



Report No.: RZA2009-1369FCC



OET 65

TEST REPORT

Product Name	HSPA USB Stick
Model	E1756
FCC ID	QISE1756A
Client	HUAWEI Technologies Co., Ltd.

TA Technology (Shanghai) Co., Ltd.



GENERAL SUMMARY

Product Name	HSPA USB Stick	Model	E1756
FCC ID	QISE1756A	Report No.	RZA2009-1369FCC
Client	HUAWEI Technologies Co., Ltd.		
Manufacturer	HAUWEI Technologies Co., Ltd.		
Standard(s)	<p>ANSI/IEEE Std C95.1-1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.</p> <p>OET Bulletin 65 supplement C, published June 2001 including DA 02-1438, published June 2002: Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits. Transition Period for the Phantom Requirements of Supplement C to OET Bulletin 65.</p> <p>IEC 62209-2:2008(106/162/CDV): 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 wireless communication devices used in close proximity to the human body .(frequency rang of 30MHz to 6GHz)</p> <p>Tracking number: 807360</p>		
Conclusion	<p>Localized Specific Absorption Rate (SAR) of this portable wireless equipment has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this test report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.</p> <p>General Judgment: Pass</p> <div style="text-align: right;">  (Stamp) Date of issue: November 9th, 2009 </div>		
Comment	The test result only responds to the measured sample.		

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1. General Information

1.1. Notes of the test report

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

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

This report standalone 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.

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1.3. Applicant Information

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1.5. Information of EUT

General information

Device type :	portable device		
Exposure category:	uncontrolled environment / general population		
Device operating configurations :			
Operating mode(s):	GSM850; (tested) GSM1900; (tested) WCDMA Band II; (tested)		
Test Modulation:	(GSM) GMSK (WCDMA)QPSK		
S/N or IMEI	355849031015416		
GPRS multislots class :	12		
EGPRS multislots class:	12		
Maximum no. of timeslots in uplink:	4		
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
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		
Test channel (Low –Middle –High)	128-190-251 512 - 661-810 9262 -9400 -9538	(GSM850) (GSM1900) (WCDMA Band II)	
Hardware version:	CD6BTCPU		
Software version:	11.126.07.100.00		
Antenna type:	Internal antenna		
Used host products:	IBM T61 BenQ Joybook R55V		

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Equipment Under Test (EUT) is a model of HSPA USB Stick, During SAR test of the EUT, it was connected to a portable computer. The tests in the band of GSM 850 , GSM 1900 and WCDMA Band II are performed in the mode of GPRS, EGPRS, WCDMA, HSDPA and HSUPA .The measurements were performed in combination with two different host products (IBM T61, BenQ Joybook R55V). IBM T61 laptop has vertical and horizontal USB slots, BenQ Joybook R55V laptop has horizontal USB slot.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. Test Period

The test is performed from October 22, 2009 to October 25, 2009.

2. Operational Conditions 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.

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 performed in the mode of GPRS and EGPRS. The GPRS class is 12 for this EUT; it has at most 4 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

Number of timeslots in uplink assignment	Permissible nominal reduction of maximum output power,(dB)
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, we established the radio link through call processing. The maximum output power were verified on high, middle and low channels for each test band according to 3GPP TS 34.121 with the following configuration:

- 1) 12.2kbps RMC, 64,144,384 kbps RMC with TPC set to all "all '1's"
- 2) Test loop Mode 1

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

Table 2: The configurations for the DPCCH and DPDCH₁

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

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

2.4. HSDPA Test Configuration

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

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

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

Table 3: Subtests for UMTS Release 5 HSDPA

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

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

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Table 5: HSDPA UE category

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

2.5. HSUPA Test Configuration

Body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least 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.⁴⁰

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

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

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

Note 1: $\Delta_{ACK}, \Delta_{NACK}$ 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 β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the

signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the

signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

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

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

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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 product (IBMT61, BenQ Joybook R55V). IBM T61 laptop has vertical and horizontal USB slot and BenQ Joybook R55V laptop has horizontal 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 5 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-a)
- Test Position 2: The EUT is connected to the portable computer with horizontal USB slot. The top side of the EUT towards the bottom of the flat phantom. (ANNEX H Picture 6-b)
- Test Position 3: The EUT is connected to the portable computer with vertical USB slot. The left side of the EUT towards the bottom of the flat phantom. (ANNEX H Picture 6-c)
- 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 6-d)
- Test Position 5: The EUT is connected to the portable computer with horizontal USB slot. The front side of the EUT towards the bottom of the flat phantom. (ANNEX H Picture 6-e)



Picture 1-g: BenQ Joy book R55V(118) with horizontal USB slot

Picture 1: Computer as a test assistant

3. SAR Measurements System Configuration

3.1. SAR Measurement Set-up

The DASY4/5 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 DASY4/5 measurement server.
- The DASY4/5 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
- DASY4/5 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.

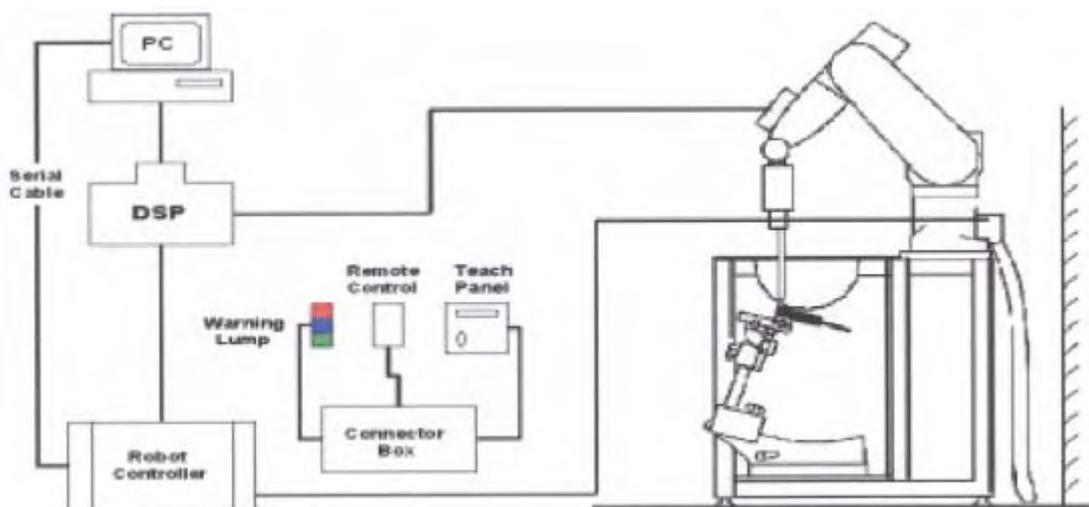


Figure 1. SAR Lab Test Measurement Set-up

3.2. DASY4/5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe ET3DV6 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

3.2.1. ET3DV6 Probe Specification

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection System (ET3DV6 only) Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.q., glycol)
Calibration	In air from 10 MHz to 3 GHz In brain and muscle simulating tissue at frequencies of 450MHz, 900MHz, 1810 MHz, 2000 MHz and 2450 MHz. (accuracy±8%) Calibration for other liquids and frequencies upon request
Frequency	10 MHz to 2.5 GHz; Linearity: ±0.2 dB (30 MHz to 2.5 GHz)
Directivity	±0.2 dB in brain tissue (rotation around probe axis) ±0.4 dB in brain tissue (rotation around probe axis)
Dynamic Range	5u W/g to > 100mW/g; Linearity: ±0.2dB
Surface Detection	±0.2 mm repeatability in air and clear liquids over diffuse reflecting surface (ET3DV6 only)
Dimensions	Overall length: 330mm Tip length: 16mm Body diameter: 12mm Tip diameter: 6.8mm Distance from probe tip to dipole centers: 2.7mm
Application	General dosimetry up to 2.5GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary Phantoms



Figure 2 ET3DV6 E-field Probe

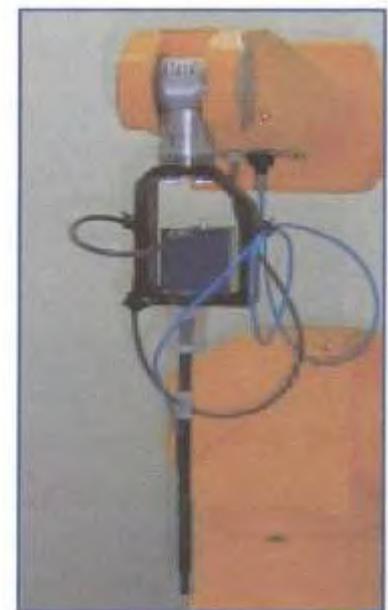


Figure 3 ET3DV6 E-field probe

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.

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

Where: Δt = Exposure time (30 seconds),
C = Heat capacity of tissue (brain or muscle),
 ΔT = Temperature increase due to RF exposure.
Or

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

Where:
 σ = Simulated tissue conductivity,
 ρ = Tissue density (kg/m³).

3.3. Other Test Equipment

3.3.1. Device Holder for Transmitters

The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.



Figure 4. Device Holder

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 5. Generic Twin Phantom

3.4. Scanning procedure

The DASY4/5 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 DASY4/5 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 DASY4/5 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 DASY4/5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DA4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

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

3.5.2. Data Evaluation by SEMCAD

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

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

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY4/5 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

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

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

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

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

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

cf = crest factor of exciting field (DASY parameter)

dcp_i = diode compression point (DASY parameter)

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

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

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

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

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

$ConvF$ = sensitivity enhancement in solution

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

f = carrier frequency [GHz]

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

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

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

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

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

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

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

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

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

ρ = equivalent tissue density in g/cm³

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

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

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

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

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

3.6. System check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyser. 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 DASY 4 system.

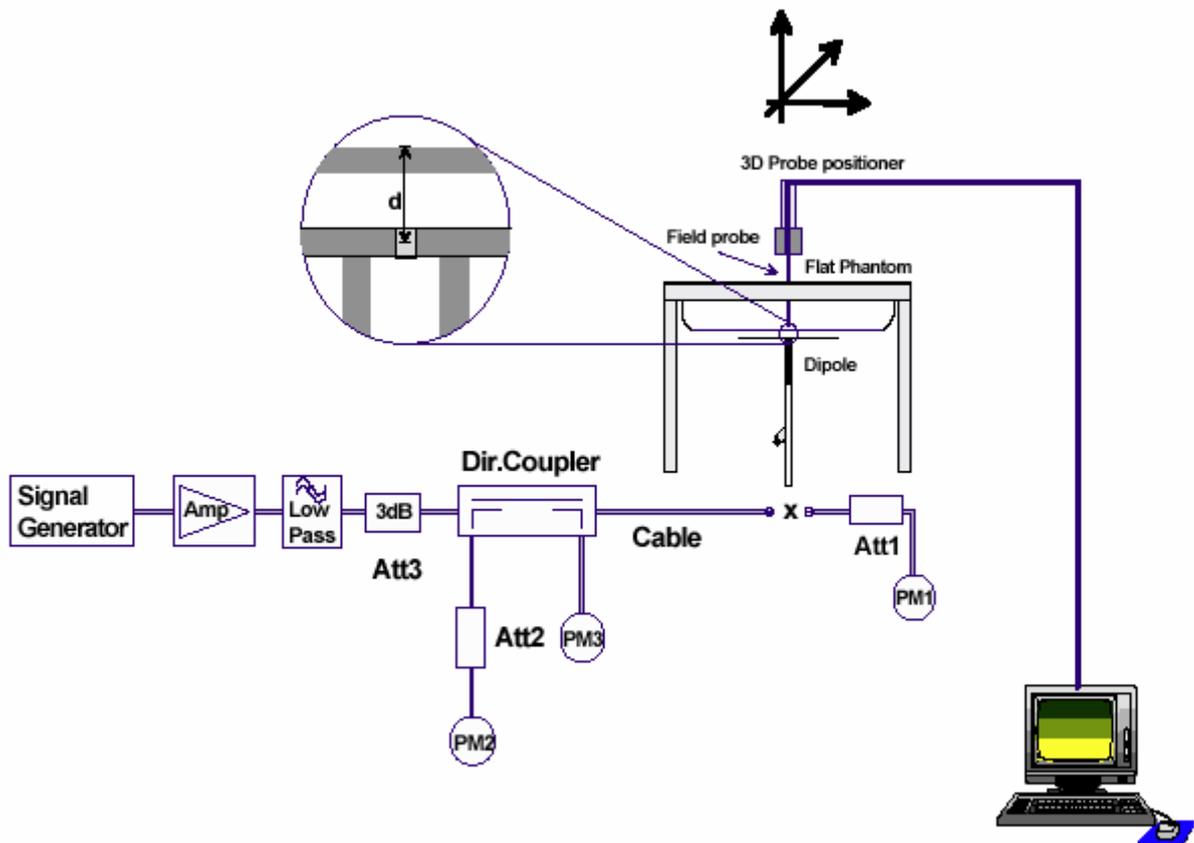


Figure 6. System Check Set-up

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 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

5. Characteristics of the Test

5.1. Applicable Limit Regulations

ANSI/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

OET Bulletin 65 supplement C, published June 2001 including DA 02-1438, published June 2002: Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits. Transition Period for the Phantom Requirements of Supplement C to OET Bulletin 65.

IEC 62209-2:2008(106/162/CDV): 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 wireless communication devices used in close proximity to the human body .(frequency rang of 30MHz to 6GHz).

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 peak 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

GSM 850+GPRS		Conducted Power		
		Channel 128	Channel 190	Channel 251
		(824.2MHz)	(836.6MHz)	(848.8MHz)
1 timeslot	Before Test (dBm)	31.54	31.72	31.66
	After Test (dBm)	31.53	31.71	31.65
2 timeslots	Before Test (dBm)	28.73	28.81	28.76
	After Test (dBm)	28.72	28.80	28.75
3 timeslots	Before Test (dBm)	27.79	27.85	27.80
	After Test (dBm)	27.78	27.84	27.79
4 timeslots	Before Test (dBm)	26.10	26.23	26.18
	After Test (dBm)	26.09	26.21	26.16
GSM 850+EGPRS		Conducted Power		
		Channel 128	Channel 192	Channel 251
		(824.2MHz)	(836.6MHz)	(848.8MHz)
1 timeslot	Before Test (dBm)	26.29	26.37	26.34
	After Test (dBm)	26.27	26.36	26.33
2 timeslots	Before Test (dBm)	24.28	24.36	24.28
	After Test (dBm)	24.27	24.35	24.27
3 timeslots	Before Test (dBm)	22.15	22.23	22.22
	After Test (dBm)	22.14	22.22	22.21
4 timeslots	Before Test (dBm)	20.11	20.19	20.06
	After Test (dBm)	20.10	20.18	20.05
GSM 1900+GPRS		Conducted Power		
		Channel 512	Channel 661	Channel 810

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		(1850.2MHz)	(1880MHz)	(1909.8MHz)
1 timeslot	Before Test (dBm)	28.36	28.49	28.24
	After Test (dBm)	28.34	28.48	28.22
2 timeslots	Before Test (dBm)	25.43	25.43	25.38
	After Test (dBm)	25.41	25.42	25.37
3 timeslots	Before Test (dBm)	25.07	24.94	24.85
	After Test (dBm)	25.06	24.93	24.84
4 timeslots	Before Test (dBm)	23.50	23.34	23.31
	After Test (dBm)	23.48	23.33	23.30
GSM 1900+EGPRS		Conducted Power		
		Channel 512	Channel 661	Channel 810
		(1850.2MHz)	(1880MHz)	(1909.8MHz)
1 timeslot	Before Test (dBm)	24.88	25.04	24.85
	After Test (dBm)	24.87	25.03	24.84
2 timeslots	Before Test (dBm)	23.11	22.91	22.87
	After Test (dBm)	23.10	22.90	22.86
3 timeslots	Before Test (dBm)	21.01	20.87	20.82
	After Test (dBm)	21.00	20.86	20.81
4 timeslots	Before Test (dBm)	18.97	18.83	18.80
	After Test (dBm)	18.96	18.82	18.81
WCDMA Band II		Conducted Power		
		Channel 9262	Channel 9400	Channel 9538
		(1852.4MHz)	(1880MHz)	(1907.6MHz)
12.2kbps RMC	Before Test (dBm)	21.70	22.05	21.89
	After Test (dBm)	21.71	22.04	21.88
64kbps RMC	Before Test (dBm)	21.74	22.09	21.78
	After Test (dBm)	21.73	22.08	21.77
144kbps RMC	Before Test (dBm)	21.69	22.15	21.84
	After Test (dBm)	21.66	22.14	21.83
384kbps RMC	Before Test (dBm)	21.81	22.00	21.90
	After Test (dBm)	21.80	22.01	21.91
WCDMA Band II+HSDPA		Conducted Power		
		Channel 9262	Channel 9400	Channel 9538
		(1852.4MHz)	(1880MHz)	(1907.6MHz)
Sub Test - 1	Before Test (dBm)	21.67	22.02	21.99

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	After Test (dBm)	21.66	22.01	21.98
Sub Test - 2	Before Test (dBm)	21.50	21.93	22.18
	After Test (dBm)	21.51	21.92	22.17
Sub Test - 3	Before Test (dBm)	21.39	21.77	21.52
	After Test (dBm)	21.38	21.76	21.51
Sub Test - 4	Before Test (dBm)	21.35	21.80	21.45
	After Test (dBm)	21.34	21.81	21.44
WCDMA Band II+HSUPA		Conducted Power		
		Channel 9262	Channel 9400	Channel 9538
		(1852.4MHz)	(1880MHz)	(1907.6MHz)
Sub Test - 1	Before Test (dBm)	21.66	21.36	21.45
	After Test (dBm)	21.65	21.35	21.44
Sub Test - 2	Before Test (dBm)	19.75	19.63	19.78
	After Test (dBm)	19.74	19.62	19.77
Sub Test - 3	Before Test (dBm)	20.83	20.79	20.77
	After Test (dBm)	20.82	20.77	20.76
Sub Test - 4	Before Test (dBm)	19.93	20.50	19.97
	After Test (dBm)	19.92	20.51	19.96
Sub Test - 5	Before Test (dBm)	21.32	21.14	21.25
	After Test (dBm)	21.31	21.13	21.24

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7. Test Results

7.1. Dielectric Performance

Table 11: Dielectric Performance of Body Tissue Simulating Liquid

Frequency	Description	Dielectric Parameters		Temp °C
		ϵ_r	σ (s/m)	
835MHz (body)	Target value ±5% window	55.20 52.44 — 57.96	0.97 0.92 — 1.02	/
	Measurement value 2009-10-23	54.65	0.99	21.5
1900MHz (body)	Target value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60	/
	Measurement value 2009-10-22	52.40	1.53	21.7
	Measurement value 2009-10-25	52.41	1.52	21.7

7.2. System Check

Table 12: System Check for Body tissue stimulant

Frequency	Description	SAR(W/kg)		Dielectric Parameters		Temp °C
		10g	1g	ϵ_r	σ (s/m)	
835MHz	Target value ±10% window	1.58 1.42—1.74	2.41 2.17 — 2.65	54.60	0.99	/
	Measurement value 2009-10-23	1.59	2.42	54.65	0.99	21.9
1900 MHz	Target value ±10% window	5.18 4.66—5.70	10.20 9.18 — 11.22	52.90	1.55	/
	Measurement value 2009-10-22	5.15	10.01	52.40	1.53	21.7
	Measurement value 2009-10-25	5.14	10.00	52.41	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. GSM850 (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		
IBM T61						
Test Position 1	4 timeslots	High	0.503	0.842	-0.078	Figure 13
		Middle	0.503	0.834	-0.138	Figure 15
		Low	0.420	0.691	0.191	Figure 17
	3 timeslots	High	0.629	1.050	-0.154	Figure 19
		Middle	0.521	0.842	-0.185	Figure 21
		Low	0.504	0.830	-0.132	Figure 23
	2 timeslots	High	0.581	0.970	-0.155	Figure 25
		Middle	0.498	0.825	0.168	Figure 27
		Low	0.442	0.728	0.146	Figure 29
	1 timeslot	High	0.646	1.070	-0.084	Figure 31
		Middle	0.534	0.882	0.193	Figure 33
		Low	0.459	0.755	-0.169	Figure 35
Test Position 2	1 timeslot	Middle	0.033	0.082	-0.153	Figure 37
Test Position 3	1 timeslot	Middle	0.189(max.cube)	0.269(max.cube)	-0.015	Figure 39
Test Position 4	1 timeslot	Middle	0.305	0.486	-0.123	Figure 41
BenQ Joybook R55V						
Test Position 5	1 timeslot	Middle	0.491	0.785	-0.124	Figure 43
Worst case position of GPRS with EGPRS						
Test Position 1	1 timeslot	High	0.591	0.972	0.043	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.
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;

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Table 14: SAR Values [GSM850, 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	High	1.210	0.605	1.513
	5mm		0.663		
	10mm		0.383		

- Note: 1. The probe tip location is fixed at the distance of one half the probe tip diameter 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. GSM1900 (GPRS/EGPRS)

Table 15: [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		
IBM T61						
Test Position 1	4 timeslots	Middle	0.312	0.543	0.044	Figure 47
	3 timeslots	High	0.391	0.684	-0.111	Figure 49
		Middle	0.344	0.601	0.043	Figure 51
		Low	0.341	0.599	0.144	Figure 53
	2 timeslots	Middle	0.262	0.456	0.088	Figure 55
	1 timeslot	Middle	0.241(max.cube)	0.436(max.cube)	0.144	Figure 57
Test Position 2	3 timeslots	Middle	0.044	0.076	-0.095	Figure 59
Test Position 3	3 timeslots	Middle	0.104	0.187	-0.171	Figure 61
Test Position 4	3 timeslots	Middle	0.249	0.447	0.118	Figure 63
BenQ Joybook R55V						
Test Position 5	3 timeslots	Middle	0.329(max.cube)	0.562(max.cube)	0.167	Figure 65
Worst case position of GPRS with EGPRS						
Test Position 1	3 timeslots	High	0.390	0.687	0.012	Figure 67

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;

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Table 16: SAR Values [GSM1900, 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	High	0.787	0.394	0.984
	5mm		0.402		
	10mm		0.240		

- Note: 1. The probe tip location is fixed at the distance of one half the probe tip diameter 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)	
		10 g Average	1 g Average		
Different Test Position	Channel				
IBM T61					
Test Position 1	High	0.687	1.170	0.098	Figure 69
	Middle	0.547	0.949	-0.199	Figure 71
	Low	0.587	1.020	0.034	Figure 73
Test Position 2	Middle	0.069	0.106	-0.150	Figure 75
Test Position 3	Middle	0.200	0.324	-0.186	Figure 77
Test Position 4	Middle	0.402	0.725	0.160	Figure 79
BenQ Joybook R55V					
Test Position 5	High	0.596	1.020	0.165	Figure 81
	Middle	0.520	0.882	0.122	Figure 83
	Low	0.584	0.994	-0.007	Figure 85
Worst case position of RMC with HSDPA					
Test Position 1	High	0.628	1.090	0.051	Figure 87
Worst case position of RMC with HSUPA					
Test Position 1	High	0.452	0.798	-0.182	Figure 89

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 18: SAR Values [WCDMA Band II, 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	High	1.346	0.673	1.683
	5mm		0.709		
	10mm		0.390		

- Note: 1. The probe tip location is fixed at the distance of one half the probe tip diameter 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_{1g} 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 _i	Standard uncertainty u _i (%)	Degree of freedom V _{eff} or v _i
1	System repetivity	A	0.5	N	1	1	0.5	9
Measurement system								
2	probe calibration	B	5.9	N	1	1	5.9	∞
3	axial isotropy of the probe	B	4.7	R	$\sqrt{3}$	$\sqrt{0.5}$	1.9	∞
4	Hemispherical isotropy of the probe	B	9.4	R	$\sqrt{3}$	$\sqrt{0.5}$	3.9	∞
6	boundary effect	B	1.9	R	$\sqrt{3}$	1	1.1	∞
7	probe linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
8	System detection limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
9	readout Electronics	B	1.0	N	1	1	1.0	∞
10	response time	B	0	R	$\sqrt{3}$	1	0	∞
11	integration time	B	4.32	R	$\sqrt{3}$	1	2.5	∞
12	noise	B	0	R	$\sqrt{3}$	1	0	∞
13	RF Ambient Conditions	B	3	R	$\sqrt{3}$	1	1.73	∞
14	Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
15	Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
16	Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
Test sample Related								
17	-Test Sample Positioning	A	2.9	N	1	1	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	∞	
21	-liquid conductivity (deviation from target)	B	5.0	R	$\sqrt{3}$	$\frac{0.6}{4}$	1.8	∞	
22	-liquid conductivity (measurement uncertainty)	B	5.0	N	1	$\frac{0.6}{4}$	3.2	∞	
23	-liquid permittivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞	
24	-liquid permittivity (measurement uncertainty)	B	5.0	N	1	0.6	3.0	∞	
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 19: List of Main Instruments

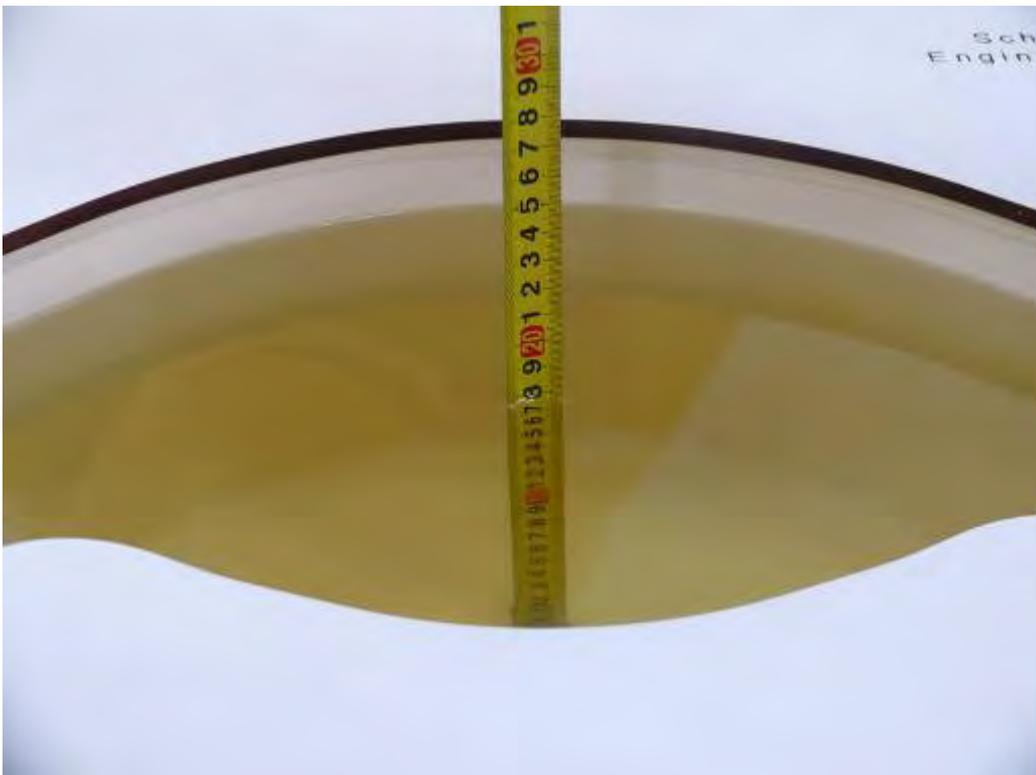
No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 13, 2009	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 14, 2009	One year
04	Power sensor	Agilent 8481H	MY41091316	March 14, 2009	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	4d020	July 15, 2009	One year
08	Validation Kit 1900MHz	D1900V2	5d060	July 15, 2009	One year
09	BTS	E5515C	MY48360988	December 16, 2008	One year
10	E-field Probe	ET3DV6	1531	January 20, 2009	One year
11	DAE	DAE4	452	November 18, 2008	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)

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Picture 4: Liquid depth in the Flat Phantom (1900 MHz)

ANNEX B: System Check Results

System Performance Check at 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d020

Date/Time: 10/23/2009 7:21:49 AM

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

Medium parameters used: $f = 835$ MHz; $\sigma = 0.99$ mho/m; $\epsilon_r = 54.65$; $\rho = 1000$ kg/m³

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

Phantom section: Flat Section

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM1; Type: SAM;

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

d=15mm, Pin=250mW/Area Scan (101x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.94 mW/g

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

Reference Value = 55.7 V/m; Power Drift = -0.024 dB

Peak SAR (extrapolated) = 3.59 W/kg

SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.59 mW/g

Maximum value of SAR (measured) = 2.92 mW/g

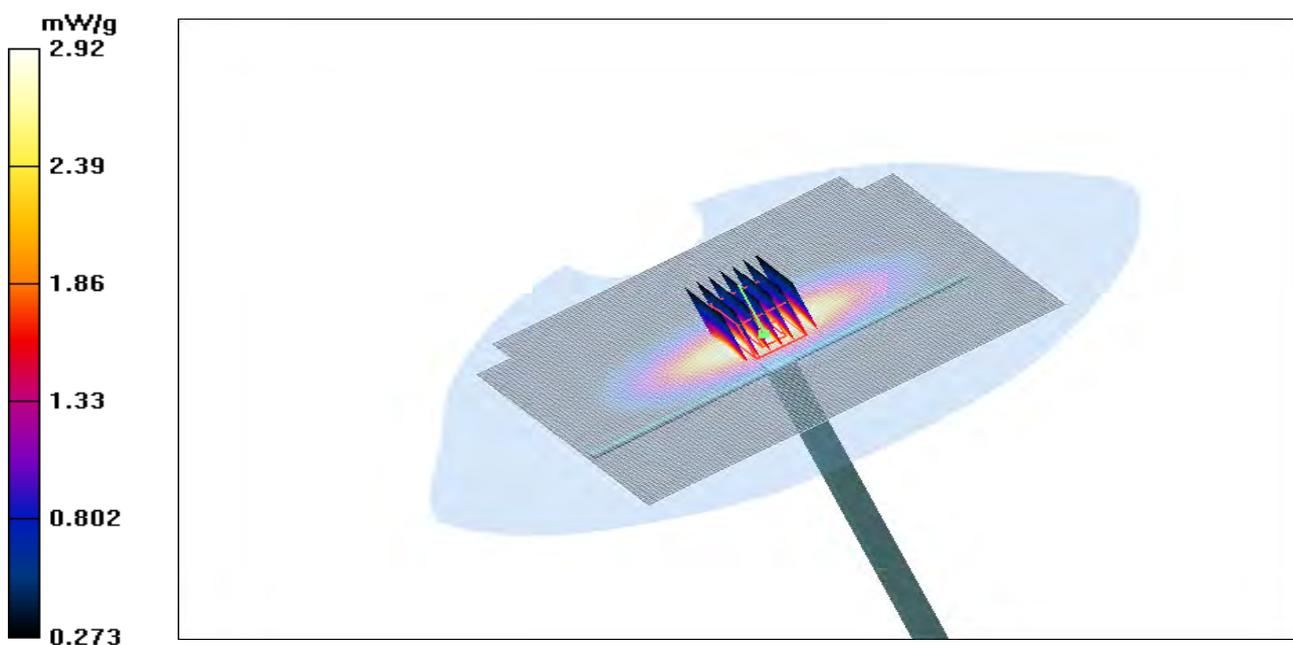


Figure 7 System Performance Check 835MHz 250mW

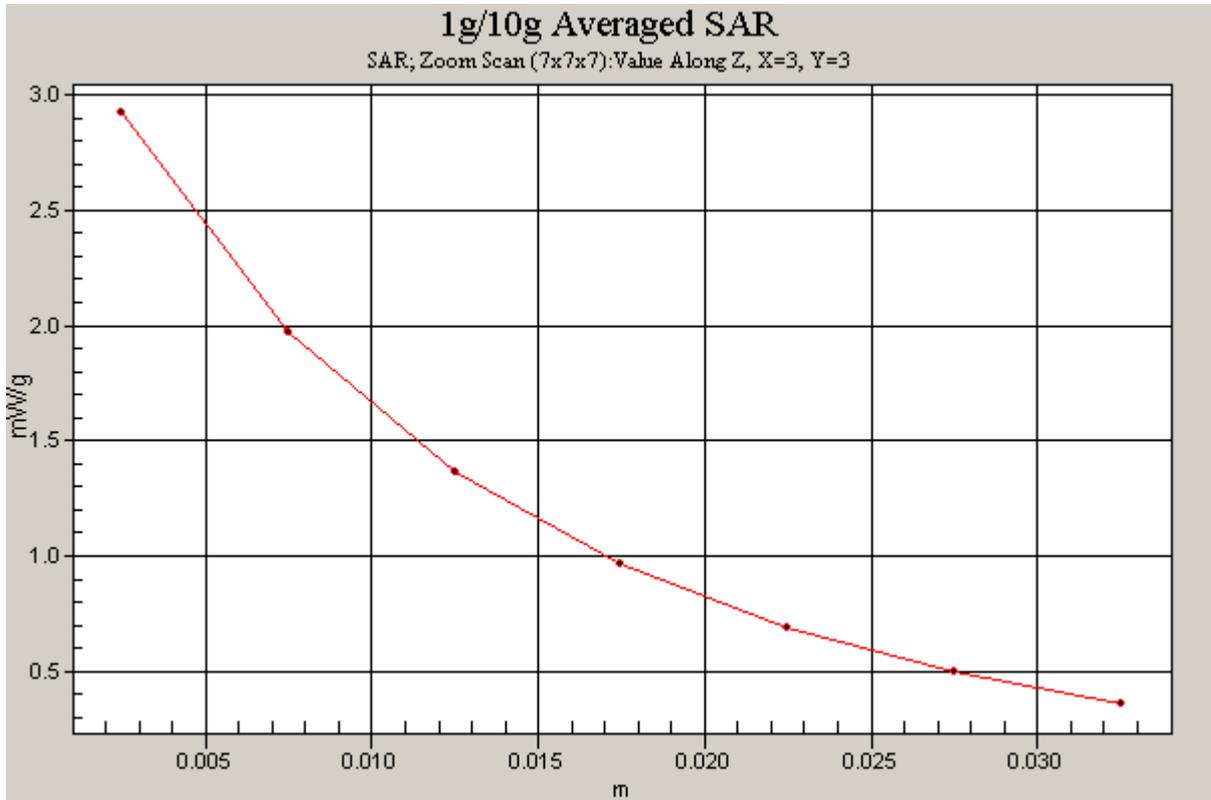


Figure 8 Z-Scan at power reference point (system Check at 835 MHz dipole)

System Performance Check at 1900 MHz

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d060

Date/Time: 10/22/2009 2:12:49 PM

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.40$; $\rho = 1000$ kg/m³

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

Phantom section: Flat Section

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

d=10mm, Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 86.0 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 18.9 W/kg

SAR(1 g) = 10.01 mW/g; SAR(10 g) = 5.15 mW/g

Maximum value of SAR (measured) = 11.3 mW/g

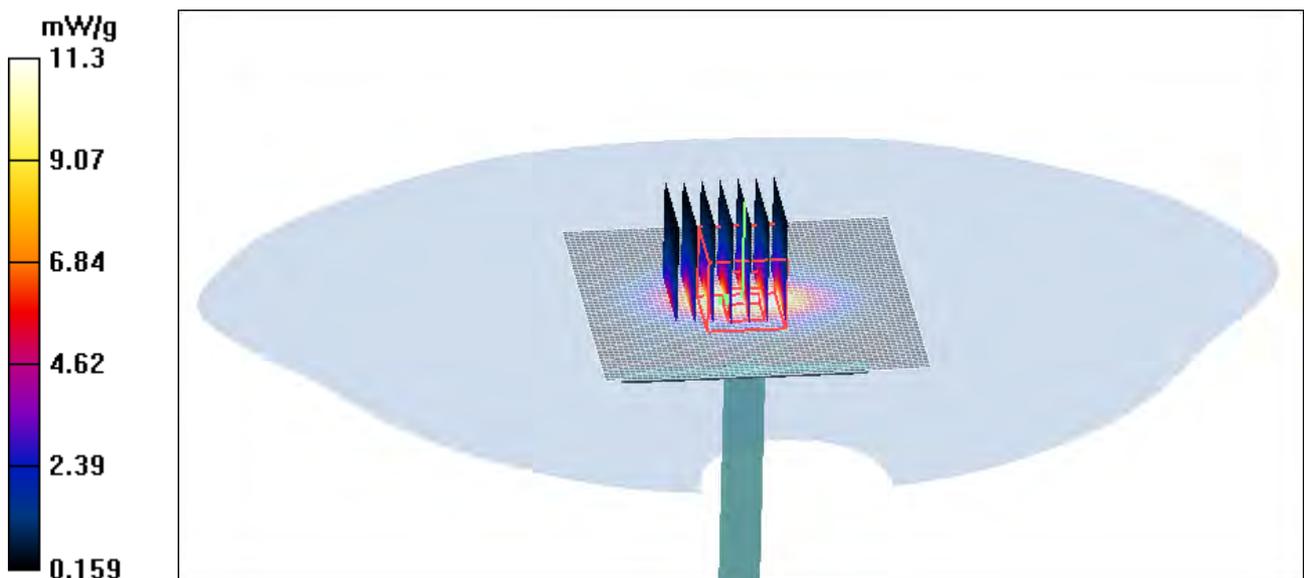


Figure 9 System Performance Check 1900MHz 250mW

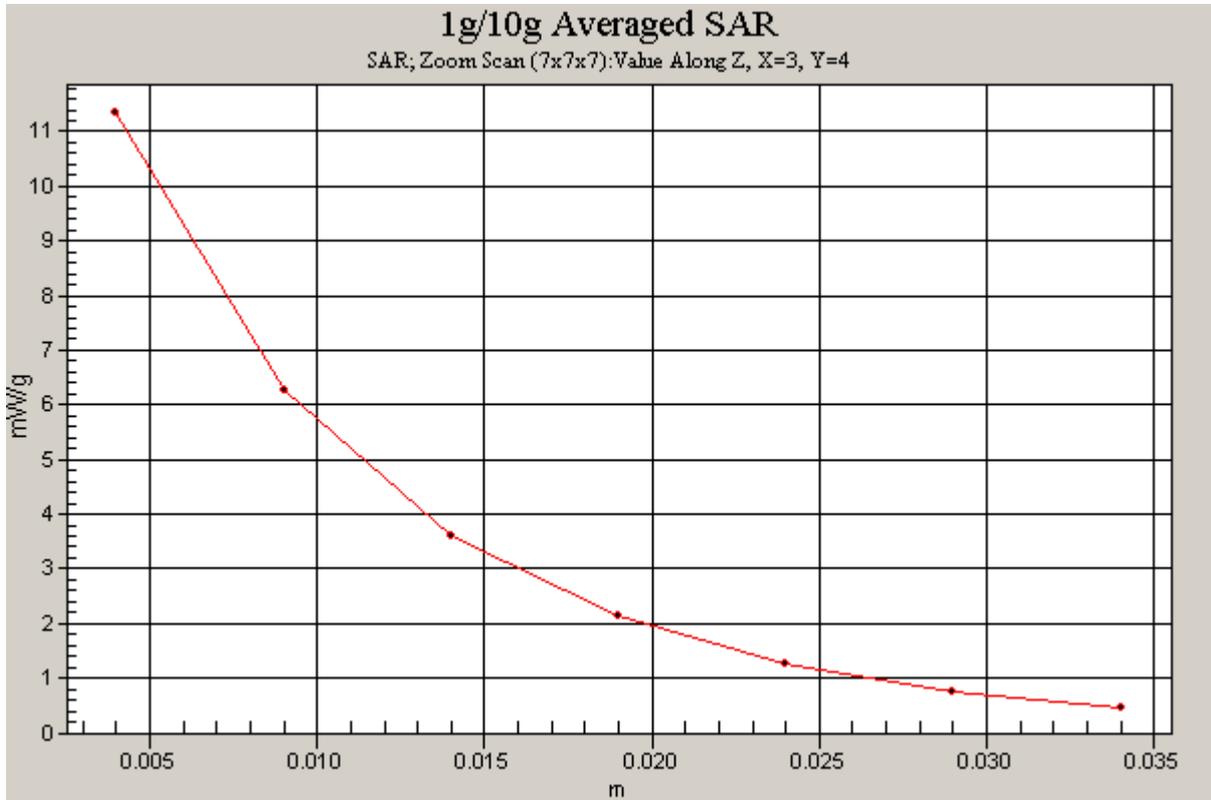


Figure 10 Z-Scan at power reference point (system Check at 1900 MHz dipole)

System Performance Check at 1900 MHz

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d060

Date/Time: 10/25/2009 7:12:49 AM

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 52.41$; $\rho = 1000$ kg/m³

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

Phantom section: Flat Section

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

d=10mm, Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 86.0 V/m; Power Drift = -0.003 dB

Peak SAR (extrapolated) = 18.9 W/kg

SAR(1 g) = 10 mW/g; SAR(10 g) = 5.14 mW/g

Maximum value of SAR (measured) = 11.3 mW/g

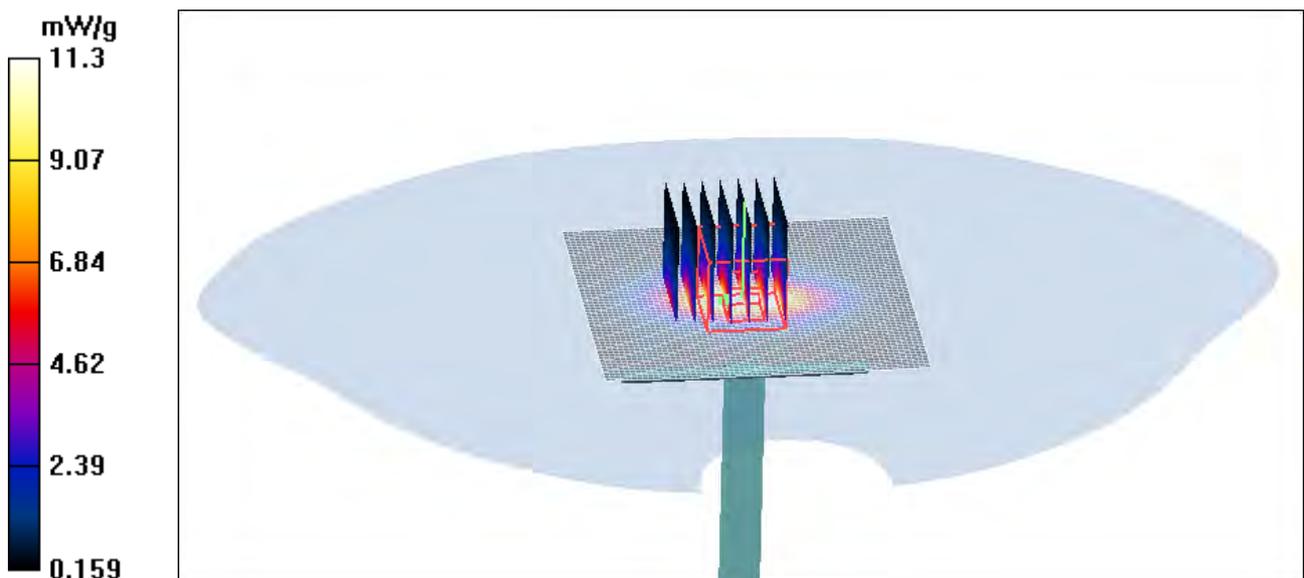


Figure 11 System Performance Check 1900MHz 250mW

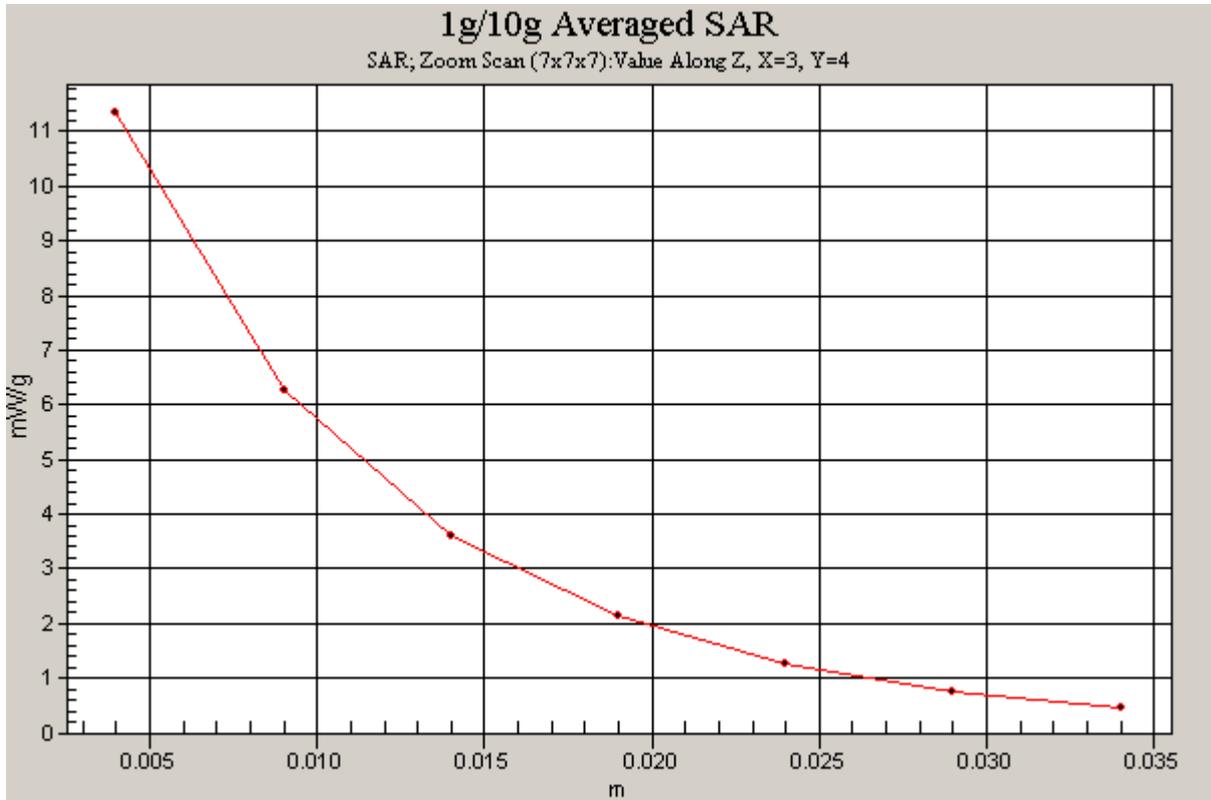


Figure 12 Z-Scan at power reference point (system Check at 1900 MHz dipole)

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ANNEX C: Graph Results

GSM 850 GPRS (4 timeslots in uplink) with IBM T61 Test Position 1 High

Date/Time: 10/23/2009 2:57:23 PM

Communication System: GSM 850+GPRS(4Up); Frequency: 848.8 MHz; Duty Cycle: 1:2

Medium parameters used: $f = 849$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM1; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 0.943 mW/g

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

Reference Value = 27.1 V/m; Power Drift = -0.078 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.842 mW/g; SAR(10 g) = 0.503 mW/g

Maximum value of SAR (measured) = 0.934 mW/g

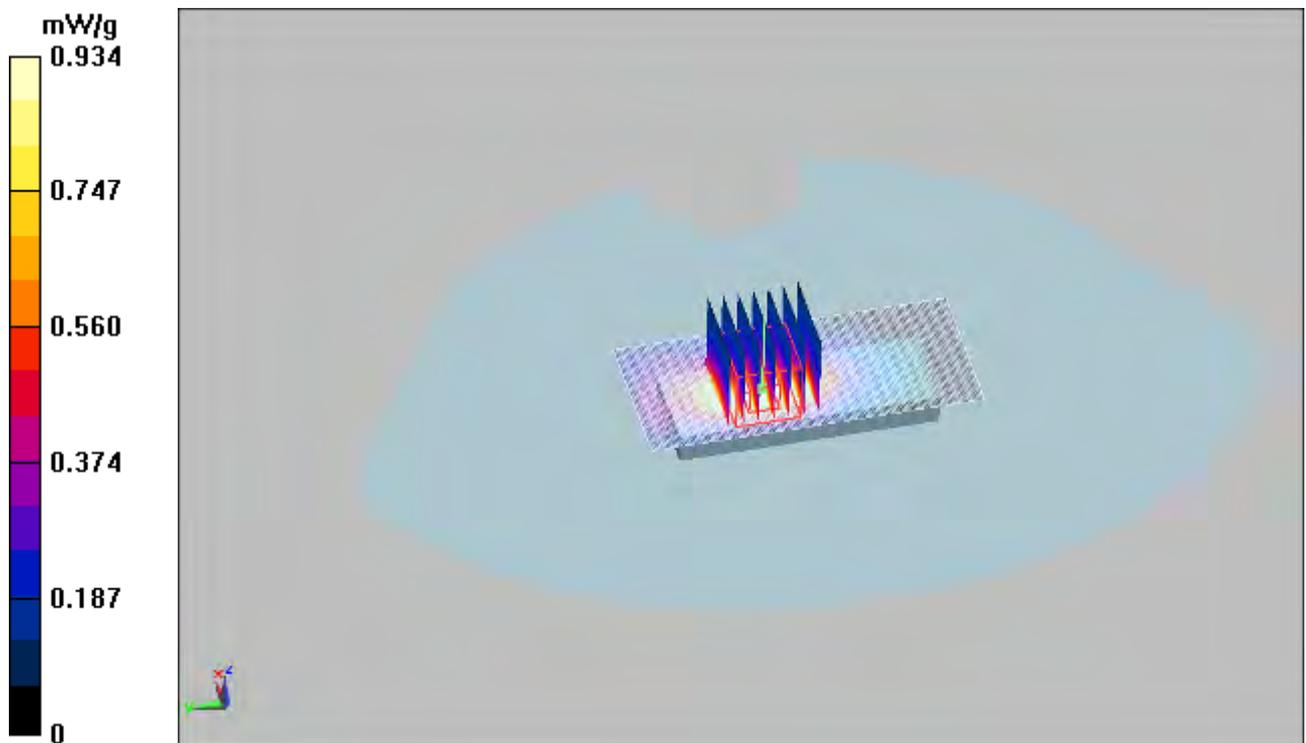


Figure 13 GSM 850 GPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Channel 251

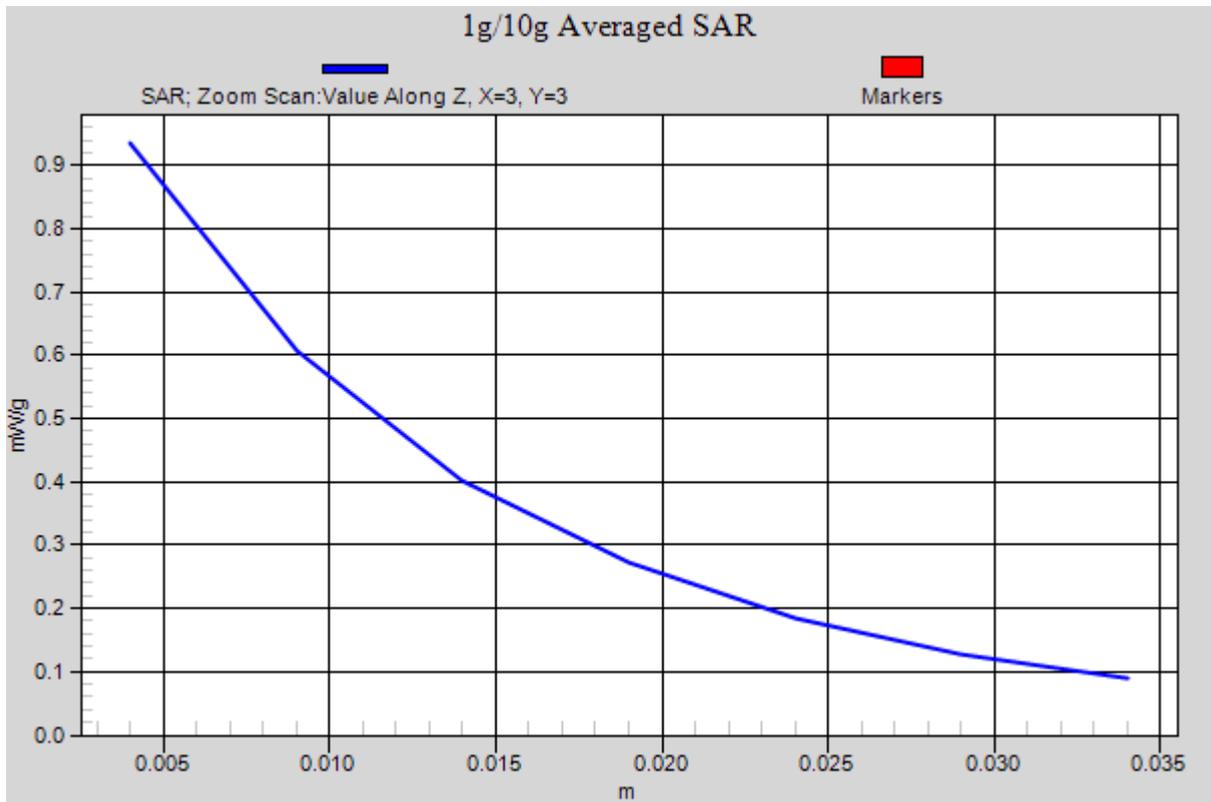


Figure 14 Z-Scan at power reference point [GSM 850 GPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Channel 251]

GSM 850 GPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Middle

Date/Time: 10/23/2009 9:08:22 AM

Communication System: GSM 850+GPRS(4Up); Frequency: 836.6 MHz; Duty Cycle: 1:2

Medium parameters used: $f = 837$ MHz; $\sigma = 0.995$ mho/m; $\epsilon_r = 54.6$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM1; Type: SAM;

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

Test Position 1 Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.980 mW/g

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

Reference Value = 28.4 V/m; Power Drift = -0.138 dB

Peak SAR (extrapolated) = 1.34 W/kg

SAR(1 g) = 0.834 mW/g; SAR(10 g) = 0.503 mW/g

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

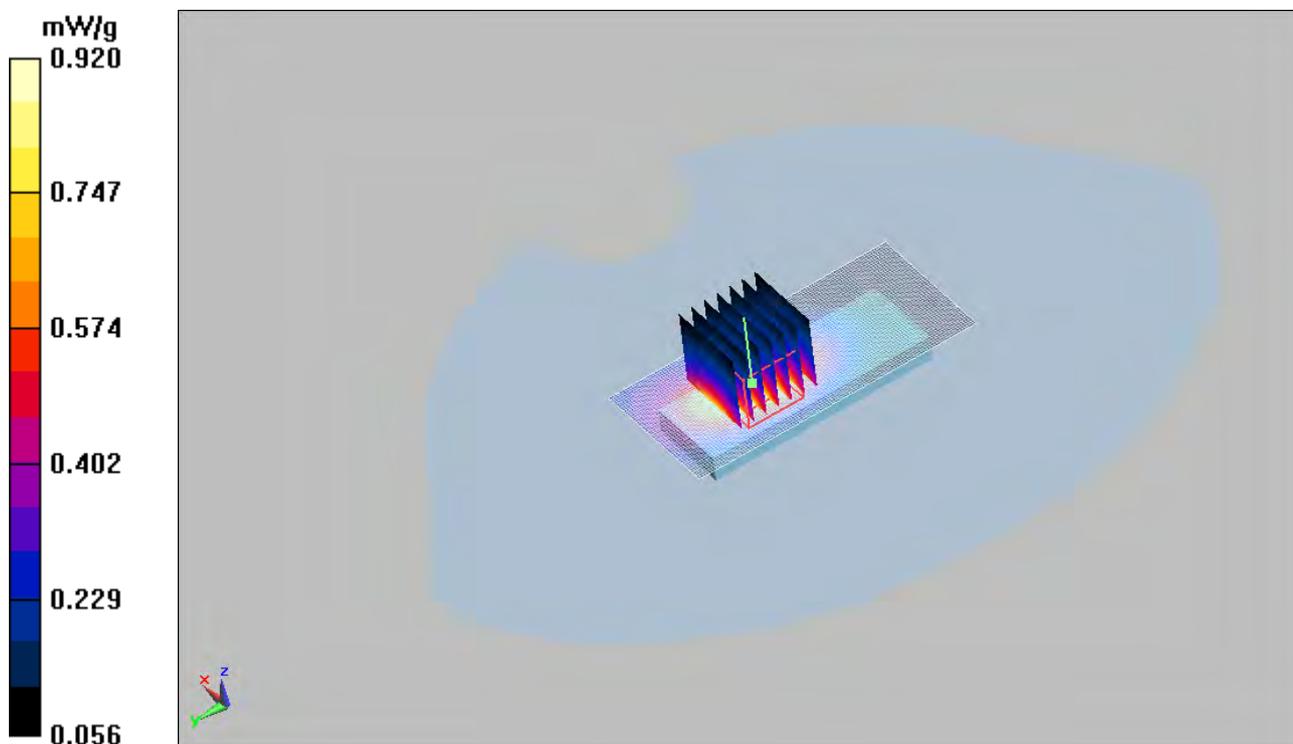


Figure 15 GSM 850 GPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Channel 190

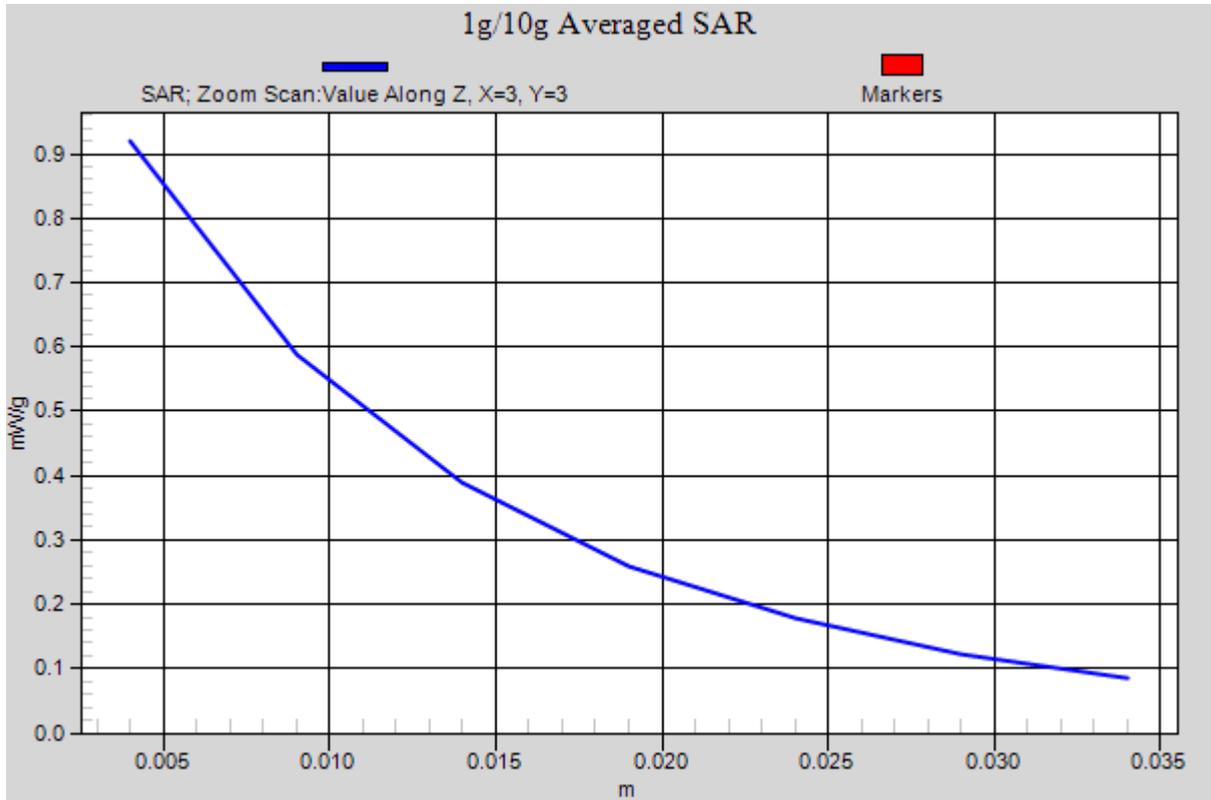


Figure 16 Z-Scan at power reference point [GSM 850 GPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Channel190]

GSM 850 GPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Low

Date/Time: 10/23/2009 3:19:56 PM

Communication System: GSM 850+GPRS(4Up); Frequency: 824.2 MHz; Duty Cycle: 1:2

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.984$ mho/m; $\epsilon_r = 54.8$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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) = 0.750 mW/g

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

Reference Value = 23.9 V/m; Power Drift = 0.191 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.691 mW/g; SAR(10 g) = 0.420 mW/g

Maximum value of SAR (measured) = 0.755 mW/g

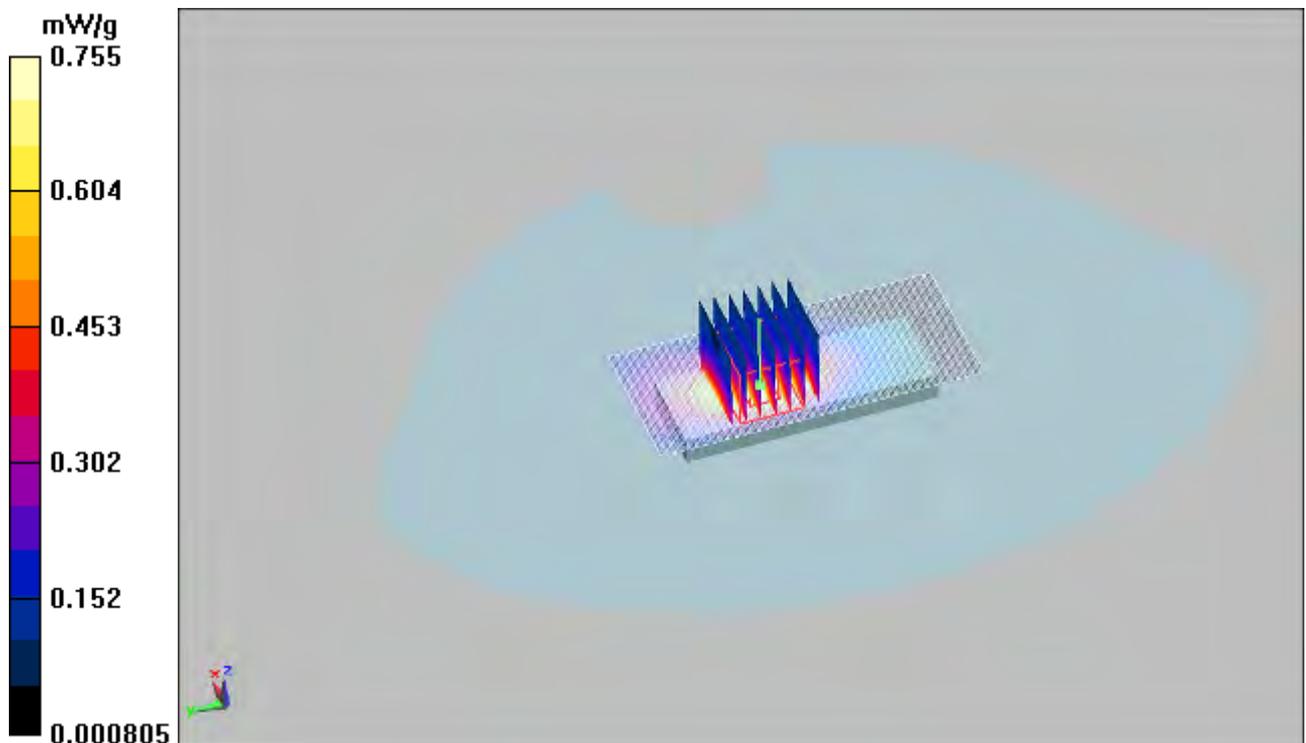


Figure 17 GSM 850 GPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Channel 128

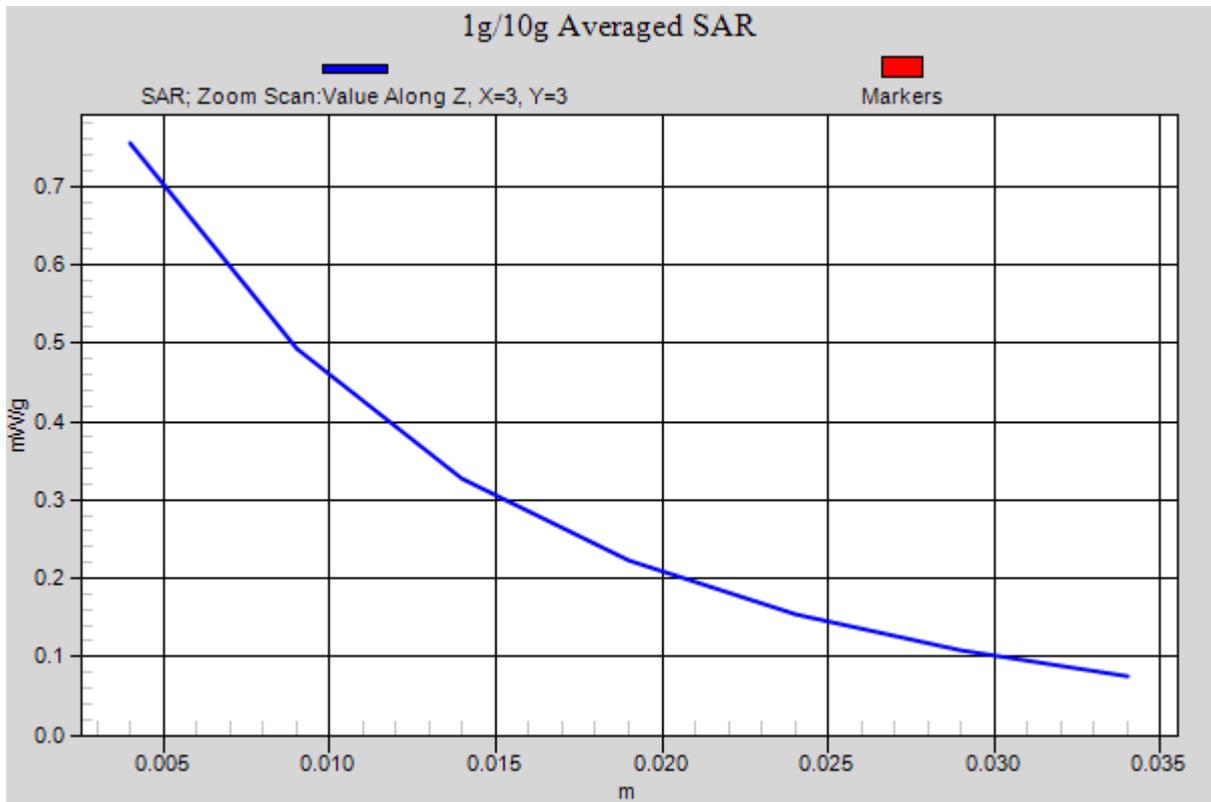


Figure 18 Z-Scan at power reference point [GSM 850 GPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Channel 128]

GSM 850 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 High

Date/Time: 10/23/2009 2:28:36 PM

Communication System: GSM850 + GPRS(3Up); Frequency: 848.8 MHz; Duty Cycle: 1:2.67

Medium parameters used: $f = 849$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM1; Type: SAM;

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

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

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

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

Reference Value = 32.1 V/m; Power Drift = -0.154 dB

Peak SAR (extrapolated) = 1.73 W/kg

SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.629 mW/g

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

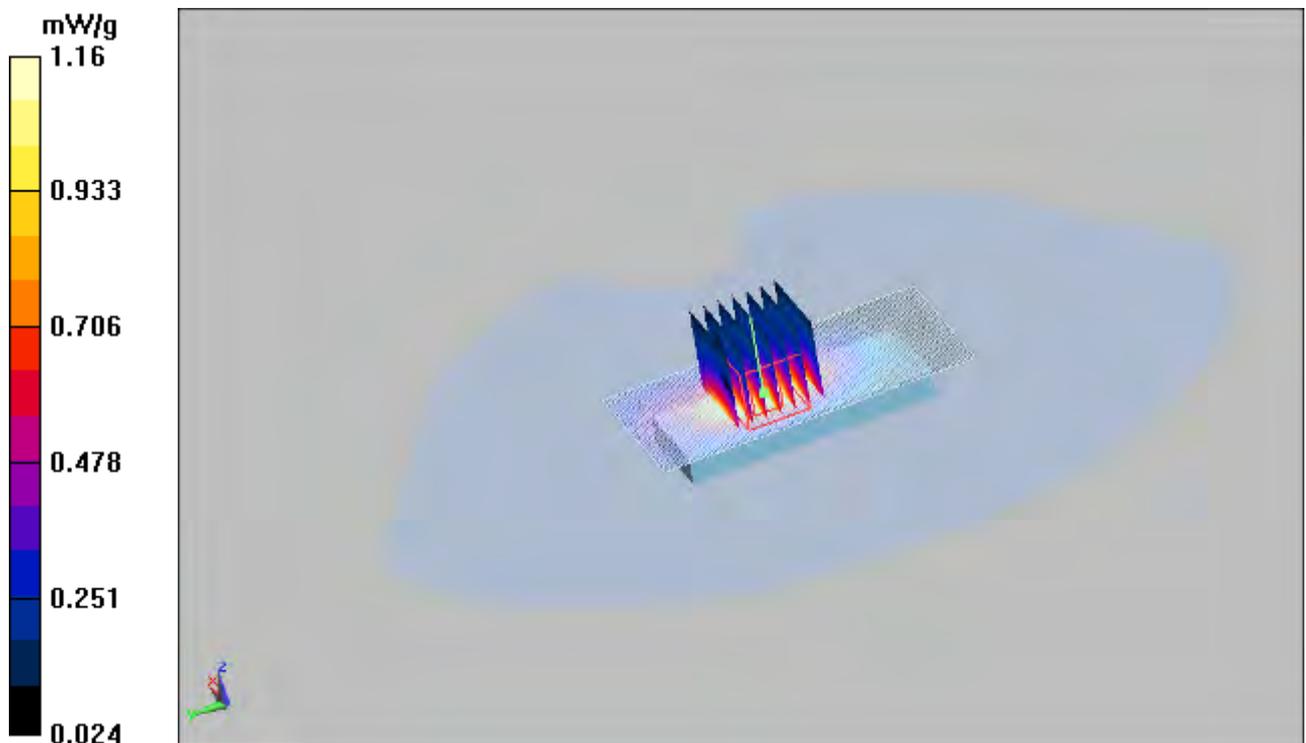


Figure 19 GSM 850 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 251

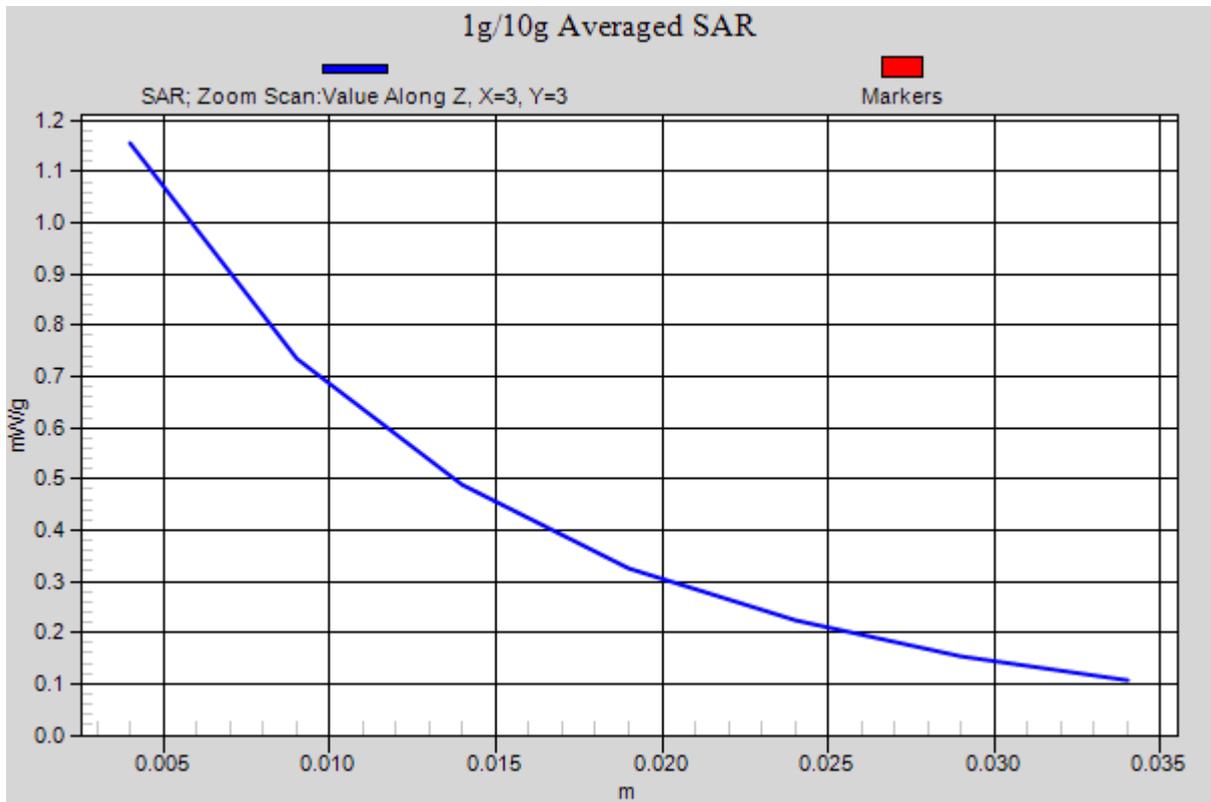


Figure 20 Z-Scan at power reference point [GSM 850 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 251]

GSM 850 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Middle

Date/Time: 10/23/2009 8:47:07 AM

Communication System: GSM850 + GPRS(3Up); Frequency: 836.6 MHz; Duty Cycle: 1:2.67

Medium parameters used: $f = 837$ MHz; $\sigma = 0.995$ mho/m; $\epsilon_r = 54.6$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM1; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 0.962 mW/g

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

dz=5mm

Reference Value = 31 V/m; Power Drift = -0.185 dB

Peak SAR (extrapolated) = 1.34 W/kg

SAR(1 g) = 0.842 mW/g; SAR(10 g) = 0.521 mW/g

Maximum value of SAR (measured) = 0.922 mW/g

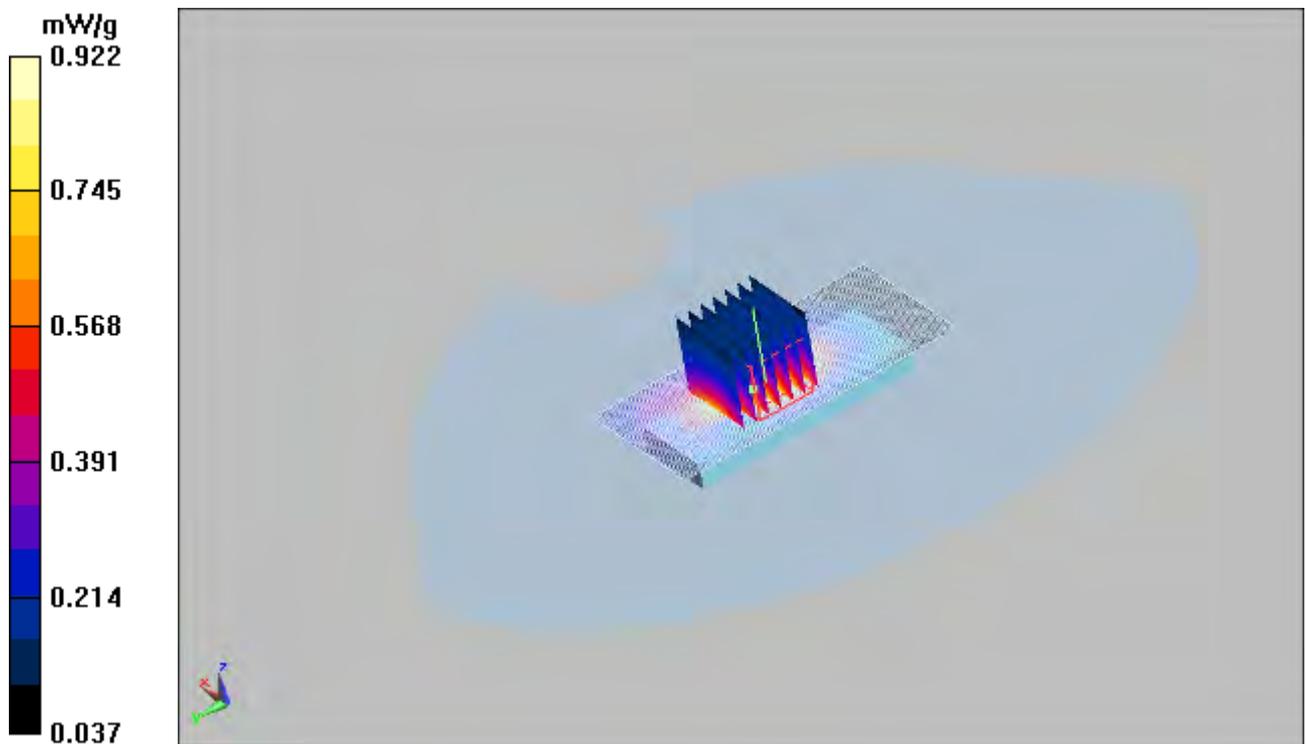


Figure 21 GSM 850 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 190

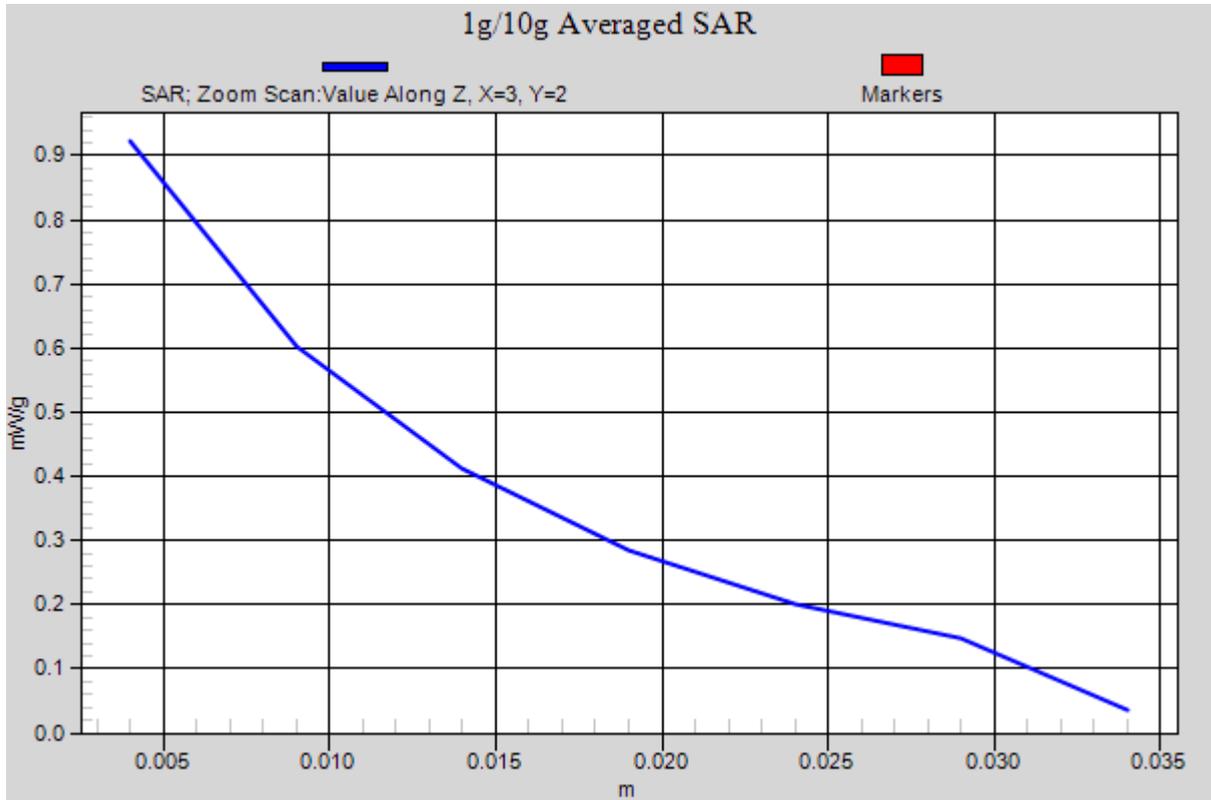


Figure 22 Z-Scan at power reference point [GSM 850 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel190]

GSM 850 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Low

Date/Time: 10/23/2009 2:06:09 PM

Communication System: GSM850 + GPRS(3Up); Frequency: 824.2 MHz; Duty Cycle: 1:2.67

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.984$ mho/m; $\epsilon_r = 54.8$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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) = 0.919 mW/g

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

Reference Value = 28.8 V/m; Power Drift = -0.132 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.830 mW/g; SAR(10 g) = 0.504 mW/g

Maximum value of SAR (measured) = 0.914 mW/g

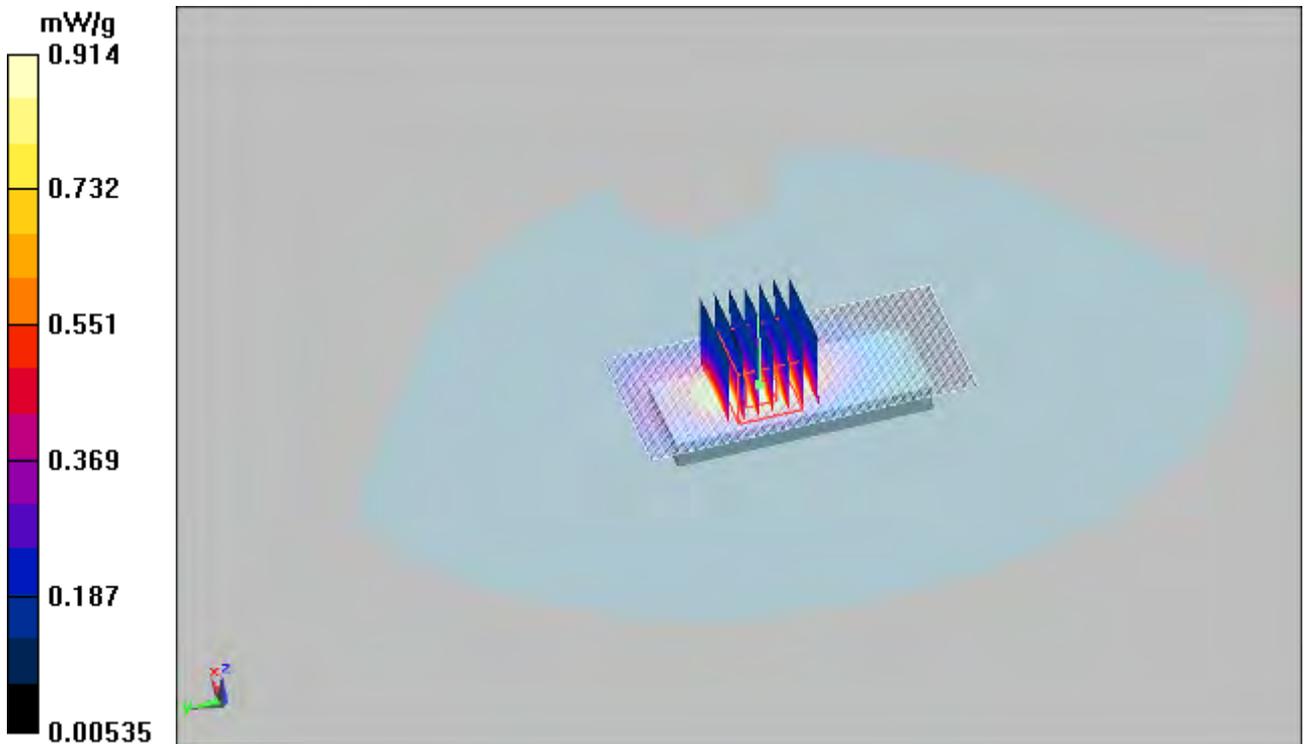


Figure 23 GSM 850 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 128

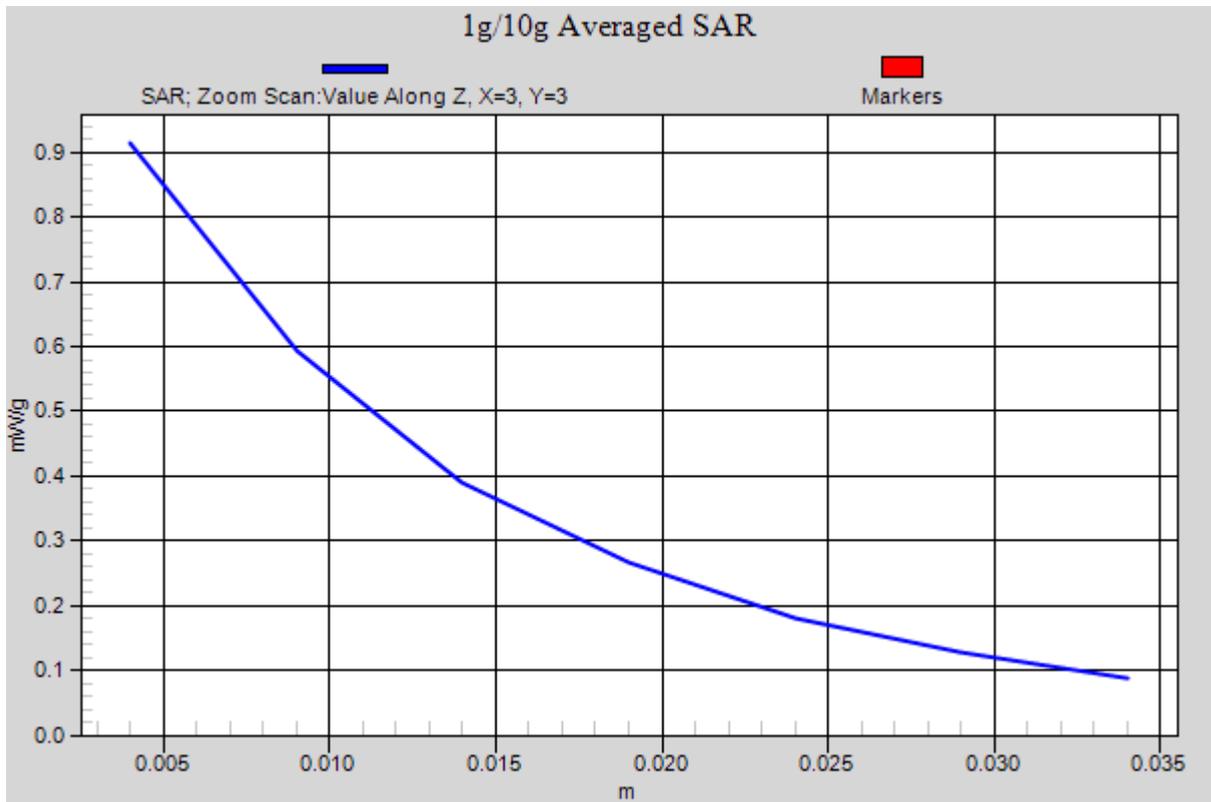


Figure 24 Z-Scan at power reference point [GSM 850 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 128]

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

Date/Time: 10/23/2009 1:20:38 PM

Communication System: GSM850 + GPRS(2Up); Frequency: 848.8 MHz; Duty Cycle: 1:4

Medium parameters used: $f = 849$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM1; Type: SAM;

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

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

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

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

Reference Value = 31 V/m; Power Drift = -0.155 dB

Peak SAR (extrapolated) = 1.91 W/kg

SAR(1 g) = 0.970 mW/g; SAR(10 g) = 0.581 mW/g

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

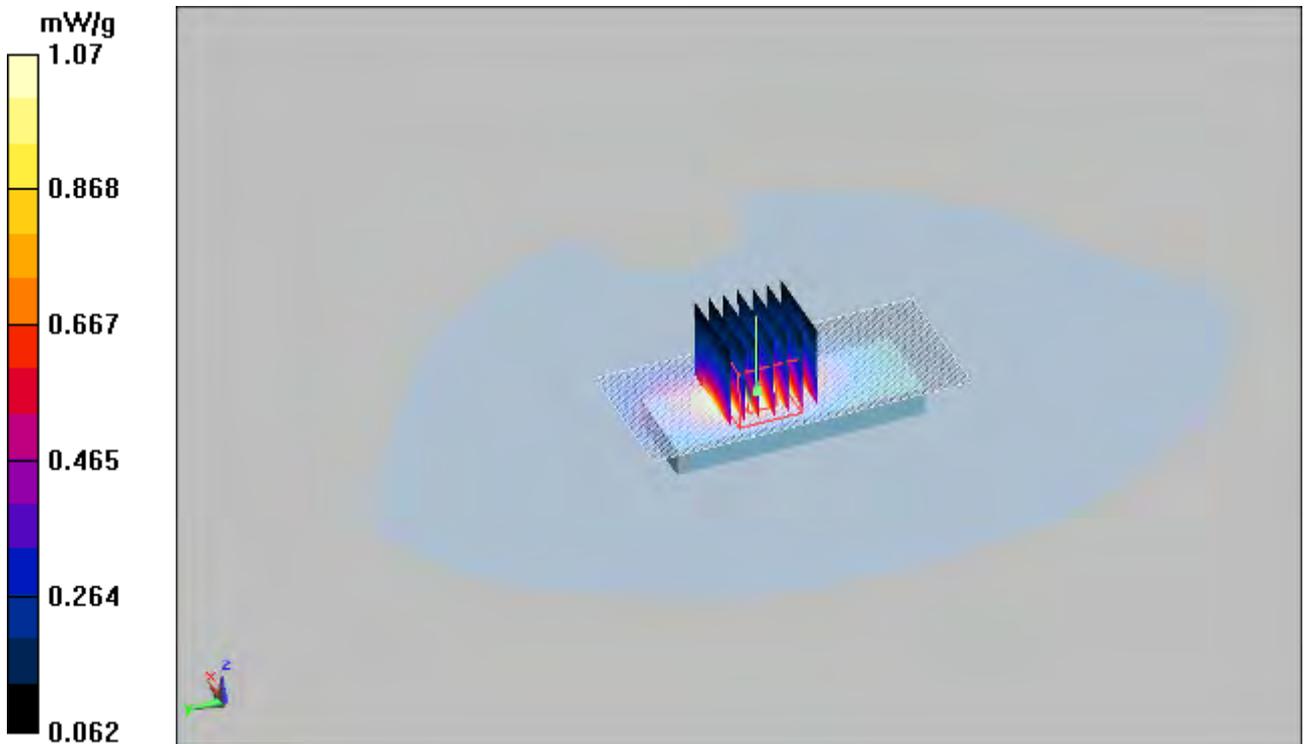


Figure 25 GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 251

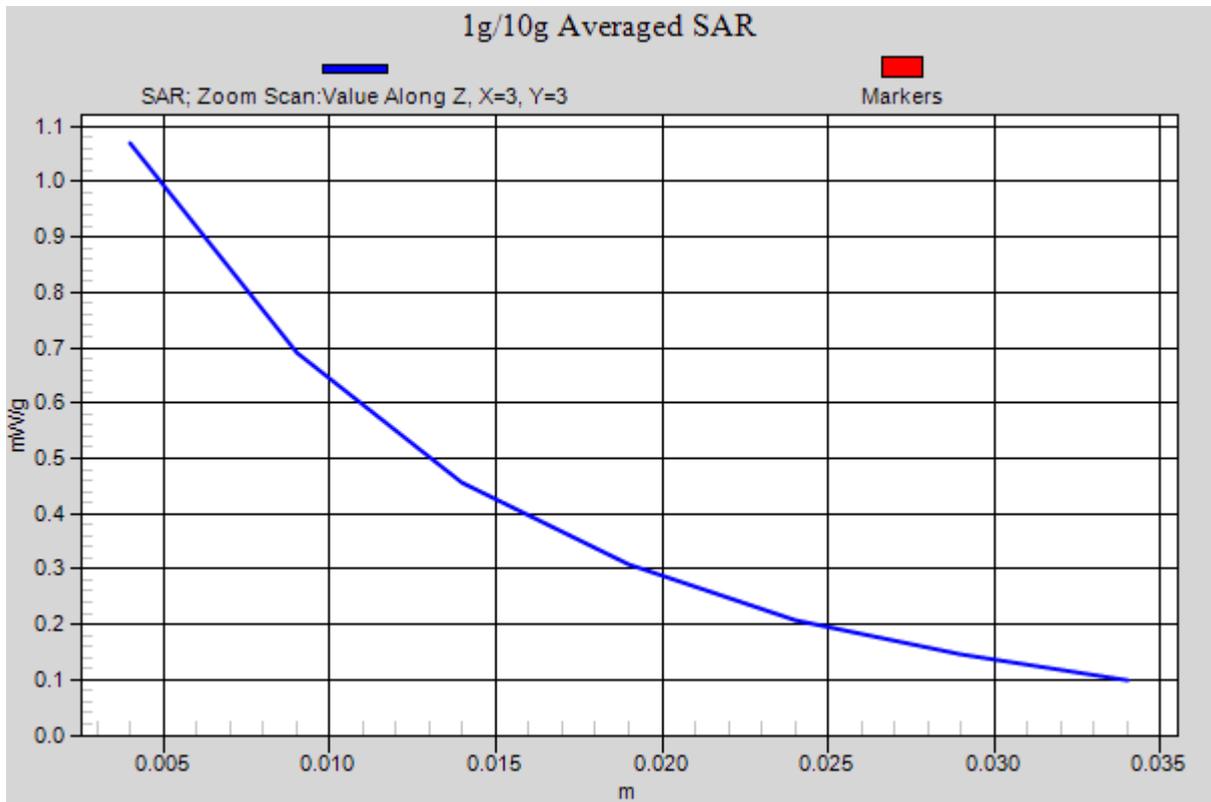


Figure 26 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 251]

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

Date/Time: 10/23/2009 9:31:14 AM

Communication System: GSM850 + GPRS(2Up); Frequency: 836.6 MHz; Duty Cycle: 1:4

Medium parameters used: $f = 837$ MHz; $\sigma = 0.995$ mho/m; $\epsilon_r = 54.6$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM1; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 0.903 mW/g

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

dz=5mm

Reference Value = 25.6 V/m; Power Drift = 0.168 dB

Peak SAR (extrapolated) = 1.34 W/kg

SAR(1 g) = 0.825 mW/g; SAR(10 g) = 0.498 mW/g

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

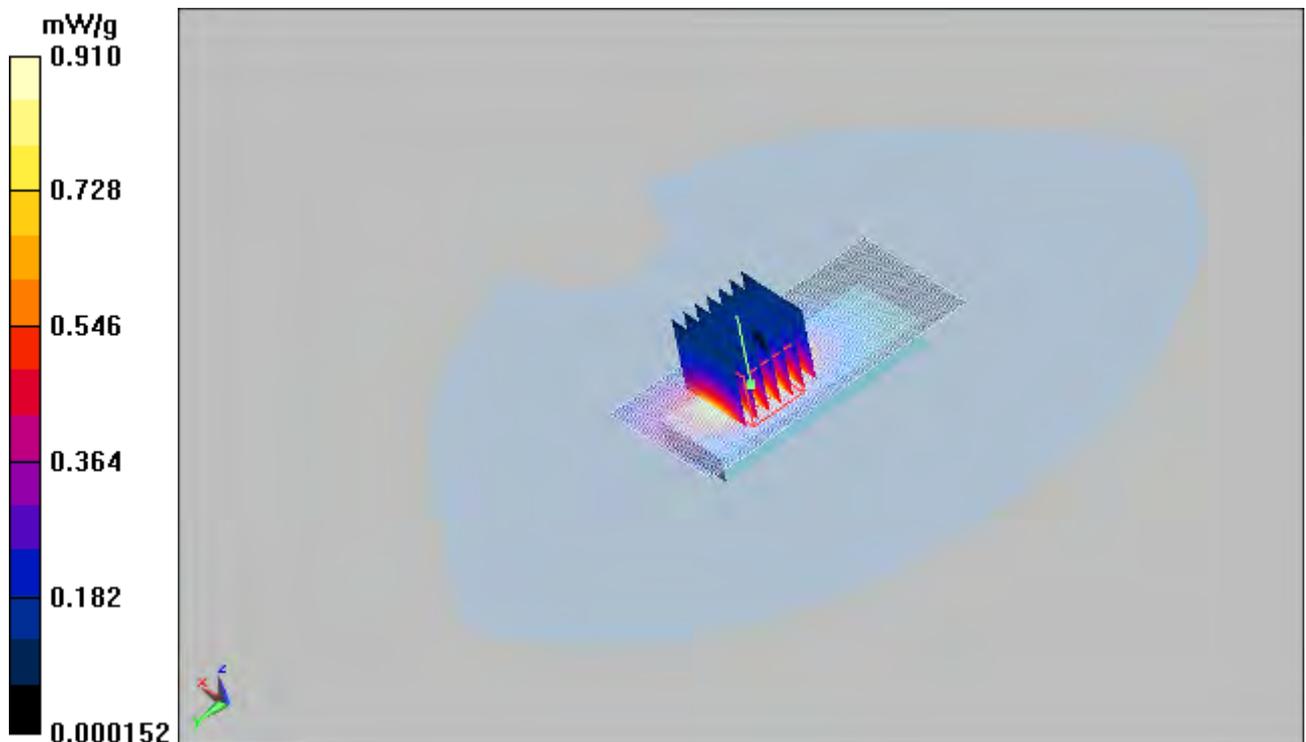


Figure 27 GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 190

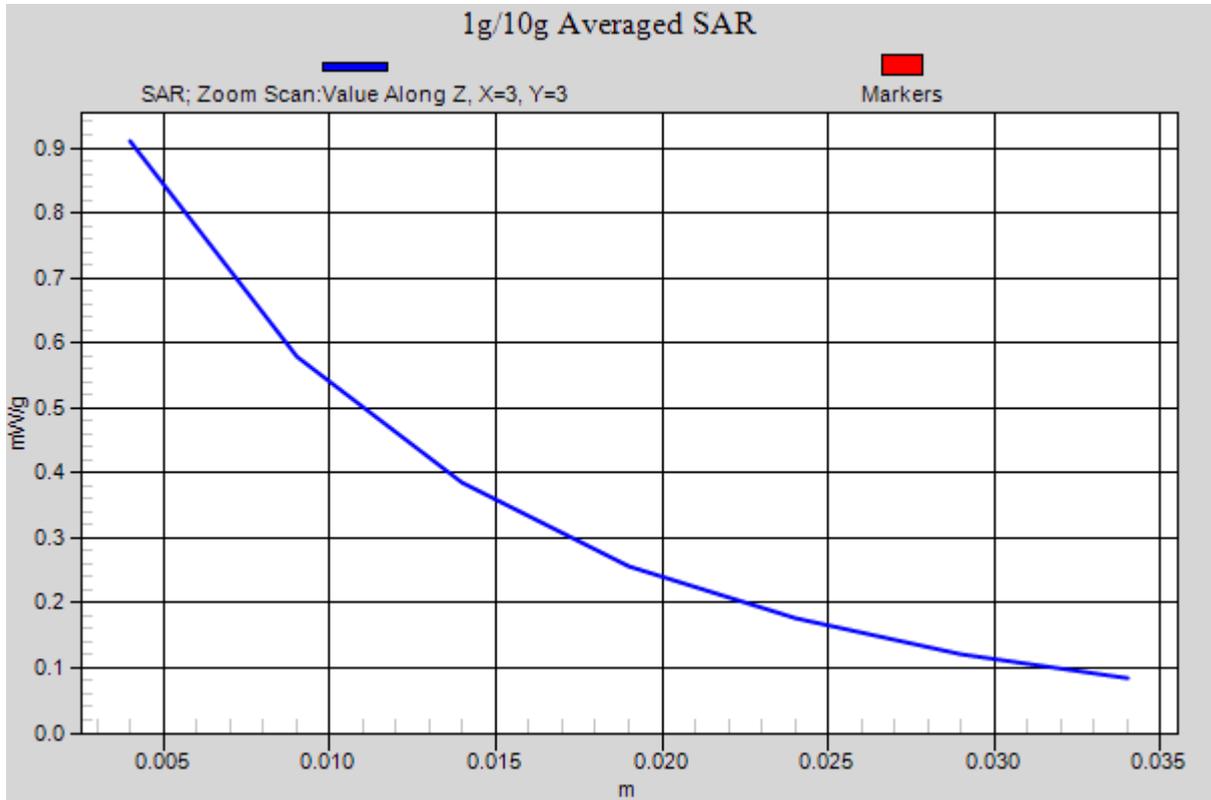


Figure 28 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel190]

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

Date/Time: 10/23/2009 1:42:52 PM

Communication System: GSM850 + GPRS(2Up); Frequency: 824.2 MHz; Duty Cycle: 1:4

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.984$ mho/m; $\epsilon_r = 54.8$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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) = 0.790 mW/g

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

Reference Value = 26.1 V/m; Power Drift = 0.146 dB

Peak SAR (extrapolated) = 1.17 W/kg

SAR(1 g) = 0.728 mW/g; SAR(10 g) = 0.442 mW/g

Maximum value of SAR (measured) = 0.797 mW/g

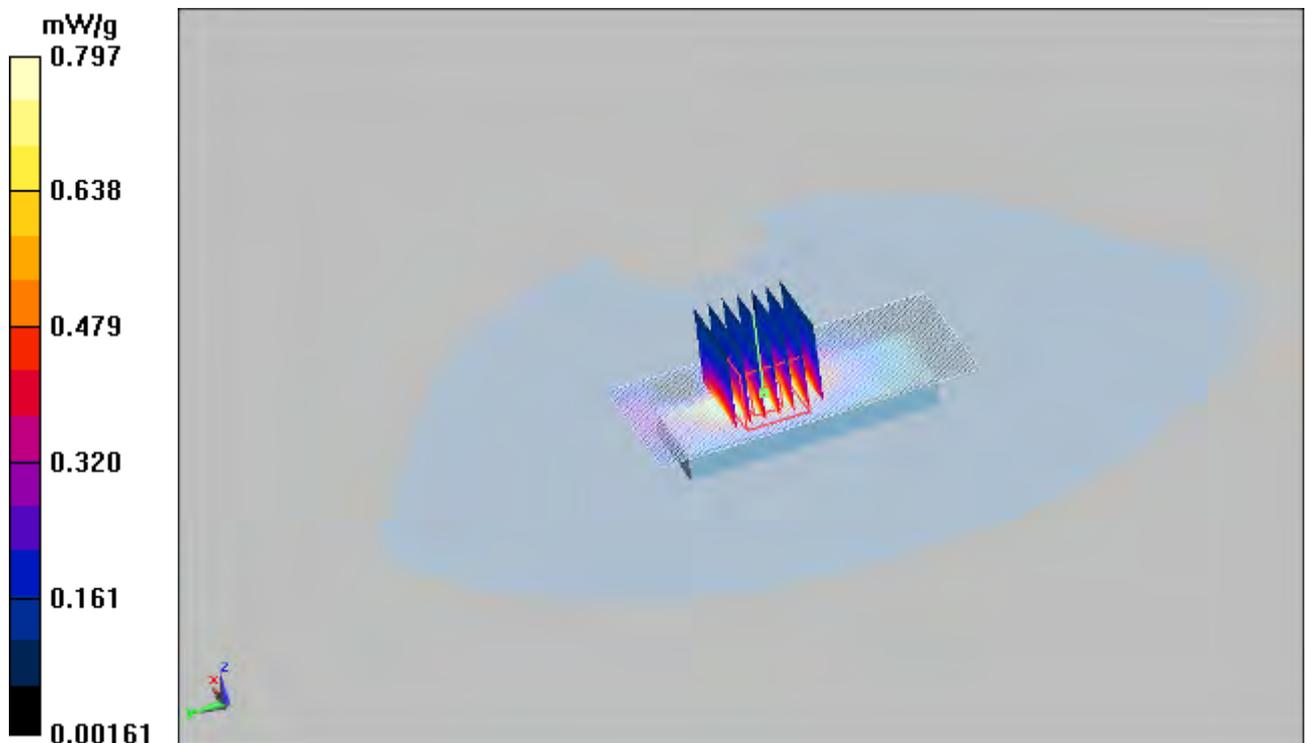


Figure 29 GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 128

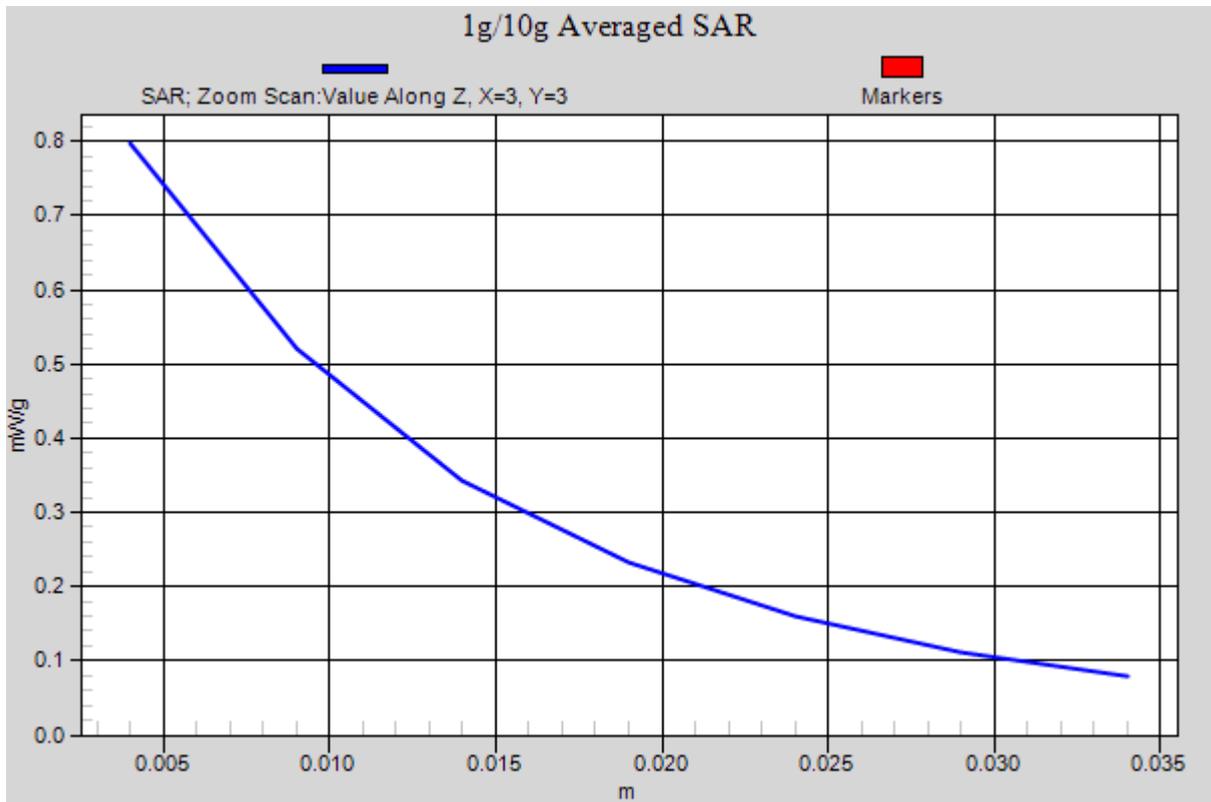


Figure 30 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 128]

GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 High

Date/Time: 10/23/2009 12:55:34 PM

Communication System: GSM850 + GPRS(1Up); Frequency: 848.8 MHz; Duty Cycle: 1:8

Medium parameters used: $f = 849$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM1; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 1.2 mW/g

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

Reference Value = 32.3 V/m; Power Drift = -0.084 dB

Peak SAR (extrapolated) = 1.97 W/kg

SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.646 mW/g

Maximum value of SAR (measured) = 1.19 mW/g

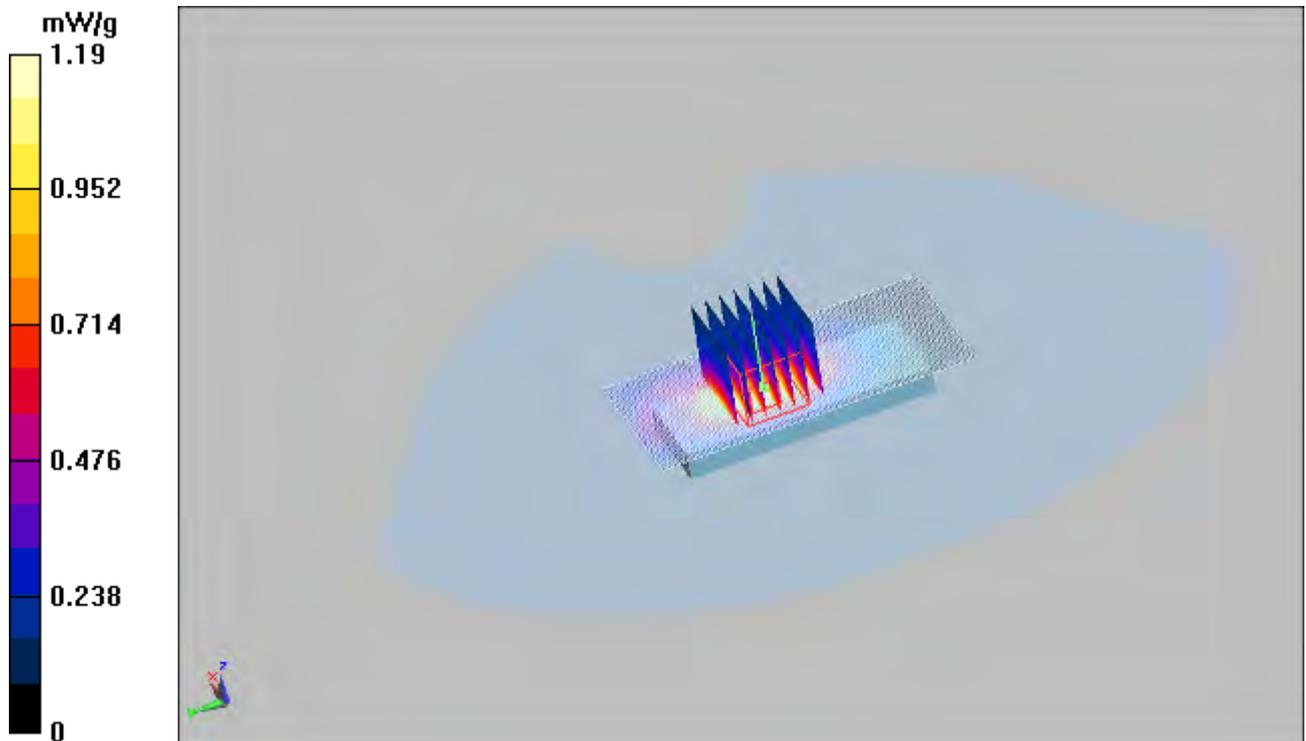


Figure 31 GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 251

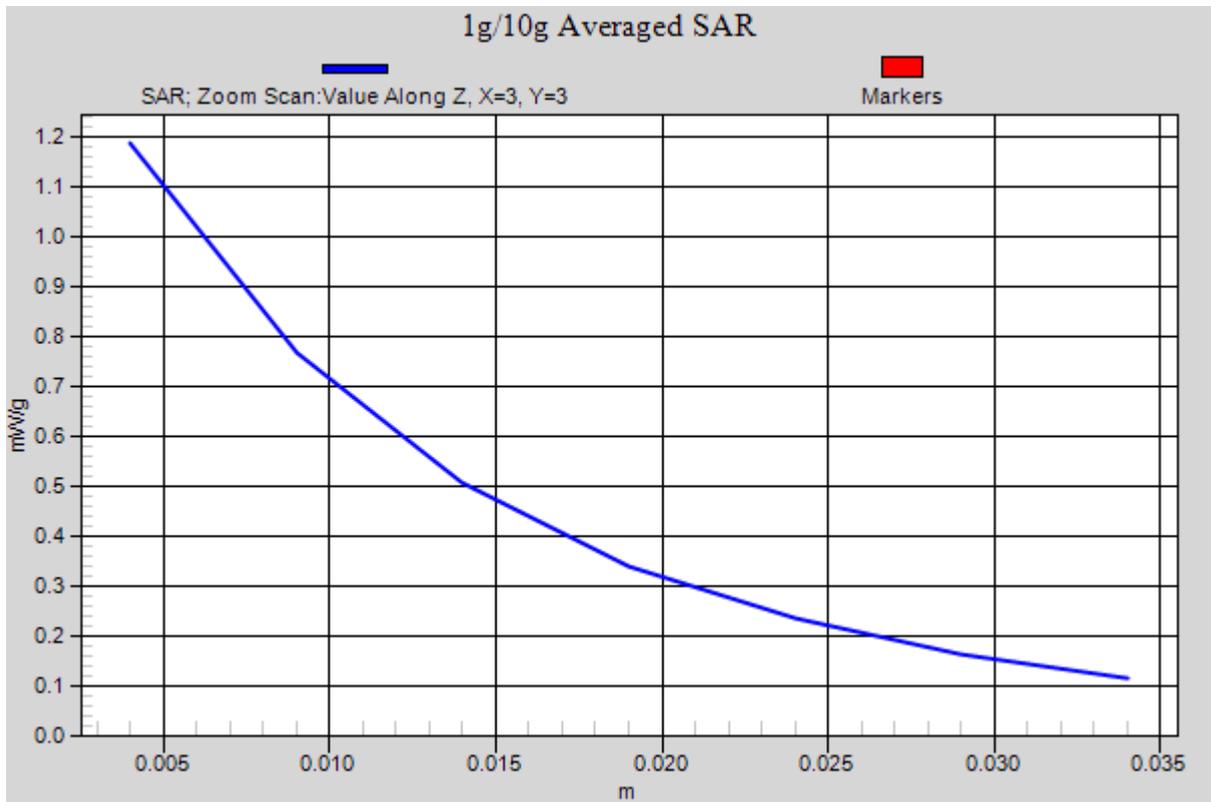


Figure 32 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with IBM T61
Test Position 1 Channel 251]

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

Date/Time: 10/23/2009 9:54:51 AM

Communication System: GSM850 + GPRS(1Up); Frequency: 836.6 MHz; Duty Cycle: 1:8

Medium parameters used: $f = 837$ MHz; $\sigma = 0.995$ mho/m; $\epsilon_r = 54.6$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM1; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 0.960 mW/g

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

dz=5mm

Reference Value = 26.5 V/m; Power Drift = 0.193 dB

Peak SAR (extrapolated) = 1.41 W/kg

SAR(1 g) = 0.882 mW/g; SAR(10 g) = 0.534 mW/g

Maximum value of SAR (measured) = 0.969 mW/g

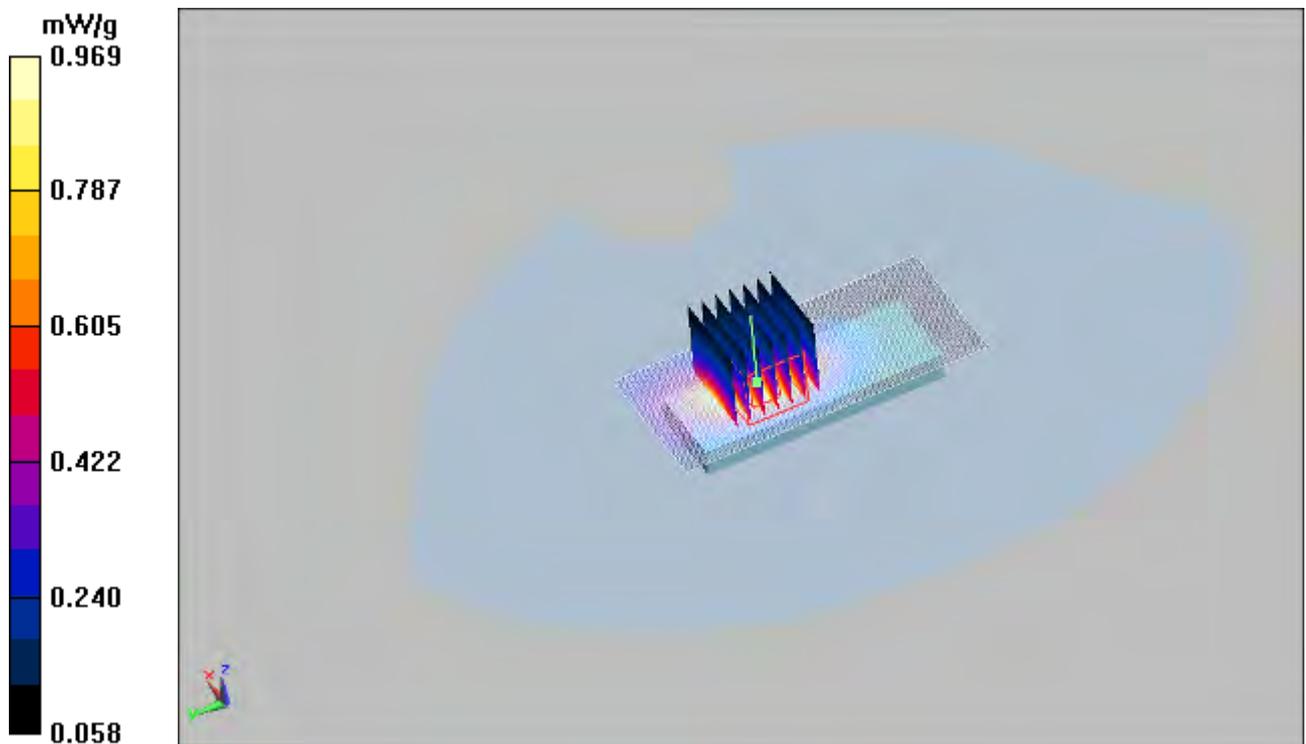


Figure 33 GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 190

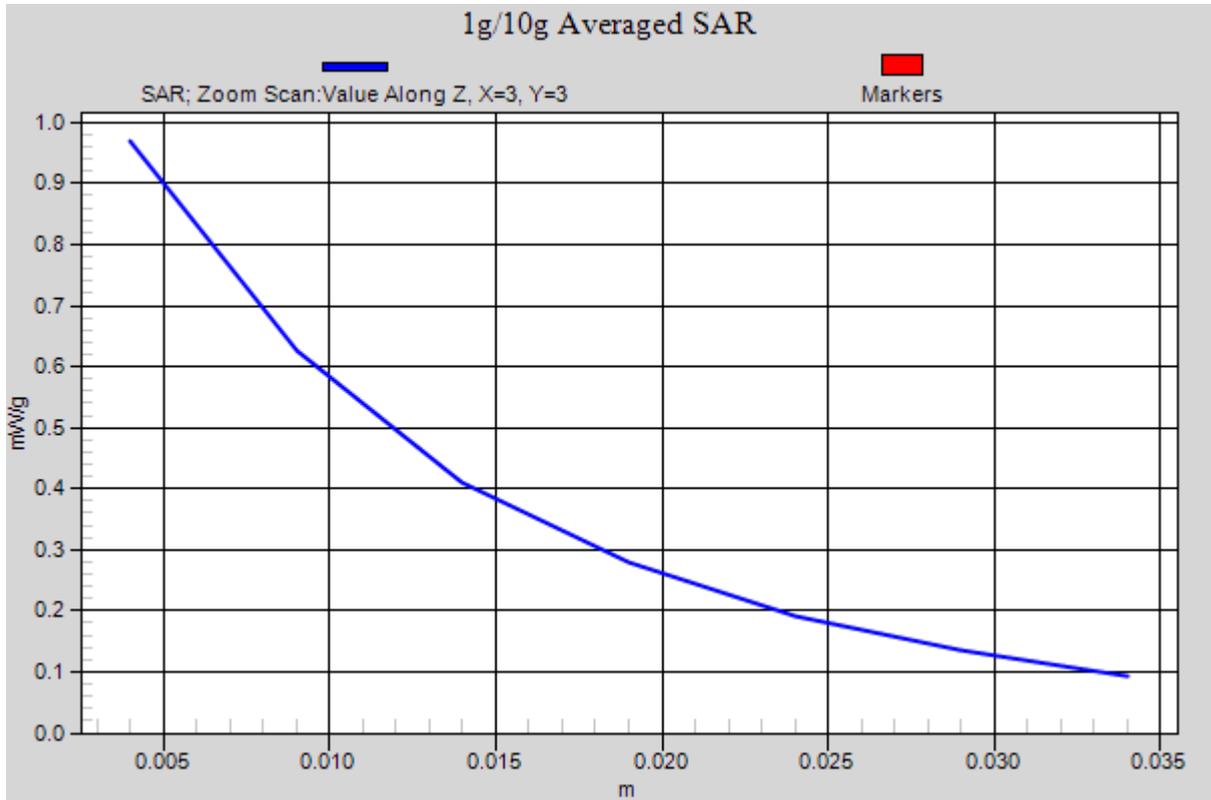


Figure 34 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel190]

GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Low

Date/Time: 10/23/2009 12:33:15 PM

Communication System: GSM850 + GPRS(1Up); Frequency: 824.2 MHz; Duty Cycle: 1:8

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.984$ mho/m; $\epsilon_r = 54.8$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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) = 0.844 mW/g

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

Reference Value = 27.5 V/m; Power Drift = -0.169 dB

Peak SAR (extrapolated) = 1.2 W/kg

SAR(1 g) = 0.755 mW/g; SAR(10 g) = 0.459 mW/g

Maximum value of SAR (measured) = 0.826 mW/g

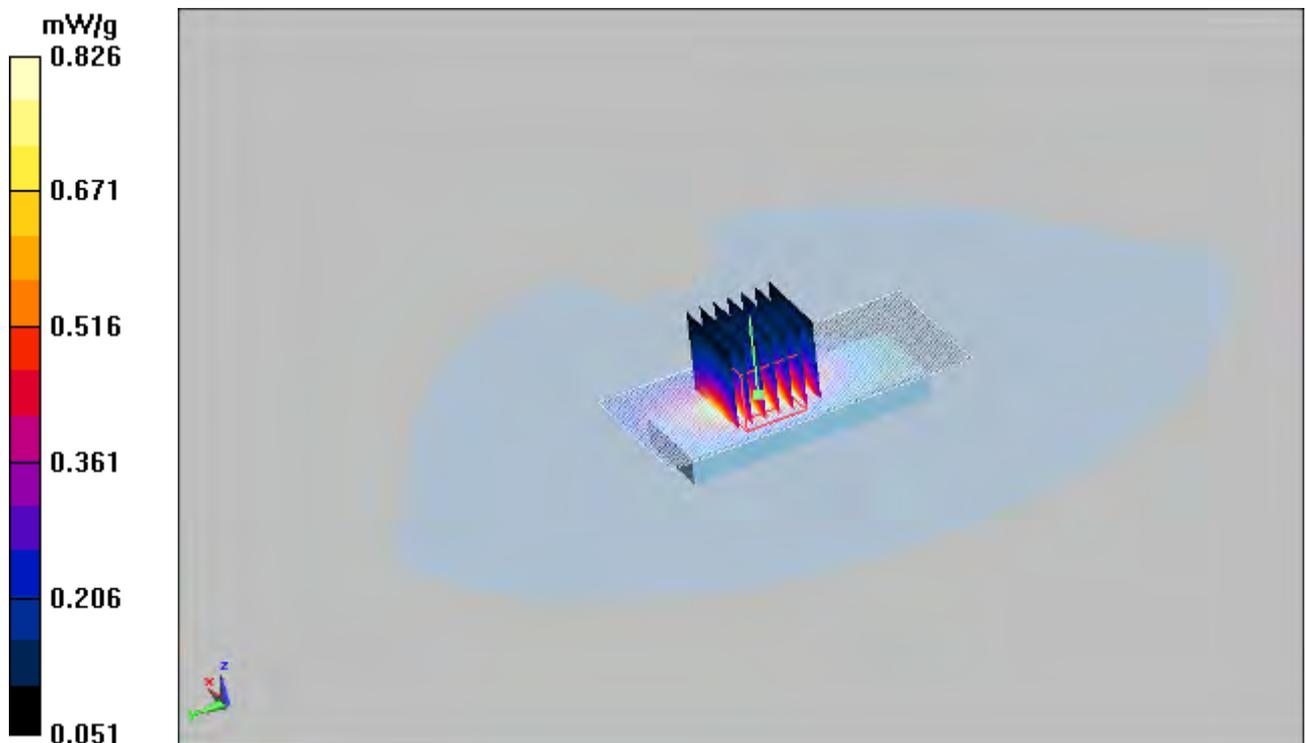


Figure 35 GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 128

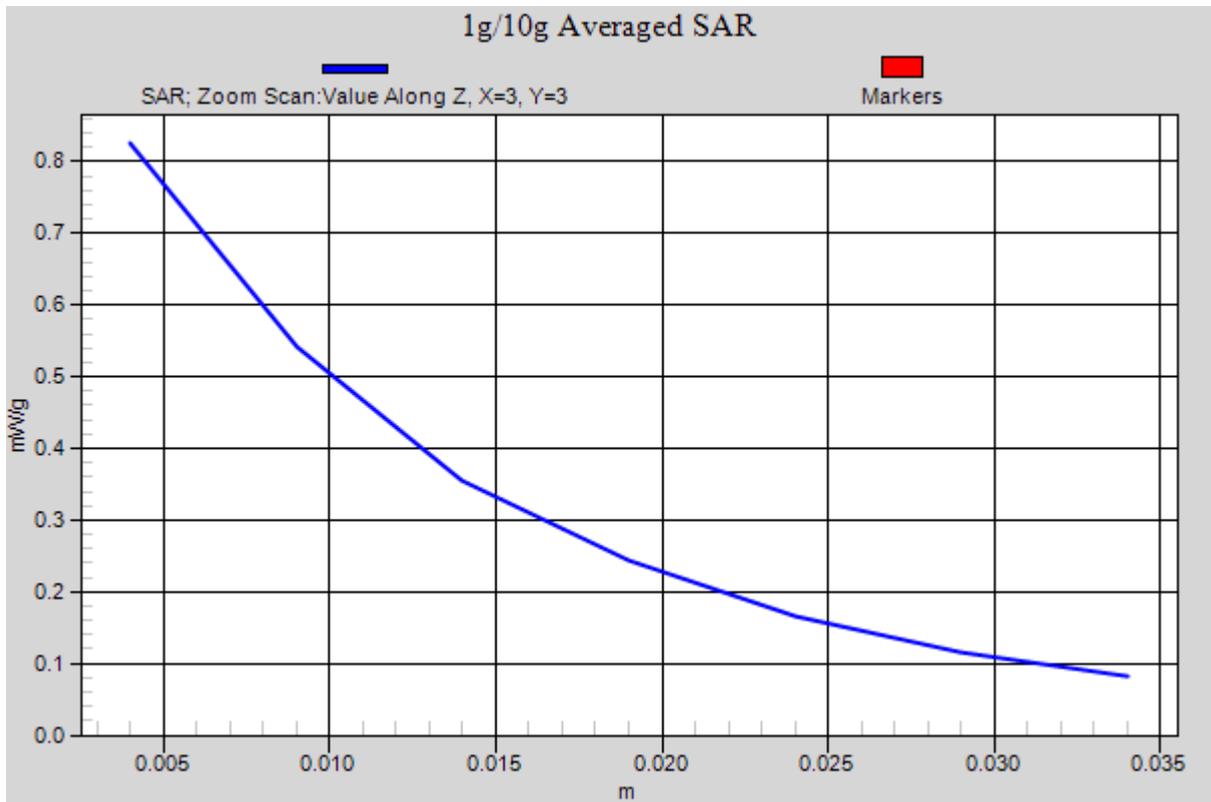


Figure 36 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 128]

GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 2 Middle

Date/Time: 10/23/2009 11:32:44 AM

Communication System: GSM850 + GPRS(1Up); Frequency: 836.6 MHz; Duty Cycle: 1:8

Medium parameters used: $f = 837$ MHz; $\sigma = 0.995$ mho/m; $\epsilon_r = 54.6$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM1; Type: SAM;

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

Test Position 2 Middle/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.081 mW/g

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

Reference Value = 10.2 V/m; Power Drift = -0.153 dB

Peak SAR (extrapolated) = 0.296 W/kg

SAR(1 g) = 0.082 mW/g; SAR(10 g) = 0.033 mW/g

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

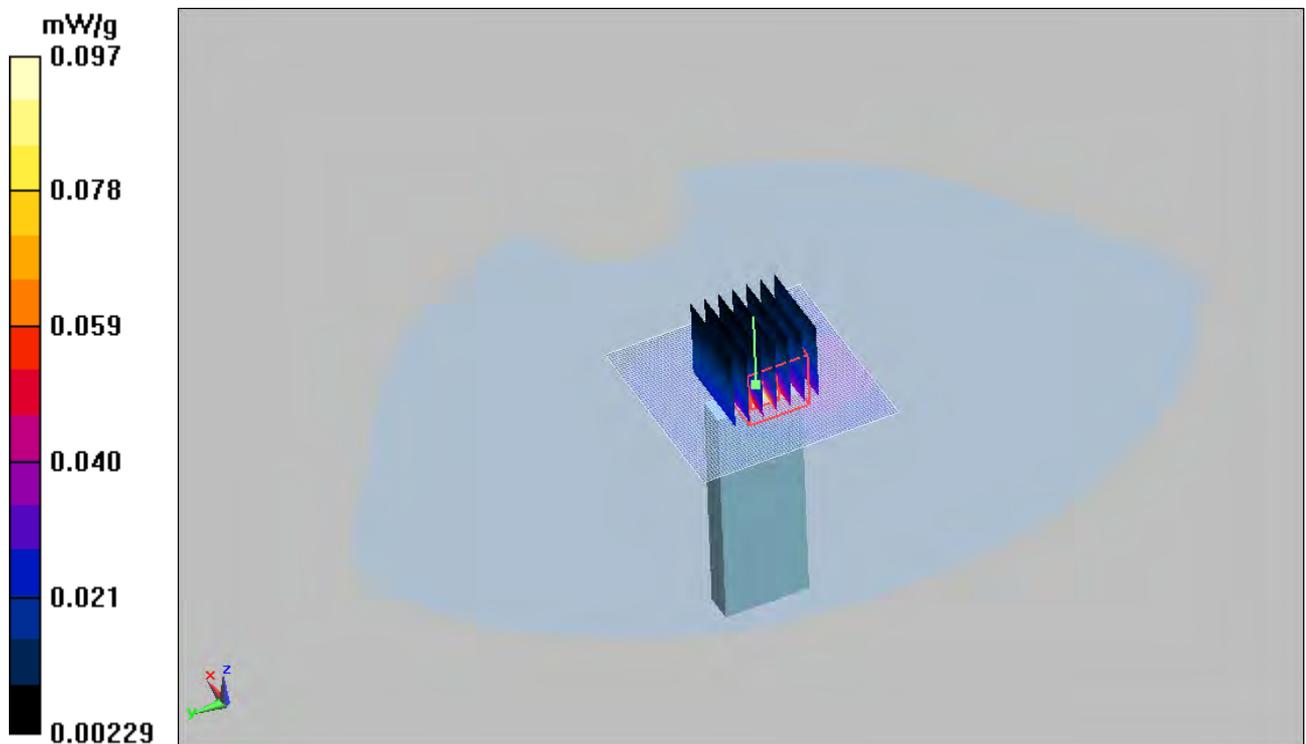


Figure 37 GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 2 Channel 190

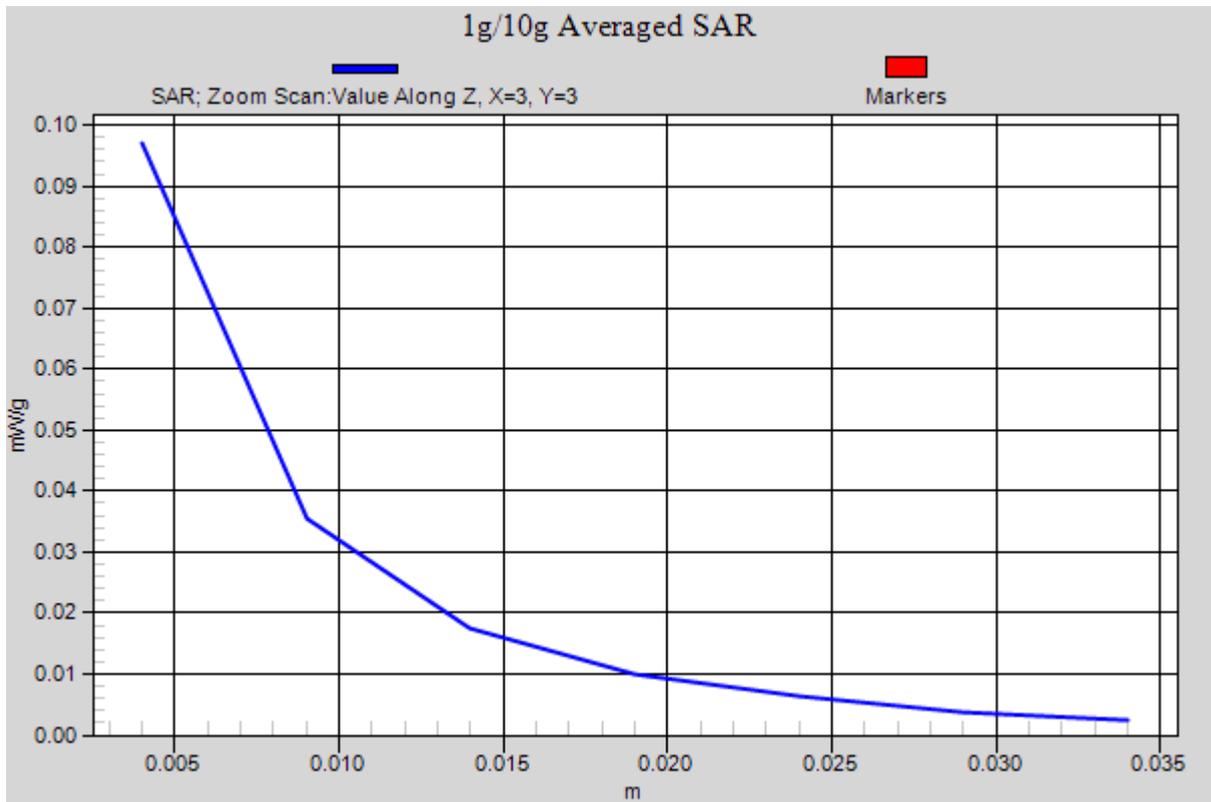


Figure 38 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with IBM T61
Test Position 2 Channel 190]

GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 3 Middle

Date/Time: 10/23/2009 10:48:13 AM

Communication System: GSM850 + GPRS(1Up); Frequency: 836.6 MHz; Duty Cycle: 1:8

Medium parameters used: $f = 837$ MHz; $\sigma = 0.995$ mho/m; $\epsilon_r = 54.6$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM1; Type: SAM;

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

Test Position 3 Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.289 mW/g

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

Reference Value = 16.3 V/m; Power Drift = -0.015 dB

Peak SAR (extrapolated) = 0.388 W/kg

SAR(1 g) = 0.269 mW/g; SAR(10 g) = 0.189 mW/g

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

Test Position 3 Middle/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.3 V/m; Power Drift = -0.015 dB

Peak SAR (extrapolated) = 0.365 W/kg

SAR(1 g) = 0.249 mW/g; SAR(10 g) = 0.176 mW/g

Maximum value of SAR (measured) = 0.272 mW/g

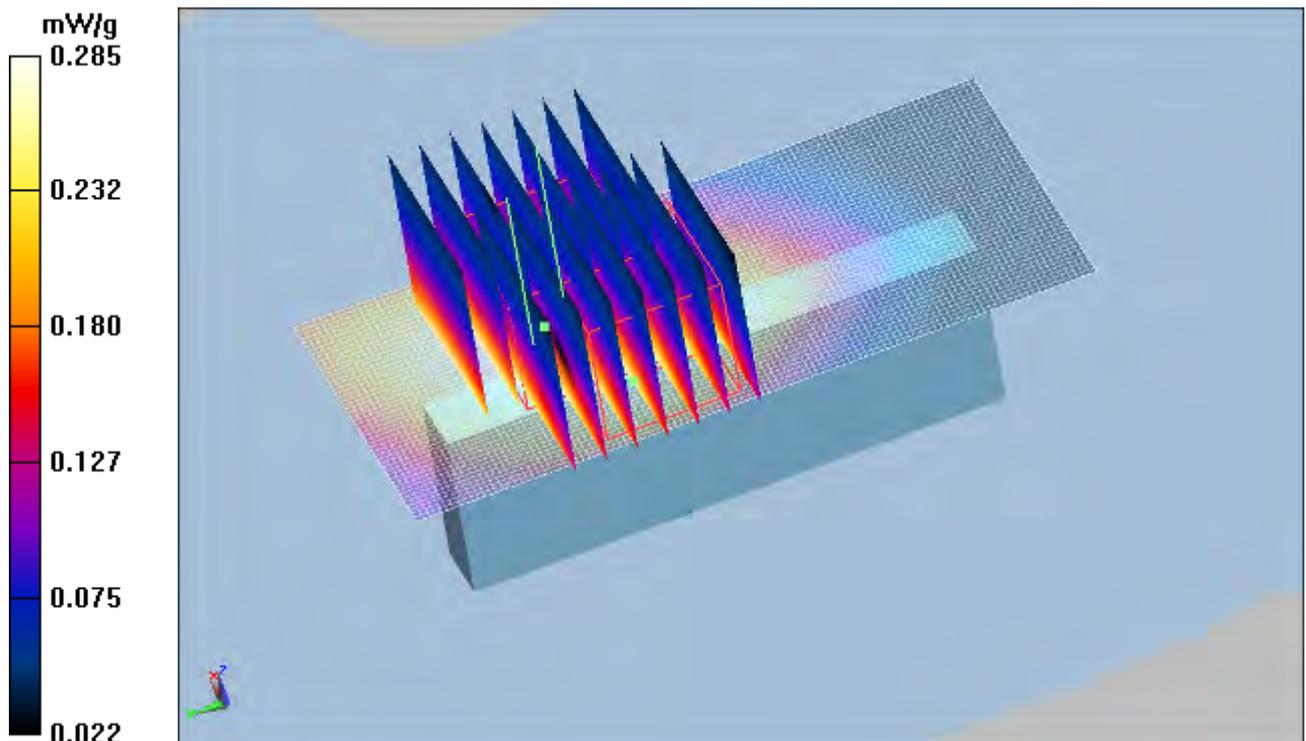


Figure 39 GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 3 Channel 190

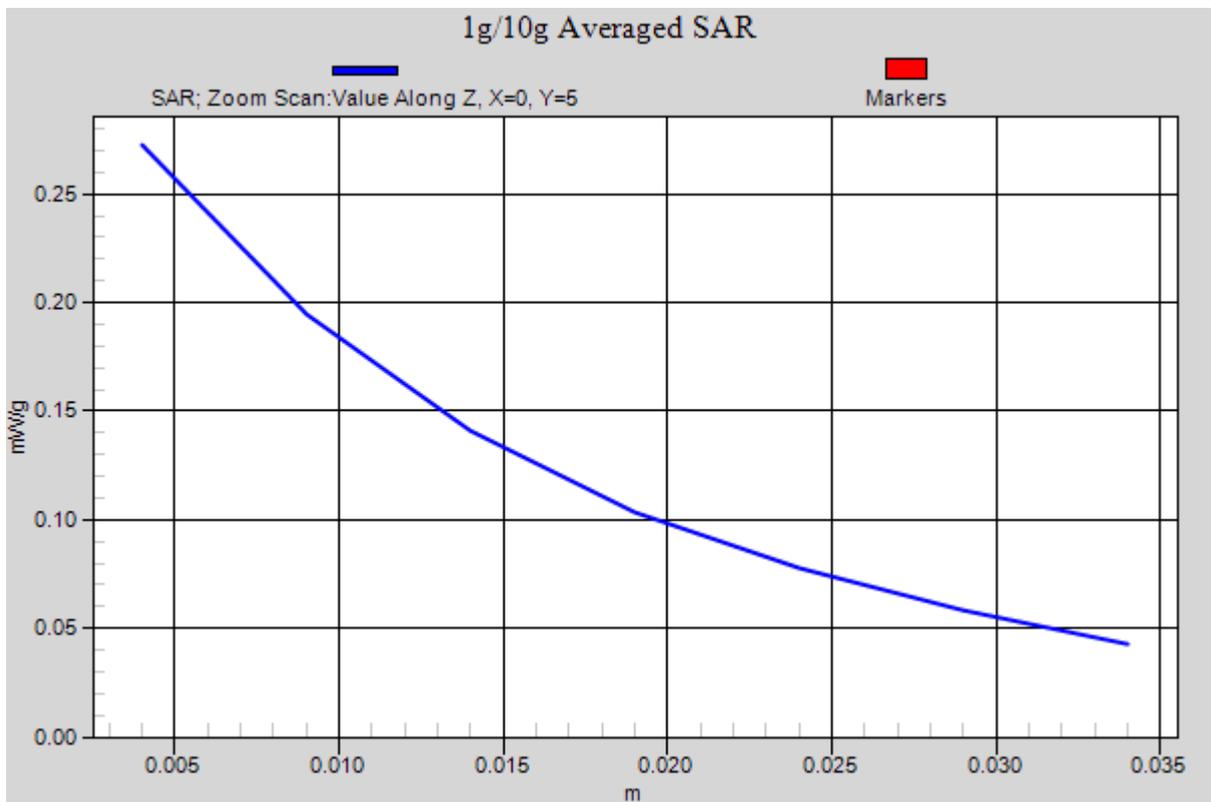
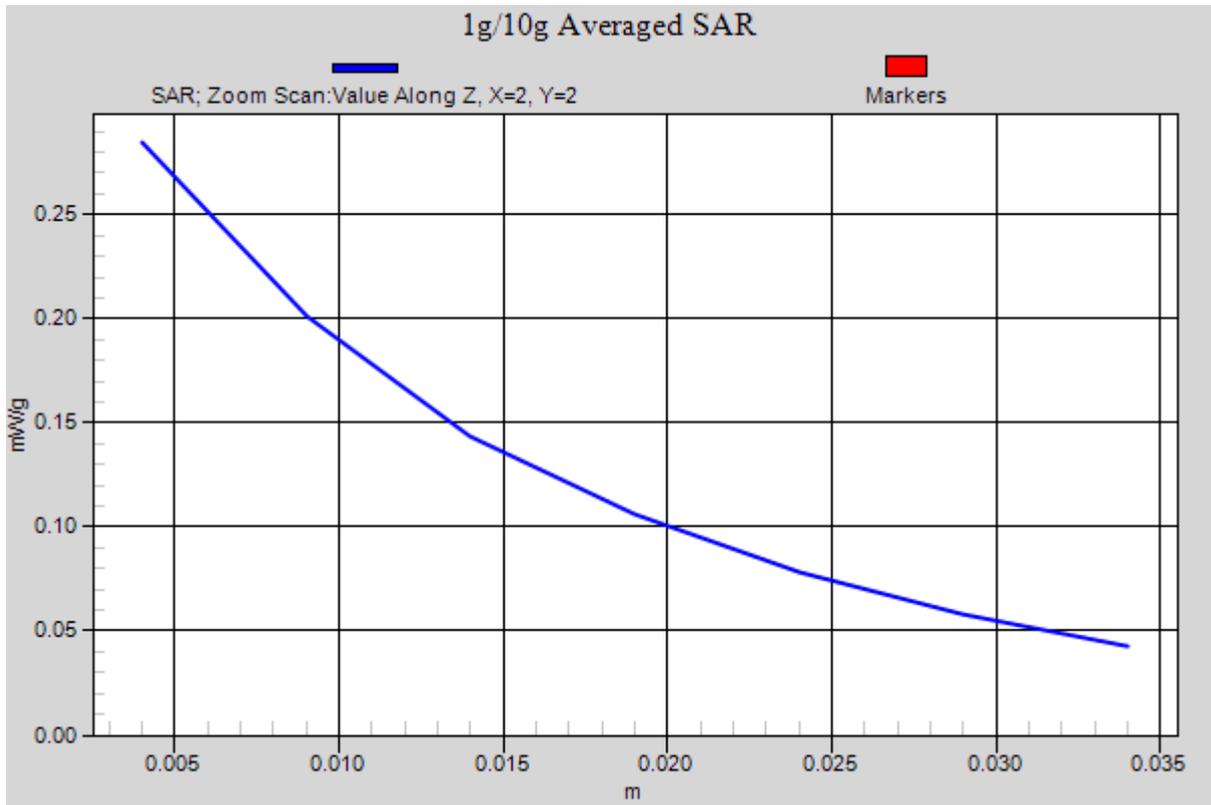


Figure 40 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 3 Channel 190]

GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 4 Middle

Date/Time: 10/23/2009 10:22:20 AM

Communication System: GSM850 + GPRS(1Up); Frequency: 836.6 MHz; Duty Cycle: 1:8

Medium parameters used: $f = 837$ MHz; $\sigma = 0.995$ mho/m; $\epsilon_r = 54.6$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM1; Type: SAM;

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

Test Position 4 Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.542 mW/g

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

Reference Value = 18.1 V/m; Power Drift = -0.123 dB

Peak SAR (extrapolated) = 0.750 W/kg

SAR(1 g) = 0.486 mW/g; SAR(10 g) = 0.305 mW/g

Maximum value of SAR (measured) = 0.530 mW/g

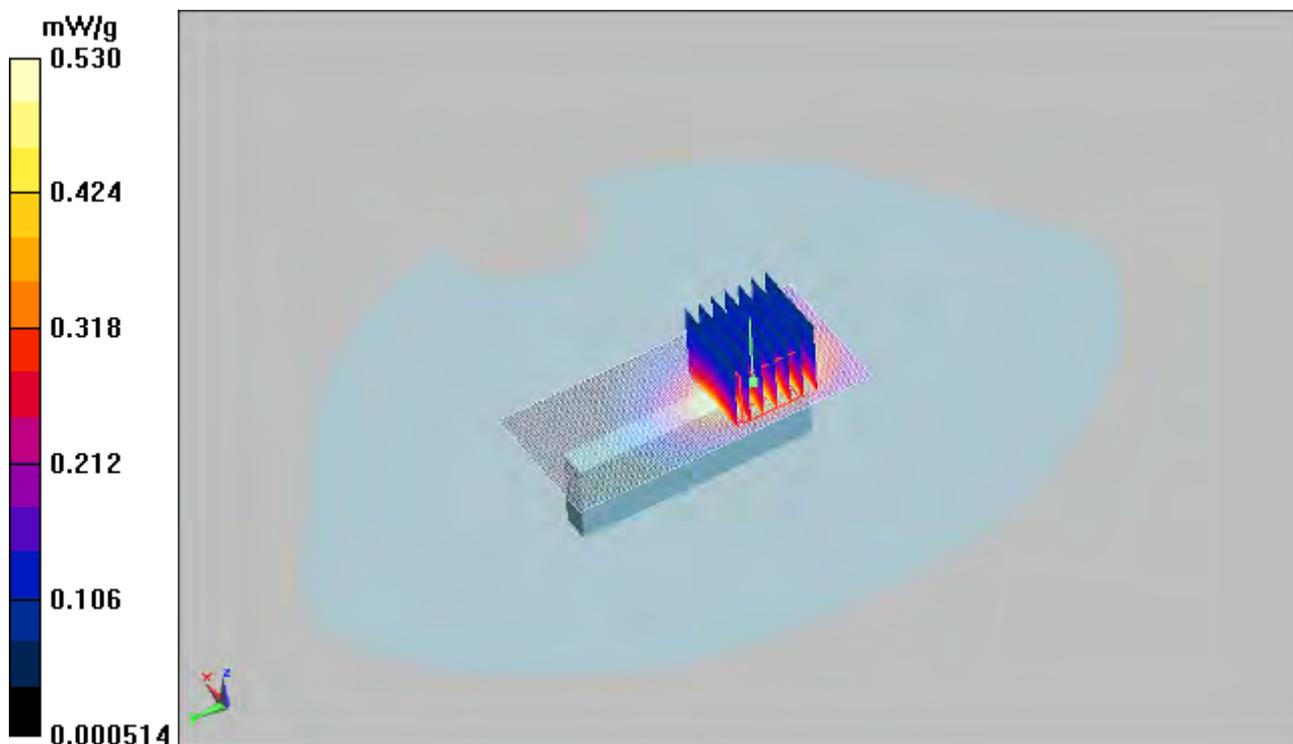


Figure 41 GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 4 Channel 190

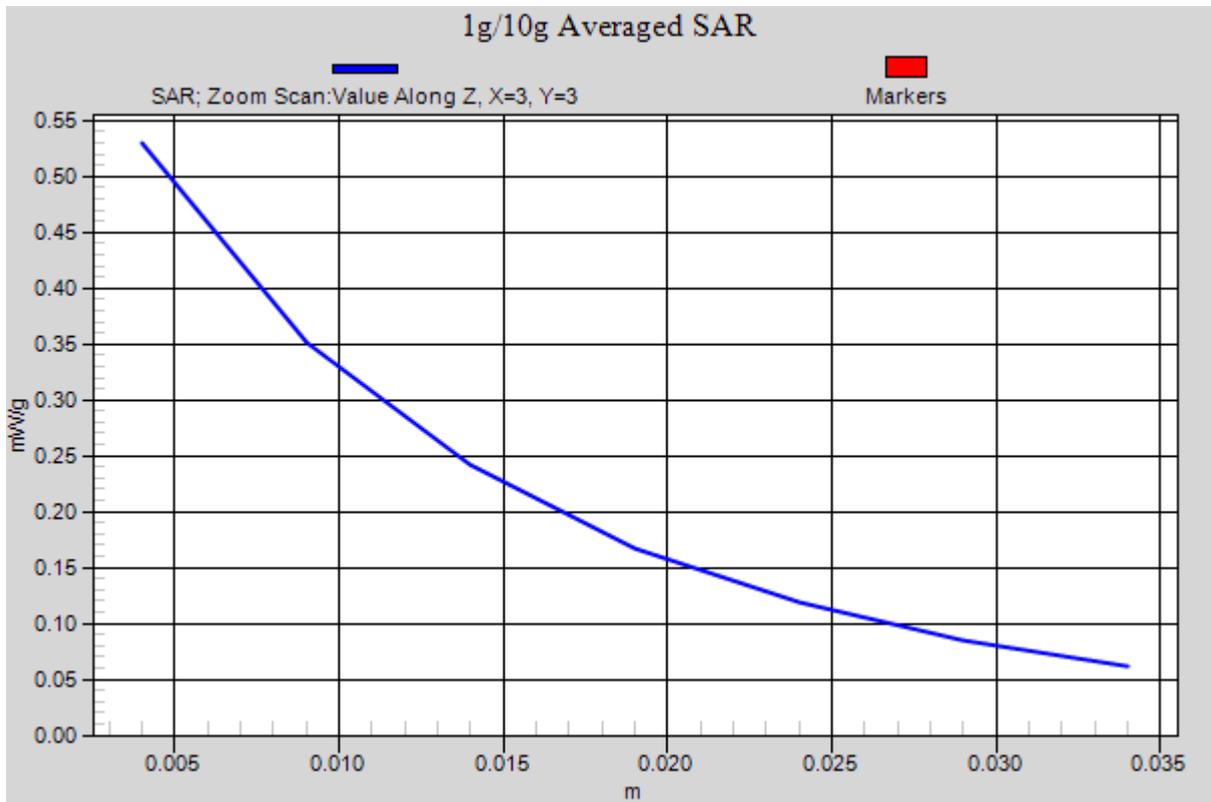


Figure 42 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with IBM T61
Test Position 4 Channel 190]

GSM 850 GPRS (1 timeslot in uplink) with BenQ Joybook R55V Test Position 5 Middle

Date/Time: 10/23/2009 12:07:23 PM

Communication System: GSM850 + GPRS(1Up); Frequency: 836.6 MHz; Duty Cycle: 1:8

Medium parameters used: $f = 837$ MHz; $\sigma = 0.995$ mho/m; $\epsilon_r = 54.6$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM1; Type: SAM;

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

Test Position 5 Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.879 mW/g

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

Reference Value = 25.5 V/m; Power Drift = -0.124 dB

Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.785 mW/g; SAR(10 g) = 0.491 mW/g

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

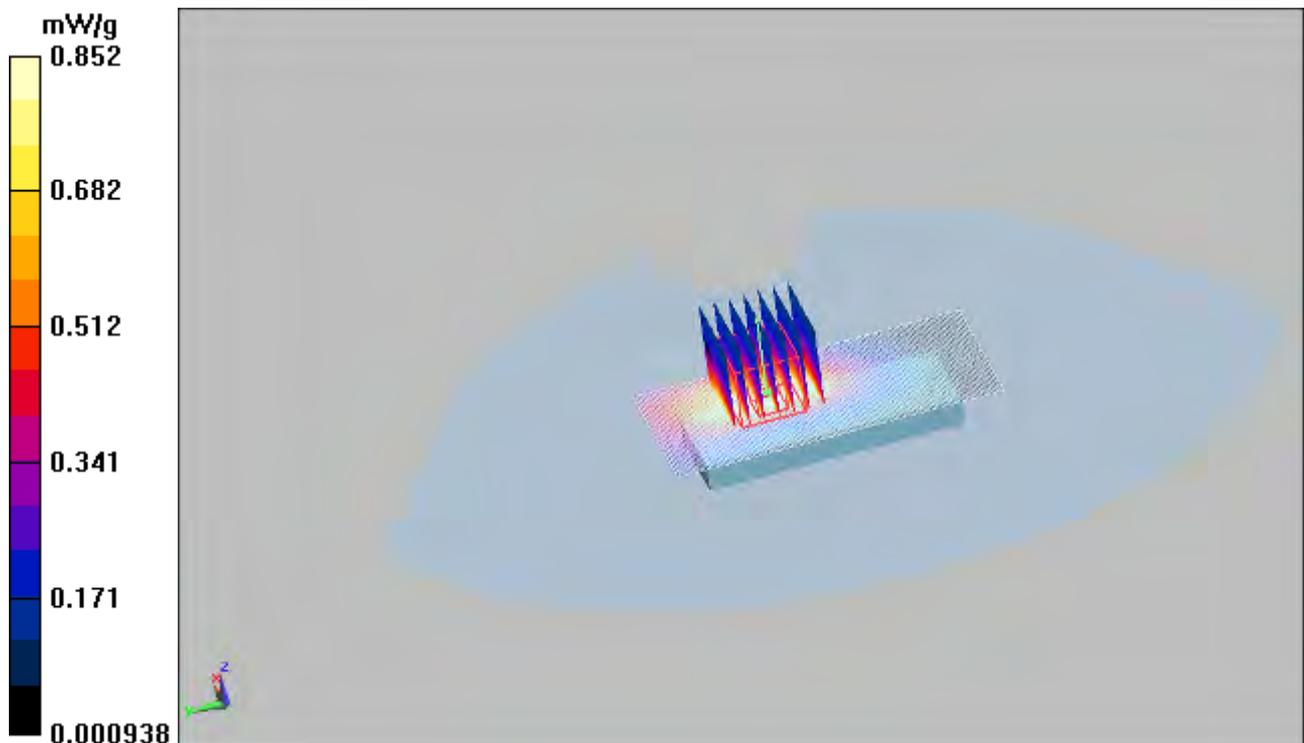


Figure 43 GSM 850 GPRS (1 timeslot in uplink) with BenQ Joybook R55V Test Position 5 Channel 190

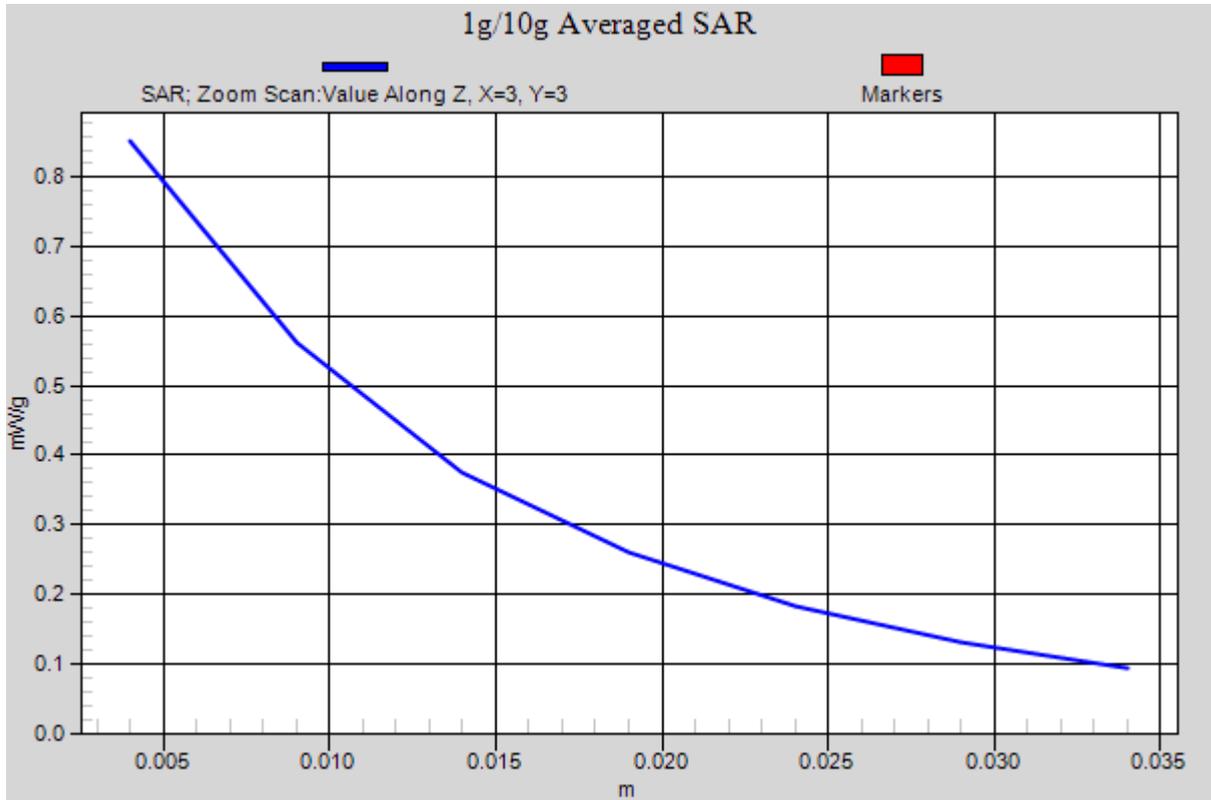


Figure 44 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with BenQ Joybook R55V Test Position 5 Channel 190]

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

Date/Time: 10/23/2009 3:47:44 PM

Communication System: GSM850 + EGPRS(1Up); Frequency: 848.8 MHz; Duty Cycle: 1:8

Medium parameters used: $f = 849$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.5$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(5.83, 5.83, 5.83); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM1; Type: SAM;

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

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

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

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

Reference Value = 28.7 V/m; Power Drift = 0.043 dB

Peak SAR (extrapolated) = 1.52 W/kg

SAR(1 g) = 0.972 mW/g; SAR(10 g) = 0.591 mW/g

Maximum value of SAR (measured) = 1.05 mW/g

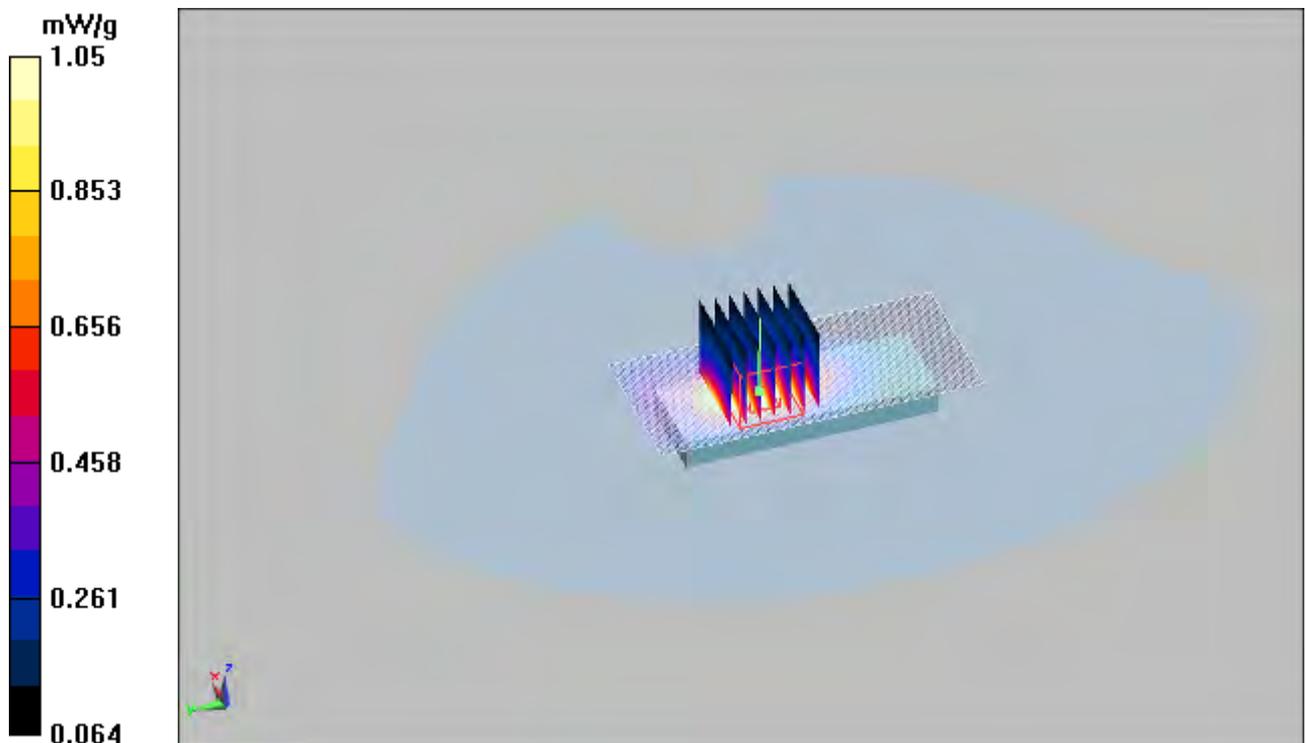


Figure 45 GSM 850 EGPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 251

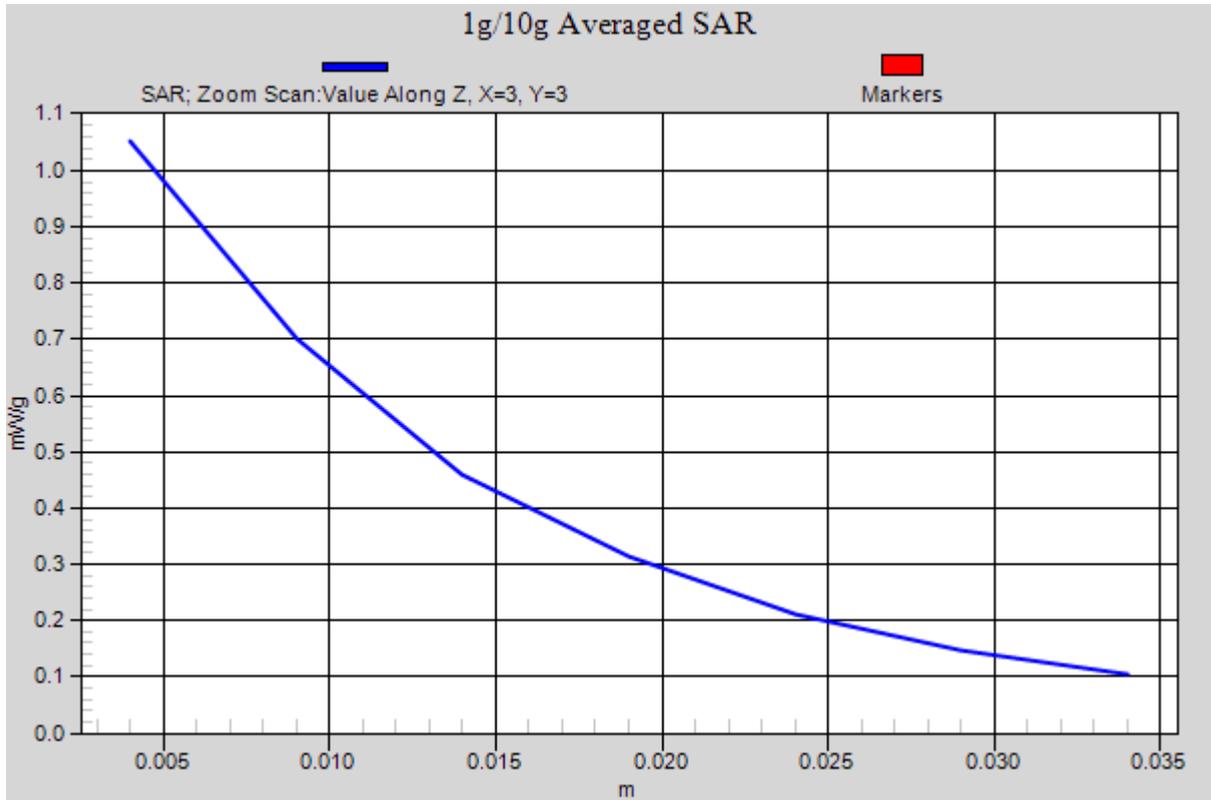


Figure 46 Z-Scan at power reference point [GSM 850 EGPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 251]

GSM 1900 GPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Middle

Date/Time: 10/22/2009 5:05:18 PM

Communication System: GSM 1900+GPRS(4Up); Frequency: 1880 MHz; Duty Cycle: 1:2

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 1 Middle/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.607 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 = 0.044 dB

Peak SAR (extrapolated) = 0.861 W/kg

SAR(1 g) = 0.543 mW/g; SAR(10 g) = 0.312 mW/g

Maximum value of SAR (measured) = 0.599 mW/g

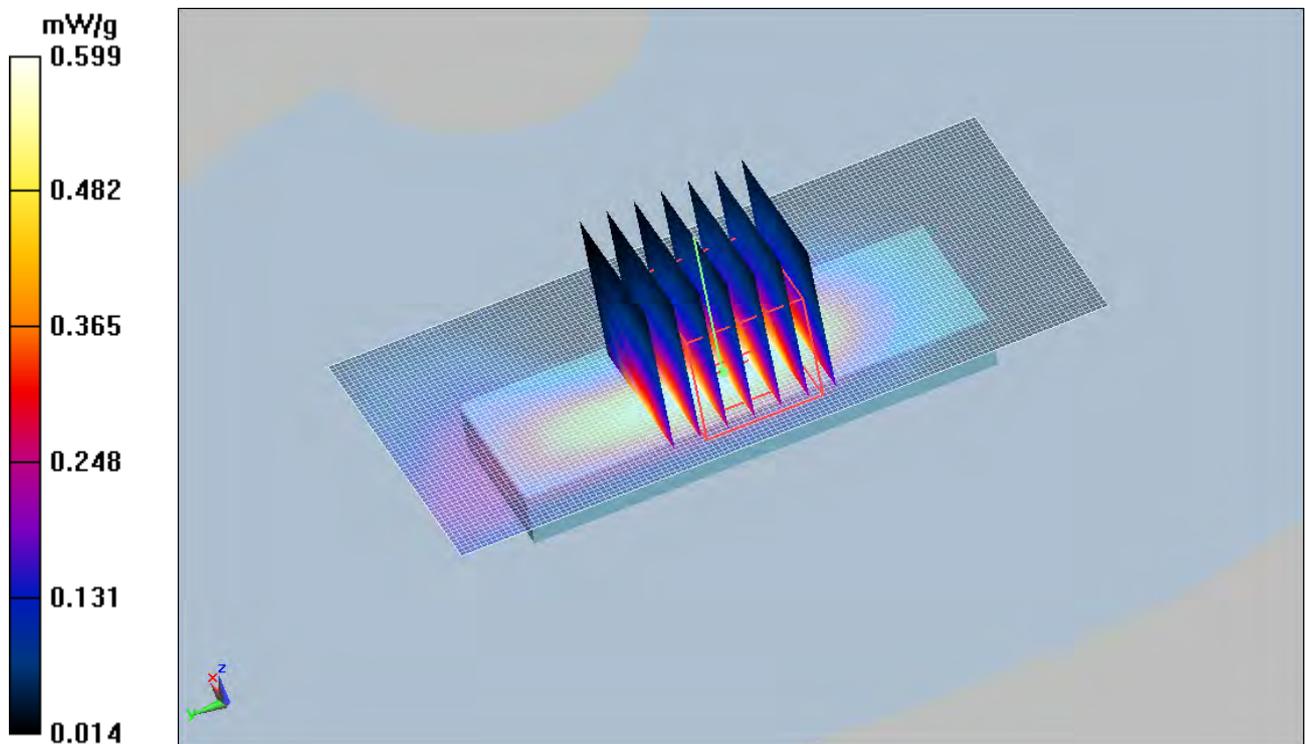


Figure 47 GSM 1900 GPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Channel 661

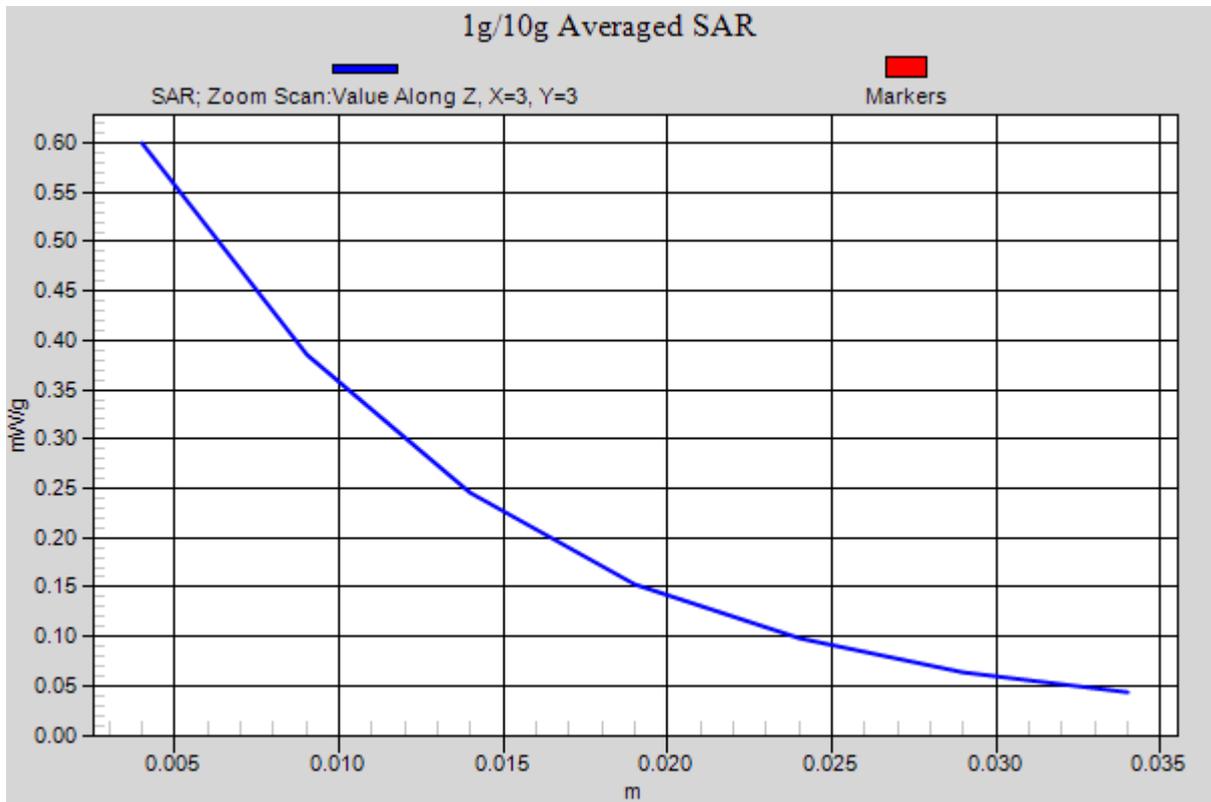


Figure 48 Z-Scan at power reference point [GSM 1900 GPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Channel 661]

GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 High

Date/Time: 10/22/2009 9:45:22 PM

Communication System: GSM 1900+GPRS(3Up); Frequency: 1909.8 MHz; Duty Cycle: 1:2.67

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 1 High/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 18.4 V/m; Power Drift = -0.111 dB

Peak SAR (extrapolated) = 2.52 W/kg

SAR(1 g) = 0.684 mW/g; SAR(10 g) = 0.391 mW/g

Maximum value of SAR (measured) = 0.755 mW/g

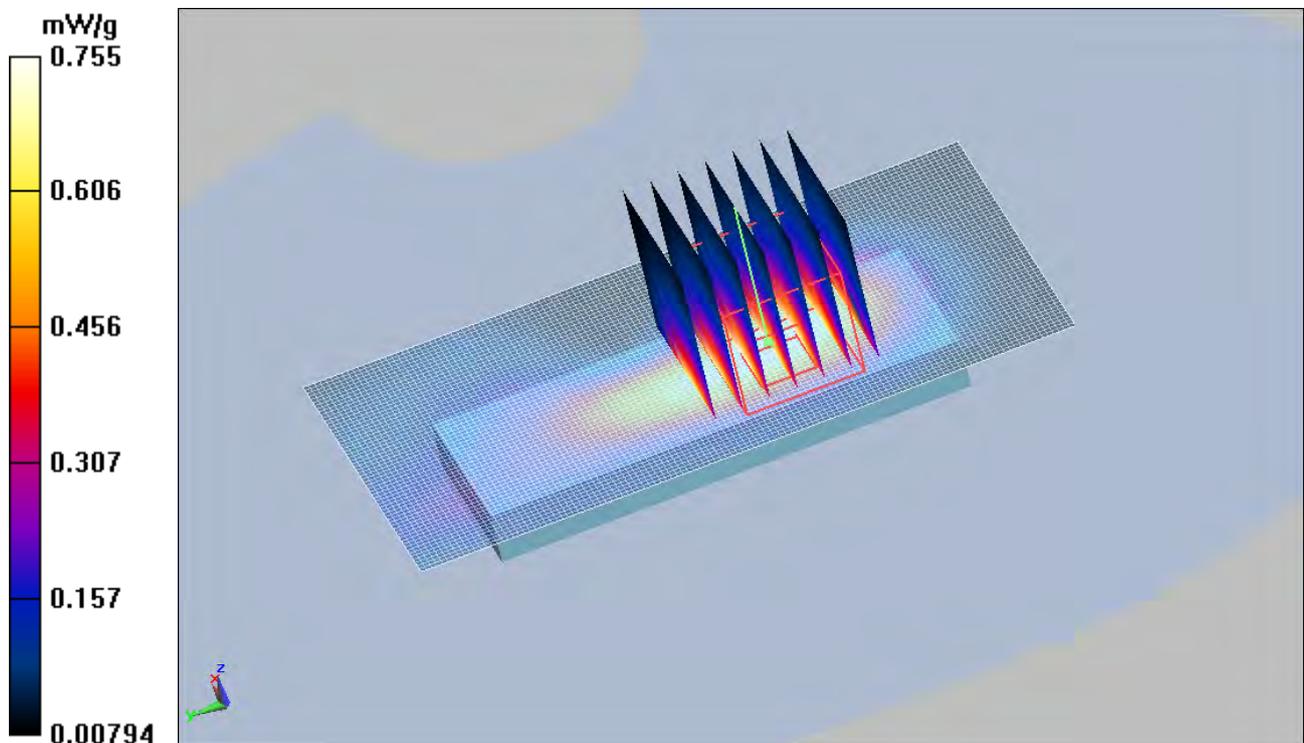


Figure 49 GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 810

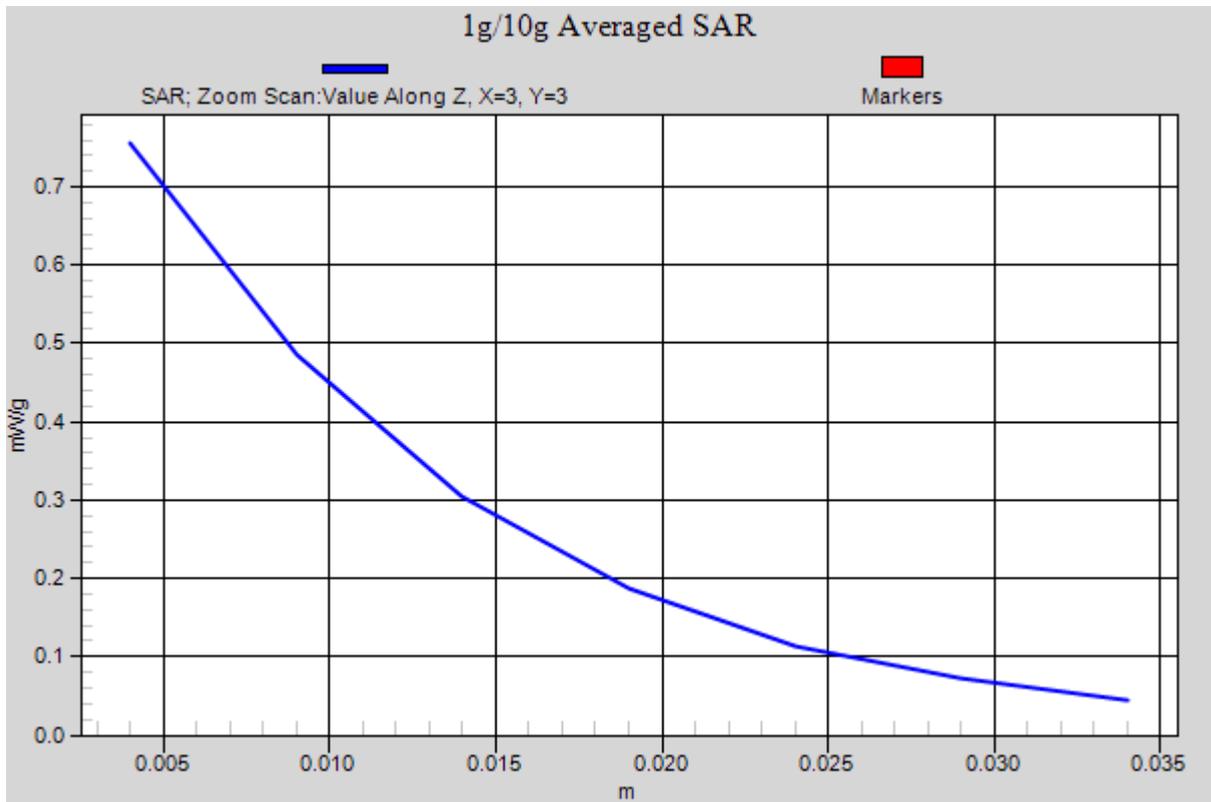


Figure 50 Z-Scan at power reference point [GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 810]

GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Middle

Date/Time: 10/22/2009 3:44:32 PM

Communication System: GSM 1900+GPRS(3Up); Frequency: 1880 MHz; Duty Cycle: 1:2.67

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 1 Middle/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.677 mW/g

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

dz=5mm

Reference Value = 17.9 V/m; Power Drift = 0.043 dB

Peak SAR (extrapolated) = 0.969 W/kg

SAR(1 g) = 0.601 mW/g; SAR(10 g) = 0.344 mW/g

Maximum value of SAR (measured) = 0.669 mW/g

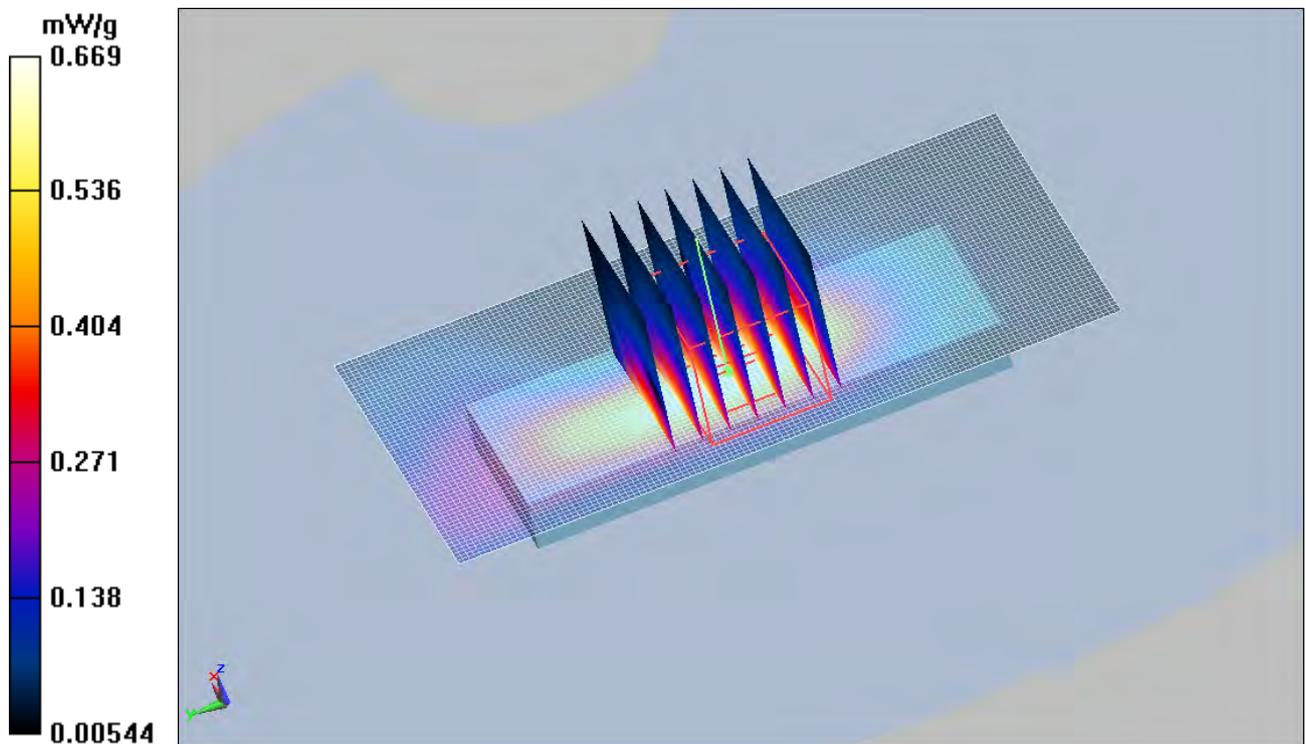


Figure 51 GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 661

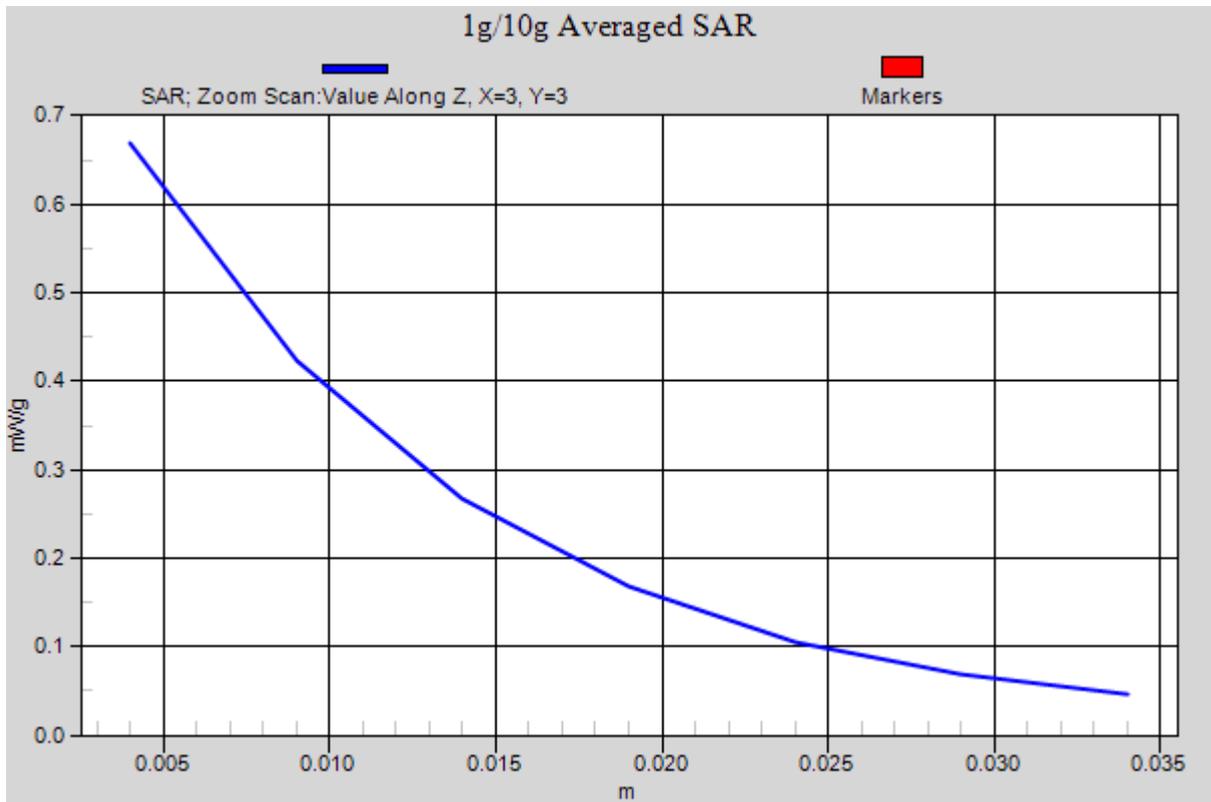


Figure 52 Z-Scan at power reference point [GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 661]

GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Low

Date/Time: 10/22/2009 10:09:45 PM

Communication System: GSM 1900+GPRS(3Up); Frequency: 1850.2 MHz; Duty Cycle: 1:2.67

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52.5$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 1 Low/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.683 mW/g

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

Reference Value = 17.7 V/m; Power Drift = 0.144 dB

Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.599 mW/g; SAR(10 g) = 0.341 mW/g

Maximum value of SAR (measured) = 0.667 mW/g

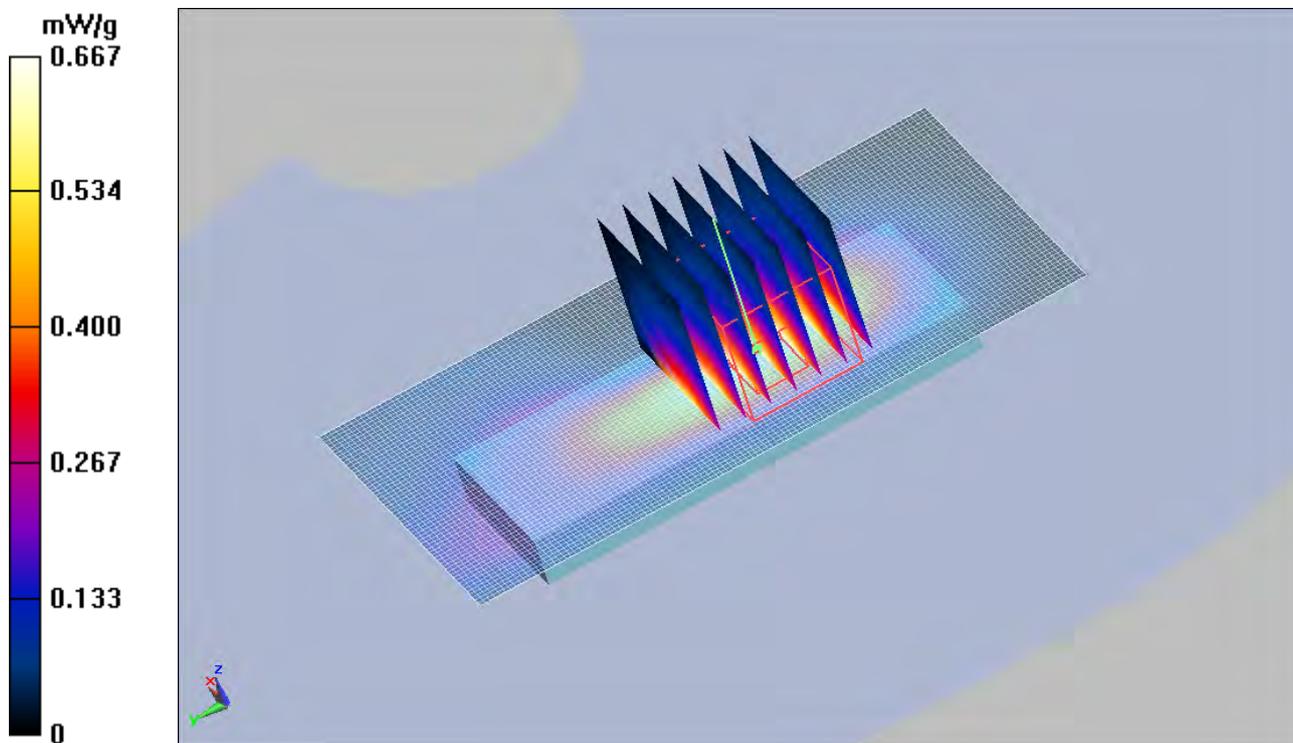


Figure 53 GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 512

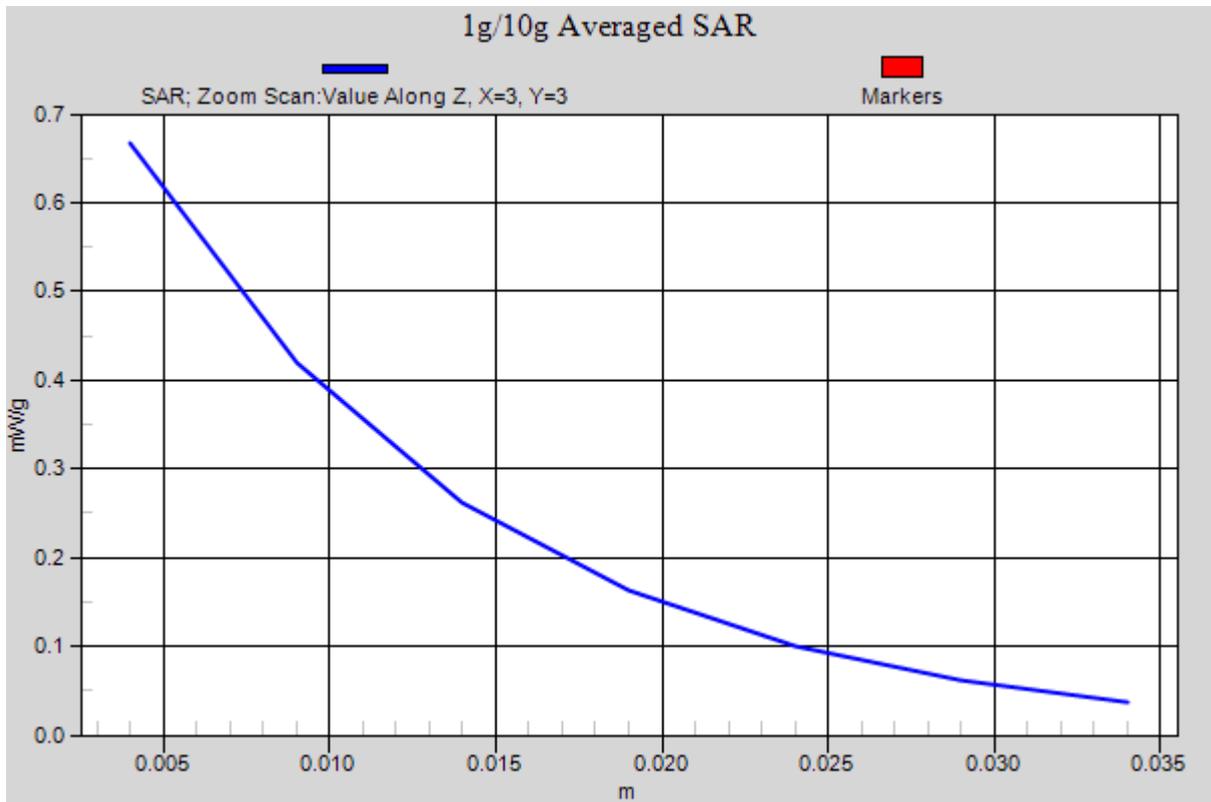


Figure 54 Z-Scan at power reference point [GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 512]

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

Date/Time: 10/22/2009 4:16:33 PM

Communication System: GSM 1900+GPRS(2Up); Frequency: 1880 MHz; Duty Cycle: 1:4

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 1 Middle/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.507 mW/g

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

dz=5mm

Reference Value = 15.6 V/m; Power Drift = 0.088 dB

Peak SAR (extrapolated) = 0.795 W/kg

SAR(1 g) = 0.456 mW/g; SAR(10 g) = 0.262 mW/g

Maximum value of SAR (measured) = 0.505 mW/g

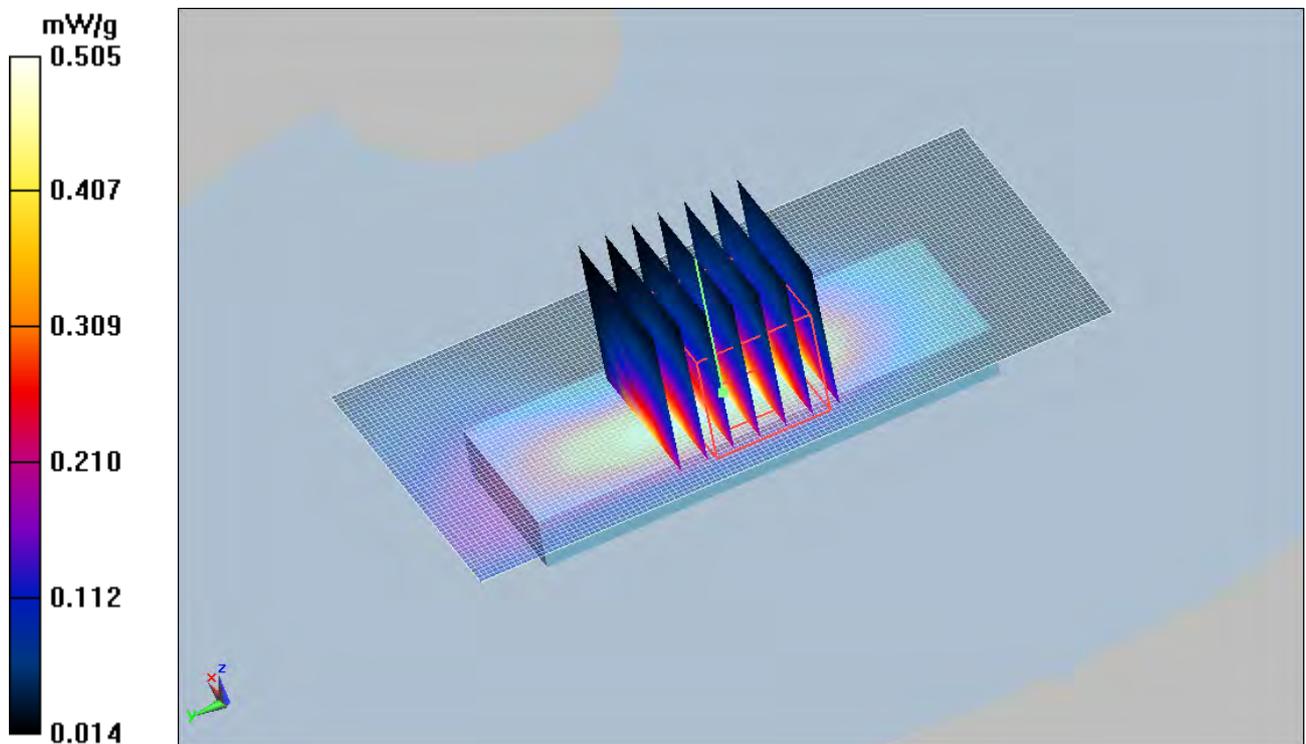


Figure 55 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 661

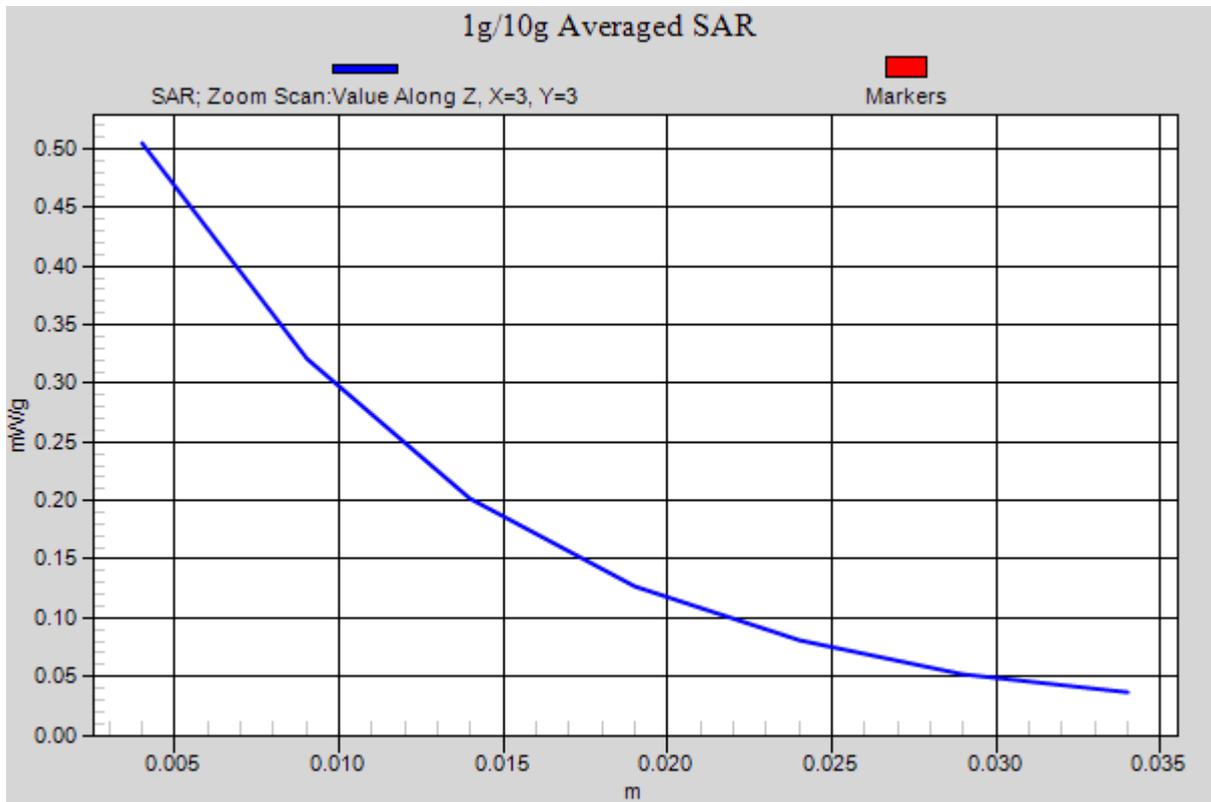


Figure 56 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 661]

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

Date/Time: 10/22/2009 5:29:56 PM

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 1 Middle/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 14.8 V/m; Power Drift = 0.144 dB

Peak SAR (extrapolated) = 0.687 W/kg

SAR(1 g) = 0.436 mW/g; SAR(10 g) = 0.241 mW/g

Maximum value of SAR (measured) = 0.481 mW/g

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

Reference Value = 14.8 V/m; Power Drift = 0.144 dB

Peak SAR (extrapolated) = 0.685 W/kg

SAR(1 g) = 0.435 mW/g; SAR(10 g) = 0.241 mW/g

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

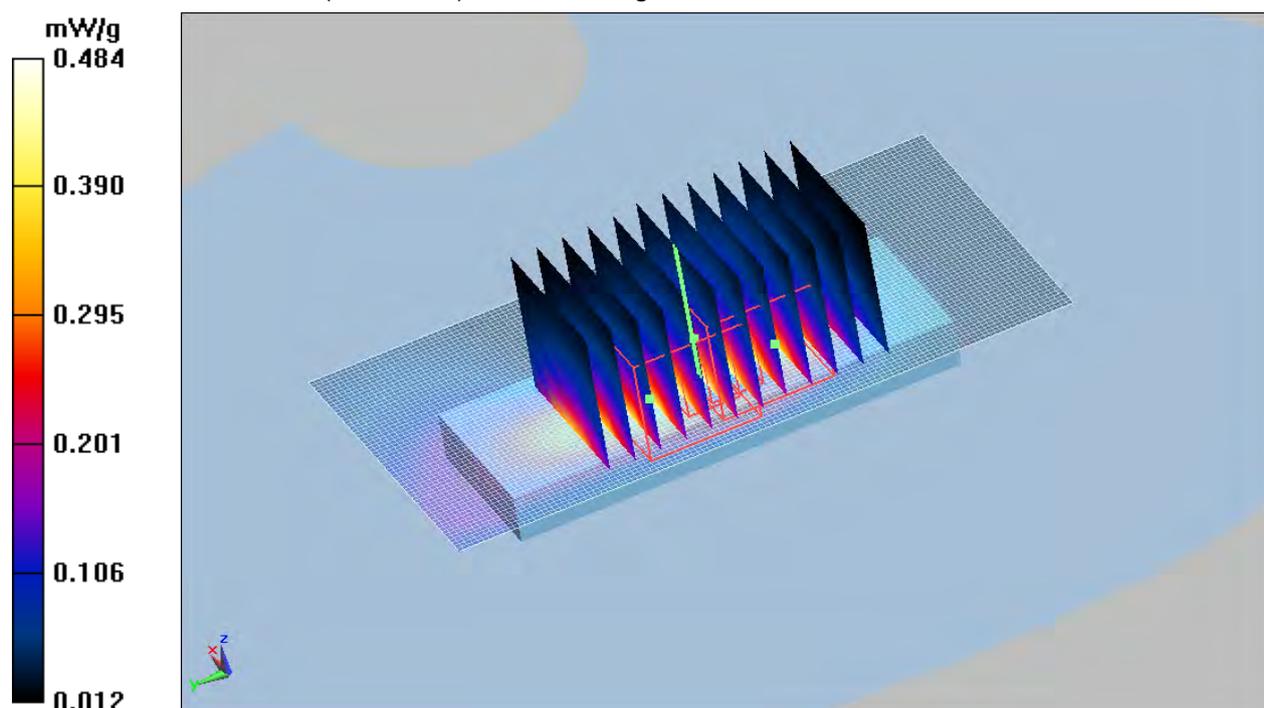


Figure 57 GSM 1900 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 661

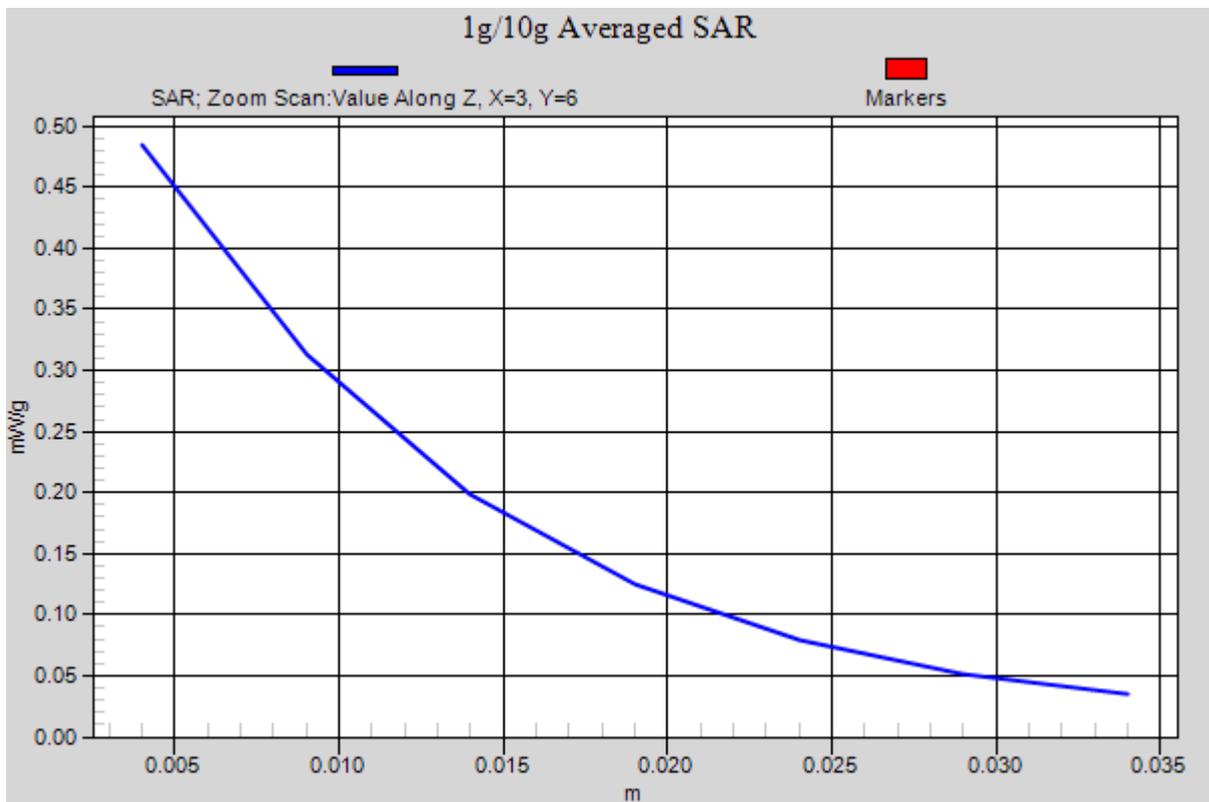
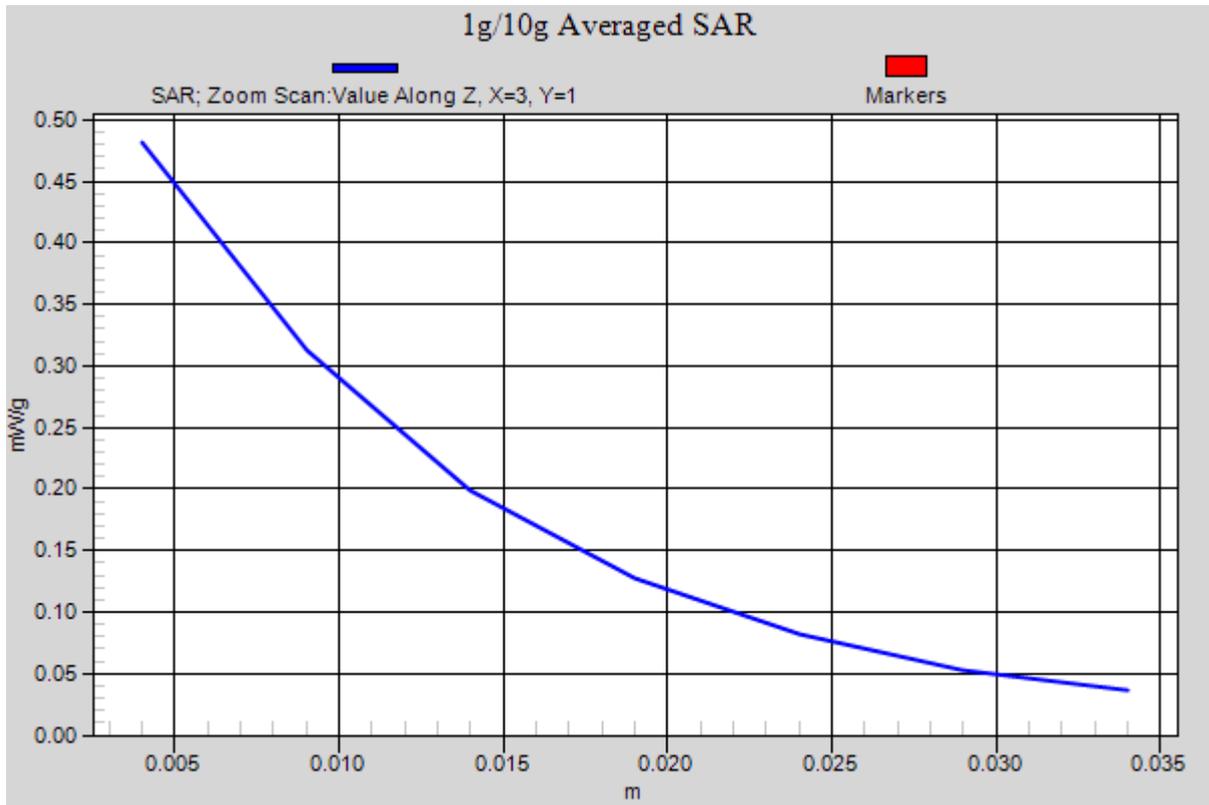


Figure 58 Z-Scan at power reference point [GSM 1900 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 661]

GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 2 Middle

Date/Time: 10/22/2009 9:19:05 PM

Communication System: GSM 1900+GPRS(3Up); Frequency: 1880 MHz; Duty Cycle: 1:2.67

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 2 Middle/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.098 mW/g

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

Reference Value = 5.14 V/m; Power Drift = -0.095 dB

Peak SAR (extrapolated) = 0.132 W/kg

SAR(1 g) = 0.076 mW/g; SAR(10 g) = 0.044 mW/g

Maximum value of SAR (measured) = 0.084 mW/g

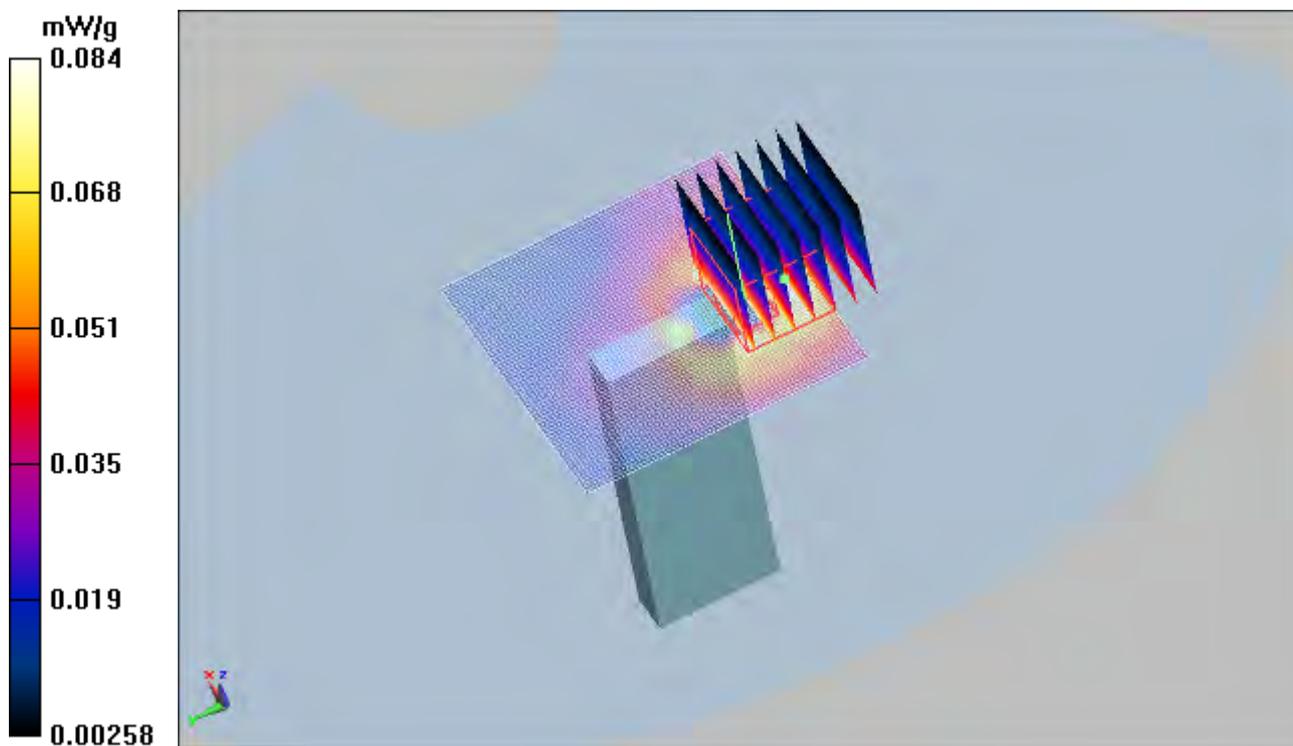


Figure 59 GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 2 Channel 661

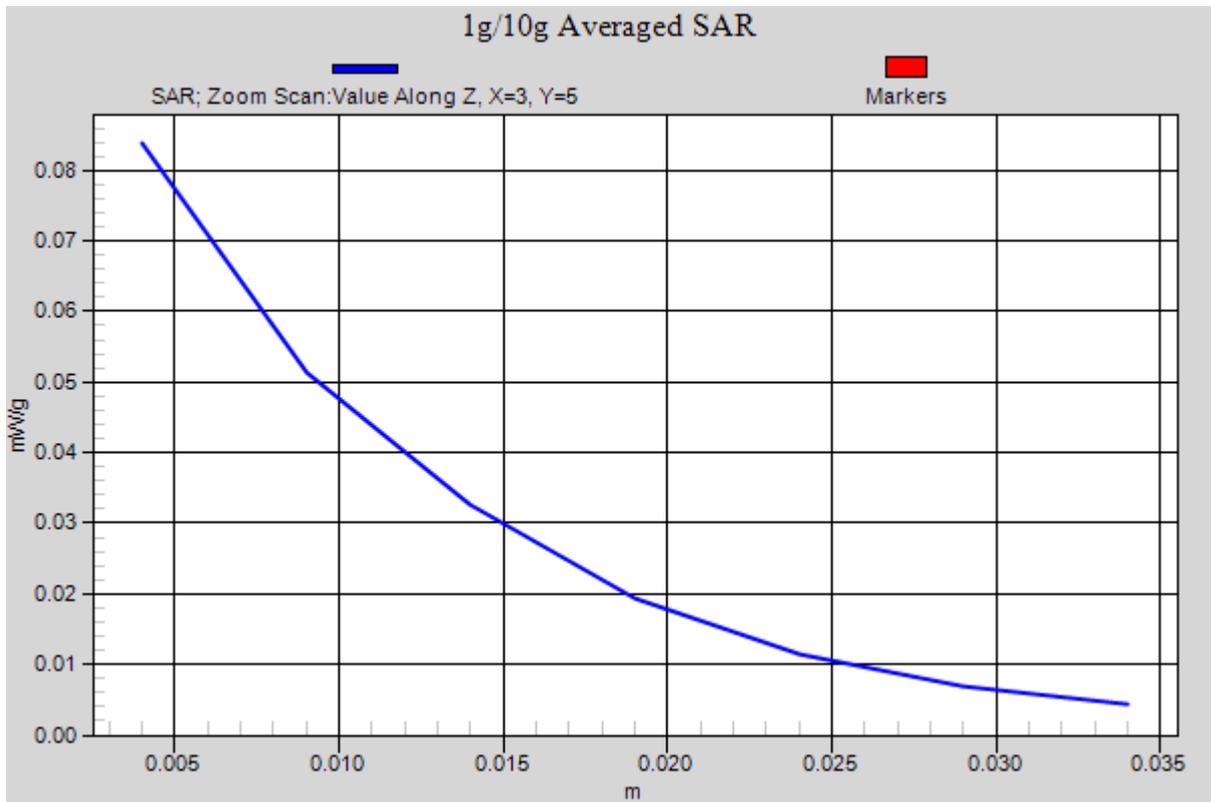


Figure 60 Z-Scan at power reference point [GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 2 Channel 661]

GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 3 Middle

Date/Time: 10/22/2009 8:02:57 PM

Communication System: GSM 1900+GPRS(3Up); Frequency: 1880 MHz; Duty Cycle: 1:2.67

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 3 Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.211 mW/g

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

dz=5mm

Reference Value = 9.1 V/m; Power Drift = -0.171 dB

Peak SAR (extrapolated) = 0.316 W/kg

SAR(1 g) = 0.187 mW/g; SAR(10 g) = 0.104 mW/g

Maximum value of SAR (measured) = 0.208 mW/g

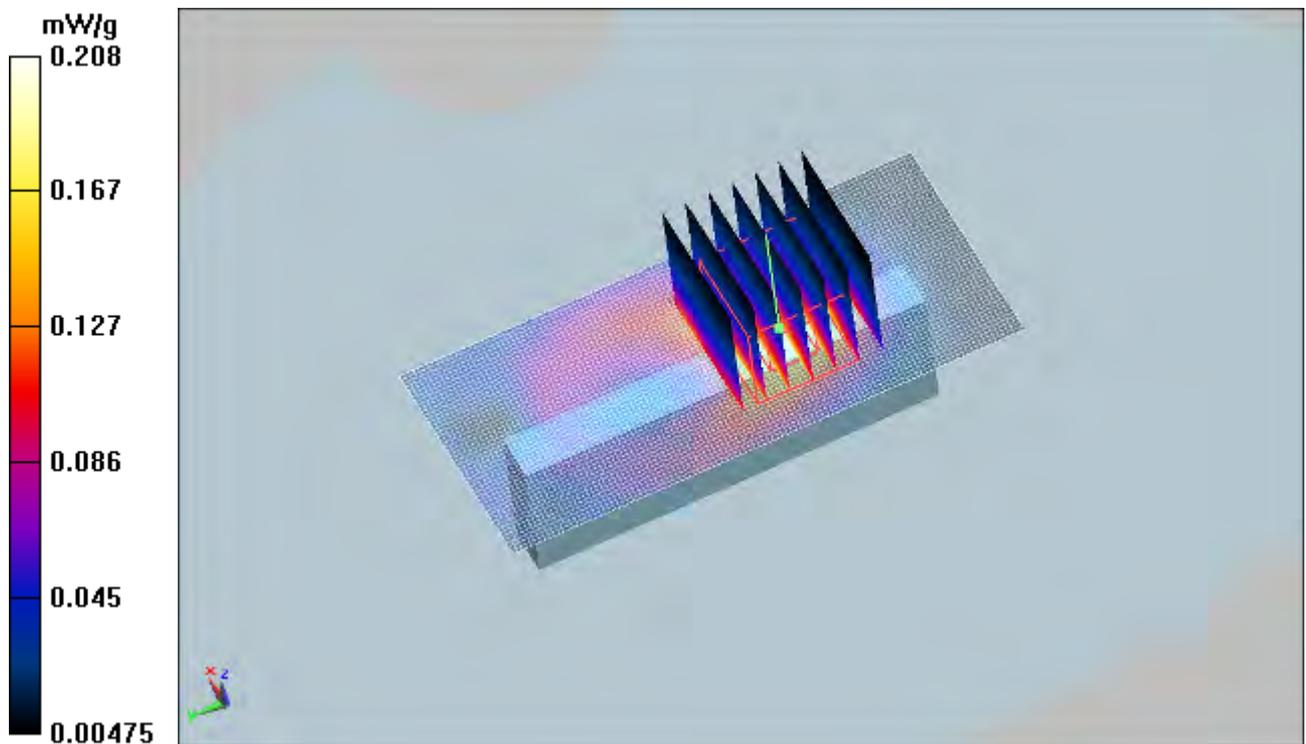


Figure 61 GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 3 Channel 661

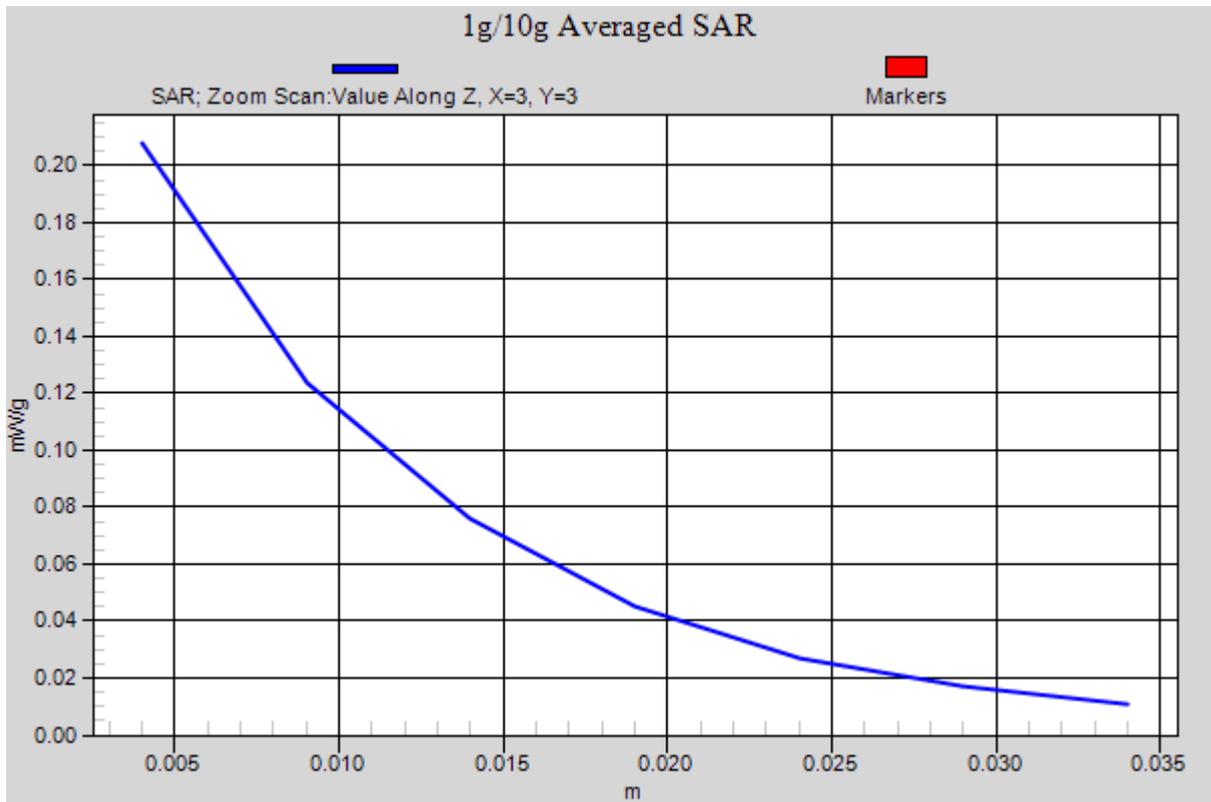


Figure 62 Z-Scan at power reference point [GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 3 Channel 661]

GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 4 Middle

Date/Time: 10/22/2009 8:28:01 PM

Communication System: GSM 1900+GPRS(3Up); Frequency: 1880 MHz; Duty Cycle: 1:2.67

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 4 Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.502 mW/g

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

Reference Value = 16.6 V/m; Power Drift = 0.118 dB

Peak SAR (extrapolated) = 0.726 W/kg

SAR(1 g) = 0.447 mW/g; SAR(10 g) = 0.249 mW/g

Maximum value of SAR (measured) = 0.503 mW/g

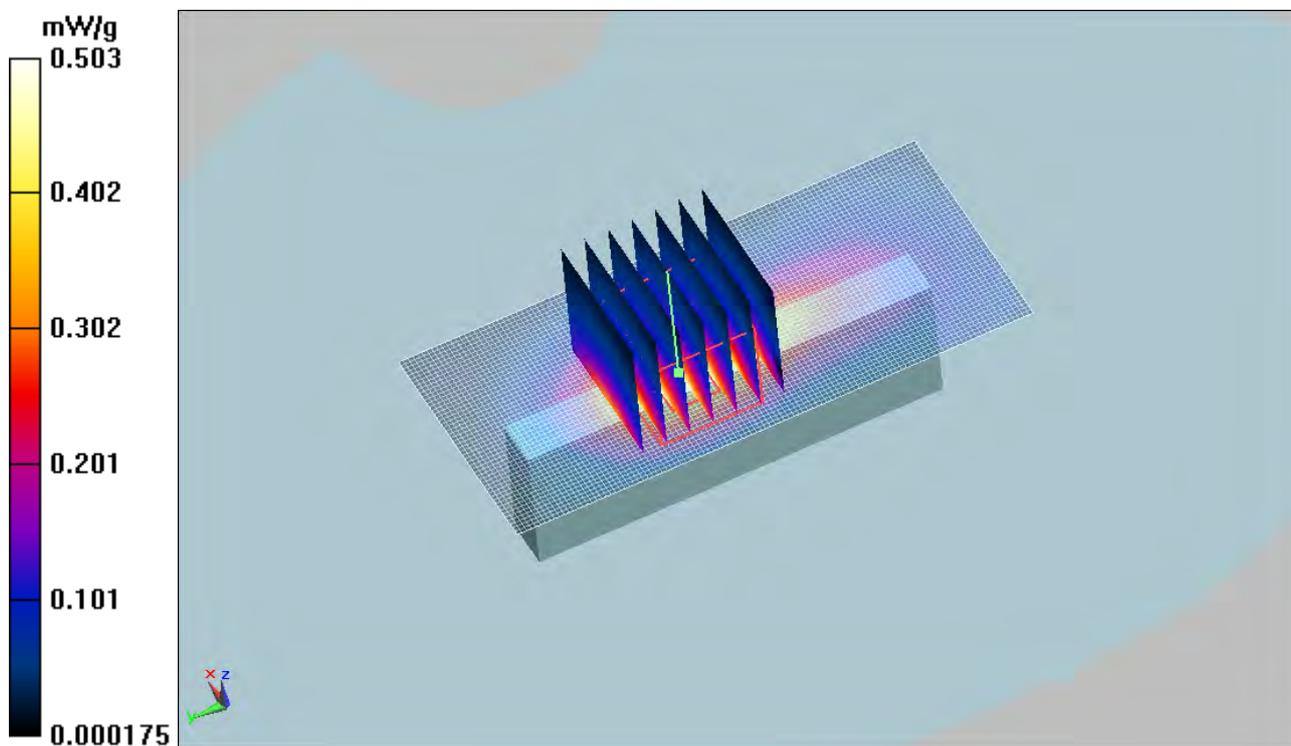


Figure 63 GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 4 Channel 661

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

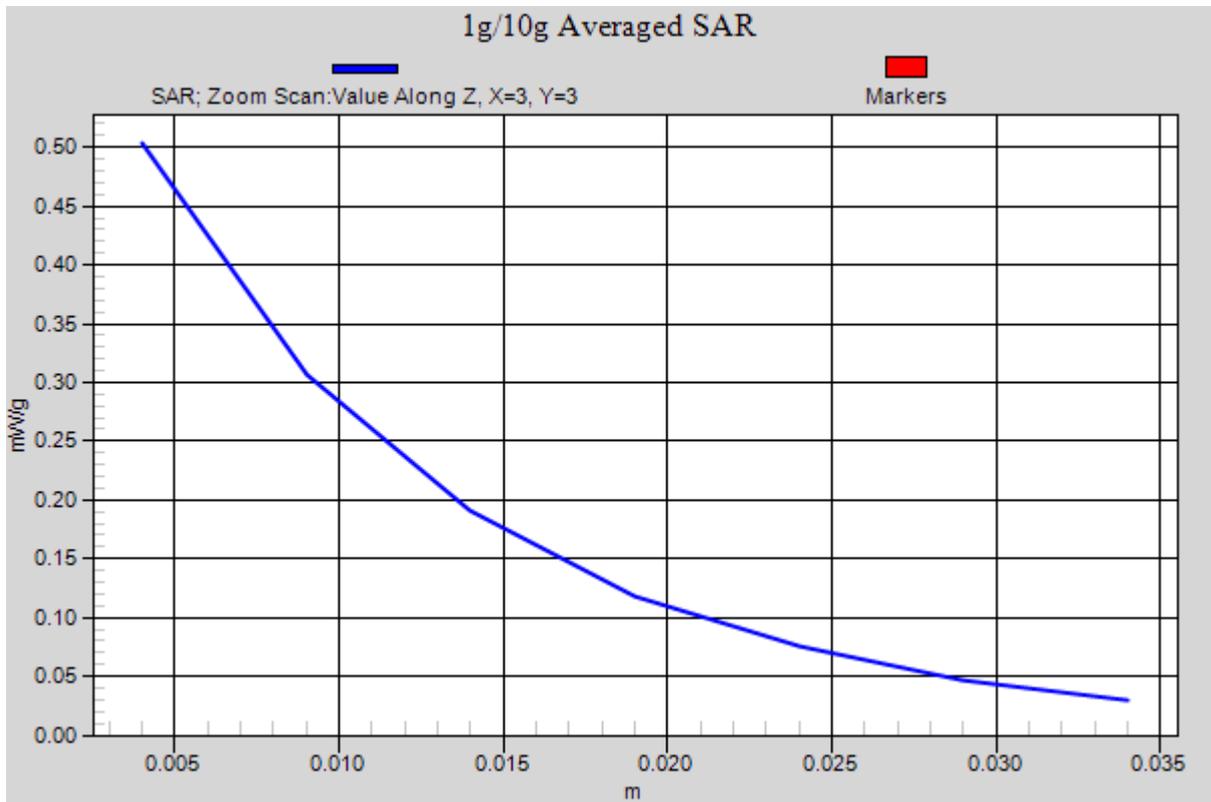


Figure 64 Z-Scan at power reference point [GSM 1900 GPRS (3 timeslots in uplink) with IBM T61 Test Position 4 Channel 661]

GSM 1900 GPRS (3 timeslots in uplink) with BenQ Joybook R55V Test Position 5 Middle

Date/Time: 10/22/2009 7:21:30 PM

Communication System: GSM 1900+GPRS(3Up); Frequency: 1880 MHz;Duty Cycle: 1:2.67

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 5 Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.773 mW/g

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

Reference Value = 19.2 V/m; Power Drift = 0.167 dB

Peak SAR (extrapolated) = 0.913 W/kg

SAR(1 g) = 0.562 mW/g; SAR(10 g) = 0.329 mW/g

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

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

Reference Value = 19.2 V/m; Power Drift = 0.167 dB

Peak SAR (extrapolated) = 0.923 W/kg

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

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

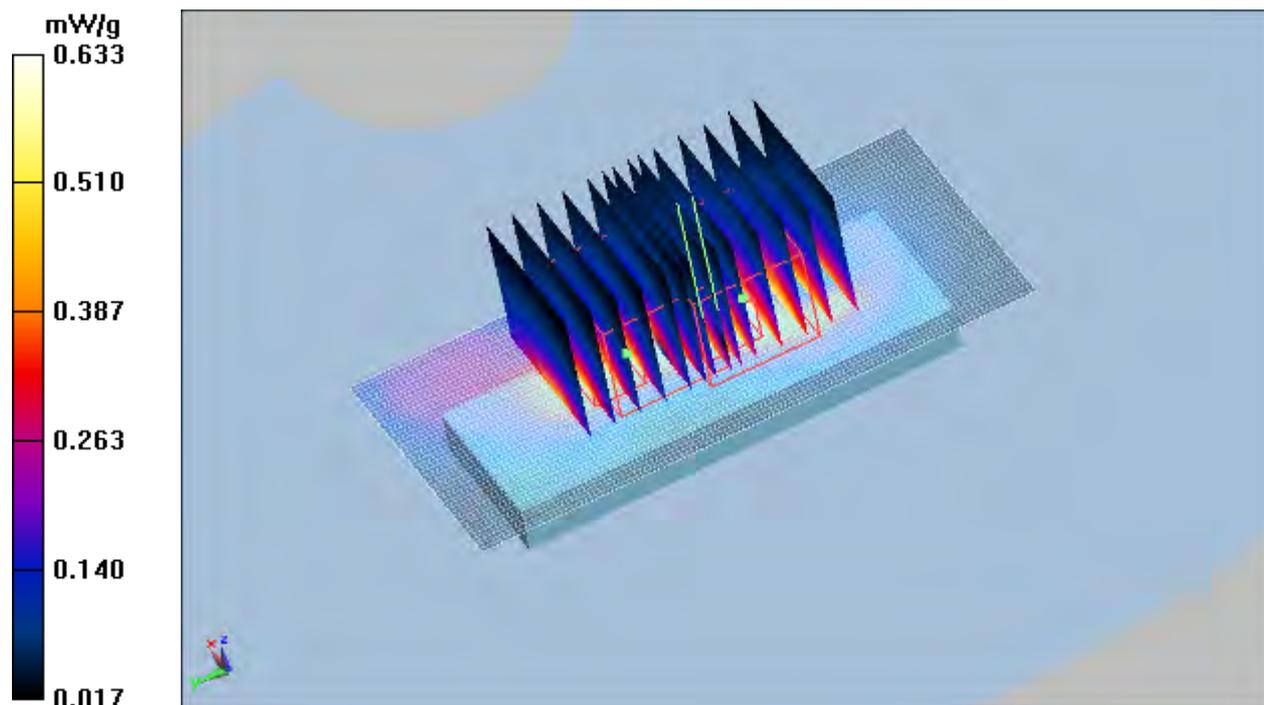


Figure 65GSM 1900 GPRS (3 timeslots in uplink) with BenQ Joybook R55V Test Position 5 Channel 661

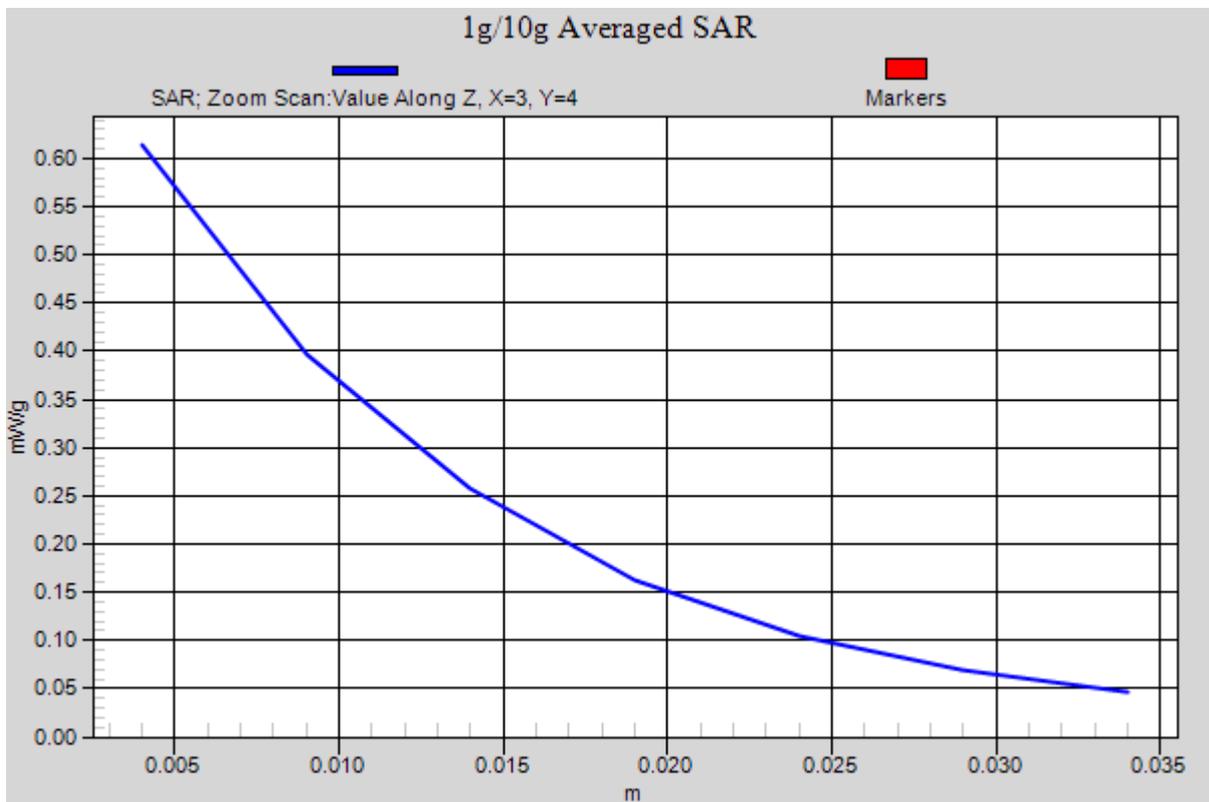
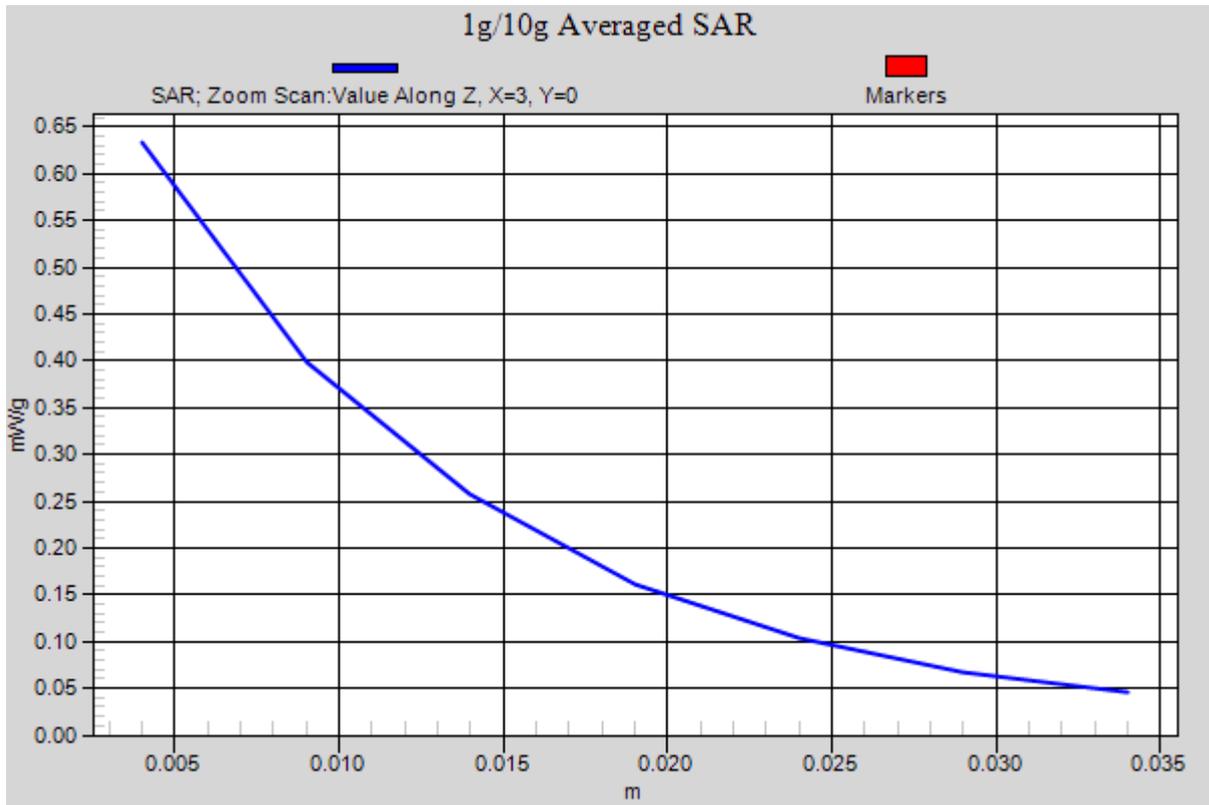


Figure 66 Z-Scan at power reference point [GSM 1900 GPRS (3 timeslots in uplink) with BenQ Joybook R55V Test Position 5 Channel 661]

GSM 1900 EGPRS (3 timeslots in uplink) with IBM T61 Test Position 1 High

Date/Time: 10/22/2009 10:36:24 PM

Communication System: GSM 1900+EGPRS(3Up); Frequency: 1909.8 MHz; Duty Cycle: 1:2.67

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 0.774 mW/g

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

Reference Value = 18 V/m; Power Drift = 0.012 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.687 mW/g; SAR(10 g) = 0.390 mW/g

Maximum value of SAR (measured) = 0.766 mW/g

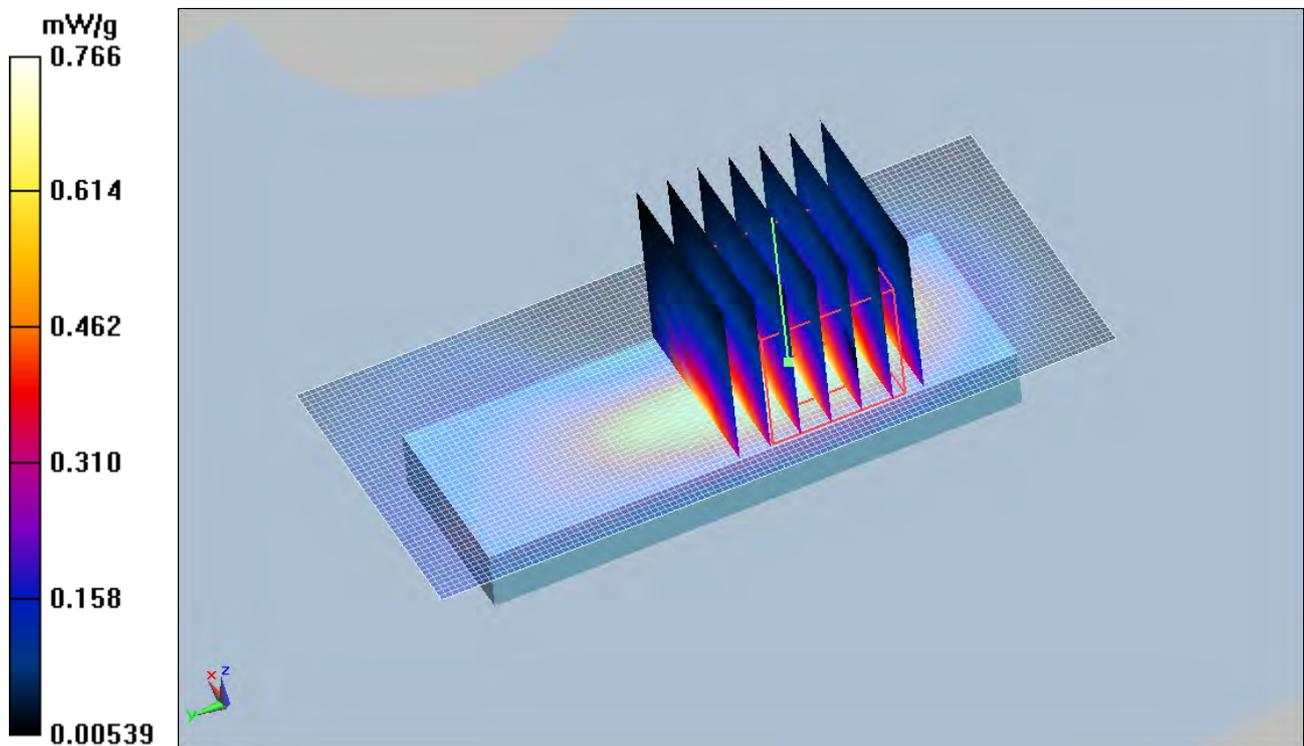


Figure 67 GSM 1900 EGPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 810

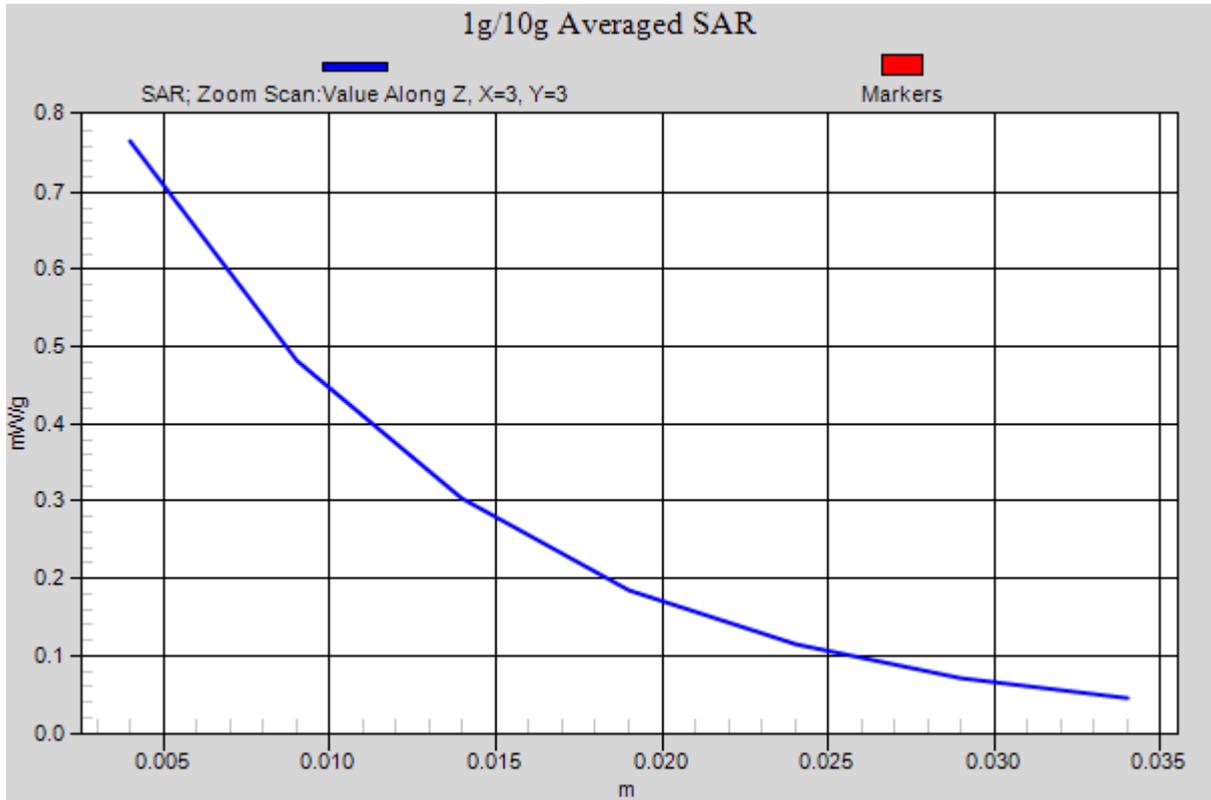


Figure 68 Z-Scan at power reference point [GSM 1900 EGPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 810]

WCDMA Band II with IBM T61 Test Position 1 High

Date/Time: 10/25/2009 4:13:47 PM

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

Medium parameters used: $f = 1908$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 1.32 mW/g

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

Reference Value = 26.6 V/m; Power Drift = 0.098 dB

Peak SAR (extrapolated) = 1.82 W/kg

SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.687 mW/g

Maximum value of SAR (measured) = 1.3 mW/g

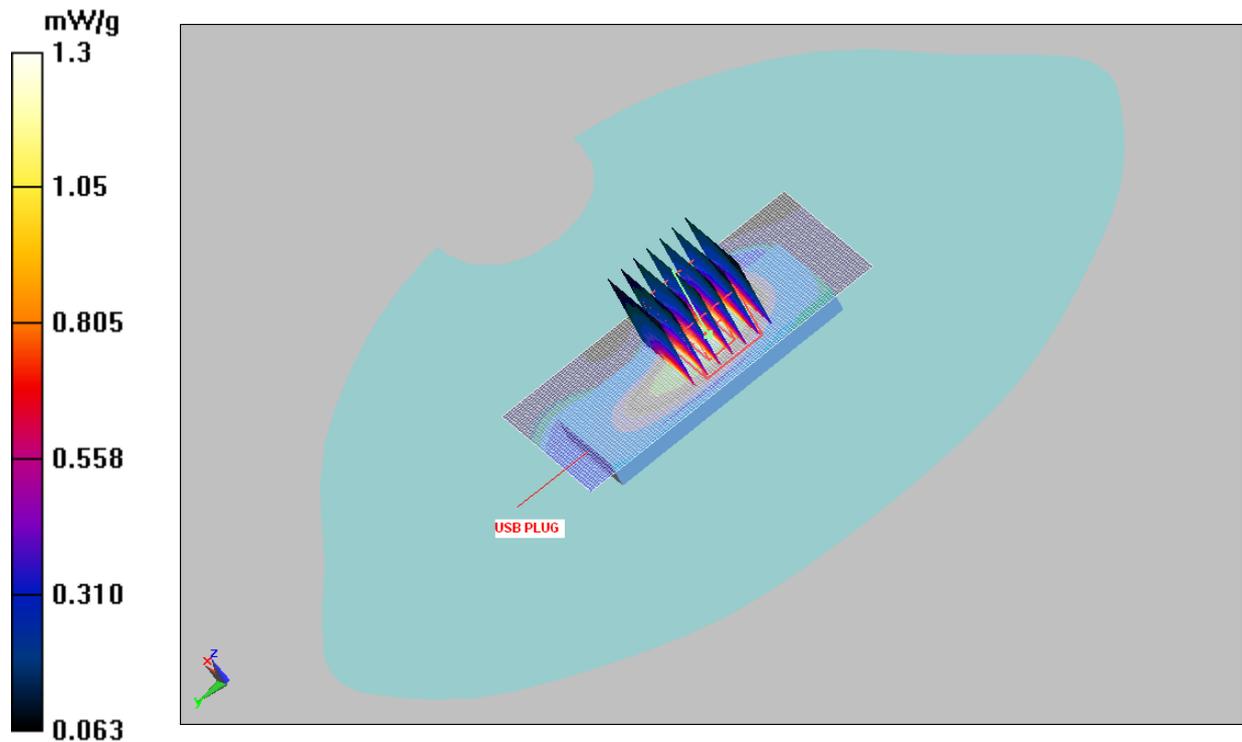


Figure 69 WCDMA Band II with IBM T61 Test Position 1 Channel 9538

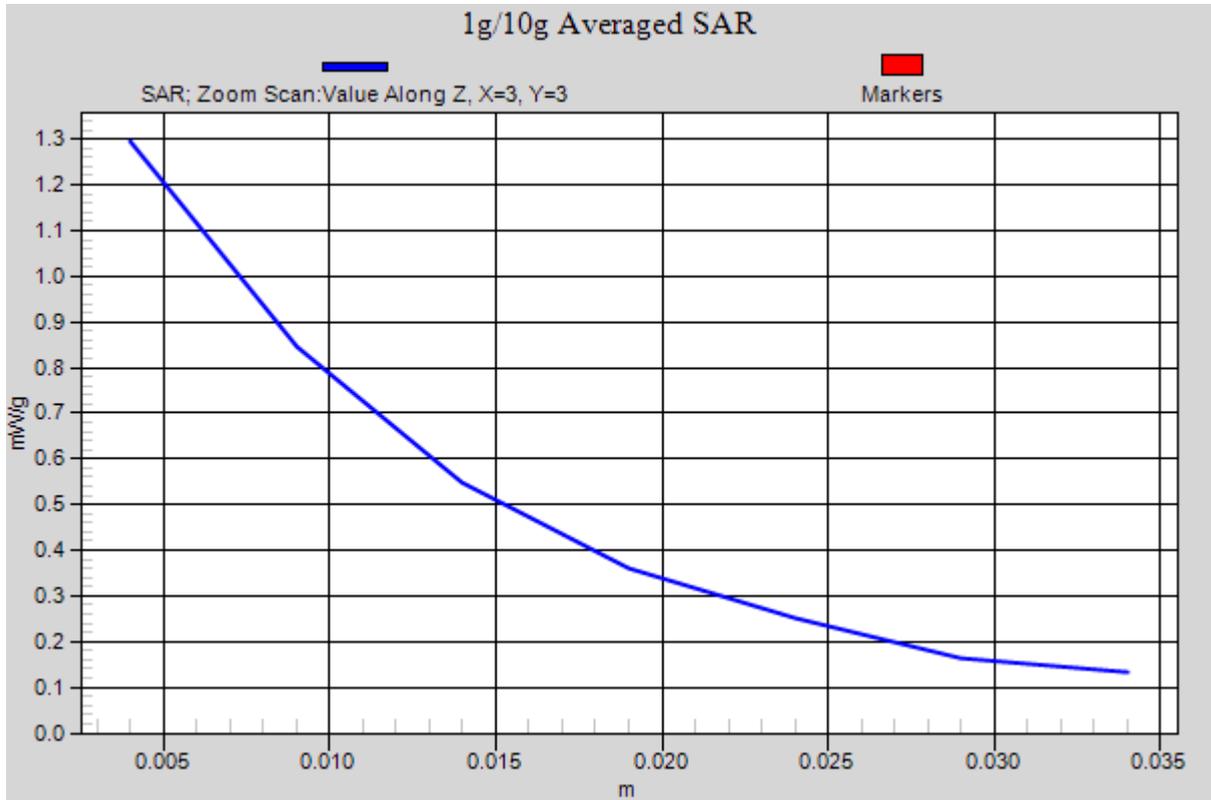


Figure 70 Z-Scan at power reference point [WCDMA Band II with IBM T61 Test Position 1 Channel 9538]

WCDMA Band II with IBM T61 Test Position 1 Middle

Date/Time: 10/25/2009 4:05:10 PM

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 1 Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.11 mW/g

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

Reference Value = 26.9 V/m; Power Drift = -0.199 dB

Peak SAR (extrapolated) = 1.49 W/kg

SAR(1 g) = 0.949 mW/g; SAR(10 g) = 0.547 mW/g

Maximum value of SAR (measured) = 1.05 mW/g

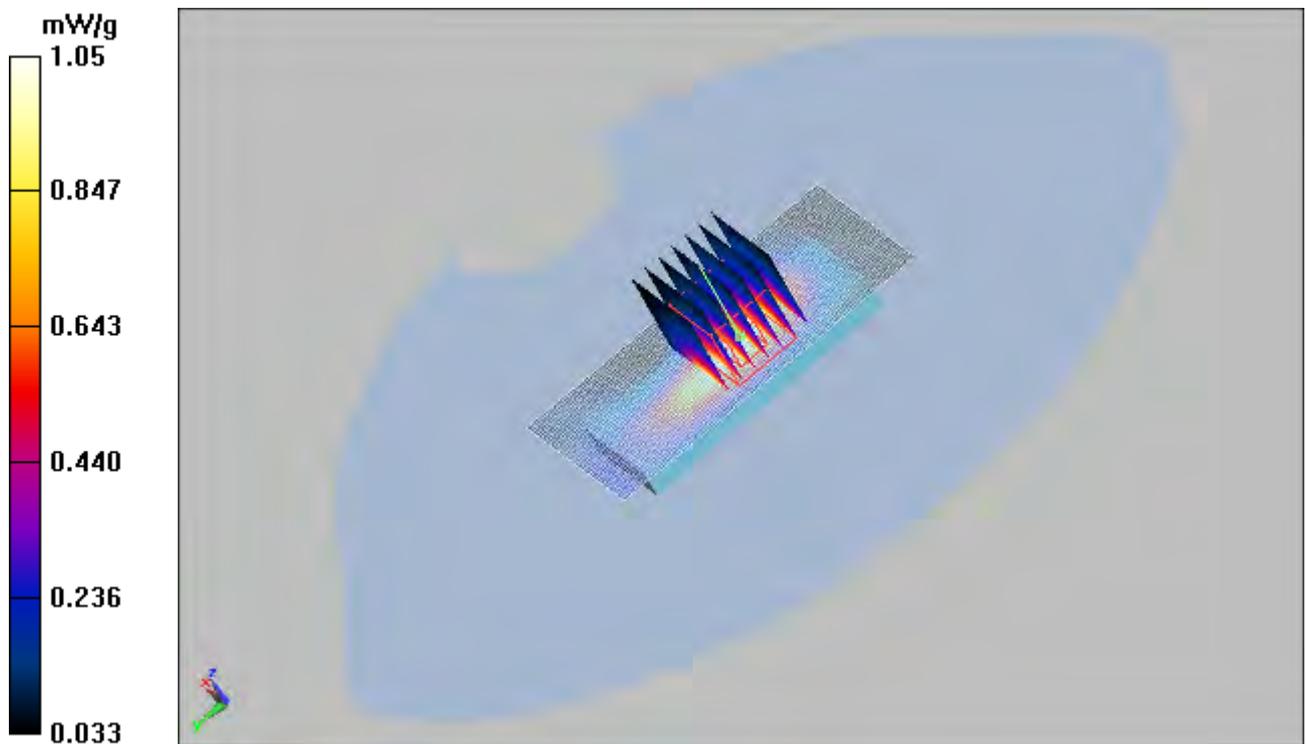


Figure 71 WCDMA Band II with IBM T61 Test Position 1 Channel 9400

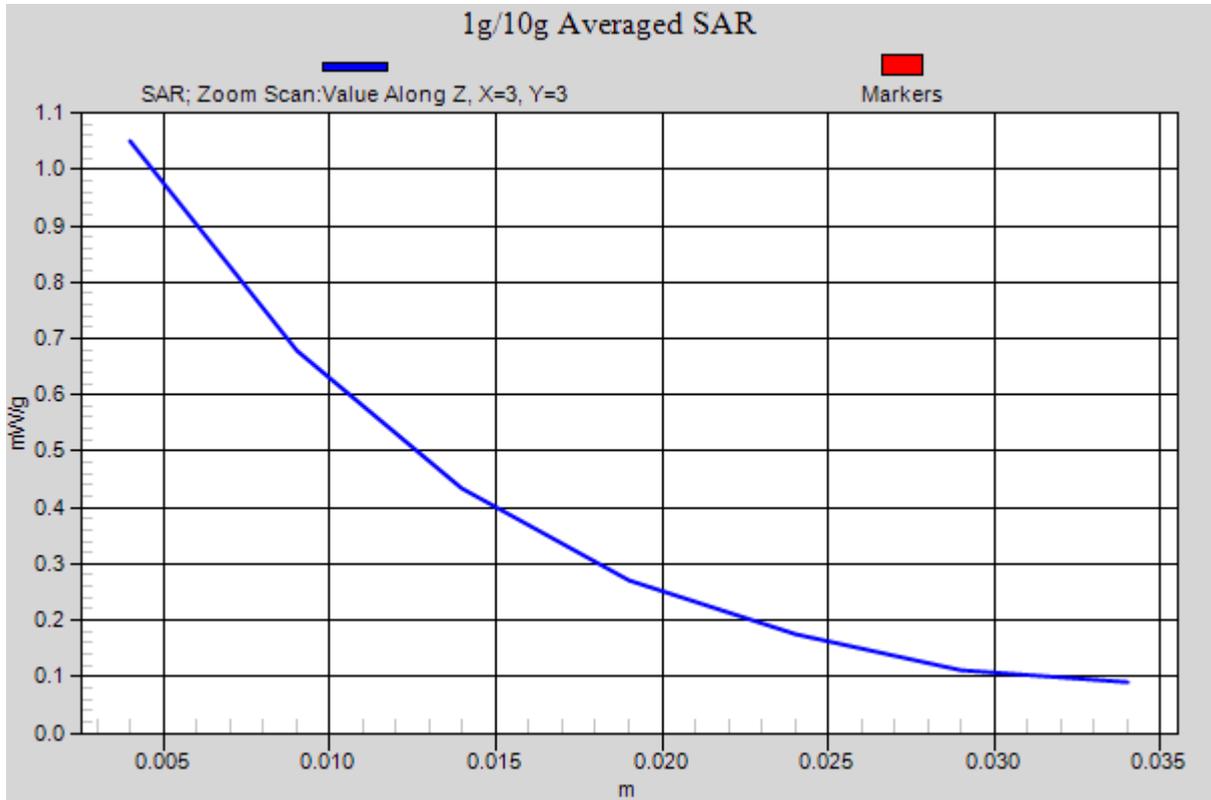


Figure 72 Z-Scan at power reference point [WCDMA Band II with IBM T61 Test Position 1 Channel 9400]

WCDMA Band II with IBM T61 Test Position 1 Low

Date/Time: 10/25/2009 4:51:03 PM

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

Medium parameters used (interpolated): $f = 1852.4$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 52.5$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; 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) = 1.14 mW/g

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

Reference Value = 25.9 V/m; Power Drift = 0.034 dB

Peak SAR (extrapolated) = 1.6 W/kg

SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.587 mW/g

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

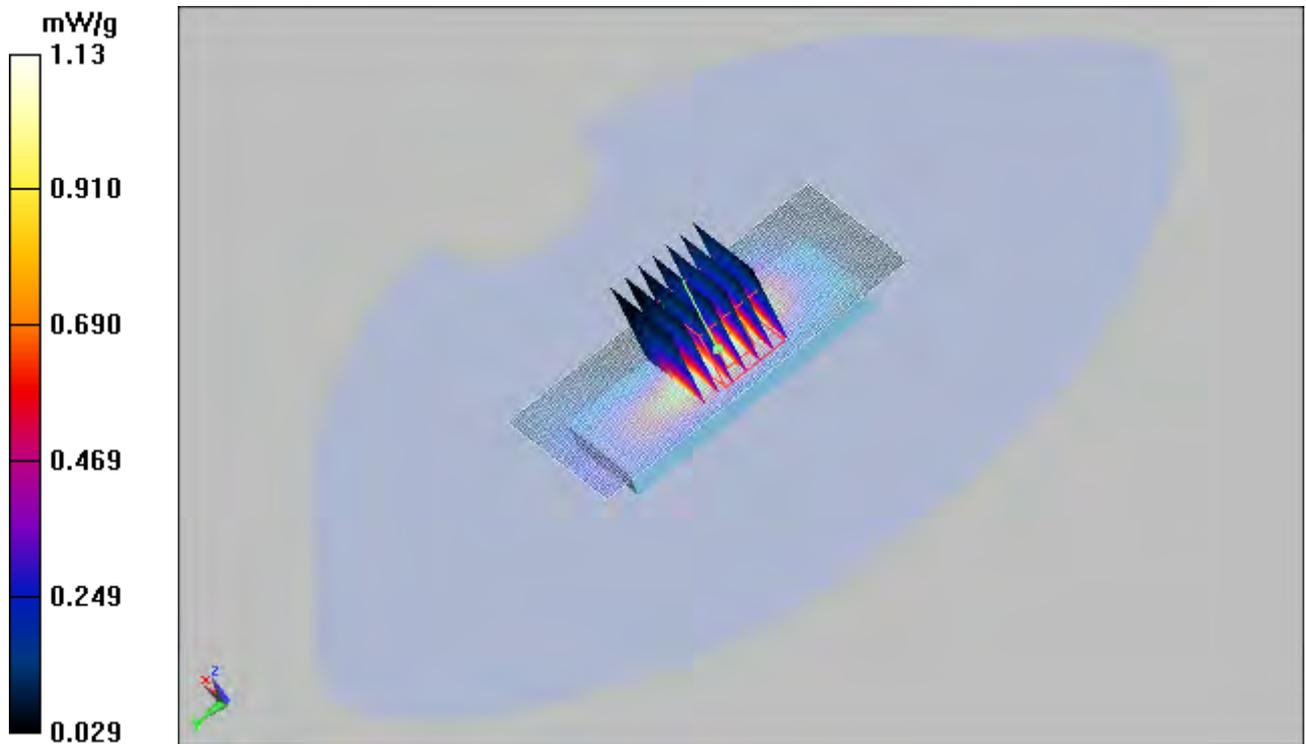


Figure 73 WCDMA Band II with IBM T61 Test Position 1 Channel 9262

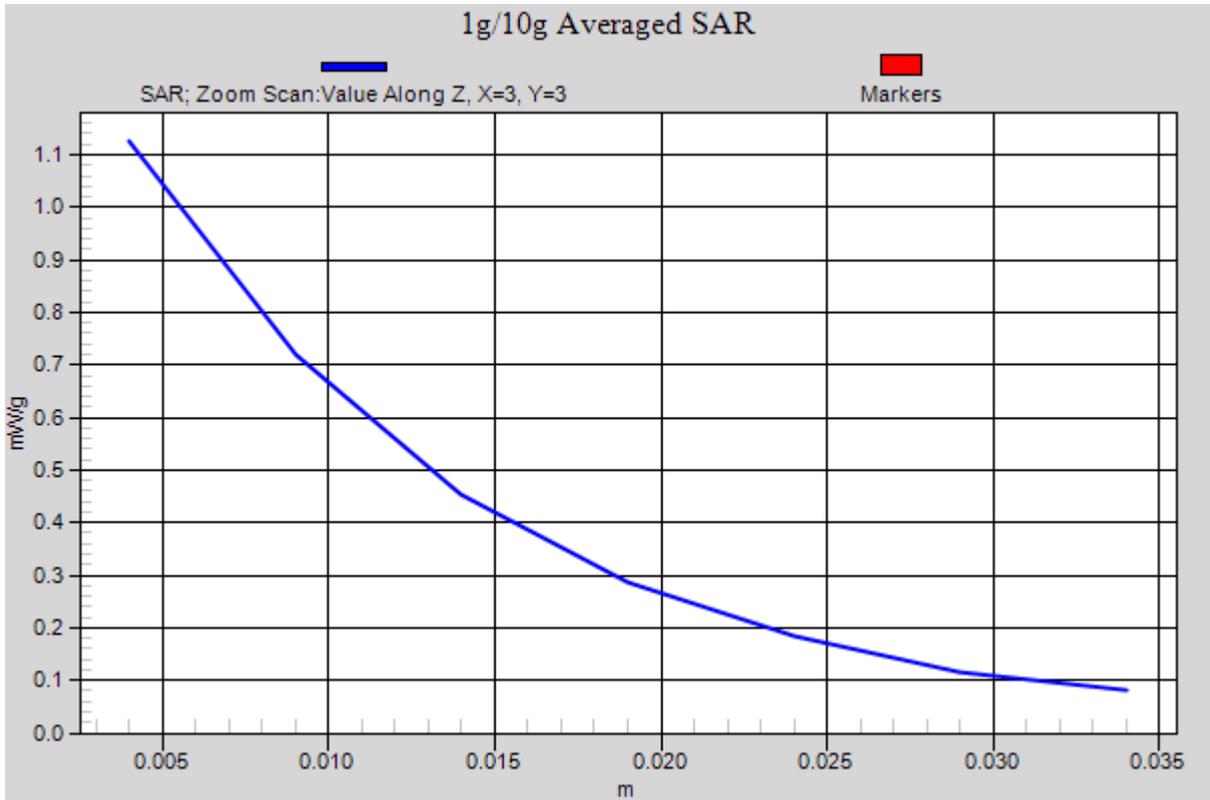


Figure 74 Z-Scan at power reference point [WCDMA Band II with IBM T61 Test Position 1 Channel 9262]

WCDMA Band II with IBM T61 Test Position 2 Middle

Date/Time: 10/25/2009 3:31:42 PM

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 2 Middle/Area Scan (61x61x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.121 mW/g

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

Reference Value = 8.2 V/m; Power Drift = -0.150 dB

Peak SAR (extrapolated) = 0.175 W/kg

SAR(1 g) = 0.106 mW/g; SAR(10 g) = 0.069 mW/g

Maximum value of SAR (measured) = 0.115 mW/g

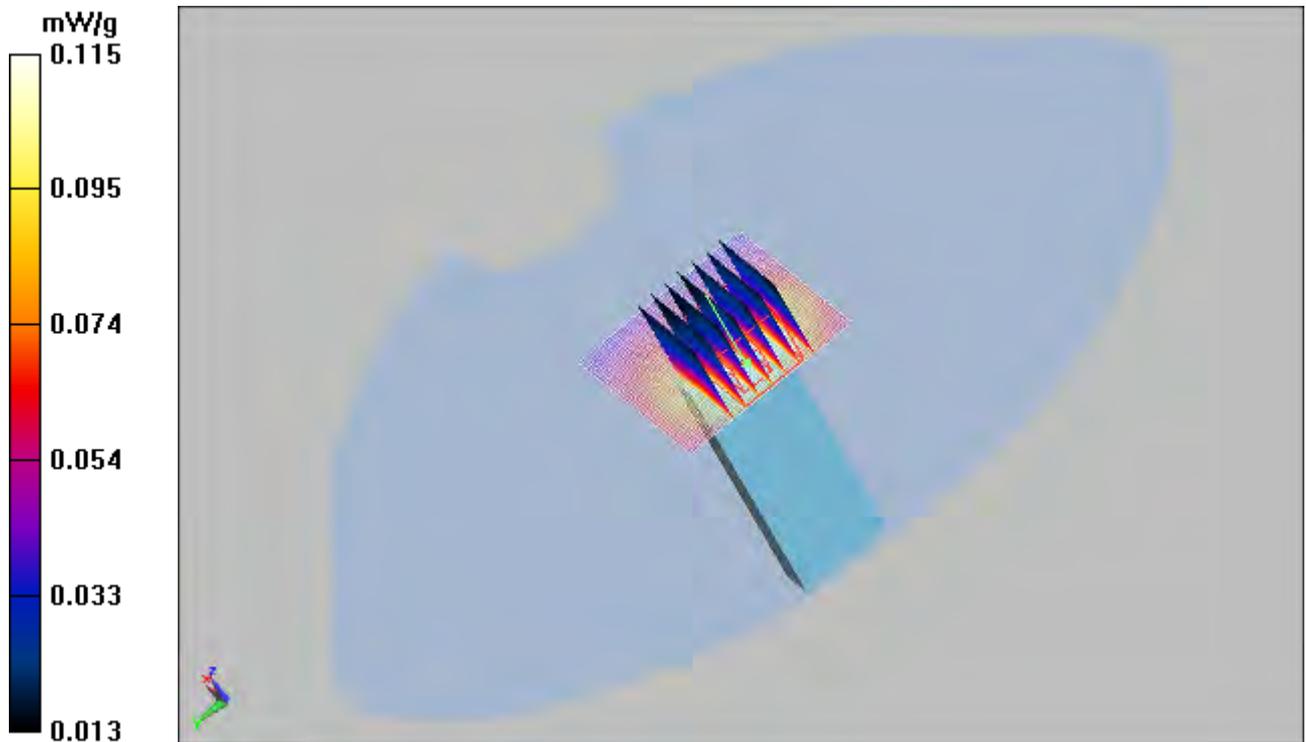


Figure 75 WCDMA Band II with IBM T61 Test Position 2 Channel 9400

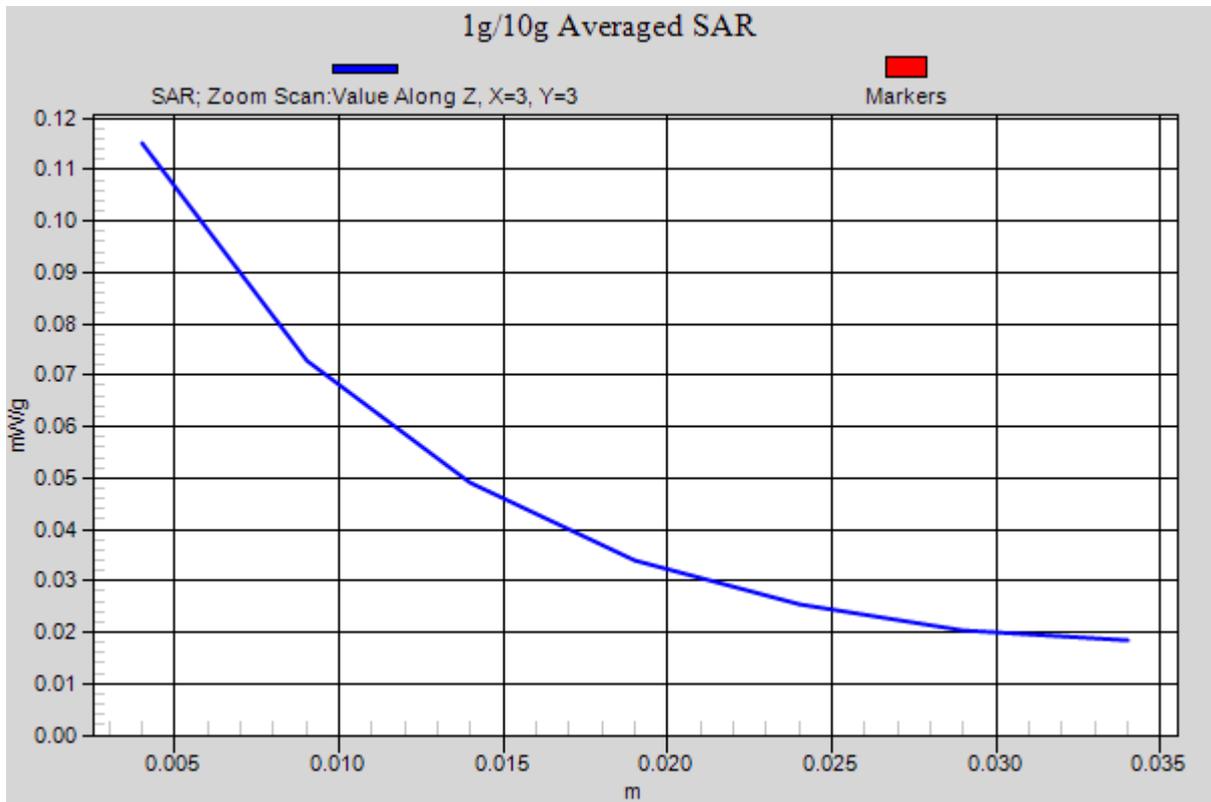


Figure 76 Z-Scan at power reference point [WCDMA Band II with IBM T61 Test Position 2 Channel 9400]

WCDMA Band II with IBM T61 Test Position 3 Middle

Date/Time: 10/25/2009 2:54:25 PM

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 3 Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.331 mW/g

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

Reference Value = 14.5 V/m; Power Drift = -0.186 dB

Peak SAR (extrapolated) = 0.544 W/kg

SAR(1 g) = 0.324 mW/g; SAR(10 g) = 0.200 mW/g

Maximum value of SAR (measured) = 0.348 mW/g

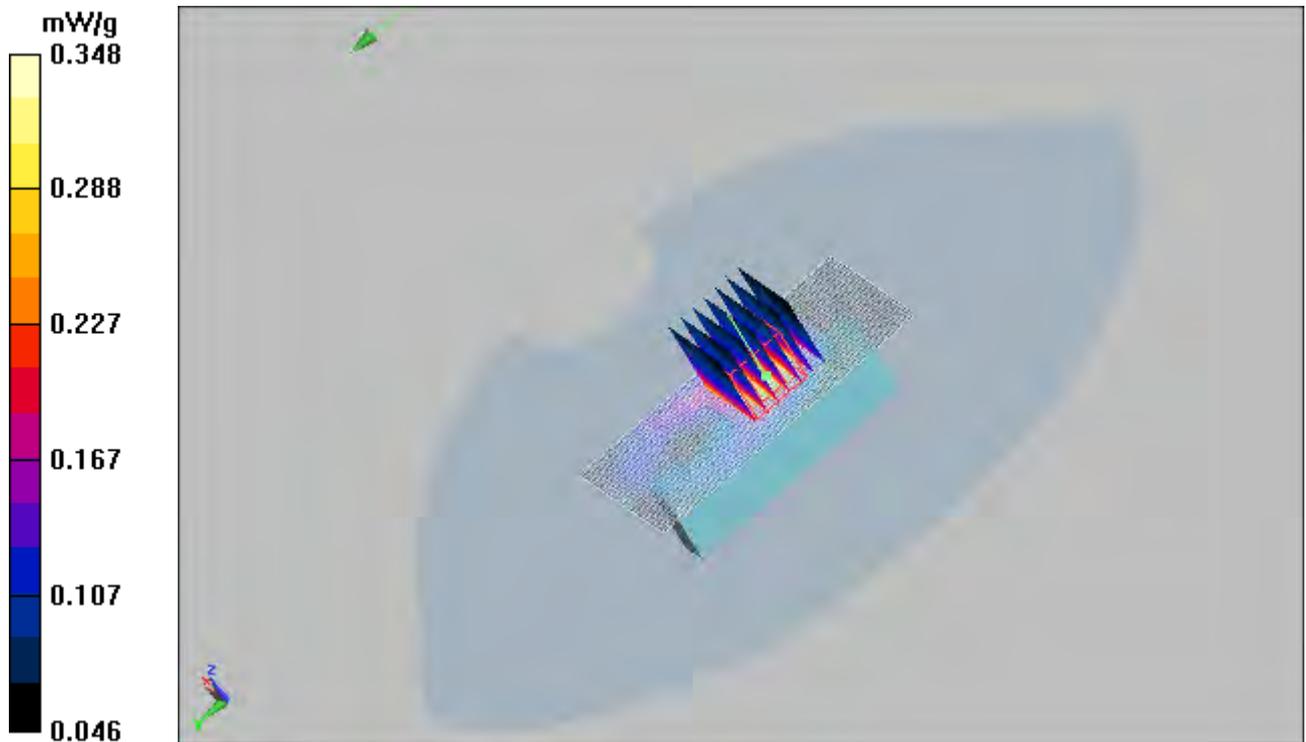


Figure 77 WCDMA Band II with IBM T61 Test Position 3 Channel 9400

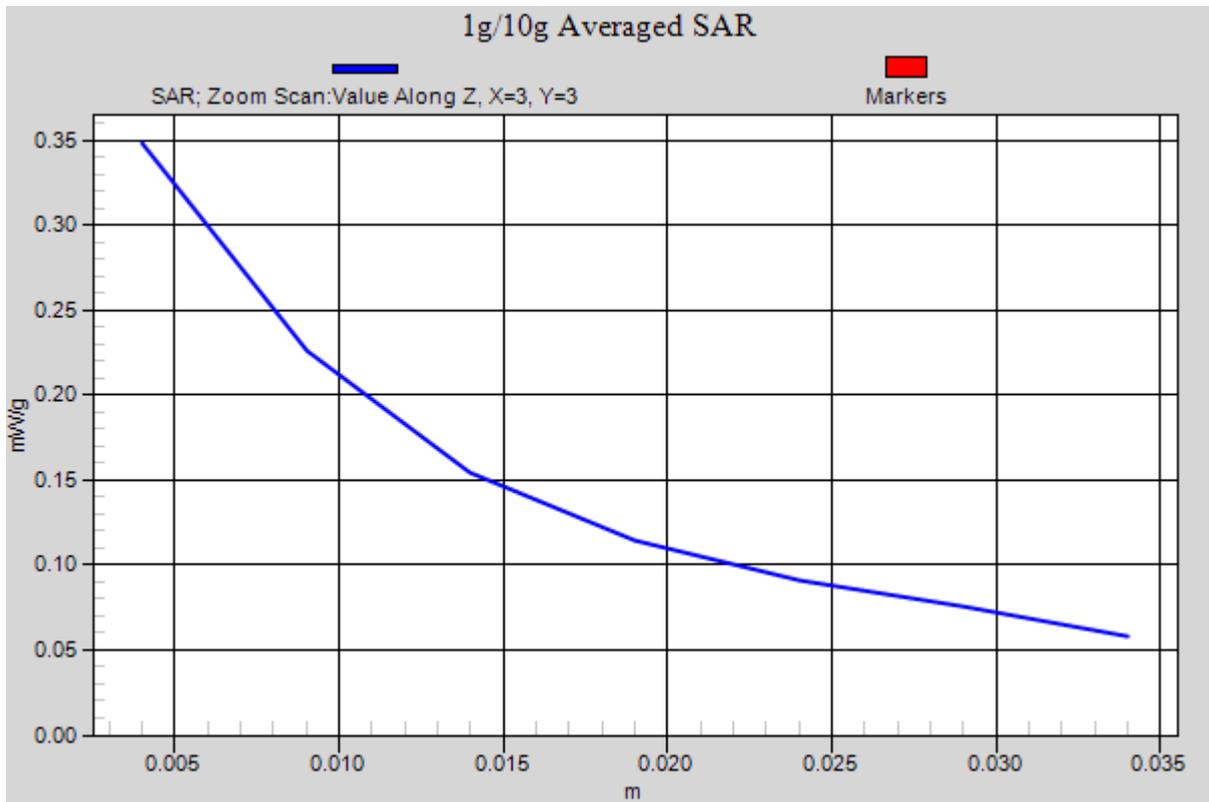


Figure 78 Z-Scan at power reference point [WCDMA Band II with IBM T61 Test Position 3 Channel 9400]

WCDMA Band II with IBM T61 Test Position 4 Middle

Date/Time: 10/25/2009 2:29:16 PM

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 4 Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.813 mW/g

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

Reference Value = 21.9 V/m; Power Drift = 0.160 dB

Peak SAR (extrapolated) = 1.22 W/kg

SAR(1 g) = 0.725 mW/g; SAR(10 g) = 0.402 mW/g

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

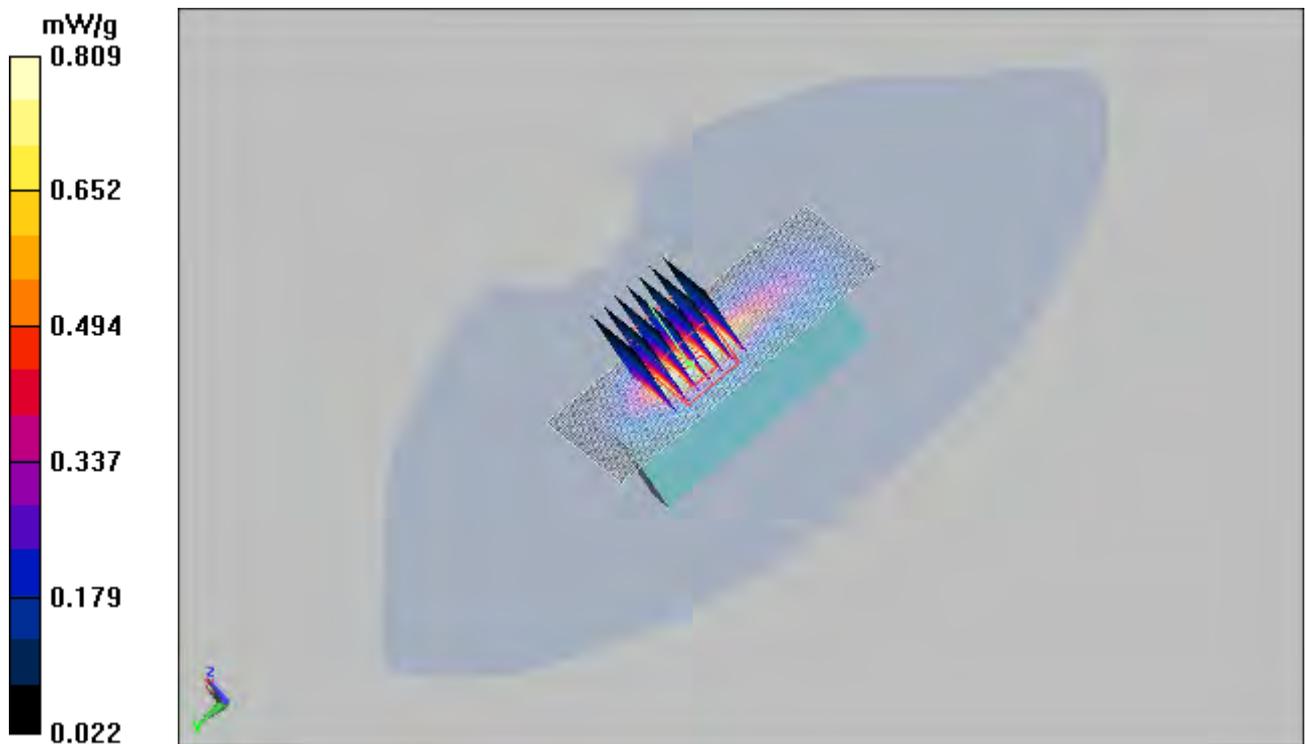


Figure 79 WCDMA Band II with IBM T61 Test Position 4 Channel 9400

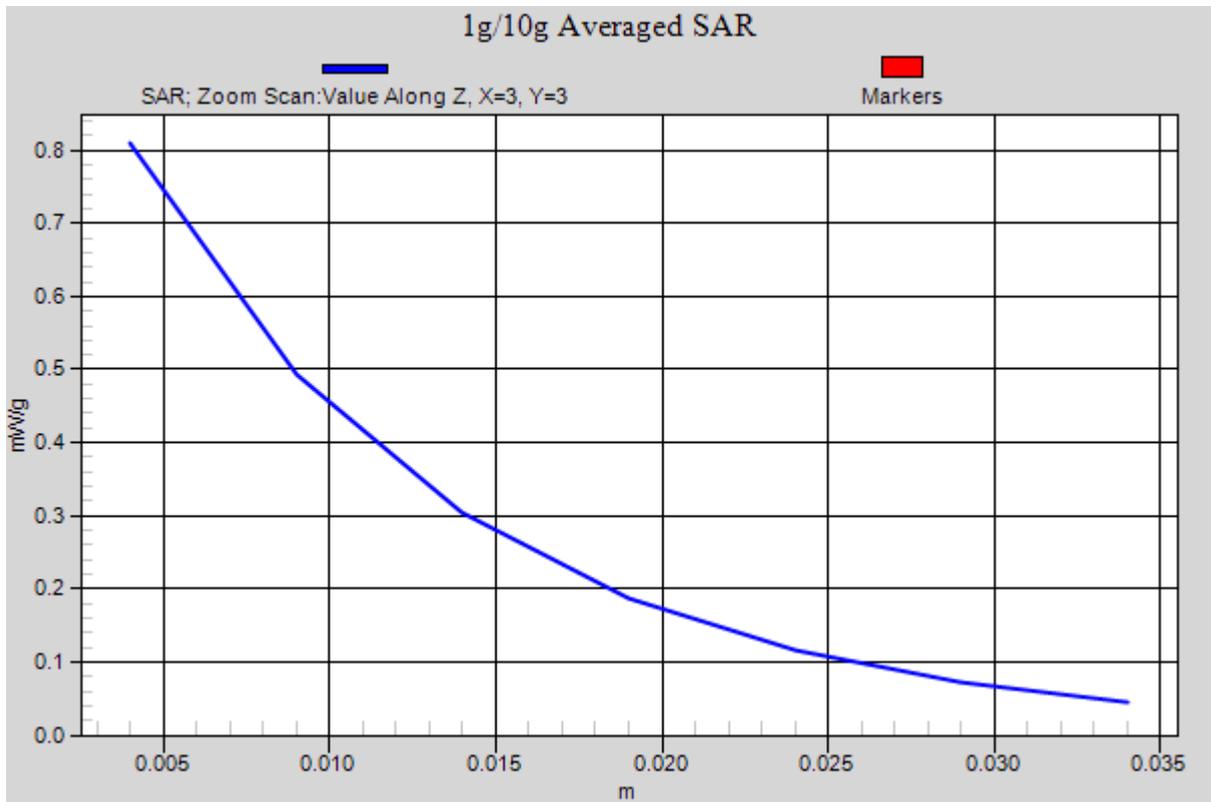


Figure 80 Z-Scan at power reference point [WCDMA Band II with IBM T61 Test Position 4 Channel 9400]

WCDMA Band II with BenQ Joybook R55V Test Position 5 High

Date/Time: 10/25/2009 10:35:47 AM

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

Medium parameters used: $f = 1908$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 5 High/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 26.9 V/m; Power Drift = 0.165 dB

Peak SAR (extrapolated) = 1.6 W/kg

SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.596 mW/g

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

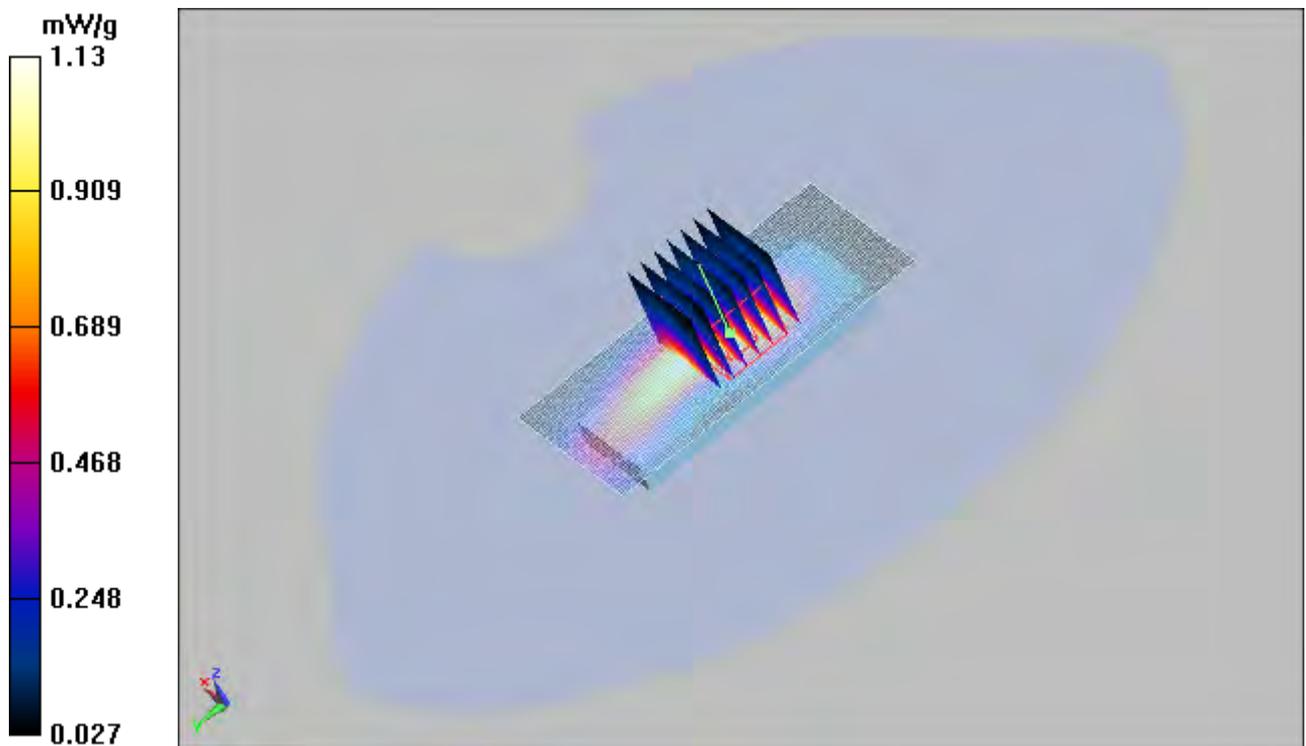


Figure 81 WCDMA Band II with BenQ Joybook R55V Test Position 5 Channel 9538

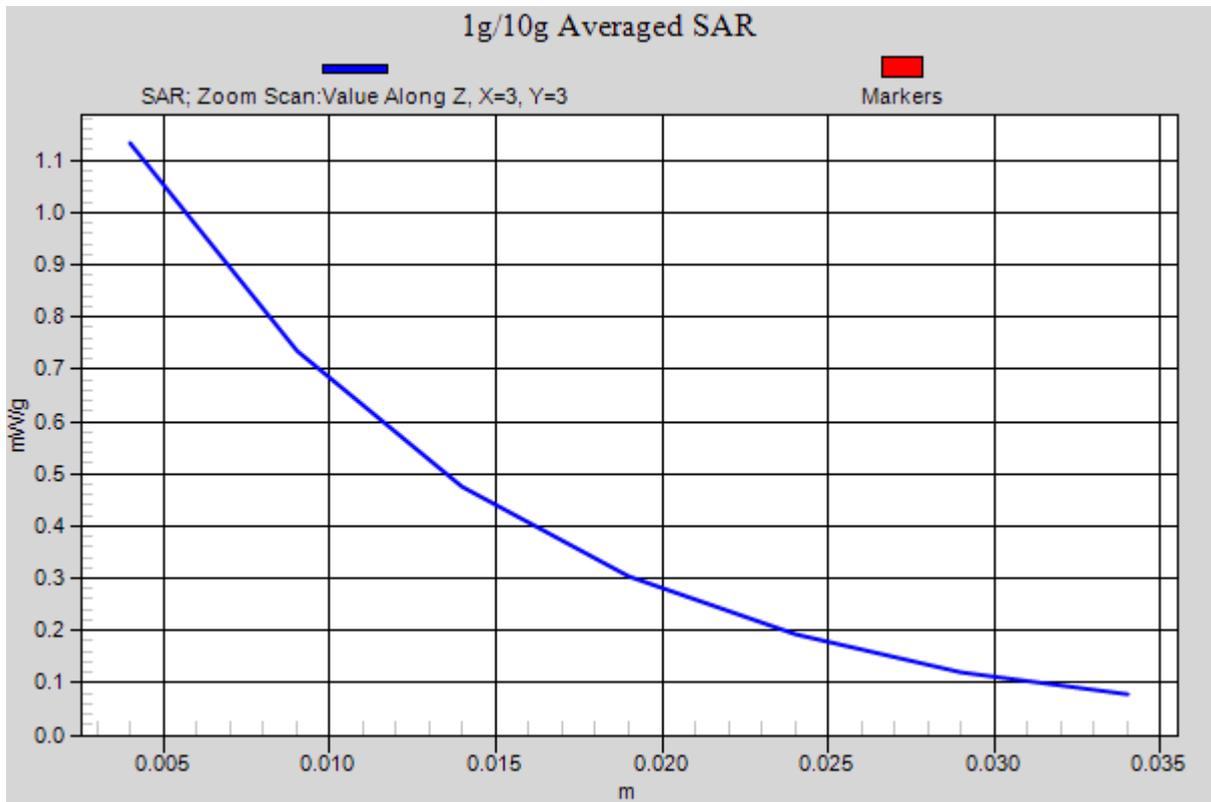


Figure 82 Z-Scan at power reference point [WCDMA Band II with BenQ Joybook R55V Test Position 5 Channel 9538]

WCDMA Band II with BenQ Joybook R55V Test Position 5 Middle

Date/Time: 10/25/2009 10:11:04 AM

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

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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

DASY5 Configuration:

Probe: ET3DV6 - SN1531; ConvF(4.7, 4.7, 4.7); Calibrated: 1/20/2009

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

Phantom: SAM2; Type: SAM;

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

Test Position 5 Middle/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.997 mW/g

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

Reference Value = 25.5 V/m; Power Drift = 0.122 dB

Peak SAR (extrapolated) = 1.36 W/kg

SAR(1 g) = 0.882 mW/g; SAR(10 g) = 0.520 mW/g

Maximum value of SAR (measured) = 0.968 mW/g

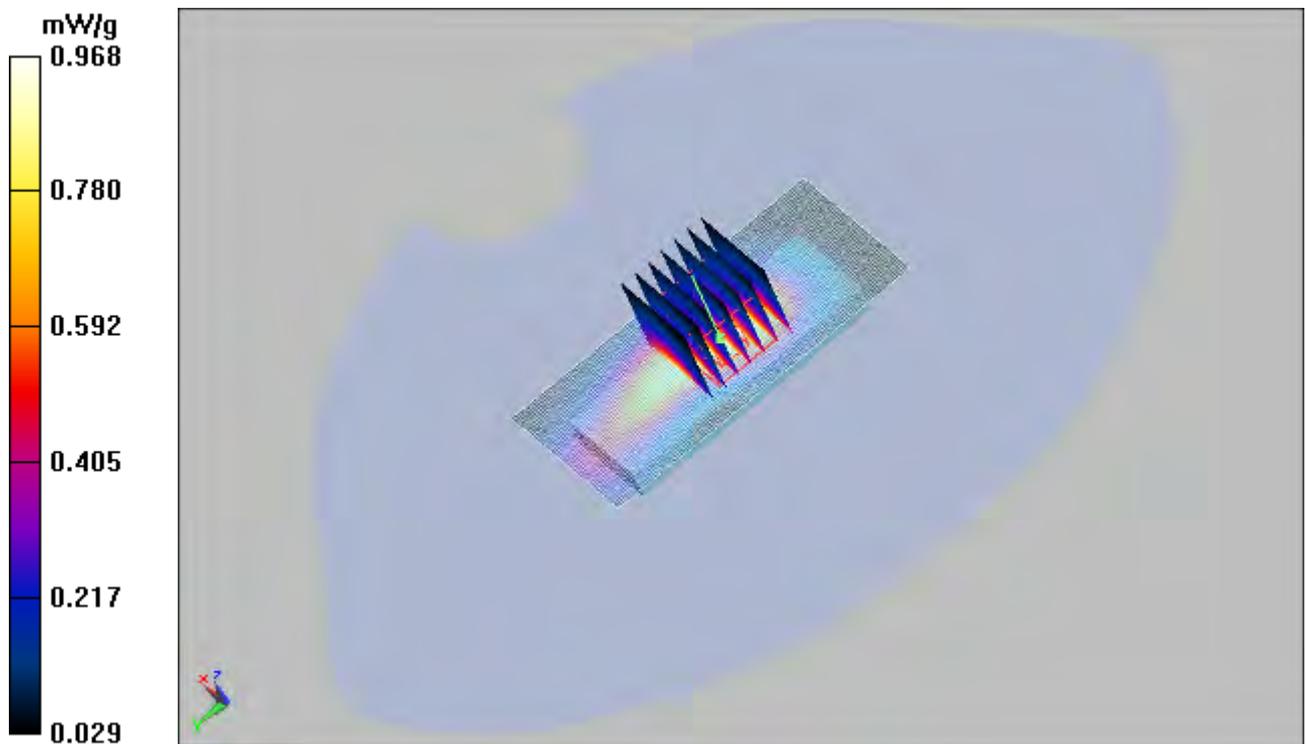


Figure 83 WCDMA Band II with BenQ Joybook R55V Test Position 5 Channel 9400