

CDMA Cellular Right Tilt Low

Communication System: CDMA Cellular; Frequency: 824.7 MHz; Duty Cycle: 1:1

Medium: Head 835MHz

Medium parameters used: $f = 825$ MHz; $\sigma = 0.916$ mho/m; $\epsilon_r = 41.7$; $\rho = 1000$ kg/m³

- Probe: ET3DV6 - SN1737; ConvF(6.85, 6.85, 6.85);

- Electronics: DAE3 Sn452;

Right Tilt Low/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.471 mW/g

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

Reference Value = 21.9 V/m; Power Drift = -0.161 dB

Peak SAR (extrapolated) = 0.644 W/kg

SAR(1 g) = 0.464 mW/g; SAR(10 g) = 0.319 mW/g

Maximum value of SAR (measured) = 0.499 mW/g

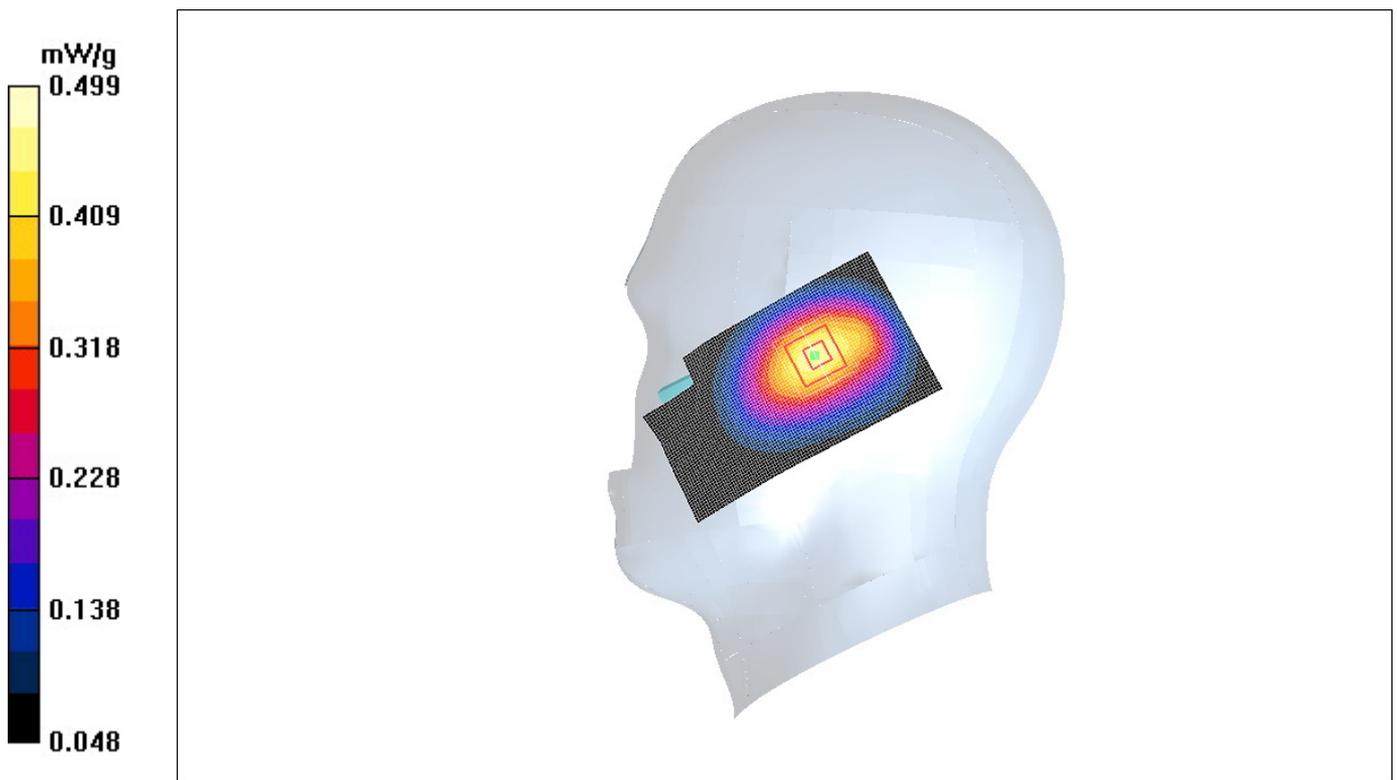


Fig. 29 Right Hand Tilt 15°CDMA 835MHz CH1013



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

CDMA Cellular Towards the phantom High

Communication System: CDMA Cellular; Frequency: 848.31 MHz; Duty Cycle: 1:1
Medium: Body 835MHz Medium parameters used (interpolated): $f = 848.31$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 55.2$; $\rho = 1000$ kg/m³
- Probe: ET3DV6 - SN1737; ConvF(6.52, 6.52, 6.52);
- Electronics: DAE3 Sn452;

Towards the phantom, High /Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.508 mW/g

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

Reference Value = 17.9 V/m; Power Drift = -0.022 dB

Peak SAR (extrapolated) = 0.610 W/kg

SAR(1 g) = 0.476 mW/g; SAR(10 g) = 0.343 mW/g

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

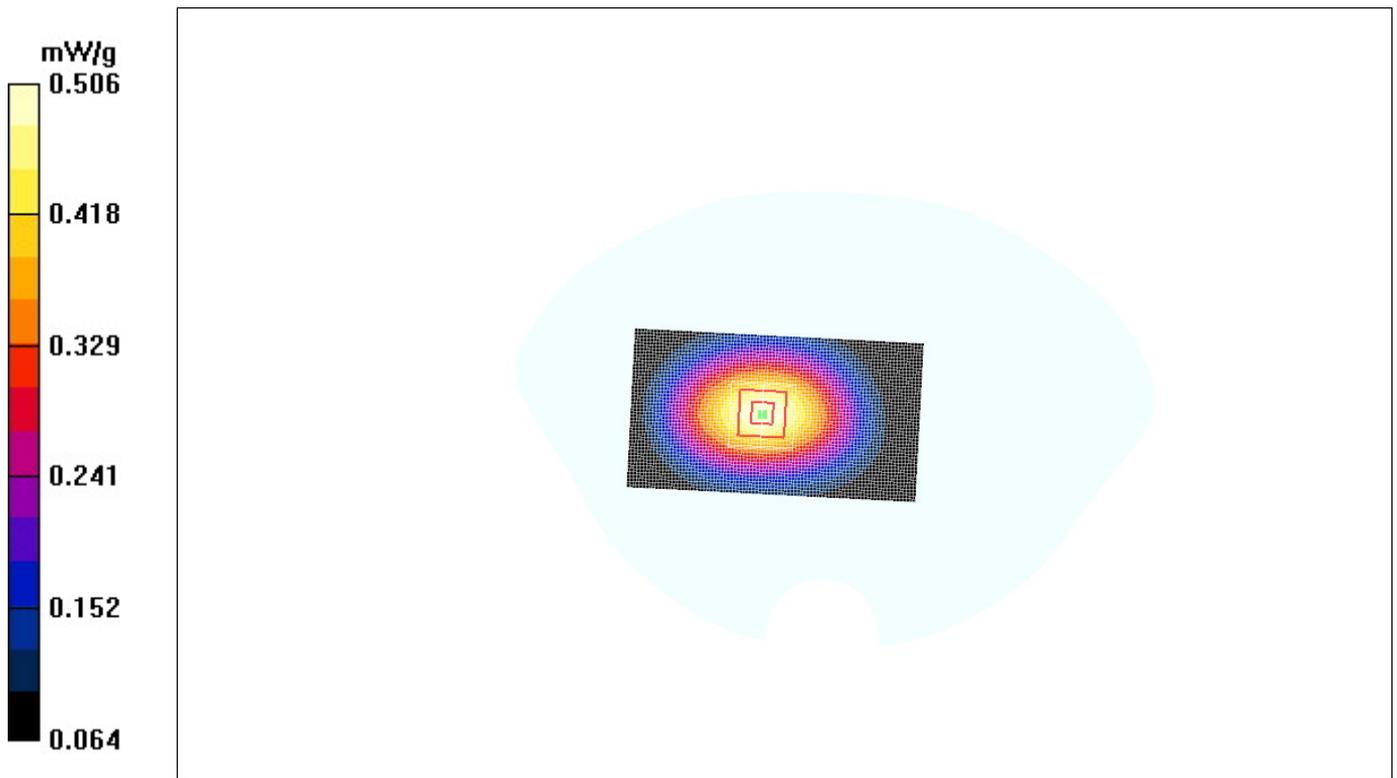


Fig. 31 CDMA 835MHz, Body, Towards Phantom, CH777

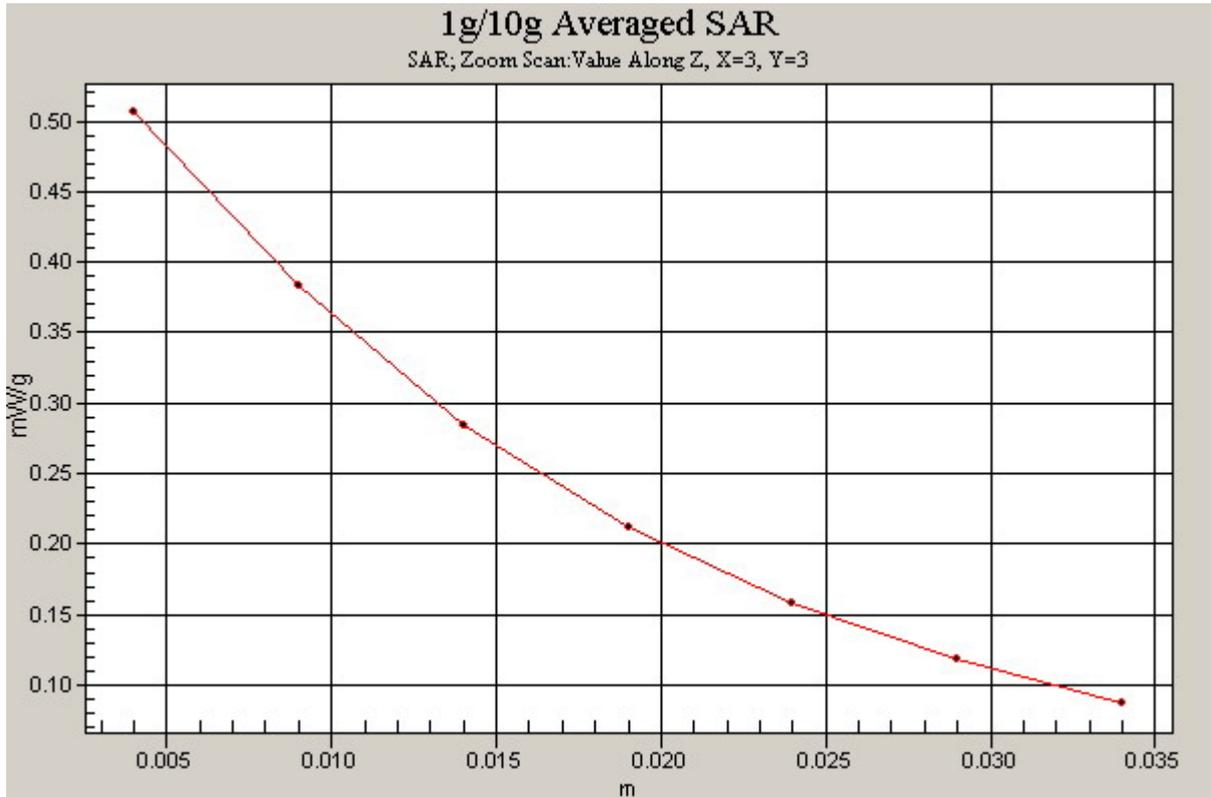


Fig. 32 Z-Scan at power reference point (CDMA 835MHz, Body, Towards Phantom, CH777)

CDMA Cellular Towards the phantom Middle

Communication System: CDMA Cellular; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: Body 835MHz

Medium parameters used: $f = 837$ MHz; $\sigma = 0.996$ mho/m; $\epsilon_r = 55.3$; $\rho = 1000$ kg/m³

- Probe: ET3DV6 - SN1737; ConvF(6.52, 6.52, 6.52);

- Electronics: DAE3 Sn452;

Towards the phantom, Middle /Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.257 mW/g

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

Reference Value = 12.4 V/m; Power Drift = 0.099 dB

Peak SAR (extrapolated) = 0.300 W/kg

SAR(1 g) = 0.234 mW/g; SAR(10 g) = 0.169 mW/g

Maximum value of SAR (measured) = 0.251 mW/g

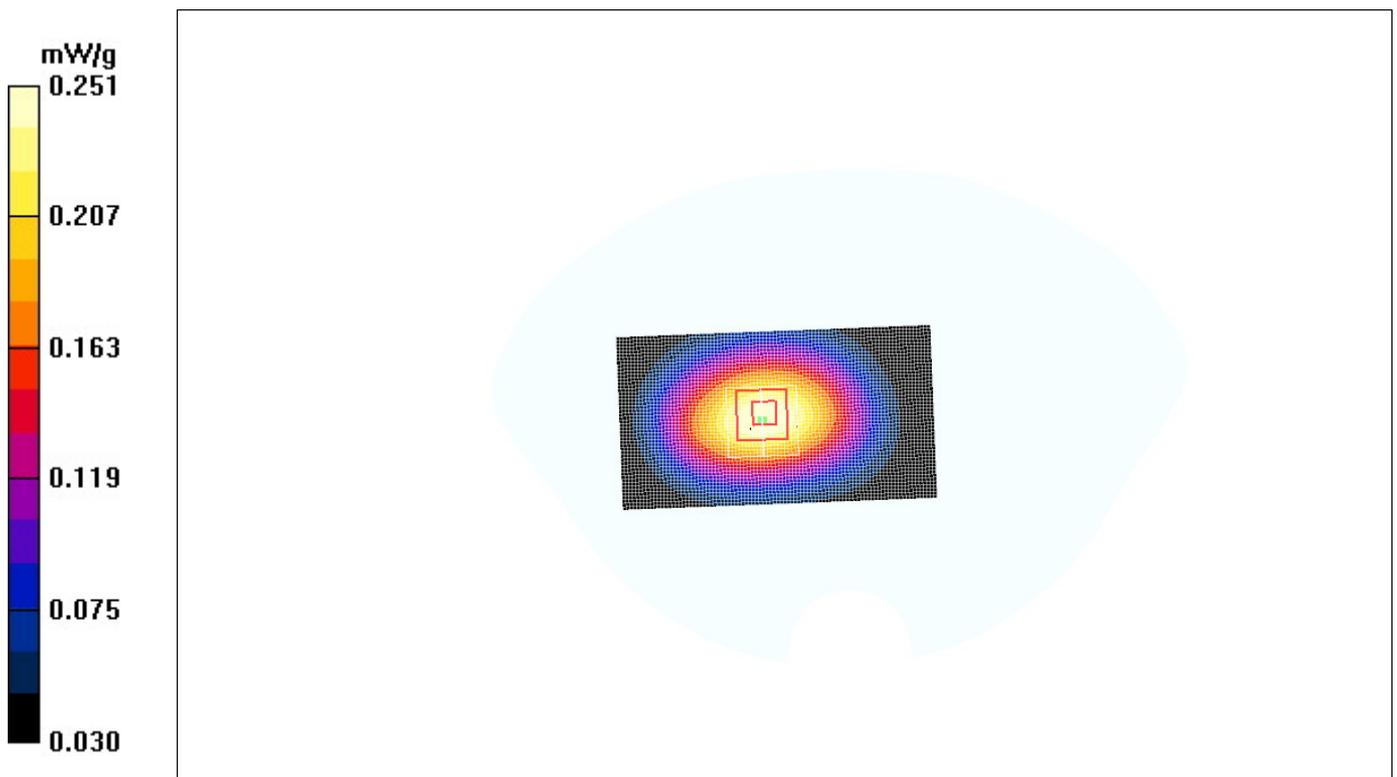


Fig. 33 CDMA 835MHz, Body, Towards Phantom, CH384

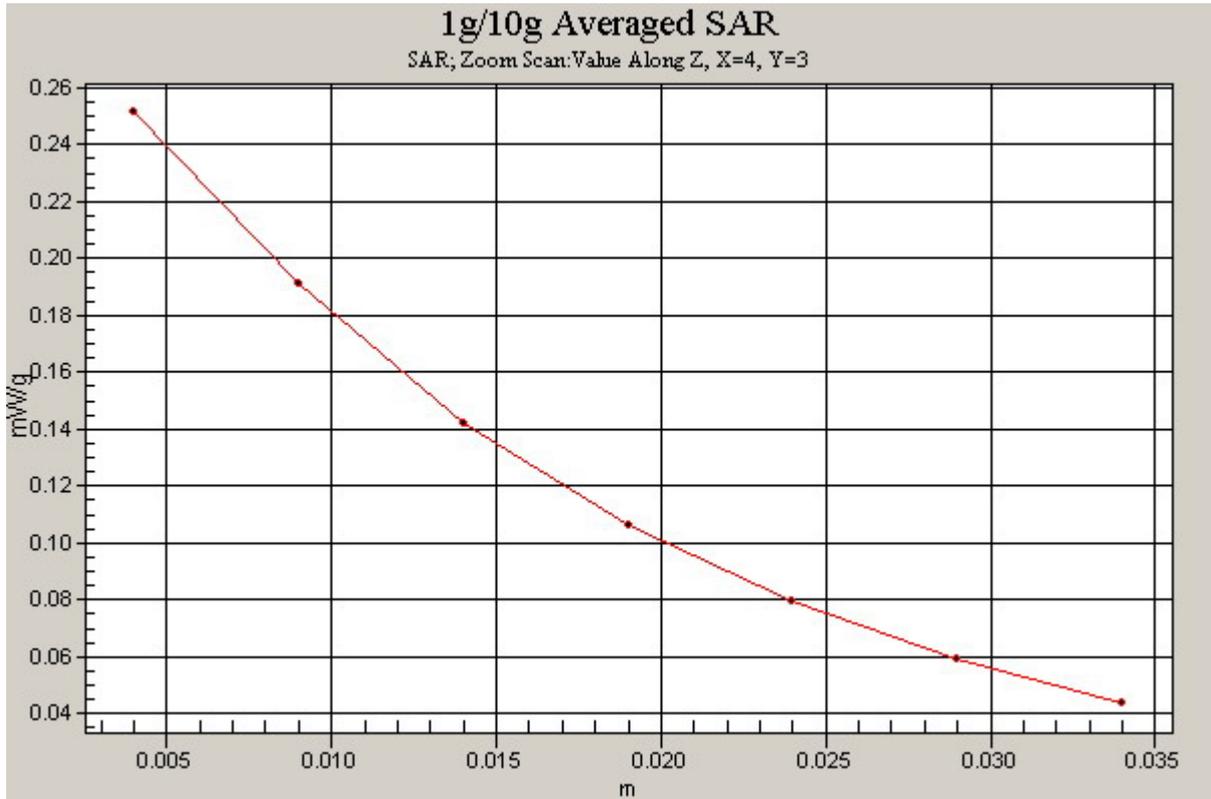


Fig. 34 Z-Scan at power reference point (CDMA 835MHz, Body, Towards Phantom, CH384)

CDMA Cellular Towards the phantom Low

Communication System: CDMA Cellular; Frequency: 824.7 MHz; Duty Cycle: 1:1

Medium: Body 835MHz

Medium parameters used: $f = 825$ MHz; $\sigma = 0.982$ mho/m; $\epsilon_r = 55.5$; $\rho = 1000$ kg/m³

- Probe: ET3DV6 - SN1737; ConvF(6.52, 6.52, 6.52);

- Electronics: DAE3 Sn452;

Towards the phantom, Low frequency/Area Scan (51x91x1): Measurement grid:
dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.273 mW/g

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

Reference Value = 13.5 V/m; Power Drift = -0.115 dB

Peak SAR (extrapolated) = 0.322 W/kg

SAR(1 g) = 0.253 mW/g; SAR(10 g) = 0.183 mW/g

Maximum value of SAR (measured) = 0.271 mW/g

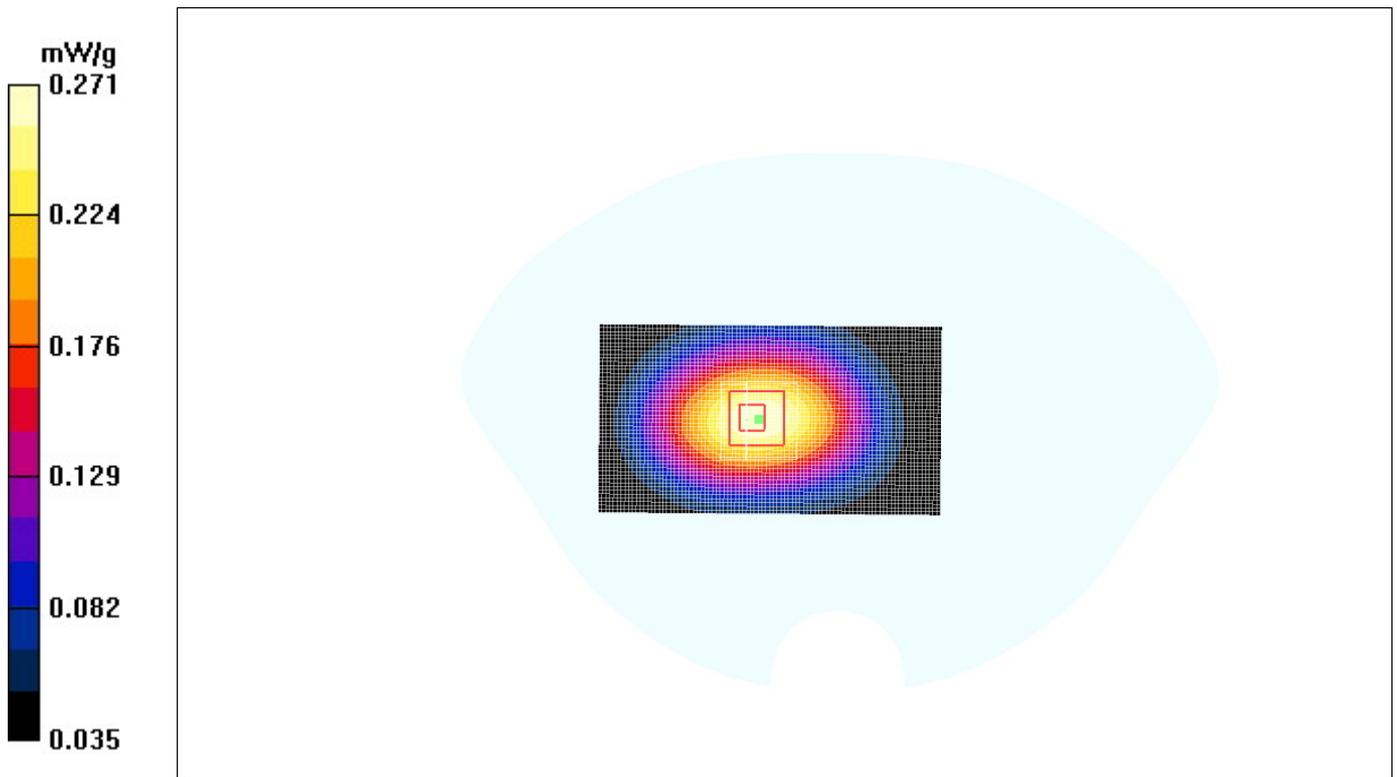


Fig. 35 CDMA 835MHz, Body, Towards Phantom, CH1013

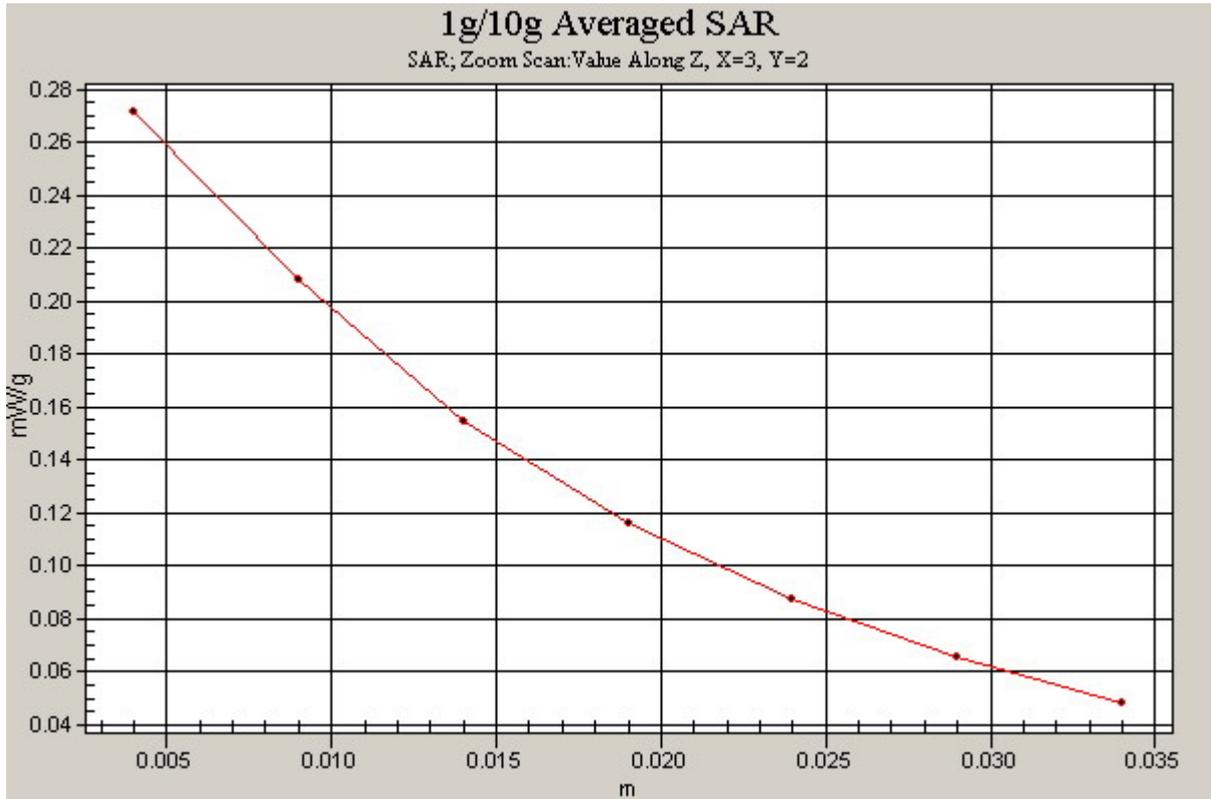


Fig. 36 Z-Scan at power reference point (CDMA 835MHz, Body, Towards Phantom, CH1013)

CDMA Cellular Towards the phantom High

Communication System: CDMA Cellular; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium: Body 835MHz

Medium parameters used (interpolated): $f = 848.31$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 55.2$; $\rho = 1000$ kg/m³

- Probe: ET3DV6 - SN1737; ConvF(6.52, 6.52, 6.52);

- Electronics: DAE3 Sn452;

Towards the ground, High /Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.08 mW/g

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

Reference Value = 21.2 V/m; Power Drift = 0.034 dB

Peak SAR (extrapolated) = 1.27 W/kg

SAR(1 g) = 0.966 mW/g; SAR(10 g) = 0.680 mW/g

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

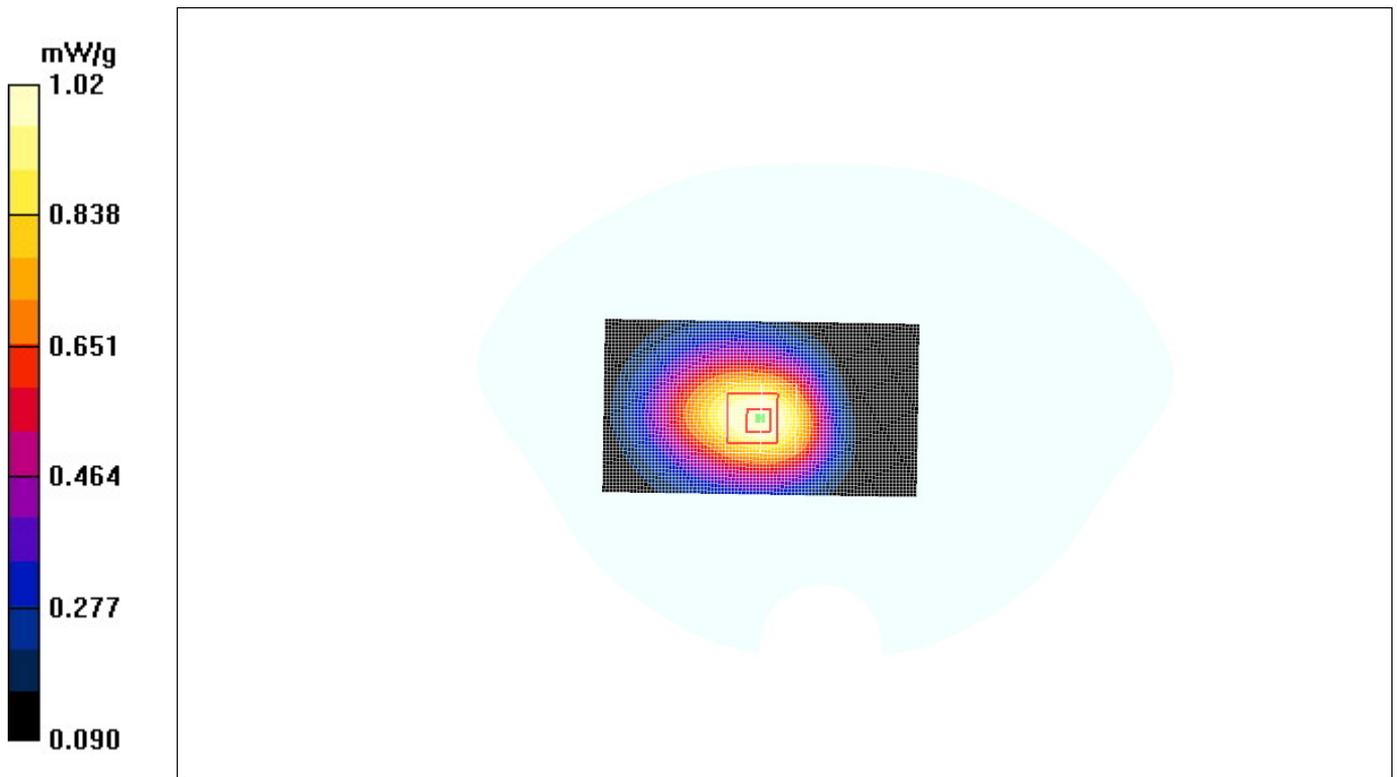


Fig. 37 CDMA 835MHz, Body, Towards Ground, CH777

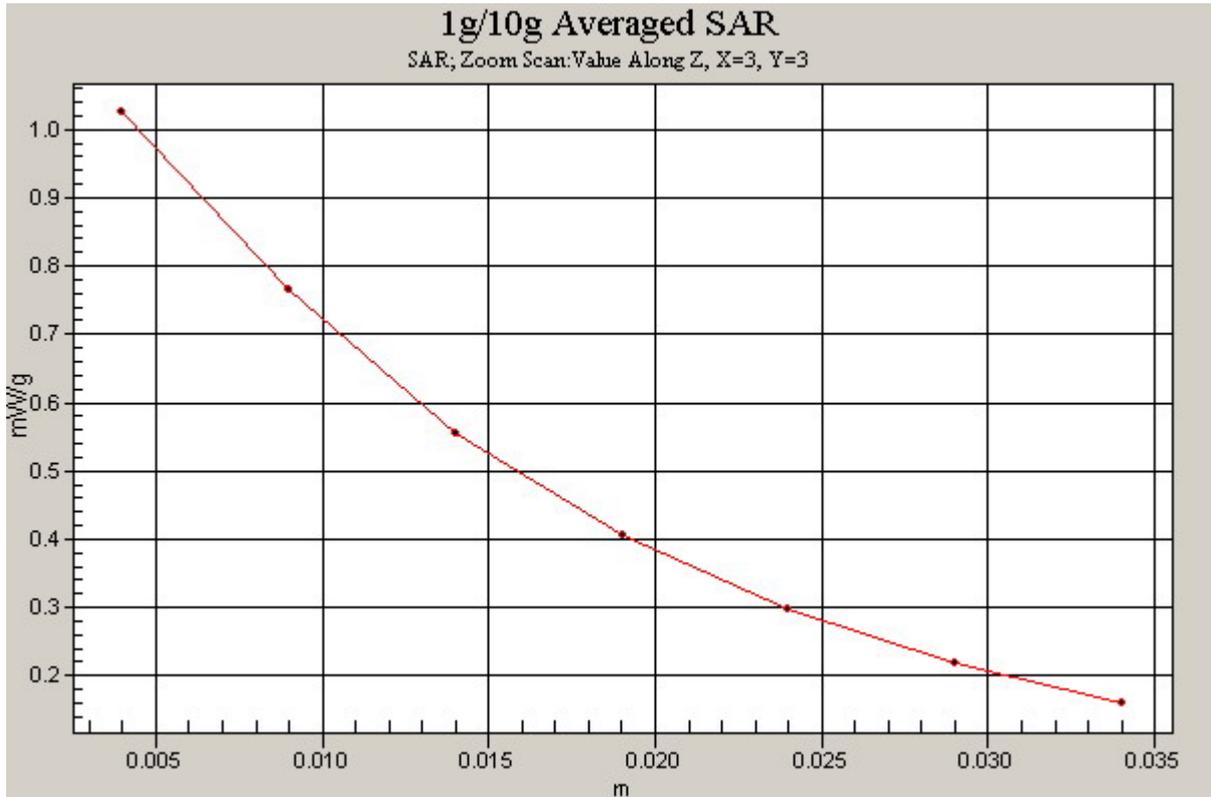


Fig. 38 Z-Scan at power reference point (CDMA 835MHz, Body, Towards Ground, CH777)

CDMA Cellular Towards the phantom Middle

Communication System: CDMA Cellular; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: Body 835MHz

Medium parameters used: $f = 837$ MHz; $\sigma = 0.996$ mho/m; $\epsilon_r = 55.3$; $\rho = 1000$ kg/m³

- Probe: ET3DV6 - SN1737; ConvF(6.52, 6.52, 6.52);

- Electronics: DAE3 Sn452;

Towards the ground, Middle /Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.782 mW/g

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

Reference Value = 19.3 V/m; Power Drift = 0.046 dB

Peak SAR (extrapolated) = 0.956 W/kg

SAR(1 g) = 0.735 mW/g; SAR(10 g) = 0.523 mW/g

Maximum value of SAR (measured) = 0.786 mW/g

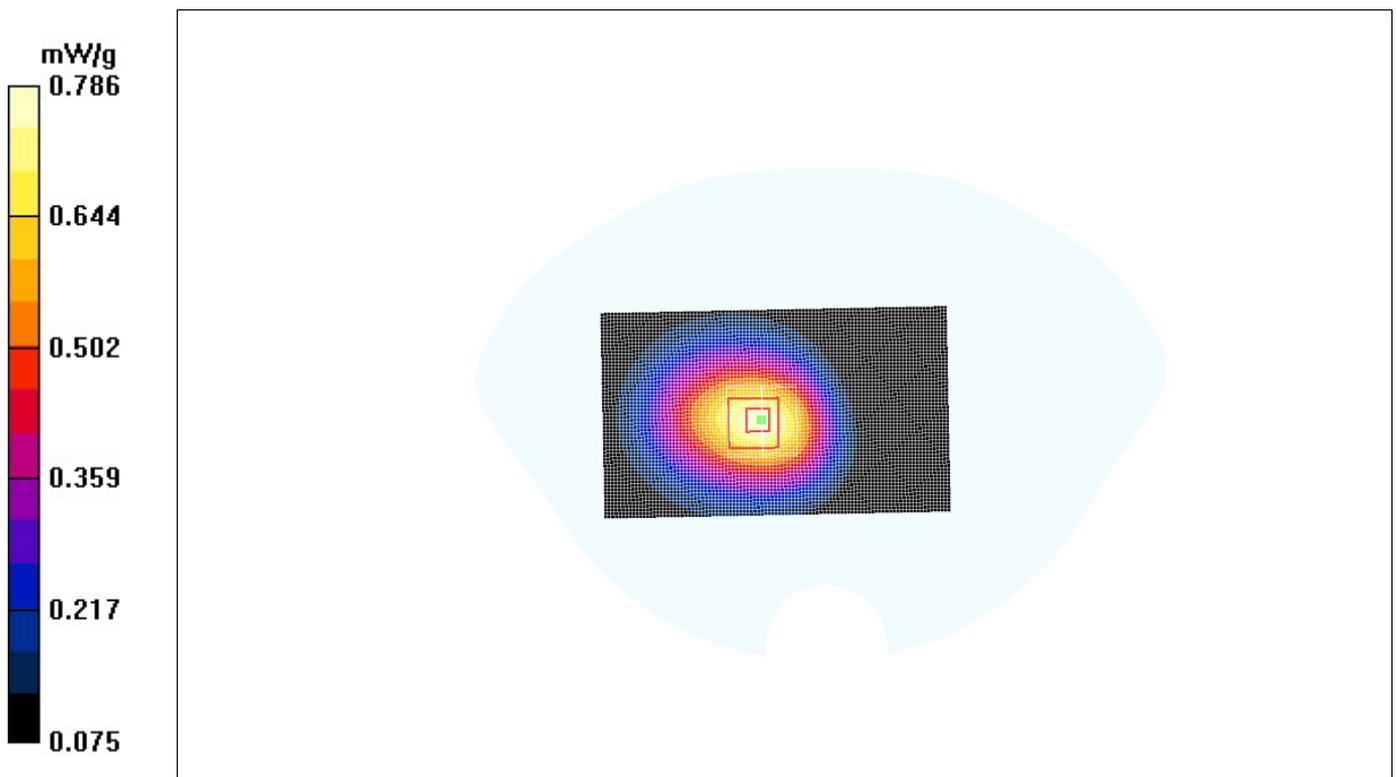


Fig. 39 CDMA 835MHz, Body, Towards Ground, CH384

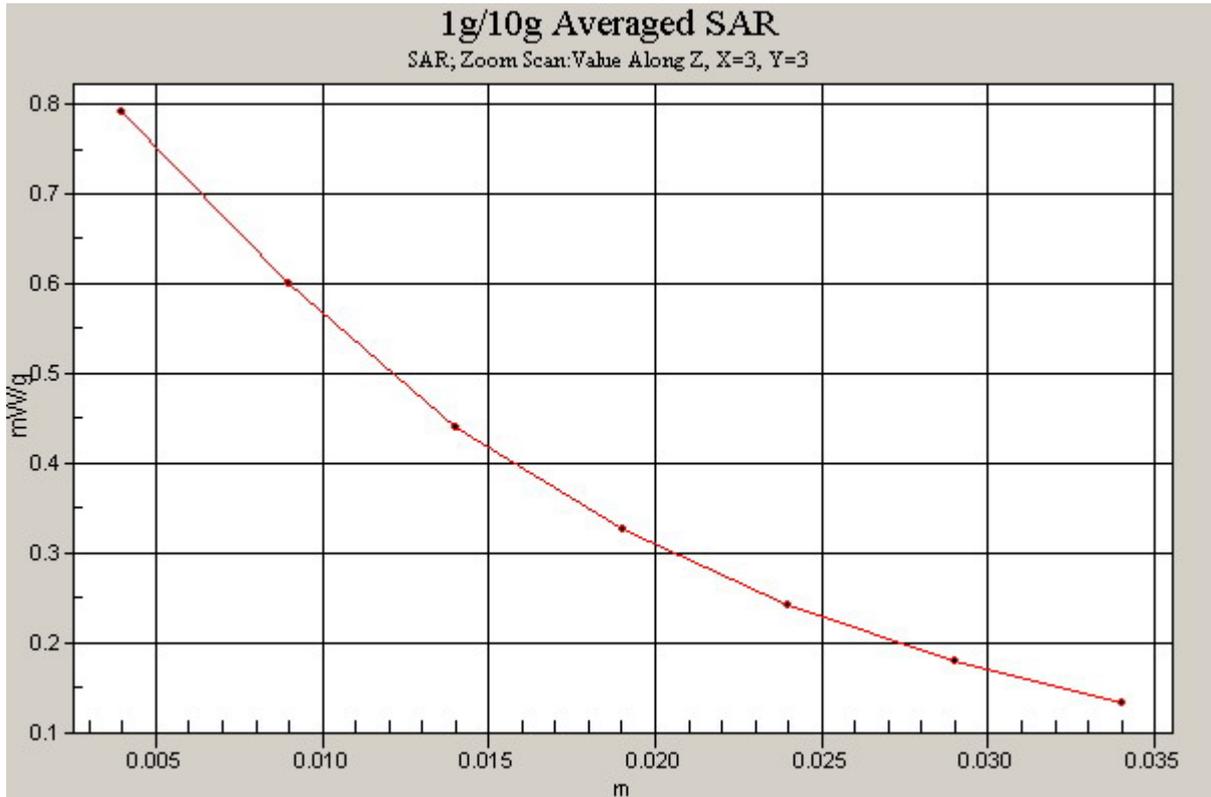


Fig. 40 Z-Scan at power reference point (CDMA 835MHz, Body, Towards Ground, CH384)

CDMA Cellular Towards the phantom Low

Communication System: CDMA Cellular; Frequency: 824.7 MHz; Duty Cycle: 1:1

Medium: Body 835MHz

Medium parameters used: $f = 825$ MHz; $\sigma = 0.982$ mho/m; $\epsilon_r = 55.5$; $\rho = 1000$ kg/m³

- Probe: ET3DV6 - SN1737; ConvF(6.52, 6.52, 6.52);

- Electronics: DAE3 Sn452;

Towards the ground, Low /Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

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

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

Reference Value = 20.8 V/m; Power Drift = -0.108 dB

Peak SAR (extrapolated) = 1.01 W/kg

SAR(1 g) = 0.783 mW/g; SAR(10 g) = 0.559 mW/g

Maximum value of SAR (measured) = 0.833 mW/g

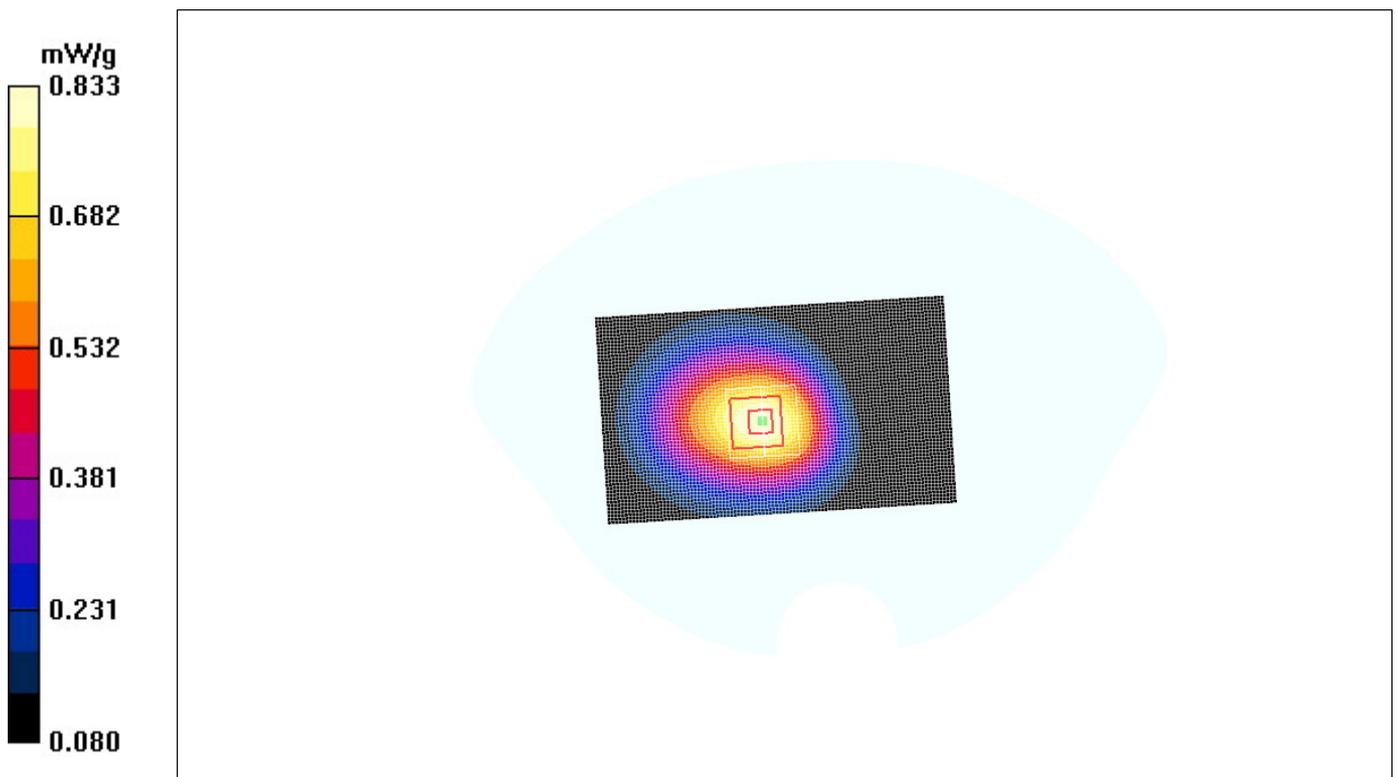


Fig. 41 CDMA 835MHz, Body, Towards Ground, CH1013

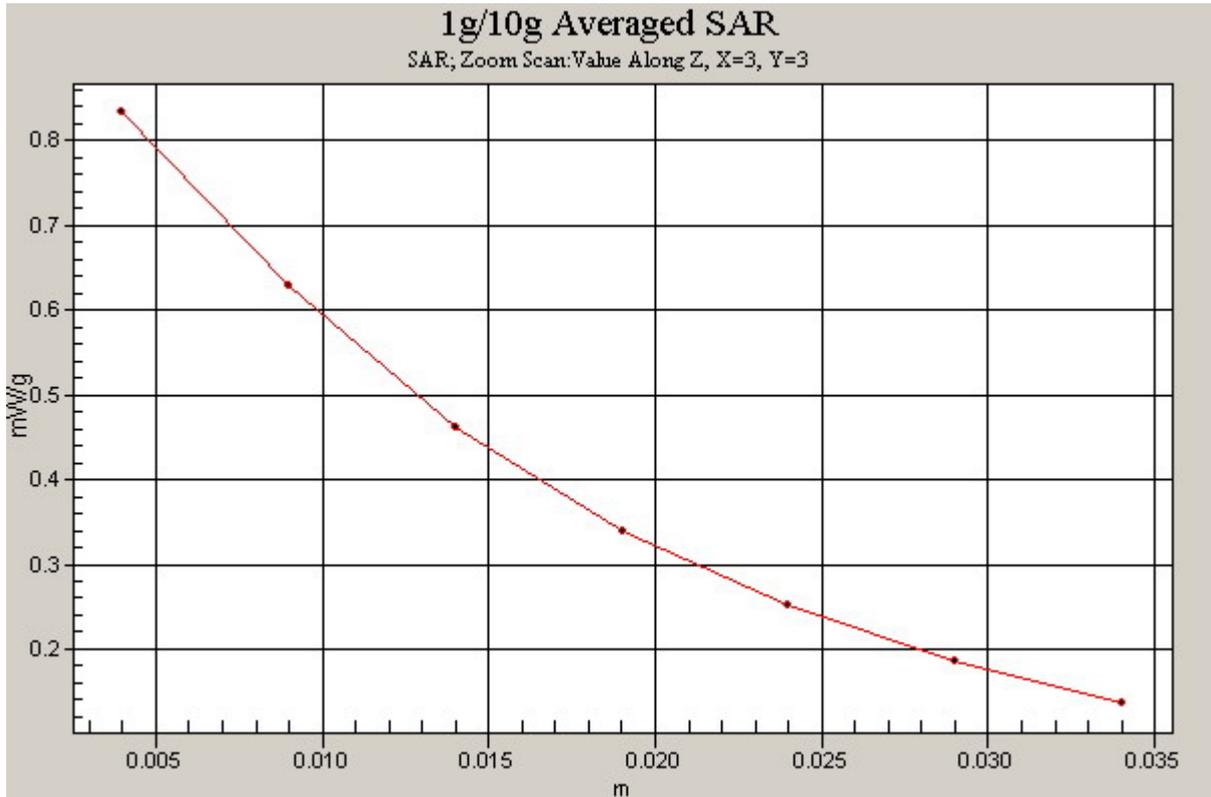


Fig. 42 Z-Scan at power reference point (CDMA 835MHz, Body, Towards Ground, CH1013)

ANNEX D: SYSTEM VALIDATION RESULTS

System Performance Check at 835 MHz

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Head 835MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 0.899$ mho/m; $\epsilon_r = 42.8$; $\rho = 1000$ kg/m³

- Probe: ET3DV6 - SN1737; ConvF(6.52, 6.52, 6.52);

- Electronics: DAE3 Sn452;

d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.54 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:

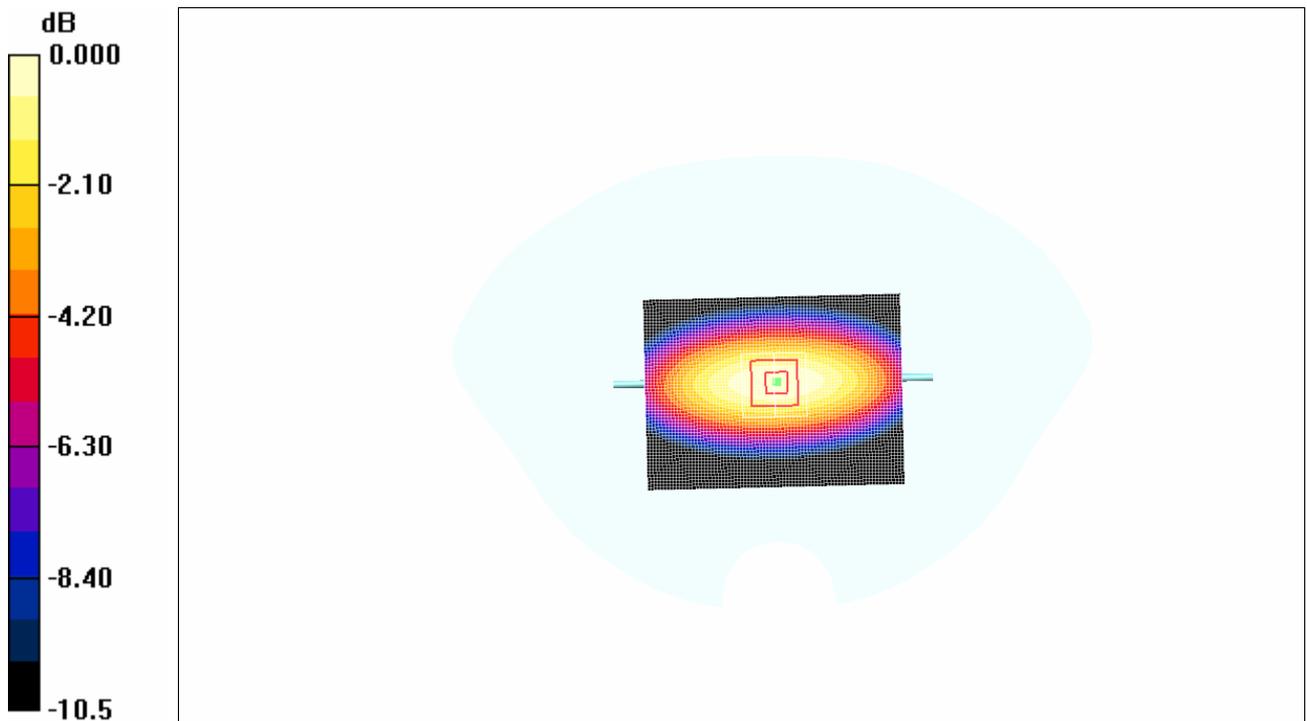
dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.0 V/m; Power Drift = -0.061 dB

Peak SAR (extrapolated) = 3.44 W/kg

SAR(1 g) = 2.34 mW/g; SAR(10 g) = 1.53 mW/g

Maximum value of SAR (measured) = 2.52 mW/g



0 dB = 2.52mW/g

Fig. 43 System Performance Check 835MHz 250mW

TA Technology (Shanghai) Co., Ltd. Test Report

No. RZA2007-0748S

Page 61 of 75

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
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: **ET3-1737_Feb07**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1737**

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

Calibration date: **February 19, 2007**

Condition of the calibrated item **In Tolerance**

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

All calibrations have been conducted 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-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41495277	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41498087	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-06 (METAS, No. 217-00592)	Aug-07
Reference 20 dB Attenuator	SN: S5086 (20b)	4-Apr-06 (METAS, No. 251-00558)	Apr-07
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-06 (METAS, No. 217-00593)	Aug-07
Reference Probe ES3DV2	SN: 3013	4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Jan-08
DAE4	SN: 654	21-Jun-06 (SPEAG, No. DAE4-654_Jun06)	Jun-07
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: February 19, 2007

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

**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
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,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:

- 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
- 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:

- NORM_{x,y,z}:** Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E²-field uncertainty inside TSL (see below *ConvF*).
- NORM(*f*)_{x,y,z} = NORM_{x,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*.
- DCP_{x,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 NORM_{x,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:1737

February 19, 2007

Probe ET3DV6

SN:1737

Manufactured:	September 27, 2002
Last calibrated:	February 23, 2005
Recalibrated:	February 19, 2007

Calibrated for DASY Systems

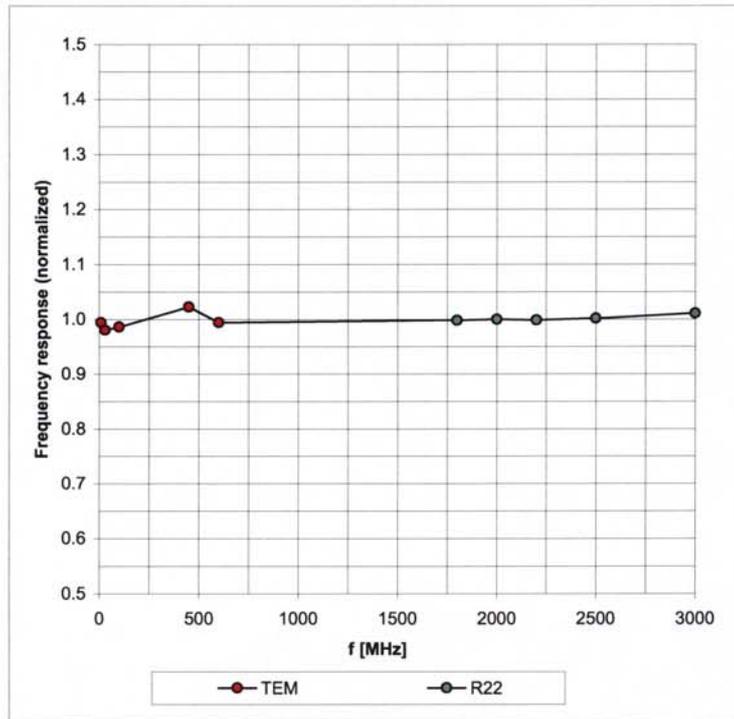
(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1737

February 19, 2007

Frequency Response of E-Field

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

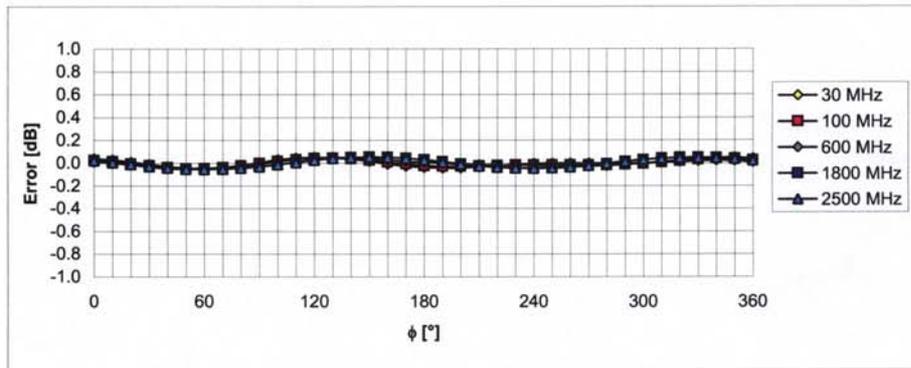
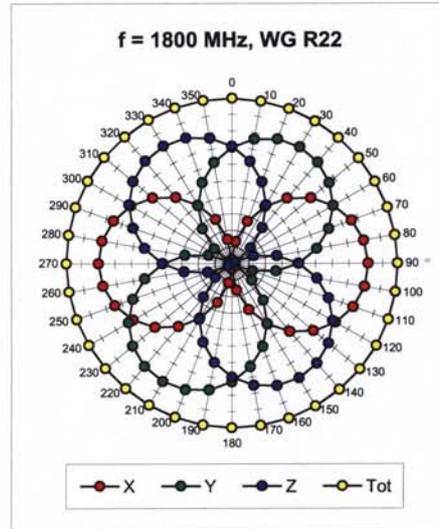
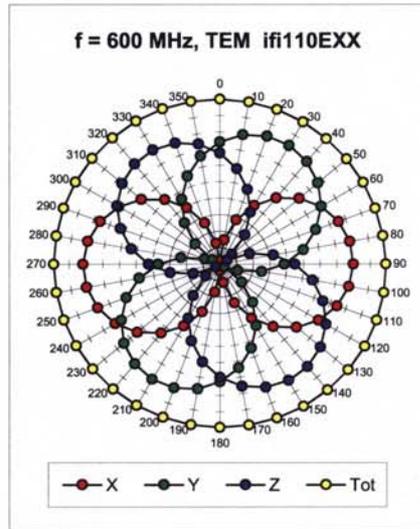


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

ET3DV6 SN:1737

February 19, 2007

Receiving Pattern (ϕ), $\vartheta = 0^\circ$

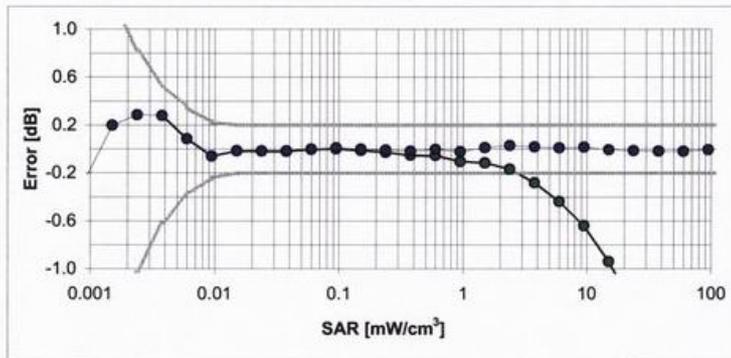
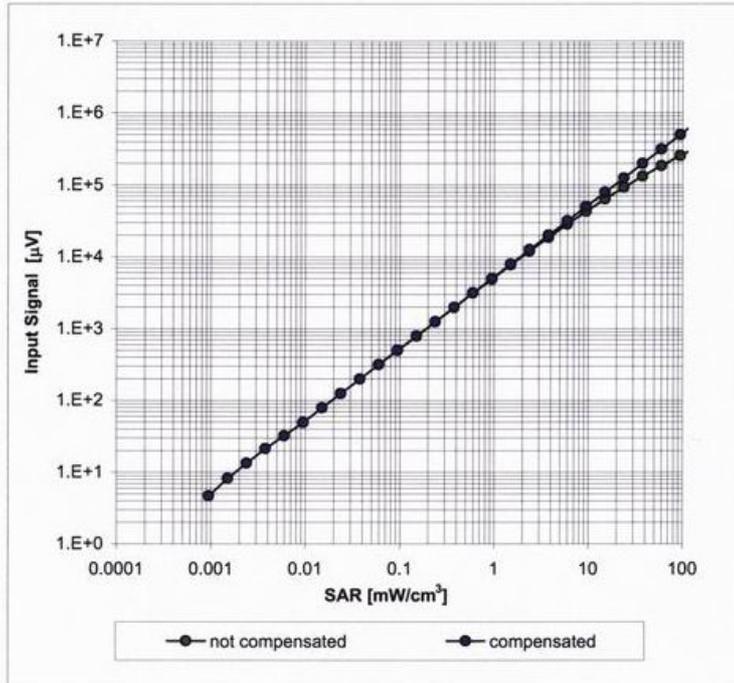


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

ET3DV6 SN:1737

February 19, 2007

Dynamic Range $f(SAR_{head})$
(Waveguide R22, $f = 1800$ MHz)

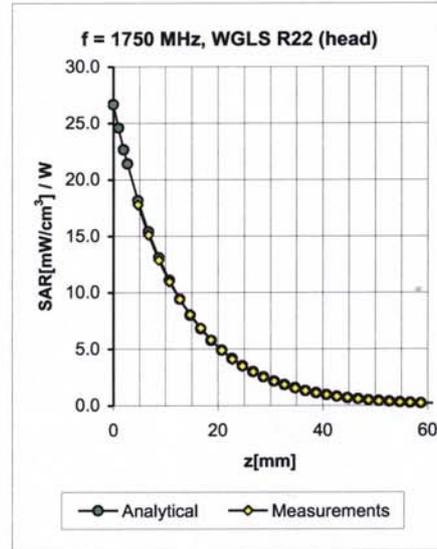
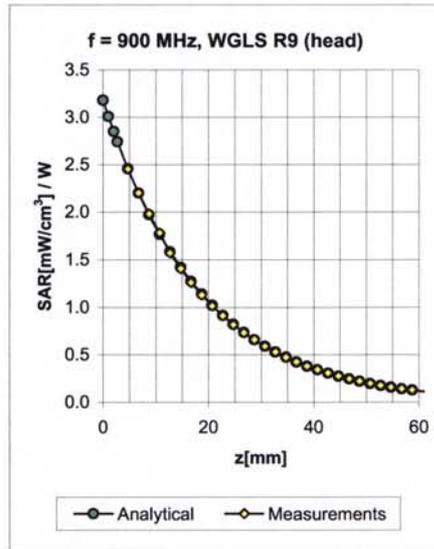


Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

ET3DV6 SN:1737

February 19, 2007

Conversion Factor Assessment



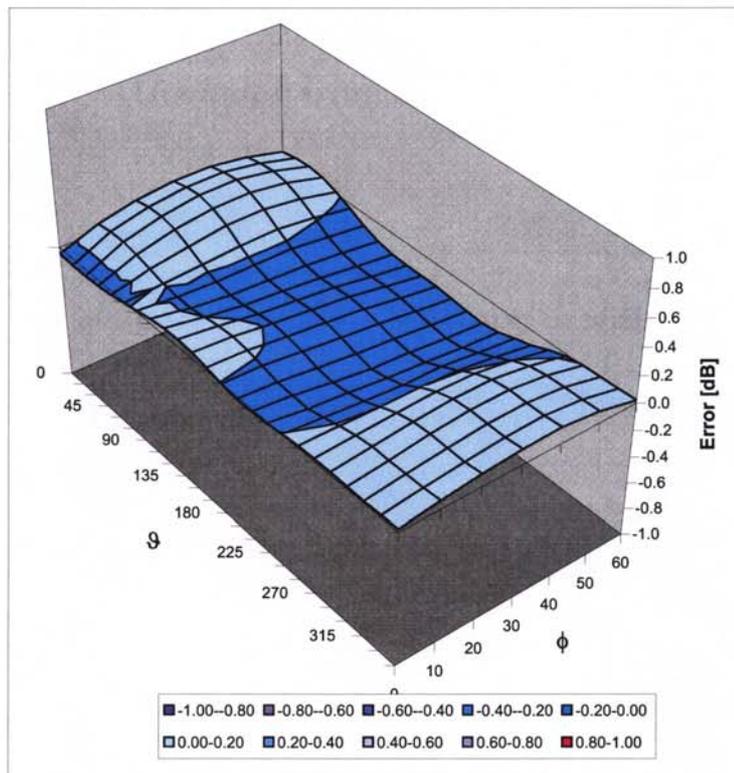
f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.27	2.89	6.85 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.52	2.56	5.42 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.49	2.89	5.15 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.35	2.82	6.52 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.56	2.68	4.97 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.88	2.07	4.64 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.66	2.16	4.10 ± 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:1737

February 19, 2007

Deviation from Isotropy in HSL
Error (ϕ , ϑ), $f = 900$ MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ ($k=2$)

ANNEX F: DIPOLE CALIBRATION CERTIFICATE

Y357

受控文件
文件编号

**Schmid & Partner
Engineering AG**

009

Zeughausstrasse 42, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

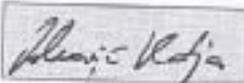
Calibration Certificate

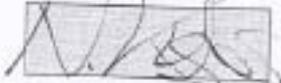
835 MHz System Validation Dipole

Type:	D835V2
Serial Number:	443
Place of Calibration:	Zurich
Date of Calibration:	September 3, 2005
Calibration Interval:	24 months

Schmid & Partner Engineering AG hereby certifies, that this device has been calibrated on the date indicated above. The calibration was performed in accordance with specifications and procedures of Schmid & Partner Engineering AG.

Wherever applicable, the standards used in the calibration process are traceable to international standards. In all other cases the standards of the Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland have been applied.

Calibrated by: 

Approved by: 

Schmid & Partner
Engineering AG

Zoeghausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

DASY

Dipole Validation Kit

Type: D835V2

Serial: 443

Manufactured: July 26, 2001

Calibrated: September 3, 2005

1. Measurement Conditions

The measurements were performed in the flat section of the new generic twin phantom filled with head simulating solution of the following electrical parameters at 835 MHz:

Relative Dielectricity	41.0	± 5%
Conductivity	0.89 mho/m	± 5%

The DASY3 System (Software version 3.1c) with a dosimetric E-field probe ET3DV6 (SN.1307, Conversion factor 6.27 at 900 MHz) was used for the measurements.

The dipole was mounted on the small tripod so that the dipole feedpoint was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15mm from dipole center to the solution surface. The included distance holder was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 5x5x7 fine cube was chosen for cube integration. Probe isotropy errors were cancelled by measuring the SAR with normal and 90° turned probe orientations and averaging.

The dipole input power (forward power) was 250mW ± 3%. The results are normalized to 1W input power.

2. SAR Measurement

Standard SAR-measurements were performed with the phantom according to the measurement conditions described in section 1. The results have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values are:

averaged over 1 cm ³ (1 g) of tissue:	10.6 mW/g
averaged over 10 cm ³ (10 g) of tissue:	6.80 mW/g

Note: If the liquid parameters for validation are slightly different from the ones used for initial calibration, the SAR-values will be different as well.

3. Dipole Impedance and Return Loss

The impedance was measured at the SMA-connector with a network analyzer and numerically transformed to the dipole feedpoint. The transformation parameters from the SMA-connector to the dipole feedpoint are:

Electrical delay:	1.403 ns	(one direction)
Transmission factor:	0.995	(voltage transmission, one direction)

The dipole was positioned at the flat phantom sections according to section 1 and the distance holder was in place during impedance measurements.

Feedpoint impedance at 835 MHz:	$\text{Re}\{Z\} = 50.5 \Omega$
---------------------------------	--------------------------------

	$\text{Im}\{Z\} = -5.3 \Omega$
--	--------------------------------

Return Loss at 835 MHz	-25.6 dB
------------------------	-----------------

4. Handling

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

Do not apply excessive force to the dipole arms, because they might bend. If the dipole arms have to be bent back, take care to release stress to the soldered connections near the feedpoint, they might come off.

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

TA Technology (Shanghai) Co., Ltd.
Test Report

No. RZA2007-0748S

Page 74 of 75

Validation Dipole D835V2 SN:443, $d = 15$ mm

Frequency: 835 MHz; Antenna Input Power: 250 [mW]

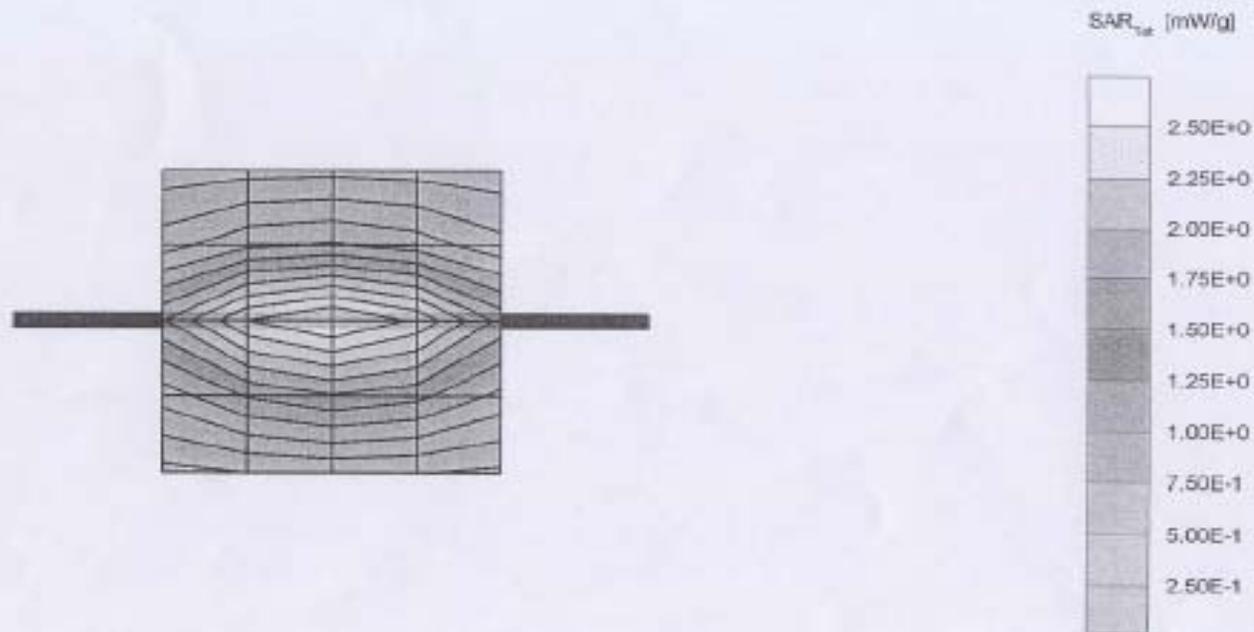
SAM Phantom; Flat Section; Grid Spacing: $D_x = 20.0$, $D_y = 20.0$, $D_z = 10.0$

Probe: ET3DV6 - SN1507; ConvF(6.27,6.27,6.27) at 900 MHz; IEEE1528 835 MHz; $\sigma = 0.89$ mho/m $\epsilon_r = 41.0$ $\rho = 1.00$ g/cm³

Cubes (2): Peak: 4.23 mW/g ± 0.05 dB, SAR (1g): 2.65 mW/g ± 0.04 dB, SAR (10g): 1.70 mW/g ± 0.02 dB, (Worst-case extrapolation)

Penetration depth: 11.9 (10.5, 13.8) [mm]

Powerdrift: -0.02 dB



TA Technology (Shanghai) Co., Ltd. Test Report

No. RZA2007-0748S

Page 75 of 75

