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

CDMA 1X 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 2/Area Scan (51x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.171 mW/g

Tilt Low 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.72 V/m; Power Drift = -0.200 dB
Peak SAR (extrapolated) = 0.197 W/kg
SAR(1 g) = 0.156 mW/g; SAR(10 g) = 0.117 mW/g
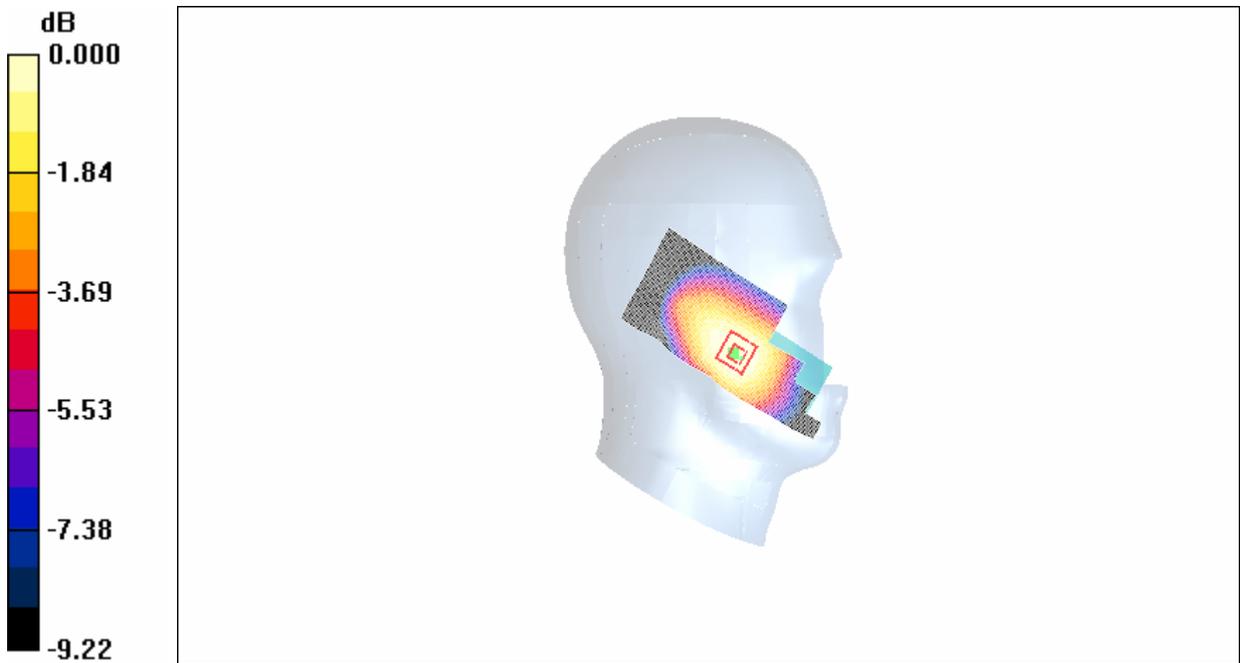Maximum value of SAR (measured) = 0.164 mW/g

0 dB = 0.164mW/g

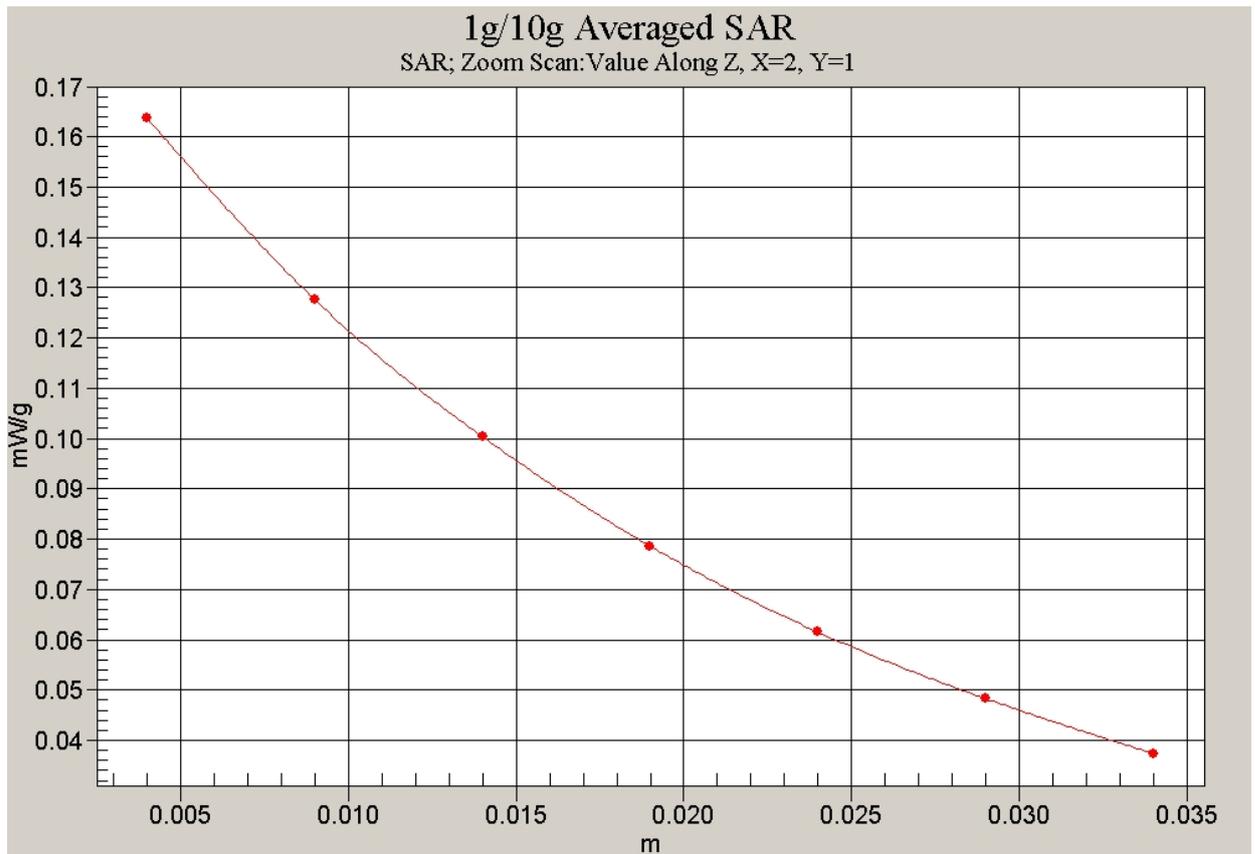**Fig. 11 Left Hand Tilt 15°CDMA 835MHz CH1013**

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

CDMA 1X Right Cheek High

Electronics: 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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

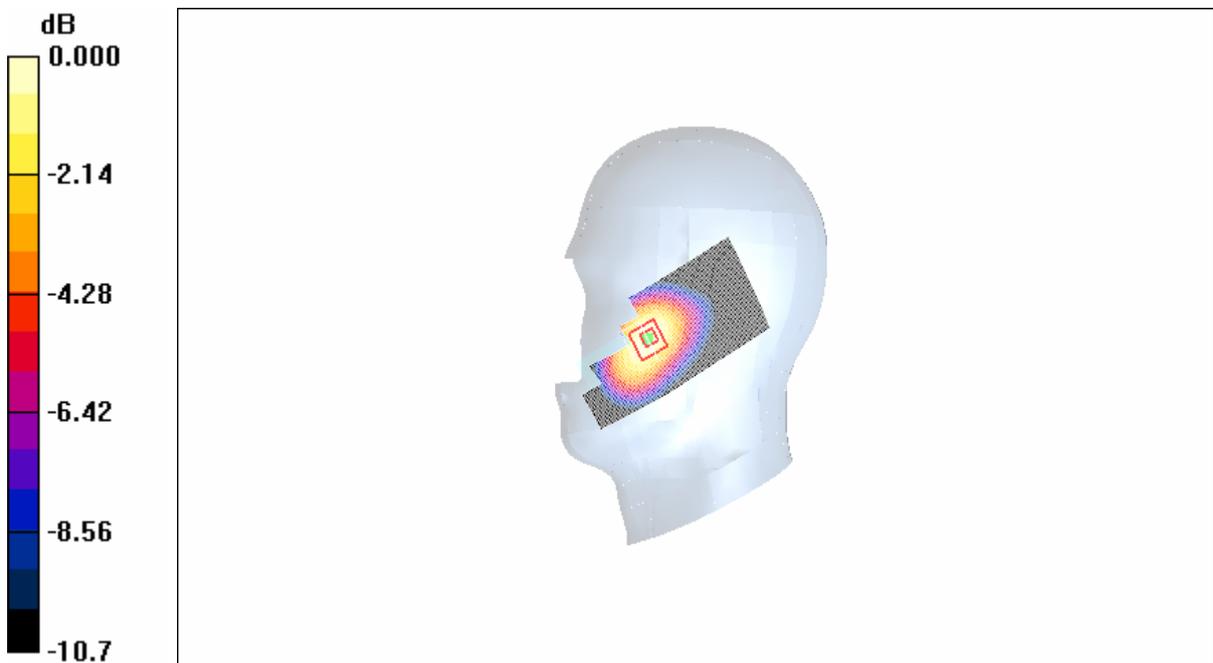Maximum value of SAR (interpolated) = 1.26 mW/g

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

Reference Value = 8.00 V/m; Power Drift = -0.200 dB

Peak SAR (extrapolated) = 1.59 W/kg

SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.757 mW/g

Maximum value of SAR (measured) = 1.21 mW/g

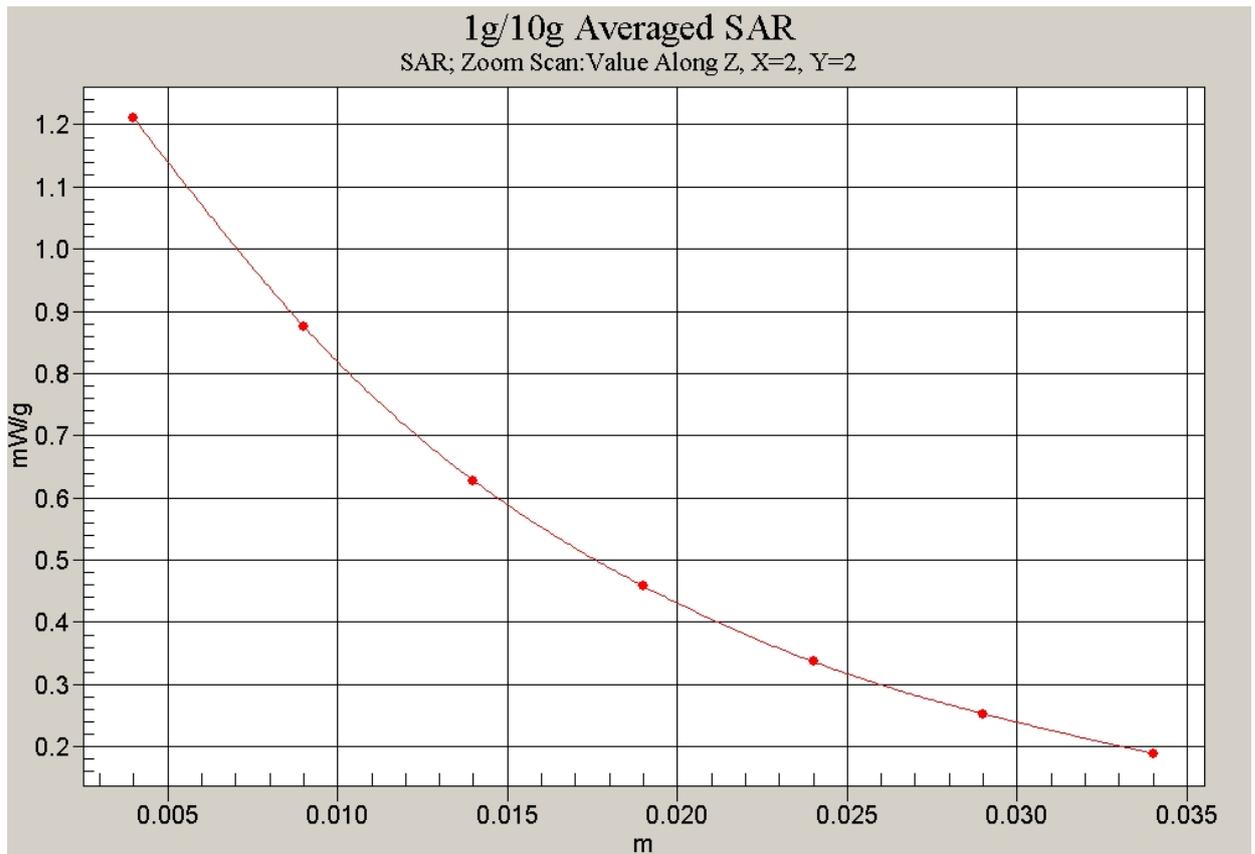0 dB = 1.21mW/g

Fig. 13 Right Hand Touch Cheek CDMA 835MHz CH777

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

CDMA 1X Right Cheek Middle

Electronics: 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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.564 mW/g

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

Reference Value = 5.65 V/m; Power Drift = 0.183 dB

Peak SAR (extrapolated) = 0.761 W/kg

SAR(1 g) = 0.542 mW/g; SAR(10 g) = 0.361 mW/g

Maximum value of SAR (measured) = 0.575 mW/g

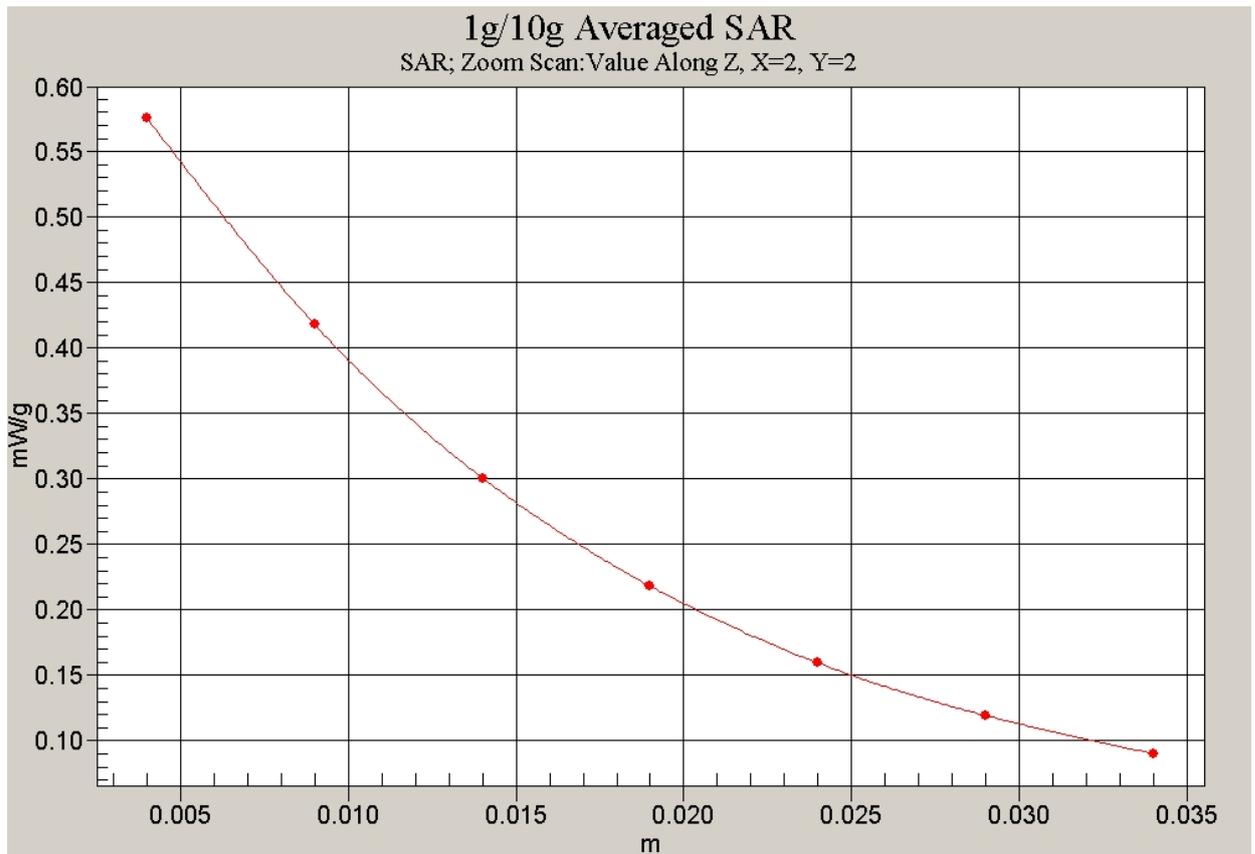0 dB = 0.575mW/g

Fig.15 Right Hand Touch Cheek CDMA 835MHz CH384

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

CDMA 1X Right Cheek Low

Electronics: 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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

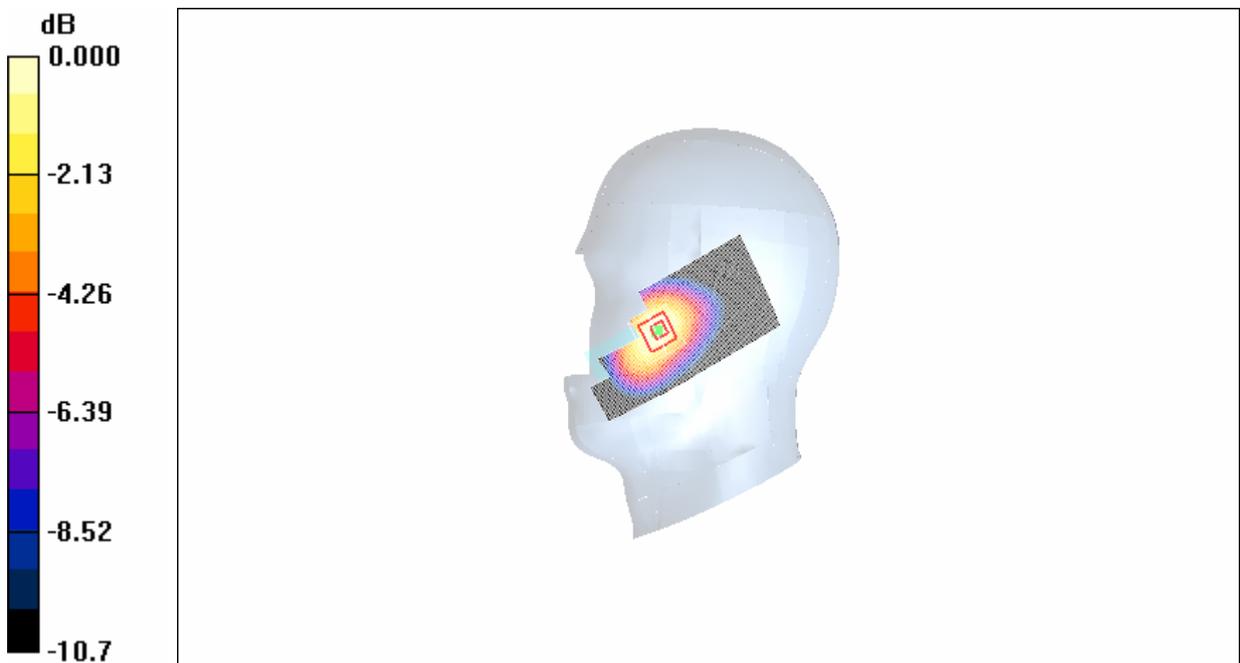Maximum value of SAR (interpolated) = 0.671 mW/g

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

Reference Value = 5.99 V/m; Power Drift = -0.125 dB

Peak SAR (extrapolated) = 0.878 W/kg

SAR(1 g) = 0.620 mW/g; SAR(10 g) = 0.412 mW/g

Maximum value of SAR (measured) = 0.660 mW/g

0 dB = 0.660mW/g
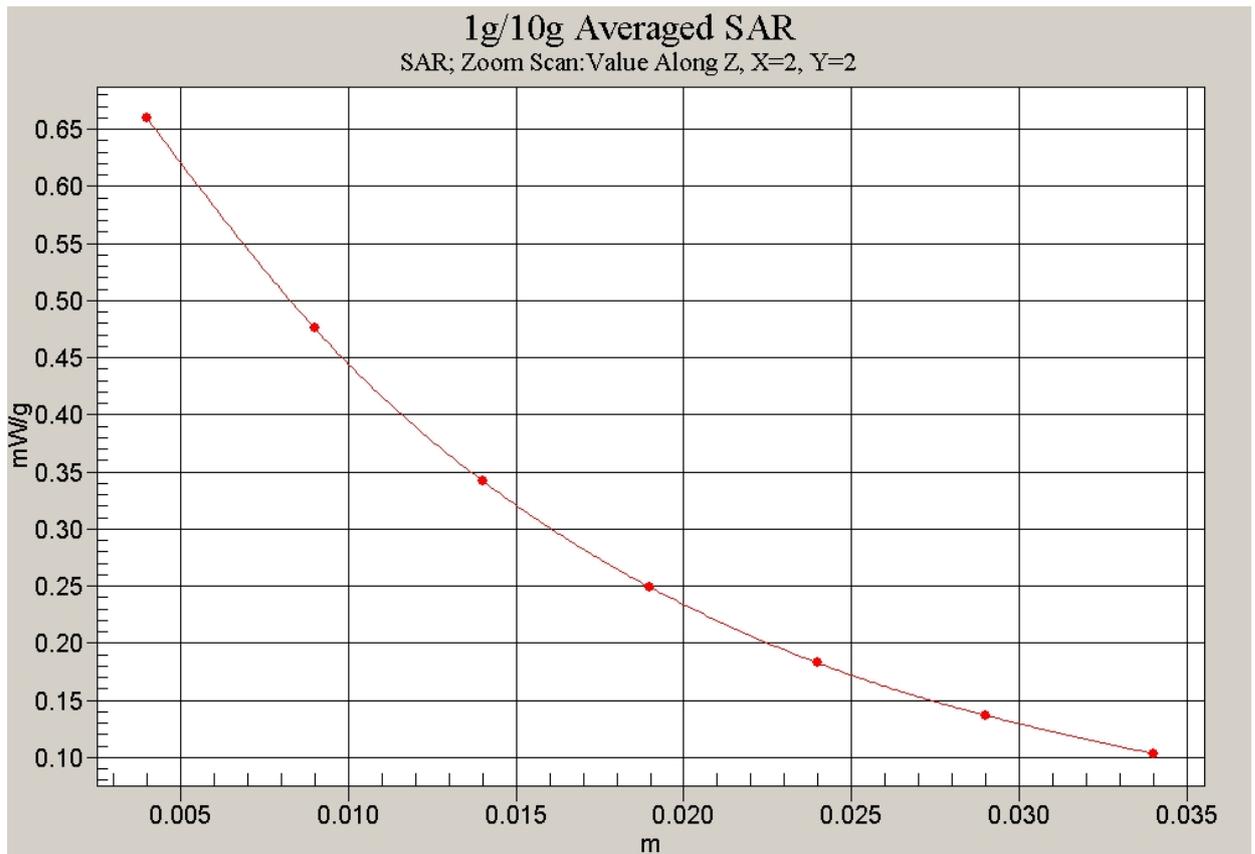
Fig. 17 Right Hand Touch Cheek CDMA 835MHz CH1013

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

CDMA 1X Right Tilt High

Electronics: 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 (51x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.360 mW/g

Tilt High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.1 V/m; Power Drift = 0.103 dB
Peak SAR (extrapolated) = 0.436 W/kg
SAR(1 g) = 0.341 mW/g; SAR(10 g) = 0.250 mW/g
Maximum value of SAR (measured) = 0.362 mW/g

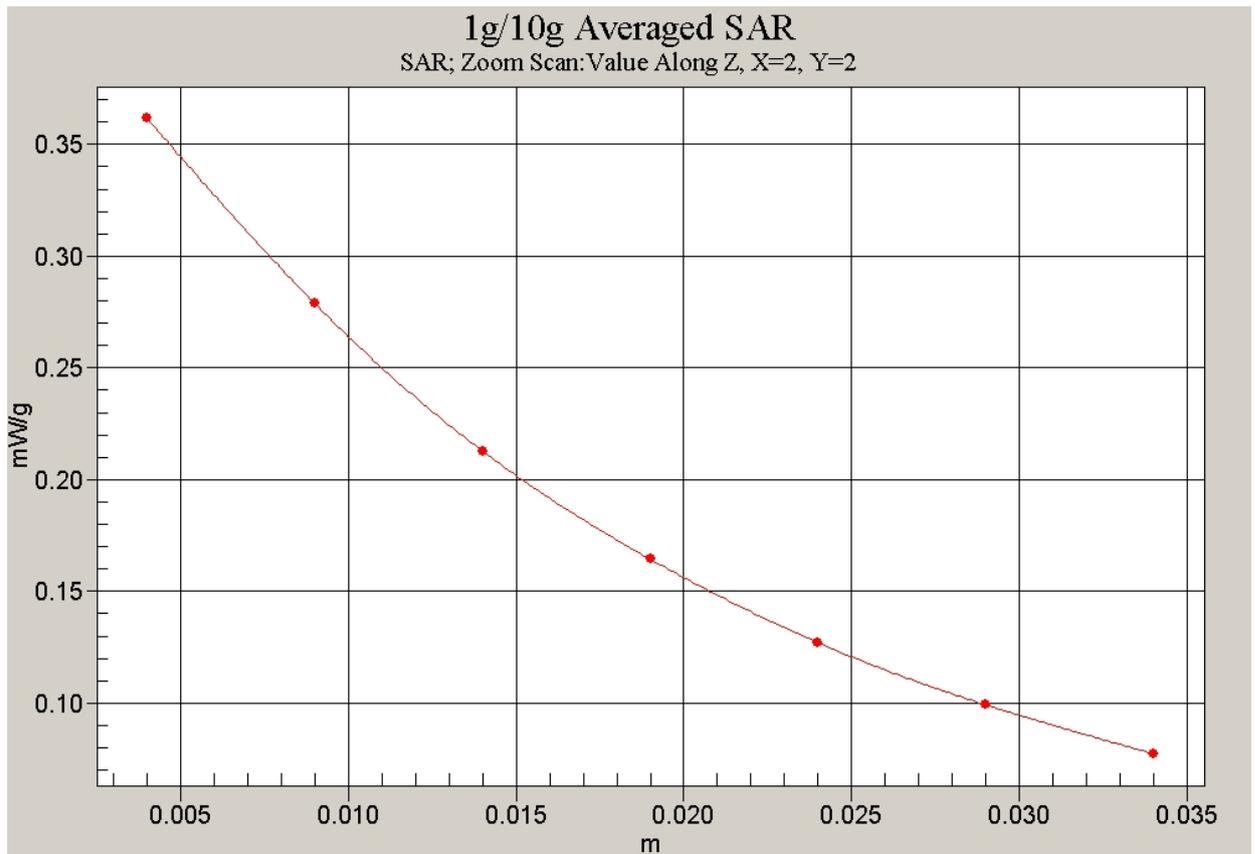0 dB = 0.362mW/g

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

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

CDMA 1X Right Tilt Middle

Electronics: 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 (51x111x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.177 mW/g

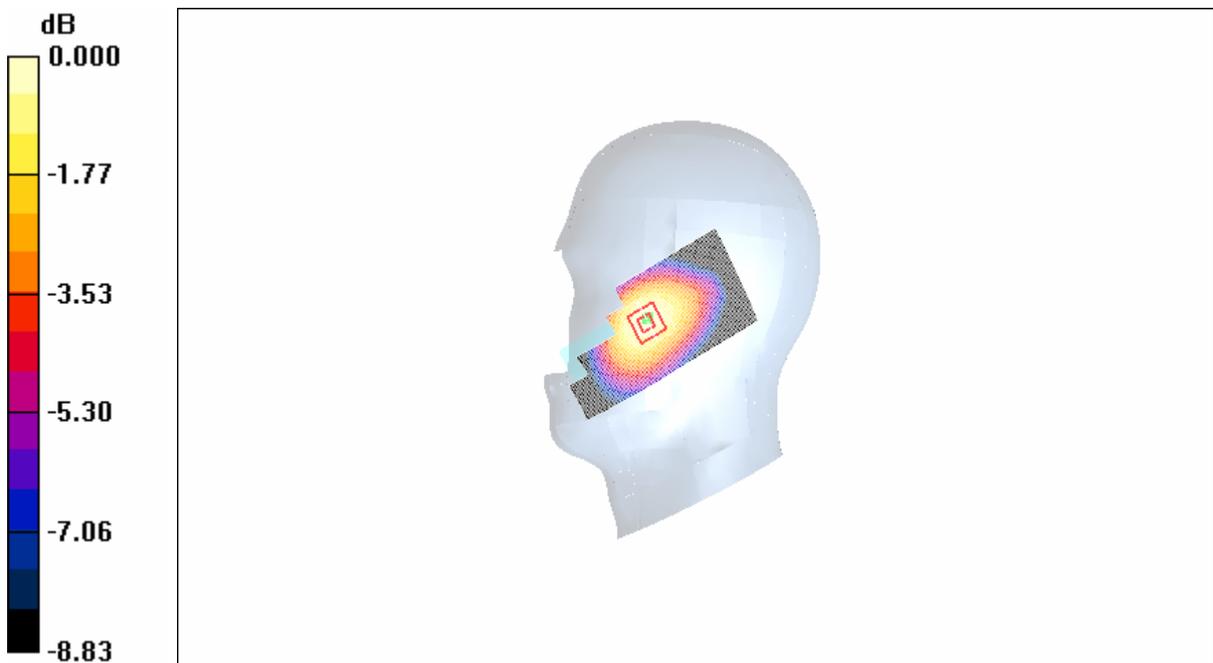**Tilt Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.58 V/m; Power Drift = 0.074 dB
Peak SAR (extrapolated) = 0.218 W/kg
SAR(1 g) = 0.170 mW/g; SAR(10 g) = 0.124 mW/g
Maximum value of SAR (measured) = 0.181 mW/g

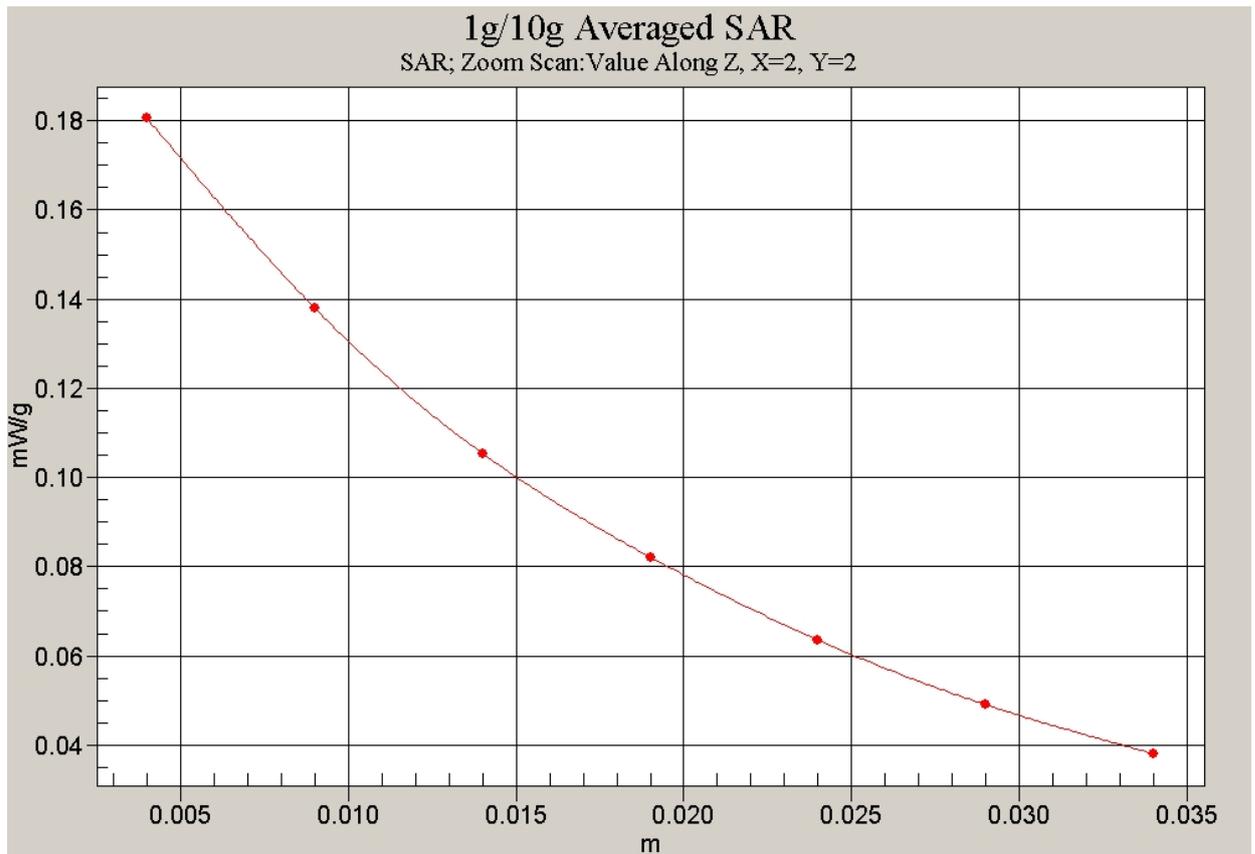0 dB = 0.181mW/g

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

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

CDMA 1X Right Tilt Low

Electronics: 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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.247 mW/g

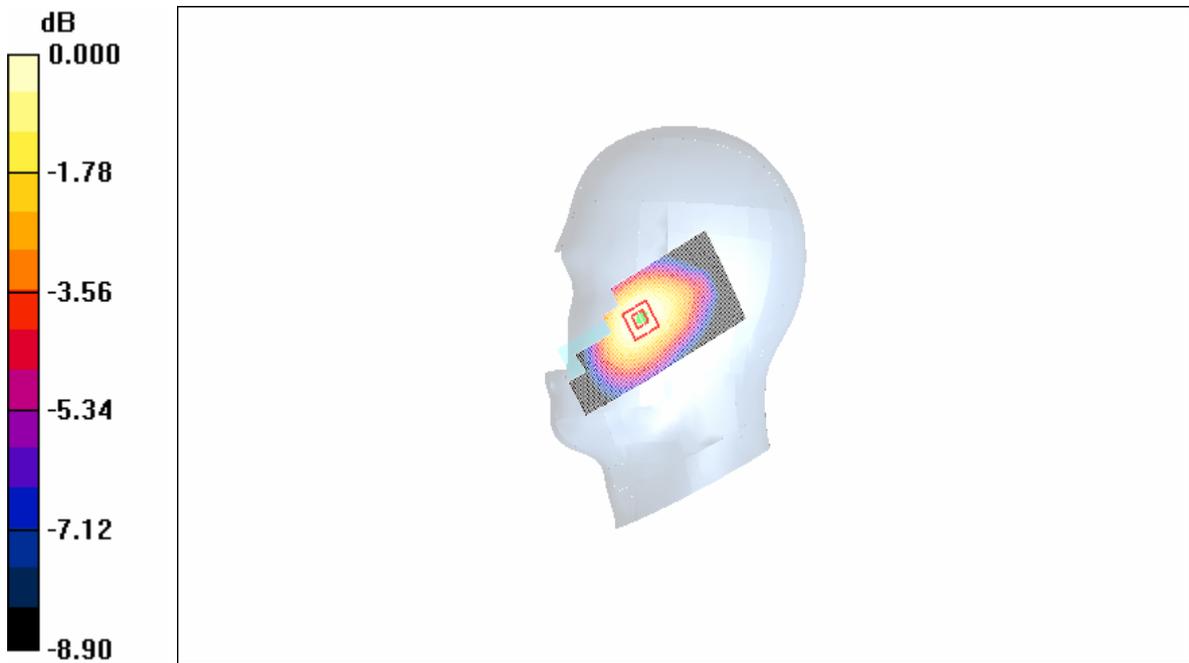**Tilt Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.56 V/m; Power Drift = -0.200 dB

Peak SAR (extrapolated) = 0.274 W/kg

SAR(1 g) = 0.214 mW/g; SAR(10 g) = 0.156 mW/g

Maximum value of SAR (measured) = 0.228 mW/g

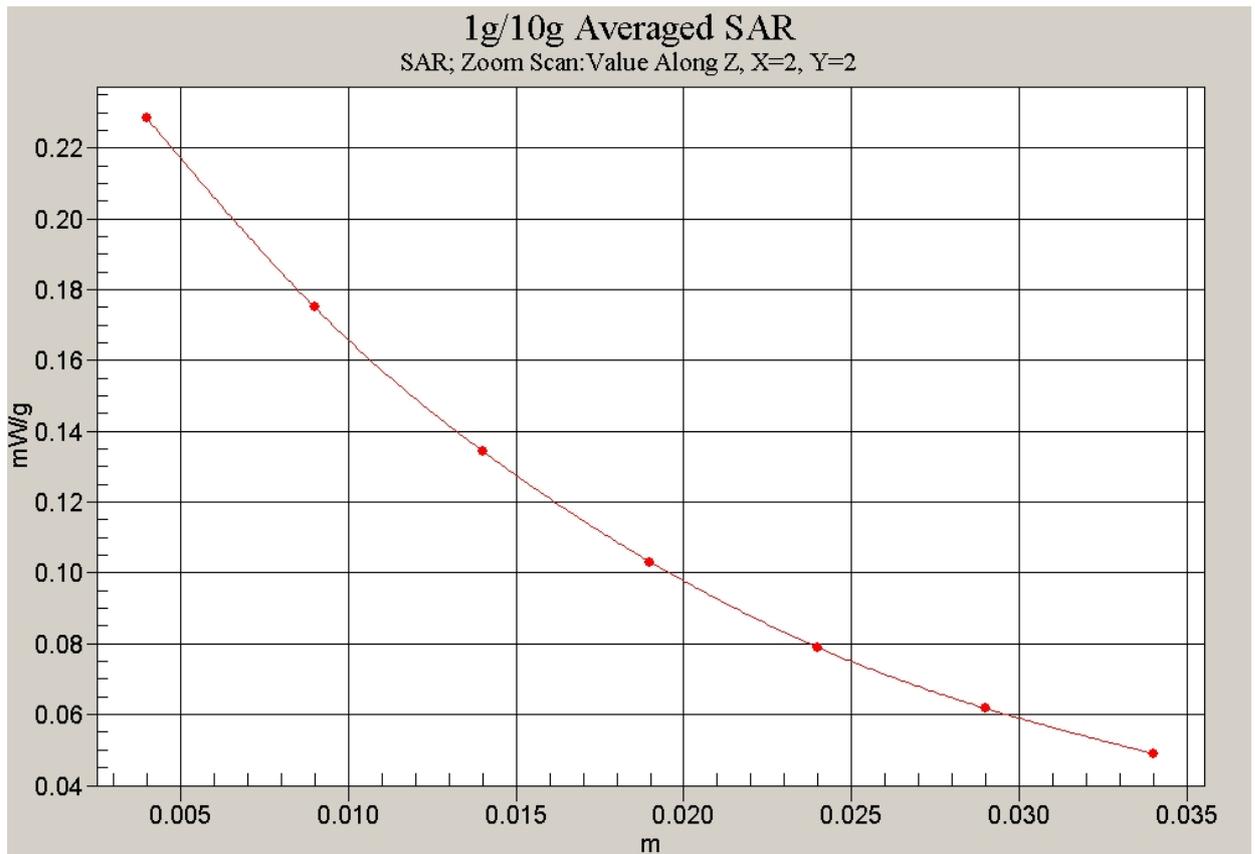0 dB = 0.228mW/g

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

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

CDMA 1X Body Toward Ground High

Electronics: 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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.895 mW/g

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

Reference Value = 30.8 V/m; Power Drift = -0.200 dB

Peak SAR (extrapolated) = 1.02 W/kg

SAR(1 g) = 0.764 mW/g; SAR(10 g) = 0.528 mW/g

Maximum value of SAR (measured) = 0.818 mW/g

0 dB = 0.818mW/g

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

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

CDMA 1X Body Toward 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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

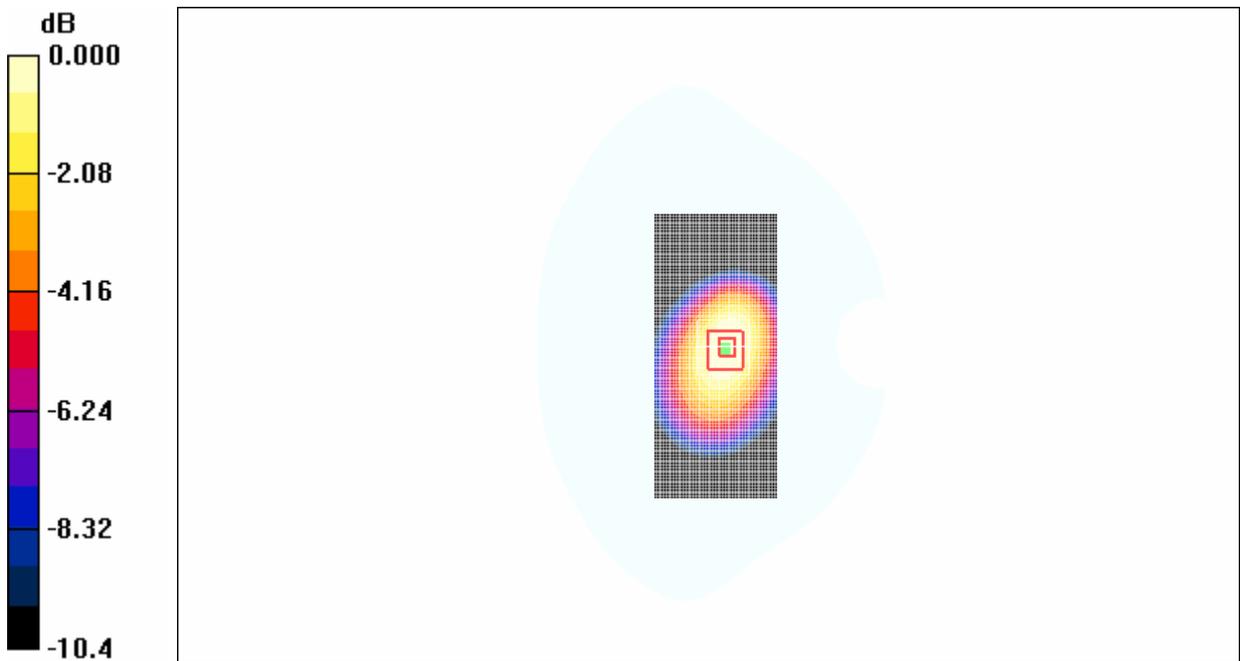Maximum value of SAR (interpolated) = 0.417 mW/g

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

Reference Value = 20.4 V/m; Power Drift = -0.200 dB

Peak SAR (extrapolated) = 0.490 W/kg

SAR(1 g) = 0.367 mW/g; SAR(10 g) = 0.254 mW/g

Maximum value of SAR (measured) = 0.393 mW/g

0 dB = 0.393mW/g

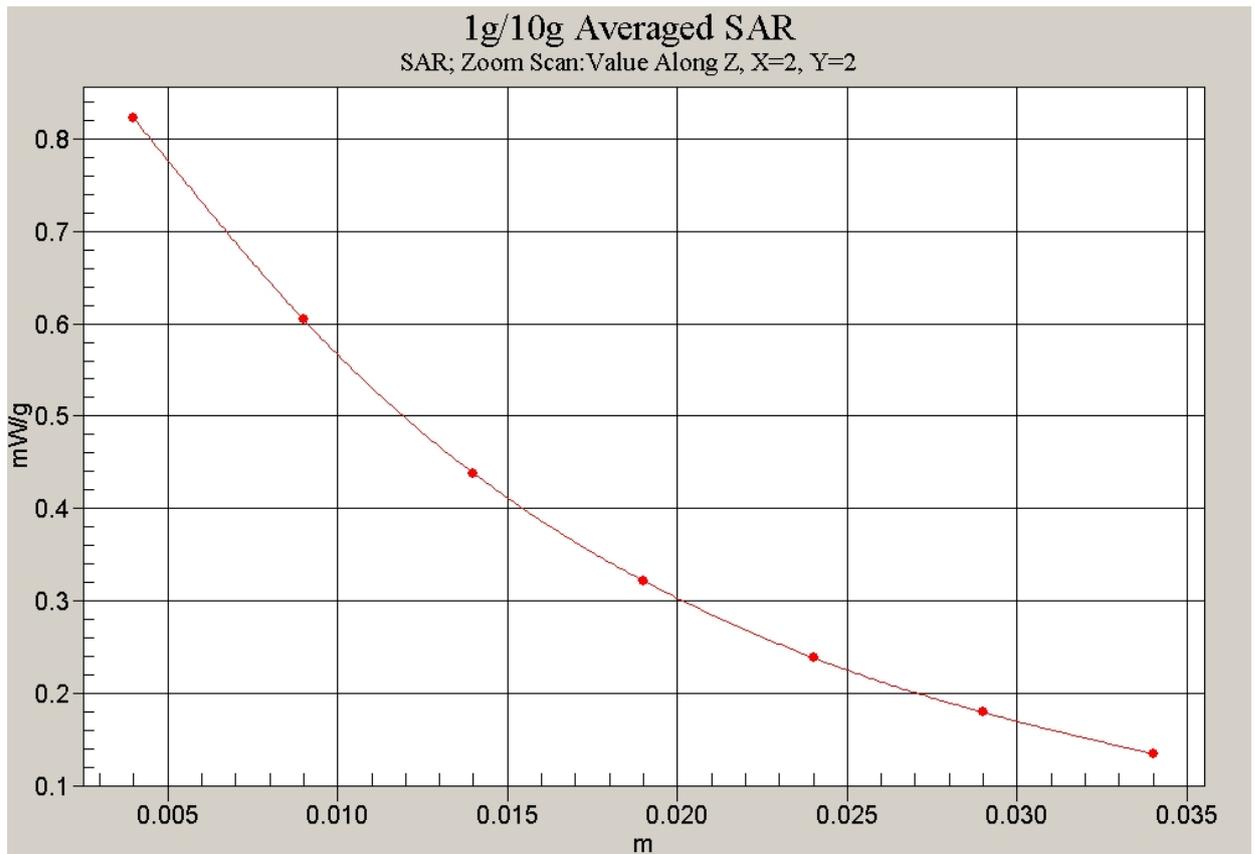**Fig. 27 CDMA 835MHz, Body, Towards Ground CH384**

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

CDMA 1X Body Toward 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 (51x111x1): Measurement grid: dx=10mm, dy=10mm

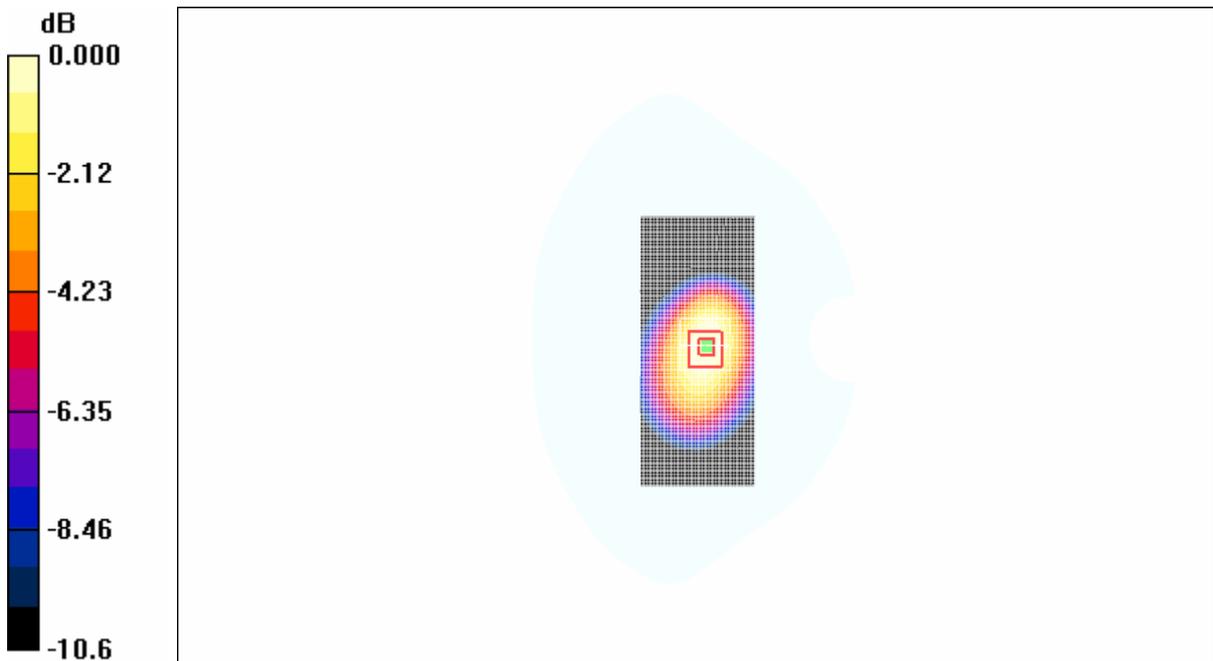Maximum value of SAR (interpolated) = 0.411 mW/g

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

Reference Value = 19.6 V/m; Power Drift = 0.030 dB

Peak SAR (extrapolated) = 0.510 W/kg

SAR(1 g) = 0.382 mW/g; SAR(10 g) = 0.264 mW/g

Maximum value of SAR (measured) = 0.411 mW/g

0 dB = 0.411mW/g
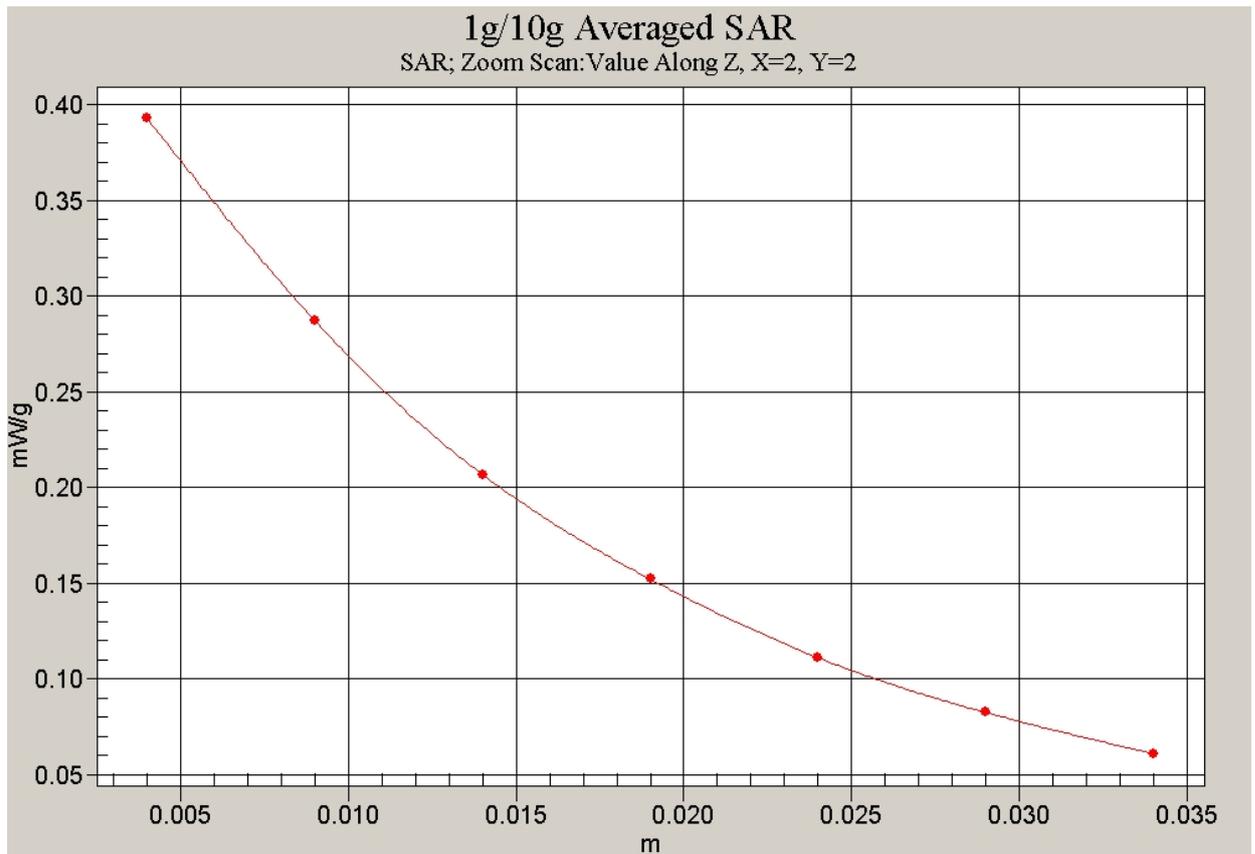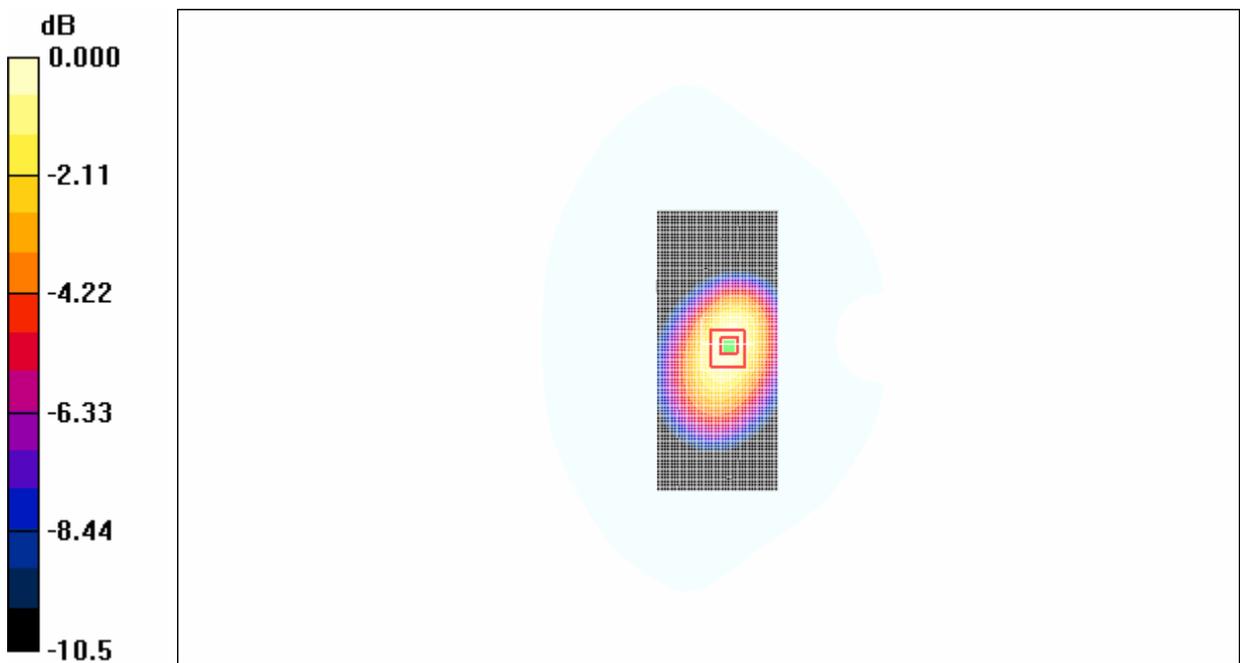
Fig. 28 CDMA 835MHz, Body, Towards Ground CH1013
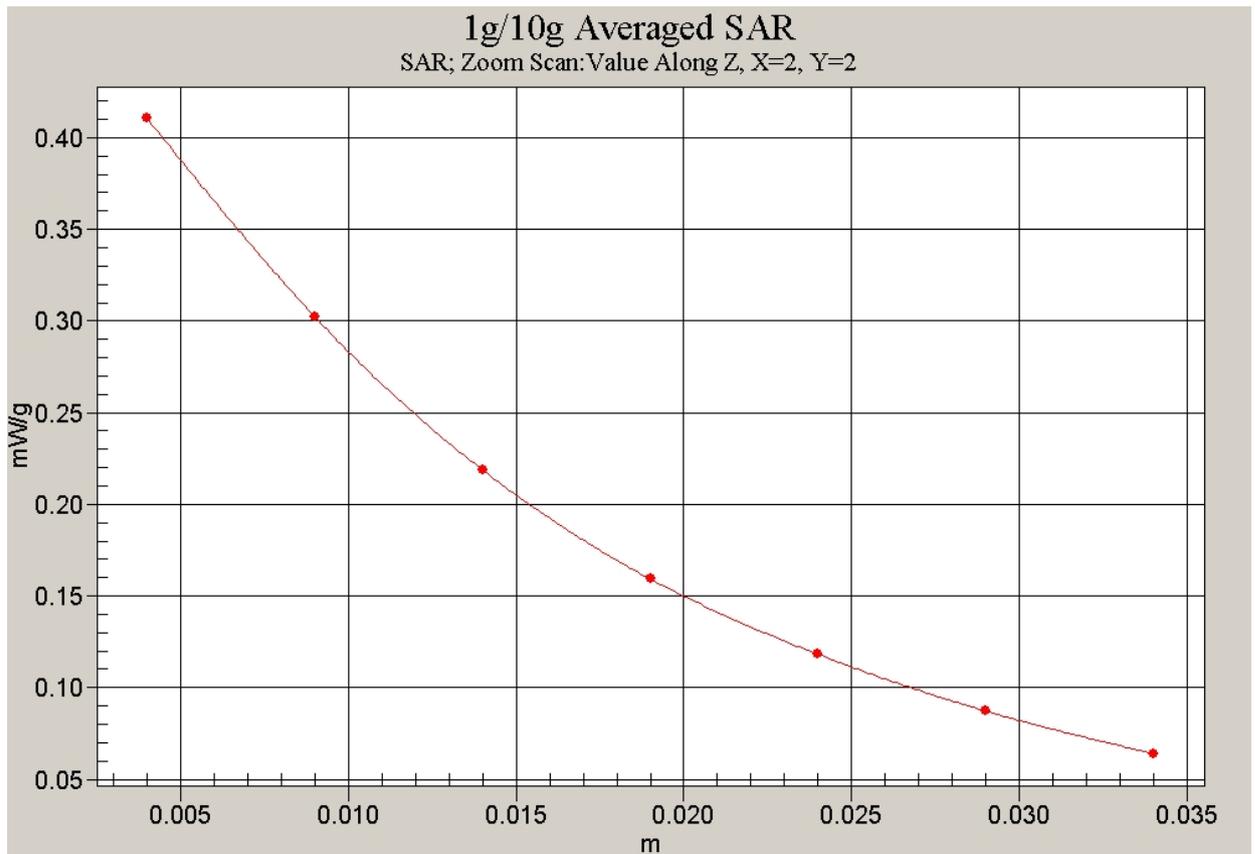
Fig. 30 Z-Scan at power reference point (CDMA 835MHz, Body, CH1013)

ANNEX D 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.31 validation 835MHz 250mW

ANNEX E 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
   Swiss Calibration Service

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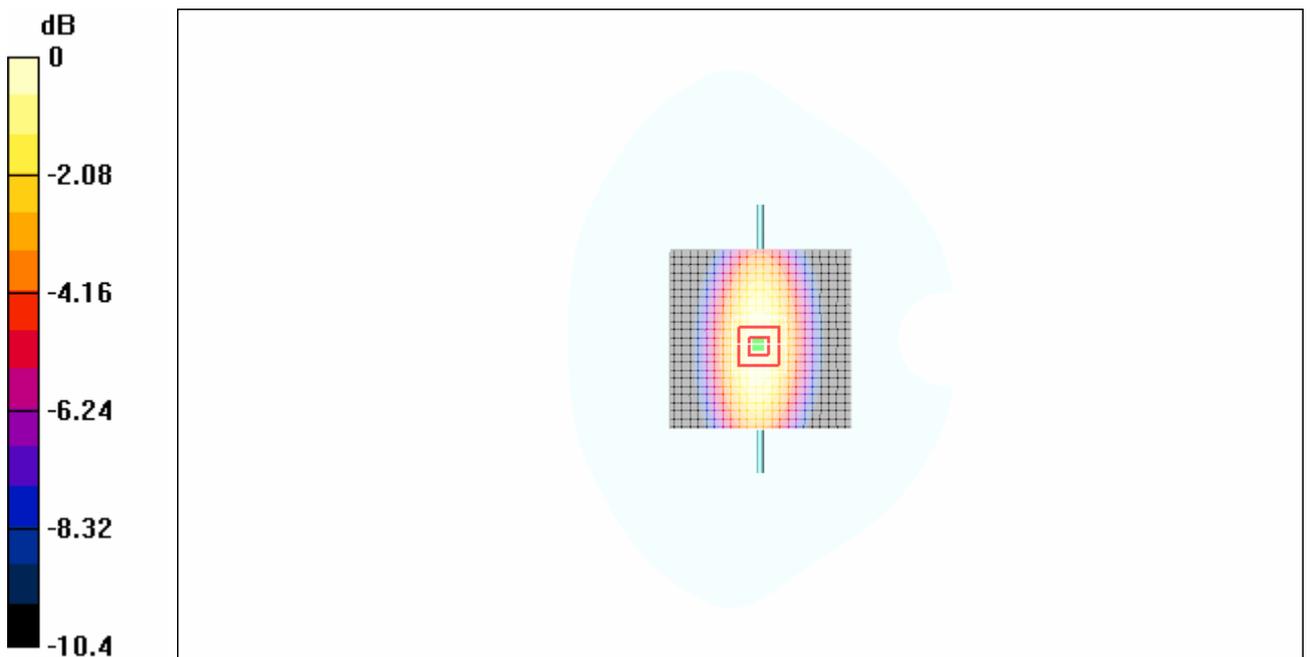The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

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	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 18, 2005

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

Certificate No: ET3-1736_Jul05   Page 1 of 9

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

S   Schweizerischer Kalibrierdienst
C   Service suisse d'étalonnage
C   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.

ET3DV6 SN:1736

July 14, 2005

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]

Diode Compression[B]

NormX	1.86 ± 10.1%	$\mu V/(V/m)^2$	DCP X	97 mV
NormY	1.90 ± 10.1%	$\mu V/(V/m)^2$	DCP Y	97 mV
NormZ	1.89 ± 10.1%	$\mu V/(V/m)^2$	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).

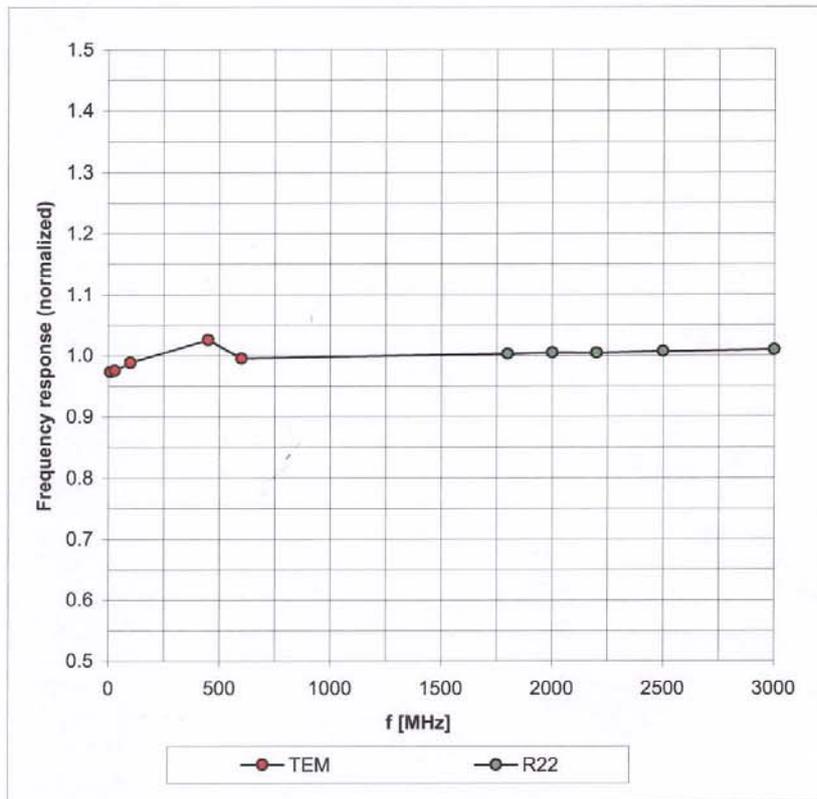[B] Numerical linearization parameter: uncertainty not required.

ET3DV6 SN:1736   July 14, 2005

Frequency Response of E-Field
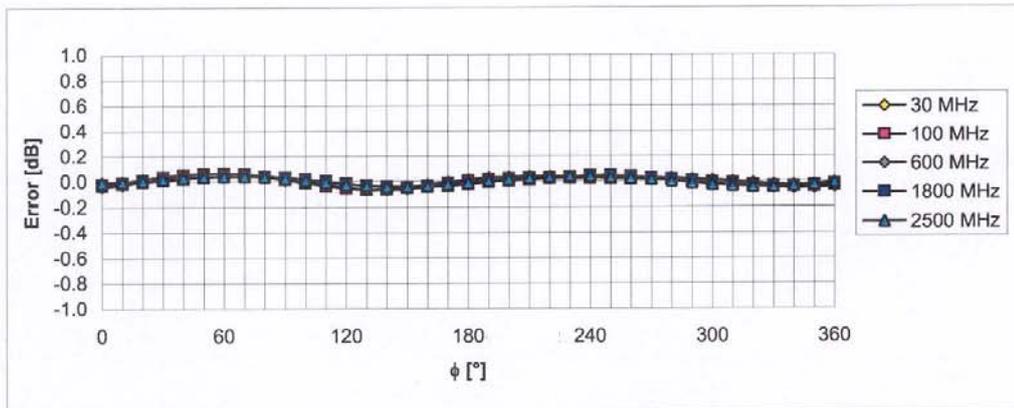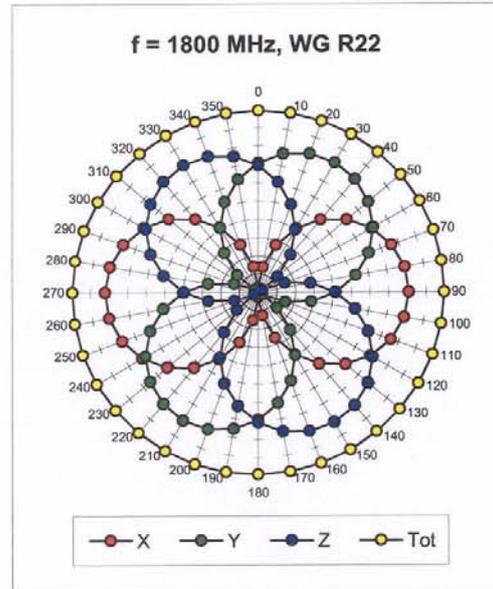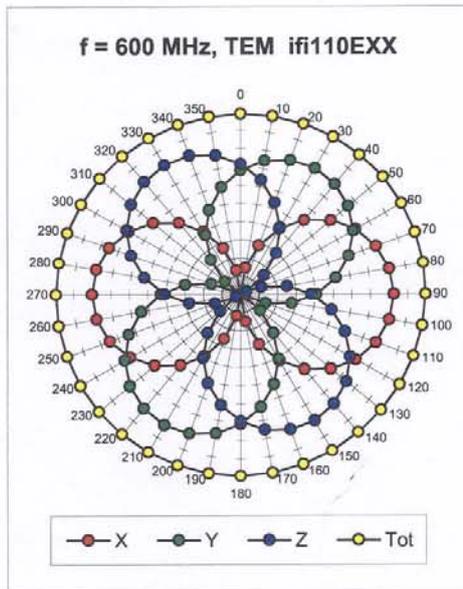
(TEM-Cell:ifi110 EXX, Waveguide: R22)

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

ET3DV6 SN:1736   July 14, 2005

Receiving Pattern (φ), ϑ = 0°

f = 600 MHz, TEM ifi110EXX

f = 1800 MHz, WG R22

Legend: X — Y — Z — Tot

Legend: 30 MHz, 100 MHz, 600 MHz, 1800 MHz, 2500 MHz
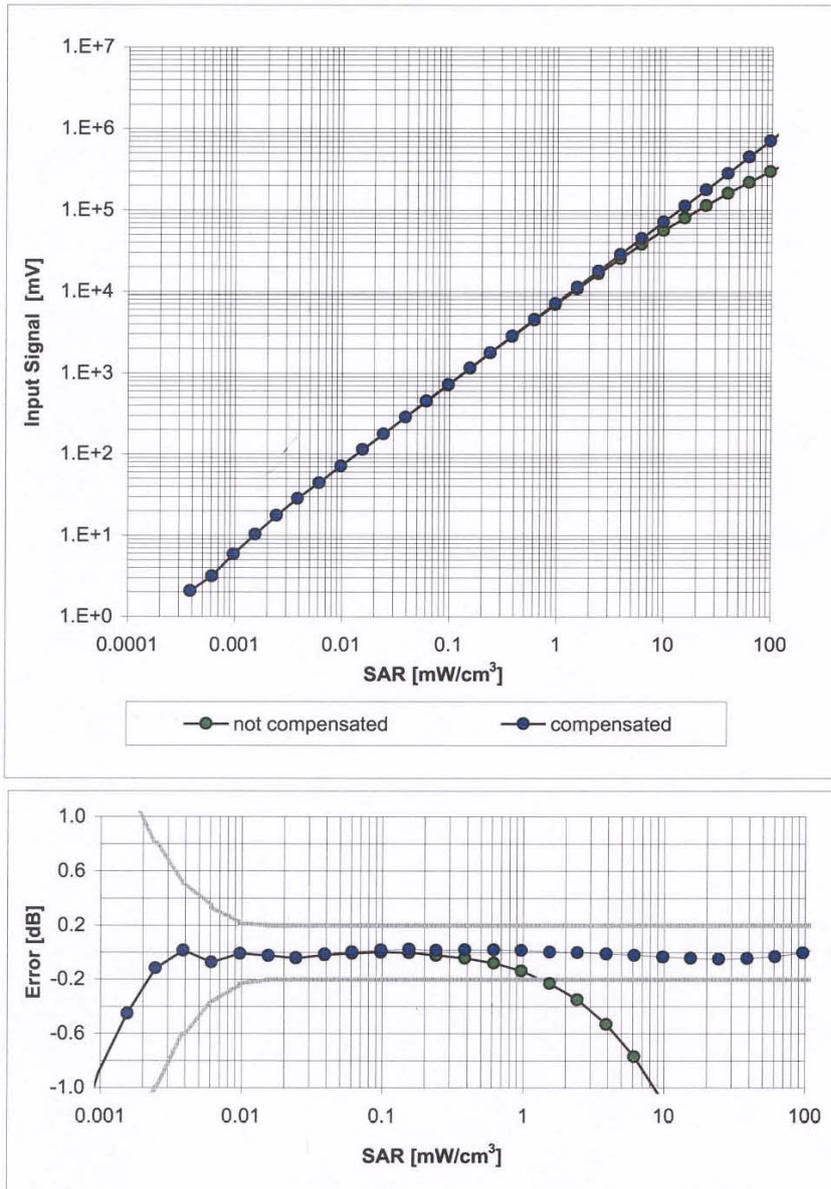
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

Dynamic Range f(SAR_head)
(Waveguide R22, f = 1800 MHz)

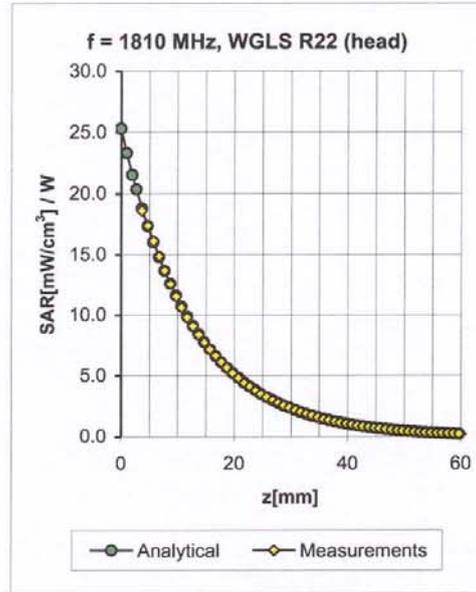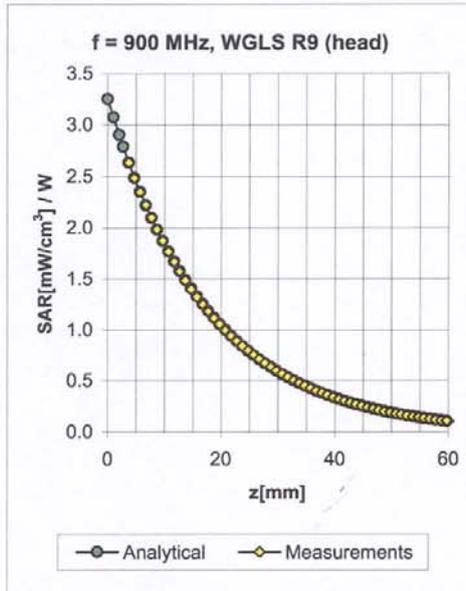**Uncertainty of Linearity Assessment: ± 0.6% (k=2)**

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.

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Deviation from Isotropy in HSL
Error (φ, ϑ), f = 900 MHz
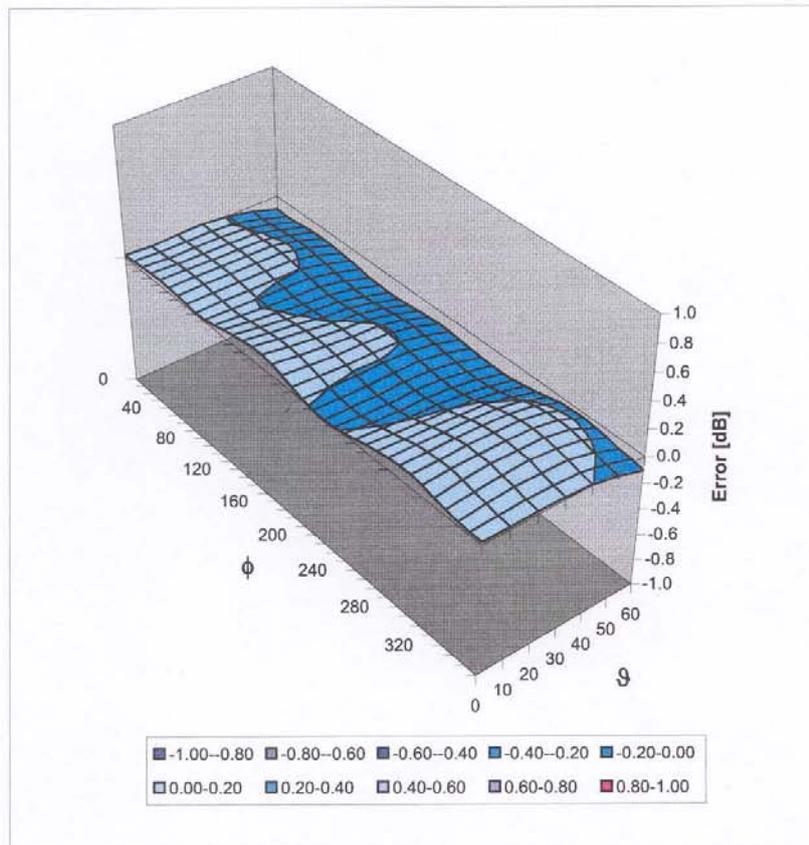
Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)