



NO.: RZA2009-0159FCC



# OET 65

# TEST REPORT

<b>Test name</b>	Electromagnetic Field (Specific Absorption Rate)
<b>Product</b>	HSPA USB Stick
<b>Model</b>	E1762V
<b>FCC ID</b>	QISE1762V
<b>Client</b>	HUAWEI Technologies Co., Ltd.

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



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**GENERAL SUMMARY**

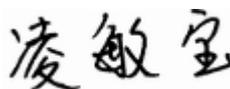
<b>Product</b>	HSPA USB Stick	<b>Model</b>	E1762V
<b>Client</b>	HUAWEI Technologies Co., Ltd.	<b>Type of test</b>	Entrusted
<b>Manufacturer</b>	HUAWEI Technologies Co., Ltd.	<b>Arrival Date of sample</b>	February 24 <sup>th</sup> , 2009
<b>Place of sampling</b>	(Blank)	<b>Carrier of the samples</b>	Ting Zhang
<b>Quantity of the samples</b>	One	<b>Date of product</b>	(Blank)
<b>Base of the samples</b>	(Blank)	<b>Items of test</b>	SAR
<b>Series number</b>	R02AA10920600080		
<b>Standard(s)</b>	<p><b>ANSI C95.1-2005:</b> IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.</p> <p><b>OET Bulletin 65 supplement C, published June 2001 including DA 02-1438, published June 2002:</b> 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><b>IEC 62209-2:2008(106/162/CDV):</b> Human exposure to radio frequency fields from handheld and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 2: Procedure to determine the Specific Absorption Rate (SAR)for wireless communication devices used in close proximity to the human body .( frequency rang of 30MHz to 6GHz )</p>		
<b>Conclusion</b>	<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 7.2 of this test report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 7.1 of this test report.</p> <p>General Judgment: <b>Pass</b></p> <p style="text-align: right;">(Stamp) <b>Date of issue: February 27<sup>th</sup>, 2009</b></p>		
<b>Comment</b>	The test result only responds to the measured sample.		

Approved by



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Revised by



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Performed by



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## **1. COMPETENCE AND WARRANTIES**

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**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.

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### 3. DESCRIPTION OF EUT

#### 3.1. Addressing Information Related to EUT

**Table 1: Applicant (The Client)**

Name or Company	HUAWEI Technologies Co., Ltd.
Address/Post	Bantian, Longgang District
City	Shenzhen
Postal Code	518129
Country	P.R. China
Telephone	0755-28780808
Fax	0755-28780808

**Table 2: Manufacturer**

Name or Company	HUAWEI Technologies Co., Ltd.
Address/Post	Bantian, Longgang District
City	Shenzhen
Postal Code	518129
Country	P.R. China
Telephone	0755-28780808
Fax	0755-28780808

#### 3.2. Constituents of EUT

**Table 3: Constituents of Samples**

Description	Model	Serial Number	Manufacturer
HSPA USB Stick	E1762V	R02AA10920600080	HUAWEI Technologies Co., Ltd.

Note:

The EUT appearances see ANNEX H.

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**3.3. Test item**

**Table 4: Test item**

device type :	portable device	
exposure category:	uncontrolled environment / general population	
device operating configurations :		
operating mode(s):	GSM850; ( tested ) GSM1900; ( tested )	
Modulation:	GMSK, 8-PSK;	
GPRS mobile station class :	B	
GPRS multislot class :	10	
EGPRS multislot class:	10	
Maximum no. of timeslots in uplink:	2	
operating frequency range(s)	transmitter frequency range	receiver frequency range
GSM850: (tested)	824.2 MHz ~ 848.8 MHz	869.2 MHz ~ 893.8 MHz
GSM1900: (tested)	1850.2 MHz ~ 1909.8 MHz	1930.2 MHz ~ 1989.8 MHz
Power class	GSM 850: 4, tested with power level 5	
	GSM 1900: 1, tested with power level 0	
Test channel (Low –Middle –High)	128-190-251	(GSM850) (tested)
	512 - 661-810	(GSM1900) (tested)
hardware version:	CD25TCPU	
software version:	11.108.03.01.00	
antenna type:	integrated antenna	
Used host products:	IBM T61	

### **3.4. General Description**

Equipment Under Test (EUT) is a HSPA USB Stick with internal antenna. During SAR test of the EUT, it was connected to a portable computer. SAR is tested for the EUT respectively for GSM 850 and GSM1900. The EUT have GPRS (class 10) and EGPRS (class 10) functions.

Since the EUT only has the data transfer function, but does not have the voice transfer function, the tests in the band of GSM850 and GSM 1900 are performed in the mode of GPRS and EGPRS, The measurements were performed in combination with a host product (IBM T61). IBM T61 laptop has vertical USB slot and horizontal USB slot.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

## **4. OPERATIONAL CONDITIONS DURING TEST**

### **4.1. 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.

The device that connected to host computers must be tested with the device position for all applicable orientations. The measurements were performed in combination with a host product (IBM T61).

### **4.2. GSM Test Configuration**

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

### **4.3. Position of module in Portable devices**

The measurements were performed in combination with a host product (IBMT61). IBM T61 laptop has vertical USB slot and 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 5-a)
- Test Position 2: The EUT is connected to the portable computer through a 19cm USB cable. The front side of the EUT towards the bottom of the flat phantom. (ANNEX H Picture 5-b)
- Test Position 3: 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 5-c)
- Test Position 4: 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 5-d)
- Test Position 5: 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 5-e)

#### 4.4. Picture of host product

During the test, IBM T61 laptop was used as an assistant to help to setup communication. (See Picture 1)



Picture 1-a: IBM T61 Close



Picture 1-b: IBM T61 Open



Picture 1-c: IBM T61 with horizontal USB slot



Picture 1-d: IBM T61 with Vertical USB slot



Picture 1-e: a 19cm USB cable

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

## 5. SAR MEASUREMENTS SYSTEM CONFIGURATION

### 5.1. SAR Measurement Set-up

The DASY4 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 measurement server.
- The DASY4 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 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.

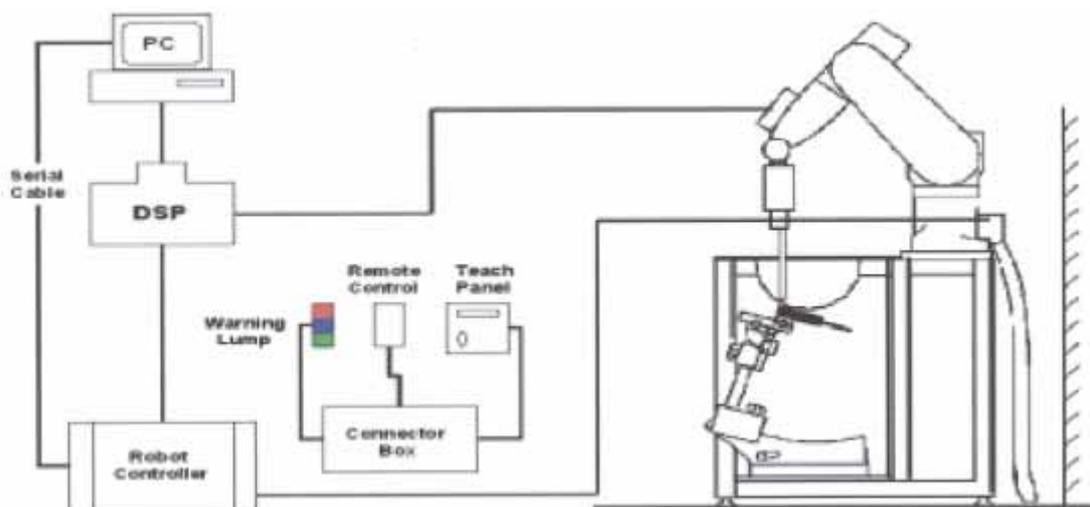


Figure 1. SAR Lab Test Measurement Set-up

## 5.2. Dasy4 E-field Probe System

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

### 5.2.1. EX3DV4 Probe Specification

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 900 and HSL 1750 Additional CF for other liquids and frequencies upon request
Frequency	10 MHz to > 6 GHz Linearity: $\pm 0.2$ dB (30 MHz to 6 GHz)
Directivity	$\pm 0.3$ dB in HSL (rotation around probe axis) $\pm 0.5$ dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 $\mu$ W/g to > 100 mW/g Linearity: $\pm 0.2$ dB (noise: typically < 1 $\mu$ W/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.



Figure 2. EX3DV4 E-field Probe



Figure 3. EX3DV4 E-field probe

### 5.2.2. 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:  $\Delta t$  = Exposure time (30 seconds),  
C = Heat capacity of tissue (brain or muscle),  
 $\Delta T$  = Temperature increase due to RF exposure.  
Or

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

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

### 5.3. Other Test Equipment

#### 5.3.1. 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 DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity  $\epsilon_r=3$  and loss tangent  $\tan \delta=0.02$ . 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**

### 5.3.2. 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**

### 5.4. Scanning procedure

The DASY4 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 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 15 mm x 15 mm is set. During the scan the distance of the probe to the phantom remains unchanged.

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

- Zoom Scan

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

- Spatial Peak Detection

The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses. The DASY4 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.

## 5.5. Data Storage and Evaluation

### 5.5.1. Data Storage

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

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm<sup>2</sup>], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

### 5.5.2. 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, ai <sub>0</sub> , ai <sub>1</sub> , ai <sub>2</sub>
	- Conversion factor	ConvF <sub>i</sub>
	- Diode compression point	Dcp <sub>i</sub>
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

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 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

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

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

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

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

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

$cf$  = crest factor of exciting field (DASY parameter)

$dcp_i$  = diode compression point (DASY parameter)

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

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

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

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

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

$ConvF$  = sensitivity enhancement in solution

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

$f$  = carrier frequency [GHz]

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

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

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

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

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

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

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

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

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

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

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

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

with  **$P_{pwe}$**  = equivalent power density of a plane wave in mW/cm<sup>2</sup>

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

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

## 5.6. 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 9.

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.

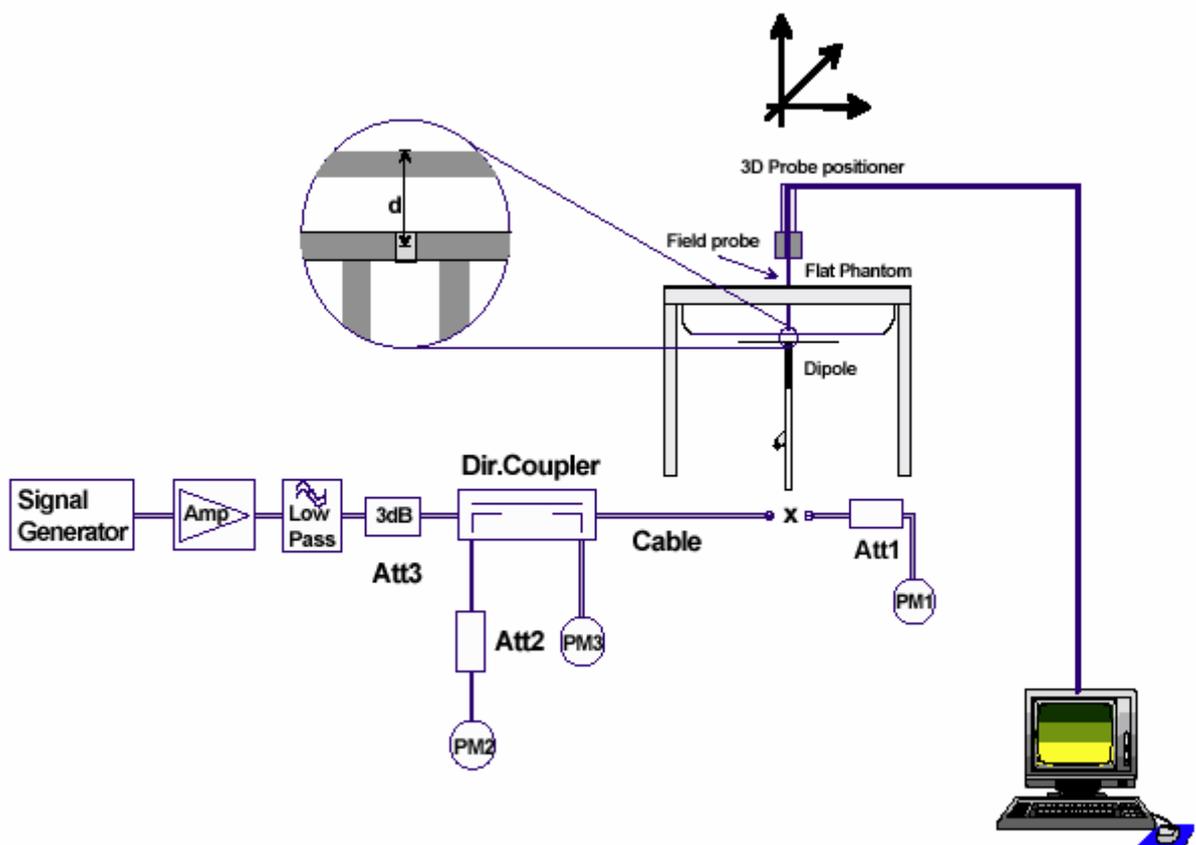


Figure 6. System Check Set-up

### 5.7. 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 10 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by OET 65.

**Table 5: 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 $\epsilon=53.3$ $\sigma=1.52$

## 6. LABORATORY ENVIRONMENT

**Table 6: The Ambient Conditions during Test**

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

## **7. CHARACTERISTICS OF THE TEST**

### **7.1. Applicable Limit Regulations**

**ANSI C95.1–2005:** IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

### **7.2. 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 ).

## 8. CONDUCTED OUTPUT POWER MEASUREMENT

### 8.1. 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.

### 8.2. Conducted Power Results

**Table 7: Conducted Power Measurement Results**

<b>GSM 850+GPRS(1 slot)</b>	<b>Conducted Power</b>		
	Channel 128	Channel 190	Channel 251
Before test (dBm)	29.47	29.25	29.23
After test(dBm)	29.46	29.24	29.24
<b>GSM 850+GPRS(2 slots)</b>	<b>Conducted Power</b>		
	Channel 128	Channel 190	Channel 251
Before test (dBm)	26.49	26.28	26.24
After test(dBm)	26.47	26.27	26.23
<b>GSM 1900+GPRS(1 slot)</b>	<b>Conducted Power</b>		
	Channel 512	Channel 661	Channel 810
Before test (dBm)	27.26	27.25	27.17
After test(dBm)	27.25	27.24	27.18
<b>GSM 1900+GPRS(2 slots)</b>	<b>Conducted Power</b>		
	Channel 512	Channel 661	Channel 810
Before test (dBm)	25.38	25.29	25.30
After test(dBm)	25.37	25.28	25.31

## 9. TEST RESULTS

### 9.1. Dielectric Performance

**Table 8: Dielectric Performance of Body Tissue Simulating Liquid**

Frequency	Description	Dielectric Parameters		Temp °C
		$\epsilon_r$	$\sigma$ (s/m)	
<b>835MHz (body)</b>	Target value ±5% window	55.20 52.44 — 57.96	0.97 0.92 — 1.02	/
	Measurement value 2009-2-25	54.97	0.96	21.9
<b>1900MHz (body)</b>	Target value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60	/
	Measurement value 2009-2-26	51.82	1.55	21.8

### 9.2. System check

**Table 9: System check**

Frequency	Description	SAR(W/kg)		Dielectric Parameters		Temp °C
		10g	1g	$\epsilon_r$	$\sigma$ (s/m)	
<b>835MHz</b>	Recommended result ±10% window	1.52 1.37—1.67	2.3 2.07 — 2.53	40.9	0.89	/
	Measurement value 2009-2-25	1.5	2.3	41.75	0.92	21.9
<b>1900 MHz</b>	Recommended result ±10% window	5.06 4.55—5.57	9.84 8.86 — 10.82	38.8	1.47	/
	Measurement value 2009-2-26	5.09	9.74	39.70	1.41	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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## Test Report

### 9.3. Summary of Measurement Results

#### 9.3.1. GSM850 (GPRS/EGPRS)

**Table 10: SAR Values [GSM850 (GPRS/EGPRS)]**

Liquid Temperature: 22.4						
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	2 timeslots	Middle	0.354 (max.cube)	0.541 (max.cube)	-0.182	Figure 11
	1 timeslot	High	0.355 (max.cube)	0.560 (max.cube)	0.014	Figure 13
		Middle	0.393 (max.cube)	0.610 (max.cube)	-0.036	Figure 15
		Low	<b>0.403</b> <b>(max.cube)</b>	<b>0.617</b> <b>(max.cube)</b>	-0.038	Figure 17
Test Position 2	1 timeslot	Middle	0.183 (max.cube)	0.288 (max.cube)	0.004	Figure 19
Test Position 3	1 timeslot	Middle	0.030	0.073	-0.023	Figure 21
Test Position 4	1 timeslot	Middle	0.320	0.498	-0.095	Figure 23
Test Position 5	1 timeslot	Middle	0.238	0.366	-0.111	Figure 25
Worst case position of GPRS with EGPRS						
Test Position 1	1 timeslot	Low	0.166	0.254	0.118	Figure 27

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 tables above; the value from the second assessed cube is given in the SAR distribution plots (See ANNEX C).

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**Table 11: 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	Low	0.813	0.407	1.017
	5mm	Low	0.546		
	10mm	Low	0.342		

- 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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### 9.3.2. GSM1900 (GPRS/EGPRS)

**Table 12: SAR Values [GSM1900 (GPRS/EGPRS)]**

Liquid Temperature: 22.4°C						
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	2 timeslots	High	0.399	0.757	0.135	Figure 29
		Middle	0.440	0.832	-0.053	Figure 31
		Low	<b>0.490</b>	<b>0.928</b>	-0.176	Figure 33
	1 timeslot	Middle	0.341	0.646	-0.064	Figure 35
Test Position 2	2 timeslots	High	0.418	0.803	-0.091	Figure 37
		Middle	0.431	0.839	-0.103	Figure 39
		Low	0.453	0.895	0.006	Figure 41
Test Position 3	2 timeslots	Middle	0.129	0.262	-0.047	Figure 43
Test Position 4	2 timeslots	Middle	0.248	0.445	0.047	Figure 45
Test Position 5	2 timeslots	Middle	0.254	0.471	-0.189	Figure 47
Worst case position of GPRS with EGPRS						
Test Position 1	2 timeslots	Low	0.456	0.859	-0.044	Figure 49

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

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

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**Table 13: 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	Low	1.340	0.670	1.675
	5mm	Low	0.630		

- 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.

#### 9.4. 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 7.2 of this report. Maximum localized SAR is 0.928w/kg that is below exposure limits specified in the relevant standards cited in Clause 7.1 of this test report.

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**10. MEASUREMENT UNCERTAINTY**

No.	a	Type	c	d	e=f(d, k)	f	h=cxf / e	k
	Uncertainty Component		Tol. (±%)	Prob. Dist	Div.	c <sub>1</sub> (1g)	1g u (± %)	v <sub>1</sub>
1	System repetivity	A	0.5	N	1	1	0.5	9
Measurement system								
2	Probe Calibration	B	5	N	2	1	2.5	∞
3	Axial isotropy	B	4.7	R	$\sqrt{3}$	$(1-c_p)_{1/2}$	4.3	∞
4	Hemisphere Isotropy	B	9.4	R	$\sqrt{3}$	$\sqrt{C_P}$		∞
5	Boundary Effect	B	0.4	R	$\sqrt{3}$	1	0.23	∞
6	Linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
7	System Detection Limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
8	Readout Electronics	B	1.0	N	1	1	1.0	∞
9	RF Ambient Conditions	B	3.0	R	$\sqrt{3}$	1	1.73	∞
10	Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
11	Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
12	Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
Test Sample Related								
13	Test Sample Positioning	A	4.9	N	1	1	4.9	N-1
14	Device Holder Uncertainty	A	6.1	N	1	1	6.1	N-1
15	Output Power Variation-SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.9	∞
Phantom and Tissue Parameters								
16	Phantom Uncertainty(shape and thickness tolerances)	B	1.0	R	$\sqrt{3}$	1	0.6	∞
17	Liquid Conductivity-deviation from target values	B	5.0	R	$\sqrt{3}$	0.64	1.7	∞
18	Liquid Conductivity-measurement uncertainty	B	5.0	N	1	0.64	1.7	M
19	Liquid Permittivity-deviation from target values	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
20	Liquid Permittivity- measurement uncertainty	B	5.0	N	1	0.6	1.7	M
Combined Standard Uncertainty							11.25	
Expanded Uncertainty (95 % CONFIDENCE INTERVAL)							22.5	

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## 11. MAIN TEST INSTRUMENTS

**Table 14: List of Main Instruments**

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 14, 2008	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 14, 2008	One year
04	Power sensor	Agilent 8481H	MY41091316	March 14, 2008	One year
05	Signal Generator	HP 8341B	2730A00804	September 14, 2008	One year
06	Amplifier	IXA-020	0401	No Calibration Requested	
07	Validation Kit 835MHz	D835V2	4d020	July 21, 2008	One year
08	Validation Kit 1900MHz	D1900V2	5d060	July 22, 2008	One year
09	BTS	E5515C	GB46490218	September 14, 2008	One year
10	E-field Probe	EX3DV4	3660	September 3, 2008	One year
11	DAE	DAE4	452	November 18, 2008	One year

## 12. TEST PERIOD

The test is performed in February 25, 2009 to February 26, 2009.

## 13. TEST LOCATION

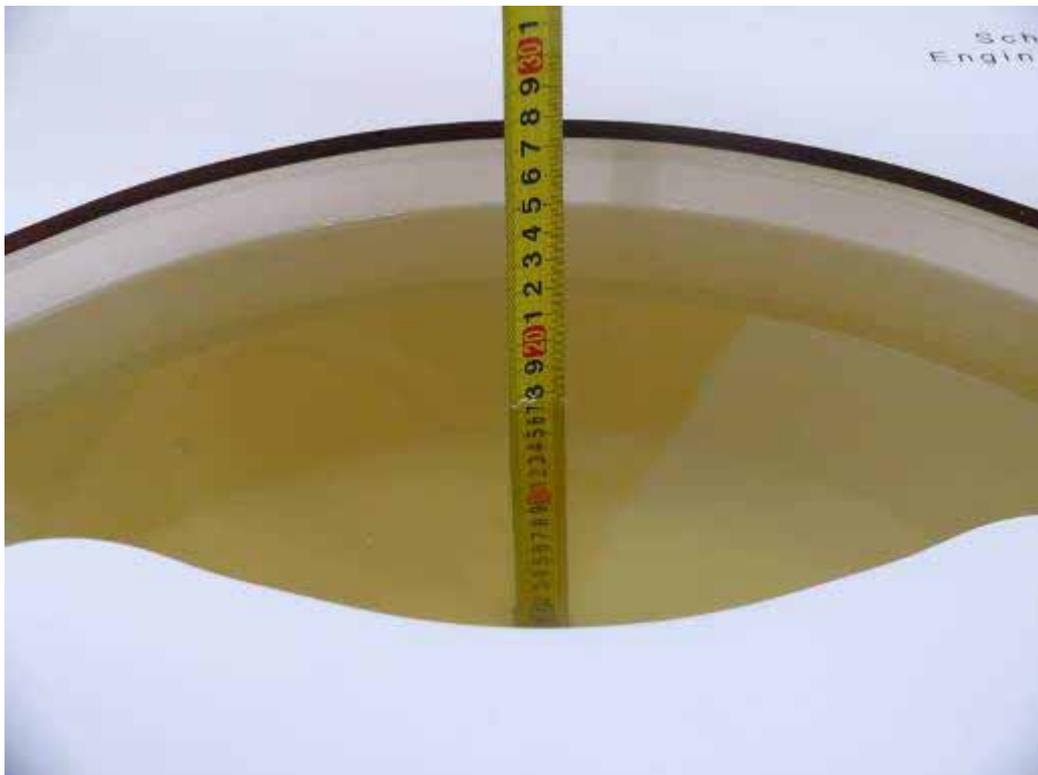
The test is performed at TA Technology (Shanghai) Co., Ltd.

\*\*\*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)



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

## ANNEX B: SYSTEM CHECK RESULTS

Date/Time: 2/25/2009 8:32:49 AM

### System Performance Check at 835 MHz

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

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

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.92$  mho/m;  $\epsilon_r = 41.75$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Probe: EX3DV4 - SN3660; ConvF(9.19, 9.19, 9.19);

Electronics: DAE4 Sn452;

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

Maximum value of SAR (interpolated) = 2.81 mW/g

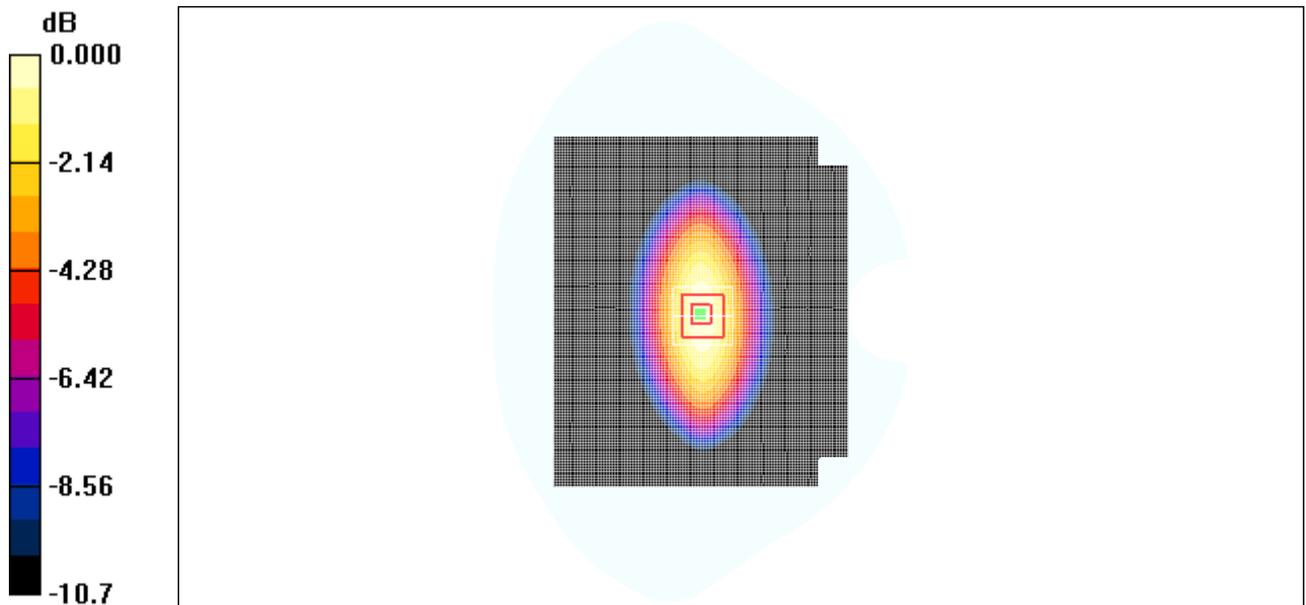
**d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.8 V/m; Power Drift = -0.060 dB

Peak SAR (extrapolated) = 3.50 W/kg

**SAR(1 g) = 2.3 mW/g; SAR(10 g) = 1.5 mW/g**

Maximum value of SAR (measured) = 2.83 mW/g



0 dB = 2.83mW/g

Figure 7 System Performance Check 835MHz 250mW

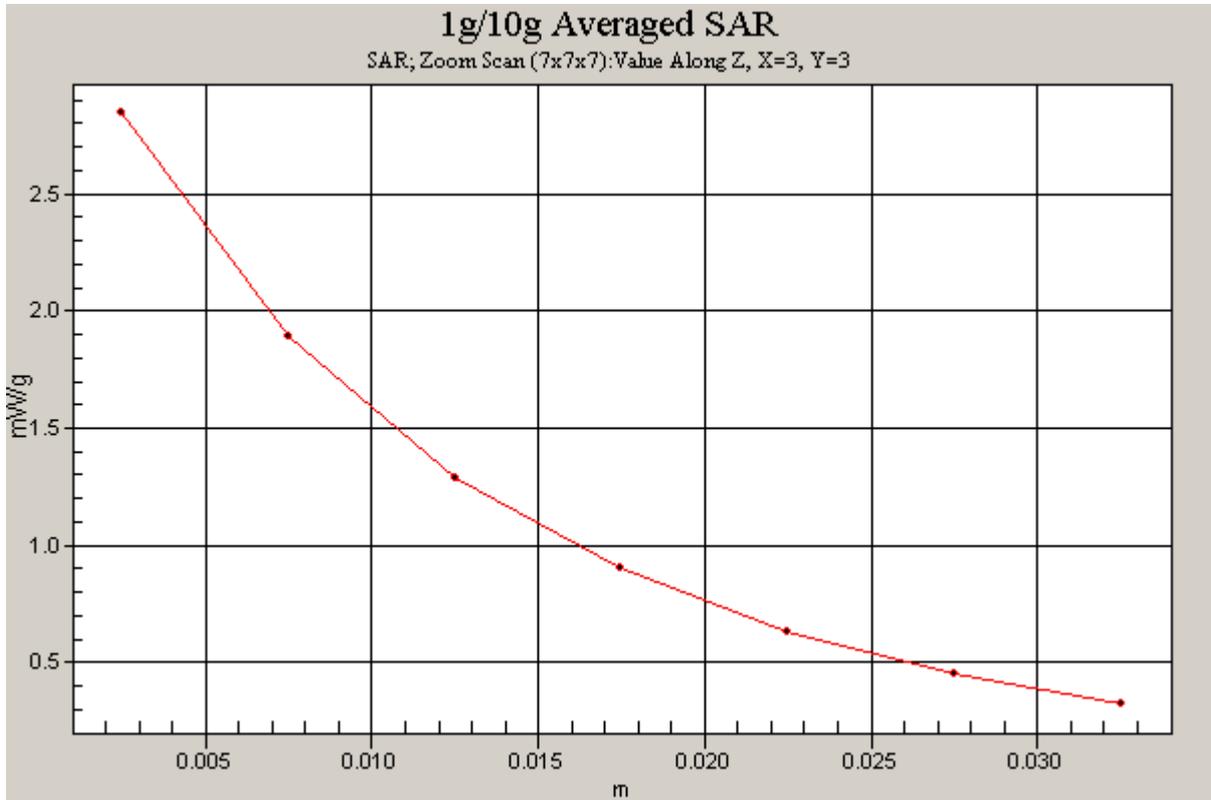


Figure 8 Z-Scan at power reference point (system Check at 835 MHz dipole)

Date/Time: 2/26/2009 11:31:49 AM

### System Performance Check at 1900 MHz

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

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

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.41$  mho/m;  $\epsilon_r = 39.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Probe: EX3DV4 - SN3660; ConvF(7.35, 7.35, 7.35);

Electronics: DAE4 Sn452;

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

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

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

Reference Value = 93.1 V/m; Power Drift = -0.006 dB

Peak SAR (extrapolated) = 16.9 W/kg

**SAR(1 g) = 9.74 mW/g; SAR(10 g) = 5.09 mW/g**

Maximum value of SAR (measured) = 11.1 mW/g

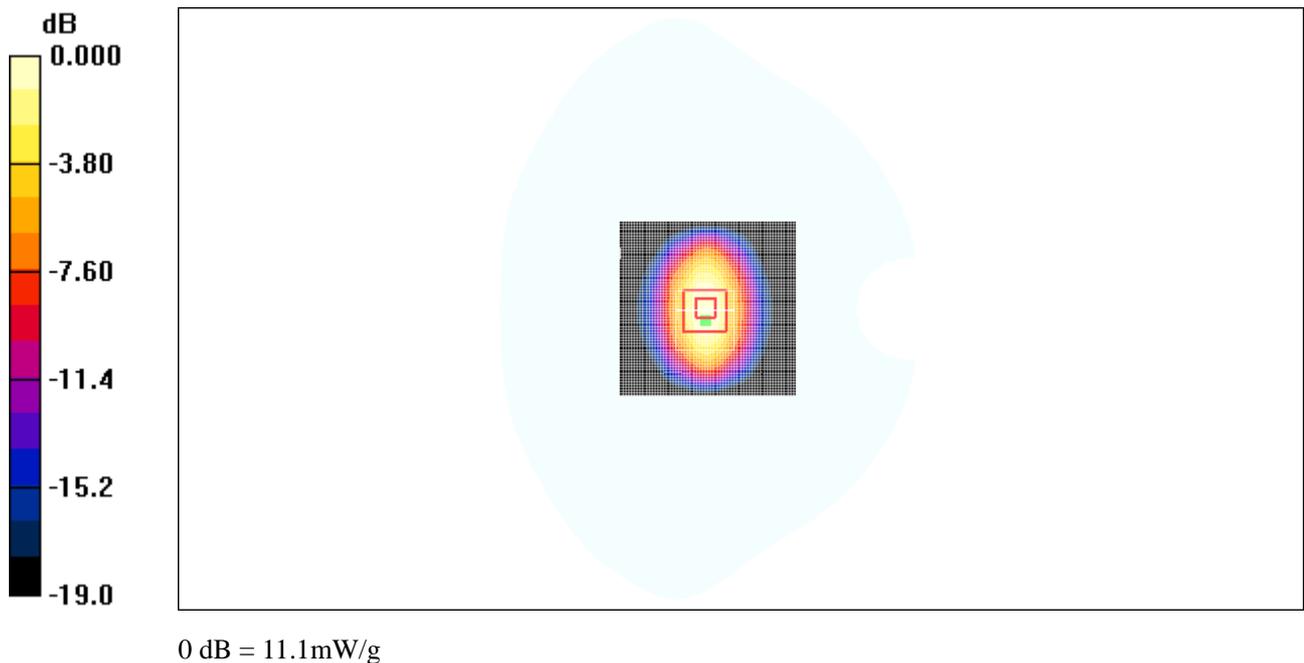


Figure 9 System Performance Check 1900MHz 250mW

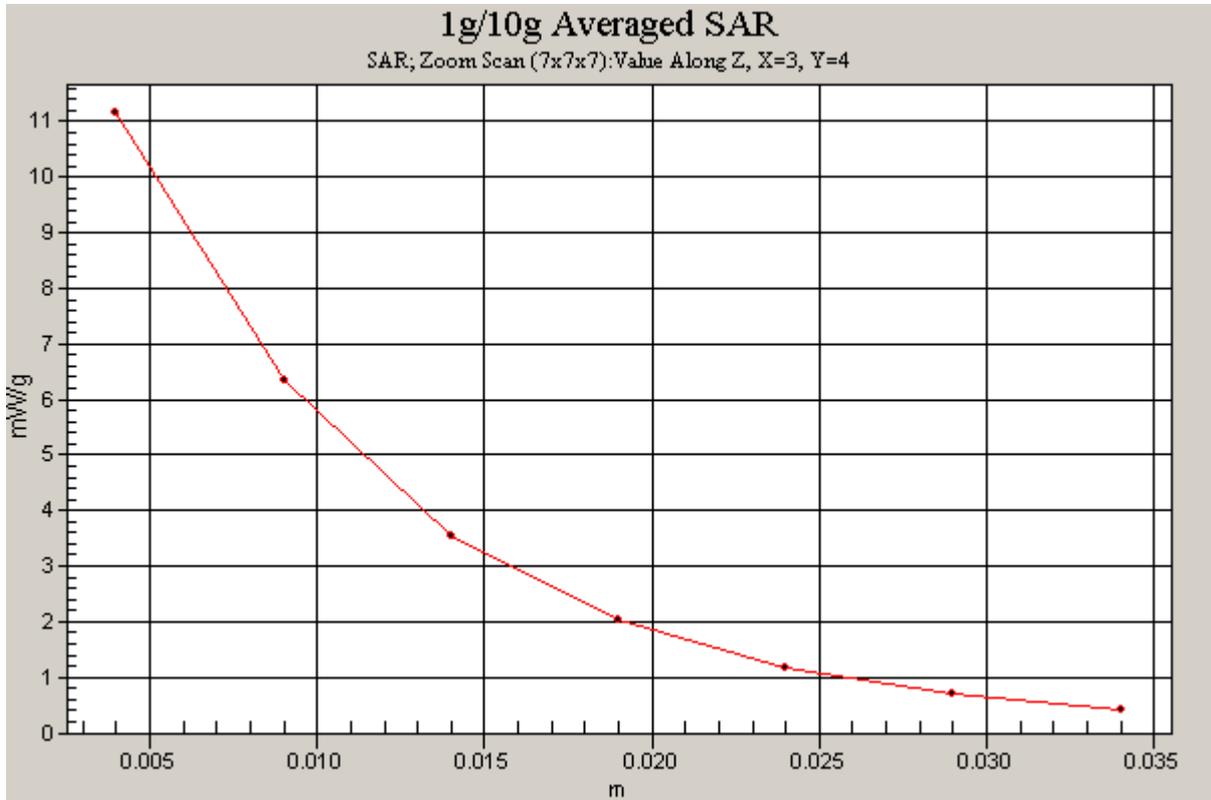


Figure 10 Z-Scan at power reference point (system Check at 1900 MHz dipole)

## ANNEX C: GRAPH RESULTS

Date/Time: 2/25/2009 9:45:05 AM

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

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.961$  mho/m;  $\epsilon_r = 54.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 1 Middle/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.670 mW/g

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

Reference Value = 25.5 V/m; Power Drift = -0.182 dB

Peak SAR (extrapolated) = 0.800 W/kg

**SAR(1 g) = 0.541 mW/g; SAR(10 g) = 0.354 mW/g**

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

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

Reference Value = 25.5 V/m; Power Drift = -0.182 dB

Peak SAR (extrapolated) = 0.594 W/kg

**SAR(1 g) = 0.384 mW/g; SAR(10 g) = 0.222 mW/g**

Maximum value of SAR (measured) = 0.498 mW/g

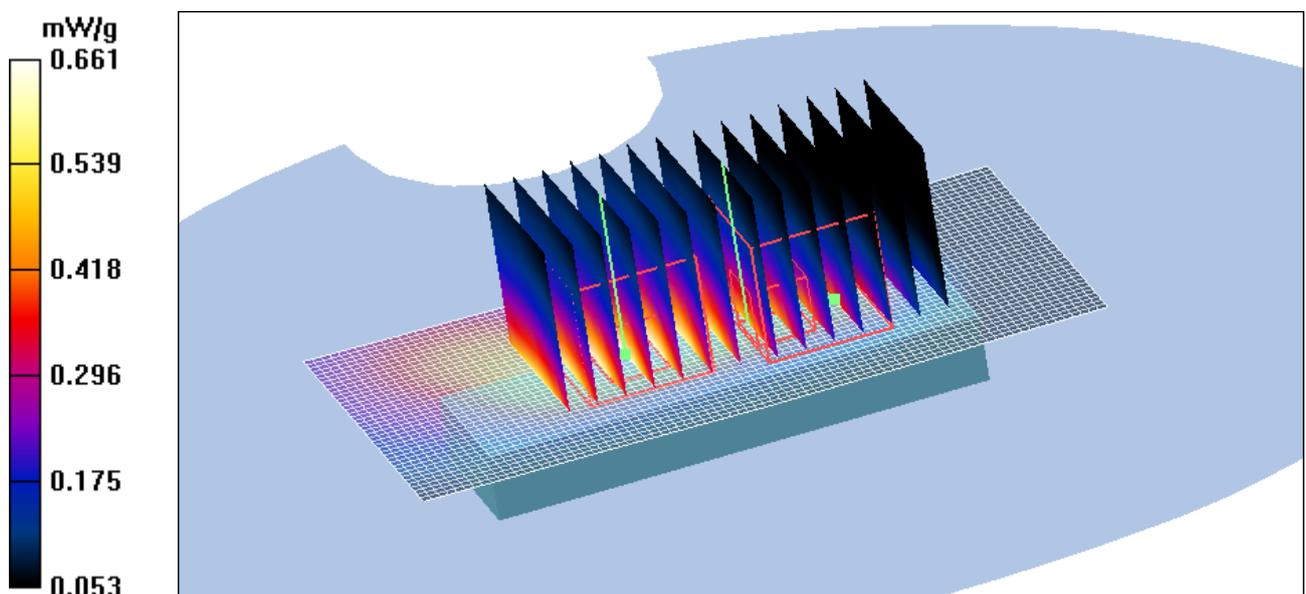


Figure 11 GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 190

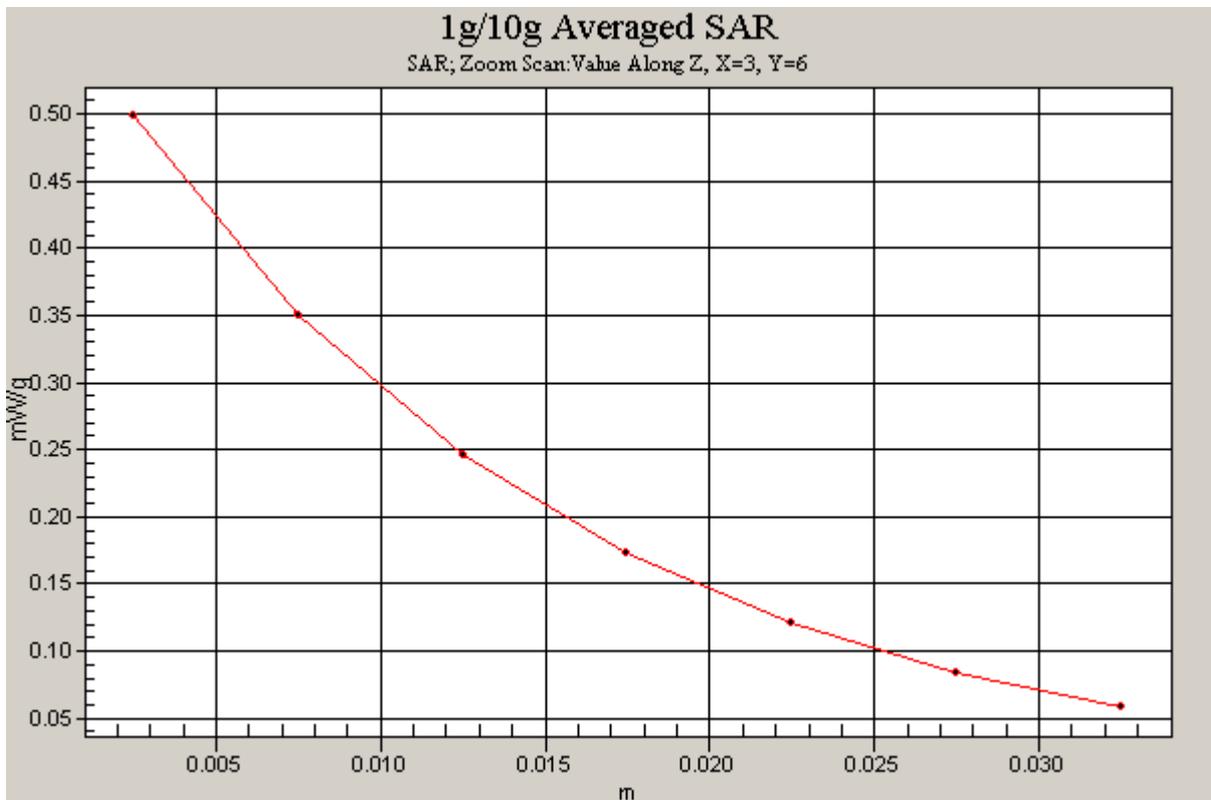
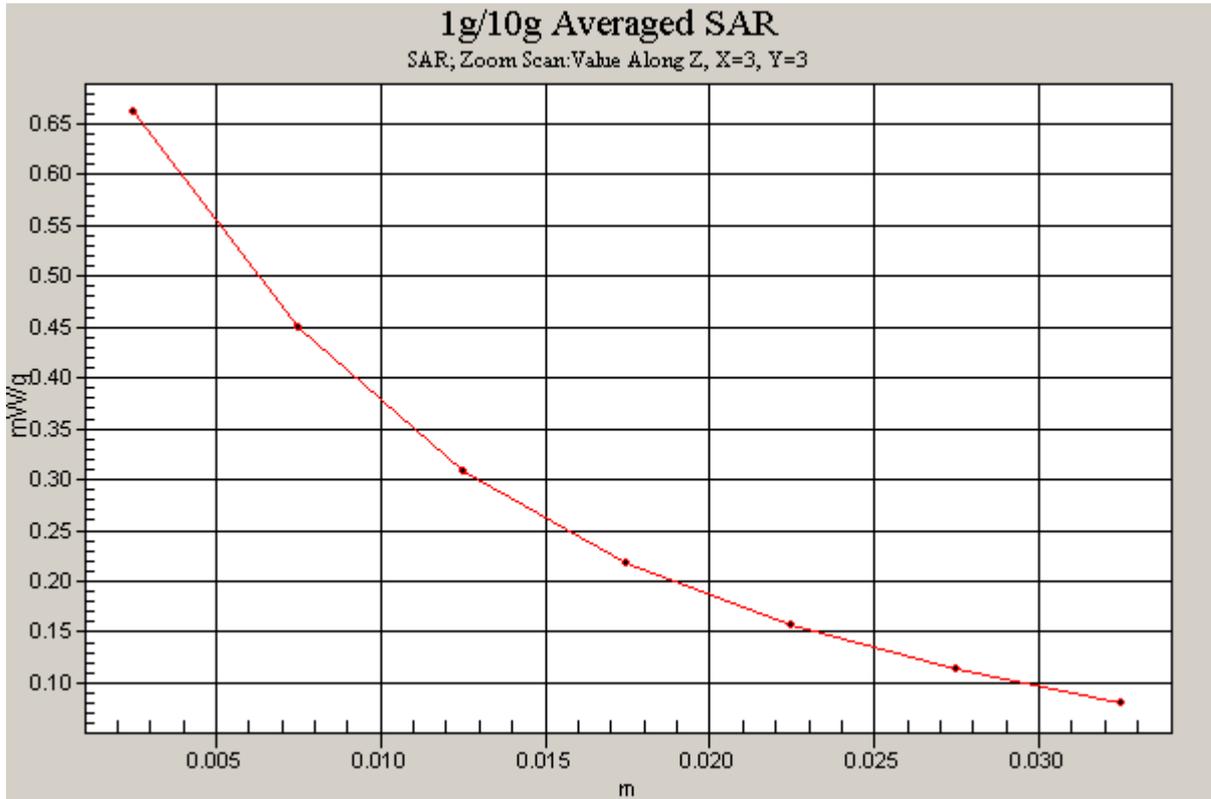


Figure 12 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1Channel 190]

Date/Time: 2/25/2009 10:16:05 AM

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

Medium parameters used:  $f = 849$  MHz;  $\sigma = 0.976$  mho/m;  $\epsilon_r = 54.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 1 High/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.672 mW/g

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

Reference Value = 22.6 V/m; Power Drift = 0.014 dB

Peak SAR (extrapolated) = 0.859 W/kg

**SAR(1 g) = 0.560 mW/g; SAR(10 g) = 0.355 mW/g**

Maximum value of SAR (measured) = 0.680 mW/g

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

Reference Value = 22.6 V/m; Power Drift = 0.014 dB

Peak SAR (extrapolated) = 0.705 W/kg

**SAR(1 g) = 0.431 mW/g; SAR(10 g) = 0.251 mW/g**

Maximum value of SAR (measured) = 0.579 mW/g

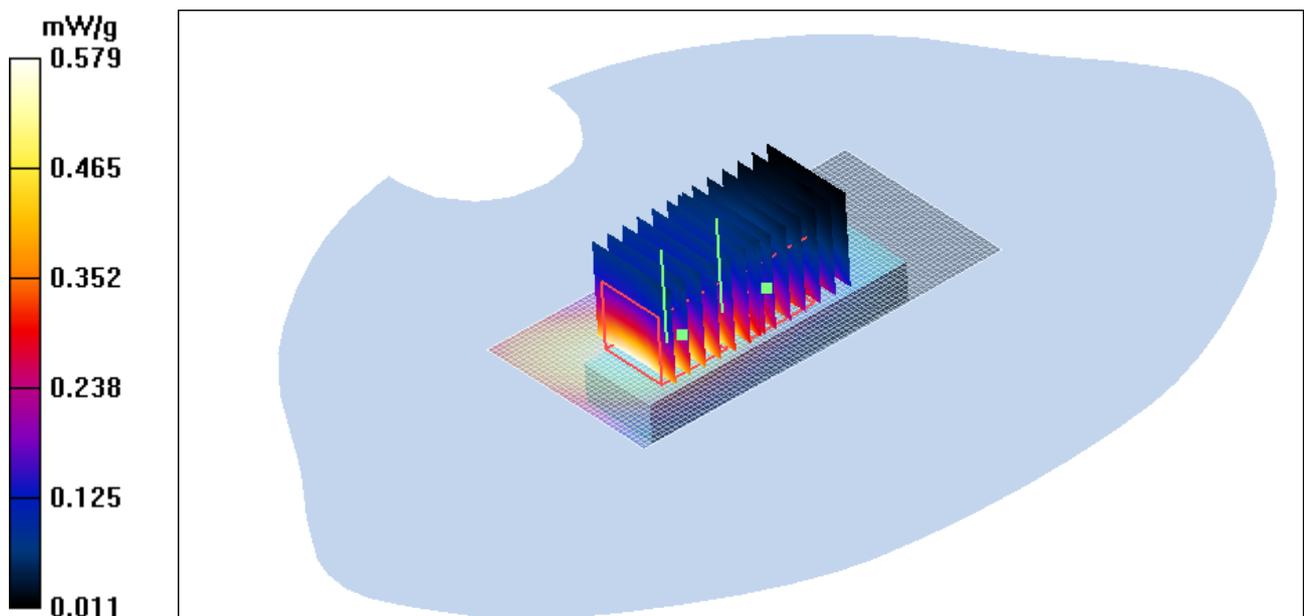


Figure 13 GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 251

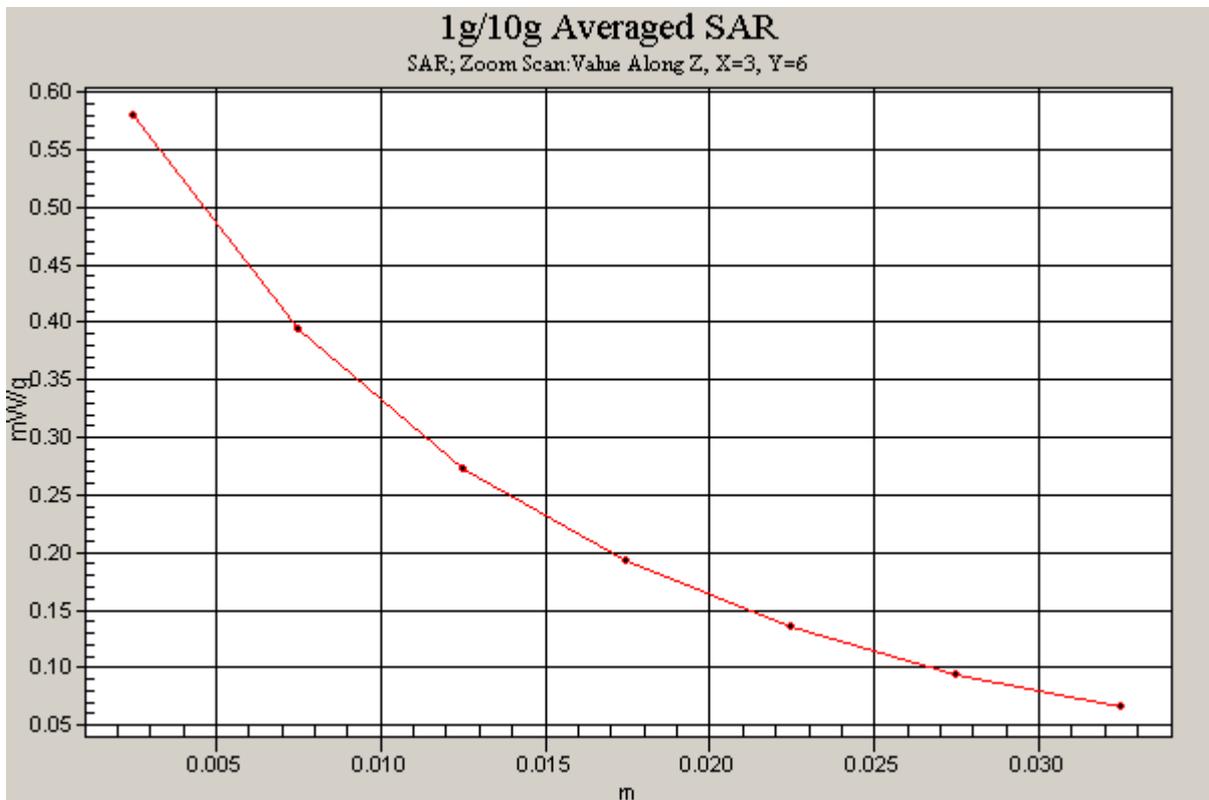
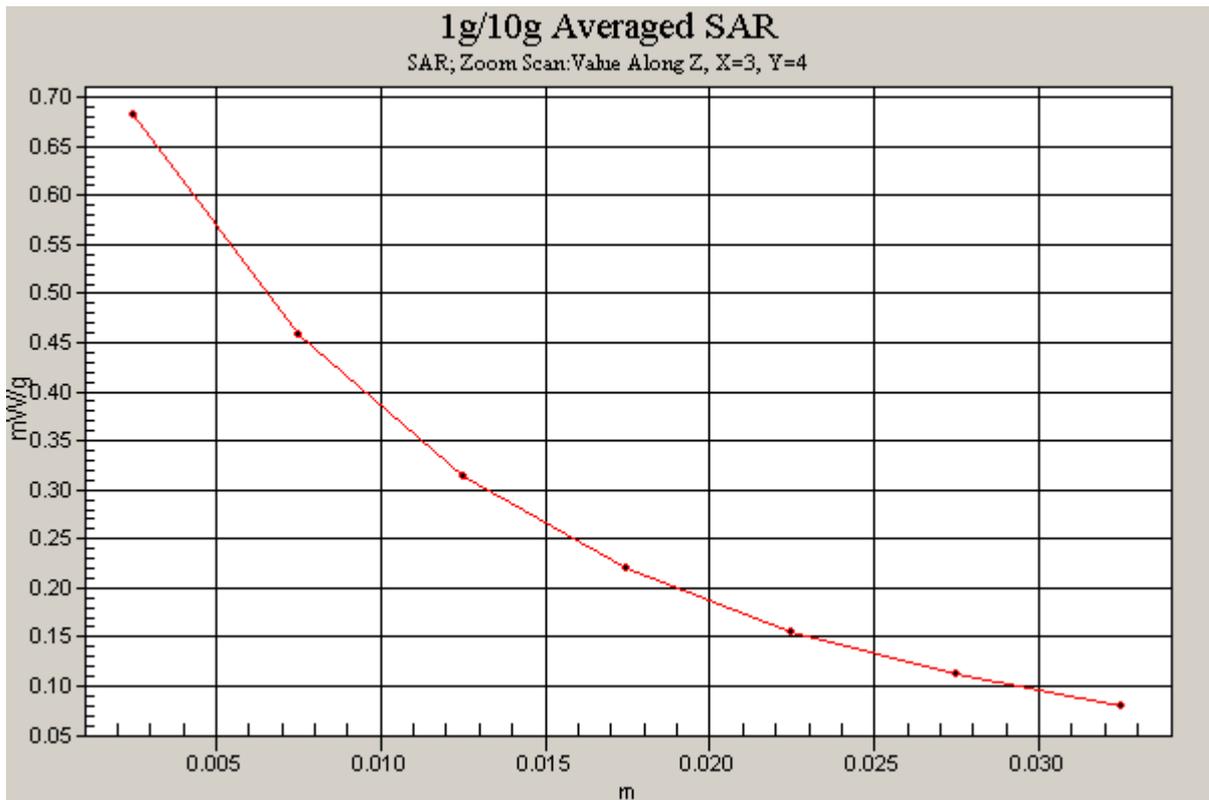


Figure 14 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1Channel 251]

Date/Time: 2/25/2009 10:47:05 AM

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

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.961$  mho/m;  $\epsilon_r = 54.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 1 Middle/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.757 mW/g

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

Reference Value = 24.5 V/m; Power Drift = -0.036 dB

Peak SAR (extrapolated) = 0.924 W/kg

**SAR(1 g) = 0.610 mW/g; SAR(10 g) = 0.393 mW/g**

Maximum value of SAR (measured) = 0.744 mW/g

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

Reference Value = 24.5 V/m; Power Drift = -0.036 dB

Peak SAR (extrapolated) = 0.754 W/kg

**SAR(1 g) = 0.460 mW/g; SAR(10 g) = 0.269 mW/g**

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

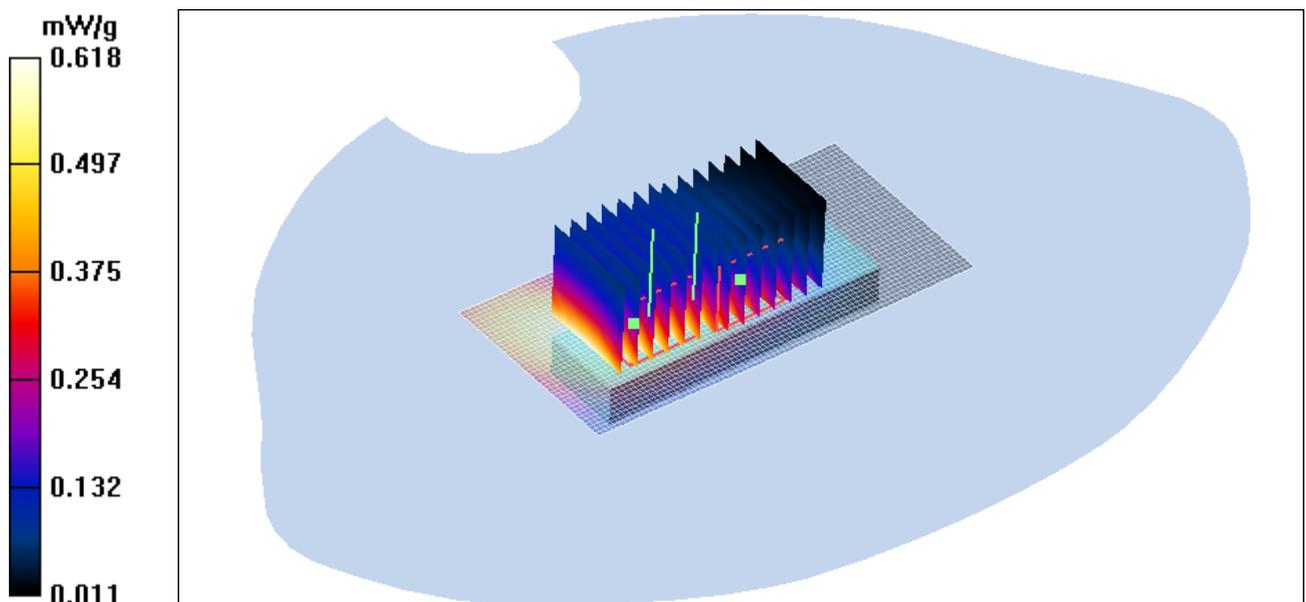


Figure 15 GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 190

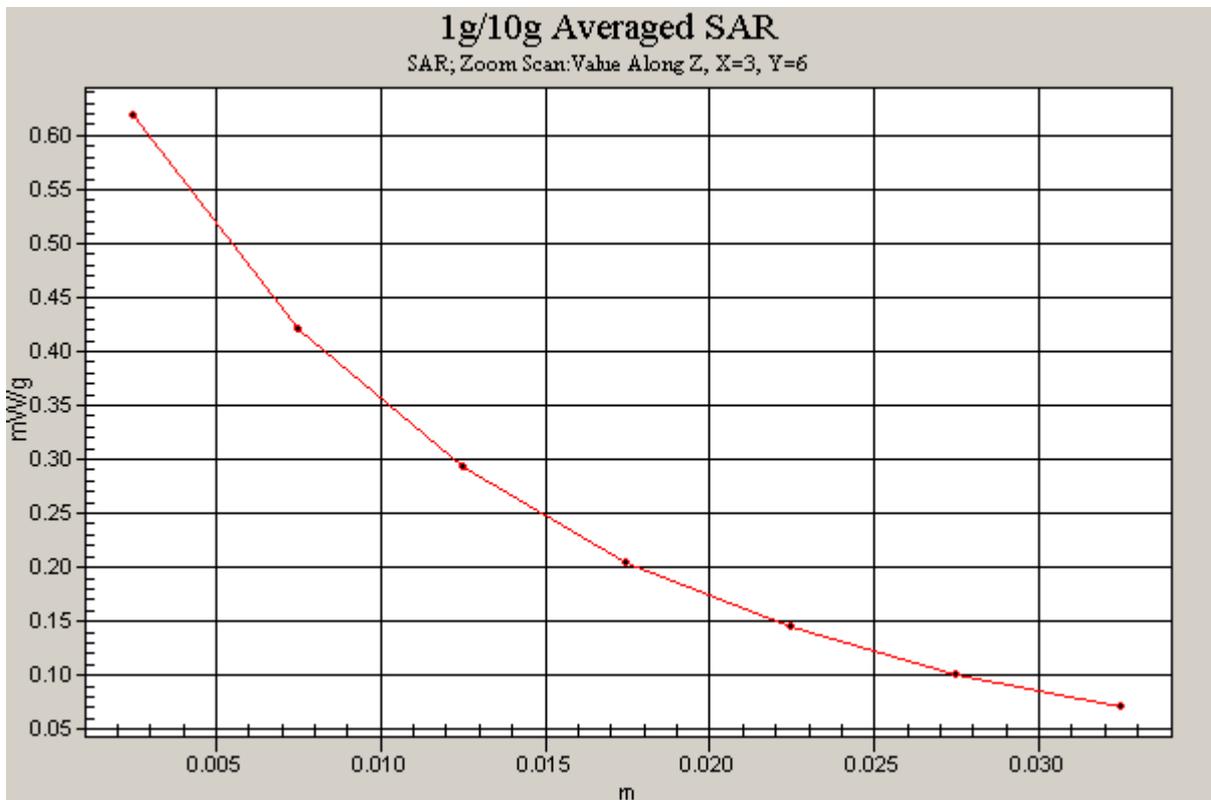
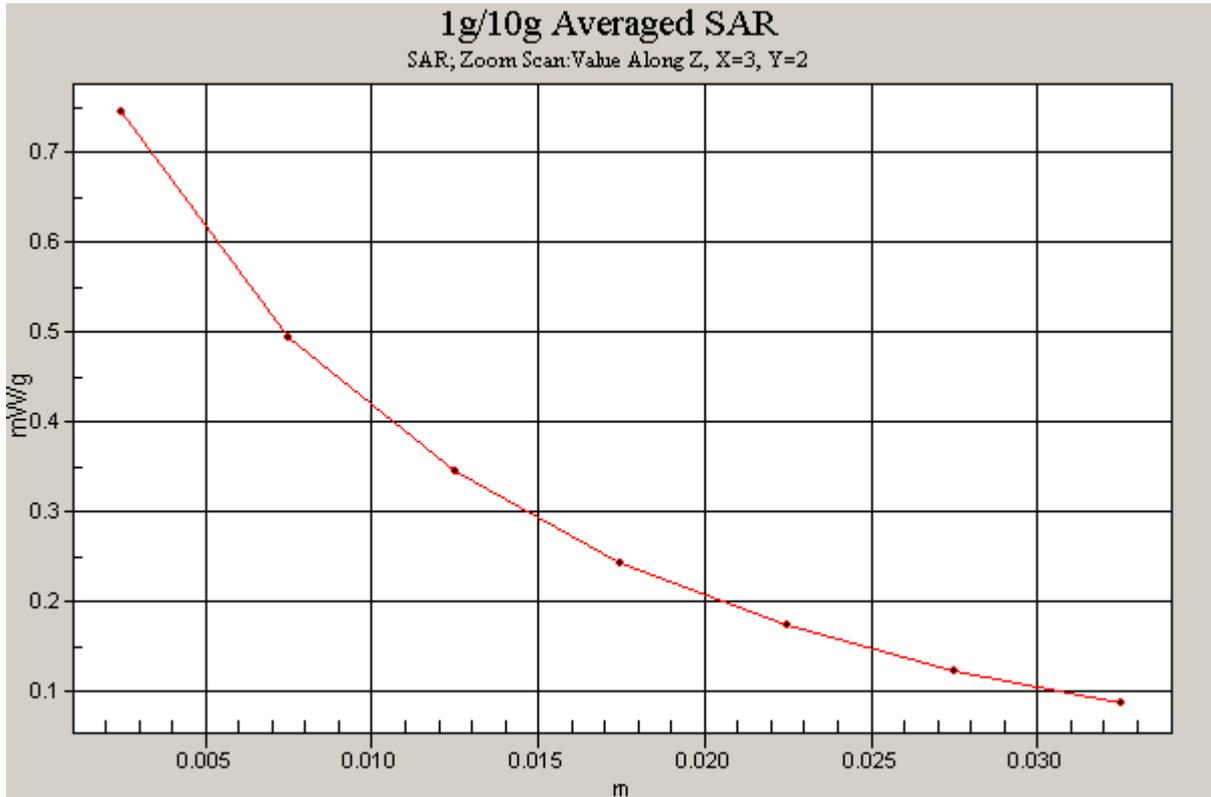


Figure 16 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with IBM T61  
Test Position 1Channel 190]

Date/Time: 2/25/2009 11:06:25 AM

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

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

Medium parameters used (interpolated):  $f = 824.2$  MHz;  $\sigma = 0.949$  mho/m;  $\epsilon_r = 55.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 1 Low/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.738 mW/g

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

Reference Value = 24.2 V/m; Power Drift = -0.038 dB

Peak SAR (extrapolated) = 0.922 W/kg

**SAR(1 g) = 0.617 mW/g; SAR(10 g) = 0.403 mW/g**

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

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

Reference Value = 24.2 V/m; Power Drift = -0.038 dB

Peak SAR (extrapolated) = 0.761 W/kg

**SAR(1 g) = 0.471 mW/g; SAR(10 g) = 0.277 mW/g**

Maximum value of SAR (measured) = 0.624 mW/g

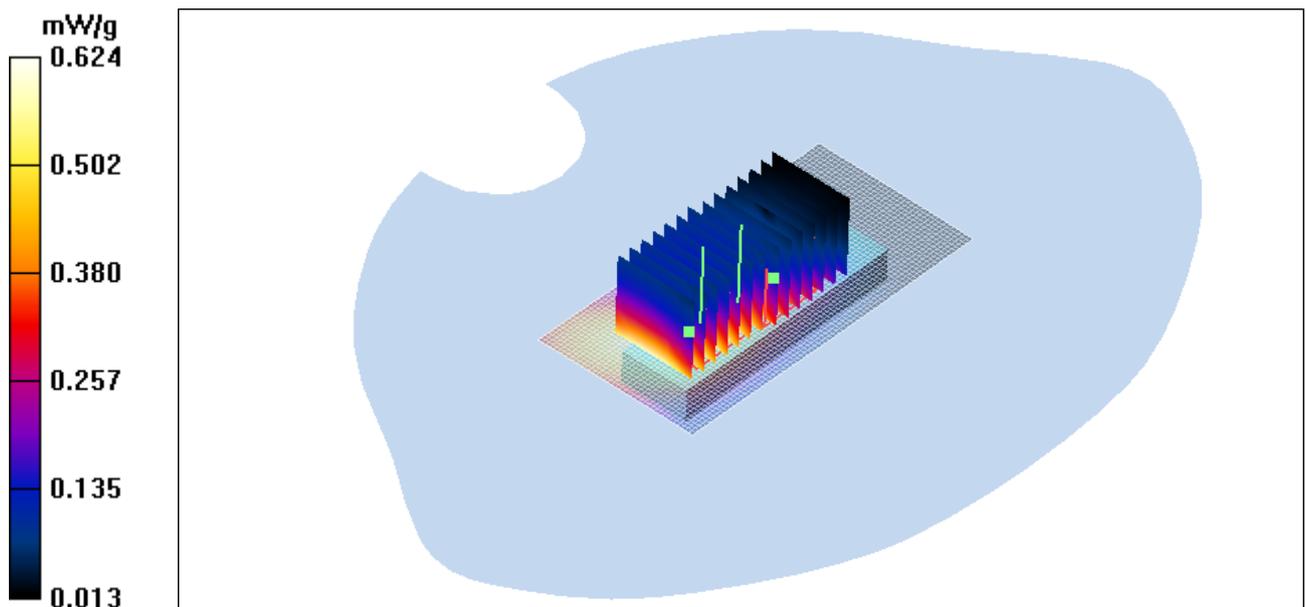


Figure 17 GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 128

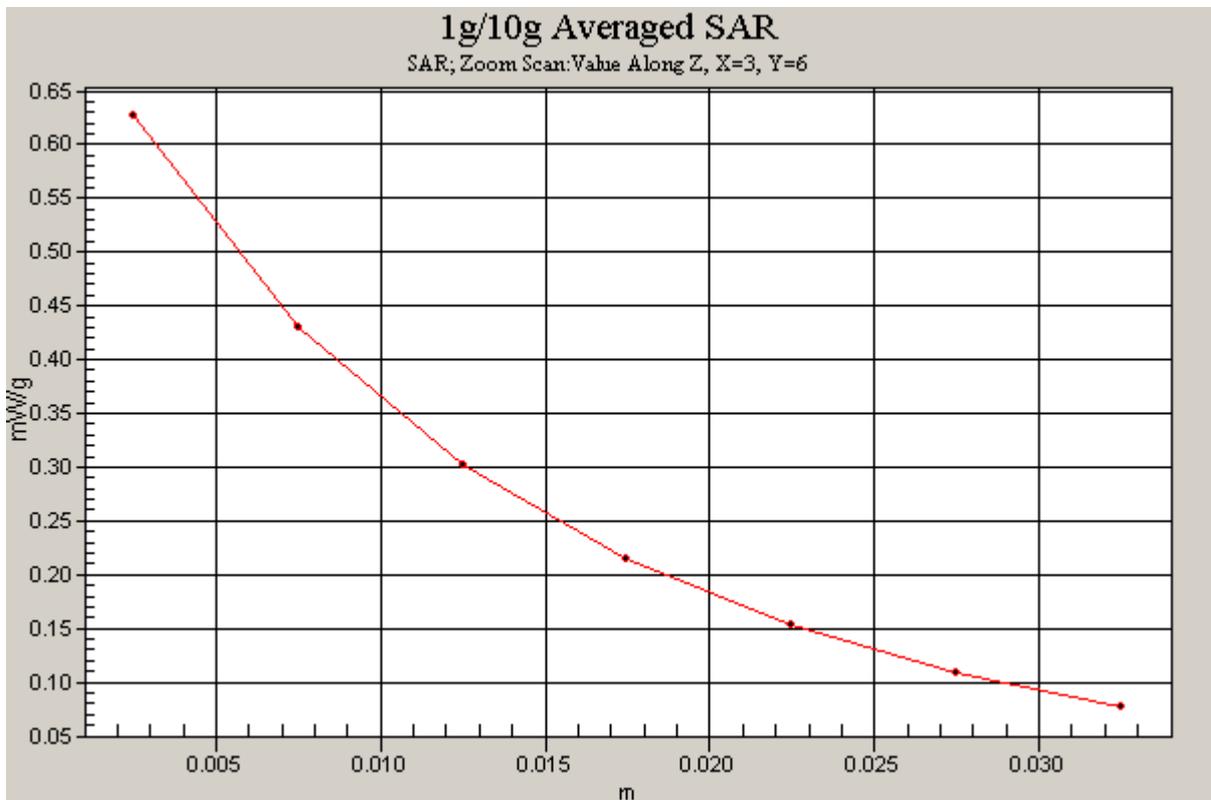
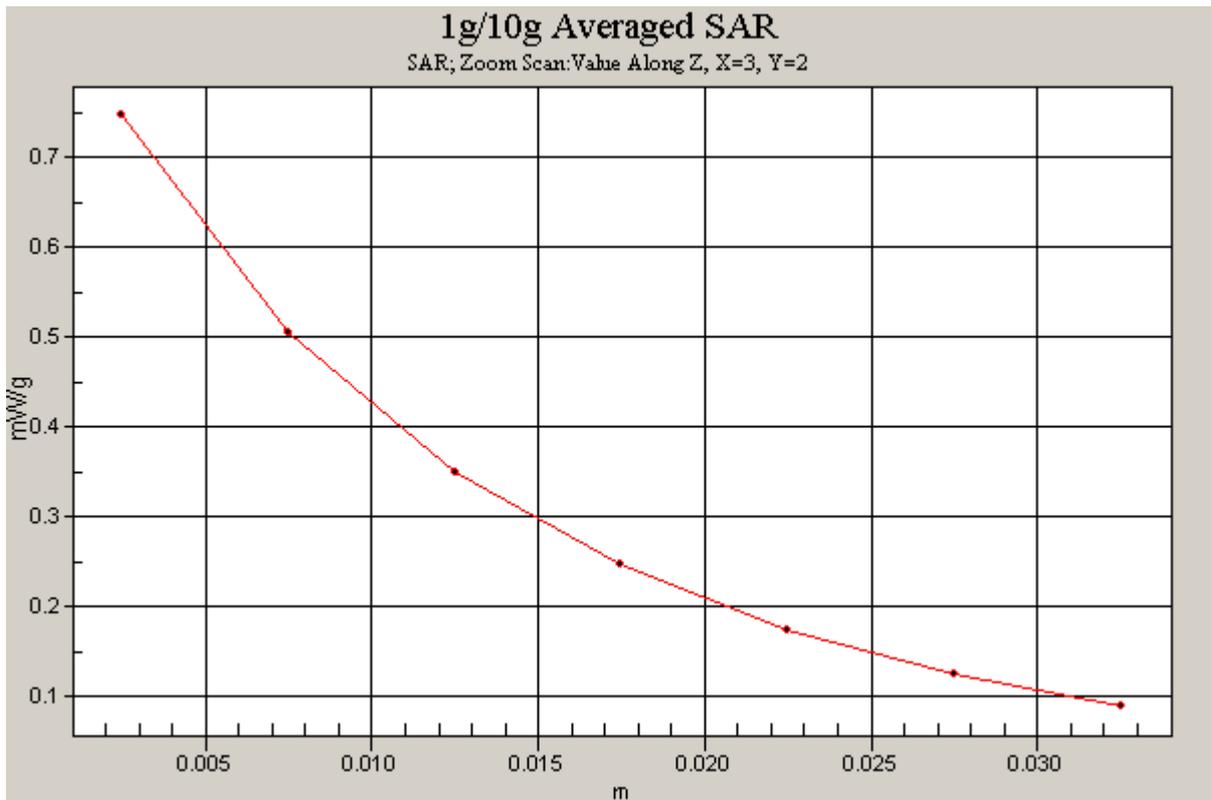


Figure 18 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with IBM T61  
Test Position 1Channel 128]

Date/Time: 2/25/2009 11:46:49 AM

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

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.961$  mho/m;  $\epsilon_r = 54.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 2 Middle/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.363 mW/g

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

Reference Value = 19.4 V/m; Power Drift = 0.004 dB

Peak SAR (extrapolated) = 0.450 W/kg

**SAR(1 g) = 0.288 mW/g; SAR(10 g) = 0.183 mW/g**

Maximum value of SAR (measured) = 0.353 mW/g

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

Reference Value = 19.4 V/m; Power Drift = 0.004 dB

Peak SAR (extrapolated) = 0.775 W/kg

**SAR(1 g) = 0.273 mW/g; SAR(10 g) = 0.184 mW/g**

Maximum value of SAR (measured) = 0.333 mW/g

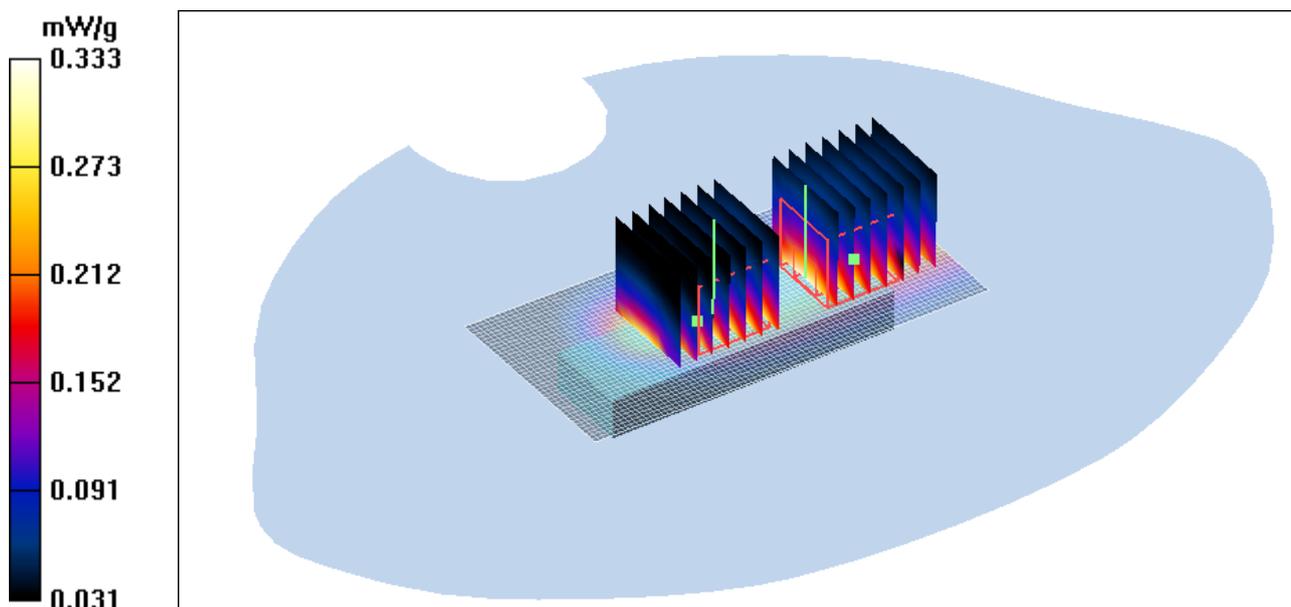


Figure 19 GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 2 Channel 190

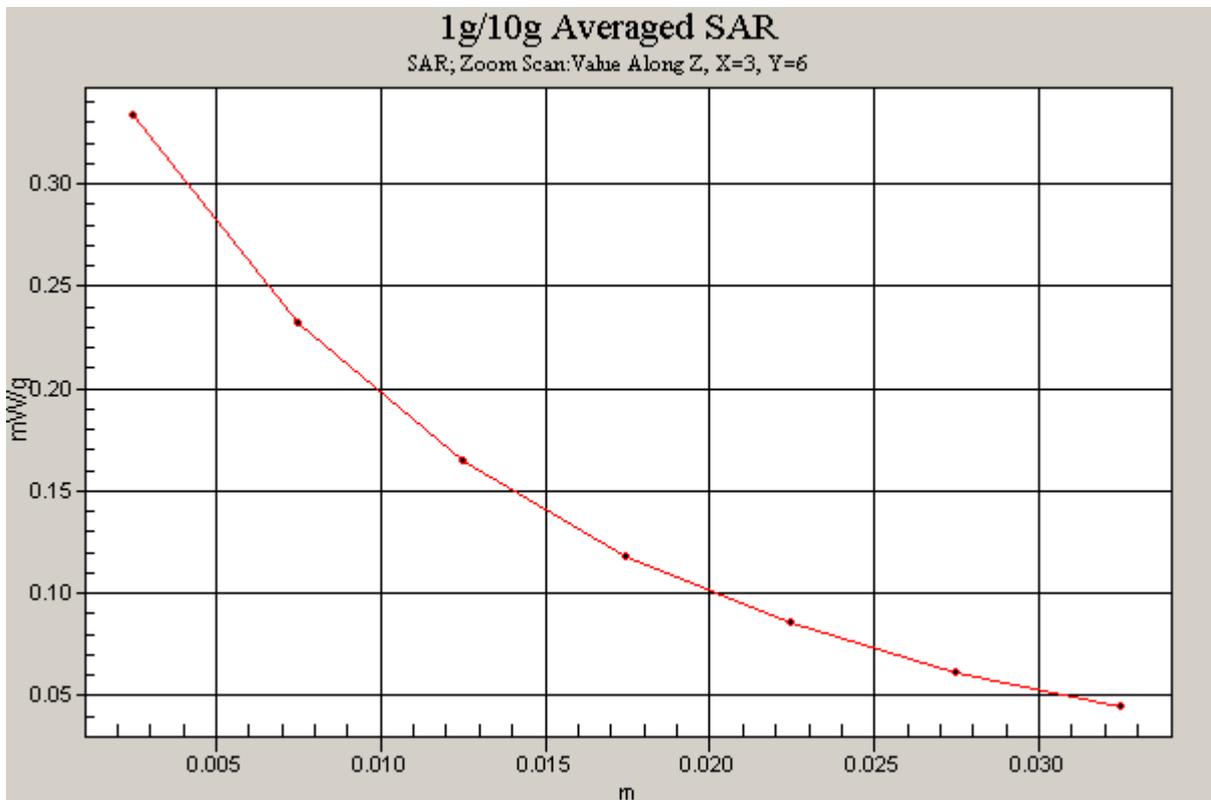
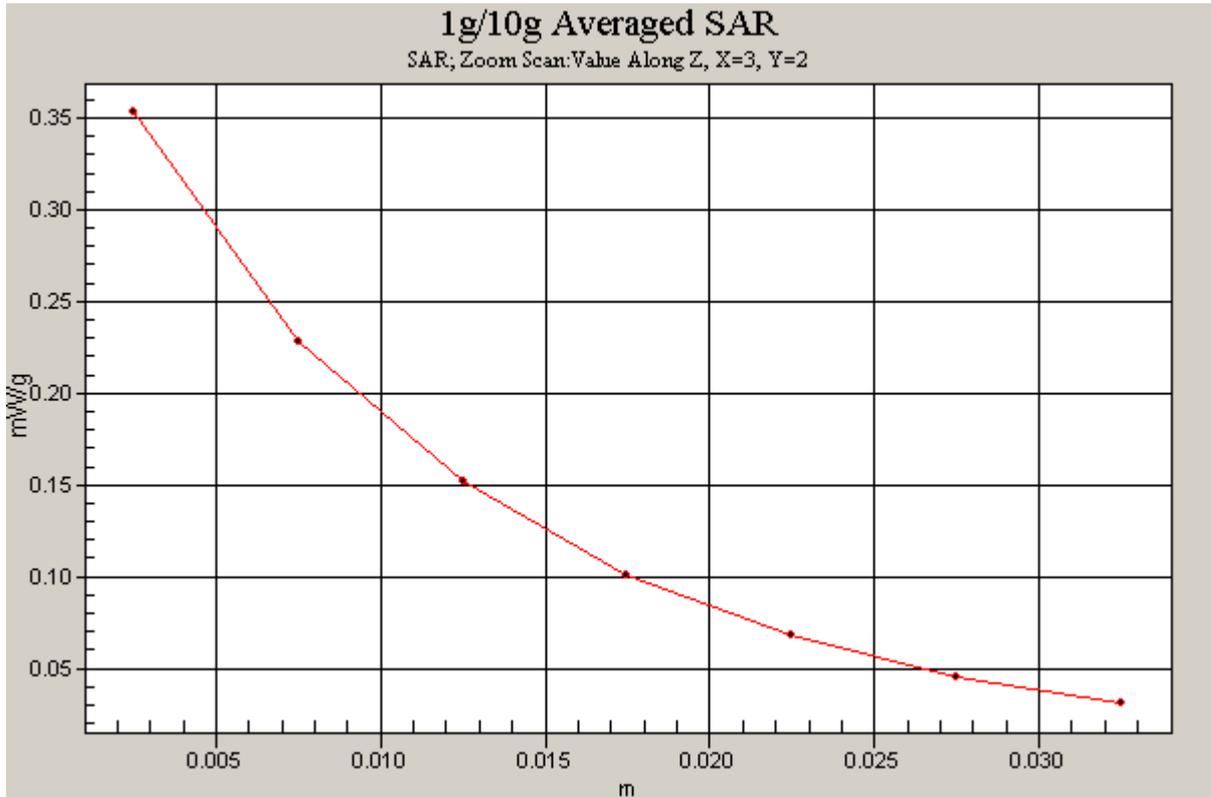


Figure 20 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with IBM T61  
Test Position 2 Channel 190]

Date/Time: 2/25/2009 12:17:03 PM

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

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.961$  mho/m;  $\epsilon_r = 54.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 3 Middle/Area Scan (51x51x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.072 mW/g

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

Reference Value = 11.1 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 0.240 W/kg

**SAR(1 g) = 0.073 mW/g; SAR(10 g) = 0.030 mW/g**

Maximum value of SAR (measured) = 0.124 mW/g

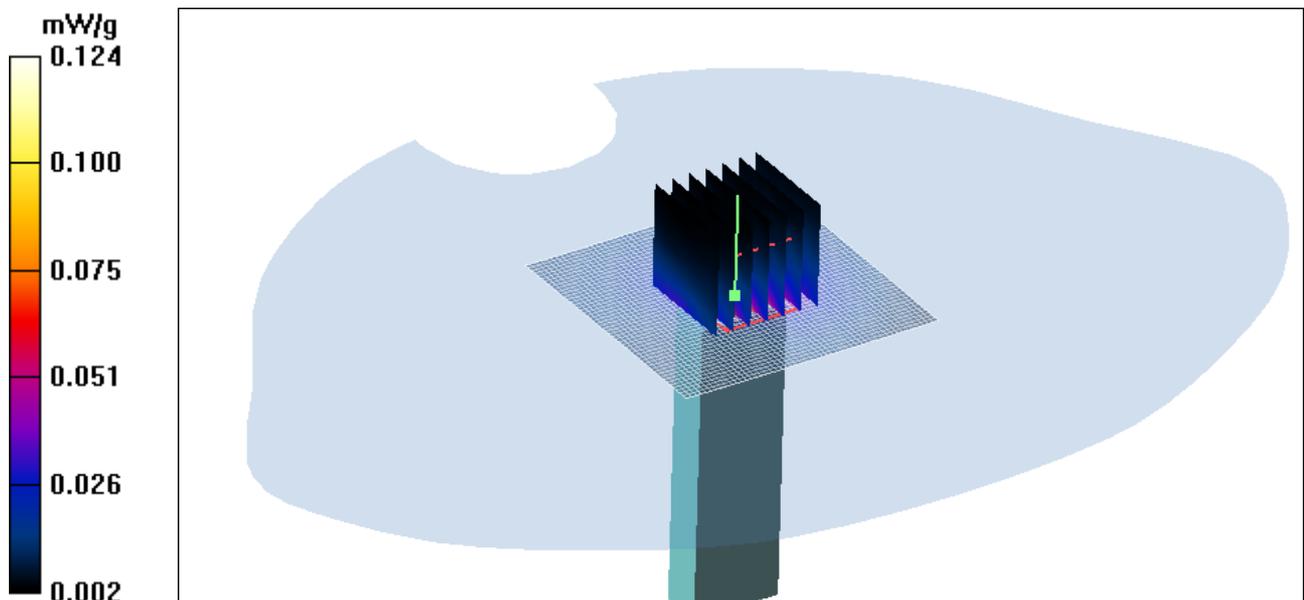


Figure 21 GSM 850 GPRS (1timeslot in uplink) with IBM T61 Test Position 3 Channel 190

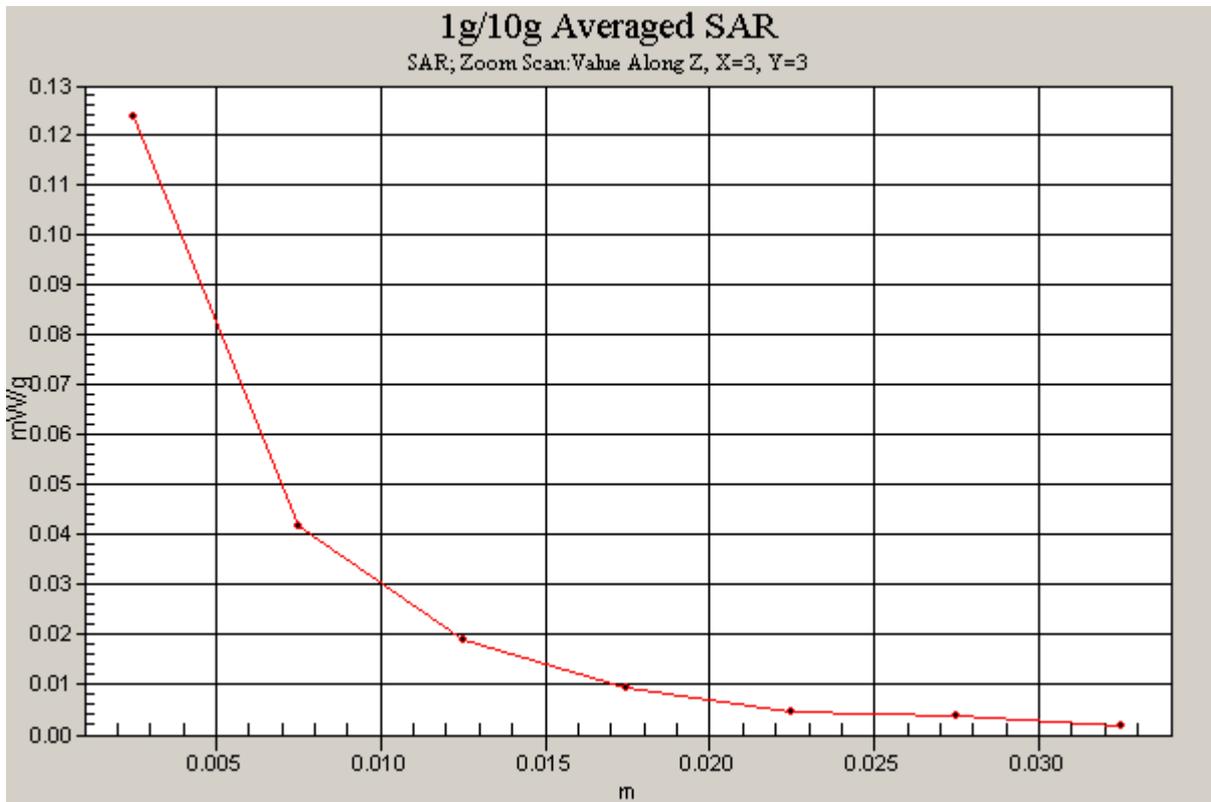


Figure 22 Z-Scan at power reference point [GSM 850 GPRS (1timeslot in uplink) with IBM T61  
Test Position 3 Channel 190]

Date/Time: 2/25/2009 12:38:55 PM

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

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.961$  mho/m;  $\epsilon_r = 54.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 4 Middle/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.612 mW/g

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

Reference Value = 19.3 V/m; Power Drift = -0.095 dB

Peak SAR (extrapolated) = 0.766 W/kg

**SAR(1 g) = 0.498 mW/g; SAR(10 g) = 0.320 mW/g**

Maximum value of SAR (measured) = 0.610 mW/g

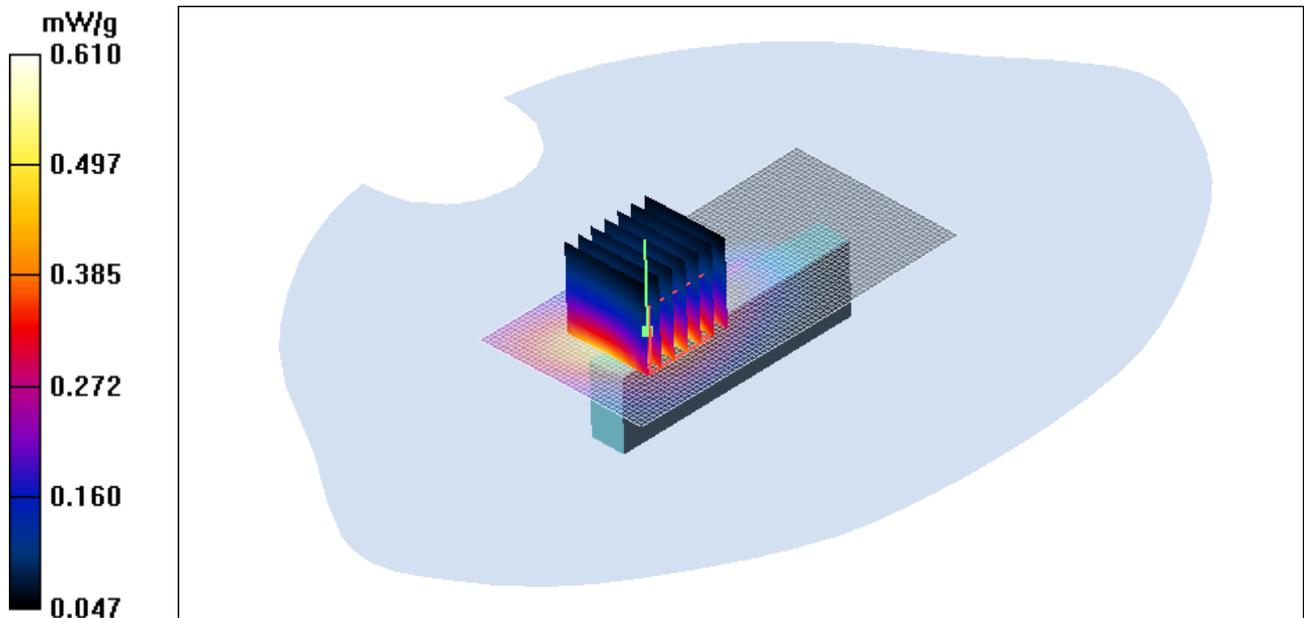


Figure 23 GSM 850 GPRS (1timeslot in uplink) with IBM T61 Test Position 4 Channel 190

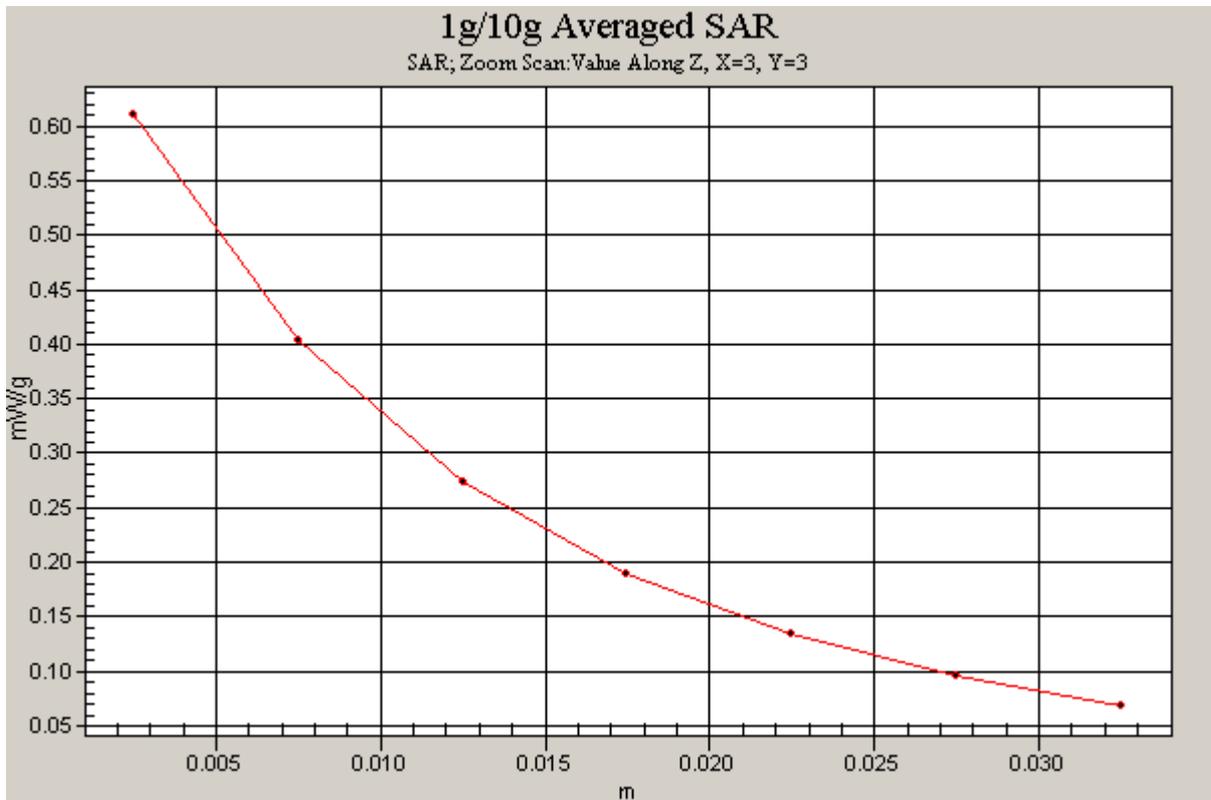


Figure 24 Z-Scan at power reference point [GSM 850 GPRS (1timeslot in uplink) with IBM T61  
Test Position 4 Channel 190]

Date/Time: 2/25/2009 12:59:38 PM

**GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 5 Middle Frequency**

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

Medium parameters used:  $f = 837$  MHz;  $\sigma = 0.961$  mho/m;  $\epsilon_r = 54.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 5 Middle/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 17.3 V/m; Power Drift = -0.111 dB

Peak SAR (extrapolated) = 0.566 W/kg

**SAR(1 g) = 0.366 mW/g; SAR(10 g) = 0.238 mW/g**

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

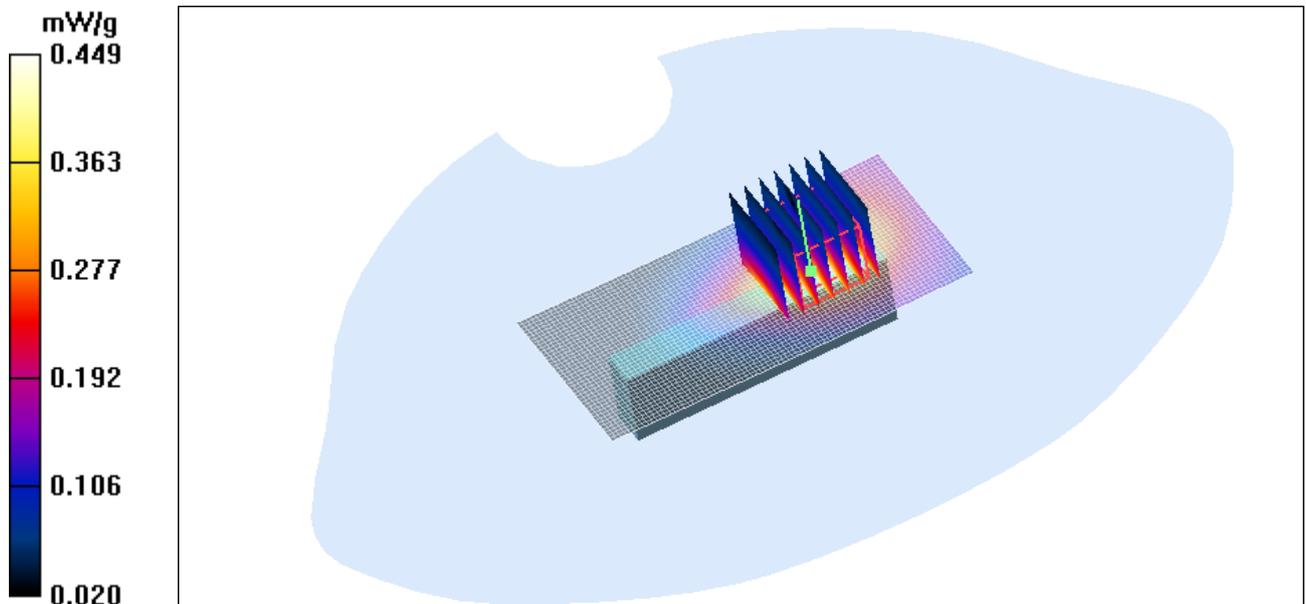


Figure 25 GSM 850 GPRS (1timeslot in uplink) with IBM T61 Test Position 5 Channel 190

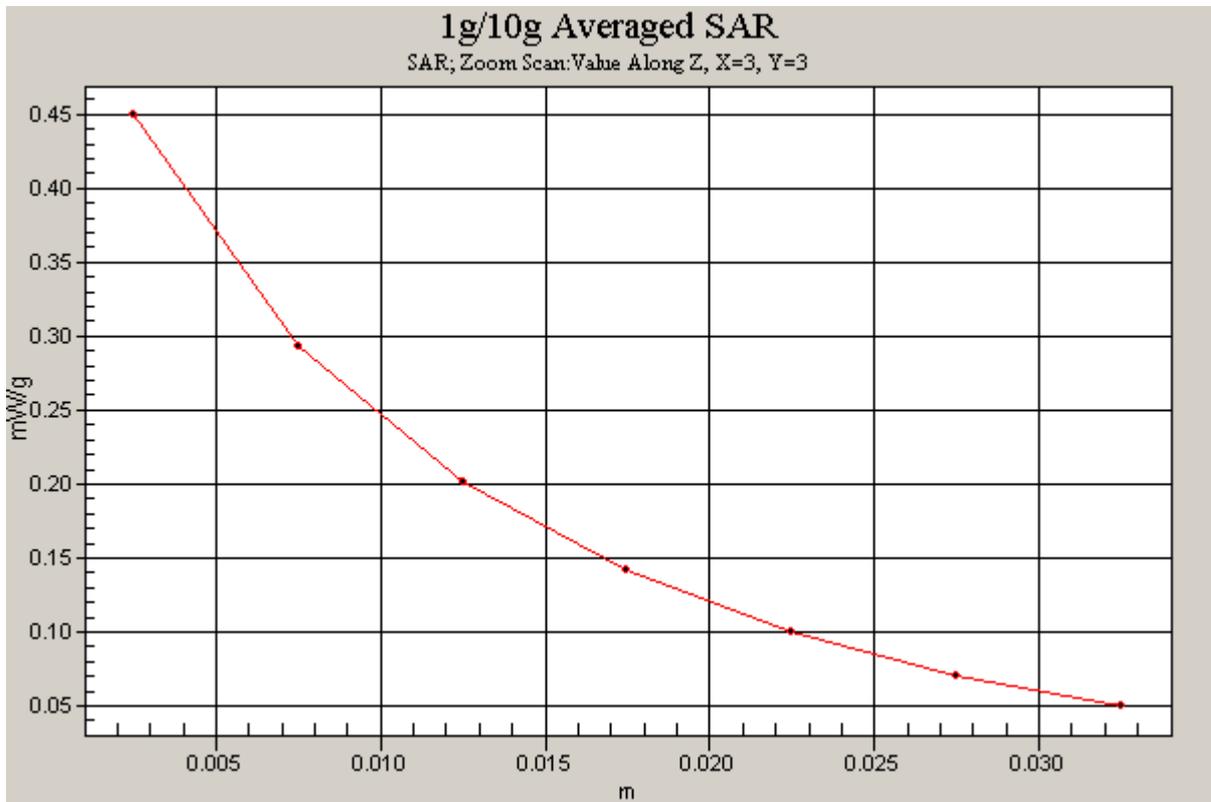


Figure 26 Z-Scan at power reference point [GSM 850 GPRS (1timeslot in uplink) with IBM T61  
Test Position 5 Channel 190]

Date/Time: 2/25/2009 1:20:21 PM

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

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

Medium parameters used (interpolated):  $f = 824.2$  MHz;  $\sigma = 0.949$  mho/m;  $\epsilon_r = 55.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position Low/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.303 mW/g

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

Reference Value = 15.1 V/m; Power Drift = 0.118 dB

Peak SAR (extrapolated) = 0.381 W/kg

**SAR(1 g) = 0.254 mW/g; SAR(10 g) = 0.166 mW/g**

Maximum value of SAR (measured) = 0.307 mW/g

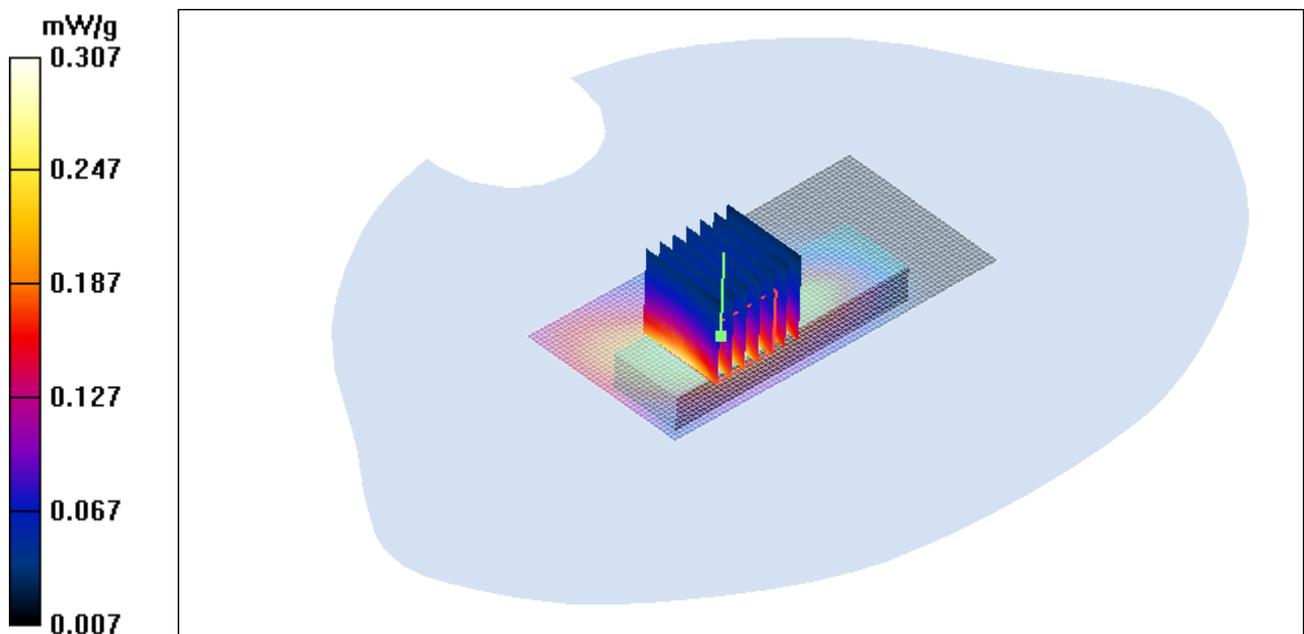


Figure 27 GSM 850 EGPRS (1timeslot in uplink) with IBM T61 Test Position 1 Channel 128

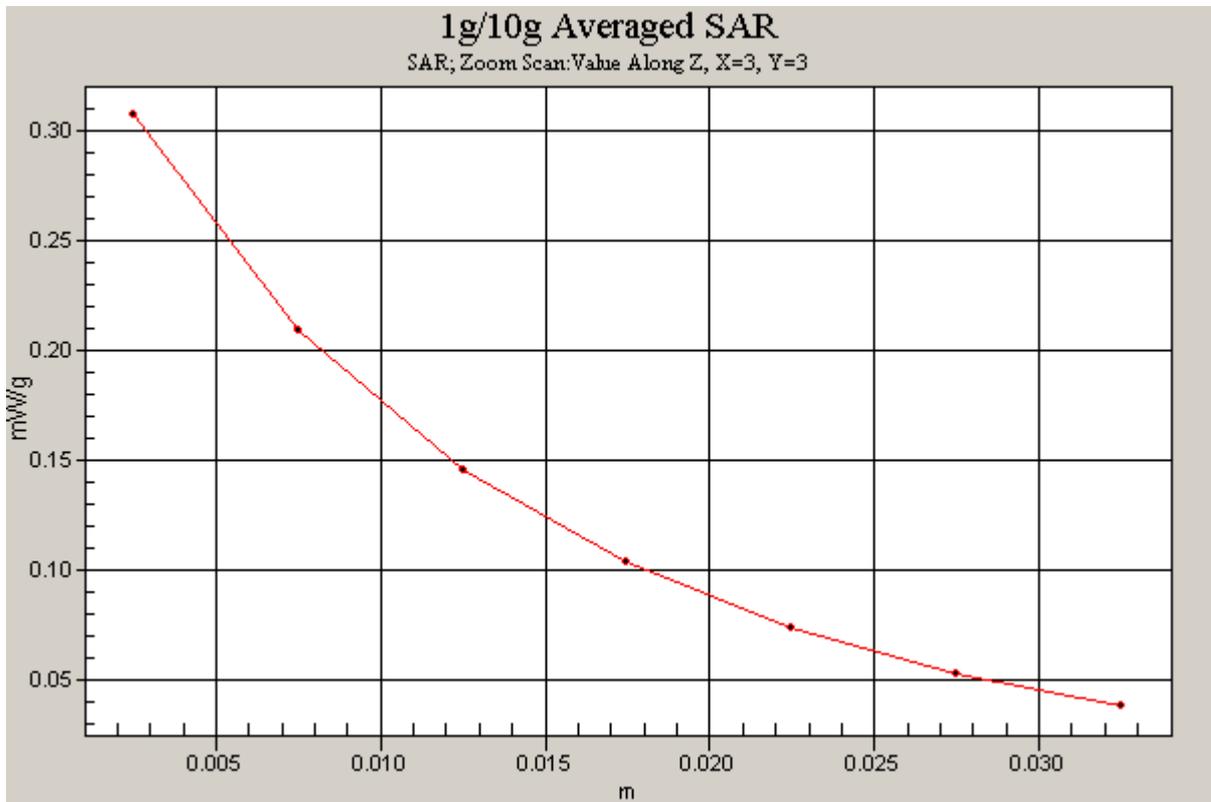


Figure 28 Z-Scan at power reference point [GSM 850 EGPRS (1timeslot in uplink) with IBM T61  
Test Position 1 Channel 128]

Date/Time: 2/26/2009 12:50:49 PM

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

Communication System: PCS 1900+GPRS(2Up); Frequency: 1909.8 MHz; Duty Cycle: 1:4

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.55$  mho/m;  $\epsilon_r = 51.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM000 T01 ; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 1 High/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 18.3 V/m; Power Drift = 0.135 dB

Peak SAR (extrapolated) = 1.36 W/kg

**SAR(1 g) = 0.757 mW/g; SAR(10 g) = 0.399 mW/g**

Maximum value of SAR (measured) = 0.995 mW/g

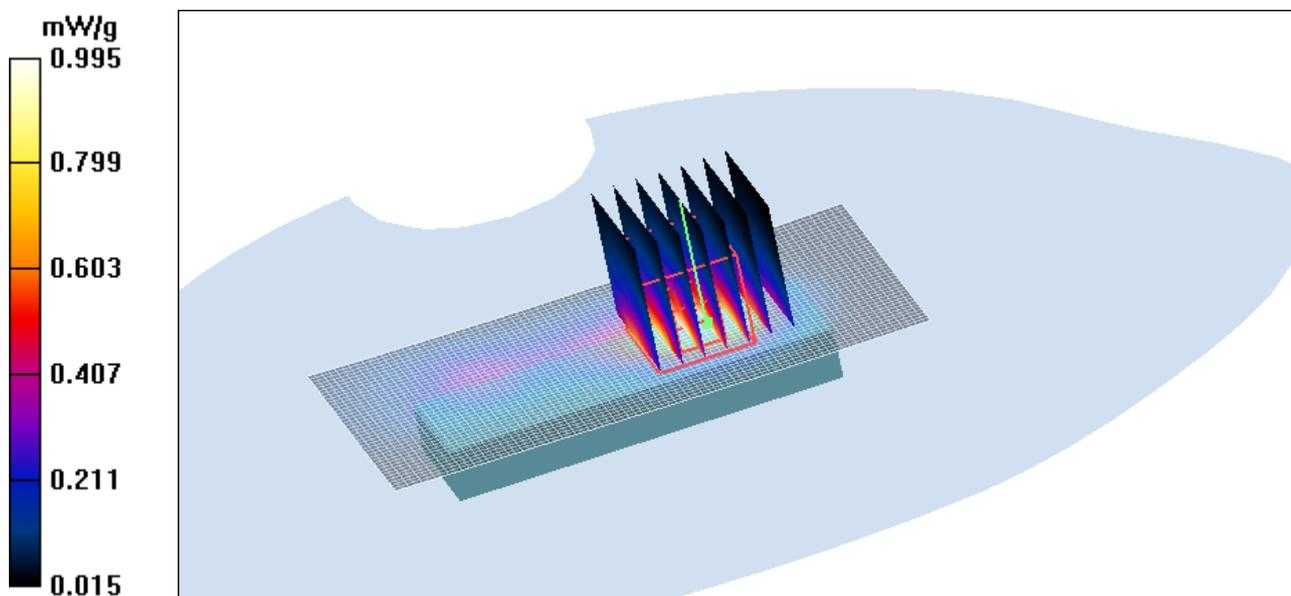


Figure 29 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 810

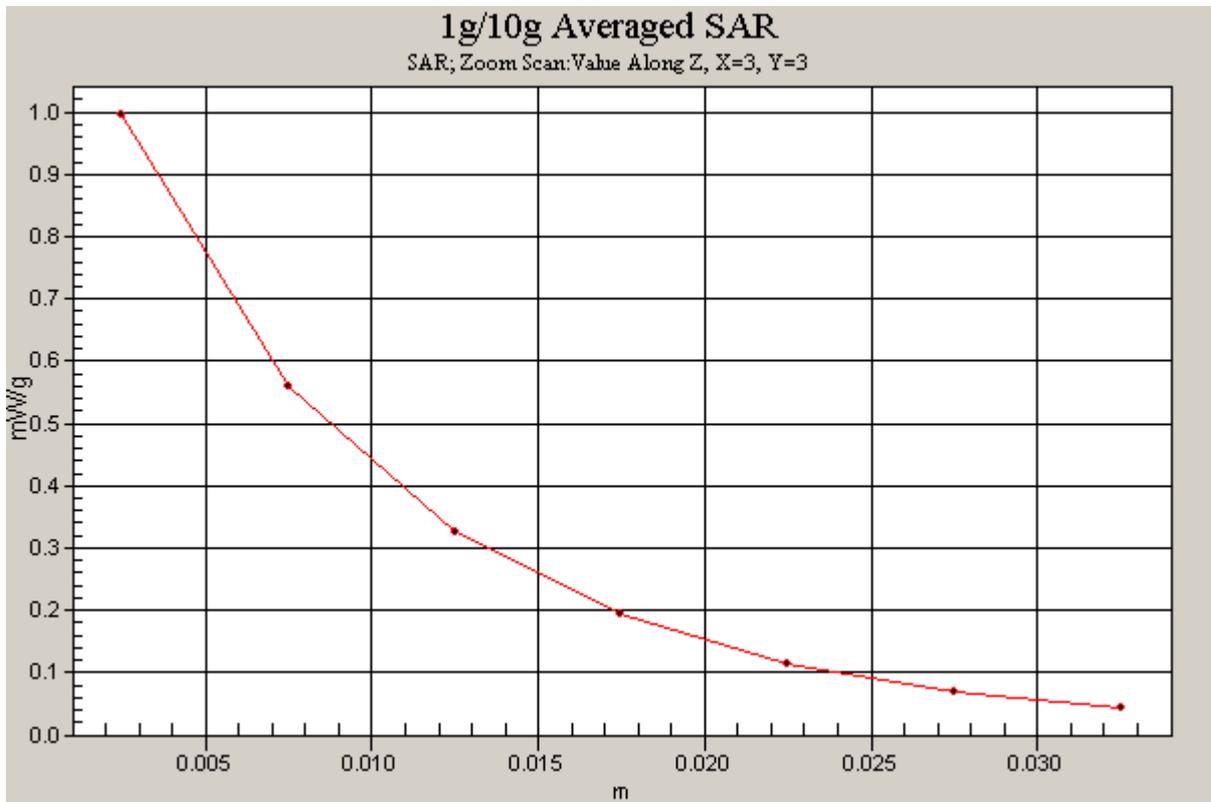


Figure 30 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 810]

Date/Time: 2/26/2009 1:11:05 PM

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

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 51.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM000 T01 ; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 1 Middle/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 15.4 V/m; Power Drift = -0.053 dB

Peak SAR (extrapolated) = 1.48 W/kg

**SAR(1 g) = 0.832 mW/g; SAR(10 g) = 0.440 mW/g**

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

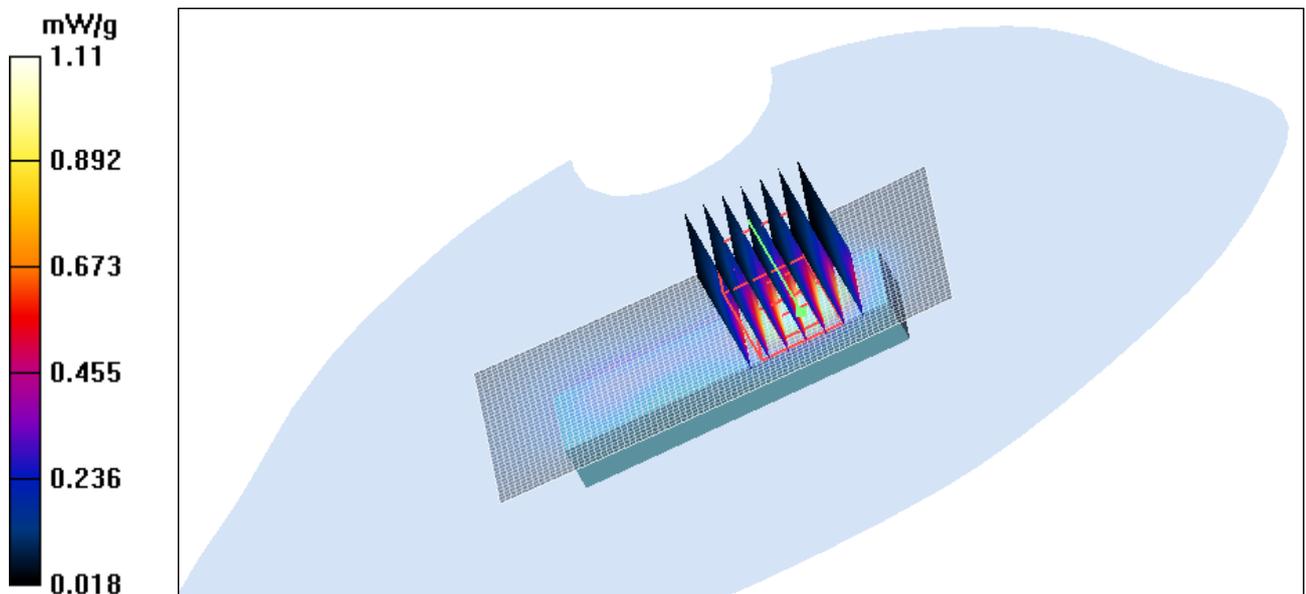


Figure 31 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 661

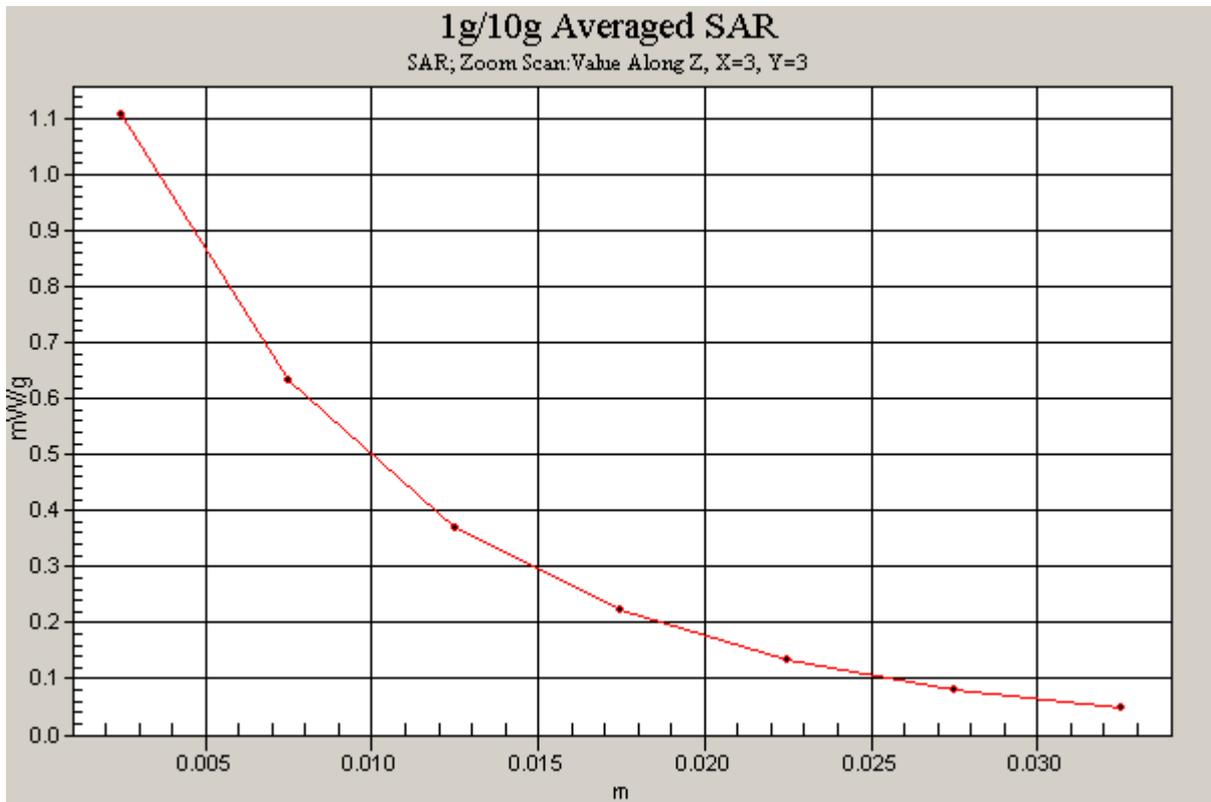


Figure 32 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 661]

Date/Time: 2/26/2009 1:31:36 PM

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

Communication System: PCS 1900+GPRS(2Up); Frequency: 1850.2 MHz; Duty Cycle: 1:4  
Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 51.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM000 T01 ; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 1 Low/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 1.34 mW/g

**Test Position 1 Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 16.0 V/m; Power Drift = -0.176 dB  
Peak SAR (extrapolated) = 1.65 W/kg  
**SAR(1 g) = 0.928 mW/g; SAR(10 g) = 0.490 mW/g**  
Maximum value of SAR (measured) = 1.24 mW/g

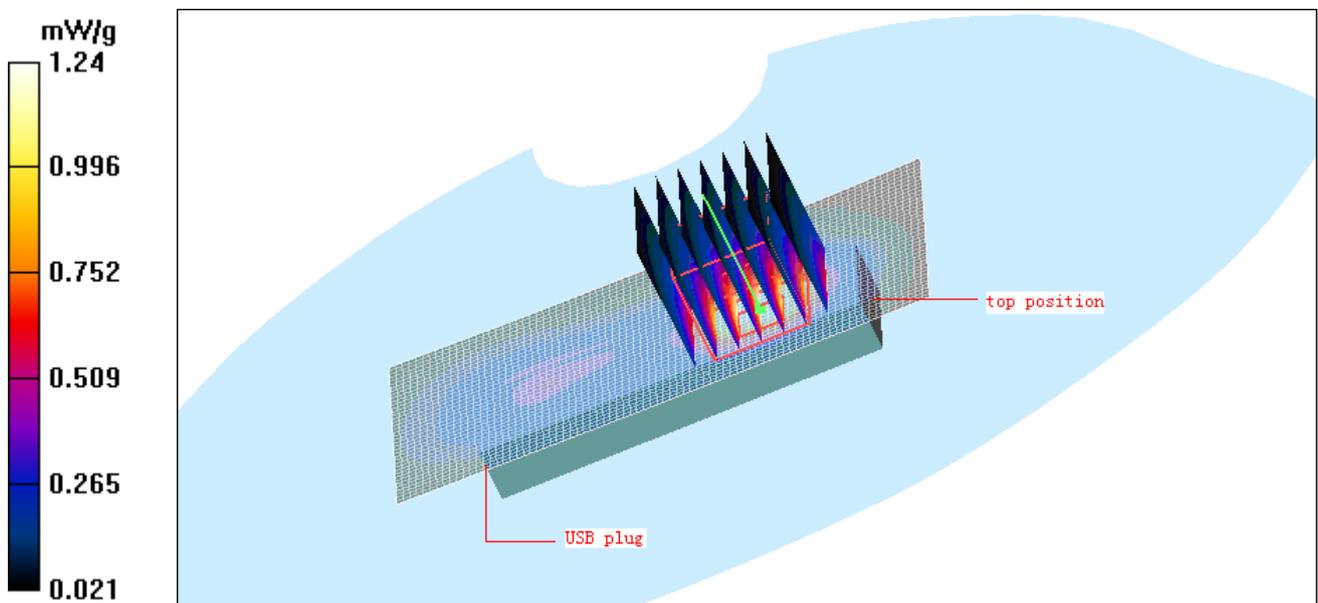


Figure 33 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 512

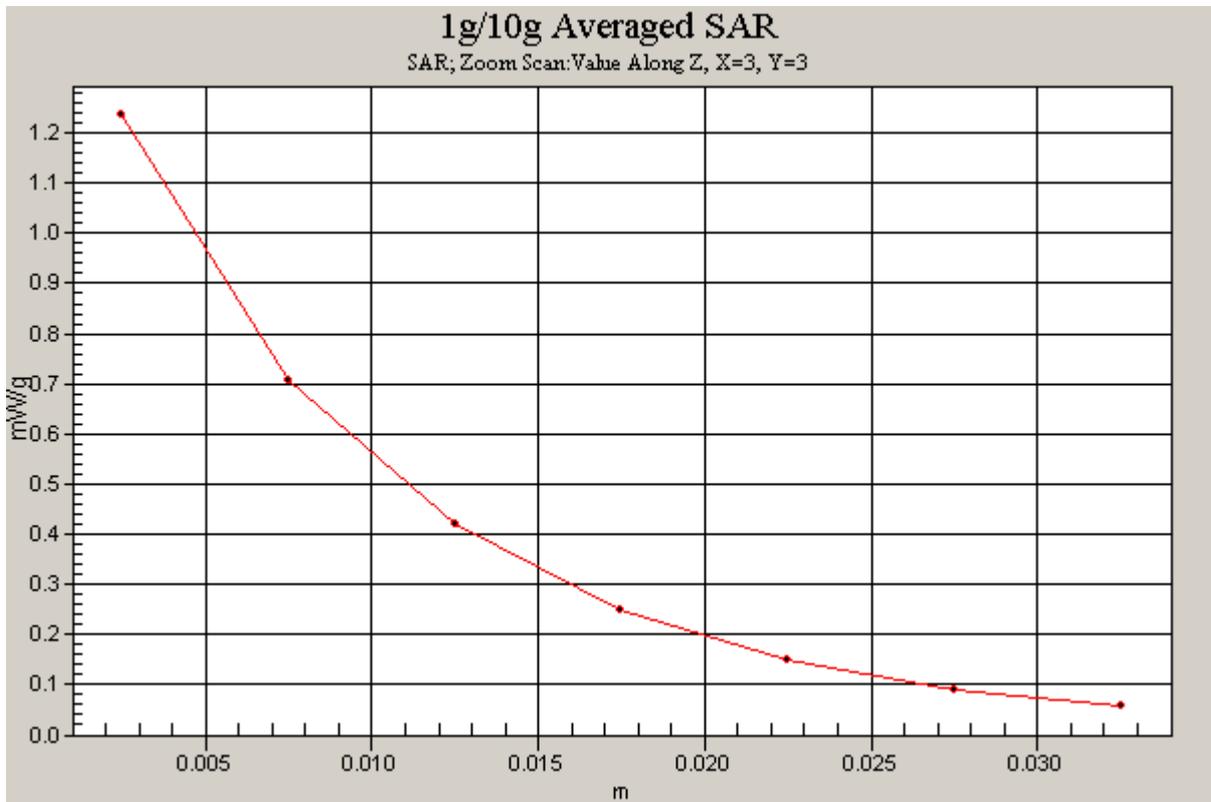


Figure 34 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 512]

Date/Time: 2/26/2009 1:50:52 PM

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

Communication System: PCS 1900+GPRS(1Up); Frequency: 1880 MHz; Duty Cycle: 1:8

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 51.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM000 T01 ; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 1 Middle/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.874 mW/g

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

Reference Value = 15.2 V/m; Power Drift = -0.064 dB

Peak SAR (extrapolated) = 1.16 W/kg

**SAR(1 g) = 0.646 mW/g; SAR(10 g) = 0.341 mW/g**

Maximum value of SAR (measured) = 0.858 mW/g

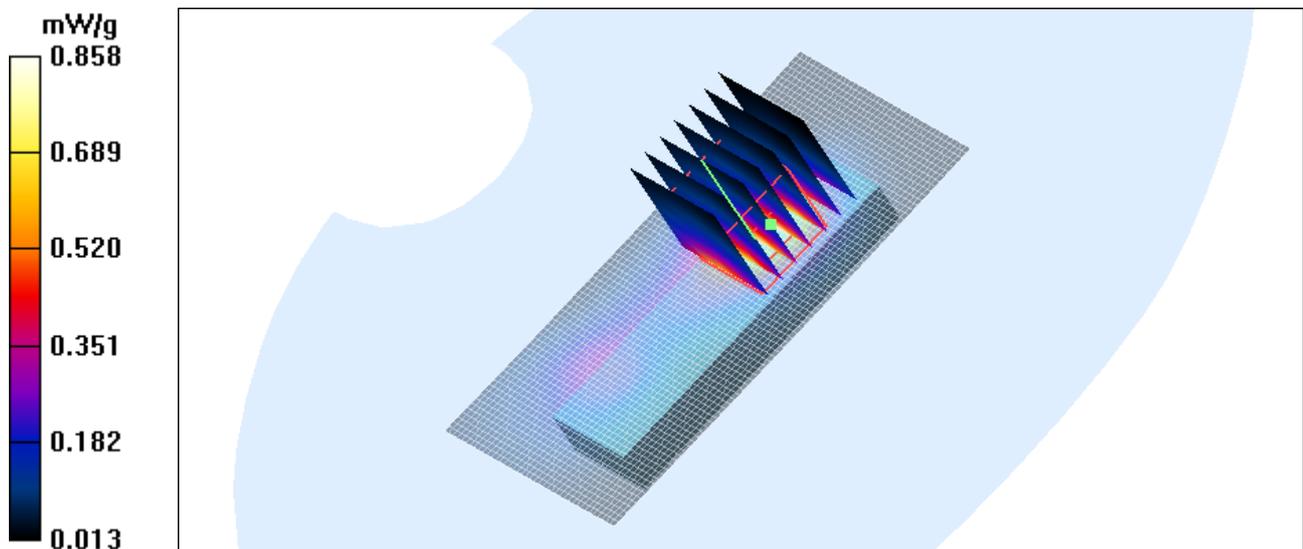


Figure 35 GSM 1900 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 661

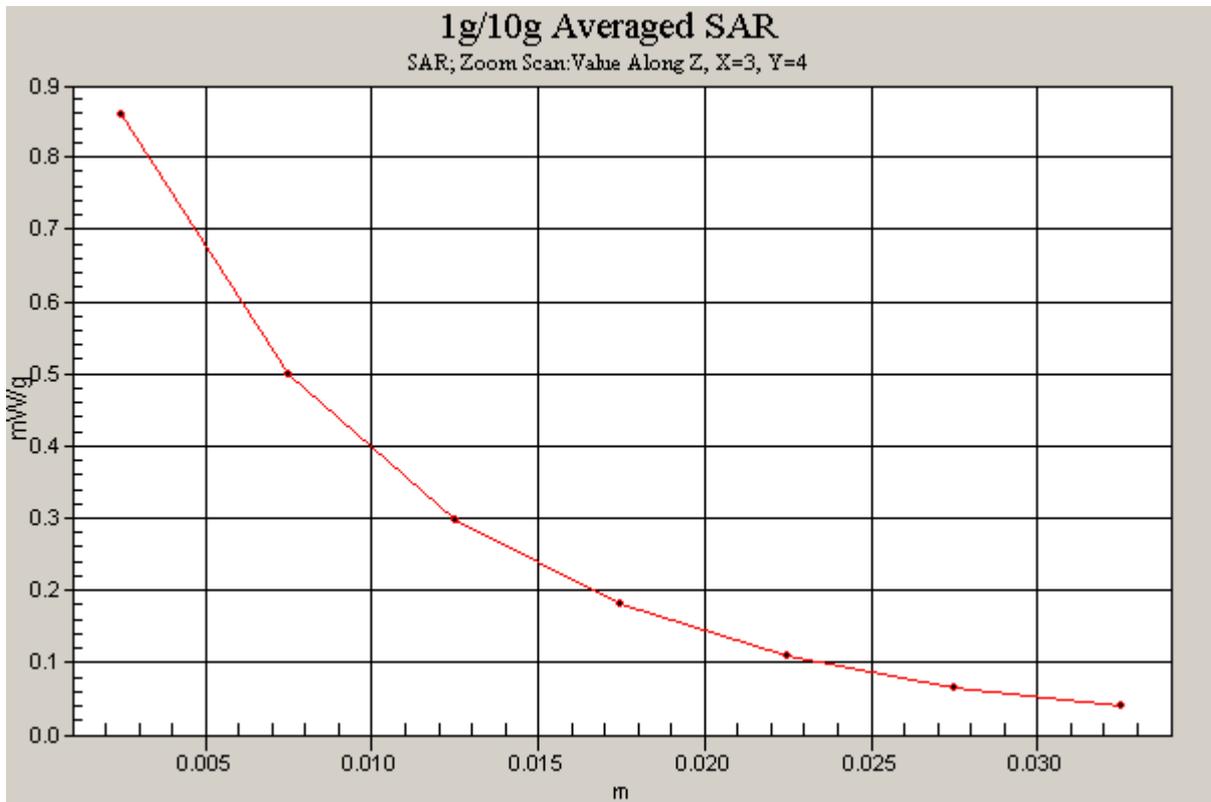


Figure 36 Z-Scan at power reference point [GSM 1900 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1Channel 661]

Date/Time: 2/26/2009 2:12:30 PM

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

Communication System: PCS 1900+GPRS(2Up); Frequency: 1909.8 MHz; Duty Cycle: 1:4

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.55$  mho/m;  $\epsilon_r = 51.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM000 T01 ; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 2 High/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 20.9 V/m; Power Drift = -0.092 dB

Peak SAR (extrapolated) = 1.53 W/kg

**SAR(1 g) = 0.803 mW/g; SAR(10 g) = 0.418 mW/g**

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

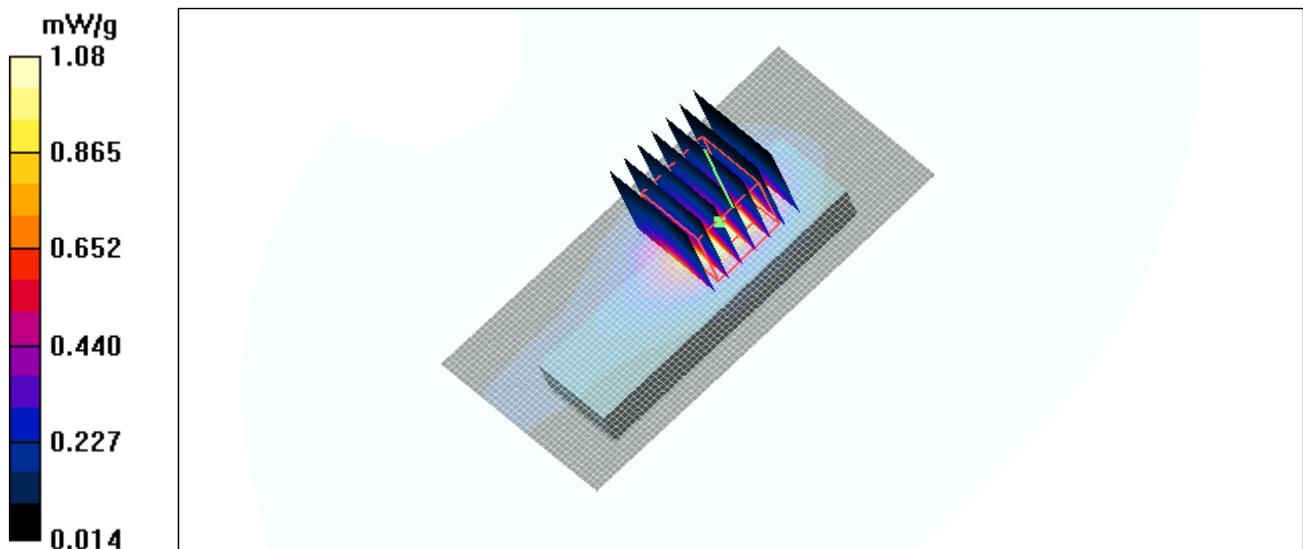


Figure 37 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Channel 810

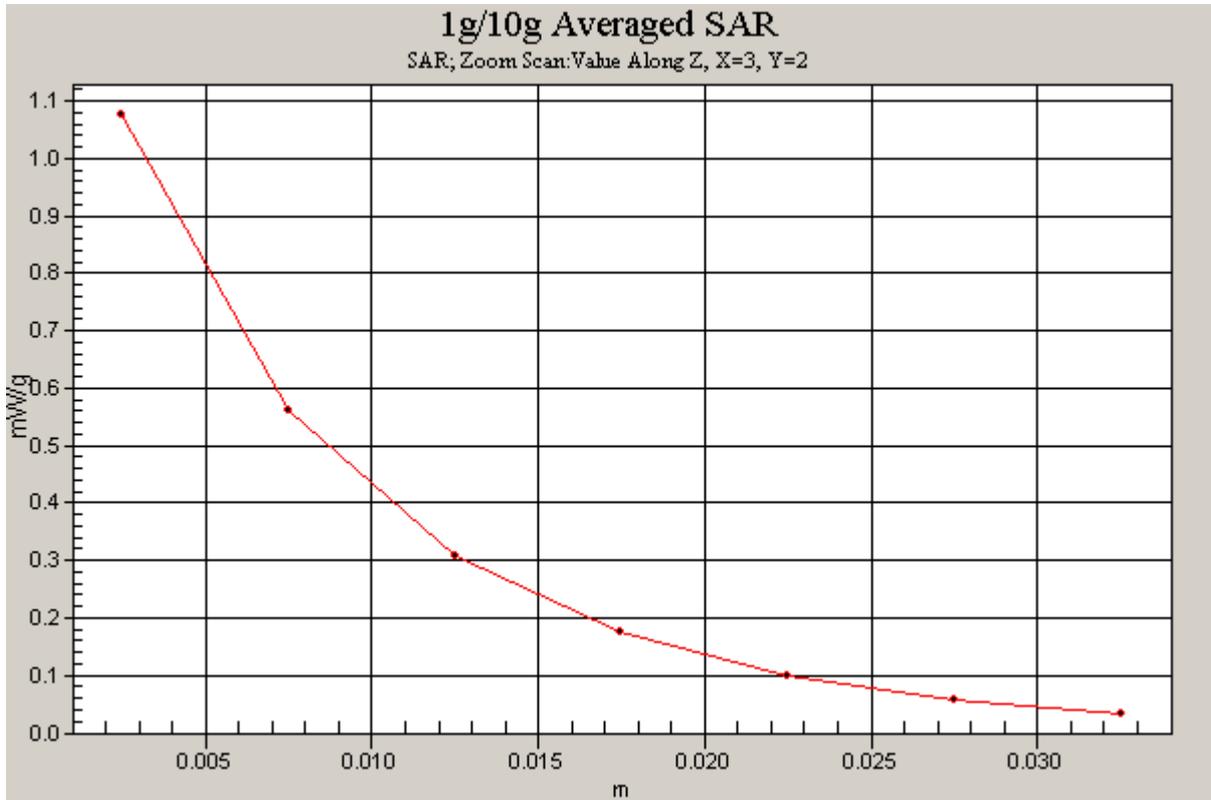


Figure 38 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Channel 810]

Date/Time: 2/26/2009 2:34:14 PM

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

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 51.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM000 T01 ; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 2 Middle/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.21 mW/g

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

Reference Value = 20.1 V/m; Power Drift = -0.103 dB

Peak SAR (extrapolated) = 1.59 W/kg

**SAR(1 g) = 0.839 mW/g; SAR(10 g) = 0.431 mW/g**

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

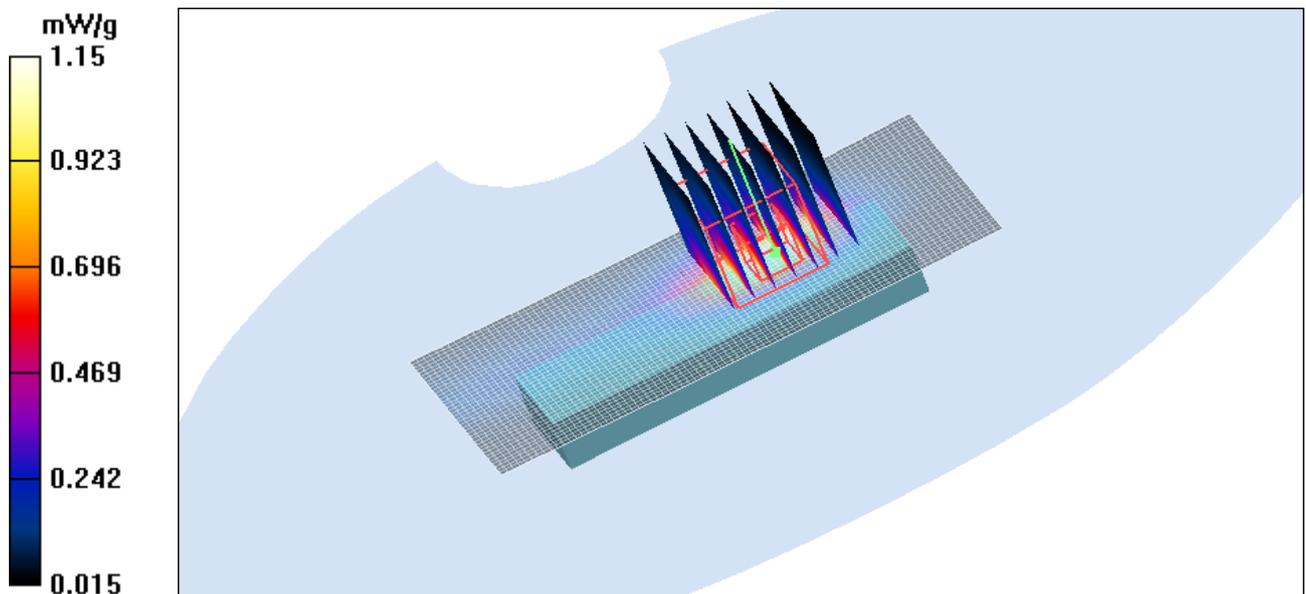


Figure 39 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Channel 661

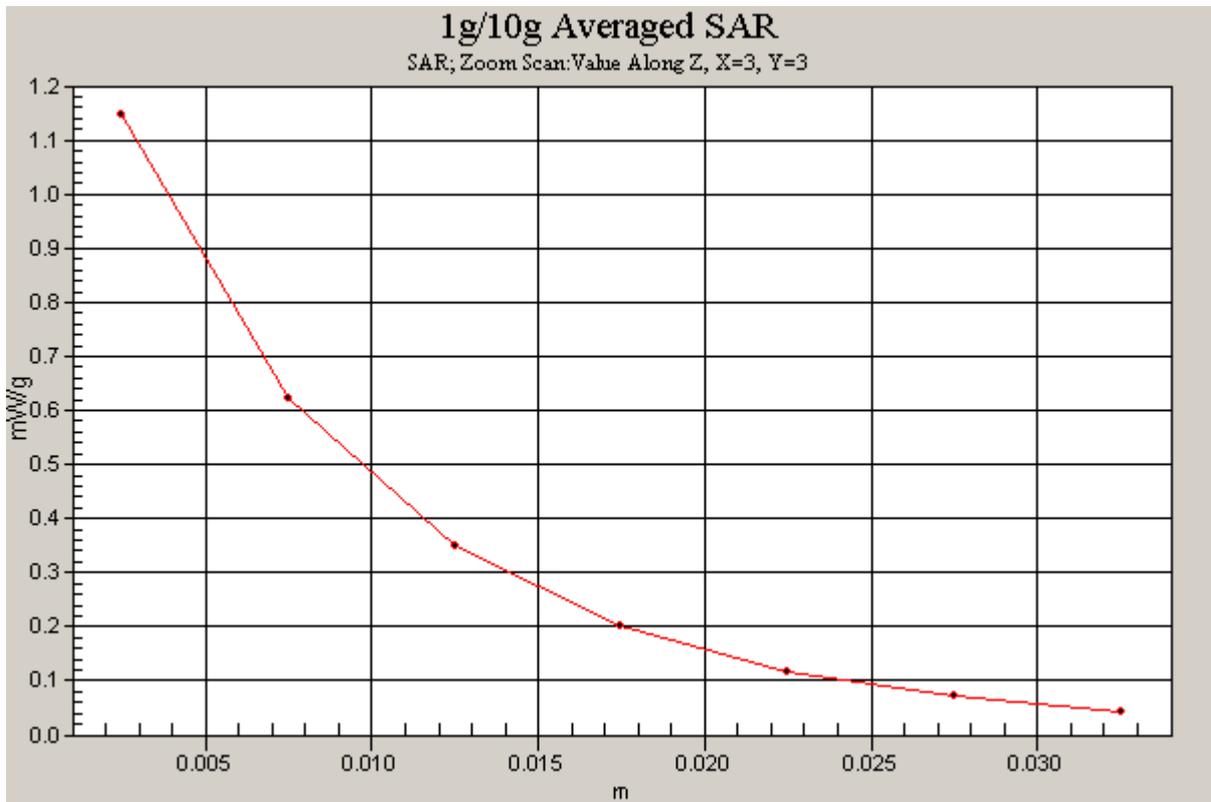


Figure 40 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Channel 661]

Date/Time: 2/26/2009 2:53:06 PM

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

Communication System: PCS 1900+GPRS(2Up); Frequency: 1850.2 MHz; Duty Cycle: 1:4  
Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 51.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM000 T01 ; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 2 Low/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 1.29 mW/g

**Test Position 2 Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 19.4 V/m; Power Drift = 0.001 dB  
Peak SAR (extrapolated) = 1.73 W/kg  
**SAR(1 g) = 0.895 mW/g; SAR(10 g) = 0.453 mW/g**  
Maximum value of SAR (measured) = 1.22 mW/g

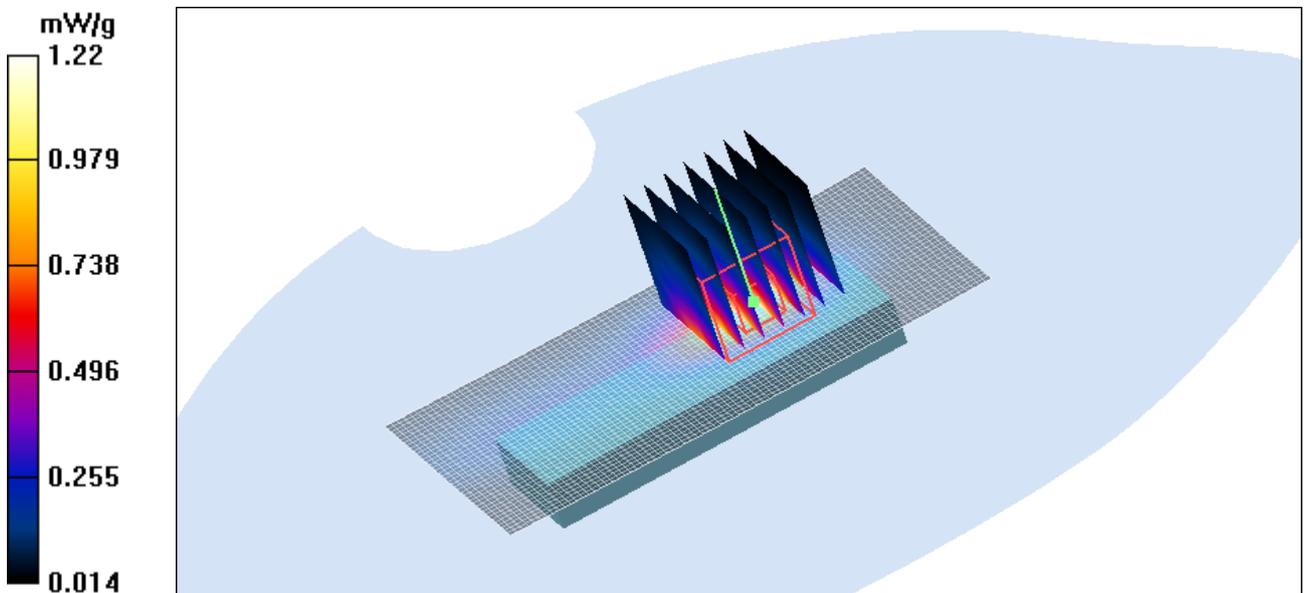


Figure 41 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Channel 512

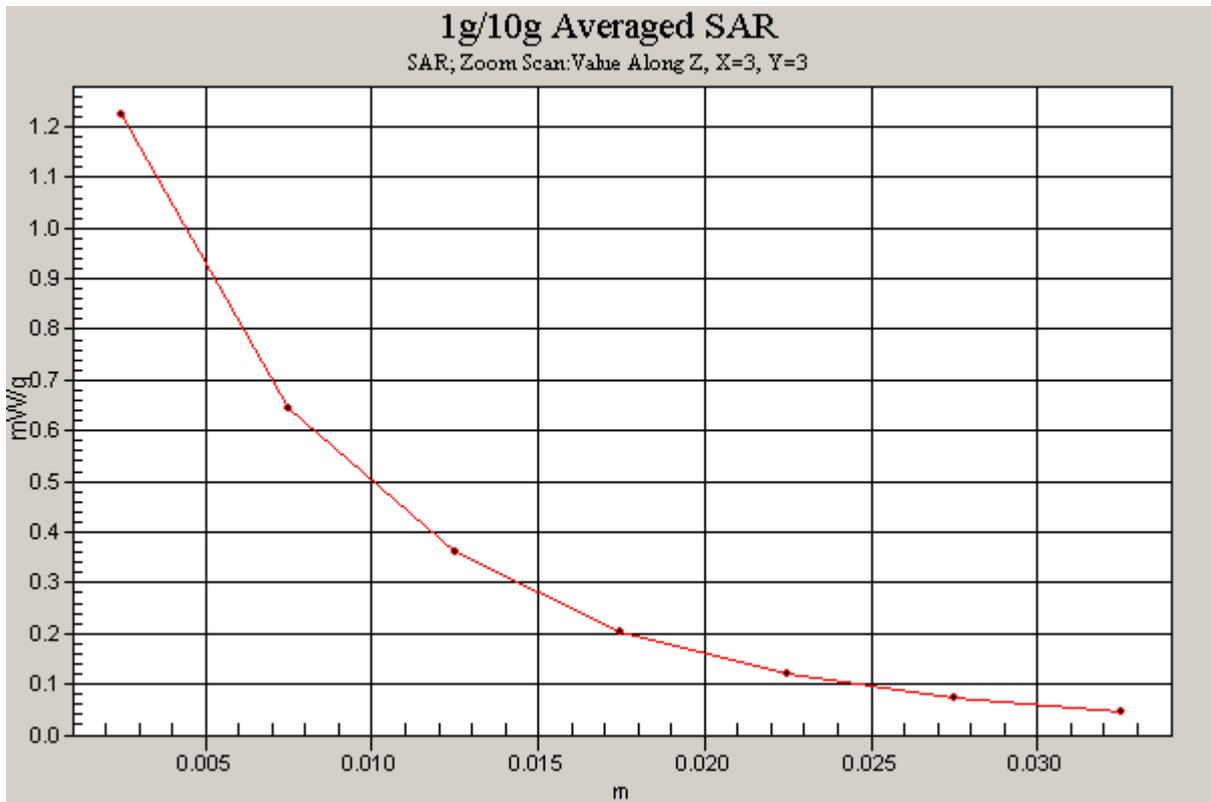


Figure 42 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Channel 512]

Date/Time: 2/26/2009 3:14:36 PM

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

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 51.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM000 T01 ; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 3 Middle/Area Scan (51x51x1):** Measurement grid: dx=15mm, dy=15mm

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 = 14.9 V/m; Power Drift = -0.047 dB

Peak SAR (extrapolated) = 0.700 W/kg

**SAR(1 g) = 0.262 mW/g; SAR(10 g) = 0.129 mW/g**

Maximum value of SAR (measured) = 0.430 mW/g

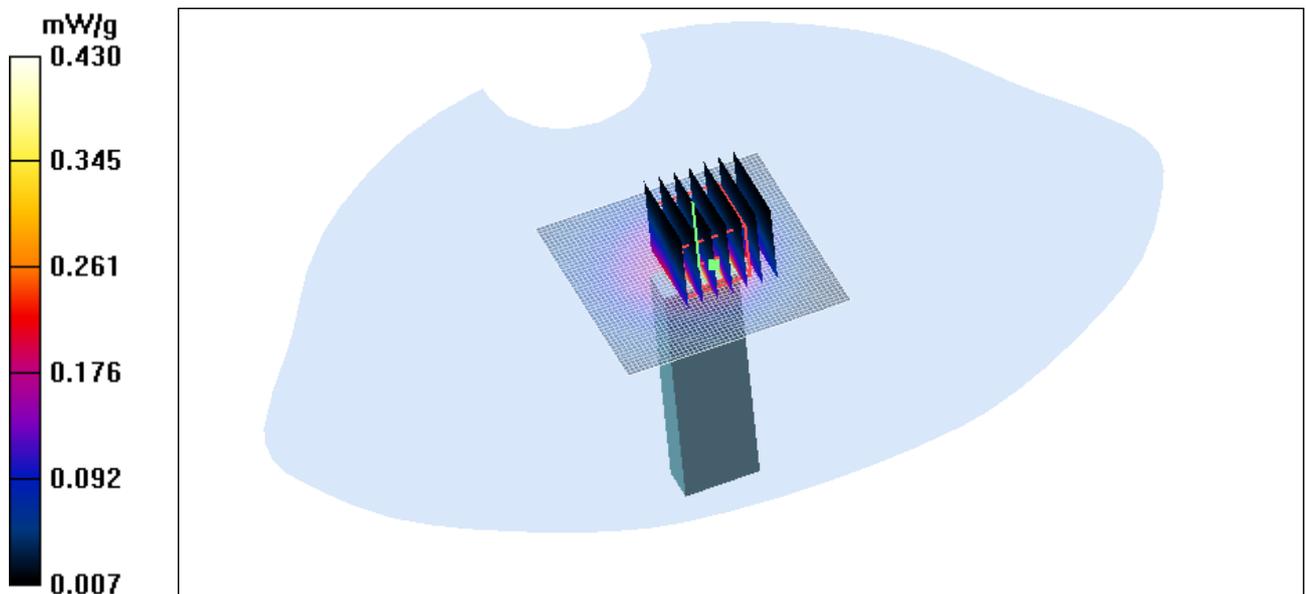


Figure 43 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 3 Channel 661

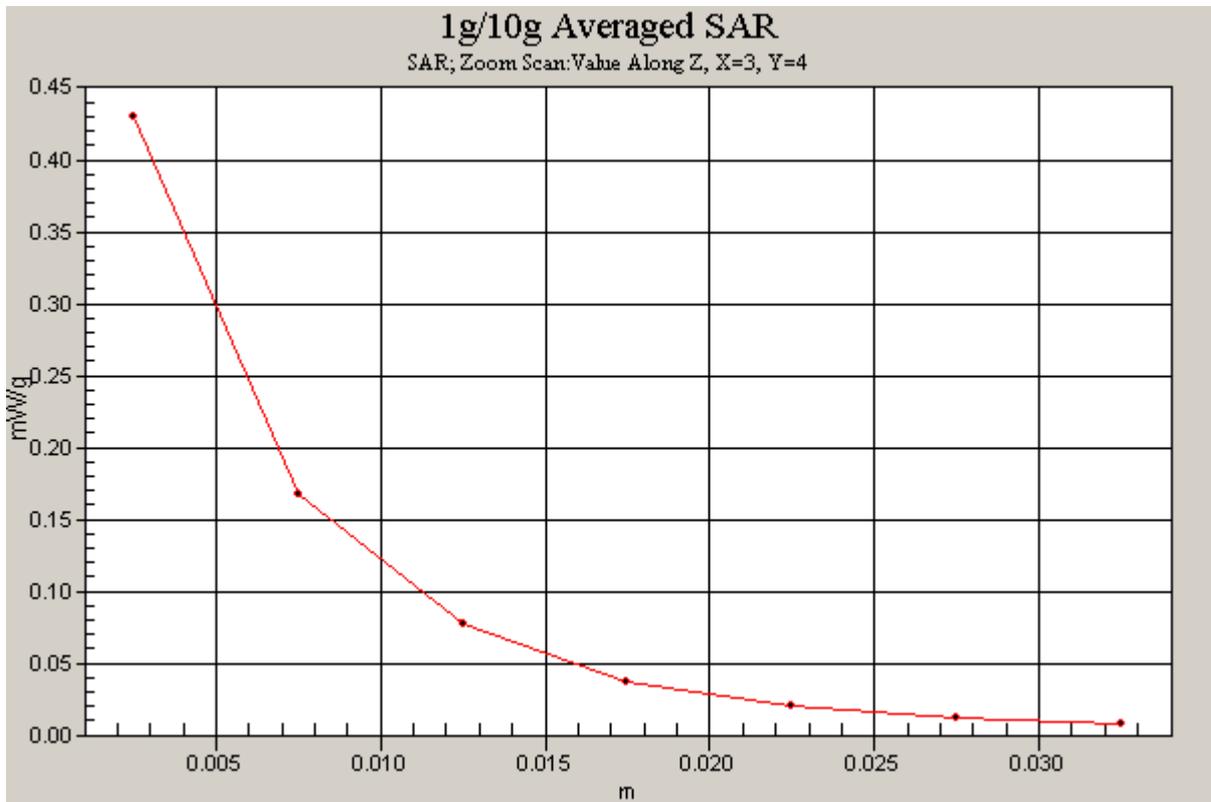


Figure 44 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 3 Channel 661]

Date/Time: 2/26/2009 3:35:16 PM

**GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 4 Middle Frequency**

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 51.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM000 T01 ; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 4 Middle/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.605 mW/g

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

Reference Value = 14.3 V/m; Power Drift = 0.047 dB

Peak SAR (extrapolated) = 0.746 W/kg

**SAR(1 g) = 0.445 mW/g; SAR(10 g) = 0.248 mW/g**

Maximum value of SAR (measured) = 0.571 mW/g

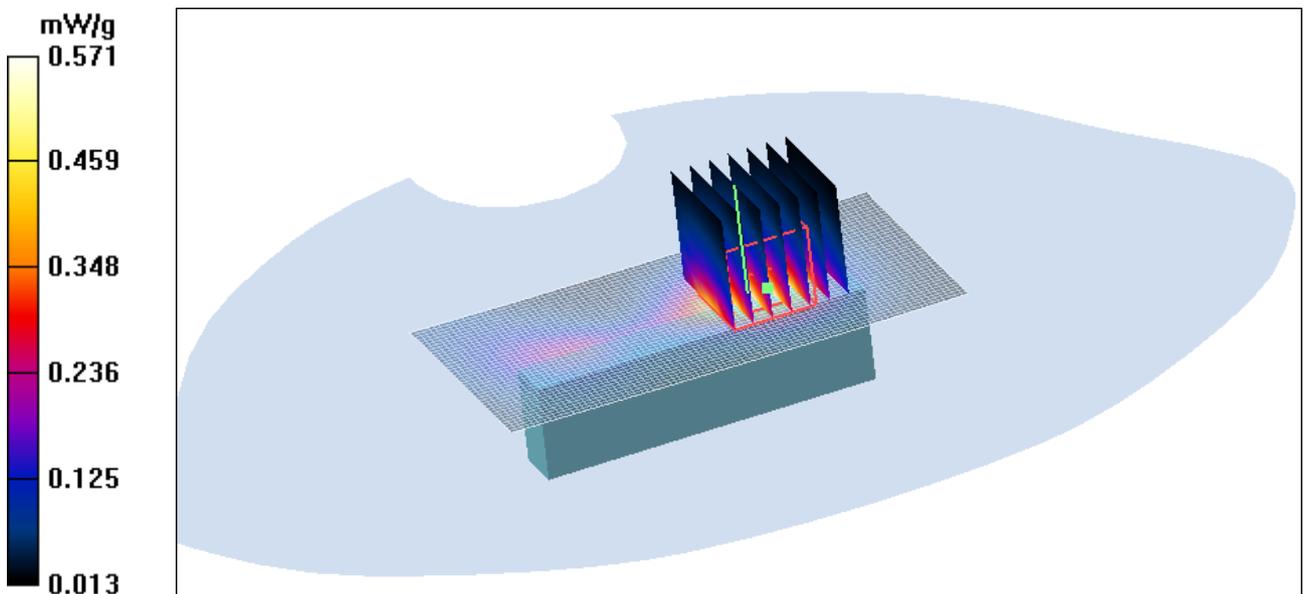


Figure 45 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 4 Channel 661

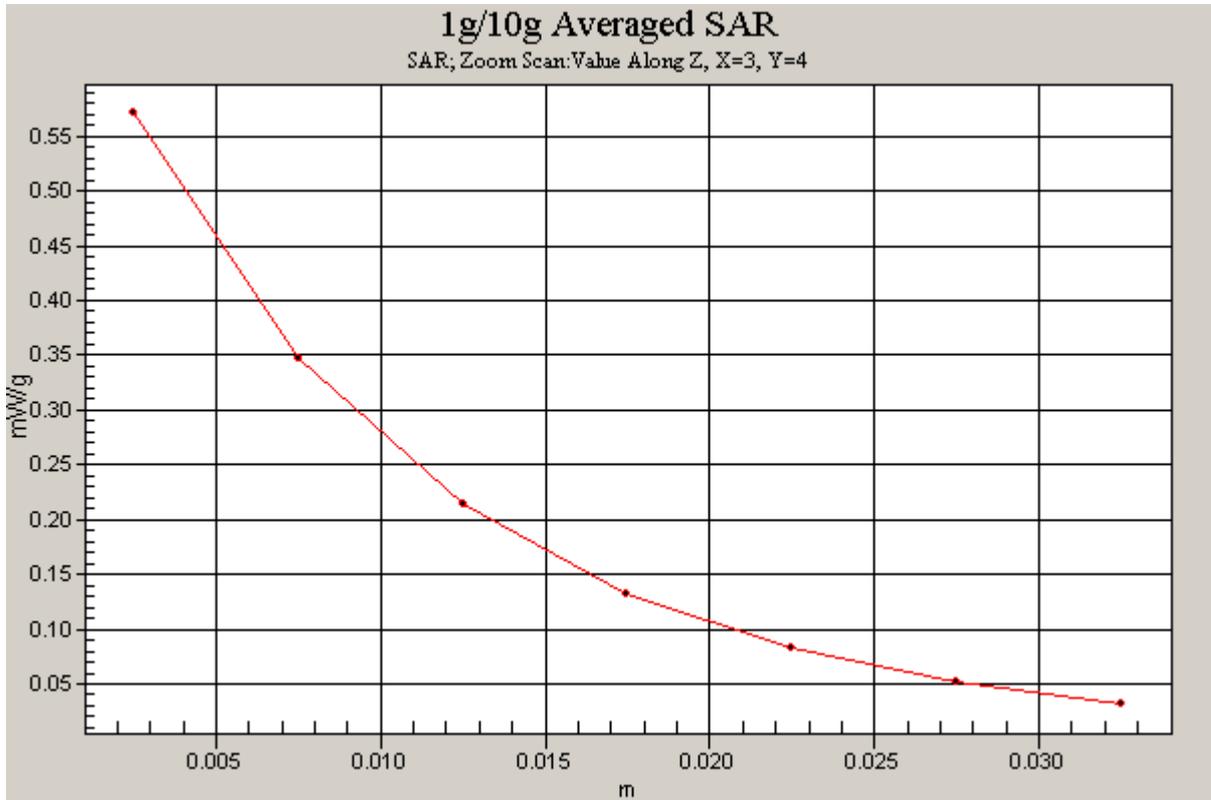


Figure 46 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 4 Channel 661]

Date/Time: 2/26/2009 3:54:26 PM

**GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 5 Middle Frequency**

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

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.53$  mho/m;  $\epsilon_r = 51.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM000 T01 ; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 5 Middle/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 15.1 V/m; Power Drift = -0.189 dB

Peak SAR (extrapolated) = 0.834 W/kg

**SAR(1 g) = 0.471 mW/g; SAR(10 g) = 0.254 mW/g**

Maximum value of SAR (measured) = 0.617 mW/g

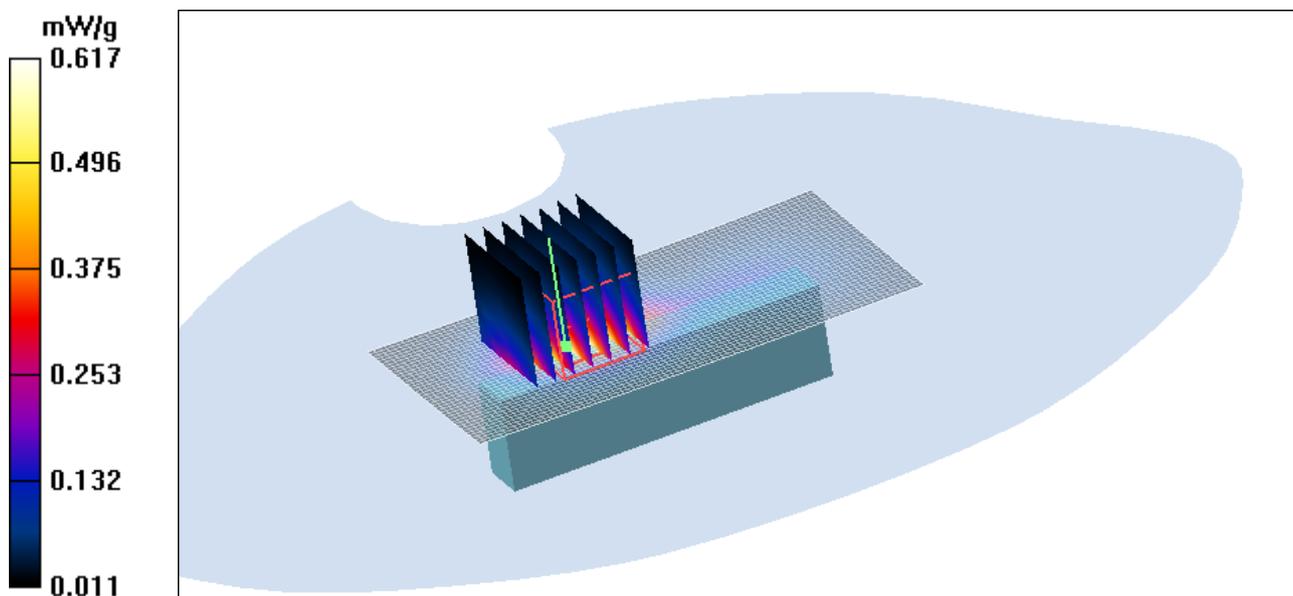


Figure 47 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 5 Channel 661



Figure 48 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 5 Channel 661]

Date/Time: 2/26/2009 4:25:42 PM

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

Communication System: PCS 1900+EGPRS(2Up); Frequency: 1850.2 MHz; Duty Cycle: 1:4  
Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.48$  mho/m;  $\epsilon_r = 51.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
DASY4 Configuration:

- Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45); Calibrated: 9/3/2008
- Electronics: DAE4 Sn452; Calibrated: 11/18/2008
- Phantom: SAM000 T01 ; Type: SAM V4.0; Serial: TP-1246
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

**Test Position 1 Low/Area Scan (41x81x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 1.20 mW/g

**Test Position 1 Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 18.3 V/m; Power Drift = -0.043 dB  
Peak SAR (extrapolated) = 1.52 W/kg  
**SAR(1 g) = 0.859 mW/g; SAR(10 g) = 0.456 mW/g**  
Maximum value of SAR (measured) = 1.13 mW/g

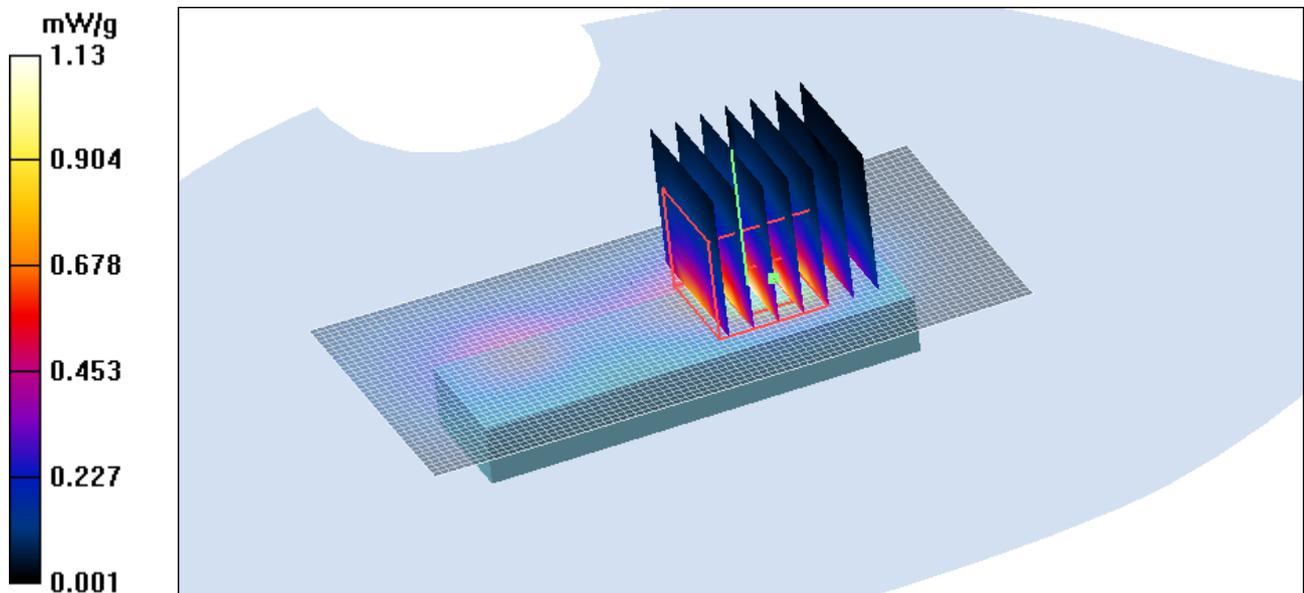


Figure 49 GSM 1900 EGPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 512

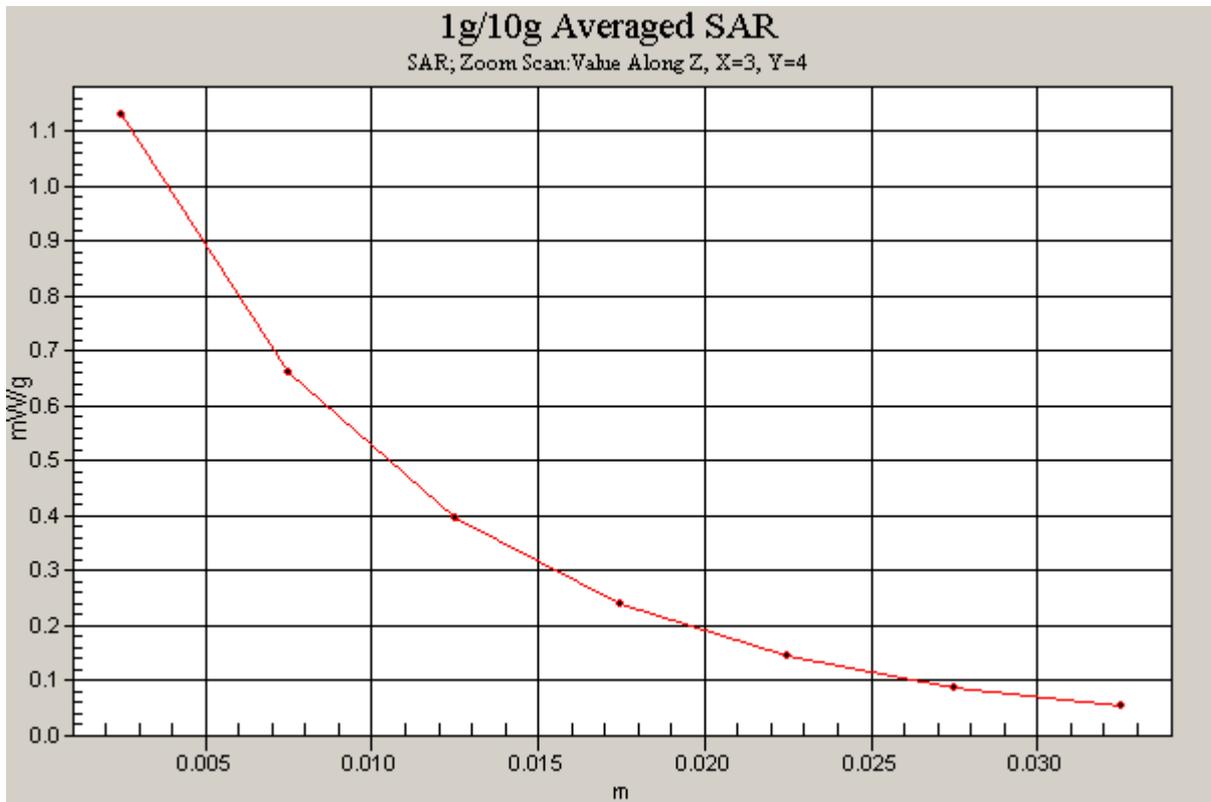


Figure 50 Z-Scan at power reference point [GSM 1900 EGPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 512]

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

No. RZA2009-0159FCC

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## ANNEX D: PROBE CALIBRATION CERTIFICATE

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



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

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

Accreditation No.: **SCS 108**

Client **TA (Auden)**

Certificate No: **EX3-3660\_Sep08**

### CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3660**

Calibration procedure(s) **QA CAL-01.v6 and QA CAL-23.v3  
Calibration procedure for dosimetric E-field probes**

Calibration date: **September 3, 2008**

Condition of the calibrated item **In Tolerance**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	1-Jul-08 (No. 217-00685)	Jul-09
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	1-Jul-08 (No. 217-00666)	Jul-09
Reference Probe ES3DV2	SN: 3013	2-Jan-08 (No. ES3-3013_Jan08)	Jan-09
DAE4	SN: 660	3-Sep-07 (No. DAE4-660_Sep07)	Sep-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

Calibrated by:	Name	Function	Signature
	Katja Pokovic	Technical Manager	

Approved by:	Name	Function	Signature
	Fin Bomholt	R&D Director	

Issued: September 3, 2008

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

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



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

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

Accreditation No.: SCS 108

**Glossary:**

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

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

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

**Methods Applied and Interpretation of Parameters:**

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

EX3DV4 SN:3660

September 3, 2008

# Probe EX3DV4

## SN:3660

Manufactured: April 29, 2008

Calibrated: September 3, 2008

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)