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DAR

No. DAT-P-114/01-10

TEST REPORT

No. SAR2005025

Test name	Electromagnetic Field (Specific Absorption Rate)
Product	CDMA 800MHz Frequency Mobile Station
Model	CT300
Client	TCL Mobile Communication Co., Ltd
Type of test	Non Type Approval

Telecommunication Metrology Center

of Ministry of Information Industry

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TABLE OF CONTENT

Product Name	CDMA 800MHz Frequency Mobile Station	Sample Model	CT300
Client	TCL Mobile Communication Co., Ltd.	Type of test	Non Type Approval
Factory	TCL Mobile Communication Co., Ltd.	Sampling arrival date	September 14th, 2005
Manufacturer	TCL Mobile Communication Co., Ltd.		
Sampling/ Sending sample	Sending sample	Sample sent by	Wang Jianhong
Sampling location	/	Sampling person	/
Sample quantity	1	Sample matrix	/
Series number of the Sample	/		
Test basis	**EN 50360–2001:** Product standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones. **EN 50361–2001:** Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones. **IEC 62209-1-2005:** Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 1:Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz) **ANSI C95.1–1999:** IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz **OET Bulletin 65 (Edition 97-01) and Supplement C (Edition 01-01):** Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits. **IEEE 1528–2003:** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.		
Test conclusion	Localized Specific Absorption Rate (SAR) of this portable wireless equipment has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this test report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report. General Judgment: **Pass** (Stamp) **Date of issue: September 29th, 2005**		
Note	TX Freq. Band: 824-849 MHz (CDMA) Max. Power: 0.25 Watt (CDMA) Antenna Character: / The test results relate only to the items tested of the sample(s).		

Approved by________ **Reviewed by**________ **Tested by**________

(Lu Bingsong- **Deputy Director of the laboratory**) (Wang Hongbo) (Sun Qian)

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3 DESCRIPTION OF EUT

3.1 Addressing Information Related to EUT

Table 1: Applicant (The Client)

Name or Company	TCL Mobile Communication Co., Ltd.
Address/Post	No.23 Zone, Zhongkai High Technology Development Zone, Huizhou, Guangdong
City	Hui Zhou
Postal Code	516006
Country	China
Telephone	0752-2616189
Fax	0752-2636525

Table 2: Manufacturer

Name or Company	TCL Mobile Communication Co., Ltd.
Address/Post	No.23 Zone, Zhongkai High Technology Development Zone, Huizhou, Guangdong
City	Hui Zhou
Postal Code	516006
Country	China
Telephone	0752-2616189
Fax	0752-2636525

3.2 Constituents of EUT

Table 3: Constituents of Samples

Description	Model	Serial Number	Manufacturer
Handset	CT300	/	TCL Mobile Communication Co., Ltd.
Lithium Battery	TB-04B	TB-04B0000115	BYD Inc.
AC/DC Adapter	WYS-036	OT1520002943	Huizhou Weiyeshun Electronics Co., Ltd

External Photo

Mobile Phone

Mobile Phone

Mobile Phone

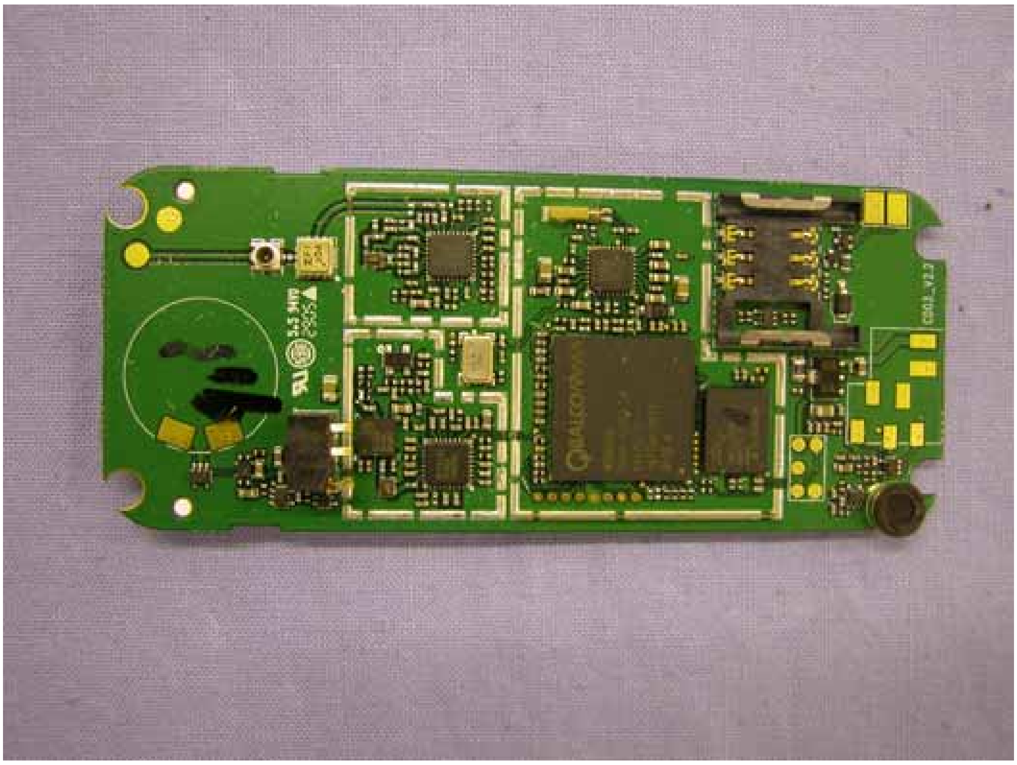
Mobile phone

Charger (AC/DC Adapter)

Charger (AC/DC Adapter)

Internal Photo

Mobile phone Disassembly



mobile phone PCB front view

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 integrated antenna. It consists of Handset and normal options: Lithium Battery and AC/DC Adapter as Table 3 and Fig.1.

EUT's CDMA MS Protocol Revision number is CDMA2000 1x Release 0 and it applies to TIA/EIA-98-D <Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations>.

The sample undergoing test was selected by the Client.
Components list please refer to documents of the manufacturer.

4 OPERATIONAL CONDITIONS DURING TEST

4.1 Schematic Test Configuration

During SAR test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a System Simulator (SS) by air link, and a call is established. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 1013, 384 and 777 respectively in the case of CDMA 835 MHz. The EUT is commanded to operate at maximum transmitting power.

The EUT shall use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the manufacturer. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. 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	TIA/EIA-98-D
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 TIA/EIA-98-D:

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.

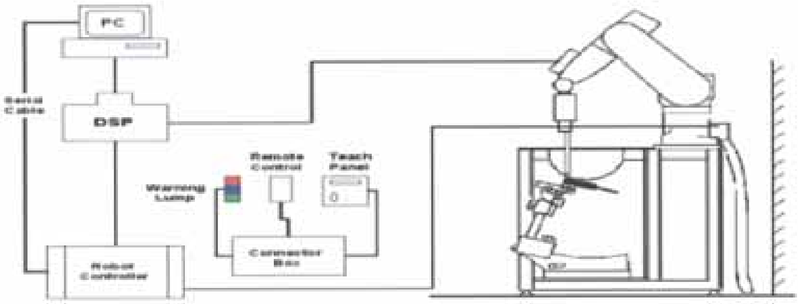


Figure2. SAR Lab Test Measurement Set-up

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

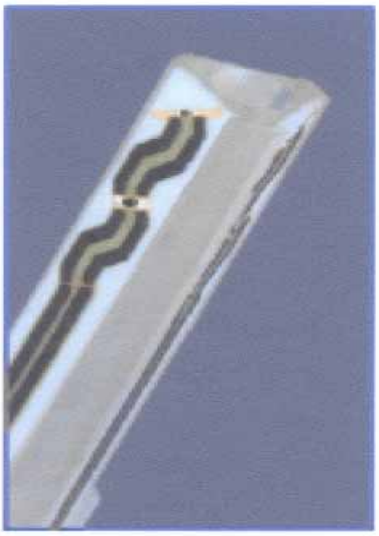


Figure3. ET3DV6 E-field Probe

Figure4. 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).
Note：please see Annex E to check the probe calibration certificate.

Figure5. Device Holder

4.5 Other Test Equipment

4.5.1 Device Holder for Transmitters

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

Figure6. Generic Twin 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 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

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 mm of the user in the uncontrolled environment.

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

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

5.2 Applicable Measurement Standards

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

IEC 62209-1-2005: Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)

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

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

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

5.3 Characteristic of the Test

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

6 LABORATORY ENVIRONMENT

Table 6: The Ambient Conditions during EMF Test

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

7 TEST RESULTS

7.1 Dielectric Performance

Table 7: Dielectric Performance of Head Tissue Simulating Liquid

Measurement is made at temperature 22.5 °C and relative humidity 49%.
Liquid temperature during the test: 21.4°C

/	Frequency	Permittivity ε	Conductivity σ (S/m)
Target value	835 MHz	41.5	0.90
Measurement value (Average of 10 tests)	835 MHz	41.7	0.88

Table 8: Dielectric Performance of Body Tissue Simulating Liquid

Measurement is made at temperature 22.6 °C and relative humidity 51%.
Liquid temperature during the test: 22.0°C

/	Frequency	Permittivity ε	Conductivity σ (S/m)
Target value	835 MHz	55.2	0.97
Measurement value (Average of 10 tests)	835 MHz	54.3	0.97

7.2 System Validation

Table 9: System Validation

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

Liquid parameters		Frequency		Permittivity ε	Conductivity σ (S/m)
		835 MHz		41.7	0.88
Verification results	**Frequency**	**Target value (W/kg)**		**Measurement value (W/kg)**	
		10 g Average	**1 g Average**	**10 g Average**	**1 g Average**
	835 MHz	1.55	2.375	1.62	2.48

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

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

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

Temperature: 22 °C, humidity: 50%.
Liquid temperature during the test: 22.2°C

Limit of SAR (W/kg)	10 g Average	1 g Average	Conducted Power before/after each test (dBm)
	2.0	1.6	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Left hand, Touch cheek, Top frequency (See ANNEX C GRAPH RESULTS Fig.1)	0.169	0.280	**25.56/25.54**
Left hand, Touch cheek, Mid frequency (See ANNEX C GRAPH RESULTS Fig.3)	0.129	0.194	**25.24/25.26**
Left hand, Touch cheek, Bottom frequency (See ANNEX C GRAPH RESULTS Fig.5)	0.105	0.167	**25.71/25.70**
Left hand, Tilt 15 Degree, Top frequency (See ANNEX C GRAPH RESULTS Fig.7)	0.096	0.164	**25.55/25.54**
Left hand, Tilt 15 Degree, Mid frequency (See ANNEX C GRAPH RESULTS Fig.9)	0.060	0.093	**25.25/25.26**
Left hand, Tilt 15 Degree, Bottom frequency (See ANNEX C GRAPH RESULTS Fig.11)	0.027	0.050	**25.72/25.73**
Right hand, Touch cheek, Top frequency (See ANNEX C GRAPH RESULTS Fig.13)	0.170	0.262	**25.54/25.56**
Right hand, Touch cheek, Mid frequency (See ANNEX C GRAPH RESULTS Fig.15)	0.124	0.216	**25.26/25.28**
Right hand, Touch cheek, Bottom frequency (See ANNEX C GRAPH RESULTS Fig.17)	0.132	0.204	**25.73/25.72**
Right hand, Tilt 15 Degree, Top frequency (See ANNEX C GRAPH RESULTS Fig.19)	0.091	0.140	**25.55/25.54**
Right hand, Tilt 15 Degree, Mid frequency (See ANNEX C GRAPH RESULTS Fig.21)	0.056	0.091	**25.26/25.25**
Right hand, Tilt 15 Degree, Bottom frequency (See ANNEX C GRAPH RESULTS Fig.23)	0.075	0.116	**25.70/25.72**

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

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

Temperature: 22 °C, humidity: 50%. Liquid temperature during the test: 22.2°C			
Limit of SAR (W/kg)	**10 g Average**	**1 g Average**	**Conducted Power before/after each test (dBm)**
	2.0	**1.6**	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Display of EUT towards the ground, Top frequency (See ANNEX C GRAPH RESULTS Fig.25)	0.152	0.218	**25.55/25.54**
Display of EUT towards the ground, Mid frequency (See ANNEX C GRAPH RESULTS Fig.27)	0.174	0.246	**25.26/25.25**
Display of EUT towards the ground, Bottom frequency (See ANNEX C GRAPH RESULTS Fig.29)	0.152	0.274	**25.72/25.73**
Display of EUT towards the phantom, Top frequency (See ANNEX C GRAPH RESULTS Fig.31)	0.097	0.188	**25.55/25.54**
Display of EUT towards the phantom, Mid frequency (See ANNEX C GRAPH RESULTS Fig.33)	0.084	0.122	**25.25/25.27**
Display of EUT towards the phantom, Bottom frequency (See ANNEX C GRAPH RESULTS Fig.35)	0.096	0.146	**25.72/25.73**

7.5 Conclusion

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

8 MEASUREMENT UNCERTAINTY

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	$\sqrt{3}$	$(1-c_p)^{1/2}$	4.3	∞
4	Hemispherical Isotropy	B	9.4	R	$\sqrt{3}$	$\sqrt{c_p}$		∞
5	Boundary Effect	B	0.4	R	$\sqrt{3}$	1	0.23	∞
6	Linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
7	System Detection Limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
8	Readout Electronics	B	1.0	N	1	1	1.0	∞
9	RF Ambient Conditions	B	3.0	R	$\sqrt{3}$	1	1.73	∞
10	Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
11	Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
12	Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
	Test sample Related							
13	Test Sample Positioning	A	4.9	N	1	1	4.9	*N*-1
14	Device Holder Uncertainty	A	6.1	N	1	1	6.1	*N*-1

15	Output Power Variation - SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.9	∞
	Phantom and Tissue Parameters							
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 12: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	HP 8753E	US38433212	August 29,2005	One year
02	Dielectric Probe Kit	Agilent 85070C	US99360113	No Calibration Requested	
03	Power meter	NRVD	101253	June 3,2005	One year
04	Power sensor	NRV-Z5	100331	June 20,2005	
05	Power sensor	NRV-Z6	100011	December 12,2004	
06	Signal Generator	MG 3633A	M73386	No Calibration Requested	
07	Amplifier	AT 50S1G4A	26549	No Calibration Requested	
08	BTS	CMU 200	105948	August 15,2005	One year
09	E-field Probe	SPEAG ET3DV6	1736	July 14, 2005	One year
10	DAE	SPEAG DAE3	536	July 11, 2005	One year

10 TEST PERIOD

The test is performed from September 26th, 2005 to September 28th, 2005

11 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.

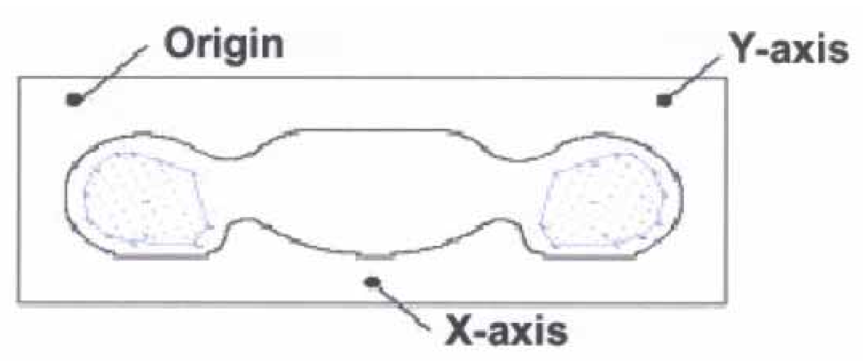


Figure 1 SAR Measurement Points in Area Scan

ANNEX B TEST LAYOUT

Picture 1 Specific Absorption Rate Test Layout

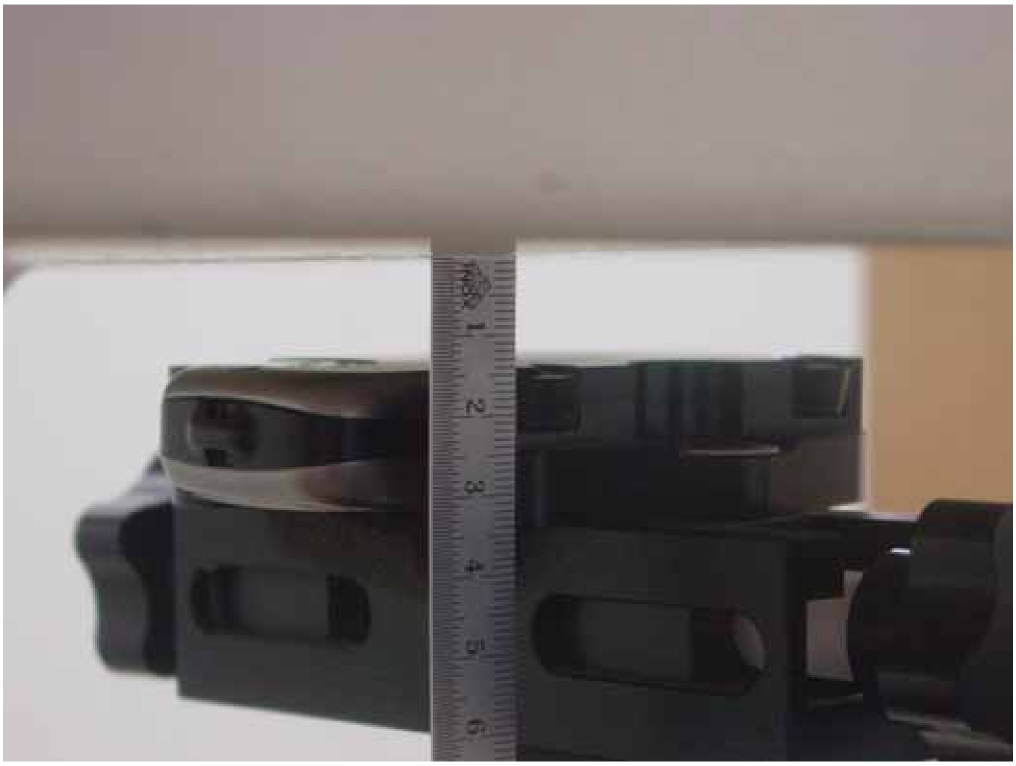
Picture 2 Left Hand Touch Cheek Position

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 (towards ground, the distance from handset to the bottom of the Phantom is 1.5cm)



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

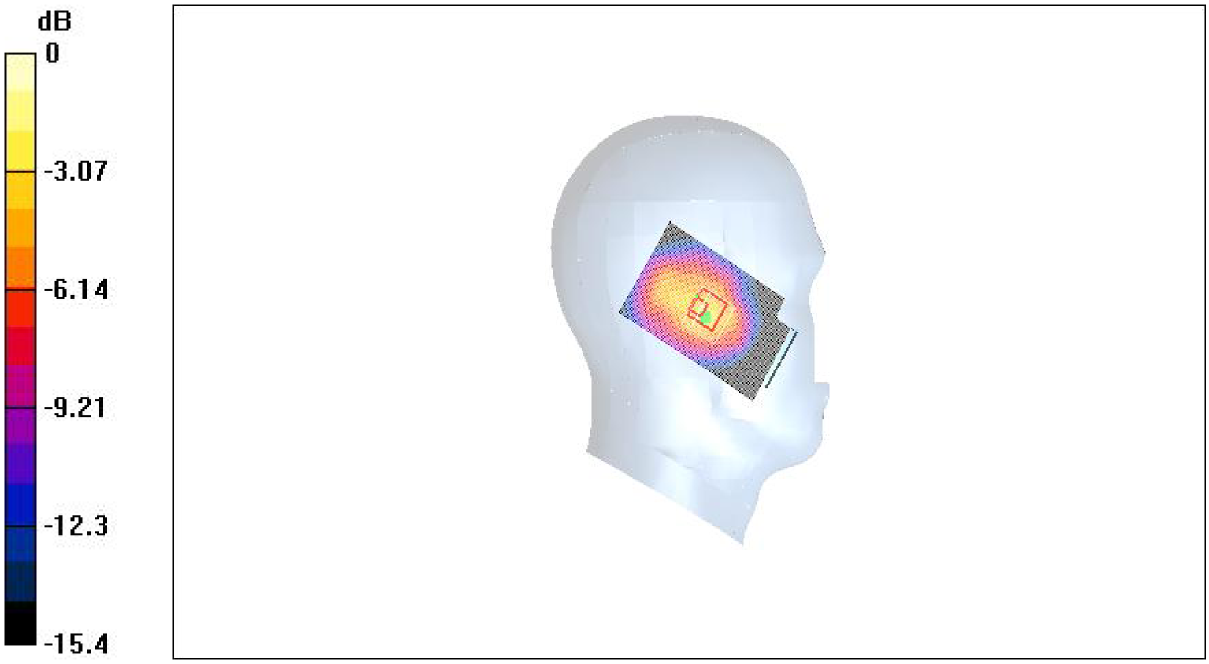
ANNEX C GRAPH RESULTS

835 Left Cheek High

Electronics: DAE3 Sn536
Communication System: CDMA 1X-new Frequency: 848.31 MHz Duty Cycle: 1:1
Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

Cheek High/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 15.3 V/m; Power Drift = -0.008 dB
Maximum value of SAR (interpolated) = 0.337 mW/g

Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.3 V/m; Power Drift = -0.008 dB
Maximum value of SAR (measured) = 0.591 mW/g
Peak SAR (extrapolated) = 0.591 W/kg
SAR(1 g) = 0.280 mW/g; SAR(10 g) = 0.169 mW/g



0 dB = 0.591mW/g

Fig. 1 Left Hand Touch Cheek 835MHz CH777

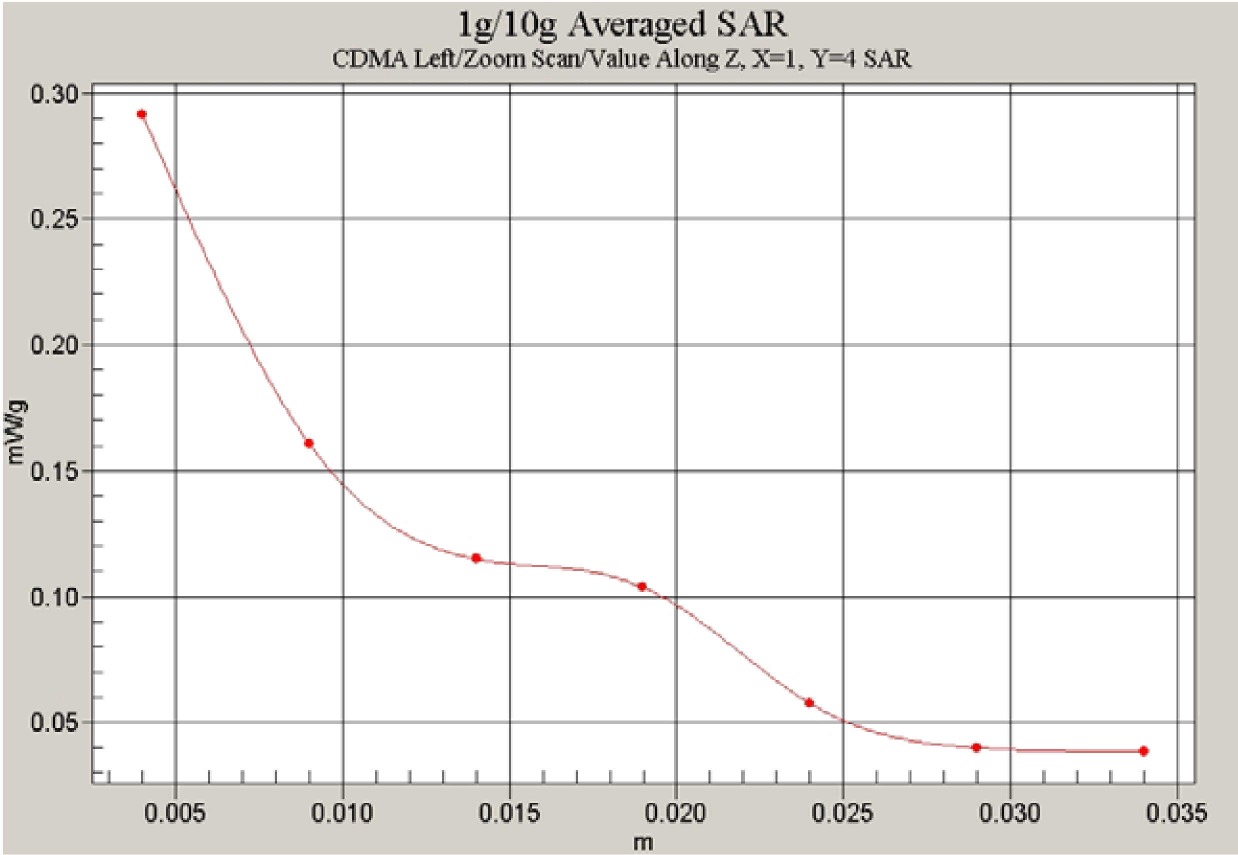
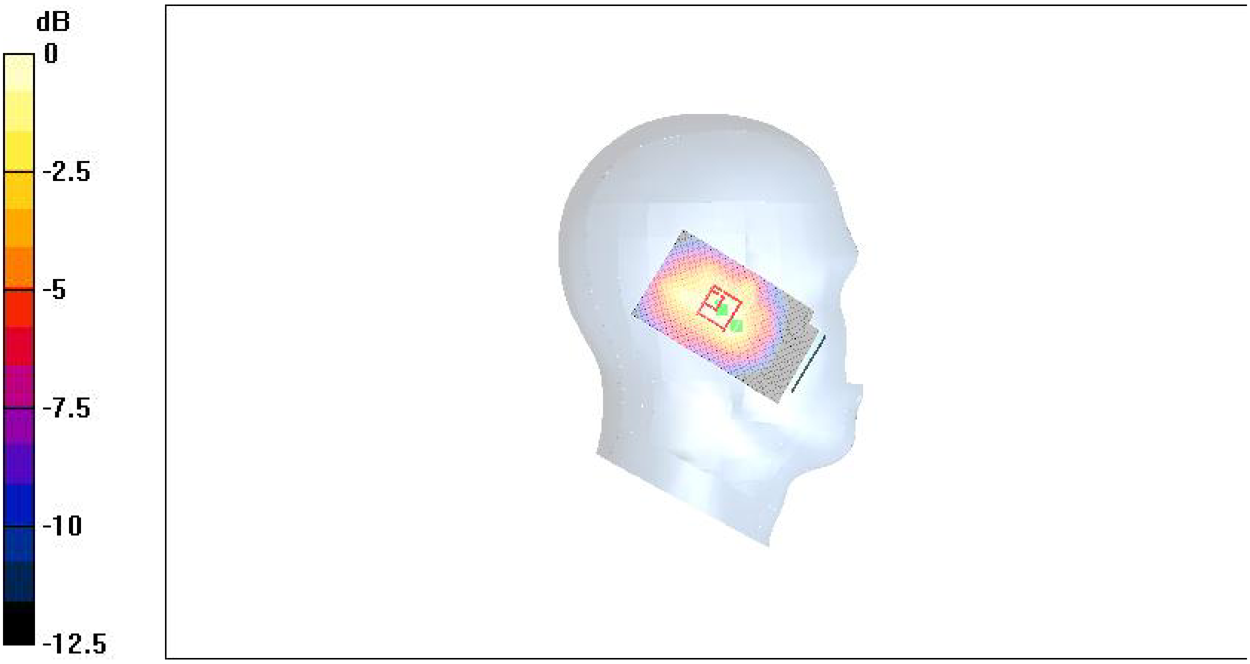


Fig. 2 Z-Scan at power reference point (Left Hand Touch Cheek 835MHz CH777)

835 Left Cheek Middle
Electronics: DAE3 Sn536
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 (71x121x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 13 V/m; Power Drift = 0.2 dB
Maximum value of SAR (interpolated) = 0.224 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13 V/m; Power Drift = 0.2 dB
Maximum value of SAR (measured) = 0.224 mW/g
Peak SAR (extrapolated) = 0.360 W/kg
SAR(1 g) = 0.194 mW/g; SAR(10 g) = 0.129 mW/g



0 dB = 0.224mW/g

Fig. 3 Left Hand Touch Cheek 835MHz CH384

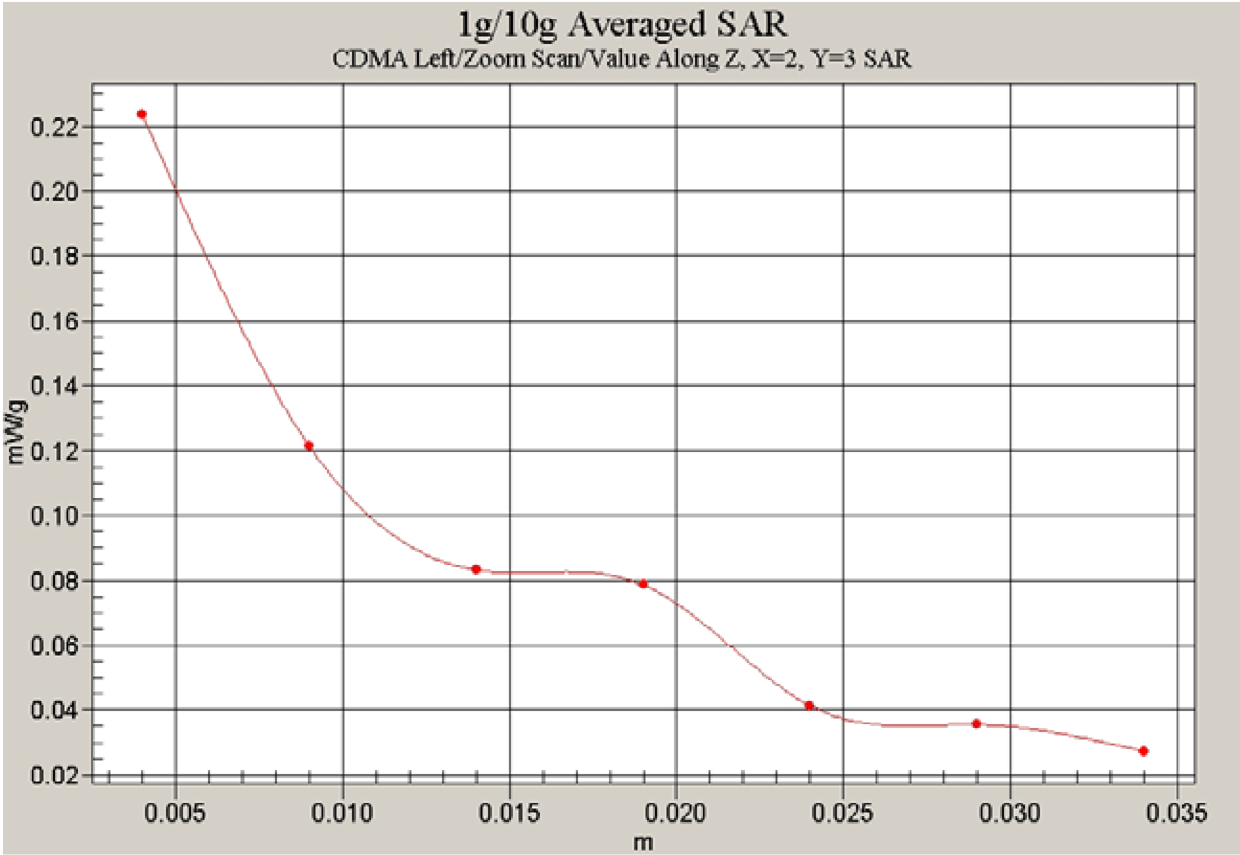
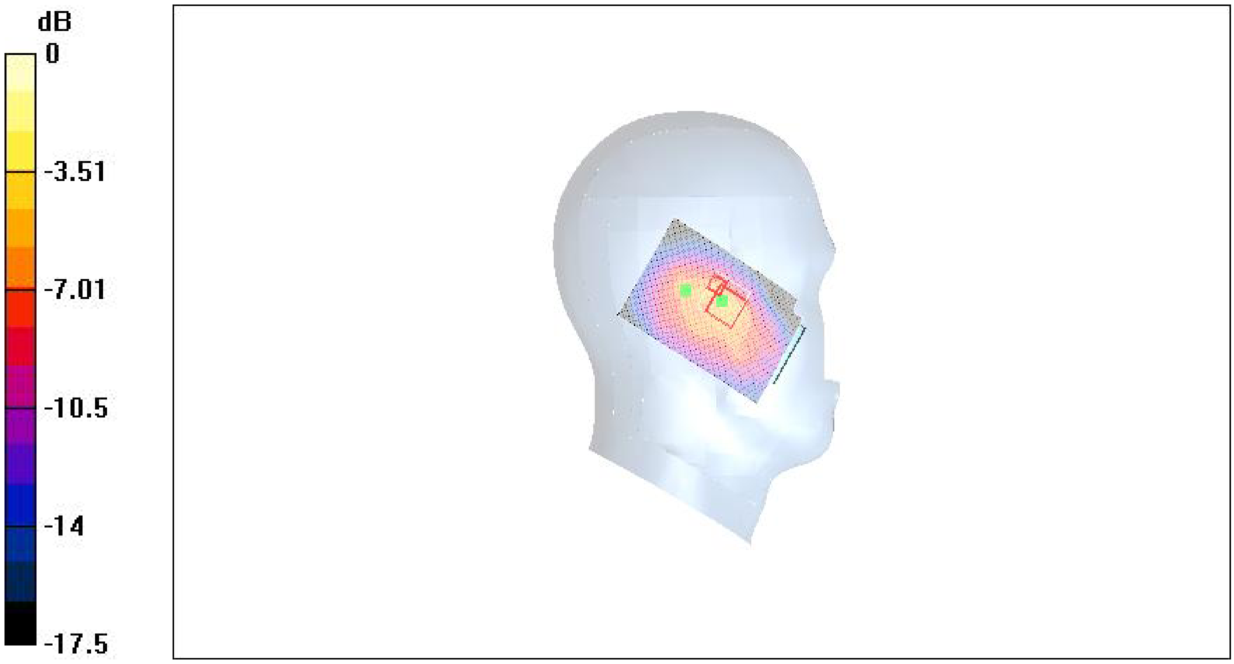


Fig. 4 Z-Scan at power reference point (Left Hand Touch Cheek 835MHz CH384)

835 Left Cheek Low
Electronics: DAE3 Sn536
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 (81x121x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 11.4 V/m; Power Drift = 0.2 dB
Maximum value of SAR (interpolated) = 0.204 mW/g

Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.4 V/m; Power Drift = 0.2 dB
Maximum value of SAR (measured) = 0.501 mW/g
Peak SAR (extrapolated) = 0.641 W/kg
SAR(1 g) = 0.167 mW/g; SAR(10 g) = 0.105 mW/g



0 dB = 0.501mW/g

Fig. 5 Left Hand Touch Cheek 835MHz CH1013

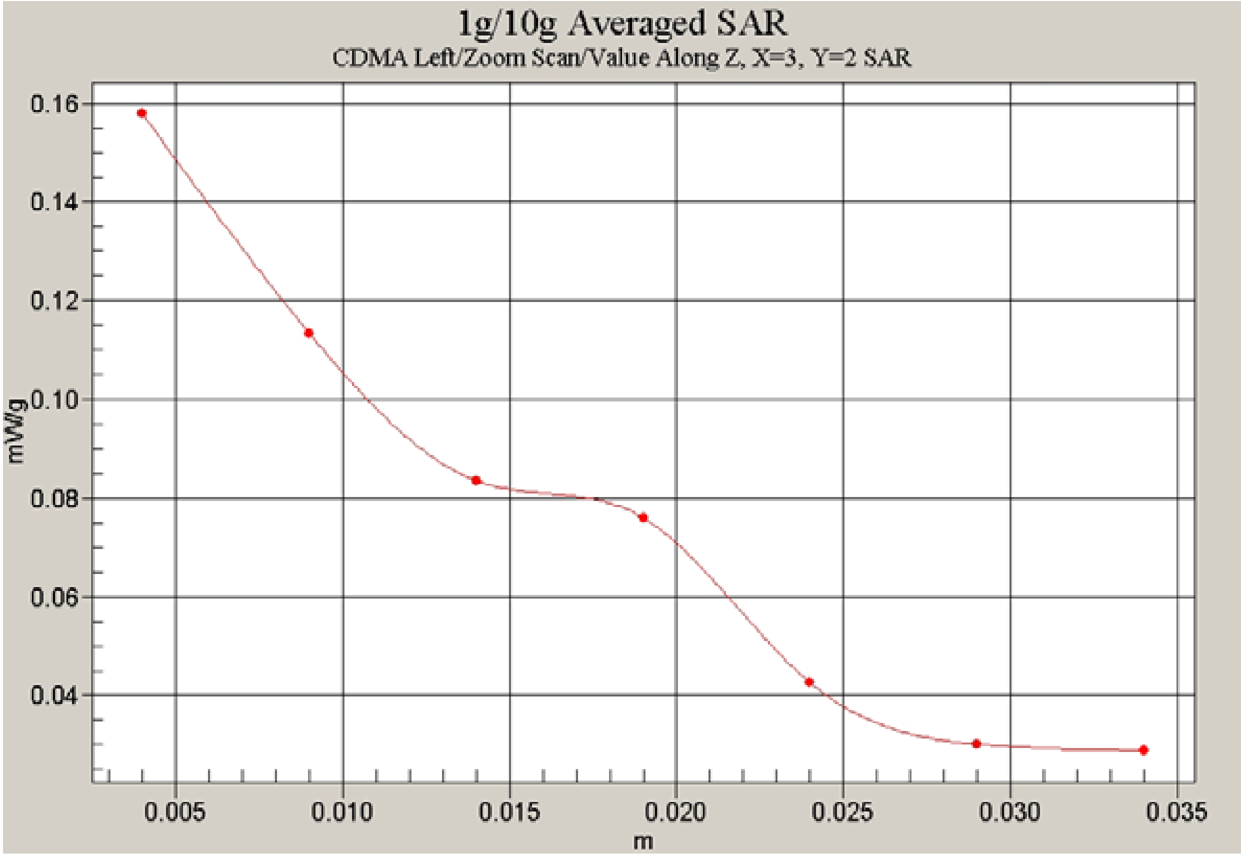
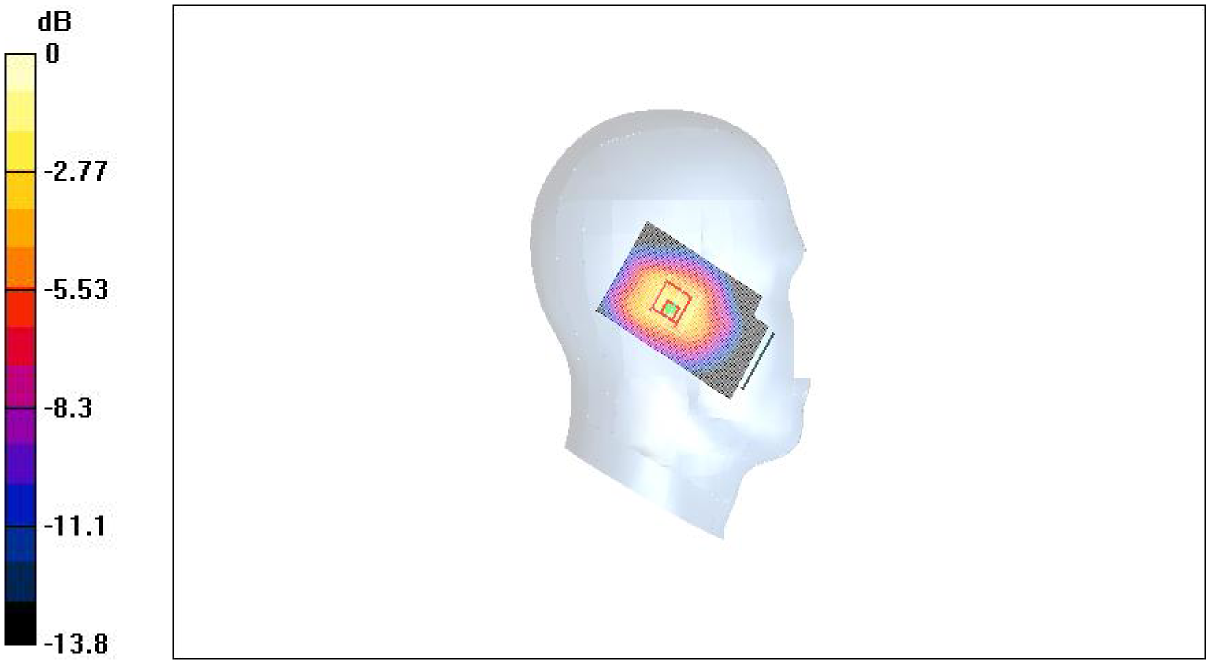


Fig. 6 Z-Scan at power reference point (Left Hand Touch Cheek 835MHz CH1013)

835 Left Tilt High
Electronics: DAE3 Sn536
Communication System: CDMA 1X-new Frequency: 848.31 MHz Duty Cycle: 1:1
Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

Tilt High/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 13.2 V/m; Power Drift = -0.2 dB
Maximum value of SAR (interpolated) = 0.161 mW/g

Tilt High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.2 V/m; Power Drift = -0.2 dB
Maximum value of SAR (measured) = 0.244 mW/g
Peak SAR (extrapolated) = 0.305 W/kg
SAR(1 g) = 0.164 mW/g; SAR(10 g) = 0.096 mW/g



0 dB = 0.244mW/g

Fig. 7 Left Hand Tilt 15° 835MHz CH777

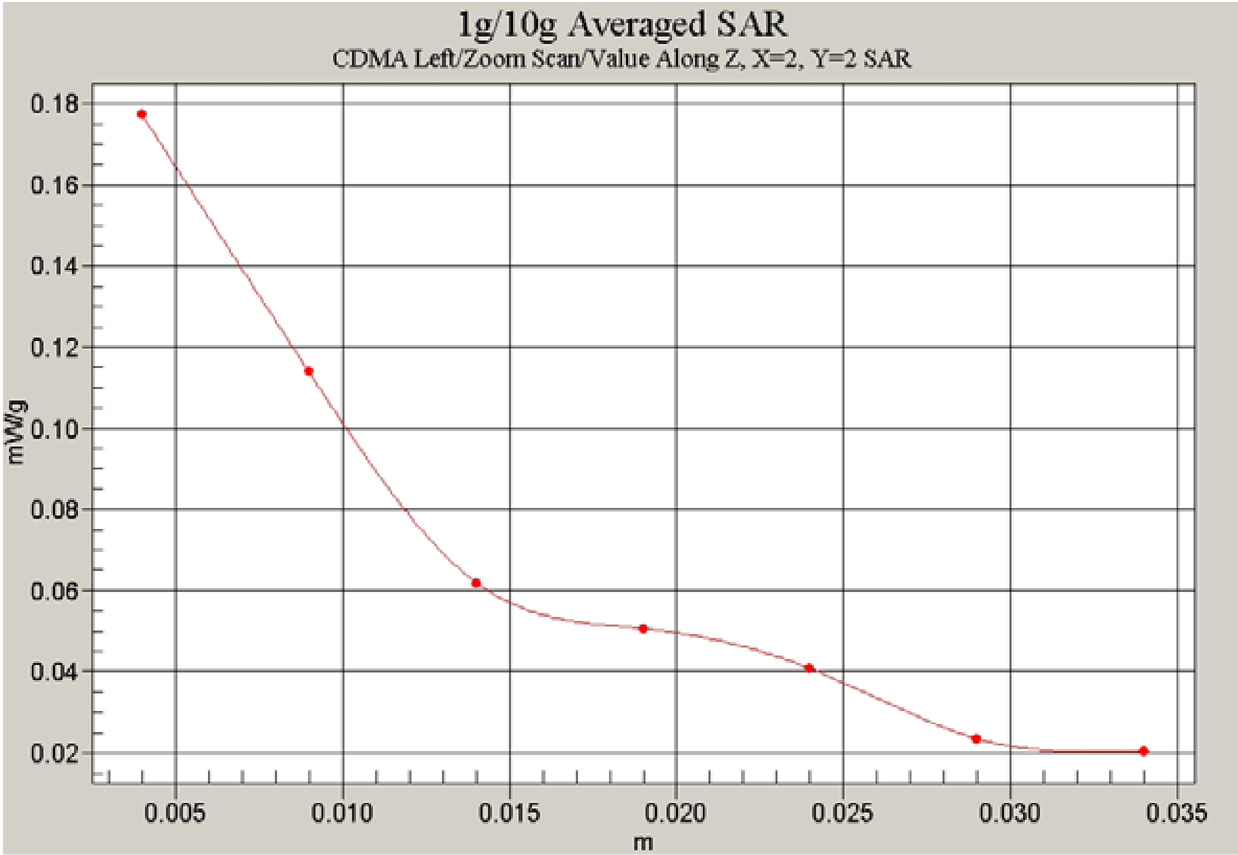


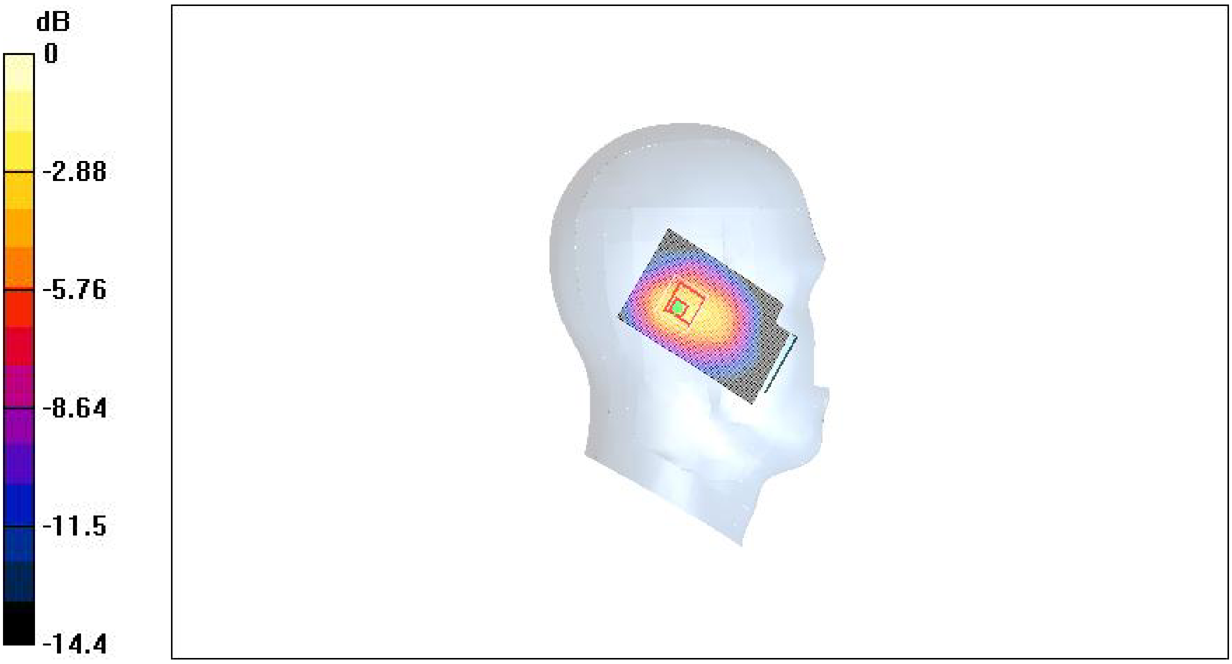
Fig. 8 Z-Scan at power reference point (Left Hand Tilt 15° 835MHz CH777)

835 Left Tilt Middle

Electronics: DAE3 Sn536
Communication System: CDMA 1X-new Frequency: 836.52 MHz Duty Cycle: 1:1
Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

Tilt Middle/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 10.6 V/m; Power Drift = -0.2 dB
Maximum value of SAR (interpolated) = 0.107 mW/g

Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.6 V/m; Power Drift = -0.2 dB
Maximum value of SAR (measured) = 0.175 mW/g
Peak SAR (extrapolated) = 0.175 W/kg
SAR(1 g) = 0.093 mW/g; SAR(10 g) = 0.060 mW/g



0 dB = 0.175mW/g

Fig. 9 Left Hand Tilt 15° 835MHz CH384

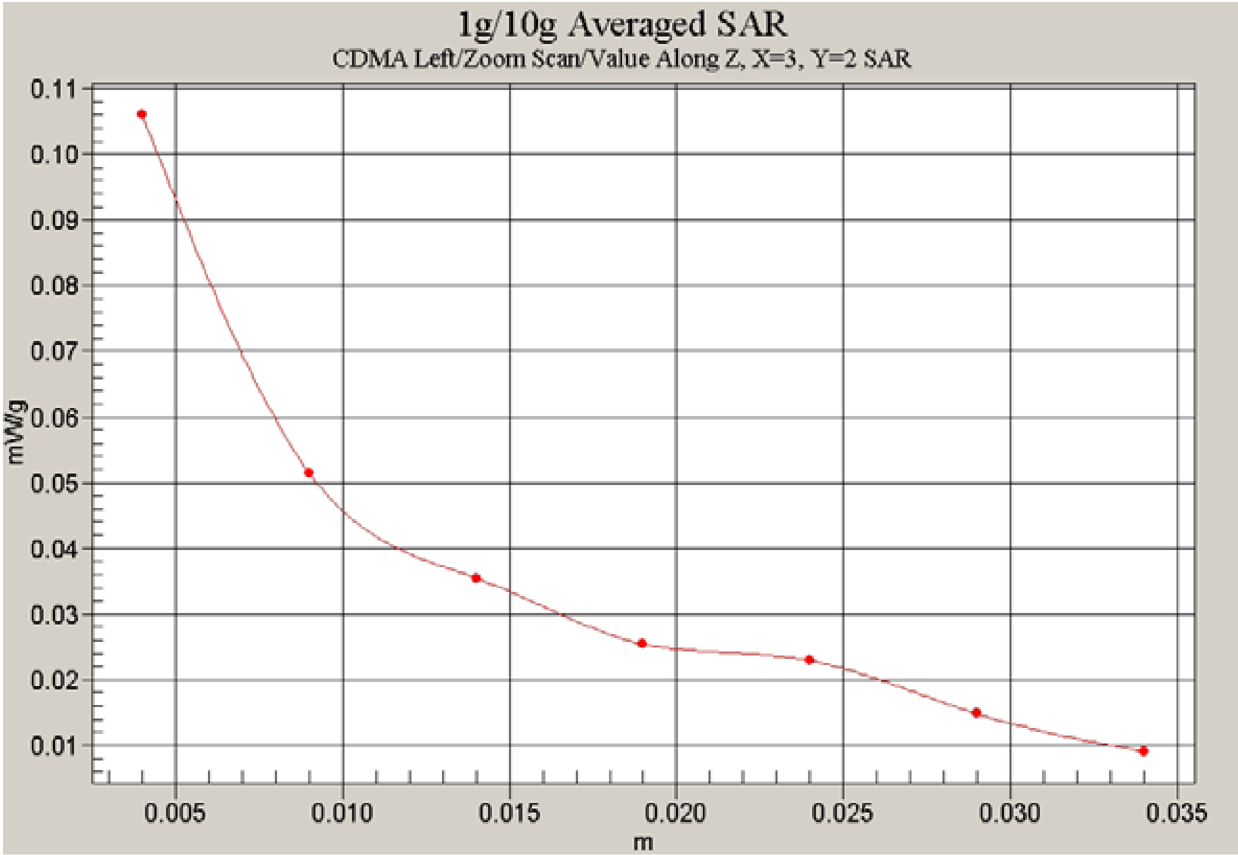


Fig. 10 Z-Scan at power reference point (Left Hand Tilt 15° 835MHz CH384)

835 Left Tilt Low

Electronics: DAE3 Sn536

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 (81x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 8.85 V/m; Power Drift = -0.1 dB

Maximum value of SAR (interpolated) = 0.159 mW/g

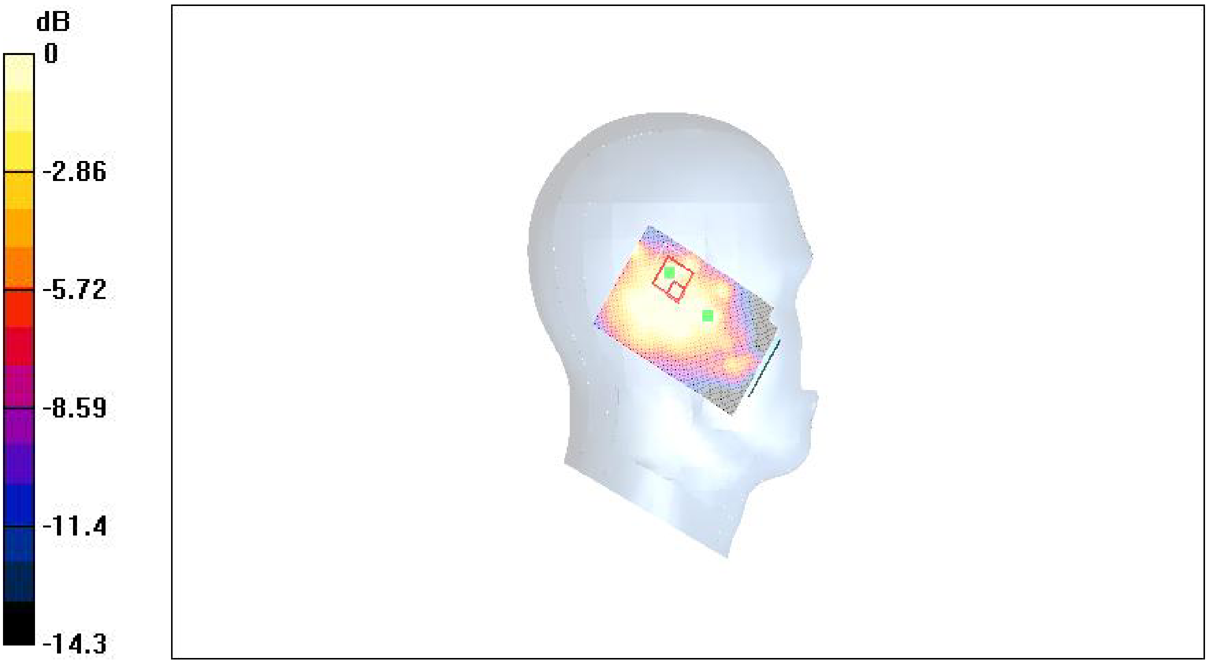
Tilt Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.85 V/m; Power Drift = -0.1 dB

Maximum value of SAR (measured) = 0.060 mW/g

Peak SAR (extrapolated) = 0.092 W/kg

SAR(1 g) = 0.050 mW/g; SAR(10 g) = 0.027 mW/g



0 dB = 0.060mW/g

Fig. 11 Left Hand Tilt 15° 835MHz CH1013

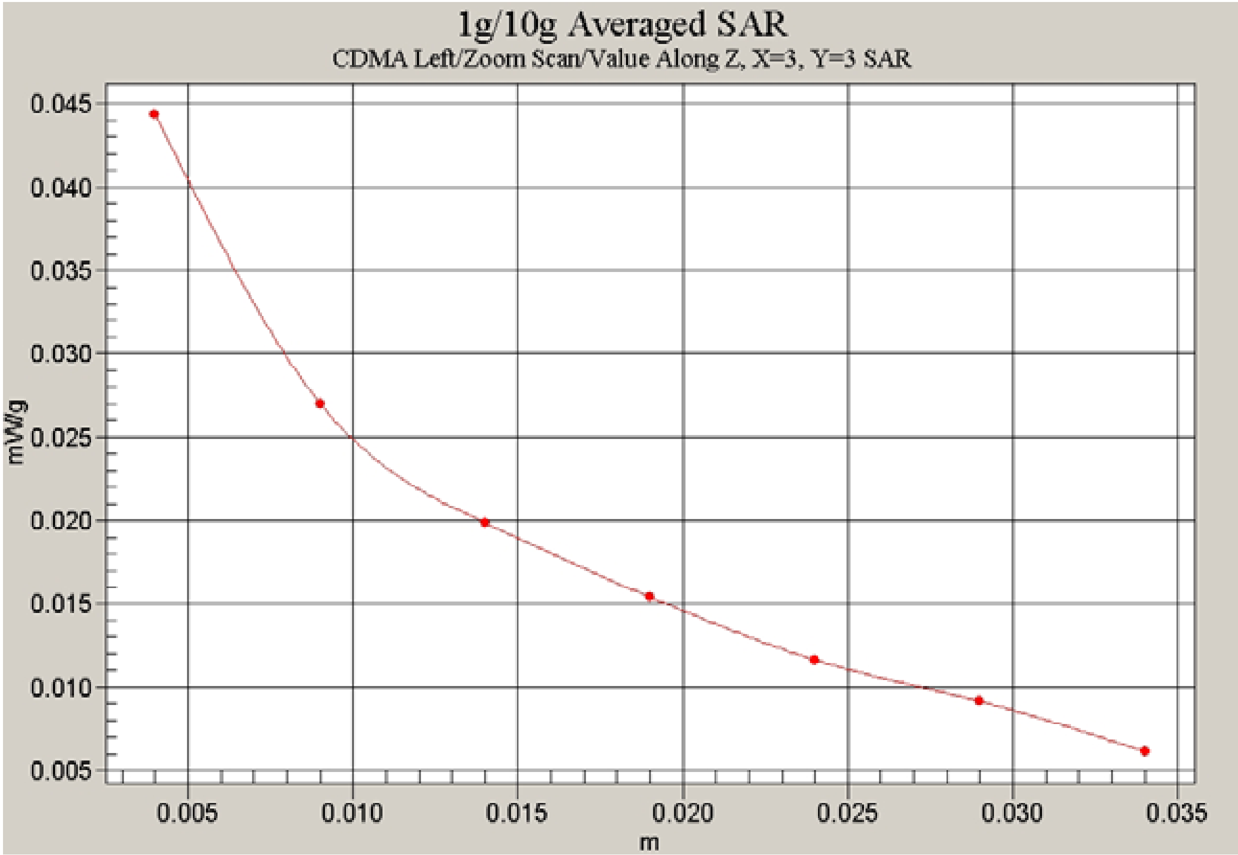


Fig. 12 Z-Scan at power reference point (Left Hand Tilt 15° 835MHz CH1013)

835 Right Cheek High

Electronics: DAE3 Sn536

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

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

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

Reference Value = 14.5 V/m; Power Drift = 0.1 dB

Maximum value of SAR (interpolated) = 0.301 mW/g

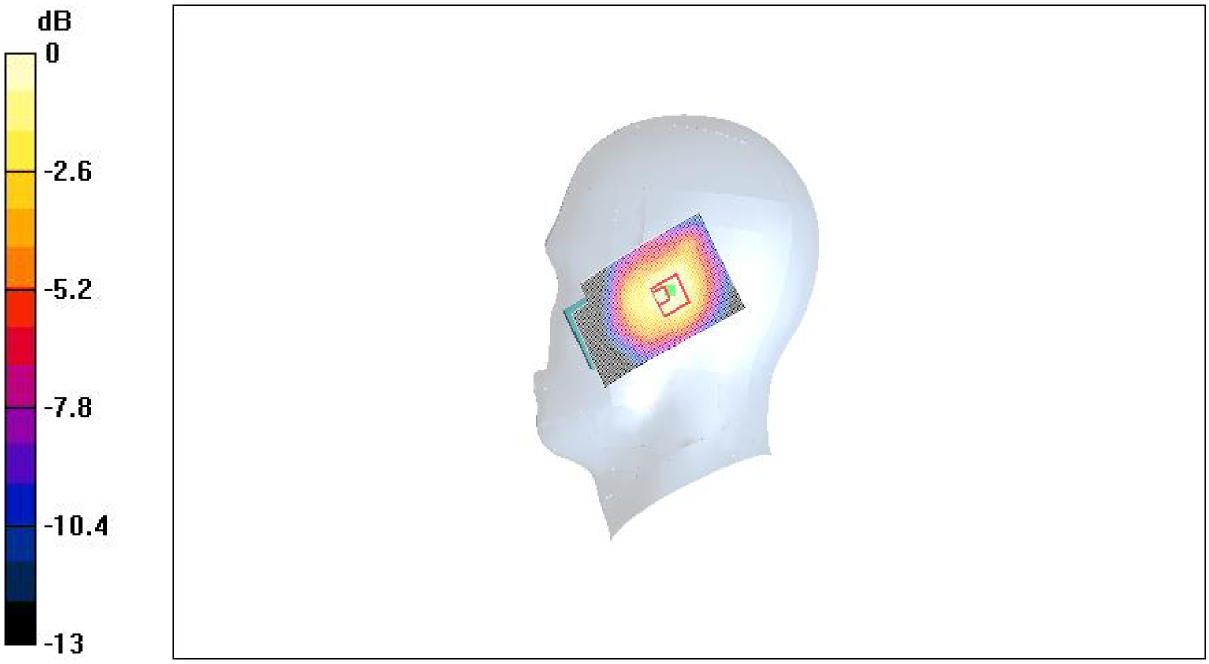
Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.5 V/m; Power Drift = 0.1 dB

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

Peak SAR (extrapolated) = 0.434 W/kg

SAR(1 g) = 0.262 mW/g; SAR(10 g) = 0.170 mW/g



0 dB = 0.311mW/g

Fig. 13 Right Hand Touch Cheek 835MHz CH777

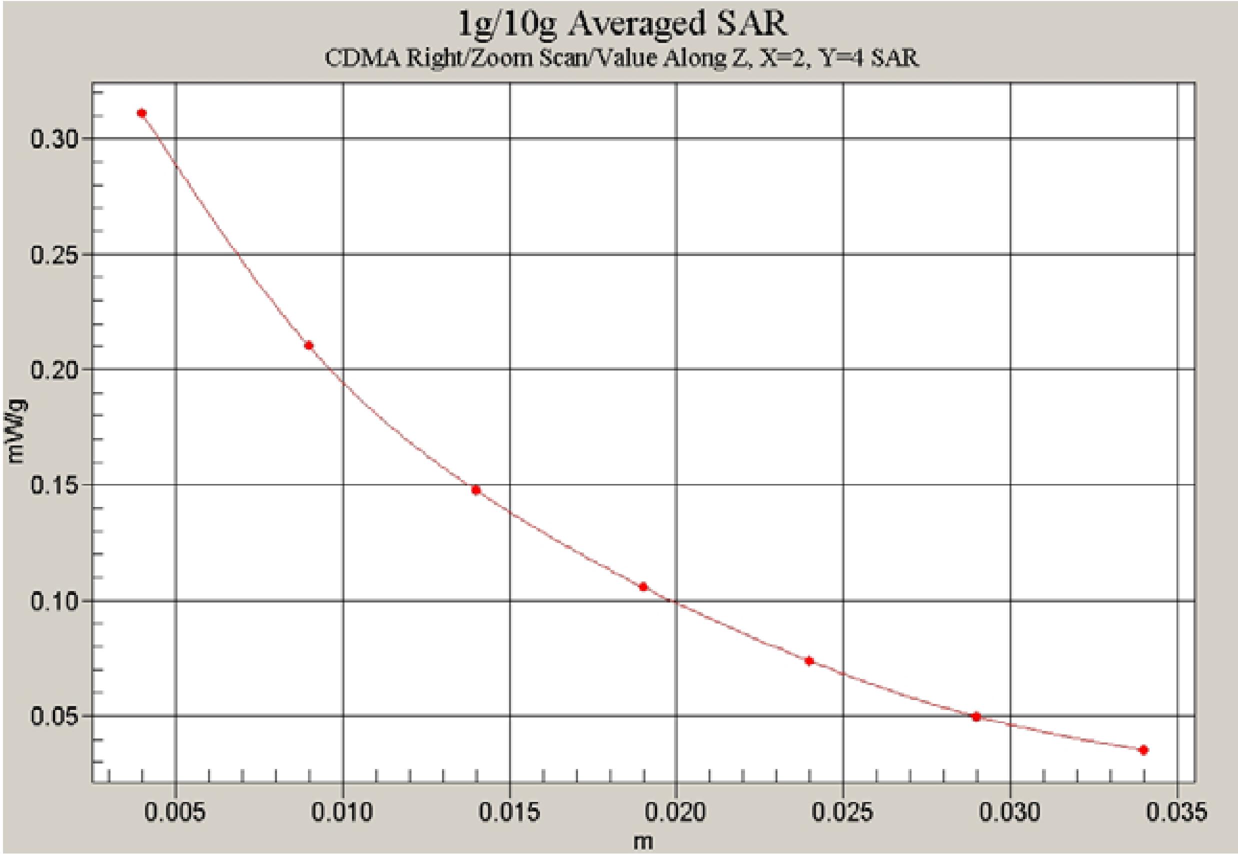
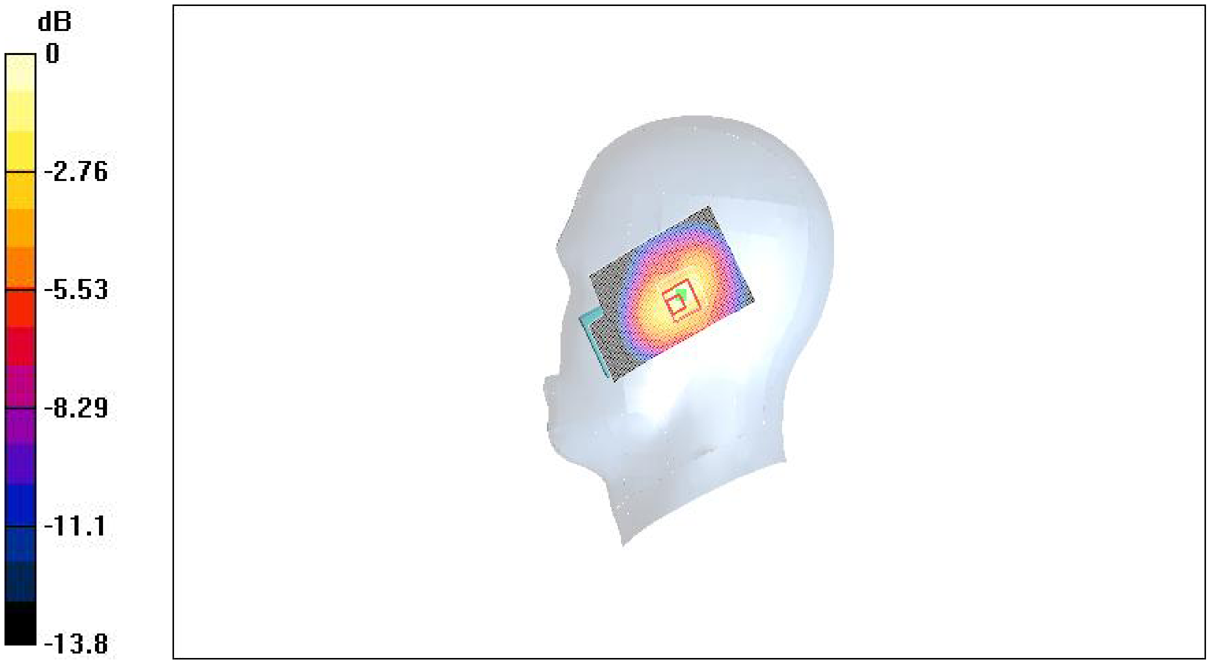


Fig. 14 Z-Scan at power reference point (Right Hand Touch Cheek 835MHz CH777)

835 Right Cheek Middle
Electronics: DAE3 Sn536
Communication System: CDMA 1X-new Frequency: 836.52 MHz Duty Cycle: 1:1
Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

Cheek Middle/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 12.2 V/m; Power Drift = 0.1 dB
Maximum value of SAR (interpolated) = 0.322 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.2 V/m; Power Drift = 0.1 dB
Maximum value of SAR (measured) = 0.290 mW/g
Peak SAR (extrapolated) = 0.432 W/kg
SAR(1 g) = 0.216 mW/g; SAR(10 g) = 0.124 mW/g



0 dB = 0.290mW/g

Fig.15 Right Hand Touch Cheek 835MHz CH384

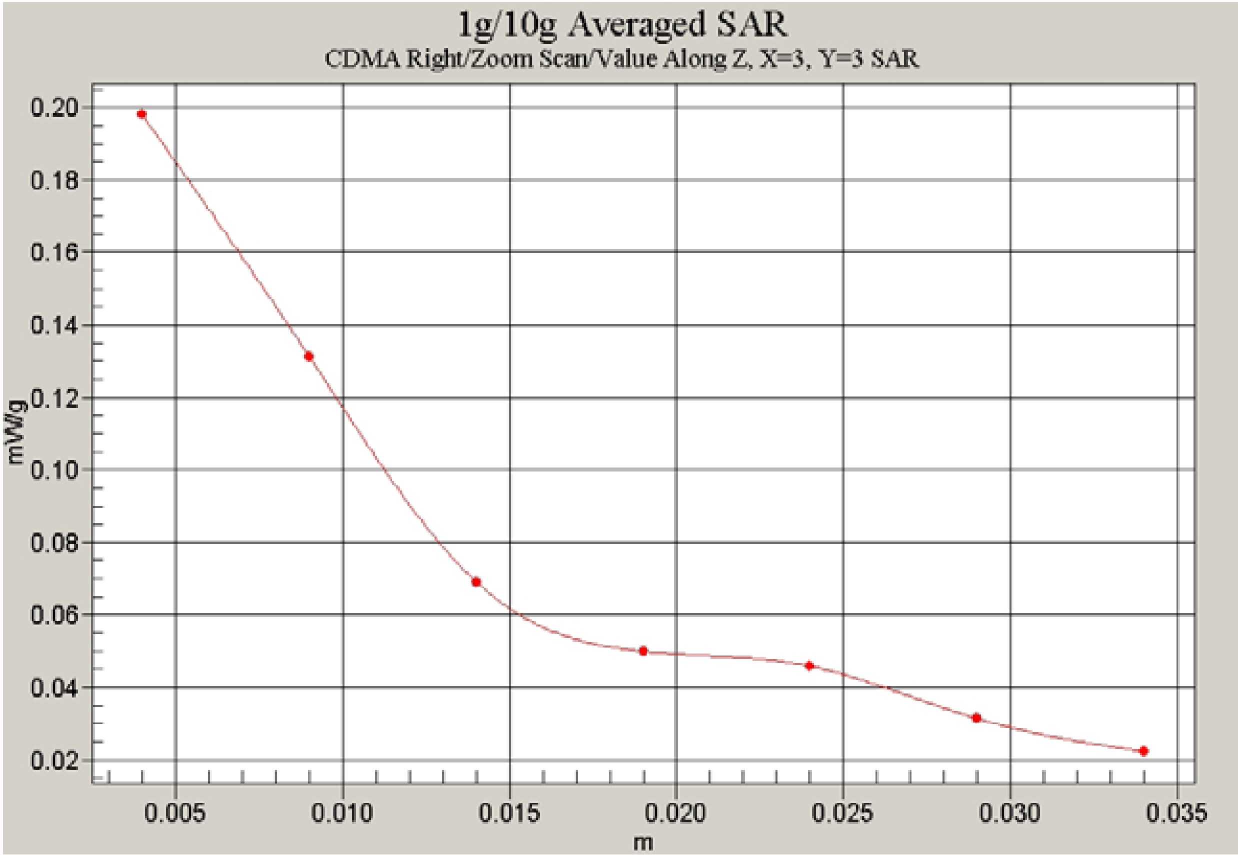
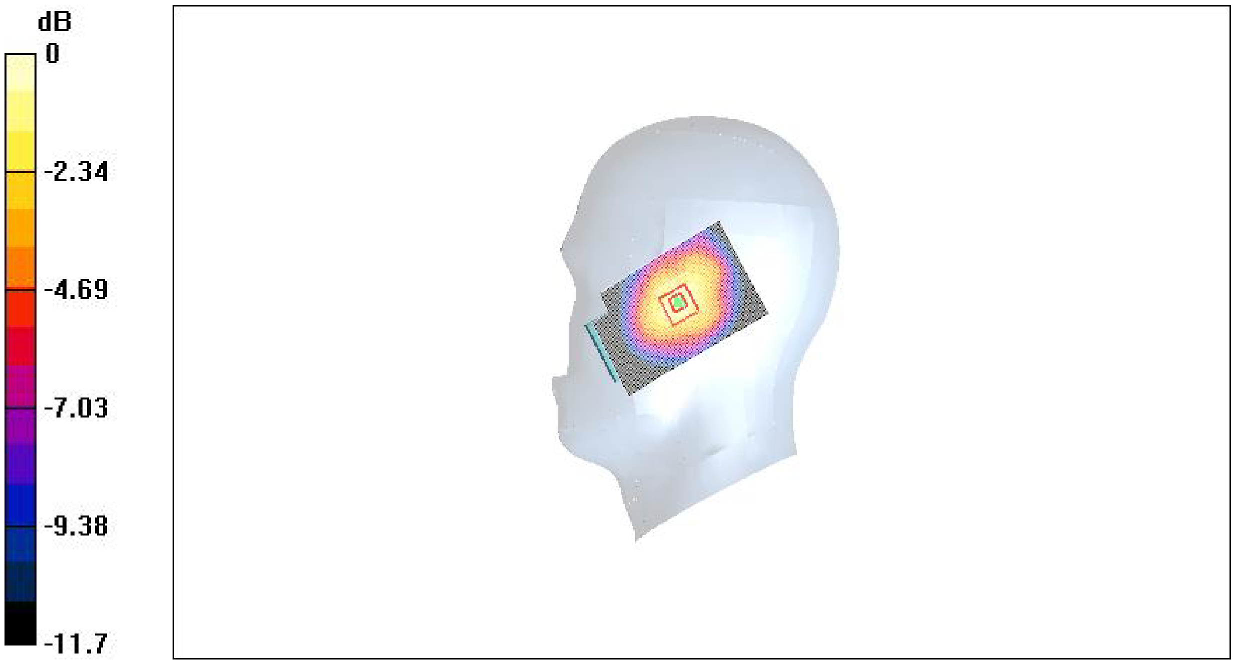


Fig. 16 Z-Scan at power reference point (Right Hand Touch Cheek 835MHz CH384)

835 Right Cheek Low
Electronics: DAE3 Sn536
Communication System: CDMA 1X-new Frequency: 824.7 MHz Duty Cycle: 1:1
Probe: ET3DV6 - SN1736 ConvF(6.51, 6.51, 6.51)

Cheek Low/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 13.7 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 0.200 mW/g

Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.7 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 0.251 mW/g
Peak SAR (extrapolated) = 0.274 W/kg
SAR(1 g) = 0.204 mW/g; SAR(10 g) = 0.132 mW/g



0 dB = 0.251mW/g

Fig. 17 Right Hand Touch Cheek 835MHz CH1013

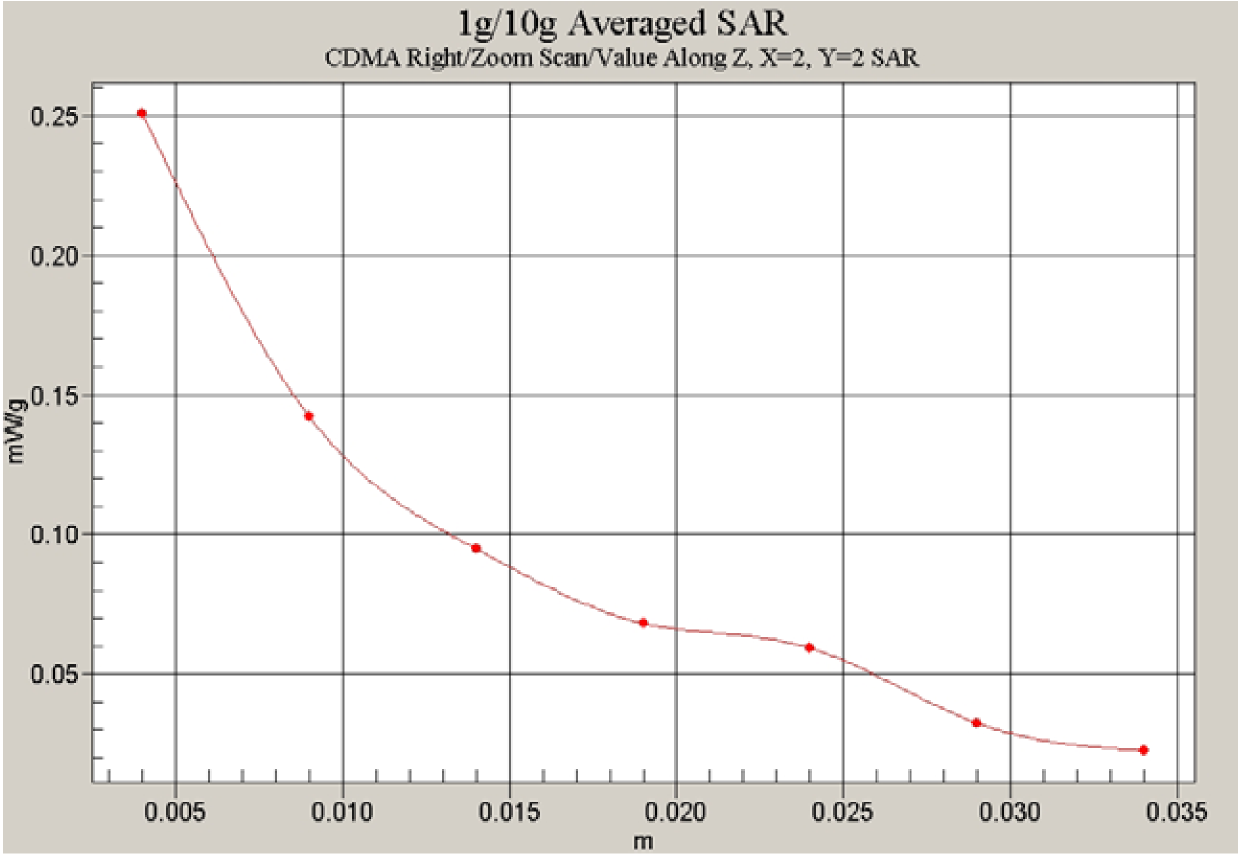


Fig. 18 Z-Scan at power reference point (Right Hand Touch Cheek 835MHz CH1013)

835 Right Tilt High

Electronics: DAE3 Sn536

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 (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 11.2 V/m; Power Drift = 0.2 dB

Maximum value of SAR (interpolated) = 0.161 mW/g

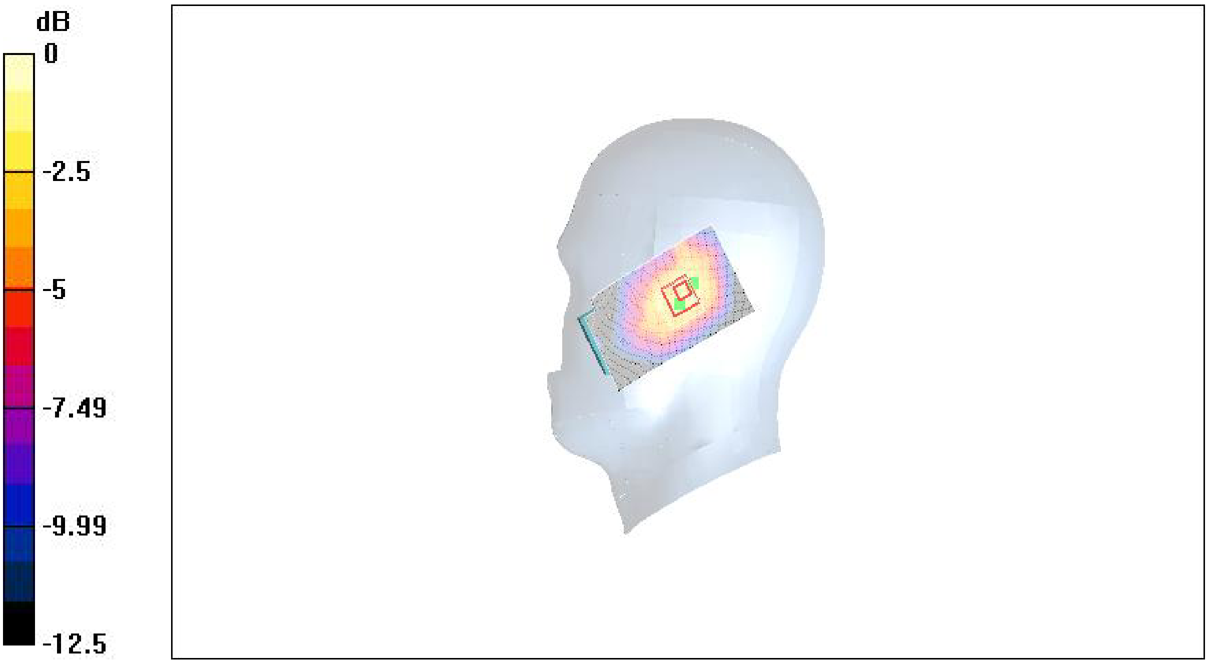
Tilt High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.2 V/m; Power Drift = 0.2 dB

Maximum value of SAR (measured) = 0.213 mW/g

Peak SAR (extrapolated) = 0.256 W/kg

SAR(1 g) = 0.140 mW/g; SAR(10 g) = 0.091 mW/g



0 dB = 0.213mW/g

Fig. 19 Right Hand Tilt 15°835MHz CH777

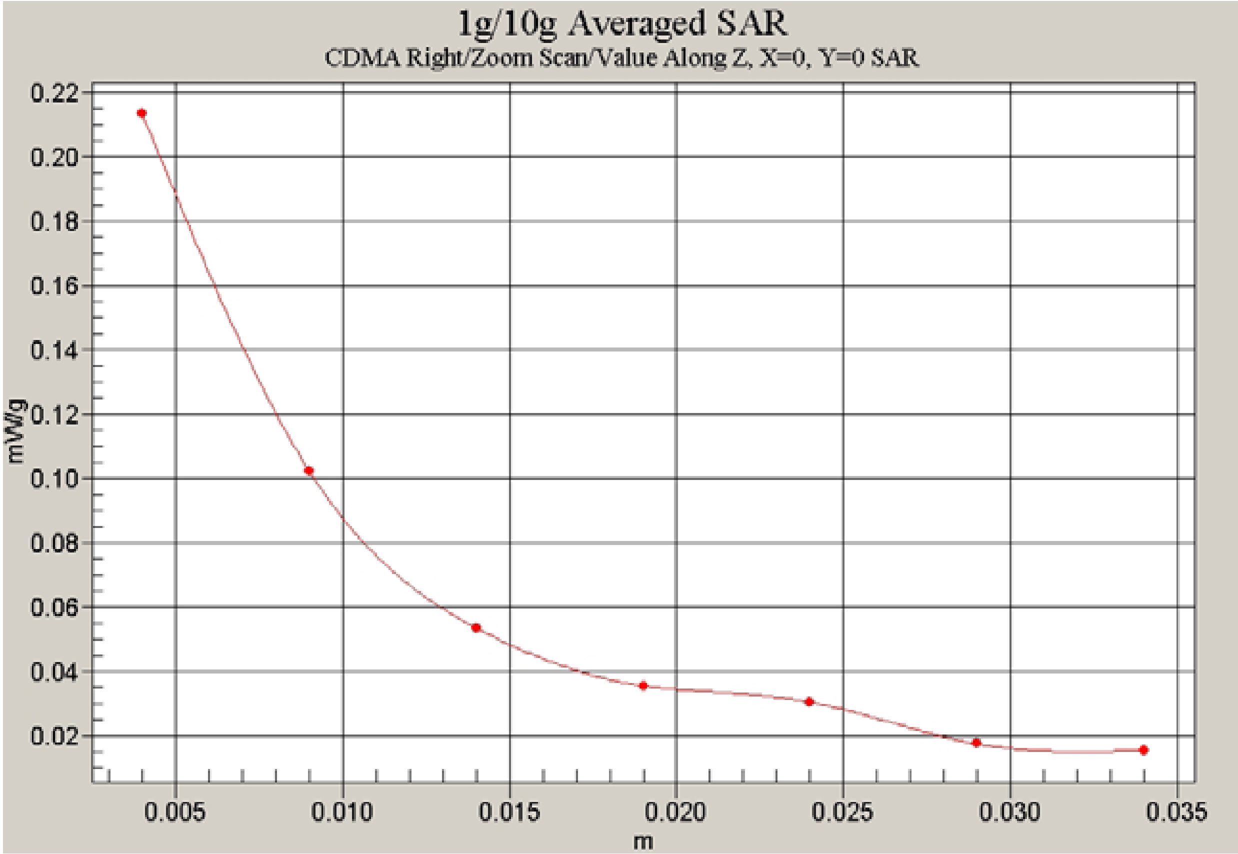


Fig. 20 Z-Scan at power reference point (Right Hand Tilt 15° 835MHz CH777)

835 Right Tilt Middle

Electronics: DAE3 Sn536

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 (71x121x1): Measurement grid: dx=10mm, dy=10mm

Reference Value = 9.76 V/m; Power Drift = 0.2 dB

Maximum value of SAR (interpolated) = 0.119 mW/g

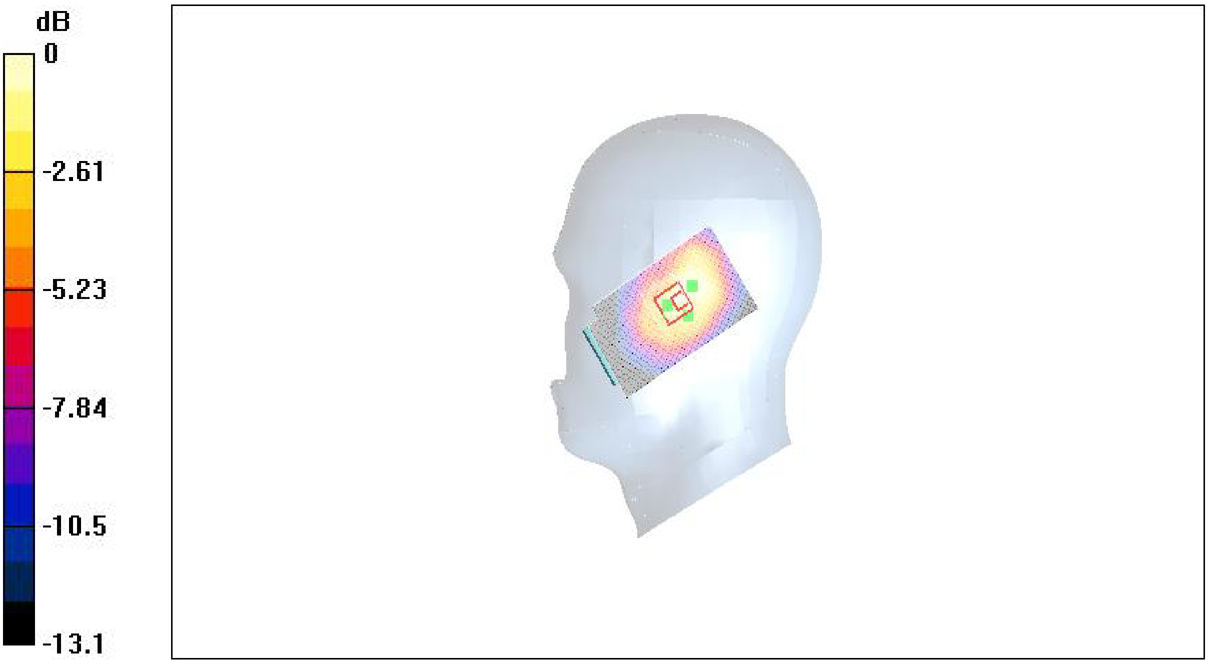
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.76 V/m; Power Drift = 0.2 dB

Maximum value of SAR (measured) = 0.109 mW/g

Peak SAR (extrapolated) = 0.157 W/kg

SAR(1 g) = 0.091 mW/g; SAR(10 g) = 0.056 mW/g



0 dB = 0.109mW/g

Fig. 21 Right Hand Tilt 15°835MHz CH384

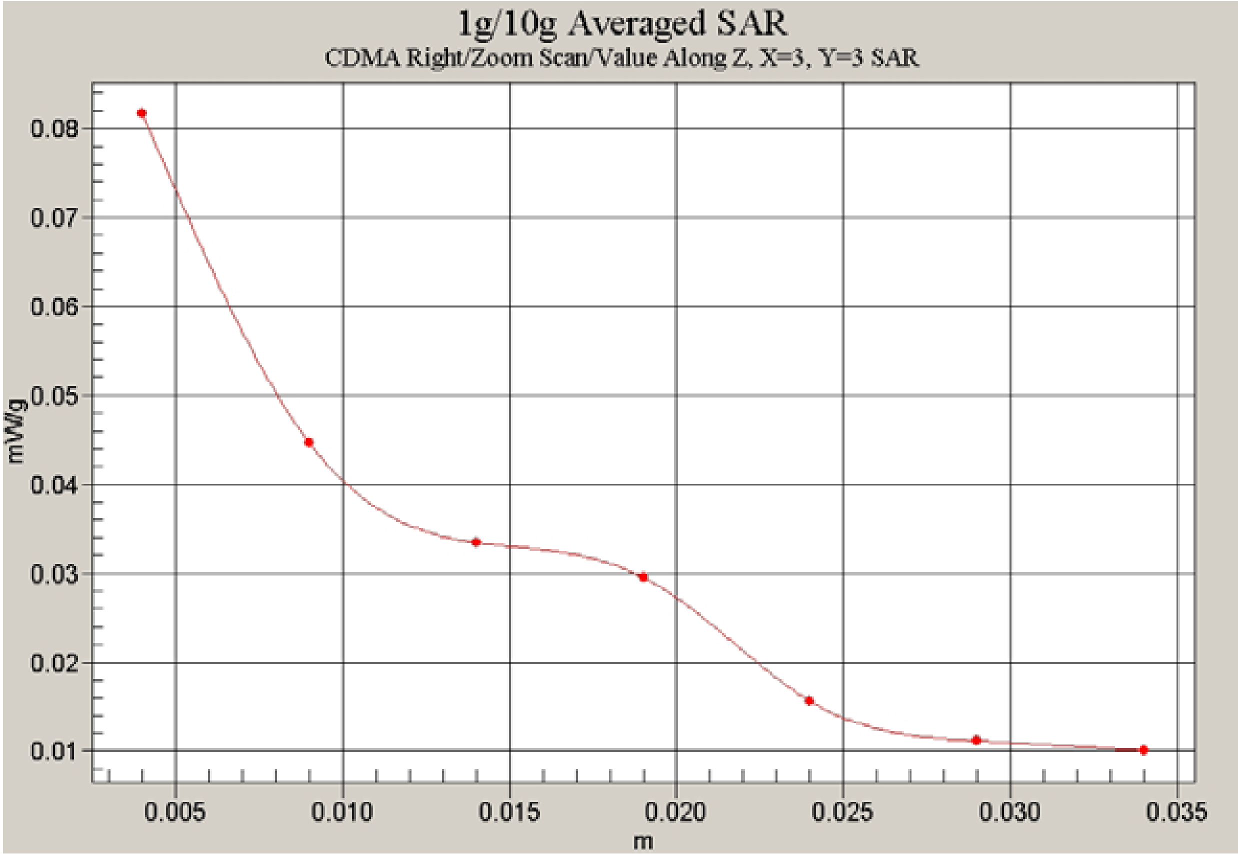


Fig. 22 Z-Scan at power reference point (Right Hand Tilt 15° 835MHz CH384)

835 Right Tilt Low

Electronics: DAE3 Sn536

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

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

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

Reference Value = 10.7 V/m; Power Drift = 0.002 dB

Maximum value of SAR (interpolated) = 0.116 mW/g

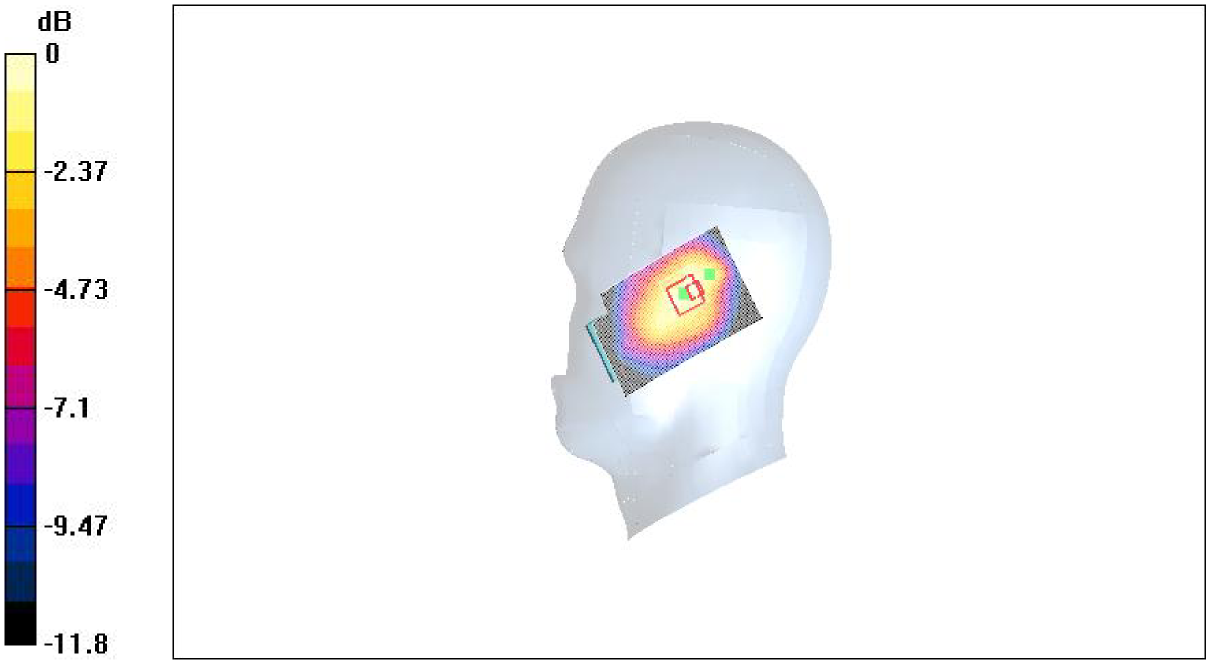
Tilt Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.7 V/m; Power Drift = 0.002 dB

Maximum value of SAR (measured) = 0.126 mW/g

Peak SAR (extrapolated) = 0.225 W/kg

SAR(1 g) = 0.116 mW/g; SAR(10 g) = 0.075 mW/g



0 dB = 0.126mW/g

Fig. 23 Right Hand Tilt 15° 835MHz CH1013

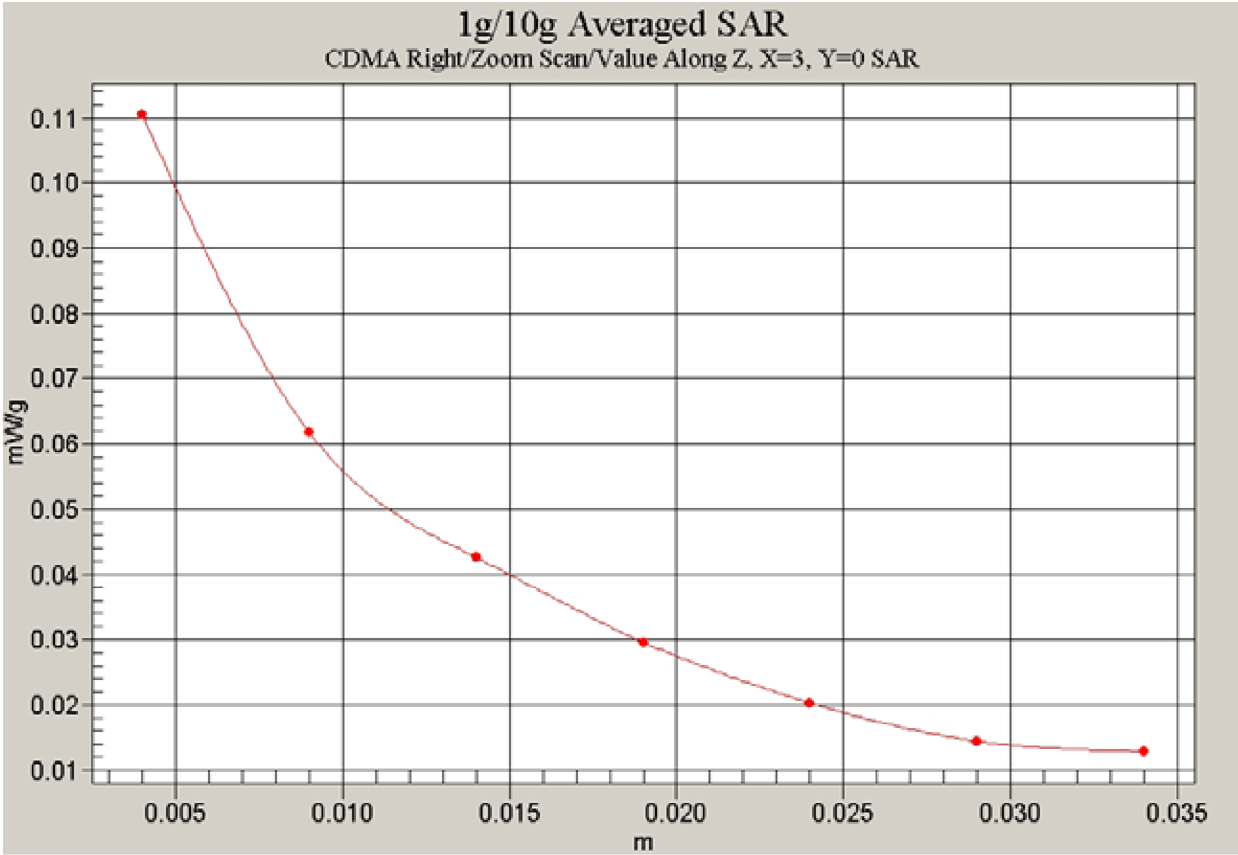
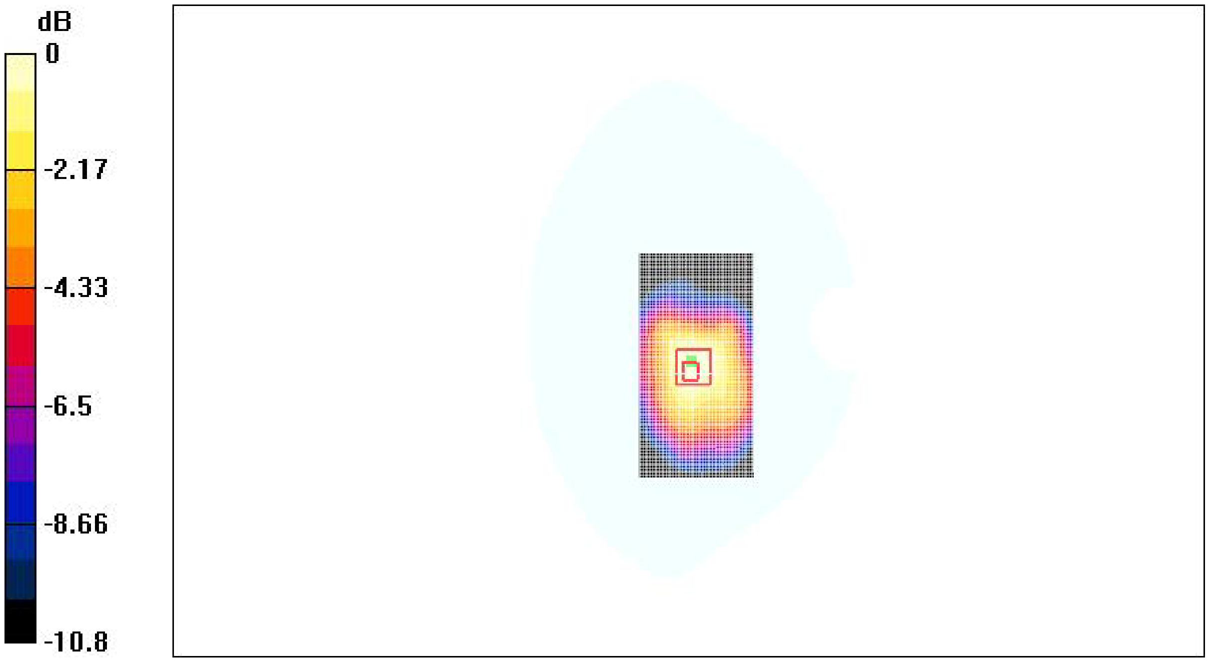


Fig. 24 Z-Scan at power reference point (Right Hand Tilt 15° 835MHz CH1013)

835 Body Towards Ground High
Electronics: DAE3 Sn536
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 (51x91x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 12.1 V/m; Power Drift = -0.2 dB
Maximum value of SAR (interpolated) = 0.287 mW/g

Toward Ground High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.1 V/m; Power Drift = -0.2 dB
Maximum value of SAR (measured) = 0.251 mW/g
Peak SAR (extrapolated) = 0.364 W/kg
SAR(1 g) = 0.218 mW/g; SAR(10 g) = 0.152 mW/g



0 dB = 0.251mW/g

Fig. 25 Flat Phantom Body-worn Position 835MHz CH777 with the display of the handset towards the ground

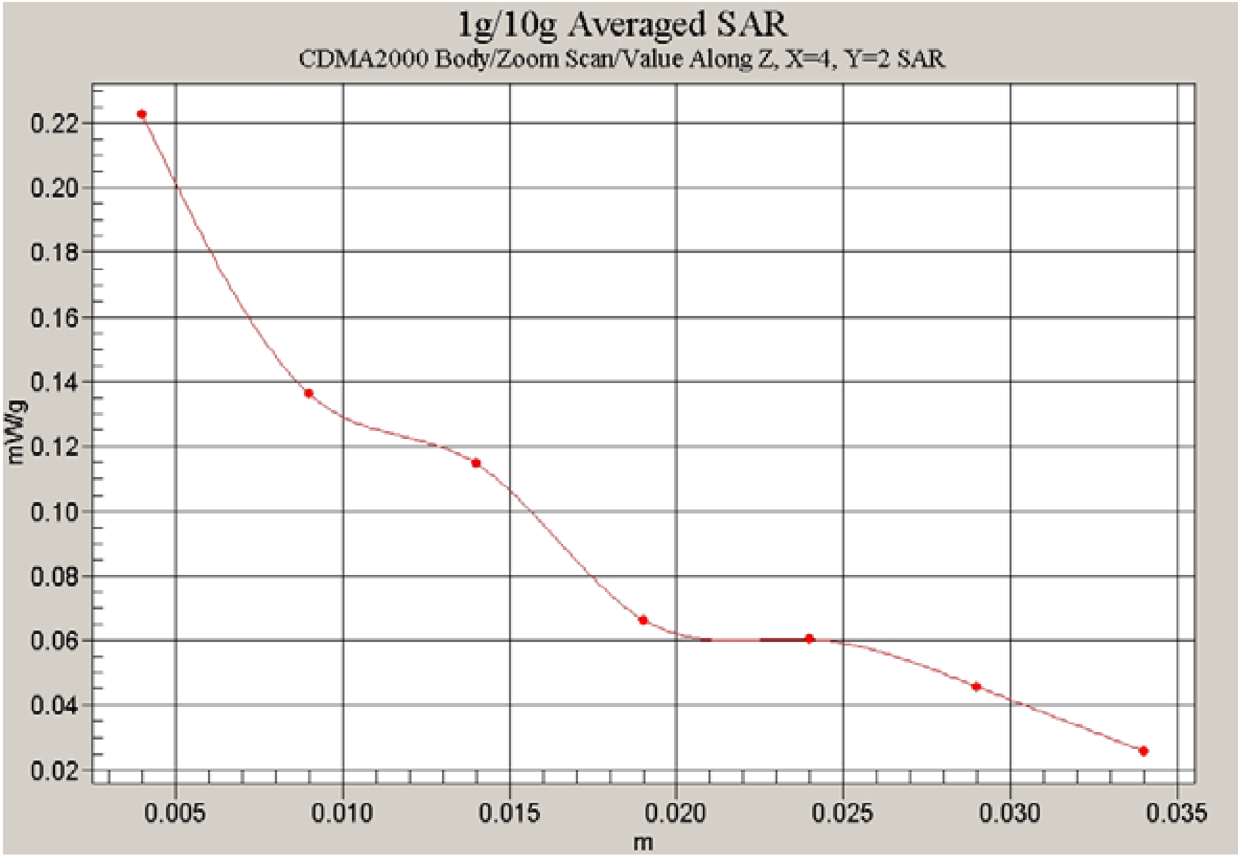
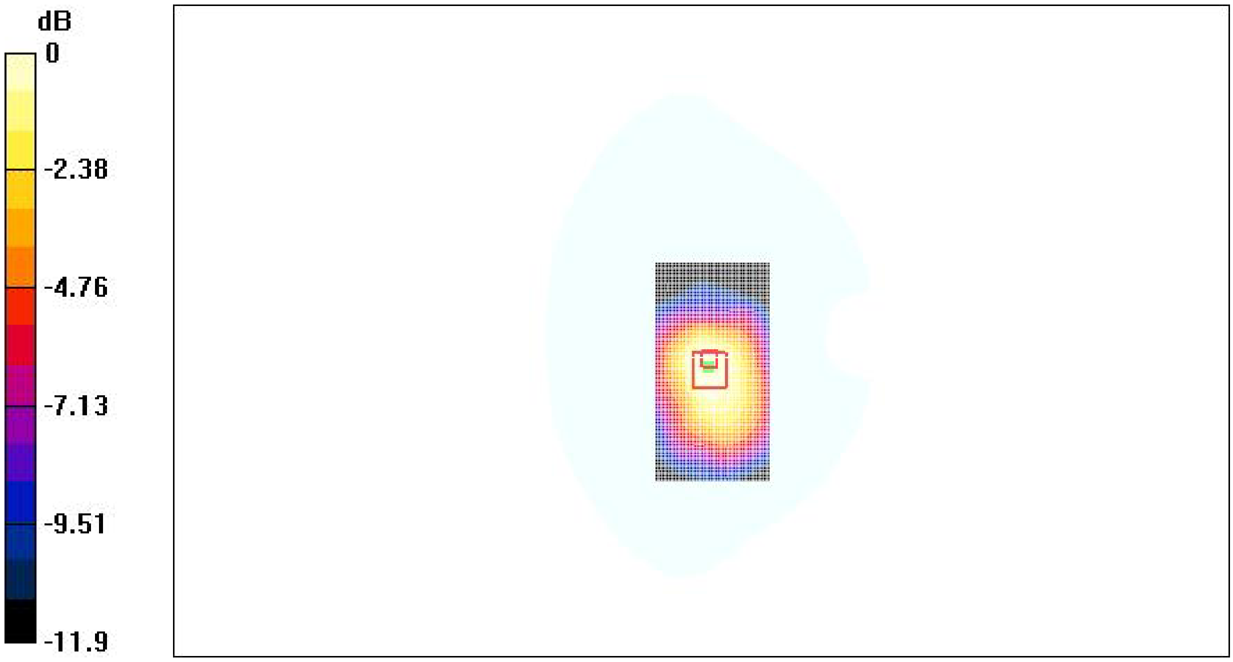


Fig. 26 Z-Scan at power reference point (Flat Phantom 835MHz CH777 with the display of the handset towards the ground)

835 Body Towards Ground Middle
Electronics: DAE3 Sn536
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 (51x91x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 12.8 V/m; Power Drift = -0.1 dB
Maximum value of SAR (interpolated) = 0.303 mW/g

Toward Ground Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.8 V/m; Power Drift = -0.1 dB
Maximum value of SAR (measured) = 0.280 mW/g
Peak SAR (extrapolated) = 0.431 W/kg
SAR(1 g) = 0.246 mW/g; SAR(10 g) = 0.174 mW/g



0 dB = 0.280mW/g

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

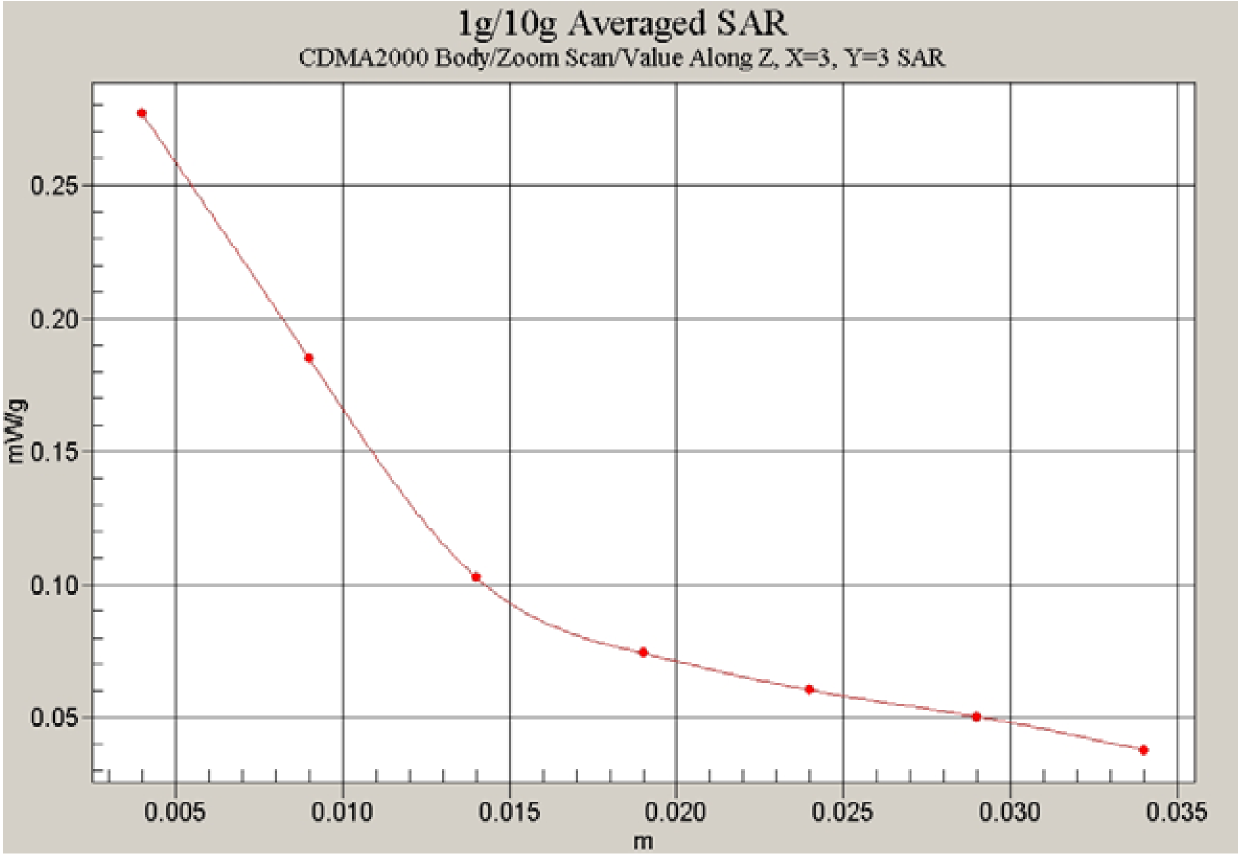
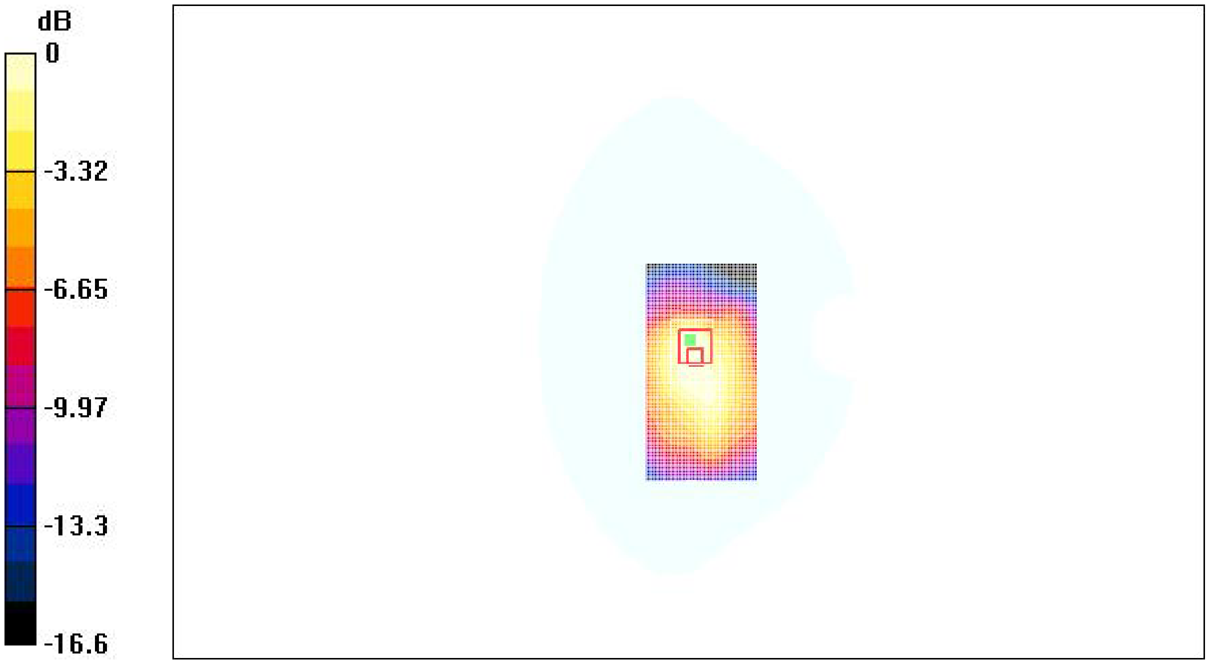


Fig. 28 Z-Scan at power reference point (Flat Phantom 835MHz CH384 with the display of the handset towards the ground)

835 Body Towards Ground Low
Electronics: DAE3 Sn536
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 (51x91x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 11.9 V/m; Power Drift = 0.2 dB
Maximum value of SAR (interpolated) = 0.483 mW/g

Toward Ground Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.9 V/m; Power Drift = 0.2 dB
Maximum value of SAR (measured) = 0.295 mW/g
Peak SAR (extrapolated) = 0.515 W/kg
SAR(1 g) = 0.274 mW/g; SAR(10 g) = 0.152 mW/g



0 dB = 0.295mW/g

Fig. 29 Flat Phantom Body-worn Position 835MHz CH1013 with the display of the handset towards the ground

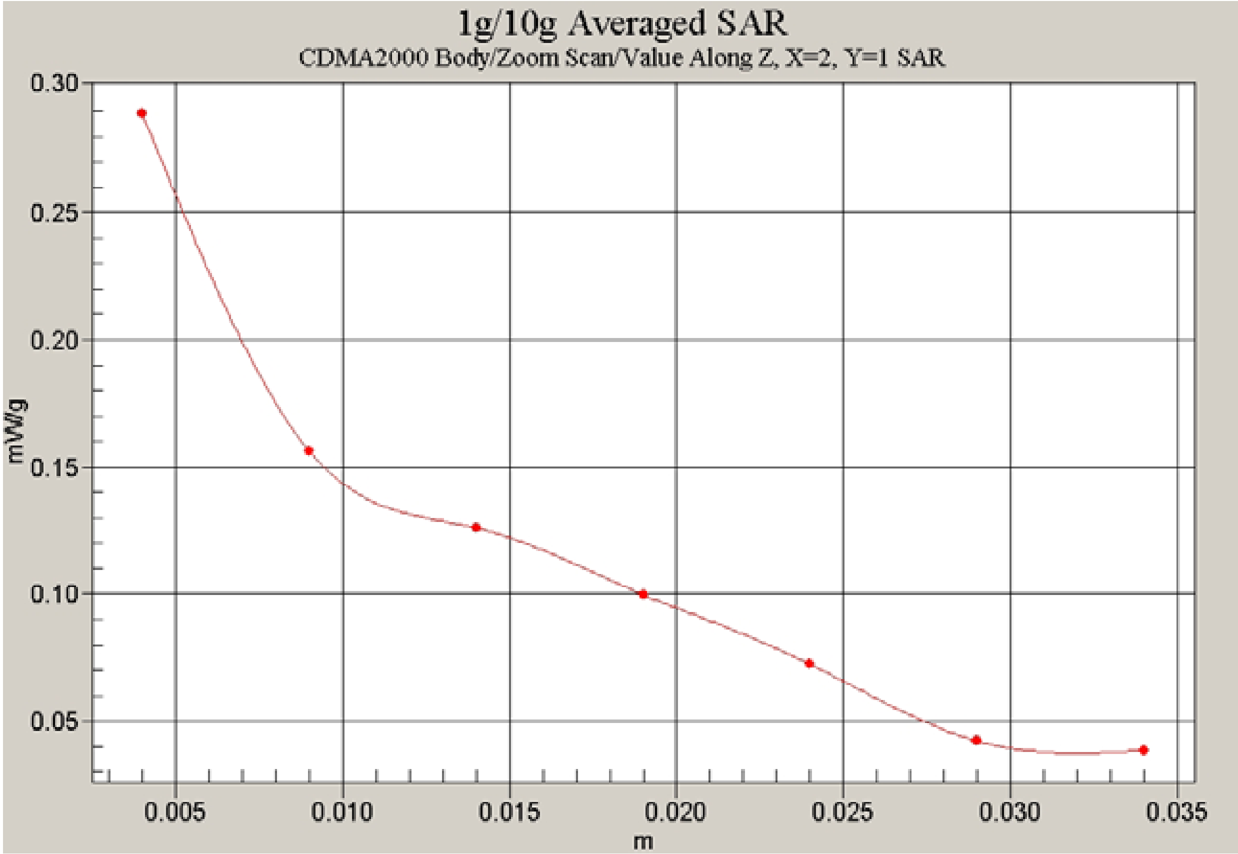
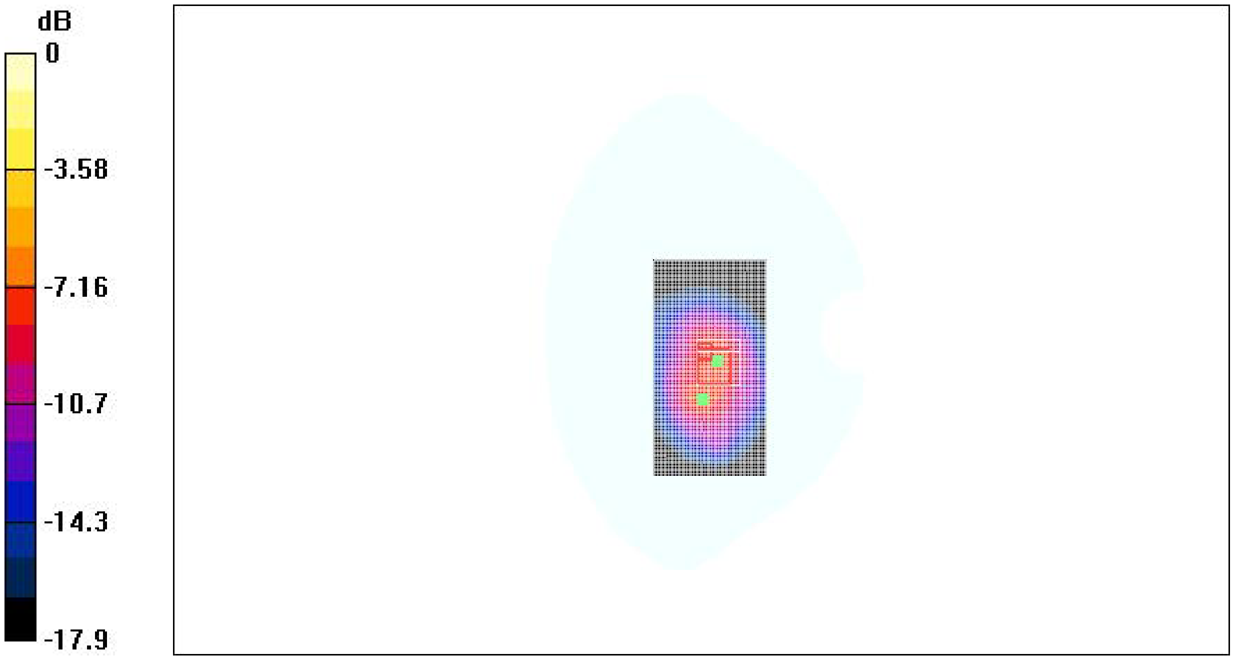


Fig. 30 Z-Scan at power reference point (Flat Phantom 835MHz CH1013 with the display of the handset towards the ground)

835 Body Towards Phantom High
Electronics: DAE3 Sn536
Communication System: CDMA 1X-new Frequency: 848.31 MHz Duty Cycle: 1:1
Probe: ET3DV6 - SN1736 ConvF(6.45, 6.45, 6.45)

Toward Phantom High/Area Scan (51x91x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 9.53 V/m; Power Drift = 0.2 dB
Maximum value of SAR (interpolated) = 0.151 mW/g

Toward Phantom High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.53 V/m; Power Drift = 0.2 dB
Maximum value of SAR (measured) = 0.816 mW/g
Peak SAR (extrapolated) = 2.7 W/kg
SAR(1 g) = 0.188 mW/g; SAR(10 g) = 0.097 mW/g



0 dB = 0.816mW/g

Fig. 31 Flat Phantom Body-worn Position 835MHz CH777 with the display of the handset towards the phantom

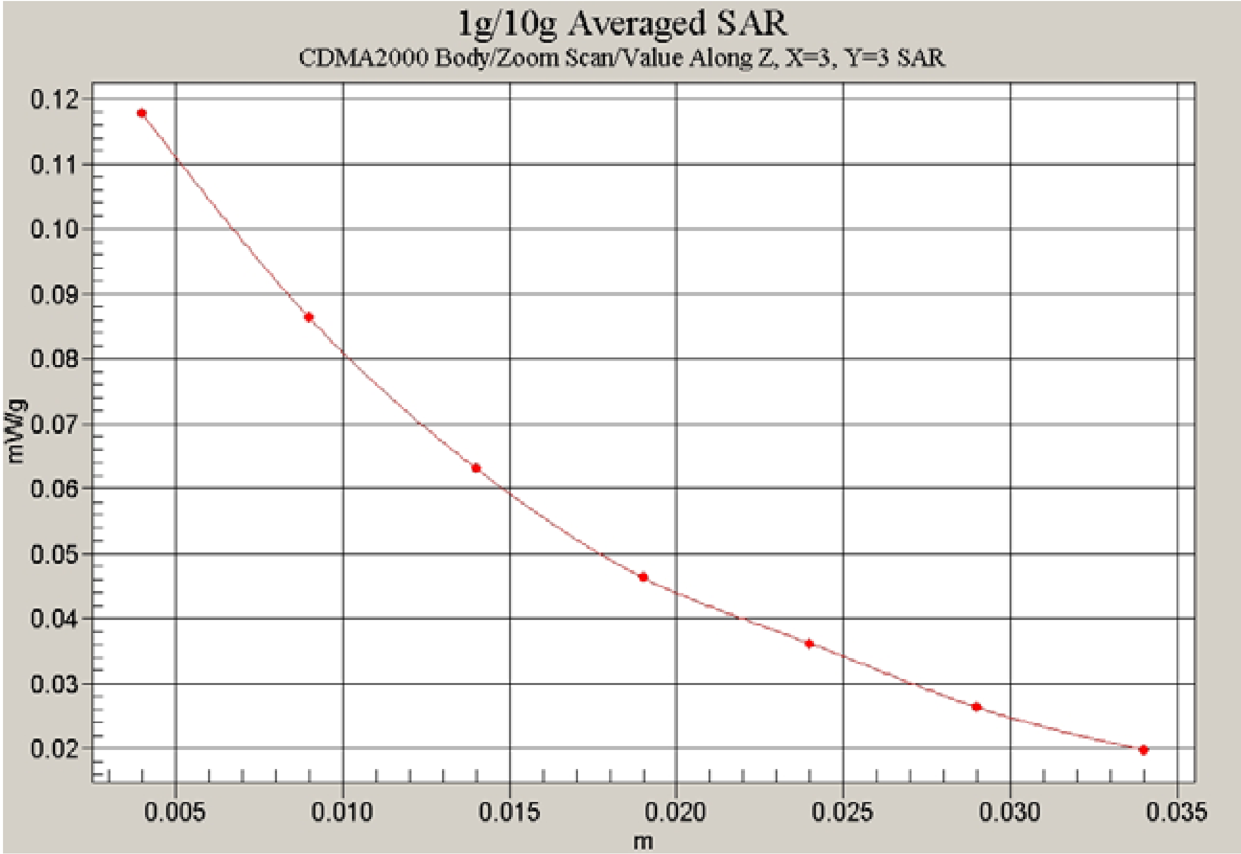
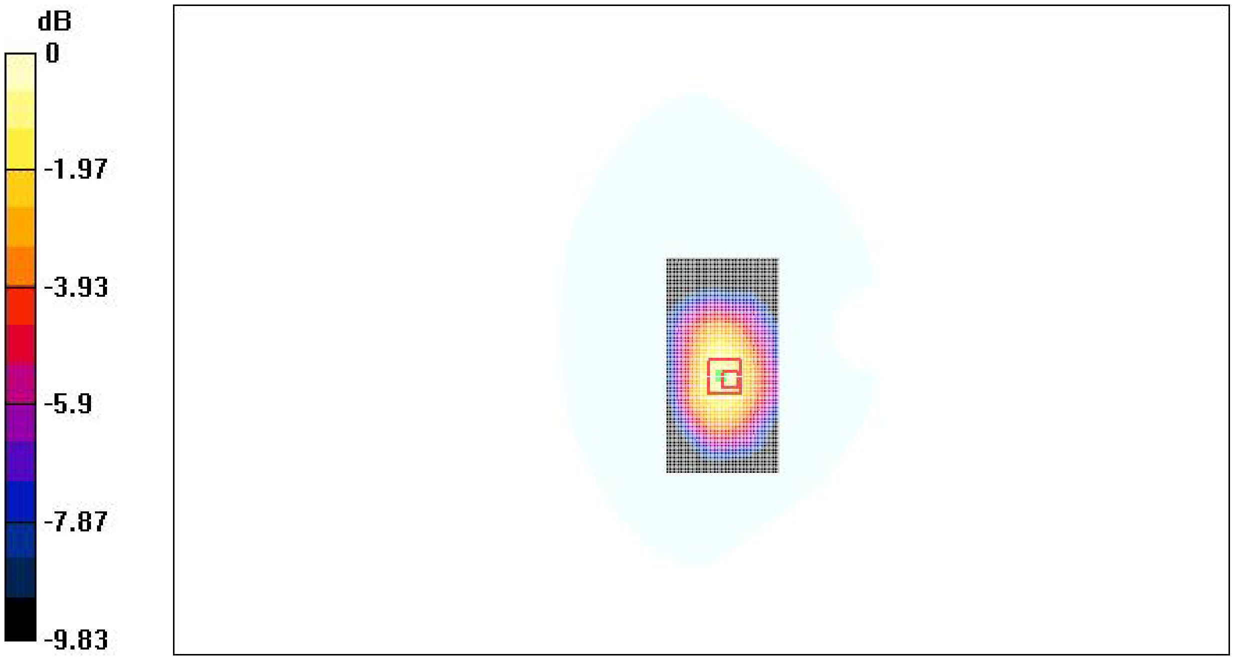


Fig. 32 Z-Scan at power reference point (Flat Phantom 835MHz CH777 with the display of the handset towards the phantom)

835 Body Towards Phantom Middle
Electronics: DAE3 Sn536
Communication System: CDMA 1X-new Frequency: 836.52 MHz Duty Cycle: 1:1
Probe: ET3DV6 - SN1736 ConvF(6.45, 6.45, 6.45)

Toward Phantom Middle/Area Scan (51x91x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 8.65 V/m; Power Drift = 0.1 dB
Maximum value of SAR (interpolated) = 0.114 mW/g

Toward Phantom Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.65 V/m; Power Drift = 0.1 dB
Maximum value of SAR (measured) = 0.135 mW/g
Peak SAR (extrapolated) = 0.213 W/kg
SAR(1 g) = 0.122 mW/g; SAR(10 g) = 0.084 mW/g



0 dB = 0.135mW/g

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

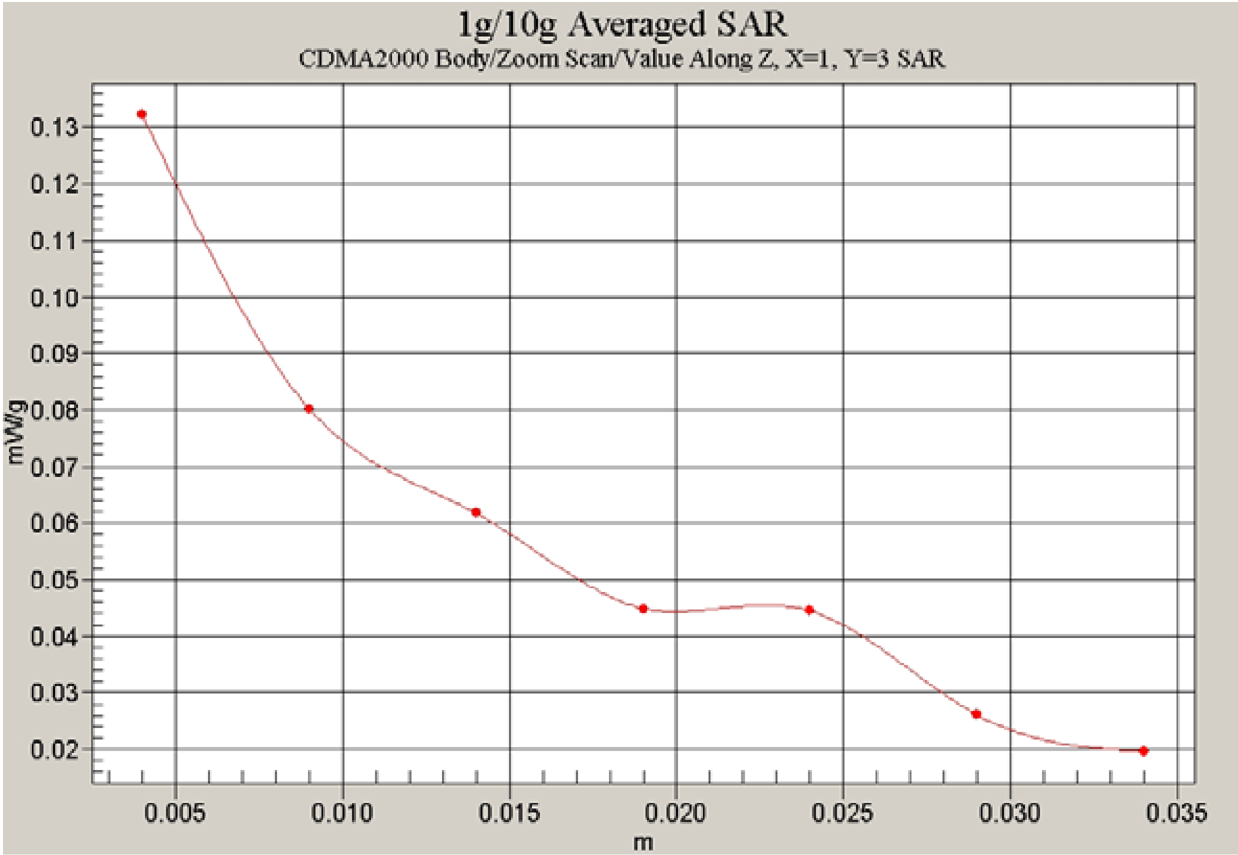
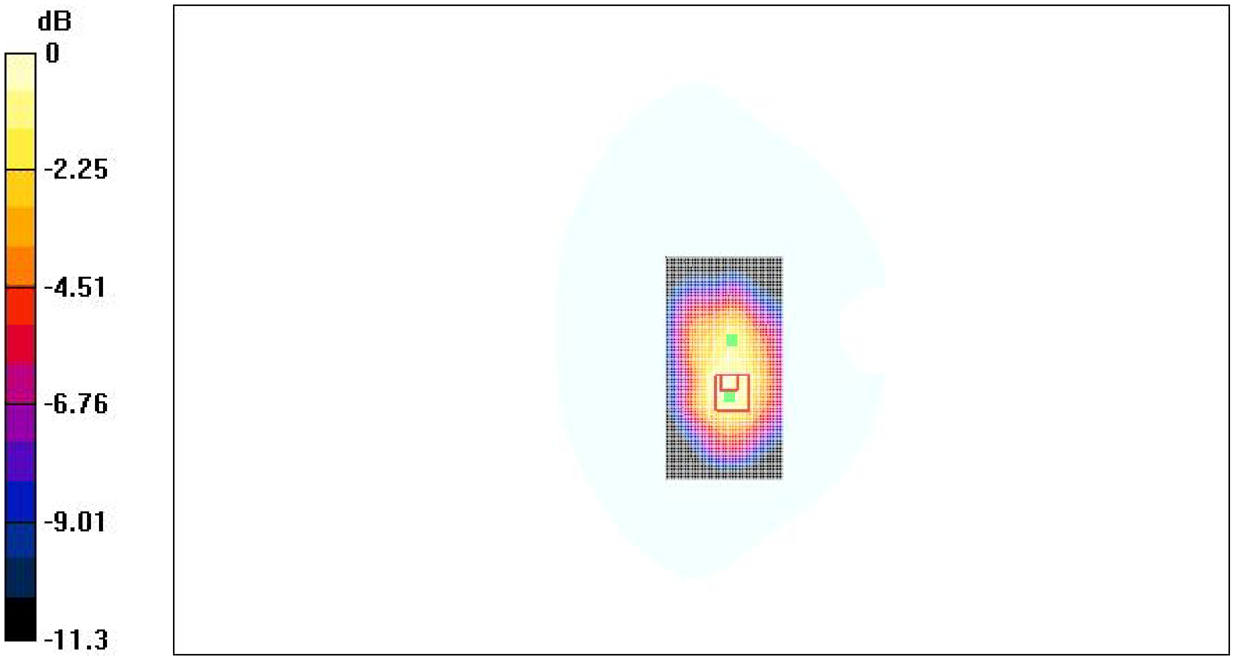


Fig. 34 Z-Scan at power reference point (Flat Phantom 835MHz CH384 with the display of the handset towards the phantom)

835 Body Towards Phantom Low
Electronics: DAE3 Sn536
Communication System: CDMA 1X-new Frequency: 824.7 MHz Duty Cycle: 1:1
Probe: ET3DV6 - SN1736 ConvF(6.45, 6.45, 6.45)

Toward Phantom Low/Area Scan (51x91x1): Measurement grid: dx=10mm, dy=10mm
Reference Value = 10.8 V/m; Power Drift = 0.2 dB
Maximum value of SAR (interpolated) = 0.156 mW/g

Toward Phantom Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.8 V/m; Power Drift = 0.2 dB
Maximum value of SAR (measured) = 0.173 mW/g
Peak SAR (extrapolated) = 0.255 W/kg
SAR(1 g) = 0.146 mW/g; SAR(10 g) = 0.096 mW/g



0 dB = 0.173mW/g

Fig. 35 Flat Phantom Body-worn Position 835MHz CH1013 with the display of the handset towards the phantom

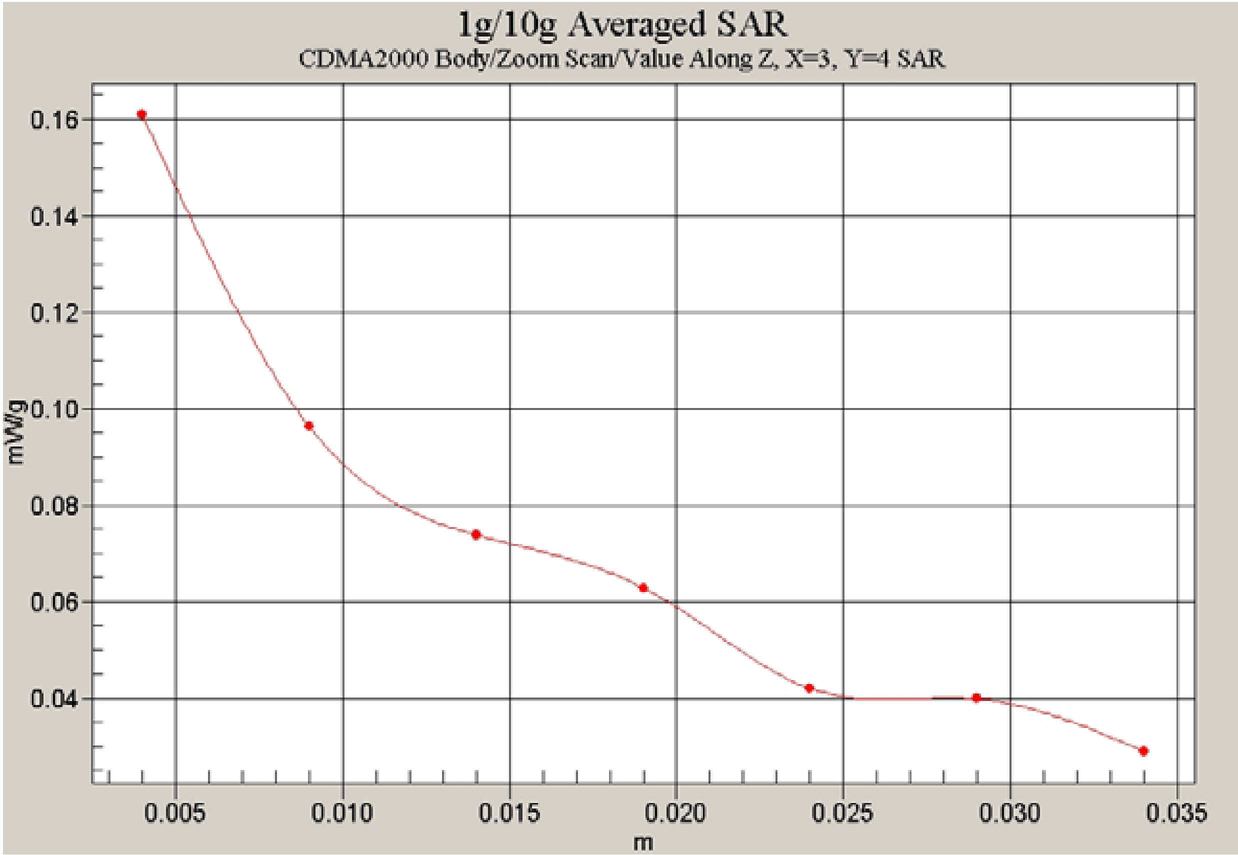


Fig. 36 Z-Scan at power reference point (Flat Phantom 835MHz CH1013 with the display of the handset towards the phantom)

ANNEX D CONDUCTED OUTPUT POWER MEASUREMENT

D.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMU-200) to ensure max 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.

D.2 Conducted

D.2.1 Method of Measurements

The EUT was set up for the max output power.
The channel power was measured with Agilent Spectrum Analyzer E4440A.
These measurements were done at 3 channels, 1013, 363 and 777 .

D.2.2 Measurement result

Please refer to the results in Table 10 and Table 11.

ANNEX E SYSTEM VALIDATION RESULTS

835MHzDAE536Probe1736

Electronics: DAE3 Sn536

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

Reference Value = 56.8 V/m; Power Drift = -0.0 dB

Maximum value of SAR (interpolated) = 2.68 mW/g

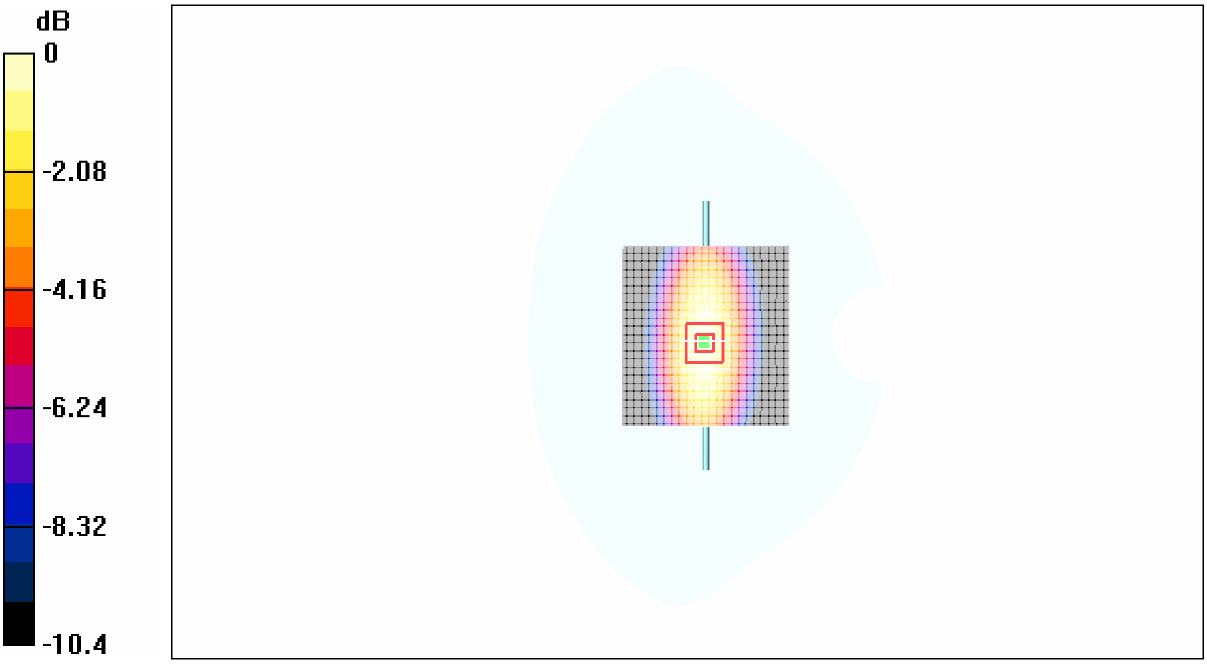
835MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.8 V/m; Power Drift = -0.0 dB

Maximum value of SAR (measured) = 2.69 mW/g

Peak SAR (extrapolated) = 3.67 W/kg

SAR(1 g) = 2.48 mW/g; SAR(10 g) = 1.62 mW/g



0 dB = 2.69mW/g

Fig.97 validation 835MHz 250mW

ANNEX F PROBE CALIBRATION CERTIFICATE

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_Jul05

CALIBRATION CERTIFICATE

Object: ET3DV6 - SN:1736

Calibration procedure(s): QA CAL-01.v5
Calibration procedure for dosimetric E-field probes

Calibration date: July 14, 2005

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	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41498087	3-May-05 (METAS, No. 251-00466)	May-06
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-05 (METAS, No. 251-00467)	May-06
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe ES3DV2	SN: 3013	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 907	21-Jun-05 (SPEAG, No. DAE4-907_Jun05)	Jun-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
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-04)	In house check: Nov 05

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

Issued: July 18, 2005

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

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, 2004
Recalibrated:	July 14, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1736 **July 14, 2005**

DASY - Parameters of Probe: ET3DV6 SN:1736

Sensitivity in Free Space[A]

NormX	**1.86** ± 10.1%	$\mu V/(V/m)^2$		
NormY	**1.90** ± 10.1%	$\mu V/(V/m)^2$		
NormZ	**1.89** ± 10.1%	$\mu V/(V/m)^2$		

Diode Compression[B]

DCP X	**97** mV
DCP Y	**97** mV
DCP Z	**97** 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	8.3	4.4
SAR_{be} [%]	With Correction Algorithm	0.1	0.2

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	13.6	9.5
SAR_{be} [%]	With Correction Algorithm	0.9	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%.

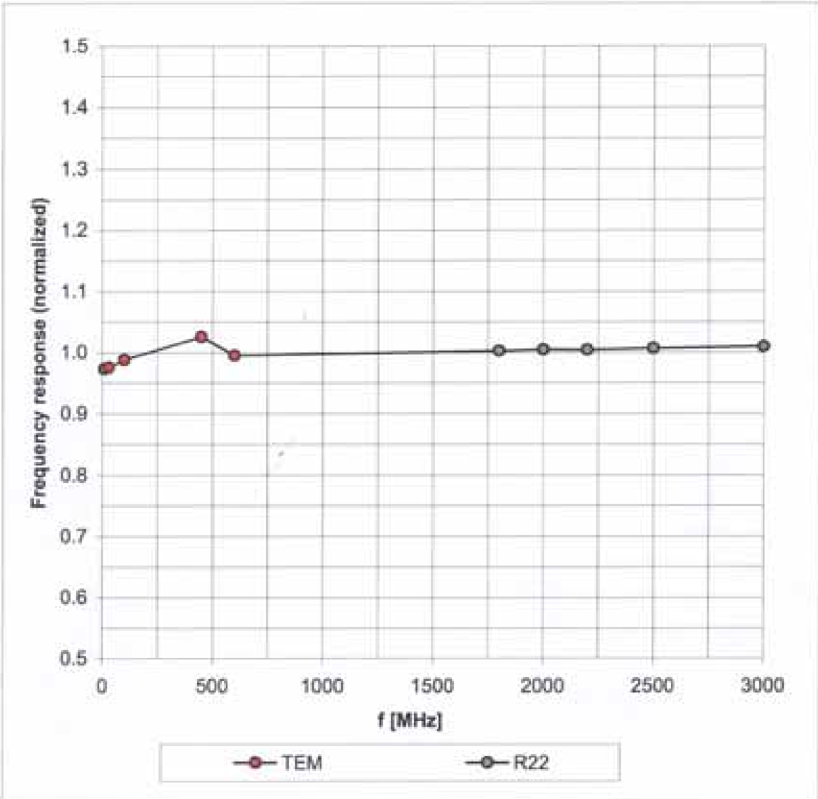
[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

ET3DV6 SN:1736 **July 14, 2005**

Frequency Response of E-Field

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



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

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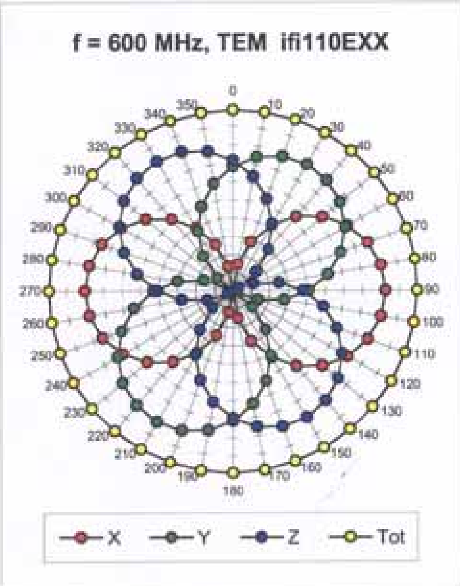
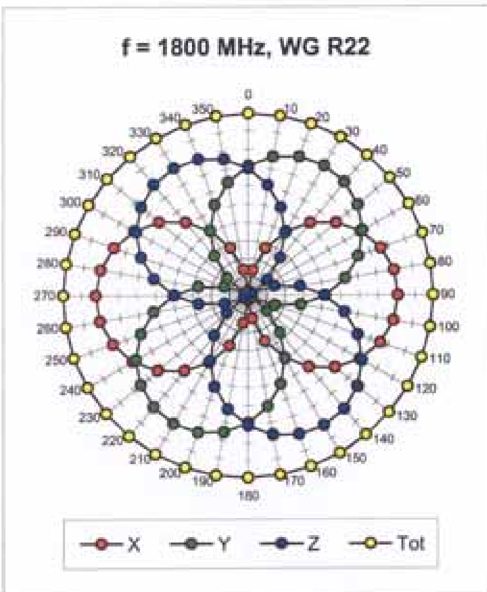
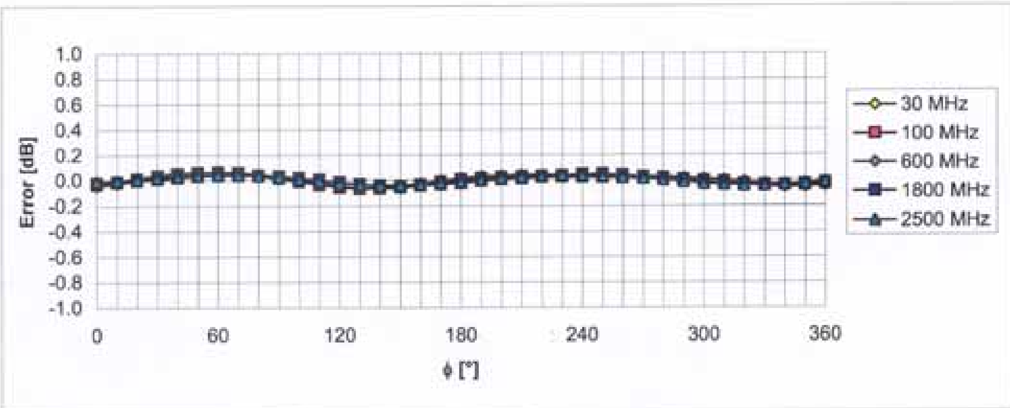
Receiving Pattern (ϕ), ϑ = 0°





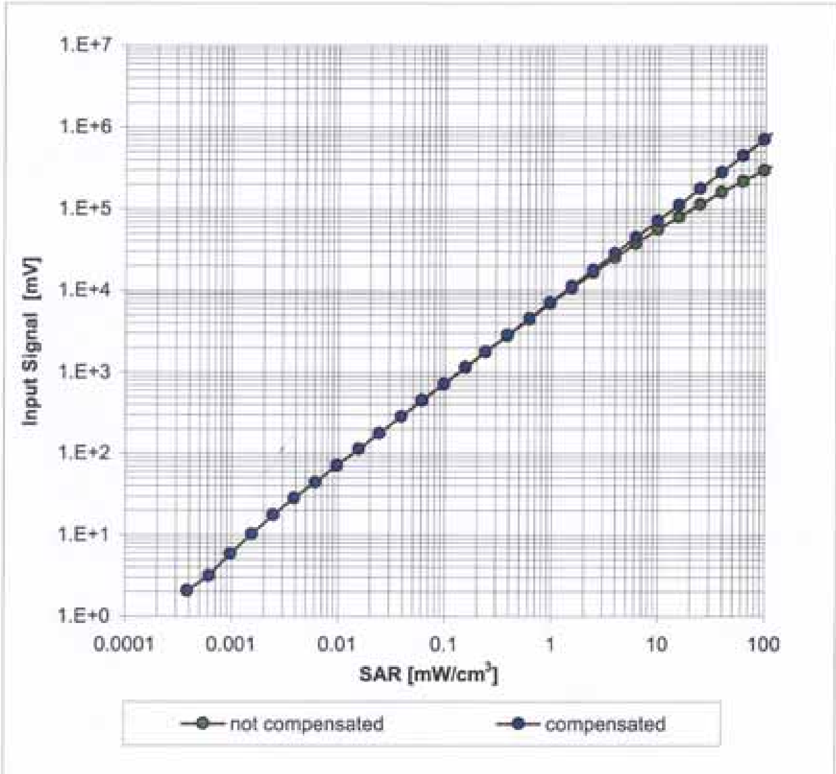


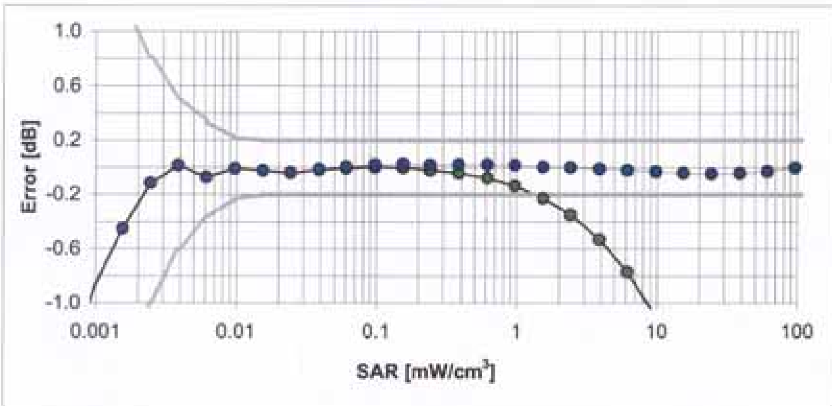
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ET3DV6 SN:1736 July 14, 2005

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)

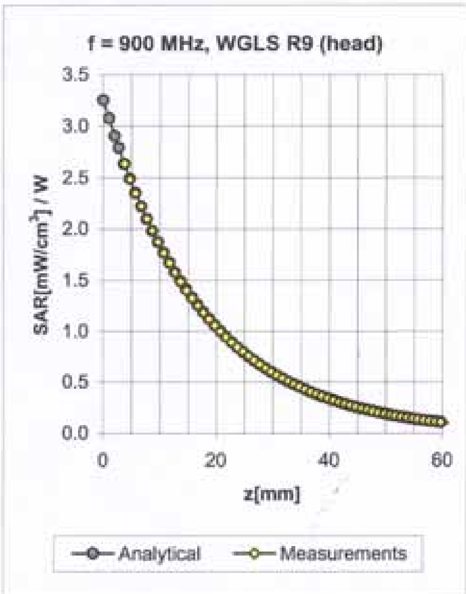


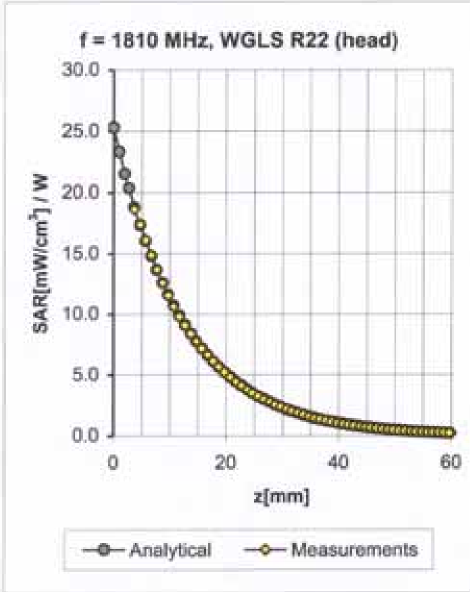


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

ET3DV6 SN:1736 July 14, 2005

Conversion Factor Assessment





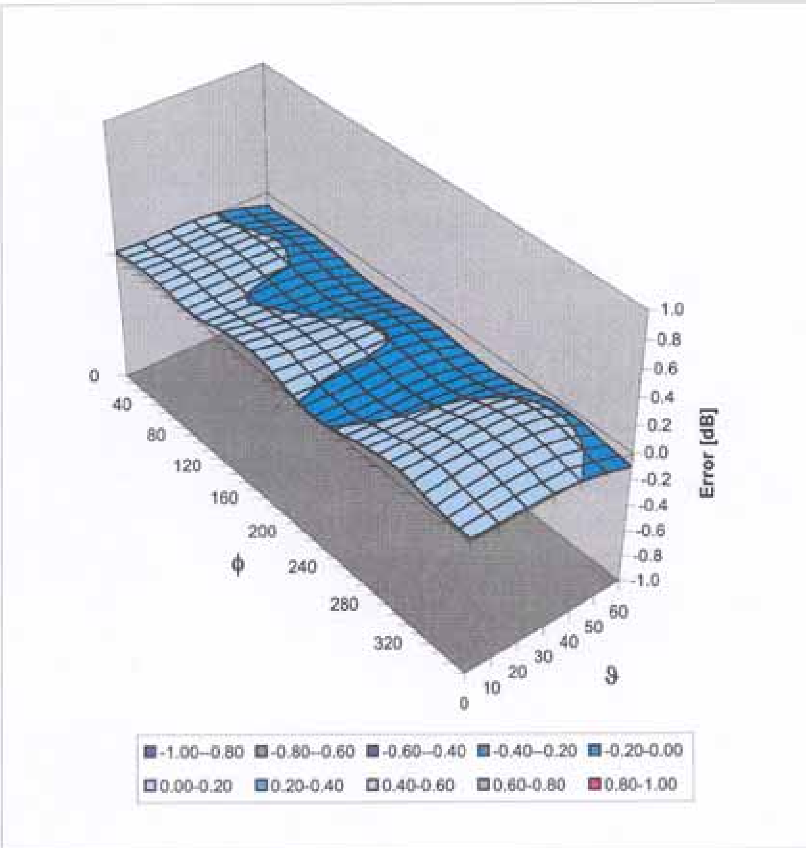
f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.56	1.85	6.51	± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.57	2.47	5.40	± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.62	2.29	4.67	± 11.8% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.72	1.94	4.39	± 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 **July 14, 2005**

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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