



OET 65

TEST REPORT

Product Name	IDEOS S7 Slim
Model	S7-202u
FCC ID	QISS7-202U
Client	Huawei Technologies Co., Ltd.

TA Technology (Shanghai) Co., Ltd.



GENERAL SUMMARY

Product Name	IDEOS S7 Slim	Model	S7-202u
FCC ID	QISS7-202U		
Report No.	RZA1106-0899SAR		
Client	Huawei Technologies Co., Ltd.		
Manufacturer	Huawei Technologies Co., Ltd.		
Reference Standard(s)	<p>RSS-102 Issue 4 March 2010: Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands).</p> <p>IEEE Std C95.1, 1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.</p> <p>SUPPLEMENT C Edition 01-01 to OET BULLETIN 65 Edition 97-01 June 2001 including DA 02-1438, published June 2002: Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields Additional Information for Evaluation Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radio frequency Emissions.</p> <p>KDB 248227 D01 SAR meas for a b g V01R02: SAR Measurement Procedures for 802.11a/b/g Transmitters.</p> <p>KDB 616217 D03 SAR Supp Note and Netbook Laptop V01: SAR Evaluation Considerations for Laptop/Notebook/Netbook and Tablet Computers-Supplement to KDB 616217</p> <p>KDB 648474 D01 SAR Handsets Multi Xmitter and Ant, v01r05: SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas.</p>		
Conclusion	<p>This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 7 of this test report are below limits specified in the relevant standards.</p> <p>General Judgment: Pass</p> <p align="right">(Stamp) Date of issue: June 2nd, 2011</p>		
Comment	The test result only responds to the measured sample.		

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1. General Information

1.1. Notes of the Test Report

TA Technology (Shanghai) Co., Ltd. guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

TA Technology (Shanghai) Co., Ltd. is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test. This report only refers to the item that has undergone the test.

This report standalone does not constitute or imply by its own an approval of the product by the certification Bodies or competent Authorities. This report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of **TA Technology (Shanghai) Co., Ltd.** and the Accreditation Bodies, if it applies.

If the electrical report is inconsistent with the printed one, it should be subject to the latter.

1.2. Testing Laboratory

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1.3. Applicant Information

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1.4. Manufacturer Information

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City: Shenzhen

Postal Code: 518129

Country: P.R.China

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Fax: 0755-28780808



1.5. Information of EUT

General Information

Device Type:	Portable Device		
Exposure Category:	Uncontrolled Environment / General Population		
Product Name:	IDEOS S7 Slim		
IMEI:	356650040001077		
Hardware Version:	HIDS70IM		
Software Version:	S7-202u V100R001		
Antenna Type:	Internal Antenna		
Device Operating Configurations:			
Supporting Mode(s):	GSM 850/GSM 1900; (tested)		
	WCDMA Band II/WCDMA Band V; (tested)		
	WiFi(802.11b/g/n);		
	Bluetooth;		
Test Modulation:	(GSM)GMSK; (WCDMA)QPSK		
Device Class:	B		
HSDPA UE Category:	8		
HSUPA UE Category:	6		
GPRS Multislot Class(12):	Max Number of Timeslots in Uplink	4	
	Max Number of Timeslots in Downlink	4	
	Max Total Timeslot	5	
EGPRS Multislot Class(12):	Max Number of Timeslots in Uplink	4	
	Max Number of Timeslots in Downlink	4	
	Max Total Timeslot	5	
Operating Frequency Range(s):	Mode	Tx (MHz)	Rx (MHz)
	GSM 850	824.2 ~ 848.8	869.2 ~ 893.8
	GSM 1900	1850.2 ~ 1909.8	1930.2 ~ 1989.8
	WCDMA Band II	1852.4 ~ 1907.6	1932.4 ~ 1987.6.
	WCDMA Band V	826.4 ~ 846.6	871.4 ~ 891.6
Power Class:	GSM 850: 4, tested with power level 5		
	GSM 1900: 1, tested with power level 0		
	WCDMA Band II: 3, tested with power control all up bits		
	WCDMA Band V: 3, tested with power control all up bits		
Test Channel: (Low - Middle - High)	128 -190 - 251	(GSM 850) (tested)	
	512 - 661 - 810	(GSM 1900) (tested)	
	9262 - 9400 - 9538	(WCDMA Band II) (tested)	
	4132 - 4183 - 4233	(WCDMA Band V) (tested)	



Auxiliary Equipment Details

AE1:Battery

Model: HB4G1H
 Manufacturer: Huawei Technologies Co., Ltd.
 SN: LGCAC30HI5307737

Equipment Under Test (EUT) is a IDEOS S7 Slim. The detail about EUT and Lithium Battery is in chapter 1.5 in this report. SAR is tested for the EUT respectively for GSM 850, GSM 1900, WCDMA Band II and WCDMA Band V. The EUT has a GSM/WCDMA antenna that is used for Tx/Rx, the second is diversity WWAN antenna that only can be used for Rx. the third is BT/WIFI antenna that can be used for Tx/Rx. the forth is GPS antenna that only can be used for Rx. It has Personal Wireless Routers (hot spots) function.

This report is a variant report.

The number of the initial report is RZA1102-0235SAR. This report adds SAR values of earphone in each band and description of wifi hotspot, the other SAR values are duplicated from the initial report RZA1102-0235SAR. The detailed differences between the two reports refer to the ANNEX I.

The sample undergoing test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. The Maximum SAR_{1g} Values and Power of each tested Mode

Body Worn Configuration

Mode	Channel	Position	SAR _{1g} (W/kg)
4 slots GPRS 850	Low/128	Test Position 3	1.150
4 slots GPRS 1900	Low/512	Test Position 3	0.925
WCDMA Band II	High/9538	Test Position 3	0.917
WCDMA Band V	Middle/4183	Test Position 2	0.649

Maximum Power

Mode		Max Conducted Power (dBm)	Max Average Power (dBm)
GSM 850	GPRS,2 slots	29.50	23.48
	EGPRS, 2 slots	29.50	23.48
GSM 1900	GPRS,2 slots	27.80	21.78
	EGPRS, 2 slots	27.80	21.78
WCDMA Band II		22.91	/
WCDMA Band V		21.62	/



1.7. Test Date

The test is performed from March 12, 2011 to March 14, 2011 and from June 1, 2011 to June 2, 2011.



2. Operational Conditions during Test

2.1. General Description of Test Procedures

A communication link is set up with a System Simulator (SS) by air link, and a call is established. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 128, 190 and 251 in the case of GSM 850, allocated to 512, 661 and 810 in the case of GSM 1900, allocated to 9262, 9400 and 9538 respectively in the case of WCDMA Band II, allocated to 4132, 4183 and 4233 in the case of WCDMA Band V. The EUT is commanded to operate at maximum transmitting power.

Connection to the EUT is established via air interface with E5515C, and the EUT is set to maximum output power by E5515C. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. The antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the EUT. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the EUT by at least 30 dB.

2.2. GSM Test Configuration

For the body SAR tests for GSM 850 and GSM 1900, a communication link is set up with a System Simulator (SS) by air link. Using E5515C the power lever is set to “5” in SAR of GSM 850, set to “0” in SAR of GSM 1900. The EUT is commanded to operate at maximum transmitting power. The GPRS class is 12 for this EUT; it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslots is 5. The EGPRS class is 12 for this EUT; it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslots is 5.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot.

GSM 850

GPRS (GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

EGPRS (8PSK):



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Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

EGPRS (GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

GSM 1900

GPRS (GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

EGPRS (8PSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

EGPRS (GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6



2.3. WCDMA Test Configuration

As the SAR body tests for WCDMA Band II and WCDMA band V, we established the radio link through call processing. The maximum output power were verified on high, middle and low channels for each test band according to 3GPP TS 34.121 with the following configuration:

- 1) 12.2kbps RMC, 64,144,384 kbps RMC with TPC set to all “all ‘1’s”
- 2) Test loop Mode 1

For the output power, the configurations for the DPCCH and DPDCH₁ are as followed (EUT do not support the DPDCH_{2-n})

Table 1: The configurations for the DPCCH and DPDCH₁

	Channel Bit Rate(kbps)	Channel Symbol Rate(kcps)	Spreading Factor	Spreading Code Number	Bits/Slot
DPCCH	15	15	256	0	10
DPDCH ₁	15	15	256	64	10
	30	30	128	32	20
	60	60	64	16	40
	120	120	32	8	80
	240	240	16	4	160
	480	480	8	2	320
	960	960	4	1	640

SAR is tested with 12.2kps RMC and not required for other spreading codes (64,144, and 384 kbps RMC) and multiple DPDCH_n, because the maximum output power for each of these other configurations<0.25dB higher than 12.2kbps RMC and the multiple DPDCH_n is not applicable for the EUT.

2.4. HSDPA Test Configuration

SAR for body exposure configurations is measured according to the “Body SAR Measurements” procedures of 3G device. In addition, body SAR is also measured for HSDPA when the maximum average output of each RF channel with HSDPA active is at least 1/4 dB higher than that measured without HSDPA using 12.2kbps RMC or the maximum SAR 12.2kbps RMC is above 75% of the SAR limit. Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA.

HSDPA should be configured according to the UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission condition, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms with a CQI repetition factor of 2 to maintain a constant



rate of active CQI slots. DPCCH and DPDCH gain factors(β_c, β_d), and HS-DPCCH power offset parameters(Δ_{ACK} , Δ_{NACK} , Δ_{CQI}) should be set according to values indicated in the Table below. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Table 2: Subtests for UMTS Release 5 HSDPA

Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (note 1, note 2)	CM(dB) (note 3)	MPR(dB)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (note 4)	15/15 (note 4)	64	12/15 (note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$
 Note2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1.A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 8$ ($A_{hs} = 30/15$) with $\beta_{hs} = 30/15 * \beta_c$, and $\Delta_{CQI} = 7$ ($A_{hs} = 24/15$) with $\beta_{hs} = 24/15 * \beta_c$.
 Note3: CM=1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.
 Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TFC1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

Table 3: Settings of required H-Set 1 QPSK in HSDPA mode

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	534
Inter-TTI Distance	TTI's	3
Number of HARQ Processes	Processes	2
Information Bit Payload (N_{INF})	Bits	3202
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	4800
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	9600
Coding Rate	/	0.67
Number of Physical Channel Codes	Codes	5
Modulation	/	QPSK



Table 4: HSDPA UE category

HS-DSCH Category	Maximum HS-DSCH Codes Received	Minimum Inter-TTI Interval	Maximum Transport Bits/HS-DSCH	Total Channel
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
10	15	1	27952	172800
11	5	2	3630	14400
12	5	1	3630	28800
13	15	1	34800	259200
14	15	1	42196	259200
15	15	1	23370	345600
16	15	1	27952	345600

2.5. HSUPA Test Configuration

Body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least $\frac{1}{4}$ dB higher than that measured without HSPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.2 kbps RMC without HSPA.⁴⁰

Due to inner loop power control requirements in HSPA, a commercial communication test set should be used for the output power and SAR tests.⁴¹ The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSPA should be configured according to the β values indicated below as well as other applicable procedures described in the 'WCDMA Handset' and 'Release 5 HSDPA Data Devices' sections of 3 G device.



Table 5: Sub-Test 5 Setup for Release 6 HSUPA

Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM ₍₂₎ (dB)	MPR (dB)	AG ⁽⁴⁾ Index	E-TFCI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1} : 47/15 β_{ed2} : 47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64	15/15 ⁽⁴⁾	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Figure 5.1g.

Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Table 6: HSUPA UE category

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI (ms)	Minimum Spreading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	2	2 SF2 & 2 SF4	11484	5.76
	4	4	10		20000	2.00
7 (No DPDCH)	4	8	2	2 SF2 & 2 SF4	22996	?
	4	4	10		20000	?

NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.

UE Categories 1 to 6 supports QPSK only. UE Category 7 supports QPSK and 16QAM. (TS25.306-7.3.0)



2.6. Position of Module

The diagonal display of EUT is 6.94 inches less than 8. According to the UMPC mini-tablet procedures described in October 2010 TCB workshop, the separation distance of 5 mm should be applied to test all sides and edges of the device with an antenna closer than 2.5 cm from the surface or edge. The EUT is tested at the following 6 test positions:

- Test Position 1: The back side of the EUT towards the bottom of the flat phantom distance 5mm. (ANNEX H Picture 5) SAR is required for GSM/WCDMA antenna; because the back side of the EUT with an antenna closer than 2.5 cm from the surface or edge.
- Test Position 2: The front side of the EUT towards the bottom of the flat phantom distance 5mm. (ANNEX H Picture 6) SAR is required for GSM/WCDMA antenna; because the front side of the EUT with an antenna closer than 2.5 cm from the surface or edge.
- Test Position 3: The top side of the EUT towards the bottom of the flat phantom distance 5mm. (ANNEX H Picture 7) SAR is required for GSM/WCDMA antenna; because the top side of the EUT with an antenna closer than 2.5 cm from the surface or edge.
- Test Position 4: The bottom side of the EUT towards the bottom of the flat phantom distance 5mm. (ANNEX H Picture 8) SAR is not required for GSM/WCDMA antenna; because the bottom side of the EUT with an antenna further than 2.5 cm from the surface or edge.
- Test Position 5: The left side of the EUT towards the bottom of the flat phantom distance 5mm. (ANNEX H Picture 9) SAR is required for GSM/WCDMA antenna; because the bottom side of the EUT with an antenna closer than 2.5 cm from the surface or edge.
- Test Position 6: The right side of the EUT towards the bottom of the flat phantom distance 5mm. (ANNEX H Picture 10) SAR is not required for GSM/WCDMA antenna; because the bottom side of the EUT with an antenna further than 2.5 cm from the surface or edge.



3. SAR Measurements System Configuration

3.1. SAR Measurement Set-up

The DASY5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- A unit to operate the optical surface detector which is connected to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
- The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2003.
- DASY5 software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System validation dipoles allowing to validate the proper functioning of the system.

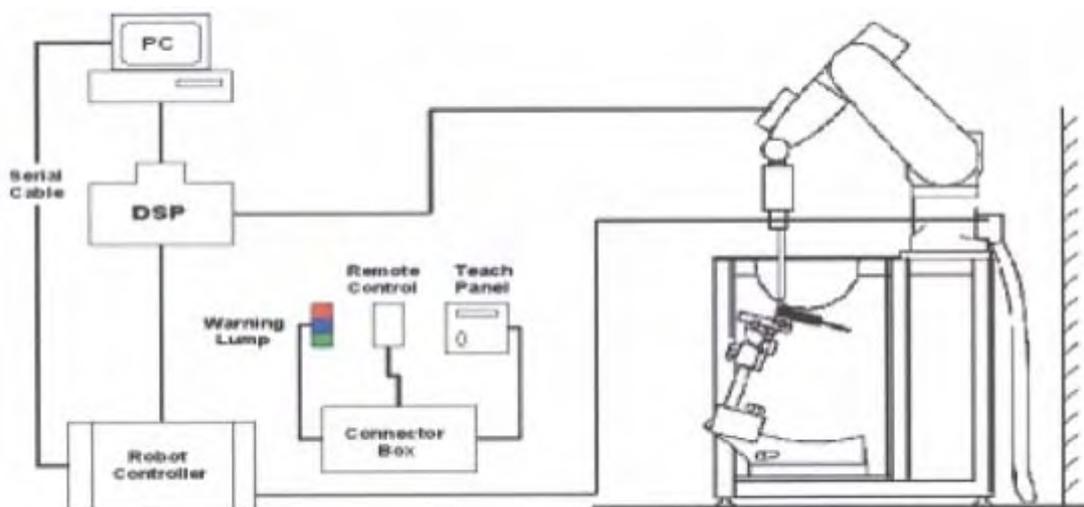


Figure 1. SAR Lab Test Measurement Set-up



3.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

3.2.1. EX3DV4 Probe Specification

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.



Figure 2. EX3DV4 E-field Probe



Figure 3. EX3DV4 E-field probe



3.2.2. E-field Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than $\pm 10\%$. The spherical isotropy was evaluated and found to be better than $\pm 0.25\text{dB}$. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies below 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$\text{SAR} = C \frac{\Delta T}{\Delta t}$$

Where: Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

ΔT = Temperature increase due to RF exposure.

Or

$$\text{SAR} = \frac{|E|^2 \sigma}{\rho}$$

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m³).

3.3. Other Test Equipment

3.3.1. Device Holder for Transmitters

Construction: Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.) It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin SAM, ELI4 and SAM v6.0 Phantoms.

Material: POM, Acrylic glass, Foam



3.3.2. Phantom

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (Oval Flat) phantom defined in IEEE 1528-2003, CENELEC 50361 and IEC 62209. It enables the dosimetric evaluation of wireless portable device usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points with the robot.

Shell Thickness 2 ± 0.2 mm

Filling Volume Approx. 30 liters

Dimensions 190×600×400 mm (H×L×W)

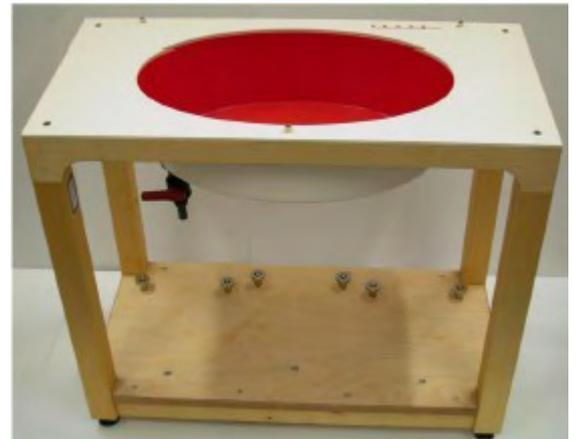


Figure 4.ELI4 Phantom

3.4. Scanning Procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

- The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5 %.
- The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1 mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within $\pm 30^\circ$.)
- Area Scan
The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot. Before starting the area scan a grid



spacing of 15 mm x 15 mm is set. During the scan the distance of the probe to the phantom remains unchanged.

After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

- **Zoom Scan**

Zoom Scans are used to estimate the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The default Zoom Scan is done by 7x7x7 points within a cube whose base is centered around the maxima found in the preceding area scan.

- **Spatial Peak Detection**

The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses. The DASY5 system allows evaluations that combine measured data and robot positions, such as:

- maximum search
- extrapolation
- boundary correction
- peak search for averaged SAR

During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard's method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space.

They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation. For a grid using 7x7x7 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1g and 10g cubes.

- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube 7x7x7 scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.



3.5. Data Storage and Evaluation

3.5.1. Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension “.DA4”. The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

3.5.2. Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	Normi, a _{i0} , a _{i1} , a _{i2}
	- Conversion factor	ConvF _i
	- Diode compression point	Dcp _i
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	
	- Density	

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY5 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.



If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot c f / d c p_i$$

With V_i = compensated signal of channel i (i = x, y, z)

U_i = input signal of channel i (i = x, y, z)

cf = crest factor of exciting field (DASY parameter)

dcp_i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes: $E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$

H-field probes: $H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f$

With V_i = compensated signal of channel i (i = x, y, z)

$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)
[mV/(V/m)²] for E-field Probes

$ConvF$ = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_x^2 + E_y^2 + E_z^2)^{1/2}$$

The primary field data are used to calculate the derived field units.

$$SAR = (E_{tot}^2 \cdot \rho) / (m \cdot 1000)$$

with SAR = local specific absorption rate in mW/g



E_{tot} = total field strength in V/m

σ = conductivity in [mho/m] or [Siemens/m]

ρ = equivalent tissue density in g/cm³

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 / 3770 \quad \text{or} \quad P_{pwe} = H_{tot}^2 \cdot 37.7$$

with P_{pwe} = equivalent power density of a plane wave in mW/cm²

E_{tot} = total electric field strength in V/m

H_{tot} = total magnetic field strength in A/m



3.6. System Check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the table 11.

System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system ($\pm 10\%$).

System check is performed regularly on all frequency bands where tests are performed with the DASY5 system.

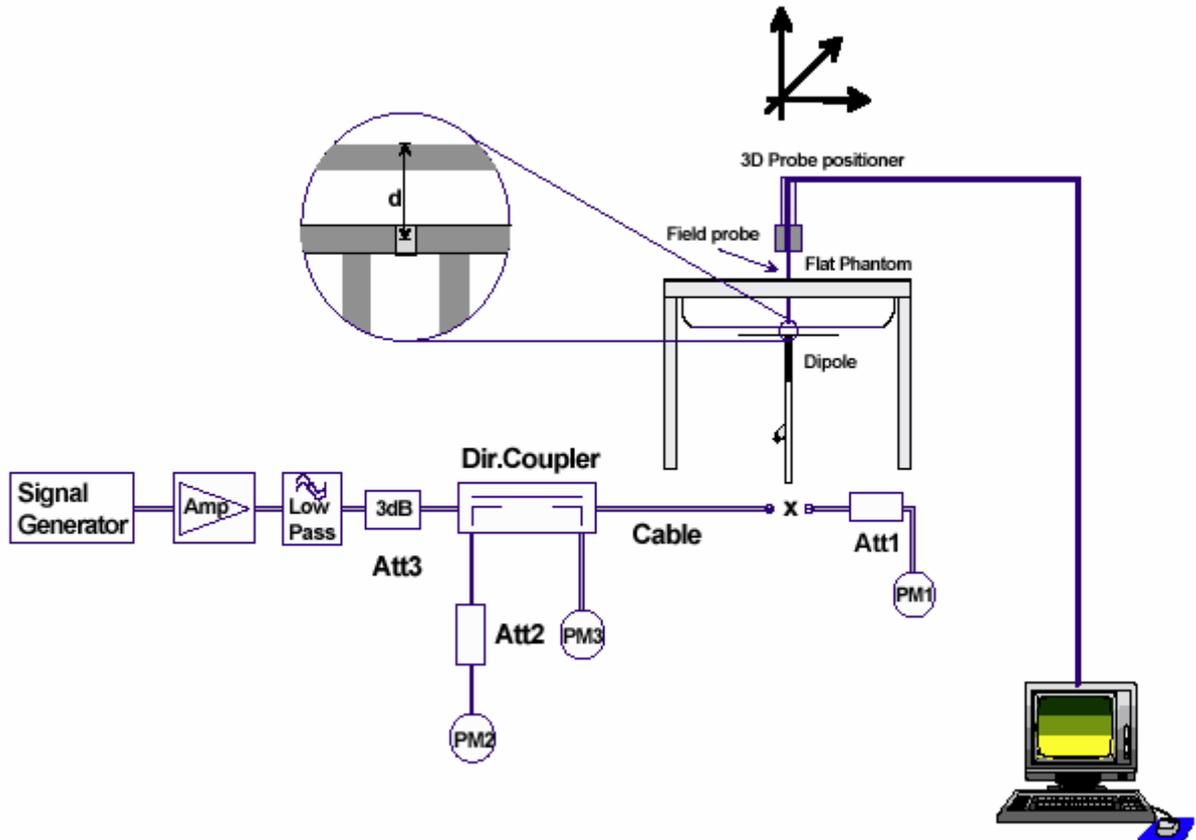


Figure 5. System Check Set-up



3.7. Equivalent Tissues

The liquid is consisted of water, sugar, salt, Glycol monobutyl, Preventol and Cellulose. The liquid has previously been proven to be suited for worst-case. The Table 7 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by OET 65.

Table 7: Composition of the Body Tissue Equivalent Matter

MIXTURE%	FREQUENCY(Body) 835MHz
Water	52.5
Sugar	45
Salt	1.4
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz $\epsilon=55.2$ $\sigma=0.97$

MIXTURE%	FREQUENCY (Body) 1900MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1900MHz $\epsilon=53.3$ $\sigma=1.52$



4. Laboratory Environment

Table 8: The Ambient Conditions during Test

Temperature	Min. = 20°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards.	
Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

5. Characteristics of the Test

5.1. Applicable Limit Regulations

IEEE Std C95.1, 1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

5.2. Applicable Measurement Standards

RSS-102 Issue 4 March 2010: Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands).

SUPPLEMENT C Edition 01-01 to OET BULLETIN 65 Edition 97-01 June 2001 including DA 02-1438, published June 2002: Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields Additional Information for Evaluation Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radio frequency Emissions.

KDB 248227 D01 SAR meas for a b g V01R02: SAR Measurement Procedures for 802.11a/b/g Transmitters.

KDB 616217 D03 SAR Supp Note and Netbook Laptop V01: SAR Evaluation Considerations for Laptop/Notebook/Netbook and Tablet Computers-Supplement to KDB 616217

KDB 648474 D01 SAR Handsets Multi Xmitter and Ant, v01r05: SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas.



6. Conducted Output Power Measurement

6.1. Summary

The DUT is tested using an E5515C communications tester as controller unit to set test channels and maximum output power to the DUT, as well as for measuring the conducted power. Conducted output power was measured using an integrated RF connector and attached RF cable. This result contains conducted output power for the EUT.

6.2. Conducted Power Results

Table 9: Conducted Power Measurement Results

GSM 850			Conducted Power(dBm)					Average power(dBm)		
			Channel 128	Channel 190	Channel 251			Channel 128	Channel 190	Channel 251
GPRS (GMSK)	1TXslot	Before	31.50	31.70	31.60	-9.03dB	22.47	22.67	22.57	
		After	31.50	31.70	31.60	-9.03dB	22.47	22.67	22.57	
	2TXslots	Before	29.40	29.30	29.50	-6.02dB	23.38	23.28	23.48	
		After	29.40	29.30	29.50	-6.02dB	23.38	23.28	23.48	
	3TXslots	Before	27.10	27.40	27.30	-4.26dB	22.84	23.14	23.04	
		After	27.10	27.40	27.30	-4.26dB	22.84	23.14	23.04	
	4TXslots	Before	26.18	26.30	26.15	-3.01dB	23.17	23.29	23.14	
		After	26.18	26.30	26.15	-3.01dB	23.17	23.29	23.14	
EGPRS (GMSK)	1TXslot	Before	31.50	31.70	31.60	-9.03dB	22.47	22.67	22.57	
	2TXslots	Before	29.40	29.30	29.50	-6.02dB	23.38	23.28	23.48	
	3TXslots	Before	27.10	27.40	27.30	-4.26dB	22.84	23.14	23.04	
	4TXslots	Before	26.18	26.3	26.20	-3.01dB	23.17	23.29	23.14	
		After	26.18	26.3	26.20	-3.01dB	23.17	23.29	23.14	
	EGPRS (8PSK)	1TXslot	Before	27.01	27.02	27.01	-9.03dB	17.98	17.99	17.98
2TXslots		Before	24.97	24.87	24.95	-6.02dB	18.95	18.85	18.93	
3TXslots		Before	23.96	23.86	23.94	-4.26dB	19.70	19.60	19.68	
4TXslots		Before	22.90	22.80	22.80	-3.01dB	19.89	19.79	19.79	
GSM 1900			Conducted Power(dBm)					Average power(dBm)		
			Channel 512	Channel 661	Channel 810			Channel 512	Channel 661	Channel 810
GPRS (GMSK)	1TXslot	Before	29.56	29.45	29.08	-9.03dB	20.53	20.42	20.05	
		After	29.56	29.45	29.08	-9.03dB	20.53	20.42	20.05	
	2TXslots	Before	27.80	27.60	27.10	-6.02dB	21.78	21.58	21.08	
		After	27.80	27.60	27.10	-6.02dB	21.78	21.58	21.08	
	3TXslots	Before	25.60	25.50	25.90	-4.26dB	21.34	21.24	21.64	
		After	25.60	25.50	25.90	-4.26dB	21.34	21.24	21.64	



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	4TXslots	Before	24.03	23.90	23.56	-3.01dB	21.02	20.89	20.55
		After	24.03	23.90	23.56	-3.01dB	21.02	20.89	20.55
EGPRS (GMSK)	1TXslot	Before	29.56	29.45	29.08	-9.03dB	20.53	20.42	20.05
	2TXslots	Before	27.80	27.60	27.10	-6.02dB	21.78	21.58	21.08
	3TXslots	Before	25.60	25.50	25.90	-4.26dB	21.34	21.24	21.64
	4TXslots	Before	24.03	23.90	23.56	-3.01dB	21.02	20.89	20.55
		After	24.03	23.90	23.56	-3.01dB	21.02	20.89	20.55
EGPRS (8PSK)	1TXslot	Before	26.41	26.32	26.56	-9.03dB	17.38	17.29	17.53
	2TXslots	Before	24.46	24.33	24.47	-6.02dB	18.44	18.31	18.45
	3TXslots	Before	23.34	23.14	23.56	-4.26dB	19.08	18.88	19.30
	4TXslots	Before	22.32	22.35	22.22	-3.01dB	19.31	19.34	19.21

Note:

1) Division Factors

To average the power, the division factor is as follows:

- 1 TX- slot = 1 transmit time slot out of 8 time slots
=> conducted power divided by (8/1) => -9.03 dB
- 2 TX- slots = 2 transmit time slots out of 8 time slots
=> conducted power divided by (8/2) => -6.02 dB
- 3TX- slots = 3 transmit time slots out of 8 time slots
=> conducted power divided by (8/3) => -4.26 dB
- 4 TX- slots = 4 transmit time slots out of 8 time slots
=> conducted power divided by (8/4) => -3.01 dB

WCDMA Band II			Conducted Power(dBm)		
			Channel 9262	Channel 9400	Channel 9538
RMC	12.2kbps	Before	21.75	21.72	21.99
		After	21.75	21.72	21.99
	64kbps	Before	21.74	21.71	21.97
	144kbps	Before	21.71	21.72	21.98
	384kbps	Before	21.65	21.71	21.69
HSDPA	Sub-Test 1	Before	22.09	22.19	22.91
		After	22.09	22.19	22.91
	Sub-Test 2	Before	22.30	22.10	22.25
	Sub-Test 3	Before	21.23	22.00	22.05
	Sub-Test 4	Before	22.12	21.80	21.95
HSUPA	Sub-Test 1	Before	20.79	20.42	20.74
	Sub-Test 2	Before	19.66	19.29	19.79
	Sub-Test 3	Before	19.93	19.55	20.07
	Sub-Test 4	Before	20.02	19.68	20.49
	Sub-Test 5	Before	20.66	20.14	20.87
After		20.66	20.14	20.87	



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WCDMA Band V			Conducted Power(dBm)		
			Channel 4132	Channel 4183	Channel 4233
RMC	12.2kbps	Before	21.33	21.59	21.12
		After	21.33	21.59	21.12
	64kbps	Before	21.23	21.62	21.42
	144kbps	Before	21.42	21.29	21.36
	384kbps	Before	21.53	21.53	21.16
HSDPA	Sub-Test 1	Before	21.21	21.44	20.80
		After	21.21	21.44	20.80
	Sub-Test 2	Before	21.05	21.21	20.57
	Sub-Test 3	Before	20.40	20.52	19.95
	Sub-Test 4	Before	20.31	20.53	19.98
HSUPA	Sub-Test 1	Before	20.72	20.84	20.12
	Sub-Test 2	Before	19.69	19.35	19.22
	Sub-Test 3	Before	19.76	19.75	19.35
	Sub-Test 4	Before	19.77	19.80	19.24
	Sub-Test 5	Before	20.70	20.81	20.20
		After	20.70	20.81	20.20



7. Test Results

7.1. Dielectric Performance

Table 10: Dielectric Performance of Body Tissue Simulating Liquid

Frequency	Description	Dielectric Parameters		Temp °C
		ϵ_r	σ (s/m)	
835MHz (body)	Target value ±5% window	55.20 52.44 — 57.96	0.97 0.92 — 1.02	/
	Measurement value 2011-3-12	53.84	0.95	21.5
	Measurement value 2011-6-1	55.89	0.99	21.6
1900MHz (body)	Target value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60	/
	Measurement value 2011-3-13	52.98	1.55	21.7
	Measurement value 2011-6-2	51.84	1.55	21.9

7.2. System Check

Table 11: System Check for Body Tissue Simulating Liquid

Frequency	Description	SAR(W/kg)		Dielectric Parameters		Temp °C
		10g	1g	ϵ_r	σ (s/m)	
835MHz	Recommended result ±10% window	1.63 1.47 — 1.79	2.49 2.24 — 2.74	54.6	0.98	/
	Measurement value 2011-3-12	1.65	2.52	53.84	0.95	21.5
	Measurement value 2011-6-1	1.63	2.51	55.89	0.99	21.6
1900 MHz	Recommended result ±10% window	5.52 4.97 — 6.07	10.3 9.27 — 11.33	53.5	1.54	/
	Measurement value 2011-3-13	5.20	9.82	52.98	1.55	21.7
	Measurement value 2011-6-2	5.21	9.84	51.84	1.55	21.9

Note: 1. The graph results see ANNEX B.

2. Target Values used derive from the calibration certificate and 250 mW is used as feeding power to the Calibrated dipole.



7.3. Summary of Measurement Results

7.3.1. GSM 850 (GPRS/EGPRS)

Table 12: SAR Values [GSM 850 (GPRS/EGPRS)]

Limit of SAR			10 g Average	1g Average	Power Drift	Graph Results	
			2.0 W/kg	1.6 W/kg	± 0.21 dB		
Test Case Of Body			Measurement Result (W/kg)		Power Drift (dB)		
Test Position	Timeslots	Channel	10 g Average	1 g Average			
Test Position 1	1 timeslot	Middle/190	0.326	0.479	0.031	Figure 10	
	2 timeslots	Middle/190	0.510	0.749	0.007	Figure 11	
	3 timeslots		High/251	0.580	0.842	0.059	Figure 12
			Middle/190	0.608	0.877	0.051	Figure 13
			Low/128	0.660	0.949	-0.071	Figure 14
	4 timeslots		High/251	0.631	0.916	-0.042	Figure 15
			Middle/190	0.629	0.913	-0.004	Figure 16
		Low/128	0.671	0.976	-0.055	Figure 17	
Test Position 2	4 timeslots	High/251	0.634	0.946	0.069	Figure 18	
		Middle/190	0.687	1.040	-0.056	Figure 19	
		Low/128	0.693	1.040	-0.096	Figure 20	
Test Position 3	4 timeslots	High/251	0.669	1.030	0.026	Figure 21	
		Middle/190	0.758	1.150	-0.190	Figure 22	
		Low/128	0.764	1.150	-0.028	Figure 23	
Test Position 4	/	/	/	/	/	/	
Test Position 5	4 timeslots	Middle/190	0.212	0.343	0.048	Figure 24	
Test Position 6	/	/	/	/	/	/	
Worst case position of GPRS with Earphone							
Test Position 3	1 timeslot	Low/128	0.501	0.750	-0.008	Figure 25	
Worst Case Position of GPRS with EGPRS (GMSK)							
Test Position 3	4 timeslots	Low/128	0.718	1.100	-0.057	Figure 26	

Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB (< 0.8W/kg) lower than the SAR limit, testing at the high and low channels is optional.
3. Upper and lower frequencies were measured at the worst case.
4. When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.



Table 13: Extrapolated SAR Values of highest measured SAR [GSM 850 (GPRS/EGPRS)]

Test Case Of Body			Conducted Power(dBm)	1g Average (W/kg)	Tune-up procedures	1g Average Limit 1.6 W/kg
Test Position	Timeslots	Channel	Measurement Result		MAX Power(dBm)	Extrapolated Result (W/kg)
GPRS						
Test Position 3	4 timeslots	Low/128	26.18	1.150	26.8	1.326
EGPRS (GMSK)						
Test Position 3	4 timeslots	Low/128	26.18	1.100	26.8	1.269



7.3.2. GSM 1900 (GPRS/EGPRS)

Table 14: SAR Values [GSM 1900 (GPRS/EGPRS)]

Limit of SAR			10 g Average	1g Average	Power Drift	Graph Results
			2.0 W/kg	1.6 W/kg	± 0.21 dB	
Test Case Of Body			Measurement Result (W/kg)		Power Drift	
Test Position	Timeslots	Channel	10 g Average	1 g Average	(dB)	
Test Position 1	1 timeslot	Middle/661	0.240	0.407	-0.017	Figure 27
	2 timeslots	Middle/661	0.272	0.487	-0.175	Figure 28
	3 timeslots	Middle/661	0.340	0.575	-0.010	Figure 29
	4 timeslots	Middle/661	0.348	0.605	0.012	Figure 30
Test Position 2	4 timeslots	Middle/661	0.300	0.531	-0.014	Figure 31
Test Position 3	4 timeslots	High/810	0.297	0.558	-0.075	Figure 32
		Middle/661	0.484	0.872	0.050	Figure 33
		Low/512	0.523	0.925	-0.064	Figure 34
Test Position 4	/	/	/	/	/	/
Test Position 5	4 timeslots	Middle/661	0.167	0.298	-0.090	Figure 35
Test Position 6	/	/	/	/	/	/
Worst case position of GPRS with Earphone						
Test Position 3	1 timeslot	Low/512	0.397	0.703	0.029	Figure 36
Worst Case Position of GPRS with EGPRS (GMSK)						
Test Position 3	4 timeslots	Low/512	0.501	0.896	-0.124	Figure 37

Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB (< 0.8W/kg) lower than the SAR limit, testing at the high and low channels is optional.
3. Upper and lower frequencies were measured at the worst case.
4. When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

Table 15: Extrapolated SAR Values of highest measured SAR [GSM 1900 (GPRS/EGPRS)]

Test Case Of Body			Conducted Power(dBm)	1g Average (W/kg)	Tune-up procedures	1g Average Limit 1.6 W/kg
Test Position	Timeslots	Channel	Measurement Result		MAX Power(dBm)	Extrapolated Result (W/kg)
GPRS						
Test Position 3	4 timeslots	Low/512	24.03	0.925	25.5	1.298
EGPRS (GMSK)						
Test Position 3	4 timeslots	Low/512	24.03	0.896	25.5	1.257



7.3.3. WCDMA Band II (WCDMA/HSDPA/HSUPA)

Table 16: SAR Values [WCDMA Band II (WCDMA/HSDPA/HSUPA)]

Limit of SAR		10 g Average	1g Average	Power Drift	Graph Results
		2.0 W/kg	1.6 W/kg	± 0.21 dB	
Test Case Of Body		Measurement Result (W/kg)		Power Drift (dB)	
Test Position	Channel	10 g Average	1 g Average		
Test Position 1	Middle/9400	0.377	0.639	0.018	Figure 38
Test Position 2	Middle/9400	0.348(max.cube)	0.593(max.cube)	-0.044	Figure 39
Test Position 3	High/9538	0.476	0.855	0.139	Figure 40
	Middle/9400	0.416	0.734	-0.022	Figure 41
	Low/9262	0.449	0.792	0.040	Figure 42
Test Position 4	/	/	/	/	/
Test Position 5	Middle/9400	0.121	0.213	-0.147	Figure 43
Test Position 6	/	/	/	/	/
Worst case position of RMC with Earphone					
Test Position 3	High/9538	0.520	0.917	-0.190	Figure 44
Worst Case Position of RMC with HSDPA					
Test Position 3	High/9538	0.467	0.841	-0.039	Figure 45
Worst Case Position of RMC with HSUPA					
Test Position 3	High/9538	0.370(max.cube)	0.634(max.cube)	-0.020	Figure 46

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB (< 0.8W/kg) lower than the SAR limit, testing at the high and low channels is optional.
3. Upper and lower frequencies were measured at the worst case.
4. The (max.cube) labeling indicates that during the grid scanning an additional peak was found which was within 2.0dB of the highest peak. The value of the highest cube is given in the table above; the value from the second assessed cube is given in the SAR distribution plots (See ANNEX C).

Table 17: Extrapolated SAR Values of Highest Measured SAR [WCDMA Band II (WCDMA/HSDPA/HSUPA)]

Test Case Of Body		Conducted Power(dBm)	1g Average (W/kg)	Tune-up Procedures	1g Average Limit 1.6 W/kg
Test Position	Channel	Measurement Result		MAX Power (dBm)	Extrapolated Result (W/kg)
RMC					
Test Position 3	High/9538	21.99	0.917	23.5	1.298



7.3.4. WCDMA Band V (WCDMA/HSDPA/HSUPA)

Table 18: SAR Values [WCDMA Band V (WCDMA/HSDPA/HSUPA)]

Limit of SAR		10 g Average	1g Average	Power Drift	Graph Results
		2.0 W/kg	1.6 W/kg	± 0.21 dB	
Test Case Of Body		Measurement Result (W/kg)		Power Drift (dB)	
Test Position	Channel	10 g Average	1 g Average		
Test Position 1	Middle/4183	0.365	0.529	0.049	Figure 47
Test Position 2	High/4233	0.339	0.499	-0.117	Figure 48
	Middle/4183	0.432	0.649	-0.084	Figure 49
	Low/4132	0.367	0.541	-0.178	Figure 50
Test Position 3	Middle/4183	0.374	0.566	-0.089	Figure 51
Test Position 4	/	/	/	/	/
Test Position 5	Middle/4183	0.120	0.192	-0.129	Figure 52
Test Position 6	/	/	/	/	/
Worst case position of RMC with Earphone					
Test Position 2	Middle/4183	0.433	0.640	-0.193	Figure 53
Worst Case Position of RMC with HSDPA					
Test Position 2	Middle/4183	0.405	0.598	-0.079	Figure 54
Worst Case Position of RMC with HSUPA					
Test Position 2	Middle/4183	0.300	0.444	-0.029	Figure 55

Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB (< 0.8W/kg) lower than the SAR limit, testing at the high and low channels is optional.
3. Upper and lower frequencies were measured at the worst case.

Table 19: Extrapolated SAR Values of Highest Measured SAR [WCDMA Band V (WCDMA/HSDPA/HSUPA)]

Test Case Of Body		Conducted Power(dBm)	1g Average (W/kg)	Tune-up Procedures	1g Average Limit 1.6 W/kg
Test Position	Channel	Measurement Result		MAX Power (dBm)	Extrapolated Result (W/kg)
RMC					
Test Position 2	Middle/4183	21.59	0.649	23.5	1.007



7.3.5. BT/WIFI Function

The distance between BT/WIFI antenna and main antenna is >5cm. The location of the antennas refers to ANNEX H:

Output Power Thresholds for Unlicensed Transmitters

	2.45	5.15 - 5.35	5.47 - 5.85	GHz
P_{Ref}	12	6	5	mW
Device output power should be rounded to the nearest mW to compare with values specified in this table.				

The output power of BT antenna is as following:

Channel	Ch 0 (2402 MHz)	Ch 39 (2441 MHz)	Ch 78 (2480 MHz)
GFSK Test result (dBm)	6.25	6.24	6.32
EDR2M-4_DQPSK Test result (dBm)	4.25	4.12	5.02
EDR3M-8DPSK Test result (dBm)	3.56	3.65	4.24

The output power of WIFI antenna is as following:

Mode	Channel	Data rate (Mbps)		Conducted Power (dBm)	
802.11b	1	1	Before	13.03	
			After	13.03	
		2	Before	12.85	
			5.5	Before	12.87
	6	1	Before	13.04	
			After	13.04	
		2	Before	12.67	
			5.5	Before	12.98
		11	Before	12.98	
			11	Before	12.74
		11	1	Before	13.04
				After	13.04
	2		Before	12.98	
			5.5	Before	12.86
	802.11g	1	6	Before	11.96
			9	Before	11.71
12			Before	11.64	
18			Before	11.25	
24			Before	10.93	
36			Before	10.61	
48			Before	10.32	



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	6	54	Before	10.08
		6	Before	11.98
		9	Before	11.75
		12	Before	11.63
		18	Before	11.34
		24	Before	10.97
		36	Before	10.68
		48	Before	10.65
		54	Before	10.13
	11	6	Before	11.92
		9	Before	11.69
		12	Before	11.63
		18	Before	11.34
		24	Before	10.94
		36	Before	10.65
		48	Before	10.26
		54	Before	10.04
		802.11n (HT20)	1	6.5
13	Before			9.65
19.5	Before			9.19
26	Before			8.76
39	Before			8.56
52	Before			8.12
58.5	Before			7.98
65	Before			7.72
6	6.5		Before	10.23
	13		Before	9.62
	19.5		Before	9.10
	26		Before	8.74
	39		Before	8.53
	52		Before	8.10
	58.5		Before	7.99
	65		Before	7.76
11	6.5		Before	10.21
	13		Before	9.62
	19.5		Before	9.21
	26		Before	8.75
	39		Before	8.65
	52		Before	8.13
	58.5		Before	7.95
	65		Before	7.73



Stand-alone SAR

According to the output power measurement result and the distance between BT/WIFI antenna and GSM/WCDMA antenna we can draw the conclusion that:

stand-alone SAR are not required for BT, because the output power of BT transmitter is $\leq 2P_{\text{Ref}}=13.8\text{dBm}$ and its antenna is $\geq 5\text{cm}$ from other antenna;

stand-alone SAR are not required for WIFI, because the output power of WIFI transmitter is $\leq 2P_{\text{Ref}}=13.8\text{dBm}$ and its antenna is $\geq 5\text{cm}$ from other antenna.

Simultaneous transmit

About BT and GSM/WCDMA antenna, stand-alone SAR are not required for BT and its antenna is $\geq 5\text{cm}$ from GSM/WCDMA antenna, so Simultaneous SAR are not required for BT and GSM/WCDMA antenna;

About WIFI and GSM/WCDMA antenna, stand-alone SAR are not required for WIFI and its antenna is $\geq 5\text{cm}$ from GSM/WCDMA antenna, so Simultaneous SAR are not required for wifi and GSM/WCDMA antenna;

About BT and WIFI can't simultaneous transmit.



8. Measurement Uncertainty

9. Main Test Instruments

No.	source	Type	Uncertainty Value (%)	Probability Distribution	k	c _i	Standard uncertainty u _i (%)	Degree of freedom V _{eff} or v _i
1	System repetivity	A	0.5	N	1	1	0.5	9
Measurement system								
2	-probe calibration	B	5.9	N	1	1	5.9	∞
3	-axial isotropy of the probe	B	4.7	R	$\sqrt{3}$	$\sqrt{0.5}$	1.9	∞
4	- Hemispherical isotropy of the probe	B	9.4	R	$\sqrt{3}$	$\sqrt{0.5}$	3.9	∞
6	-boundary effect	B	1.9	R	$\sqrt{3}$	1	1.1	∞
7	-probe linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
8	- System detection limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
9	-readout Electronics	B	1.0	N	1	1	1.0	∞
10	-response time	B	0	R	$\sqrt{3}$	1	0	∞
11	-integration time	B	4.32	R	$\sqrt{3}$	1	2.5	∞
12	-noise	B	0	R	$\sqrt{3}$	1	0	∞
13	-RF Ambient Conditions	B	3	R	$\sqrt{3}$	1	1.73	∞
14	-Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
15	-Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
16	-Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
Test sample Related								
17	-Test Sample Positioning	A	2.9	N	1	1	4.92	71
18	-Device Holder Uncertainty	A	4.1	N	1	1	4.1	5
19	-Output Power Variation - SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.9	∞
Physical parameter								



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20	-phantom	B	4.0	R	$\sqrt{3}$	1	2.3	∞
21	-liquid conductivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.64	1.8	∞
22	-liquid conductivity (measurement uncertainty)	B	0.77	N	1	0.64	0.493	9
23	-liquid permittivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
24	-liquid permittivity (measurement uncertainty)	B	0.29	N	1	0.6	0.174	9
Combined standard uncertainty		$u_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$				11.36		
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N	k=2		22.72	

Table 20: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 13, 2010	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 12, 2011	One year
04	Power sensor	Agilent N8481H	MY50350004	September 26, 2010	One year
05	Signal Generator	HP 8341B	2730A00804	September 13, 2010	One year
06	Amplifier	IXA-020	0401	No Calibration Requested	
07	BTS	E5515C	MY48360988	December 3, 2010	One year
08	E-field Probe	EX3DV4	3677	November 24, 2010	One year
09	DAE	DAE4	871	November 18, 2010	One year
10	Validation Kit 835MHz	D835V2	4d092	January 14, 2010	Two years
11	Validation Kit 1900MHz	D1900V2	5d018	June 15, 2010	Two years

END OF REPORT BODY



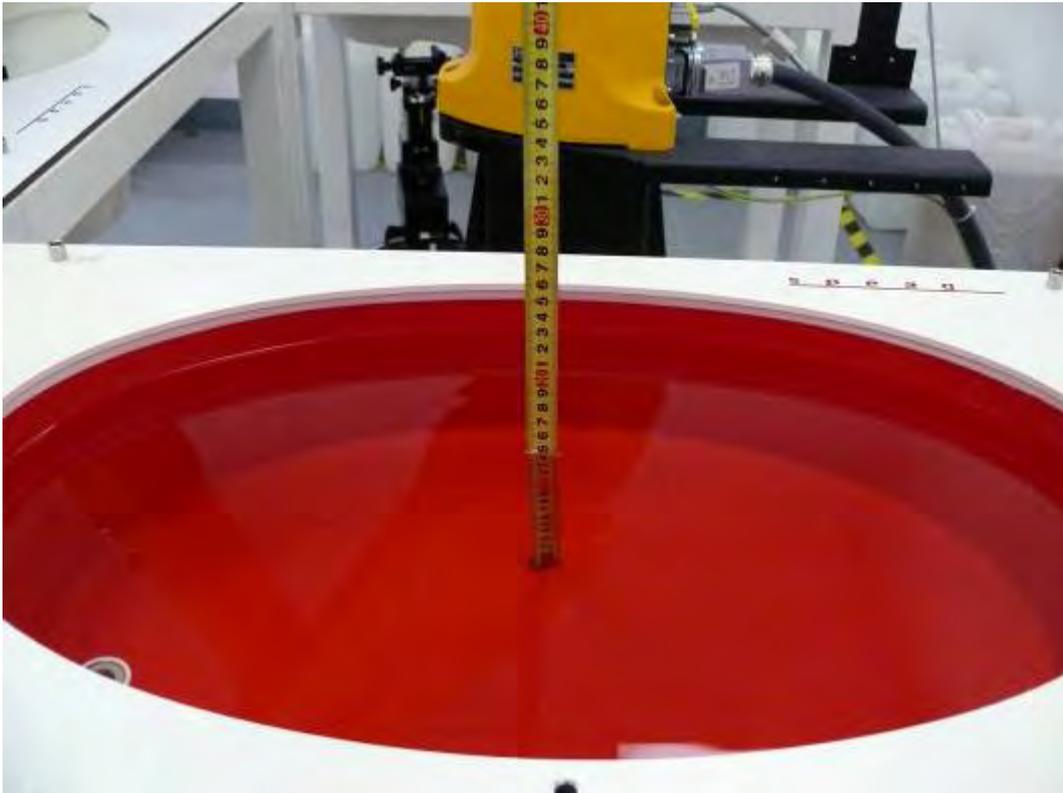
ANNEX A: Test Layout



Picture 1: Specific Absorption Rate Test Layout



Picture 2: Liquid depth in the Flat Phantom (835 MHz, 15.4cm depth)



Picture 3: Liquid depth in the Flat Phantom (1900 MHz, 15.2cm depth)



ANNEX B: System Check Results

System Performance Check at 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d092

Date/Time: 3/12/2011 4:00:20 AM

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 835$ MHz; $\sigma = 0.95$ mho/m; $\epsilon_r = 53.84$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

d=15mm, Pin=250mW/Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.72 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 50.9 V/m; Power Drift = 0.023 dB

Peak SAR (extrapolated) = 3.63 W/kg

SAR(1 g) = 2.52 mW/g; SAR(10 g) = 1.65 mW/g

Maximum value of SAR (measured) = 2.73 mW/g

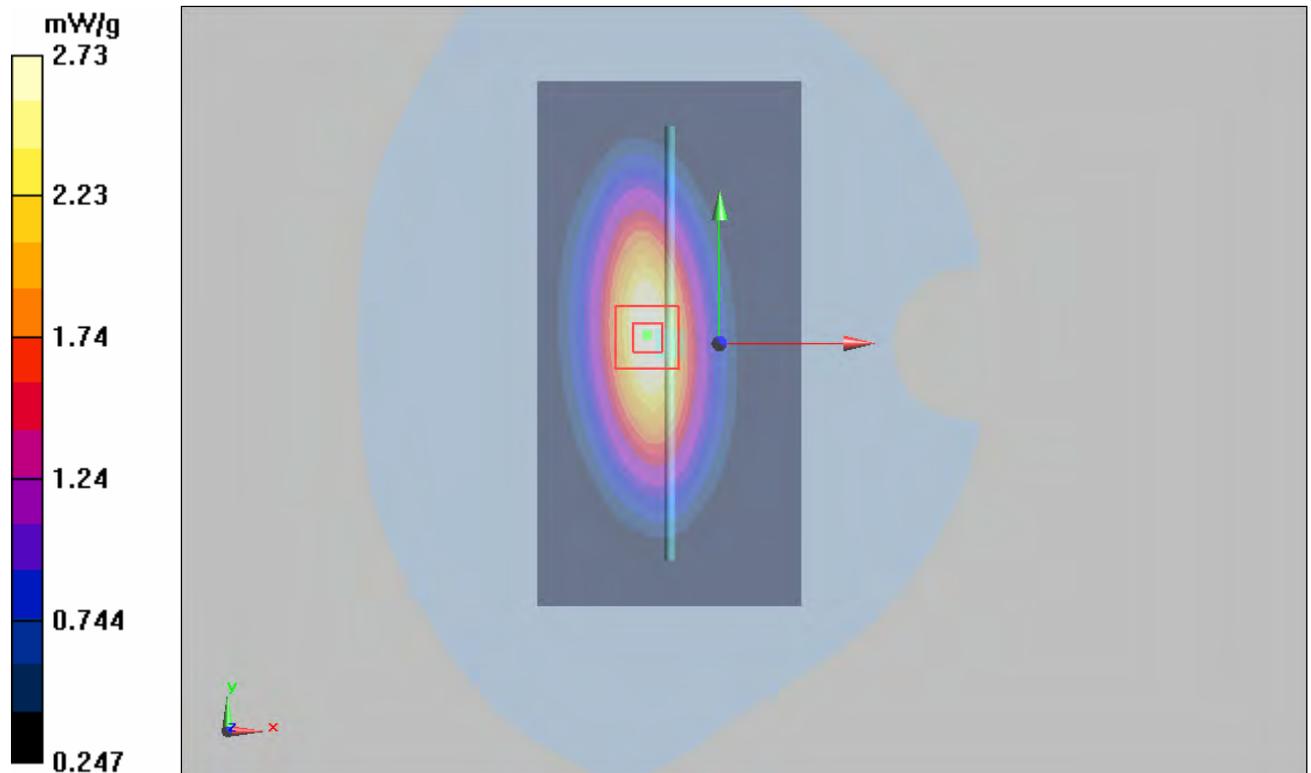


Figure 6 System Performance Check 835MHz 250mW



System Performance Check at 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d092

Date/Time: 6/1/2011 7:30:20 PM

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 55.89$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: $22.3 \text{ }^\circ\text{C}$ Liquid Temperature: $21.6 \text{ }^\circ\text{C}$

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

d=15mm, Pin=250mW/Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.72 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 50.9 V/m; Power Drift = 0.023 dB

Peak SAR (extrapolated) = 3.63 W/kg

SAR(1 g) = 2.51 mW/g; SAR(10 g) = 1.63 mW/g

Maximum value of SAR (measured) = 2.72 mW/g

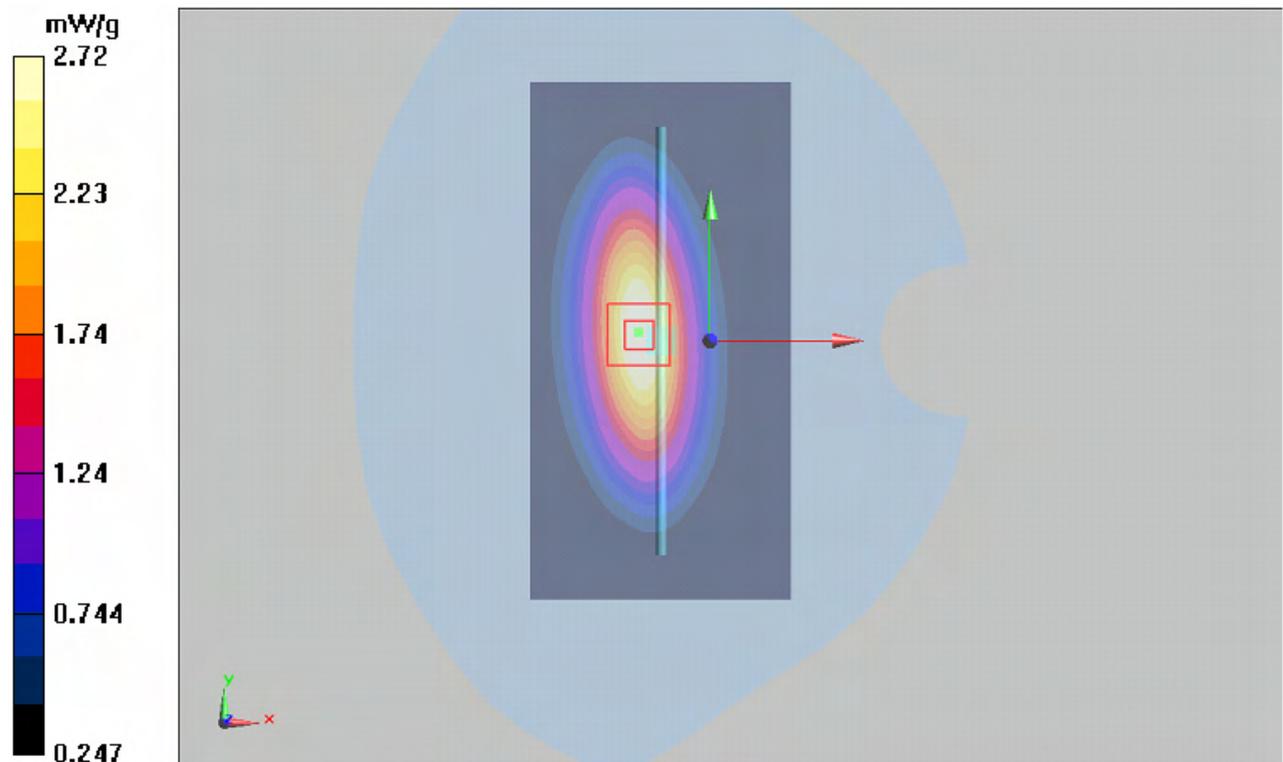


Figure 7 System Performance Check 835MHz 250mW



System Performance Check at 1900 MHz

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d018

Date/Time: 3/13/2011 8:02:19 AM

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.55$ mho/m; $\epsilon_r = 52.98$ $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.7 °C

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.9 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 80.8 V/m; Power Drift = -0.063 dB

Peak SAR (extrapolated) = 17.6 W/kg

SAR(1 g) = 9.82 mW/g; SAR(10 g) = 5.2 mW/g

Maximum value of SAR (measured) = 11 mW/g

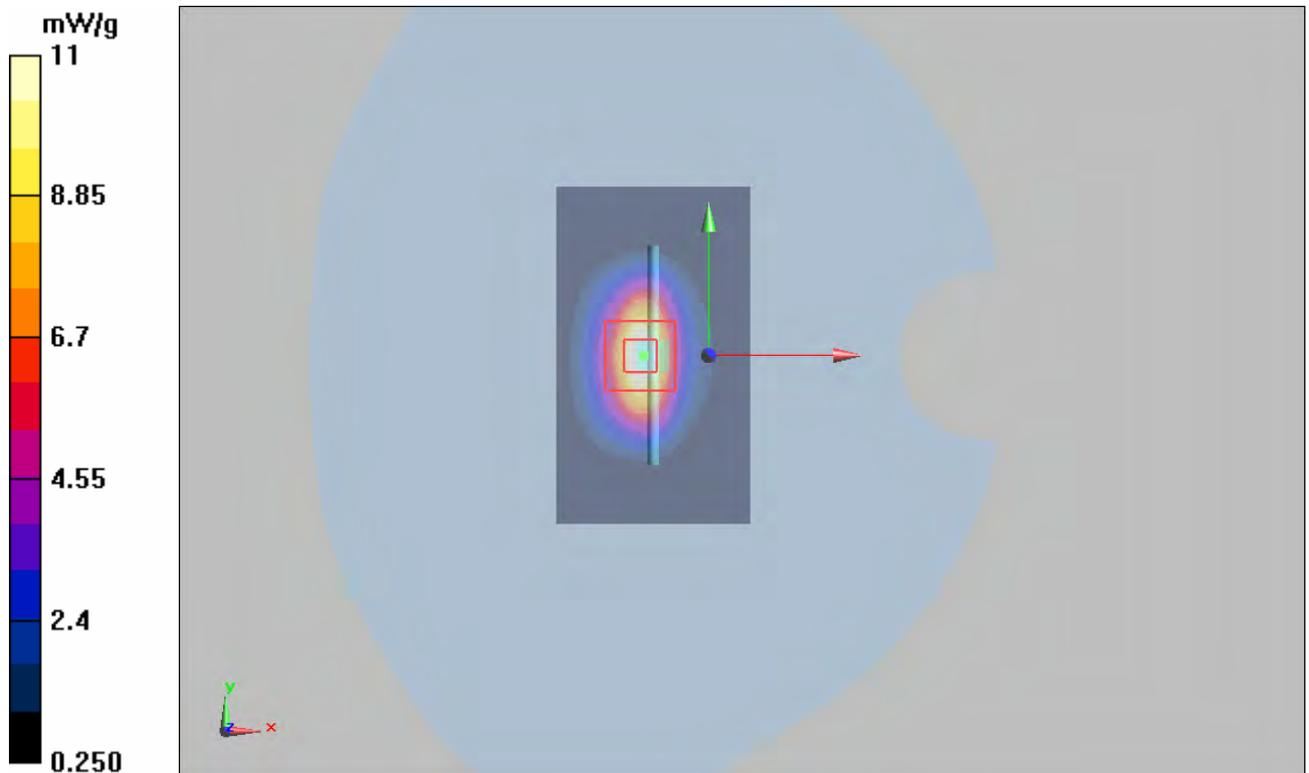


Figure 8 System Performance Check 1900MHz 250mW



System Performance Check at 1900 MHz

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d018

Date/Time: 6/2/2011 8:36:19 AM

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.55$ mho/m; $\epsilon_r = 51.84$ $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.9 °C

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.9 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 80.8 V/m; Power Drift = -0.063 dB

Peak SAR (extrapolated) = 17.6 W/kg

SAR(1 g) = 9.84 mW/g; SAR(10 g) = 5.21 mW/g

Maximum value of SAR (measured) = 11.4 mW/g

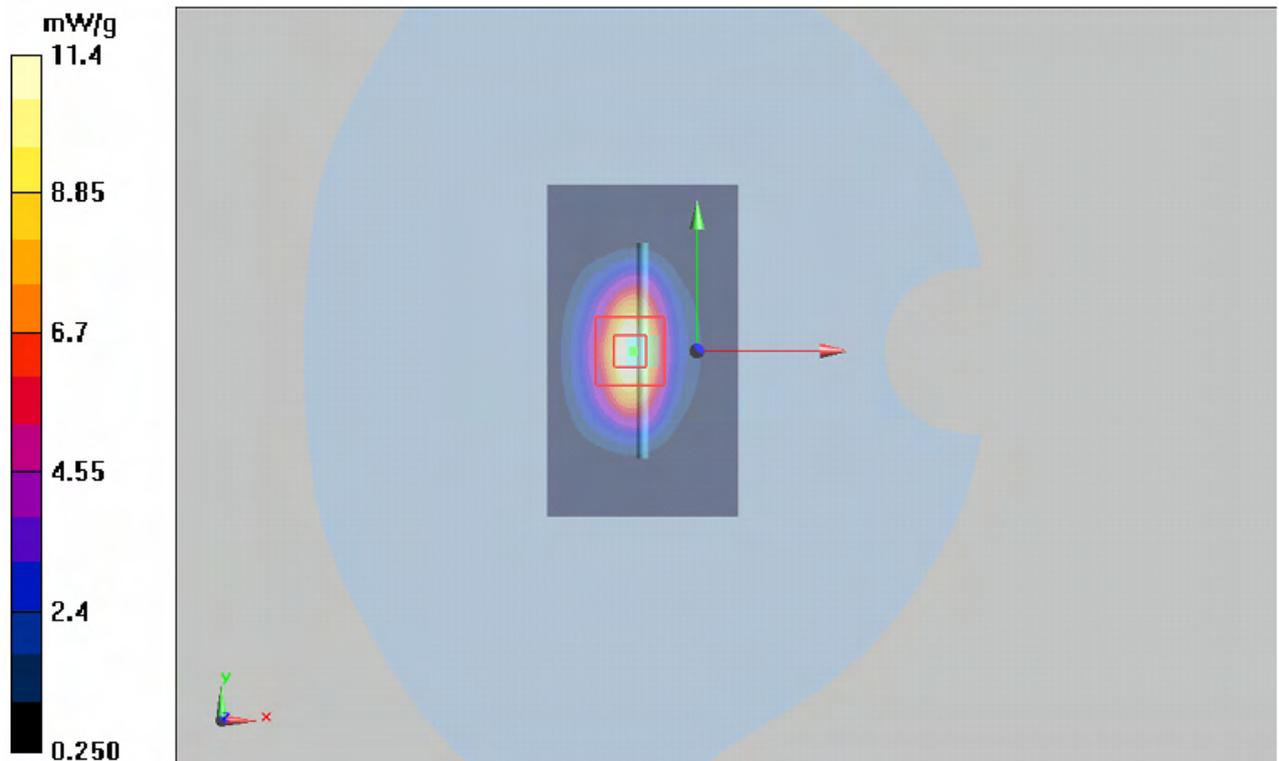


Figure 9 System Performance Check 1900MHz 250mW



ANNEX C: Graph Results

GSM 850 GPRS (1Txslot) Test Position 1 Middle

Date/Time: 3/12/2011 5:21:13 AM

Communication System: GSM850 + GPRS(1Up); Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.951$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 1 Middle/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.539 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.53 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 0.712 W/kg

SAR(1 g) = 0.479 mW/g; SAR(10 g) = 0.326 mW/g

Maximum value of SAR (measured) = 0.513 mW/g

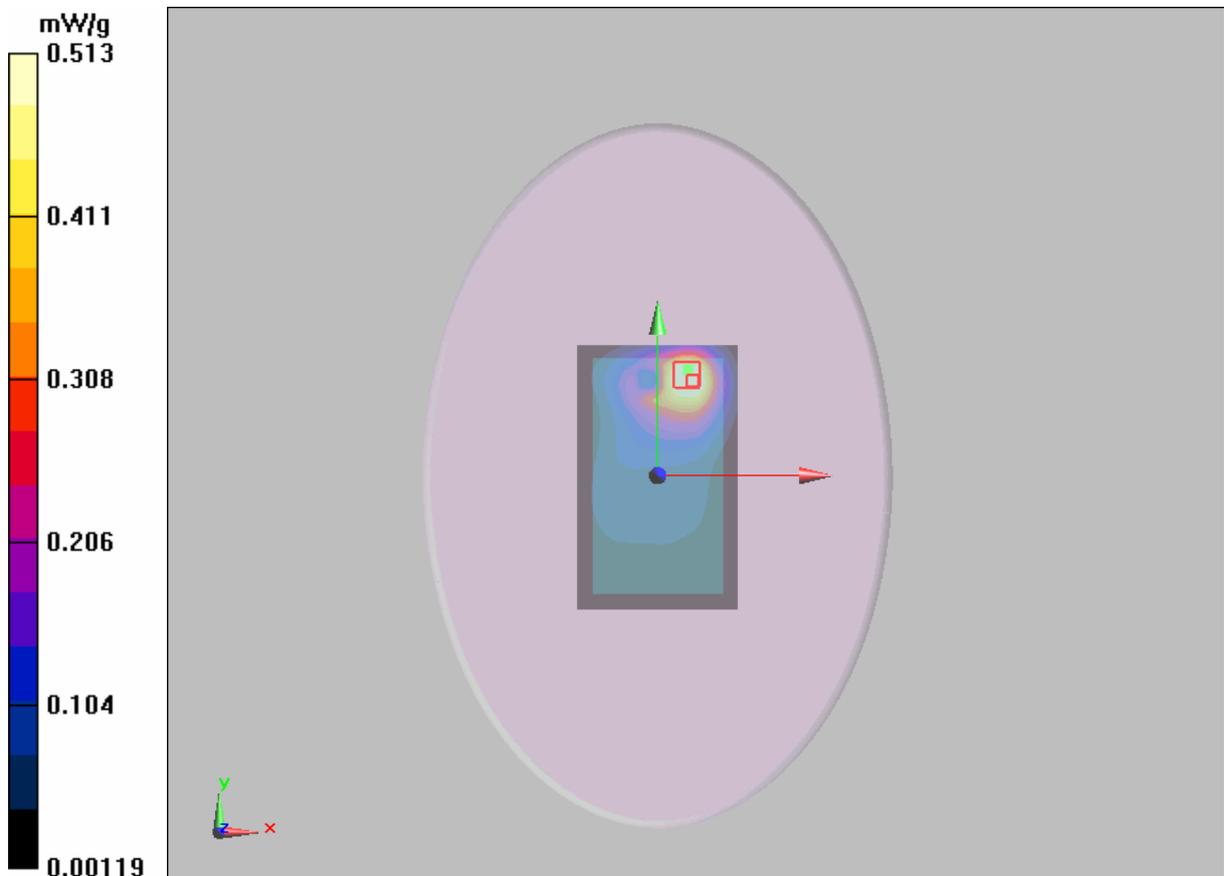


Figure 10 GSM 850 GPRS (1Txslot) Test Position 1 Channel 190



GSM 850 GPRS (2Txslots) Test Position 1 Middle

Date/Time: 3/12/2011 5:53:55 AM

Communication System: GSM850 + GPRS(2Up); Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium parameters used: $f = 837$ MHz; $\sigma = 0.951$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 1 Middle/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.852 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.7 V/m; Power Drift = 0.007 dB

Peak SAR (extrapolated) = 1.12 W/kg

SAR(1 g) = 0.749 mW/g; SAR(10 g) = 0.510 mW/g

Maximum value of SAR (measured) = 0.798 mW/g

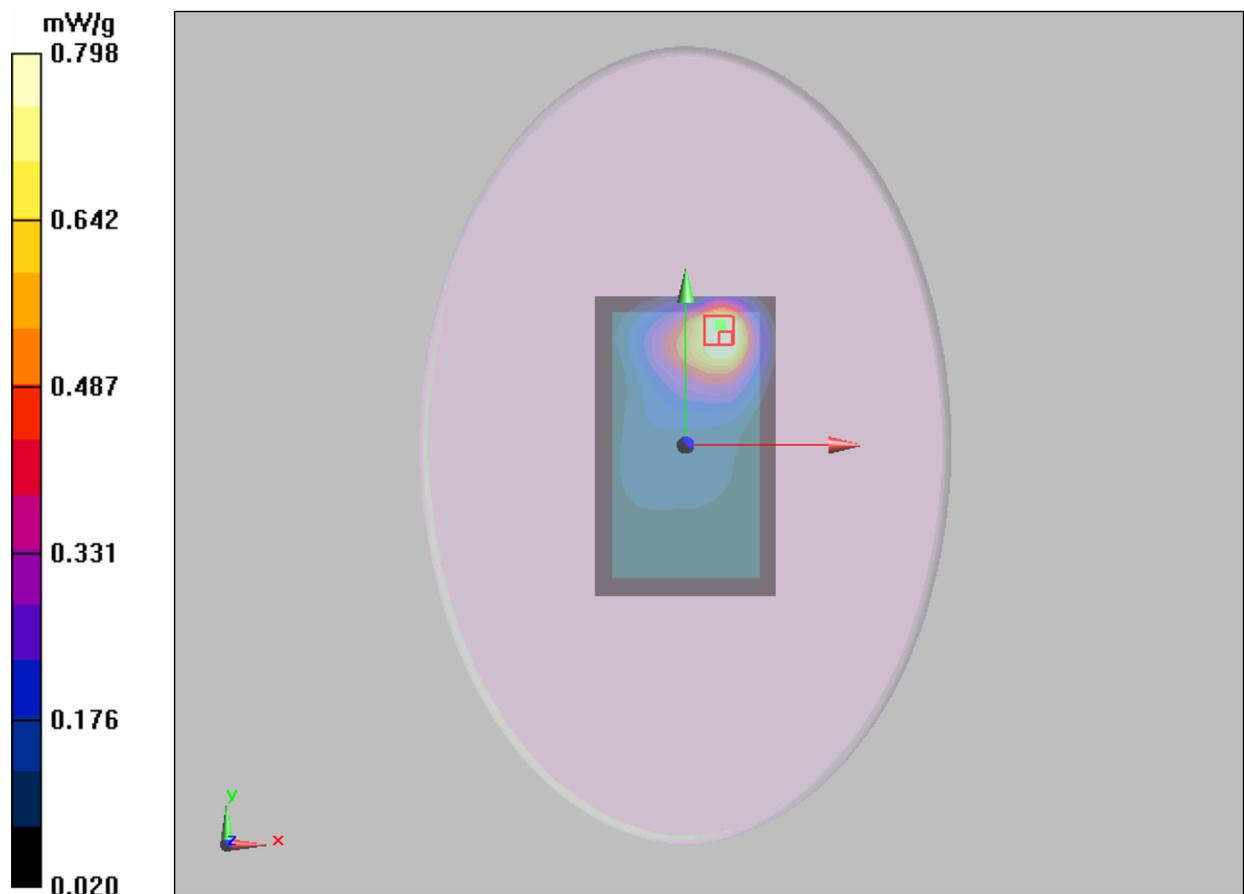


Figure 11 GSM 850 GPRS (2Txslots) Test Position 1 Channel 190



GSM 850 GPRS (3Txslots) Test Position 1 High

Date/Time: 3/12/2011 9:57:25 AM

Communication System: GSM850 + GPRS(3Up); Frequency: 848.8 MHz; Duty Cycle: 1:2.767

Medium parameters used: $f = 849$ MHz; $\sigma = 0.964$ mho/m; $\epsilon_r = 53.7$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 1 High/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.972 mW/g

Test Position 1 High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.1 V/m; Power Drift = 0.059 dB

Peak SAR (extrapolated) = 1.26 W/kg

SAR(1 g) = 0.842 mW/g; SAR(10 g) = 0.580 mW/g

Maximum value of SAR (measured) = 0.899 mW/g

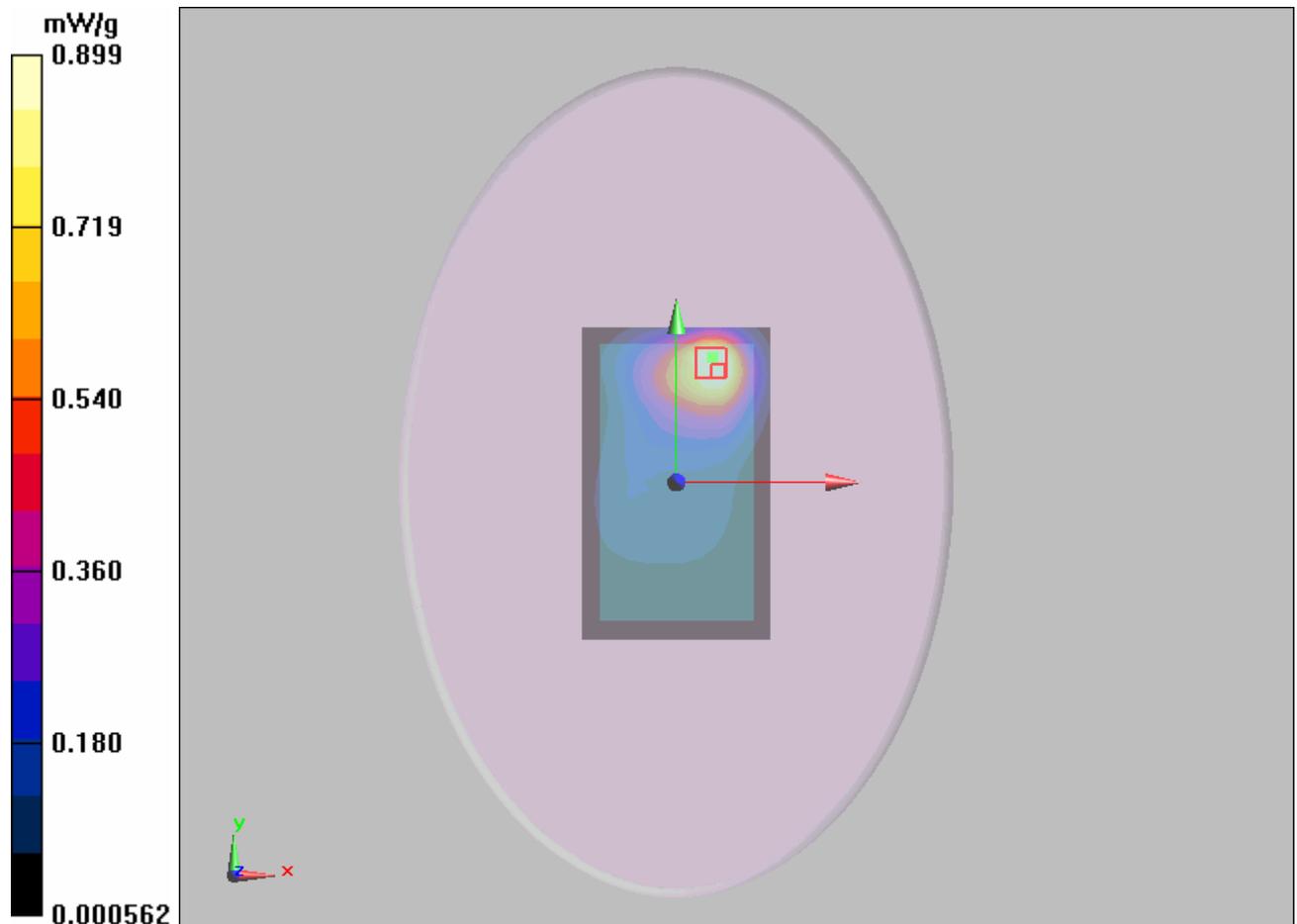


Figure 12 GSM 850 GPRS (3Txslots) Test Position 1 Channel 251



GSM 850 GPRS (3Txslots) Test Position 1 Middle

Date/Time: 3/12/2011 9:25:00 AM

Communication System: GSM850 + GPRS(3Up); Frequency: 836.6 MHz; Duty Cycle: 1:2.767

Medium parameters used: $f = 837$ MHz; $\sigma = 0.951$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 1 Middle/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.01 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.5 V/m; Power Drift = 0.051 dB

Peak SAR (extrapolated) = 1.29 W/kg

SAR(1 g) = 0.877 mW/g; SAR(10 g) = 0.608 mW/g

Maximum value of SAR (measured) = 0.939 mW/g

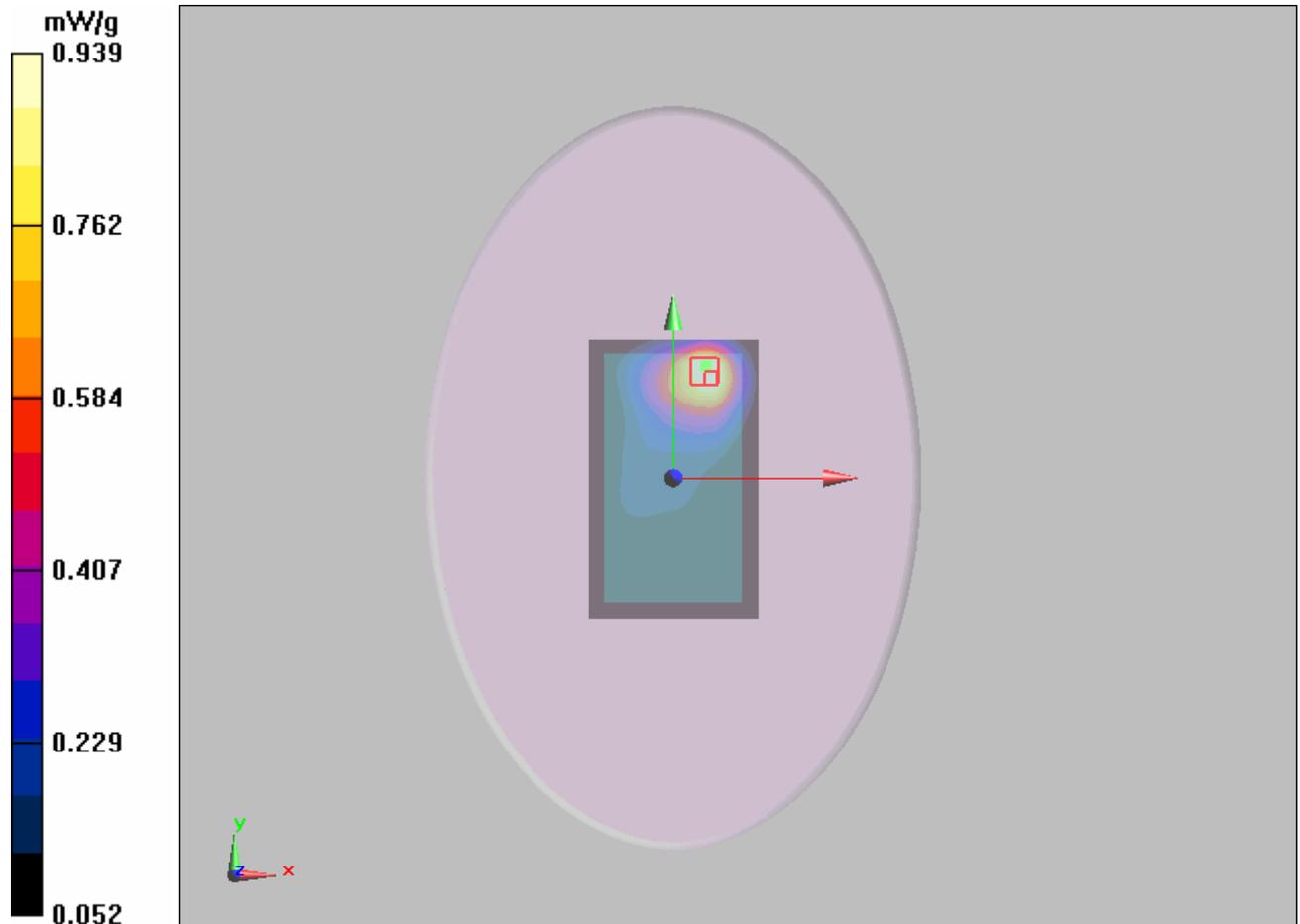


Figure 13 GSM 850 GPRS (3Txslots) Test Position 1 Channel 190



GSM 850 GPRS (3Txslots) Test Position 1 Low

Date/Time: 3/12/2011 10:29:16 AM

Communication System: GSM850 + GPRS(3Up); Frequency: 824.2 MHz; Duty Cycle: 1:2.767

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.942$ mho/m; $\epsilon_r = 54$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 1 Low/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.12 mW/g

Test Position 1 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.8 V/m; Power Drift = -0.071 dB

Peak SAR (extrapolated) = 1.39 W/kg

SAR(1 g) = 0.949 mW/g; SAR(10 g) = 0.660 mW/g

Maximum value of SAR (measured) = 1.01 mW/g

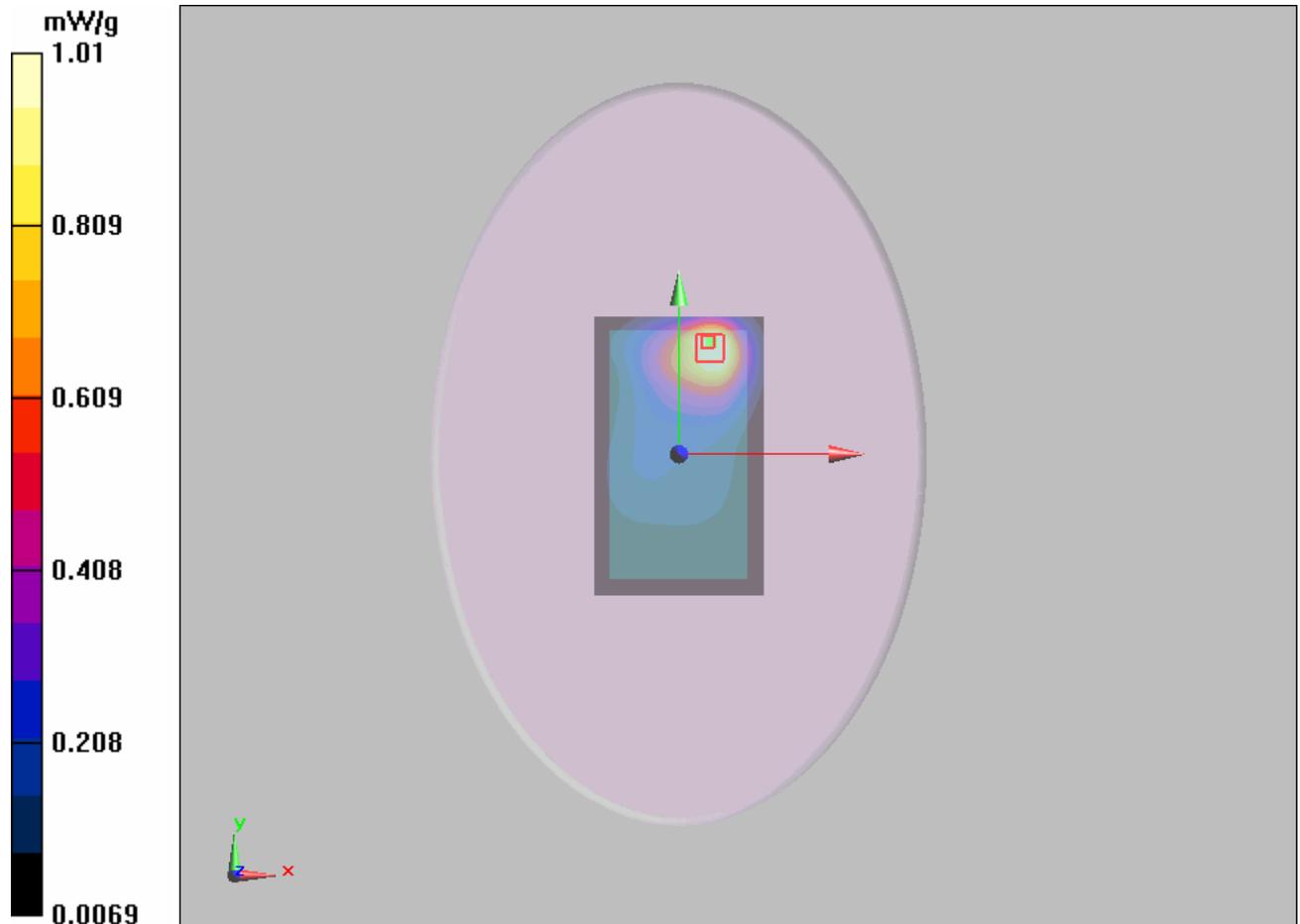


Figure 14 GSM 850 GPRS (3Txslots) Test Position 1 Channel 128



GSM 850 GPRS (4Txslots) Test Position 1 High

Date/Time: 3/12/2011 10:47:14 AM

Communication System: GSM 850+GPRS(4Up); Frequency: 848.8 MHz; Duty Cycle: 1:2.075

Medium parameters used: $f = 849$ MHz; $\sigma = 0.964$ mho/m; $\epsilon_r = 53.7$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 1 High/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.08 mW/g

Test Position 1 High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.8 V/m; Power Drift = -0.042 dB

Peak SAR (extrapolated) = 1.36 W/kg

SAR(1 g) = 0.916 mW/g; SAR(10 g) = 0.631 mW/g

Maximum value of SAR (measured) = 0.975 mW/g

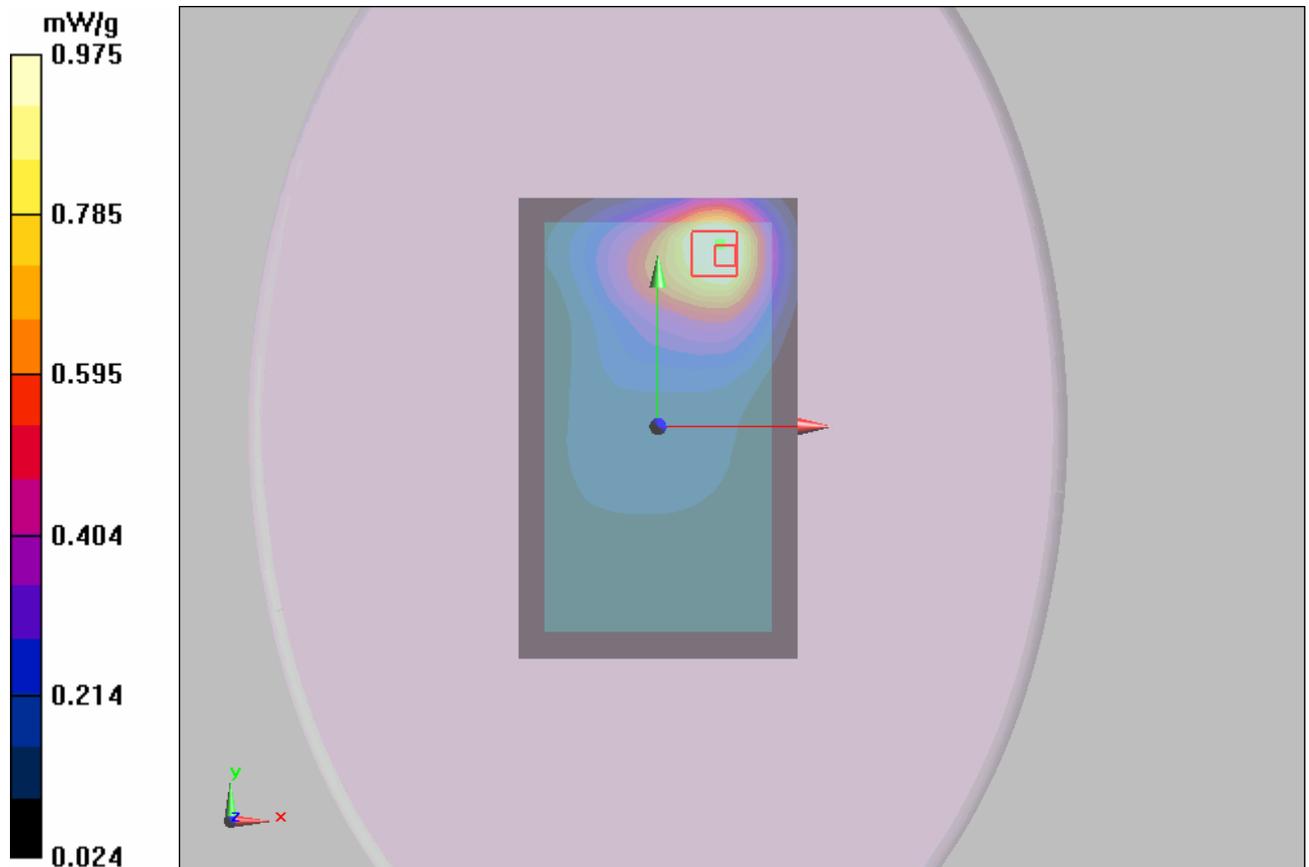


Figure 15 GSM 850 GPRS (4Txslots) Test Position 1 Channel 251



GSM 850 GPRS (4Txslots) Test Position 1 Middle

Date/Time: 3/12/2011 8:52:16 AM

Communication System: GSM 850+GPRS(4Up); Frequency: 836.6 MHz; Duty Cycle: 1:2.075

Medium parameters used: $f = 837$ MHz; $\sigma = 0.951$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 1 Middle/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.07 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.3 V/m; Power Drift = -0.004 dB

Peak SAR (extrapolated) = 1.35 W/kg

SAR(1 g) = 0.913 mW/g; SAR(10 g) = 0.629 mW/g

Maximum value of SAR (measured) = 0.977 mW/g

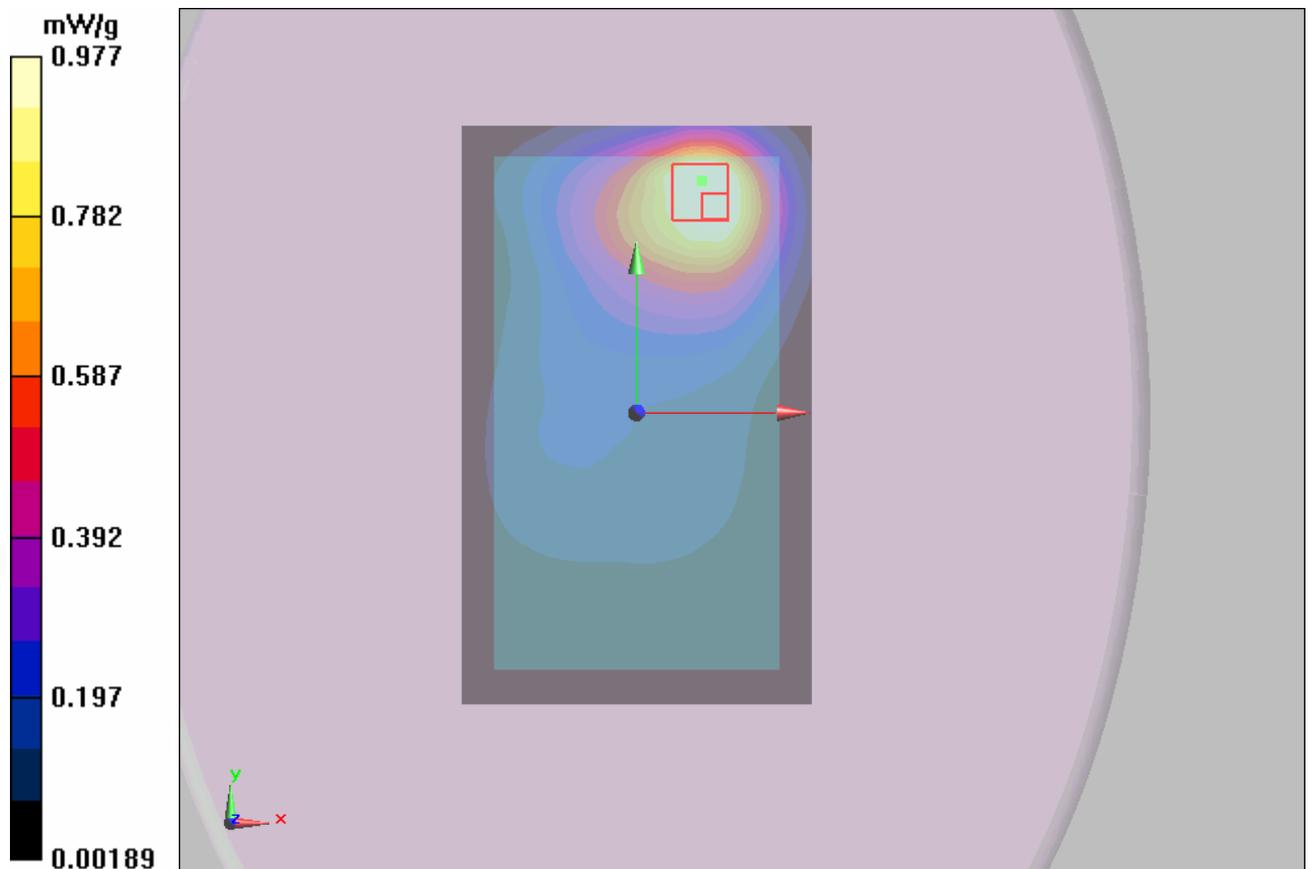


Figure 16 GSM 850 GPRS (4Txslots) Test Position 1 Channel 190



GSM 850 GPRS (4Txslots) Test Position 1 Low

Date/Time: 3/12/2011 11:01:41 AM

Communication System: GSM 850+GPRS(4Up); Frequency: 824.2 MHz; Duty Cycle: 1:2.075

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.942$ mho/m; $\epsilon_r = 54$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 1 Low/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.15 mW/g

Test Position 1 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.9 V/m; Power Drift = -0.055 dB

Peak SAR (extrapolated) = 1.91 W/kg

SAR(1 g) = 0.976 mW/g; SAR(10 g) = 0.671 mW/g

Maximum value of SAR (measured) = 1.04 mW/g

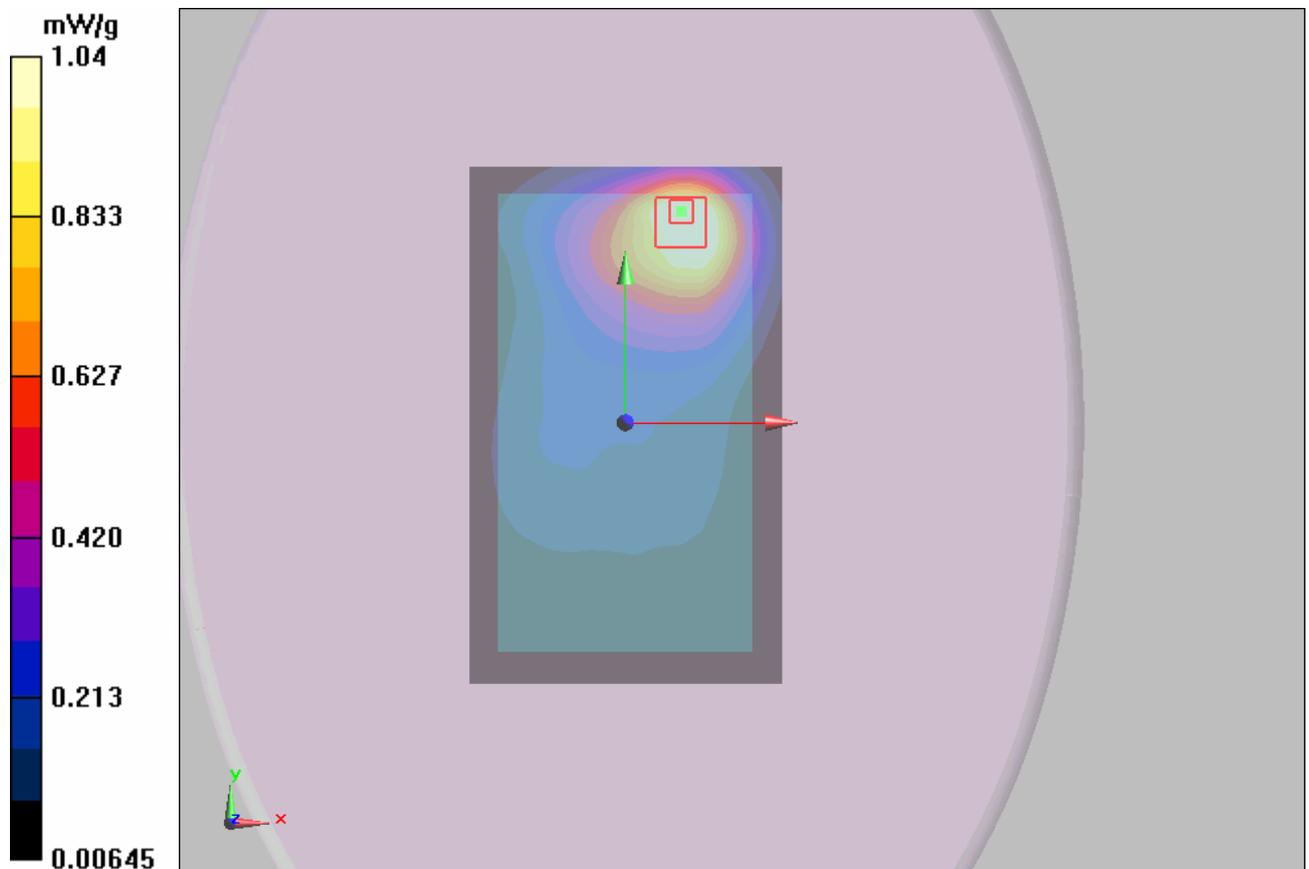


Figure 17 GSM 850 GPRS (4Txslots) Test Position 1 Channel 128



GSM 850 GPRS (4Txslots) Test Position 2 High

Date/Time: 3/12/2011 3:10:11 PM

Communication System: GSM 850+GPRS(4Up); Frequency: 848.8 MHz; Duty Cycle: 1:2.075

Medium parameters used: $f = 849$ MHz; $\sigma = 0.964$ mho/m; $\epsilon_r = 53.7$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 2 High/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.976 mW/g

Test Position 2 High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.2 V/m; Power Drift = 0.069 dB

Peak SAR (extrapolated) = 2.38 W/kg

SAR(1 g) = 0.946 mW/g; SAR(10 g) = 0.634 mW/g

Maximum value of SAR (measured) = 0.994 mW/g

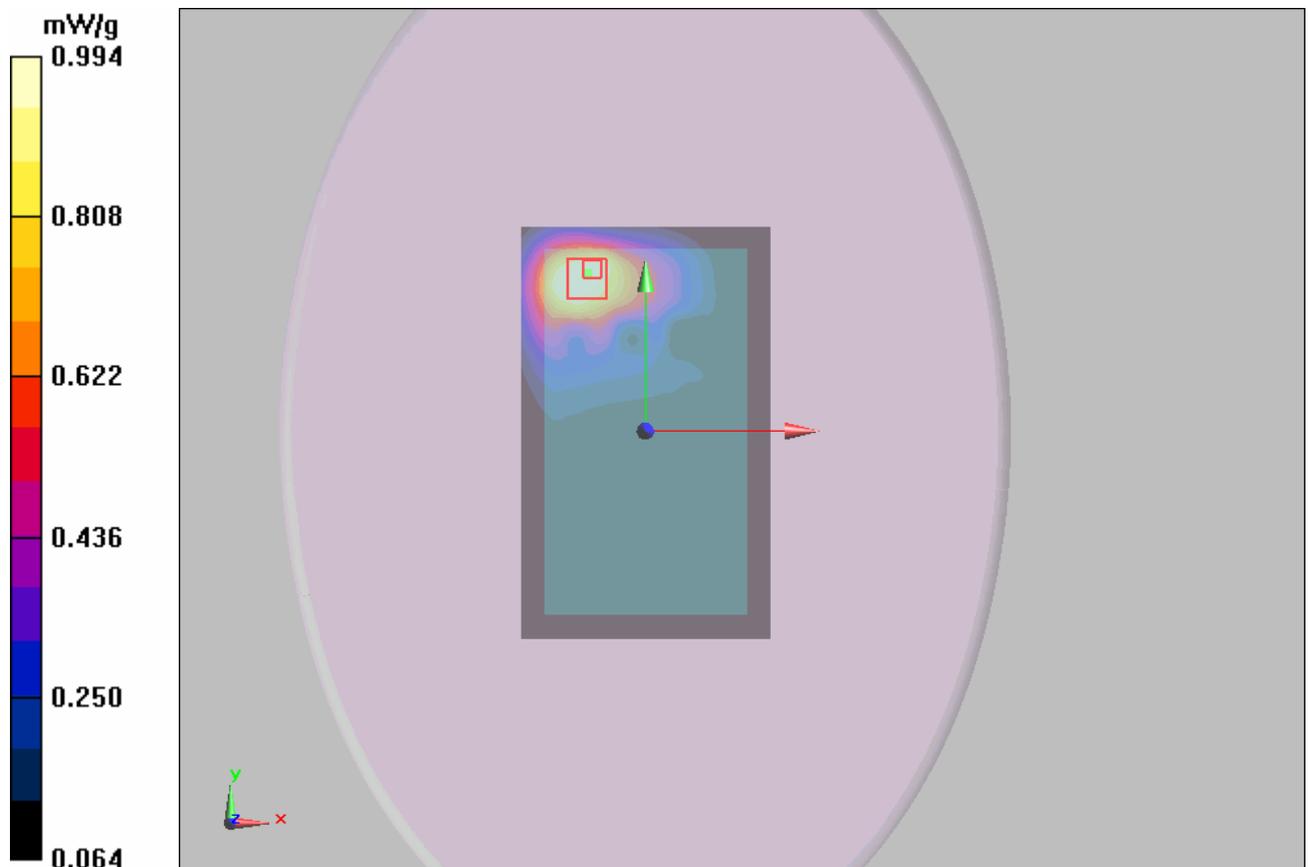


Figure 18 GSM 850 GPRS (4Txslots) Test Position 2 Channel 251



GSM 850 GPRS (4Txslots) Test Position 2 Middle

Date/Time: 3/12/2011 12:55:23 PM

Communication System: GSM 850+GPRS(4Up); Frequency: 836.6 MHz; Duty Cycle: 1:2.075

Medium parameters used: $f = 837$ MHz; $\sigma = 0.951$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 2 Middle/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.06 mW/g

Test Position 2 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.5 V/m; Power Drift = -0.056 dB

Peak SAR (extrapolated) = 1.6 W/kg

SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.687 mW/g

Maximum value of SAR (measured) = 1.12 mW/g

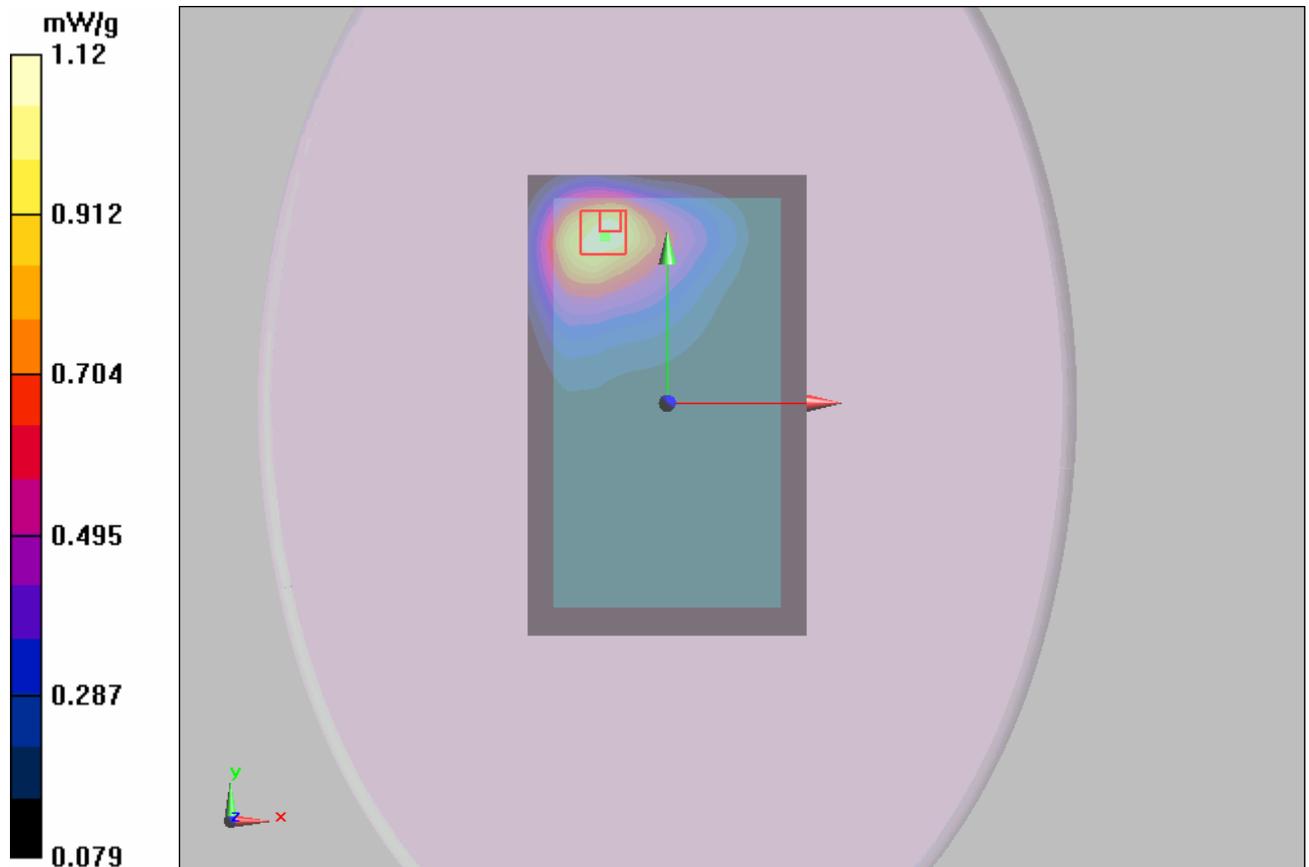


Figure 19 GSM 850 GPRS (4Txslots) Test Position 2 Channel 190



GSM 850 GPRS (4Txslots) Test Position 2 Low

Date/Time: 3/12/2011 3:42:52 PM

Communication System: GSM 850+GPRS(4Up); Frequency: 824.2 MHz; Duty Cycle: 1:2.075

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.942$ mho/m; $\epsilon_r = 54$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 2 Low/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.11 mW/g

Test Position 2 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.5 V/m; Power Drift = -0.096 dB

Peak SAR (extrapolated) = 1.55 W/kg

SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.693 mW/g

Maximum value of SAR (measured) = 1.12 mW/g

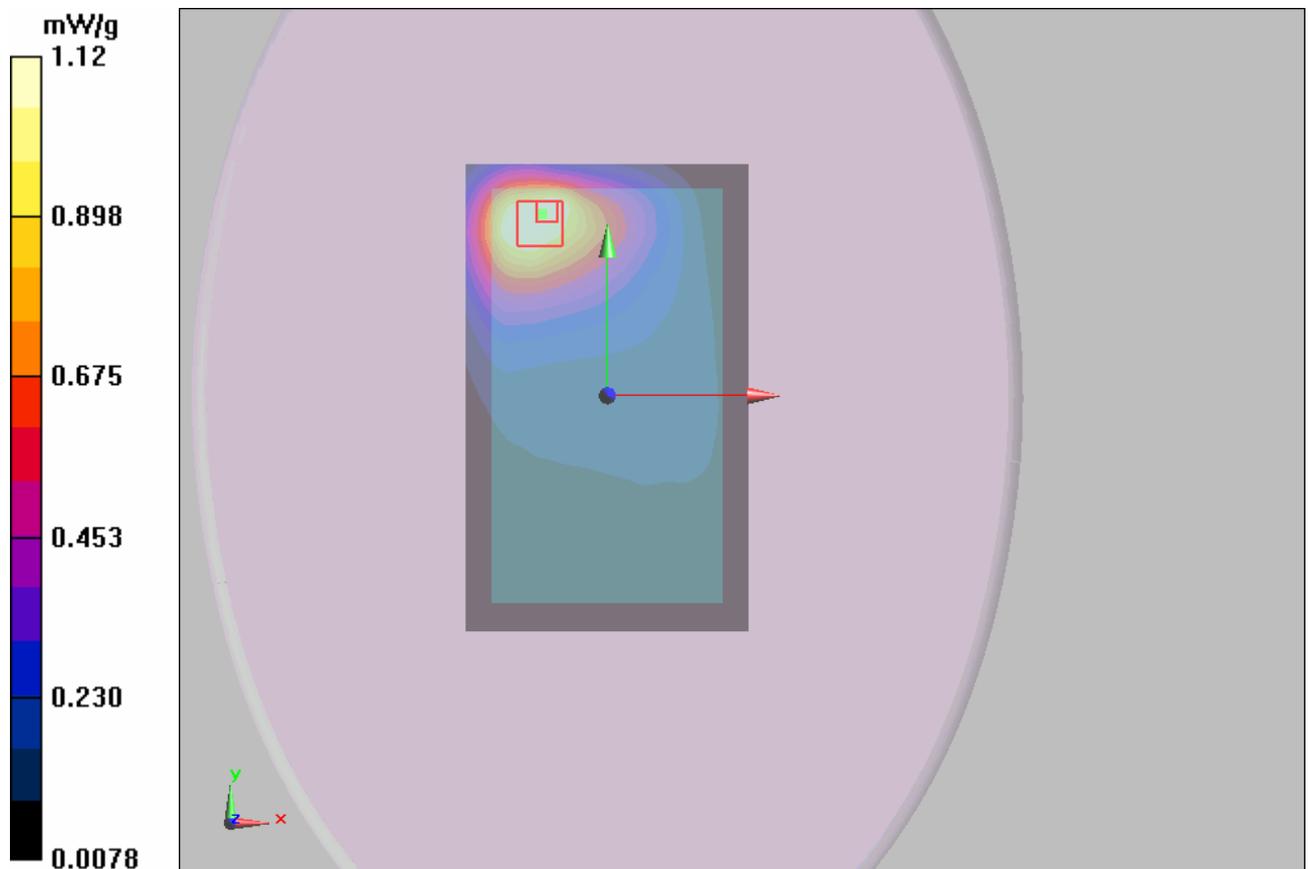


Figure 20 GSM 850 GPRS (4Txslots) Test Position 2 Channel 128



GSM 850 GPRS (4Txslots) Test Position 3 High

Date/Time: 3/12/2011 6:36:59 PM

Communication System: GSM 850+GPRS(4Up); Frequency: 848.8 MHz; Duty Cycle: 1:2.075

Medium parameters used: $f = 849$ MHz; $\sigma = 0.964$ mho/m; $\epsilon_r = 53.7$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 3 High/Area Scan (31x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.16 mW/g

Test Position 3 High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 34.9 V/m; Power Drift = 0.026 dB

Peak SAR (extrapolated) = 1.45 W/kg

SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.669 mW/g

Maximum value of SAR (measured) = 1.15 mW/g

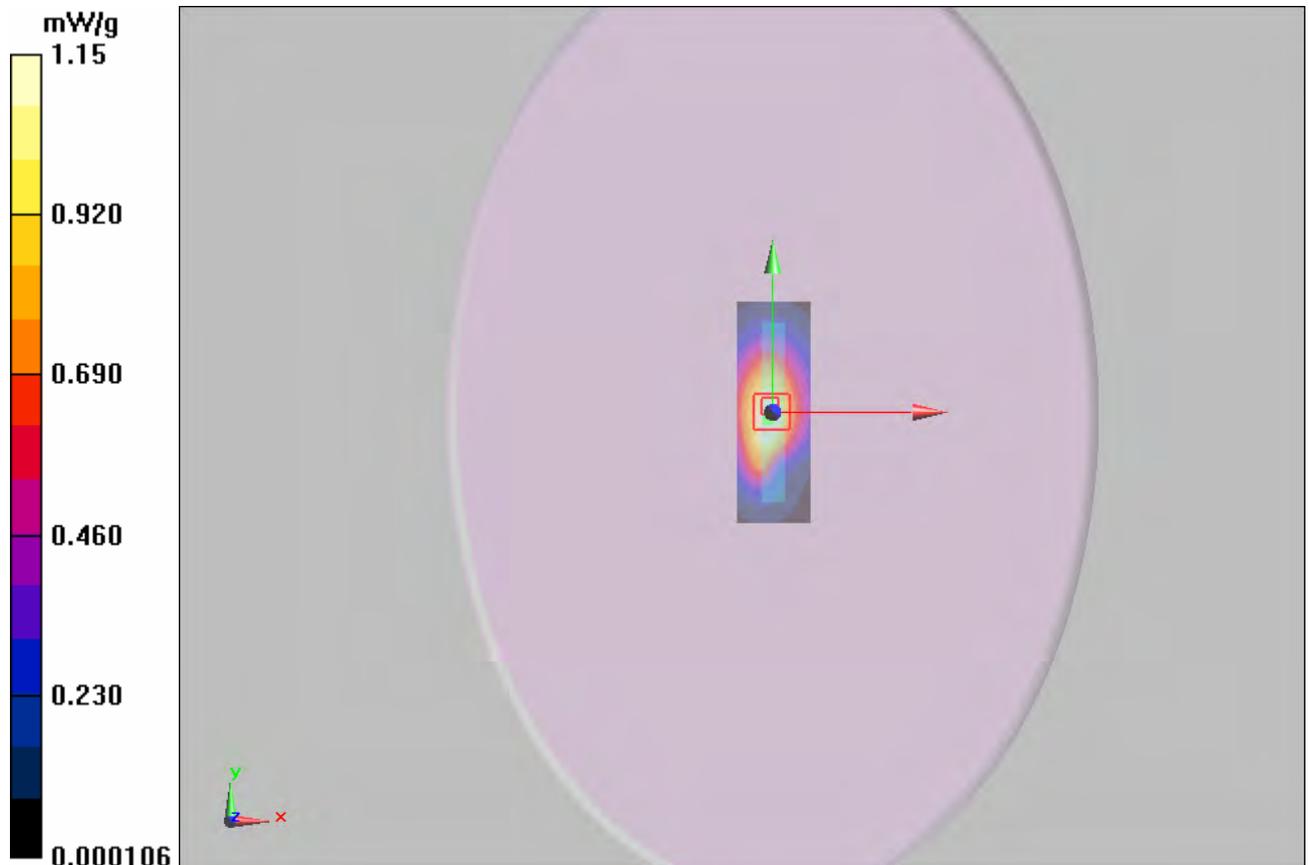


Figure 21 GSM 850 GPRS (4Txslots) Test Position 3 Channel 251



GSM 850 GPRS (4Txslots) Test Position 3 Middle

Date/Time: 3/12/2011 6:16:04 PM

Communication System: GSM 850+GPRS(4Up); Frequency: 836.6 MHz; Duty Cycle: 1:2.075

Medium parameters used: $f = 837$ MHz; $\sigma = 0.951$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 3 Middle/Area Scan (31x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.25 mW/g

Test Position 3 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 38.1 V/m; Power Drift = -0.190 dB

Peak SAR (extrapolated) = 1.89 W/kg

SAR(1 g) = 1.15 mW/g; SAR(10 g) = 0.758 mW/g

Maximum value of SAR (measured) = 1.24 mW/g

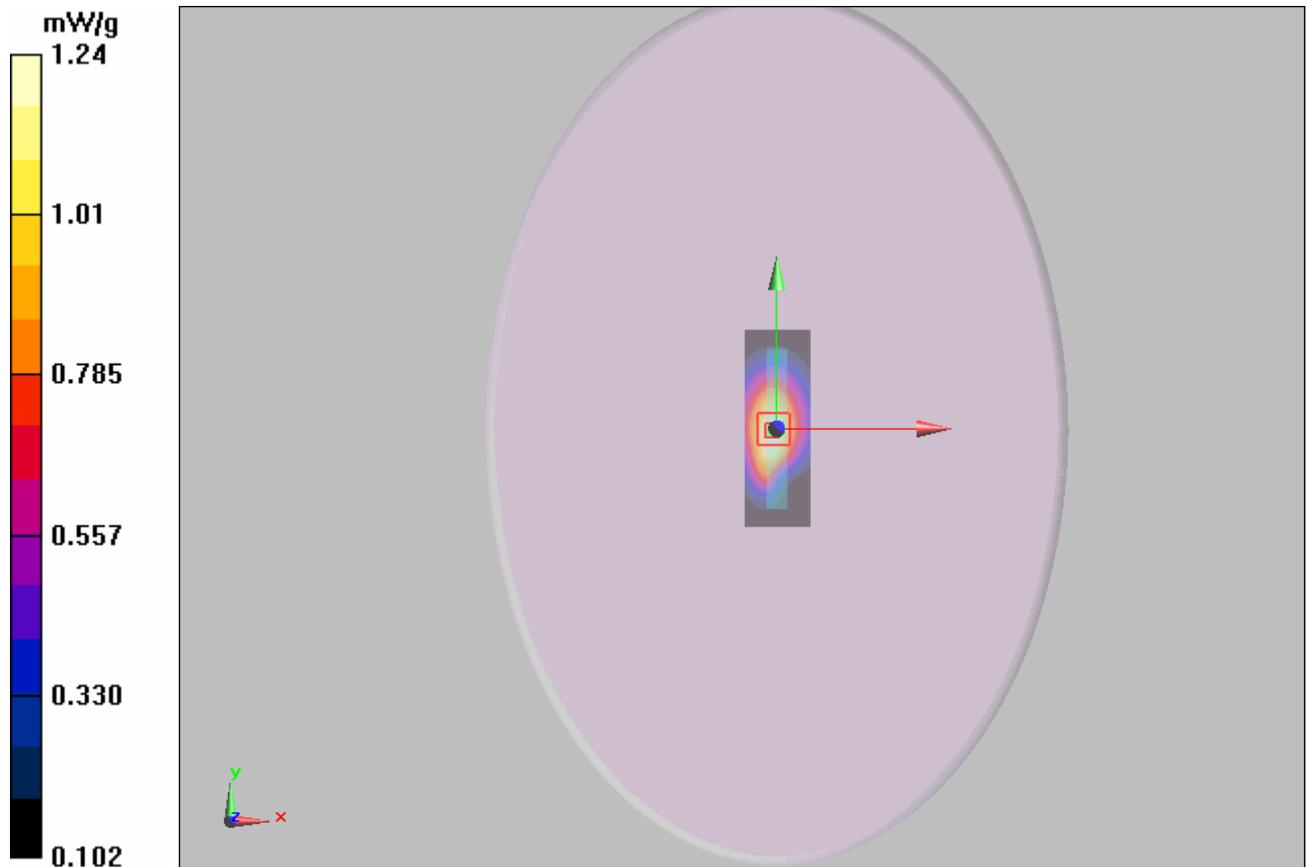


Figure 22 GSM 850 GPRS (4Txslots) Test Position 3 Channel 190



GSM 850 GPRS (4Txslots) Test Position 3 Low

Date/Time: 3/12/2011 6:56:34 PM

Communication System: GSM 850+GPRS(4Up); Frequency: 824.2 MHz; Duty Cycle: 1:2.075

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.942$ mho/m; $\epsilon_r = 54$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 3 Low/Area Scan (31x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.25 mW/g

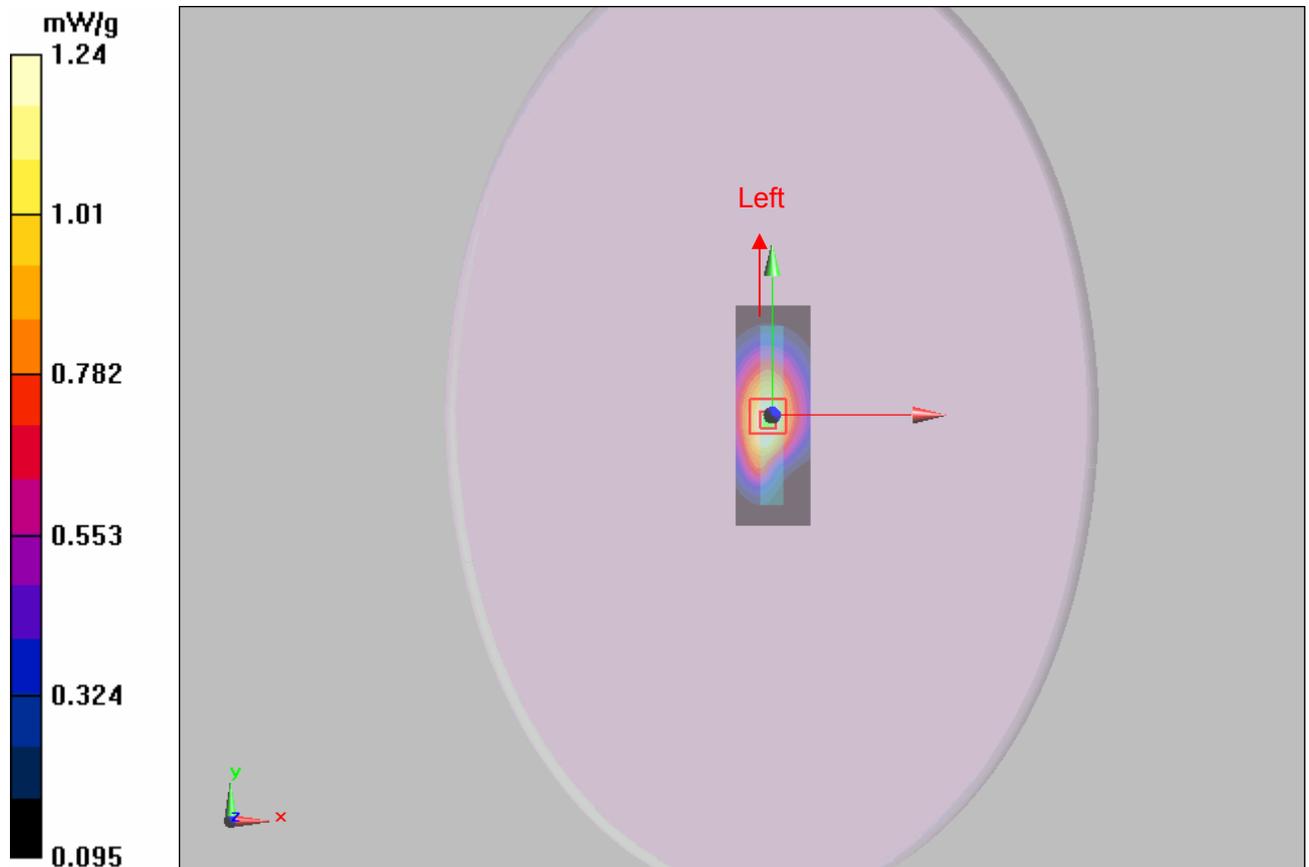
Test Position 3 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 36.7 V/m; Power Drift = -0.028 dB

Peak SAR (extrapolated) = 1.67 W/kg

SAR(1 g) = 1.15 mW/g; SAR(10 g) = 0.764 mW/g

Maximum value of SAR (measured) = 1.24 mW/g



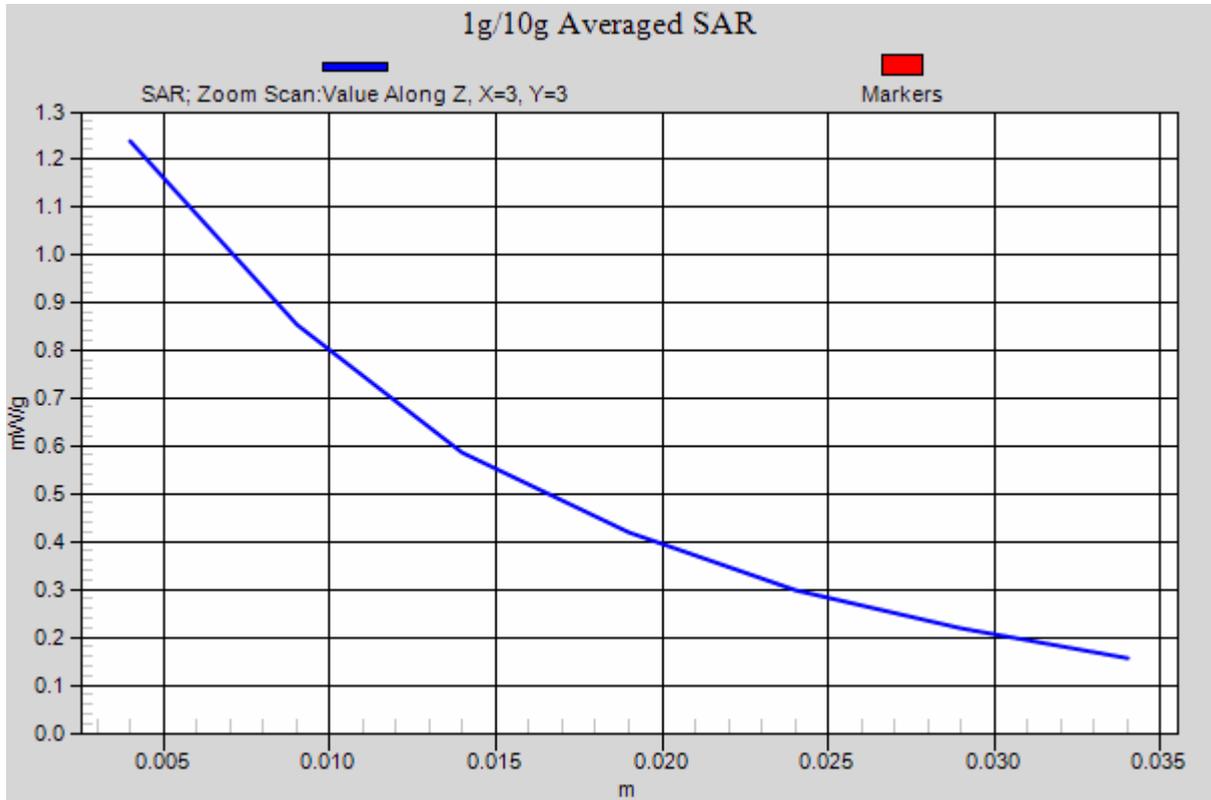


Figure 23 GSM 850 GPRS (4Txslots) Test Position 3 Channel 128



GSM 850 GPRS (4Txslots) Test Position 5 Middle

Date/Time: 3/12/2011 7:17:42 PM

Communication System: GSM 850+GPRS(4Up); Frequency: 836.6 MHz; Duty Cycle: 1:2.075

Medium parameters used: $f = 837$ MHz; $\sigma = 0.951$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 5 Middle/Area Scan (31x161x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.386 mW/g

Test Position 5 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.9 V/m; Power Drift = 0.048 dB

Peak SAR (extrapolated) = 0.538 W/kg

SAR(1 g) = 0.343 mW/g; SAR(10 g) = 0.212 mW/g

Maximum value of SAR (measured) = 0.374 mW/g

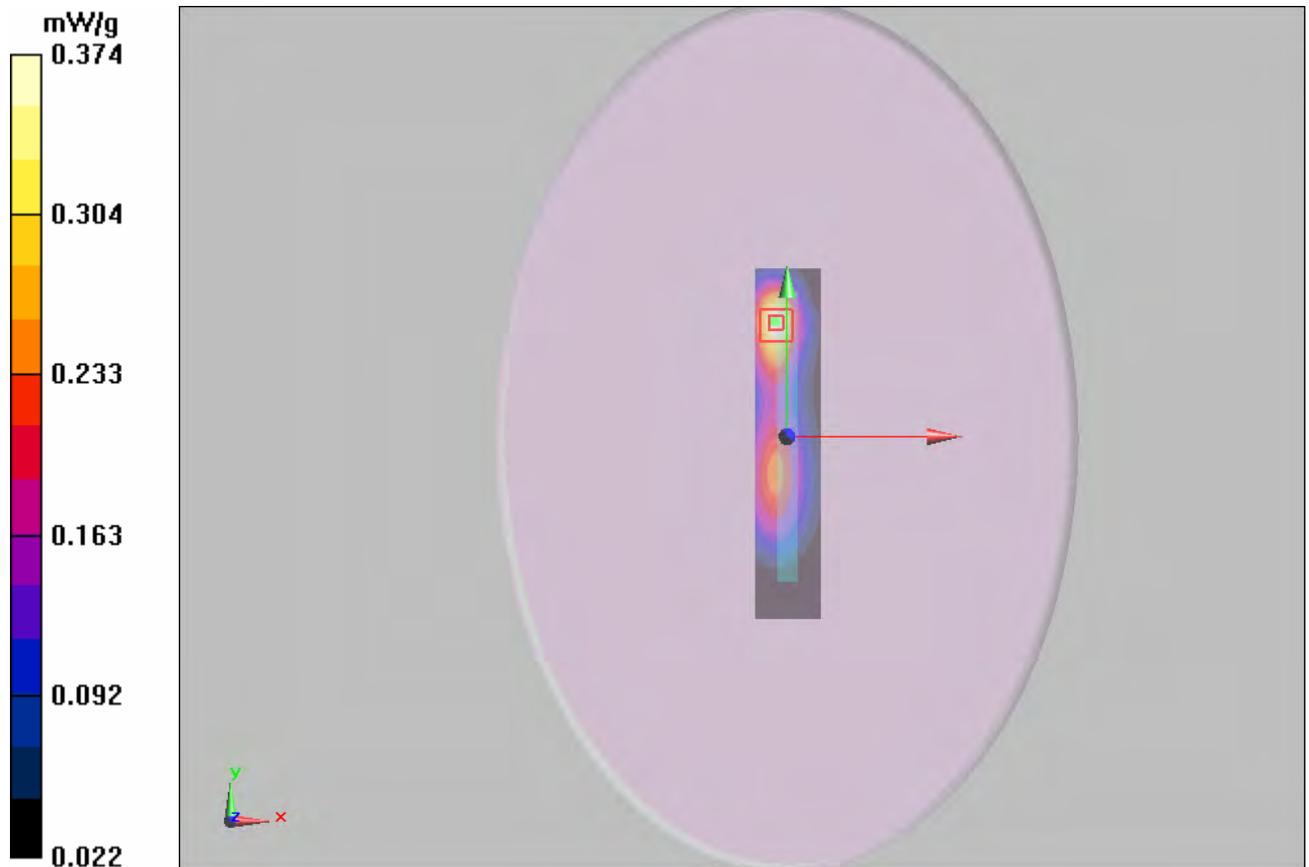


Figure 24 GSM 850 GPRS (4Txslots) Test Position 5 Channel 190



GSM 850 with Earphone Test Position 3 Low

Date/Time: 6/1/2011 8:57:30 PM

Communication System: GSM850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.978$ mho/m; $\epsilon_r = 55.9$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Towards Phantom Low/Area Scan (31x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.789 mW/g

Towards Phantom Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm,

dz=5mm

Reference Value = 29.1 V/m; Power Drift = -0.008 dB

Peak SAR (extrapolated) = 1.09 W/kg

SAR(1 g) = 0.750 mW/g; SAR(10 g) = 0.501 mW/g

Maximum value of SAR (measured) = 0.809 mW/g

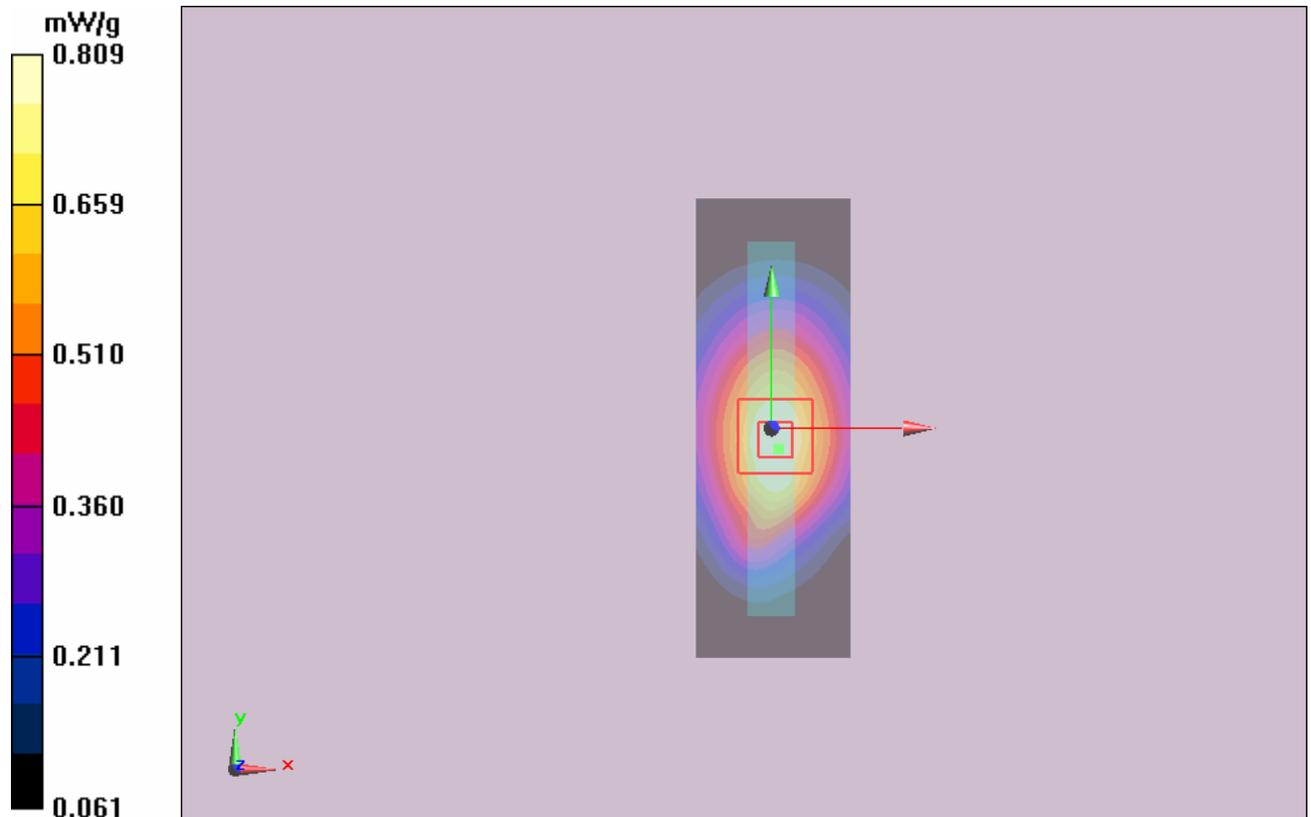


Figure 25 GSM 850 with Earphone, Test Position 3 Channel 128



GSM 850 EGPRS (4Txslots) Test Position 3 Low

Date/Time: 3/12/2011 8:05:31 PM

Communication System: GSM 850+EGPRS(4Up); Frequency: 824.2 MHz;Duty Cycle: 1:2.075

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.942$ mho/m; $\epsilon_r = 54$; $\rho = 1000$ kg/m³

Ambient Temperature:22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(10.33, 10.33, 10.33); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 3 Low/Area Scan (31x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.16 mW/g

Test Position 3 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 36.8 V/m; Power Drift = -0.057 dB

Peak SAR (extrapolated) = 1.64 W/kg

SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.718 mW/g

Maximum value of SAR (measured) = 1.18 mW/g

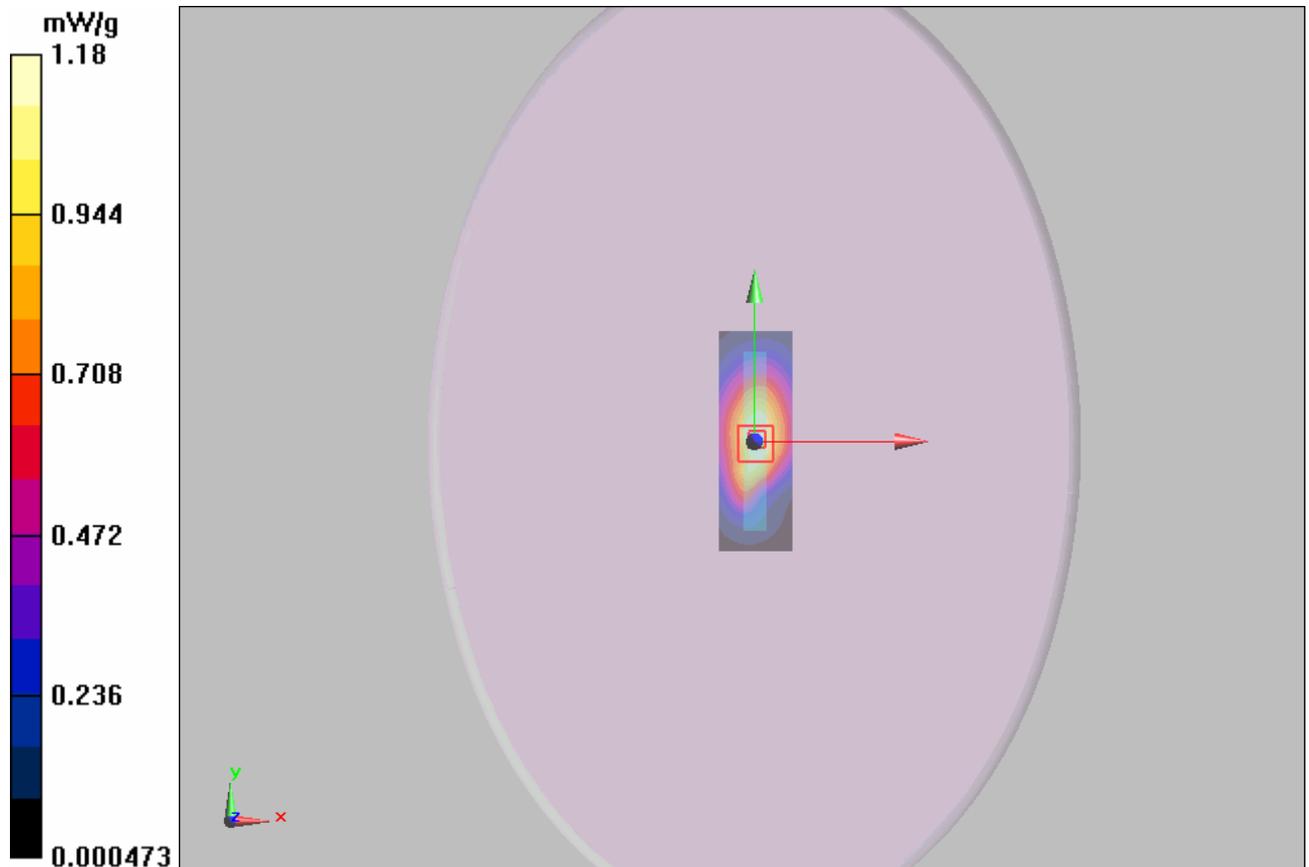


Figure 26 GSM 850 EGPRS (4Txslots) Test Position 3 Channel 128



GSM 1900 GPRS (1Txslot) Test Position 1 Middle

Date/Time: 3/13/2011 9:46:27 AM

Communication System: PCS 1900+GPRS(1Up); Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 1 Middle/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.484 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.5 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 0.724 W/kg

SAR(1 g) = 0.407 mW/g; SAR(10 g) = 0.240 mW/g

Maximum value of SAR (measured) = 0.444 mW/g

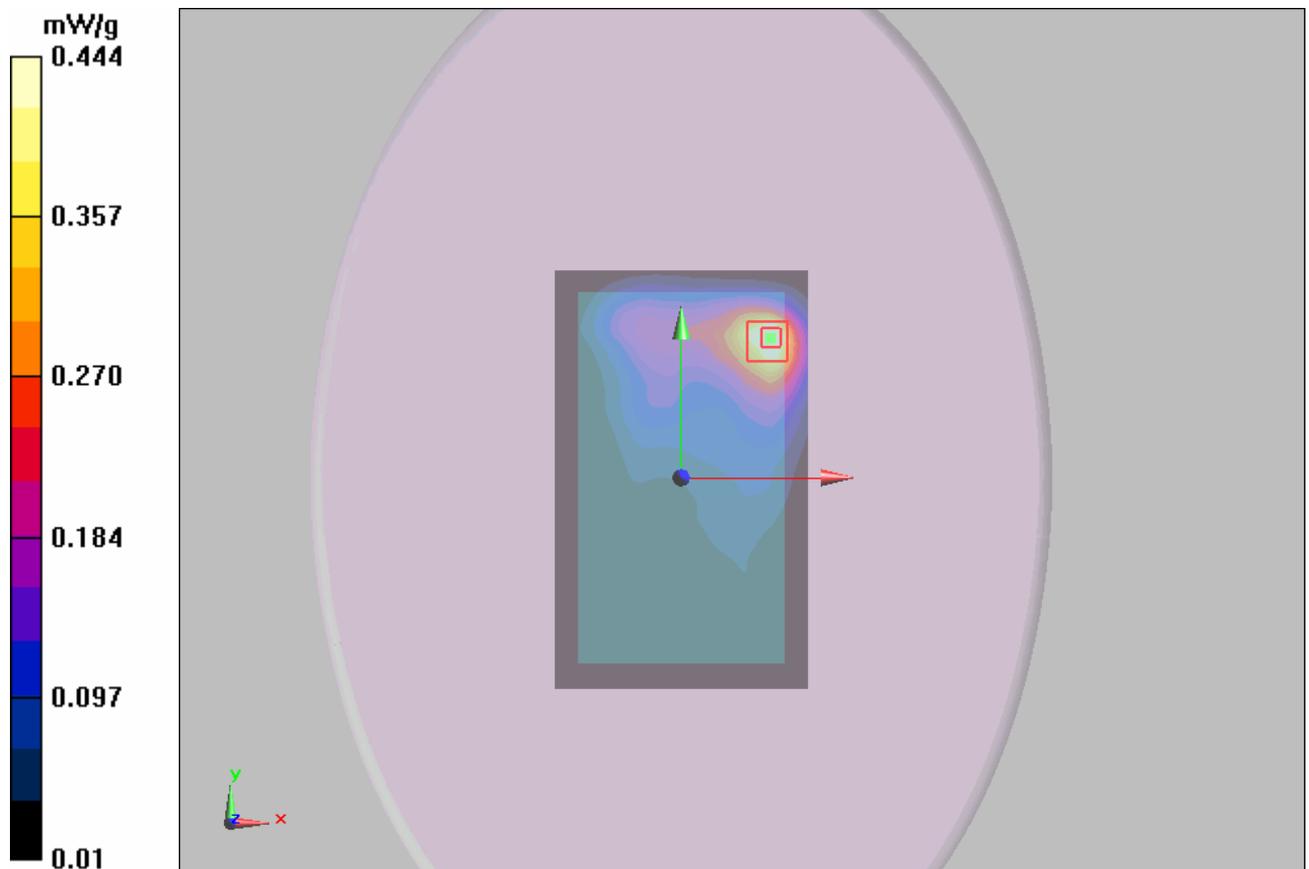


Figure 27 GSM 1900 GPRS (1Txslot) Test Position 1 Channel 661



GSM 1900 GPRS (2Txslots) Test Position 1 Middle

Date/Time: 3/13/2011 10:36:21 AM

Communication System: PCS 1900+GPRS(2Up); Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 1 Middle/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.555 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.49 V/m; Power Drift = -0.175 dB

Peak SAR (extrapolated) = 0.873 W/kg

SAR(1 g) = 0.487 mW/g; SAR(10 g) = 0.272 mW/g

Maximum value of SAR (measured) = 0.531 mW/g

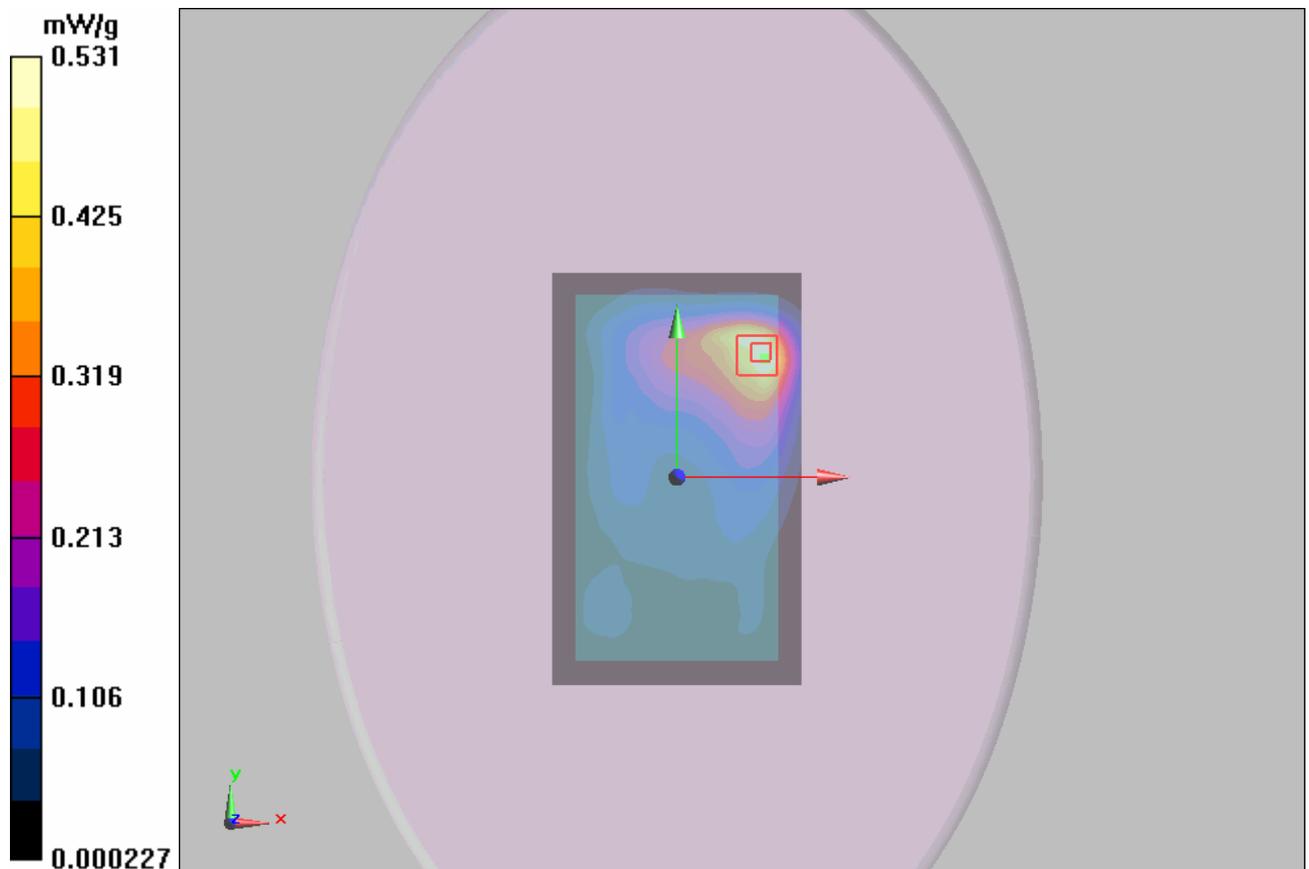


Figure 28 GSM 1900 GPRS (2Txslots) Test Position 1 Channel 661



GSM 1900 GPRS (3Txslots) Test Position 1 Middle

Date/Time: 3/13/2011 11:32:00 AM

Communication System: PCS 1900+GPRS(3Up); Frequency: 1880 MHz; Duty Cycle: 1:2.767

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 1 Middle/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.632 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.83 V/m; Power Drift = -0.010 dB

Peak SAR (extrapolated) = 1.04 W/kg

SAR(1 g) = 0.575 mW/g; SAR(10 g) = 0.340 mW/g

Maximum value of SAR (measured) = 0.618 mW/g

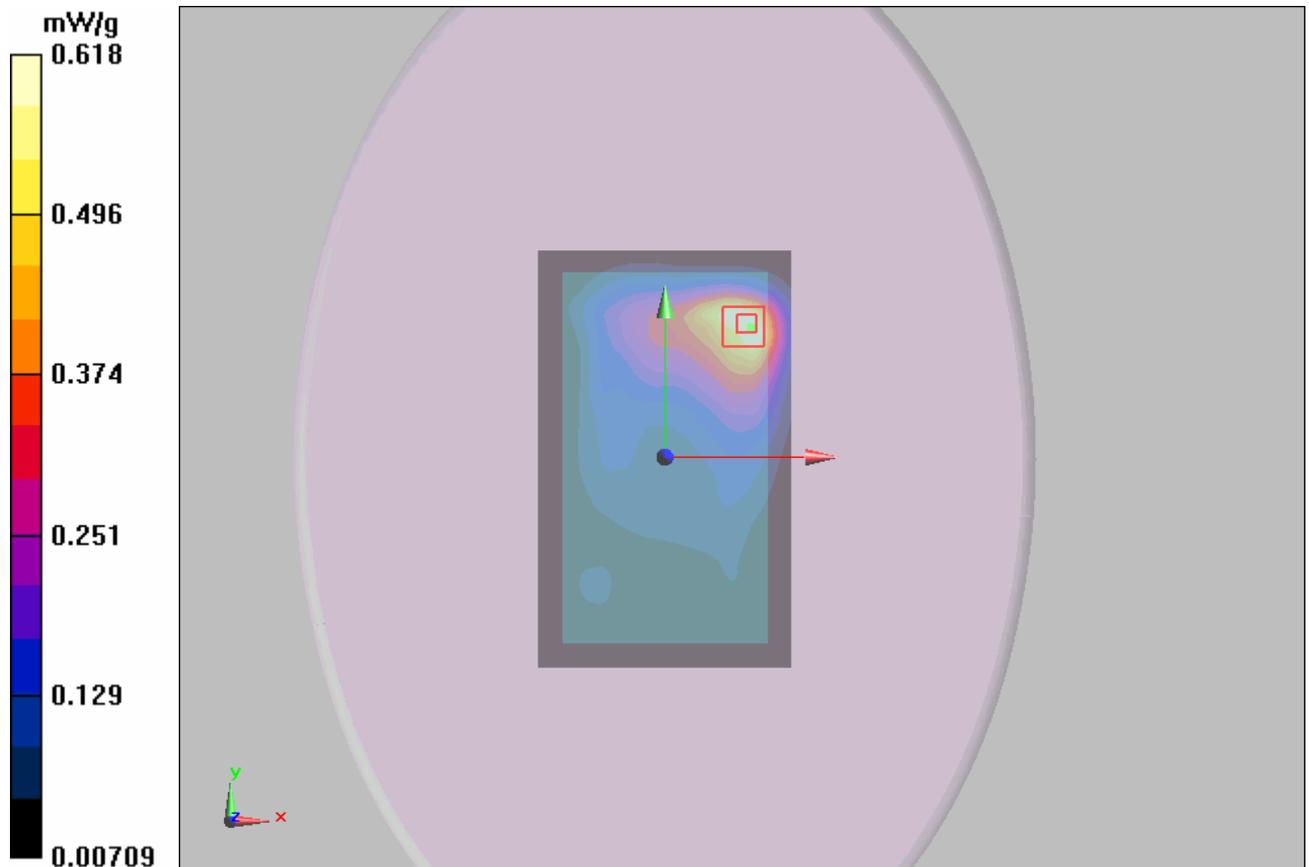


Figure 29 GSM 1900 GPRS (3Txslots) Test Position 1 Channel 661



GSM 1900 GPRS (4Txslots) Test Position 1 Middle

Date/Time: 3/13/2011 12:27:21 PM

Communication System: PCS 1900+GPRS(4Up); Frequency: 1880 MHz; Duty Cycle: 1:2.075

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 1 Middle/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.679 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.15 V/m; Power Drift = 0.012 dB

Peak SAR (extrapolated) = 1.46 W/kg

SAR(1 g) = 0.605 mW/g; SAR(10 g) = 0.348 mW/g

Maximum value of SAR (measured) = 0.659 mW/g

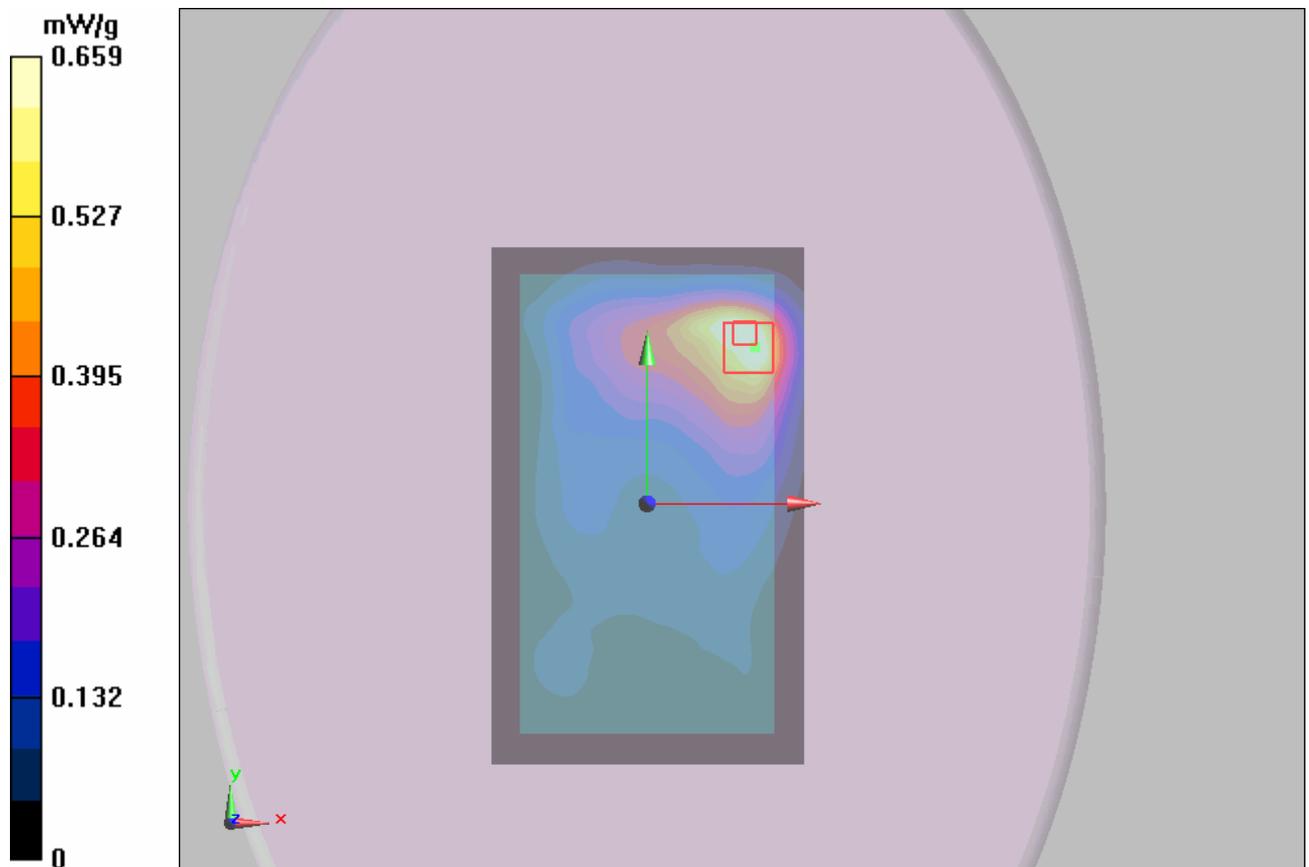


Figure 30 GSM 1900 GPRS (4Txslots) Test Position 1 Channel 661



GSM 1900 GPRS (4Txslots) Test Position 2 Middle

Date/Time: 3/13/2011 9:25:55 AM

Communication System: PCS 1900+GPRS(4Up); Frequency: 1880 MHz;Duty Cycle: 1:2.075

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature:22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 2 Middle/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.629 mW/g

Test Position 2 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.86 V/m; Power Drift = -0.014 dB

Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.531 mW/g; SAR(10 g) = 0.300 mW/g

Maximum value of SAR (measured) = 0.585 mW/g

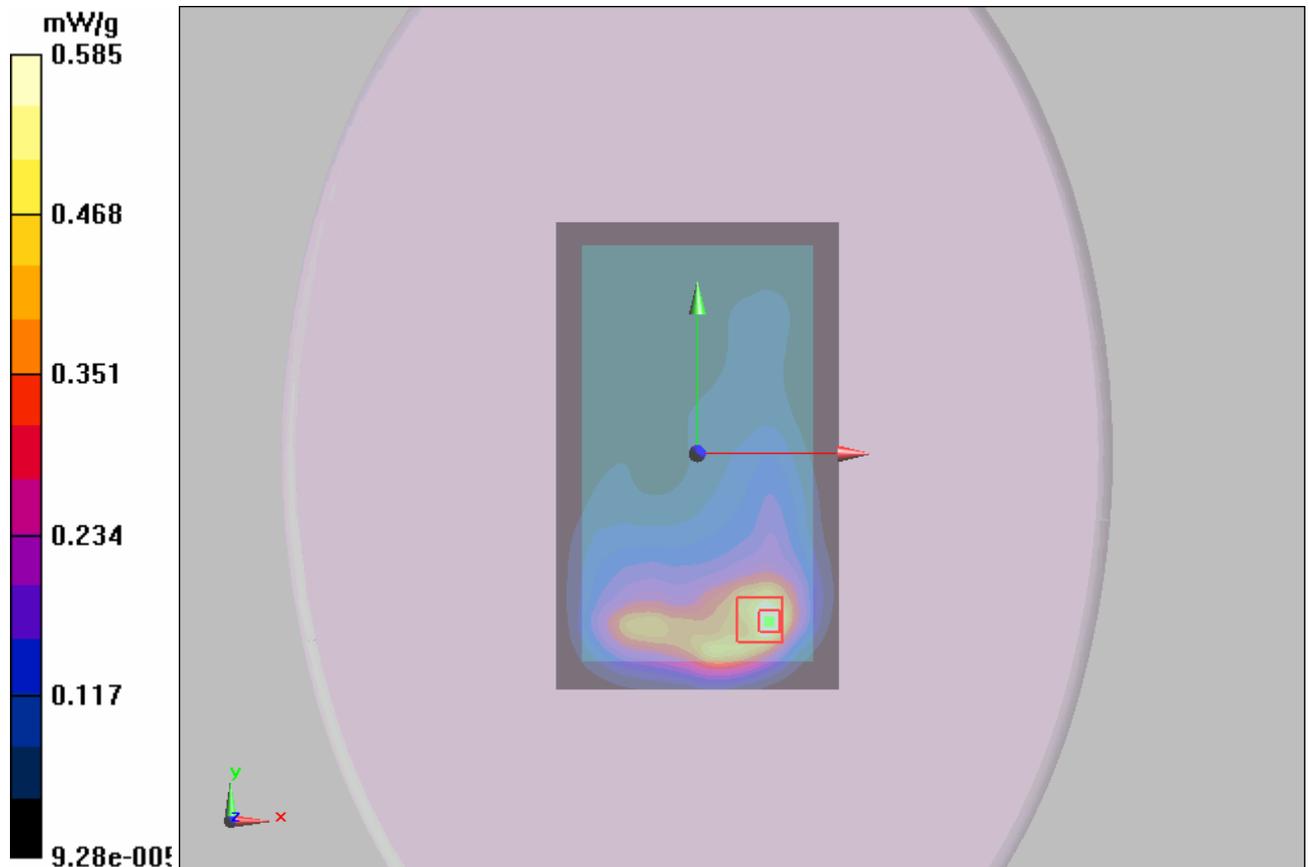


Figure 31 GSM 1900 GPRS (4Txslots) Test Position 2 Channel 661



GSM 1900 GPRS (4Txslots) Test Position 3 High

Date/Time: 3/13/2011 2:24:44 PM

Communication System: PCS 1900+GPRS(4Up); Frequency: 1909.8 MHz;Duty Cycle: 1:2.075

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.56$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Ambient Temperature:22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 3 High/Area Scan (31x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.663 mW/g

Test Position 3 High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.7 V/m; Power Drift = -0.075 dB

Peak SAR (extrapolated) = 0.951 W/kg

SAR(1 g) = 0.558 mW/g; SAR(10 g) = 0.297 mW/g

Maximum value of SAR (measured) = 0.638 mW/g

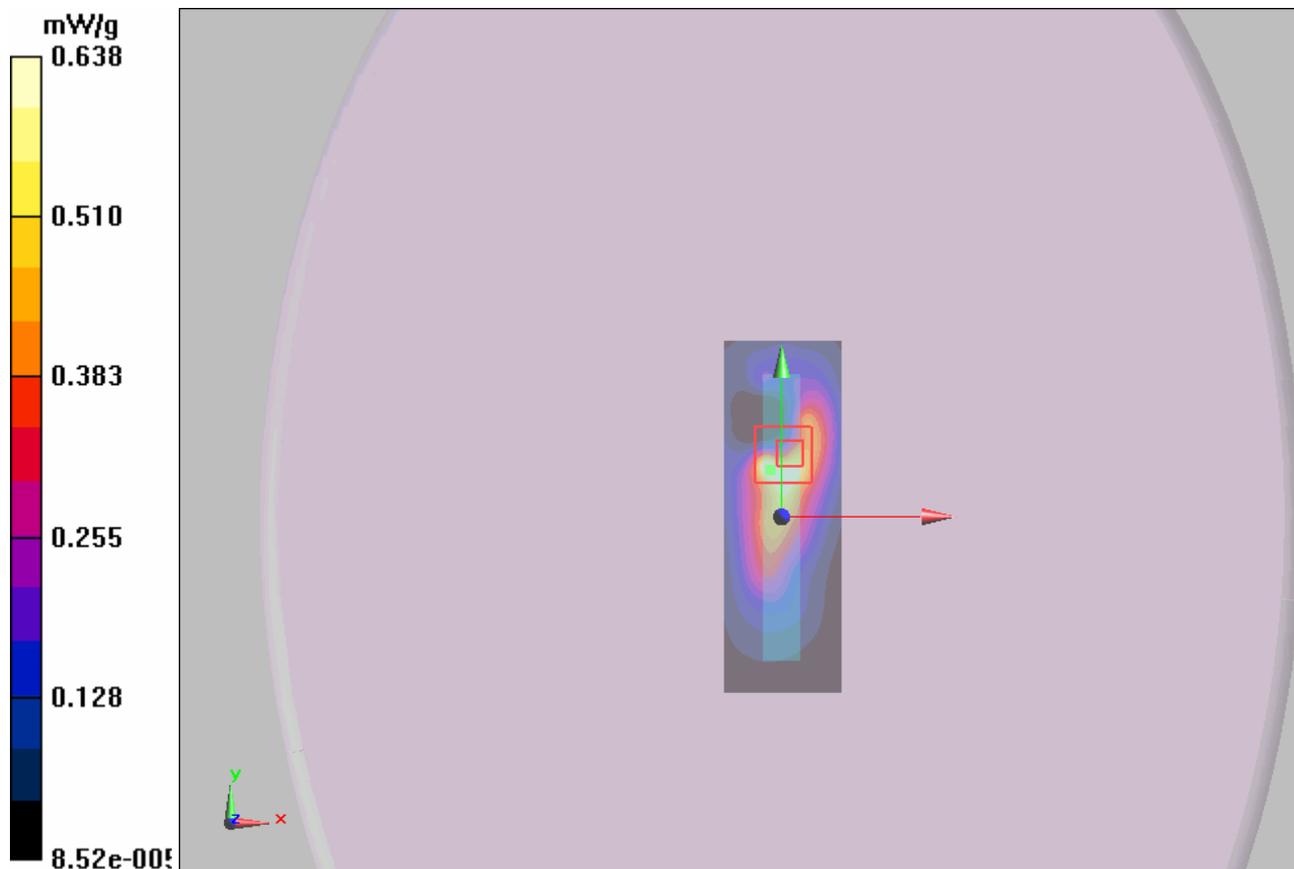


Figure 32 GSM 1900 GPRS (4Txslots) Test Position 3 Channel 810



GSM 1900 GPRS (4Txslots) Test Position 3 Middle

Date/Time: 3/13/2011 1:38:51 PM

Communication System: PCS 1900+GPRS(4Up); Frequency: 1880 MHz;Duty Cycle: 1:2.075

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature:22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 3 Middle/Area Scan (31x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.953 mW/g

Test Position 3 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 19.9 V/m; Power Drift = 0.050 dB

Peak SAR (extrapolated) = 1.5 W/kg

SAR(1 g) = 0.872 mW/g; SAR(10 g) = 0.484 mW/g

Maximum value of SAR (measured) = 0.970 mW/g

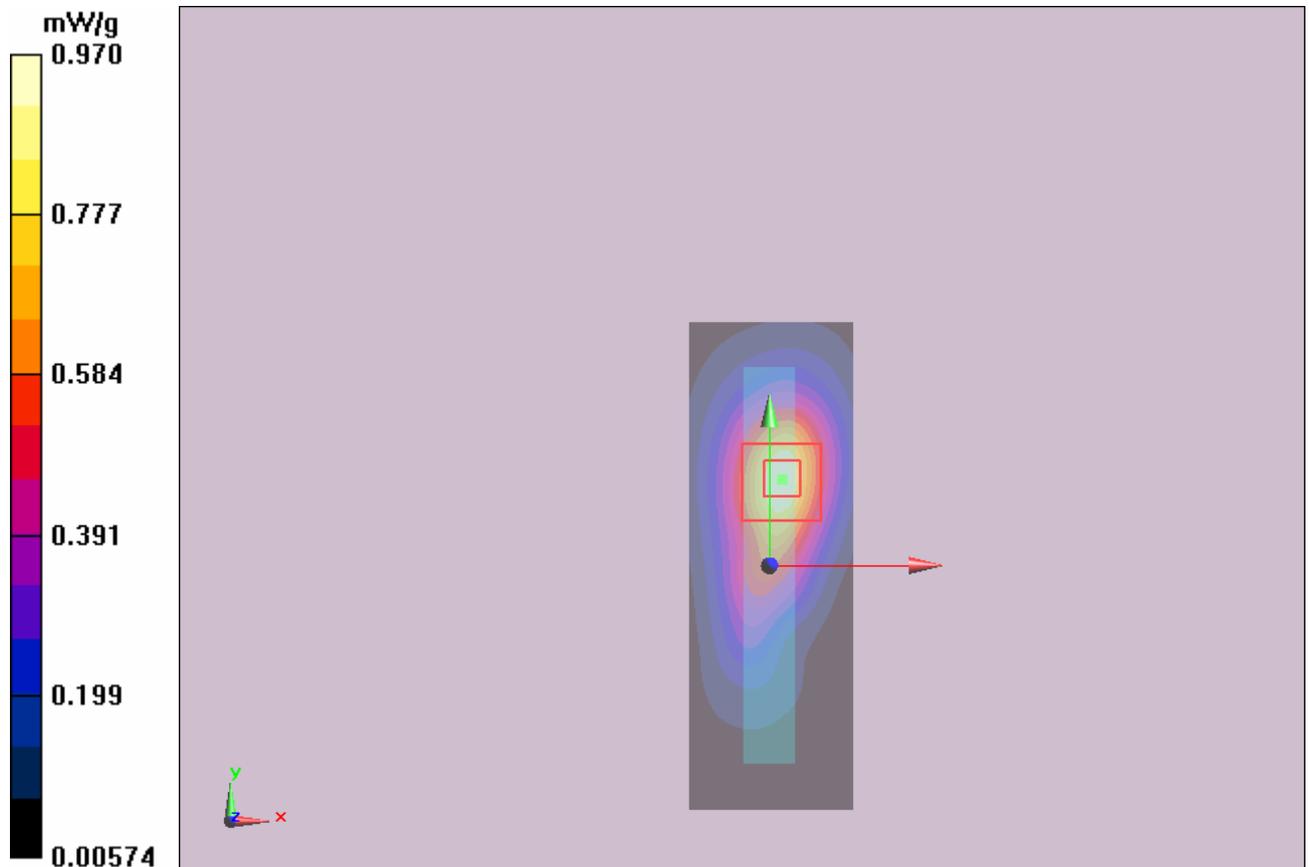


Figure 33 GSM 1900 GPRS (4Txslots) Test Position 3 Channel 661



GSM 1900 GPRS (4Txslots) Test Position 3 Low

Date/Time: 3/13/2011 1:51:03 PM

Communication System: PCS 1900+GPRS(4Up); Frequency: 1850.2 MHz; Duty Cycle: 1:2.075

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 3 Low/Area Scan (31x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.11 mW/g

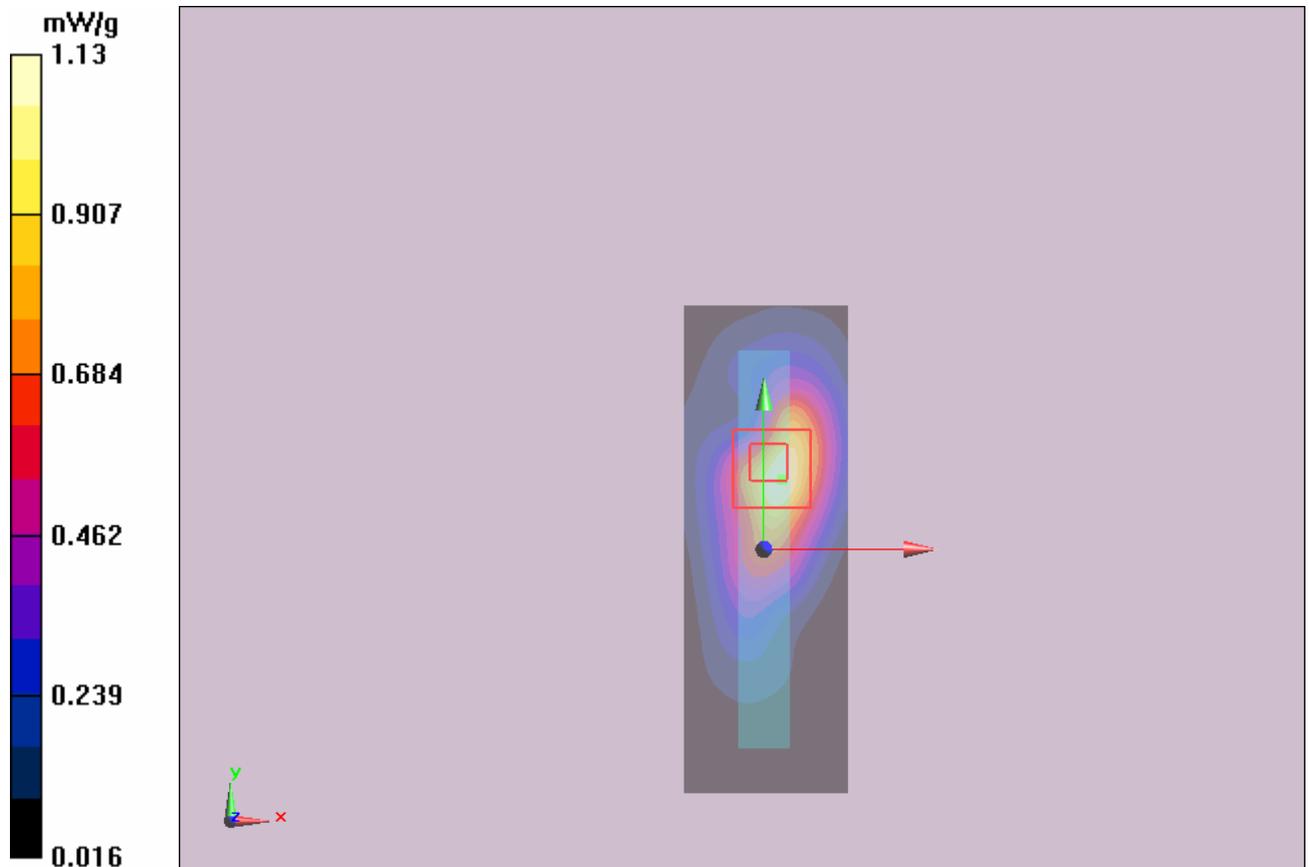
Test Position 3 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.4 V/m; Power Drift = -0.064 dB

Peak SAR (extrapolated) = 1.65 W/kg

SAR(1 g) = 0.925 mW/g; SAR(10 g) = 0.523 mW/g

Maximum value of SAR (measured) = 1.13 mW/g



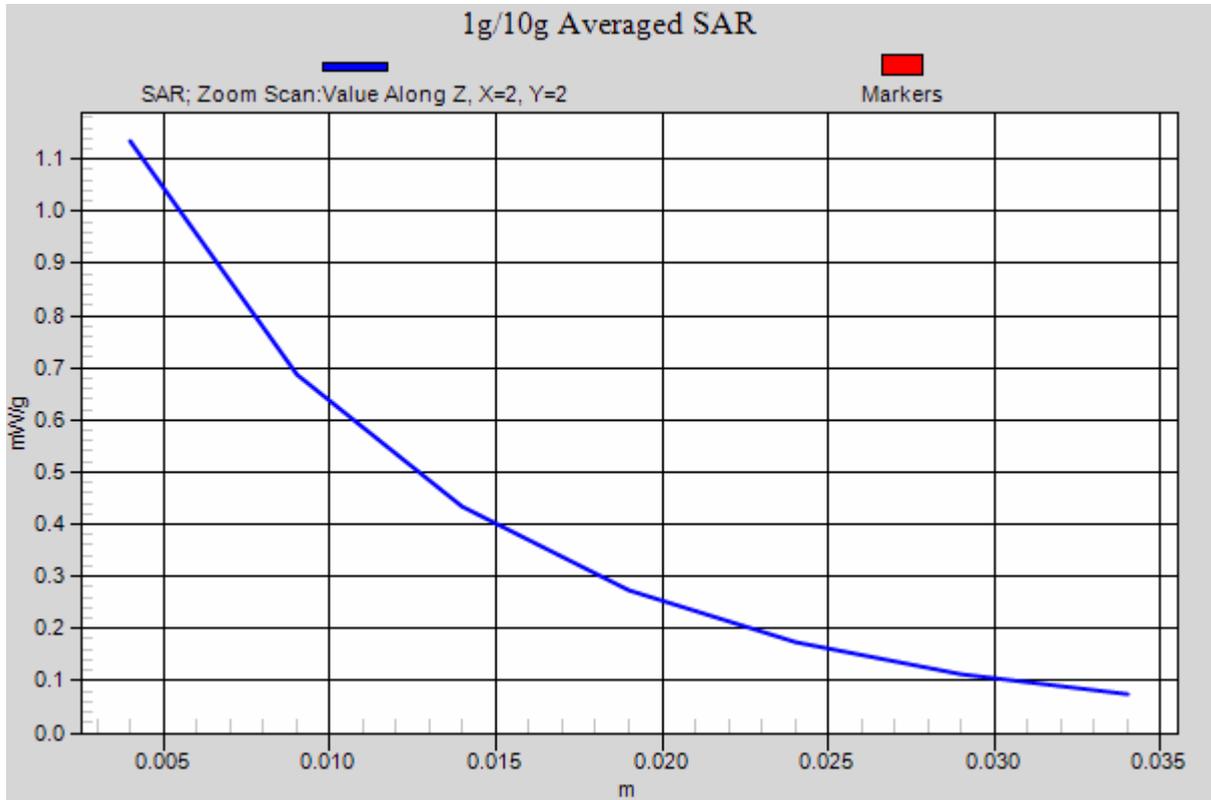


Figure 34 GSM 1900 GPRS (4Txslots) Test Position 3 Channel 512



GSM 1900 GPRS (4Txslots) Test Position 5 Middle

Date/Time: 3/13/2011 3:56:13 PM

Communication System: PCS 1900+GPRS(4Up); Frequency: 1880 MHz;Duty Cycle: 1:2.075

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature:22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 5 Middle/Area Scan (31x161x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.314 mW/g

Test Position 5 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.7 V/m; Power Drift = -0.090 dB

Peak SAR (extrapolated) = 0.514 W/kg

SAR(1 g) = 0.298 mW/g; SAR(10 g) = 0.167 mW/g

Maximum value of SAR (measured) = 0.324 mW/g

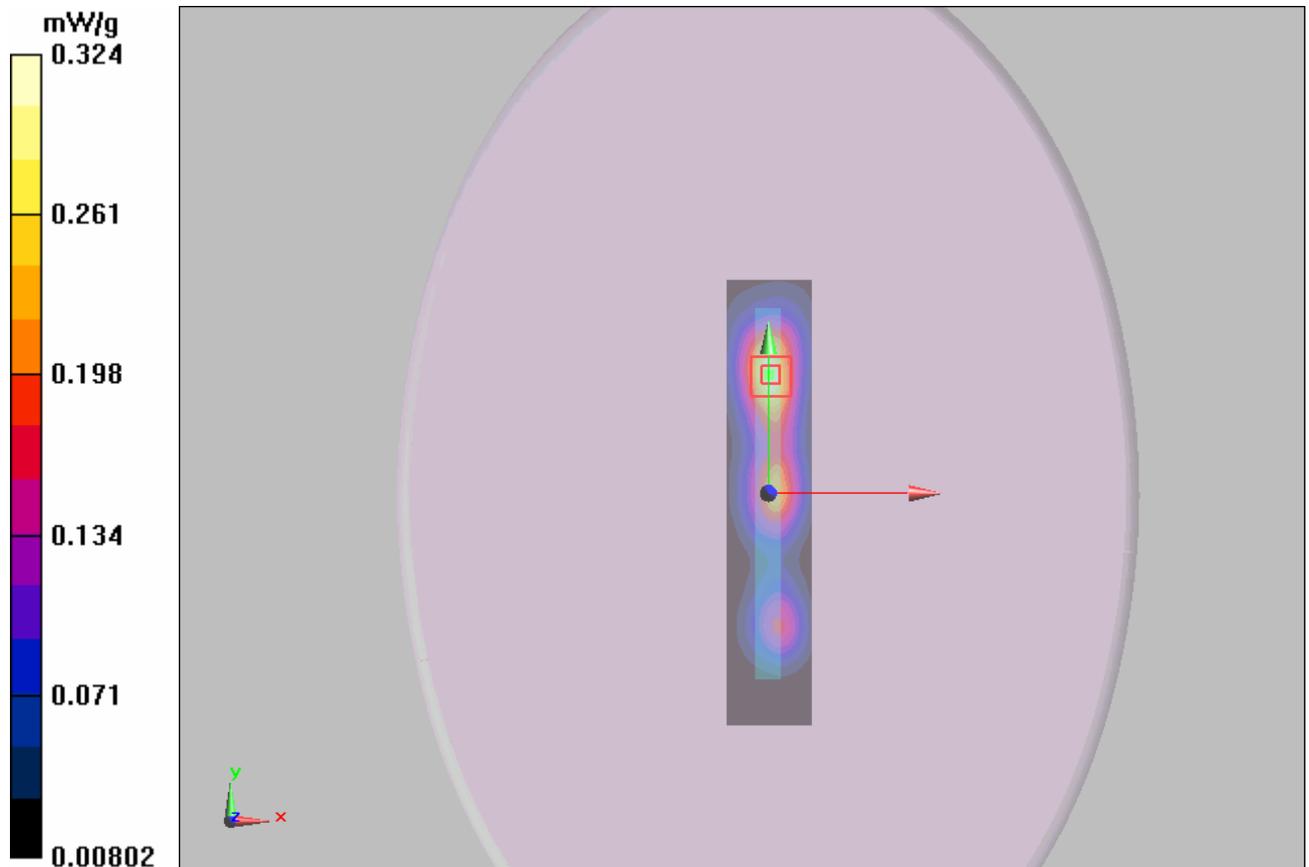


Figure 35 GSM 1900 GPRS (4Txslots) Test Position 5 Channel 661



GSM 1900 with Earphone Test Position 3 Low

Date/Time: 6/2/2011 10:33:27 AM

Communication System: PCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Towards Phantom Low/Area Scan (31x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.784 mW/g

Towards Phantom Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.9 V/m; Power Drift = 0.029 dB

Peak SAR (extrapolated) = 1.16 W/kg

SAR(1 g) = 0.703 mW/g; SAR(10 g) = 0.397 mW/g

Maximum value of SAR (measured) = 0.785 mW/g

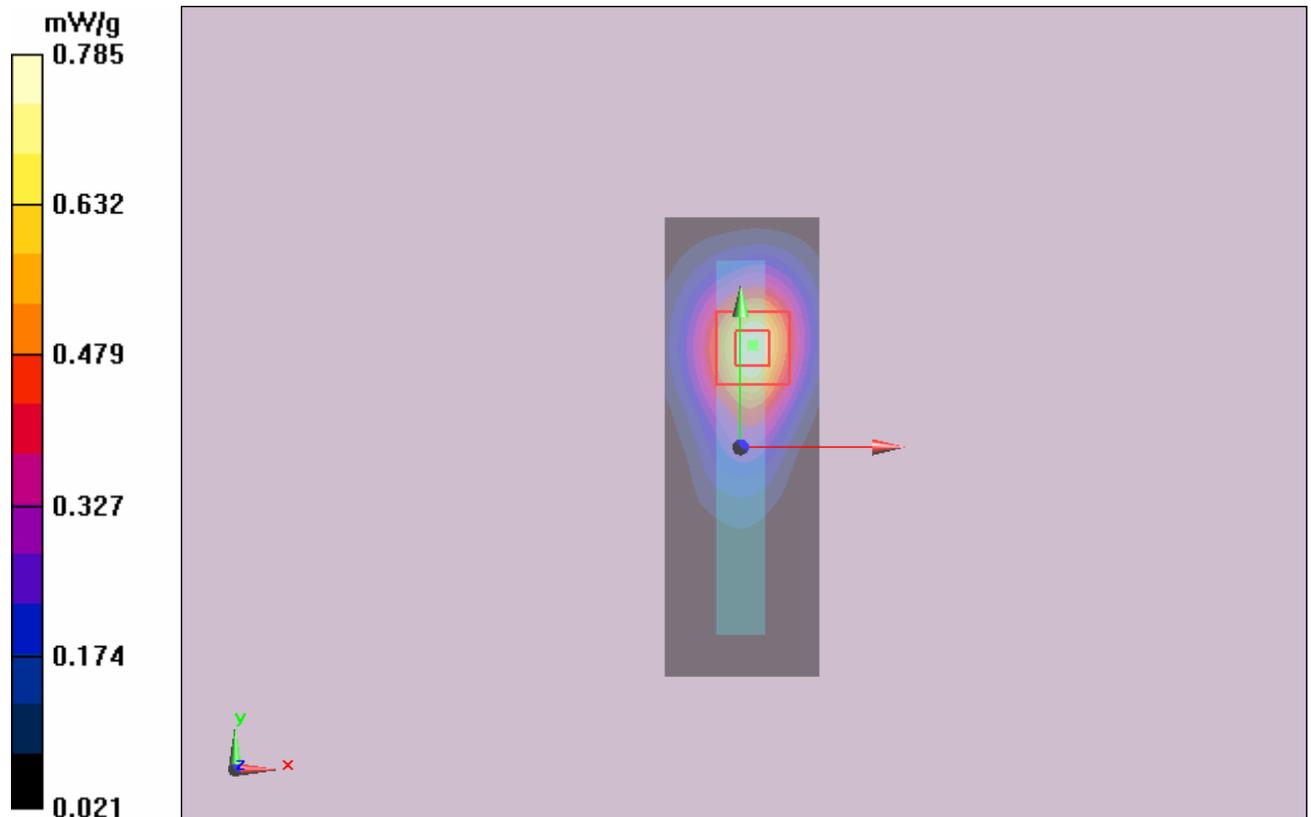


Figure 36 GSM 1900 with Earphone, Test Position 3 Channel 512



GSM 1900 EGPRS (4Txslots) Test Position 3 Low

Date/Time: 3/13/2011 3:21:15 PM

Communication System: PCS 1900+EGPRS(4Up); Frequency: 1850.2 MHz; Duty Cycle: 1:2.075

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.5$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 3 Low/Area Scan (31x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.06 mW/g

Test Position 3 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.8 V/m; Power Drift = -0.124 dB

Peak SAR (extrapolated) = 1.74 W/kg

SAR(1 g) = 0.896 mW/g; SAR(10 g) = 0.501 mW/g

Maximum value of SAR (measured) = 0.996 mW/g

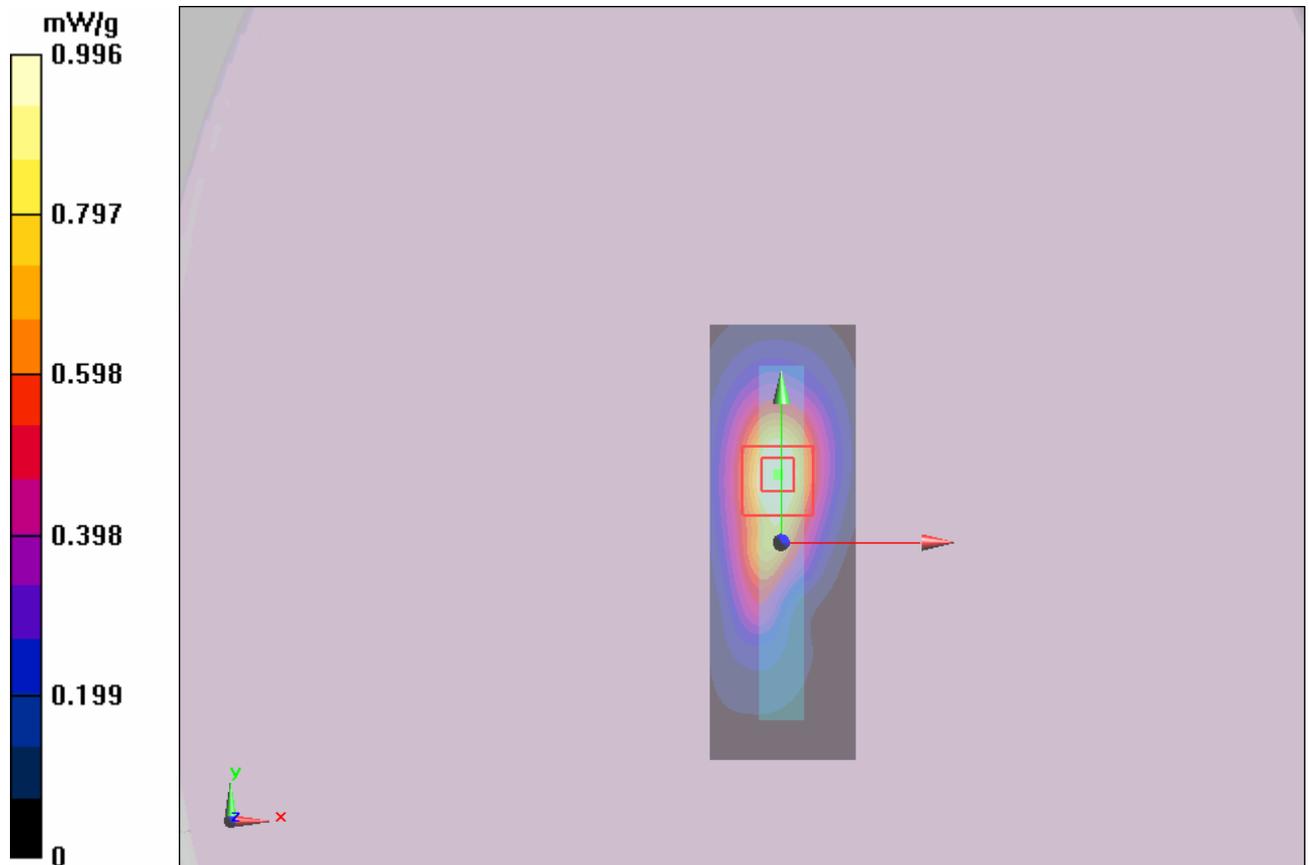


Figure 37 GSM 1900 EGPRS (4Txslots) Test Position 3 Channel 512



WCDMA Band II Test Position 1 Middle

Date/Time: 3/13/2011 4:20:35 PM

Communication System: WCDMA Band II; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 1 Middle/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.779 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.09 V/m; Power Drift = 0.018 dB

Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.639 mW/g; SAR(10 g) = 0.377 mW/g

Maximum value of SAR (measured) = 0.681 mW/g

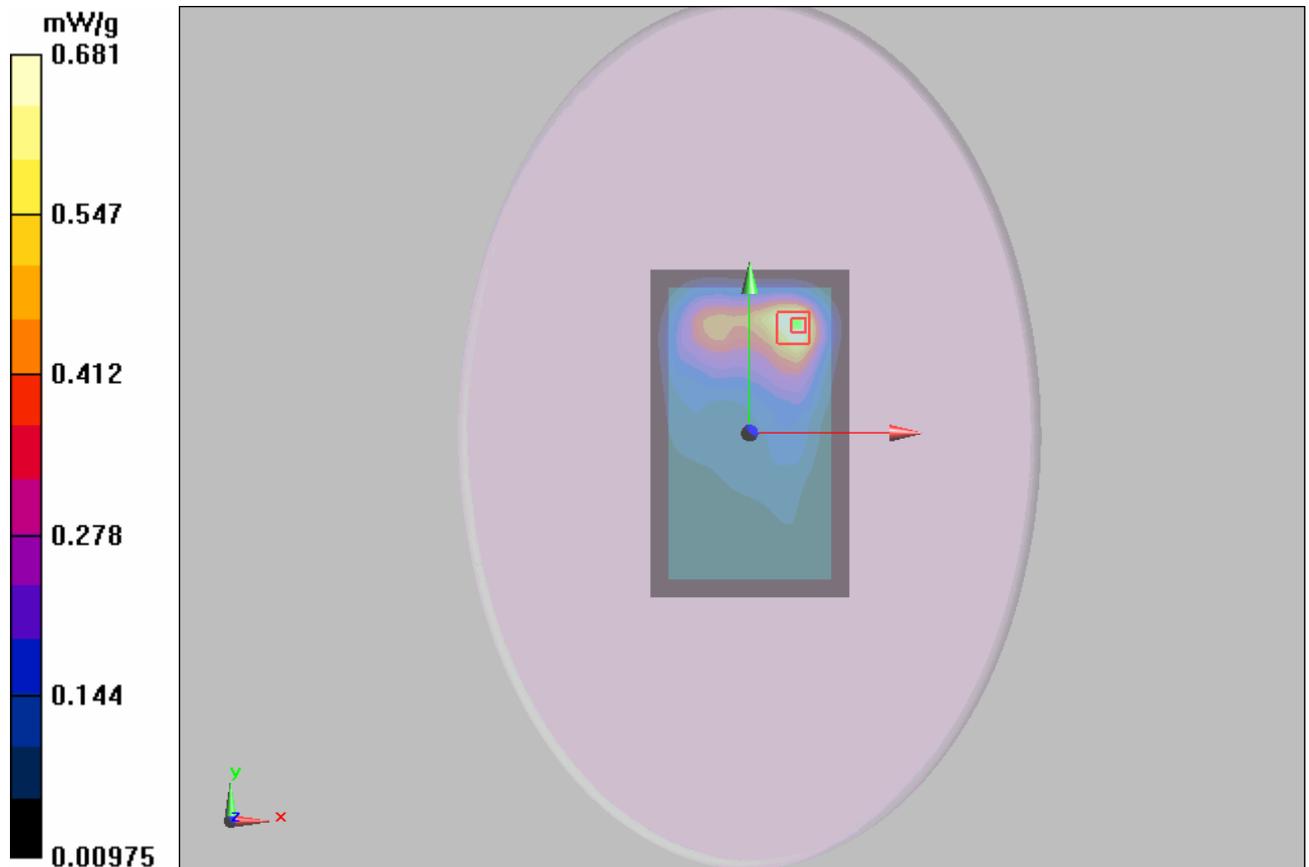


Figure 38 WCDMA Band II Test Position 1 Channel 9400



WCDMA Band II Test Position 2 Middle

Date/Time: 3/13/2011 6:26:37 PM

Communication System: WCDMA Band II; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 53.1$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 2 Middle/Area Scan (91x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.747 mW/g

Test Position 2 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.56 V/m; Power Drift = -0.044 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.593 mW/g; SAR(10 g) = 0.348 mW/g

Maximum value of SAR (measured) = 0.645 mW/g

Test Position 2 Middle/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.56 V/m; Power Drift = -0.044 dB

Peak SAR (extrapolated) = 0.956 W/kg

SAR(1 g) = 0.544 mW/g; SAR(10 g) = 0.331 mW/g

Maximum value of SAR (measured) = 0.591 mW/g

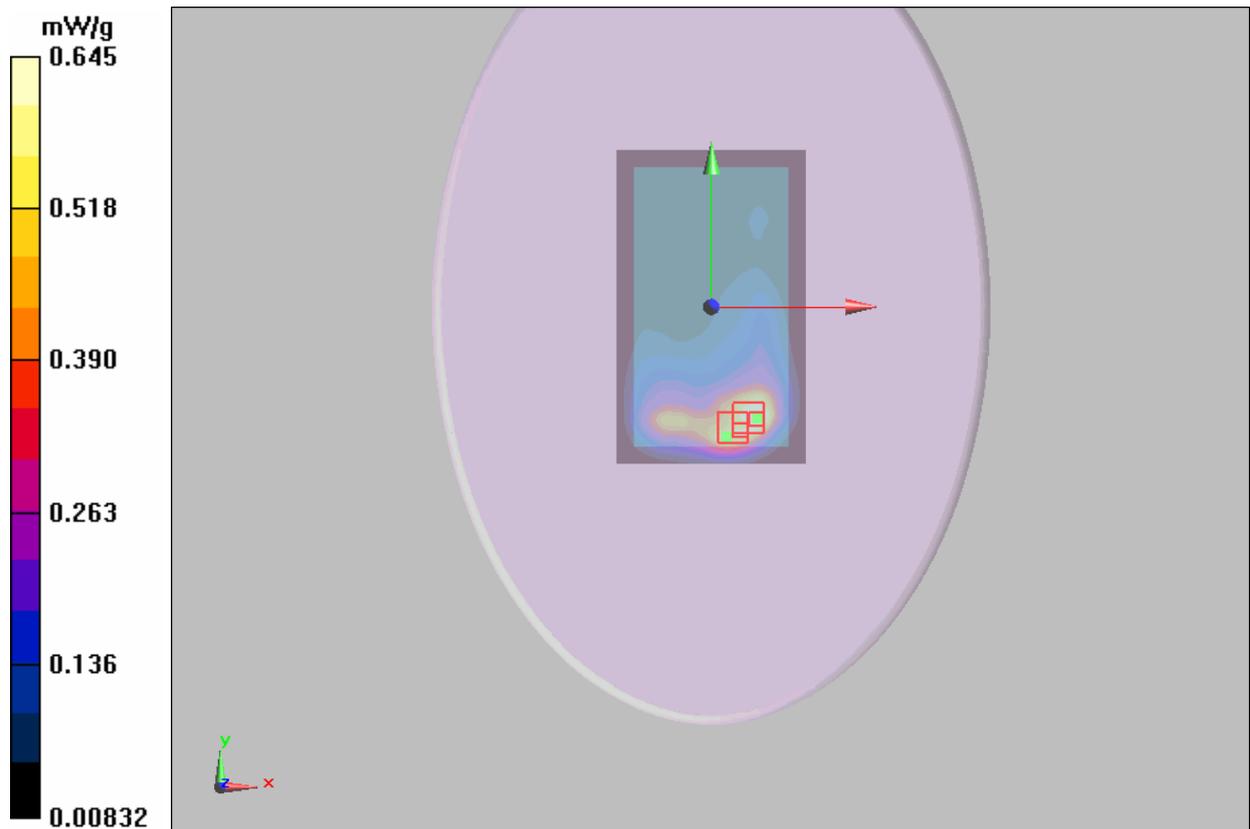


Figure 39 WCDMA Band II Test Position 2 Channel 9400



WCDMA Band II Test Position 3 High

Date/Time: 3/13/2011 5:46:43 PM

Communication System: WCDMA Band II; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1908$ MHz; $\sigma = 1.56$ mho/m; $\epsilon_r = 53$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/24/2010

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: ELI 4.0; Type: QDOVA001BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Test Position 3 High/Area Scan (31x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.953 mW/g

Test Position 3 High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.4 V/m; Power Drift = 0.139 dB

Peak SAR (extrapolated) = 1.46 W/kg

SAR(1 g) = 0.855 mW/g; SAR(10 g) = 0.476 mW/g

Maximum value of SAR (measured) = 0.952 mW/g

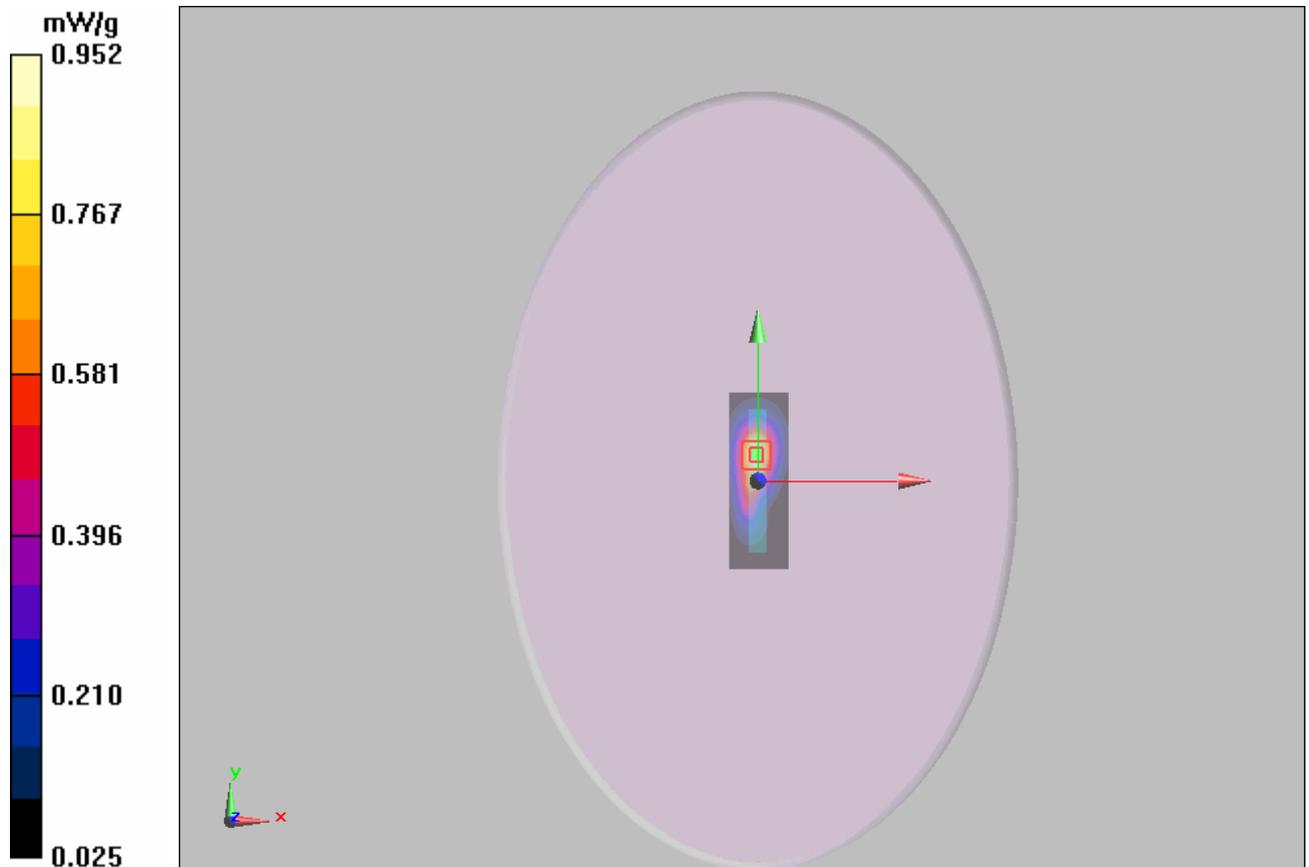


Figure 40 WCDMA Band II Test Position 3 Channel 9538