信息产业部通信计量中心 TMC
Telecommunication Metrology Center of MII

Deutscher Akkreditierungs Rat DAR

No. DAT-P-114/01-01

CNAS 检测 CNAS L0442

TEST REPORT

No. 2007EEE02713

FCC ID	QISC3308A
Test Name	Electromagnetic Field (Specific Absorption Rate)
Product Name	CDMA 1X Digital Mobile Phone
Model	HUAWEI C3308
Client	HUAWEI Technologies Co., Ltd.
Classification of test	Non Type Approval

Telecommunication Metrology Center

of Ministry of Information Industry

信息产业部通信计量中心 检验报告专用章

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TABLE OF CONTENT

Product Name	CDMA 1X Digital Mobile Phone	Sample Model	HUAWEI C3308
Client	HUAWEI Technologies Co., Ltd.	Type of test	Non Type Approval
Factory	HUAWEI Technologies Co., Ltd.	Sampling arrival date	September 14th, 2007
Manufacturer	HUAWEI Technologies Co., Ltd.		
Sampling/ Sending sample	Sending sample	Sample sent by	Xie Yan
Sampling location	/	Sampling person	/
Sample quantity	1	Sample matrix	/
Series number of the Sample	0D226003		
Manufacture date	/	Manufacture location	/
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. **ANSI C95.1–1999**: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. **IEEE 1528–2003**: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques. **OET Bulletin 65 (Edition 97-01) and Supplement C (Edition 01-01)**: Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits. **IEC 62209-1**: Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 1:Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz) **IEC 62209-2 (Draft)**: Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures – Part 2: Procedure to determine the Specific Absorption Rate (SAR)in the head and body for 30MHz to 6GHz Handheld and Body-Mounted Devices used in close proximity to the Body.		
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: October 15th, 2007**		
Note	TX Freq. Band: 824-849 MHz (CDMA) Max. Power: 0.25 Watt (CDMA) The test results relate only to the items tested of the sample(s).		

Approved by (Lu Bingsong) **Reviewed by** (Sun Qian) **Tested by** (Lin Hao)

Deputy Director of the laboratory

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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	0755-28780808

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	0755-28780808

3.2 Constituents of EUT

Table 3: Constituents of Samples

Description	Model	Serial Number	Manufacturer
Handset	HUAWE C3308	0D226003	HUAWEI Technologies Co., Ltd.
Lithium Battery	HBL3A	HGY742504056	Shenzhen BYD Co., Ltd.
AC/DC Adapter	NTPCA-053065C	\	TECH-POWER Electronics （Shenzhen） Co., Ltd.

3.3 General Description

Equipment Under Test (EUT) is a model of CDMA 1X portable Mobile Station (MS) with integrated antenna. It consists of Handset and normal options: Lithium Battery and AC/DC Adapter as Table 3. SAR is tested for CDMA 835MHz.

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 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

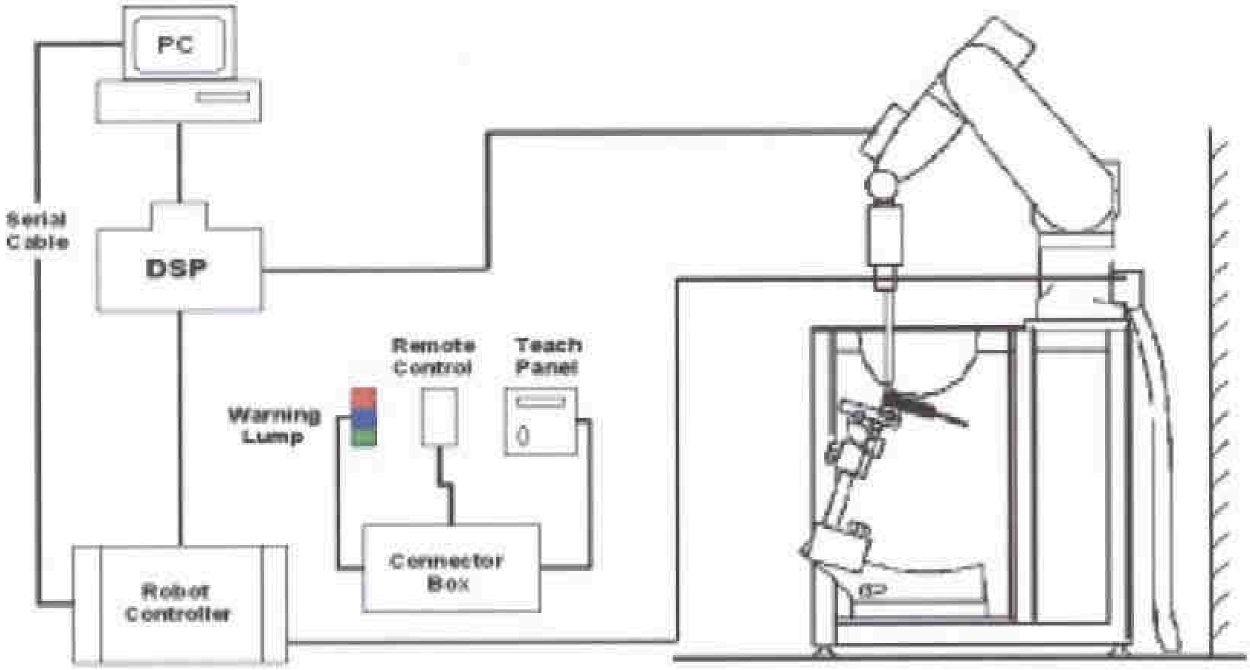
For SAR test, the maximum power output is very important and essential; it is identical under the measurement uncertainty. It is proper to use typical Test Mode 3 (FW RC3, RVS RC3, SO55) as the worst case for SAR test.

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 ± 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 1: SAR Lab Test Measurement Set-up

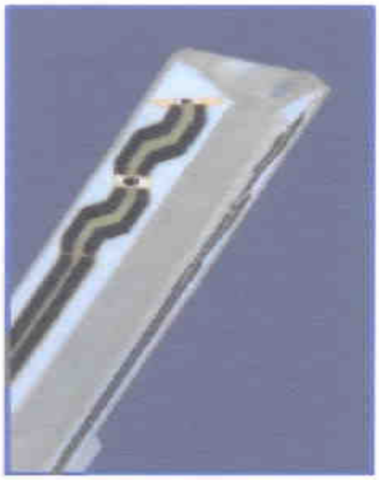
The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information 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 2: ET3DV6 E-field Probe

Picture3: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).

Picture 4:Device Holder

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

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

Picture5:Generic Twin Phantom

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 835MHz
Water	41.45
Sugar	56.0
Salt	1.45
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz ε=41.5 σ=0.90

Table 5. 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 ε=55.2 σ=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.

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

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

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

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

7.2.2 Measurement result

Table 7: Conducted Power Measurement Results

CDMA2000 1X (RC3)	Conducted Power		
	Channel 1013 (824.7MHz)	Channel 384 (836.52MHz)	Channel 777 (848.31MHz)
Before Test (dBm)	24.2	24.4	24.2
After Test (dBm)	24.1	24.2	24.2
CDMA2000 1X (RC1)	Conducted Power		
	Channel 1013 (824.7MHz)	Channel 384 (836.52MHz)	Channel 777 (848.31MHz)
Before Test (dBm)	24.2	24.4	24.2
After Test (dBm)	24.1	24.2	24.2

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 12 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 23.3 °C and relative humidity 49%. Liquid temperature during the test: 22.5°C			
/	**Frequency**	**Permittivity ε**	**Conductivity σ (S/m)**
Target value	835 MHz	41.5	0.90
Measurement value (Average of 10 tests)	835 MHz	43.5	0.90

Table 9: Dielectric Performance of Body Tissue Simulating Liquid

Measurement is made at temperature 23.3 °C and relative humidity 49%. Liquid temperature during the test: 22.5°C			
/	**Frequency**	**Permittivity ε**	**Conductivity σ (S/m)**
Target value	835 MHz	55.2	0.97
Measurement value (Average of 10 tests)	835 MHz	55.0	0.97

8.2 System Validation

Table 10: System Validation

Measurement is made at temperature 23.3 °C, relative humidity 49%, input power 250 mW. Liquid temperature during the test: 22.5°C							
Liquid parameters		**Frequency**		**Permittivity ε**		**Conductivity σ (S/m)**	
		835 MHz		43.5		0.90	
Verification results	**Frequency**	**Target value (W/kg)**		**Measured value (W/kg)**		**Deviation**	
		10 g Average	**1 g Average**	**10 g Average**	**1 g Average**	**10 g Average**	**1 g Average**
	835 MHz	1.60	2.48	1.67	2.53	4.375%	2.016%

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

8.3 Summary of Measurement Results

Table 11: 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)	0.303	0.467	-0.083
Left hand, Touch cheek, Mid frequency(See Fig.3)	0.411	0.630	-0.117
Left hand, Touch cheek, Bottom frequency(See Fig.5)	0.315	0.484	-0.068
Left hand, Tilt 15 Degree, Top frequency(See Fig.7)	0.096	0.133	-0.200
Left hand, Tilt 15 Degree, Mid frequency(See Fig.9)	0.129	0.178	-0.131
Left hand, Tilt 15 Degree, Bottom frequency(See Fig.11)	0.098	0.136	-0.157
Right hand, Touch cheek, Top frequency(See Fig.13)	0.293	0.447	-0.200
Right hand, Touch cheek, Mid frequency(See Fig.15)	0.404	0.613	-0.101
Right hand, Touch cheek, Bottom frequency(See Fig.17)	0.308	0.465	-0.126
Right hand, Tilt 15 Degree, Top frequency(See Fig.19)	0.100	0.139	0.143
Right hand, Tilt 15 Degree, Mid frequency(See Fig.21)	0.142	0.198	-0.164
Right hand, Tilt 15 Degree, Bottom frequency(See Fig.23)	0.109	0.150	-0.151

Table 12: 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 Ground, Top frequency(See Fig.25)	0.218	0.327	-0.098
Body, Towards Ground, Mid frequency(See Fig.27)	0.281	0.419	-0.132
Body, Towards Ground, Bottom frequency(See Fig.29)	0.228	0.341	-0.200

8.4 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.

The maximum SAR value is obtained at the case of **Left hand, Touch cheek, Mid frequency (Table 11),** and the value are: **0.411 (10g), 0.630 (10g).**

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	$(1-cp)^{1/2}$	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	B	5.0	R	√3	0.64	1.7	∞

	values							
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

Table 13: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	HP 8753E	US38433212	August 31,2007	One year
02	Power meter	NRVD	101253	June 21, 2007	One year
03	Power sensor	NRV-Z5	100333		
04	Power sensor	NRV-Z6	100011	September 3, 2007	One year
05	Signal Generator	E4433B	US37230472	September 5, 2007	One Year
06	Amplifier	VTL5400	0505	No Calibration Requested	
07	BTS	CMU 200	105948	August 16, 2007	One year
08	E-field Probe	SPEAG ET3DV6	1736	December 1, 2006	One year
09	DAE	SPEAG DAE4	777	September 7, 2007	One year
10	Dipole Validation Kit	SPEAG D835V2	443	February 19, 2007	Two years

11 TEST PERIOD

The test is performed on September 28th, 2007.

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.

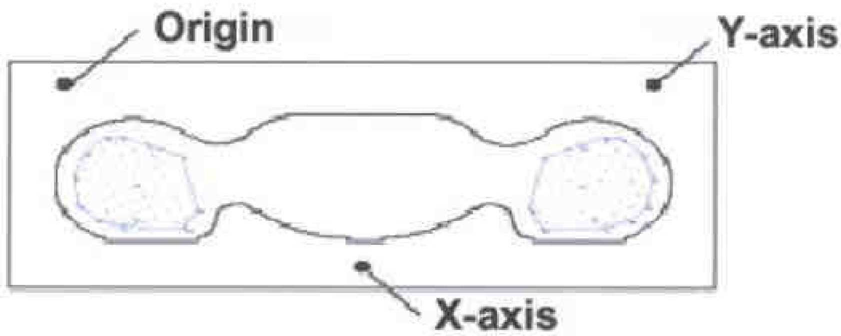
Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7 x 7x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

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.

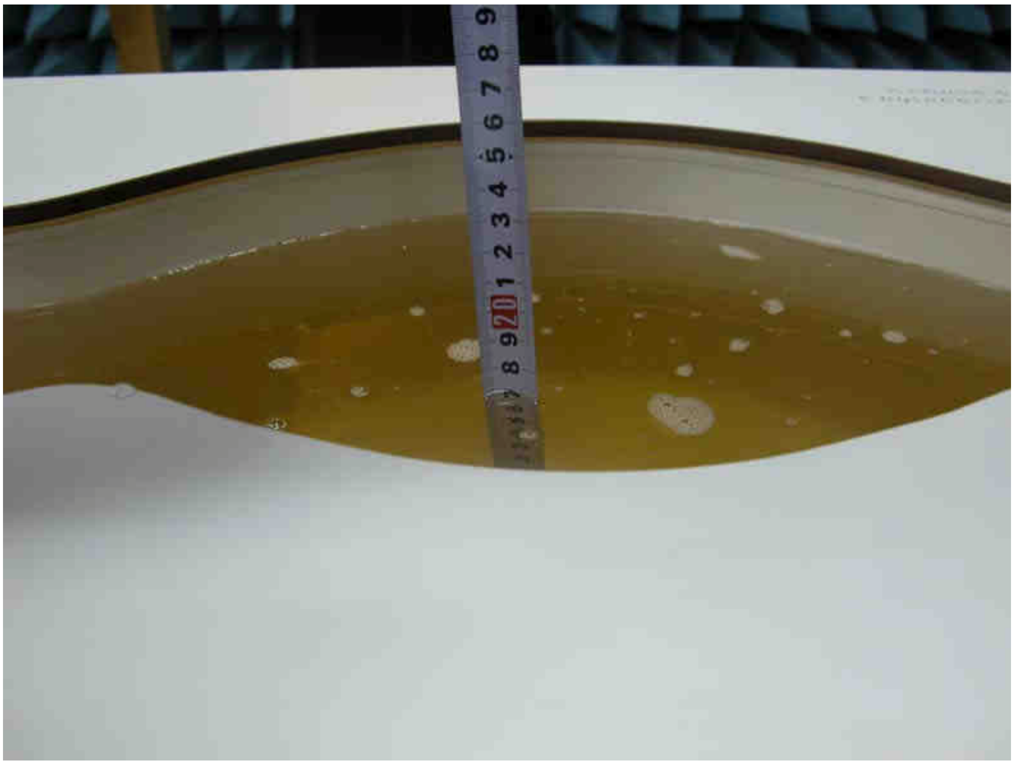
Step 4: Re-measurement the SAR value at the same location as in Step 1. If the value changed by more than 5%, the evaluation is repeated.



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 (835 MHz)

ANNEX C GRAPH RESULTS

CDMA 1X Left Cheek High

Electronics: DAE4 Sn777
Medium: 835 Head

Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.917 mho/m; ε_r = 43.7; ρ = 1000 kg/m^3

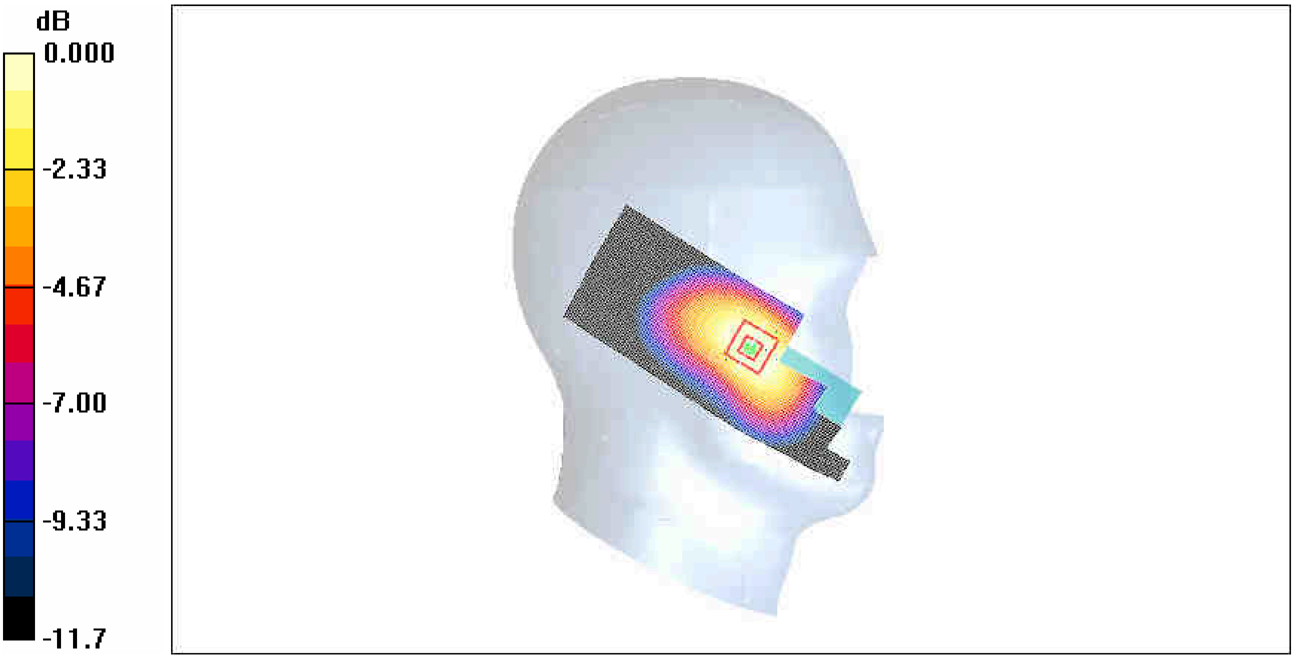
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C

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 (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.578 mW/g

Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.44 V/m; Power Drift = -0.083dB
Peak SAR (extrapolated) = 0.660 W/kg
SAR(1 g) = 0.467 mW/g; SAR(10 g) = 0.303 mW/g
Maximum value of SAR (measured) = 0.501 mW/g



0 dB = 0.501mW/g

Fig. 1 Left Hand Touch Cheek CDMA 835MHz CH777

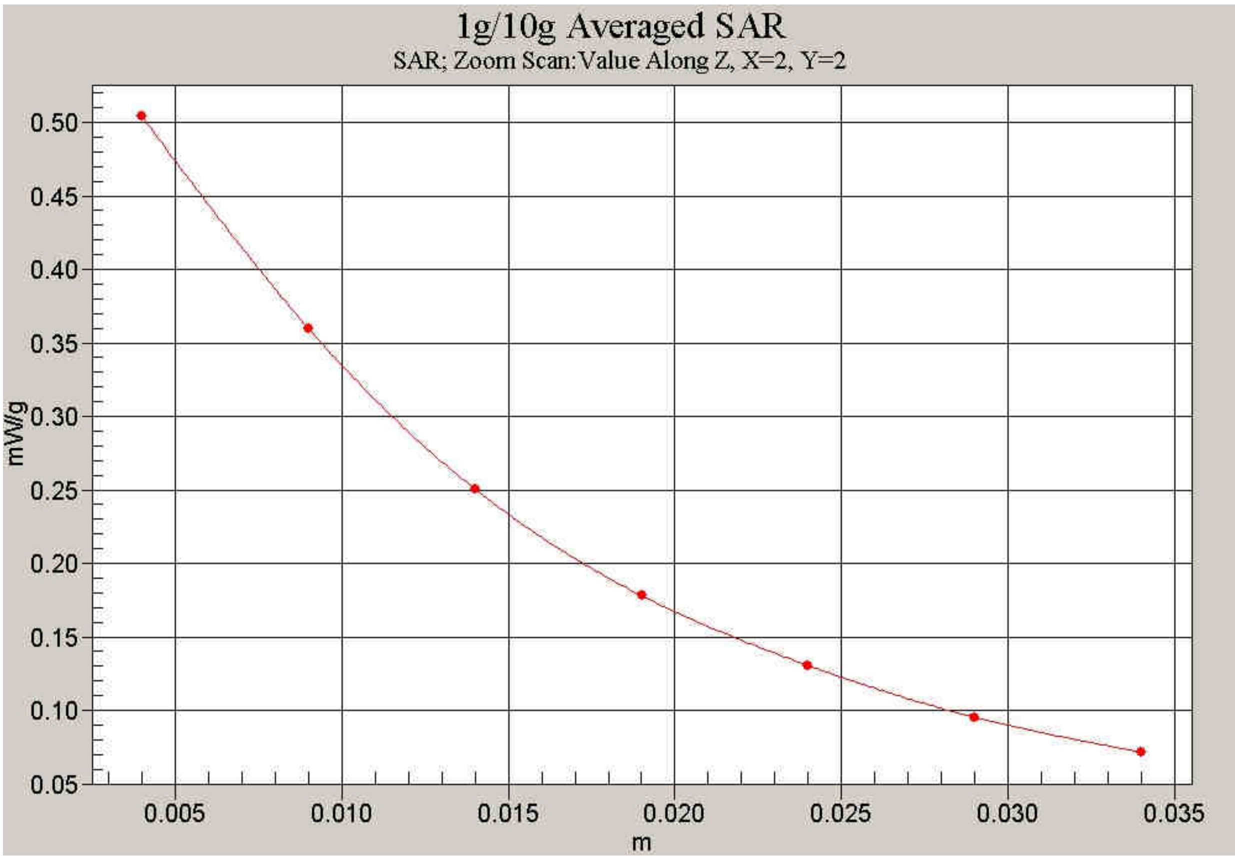


Fig. 2 Z-Scan at power reference point (CDMA 835MHz CH777)

CDMA 1X Left Cheek Middle

Electronics: DAE4 Sn777

Medium: 835 Head

Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.906 mho/m; ε_r = 43.8; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C Liqiud Temperature: 22.5^{o}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 (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.790 mW/g

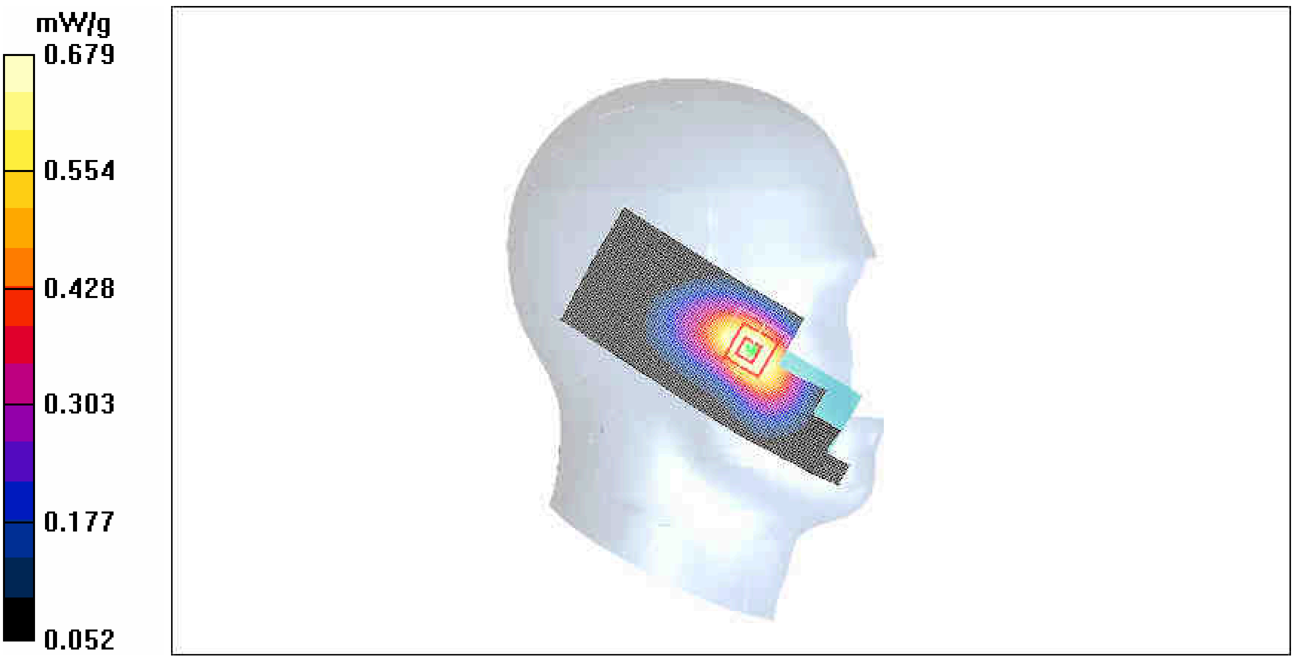
Cheek Middle /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.2 V/m; Power Drift = -0.117dB

Peak SAR (extrapolated) = 0.884 W/kg

SAR(1 g) = 0.630 mW/g; SAR(10 g) = 0.411 mW/g

Maximum value of SAR (measured) = 0.679 mW/g



0 dB = 0.679mW/g

Fig. 3 Left Hand Touch Cheek CDMA 835MHz CH384

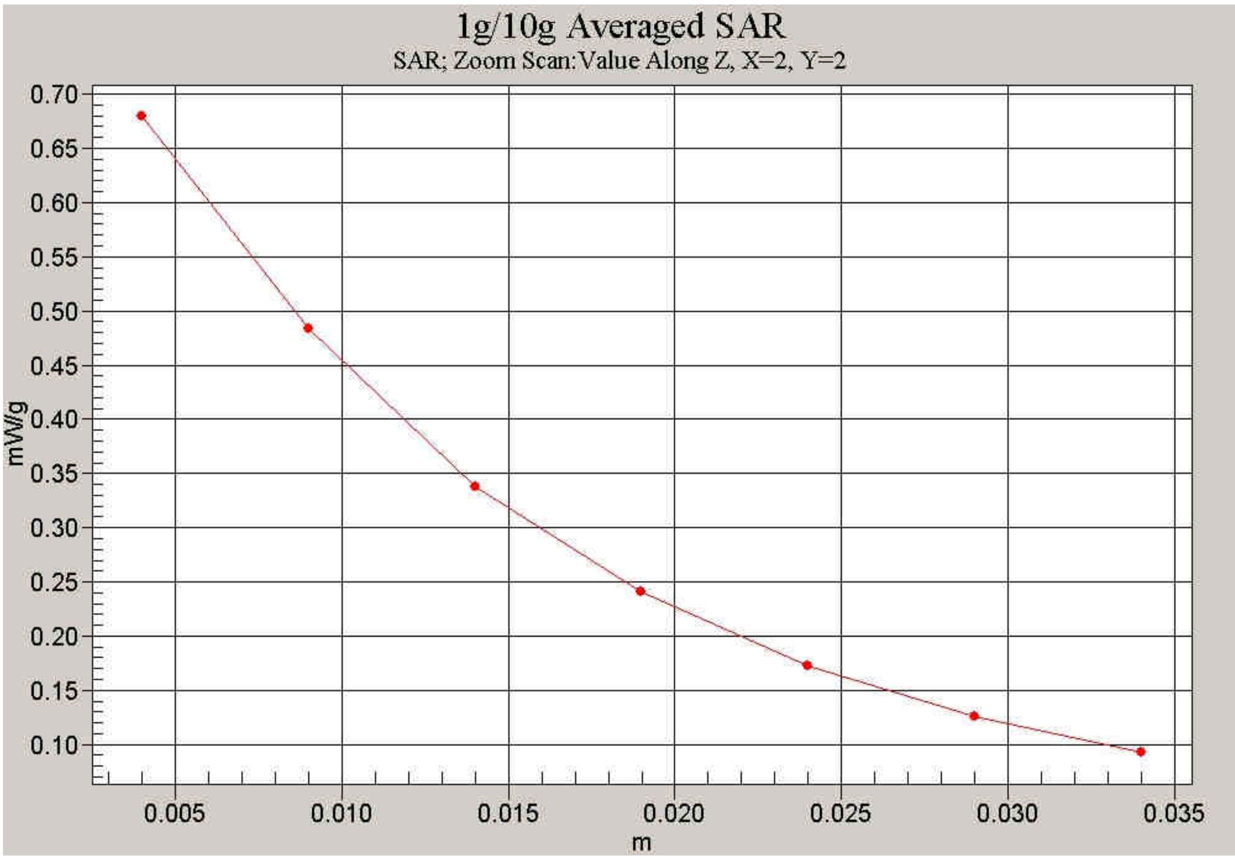


Fig. 4 Z-Scan at power reference point (CDMA 835MHz CH384)

CDMA 1X Left Cheek Low

Electronics: DAE4 Sn777

Medium: 835 Head

Medium parameters used: f = 825 MHz; σ = 0.896 mho/m; ε_r = 43.9; ρ = 1000 kg/m^3

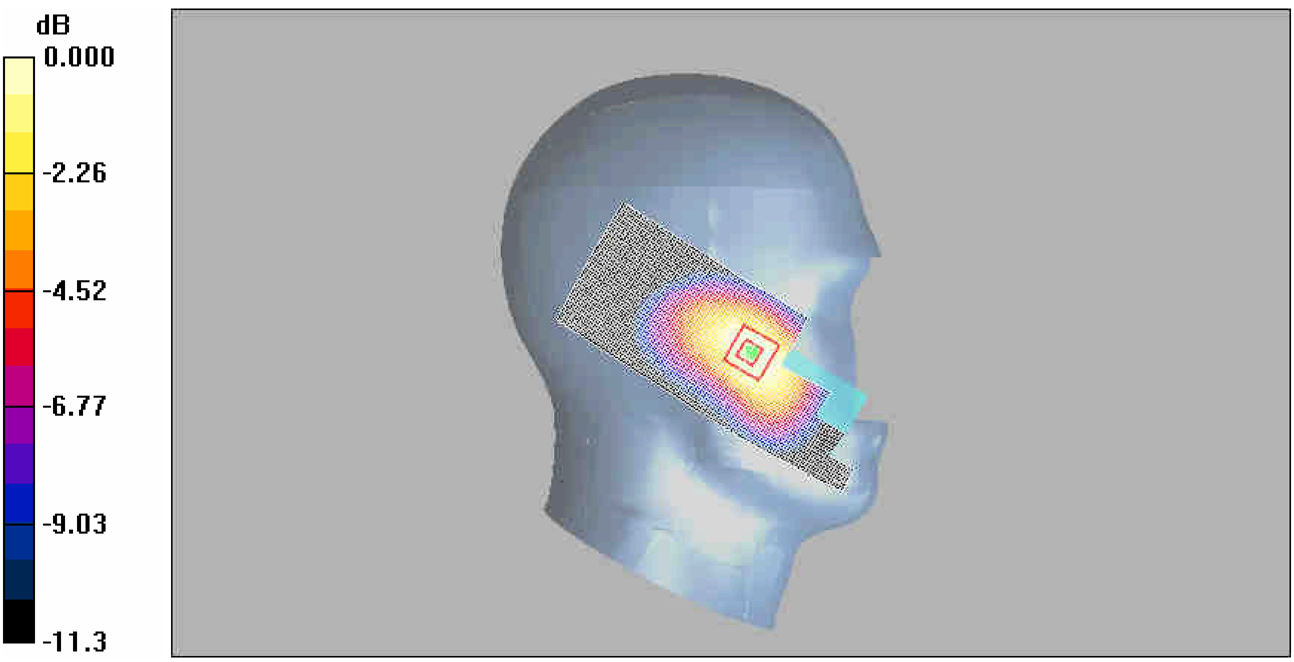
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C

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 (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.573 mW/g

Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.06 V/m; Power Drift = -0.068 dB
Peak SAR (extrapolated) = 0.682 W/kg
SAR(1 g) = 0.484 mW/g; SAR(10 g) = 0.315 mW/g
Maximum value of SAR (measured) = 0.523 mW/g



0 dB = 0.523mW/g

Fig. 5 Left Hand Touch Cheek CDMA 835MHz CH1013

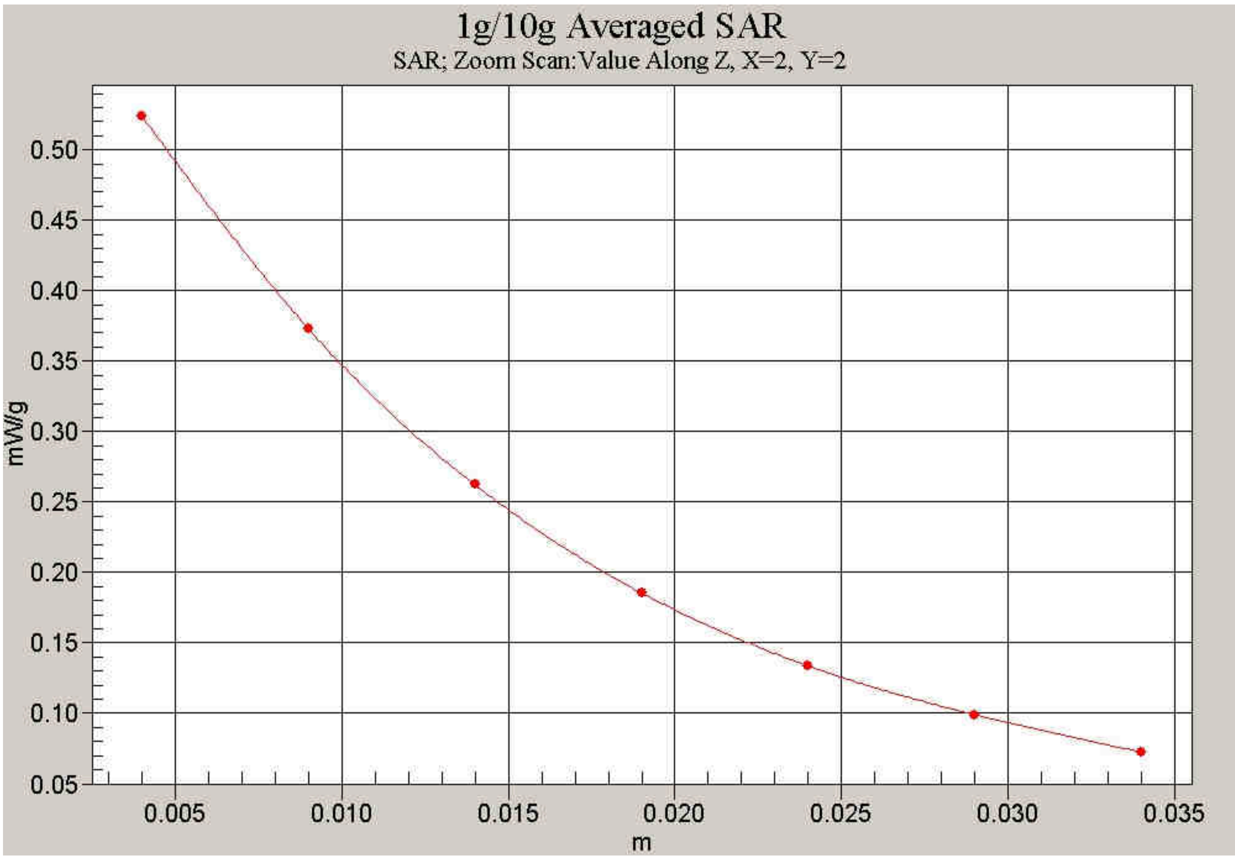


Fig. 6 Z-Scan at power reference point (CDMA 835MHz CH1013)

CDMA 1X Left Tilt High

Electronics: DAE4 Sn777

Medium: 835 Head

Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.917 mho/m; ε_r = 43.7; ρ = 1000 kg/m^3

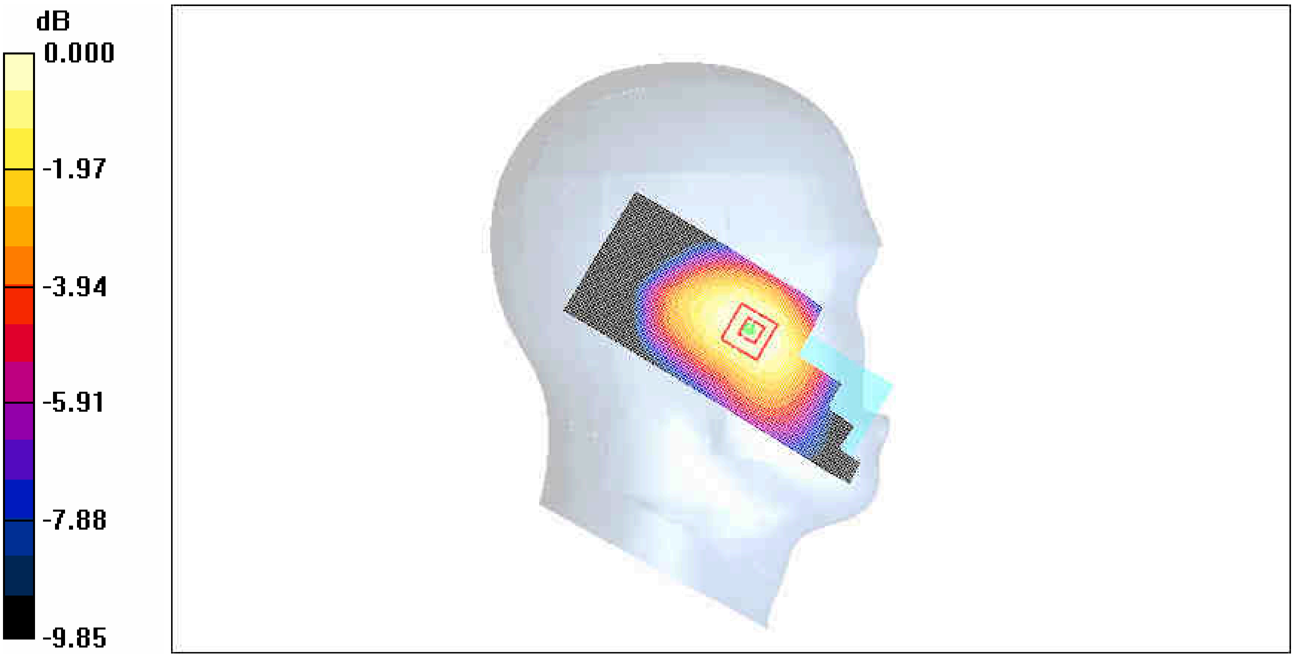
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C

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 (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.145 mW/g

Tilt High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.76 V/m; Power Drift = -0.200 dB
Peak SAR (extrapolated) = 0.169 W/kg
SAR(1 g) = 0.133 mW/g; SAR(10 g) = 0.096 mW/g
Maximum value of SAR (measured) = 0.140 mW/g



0 dB = 0.140mW/g

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

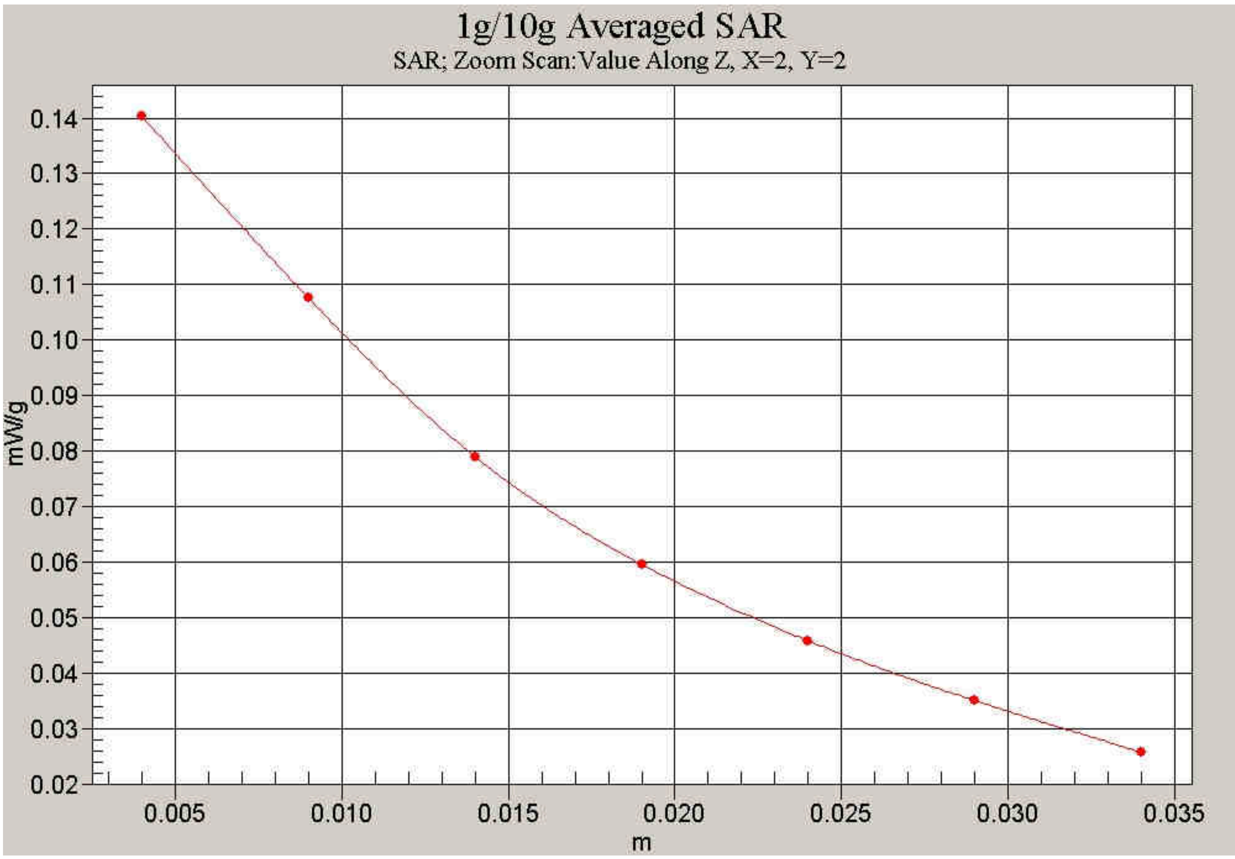


Fig. 8 Z-Scan at power reference point (CDMA 835MHz CH777)

CDMA 1X Left Tilt Middle

Electronics: DAE4 Sn777

Medium: 835 Head

Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.906 mho/m; ε_r = 43.8; ρ = 1000 kg/m^3

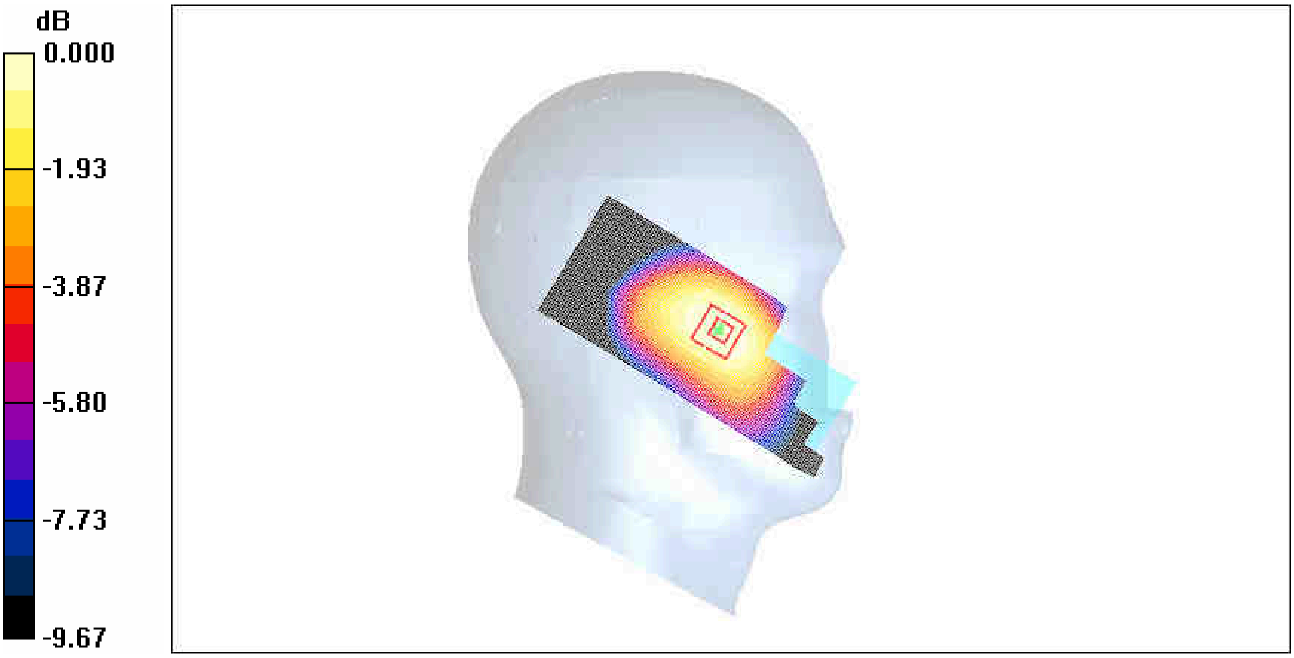
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C

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 (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.196 mW/g

Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.99 V/m; Power Drift = -0.131 dB
Peak SAR (extrapolated) = 0.230 W/kg
SAR(1 g) = 0.178 mW/g; SAR(10 g) = 0.129 mW/g
Maximum value of SAR (measured) = 0.187 mW/g



0 dB = 0.187mW/g

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

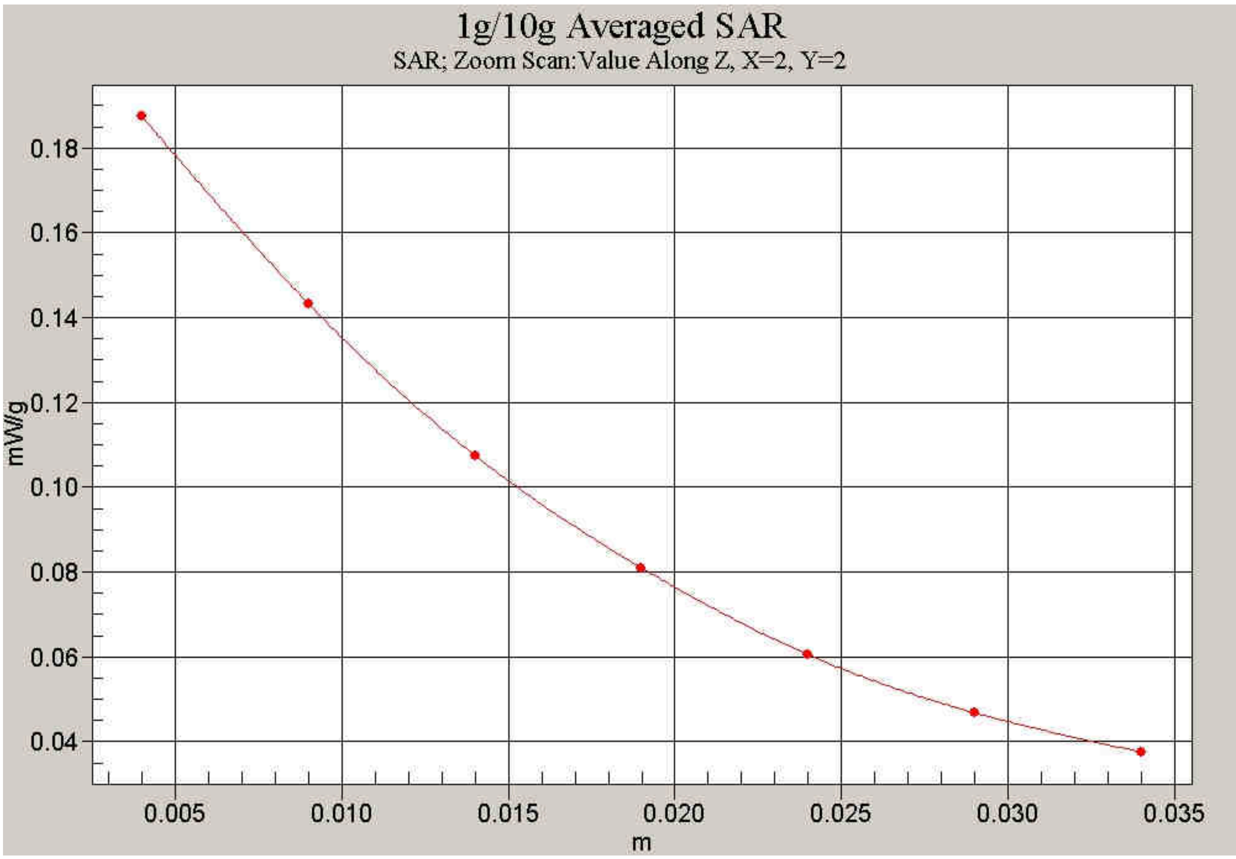


Fig. 10 Z-Scan at power reference point (CDMA 835MHz CH384)

CDMA 1X Left Tilt Low
Electronics: DAE4 Sn777
Medium: 835 Head

Medium parameters used: f = 825 MHz; σ = 0.896 mho/m; ε_r = 43.9; ρ = 1000 kg/m^3

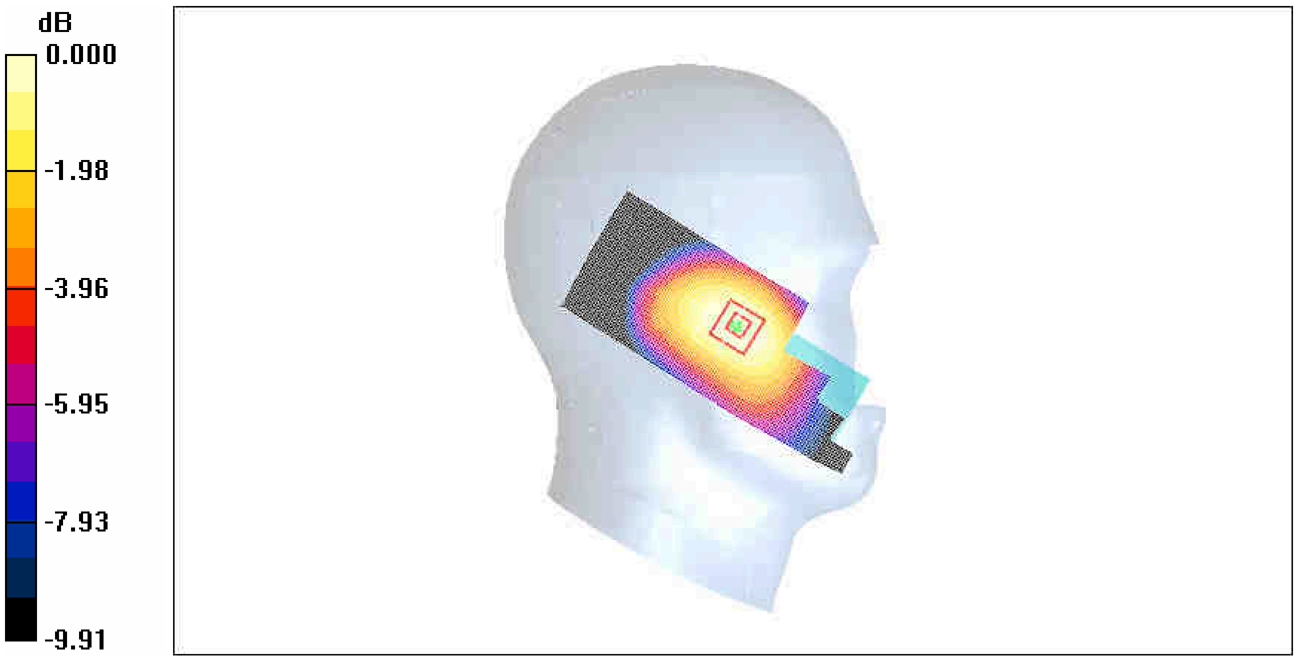
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C

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 (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.149 mW/g

Tilt Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.58 V/m; Power Drift = -0.157 dB
Peak SAR (extrapolated) = 0.174 W/kg
SAR(1 g) = 0.136 mW/g; SAR(10 g) = 0.098 mW/g
Maximum value of SAR (measured) = 0.144 mW/g



0 dB = 0.144mW/g

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

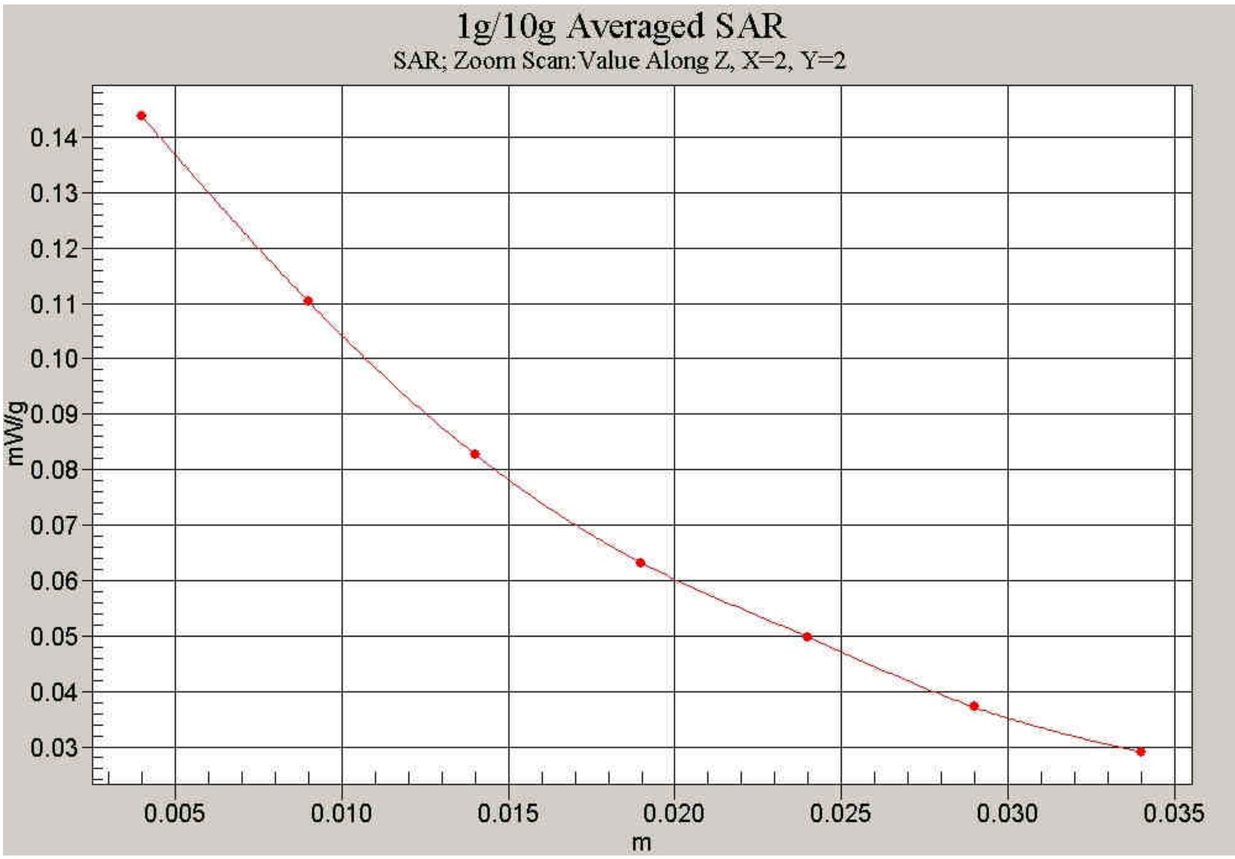


Fig. 12 Z-Scan at power reference point (CDMA 835MHz CH1013)

CDMA 1X Right Cheek High
Electronics: DAE4 Sn777
Medium: 835 Head

Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.917 mho/m; ε_r = 43.7; ρ = 1000 kg/m^3

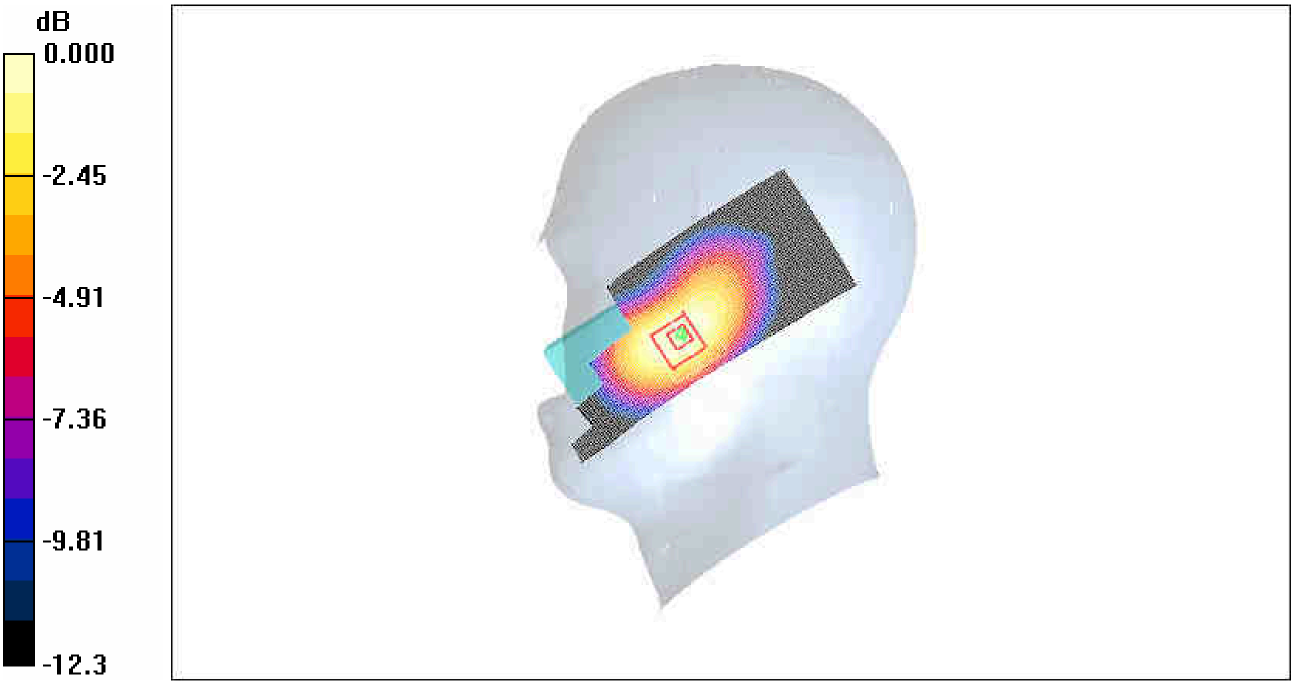
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C

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 (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.514 mW/g

Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.54 V/m; Power Drift = -0.200 dB
Peak SAR (extrapolated) = 0.639 W/kg
SAR(1 g) = 0.447 mW/g; SAR(10 g) = 0.293 mW/g
Maximum value of SAR (measured) = 0.489 mW/g



0 dB = 0.489mW/g

Fig. 13 Right Hand Touch Cheek CDMA 835MHz CH777

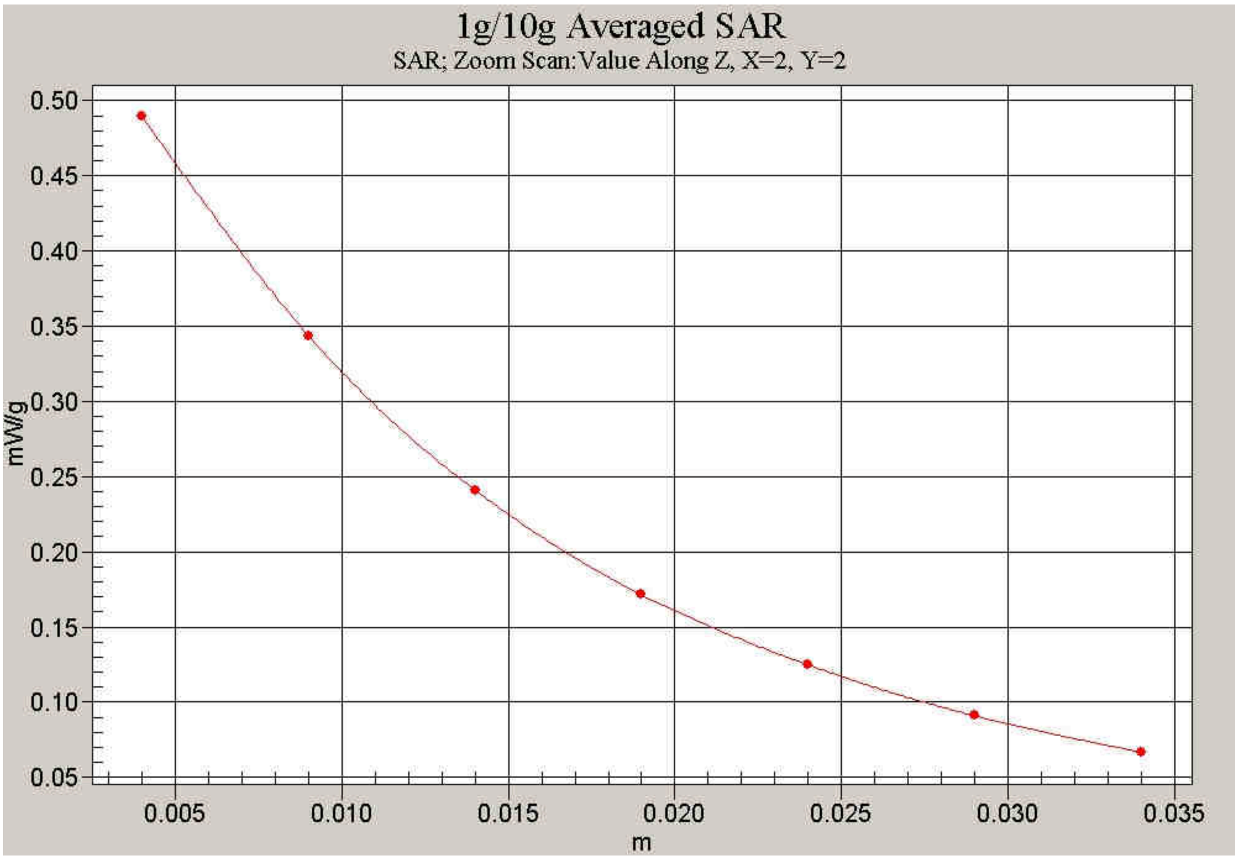


Fig. 14 Z-Scan at power reference point (CDMA 835MHz CH777)

CDMA 1X Right Cheek Middle
Electronics: DAE4 Sn777
Medium: 835 Head

Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.906 mho/m; ε_r = 43.8; ρ = 1000 kg/m^3

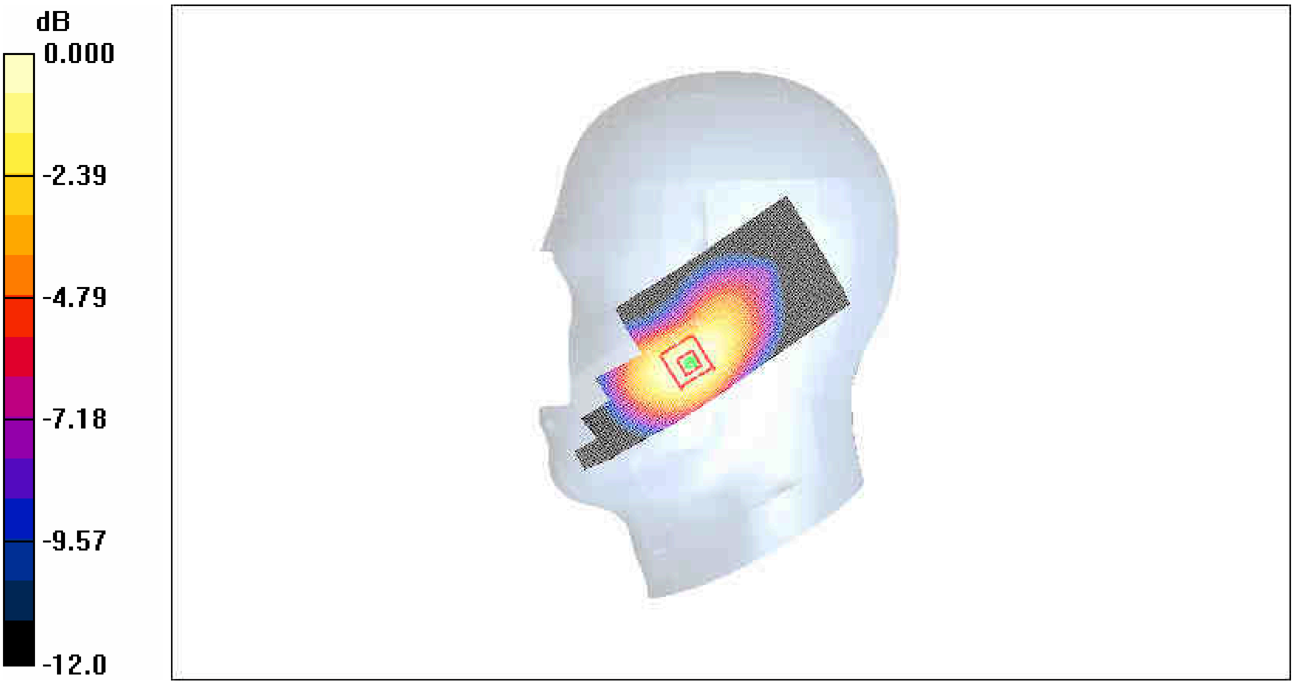
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C

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 (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.705 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.0 V/m; Power Drift = -0.101 dB
Peak SAR (extrapolated) = 0.862 W/kg
SAR(1 g) = 0.613 mW/g; SAR(10 g) = 0.404 mW/g
Maximum value of SAR (measured) = 0.667 mW/g



0 dB = 0.667mW/g

Fig.15 Right Hand Touch Cheek CDMA 835MHz CH384

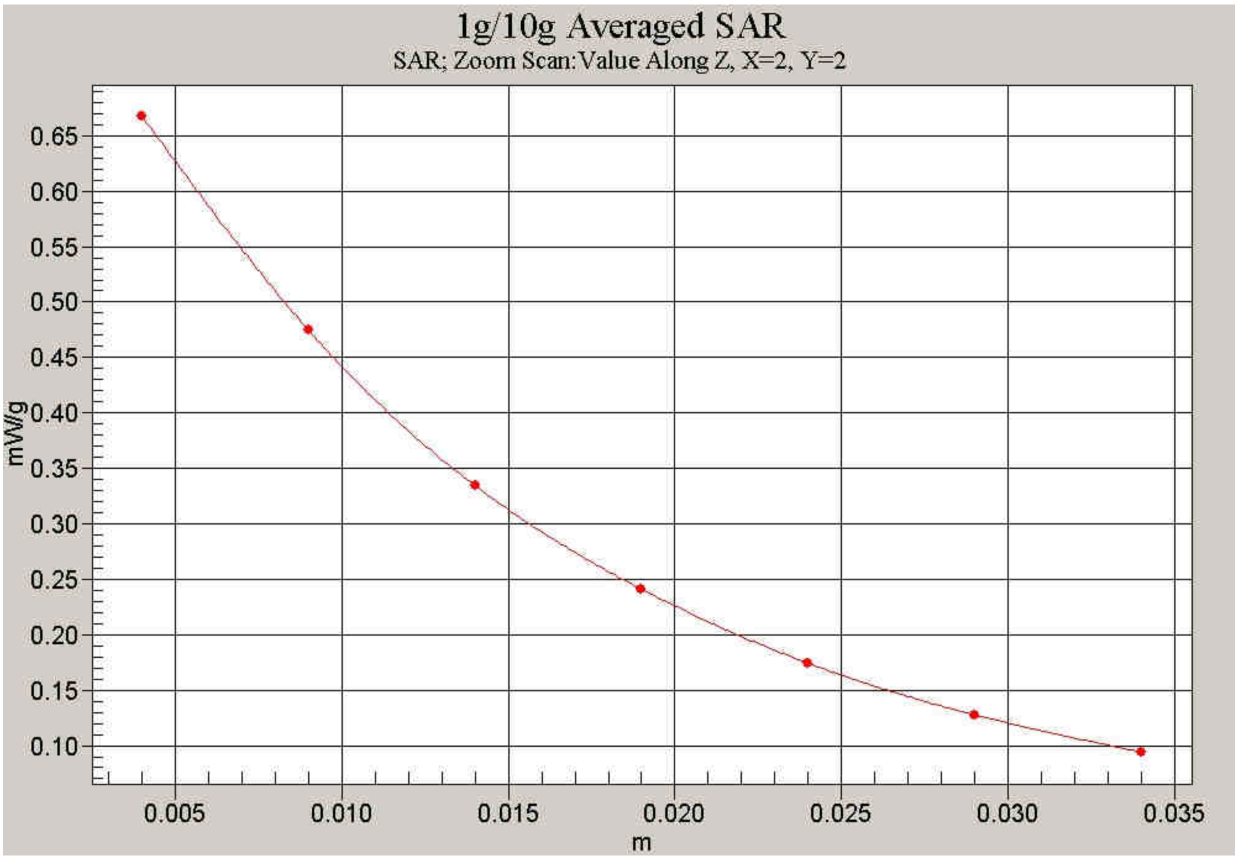


Fig. 16 Z-Scan at power reference point (CDMA 835MHz CH384)

CDMA 1X Right Cheek Low
Electronics: DAE4 Sn777
Medium: 835 Head

Medium parameters used: f = 825 MHz; σ = 0.896 mho/m; ε_r = 43.9; ρ = 1000 kg/m^3

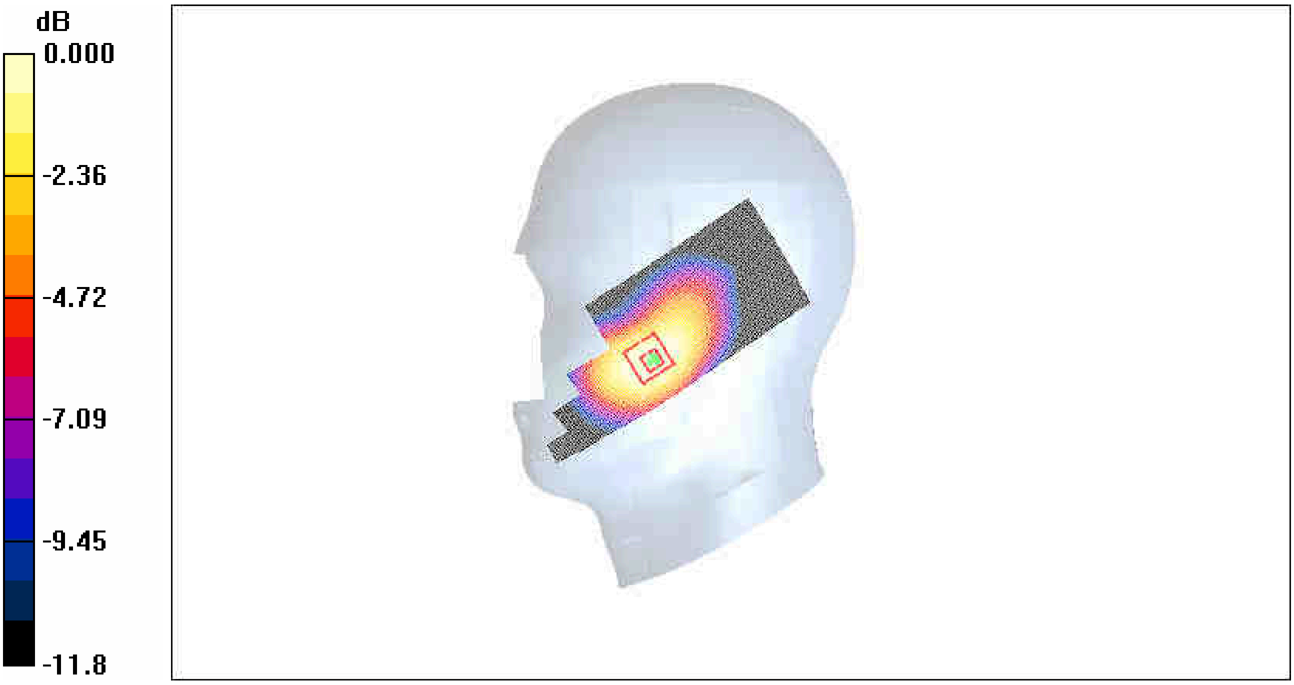
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C

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 (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.549 mW/g

Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.82 V/m; Power Drift = -0.126dB
Peak SAR (extrapolated) = 0.649 W/kg
SAR(1 g) = 0.465 mW/g; SAR(10 g) = 0.308 mW/g
Maximum value of SAR (measured) = 0.510 mW/g



0 dB = 0.510mW/g

Fig. 17 Right Hand Touch Cheek CDMA 835MHz CH1013

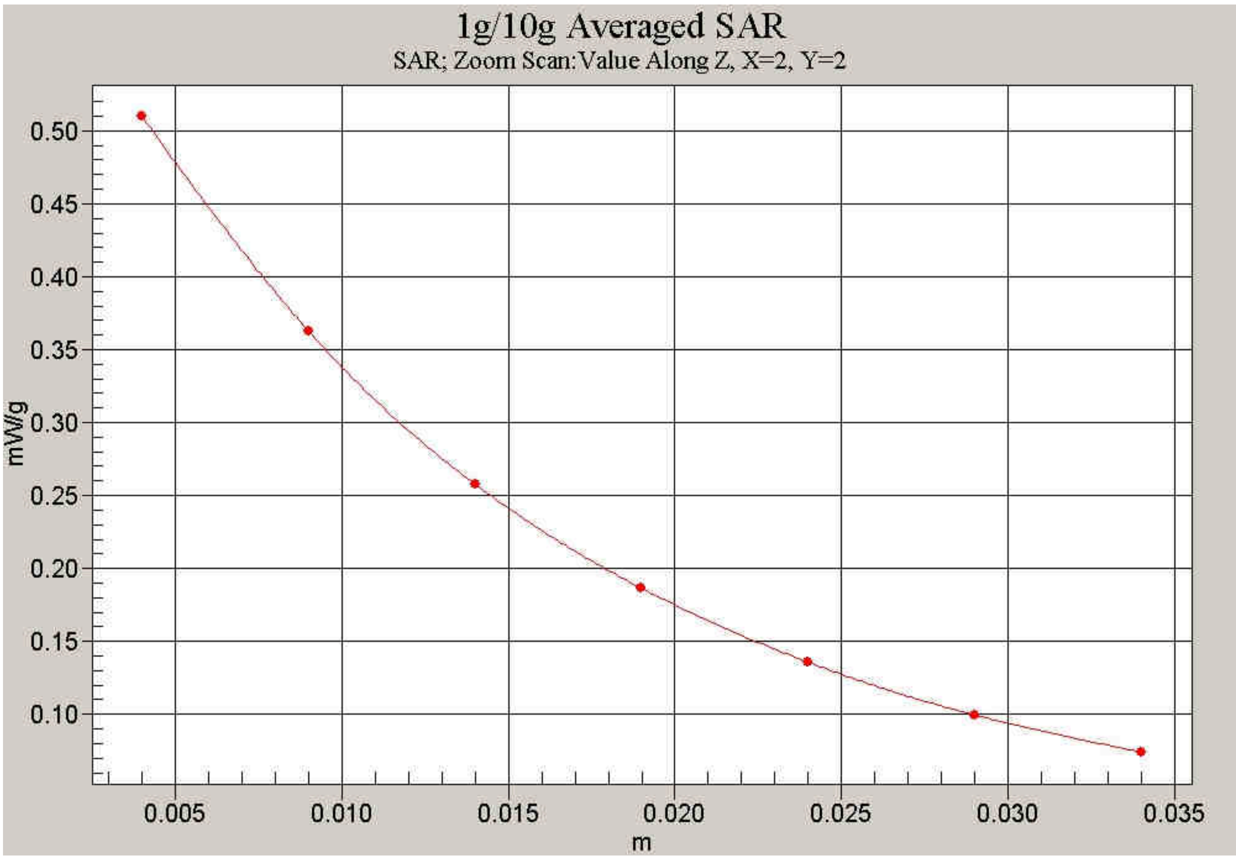


Fig. 18 Z-Scan at power reference point (CDMA 835MHz CH1013)

CDMA 1X Right Tilt High

Electronics: DAE4 Sn777

Medium: 835 Head

Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.917 mho/m; ε_r = 43.7; ρ = 1000 kg/m^3

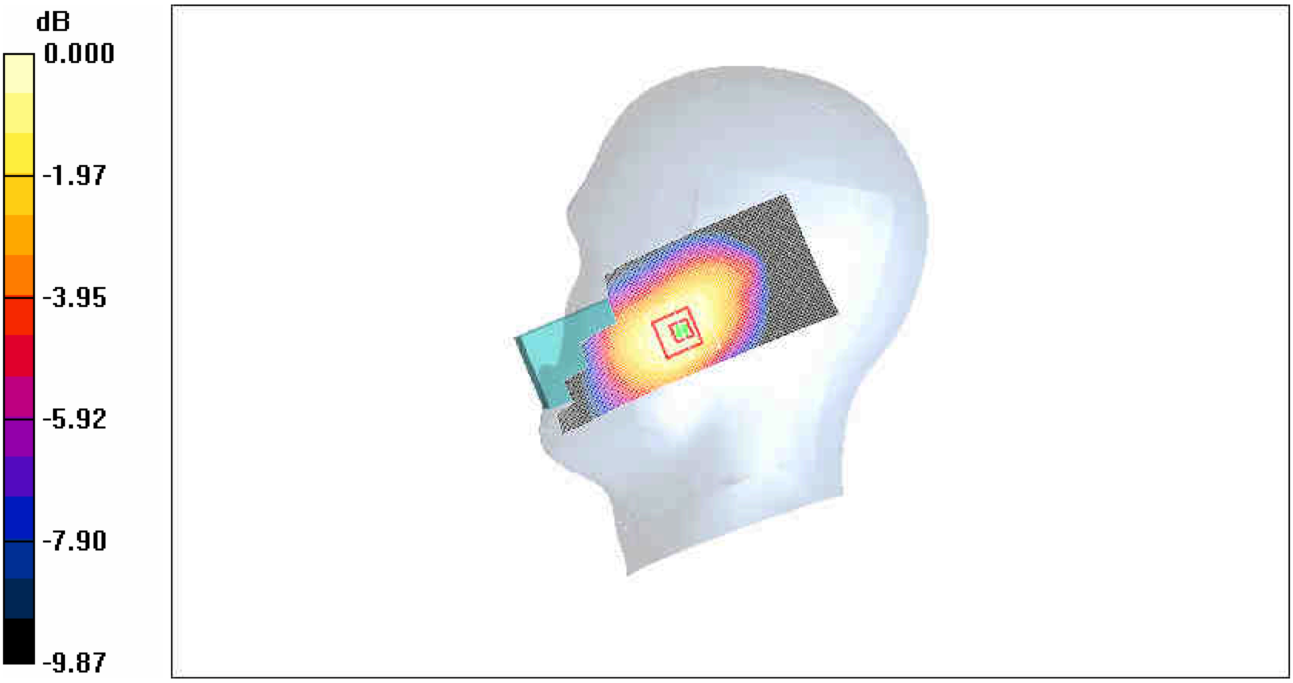
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C

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 (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.147 mW/g

Tilt High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.69 V/m; Power Drift = 0.143 dB
Peak SAR (extrapolated) = 0.179 W/kg
SAR(1 g) = 0.139 mW/g; SAR(10 g) = 0.100 mW/g
Maximum value of SAR (measured) = 0.148 mW/g



0 dB = 0.148mW/g

Fig. 19 Right Hand Tilt 15°CDMA 835MHz CH777

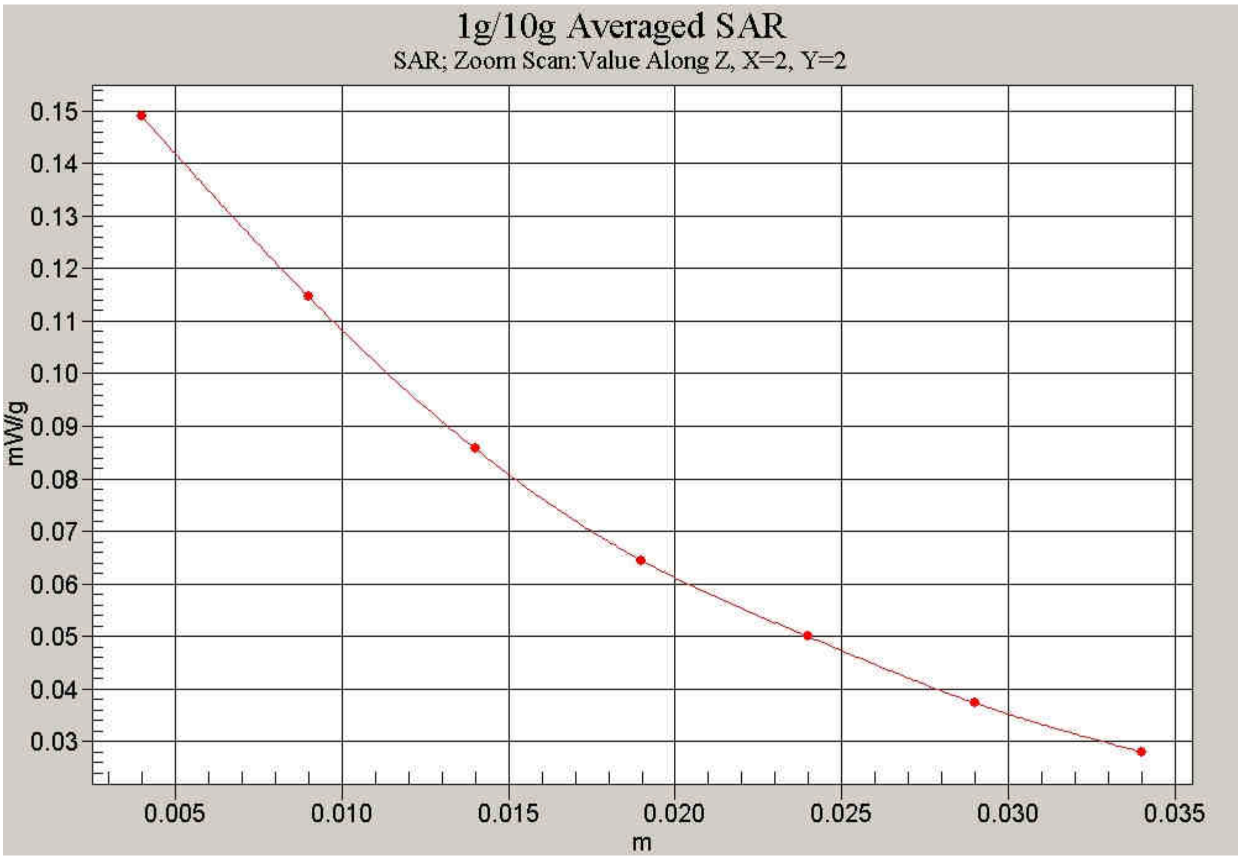


Fig. 20 Z-Scan at power reference point (CDMA 835MHz CH777)

CDMA 1X Right Tilt Middle

Electronics: DAE4 Sn777
Medium: 835 Head

Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.906 mho/m; ε_r = 43.8; ρ = 1000 kg/m^3

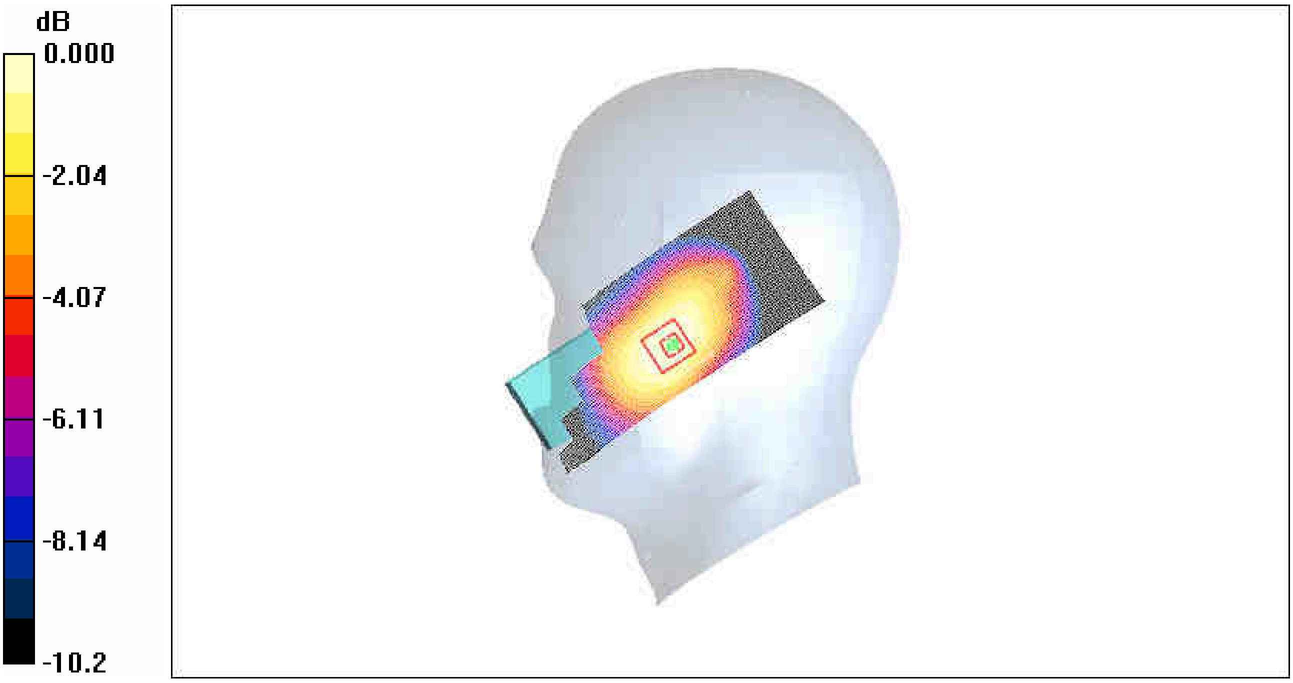
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C

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 (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.213 mW/g

Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.0 V/m; Power Drift = -0.164 dB
Peak SAR (extrapolated) = 0.255 W/kg
SAR(1 g) = 0.198 mW/g; SAR(10 g) = 0.142 mW/g
Maximum value of SAR (measured) = 0.211 mW/g



0 dB = 0.211mW/g

Fig. 21 Right Hand Tilt 15°CDMA 835MHz CH384

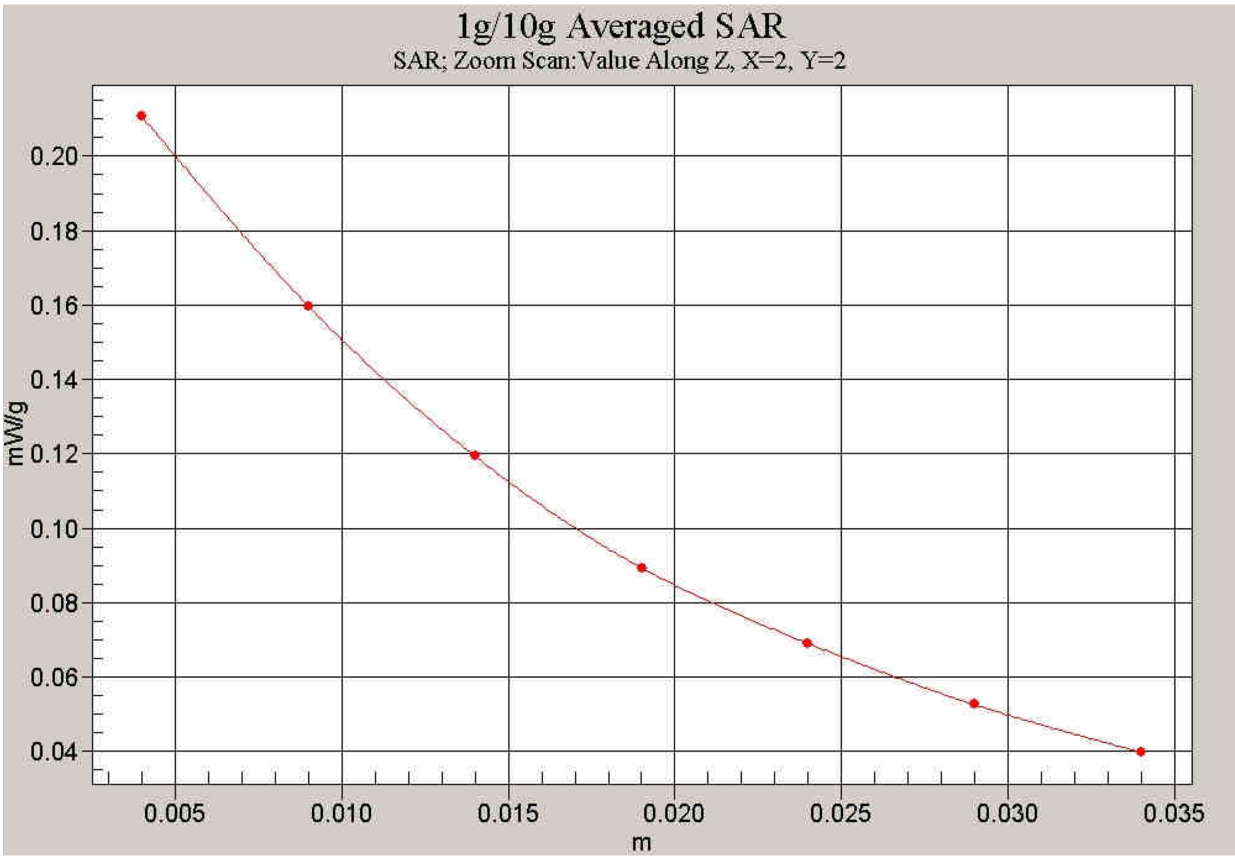


Fig. 22 Z-Scan at power reference point (CDMA 835MHz CH384)

CDMA 1X Right Tilt Low

Electronics: DAE4 Sn777

Medium: 835 Head

Medium parameters used: f = 825 MHz; σ = 0.896 mho/m; ε_r = 43.9; ρ = 1000 kg/m^3

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

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 (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.160 mW/g

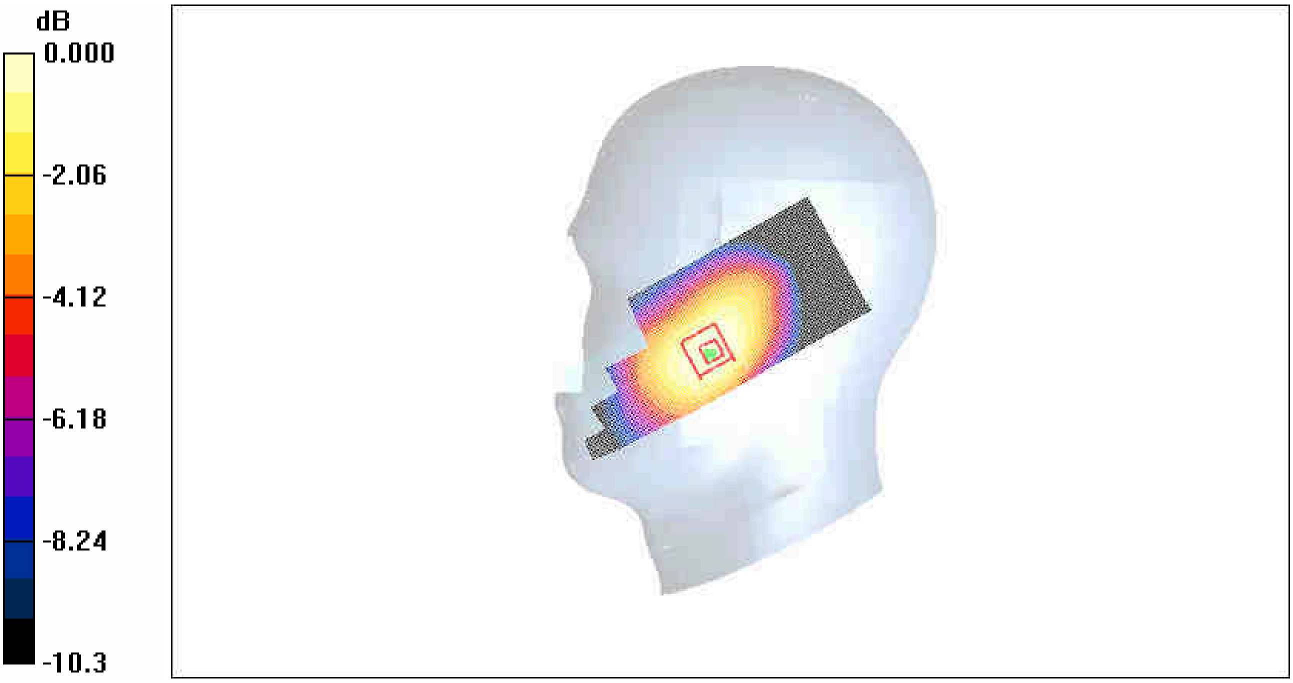
Tilt Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.90 V/m; Power Drift = -0.151 dB

Peak SAR (extrapolated) = 0.190 W/kg

SAR(1 g) = 0.150 mW/g; SAR(10 g) = 0.109 mW/g

Maximum value of SAR (measured) = 0.158 mW/g



0 dB = 0.158mW/g

Fig. 23 Right Hand Tilt 15°CDMA 835MHz CH1013

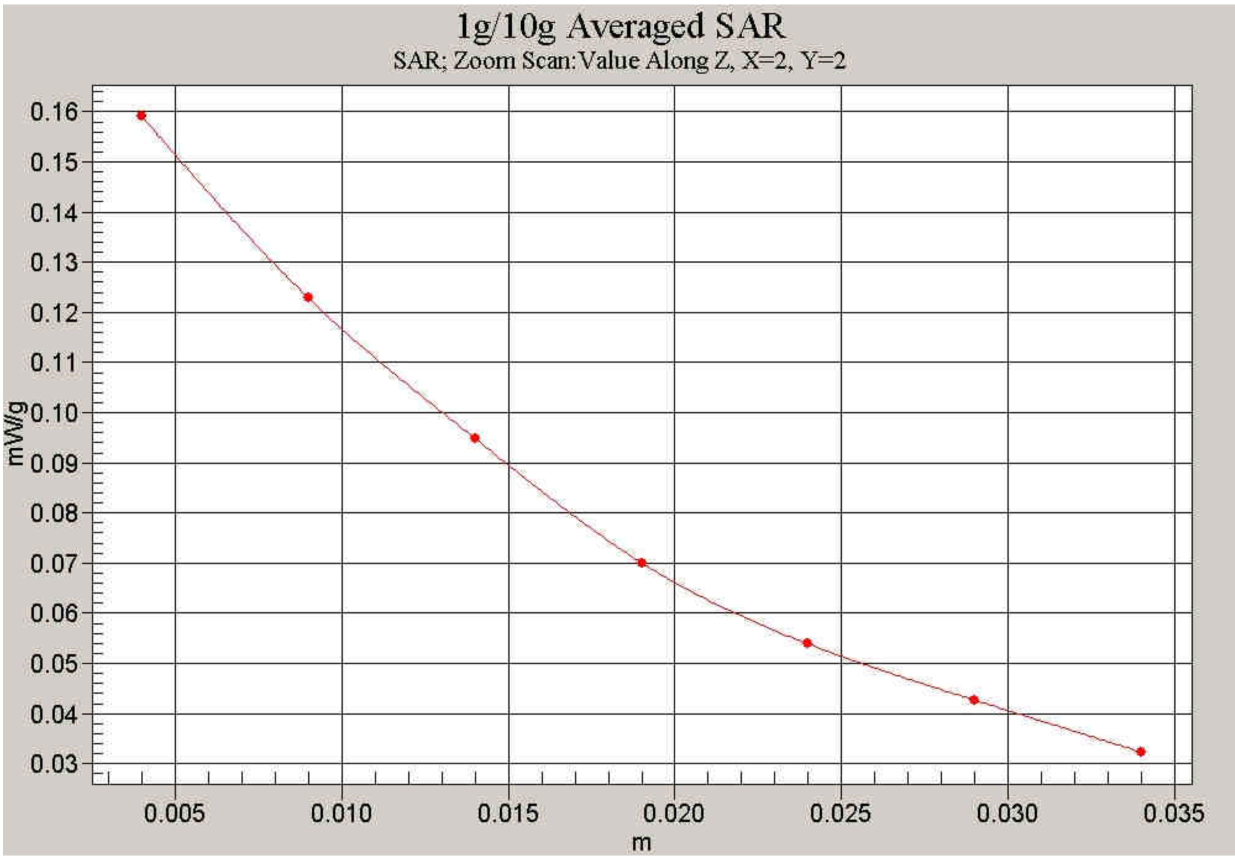


Fig. 24 Z-Scan at power reference point (CDMA 835MHz CH1013)

CDMA 1X Body Toward Ground High

Electronics: DAE4 Sn777

Medium: 835 Body

Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.982 mho/m; ε_r = 55; ρ = 1000 kg/m^3

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

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

Probe: ET3DV6 - SN1736 ConvF(6.45, 6.45, 6.45)

Toward Ground High/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.377 mW/g

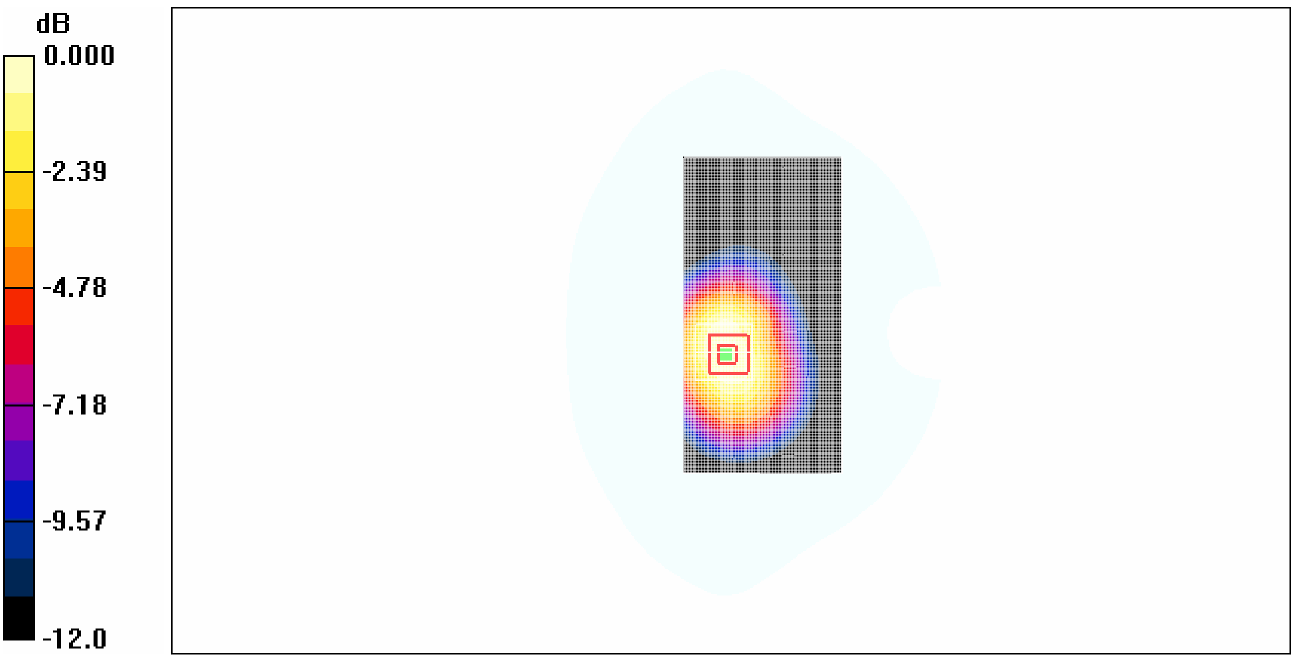
Toward Ground High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.6 V/m; Power Drift = -0.098 dB

Peak SAR (extrapolated) = 0.463 W/kg

SAR(1 g) = 0.327 mW/g; SAR(10 g) = 0.218 mW/g

Maximum value of SAR (measured) = 0.351 mW/g



0 dB = 0.351mW/g

Fig. 25 CDMA 835MHz, Body, Towards Ground, CH777

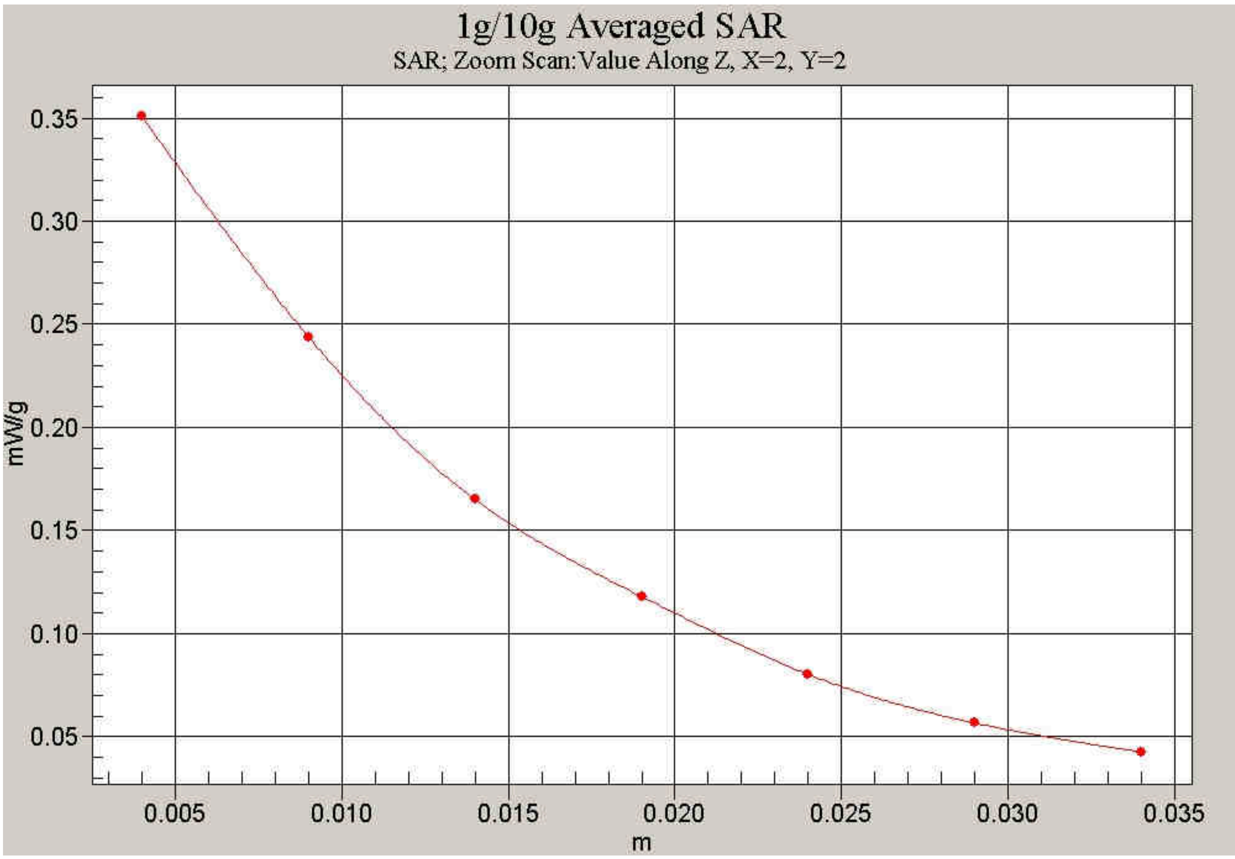


Fig. 26 Z-Scan at power reference point (CDMA 835MHz, Body, Towards Ground, CH777)

CDMA 1X Body Toward Ground Middle

Electronics: DAE4 Sn777

Medium: 835 Body

Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.971 mho/m; ε_r = 55; ρ = 1000 kg/m^3

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

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

Probe: ET3DV6 - SN1736 ConvF(6.45, 6.45, 6.45)

Toward Ground Middle/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.472 mW/g

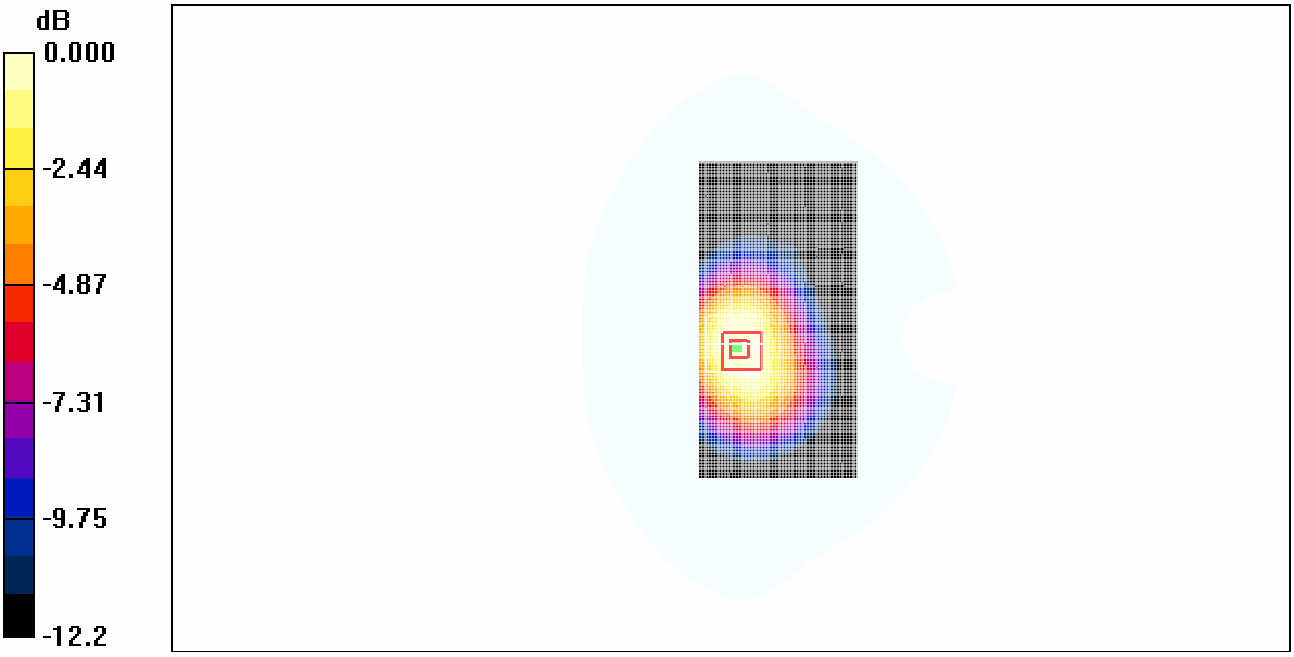
Toward Ground Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.6 V/m; Power Drift = -0.132 dB

Peak SAR (extrapolated) = 0.591 W/kg

SAR(1 g) = 0.419 mW/g; SAR(10 g) = 0.281 mW/g

Maximum value of SAR (measured) = 0.447 mW/g



0 dB = 0.447mW/g

Fig. 27 CDMA 835MHz, Body, Towards Ground, CH384

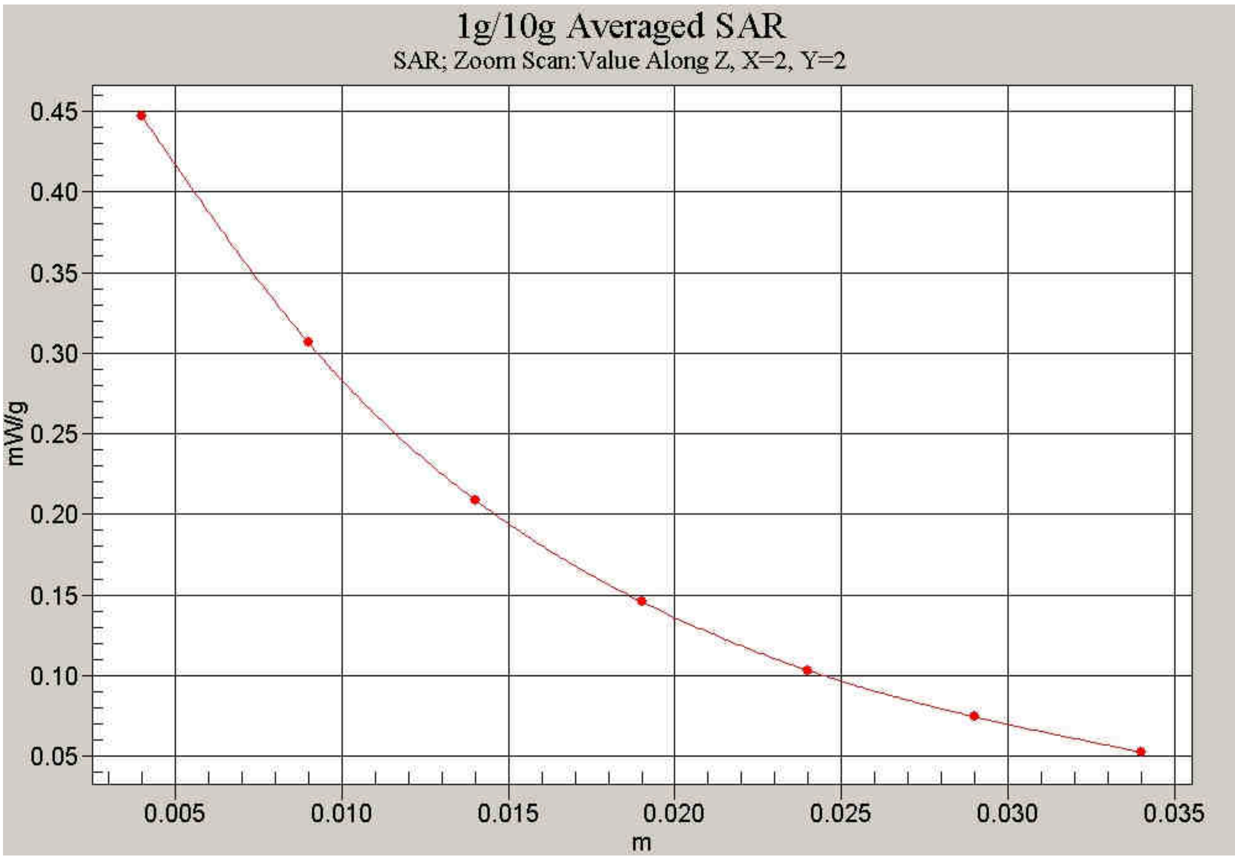


Fig. 28 Z-Scan at power reference point (CDMA 835MHz, Body, Towards Ground, CH384)

CDMA 1X Body Toward Ground Low

Electronics: DAE4 Sn777

Medium: 835 Body

Medium parameters used: f = 825 MHz; σ = 0.96 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3

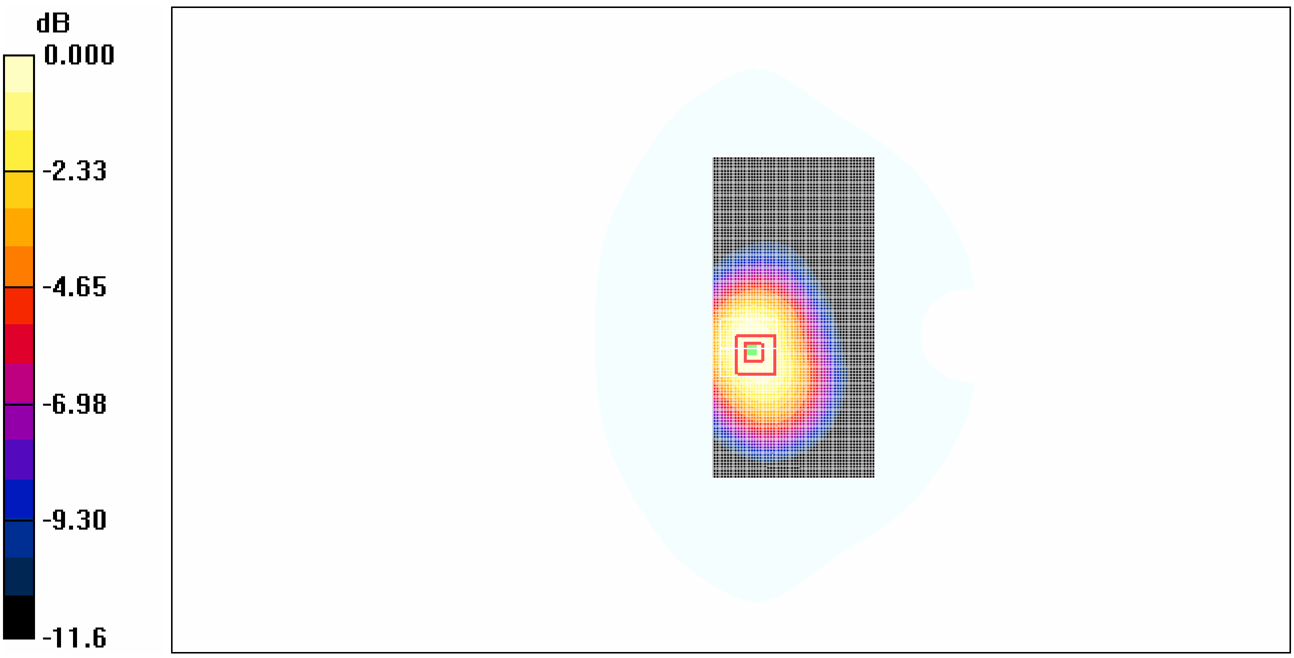
Ambient Temperature:23.3°C Liqiud Temperature: 22.5°C

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

Probe: ET3DV6 - SN1736 ConvF(6.45, 6.45, 6.45)

Toward Ground Low/Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.387 mW/g

Toward Ground Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.0 V/m; Power Drift = -0.200 dB
Peak SAR (extrapolated) = 0.494 W/kg
SAR(1 g) = 0.341 mW/g; SAR(10 g) = 0.228 mW/g
Maximum value of SAR (measured) = 0.364 mW/g



0 dB = 0.364mW/g

Fig. 29 CDMA 835MHz, Body, Towards Ground, CH1013

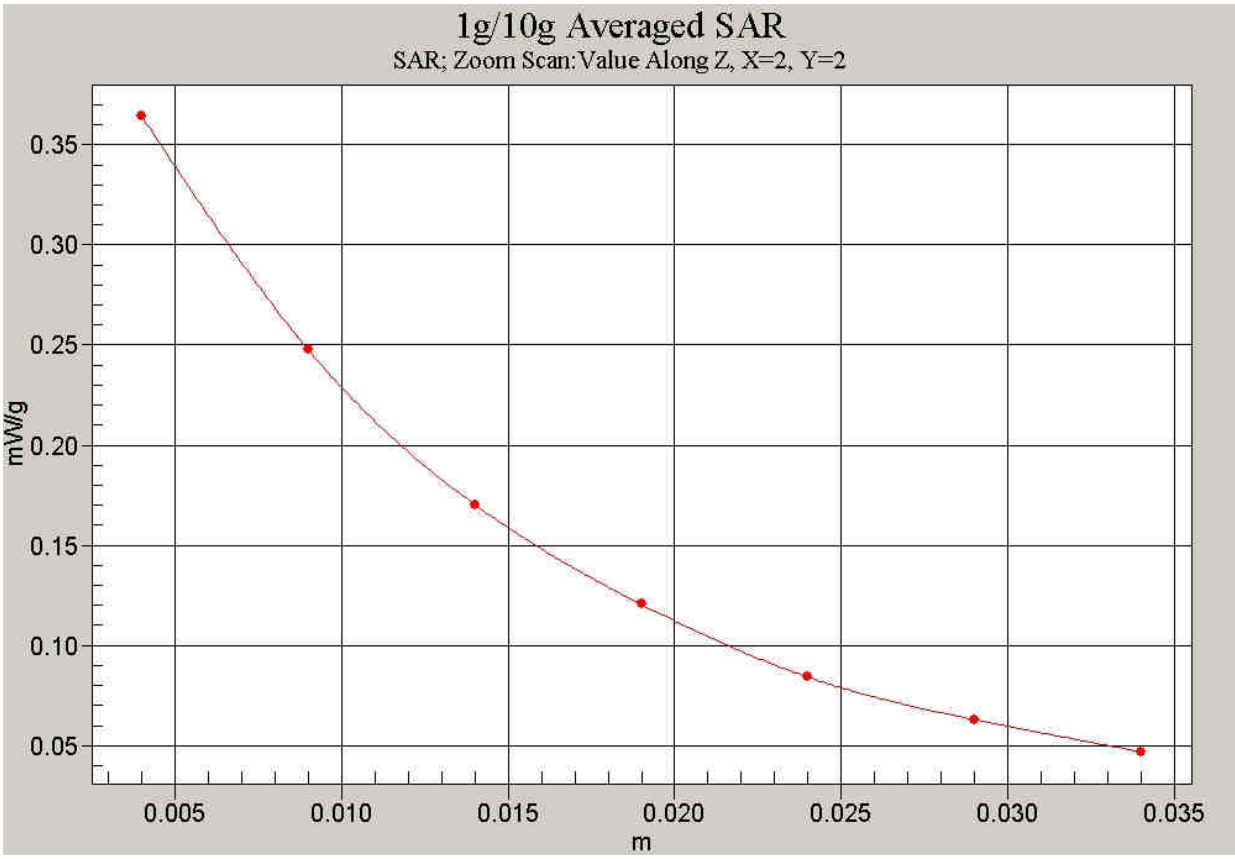


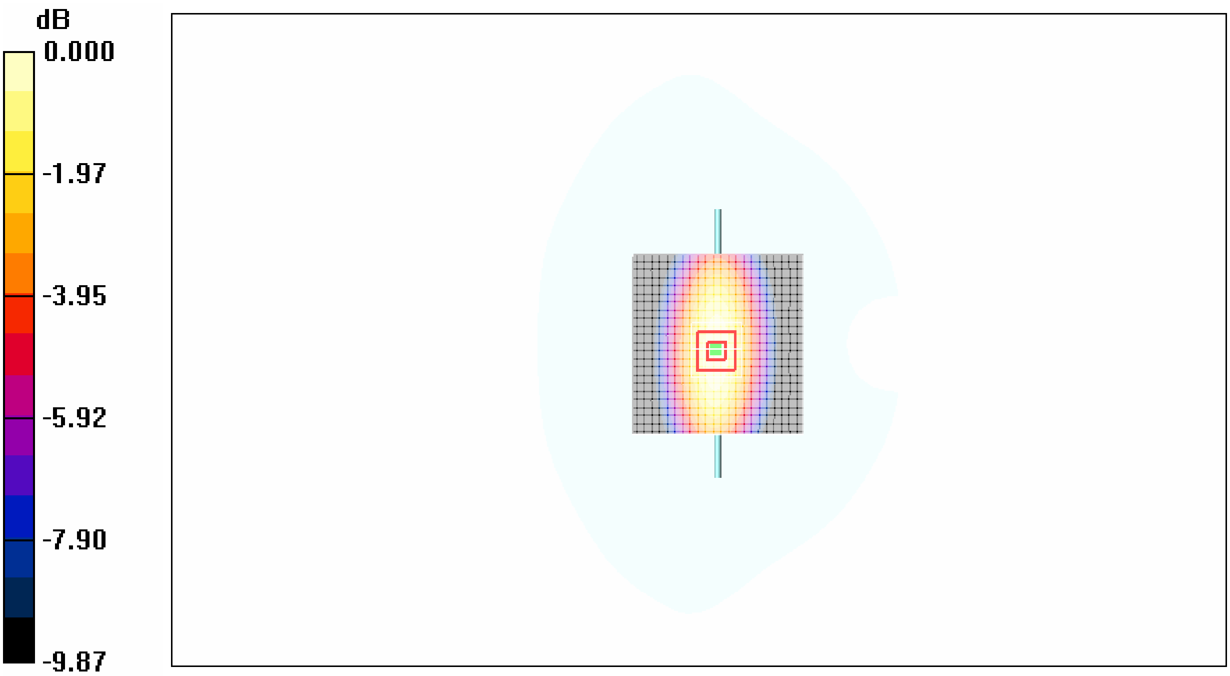
Fig. 30 Z-Scan at power reference point (CDMA 835MHz, Body, Towards Ground, CH1013)

ANNEX D SYSTEM VALIDATION RESULTS

835MHz Results

Electronics: DAE4 Sn777
Medium: 835 Head
Medium parameters used : f=835MHz; σ = 0.90 mho/m; ε_r = 43.5; ρ = 1000 kg/m^3
Ambient Temperature: 23.3°C Liqiud Temperature: 22.5°C
Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1
Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)
835MHz/Area Scan (101x101x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.76 mW/g

835MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.5 V/m; Power Drift = -0.094 dB
Peak SAR (extrapolated) = 3.79 W/kg
SAR(1 g) = 2.53 mW/g; SAR(10 g) = 1.67 mW/g
Maximum value of SAR (measured) = 2.73 mW/g



0 dB = 2.73mW/g

Fig.31 validation 835MHz 250mW

ANNEX E PROBE CALIBRATION CERTIFICATE

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Swizerland

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client TMC China **Certificate No:** ET3DV6-1736_Dec06

CALIBRATION CERTIFICATE

Object	**ET3DV6-SN: 1736**
Calibration procedure(s)	**QA CAL-01.v5** **Calibration procedure for dosimetric E-field probes**
Calibration date:	**December 1, 2006**
Condition of the calibrated item	**In Tolerance**

This calibration certify documents the traceability to national standards, which realize the physical units of measurements(SI).
All calibrations have been conducted at an environment temperature (22±3)^{0}C and humidity<70%

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Data (Calibrated by, Certification NO.)	Scheduled Calibration
Power meter E4419B	GB341293874	22-May-06 (METAS, NO. 251-00466)	May-07
Power sensor E4412A	MY41495277	22-May-06 (METAS, NO. 251-00466)	May-07
Power sensor E4412A	MY41498087	22-May-06 (METAS, NO. 251-00466)	May-07
Reference 20 dB Attenuator	SN:S5086 (20b)	22-May-06 (METAS, NO. 251-00467)	May-07
Reference Probe ES3DV2	SN:S5086 (20b)	22-May-06 (METAS, NO. 251-00467)	May-07
DAE4	SN:3013	13-Jan-06 (SPEAG, NO. ES3-3013_Jan06)	Jan-07
Reference Probe ES3DV2	SN: 907	11-Jun-06 (SPEAG, NO.DAE4-907_Jun06)	Jun-07

Secondary Standards	ID#	Check Data (in house)	Scheduled Calibration
RF generator HP8648C	US3642U01700	4-Dec-05(SPEAG, in house check Dec-03)	In house check: Dec-09
Network Analyzer HP 8753E	US37390585	10-Nov-05(SPEAG, NO. DAE4-901_Nov-04)	In house check: Nov-09

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Director	

Issued: December 1, 2006

This calibration certificate shall not be reported except in full without written approval of the laboratory.

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ET3DV6

SN: 1736

Manufactured:	September 27, 2002
Last calibrated:	November 25, 2005
Recalibrated:	December 1, 2006

Calibrated for DASY System

DASY - Parameters of Probe: ET3DV6 SN:1736

Sensitivity in Free Space[A]

NormX	**1.97** ± 10.1%	$\mu V/(V/m)^2$	
NormY	**1.75** ± 10.1%	$\mu V/(V/m)^2$	
NormZ	**1.97** ± 10.1%	$\mu V/(V/m)^2$	

Diode Compression[B]

DCP X	**93** mV
DCP Y	**93** mV
DCP Z	**93** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	9.6	5.0
SAR_{be} [%]	With Correction Algorithm	0.1	0.3

TSL **1810 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**3.7 mm**	**4.7 mm**
SAR_{be} [%]	Without Correction Algorithm	13.2	8.8
SAR_{be} [%]	With Correction Algorithm	0.6	0.1

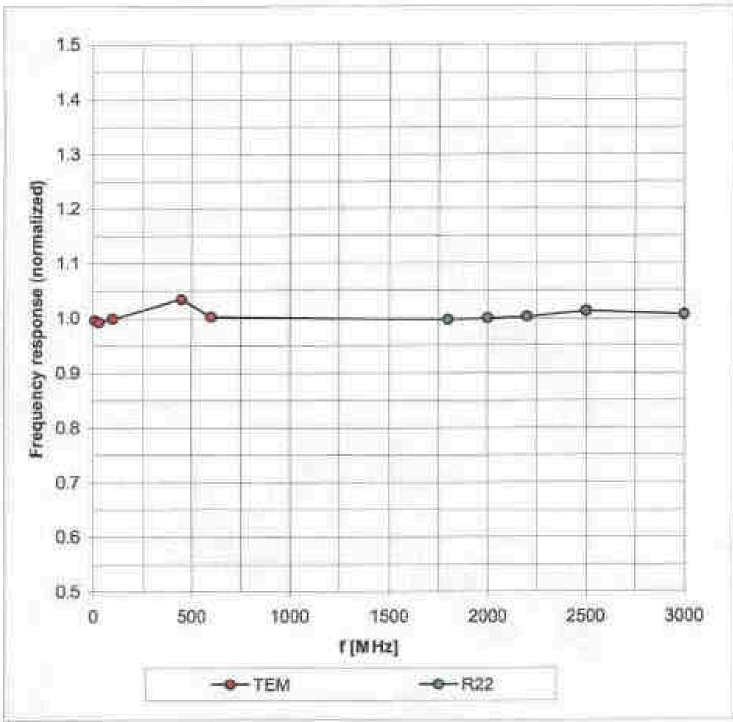
Sensor Offset

Probe Tip to Sensor Center **2.7** mm

ET3DV6 SN: 1736 December 1, 2006

Frequency Response of E-Field

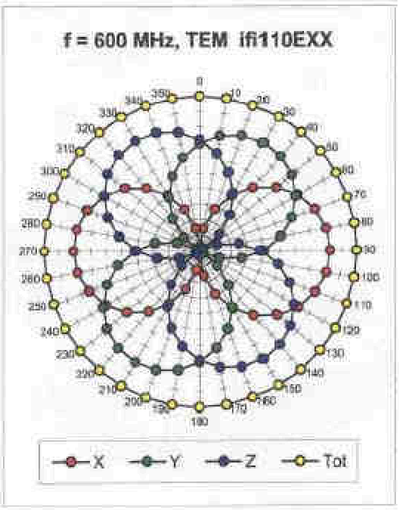
(TEM-Cell:ifi110 EXX, Waveguide: R22)

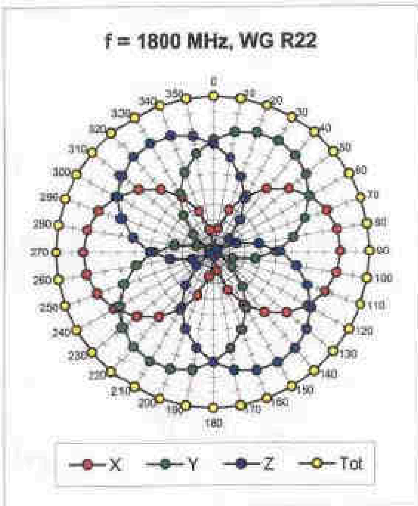


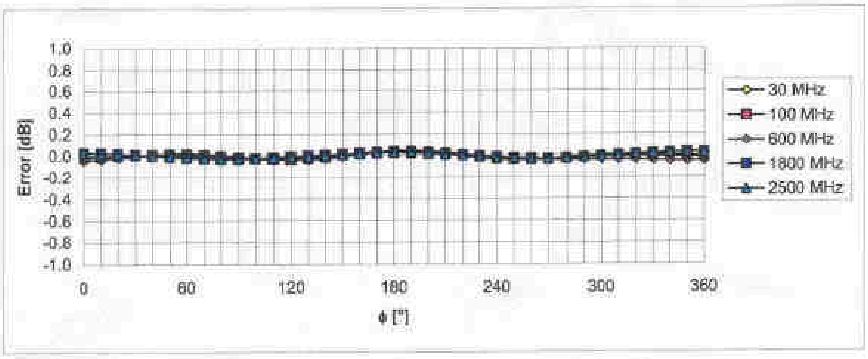
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

ET3DV6 SN: 1736 December 1, 2006

Receiving Pattern (ϕ), ϑ = 0°





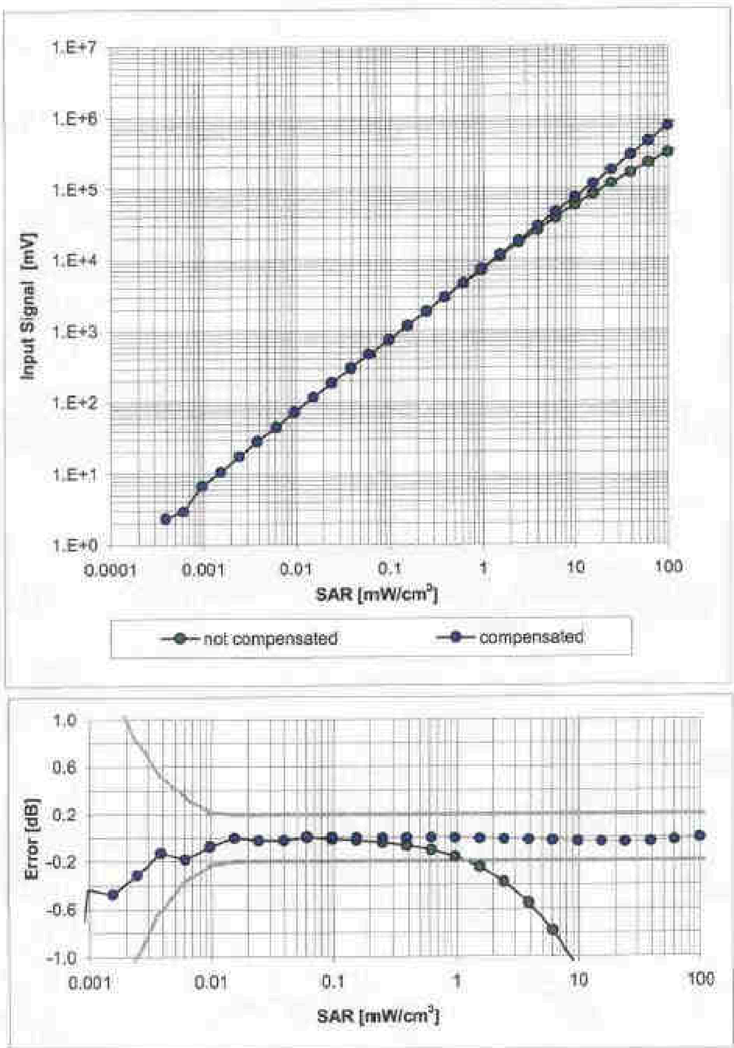


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ET3DV6 SN: 1736 December 1, 2006

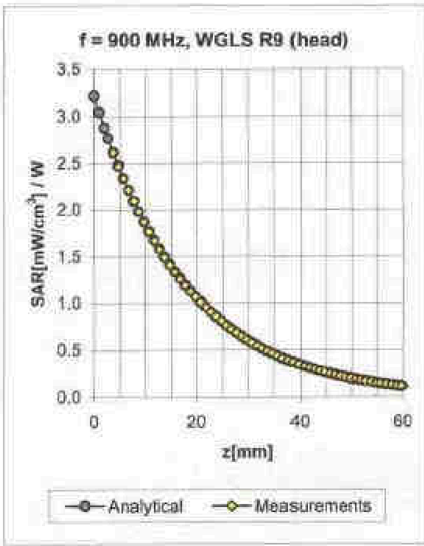
Dynamic Range f(SAR_{head})

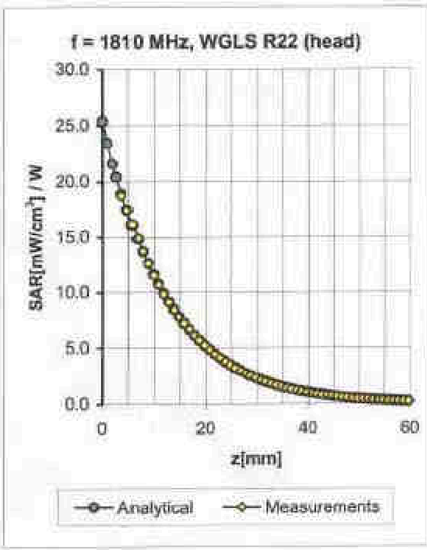
(Waveguide R22, f = 1800 MHz)



Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



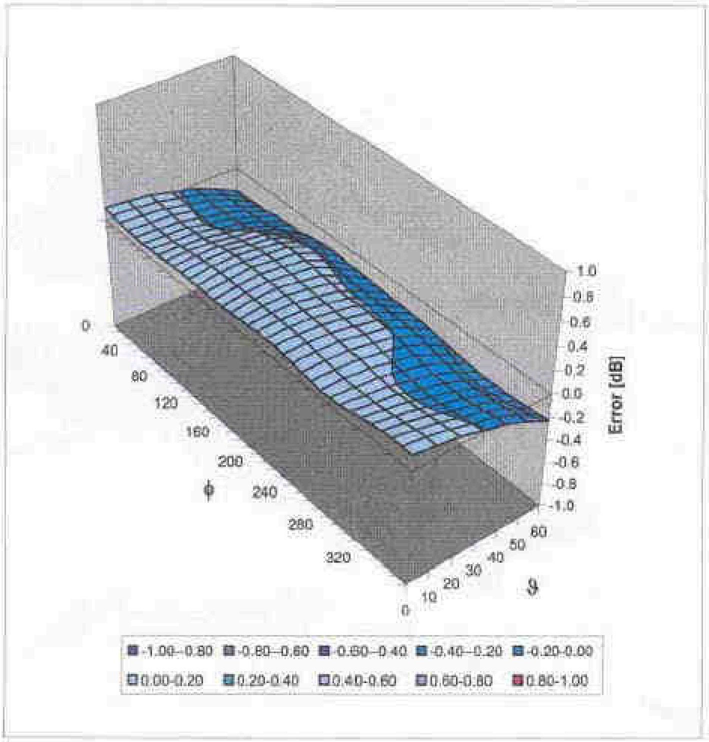


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.56	1.85	6.51 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.57	2.47	5.40 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.62	2.29	4.67 ± 11.8% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.12	1.61	7.74 ± 13.3% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.47	2.15	6.45 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.53	2.78	4.88 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.65	2.11	4.35 ± 11.8% (k=2)

ET3DV6 SN: 1736 December 1, 2006

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

ANNEX F DIPOLE CALIBRATION CERTIFICATE

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accredited by the Swiss Federal Office of metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client TMC China

Certificate No: D835V2-443_Feb07

CALIBRATION CERTIFICATE

Object	D835V2-SN: 443
Calibration procedure(s)	QA CAL-05.v6 Calibration procedure for dipole validation kits
Calibration date:	February 19, 2007
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements(SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted at an environment temperature (22±3)°C and humidity<70%

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Data (Calibrated by, Certification NO.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	03-Oct-06 (METAS, NO. 217-00608)	Oct-07
Power sensor 8481A	US37292783	03-Oct-06 (METAS, NO. 217-00608)	Oct-07
Reference 20 dB Attenuator	SN:5086 (20g)	10-Aug-06 (METAS, NO. 217-00591)	Aug-07
Reference 10 dB Attenuator	SN:5047_2 (10r)	10-Aug-06 (METAS, NO. 217-00591)	Aug-07
DAE4	SN:601	30-Jan-07 (SPEAG, NO.DAE4-601_Jan07)	Jan-08
Reference Probe ET3DV6 (HF)	SN: 1507	19-Oct-06 (SPEAG, NO. ET3-1507_Oct06)	Oct-07

Secondary Standards	ID#	Check Data (in house)	Scheduled Calibration
Power sensor HP 8481A	MY41092317	18-Oct-02(SPEAG, in house check Oct-05)	In house check: Oct-07
RF generator Agilent E4421B	MY41000675	11-May-05(SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585554206	18-Oct-01(SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Marcel Fehr	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Director	

Issued: February 21, 2007

This calibration certificate shall not be reported except in full without written approval of the laboratory.

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.9 ± 6 %	0.88 mho/m ± 6 %
Head TSL temperature during test	(21.2 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.48 mW / g
SAR normalized	normalized to 1W	9.90 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**9.70 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.60 mW / g
SAR normalized	normalized to 1W	6.40 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**6.31 mW /g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.5 Ω - 6.8 jΩ
Return Loss	- 25.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.402 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 3, 2001

DASY4 Validation Report for Head TSL

Date/Time: 19.02.2007 10:04:15

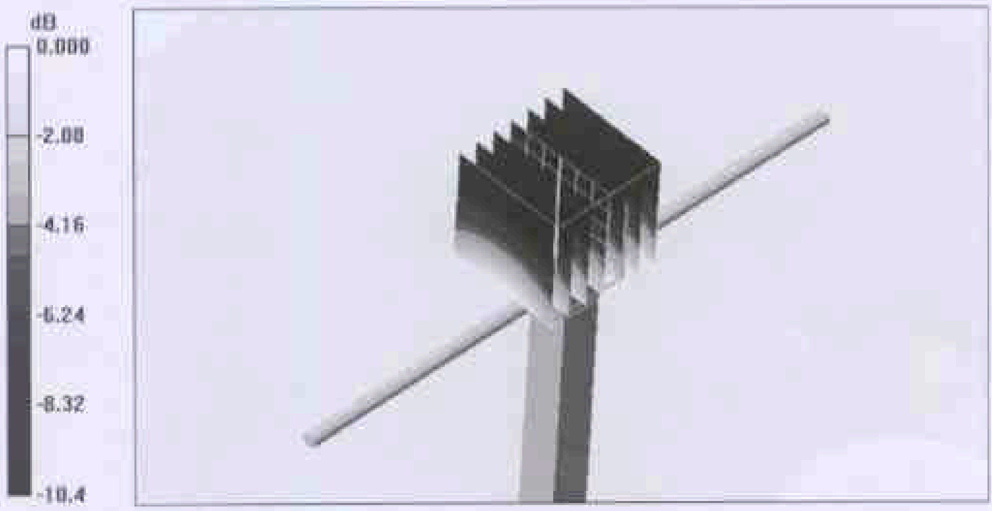
Test laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; serial: D835V2-SN: 443

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL 835 MHz;
Medium parameters used: f=835 MHz; σ=0.88 mho/m; ε_r=39.9; ρ= 1000kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:

- Probe: ET3DV6-SN1507(HF); ConvF(6.01,6.01,6.01); Calibrated: 19.10.2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.1_2007
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA;
- Measurement SW: DASY, V4.7 Build 53; Post processing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 15 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.6 V/m; Power Drift = 0.010 dB
Peak SAR (extrapolated) = 3.72 W/kg
SAR(1 g) = 2.48 mW/g; SAR(10 g) = 1.60 mW/g
Maximum value of SAR (measured) = 2.70 mW/g



0 dB = 2.70mW/g

Impedance measurement Plot for Head TSL