Deutscher Akkreditierungs Rat

DAR

No. DAT-P-114/01-01

TEST REPORT

No. SAR2006002

Test name	Electromagnetic Field (Specific Absorption Rate)
Product	GSM Triband Smartphone
Model	Jasper S20
Client	Group Sense PDA Ltd
Type of test	Non Type Approval

Telecommunication Metrology Center

of Ministry of Information Industry

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TABLE OF CONTENT

Product Name	GSM Triband Smarphone	Sample Model	Jasper S20
Client	Group Sense PDA Ltd	Type of test	Non Type Approval
Factory	Group Sense PDA Ltd	Sampling arrival date	March 31st, 2006
Manufacturer	Group Sense PDA Ltd		
Sampling/ Sending sample	Sending sample	Sample sent by	Jackie WONG
Sampling location	/	Sampling person	/
Sample quantity	1	Sample matrix	/
Series number of the Sample	354282000650891		
Test basis	**EN 50360–2001:** Product standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones. **EN 50361–2001:** Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones. **IEC 62209-1-2005:** 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) **ANSI C95.1–1999:** IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz **OET Bulletin 65 (Edition 97-01) and Supplement C(Edition 01-01):** Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits. **IEEE 1528–2003:** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.		
Test conclusion	Localized Specific Absorption Rate (SAR) of this portable wireless equipment has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this test report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report. General Judgment: **Pass** (Stamp) **Date of issue: April 7th, 2006**		
Note	TX Freq. Band: 1850-1910 MHz (PCS) Max. Power: 1 Watt (PCS) Antenna Character: / The test results relate only to the items tested of the sample(s).		

Approved by (Lu Bingsong) **Deputy Director of the laboratory** **Reviewed by** (Wang Hongbo) **Tested by** (Qi Dianyuan)

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3 DESCRIPTION OF EUT

3.1 Addressing Information Related to EUT

Table 1: Applicant (The Client)

Name or Company	Group Sense PDA Ltd
Address/Post	6th Floor, Building 9, No.5 Science Park West Avenue, Hong Kong Science Park, Shatin, Hong Kong
City	Hong Kong
Postal Code	/
Country	China
Telephone	+852 2832 8596
Fax	+852 2591 2397

Table 2: Manufacturer

Name or Company	Group Sense PDA Ltd
Address/Post	6th Floor, Building 9, No.5 Science Park West Avenue, Hong Kong Science Park, Shatin, Hong Kong
City	Hong Kong
Postal Code	/
Country	China
Telephone	+852 2832 8596
Fax	+852 2591 2397

3.2 Constituents of EUT

Description	Model	Serial Number	Manufacturer
Handset	Jasper S20	354282000650891	Group Sense PDA Ltd
Lithium Battery	Varta 66661711012	/	VARTA Mircobattery Pte. Ltd.
AC/DC Adapter	S010AU0500100	/	/

Table 3: Constituents of Samples

Picture 1: Constituents of the sample (Lithium Battery is in the Handset)

3.3 General Description

Equipment Under Test (EUT) is a model of GSM Tri-band Smartphone (MS) with integrated antenna. It consists of Handset and normal options: Lithium Battery and AC/DC Adapter as Table 3 and Picture 1. With the request of the client, SAR is tested for PCS 1900MHz. Its GPRS class is 10.

The sample undergoing test was selected by the Client.

Components list please refer to documents of the manufacturer

4 OPERATIONAL CONDITIONS DURING TEST

4.1 Schematic Test Configuration

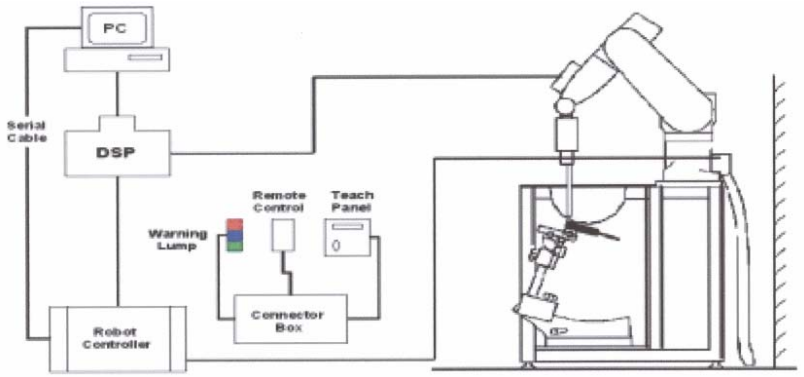
A communication link is set up with a System Simulator (SS) by air link, and a call is established. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 512, 661 and 810 respectively in the case of PCS 1900 MHz. The EUT is commanded to operate at maximum transmitting power.

The EUT shall use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the manufacturer. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. If a wireless link is used, the antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the handset. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the handset by at least 30 dB.

4.2 SAR Measurement Set-up

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

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



Picture 2: SAR Lab Test Measurement Set-up

The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic

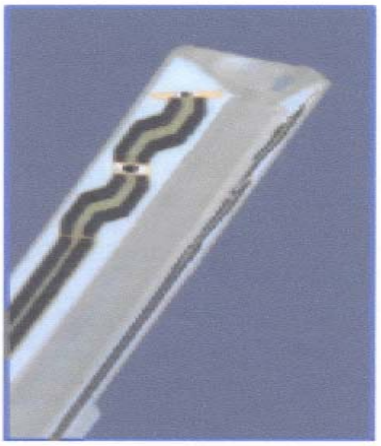
unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

4.3 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. The probe has been calibrated according to the standard procedure with an accuracy of better than ± 10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB.

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 2.5 GHz In brain and muscle simulating tissue at frequencies of 450MHz, 900MHz and 1.8GHz (accuracy±8%) Calibration for other liquids and frequencies upon request
Frequency	l 0 MHz to > 6 GHz; Linearity: ±0.2 dB (30 MHz to 3 GHz)
Directivity	±0.2 dB in brain tissue (rotation around probe axis) ±0.4 dB in brain tissue (rotation normal probe axis)
Dynamic Range	5u W/g to > 100mW/g; Linearity: ±0.2dB
Surface Detection	±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 diarneter: 6.8mm Distance from probe tip to dipole centers: 2.7mm
Application	General dosimetry up to 3GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms



Picture 3: ET3DV6 E-field Probe

Picture4:ET3DV6 E-field probe

4.4 E-field Probe Calibration

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

parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

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

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

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

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

Or

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

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

Note: Please see Annex E to check the probe calibration certificate.

Picture 5:Device Holder

4.5 Other Test Equipment

4.5.1 Device Holder for Transmitters

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

4.5.2 Phantom

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

Picture6:Generic Twin Phantom

predefined phantom positions and measurement grids by the complete setup of manually teaching three points in the robot.

Shell Thickness 2±0. l mm
Filling Volume Approx. 20 liters
Dimensions 810 x l000 x 500 mm (H x L x W)
Available Special

4.6 Equivalent Tissues

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

Table 4. Composition of the Head Tissue Equivalent Matter

MIXTURE %	FREQUENCY 1900MHz
Water	55.242
Glycol monobutyl	44.452
Salt	0.306
Dielectric Parameters Target Value	f=1900MHz ε=40.0 σ=1.40

Table 5. Composition of the Body Tissue Equivalent Matter

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

4.7 System Specifications

4.7.1 Robotic System Specifications

Specifications

Positioner: Stäubli Unimation Corp. Robot Model: RX90L
Repeatability: ±0.02 mm
No. of Axis: 6

Data Acquisition Electronic (DAE) System

Cell Controller
Processor: Pentium III
Clock Speed: 800 MHz
Operating System: Windows 2000
Data Converter
Features: Signal Amplifier, multiplexer, A/D converter, and control logic
Software: DASY4 software
Connecting Lines: Optical downlink for data and status info.
Optical uplink for commands and clock

5 CHARACTERISTICS OF THE TEST

5.1 Applicable Limit Regulations

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

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

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

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

5.2 Applicable Measurement Standards

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

IEC 62209-1-2005: 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)

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

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

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

6 LABORATORY ENVIRONMENT

Table 6: The Ambient Conditions during EMF Test

Temperature	Min. = 15 °C**,** Max. = 30 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

7 CONDUCTED OUTPUT POWER MEASUREMENT

7.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMU-200) to ensure the maximum power transmission and proper modulation. This result contains conducted output power and ERP for the EUT. In all cases, the measured peak output power should be greater and within 5% than EMI measurement.

7.2 Conducted Power

7.2.1 Measurement Methods

The EUT was set up for the maximum output power. The channel power was measured with Agilent Spectrum Analyzer E4440A. These measurements were done at 3 channels, 512, 661 and 810 before SAR test and after SAR test.

7.2.2 Measurement result

Table 7: Conducted Power Measurement Results

	Conducted Power		
	Channel 512 (1850.2MHz)	**Channel 661 (1880MHz)**	**Channel 810 (1909.8MHz)**
Before Test (dBm)	29.8	29.9	30.0
After Test (dBm)	29.6	30.1	29.9

7.2.3 Power Drift

To control the output power stability during the SAR test, DASY4 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in Table 11 to Table 13 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

8 TEST RESULTS

8.1 Dielectric Performance

Table 8: Dielectric Performance of Head Tissue Simulating Liquid

Measurement is made at temperature 22.5 °C and relative humidity 49%. Liquid temperature during the test: 21.4°C			
/	**Frequency**	**Permittivity ε**	**Conductivity σ (S/m)**
Target value	1900MHz	40.0	1.40
Measurement value (Average of 10 tests)	1900MHz	40.27	1.45

Table 9: Dielectric Performance of Body Tissue Simulating Liquid

Measurement is made at temperature 22.5 °C and relative humidity 49%. Liquid temperature during the test: 21.4°C			
/	**Frequency**	**Permittivity ε**	**Conductivity σ (S/m)**
Target value	1900MHz	53.3	1.52
Measurement value (Average of 10 tests)	1900MHz	55.85	1.55

8.2 System Validation

Table 10: System Validation

Measurement is made at temperature 23.3 ℃, relative humidity 47%, input power 250 mW. Liquid temperature during the test: 22.5℃					
Liquid parameters		**Frequency**	**Permittivity ε**	**Conductivity σ (S/m)**	
		1900 MHz	40.27	1.45	
Verification results	**Frequency**	**Target value (W/kg)**		**Measurement value (W/kg)**	
		10 g Average	**1 g Average**	**10 g Average**	**1 g Average**
	1900 MHz	5.125	9.925	5.27	9.91

Note：Target Values used are one fourth of those in IEEE Std 1528-2003 (feeding power is normalized to 1 Watt), i.e. 250 mW is used as feeding power to the validation dipole (SPEAG using).

8.3 Summary of Measurement Results

Table 11: SAR Values (Head, 1900 MHz Band)

Limit of SAR (W/kg)	**10 g Average**	**1 g Average**	**Power Drift (dB)**
	2.0	1.6	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Left hand, Touch cheek, Top frequency(See Fig.1)	0.214	0.361	0.073
Left hand, Touch cheek, Mid frequency(See Fig.3)	0.230	0.387	-0.049
Left hand, Touch cheek, Bottom frequency(See Fig.5)	0.165	0.273	0.066
Left hand, Tilt 15 Degree, Top frequency(See Fig.7)	0.230	0.410	-0.023
Left hand, Tilt 15 Degree, Mid frequency(See Fig.9)	0.254	0.449	-0.123
Left hand, Tilt 15 Degree, Bottom frequency(See Fig.11)	0.176	0.309	-0.033
Right hand, Touch cheek, Top frequency(See Fig.13)	0.217	0.393	-0.079
Right hand, Touch cheek, Mid frequency(See Fig.15)	0.227	0.412	0.001
Right hand, Touch cheek, Bottom frequency(See Fig.17)	0.146	0.260	-0.045
Right hand, Tilt 15 Degree, Top frequency(See Fig.19)	0.238	0.432	-0.122
Right hand, Tilt 15 Degree, Mid frequency(See Fig.21)	0.264	0.476	-0.046
Right hand, Tilt 15 Degree, Bottom frequency(See Fig.23)	0.175	0.313	0.043

Table 12: SAR Values (Body, 1900 MHz Band)

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Body, Towards Phantom, Top frequency(See Fig.25)	0.067	0.105	-0.200
Body, Towards Phantom, Mid frequency(See Fig.27)	0.068	0.105	0.067
Body, Towards Phantom, Bottom frequency(See Fig.29)	0.038	0.063	-0.147
Body, Towards Ground, Top frequency(See Fig.31)	0.161	0.271	-0.046
Body, Towards Ground, Mid frequency(See Fig.33)	0.186	0.312	-0.126
Body, Towards Ground, Bottom frequency(See Fig.35)	0.155	0.262	0.057

Table 13: SAR Values (Body, 1900 MHz Band with GPRS)

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Body, Towards Phantom, Top frequency(See Fig.37)	0.107	0.178	-0.156
Body, Towards Phantom, Mid frequency(See Fig.39)	0.122	0.182	-0.059
Body, Towards Phantom, Bottom frequency(See Fig.41)	0.061	0.113	-0.147
Body, Towards Ground, Top frequency(See Fig.43)	0.274	0.434	0.039
Body, Towards Ground, Mid frequency(See Fig.45)	0.334	0.531	-0.076
Body, Towards Ground, Bottom frequency(See Fig.47)	0.279	0.471	0.088

8.4Conclusion

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 is below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.

9 Measurement Uncertainty

SN	a	Type	c	d	e = f(d,k)	f	h = c x f / e	k
	Uncertainty Component		Tol. (± %)	Prob. Dist.	Div.	c_i (1 g)	1 g u_i (±%)	v_i
1	System repetivity	A	0.5	N	1	1	0.5	9
	Measurement System							
2	Probe Calibration	B	5	N	2	1	2.5	∞
3	Axial Isotropy	B	4.7	R	√3	$(1\text{-}cp)^{1/2}$	4.3	∞
4	Hemispherical Isotropy	B	9.4	R	√3	$\sqrt{c_p}$		∞
5	Boundary Effect	B	0.4	R	√3	1	0.23	∞
6	Linearity	B	4.7	R	√3	1	2.7	∞
7	System Detection Limits	B	1.0	R	√3	1	0.6	∞
8	Readout Electronics	B	1.0	N	1	1	1.0	∞
9	RF Ambient Conditions	B	3.0	R	√3	1	1.73	∞
10	Probe Positioner Mechanical Tolerance	B	0.4	R	√3	1	0.2	∞
11	Probe Positioning with respect to Phantom Shell	B	2.9	R	√3	1	1.7	∞
12	Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	√3	1	2.3	∞
	Test sample Related							
13	Test Sample Positioning	A	4.9	N	1	1	4.9	N-1
14	Device Holder Uncertainty	A	6.1	N	1	1	6.1	N-1
15	Output Power Variation - SAR drift measurement	B	5.0	R	√3	1	2.9	∞
	Phantom and Tissue Parameters							
16	Phantom Uncertainty (shape and thickness tolerances)	B	1.0	R	√3	1	0.6	∞
17	Liquid Conductivity - deviation from target values	B	5.0	R	√3	0.64	1.7	∞
18	Liquid Conductivity - measurement uncertainty	B	5.0	N	1	0.64	1.7	M
19	Liquid Permittivity - deviation from target values	B	5.0	R	√3	0.6	1.7	∞
20	Liquid Permittivity - measurement uncertainty	B	5.0	N	1	0.6	1.7	M
	Combined Standard Uncertainty			RSS			11.25	
	Expanded Uncertainty (95% CONFIDENCE INTERVAL)			K=2			22.5	

10 MAIN TEST INSTRUMENTS

Table14: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	HP 8753E	US38433212	August 29,2005	One year
02	Dielectric Probe Kit	Agilent 85070C	US99360113	No Calibration Requested	
03	Power meter	NRVD	101253	No Calibration Requested	
04	Power sensor	NRV-Z5	100331		
05	Power sensor	NRV-Z6	100011		
06	Signal Generator	MG 3633A	M73386	No Calibration Requested	
07	Amplifier	AT 50S1G4A	26549	No Calibration Requested	
08	BTS	CMU 200	105948	August 15, 2005	One year
09	E-field Probe	SPEAG ET3DV6	1736	November 25, 2005	One year
10	DAE	SPEAG DAE3	536	July 11, 2005	One year

11 TEST PERIOD

The test is performed from April 4th, 2006 to April 5th, 2006.

12 TEST LOCATION

The test is performed at Radio Communication & Electromagnetic Compatibility Laboratory of Telecommunication Metrology Center

END OF REPORT BODY

ANNEX A MEASUREMENT PROCESS

The evaluation was performed with the following procedure:

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

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

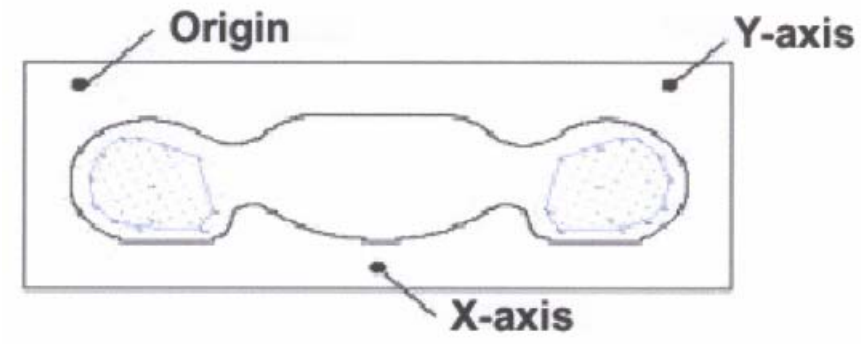
Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7 x 7x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

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

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

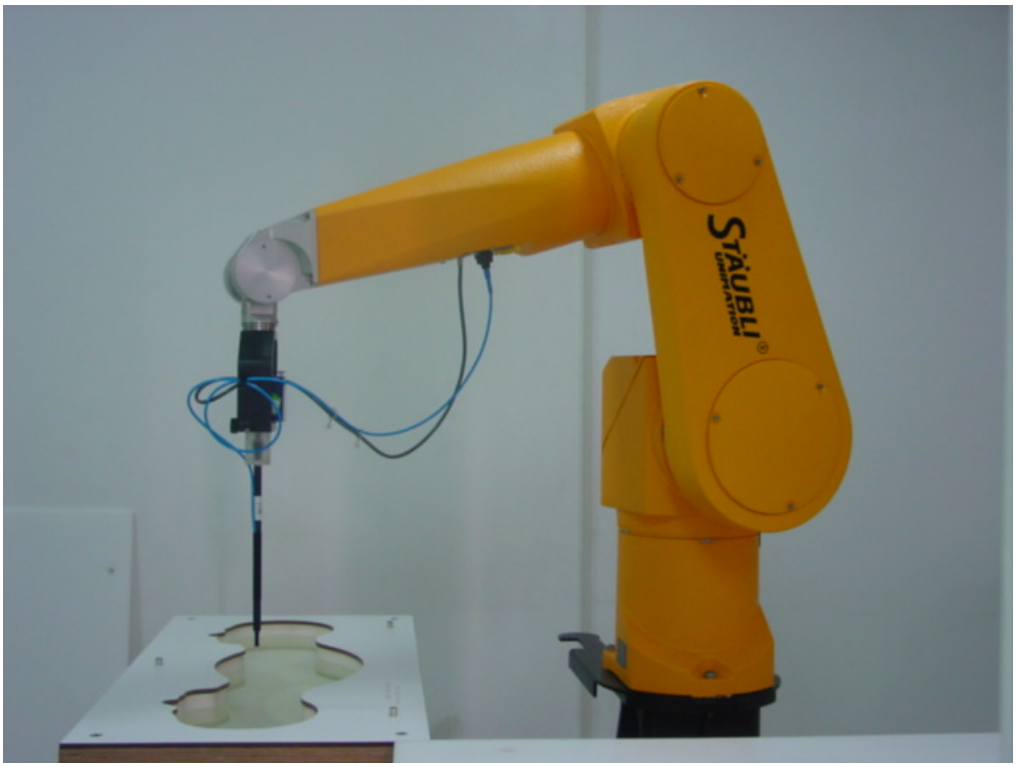
c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

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



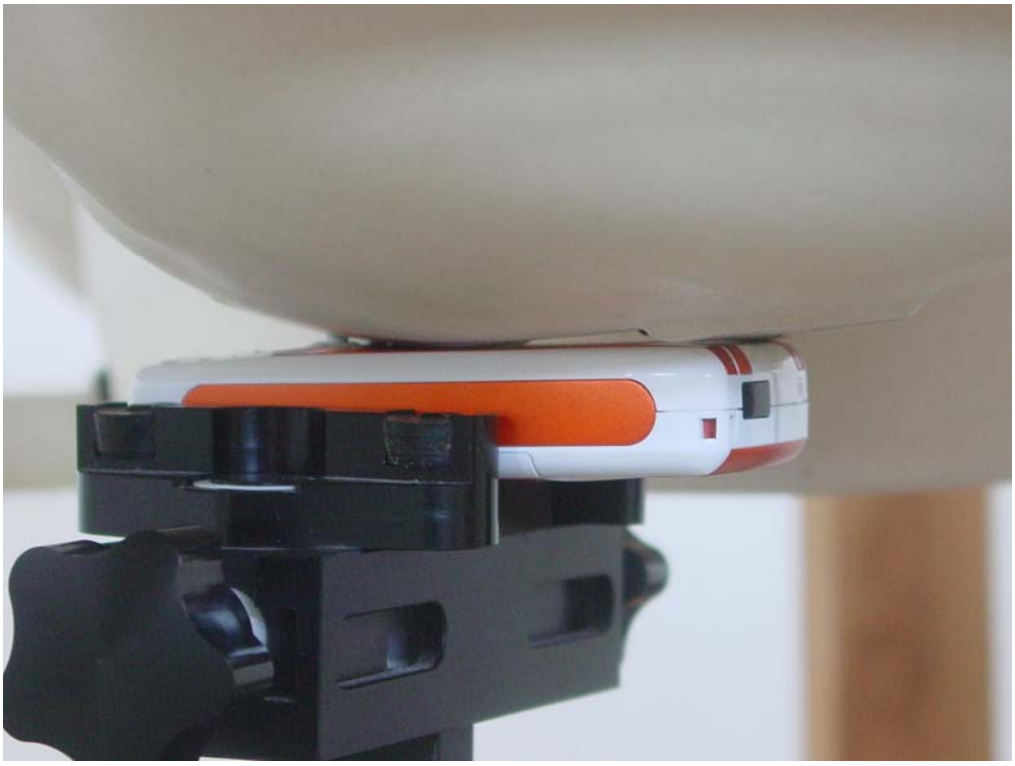
Picture A: SAR Measurement Points in Area Scan

ANNEX B TEST LAYOUT



Picture B1: Specific Absorption Rate Test Layout

Picture B2: Liquid depth in the Flat Phantom (PCS 1900MHz)

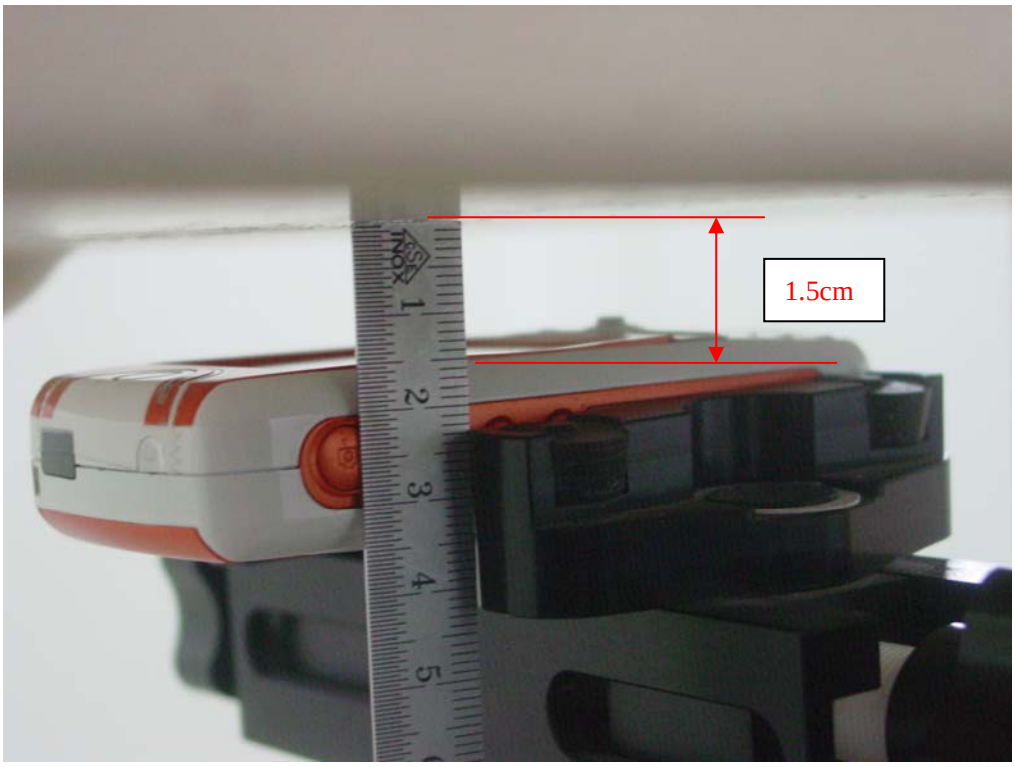


Picture B4: Left Hand Touch Cheek Position

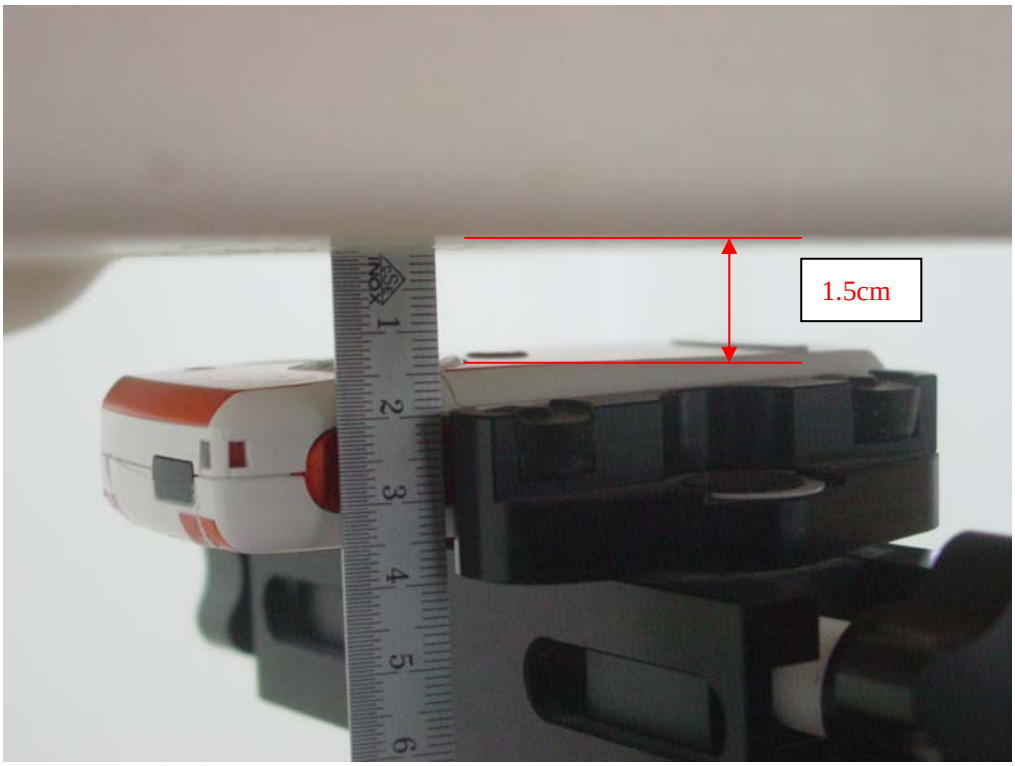
Picture B5: Left Hand Tilt 15° Position

Picture B6: Right Hand Touch Cheek Position

Picture B7: Right Hand Tilt 15° Position



Picture B7: Body-worn Position (toward phantom, the distance from handset to the bottom of the Phantom is 1.5cm)



Picture B8: Body-worn Position (toward ground, the distance from handset to the bottom of the Phantom is 1.5cm)

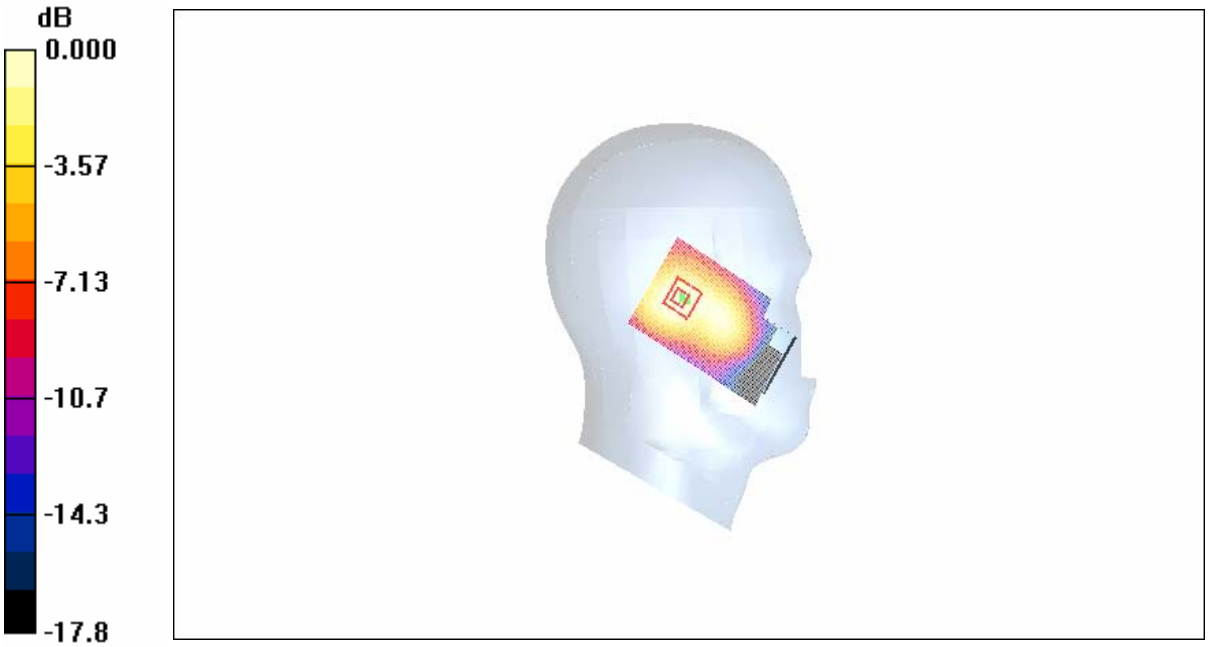
ANNEX C GRAPH RESULTS

1900 Left Cheek High

Electronics: DAE3 Sn536
Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3
Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Cheek High/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.409 mW/g

Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.0 V/m; Power Drift = 0.073 dB
Peak SAR (extrapolated) = 0.587 W/kg
SAR(1 g) = 0.361 mW/g; SAR(10 g) = 0.214 mW/g
Maximum value of SAR (measured) = 0.388 mW/g



0 dB = 0.388mW/g

Fig. 1 Left Hand Touch Cheek PCS 1900MHz CH810

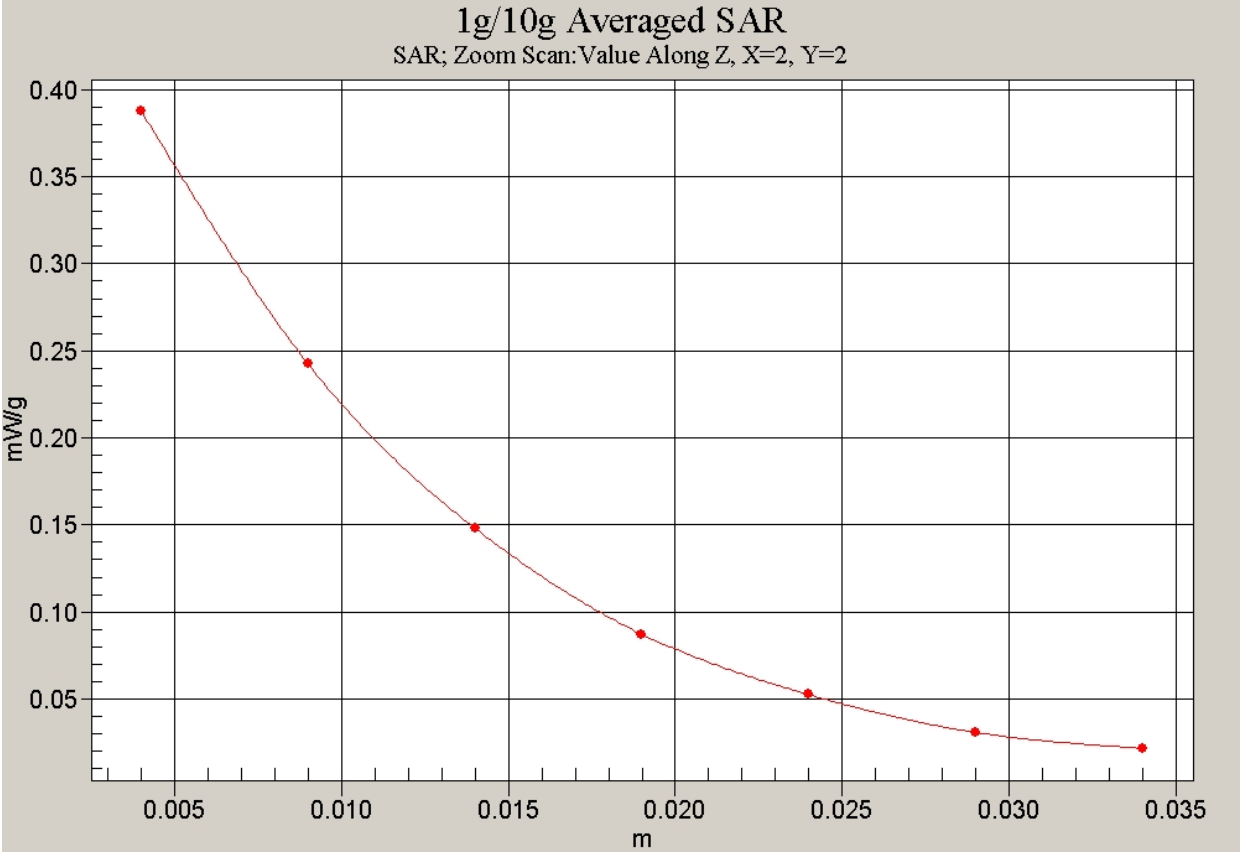


Fig. 2 Z-Scan at power reference point (PCS 1900MHz CH810)

1900 Left Cheek Middle

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Cheek Middle/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm

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

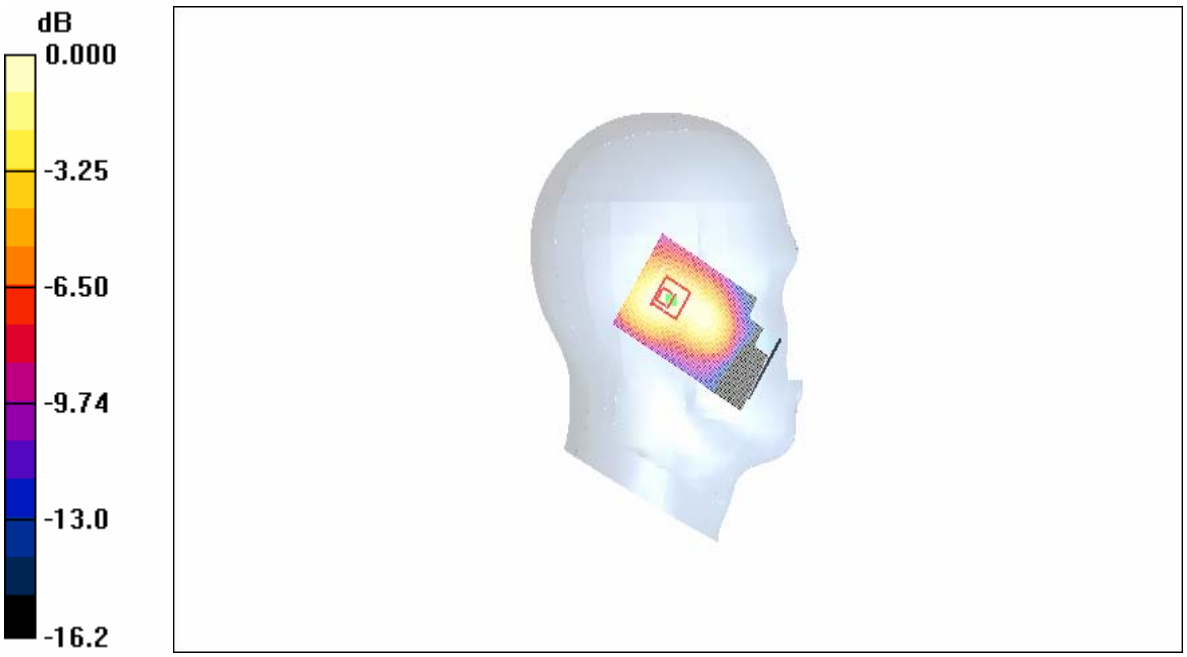
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.6 V/m; Power Drift = -0.049 dB

Peak SAR (extrapolated) = 0.618 W/kg

SAR(1 g) = 0.387 mW/g; SAR(10 g) = 0.230 mW/g

Maximum value of SAR (measured) = 0.416 mW/g



0 dB = 0.416mW/g

Fig. 3 Left Hand Touch Cheek PCS 1900MHz CH661

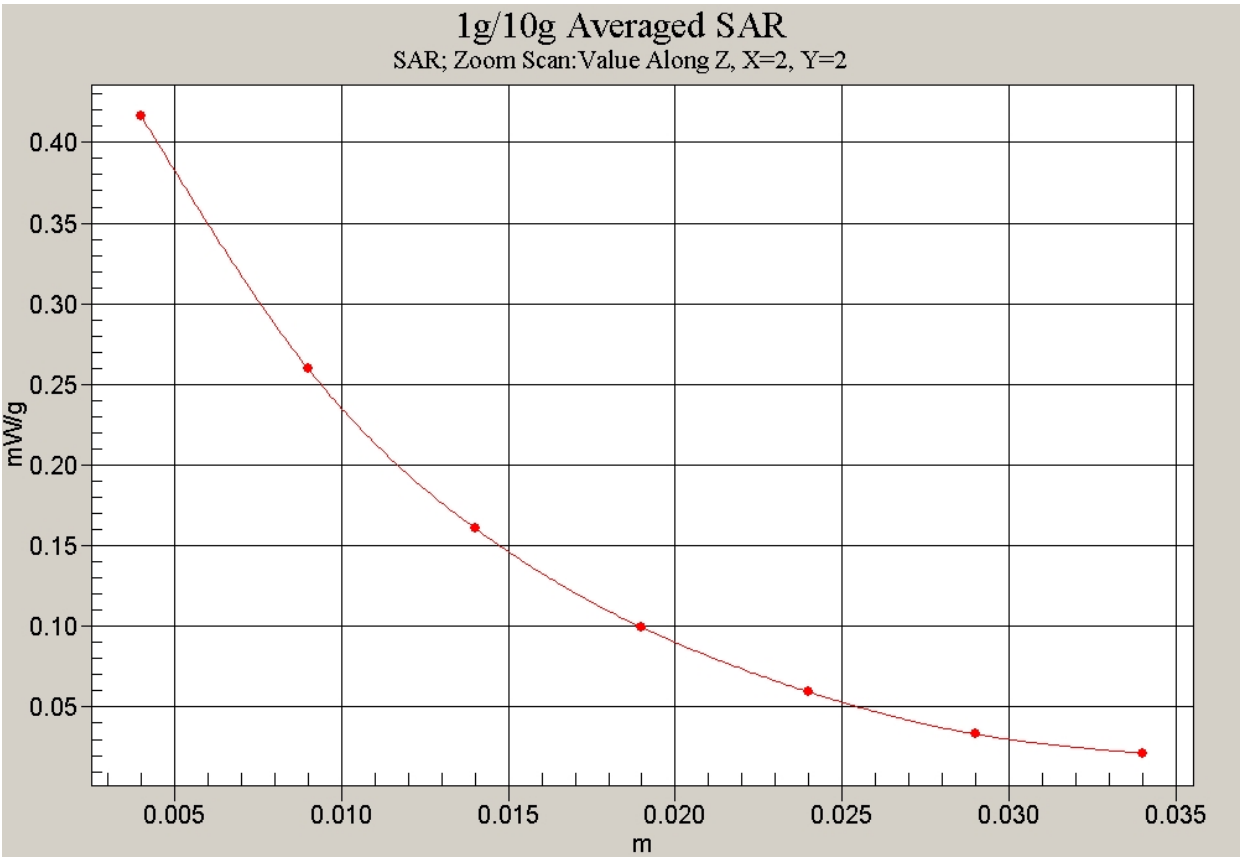


Fig. 4 Z-Scan at power reference point (PCS 1900MHz CH661)

1900 Left Cheek Low

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Cheek Low/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.311 mW/g

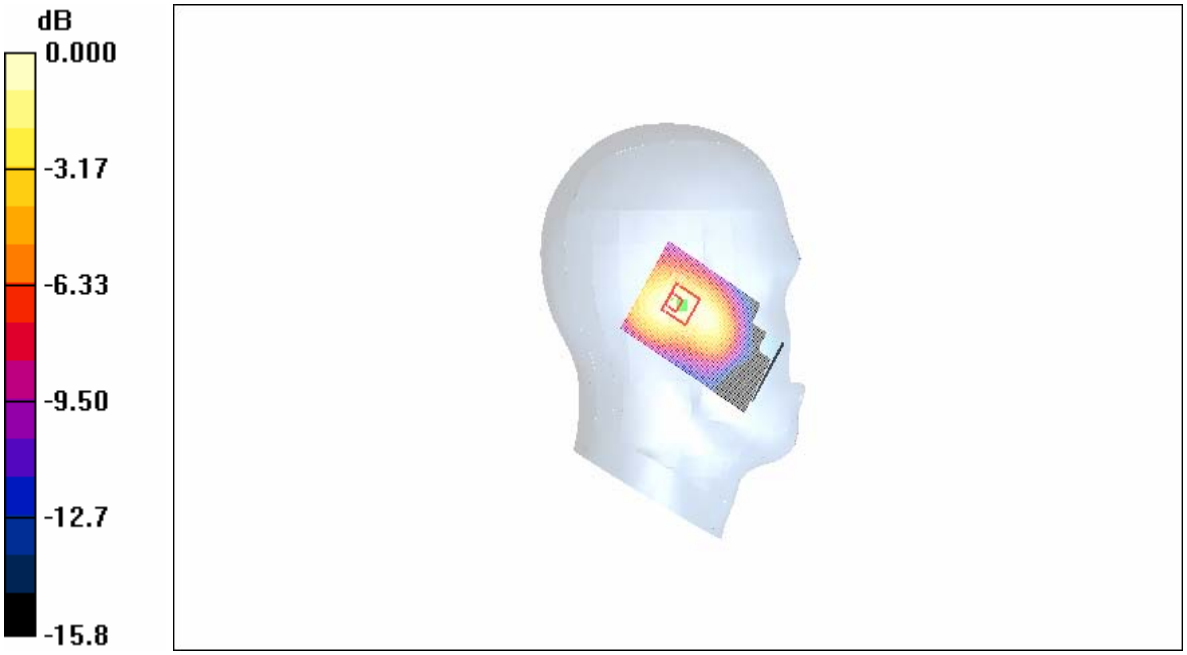
Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.7 V/m; Power Drift = 0.066 dB

Peak SAR (extrapolated) = 0.431 W/kg

SAR(1 g) = 0.273 mW/g; SAR(10 g) = 0.165 mW/g

Maximum value of SAR (measured) = 0.296 mW/g



0 dB = 0.296mW/g

Fig. 5 Left Hand Touch Cheek PCS 1900MHz CH512

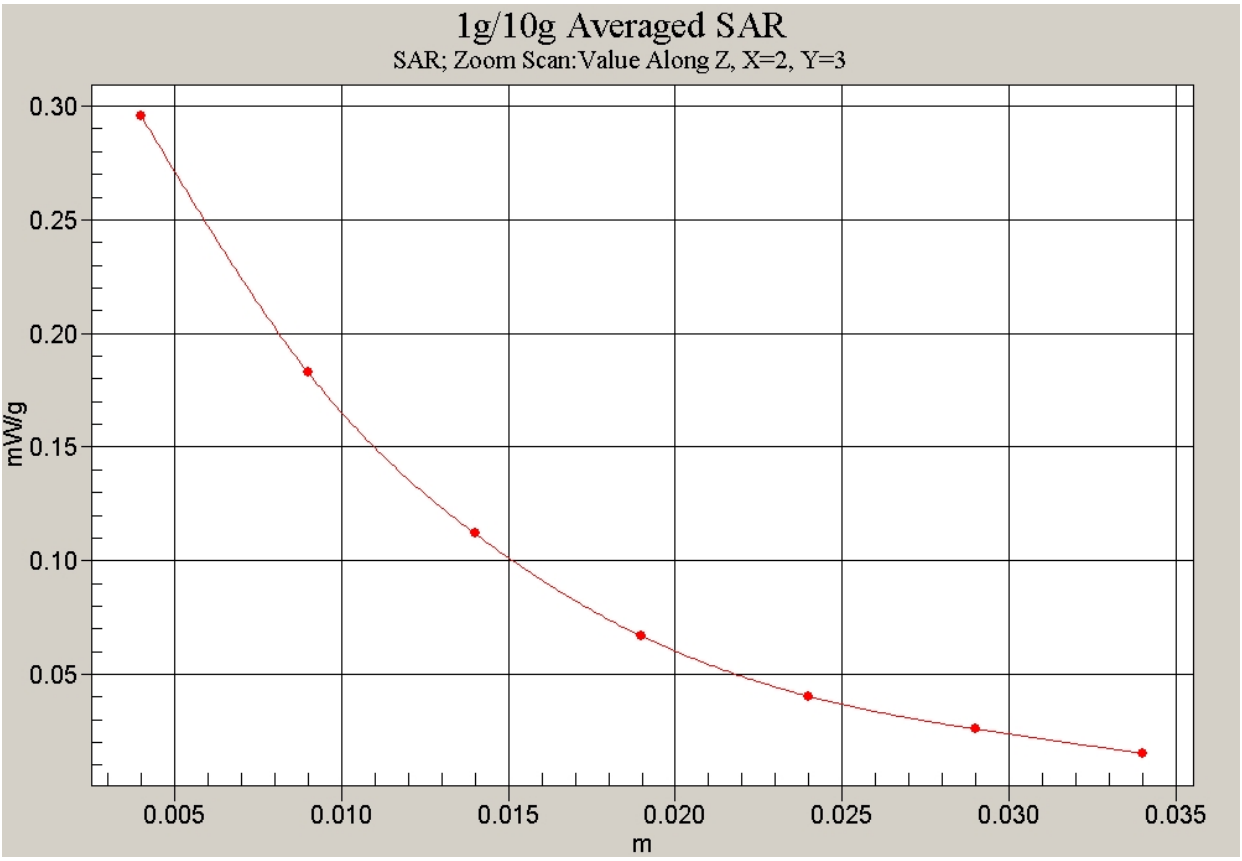


Fig. 6 Z-Scan at power reference point (PCS 1900MHz CH512)

1900 Left Tilt High

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Tilt High/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.448 mW/g

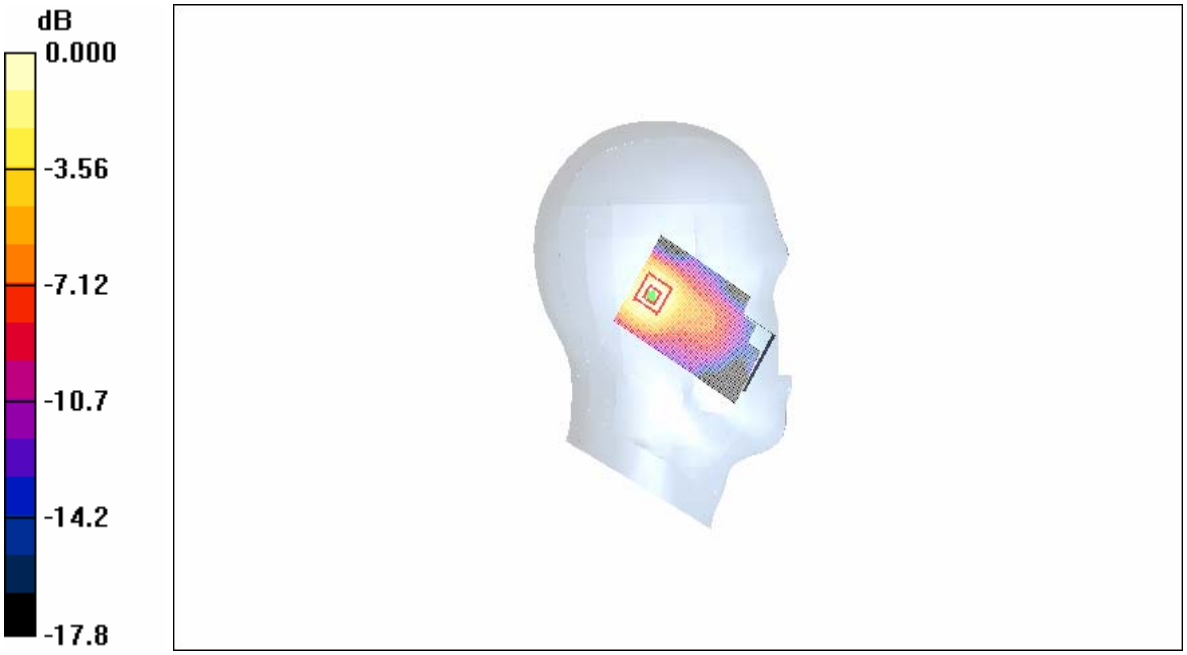
Tilt High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.2 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 0.695 W/kg

SAR(1 g) = 0.410 mW/g; SAR(10 g) = 0.230 mW/g

Maximum value of SAR (measured) = 0.442 mW/g



0 dB = 0.442mW/g

Fig. 7 Left Hand Tilt 15° PCS 1900MHz CH810

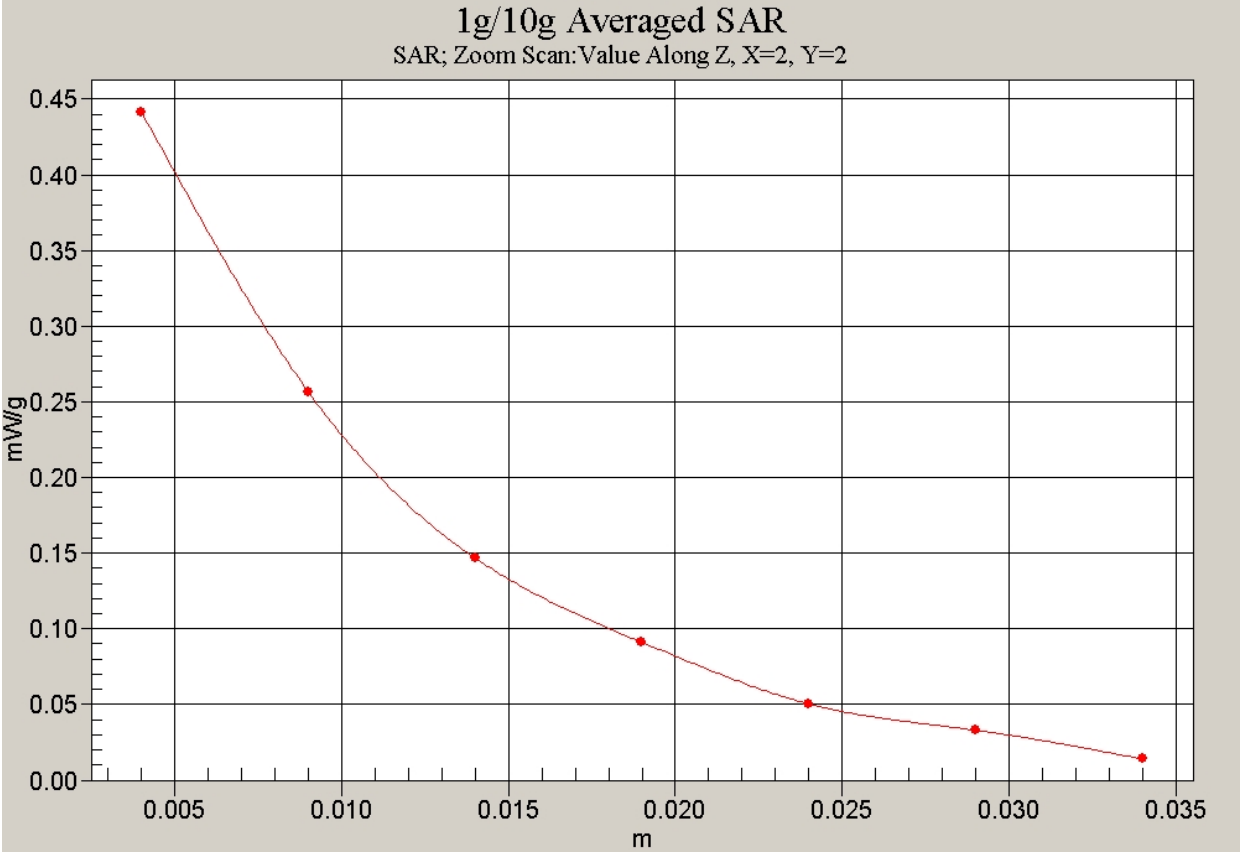


Fig. 8 Z-Scan at power reference point (PCS 1900MHz CH810)

1900 Left Tilt Middle

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Tilt Middle/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.501 mW/g

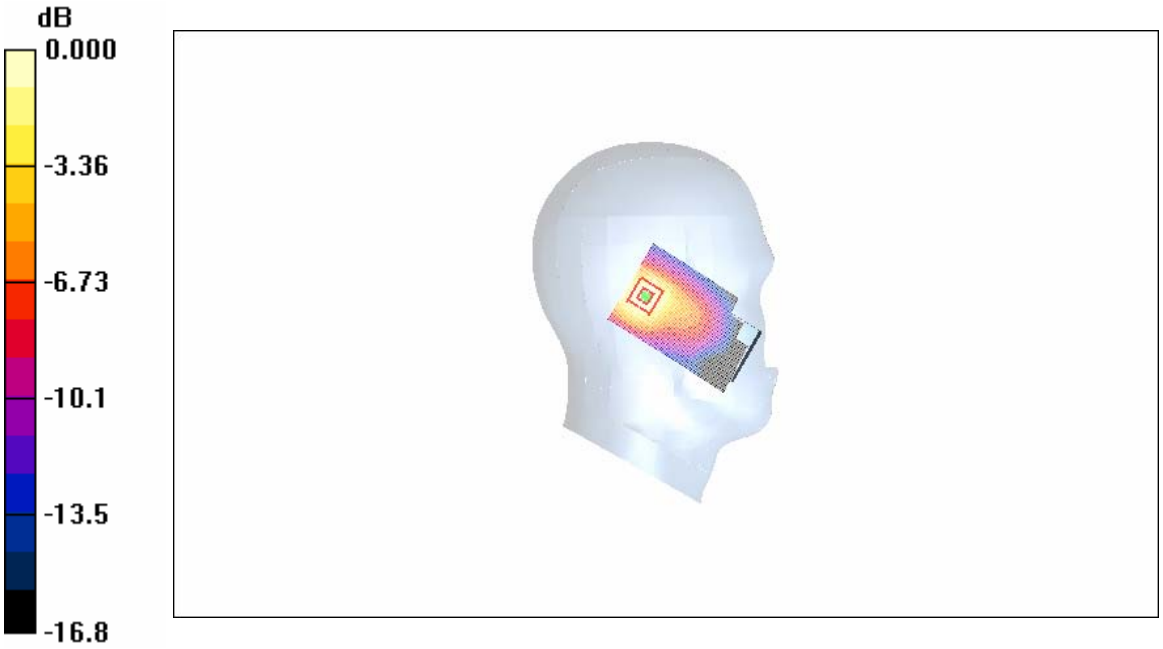
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 19.4 V/m; Power Drift = -0.123 dB

Peak SAR (extrapolated) = 0.775 W/kg

SAR(1 g) = 0.449 mW/g; SAR(10 g) = 0.254 mW/g

Maximum value of SAR (measured) = 0.497 mW/g



0 dB = 0.497mW/g

Fig. 9 Left Hand Tilt 15°PCS 1900MHz CH661

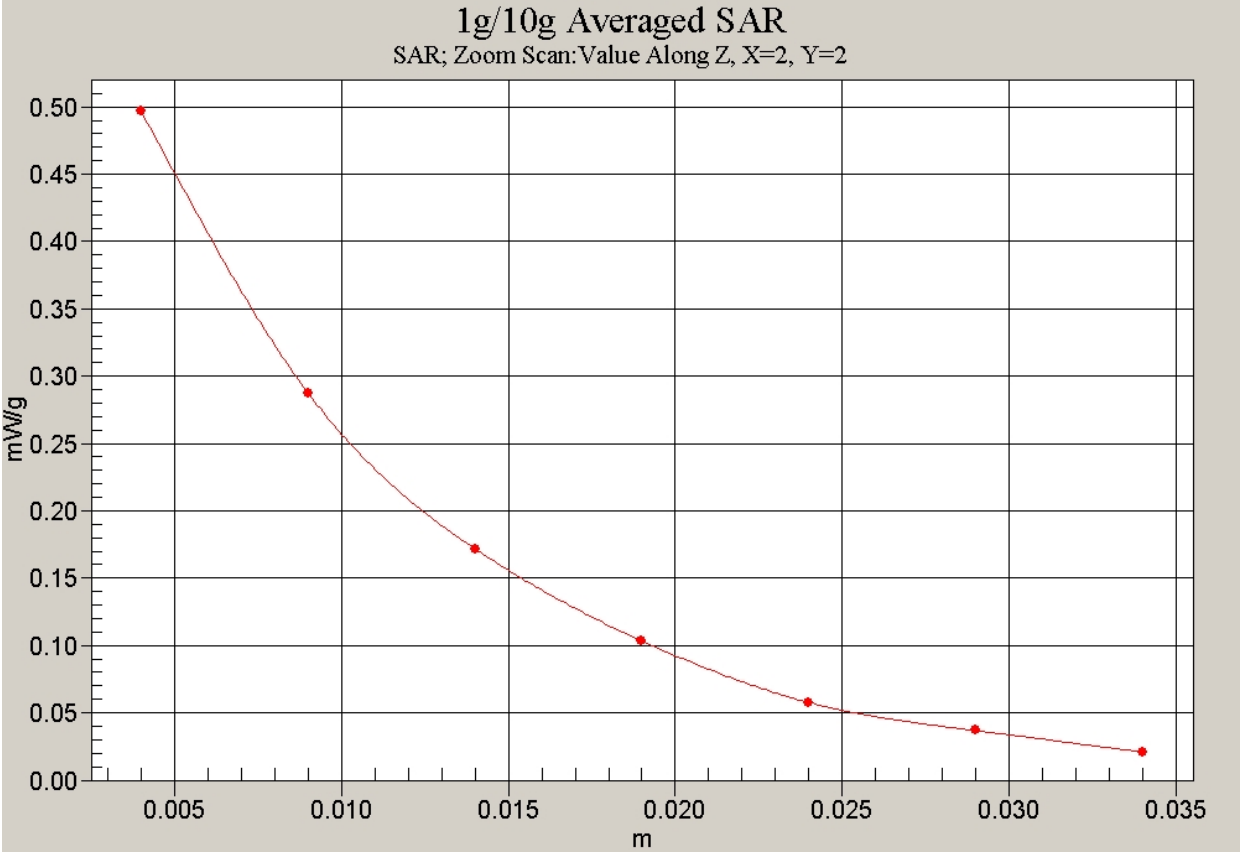


Fig. 10 Z-Scan at power reference point (PCS 1900MHz CH661)

1900 Left Tilt Low

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Tilt Low/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.342 mW/g

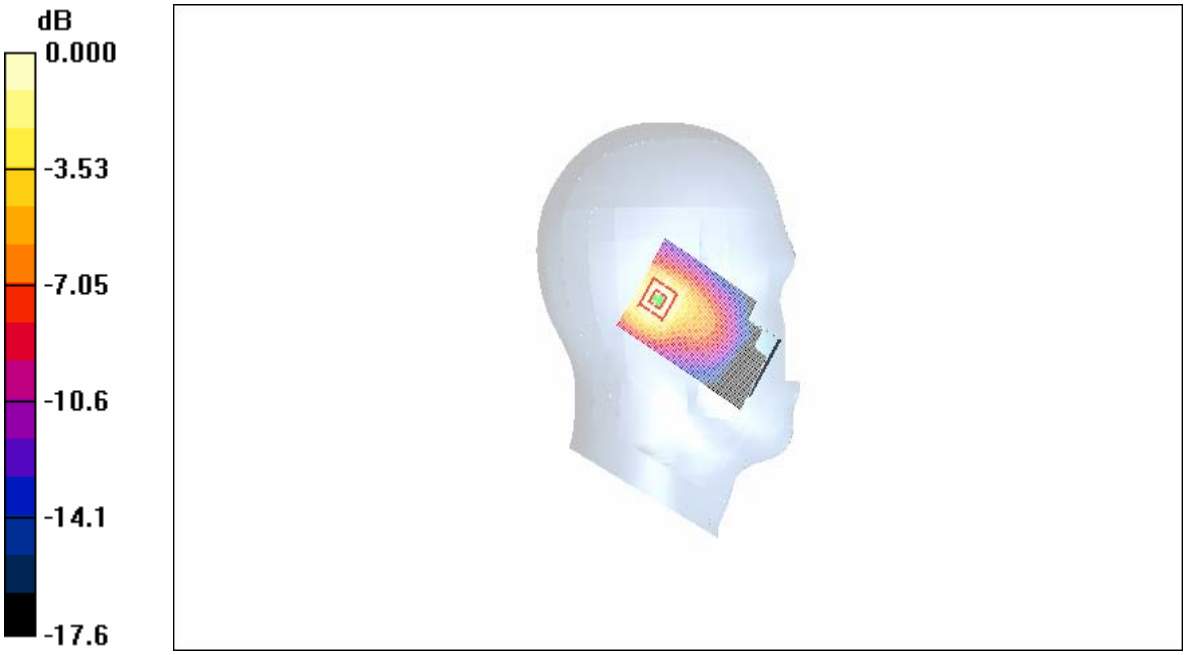
Tilt Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.1 V/m; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 0.514 W/kg

SAR(1 g) = 0.309 mW/g; SAR(10 g) = 0.176 mW/g

Maximum value of SAR (measured) = 0.339 mW/g



0 dB = 0.339mW/g

Fig. 11 Left Hand Tilt 15°PCS 1900MHz CH512

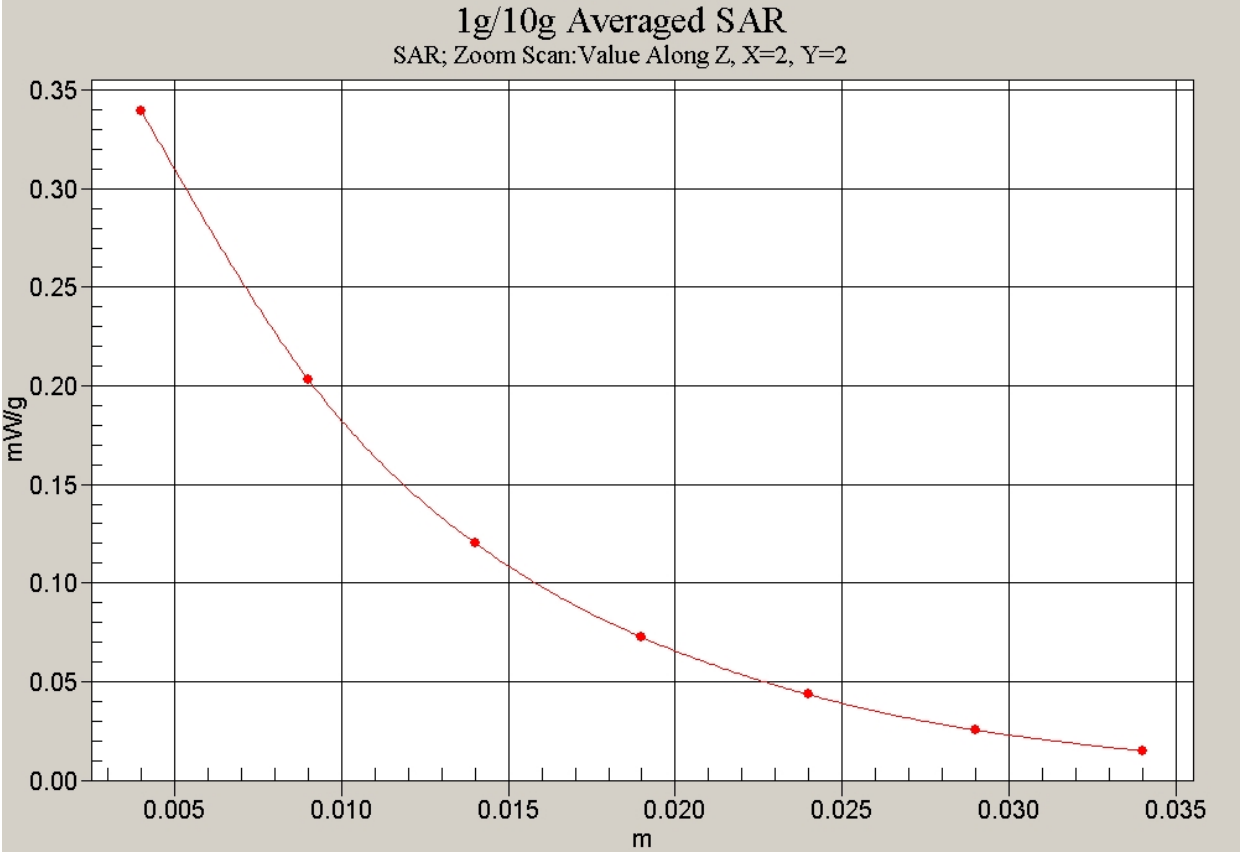


Fig. 12 Z-Scan at power reference point (PCS 1900MHz CH512)

1900 Right Cheek High

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Cheek High/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.433 mW/g

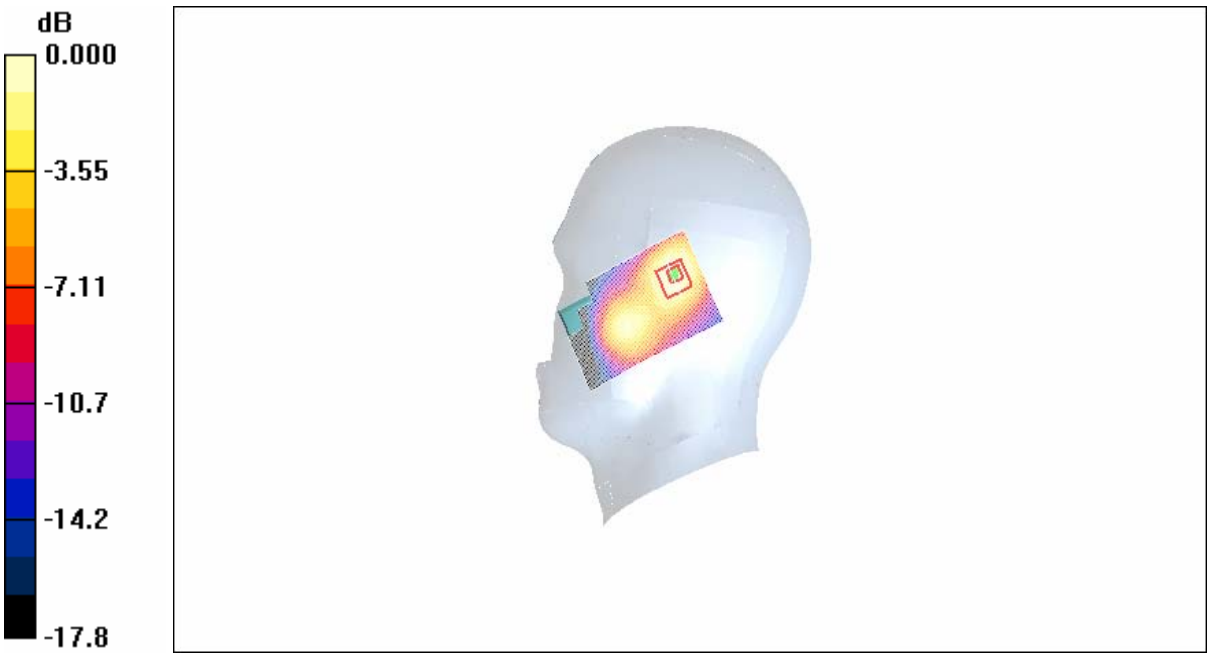
Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.3 V/m; Power Drift = -0.079 dB

Peak SAR (extrapolated) = 0.695 W/kg

SAR(1 g) = 0.393 mW/g; SAR(10 g) = 0.217 mW/g

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



0 dB = 0.427mW/g

Fig. 13 Right Hand Touch Cheek PCS 1900MHz CH810

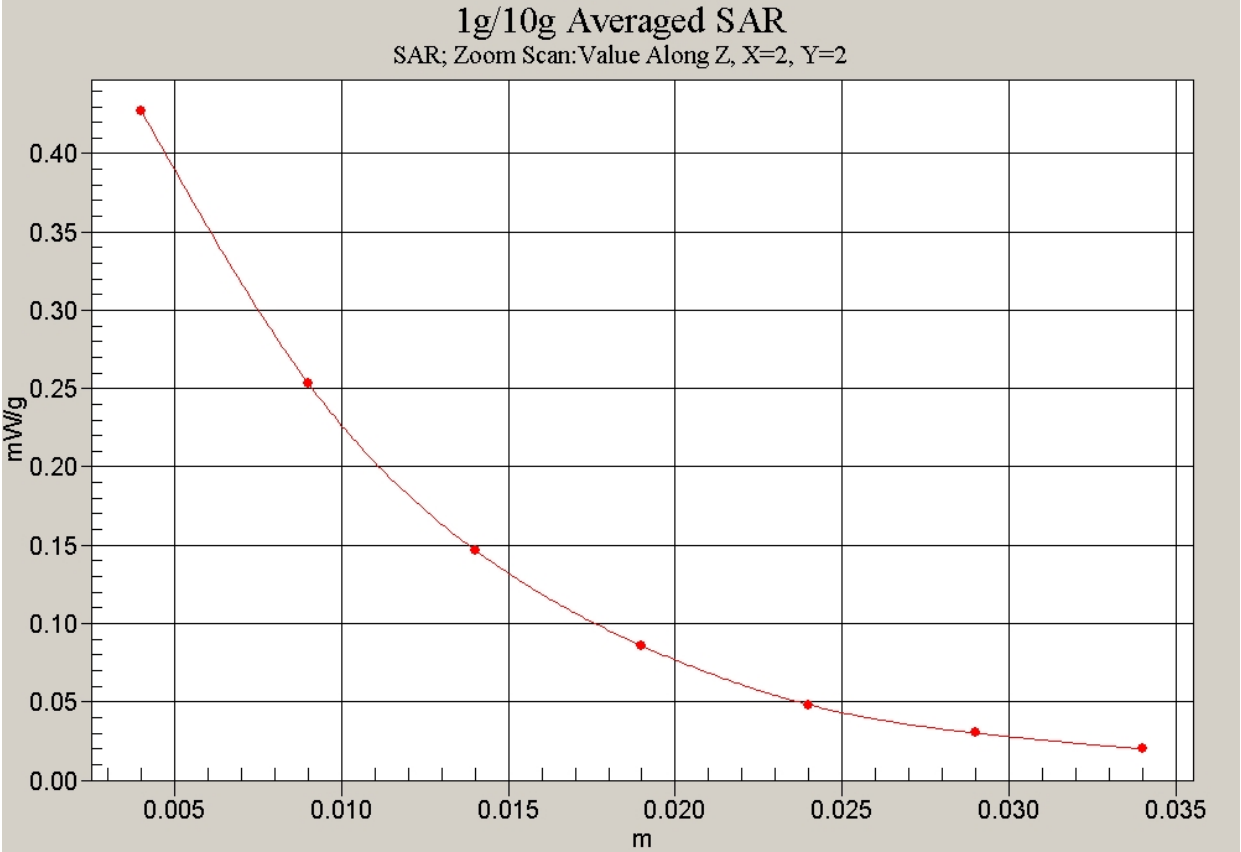


Fig. 14 Z-Scan at power reference point (PCS 1900MHz CH810)

1900 Right Cheek Middle

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Cheek Middle/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.448 mW/g

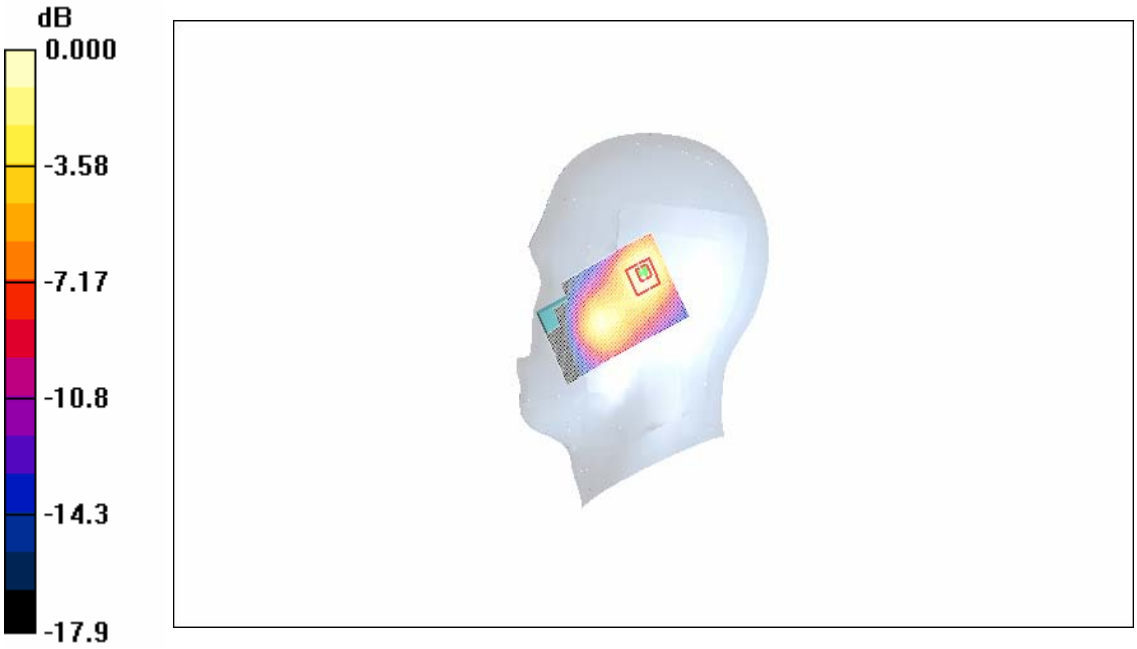
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.7 V/m; Power Drift = 0.001 dB

Peak SAR (extrapolated) = 0.718 W/kg

SAR(1 g) = 0.412 mW/g; SAR(10 g) = 0.227 mW/g

Maximum value of SAR (measured) = 0.457 mW/g



0 dB = 0.457mW/g

Fig.15 Right Hand Touch Cheek PCS 1900MHz CH661

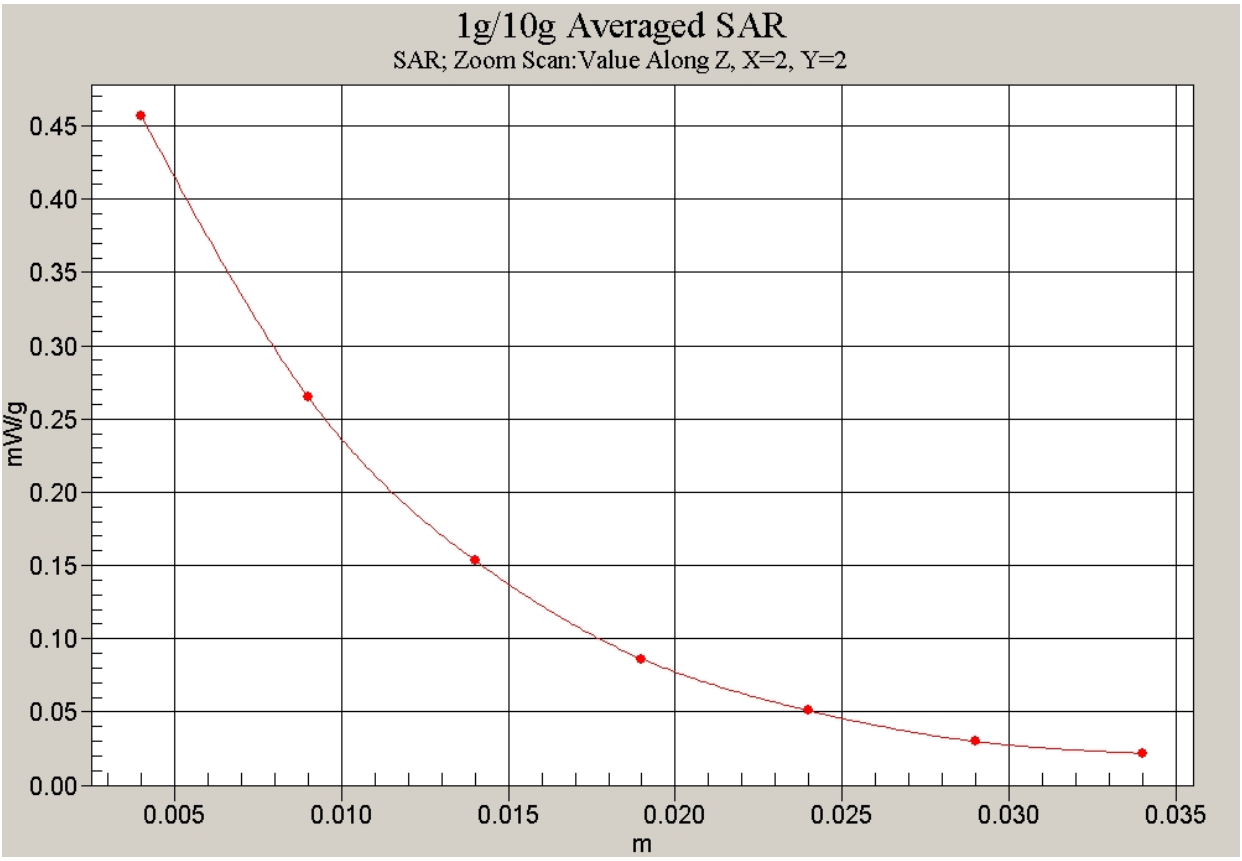


Fig. 16 Z-Scan at power reference point (PCS 1900MHz CH661)

1900 Right Cheek Low

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Cheek Low/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.282 mW/g

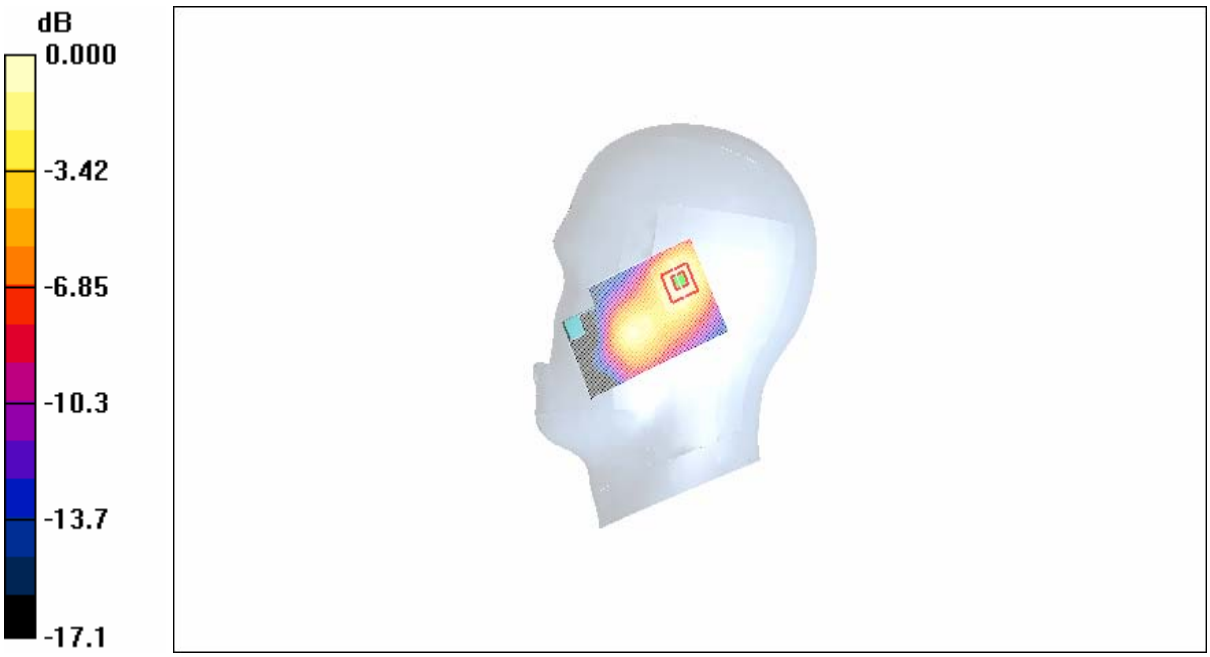
Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.0 V/m; Power Drift = -0.045 dB

Peak SAR (extrapolated) = 0.446 W/kg

SAR(1 g) = 0.260 mW/g; SAR(10 g) = 0.146 mW/g

Maximum value of SAR (measured) = 0.288 mW/g



0 dB = 0.288mW/g

Fig. 17 Right Hand Touch Cheek PCS 1900MHz CH512

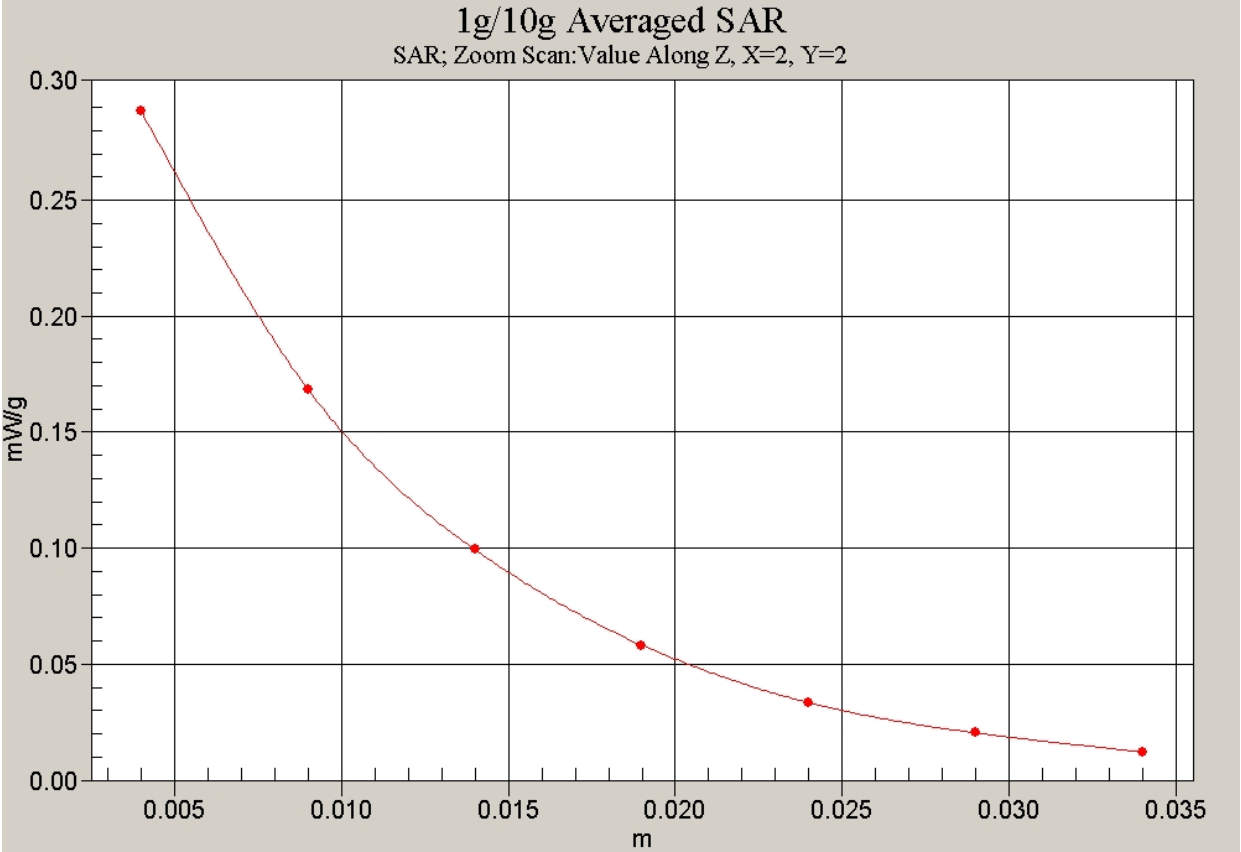


Fig. 18 Z-Scan at power reference point (PCS 1900MHz CH512)

1900 Right Tilt High

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Tilt High/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.479 mW/g

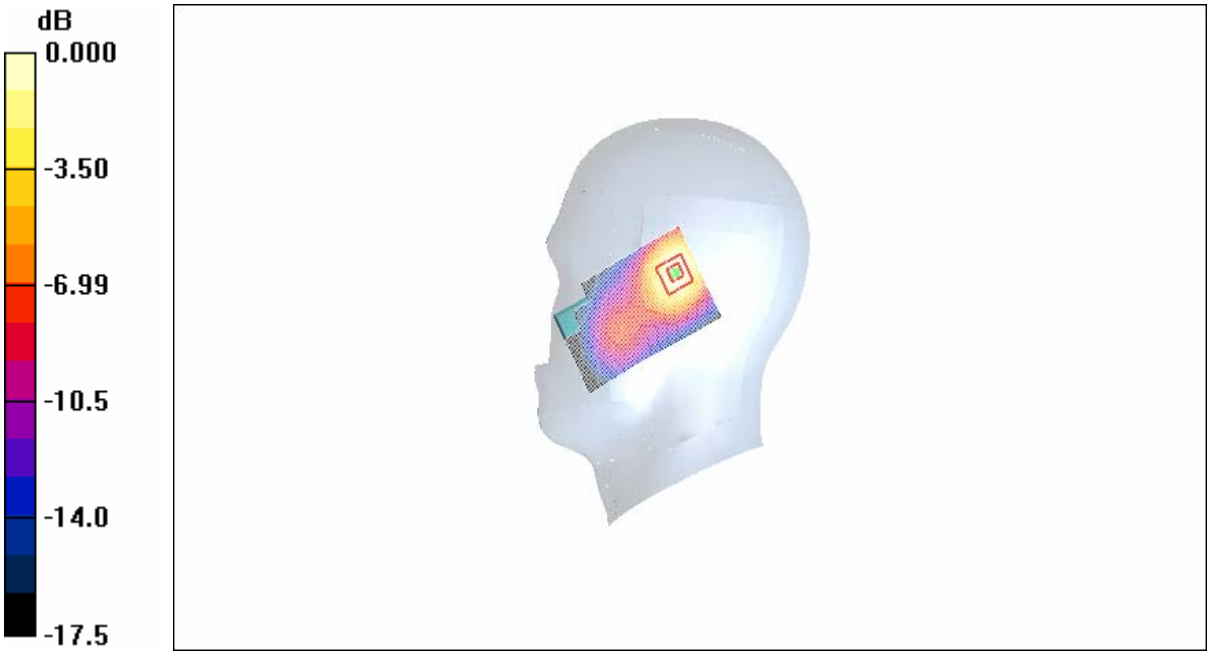
Tilt High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.5 V/m; Power Drift = -0.122 dB

Peak SAR (extrapolated) = 0.752 W/kg

SAR(1 g) = 0.432 mW/g; SAR(10 g) = 0.238 mW/g

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



0 dB = 0.471mW/g

Fig. 19 Right Hand Tilt 15°PCS 1900MHz CH810

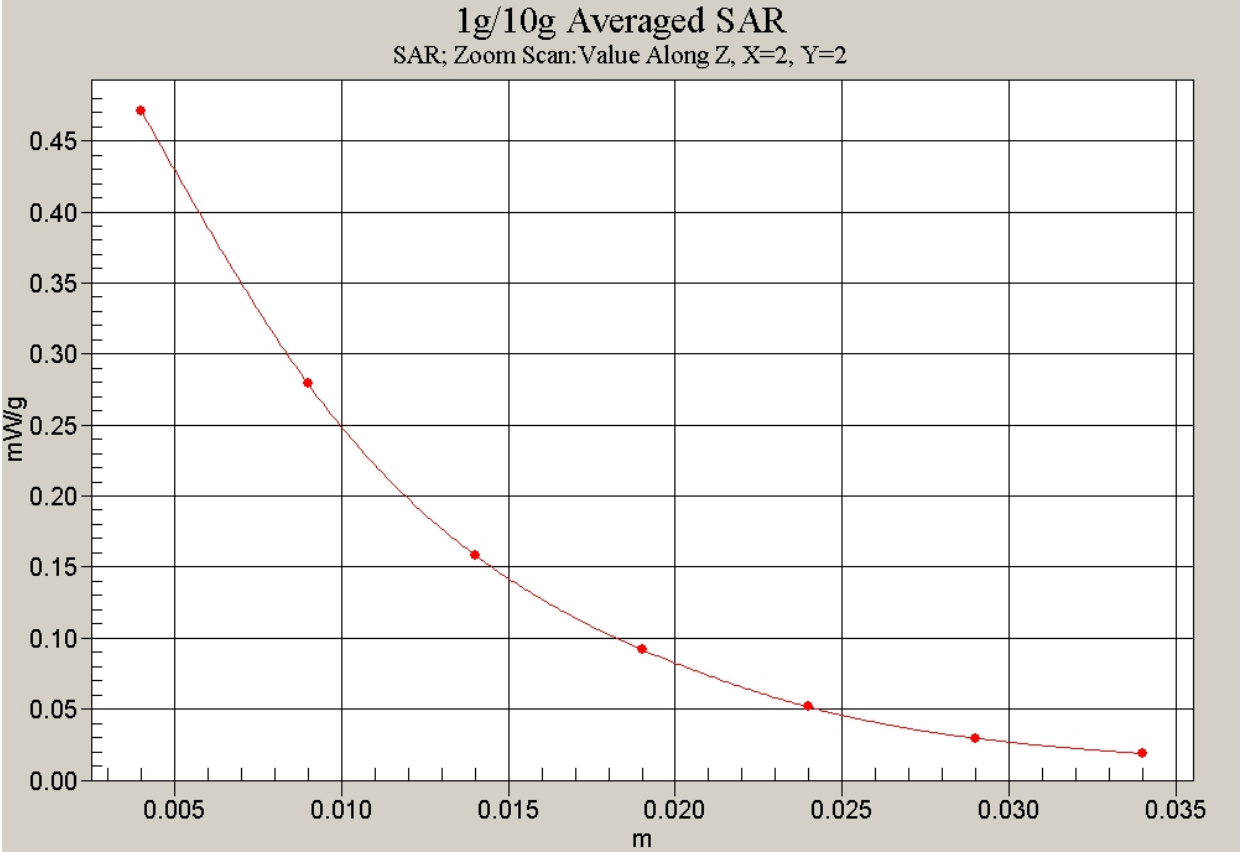


Fig. 20 Z-Scan at power reference point (PCS 1900MHz CH810)

1900 Right Tilt Middle

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Tilt Middle/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.523 mW/g

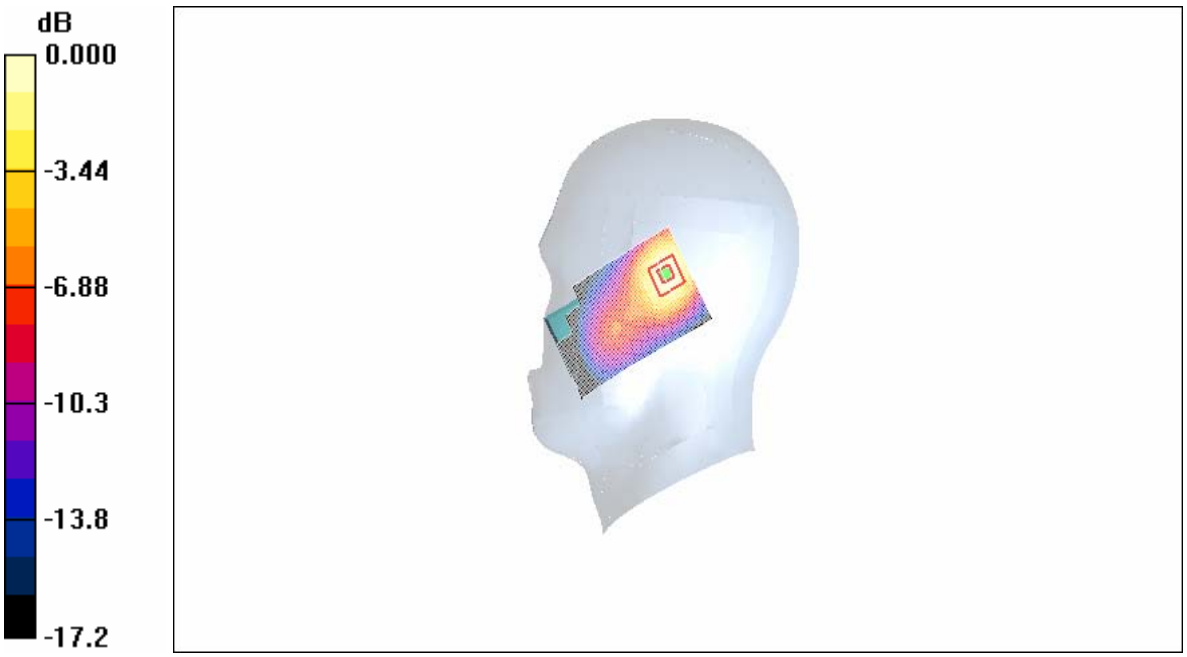
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.8 V/m; Power Drift = -0.046 dB

Peak SAR (extrapolated) = 0.819 W/kg

SAR(1 g) = 0.476 mW/g; SAR(10 g) = 0.264 mW/g

Maximum value of SAR (measured) = 0.522 mW/g



0 dB = 0.522mW/g

Fig. 21 Right Hand Tilt 15°PCS 1900MHz CH661

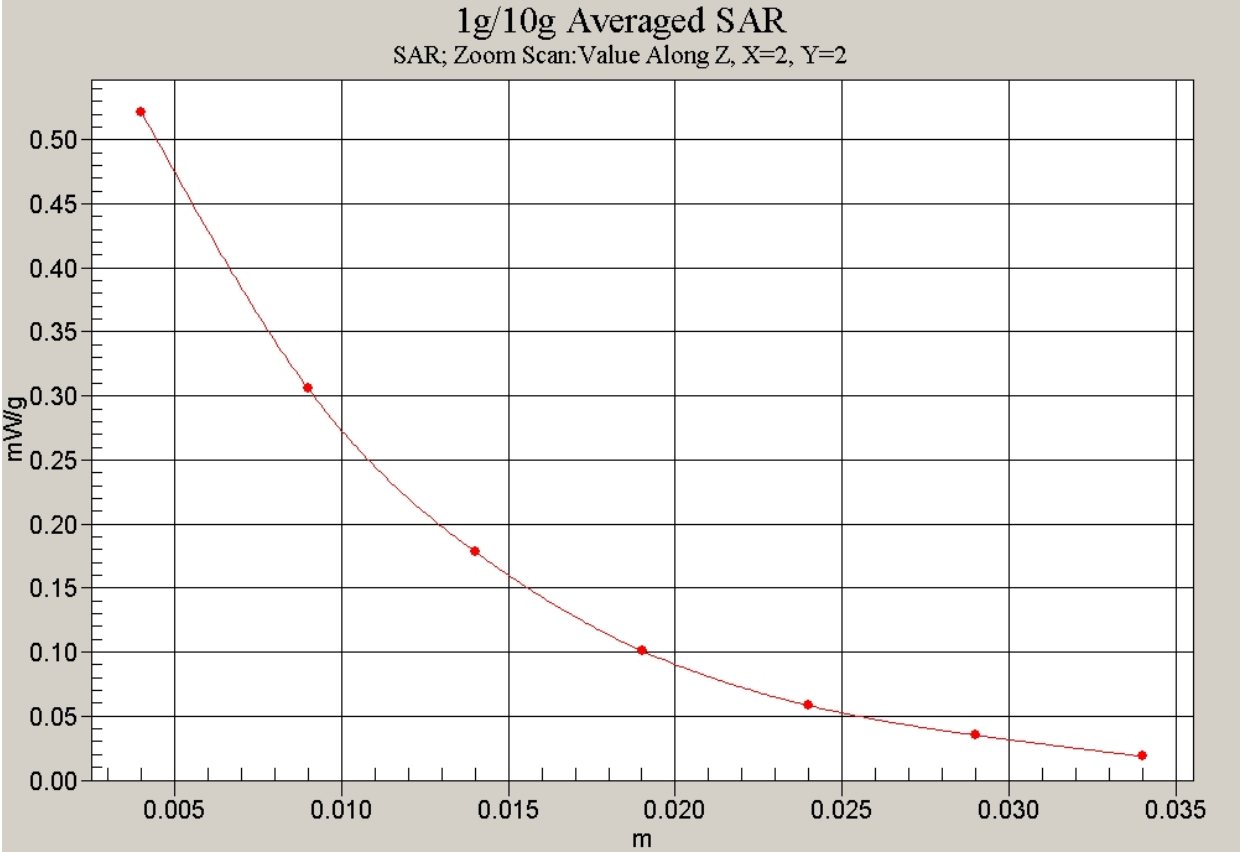


Fig. 22 Z-Scan at power reference point (PCS 1900MHz CH661)

1900 Right Tilt Low

Electronics: DAE3 Sn536

Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Tilt Low/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.340 mW/g

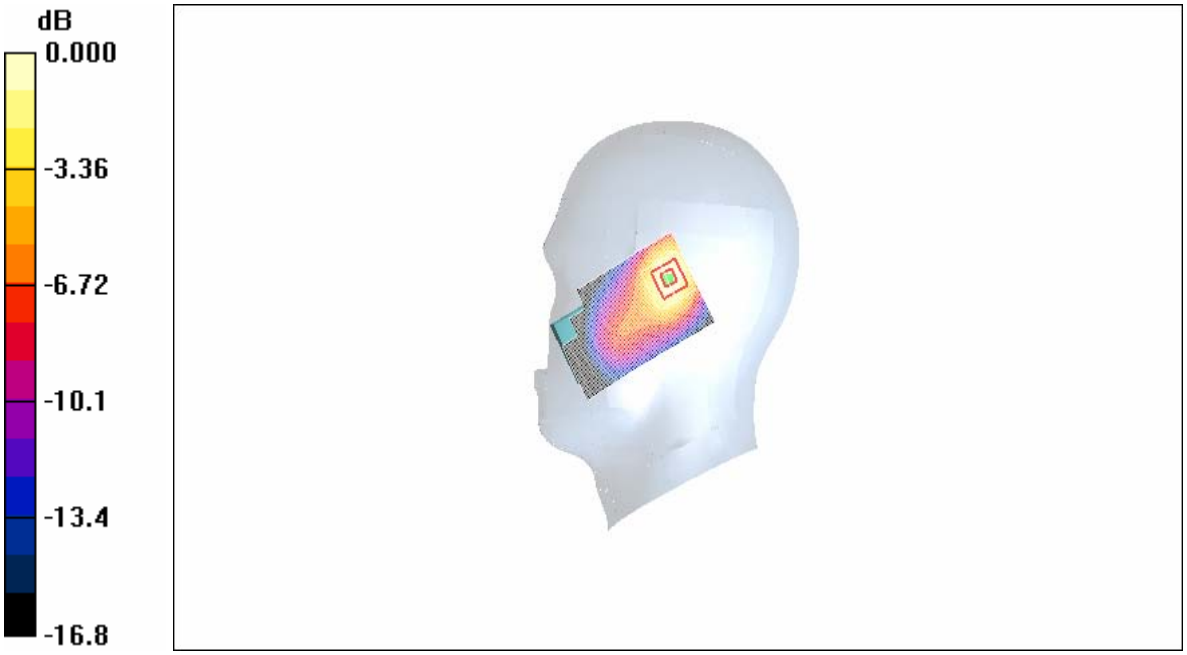
Tilt Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 0.540 W/kg

SAR(1 g) = 0.313 mW/g; SAR(10 g) = 0.175 mW/g

Maximum value of SAR (measured) = 0.341 mW/g



0 dB = 0.341mW/g

Fig. 23 Right Hand Tilt 15°PCS 1900MHz CH512

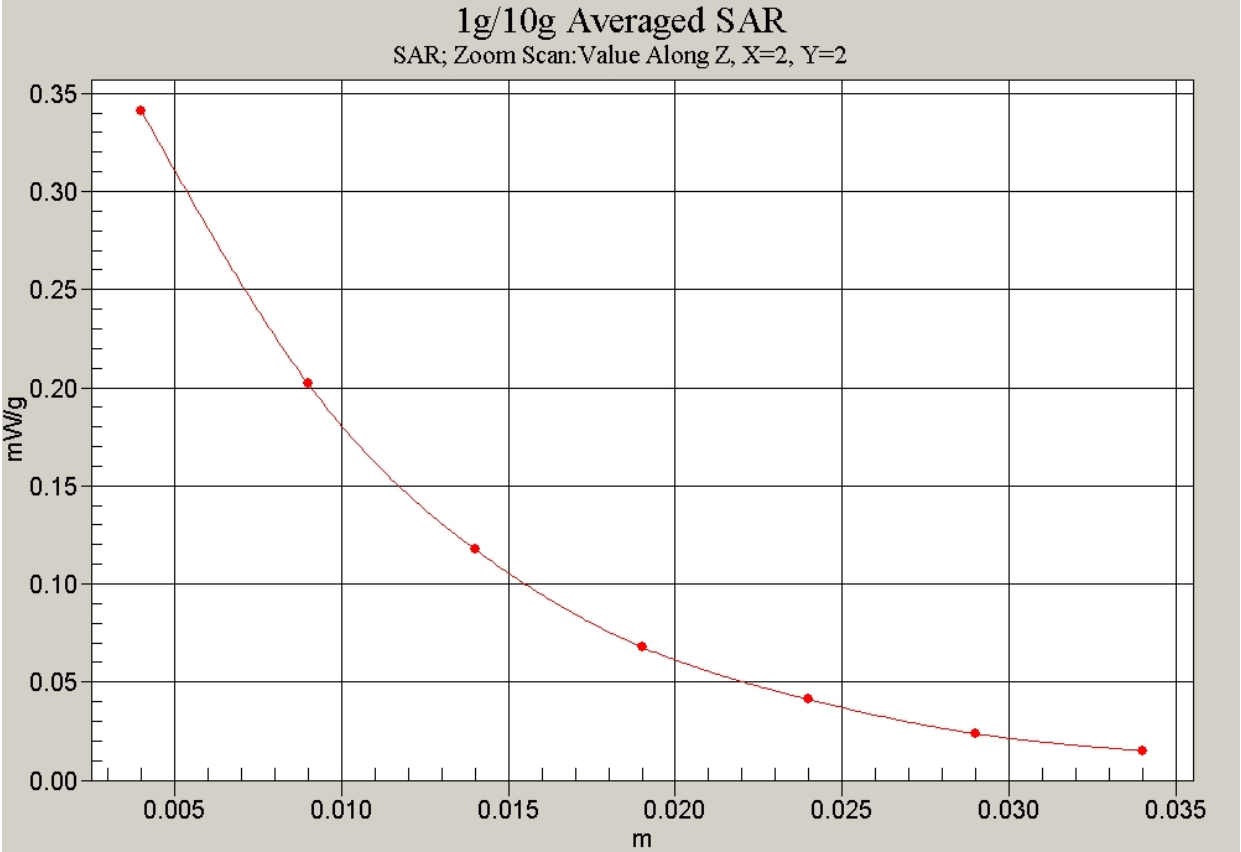


Fig. 24 Z-Scan at power reference point (PCS 1900MHz CH512)