



Report No.: RZA2009-1278



OET 65

TEST REPORT

Product Name	HSPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth
Model	HUAWEI U8220-6/U8220-6
FCC ID	QISU8220-6
Client	HUAWEI Technologies Co., Ltd.

TA Technology (Shanghai) Co., Ltd.



GENERAL SUMMARY

Product Name	HSPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth	Model	HUAWEI U8220-6/U8220-6
FCC ID	QISU8220-6	Report No.	RZA2009-1278
Client	HUAWEI Technologies Co., Ltd.		
Manufacturer	HUAWEI Technologies Co., Ltd.		
Reference Standard(s)	ANSI/IEEE Std C95.1-1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. IEEE 1528-2003: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head Due to Wireless Communications Devices: Experimental Techniques. 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 62209-1: Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 1: Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear. (frequency range of 300 MHz to 3 GHz). IEC 62209-2:2008(106/162/CDV): Human exposure to radio frequency fields from handheld and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 2: Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body. (frequency rang of 30MHz to 6GHz)		
Conclusion	This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 7 of this test report are below limits specified in the relevant standards. General Judgment: Pass (Stamp) Date of issue: September 30th, 2009		
Comment	The test result only responds to the measured sample.		

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1. General Information

1.1. Notes of the test report

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

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

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1.2. Testing laboratory

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1.3. Applicant Information

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1.4. Manufacturer Information

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1.5. Information of EUT

General information

Device type :	portable device		
Exposure category:	uncontrolled environment / general population		
Product Name:	HSPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth		
IMEI or SN:	357258030000742		
Device operating configurations :			
Operating mode(s):	GSM850; （tested） GSM1900; （tested） WCDMA Band II; （tested） WCDMA Band V; （tested）		
Test Modulation:	(GSM) GMSK, (WCDMA)QPSK		
GPRS multislot class :	10		
EGPRS multislot class :	10		
Maximum no. of timeslots in uplink:	2		
HSDPA UE category	8		
HSUPA UE category	6		
Operating frequency range(s):	Band	Tx (MHz)	Rx (MHz)
	GSM 850	824.2 ~ 848.8	869.2 ~ 893.8
	GSM 1900	1850.2 ~ 1909.8	1930.2 ~ 1989.8
	WCDMA Band II	1852.4 ~ 1907.6	1932.4 ~ 1987.6
	WCDMA Band V	826.4 ~ 846.6	871.4 ~ 891.6
Power class	GSM 850: 4, tested with power level 5		
	GSM 1900: 1, tested with power level 0		
	WCDMA Band II: 3, tested with maximum output power		
	WCDMA Band V: 3, tested with maximum output power		
Test channel (Low –Middle –High)	128 -190 -251	(GSM850)	(tested)
	512 - 661-810	(GSM1900)	(tested)
	9262 - 9400-9538	(WCDMA Band II)	(tested)
	4132 - 4183-4233	(WCDMA Band V)	(tested)
Hardware version:	HD1U822M VER.D		
Software version:	U8220-6V100R001C55B204		
Antenna type:	Internal antenna		

Auxiliary equipment details

AE1: Battery

Model: HB4F1
Manufacture: HUAWEI Technologies Co., Ltd.
IMEI or SN: SAC9516HI1648954

AE2: Travel Adaptor

Model: HS-050040E5
Manufacture: HUAWEI Technologies Co., Ltd.
IMEI or SN: BYA931202198

Equipment Under Test (EUT) is a model of HSPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth with internal antenna. The detail about Mobile phone, Lithium Battery and AC/DC Adapter is in in chapter 1.5 in this report. SAR is tested for GSM850, GSM 1900, WCDMA Band II and WCDMA Band V. The EUT has GPRS (class 10), EGPRS (class 10) and WCDMA/HSPDA/HSPUA functions.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. Test Date

The test is performed from September 23, 2009 to September 29, 2009.

2. Operational Conditions during Test

2.1. General description of test procedures

A communication link is set up with a System Simulator (SS) by air link, and a call is established. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 128, 190 and 251 in the case of GSM 850, to 512, 661 and 810 in the case of GSM 1900, to 9262, 9400 and 9538 in the case of WCDMA Band II, to 4132, 4183 and 4233 in the case of WCDMA Band V. The EUT is commanded to operate at maximum transmitting power.

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

2.2. GSM Test Configuration

SAR tests for GSM 850 and GSM 1900, a communication link is set up with a System Simulator (SS) by air link. Using E5515C the power level is set to "5" in SAR of GSM850, set to "0" in SAR of GSM1900. The test in the band of GSM850 and GSM1900 are performed in the mode of speech transfer function and GPRS/EGPRS function. Since the GPRS class is 10 for this EUT, it has at most 2 timeslots in uplink. The EGPRS class is 10 for this EUT; it has at most 2 timeslots in uplink.

2.3. WCDMA Test Configuration

2.3.1. Output power Verification

Maximum output power is verified on the High, Middle and Low channel according to the procedures described in section 5.2 of 3GPP TS 34. 121, using the appropriate RMC or AMR with TPC(transmit power control) set to all "1's" for WCDMA/HSDPA or applying the required inner loop power control procedures to the maximum output power while HSUPA is active. Results for all applicable physical channel configuration (DPCCH, DPDCH_n and spreading codes, HSDPA, HSPA) should be tabulated in the SAR report. All configuration that are not supported by the DUT or can not be measured due to technical or equipment limitations should be clearly identified.

2.3.2. Head SAR Measurements

SAR for head exposure configurations in voice mode is measured using a 12.2kbps RMC with TPC bits configured to all "1's". SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2kbps AMR is less than 1/4 dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2kbps AMR with a 3.4 kbps SRB(Signaling radio bearer) using the exposure configuration that results in the highest SAR in 12.2kbps RMC for that RF channel.

2.3.3. Body SAR Measurements

SAR for body exposure configurations in voice and data modes is measured using 12.2kbps RMC with TPC bits configured to all "1's". SAR for other spreading codes and multiple DPDCH_n, when supported by the DUT, are not required when the maximum average output of each RF channel, for each spreading code and DPDCH_n configuration, are less than 1/4 dB higher than those measured in 12.2kbps RMC. Otherwise, SAR is measured on the maximum output channel with an applicable RMC configuration for the corresponding spreading code or DPDCH_n using the exposure configuration that results in the highest SAR with 12.2 kbps RMC. When more than 2 DPDCH_n are supported by the DUT, it may be necessary to configure additional DPDCH_n for a DUT using FTM (Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384 kbps and 768 kbps RMC.

2.4. HSDPA Test Configuration

SAR for body exposure configurations is measured according to the "Body SAR Measurements" procedures of that section. 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 f. To maintain a consistent test configuration and stable transmission condition, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors (β_c , β_d), and HS-DPCCH power offset parameters (Δ_{ACK} , Δ_{NACK} , Δ_{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.

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Table 1: Subtests for UMTS Release 5 HSDPA

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

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

Note2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1.A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 8$ ($A_{hs} = 30/15$) with $\beta_{hs} = 30/15 * \beta_c$, and $\Delta_{CQI} = 7$ ($A_{hs} = 24/15$) with $\beta_{hs} = 24/15 * \beta_c$.

Note3: CM=1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TFC1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

Table 2: 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

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Table 3: HSDPA UE category

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

2.5. HSUPA Test Configuration

Body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least ¼ dB higher than that measured without HSPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.2 kbps RMC without HSPA.⁴⁰

Due to inner loop power control requirements in HSPA, a commercial communication test set should be used for the output power and SAR tests.⁴¹ The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSPA should be configured according to the β values indicated below as well as other applicable procedures described in the 'WCDMA Handset' and 'Release 5 HSDPA Data Devices' sections of 3 G device.

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Table 4: Sub-Test 5 Setup for Release 6 HSUPA

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

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

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-

DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the

signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the

signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Figure 5.1g.

Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Table 5: HSUPA UE category

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

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

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

3. SAR Measurements System Configuration

3.1. 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.

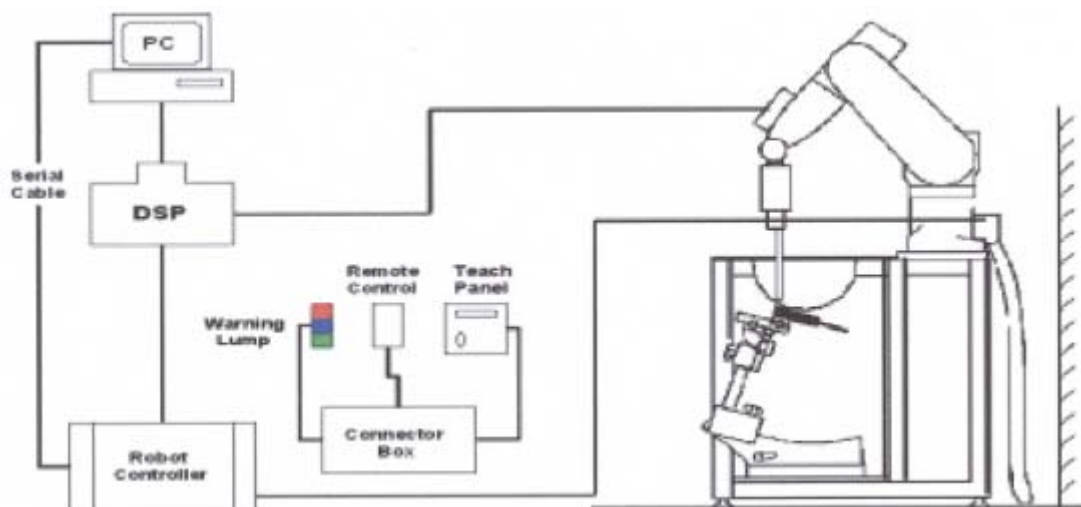


Figure 1 SAR Lab Test Measurement Set-up

3.2. DASY4 E-field Probe System

The SAR measurements were conducted with the dosimetric probe ET3DV6 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

3.2.1. ET3DV6 Probe Specification

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection System (ET3DV6 only) Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.q., glycol)
Calibration	In air from 10 MHz to 3 GHz In brain and muscle simulating tissue at frequencies of 450MHz, 900MHz, 1750 MHz, 1950MHz and 2450 MHz. (accuracy $\pm$ 8%) Calibration for other liquids and frequencies upon request
Frequency	10 MHz to 2.5 GHz; Linearity: $\pm$ 0.2 dB (30 MHz to 2.5 GHz)
Directivity	$\pm$ 0.2 dB in brain tissue (rotation around probe axis) $\pm$ 0.4 dB in brain tissue (rotation around probe axis)
Dynamic Range	5u W/g to > 100mW/g; Linearity: $\pm$ 0.2dB
Surface Detection	$\pm$ 0.2 mm repeatability in air and clear liquids over diffuse reflecting surface (ET3DV6 only)
Dimensions	Overall length: 330mm Tip length: 16mm Body diameter: 12mm Tip diameter: 6.8mm Distance from probe tip to dipole centers: 2.7mm
Application	General dosimetry up to 2.5GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

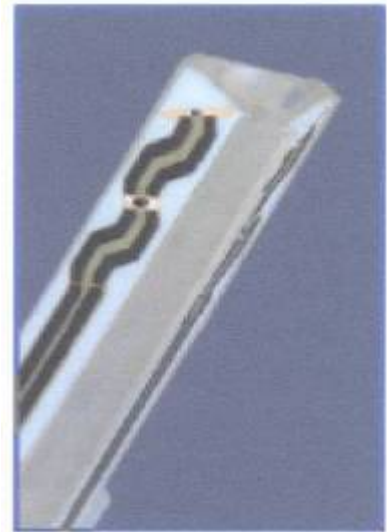


Figure 2 ET3DV6 E-field Probe



Figure 3 ET3DV6 E-field probe

3.2.2. E-field Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than $\pm 10\%$. The spherical isotropy was evaluated and found to be better than $\pm 0.25\text{dB}$. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies below 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

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

Where: Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

ΔT = Temperature increase due to RF exposure.

Or

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

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m^3).

3.3. Other Test Equipment

3.3.1. Device Holder for Transmitters

The DASY device holder is designed to cope with the different positions given in the standard.

It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.



Figure 4 Device Holder

3.3.2. Phantom

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

Shell Thickness	2±0.1 mm
Filling Volume	Approx. 20 liters
Dimensions	810 x 1000 x 500 mm (H x L x W)
Available	Special



Figure 5 Generic Twin Phantom

3.4. 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. $\pm 5\%$.
- 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 $\pm 0.1\text{mm}$). 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 $\pm 30^\circ$.)
- Area Scan
The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot. Before starting the area scan a grid

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

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

- **Zoom Scan**

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

- **Spatial Peak Detection**

The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses. The DASY4 system allows evaluations that combine measured data and robot positions, such as:

- maximum search
- extrapolation
- boundary correction
- peak search for averaged SAR

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

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

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

3.5. Data Storage and Evaluation

3.5.1. 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.

3.5.2. Data Evaluation by SEMCAD

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

Probe parameters:	- Sensitivity	Normi, ai ₀ , ai ₁ , ai ₂
	- Conversion factor	ConvF _i
	- Diode compression point	Dcp _i
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	
	- Density	

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

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

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

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

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

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

cf = crest factor of exciting field (DASY parameter)

dcp_i = diode compression point (DASY parameter)

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

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

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

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

$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)
[mV/(V/m)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.

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

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

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

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

ρ = equivalent tissue density in g/cm³

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

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

with **P_{pwe}** = equivalent power density of a plane wave in mW/cm²

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

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

3.6. System check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulates were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulates, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the table 12 and table 13.

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

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

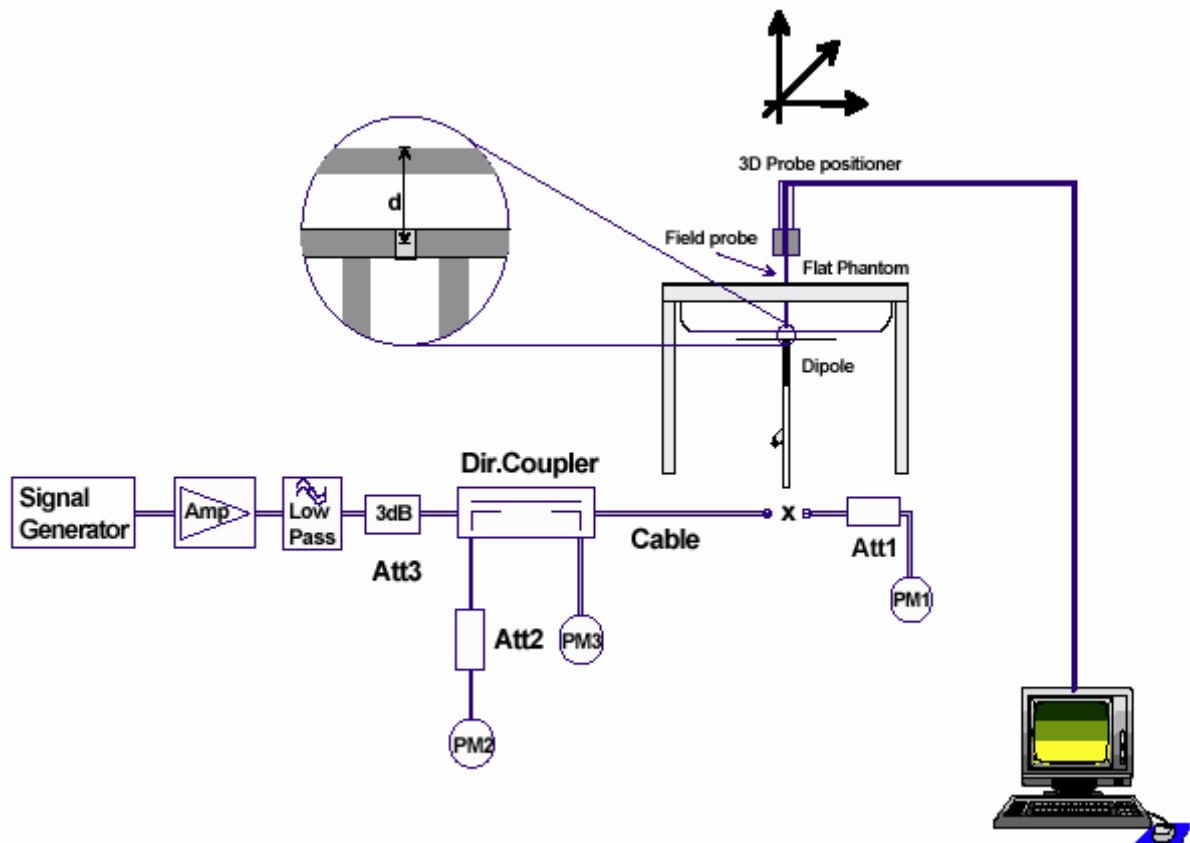


Figure 6 System Check Set-up

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3.7. Equivalent Tissues

The liquid is consisted of water, salt, Glycol, Sugar, Preventol and Cellulose. The liquid has previously been proven to be suited for worst-case. The Table 6 and Table 7 show the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the OET 65.

Table 6: Composition of the Head Tissue Equivalent Matter

MIXTURE%	FREQUENCY(Brain) 835MHz
Water	41.45
Sugar	56
Salt	1.45
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz $\epsilon=41.5$ $\sigma=0.9$

MIXTURE%	FREQUENCY(Brain)1900MHz
Water	55.242
Glycol monobutyl	44.452
Salt	0.306
Dielectric Parameters Target Value	f=1900MHz $\epsilon=40.0$ $\sigma=1.40$

Table 7: Composition of the Body Tissue Equivalent Matter

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

MIXTURE%	FREQUENCY (Body) 1900MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1900MHz $\epsilon=53.3$ $\sigma=1.52$

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MIXTURE%	FREQUENCY (Body) 2450MHz		
Water	73.2		
Glycol	26.7		
Salt	0.1		
Dielectric Parameters Target Value	f=2450MHz	$\epsilon=52.70$	$\sigma=1.95$

4. Laboratory Environment

Table 8: The Ambient Conditions during Test

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

5. Characteristics of the Test

5.1. Applicable Limit Regulations

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

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.

5.2. Applicable Measurement Standards

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

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 62209-1: Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 1: Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear. (frequency range of 300 MHz to 3 GHz).

IEC 62209-2:2008(106/162/CDV): Human exposure to radio frequency fields from handheld and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 2: Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body. (frequency rang of 30MHz to 6GHz)

6. Conducted Output Power Measurement

6.1. Summary

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

6.2. Conducted Power Results

Table 9: Conducted Power Measurement Results

GSM 850	Conducted Power		
	Channel 128	Channel 190	Channel 251
	(824.2MHz)	(836.6MHz)	(848.8MHz)
Before Test (dBm)	32.52	32.48	32.50
After Test (dBm)	32.5	32.49	32.53
GSM 850+GPRS	Conducted Power		
	Channel 128	Channel 190	Channel 251
	(824.2MHz)	(836.6MHz)	(848.8MHz)
Before Test (dBm)	31.78	31.52	31.72
After Test (dBm)	31.75	31.52	31.69
GSM 850+EGPRS	Conducted Power		
	Channel 128	Channel 190	Channel 251
	(824.2MHz)	(836.6MHz)	(848.8MHz)
Before Test (dBm)	26.36	26.15	26.25
After Test (dBm)	26.34	26.19	26.25
GSM 1900	Conducted Power		
	Channel 512	Channel 661	Channel 810
	(1850.2MHz)	(1880MHz)	(1909.8MHz)
Before Test (dBm)	29.48	29.41	29.43
After Test (dBm)	29.45	29.38	29.43
GSM 1900+GPRS	Conducted Power		
	Channel 512	Channel 661	Channel 810
	(1850.2MHz)	(1880MHz)	(1909.8MHz)
Before Test (dBm)	29.36	29.24	29.23
After Test (dBm)	29.37	29.26	29.27
GSM 1900+EGPRS	Conducted Power		
	Channel 512	Channel 661	Channel 810
	(1850.2MHz)	(1880MHz)	(1909.8MHz)
Before Test (dBm)	25.04	24.86	25.01
After Test (dBm)	25.07	24.91	25.0
WCDMA Band V	Conducted Power		

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(12.2kbps RMC)	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	22.99	23.04	23.10
After Test (dBm)	22.95	23.07	23.08
WCDMA Band V (64kbps RMC)	Conducted Power		
	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	22.94	22.89	23.07
After Test (dBm)	22.97	22.91	23.05
WCDMA Band V (144kbps RMC)	Conducted Power		
	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	23.07	22.88	22.94
After Test (dBm)	23.03	22.91	22.97
WCDMA Band V (384kbps RMC)	Conducted Power		
	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	22.94	23.04	23.10
After Test (dBm)	22.97	23.06	23.06
WCDMA Band V + HSDPA ($\beta_c/\beta_d=2/15$)	Conducted Power		
	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	22.87	22.94	22.79
After Test (dBm)	22.89	22.97	22.76
WCDMA Band V + HSDPA ($\beta_c/\beta_d=12/15$)	Conducted Power		
	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	22.36	22.54	22.27
After Test (dBm)	22.39	22.57	22.31
WCDMA Band V + HSDPA ($\beta_c/\beta_d=15/8$)	Conducted Power		
	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	20.79	20.97	21.02
After Test (dBm)	20.82	20.99	21.06
WCDMA Band V + HSDPA ($\beta_c/\beta_d=15/4$)	Conducted Power		
	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	20.04	20.12	20.08
After Test (dBm)	20.06	20.17	20.11
WCDMA Band V + HSUPA ($\beta_c/\beta_d=11/15$)	Conducted Power		
	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	20.47	20.39	20.64
After Test (dBm)	20.5	20.37	20.66

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WCDMA Band V + HSUPA ($\beta_c / \beta_d = 6/15$)	Conducted Power		
	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	20.01	20.03	19.89
After Test (dBm)	19.98	20.04	19.93
WCDMA Band V + HSUPA ($\beta_c / \beta_d = 15/9$)	Conducted Power		
	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	19.99	20.05	20.04
After Test (dBm)	19.96	20.09	20.04
WCDMA Band V + HSUPA ($\beta_c / \beta_d = 2/15$)	Conducted Power		
	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	20.07	19.91	20.04
After Test (dBm)	20.03	19.93	20.06
WCDMA Band V + HSUPA ($\beta_c / \beta_d = 15/15$)	Conducted Power		
	Channel 4132 (826.4MHz)	Channel 4182 (836.4MHz)	Channel 4233 (846.6MHz)
Before Test (dBm)	20.45	20.24	20.26
After Test (dBm)	20.46	20.27	20.3
WCDMA Band II (12.2kbps RMC)	Conducted Power		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
Before Test (dBm)	21.57	21.47	21.64
After Test (dBm)	21.61	21.44	21.63
WCDMA Band II (64kbps RMC)	Conducted Power		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
Before Test (dBm)	21.33	21.57	21.43
After Test (dBm)	21.37	21.61	21.4
WCDMA Band II (144kbps RMC)	Conducted Power		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
Before Test (dBm)	21.28	21.54	21.44
After Test (dBm)	21.31	21.59	21.46
WCDMA Band II (384kbps RMC)	Conducted Power		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
Before Test (dBm)	21.58	21.41	21.57
After Test (dBm)	21.6	21.46	21.58
WCDMA Band II+HSDPA ($\beta_c / \beta_d = 2/15$)	Conducted Power		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
Before Test (dBm)	21.58	21.66	21.47

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After Test (dBm)	21.62	21.69	21.51
WCDMA Band II+HSDPA ($\beta_c / \beta_d = 12/15$)	Conducted Power		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
Before Test (dBm)	21.41	21.65	21.49
After Test (dBm)	21.42	21.66	21.51
WCDMA Band II+HSDPA ($\beta_c / \beta_d = 15/8$)	Conducted Power		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
Before Test (dBm)	19.72	19.98	19.54
After Test (dBm)	19.76	19.97	19.56
WCDMA Band II+HSDPA ($\beta_c / \beta_d = 15/4$)	Conducted Power		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
Before Test (dBm)	19.03	19.25	19.14
After Test (dBm)	19.07	19.27	19.16
WCDMA Band II+HSUPA ($\beta_c / \beta_d = 11/15$)	Conducted Power		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
Before Test (dBm)	19.17	19.35	19.11
After Test (dBm)	19.18	19.35	19.13
WCDMA Band II+HSUPA ($\beta_c / \beta_d = 6/15$)	Conducted Power		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
Before Test (dBm)	19.14	19.04	19.09
After Test (dBm)	19.1	19.02	19.11
WCDMA Band II+HSUPA ($\beta_c / \beta_d = 15/9$)	Conducted Power		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
Before Test (dBm)	19.24	19.35	19.07
After Test (dBm)	19.27	19.34	19.1
WCDMA Band II+HSUPA ($\beta_c / \beta_d = 2/15$)	Conducted Power		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
Before Test (dBm)	19.24	19.55	19.47
After Test (dBm)	19.26	19.56	19.51
WCDMA Band II+HSUPA ($\beta_c / \beta_d = 15/15$)	Conducted Power		
	Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)
Before Test (dBm)	19.98	19.84	19.8
After Test (dBm)	19.95	19.86	19.82

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7. Test Results

7.1. Dielectric Performance

Table 10: Dielectric Performance of Head Tissue Simulating Liquid

Frequency	Description	Dielectric Parameters		Temp ℃
		ϵ_r	$\sigma(\text{s/m})$	
835MHz (head)	Target value ± 5% window	41.50 39.43 — 43.58	0.90 0.86 — 0.95	/
	Measurement value 2009-9-25	41.86	0.92	21.8
1900MHz (head)	Target value ±5% window	40.00 38.00 — 42.00	1.40 1.33 — 1.47	/
	Measurement value 2009-9-25	39.50	1.41	21.9

Table 11: Dielectric Performance of Body Tissue Simulating Liquid

Frequency	Description	Dielectric Parameters		Temp ℃
		ϵ_r	$\sigma(\text{s/m})$	
835MHz (body)	Target value ±5% window	55.20 52.44 — 57.96	0.97 0.92 — 1.02	/
	Measurement value 2009-9-24	55.07	1.02	21.8
1900MHz (body)	Target value ±5% window	53.30 50.64 — 55.97	1.52 1.44 — 1.60	/
	Measurement value 2009-9-23	51.93	1.54	21.9
2450MHz (body)	Target value ±5% window	52.70 50.07 — 55.34	1.95 1.85 — 2.05	/
	Measurement value 2009-9-28	51.65	1.99	21.9

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7.2. System Check Results

Table 12: System Check for Head tissue simulation liquid

Frequency	Description	SAR(W/kg)		Dielectric Parameters		Temp
		10g	1g	ϵ_r	σ (s/m)	°C
835MHz	Recommended result ±10% window	1.55 1.40 — 1.71	2.40 2.16 — 2.64	41.20	0.91	/
	Measurement value 2009-9-25	1.50	2.30	41.86	0.92	21.9
1900MHz	Recommended result ±10% window	5.00 4.50 — 5.50	9.88 8.89 — 10.87	39.60	1.40	/
	Measurement value 2009-9-25	5.09	9.74	39.50	1.41	22.1

Note: 1. the graph results see ANNEX B.

2. Recommended Values used derive from the calibration certificate and 250 mW is used as feeding power to the calibrated dipole.

Table 13: System Check for Body tissue simulation liquid

Frequency	Description	SAR(W/kg)		Dielectric Parameters		Temp
		10g	1g	ϵ_r	σ (s/m)	°C
835MHz	Recommended result ±10% window	1.58 1.42 — 1.74	2.41 2.17 — 2.65	54.60	0.99	/
	Measurement value 2009-9-24	1.58	2.40	55.07	1.02	21.9
1900 MHz	Recommended result ±10% window	5.18 4.66 — 5.70	10.20 9.18 — 11.22	52.90	1.55	/
	Measurement value 2009-9-23	5.14	10.00	51.93	1.54	21.7
2450 MHz	Recommended result ±10% window	6.18 5.56—6.80	13.10 11.79 — 14.41	52.5	2.02	/
	Measurement value 2009-9-28	6.46	14.00	51.65	1.99	21.7

Note: 1. The graph results see ANNEX B.

2. Target Values used derive from the calibration certificate and 250 mW is used as feeding power to the Calibrated dipole.

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7.3. Test Results

7.3.1. Summary of Measurement Results (GSM850/GPRS/EGPRS)

Table 14: SAR Values (GSM850/GPRS/EGPRS)

Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.21	
Test Case Of Head		Measurement Result(W/kg)		Power Drift(dB)	
Different Test Position	Channel	10 g Average	1 g Average	Power Drift(dB)	
Test position of Head					
Left hand, Touch cheek	Middle	0.430	0.609	-0.174	Figure 16
Left hand, Tilt 15 Degree	Middle	0.250	0.316	-0.052	Figure 18
Right hand, Touch cheek	High	0.671	0.876	0.038	Figure 20
	Middle	0.509	0.663	-0.115	Figure 22
	Low	0.333	0.431	-0.089	Figure 24
Right hand, Tilt 15 Degree	Middle	0.281	0.358	-0.022	Figure 26
Test position of Body (Distance 15mm)					
Towards Ground	High	0.574	0.811	-0.195	Figure 28
	Middle	0.503	0.712	-0.019	Figure 30
	Low	0.397	0.564	-0.065	Figure 32
Towards Phantom	Middle	0.435	0.594	-0.044	Figure 34
Worst case position of Body with Earphone					
Towards Ground	High	0.501	0.722	-0.107	Figure 36
Worst case position of Body with GPRS(2UP) (Distance 15mm)					
Towards Ground	High	0.900	1.300	-0.005	Figure 38
	Middle	0.788	1.120	-0.179	Figure 40
	Low	0.566	0.808	-0.048	Figure 42
Towards Phantom	Middle	0.626	0.856	-0.182	Figure 44
Worst case position of Body with EGPRS(2UP) (Distance 15mm)					
Towards Ground	High	0.923	1.310	-0.078	Figure 46

Note: 1. The value with blue color is the maximum SAR Value of test case of head and body in each test band.

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

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7.3.2. Summary of Measurement Results (GSM1900/GPRS/EGPRS)

Table 15: SAR Values (GSM1900/GPRS/EGPRS)

Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.21	
Test Case Of Head		Measurement Result(W/kg)		Power	
Different Test Position	Channel	10 g Average	1 g Average	Drift(dB)	
Test position of Head					
Left hand, Touch cheek	High	0.278	0.497	0.059	Figure 48
	Middle	0.323	0.563	-0.146	Figure 50
	Low	0.333	0.581	-0.061	Figure 52
Left hand, Tilt 15 Degree	Middle	0.065	0.103	-0.141	Figure 54
Right hand, Touch cheek	Middle	0.188(max.cube)	0.304(max.cube)	0.082	Figure 56
Right hand, Tilt 15 Degree	Middle	0.063	0.100	0.011	Figure 58
Test position of Body (Distance 15mm)					
Towards Ground	High	0.156	0.257	0.020	Figure 60
	Middle	0.173	0.288	0.089	Figure 62
	Low	0.177	0.295	0.016	Figure 64
Towards Phantom	Middle	0.135	0.227	-0.020	Figure 66
Worst case position of Body with Earphone (Distance 15mm)					
Towards Ground	Low	0.160	0.266	-0.043	Figure 68
Worst case position of Body with GPRS(2UP) (Distance 15mm)					
Towards Ground	High	0.309	0.506	-0.037	Figure 70
	Middle	0.335	0.552	-0.053	Figure 72
	Low	0.324	0.553	0.029	Figure 74
Towards Phantom	Middle	0.243	0.409	-0.011	Figure 76
Worst case position of Body with EGPRS(2UP) (Distance 15mm)					
Towards Ground	Middle	0.294	0.489	-0.068	Figure 78

Note: 1. The value with blue color is the maximum SAR Value of test case of head and body in each test band.

- Upper and lower frequencies were measured at the worst position.
- The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit ($< 0.8\text{W/kg}$), testing at the high and low channels is optional.
- The (max.cube) labeling indicates that during the grid scanning an additional peak was found which was within 2.0dB of the highest peak. The value of the highest cube is given in the table above; the value from the second assessed cube is given in the SAR distribution plots (See ANNEX C).

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7.3.3. Summary of Measurement Results (WCDMA Band II/WCDMA/HSPA)

Table 16: SAR Values (WCDMA Band II/WCDMA/HSPA)

Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.21	
Test Case Of Head		Measurement Result(W/kg)		Power Drift(dB)	
Different Test Position	Channel	10 g Average	1 g Average	Power Drift(dB)	
Test position of Head					
Left hand, Touch cheek	High	0.463	0.813	-0.157	Figure 80
	Middle	0.470	0.809	-0.134	Figure 82
	Low	0.441	0.760	-0.083	Figure 84
Left hand, Tilt 15 Degree	Middle	0.121	0.191	-0.190	Figure 86
Right hand, Touch cheek	Middle	0.348	0.557	0.183	Figure 88
Right hand, Tilt 15 Degree	Middle	0.153	0.249	0.025	Figure 90
Test position of Body (Distance 15mm)					
Towards Ground	High	0.246	0.405	-0.008	Figure 92
	Middle	0.279	0.462	0.108	Figure 94
	Low	0.212	0.353	-0.105	Figure 96
Towards Phantom	Middle	0.226	0.375	-0.045	Figure 98
Worst case position of Body with Earphone (Distance 15mm)					
Towards Ground	Middle	0.258	0.425	-0.104	Figure 100
Worst case position of Body with HSDPA (Distance 15mm)					
Towards Ground	Middle	0.277	0.454	0.150	Figure 102
Worst case position of Body with HSUPA (Distance 15mm)					
Towards Ground	Middle	0.213	0.349	-0.100	Figure 104

Note: 1. The value with blue color is the maximum SAR Value of test case of head and body in each test band.

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

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7.3.4. Summary of Measurement Results (WCDMA Band V/WCDMA/HSPA)

Table 17: SAR Values (WCDMA Band V/WCDMA/HSPA)

Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.21	
Test Case Of Head		Measurement Result(W/kg)		Power Drift(dB)	
Different Test Position	Channel	10 g Average	1 g Average	Power Drift(dB)	
Test position of Head					
Left hand, Touch cheek	Middle	0.390	0.571	0.109	Figure 106
Left hand, Tilt 15 Degree	Middle	0.247	0.316	0.001	Figure 108
Right hand, Touch cheek	High	0.527	0.690	-0.115	Figure 110
	Middle	0.446	0.582	-0.167	Figure 112
	Low	0.410	0.533	0.111	Figure 114
Right hand, Tilt 15 Degree	Middle	0.275	0.353	0.119	Figure 116
Test position of Body (Distance 15mm)					
Towards Ground	High	0.520	0.740	0.016	Figure 118
	Middle	0.475	0.672	0.009	Figure 120
	Low	0.452	0.641	-0.005	Figure 122
Towards Phantom	Middle	0.375	0.513	0.056	Figure 124
Worst case position of Body with Earphone (Distance 15mm)					
Towards Ground	High	0.511	0.725	0.016	Figure 126
Worst case position of Body with HSDPA (Distance 15mm)					
Towards Ground	High	0.490	0.696	0.030	Figure 128
Worst case position of Body with HSUPA (Distance 15mm)					
Towards Ground	High	0.400	0.570	-0.029	Figure 130

Note: 1. The value with blue color is the maximum SAR Value of test case of head and body in each test band.

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

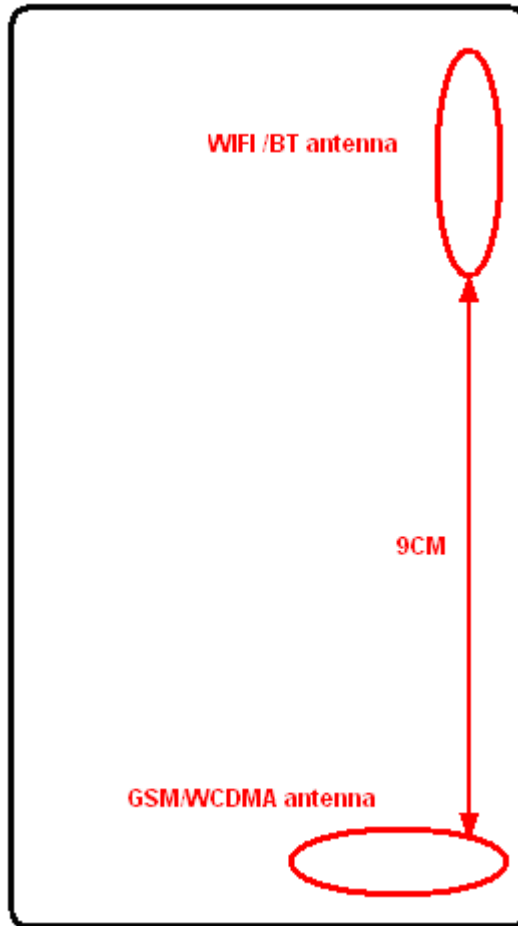
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7.3.5. Summary of Measurement Results (Bluetooth function)

The distance between BT antenna and GSM antenna is >5cm and the distance between BT antenna and GPS is >5cm. The location of the antennas inside mobile phone is shown below:



The output power of BT antenna is as following:

Channel	Ch 0 2402 MHz	Ch 39 2441 Mhz	Ch 78 2480 MHz
Peak Conducted Output Power(dBm)	6.98	6.58	6.24

The output power of wifi antenna is as following:

802.11b	Ch 1 2412MHz	Ch 6 2437 Mhz	Ch 11 2462 MHz
Peak Conducted Output Power(dBm)	17.23	16.52	16.24
802.11g	Ch 1 2412MHz	Ch 6 2437 Mhz	Ch 11 2462 MHz
Peak Conducted Output Power(dBm)	16.36	14.86	15.35

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According to the output power measurement result and the distance between the two antennas, we can draw the conclusion that: stand-alone SAR and simultaneous transmission SAR are not required for BT/WIFI transmitter, because the output power of BT/WIFI transmitter is $\leq 2P_{\text{Ref}}$ and its antenna is $\geq 5\text{cm}$ from other antenna.

Table 18: SAR Values (802.11b/g)

Limit of SAR (W/kg)		10 g Average	1 g Average	Power Drift (dB)	Graph Results
		2.0	1.6	± 0.21	
Test Case Of Head		Measurement Result(W/kg)		Power Drift(dB)	
Different Test Position	Channel	10 g Average	1 g Average		
Test Position of Body(802.11b , Distance 15mm)					
Towards Ground	High	0.013	0.024	0.011	Figure 132
	Middle	0.013	0.023	-0.156	Figure 134
	Low	0.008	0.016	-0.146	Figure 136
Towards Phantom	Middle	0.005	0.008	0.063	Figure 138
Test Position of Body(802.11g , Distance 15mm)					
Towards Phantom	High	0.013	0.025	-0.169	Figure 140

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

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

7.4. Conclusion

Localized Specific Absorption Rate (SAR) of this portable wireless device has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this report. Maximum localized SAR_{1g} are 0.876 (head) and 1.310 W/kg (body) that are below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.

No.	source	Type	Uncertainty Value (%)	Probability Distribution	k	c _i	Standard uncertainty u _i ' (%)	Degree of freedom V _{eff} or v _i
1	System repetivity	A	0.5	N	1	1	0.5	9
Measurement system								
2	probe calibration	B	5.9	N	1	1	5.9	∞
3	axial isotropy of the probe	B	4.7	R	√3	√0.5	1.9	∞
4	Hemispherical isotropy of the probe	B	9.4	R	√3	√0.5	3.9	∞
6	boundary effect	B	1.9	R	√3	1	1.1	∞
7	probe linearity	B	4.7	R	√3	1	2.7	∞
8	System detection limits	B	1.0	R	√3	1	0.6	∞
9	readout Electronics	B	1.0	N	1	1	1.0	∞
10	response time	B	0	R	√3	1	0	∞
11	integration time	B	4.32	R	√3	1	2.5	∞
12	noise	B	0	R	√3	1	0	∞
13	RF Ambient Conditions	B	3	R	√3	1	1.73	∞
14	Probe Positioner Mechanical Tolerance	B	0.4	R	√3	1	0.2	∞
15	Probe Positioning with respect to Phantom Shell	B	2.9	R	√3	1	1.7	∞
16	Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	√3	1	2.3	∞
Test sample Related								
17	-Test Sample Positioning	A	2.9	N	1	1	2.9	5
18	-Device Holder Uncertainty	A	4.1	N	1	1	4.1	5
19	-Output Power Variation - SAR drift measurement	B	5.0	R	√3	1	2.9	∞
Physical parameter								

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20	-phantom	B	4.0	R	$\sqrt{3}$	1	2.3	∞
21	-liquid conductivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6 4	1.8	∞
22	-liquid conductivity (measurement uncertainty)	B	5.0	N	1	0.6 4	3.2	∞
23	-liquid permittivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
24	-liquid permittivity (measurement uncertainty)	B	5.0	N	1	0.6	3.0	∞
Combined standard uncertainty		$u_c' = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					12.0	
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N	k=2		24.0	

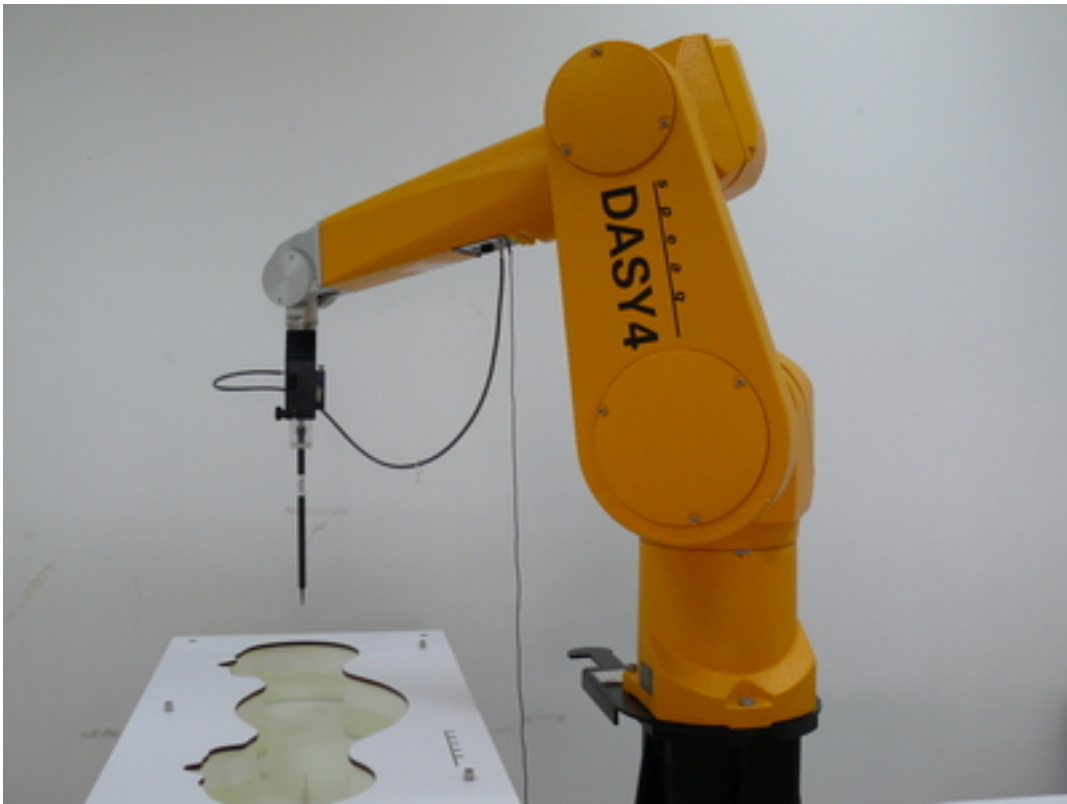
9. Main Test Instruments

Table 19: List of Main Instruments

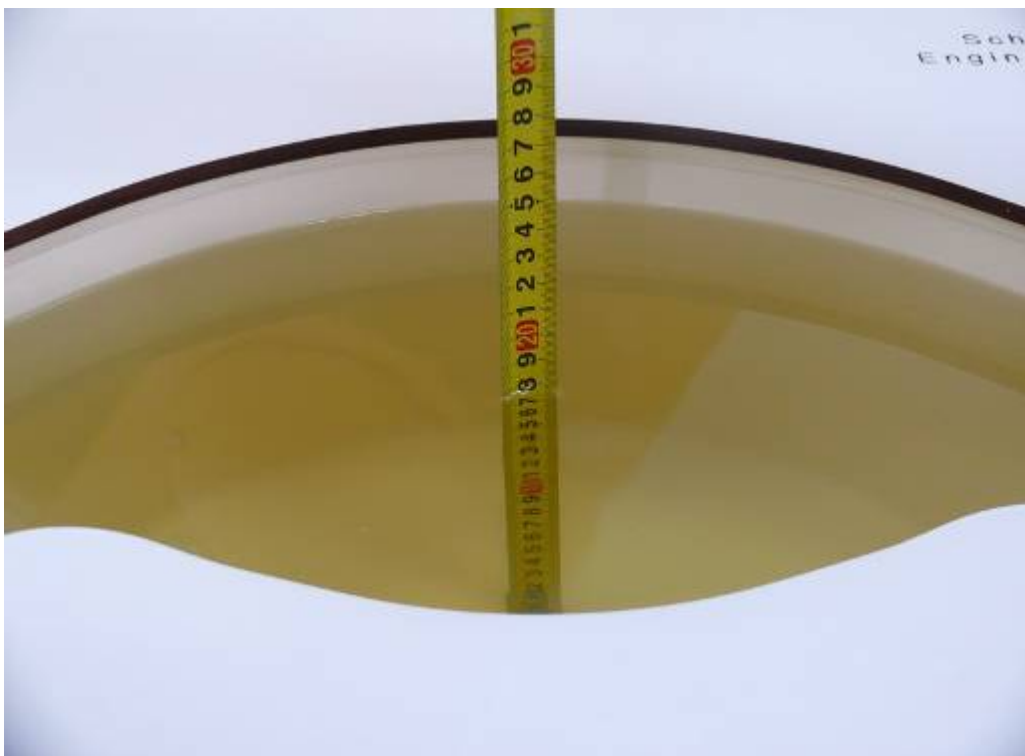
No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 13, 2009	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 14, 2009	One year
04	Power sensor	Agilent 8481H	MY41091316	March 14, 2009	One year
05	Signal Generator	HP 8341B	2730A00804	September 13, 2009	One year
06	Amplifier	IXA-020	0401	No Calibration Requested	
07	BTS	E5515C	MY48360988	December 16, 2008	One year
08	E-field Probe	ET3DV6	1737	November 25, 2008	One year
09	DAE	DAE4	452	November 18, 2008	One year
10	Validation Kit 835MHz	D835V2	4d020	July 15, 2009	One year
11	Validation Kit 1900MHz	D1900V2	5d060	July 15, 2009	One year
12	Validation Kit 2450MHz	D2450V2	786	July 15, 2009	One year

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

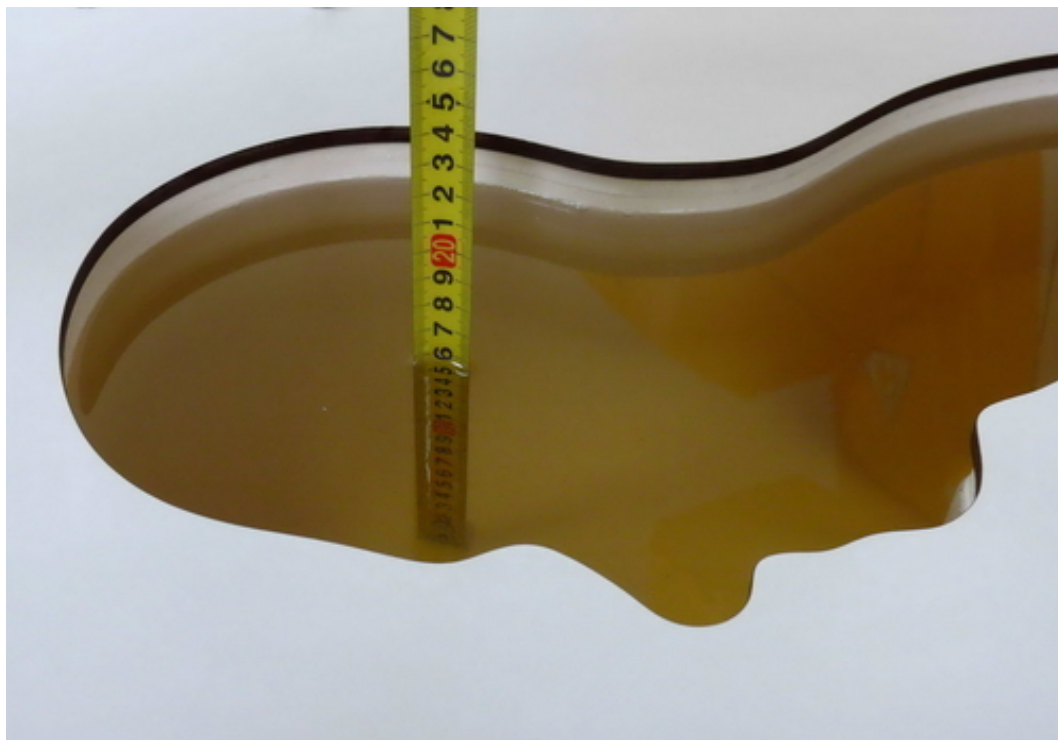
ANNEX A: Test Layout



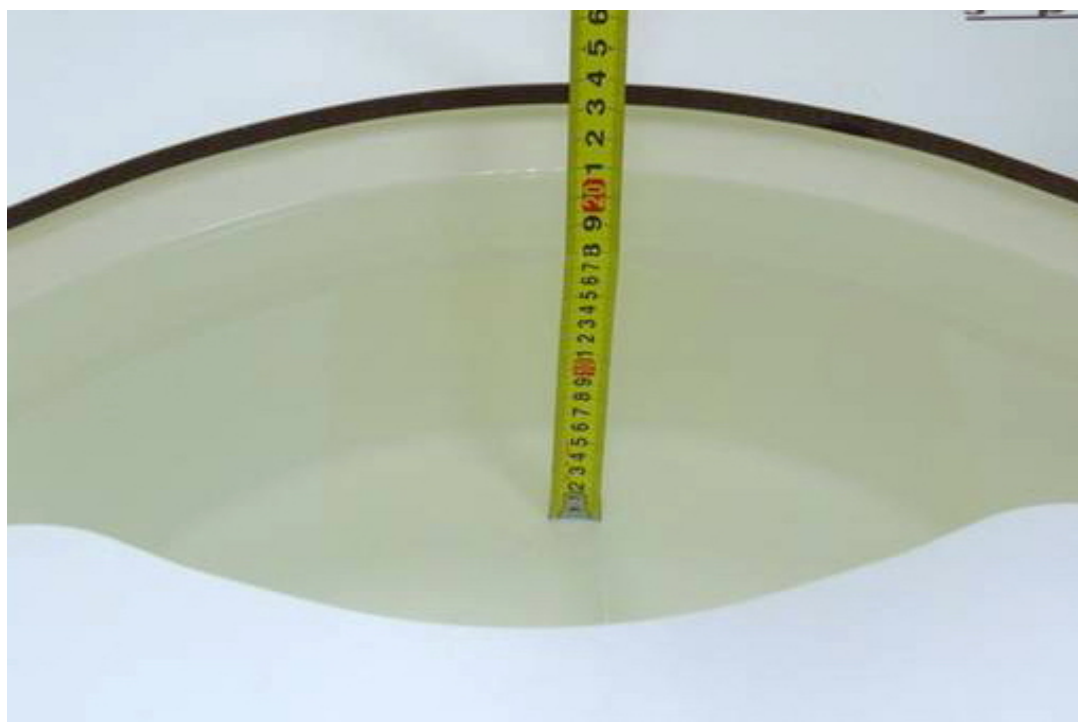
Picture 1: Specific Absorption Rate Test Layout



Picture 2: Liquid depth in the flat Phantom (835MHz)



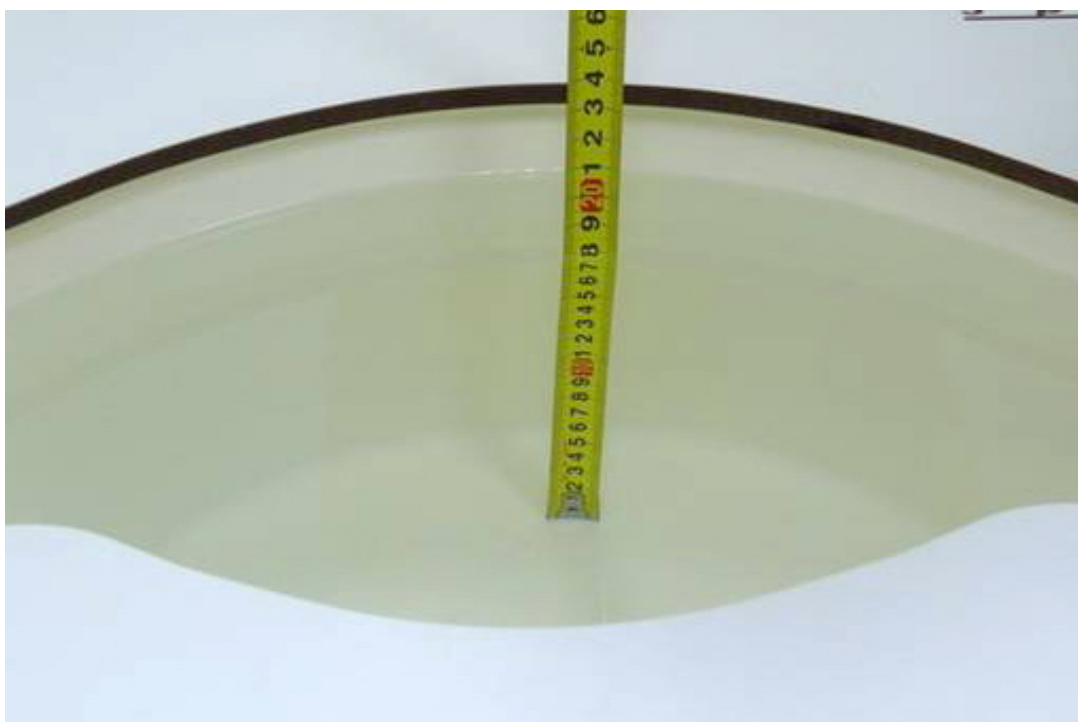
Picture 3: Liquid depth in the head Phantom (835MHz)



Picture 4: Liquid depth in the flat Phantom (1900 MHz)



Picture 5: liquid depth in the head Phantom (1900 MHz)



Picture 6: Liquid depth in the flat Phantom (2450 MHz)

ANNEX B: System Check Results

System Performance Check at 835 MHz Head TSL

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

Date/Time: 9/25/2009 2:47:58 PM

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

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.92 \text{ mho/m}$; $\epsilon_r = 41.86$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.33, 6.33, 6.33); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

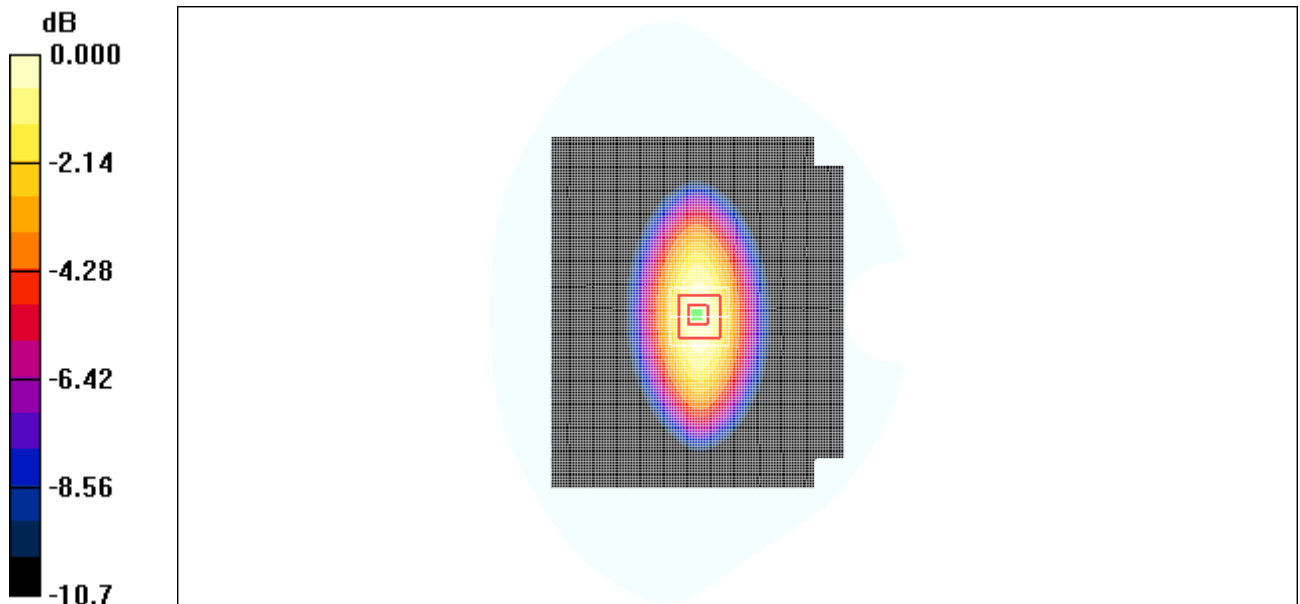


Figure 7 System Performance Check 835MHz 250mW

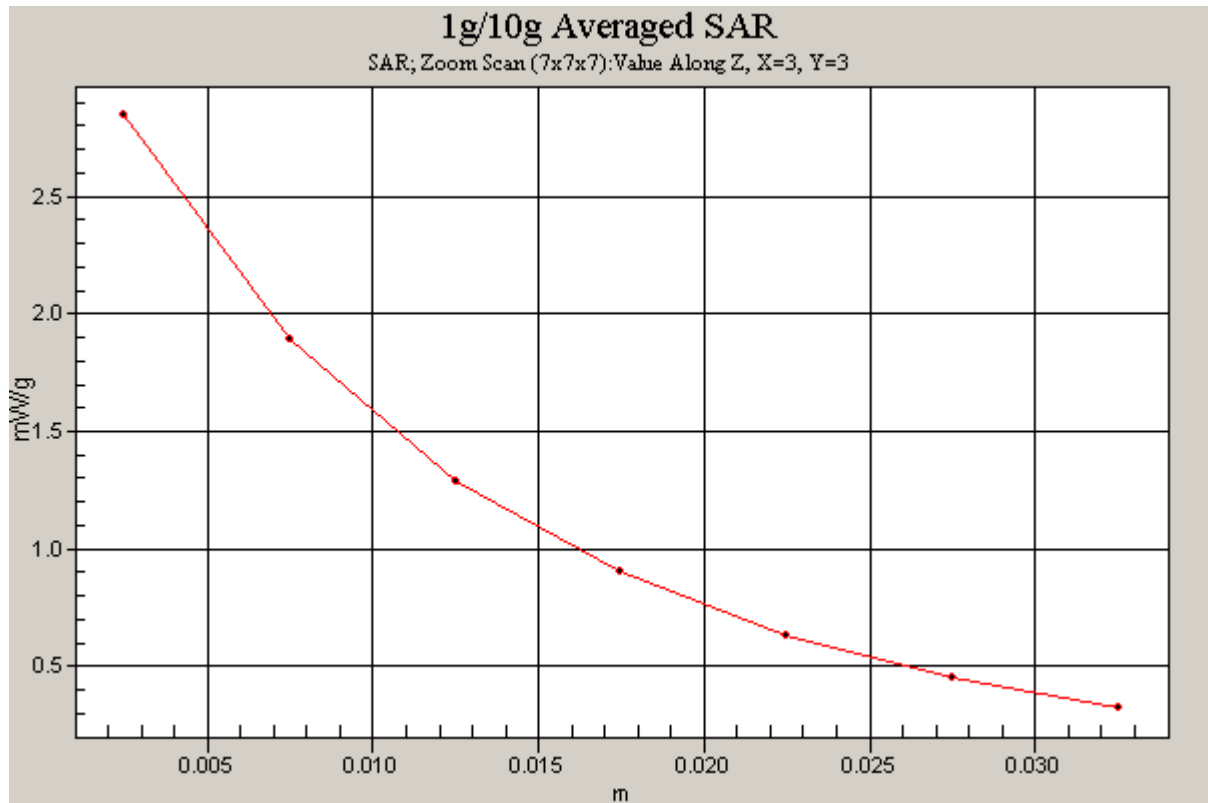


Figure 8 Z-Scan at power reference point (system check at 835 MHz dipole)

System Performance Check at 835 MHz Body TSL

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

Date/Time: 9/24/2009 9:55:49 AM

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

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 1.02 \text{ mho/m}$; $\epsilon_r = 55.07$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.14, 6.14, 6.14); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Maximum value of SAR (interpolated) = 2.93 mW/g

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

Reference Value = 55.7 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 3.59 W/kg

SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.58 mW/g

Maximum value of SAR (measured) = 2.92 mW/g

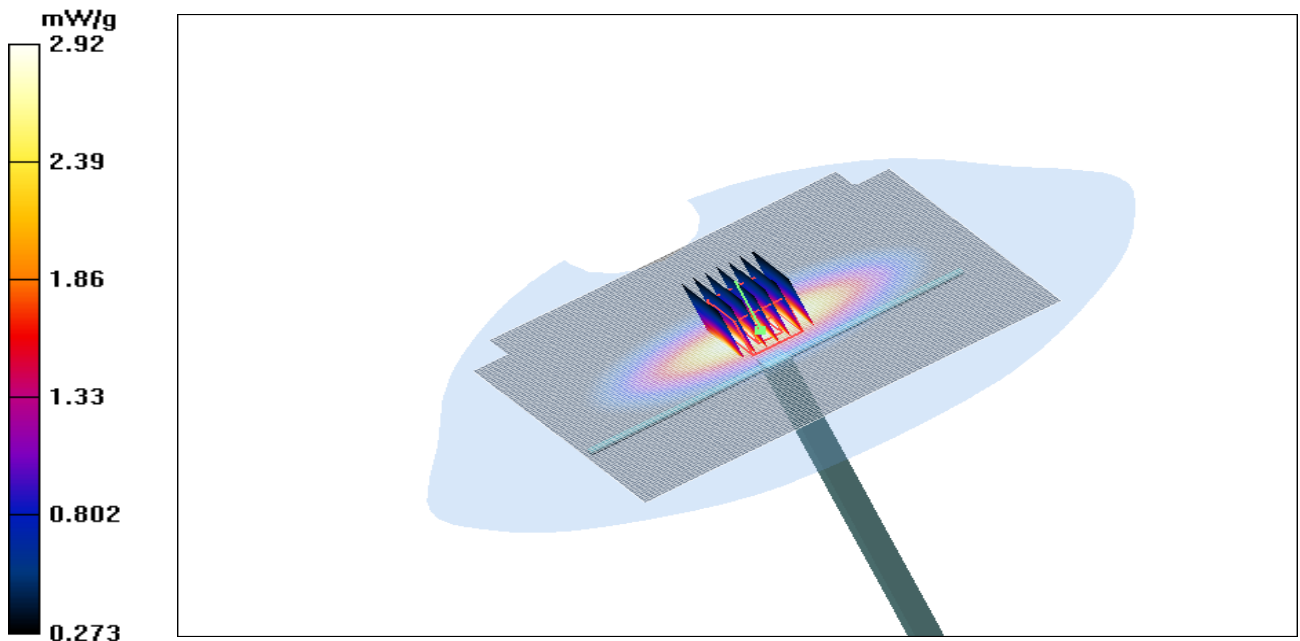


Figure 9 System Performance Check 835MHz 250mW

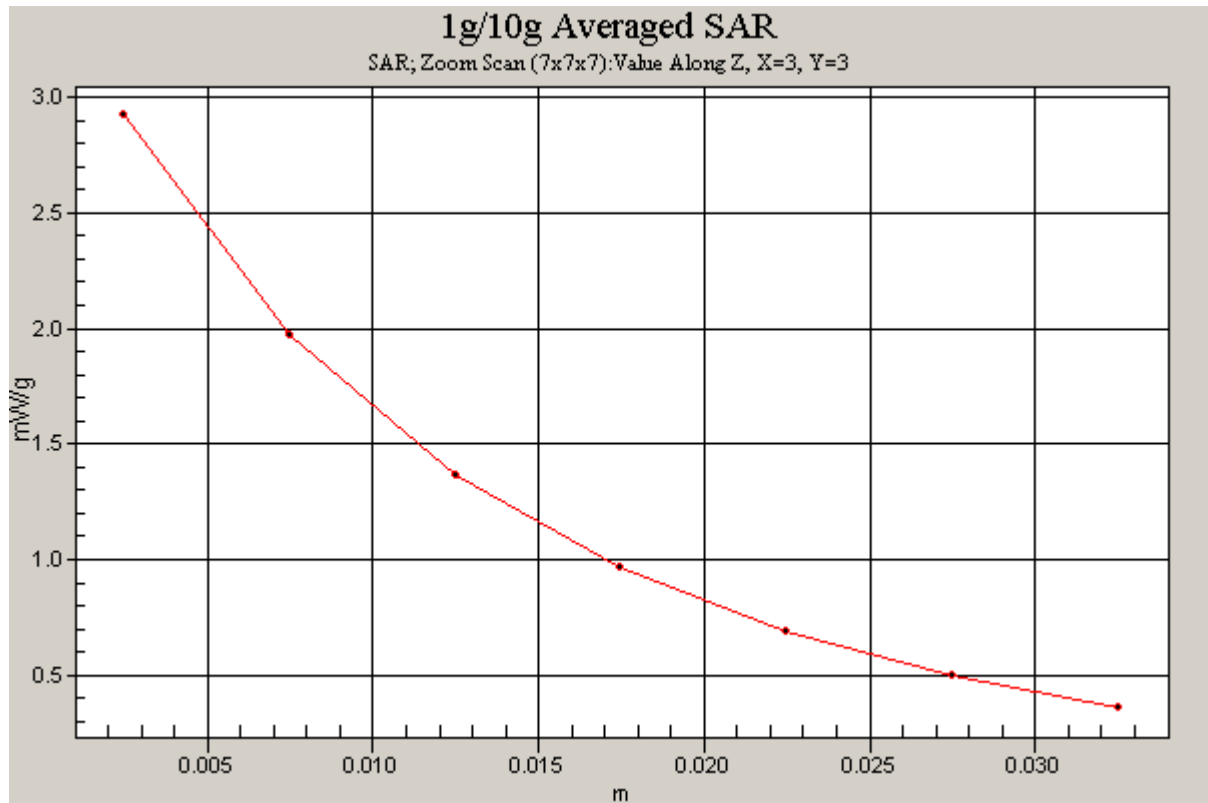


Figure 10 Z-Scan at power reference point (system Check at 835 MHz dipole)

System Performance Check at 1900 MHz Head TSL

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

Date/Time: 9/25/2009 9:16:58 AM

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

Probe: ET3DV6 – SN1737; ConvF(4.89, 4.89, 4.89); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 16.9 W/kg

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

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

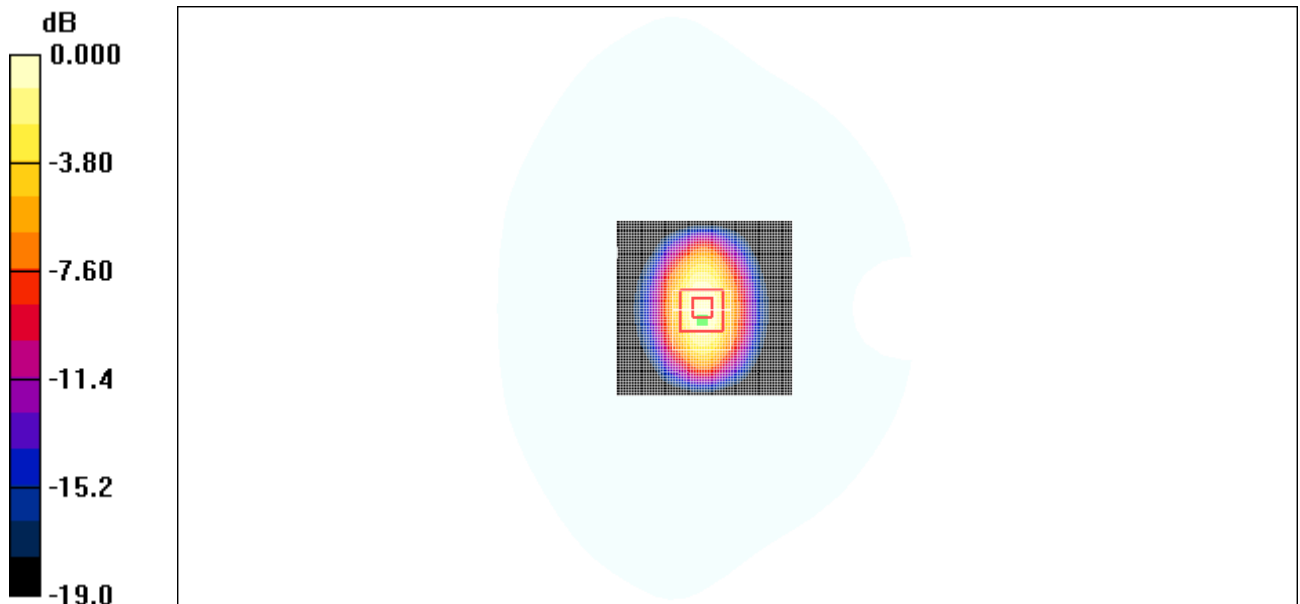


Figure 11 System Performance Check 1900MHz 250mW

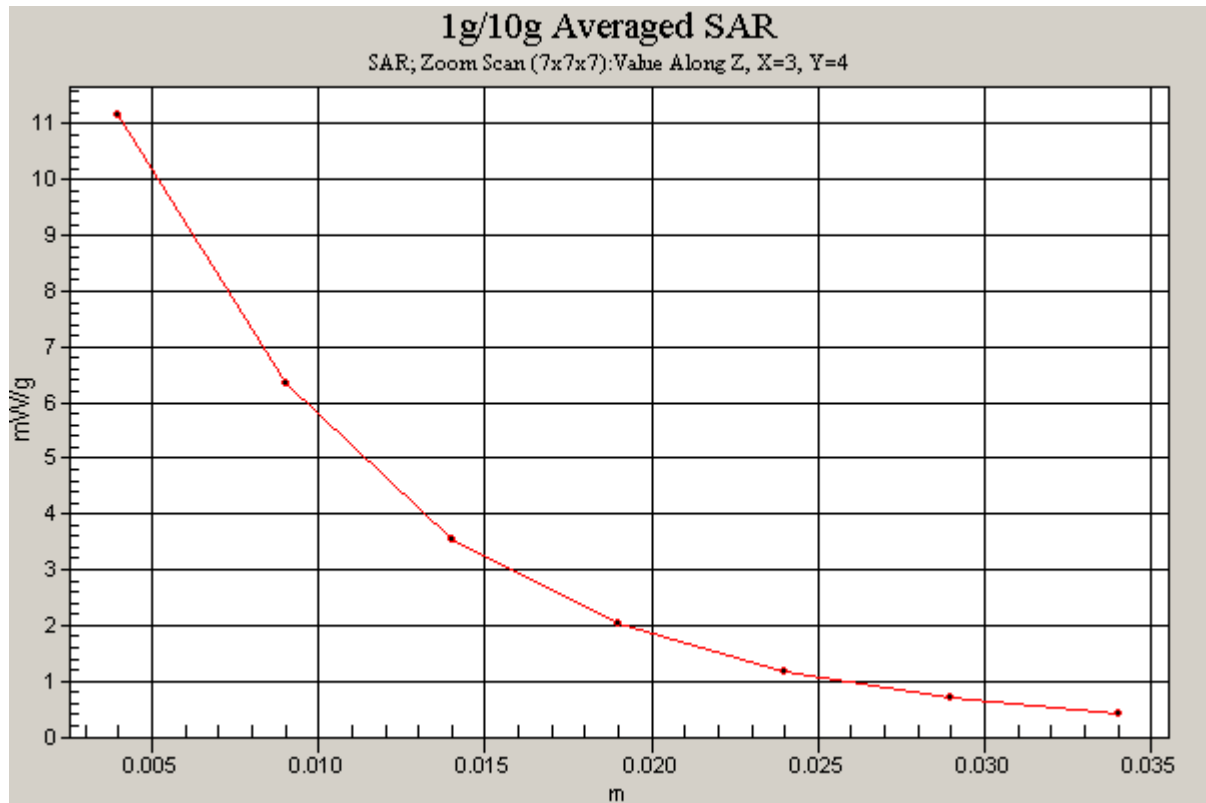


Figure 12 Z-Scan at power reference point (system check at 1900 MHz dipole)

System Performance Check at 1900 MHz Body TSL

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

Date/Time: 9/23/2009 5:52:49 PM

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 51.93$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(4.60, 4.60, 4.60); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Maximum value of SAR (interpolated) = 11.9 mW/g

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

Reference Value = 86.0 V/m; Power Drift = -0.012 dB

Peak SAR (extrapolated) = 18.9 W/kg

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

Maximum value of SAR (measured) = 11.3 mW/g

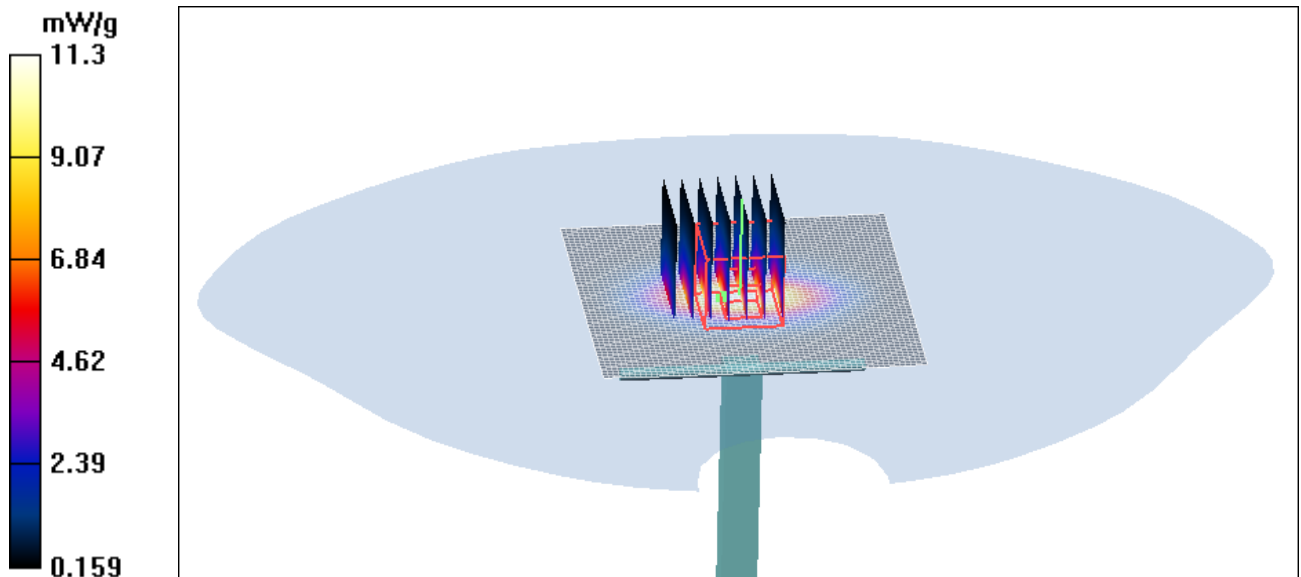


Figure 13 System Performance Check 1900MHz 250mW

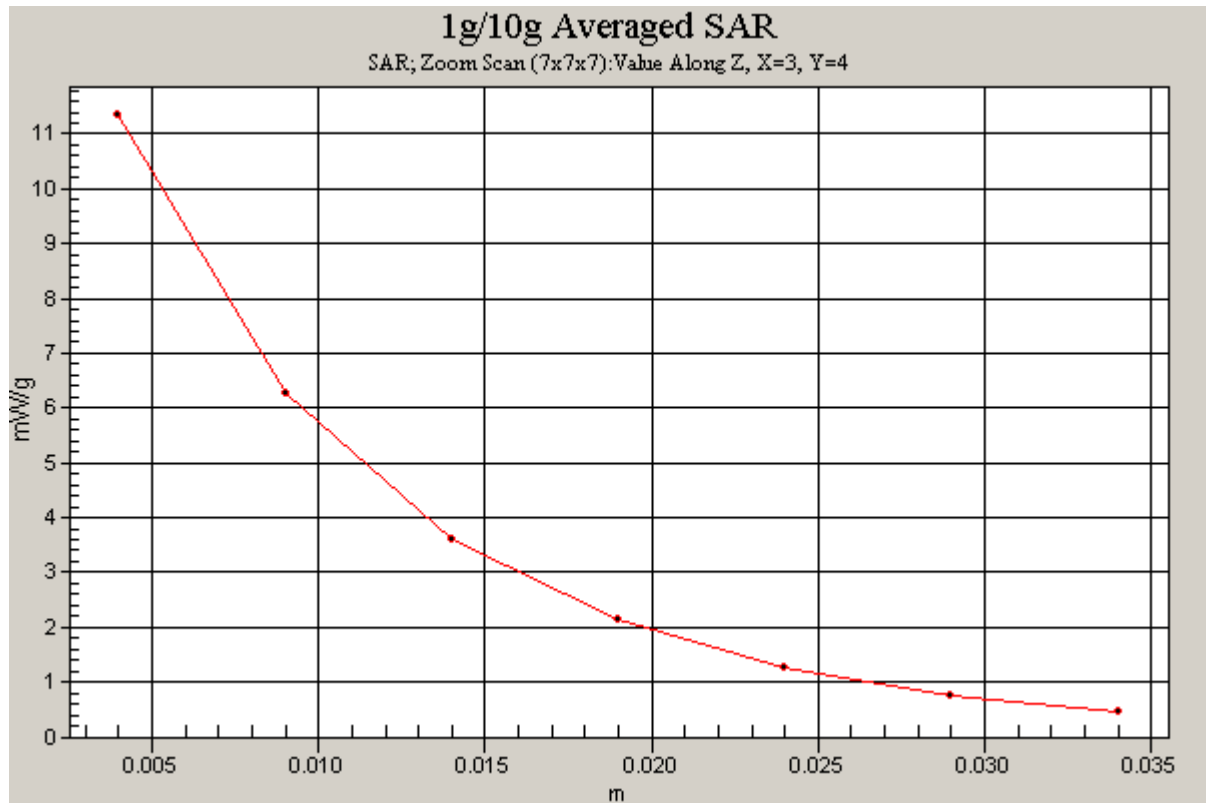


Figure 14 Z-Scan at power reference point (system Check at 1900 MHz dipole)

System Performance Check at 2450 MHz

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:786

Date/Time: 9/28/2009 8:01:36 PM

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.99$ mho/m; $\epsilon_r = 51.65$; $\rho = 1000$ kg/m³

Probe: ET3DV6 – SN1737; ConvF(3.91, 3.91, 3.91); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008;

d=10mm, Pin=250mW/Area Scan (71x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 21.5 mW/g

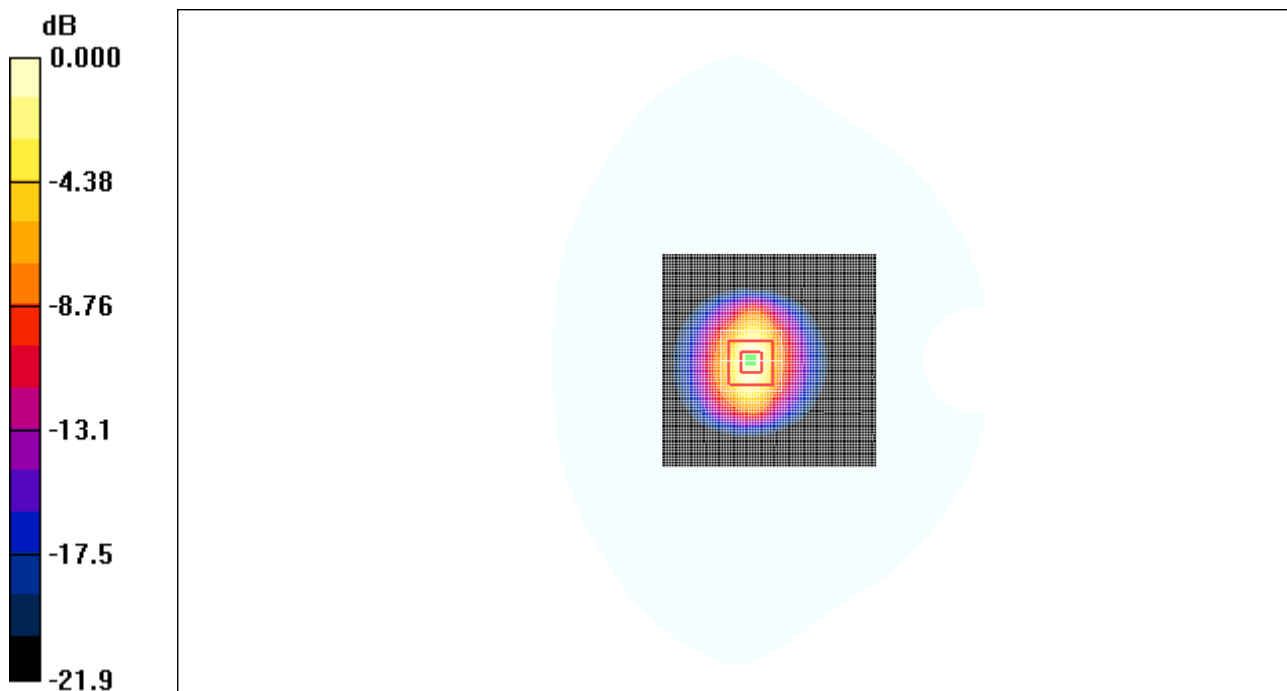
d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 71.0 V/m; Power Drift = 0.011 dB

Peak SAR (extrapolated) = 28.2 W/kg

SAR(1 g) = 14.0 mW/g; SAR(10 g) = 6.46 mW/g

Maximum value of SAR (measured) = 19.8 mW/g



0 dB = 19.8mW/g

Figure 15 System Performance Check 2450MHz 250mW

ANNEX C: Graph Results

GSM 850 Left Cheek Middle

Date/Time: 9/25/2009 3:10:57 PM

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.924$ mho/m; $\epsilon_r = 41.8$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.33, 6.33, 6.33); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Maximum value of SAR (interpolated) = 0.654 mW/g

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

Reference Value = 10.7 V/m; Power Drift = -0.174 dB

Peak SAR (extrapolated) = 0.860 W/kg

SAR(1 g) = 0.609 mW/g; SAR(10 g) = 0.430 mW/g

Maximum value of SAR (measured) = 0.647 mW/g

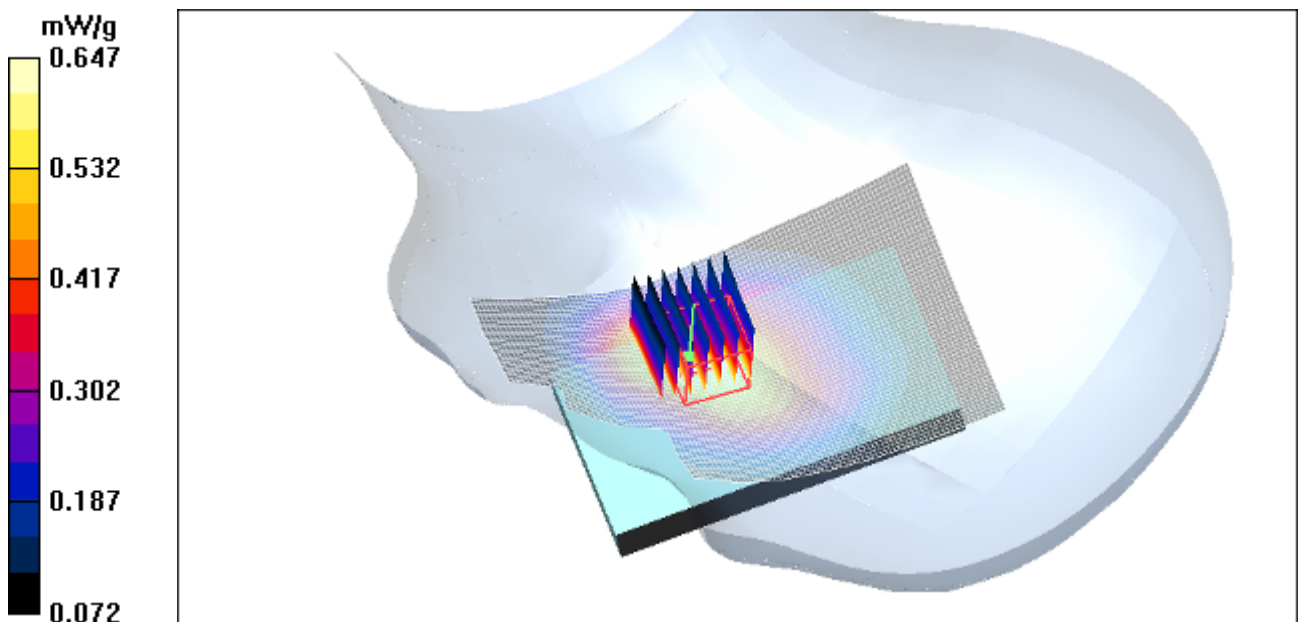


Figure 16 Left Hand Touch Cheek GSM 850 Channel 190

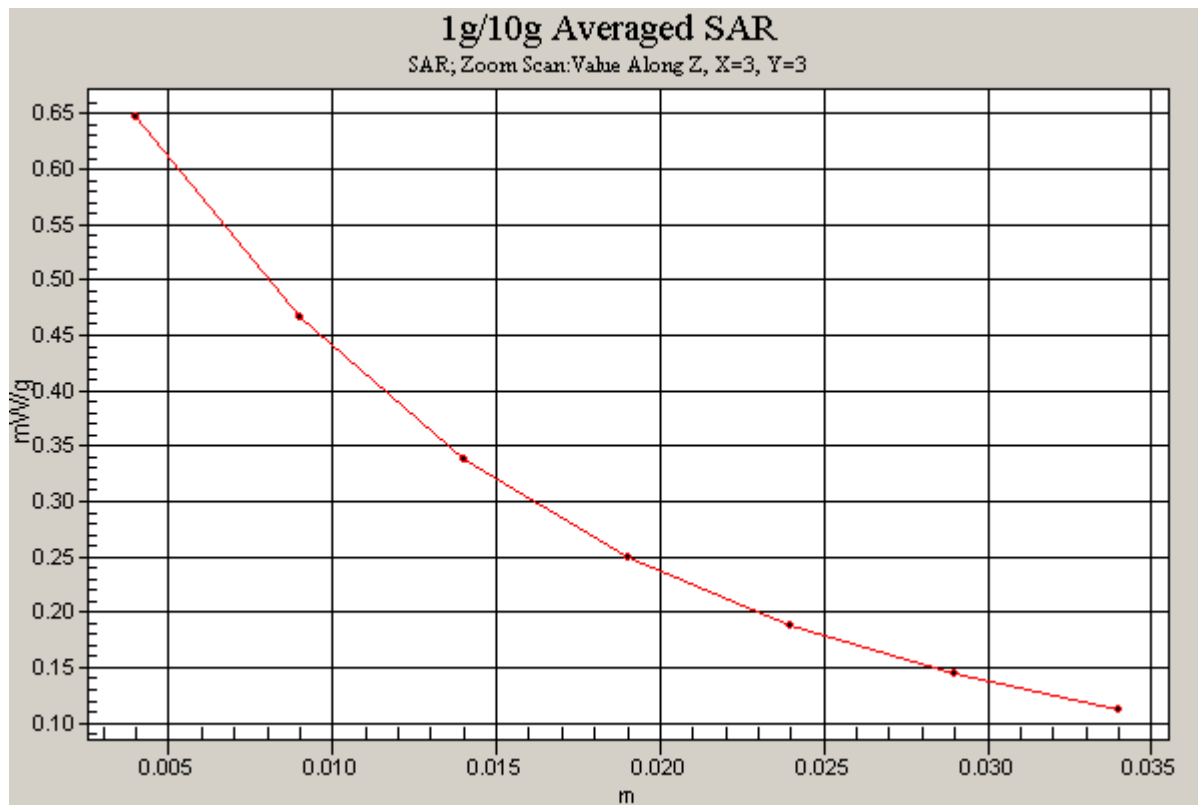


Figure 17 Z-Scan at power reference point (Left Hand Touch Cheek GSM 850 Channel 190)

GSM 850 Left Tilt Middle

Date/Time: 9/25/2009 3:34:32 PM

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.924$ mho/m; $\epsilon_r = 41.8$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.33, 6.33, 6.33); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

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

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

Reference Value = 14.2 V/m; Power Drift = -0.052 dB

Peak SAR (extrapolated) = 0.375 W/kg

SAR(1 g) = 0.316 mW/g; SAR(10 g) = 0.250 mW/g

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

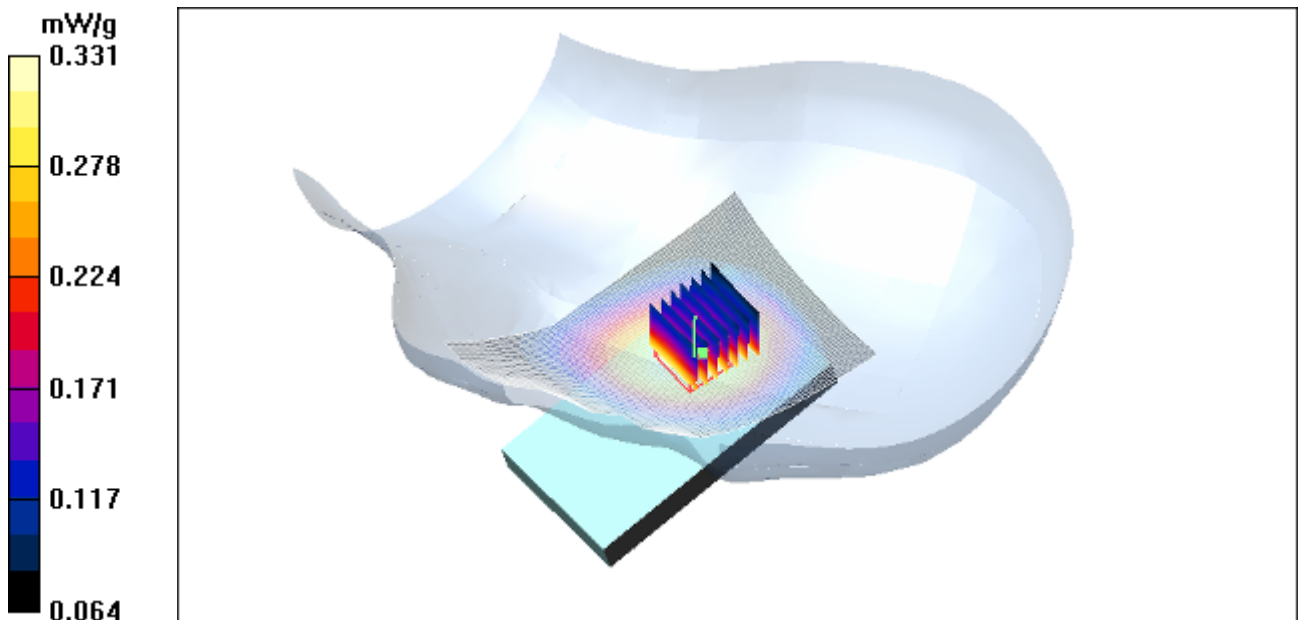


Figure 18 Left Hand Tilt 15° GSM 850 Channel 190

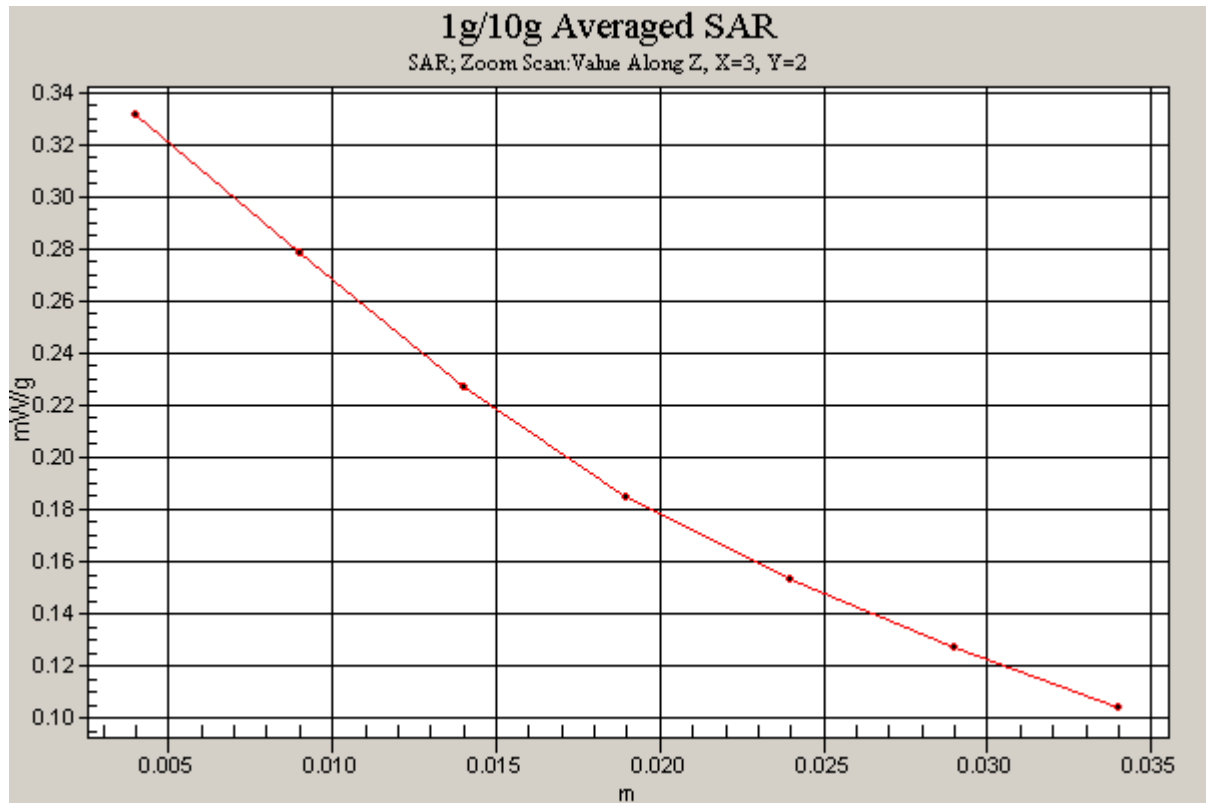


Figure 19 Z-Scan at power reference point (Left Hand Tilt 15° GSM 850 Channel 190)

GSM 850 Right Cheek High

Date/Time: 9/25/2009 4:49:03 PM

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 849$ MHz; $\sigma = 0.936$ mho/m; $\epsilon_r = 41.8$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.33, 6.33, 6.33); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek High/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.927 mW/g

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

Reference Value = 11.9 V/m; Power Drift = 0.038 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.876 mW/g; SAR(10 g) = 0.671 mW/g

Maximum value of SAR (measured) = 0.915 mW/g

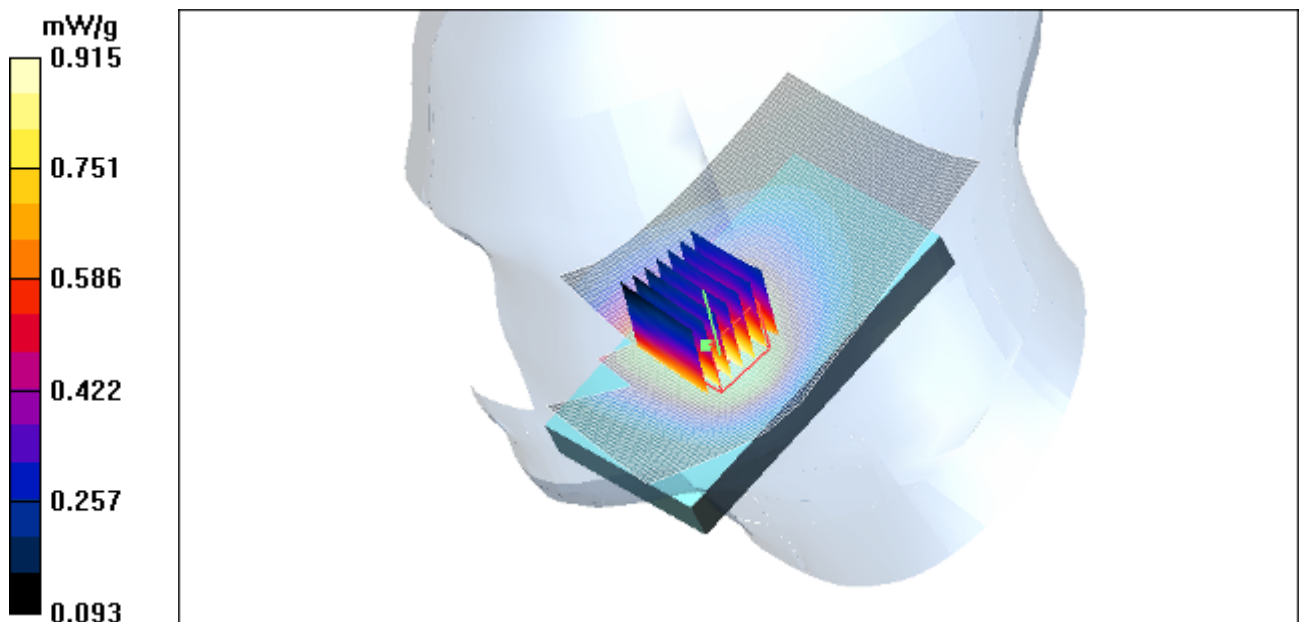


Figure 20 Right Hand Touch Cheek GSM 850 Channel 251

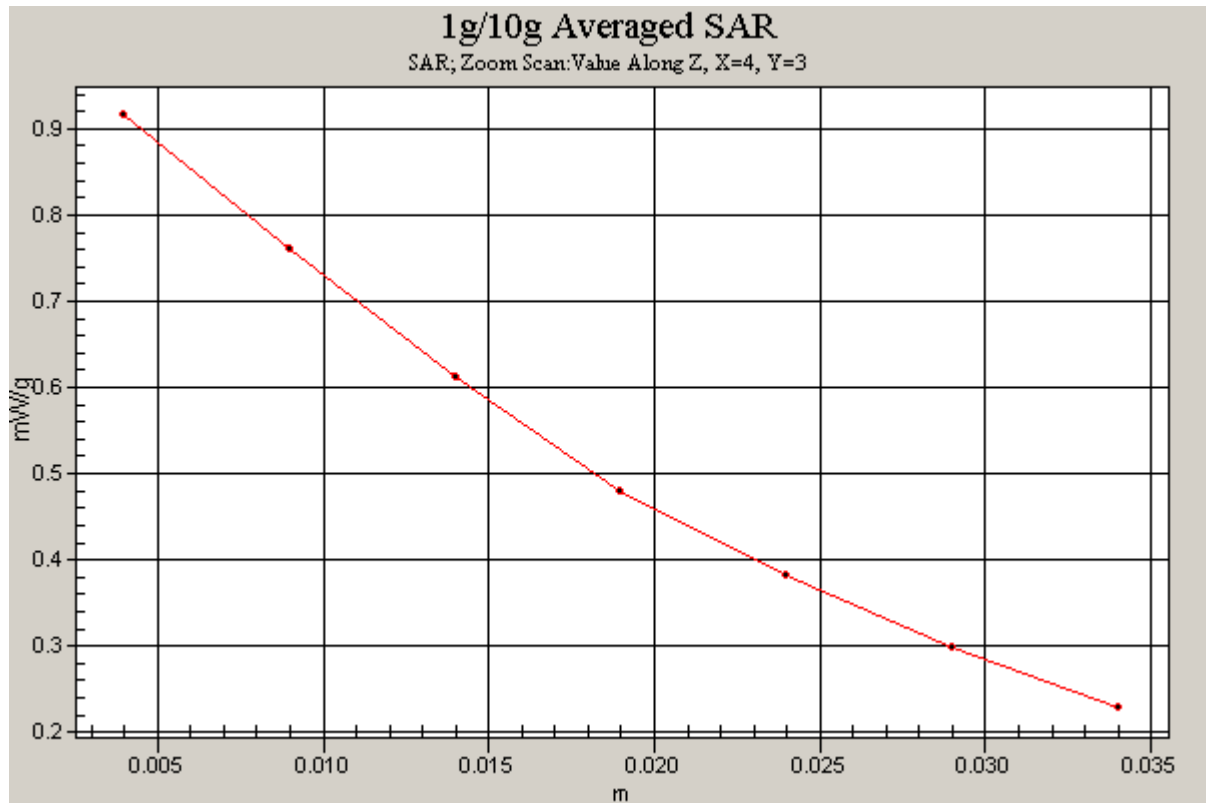


Figure 21 Z-Scan at power reference point (Right Hand Touch Cheek GSM 850 Channel 251)

GSM 850 Right Cheek Middle

Date/Time: 9/25/2009 4:01:54 PM

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.924$ mho/m; $\epsilon_r = 41.8$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.33, 6.33, 6.33); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Maximum value of SAR (interpolated) = 0.703 mW/g

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

Reference Value = 11.1 V/m; Power Drift = -0.115 dB

Peak SAR (extrapolated) = 0.812 W/kg

SAR(1 g) = 0.663 mW/g; SAR(10 g) = 0.509 mW/g

Maximum value of SAR (measured) = 0.693 mW/g

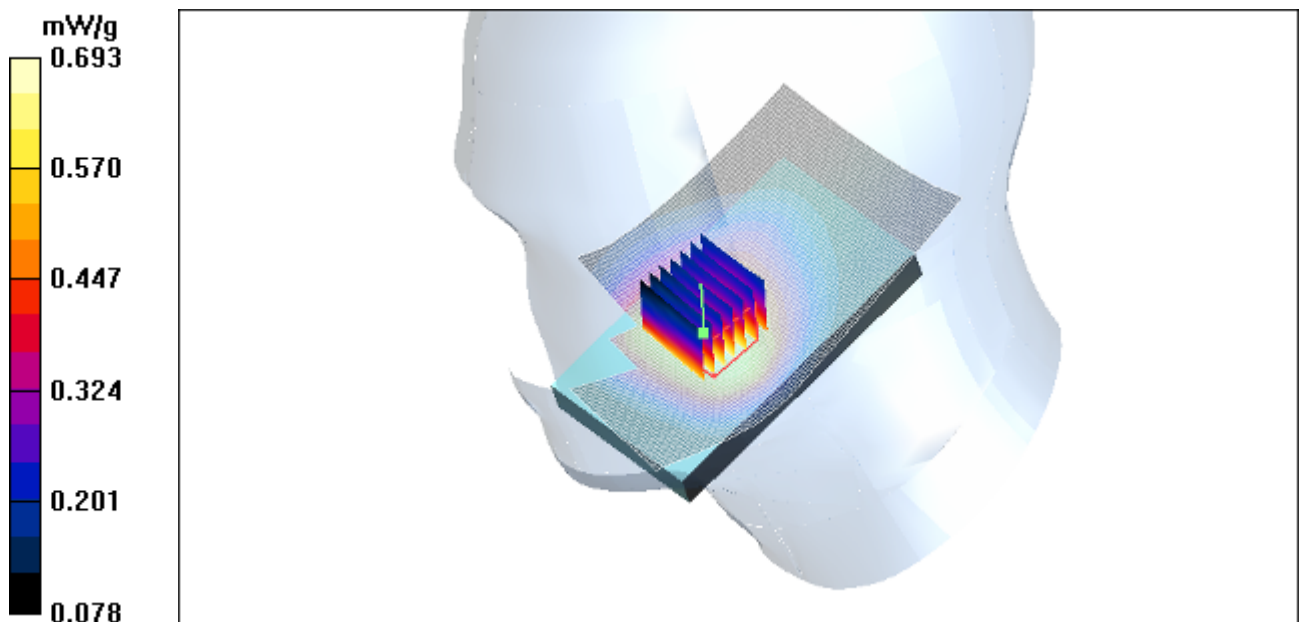


Figure 22 Right Hand Touch Cheek GSM 850 Channel 190

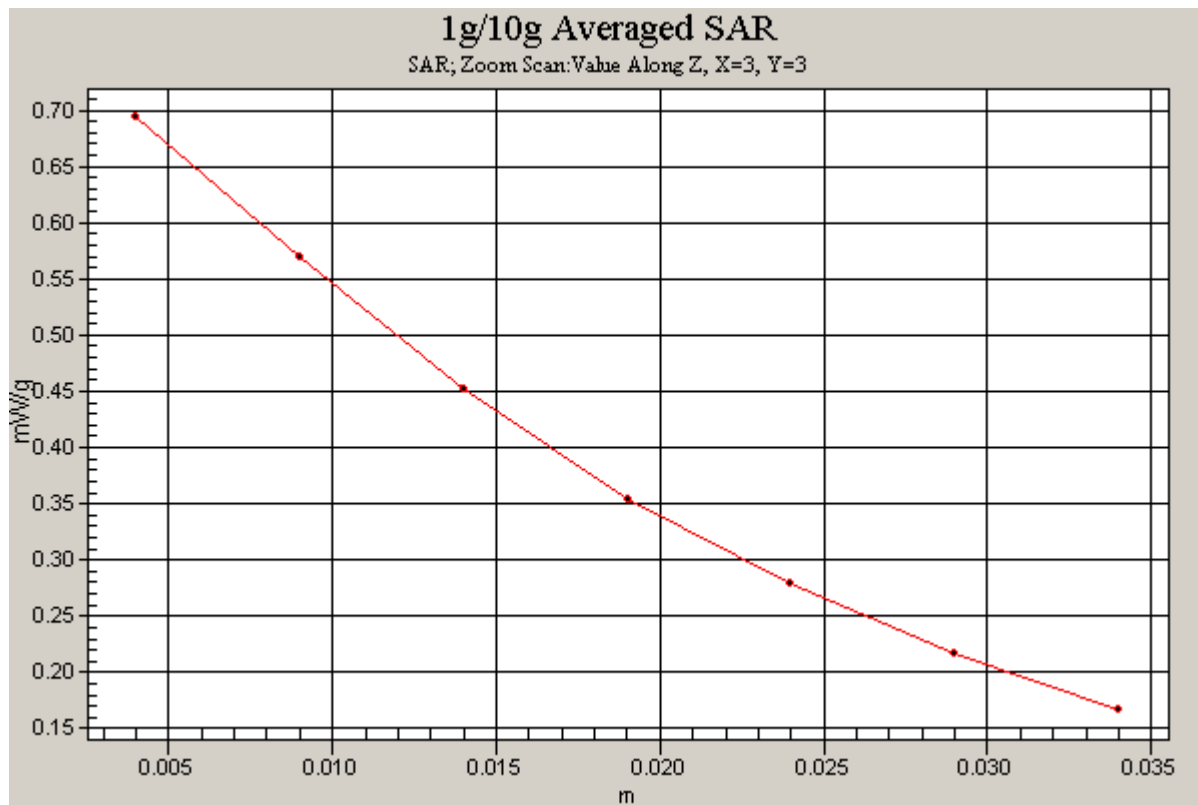


Figure 23 Z-Scan at power reference point (Right Hand Touch Cheek GSM 850 Channel 190)

GSM 850 Right Cheek Low

Date/Time: 9/25/2009 5:36:55 PM

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.905$ mho/m; $\epsilon_r = 41.9$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.33, 6.33, 6.33); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Low/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.451 mW/g

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

Reference Value = 9.19 V/m; Power Drift = -0.089 dB

Peak SAR (extrapolated) = 0.520 W/kg

SAR(1 g) = 0.431 mW/g; SAR(10 g) = 0.333 mW/g

Maximum value of SAR (measured) = 0.451 mW/g

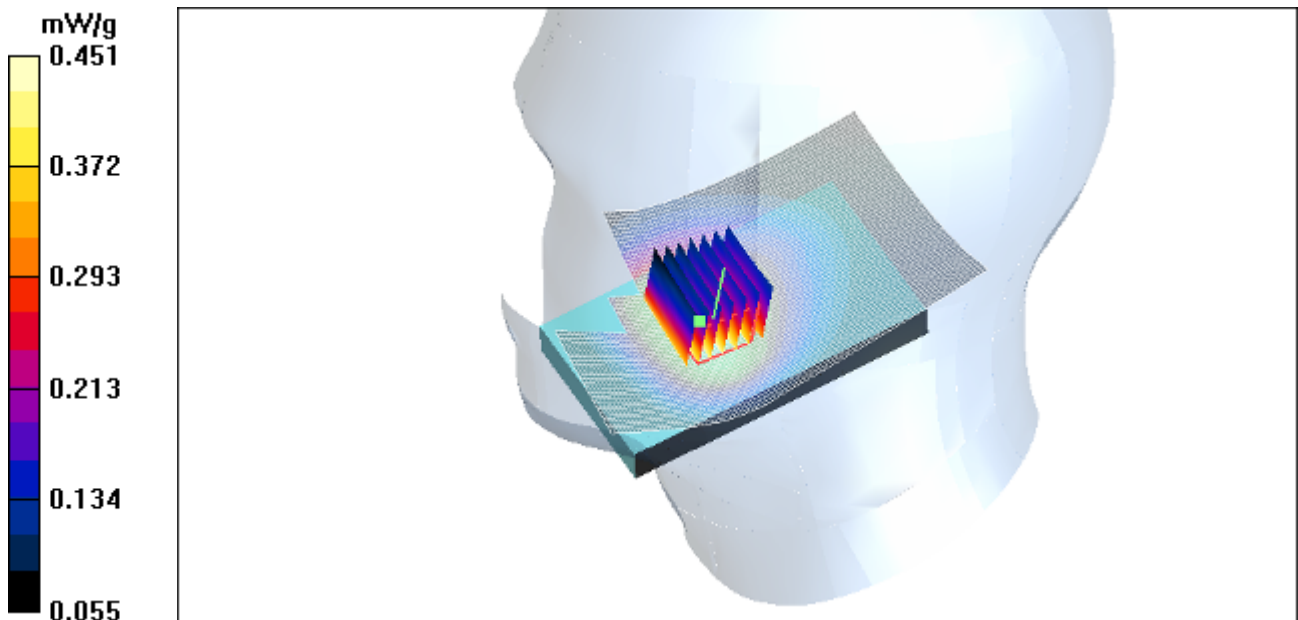


Figure 24 Right Hand Touch Cheek GSM 850 Channel 128

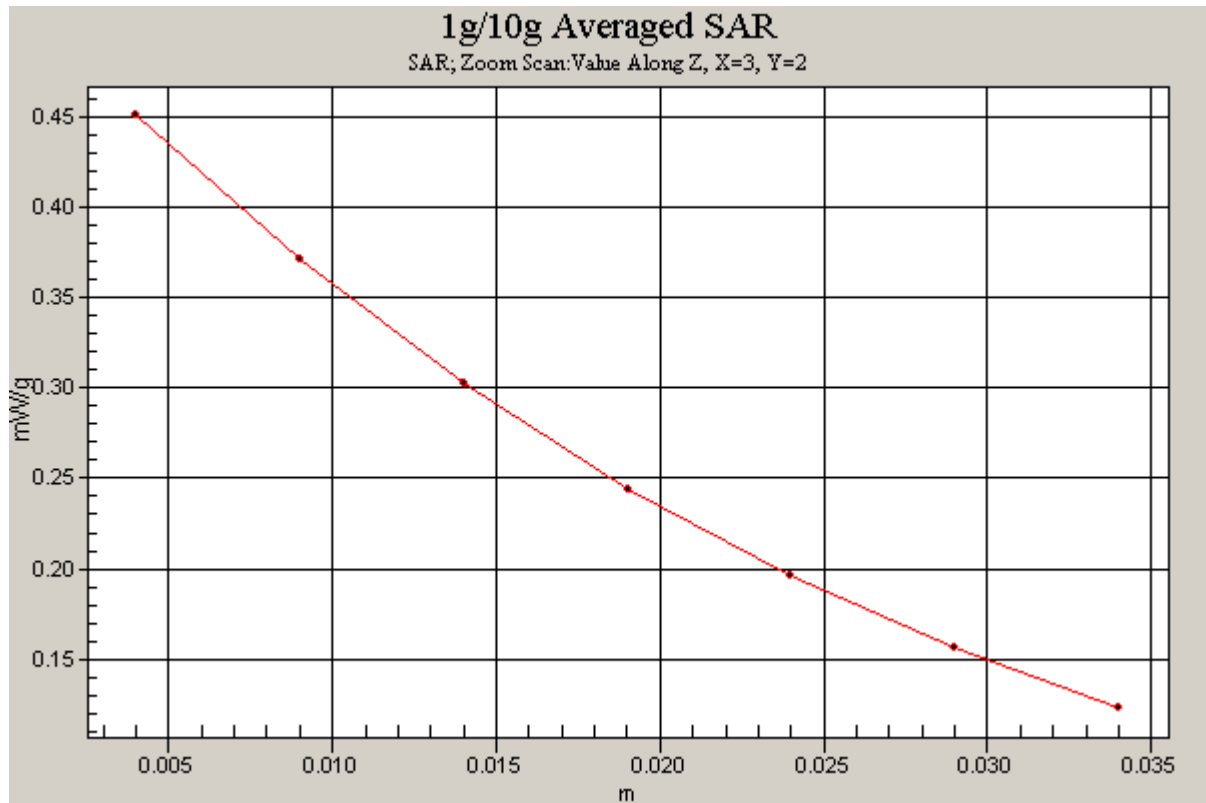


Figure 25 Z-Scan at power reference point (Right Hand Touch Cheek GSM 850 Channel 128)

GSM 850 Right Tilt Middle

Date/Time: 9/25/2009 4:25:11 PM

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 0.924$ mho/m; $\epsilon_r = 41.8$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.33, 6.33, 6.33); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Maximum value of SAR (interpolated) = 0.381 mW/g

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

Reference Value = 15.1 V/m; Power Drift = -0.022 dB

Peak SAR (extrapolated) = 0.421 W/kg

SAR(1 g) = 0.358 mW/g; SAR(10 g) = 0.281 mW/g

Maximum value of SAR (measured) = 0.376 mW/g

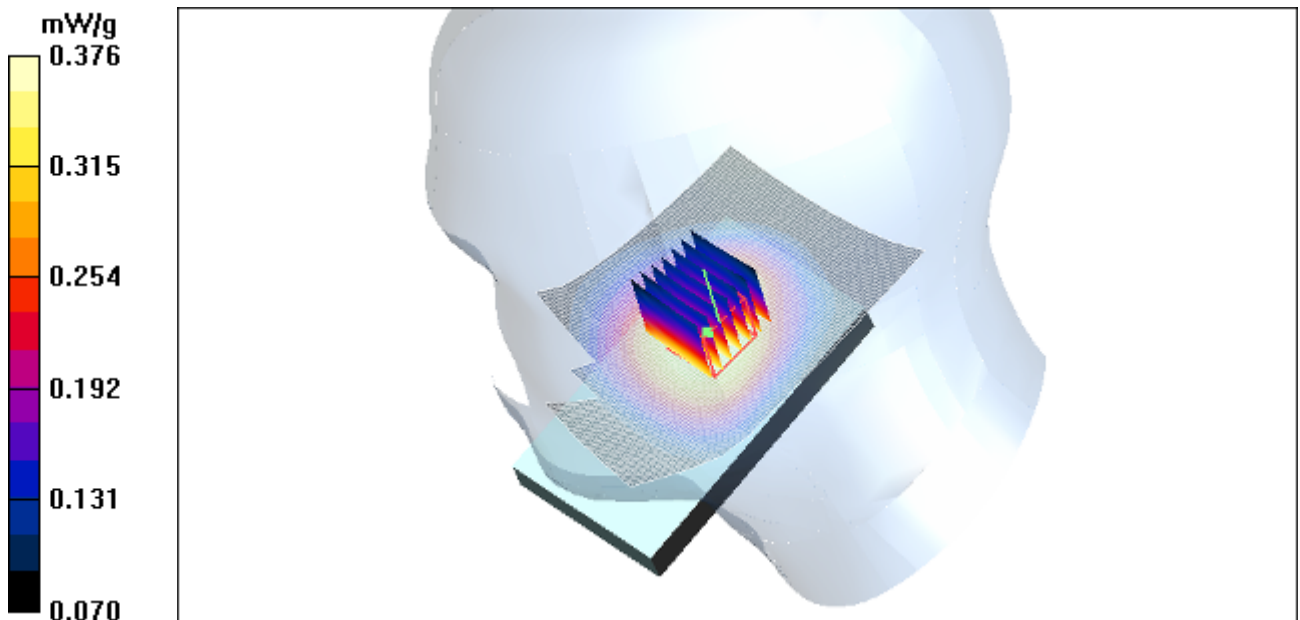


Figure 26 Right Hand Tilt 15° GSM 850 Channel 190

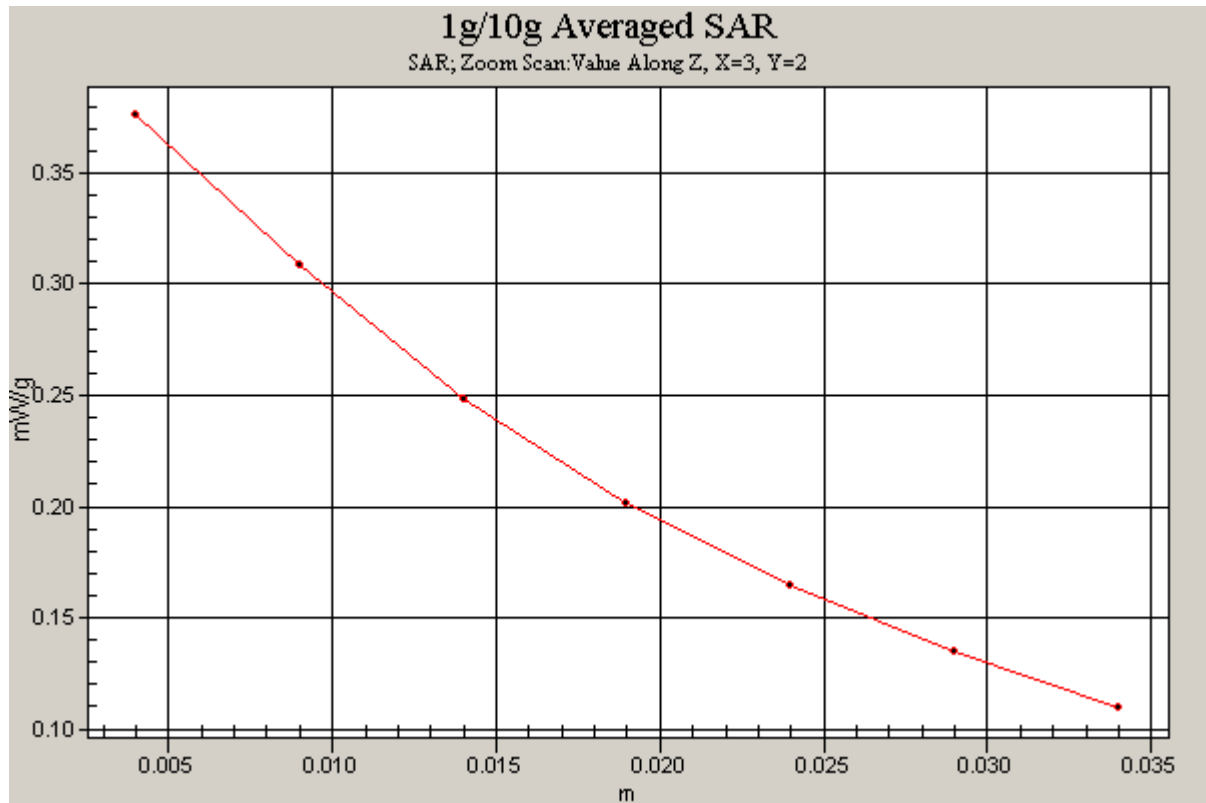


Figure 27 Z-Scan at power reference point (Right Hand Tilt 15° GSM 850 Channel 190)

GSM 850 Towards Ground High

Date/Time: 9/24/2009 12:16:18 PM

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 849$ MHz; $\sigma = 1.03$ mho/m; $\epsilon_r = 54.9$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.14, 6.14, 6.14); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.896 mW/g

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

Reference Value = 10.5 V/m; Power Drift = -0.195 dB

Peak SAR (extrapolated) = 1.07 W/kg

SAR(1 g) = 0.811 mW/g; SAR(10 g) = 0.574 mW/g

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

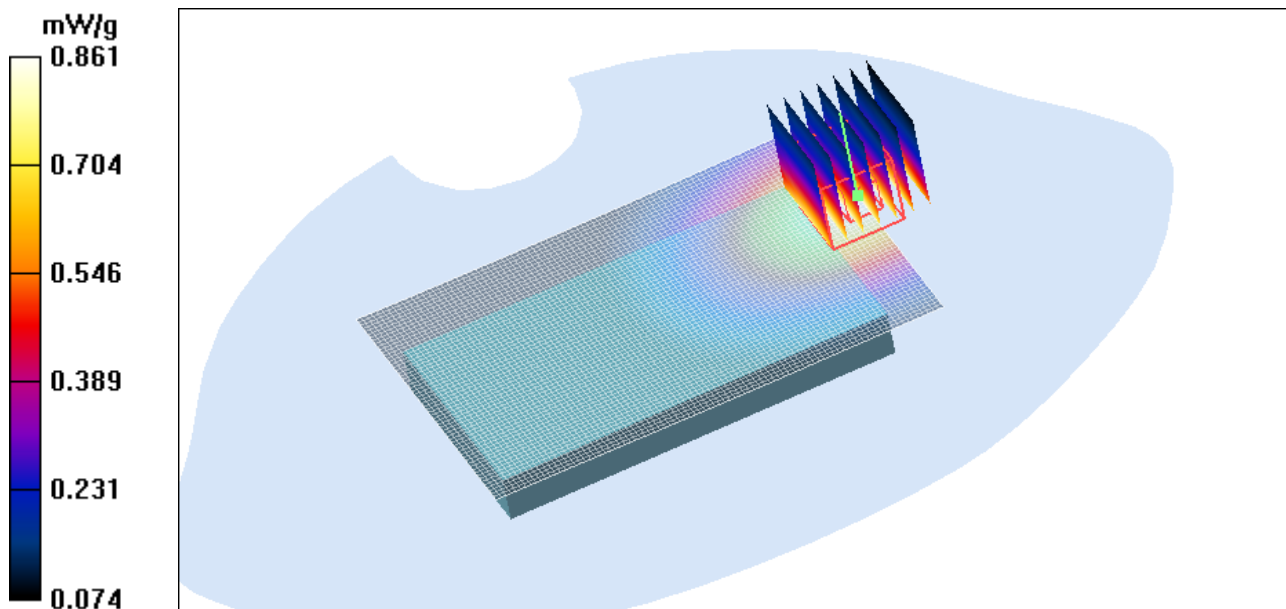


Figure 28 Body, Towards Ground, GSM 850 Channel 251

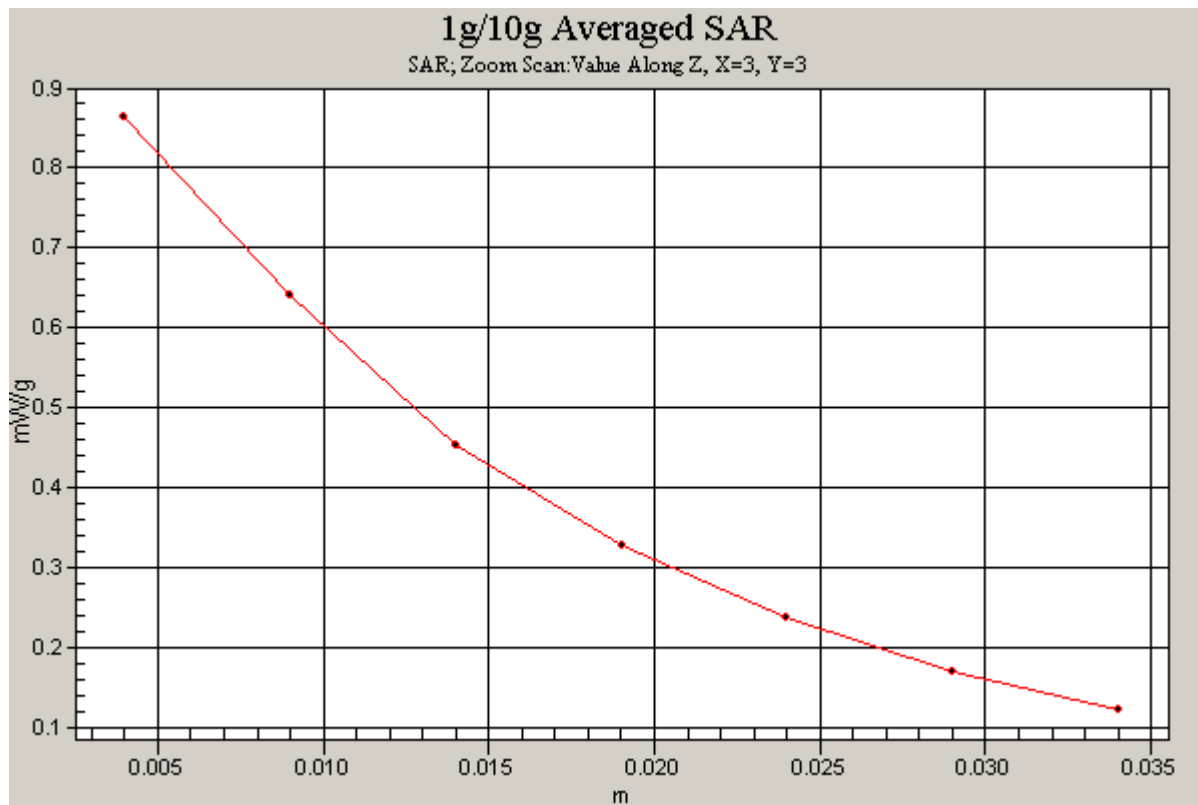


Figure 29 Z-Scan at power reference point (Body, Towards Ground, GSM 850 Channel 251)

GSM 850 Towards Ground Middle

Date/Time: 9/24/2009 10:34:25 AM

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 1.02$ mho/m; $\epsilon_r = 55$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.14, 6.14, 6.14); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.761 mW/g

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

Reference Value = 24.7 V/m; Power Drift = -0.019 dB

Peak SAR (extrapolated) = 0.950 W/kg

SAR(1 g) = 0.712 mW/g; SAR(10 g) = 0.503 mW/g

Maximum value of SAR (measured) = 0.759 mW/g

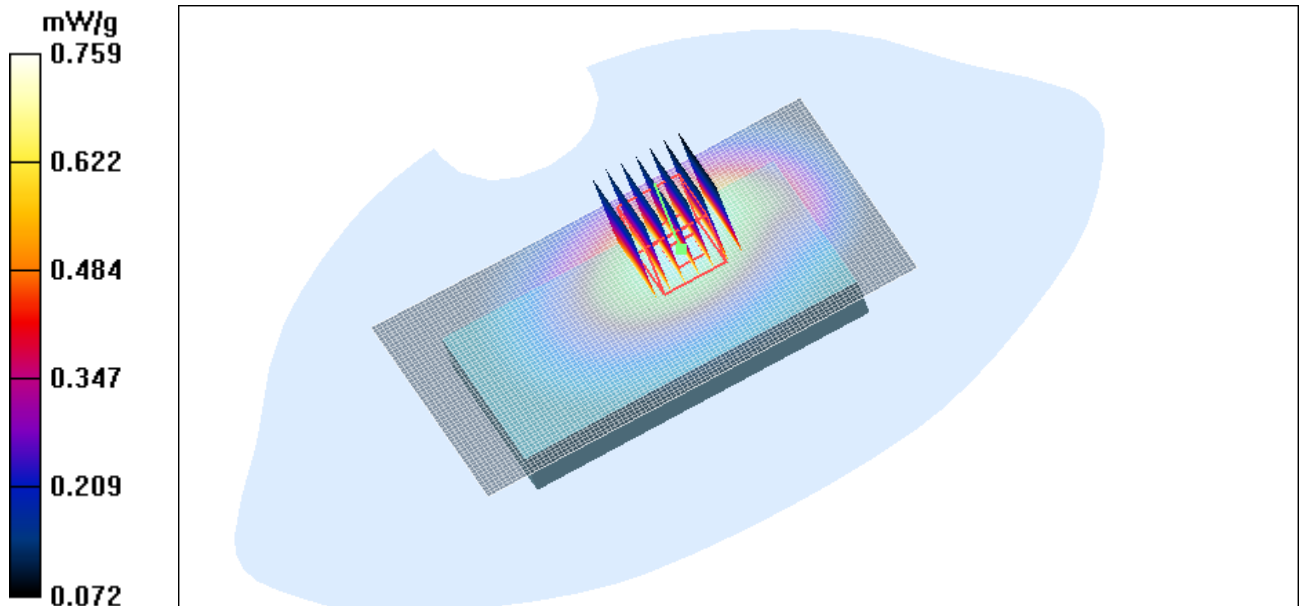


Figure 30 Body, Towards Ground, GSM 850 Channel 190

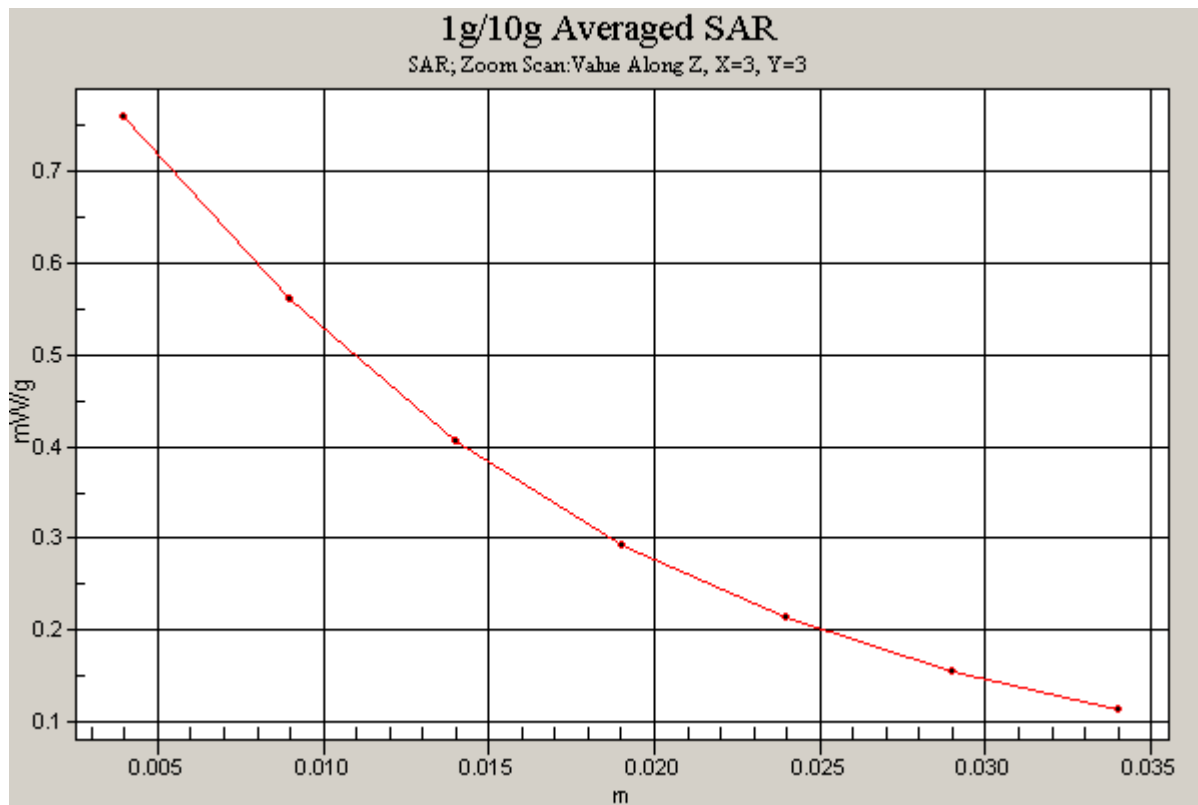


Figure 31 Z-Scan at power reference point (Body, Towards Ground, GSM 850 Channel 190)

GSM 850 Towards Ground Low

Date/Time: 9/24/2009 12:39:40 PM

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 55.2$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.14, 6.14, 6.14); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.596 mW/g

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

Reference Value = 21.7 V/m; Power Drift = -0.065 dB

Peak SAR (extrapolated) = 0.766 W/kg

SAR(1 g) = 0.564 mW/g; SAR(10 g) = 0.397 mW/g

Maximum value of SAR (measured) = 0.604 mW/g

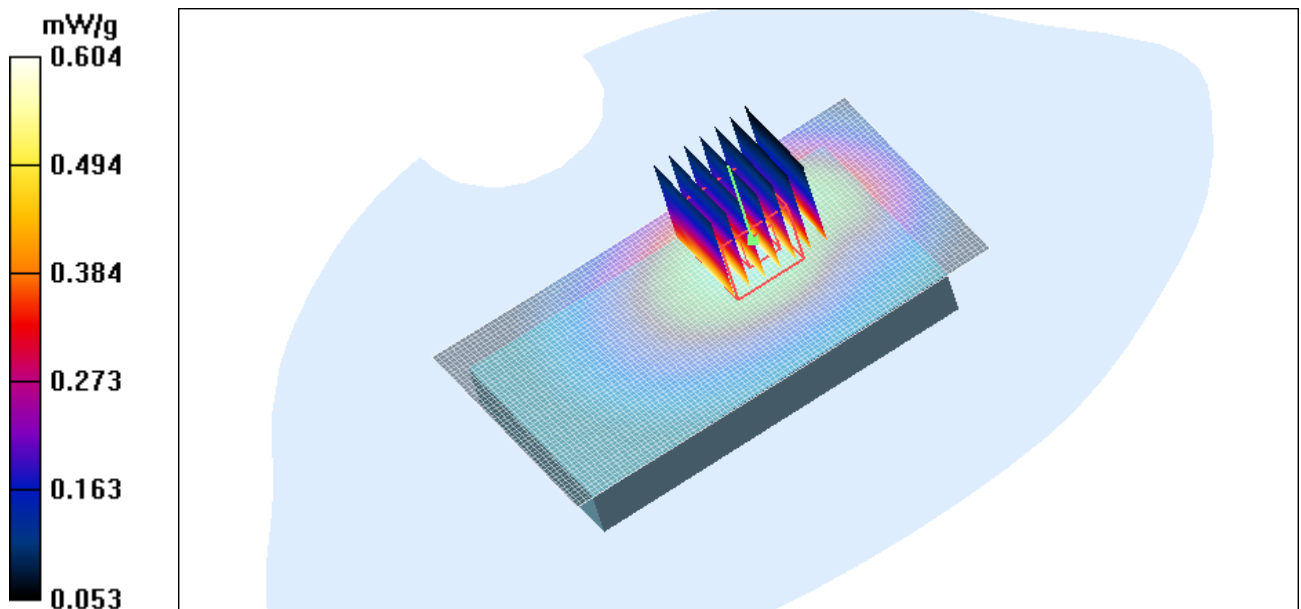


Figure 32 Body, Towards Ground, GSM 850 Channel 128

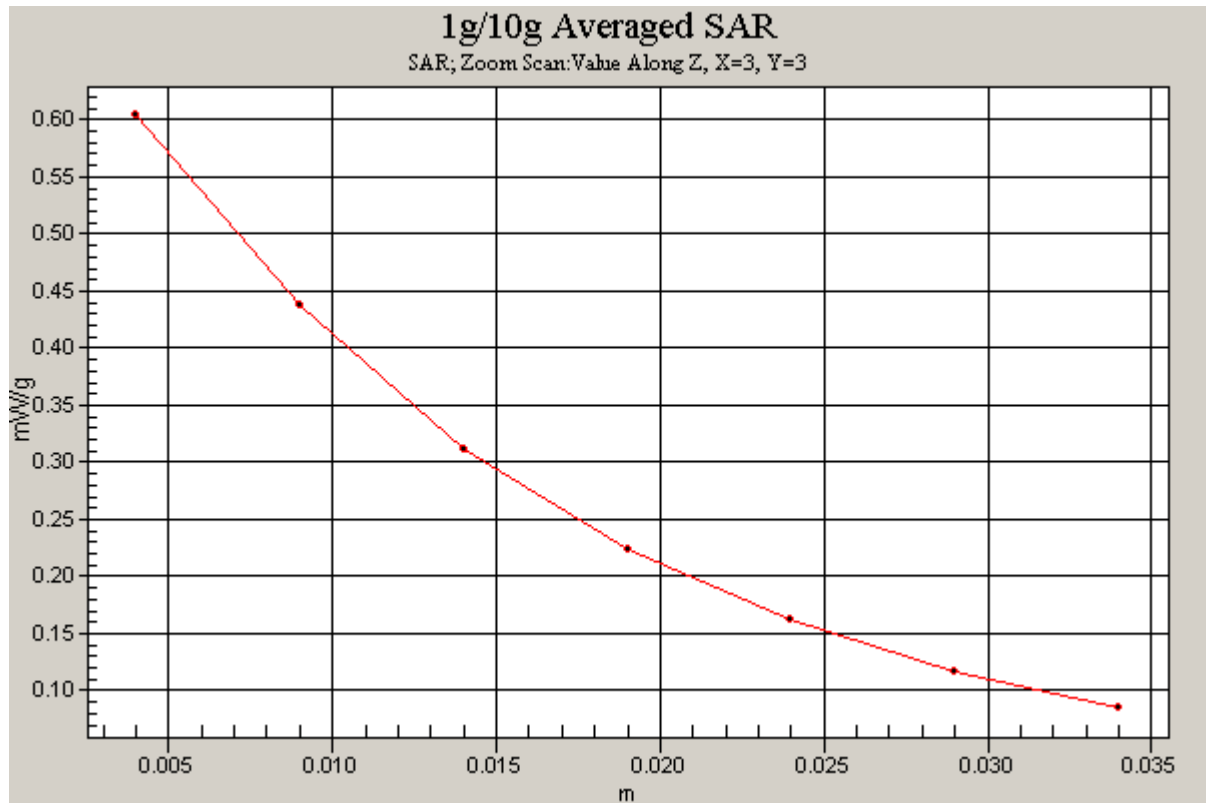


Figure 33 Z-Scan at power reference point (Body, Towards Ground, GSM 850 Channel 128)

GSM 850 Towards Phantom Middle

Date/Time: 9/24/2009 10:13:56 AM

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 837$ MHz; $\sigma = 1.02$ mho/m; $\epsilon_r = 55$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.14, 6.14, 6.14); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Phantom Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 24.4 V/m; Power Drift = -0.044 dB

Peak SAR (extrapolated) = 0.768 W/kg

SAR(1 g) = 0.594 mW/g; SAR(10 g) = 0.435 mW/g

Maximum value of SAR (measured) = 0.633 mW/g

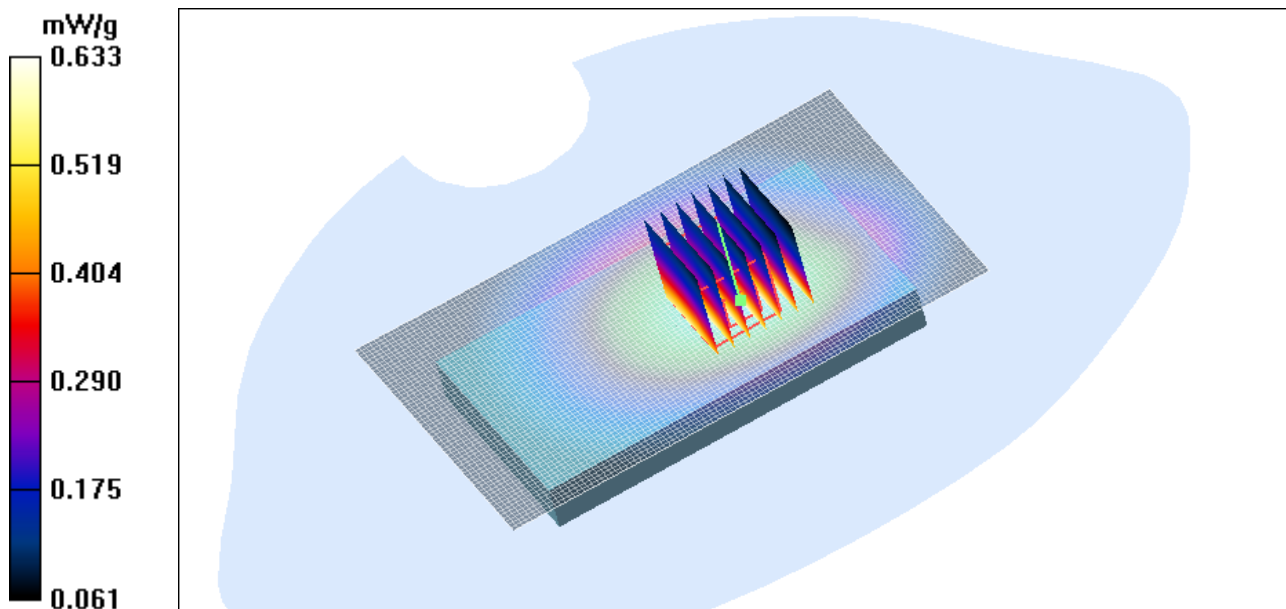


Figure 34 Body, Towards Phantom, GSM 850 Channel 190

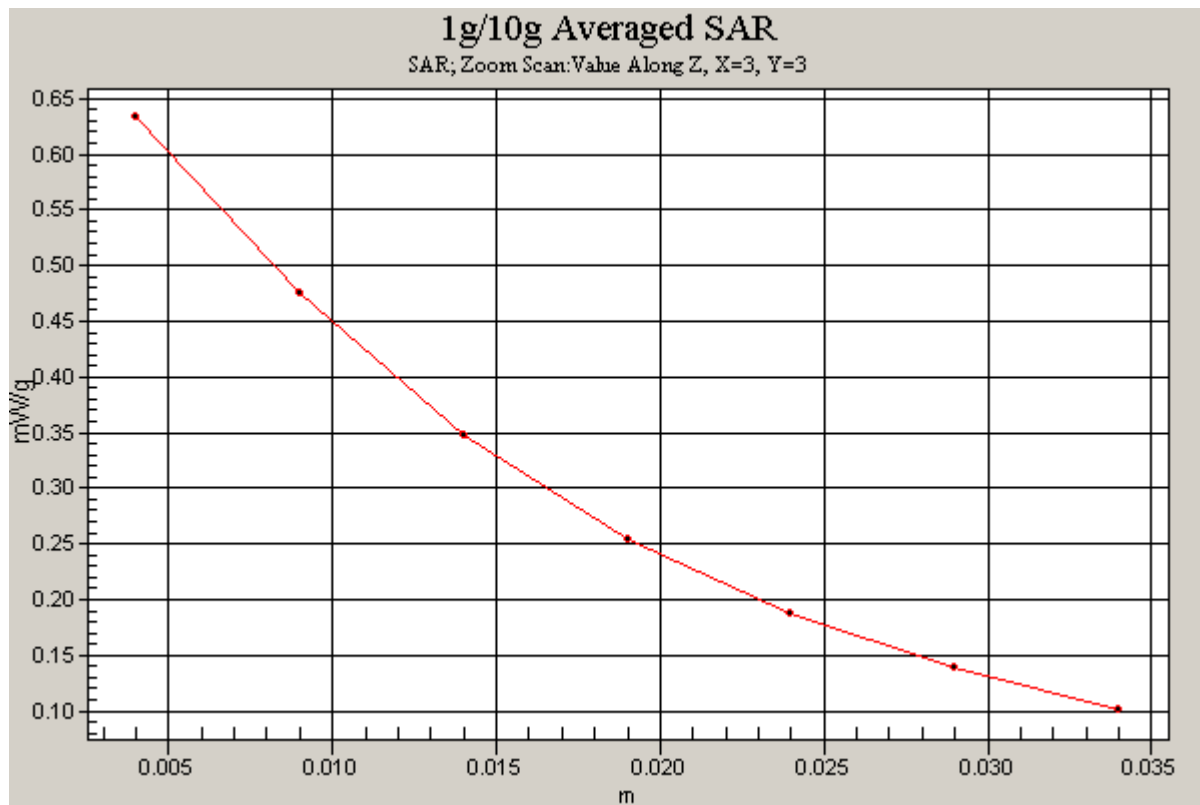


Figure 35 Z-Scan at power reference point (Body, Towards Phantom, GSM 850 Channel 190)

GSM 850 with Earphone Towards Ground High

Date/Time: 9/24/2009 12:58:10 PM

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 849$ MHz; $\sigma = 1.03$ mho/m; $\epsilon_r = 54.9$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.14, 6.14, 6.14); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.785 mW/g

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

Reference Value = 24.1 V/m; Power Drift = -0.107 dB

Peak SAR (extrapolated) = 0.992 W/kg

SAR(1 g) = 0.722 mW/g; SAR(10 g) = 0.501 mW/g

Maximum value of SAR (measured) = 0.773 mW/g

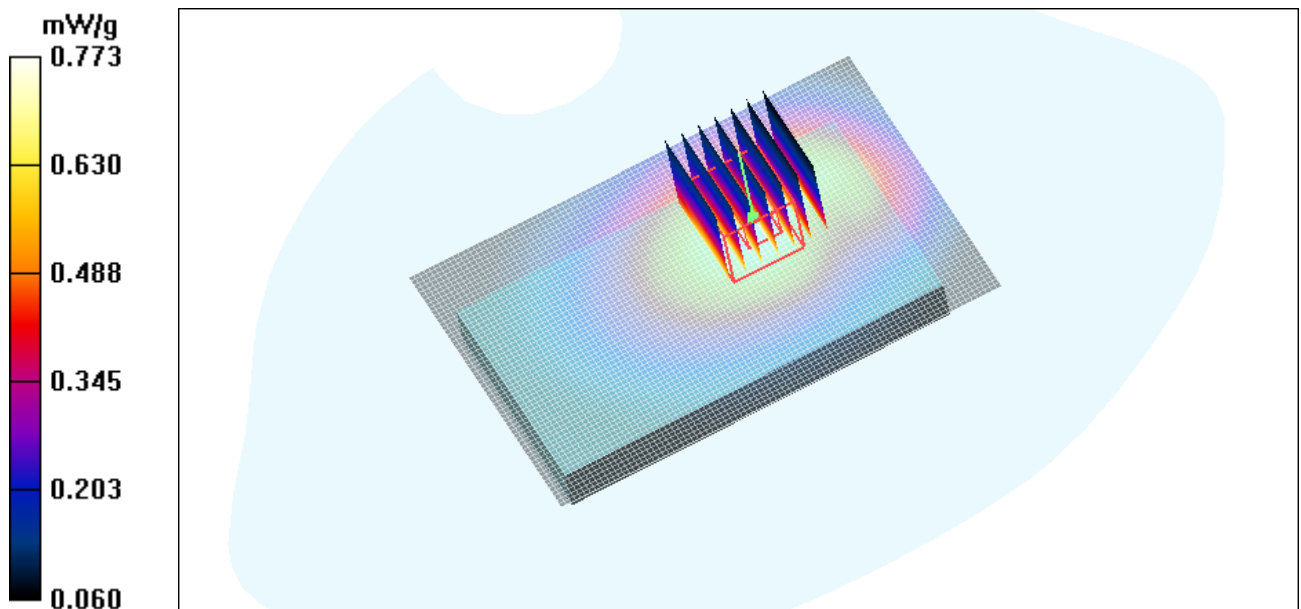


Figure 36 Body, Towards Ground, GSM 850 Channel 251

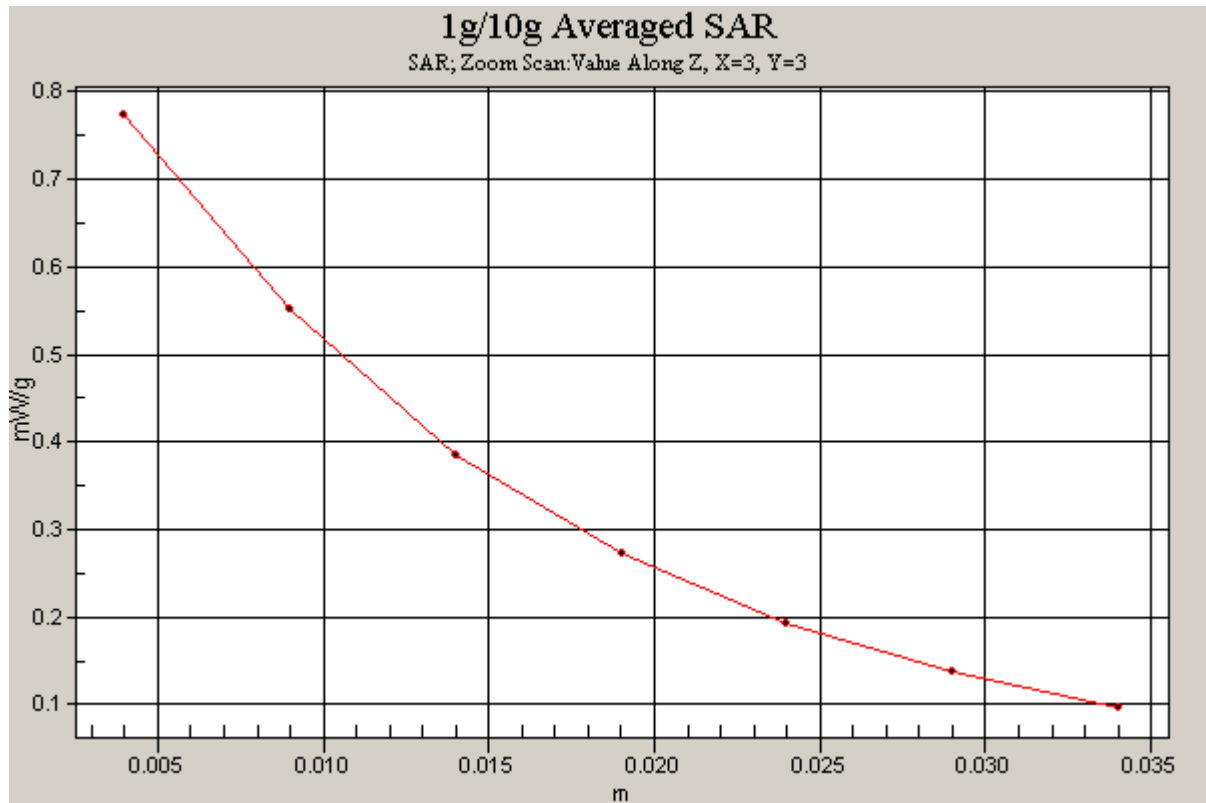


Figure 37 Z-Scan at power reference point (Body, Towards Ground, GSM 850 Channel 251)

GSM 850+GPRS(2Up) Towards Ground High

Date/Time: 9/24/2009 12:39:24 AM

Communication System: GSM850 + GPRS(2Up); Frequency: 848.8 MHz; Duty Cycle: 1:4

Medium parameters used: $f = 849 \text{ MHz}$; $\sigma = 1.03 \text{ mho/m}$; $\epsilon_r = 54.9$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 22.3°C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.14, 6.14, 6.14); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High/Area Scan (61x91x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 1.38 mW/g

Towards Ground High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 34.1 V/m ; Power Drift = -0.005 dB

Peak SAR (extrapolated) = 2.55 W/kg

SAR(1 g) = 1.3 mW/g ; SAR(10 g) = 0.900 mW/g

Maximum value of SAR (measured) = 1.37 mW/g

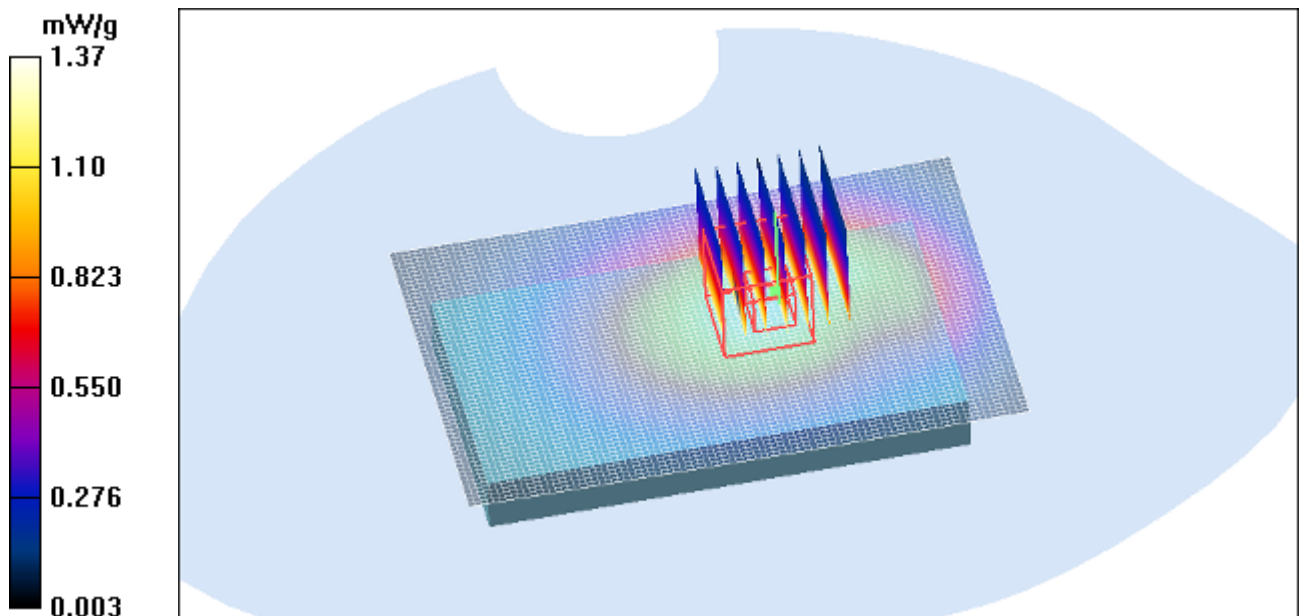


Figure 38 Body, Towards Ground, GSM 850 GPRS(2Up) Channel 251

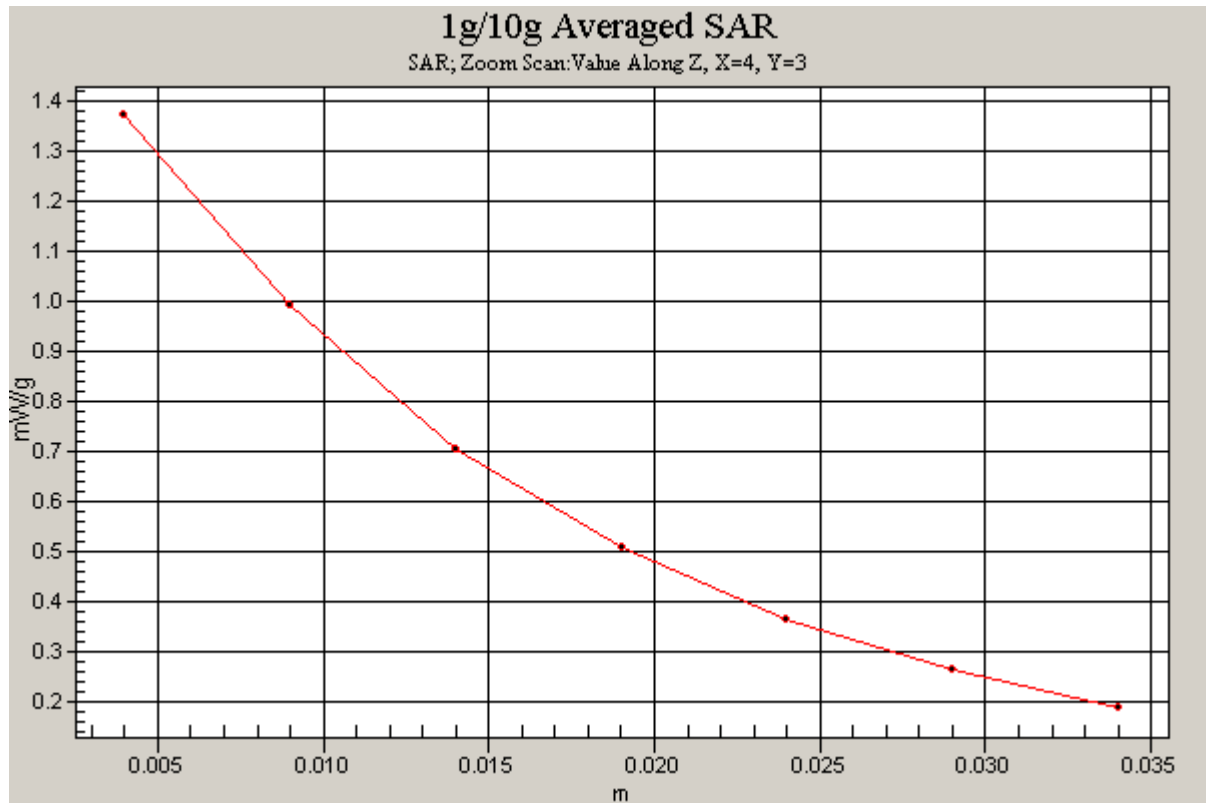


Figure 39 Z-Scan at power reference point (Body, Towards Ground, GSM 850 GPRS(2Up) Channel 251)

GSM 850+GPRS(2Up) Towards Ground Middle

Date/Time: 9/24/2009 12:19:52 AM

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

Medium parameters used: $f = 837$ MHz; $\sigma = 1.02$ mho/m; $\epsilon_r = 55$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.14, 6.14, 6.14); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.22 mW/g

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

Reference Value = 32.4 V/m; Power Drift = -0.179 dB

Peak SAR (extrapolated) = 1.47 W/kg

SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.788 mW/g

Maximum value of SAR (measured) = 1.19 mW/g

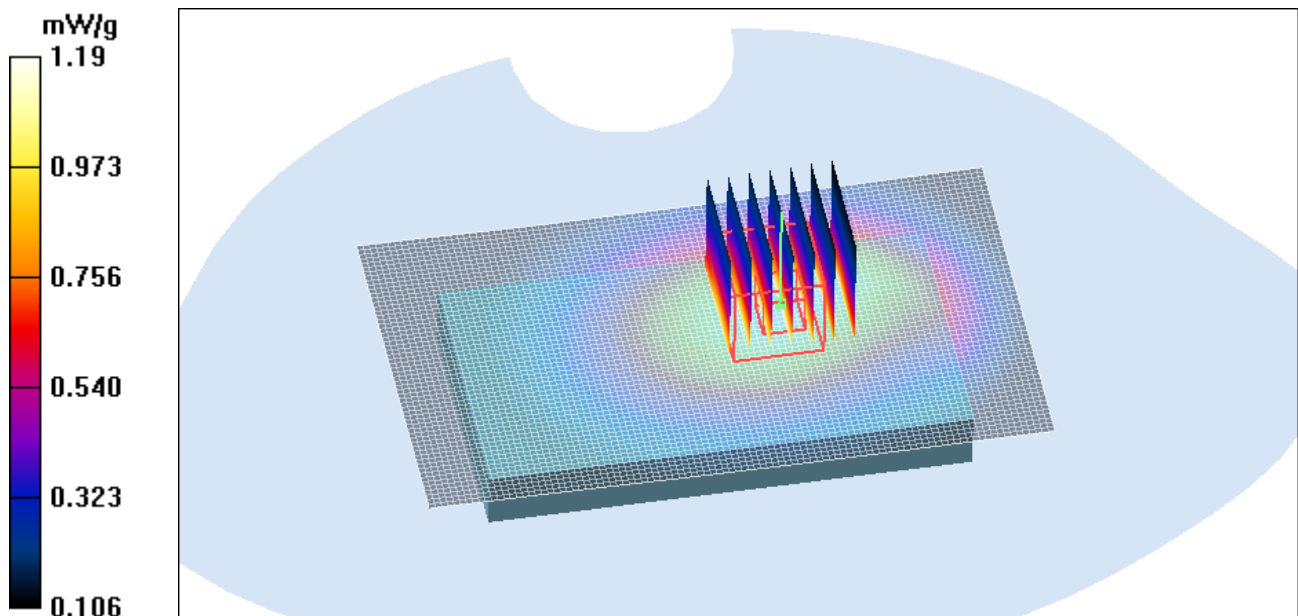


Figure 40 Body, Towards Ground, GSM 850 GPRS (2Up) Channel 190

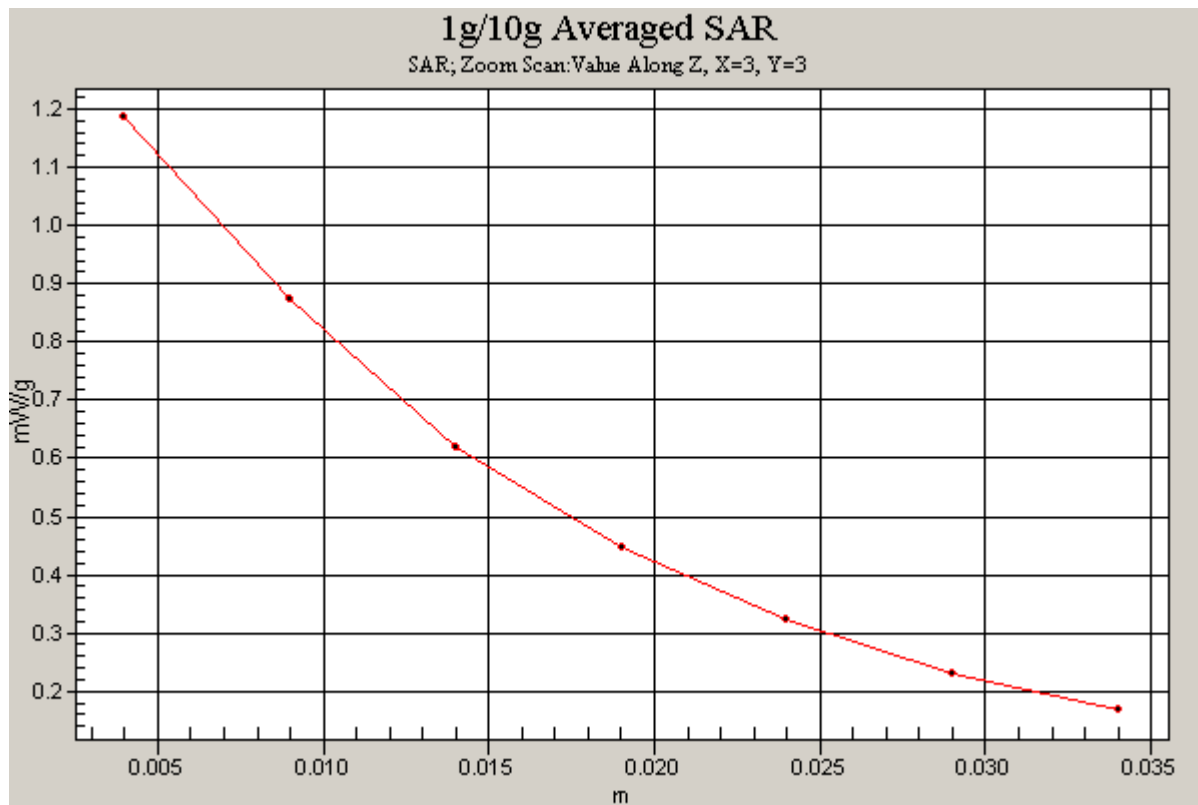


Figure 41 Z-Scan at power reference point (Body, Towards Ground, GSM 850 GPRS (2Up) Channel 190)

GSM 850+GPRS(2Up) Towards Ground Low

Date/Time: 9/24/2009 12:58:21 AM

Communication System: GSM850 + GPRS(2Up); Frequency: 824.2 MHz; Duty Cycle: 1:4

Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 55.2$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.14, 6.14, 6.14); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 26.9 V/m; Power Drift = -0.048 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.808 mW/g; SAR(10 g) = 0.566 mW/g

Maximum value of SAR (measured) = 0.863 mW/g

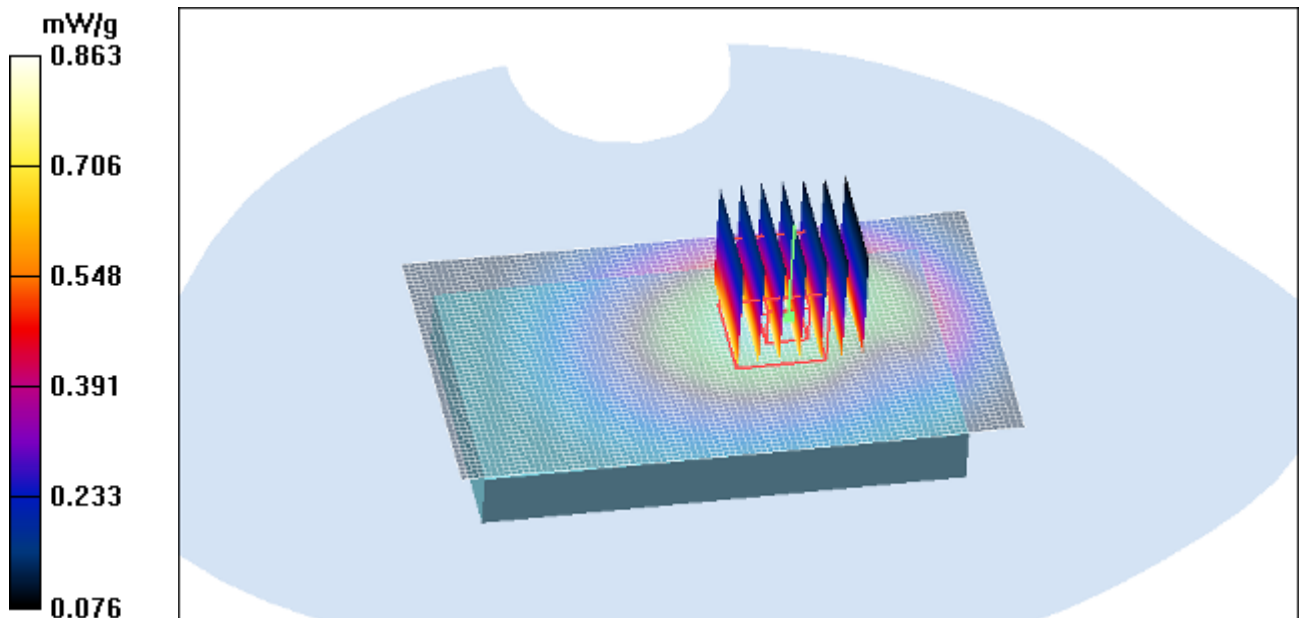


Figure 42 Body, Towards Ground, GSM 850 GPRS (2Up) Channel 128

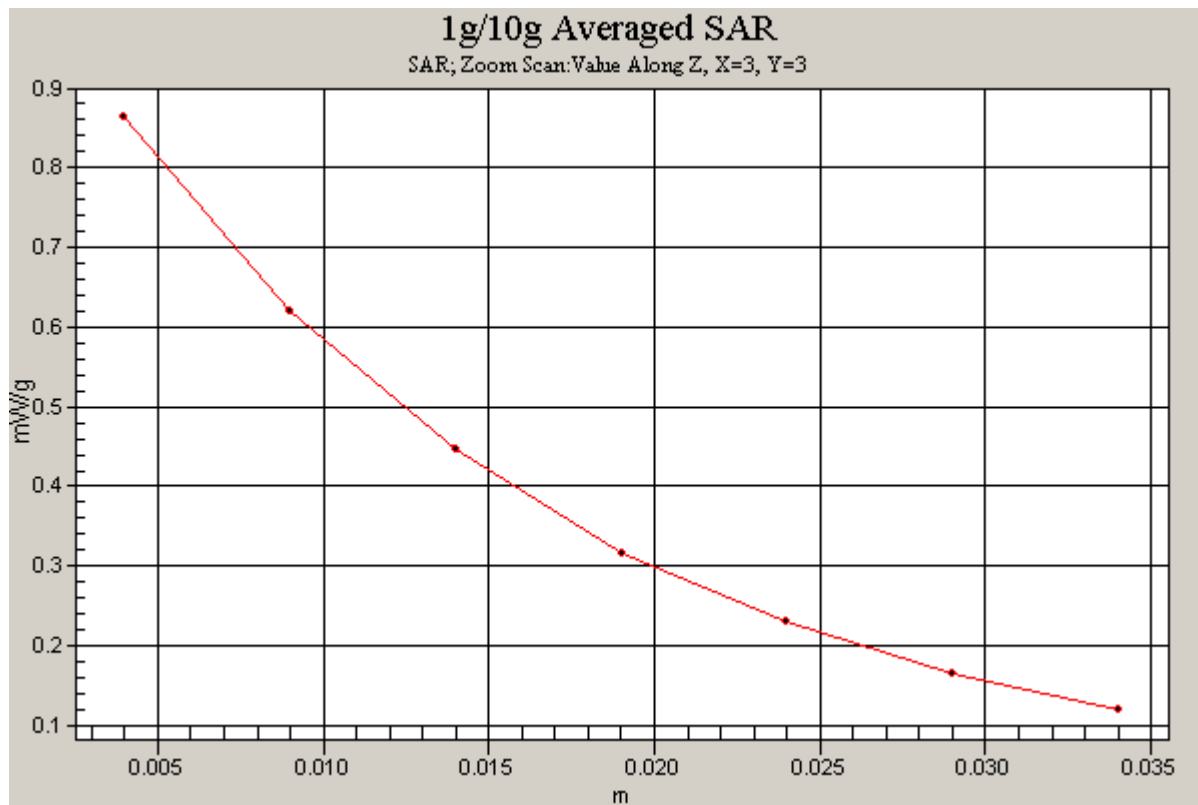


Figure 43 Z-Scan at power reference point (Body, Towards Ground, GSM 850 GPRS (2Up) Channel 128)

GSM 850+GPRS(2Up) Towards Phantom Middle

Date/Time: 9/24/2009 2:46:36 AM

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

Medium parameters used: $f = 837$ MHz; $\sigma = 1.02$ mho/m; $\epsilon_r = 55$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.14, 6.14, 6.14); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Phantom Middle/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.928 mW/g

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

Reference Value = 28.3 V/m; Power Drift = -0.182 dB

Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.856 mW/g; SAR(10 g) = 0.626 mW/g

Maximum value of SAR (measured) = 0.911 mW/g

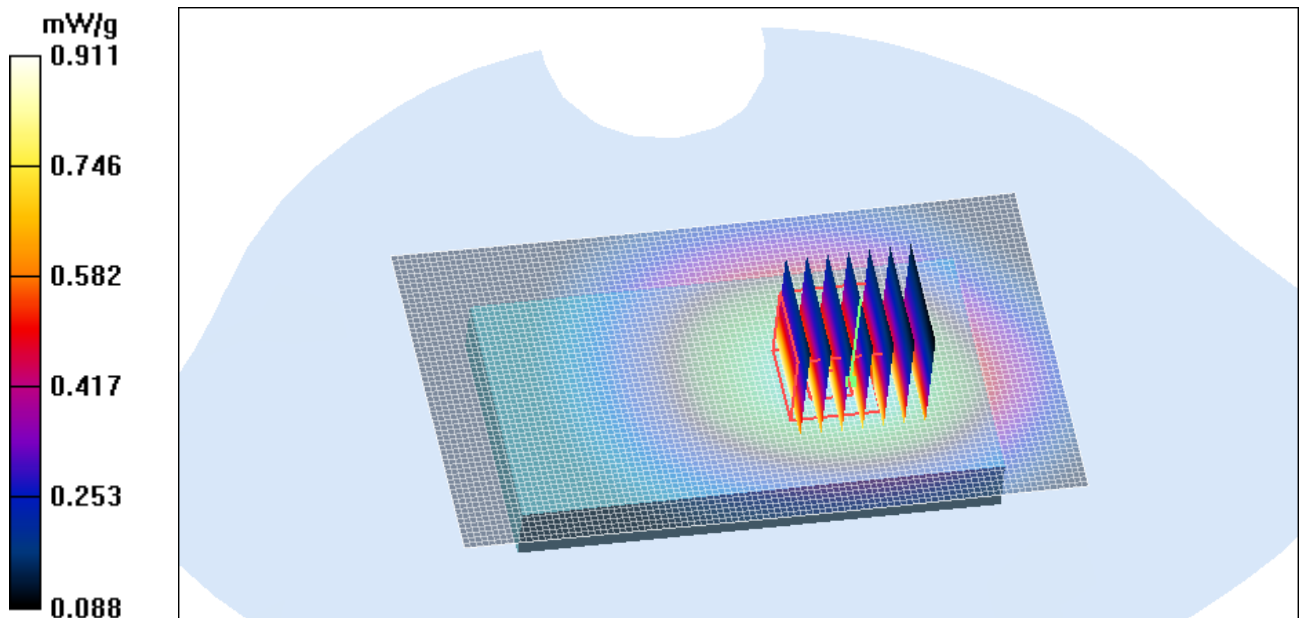


Figure 44 Body, Towards Phantom, GSM 850 GPRS (2Up) Channel 190

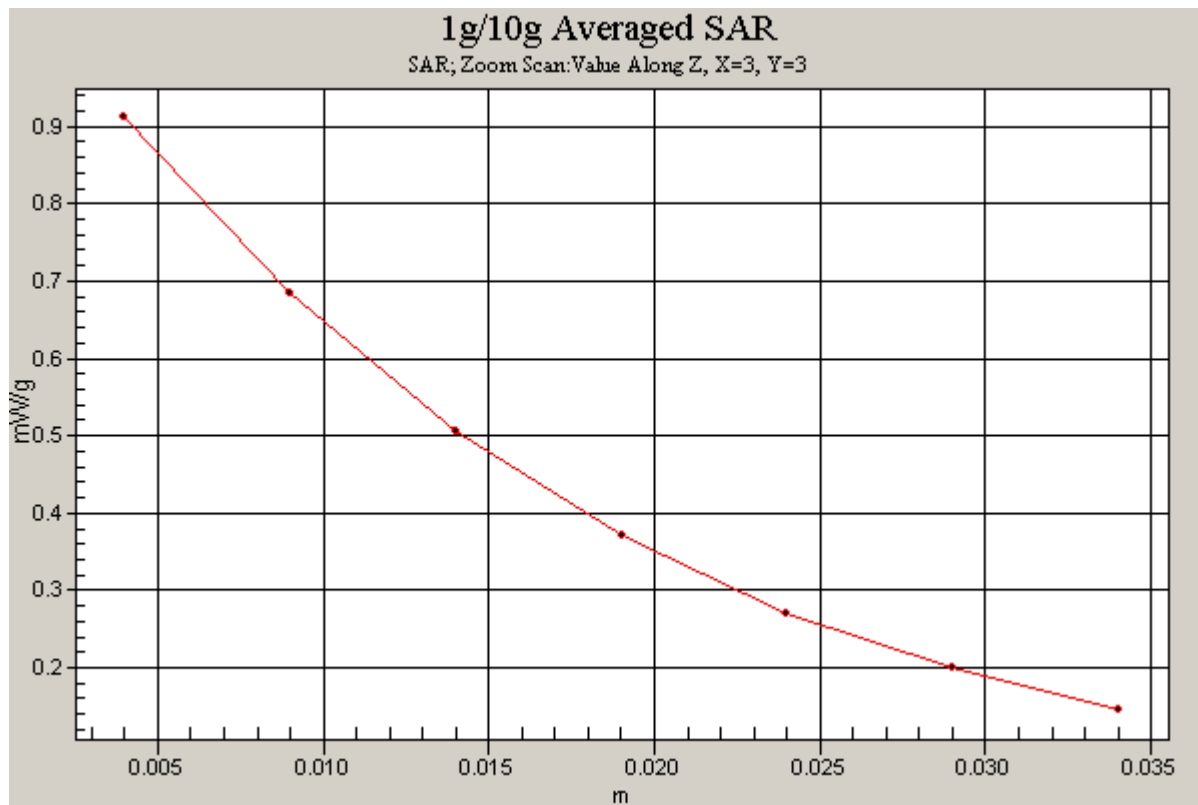


Figure 45 Z-Scan at power reference point (Body, Towards Phantom, GSM 850 GPRS (2Up)
Channel 190)

GSM 850+EGPRS (2Up) Towards Ground High

Date/Time: 9/24/2009 11:16:00 PM

Communication System: GSM850 + EGPRS(2Up); Frequency: 848.8 MHz; Duty Cycle: 1:4

Medium parameters used: $f = 849$ MHz; $\sigma = 1.03$ mho/m; $\epsilon_r = 54.9$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(6.14, 6.14, 6.14); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Towards Ground High 2/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.39 mW/g

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

Reference Value = 33.6 V/m; Power Drift = -0.078 dB

Peak SAR (extrapolated) = 1.76 W/kg

SAR(1 g) = 1.31 mW/g; SAR(10 g) = 0.923 mW/g

Maximum value of SAR (measured) = 1.40 mW/g

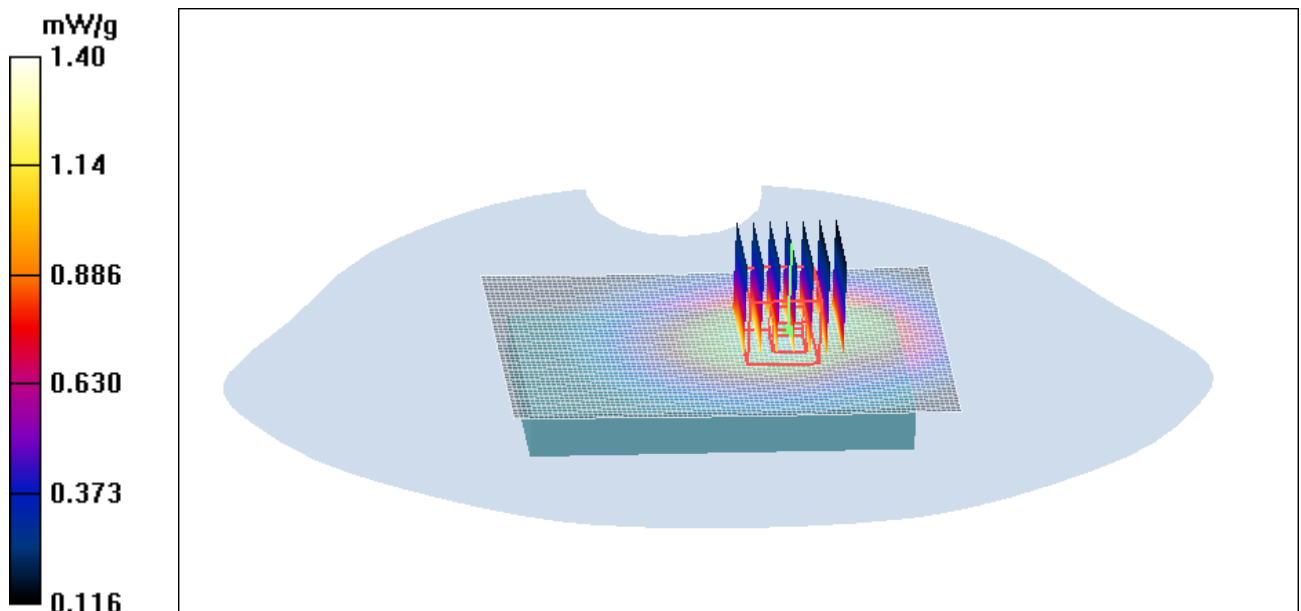


Figure 46 Body, Towards Ground, GSM 850 EGPRS (2Up) Channel 251

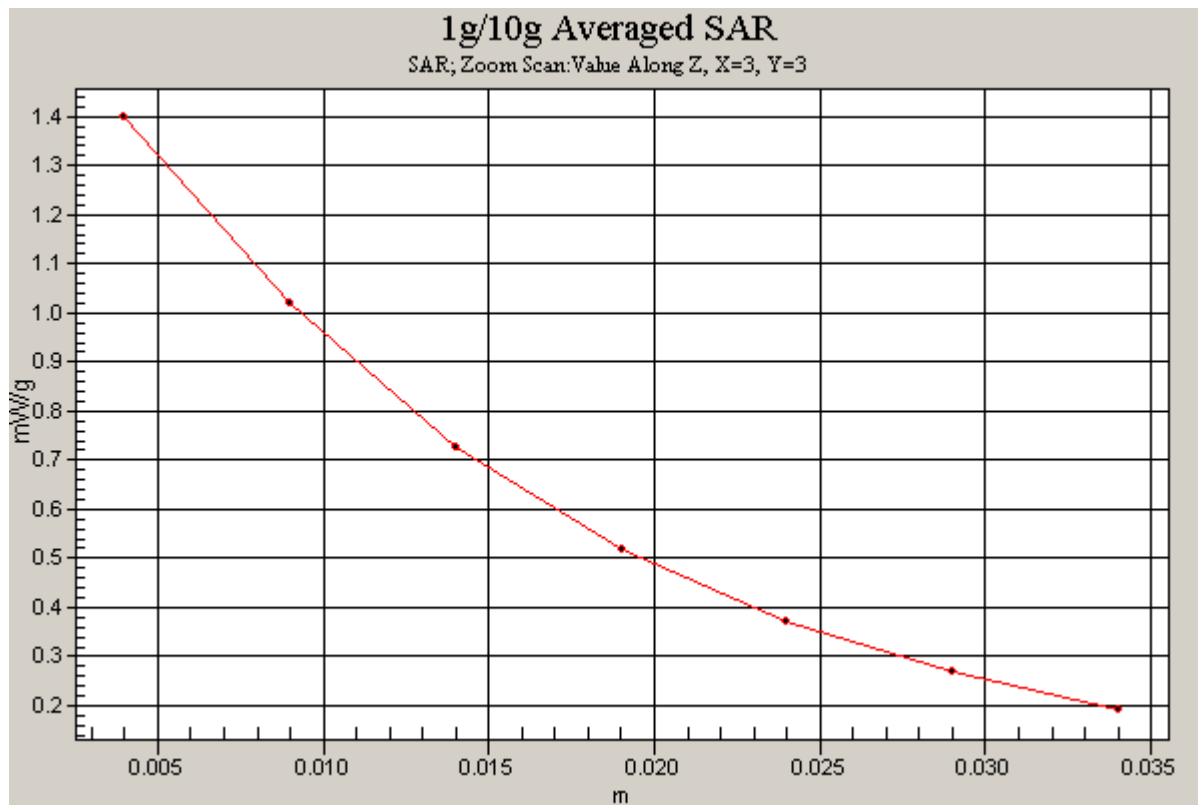


Figure 47 Z-Scan at power reference point (Body, Towards Ground, GSM 850 EGPRS (2Up)
Channel 251)

GSM 1900 Left Cheek High

Date/Time: 9/25/2009 1:37:21 AM

Communication System: PCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1910$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(4.89, 4.89, 4.89); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek High/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.532 mW/g

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

Reference Value = 4.05 V/m; Power Drift = 0.059 dB

Peak SAR (extrapolated) = 0.774 W/kg

SAR(1 g) = 0.497 mW/g; SAR(10 g) = 0.278 mW/g

Maximum value of SAR (measured) = 0.546 mW/g

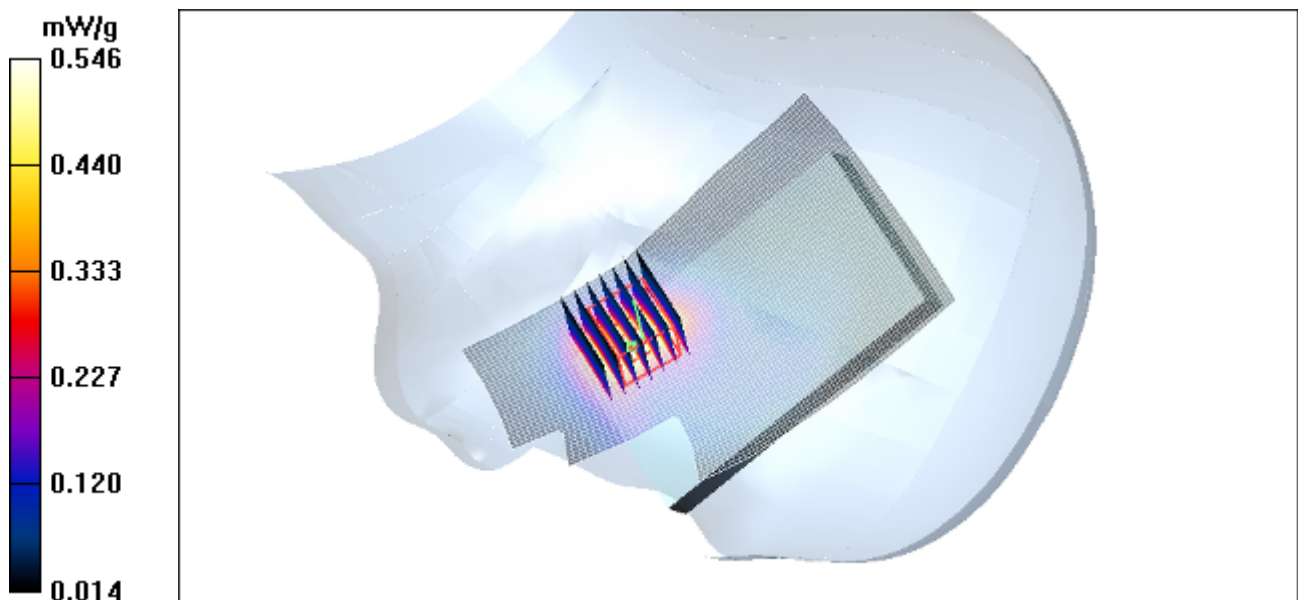


Figure 48 Left Hand Touch Cheek GSM 1900 Channel 810

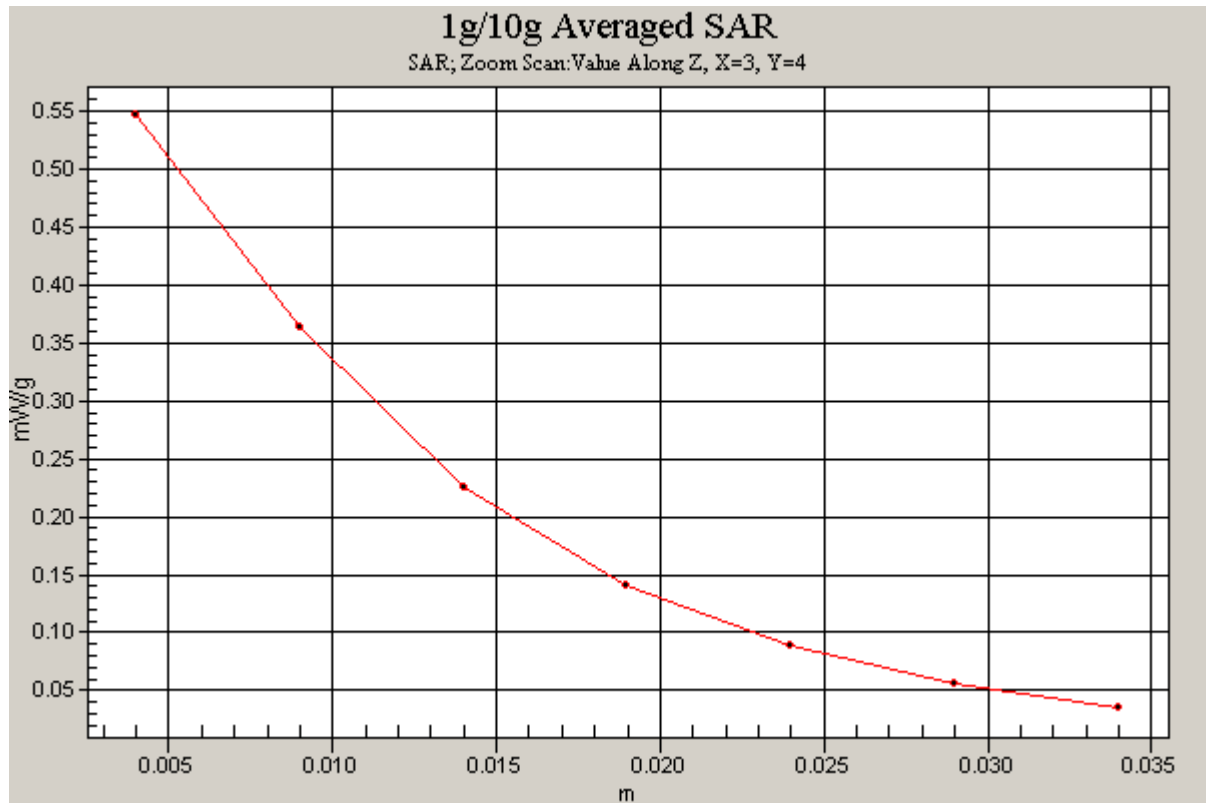


Figure 49 Z-Scan at power reference point (Left Hand Touch Cheek GSM 1900 Channel 810)

GSM 1900 Left Cheek Middle

Date/Time: 9/24/2009 11:46:16 PM

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(4.89, 4.89, 4.89); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Maximum value of SAR (interpolated) = 0.628 mW/g

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

Reference Value = 4.69 V/m; Power Drift = -0.146 dB

Peak SAR (extrapolated) = 0.879 W/kg

SAR(1 g) = 0.563 mW/g; SAR(10 g) = 0.323 mW/g

Maximum value of SAR (measured) = 0.634 mW/g

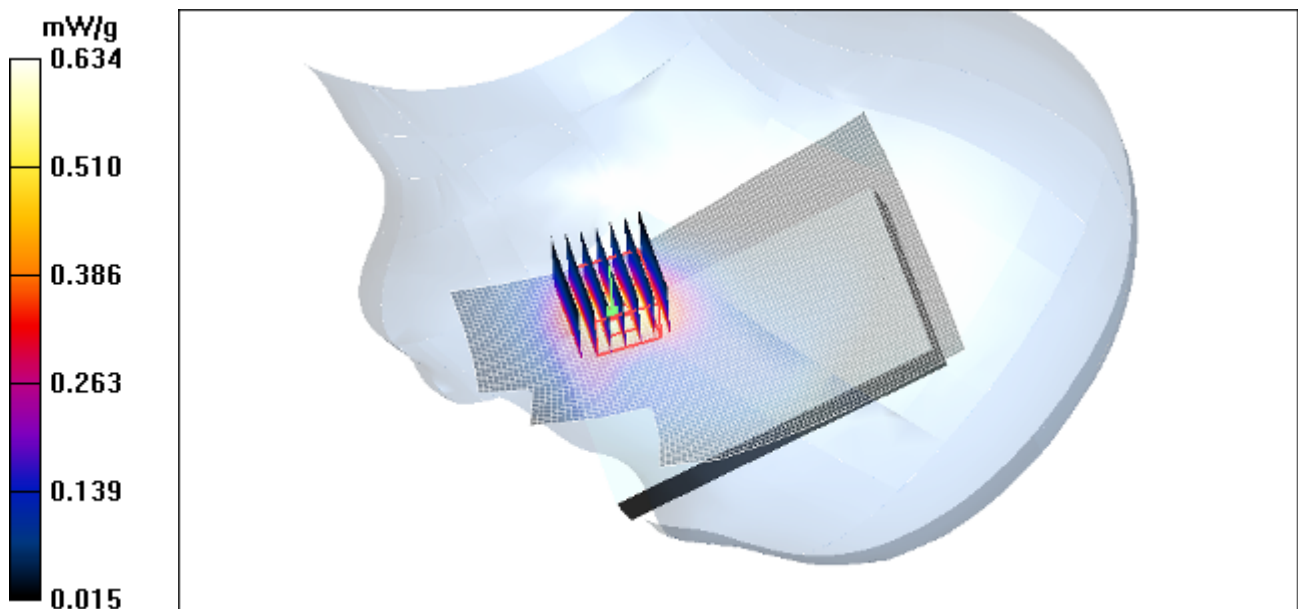


Figure 50 Left Hand Touch Cheek GSM 1900 Channel 661

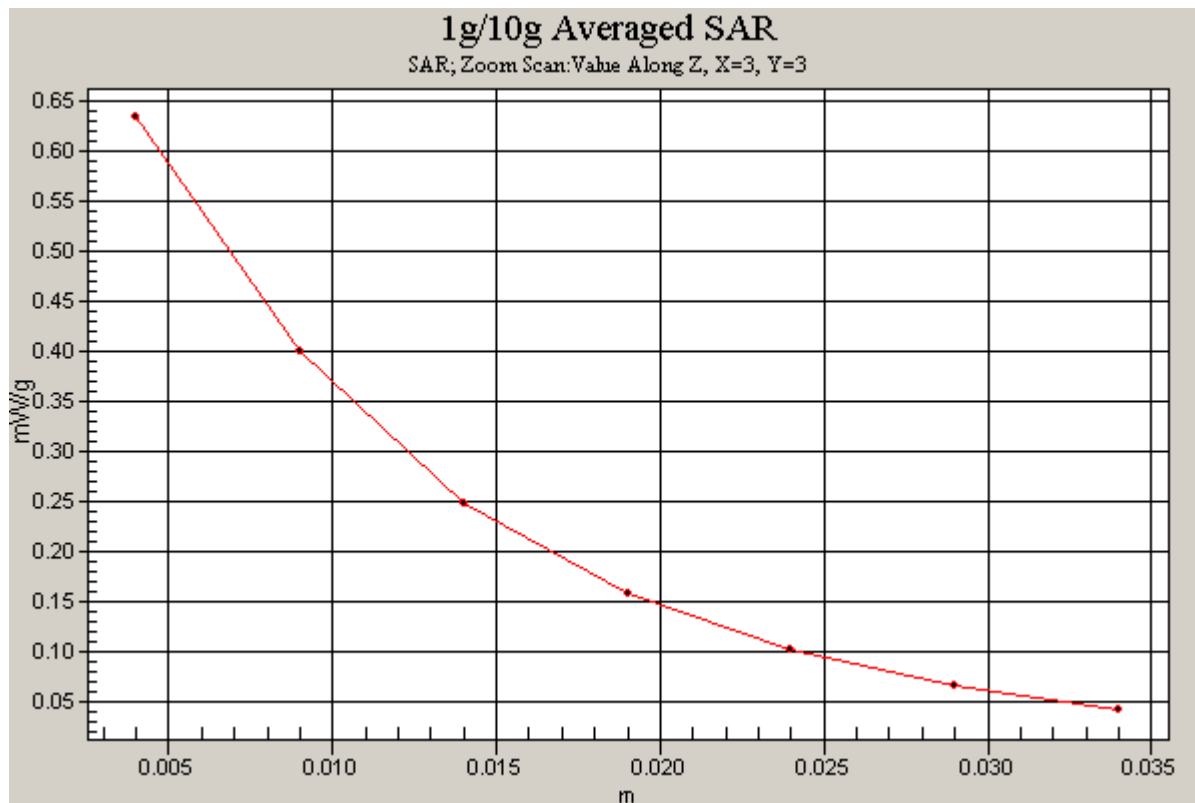


Figure 51 Z-Scan at power reference point (Left Hand Touch Cheek GSM 1900 Channel 661)

GSM 1900 Left Cheek Low

Date/Time: 9/25/2009 1:58:07 AM

Communication System: PCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.37$ mho/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(4.89, 4.89, 4.89); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Low/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.635 mW/g

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

Reference Value = 4.24 V/m; Power Drift = -0.061 dB

Peak SAR (extrapolated) = 0.879 W/kg

SAR(1 g) = 0.581 mW/g; SAR(10 g) = 0.333 mW/g

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

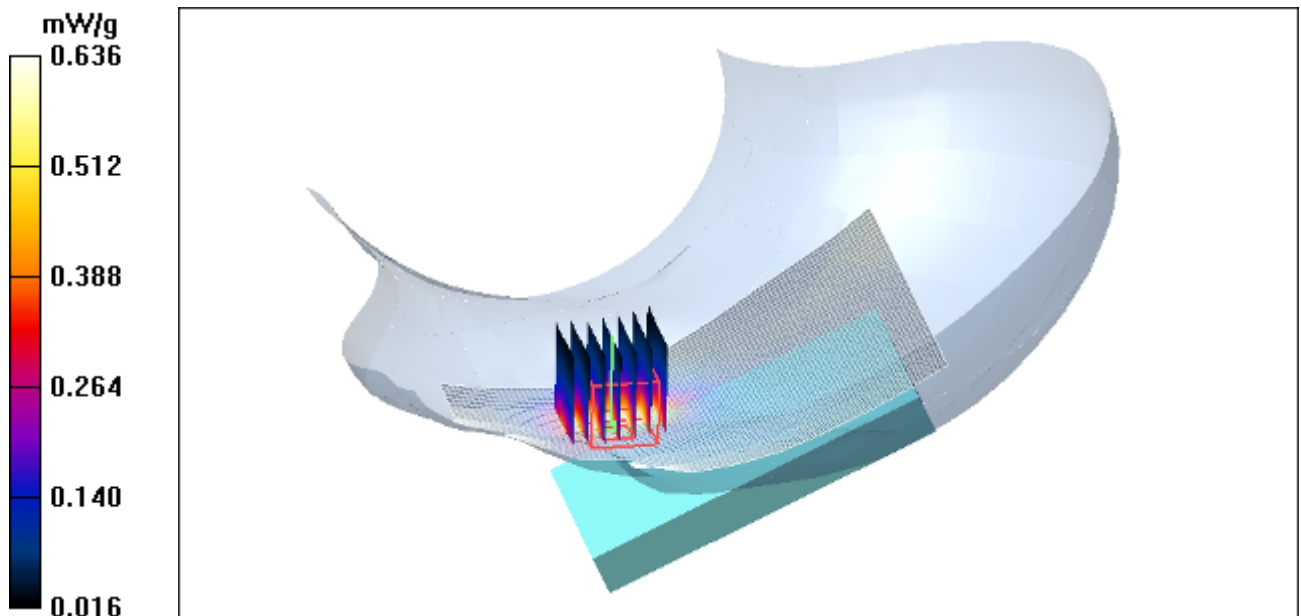


Figure 52 Left Hand Touch Cheek GSM 1900 Channel 512

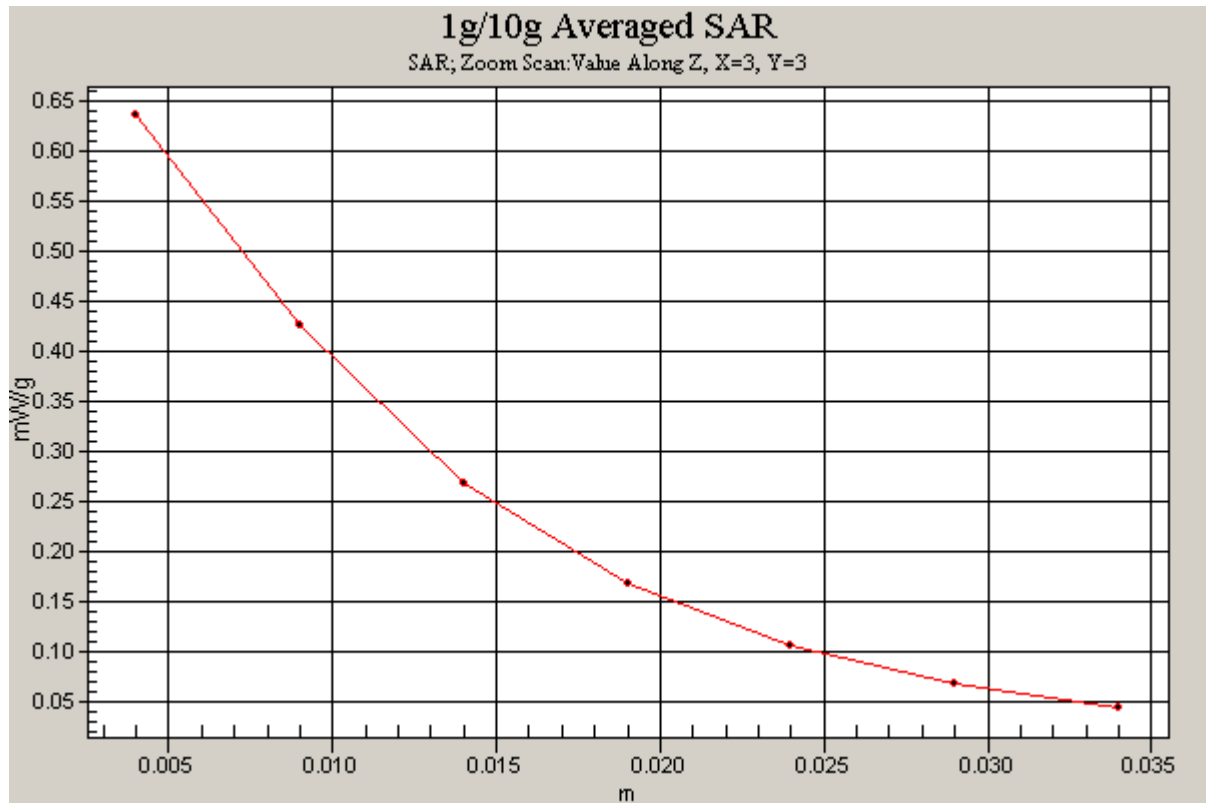


Figure 53 Z-Scan at power reference point (Left Hand Touch Cheek GSM 1900 Channel 512)

GSM 1900 Left Tilt Middle

Date/Time: 9/25/2009 12:07:44 AM

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.39$ mho/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY4 Configuration:

Probe: ET3DV6 - SN1737; ConvF(4.89, 4.89, 4.89); Calibrated: 11/25/2008

Electronics: DAE4 Sn452; Calibrated: 11/18/2008

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

Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Maximum value of SAR (interpolated) = 0.117 mW/g

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

Reference Value = 7.66 V/m; Power Drift = -0.141 dB

Peak SAR (extrapolated) = 0.140 W/kg

SAR(1 g) = 0.103 mW/g; SAR(10 g) = 0.065 mW/g

Maximum value of SAR (measured) = 0.112 mW/g

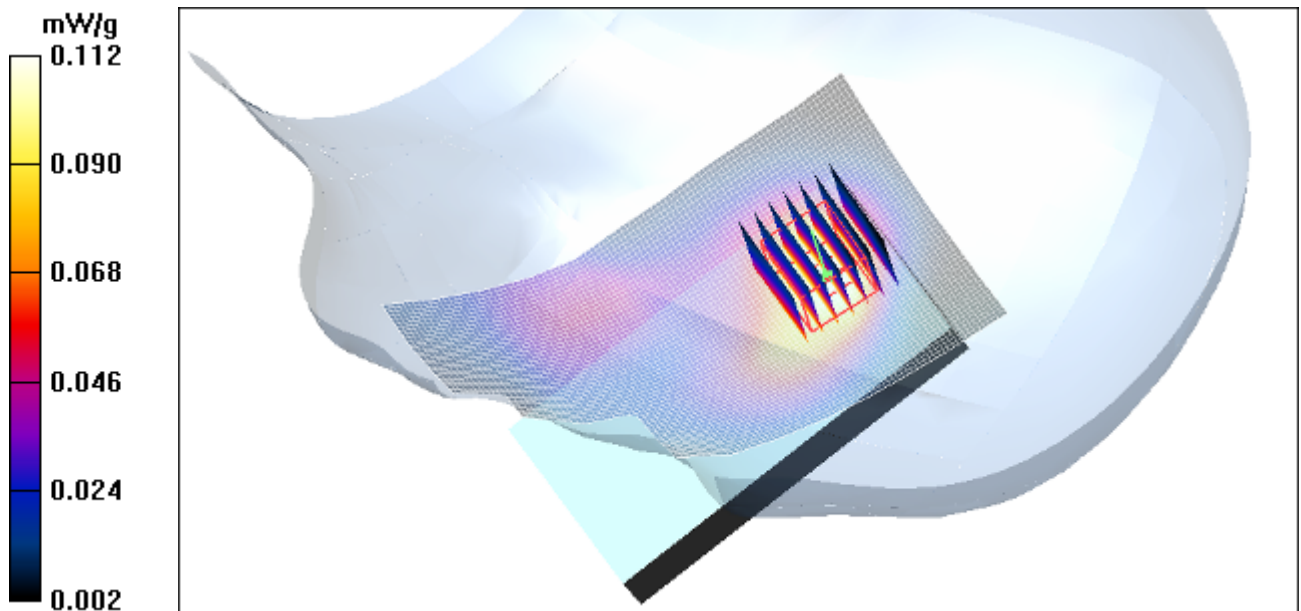


Figure 54 Left Hand Tilt 15° GSM 1900 Channel 661