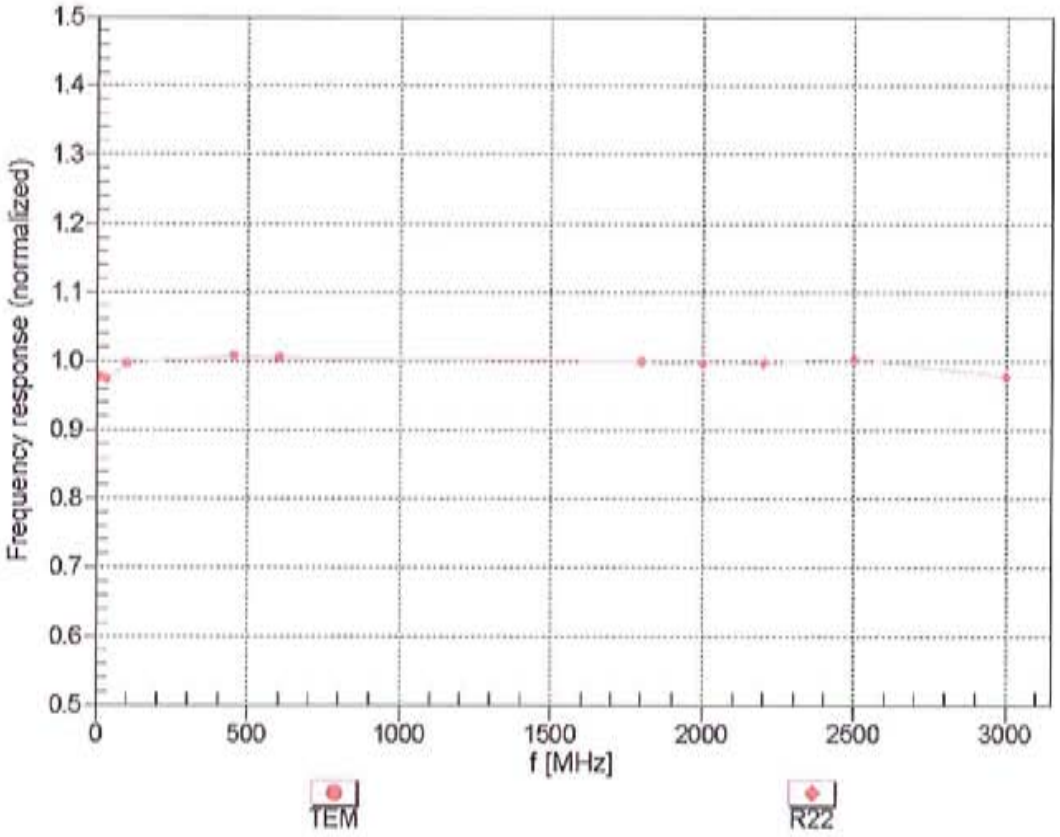
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	5.97	5.97	5.97	0.43	1.57	± 12.0 %
835	55.2	0.97	5.89	5.89	5.89	0.67	1.27	± 12.0 %
1810	53.3	1.52	4.72	4.72	4.72	0.56	1.49	± 12.0 %
1950	53.3	1.52	4.67	4.67	4.67	0.37	1.87	±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

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

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

Frequency Response of E-Field

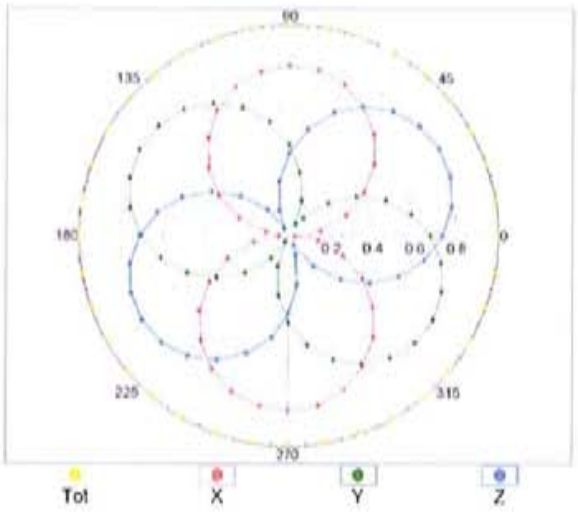
(TEM-Cell:ifi110 EXX, Waveguide: R22)



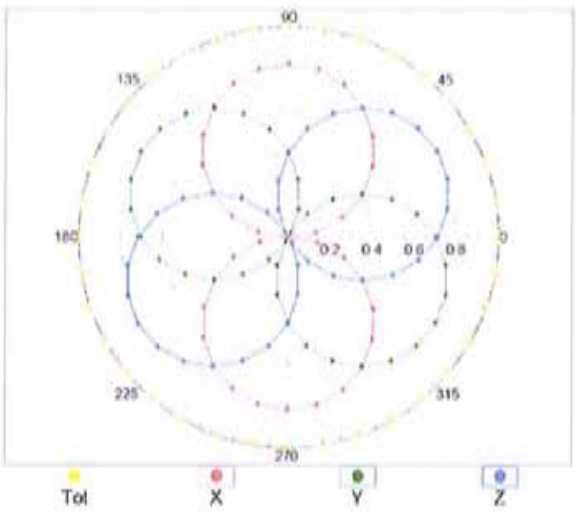
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

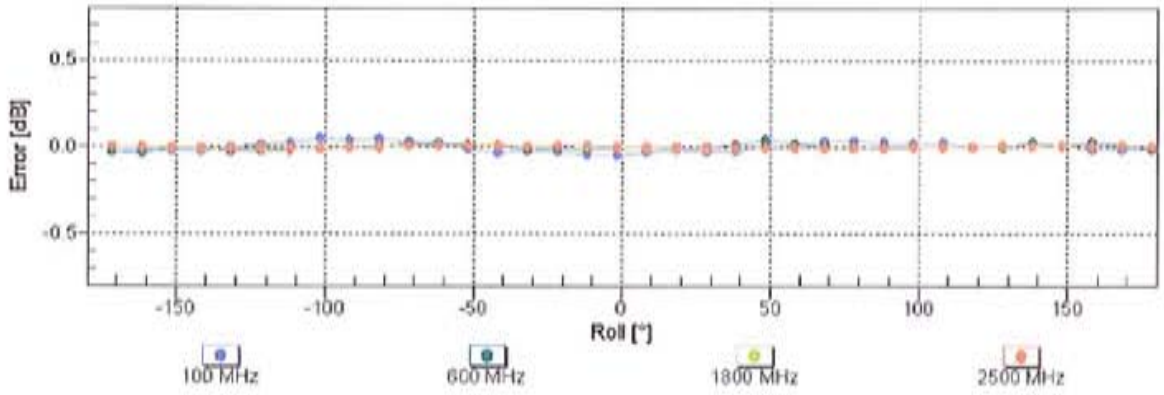
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



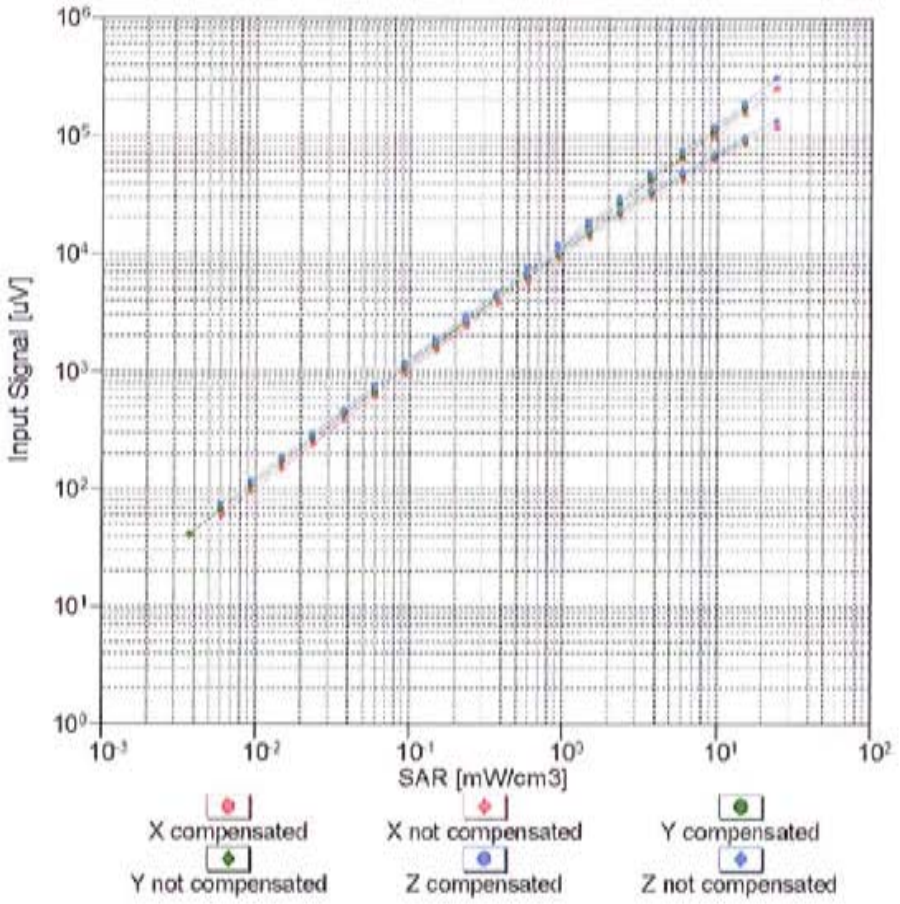
f=1800 MHz,R22

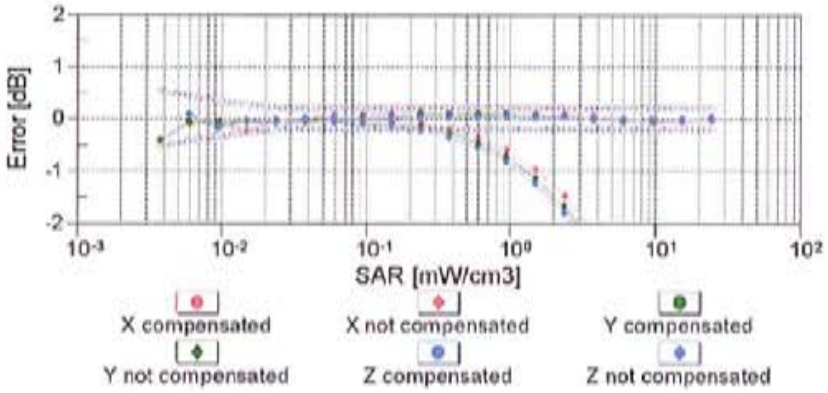




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

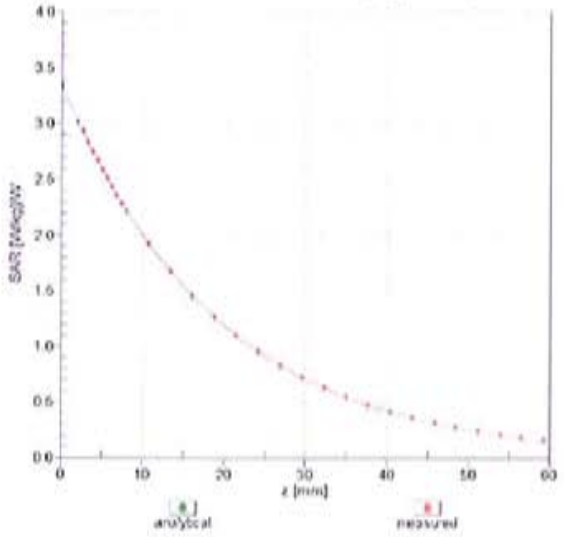




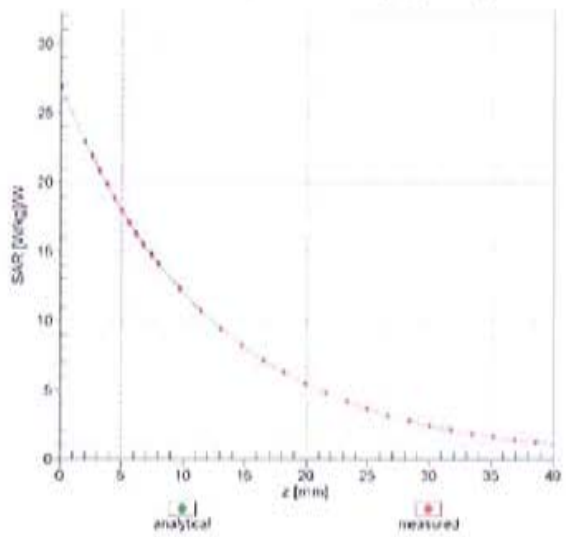
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

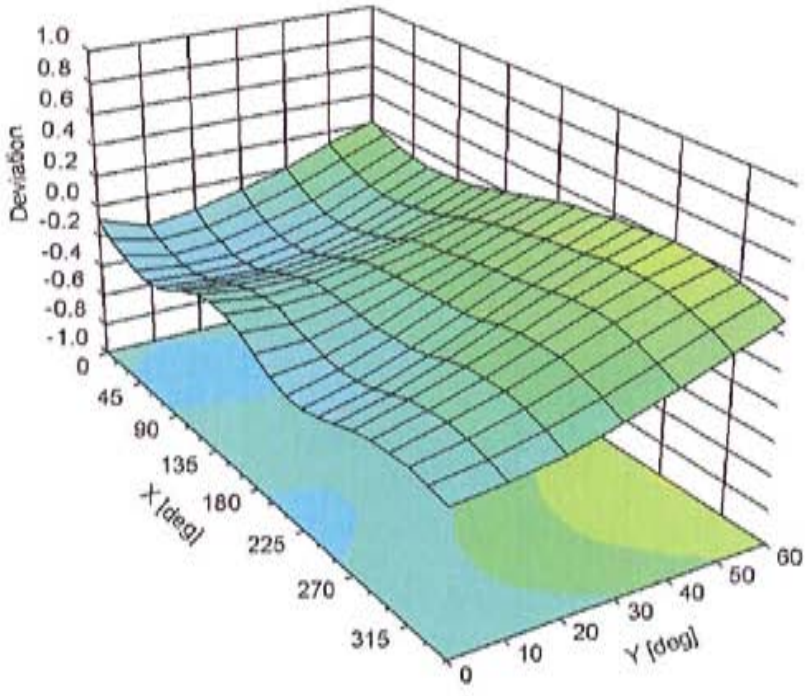


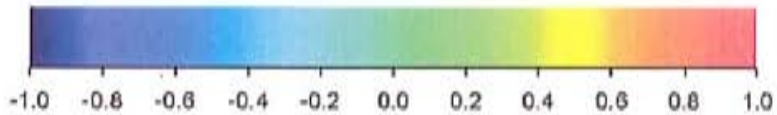
f = 1810 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

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

Other Probe Parameters

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

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

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Accreditation No.: SCS 108

Client: Motorola MDb

Certificate No: EX3-3728_Apr12

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3728

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: April 24, 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	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	10-Jan-12 (No. DAE4-660_Jan12)	Jan-13
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: April 25, 2012

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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Accredited by the Swiss Accreditation Service (SAS) Accreditation No.: **SCS 108**
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., 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 EX3DV4

SN:3728

Manufactured: October 19, 2009
Calibrated: April 24, 2012

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3728

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.48	0.45	0.50	± 10.1 %
DCP (mV)[B]	99.3	100.3	102.1	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
0	CW	0.00	X	0.00	0.00	1.00	155.3	±3.3 %
			Y	0.00	0.00	1.00	155.9	
			Z	0.00	0.00	1.00	120.3	

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:3728

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	9.24	9.24	9.24	0.50	0.76	± 12.0 %
835	41.5	0.90	8.83	8.83	8.83	0.32	0.97	± 12.0 %
1810	40.0	1.40	7.61	7.61	7.61	0.80	0.58	± 12.0 %
1950	40.0	1.40	7.43	7.43	7.43	0.77	0.57	± 12.0 %
2450	39.2	1.80	6.86	6.86	6.86	0.25	0.98	± 12.0 %
2600	39.0	1.96	6.71	6.71	6.71	0.35	0.86	± 12.0 %
5200	36.0	4.66	4.74	4.74	4.74	0.40	1.80	± 13.1 %
5300	35.9	4.76	4.43	4.43	4.43	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.14	4.14	4.14	0.50	1.80	± 13.1 %
5800	35.3	5.27	4.23	4.23	4.23	0.45	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:3728

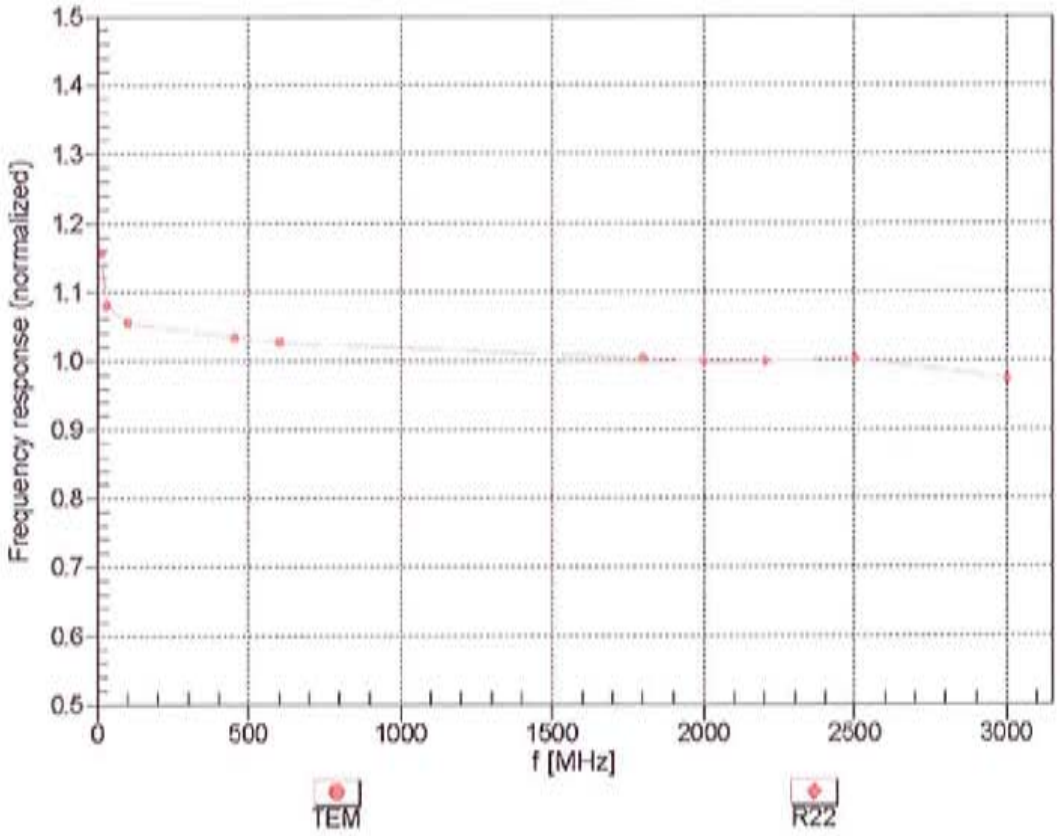
Calibration Parameter Determined in Body Tissue Simulating Media

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	9.16	9.16	9.16	0.25	1.16	± 12.0 %
835	55.2	0.97	9.05	9.05	9.05	0.36	0.97	± 12.0 %
1810	53.3	1.52	7.29	7.29	7.29	0.28	1.10	± 12.0 %
1950	53.3	1.52	7.31	7.31	7.31	0.40	0.89	± 12.0 %
2450	52.7	1.95	6.84	6.84	6.84	0.80	0.50	± 12.0 %
2600	52.5	2.16	6.45	6.45	6.45	0.80	0.57	± 12.0 %
5200	49.0	5.30	4.22	4.22	4.22	0.50	1.90	± 13.1 %
5300	48.9	5.42	4.11	4.11	4.11	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.37	3.37	3.37	0.60	1.90	± 13.1 %
5800	48.2	6.00	3.71	3.71	3.71	0.60	1.90	± 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

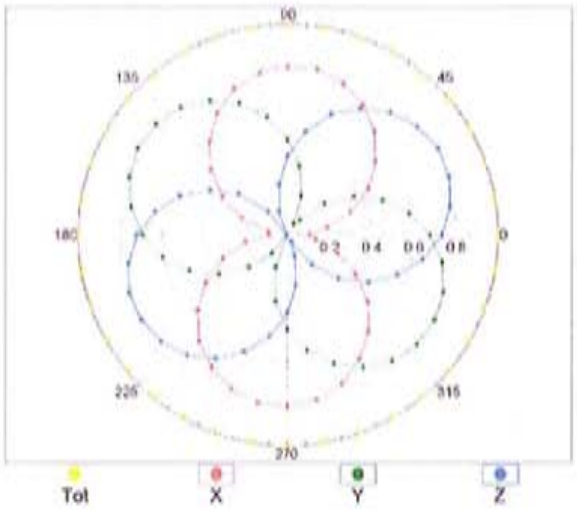
(TEM-Cell:ifi110 EXX, Waveguide: R22)



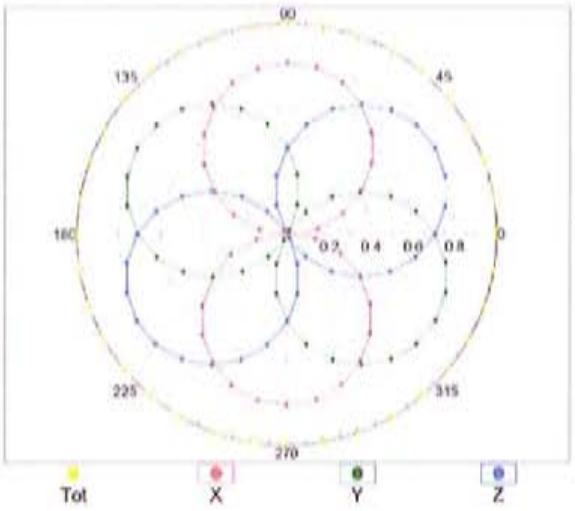
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

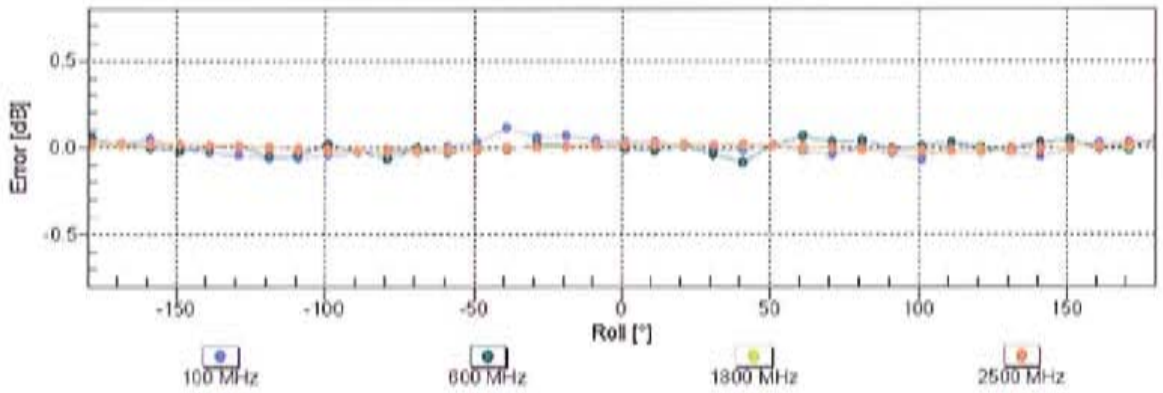
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



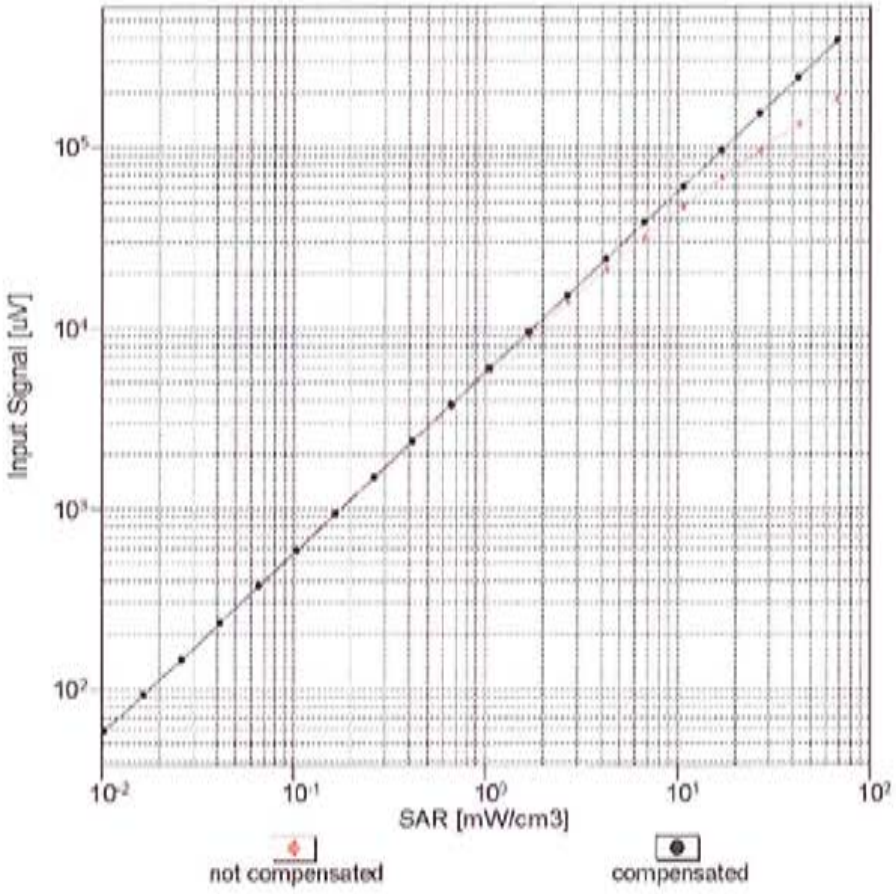
f=1800 MHz,R22

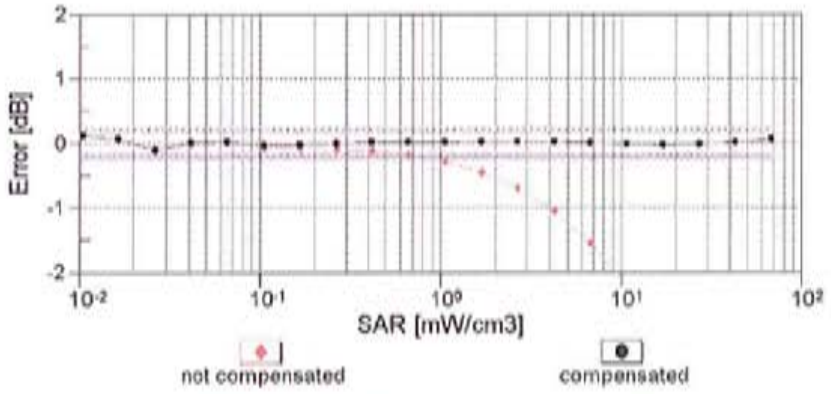




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

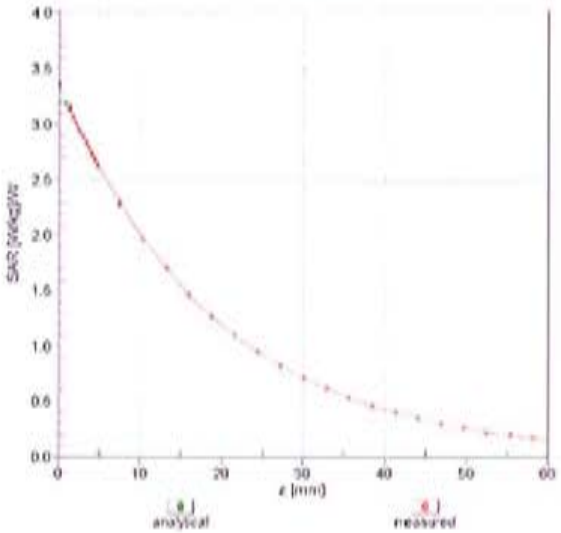




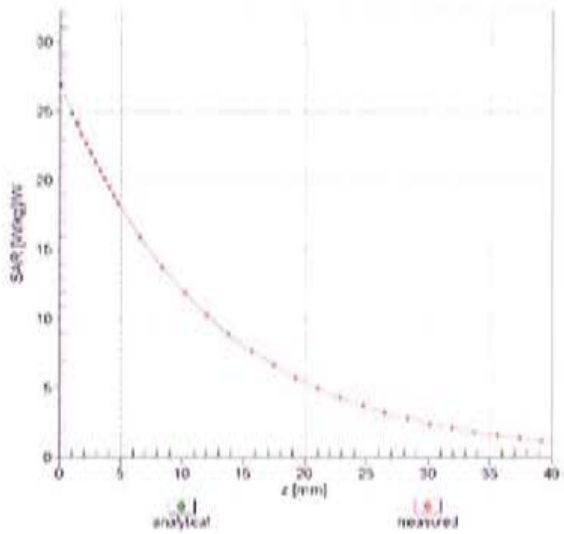
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

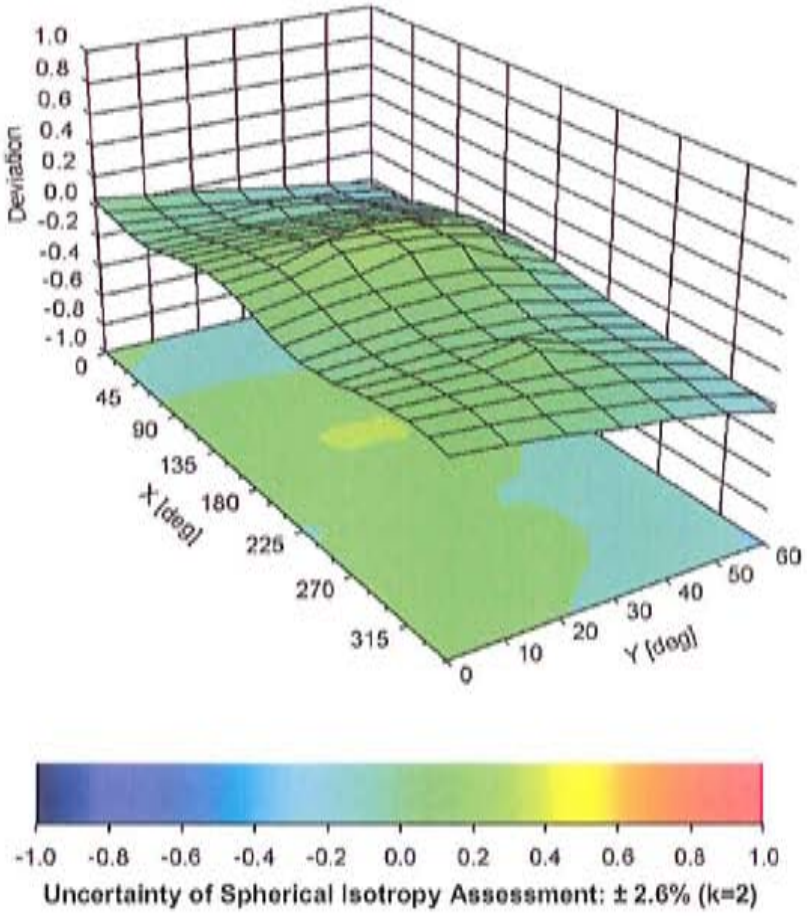


f = 1810 MHz,WGLS R22 (H_convF)



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: EX3DV4 - SN:3728

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	151.1
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