No. L0442

Deutscher Akkreditierungs Rat

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

GENERAL TERMS

1. The test report is invalid if not marked with “exclusive stamp for the test report” or the stamp of the test center.
2. Any copy of the test report is invalid if not re-marked with the “exclusive stamp for the test report” or the stamp of the test center.
3. The test report is invalid if not marked with the stamps or the signatures of the persons responsible for performing, revising and approving the test report.
4. The test report is invalid if there is any evidence of erasure and/or falsification.
5. If there is any dissidence for the test report, please file objection to the test center within 15 days from the date of receiving the test report.
6. Normally, entrust test is only responsible for the samples that have undergone the test.
7. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permissions of the test center.

Address: No. 52, Huayuanbei Road, Beijing, P. R. China
Post code: 100083 Cable: 04282
Telephone: +86 10 62302041 Fax: +86 10 62304793

GENERAL SUMMARY

Product	CDMA Mobile Station	**Model**	C218
Hardware Version	61536(6000(MIN1X) Rev 1.0)	**Mobile Model ID**	108 (SURF6000-ZRF6000)
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)	**EN 50360–2001:** Product standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones. **EN 50361–2001:** Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones. **IEC 62209-1:** Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz). **ANSI C95.1–1999:** IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz **OET Bulletin 65 (Edition 97-01) and Supplement C(Edition 01-01):** Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits. **IEEE 1528–2003:** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.		
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: September 5th, 2005**		
Comment	TX Freq. Band: 824-849 MHz (CDMA) Max. Power: 0.25 Watt (CDMA) Antenna Character: 21mm The test results relate only to the measured sample(s).		

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

TABLE OF CONTENT

1 COMPETENCE AND WARRANTIES

Telecommunication Metrology Center of Ministry of Information Industry is a test laboratory accredited by DAR (DATech) – Deutschen Akkreditierungs Rat (Deutsche Akkreditierungsstelle Technik) for the tests indicated in the Certificate No. **DAT-P-114/01-10**.

Telecommunication Metrology Center of Ministry of Information Industry is a test laboratory accredited by CNAL – China National Accreditation Committee for Laboratories, for the tests indicated in the Certificate No. **L0442**.

Telecommunication Metrology Center of Ministry of Information Industry is a test laboratory competent to carry out the tests described in this test report.

Telecommunication Metrology Center of Ministry of Information Industry guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at **Telecommunication Metrology Center of Ministry of Information Industry** at the time of execution of the test.

Telecommunication Metrology Center of Ministry of Information Industry is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test.

2 GENERAL CONDITIONS

2.1 This report only refers to the item that has undergone the test.

2.2 This report standalone dose not constitute or imply by its own an approval of the product by the certification Bodies or competent Authorities.

2.3 This document is only valid if complete; no partial reproduction can be made without written approval of Telecommunication Metrology Center of Ministry of Information Industry.

2.4 This report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of Telecommunication Metrology Center of Ministry of Information Industry and the Accreditation Bodies, if it applies.

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 its Traffic Mode (Channel Allocated) at Normal Voltage Condition. 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. The Factory Manufacture Mode (FTM) Software is used to command the EUT operate at maximum power. The RF output power can be set to maximum manually and it was monitored by power meter.

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 does not matter with radio configurations. In this report, we use typical RC3 to estimate.
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.

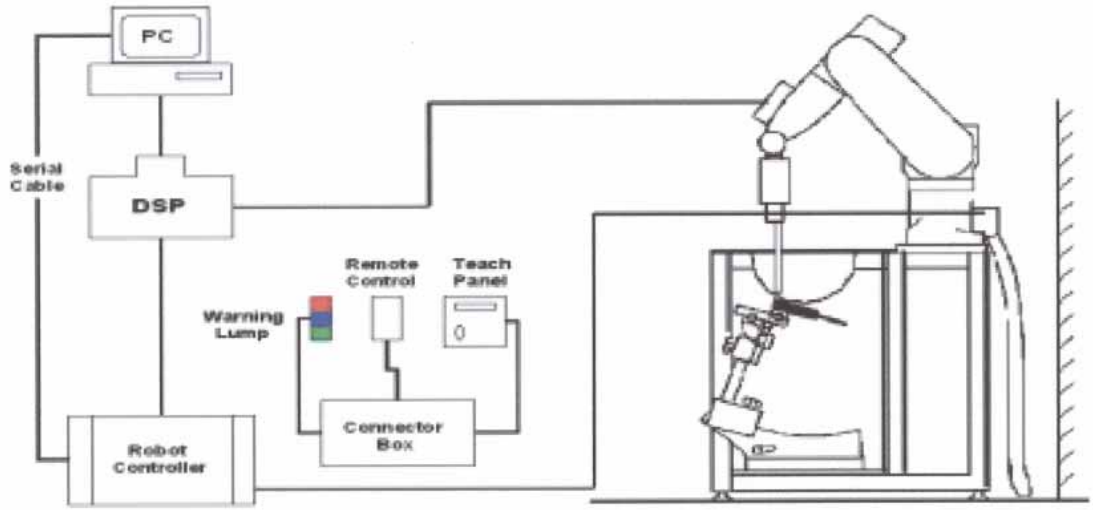


Figure 2. SAR Lab Test Measurement Set-up

The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

4.3 Dasy4 E-field Probe System

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

ET3DV6 Probe Specification

Construction	Symmetrical design with triangular core Built-in optical fiber *for* surface detection System(ET3DV6 only) Built-in shielding against static charges PEEK enclosure material(resistant to organic solvents, e.q., glycol)
Calibration	In air from 10 MHz to 2.5 GHz In brain and muscle simulating tissue at frequencies of 450MHz, 900MHz and 1.8GHz (accuracy±8%) Calibration for other liquids and frequencies upon request
Frequency	I 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)

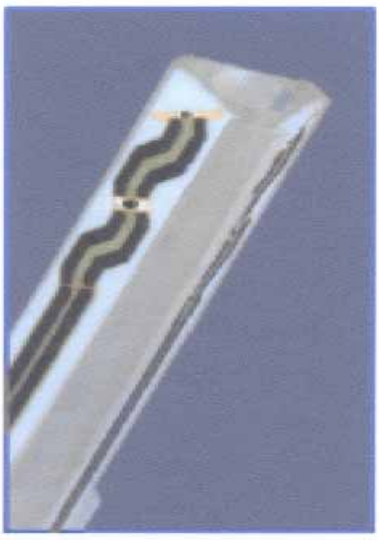


Figure 3. ET3DV6 E-field Probe

	±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 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

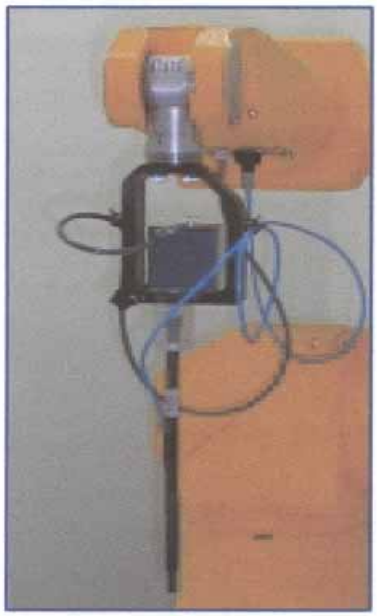


Figure 4. ET3DV6 E-field probe

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.

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

Where: Δt = Exposure time (30 seconds),

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

ΔT = Temperature increase due to RF exposure.

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

Where: σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m3).

The calibration certificate of the relevant E-field probe used during the test is in Annex E.

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

Figure 6. 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 824-849MHz
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 824-849MHz
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 mm of the user in the uncontrolled environment.
ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue for portable devices being used within 20 mm of the user in the uncontrolled environment.

5.2 Applicable Measurement Standards

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

IEC 62209-1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz).
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 ℃ and relative humidity 51%. Liquid temperature during the test: 22.0℃			
/	**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 ℃, relative humidity 47%, input power 250 mW. Liquid temperature during the test: 22.5℃					
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

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

7.3 Summary of Measurement Results (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)

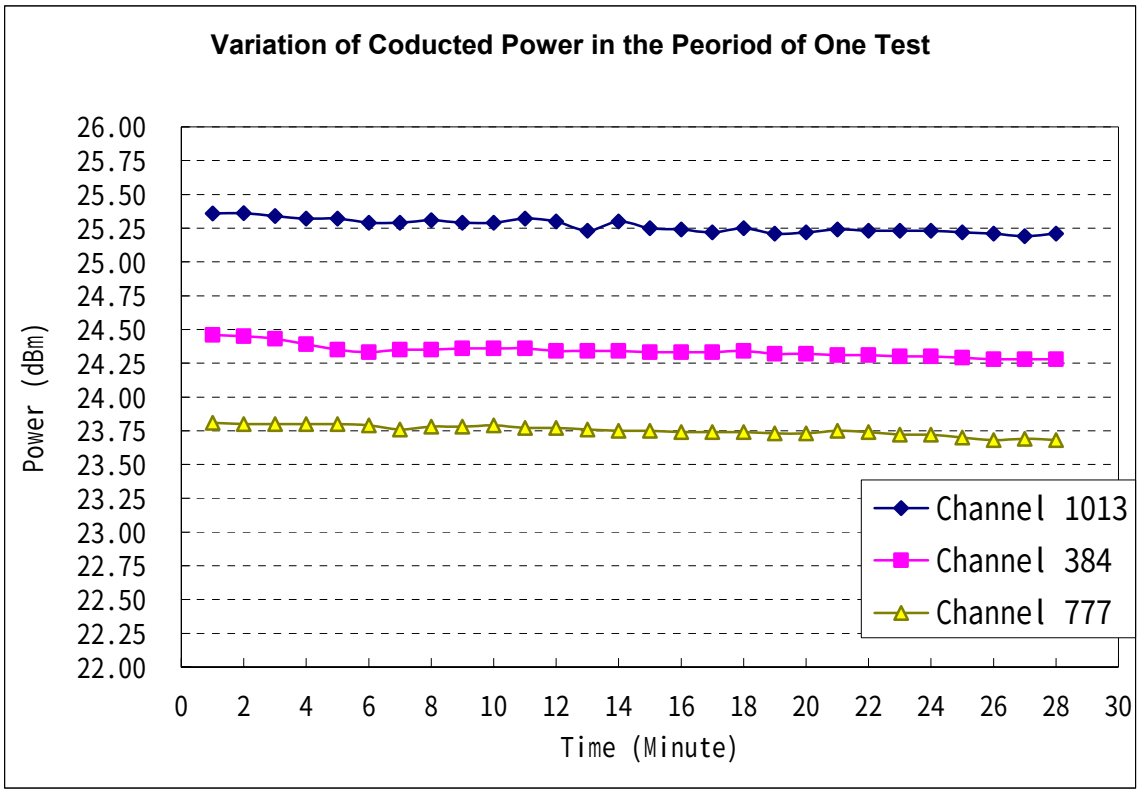
Temperature: 22 ºC, humidity: 50%. Liquid temperature during the test: 22.2ºC			
Limit of SAR (W/kg)	**10 g Average**	**1 g Average**	**Conducted Power before/after each test (dBm)**
	2.0	**1.6**	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Display of EUT towards the phantom, 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 Summary of Measurement Results of RF Power in 28 Minutes for Each Channel Under Test

To monitor the RF power of the Handset Under Test, the Measurement Results of RF Power in 30 Minutes for Each Channel Under Test was showed in the follow table. And the data are visualized to showed the RF Power fluctuation trend.

Table 12 : Measurement Results of RF Power in 28 Minutes for Each Channel Under Test

Time	1	2	3	4	5	6	7	8	9	10
Channel 1013	25.36	25.36	25.34	25.32	25.32	25.29	25.29	25.31	25.29	25.29
Channel 384	24.46	24.45	24.43	24.39	24.35	24.33	24.35	24.35	24.36	24.36
Channel 777	23.81	23.80	23.80	23.80	23.80	23.79	23.76	23.78	23.78	23.79
Time	11	12	13	14	15	16	17	18	19	20
Channel 1013	25.32	25.30	25.23	25.30	25.25	25.24	25.22	25.25	25.21	25.22
Channel 384	24.36	24.34	24.34	24.34	24.33	24.33	24.33	24.34	24.32	24.32
Channel 777	23.77	23.77	23.76	23.75	23.75	23.74	23.74	23.74	23.73	23.73
Time	21	22	23	24	25	26	27	28		
Channel 1013	25.24	25.23	25.23	25.23	25.22	25.21	25.19	25.21		
Channel 384	24.31	24.31	24.30	24.30	24.29	24.28	24.28	24.28		
Channel 777	23.75	23.74	23.72	23.72	23.70	23.68	23.69	23.68		



7.6 Conclusion

Localized Specific Absorption Rate (SAR) of this portable wireless device has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.

8 Measurement Uncertainty

SN	*a*	*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	$\sqrt{3}$	$(1\text{-}cp)^{1/2}$	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							
16	Phantom Uncertainty (shape and thickness tolerances)	B	1.0	R	$\sqrt{3}$	1	0.6	∞
17	Liquid Conductivity - deviation from target values	B	5.0	R	$\sqrt{3}$	0.64	1.7	∞
18	Liquid Conductivity - measurement uncertainty	B	5.0	N	1	0.64	1.7	*M*
19	Liquid Permittivity - deviation from target values	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
20	Liquid Permittivity - measurement uncertainty	B	5.0	N	1	0.6	1.7	*M*
	Combined Standard Uncertainty			RSS			11.25	
	Expanded Uncertainty (95% CONFIDENCE INTERVAL)			*K=2*			22.5	

9 MAIN TEST INSTRUMENTS

Table 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 July 28, 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.

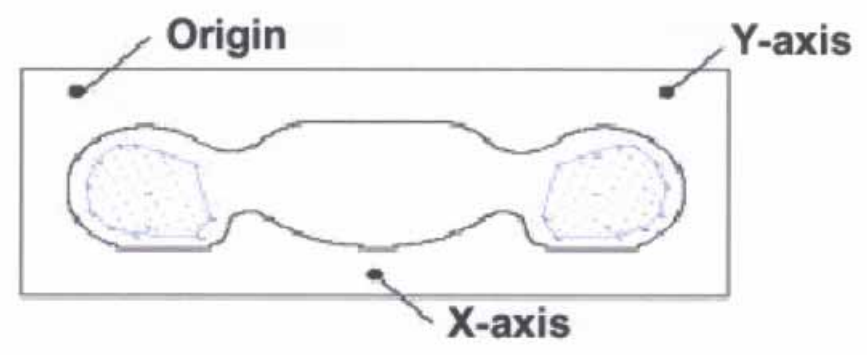
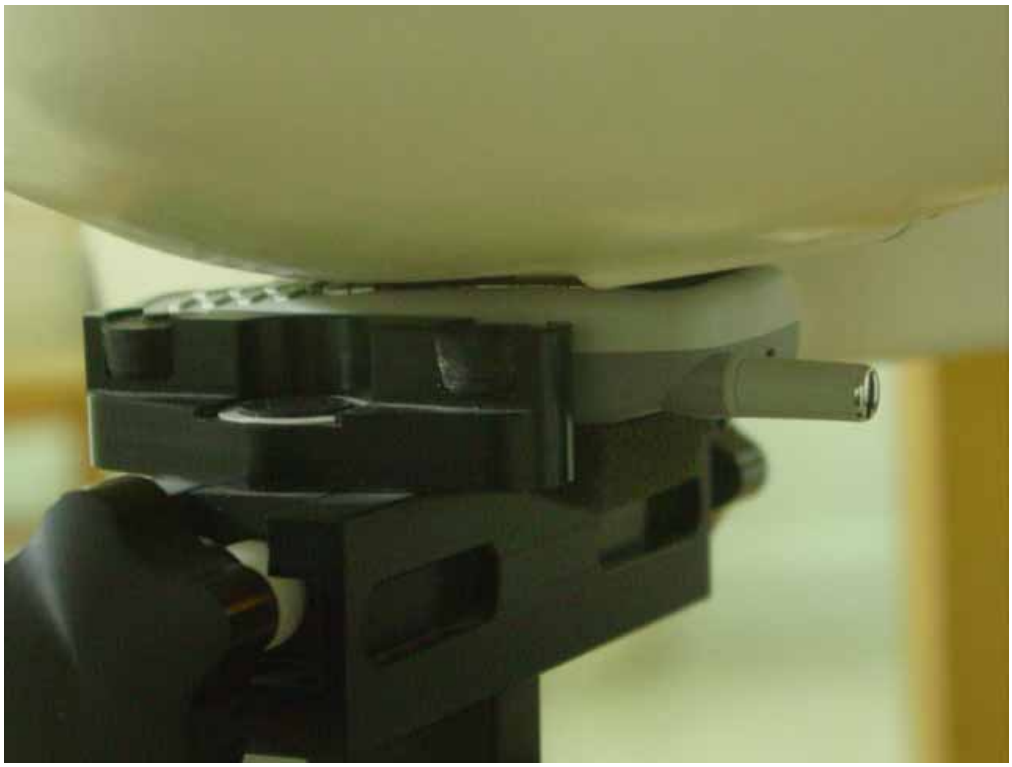


Figure 2 SAR Measurement Points in Area Scan

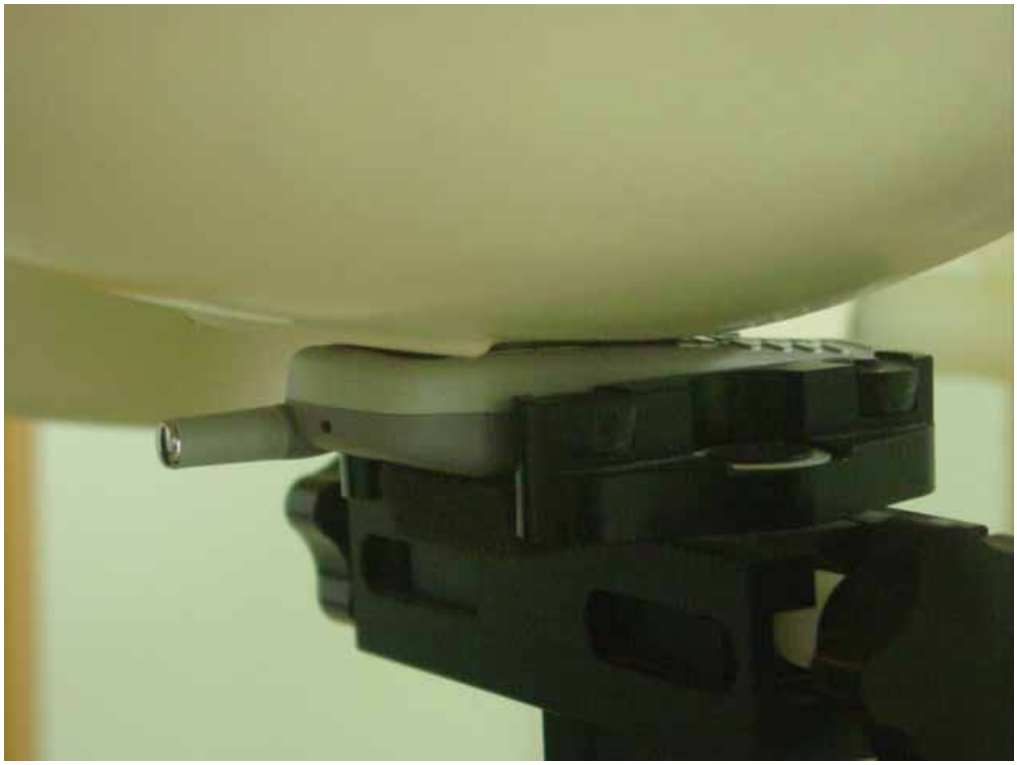
ANNEX B： TEST LAYOUT

Picture 1 Specific Absorption Rate Test Layout



Picture 2 Left Hand Touch Cheek Position

Picture 3 Left Hand Tilt 15° Position

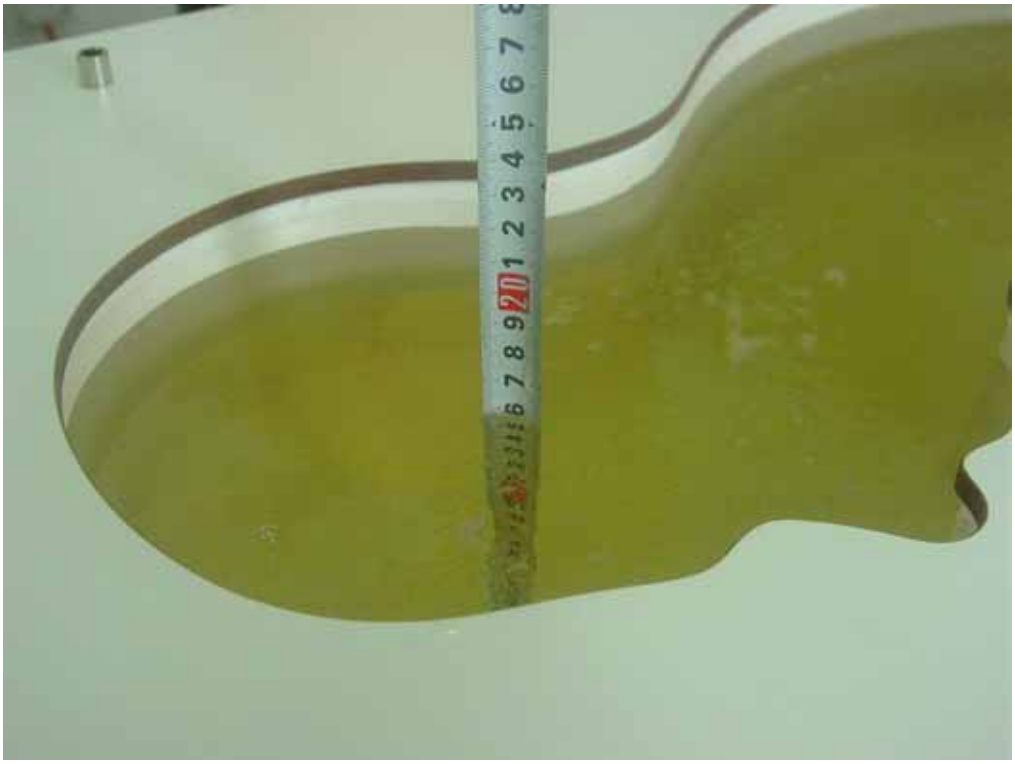


Picture 4 Right Hand Touch Cheek Position

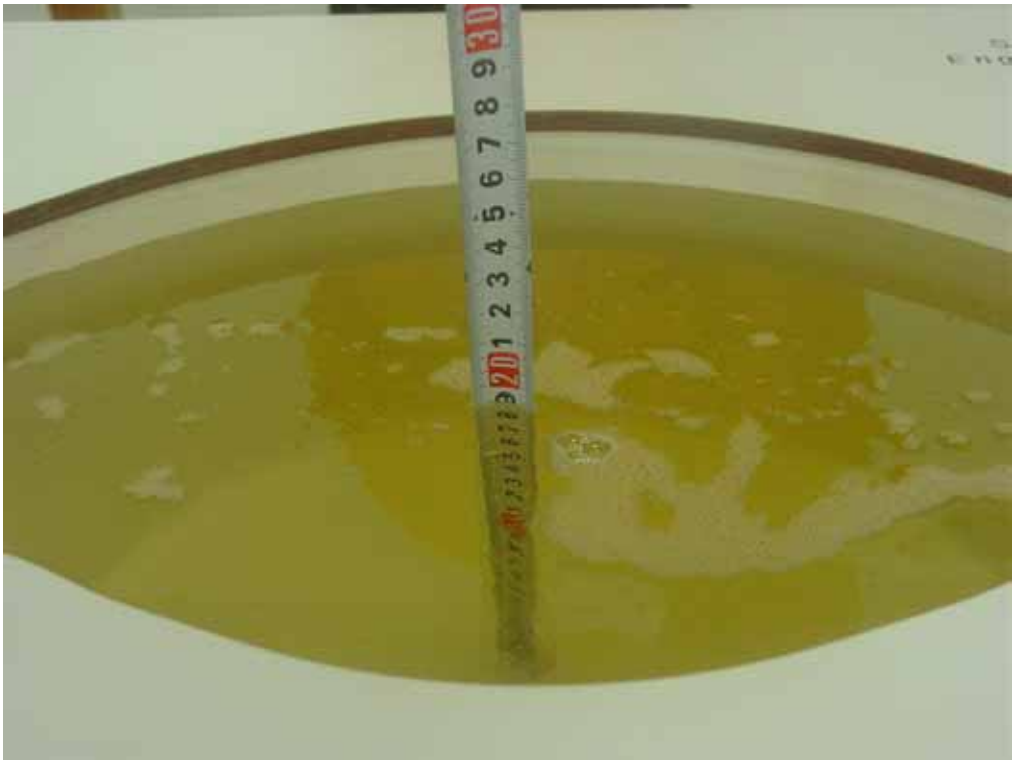
Picture 5 Right Hand Tilt 15° Position

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)

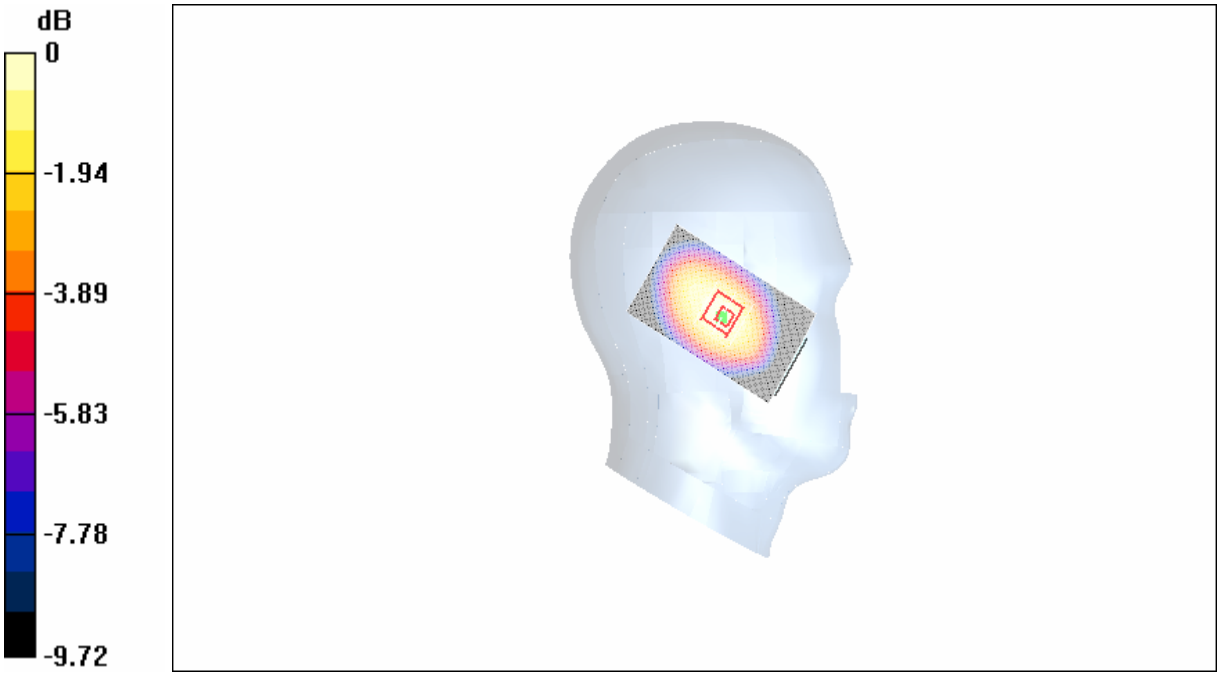
ANNEX C: GRAPH RESULTS

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

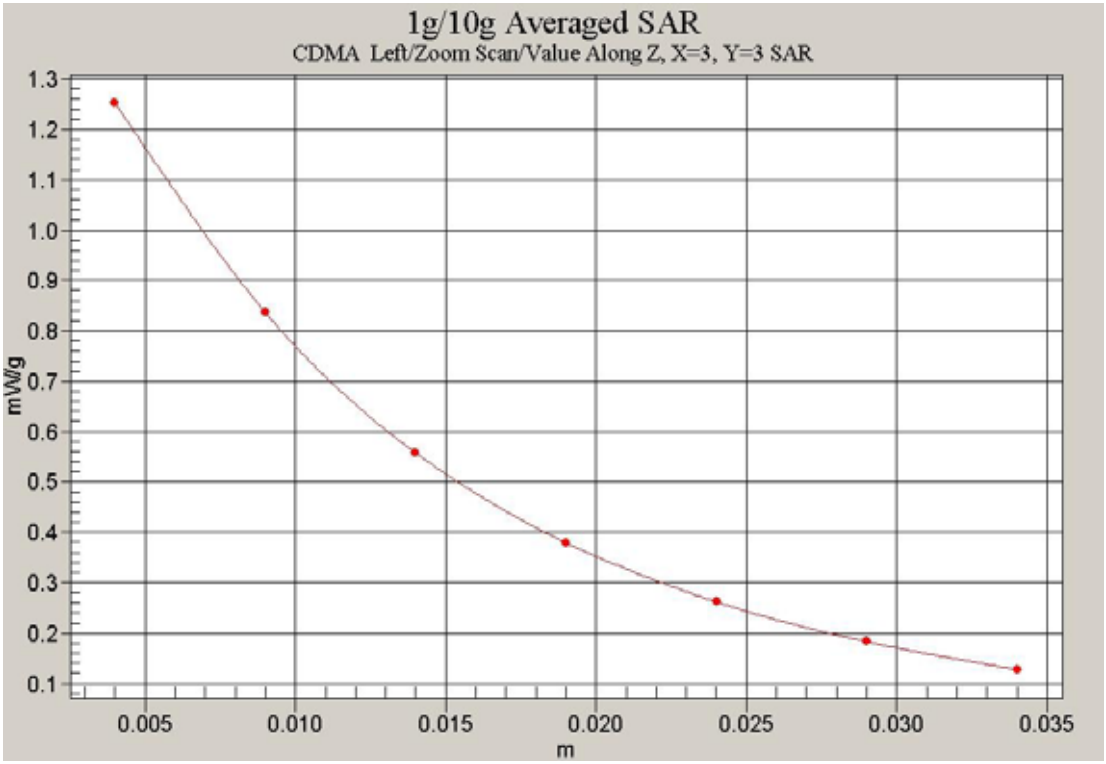


Fig. 2 Z-Scan at power reference point (Left Hand Touch Cheek CDMA 1X CH1013)

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

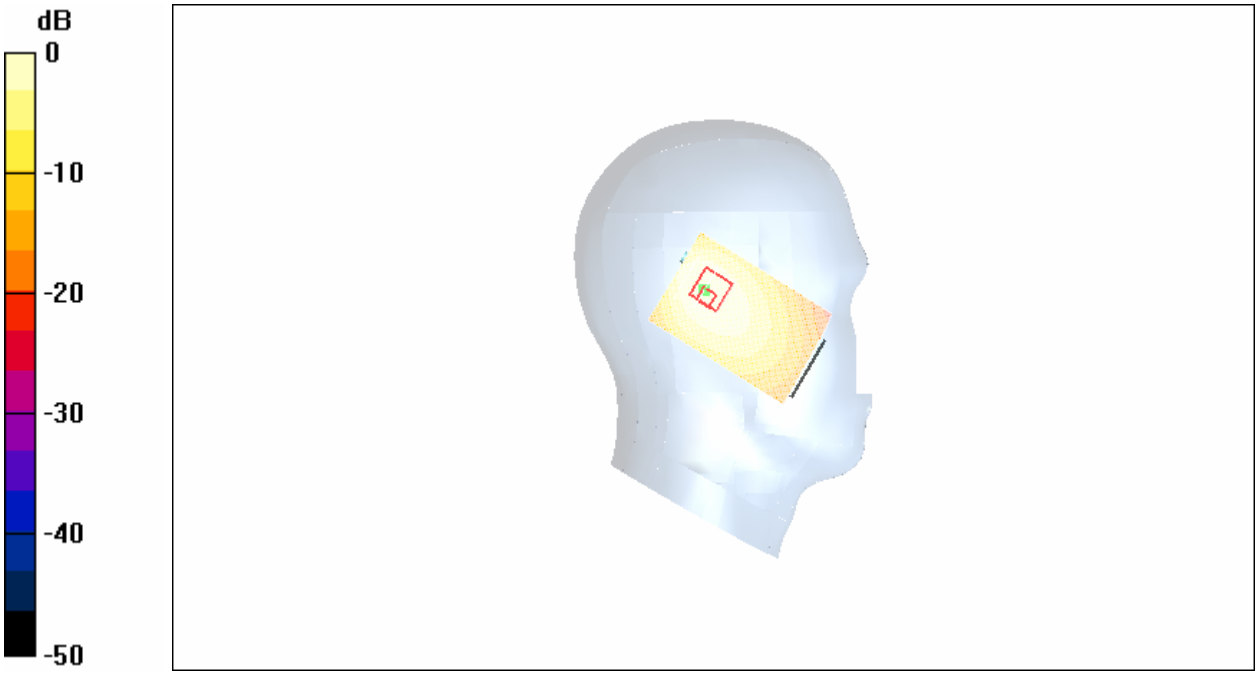
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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



0 dB = 1.25mW/g

Fig. 3 Left Hand Touch Cheek CDMA 1X CH384

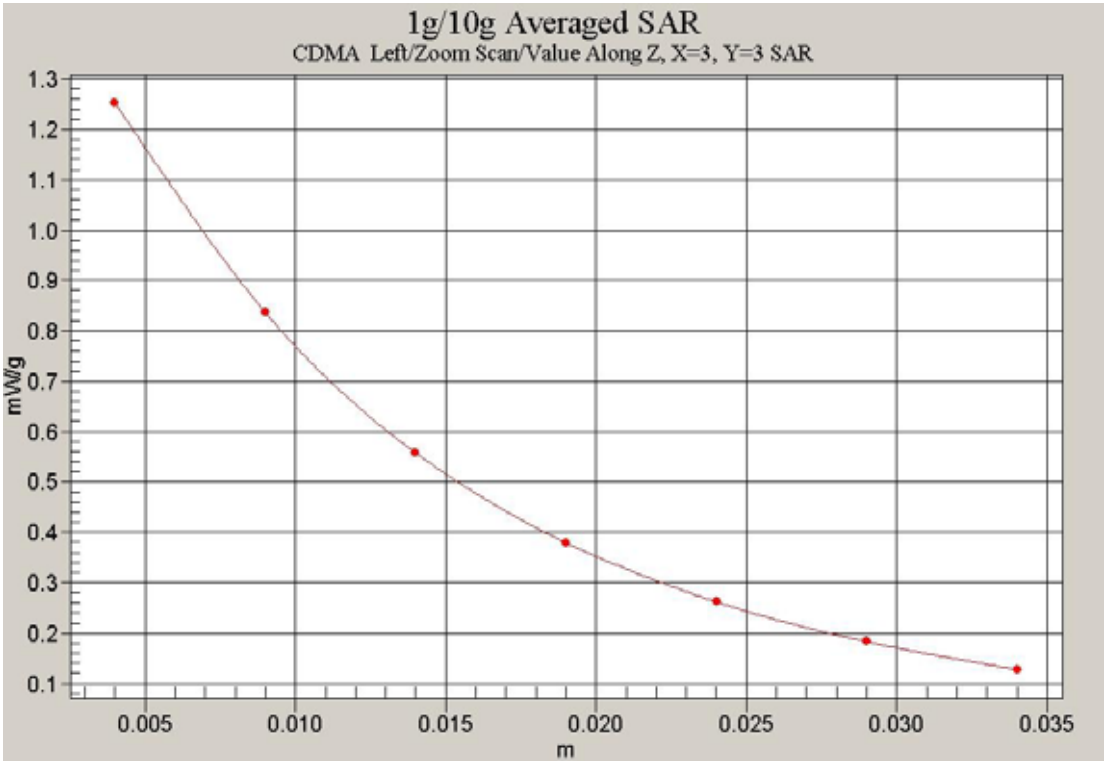


Fig. 4 Z-Scan at power reference point (Left Hand Touch Cheek CDMA 1X CH384)

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

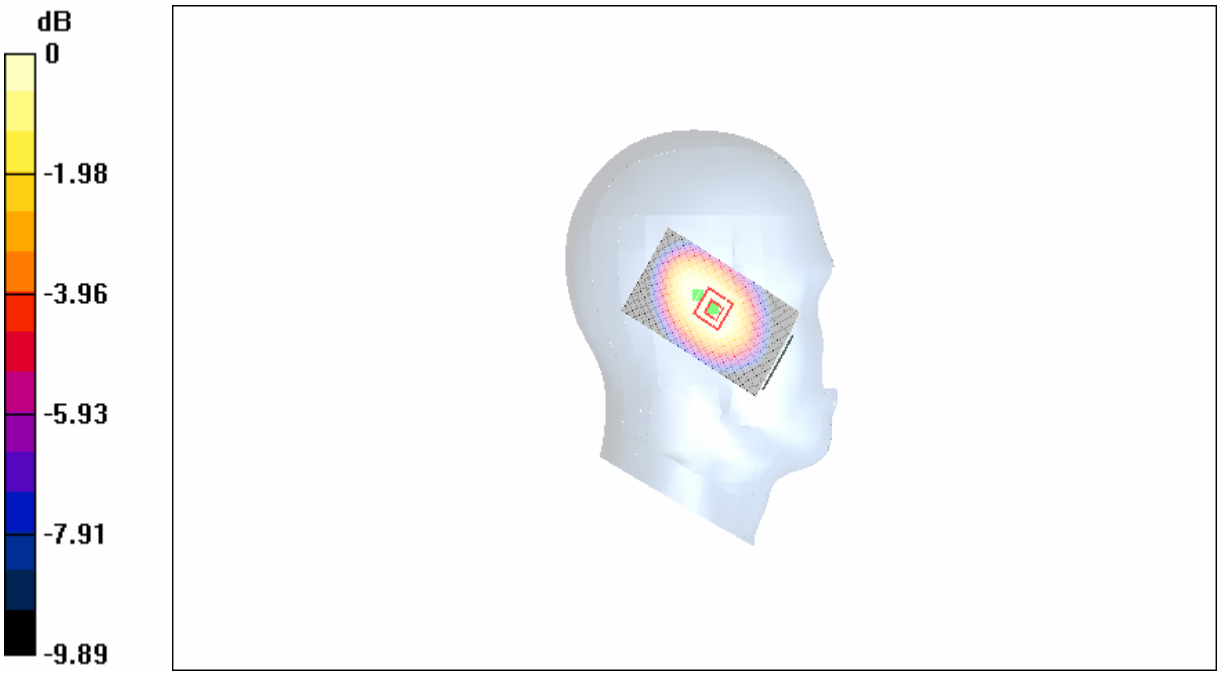
Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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



0 dB = 1.05mW/g

Fig. 5 Left Hand Touch Cheek CDMA 1X CH777

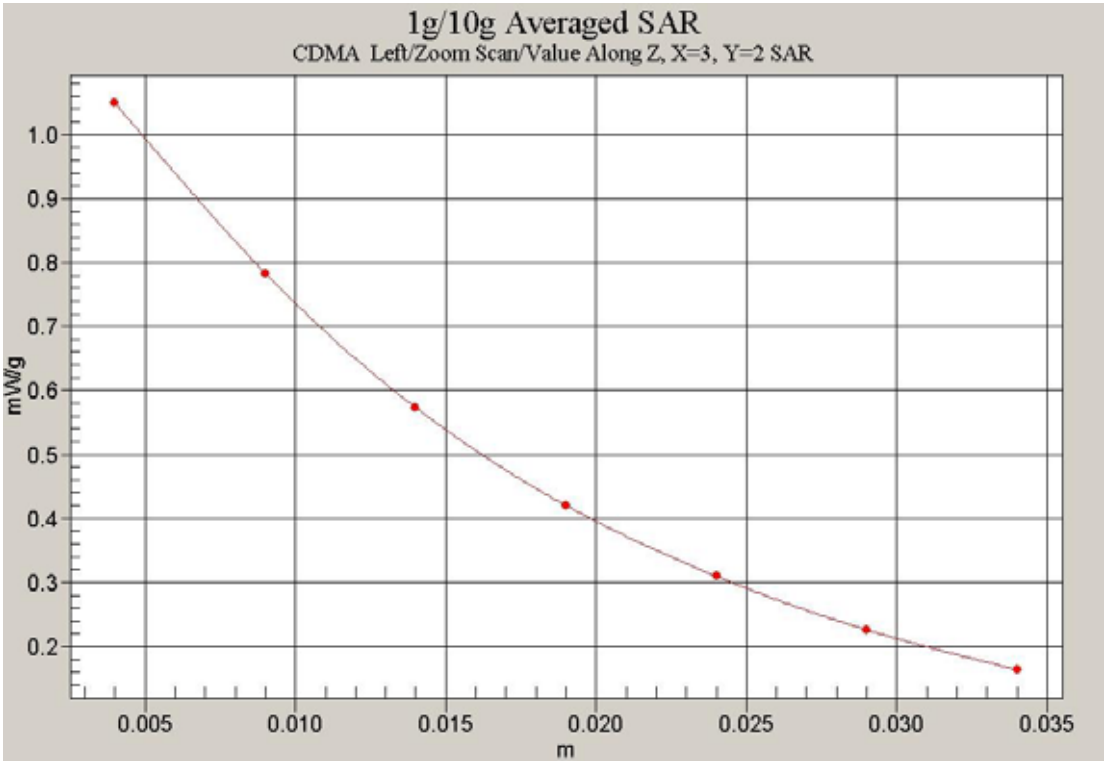


Fig. 6 Z-Scan at power reference point (Left Hand Touch Cheek CDMA 1X CH777)

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

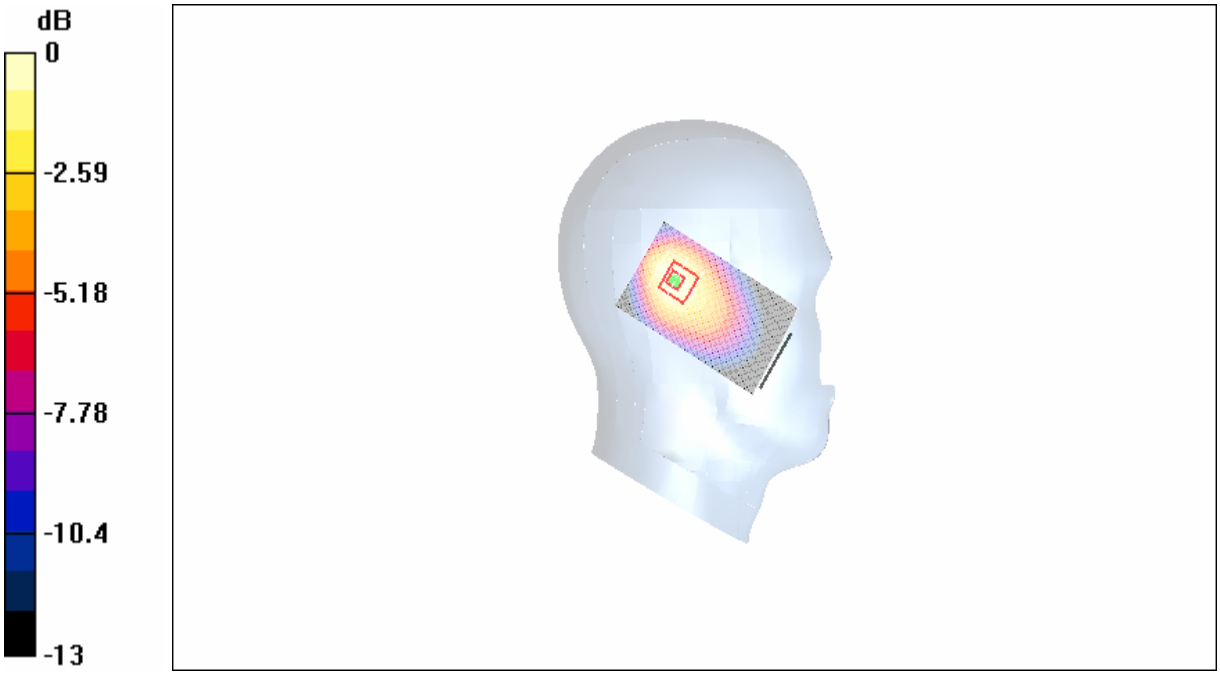
Tilt Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

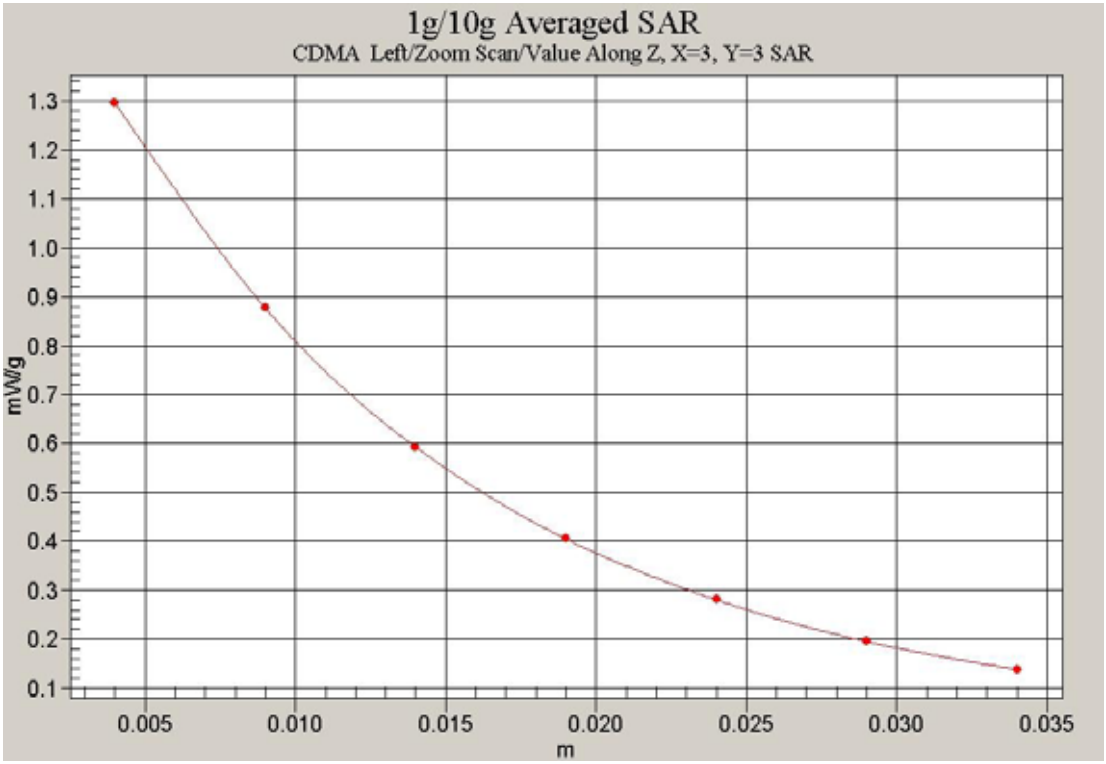


Fig. 8 Z-Scan at power reference point (Left Hand Tilt 15° CDMA 1X CH1013)

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

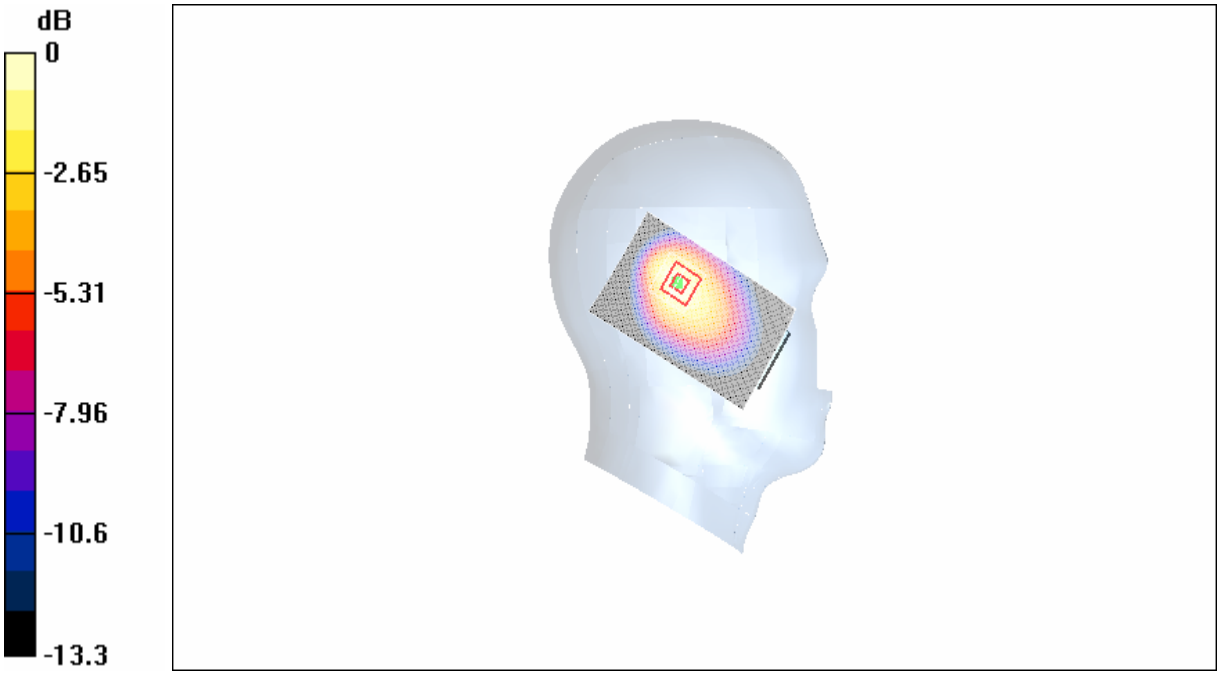
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

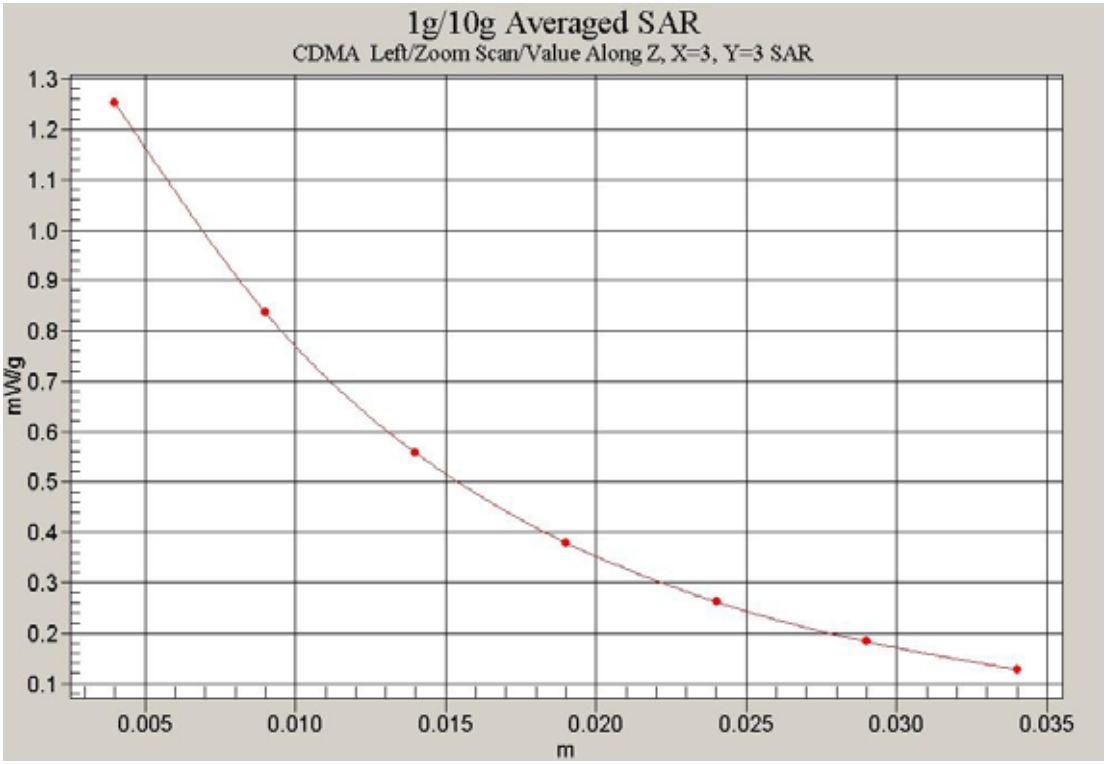


Fig. 10 Z-Scan at power reference point (Left Hand Tilt 15° CDMA 1X CH384)

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

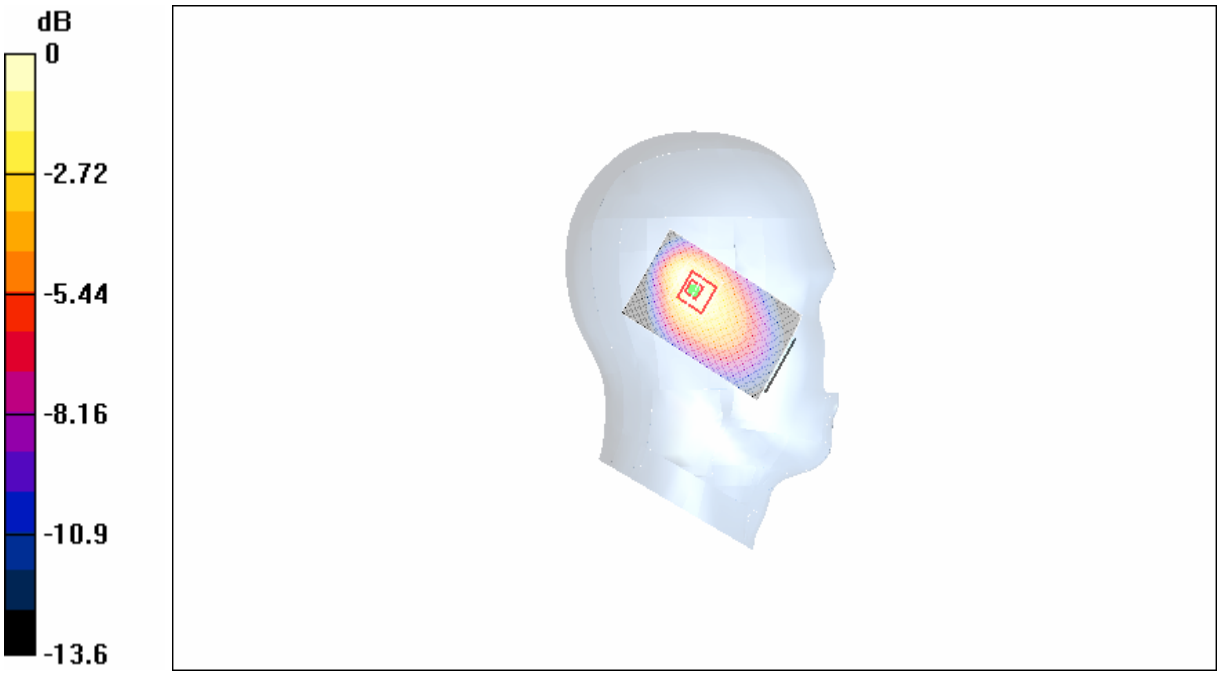
Tilt High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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



0 dB = 0.816mW/g

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

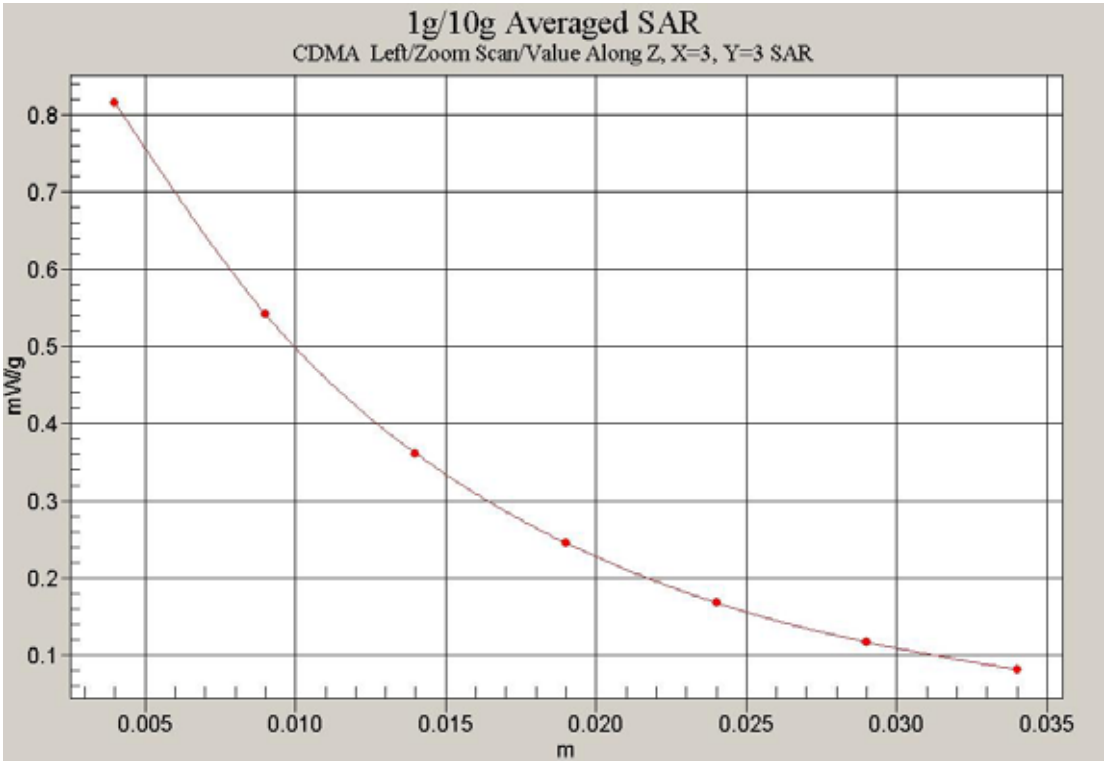


Fig. 12 Z-Scan at power reference point (left Hand Tilt 15° CDMA 1X CH777)

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

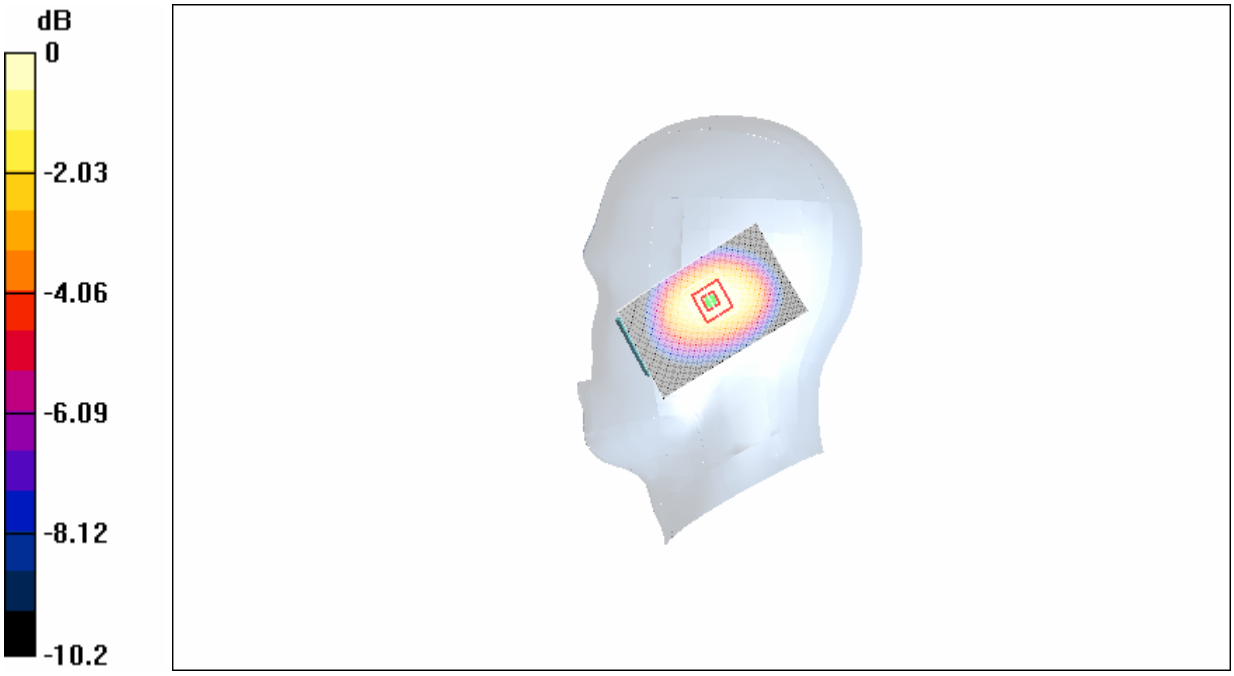
Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

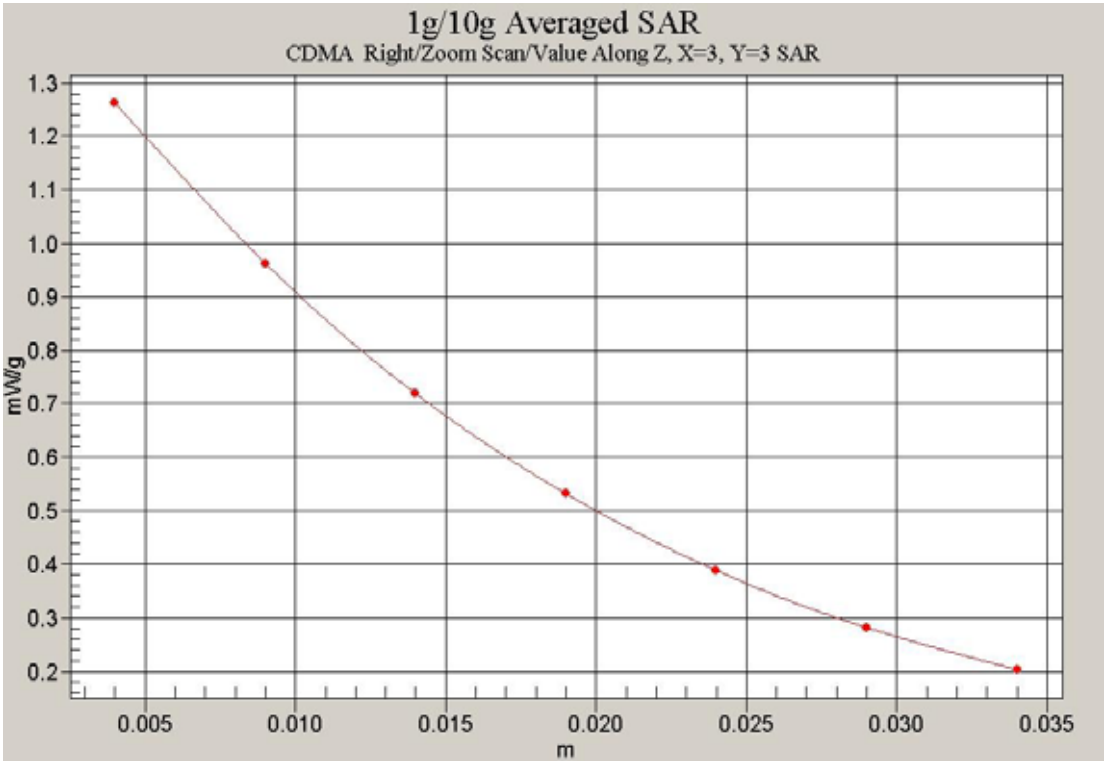


Fig. 14 Z-Scan at power reference point (Right Hand Touch Cheek CDMA 1X CH1013)

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

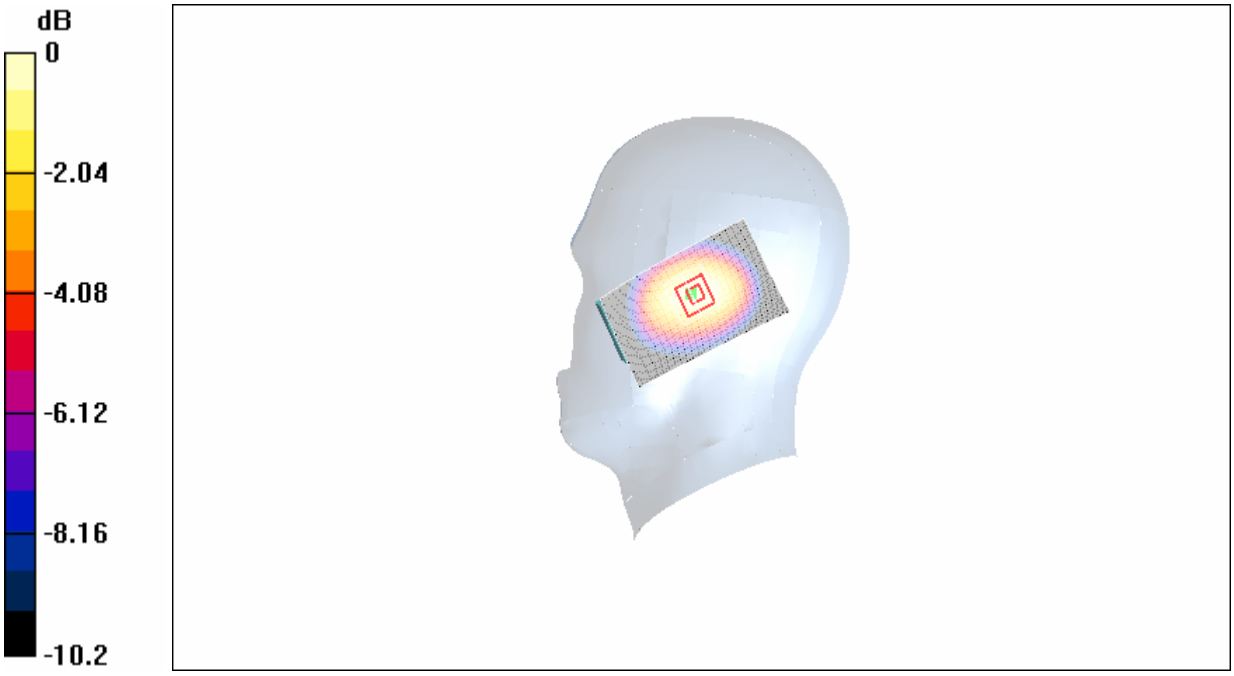
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

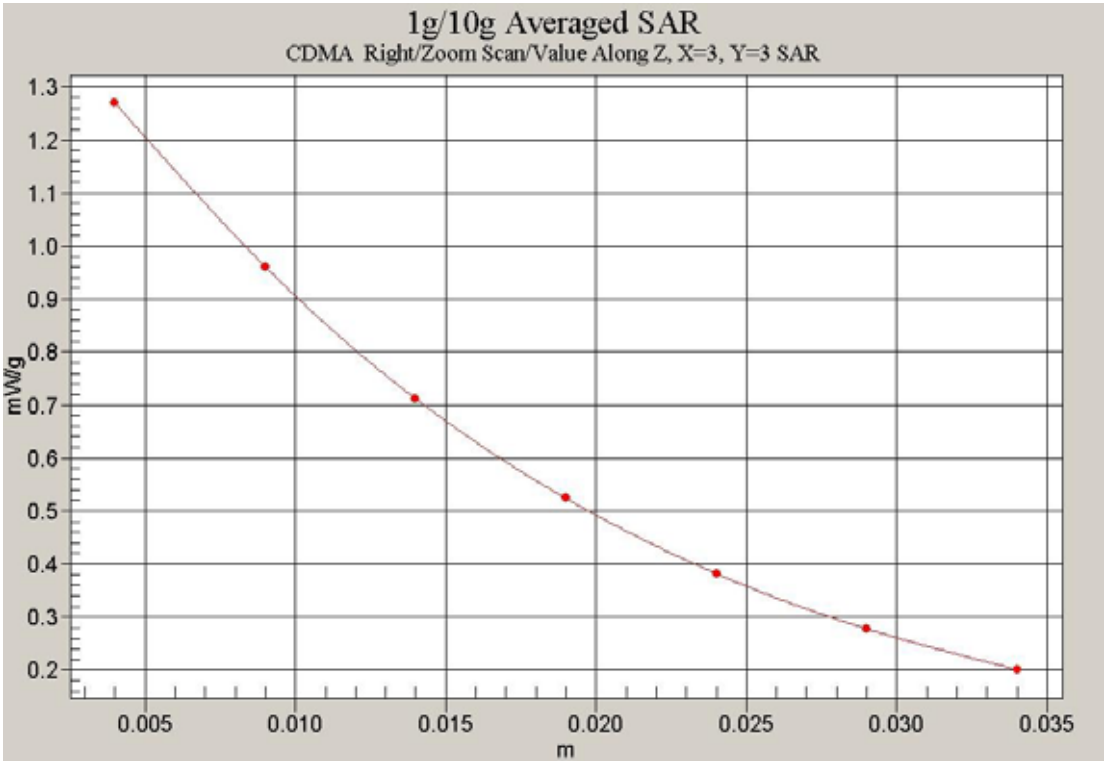


Fig. 16 Z-Scan at power reference point (Right Hand Touch Cheek CDMA 1X CH384)

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

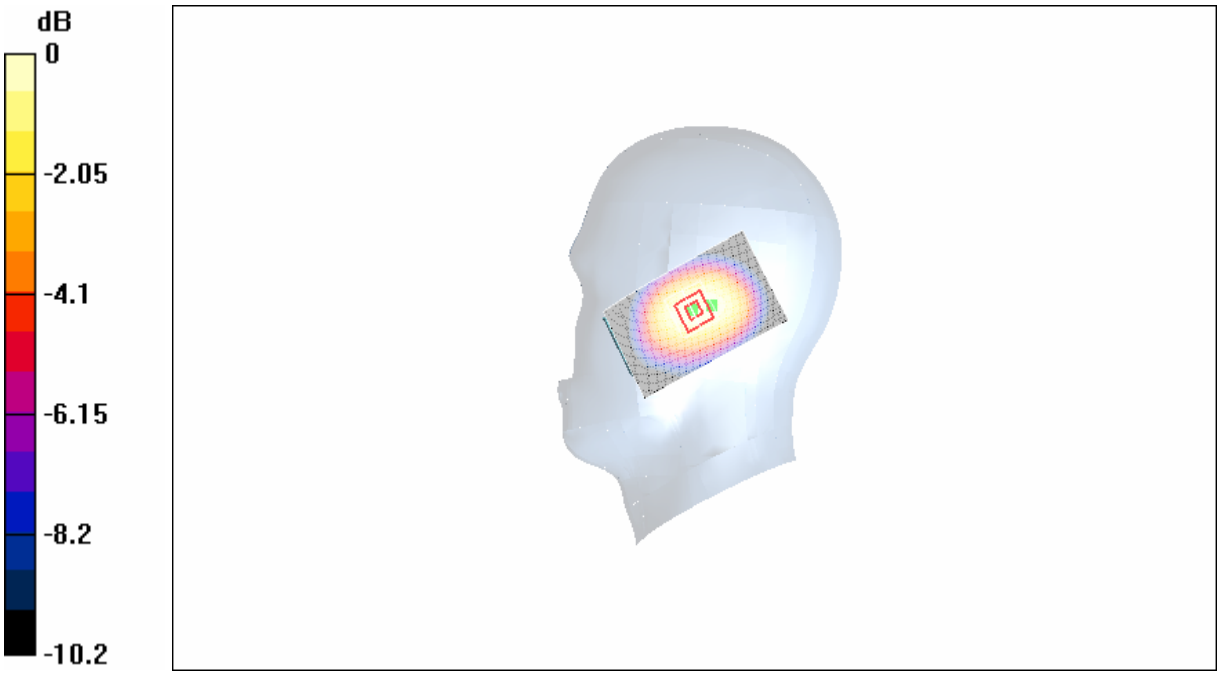
Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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



0 dB = 0.864mW/g

Fig. 17 Right Hand Touch Cheek CDMA 1X CH777

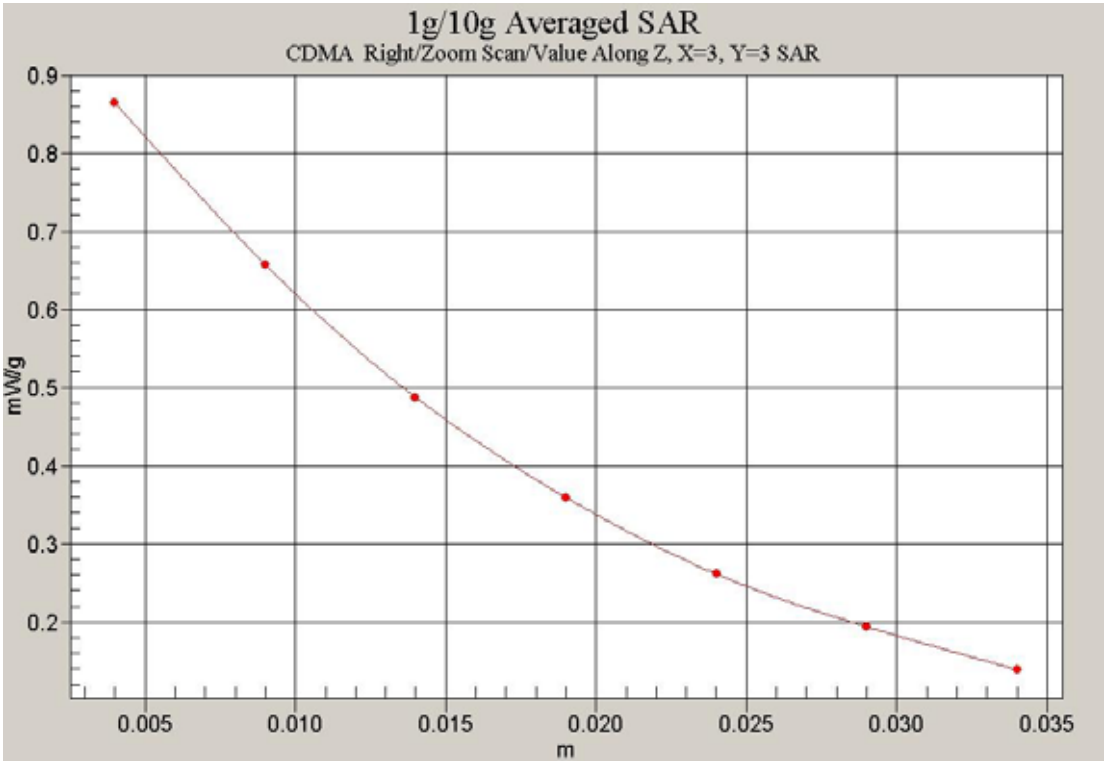


Fig. 18 Z-Scan at power reference point (Right Hand Touch Cheek CDMA 1X CH777)

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

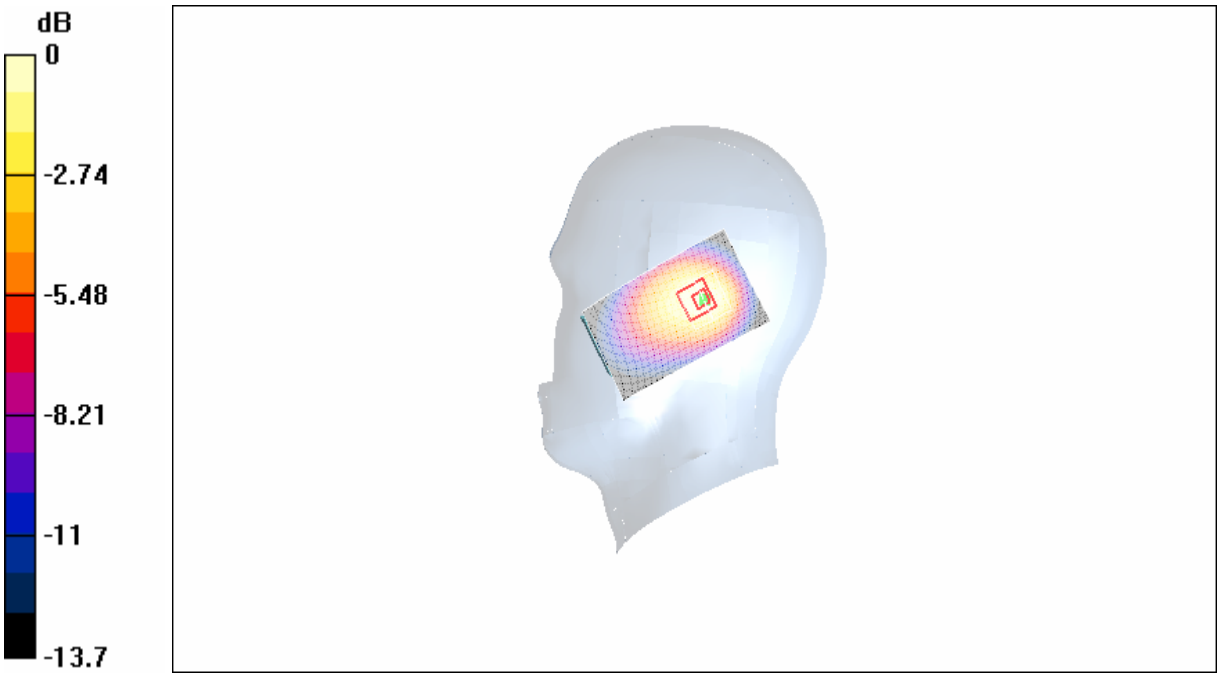
Tilt Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

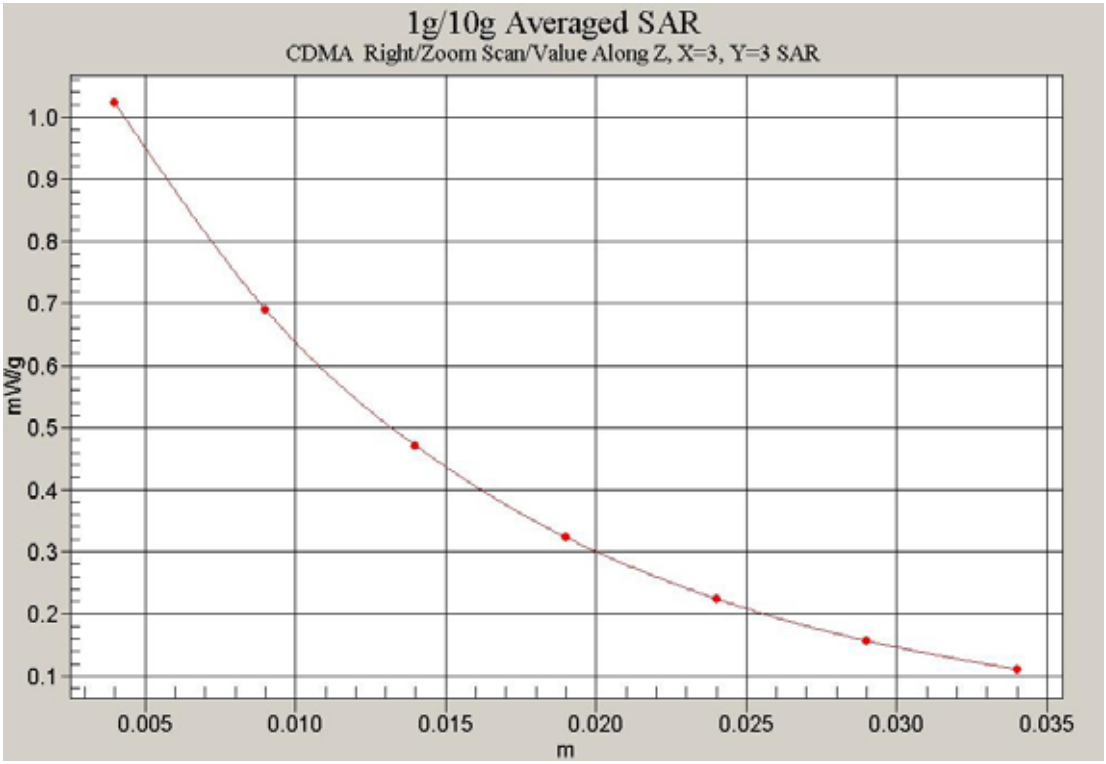


Fig. 20 Z-Scan at power reference point (Right Hand Tilt 15°CDMA 1X CH1013)

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

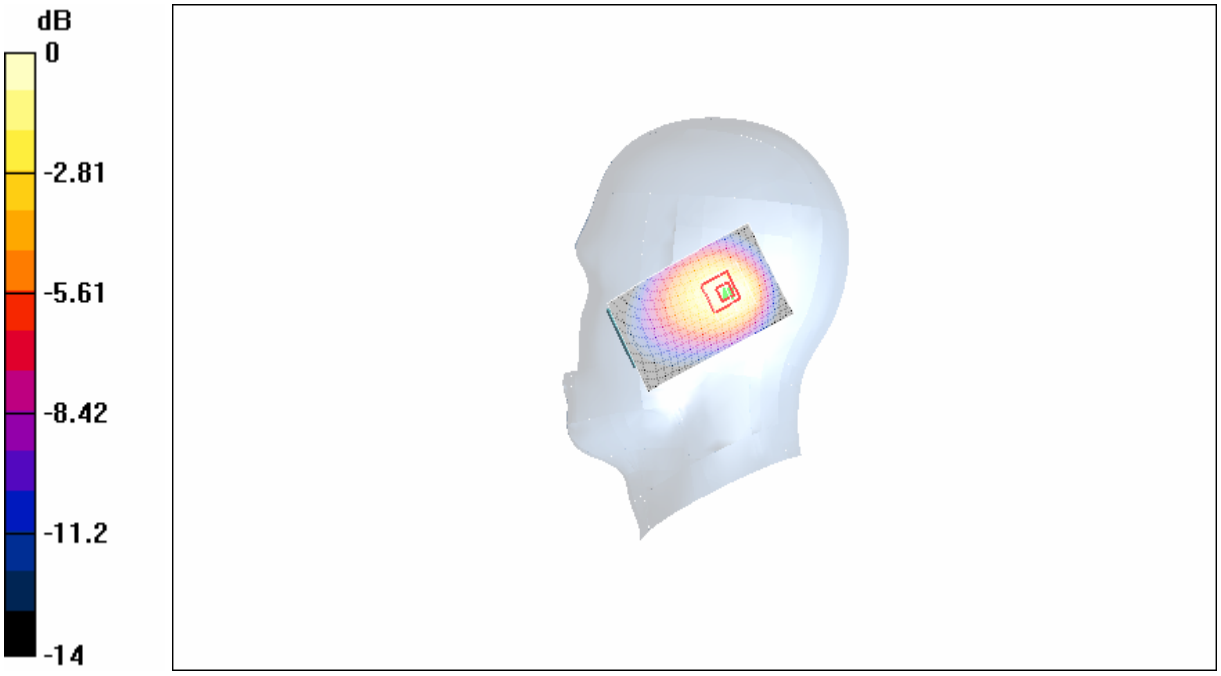
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

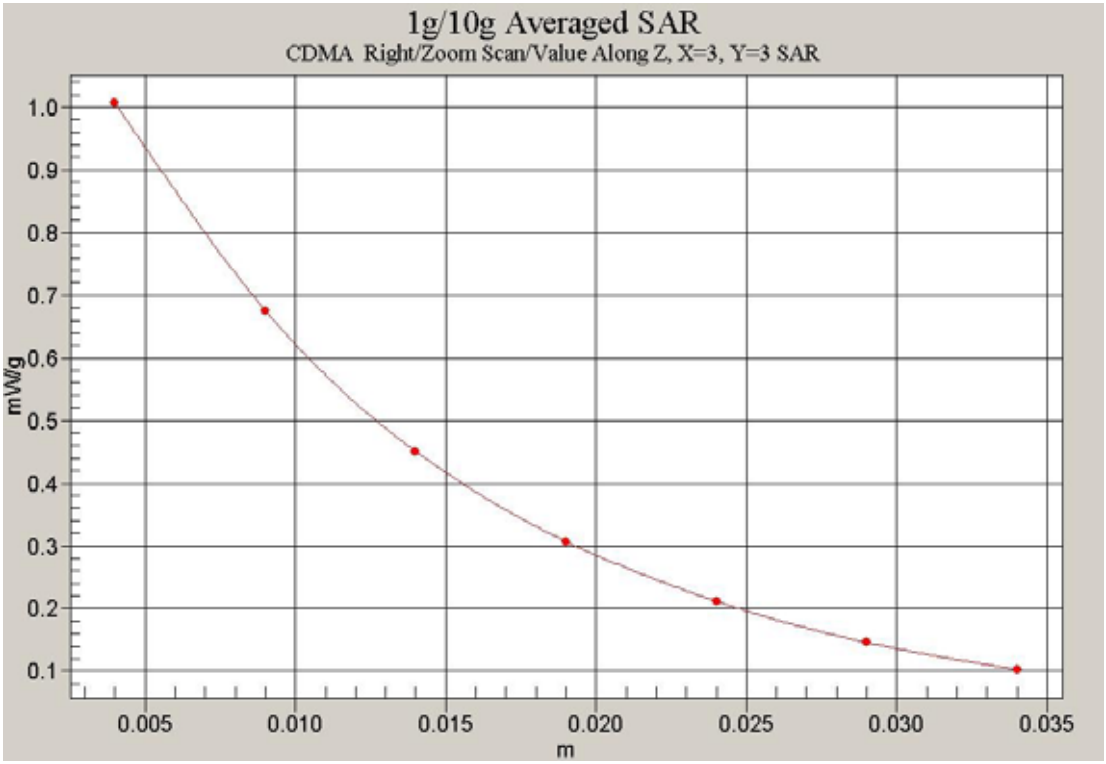


Fig. 22 Z-Scan at power reference point (Right Hand Tilt 15° CDMA 1X CH384)

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

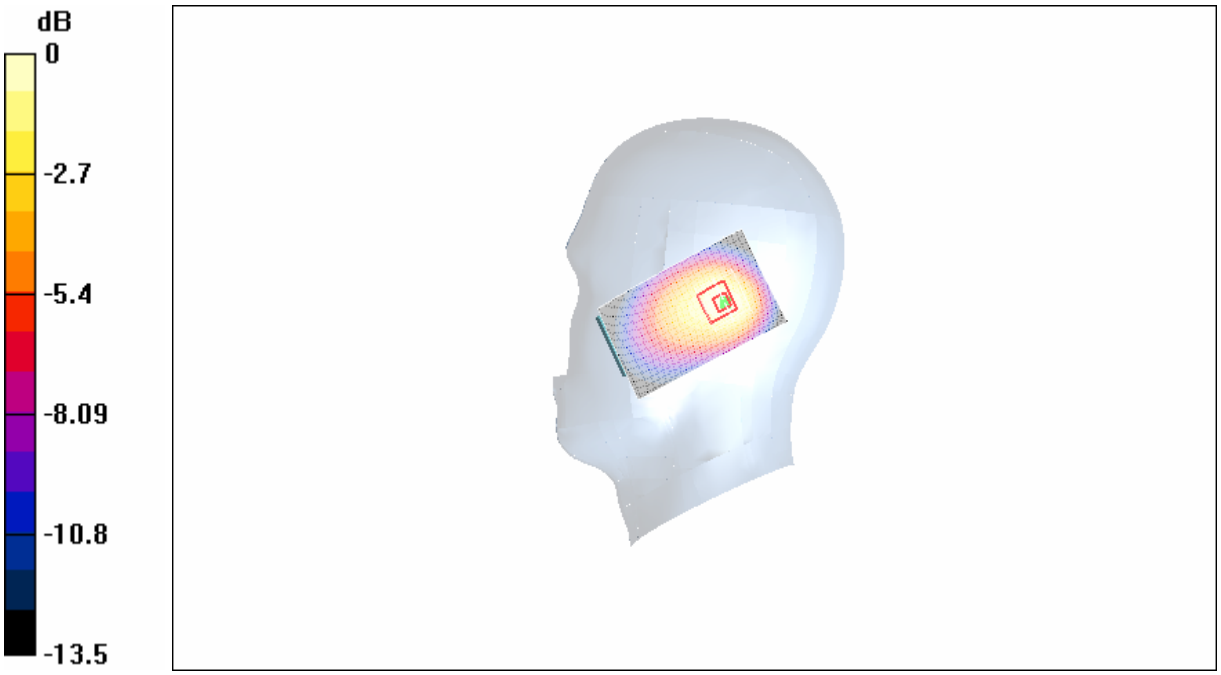
Tilt High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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



0 dB = 0.698mW/g

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

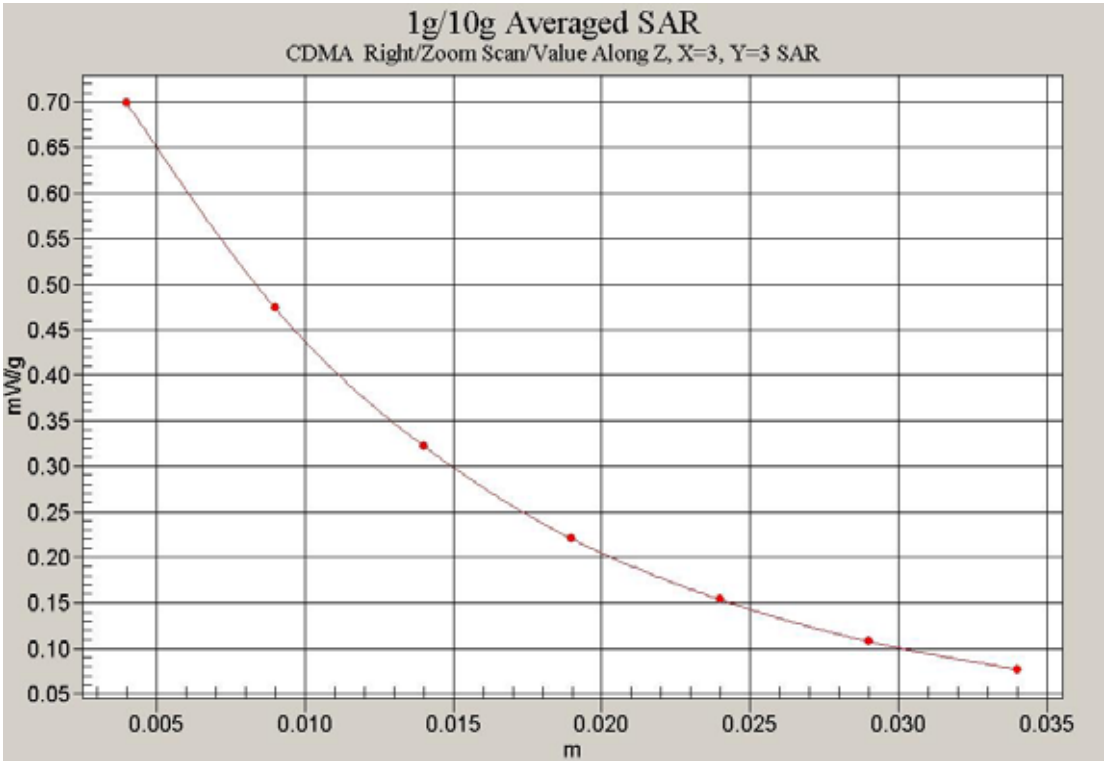


Fig. 24 Z-Scan at power reference point (Right Hand Tilt 15° CDMA 1X CH777)

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

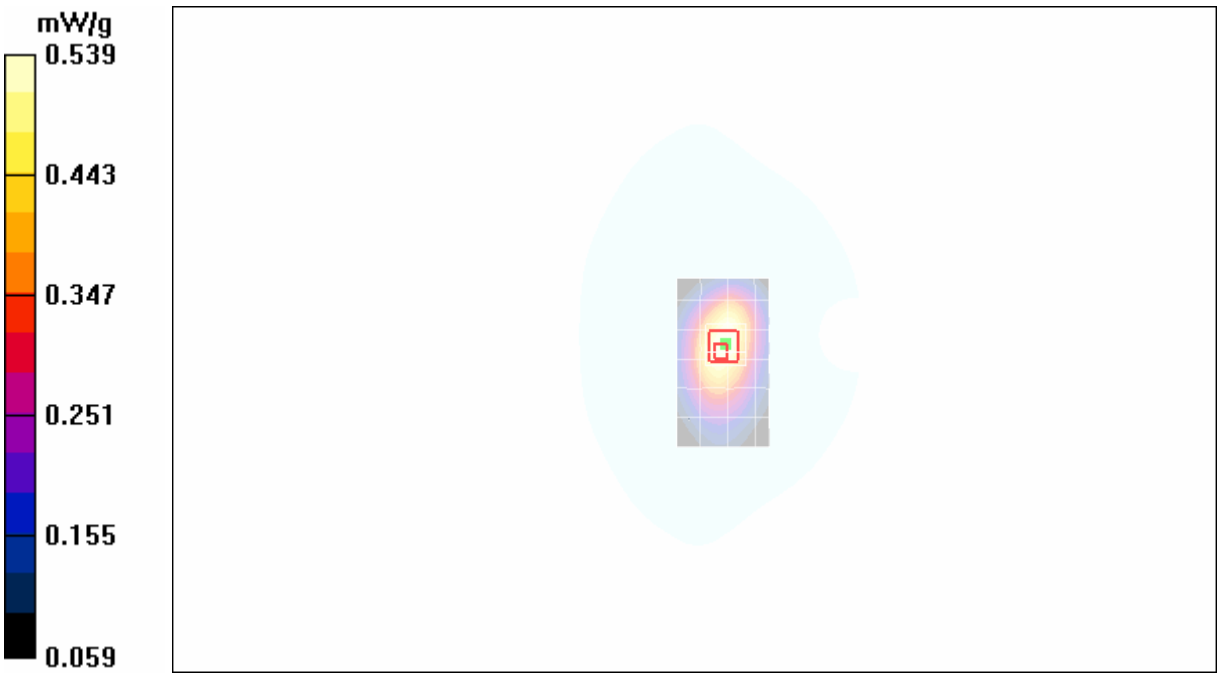


Fig. 25 Flat Phantom Body-worn Position 835MHz CH1013 with the display of the handset towards the phantom

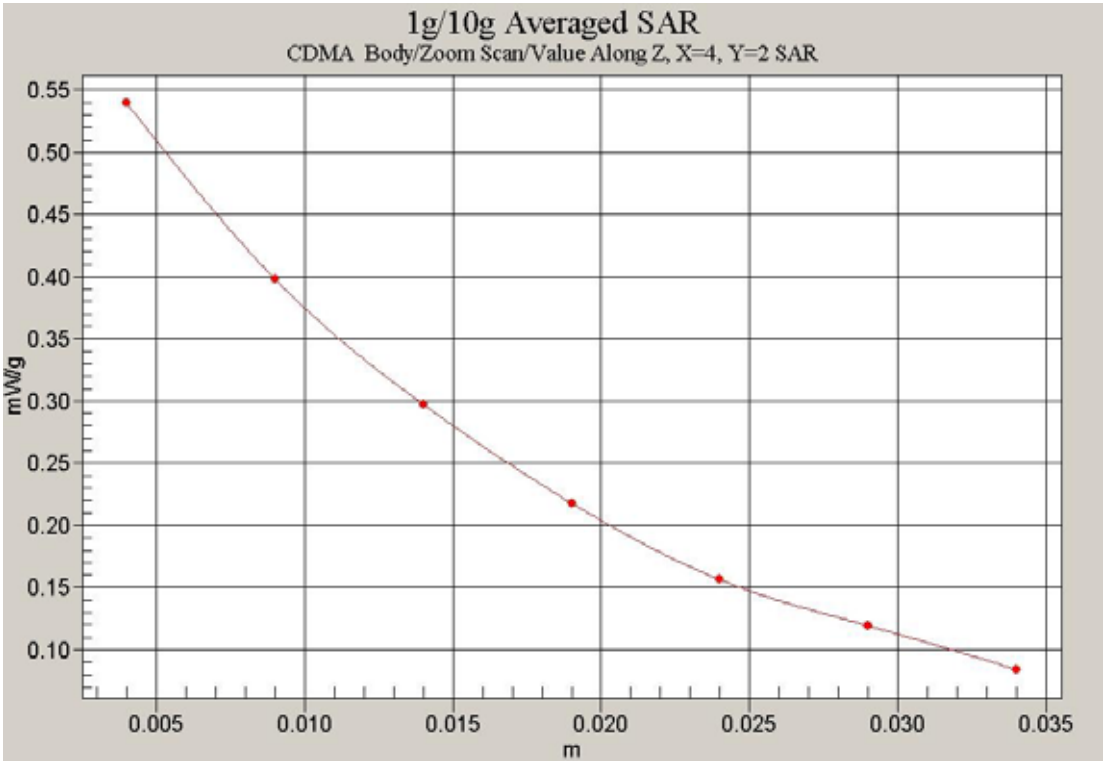


Fig. 26 Z-Scan at power reference point (Flat Phantom 835MHz CH1013 with the display of the handset towards the phantom)

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

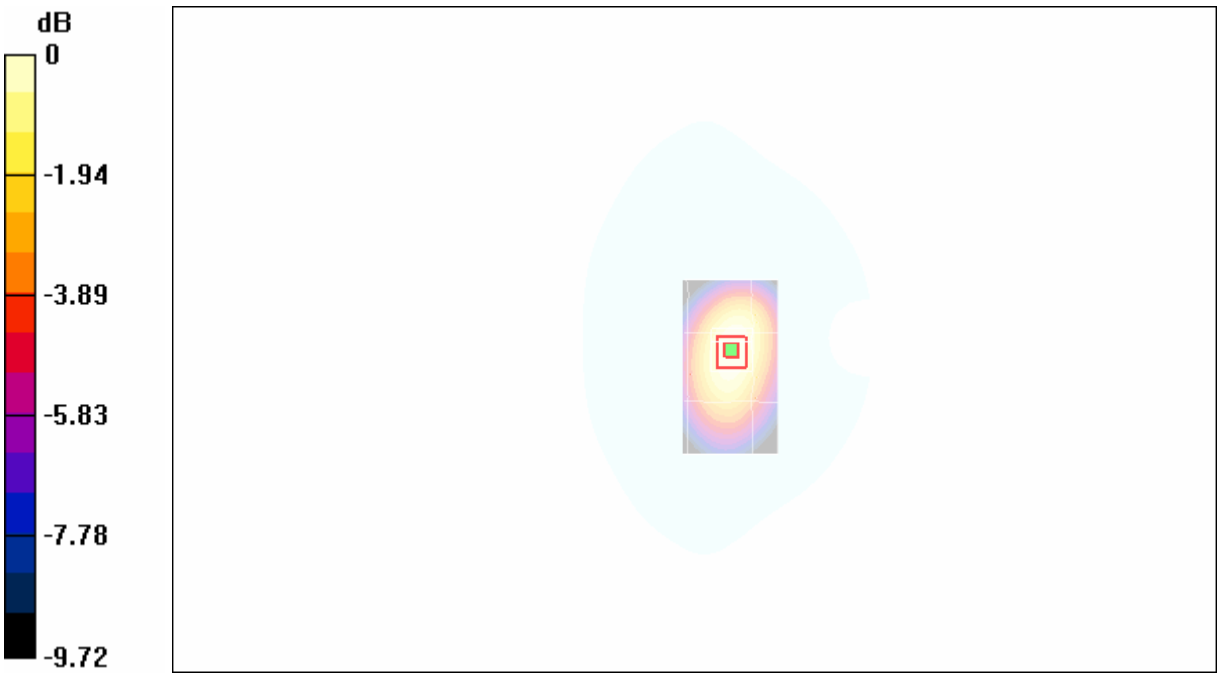
Toward Phantom, Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

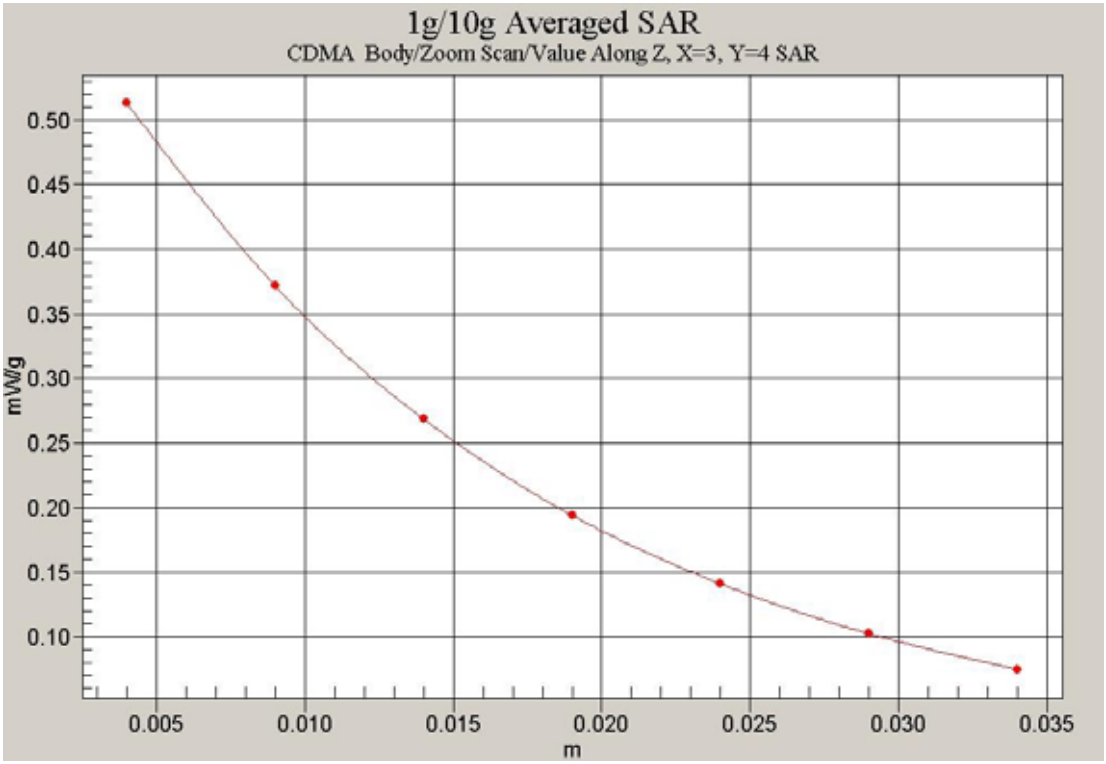


Fig. 28 Z-Scan at power reference point (Flat Phantom 835MHz CH384 with the display of the handset towards the phantom)

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

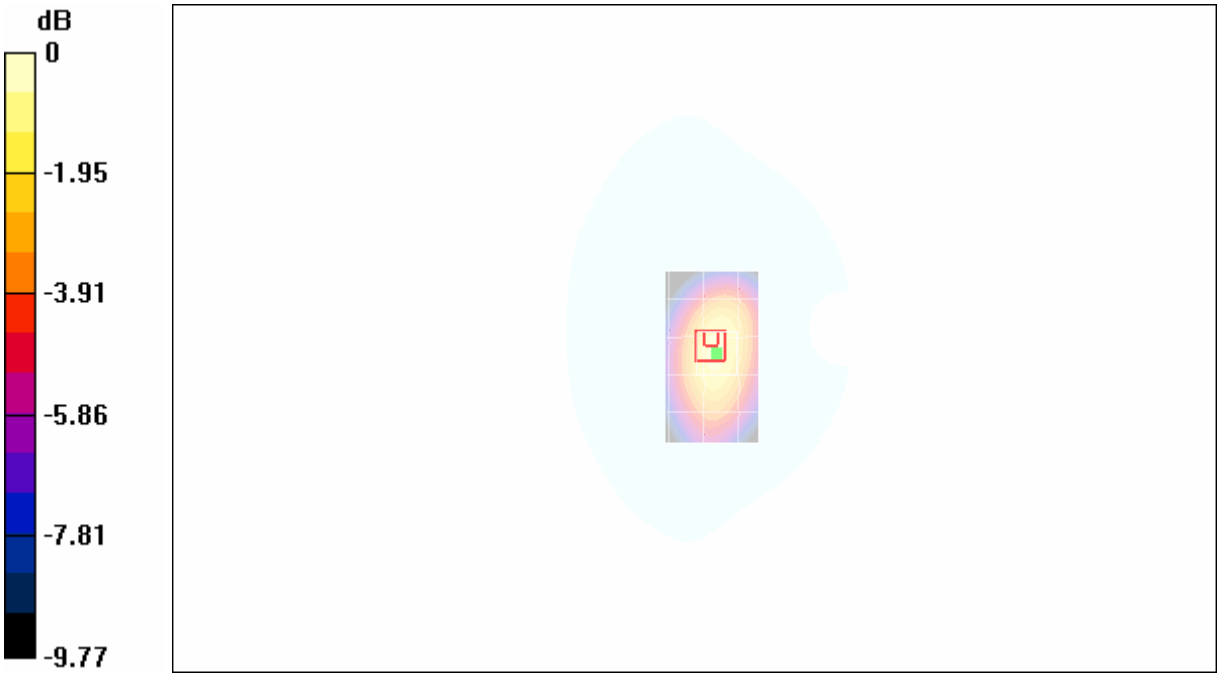
Toward Phantom, High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

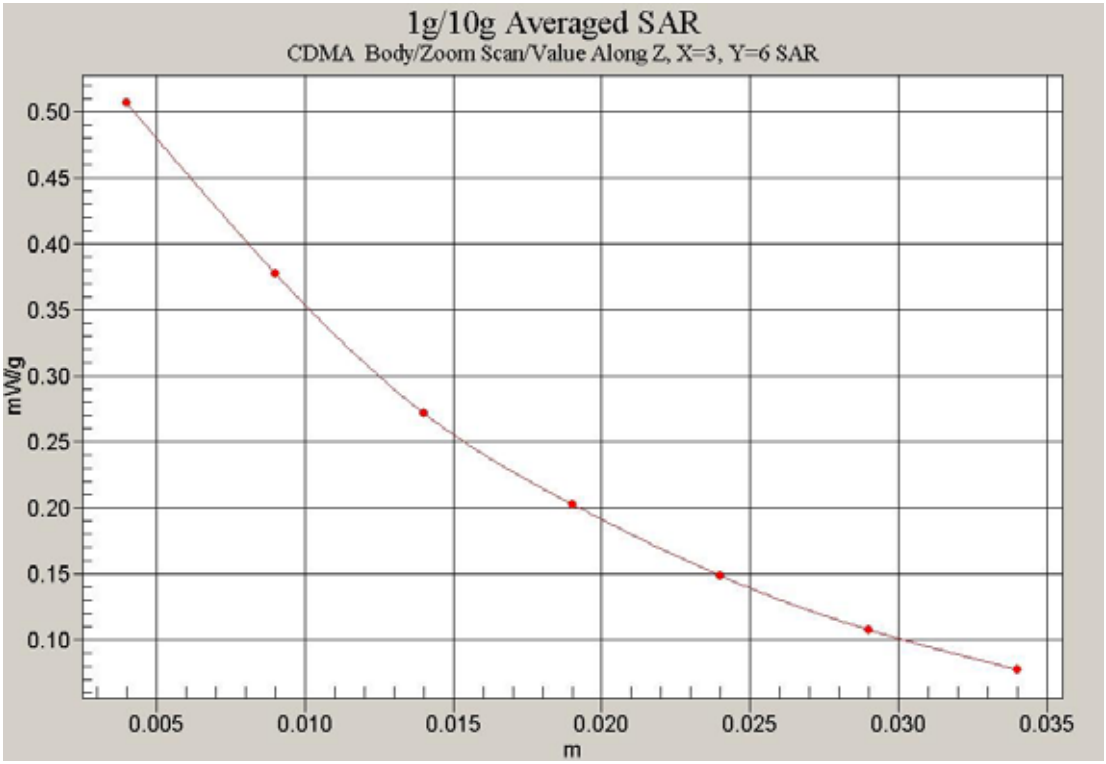


Fig. 30 Z-Scan at power reference point (Flat Phantom 835MHz CH777 with the display of the handset towards the phantom)

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

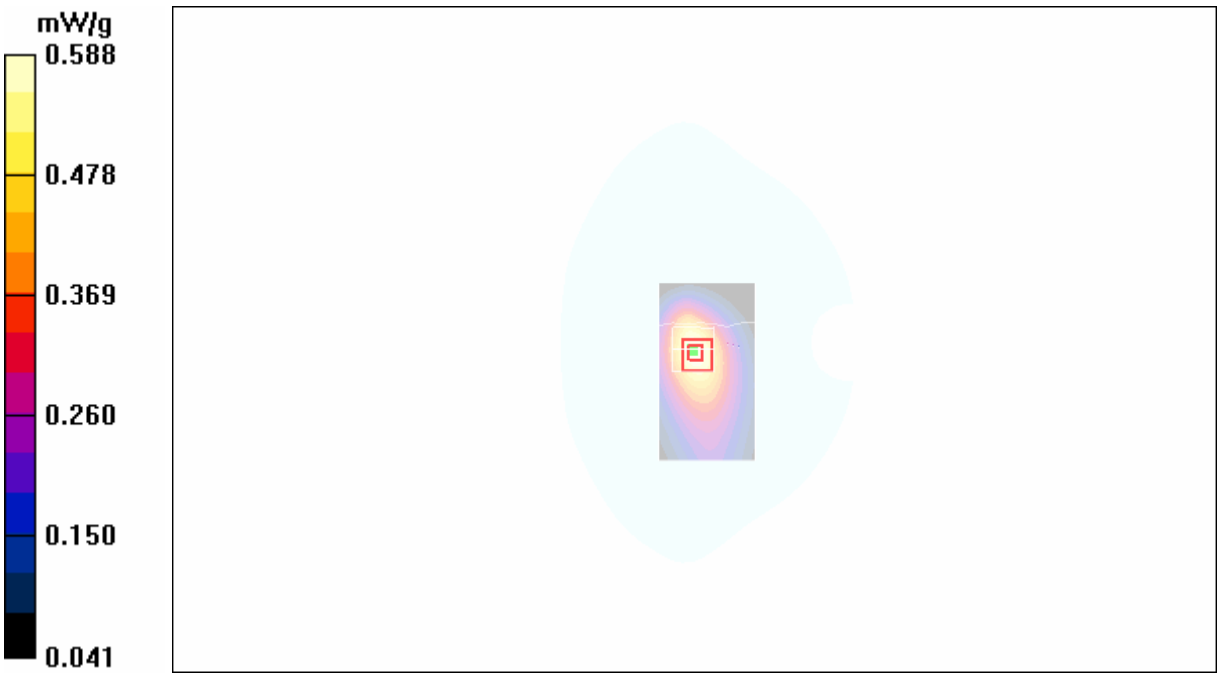


Fig. 31 Flat Phantom Body-worn Position 835MHz CH1013 with the display of the handset towards the ground

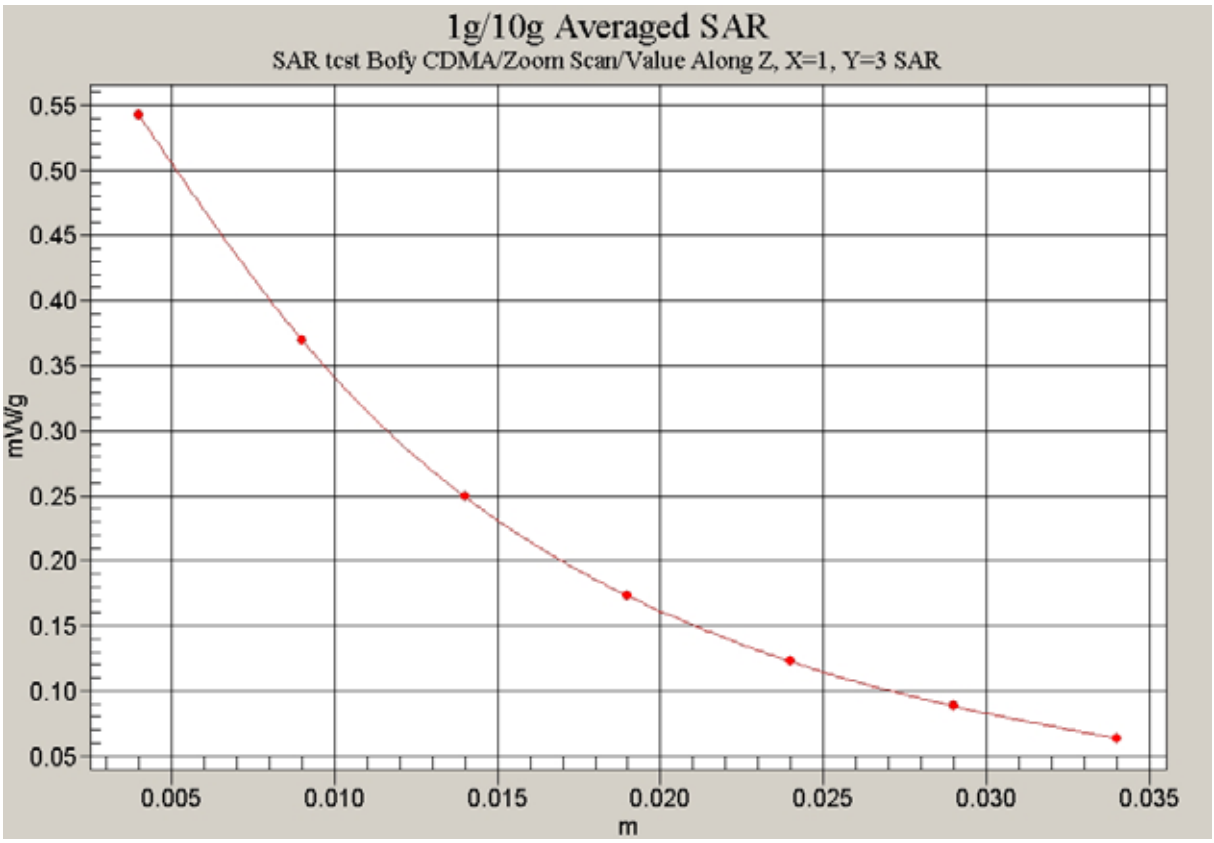


Fig. 32 Z-Scan at power reference point (Flat Phantom 835MHz CH1013 with the display of the handset towards the ground)

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

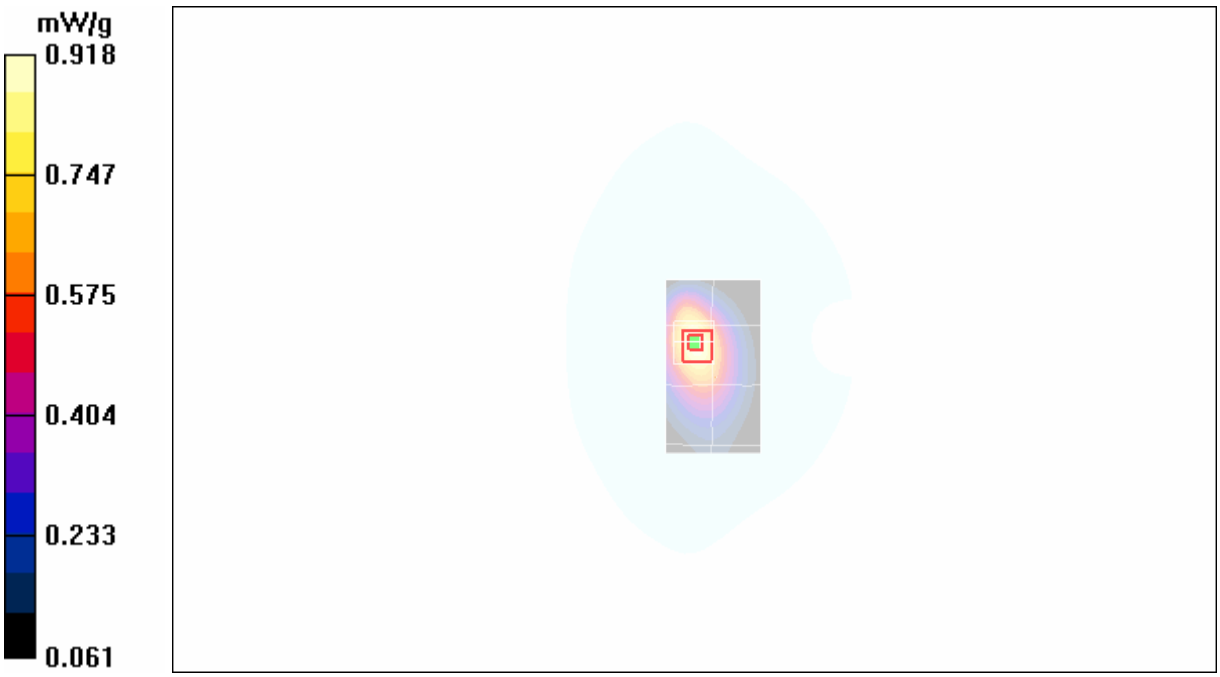


Fig. 33 Flat Phantom Body-worn Position 835MHz CH384 with the display of the handset towards the ground

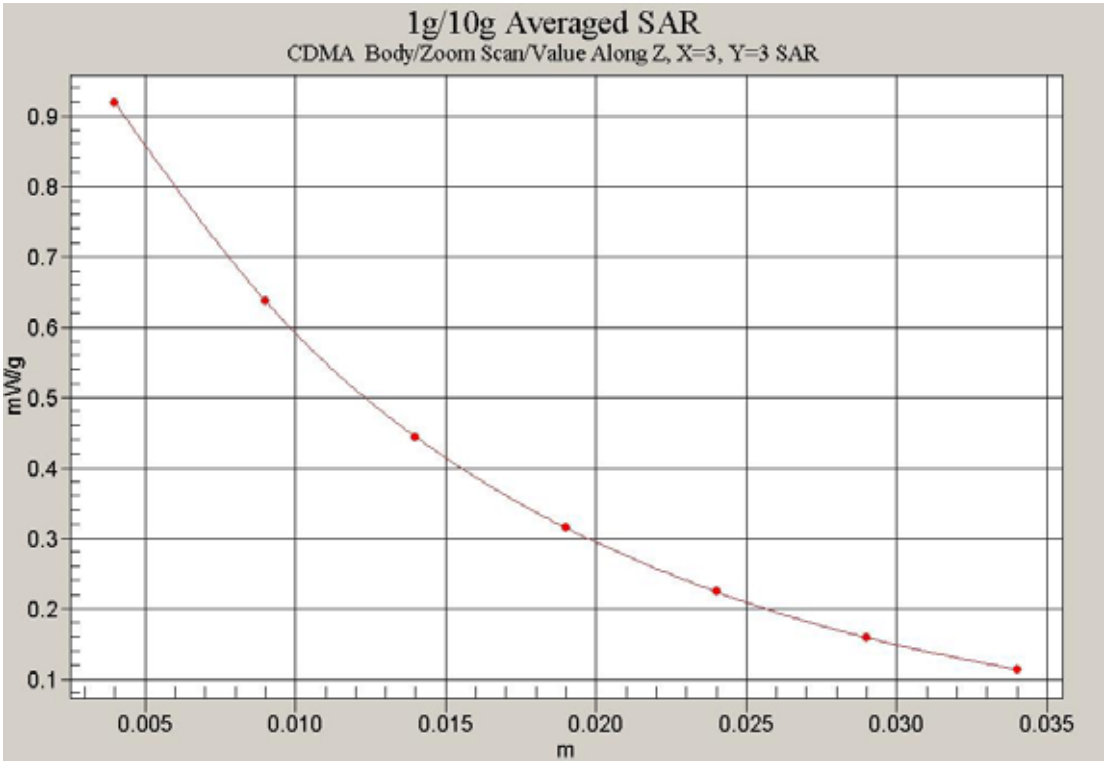


Fig. 34 Z-Scan at power reference point (Flat Phantom 835MHz CH384 with the display of the handset towards the ground)

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

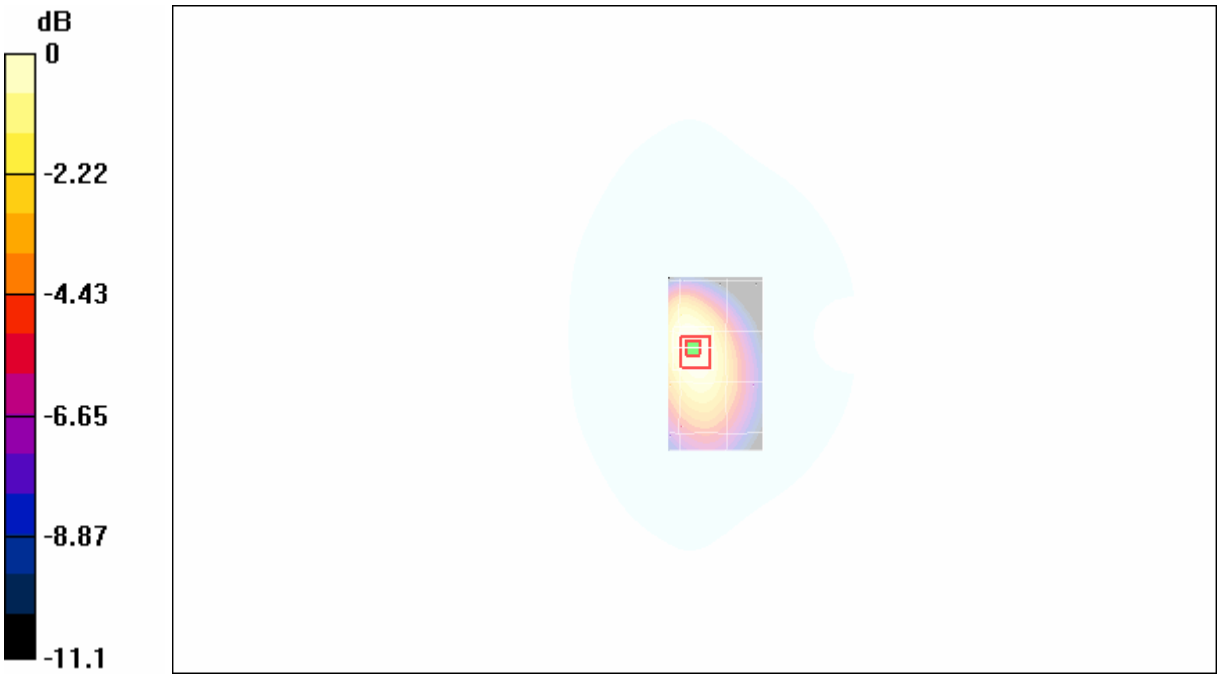
Toward Ground, High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

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



0 dB = 0.510mW/g

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

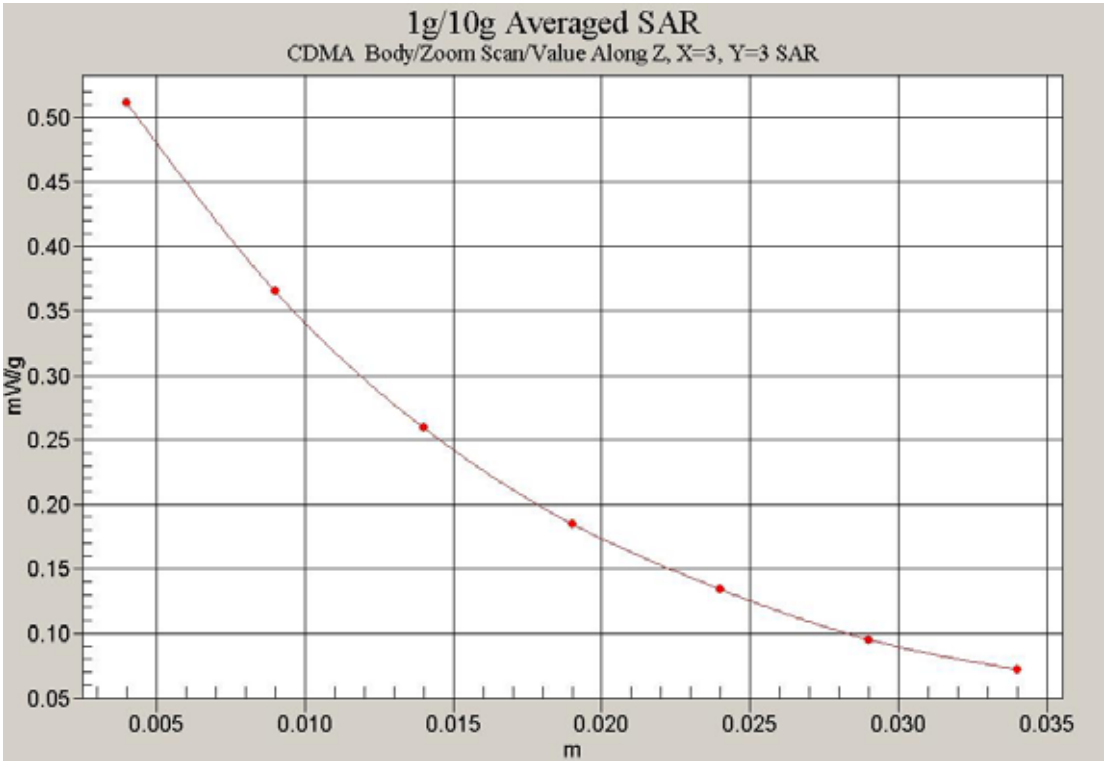


Fig. 36 Z-Scan at power reference point (Flat Phantom 835MHz CH777 with the display of the handset towards the ground)

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

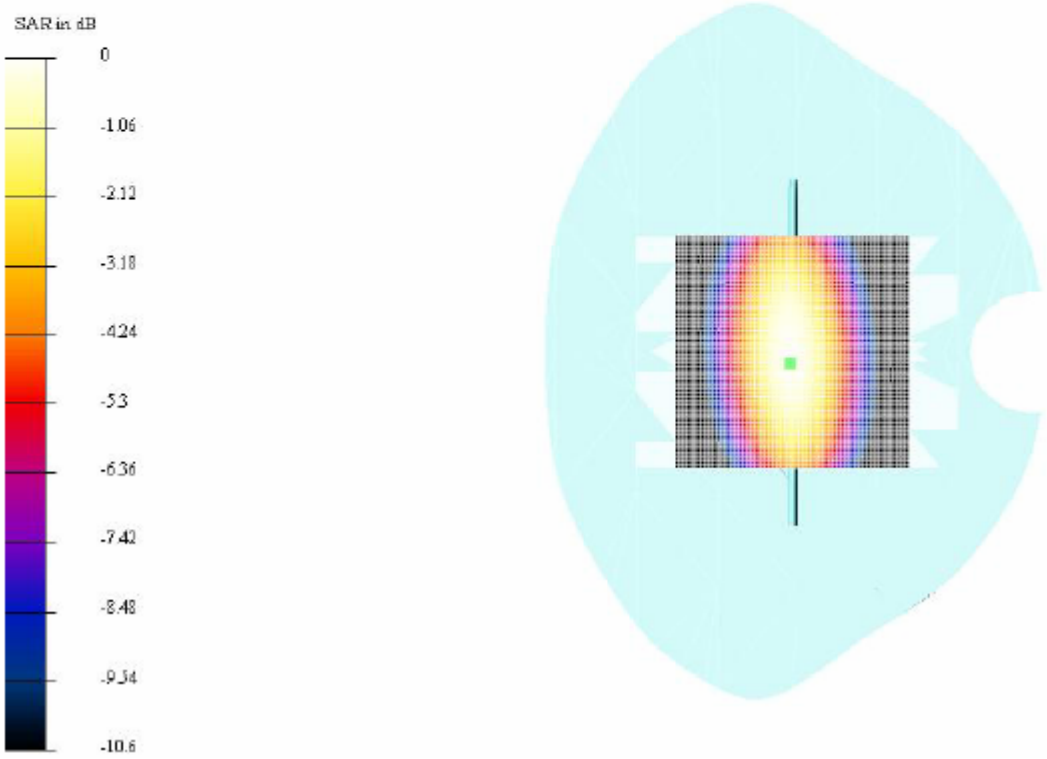


Fig.37 System Performance Check 835MHz 250Mw

ANNEX E: CALIBRATION Certificate of E-field Probe 1736

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

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-Auden**

Certificate No: ET3-1736_Nov04

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1736
Calibration procedure(s)	QA CAL-01.v5 Calibration procedure for dosimetric E-field probes
Calibration date:	November 25, 2004
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 in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-04 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe ES3DV2	SN:3013	8-Jan-04 (SPEAG, No. ES3-3013_Jan04)	Jan-05
DAE4	SN: 617	29-Sep-04 (SPEAG, No. DAE4-617_Sep04)	Sep-05

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-03)	In house check: Nov 04

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

Issued: November 25, 2004

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

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

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., $\vartheta = 0$ 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 $\vartheta = 0$ ($f \leq 900$ 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 $f \leq 800$ 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:	December 9, 2002
Repaired:	November 15, 2004
Recalibrated:	November 25, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1736 **November 25, 2004**

DASY - Parameters of Probe: ET3DV6 SN:1736

Sensitivity in Free Space[A] Diode Compression[B]

NormX	**1.97** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**93** mV
NormY	**1.75** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**93** mV
NormZ	**1.97** ± 10.1%	$\mu V/(V/m)^2$	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

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

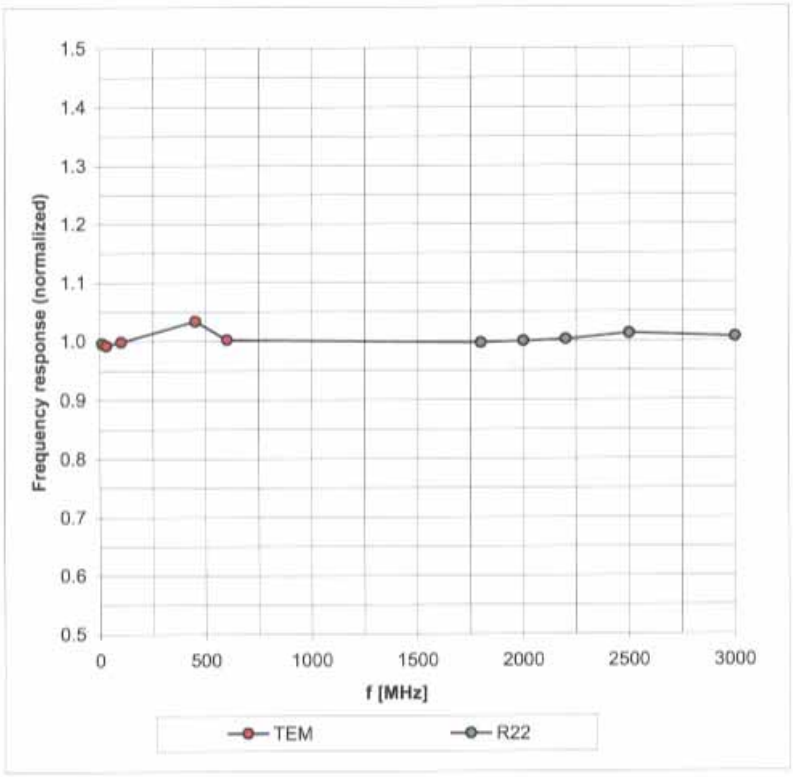
[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

ET3DV6 SN:1736 November 25, 2004

Frequency Response of E-Field

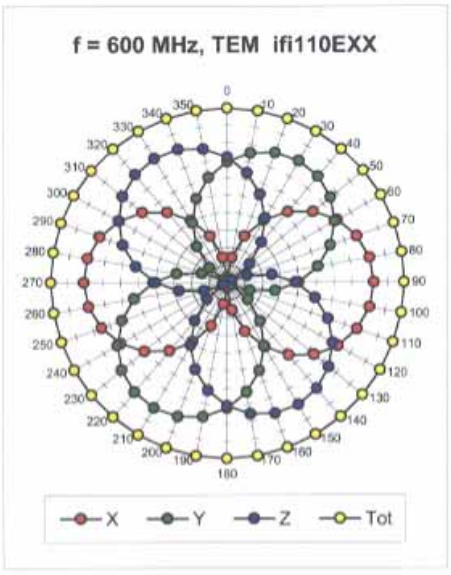
(TEM-Cell:ifi110 EXX, Waveguide: R22)

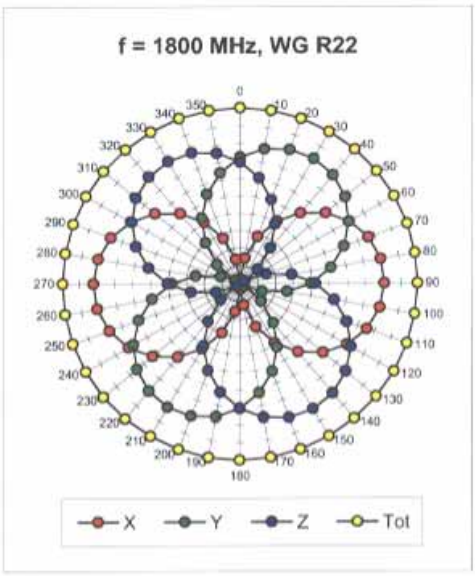


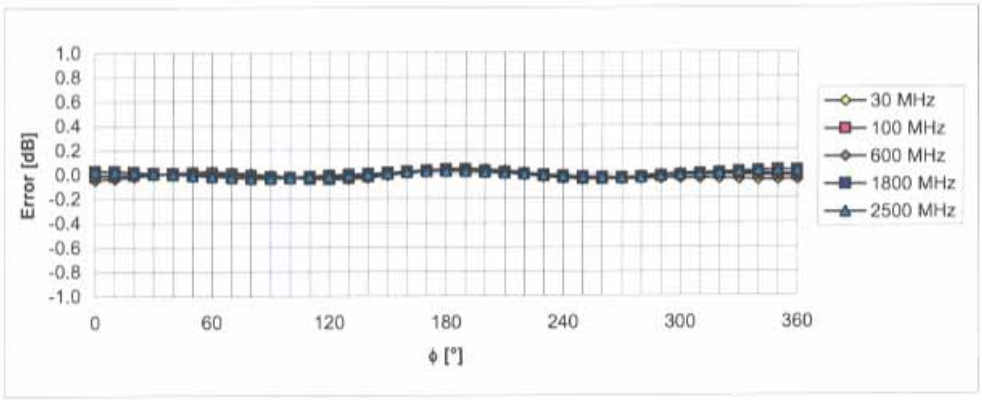
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

ET3DV6 SN:1736 November 25, 2004

Receiving Pattern (ϕ), ϑ = 0°





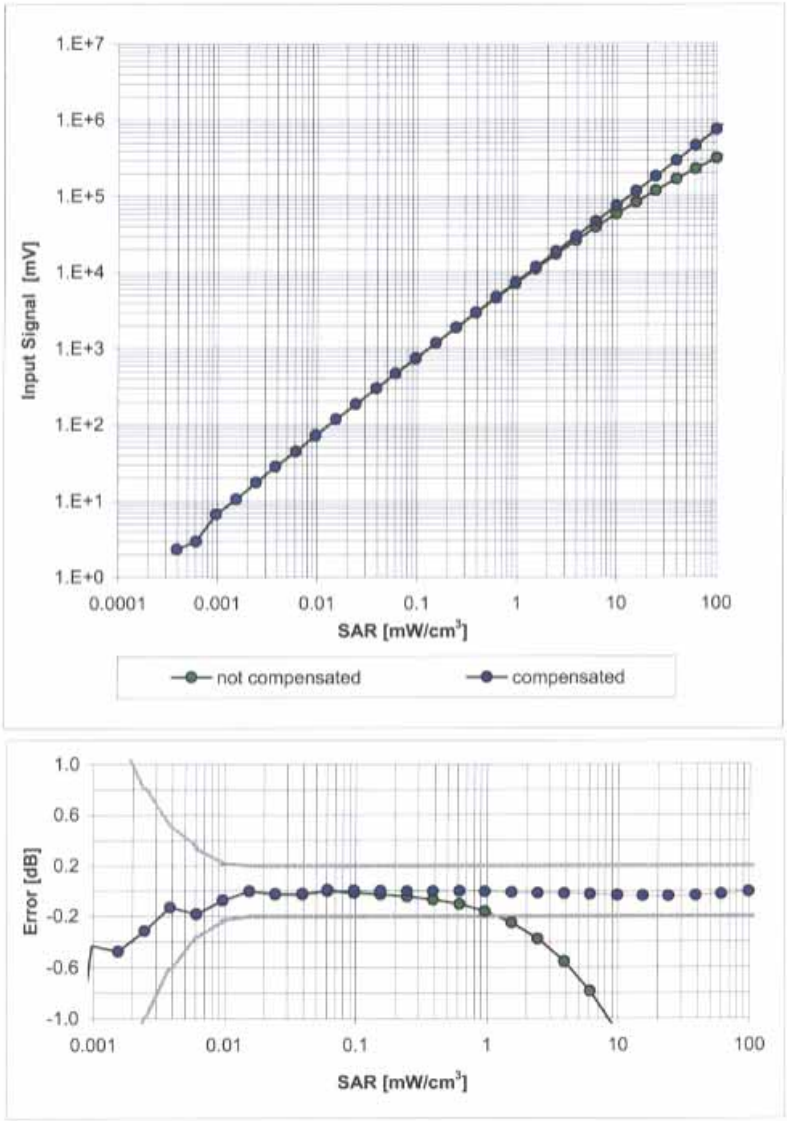


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ET3DV6 SN:1736 November 25, 2004

Dynamic Range f(SAR_{head})

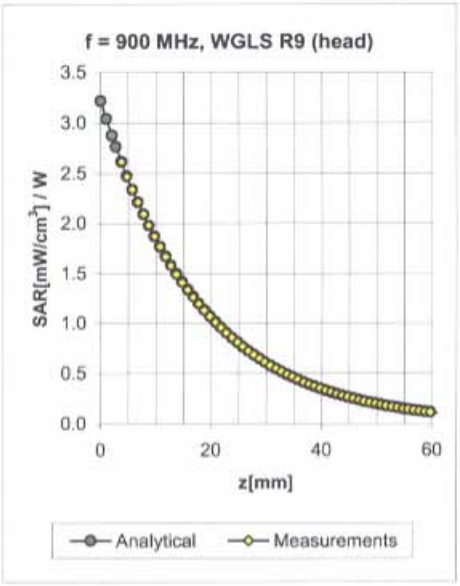
(Waveguide R22, f = 1800 MHz)

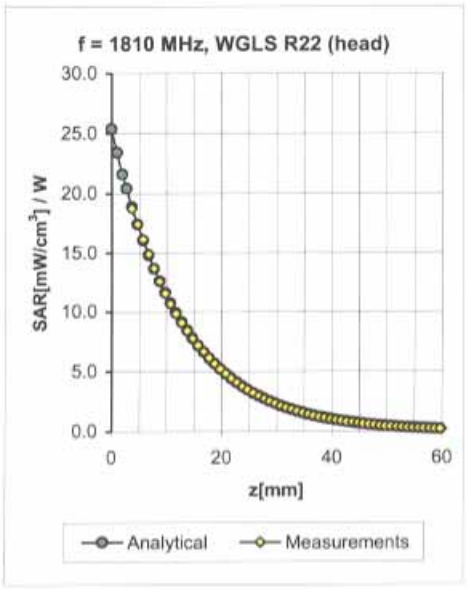


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

ET3DV6 SN:1736 **November 25, 2004**

Conversion Factor Assessment





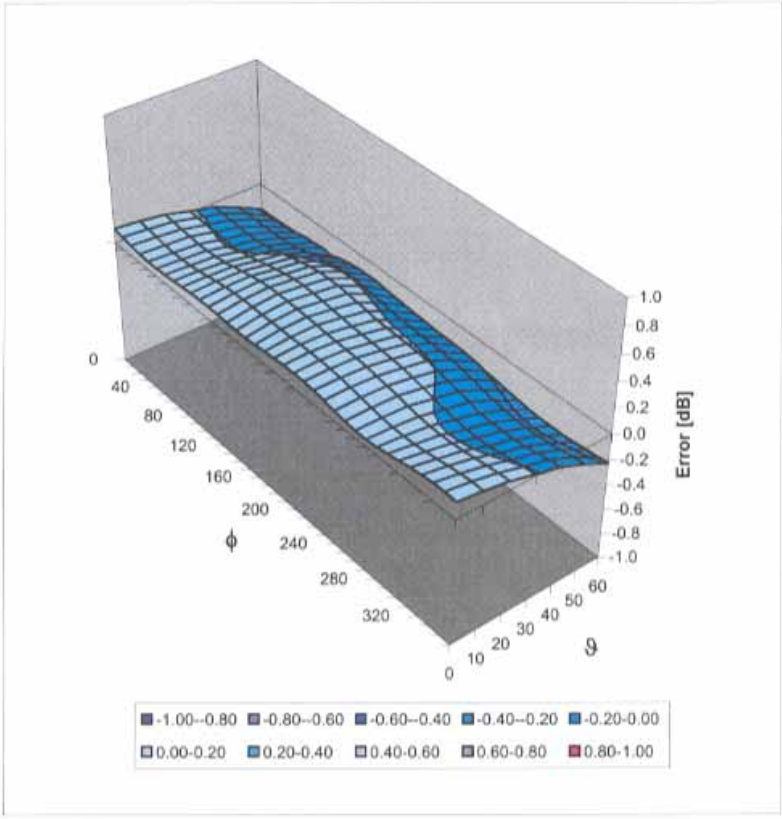
f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.65	1.84	6.53 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.57	2.41	5.37 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.66	2.26	4.58 ± 11.8% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.65	2.11	4.35 ± 11.8% (k=2)

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

ET3DV6 SN:1736 November 25, 2004

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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