NO.: RZA2008-1350

OET 65

TEST REPORT

Test name	Electromagnetic Field (Specific Absorption Rate)
Product	HSPA USB Stick
Model	E176
FCC ID	QISE176
Client	HUAWEI Technologies Co., Ltd.

TA Technology (Shanghai) Co., Ltd.

GENERAL TERMS

1. The test report is invalid if not marked with “exclusive stamp for the data report” or the stamp of the TA.
2. Any copy of the test report is invalid if not re-marked with the “exclusive stamp for the test report” or the stamp of TA.
3. The test report is invalid if not marked with the stamps or the signatures of the persons responsible for performing, revising and approving the test report.
4. The test report is invalid if there is any evidence of erasure and/or falsification.
5. If there is any dissidence for the test report, please file objection to the test center with in 15 days from the date of receiving the test report.
6. Normally, entrust test is only responsible for the samples that have undergone the test.
7. This test report cannot be used partially or in full for publicity and/or promotional purposes with out previous written permissions of TA.

Address: **Room4,No.399,Cailun Rd,Zhangjiang Hi-Tech Park, Pudong Shanghai,China**

Post code: **201203**

Telephone: **+86-021-50791141/2/3** **Fax：+86-021-50791141/2/3-8000**

Website: **http://www.ta-shanghai.com**

E-mail: **service@ta-shanghai.com**

GENERAL SUMMARY

Product	HSPA USB Stick	**Model**	E176
Client	HUAWEI Technologies Co., Ltd.	**Type of test**	Entrusted
Manufacturer	HUAWEI Technologies Co., Ltd.	**Arrival Date of sample**	October 20th, 2008
Place of sampling	(Blank)	**Carrier of the samples**	Ting Zhang
Quantity of the samples	One	**Date of product**	(Blank)
Base of the samples	(Blank)	**Items of test**	SAR
Series number	355851020013873		
Standard(s)	**ANSI C95.1–2005:** 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(draft):** Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 2: Procedure to determine the Specific Absorption Rate (SAR)in the head and body for 30MHz to 6GHz Handheld and Body-Mounted Devices used in close proximity to the body.		
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 7.2 of this test report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 7.1 of this test report. General Judgment: **Pass** (Stamp) **Date of issue: October 30th, 2008**		
Comment	The test result only responds to the measured sample.		

Approved by 杨伟中 Revised by 汪大保 Performed by 石峰

Weizhong Yang Dabao Wang Feng Shi

TABLE OF CONTENT

1. COMPETENCE AND WARRANTIES

TA Technology (Shanghai) Co., Ltd. is a test laboratory competent to carry out the tests described in this 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.

2. GENERAL CONDITIONS

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 document is only valid if complete; no partial reproduction can be made without written approval of **TA Technology (Shanghai) Co., Ltd.**

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.

3. DESCRIPTION OF EUT

3.1. Addressing Information Related to EUT

Table 1: Applicant (The Client)

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

Table 2: Manufacturer

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

3.2. Constituents of EUT

Table 3: Constituents of Samples

Description	Model	Serial Number	Manufacturer
HSPA USB Stick	E176	355851020013873	HUAWEI Technologies Co., Ltd.

Note:

The EUT appearances see ANNEX I.

3.3. Test item

Table 4: Test item

device type :	portable device	
exposure category:	uncontrolled environment / general population	
device operating configurations :		
operating mode(s):	GSM850; （tested） GSM1900; （tested） WCDMA Band II; (tested); WCDMA Band V; （tested）	
Modulation:	GMSK, 8-PSK; QPSK	
GPRS mobile station class :	B	
GPRS multislot class :	12	
EGPRS multislot class:	12	
Maximum no. of timeslots in uplink:	4	
standard output power	(33dBm,2W)GSM850; (tested); (30dBm,1W)GSM1900; (tested); (24dBm,0.25W)WCDMA Band II; (tested); (24dBm,0.25W)WCDMA Band V; (tested);	
operating frequency range(s)	transmitter frequency range	receiver frequency range
GSM850: (tested)	824.2 MHz ~ 848.8 MHz	869.2 MHz ~ 893.8 MHz
GSM1900: (tested)	1850.2 MHz ~ 1909.8 MHz	1930.2 MHz ~ 1989.8 MHz
WCDMA Band II: (tested);	1852.4 MHz ~ 1907.6MHz	1932.4 MHz ~ 1987.6 MHz
WCDMA Band V: (tested)	826.4 MHz ~ 846.6 MHz	871.4 MHz ~ 891.6 MHz
Power class	GSM 850: 4, tested with power level 5	
	GSM 1900: 1, tested with power level 0	
	WCDMA Band II: 3, tested with maximum output power	
	WCDMA Band V: 3, tested with maximum output power	
Test channel (Low –Middle –High)	128-190-251 (GSM850) (tested) 512 - 661-810 (GSM1900) (tested) 9262- 9400 -9538 (WCDMA Band II) (tested) 4132 -4182 -4233 (WCDMA Band V) (tested)	
hardware version:	CD25TCPV	
software version:	11.104.16.05.00	
antenna type:	integrated antenna	
Used host products:	IBM T61 BenQ Joy book S72 BenQ Joy book R55V	

3.4. General Description

Equipment Under Test (EUT) is a HSPA USB Stick with internal antenna. During SAR test of the EUT, it was connected to three different portable computers. SAR is tested for the EUT respectively for GSM 850, GSM1900, WCDMA Band II and WCDMA Band V. The EUT have GPRS (class 12), EGPRS (class 12) and WCDMA/HSDPA functions.

Since the EUT only has the data transfer function, but does not have the voice transfer function, the tests in the band of GSM850 and GSM 1900 are only performed in the mode of GPRS and EGPRS， The tests in the band of WCDMA Band II and WCDMA Band V are performed in the mode of WCDMA and HSDPA .The measurements were performed in combination with three different host products (BenQ Joy book S72,BenQ Joy book R55V and IBM T61). BenQ Joy book S72 and BenQ Joy book R55V laptop have horizontal USB slot, IBM T61 laptop has vertical USB slot.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

4. OPERATIONAL CONDITIONS DURING TEST

4.1. General description of test procedures

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. Test positions as described in the ANNEX I are in accordance with the specified test standard. Conducted output power was measured using an integrated RF connector and attached RF cable.
The measurements were performed in combination with three host products (IBMT61, BenQ Joy book S72 and BenQ Joy book R55V). BenQ Joy book S72 and BenQ Joy book R55V laptop have horizontal USB slot, IBM T61 laptop has vertical USB slot.

If a wireless link is used, 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 handset by at least 30 dB.

And according to the "3 dB rule" OET Bulletin 65 supplement C, published June 2001 including DA 02-1438, published June 2002: **" If the SAR measured at the middle channel for each test configuration (left, right, Cheek/Touch, Tile/Ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s)"**.

4.2. GSM Test Configuration

For the body SAR tests for GSM 850, GSM 1900, a communication link is set up with a System Simulator (SS) by air link. The EUT is commanded to operate at maximum transmitting power. Since the EUT only has the data transfer function, but does not have the speech transfer function. The tests in the band of GSM 850, GSM 1900 are only performed in the mode of GPRS. And since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink. According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot. The allowed power reduction in the multi-slot configuration is as following:

Number of timeslots in uplink assignment	Permissible nominal reduction of maximum output power,(dB)
1	0
2	0 to 3,0
3	1,8 to 4,8
4	3,0 to 6,0

For this EUT, the tests for GSM 850 GPRS and GSM 1900 GPRS band will be performed under the following 4 setups at one same test position:

1) using 1 timeslot in uplink with the power of 33 dBm for GSM850 and 30 dBm for GSM1900
2) using 2 timeslots in uplink with the power reduced 2dB

3) using 3 timeslots in uplink with the power reduced 4dB
4) using 4 timeslots in uplink with the power reduced 6dB

After drawn the worst case, the tests will be continued to perform with the same EUT setup for the Whole tests for GSM850 GPRS and GSM1900 GPRS.

4.3. WCDMA Test Configuration

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

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

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

	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.

4.4. HSDPA Test Configuration

SAR for HSDPA is selectively measured using the highest SAR configuration in WCDMA with an FRC in H-set 1 and a 12.2kbps RMC configured in Test Loop Mode 1. Body SAR is 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 for 12.2kbps RMC is above 75% of the SAR limit.

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 f. 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(βc, βd), and HS-DPCCH power offset parameters(△ACK, △NACK, △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.

Sub-Test 1 Setup for Release 5 HSDPA

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

Note1: △ACK, △NACK and △CQI= 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c=30/15$ ⇔ $\beta_{hs}=30/15*\beta_c$

Note2:CM=1 for β_c/β_d =12/15, β_{hs}/β_c=24/15

Note 3: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 factor for the reference TFC (TFC1,TF1) to β_c=11/15 and β_d=15/15.

4.5. Position of module in Portable devices

The measurements were performed in combination with three different host products (IBMT61, BenQ Joy book S72 and BenQ Joy book R55V). BenQ Joy book S72 and BenQ Joy book R55V laptop have horizontal USB slot, IBM T61 laptop has vertical USB slot.

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

For each channel, the EUT is tested at the following 5 test positions:

- Test Position 1: The EUT is connected to the portable computer with horizontal USB slot. The back side of the EUT towards the bottom of the flat phantom. (ANNEX I Picture 7-a)
- Test Position 2: The EUT is connected to the portable computer with horizontal USB slot. The top side of the EUT towards the bottom of the flat phantom.（ANNEX I Picture 7-b)
- Test Position 3: The EUT is connected to the portable computer with horizontal USB slot. The front side of the EUT towards the bottom of the flat phantom.（ANNEX I Picture 7-c)
- Test Position 4: The EUT is connected to the portable computer with vertical USB slot. The right side of the EUT towards the bottom of the flat phantom.（ANNEX I Picture 7-d)
- Test Position 5: The EUT is connected to the portable computer with vertical USB slot. The left side of the EUT towards the bottom of the flat phantom. (ANNEX I Picture 7-e)

4.6. Picture of host product

During the test, The IBMT61, BenQ Joy book S72 and BenQ Joy book R55V laptop were used as an assistant to help to setup communication. (See Picture 1)

Picture 1-a: BenQ Joybook S72 Close

Picture 1-b: BenQ Joybook S72 Open

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

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

Picture 1-c: IBM T61 Close

Picture 1-d: IBM T61 Open

Picture 1-h: IBM T61 with Vertical USB slot

Picture 1-h: BenQ Joy book S72 with horizontal USB slot

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

Picture 1: Computer as a test assistant

5. SAR MEASUREMENTS SYSTEM CONFIGURATION

5.1. SAR Measurement Set-up

These measurements were performed with the automated near-field scanning system DASY4 from Schmid & Partner Engineering AG (SPEAG). The system is based on a high precision robot (working range greater than 0.9m) which positions the probes with a positional repeatability of better than ± 0.02mm. Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines (length =300mm) to the data acquisition unit.

A cell controller system contains the power supply, robot controller, teaches pendant (Joystick) and remote control, is used to drive the robot motors. The PC consists of the Micron Pentium III 800 MHz computer with Windows 2003 system and SAR Measurement Software DASY4, A/D interface card, monitor, mouse, and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

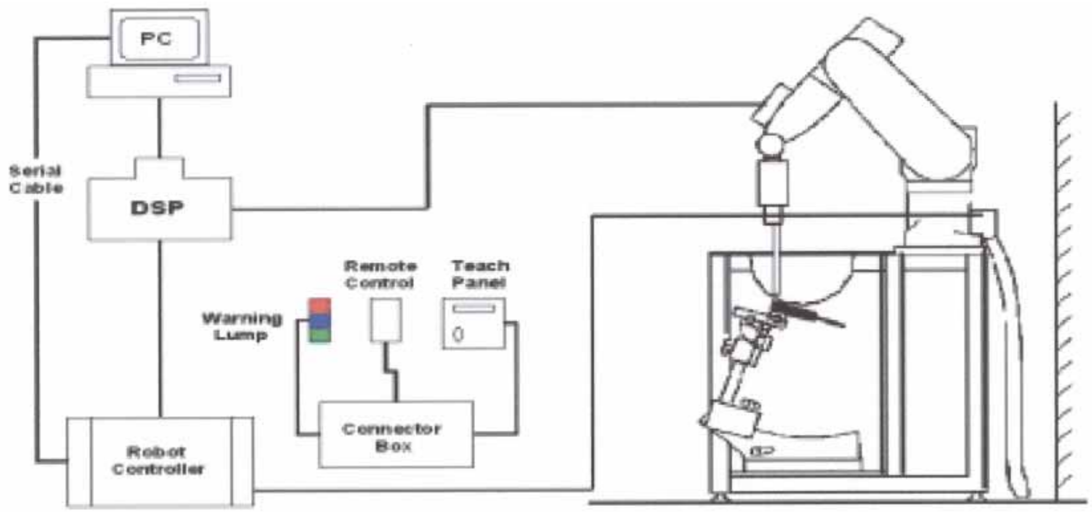


Figure 1 SAR Lab Test Measurement Set-up

The DAE3 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

5.2. Dasy4 E-field Probe System

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

5.2.1. EX3DV4 Probe Specification

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 900 and HSL 1800 Additional CF for other liquids and frequencies upon request
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 2.EX3DV4 E-field Probe

Figure 3. EX3DV4 E-field probe

5.2.2. E-field Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than ± 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.

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

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

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

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

5.3. Other Test Equipment

5.3.1. Device Holder for Transmitters

In combination with the Generic Twin Phantom V3.0, the Mounting Device (POM) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeat ably positioned according to the FCC and CENELEC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Figure 4 Device Holder

5.3.2. Phantom

The Generic Twin Phantom is constructed of a fiberglass shell integrated in a wooden table. 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 5 Generic Twin Phantom

5.4. Scanning procedure

The DASY4 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

- The ”reference“ and ”drift“ measurements are located at the beginning and end of the batch process.

They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5 %.

- The ”surface check“ measurement tests the optical surface detection system of the DASY4 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

- The “area scan“ measures the SAR above the DUT or verification dipole on a parallel plane to the surface. It is used to locate the approximate location of the peak SAR with 2D spline interpolation. The robot performs a stepped movement along one grid axis while the local electrical field strength is measured by the probe. The probe is touching the surface of the SAM during acquisition of measurement values. The standard scan uses large grid spacing for faster measurement. Standard grid spacing for head measurements is 15 mm in x- and y- dimension. If a finer resolution is needed, the grid spacing can be reduced. Grid spacing and orientation have no influence on the SAR result. For special applications where the standard scan method does not find the peak SAR within the grid, e.g. mobile phones with flip cover, the grid can be adapted in orientation.

- A" 7x7x7 zoom scan" measures the field in a volume around the 2D peak SAR value acquired in the previous "coarse" scan. This is a fine 7x7 grid where the robot additionally moves the probe in 7 steps along the z-axis away from the bottom of the Phantom. Grid spacing for the cube measurement is 5mm in x and y-direction and 5 mm in z-direction. DASY4 is also able to perform repeated zoom scans if more than 1 peak is found during area scan.

- 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 2mm steps.

5.5. Data Storage and Evaluation

5.5.1. Data Storage

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

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/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.

5.5.2. Data Evaluation by SEMCAD

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

Probe parameters:	- Sensitivity	Normi, ai_0, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	Dcp_i
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

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

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

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.

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

with SAR = local specific absorption rate in mW/g

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

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

ρ = equivalent tissue density in g/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.

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

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

5.6. System Specifications

5.6.1. Robotic System Specifications

Specifications

Positioner: Stäubli Unimation Corp. Robot Model: RX90L

Repeatability: ±0.02 mm

No. of Axis: 6

Data Acquisition Electronic (DAE) System

Cell Controller

Processor: Pentium III

Clock Speed: 800 MHz

Operating System: Windows 2003

Data Converter

Features: Signal Amplifier, multiplexer, A/D converter, and control logic

Software: DASY4 software

Connecting Lines: Optical downlink for data and status info. Optical uplink for commands and clock.

5.7. System validation

System validation is performed by using a validation dipole which is positioned parallel to the planar part of the SAM phantom at the reference point. The distance of the dipole to the SAM phantom is determined by a plexiglass spacer. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. It is fed with a power of 1000 mW. To adjust this power a power meter is used. The power sensor is connected to the cable before the validation to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the validation to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test.

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

System validation is performed regularly on all frequency bands where tests are performed with the DASY 4 system.

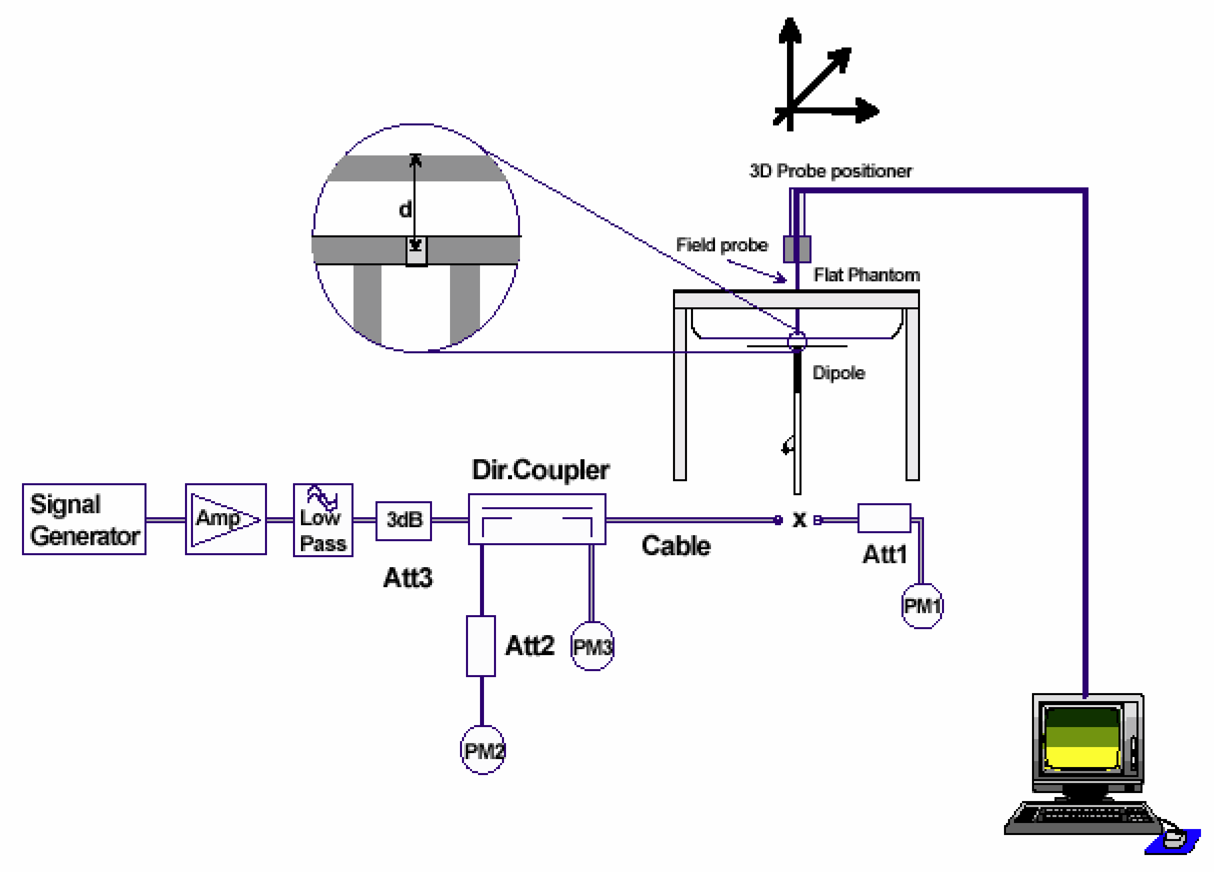


Figure 6 System validation Set-up

5.8. 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 5 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by OET 65.

Table 5: Composition of the Body Tissue Equivalent Matter

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

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

6. LABORATORY ENVIRONMENT

Table 6: The Ambient Conditions during Test

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

7. CHARACTERISTICS OF THE TEST

7.1. Applicable Limit Regulations

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

7.2. Applicable Measurement Standards

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

IEC 62209-2(draft): Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 2: Procedure to determine the Specific Absorption Rate (SAR)in the head and body for 30MHz to 6GHz Handheld and Body-Mounted Devices used in close proximity to the body.

8. CONDUCTED OUTPUT POWER MEASUREMENT

8.1. Summary

During the process of testing, the EUT was controlled via Digital Radio Communication tester to ensure the maximum power transmission and proper modulation. This result contains conducted output power for the EUT. In all cases, the measured peak output power should be greater and within 5% than EMI measurement.

8.2. Power Drift

To control the output power stability during the SAR test, DASY4 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in Table 10 to Table 25 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 0.21dB.

8.3. Conducted Power

8.3.1. Measurement Methods

The EUT was set up for the maximum output power. The channel power was measured .The measurements were done at 3 channels both before and after SAR tests for each test band.

8.3.2. Measurement result

Table 7: Conducted Power Measurement Results

GSM 850+GPRS	**Conducted Power**		
	Channel 128	Channel 190	Channel 251
	(824.2MHz)	(836.6MHz)	(848.8MHz)
Results (dBm)	28.18	28.39	28.51
GSM 1900+GPRS	**Conducted Power**		
	Channel 512	Channel 661	Channel 810
	(1850.2MHz)	(1880MHz)	(1909.8MHz)
Results (dBm)	25.75	25.51	25.44
WCDMA Band II (12.2kbps RMC)	**Conducted Power**		
	Channel 9262	Channel 9400	Channel 9538
	1852.4MHz	1880MHz	1907.6MHz
Results (dBm)	18.17	17.46	17.08
WCDMA Band II (64kbps RMC)	**Conducted Power**		
	Channel 9262	Channel 9400	Channel 9538
	1852.4MHz	1880MHz	1907.6MHz
Results (dBm)	18.07	17.46	17.15
WCDMA Band II (144kbps RMC)	**Conducted Power**		
	Channel 9262	Channel 9400	Channel 9538
	1852.4MHz	1880MHz	1907.6MHz
Results (dBm)	18.09	17.45	17.12
WCDMA Band II (384kbps RMC)	**Conducted Power**		
	Channel 9262	Channel 9400	Channel 9538
	1852.4MHz	1880MHz	1907.6MHz
Results (dBm)	18.13	17.40	17.18
WCDMA Band II+HSDPA (Sub - Test 1)	**Conducted Power**		
	Channel 9262	Channel 9400	Channel 9538
	1852.4MHz	1880MHz	1907.6MHz
Results (dBm)	17.65	17.01	16.72
WCDMA Band II+HSDPA (Sub - Test 2)	**Conducted Power**		
	Channel 9262	Channel 9400	Channel 9538
	1852.4MHz	1880MHz	1907.6MHz
Results (dBm)	16.65	16.16	15.95
WCDMA Band II+HSDPA (Sub - Test 3)	**Conducted Power**		
	Channel 9262	Channel 9400	Channel 9538
	1852.4MHz	1880MHz	1907.6MHz
Results (dBm)	16.54	15.97	15.50
WCDMA Band II+HSDPA	**Conducted Power**		
	Channel 9262	Channel 9400	Channel 9538

(Sub - Test 4)	1852.4MHz	1880MHz	1907.6MHz
Results (dBm)	14.80	14.21	14.02
WCDMA Band V (12.2kbps RMC)	**Conducted Power**		
	Channel 4132	Channel 4182	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
Results (dBm)	17.37	17.76	17.34
WCDMA Band V (64kbps RMC)	**Conducted Power**		
	Channel 4132	Channel 4182	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
Results (dBm)	17.29	17.78	17.32
WCDMA Band V (144kbps RMC)	**Conducted Power**		
	Channel 4132	Channel 4182	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
Results (dBm)	17.31	17.79	17.35
WCDMA Band V (384kbps RMC)	**Conducted Power**		
	Channel 4132	Channel 4182	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
Results (dBm)	17.34	17.80	17.35
WCDMA Band V +HSDPA (Sub - Test 1)	**Conducted Power**		
	Channel 4132	Channel 4182	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
Results (dBm)	16.64	17.08	16.71
WCDMA Band V+HSDPA (Sub - Test 2)	**Conducted Power**		
	Channel 4132	Channel 4182	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
Results (dBm)	15.21	15.69	15.32
WCDMA Band V+HSDPA (Sub - Test 3)	**Conducted Power**		
	Channel 4132	Channel 4182	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
Results (dBm)	15.21	15.62	15.23
WCDMA Band V+HSDPA (Sub - Test 4)	**Conducted Power**		
	Channel 4132	Channel 4182	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
Results (dBm)	14.18	14.62	14.23

9. TEST RESULTS

9.1. Dielectric Performance

Table 8: Dielectric Performance of Body Tissue Simulating Liquid

Measurement is made at temperature 22.5 °C and relative humidity 51%.					
Frequency		**Target value**	**Measurement**	**Difference**	
835 (Body)	Permittivity ε_r	55.20	54.71	-0.89	%
	Conductivity σ	0.97	0.985	1.55	%
1900 (Body)	Permittivity ε_r	53.30	53.73	0.81	%
	Conductivity σ	1.52	1.55	1.97	%

9.2. System Validation

Table 9: System Validation

Measurement is made at temperature 23.2 °C, relative humidity 50%, and input power 250 mW. Liquid temperature during the test: 22.3°C							
Liquid parameters	**Frequency**	**Permittivity ε**			**Conductivity σ (S/m)**		
	835MHz	41.75			0.92		
	1900MHz	39.70			1.41		
Verification results	**Frequency**	**Target value (W/kg)**		**Measurement value (W/kg)**		**Difference percentage**	
		10 g Average	**1 g Average**	**10 g Average**	**1 g Average**	**10 g Average**	**1g Average**
	835MHz	1.52	2.30	1.50	2.30	-1.32%	0.00%
	1900MHz	5.06	9.84	5.09	9.74	0.59%	-1.02%

Note：

a. Target Values used derive from the SPEAG calibration certificate and 250 mW is used as feeding power to the validation dipole (SPEAG using).

b. The graph results see ANNEX D.

9.3. Summary of Measurement Results

9.3.1. GSM850 (GPRS/EGPRS)

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

Liquid Temperature: 22.4°C,relative humidity 50%						
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**		
BenQ Joy book S72						
Test Position 1	4 timeslots	Middle	0.205	0.321	-0.061	Figure 8
	3 timeslots	Middle	0.255	0.403	0.031	Figure 10
	2 timeslots	Middle	**0.304**	**0.479**	0.090	Figure 12
	1 timeslot	Middle	0.283	0.446	0.184	Figure 14
Test Position 2	2 timeslots	Middle	0.020	0.044	0.002	Figure 16
BenQ Joy book R55V						
Test Position 3	2 timeslots	Middle	0.220	0.325	0.119	Figure 18
IBM T61						
Test Position 4	2 timeslots	Middle	0.244	0.380	0.029	Figure 20
Test Position 5	2 timeslots	Middle	0.196	0.302	0.012	Figure 22
BenQ Joy book S72,Worst case position of Test Position with EGPRS						
Test Position 1	2 timeslots	Middle	0.122	0.192	0.091	Figure 24

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 lower than the SAR limit, testing at the high and low channels is optional.

Table 11: SAR Values (GSM850, BenQ Joy book S72, 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	0.521	0.261	0.651
	5mm	Middle	0.442		
	10mm	Middle	0.266		
	15mm	Middle	0.169		

Table 12: SAR Values (GSM850, BenQ Joy book R55V, 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 3	initial position	Middle	0.346	0.173	0.433
	5mm	Middle	0.299		
	10mm	Middle	0.183		
	15mm	Middle	0.120		

Table 13: SAR Values (GSM850, IBMT61, 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 4	initial position	Middle	0.413	0.207	0.516
	5mm	Middle	0.328		
	10mm	Middle	0.194		

Note: 1. 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.

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

9.3.2. GSM1900 (GPRS/EGPRS)

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

Liquid Temperature: 22.4°C,relative humidity 50%						
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**		
BenQ Joy book S72						
Test Position 1	4 timeslots	Middle	0.228	0.416	-0.091	Figure 26
	3 timeslots	Middle	0.240	0.445	0.048	Figure 28
	2 timeslots	Middle	**0.258**	**0.482**	0.043	Figure 30
	1 timeslot	Middle	0.209	0.388	0.073	Figure 32
Test Position 2	2 timeslots	Middle	0.088	0.181	-0.199	Figure 34
BenQ Joy book R55V						
Test Position 3	2 timeslots	Middle	0.358	0.697	-0.012	Figure 36
IBM T61						
Test Position 4	2 timeslots	Middle	0.211	0.418	-0.004	Figure 38
Test Position 5	2 timeslots	Middle	0.177	0.322	-0.107	Figure 40
BenQ Joy book R55V,Worst case position of Test Position with EGPRS						
Test Position 3	2 timeslots	Middle	0.193	0.373	-0.015	Figure 42

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 lower than the SAR limit, testing at the high and low channels is optional.

Table 15: SAR Values (GSM 1900, BenQ Joy book S72, enhanced energy coupling at increased separation distances)

<table>
<tr><th>Different Test Position</th><th>Distance of EUT to Phantom</th><th>Channel</th><th>Measurement Result (W/kg)</th><th>50% of initial position SAR (W/kg)</th><th>125% of initial position SAR (W/kg)</th></tr>
<tr><td rowspan="3">Test Position 1</td><td>initial position</td><td>Middle</td><td>0.531</td><td rowspan="3">0.266</td><td rowspan="3">0.664</td></tr>
<tr><td>5mm</td><td>Middle</td><td>0.423</td></tr>
<tr><td>10mm</td><td>Middle</td><td>0.210</td></tr>
</table>

Table 16: SAR Values (GSM1900, BenQ Joy book R55V, enhanced energy coupling at increased separation distances)

<table>
<tr><th>Different Test Position</th><th>Distance of EUT to Phantom</th><th>Channel</th><th>Measurement Result (W/kg)</th><th>50% of initial position SAR (W/kg)</th><th>125% of initial position SAR (W/kg)</th></tr>
<tr><td rowspan="3">Test Position 3</td><td>initial position</td><td>Middle</td><td>0.786</td><td rowspan="3">0.393</td><td rowspan="3">0.983</td></tr>
<tr><td>5mm</td><td>Middle</td><td>0.610</td></tr>
<tr><td>10mm</td><td>Middle</td><td>0.292</td></tr>
</table>

Table 17: SAR Values (GSM1900, IBMT61, enhanced energy coupling at increased separation distances)

<table>
<tr><th>Different Test Position</th><th>Distance of EUT to Phantom</th><th>Channel</th><th>Measurement Result (W/kg)</th><th>50% of initial position SAR (W/kg)</th><th>125% of initial position SAR (W/kg)</th></tr>
<tr><td rowspan="3">Test Position 4</td><td>initial position</td><td>Middle</td><td>0.470</td><td rowspan="3">0.235</td><td rowspan="3">0.588</td></tr>
<tr><td>5mm</td><td>Middle</td><td>0.361</td></tr>
<tr><td>10mm</td><td>Middle</td><td>0.154</td></tr>
</table>

Note: 1. 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.

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

9.3.3. WCDMA Band II (HSDPA)

Table 18: SAR Values [WCDMA Band II (HSDPA)]

Liquid Temperature: 22.4°C,relative humidity 50%					
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**		
BenQ Joy book S72					
Test Position 1	Middle	**0.406**	**0.745**	0.027	Figure 44
Test Position 2	Middle	0.134	0.285	-0.088	Figure 46
BenQ Joy book R55V					
Test Position 3	Middle	0.349	0.666	-0.035	Figure 48
IBM T61					
Test Position 4	Middle	0.256	0.502	-0.039	Figure 50
Test Position 5	Middle	0.211	0.386	0.032	Figure 52
BenQ Joy book S72,Worst case position of Test Position with HSDPA					
Test Position 1	Middle	0.346	0.649	-0.154	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 lower than the SAR limit, testing at the high and low channels is optional.

Table 19: SAR Values (WCDMA Band II, BenQ Joy book S72, 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	0.825	0.413	1.031
	5mm	Middle	0.285		

Table 20: SAR Values (WCDMA Band II, BenQ Joy book R55V, 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 3	initial position	Middle	0.743	0.372	0.929
	5mm	Middle	0.581		
	10mm	Middle	0.346		

Table 21: SAR Values (WCDMA Band II, IBMT61, 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 4	initial position	Middle	0.566	0.283	0.708
	5mm	Middle	0.388		
	10mm	Middle	0.107		

Note: 1. 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.

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

9.3.4. WCDMA Band V (HSDPA)

Table 22: SAR Values [WCDMA Band V (HSDPA)]

Liquid Temperature: 22.4°C,relative humidity 50%					
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**		
BenQ Joy book S72					
Test Position 1	Middle	**0.106**	**0.166**	-0.168	Figure 56
Test Position 2	Middle	0.007	0.017	0.193	Figure 58
BenQ Joy book R55V					
Test Position 3	Middle	0.080	0.120	0.103	Figure 60
IBM T61					
Test Position 4	Middle	0.094	0.146	-0.159	Figure 62
Test Position 5	Middle	0.085	0.132	-0.119	Figure 64
BenQ Joy book S72,Worst case position of Test Position with HSDPA					
Test Position 1	Middle	0.097	0.152	-0.018	Figure 66

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 lower than the SAR limit, testing at the high and low channels is optional.

Table 23: SAR Values (WCDMA Band V, BenQ Joy book S72, 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	0.180	0.090	0.225
	5mm	Middle	0.157		
	10mm	Middle	0.083		

Table 24: SAR Values (WCDMA Band V, BenQ Joy book R55V, 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 3	initial position	Middle	0.128	0.064	0.160
	5mm	Middle	0.105		
	10mm	Middle	0.060		

Table 25: SAR Values (WCDMA Band V, IBMT61, 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 4	initial position	Middle	0.158	0.079	0.198
	5mm	Middle	0.133		
	10mm	Middle	0.083		
	15mm	Middle	0.057		

Note: 1. 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.

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

9.4. Conclusion

Localized Specific Absorption Rate (SAR) of this portable wireless device has been measured in all cases requested by the relevant standards cited in Clause 7.2 of this report. Maximum localized SAR is 0.745w/kg that is below exposure limits specified in the relevant standards cited in Clause 7.1 of this test report. And minimum localized SAR is 0.017w/kg

10. MEASUREMENT UNCERTAINTY

No.	a	Type	c	d	e=f(d、k)	f	h=c×f／e	k
	Uncertainty Component		Tol. (±%)	Prob. Dist	Div.	c_1(1g)	1g u (± %)	v_1
1	System repetivity	A	0.5	N	1	1	0.5	9
	Measurement system							
2	Probe Calibration	B	5	N	2	1	2.5	∞
3	Axial isotropy	B	4.7	R	$\sqrt{3}$	$(1-cp)^{1/2}$	4.3	∞
4	Hemisphere Isotropy	B	9.4	R	$\sqrt{3}$	$\sqrt{C_P}$		∞
5	Boundary Effect	B	0.4	R	$\sqrt{3}$	1	0.23	∞
6	Linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
7	System Detection Limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
8	Readout Electronics	B	1.0	N	1	1	1.0	∞
9	RF Ambient Conditions	B	3.0	R	$\sqrt{3}$	1	1.73	∞
10	Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
11	Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
12	Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
	Test Sample Related							
13	Test Sample Positioning	A	4.9	N	1	1	4.9	N-1
14	Device Holder Uncertainty	A	6.1	N	1	1	6.1	N-1
15	Output Power Variation-SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.9	∞
	Phantom and Tissue Parameters							
16	Phantom Uncertainty(shape and thickness tolerances)	B	1.0	R	$\sqrt{3}$	1	0.6	∞
17	Liquid Conductivity-deviation from target values	B	5.0	R	$\sqrt{3}$	0.64	1.7	∞
18	Liquid Conductivity-measurement uncertainty	B	5.0	N	1	0.64	1.7	M
19	Liquid Permittivity-deviation from target values	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
20	Liquid Permittivity- measurement uncertainty	B	5.0	N	1	0.6	1.7	M
Combined Standard Uncertainty				RSS			11.25	
Expanded Uncertainty (95 % CONFIDENCE INTERVAL)				K=2			22.5	

11. MAIN TEST INSTRUMENTS

Table 26: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 14, 2008	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 14, 2008	One year
04	Power sensor	Agilent 8481H	MY41091316	March 14, 2008	One year
05	Signal Generator	HP 8341B	2730A00804	September 14, 2008	One year
06	Amplifier	IXA-020	0401	No Calibration Requested	
07	Validation Kit 835MHz	D835V2	4d020	July 21, 2008	One year
08	Validation Kit 1900MHz	D1900V2	5d060	July 22, 2008	One year
09	BTS	E5515C	GB46490218	September 14, 2008	One year
10	E-field Probe	EX3DV4	3660	September 3, 2008	One year
11	DAE	DAE3	536	August 28, 2008	One year

12. TEST PERIOD

The test is performed in October 23rd, 2008 to October 28th, 2008

13. TEST LOCATION

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

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

ANNEX A： MEASUREMENT PROCESS

The evaluation was performed with the following procedure:

Step 1: Measurement of the SAR value at a fixed location above the ear point was measured and was used as a reference value for assessing the power drop.

Step 2: The area covered the entire dimension of the head and the horizontal grid spacing was 15 mm x 15 mm. Based on this data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Around this point, a volume of 32 mm x 32 mm x 34 mm was assessed by measuring 7 x 7x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

a. The data at the surface were extrapolated, The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

b. The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot"-condition (in x ~ y and z-directions). The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.

c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Re-measurement the SAR value at the same location as in Step 1. If the value changed by more than 5%, the evaluation is repeated.

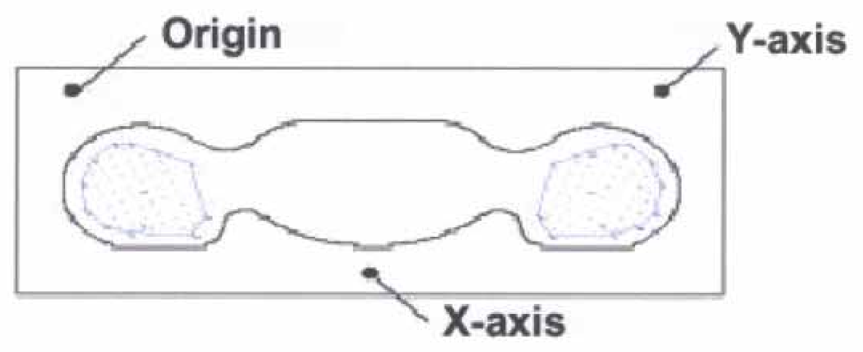
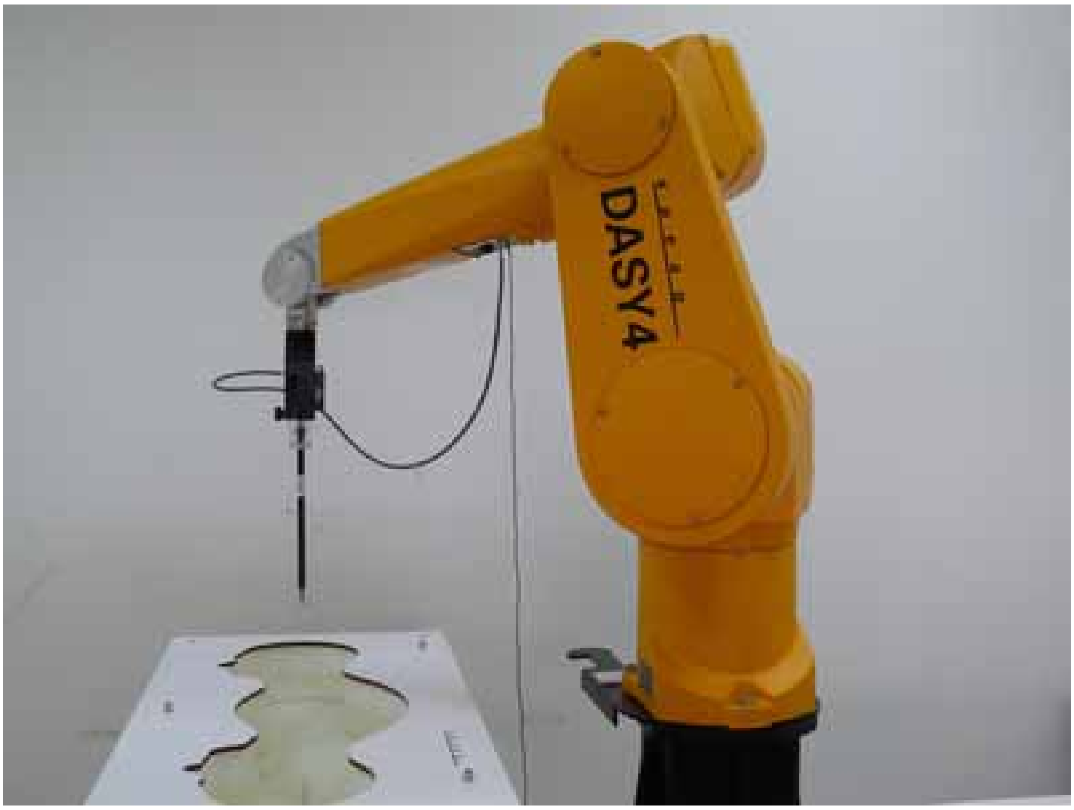


Figure 7 SAR Measurement Points in Area Scan

ANNEX B： TEST LAYOUT



Picture 2 Specific Absorption Rate Test Layout

Picture 3 Liquid depth in the Flat Phantom (835 MHz)

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

ANNEX C： GRAPH RESULTS

GSM 850 GPRS (4 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Middle Frequency

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

Medium parameters used: f = 837 MHz; σ = 0.986 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);

Electronics: DAE3 Sn536;

Test Position 1 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.357 mW/g

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

Reference Value = 15.5 V/m; Power Drift = -0.061 dB

Peak SAR (extrapolated) = 0.491 W/kg

SAR(1 g) = 0.321 mW/g; SAR(10 g) = 0.205 mW/g

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

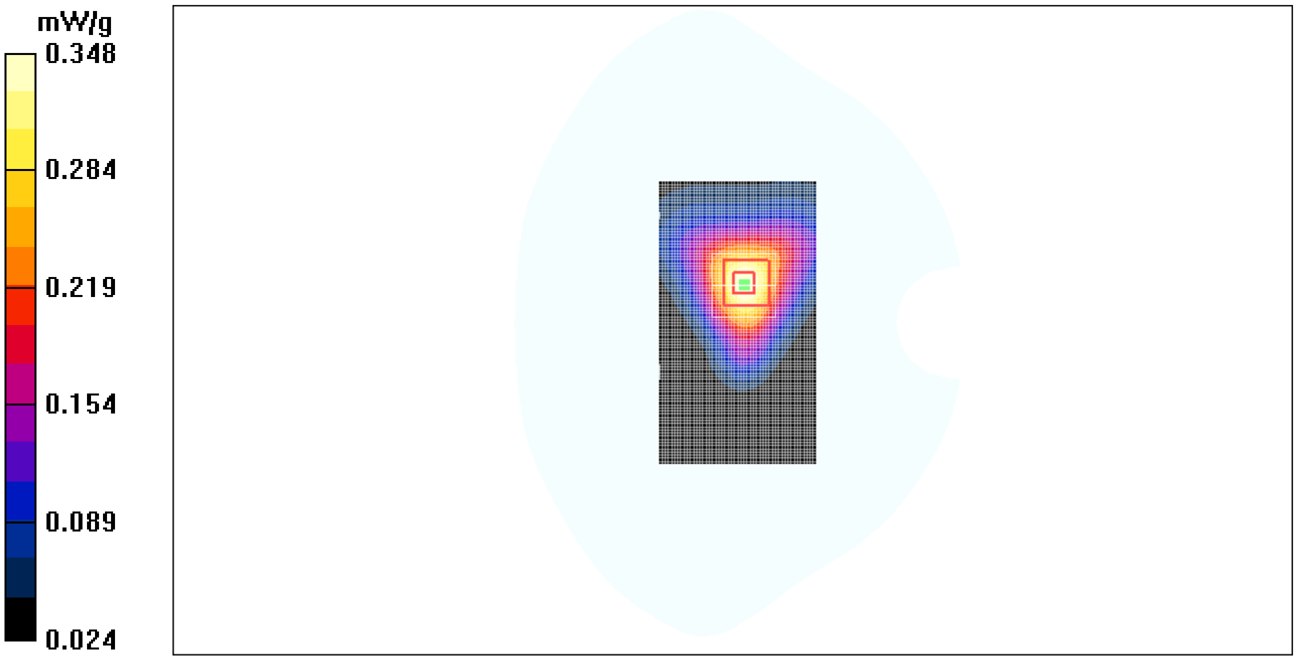


Figure 8 GSM 850 GPRS (4 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 190

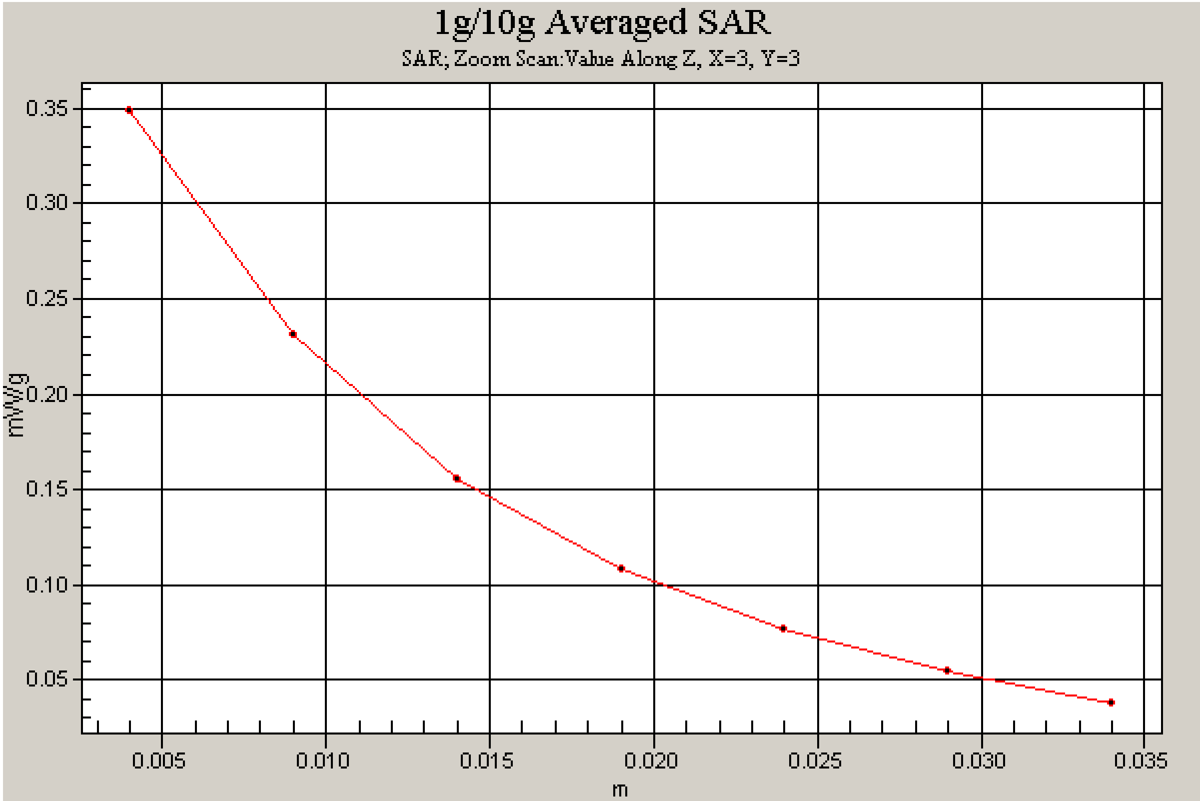


Figure 9 Z-Scan at power reference point [GSM 850 GPRS (4 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 190]

GSM 850 GPRS (3 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Middle Frequency

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

Medium parameters used: f = 837 MHz; σ = 0.986 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);

Electronics: DAE3 Sn536;

Test Position 1 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 16.7 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 0.621 W/kg

SAR(1 g) = 0.403 mW/g; SAR(10 g) = 0.255 mW/g

Maximum value of SAR (measured) = 0.438 mW/g

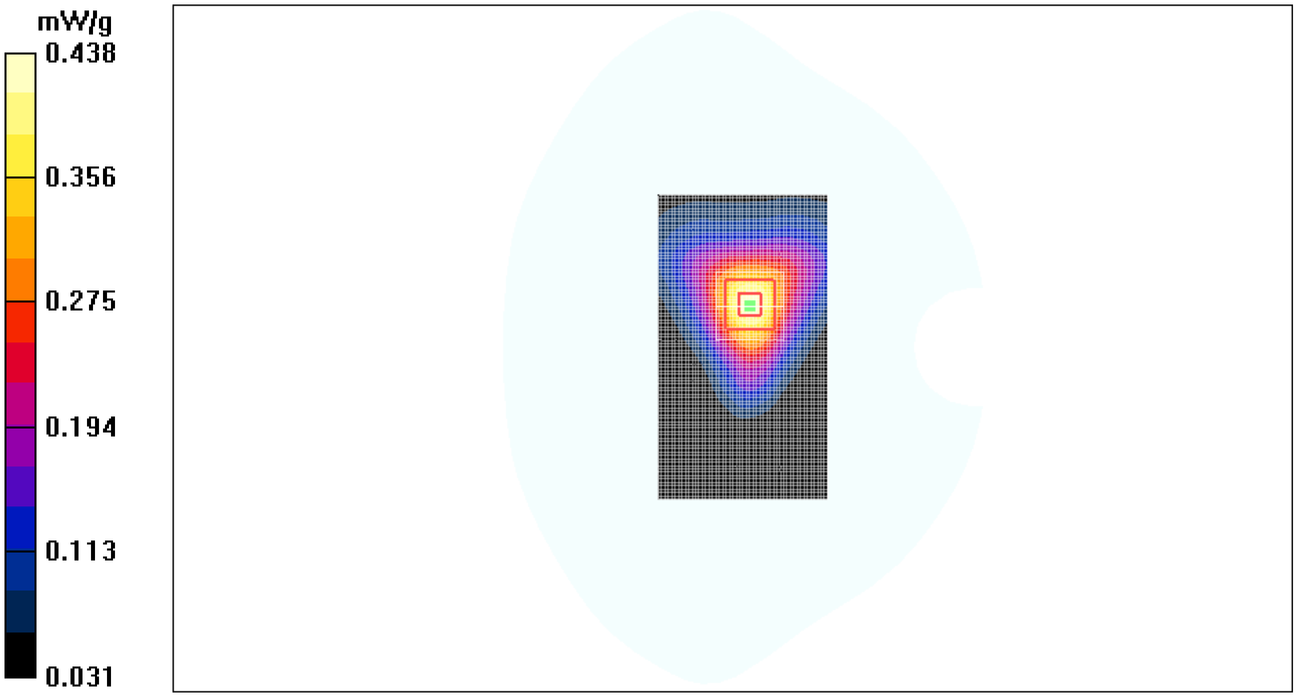


Figure 10 GSM 850 GPRS (3 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 190

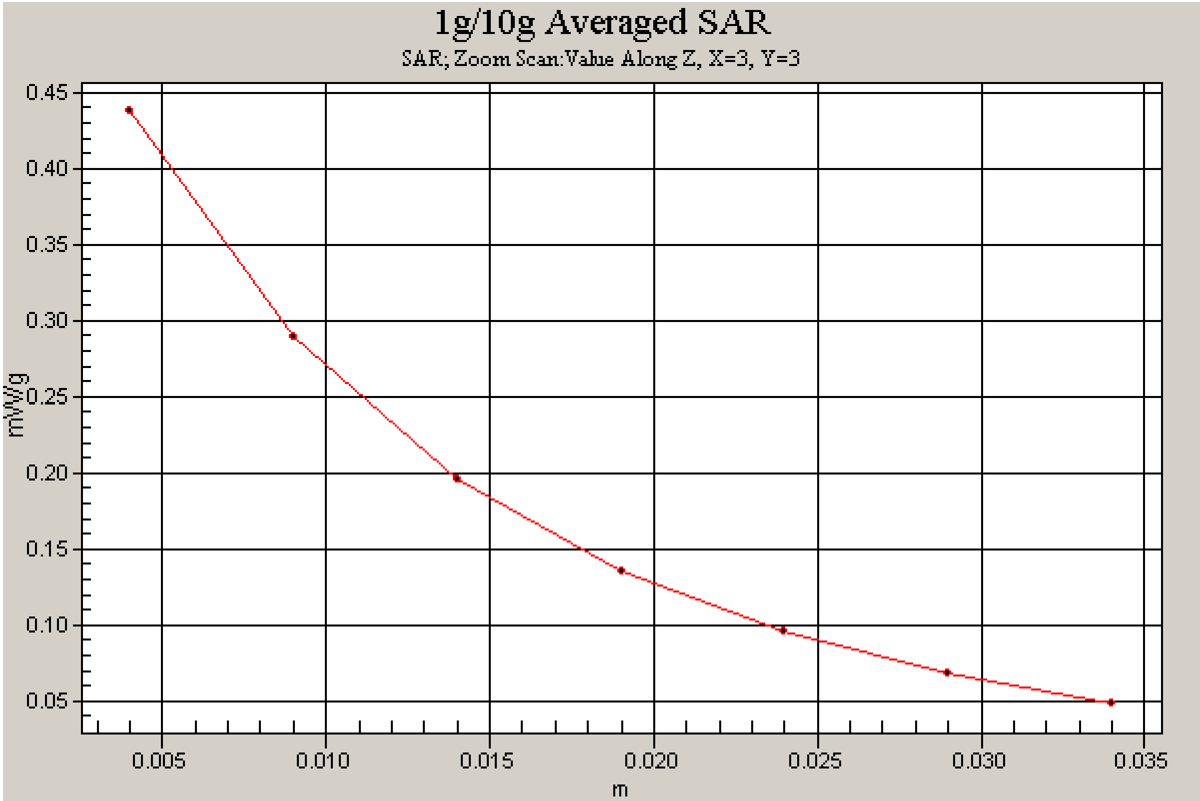


Figure 11 Z-Scan at power reference point [GSM 850 GPRS (3 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 190]

GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Middle Frequency

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

Medium parameters used: f = 837 MHz; σ = 0.986 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);

Electronics: DAE3 Sn536;

Test Position 1 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.508 mW/g

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

Reference Value = 18.1 V/m; Power Drift = 0.090 dB

Peak SAR (extrapolated) = 0.740 W/kg

SAR(1 g) = 0.479 mW/g; SAR(10 g) = 0.304 mW/g

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

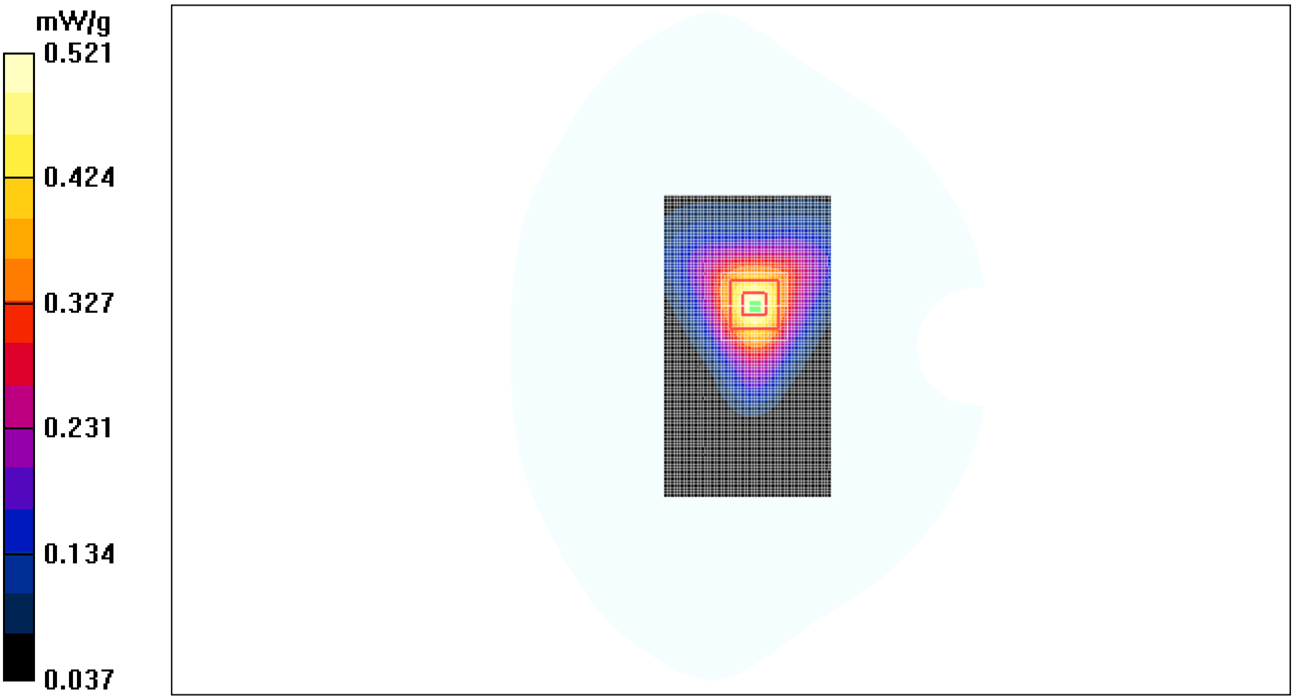


Figure 12 GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 190

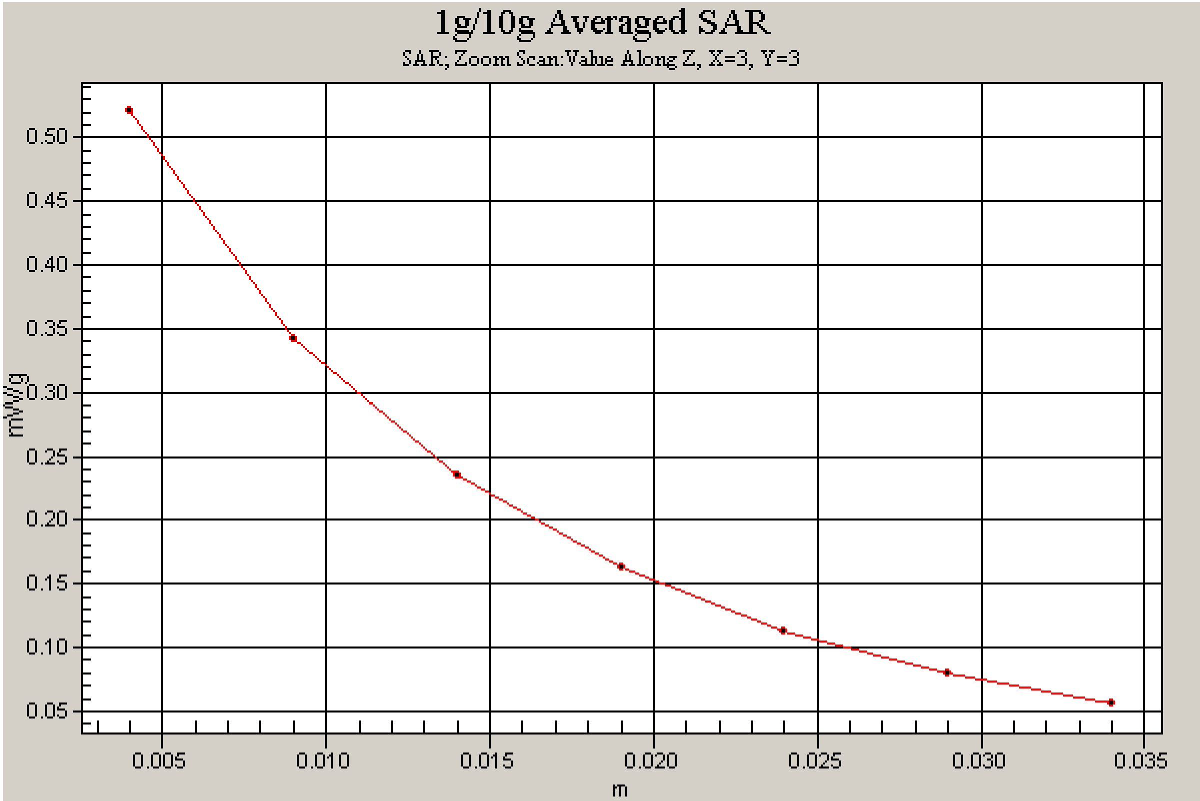


Figure 13 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 190]

GSM 850 GPRS (1 timeslot in uplink) with BenQ Joybook S72 Test Position 1 Middle Frequency

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

Medium parameters used: f = 837 MHz; σ = 0.986 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);

Electronics: DAE3 Sn536;

Test Position 1 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.467 mW/g

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

Reference Value = 16.9 V/m; Power Drift = 0.184 dB

Peak SAR (extrapolated) = 0.687 W/kg

SAR(1 g) = 0.446 mW/g; SAR(10 g) = 0.283 mW/g

Maximum value of SAR (measured) = 0.486 mW/g

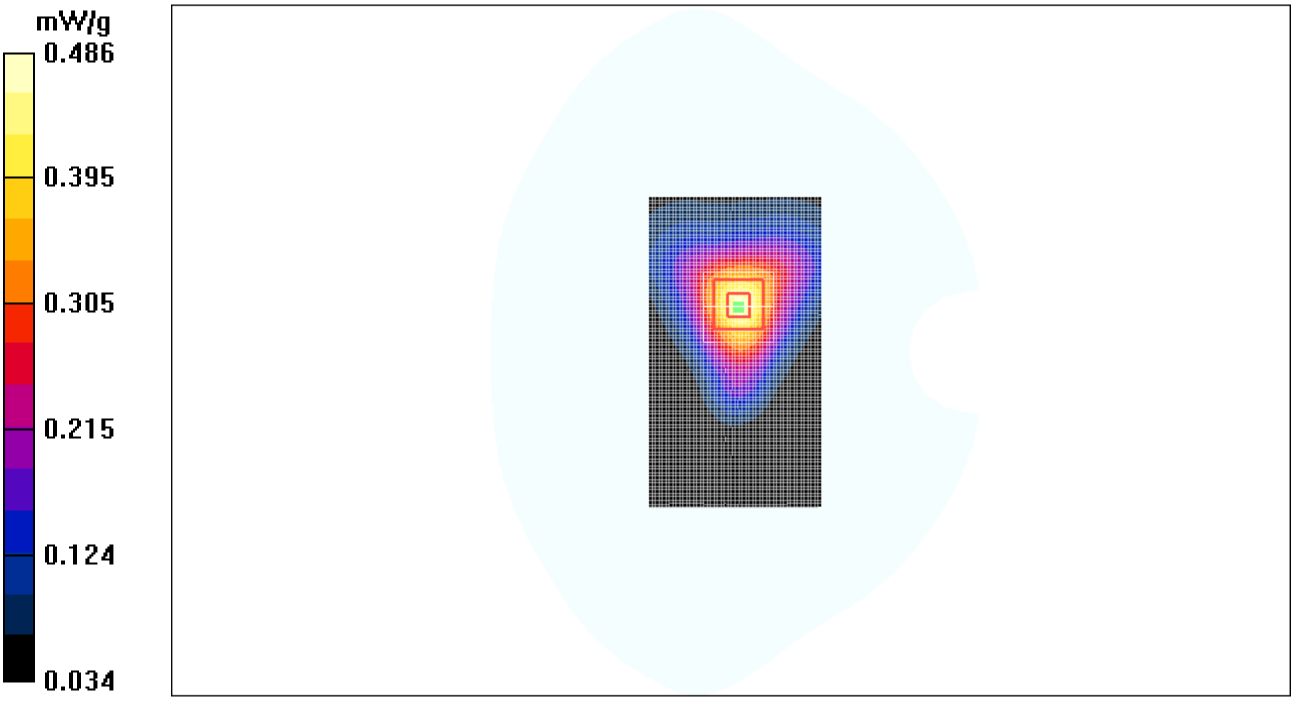


Figure 14 GSM 850 GPRS (1 timeslot in uplink) with BenQ Joybook S72 Test Position 1Channel 190

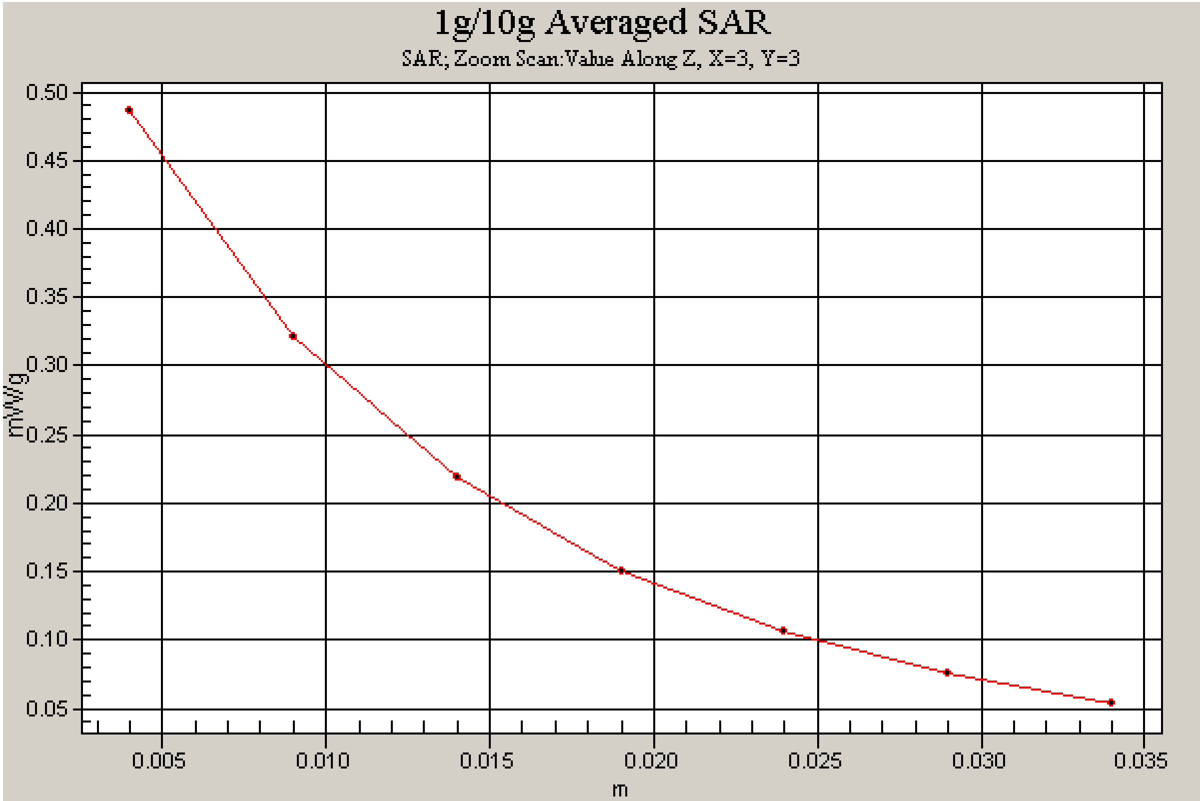


Figure 15 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with BenQ Joybook S72 Test Position 1Channel 190]

GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 2 Middle Frequency

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

Medium parameters used: f = 837 MHz; σ = 0.986 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);

Electronics: DAE3 Sn536;

Test Position 2 Middle/Area Scan (51x51x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.044 mW/g

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

Reference Value = 6.99 V/m; Power Drift = 0.002 dB

Peak SAR (extrapolated) = 0.134 W/kg

SAR(1 g) = 0.044 mW/g; SAR(10 g) = 0.020 mW/g

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

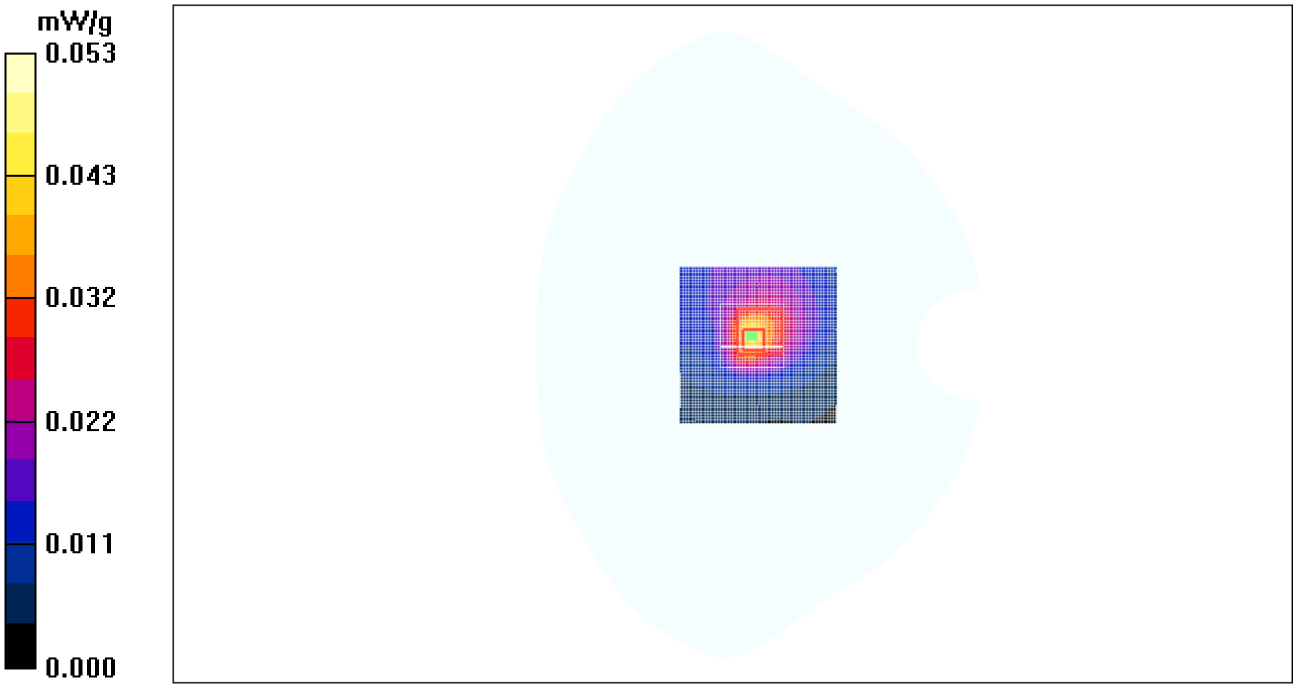


Figure 16 GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 2 Channel 190

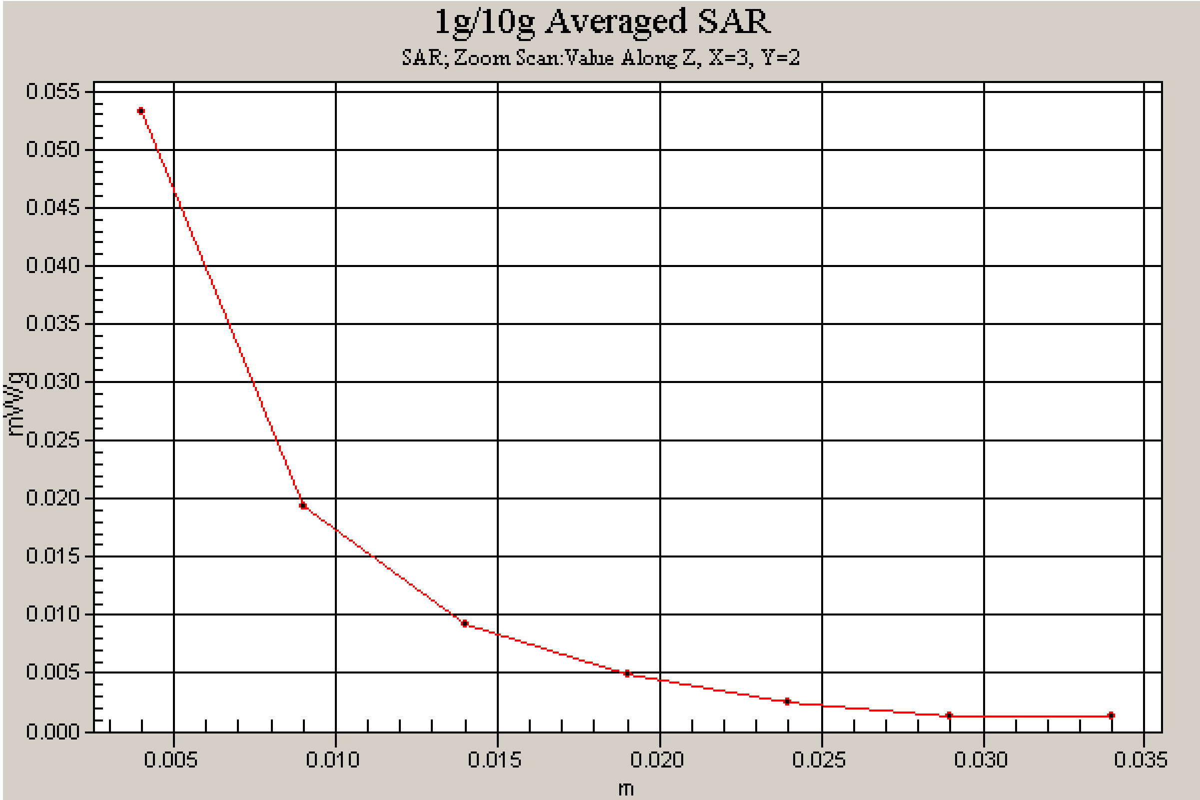


Figure 17 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 2 Channel 190]

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

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

Medium parameters used: f = 837 MHz; σ = 0.986 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);

Electronics: DAE3 Sn536;

Test Position 3 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.352 mW/g

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

Reference Value = 15.3 V/m; Power Drift = 0.119 dB

Peak SAR (extrapolated) = 0.479 W/kg

SAR(1 g) = 0.325 mW/g; SAR(10 g) = 0.220 mW/g

Maximum value of SAR (measured) = 0.346 mW/g

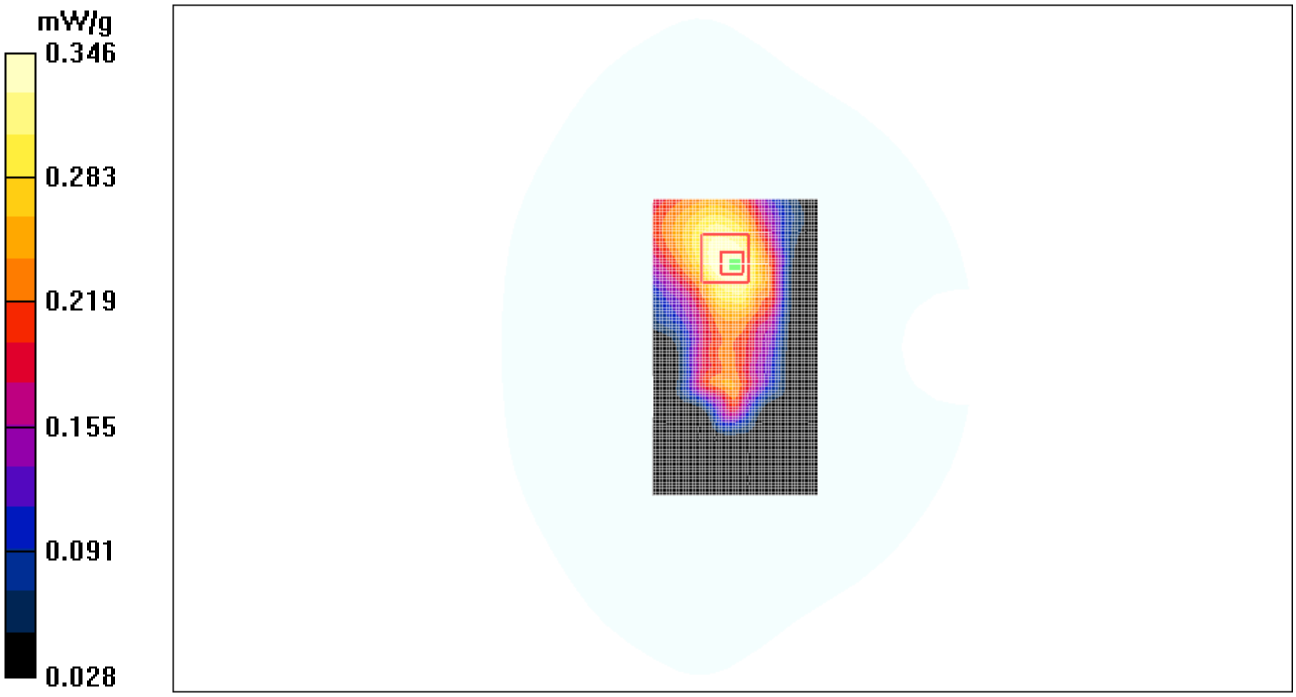


Figure 18 GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 190

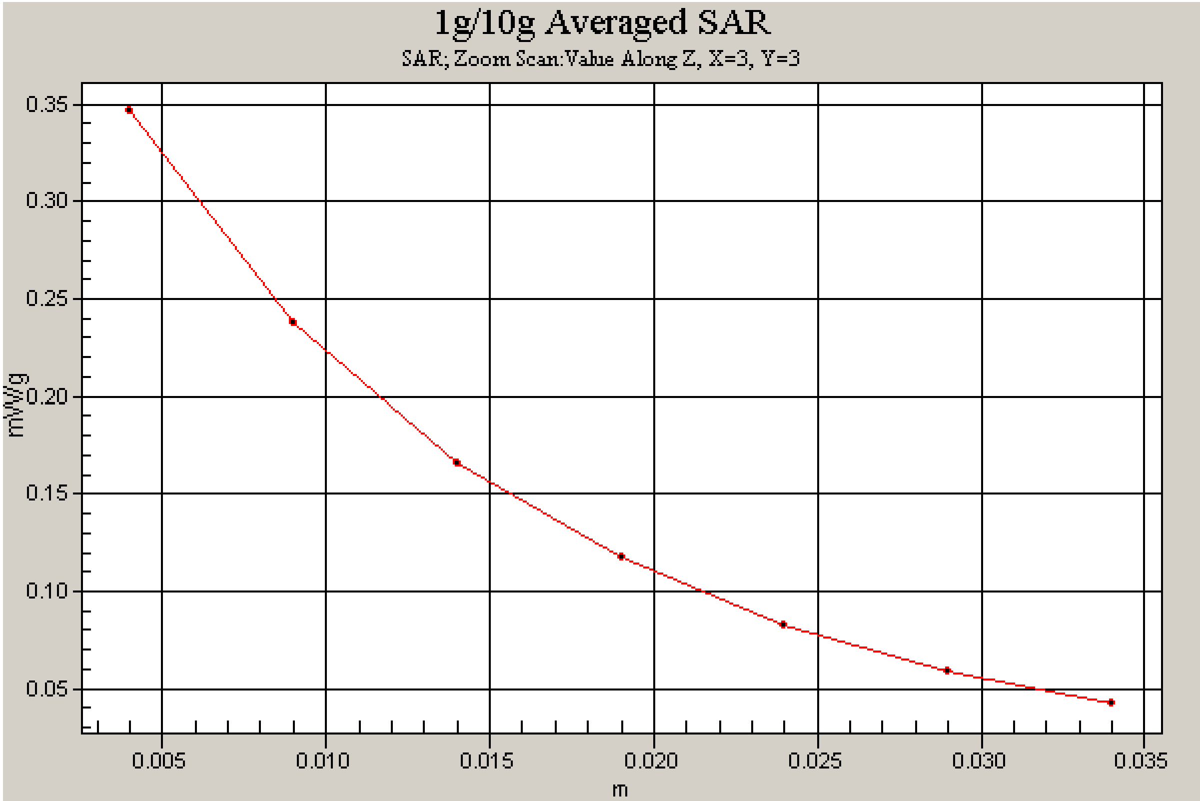


Figure 19 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 190]

GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 4 Middle Frequency

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

Medium parameters used: f = 837 MHz; σ = 0.986 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);

Electronics: DAE3 Sn536;

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

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

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

Reference Value = 19.9 V/m; Power Drift = 0.029 dB

Peak SAR (extrapolated) = 0.586 W/kg

SAR(1 g) = 0.380 mW/g; SAR(10 g) = 0.244 mW/g

Maximum value of SAR (measured) = 0.413 mW/g

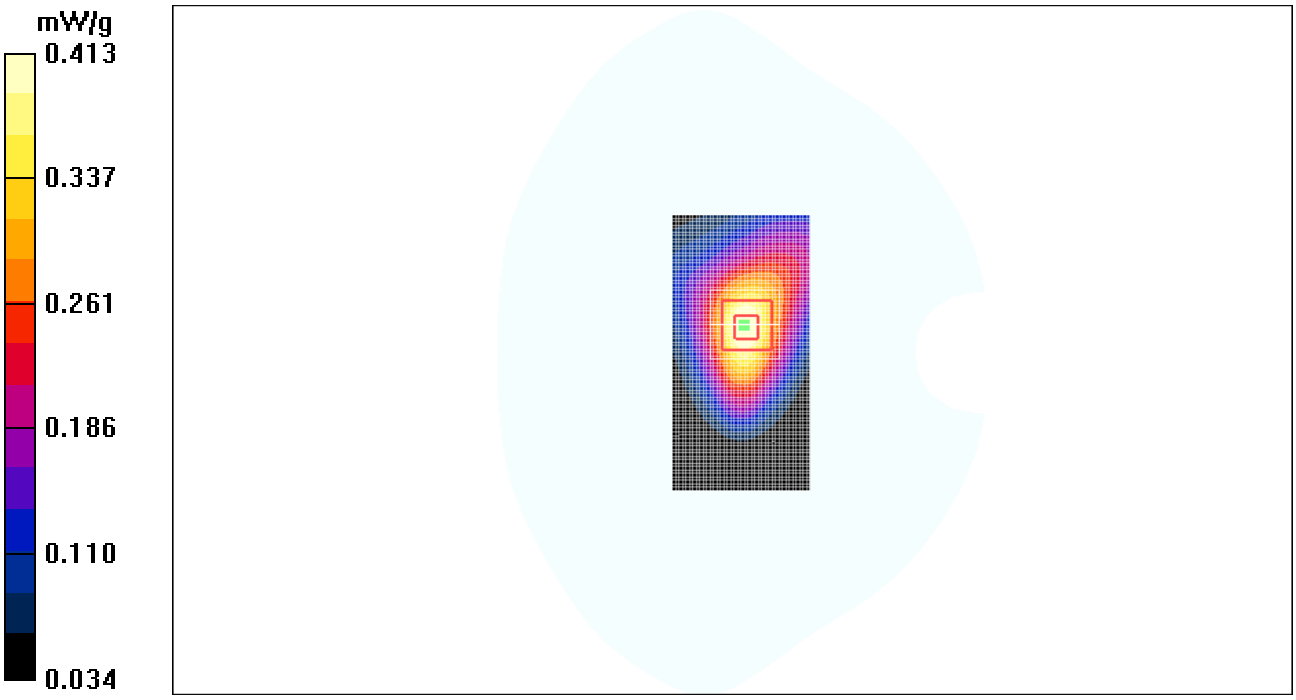


Figure 20 GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 4 Channel 190

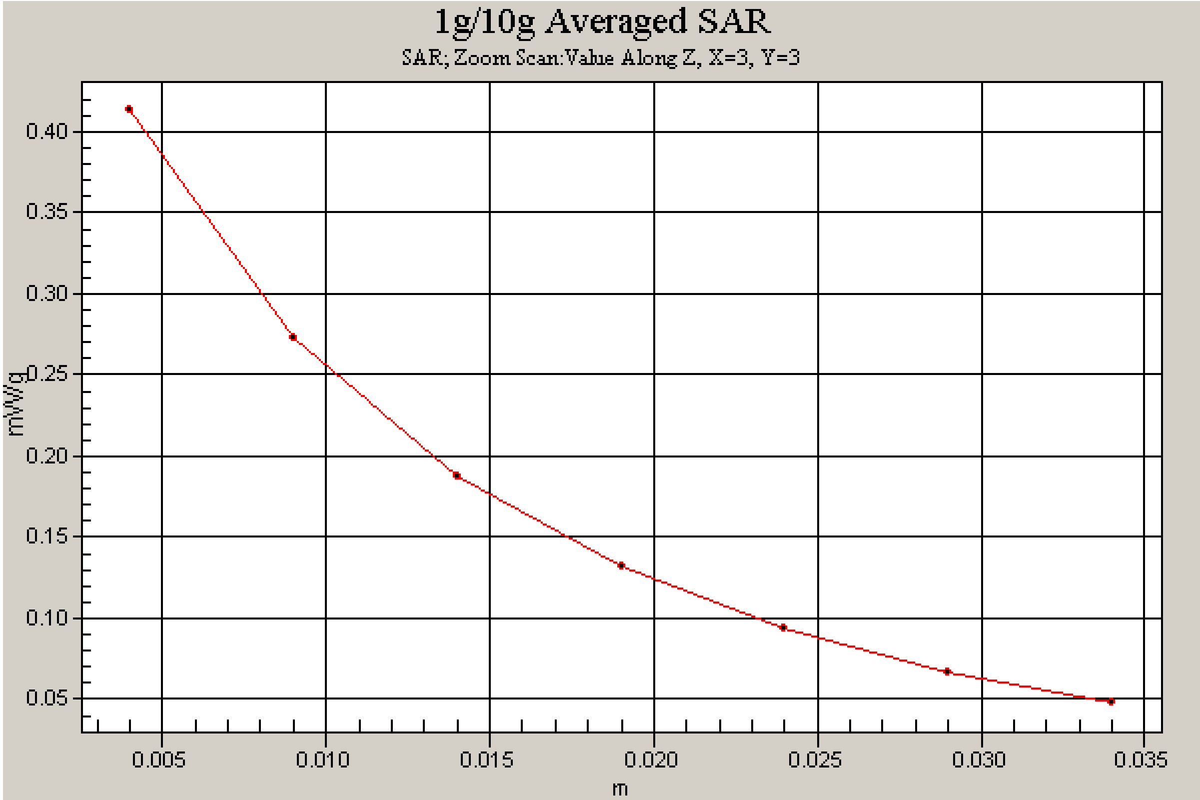


Figure 21 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 4 Channel 190]

GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 5 Middle Frequency

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

Medium parameters used: f = 837 MHz; σ = 0.986 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);

Electronics: DAE3 Sn536;

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

Maximum value of SAR (interpolated) = 0.331 mW/g

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

Reference Value = 17.5 V/m; Power Drift = 0.012 dB

Peak SAR (extrapolated) = 0.459 W/kg

SAR(1 g) = 0.302 mW/g; SAR(10 g) = 0.196 mW/g

Maximum value of SAR (measured) = 0.327 mW/g

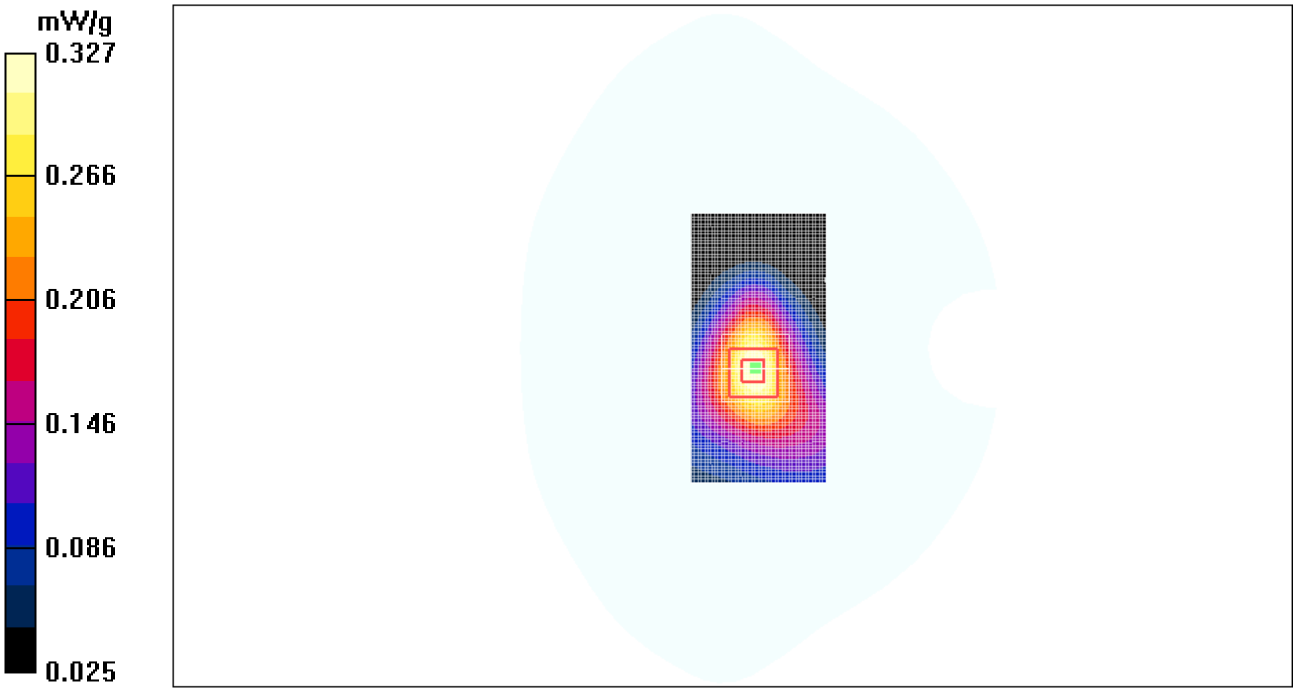


Figure 22 GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 5 Channel 190

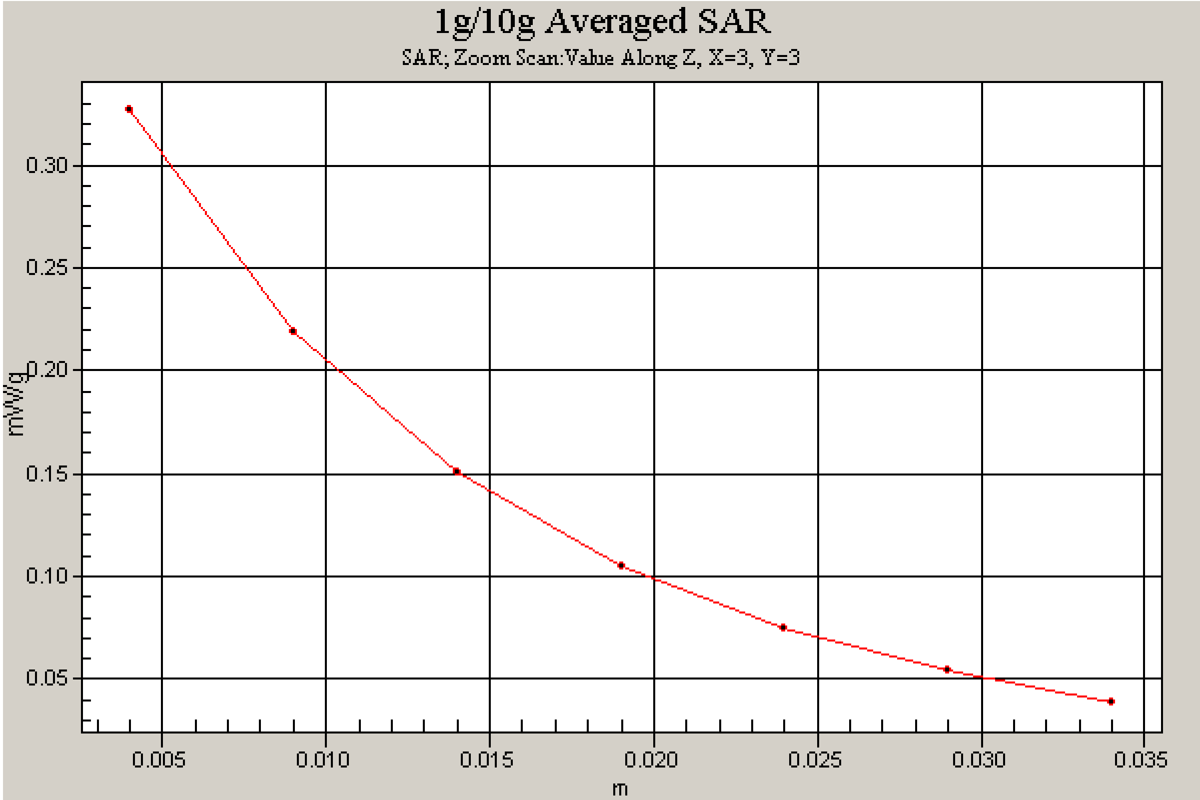


Figure 23 Z-Scan at power reference point (GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 5 Channel 190

GSM 850 EGPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Middle Frequency

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

Medium parameters used: f = 837 MHz; σ = 0.986 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);

Electronics: DAE3 Sn536;

Test Position 1 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.213 mW/g

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

Reference Value = 13.0 V/m; Power Drift = 0.091 dB

Peak SAR (extrapolated) = 0.297 W/kg

SAR(1 g) = 0.192 mW/g; SAR(10 g) = 0.122 mW/g

Maximum value of SAR (measured) = 0.209 mW/g

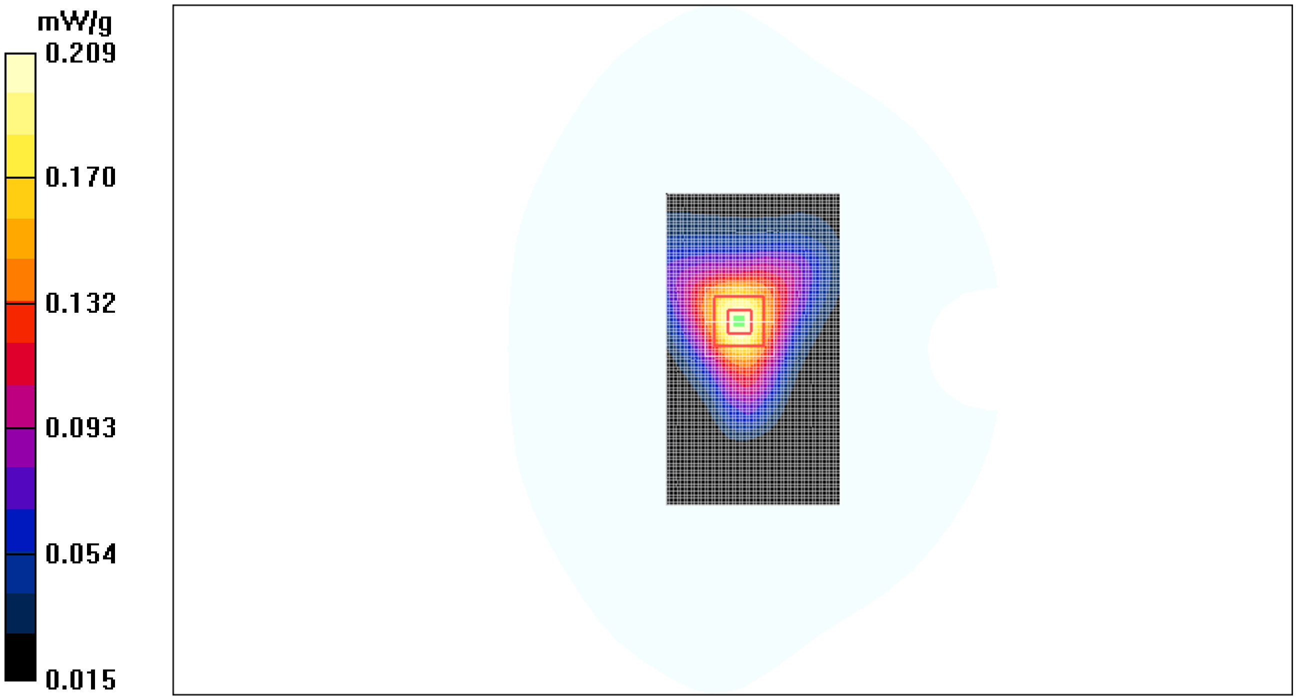


Figure 24 GSM 850 EGPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Channel 190

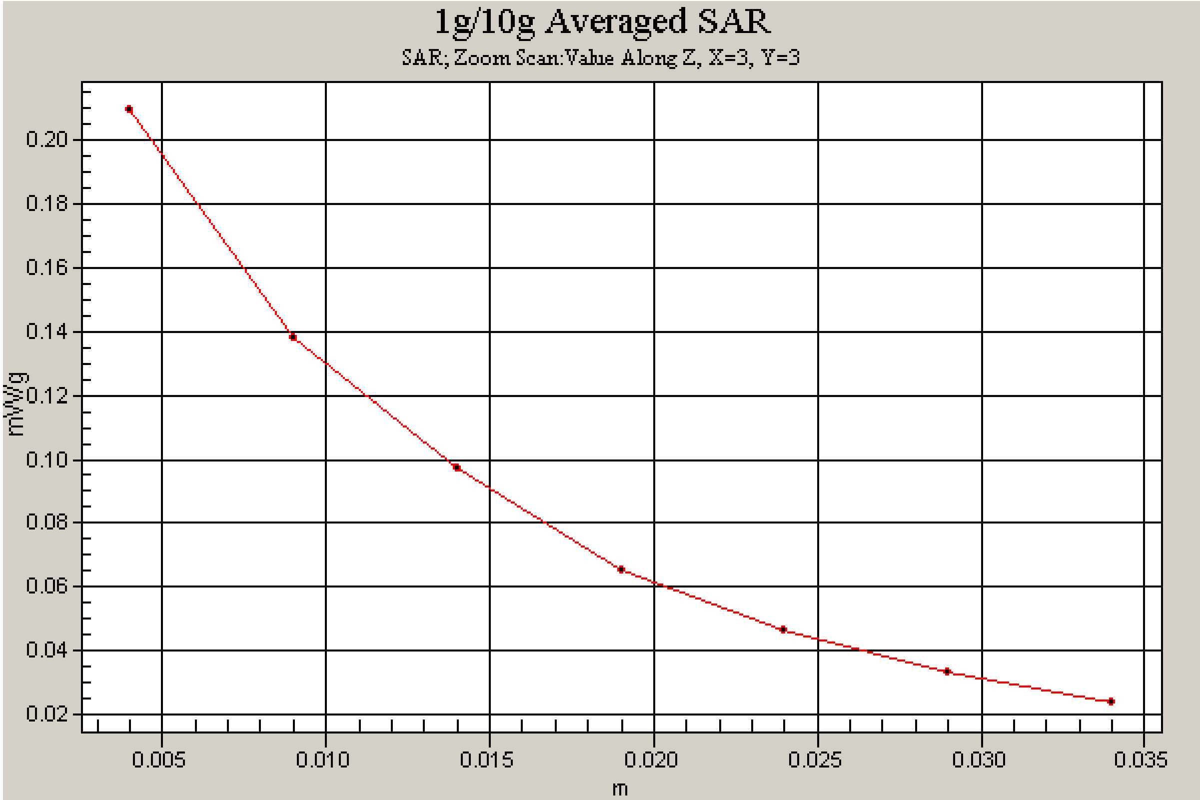


Figure 25 Z-Scan at power reference point (GSM 850 EGPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Channel 190

GSM 1900 GPRS (4 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Middle Frequency

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

Test Position 1 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.506 mW/g

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

Reference Value = 13.7 V/m; Power Drift = -0.091 dB

Peak SAR (extrapolated) = 0.741 W/kg

SAR(1 g) = 0.416 mW/g; SAR(10 g) = 0.228 mW/g

Maximum value of SAR (measured) = 0.464 mW/g

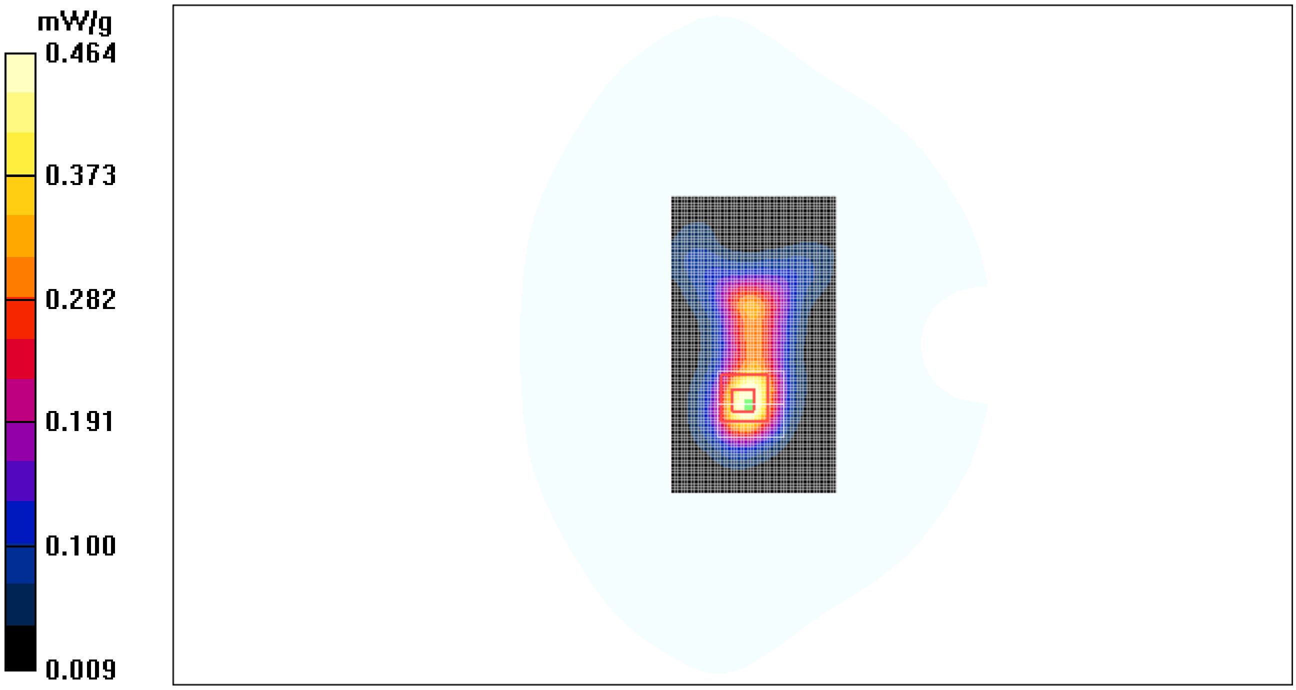


Figure 26 GSM 1900 GPRS (4 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 661

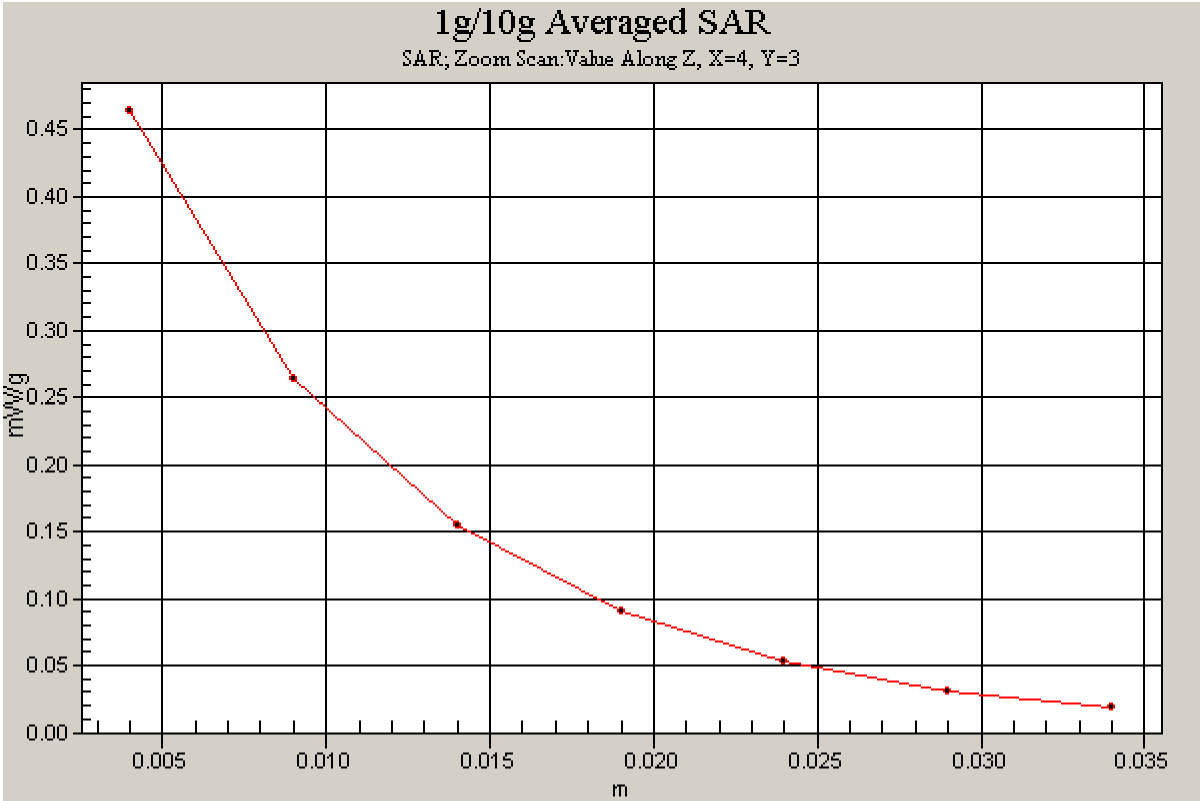


Figure 27 Z-Scan at power reference point [GSM 1900 GPRS (4 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 661]

GSM 1900 GPRS (3 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Middle Frequency

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

Test Position 1 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.524 mW/g

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

Reference Value = 14.0 V/m; Power Drift = 0.048 dB

Peak SAR (extrapolated) = 0.802 W/kg

SAR(1 g) = 0.445 mW/g; SAR(10 g) = 0.240 mW/g

Maximum value of SAR (measured) = 0.490 mW/g

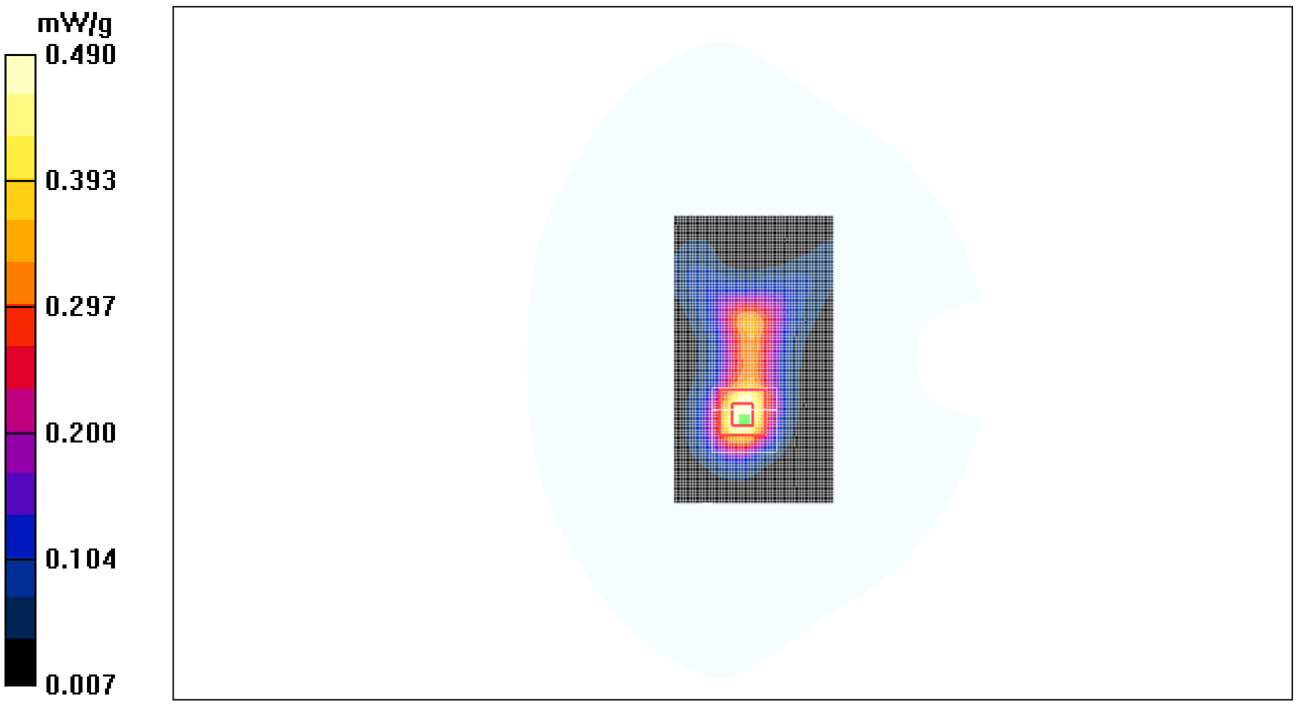


Figure 28 GSM 1900 GPRS (3 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 661

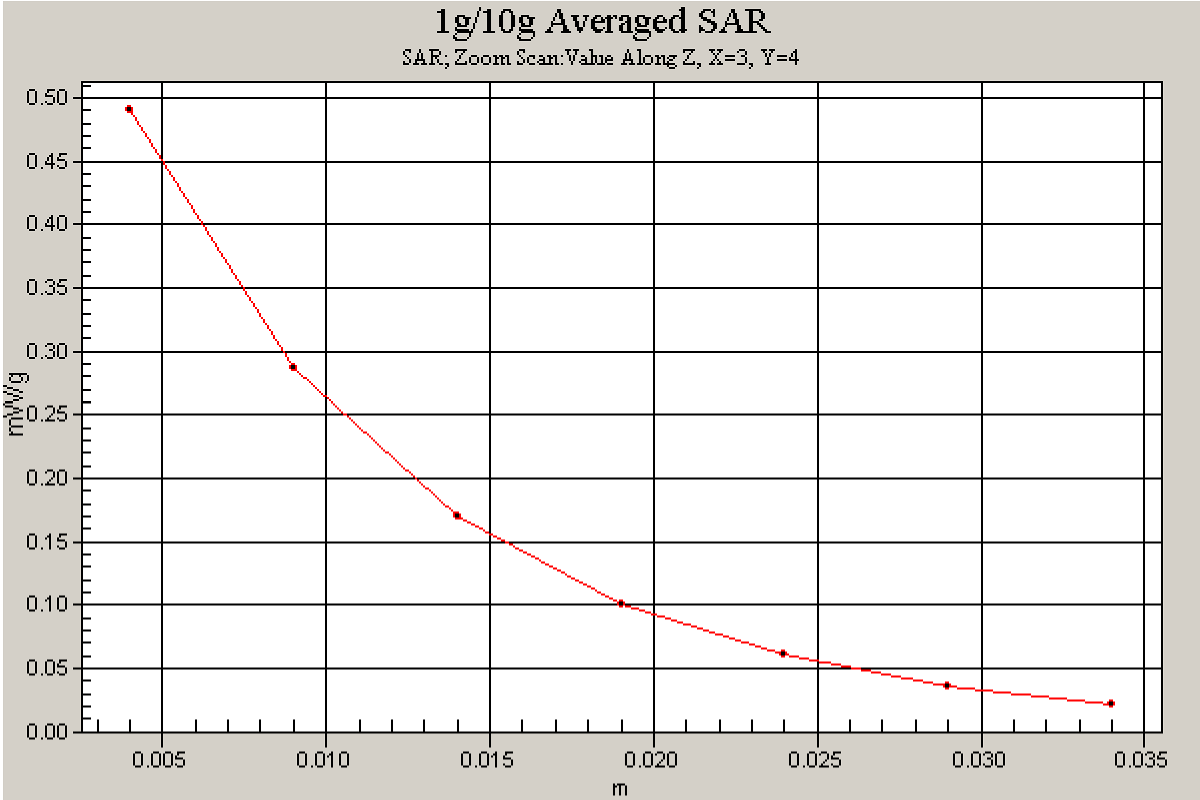


Figure 29 Z-Scan at power reference point (GSM 1900 GPRS (3 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 661

GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Middle Frequency

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

Test Position 1 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.560 mW/g

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

Reference Value = 14.5 V/m; Power Drift = 0.043 dB

Peak SAR (extrapolated) = 0.869 W/kg

SAR(1 g) = 0.482 mW/g; SAR(10 g) = 0.258 mW/g

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

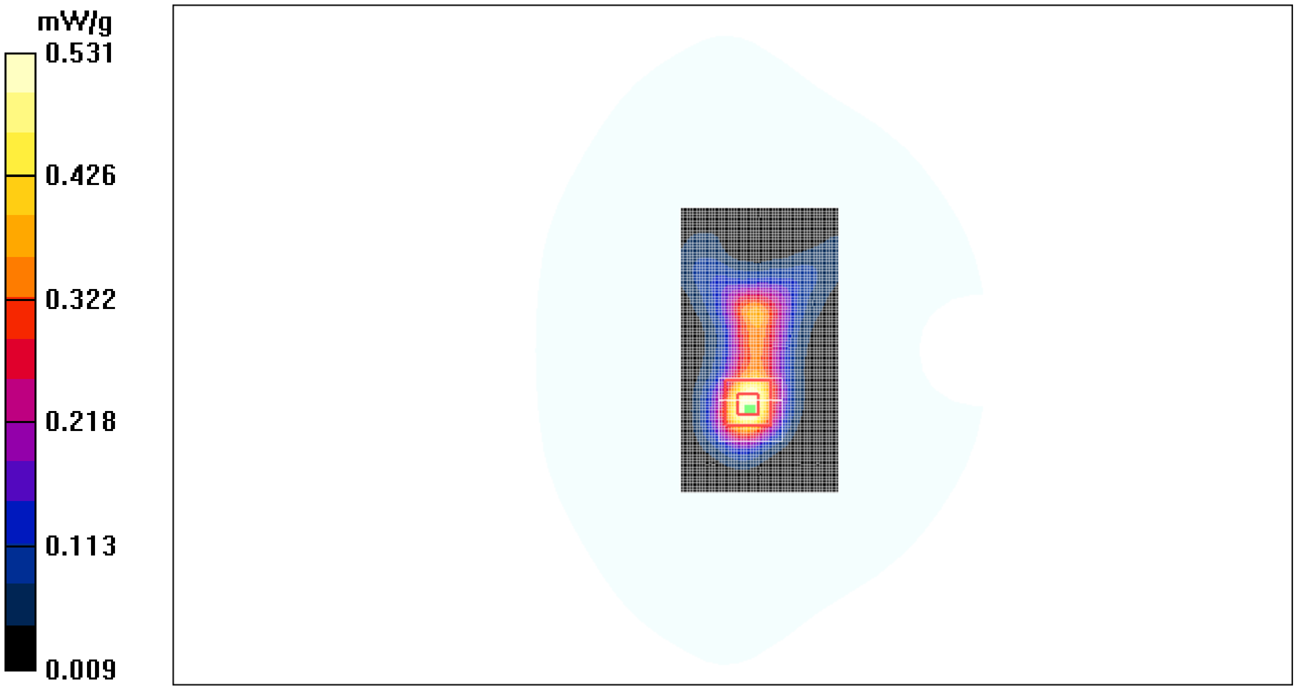


Figure 30 GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 661

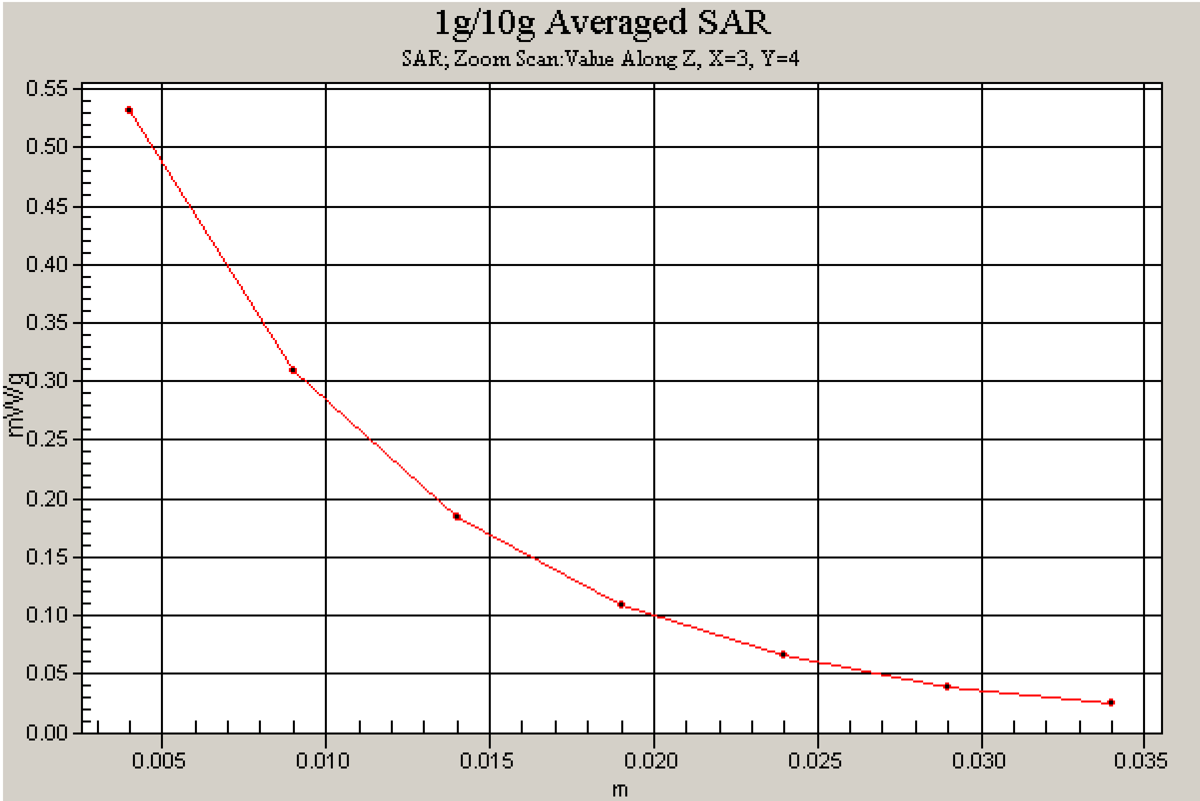


Figure 31 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 661]

GSM 1900 GPRS (1 timeslot in uplink) with BenQ Joybook S72 Test Position 1 Middle Frequency

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

Test Position 1 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.459 mW/g

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

Reference Value = 13.0 V/m; Power Drift = 0.073 dB

Peak SAR (extrapolated) = 0.698 W/kg

SAR(1 g) = 0.388 mW/g; SAR(10 g) = 0.209 mW/g

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

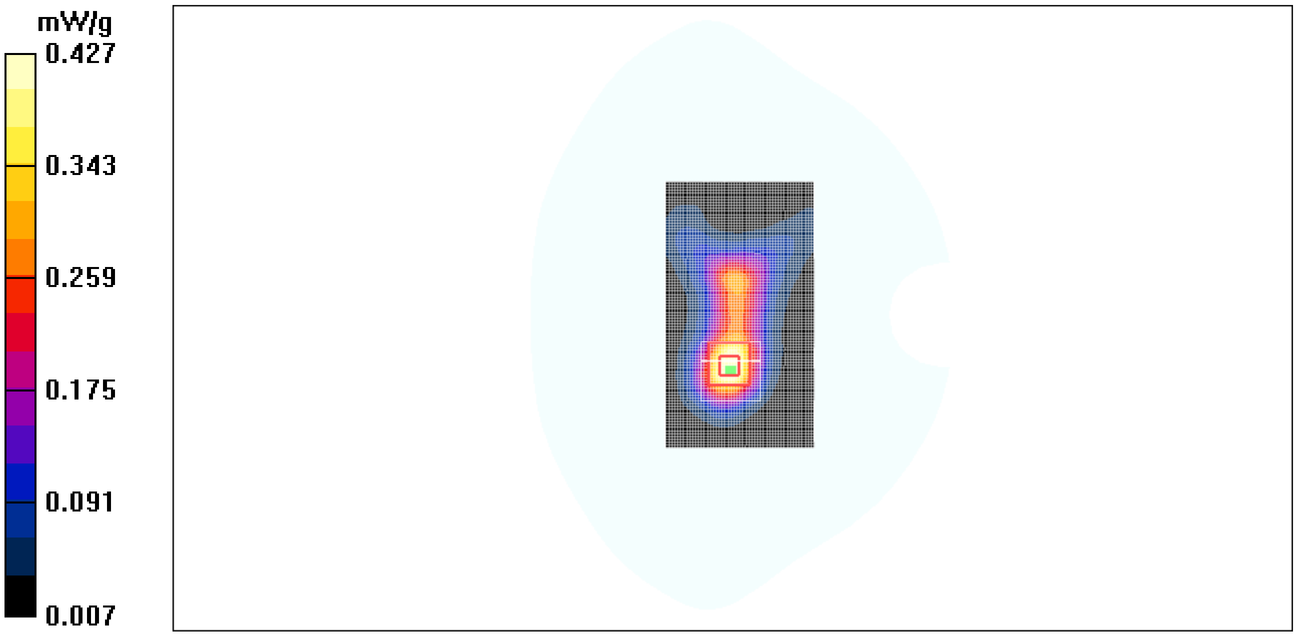


Figure 32 GSM 1900 GPRS (1 timeslot in uplink) with BenQ Joybook S72 Test Position 1Channel 661

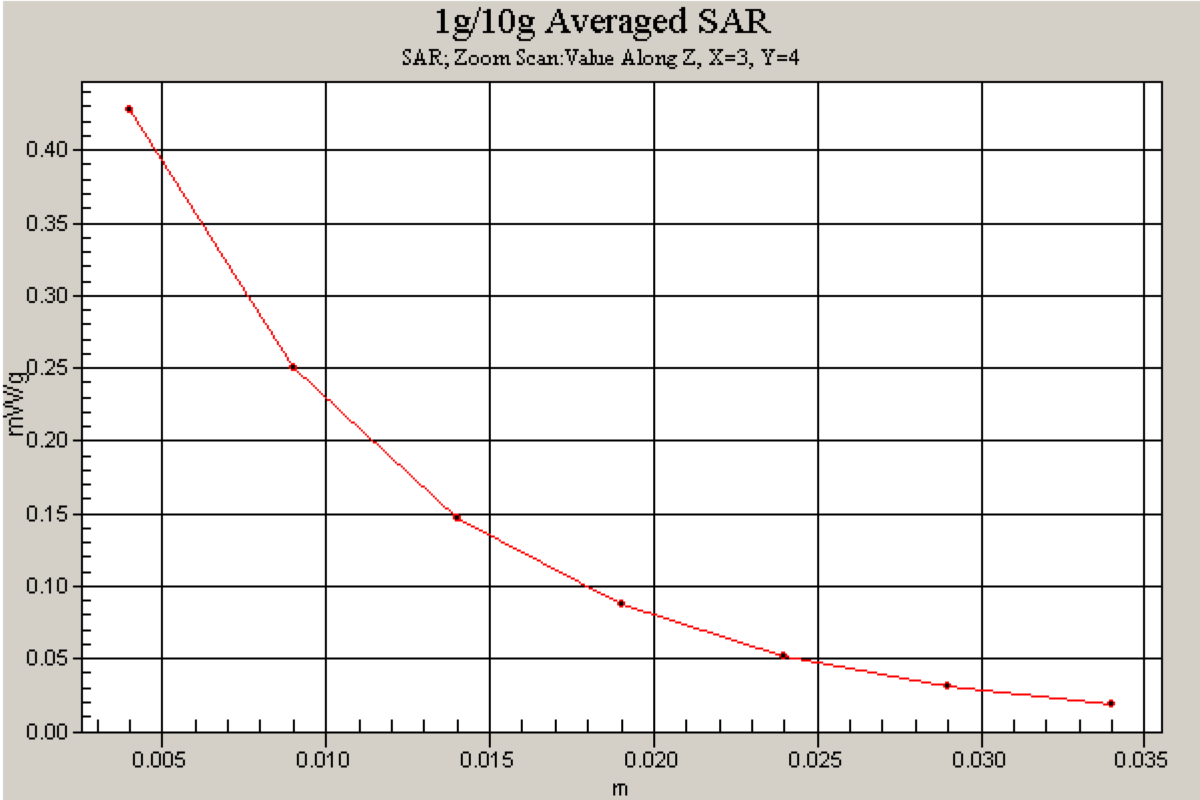


Figure 33 Z-Scan at power reference point (GSM 1900 GPRS (1 timeslot in uplink) with BenQ Joybook S72 Test Position 1Channel 661

GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 2 Middle Frequency

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

Test Position 2 Middle/Area Scan (51x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.217 mW/g

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

Reference Value = 9.90 V/m; Power Drift = -0.199 dB

Peak SAR (extrapolated) = 0.452 W/kg

SAR(1 g) = 0.181 mW/g; SAR(10 g) = 0.088 mW/g

Maximum value of SAR (measured) = 0.210 mW/g

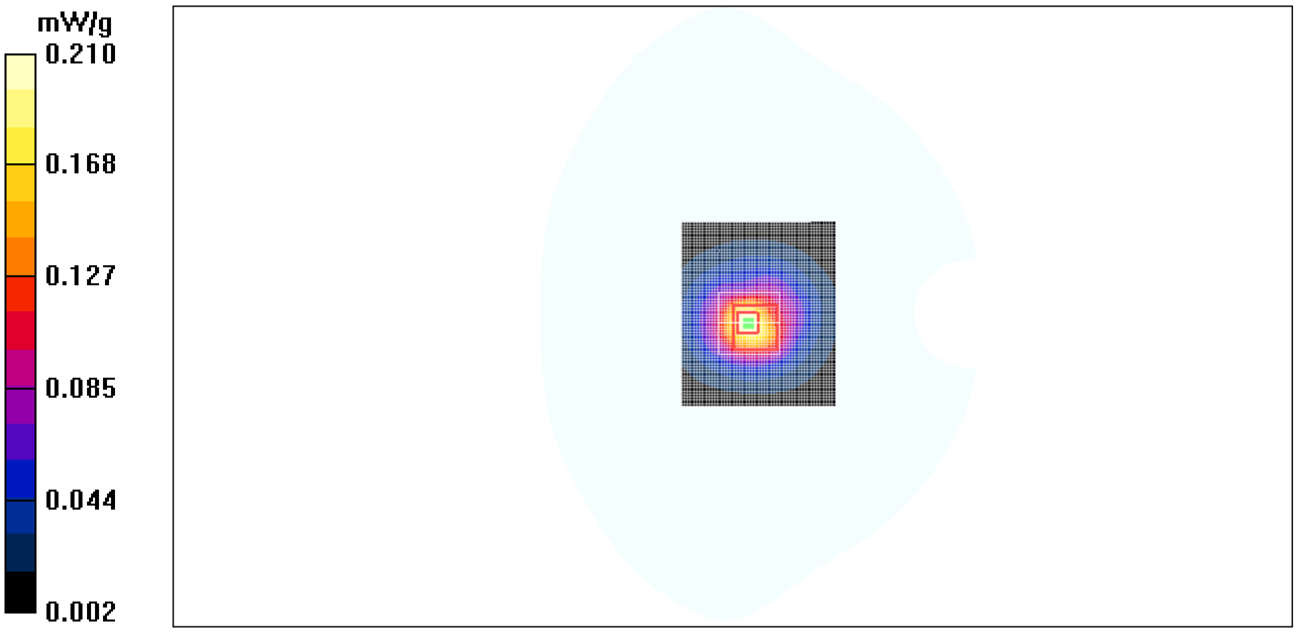


Figure 34 GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 2 Channel 661

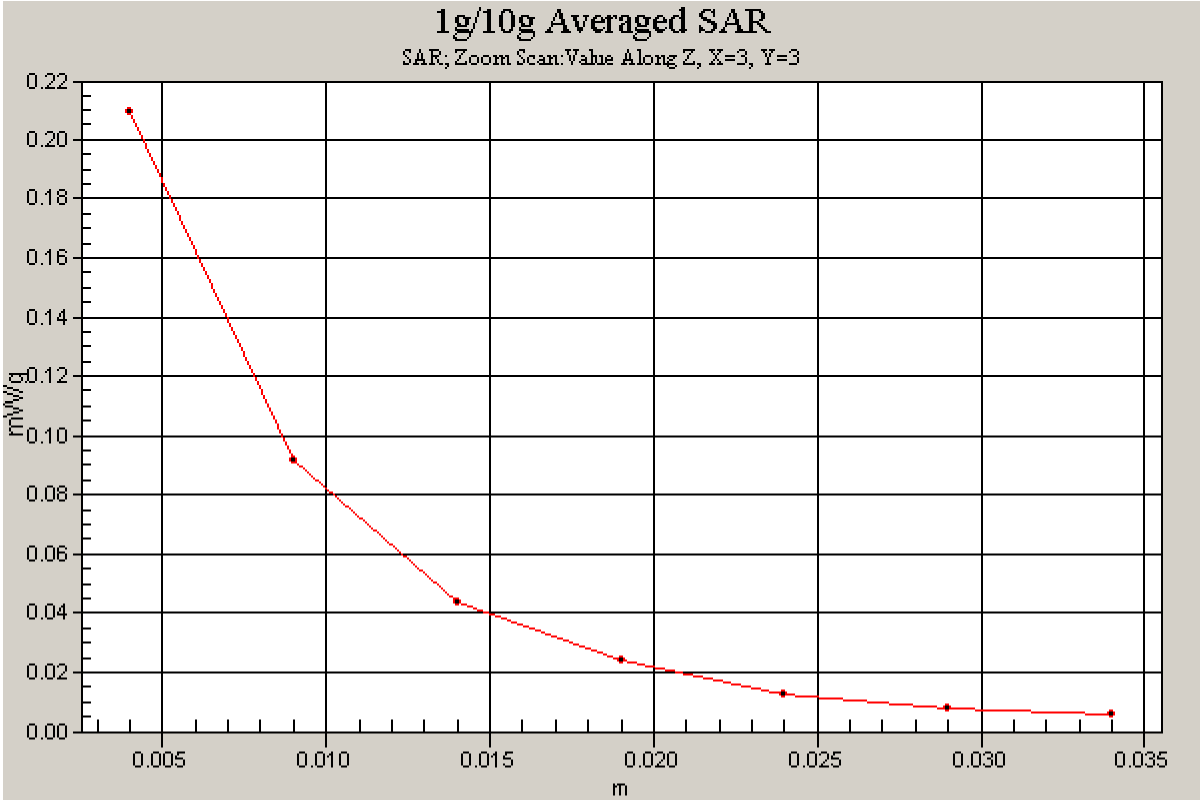


Figure 35 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 2 Channel 661]

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

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

Test Position 3 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.929 mW/g

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

Reference Value = 16.6 V/m; Power Drift = -0.012 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.697 mW/g; SAR(10 g) = 0.358 mW/g

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

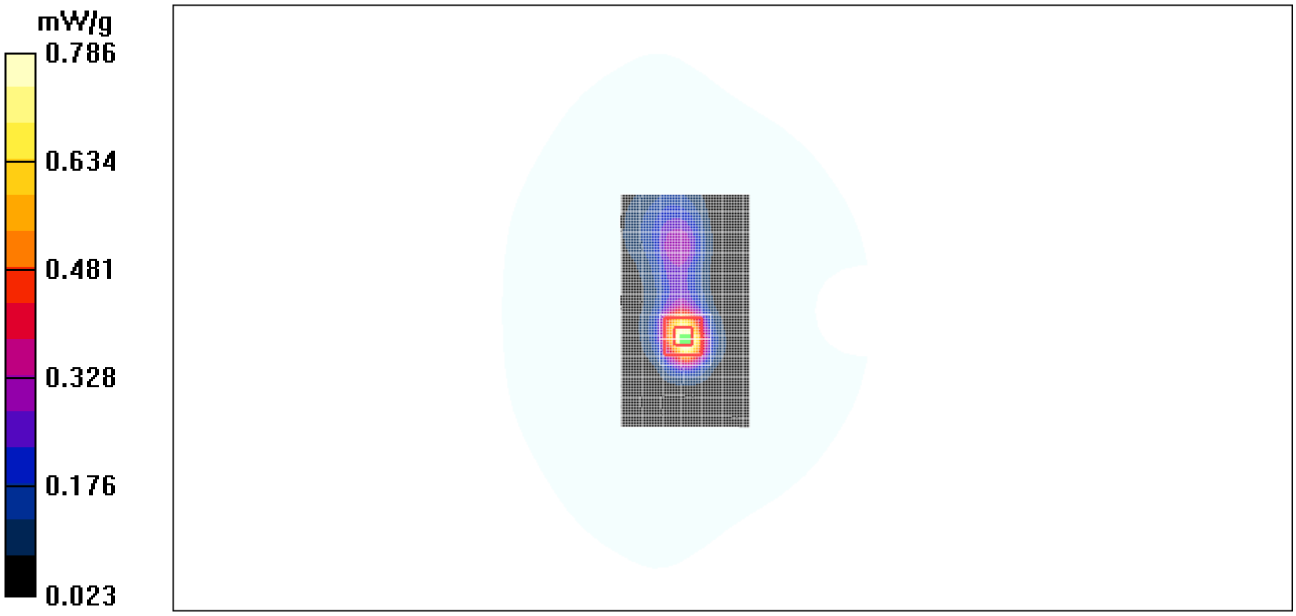


Figure 36 GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 661

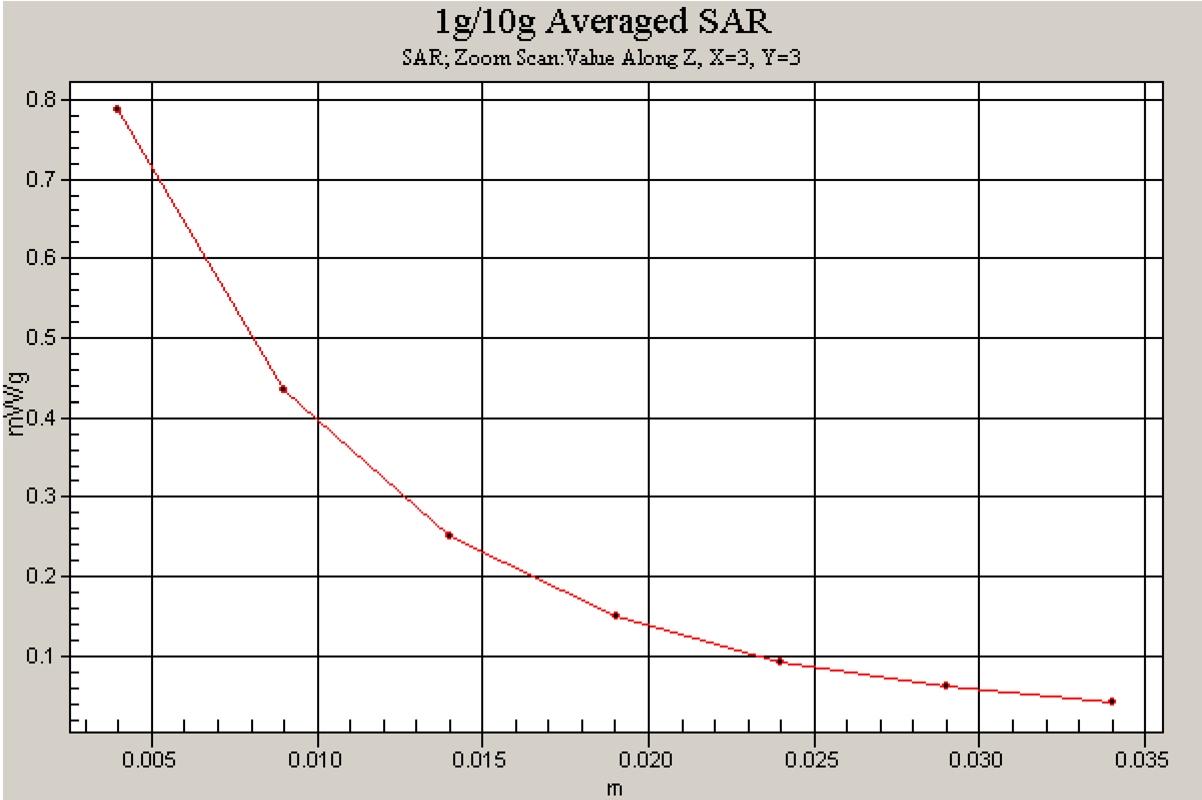


Figure 37 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 661]

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

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

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

Maximum value of SAR (interpolated) = 0.493 mW/g

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

Reference Value = 12.0 V/m; Power Drift = -0.004 dB

Peak SAR (extrapolated) = 0.792 W/kg

SAR(1 g) = 0.418 mW/g; SAR(10 g) = 0.211 mW/g

Maximum value of SAR (measured) = 0.470 mW/g

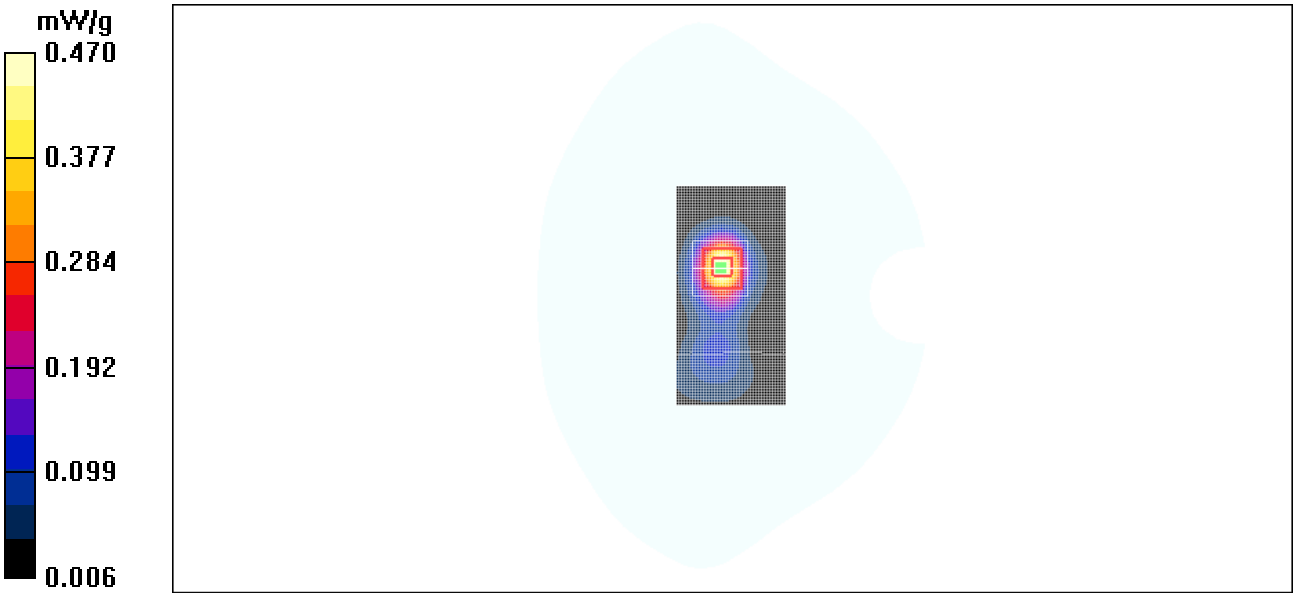


Figure 38 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 4 Channel 661

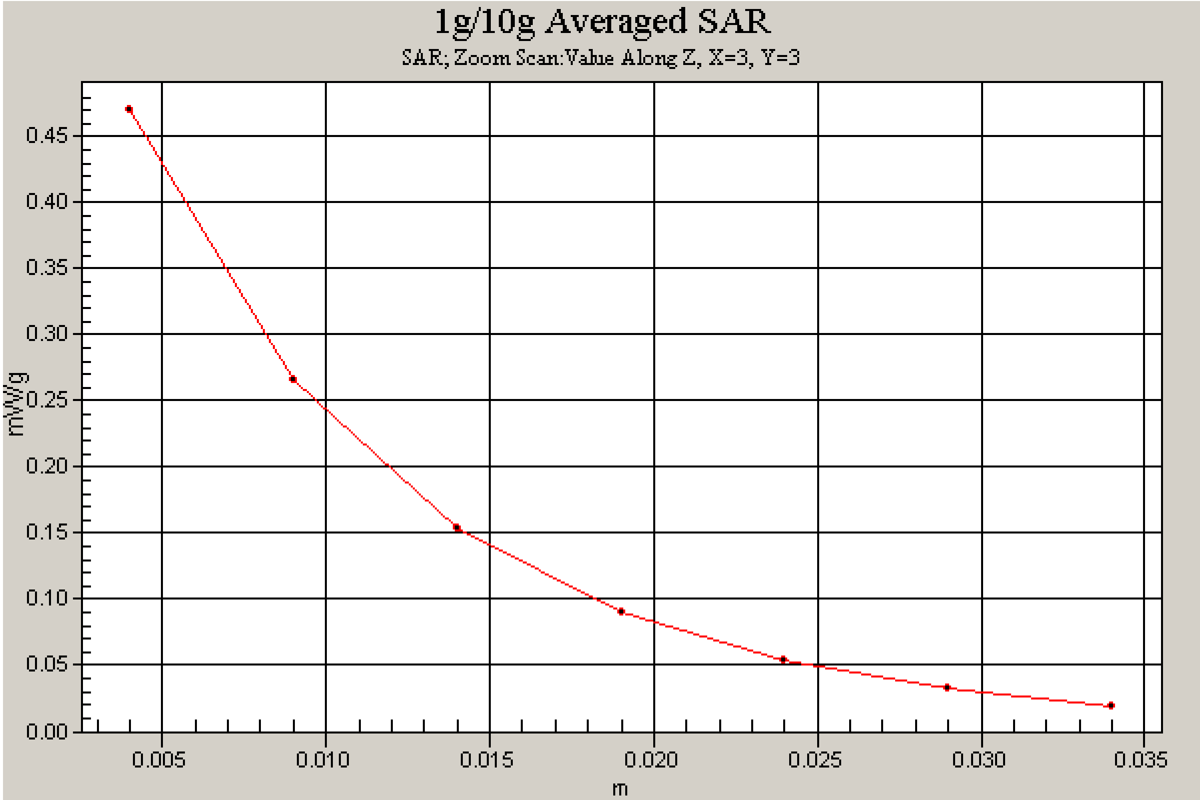


Figure 39 Z-Scan at power reference point (GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 4 Channel 661

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

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

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

Maximum value of SAR (interpolated) = 0.378 mW/g

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

Reference Value = 12.0 V/m; Power Drift = -0.107 dB

Peak SAR (extrapolated) = 0.547 W/kg

SAR(1 g) = 0.322 mW/g; SAR(10 g) = 0.177 mW/g

Maximum value of SAR (measured) = 0.357 mW/g

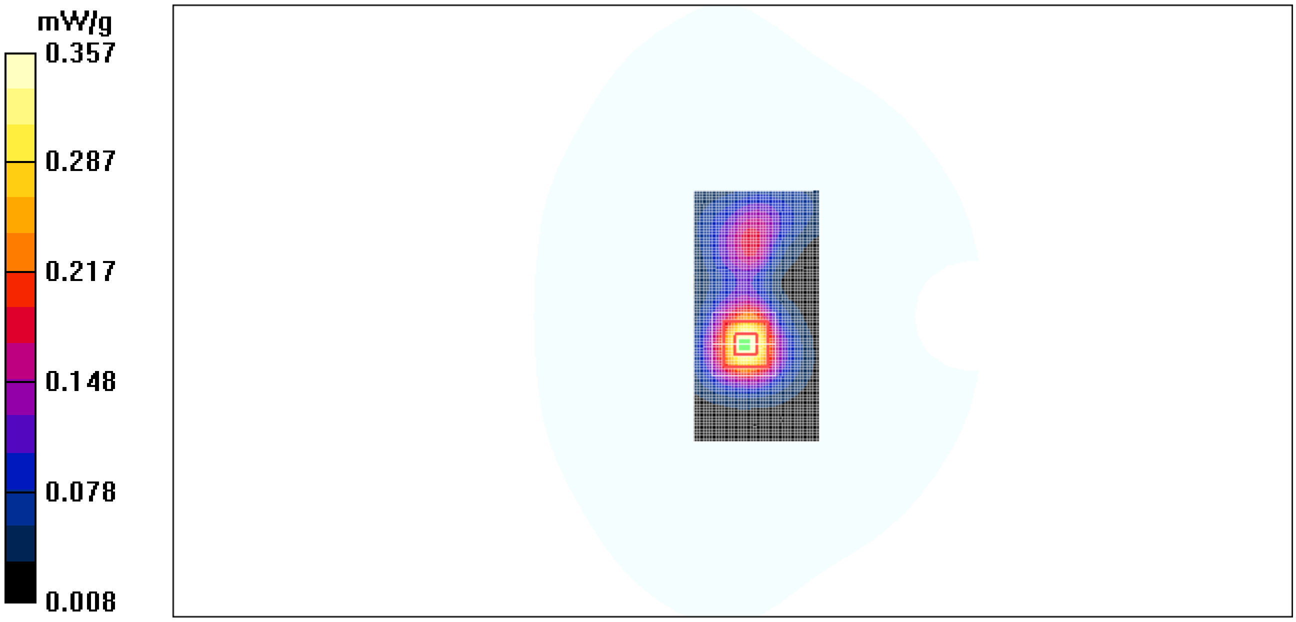


Figure 40 GSM 1900 GPRS (2 timeslots in uplink) with IBMT61 Test Position 5 Channel 661

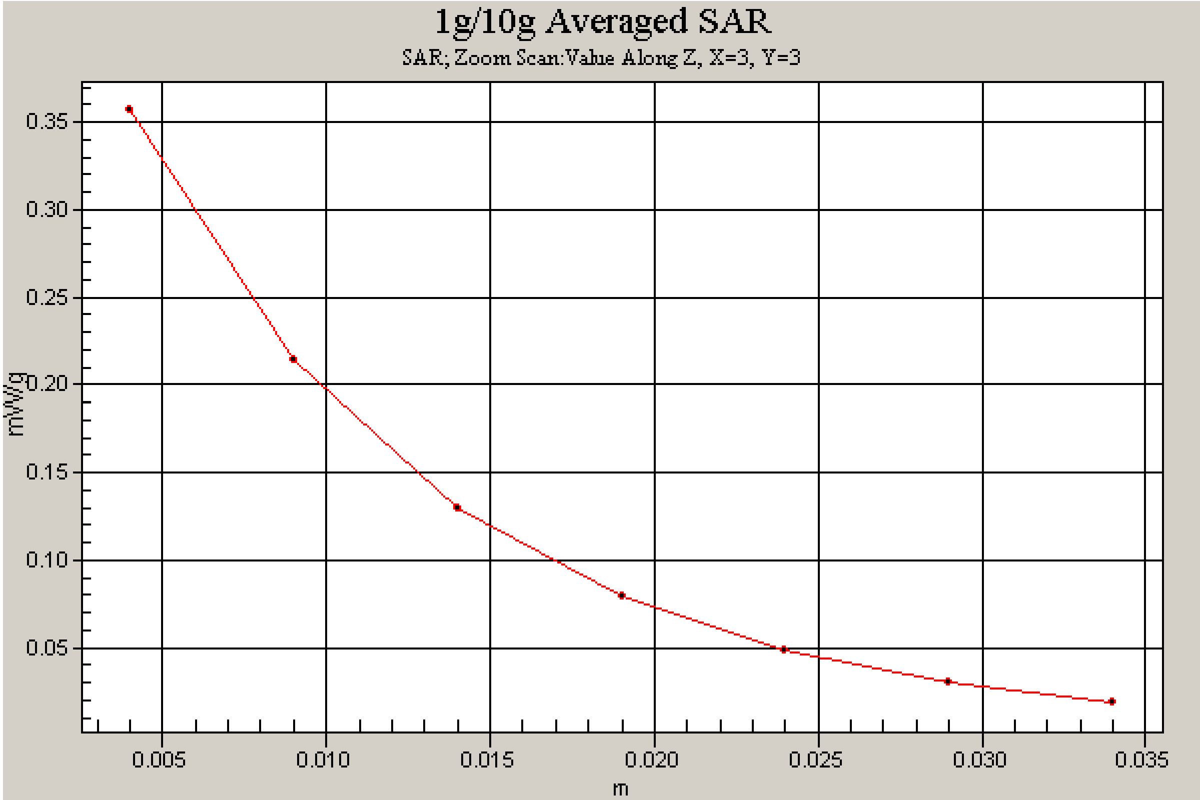


Figure 41 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBMT61 Test Position 5 Channel 661]

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

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

Test Position 3 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.454 mW/g

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

Reference Value = 11.4 V/m; Power Drift = -0.015 dB

Peak SAR (extrapolated) = 0.693 W/kg

SAR(1 g) = 0.373 mW/g; SAR(10 g) = 0.193 mW/g

Maximum value of SAR (measured) = 0.418 mW/g

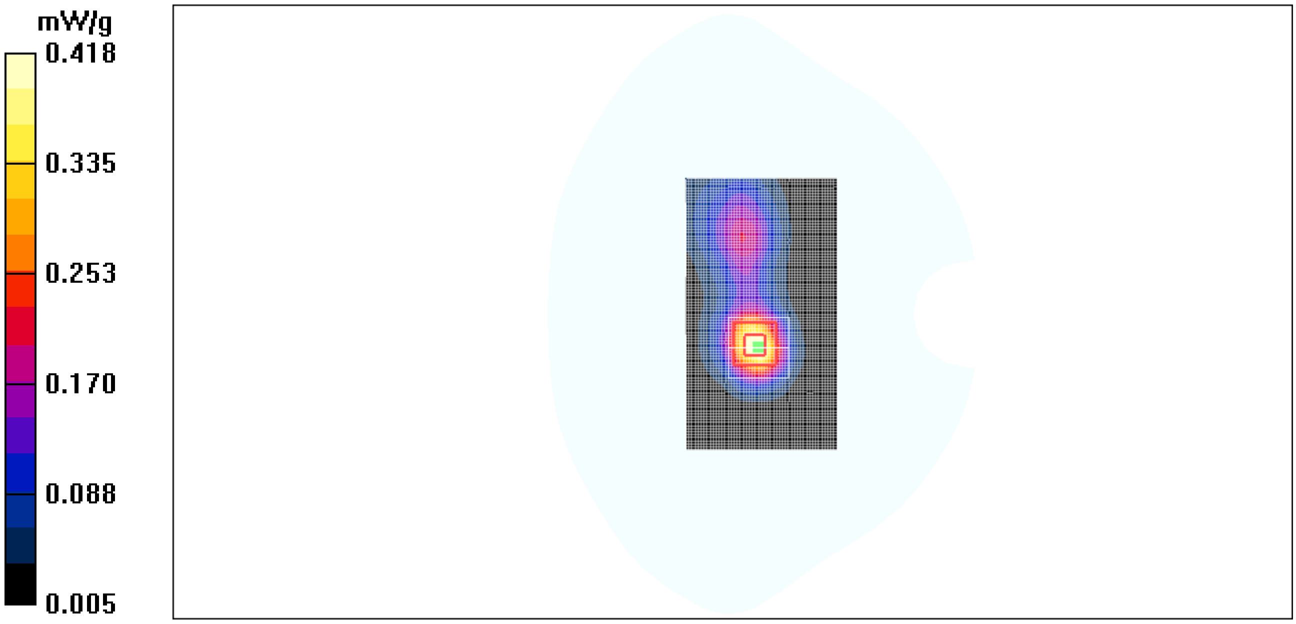


Figure 42 GSM 1900 EGPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 661

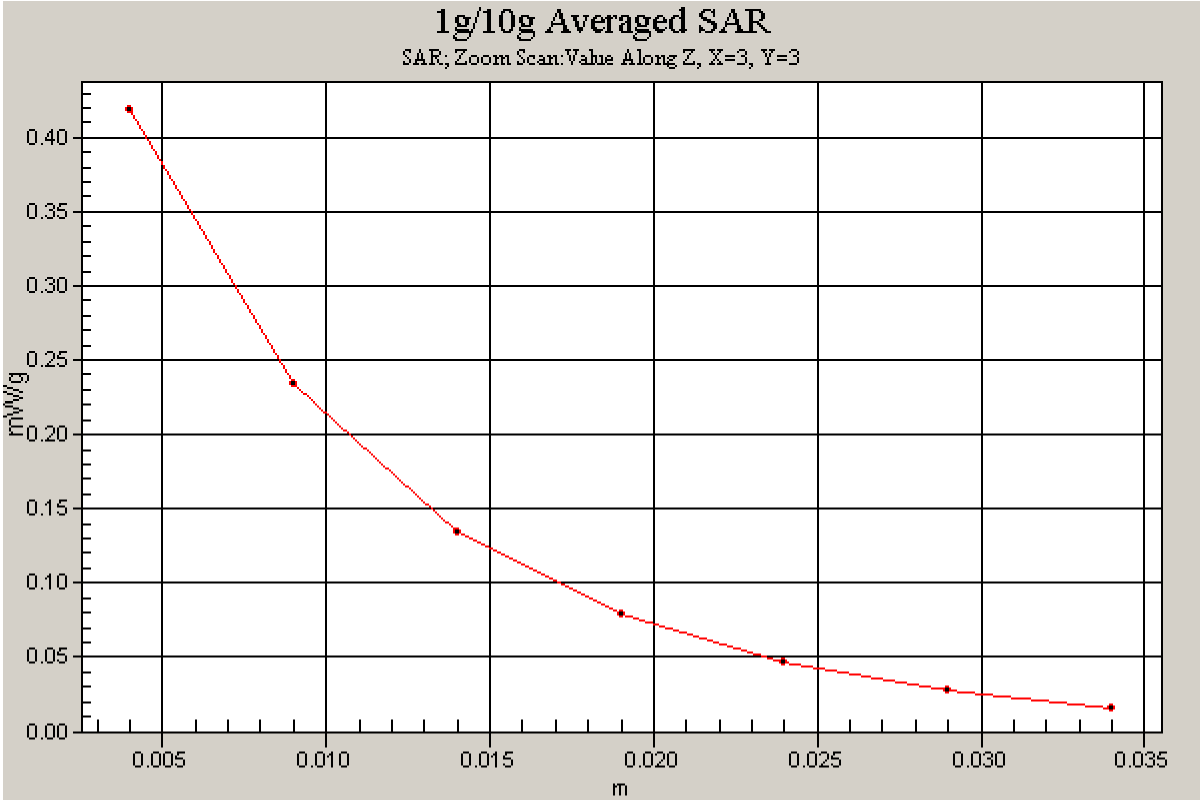


Figure 43 Z-Scan at power reference point [GSM 1900 EGPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 661]

WCDMA Band II with BenQ Joybook S72 Test Position 1 Middle Frequency

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

Test Position 1 Middle/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.862 mW/g

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

Reference Value = 15.7 V/m; Power Drift = 0.027 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.745 mW/g; SAR(10 g) = 0.406 mW/g

Maximum value of SAR (measured) = 0.825 mW/g

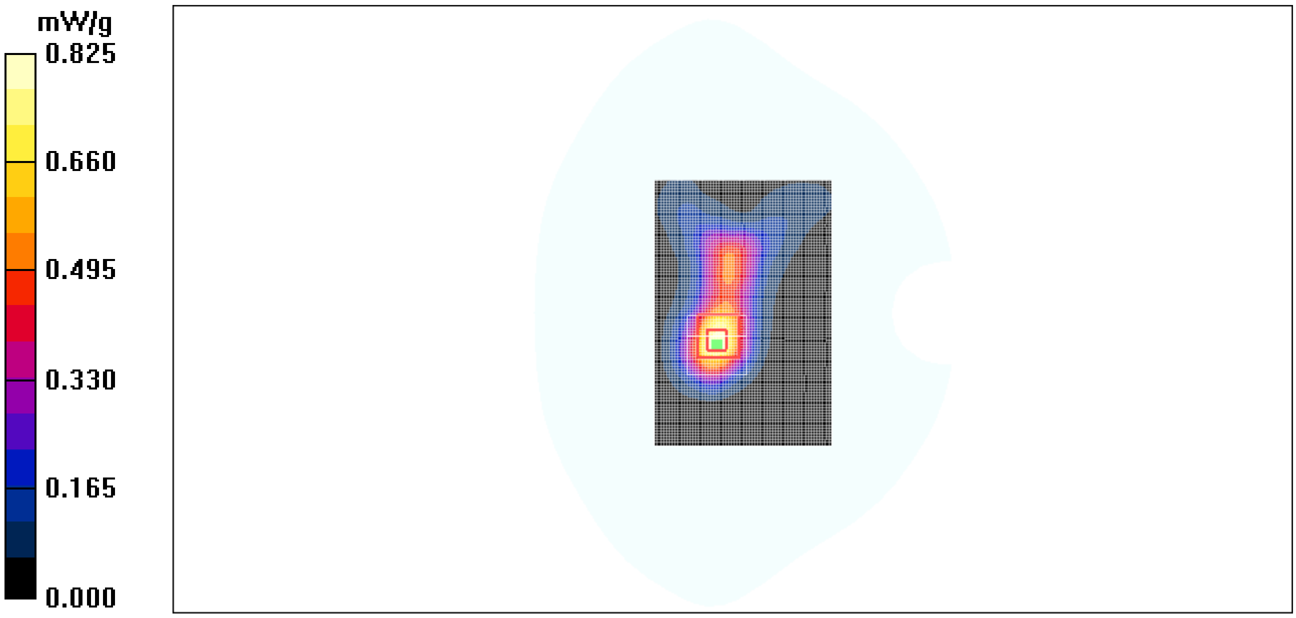


Figure 44 WCDMA Band II with BenQ Joybook S72 Test Position 1Channel 9400

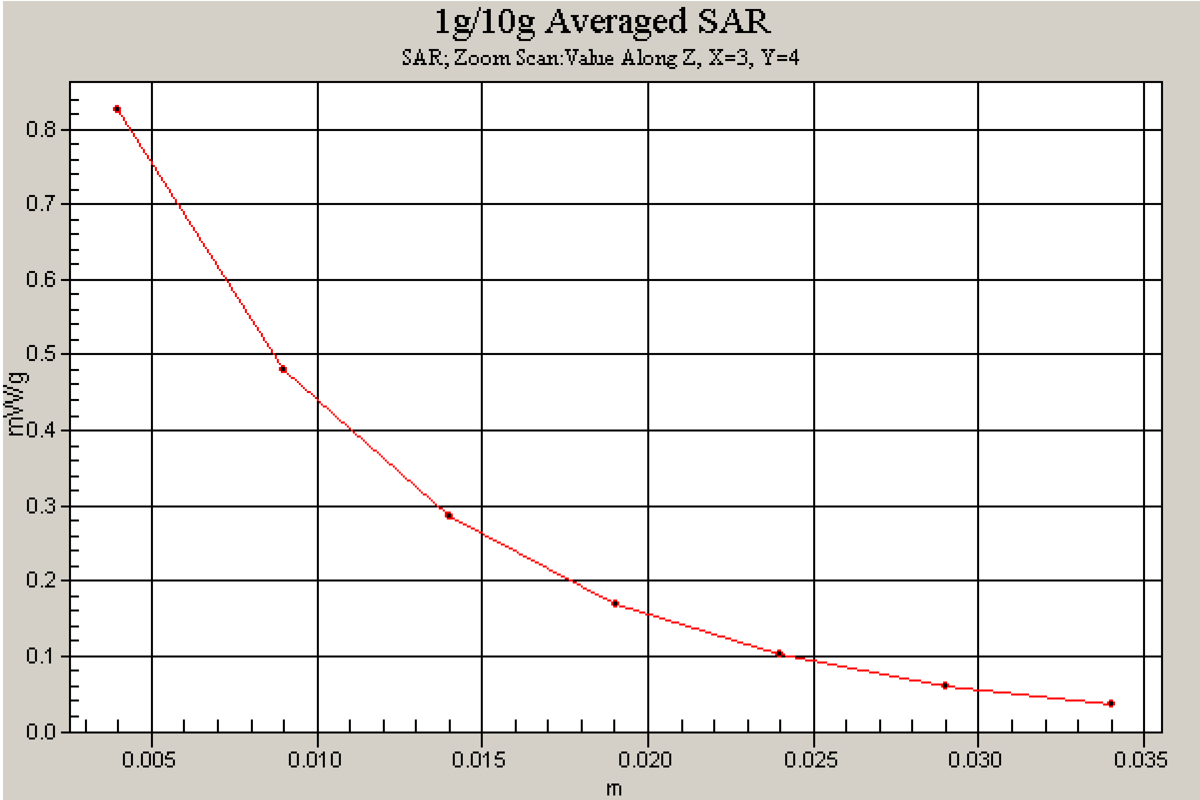


Figure 45 Z-Scan at power reference point (WCDMA Band II with BenQ Joybook S72 Test Position 1Channel 9400)

WCDMA Band II with BenQ Joybook S72 Test Position 2 Middle Frequency

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

Test Position 2 Middle/Area Scan (51x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.364 mW/g

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

Reference Value = 12.6 V/m; Power Drift = -0.088 dB

Peak SAR (extrapolated) = 0.757 W/kg

SAR(1 g) = 0.285 mW/g; SAR(10 g) = 0.134 mW/g

Maximum value of SAR (measured) = 0.344 mW/g

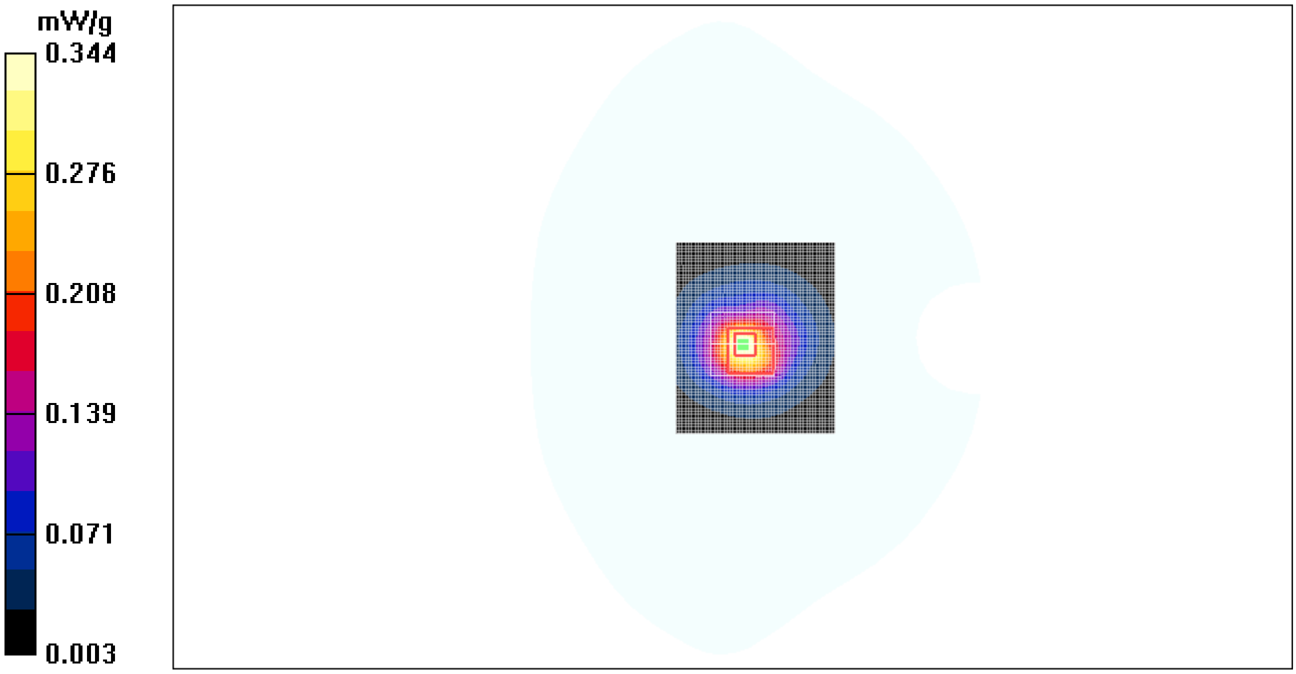


Figure 46 WCDMA Band II with BenQ Joybook S72 Test Position 2Channel 9400

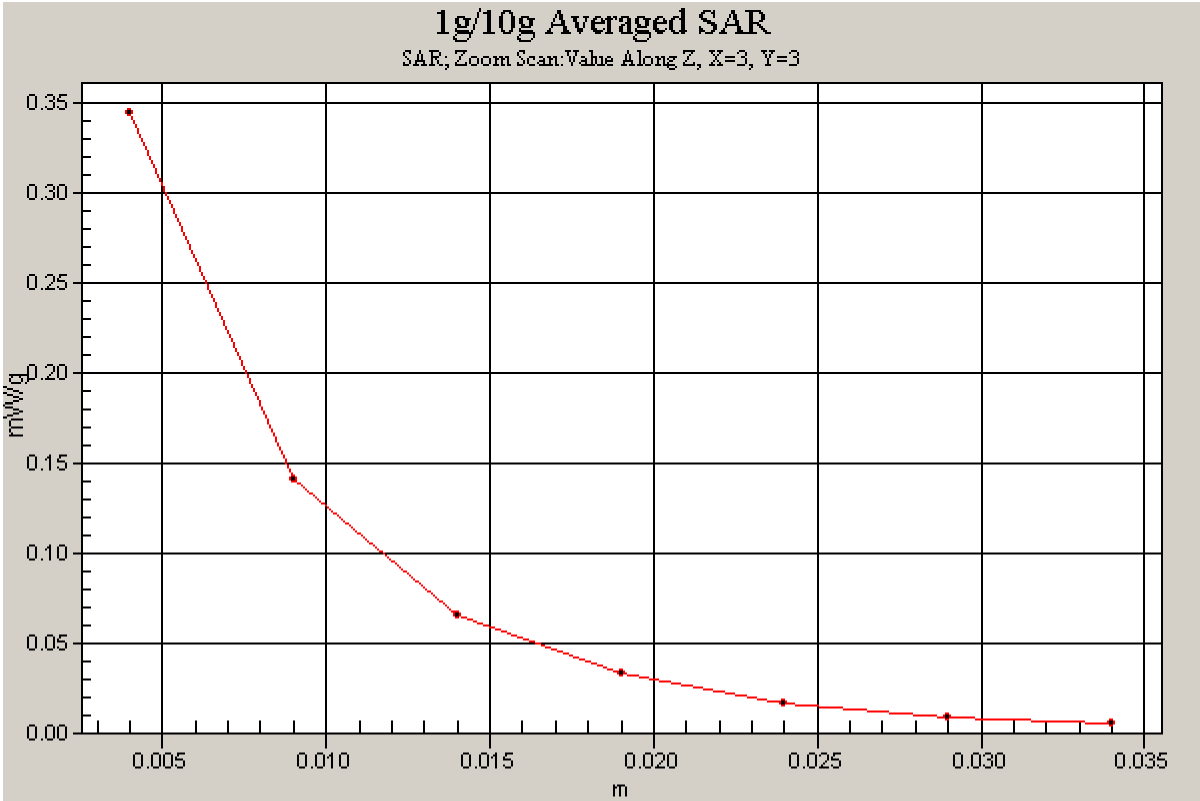


Figure 47 Z-Scan at power reference point (WCDMA Band II with BenQ Joybook S72 Test Position 2 Channel 9400)

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

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

Test Position 3 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.824 mW/g

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

Reference Value = 17.3 V/m; Power Drift = -0.035 dB

Peak SAR (extrapolated) = 1.22 W/kg

SAR(1 g) = 0.666 mW/g; SAR(10 g) = 0.349 mW/g

Maximum value of SAR (measured) = 0.743 mW/g

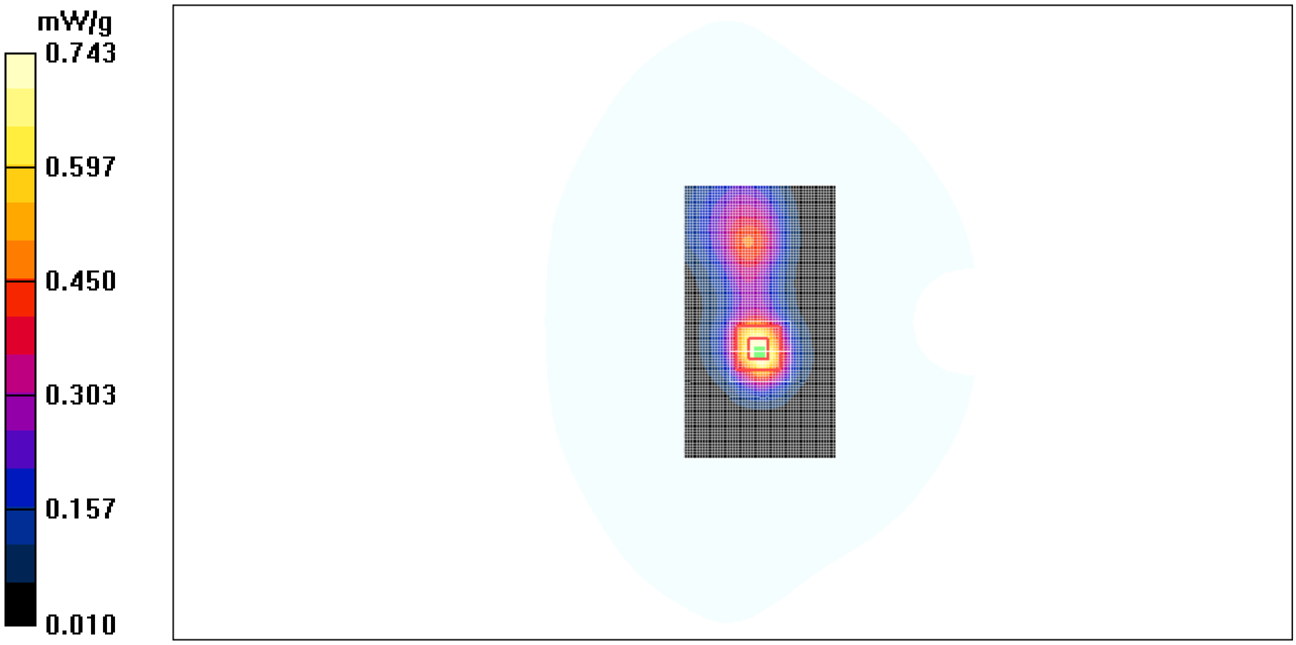


Figure 48 WCDMA Band II with BenQ Joybook R55V Test Position 3 Channel 9400

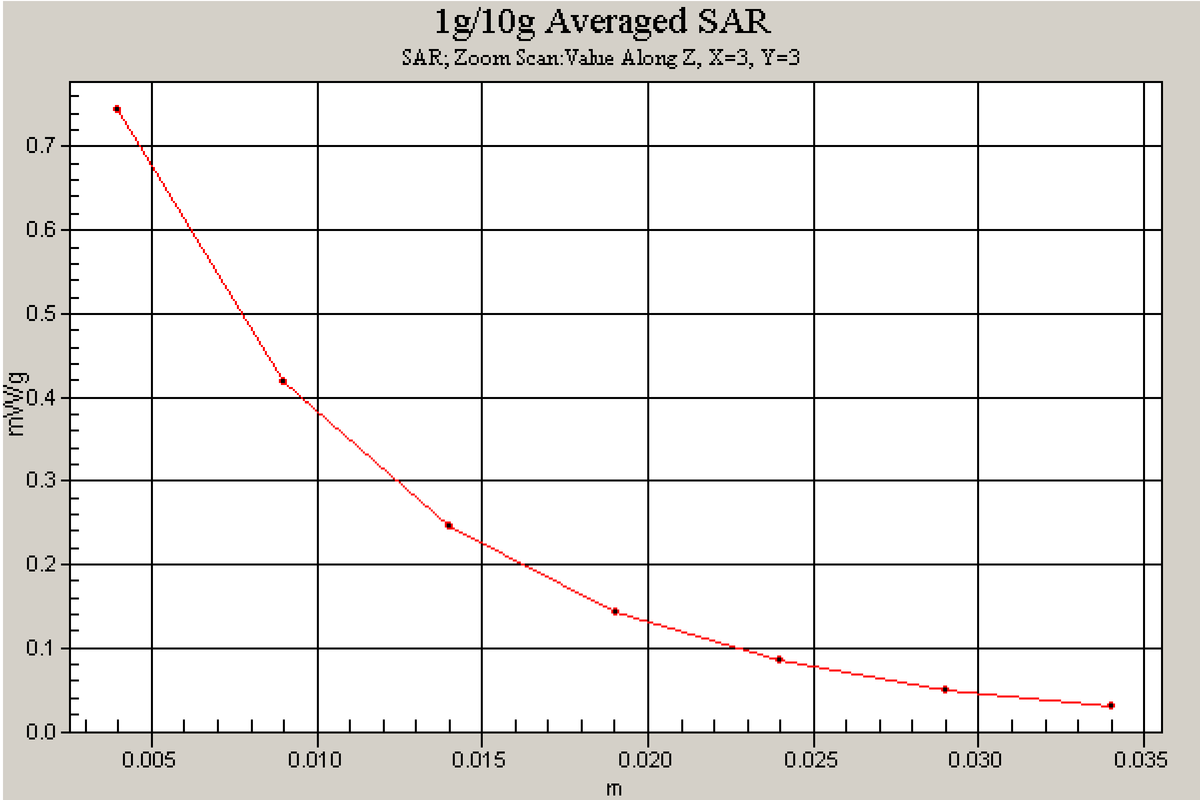


Figure 49 Z-Scan at power reference point (WCDMA Band II with BenQ Joybook R55V Test Position 3 Channel 9400)

WCDMA Band II with IBM T61 Test Position 4 Middle Frequency

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

Test Position 4 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 13.7 V/m; Power Drift = -0.039 dB

Peak SAR (extrapolated) = 0.936 W/kg

SAR(1 g) = 0.502 mW/g; SAR(10 g) = 0.256 mW/g

Maximum value of SAR (measured) = 0.566 mW/g

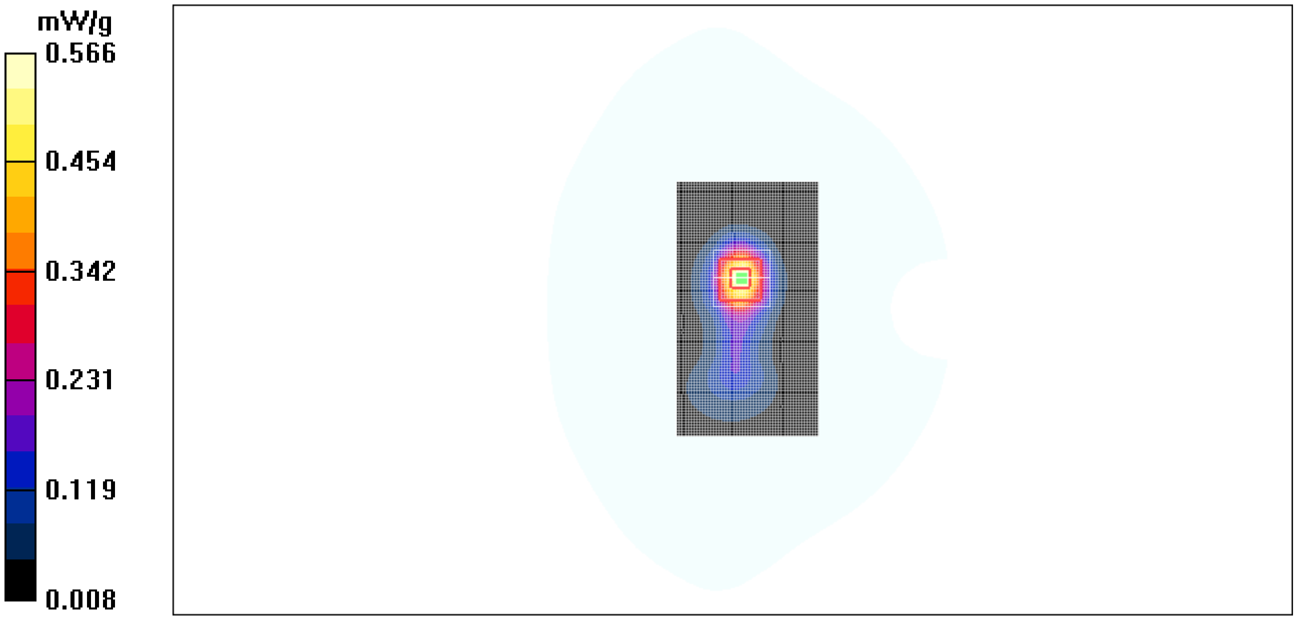


Figure 50 WCDMA Band II with IBMT61 Test Position 4 Channel 9400

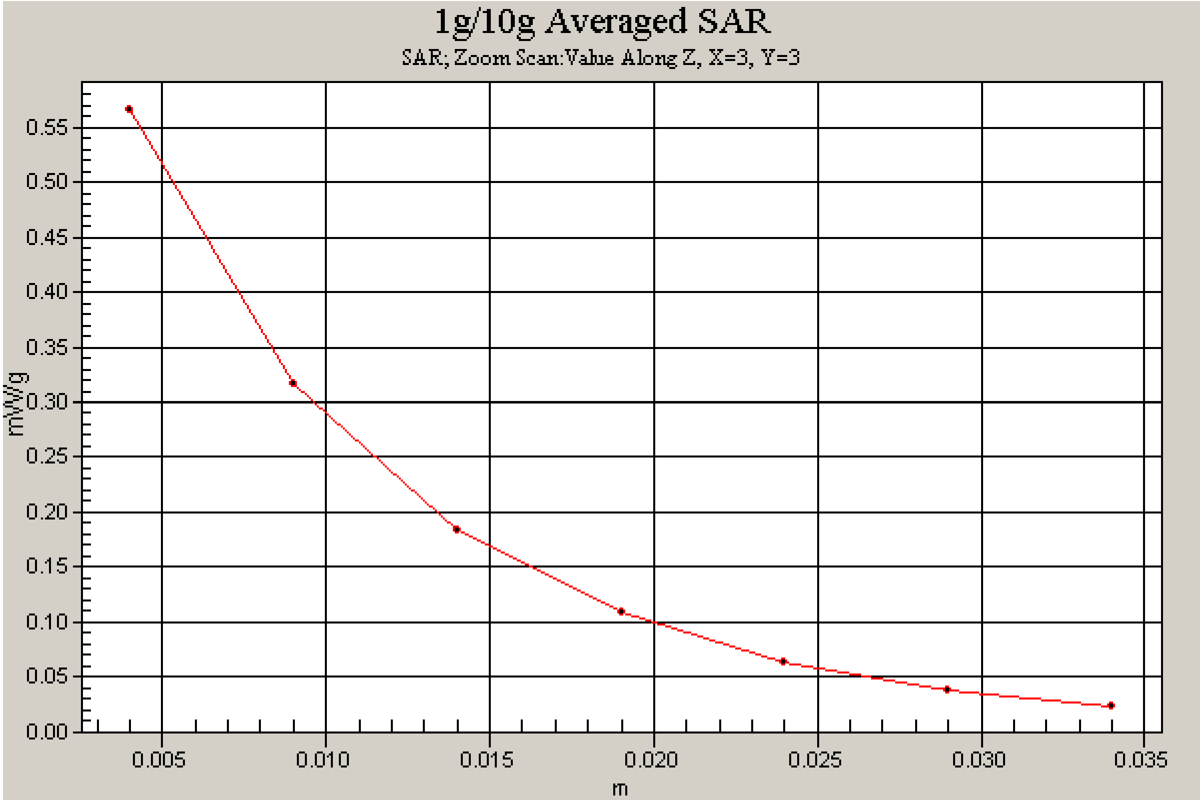


Figure 51 Z-Scan at power reference point (WCDMA Band II with IBMT61 Test Position 4 Channel 9400)

WCDMA Band II with IBM T61 Test Position 5 Middle Frequency

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

Test Position 5 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 12.4 V/m; Power Drift = 0.032 dB

Peak SAR (extrapolated) = 0.663 W/kg

SAR(1 g) = 0.386 mW/g; SAR(10 g) = 0.211 mW/g

Maximum value of SAR (measured) = 0.429 mW/g

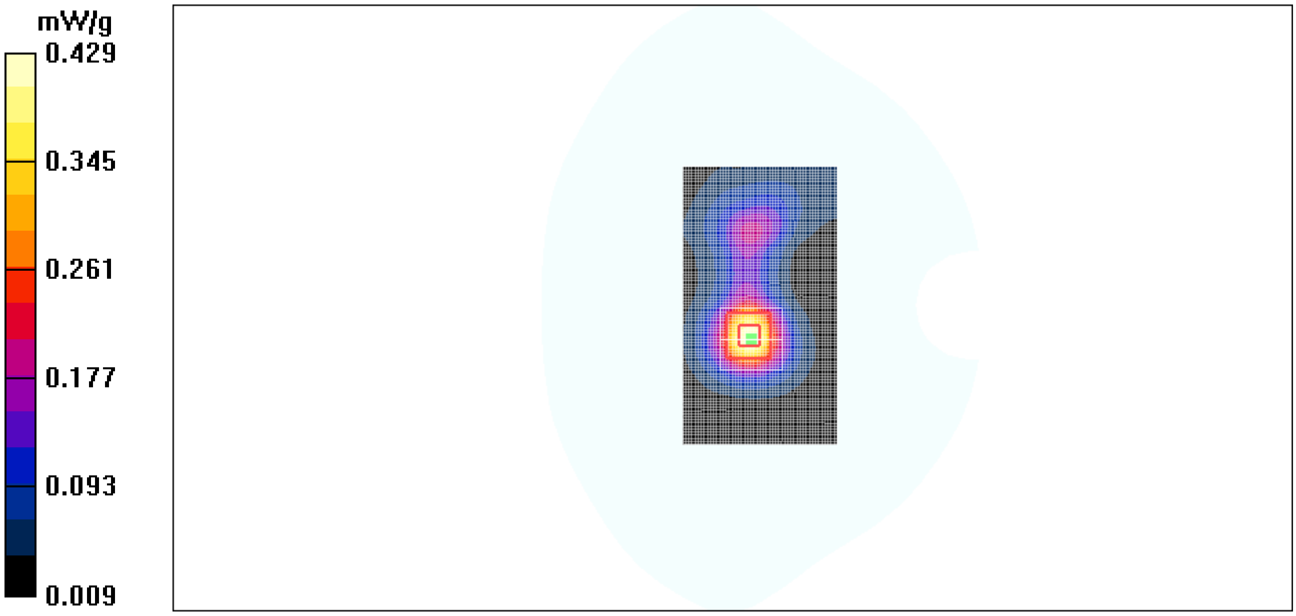


Figure 52 WCDMA Band II with IBM T61 Test Position 5 Channel 9400

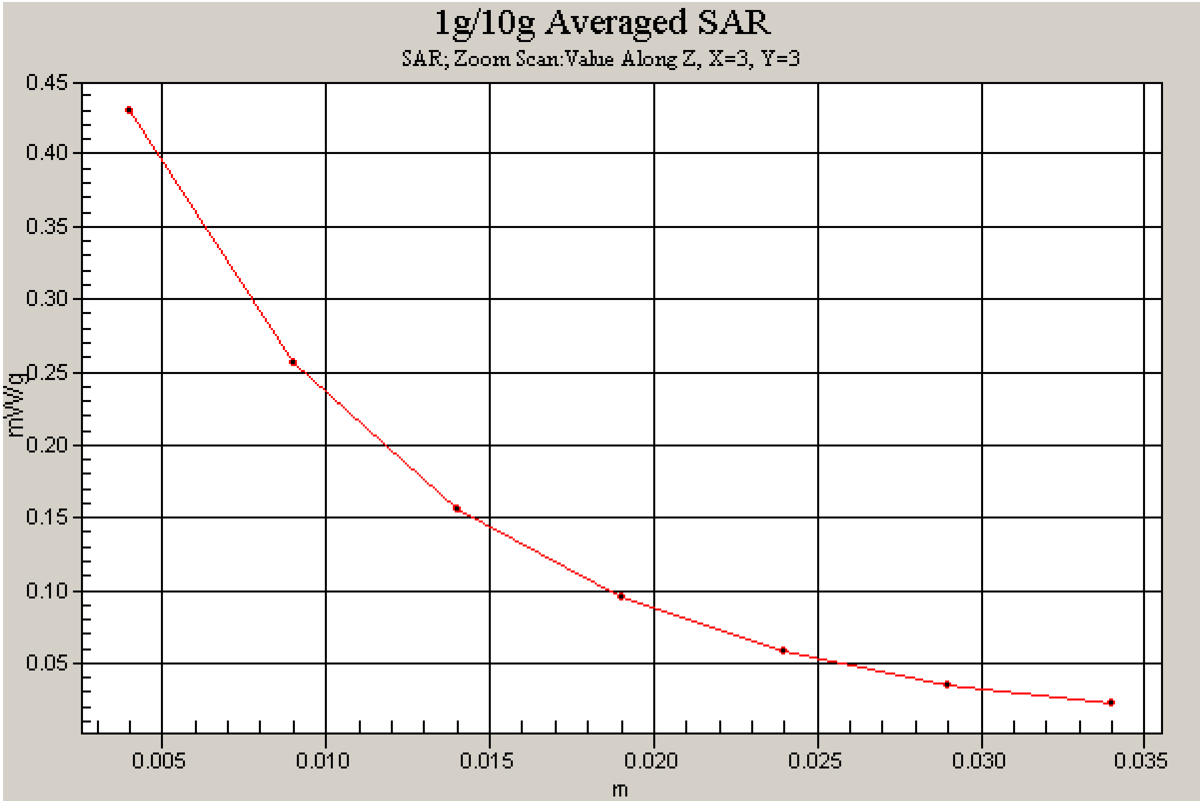


Figure 53 Z-Scan at power reference point (WCDMA Band II with IBM T61 Test Position 5 Channel 9400)

WCDMA Band II HSDPA with BenQ Joybook S72 Test Position 1 Middle Frequency

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

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);

Electronics: DAE3 Sn536;

Test Position 1 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.836 mW/g

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

Reference Value = 17.4 V/m; Power Drift = -0.154 dB

Peak SAR (extrapolated) = 1.17 W/kg

SAR(1 g) = 0.649 mW/g; SAR(10 g) = 0.346 mW/g

Maximum value of SAR (measured) = 0.724 mW/g

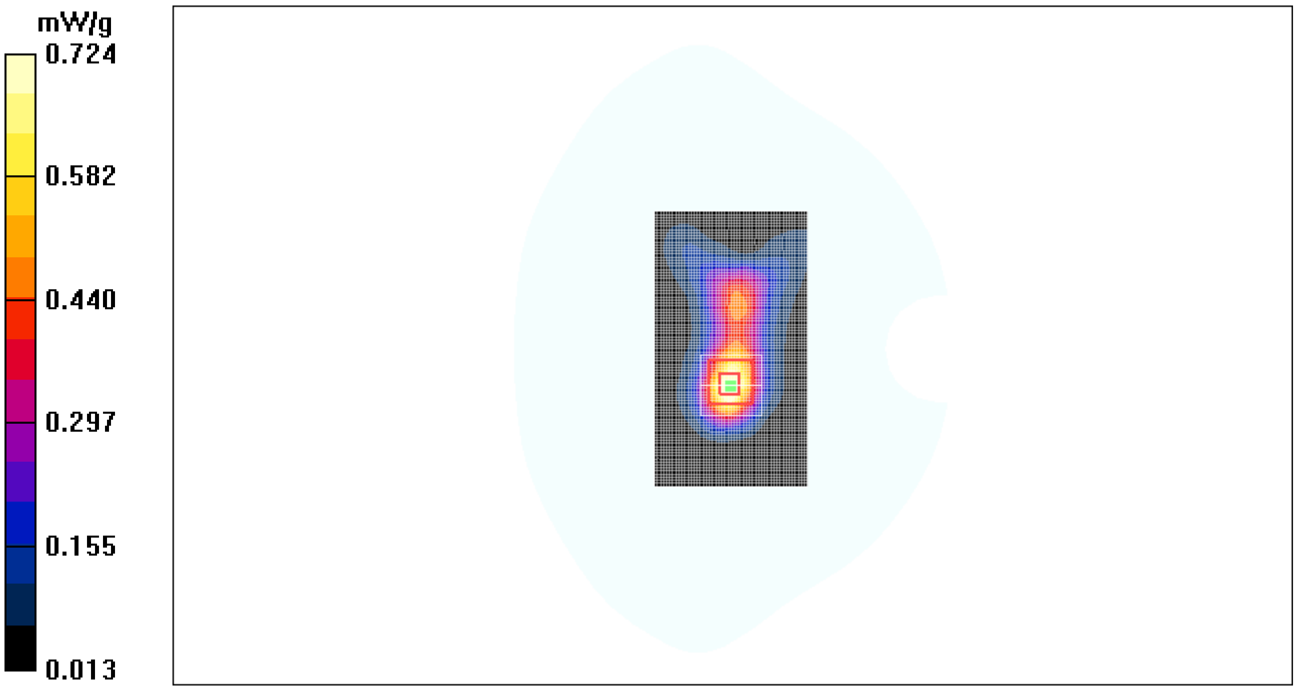


Figure 54 WCDMA Band II HSDPA with BenQ Joybook S72 Test Position 1 Channel 9400

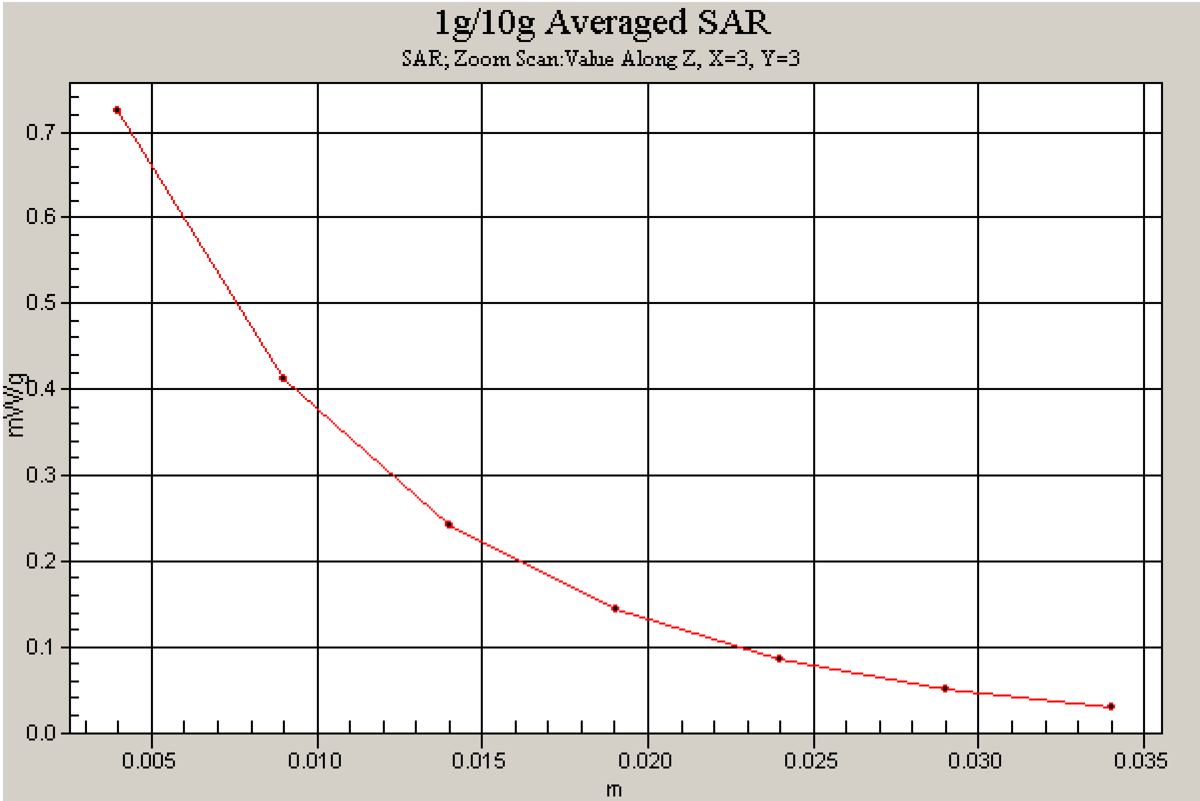


Figure 55 Z-Scan at power reference point (WCDMA Band II HSDPA with BenQ Joybook S72 Test Position 1 Channel 9400)

WCDMA Band V with BenQ Joybook S72 Test Position 1 Middle Frequency

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

Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.985 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);

Electronics: DAE3 Sn536;

Test Position 1 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.194 mW/g

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

Reference Value = 11.0 V/m; Power Drift = -0.168 dB

Peak SAR (extrapolated) = 0.254 W/kg

SAR(1 g) = 0.166 mW/g; SAR(10 g) = 0.106 mW/g

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

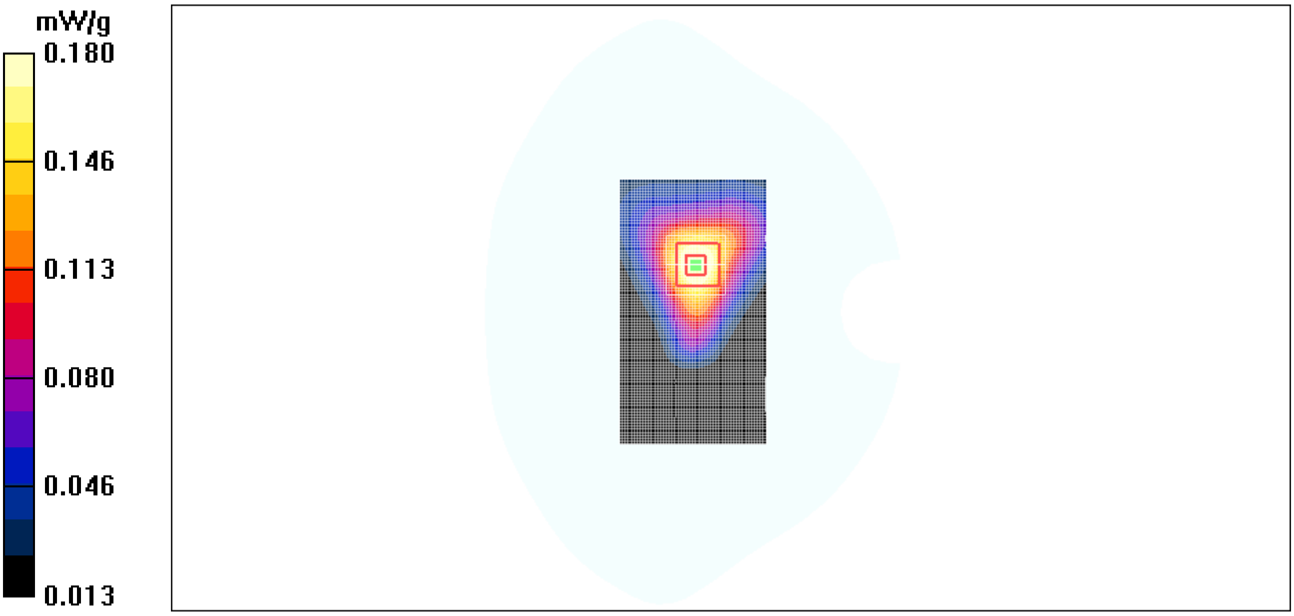


Figure 56 WCDMA Band V with BenQ Joybook S72 Test Position 1Channel 4182

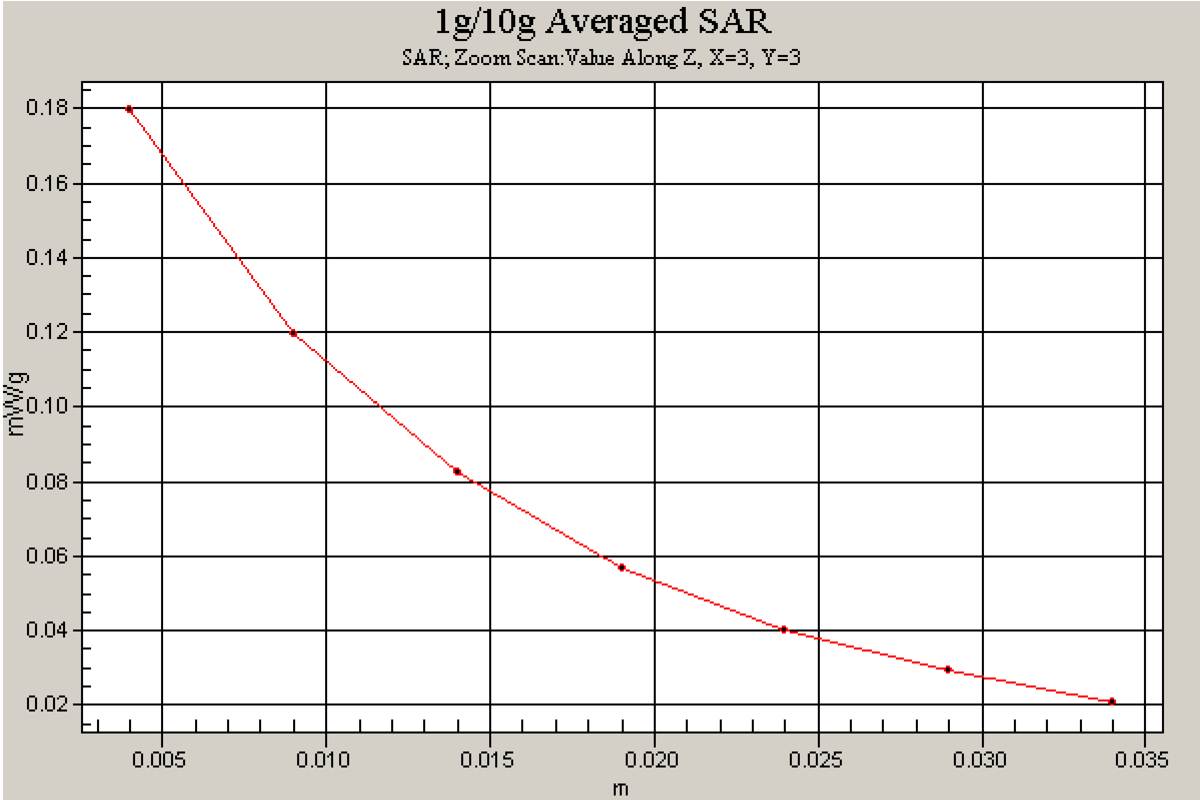


Figure 57 Z-Scan at power reference point (WCDMA Band V with BenQ Joybook S72 Test Position 1Channel 4182)

WCDMA Band V with BenQ Joybook S72 Test Position 2 Middle Frequency
Communication System: WCDMA Band V; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.985 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);
Electronics: DAE3 Sn536;
Test Position 2 Middle/Area Scan (51x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.014 mW/g

Test Position 2 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.43 V/m; Power Drift = 0.193 dB
Peak SAR (extrapolated) = 0.062 W/kg
SAR(1 g) = 0.017 mW/g; SAR(10 g) = 0.007 mW/g
Maximum value of SAR (measured) = 0.020 mW/g

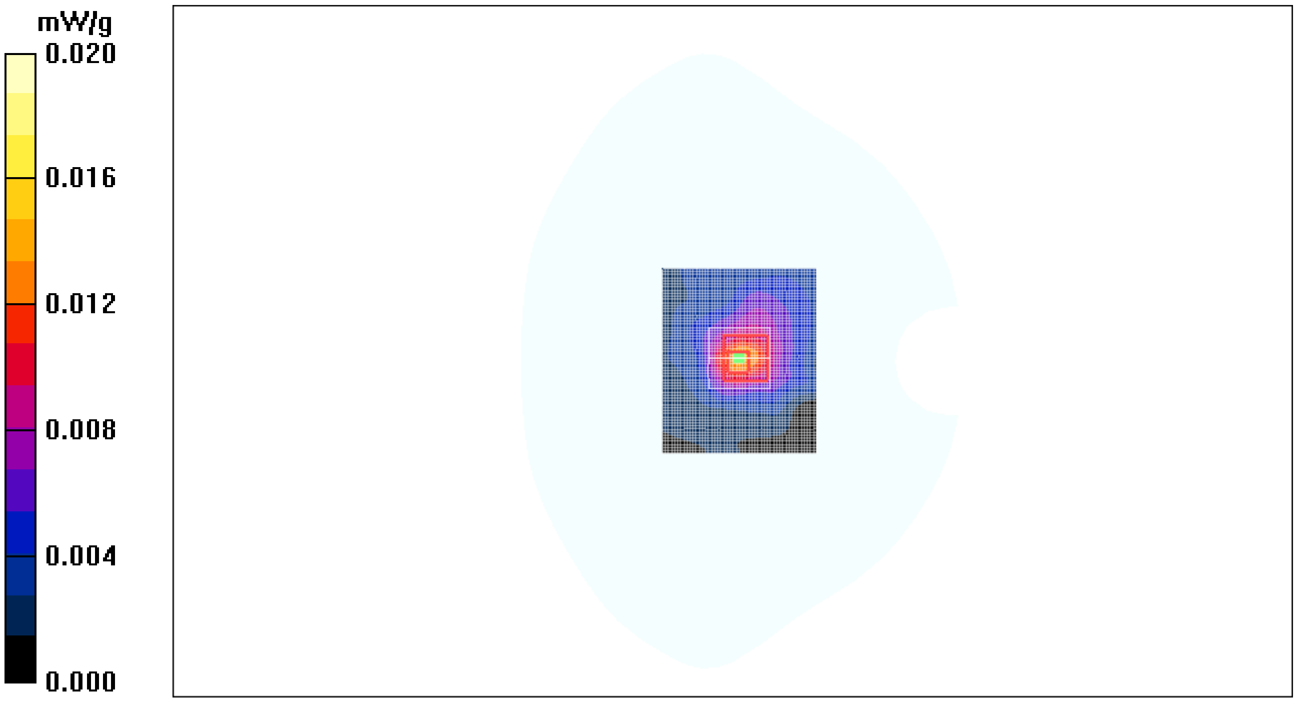


Figure 58 WCDMA Band V with BenQ Joybook S72 Test Position 2 Channel 4182

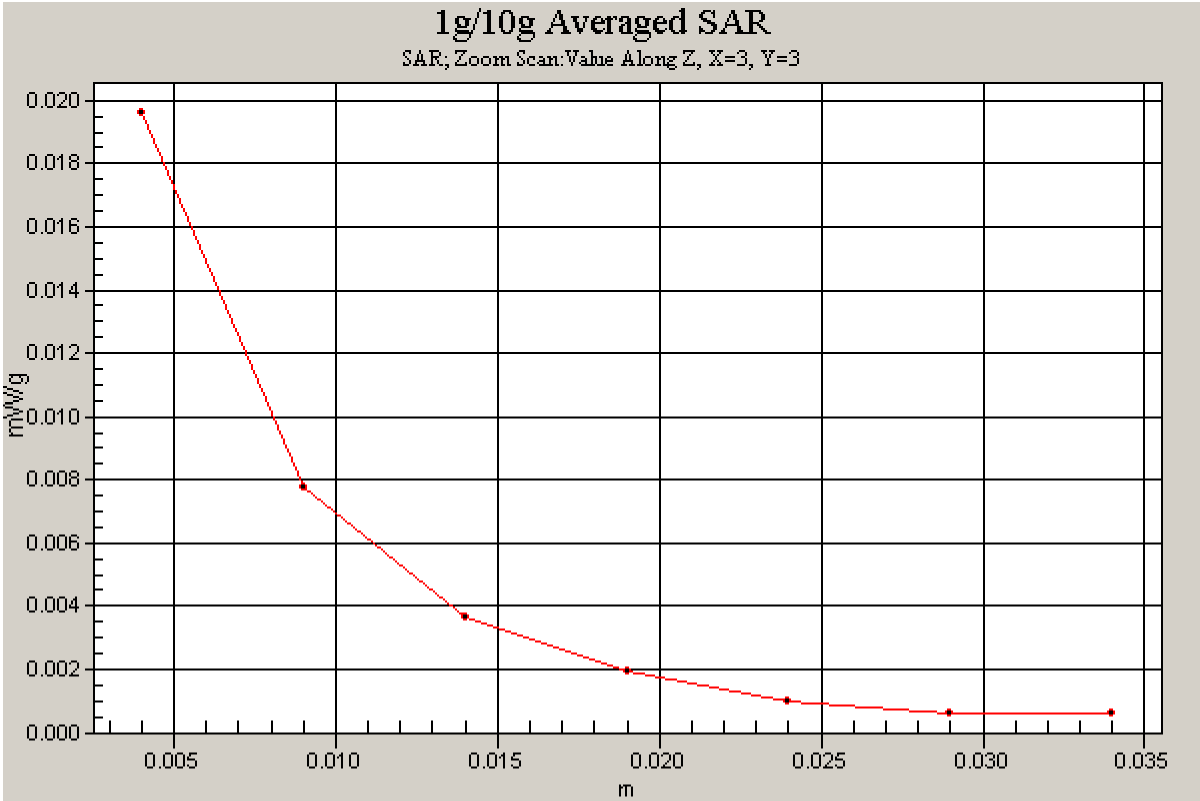


Figure 59 Z-Scan at power reference point (WCDMA Band V with BenQ Joybook S72 Test Position 2 Channel 4182)

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

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

Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.985 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);

Electronics: DAE3 Sn536;

Test Position 3 Middle/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 8.40 V/m; Power Drift = 0.103 dB

Peak SAR (extrapolated) = 0.182 W/kg

SAR(1 g) = 0.120 mW/g; SAR(10 g) = 0.080 mW/g

Maximum value of SAR (measured) = 0.128 mW/g

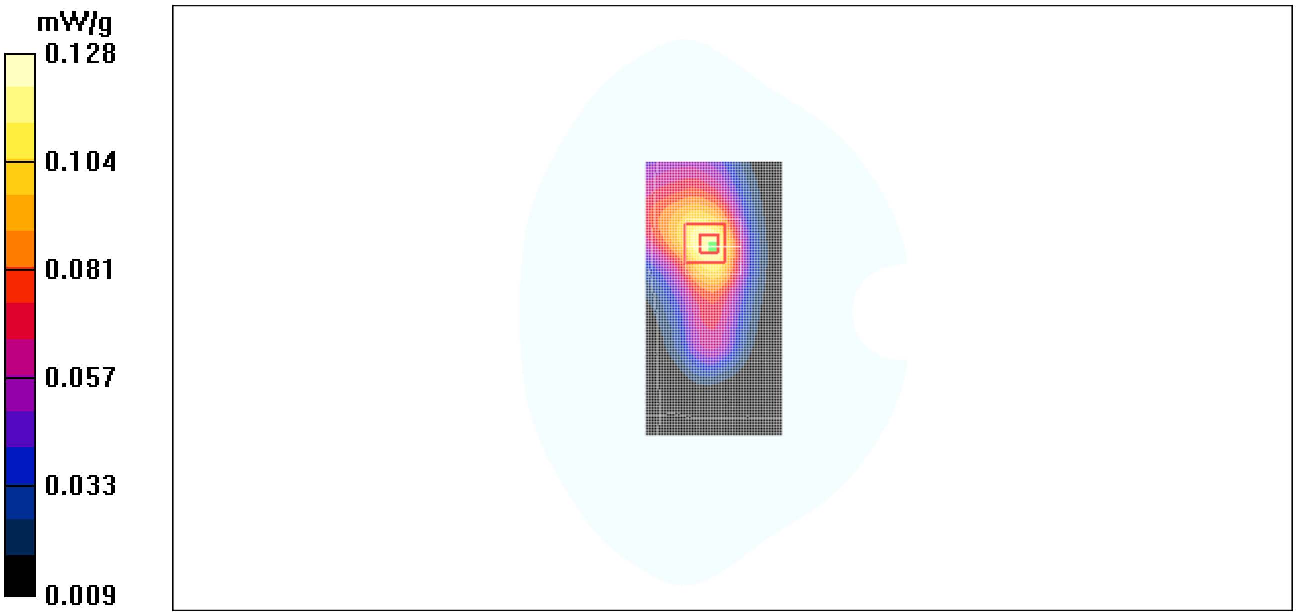


Figure 60 WCDMA Band V with BenQ Joybook R55V Test Position 3 Channel 4182

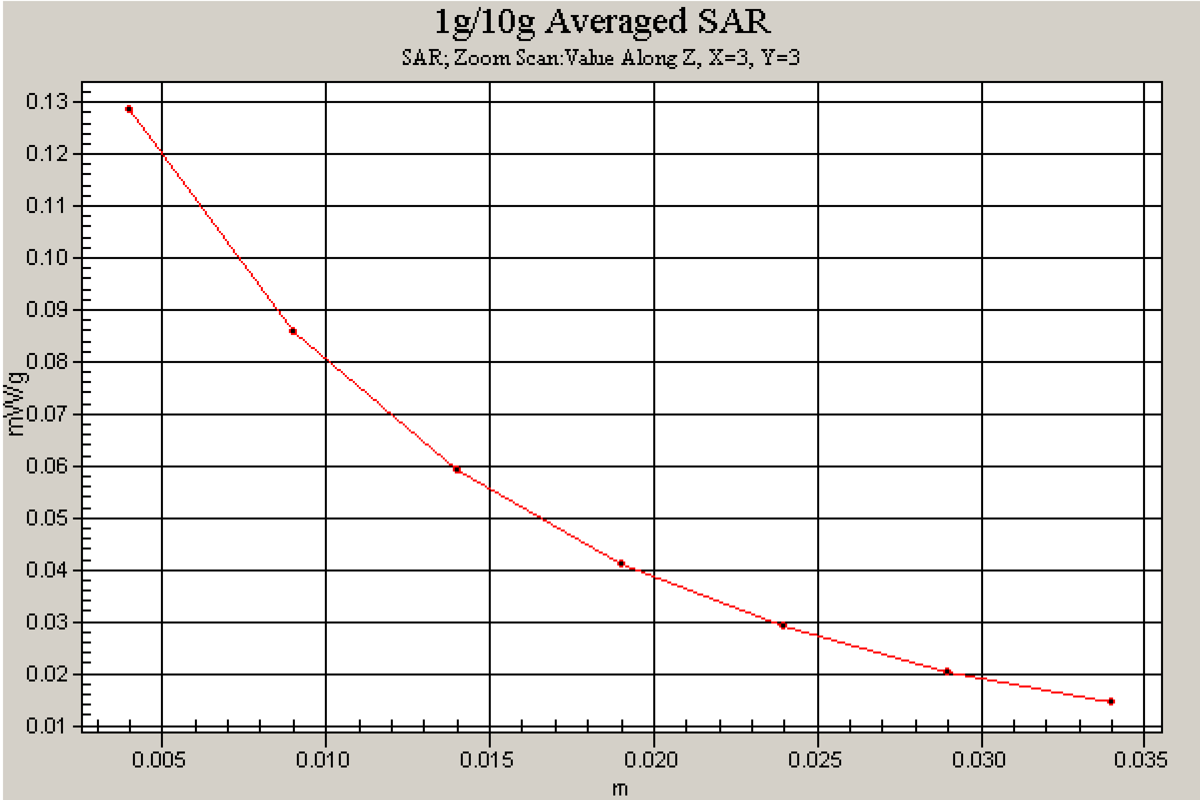


Figure 61 Z-Scan at power reference point (WCDMA Band V with BenQ Joybook R55V Test Position 3 Channel 4182)

WCDMA Band V with IBM T61 Test Position 4 Middle Frequency

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

Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.985 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);

Electronics: DAE3 Sn536;

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

Maximum value of SAR (interpolated) = 0.167 mW/g

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

Reference Value = 10.9 V/m; Power Drift = -0.159 dB

Peak SAR (extrapolated) = 0.223 W/kg

SAR(1 g) = 0.146 mW/g; SAR(10 g) = 0.094 mW/g

Maximum value of SAR (measured) = 0.158 mW/g

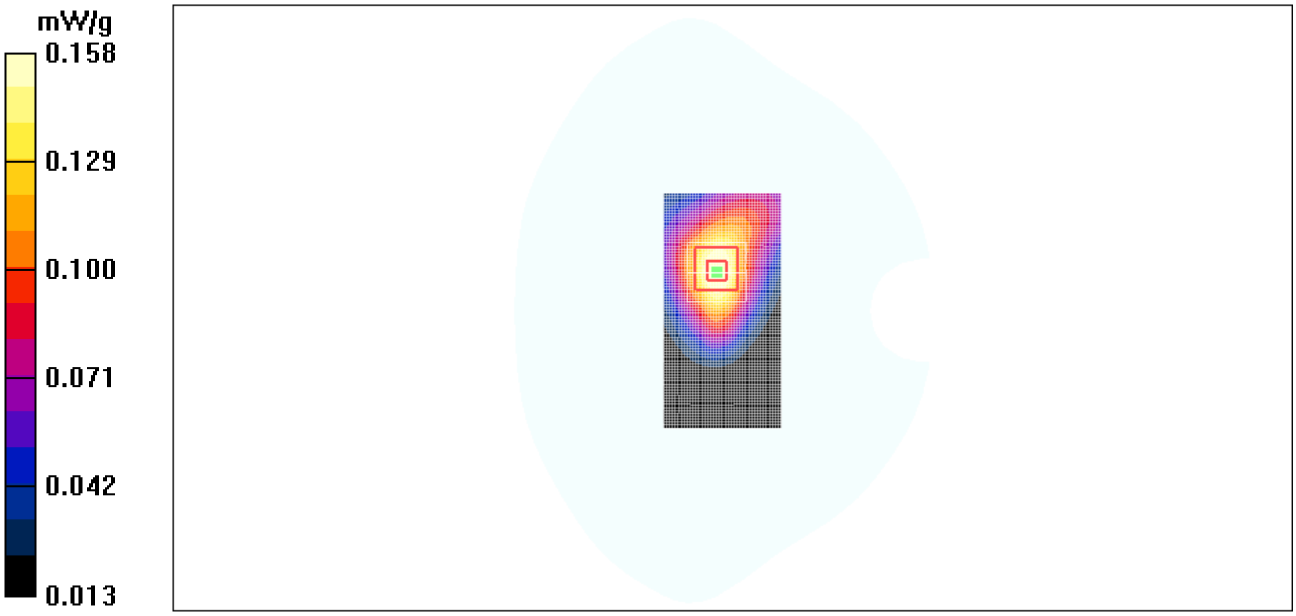


Figure 62 WCDMA Band V with IBM T61 Test Position 4 Channel 4182

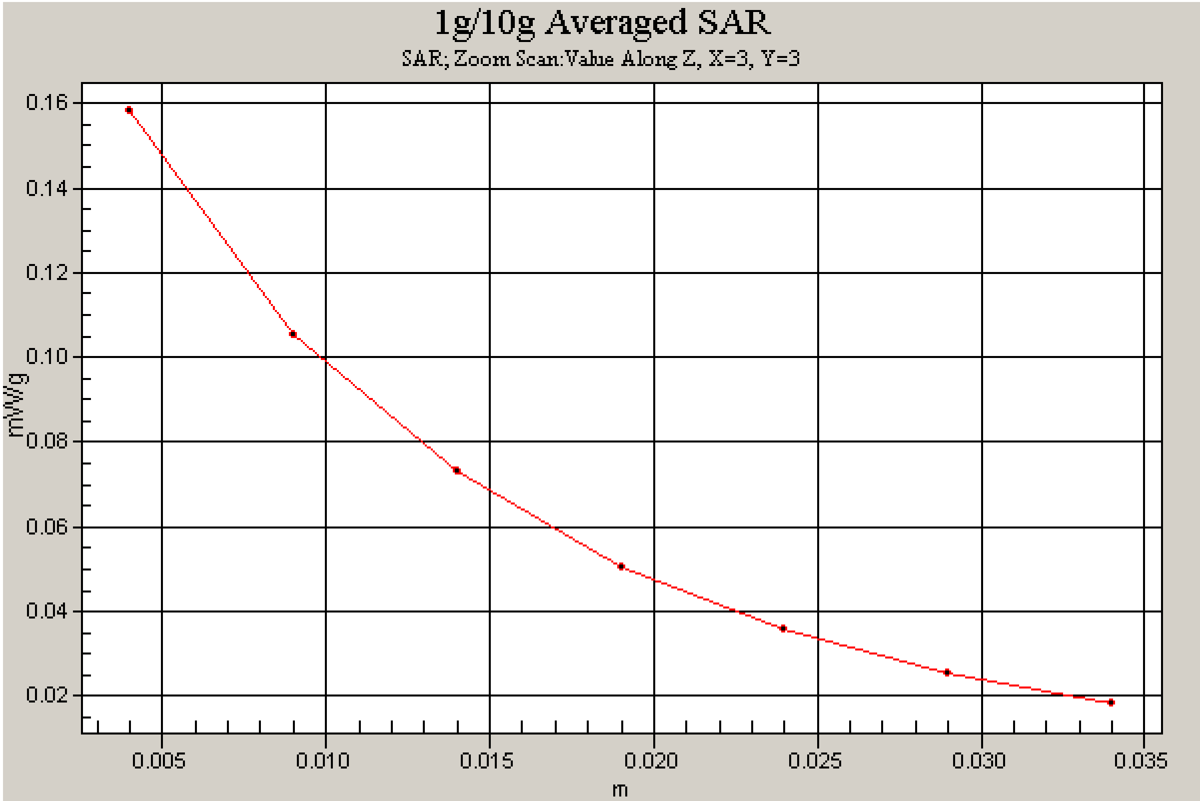


Figure 63 Z-Scan at power reference point (WCDMA Band V with IBM T61 Test Position 4 Channel 4182)

WCDMA Band V with IBM T61 Test Position 5 Middle Frequency

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

Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.985 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);

Electronics: DAE3 Sn536;

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

Maximum value of SAR (interpolated) = 0.147 mW/g

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

Reference Value = 10.3 V/m; Power Drift = -0.119 dB

Peak SAR (extrapolated) = 0.203 W/kg

SAR(1 g) = 0.132 mW/g; SAR(10 g) = 0.085 mW/g

Maximum value of SAR (measured) = 0.143 mW/g

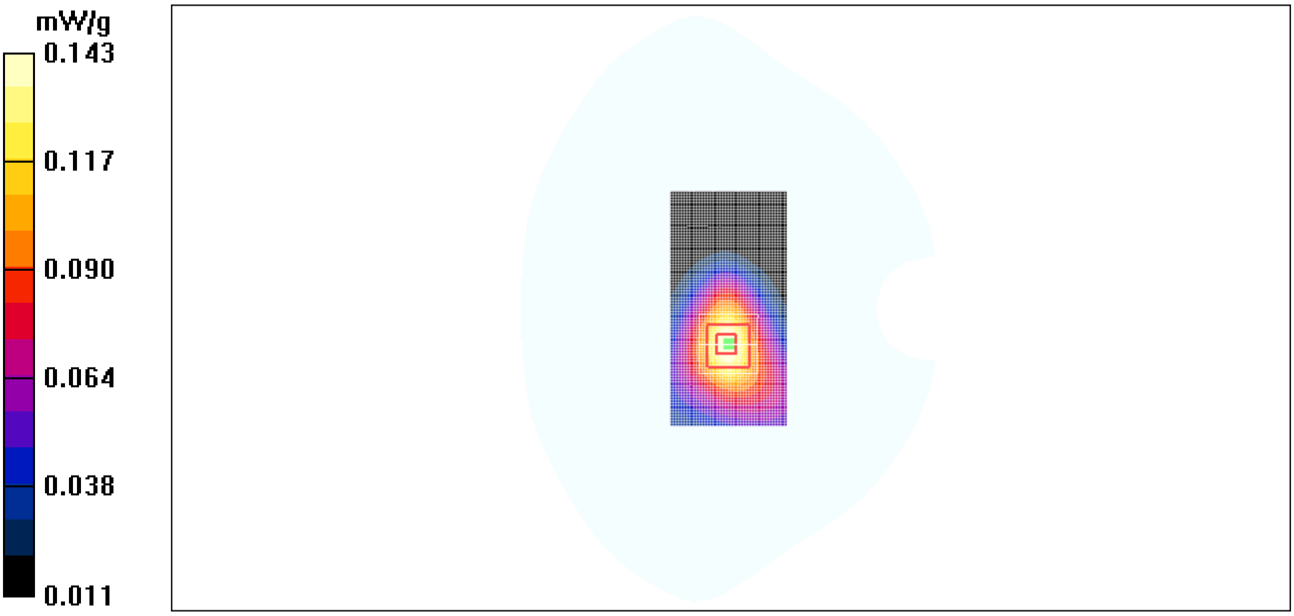


Figure 64 WCDMA Band V with IBM T61 Test Position 5 Channel 4182

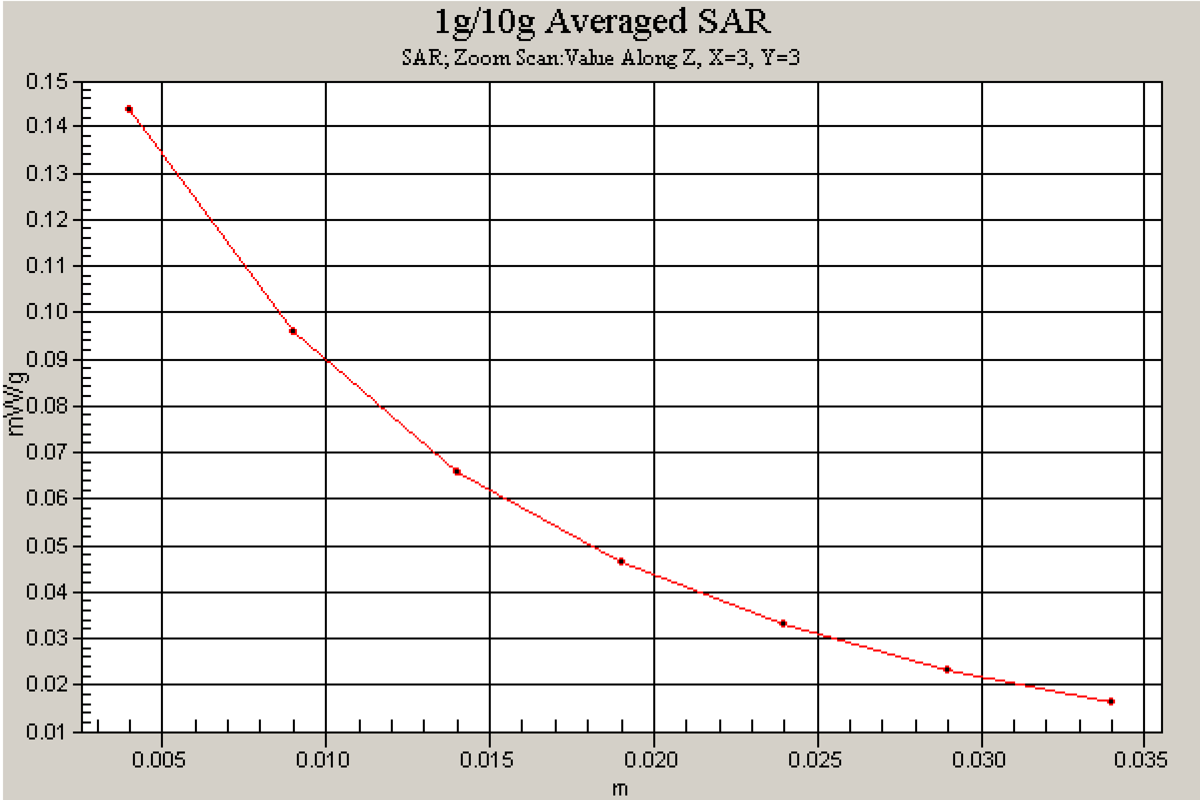


Figure 65 Z-Scan at power reference point (WCDMA Band V with IBM T61 Test Position 5 Channel 4182)

WCDMA Band V HSDPA with BenQ Joybook S72 Test Position 1 Middle Frequency

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

Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.985 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3

Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);

Electronics: DAE3 Sn536;

Test Position 1 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.179 mW/g

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

Reference Value = 10.9 V/m; Power Drift = -0.018 dB

Peak SAR (extrapolated) = 0.230 W/kg

SAR(1 g) = 0.152 mW/g; SAR(10 g) = 0.097 mW/g

Maximum value of SAR (measured) = 0.165 mW/g

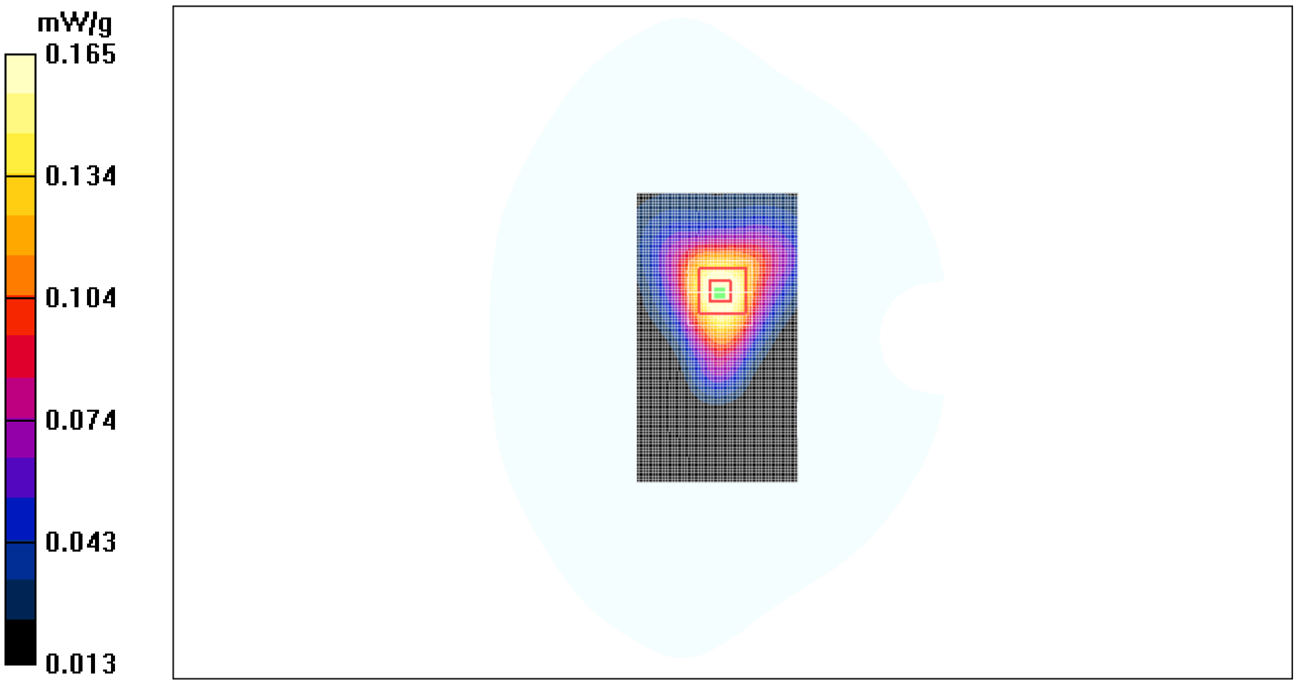


Figure 66 WCDMA Band V HSDPA with BenQ Joybook S72 Test Position 1 Channel 4182

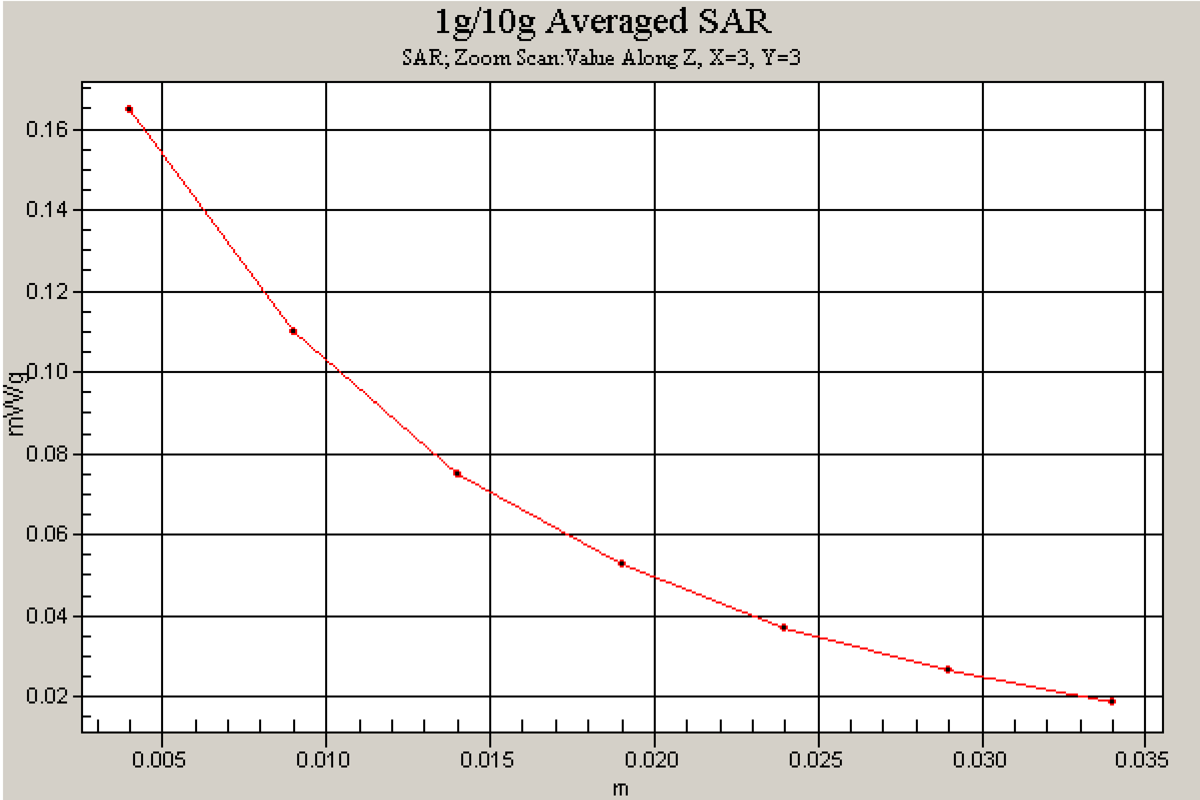


Figure 67 Z-Scan at power reference point (WCDMA Band V HSDPA with BenQ Joybook S72 Test Position 1 Channel 4182)

ANNEX D： SYSTEM VALIDATION RESULTS

System Performance Check at 835 MHz

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

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

Medium parameters used: f = 835 MHz; σ = 0.92 mho/m; ε_r = 41.75; ρ = 1000 kg/m^3

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

Electronics: DAE3 Sn536;

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

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

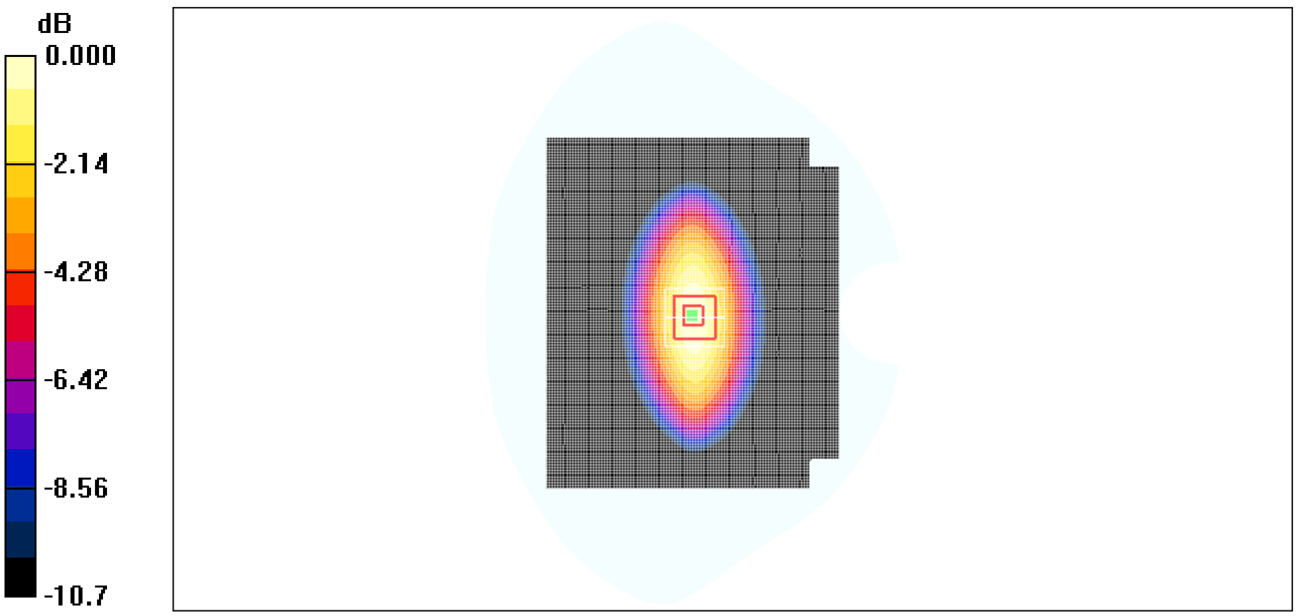
d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 3.50 W/kg

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

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



0 dB = 2.83mW/g

Figure 68 System Performance Check 835MHz 250mW

System Performance Check at 1900 MHz

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

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

Medium parameters used: f = 1900 MHz; σ = 1.412 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3

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

Electronics: DAE3 Sn536;

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

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

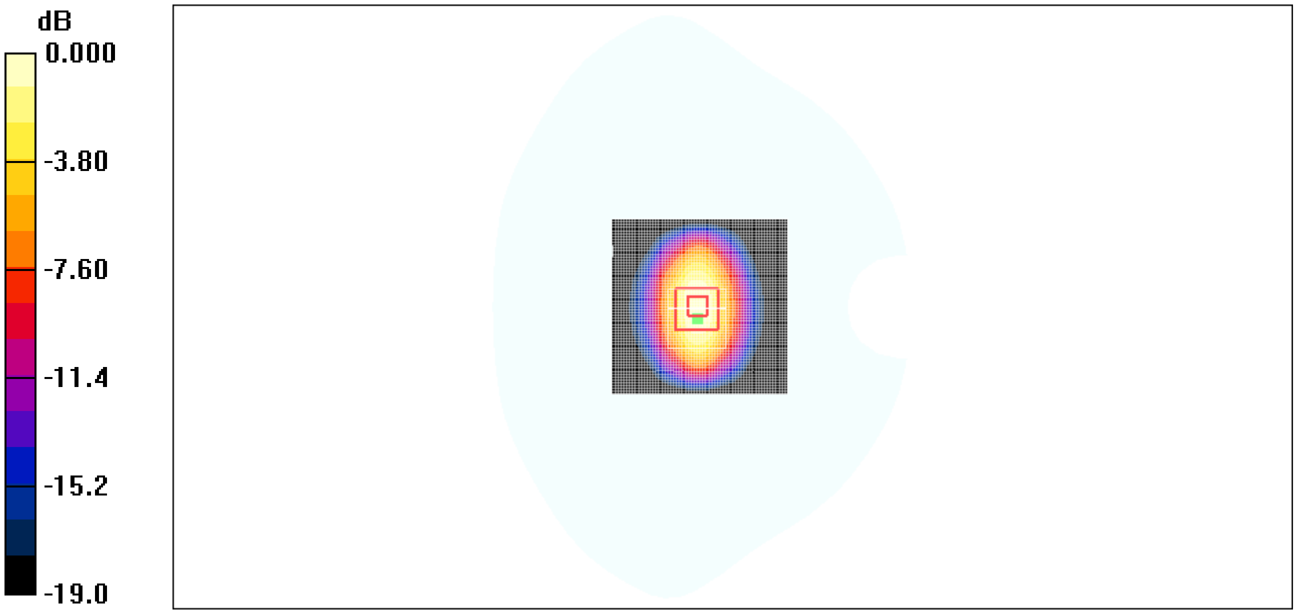
d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 16.9 W/kg

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

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



0 dB = 11.1mW/g

Figure 69 System Performance Check 1900MHz 250mW

`

ANNEX E： PROBE CALIBRATION CERTIFICATE

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

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

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

Accreditation No.: **SCS 108**

Client **TA (Auden)**

Certificate No: **EX3-3660_Sep08**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3660
Calibration procedure(s)	QA CAL-01.v6 and QA CAL-23.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	September 3, 2008
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	1-Jul-08 (No. 217-00865)	Jul-09
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	1-Jul-08 (No. 217-00866)	Jul-09
Reference Probe ES3DV2	SN: 3013	2-Jan-08 (No. ES3-3013_Jan08)	Jan-09
DAE4	SN: 660	3-Sep-07 (No. DAE4-660_Sep07)	Sep-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	[signature]
Approved by:	Fin Bomholt	R&D Director	[signature]

Issued: September 3, 2008

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

Certificate No: EX3-3660_Sep08 Page 1 of 9

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

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

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

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:3660

Manufactured:	April 29, 2008
Calibrated:	September 3, 2008

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: EX3DV4 SN:3660

Sensitivity in Free Space[A]

NormX	**0.44** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**88** mV
NormY	**0.42** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**85** mV
NormZ	**0.45** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**89** mV

Diode Compression[B]

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL 900 MHz Typical SAR gradient: 5 % per mm

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	9.5	5.2
SAR_{be} [%]	With Correction Algorithm	0.4	0.1

TSL 1750 MHz Typical SAR gradient: 10 % per mm

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	7.6	3.8
SAR_{be} [%]	With Correction Algorithm	0.2	0.1

Sensor Offset

Probe Tip to Sensor Center **1.0** mm

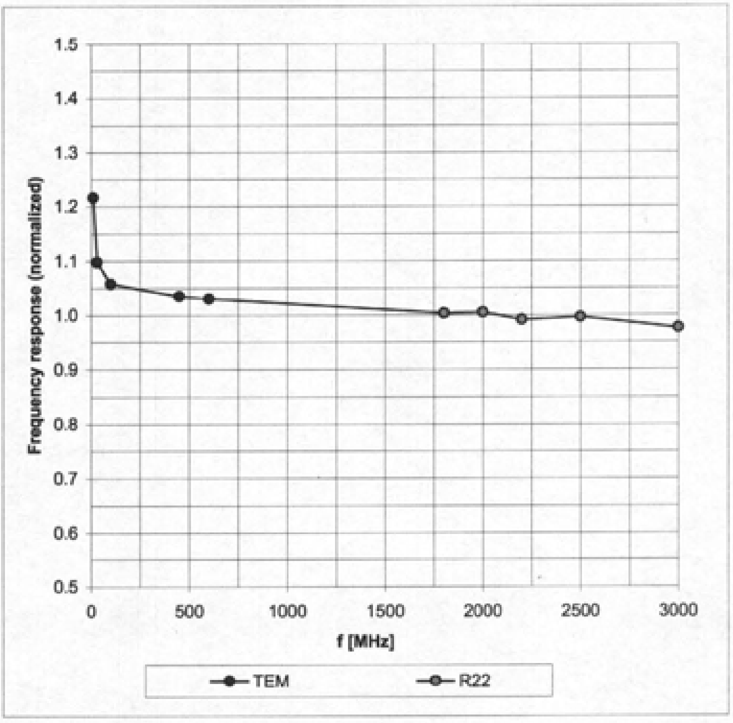
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

Frequency Response of E-Field

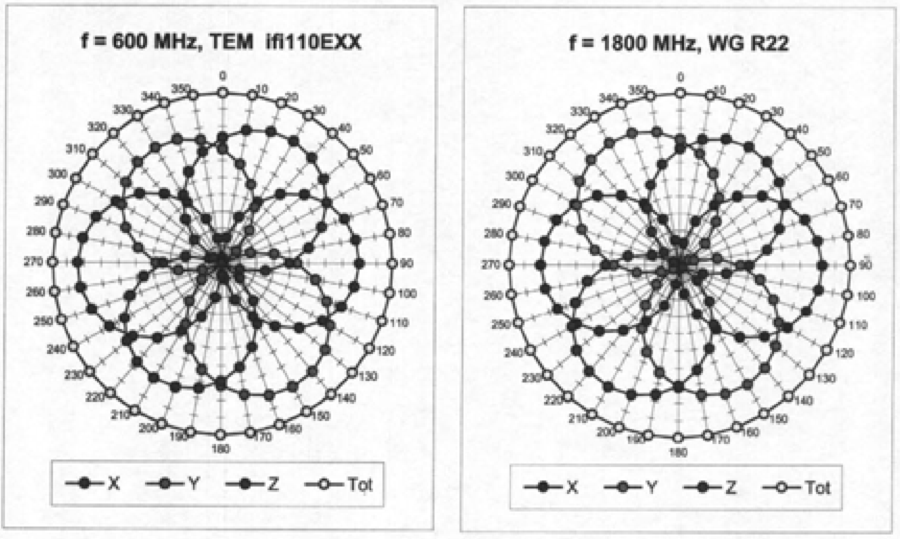
(TEM-Cell:ifi110 EXX, Waveguide: R22)

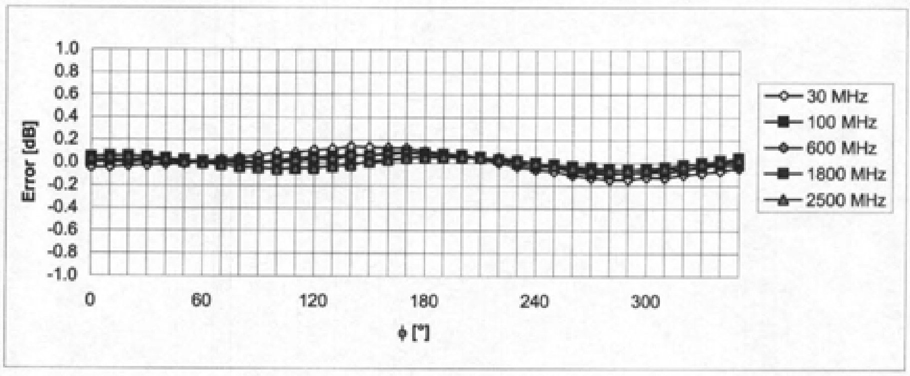


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

EX3DV4 SN:3660 **September 3, 2008**

Receiving Pattern (ϕ), ϑ = 0°



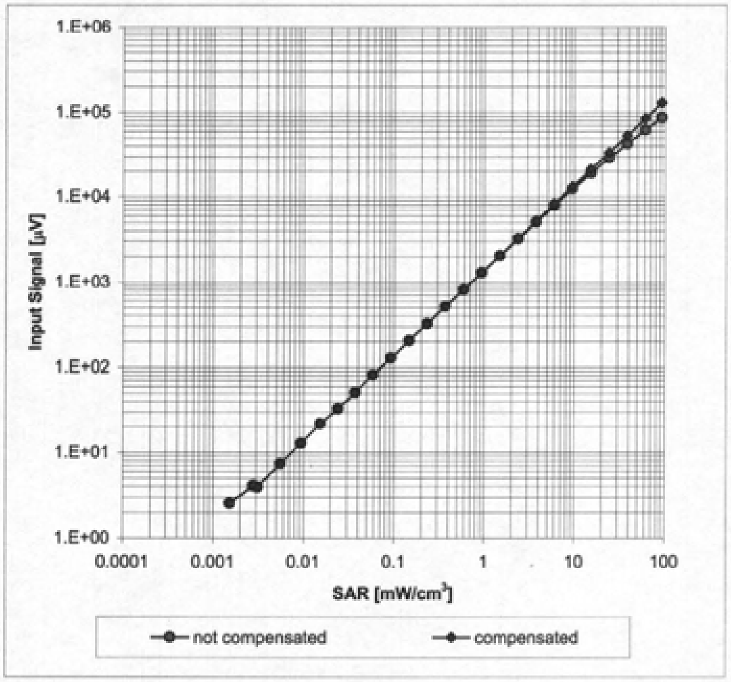


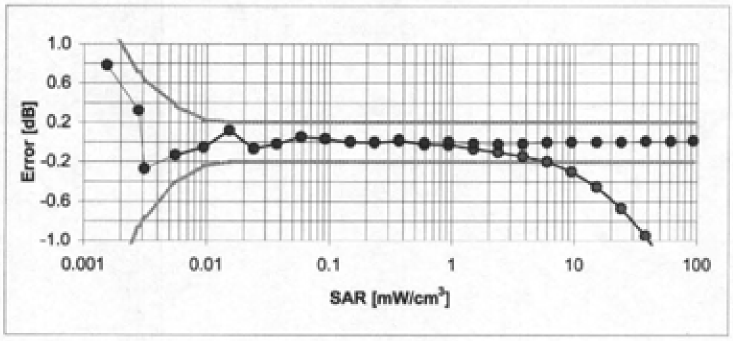
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

EX3DV4 SN:3660 September 3, 2008

Dynamic Range f(SAR_{head})

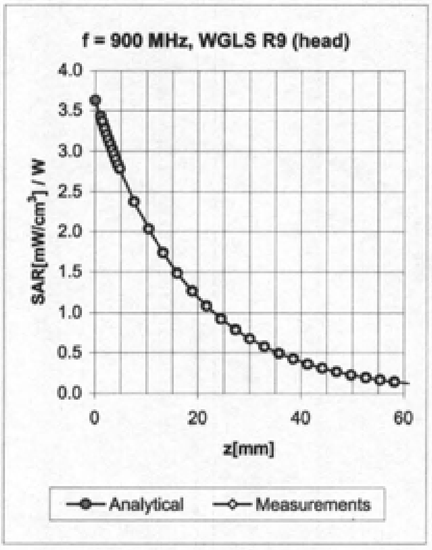
(Waveguide R22, f = 1800 MHz)

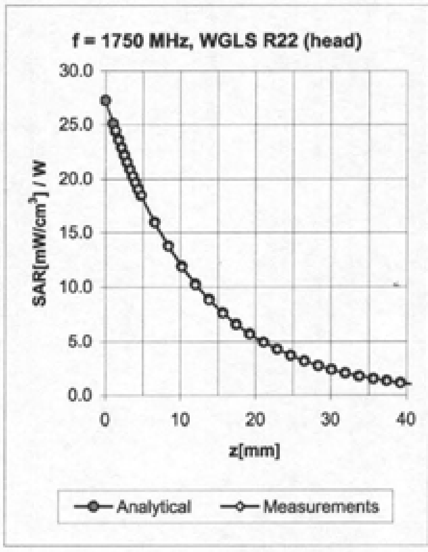




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment





f [MHz]	Validity [MHz][c]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.49	0.76	9.19	± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.43	0.83	8.84	± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.68	0.63	7.79	± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.31	0.80	7.35	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.32	0.85	6.94	± 11.0% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.63	0.71	9.10	± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.30	1.08	8.76	± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.34	0.86	7.55	± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.60	0.67	7.45	± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.30	1.15	6.75	± 11.0% (k=2)

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