TESTING
No. L2264

OET 65

TEST REPORT

Product Name	HSPA+ USB Slider
Model	E1831
FCC ID	QISE1831
Client	HUAWEI Technologies Co., Ltd.

TA Technology (Shanghai) Co., Ltd.

GENERAL SUMMARY

Product Name	HSPA+ USB Slider	Model	E1831
FCC ID	QISE1831	**Report No.**	RZA2009-1689
Client	HUAWEI Technologies Co., Ltd.		
Manufacturer	HUAWEI Technologies Co., Ltd.		
Standard(s)	**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. **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) **KDB447498 D02:2009-11-13**		
Conclusion	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. General Judgment: **Pass** (Stamp) **Date of issue: December 16th, 2009**		
Comment	The test result only responds to the measured sample.		

Approved by _Yang Weizhong_   **Revised by** _Ling Minbao_   **Performed by** _Li Jinchang_

TABLE OF CONTENT

1. General Information

1.1. Notes of the test report

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

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

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

1.2. Testing laboratory

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai,China
City:	Shanghai
Post code:	201201
Country:	P. R. China
Contact:	Yang Weizhong
Telephone:	+86-021-50791141/2/3
Fax:	+86-021-50791141/2/3-8000
Website:	http://www.ta-shanghai.com
E-mail:	yangweizhong@ta-shanghai.com

1.3. Applicant Information

Company: HUAWEI Technologies Co., Ltd.

Address: Bantian, Longgang District

City: Shenzhen

Postal Code: 518129

Country: P.R. China

Contact: Zhang Ting

Telephone: 0755-28780808

Fax: 0755-28780808

1.4. Manufacturer Information

Company: HUAWEI Technologies Co., Ltd.

Address: Bantian, Longgang District

City: Shenzhen

Postal Code: 518129

Country: P.R. China

Telephone: 0755-28780808

Fax: 0755-28780808

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） WCDMA Band IV; （tested） WCDMA Band V; （tested）		
Test Modulation:	(GSM) GMSK (WCDMA)QPSK		
S/N or IMEI	356997030008590		
GPRS multislot class :	10		
EGPRS multislot class:	12		
HSDPA UE category	14		
HSUPA UE category	6		
Operating frequency range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM850	824.2 ~ 848.8	869.2 ~ 893.8
	GSM1900:	1850.2 ~ 1909.8	1930.2 ~ 1989.8
	WCDMA Band II	1852.4~ 1907.6	1932.4 ~1987.6
	WCDMA Band IV;	1712.4 ~ 1752.6	2112.4 ~ 2152.6
	WCDMA Band V	826.4 ~ 846.6	871.4 ~ 891.6
Power class	GSM 850: 4, tested with power level 5		
	GSM 1900: 1, tested with power level 0		
	WCDMA Band II: 4, tested with maximum output power		
	WCDMA Band IV: 4, tested with maximum output power		
	WCDMA Band V: 4, tested with maximum output power		
Test channel (Low –Middle –High)	128-190-251 (GSM850) 512 - 661-810 (GSM1900) 9262 -9400 -9538 (WCDMA Band II) 1312 -1413 -1513 (WCDMA Band IV) 4132 - 4183 - 4233 (WCDMA Band V)		
Hardware version:	CP1E1831M		
Software version:	11.823.03.rf2.00		
Antenna type:	Internal antenna		
Used host products:	IBM T61 BenQ Joybook R55V		

Equipment Under Test (EUT) is a model of HSPA+ USB Slider, During SAR test of the EUT, it was connected to a portable computer. The tests in the band of GSM 850 , GSM 1900, WCDMA Band II, WCDMA Band IV and WCDMA Band V 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 Joy book R55V). IBM T61 laptop has horizontal USB slot, BenQ Joy book R55V laptop has vertical USB slot.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. Test Date

The test is performed from December 13, 2009 to December 15, 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 10 for this EUT; it has at most 2 timeslots in uplink. The EGPRS class is 12 for this EUT; it has at most 4 timeslots in uplink.

2.3. WCDMA Test Configuration

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

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

For the output power, the configurations for the DPCCH and $DPDCH_1$ are as followed (EUT do not support the $DPDCH_{2-n}$)

Table 1：The configurations for the DPCCH and $DPDCH_1$

	Channel Bit Rate(kbps)	Channel Symbol Rate(ksps)	Spreading Factor	Spreading Code Number	Bits/Slot
DPCCH	15	15	256	0	10
$DPDCH_1$	15	15	256	64	10
	30	30	128	32	20
	60	60	64	16	40
	120	120	32	8	80
	240	240	16	4	160
	480	480	8	2	320
	960	960	4	1	640

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

2.4. HSDPA Test Configuration

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

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

configured with a CQI feedback cycle of 4 ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors($\beta c, \beta d$), and HS-DPCCH power offset parameters($\triangle$ACK, $\triangle$NACK, $\triangle$CQI)should be set according to values indicated in the Table below. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Table 2: Subtests for UMTS Release 5 HSDPA

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

Note1: $\triangle_{ACK}$, $\triangle_{NACK}$ and $\triangle_{CQI}$= 8 $\Leftrightarrow$ A_{hs} = β_{hs}/β_c=30/15 $\Leftrightarrow$ β_{hs}=30/15*β_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, $\triangle_{ACK}$ and $\triangle_{NACK}$= 8 ($A_{hs=}30/15$) with β_{hs}=30/15*β_c,and $\triangle_{CQI}$= 7 ($A_{hs=}24/15$) with β_{hs}=24/15*β_c.

Note3: CM=1 forβ_c/β_d =12/15, β_{hs}/β_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 β_c=11/15 and β_d=15/15.

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

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

Table 4: HSDPA UE category

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

2.5. HSUPA Test Configuration

Body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least 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 5：Sub-Test 5 Setup for Release 6 HSUPA

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

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

Note 2: CM = 1 for βc/βd =12/15, $\underline{\beta}_{hs}/\underline{\beta}_c$ =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 βc/βd 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 βc = 10/15 and βd = 15/15.

Note 4: For subtest 5 the βc/βd 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 βc = 14/15 and βd = 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: βed can not be set directly; it is set by Absolute Grant Value.

Table 6: HSUPA UE category

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

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

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

2.6. Position of module in Portable devices

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

A test distance of 5mm or less, according to KDB 447498 D02 -2009.11.13, should be considered for the orientation that can satisfy such requirements.

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

● Test Position 1: The EUT is connected to the portable computer with horizontal USB slot. The back side of the portable computer is directed tightly to touch the bottom of the flat phantom, and the back side of the EUT towards the bottom of the flat phantom. (ANNEX I Picture 6-a)

● Test Position 2: The EUT is connected to the portable computer through a 19 cm USB cable. The front side of the EUT towards the bottom of the flat phantom. (ANNEX I Picture 6-b)

● Test Position 3: The EUT is connected to the portable computer through a 19 cm USB cable. The left side of the EUT towards the bottom of the flat phantom. (ANNEX I Picture 6-c)

● Test Position 4: The EUT is connected to the portable computer with vertical USB slot. The back side of the portable computer is directed tightly to touch the bottom of the flat phantom, and the right side of the EUT towards the bottom of the flat phantom. (ANNEX I Picture 6-d)

2.7. Picture of host product

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

Picture 1-a: IBM T61 Close

Picture 1-b: IBM T61 Open

Picture 1-c: BenQ Joybook R55V(118) Close

Picture 1-d: BenQ Joybook R55V(118) Open

Picture 1-e: IBM T61 with horizontal USB slot

Picture 1-f: BenQ Joybook R55V(118) with Vertical USB slot

Picture 1-g: a 19 cm USB cable

Picture 1: Computer as a test assistant

3. SAR Measurements System Configuration

3.1. SAR Measurement Set-up

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

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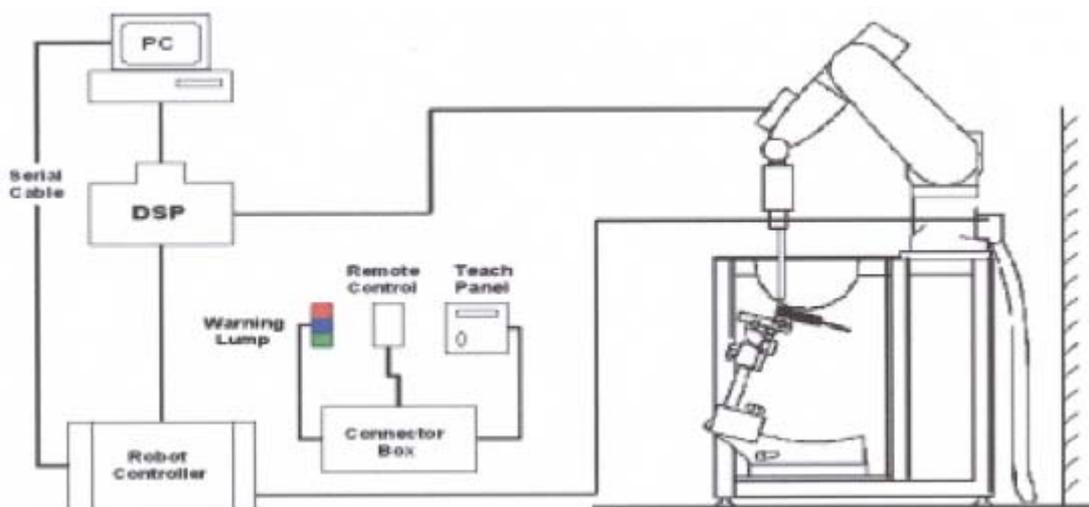- System validation dipoles allowing to validate the proper functioning of the system.

Figure 1. SAR Lab Test Measurement Set-up

3.2. 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.

1.1.1. 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 850MHz, 900MHz,1750MHz and 1950 MHz
Additional CF for other liquids and frequencies upon request

Figure 2.EX3DV4 E-field Probe

Frequency
10 MHz to > 6 GHz
Linearity: ± 0.2 dB
(30 MHz to 6 GHz)

Directivity
± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)

Dynamic Range
10 µW/g to > 100 mW/g Linearity:
± 0.2dB (noise: typically < 1 µW/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 3. EX3DV4 E-field probe

3.2.1. E-field Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB. 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 bellow 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

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

3.3.2. Phantom

The Generic Twin Phantom is constructed of a fiberglass shell integrated in a wooden Figure. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

Shell Thickness	2±0.1 mm
Filling Volume	Approx. 20 liters
Dimensions	810 x l000 x 500 mm (H x L x W)
Aailable	Special

Figure 4.Generic Twin Phantom

3.4. Scanning procedure

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

- The "reference" and "drift" measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT's output power and should vary max. ± 5 %.

- The "surface check" measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

- Area Scan
  The Area Scan is used as a fast scan in two dimensions to find the area of high field values

before running a detailed measurement around the hot spot. Before starting the area scan a grid spacing of 10 mm x 10 mm is set. During the scan the distance of the probe to the phantom remains unchanged.

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

- Zoom Scan

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

- Spatial Peak Detection

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

  • maximum search

  • extrapolation

  • boundary correction

  • peak search for averaged SAR

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

  Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space. They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation. For a grid using 7x7x7 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1g and 10g cubes.

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

3.5. Data Storage and Evaluation

3.5.1. Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DA5". 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	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	Dcp_i
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	
	- Density	

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

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

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

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

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

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

cf = crest factor of exciting field   (DASY parameter)

dcp_i = diode compression point   (DASY parameter)

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

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

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

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

$Norm_i$ = sensor sensitivity of channel i   (i = x, y, z)

$[mV/(V/m)^2]$ for E-field Probes

$ConvF$ = sensitivity enhancement in solution

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

f = carrier frequency [GHz]

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

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

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

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

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

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

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

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

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

     ▪ = equivalent tissue density in g/cm^3

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.

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

with P_{pwe} = equivalent power density of a plane wave in mW/cm^2

    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 11.

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

System check is performed regularly on all frequency bands where tests are performed with the DASY 5 system.

.
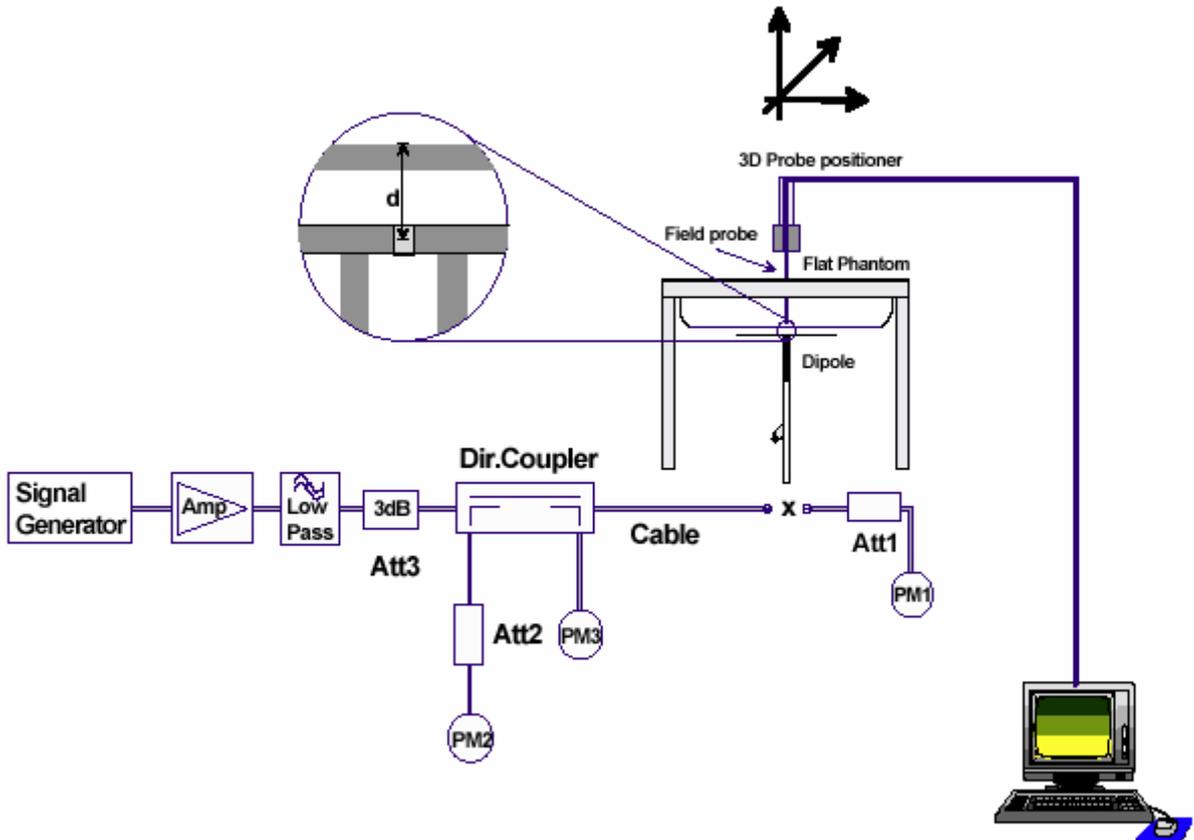
Figure 5. **System Check Set-up**

3.7. Equivalent Tissues

The liquid is consisted of water, sugar, salt, Glycol monobutyl, Preventol and Cellulose. The liquid has previously been proven to be suited for worst-case. The Table 8 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by OET 65.

Table 7: Composition of the Body Tissue Equivalent Matter

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

MIXTURE%	FREQUENCY (Body) 1800MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1800MHz ε=53.3 σ=1.52

MIXTURE%	FREQUENCY (Body) 1900MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1900MHz ε=53.3 σ=1.52

4. Laboratory Environment

Table 8: The Ambient Conditions during Test

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

5. Characteristics of the Test

5.1. Applicable Limit Regulations

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).

KDB447498 D02:2009-11-13

6. Conducted Output Power Measurement

6.1. Summary

The DUT is tested using an E5515C communications tester as controller unit to set test channels and maximum output power to the DUT, as well as for measuring the conducted 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 9: Conducted Power Measurement Results

GSM 850+GPRS		Conducted Power		
		Channel 128	Channel 190	Channel 251
		(824.2MHz)	(836.6MHz)	(848.8MHz)
1 slot Result	Before Test (dBm)	31.38	31.50	31.42
	After Test (dBm)	31.37	31.51	31.41
2 slots Result	Before Test (dBm)	30.73	30.87	30.80
	After Test (dBm)	30.72	30.86	30.81
GSM 850+EGPRS		Conducted Power		
		Channel 128	Channel 190	Channel 251
		(824.2MHz)	(836.6MHz)	(848.8MHz)
1 slot Result	Before Test (dBm)	26.33	26.45	26.39
	After Test (dBm)	26.32	26.44	26.38
2 slots Result	Before Test (dBm)	24.20	24.33	24.30
	After Test (dBm)	24.21	24.32	24.31
3 slots Result	Before Test (dBm)	22.19	22.35	22.30
	After Test (dBm)	22.18	22.34	22.31
4 slots Result	Before Test (dBm)	20.14	20.22	20.23
	After Test (dBm)	20.13	20.21	20.22
GSM 1900+GPRS		Conducted Power		
		Channel 512	Channel 661	Channel 810
		(1850.2MHz)	(1880MHz)	(1909.8MHz)
1 slot Result	Before Test (dBm)	29.48	29.53	29.35
	After Test (dBm)	29.47	29.54	29.36
2 slots Result	Before Test (dBm)	27.26	27.37	27.11
	After Test (dBm)	27.25	27.36	27.10
GSM 1900+EGPRS		Conducted Power		
		Channel 512	Channel 661	Channel 810
		(1850.2MHz)	(1880MHz)	(1909.8MHz)
1 slot Result	Before Test (dBm)	26.14	26.09	25.94
	After Test (dBm)	26.13	26.08	25.93
2 slots Result	Before Test (dBm)	23.35	23.43	23.17

	After Test (dBm)	23.34	23.42	23.16
3 slots Result	Before Test (dBm)	20.90	21.01	20.85
	After Test (dBm)	20.91	21.00	20.84
4 slots Result	Before Test (dBm)	18.92	19.01	18.83
	After Test (dBm)	18.91	19.00	18.82
WCDMA Band IV		Conducted Power		
		Channel 1312	Channel 1413	Channel 1513
		(826.4MHz)	(836.4MHz)	(846.6MHz)
12.2kbps RMC	Before Test (dBm)	19.93	20.10	19.98
	After Test (dBm)	19.92	20.11	19.96
64kbps RMC	Before Test (dBm)	19.85	20.07	19.93
	After Test (dBm)	19.84	20.06	19.92
144kbps RMC	Before Test (dBm)	19.98	20.13	19.89
	After Test (dBm)	19.97	20.12	19.85
384kbps RMC	Before Test (dBm)	19.90	20.12	19.91
	After Test (dBm)	19.91	20.11	19.90
WCDMA Band IV+HSDPA		Conducted Power		
		Channel 1312	Channel 1413	Channel 1513
		(826.4MHz)	(836.4MHz)	(846.6MHz)
Sub Test - 1	Before Test (dBm)	19.89	20.03	19.96
	After Test (dBm)	19.88	20.02	19.95
Sub Test - 2	Before Test (dBm)	19.67	19.86	19.79
	After Test (dBm)	19.66	19.85	19.78
Sub Test - 3	Before Test (dBm)	19.59	19.77	19.65
	After Test (dBm)	19.58	19.76	19.64
Sub Test - 4	Before Test (dBm)	19.66	19.81	19.63
	After Test (dBm)	19.65	19.80	19.61
WCDMA Band IV+HSUPA		Conducted Power		
		Channel 1312	Channel 1413	Channel 1513
		(826.4MHz)	(836.4MHz)	(846.6MHz)
Sub Test - 1	Before Test (dBm)	19.15	19.75	19.54
	After Test (dBm)	19.14	19.74	19.53
Sub Test - 2	Before Test (dBm)	17.83	17.86	17.70
	After Test (dBm)	17.82	17.85	17.71
Sub Test - 3	Before Test (dBm)	18.19	18.45	18.27
	After Test (dBm)	18.18	18.44	18.26
Sub Test - 4	Before Test (dBm)	17.77	17.92	17.88
	After Test (dBm)	17.76	17.91	17.87
Sub Test - 5	Before Test (dBm)	19.36	19.49	19.32
	After Test (dBm)	19.35	19.48	19.31
WCDMA Band II		Conducted Power		
		Channel 9262	Channel 9400	Channel 9538
		(1852.4MHz)	(1880MHz)	(1907.6MHz)
12.2kbps RMC	Before Test (dBm)	20.12	19.96	19.69

	After Test (dBm)	20.11	19.95	19.66
64kbps RMC	Before Test (dBm)	20.09	20.11	19.76
	After Test (dBm)	20.08	20.10	19.74
144kbps RMC	Before Test (dBm)	20.22	19.98	19.65
	After Test (dBm)	20.08	20.10	19.75
384kbps RMC	Before Test (dBm)	20.13	20.07	19.63
	After Test (dBm)	20.12	20.04	19.61
WCDMA Band II+HSDPA		Conducted Power		
		Channel 9262	Channel 9400	Channel 9538
		(1852.4MHz)	(1880MHz)	(1907.6MHz)
Sub Test - 1	Before Test (dBm)	20.03	19.97	19.61
	After Test (dBm)	20.02	19.96	19.60
Sub Test - 2	Before Test (dBm)	19.77	19.69	19.12
	After Test (dBm)	19.76	19.68	19.11
Sub Test - 3	Before Test (dBm)	19.63	19.95	19.04
	After Test (dBm)	19.62	19.94	19.02
Sub Test - 4	Before Test (dBm)	19.59	20.01	19.16
	After Test (dBm)	19.55	20.00	19.15
WCDMA Band II+HSUPA		Conducted Power		
		Channel 9262	Channel 9400	Channel 9538
		(1852.4MHz)	(1880MHz)	(1907.6MHz)
Sub Test - 1	Before Test (dBm)	19.64	19.68	18.99
	After Test (dBm)	19.63	19.67	18.98
Sub Test - 2	Before Test (dBm)	18.07	17.83	17.16
	After Test (dBm)	18.06	17.82	17.15
Sub Test - 3	Before Test (dBm)	18.45	18.96	17.85
	After Test (dBm)	18.44	18.95	17.84
Sub Test - 4	Before Test (dBm)	17.96	17.86	16.90
	After Test (dBm)	17.97	17.85	16.91
Sub Test - 5	Before Test (dBm)	19.51	19.33	18.79
	After Test (dBm)	19.50	19.32	18.78
WCDMA Band V		Conducted Power		
		Channel 4132	Channel 4183	Channel 4233
		(826.4MHz)	(836.6MHz)	(846.6MHz)
12.2kbps RMC	Before Test (dBm)	20.33	20.45	20.56
	After Test (dBm)	20.32	20.43	20.54
64kbps RMC	Before Test (dBm)	20.29	20.38	20.57
	After Test (dBm)	20.27	20.36	20.55
144kbps RMC	Before Test (dBm)	20.36	20.47	20.49
	After Test (dBm)	20.34	20.45	20.47
384kbps RMC	Before Test (dBm)	20.25	20.35	20.60
	After Test (dBm)	20.24	20.32	20.61
WCDMA Band V+HSDPA		Conducted Power		
		Channel 4132	Channel 4183	Channel 4233

		(826.4MHz)	(836.6MHz)	(846.6MHz)
Sub Test - 1	Before Test (dBm)	20.31	20.39	20.52
	After Test (dBm)	20.30	20.37	20.51
Sub Test - 2	Before Test (dBm)	20.15	20.06	20.31
	After Test (dBm)	20.14	20.04	20.30
Sub Test - 3	Before Test (dBm)	19.99	20.17	20.25
	After Test (dBm)	19.97	20.15	20.23
Sub Test - 4	Before Test (dBm)	20.07	20.12	20.23
	After Test (dBm)	20.05	20.10	20.21
WCDMA Band V+HSUPA		Conducted Power		
		Channel 4132	Channel 4183	Channel 4233
		(826.4MHz)	(836.6MHz)	(846.6MHz)
Sub Test - 1	Before Test (dBm)	19.94	19.20	19.28
	After Test (dBm)	19.93	19.21	19.27
Sub Test - 2	Before Test (dBm)	18.15	18.17	18.11
	After Test (dBm)	18.14	18.16	18.12
Sub Test - 3	Before Test (dBm)	18.64	18.52	18.61
	After Test (dBm)	18.63	18.52	18.60
Sub Test - 4	Before Test (dBm)	18.19	18.23	18.25
	After Test (dBm)	18.18	18.22	18.23
Sub Test - 5	Before Test (dBm)	19.77	19.73	19.59
	After Test (dBm)	19.76	19.71	19.56

7. Test Results

7.1. Dielectric Performance

Table 10: Dielectric Performance of Body Tissue Simulating Liquid

Frequency	Description	Dielectric Parameters		Temp
		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 2009-12-14	53.56	0.98	21.5
1800MHz (body)	Target value ±5% window	53.30 50.64 - 55.97	1.52 1.44 - 1.60	/
	Measurement value 2009-12-15	52.74	1.53	21.7
1900MHz (body)	Target value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60	/
	Measurement value 2009-12-13	52.38	1.55	21.7

7.2. System Check

Table 11: System Check for Body tissue stimulant

Frequency	Description	SAR(W/kg)		Dielectric Parameters		Temp
		10g	1g	ε_r	σ(s/m)	℃
835MHz	Recommended result ±10% window	1.67 1.50 — 1.84	2.54 2.29 — 2.79	53.5	1.00	/
	Measurement value 2009-12-14	1.68	2.56	53.56	0.98	21.9
1800 MHz	Recommended result ±10% window	4.97 4.47 — 5.47	9.31 8.38 — 10.24	54.2	1.49	/
	Measurement value 2009-12-15	5.14	9.46	52.74	1.53	22.1
1900 MHz	Recommended result ±10% window	5.52 4.97 — 6.07	10.5 9.45 — 11.55	54	1.55	/
	Measurement value 2009-12-13	5.17	9.73	52.38	1.55	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.

7.3. Summary of Measurement Results

7.3.1. GSM850 (GPRS/EGPRS)
Table 12: 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	2 timeslots	Middle	0.247	0.408	-0.051	Figure 12
	1 timeslot	High	0.294	0.474	-0.010	Figure 14
		Middle	0.362	0.599	0.024	Figure 16
		Low	0.281	0.450	-0.033	Figure 18
Test Position 2	1 timeslot	Middle	0.193(max.cube)	0.321(max.cube)	0.188	Figure 20
BenQ Joybook R55V						
Test Position 3	1 timeslot	Middle	0.064	0.099	-0.063	Figure 22
Test Position 4	1 timeslot	Middle	0.255	0.365	0.048	Figure 24
Worst case position of GPRS with EGPRS						
Test Position 1	4 timeslots	Middle	0.347	0.576	-0.037	Figure 26
	3 timeslots	Middle	0.347	0.574	-0.052	Figure 28
	2 timeslots	Middle	0.251	0.420	-0.167	Figure 30
	1 timeslot	Middle	0.366	0.607	-0.002	Figure 32

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;

Table 13: 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	Middle	0.618	0.309	0.773
	5mm		0.470		
	10mm		0.280		

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

2. when the device position with the highest point SAR is > 25% of that measured at the initial position, a complete 1-g SAR evaluation is required for this configuration.

3. A single point SAR is measured for each of these device positions until the SAR is less than 50% of that measured at the initial position.

7.3.2. GSM1900 (GPRS/EGPRS)

Table 14: SAR Values [GSM1900 (GPRS/EGPRS)]

Limit of SAR (W/kg)			10 g Average	1g Average	Power Drift(dB)	Graph Results
			2.0	1.6	± 0.21	
Test Case Of Body			Measurement Result (W/kg)		Power Drift(dB)	
Different Test Position	Different Timeslots	Channel	10 g Average	1 g Average		
IBM T61						
Test Position 1	2 timeslots	High	0.505(max.cube)	0.877(max.cube)	-0.007	Figure 34
		Middle	0.566	0.982	-0.033	Figure 36
		Low	0.546(max.cube)	0.941(max.cube)	-0.028	Figure 38
	1 timeslot	Middle	0.415(max.cube)	0.703(max.cube)	-0.044	Figure 40
Test Position 2	2 timeslots	Middle	0.264(max.cube)	0.449(max.cube)	0.156	Figure 42
BenQ Joybook R55V						
Test Position 3	2 timeslots	Middle	0.369	0.714	0.017	Figure 44
Test Position 4	2 timeslots	Middle	0.324(max.cube)	0.599(max.cube)	0.190	Figure 46
Worst case position of GPRS with EGPRS						
Test Position 1	4 timeslots	Middle	0.454(max.cube)	0.761(max.cube)	-0.025	Figure 48
	3 timeslots	Middle	0.513(max.cube)	0.895(max.cube)	0.072	Figure 50
	2 timeslots	Middle	0.563(max.cube)	0.983(max.cube)	0.051	Figure 52
	1 timeslot	Middle	0.456(max.cube)	0.794(max.cube)	0.130	Figure 54

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;

Table 15: 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	Middle	1.182	0.591	1.4775
	5mm		0.725		
	10mm		0.473		

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

2. when the device position with the highest point SAR is > 25% of that measured at the initial position, a complete 1-g SAR evaluation is required for this configuration.

3. A single point SAR is measured for each of these device positions until the SAR is less than 50% of that measured at the initial position.

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

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

Limit of SAR (W/kg)		10 g Average	1g Average	Power Drift(dB)	Graph Results
		2.0	1.6	± 0.21	
Test Case Of Body		Measurement Result (W/kg)		Power Drift(dB)	
Different Test Position	Channel	10 g Average	1 g Average		
IBM T61					
Test Position 1	High	0.331(max.cube)	0.569(max.cube)	0.178	Figure 56
	Middle	0.470(max.cube)	0.825(max.cube)	0.122	Figure 58
	Low	0.587(max.cube)	1.010(max.cube)	0.046	Figure 60
Test Position 2	Middle	0.207(max.cube)	0.350(max.cube)	0.013	Figure 62
BenQ Joybook R55V					
Test Position 3	Middle	0.277	0.537	-0.158	Figure 64
Test Position 4	Middle	0.327(max.cube)	0.528(max.cube)	-0.062	Figure 66
Worst case position of RMC with HSDPA					
Test Position 1	Low	0.604(max.cube)	1.040(max.cube)	-0.027	Figure 68
Worst case position of RMC with HSUPA					
Test Position 1	Low	0.586(max.cube)	1.010(max.cube)	-0.021	Figure 70

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;

Table 17: 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	Low	1.120	0.560	1.400
	5mm		0.776		
	10mm		0.362		

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

     2. when the device position with the highest point SAR is > 25% of that measured at the initial position, a complete 1-g SAR evaluation is required for this configuration.

     3. A single point SAR is measured for each of these device positions until the SAR is less than 50% of that measured at the initial position.

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

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

Limit of SAR (W/kg)		10 g Average	1g Average	Power Drift(dB)	Graph Results
		2.0	1.6	$\pm$ 0.21	
Test Case Of Body		Measurement Result (W/kg)		Power Drift(dB)	
Different Test Position	Channel	10 g Average	1 g Average		
IBM T61					
Test Position 1	High	0.498(max.cube)	0.905(max.cube)	-0.043	Figure 72
	Middle	0.515	0.884	0.116	Figure 74
	Low	0.451	0.827	0.065	Figure 76
Test Position 2	High	0.532	0.938	0.059	Figure 78
	Middle	0.470	0.853	0.162	Figure 80
	Low	0.476	0.871	0.020	Figure 82
BenQ Joybook R55V					
Test Position 3	Middle	0.228	0.419	0.020	Figure 84
Test Position 4	Middle	0.436	0.752	-0.011	Figure 86
Worst case position of RMC with HSDPA					
Test Position 2	High	0.515	0.883	-0.074	Figure 88
Worst case position of RMC with HSUPA					
Test Position 2	High	0.441	0.767	-0.055	Figure 90

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.

Table 19: SAR Values [WCDMA Band IV, 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 2	initial position	High	1.079	0.540	1.349
	5mm		0.471		

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

2. when the device position with the highest point SAR is > 25% of that measured at the initial position, a complete 1-g SAR evaluation is required for this configuration.

3. A single point SAR is measured for each of these device positions until the SAR is less than 50% of that measured at the initial position.

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

Table 20: SAR Values [WCDMA Band V (WCDMA/HSDPA/HSUPA)]

Limit of SAR (W/kg)		10 g Average	1g Average	Power Drift(dB)	Graph Results
		2.0	1.6	± 0.21	
Test Case Of Body		Measurement Result (W/kg)		Power Drift(dB)	
Different Test Position	Channel	10 g Average	1 g Average		
IBM T61					
Test Position 1	High	0.185	0.310	0.144	Figure 92
	Middle	0.183	0.304	0.076	Figure 94
	Low	0.199	0.331	0.057	Figure 96
Test Position 2	Middle	0.076	0.126	0.026	Figure 98
BenQ Joybook R55V					
Test Position 3	Middle	0.039	0.061	0.026	Figure 100
Test Position 4	Middle	0.120	0.183	0.066	Figure 102
Worst case position of RMC with HSDPA					
Test Position 1	Low	0.205	0.333	-0.057	Figure 104
Worst case position of RMC with HSUPA					
Test Position 1	Low	0.195	0.317	0.034	Figure 106

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 21: SAR Values [WCDMA Band IV, 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	0.459	0.230	0.574
	5mm		0.308		
	10mm		0.155		

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

2. when the device position with the highest point SAR is > 25% of that measured at the initial position, a complete 1-g SAR evaluation is required for this configuration.

3. A single point SAR is measured for each of these device positions until the SAR is less than 50% of that measured at the initial position.

7.4. Conclusion

Localized Specific Absorption Rate (SAR) of this portable wireless device has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this report. Maximum localized SAR_{1g} is 1.040 W/kg that is below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.

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								

20	-phantom	B	4.0	R	$\sqrt{3}$	1	2.3	∞
21	-liquid conductivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.64	1.8	∞
22	-liquid conductivity (measurement uncertainty)	B	5.0	N	1	0.64	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 22: 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	4d031	January 22, 2009	One year
08	Validation Kit 1800MHz	D1800V2	2d052	June 26, 2009	One year
09	Validation Kit 1900MHz	D1900V2	5d018	June 26, 2009	One year
10	BTS	E5515C	MY48360988	December 10, 2009	One year
11	E-field Probe	EX3DV4	3677	September 23, 2009	One year
12	DAE	DAE4	905	June 24, 2009	One year

END OF REPORT BODY

ANNEX A: Test Layout

Picture 2: Specific Absorption Rate Test Layout
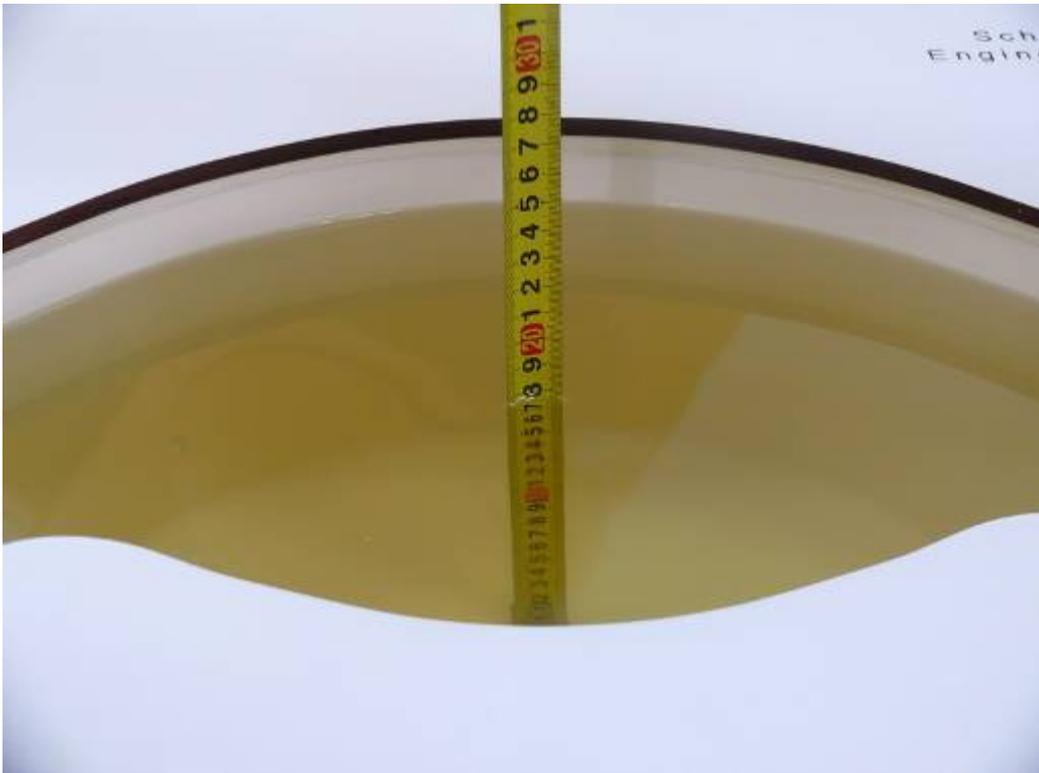
Picture 3: Liquid depth in the Flat Phantom (835 MHz)

Picture 4: Liquid depth in the Flat Phantom (1800 MHz)

Picture 5: Liquid depth in the Flat Phantom (1900 MHz)

ANNEX B: System Check Results

System Performance Check at 835 MHz Body TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d031

Date/Time: 12/14/2009 7:50:20 AM

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

Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 53.56; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM1; Type: SAM;

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

835 MHZ Dipole/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

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

835 MHZ Dipole/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 3.68 W/kg

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

Maximum value of SAR (measured) = 2.77 mW/g
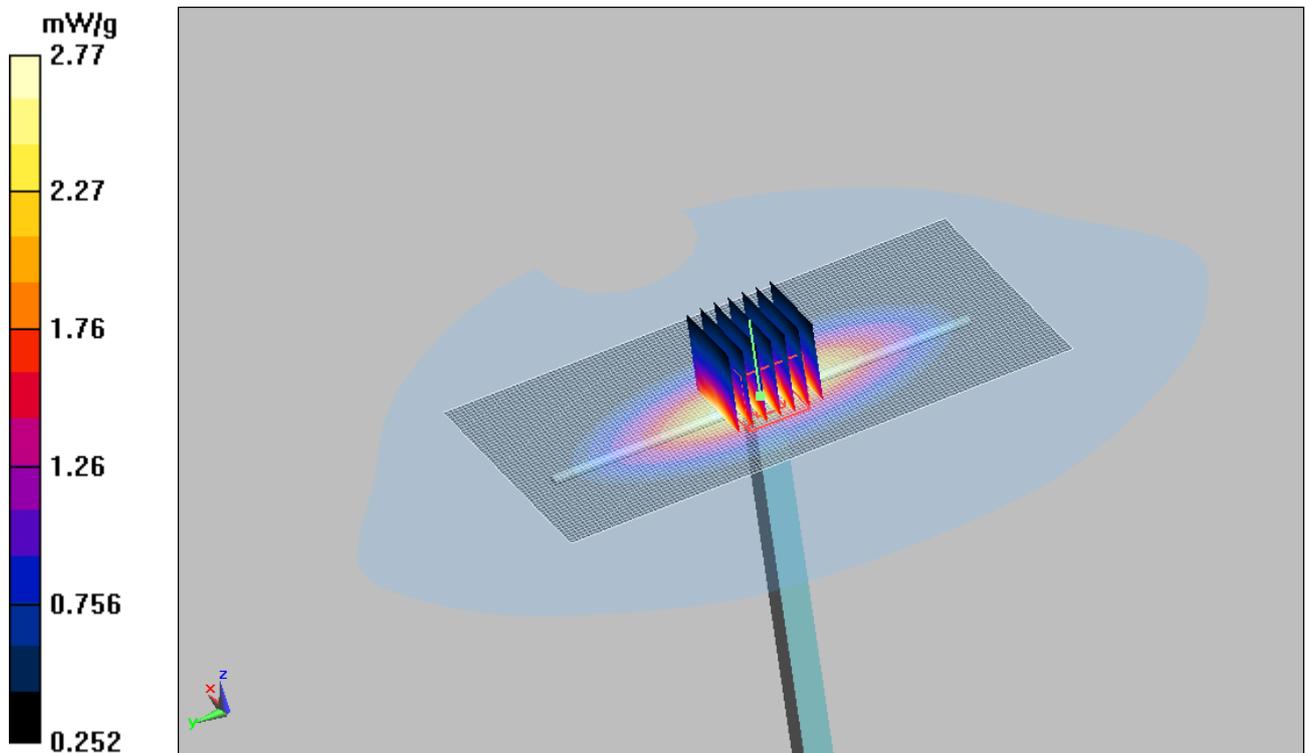
Figure 6 System Performance Check 835MHz 250mW
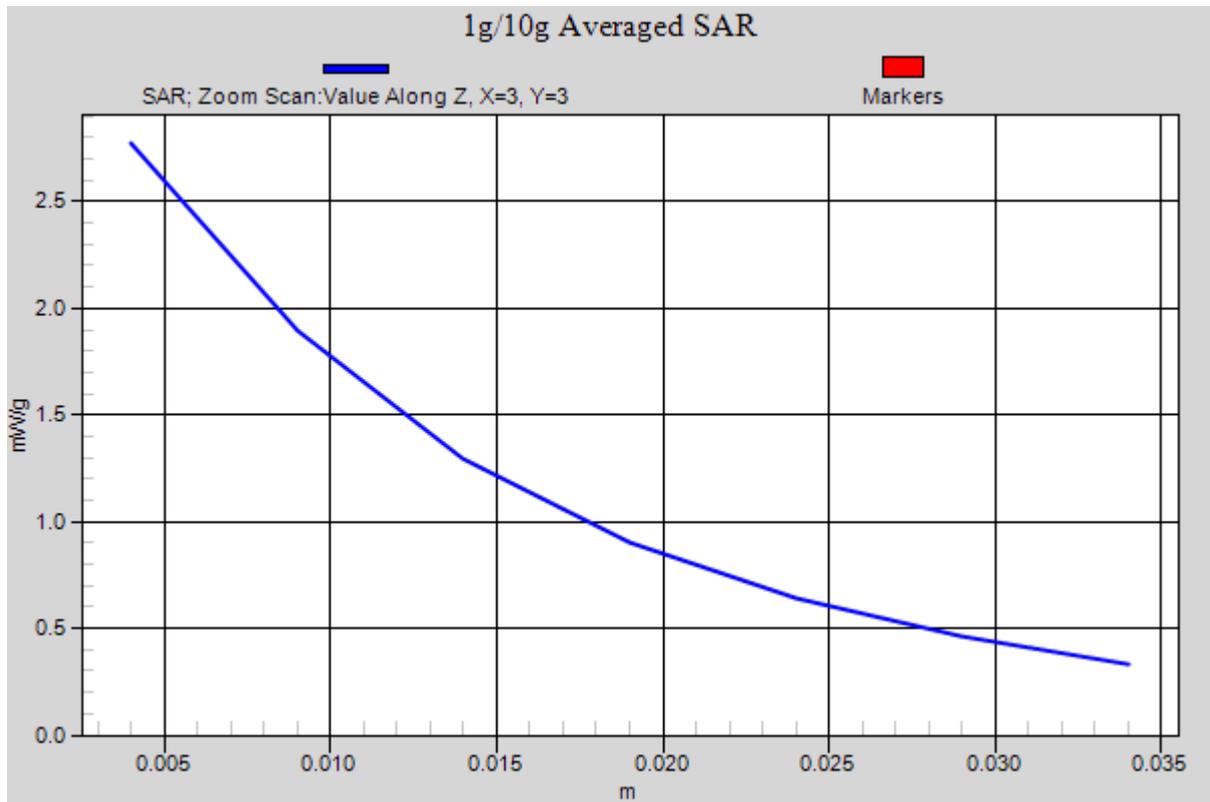
Figure 7 Z-Scan at power reference point (system Check at 835 MHz dipole)

System Performance Check at 1800 MHz Body TSL

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d052

Date/Time: 12/15/2009 7:52:45 AM

Communication System: CW; Frequency: 1800 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1800 MHz; σ = 1.53 mho/m; ε_r = 52.74; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3677; ConvF(7.7, 7.7, 7.7); Calibrated: 9/23/2009

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM000 T01 ; Type: SAM V4.0; Serial: TP-1246

Measurement SW: DASY5, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

1800 MHZ Dipole /Area Scan (41x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 12.1 mW/g

1800 MHZ Dipole /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 75.3 V/m; Power Drift = 0.059 dB

Peak SAR (extrapolated) = 15.4 W/kg

SAR(1 g) = 9.46 mW/g; SAR(10 g) = 5.14 mW/g

Maximum value of SAR (measured) = 10.7 mW/g
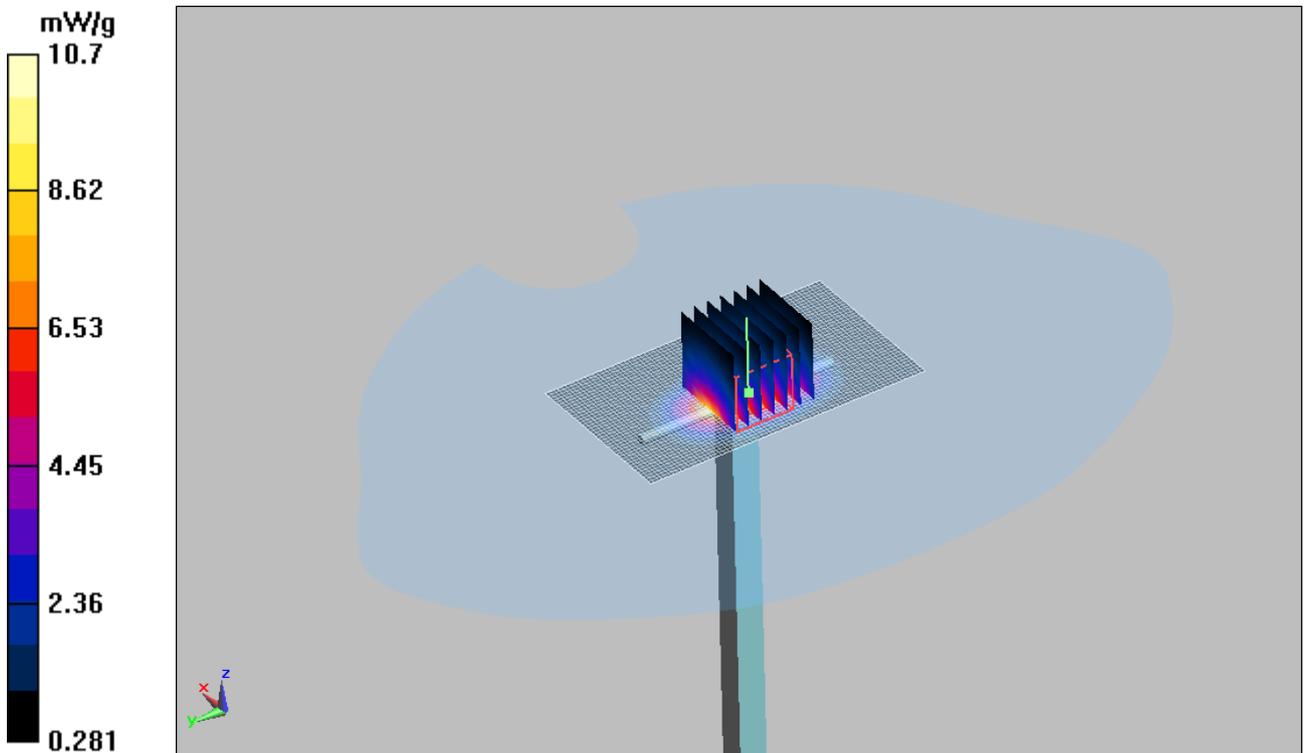
Figure 8 System Performance Check 1800MHz 250mW
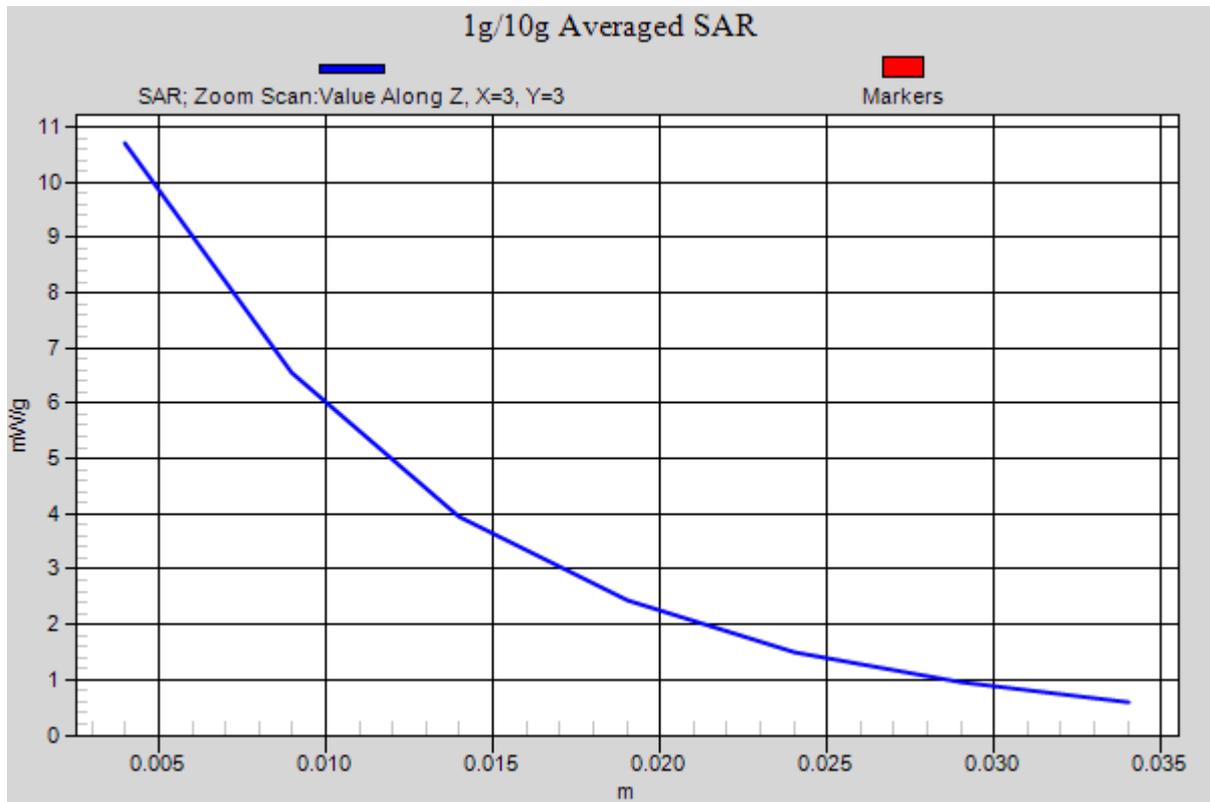
Figure 9 Z-Scan at power reference point (system Check at 1800 MHz dipole)

System Performance Check at 1900 MHz Body TSL

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

Date/Time: 12/13/2009 9:20:19 AM

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

Medium parameters used: f = 1900 MHz; σ = 1.55 mho/m; ε_r = 52.38; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM2; Type: SAM;

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

1900 MHZ Dipole/Area Scan (41x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 12.5 mW/g

1900 MHZ Dipole/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 16.8 W/kg

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

Maximum value of SAR (measured) = 11 mW/g
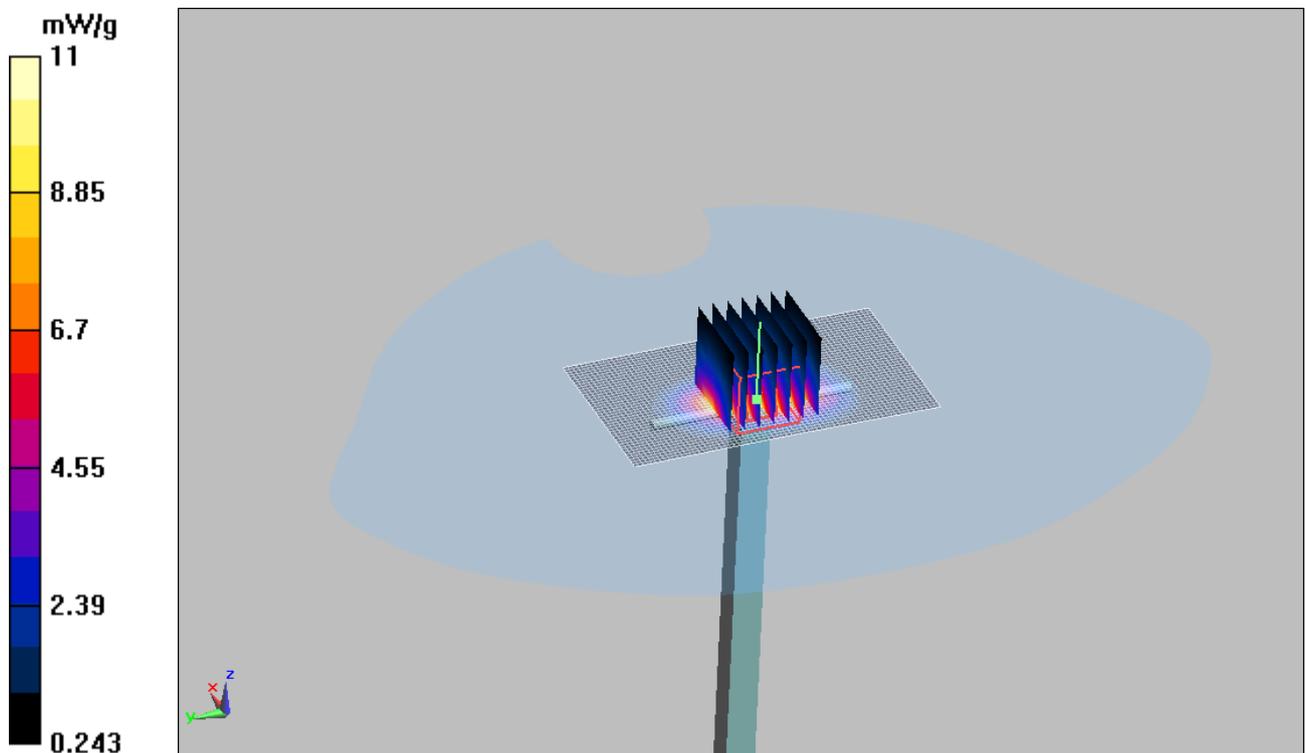
Figure 10 System Performance Check 1900MHz 250mW
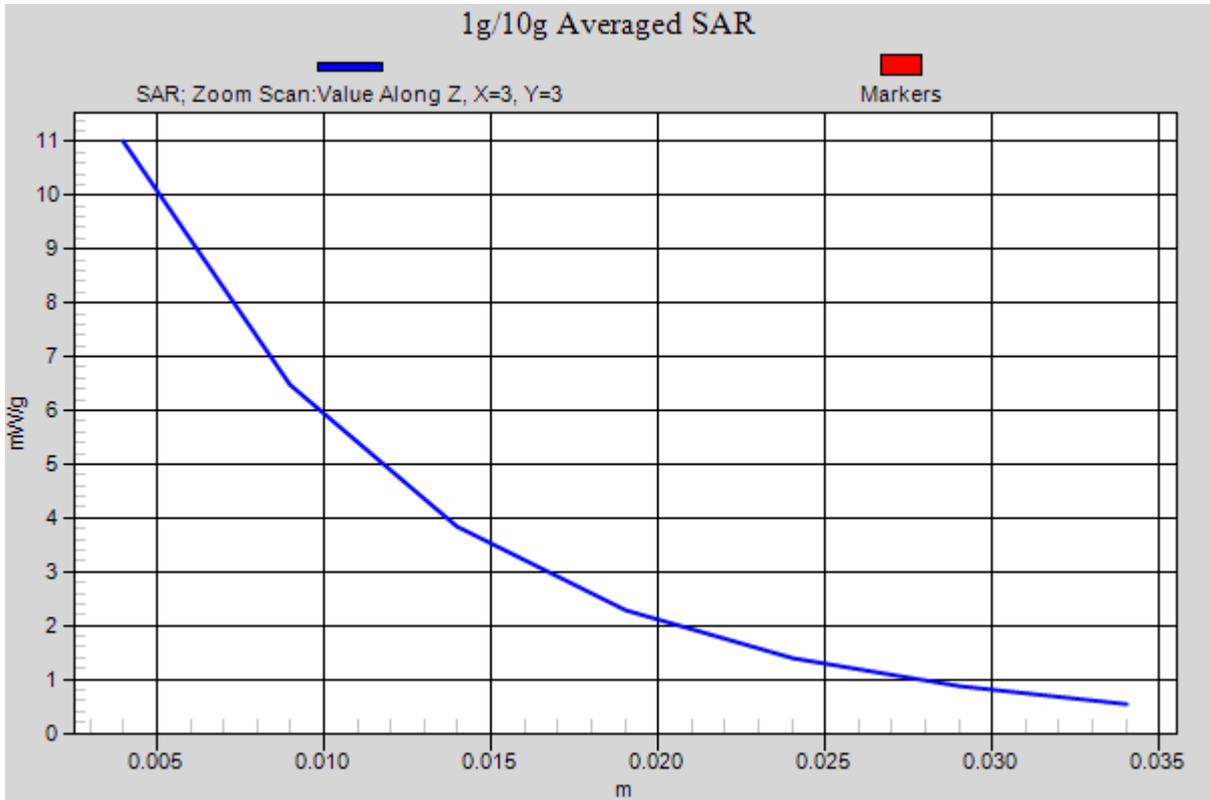
Figure 11 Z-Scan at power reference point (system Check at 1900 MHz dipole)

ANNEX C: Graph Results

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

Date/Time: 12/14/2009 9:31:00 AM

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

Medium parameters used: f = 837 MHz; σ = 0.989 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM1; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 0.487 mW/g

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

Reference Value = 20.4 V/m; Power Drift = -0.051 dB

Peak SAR (extrapolated) = 0.650 W/kg

SAR(1 g) = 0.408 mW/g; SAR(10 g) = 0.247 mW/g

Maximum value of SAR (measured) = 0.449 mW/g
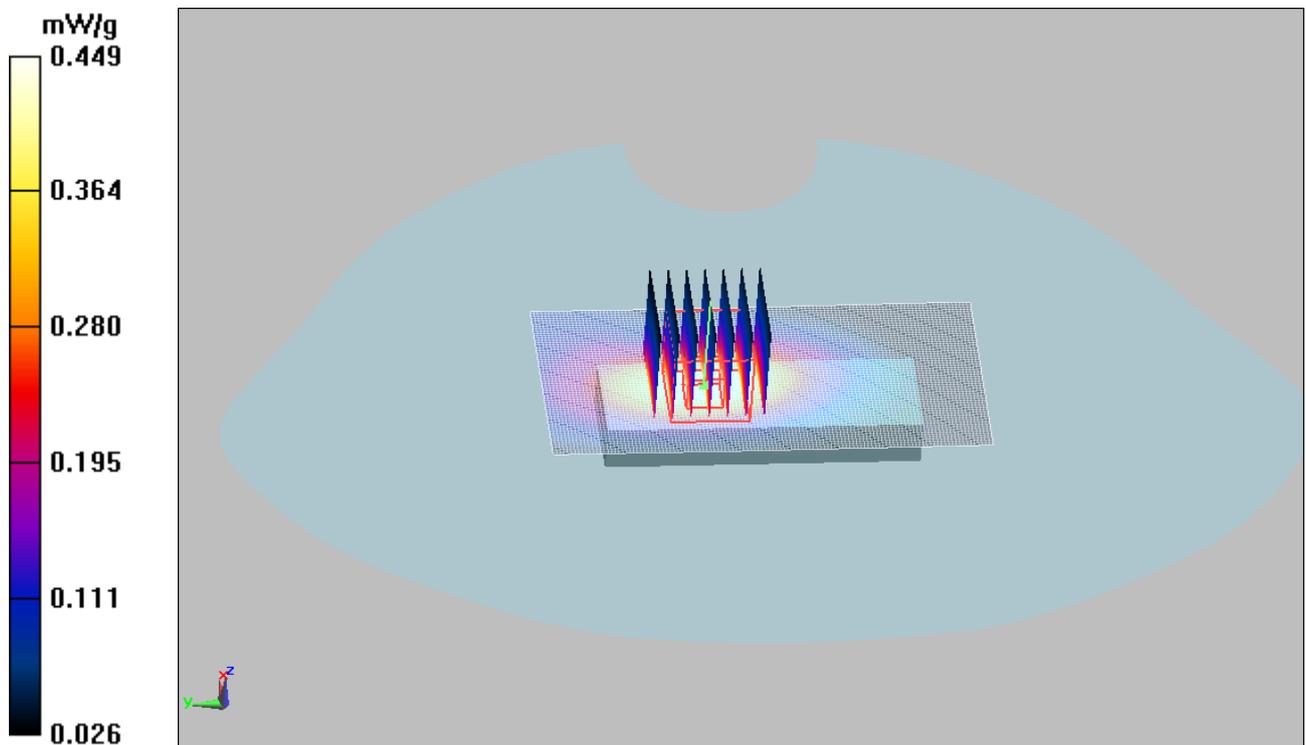
Figure 12GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 190
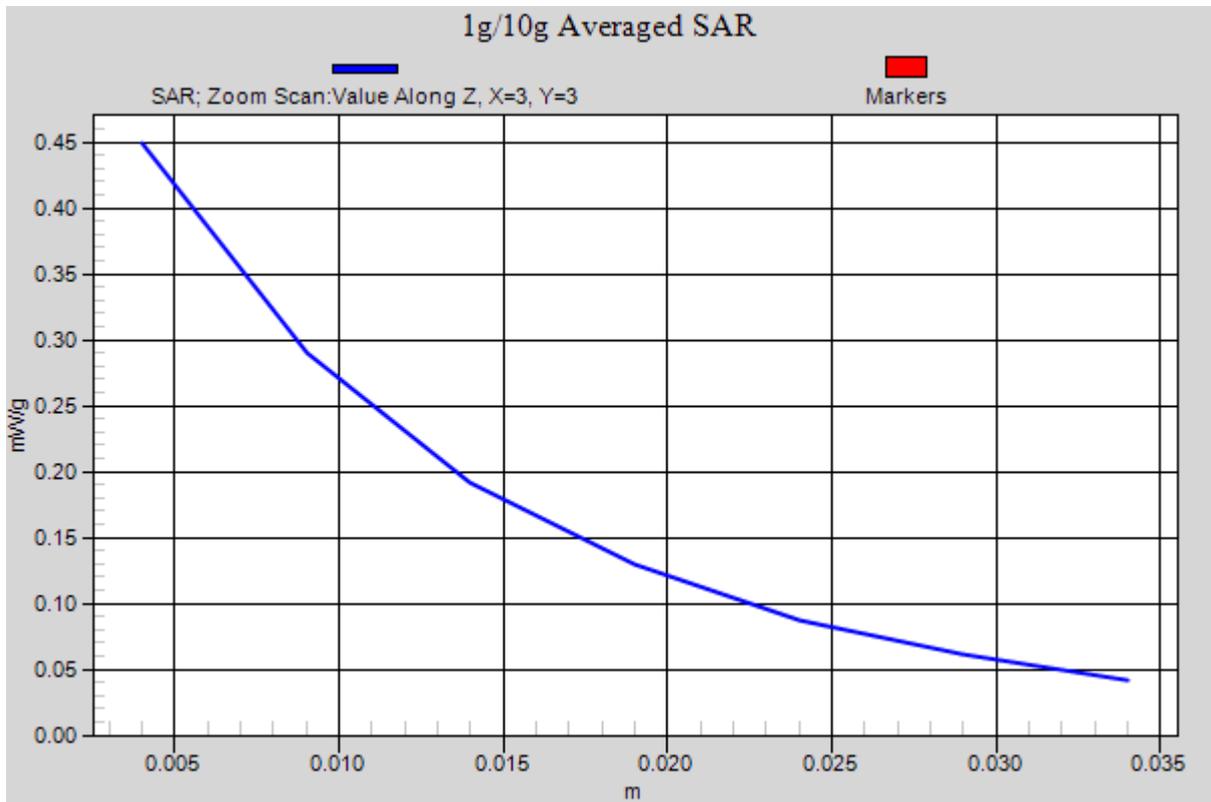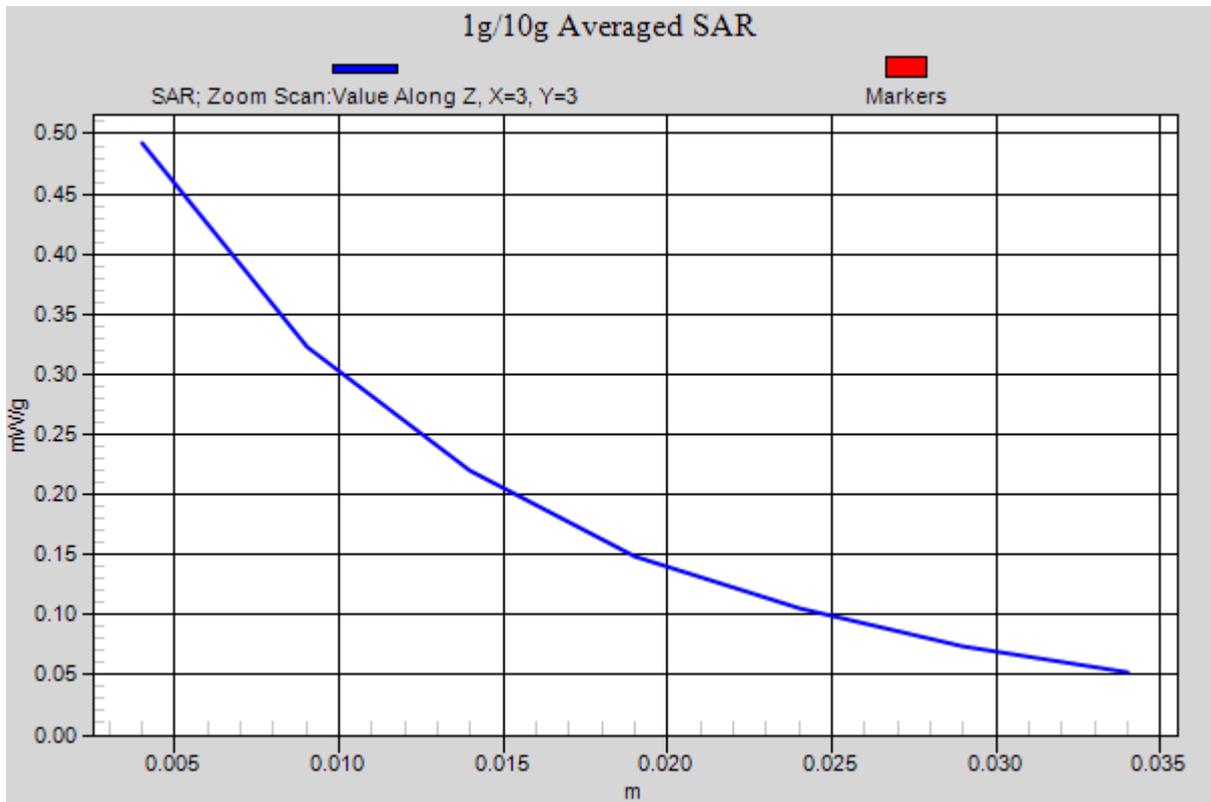
Figure 13 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 190]

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

Date/Time: 12/14/2009 10:52:01 PM

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

Medium parameters used: f = 849 MHz; σ = 1 mho/m; $ε_r$ = 53.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM1; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 0.521 mW/g

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

Reference Value = 19.7 V/m; Power Drift = -0.010 dB

Peak SAR (extrapolated) = 0.743 W/kg

SAR(1 g) = 0.474 mW/g; SAR(10 g) = 0.294 mW/g

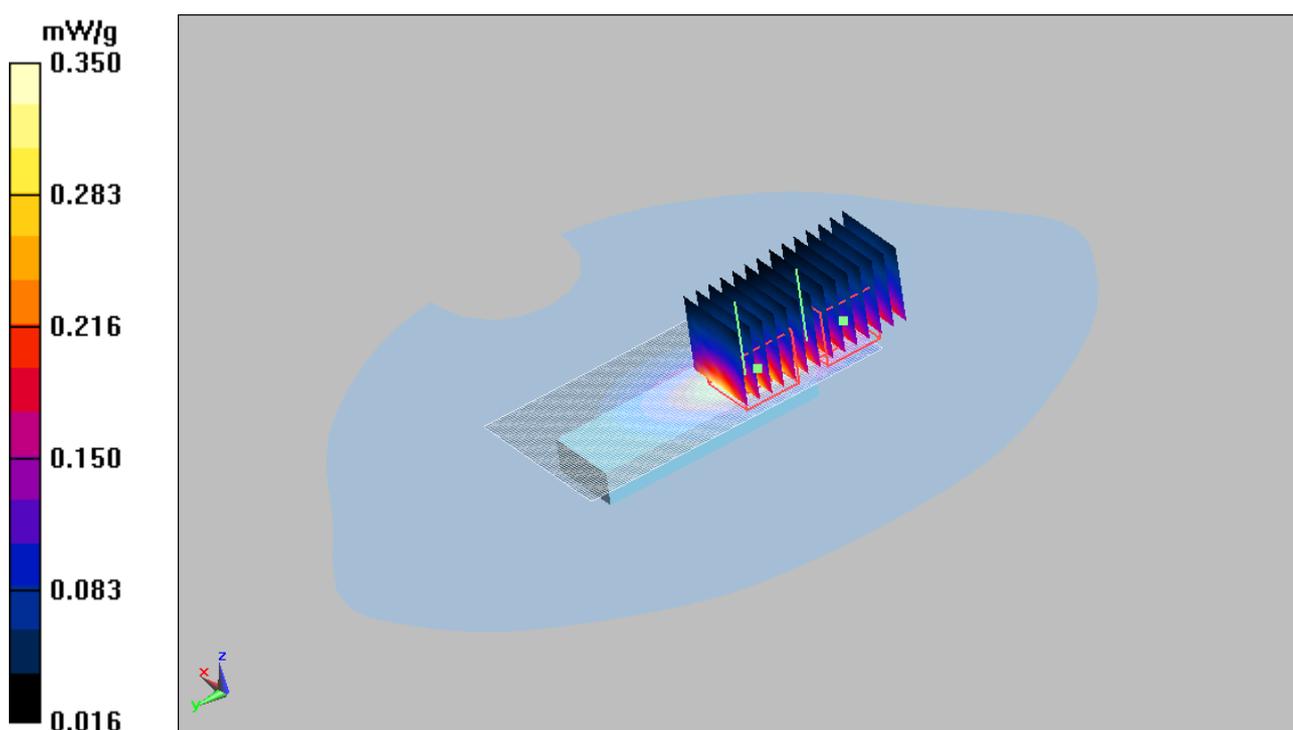Maximum value of SAR (measured) = 0.519 mW/g
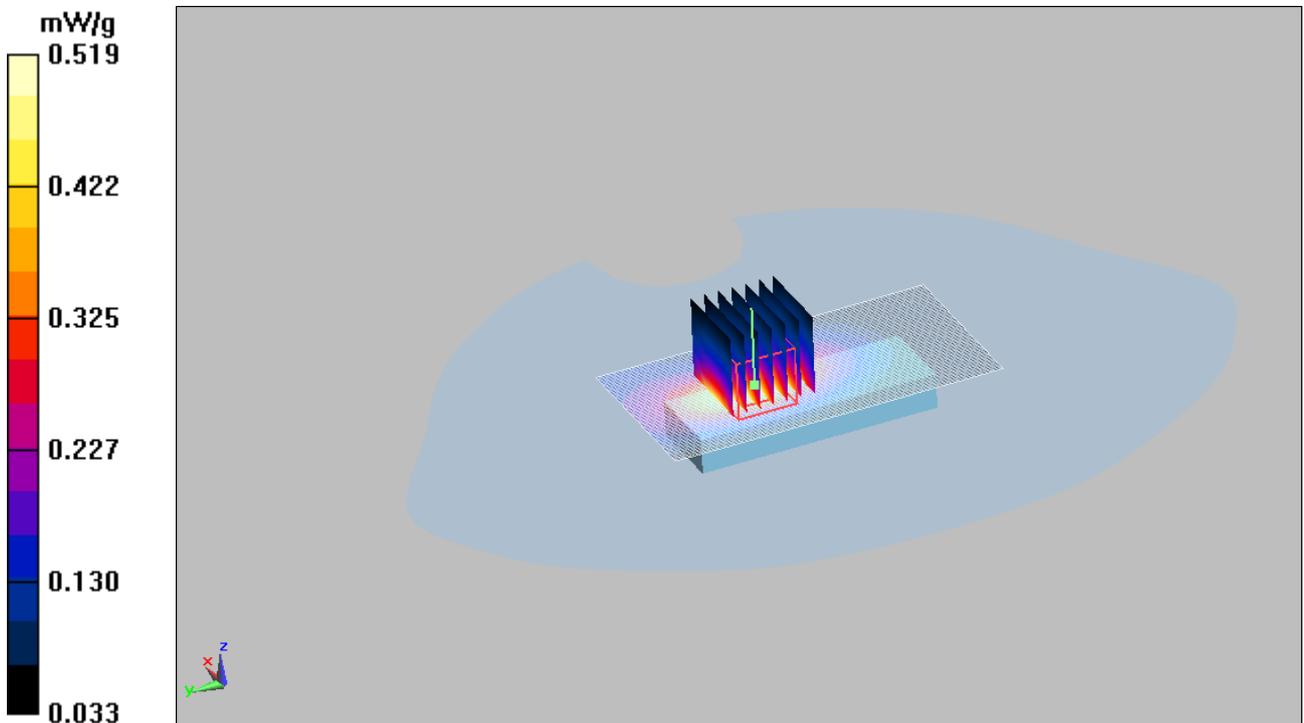
Figure 14GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 251
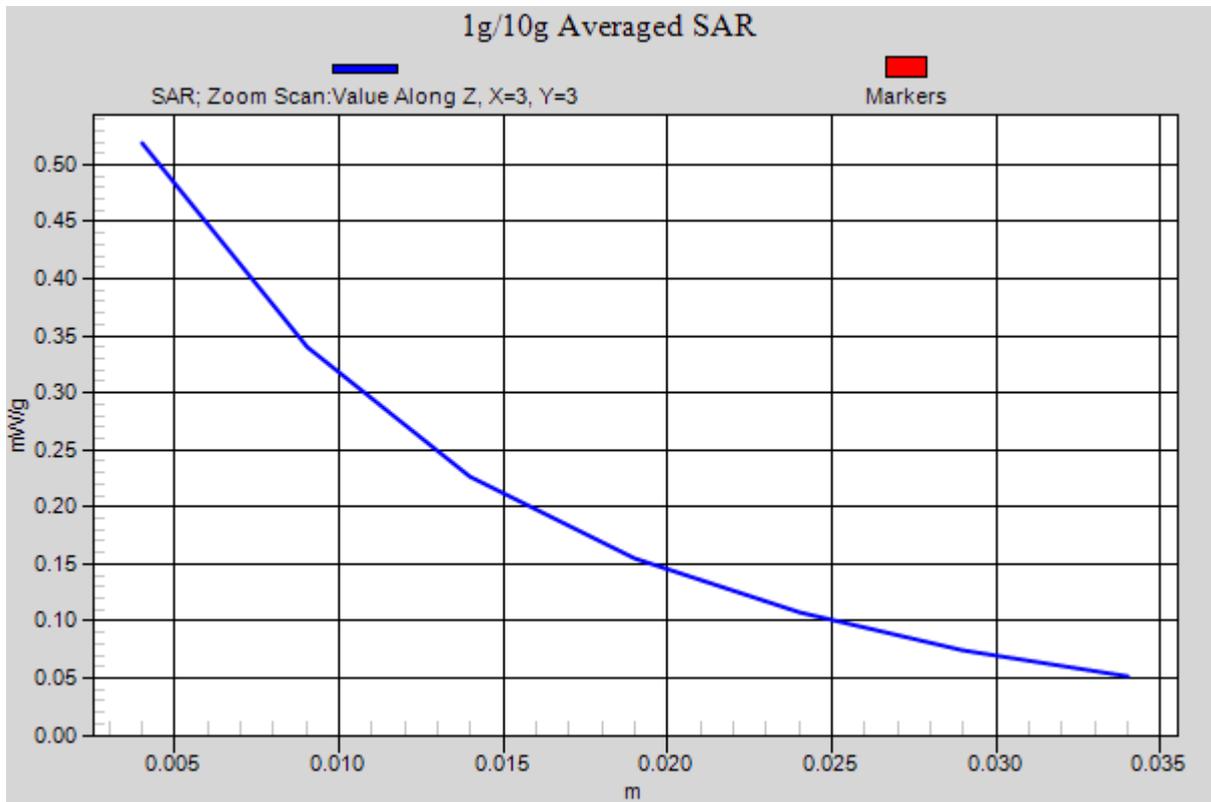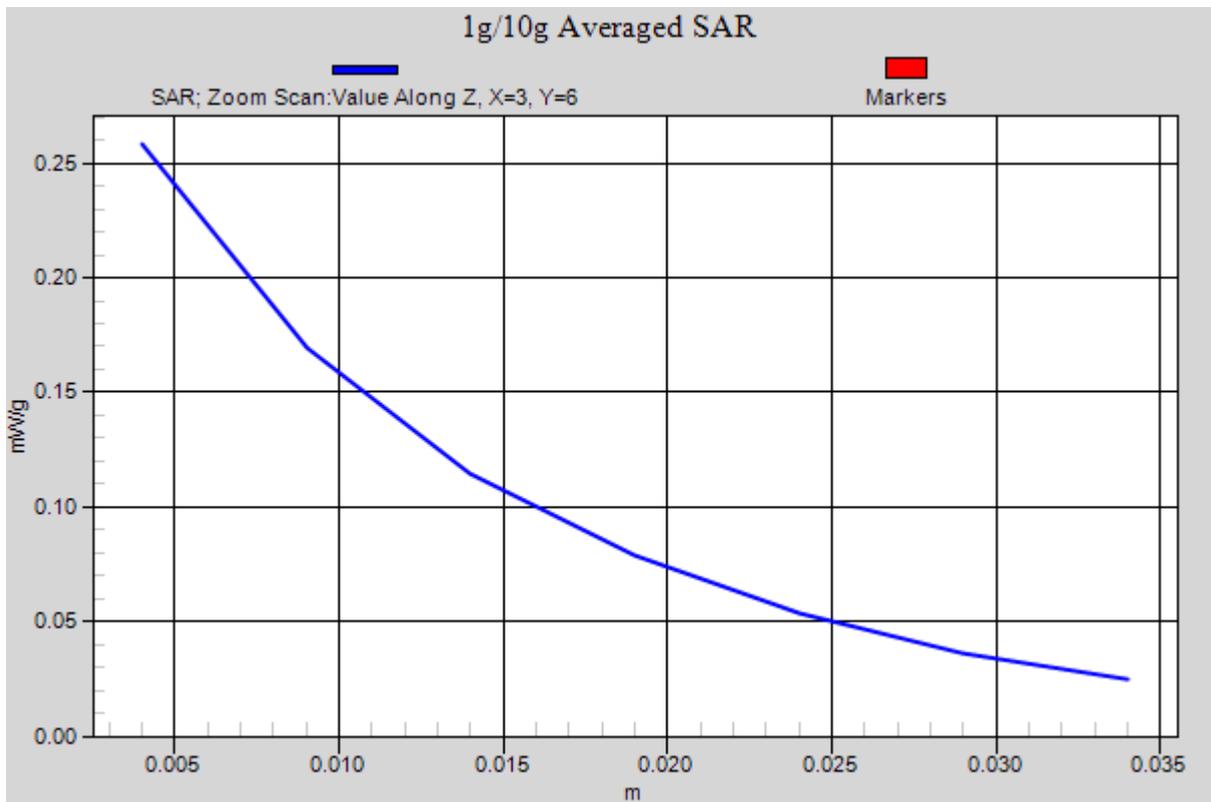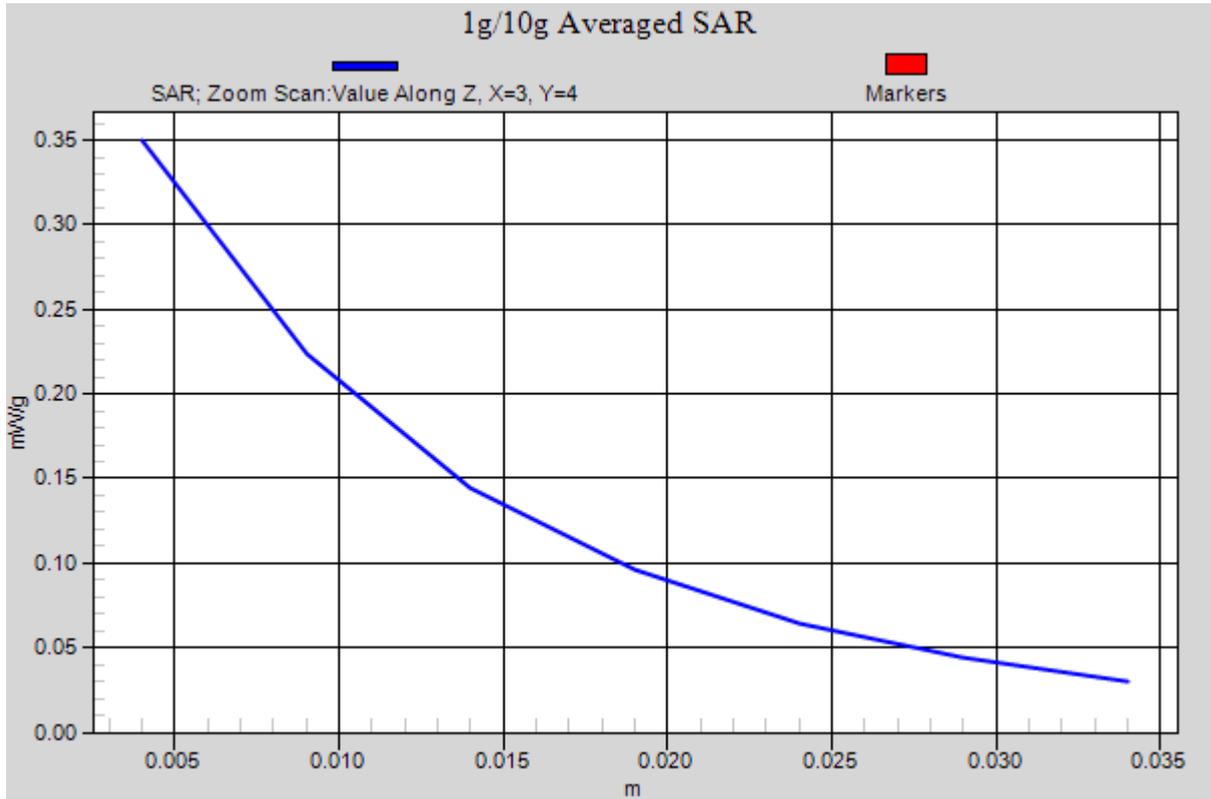
Figure 15 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 251]

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

Date/Time: 12/14/2009 9:56:31 AM

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

Medium parameters used: f = 837 MHz; σ = 0.989 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM1; Type: SAM;

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

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

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

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

Reference Value = 22.4 V/m; Power Drift = 0.024 dB

Peak SAR (extrapolated) = 0.976 W/kg

SAR(1 g) = 0.599 mW/g; SAR(10 g) = 0.362 mW/g

Maximum value of SAR (measured) = 0.661 mW/g
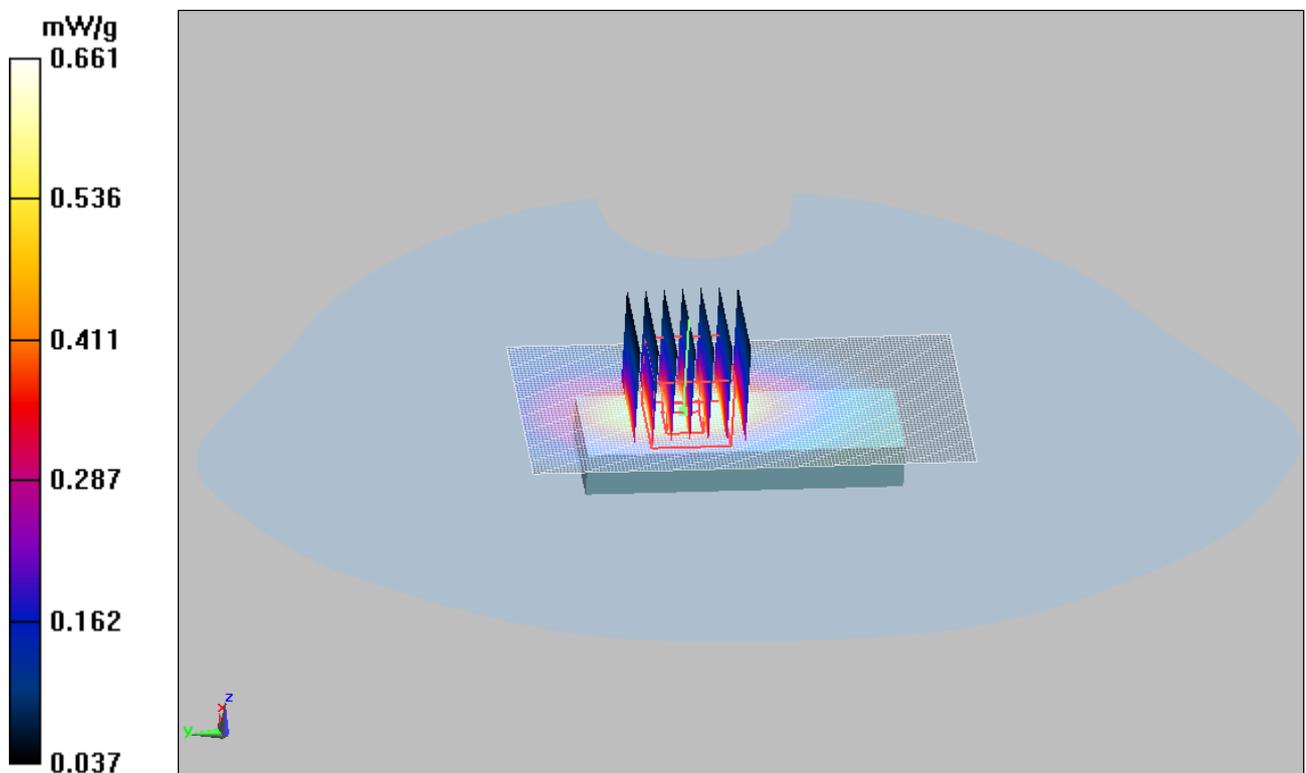
Figure 16GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 190
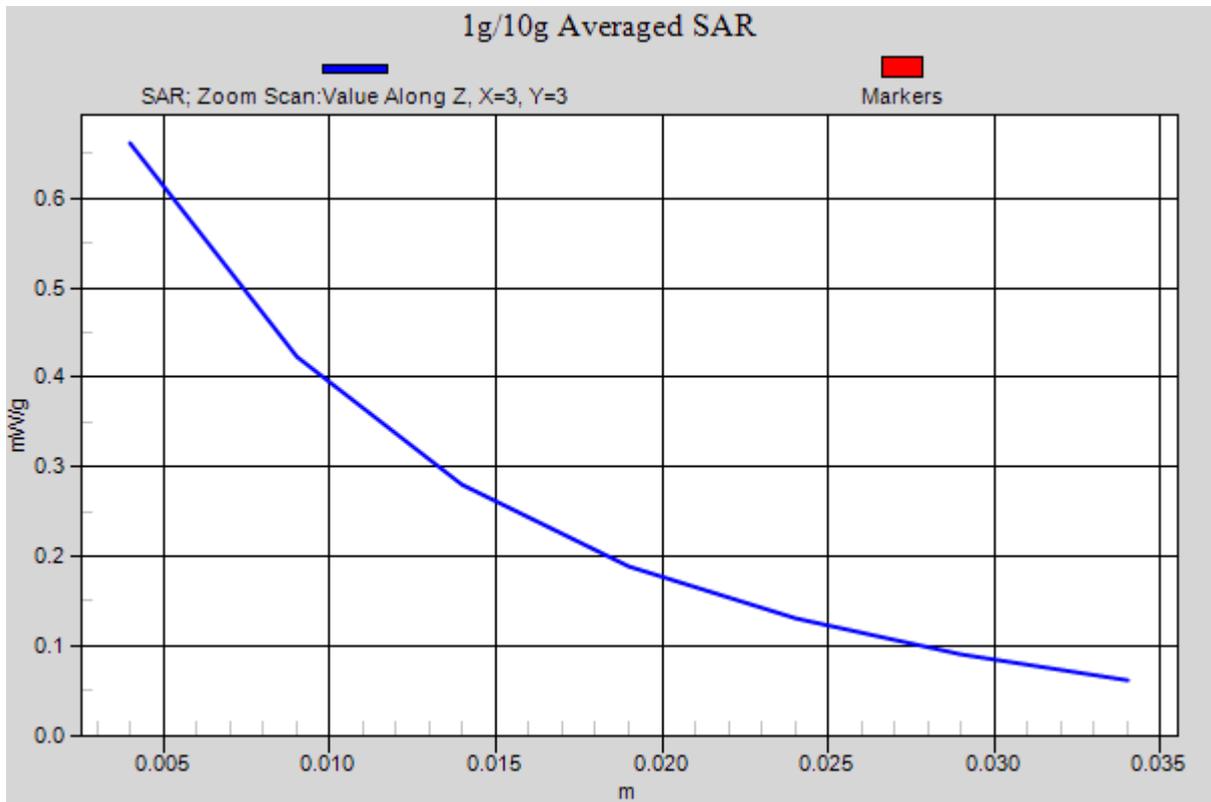
Figure 17 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 190]

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

Date/Time: 12/14/2009 10:27:31 PM

Communication System: GSM850 + GPRS(1Up); Frequency: 824.2 MHz;Duty Cycle: 1:8.3

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.97 mho/m; ε_r = 53.7; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM1; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 0.499 mW/g

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

Reference Value = 20.2 V/m; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 0.702 W/kg

SAR(1 g) = 0.450 mW/g; SAR(10 g) = 0.281 mW/g

Maximum value of SAR (measured) = 0.492 mW/g
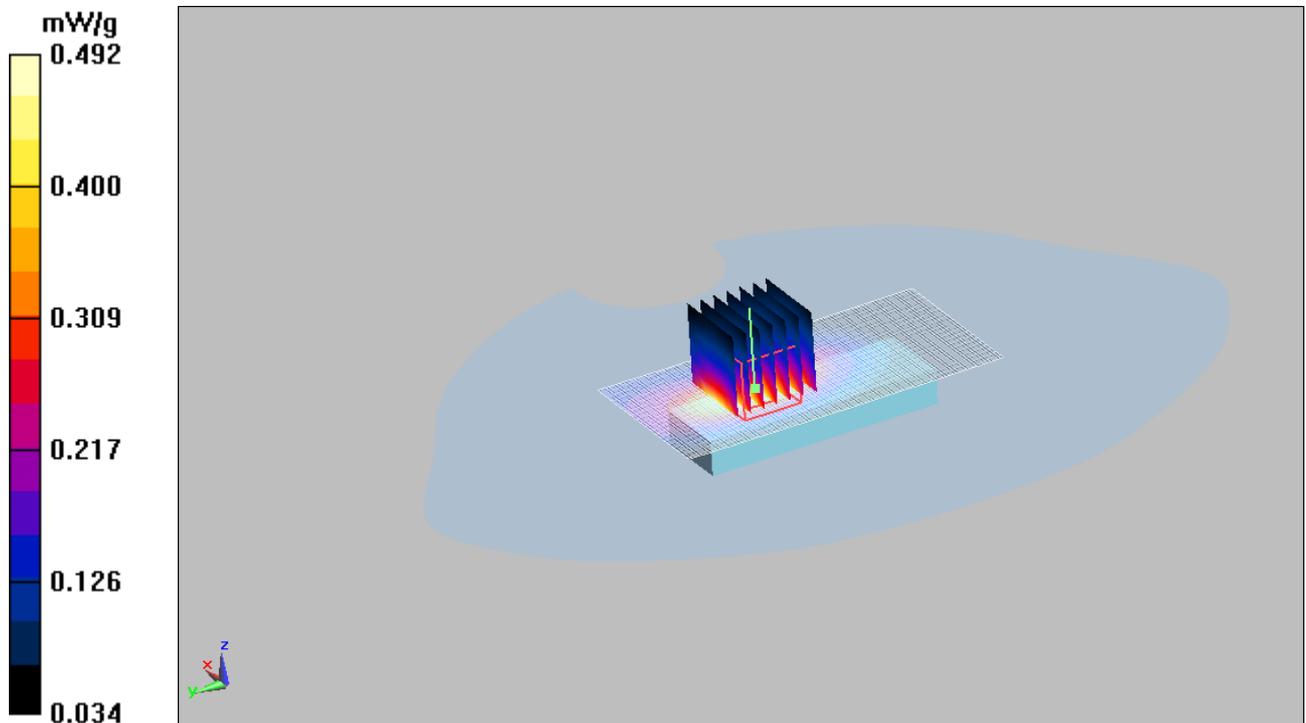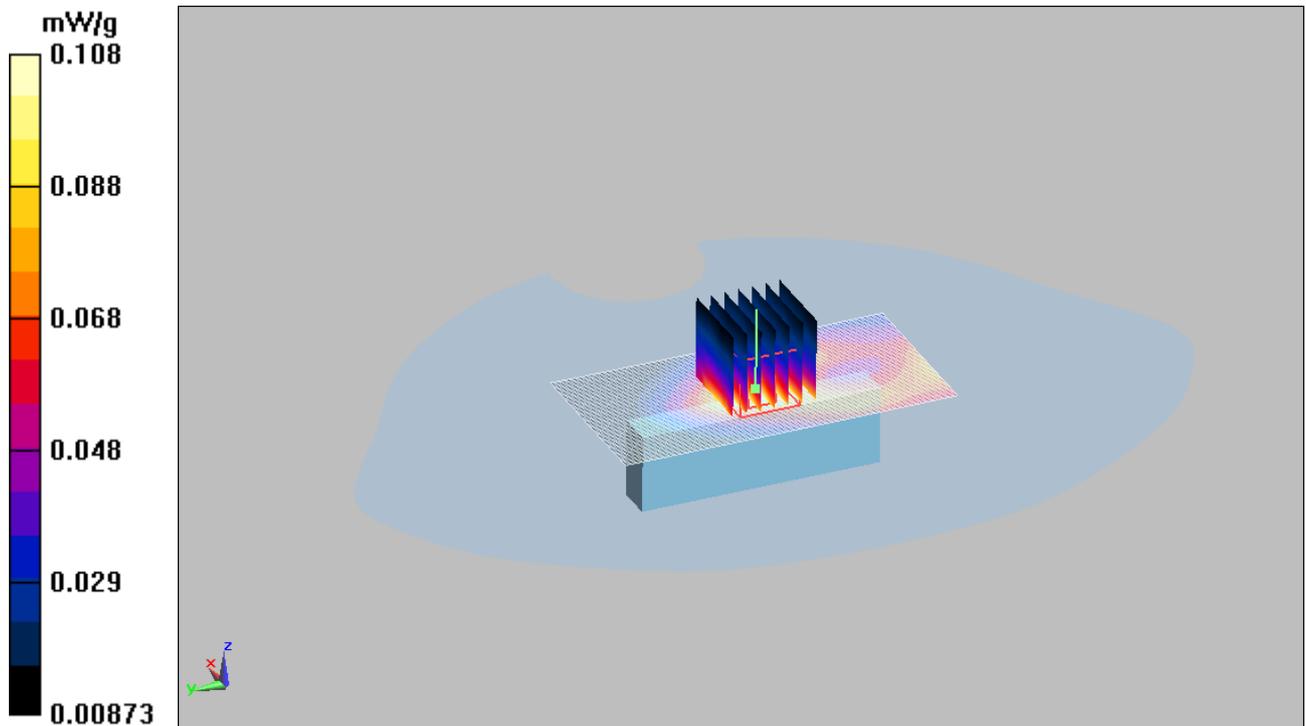

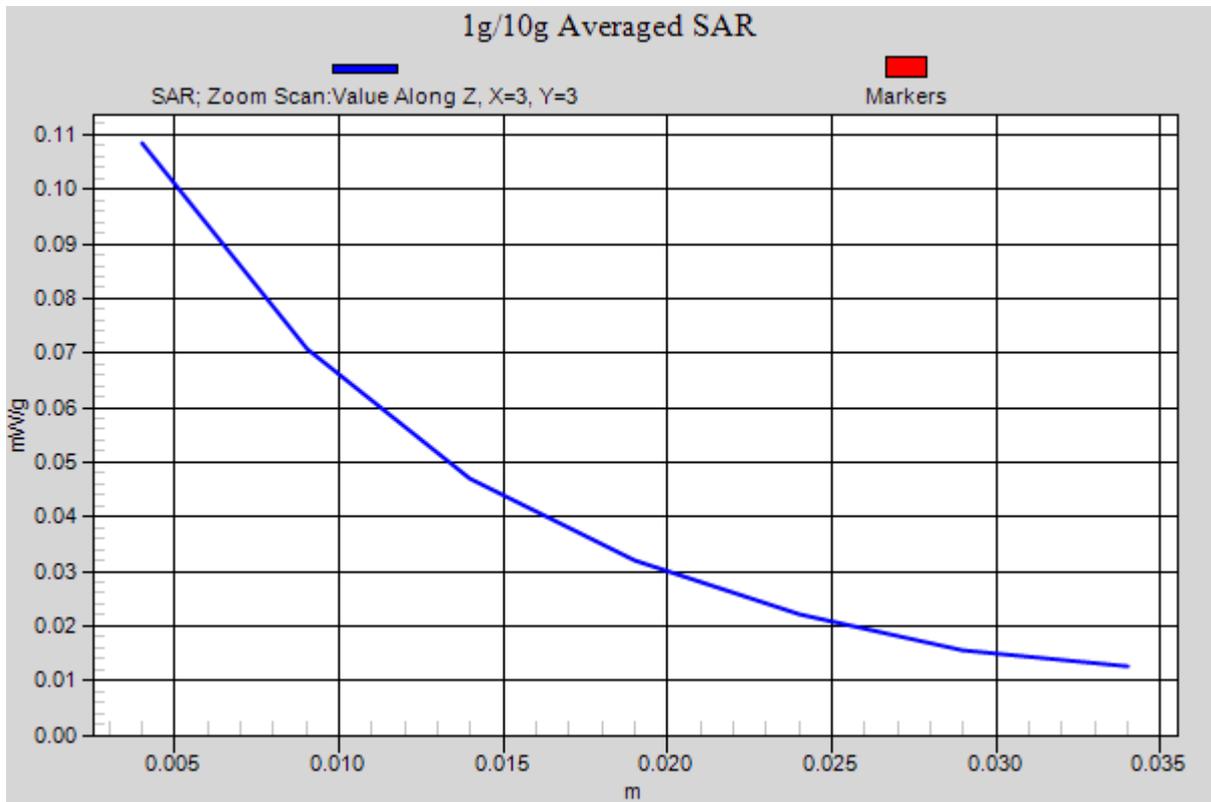**Figure 18GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 128**

Figure 19 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: 12/14/2009 9:25:46 PM

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

Medium parameters used: f = 837 MHz; σ = 0.989 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM1; Type: SAM;

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

Test Position 2 Middle/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 14.3 V/m; Power Drift = 0.188 dB

Peak SAR (extrapolated) = 0.527 W/kg

SAR(1 g) = 0.321 mW/g; SAR(10 g) = 0.193 mW/g

Maximum value of SAR (measured) = 0.350 mW/g

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

Reference Value = 14.3 V/m; Power Drift = 0.188 dB

Peak SAR (extrapolated) = 0.367 W/kg

SAR(1 g) = 0.221 mW/g; SAR(10 g) = 0.141 mW/g

Maximum value of SAR (measured) = 0.258 mW/g

Figure 20GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 2 Channel 190

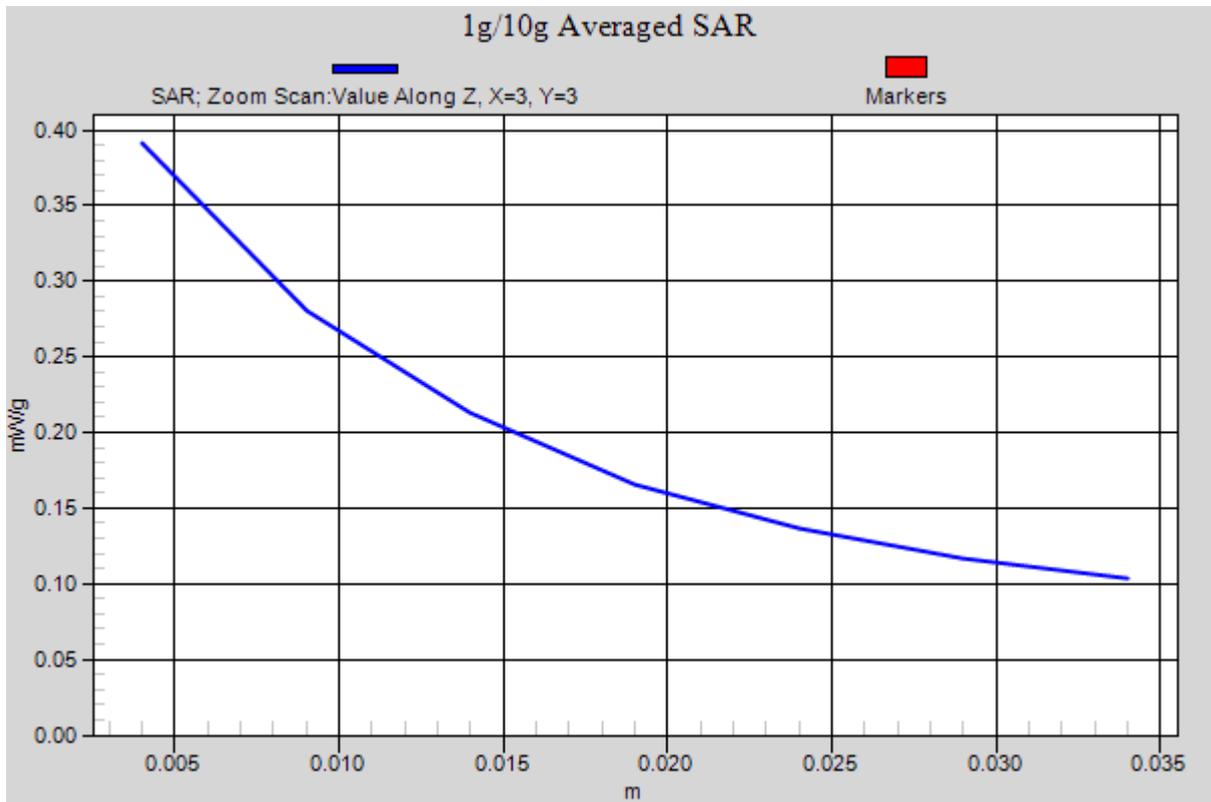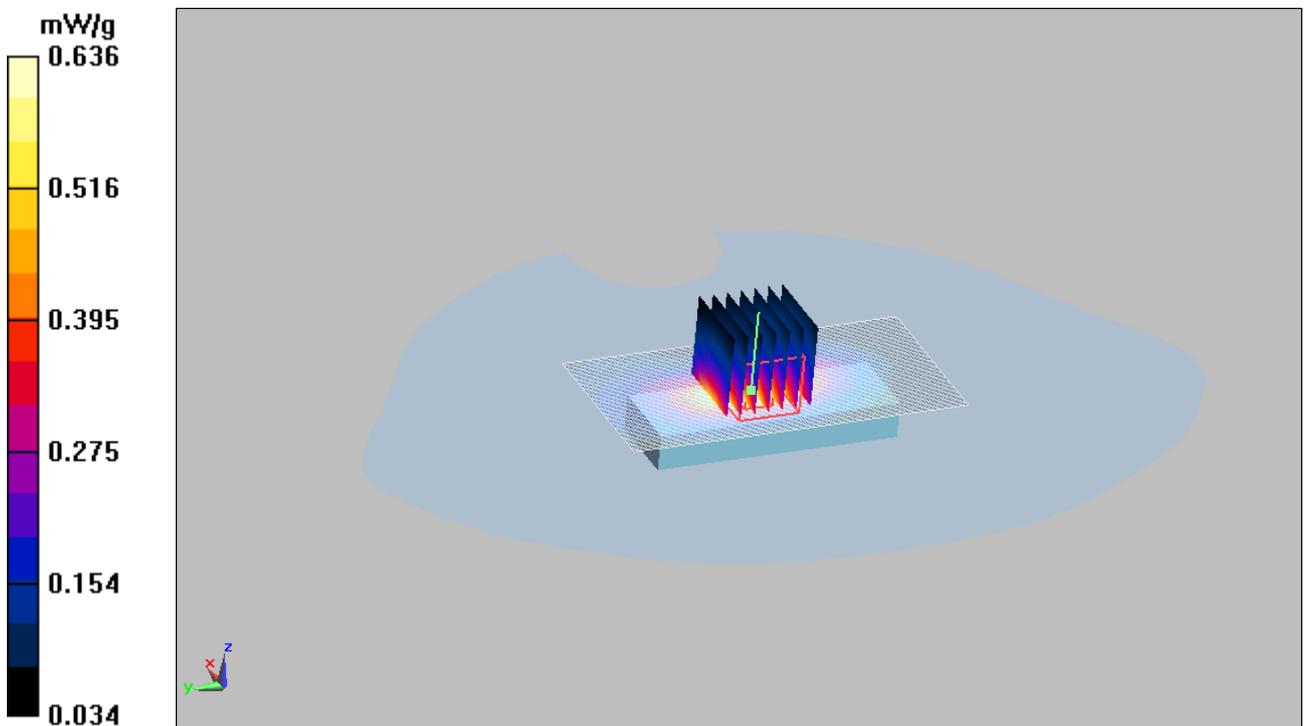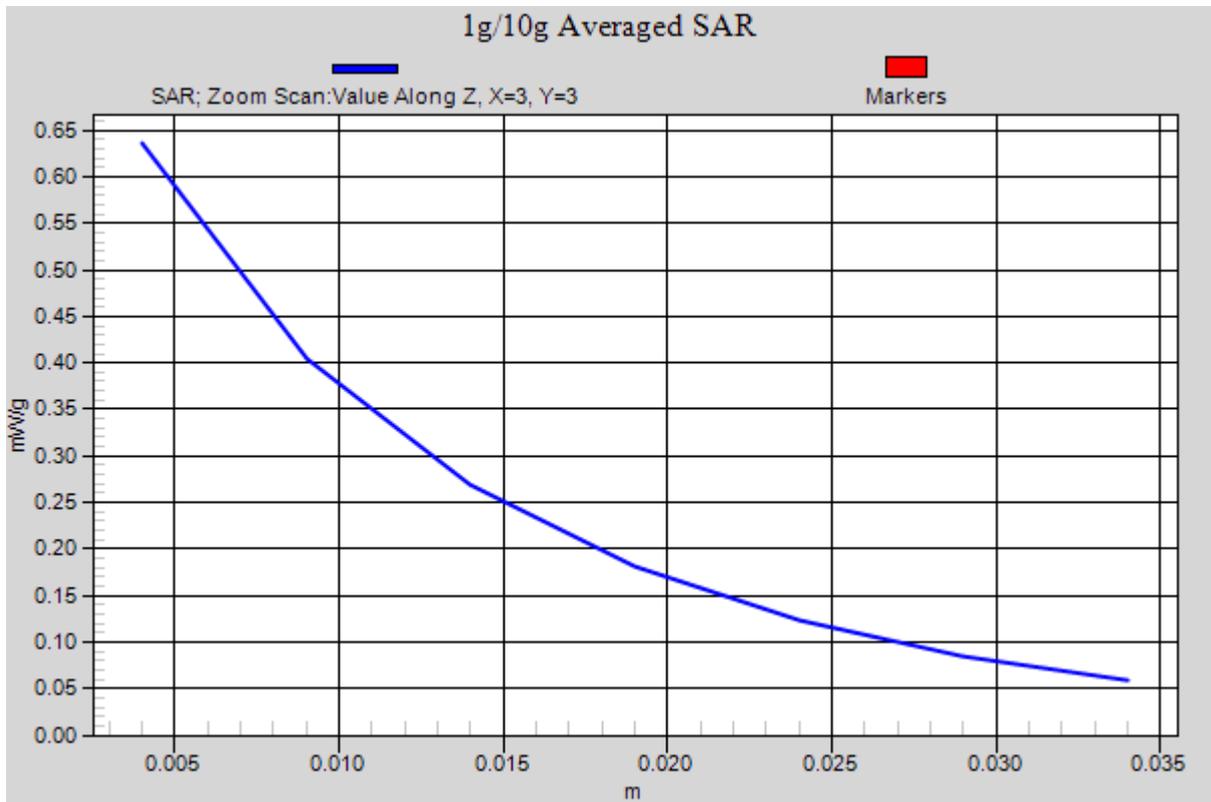**Figure 21 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with IBM T61 Test Position 2 Channel 190]**

GSM 850 GPRS (1 timeslot in uplink) with BenQ Joybook R55V Test Position 3 Middle

Date/Time: 12/14/2009 3:46:31 PM

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

Medium parameters used: f = 837 MHz; σ = 0.989 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃　　　　Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM1; Type: SAM;

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

Test Position 3 Middle/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.109 mW/g

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

Reference Value = 10.6 V/m; Power Drift = -0.063 dB

Peak SAR (extrapolated) = 0.156 W/kg

SAR(1 g) = 0.099 mW/g; SAR(10 g) = 0.064 mW/g

Maximum value of SAR (measured) = 0.108 mW/g

Figure 22GSM 850 GPRS (1 timeslot in uplink) with BenQ Joybook R55V Test Position 3 Channel 190

Figure 23 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with BenQ Joybook R55V Test Position 3 Channel 190]

GSM 850 GPRS (1 timeslot in uplink) with BenQ Joybook R55V Test Position 4 Middle

Date/Time: 12/14/2009 3:14:48 PM

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

Medium parameters used: f = 837 MHz; σ = 0.989 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM1; Type: SAM;

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

Test Position 4 Middle/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.396 mW/g

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

Reference Value = 19.1 V/m; Power Drift = 0.048 dB

Peak SAR (extrapolated) = 0.557 W/kg

SAR(1 g) = 0.365 mW/g; SAR(10 g) = 0.255 mW/g

Maximum value of SAR (measured) = 0.391 mW/g
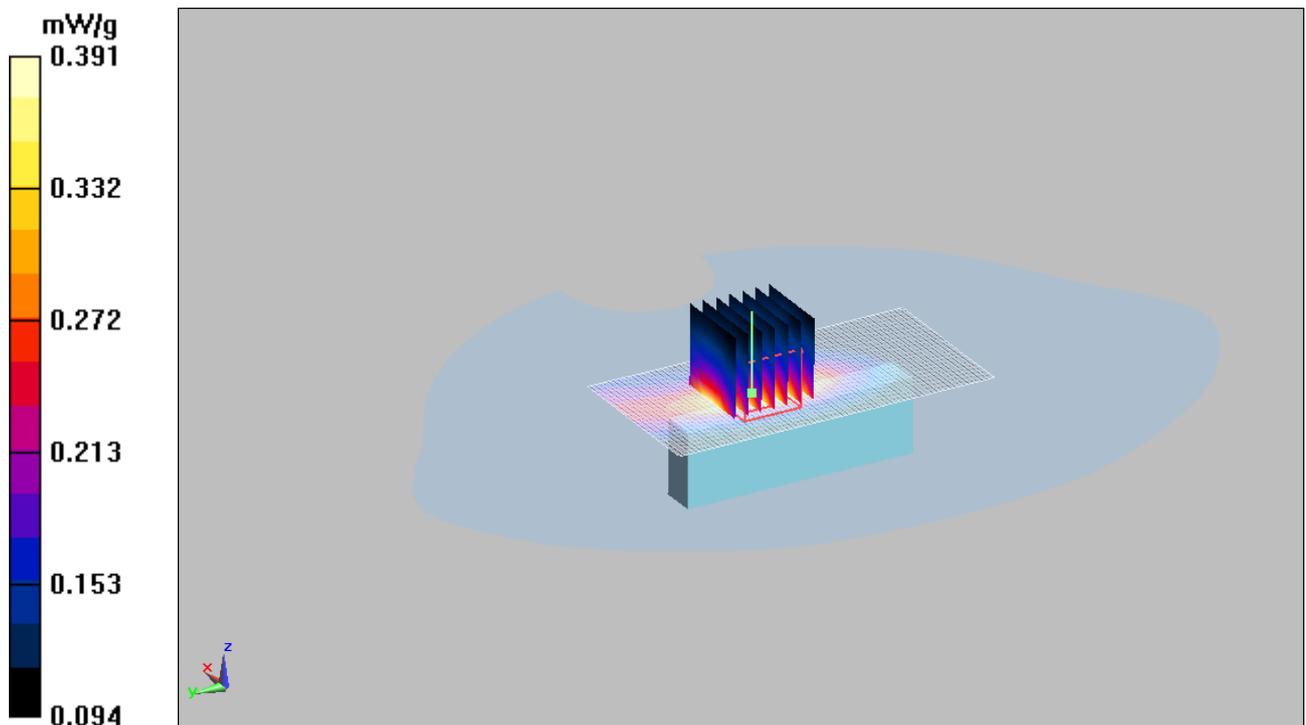

Figure 24GSM 850 GPRS (1 timeslot in uplink) with BenQ Joybook R55V Test Position 4 Channel 190

Figure 25 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with BenQ Joybook R55V Test Position 4 Channel 190]

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

Date/Time: 12/14/2009 8:54:09 PM

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

Medium parameters used: f = 837 MHz; σ = 0.989 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM1; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 0.676 mW/g

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

Reference Value = 25.9 V/m; Power Drift = -0.037 dB

Peak SAR (extrapolated) = 0.936 W/kg

SAR(1 g) = 0.576 mW/g; SAR(10 g) = 0.347 mW/g

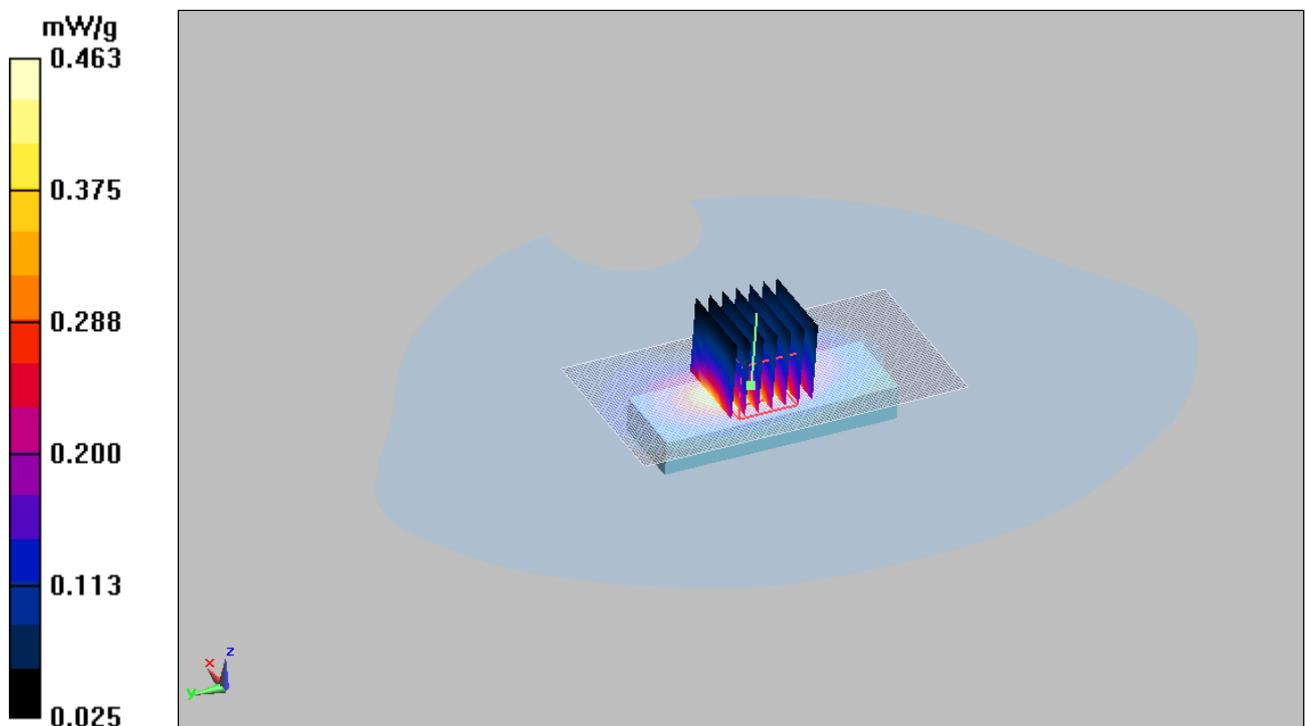Maximum value of SAR (measured) = 0.636 mW/g

Figure 26GSM 850 EGPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Channel 190
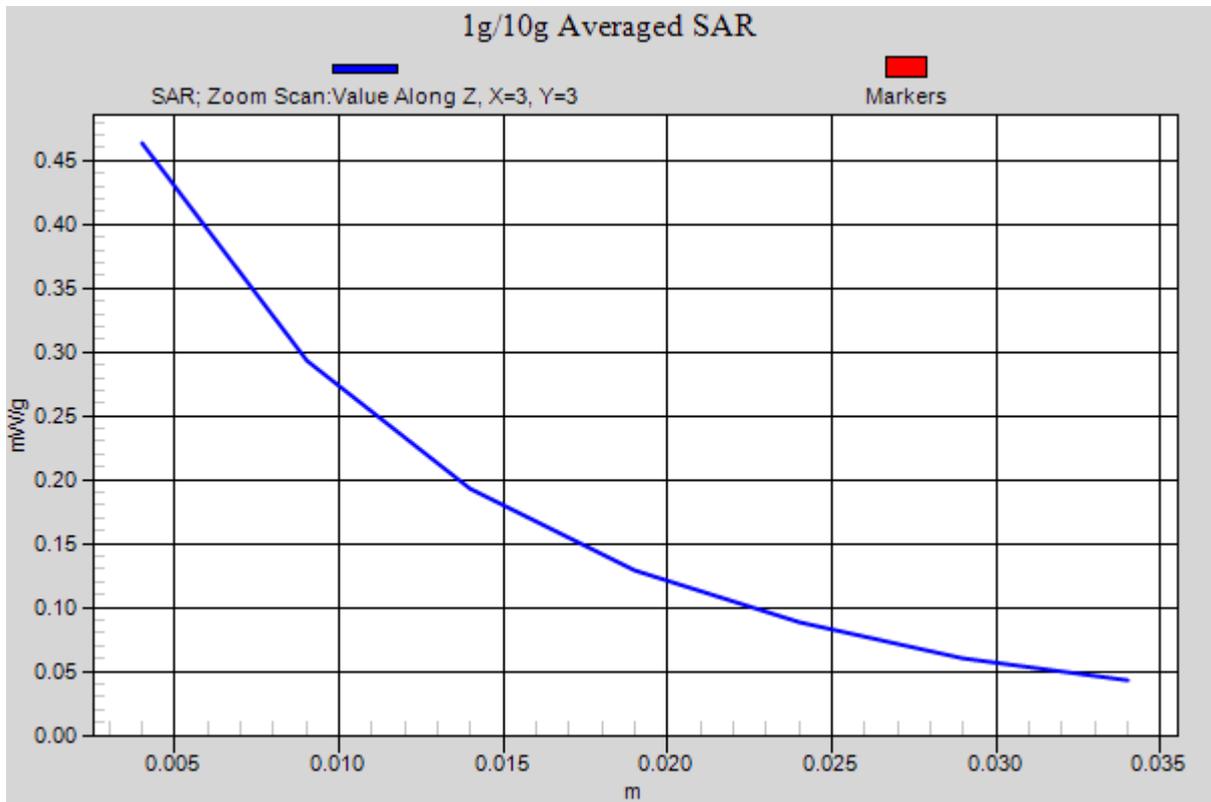
Figure 27 Z-Scan at power reference point [GSM 850 EGPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Channel 190]

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

Date/Time: 12/14/2009 8:19:14 PM

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

Medium parameters used: f = 837 MHz; σ = 0.989 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM1; Type: SAM;

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

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

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

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

Reference Value = 24.9 V/m; Power Drift = -0.052 dB

Peak SAR (extrapolated) = 0.909 W/kg

SAR(1 g) = 0.574 mW/g; SAR(10 g) = 0.347 mW/g

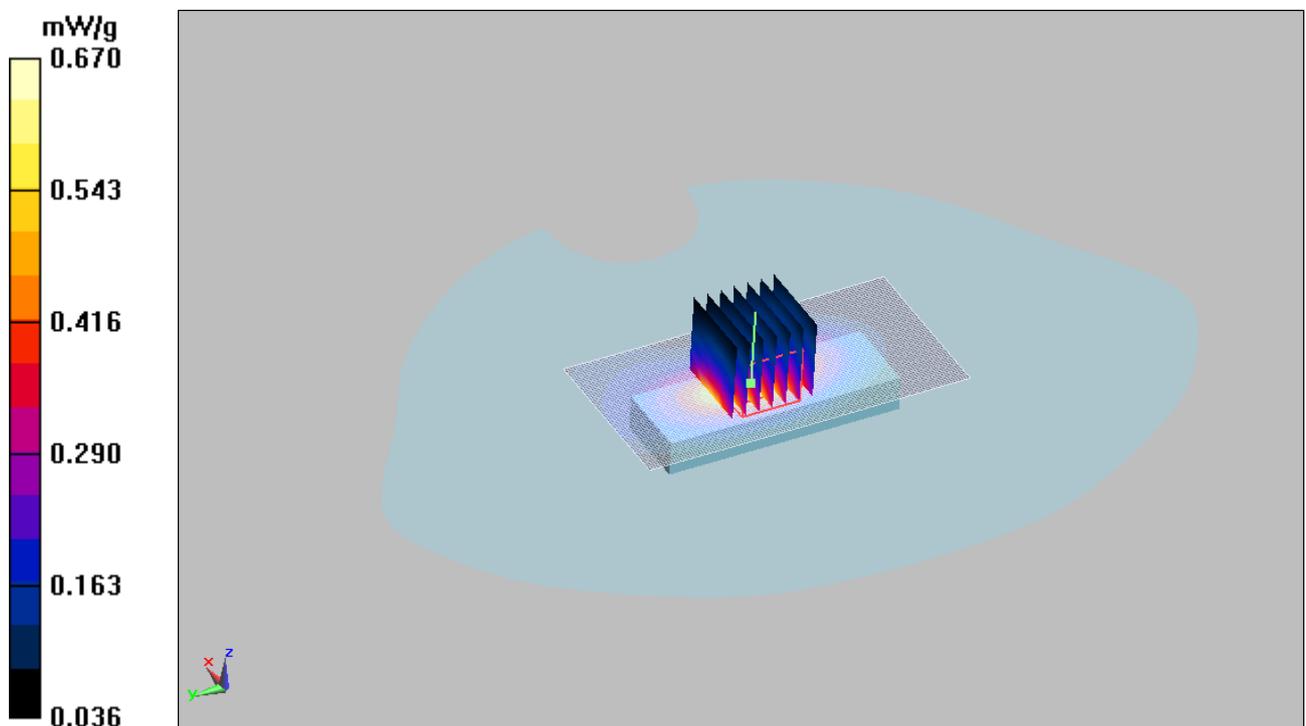Maximum value of SAR (measured) = 0.624 mW/g
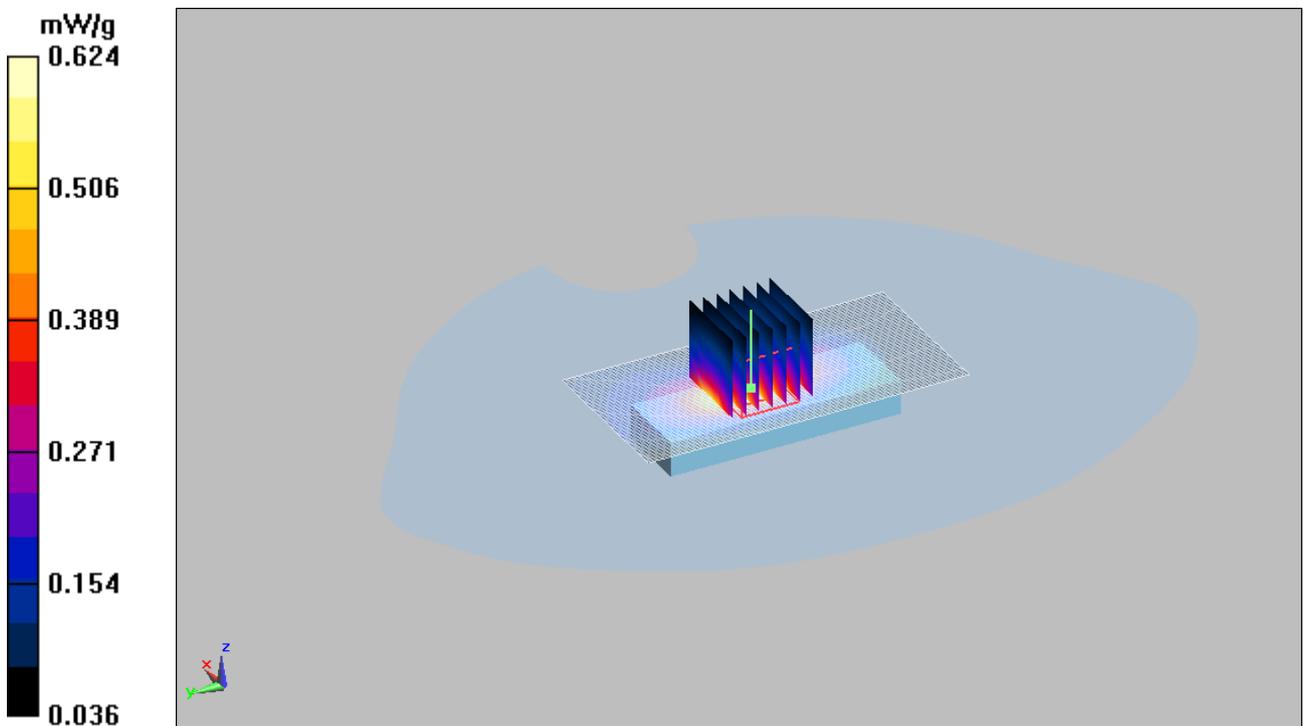
Figure 28GSM 850 EGPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 190
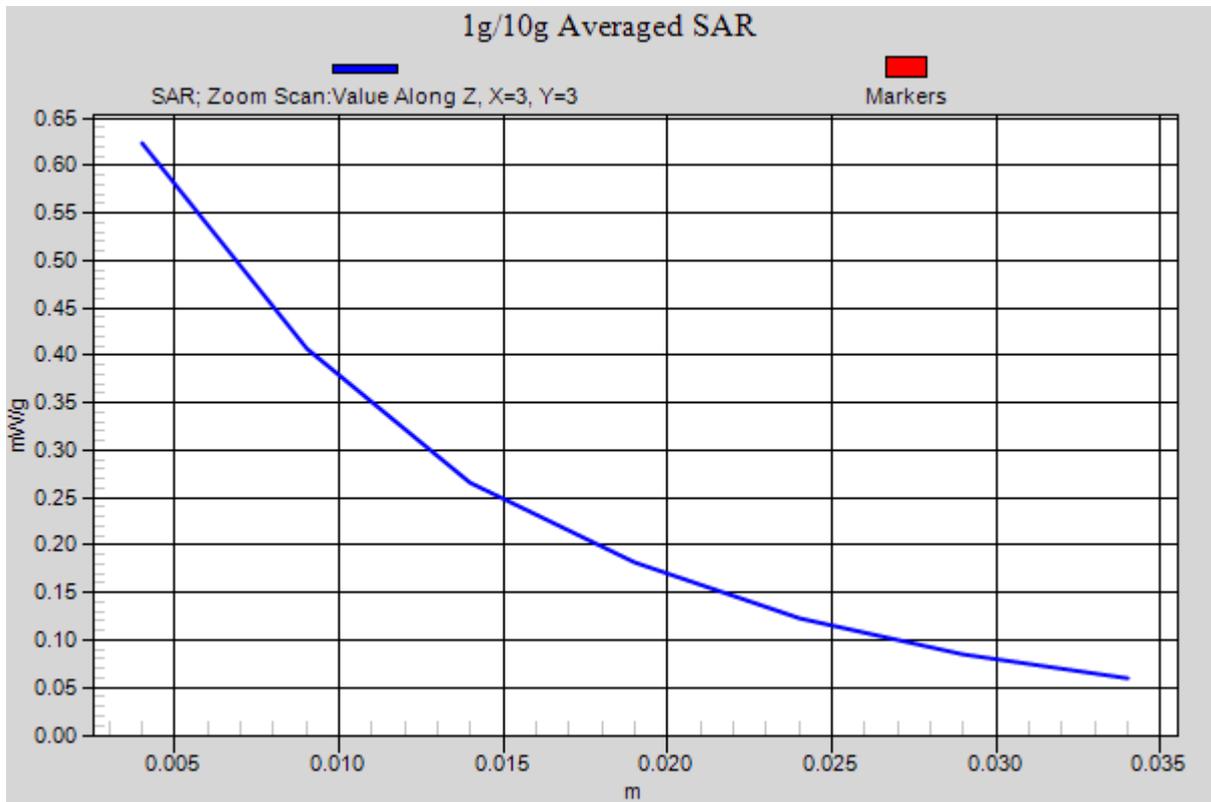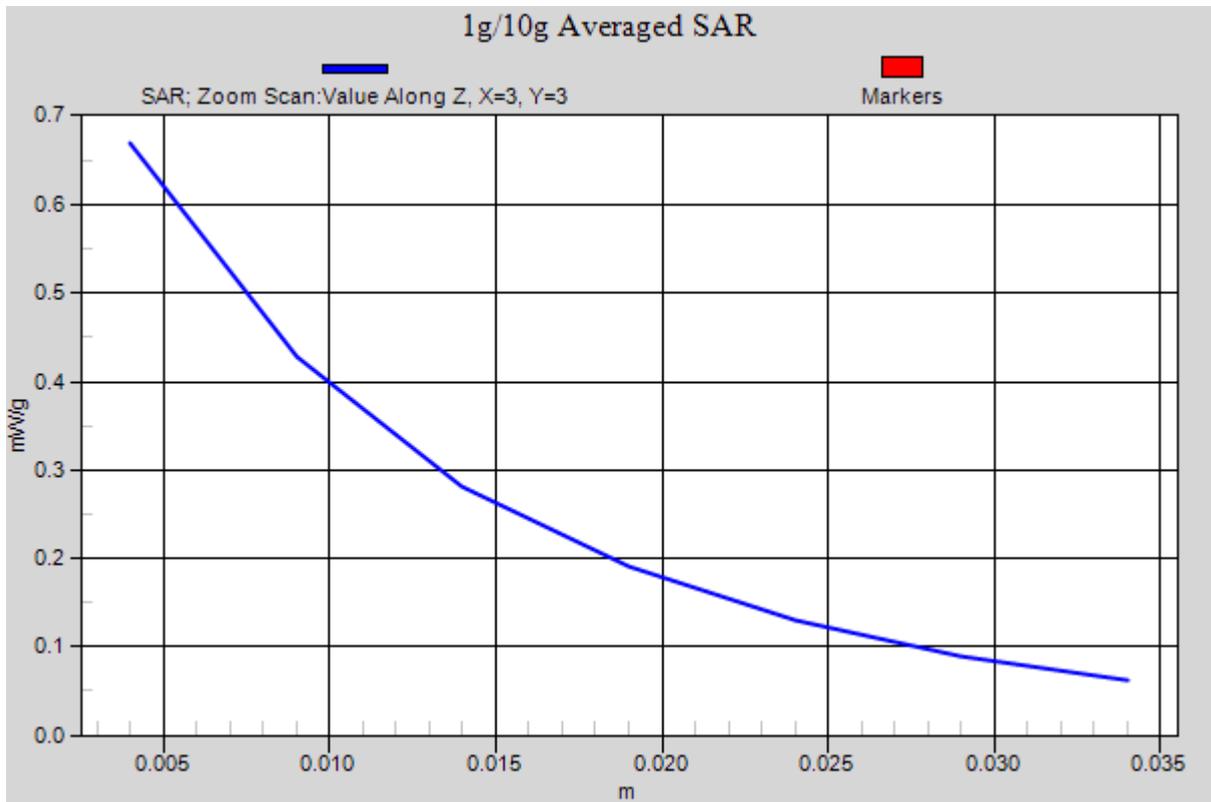
Figure 29 Z-Scan at power reference point [GSM 850 EGPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 190]

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

Date/Time: 12/14/2009 7:54:08 PM

Communication System: GSM850 + EGPRS(2Up); Frequency: 836.6 MHz;Duty Cycle: 1:8.3

Medium parameters used: f = 837 MHz; σ = 0.989 mho/m; $ε_r$ = 53.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM1; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 0.471 mW/g

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

Reference Value = 21.6 V/m; Power Drift = -0.167 dB

Peak SAR (extrapolated) = 0.692 W/kg

SAR(1 g) = 0.420 mW/g; SAR(10 g) = 0.251 mW/g

Maximum value of SAR (measured) = 0.463 mW/g

Figure 30GSM 850 EGPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 190
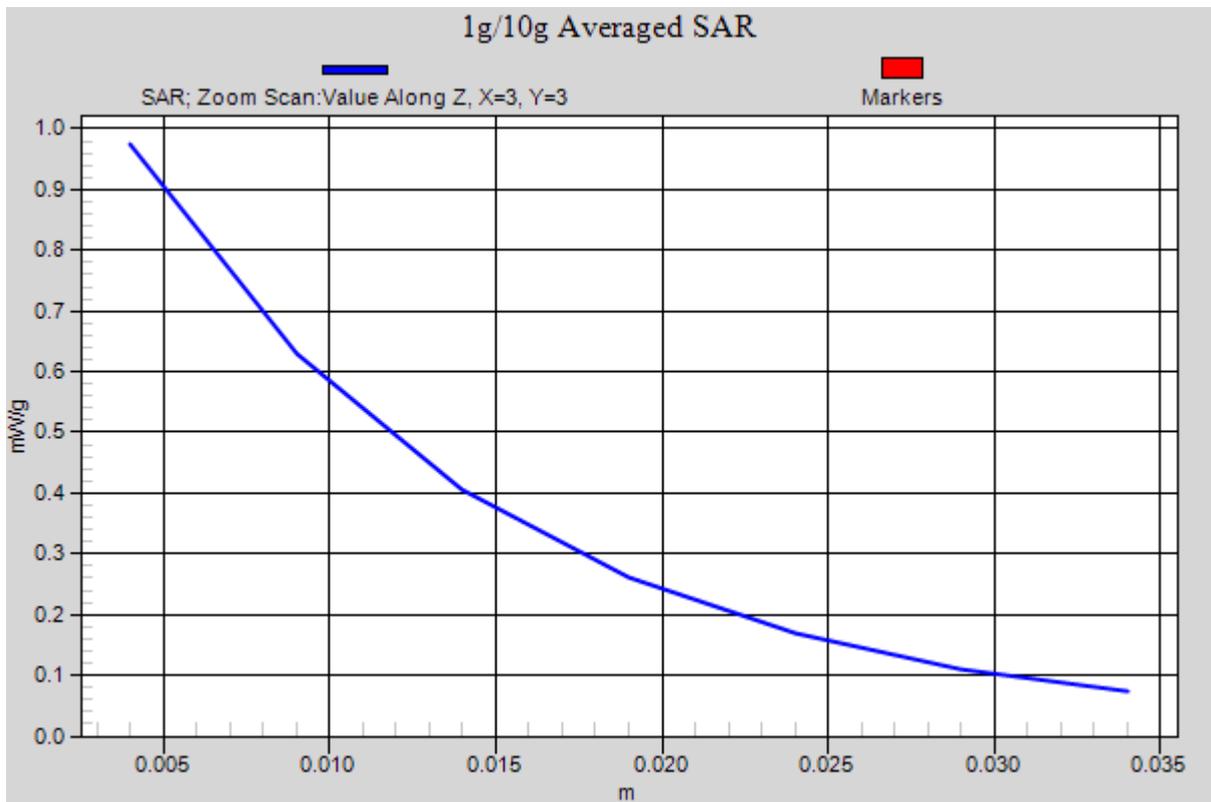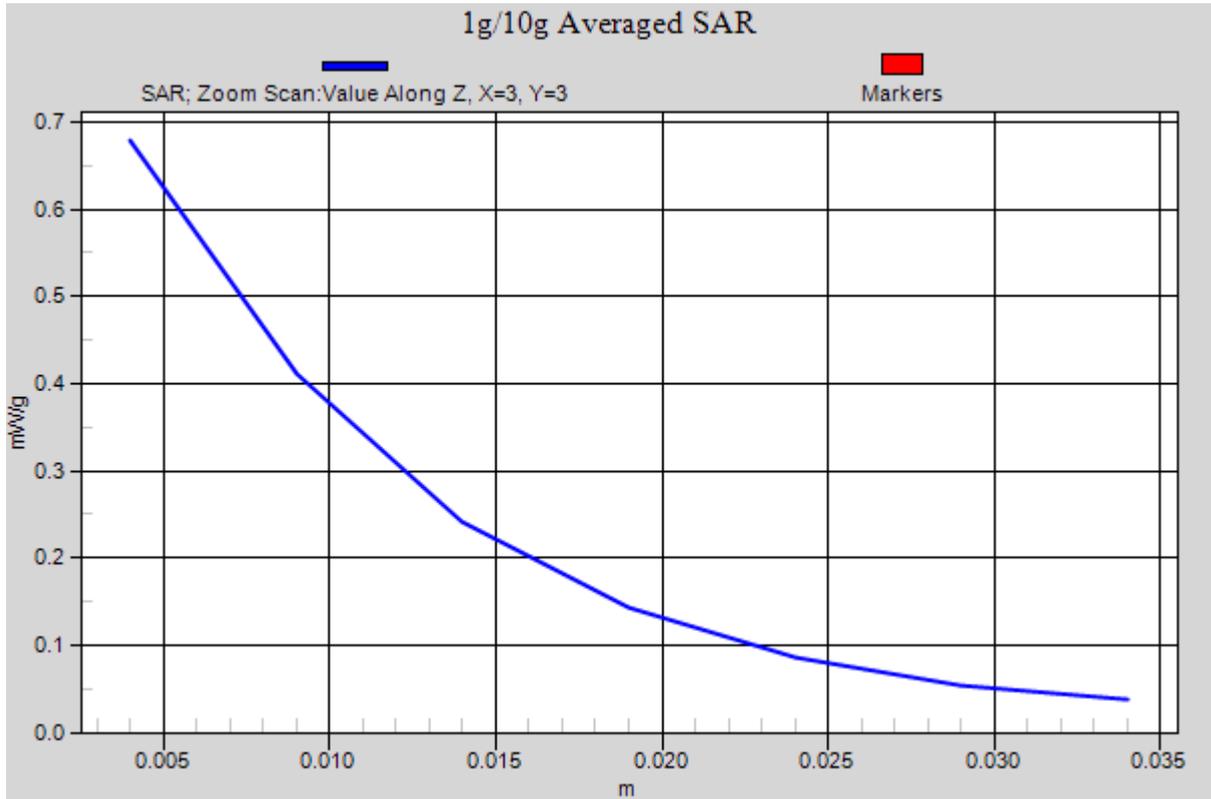
Figure 31 Z-Scan at power reference point [GSM 850 EGPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 190]

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

Date/Time: 12/14/2009 7:27:22 PM

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

Medium parameters used: f = 837 MHz; σ = 0.989 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM1; Type: SAM;

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

Test Position 1 Middle/Area Scan (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 = 25.5 V/m; Power Drift = -0.002 dB

Peak SAR (extrapolated) = 0.971 W/kg

SAR(1 g) = 0.607 mW/g; SAR(10 g) = 0.366 mW/g

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

Figure 32GSM 850 EGPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 190

Figure 33 Z-Scan at power reference point [GSM 850 EGPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 190]

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

Date/Time: 12/13/2009 4:04:30 PM

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

Medium parameters used: f = 1910 MHz; σ = 1.56 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

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) = 0.989 mW/g

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

Reference Value = 22.1 V/m; Power Drift = -0.00731 dB

Peak SAR (extrapolated) = 1.37 W/kg

SAR(1 g) = 0.877 mW/g; SAR(10 g) = 0.505 mW/g

Maximum value of SAR (measured) = 0.974 mW/g

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

Reference Value = 22.1 V/m; Power Drift = -0.00731 dB

Peak SAR (extrapolated) = 1.05 W/kg

SAR(1 g) = 0.602 mW/g; SAR(10 g) = 0.317 mW/g

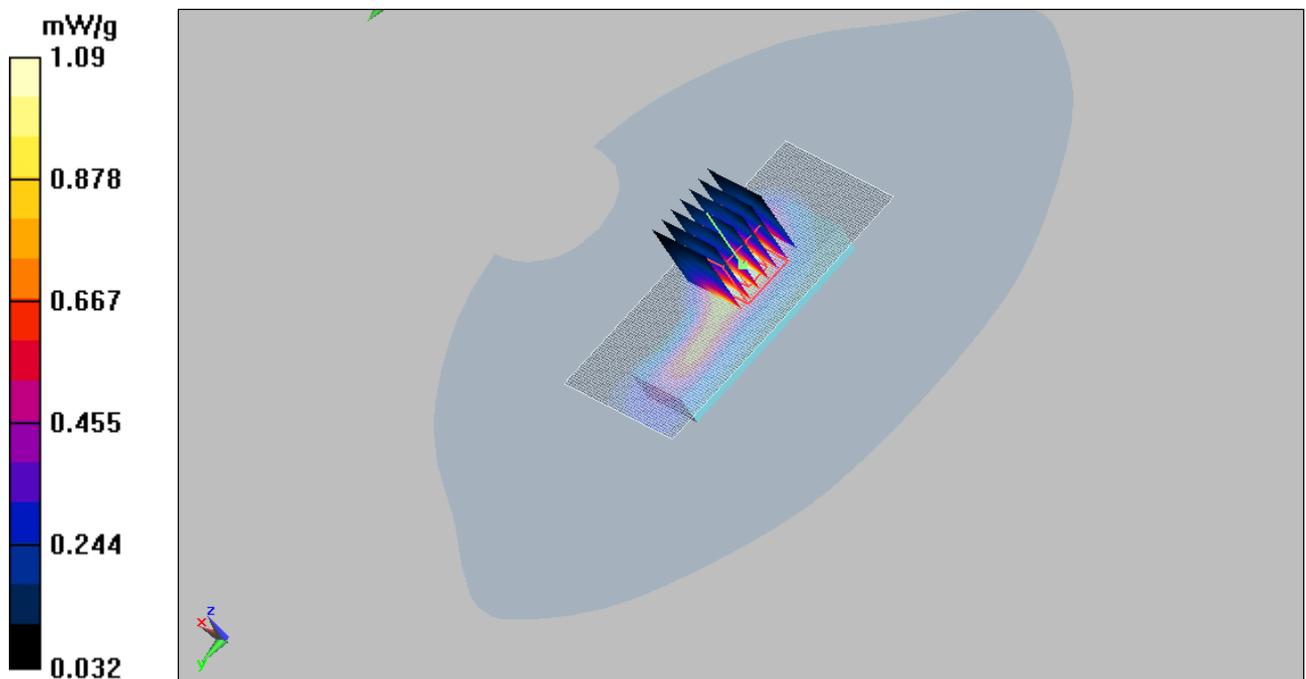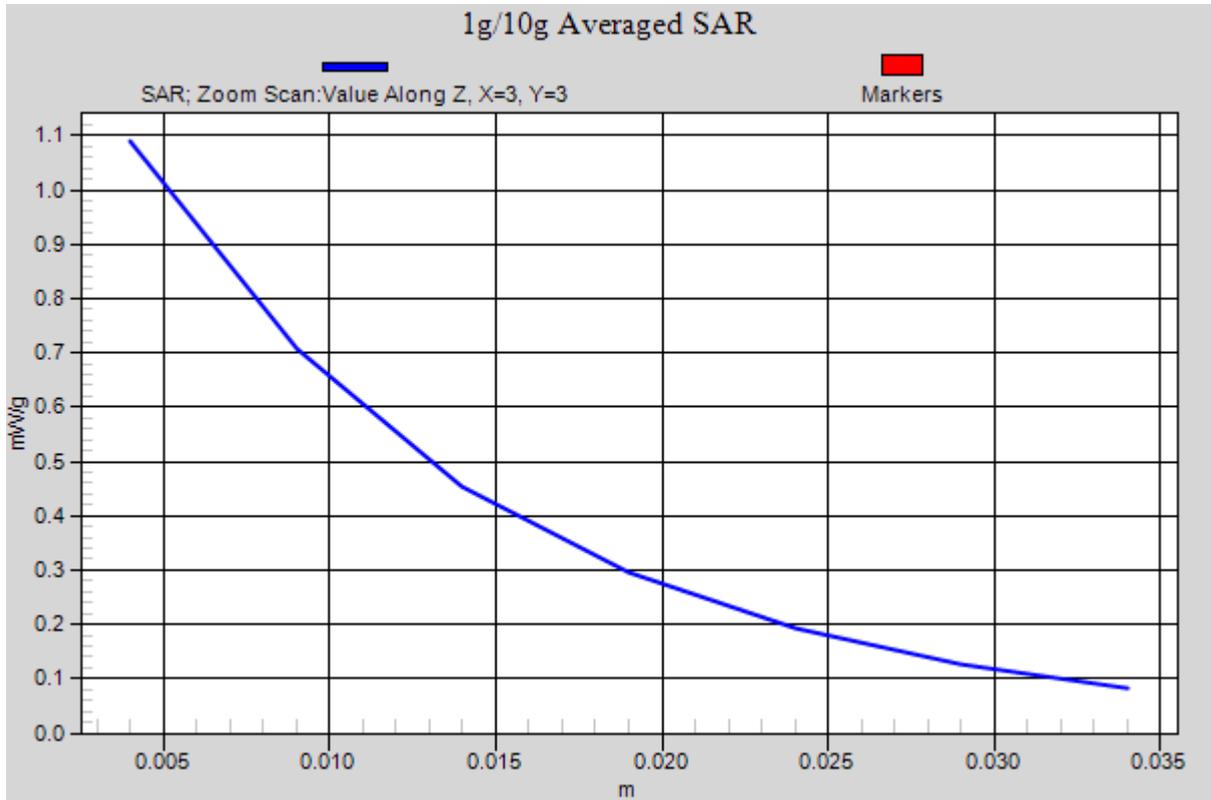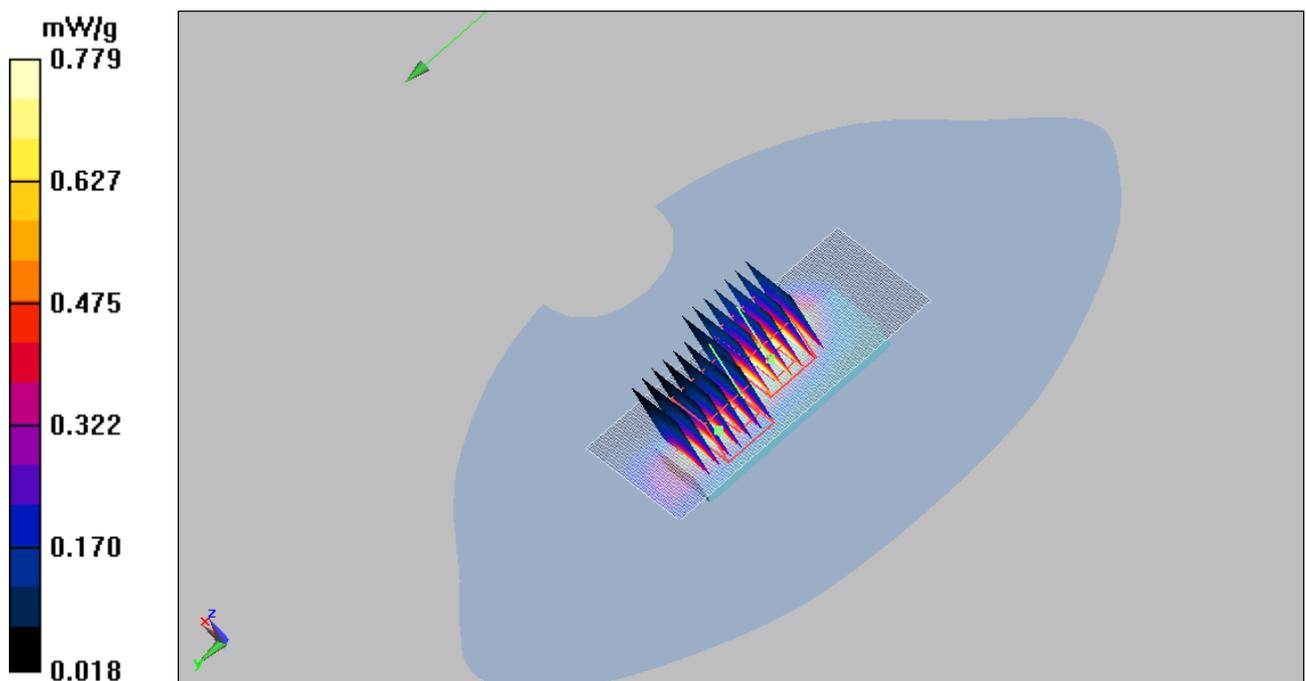Maximum value of SAR (measured) = 0.679 mW/g
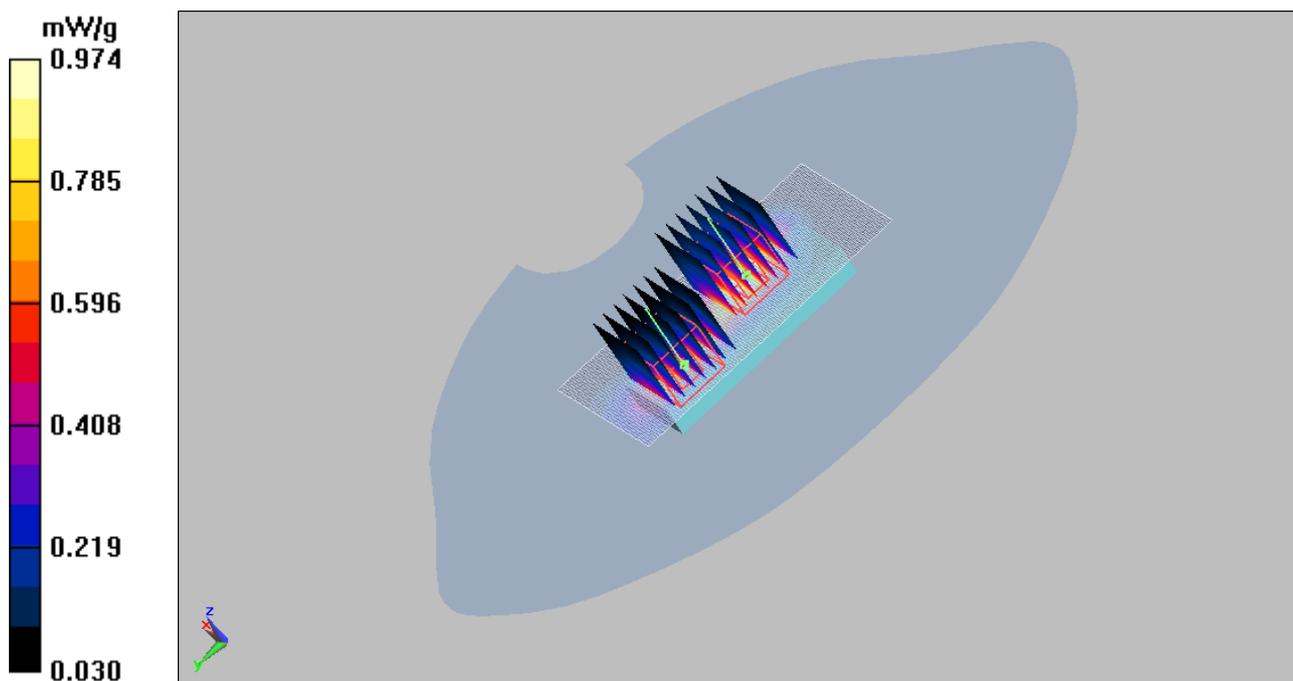
Figure 34GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 810
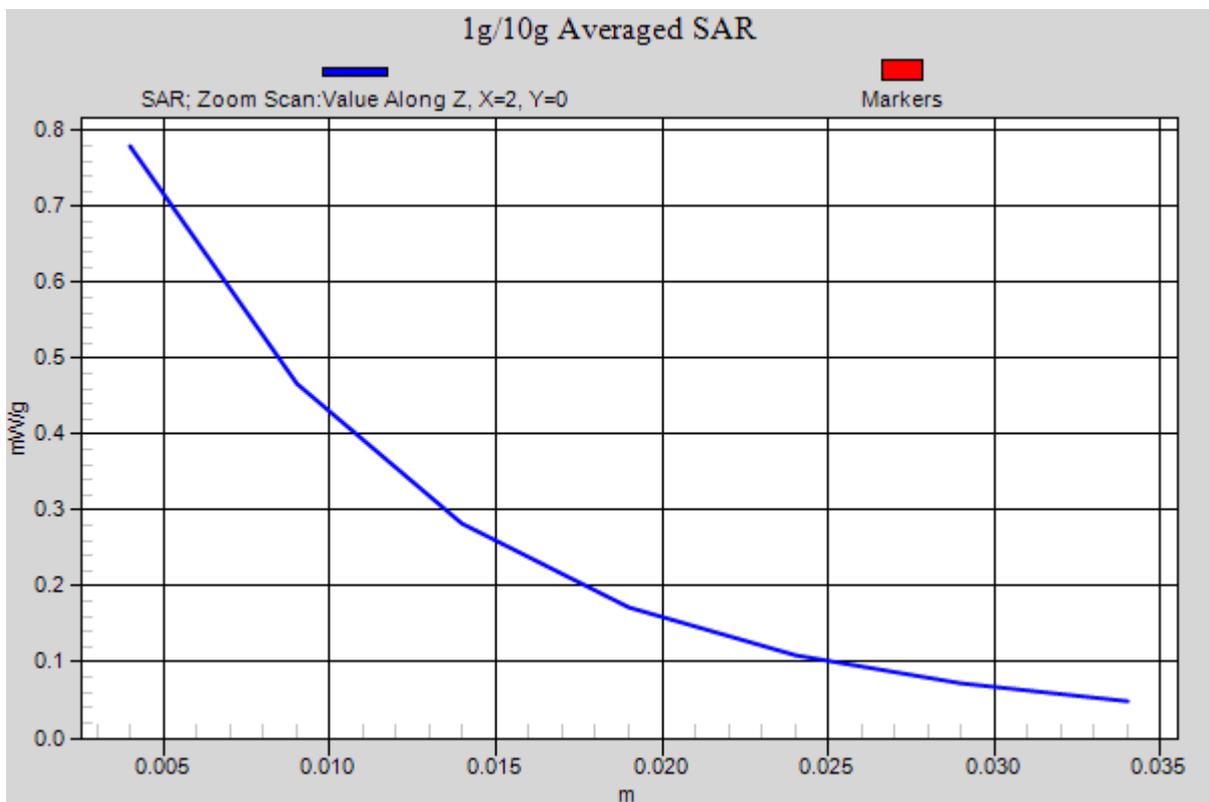
Figure 35 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 810]

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

Date/Time: 12/13/2009 3:23:46 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; $ε_r$ = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM2; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 1.17 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 = -0.033 dB

Peak SAR (extrapolated) = 1.55 W/kg

SAR(1 g) = 0.982 mW/g; SAR(10 g) = 0.566 mW/g

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

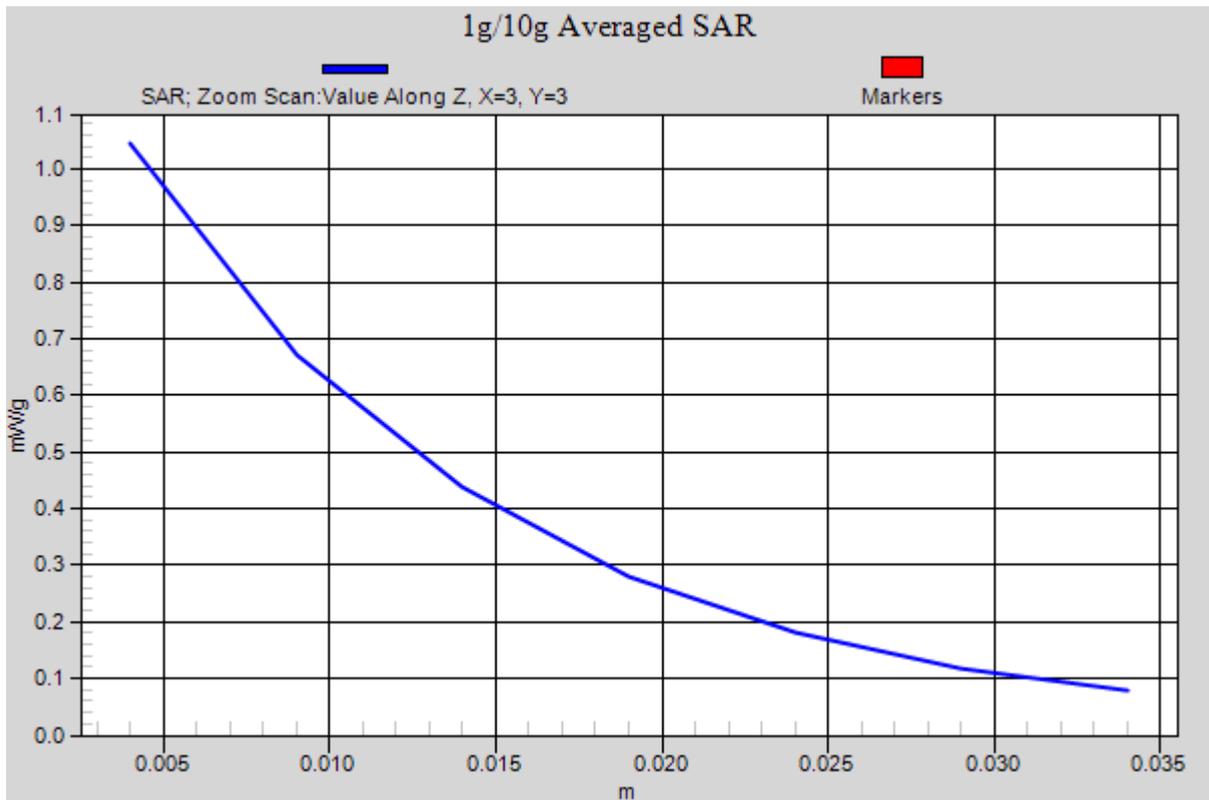**Figure 36GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 661**

Figure 37 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 661]

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

Date/Time: 12/13/2009 3:50:11 PM

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

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.51 mho/m; $ε_r$ = 52.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

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) = 1.06 mW/g

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

Reference Value = 25.5 V/m; Power Drift = -0.028 dB

Peak SAR (extrapolated) = 1.49 W/kg

SAR(1 g) = 0.941 mW/g; SAR(10 g) = 0.546 mW/g

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

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

Reference Value = 25.5 V/m; Power Drift = -0.028 dB

Peak SAR (extrapolated) = 1.2 W/kg

SAR(1 g) = 0.667 mW/g; SAR(10 g) = 0.359 mW/g

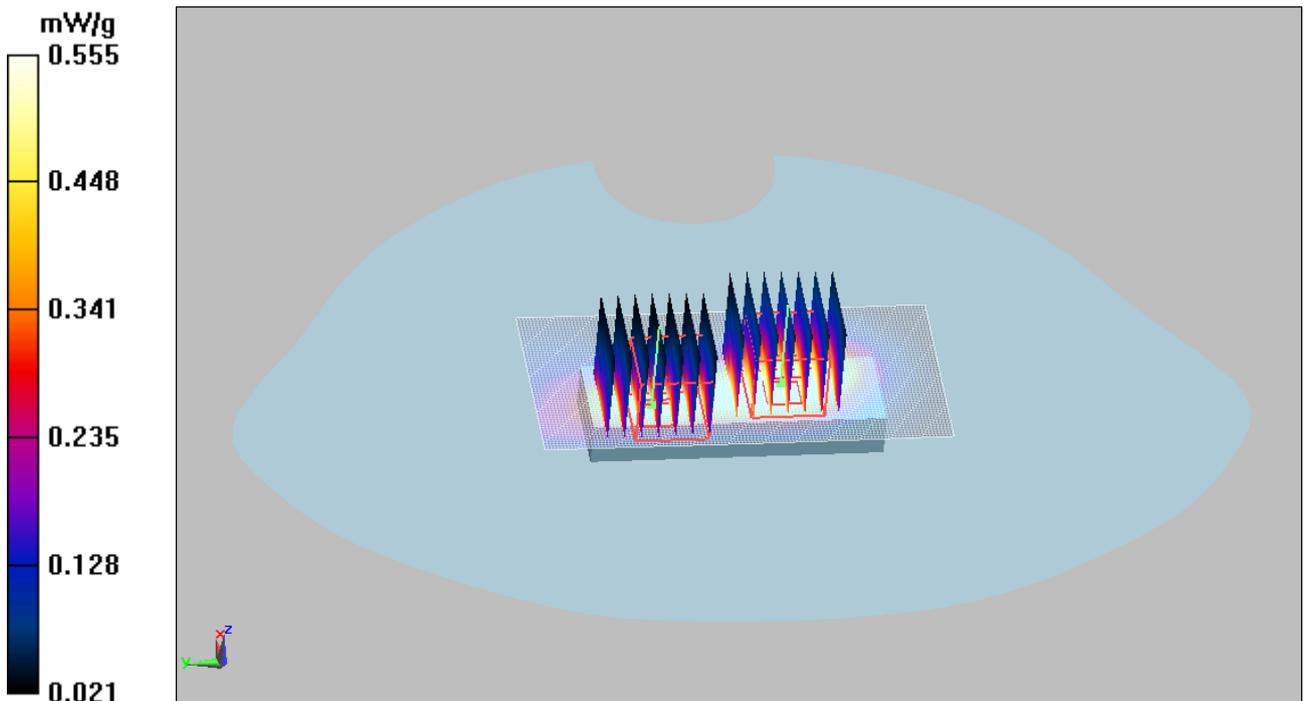Maximum value of SAR (measured) = 0.779 mW/g

Figure 38GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 512
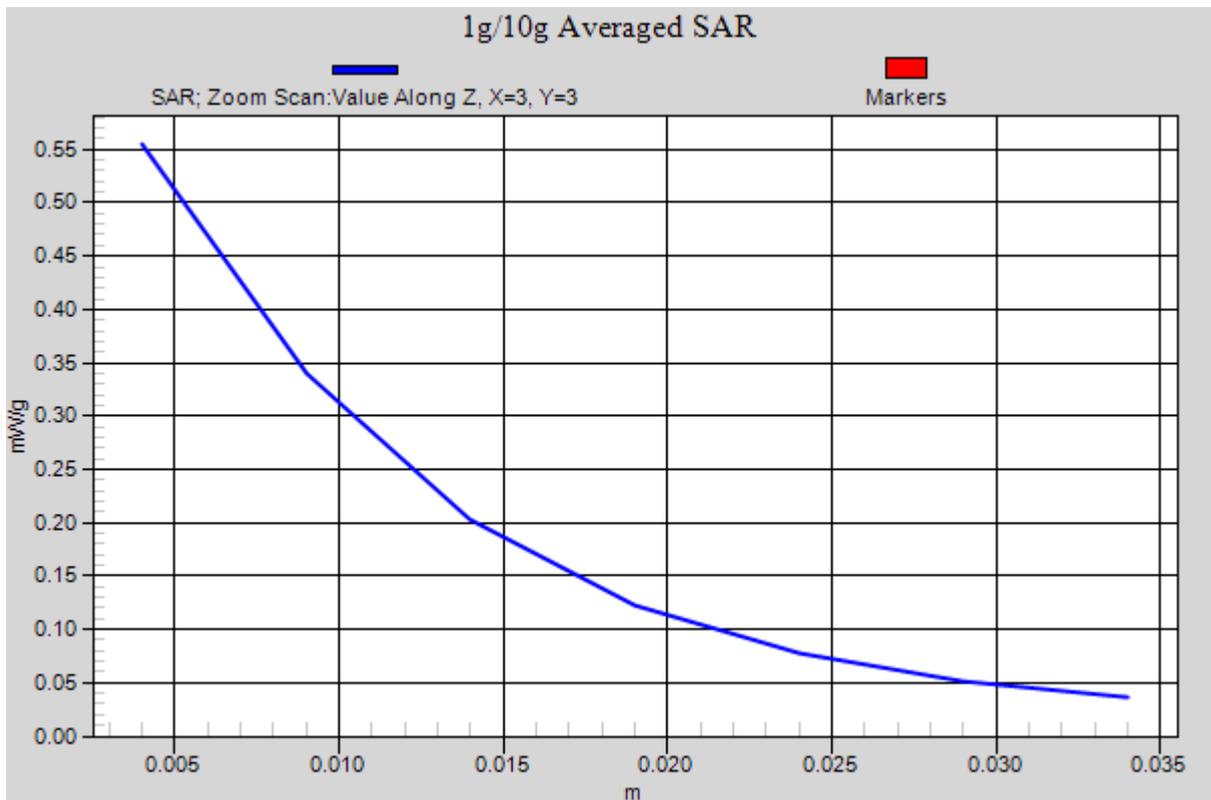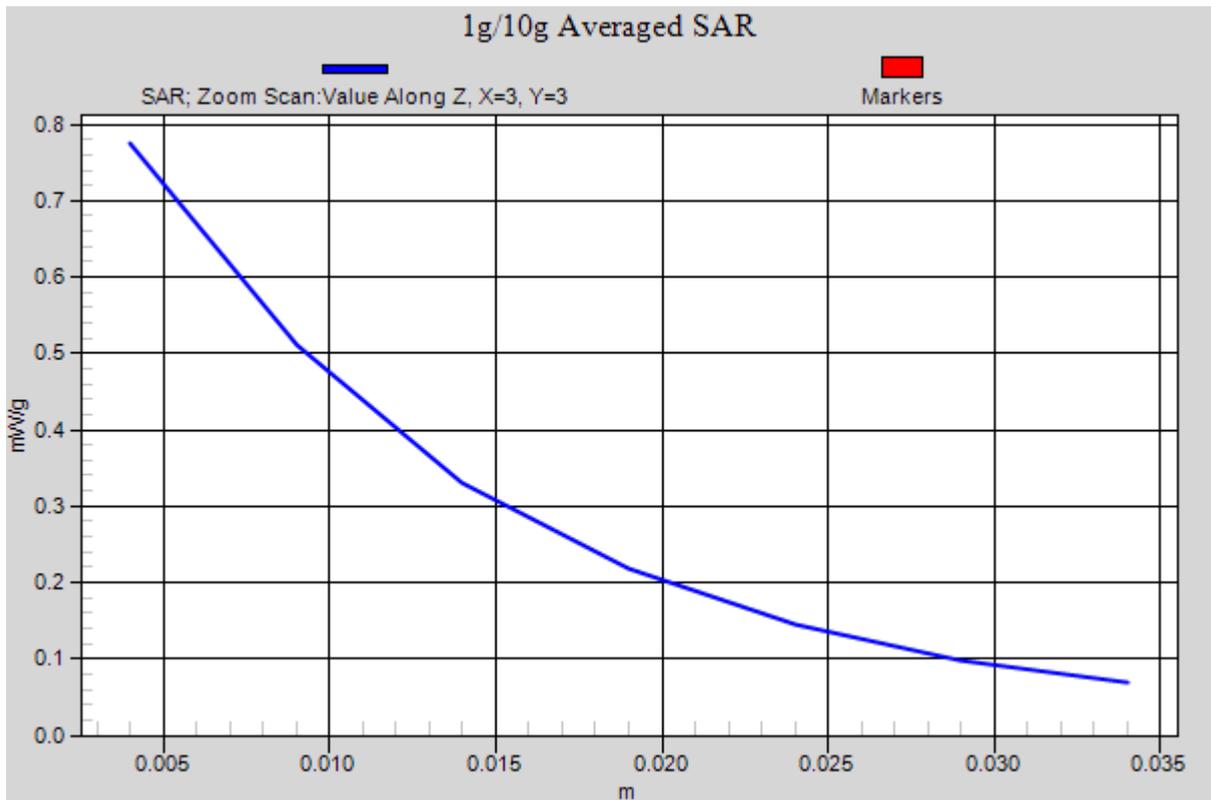
Figure 39 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 512]

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

Date/Time: 12/13/2009 7:51:30 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; $ε_r$ = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM2; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 0.794 mW/g

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

Reference Value = 18.8 V/m; Power Drift = -0.044 dB

Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.703 mW/g; SAR(10 g) = 0.415 mW/g

Maximum value of SAR (measured) = 0.775 mW/g

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

Reference Value = 18.8 V/m; Power Drift = -0.044 dB

Peak SAR (extrapolated) = 0.842 W/kg

SAR(1 g) = 0.492 mW/g; SAR(10 g) = 0.267 mW/g

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

Figure 40GSM 1900 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 661
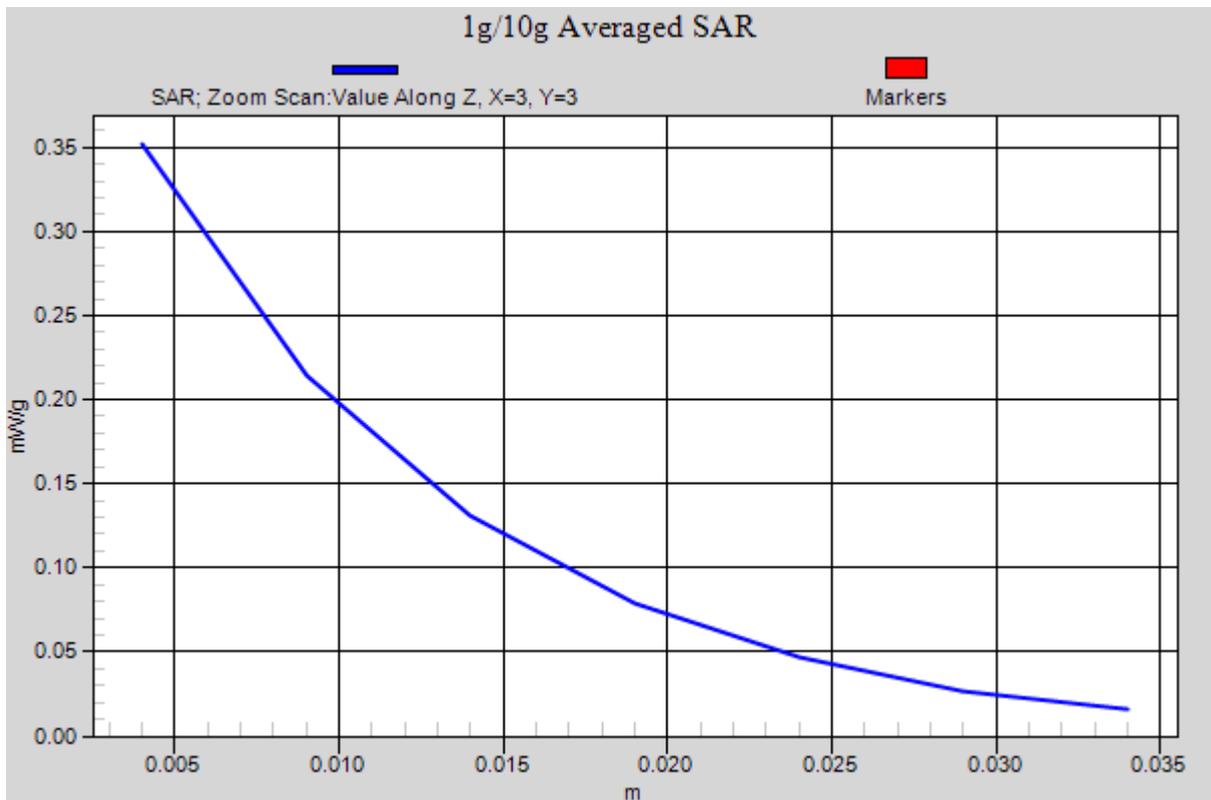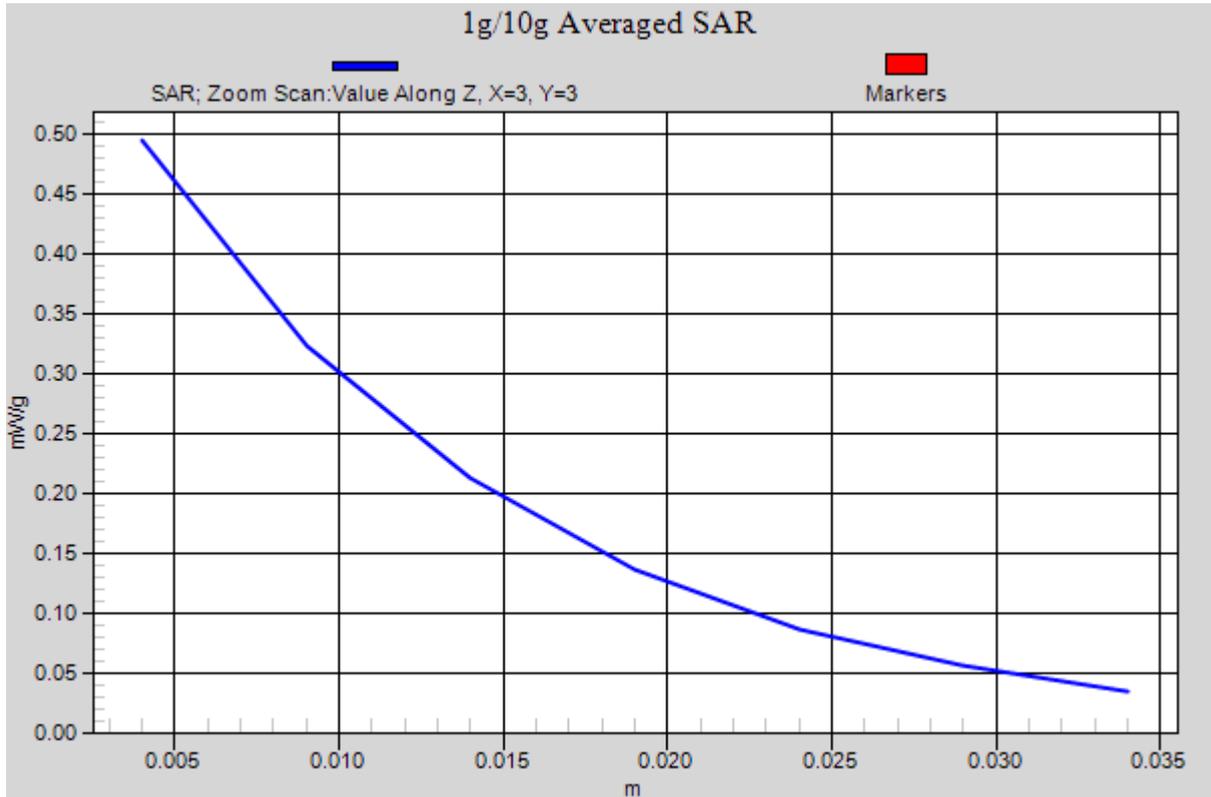
Figure 41 Z-Scan at power reference point [GSM 1900 GPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 661]

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

Date/Time: 12/13/2009 5:55:11 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM2; Type: SAM;

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

Test Position 2 Middle/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 15.4 V/m; Power Drift = 0.156 dB

Peak SAR (extrapolated) = 0.696 W/kg

SAR(1 g) = 0.449 mW/g; SAR(10 g) = 0.264 mW/g

Maximum value of SAR (measured) = 0.495 mW/g

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

Reference Value = 15.4 V/m; Power Drift = 0.156 dB

Peak SAR (extrapolated) = 0.523 W/kg

SAR(1 g) = 0.312 mW/g; SAR(10 g) = 0.170 mW/g
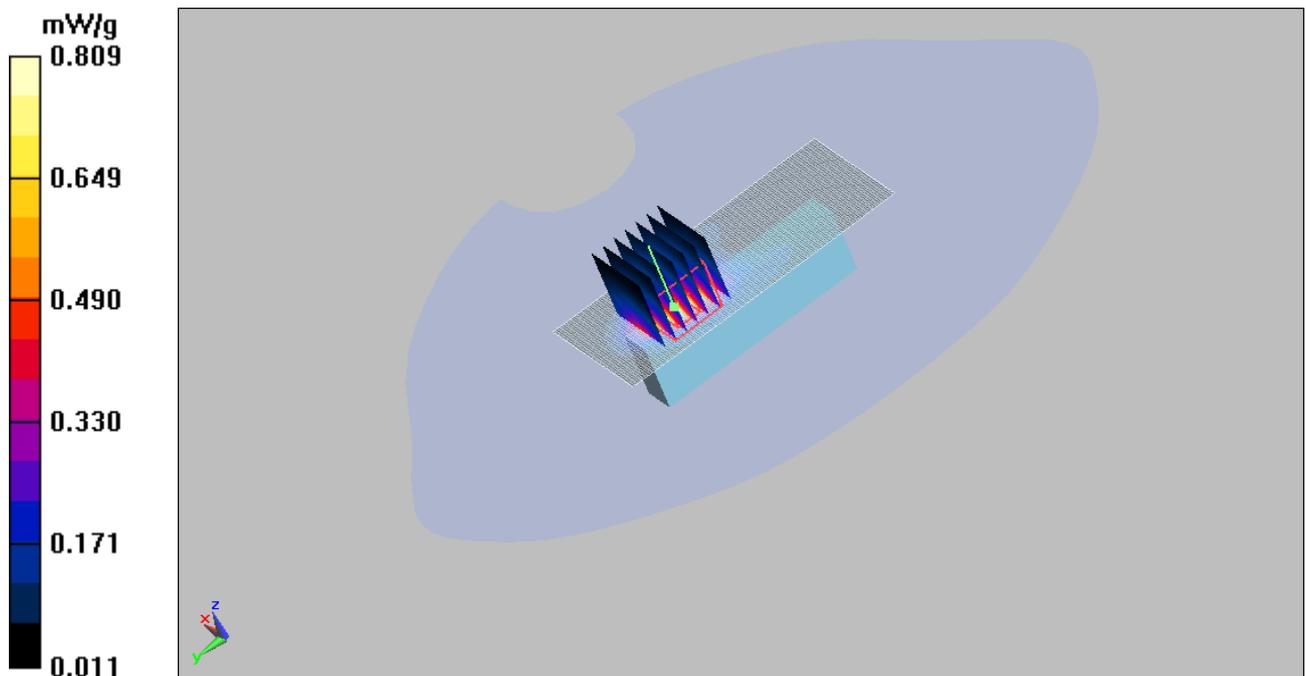
Maximum value of SAR (measured) = 0.352 mW/g
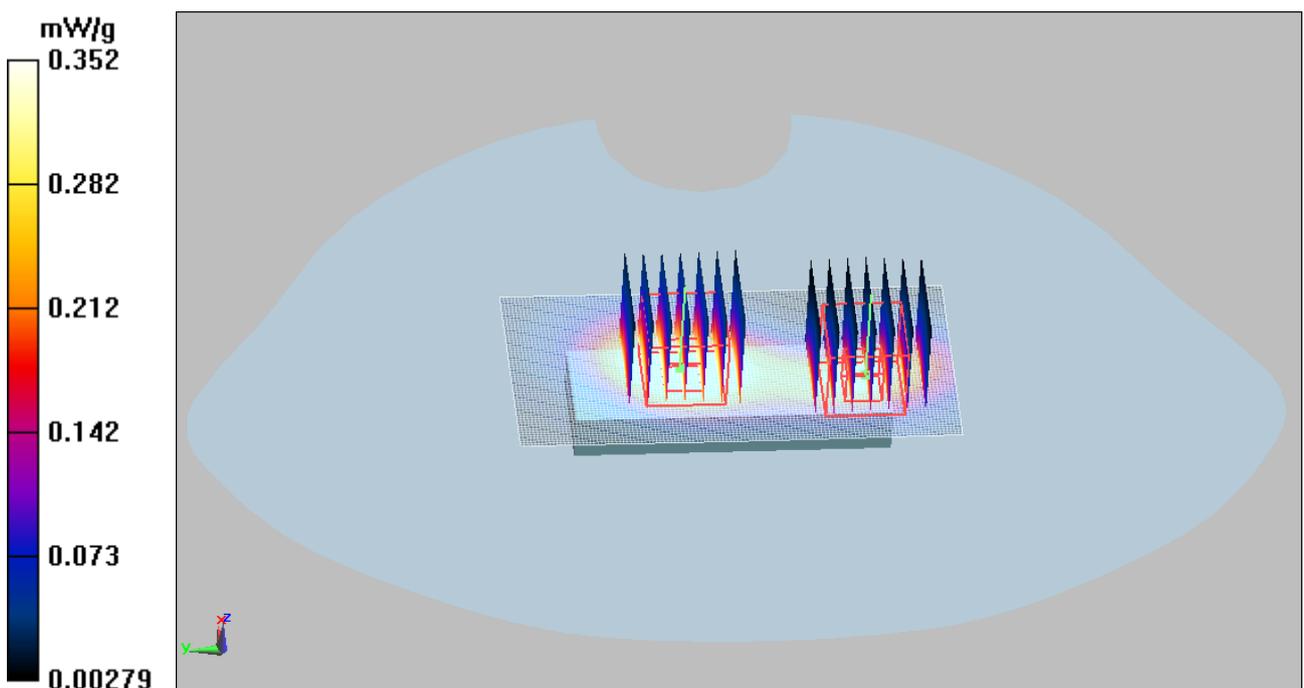
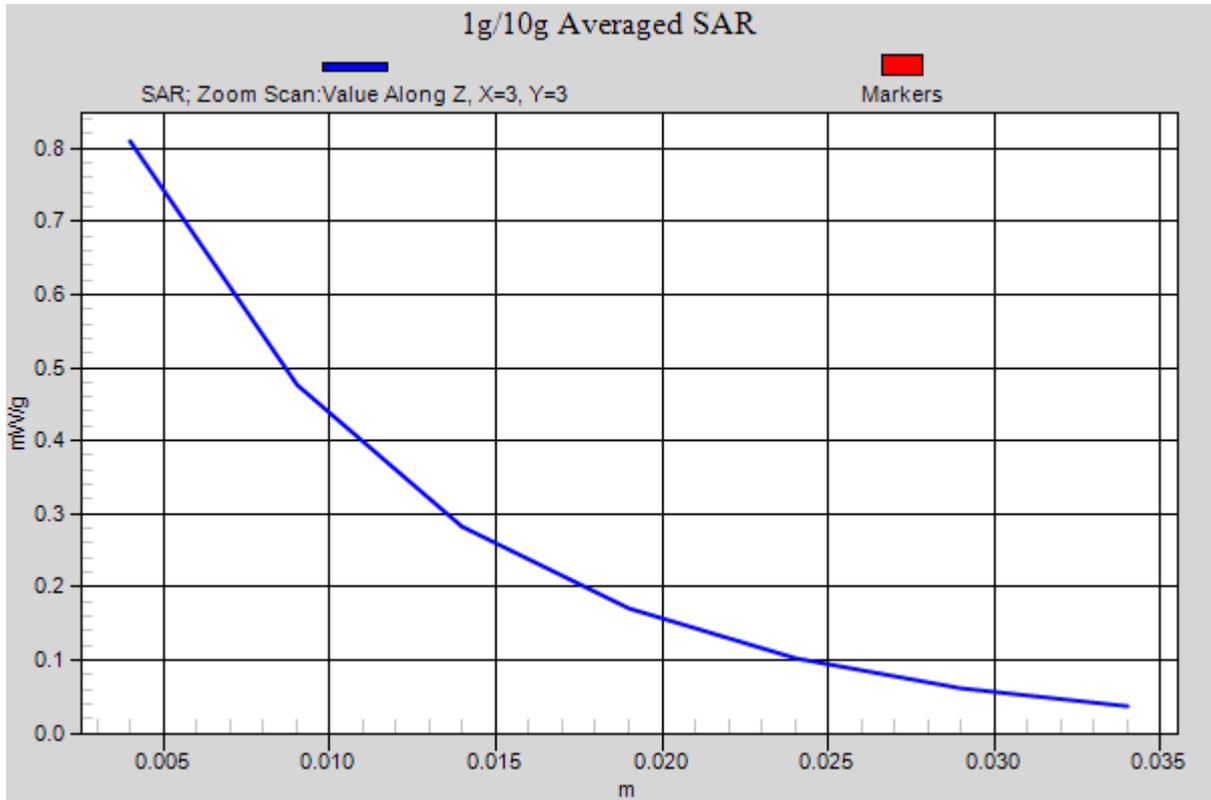**Figure 42 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Channel 661**

Figure 43 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 2 Channel 661]

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

Date/Time: 12/13/2009 8:37:55 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; $ε_r$ = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM2; Type: SAM;

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

Test Position 3 Middle/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.817 mW/g

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

Reference Value = 10.4 V/m; Power Drift = 0.017 dB

Peak SAR (extrapolated) = 1.27 W/kg

SAR(1 g) = 0.714 mW/g; SAR(10 g) = 0.369 mW/g

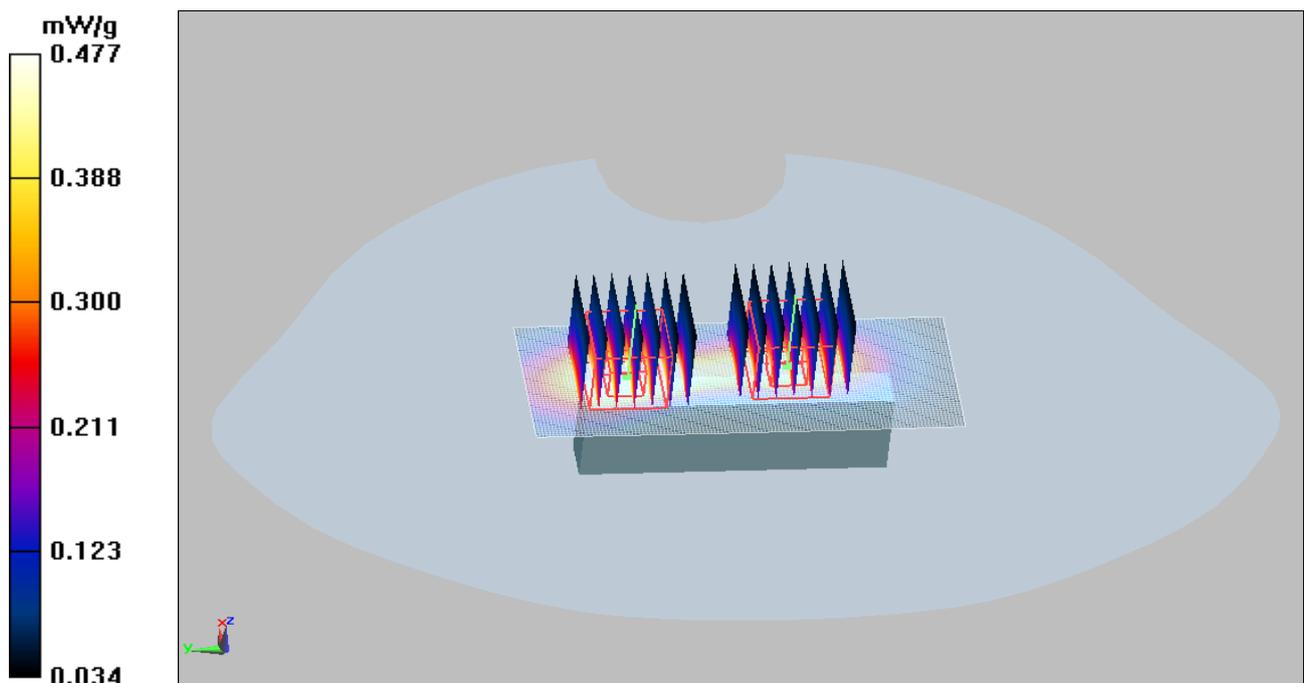Maximum value of SAR (measured) = 0.809 mW/g

Figure 44GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 661
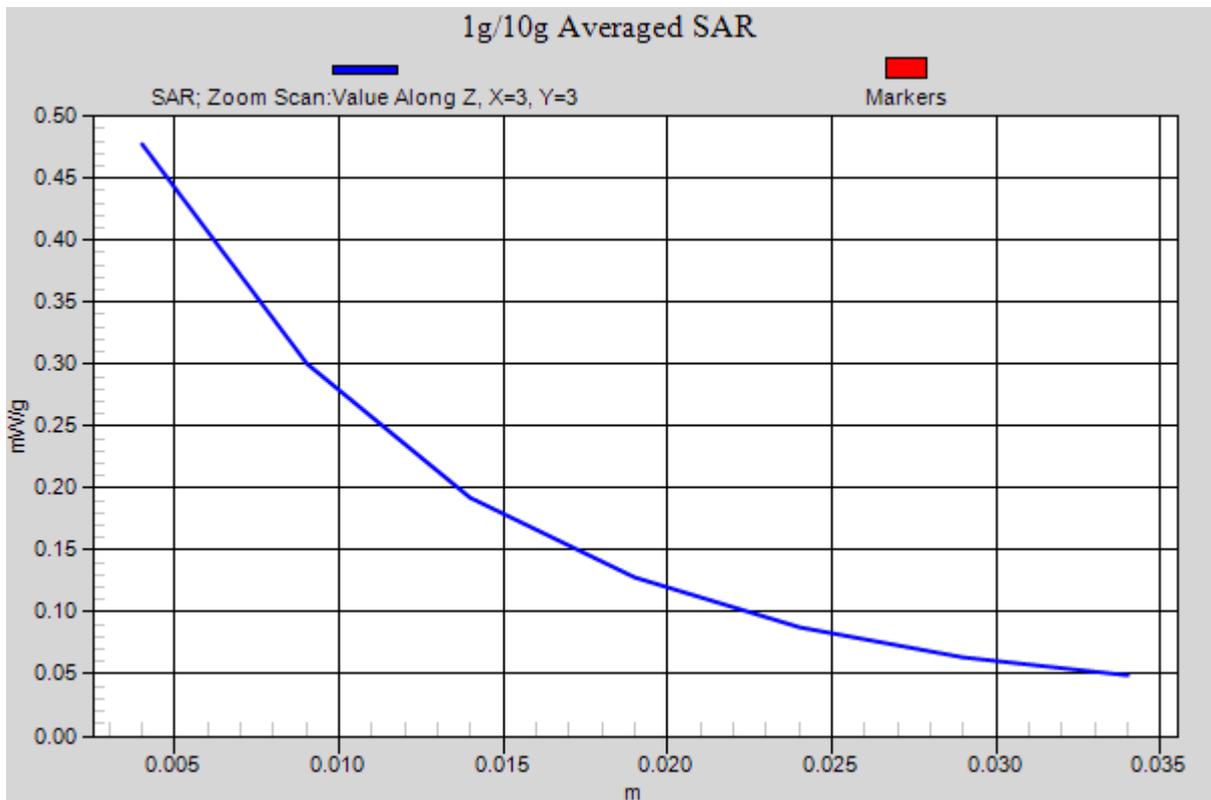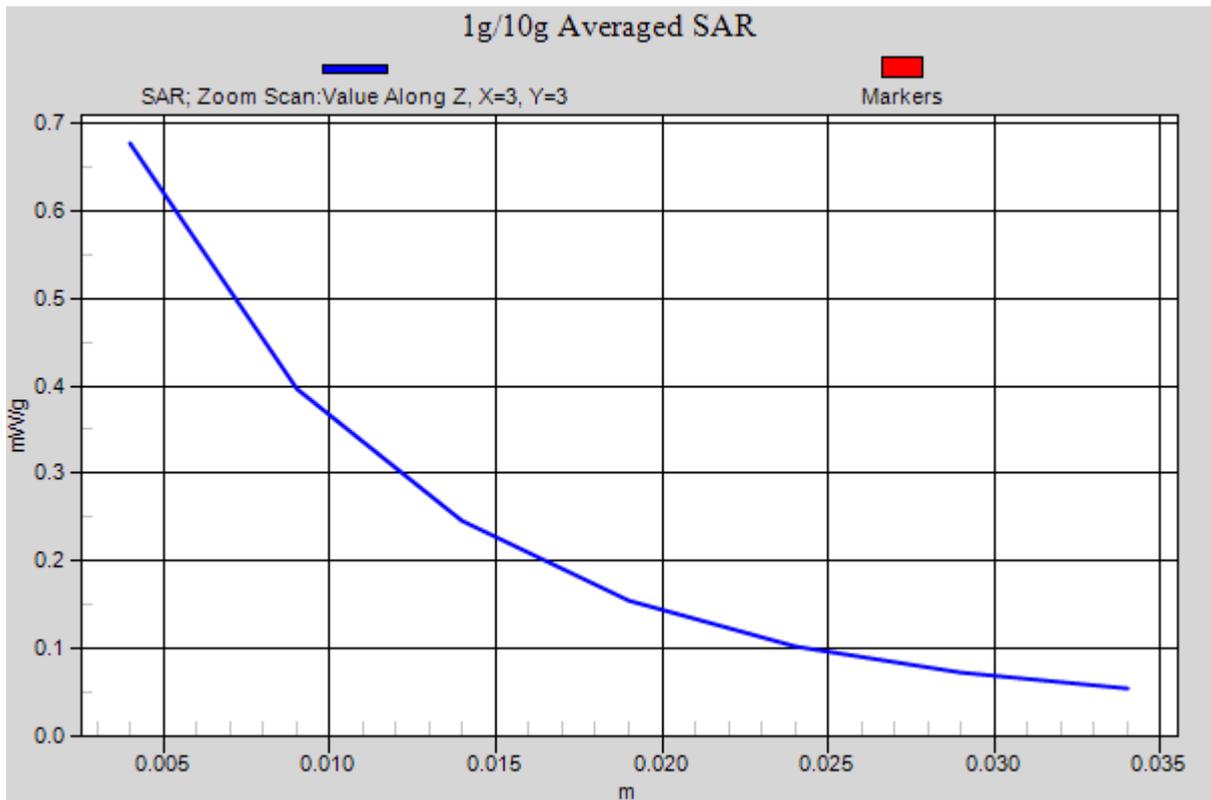
Figure 45 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 661]

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

Date/Time: 12/13/2009 6:39:32 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; $ε_r$ = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM2; Type: SAM;

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

Test Position 4 Middle/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.700 mW/g

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

Reference Value = 16.3 V/m; Power Drift = 0.190 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.599 mW/g; SAR(10 g) = 0.324 mW/g

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

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

Reference Value = 16.3 V/m; Power Drift = 0.190 dB

Peak SAR (extrapolated) = 0.709 W/kg

SAR(1 g) = 0.431 mW/g; SAR(10 g) = 0.249 mW/g

Maximum value of SAR (measured) = 0.477 mW/g

Figure 46GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 4 Channel 661

Figure 47 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 4 Channel 661]

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

Date/Time: 12/13/2009 11:05:26 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM2; Type: SAM;

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

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

Maximum value of SAR (interpolated) = 0.861 mW/g

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

Reference Value = 21.8 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 1.19 W/kg

SAR(1 g) = 0.761 mW/g; SAR(10 g) = 0.454 mW/g

Maximum value of SAR (measured) = 0.833 mW/g

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

Reference Value = 21.8 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 0.927 W/kg

SAR(1 g) = 0.541 mW/g; SAR(10 g) = 0.301 mW/g

Maximum value of SAR (measured) = 0.614 mW/g
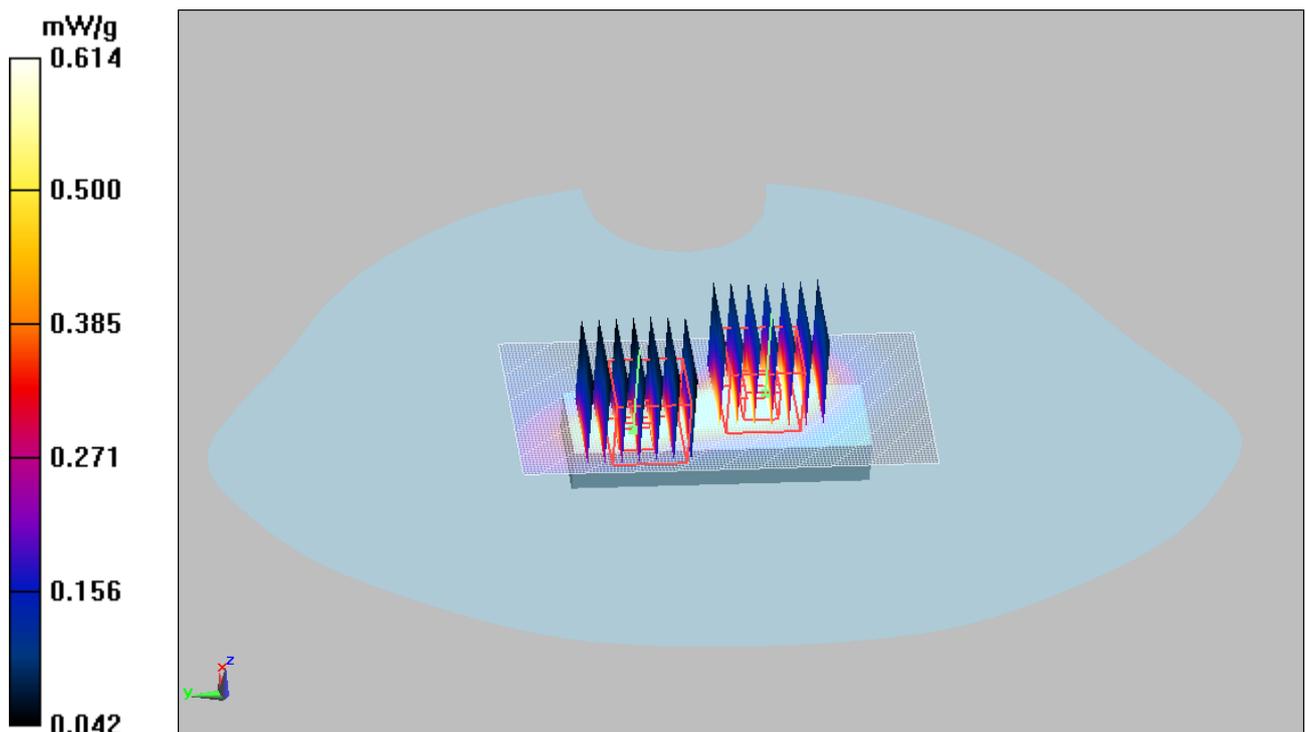
Figure 48GSM 1900 EGPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Channel 661
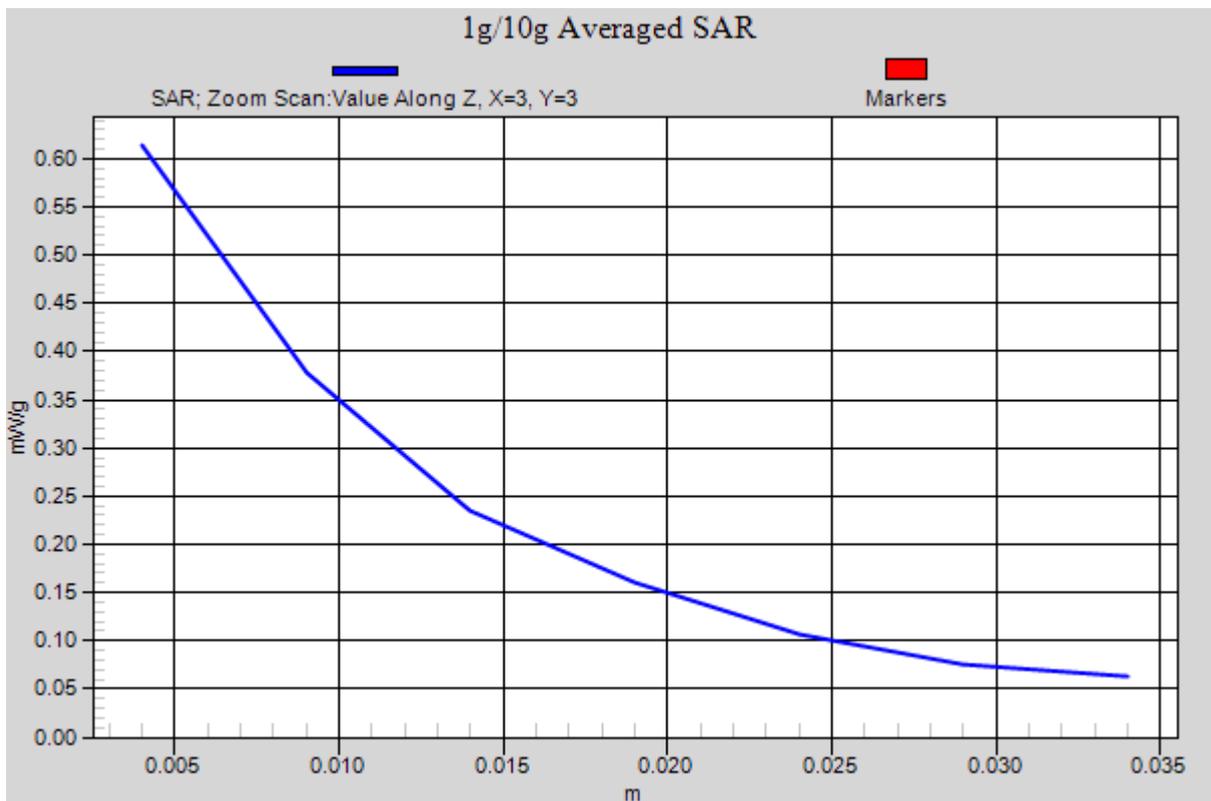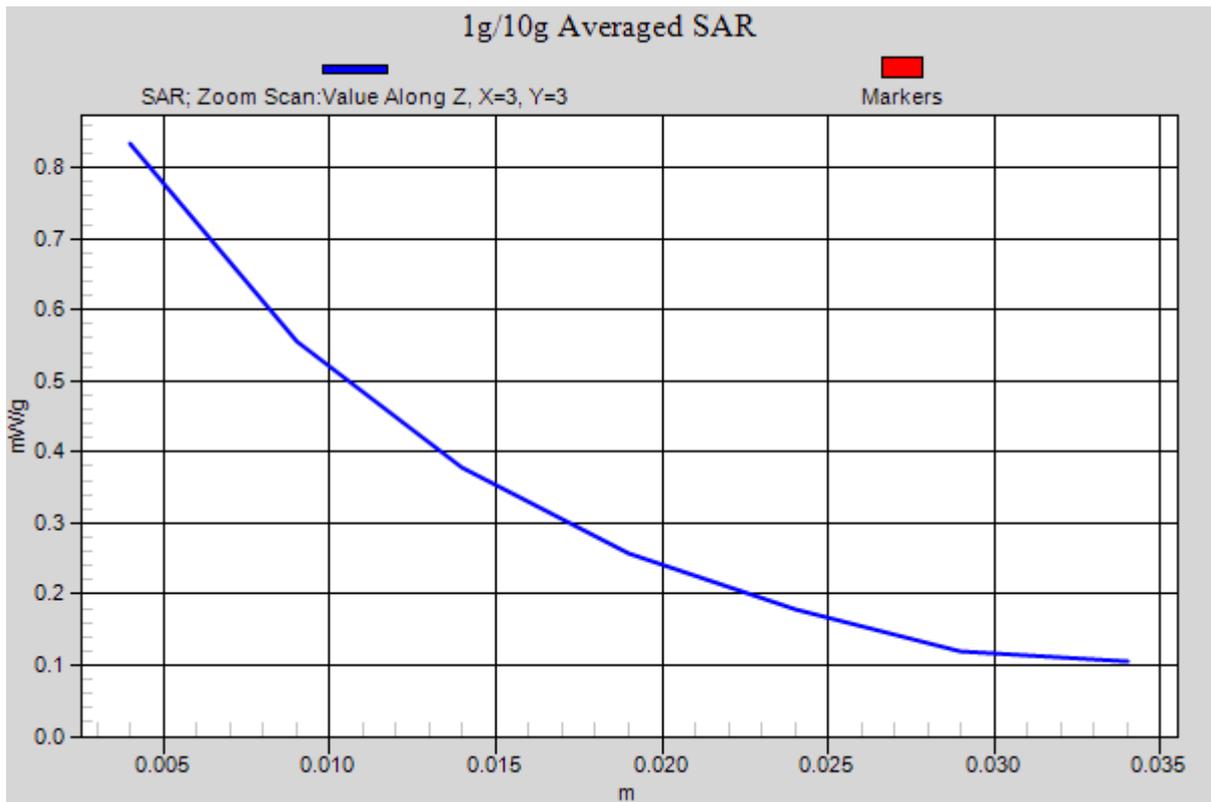
Figure 49 Z-Scan at power reference point [GSM 1900 EGPRS (4 timeslots in uplink) with IBM T61 Test Position 1 Channel 661]

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

Date/Time: 12/13/2009 10:25:49 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM2; Type: SAM;

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

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

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

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

Reference Value = 23.5 V/m; Power Drift = 0.072 dB

Peak SAR (extrapolated) = 1.41 W/kg

SAR(1 g) = 0.895 mW/g; SAR(10 g) = 0.513 mW/g

Maximum value of SAR (measured) = 1 mW/g

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

Reference Value = 23.5 V/m; Power Drift = 0.072 dB

Peak SAR (extrapolated) = 1.1 W/kg

SAR(1 g) = 0.624 mW/g; SAR(10 g) = 0.331 mW/g

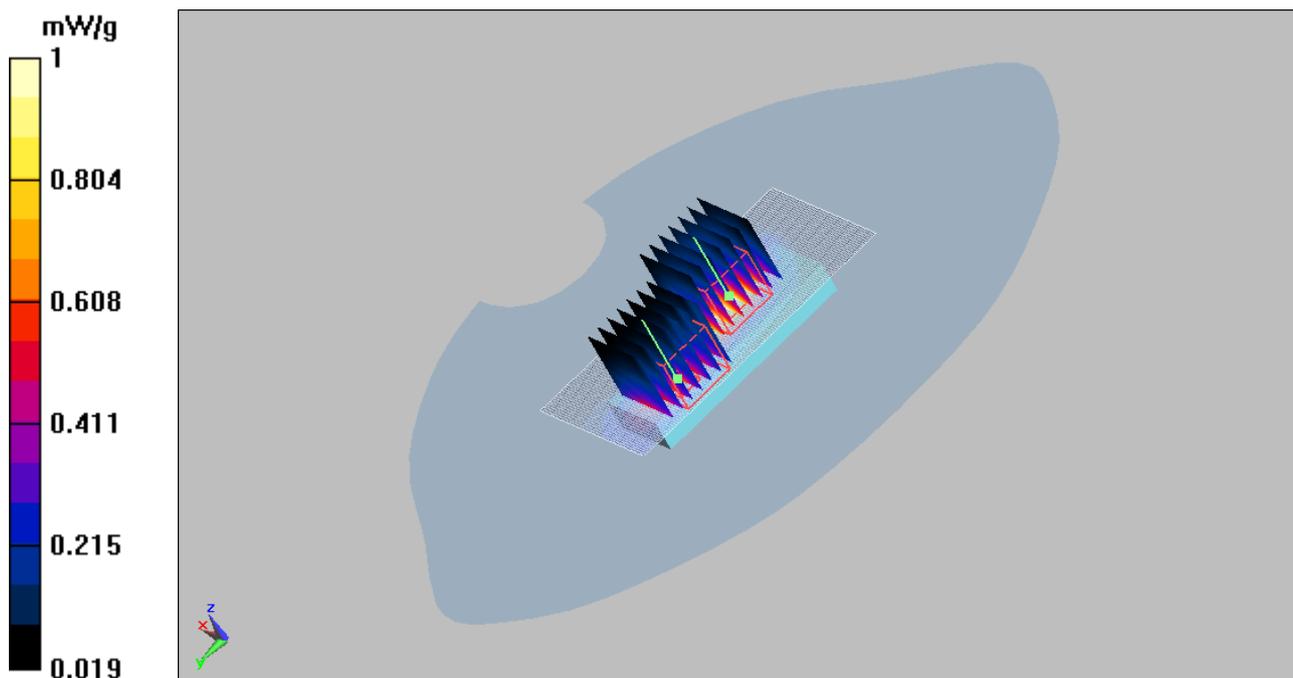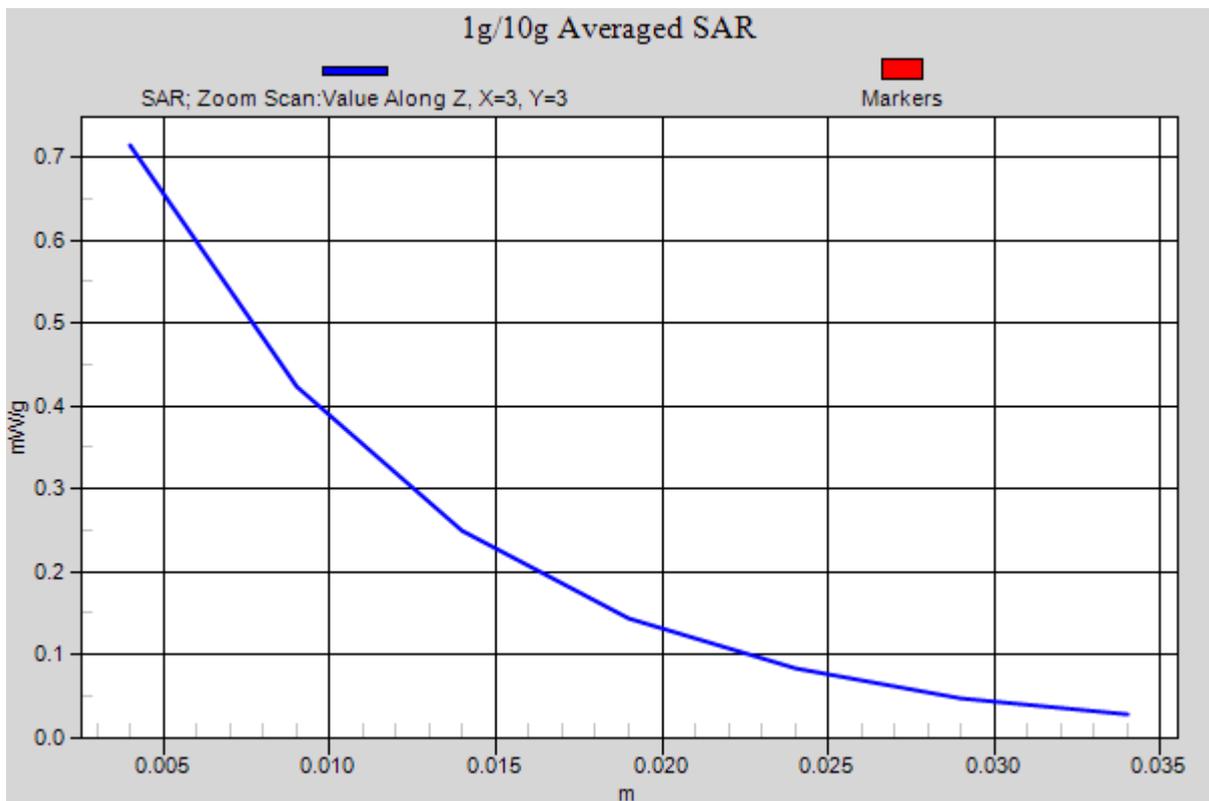Maximum value of SAR (measured) = 0.714 mW/g

Figure 50GSM 1900 EGPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 661
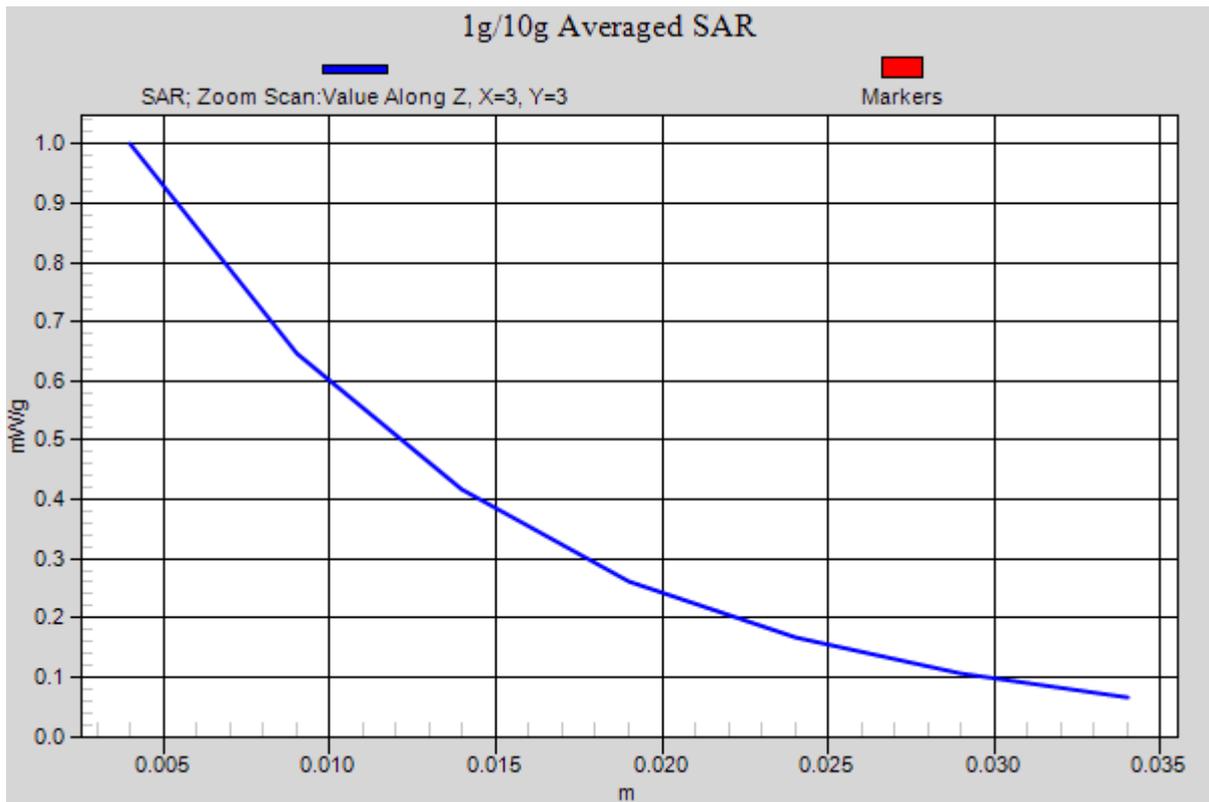
Figure 51 Z-Scan at power reference point [GSM 1900 EGPRS (3 timeslots in uplink) with IBM T61 Test Position 1 Channel 661]

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

Date/Time: 12/13/2009 9:06:24 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM2; Type: SAM;

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

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

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

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

Reference Value = 24.8 V/m; Power Drift = 0.051 dB

Peak SAR (extrapolated) = 1.53 W/kg

SAR(1 g) = 0.983 mW/g; SAR(10 g) = 0.563 mW/g

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

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

Reference Value = 24.8 V/m; Power Drift = 0.051 dB

Peak SAR (extrapolated) = 1.22 W/kg

SAR(1 g) = 0.696 mW/g; SAR(10 g) = 0.362 mW/g

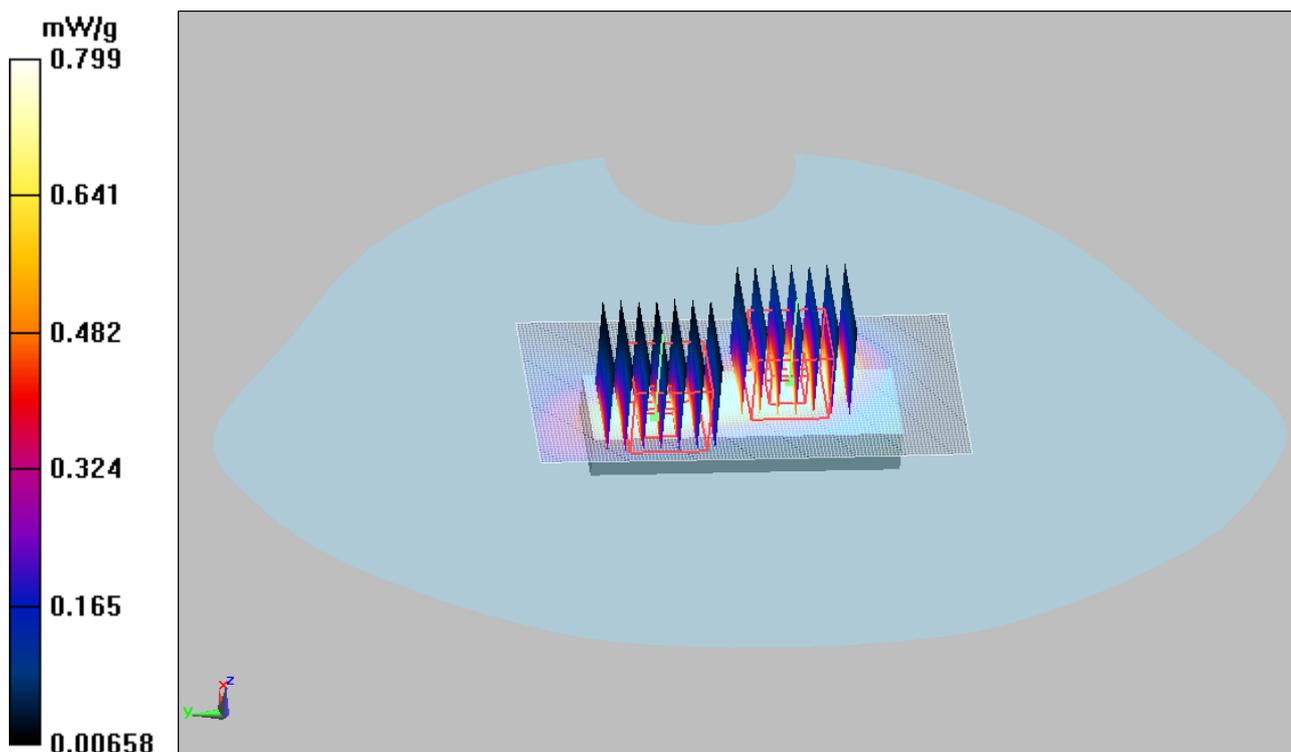Maximum value of SAR (measured) = 0.799 mW/g

Figure 52GSM 1900 EGPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 661
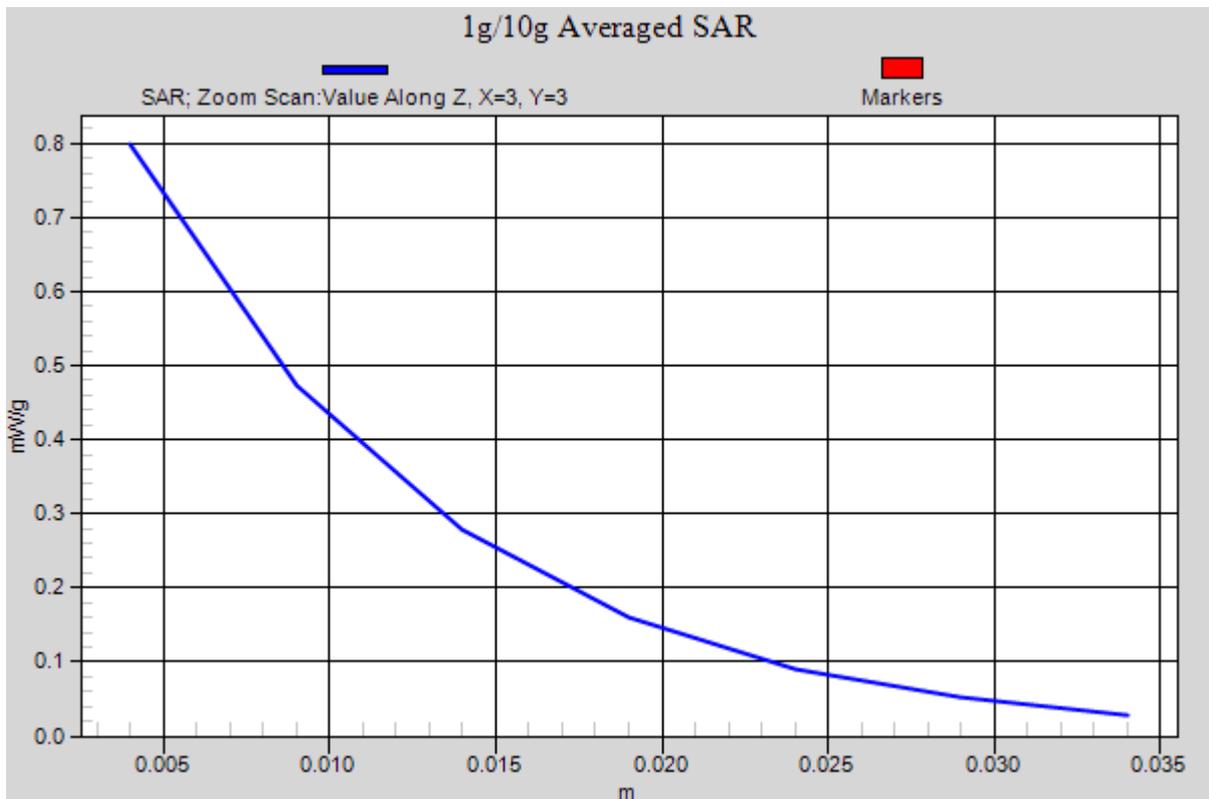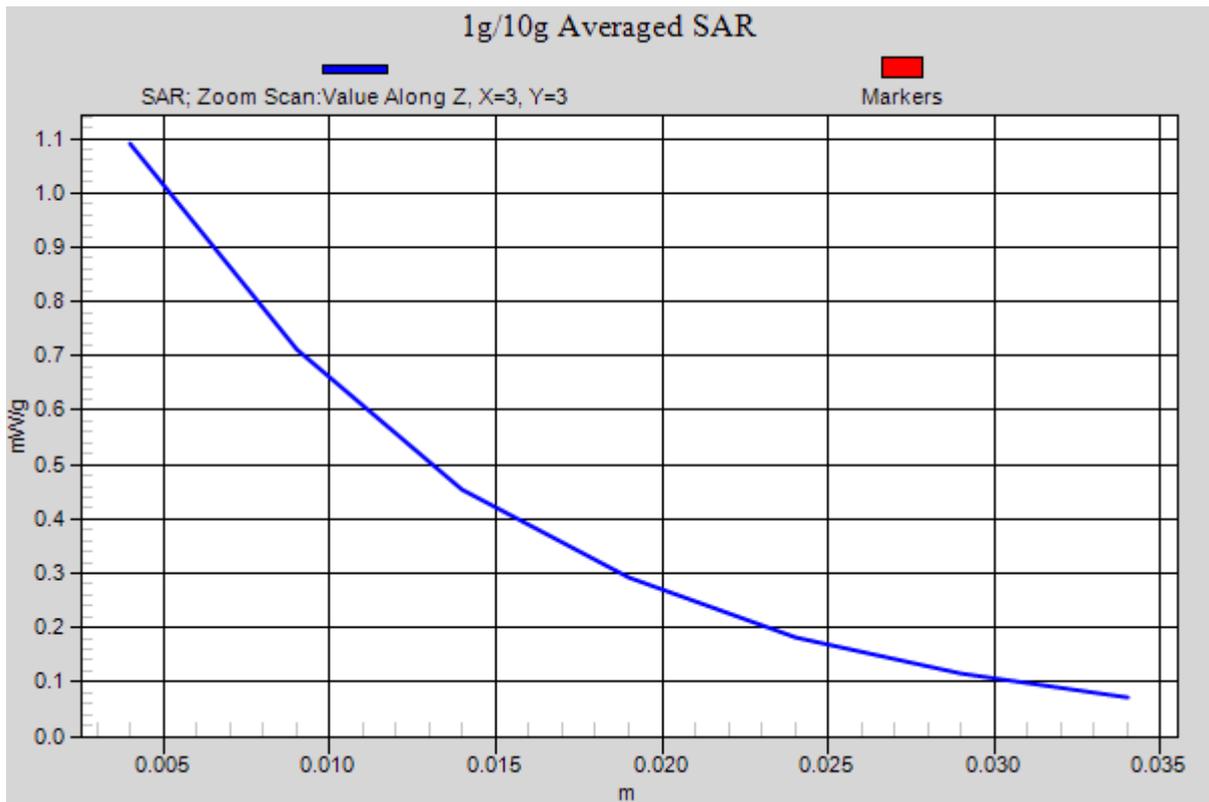
Figure 53 Z-Scan at power reference point [GSM 1900 EGPRS (2 timeslots in uplink) with IBM T61 Test Position 1 Channel 661]

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

Date/Time: 12/13/2009 9:46:28 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; $ε_r$ = 52.4; ρ = 1000 kg/m³

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM2; Type: SAM;

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

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

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

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

Reference Value = 21.6 V/m; Power Drift = 0.130 dB

Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.794 mW/g; SAR(10 g) = 0.456 mW/g

Maximum value of SAR (measured) = 0.881 mW/g

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

Reference Value = 21.6 V/m; Power Drift = 0.130 dB

Peak SAR (extrapolated) = 0.984 W/kg

SAR(1 g) = 0.566 mW/g; SAR(10 g) = 0.295 mW/g
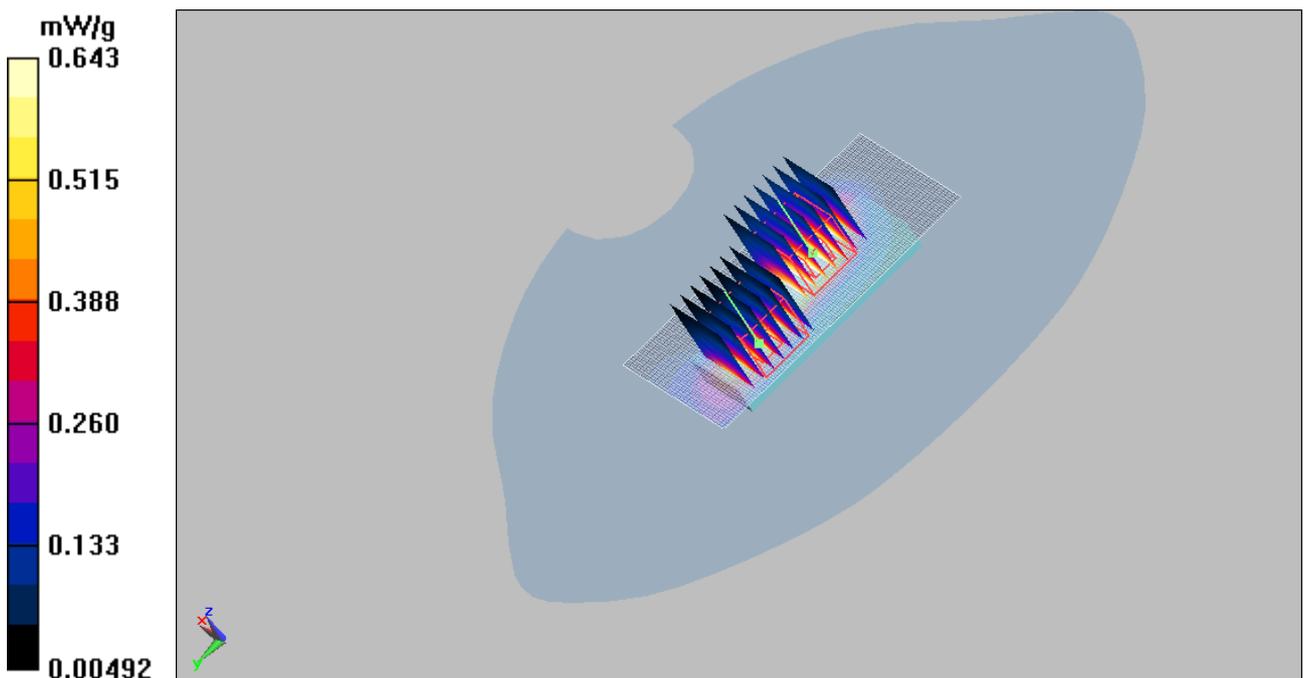
Maximum value of SAR (measured) = 0.643 mW/g

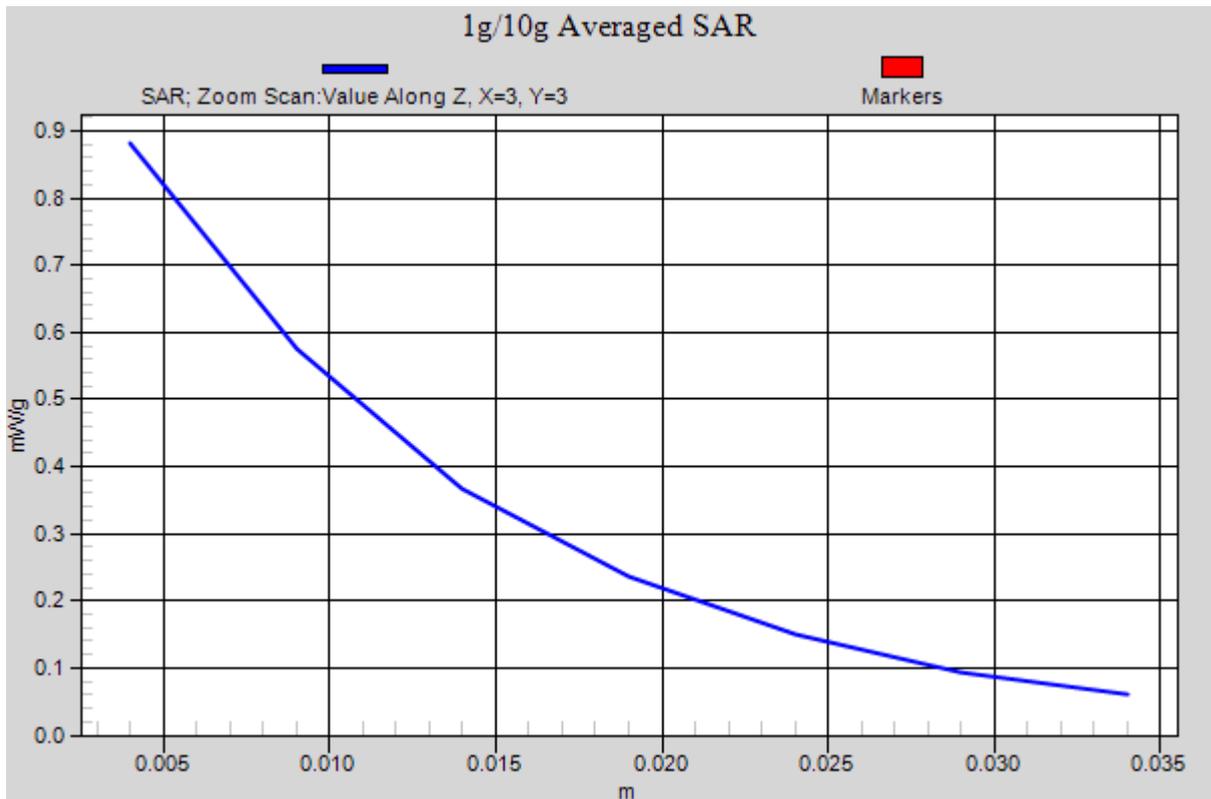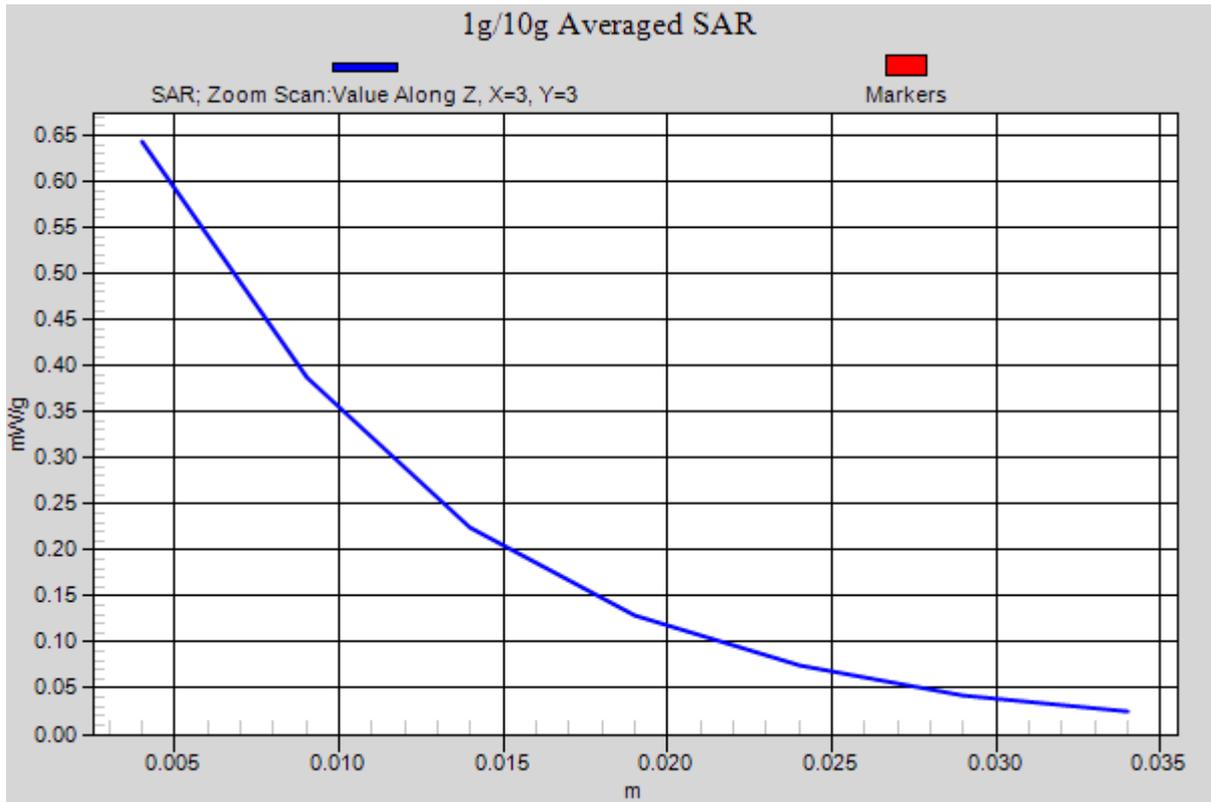**Figure 54GSM 1900 EGPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 661**

Figure 55 Z-Scan at power reference point [GSM 1900 EGPRS (1 timeslot in uplink) with IBM T61 Test Position 1 Channel 661]

WCDMA Band II with IBM T61 Test Position 1 High

Date/Time: 12/13/2009 2:38:52 PM

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

Medium parameters used: f = 1908 MHz; σ = 1.56 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

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) = 0.603 mW/g

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

Reference Value = 17.3 V/m; Power Drift = 0.178 dB

Peak SAR (extrapolated) = 0.894 W/kg

SAR(1 g) = 0.569 mW/g; SAR(10 g) = 0.331 mW/g

Maximum value of SAR (measured) = 0.630 mW/g

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

Reference Value = 17.3 V/m; Power Drift = 0.178 dB

Peak SAR (extrapolated) = 0.614 W/kg

SAR(1 g) = 0.360 mW/g; SAR(10 g) = 0.193 mW/g

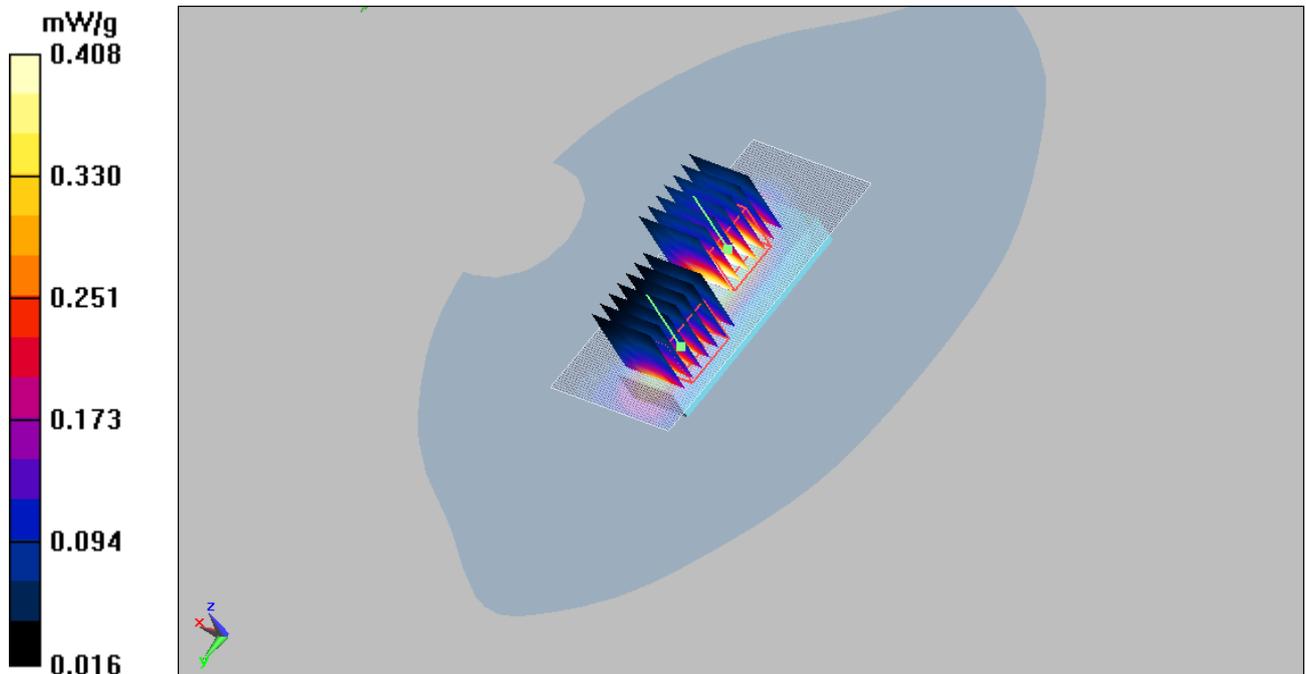Maximum value of SAR (measured) = 0.408 mW/g

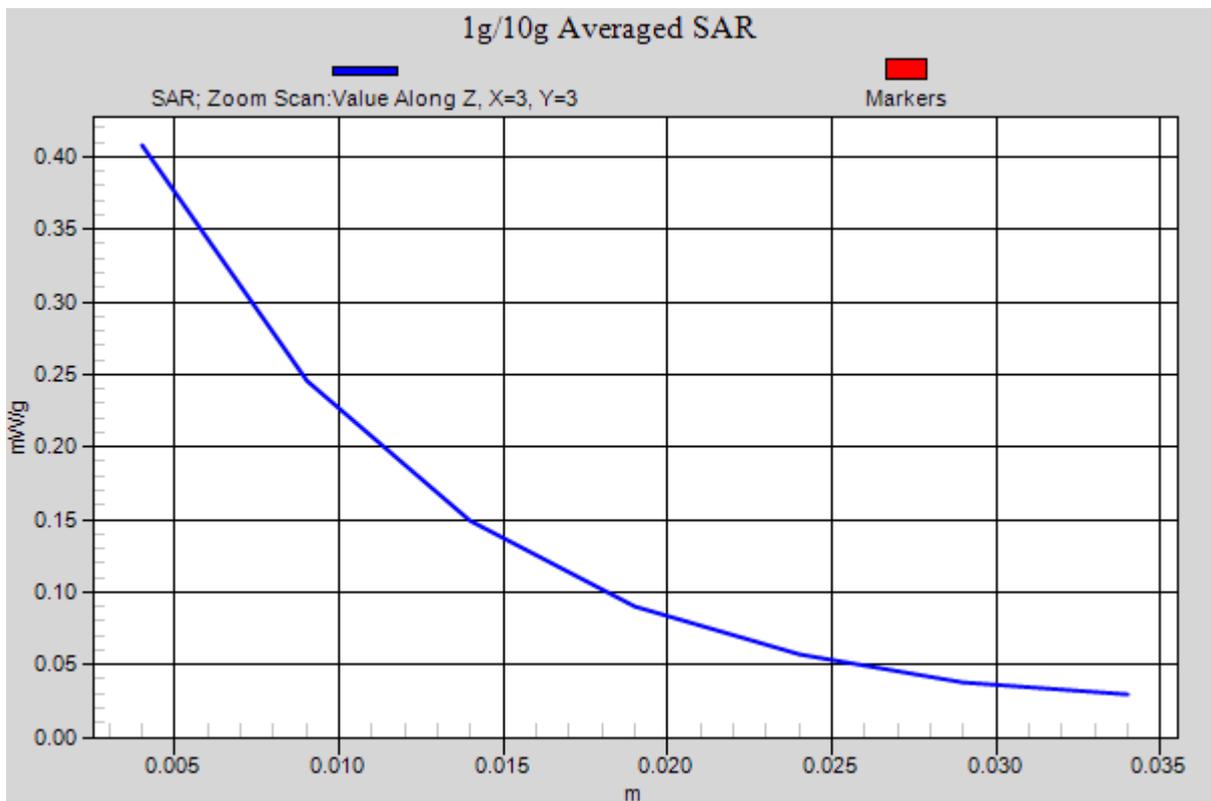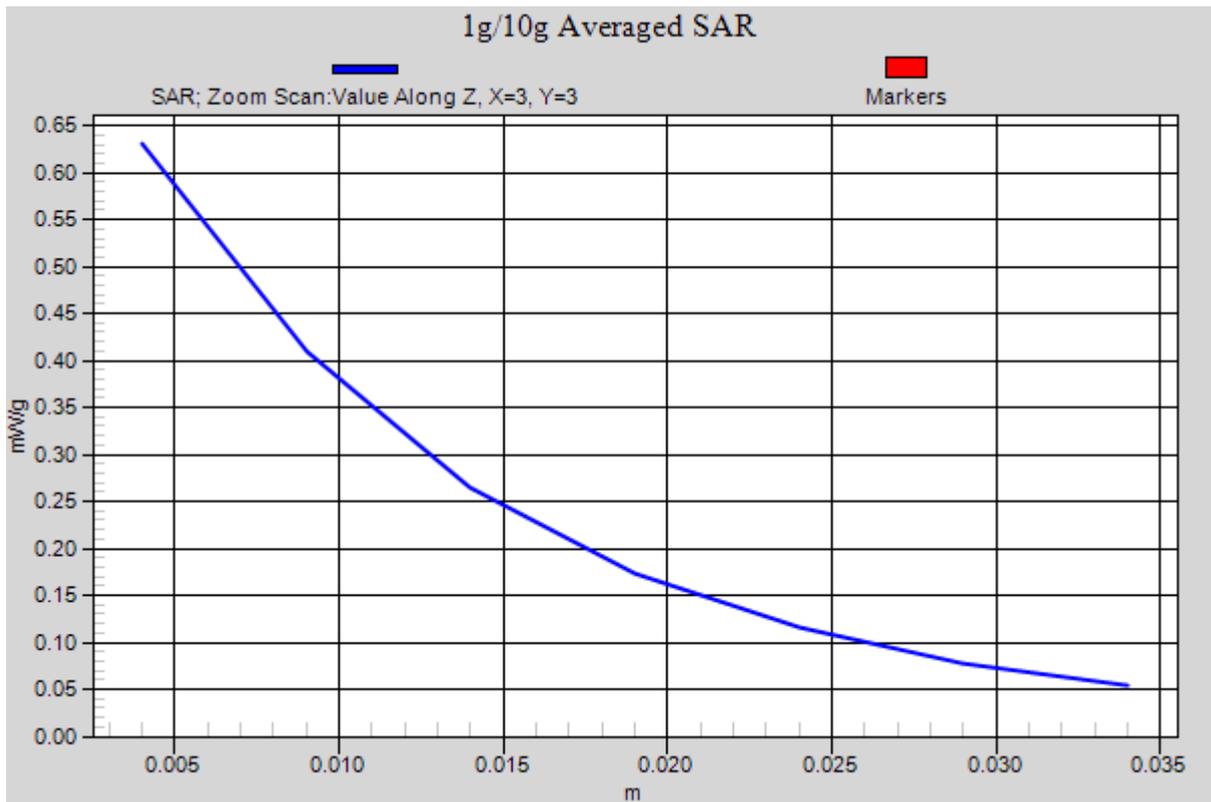**Figure 56 WCDMA Band II with IBM T61 Test Position 1 Channel 9538**

Figure 57 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: 12/13/2009 1:20:43 PM

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

Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; $ε_r$ = 52.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃   Liqiud Temperature: 21.5℃

DASY5 Configuration:

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

Electronics: DAE4 Sn905; Calibrated: 6/24/2009

Phantom: SAM2; Type: SAM;

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

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

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

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

Reference Value = 23.6 V/m; Power Drift = 0.122 dB

Peak SAR (extrapolated) = 1.3 W/kg

SAR(1 g) = 0.825 mW/g; SAR(10 g) = 0.470 mW/g

Maximum value of SAR (measured) = 0.913 mW/g

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

Reference Value = 23.6 V/m; Power Drift = 0.122 dB

Peak SAR (extrapolated) = 0.866 W/kg

SAR(1 g) = 0.498 mW/g; SAR(10 g) = 0.260 mW/g
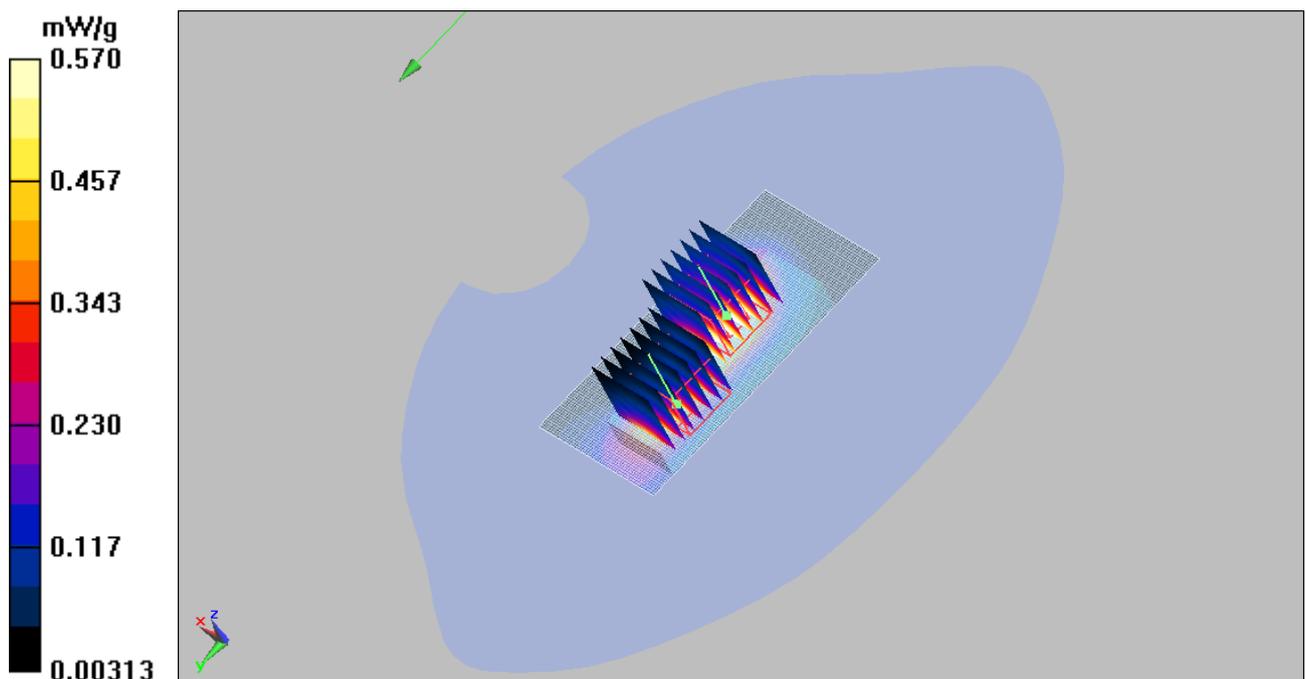
Maximum value of SAR (measured) = 0.570 mW/g

Figure 58 WCDMA Band II with IBM T61 Test Position 1 Channel 9400