



Report No.: RZA2010-0505-1



# TEST REPORT

<b>Product Name</b>	HSPA/ISDB-T USB Stick
<b>Model</b>	E192
<b>FCC ID</b>	QISE192
<b>Client</b>	HUAWEI Technologies Co., Ltd.

**TA Technology (Shanghai) Co., Ltd.**



## GENERAL SUMMARY

<b>Product Name</b>	HSPA/ISDB-T USB Stick	<b>Model</b>	E192
<b>FCC ID</b>	QISE192		
<b>Report No.</b>	RZA2010-0505-1		
<b>Client</b>	HUAWEI Technologies Co., Ltd.		
<b>Manufacturer</b>	HUAWEI Technologies Co., Ltd.		
<b>Reference Standard(s)</b>	<p><b>IEEE Std C95.1, 1999:</b> IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.</p> <p><b>SUPPLEMENT C Edition 01-01 to OET BULLETIN 65 Edition 97-01 June 2001 including DA 02-1438, published June 2002:</b> 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><b>IEC 62209-2 Ed.1(2008-10):</b> Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices – Human models, Instrumentation, and Procedures Part 2: Procedure to determine the specific absorption rate (SAR) for mobile wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz )</p> <p><b>KDB 447498 D02:</b> 2009-11-13</p>		
<b>Conclusion</b>	<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: <b>Pass</b></p> <p style="text-align: right;">(Stamp) Date of issue: April 19<sup>th</sup>, 2010</p>		
<b>Comment</b>	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 dose 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.

### **1.2. Testing laboratory**

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## 1.3. Applicant Information

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City: Shenzhen  
Postal Code: 518129  
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## 1.4. Manufacturer Information

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**1.5. Information of EUT**

**General information**

Device type :	portable device		
Exposure category:	uncontrolled environment / general population		
Name of EUT:	HSPA/ISDB-T USB Stick		
IMEI or SN:	359629030011657		
Device operating configurations :			
Operating mode(s):	GSM850; (tested) GSM1900; (tested) WCDMA Band II; (tested) WCDMA Band V; (tested)		
Test modulation:	(GSM)GMSK; (WCDMA)QPSK		
GPRS multislot class :	10		
EGPRS multislot class:	12		
HSDPA UE category	8		
HSUPA UE category	6		
Operating frequency range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM850	824.2 ~ 848.8	869.2 ~ 893.8
	GSM1900	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 maximum output power		
	WCDMA Band V: 3, tested with maximum output power		
Test channel (Low –Middle –High)	128 -192 - 251	(GSM850) (tested)	
	512 - 661 - 810	(GSM1900) (tested)	
	9262 - 9400 - 9538	(WCDMA Band II) (tested)	
	4132 - 4182 - 4233	(WCDMA Band V) (tested)	
Hardware version:	CD1E192M		
Software version:	11.126.10.07.00		
Antenna type:	Internal antenna		
Used host products:	IBM T61		
	BenQ Joybook R55V		

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Equipment Under Test (EUT) is HSPA/ISDB-T USB Stick with internal antenna. During SAR test of the EUT, it was connected to a portable computer. SAR is tested for the EUT respectively for GSM 850, GSM 1900, WCDMA Band II and WCDMA Band V. The EUT has GPRS (class 10), EGPRS (class 12), and WCDMA/HSDPA/HSUPA functions.

Since the EUT only has the data transfer function, but does not have the voice transfer function, the tests in the band of GSM 850 and GSM 1900 are performed in the mode of GPRS and EGPRS, the tests in the band of WCDMA Band II and WCDMA Band V are performed in the mode of WCDMA/HSDPA/HSUPA. The measurements were performed in combination with two host products (IBM T61, BenQ Joybook R55V). IBM T61 laptop has horizontal USB slot, BenQ Joybook R55V laptop has vertical USB slot.

The sample undergoing test was selected by the Client.

Components list please refer to documents of the manufacturer.

### **1.6. Test Date**

The test is performed from April 16, 2010 to April 17, 2010.

## 2. Operational Conditions during Test

### 2.1. General description of test procedures

Connection to the EUT is established via air interface with E5515C, and the EUT is set to maximum output power by E5515C. 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.

Since the EUT only has the data transfer function, but does not have the voice transfer function, the tests in the band of GSM 850 and GSM 1900 are performed in the mode of GPRS and EGPRS, The tests in the band of WCDMA Band II and WCDMA Band V are performed in the mode of WCDMA/HSDPA/HSUPA. The measurements were performed in combination with two host products (IBM T61, BenQ Joybook R55V). IBM T61 laptop has horizontal USB slot, BenQ Joybook R55V laptop has vertical USB slot.

### 2.2. GSM Test Configuration

For the body SAR tests for GSM 850, GSM 1900, a communication link is set up with a System Simulator (SS) by air link. The EUT is commanded to operate at maximum transmitting power. Since the EUT only has the data transfer function, but does not have the speech transfer function. The tests in the band of GSM 850, GSM 1900 are only performed in the mode of GPRS and EGPRS. The GPRS class is 10 for this EUT; it has at most 2 timeslots in uplink. The EGPRS class is 12 for this EUT; it has at most 4 timeslots in uplink.

According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot. The allowed power reduction in the multi-slot configuration is as following:

**Table 1: The allowed power reduction in the multi-slot configuration**

<b>Number of timeslots in uplink assignment</b>	<b>Permissible nominal reduction of maximum output power,(dB)</b>
1	0
2	0 to 3.0
3	1.8 to 4.8
4	3.0 to 6.0

### 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 DPDCH<sub>1</sub> are as followed (EUT do not support the DPDCH<sub>2-n</sub>)

**Table 2: The configurations for the DPCCH and DPDCH<sub>1</sub>**

	Channel Bit Rate(kbps)	Channel Symbol Rate(kbps)	Spreading Factor	Spreading Code Number	Bits/Slot
DPCCH	15	15	256	0	10
DPDCH <sub>1</sub>	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<sub>n</sub>, because the maximum output power for each of these other configurations<0.25dB higher than 12.2kbps RMC and the multiple DPDCH<sub>n</sub> 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

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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( $\beta_c, \beta_d$ ), and HS-DPCCH power offset parameters( $\Delta_{ACK}$ ,  $\Delta_{NACK}$ ,  $\Delta_{CQI}$ ) 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 3: Subtests for UMTS Release 5 HSDPA**

Sub-set	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{hs}$ (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:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  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,  $\Delta_{ACK}$  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  $\beta_c/\beta_d$  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 4: 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 5: HSDPA UE category**

<b>HS-DSCH Category</b>	<b>Maximum HS-DSCH Codes Received</b>	<b>Minimum Inter-TTI Interval</b>	<b>Maximum Transport Bits/HS-DSCH</b>	<b>Total Channel</b>
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 ¼ 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.<sup>40</sup>

Due to inner loop power control requirements in HSPA, a commercial communication test set should be used for the output power and SAR tests.<sup>41</sup> The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSPA should be configured according to the  $\beta$  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.

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

Sub-set	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{hs}^{(1)}$	$\beta_{ec}$	$\beta_{ed}$	$\beta_{ed}$ (SF)	$\beta_{ed}$ (codes)	CM <sup>(2)</sup> (dB)	MPR (dB)	AG <sup>(4)</sup> Index	E-TFCI
1	11/15 <sup>(3)</sup>	15/15 <sup>(3)</sup>	64	11/15 <sup>(3)</sup>	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	$\beta_{ed1}$ : 47/15 $\beta_{ed2}$ : 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 <sup>(4)</sup>	15/15 <sup>(4)</sup>	64	15/15 <sup>(4)</sup>	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  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  $\beta_c/\beta_d$  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  $\beta_c/\beta_d$  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:  $\beta_{ed}$  can not be set directly; it is set by Absolute Grant Value.

**Table 7: 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 in Portable devices**

The measurements were performed in combination with two host products (IBM T61, BenQ Joybook R55V). IBM T61 laptop has horizontal USB slot, BenQ Joybook R55V laptop has vertical USB slot.

A test distance of 5mm or less, according to KDB 447498, should be considered for the orientation that can satisfy such requirements.

For each channel, the EUT is tested at the following 4 test positions:

- Test Position 1: The EUT is connected to the portable computer with horizontal USB slot. The back side of the EUT towards the bottom of the flat phantom. (ANNEX H Picture 6)
- Test Position 2: The EUT is connected to the portable computer through a 19 cm USB cable. The front side of the EUT towards the bottom of the flat phantom. (ANNEX H Picture 7)
- Test Position 3: The EUT is connected to the portable computer through a 19 cm USB cable. The left side of the EUT towards the bottom of the flat phantom. (ANNEX H Picture 8)
- Test Position 4: The EUT is connected to the portable computer with vertical USB slot. The right side of the EUT towards the bottom of the flat phantom.(ANNEX H Picture 9)

## 2.7. Picture of host product

During the test, IBM T61 and BenQ Joybook R55V laptops were used as an assistant to help to setup communication. (See Picture 1)



Picture 1-a: IBM T61 Close



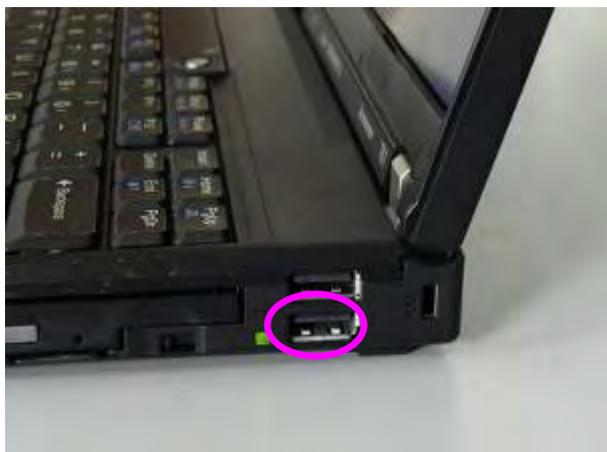
Picture 1-b: IBM T61 Open



Picture 1-c: BenQ Joybook R55V Close



Picture 1-d: BenQ Joybook R55V Open



Picture 1-e: IBM T61 with horizontal USB slot



Picture 1-f: BenQ Joybook R55V with Vertical USB slot



Picture 1-g: a 19 cm USB cable

**Picture 1: Computer as a test assistant**

### 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.

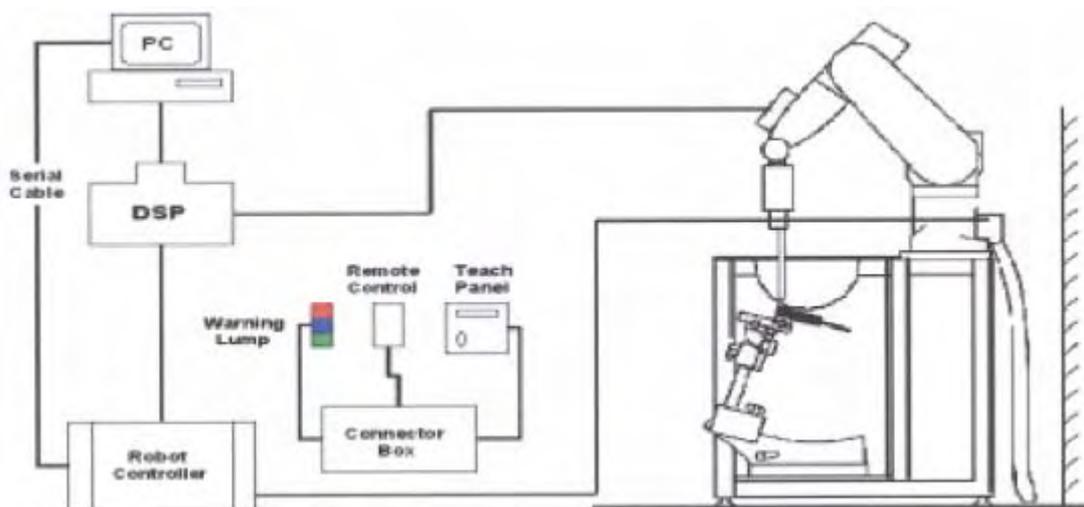


Figure 1. SAR Lab Test Measurement Set-up

### 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	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 900 and HSL 1750 Additional CF for other liquids and frequencies upon request
Frequency	10 MHz to > 6 GHz Linearity: $\pm 0.2$ dB (30 MHz to 6 GHz)
Directivity	$\pm 0.3$ dB in HSL (rotation around probe axis) $\pm 0.5$ dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 $\mu$ W/g to > 100 mW/g Linearity: $\pm 0.2$ dB (noise: typically < 1 $\mu$ 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:  $\Delta t$  = Exposure time (30 seconds),  
C = Heat capacity of tissue (brain or muscle),  
 $\Delta T$  = Temperature increase due to RF exposure.  
Or

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

Where:  
 $\sigma$  = Simulated tissue conductivity,  
 $\rho$  = Tissue density (kg/m<sup>3</sup>).

### 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 Generic Twin Phantom is constructed of a fiberglass shell integrated in a wooden Figure. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the 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 in the robot.

Shell Thickness	2±0.1 mm
Filling Volume	Approx. 20 liters
Dimensions	810 x 1000 x 500 mm (H x L x W)
Available	Special



**Figure 4. Generic Twin 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 ± 0.1mm). 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 ± 30°.)
- 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 10 mm x 10 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/cm<sup>2</sup>], [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 <sub>i0</sub> , a <sub>i1</sub> , a <sub>i2</sub>
	- Conversion factor	ConvF <sub>i</sub>
	- Diode compression point	Dcp <sub>i</sub>
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.

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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)<sup>2</sup>] 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.

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

with  $SAR$  = local specific absorption rate in mW/g

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

$\sigma$  = conductivity in [mho/m] or [Siemens/m]

$\rho$  = equivalent tissue density in g/cm<sup>3</sup>

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/cm<sup>2</sup>

**$E_{tot}$**  = 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 12.

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.

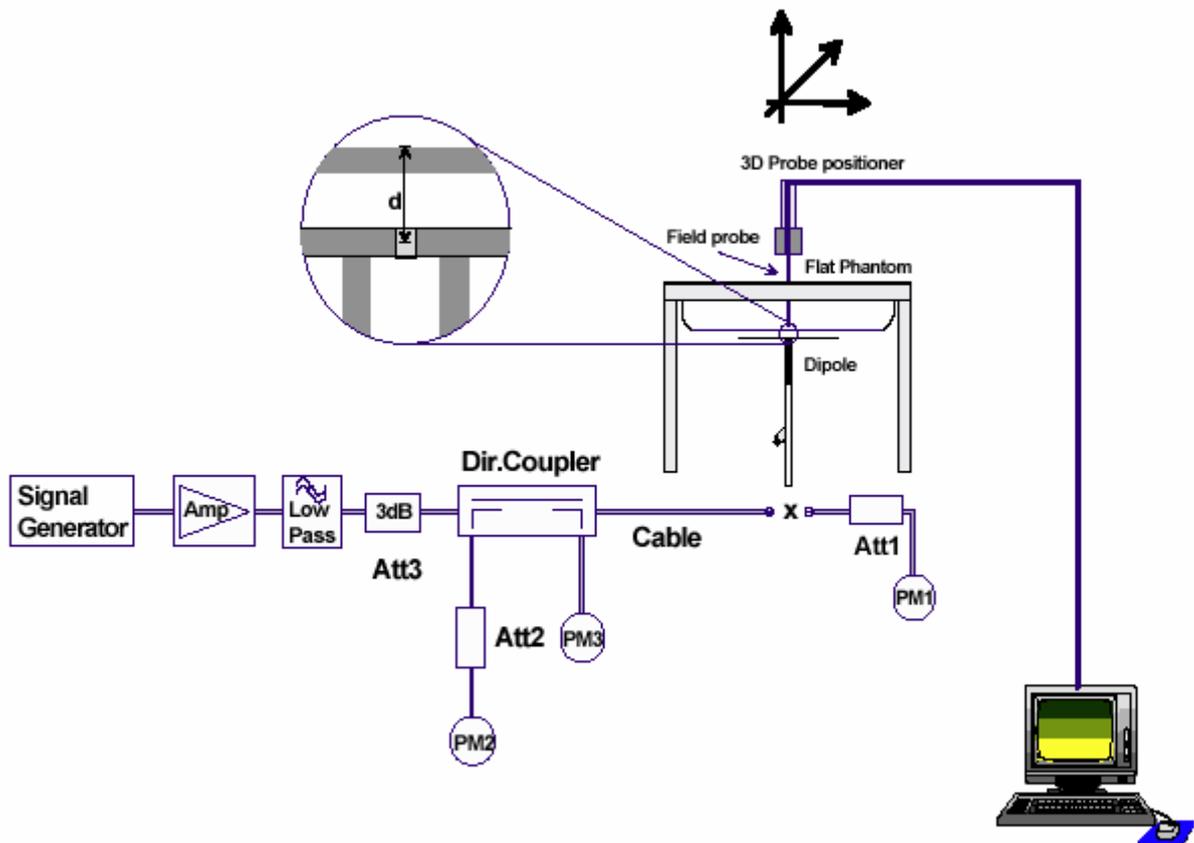


Figure 5. System Check Set-up

### 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 8 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by OET 65.

**Table 8: 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 9: The Ambient Conditions during Test**

Temperature	Min. = 20°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 $\Omega$
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**

**SUPPLEMENT C Edition 01-01 to OET BULLETIN 65 Edition 97-01 June 2001 including DA 02-1438 June 19, 2002:** Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields Additional Information for Evaluation Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions.

**IEC 62209-2 Ed.1(2008-10):** Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices – Human models, Instrumentation, and Procedures Part 2: Procedure to determine the specific absorption rate (SAR) for mobile wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz ).

**KDB 447498 D02:** 2009-11-13

## 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 10: Conducted Power Measurement Results**

<b>GSM 850+GPRS</b>	<b>Conducted Power</b>		
	Channel 128	Channel 192	Channel 251
	(824.2MHz)	(837MHz)	(848.8MHz)
1 slot Result (dBm)	31.39	31.59	31.48
2 slot Result (dBm)	29.26	29.38	29.25
<b>GSM 850+EGPRS</b>	<b>Conducted Power</b>		
	Channel 128	Channel 192	Channel 251
	(824.2MHz)	(837MHz)	(848.8MHz)
1 slot Result (dBm)	25.66	25.81	25.69
2 slot Result (dBm)	23.44	23.58	23.43
3 slot Result (dBm)	21.47	21.61	21.50
4 slot Result (dBm)	19.17	19.29	19.20
<b>GSM 1900+GPRS</b>	<b>Conducted Power</b>		
	Channel 512	Channel 661	Channel 810
	(1850.2MHz)	(1880MHz)	(1909.8MHz)
1 slot Result (dBm)	29.06	28.89	28.61
2 slot Result (dBm)	26.64	26.59	26.32
<b>GSM 1900+EGPRS</b>	<b>Conducted Power</b>		
	Channel 512	Channel 661	Channel 810
	(1850.2MHz)	(1880MHz)	(1909.8MHz)
1 slot Result (dBm)	25.03	24.94	24.62
2 slot Result (dBm)	22.74	22.66	22.39
3 slot Result (dBm)	20.65	20.58	20.25
4 slot Result (dBm)	18.64	18.56	18.29
<b>WCDMA Band II Results</b>	<b>Conducted Power</b>		
	Channel 9262	Channel 9400	Channel 9538

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12.2kbps RMC	21.99	21.95	21.58
64kbps RMC	21.97	21.88	21.52
144kbps RMC	22.01	21.87	21.60
384kbps RMC	22.07	21.98	21.61
<b>WCDMA Band II+HSDPA Results</b>	<b>Conducted Power</b>		
	Channel 9262	Channel 9400	Channel 9538
Sub Test - 1	21.89	21.81	21.62
Sub Test - 2	21.62	21.69	21.78
Sub Test - 3	21.55	21.63	21.36
Sub Test - 4	21.59	21.57	21.33
<b>WCDMA Band II+HSUPA Results</b>	<b>Conducted Power</b>		
	Channel 9262	Channel 9400	Channel 9538
Sub Test - 1	21.36	21.62	20.90
Sub Test - 2	20.27	19.93	20.31
Sub Test - 3	21.21	21.23	21.04
Sub Test - 4	20.23	20.54	20.16
Sub Test - 5	21.66	21.31	20.59
<b>WCDMA Band V Results</b>	<b>Conducted Power</b>		
	Channel 4132	Channel 4182	Channel 4233
12.2kbps RMC	21.84	21.98	21.92
64kbps RMC	21.77	22.03	21.89
144kbps RMC	21.81	22.01	21.88
384kbps RMC	21.92	21.95	21.98
<b>WCDMA Band V+HSDPA Results</b>	<b>Conducted Power</b>		
	Channel 4132	Channel 4182	Channel 4233
Sub Test - 1	21.86	21.98	21.92
Sub Test - 2	21.71	21.77	21.63
Sub Test - 3	21.66	21.58	21.57
Sub Test - 4	21.37	21.61	21.32
<b>WCDMA Band V+HSUPA Results</b>	<b>Conducted Power</b>		
	Channel 4132	Channel 4182	Channel 4233
Sub Test - 1	20.88	20.61	20.64
Sub Test - 2	19.94	19.45	19.61
Sub Test - 3	20.84	20.59	20.67
Sub Test - 4	19.96	19.94	19.55
Sub Test - 5	20.68	20.51	20.53

## 7. Test Results

### 7.1. Dielectric Performance

**Table 11: Dielectric Performance of Body Tissue Simulating Liquid**

Frequency	Description	Dielectric Parameters		Temp °C
		$\epsilon_r$	$\sigma$ (s/m)	
<b>835MHz (body)</b>	Target value ±5% window	55.20 52.44 — 57.96	0.97 0.92 — 1.02	/
	Measurement value 2010-4-16	54.00	0.99	21.5
<b>1900MHz (body)</b>	Target value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60	/
	Measurement value 2010-4-17	52.58	1.52	21.7

### 7.2. System check

**Table 12: System check for Body tissue simulation liquid**

Frequency	Description	SAR(W/kg)		Dielectric Parameters		Temp °C
		10g	1g	$\epsilon_r$	$\sigma$ (s/m)	
<b>835MHz</b>	Recommended result ±10% window	1.68 1.51 — 1.85	2.56 2.30 — 2.82	53	0.99	/
	Measurement value 2010-4-16	1.68	2.56	54.00	0.99	21.9
<b>1900 MHz</b>	Recommended result ±10% window	5.52 4.97 — 6.07	10.50 9.45 — 11.55	54	1.55	/
	Measurement value 2010-4-17	5.17	9.73	52.58	1.52	21.7

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.

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**7.3. Summary of Measurement Results**

**7.3.1. GSM 850(GPRS/EGPRS)**

**Table 13: SAR Values [GSM850 (GPRS/EGPRS)]**

Limit of SAR (W/kg)			10 g Average	1g Average	Power Drift(dB)	Graph Results
			2.0	1.6	± 0.21	
Test Case Of Body			Measurement Result (W/kg)		Power Drift(dB)	
Different Test Position	Different Timeslots	Channel	10 g Average	1 g Average		
<b>IBM T61</b>						
Test Position 1	2 timeslots	High	0.366	0.603	-0.106	Figure 8
		Middle	0.350	0.575	0.095	Figure 9
		Low	0.340	0.547	0.082	Figure 10
	1 timeslot	Middle	0.238	0.389	0.126	Figure 11
Test Position 2	2 timeslots	Middle	0.316	0.575	0.114	Figure 12
<b>BenQ Joybook R55V</b>						
Test Position 3	2 timeslots	Middle	0.062	0.090	0.157	Figure 13
Test Position 4	2 timeslots	Middle	0.184	0.306	-0.002	Figure 14
<b>Worst case position of GPRS with EGPRS</b>						
Test Position 1	4 timeslots	High	0.333	0.547	-0.046	Figure 15
	3 timeslots	High	0.363	0.587	0.006	Figure 16
	2 timeslots	High	0.388	0.628	0.060	Figure 17
	1 timeslot	High	0.244	0.394	0.021	Figure 18

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.

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**Table 14: SAR Values (GSM850, enhanced energy coupling at increased separation distances)**

Test Position	Distance of EUT to Phantom	Channel	Measurement Result (W/kg)	50% of initial position SAR (W/kg)	125% of initial position SAR (W/kg)
Test Position 1	initial position	High	0.761	0.381	0.952
	5mm		0.446		
	10mm		0.255		

- Note: 1. The probe tip location is fixed at the distance of 2mm from the phantom surface.
2. When the device position with the highest point SAR is > 25% of that measured at the initial position, a complete 1-g SAR evaluation is required for this configuration.
3. A single point SAR is measured for each of these device positions until the SAR is less than 50% of that measured at the initial position.

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### 7.3.2. GSM 1900(GPRS/EGPRS)

**Table 15: SAR Values [GSM1900 (GPRS/EGPRS)]**

Limit of SAR (W/kg)			10 g Average	1g Average	Power Drift(dB)	Graph Results
			2.0	1.6	± 0.21	
Test Case Of Body			Measurement Result (W/kg)		Power Drift(dB)	
Different Test Position	Different Timeslots	Channel	10 g Average	1 g Average		
<b>IBM T61</b>						
Test Position 1	2 timeslots	Middle	0.377	0.685	0.098	Figure 19
	1 timeslot	Middle	0.248	0.446	0.138	Figure 20
Test Position 2	2 timeslots	High	0.565	1.070	0.083	Figure 21
		Middle	0.510(max.cube)	0.998(max.cube)	0.041	Figure 22
		Low	0.441	0.879	0.064	Figure 23
<b>BenQ Joybook R55V</b>						
Test Position 3	2 timeslots	Middle	0.139	0.252	-0.116	Figure 24
Test Position 4	2 timeslots	Middle	0.397(max.cube)	0.761(max.cube)	-0.011	Figure 25
<b>Worst case position of GPRS with EGPRS</b>						
Test Position 2	4 timeslots	High	0.392	0.775	0.057	Figure 26
	3 timeslots	High	0.531	1.070	0.069	Figure 27
	2 timeslots	High	0.577	1.170	0.094	Figure 28
	1 timeslot	High	0.379	0.764	0.109	Figure 29

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).

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**Table 16: SAR Values (GSM1900, enhanced energy coupling at increased separation distances)**

<b>Test Position</b>	<b>Distance of EUT to Phantom</b>	<b>Channel</b>	<b>Measurement Result (W/kg)</b>	<b>50% of initial position SAR (W/kg)</b>	<b>125% of initial position SAR (W/kg)</b>
Test Position 2	initial position	High	1.432	0.716	1.790
	5mm		0.626		

- Note: 1. The probe tip location is fixed at the distance of 2mm from the phantom surface.
2. When the device position with the highest point SAR is > 25% of that measured at the initial position, a complete 1-g SAR evaluation is required for this configuration.
3. A single point SAR is measured for each of these device positions until the SAR is less than 50% of that measured at the initial position.

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

**Table 17: SAR Values [WCDMA Band II (WCDMA/HSDPA/HSUPA)]**

Limit of SAR (W/kg)		10 g Average	1g Average	Power Drift(dB)	Graph Results
		2.0	1.6	± 0.21	
Test Case Of Body		Measurement Result (W/kg)		Power Drift(dB)	
Different Test Position	Channel	10 g Average	1 g Average	Power Drift(dB)	
<b>IBM T61</b>					
Test Position 1	Middle	0.319	0.566	0.043	Figure 30
Test Position 2	Middle	0.401	0.798	-0.028	Figure 31
<b>BenQ Joybook R55V</b>					
Test Position 3	Middle	0.092	0.165	-0.139	Figure 32
Test Position 4	High	0.309(max.cube)	0.590(max.cube)	0.104	Figure 33
	Middle	0.415(max.cube)	0.809(max.cube)	0.098	Figure 34
	Low	0.354(max.cube)	0.673(max.cube)	0.116	Figure 35
<b>Worst case position of RMC with HSDPA</b>					
Test Position 4	Middle	0.420(max.cube)	<b>0.818(max.cube)</b>	-0.064	Figure 36
<b>Worst case position of RMC with HSUPA</b>					
Test Position 4	Middle	0.354(max.cube)	0.688(max.cube)	-0.042	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. 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).

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**Table 18: SAR Values (WCDMA Band II, enhanced energy coupling at increased separation distances)**

<b>Test Position</b>	<b>Distance of EUT to Phantom</b>	<b>Channel</b>	<b>Measurement Result (W/kg)</b>	<b>50% of initial position SAR (W/kg)</b>	<b>125% of initial position SAR (W/kg)</b>
Test Position 4	initial position	Middle	0.976	0.488	1.220
	5mm		0.391		

- Note: 1. The probe tip location is fixed at the distance of 2mm from the phantom surface.  
 2. When the device position with the highest point SAR is > 25% of that measured at the initial position, a complete 1-g SAR evaluation is required for this configuration.  
 3. A single point SAR is measured for each of these device positions until the SAR is less than 50% of that measured at the initial position.

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

**Table 19: SAR Values [WCDMA Band V (WCDMA/HSDPA/HSUPA)]**

Limit of SAR (W/kg)		10 g Average	1g Average	Power Drift(dB)	Graph Results
		2.0	1.6	± 0.21	
Test Case Of Body		Measurement Result (W/kg)		Power Drift(dB)	
Different Test Position	Channel	10 g Average	1 g Average	Power Drift(dB)	
<b>IBM T61</b>					
Test Position 1	High	0.251	0.405	-0.012	Figure 38
	Middle	0.207	0.338	-0.102	Figure 39
	Low	0.255	0.409	-0.031	Figure 40
Test Position 2	Middle	0.159	0.287	0.052	Figure 41
<b>BenQ Joybook R55V</b>					
Test Position 3	Middle	0.034	0.049	0.073	Figure 42
Test Position 4	Middle	0.064	0.109	-0.074	Figure 43
<b>Worst case position of RMC with HSDPA</b>					
Test Position 1	Low	0.246	0.392	0.114	Figure 44
<b>Worst case position of RMC with HSUPA</b>					
Test Position 1	Low	0.228	0.362	-0.110	Figure 45

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 20: SAR Values (WCDMA Band V, enhanced energy coupling at increased separation distances)**

Different Test Position	Distance of EUT to Phantom	Channel	Measurement Result (W/kg)	50% of initial position SAR (W/kg)	125% of initial position SAR (W/kg)
Test Position 1	initial position	Low	0.536	0.268	0.670
	5mm		0.283		
	10mm		0.183		

Note: 1. The probe tip location is fixed at the distance of 2mm from the phantom surface.

2. When the device position with the highest point SAR is > 25% of that measured at the initial position, a complete 1-g SAR evaluation is required for this configuration.
3. A single point SAR is measured for each of these device positions until the SAR is less than 50% of that measured at the initial position.

#### 7.4. Conclusion

Localized Specific Absorption Rate (SAR) of this portable wireless device has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this report. Maximum localized SAR<sub>1g</sub> is **1.170 W/kg** that is below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.

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**8. Measurement Uncertainty**

No.	source	Type	Uncertainty Value (%)	Probability Distribution	k	c <sub>i</sub>	Standard uncertainty u <sub>i</sub> (%)	Degree of freedom V <sub>eff</sub> or v <sub>i</sub>
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	2.9	5
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	$\infty$
21	-liquid conductivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.64	1.8	$\infty$
22	-liquid conductivity (measurement uncertainty)	B	5.0	N	1	0.64	3.2	$\infty$
23	-liquid permittivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	$\infty$
24	-liquid permittivity (measurement uncertainty)	B	5.0	N	1	0.6	3.0	$\infty$
Combined standard uncertainty		$u_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$				12.0		
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N	k=2	24.0		

## 9. Main Test Instruments

**Table 21: List of Main Instruments**

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 13, 2009	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 13, 2010	One year
04	Power sensor	Agilent 8481H	MY41091316	March 26, 2010	One year
05	Signal Generator	HP 8341B	2730A00804	September 13, 2009	One year
06	Amplifier	IXA-020	0401	No Calibration Requested	
07	Validation Kit 835MHz	D835V2	4d082	July 13, 2009	One year
08	Validation Kit 1900MHz	D1900V2	5d018	June 26, 2009	One year
09	BTS	E5515C	MY48360988	December 4, 2009	One year
10	E-field Probe	EX3DV4	3677	September 23, 2009	One year
11	DAE	DAE4	871	November 11, 2009	One year

\*\*\*END OF REPORT BODY\*\*\*

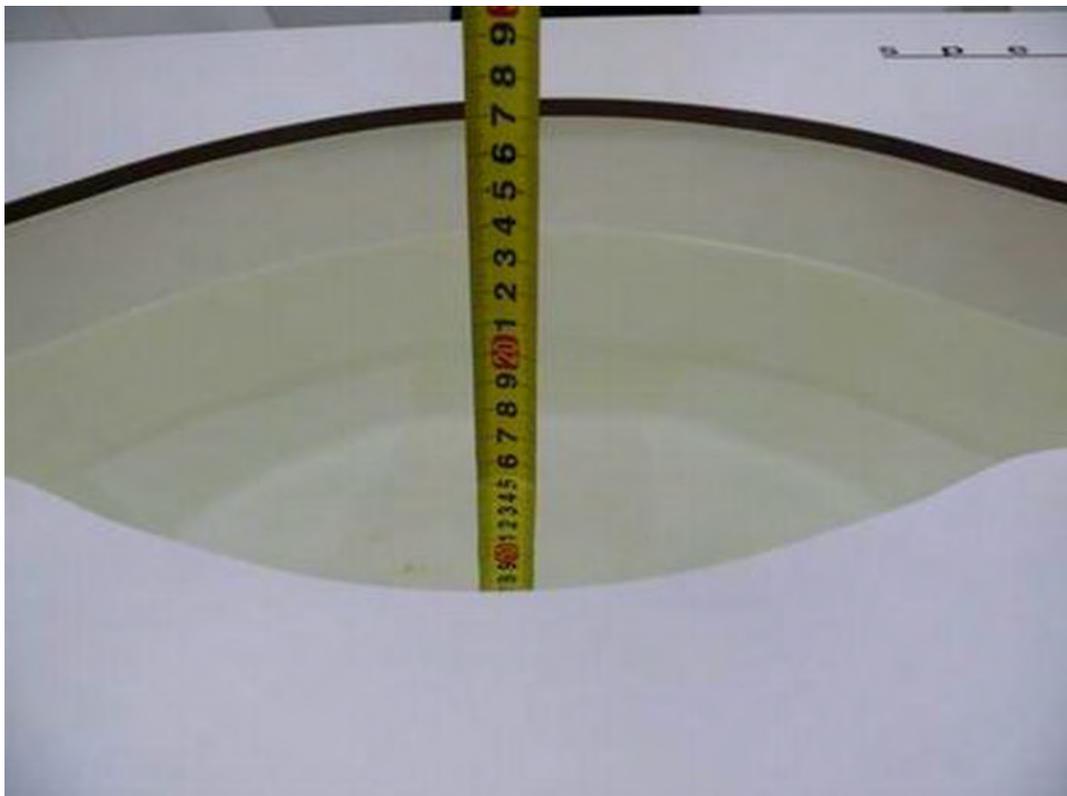
## ANNEX A: Test Layout



Picture 2: Specific Absorption Rate Test Layout



Picture 3: Liquid depth in the Flat Phantom (835 MHz, deep 15.2cm)



Picture 4: Liquid depth in the Flat Phantom (1900 MHz, deep 15.1cm)

## ANNEX B: System Check Results

### System Performance Check at 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d082

Date/Time: 4/16/2010 10:56:20 AM

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

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.99$  mho/m;  $\epsilon_r = 54.00$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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) = 2.77 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) = 3.68 W/kg

**SAR(1 g) = 2.56 mW/g; SAR(10 g) = 1.68 mW/g**

Maximum value of SAR (measured) = 2.77 mW/g

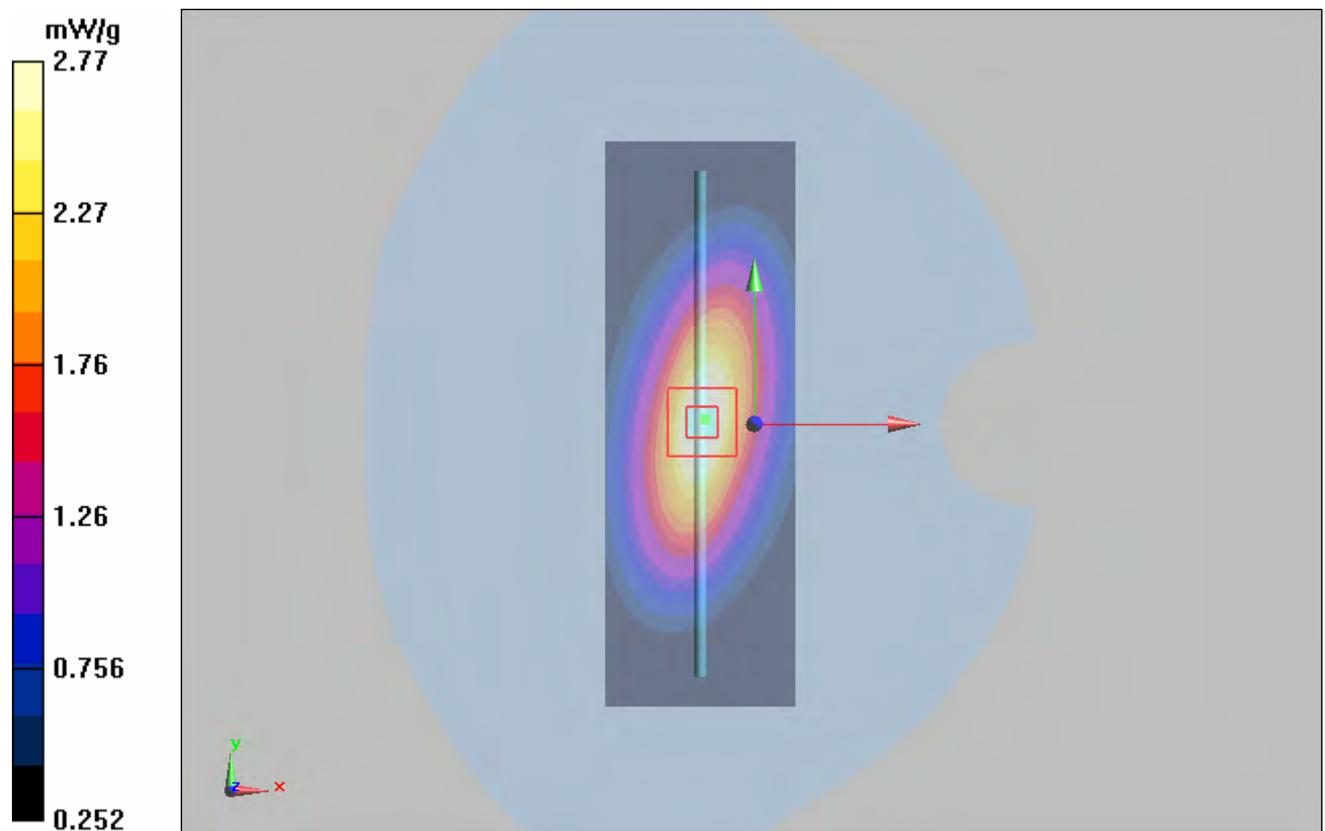


Figure 6 System Performance Check 835MHz 250mW

### System Performance Check at 1900 MHz

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

Date/Time: 4/17/2010 7:22:19 AM

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

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.52$  mho/m;  $\epsilon_r = 52.58$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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) = 12.5 mW/g

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

Reference Value = 75.9 V/m; Power Drift = 0.051 dB

Peak SAR (extrapolated) = 16.8 W/kg

**SAR(1 g) = 9.73 mW/g; SAR(10 g) = 5.17 mW/g**

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

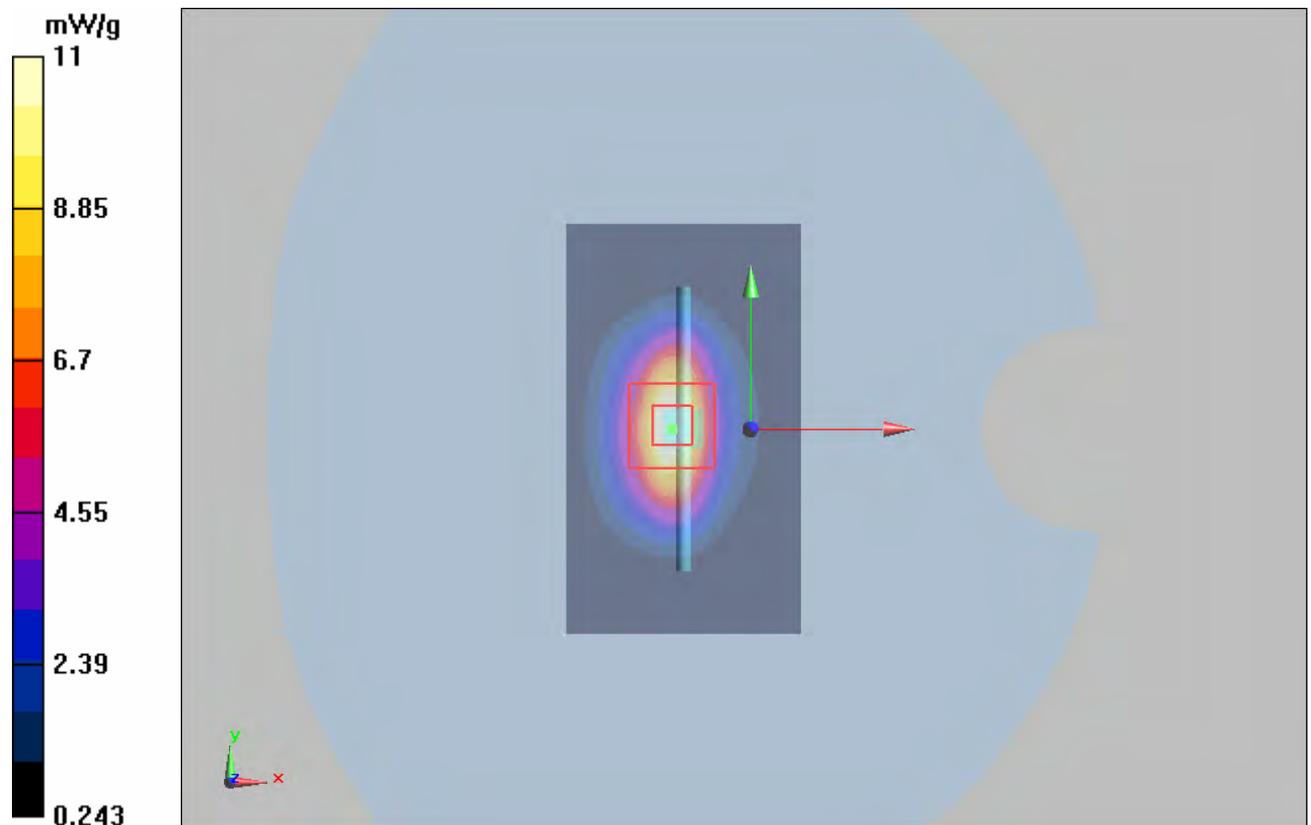


Figure 7 System Performance Check 1900MHz 250mW

## ANNEX C: Graph Results

### GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 High Frequency

Date/Time: 4/16/2010 7:59:04 PM

Communication System: GSM850 + GPRS(2Up); Frequency: 848.8 MHz; Duty Cycle: 1:4.15

Medium parameters used:  $f = 849$  MHz;  $\sigma = 1.01$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 1 High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.715 mW/g

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

Reference Value = 22 V/m; Power Drift = -0.106 dB

Peak SAR (extrapolated) = 0.999 W/kg

**SAR(1 g) = 0.603 mW/g; SAR(10 g) = 0.366 mW/g**

Maximum value of SAR (measured) = 0.699 mW/g

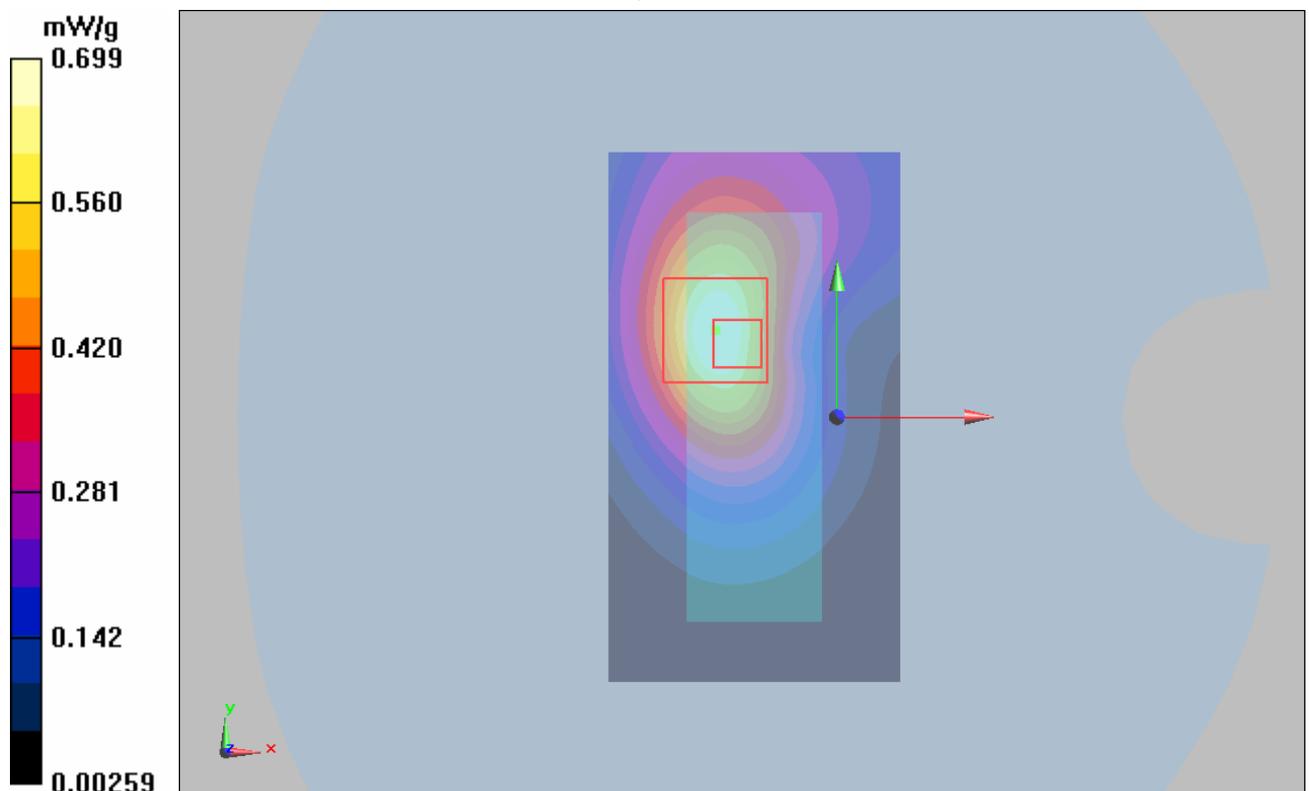


Figure 8 GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 251

**GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Middle Frequency**

Date/Time: 4/16/2010 7:09:20 PM

Communication System: GSM850 + GPRS(2Up); Frequency: 837 MHz; Duty Cycle: 1:4.15

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.995$  mho/m;  $\epsilon_r = 54$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 1 Middle/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.634 mW/g

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

Reference Value = 20.8 V/m; Power Drift = 0.095 dB

Peak SAR (extrapolated) = 0.877 W/kg

**SAR(1 g) = 0.575 mW/g; SAR(10 g) = 0.350 mW/g**

Maximum value of SAR (measured) = 0.633 mW/g

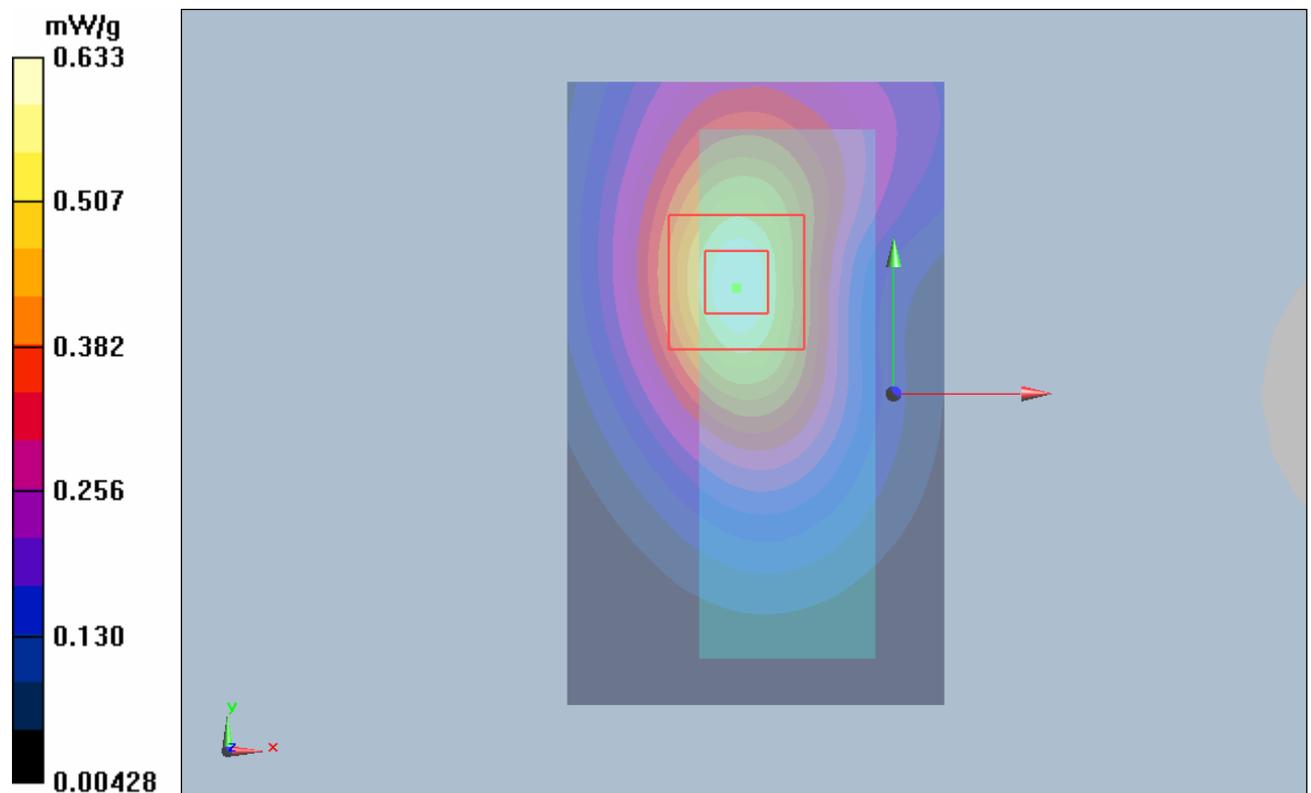


Figure 9 GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 192

**GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Low Frequency**

Date/Time: 4/16/2010 7:35:03 PM

Communication System: GSM850 + GPRS(2Up); Frequency: 824.2 MHz; Duty Cycle: 1:4.15

Medium parameters used (interpolated):  $f = 824.2$  MHz;  $\sigma = 0.983$  mho/m;  $\epsilon_r = 54.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 1 Low/Area Scan (51x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.609 mW/g

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

Reference Value = 20.5 V/m; Power Drift = 0.082 dB

Peak SAR (extrapolated) = 0.816 W/kg

**SAR(1 g) = 0.547 mW/g; SAR(10 g) = 0.340 mW/g**

Maximum value of SAR (measured) = 0.597 mW/g

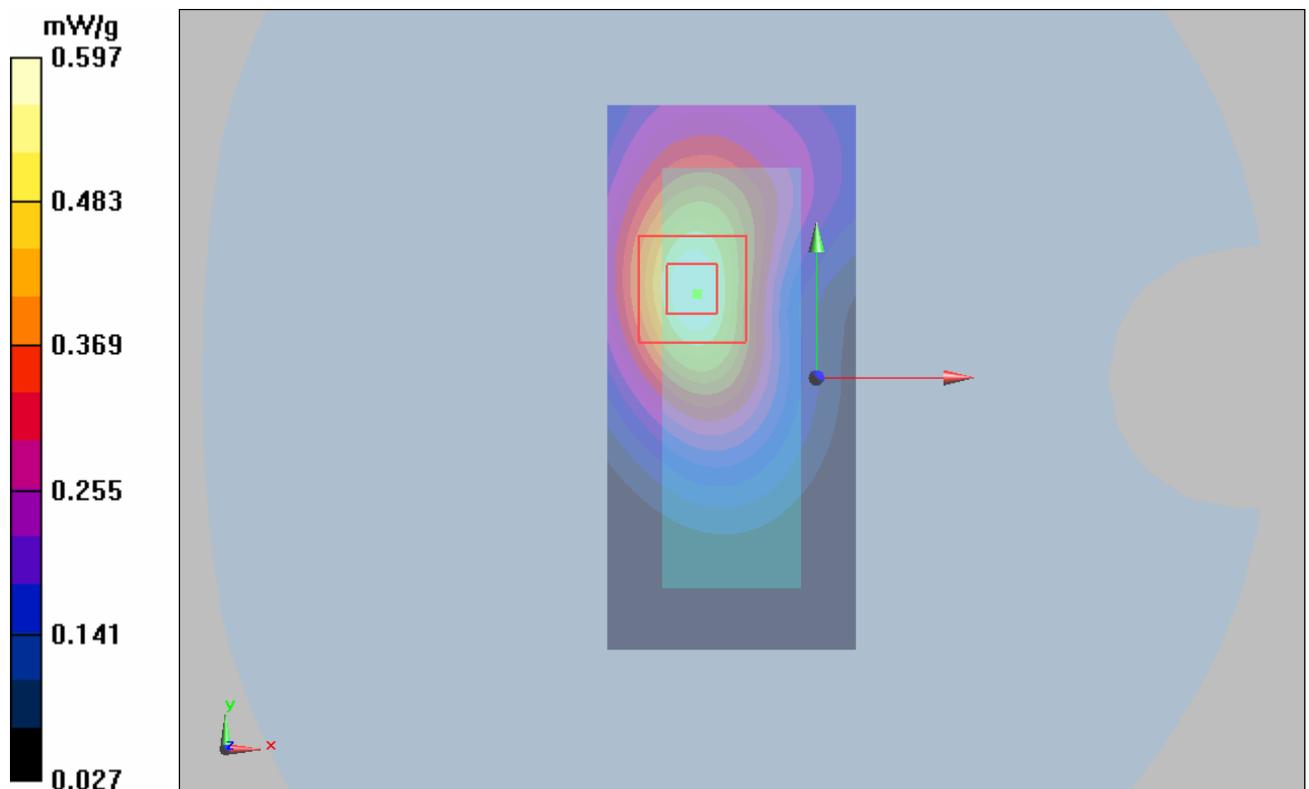


Figure 10 GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 128

**GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Middle Frequency**

Date/Time: 4/16/2010 12:22:24 PM

Communication System: GSM850 + GPRS(1Up); Frequency: 837 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.995$  mho/m;  $\epsilon_r = 54$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 1 Middle/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.427 mW/g

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

Reference Value = 19.9 V/m; Power Drift = 0.126 dB

Peak SAR (extrapolated) = 0.597 W/kg

**SAR(1 g) = 0.389 mW/g; SAR(10 g) = 0.238 mW/g**

Maximum value of SAR (measured) = 0.432 mW/g

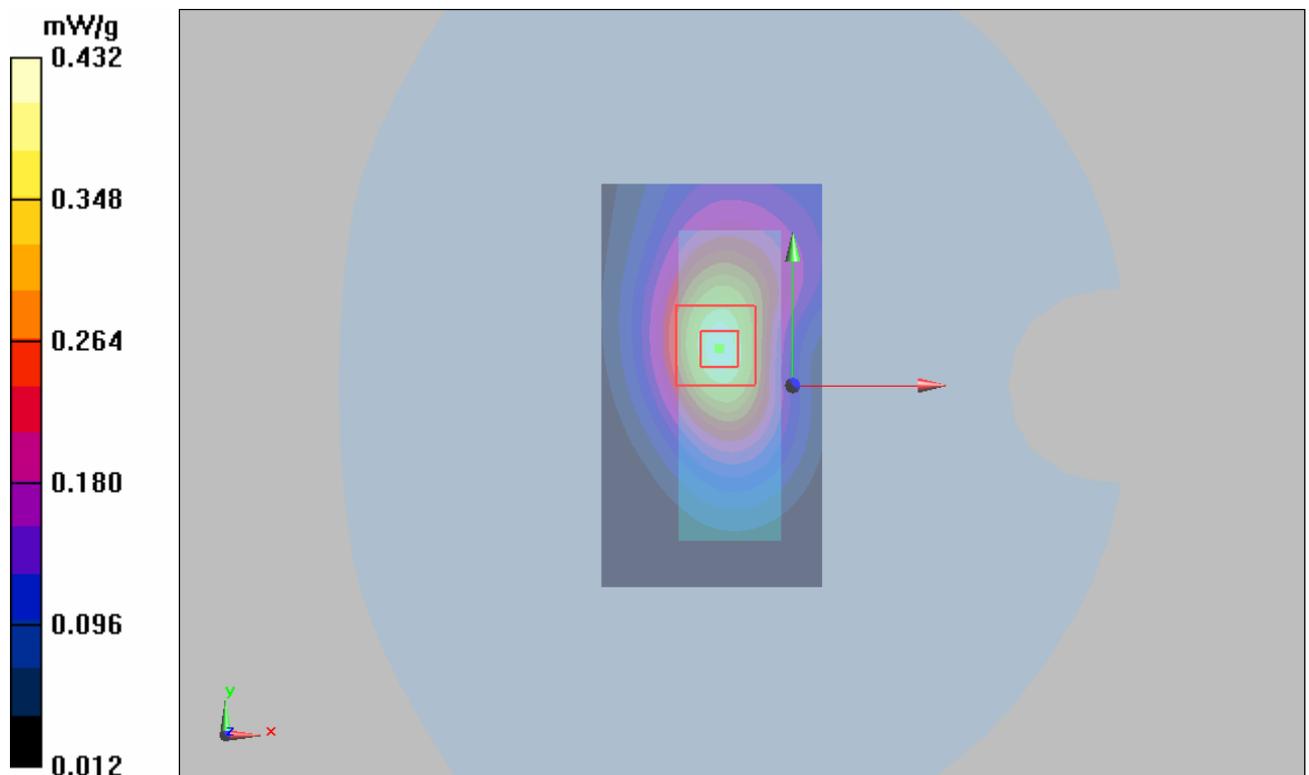


Figure 11 GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 192

**GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Middle Frequency**

Date/Time: 4/16/2010 3:57:38 PM

Communication System: GSM850 + GPRS(2Up); Frequency: 837 MHz;Duty Cycle: 1:4.15

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.995$  mho/m;  $\epsilon_r = 54$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 2 Middle/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.650 mW/g

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

Reference Value = 17.3 V/m; Power Drift = 0.114 dB

Peak SAR (extrapolated) = 1 W/kg

**SAR(1 g) = 0.575 mW/g; SAR(10 g) = 0.316 mW/g**

Maximum value of SAR (measured) = 0.649 mW/g

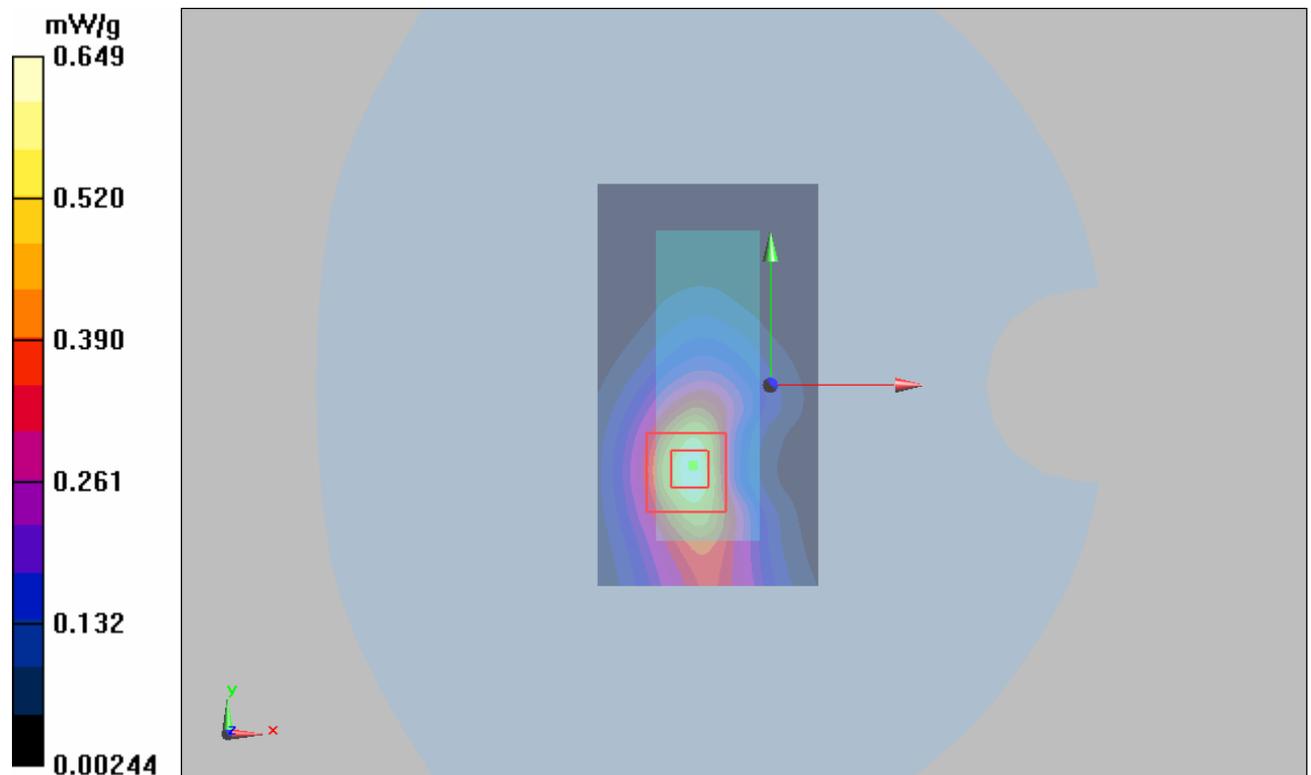


Figure 12 GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Channel 192

**GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Middle Frequency**

Date/Time: 4/16/2010 6:37:55 PM

Communication System: GSM850 + GPRS(2Up); Frequency: 837 MHz; Duty Cycle: 1:4.15

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.995$  mho/m;  $\epsilon_r = 54$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 3 Middle/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.095 mW/g

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

Reference Value = 9.78 V/m; Power Drift = 0.157 dB

Peak SAR (extrapolated) = 0.124 W/kg

**SAR(1 g) = 0.090 mW/g; SAR(10 g) = 0.062 mW/g**

Maximum value of SAR (measured) = 0.097 mW/g

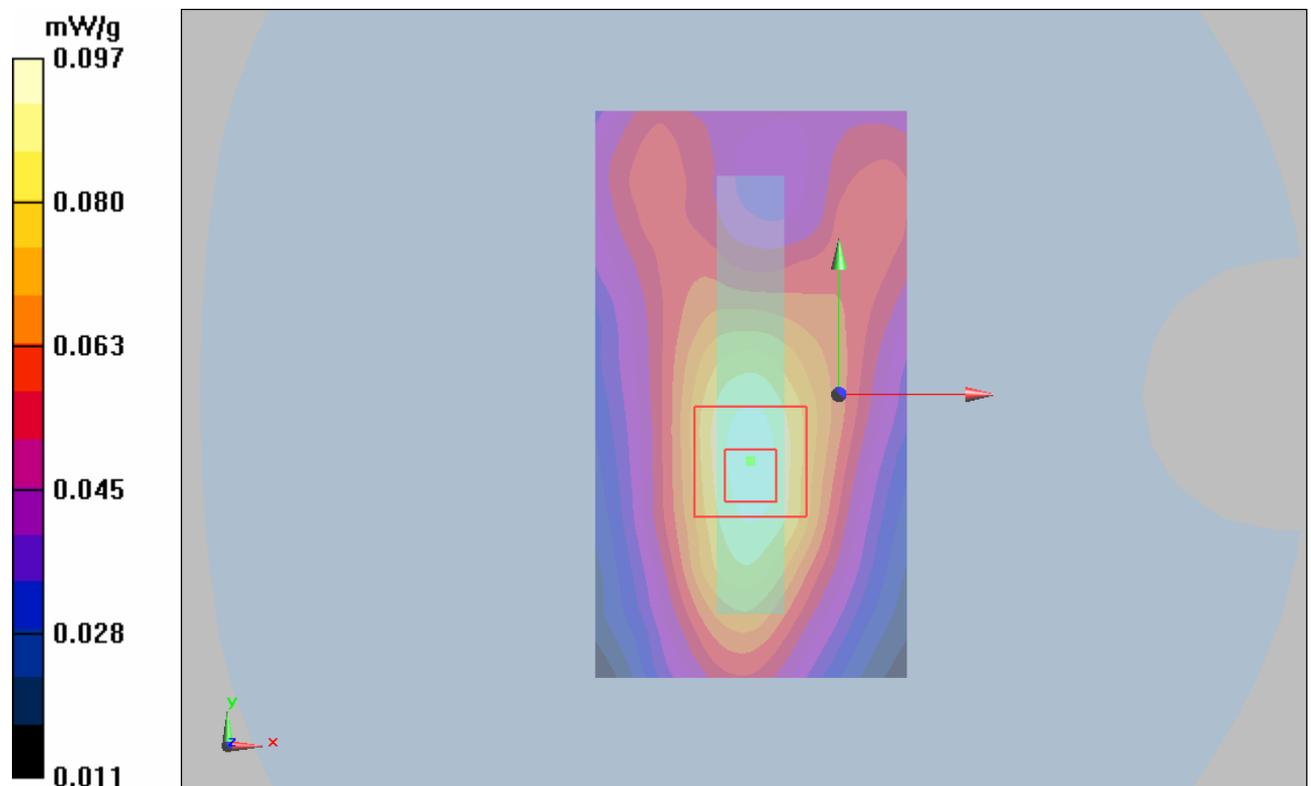


Figure 13 GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 192

**GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 4 Middle Frequency**

Date/Time: 4/16/2010 2:02:51 PM

Communication System: GSM850 + GPRS(2Up); Frequency: 837 MHz; Duty Cycle: 1:4.15

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.995$  mho/m;  $\epsilon_r = 54$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 4 Middle/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.339 mW/g

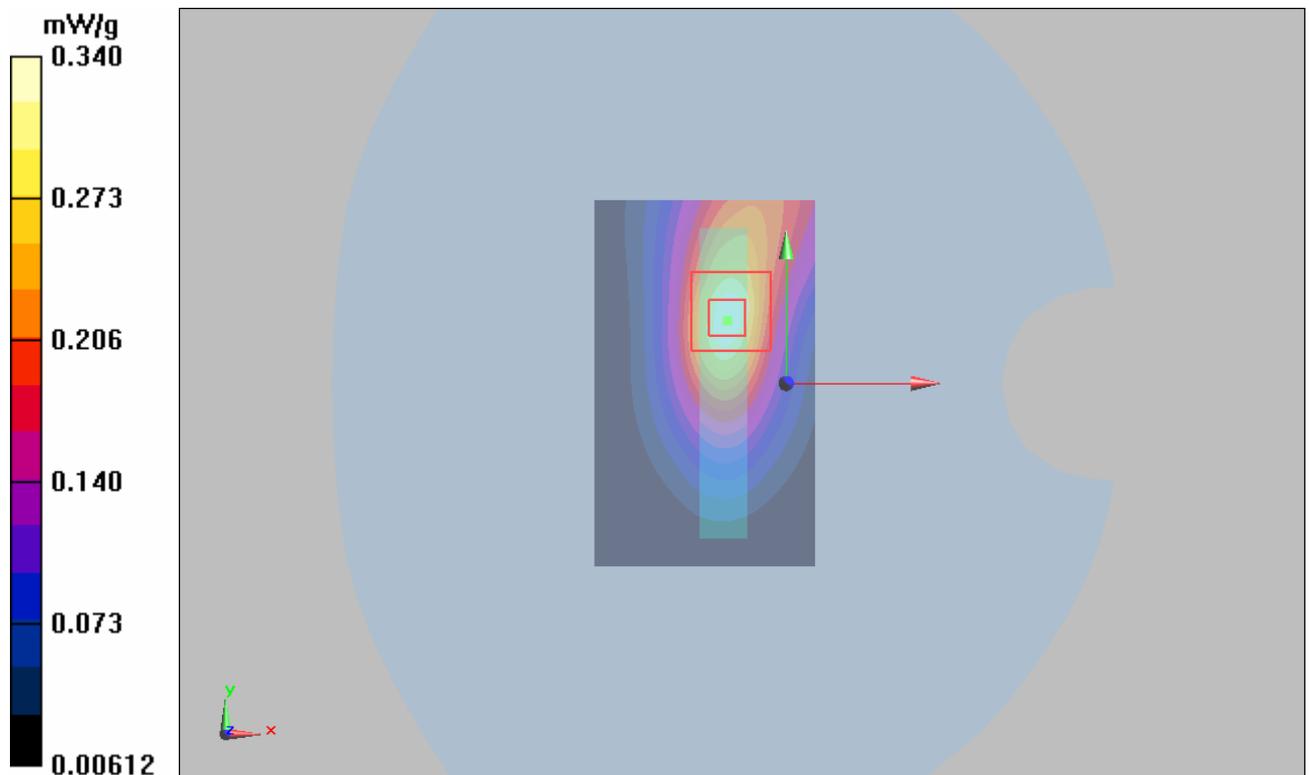
**Test Position 4 Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.3 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 0.492 W/kg

**SAR(1 g) = 0.306 mW/g; SAR(10 g) = 0.184 mW/g**

Maximum value of SAR (measured) = 0.340 mW/g



**Figure 14 GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 4 Channel 192**

**GSM 850 EGPRS (4 timeslots in uplink) with IBM T61 Test Position 1 High Frequency**

Date/Time: 4/16/2010 12:52:22 PM

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

Medium parameters used:  $f = 849$  MHz;  $\sigma = 1.01$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 1 High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.604 mW/g

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

Reference Value = 23.7 V/m; Power Drift = -0.046 dB

Peak SAR (extrapolated) = 0.836 W/kg

**SAR(1 g) = 0.547 mW/g; SAR(10 g) = 0.333 mW/g**

Maximum value of SAR (measured) = 0.600 mW/g

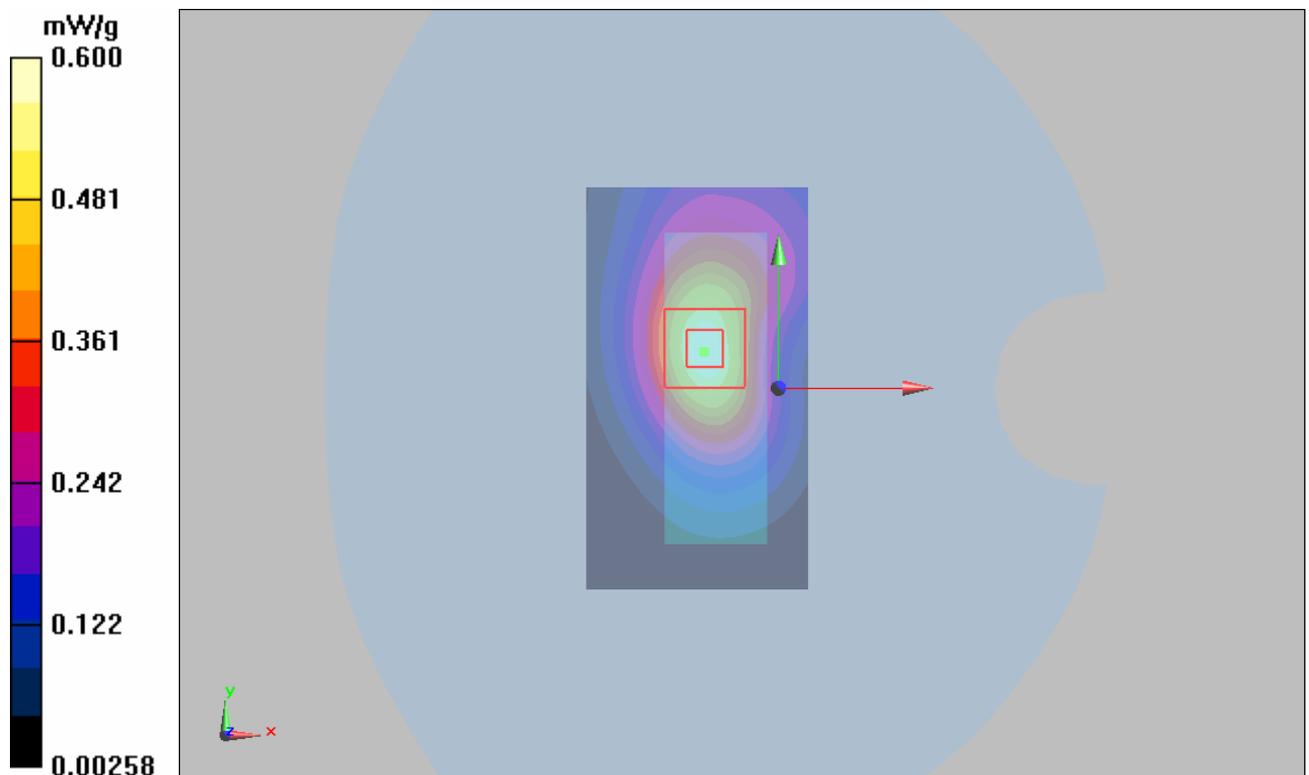


Figure 15 GSM 850 EGPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Channel 251

**GSM 850 EGPRS (3 timeslots in uplink) with IBM T61 Test Position 1 High Frequency**

Date/Time: 4/16/2010 8:25:53 PM

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

Medium parameters used:  $f = 849$  MHz;  $\sigma = 1.01$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 1 High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.662 mW/g

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

Reference Value = 21.1 V/m; Power Drift = 0.006 dB

Peak SAR (extrapolated) = 0.849 W/kg

**SAR(1 g) = 0.587 mW/g; SAR(10 g) = 0.363 mW/g**

Maximum value of SAR (measured) = 0.661 mW/g

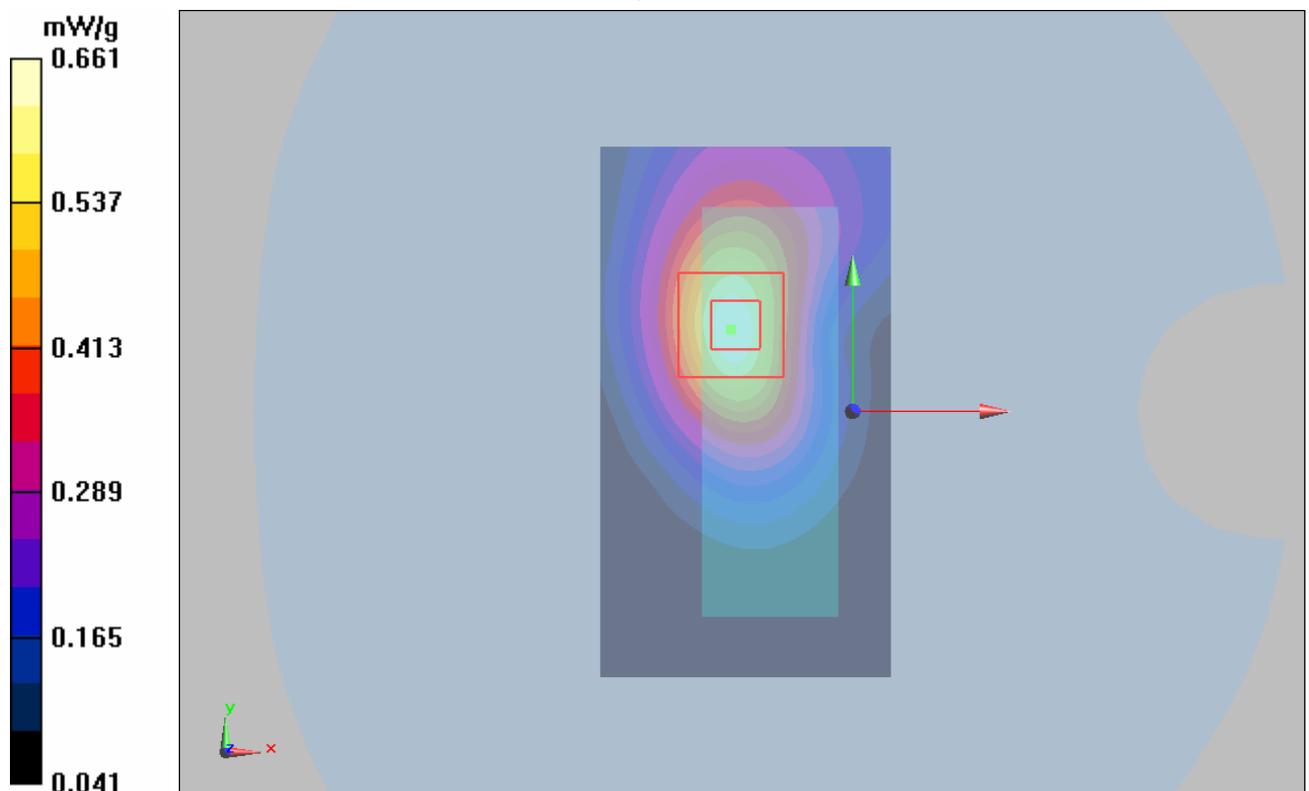


Figure 16 GSM 850 EGPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 251

**GSM 850 EGPRS (2 timeslots in uplink) with IBM T61 Test Position 1 High Frequency**

Date/Time: 4/16/2010 8:51:24 PM

Communication System: GSM850 + EGPRS(2Up); Frequency: 848.8 MHz; Duty Cycle: 1:4.15

Medium parameters used:  $f = 849$  MHz;  $\sigma = 1.01$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 1 High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.695 mW/g

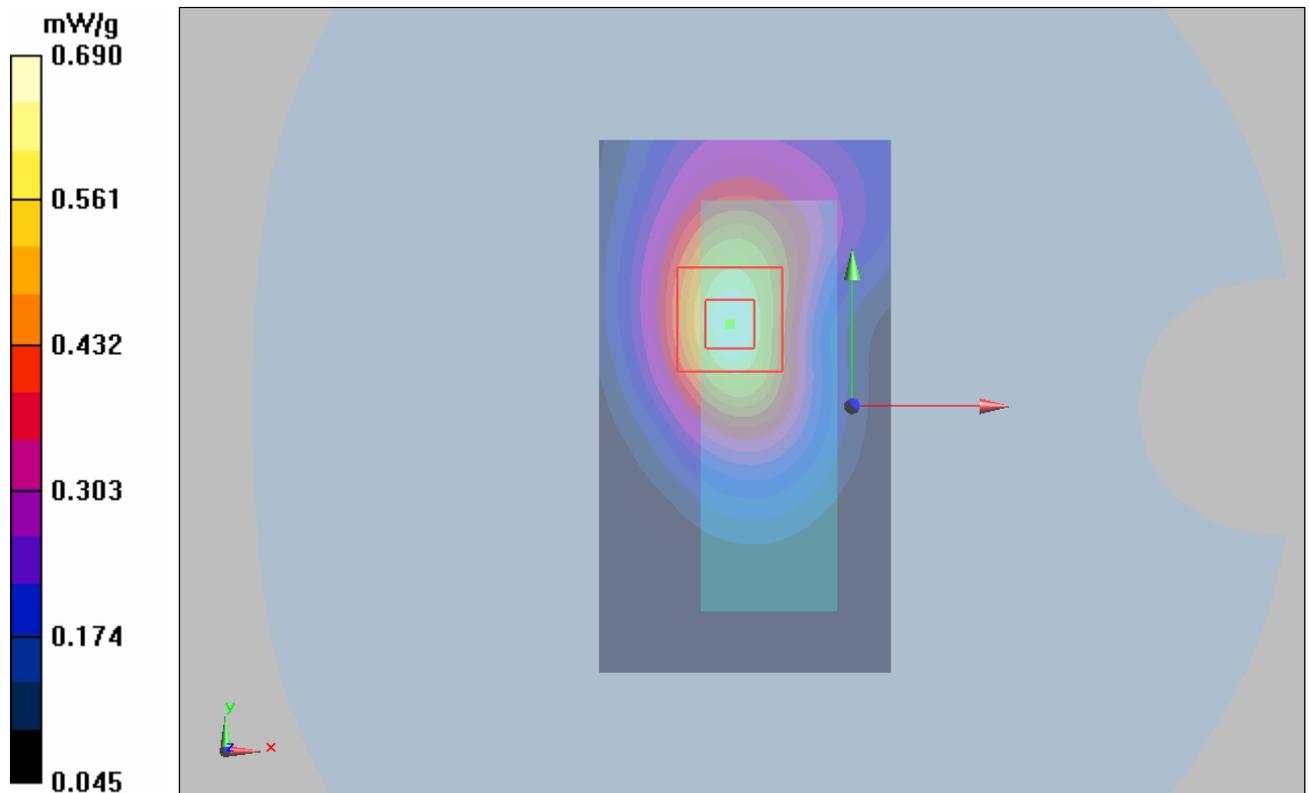
**Test Position 1 High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 21.5 V/m; Power Drift = 0.060 dB

Peak SAR (extrapolated) = 0.946 W/kg

**SAR(1 g) = 0.628 mW/g; SAR(10 g) = 0.388 mW/g**

Maximum value of SAR (measured) = 0.690 mW/g



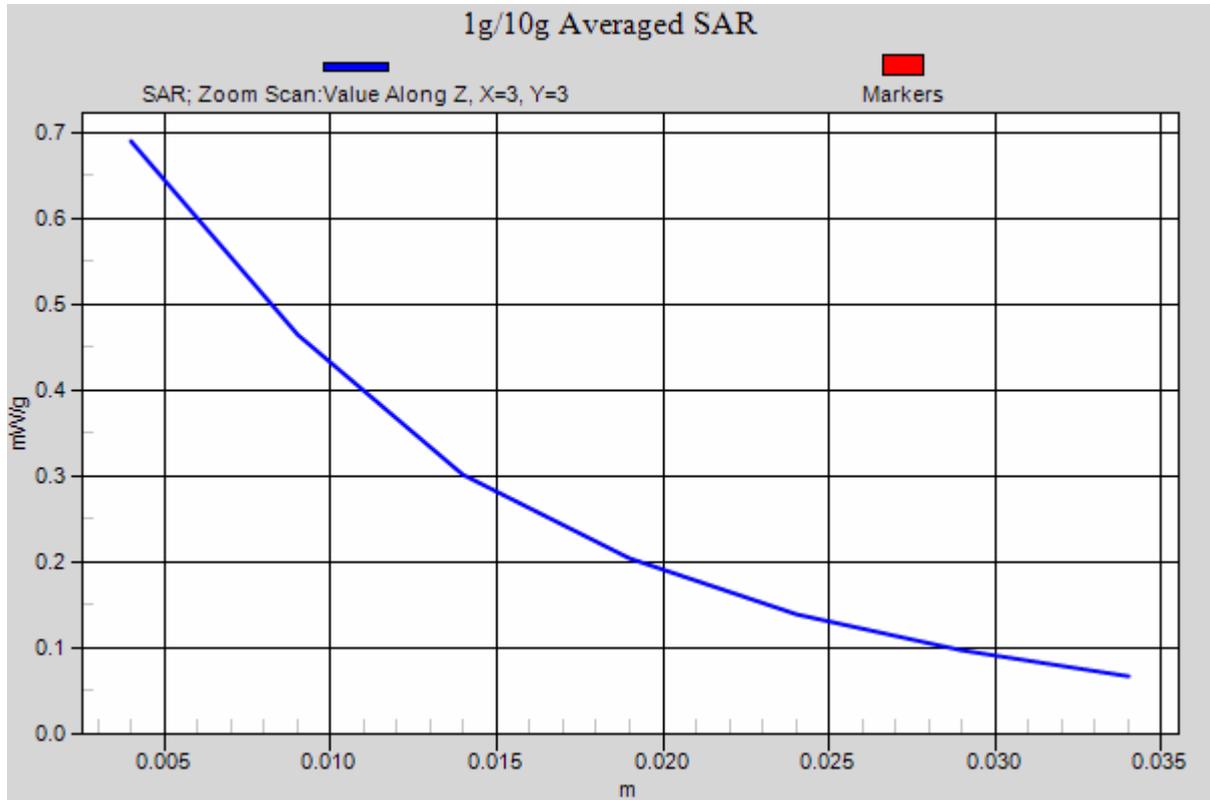


Figure 17 GSM 850 EGPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 251

**GSM 850 EGPRS (1 timeslot in uplink) with IBM T61 Test Position 1 High Frequency**

Date/Time: 4/16/2010 9:16:58 PM

Communication System: GSM850 + EGPRS(1Up); Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 849$  MHz;  $\sigma = 1.01$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 1 High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.442 mW/g

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

Reference Value = 17.2 V/m; Power Drift = 0.021 dB

Peak SAR (extrapolated) = 0.589 W/kg

**SAR(1 g) = 0.394 mW/g; SAR(10 g) = 0.244 mW/g**

Maximum value of SAR (measured) = 0.433 mW/g

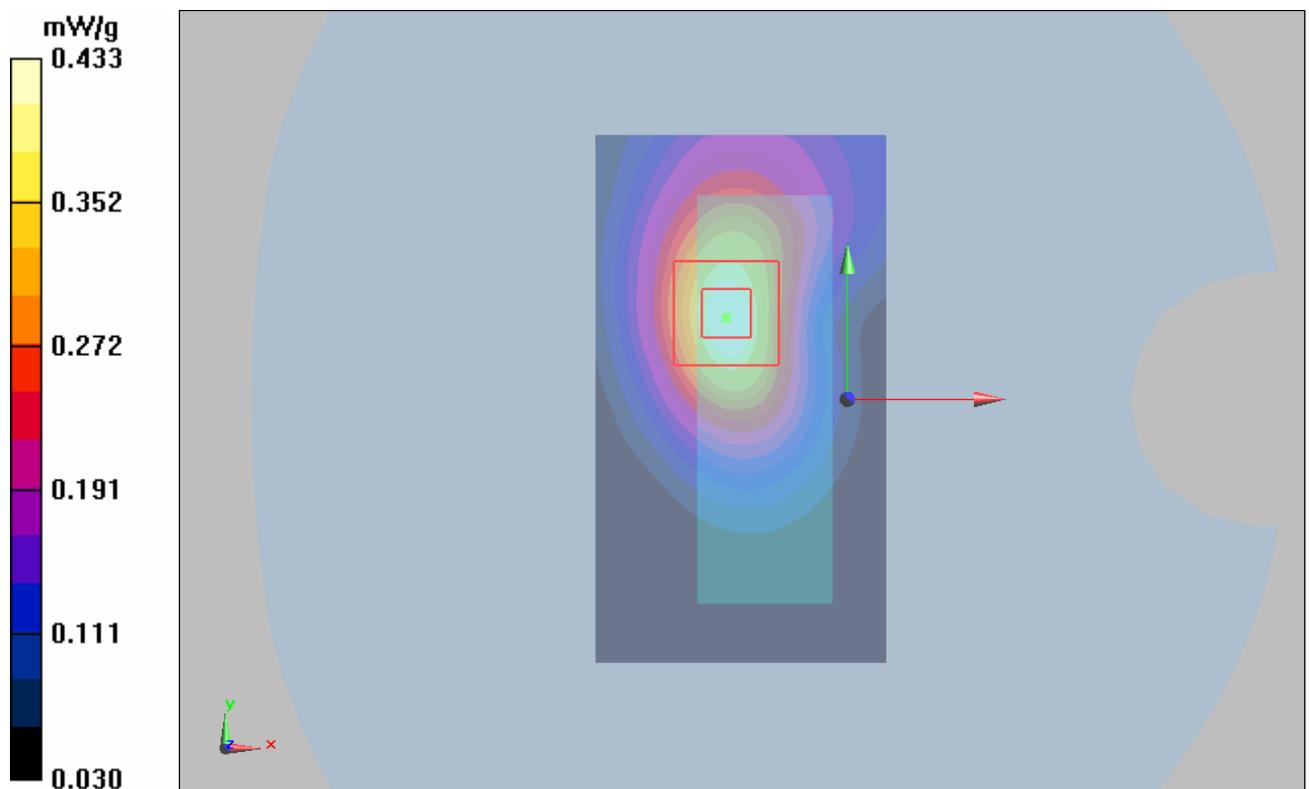


Figure 18 GSM 850 EGPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 251

**GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Middle Frequency**

Date/Time: 4/17/2010 8:52:16 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.5$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 1 Middle/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.749 mW/g

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

Reference Value = 16.9 V/m; Power Drift = 0.098 dB

Peak SAR (extrapolated) = 1.38 W/kg

**SAR(1 g) = 0.685 mW/g; SAR(10 g) = 0.377 mW/g**

Maximum value of SAR (measured) = 0.753 mW/g

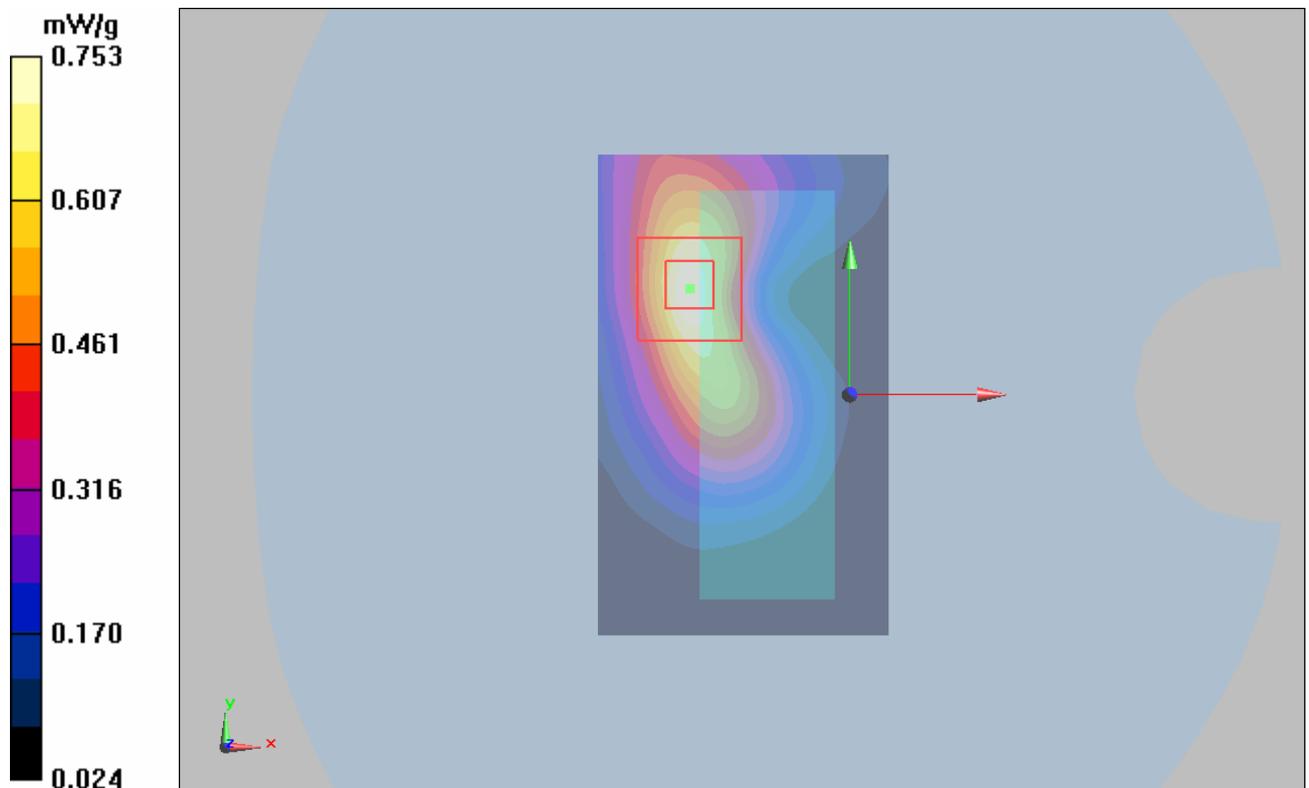


Figure 19 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 661

### GSM 1900 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Middle Frequency

Date/Time: 4/17/2010 9:16:56 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.5$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 1 Middle/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.491 mW/g

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

Reference Value = 13.7 V/m; Power Drift = 0.138 dB

Peak SAR (extrapolated) = 1.28 W/kg

**SAR(1 g) = 0.446 mW/g; SAR(10 g) = 0.248 mW/g**

Maximum value of SAR (measured) = 0.497 mW/g

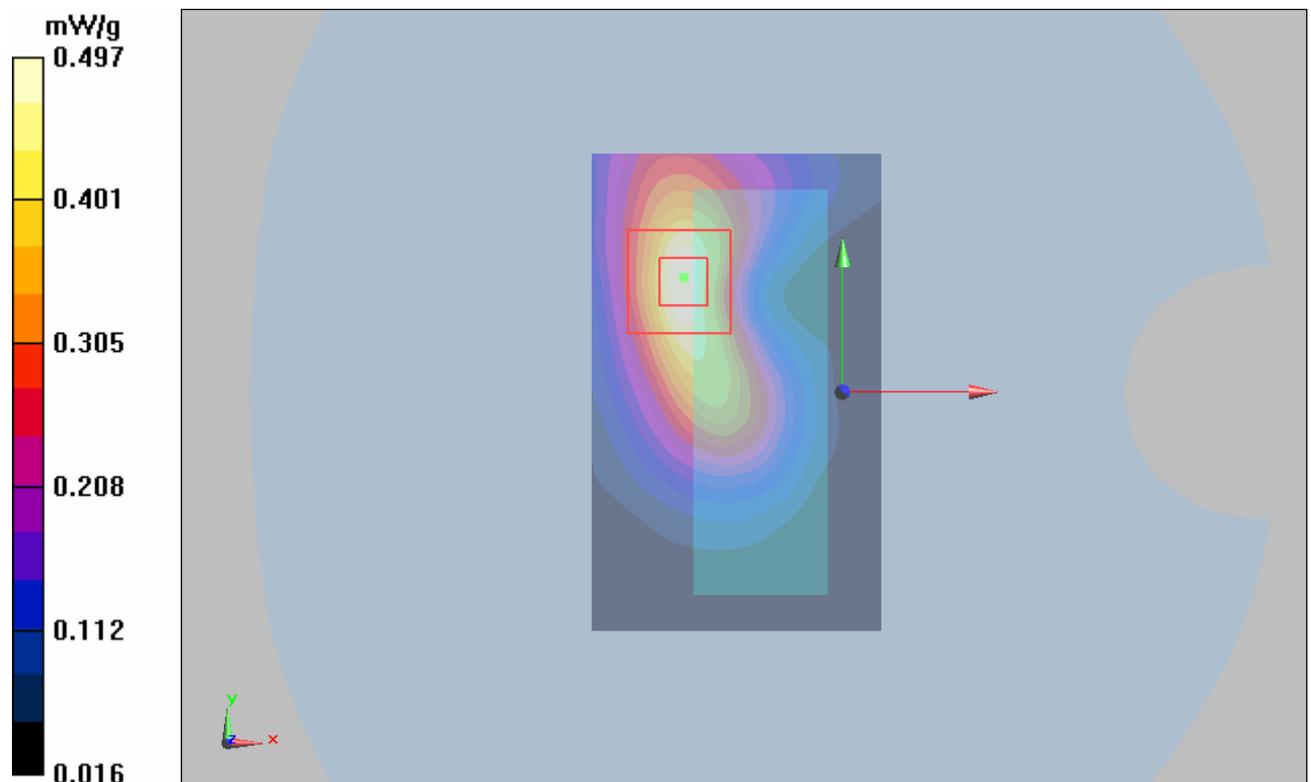


Figure 20 GSM 1900 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 661

**GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 High Frequency**

Date/Time: 4/17/2010 12:37:01 PM

Communication System: PCS 1900+GPRS(2Up); Frequency: 1909.8 MHz; Duty Cycle: 1:4.15

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 2 High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 26.7 V/m; Power Drift = 0.083 dB

Peak SAR (extrapolated) = 2.14 W/kg

**SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.565 mW/g**

Maximum value of SAR (measured) = 1.17 mW/g

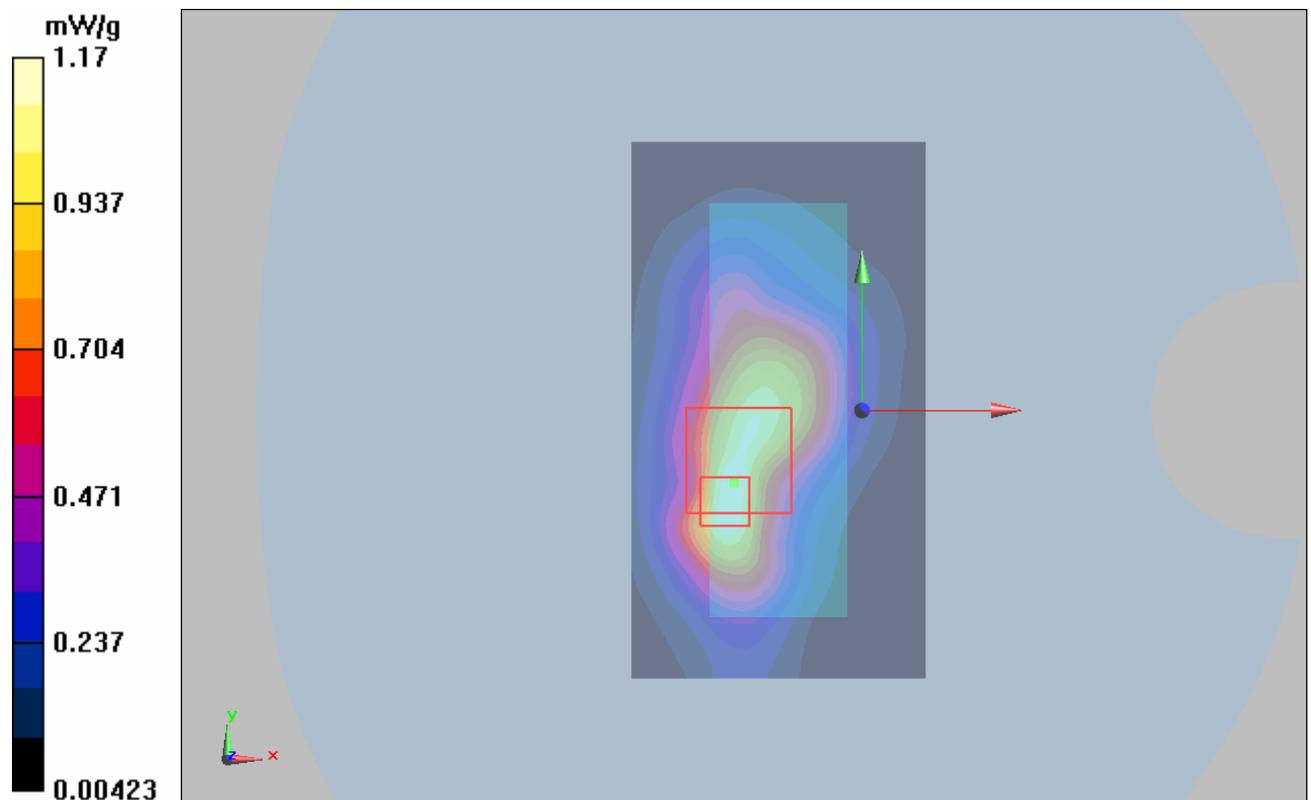


Figure 21 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Channel 810

**GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Middle Frequency**

Date/Time: 4/17/2010 11:43:31 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.5$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 2 Middle/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.22 mW/g

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

Reference Value = 25.6 V/m; Power Drift = 0.041 dB

Peak SAR (extrapolated) = 4.61 W/kg

**SAR(1 g) = 0.927 mW/g; SAR(10 g) = 0.535 mW/g**

Maximum value of SAR (measured) = 1.09 mW/g

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

Reference Value = 25.6 V/m; Power Drift = 0.041 dB

Peak SAR (extrapolated) = 2 W/kg

**SAR(1 g) = 0.998 mW/g; SAR(10 g) = 0.510 mW/g**

Maximum value of SAR (measured) = 1.14 mW/g

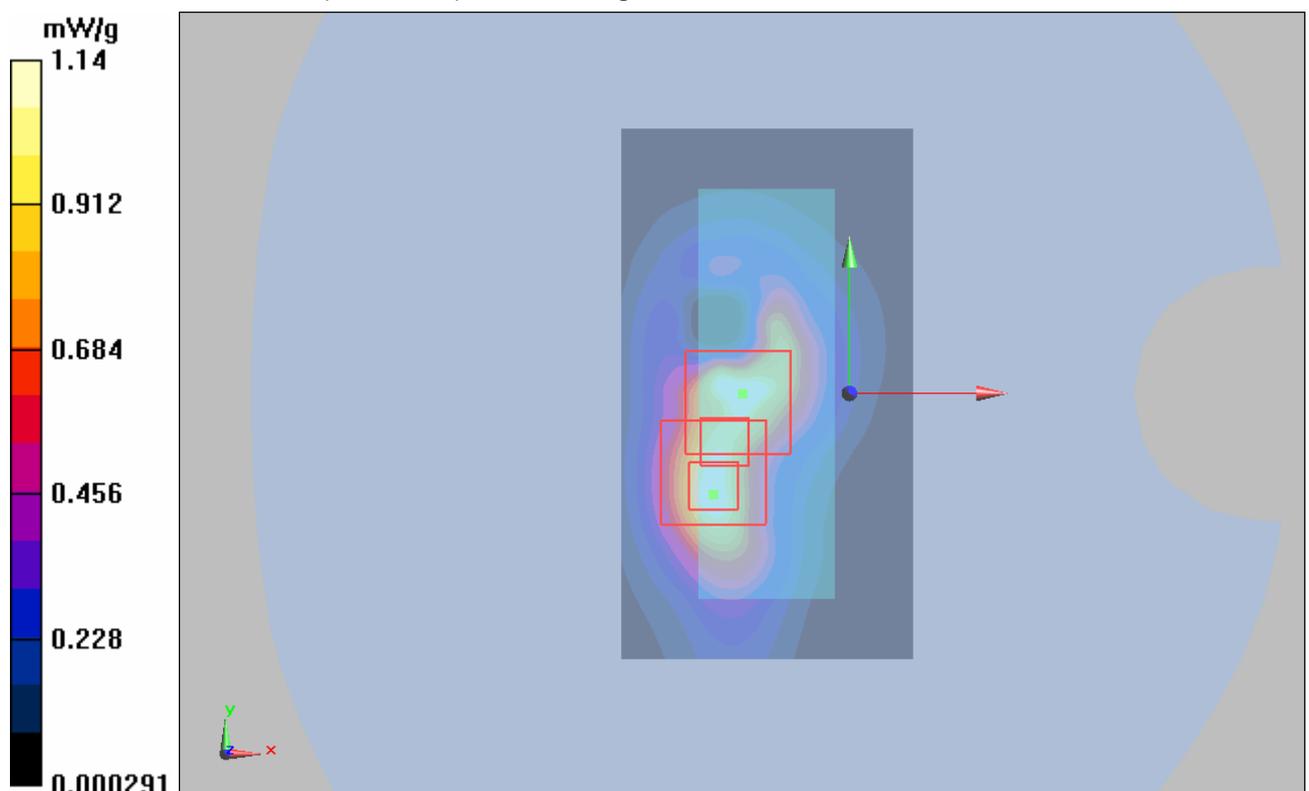


Figure 22 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Channel 661

**GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Low Frequency**

Date/Time: 4/17/2010 6:32:45 PM

Communication System: PCS 1900+GPRS(2Up); Frequency: 1850.2 MHz; Duty Cycle: 1:4.15

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 2 Low/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.03 mW/g

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

Reference Value = 18.5 V/m; Power Drift = 0.064 dB

Peak SAR (extrapolated) = 1.75 W/kg

**SAR(1 g) = 0.879 mW/g; SAR(10 g) = 0.441 mW/g**

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

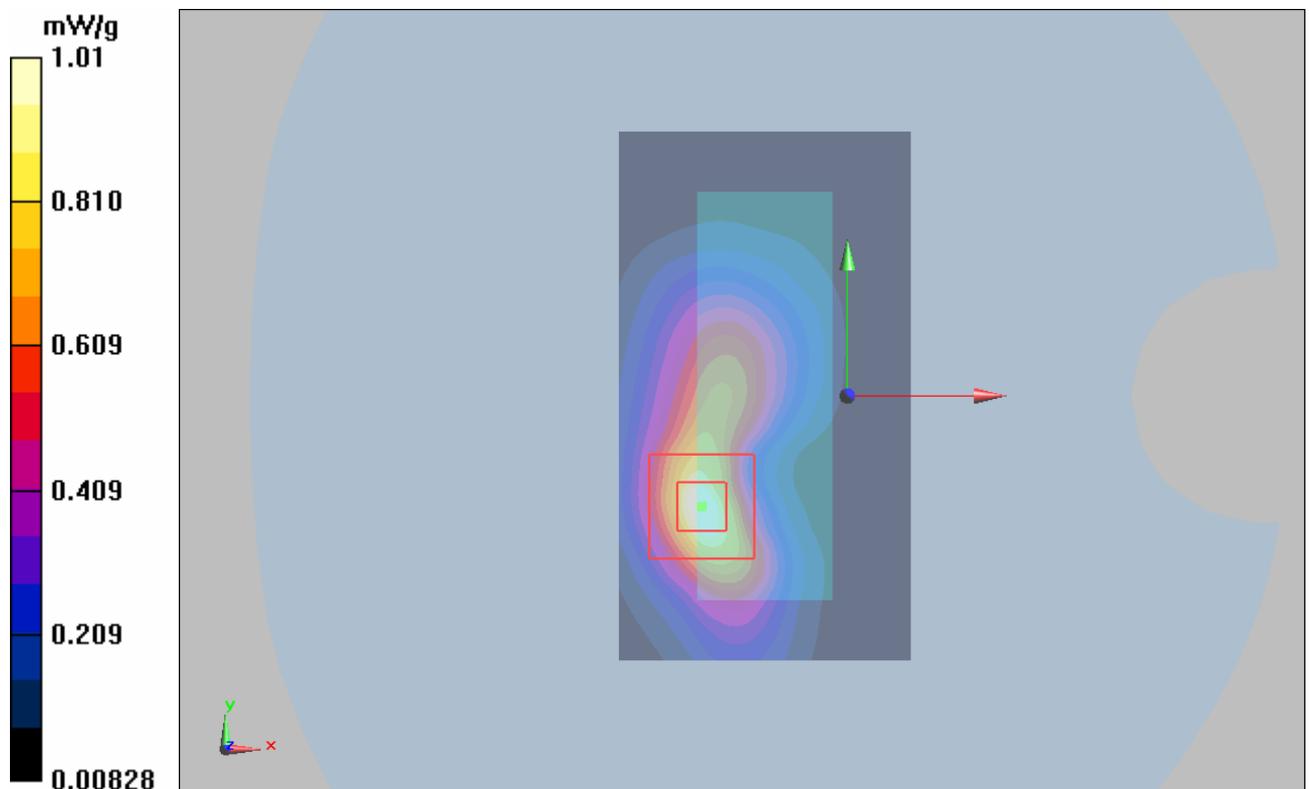


Figure 23 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Channel 512

**GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Middle Frequency**

Date/Time: 4/17/2010 5:36:48 PM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.5$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 3 Middle/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.285 mW/g

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

Reference Value = 13.5 V/m; Power Drift = -0.116 dB

Peak SAR (extrapolated) = 0.449 W/kg

**SAR(1 g) = 0.252 mW/g; SAR(10 g) = 0.139 mW/g**

Maximum value of SAR (measured) = 0.278 mW/g

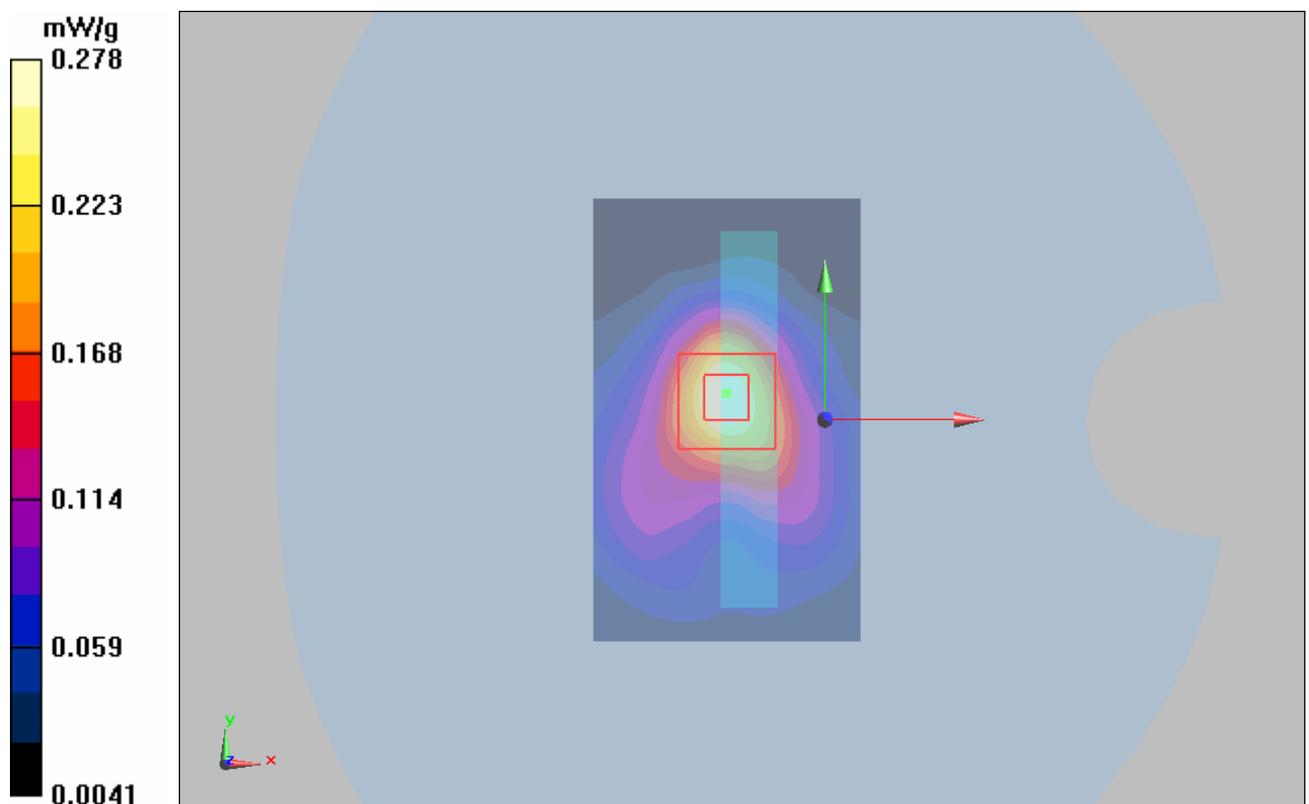


Figure 24 GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 661

**GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 4 Middle Frequency**

Date/Time: 4/17/2010 4:53:31 PM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.5$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 4 Middle/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.892 mW/g

**Test Position 4 Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.8 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 1.56 W/kg

**SAR(1 g) = 0.761 mW/g; SAR(10 g) = 0.397 mW/g**

Maximum value of SAR (measured) = 0.848 mW/g

**Test Position 4 Middle/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.8 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 1.17 W/kg

**SAR(1 g) = 0.529 mW/g; SAR(10 g) = 0.286 mW/g**

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

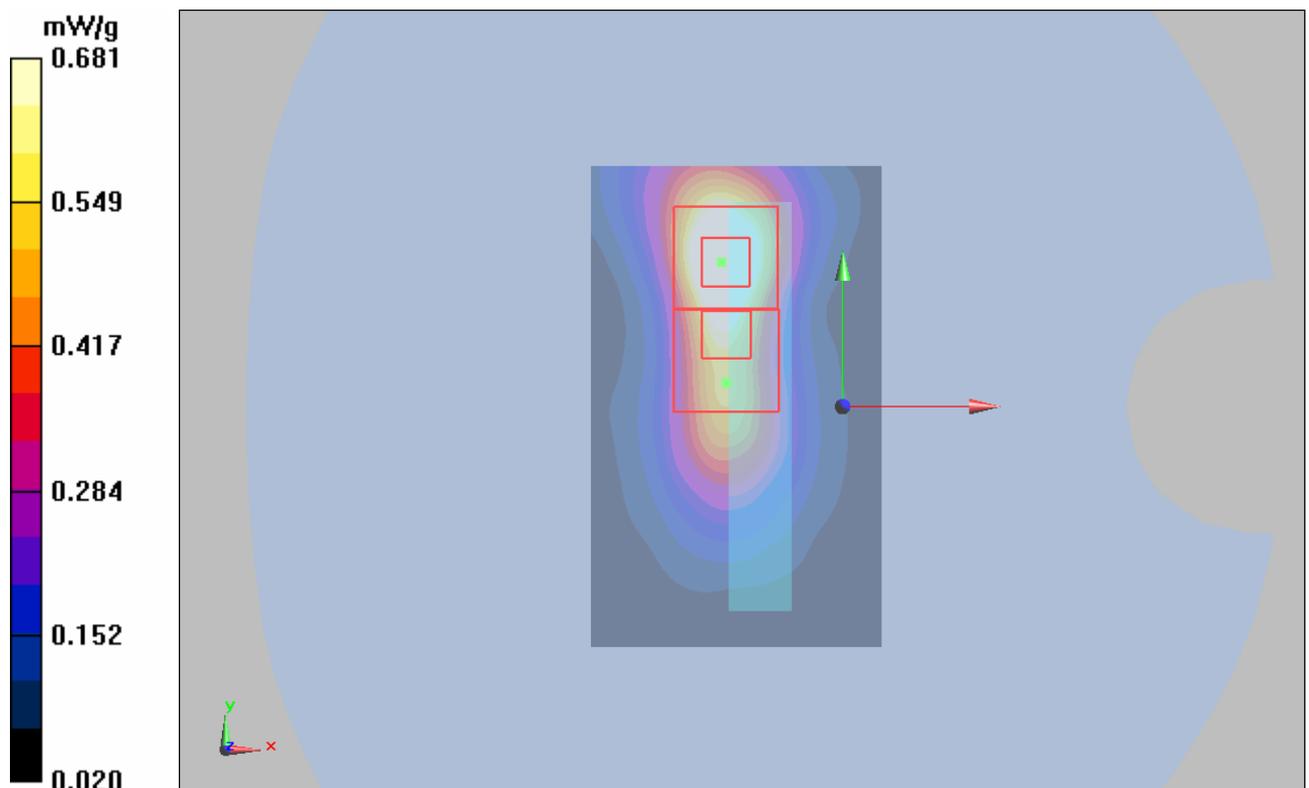


Figure 25 GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 4 Channel 661

### GSM 1900 EGPRS (4 timeslots in uplink) with IBM T61 Test Position 2 High Frequency

Date/Time: 4/17/2010 6:58:54 PM

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

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 2 High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.02 mW/g

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

Reference Value = 19.7 V/m; Power Drift = 0.057 dB

Peak SAR (extrapolated) = 1.62 W/kg

**SAR(1 g) = 0.775 mW/g; SAR(10 g) = 0.392 mW/g**

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

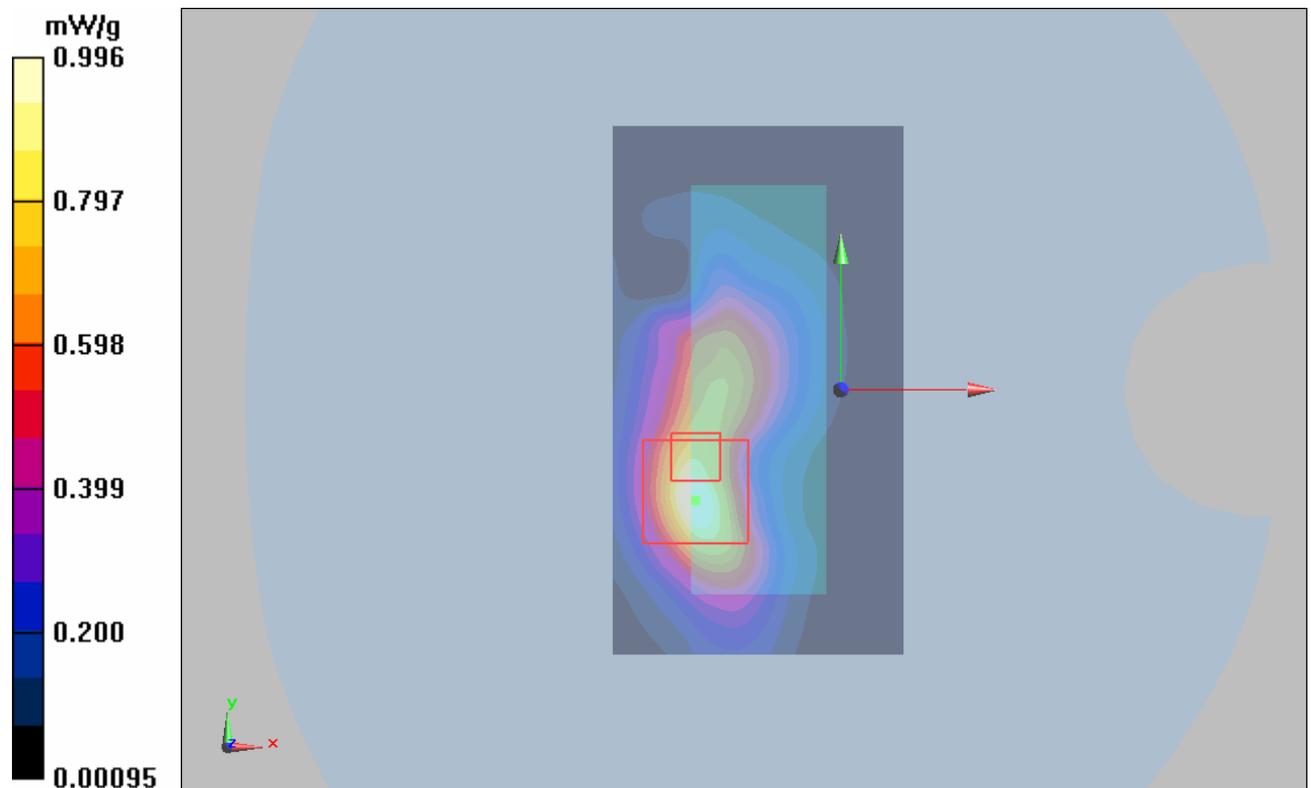


Figure 26 GSM 1900 EGPRS (4 timeslots in uplink) with IBM T61 Test Position 2 Channel 810

### GSM 1900 EGPRS (3 timeslots in uplink) with IBM T61 Test Position 2 High Frequency

Date/Time: 4/17/2010 7:25:07 PM

Communication System: PCS 1900+EGPRS(3Up); Frequency: 1909.8 MHz; Duty Cycle: 1:2.767

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 2 High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.23 mW/g

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

Reference Value = 21.7 V/m; Power Drift = 0.069 dB

Peak SAR (extrapolated) = 2.21 W/kg

**SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.531 mW/g**

Maximum value of SAR (measured) = 1.23 mW/g

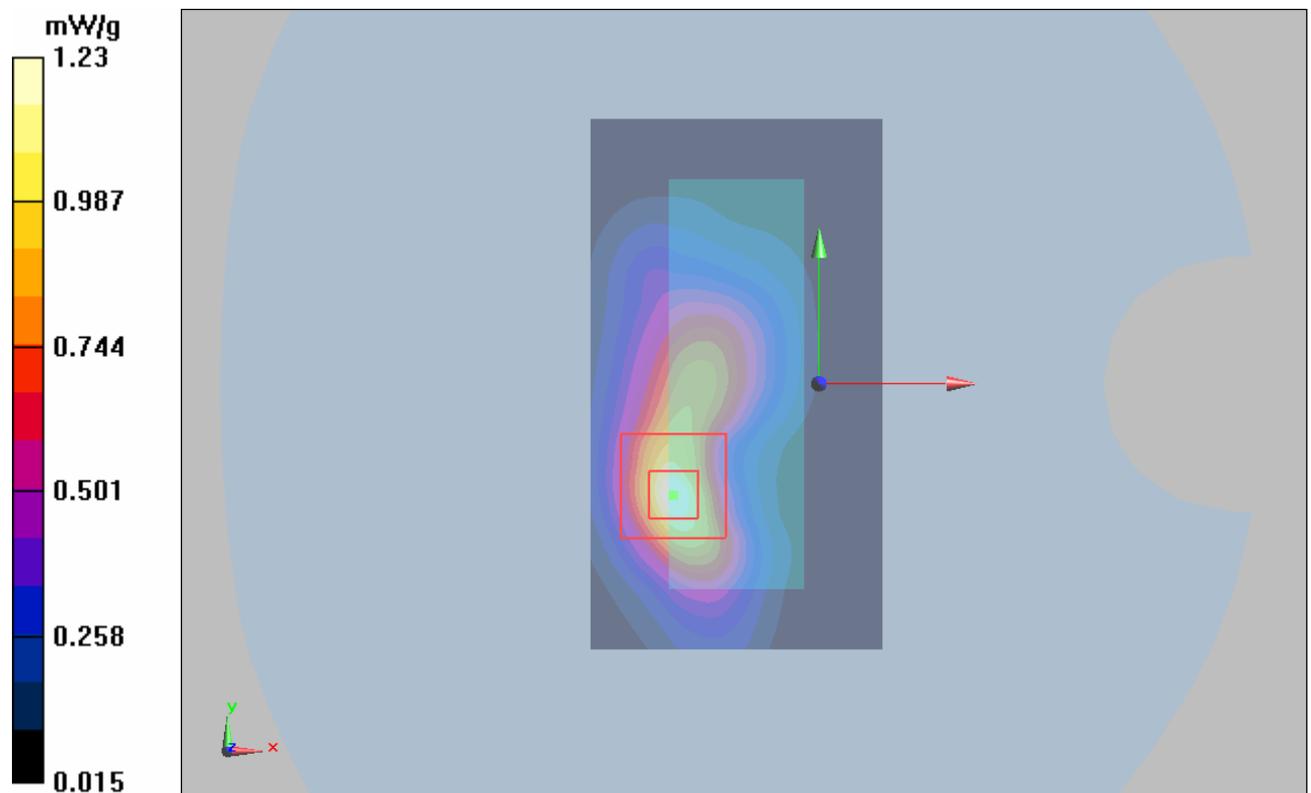


Figure 27 GSM 1900 EGPRS (3 timeslots in uplink) with IBM T61 Test Position 2 Channel 810

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## GSM 1900 EGPRS (2 timeslots in uplink) with IBM T61 Test Position 2 High Frequency

Date/Time: 4/17/2010 7:50:53 PM

Communication System: PCS 1900+EGPRS(2Up); Frequency: 1909.8 MHz; Duty Cycle: 1:4.15

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 2 High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.33 mW/g

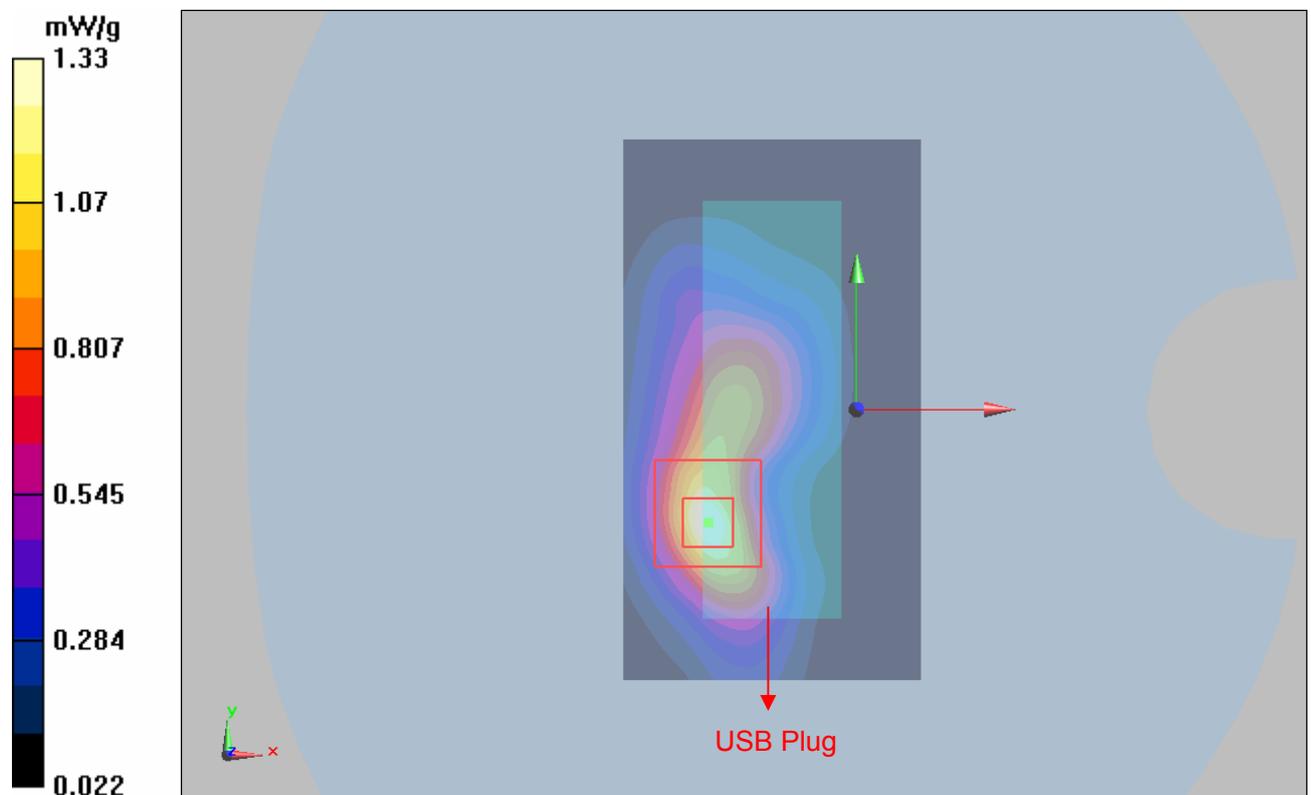
**Test Position 2 High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.3 V/m; Power Drift = 0.094 dB

Peak SAR (extrapolated) = 2.4 W/kg

**SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.577 mW/g**

Maximum value of SAR (measured) = 1.33 mW/g



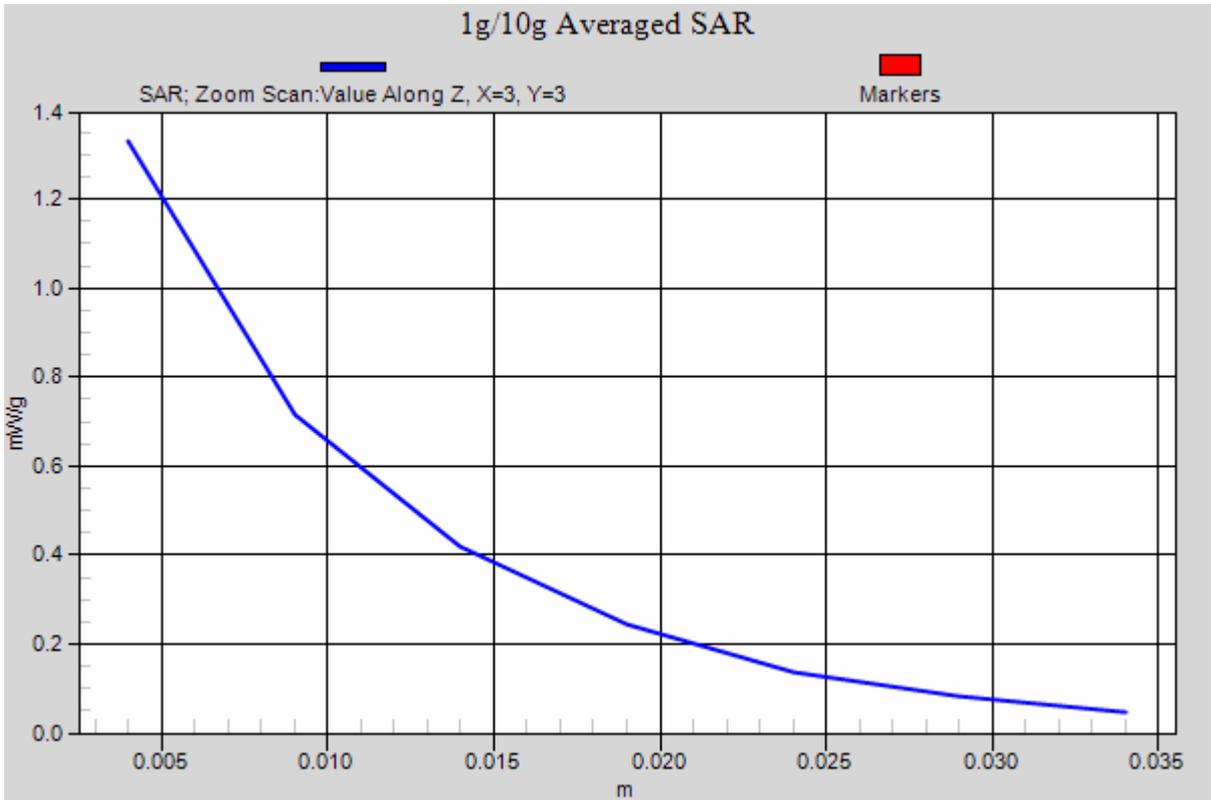


Figure 28 GSM 1900 EGPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Channel 810

**GSM 1900 EGPRS (1 timeslot in uplink) with IBM T61 Test Position 2 High Frequency**

Date/Time: 4/17/2010 8:16:58 PM

Communication System: PCS 1900+EGPRS(1Up); Frequency: 1909.8 MHz;Duty Cycle: 1:8.3

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 2 High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.882 mW/g

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

Reference Value = 18.1 V/m; Power Drift = 0.109 dB

Peak SAR (extrapolated) = 1.59 W/kg

**SAR(1 g) = 0.764 mW/g; SAR(10 g) = 0.379 mW/g**

Maximum value of SAR (measured) = 0.875 mW/g

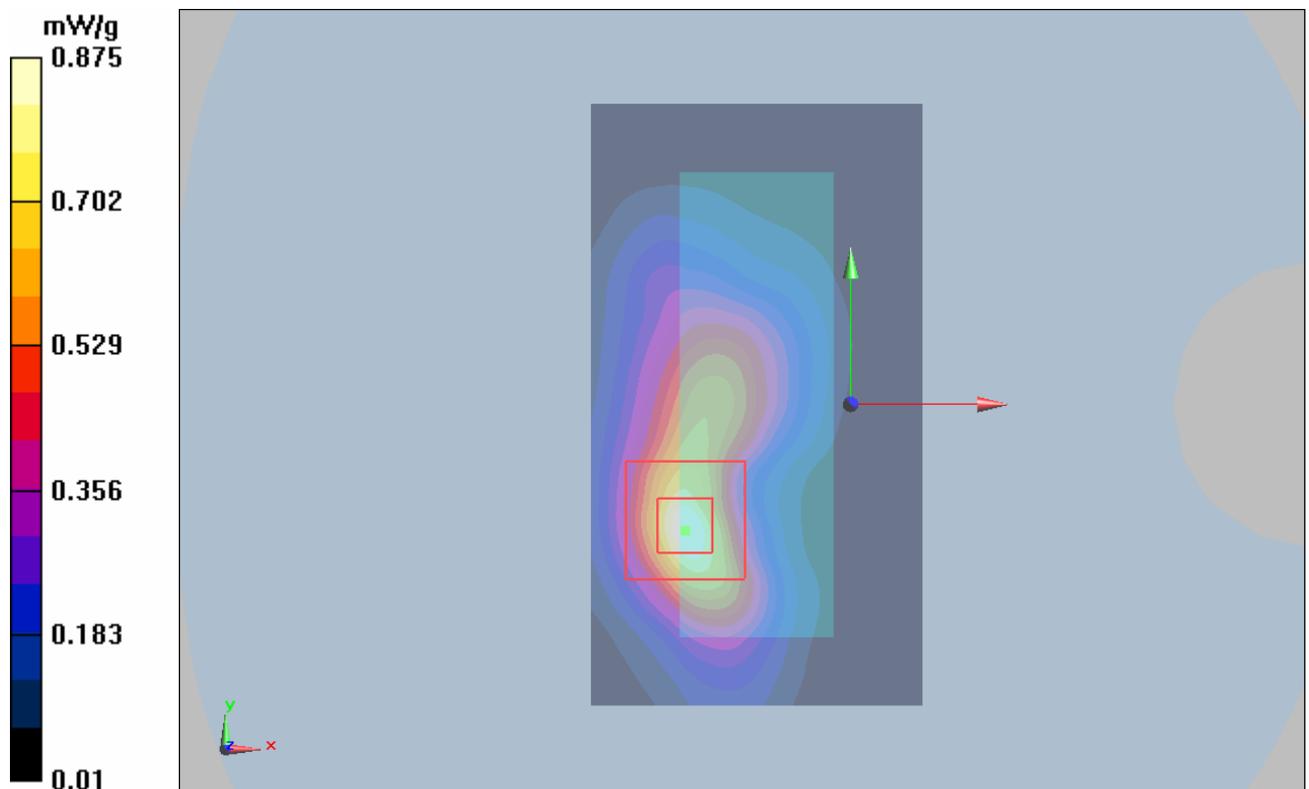


Figure 29 GSM 1900 EGPRS (1 timeslot in uplink) with IBM T61 Test Position 2 Channel 810

### WCDMA Band II with IBM T61 Test Position 1 Middle Frequency

Date/Time: 4/17/2010 10:08:09 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.5$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 1 Middle/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.619 mW/g

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

Reference Value = 14.2 V/m; Power Drift = 0.043 dB

Peak SAR (extrapolated) = 1.06 W/kg

**SAR(1 g) = 0.566 mW/g; SAR(10 g) = 0.319 mW/g**

Maximum value of SAR (measured) = 0.620 mW/g

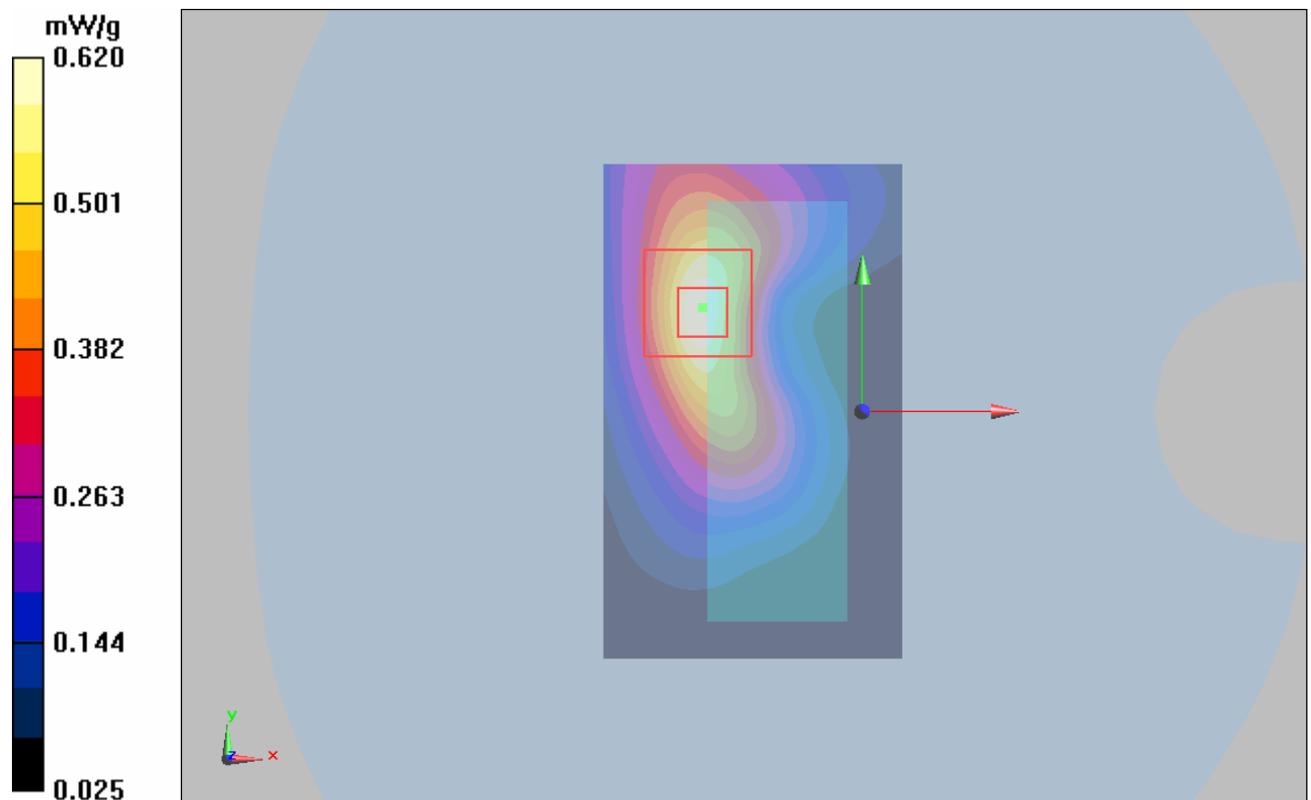


Figure 30 WCDMA Band II with IBM T61 Test Position 1 Channel 9400

### WCDMA Band II with IBM T61 Test Position 2 Middle Frequency

Date/Time: 4/17/2010 11:12:53 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.5$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 2 Middle/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.906 mW/g

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

Reference Value = 21.8 V/m; Power Drift = -0.028 dB

Peak SAR (extrapolated) = 1.59 W/kg

**SAR(1 g) = 0.798 mW/g; SAR(10 g) = 0.401 mW/g**

Maximum value of SAR (measured) = 0.920 mW/g

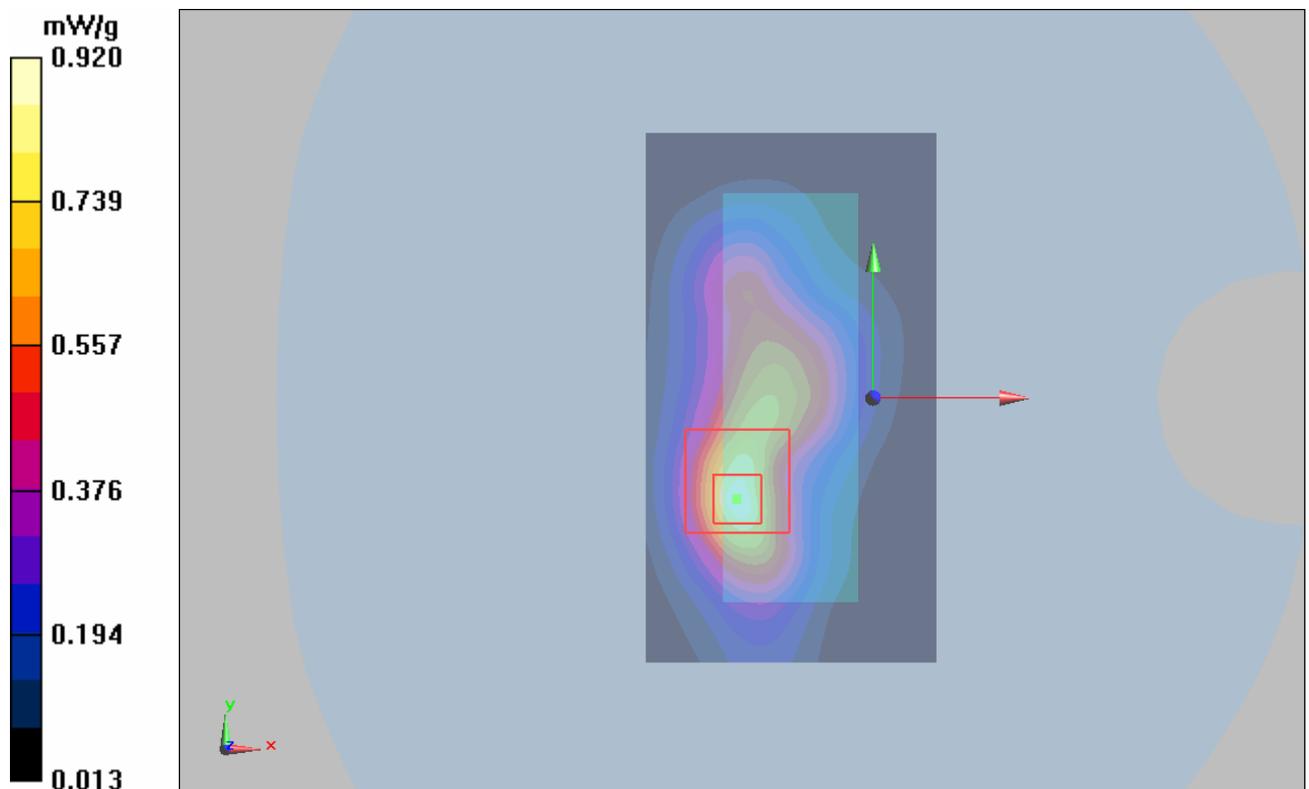


Figure 31 WCDMA Band II with IBM T61 Test Position 2 Channel 9400

### WCDMA Band II with BenQ Joybook R55V Test Position 3 Middle Frequency

Date/Time: 4/17/2010 6:02:52 PM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.5$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 3 Middle/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.177 mW/g

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

Reference Value = 11.1 V/m; Power Drift = -0.139 dB

Peak SAR (extrapolated) = 0.306 W/kg

**SAR(1 g) = 0.165 mW/g; SAR(10 g) = 0.092 mW/g**

Maximum value of SAR (measured) = 0.180 mW/g

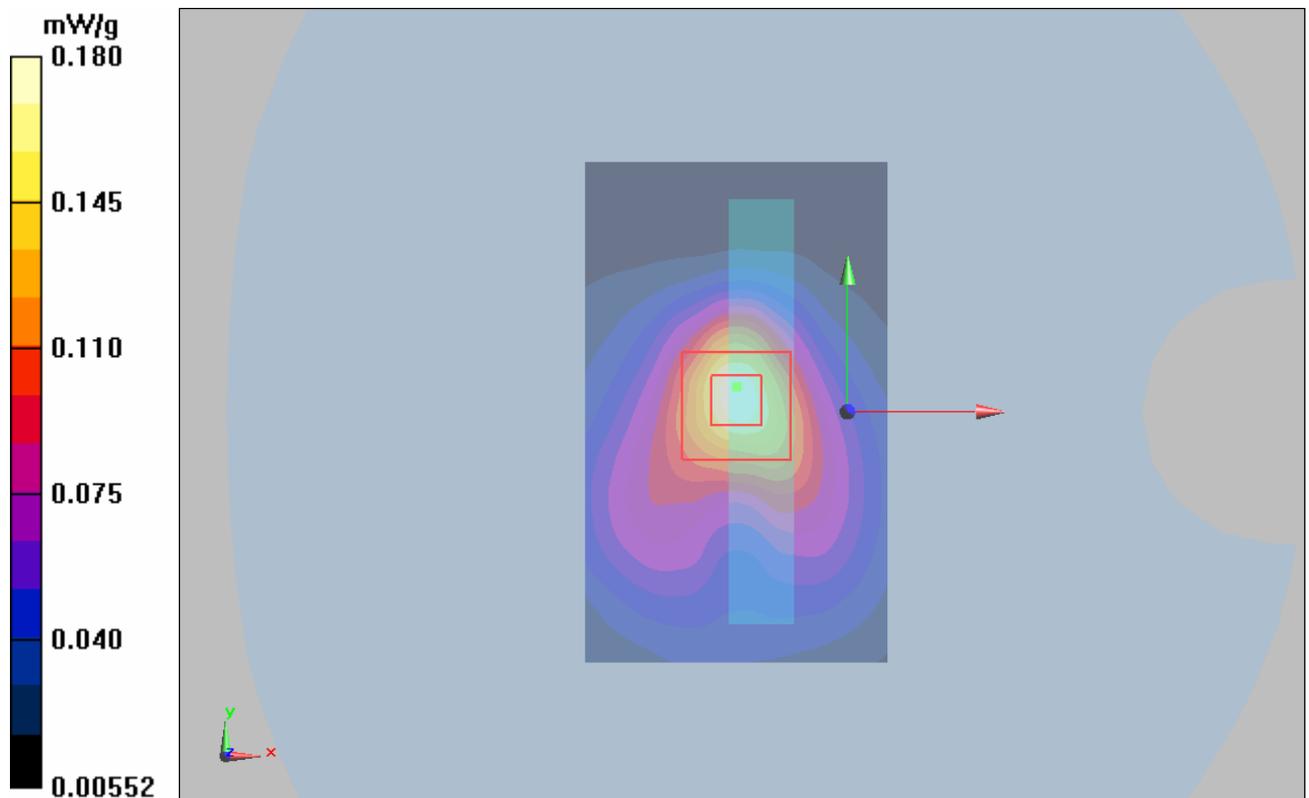


Figure 32 WCDMA Band II with BenQ Joybook R55V Test Position 3 Channel 9400

**WCDMA Band II with BenQ Joybook R55V Test Position 4 High Frequency**

Date/Time: 4/17/2010 10:26:59 AM

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

Medium parameters used:  $f = 1908$  MHz;  $\sigma = 1.52$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 4 High/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.666 mW/g

**Test Position 4 High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.4 V/m; Power Drift = 0.104 dB

Peak SAR (extrapolated) = 1.19 W/kg

**SAR(1 g) = 0.590 mW/g; SAR(10 g) = 0.309 mW/g**

Maximum value of SAR (measured) = 0.655 mW/g

**Test Position 4 High/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.4 V/m; Power Drift = 0.104 dB

Peak SAR (extrapolated) = 0.992 W/kg

**SAR(1 g) = 0.413 mW/g; SAR(10 g) = 0.223 mW/g**

Maximum value of SAR (measured) = 0.509 mW/g

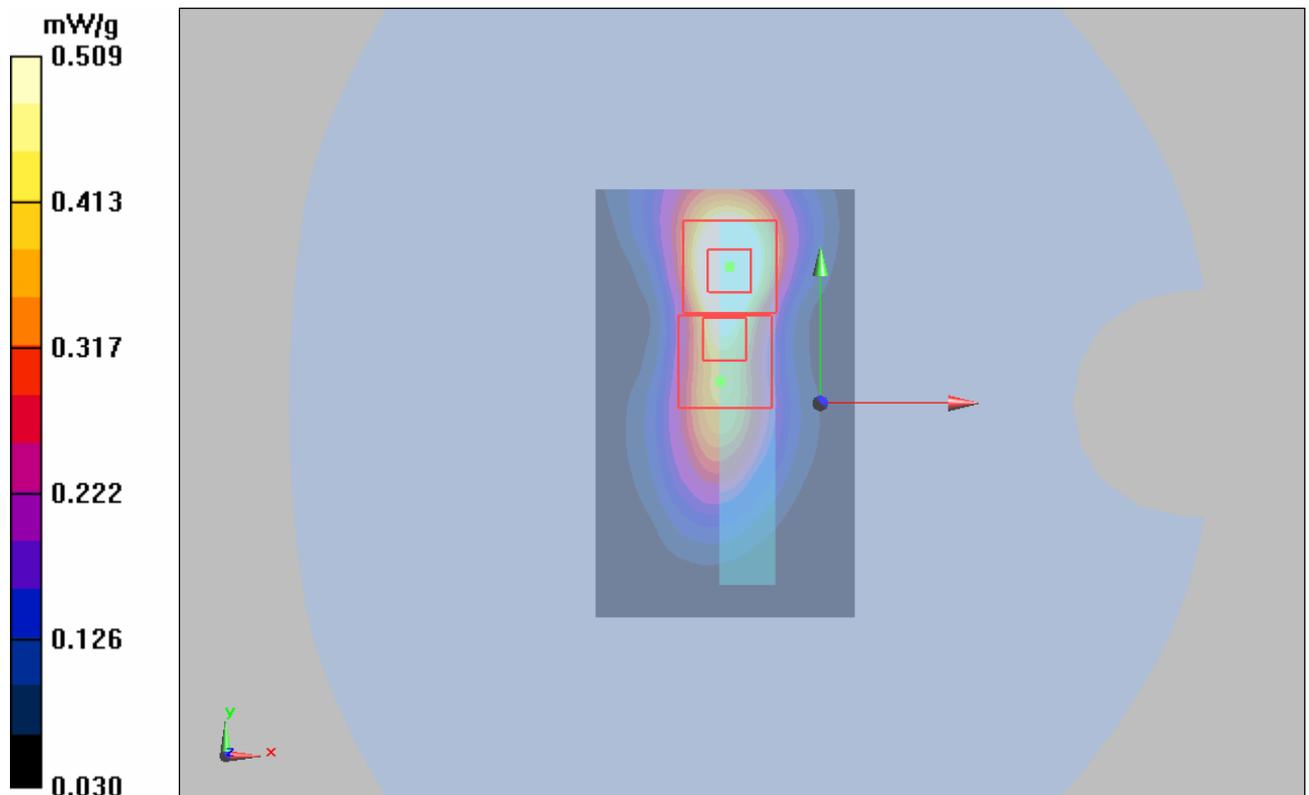


Figure 33 WCDMA Band II with BenQ Joybook R55V Test Position 4 Channel 9538

### WCDMA Band II with BenQ Joybook R55V Test Position 4 Middle Frequency

Date/Time: 4/17/2010 9:42:34 AM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.5$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 4 Middle/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.917 mW/g

**Test Position 4 Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.8 V/m; Power Drift = 0.098 dB

Peak SAR (extrapolated) = 1.61 W/kg

**SAR(1 g) = 0.809 mW/g; SAR(10 g) = 0.415 mW/g**

Maximum value of SAR (measured) = 0.906 mW/g

**Test Position 4 Middle/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.8 V/m; Power Drift = 0.098 dB

Peak SAR (extrapolated) = 1.38 W/kg

**SAR(1 g) = 0.582 mW/g; SAR(10 g) = 0.303 mW/g**

Maximum value of SAR (measured) = 0.726 mW/g

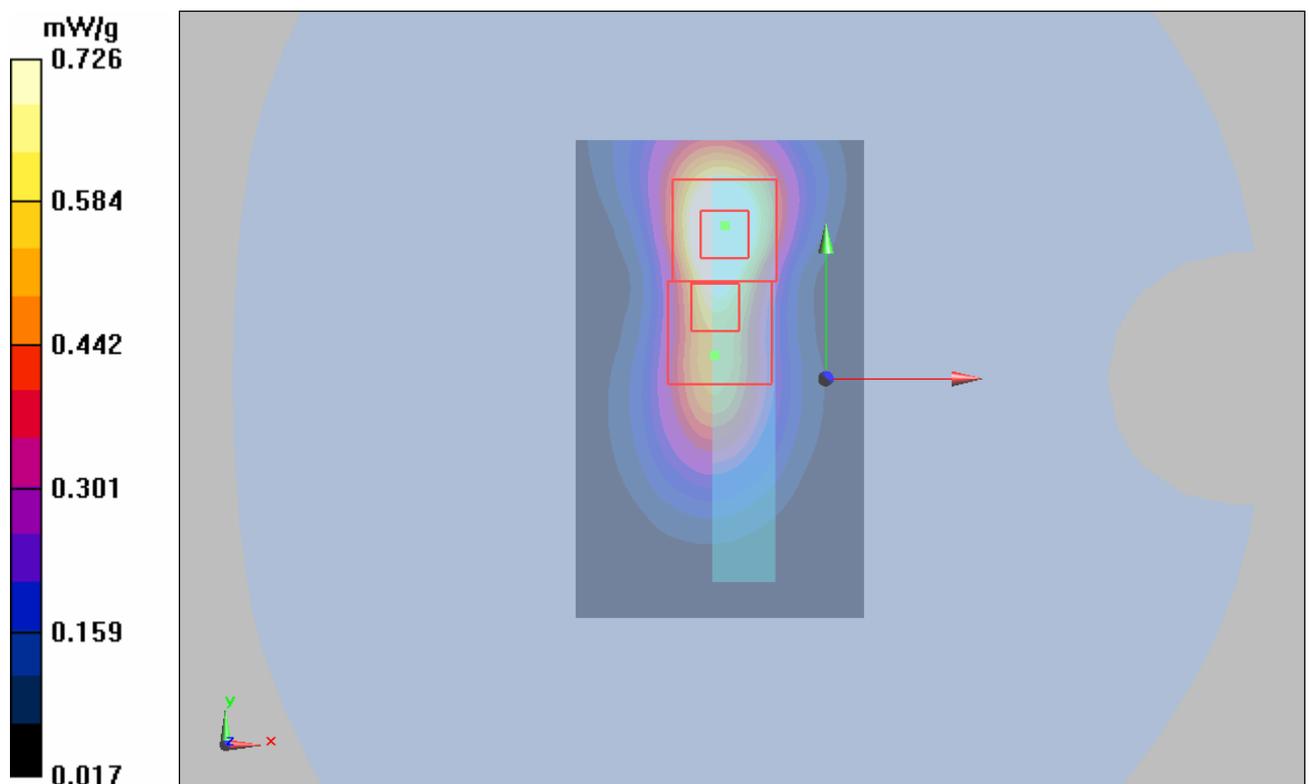


Figure 34 WCDMA Band II with BenQ Joybook R55V Test Position 4 Channel 9400

**WCDMA Band II with BenQ Joybook R55V Test Position 4 Low Frequency**

Date/Time: 4/17/2010 10:50:00 AM

Communication System: WCDMA Band II; Frequency: 1852.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 1852.4$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 4 Low/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.746 mW/g

**Test Position 4 Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.6 V/m; Power Drift = 0.116 dB

Peak SAR (extrapolated) = 1.33 W/kg

**SAR(1 g) = 0.673 mW/g; SAR(10 g) = 0.354 mW/g**

Maximum value of SAR (measured) = 0.751 mW/g

**Test Position 4 Low/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.6 V/m; Power Drift = 0.116 dB

Peak SAR (extrapolated) = 1.12 W/kg

**SAR(1 g) = 0.493 mW/g; SAR(10 g) = 0.262 mW/g**

Maximum value of SAR (measured) = 0.614 mW/g

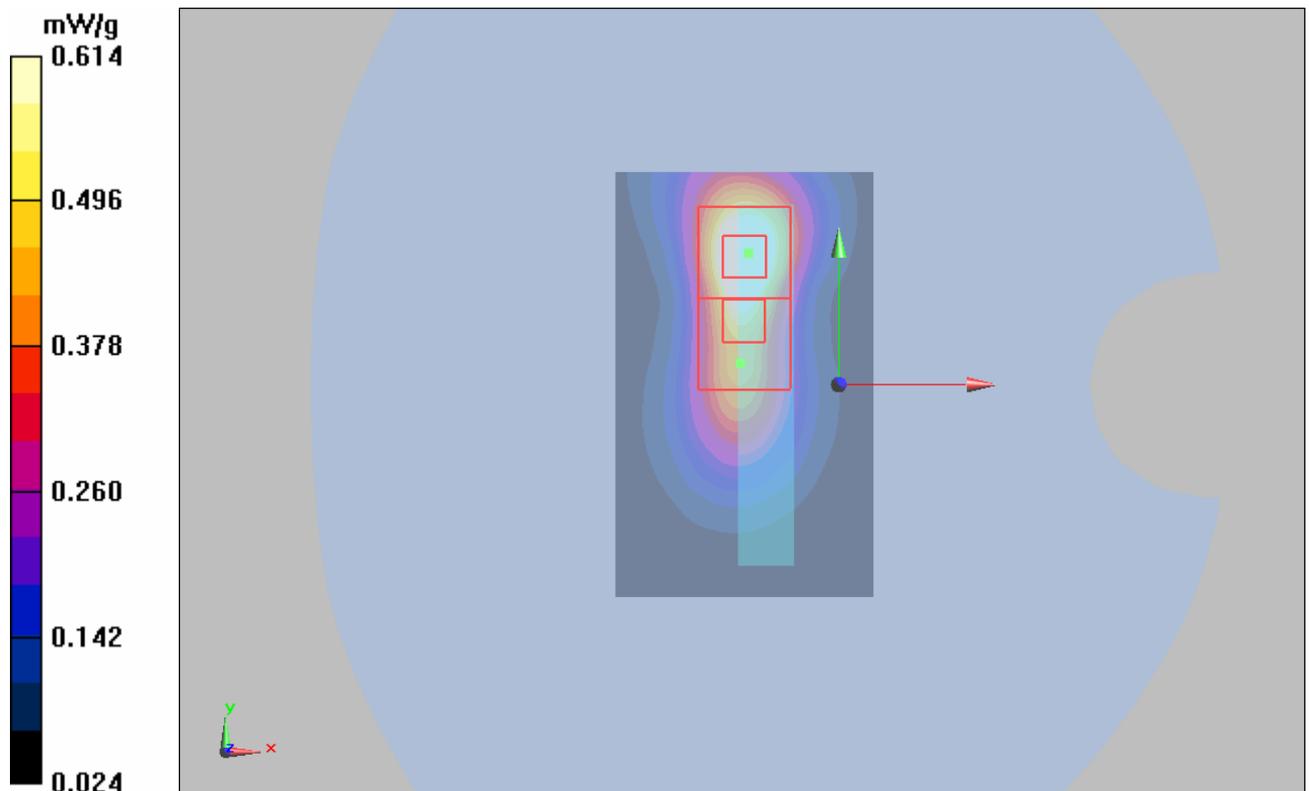


Figure 35 WCDMA Band II with BenQ Joybook R55V Test Position 4 Channel 9262

**WCDMA Band II+HSDPA with BenQ Joybook R55V Test Position 4 Middle Frequency**

Date/Time: 4/17/2010 8:56:37 PM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.5$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 4 Middle/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.910 mW/g

**Test Position 4 Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.7 V/m; Power Drift = -0.064 dB

Peak SAR (extrapolated) = 1.62 W/kg

**SAR(1 g) = 0.818 mW/g; SAR(10 g) = 0.420 mW/g**

Maximum value of SAR (measured) = 0.916 mW/g

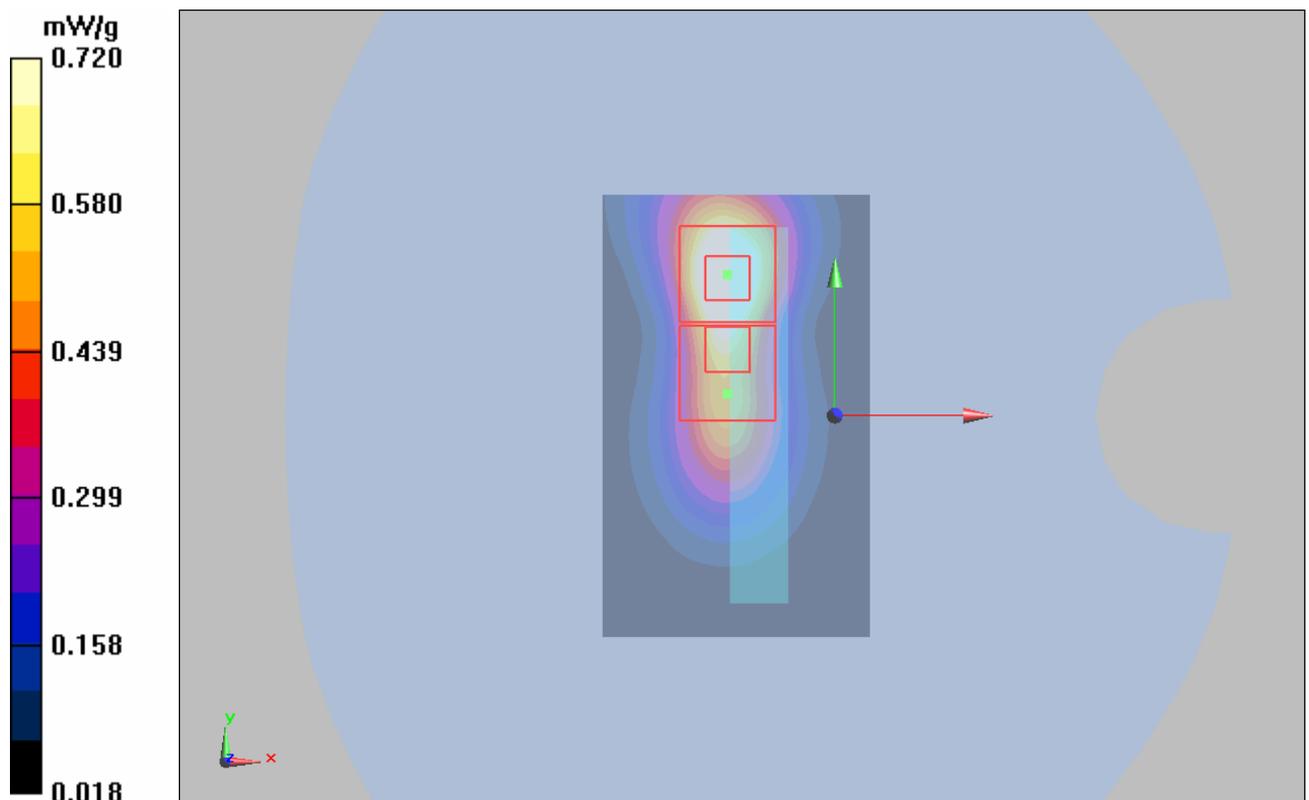
**Test Position 4 Middle/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.7 V/m; Power Drift = -0.064 dB

Peak SAR (extrapolated) = 1.35 W/kg

**SAR(1 g) = 0.577 mW/g; SAR(10 g) = 0.302 mW/g**

Maximum value of SAR (measured) = 0.720 mW/g



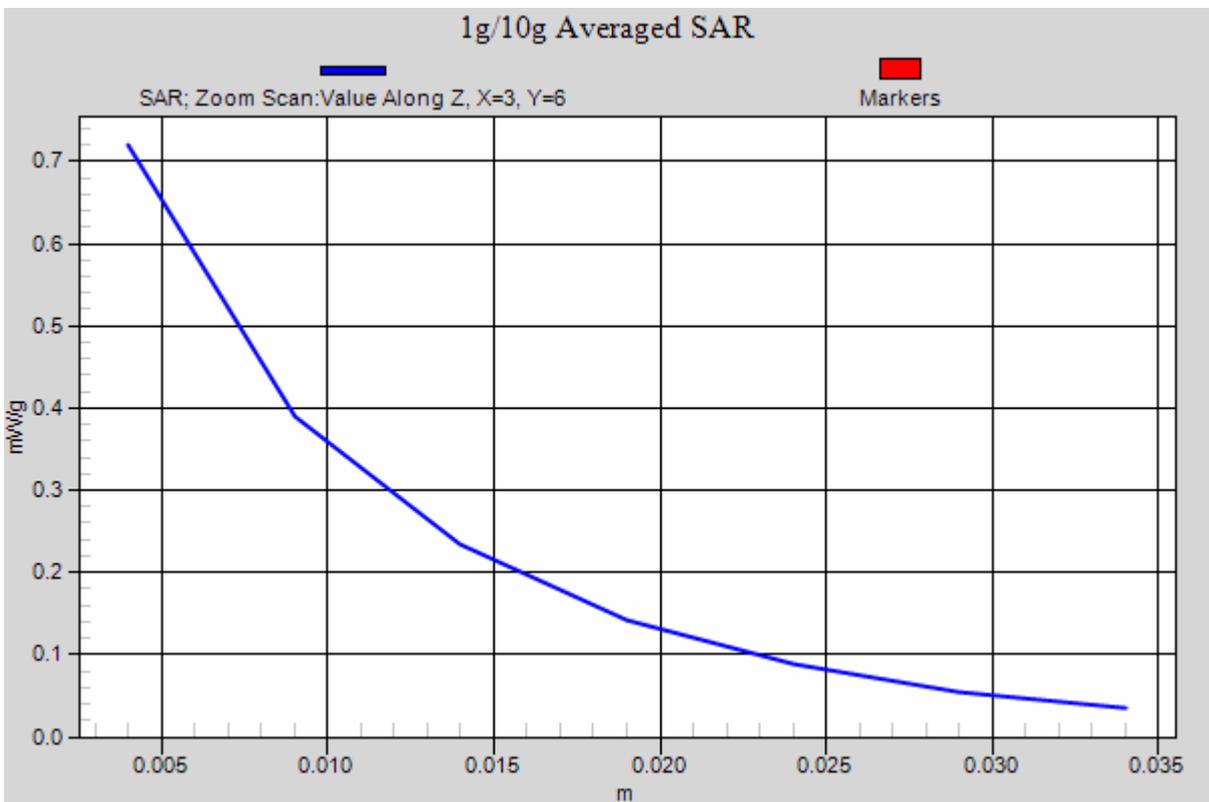
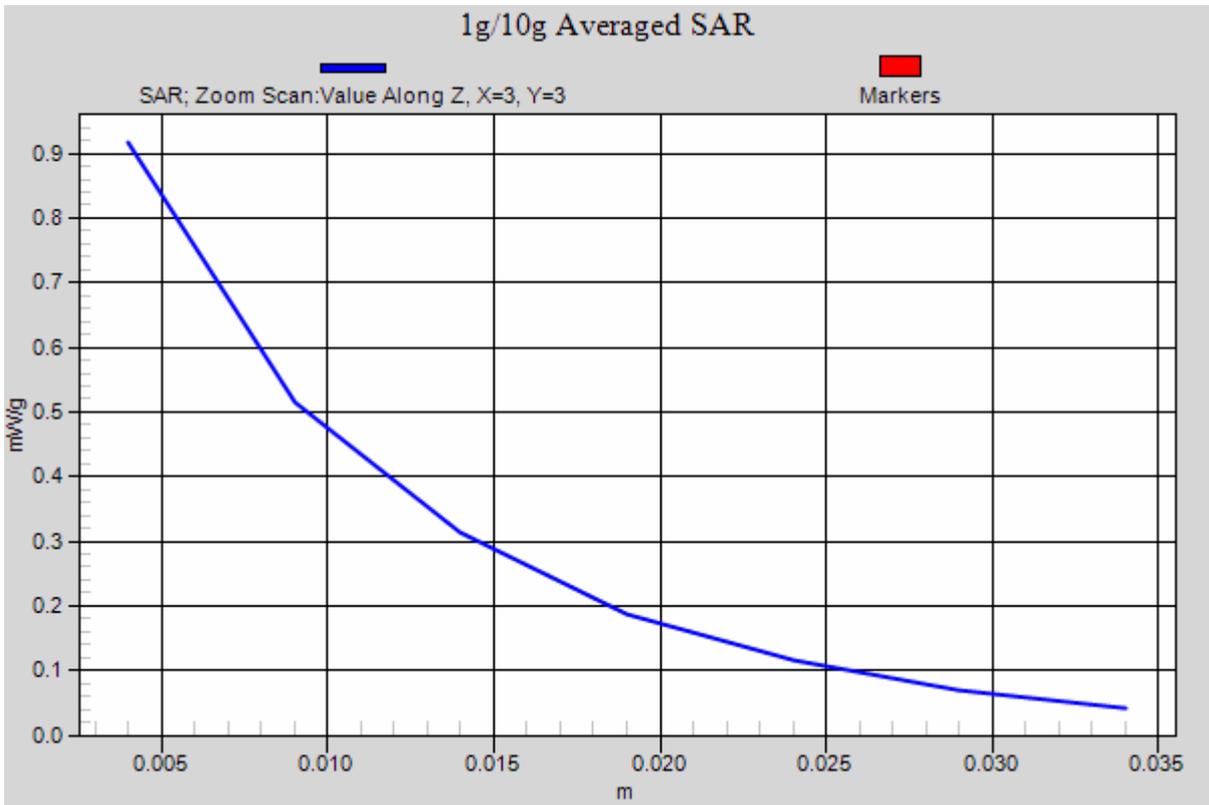


Figure 36 WCDMA Band II+HSDPA with BenQ Joybook R55V Test Position 4 Channel 9400

**WCDMA Band II+HSUPA with BenQ Joybook R55V Test Position 4 Middle Frequency**

Date/Time: 4/17/2010 9:39:39 PM

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.5$  mho/m;  $\epsilon_r = 52.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.62, 7.62, 7.62); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM2; Type: SAM;

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

**Test Position 4 Middle/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.786 mW/g

**Test Position 4 Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.2 V/m; Power Drift = -0.042 dB

Peak SAR (extrapolated) = 1.36 W/kg

**SAR(1 g) = 0.688 mW/g; SAR(10 g) = 0.354 mW/g**

Maximum value of SAR (measured) = 0.769 mW/g

**Test Position 4 Middle/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.2 V/m; Power Drift = -0.042 dB

Peak SAR (extrapolated) = 1.14 W/kg

**SAR(1 g) = 0.488 mW/g; SAR(10 g) = 0.256 mW/g**

Maximum value of SAR (measured) = 0.609 mW/g

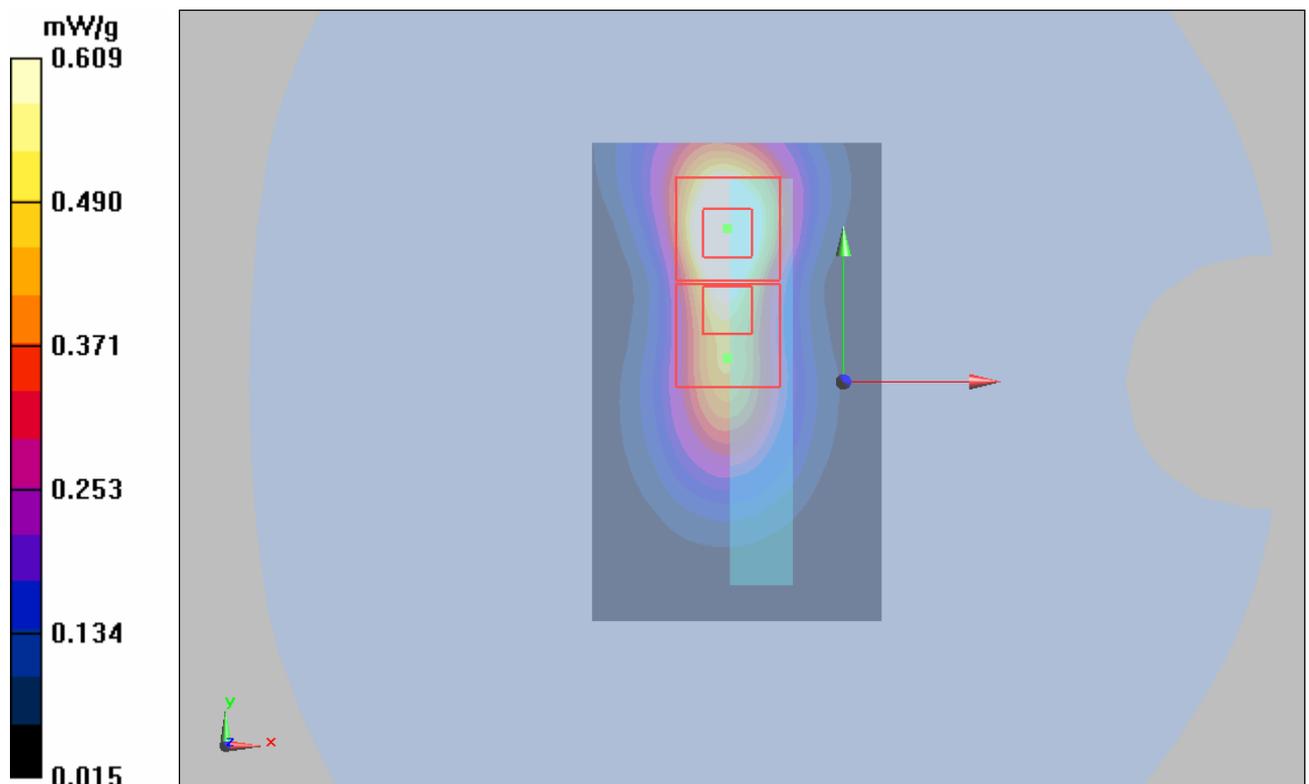


Figure 37 WCDMA Band II+HSUPA with BenQ Joybook R55V Test Position 4 Channel 9400

### WCDMA Band V with IBM T61 Test Position 1 High Frequency

Date/Time: 4/16/2010 9:44:50 PM

Communication System: WCDMA Band V; Frequency: 846.6 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 847$  MHz;  $\sigma = 1$  mho/m;  $\epsilon_r = 53.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 1 High/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.452 mW/g

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

Reference Value = 18.7 V/m; Power Drift = -0.012 dB

Peak SAR (extrapolated) = 0.609 W/kg

**SAR(1 g) = 0.405 mW/g; SAR(10 g) = 0.251 mW/g**

Maximum value of SAR (measured) = 0.448 mW/g

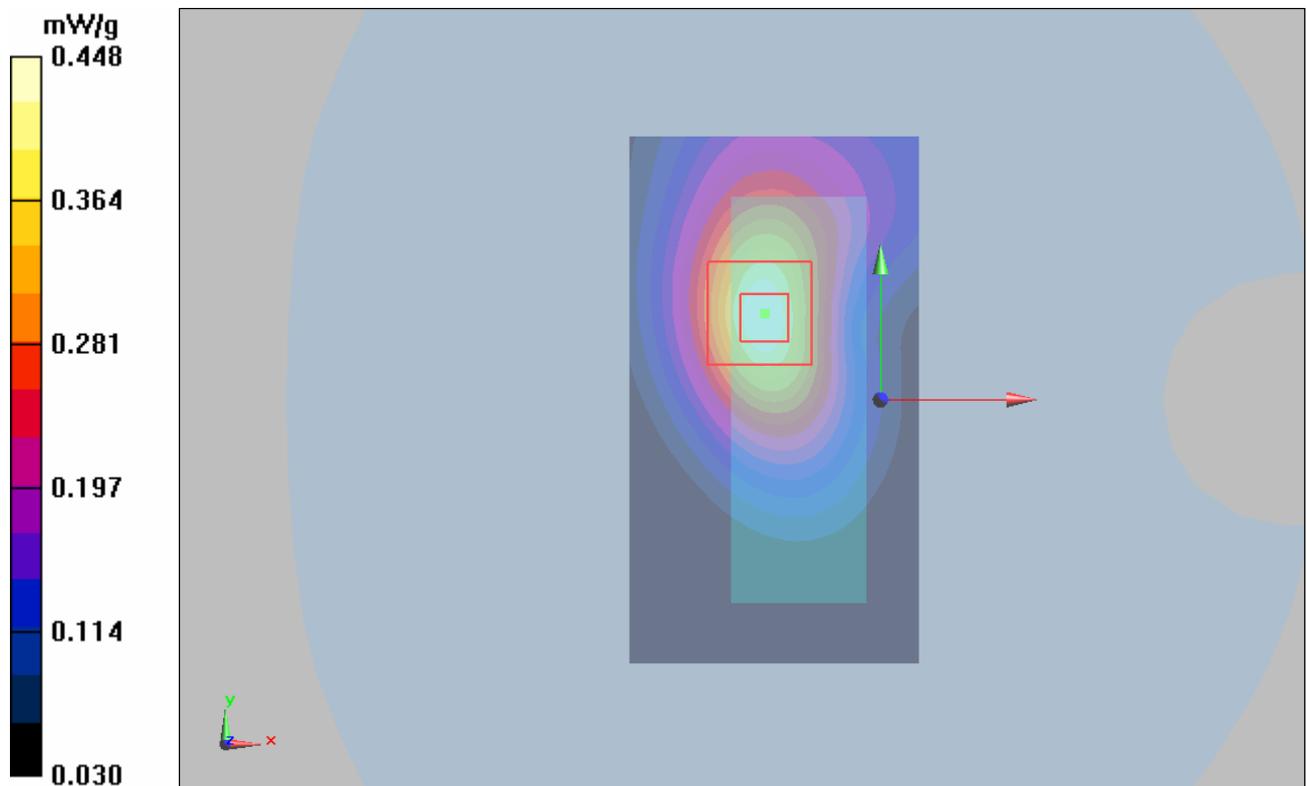


Figure 38 WCDMA Band V with IBM T61 Test Position 1 Channel 4233

### WCDMA Band V with IBM T61 Test Position 1 Middle Frequency

Date/Time: 4/16/2010 2:40:52 PM

Communication System: WCDMA Band V; Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 0.994$  mho/m;  $\epsilon_r = 54$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 1 Middle/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.375 mW/g

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

Reference Value = 18.2 V/m; Power Drift = -0.102 dB

Peak SAR (extrapolated) = 0.513 W/kg

**SAR(1 g) = 0.338 mW/g; SAR(10 g) = 0.207 mW/g**

Maximum value of SAR (measured) = 0.372 mW/g

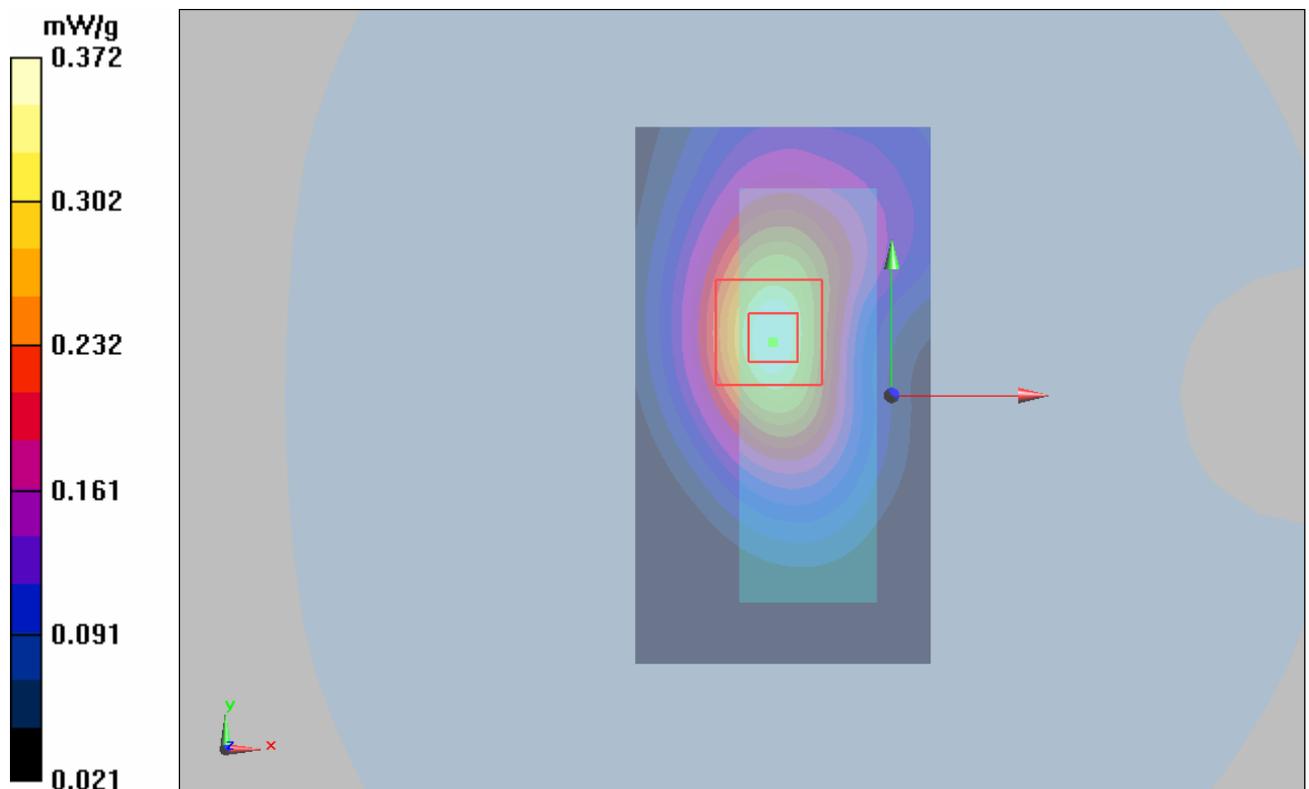


Figure 39 WCDMA Band V with IBM T61 Test Position 1 Channel 4182

### WCDMA Band V with IBM T61 Test Position 1 Low Frequency

Date/Time: 4/16/2010 10:10:15 PM

Communication System: WCDMA Band V; Frequency: 826.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 826.4$  MHz;  $\sigma = 0.984$  mho/m;  $\epsilon_r = 54.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 1 Low/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.458 mW/g

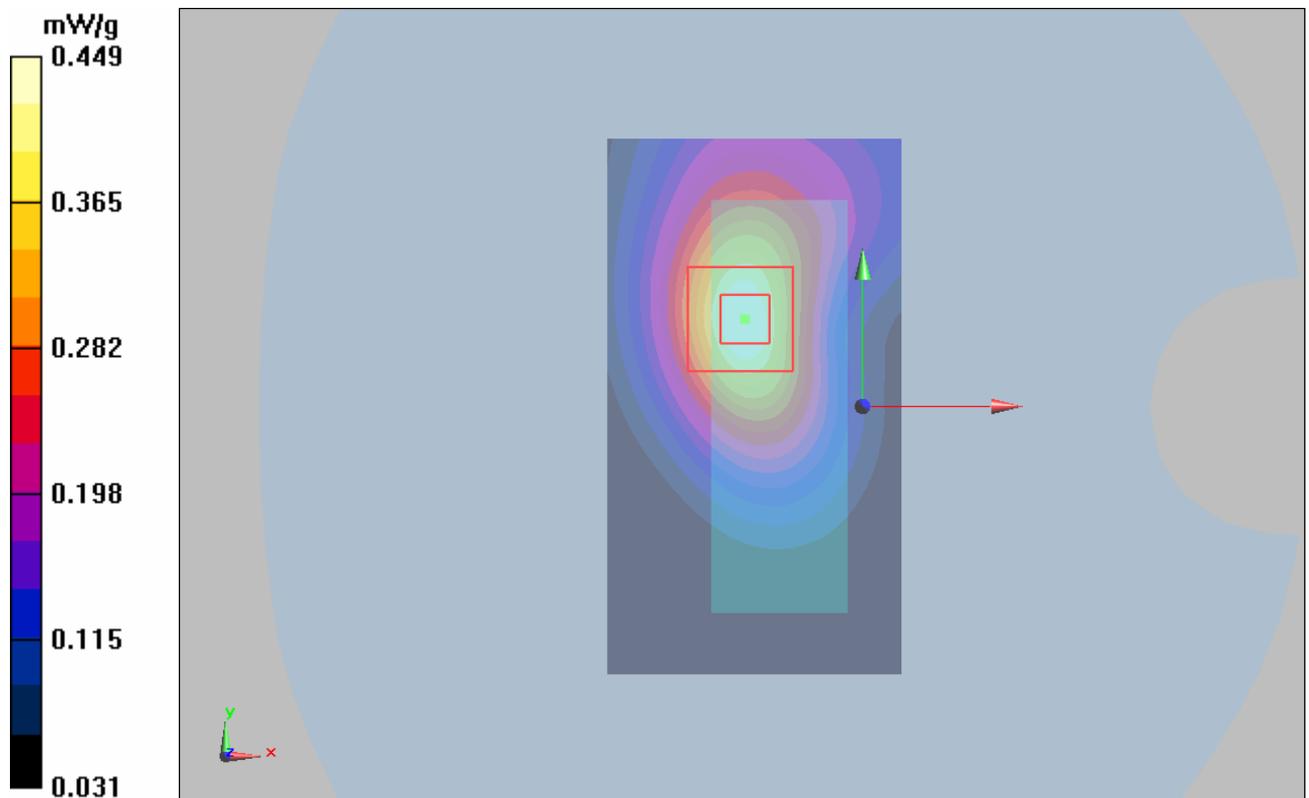
**Test Position 1 Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.1 V/m; Power Drift = -0.031 dB

Peak SAR (extrapolated) = 0.609 W/kg

**SAR(1 g) = 0.409 mW/g; SAR(10 g) = 0.255 mW/g**

Maximum value of SAR (measured) = 0.449 mW/g



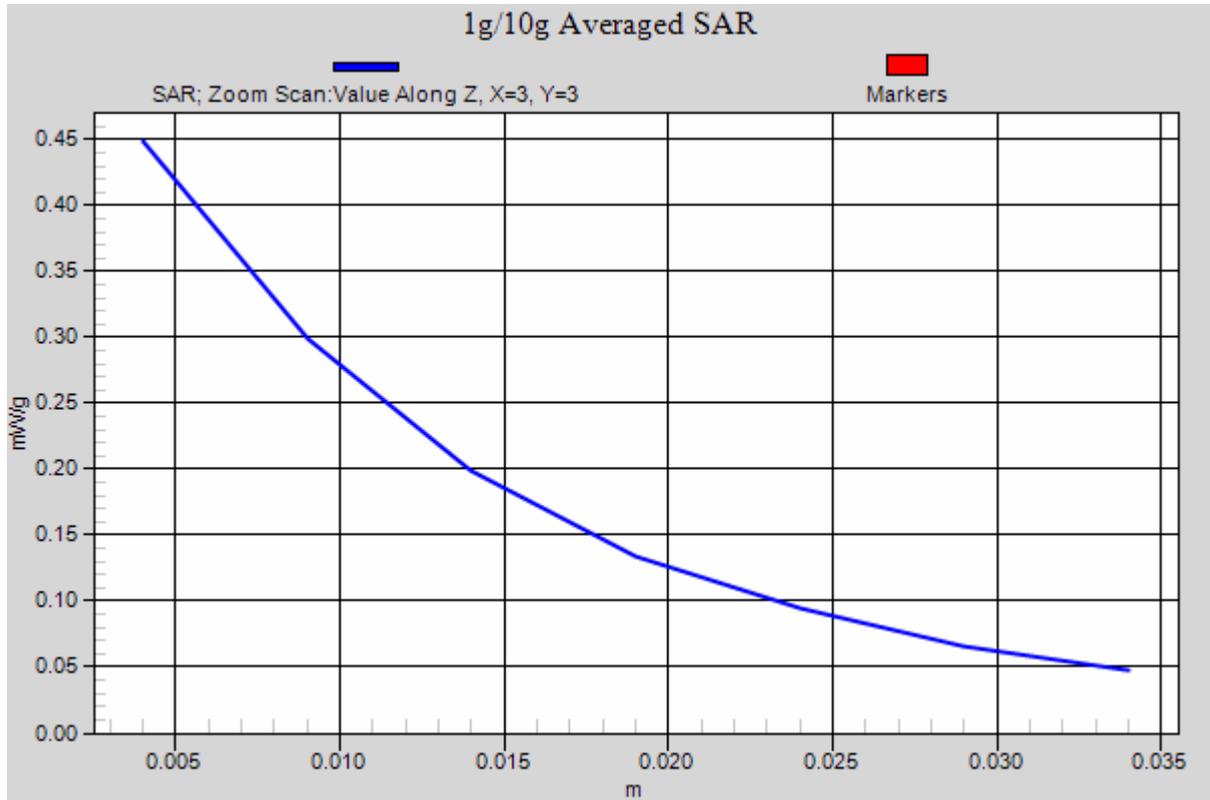


Figure 40 WCDMA Band V with IBM T61 Test Position 1 Channel 4132

### WCDMA Band V with IBM T61 Test Position 2 Middle Frequency

Date/Time: 4/16/2010 3:30:01 PM

Communication System: WCDMA Band V; Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 0.994$  mho/m;  $\epsilon_r = 54$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 2 Middle/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.323 mW/g

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

Reference Value = 12.9 V/m; Power Drift = 0.052 dB

Peak SAR (extrapolated) = 0.497 W/kg

**SAR(1 g) = 0.287 mW/g; SAR(10 g) = 0.159 mW/g**

Maximum value of SAR (measured) = 0.326 mW/g

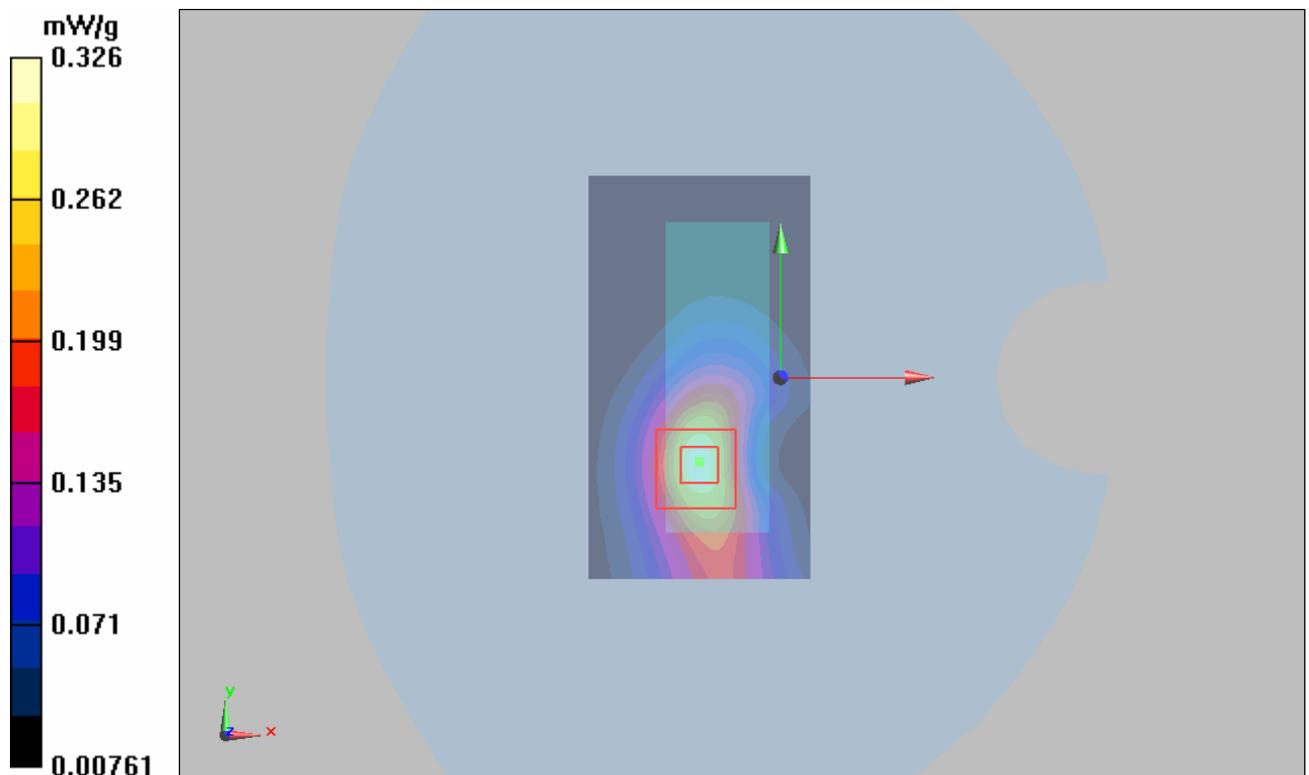


Figure 41 WCDMA Band V with IBM T61 Test Position 2 Channel 4182

### WCDMA Band V with BenQ Joybook R55V Test Position 3 Middle Frequency

Date/Time: 4/16/2010 6:03:20 PM

Communication System: WCDMA Band V; Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 0.994$  mho/m;  $\epsilon_r = 54$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 3 Middle/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.052 mW/g

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

Reference Value = 7.17 V/m; Power Drift = 0.073 dB

Peak SAR (extrapolated) = 0.066 W/kg

**SAR(1 g) = 0.049 mW/g; SAR(10 g) = 0.034 mW/g**

Maximum value of SAR (measured) = 0.053 mW/g

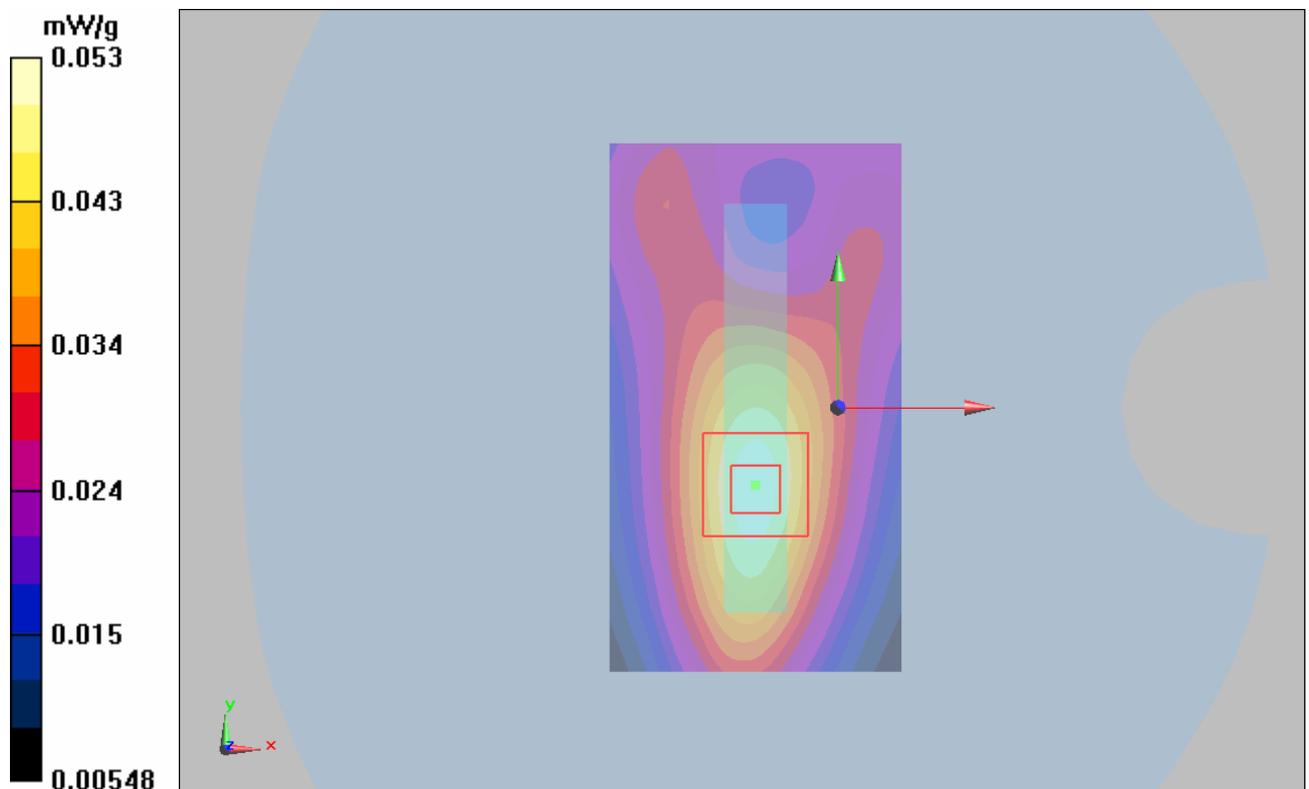


Figure 42 WCDMA Band V with BenQ Joybook R55V Test Position 3 Channel 4182

### WCDMA Band V with BenQ Joybook R55V Test Position 4 Middle Frequency

Date/Time: 4/16/2010 1:34:03 PM

Communication System: WCDMA Band V; Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 0.994$  mho/m;  $\epsilon_r = 54$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 4 Middle/Area Scan (61x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.121 mW/g

**Test Position 4 Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.86 V/m; Power Drift = -0.074 dB

Peak SAR (extrapolated) = 0.179 W/kg

**SAR(1 g) = 0.109 mW/g; SAR(10 g) = 0.064 mW/g**

Maximum value of SAR (measured) = 0.122 mW/g

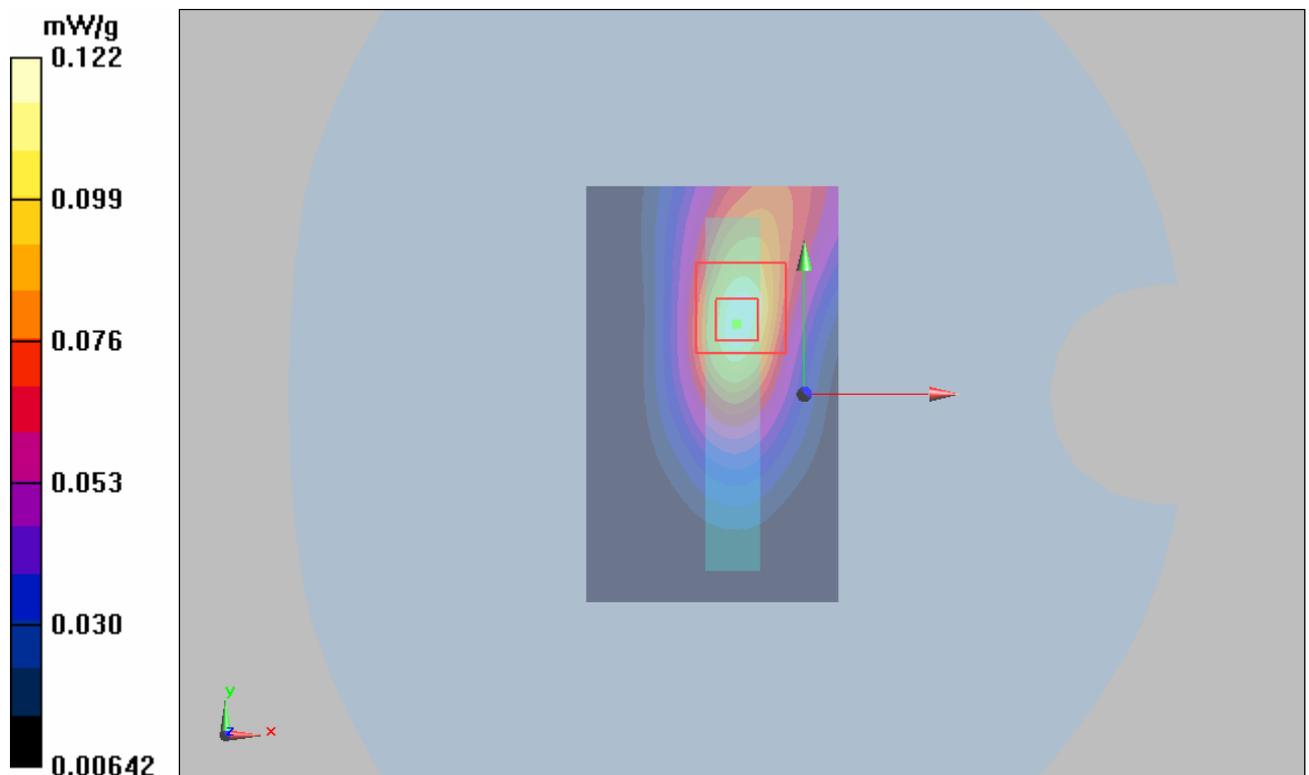


Figure 43 WCDMA Band V with BenQ Joybook R55V Test Position 4 Channel 4182

### WCDMA Band V+HSDPA with IBM T61 Test Position 1 Low Frequency

Date/Time: 4/16/2010 10:35:59 PM

Communication System: WCDMA Band V+HSDPA; Frequency: 826.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 826.4$  MHz;  $\sigma = 0.984$  mho/m;  $\epsilon_r = 54.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 1 Low/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.434 mW/g

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

Reference Value = 17.6 V/m; Power Drift = 0.114 dB

Peak SAR (extrapolated) = 0.581 W/kg

**SAR(1 g) = 0.392 mW/g; SAR(10 g) = 0.246 mW/g**

Maximum value of SAR (measured) = 0.431 mW/g

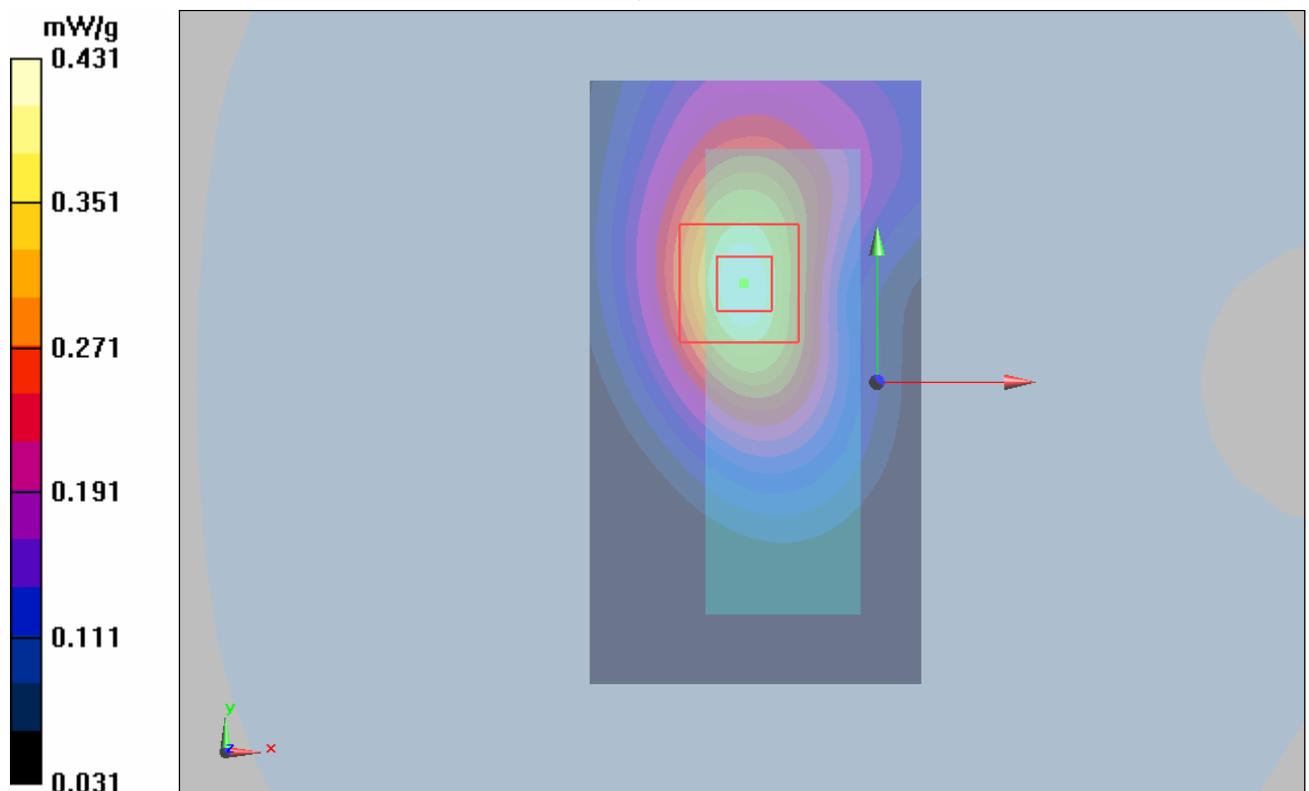


Figure 44 WCDMA Band V+HSDPA with IBM T61 Test Position 1 Channel 4182

### WCDMA Band V+HSUPA with IBM T61 Test Position 1 Low Frequency

Date/Time: 4/16/2010 11:01:23 PM

Communication System: WCDMA Band V+HSUPA; Frequency: 826.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 826.4$  MHz;  $\sigma = 0.984$  mho/m;  $\epsilon_r = 54.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(9.11, 9.11, 9.11); Calibrated: 9/23/2009

Electronics: DAE4 Sn871; Calibrated: 11/11/2009

Phantom: SAM1; Type: SAM;

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

**Test Position 1 Low/Area Scan (61x111x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.405 mW/g

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

Reference Value = 17.1 V/m; Power Drift = -0.110 dB

Peak SAR (extrapolated) = 0.544 W/kg

**SAR(1 g) = 0.362 mW/g; SAR(10 g) = 0.228 mW/g**

Maximum value of SAR (measured) = 0.402 mW/g

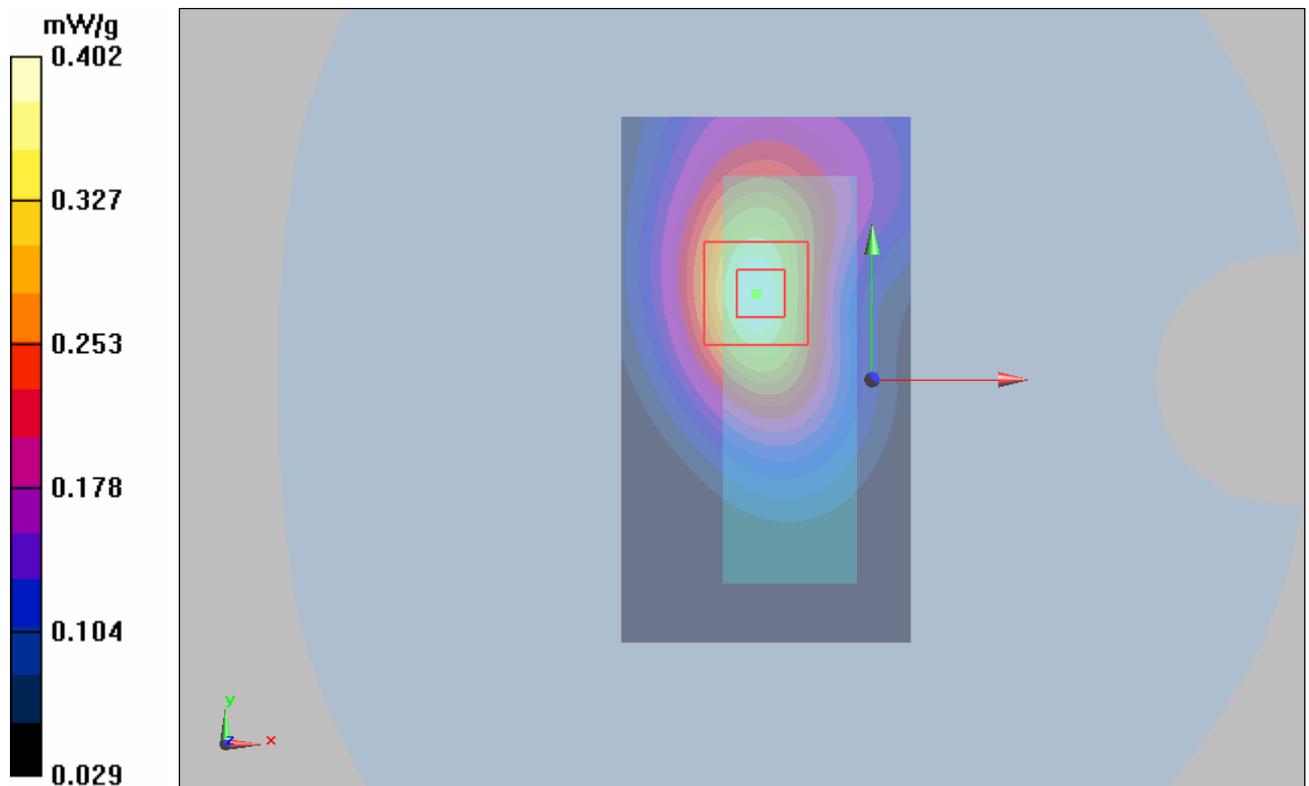


Figure 45 WCDMA Band V+HSUPA with IBM T61 Test Position 1 Channel 4182

# TA Technology (Shanghai) Co., Ltd. Test Report

Report No. RZA2010-0505-1

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## ANNEX D: Probe Calibration Certificate

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



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

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

Accreditation No.: **SCS 108**

Client **TA (Auden)**

Certificate No: **EX3-3677\_Sep09**

CALIBRATION CERTIFICATE																																																			
Object	EX3DV4 - SN:3677																																																		
Calibration procedure(s)	QA CAL-01.v6, QA CAL-12.v5, QA CAL-23.v3 and QA CAL-25.v2 - Calibration procedure for dosimetric E-field probes																																																		
Calibration date:	September 23, 2009																																																		
Condition of the calibrated item	In Tolerance																																																		
<p>This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity &lt; 70%.</p> <p>Calibration Equipment used (M&amp;TE critical for calibration)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Primary Standards</th> <th style="width: 15%;">ID #</th> <th style="width: 30%;">Cal Date (Certificate No.)</th> <th style="width: 25%;">Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power meter E4419B</td> <td>GB41293874</td> <td>1-Apr-09 (No. 217-01030)</td> <td>Apr-10</td> </tr> <tr> <td>Power sensor E4412A</td> <td>MY41495277</td> <td>1-Apr-09 (No. 217-01030)</td> <td>Apr-10</td> </tr> <tr> <td>Power sensor E4412A</td> <td>MY41498087</td> <td>1-Apr-09 (No. 217-01030)</td> <td>Apr-10</td> </tr> <tr> <td>Reference 3 dB Attenuator</td> <td>SN: S5054 (3c)</td> <td>31-Mar-09 (No. 217-01026)</td> <td>Mar-10</td> </tr> <tr> <td>Reference 20 dB Attenuator</td> <td>SN: S5086 (20b)</td> <td>31-Mar-09 (No. 217-01028)</td> <td>Mar-10</td> </tr> <tr> <td>Reference 30 dB Attenuator</td> <td>SN: S5129 (30b)</td> <td>31-Mar-09 (No. 217-01027)</td> <td>Mar-10</td> </tr> <tr> <td>Reference Probe ES3DV2</td> <td>SN: 3013</td> <td>2-Jan-09 (No. ES3-3013_Jan09)</td> <td>Jan-10</td> </tr> <tr> <td>DAE4</td> <td>SN: 660</td> <td>9-Sep-08 (No. DAE4-660_Sep08)</td> <td>Sep-09</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Secondary Standards</th> <th style="width: 15%;">ID #</th> <th style="width: 30%;">Check Date (in house)</th> <th style="width: 25%;">Scheduled Check</th> </tr> </thead> <tbody> <tr> <td>RF generator HP 8648C</td> <td>US3642U01700</td> <td>4-Aug-99 (in house check Oct-07)</td> <td>In house check: Oct-09</td> </tr> <tr> <td>Network Analyzer HP 8753E</td> <td>US37390585</td> <td>18-Oct-01 (in house check Oct-08)</td> <td>In house check: Oct-09</td> </tr> </tbody> </table>				Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration	Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10	Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10	Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10	Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10	Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10	Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10	Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10	DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09	Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-08)	In house check: Oct-09
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Calibrated by:	Name Claudio Leubler	Function Laboratory Technician	Signature 																																																
Approved by:	Katja Pokovic	Technical Manager																																																	
Issued: September 23, 2009																																																			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.																																																			

Certificate No: EX3-3677\_Sep09

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# TA Technology (Shanghai) Co., Ltd.

## Test Report

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



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

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

Accreditation No.: **SCS 108**

### Glossary:

TSL	tissue simulating liquid
NORM <sub>x,y,z</sub>	sensitivity in free space
ConvF	sensitivity in TSL / NORM <sub>x,y,z</sub>
DCP	diode compression point
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\vartheta$	$\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

### Calibration is Performed According to the Following Standards:

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

### Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not effect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- NORM(f)<sub>x,y,z</sub> = NORM<sub>x,y,z</sub> \* frequency\_response** (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM<sub>x,y,z</sub> \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

EX3DV4 SN:3677

September 23, 2009

# Probe EX3DV4

## SN:3677

Manufactured:	September 9, 2008
Last calibrated:	November 7, 2008
Recalibrated:	September 23, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

# TA Technology (Shanghai) Co., Ltd. Test Report

**EX3DV4 SN:3677**

**September 23, 2009**

## DASY - Parameters of Probe: EX3DV4 SN:3677

### Sensitivity in Free Space<sup>A</sup>

### Diode Compression<sup>B</sup>

NormX	0.42 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	91 mV
NormY	0.47 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	92 mV
NormZ	0.40 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	93 mV

### Sensitivity in Tissue Simulating Liquid (Conversion Factors)

**Please see Page 8.**

### Boundary Effect

**TSL                    900 MHz    Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance	<b>2.0 mm</b>	<b>3.0 mm</b>
SAR <sub>be</sub> [%]    Without Correction Algorithm	8.2	4.4
SAR <sub>be</sub> [%]    With Correction Algorithm	0.8	0.5

**TSL                    1750 MHz    Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance	<b>2.0 mm</b>	<b>3.0 mm</b>
SAR <sub>be</sub> [%]    Without Correction Algorithm	7.5	3.9
SAR <sub>be</sub> [%]    With Correction Algorithm	0.8	0.4

### Sensor Offset

Probe Tip to Sensor Center                    **1.0 mm**

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

<sup>A</sup> The uncertainties of NormX,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Page 8).

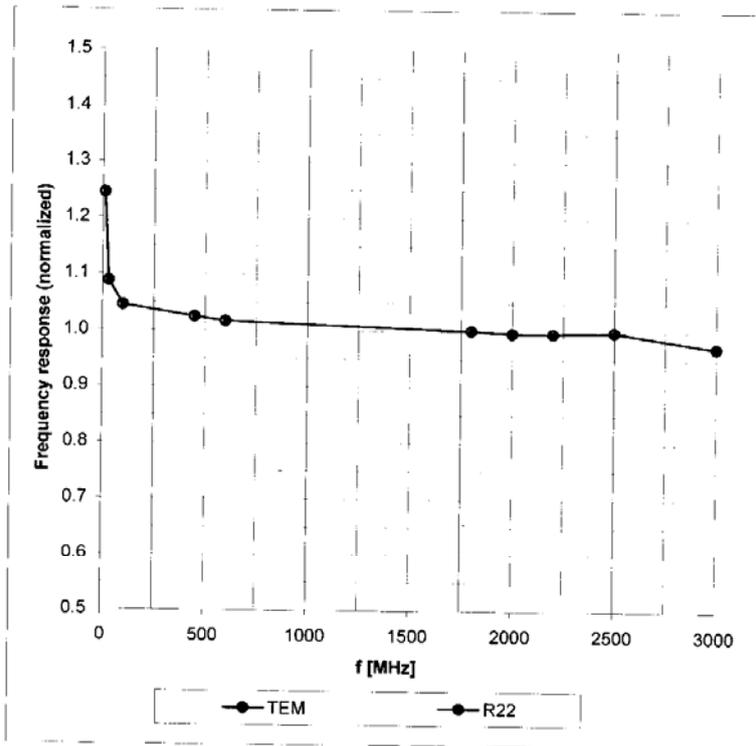
<sup>B</sup> Numerical linearization parameter: uncertainty not required.

EX3DV4 SN:3677

September 23, 2009

### Frequency Response of E-Field

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

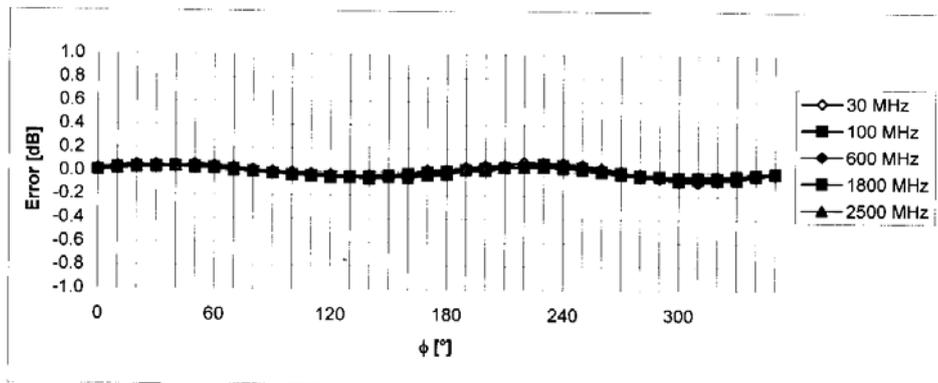
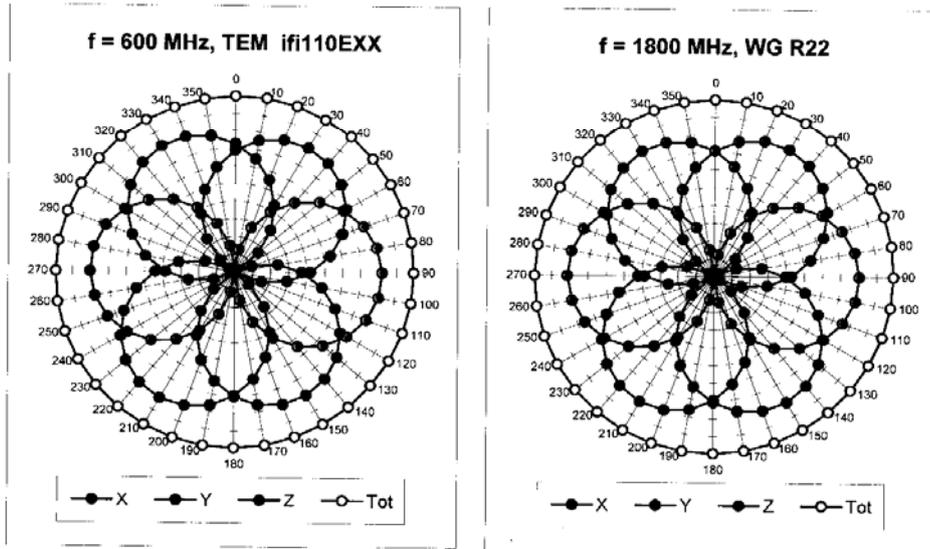


Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

EX3DV4 SN:3677

September 23, 2009

Receiving Pattern ( $\phi$ ),  $\vartheta = 0^\circ$

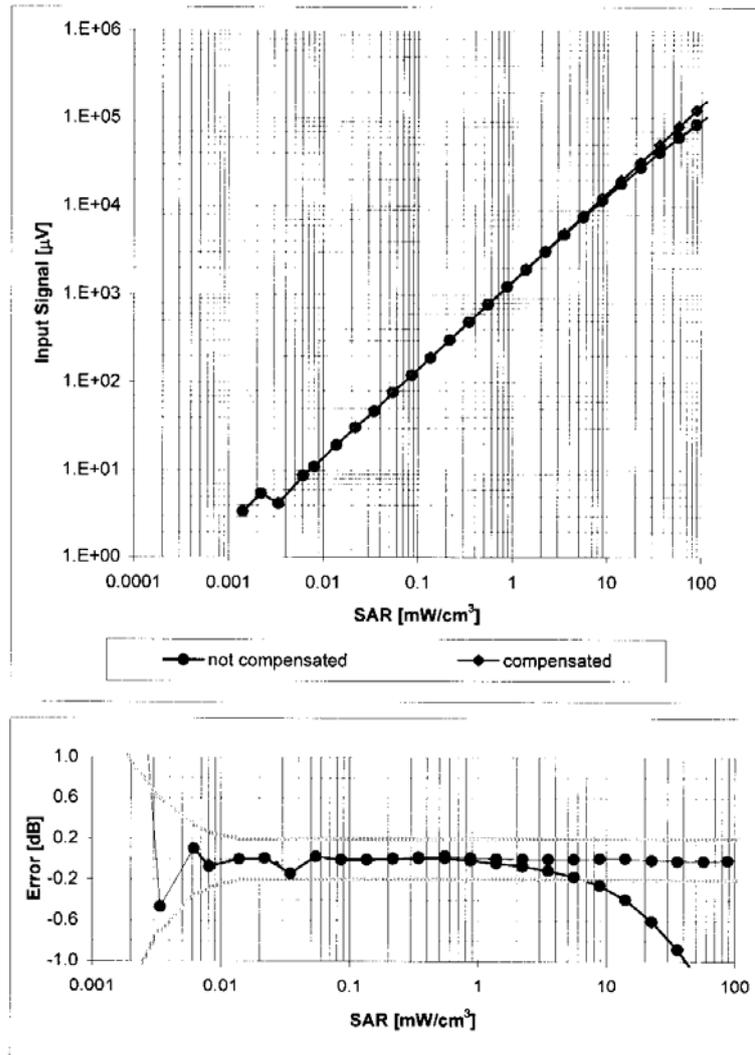


Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

EX3DV4 SN:3677

September 23, 2009

**Dynamic Range  $f(SAR_{head})$**   
(Waveguide R22,  $f = 1800$  MHz)

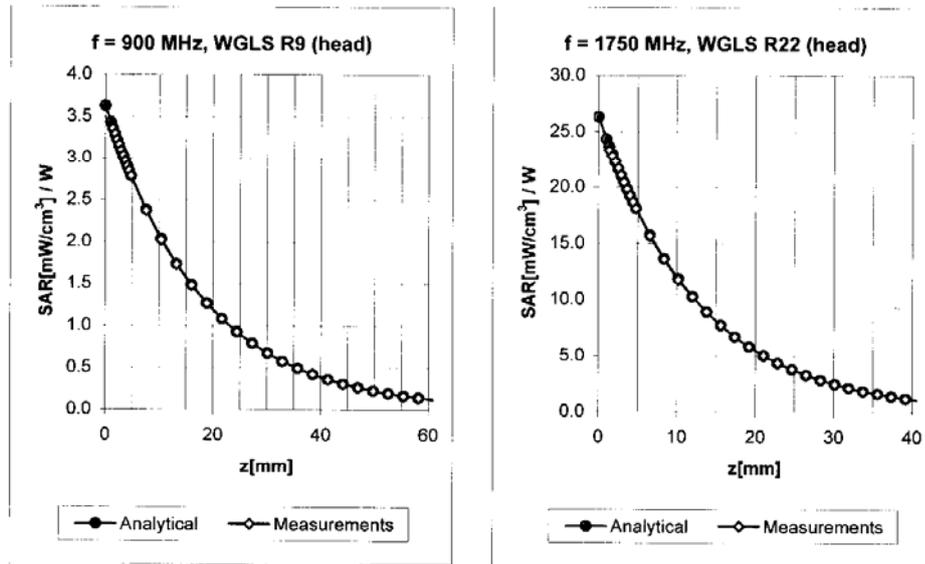


Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

EX3DV4 SN:3677

September 23, 2009

### Conversion Factor Assessment



f [MHz]	Validity [MHz] <sup>c</sup>	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.68	0.64	9.20 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.71	0.62	8.91 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.68	0.62	8.04 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.70	0.60	7.53 ± 11.0% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.32	0.49	10.43 ± 13.3% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.54	0.73	9.11 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.63	0.71	8.89 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.55	0.74	7.70 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.30	1.01	7.62 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.56	0.68	7.28 ± 11.0% (k=2)

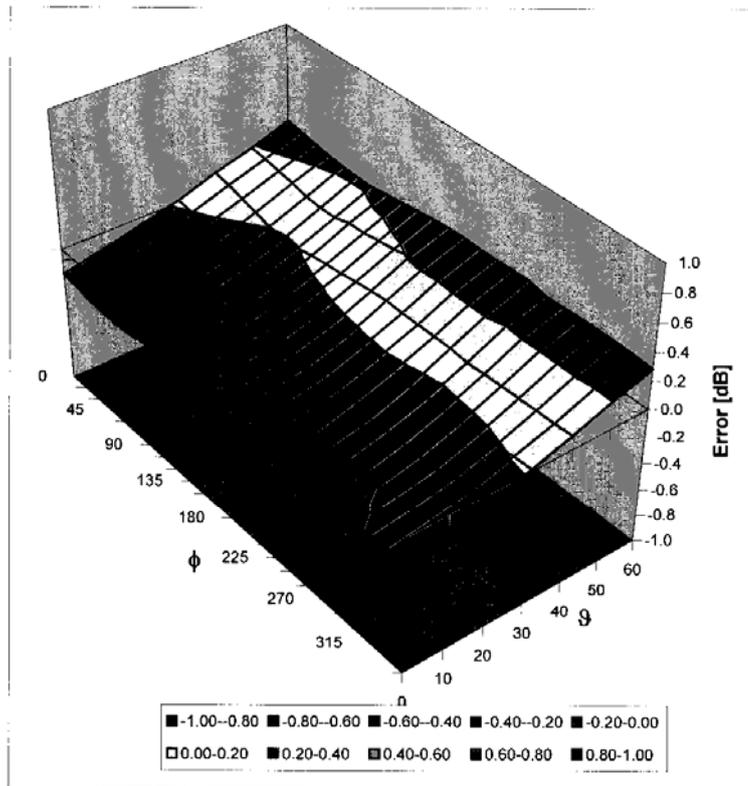
<sup>c</sup> The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

EX3DV4 SN:3677

September 23, 2009

### Deviation from Isotropy in HSL

Error ( $\phi$ ,  $\vartheta$ ),  $f = 900$  MHz



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )

# TA Technology (Shanghai) Co., Ltd. Test Report

Report No. RZA2010-0505-1

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## ANNEX E: D835V2 Dipole Calibration Certificate

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



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

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

Accreditation No.: **SCS 108**

Client **ATL (Auden)**

Certificate No: **D835V2-4d082\_Jul09**

### CALIBRATION CERTIFICATE

Object: **D835V2 - SN: 4d082**

Calibration procedure(s): **QA CAL-05.v7  
Calibration procedure for dipole validation kits**

Calibration date: **July 13, 2009**

Condition of the calibrated item: **In Tolerance**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	30-Apr-09 (No. ES3-3025_Apr09)	Apr-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

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

Issued: July 13, 2009

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

# TA Technology (Shanghai) Co., Ltd.

## Test Report

Report No. RZA2010-0505-1

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



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

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

Accreditation No.: **SCS 108**

### Glossary:

TSL tissue simulating liquid  
ConvF sensitivity in TSL / NORM x,y,z  
N/A not applicable or not measured

### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

### Additional Documentation:

- d) DASY4/5 System Handbook

### Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

# TA Technology (Shanghai) Co., Ltd. Test Report

### Measurement Conditions

DASY system configuration, as far as not given on page 1.

<b>DASY Version</b>	DASY5	V5.0
<b>Extrapolation</b>	Advanced Extrapolation	
<b>Phantom</b>	Modular Flat Phantom V4.9	
<b>Distance Dipole Center - TSL</b>	15 mm	with Spacer
<b>Zoom Scan Resolution</b>	dx, dy, dz = 5 mm	
<b>Frequency</b>	835 MHz ± 1 MHz	

### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
<b>Nominal Head TSL parameters</b>	22.0 °C	41.5	0.90 mho/m
<b>Measured Head TSL parameters</b>	(22.0 ± 0.2) °C	40.4 ± 6 %	0.89 mho/m ± 6 %
<b>Head TSL temperature during test</b>	(22.2 ± 0.2) °C	---	---

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.42 mW / g
SAR normalized	normalized to 1W	9.68 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>9.71 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.58 mW / g
SAR normalized	normalized to 1W	6.32 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>6.34 mW / g ± 16.5 % (k=2)</b>

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

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### Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.0 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature during test	(22.5 ± 0.2) °C	---	---

### SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.56 mW / g
SAR normalized	normalized to 1W	10.2 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	<b>10.0 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.68 mW / g
SAR normalized	normalized to 1W	6.72 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	<b>6.61 mW / g ± 16.5 % (k=2)</b>

<sup>2</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

**Appendix**

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	52.3 $\Omega$ - 2.5 j $\Omega$
Return Loss	- 29.5 dB

**Antenna Parameters with Body TSL**

Impedance, transformed to feed point	48.3 $\Omega$ - 4.3 j $\Omega$
Return Loss	- 26.6 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.390 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

**Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	October 17, 2008