

SAR TEST REPORT

No. 2006E02033

FCCID:QISC2008

for

HUAWEI Technologies Co., Ltd.

CDMA 1X Digital Mobile Phone

HUAWEI C2008

with

Hardware Version: VER.A

Software Version:V100R001CHSC06

Issued Date: 2007-01-05



No. DAT-P-114/01-01



No. L0442

Note:

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Test Laboratory:

TMC Beijing, Telecommunication Metrology Center of Ministry of Information Industry

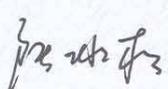
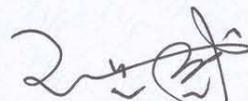
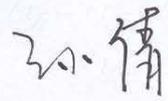
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SAR TEST REPORT

Test report No.	2006E02033	Date of report	January 5 th , 2007
Test laboratory	TMC Beijing, Telecommunication Metrology Center of MII	Client	HUAWEI Technologies Co., Ltd.
Test device	Product name: CDMA 1X Digital Mobile Phone Model type: HUAWEI C2008 Series number: 0942A17F FCCID: QISC2008		
Test reference documents	<p>EN 50360–2001: Product standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones.</p> <p>EN 50361–2001: Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones.</p> <p>ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.</p> <p>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.</p> <p>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)</p> <p>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.</p>		
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		
Signature	 Lu Bingsong Deputy Director of the laboratory (Approved for this report)	 Wang Hongbo SAR Project Leader (Reviewed for this report)	 Sun Qian SAR Test Engineer (Prepared for this report)

1 Test Laboratory

1.1 Testing Location

Company Name: TMC Beijing, Telecommunication Metrology Center of MII
Address: No 52, Huayuan beilu, Haidian District, Beijing,P.R.China
Postal Code: 100083
Telephone: 00861062303288
Fax: 00861062304793

1.2 Testing Environment

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.

1.3 Project data

Project Leader: Wang Hongbo
Test Engineer: Sun Qian
Testing Start Date: Dec 29, 2006
Testing End Date: Dec 29, 2006

2 Client Information

2.1 Applicant Information

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

2.2 Manufacturer Information

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

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

3.1 About EUT

Description: CDMA 1X Digital Mobile Phone
 Model: HUAWEI C2008
 Frequency Band: CDMA 835MHz
 FCC ID: QISC2008



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

3.2 Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	0942A17F	VER.A	V100R001CHSC06

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

3.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Lithium Battery	HBC80S	BYD6A2400644	Shenzhen BYD Co., Ltd TECH-POWER
AE2	AC/DC Adapter	TCA-050030C1	TPI661008197	INTERNATIONAL Co., Ltd/Shenzhen

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

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 1013, 384 and 777 respectively in the case of CDMA 835 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.

Test communication setup meet as followings:

Communication standard between mobile station and base station simulator 3GPP2 C.S0011-B

Radio configuration	RC3 (Supporting CDMA 1X)
Spreading Rate	SR1
Data Rate	9600bps
Service Options	SO55 (loop back mode)
Service Options	SO3 (voice mode)
Multiplex Options	The mobile station does not support this service.

Base station Simulator: CMU200

Test Parameter setup for maximum RF output power according to section 4.4.5 of 3GPP2 C.S0011-B:

Parameter	Units	Value
I_{or}	dBm/1.23MHz	-104
$\frac{PilotE_c}{I_{or}}$	dB	-7
$\frac{TrafficE_c}{I_{or}}$	dB	-7.4

For SAR test, the maximum power output is very important and essential; it is identical under the measurement uncertainty. It is proper to use typical Test Mode 3 (FW RC3, RVS RC3, SO55) as the worst case for SAR test.

Under the loop back mode between mobile station and CMU200, the transmitter continuously emits with maximum power more strong than voice mode, so the SAR test was done with loop

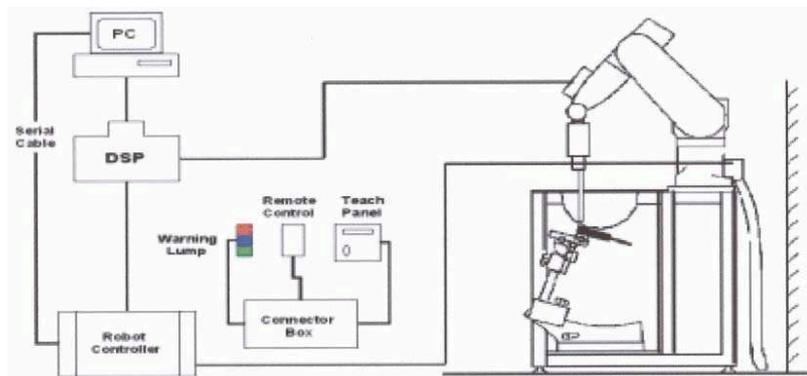
back mode.

To make the mobile emits maximum power; the output power of CMU200 would be adjusted to minimum power with the sensitivity of the mobile station to build steady connection with mobile station. The power level control parameter in the CMU200 is "0", it means "all up" and requires mobile station to emit with maximum power.

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 $\pm 0.02\text{mm}$. 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

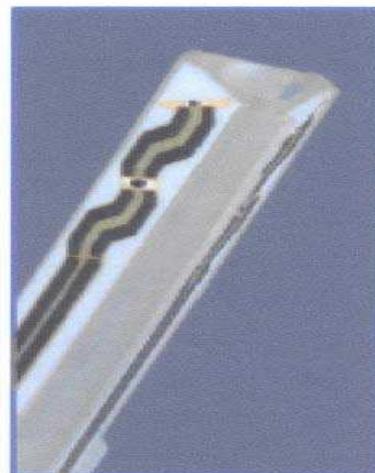
The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information 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

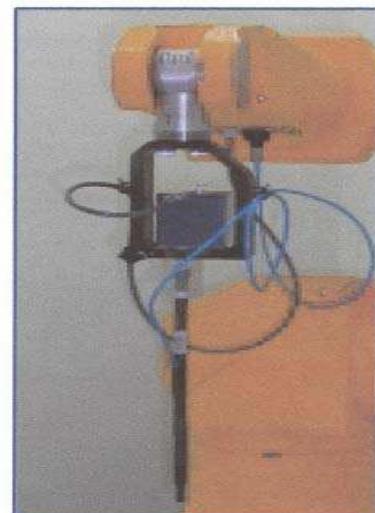
The SAR measurements were conducted with the dosimetric probe ET3DV6 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe has been calibrated according to the standard procedure with an accuracy of better than $\pm 10\%$. The spherical isotropy was evaluated and found to be better than $\pm 0.25\text{dB}$.

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 $\pm 8\%$) Calibration for other liquids and frequencies upon request
Frequency	10 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	5 μ W/g to > 100mW/g; Linearity: $\pm 0.2\text{dB}$
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 diameter: 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 $\pm 10\%$. 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.

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

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

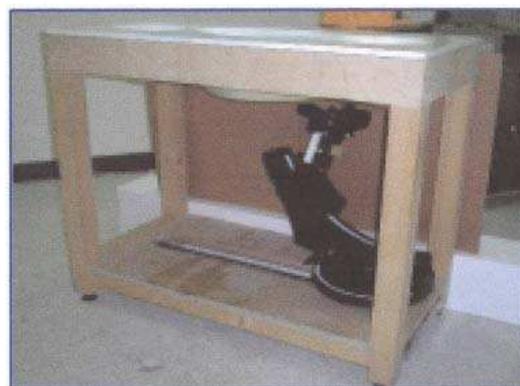
4.5.1 Device Holder for Transmitters

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 predefined phantom positions and measurement grids by the complete setup of 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



Picture6: Generic Twin Phantom

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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 1. Composition of the Head Tissue Equivalent Matter

MIXTURE %	FREQUENCY 835MHz
Water	41.45
Sugar	56.0
Salt	1.45
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz $\epsilon=41.5$ $\sigma=0.90$

Table 2. Composition of the Body Tissue Equivalent Matter

MIXTURE %	FREQUENCY 835MHz
Water	52.5
Sugar	45.0
Salt	1.4
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz $\epsilon=55.2$ $\sigma=0.97$

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 cm of the user in the uncontrolled environment.

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

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

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.

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.

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)

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 CONDUCTED OUTPUT POWER MEASUREMENT

6.1 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.

6.2 Conducted Power

6.2.1 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, 1013, 384 and 777 before SAR test and after SAR test.

6.2.2 Measurement result

Table 3: Conducted Power Measurement Results

	Conducted Power		
	Channel 1013(824.7MHz)	Channel 384(836.52MHz)	Channel 777(848.31MHz)
Before Test (dBm)	24.2	24.4	24.1
After Test (dBm)	24.1	24.2	23.9

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 14 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

7 TEST RESULTS

7.1 Dielectric Performance

Table 4: 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 Test Date: 29/12/2006			
/	Frequency	Permittivity ϵ	Conductivity σ (S/m)
Target value	835 MHz	41.5	0.90
Measurement value (Average of 10 tests)	835 MHz	41.7	0.88

Table 5: Dielectric Performance of Body Tissue Simulating Liquid

Measurement is made at temperature 22.5 °C and relative humidity 49%. Liquid temperature during the test: 21.8°C Test Date: 29/12/2006			
/	Frequency	Permittivity ϵ	Conductivity σ (S/m)
Target value	835 MHz	55.2	0.97
Measurement value (Average of 10 tests)	835 MHz	55.6	0.95

7.2 System Validation

Table 6: System Validation

Measurement is made at temperature 22.5 °C, relative humidity 49%, input power 250 mW. Liquid temperature during the test: 21.4°C Test Date: 29/12/2006							
Liquid parameters		Frequency		Permittivity ϵ		Conductivity σ (S/m)	
		835 MHz		41.7		0.88	
Verification results	Frequency	Target value (W/kg)		Measurement value (W/kg)			
		10 g Average	1 g Average	10 g Average	1 g Average		
	835 MHz	1.55	2.375	1.62	2.48		

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).

7.3 Summary of Measurement Results

Table 7: SAR Values (Head, 835 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)	0.525	0.787	-0.127
Left hand, Touch cheek, Mid frequency(See Fig.3)	0.647	0.963	-0.145
Left hand, Touch cheek, Bottom frequency(See Fig.5)	0.353	0.523	-0.193
Left hand, Tilt 15 Degree, Top frequency(See Fig.7)	0.286	0.417	-0.169
Left hand, Tilt 15 Degree, Mid frequency(See Fig.9)	0.353	0.512	-0.158
Left hand, Tilt 15 Degree, Bottom frequency(See Fig.11)	0.192	0.278	-0.163
Right hand, Touch cheek, Top frequency(See Fig.13)	0.531	0.791	-0.175
Right hand, Touch cheek, Mid frequency(See Fig.15)	0.691	1.02	-0.191
Right hand, Touch cheek, Bottom frequency(See Fig.17)	0.362	0.535	-0.173
Right hand, Tilt 15 Degree, Top frequency(See Fig.19)	0.293	0.424	-0.180
Right hand, Tilt 15 Degree, Mid frequency(See Fig.21)	0.368	0.528	-0.157
Right hand, Tilt 15 Degree, Bottom frequency(See Fig.23)	0.199	0.286	-0.187

Table 8: SAR Values (Body, 835 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)	0.222	0.313	-0.139
Body, Towards Phantom, Mid frequency(See Fig.27)	0.285	0.398	-0.145
Body, Towards Phantom, Bottom frequency(See Fig.29)	0.153	0.212	-0.200
Body, Towards Ground, Top frequency(See Fig.31)	0.197	0.269	-0.164
Body, Towards Ground, Mid frequency(See Fig.33)	0.247	0.339	-0.117
Body, Towards Ground, Bottom frequency(See Fig.35)	0.237	0.323	-0.033

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

8 Measurement Uncertainty

SN	a	Typ e	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	$\frac{(1-c_p)^{1/2}}{2}$	4.3	∞
4	Hemispherical Isotropy	B	9.4	R	√3	√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	B	2.9	R	√3	1	1.7	∞

	Shell							
12	Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
Test sample Related								
13	Test Sample Positioning	A	4.9	N	1	1	4.9	N-1
14	Device Holder Uncertainty	A	6.1	N	1	1	6.1	N-1
15	Output Power Variation - SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.9	∞
Phantom and Tissue Parameters								
16	Phantom Uncertainty (shape and thickness tolerances)	B	1.0	R	$\sqrt{3}$	1	0.6	∞
17	Liquid Conductivity - deviation from target values	B	5.0	R	$\sqrt{3}$	0.64	1.7	∞
18	Liquid Conductivity - measurement uncertainty	B	5.0	N	1	0.64	1.7	M
19	Liquid Permittivity - deviation from target values	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
20	Liquid Permittivity - measurement uncertainty	B	5.0	N	1	0.6	1.7	M
Combined Standard Uncertainty					RSS		11.25	
Expanded Uncertainty (95% CONFIDENCE INTERVAL)					K=2		22.5	

9 MAIN TEST INSTRUMENTS

Table 9: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	HP 8753E	US38433212	August 30, 2006	One year
02	Power meter	NRVD	101253	June 20, 2006	One year
03	Power sensor	NRV-Z5	100333		
04	Power sensor	NRV-Z6	100011	September 2, 2006	One year
05	Signal Generator	E4433B	US37230472	September 4, 2006	One Year
06	Amplifier	VTL5400	0505	No Calibration Requested	
07	BTS	CMU 200	105948	August 15, 2006	One year
08	E-field Probe	SPEAG ET3DV6	1736	December 1, 2006	One year
09	DAE	SPEAG DAE3	536	July 11, 2006	One year
10	Dipole	D835V2	443	September 3, 2005	Two years

END OF REPORT BODY

ANNEX A MEASUREMENT PROCESS

The evaluation was performed with the following procedure:

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

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

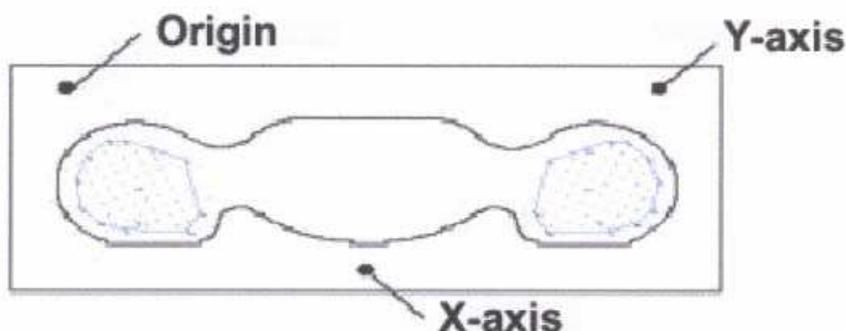
Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7 x 7 x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

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-axis. 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.

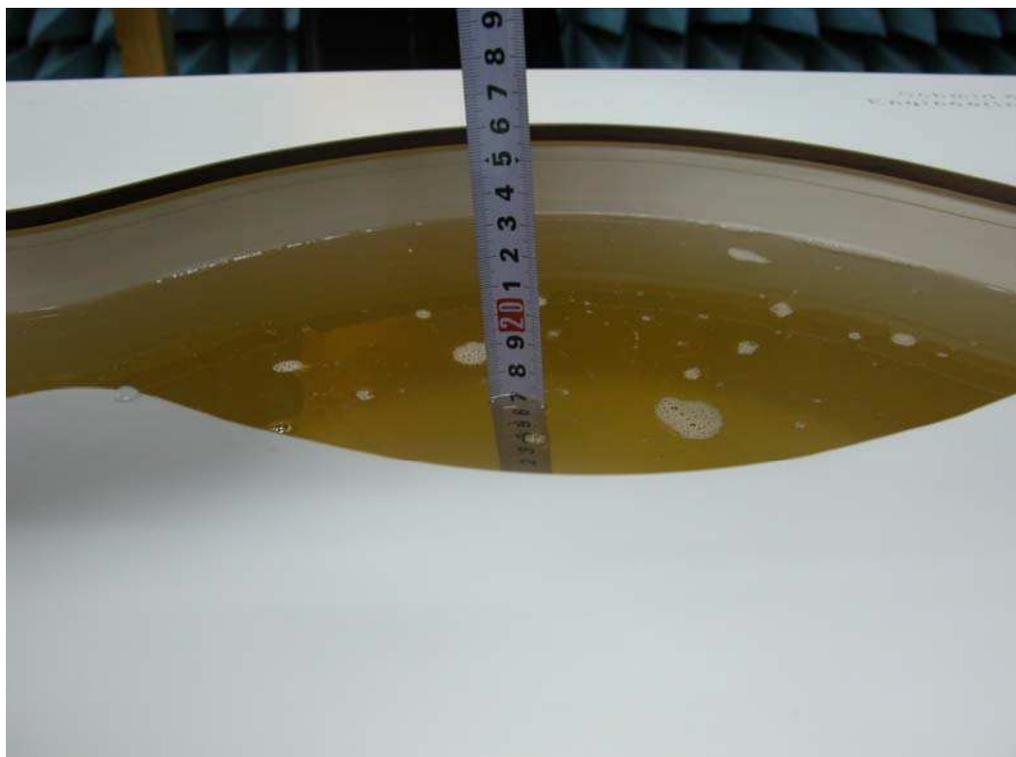


Picture A: SAR Measurement Points in Area Scan

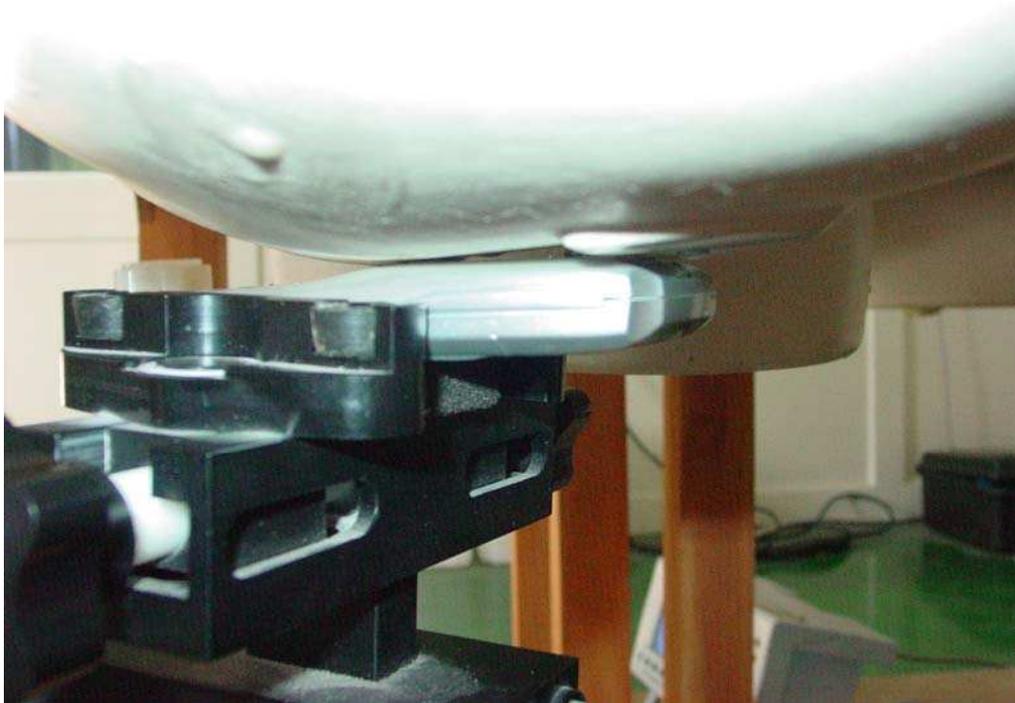
ANNEX B TEST LAYOUT



Picture B1: Specific Absorption Rate Test Layout



Picture B2: Liquid depth in the Flat Phantom (CDMA 835 MHz)



Picture B3: Left Hand Touch Cheek Position



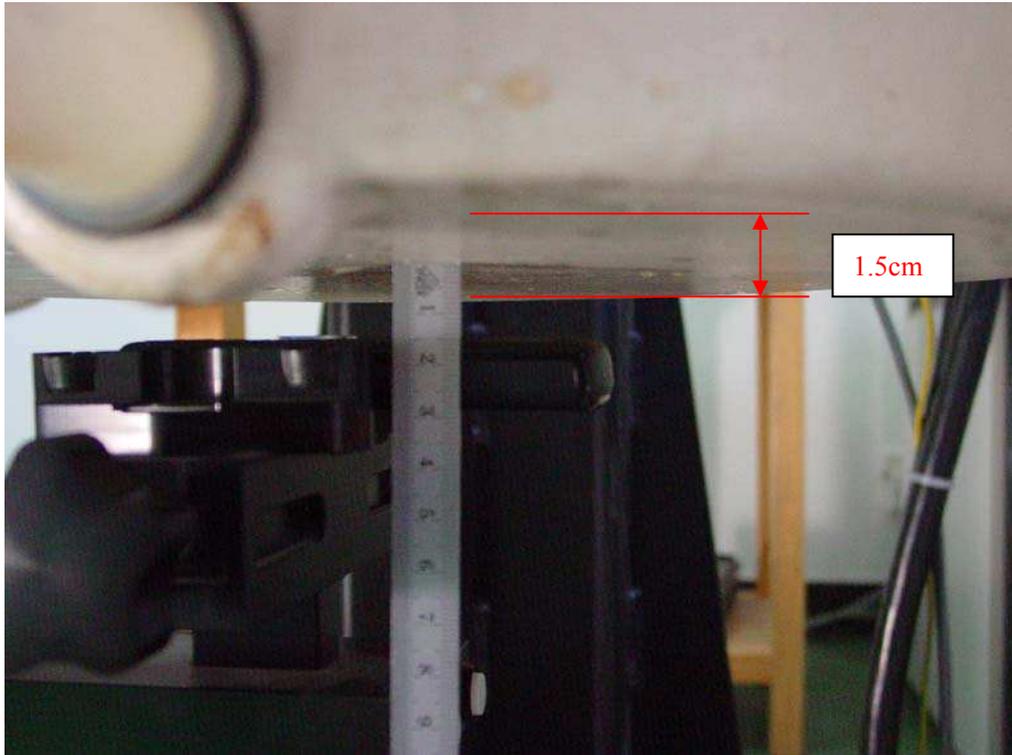
Picture B4: Left Hand Tilt 15° Position



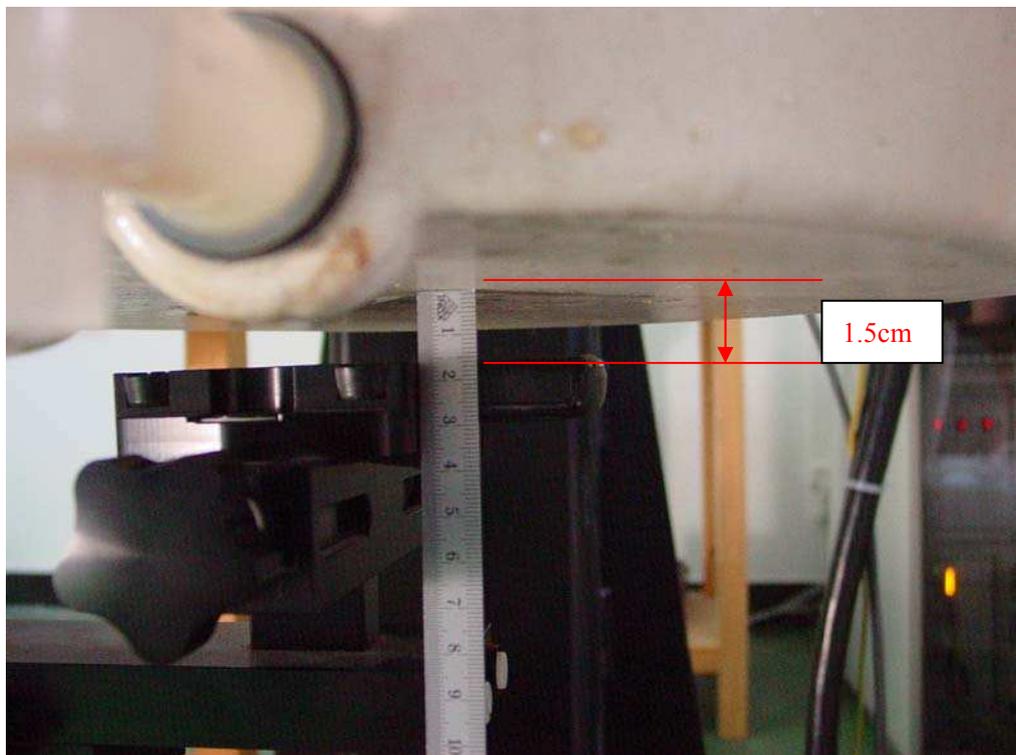
Picture B5: Right Hand Touch Cheek Position



Picture B6: 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

CDMA 1X Left Cheek High

Date/Time: 2006-12-29 08:11:07

Electronics: DAE3 Sn536

Medium: 835 Head

Medium parameters used (interpolated): $\sigma = 0.88$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.5°C Liquid Temperature: 21.4°C

Communication System: CDMA 1X-new Frequency: 848.31 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

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

Maximum value of SAR (interpolated) = 0.883 mW/g

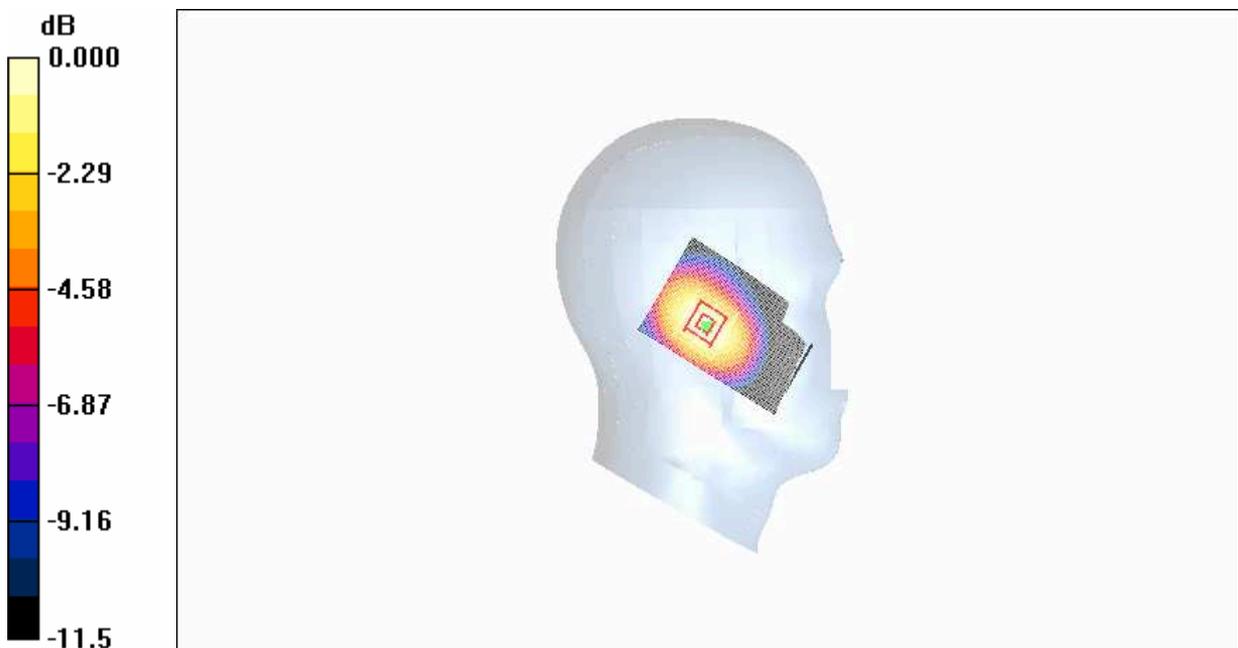
Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 26.8 V/m; Power Drift = -0.127dB

Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.787 mW/g; SAR(10 g) = 0.525 mW/g

Maximum value of SAR (measured) = 0.846 mW/g



0 dB = 0.846mW/g

Fig. 1 Left Hand Touch Cheek CDMA 835MHz CH777

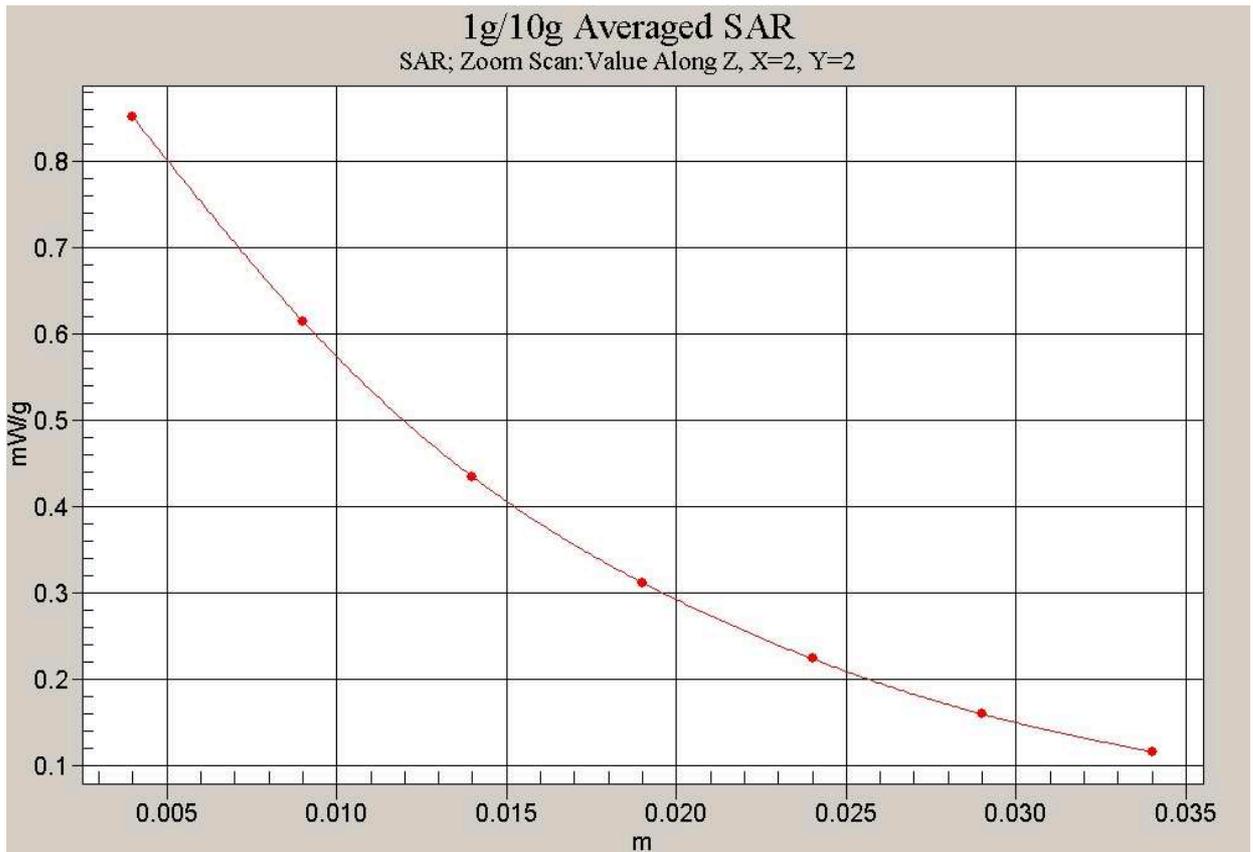


Fig. 2 Z-Scan at power reference point (CDMA 835MHz CH777)

CDMA 1X Left Cheek Middle

Date/Time: 2006-12-29 08:47:12

Electronics: DAE3 Sn536

Medium: 835 Head

Medium parameters used (interpolated): $\sigma = 0.88$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.5°C Liquid Temperature: 21.4°C

Communication System: CDMA 1X-new Frequency: 836.52 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

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

Maximum value of SAR (interpolated) = 1.12 mW/g

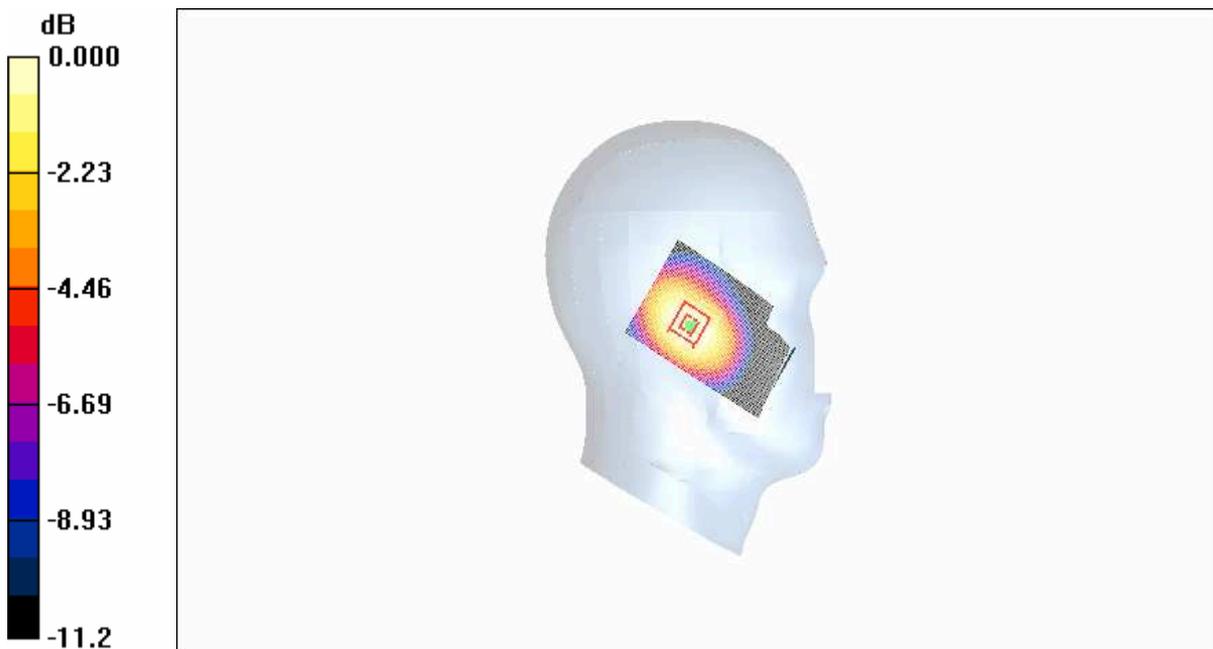
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 32.1 V/m; Power Drift = -0.145 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.963 mW/g; SAR(10 g) = 0.647 mW/g

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



0 dB = 1.03mW/g

Fig. 3 Left Hand Touch Cheek CDMA 835MHz CH384

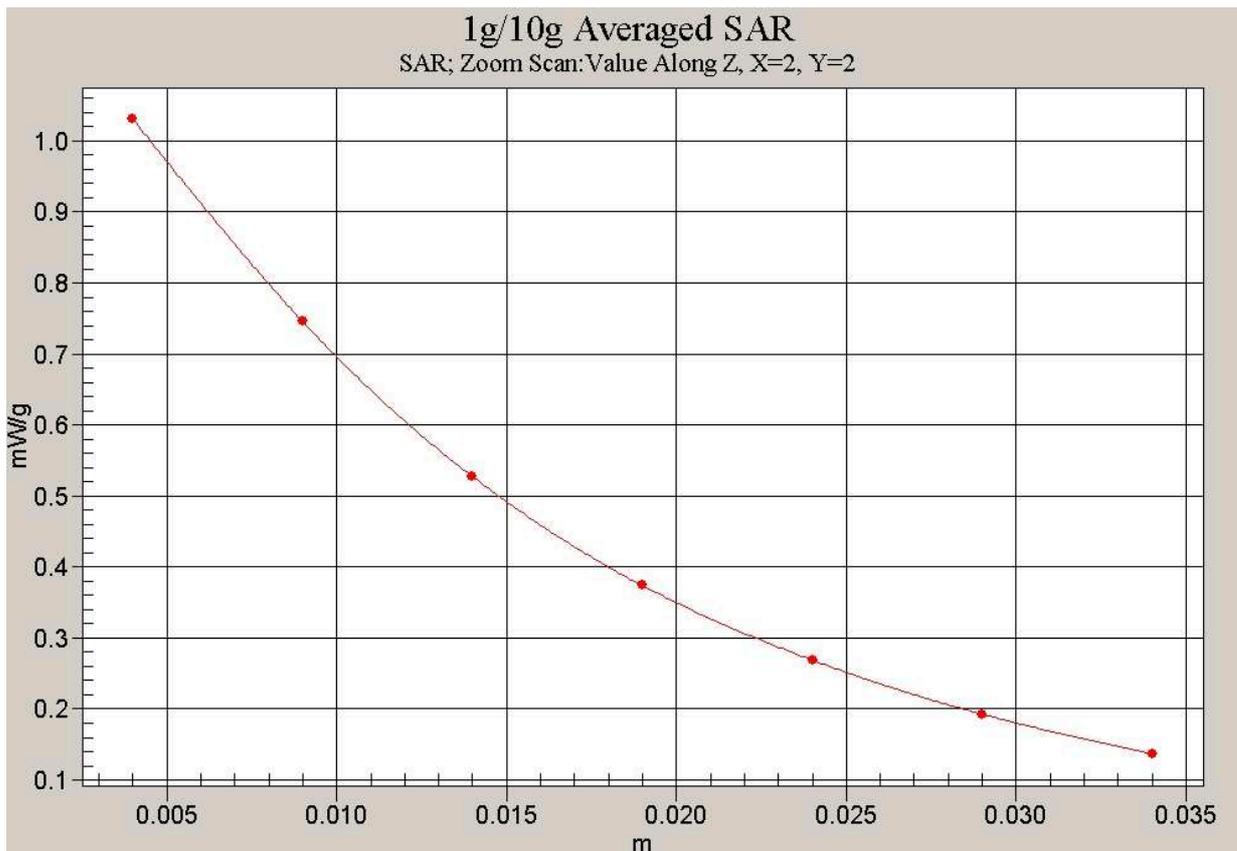


Fig. 4 Z-Scan at power reference point (CDMA 835MHz CH384)

CDMA 1X Left Cheek Low

Date/Time: 2006-12-29 09:14:40

Electronics: DAE3 Sn536

Medium: 835 Head

Medium parameters used (interpolated): $\sigma = 0.88$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.5°C Liquid Temperature: 21.4°C

Communication System: CDMA 1X-new Frequency: 824.7 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

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

Maximum value of SAR (interpolated) = 0.591 mW/g

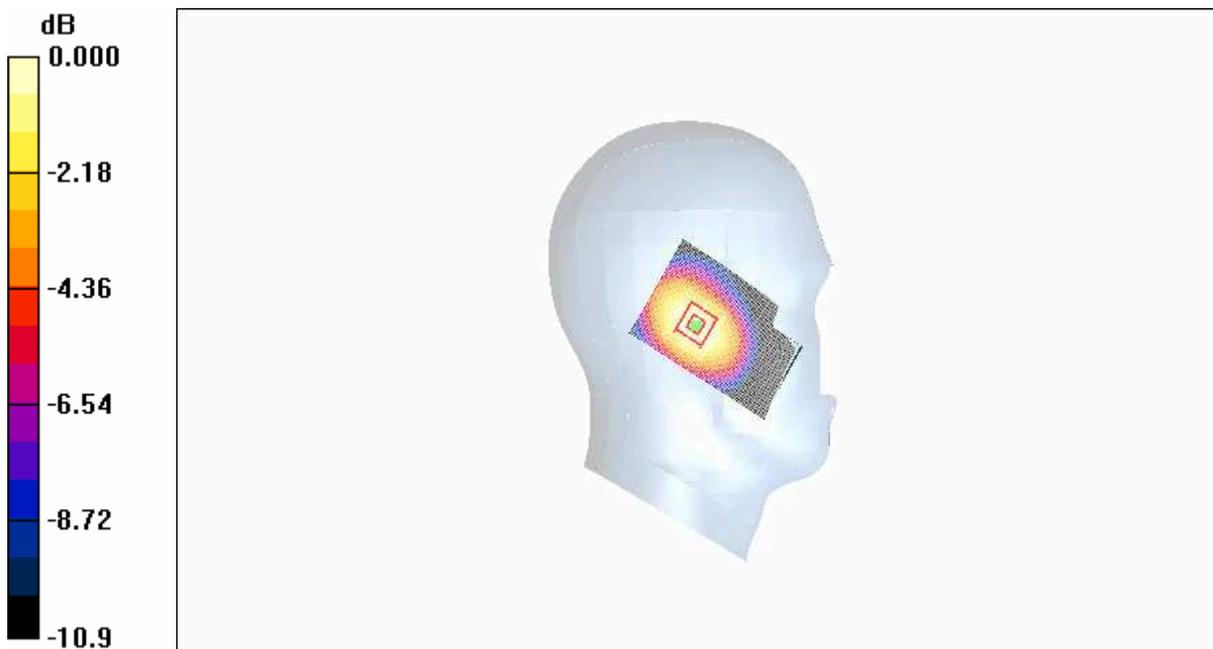
Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.0 V/m; Power Drift = -0.193 dB

Peak SAR (extrapolated) = 0.720 W/kg

SAR(1 g) = 0.523 mW/g; SAR(10 g) = 0.353 mW/g

Maximum value of SAR (measured) = 0.559 mW/g



0 dB = 0.559mW/g

Fig. 5 Left Hand Touch Cheek CDMA 835MHz CH1013

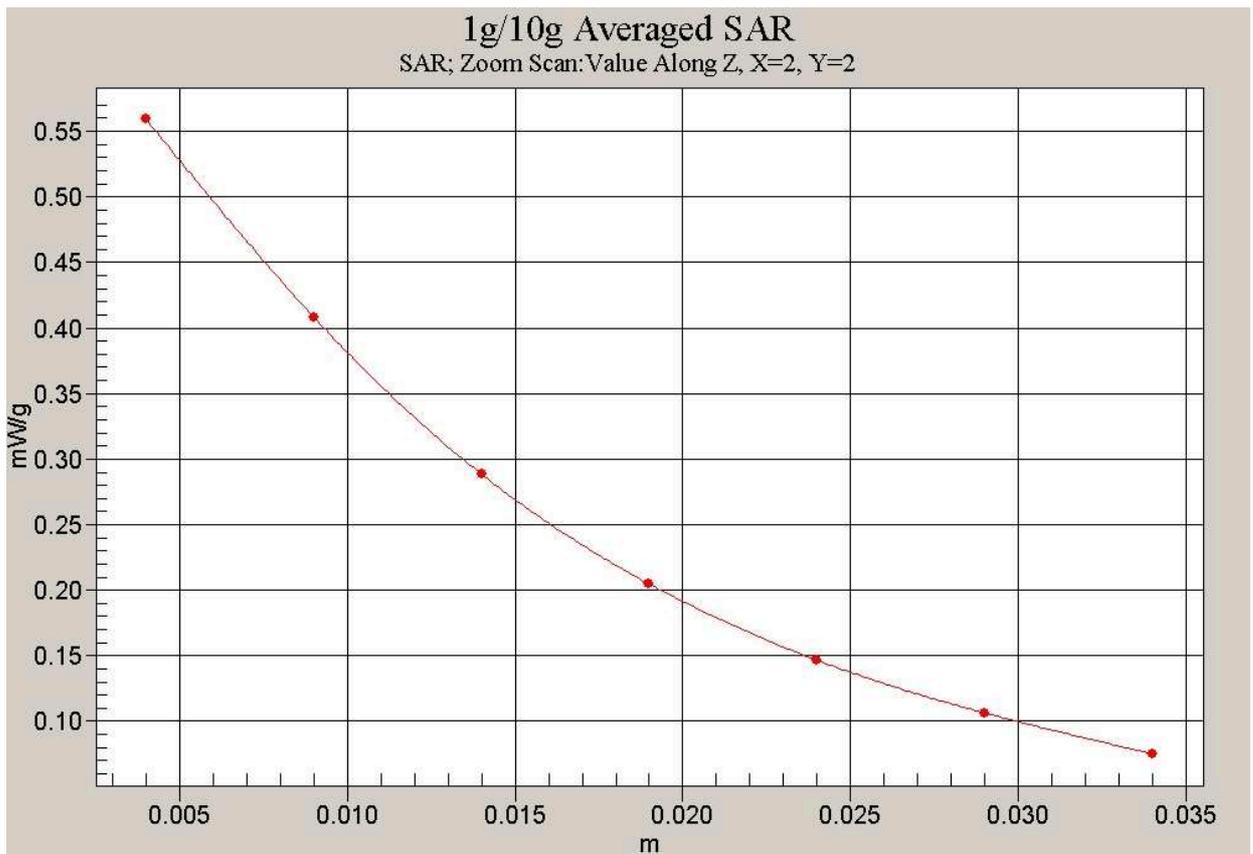


Fig. 6 Z-Scan at power reference point (CDMA 835MHz CH1013)

CDMA 1X Left Tilt High

Date/Time: 2006-12-29 10:58:35

Electronics: DAE3 Sn536

Medium: 835 Head

Medium parameters used (interpolated): $\sigma = 0.88$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.5°C Liquid Temperature: 21.4°C

Communication System: CDMA 1X-new Frequency: 848.31 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

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

Maximum value of SAR (interpolated) = 0.453 mW/g

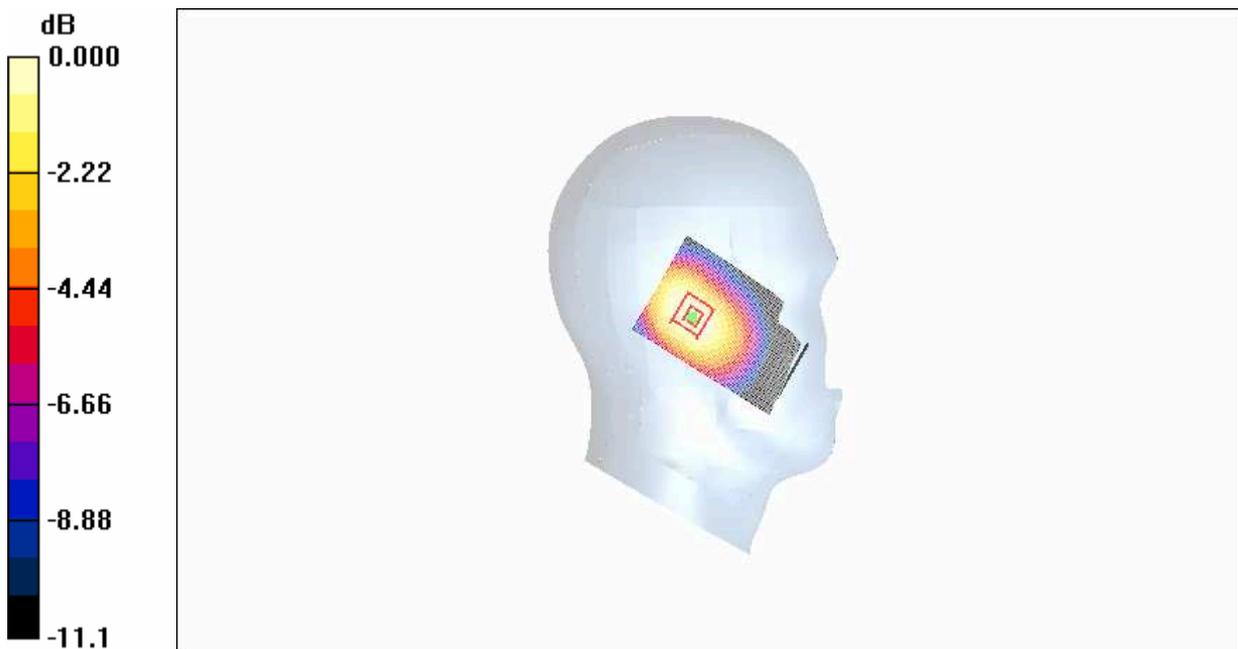
Tilt High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 21.8 V/m; Power Drift = -0.169 dB

Peak SAR (extrapolated) = 0.569 W/kg

SAR(1 g) = 0.417 mW/g; SAR(10 g) = 0.286 mW/g

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



0 dB = 0.442mW/g

Fig. 7 Left Hand Tilt 15°CDMA 835MHz CH777

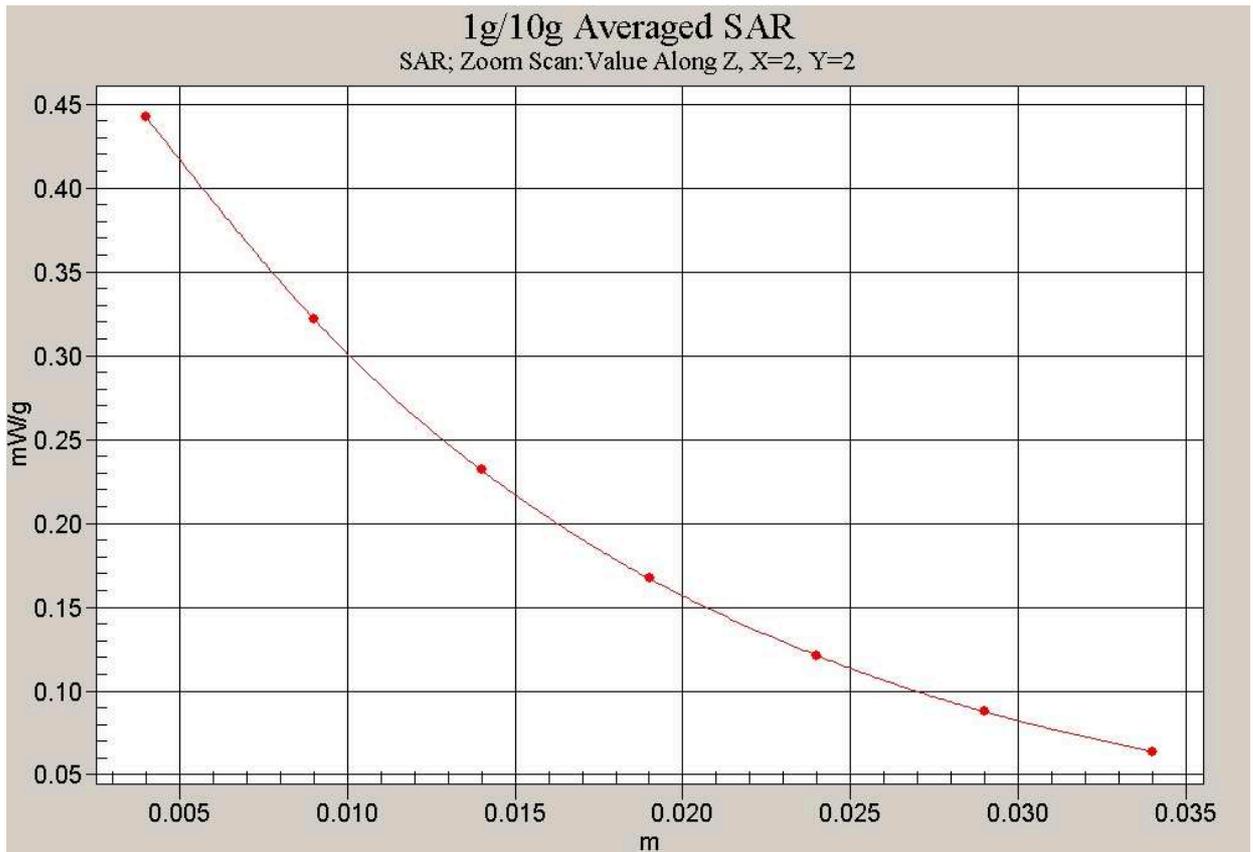


Fig. 8 Z-Scan at power reference point (CDMA 835MHz CH777)

CDMA 1X Left Tilt Middle

Date/Time: 2006-12-29 10:23:36

Electronics: DAE3 Sn536

Medium: 835 Head

Medium parameters used (interpolated): $\sigma = 0.88$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.5°C Liquid Temperature: 21.4°C

Communication System: CDMA 1X-new Frequency: 836.52 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

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

Maximum value of SAR (interpolated) = 0.565 mW/g

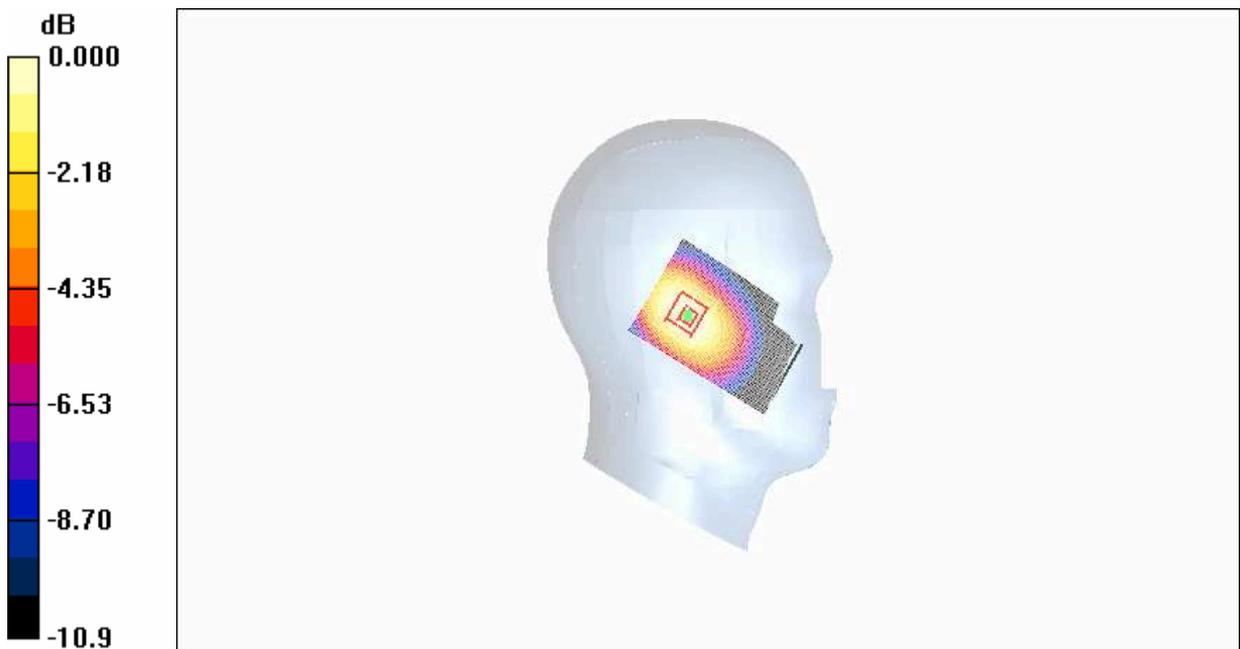
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.7 V/m; Power Drift = -0.158 dB

Peak SAR (extrapolated) = 0.699 W/kg

SAR(1 g) = 0.512 mW/g; SAR(10 g) = 0.353 mW/g

Maximum value of SAR (measured) = 0.549 mW/g



0 dB = 0.549mW/g

Fig. 9 Left Hand Tilt 15°CDMA 835MHz CH384

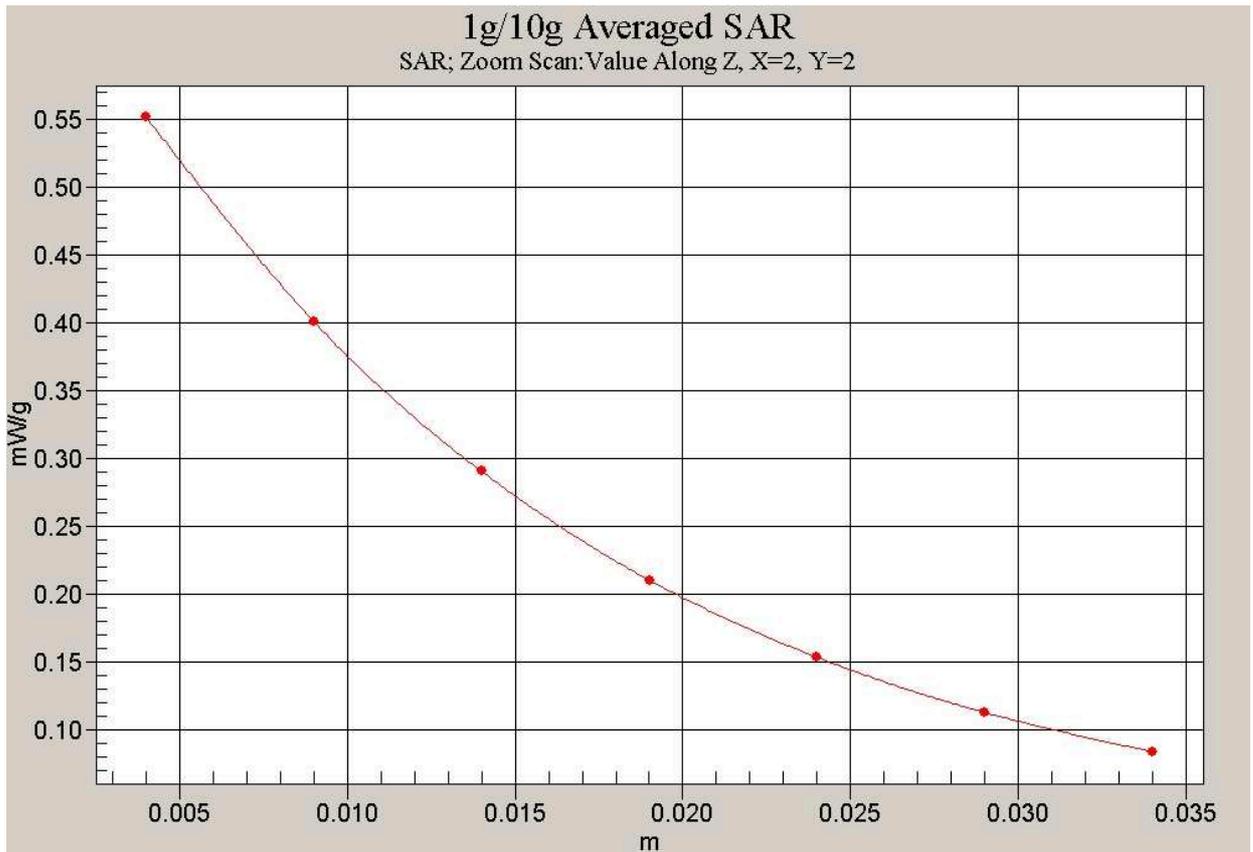


Fig. 10 Z-Scan at power reference point (CDMA 835MHz CH384)

CDMA 1X Left Tilt Low

Date/Time: 2006-12-29 09:51:03

Electronics: DAE3 Sn536

Medium: 835 Head

Medium parameters used (interpolated): $\sigma = 0.88$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.5oC Liquid Temperature: 21.4oC

Communication System: CDMA 1X-new Frequency: 824.7 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

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

Maximum value of SAR (interpolated) = 0.303 mW/g

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

Reference Value = 18.2 V/m; Power Drift = -0.163 dB

Peak SAR (extrapolated) = 0.378 W/kg

SAR(1 g) = 0.278 mW/g; SAR(10 g) = 0.192 mW/g

Maximum value of SAR (measured) = 0.298 mW/g

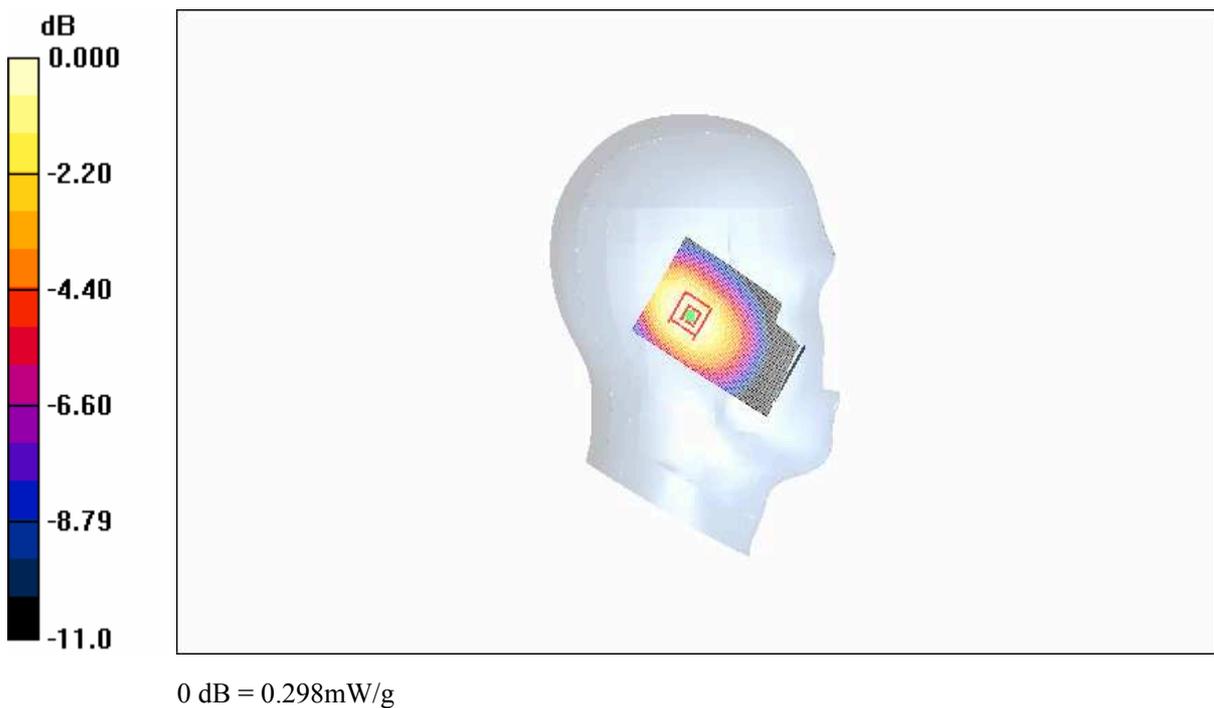


Fig. 11 Left Hand Tilt 15°CDMA 835MHz CH1013