NO.: RZA2008-1543

OET 65

TEST REPORT

Test name	Electromagnetic Field (Specific Absorption Rate)
Product	HSDPA USB Stick
Model	E156C
FCC ID	QISE156C
Client	HUAWEI Technologies Co., Ltd.

TA Technology (Shanghai) Co., Ltd.

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GENERAL SUMMARY

Product	HSDPA USB Stick	**Model**	E156C
Client	HUAWEI Technologies Co., Ltd.	**Type of test**	Entrusted
Manufacturer	HUAWEI Technologies Co., Ltd.	**Arrival Date of sample**	December 2nd, 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	GJ2AA108A0500089		
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 handheld and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 2: Procedure to determine the Specific Absorption Rate (SAR)for wireless communication devices used in close proximity to the human body .(frequency rang of 30MHz to 6GHz)		
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: December 15th, 2008**		
Comment	The test result only responds to the measured sample.		

Approved by Weizhong Yang **Revised by** Dabao Wang **Performed by** Jinchang Li

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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.

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3. DESCRIPTION OF EUT

3.1. Addressing Information Related to EUT

Table 1: Applicant (The Client)

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

Table 2: Manufacturer

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

3.2. Constituents of EUT

Table 3: Constituents of Samples

Description	Model	Serial Number	Manufacturer
HSDPA USB Stick	E156C	GJ2AA108A0500089	HUAWEI Technologies Co., Ltd.

Note:

The EUT appearances see ANNEX H.

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 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	
HSDPA UE category	6	
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 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 V: 3, tested with maximum output power	
Test channel (Low –Middle –High)	128-192-251 (GSM850) (tested) 512 - 661-810 (GSM1900) (tested) 4132 -4182 -4233 (WCDMA Band V) (tested)	
hardware version:	CD25TCPU	
software version:	11.604.21.81.00	
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 HSDPA 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, and WCDMA Band V. The EUT have GPRS (class 12), EGPRS (class 12) and WCDMA/HSDPA (category 6) functions.

Since the EUT only has the data transfer function, but does not have the voice transfer function, the tests in the band of GSM850 and GSM 1900 are performed in the mode of GPRS and EGPRS， The tests in the band of 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

Connection to the EUT is established via air interface with E5515C, and the EUT is set to maximum output power by E5515C. The antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the EUT. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the EUT by at least 30 dB.

The device that connected to host computers must be tested with the device position for all applicable orientations. The measurements were performed in combination with three host products (IBMT61, BenQ Joy book S72 and BenQ Joy book R55V).

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:

Table 5：The allowed power reduction in the multi-slot configuration

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

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

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

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

Table 6: The configurations for the DPCCH and $DPDCH_1$

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

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

4.4. HSDPA Test Configuration

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

HSDPA should be configured according to the UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission condition, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors($\beta c, \beta d$), and HS-DPCCH

power offset parameters（△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.

Table 7: Subtests for UMTS 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 ⇔ β_{hs}=30/15*β_c

Note2:CM=1 forβ_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) toβ_c=11/15 andβ_d=15/15.

Table 8: Settings of required H-Set 1 QPSK in HSDPA mode

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

Table 9: HSDPA UE category

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

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 H 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 H 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 H Picture 7-c）
- Test Position 4: The EUT is connected to the portable computer with vertical USB slot. The left side of the EUT towards the bottom of the flat phantom. (ANNEX H Picture 7-d）
- Test Position 5: The EUT is connected to the portable computer with vertical USB slot. The right side of the EUT towards the bottom of the flat phantom.（ANNEX H Picture 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-c: BenQ Joybook R55V(118) Close

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

Picture 1-e: IBM T61 Close

Picture 1-f: IBM T61 Open

Picture 1-g: 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

The DASY4 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- A unit to operate the optical surface detector which is connected to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY4 measurement server.
- The DASY4 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2003
- DASY4 software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System validation dipoles allowing to validate the proper functioning of the system.

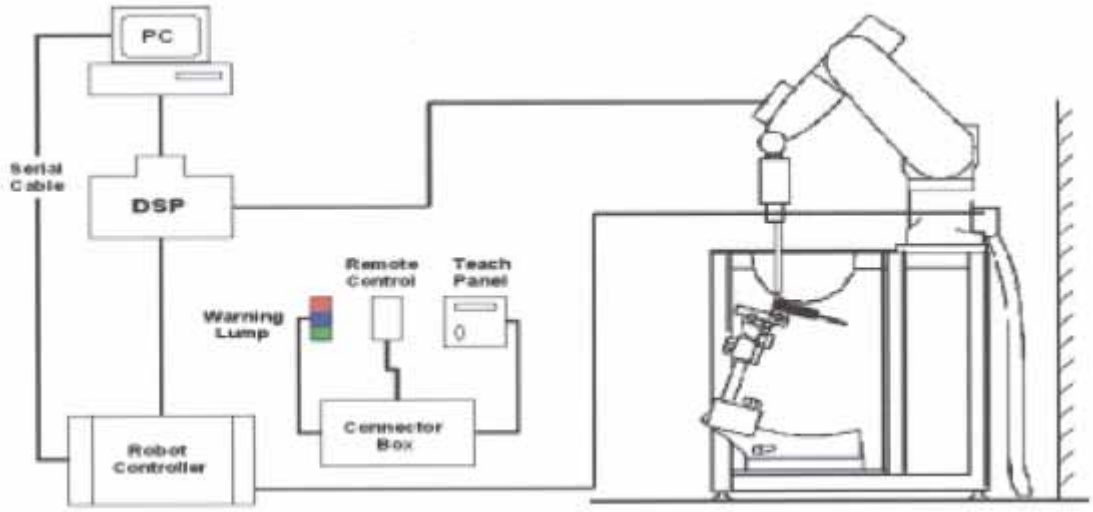


Figure 1. SAR Lab Test Measurement Set-up

5.2. Dasy4 E-field Probe System

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

5.2.1. EX3DV4 Probe Specification

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 900 and HSL 1750 Additional CF for other liquids and frequencies upon request
Frequency	10 MHz to > 6 GHz Linearity: ± 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.

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

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

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

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

5.3. Other Test Equipment

5.3.1. Device Holder for Transmitters

The DASY device holder is designed to cope with the die rent positions given in the standard.
It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.
The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity "=3 and loss tangent _=0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the inference of the clamp on the test results could thus be lowered.

Figure 4.Device Holder

5.3.2. Phantom

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

Shell Thickness	2±0.1 mm
Filling Volume	Approx. 20 liters
Dimensions	810 x 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°.)

- Area Scan

  The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot.Before starting the area scan a grid

spacing of 15 mm x 15 mm is set. During the scan the distance of the probe to the phantom remains unchanged.
After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

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

- Spatial Peak Detection
  The procedure for spatial peak SAR evaluation has been implemented according to the IEEE1529 standard and can determine values of masses of 1g and 10g, as well as for user-specific masses.The DASY4 system allows evaluations that combine measured data and robot positions, such as:
  • maximum search
  • extrapolation
  • boundary correction
  • peak search for averaged SAR
  During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard' s method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.
  Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space. They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard' s method for extrapolation. For a grid using 7x7x7 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1g and 10g cubes.
- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube 7x7x7 scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

5.5. Data Storage and Evaluation

5.5.1. Data Storage

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

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/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 $\boldsymbol{SAR}$ = local specific absorption rate in mW/g

$\boldsymbol{E_{tot}}$ = 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.

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

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

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

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

5.6. 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 adaptation 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.

.

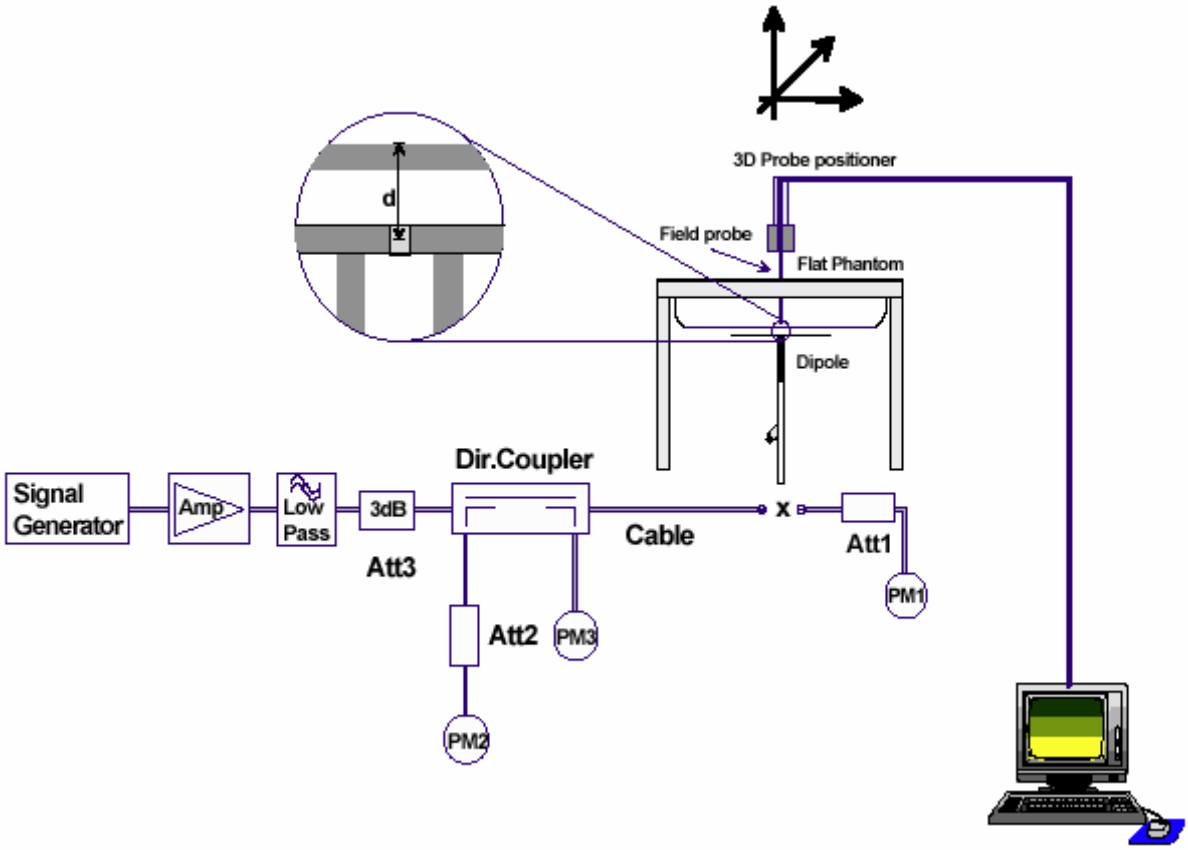


Figure 6. System validation Set-up

5.7. Equivalent Tissues

The liquid is consisted of water, sugar, salt, Glycol monobutyl, Preventol and Cellulose. The liquid has previously been proven to be suited for worst-case. The Table 10 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by OET 65.

Table 10: 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 11: 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 handheld and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 2: Procedure to determine the Specific Absorption Rate (SAR)for wireless communication devices used in close proximity to the human body .(frequency rang of 30MHz to 6GHz).

8. CONDUCTED OUTPUT POWER MEASUREMENT

8.1. Summary

The DUT is tested using an E5515C communications tester as controller unit to set test channels and maximum output power to the DUT, as well as for measuring the conducted peak power. Conducted output power was measured using an integrated RF connector and attached RF cable. This result contains conducted output power for the EUT.

8.2. Conducted Power Results

Table 12: Conducted Power Measurement Results

GSM 850+GPRS	**Conducted Power (dBm)**		
	Channel 128	Channel 192	Channel 251
	(824.2MHz)	(837 MHz)	(848.8MHz)
Results	30.08	30.25	30.19
GSM 1900+GPRS	**Conducted Power (dBm)**		
	Channel 512	Channel 661	Channel 810
	(1850.2MHz)	(1880MHz)	(1909.8MHz)
Results	26.12	25.57	25.83
WCDMA Band V Results	**Conducted Power (dBm)**		
	Channel 4132	Channel 4182	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
(12.2kbps RMC)	22.08	22.07	22.13
(64kbps RMC)	22.12	22.06	22.08
(144kbps RMC)	22.08	22.12	22.11
(384kbps RMC)	22.13	22.05	22.01
WCDMA Band V +HSDPA	**Conducted Power (dBm)**		
	Channel 4132	Channel 4182	Channel 4233
	(826.4MHz)	(836.6MHz)	(846.6MHz)
Sub - Test 1	22.07	22.12	22.01
Sub - Test 2	20.85	21.73	21.85
Sub - Test 3	20.57	20.84	20.91
Sub - Test 4	20.43	20.75	20.74

9. TEST RESULTS

9.1. Dielectric Performance

Table 13: Dielectric Performance of Body Tissue Simulating Liquid

Measurement is made at temperature 22.5 ℃ and relative humidity 51%.					
Frequency		**Target value**	**Measurement**	**Difference**	
835 (Body)	Permittivity ε_r	55.20	55.54	0.61	%
	Conductivity σ	0.97	0.98	1.03	%
1900 (Body)	Permittivity ε_r	53.30	51.59	-3.21	%
	Conductivity σ	1.52	1.56	2.63	%

9.2. System Validation

Table 14: 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 C.

9.3. Summary of Measurement Results

9.3.1. GSM850 (GPRS/EGPRS)

Table 15: SAR Values [GSM850 (GPRS/EGPRS)]

Liquid Temperature: 22.4℃;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	0.343	0.541	-0.091	Figure 7
	3 timeslots	Middle	0.445	0.715	0.060	Figure 9
	2 timeslots	High	0.557	0.880	-0.195	Figure 11
		Middle	0.537	0.850	0.102	Figure 13
		Low	0.480	0.754	-0.005	Figure 15
	1 timeslot	Middle	0.487	0.769	-0.039	Figure 17
Test Position 2	2 timeslots	Middle	0.033	0.074	0.146	Figure 19
BenQ Joy book R55V						
Test Position 3	2 timeslots	Middle	0.384	0.558	-0.169	Figure 21
IBM T61						
Test Position 4	2 timeslots	Middle	0.452	0.709	0.082	Figure 23
Test Position 5	2 timeslots	Middle	0.405	0.635	0.002	Figure 25
Worst case position with EGPRS						
Test Position 1	2 timeslots	High	0.232	0.367	-0.139	Figure 27

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

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

Table 16: 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	High	1.158	0.579	1.447
	5mm	High	0.730		
	10mm	High	0.442		

Note: 1. The probe tip location is fixed at the distance of one half the probe tip diameter from the phantom surface.

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

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

9.3.2. GSM1900 (GPRS/EGPRS)

Table 17:SAR Values [GSM1900 (GPRS/EGPRS)]

Liquid Temperature: 22.4℃;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	0.271	0.507	-0.151	Figure 29
	3 timeslots	Middle	0.315	0.588	-0.086	Figure 31
	2 timeslots	Middle	**0.329**	**0.611**	-0.103	Figure 33
	1 timeslot	Middle	0.270	0.502	0.104	Figure 35
Test Position 2	2 timeslots	Middle	0.100	0.213	0.016	Figure 37
BenQ Joy book R55V						
Test Position 3	2 timeslots	High	0.496	0.985	-0.064	Figure 39
		Middle	0.510	1.010	-0.045	Figure 41
		Low	0.581	1.160	0.014	Figure 43
IBM T61						
Test Position 4	2 timeslots	Middle	0.231	0.424	-0.112	Figure 45
Test Position 5	2 timeslots	Middle	0.270	0.527	-0.018	Figure 47
Worst case position with EGPRS						
Test Position 3	2 timeslots	Low	0.375	0.747	0.062	Figure 49

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

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

Table 18: SAR Values (GSM1900, 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	Low	1.569	0.785	1.961
	5mm	Low	0.533		

Note: 1. The probe tip location is fixed at the distance of one half the probe tip diameter from the phantom surface.

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

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

9.3.3. WCDMA Band V (HSDPA)

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

Liquid Temperature: 22.4℃;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	High	0.389	0.617	-0.032	Figure 51
	Middle	0.313	0.493	0.093	Figure 53
	Low	0.456	0.720	0.038	Figure 55
Test Position 2	Middle	0.023	0.051	0.012	Figure 57
BenQ Joy book R55V					
Test Position 3	Middle	0.265	0.403	0.034	Figure 59
IBM T61					
Test Position 4	Middle	0.245	0.381	0.038	Figure 61
Test Position 5	Middle	0.259	0.406	0.017	Figure 63
Worst case position with HSDPA					
Test Position 1	Low	0.387	0.610	-0.190	Figure 65

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

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

Table 20: SAR Values (WCDMA Band V, 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	Low	0.887	0.443	1.109
	5mm	Low	0.467		
	10mm	Low	0.358		

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

9.4. Conclusion

Localized Specific Absorption Rate (SAR) of this portable wireless device has been measured in all cases requested by the relevant standards cited in Clause 7.2 of this report. Maximum localized SAR is 1.16w/kg that is below exposure limits specified in the relevant standards cited in Clause 7.1 of this test report.

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	$\sqrt{3}$	$(1\text{-}cp)^{1/2}$	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 21: 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

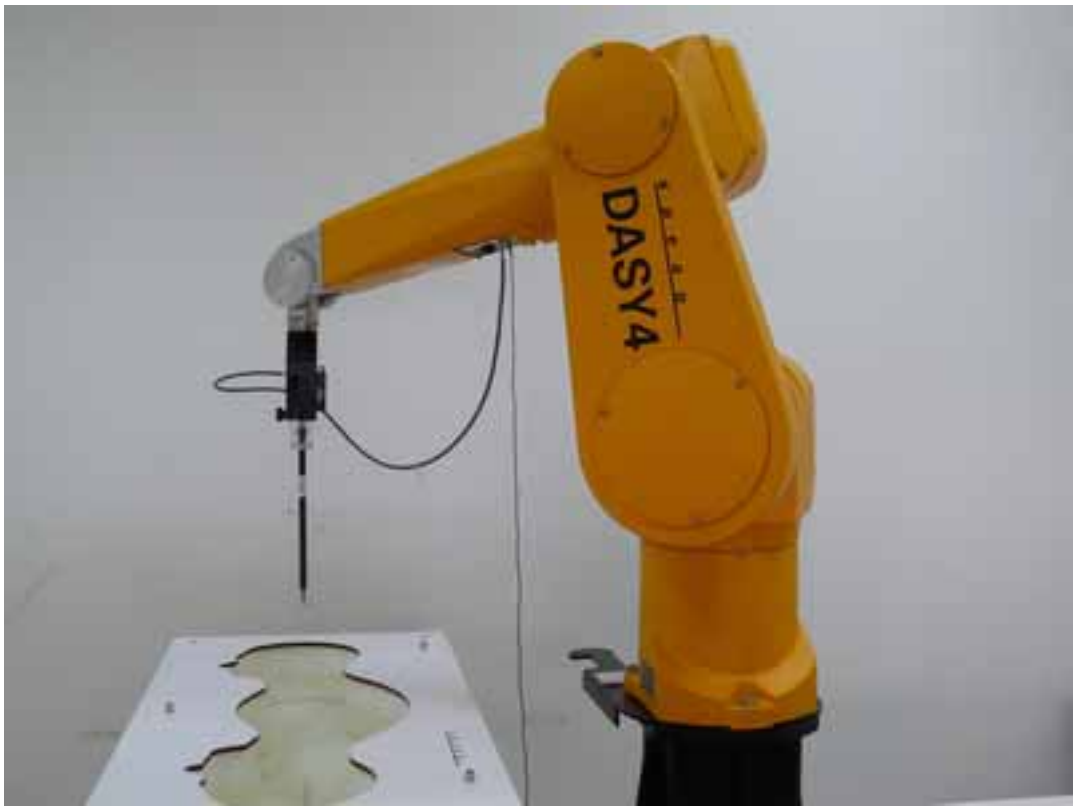
The test is performed in December 3rd, 2008 to December 6th, 2008

13. TEST LOCATION

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

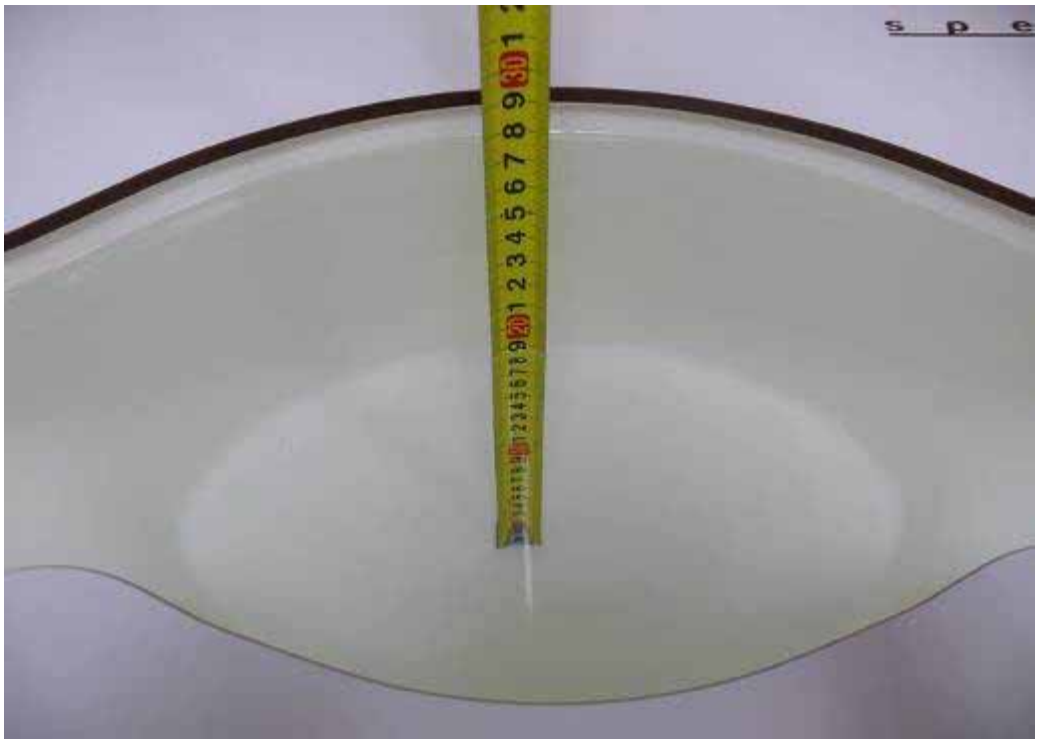
*****END OF REPORT BODY*****

ANNEX A： TEST LAYOUT



Picture 2 Specific Absorption Rate Test Layout

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



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

ANNEX B： GRAPH RESULTS

Date/Time: 12/4/2008 4:10:52 AM

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

Communication System: GSM 850+GPRS(4Up); Frequency: 837 MHz;Duty Cycle: 1:2

Medium parameters used: f = 837 MHz; σ = 0.982 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3

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

Electronics: DAE3 Sn536;

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

Maximum value of SAR (interpolated) = 0.701 mW/g

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

Reference Value = 21.1 V/m; Power Drift = -0.091 dB

Peak SAR (extrapolated) = 0.840 W/kg

SAR(1 g) = 0.541 mW/g; SAR(10 g) = 0.343 mW/g

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

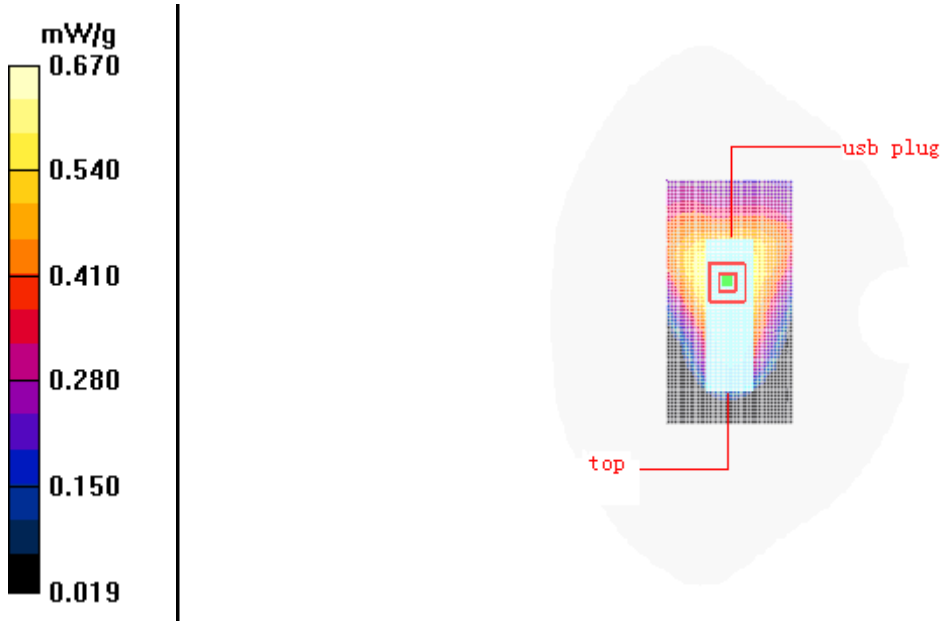


Figure 7 GSM 850 GPRS (4 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Channel 192

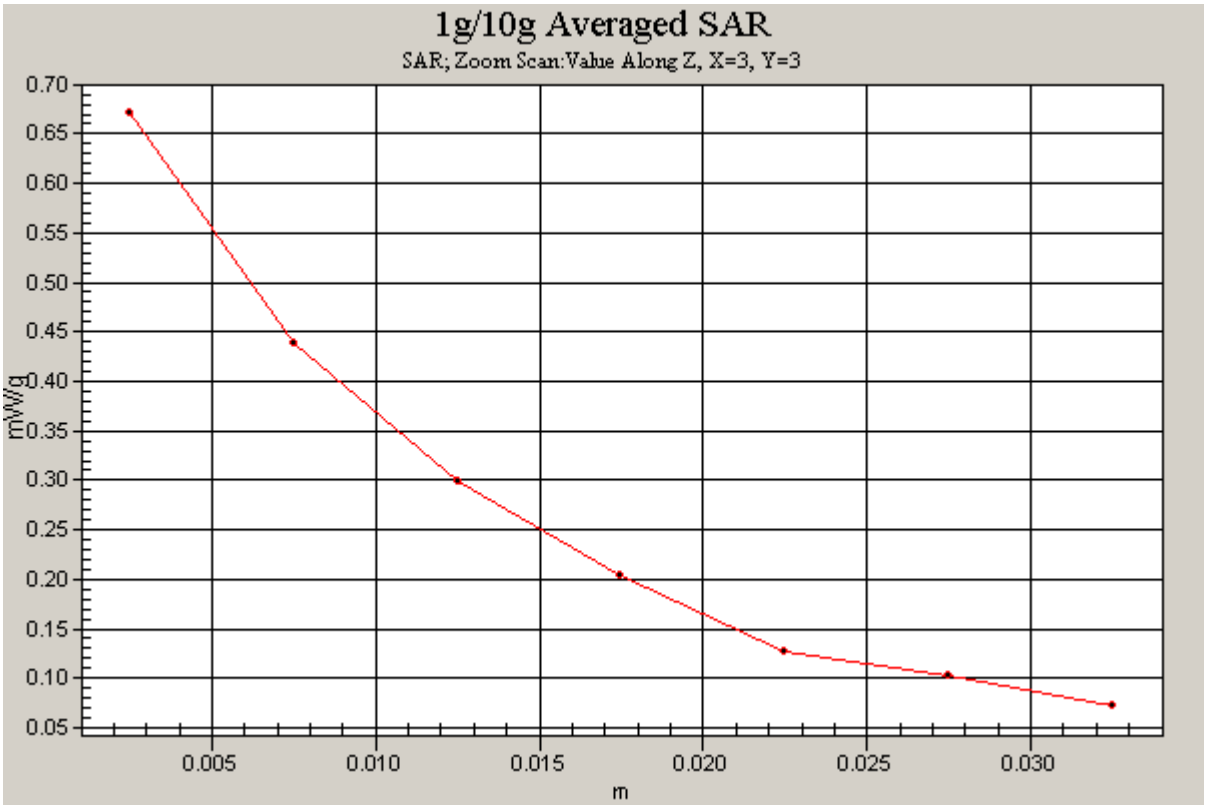


Figure 8 Z-Scan at power reference point [GSM 850 GPRS (4 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 192]

Date/Time: 12/4/2008 4:30:59 AM

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

Communication System: GSM850 + GPRS(3Up); Frequency: 837 MHz;Duty Cycle: 1:2.67
Medium parameters used: f = 837 MHz; σ = 0.982 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);
Electronics: DAE3 Sn536;
Test Position 1 Middle/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.872 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.2 V/m; Power Drift = 0.060 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.715 mW/g; SAR(10 g) = 0.445 mW/g
Maximum value of SAR (measured) = 0.875 mW/g

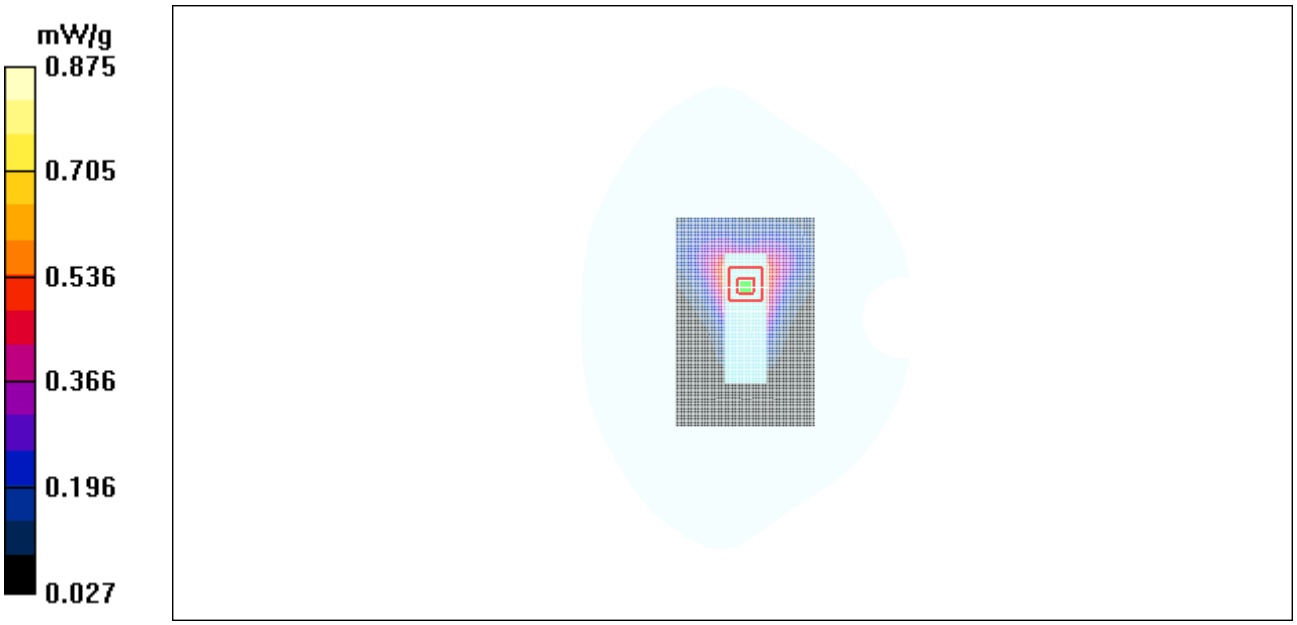


Figure 9 GSM 850 GPRS (3 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Channel 192

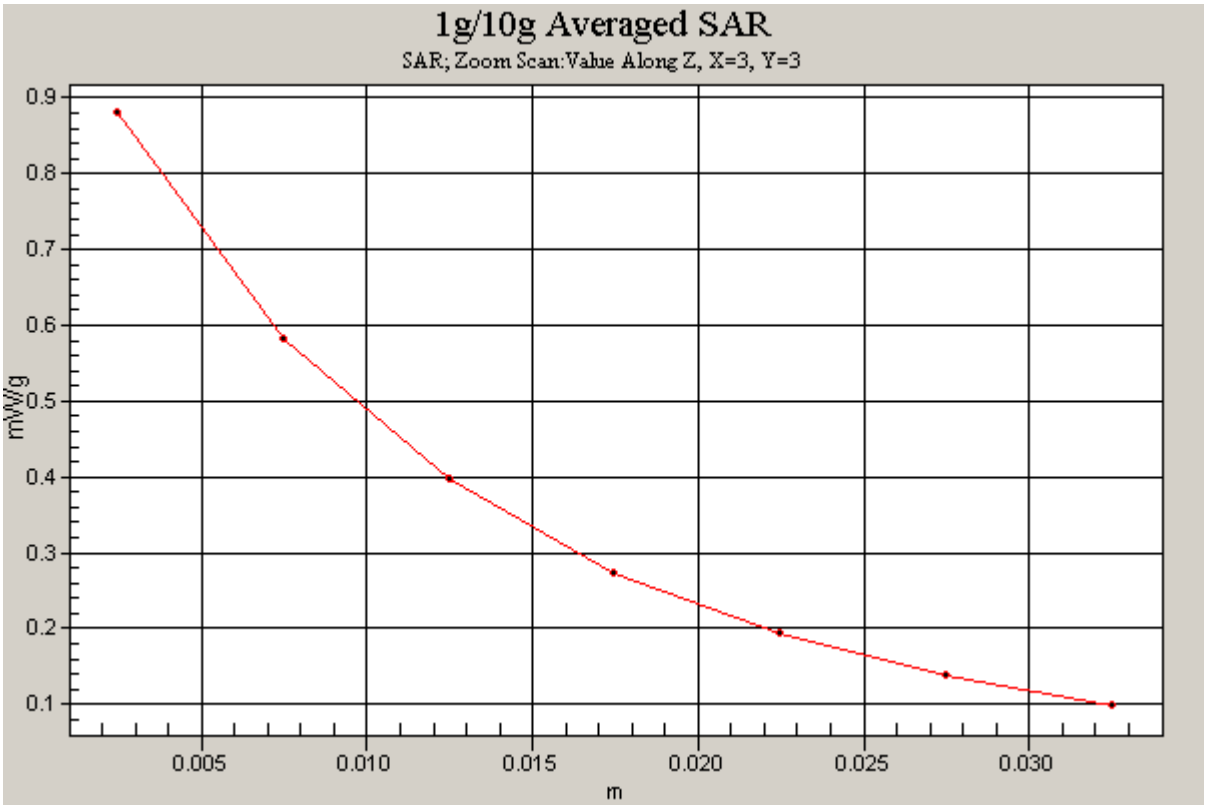


Figure 10 Z-Scan at power reference point [GSM 850 GPRS (3 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 192]

Date/Time: 12/4/2008 5:58:22 AM

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

Communication System: GSM850 + GPRS(2Up); Frequency: 848.8 MHz;Duty Cycle: 1:4
Medium parameters used: f = 849 MHz; σ = 0.989 mho/m; ε_r = 55.4; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);
Electronics: DAE3 Sn536; Cal
Test Position 1 High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.10 mW/g

Test Position 1 High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.9 V/m; Power Drift = -0.195 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.880 mW/g; SAR(10 g) = 0.557 mW/g
Maximum value of SAR (measured) = 1.09 mW/g

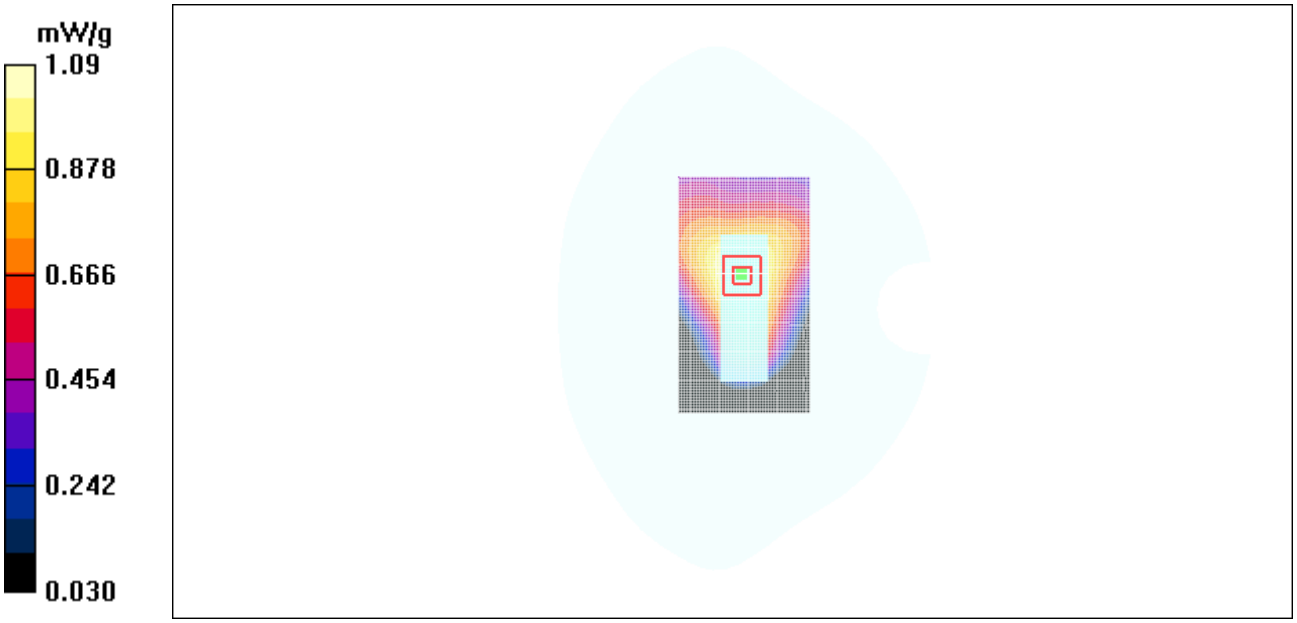


Figure 11 GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Channel 251

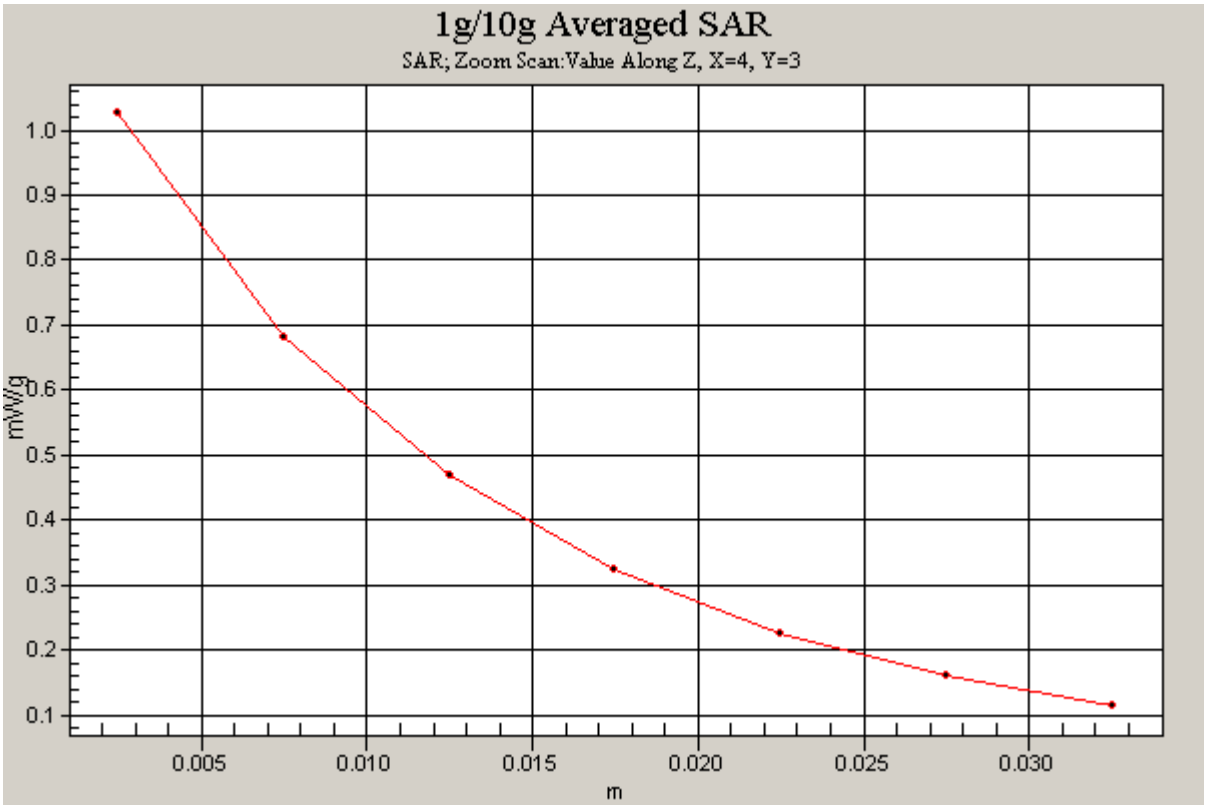


Figure 12 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 251]

Date/Time: 12/4/2008 4:49:59 AM

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

Communication System: GSM850 + GPRS(2Up); Frequency: 837 MHz;Duty Cycle: 1:4
Medium parameters used: f = 837 MHz; σ = 0.982 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);
Electronics: DAE3 Sn536;
Test Position 1 Middle/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.03 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.1 V/m; Power Drift = 0.102 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.850 mW/g; SAR(10 g) = 0.537 mW/g
Maximum value of SAR (measured) = 1.05 mW/g

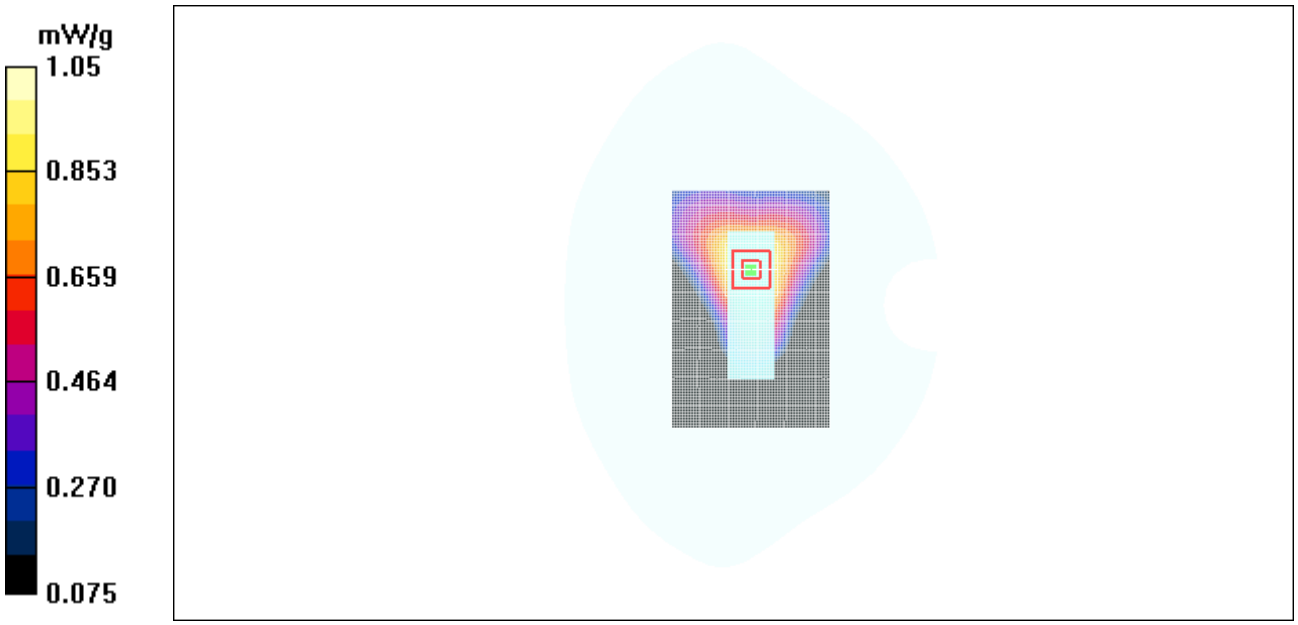


Figure 13 GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Channel 192

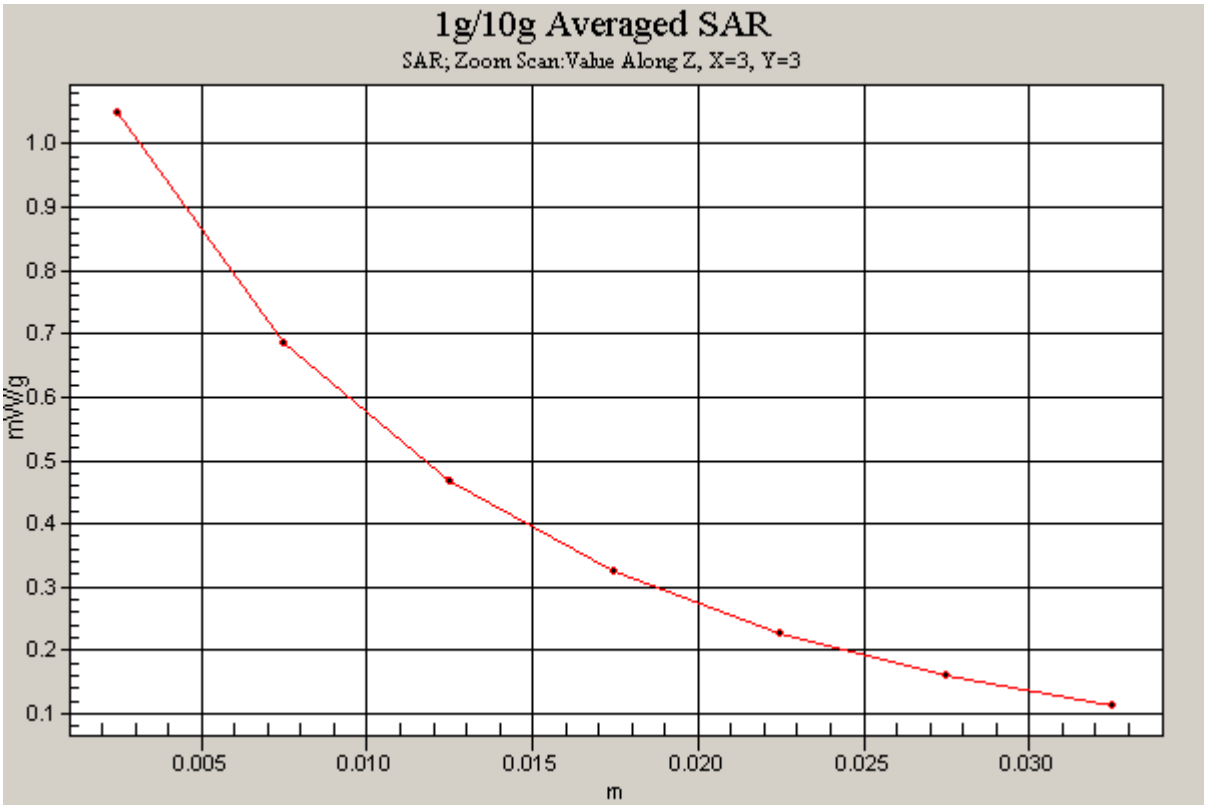


Figure 14 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 192]

Date/Time: 12/4/2008 6:18:22 AM

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

Communication System: GSM850 + GPRS(2Up); Frequency: 824.2 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.978 mho/m; ε_r = 55.6; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);
Electronics: DAE3 Sn536;
Test Position 1 Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.935 mW/g

Test Position 1 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.4 V/m; Power Drift = -0.005 dB
Peak SAR (extrapolated) = 1.16 W/kg
SAR(1 g) = 0.754 mW/g; SAR(10 g) = 0.480 mW/g
Maximum value of SAR (measured) = 0.930 mW/g

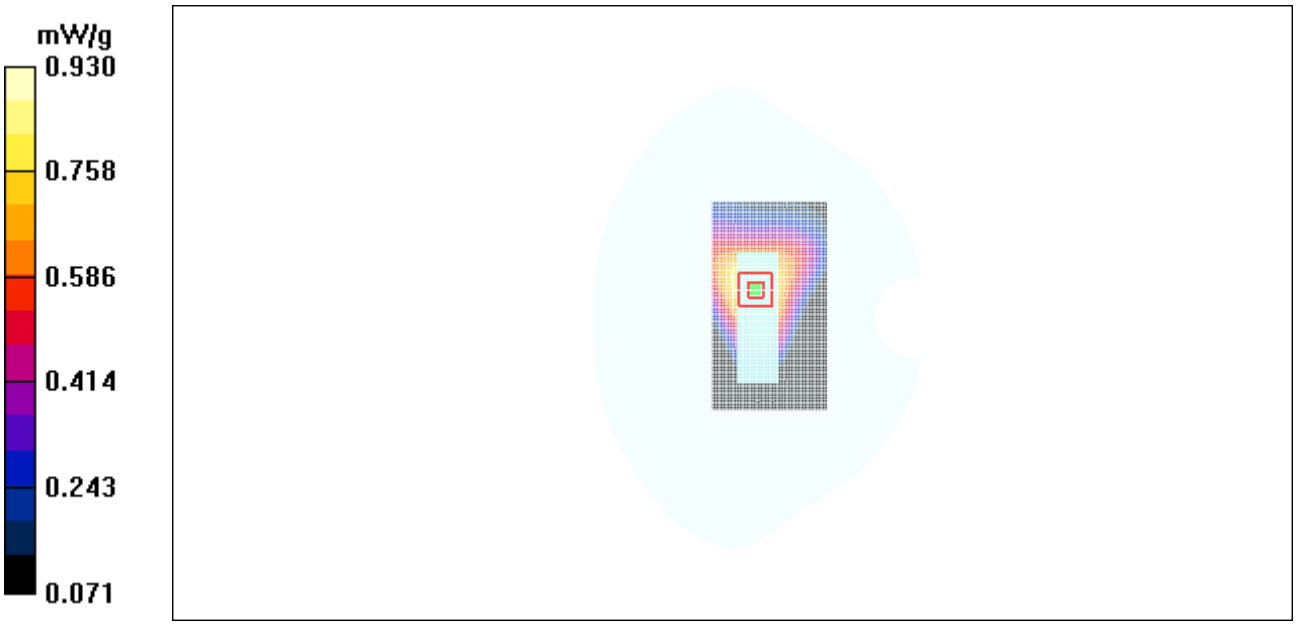


Figure 15 GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Channel 128

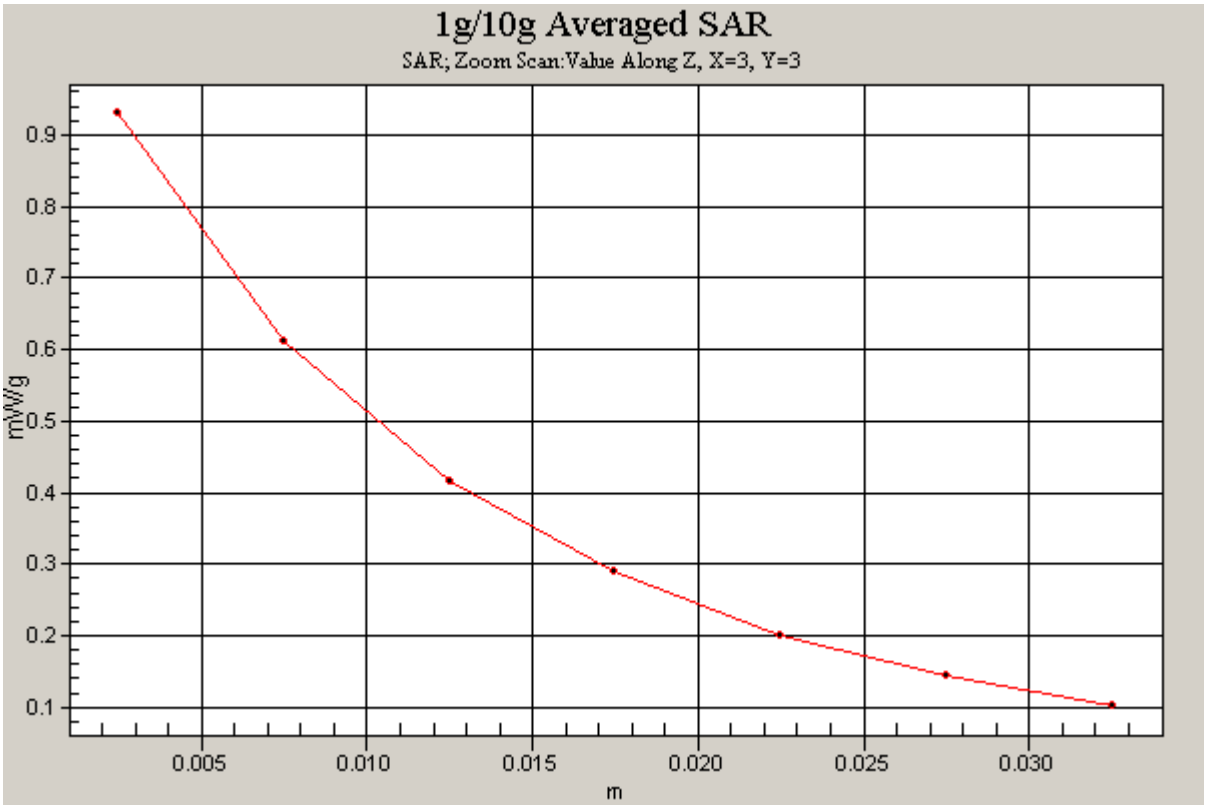


Figure 16 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Channel 128]

Date/Time: 12/4/2008 5:37:47 AM

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

Communication System: GSM850 + GPRS(1Up); Frequency: 837 MHz;Duty Cycle: 1:8
Medium parameters used: f = 837 MHz; σ = 0.982 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);
Electronics: DAE3 Sn536;
Test Position 1 Middle/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.947 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.1 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.769 mW/g; SAR(10 g) = 0.487 mW/g
Maximum value of SAR (measured) = 0.950 mW/g

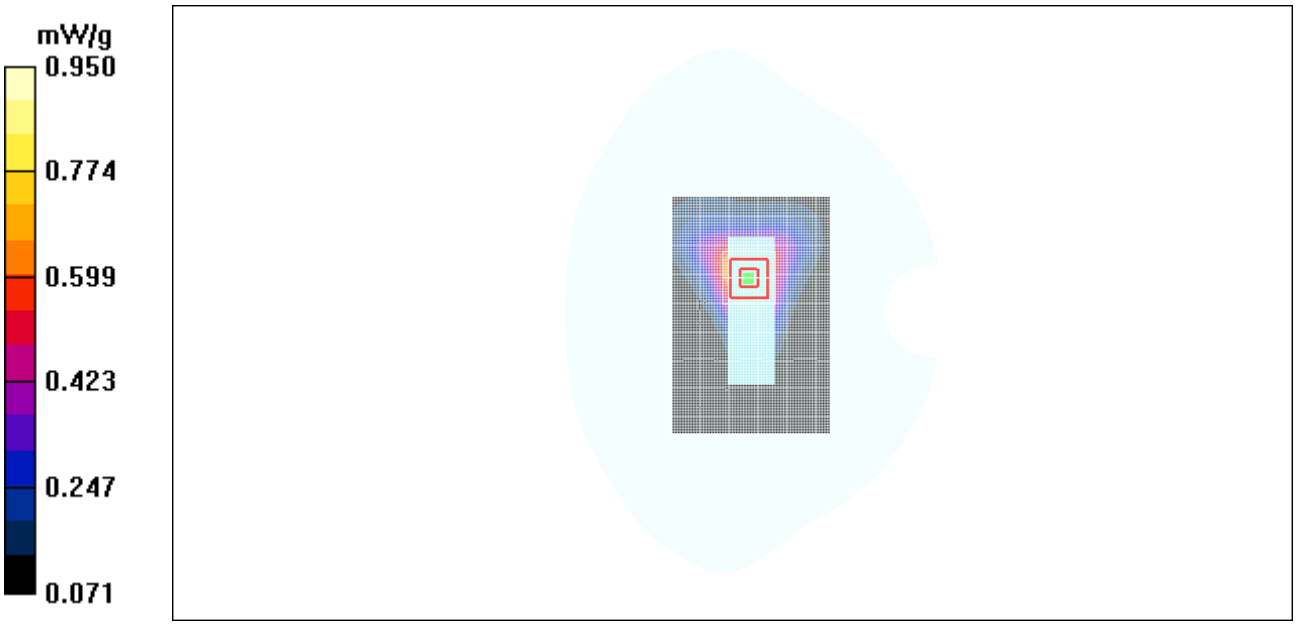


Figure 17 GSM 850 GPRS (1 timeslot in uplink) with BenQ Joybook S72 Test Position 1Channel 192

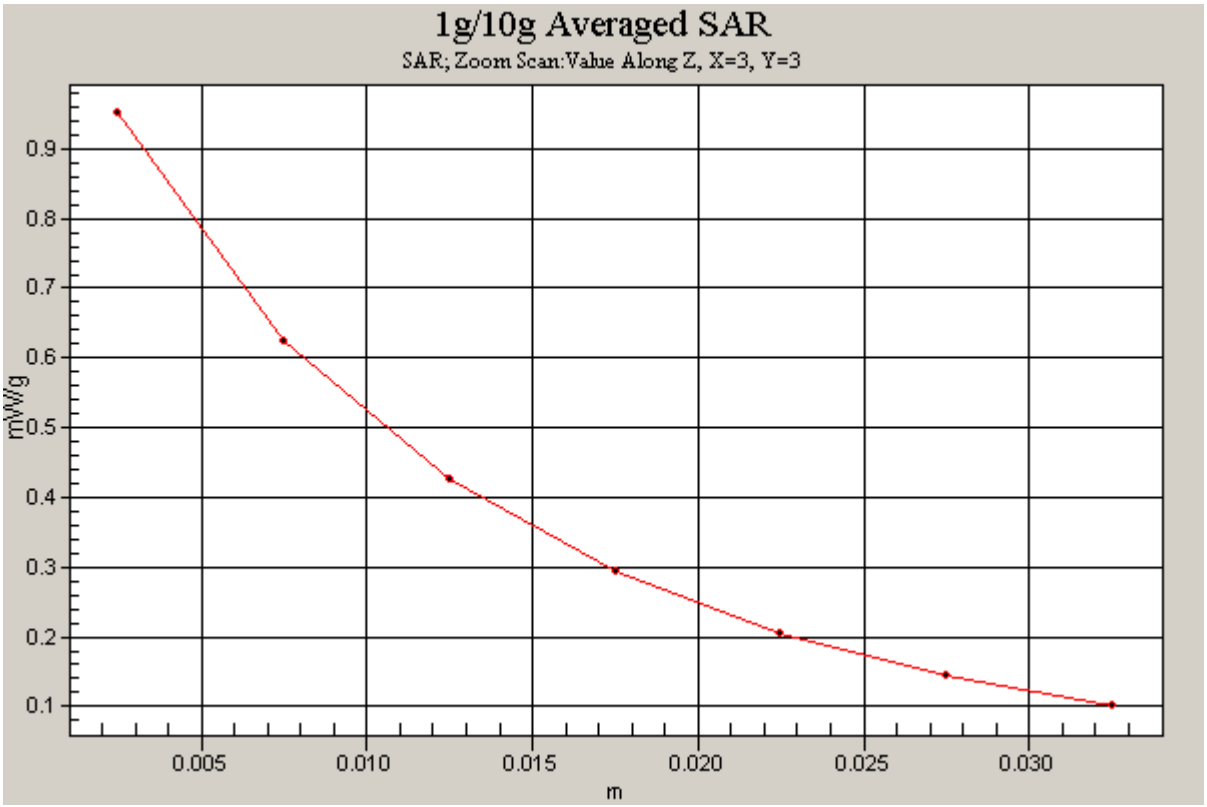


Figure 18 Z-Scan at power reference point [GSM 850 GPRS (1 timeslot in uplink) with BenQ Joybook S72 Test Position 1Channel 192]

Date/Time: 12/4/2008 8:22:46 AM

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

Communication System: GSM850 + GPRS(2Up); Frequency: 837 MHz;Duty Cycle: 1:4
Medium parameters used: f = 837 MHz; σ = 0.982 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);
Electronics: DAE3 Sn536;
Test Position 2 Middle /Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.100 mW/g

Test Position 2 Middle /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.9 V/m; Power Drift = 0.146 dB
Peak SAR (extrapolated) = 0.574 W/kg
SAR(1 g) = 0.074 mW/g; SAR(10 g) = 0.033 mW/g
Maximum value of SAR (measured) = 0.108 mW/g

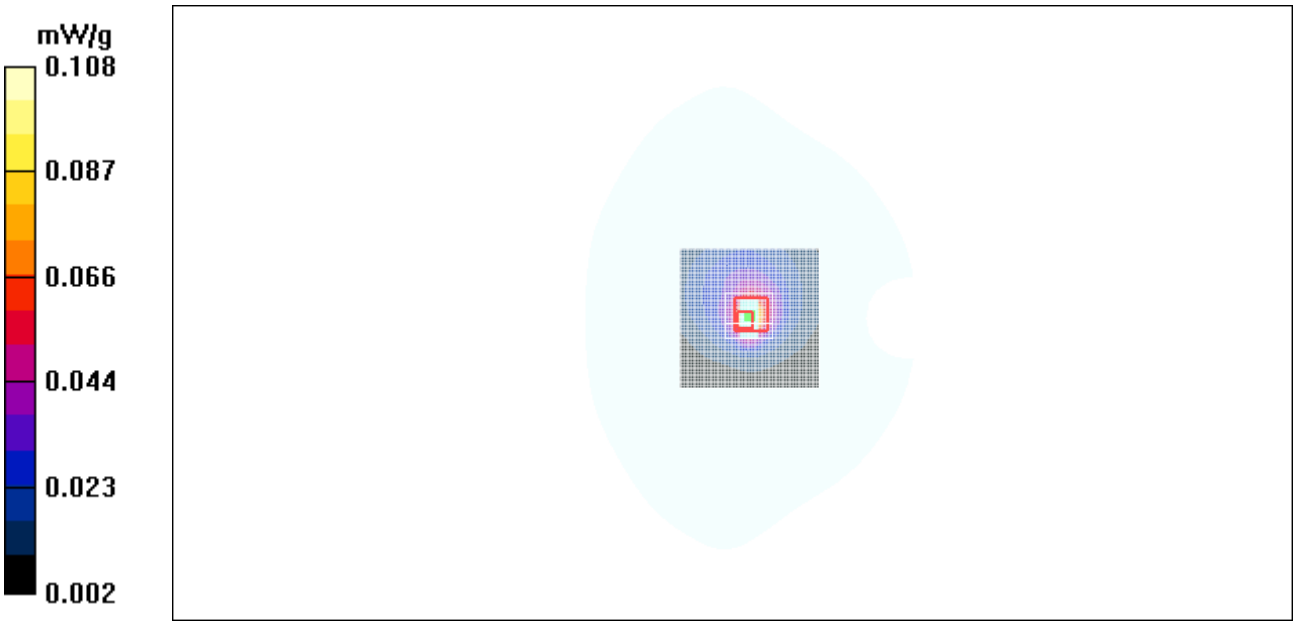


Figure 19 GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 2 Channel 192

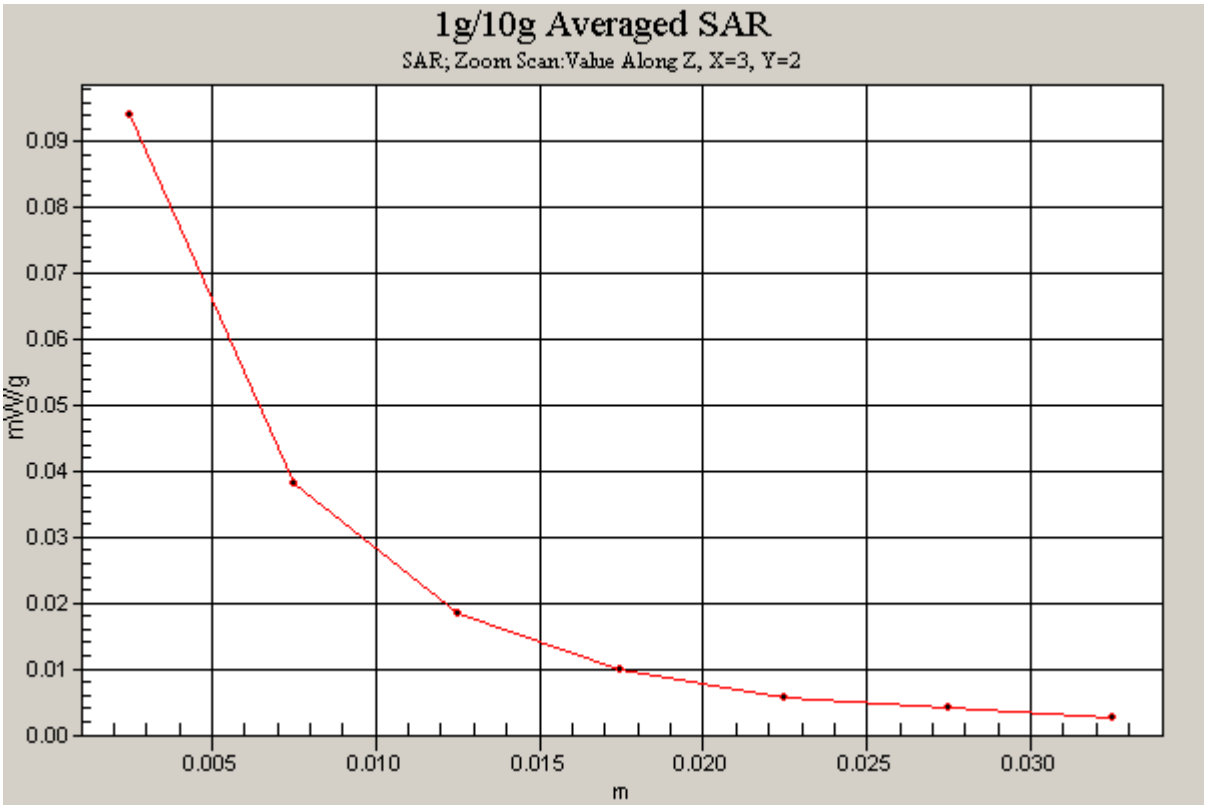


Figure 20 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 2 Channel 192]

Date/Time: 12/4/2008 5:15:42 AM

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

Communication System: GSM850 + GPRS(2Up); Frequency: 837 MHz;Duty Cycle: 1:4

Medium parameters used: f = 837 MHz; σ = 0.982 mho/m; ε_r = 55.5; 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) = 0.674 mW/g

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

Reference Value = 21.9 V/m; Power Drift = -0.169 dB

Peak SAR (extrapolated) = 0.804 W/kg

SAR(1 g) = 0.558 mW/g; SAR(10 g) = 0.384 mW/g

Maximum value of SAR (measured) = 0.658 mW/g

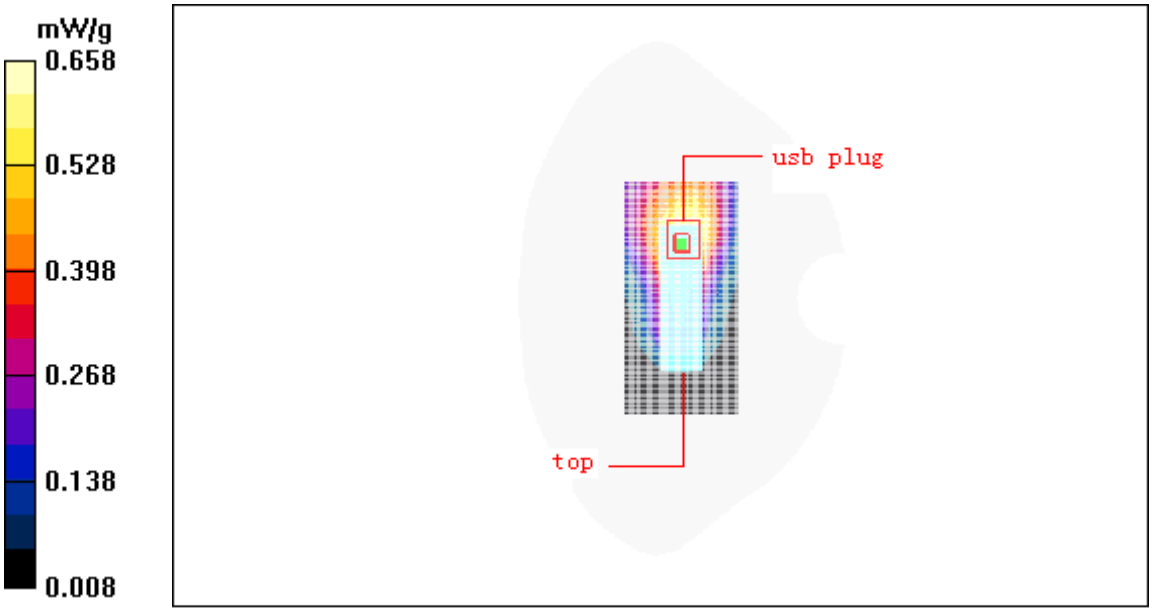


Figure 21 GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 192

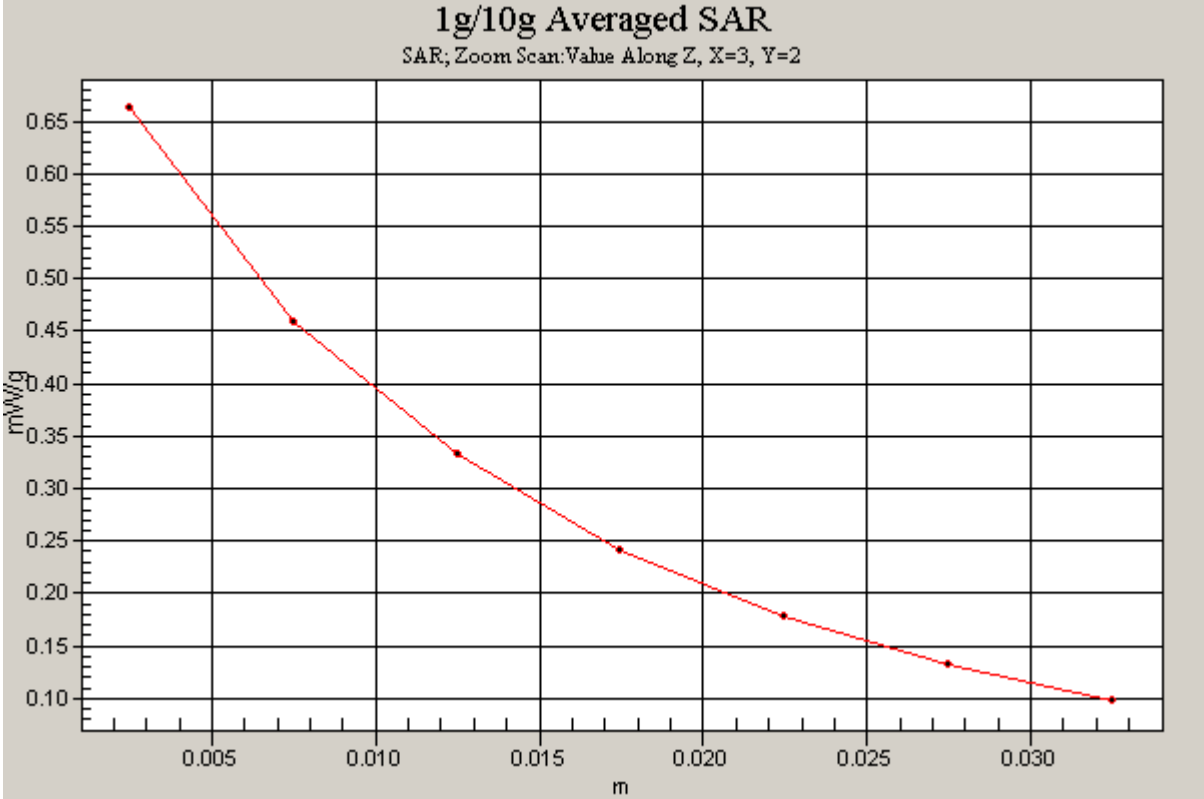


Figure 22 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 192]

Date/Time: 12/4/2008 7:20:07 AM

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

Communication System: GSM850 + GPRS(2Up); Frequency: 837 MHz;Duty Cycle: 1:4
Medium parameters used: f = 837 MHz; σ = 0.982 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);
Electronics: DAE3 Sn536;
Test Position 4 Middle/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.876 mW/g

Test Position 4 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.0 V/m; Power Drift = 0.082 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.709 mW/g; SAR(10 g) = 0.452 mW/g
Maximum value of SAR (measured) = 0.869 mW/g

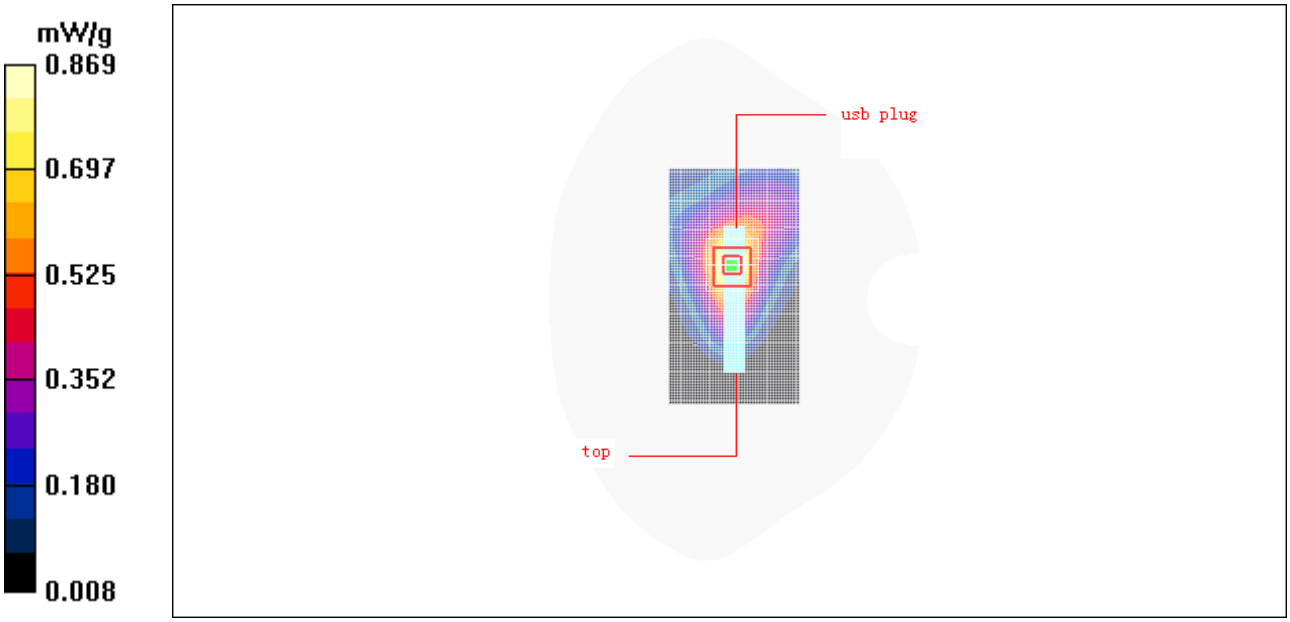


Figure 23 GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 4 Channel 192

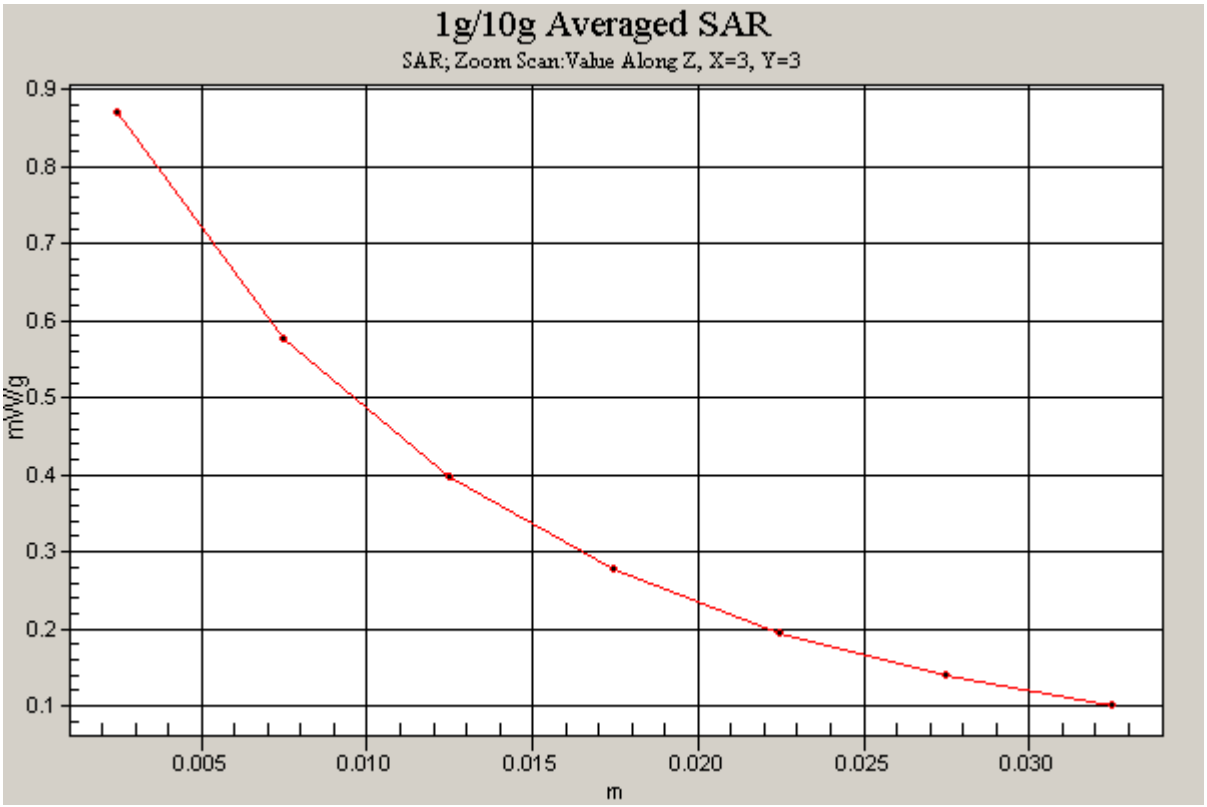


Figure 24 Z-Scan at power reference point [GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 4 Channel 192]

Date/Time: 12/4/2008 7:40:37 AM

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

Communication System: GSM850 + GPRS(2Up); Frequency: 837 MHz;Duty Cycle: 1:4

Medium parameters used: f = 837 MHz; σ = 0.982 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3

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

Electronics: DAE3 Sn536;

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

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

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

Reference Value = 22.9 V/m; Power Drift = 0.002 dB

Peak SAR (extrapolated) = 0.971 W/kg

SAR(1 g) = 0.635 mW/g; SAR(10 g) = 0.405 mW/g

Maximum value of SAR (measured) = 0.781 mW/g

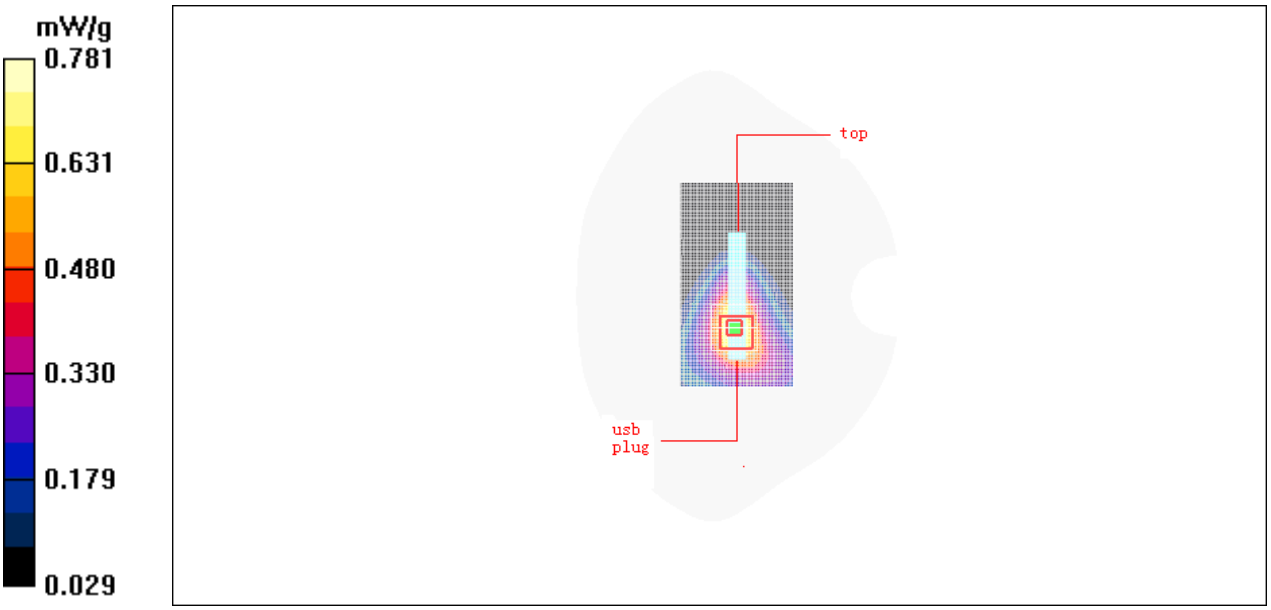


Figure 25 GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 5 Channel 192

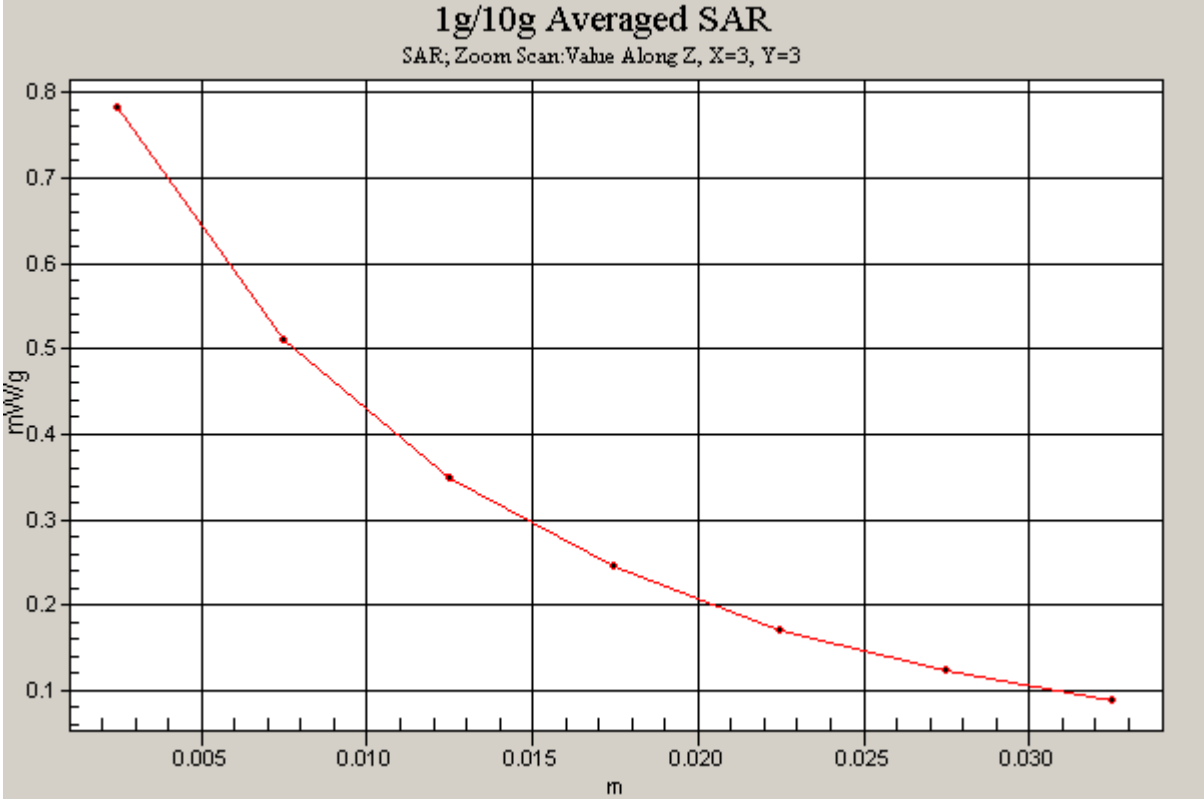


Figure 26 Z-Scan at power reference point (GSM 850 GPRS (2 timeslots in uplink) with IBM T61 Test Position 5 Channel 192

Date/Time: 12/4/2008 8:02:07 AM

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

Communication System: GSM850 +EGPRS(2Up); Frequency: 848.8 MHz;Duty Cycle: 1:4
Medium parameters used: f = 849 MHz; σ = 0.989 mho/m; ε_r = 55.4; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);
Electronics: DAE3 Sn536;
Test Position 1 High/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.454 mW/g

Test Position 1 High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.8 V/m; Power Drift = -0.139 dB
Peak SAR (extrapolated) = 0.569 W/kg
SAR(1 g) = 0.367 mW/g; SAR(10 g) = 0.232 mW/g
Maximum value of SAR (measured) = 0.454 mW/g

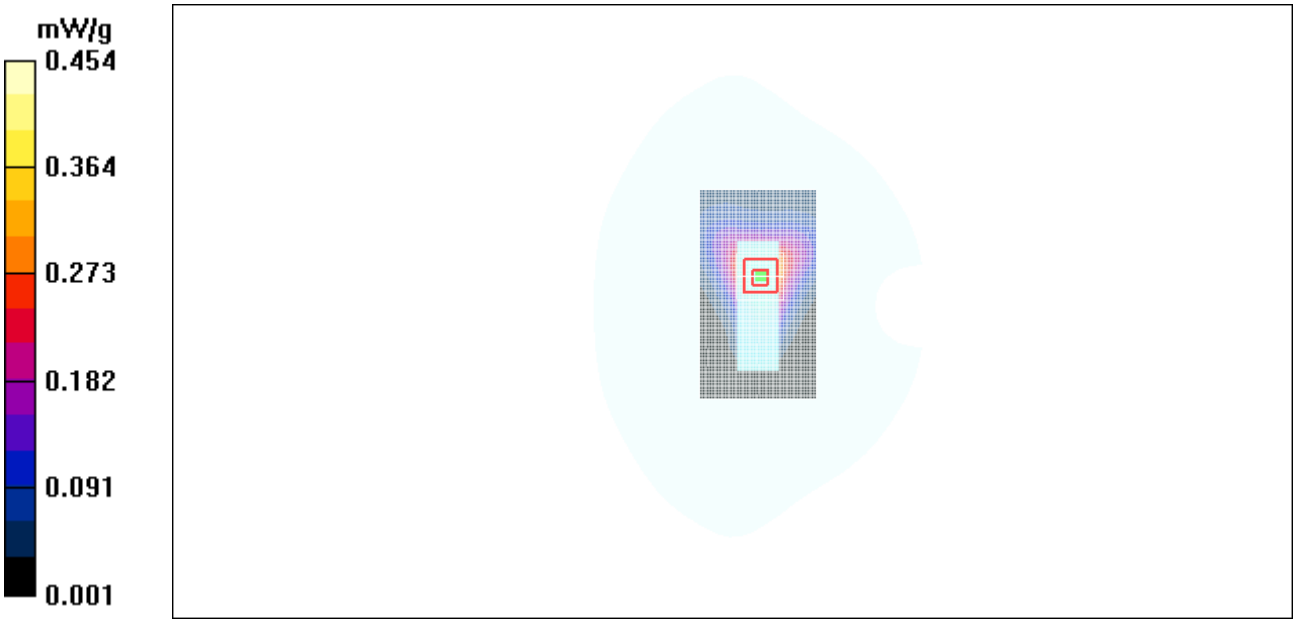


Figure 27 GSM 850 EGPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Channel 251

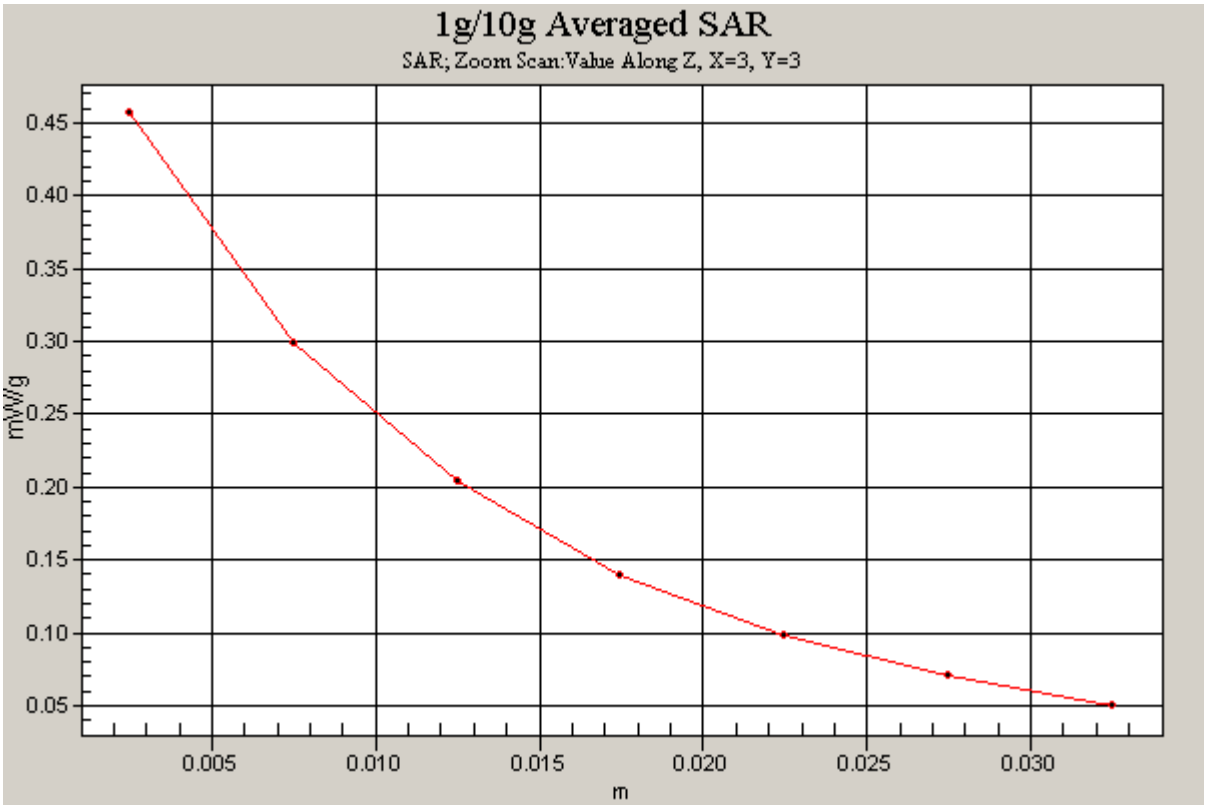


Figure 28 Z-Scan at power reference point (GSM 850 EGPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Channel 251

Date/Time: 12/3/2008 9:36:13 PM

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 = 1.54 mho/m; ε_r = 51.7; 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) = 0.802 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.8 V/m; Power Drift = -0.151 dB
Peak SAR (extrapolated) = 0.901 W/kg
SAR(1 g) = 0.507 mW/g; SAR(10 g) = 0.271 mW/g
Maximum value of SAR (measured) = 0.662 mW/g

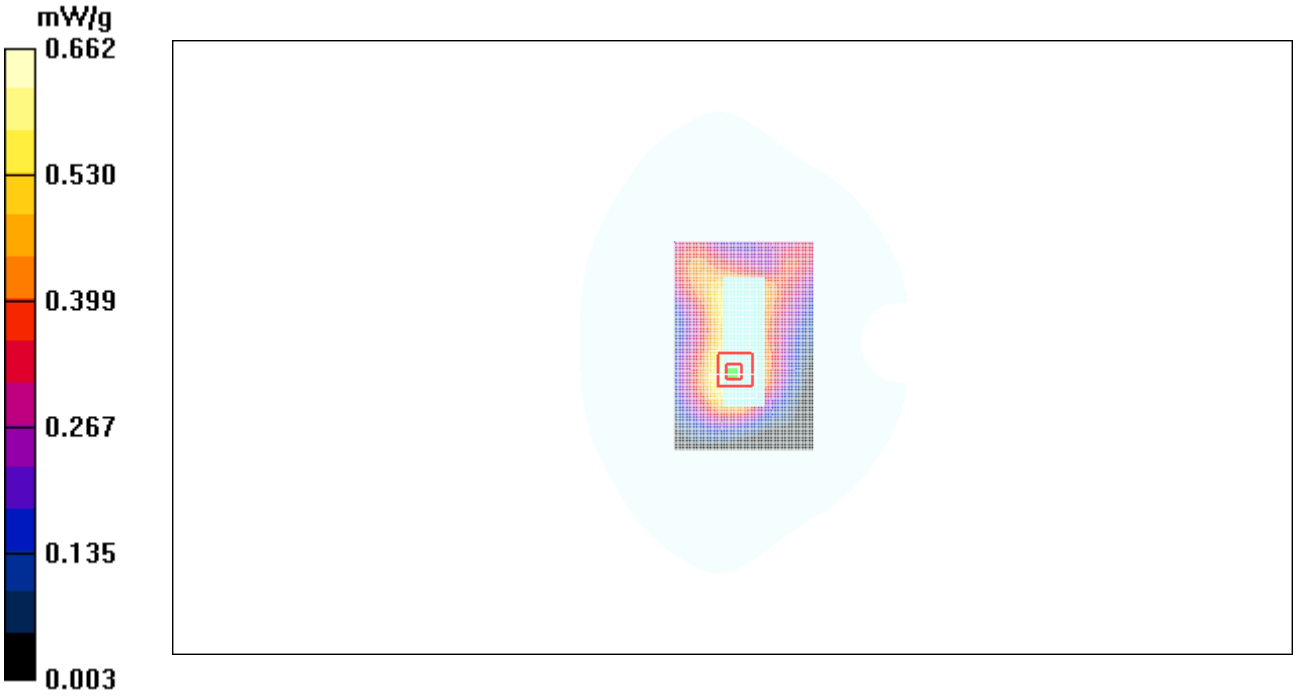


Figure 29 GSM 1900 GPRS (4 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Channel 661

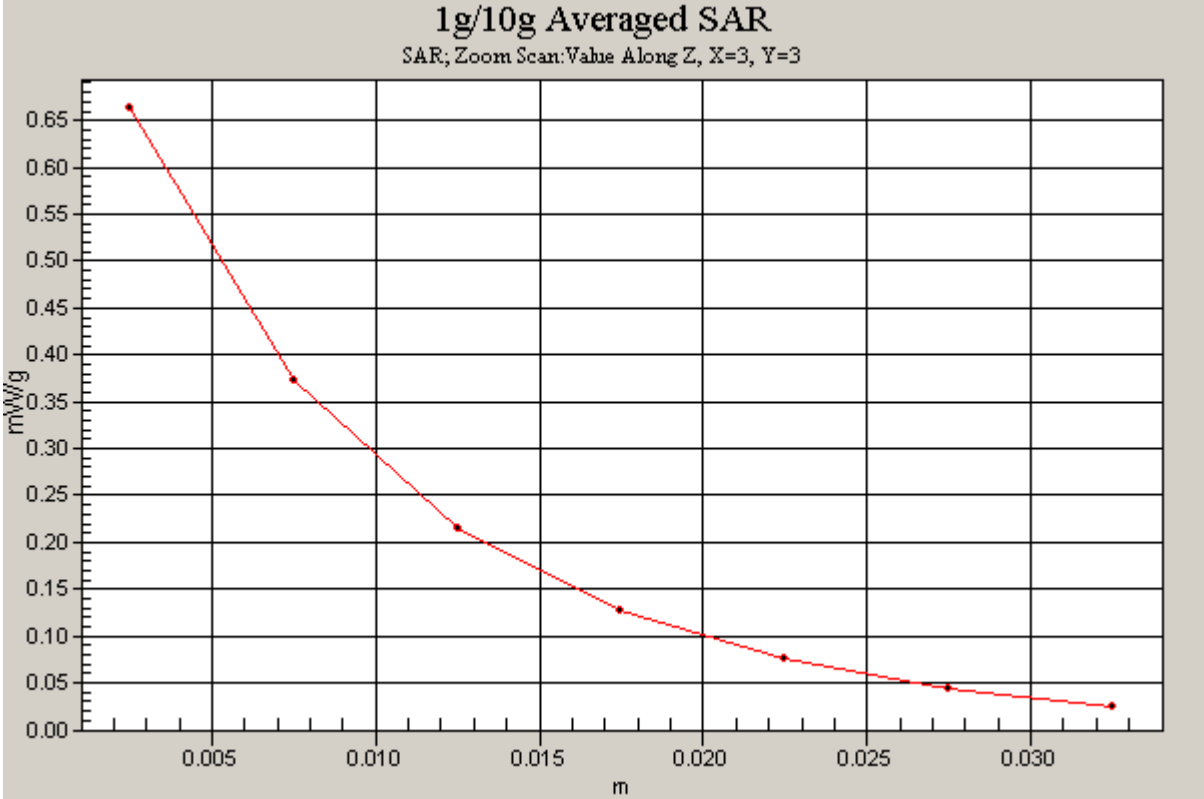


Figure 30 Z-Scan at power reference point [GSM 1900 GPRS (4 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 661]

Date/Time: 12/3/2008 9:57:16 PM

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 = 1.54 mho/m; ε_r = 51.7; 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) = 0.893 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.0 V/m; Power Drift = -0.086 dB
Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.588 mW/g; SAR(10 g) = 0.315 mW/g
Maximum value of SAR (measured) = 0.779 mW/g

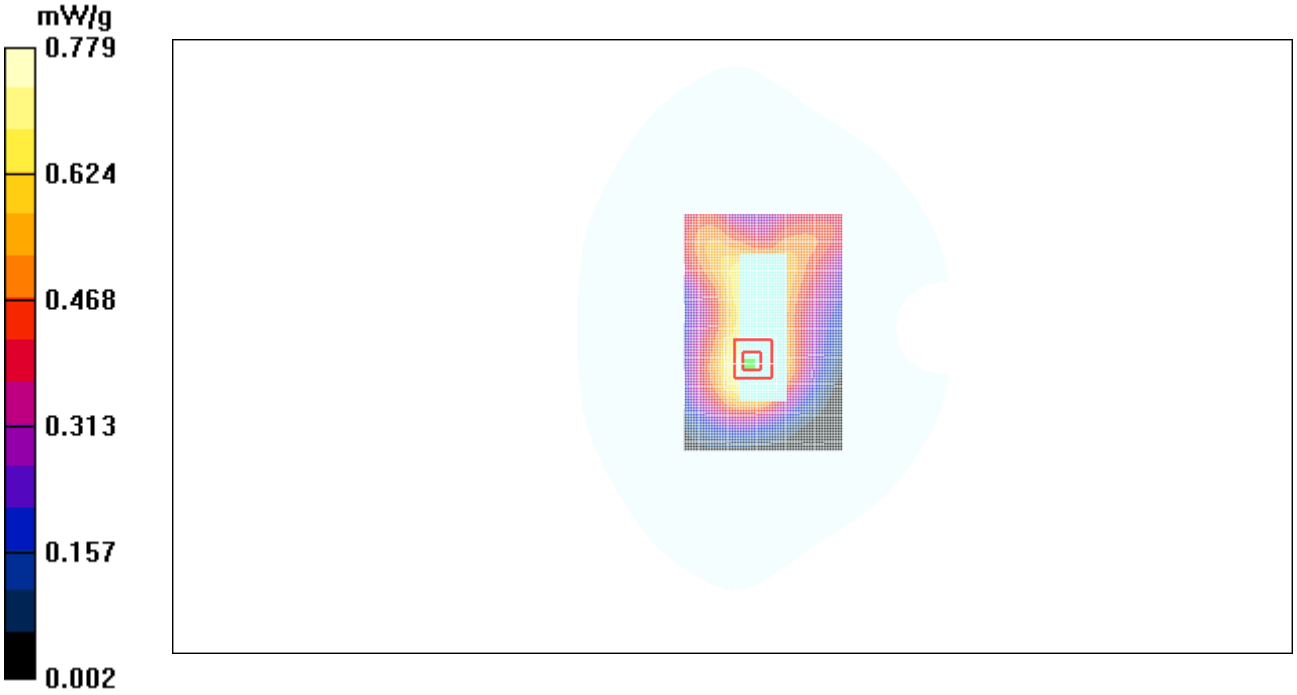


Figure 31 GSM 1900 GPRS (3 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Channel 661

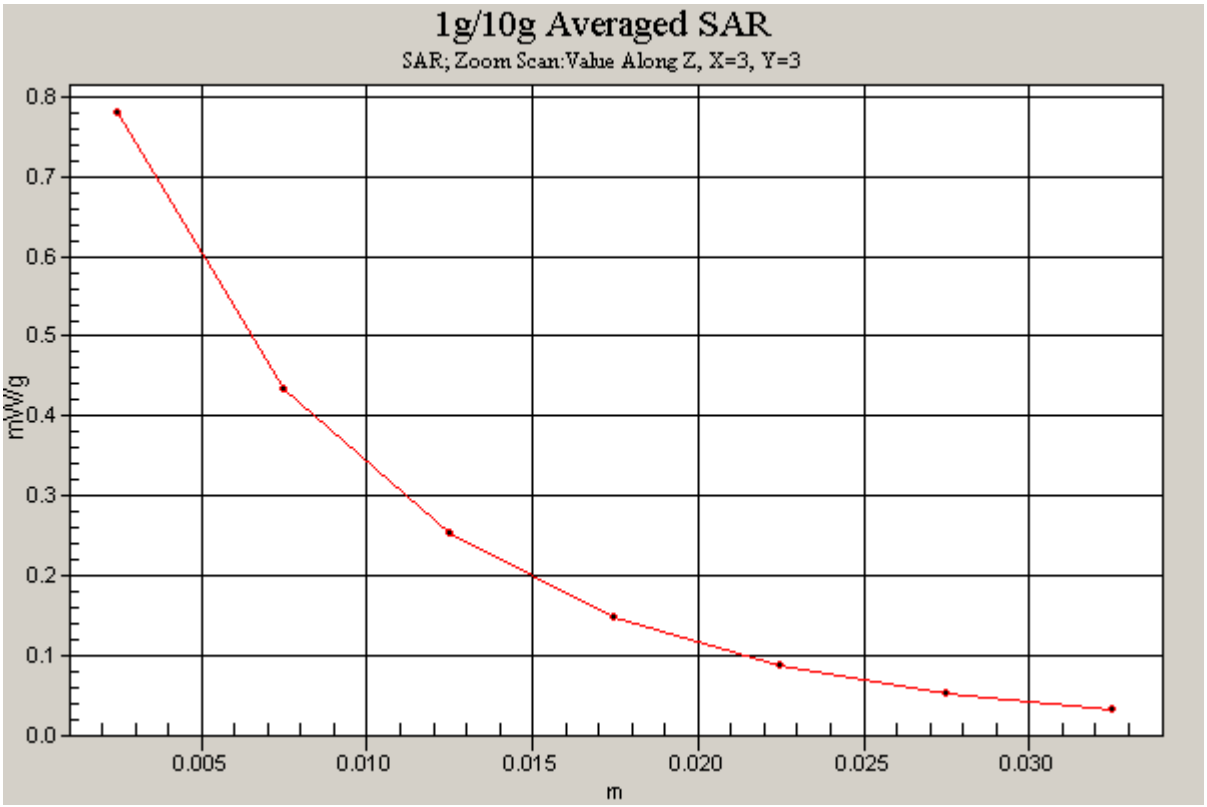


Figure 32 Z-Scan at power reference point (GSM 1900 GPRS (3 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 661

Date/Time: 12/3/2008 9:13:46 PM

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 = 1.54 mho/m; ε_r = 51.7; 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) = 0.927 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 = -0.103 dB
Peak SAR (extrapolated) = 1.10 W/kg
SAR(1 g) = 0.611 mW/g; SAR(10 g) = 0.329 mW/g
Maximum value of SAR (measured) = 0.809 mW/g

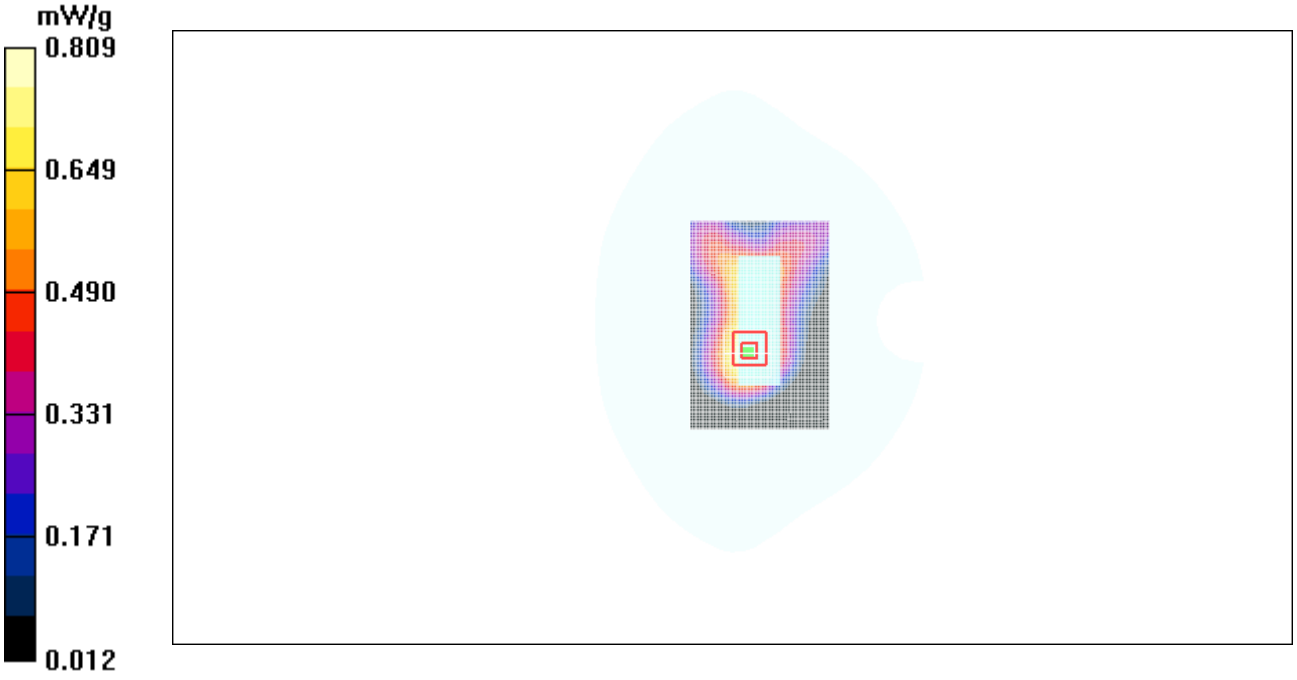


Figure 33 GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1 Channel 661

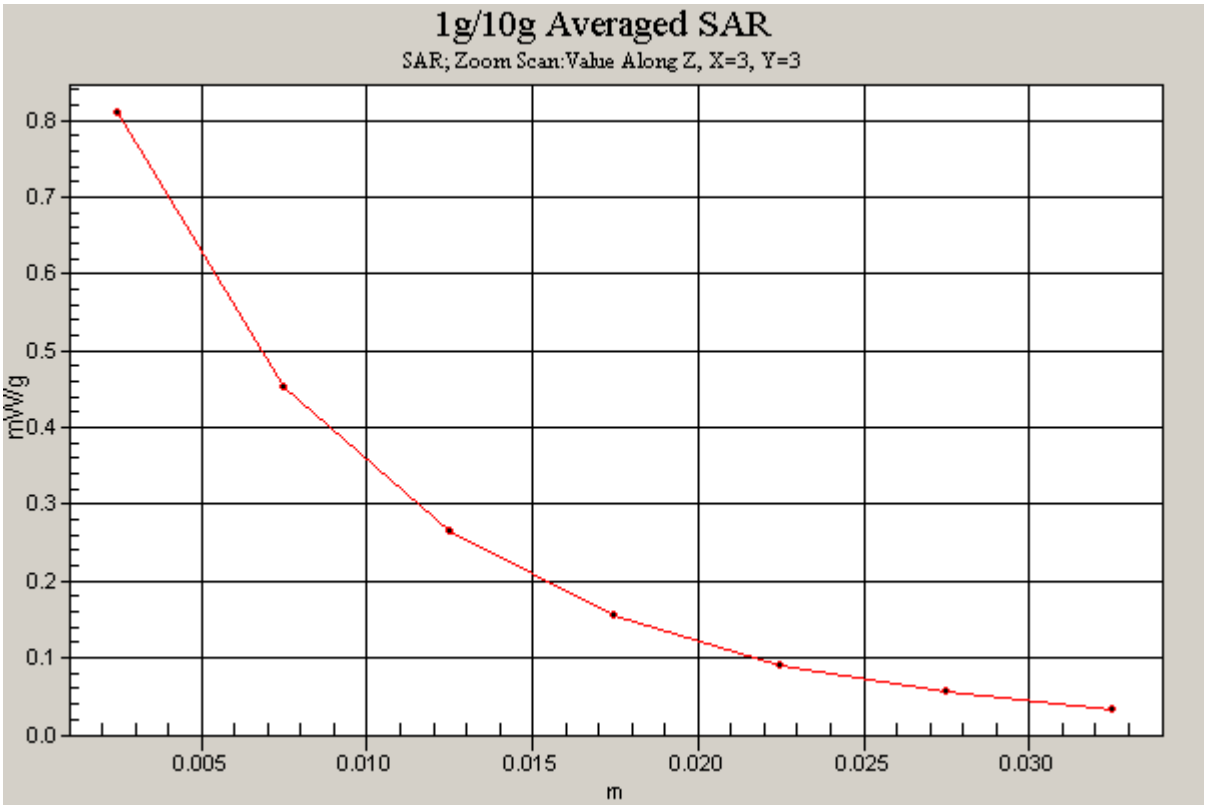


Figure 34 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 1Channel 661]

Date/Time: 12/3/2008 10:16:53 PM

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 = 1.54 mho/m; ε_r = 51.7; 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) = 0.751 mW/g

Test Position 1 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.6 V/m; Power Drift = 0.104 dB
Peak SAR (extrapolated) = 0.899 W/kg
SAR(1 g) = 0.502 mW/g; SAR(10 g) = 0.270 mW/g
Maximum value of SAR (measured) = 0.661 mW/g

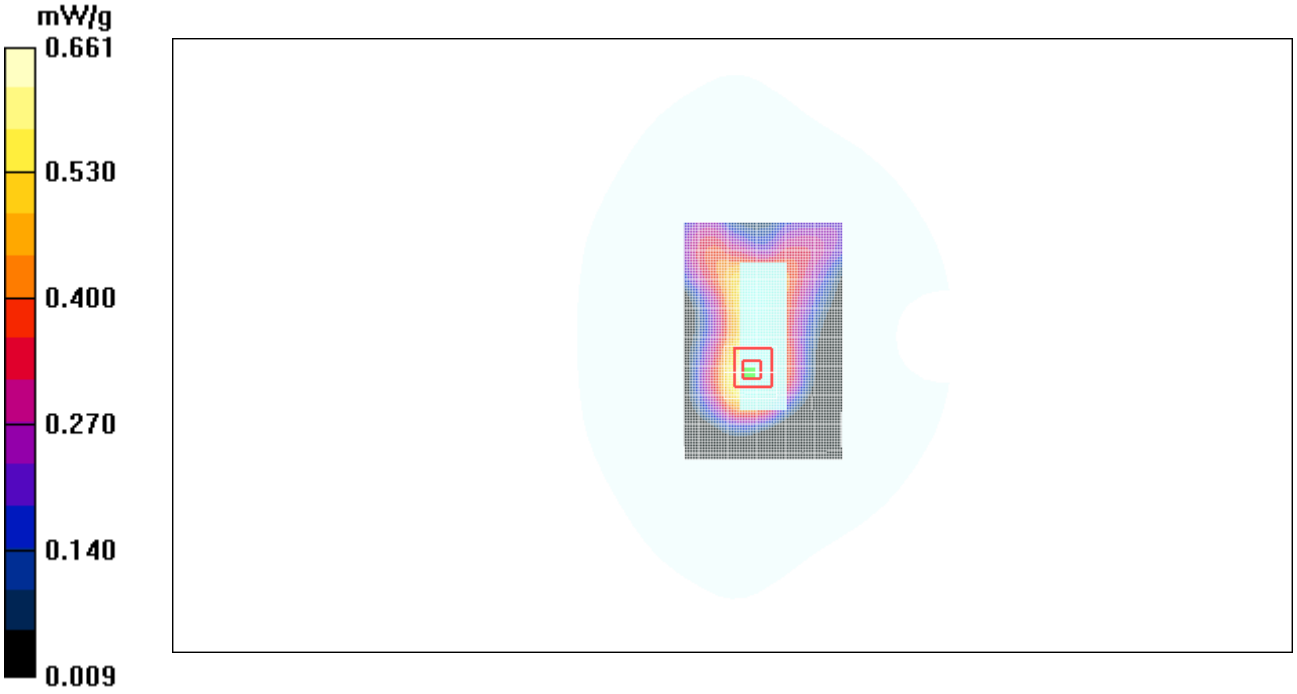


Figure 35 GSM 1900 GPRS (1 timeslot in uplink) with BenQ Joybook S72 Test Position 1 Channel 661

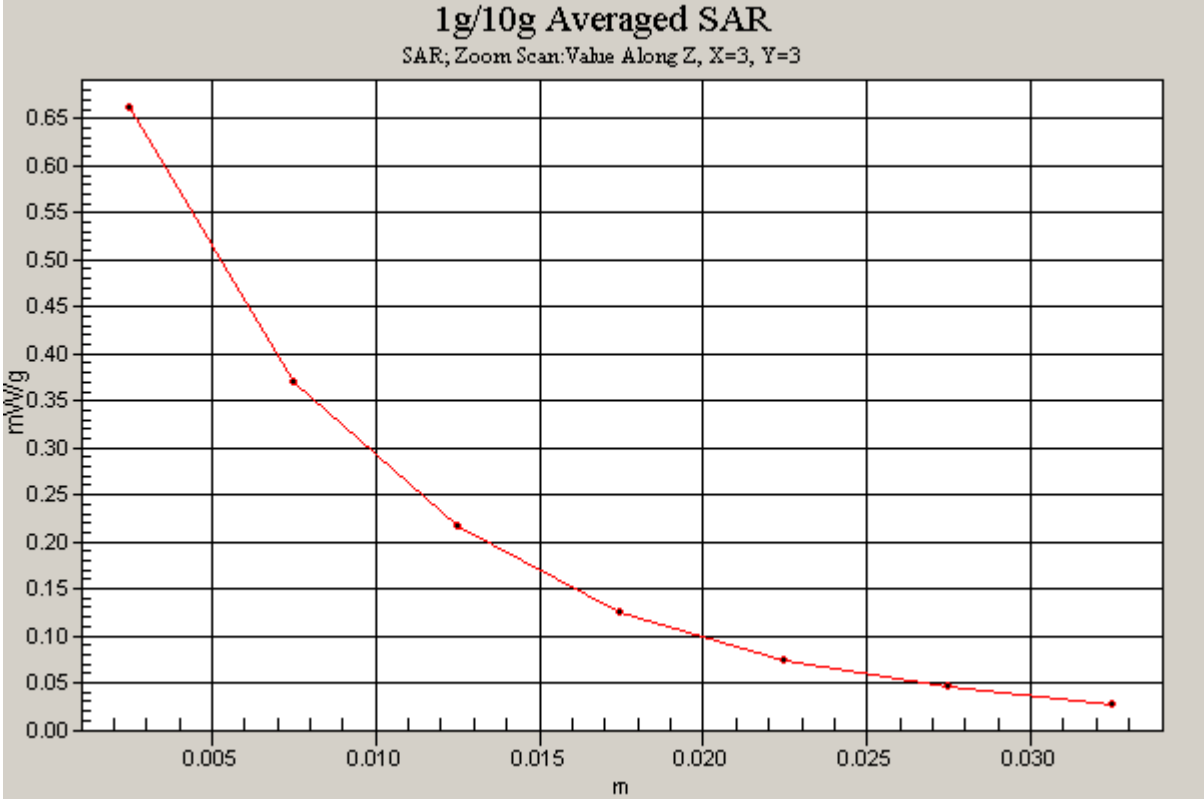


Figure 36 Z-Scan at power reference point (GSM 1900 GPRS (1 timeslot in uplink) with BenQ Joybook S72 Test Position 1Channel 661

Date/Time: 12/4/2008 12:22:52 AM

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 = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);
Electronics: DAE3 Sn536;
Test Position 2 Middle/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.281 mW/g

Test Position 2 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.8 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 0.587 W/kg
SAR(1 g) = 0.213 mW/g; SAR(10 g) = 0.100 mW/g
Maximum value of SAR (measured) = 0.350 mW/g

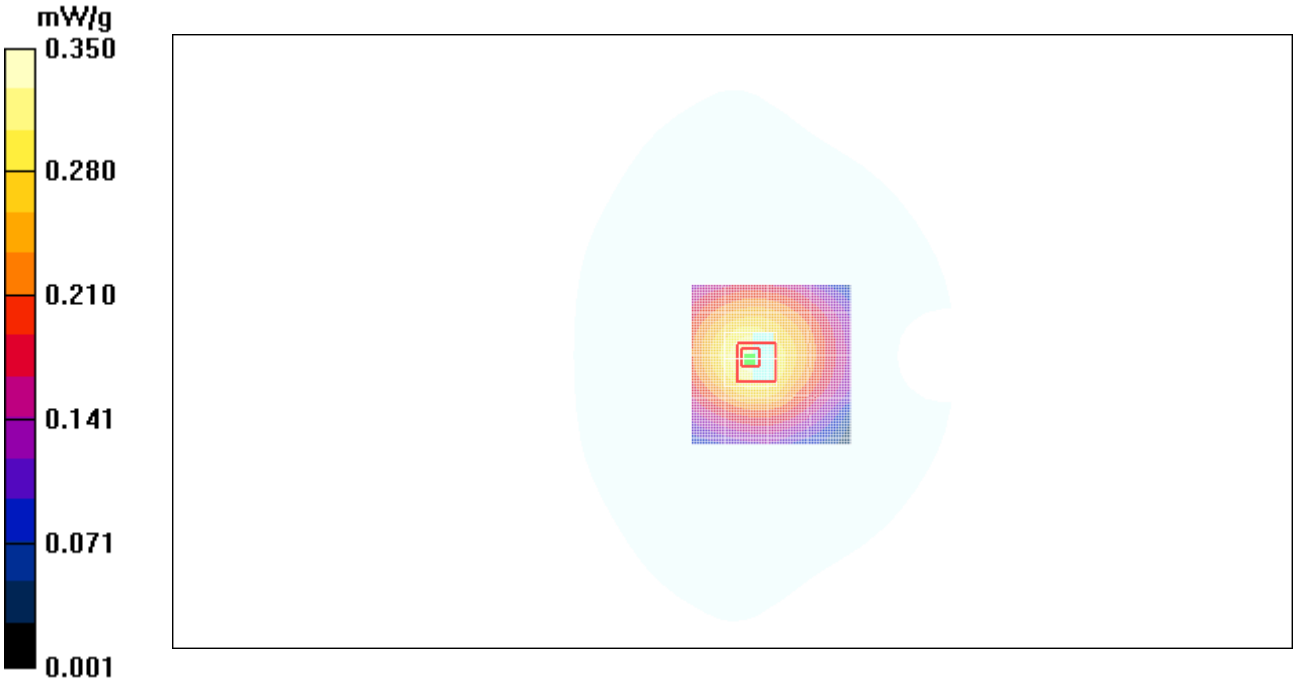


Figure 37 GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 2 Channel 661

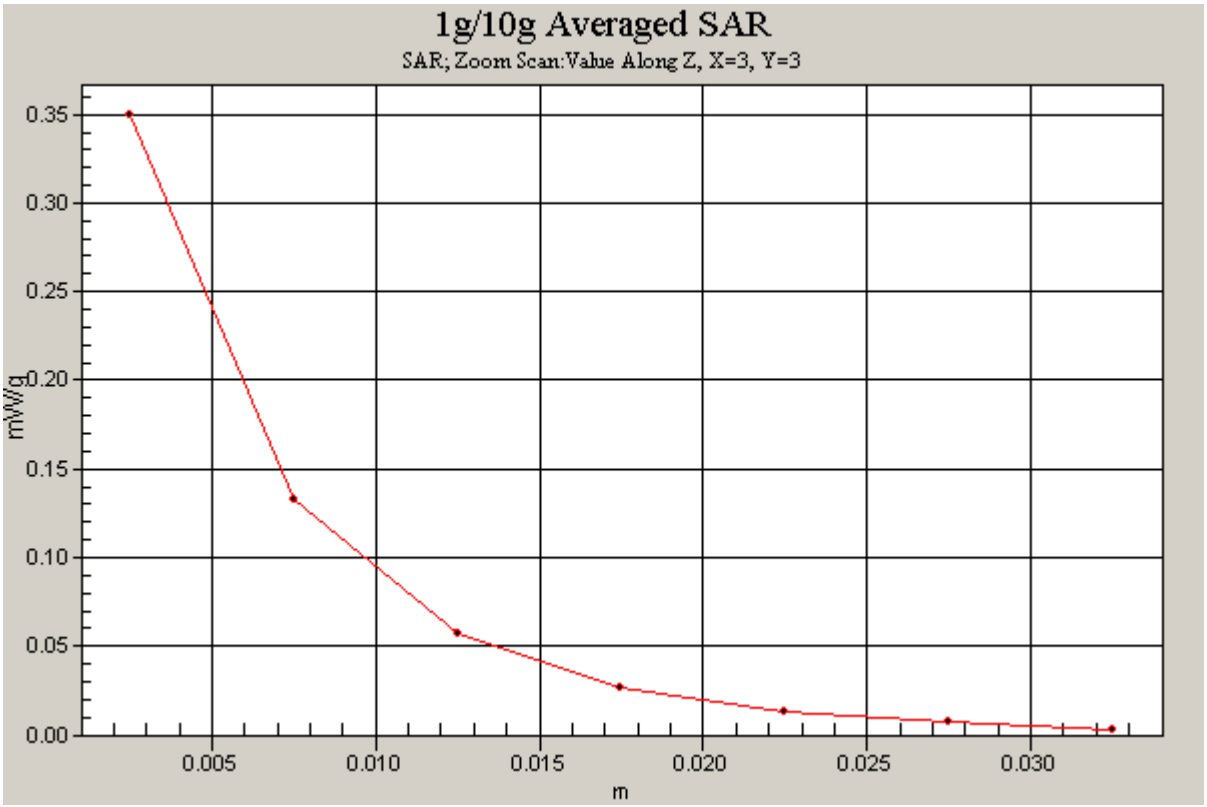


Figure 38 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook S72 Test Position 2 Channel 661]

Date/Time: 12/4/2008 2:49:54 AM

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

Communication System: GSM 1900+GPRS(2Up); Frequency: 1909.8 MHz;Duty Cycle: 1:4
Medium parameters used: f = 1910 MHz; σ = 1.58 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);
Electronics: DAE3 Sn536;
Test Position 3 High/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.48 mW/g

Test Position 3 High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.5 V/m; Power Drift = -0.064 dB
Peak SAR (extrapolated) = 1.87 W/kg
SAR(1 g) = 0.985 mW/g; SAR(10 g) = 0.496 mW/g
Maximum value of SAR (measured) = 1.34 mW/g

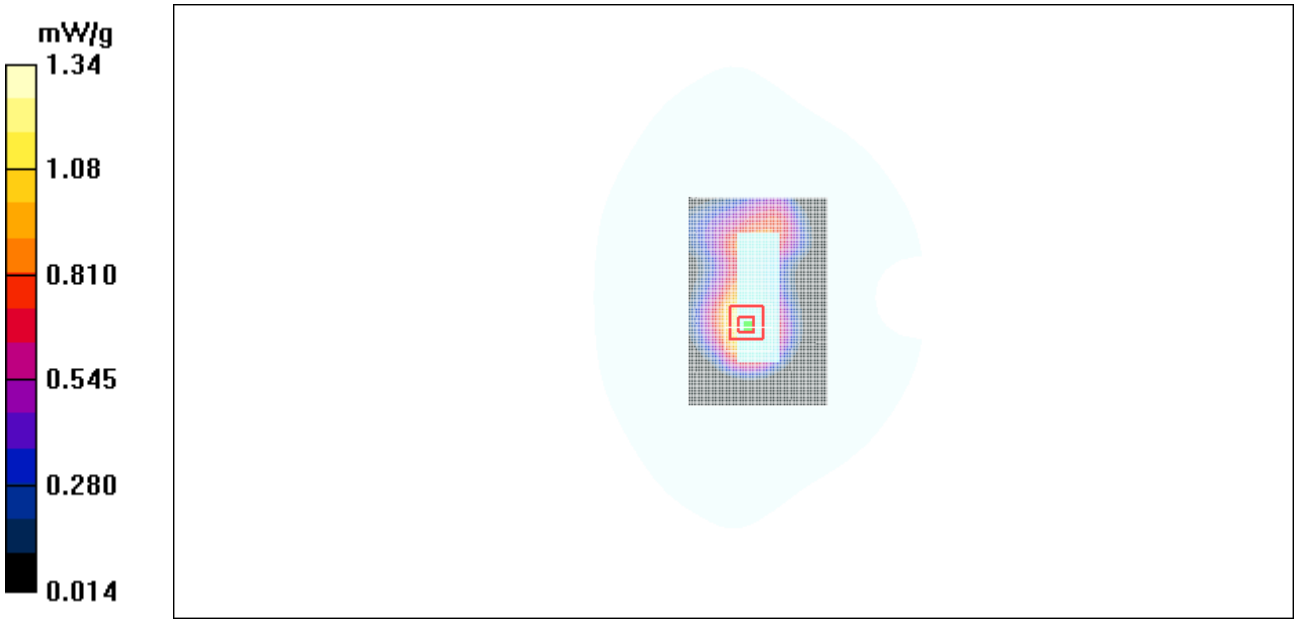


Figure 39 GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 810

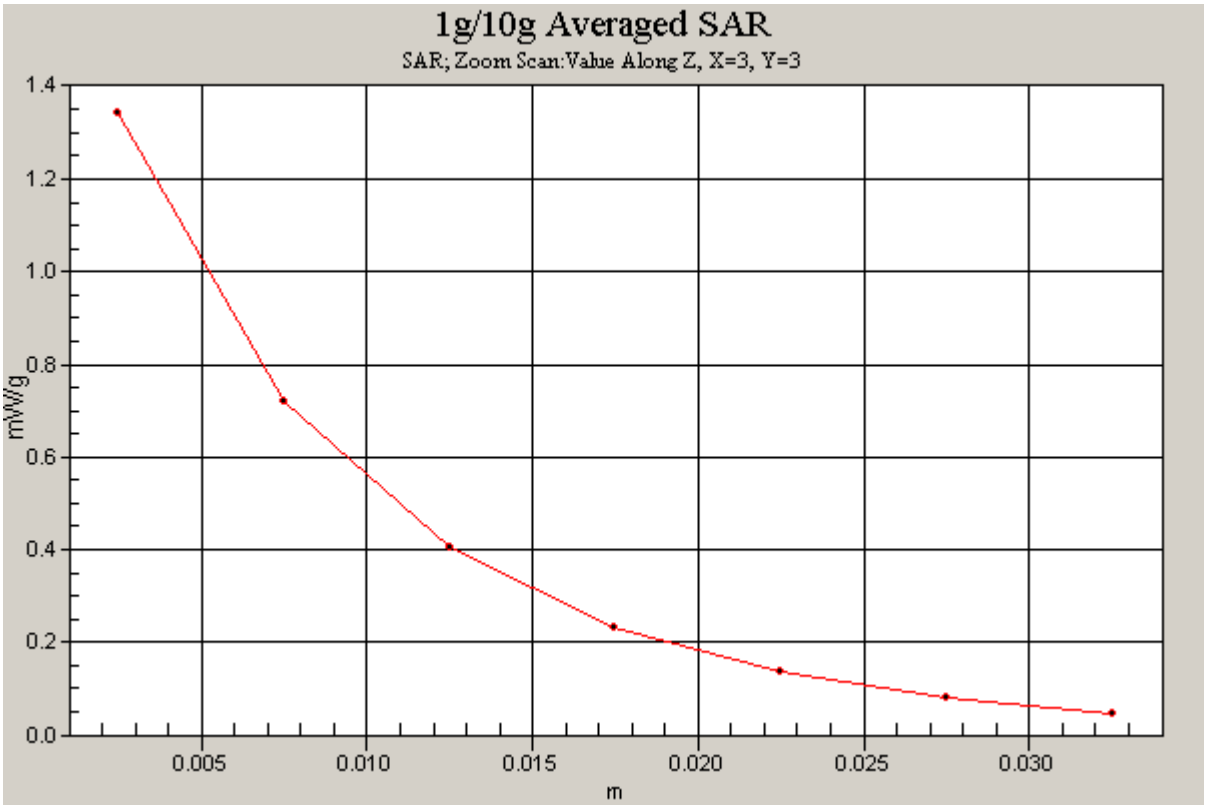


Figure 40 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 810]

Date/Time: 12/4/2008 1:34:10 AM

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 = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);
Electronics: DAE3 Sn536;
Test Position 3 Middle/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.47 mW/g

Test Position 3 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.1 V/m; Power Drift = -0.045 dB
Peak SAR (extrapolated) = 1.90 W/kg
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.510 mW/g
Maximum value of SAR (measured) = 1.39 mW/g

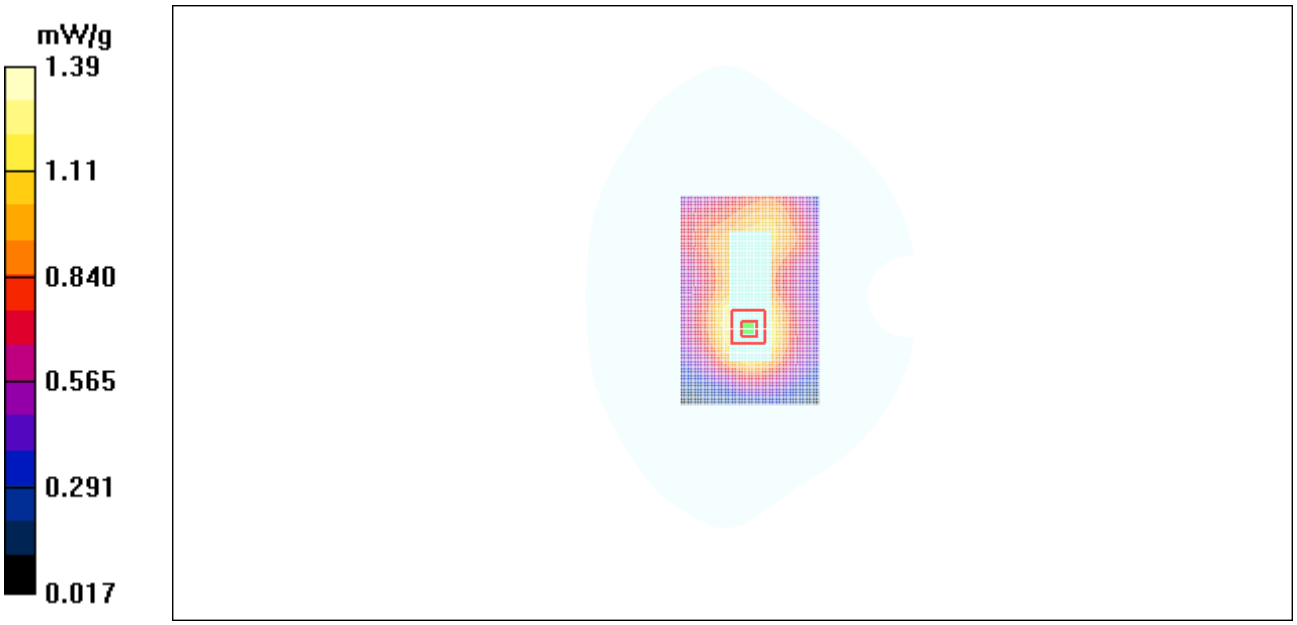


Figure 41 GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 661

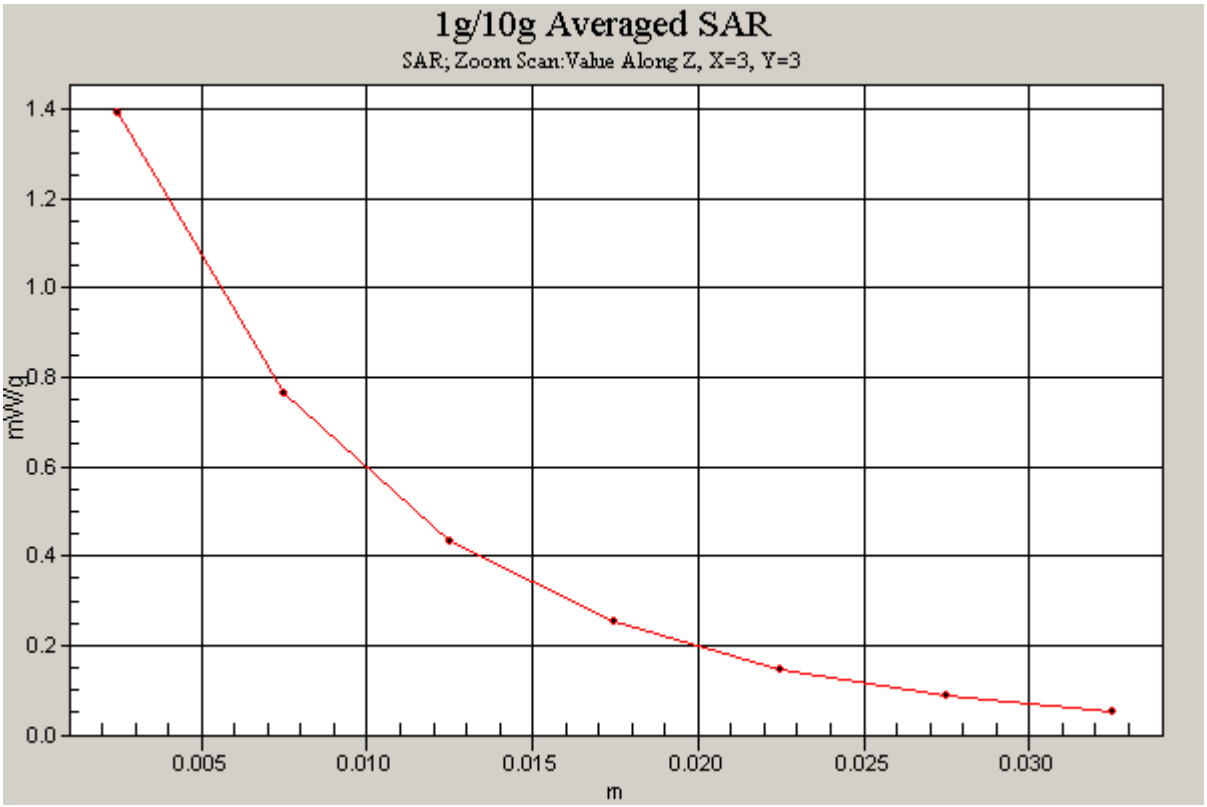


Figure 42 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 661]

Date/Time: 12/4/2008 3:09:22 AM

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

Communication System: GSM 1900+GPRS(2Up); Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.55 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);
Electronics: DAE3 Sn536;
Test Position 3 Low/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.79 mW/g

Test Position 3 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.9 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 2.21 W/kg
SAR(1 g) = 1.16 mW/g; SAR(10 g) = 0.581 mW/g
Maximum value of SAR (measured) = 1.58 mW/g

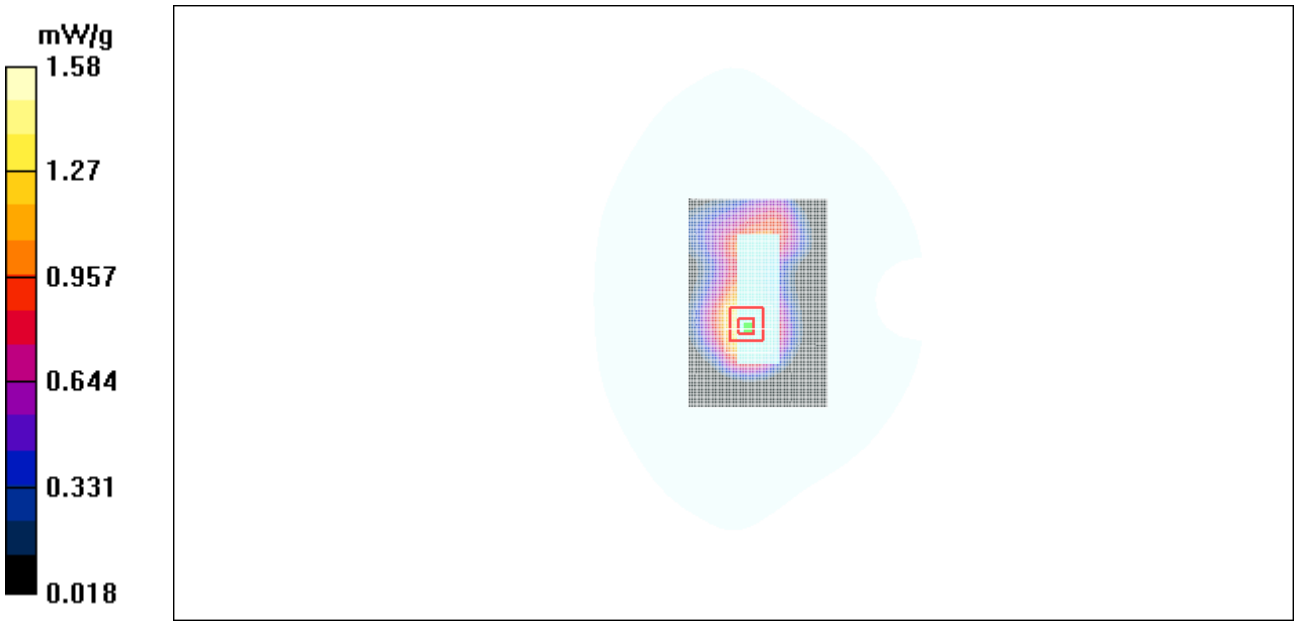


Figure 43 GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 512

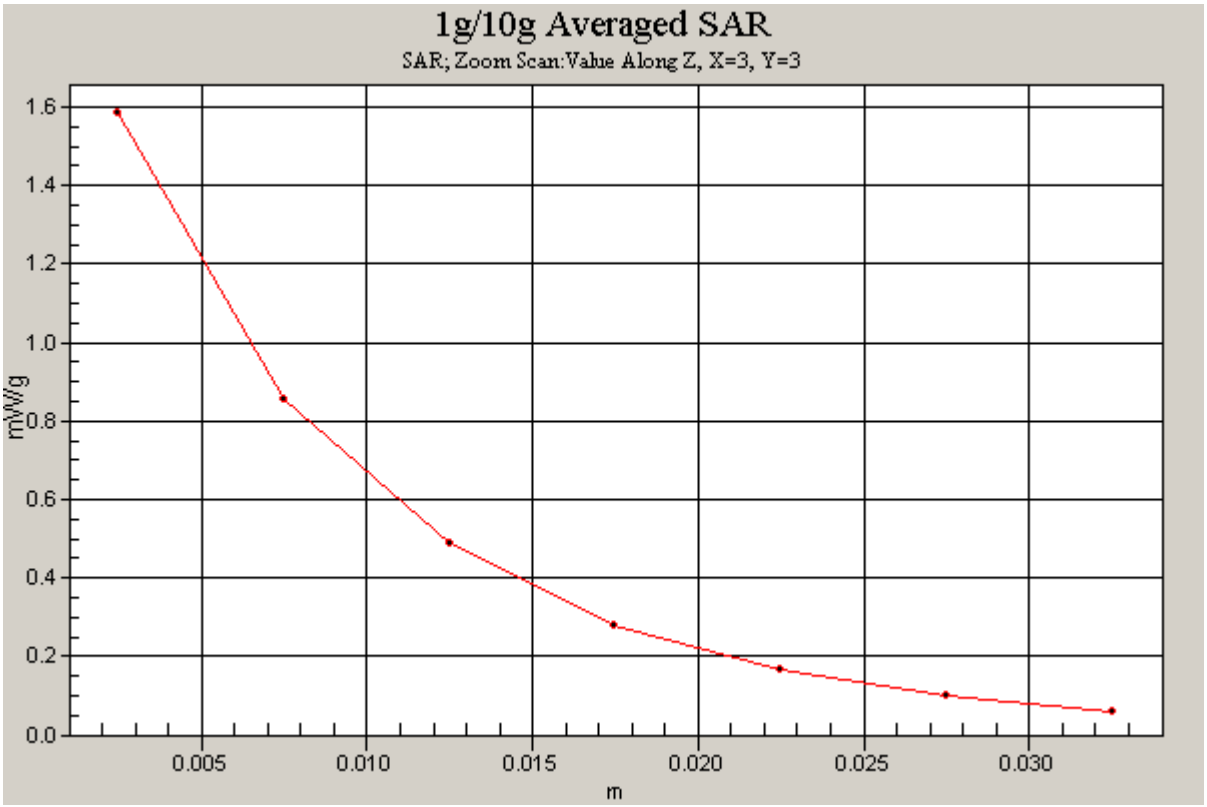


Figure 44 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 512]

Date/Time: 12/4/2008 2:00:50 AM

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 = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);
Electronics: DAE3 Sn536;
Test Position 4 Middle/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.586 mW/g

Test Position 4 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.0 V/m; Power Drift = -0.112 dB
Peak SAR (extrapolated) = 0.724 W/kg
SAR(1 g) = 0.424 mW/g; SAR(10 g) = 0.231 mW/g
Maximum value of SAR (measured) = 0.551 mW/g

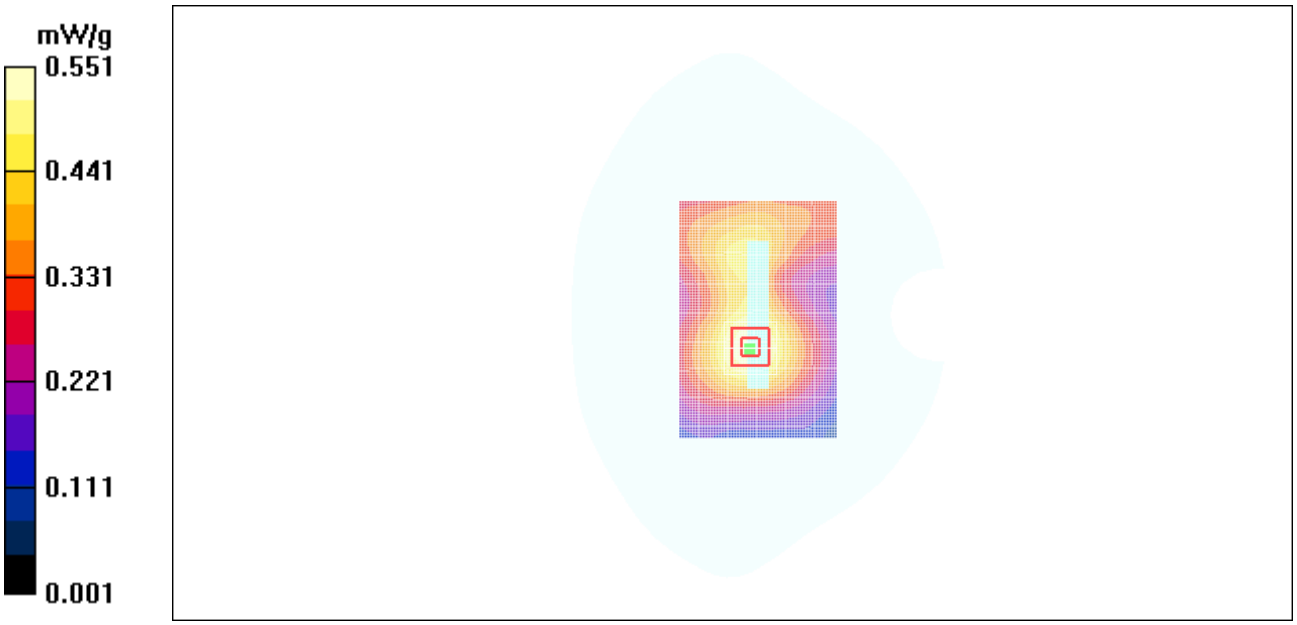


Figure 45 GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 4 Channel 661

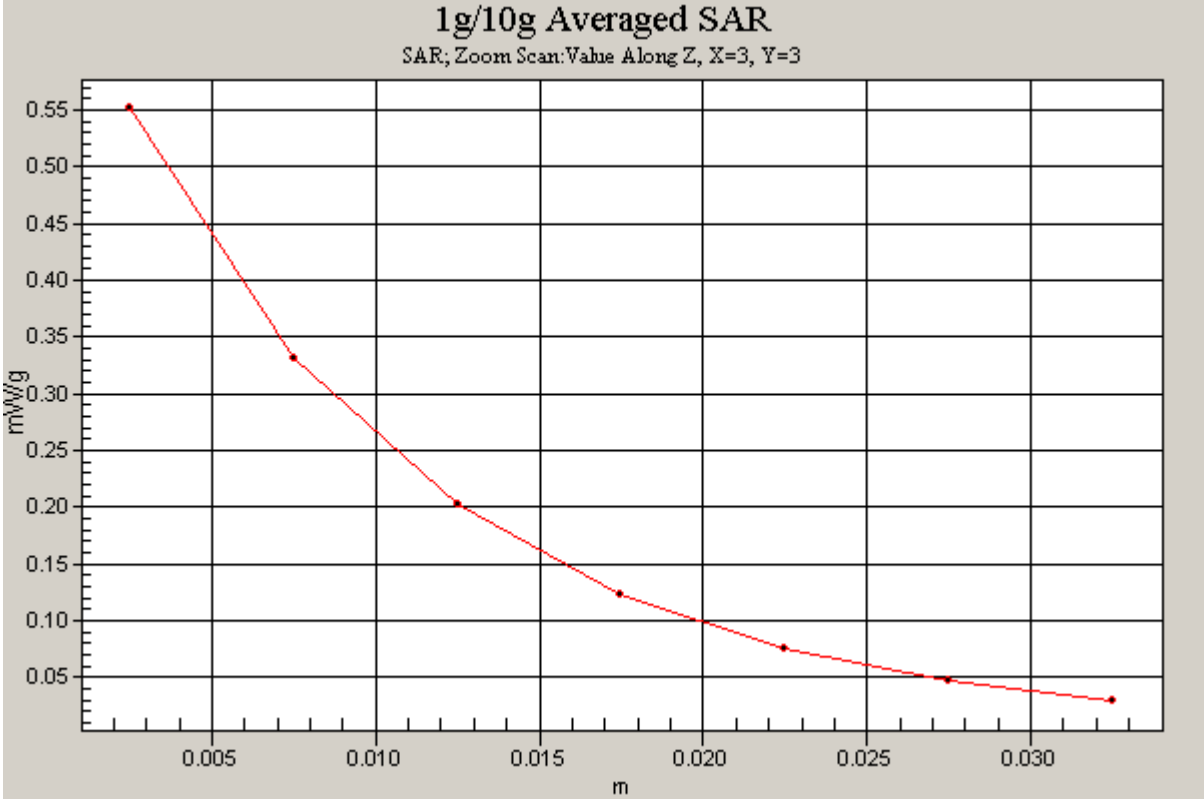


Figure 46 Z-Scan at power reference point (GSM 1900 GPRS (2 timeslots in uplink) with IBM T61 Test Position 4 Channel 661

Date/Time: 12/4/2008 2:24:34 AM

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 = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);
Electronics: DAE3 Sn536;
Test Position 5 Middle/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.754 mW/g

Test Position 5 Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.2 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 0.984 W/kg
SAR(1 g) = 0.527 mW/g; SAR(10 g) = 0.270 mW/g
Maximum value of SAR (measured) = 0.712 mW/g

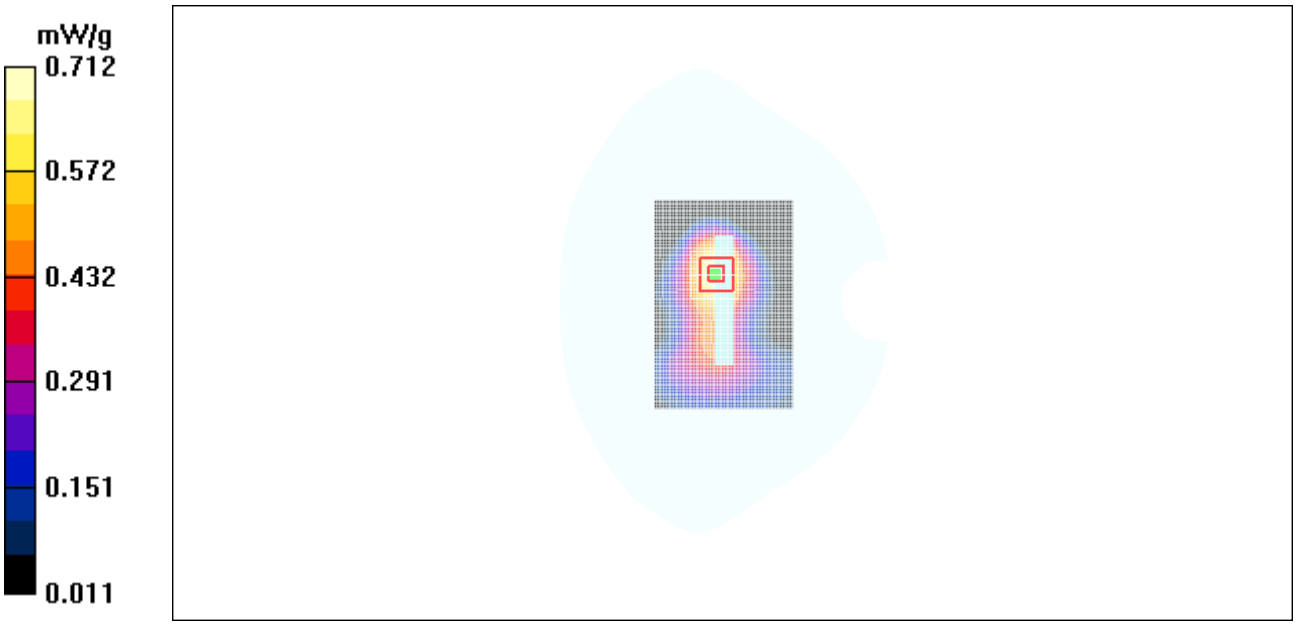


Figure 47 GSM 1900 GPRS (2 timeslots in uplink) with IBMT61 Test Position 5 Channel 661

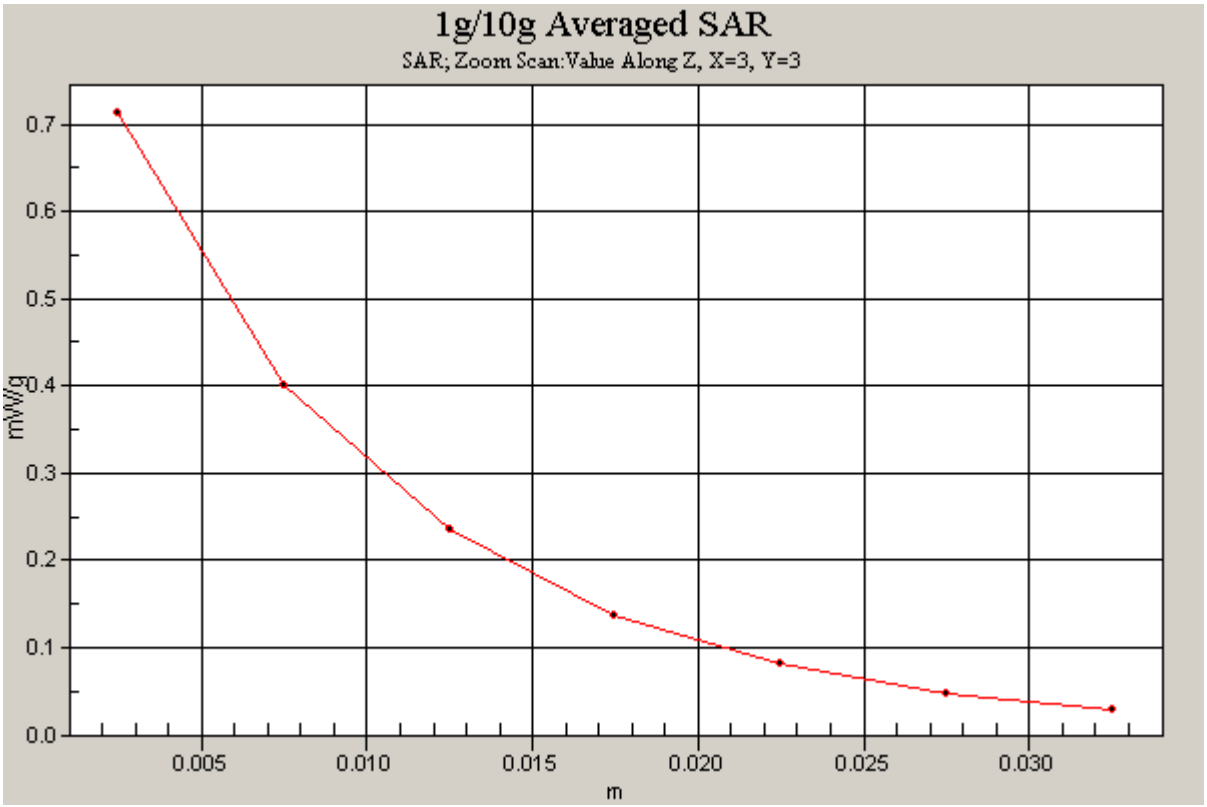


Figure 48 Z-Scan at power reference point [GSM 1900 GPRS (2 timeslots in uplink) with IBMT61 Test Position 5 Channel 661]

Date/Time: 12/4/2008 3:31:10 AM

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

Communication System: GSM 1900+EGPRS(2Up); Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.55 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(7.45, 7.45, 7.45);
Electronics: DAE3 Sn536;
Test Position 3 Low/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.36 mW/g

Test Position 3 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.7 V/m; Power Drift = 0.062 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.747 mW/g; SAR(10 g) = 0.375 mW/g
Maximum value of SAR (measured) = 1.01 mW/g

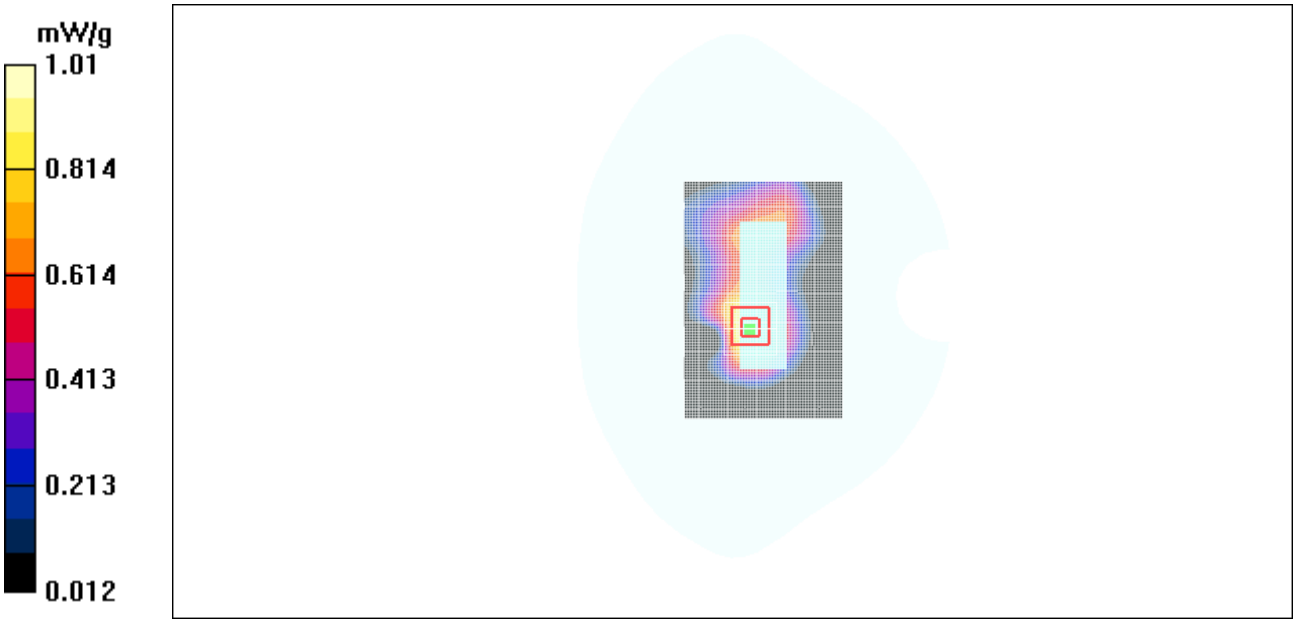


Figure 49 GSM 1900 EGPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 512

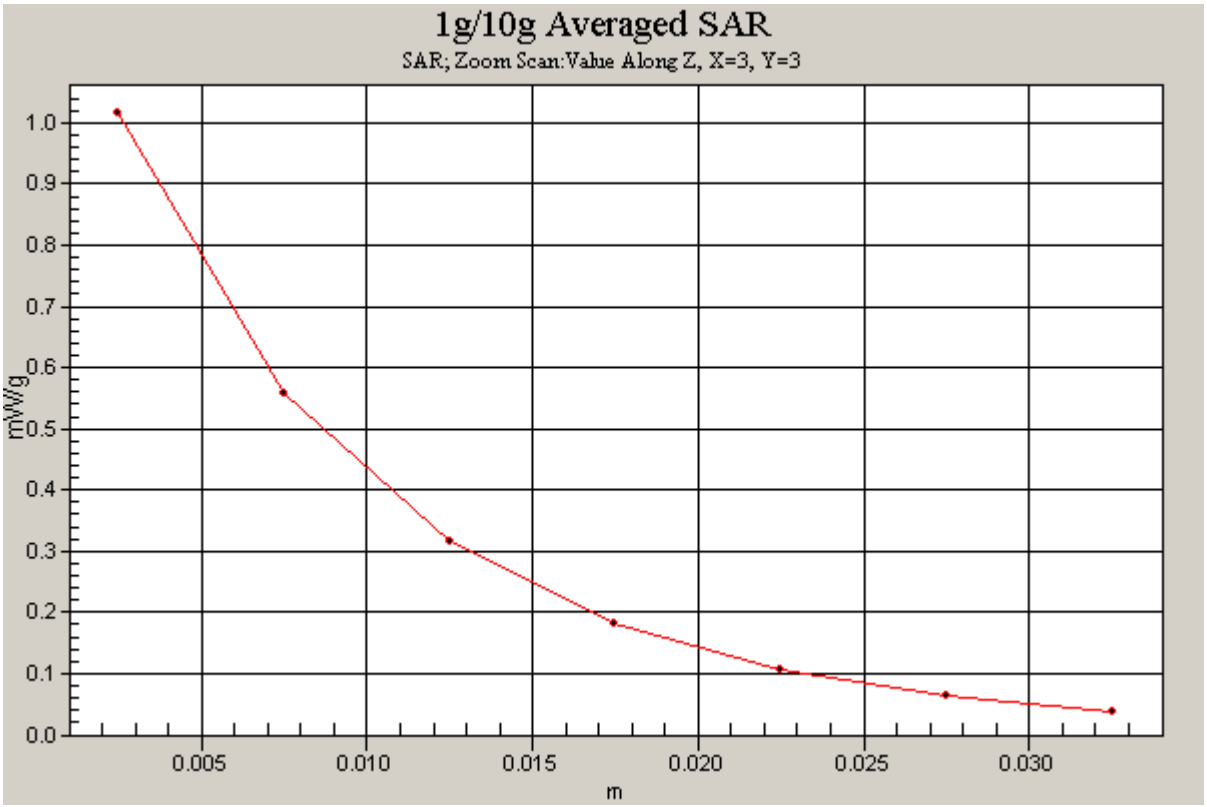


Figure 50 Z-Scan at power reference point [GSM 1900 EGPRS (2 timeslots in uplink) with BenQ Joybook R55V Test Position 3 Channel 512]

Date/Time: 12/5/2008 10:31:01 AM

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

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

Medium parameters used: f = 847 MHz; σ = 0.988 mho/m; ε_r = 55.4; ρ = 1000 kg/m^3

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

Electronics: DAE3 Sn536;

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

Maximum value of SAR (interpolated) = 0.754 mW/g

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

Reference Value = 19.5 V/m; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 0.961 W/kg

SAR(1 g) = 0.617 mW/g; SAR(10 g) = 0.389 mW/g

Maximum value of SAR (measured) = 0.768 mW/g

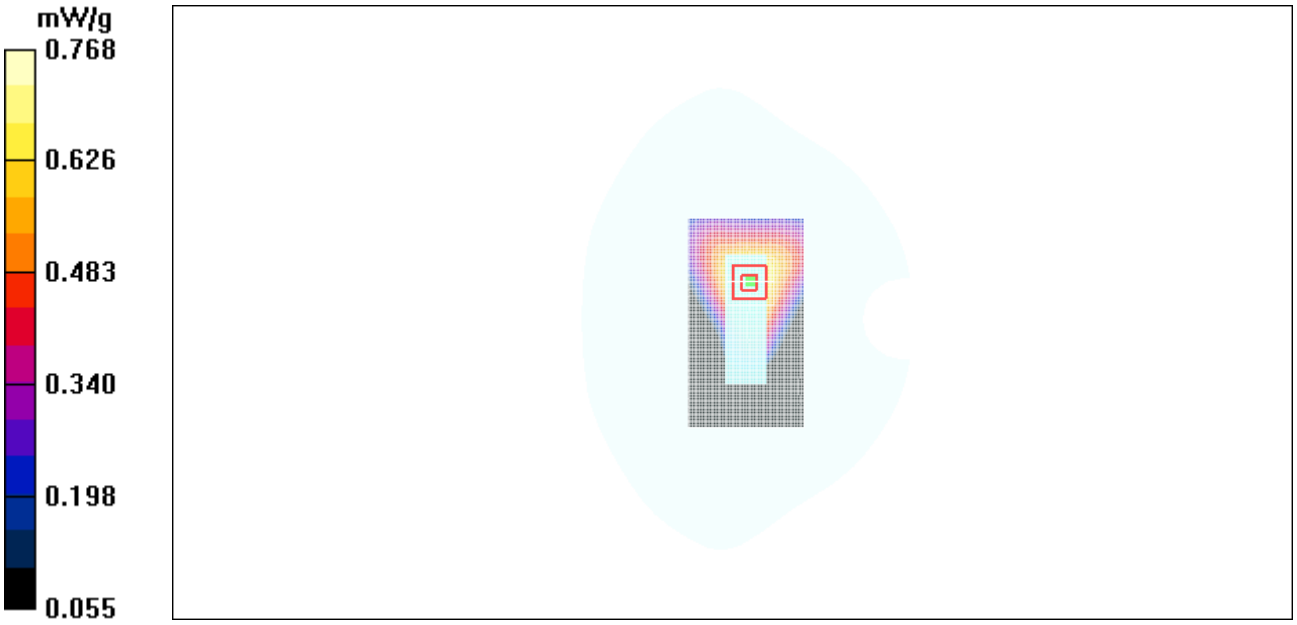


Figure 51 WCDMA Band V with BenQ Joybook S72 Test Position 1 Channel 4233

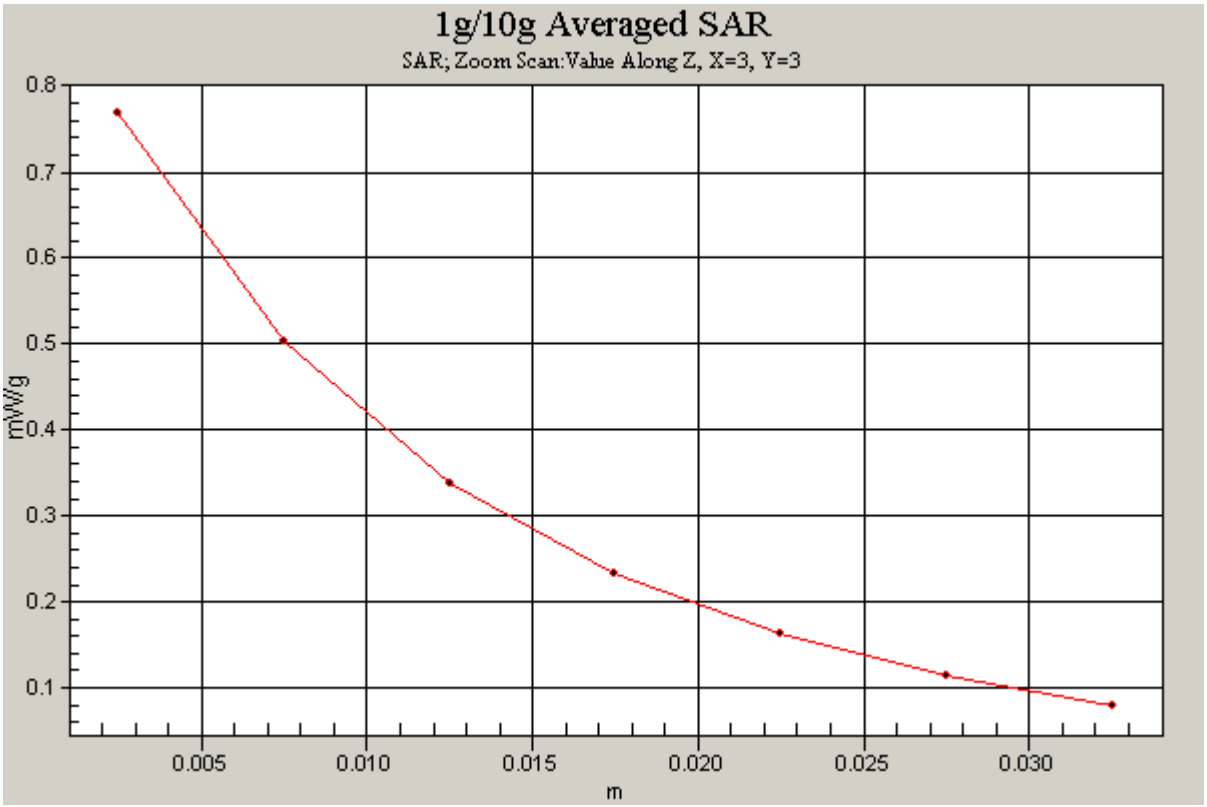


Figure 52 Z-Scan at power reference point (WCDMA Band V with BenQ Joybook S72 Test Position 1Channel 4233)

Date/Time: 12/4/2008 10:09:47 AM

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 = 0.981 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3

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

Electronics: DAE3 Sn536;

Test Position 1 Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.609 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 = 0.093 dB

Peak SAR (extrapolated) = 0.753 W/kg

SAR(1 g) = 0.493 mW/g; SAR(10 g) = 0.313 mW/g

Maximum value of SAR (measured) = 0.602 mW/g

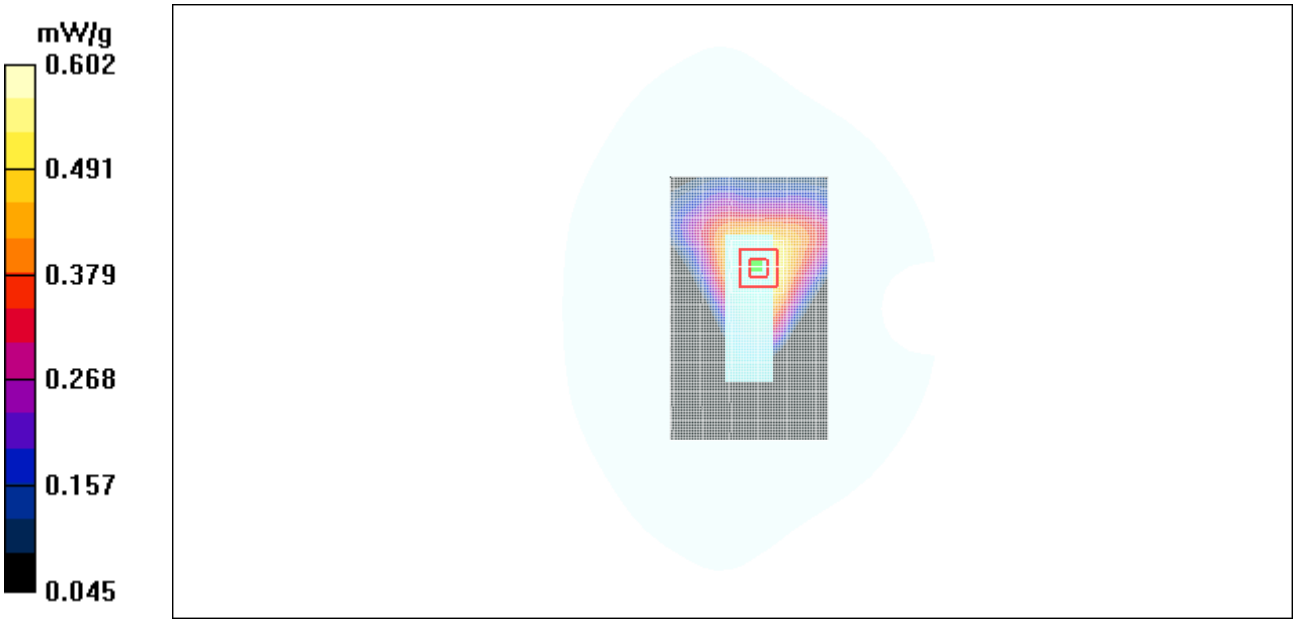


Figure 53 WCDMA Band V with BenQ Joybook S72 Test Position 1Channel 4182

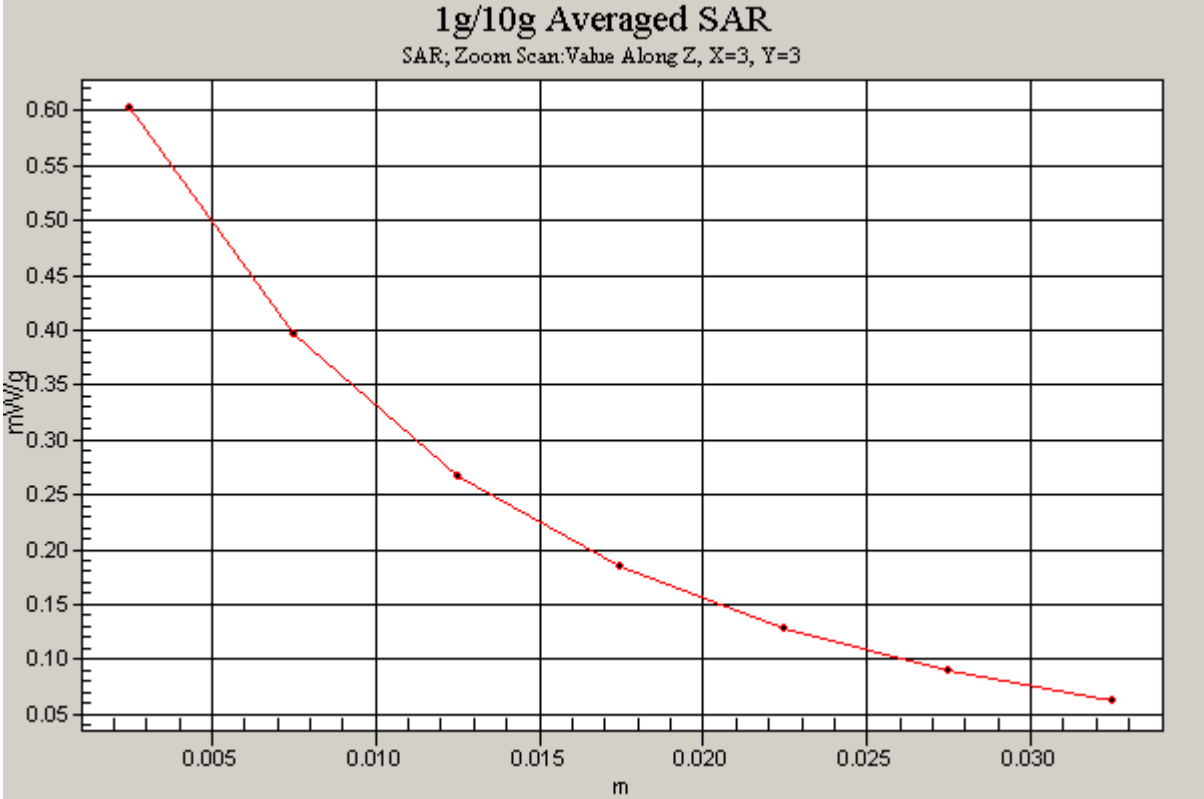


Figure 54 Z-Scan at power reference point (WCDMA Band V with BenQ Joybook S72 Test Position 1Channel 4182)

Date/Time: 12/5/2008 11:06:12 AM

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

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

Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.979 mho/m; ε_r = 55.6; ρ = 1000 kg/m^3

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

Electronics: DAE3 Sn536;

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

Maximum value of SAR (interpolated) = 0.886 mW/g

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

Reference Value = 21.7 V/m; Power Drift = 0.038 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.720 mW/g; SAR(10 g) = 0.456 mW/g

Maximum value of SAR (measured) = 0.888 mW/g

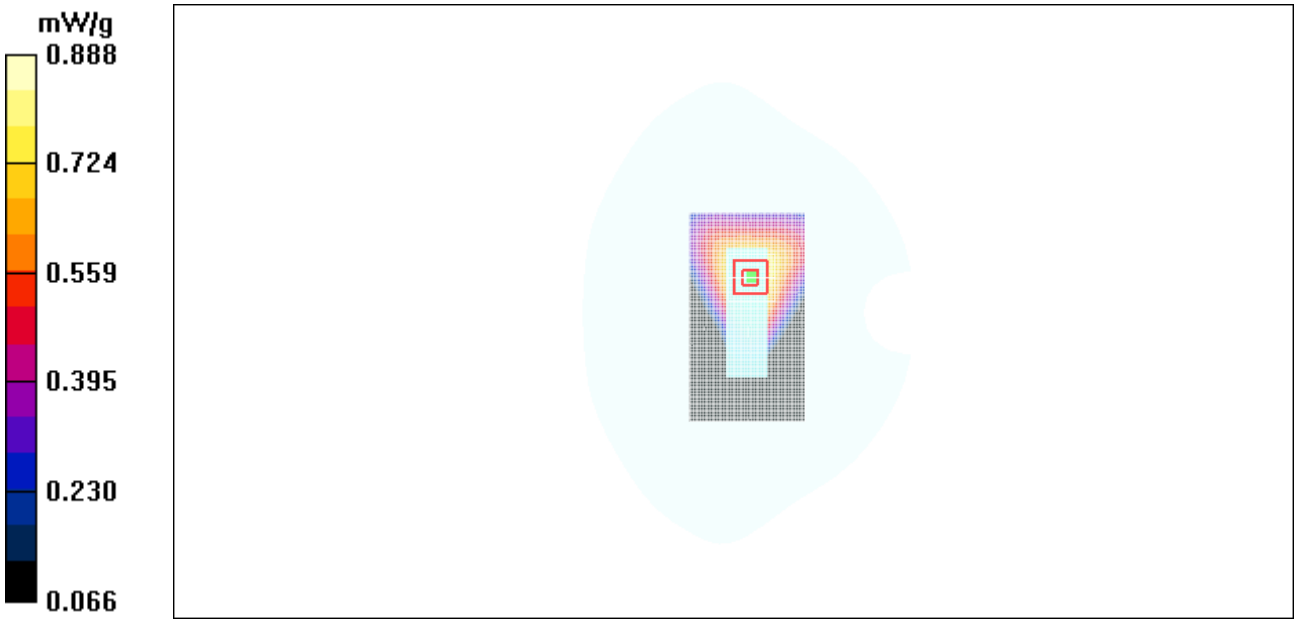


Figure 55 WCDMA Band V with BenQ Joybook S72 Test Position 1Channel 4132

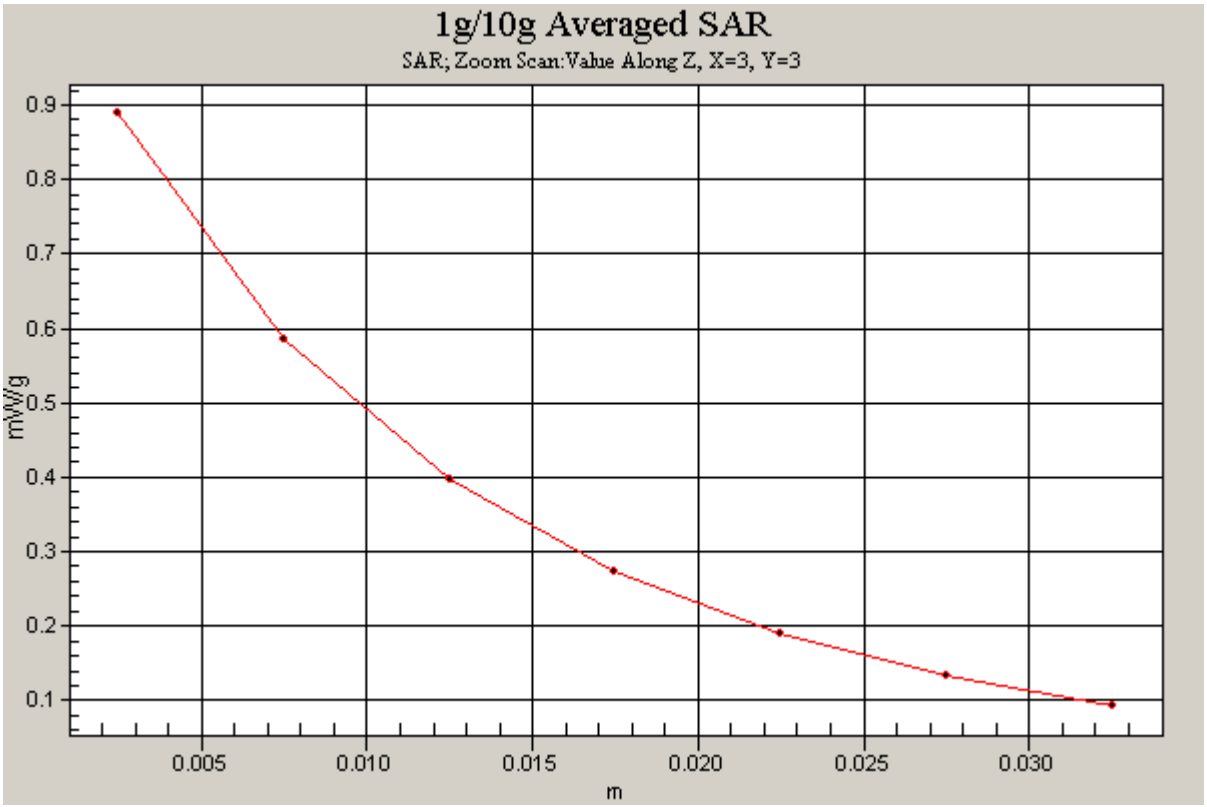


Figure 56 Z-Scan at power reference point (WCDMA Band V with BenQ Joybook S72 Test Position 1Channel 4132)

Date/Time: 12/4/2008 9:21:17 AM

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 = 0.981 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3

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

Electronics: DAE3 Sn536;

Test Position 2 Middle/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.085 mW/g

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

Reference Value = 9.32 V/m; Power Drift = 0.012 dB

Peak SAR (extrapolated) = 0.161 W/kg

SAR(1 g) = 0.051 mW/g; SAR(10 g) = 0.023 mW/g

Maximum value of SAR (measured) = 0.079 mW/g

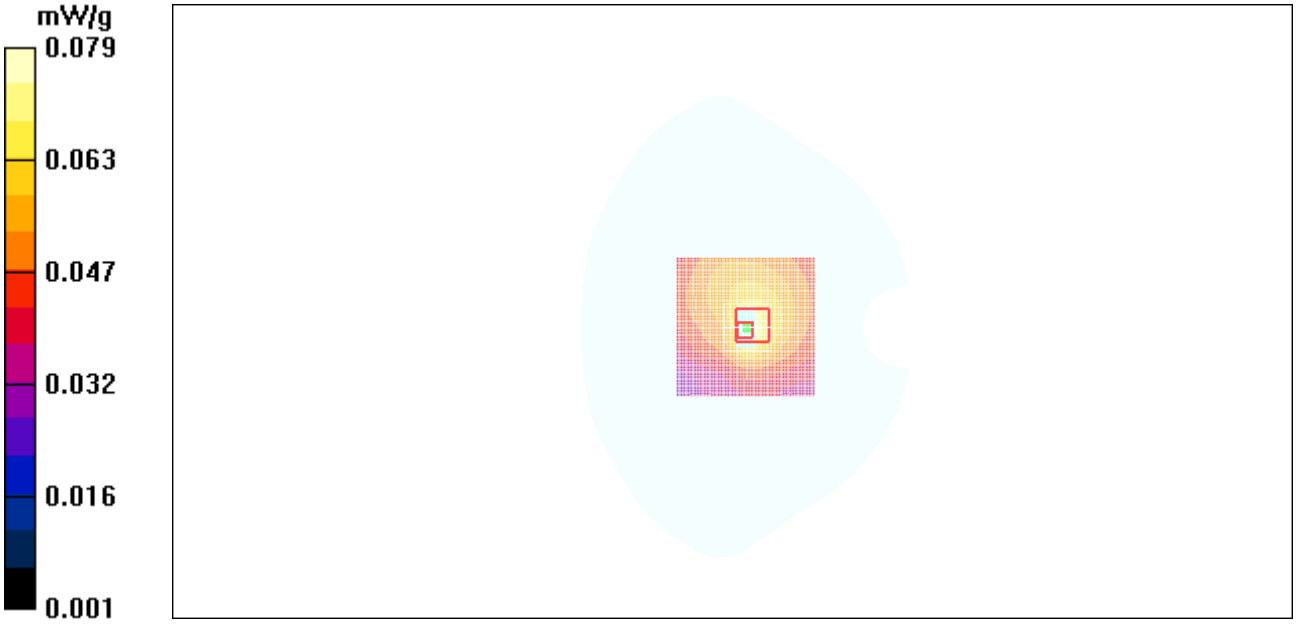


Figure 57 WCDMA Band V with BenQ Joybook S72 Test Position 2 Channel 4182

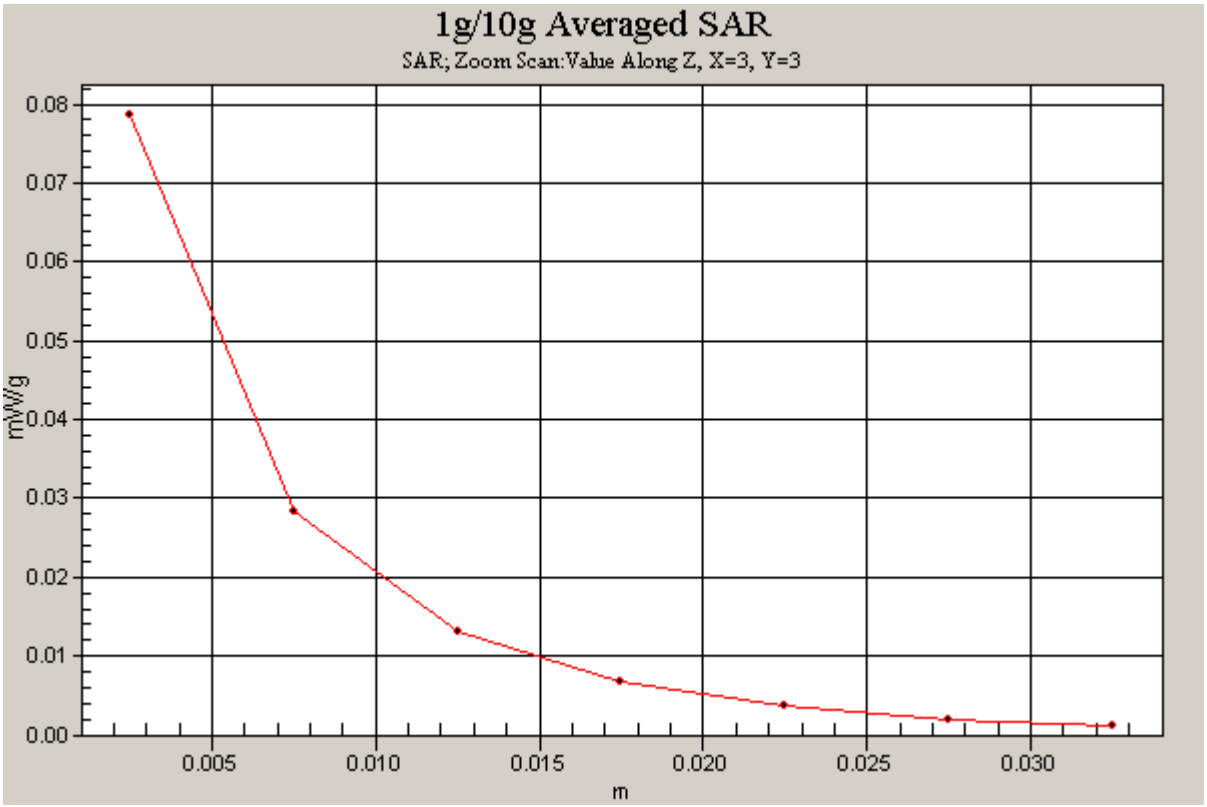


Figure 58 Z-Scan at power reference point (WCDMA Band V with BenQ Joybook S72 Test Position 2 Channel 4182)

Date/Time: 12/5/2008 7:43:17 PM

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 = 0.981 mho/m; ε_r = 55.5; 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) = 0.429 mW/g

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

Reference Value = 17.9 V/m; Power Drift = 0.034 dB

Peak SAR (extrapolated) = 0.837 W/kg

SAR(1 g) = 0.403 mW/g; SAR(10 g) = 0.265 mW/g

Maximum value of SAR (measured) = 0.435 mW/g

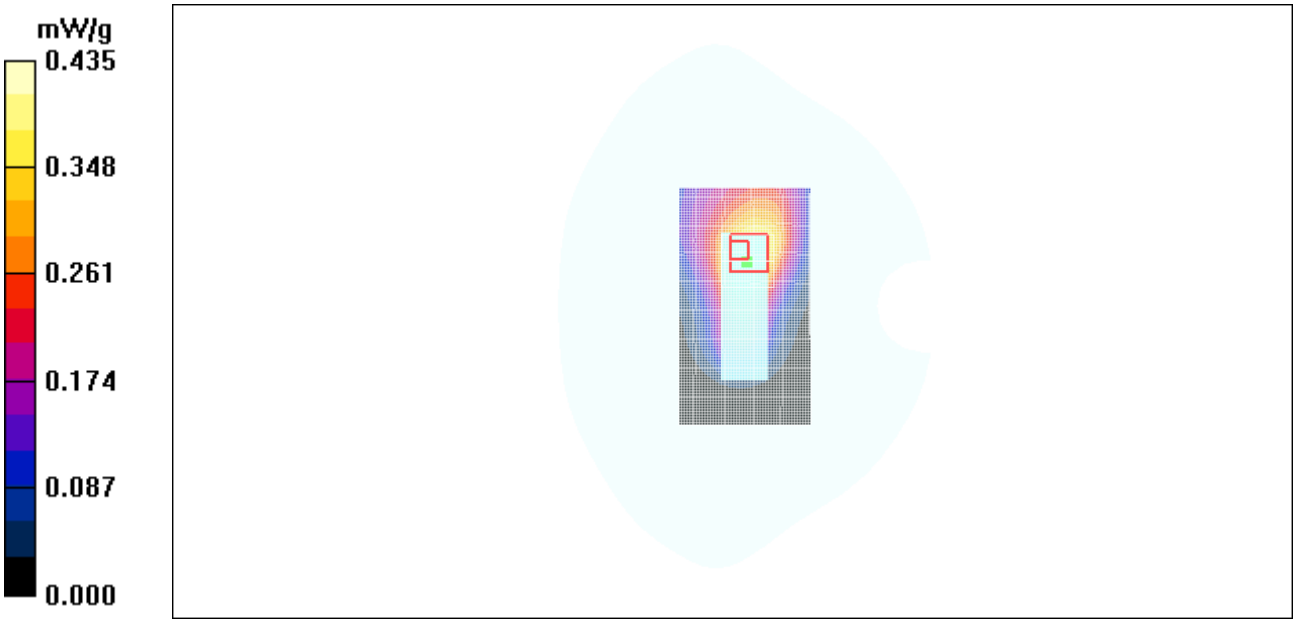


Figure 59 WCDMA Band V with BenQ Joybook R55V Test Position 3 Channel 4182

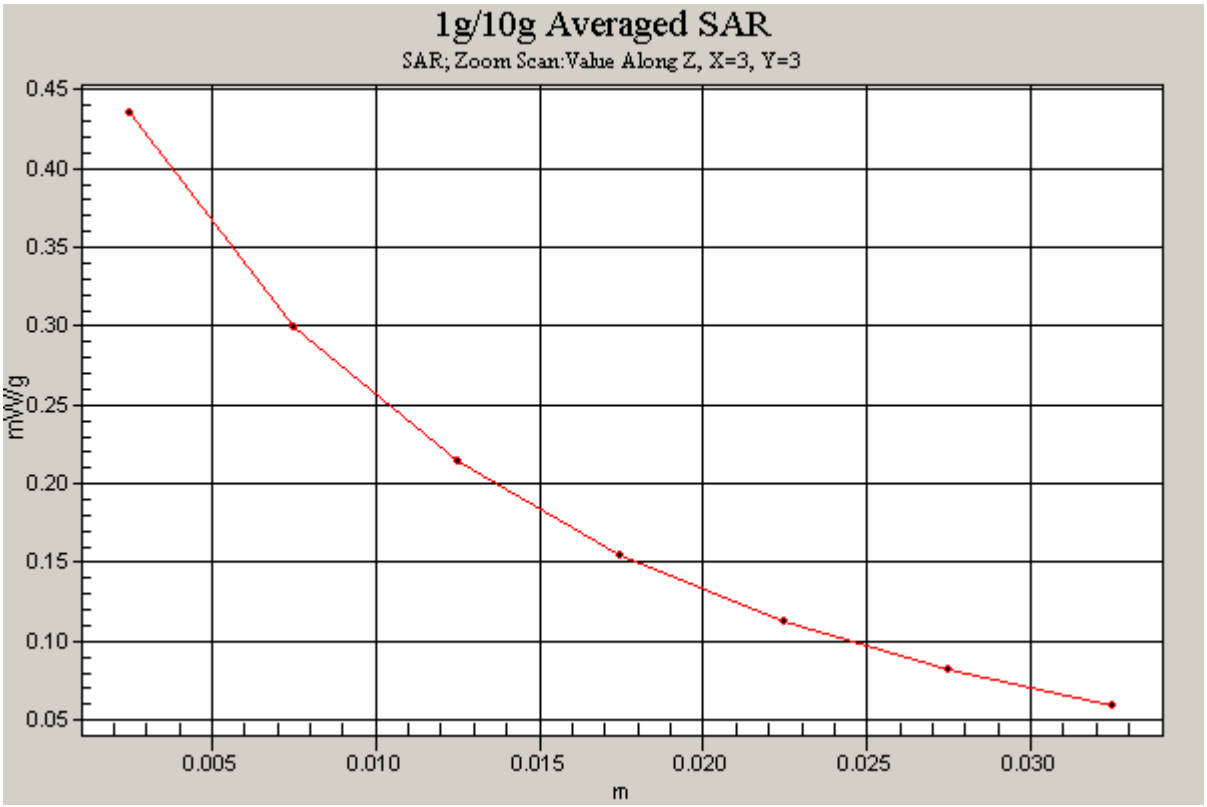


Figure 60 Z-Scan at power reference point (WCDMA Band V with BenQ Joybook R55V Test Position 3 Channel 4182)

Date/Time: 12/5/2008 9:25:04 AM

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 = 0.981 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3

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

Electronics: DAE3 Sn536;

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

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

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

Reference Value = 16.0 V/m; Power Drift = 0.038 dB

Peak SAR (extrapolated) = 0.587 W/kg

SAR(1 g) = 0.381 mW/g; SAR(10 g) = 0.245 mW/g

Maximum value of SAR (measured) = 0.468 mW/g

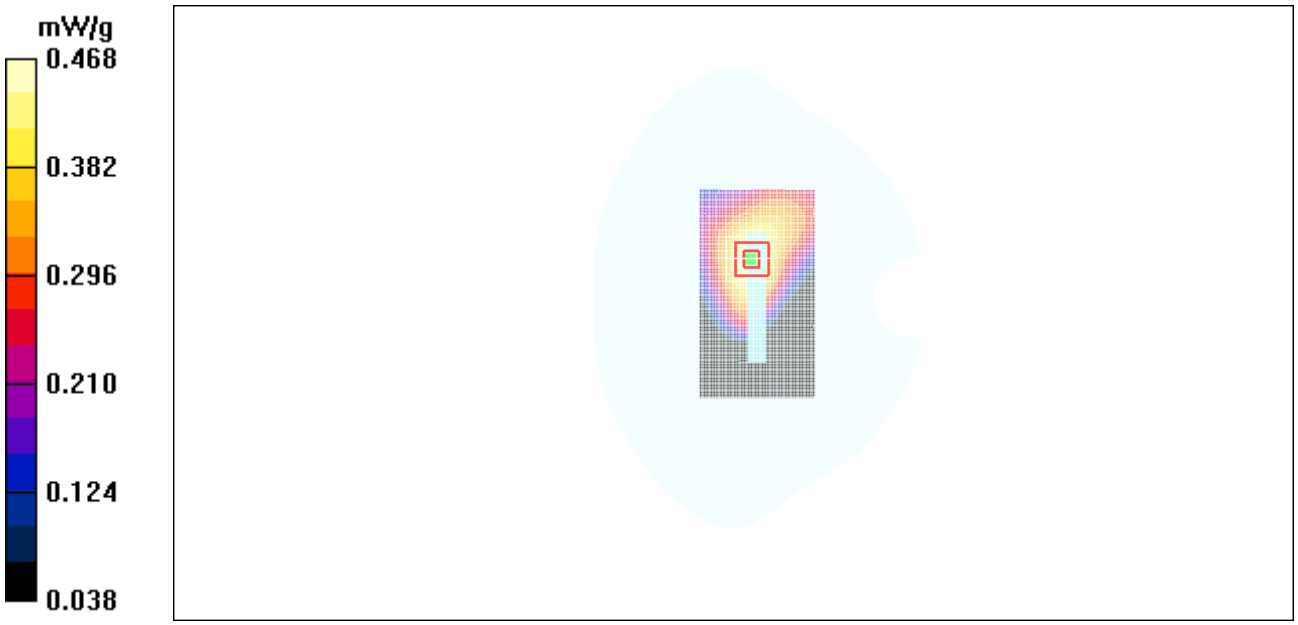


Figure 61 WCDMA Band V with IBM T61 Test Position 4 Channel 4182

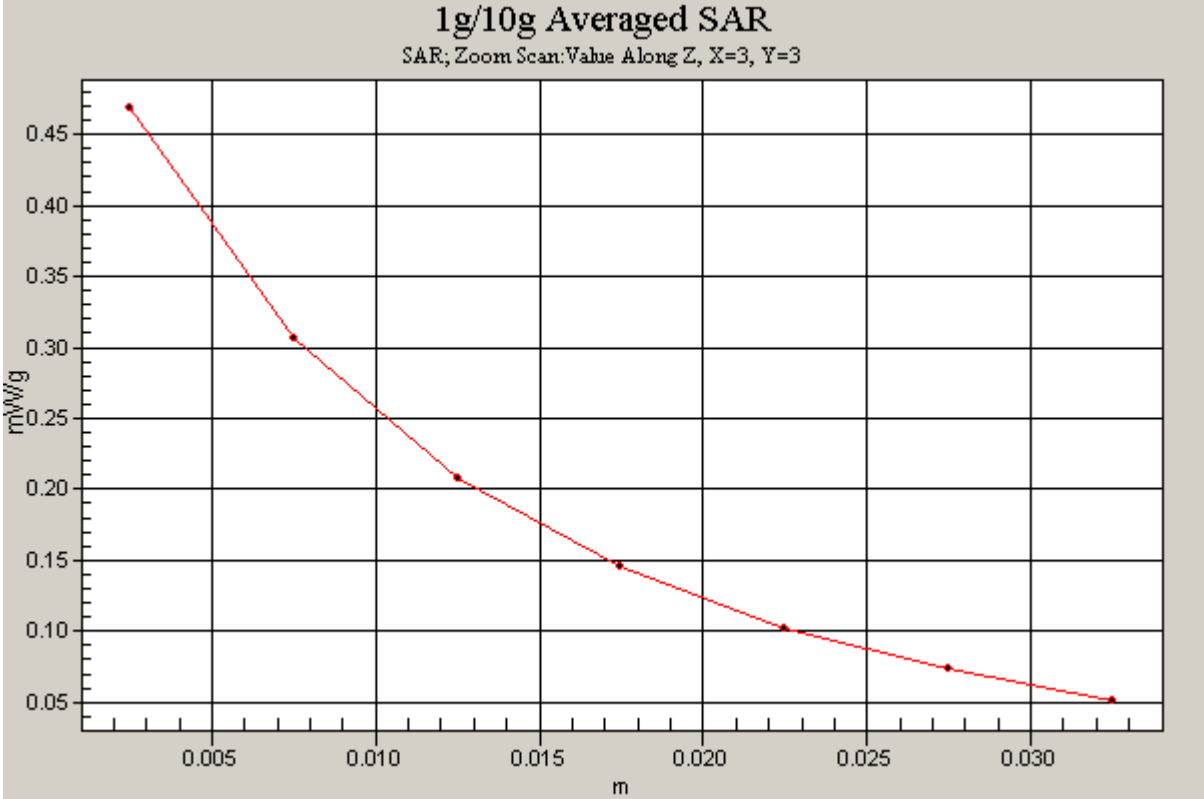


Figure 62 Z-Scan at power reference point (WCDMA Band V with IBM T61 Test Position 4 Channel 4182)

Date/Time: 12/5/2008 9:52:02 AM

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 = 0.981 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3

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

Electronics: DAE3 Sn536;

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

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

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

Reference Value = 19.3 V/m; Power Drift = 0.017 dB

Peak SAR (extrapolated) = 0.637 W/kg

SAR(1 g) = 0.406 mW/g; SAR(10 g) = 0.259 mW/g

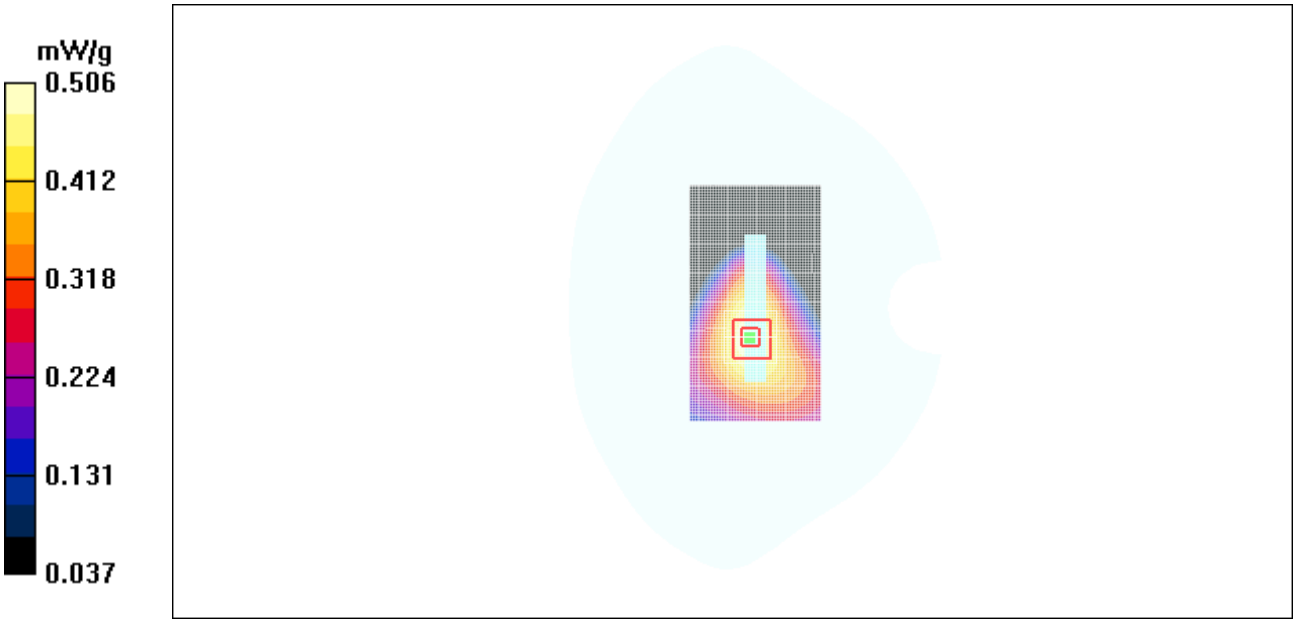


Figure 63 WCDMA Band V with IBM T61 Test Position 5 Channel 4182

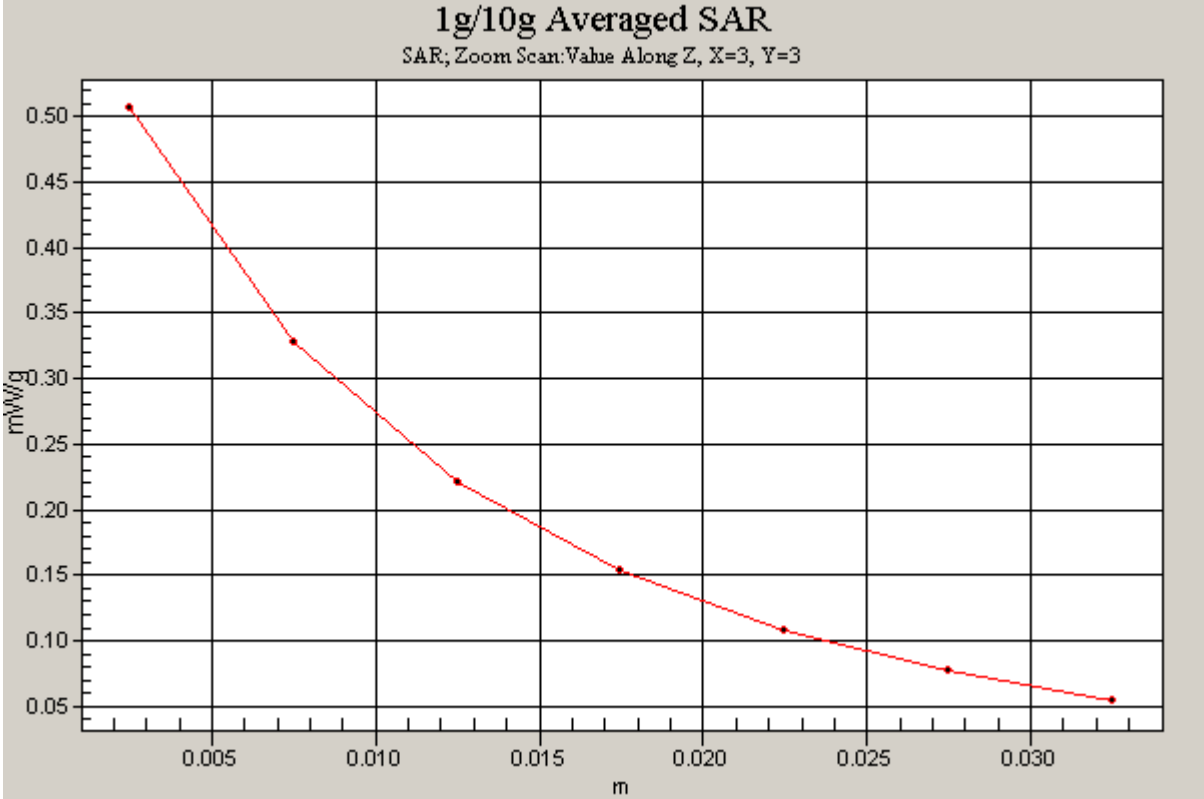


Figure 64 Z-Scan at power reference point (WCDMA Band V with IBM T61 Test Position 5 Channel 4182)

Date/Time: 12/6/2008 6:17:00 PM

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

Communication System: WCDMA Band V+HSDPA; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.979 mho/m; ε_r = 55.6; ρ = 1000 kg/m^3
Probe: EX3DV4 - SN3660; ConvF(9.1, 9.1, 9.1);
Electronics: DAE3 Sn536;
Test Position 1 Low/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.767 mW/g

Test Position 1 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.0 V/m; Power Drift = -0.190 dB
Peak SAR (extrapolated) = 1.25 W/kg
SAR(1 g) = 0.610 mW/g; SAR(10 g) = 0.387 mW/g
Maximum value of SAR (measured) = 0.754 mW/g

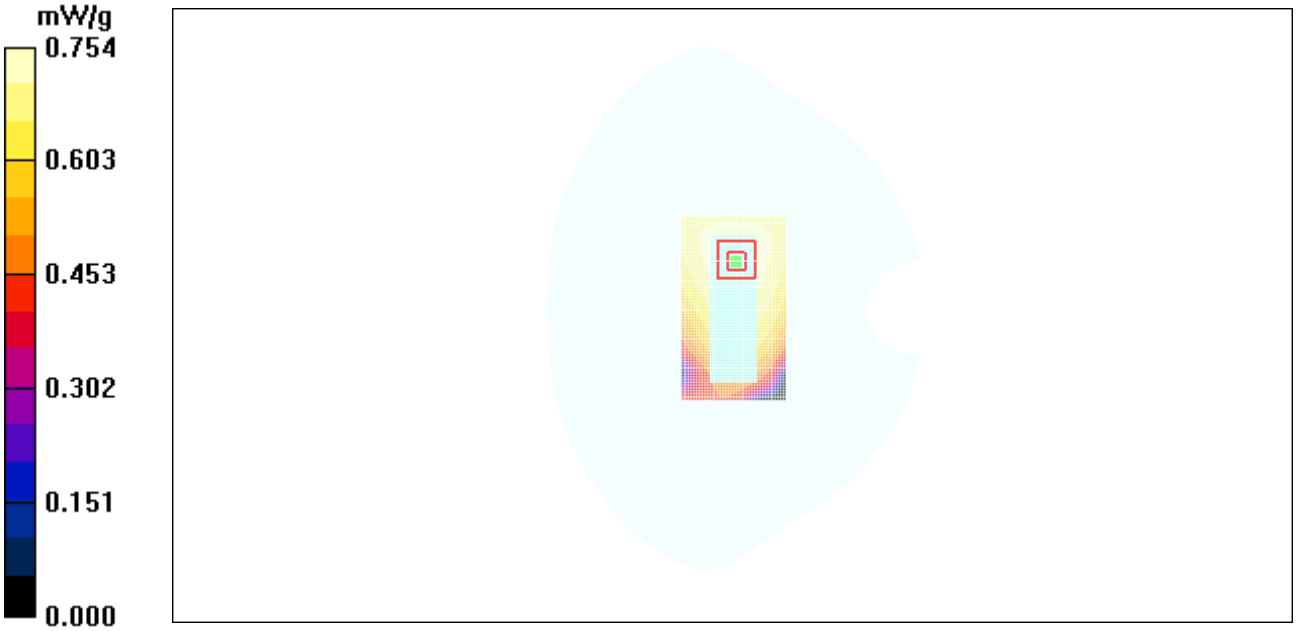


Figure 65 WCDMA Band V HSDPA with BenQ Joybook S72 Test Position 1 Channel 4132

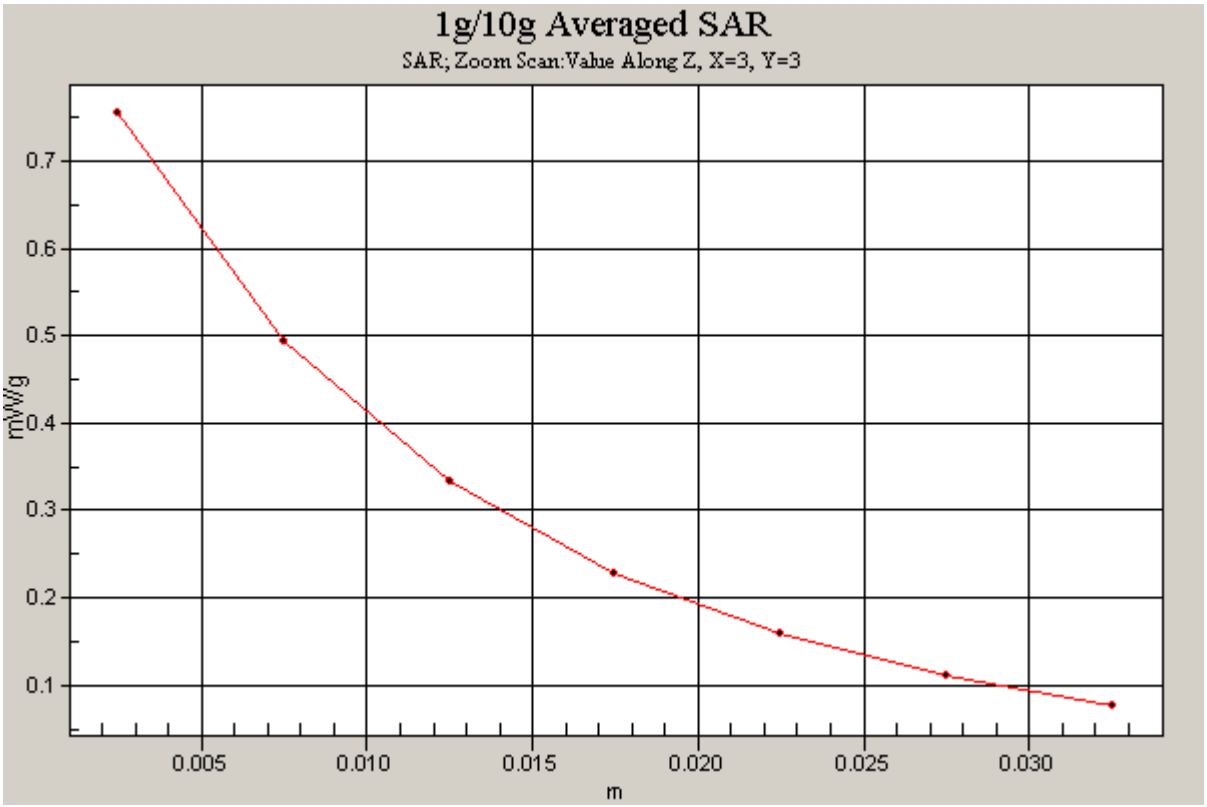


Figure 66 Z-Scan at power reference point (WCDMA Band V HSDPA with BenQ Joybook S72 Test Position 1 Channel 4132)

ANNEX C： 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

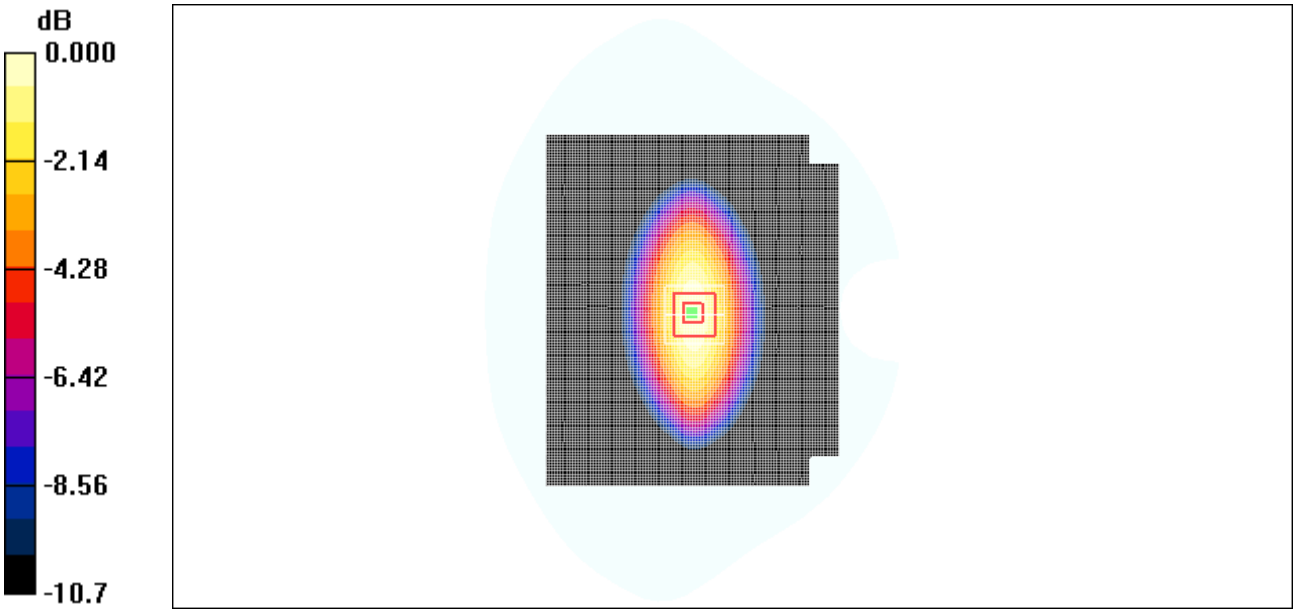
d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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 67 System Performance Check 835MHz 250mW

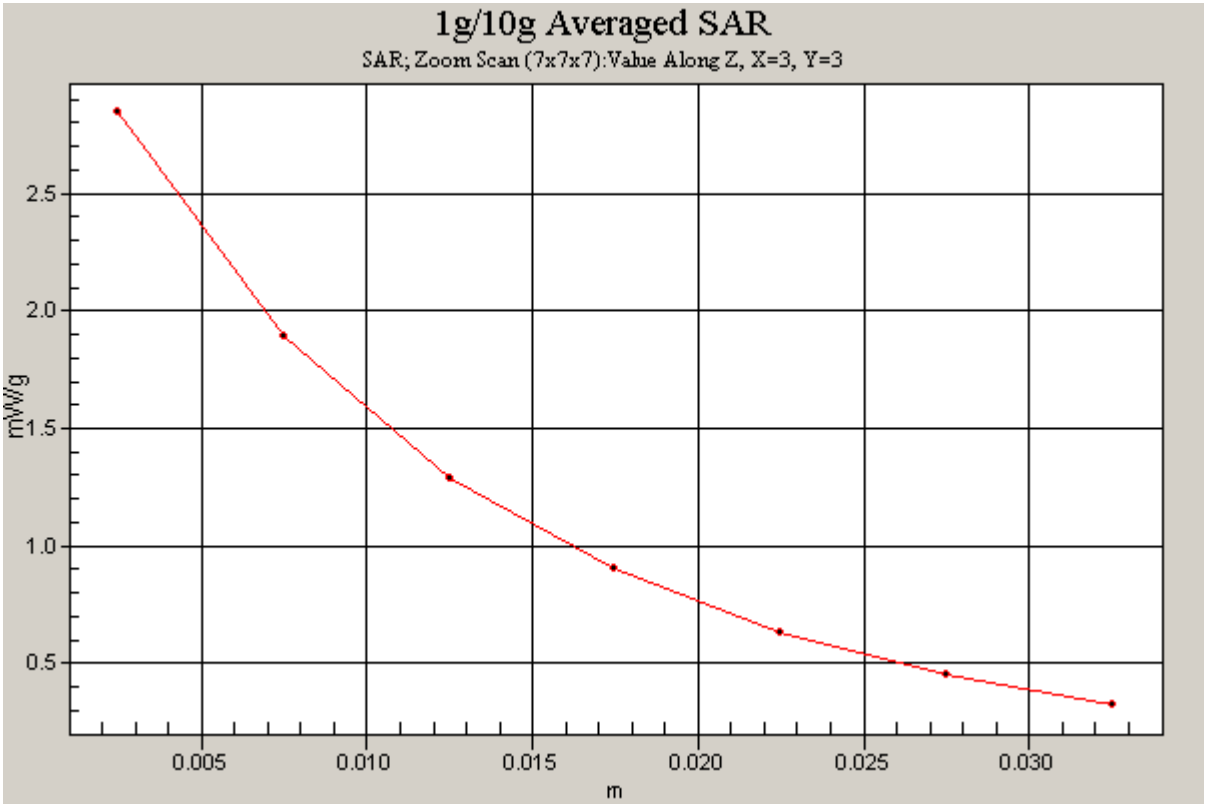


Figure 68 Z-Scan at power reference point (system validation at 835 MHz dipole)

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 = 1.41 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

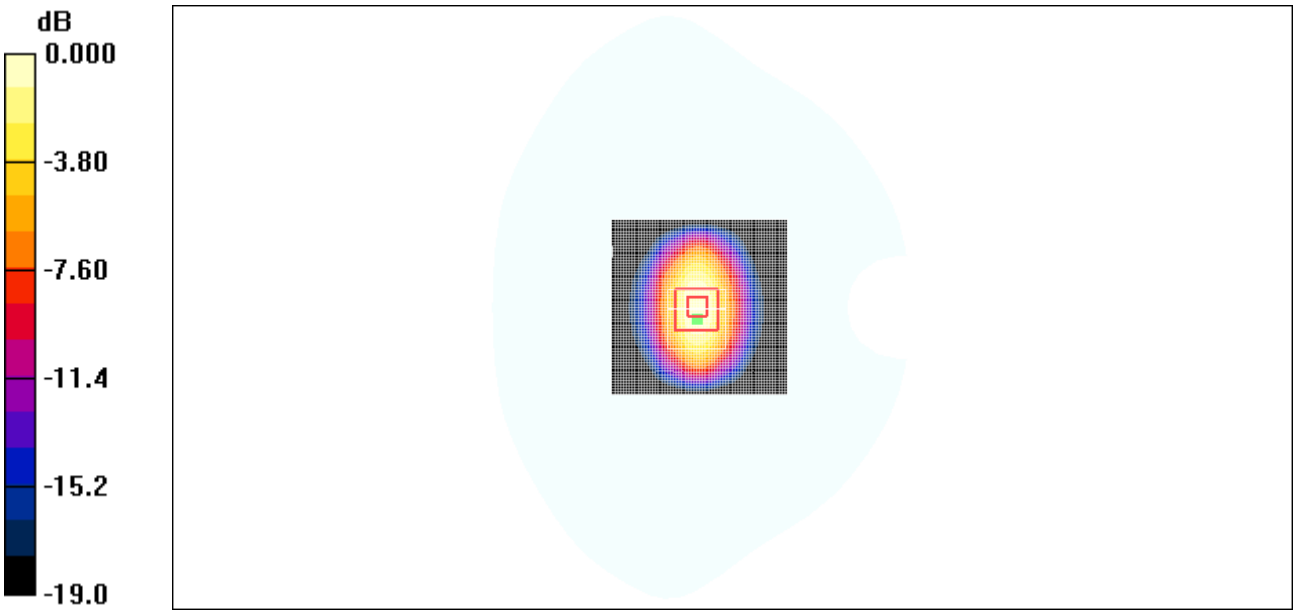
d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

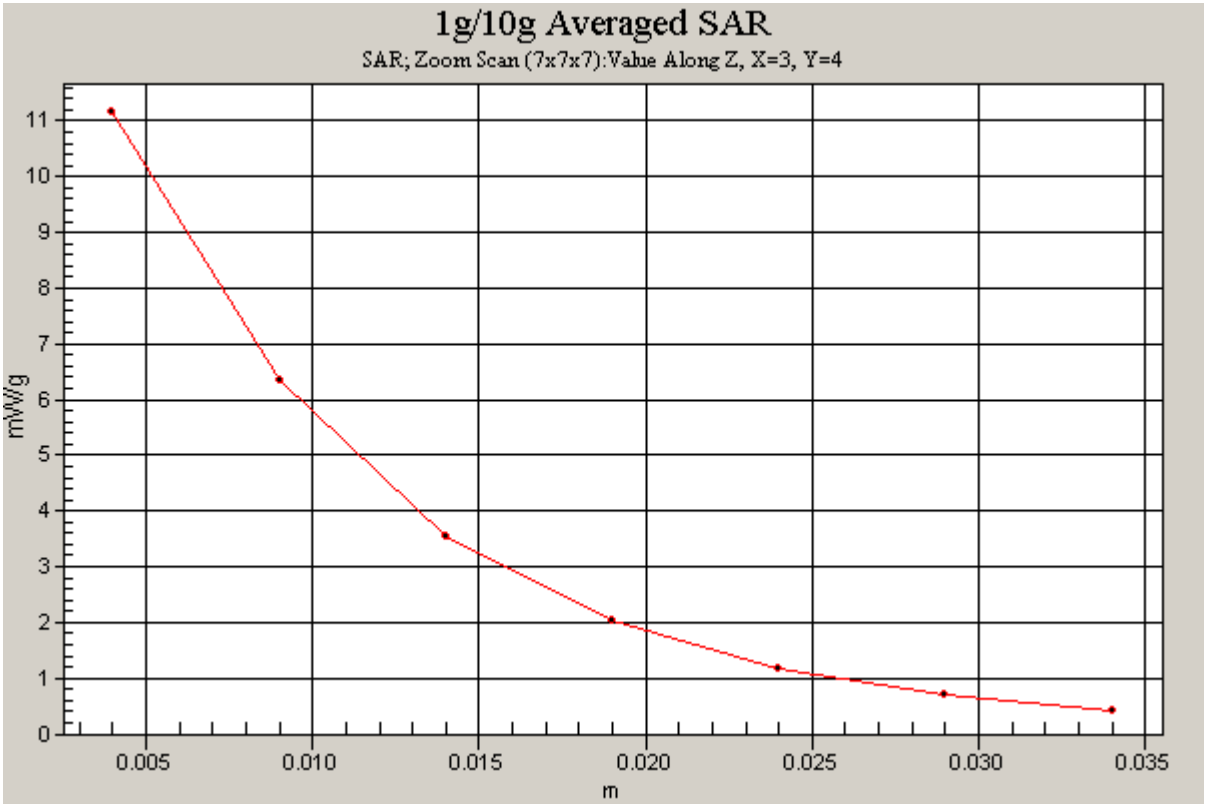


Figure 70 Z-Scan at power reference point (system validation at 1900 MHz dipole)

ANNEX D： PROBE CALIBRATION CERTIFICATE

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

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

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

Accreditation No.: SCS 108

Client **TA (Auden)** Certificate No: **EX3-3660_Sep08**

CALIBRATION CERTIFICATE

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

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	1-Jul-08 (No. 217-00865)	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	
Approved by:	Fin Bomholt	R&D Director	

Issued: September 3, 2008

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!)

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

DASY - Parameters of Probe: EX3DV4 SN:3660

Sensitivity in Free Space[A] Diode Compression[B]

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

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

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

Sensor Center to Phantom Surface Distance		**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%.

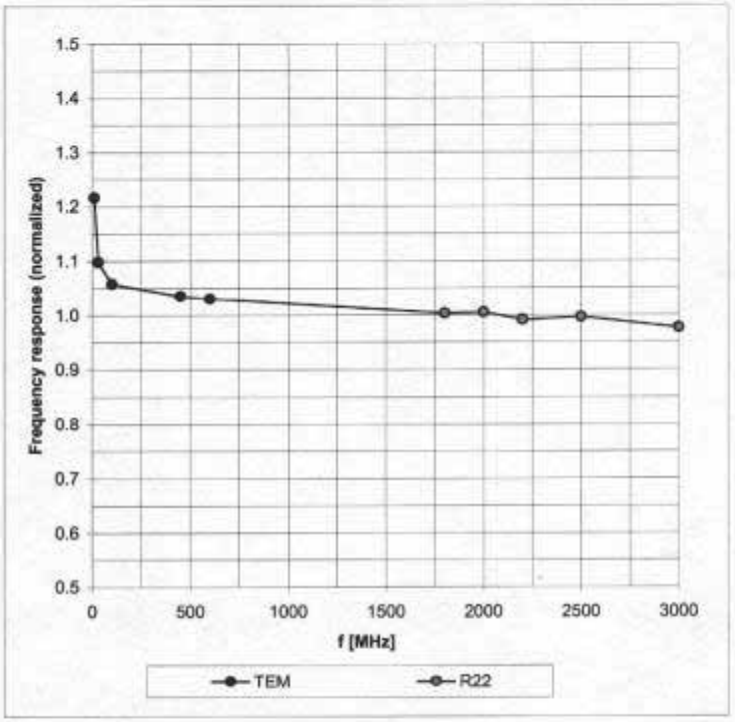
[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

EX3DV4 SN:3660 September 3, 2008

Frequency Response of E-Field

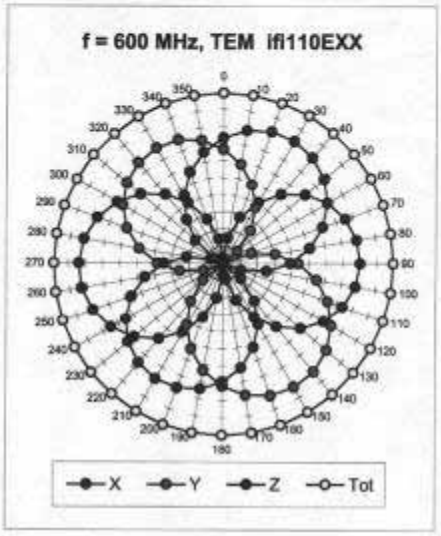
(TEM-Cell:ifi110 EXX, Waveguide: R22)

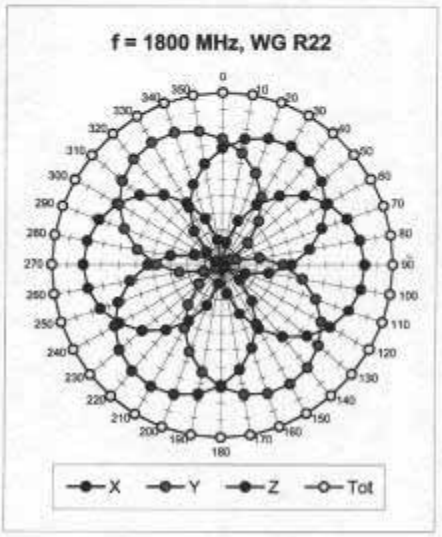


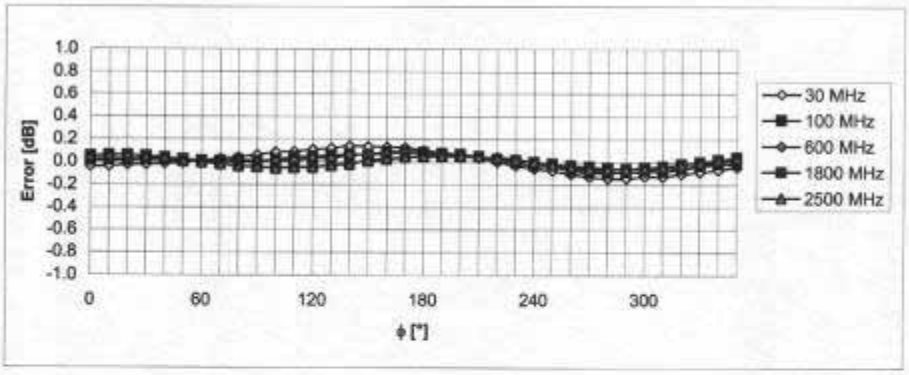
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

EX3DV4 SN:3660 September 3, 2008

Receiving Pattern (ϕ), ϑ = 0°





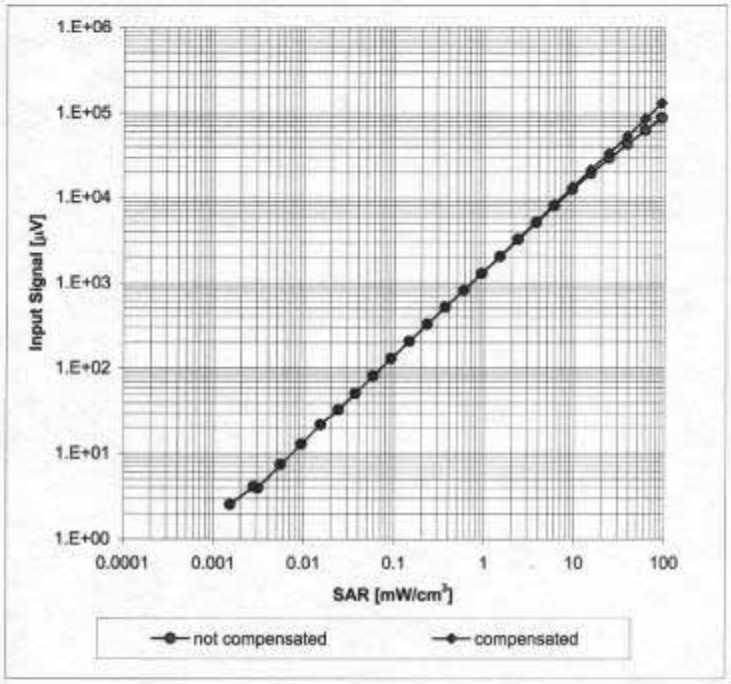


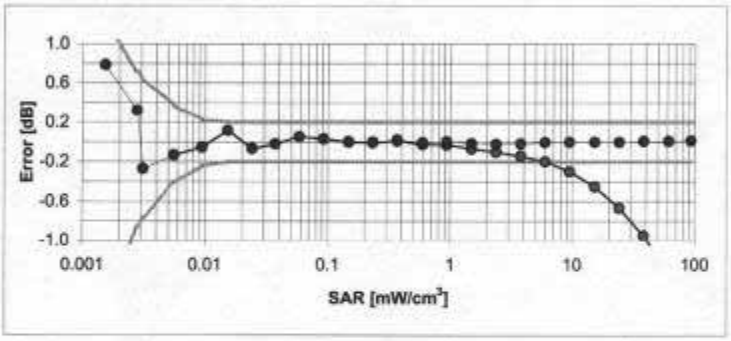
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

EX3DV4 SN:3660 September 3, 2008

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)

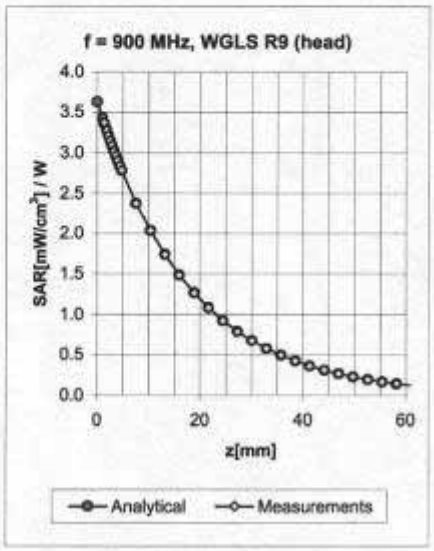


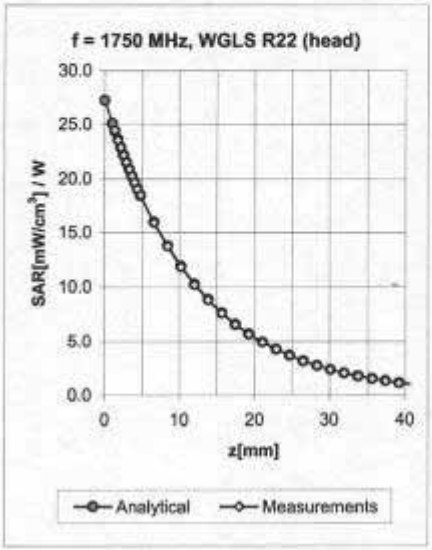


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

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

Conversion Factor Assessment





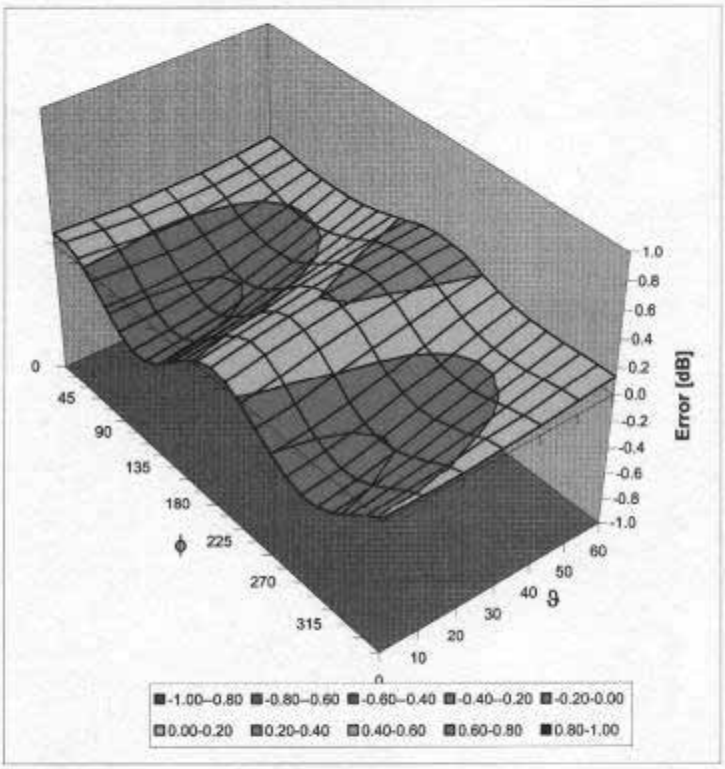
f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.49	0.76	9.19 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.43	0.83	8.84 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.68	0.63	7.79 ± 11.0% (k=2)
1950	± 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.

EX3DV4 SN:3660 September 3, 2008

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

ANNEX E： D835V2 DIPOLE CALIBRATION CERTIFICATE

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

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

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

Accreditation No.: SCS 108

Client Auden

Certificate No: D835V2-4d020_Jul08

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d020
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	July 21, 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 EPM-442A	GB37480704	04-Oct-07 (No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (No. 217-00736)	Oct-08
Reference 20 dB Attenuator	SN: 5086 (20g)	01-Jul-08 (No. 217-00864)	Jul-09
Type-N mismatch combination	SN: 5047.2 / 06327	01-Jul-08 (No. 217-00867)	Jul-09
Reference Probe ES3DV2	SN: 3025	28-Apr-08 (No. ES3-3025_Apr08)	Apr-09
DAE4	SN: 601	14-Mar-08 (No. DAE4-601_Mar08)	Mar-09

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

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

Issued: July 21, 2008

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C Service suisse d'étalonnage
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S Swiss Calibration Service

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

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65
d) EN 50361, "Basic standard for the measurement of specific absorption rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz)", July 2001

Additional Documentation:

e) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.0 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature during test	(21.6 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.30 mW / g
SAR normalized	normalized to 1W	9.20 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**9.20 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.52 mW / g
SAR normalized	normalized to 1W	6.08 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**6.07 mW / g ± 16.5 % (k=2)**

[1] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"