



No. DAT-P-114/01-10

TEST REPORT

No. 2005E00557

FCC ID	QISC218-800
Test name	Electromagnetic Field (Specific Absorption Rate)
Product	CDMA Mobile Station
Model	C218
Client	Huawei Technologies Co., Ltd.
Type of test	Entrusted

Telecommunication Metrology Center
of Ministry of Information Industry



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No. 2005E00557

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GENERAL SUMMARY

Product	CDMA Mobile Station	Model	C218
Client	Huawei Technologies Co., Ltd.	Manufacturer	Huawei Technologies Co., Ltd.
Type of test	Entrusted	Arrival Date of sample	May 30 , 2005
Place of sampling	(Blank)	Carrier of the samples	Meng Fantao
Quantity of the samples	One	Date of product	(Blank)
Base of the samples	(Blank)	Items of test	SAR
Series number	0300033F		
Standard(s)	<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>IEC 62209 Draft: Procedure to Determine the Specific Absorption Rate(SAR) for Hand-hold Mobile Phone (Part 2)</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>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> <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>		
Conclusion	<p>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.</p> <p>General Judgment: Pass</p> <p align="right">  (Stamp) Date of issue: June 2, 2005 </p>		
Comment	<p>TX Freq. Band: 824-849 MHz (CDMA)</p> <p>Max. Power: 0.25 Watt (CDMA)</p> <p>Antenna Character: 21mm</p> <p>The test results relate only to the measured sample(s).</p>		

Approved by (Lu Minniu) Reviewed by (Wang Hongbo) Performed by (Qi Dianyuan)

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1 COMPETENCE AND WARRANTIES

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3 DESCRIPTION OF EUT

3.1 Addressing Information Related to EUT

Table 1: Applicant (The Client)

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

Table 2: Manufacturer

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

3.2 Constituents of EUT

Table 3: Constituents of Samples

Description	Model	Serial Number	Manufacturer
Handset	C218	0300033F	Huawei Technologies Co., Ltd.
Lithium Battery	HBC218	HGY540202724	Huawei Technologies Co., Ltd.
AC/DC Adapter	MU03-M050040-A1	\	Weihai Honglin Technologies Co., Ltd.



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

3.3 General Description

Equipment Under Test (EUT) is a model of CDMA portable Mobile Station (MS) with non-integrated antenna. It consists of Handset and normal options: Lithium Battery and AC/DC Adapter as Table 3 and Fig.1.

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

During SAR test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. 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.

4.2 SAR Measurement Set-up

These measurements were performed with the automated near-field scanning system DASY4 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.

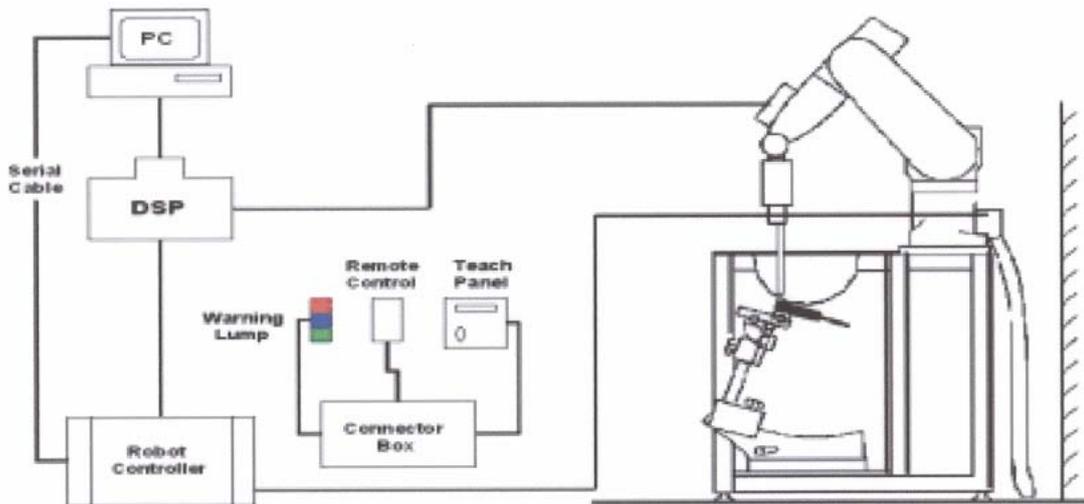


Figure 2. SAR Lab Test Measurement Set-up

The DAE3 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: $\pm 0.2\text{ dB}$ (30 MHz to 3 GHz)
Directivity	$\pm 0.2\text{ dB}$ in brain tissue (rotation around probe axis)

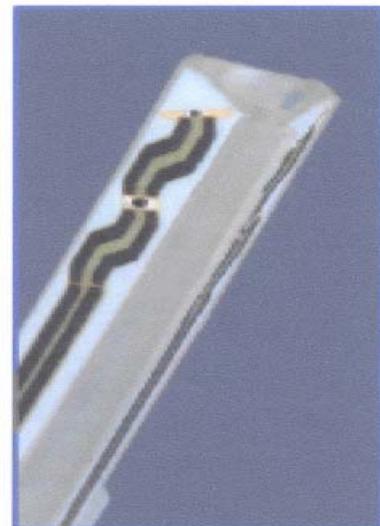


Figure 3. ET3DV6 E-field Probe

	±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 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



Figure 4. 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).

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).



Figure 5. Device Holder

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 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

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.

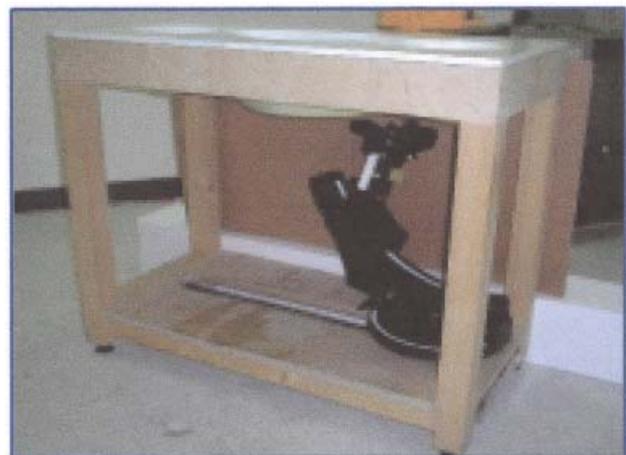


Figure 6. Generic Twin Phantom

Table 4. Composition of the Head Tissue Equivalent Matter

MIXTURE %	FREQUENCY 824-849MHz
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 5. Composition of the Body Tissue Equivalent Matter

MIXTURE %	FREQUENCY 824-849MHz
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 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 Draft : Procedure to Determine the Specific Absorption Rate(SAR) for Hand-held Mobile Phone (Part 2)

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.

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

5.3 Character of the Test

Handsets that are held on the side of a person's head next to the ear have been tested using realistic-shaped head phantoms.

Since it may be used for body-worn situation, the mobile phone is test with the flat phantom to simulate this case.

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 TEST RESULTS

7.1 Dielectric Performance

Table 7: 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	835 MHz	41.5	0.90
Measurement value (Average of 10 tests)	835 MHz	41.7	0.88

Table 8: Dielectric Performance of Body Tissue Simulating Liquid

Measurement is made at temperature 22.6 °C and relative humidity 51%. Liquid temperature during the test: 22.0°C			
/	Frequency	Permittivity ϵ	Conductivity σ(S/m)
Target value	835 MHz	55.2	0.97
Measurement value (Average of 10 tests)	835 MHz	54.3	0.97

7.2 System Validation

Table 9: System Validation

Measurement is made at temperature 23.3 °C, relative humidity 47%, input power 250 mW. Liquid temperature during the test: 22.5°C					
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	1.52	2.35

7.3 Summary of Measurement Results (Head, 835 MHz Band)

Table 10: SAR Values (835 MHz Band, head)

Temperature: 23 °C, humidity: 50%. Liquid temperature during the test: 22.2°C			
Limit of SAR (W/kg)	10 g Average	1 g Average	Conducted Power before/after each test (dBm)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Left hand, Touch cheek, Top frequency	0.702	0.994	23.7/23.8
Left hand, Touch cheek, Mid frequency	0.782	1.28	24.3/24.3
Left hand, Touch cheek, Bottom frequency	0.780	1.25	25.2/25.4
Left hand, Tilt 15 Degree, Top frequency	0.472	0.747	23.7/23.7
Left hand, Tilt 15 Degree, Mid frequency	0.821	1.27	24.4/24.3
Left hand, Tilt 15 Degree, Bottom frequency	0.762	1.19	25.3/25.5
Right hand, Touch cheek, Top frequency	0.583	0.815	23.8/23.8
Right hand, Touch cheek, Mid frequency	0.843	1.19	24.5/24.5
Right hand, Touch cheek, Bottom frequency	0.846	1.19	25.2/25.4
Right hand, Tilt 15 Degree, Top frequency	0.420	0.645	23.7/23.7
Right hand, Tilt 15 Degree, Mid frequency	0.603	0.931	24.3/24.5
Right hand, Tilt 15 Degree, Bottom frequency	0.620	0.947	25.4/25.2

7.4 Summary of Measurement Results (Body-Worn, 835 MHz Band)

Table 11: SAR Values (835 MHz Band, body-worn)

Temperature: 22 °C, humidity: 50%. Liquid temperature during the test: 22.2°C			
Limit of SAR (W/kg)	10 g Average	1 g Average	Conducted Power before/after each test (dBm)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Display of EUT towards the phantom, Top frequency	0.327	0.464	23.8/23.8
Display of EUT towards the phantom, Mid frequency	0.344	0.484	24.3/24.4
Display of EUT towards the phantom, Bottom frequency	0.355	0.497	25.4/25.4
Display of EUT towards the ground, Top frequency	0.329	0.476	23.8/23.7
Display of EUT towards the ground, Mid frequency	0.576	0.853	24.3/24.5
Display of EUT towards the ground, Bottom frequency	0.378	0.552	25.4/25.2

7.5 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

<i>SN</i>	<i>a</i>	<i>Type</i>	<i>c</i>	<i>d</i>	$e = f(d,k)$	<i>f</i>	$h = c \times f / e$	<i>k</i>
	Uncertainty Component		Tol. (\pm %)	Prob. Dist.	Div.	c_i (1 g)	1 g u_i (\pm %)	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	$\sqrt{3}$	$(1-c_p)^{1/2}$	4.3	∞
4	Hemispherical Isotropy	B	9.4	R	$\sqrt{3}$	$\sqrt{c_p}$		∞
5	Boundary Effect	B	0.4	R	$\sqrt{3}$	1	0.23	∞
6	Linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
7	System Detection Limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
8	Readout Electronics	B	1.0	N	1	1	1.0	∞
9	RF Ambient Conditions	B	3.0	R	$\sqrt{3}$	1	1.73	∞
10	Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
11	Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
12	Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
	Test sample Related							
13	Test Sample Positioning	A	4.9	N	1	1	4.9	$N-1$
14	Device Holder Uncertainty	A	6.1	N	1	1	6.1	$N-1$
15	Output Power Variation - SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.9	∞
	Phantom and Tissue Parameters							

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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	<i>M</i>
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	<i>M</i>
	Combined Standard Uncertainty			RSS			11.2 5	
	Expanded Uncertainty (95% CONFIDENCE INTERVAL)			<i>K=2</i>			22.5	

9 MAIN TEST INSTRUMENTS

Table 13: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	HP 8753C	3146A01905	September 1,2004	One year
02	Dielectric Probe Kit	Agilent 85070C	US99360113	No Calibration Requested	
03	Power meter	HP 436A	2101A11858	August 12,2004	One year
04	Power sensor	HP 8481H	2349A07289		
05	Signal Generator	MG 3633A	M73386	No Calibration Requested	
06	Amplifier	AT 50S1G4A	26549	No Calibration Requested	
07	Validation Kit 835MHz	SPEAG D 835V2	443	September 3, 2003	Two years
08	Validation Kit 900MHz	SPEAG D 900V2	125	September 3, 2003	Two years
09	Validation Kit 1800MHz	SPEAG D 1800V2	2d010	September 3, 2003	Two years
10	Validation Kit 1900MHz	1900 V2	541	September 3, 2003	Two years
11	BTS	CMU 200	100680	September 13, 2004	One year
12	E-field Probe	SPEAG ET3DV6	1736	November 25, 2004	One year
13	DAE	SPEAG DAE3	589	October 21, 2004	One year

10 TEST PERIOD

The test is performed from May 30, 2005 to May 31, 2005.

11 TEST LOCATION

The test is performed at Radio Communication & Electromagnetic Compatibility Laboratory of Telecommunication Metrology Center of Ministry of Information Industry of The People's Republic of China

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 ear 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 head was measured at a distance of 3.9 mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 20 mm x 20 mm. Based on this data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Around this point, a volume of 32 mm x 32 mm x 34 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.

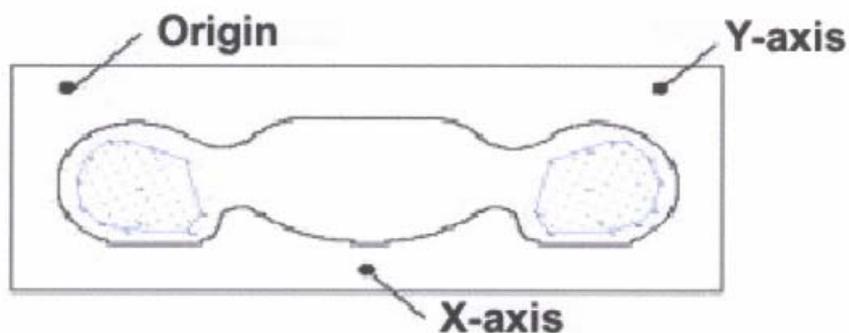
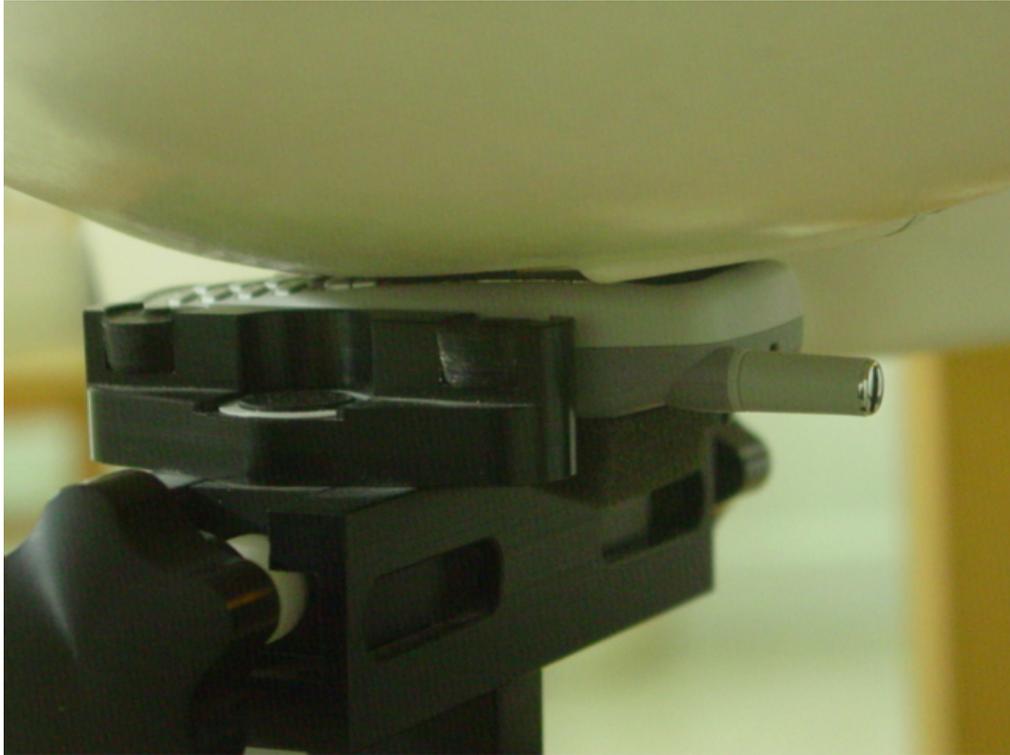


Figure 2 SAR Measurement Points in Area Scan

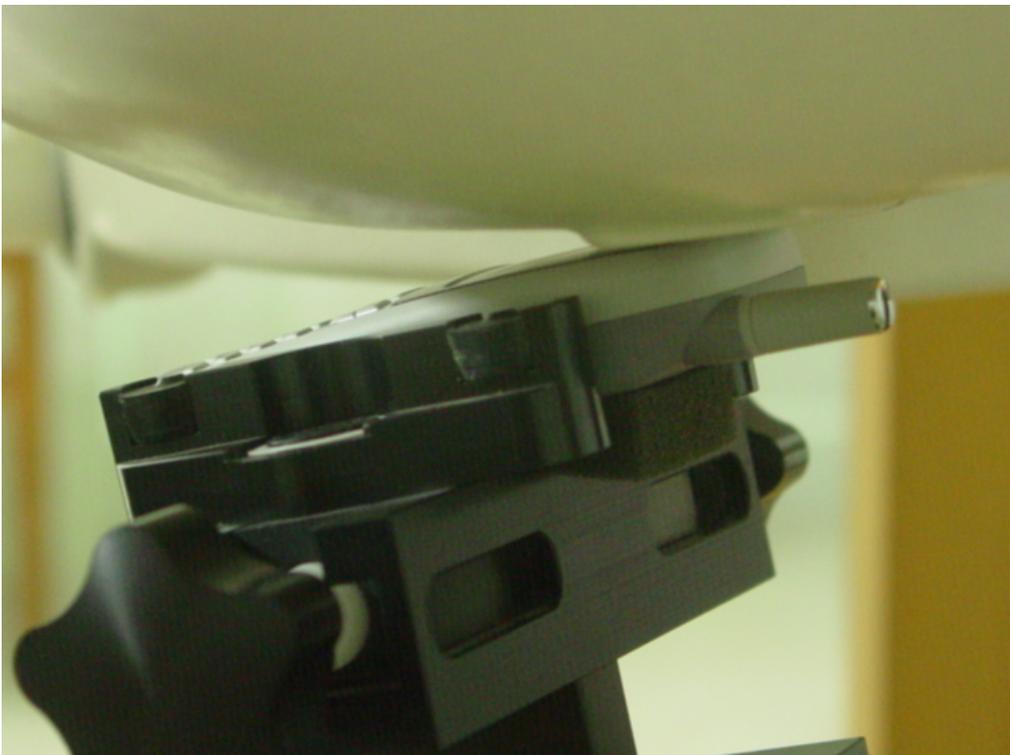
ANNEX B: TEST LAYOUT



Picture 1 Specific Absorption Rate Test Layout



Picture 2 Left Hand Touch Cheek Position



Picture 3 Left Hand Tilt 15° Position



Picture 4 Right Hand Touch Cheek Position



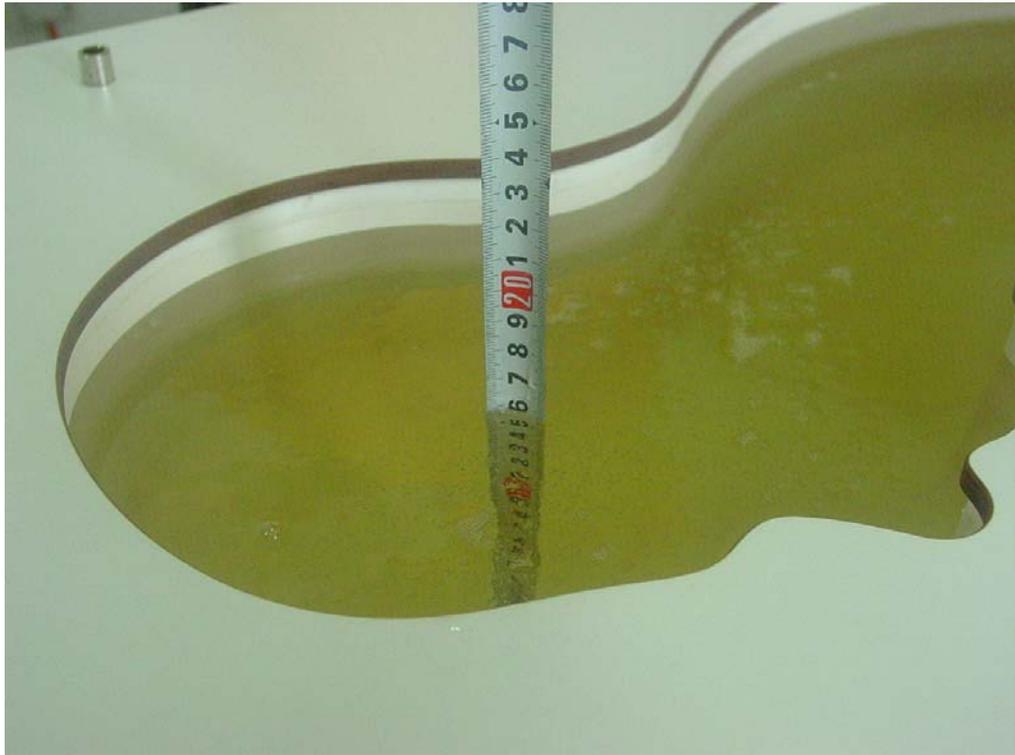
Picture 5 Right Hand Tilt 15° Position



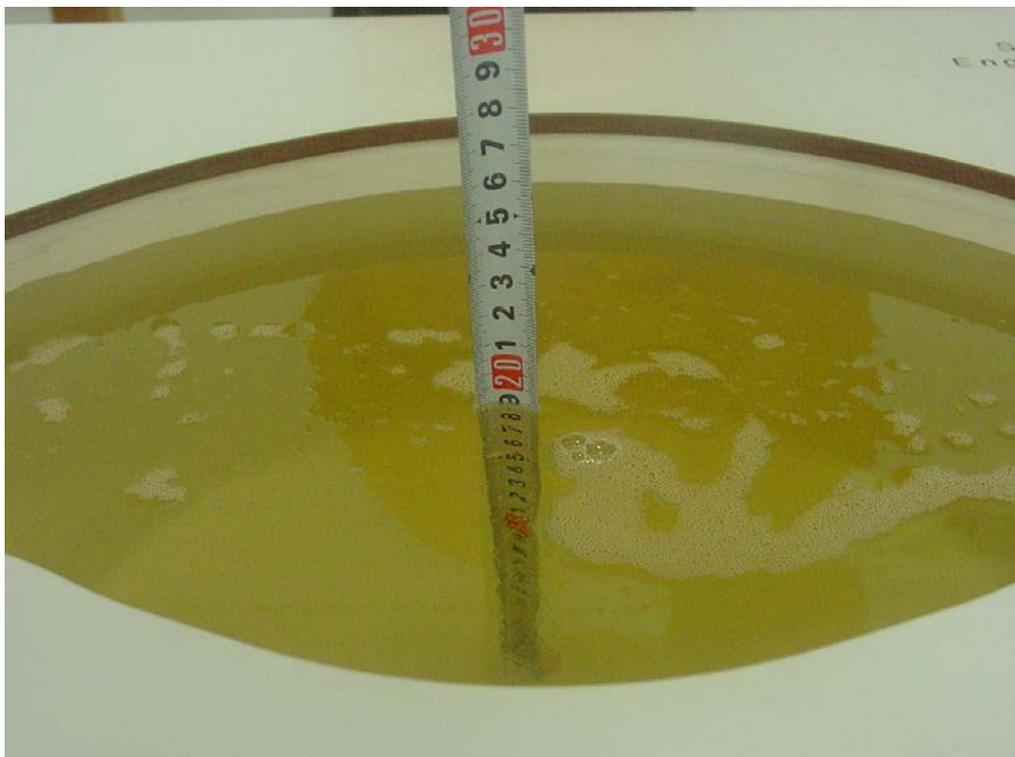
Picture 6 Flat Phantom -- Body-worn Position (toward phantom, the distance from handset to the bottom of the Phantom is 1.5cm)



Picture 7 Flat Phantom -- Body-worn Position (toward ground, the distance from handset to the bottom of the Phantom is 1.5cm)



Picture 8 Liquid depth in the Head Phantom (Head,835MHz)



Picture 9 Liquid depth in the Flat Phantom (Body 835MHz)

ANNEX C: GRAPH RESULTS

CDMA 1X Left Cheek Low

Electronics: DAE3 Sn589

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

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Cheek Low/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 36.3 V/m; Power Drift = 0.1 dB

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

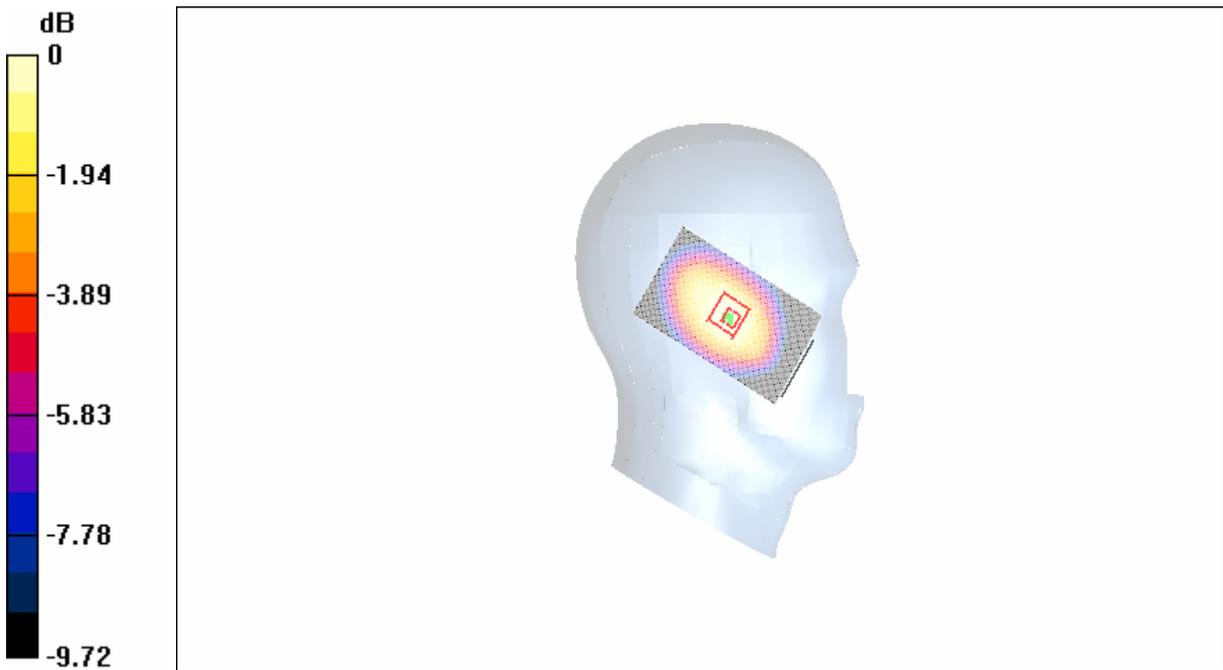
Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 36.3 V/m; Power Drift = 0.1 dB

Maximum value of SAR (measured) = 1.4 mW/g

Peak SAR (extrapolated) = 1.62 W/kg

SAR(1 g) = 1.25W/g; SAR(10 g) = 0.780 W/g



0 dB = 1.4mW/g

Fig. 1 Left Hand Touch Cheek CDMA 1X CH1013

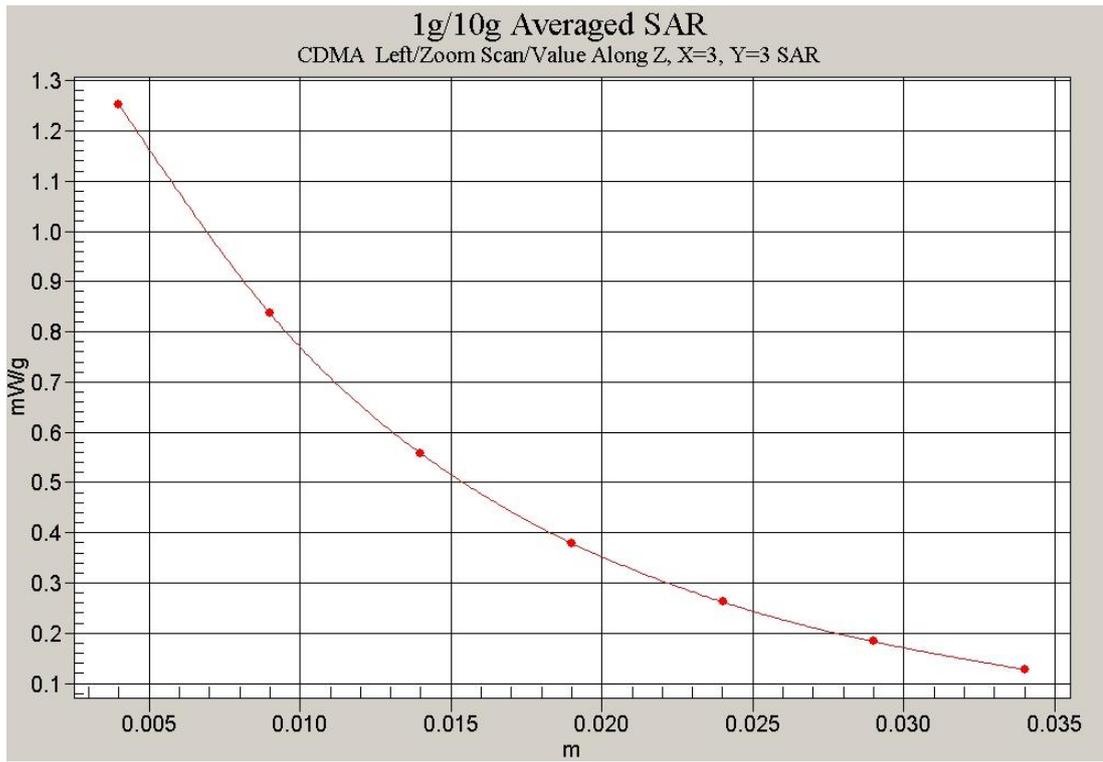


Fig. 2 Z-Scan at power reference point (Left Hand Touch Cheek CDMA 1X CH1013)

CDMA 1X Left Cheek Middle

Electronics: DAE3 Sn589

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

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Cheek Middle/Area Scan (71x111x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 38.4 V/m; Power Drift = -0.2 dB

Maximum value of SAR (interpolated) = 1.34 mW/g

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

Reference Value = 38.4 V/m; Power Drift = -0.2 dB

Maximum value of SAR (measured) = 1.25 mW/g

Peak SAR (extrapolated) = 2.29 W/kg

SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.782 mW/g

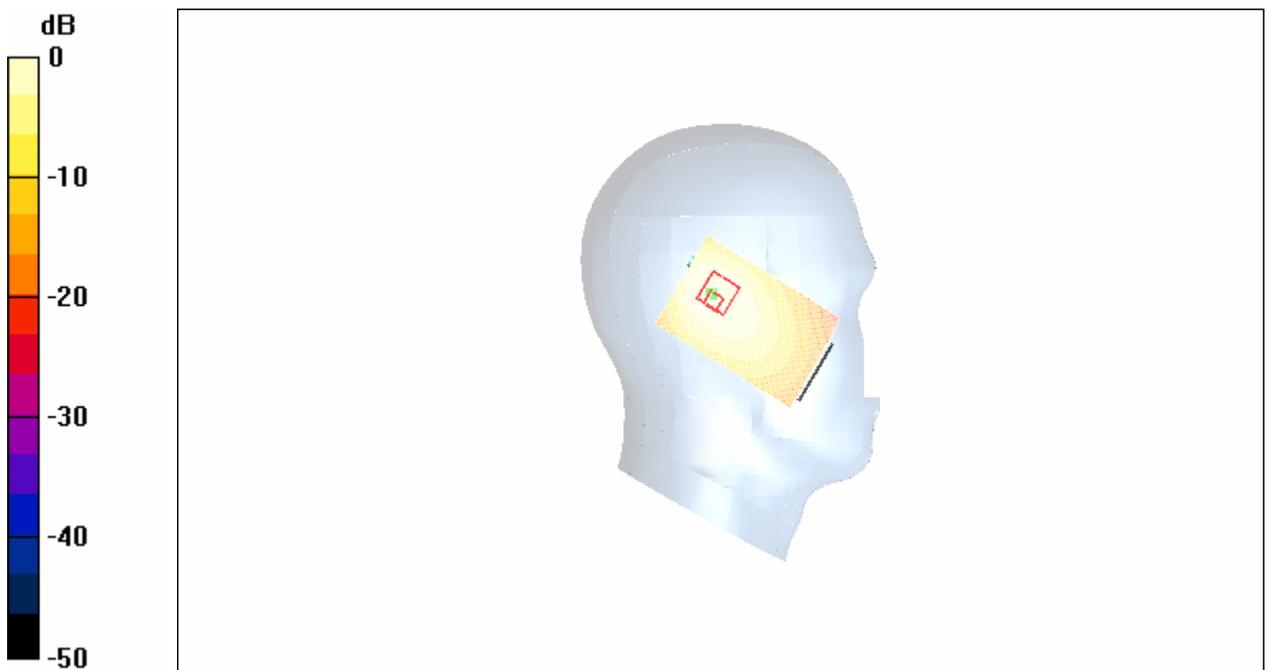


Fig. 3 Left Hand Touch Cheek CDMA 1X CH384

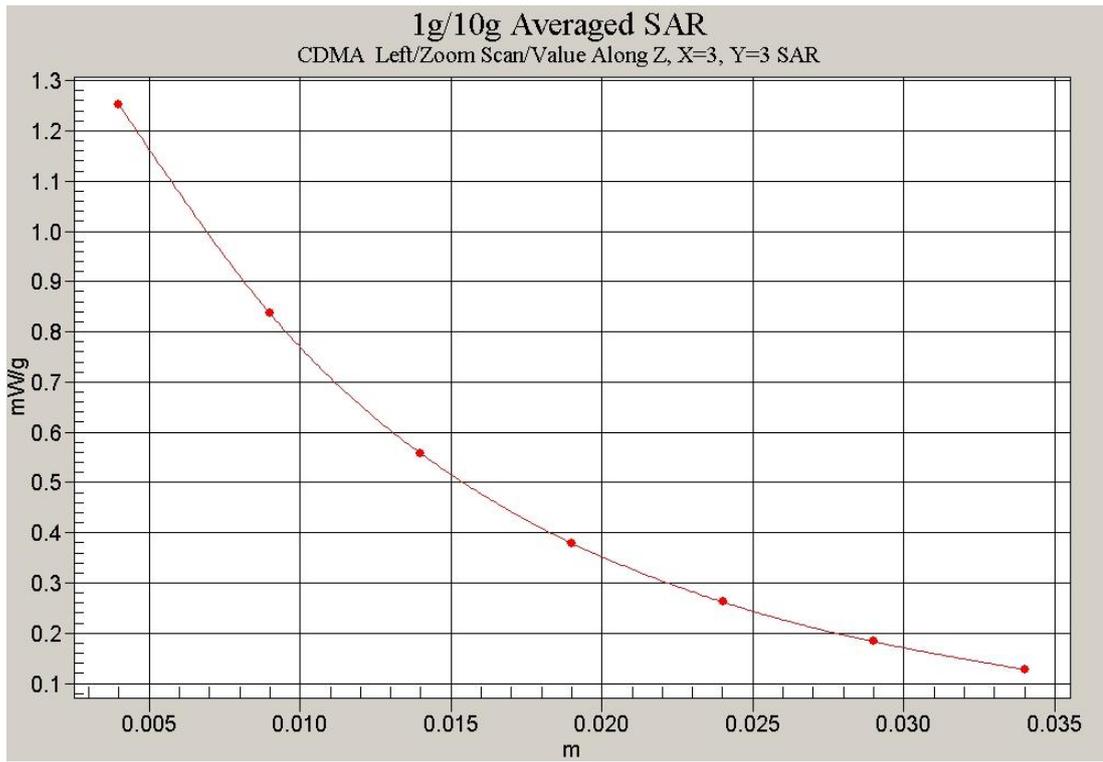


Fig. 4 Z-Scan at power reference point (Left Hand Touch Cheek CDMA 1X CH384)

CDMA 1X Left Cheek High

Electronics: DAE3 Sn589

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

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Cheek High/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 33.8 V/m; Power Drift = -0.2 dB

Maximum value of SAR (interpolated) = 1.15 mW/g

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

Reference Value = 33.8 V/m; Power Drift = -0.2 dB

Maximum value of SAR (measured) = 1.05 mW/g

Peak SAR (extrapolated) = 1.3 W/kg

SAR(1 g) = 0.994 mW/g; SAR(10 g) = 0.702 mW/g

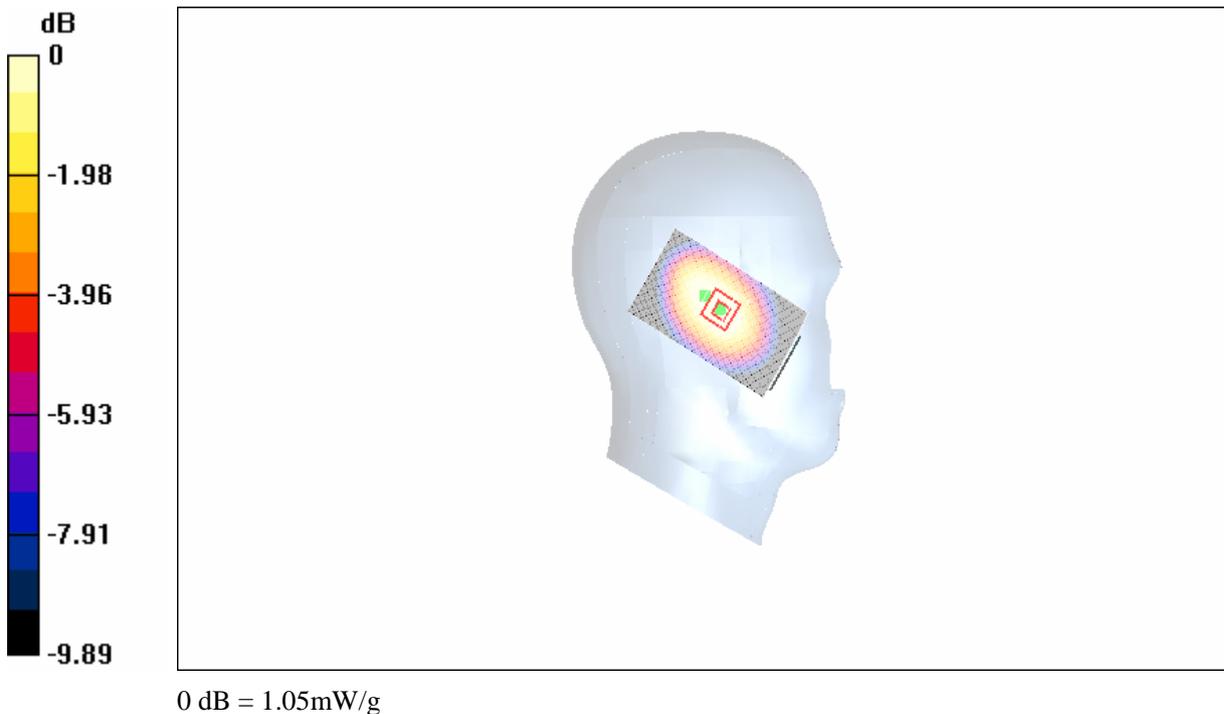


Fig. 5 Left Hand Touch Cheek CDMA 1X CH777

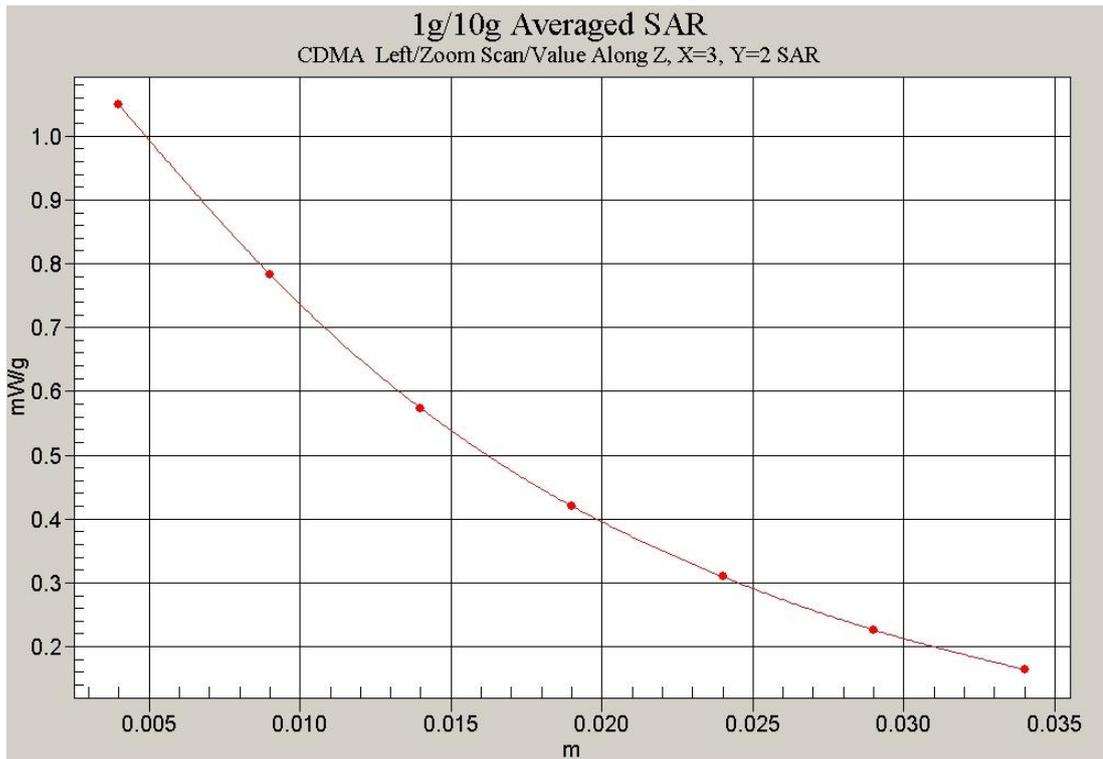


Fig. 6 Z-Scan at power reference point (Left Hand Touch Cheek CDMA 1X CH777)

CDMA 1X Left Tilt Low

Electronics: DAE3 Sn589

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

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Tilt Low/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 34.5 V/m; Power Drift = 0.0 dB

Maximum value of SAR (interpolated) = 1.29 mW/g

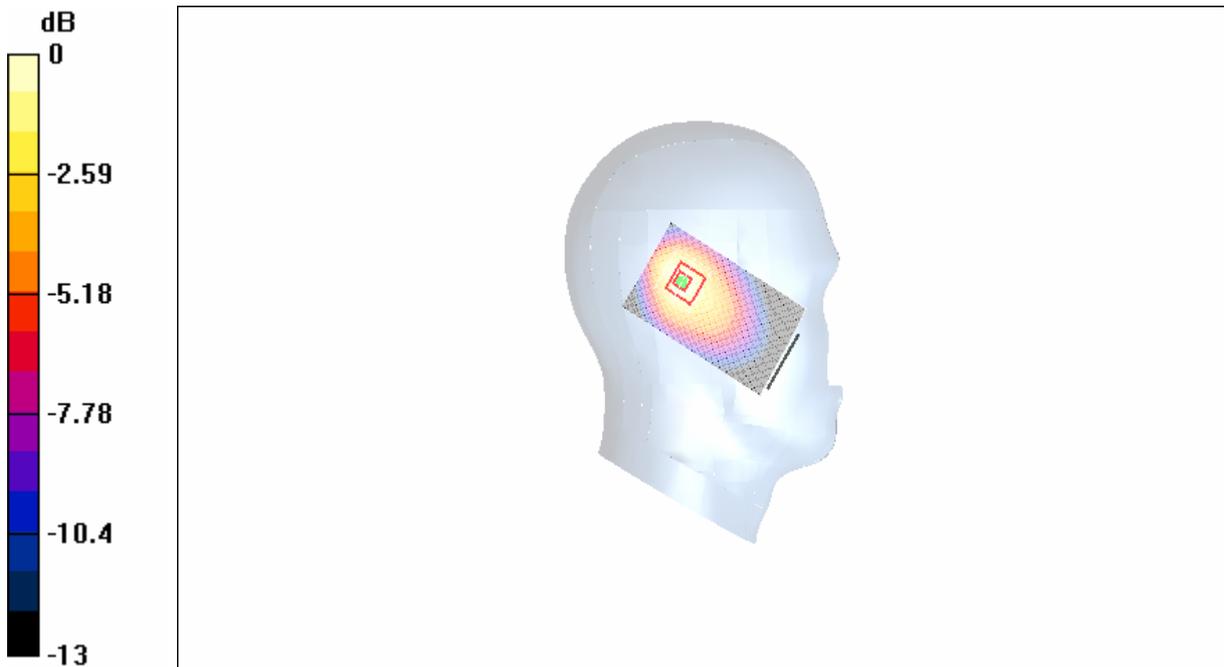
Tilt Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 34.5 V/m; Power Drift = 0.0 dB

Maximum value of SAR (measured) = 1.3 mW/g

Peak SAR (extrapolated) = 1.78 W/kg

SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.762 mW/g



0 dB = 1.3mW/g

Fig. 7 Left Hand Tilt 15° CDMA 1X CH1013

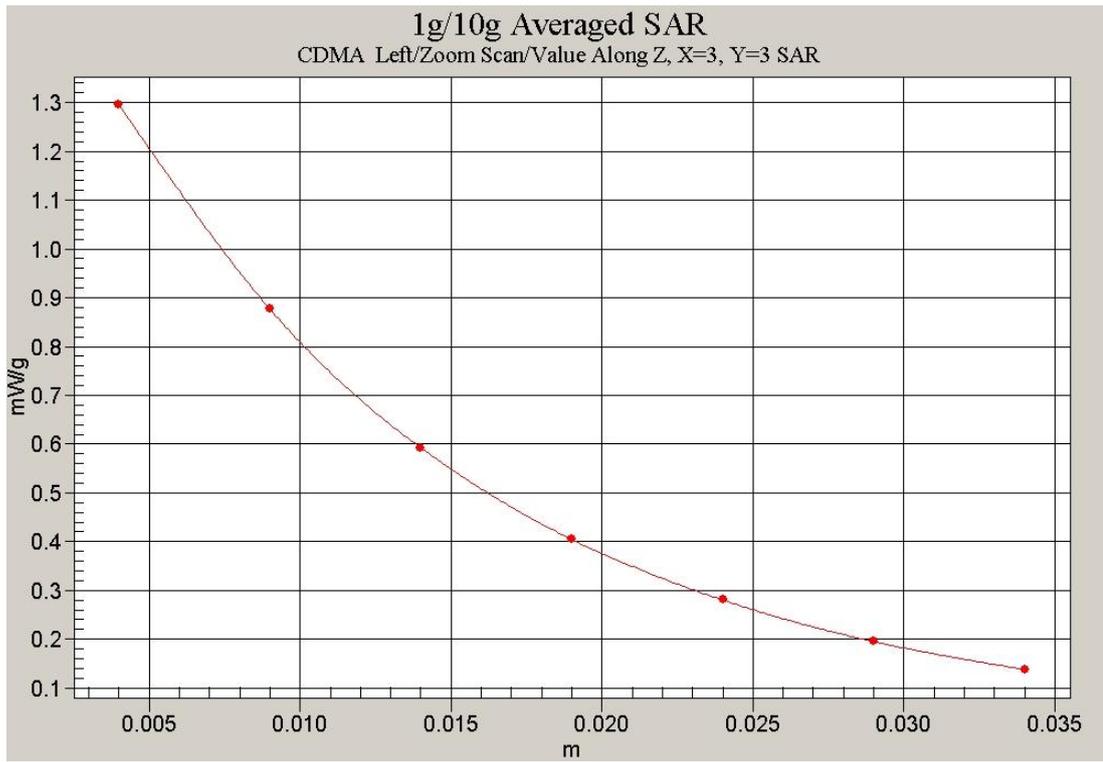


Fig. 8 Z-Scan at power reference point (Left Hand Tilt 15° CDMA 1X CH1013)

CDMA 1X Left Tilt Middle

Electronics: DAE3 Sn589

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

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Tilt Middle/Area Scan (81x131x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 39.1 V/m; Power Drift = -0.2 dB

Maximum value of SAR (interpolated) = 1.43 mW/g

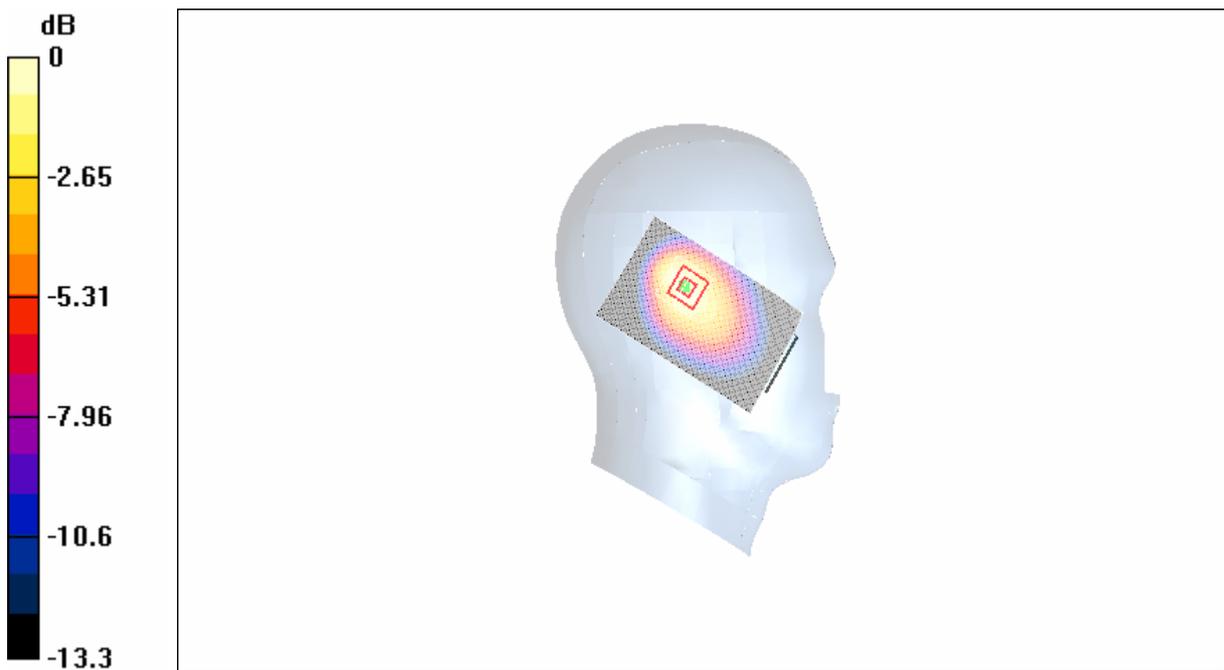
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 39.1 V/m; Power Drift = -0.2 dB

Maximum value of SAR (measured) = 1.52 mW/g

Peak SAR (extrapolated) = 2.01 W/kg

SAR(1 g) = 1.27 mW/g; SAR(10 g) = 0.821 mW/g



0 dB = 1.52mW/g

Fig. 9 Left Hand Tilt 15° CDMA 1X CH384

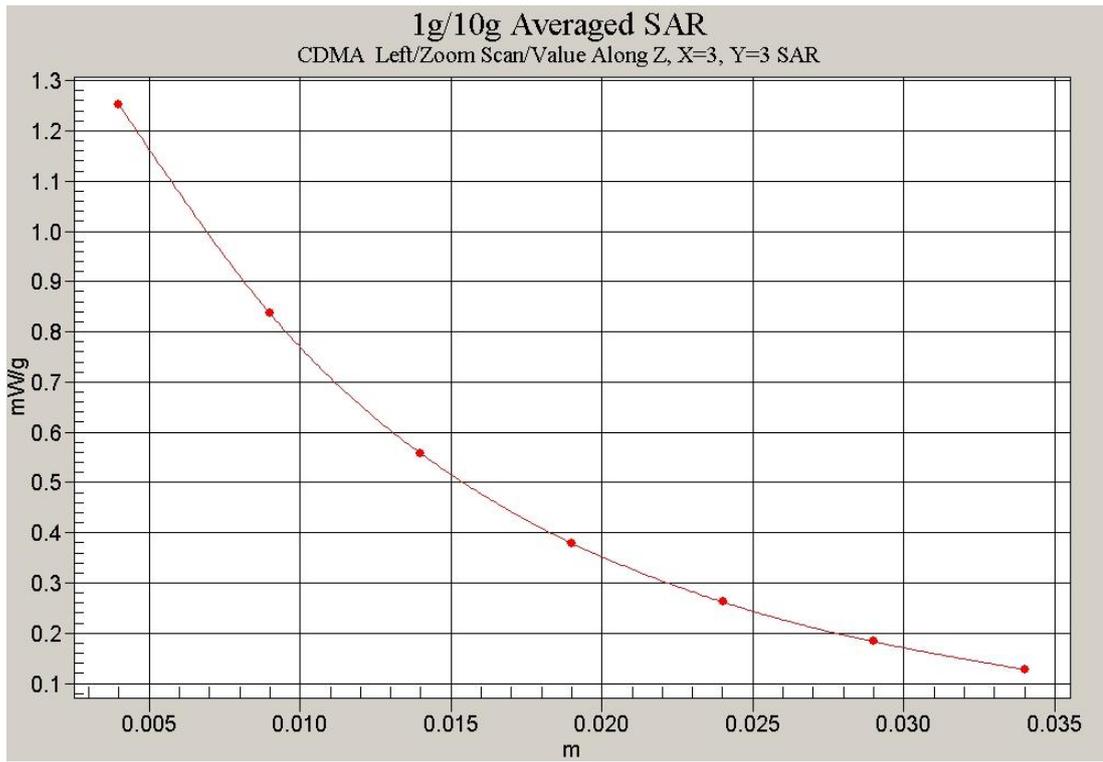


Fig. 10 Z-Scan at power reference point (Left Hand Tilt 15° CDMA 1X CH384)

CDMA 1X Left Tilt High

Electronics: DAE4 Sn611

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

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Tilt High/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 27.9 V/m; Power Drift = -0.2 dB

Maximum value of SAR (interpolated) = 0.819 mW/g

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

Reference Value = 27.9 V/m; Power Drift = -0.2 dB

Maximum value of SAR (measured) = 0.816 mW/g

Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.747 mW/g; SAR(10 g) = 0.472 mW/g

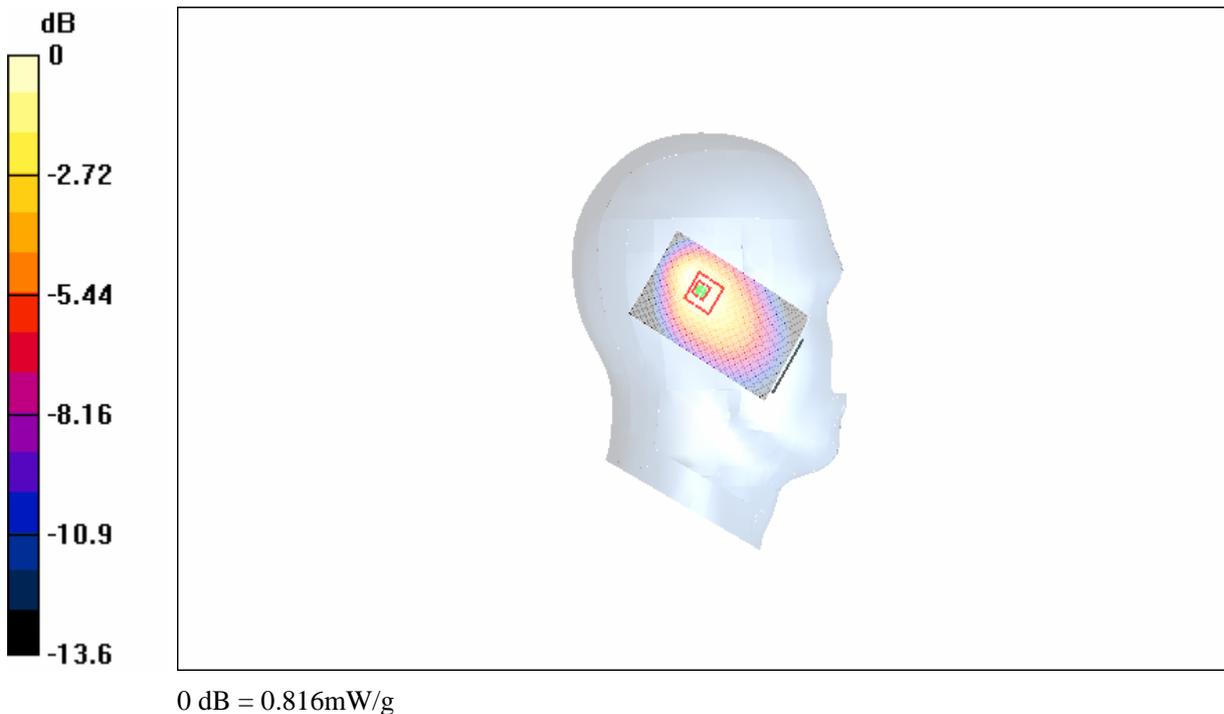


Fig. 11 Left Hand Tilt 15° CDMA 1X CH777

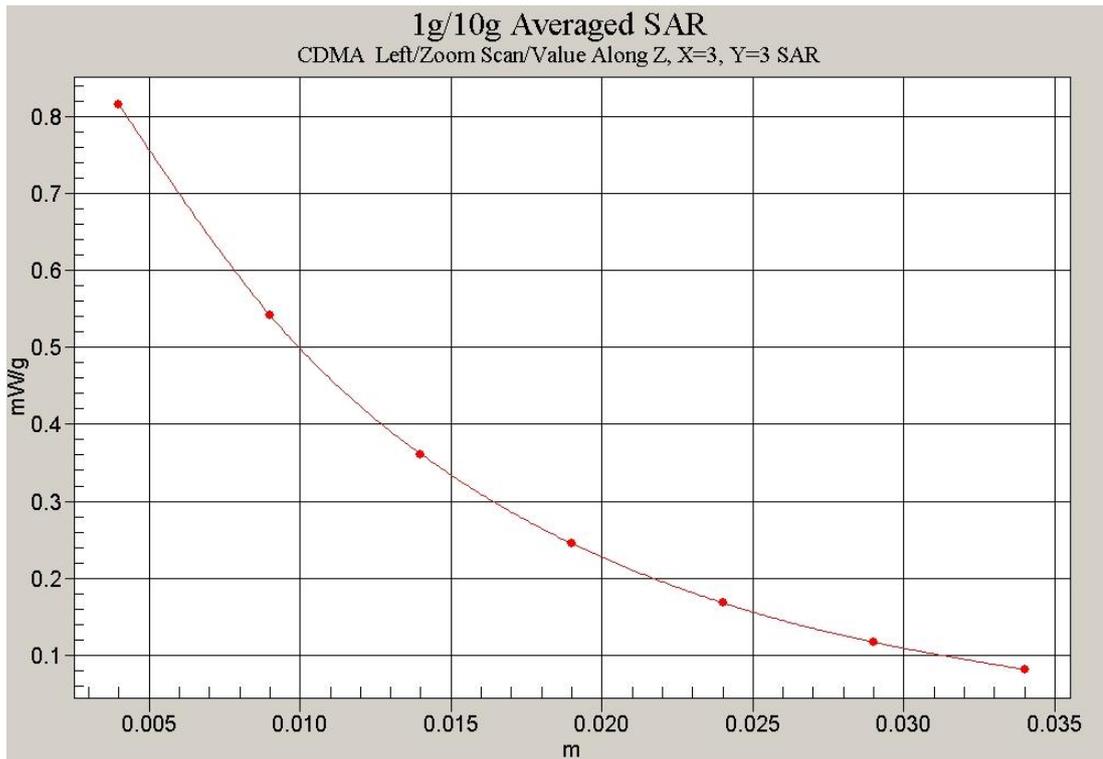


Fig. 12 Z-Scan at power reference point (left Hand Tilt 15° CDMA 1X CH777)

CDMA 1X Right Cheek Low

Electronics: DAE3 Sn589

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

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Cheek Low/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 37.2 V/m; Power Drift = 0.1 dB

Maximum value of SAR (interpolated) = 1.24 mW/g

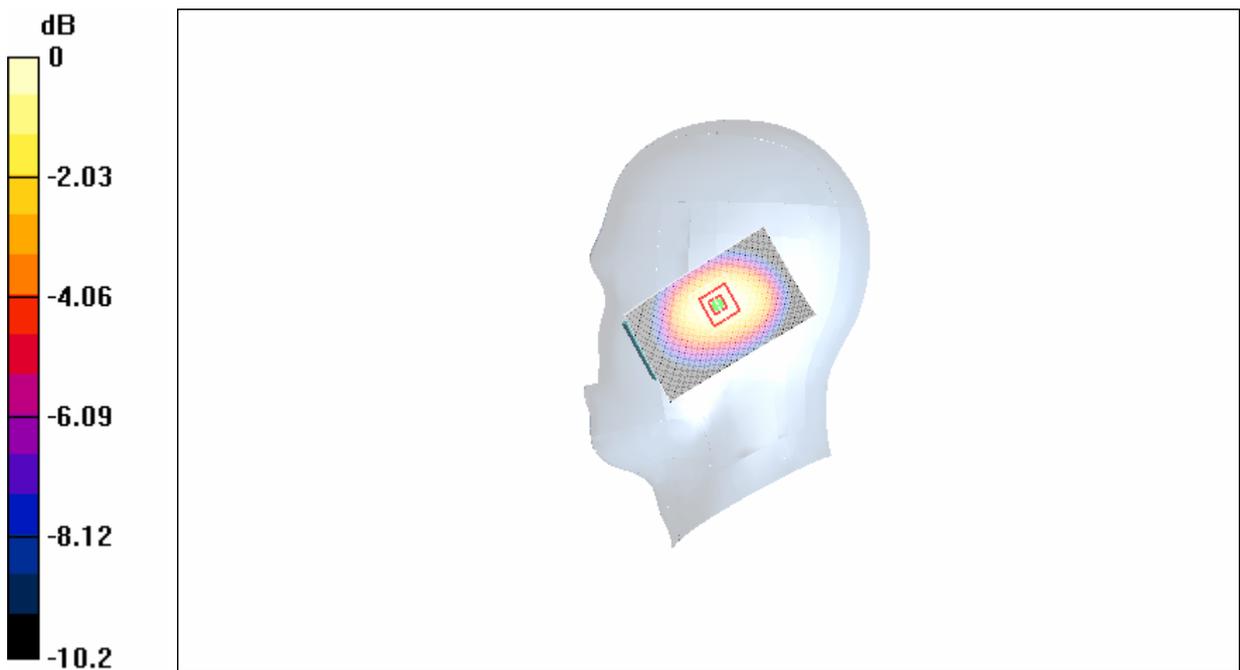
Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 37.2 V/m; Power Drift = 0.1 dB

Maximum value of SAR (measured) = 1.26 mW/g

Peak SAR (extrapolated) = 1.53 W/kg

SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.846 mW/g



0 dB = 1.26mW/g

Fig. 13 Right Hand Touch Cheek CDMA 1X CH1013

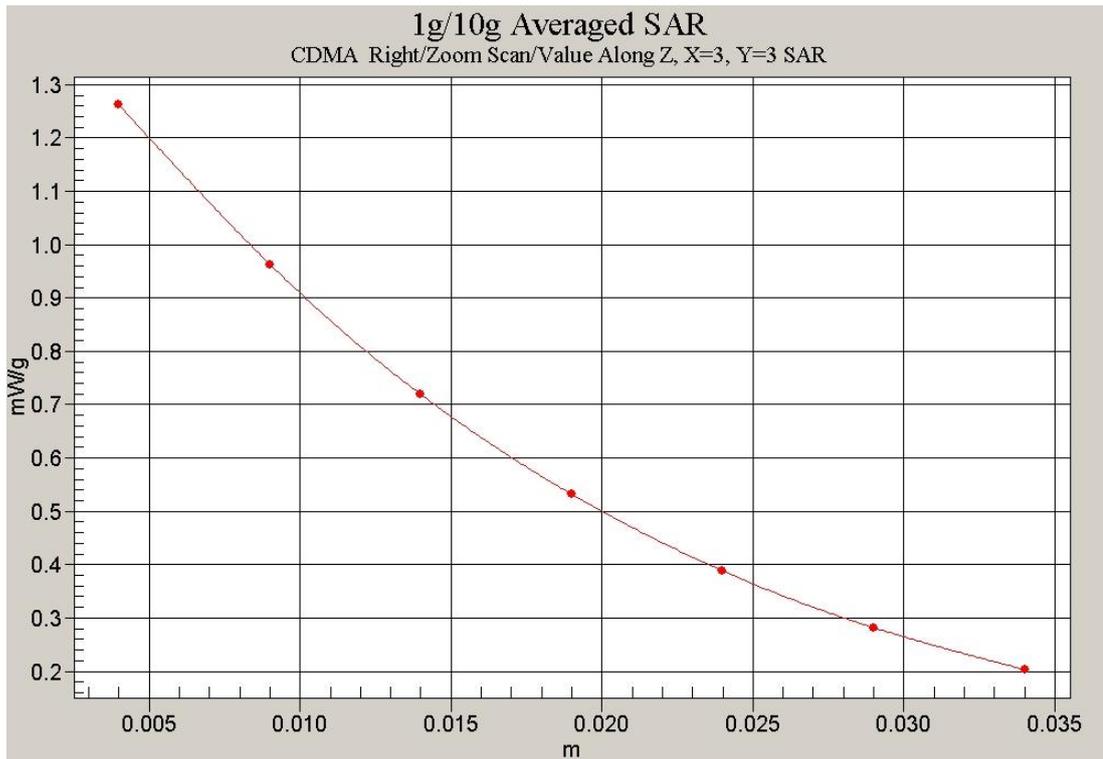


Fig. 14 Z-Scan at power reference point (Right Hand Touch Cheek CDMA 1X CH1013)

CDMA 1X Right Cheek Middle

Electronics: DAE3 Sn589

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

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Cheek Middle/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 37 V/m; Power Drift = 0.1 dB

Maximum value of SAR (interpolated) = 1.28 mW/g

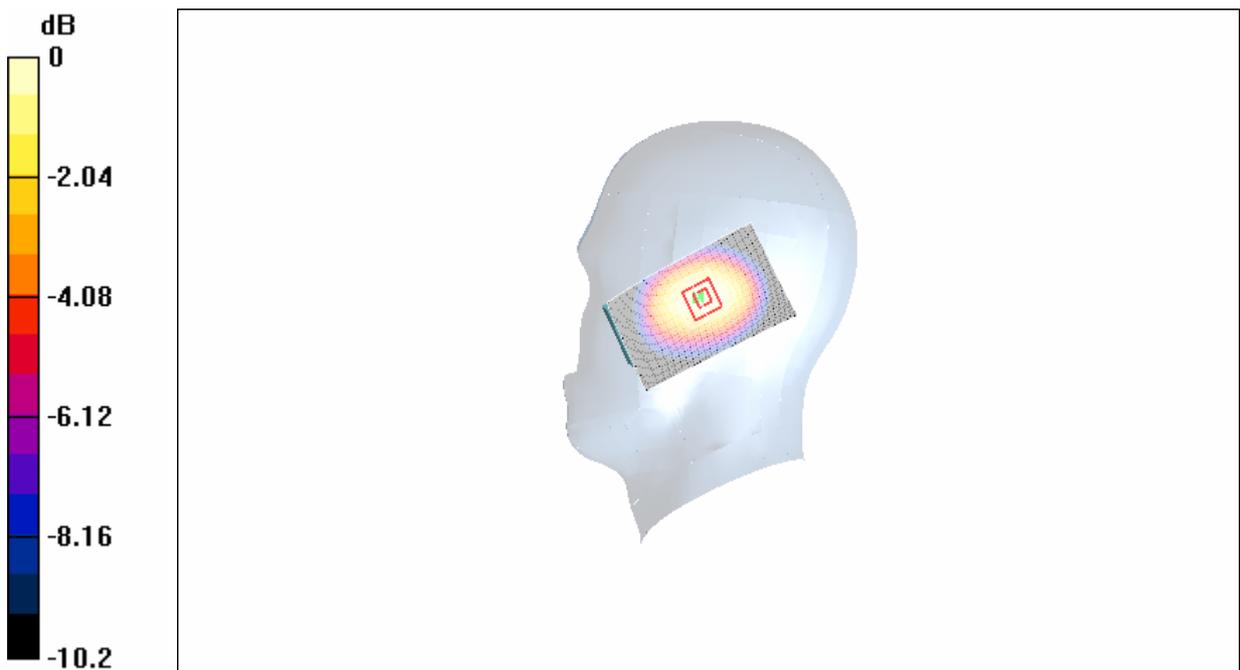
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 37 V/m; Power Drift = 0.1 dB

Maximum value of SAR (measured) = 1.27 mW/g

Peak SAR (extrapolated) = 1.56 W/kg

SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.843 mW/g



0 dB = 1.27mW/g

Fig. 15 Right Hand Touch Cheek CDMA 1X CH384

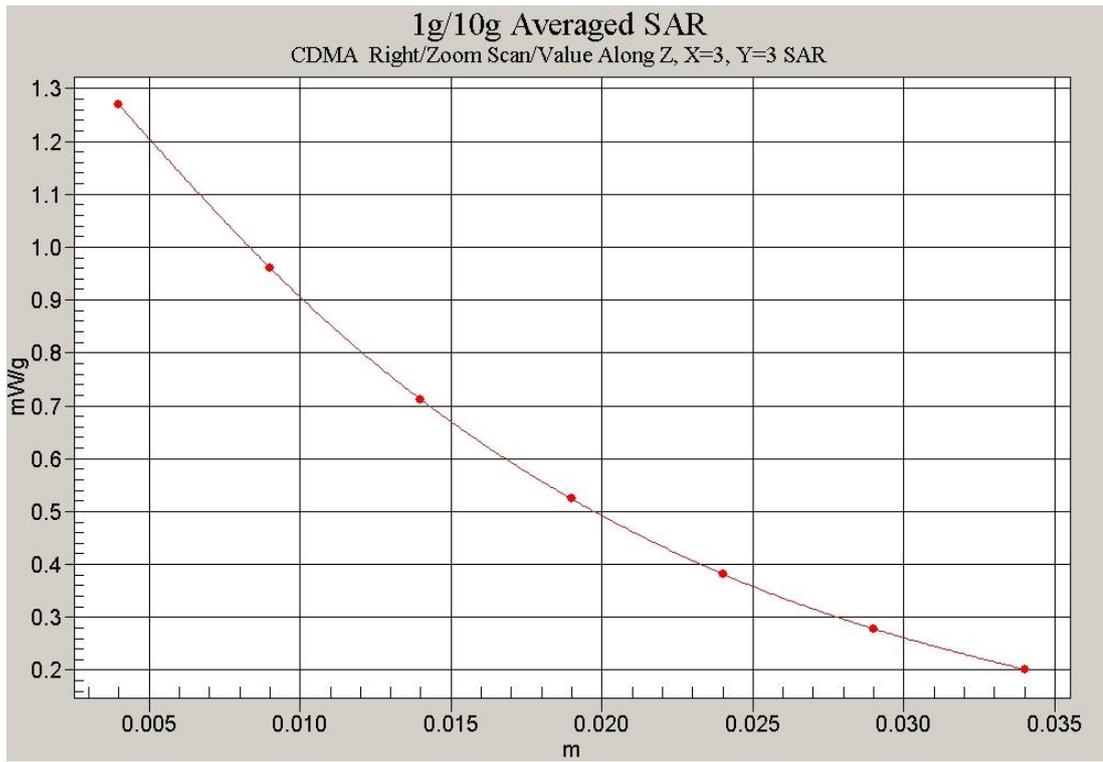


Fig. 16 Z-Scan at power reference point (Right Hand Touch Cheek CDMA 1X CH384)

CDMA Right Cheek High

Electronics: DAE3 Sn589

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

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Cheek High/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 30 V/m; Power Drift = -0.0 dB

Maximum value of SAR (interpolated) = 0.848 mW/g

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

Reference Value = 30 V/m; Power Drift = -0.0 dB

Maximum value of SAR (measured) = 0.864 mW/g

Peak SAR (extrapolated) = 1.05 W/kg

SAR(1 g) = 0.815 mW/g; SAR(10 g) = 0.583 mW/g

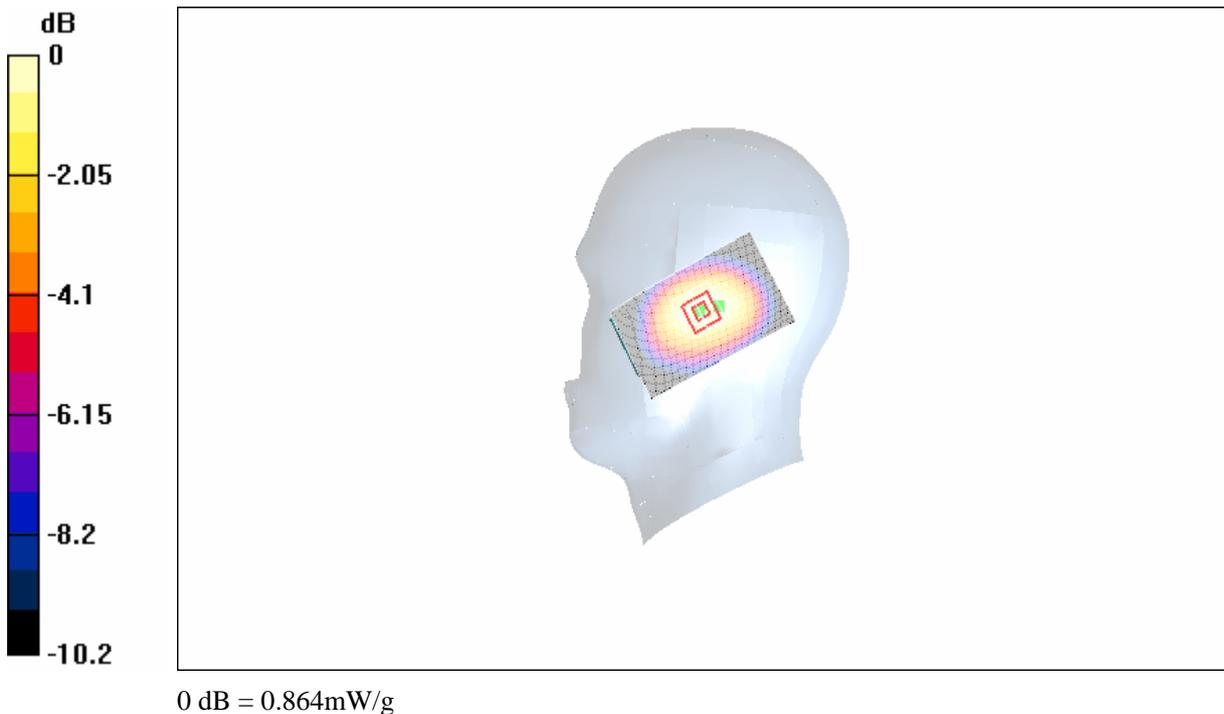


Fig. 17 Right Hand Touch Cheek CDMA 1X CH777

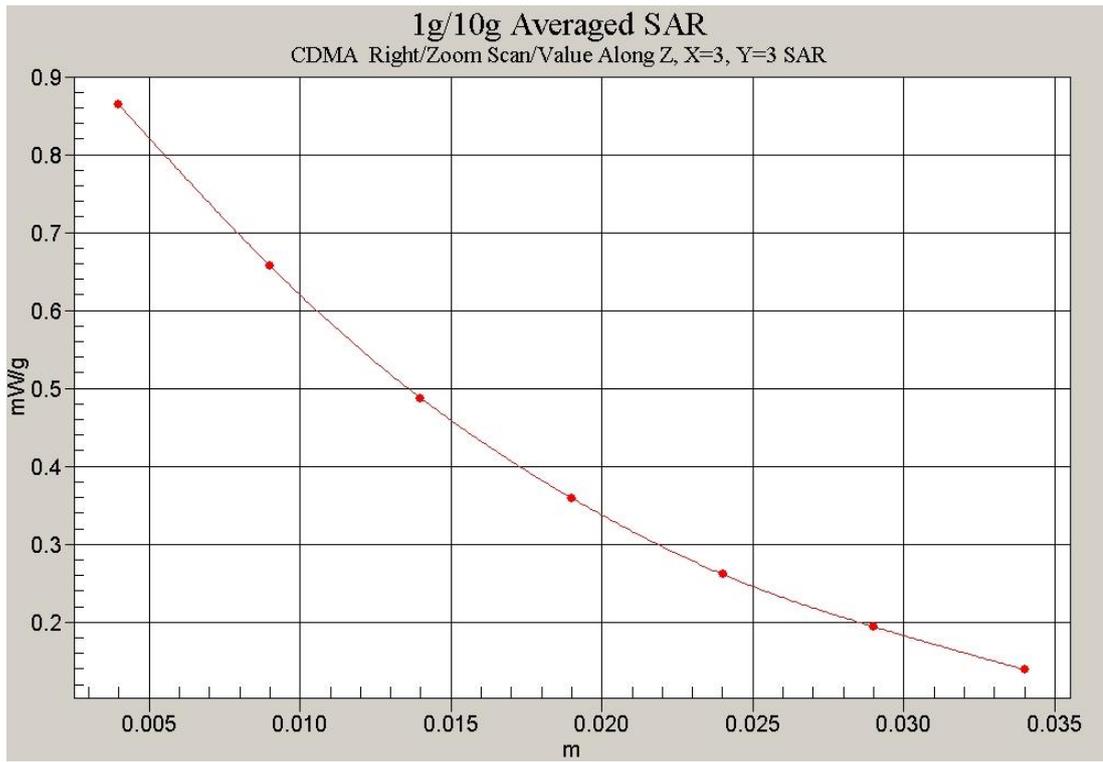


Fig. 18 Z-Scan at power reference point (Right Hand Touch Cheek CDMA 1X CH777)

CDMA 1X Right Tilt Low

Electronics: DAE3 Sn589

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

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Tilt Low/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 34.8 V/m; Power Drift = -0.1 dB

Maximum value of SAR (interpolated) = 1.04 mW/g

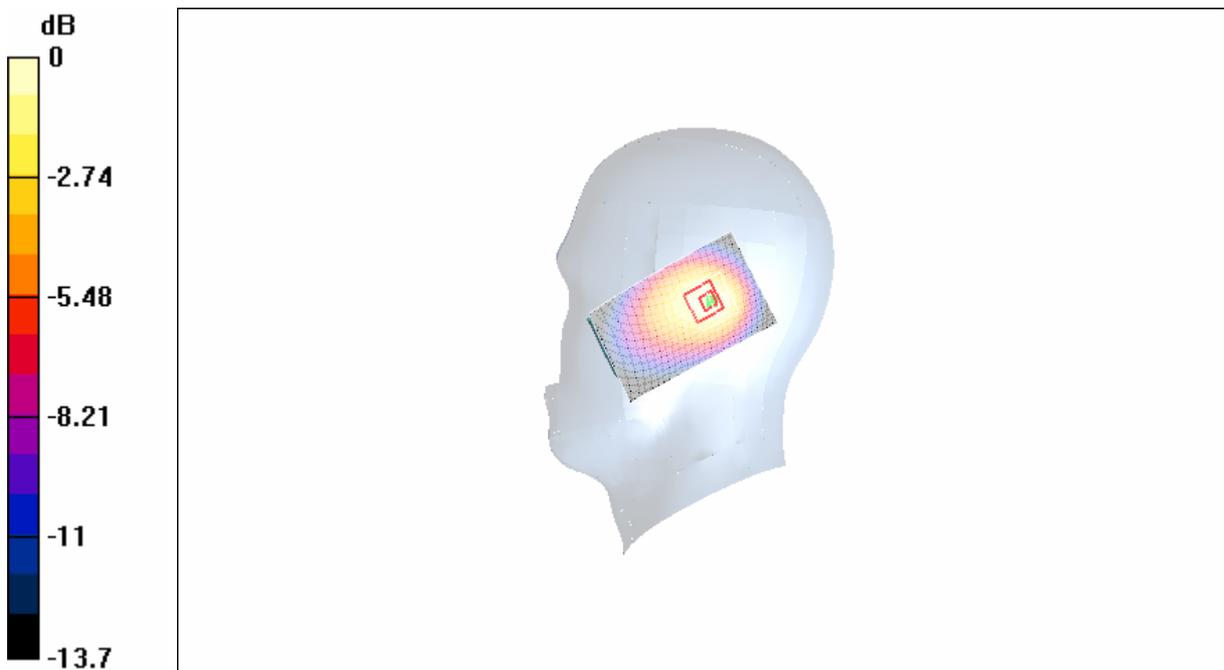
Tilt Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 34.8 V/m; Power Drift = -0.1 dB

Maximum value of SAR (measured) = 1.02 mW/g

Peak SAR (extrapolated) = 1.39 W/kg

SAR(1 g) = 0.947 mW/g; SAR(10 g) = 0.620 mW/g



0 dB = 1.02mW/g

Fig. 19 Right Hand Tilt 15° CDMA 1X CH1013

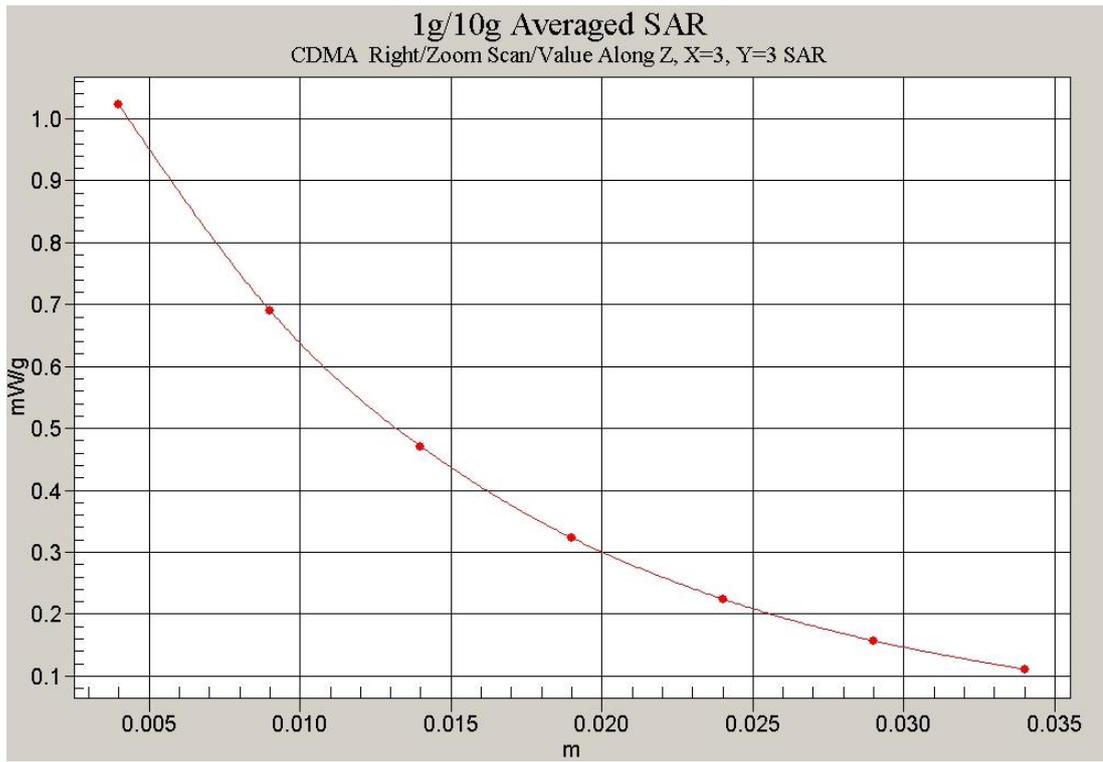


Fig. 20 Z-Scan at power reference point (Right Hand Tilt 15°CDMA 1X CH1013)

CDMA Right Tilt Middle

Electronics: DAE3 Sn589

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

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Tilt Middle/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 34.1 V/m; Power Drift = -0.1 dB

Maximum value of SAR (interpolated) = 1.02 mW/g

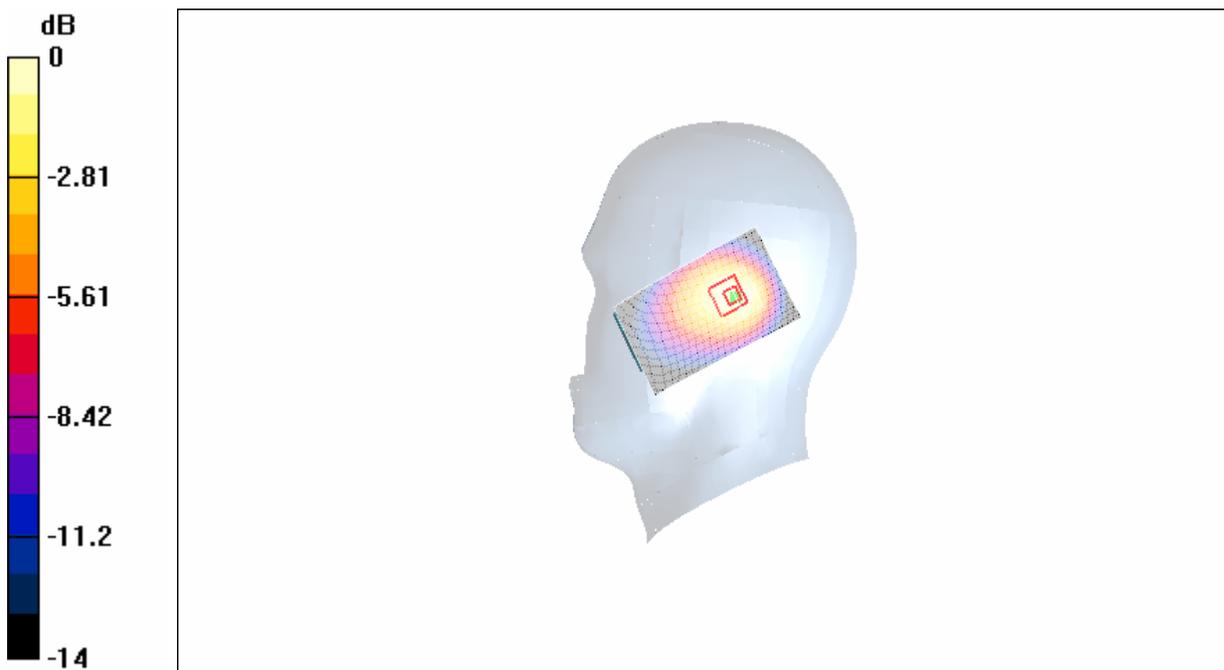
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 34.1 V/m; Power Drift = -0.1 dB

Maximum value of SAR (measured) = 1.01 mW/g

Peak SAR (extrapolated) = 1.4 W/kg

SAR(1 g) = 0.931 mW/g; SAR(10 g) = 0.603 mW/g



0 dB = 1.01mW/g

Fig. 21 Right Hand Tilt 15° CDMA 1X CH384

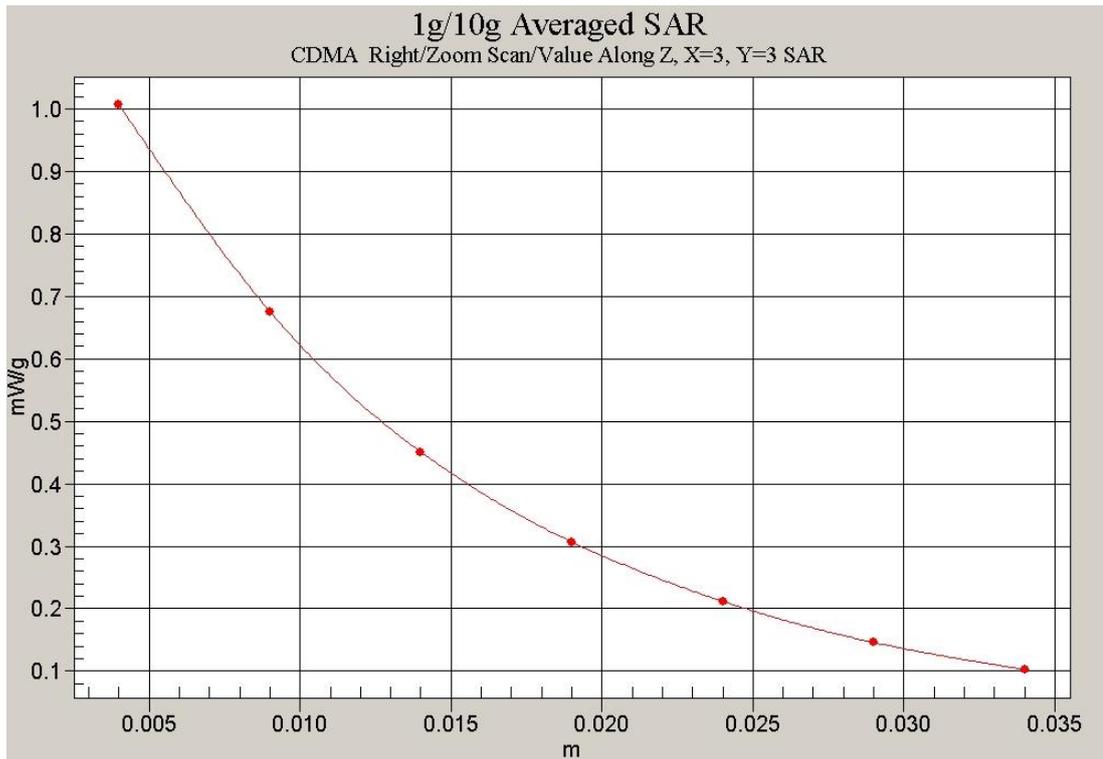


Fig. 22 Z-Scan at power reference point (Right Hand Tilt 15° CDMA 1X CH384)

CDMA Right Tilt High

Electronics: DAE3 Sn589

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

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Tilt High/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 27.2 V/m; Power Drift = -0.1 dB

Maximum value of SAR (interpolated) = 0.699 mW/g

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

Reference Value = 27.2 V/m; Power Drift = -0.1 dB

Maximum value of SAR (measured) = 0.698 mW/g

Peak SAR (extrapolated) = 0.945 W/kg

SAR(1 g) = 0.645 mW/g; SAR(10 g) = 0.420 mW/g

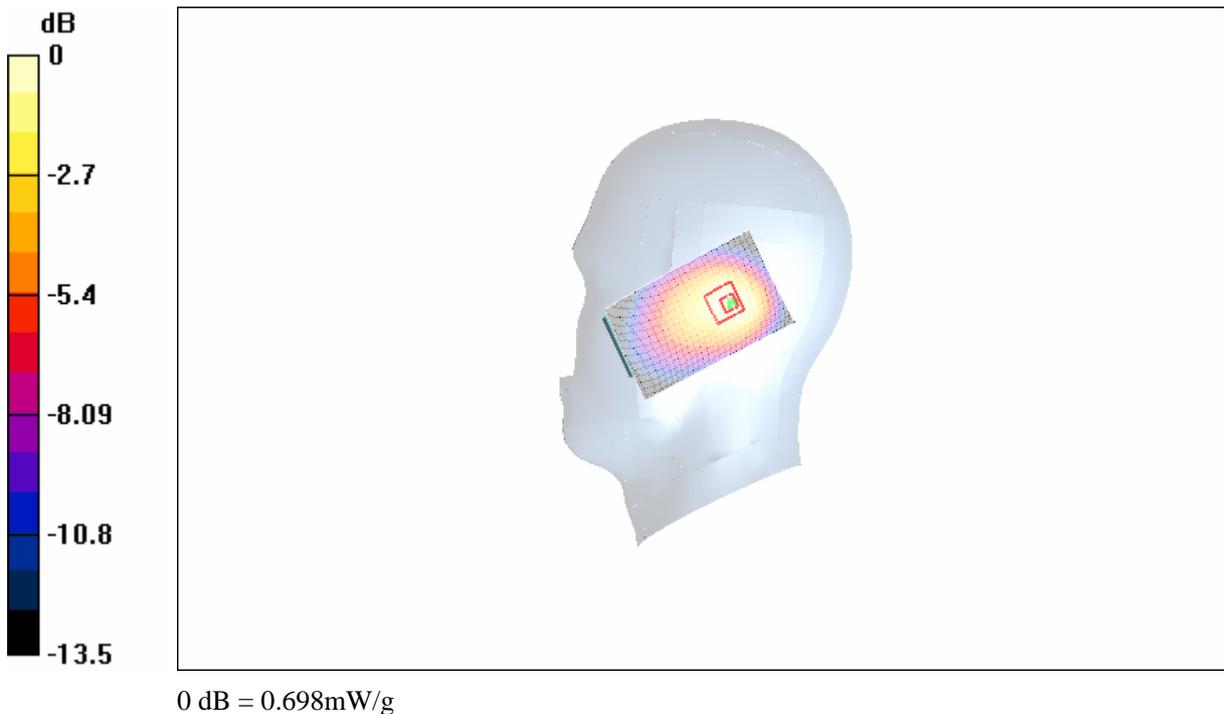


Fig. 23 Right Hand Tilt 15° CDMA 1X CH777

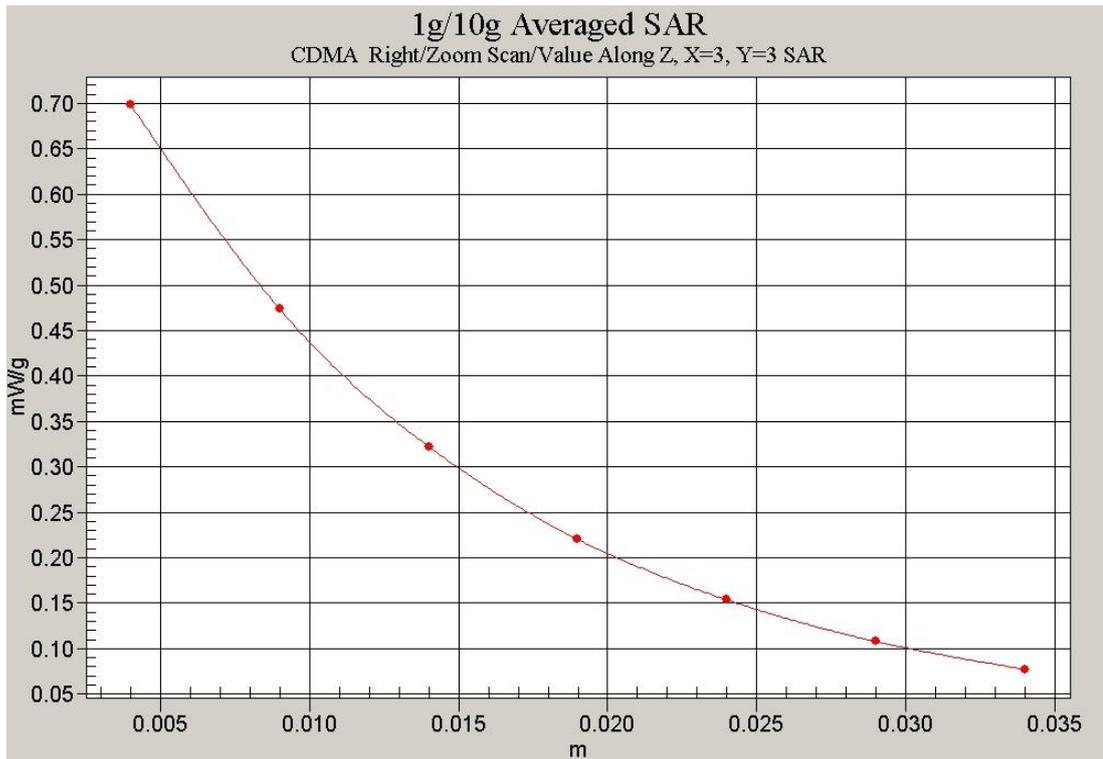


Fig. 24 Z-Scan at power reference point (Right Hand Tilt 15° CDMA 1X CH777)

CDMA Body Toward phantom Low

Electronics: DAE3 Sn589

Communication System: 835MHz Frequency: 824.7 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Toward Phantom, Low/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 26.2 V/m; Power Drift = -0.2 dB

Maximum value of SAR (interpolated) = 0.555 mW/g

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

Reference Value = 26.2 V/m; Power Drift = -0.2 dB

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

Peak SAR (extrapolated) = 0.672 W/kg

SAR(1 g) = 0.497 mW/g; SAR(10 g) = 0.355 mW/g

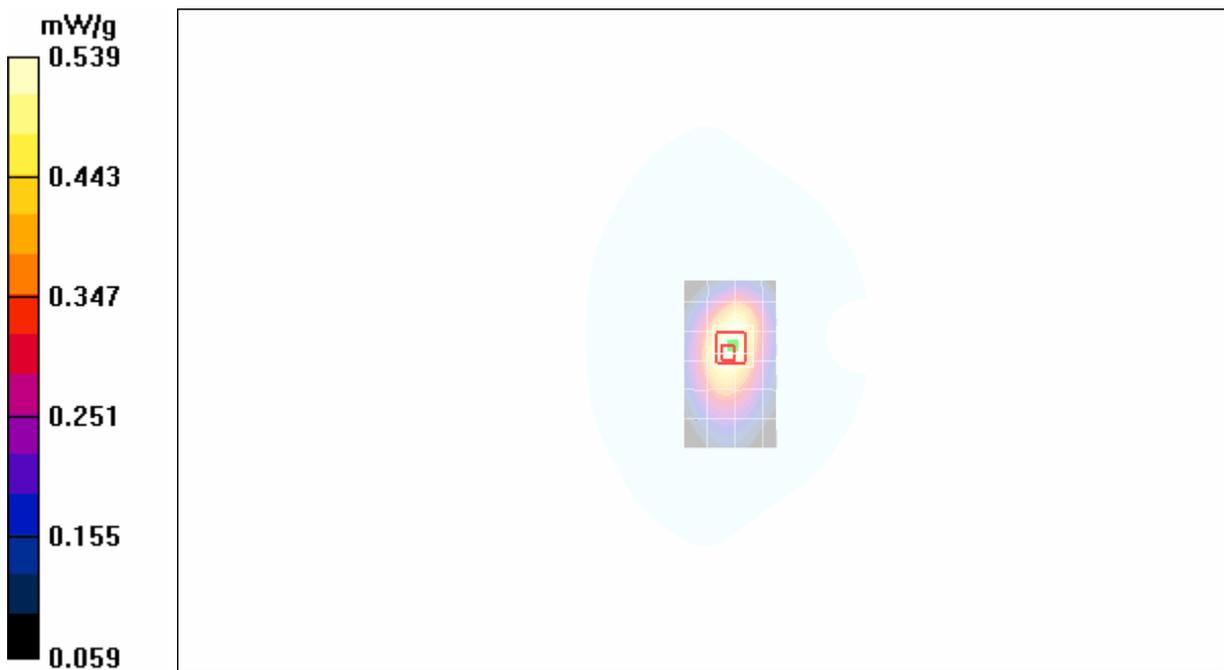


Fig. 25 Flat Phantom Body-worn Position 835MHz CH1013 with the display of the handset towards the phantom

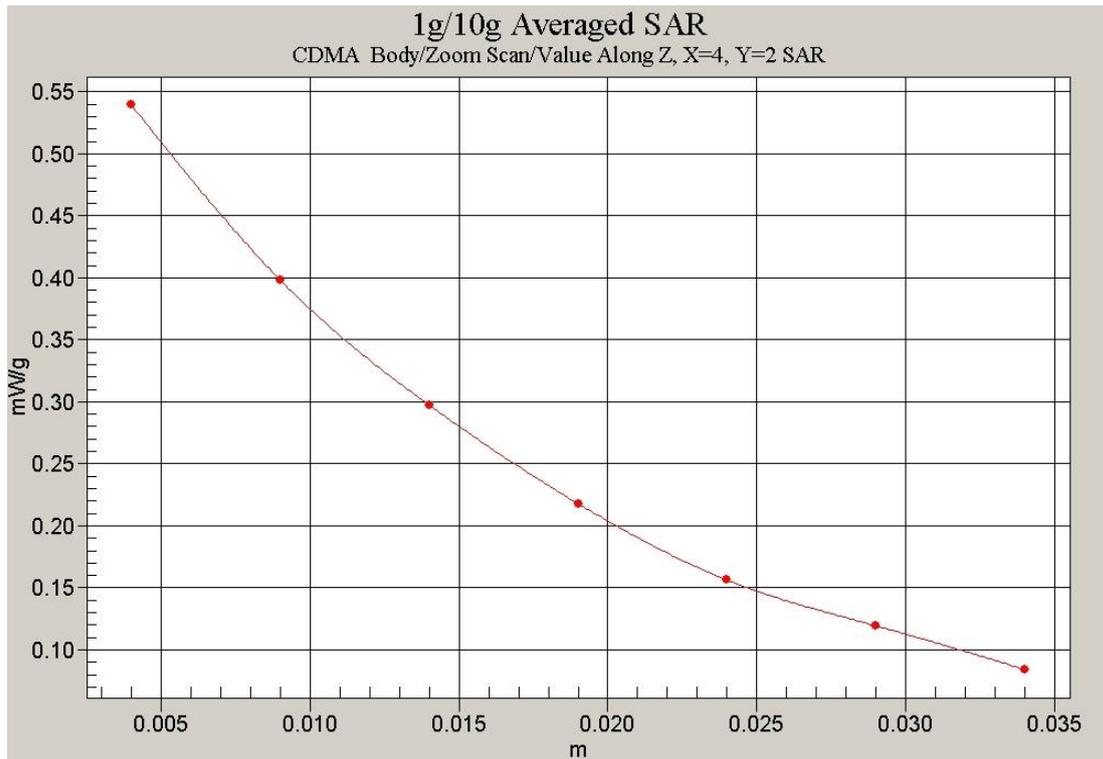


Fig. 26 Z-Scan at power reference point (Flat Phantom 835MHz CH1013 with the display of the handset towards the phantom)

CDMA Body Toward phantom Middle

Electronics: DAE3 Sn589

Communication System: 835 MHz Frequency: 836.52 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Toward Phantom, Middle/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 23.8 V/m; Power Drift = 0.0 dB

Maximum value of SAR (interpolated) = 0.515 mW/g

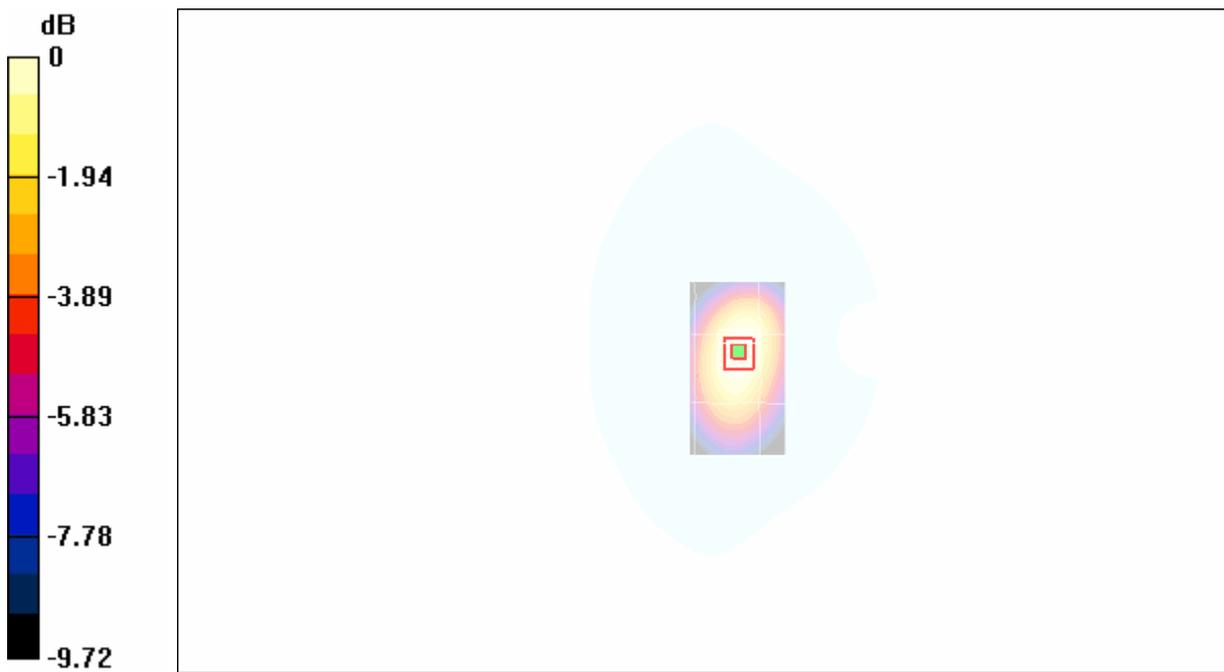
Toward Phantom, Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.8 V/m; Power Drift = 0.0 dB

Maximum value of SAR (measured) = 0.513 mW/g

Peak SAR (extrapolated) = 0.648 W/kg

SAR(1 g) = 0.484 mW/g; SAR(10 g) = 0.344 mW/g



0 dB = 0.513mW/g

Fig. 27 Flat Phantom Body-worn Position 835MHz CH384 with the display of the handset towards the phantom

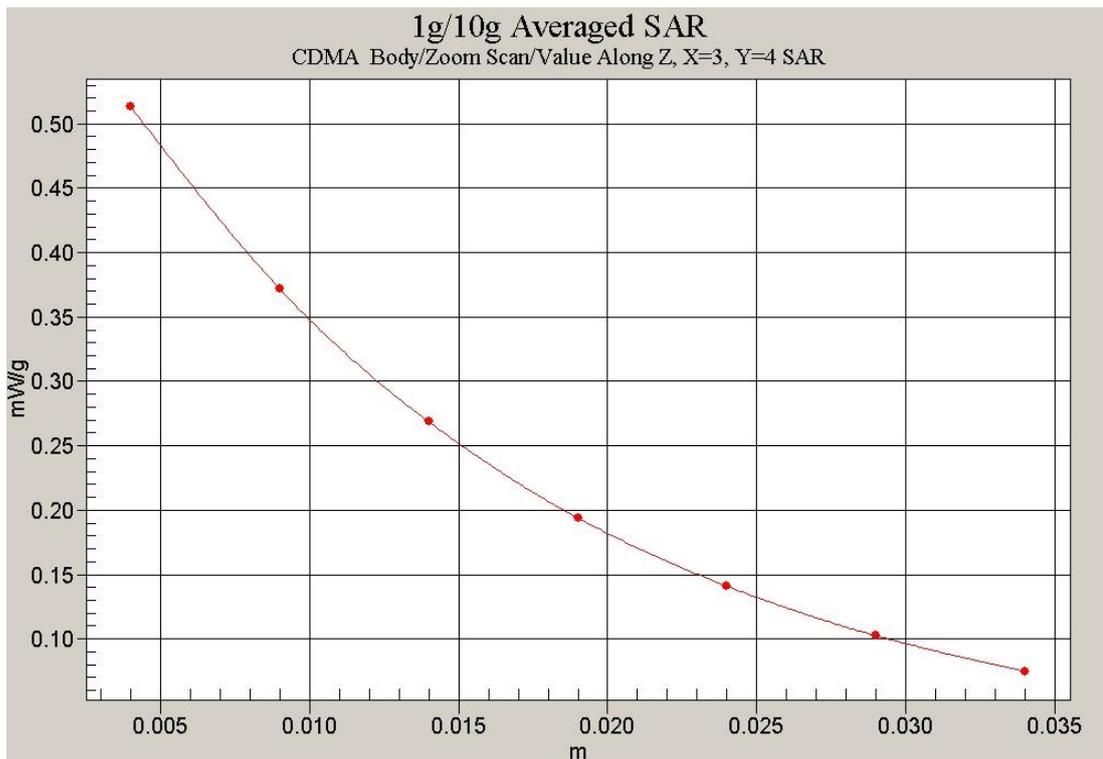


Fig. 28 Z-Scan at power reference point (Flat Phantom 835MHz CH384 with the display of the handset towards the phantom)

CDMA Body Toward phantom High

Electronics: DAE3 Sn589

Communication System: 835 MHz Frequency: 848.31 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Toward Phantom, High/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 19.9 V/m; Power Drift = 0.2 dB

Maximum value of SAR (interpolated) = 0.399 mW/g

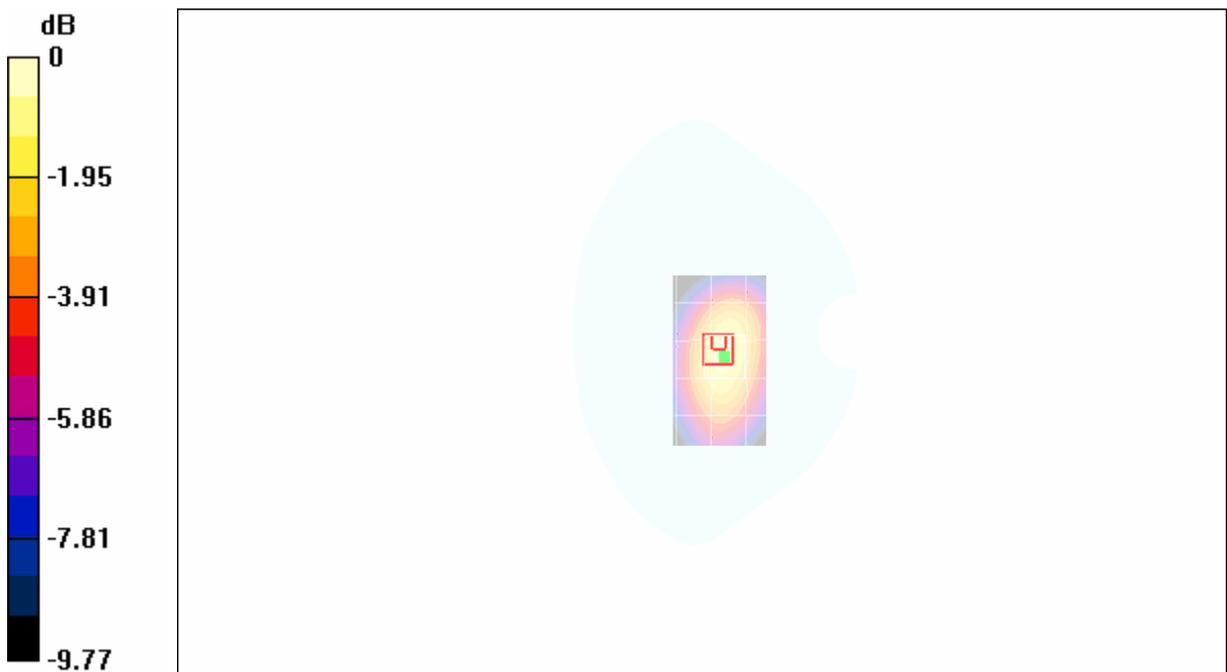
Toward Phantom, High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 19.9 V/m; Power Drift = 0.2 dB

Maximum value of SAR (measured) = 0.506 mW/g

Peak SAR (extrapolated) = 0.621 W/kg

SAR(1 g) = 0.464 mW/g; SAR(10 g) = 0.327 mW/g



0 dB = 0.506mW/g

Fig. 29 Flat Phantom Body-worn Position 835MHz CH777 with the display of the handset towards the phantom

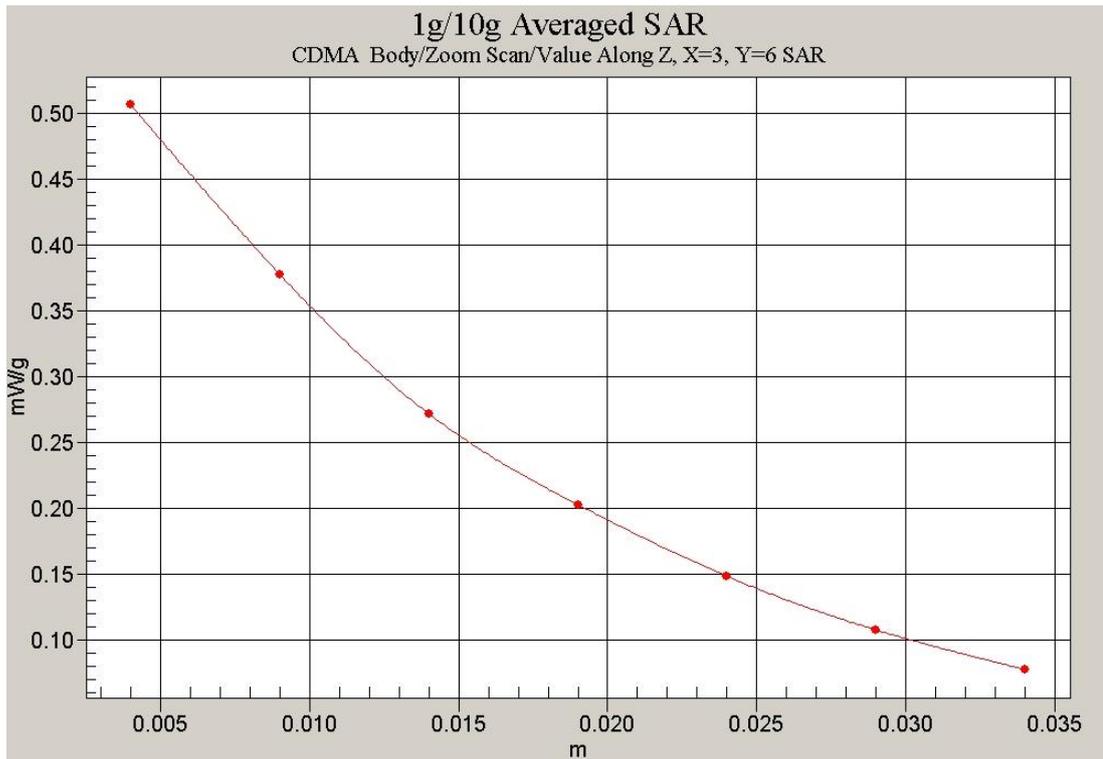


Fig. 30 Z-Scan at power reference point (Flat Phantom 835MHz CH777 with the display of the handset towards the phantom)

CDMA Body Toward Ground Low

Electronics: DAE3 Sn589

Communication System: 835MHz Frequency: 824.7 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Toward Ground, Low/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 24.5 V/m; Power Drift = 0.0 dB

Maximum value of SAR (interpolated) = 0.590 mW/g

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

Reference Value = 24.5 V/m; Power Drift = 0.0 dB

Maximum value of SAR (measured) = 0.588 mW/g

Peak SAR (extrapolated) = 0.771 W/kg

SAR(1 g) = 0.552 mW/g; SAR(10 g) = 0.378 mW/g

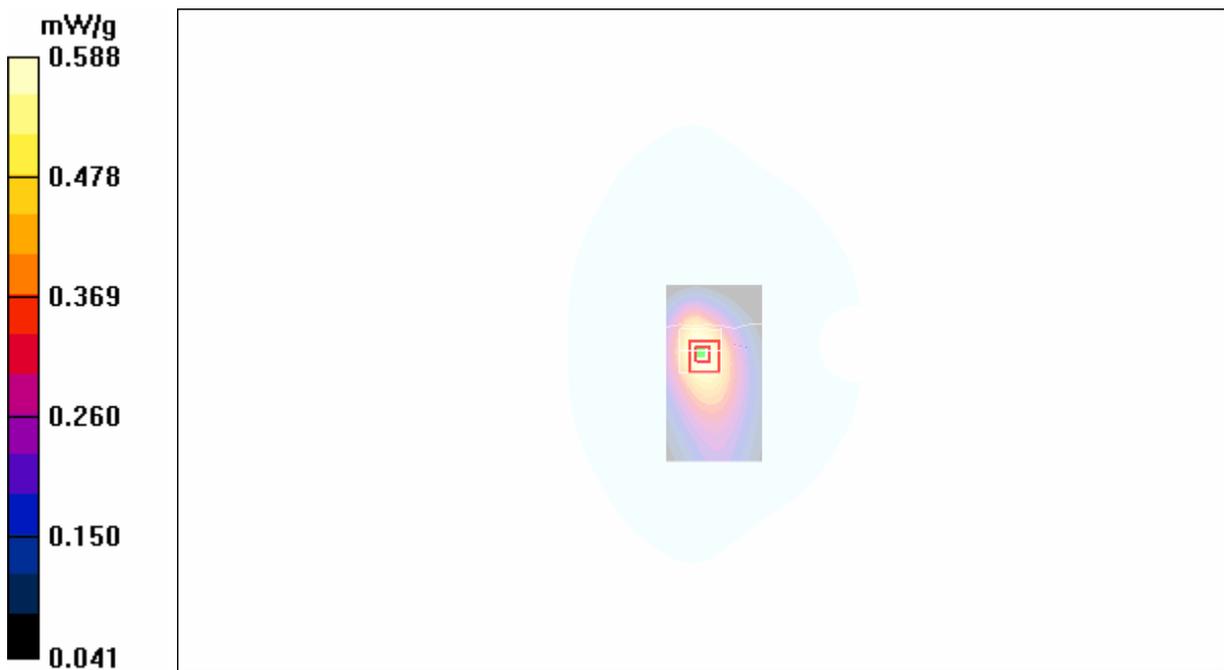


Fig. 31 Flat Phantom Body-worn Position 835MHz CH1013 with the display of the handset towards the ground

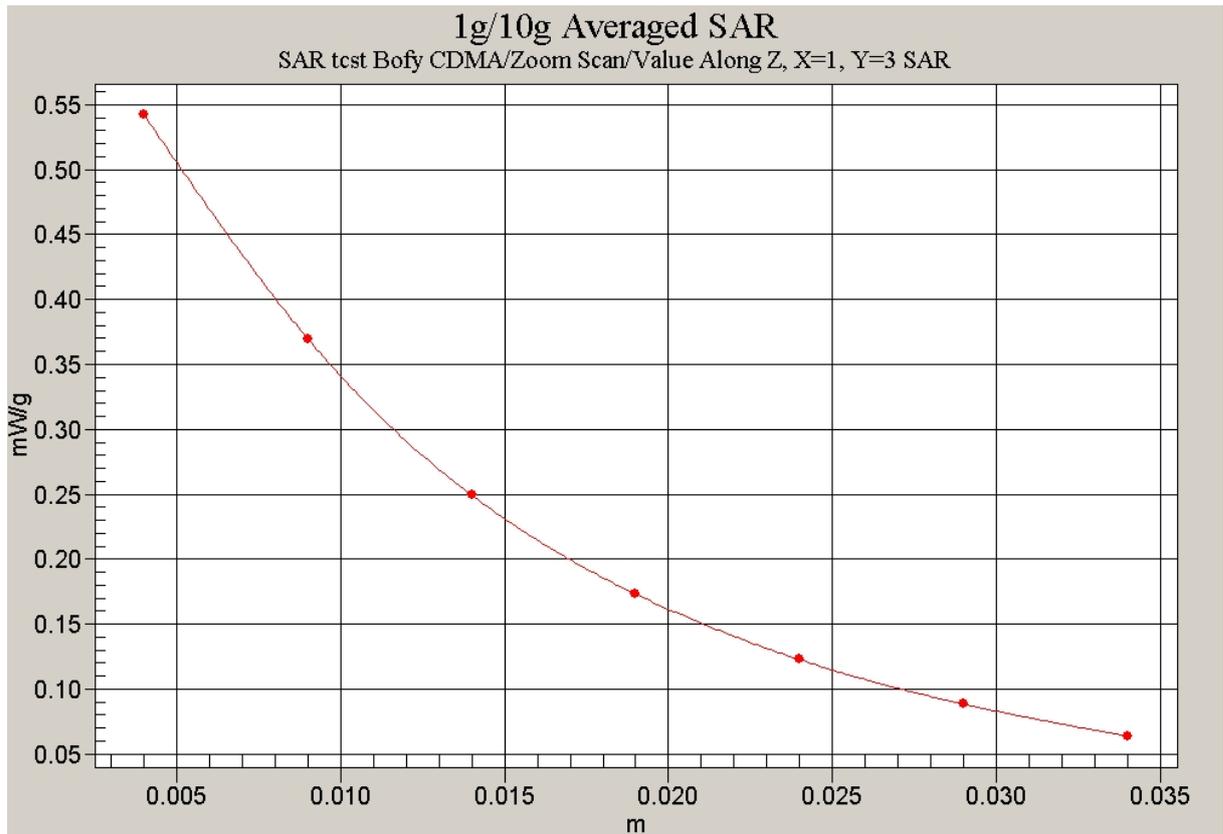


Fig. 32 Z-Scan at power reference point (Flat Phantom 835MHz CH1013 with the display of the handset towards the ground)

CDMA Body Toward ground Middle

Electronics: DAE3 Sn589

Communication System: 835MHz Frequency: 836.52 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Toward Ground, Middle/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 29.8 V/m; Power Drift = 0.1 dB

Maximum value of SAR (interpolated) = 0.920 mW/g

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

Reference Value = 29.8 V/m; Power Drift = 0.1 dB

Maximum value of SAR (measured) = 0.918 mW/g

Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.853 mW/g; SAR(10 g) = 0.576 mW/g

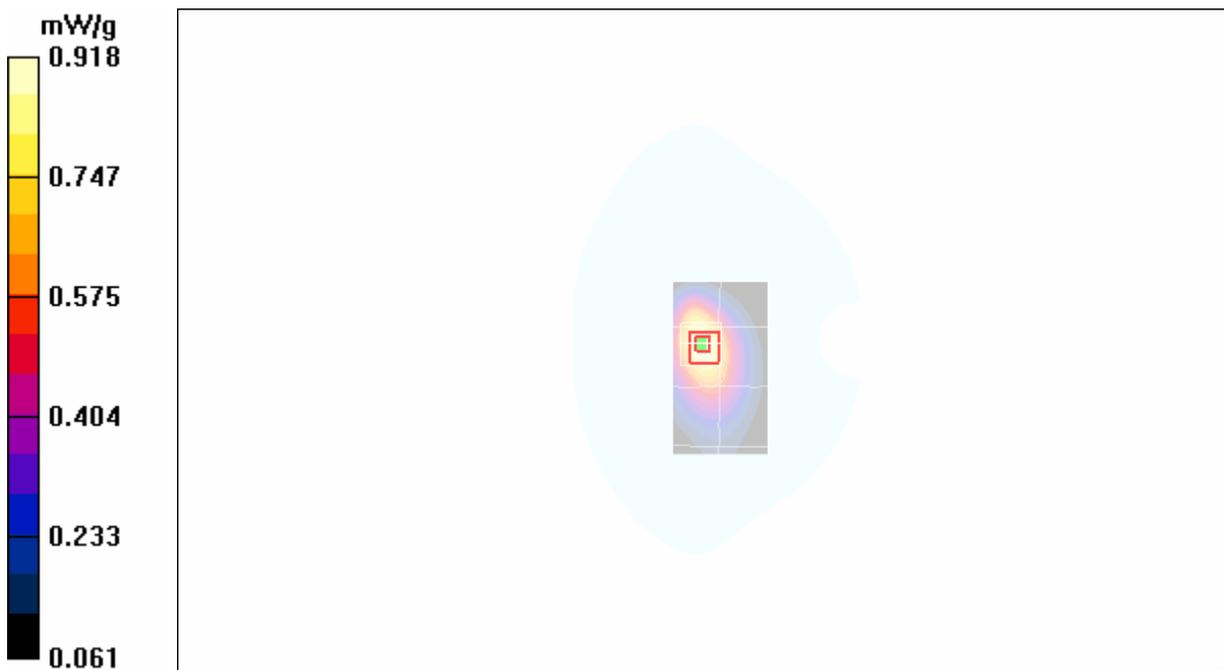


Fig. 33 Flat Phantom Body-worn Position 835MHz CH384 with the display of the handset towards the ground

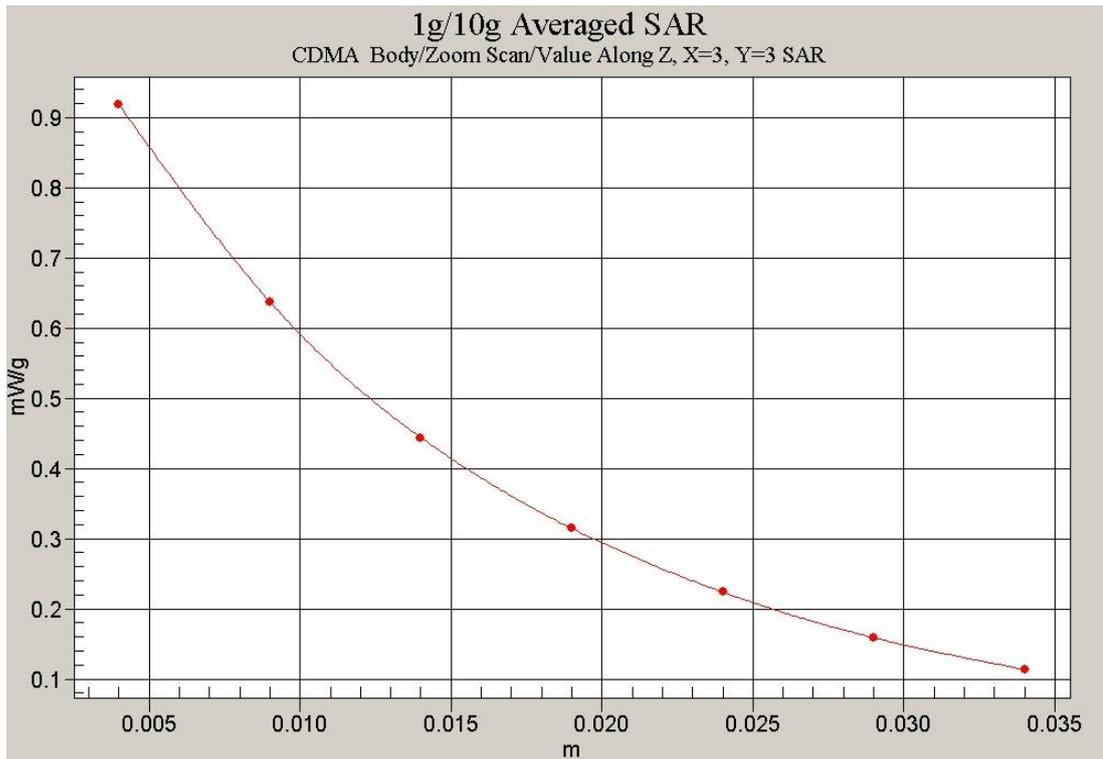


Fig. 34 Z-Scan at power reference point (Flat Phantom 835MHz CH384 with the display of the handset towards the ground)

CDMA Body Toward ground High

Electronics: DAE3 Sn589

Communication System: 835MHz Frequency: 848.31 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(6.53, 6.53, 6.53)

Toward Ground, High/Area Scan (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 20.9 V/m; Power Drift = -0.2 dB

Maximum value of SAR (interpolated) = 0.517 mW/g

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

Reference Value = 20.9 V/m; Power Drift = -0.2 dB

Maximum value of SAR (measured) = 0.510 mW/g

Peak SAR (extrapolated) = 0.654 W/kg

SAR(1 g) = 0.476 mW/g; SAR(10 g) = 0.329 mW/g

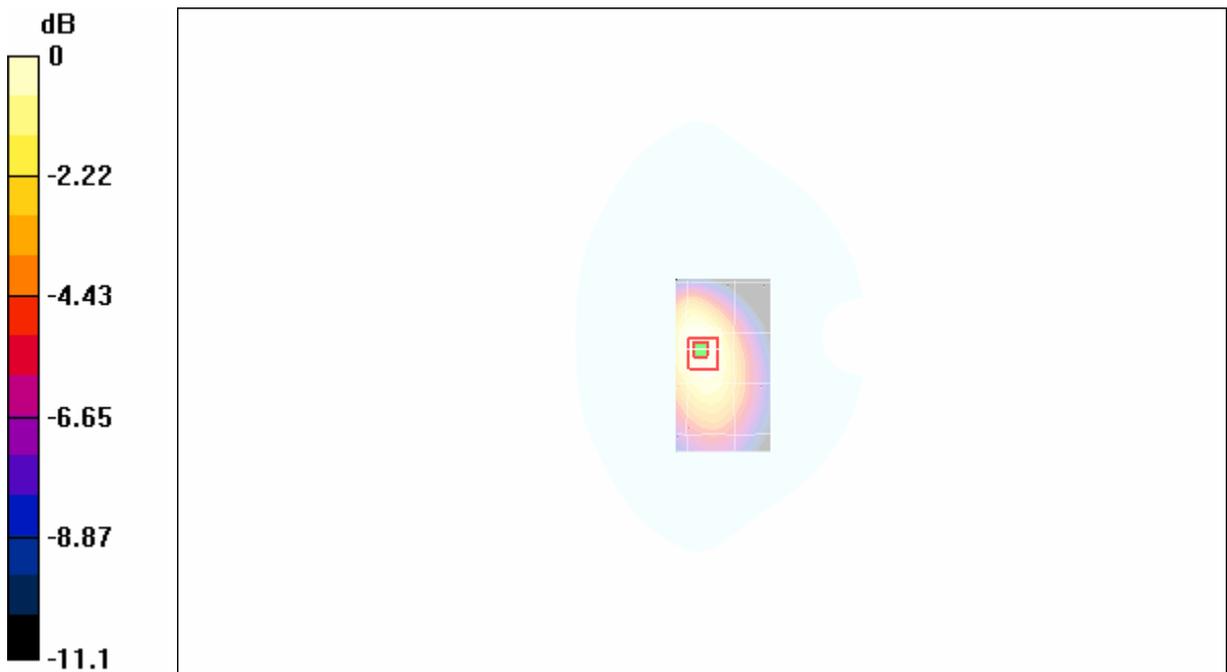


Fig.35Flat Phantom Body-worn Position 835MHz CH777 with the display of the handset towards the ground

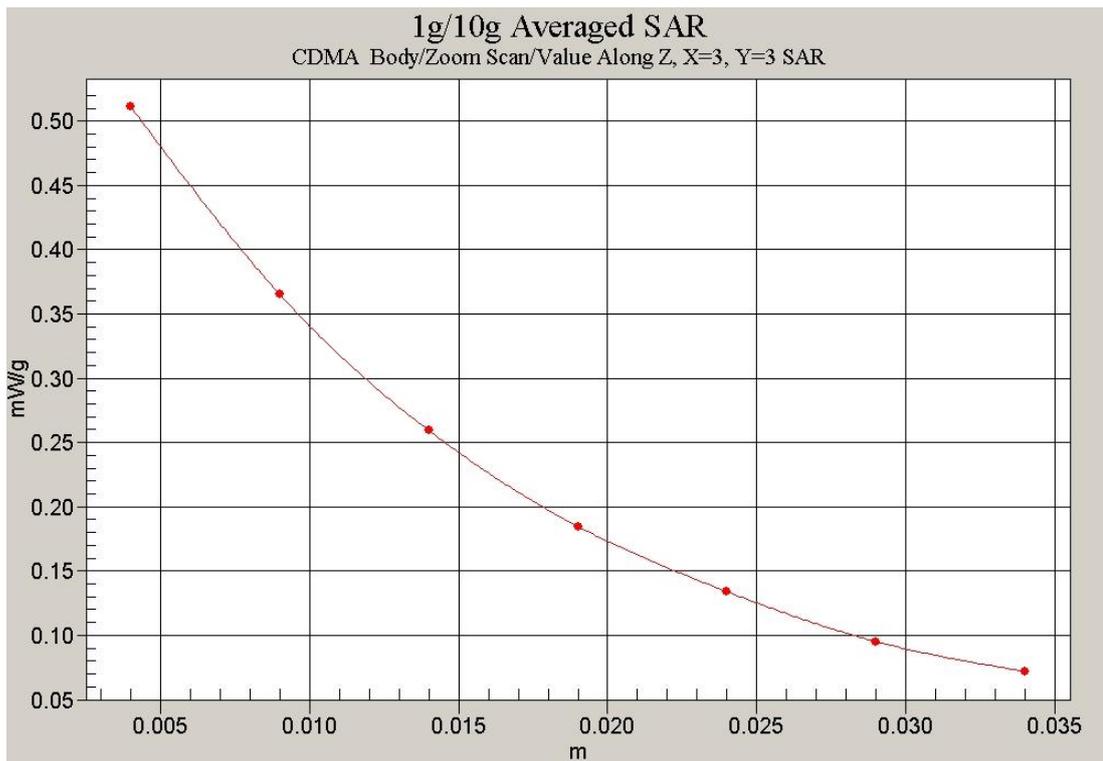


Fig. 36 Z-Scan at power reference point (Flat Phantom 835MHz CH777 with the display of the handset towards the ground)

ANNEX D SYSTEM VALIDATION RESULTS

Test Laboratory: TMC
File Name: 835MHz.da4

DUT: Dipole 835 MHz Type & Serial Number: D835V2 - SN:443
Program: System Performance Check; Dipole 835MHz,Pin=250mW,d=15mm

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

Reference Value = 54.7 V/m

Peak SAR = 3.47 mW/g

SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.52 mW/g

Power Drift = -0.01 dB

Area Scan (101x101x1): Measurement grid: dx=10mm, dy=10mm

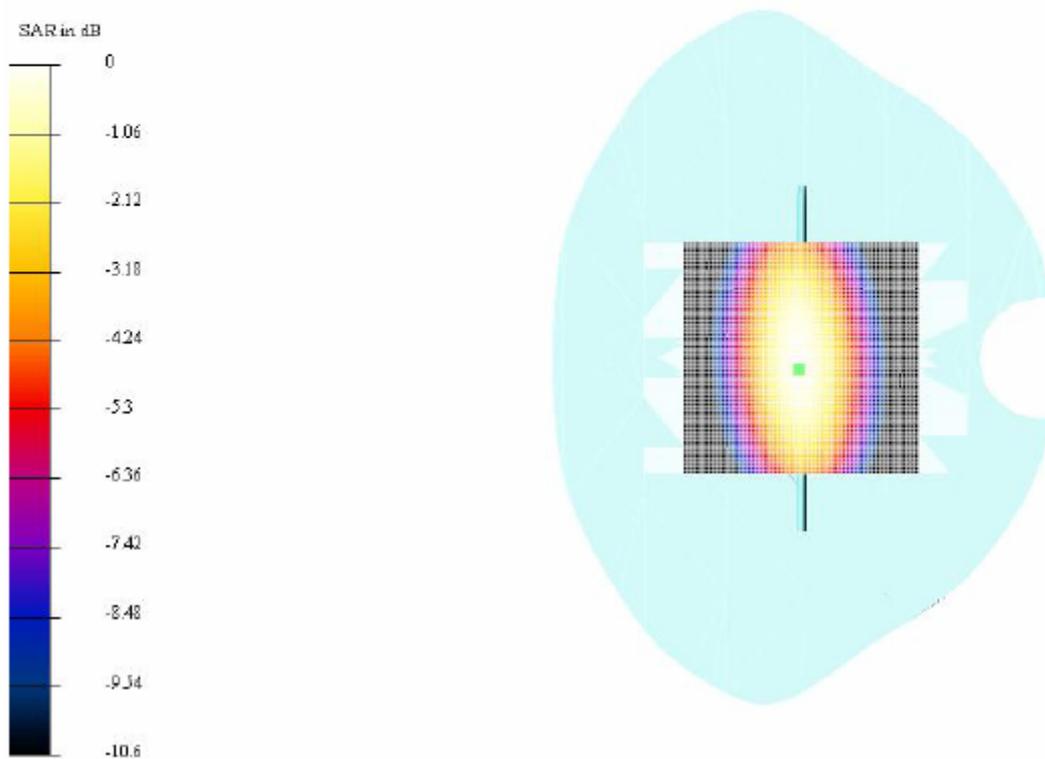


Fig.37 System Performance Check 835MHz 250mW