SAR TEST REPORT

No. 2008SAR00075

For

TCT Mobile Suzhou Limited

GSM/UMTS Data Card

LeMans

One Touch X200

With

Hardware Version: PIO5

Software Version: FL1BE3D0

FCCID: RAD095

Issued Date: 2008-12-04

Deutscher Akkreditierungs Rat

No. **DAT-P-114/01-01**

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of TMC Beijing.

Test Laboratory:

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1 Test Laboratory

1.1 Testing Location

Company Name:	TMC Beijing, Telecommunication Metrology Center of MII
Address:	No 52, Huayuan beilu, Haidian District, Beijing,P.R.China
Postal Code:	100083
Telephone:	+86-10-62303288
Fax:	+86-10-62304793

1.2 Testing Environment

Temperature:	18°C~25 °C,
Relative humidity:	30%~ 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.

1.3 Project Data

Project Leader:	Sun Qian
Test Engineer:	Lin Xiaojun
Testing Start Date:	December 2, 2008
Testing End Date:	December 3, 2008

1.4 Signature

Lin Xiaojun

(Prepared this test report)

Sun Qian

(Reviewed this test report)

Lu Bingsong

Deputy Director of the laboratory

(Approved this test report)

2 Client Information

2.1 Applicant Information

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City:	Shanghai
Postal Code:	201203
Country:	P. R. China
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Fax:	+86 (0)21 6146 0602

2.2 Manufacturer Information

Company Name:	TCT Mobile Suzhou Limited
Address /Post:	4/F, South Building,No.2966, Jinke Road, Zhangjiang High-Tech Park, Pudong, Shanghai, 201203, P.R.China
City:	Shanghai
Postal Code:	201203
Country:	P. R. China
Telephone:	+86 (0)21 6146 0697
Fax:	+86 (0)21 6146 0602

3 Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1 About EUT

Description:	GSM/UMTS Data Card
Model Name:	LeMans
Marketing Name:	One Touch X200
Brand Name:	ALCATEL
Frequency Band:	GSM/GPRS/EGPRS 850/900/1800/1900
	WCDMA/HSPA 850/1900/2100
GPRS/EGPRS Class:	12

Picture 1: Constituents of the sample

3.2 Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	356525020007213	PIO5	FL1BE3D0

*EUT ID: is used to identify the test sample in the lab internally.

4 CHARACTERISTICS OF THE TEST

4.1 Applicable Limit Regulations

EN 50360–2001: Product standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones.

It specifies the maximum exposure limit of **2.0 W/kg** as averaged over any 10 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

4.2 Applicable Measurement Standards

EN 50361–2001: Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones.

IEEE 1528–2003: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.

OET Bulletin 65 (Edition 97-01) and Supplement C(Edition 01-01): Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits.

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

KDB 447498 D01: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies v03r02

KDB 447498 D02: SAR Measurement Procedures for USB Dongle Transmitters

KDB 941225 D01: SAR Measurement Procedures for 3G devices v02

KDB 941225 D02: Guidance for Requesting a Permit-But-Ask for 3GPP R6-HSPA v01

They specify the measurement method for demonstration of compliance with the SAR limits for such equipments.

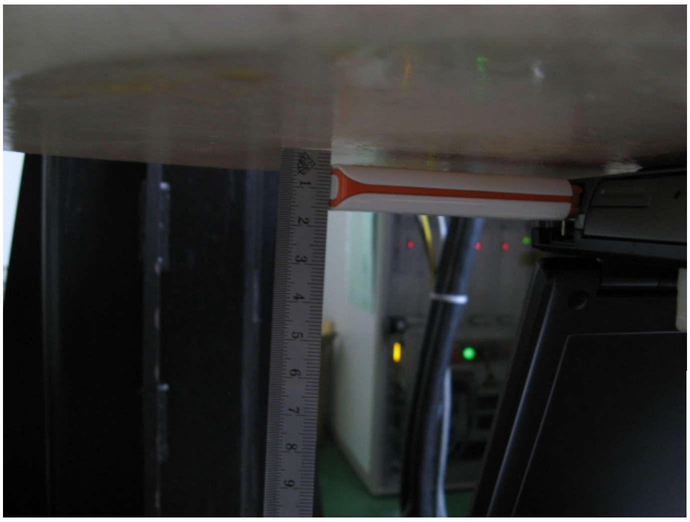
5 OPERATIONAL CONDITIONS DURING TEST

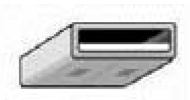
5.1 Schematic Test Configuration

5.1.1 Test positions and host laptops

The EUT is tested at the following 4 test positions all with the distance <0.5 cm between the EUT and the phantom bottom:

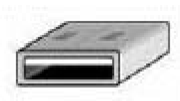
Note: position 1&2 are horizontal orientations, position 3&4 are vertical orientations. The distance between the EUT and phantom for position 1 is the same as position 2, and also the distance between the EUT and phantom for position 3 is the same as position 4.





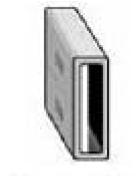
Horizontal-down

Picture 2-a: Test position 1 (distance between EUT and phantom is 4mm)



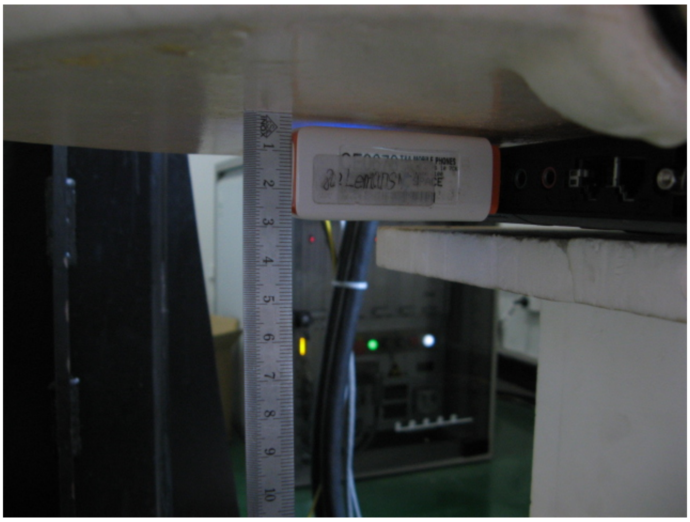
Horizontal-up

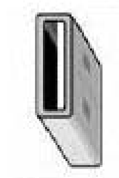
Picture 2-b: Test position 2 (EUT is connected to laptop via a USB cable which is shorter than 12 inches and distance between EUT and phantom is 4mm)



Vertical-Front

Picture 2-c: Test position 3 (distance between EUT and phantom is 3mm)





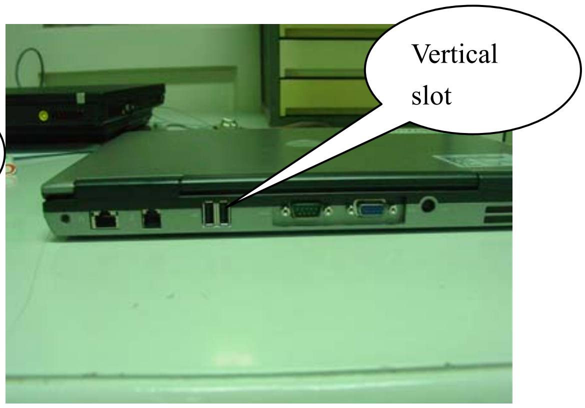
Vertical-Back

Picture 2-d: Test position 4 (distance between EUT and phantom is 3mm)

The following host laptops are used during the tests to test the 4 orientations (two horizontals and two verticals) of the EUT: Laptop A (Dell D630) and Laptop B (IBM R60), and the used USB slots are marked in the pictures.

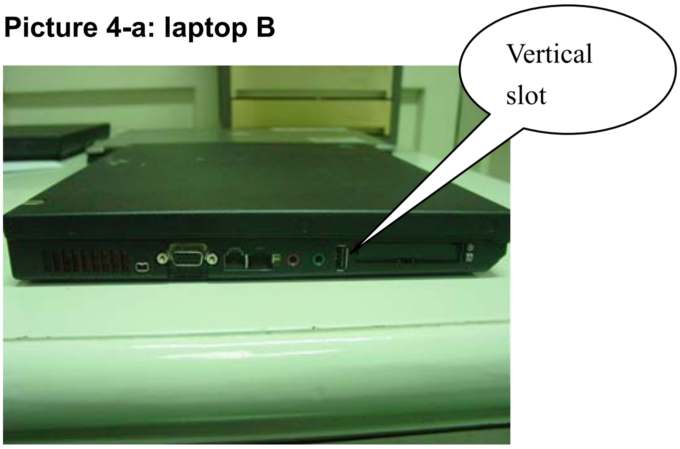
Picture 3-a: laptop A

Picture 3-b: laptop A (horizontal slot)



Picture 3-c: laptop A (vertical slot)

Picture 4-a: laptop B



Picture 4-b: laptop B (vertical slot)

5.1.2 Body SAR Measurement Description

GSM Frequency Band

Because the EUT does not have speech function but only has data transfer function, the tests for GSM 850/1900 are performed only in GPRS and EGPRS mode (since the GPRS/EGPRS class is 12, the tests are performed for the case of the slots in uplink with the maximum averaged power). The tests are performed for GPRS at middle frequency first for all the 4 test positions, and according to the 3 dB rule, ”if the SAR measured at the middle channel for each test configuration is at least 3 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).” So the test channels have been set first to the middle and then to low and high if necessary. And after found the worst case, the EGPRS will be tested for that position.

The conducted power for GPRS/EGPRS 850/1900 is as following:

GSM 850 GPRS	Measured Power (dBm)				Averaged Power (dBm)		
	Ch 251	Ch190	Ch128		Ch 251	Ch190	Ch128
1 Txslot	32.0	32.1	32.3	-9.03dB	22.97	23.07	23.27
2 Txslots	30.0	30.0	30.2	-6.02dB	**23.98**	**23.98**	**24.18**
3Txslots	27.8	27.9	28.1	-4.26dB	23.54	23.64	23.84
4 Txslots	26.3	26.4	26.5	-3.01dB	23.29	23.31	23.49
GSM 850 EGPRS	Measured Power (dBm)				Averaged Power (dBm)		
	Ch 251	Ch190	Ch128		Ch 251	Ch190	Ch128
1 Txslot	26.4	26.4	26.4	-9.03dB	17.37	17.37	17.37
2 Txslots	26.4	26.3	26.3	-6.02dB	20.38	20.28	20.28
3Txslots	26.3	26.3	26.3	-4.26dB	22.04	22.04	22.04
4 Txslots	26.2	26.2	26.3	-3.01dB	**23.19**	**23.19**	**23.29**
GSM1900 GPRS	Measured Power (dBm)				Averaged Power (dBm)		
	Ch 810	Ch661	Ch512		Ch 810	Ch661	Ch512
1 Txslot	28.6	28.5	28.8	-9.03dB	19.57	19.47	19.77
2 Txslots	26.4	26.3	26.6	-6.02dB	20.38	20.28	20.58
3Txslots	25.0	24.8	25.0	-4.26dB	**20.74**	**20.54**	**20.74**
4 Txslots	23.0	22.7	23.0	-3.01dB	19.99	19.69	19.99
GSM1900 EGPRS	Measured Power (dBm)				Averaged Power (dBm)		
	Ch 810	Ch661	Ch512		Ch 810	Ch661	Ch512
1 Txslot	24.4	24.2	24.5	-9.03dB	15.37	15.17	15.47
2 Txslots	24.2	24.0	24.3	-6.02dB	18.18	17.98	18.28
3Txslots	23.5	23.4	23.8	-4.26dB	**19.24**	**19.14**	**19.54**
4 Txslots	21.4	21.4	21.7	-3.01dB	18.39	18.39	18.69

NOTES:

1) Division Factors

To average the power, the division factor is as follows:

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

WCDMA Band

For WCDMA 850/1900, the conducted power will be measured for WCDMA/HSDPA/HSPA, and the results are as following:

Item	band	FDDII result(dBm)			FDDV result(dBm)		
	ARFCN	9263	9400	9537	4133	4175	4232
5.2(WCDMA)	\	21.75	21.35	21.5	21.66	21.89	21.75
5.2AA (HSDPA)	1	20.7	20.37	21.03	20.81	20.94	20.85
	2	20.73	20.64	20.81	20.56	20.49	21.22
	3	20.56	20.41	20.86	20.49	20.47	20.75
	4	20.64	20.4	20.79	20.57	20.48	20.97

5.2B (HSPA)	1	21.18	20.81	21.05	20.66	21.4	20.6
	2	18.9	18.86	18.97	18.76	18.92	18.85
	3	19.8	20.01	20.01	19.69	19.9	19.76
	4	19.37	19.38	19.66	19.24	19.37	19.26
	5	20.49	20.92	21	20.74	21.34	20.46

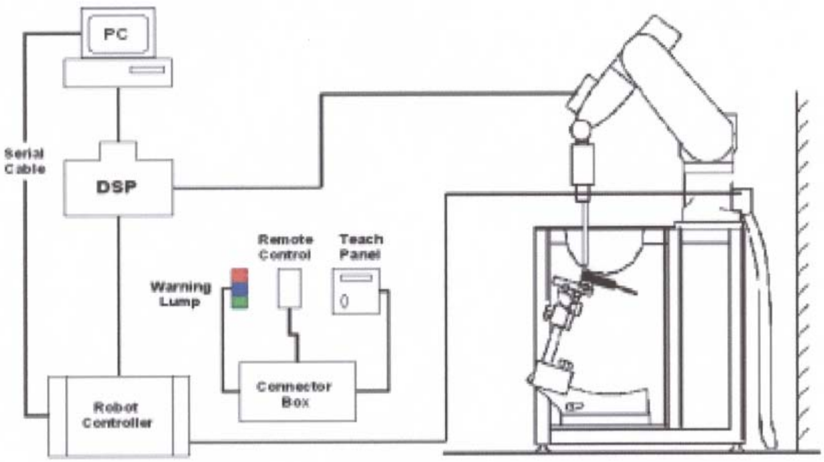
Note:

- 3GPP TS 34.121 test procedures have been followed to get above results;
- All HSPA data is within the limits defined in 3GPP TS 34.121, R99 RMC mode is the highest TX power and thus applicable for SAR testing;
- The SAR tests are performed for WCDMA 850 and WCDMA 1900 at middle frequency first for all the 4 test positions, and according to the 3 dB rule then set to low and high if necessary. HSDPA and HSPA body SAR are not required, because maximum average output power of each RF channel with HSDPA and HSPA active is not 1/4 dB higher than that measured without HSDPA and HSPA and the maximum SAR for WCDMA 850 and WCDMA 1900 are not above 75% of the SAR limit (see Table 8&9 for the SAR measurement results).

5.2 SAR Measurement Set-up

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

A cell controller system contains the power supply, robot controller, teaches pendant (Joystick), and remote control, is used to drive the robot motors. The PC consists of the Micron Pentium III 800 MHz computer with Windows 2000 system and SAR Measurement Software DASY4 Professional, A/D interface card, monitor, mouse, and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.



Picture 5: SAR Lab Test Measurement Set-up

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

5.3 Dasy4 E-field Probe System

The SAR measurements were conducted with the dosimetric probe ES3DV3 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe has been calibrated according to the standard procedure with an accuracy of better than ± 10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB.

ES3DV3 Probe Specification

Construction	Symmetrical design with triangular core Interleaved sensors 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 1810 Additional CF for other liquids and frequencies upon request
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB

Picture 6: ES3DV3 E-field Probe

Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones

5.4 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/m^3).

Picture 8: Device Holder

5.5 Other Test Equipment

5.5.1 Device Holder for Transmitters

In combination with the Generic Twin Phantom V3.0, the Mounting Device (POM) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeatably positioned according to the FCC and CENELEC

Picture 9: Generic Twin Phantom

specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

5.5.2 Phantom

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

Shell Thickness 2±0. l mm

Filling Volume Approx. 20 liters

Dimensions 810 x l000 x 500 mm (H x L x W)

Available Special

5.6 Equivalent Tissues

The liquid used for the frequency range of 800-2000 MHz consisted of water, sugar, salt and Cellulose. The liquid has been previously proven to be suited for worst-case. The Table 4 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the IEEE 1528.

Table 1: Composition of the Body Tissue Equivalent Matter

MIXTURE %	FREQUENCY 850MHz
Water	52.5
Sugar	45.0
Salt	1.4
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=850MHz ε=55.2 σ=0.97
MIXTURE %	FREQUENCY 1900MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1900MHz ε=53.3 σ=1.52

5.7 System Specifications

5.7.1 Robotic System Specifications

Specifications

Positioner: Stäubli Unimation Corp. Robot Model: RX90L

Repeatability: ±0.02 mm

No. of Axis: 6

Data Acquisition Electronic (DAE) System

Cell Controller

Processor: Pentium III

Clock Speed: 800 MHz

Operating System: Windows 2000

Data Converter

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

Software: DASY4 software

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

6 TEST RESULTS

6.1 Dielectric Performance

Table 2: Dielectric Performance of Body Tissue Simulating Liquid

Measurement is made at temperature 23.3 °C and relative humidity 49%.Liquid temperature during the test: 22.5°C			
/	**Frequency**	**Permittivity ε**	**Conductivity σ (S/m)**
Target value	850 MHz	55.2	0.97
	1900 MHz	53.3	1.52
Measurement value (Average of 10 tests)	850 MHz	53.7	1.01
	1900 MHz	53.0	1.46

6.2 System Validation

Table 3: System Validation

Measurement is made at temperature 23.3 °C, relative humidity 49%, input power 250 mW. Liquid temperature during the test: 22.5°C							
Liquid parameters		**Frequency**		**Permittivity ε**		**Conductivity σ (S/m)**	
		835 MHz		43.5		0.91	
		1900 MHz		40.9		1.38	
Verification results	**Frequency**	**Target value (W/kg)**		**Measured value (W/kg)**		**Deviation**	
		10 g Average	**1 g Average**	**10 g Average**	**1 g Average**	**10 g Average**	**1 g Average**
	835 MHz	1.60	2.48	1.62	2.50	1.25%	0.81%
	1900 MHz	5.09	9.73	5.27	9.91	3.3%	1.9%

Note：Target values are the data of the dipole validation results, please check Annex F for the Dipole Calibration Certificate.

6.3 Summary of Measurement Results

Table 4: SAR Values (GSM 850 MHz GPRS-2 Txslots)

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Flat Phantom, Test Position 1, Mid frequency (See Figure 1)	0.307	0.493	-0.194
Flat Phantom, Test Position 2 Mid frequency (See Figure 3)	0.348	0.582	-0.085
Flat Phantom, Test Position 3, Mid frequency (See Figure 5)	0.206	0.325	-0.178
Flat Phantom, Test Position 4, Mid frequency (See Figure 7)	0.165	0.255	-0.130

Table 5: SAR Values (GSM 850 MHz EGPRS-4 Txslots)

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Flat Phantom, Test Position 2, Mid frequency (See Figure 9)	0.272	0.451	-0.107

Table 6: SAR Values (DCS 1900 MHz GPRS-3 Txslots)

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Flat Phantom, Test Position 1, Mid frequency(See Figure11)	0.474	0.890	-0.200
Flat Phantom, Test Position 2 Mid frequency(See Figure13)	0.571	1.07	0.200
Flat Phantom, Test Position 3, Mid frequency(See Figure 15)	0.510	1.09	-0.083
Flat Phantom, Test Position 4, Mid frequency(See Figure 17)	0.248	0.434	-0.007

Table 7: SAR Values (DCS 1900 MHz EGPRS-3 Txslots)

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Flat Phantom, Test Position 3, Mid frequency(See Figure19)	0.442	0.934	-0.097

Table 8: SAR Values (WCDMA 850)

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Flat Phantom, Test Position 1, Mid frequency(See Figure21)	0.250	0.397	0.052
Flat Phantom, Test Position 2 Mid frequency(See Figure23)	0.365	0.605	-0.119
Flat Phantom, Test Position 3, Mid frequency(See Figure25)	0.177	0.280	-0.061
Flat Phantom, Test Position 4, Mid frequency(See Figure27)	0.114	0.175	-0.134

Table 9: SAR Values (WCDMA 1900)

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Flat Phantom, Test Position 1, Mid frequency(See Figure29)	0.187	0.358	0.200
Flat Phantom, Test Position 2 Mid frequency(See Figure31)	0.190	0.360	-0.179
Flat Phantom, Test Position 3, Mid frequency(See Figure33)	0.276	0.587	-0.005
Flat Phantom, Test Position 4, Mid frequency(See Figure35)	0.096	0.169	-0.200

6.4 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 4.2 of this report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 4.1 of this test report.

7 Measurement Uncertainty

SN	a	Type	c	d	e = f(d,k)	f	h = c x f / e	k
	Uncertainty Component		Tol. (± %)	Prob. Dist.	Div.	c_i (1 g)	1 g u_i (±%)	v_i
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	√3	$(1-cp)^{1/2}$	4.3	∞
4	Hemispherical Isotropy	B	9.4	R	√3	$\sqrt{c_p}$		∞
5	Boundary Effect	B	0.4	R	√3	1	0.23	∞
6	Linearity	B	4.7	R	√3	1	2.7	∞
7	System Detection Limits	B	1.0	R	√3	1	0.6	∞
8	Readout Electronics	B	1.0	N	1	1	1.0	∞
9	RF Ambient Conditions	B	3.0	R	√3	1	1.73	∞
10	Probe Positioner Mechanical Tolerance	B	0.4	R	√3	1	0.2	∞
11	Probe Positioning with respect to Phantom Shell	B	2.9	R	√3	1	1.7	∞
12	Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	√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	√3	1	2.9	∞
	Phantom and Tissue Parameters							
16	Phantom Uncertainty (shape and thickness tolerances)	B	1.0	R	√3	1	0.6	∞
17	Liquid Conductivity - deviation from target values	B	5.0	R	√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	√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	

8 MAIN TEST INSTRUMENTS

Table 10: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	HP 8753E	US38433212	August 30,2008	One year
02	Power meter	NRVD	101253	June 20, 2008	One year
03	Power sensor	NRV-Z5	100333		
04	Power sensor	NRV-Z6	100011	September 2, 2008	One year
05	Signal Generator	E4433B	US37230472	September 4, 2008	One Year
06	Amplifier	VTL5400	0505	No Calibration Requested	
07	BTS	CMU 200	105948	August 15, 2008	One year
08	E-field Probe	SPEAG ES3DV3	3149	December 14, 2007	One year
09	DAE	SPEAG DAE4	771	November 20, 2008	One year
10	Dipole Validation Kit	SPEAG D835V2	443	February 19, 2007	Two years
11	Dipole Validation Kit	SPEAG D1900V2	541	February 20, 2007	Two years

END OF REPORT BODY

ANNEX A MEASUREMENT PROCESS

The evaluation was performed with the following procedure:

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

Step 2: The SAR distribution at the exposed side of the phantom was measured at a distance of 3.9 mm from the inner surface of the shell. The area covered the entire dimension of the flat phantom and the horizontal grid spacing was 10 mm x 10 mm. Based on this data, the area of the maximum absorption was determined by spline interpolation.

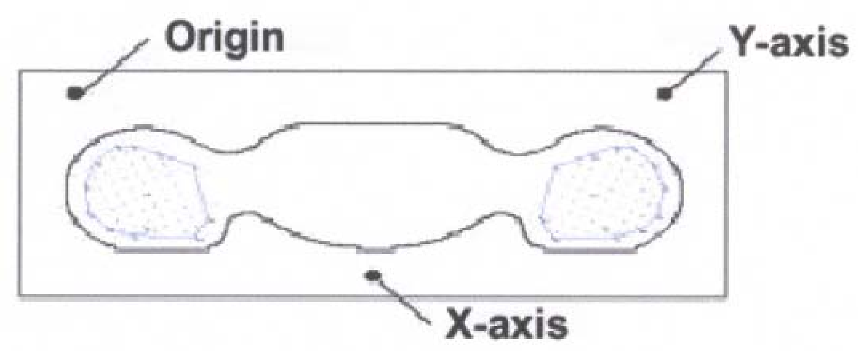
Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7 x 7x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

a. The data at the surface were extrapolated, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

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

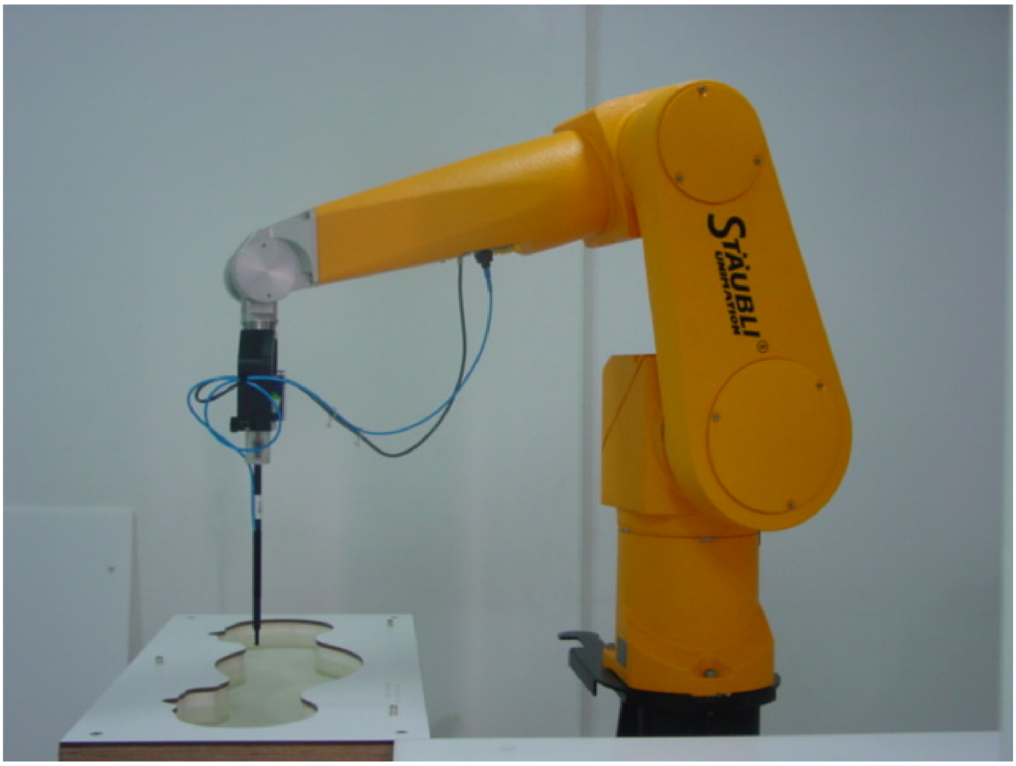
c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

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

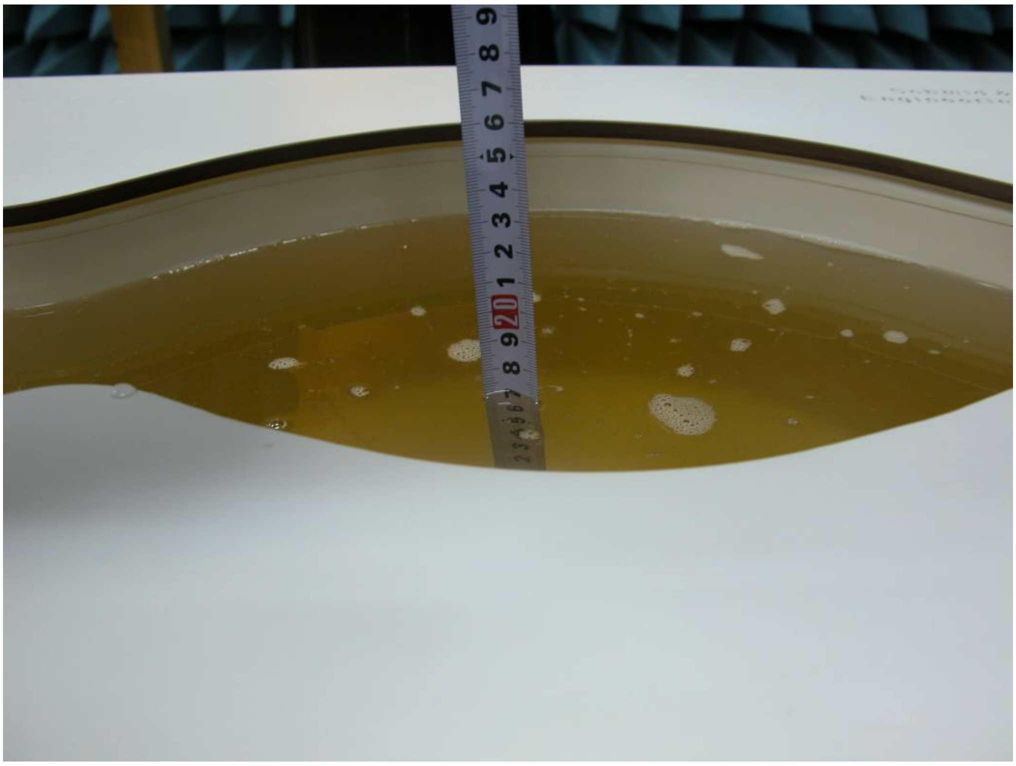


Picture A: SAR Measurement Points in Area Scan

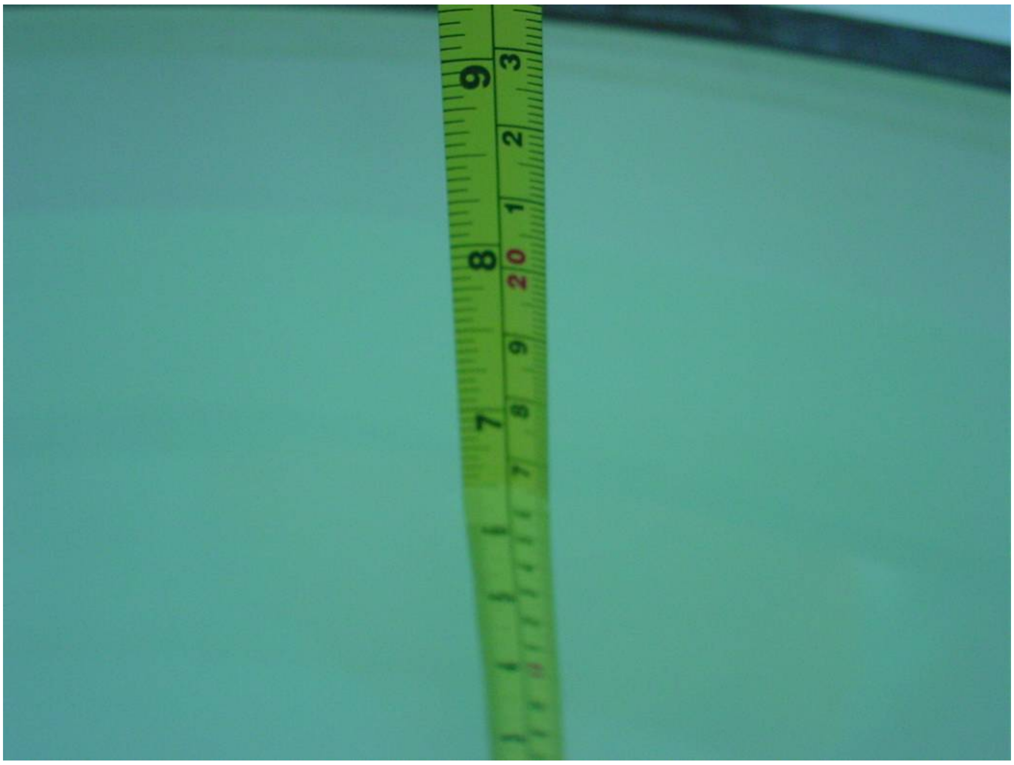
ANNEX B TEST LAYOUT



Picture B1: Specific Absorption Rate Test Layout



Picture B2: Liquid depth in the Flat Phantom (850 MHz)



Picture B3 Liquid depth in the Flat Phantom (1900MHz)

ANNEX C GRAPH RESULTS

GSM 850 Test Position 1 Middle with GPRS

Date/Time: 2008-12-2 15:13:21

Electronics: DAE4 Sn771

Medium: 850 Body

Medium parameters used (interpolated): f = 836.6 MHz; σ = 1.01 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C

Communication System: GSM 850 GPRS Frequency: 836.6 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(5.97, 5.97, 5.97)

Test Position 1/Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 22.7 V/m; Power Drift = -0.194 dB

Peak SAR (extrapolated) = 0.859 W/kg

SAR(1 g) = 0.493 mW/g; SAR(10 g) = 0.307 mW/g

Maximum value of SAR (measured) = 0.533 mW/g

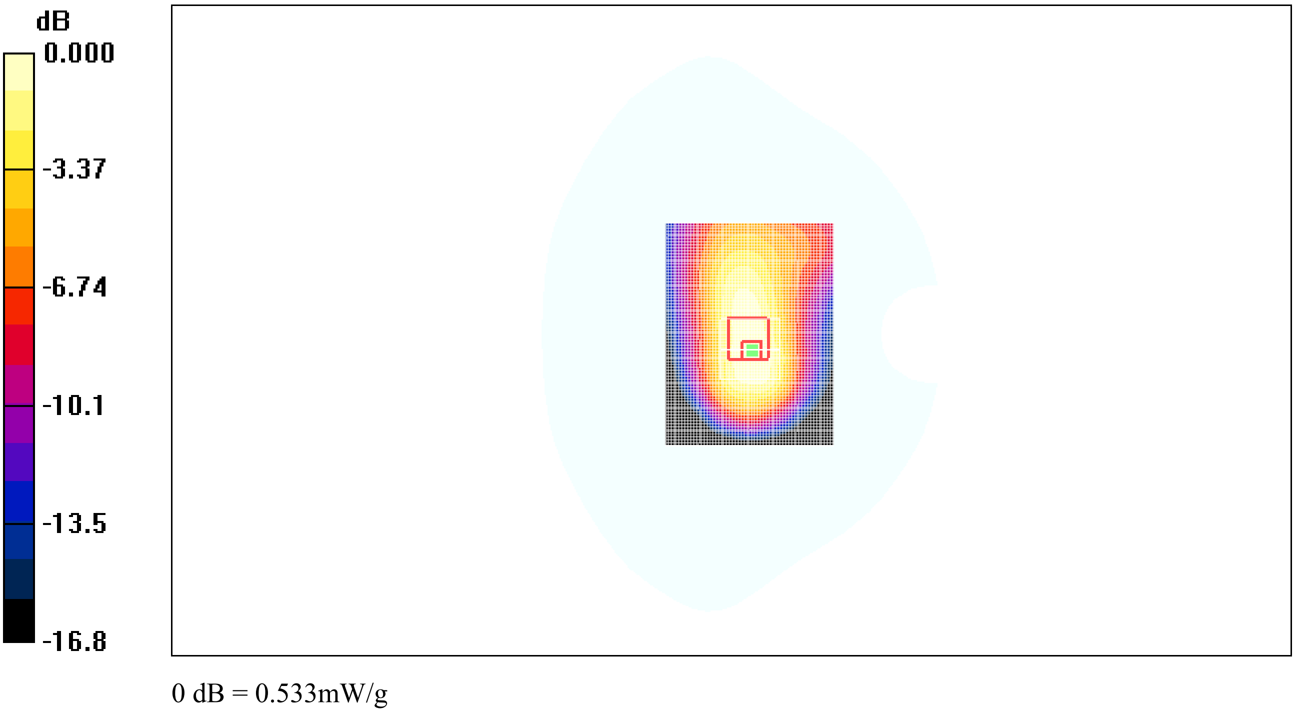


Fig. 1 850MHz CH190 Test Position 1-GPRS

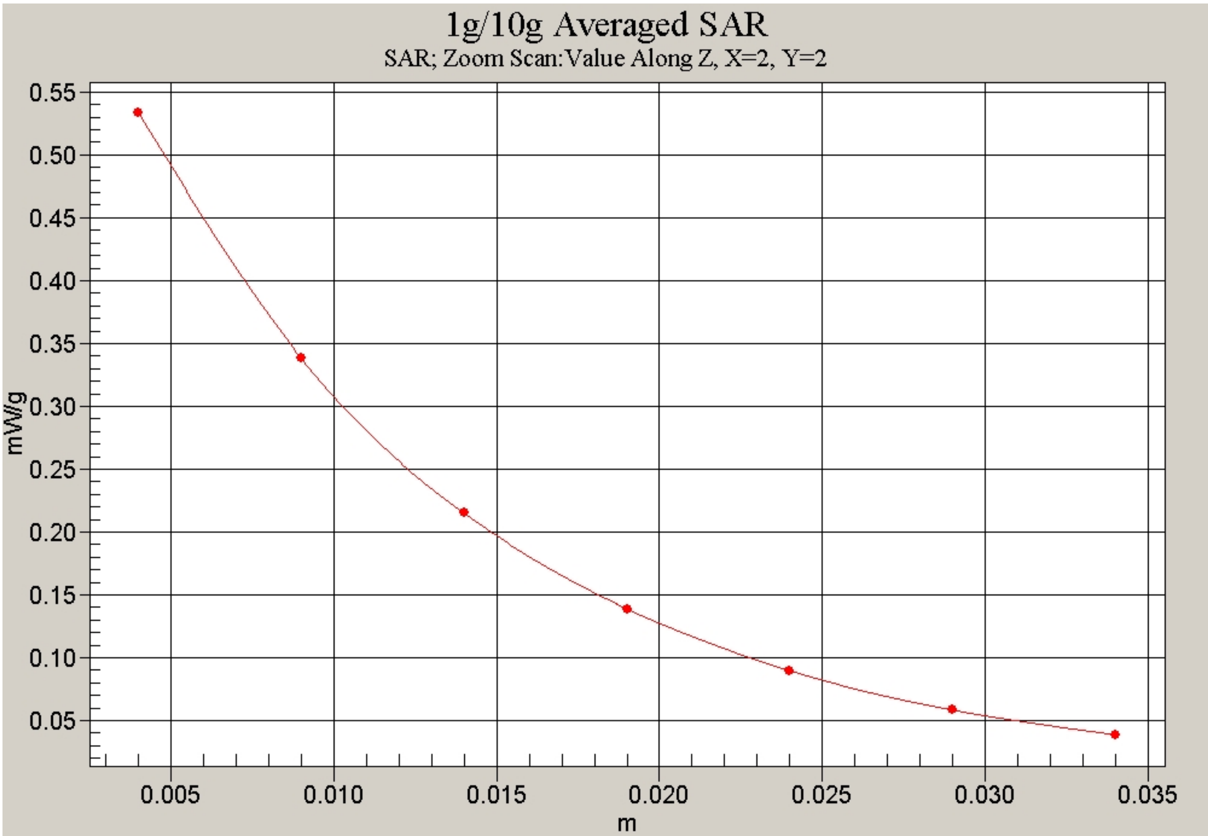


Fig. 2 Z-Scan at power reference point (850MHz CH190 Test Position 1-GPRS)

GSM 850 Test Position 2 Middle with GPRS

Date/Time: 2008-12-2 15:43:39

Electronics: DAE4 Sn771

Medium: 850 Body

Medium parameters used (interpolated): f = 836.6 MHz; σ = 1.01 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C

Communication System: GSM 850 GPRS Frequency: 836.6 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(5.97, 5.97, 5.97)

Test Position 2/Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.637 mW/g

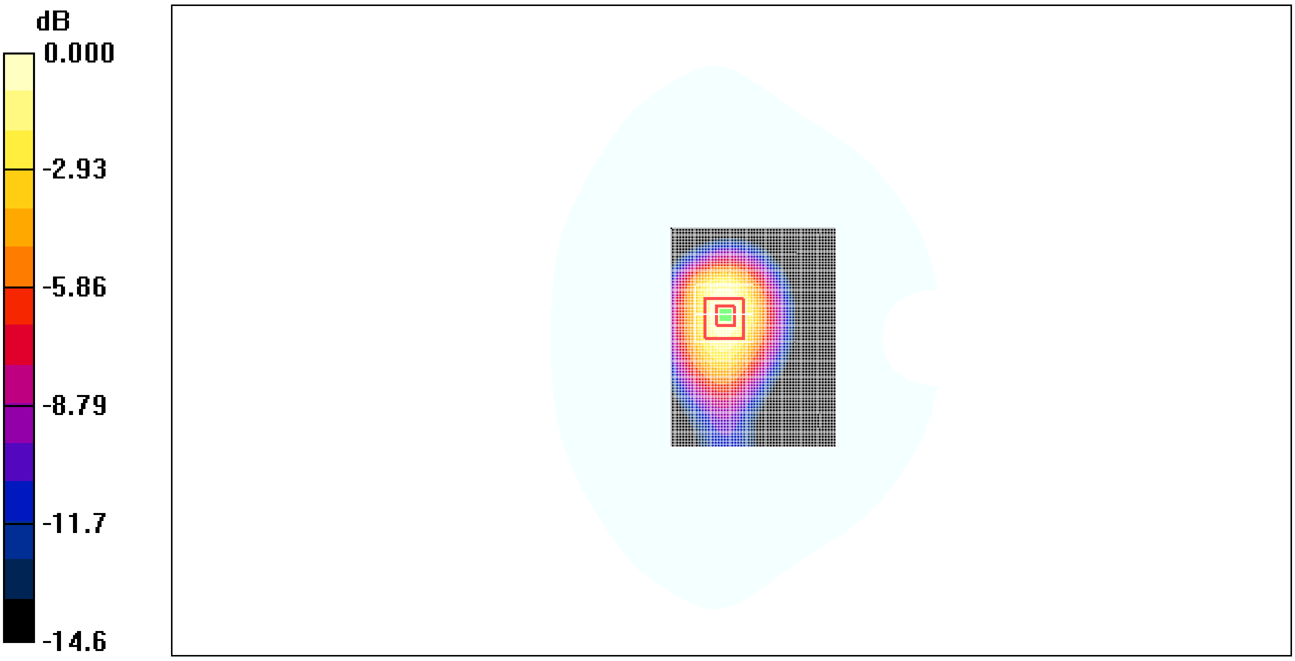
Test Position 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 19.3 V/m; Power Drift = -0.085 dB

Peak SAR (extrapolated) = 0.929 W/kg

SAR(1 g) = 0.582 mW/g; SAR(10 g) = 0.348 mW/g

Maximum value of SAR (measured) = 0.646 mW/g



0 dB = 0.646mW/g

Fig. 3 850MHz CH190 Test Position 2-GPRS

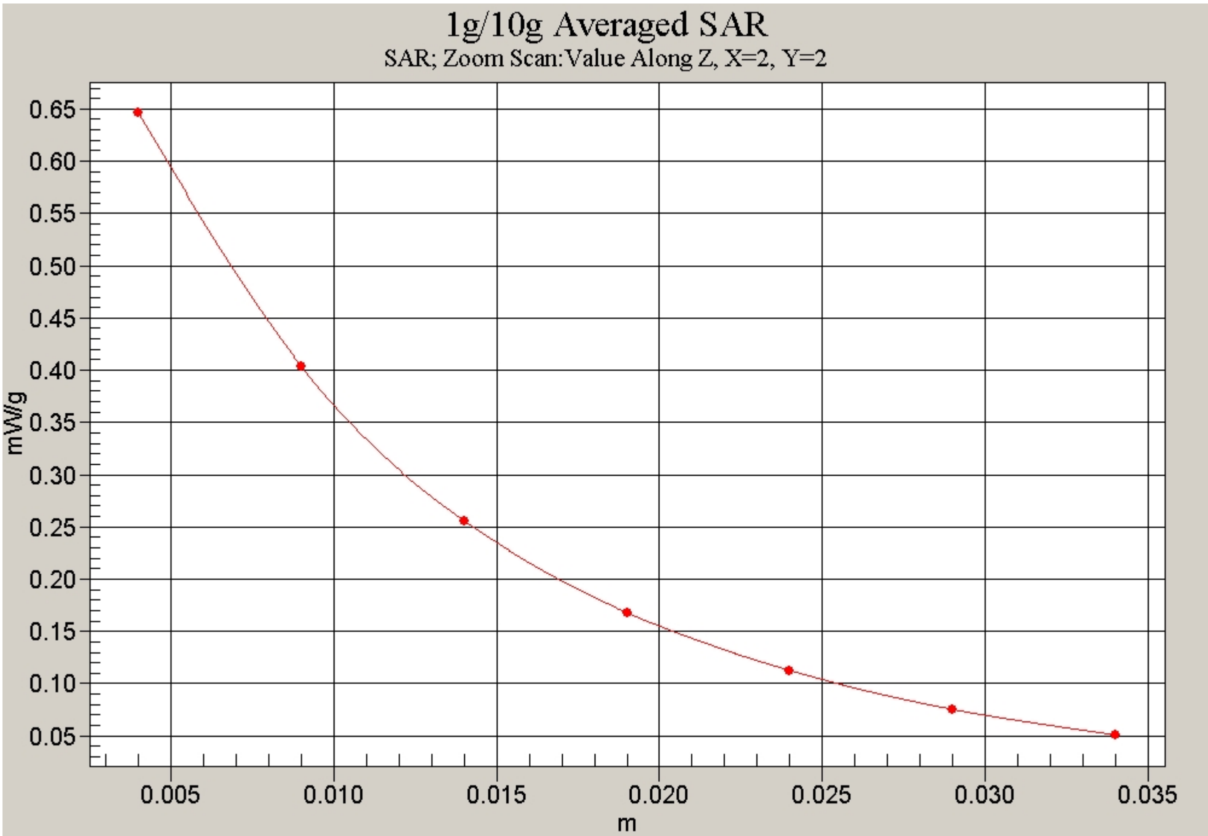


Fig. 4 Z-Scan at power reference point (850MHz CH190 Test Position 2-GPRS)

GSM 850 Test Position 3 Middle with GPRS

Date/Time: 2008-12-2 14:15:39

Electronics: DAE4 Sn771

Medium: 850 Body

Medium parameters used (interpolated): f = 836.6 MHz; σ = 1.01 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C Liqiud Temperature: 22.5^{o}C

Communication System: GSM 850 GPRS Frequency: 836.6 MHz Duty Cycle: 1:4

Probe: ES3DV3 - SN3149 ConvF(5.97, 5.97, 5.97)

Test Position 3/Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.359 mW/g

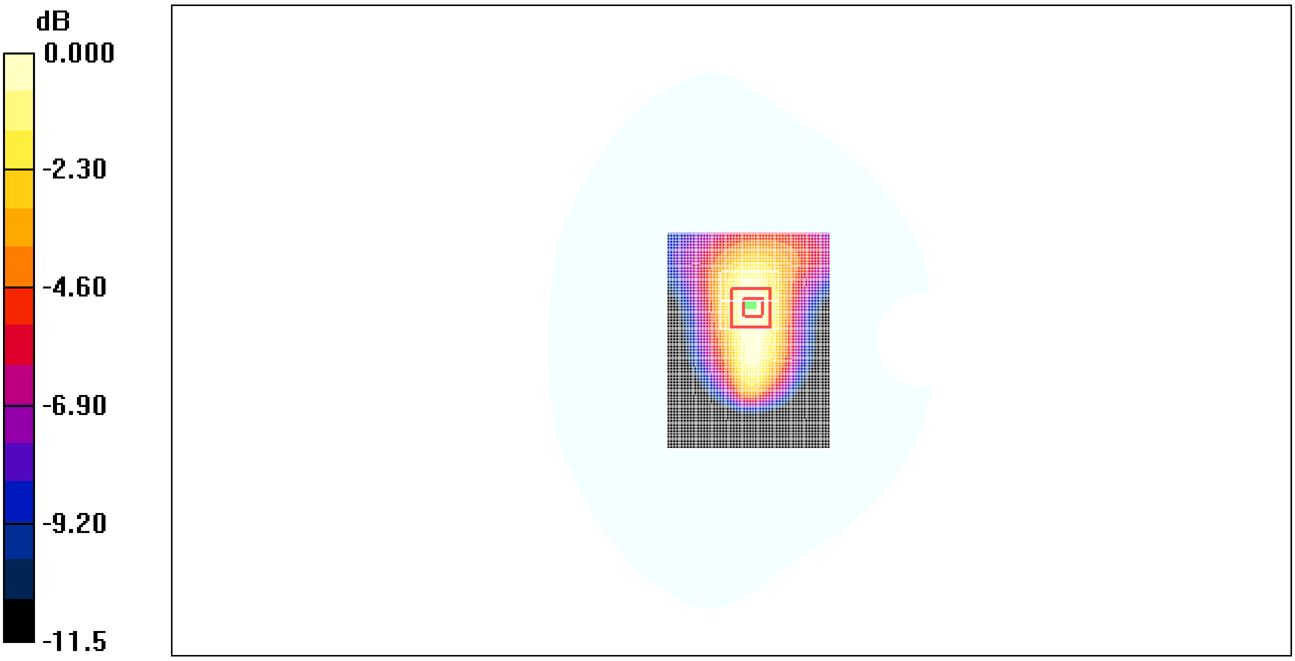
Test Position 3/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.5 V/m; Power Drift = -0.178 dB

Peak SAR (extrapolated) = 0.488 W/kg

SAR(1 g) = 0.325 mW/g; SAR(10 g) = 0.206 mW/g

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



0 dB = 0.350mW/g

Fig. 5 850MHz CH190 Test Position 3-GPRS

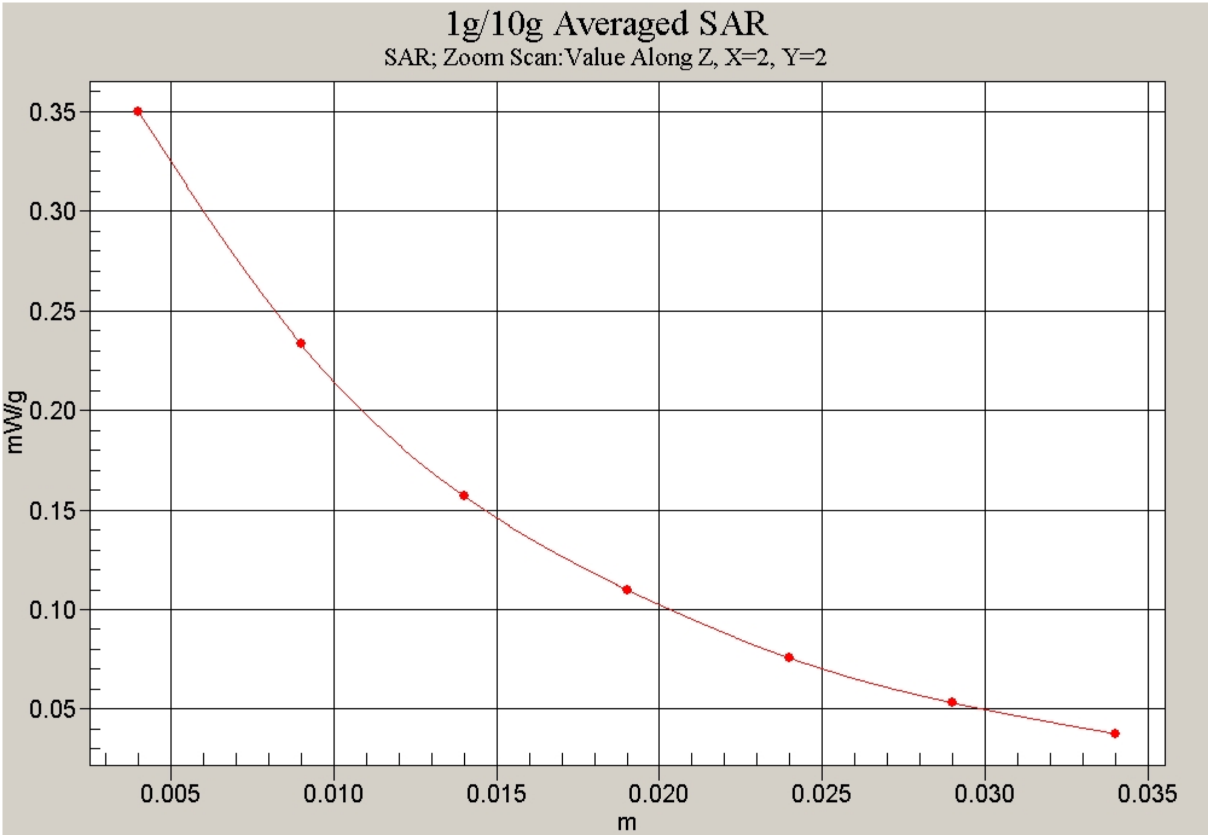


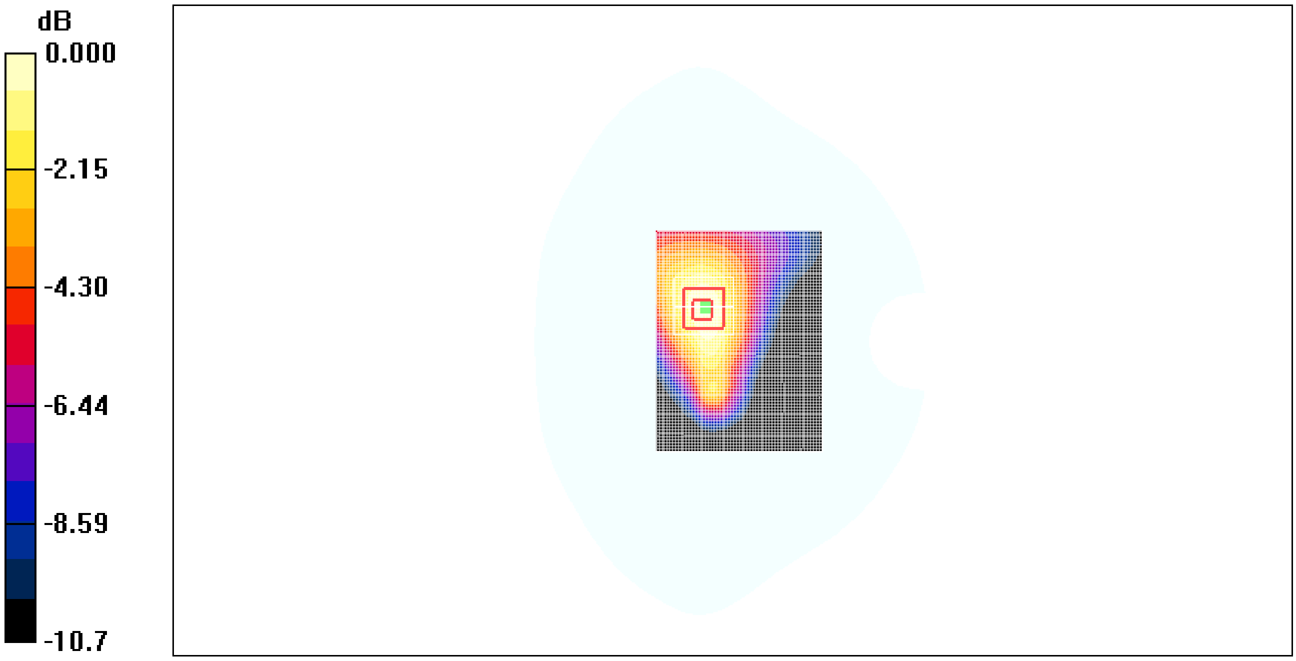
Fig. 6 Z-Scan at power reference point (850MHz CH190 Test Position 3-GPRS)

GSM 850 Test Position 4 Middle with GPRS

Date/Time: 2008-12-2 11:12:11
Electronics: DAE4 Sn771
Medium: 850 Body
Medium parameters used (interpolated): f = 836.6 MHz; σ = 1.01 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C
Communication System: GSM 850 GPRS Frequency: 836.6 MHz Duty Cycle: 1:4
Probe: ES3DV3 - SN3149 ConvF(5.97, 5.97, 5.97)

Test Position 4/Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.277 mW/g

Test Position 4/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.8 V/m; Power Drift = -0.130 dB
Peak SAR (extrapolated) = 0.380 W/kg
SAR(1 g) = 0.255 mW/g; SAR(10 g) = 0.165 mW/g
Maximum value of SAR (measured) = 0.277 mW/g



0 dB = 0.277mW/g

Fig.7 850MHz CH190 Test Position 4-GPRS

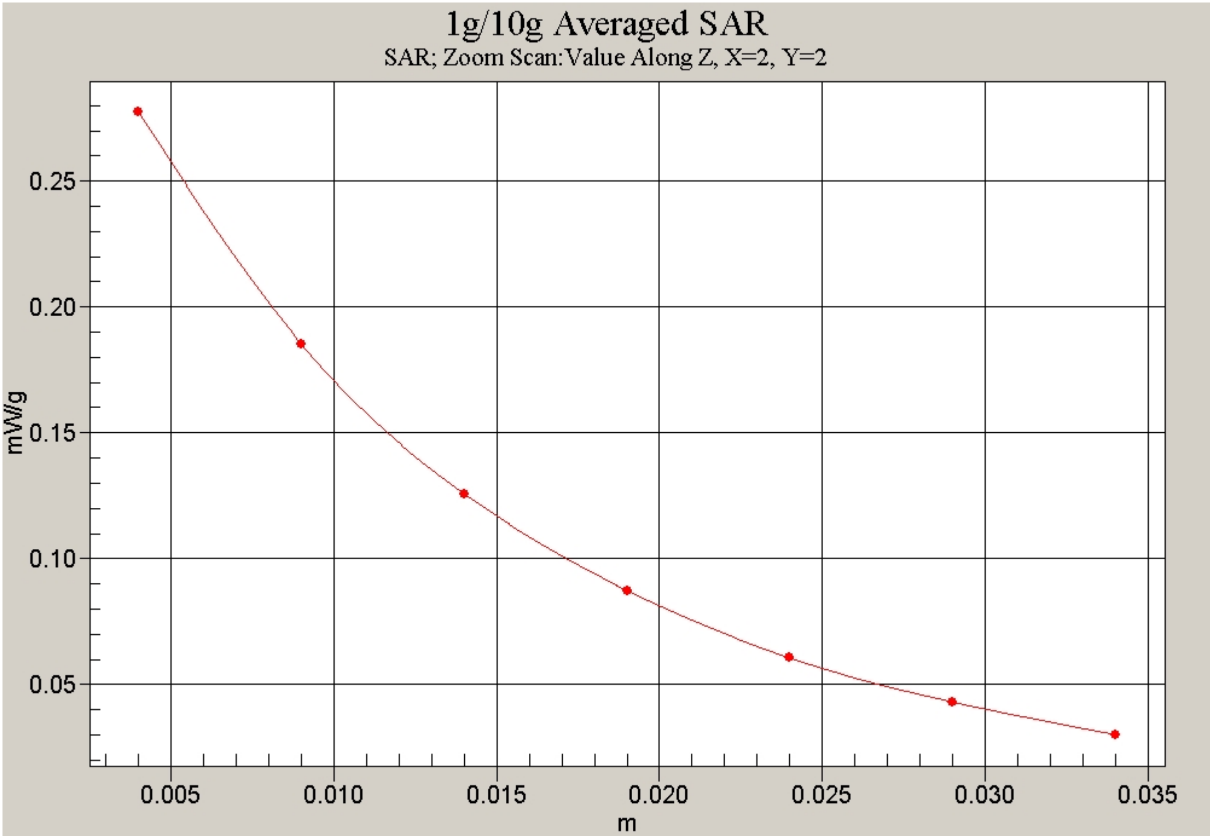


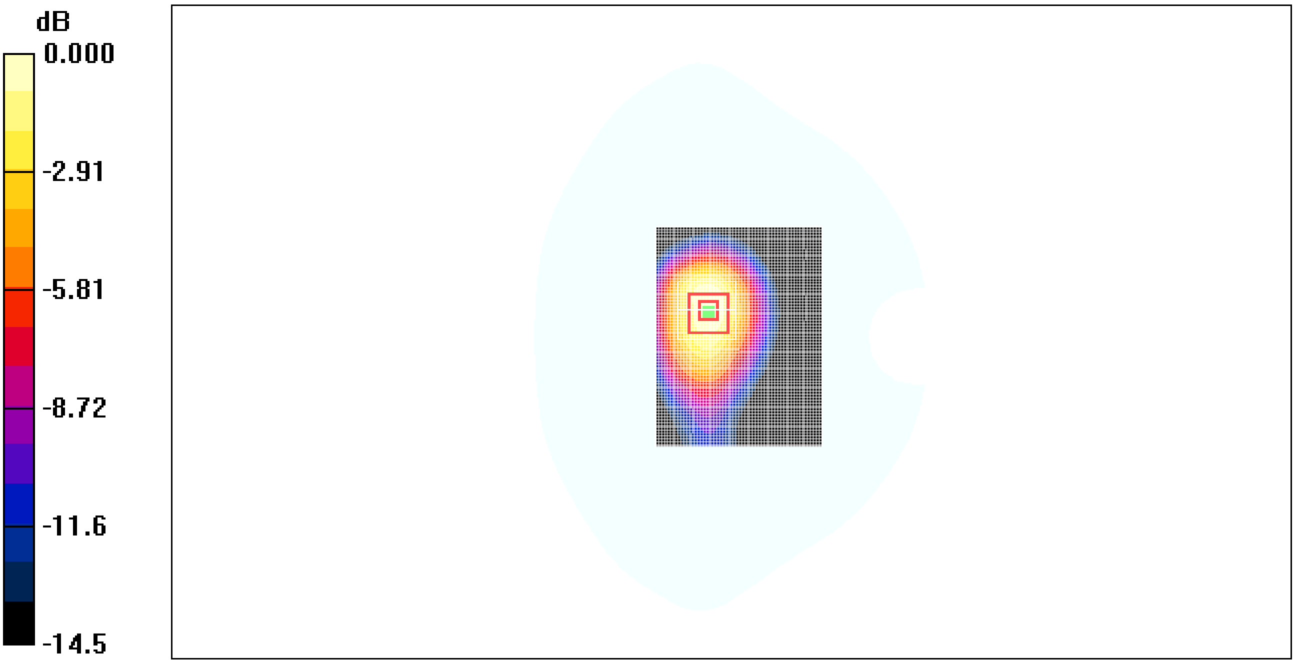
Fig. 8 Z-Scan at power reference point (850MHz CH190 Test Position 4-GPRS)

GSM 850 Test Position 2 Middle with EGPRS

Date/Time: 2008-12-2 16:24:52
Electronics: DAE4 Sn771
Medium: 850 Body
Medium parameters used (interpolated): f = 836.6 MHz; σ = 1.01 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3
Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C
Communication System: GSM 850 Glass 12 Frequency: 836.6 MHz Duty Cycle: 1:2
Probe: ES3DV3 - SN3149 ConvF(5.97, 5.97, 5.97)

Test Position 2/Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.510 mW/g

Test Position 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.1 V/m; Power Drift = -0.107 dB
Peak SAR (extrapolated) = 0.717 W/kg
SAR(1 g) = 0.451 mW/g; SAR(10 g) = 0.272 mW/g
Maximum value of SAR (measured) = 0.501 mW/g



0 dB = 0.501mW/g

Fig. 9 850MHz CH190 Test Position 2-EGPRS

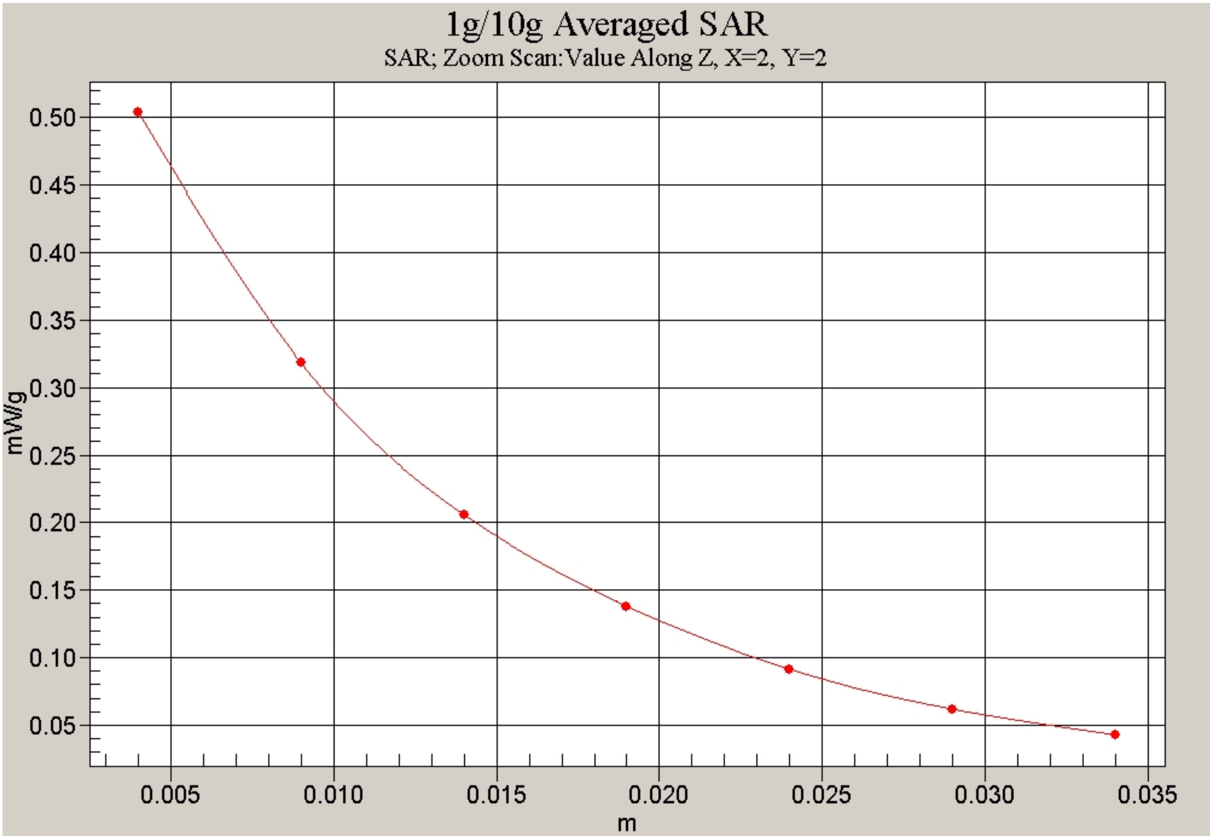
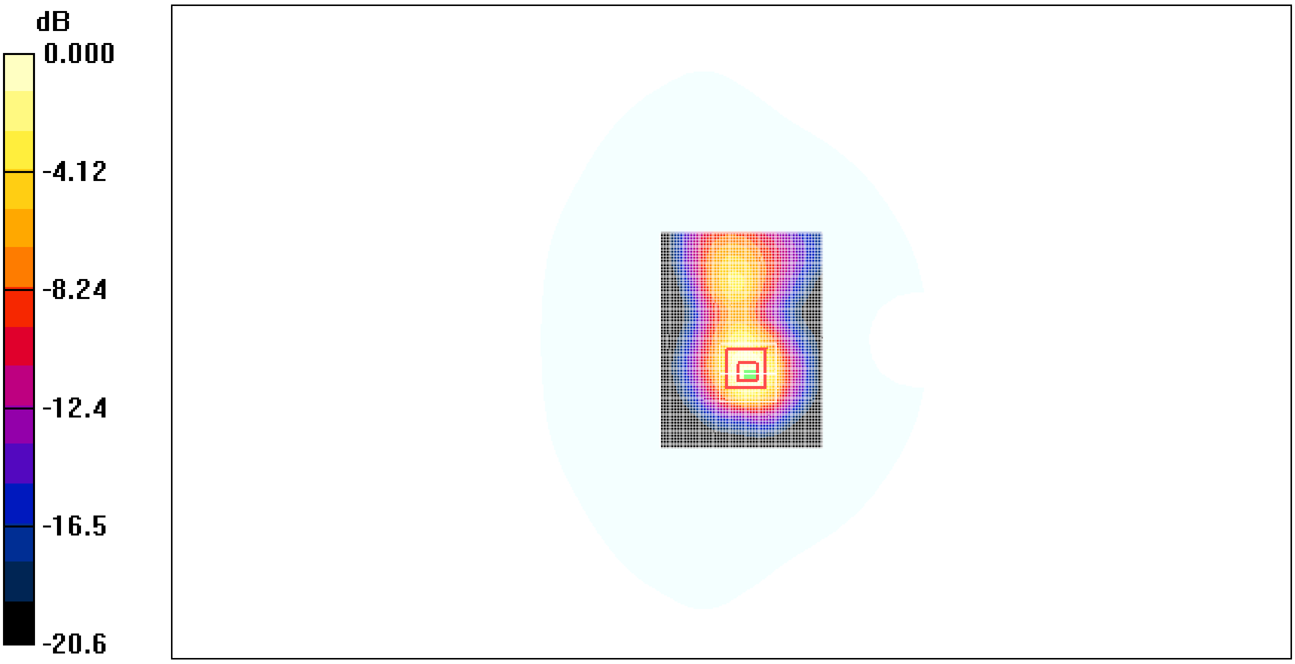


Fig. 10 Z-Scan at power reference point (850MHz CH190 Test Position 2-EGPRS)

GSM 1900 Test Position 1 Middle with GPRS
Date/Time: 2008-12-3 18:47:06
Electronics: DAE4 Sn771
Medium: Body 1900 MHz
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Ambient Temperature:23.3^{o}C Liqiud Temperature: 22.5^{o}C
Communication System: GSM 1900MHz GPRS Frequency: 1880 MHz Duty Cycle: 1:2.67
Probe: ES3DV3 - SN3149 ConvF(4.85, 4.85, 4.85)

Test Position 1/Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.11 mW/g

Test Position 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.6 V/m; Power Drift = -0.200 dB
Peak SAR (extrapolated) = 1.51 W/kg
SAR(1 g) = 0.890 mW/g; SAR(10 g) = 0.474 mW/g
Maximum value of SAR (measured) = 0.990 mW/g



0 dB = 0.990mW/g

Fig. 11 1900 MHz CH661 Test Position 1-GPRS

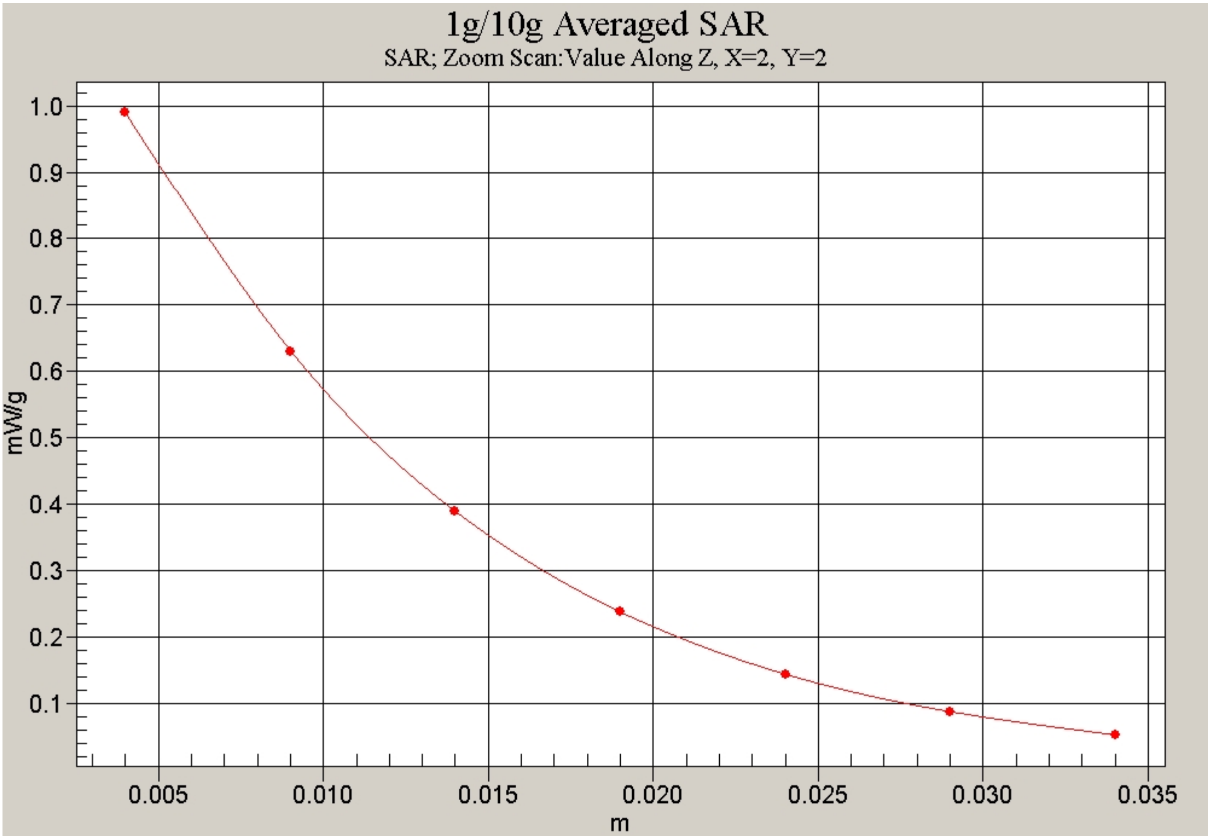


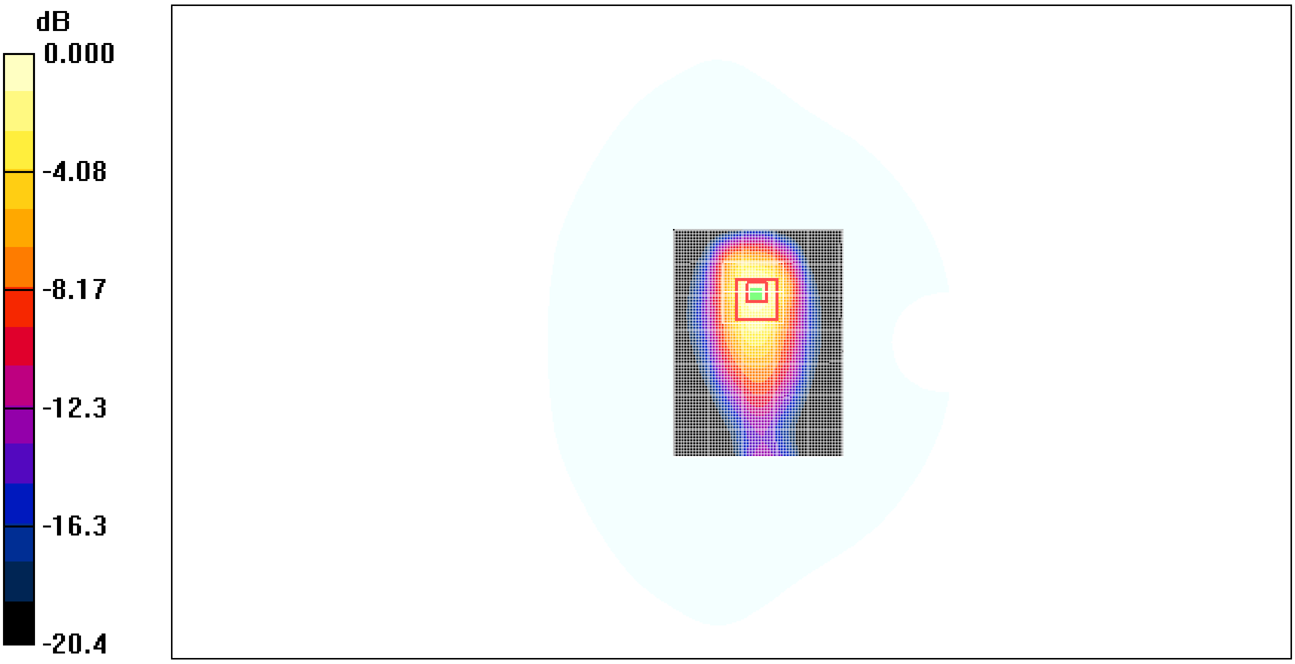
Fig. 12 Z-Scan at power reference point (1900 MHz CH661 Test 1-GPRS)

GSM 1900 Test Position 2 Middle with GPRS

Date/Time: 2008-12-3 19:13:20
Electronics: DAE4 Sn771
Medium: Body 1900 MHz
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C
Communication System: GSM 1900MHz GPRS Frequency: 1880 MHz Duty Cycle: 1:2.67
Probe: ES3DV3 - SN3149 ConvF(4.85, 4.85, 4.85)

Test Position 2/Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.15 mW/g

Test Position 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.9 V/m; Power Drift = 0.200 dB
Peak SAR (extrapolated) = 2.08 W/kg
SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.571 mW/g
Maximum value of SAR (measured) = 1.17 mW/g



0 dB = 1.17mW/g

Fig. 13 1900 MHz CH661 Test Position 2-GPRS

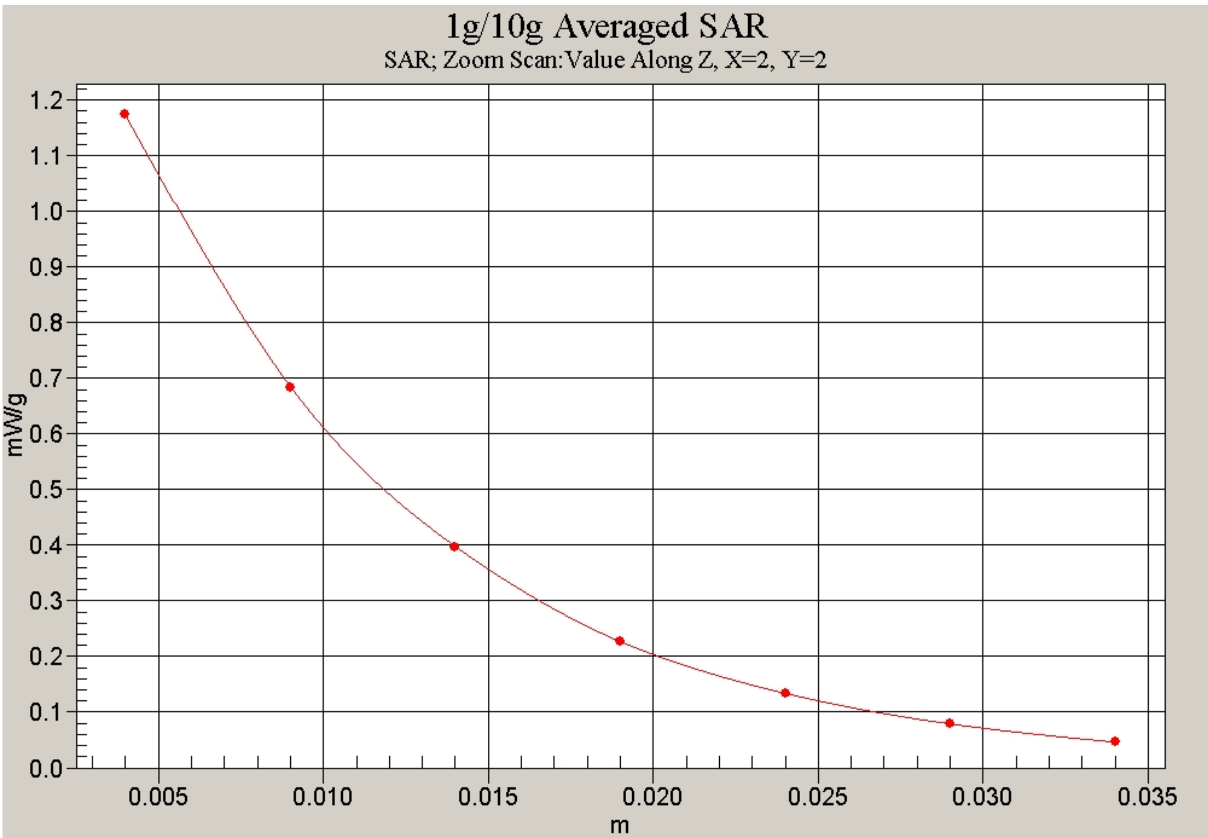


Fig. 14 Z-Scan at power reference point (1900 MHz CH661 Test Position 2-GPRS)

GSM 1900 Test Position 3 Middle with GPRS

Date/Time: 2008-12-3 17:13:22
Electronics: DAE4 Sn771
Medium: Body 1900 MHz
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C
Communication System: GSM 1900MHz GPRS Frequency: 1880 MHz Duty Cycle: 1:2.67
Probe: ES3DV3 - SN3149 ConvF(4.85, 4.85, 4.85)

Test Position 3/Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.32 mW/g

Test Position 3/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.48 V/m; Power Drift = -0.083 dB
Peak SAR (extrapolated) = 2.17 W/kg
SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.510 mW/g
Maximum value of SAR (measured) = 1.18 mW/g

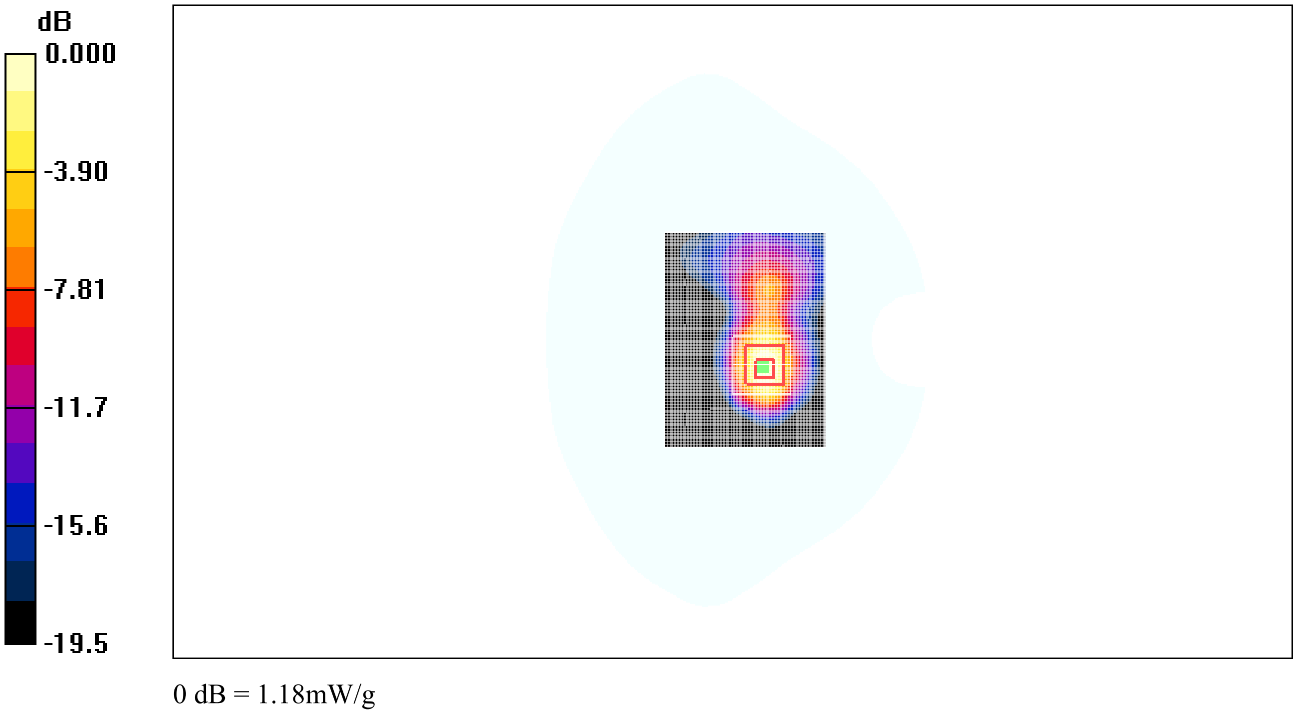


Fig. 15 1900 MHz CH661 Test Position 3-GPRS

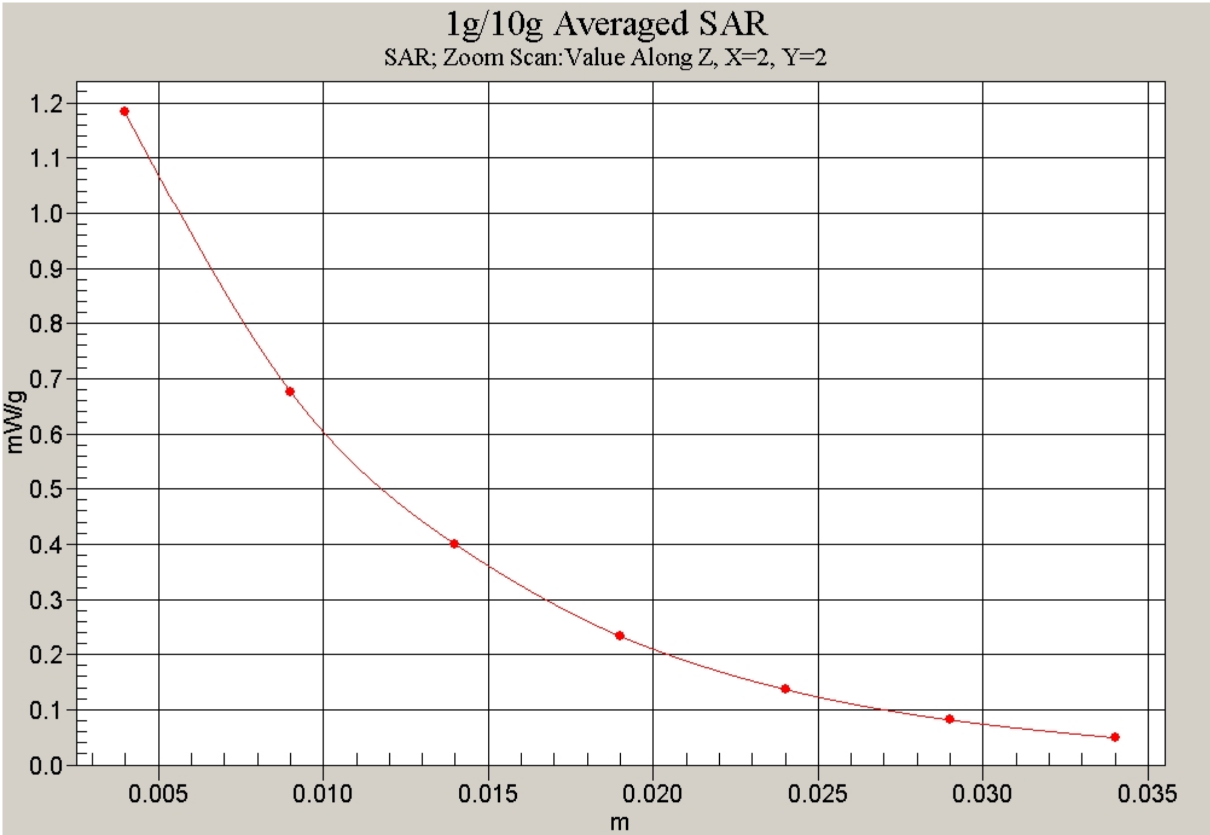


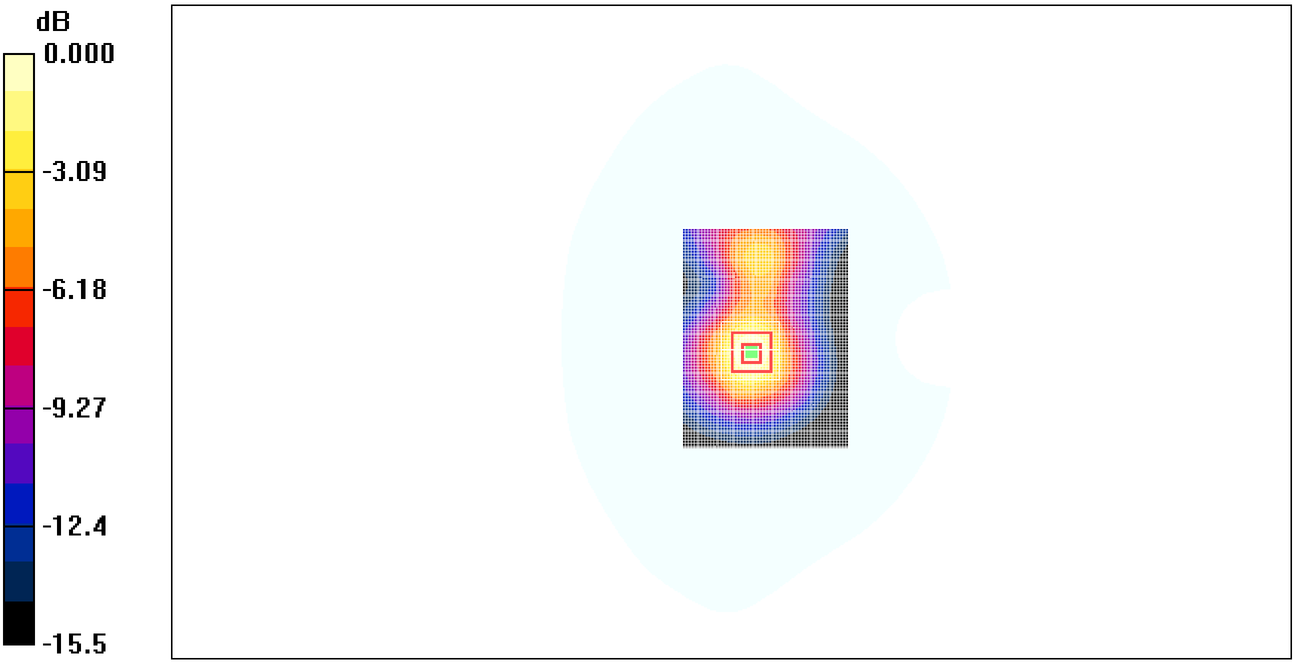
Fig. 16 Z-Scan at power reference point (1900 MHz CH661 Test Position 3-GPRS)

GSM 1900 Test Position 4 Middle with GPRS

Date/Time: 2008-12-3 19:31:18
Electronics: DAE4 Sn771
Medium: Body 1900 MHz
Medium parameters used: f = 1880 MHz; $\sigma = 1.44$ mho/m; $\varepsilon_r = 53$; $\rho = 1000$ kg/m^3
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C
Communication System: GSM 1900MHz GPRS Frequency: 1880 MHz Duty Cycle: 1:2.67
Probe: ES3DV3 - SN3149 ConvF(4.85, 4.85, 4.85)

Test Position 4/Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.521 mW/g

Test Position 4/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.2 V/m; Power Drift = -0.007 dB
Peak SAR (extrapolated) = 0.721 W/kg
SAR(1 g) = 0.434 mW/g; SAR(10 g) = 0.248 mW/g
Maximum value of SAR (measured) = 0.474 mW/g



0 dB = 0.474mW/g

Fig.17 1900 MHz CH661 Test Position 4-GPRS

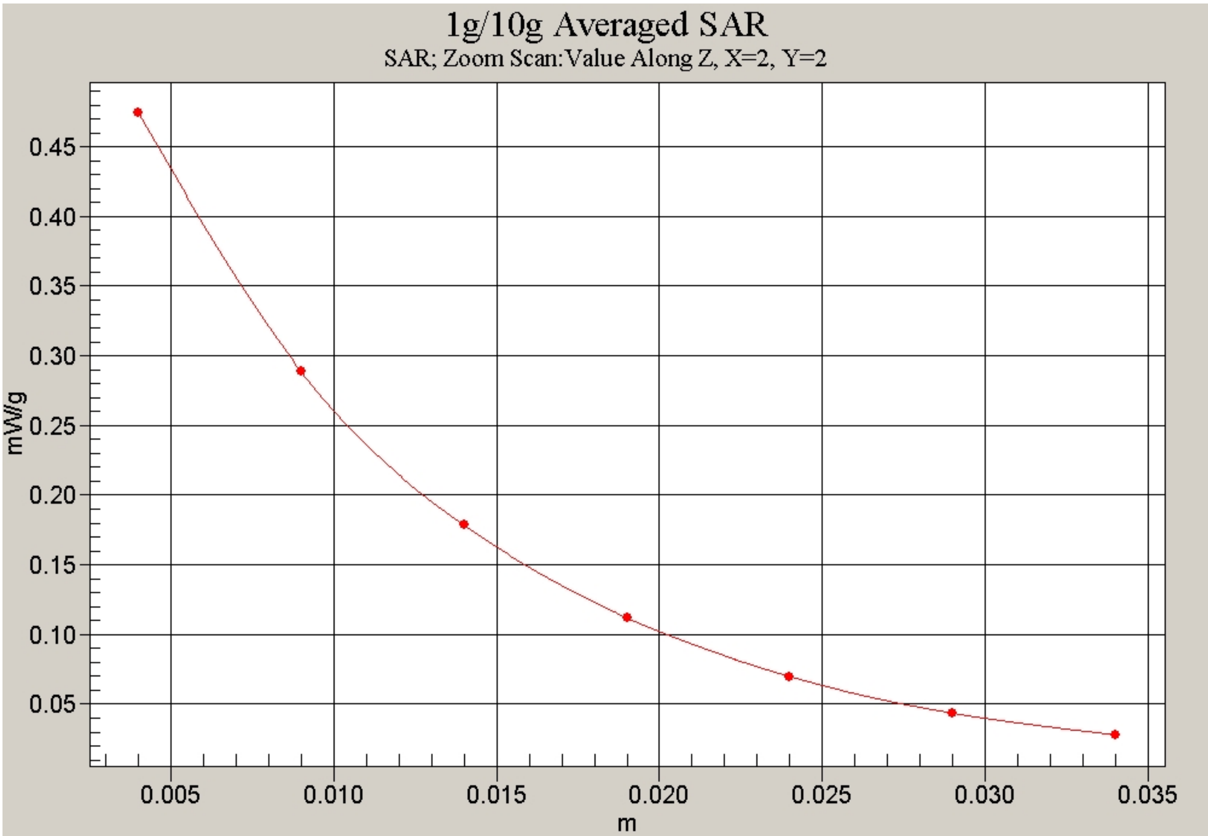


Fig. 18 Z-Scan at power reference point (1900 MHz CH661 Test Position 4-GPRS)

GSM 1900 Test Position 3 Middle with EGPRS

Date/Time: 2008-12-3 19:52:00

Electronics: DAE4 Sn771

Medium: Body 1900 MHz

Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 53; ρ = 1000 kg/m^3

Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C

Communication System: GSM 1900MHz GPRS Frequency: 1880 MHz Duty Cycle: 1:2.67

Probe: ES3DV3 - SN3149 ConvF(4.85, 4.85, 4.85)

Test Position 3/Area Scan (61x81x1): Measurement grid: dx=10mm, dy=10mm

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

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

Reference Value = 9.31 V/m; Power Drift = -0.097 dB

Peak SAR (extrapolated) = 1.86 W/kg

SAR(1 g) = 0.934 mW/g; SAR(10 g) = 0.442 mW/g

Maximum value of SAR (measured) = 1.03 mW/g