CDMA 1900 Right Cheek Low
Date/Time: 2007-3-23 17:33:04
Electronics: DAE3 Sn536
Medium: Head 1900 MHz
Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.36 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C
Communication System: CDMA 1900 Frequency: 1851.25 MHz Duty Cycle: 1:1
Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Cheek Low/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm
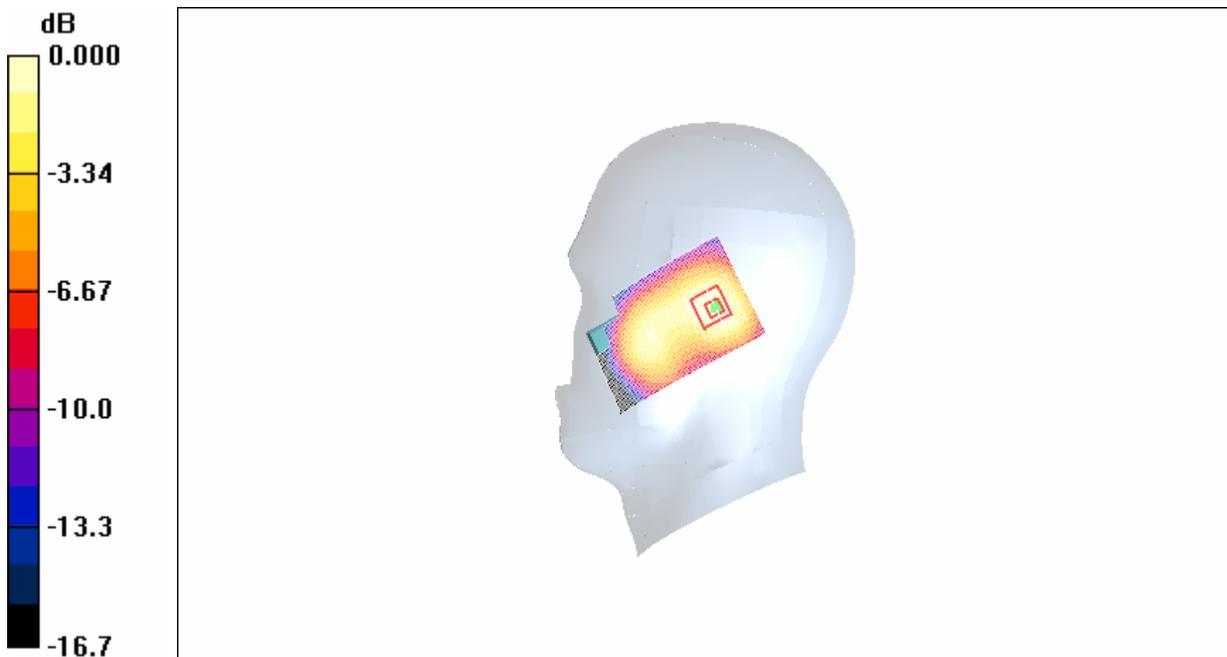Maximum value of SAR (interpolated) = 0.626 mW/g

Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.8 V/m; Power Drift = -0.200 dB
Peak SAR (extrapolated) = 0.838 W/kg
SAR(1 g) = 0.546 mW/g; SAR(10 g) = 0.339 mW/g
Maximum value of SAR (measured) = 0.589 mW/g

0 dB = 0.589mW/g

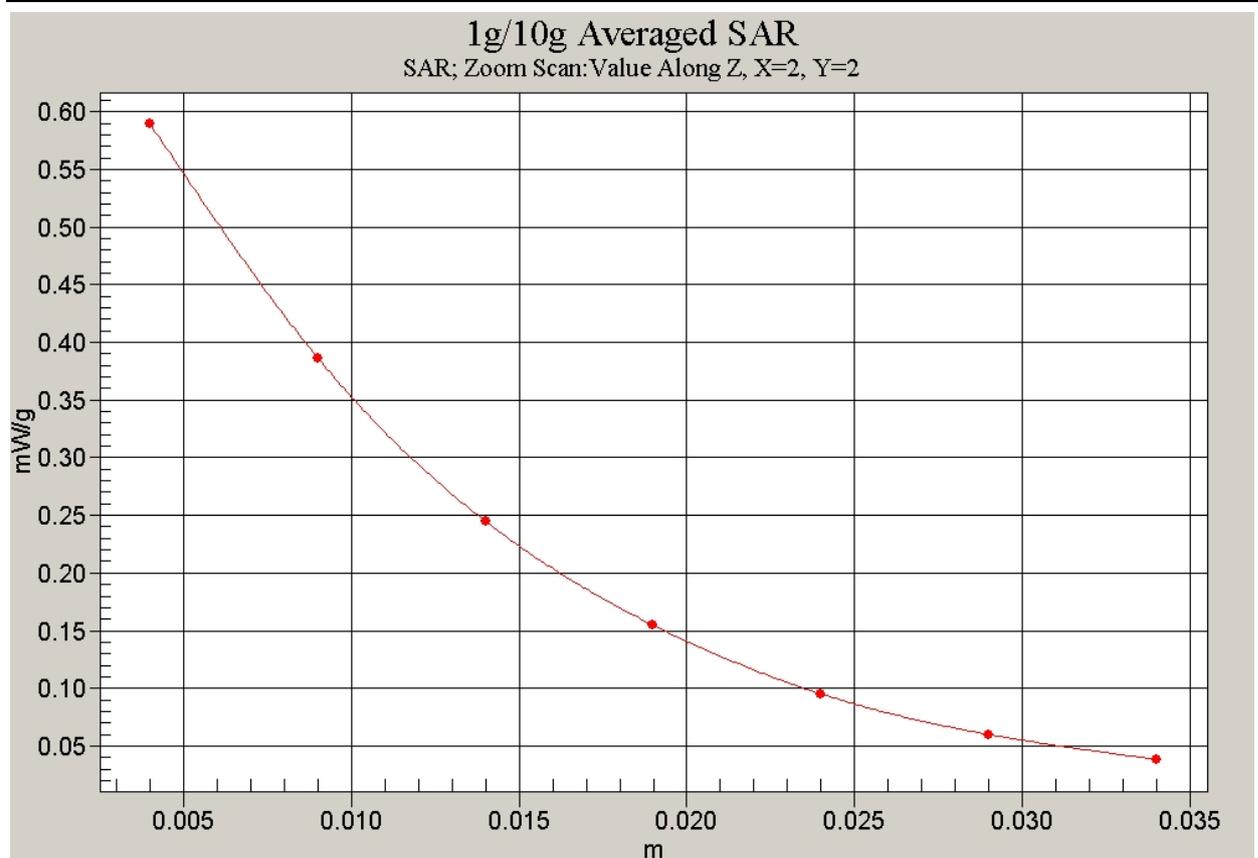**Fig. 17 Right Hand Touch Cheek CDMA 1900MHz CH25**

Fig. 18 Z-Scan at power reference point (CDMA 1900MHz CH25)

CDMA 1900 Right Tilt High
Date/Time: 2007-3-23 19:50:20
Electronics: DAE3 Sn536
Medium: Head 1900 MHz
Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.4 mho/m; $ε_r$ = 39; ρ = 1000 kg/m^3
Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C
Communication System: CDMA 1900 Frequency: 1908.75 MHz Duty Cycle: 1:1
Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Tilt High/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm
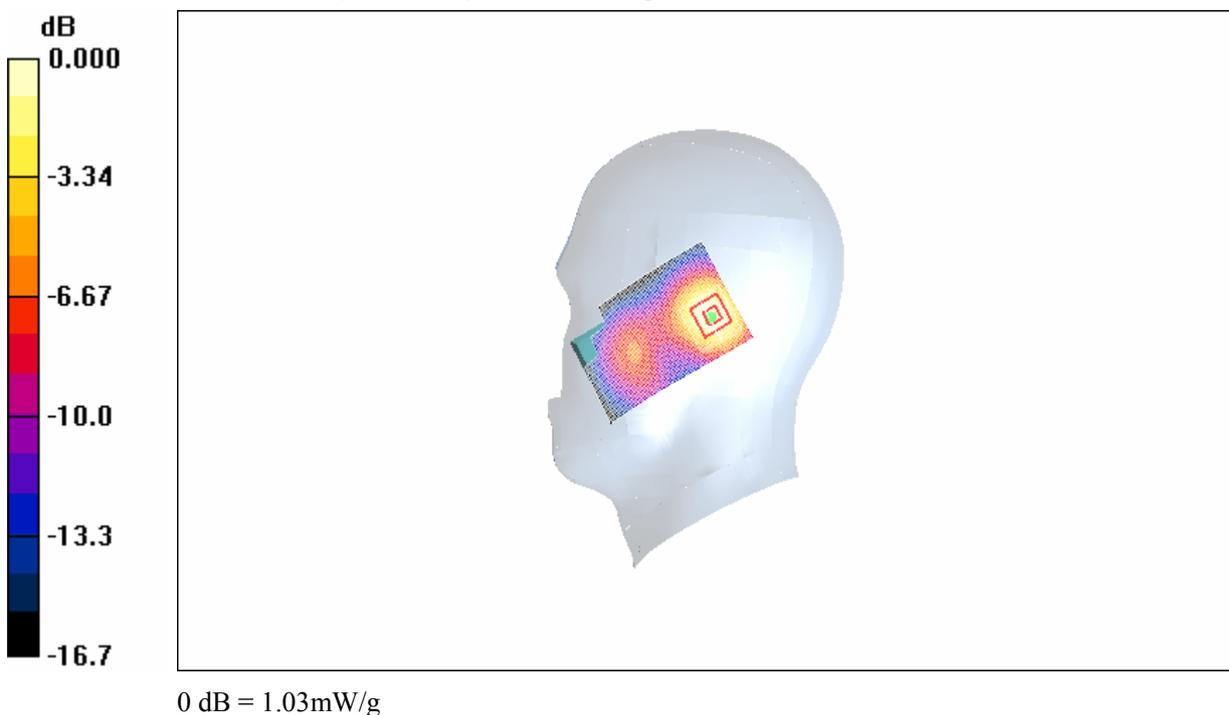Maximum value of SAR (interpolated) = 1.13 mW/g

Tilt High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.5 V/m; Power Drift = -0.136 dB
Peak SAR (extrapolated) = 1.58 W/kg
SAR(1 g) = 0.958 mW/g; SAR(10 g) = 0.541 mW/g
Maximum value of SAR (measured) = 1.03 mW/g

0 dB = 1.03mW/g

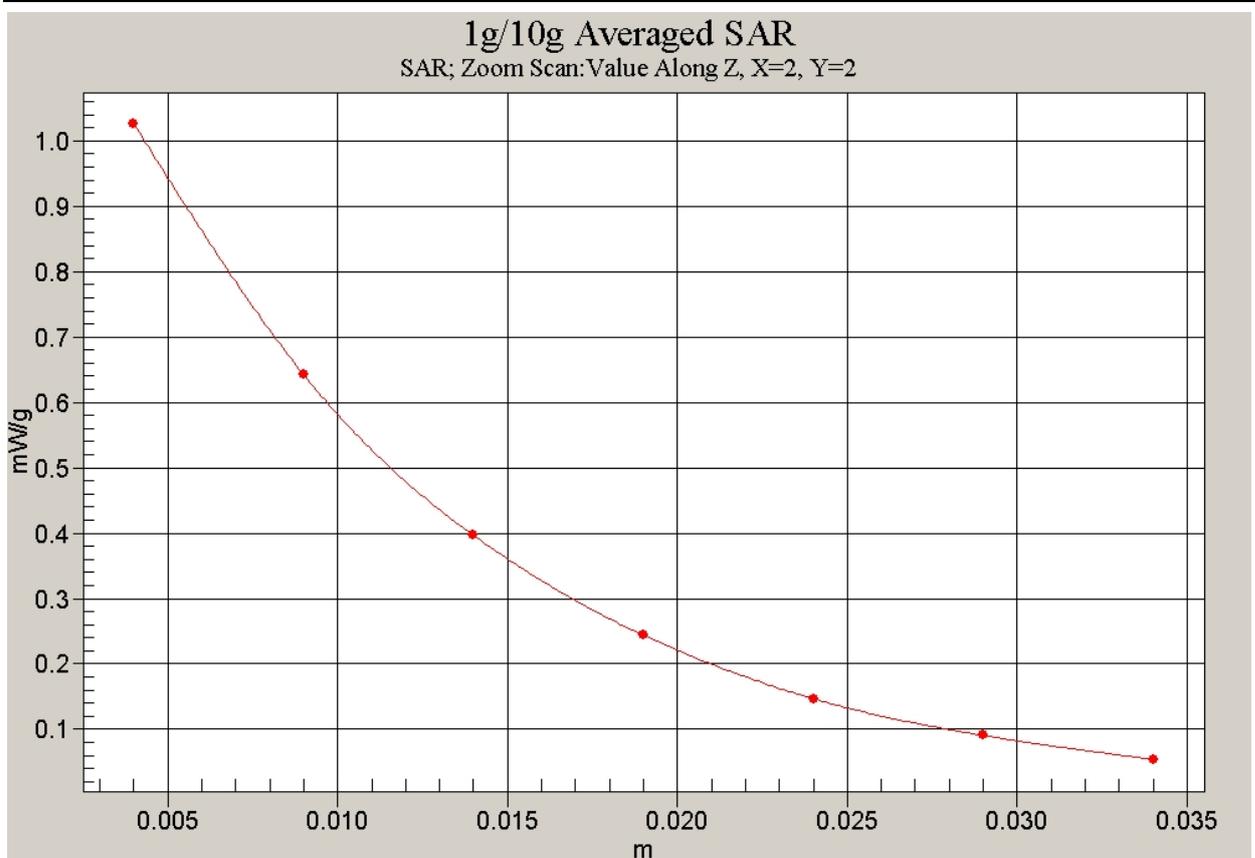**Fig. 19 Right Hand Tilt 15°CDMA 1900MHz CH1175**

Fig. 20 Z-Scan at power reference point (CDMA 1900MHz CH1175)

CDMA 1900 Right Tilt Middle

Date/Time: 2007-3-23 19:09:36

Electronics: DAE3 Sn536

Medium: Head 1900 MHz

Medium parameters used: f = 1880 MHz; σ = 1.38 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: CDMA 1900 Frequency: 1880 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

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

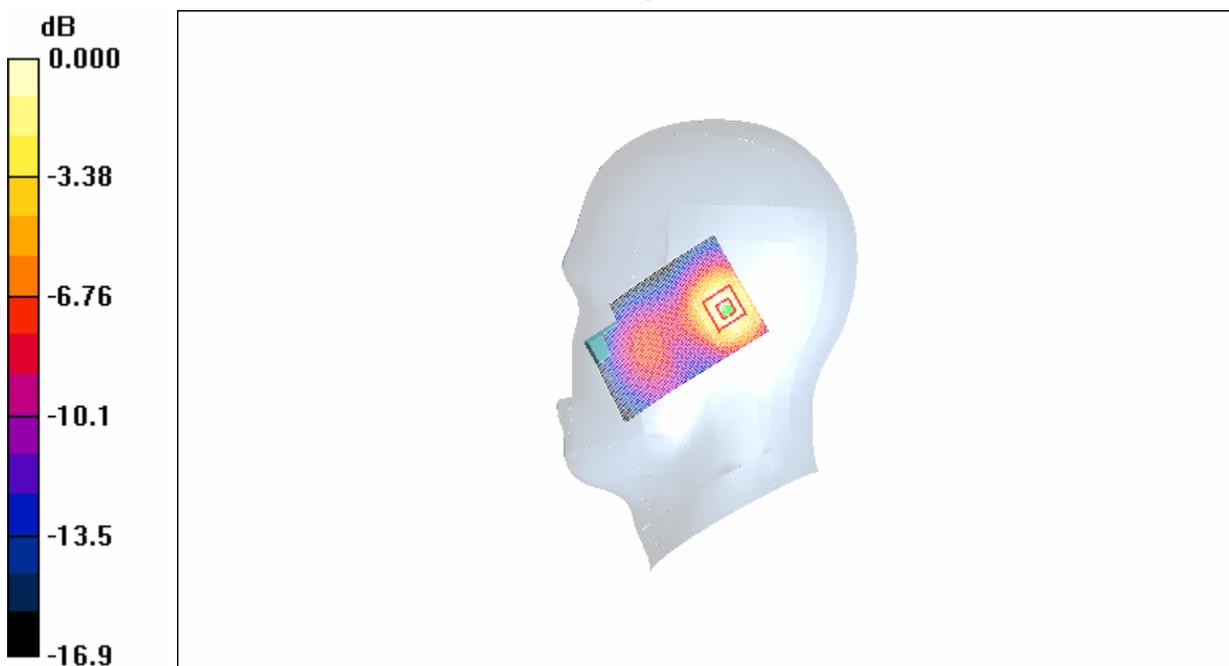Maximum value of SAR (interpolated) = 1.28 mW/g

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

Reference Value = 28.7 V/m; Power Drift = -0.109 dB

Peak SAR (extrapolated) = 1.80 W/kg

SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.615 mW/g

Maximum value of SAR (measured) = 1.19 mW/g

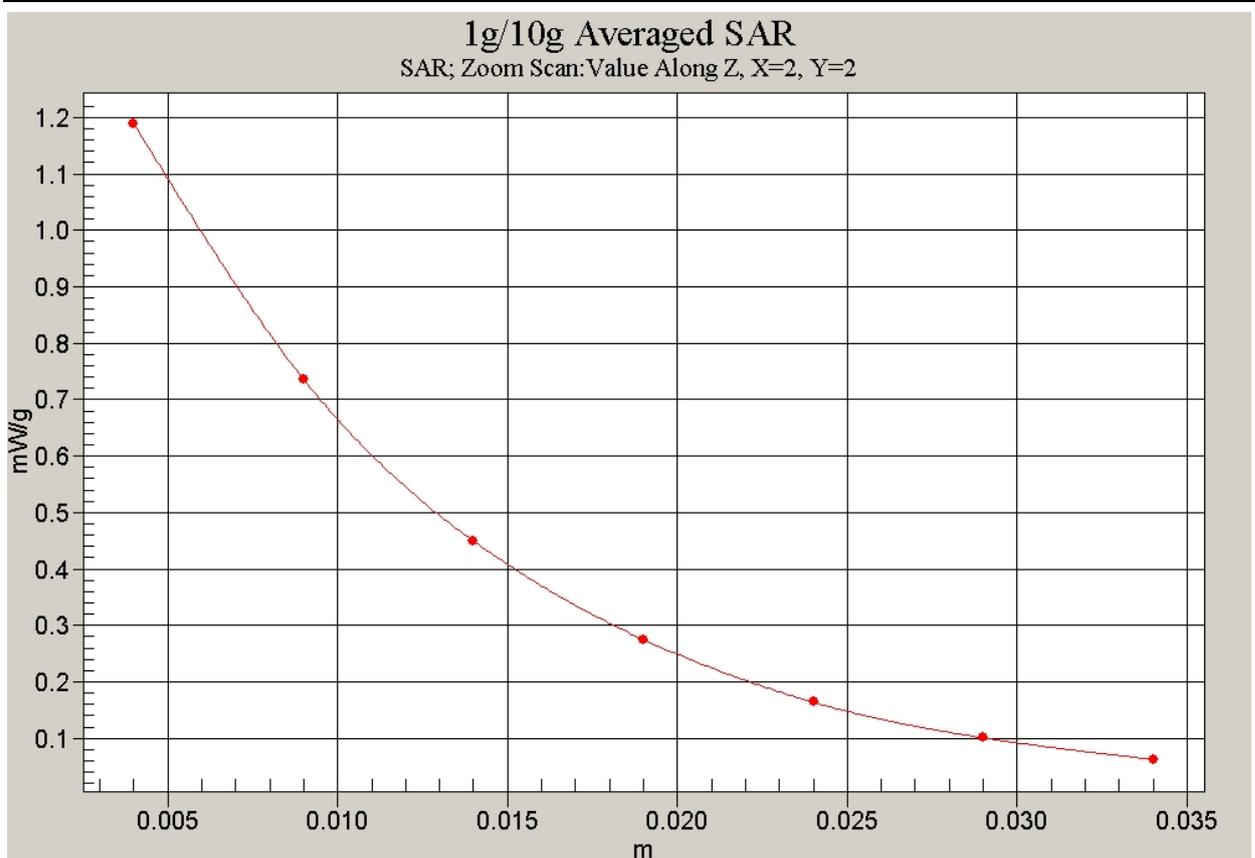0 dB = 1.19mW/g

Fig. 21 Right Hand Tilt 15°CDMA 1900MHz CH600

Fig. 22 Z-Scan at power reference point (CDMA 1900MHz CH600)

CDMA 1900 Right Tilt Low
Date/Time: 2007-3-23 22:11:59
Electronics: DAE3 Sn536
Medium: Head 1900 MHz
Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.36 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C
Communication System: CDMA 1900 Frequency: 1851.25 MHz Duty Cycle: 1:1
Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

Tilt Low/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.827 mW/g

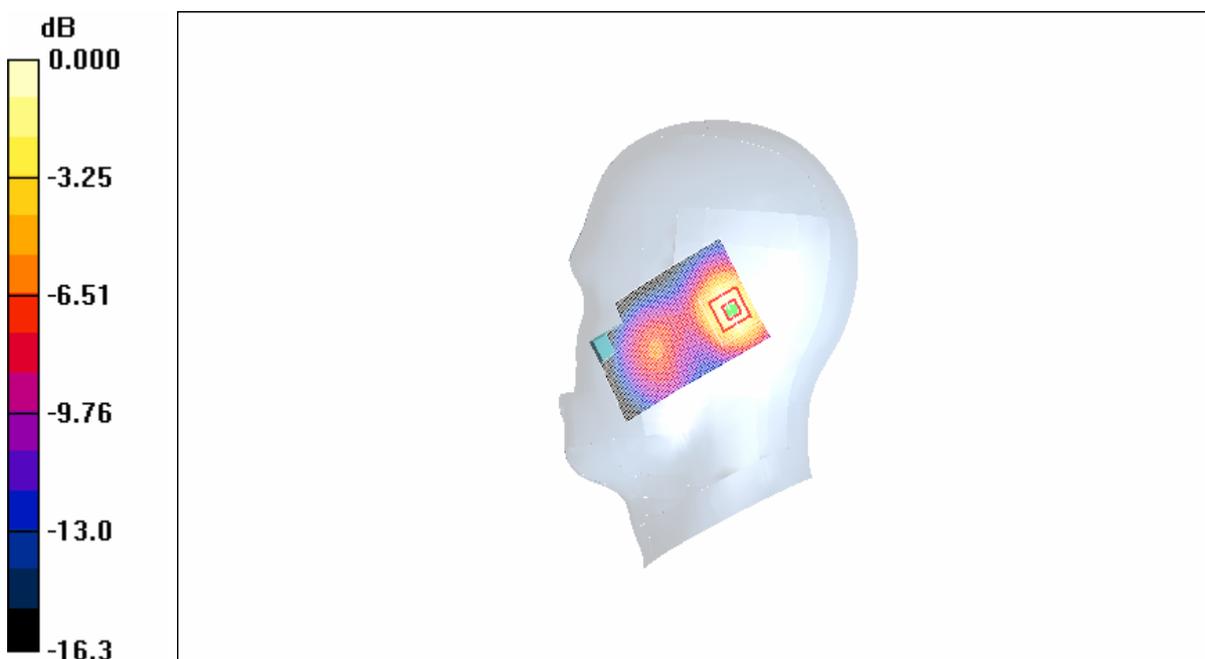**Tilt Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.4 V/m; Power Drift = -0.088 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.731 mW/g; SAR(10 g) = 0.410 mW/g
Maximum value of SAR (measured) = 0.811 mW/g

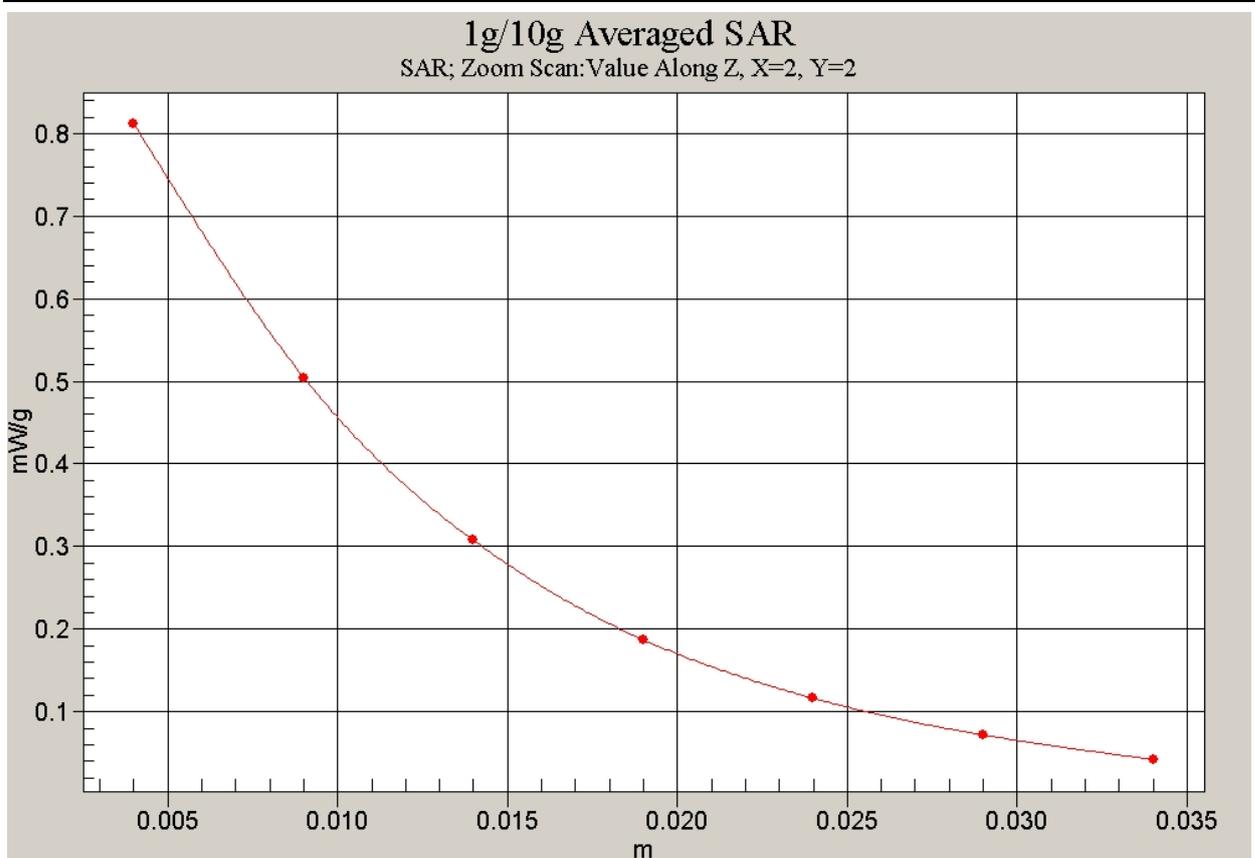0 dB = 0.811mW/g

Fig. 23 Right Hand Tilt 15°CDMA 1900MHz CH25

Fig. 24 Z-Scan at power reference point (CDMA 1900MHz CH25)

CDMA 1900 Body Toward Phantom High

Date/Time: 2007-3-23 8:51:54

Electronics: DAE3 Sn536

Medium: Body 1900

Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.55 mho/m; ε_r = 52; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: CDMA 1900 Frequency: 1908.75 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(4.88, 4.88, 4.88)

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

Maximum value of SAR (interpolated) = 0.415 mW/g

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

Reference Value = 8.43 V/m; Power Drift = -0.195 dB

Peak SAR (extrapolated) = 0.578 W/kg

SAR(1 g) = 0.367 mW/g; SAR(10 g) = 0.227 mW/g

Maximum value of SAR (measured) = 0.396 mW/g

0 dB = 0.396mW/g

Fig. 25 CDMA 1900MHz, Body, Towards Phantom, CH1175

Fig. 26 Z-Scan at power reference point (CDMA 1900MHz, Body,Towards Phantom, CH1175)

CDMA 1900 Body Toward Phantom Middle

Date/Time: 2007-3-23 7:54:42

Electronics: DAE3 Sn536

Medium: Body 1900

Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: CDMA 1900 Frequency: 1880 MHz Duty Cycle: 1:1
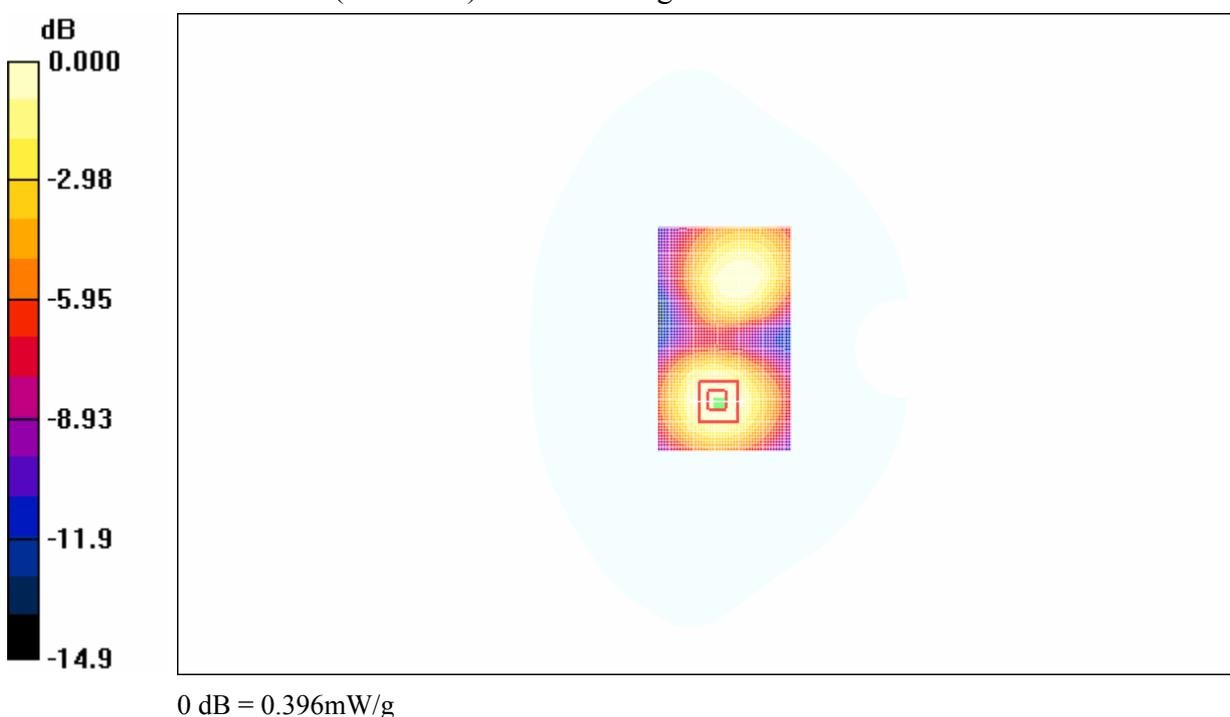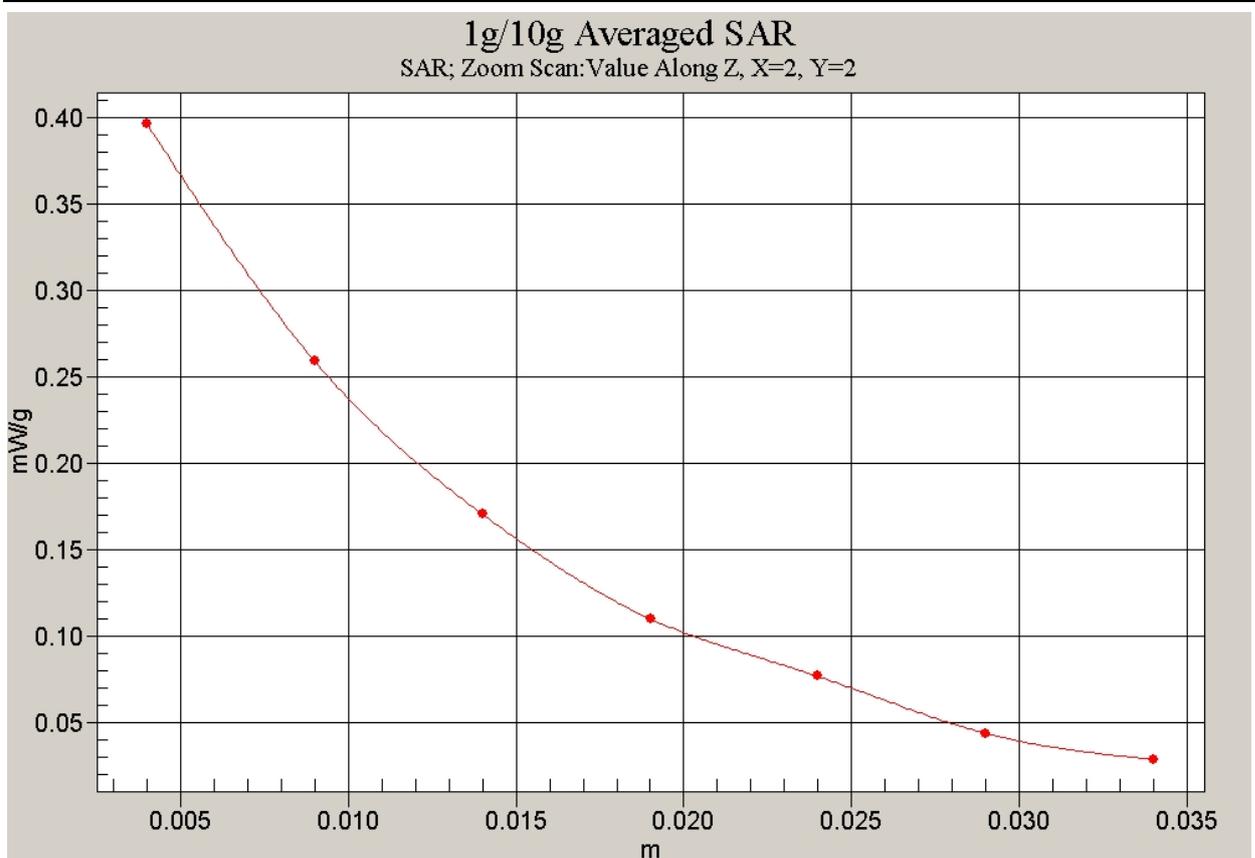
Probe: ET3DV6 - SN1736 ConvF(4.88, 4.88, 4.88)

Toward Phantom Middle/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.511 mW/g

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

Reference Value = 9.96 V/m; Power Drift = -0.168 dB

Peak SAR (extrapolated) = 0.703 W/kg

SAR(1 g) = 0.460 mW/g; SAR(10 g) = 0.288 mW/g

Maximum value of SAR (measured) = 0.495 mW/g

0 dB = 0.495mW/g
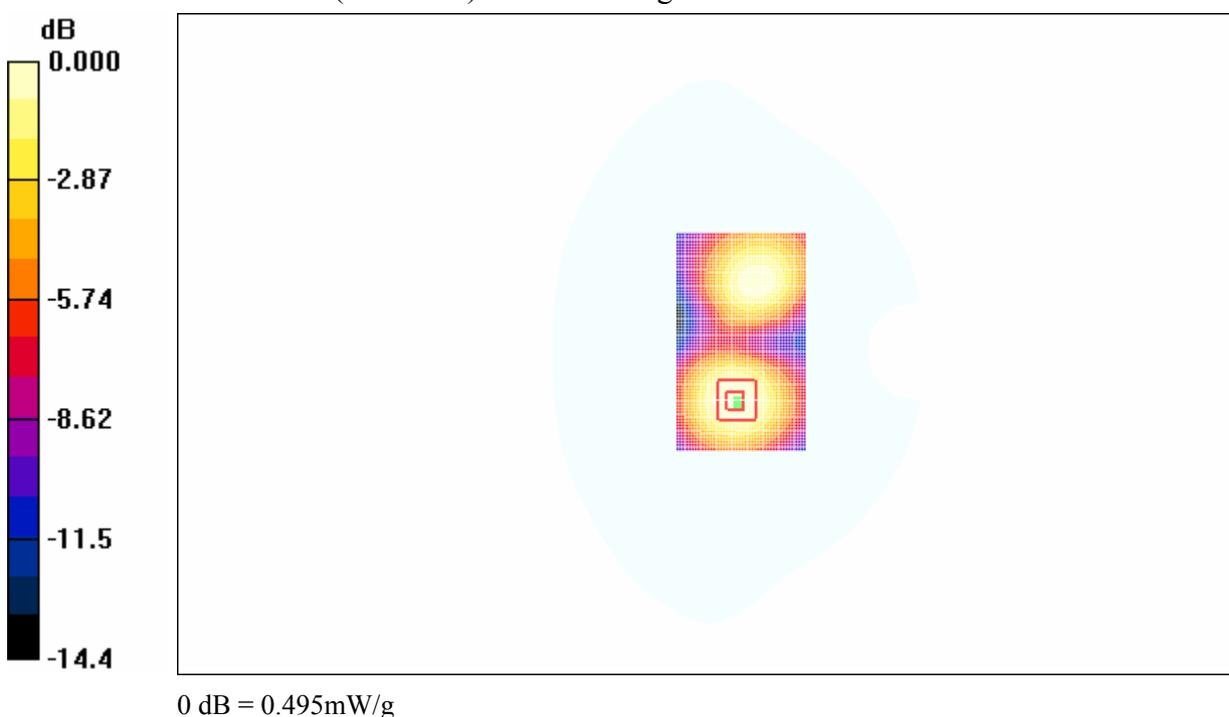
Fig. 27 CDMA 1900MHz, Body, Towards Phantom, CH600

Fig. 28 Z-Scan at power reference point (CDMA 1900MHz, Body, Towards Phantom, CH600)

CDMA 1900 Body Toward Phantom Low

Date/Time: 2007-3-23 8:23:00

Electronics: DAE3 Sn536

Medium: Body 1900

Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.52 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: CDMA 1900 Frequency: 1851.25 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(4.88, 4.88, 4.88)

Toward Phantom Low/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm
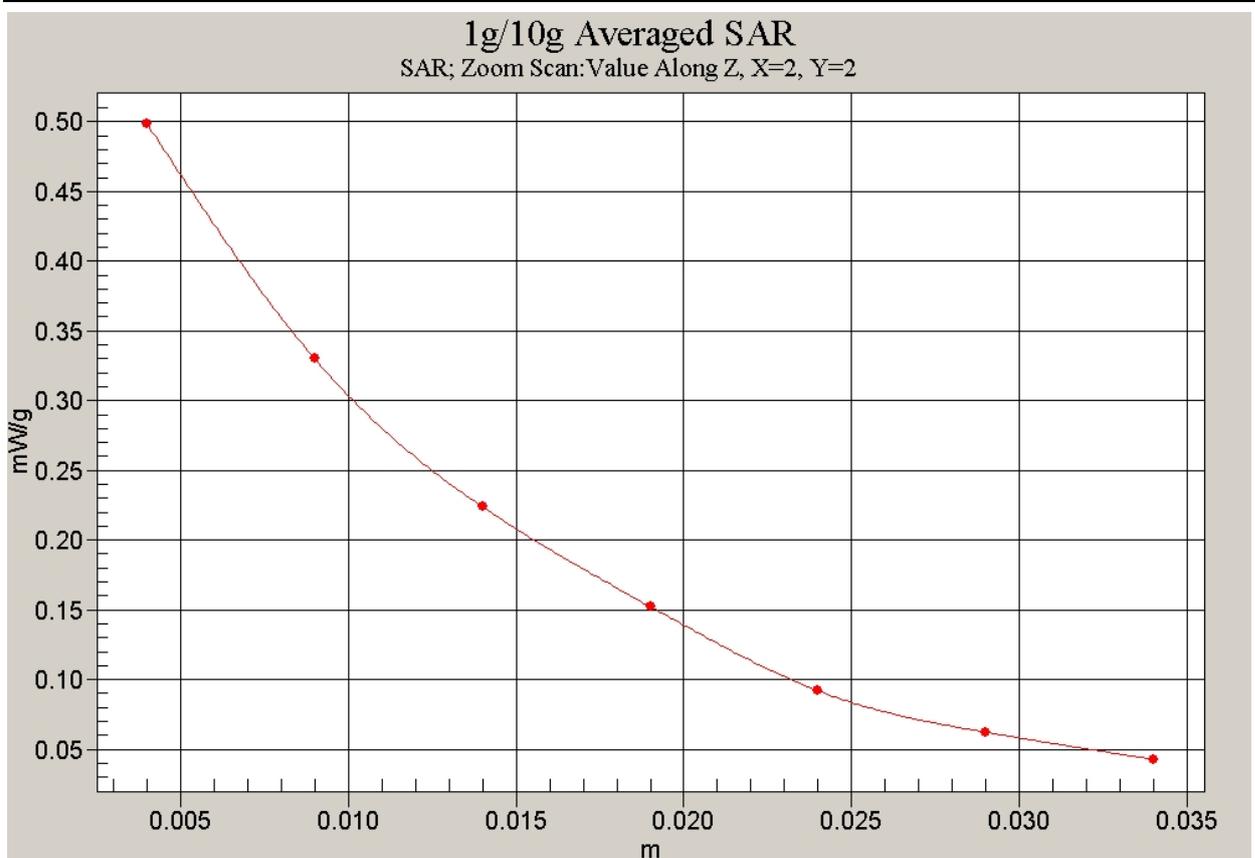
Maximum value of SAR (interpolated) = 0.270 mW/g

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

Reference Value = 8.33 V/m; Power Drift = -0.167 dB

Peak SAR (extrapolated) = 0.367 W/kg

SAR(1 g) = 0.241 mW/g; SAR(10 g) = 0.151 mW/g

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

0 dB = 0.257mW/g

Fig. 29 CDMA 1900MHz, Body, Towards Phantom, CH25

Fig. 30 Z-Scan at power reference point (CDMA 1900MHz, Body, Towards Phantom, CH25)

CDMA 1900 Body Toward Ground High

Date/Time: 2007-3-23 9:05:25

Electronics: DAE3 Sn536

Medium: Body 1900

Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.55 mho/m; ε_r = 52; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C　　　　Liqiud Temperature: 22.5^{o}C

Communication System: CDMA 1900 Frequency: 1908.75 MHz Duty Cycle: 1:1
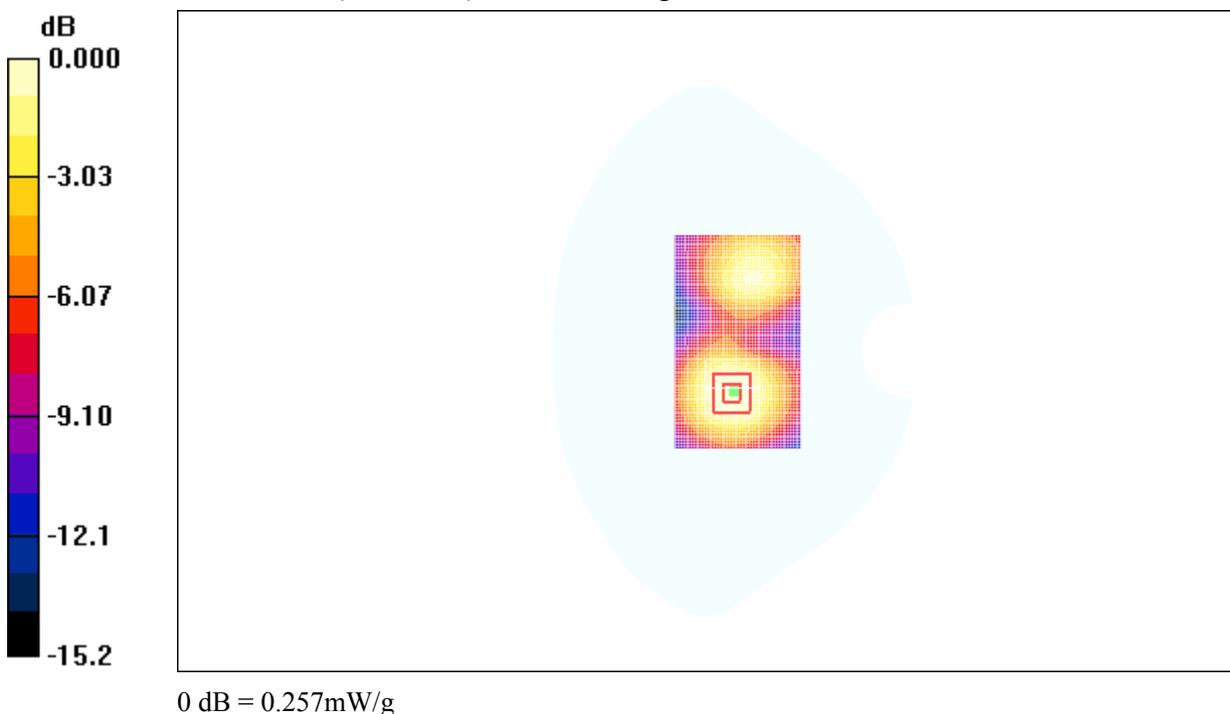
Probe: ET3DV6 - SN1736 ConvF(4.88, 4.88, 4.88)

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

Maximum value of SAR (interpolated) = 0.528 mW/g

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

Reference Value = 11.0 V/m; Power Drift = -0.141 dB

Peak SAR (extrapolated) = 0.733 W/kg

SAR(1 g) = 0.457 mW/g; SAR(10 g) = 0.279 mW/g

Maximum value of SAR (measured) = 0.486 mW/g

0 dB = 0.486mW/g

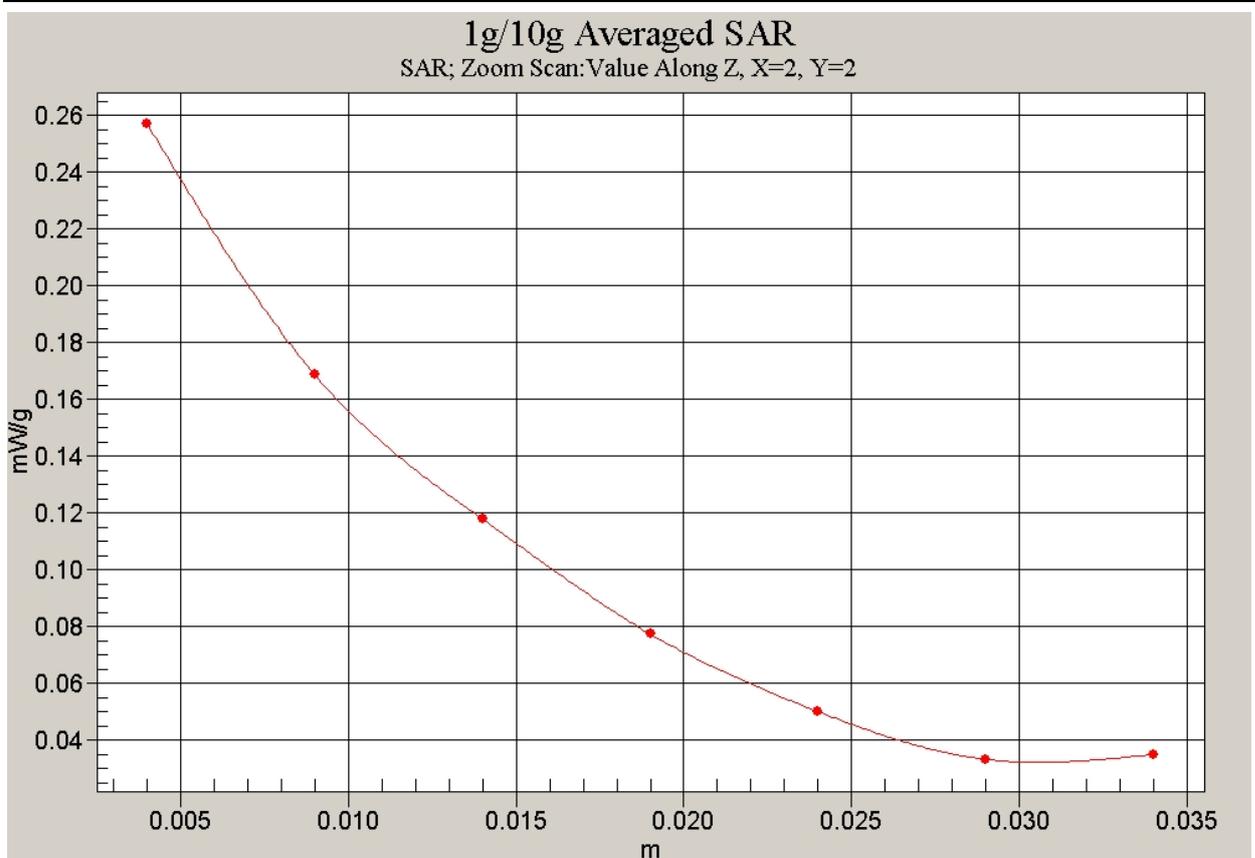**Fig. 31 CDMA 1900MHz, Body, Towards Ground, CH1175**

Fig. 32 Z-Scan at power reference point (CDMA 1900MHz, Body, Towards Ground, CH1175)

CDMA 1900 Body Toward Ground Middle
Date/Time: 2007-3-23 8:07:41
Electronics: DAE3 Sn536
Medium: Body 1900
Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3
Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C
Communication System: CDMA 1900 Frequency: 1880 MHz Duty Cycle: 1:1
Probe: ET3DV6 - SN1736 ConvF(4.88, 4.88, 4.88)

Toward Ground Middle/Area Scan (51x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.656 mW/g

Toward Ground Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.0 V/m; Power Drift = -0.041 dB
Peak SAR (extrapolated) = 0.906 W/kg
SAR(1 g) = 0.557 mW/g; SAR(10 g) = 0.342 mW/g
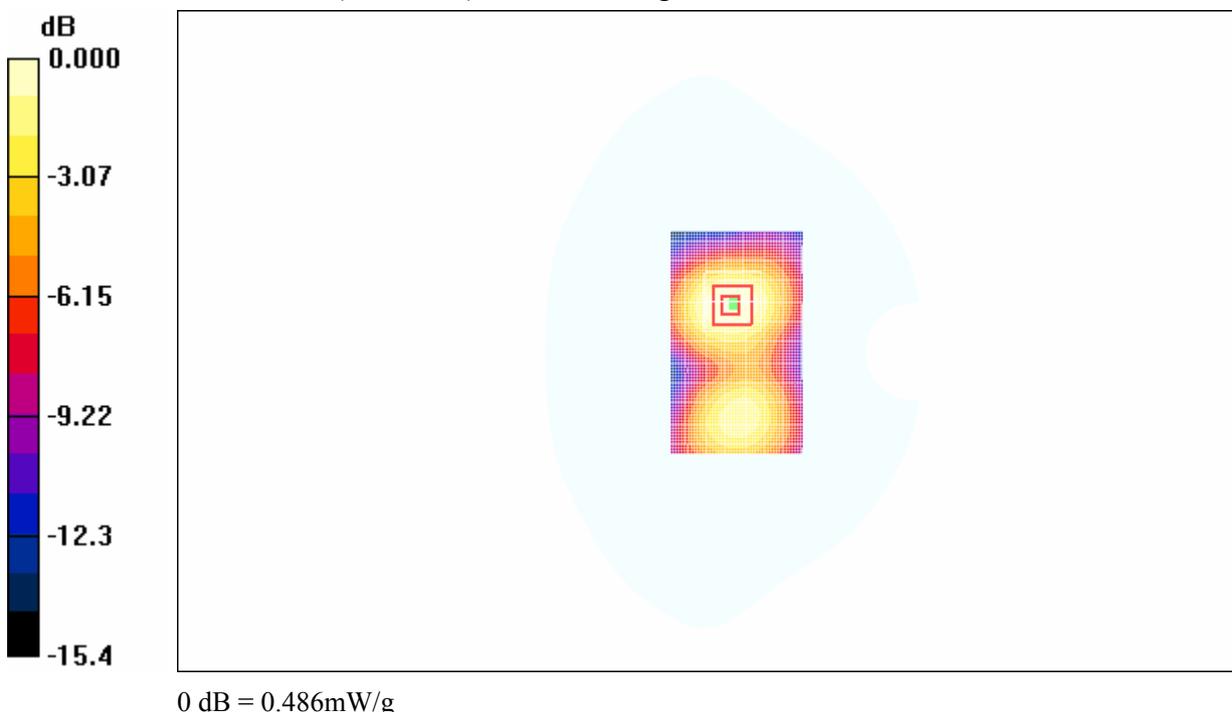Maximum value of SAR (measured) = 0.591 mW/g

0 dB = 0.591mW/g
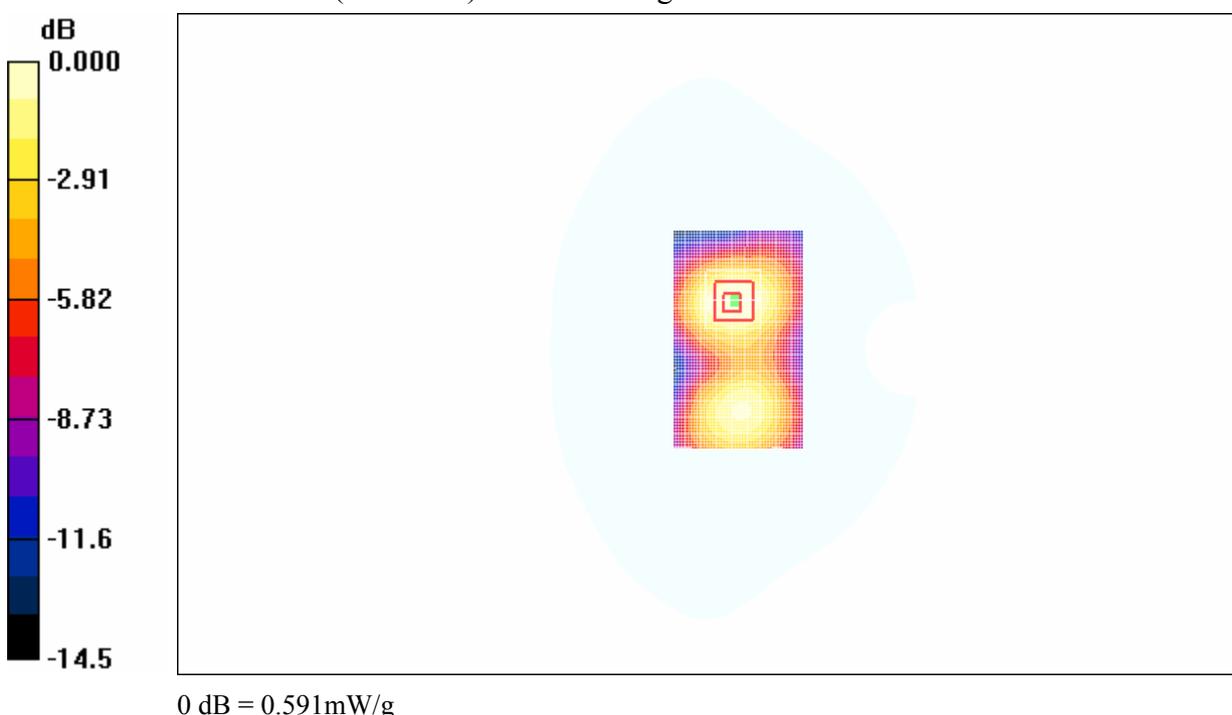
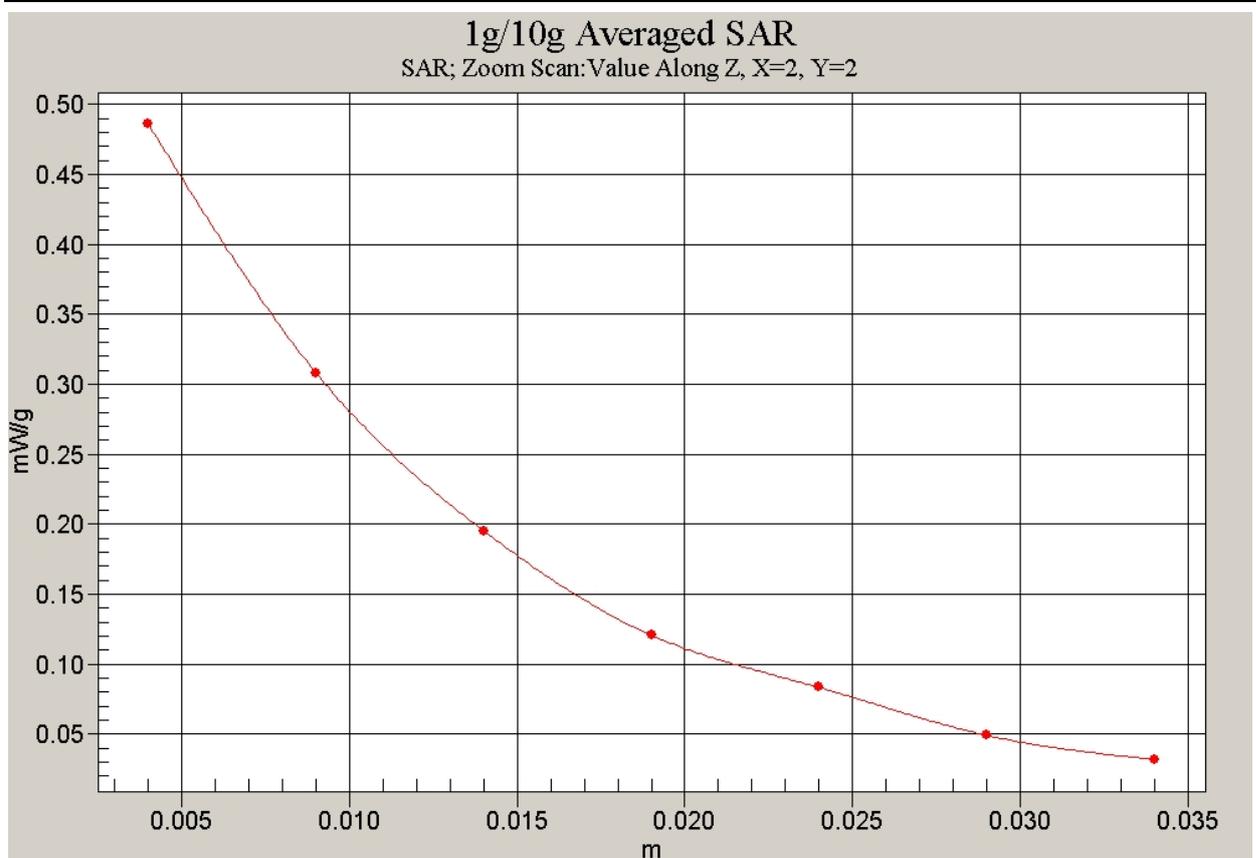**Fig. 33 CDMA 1900MHz, Body, Towards Ground, CH600**
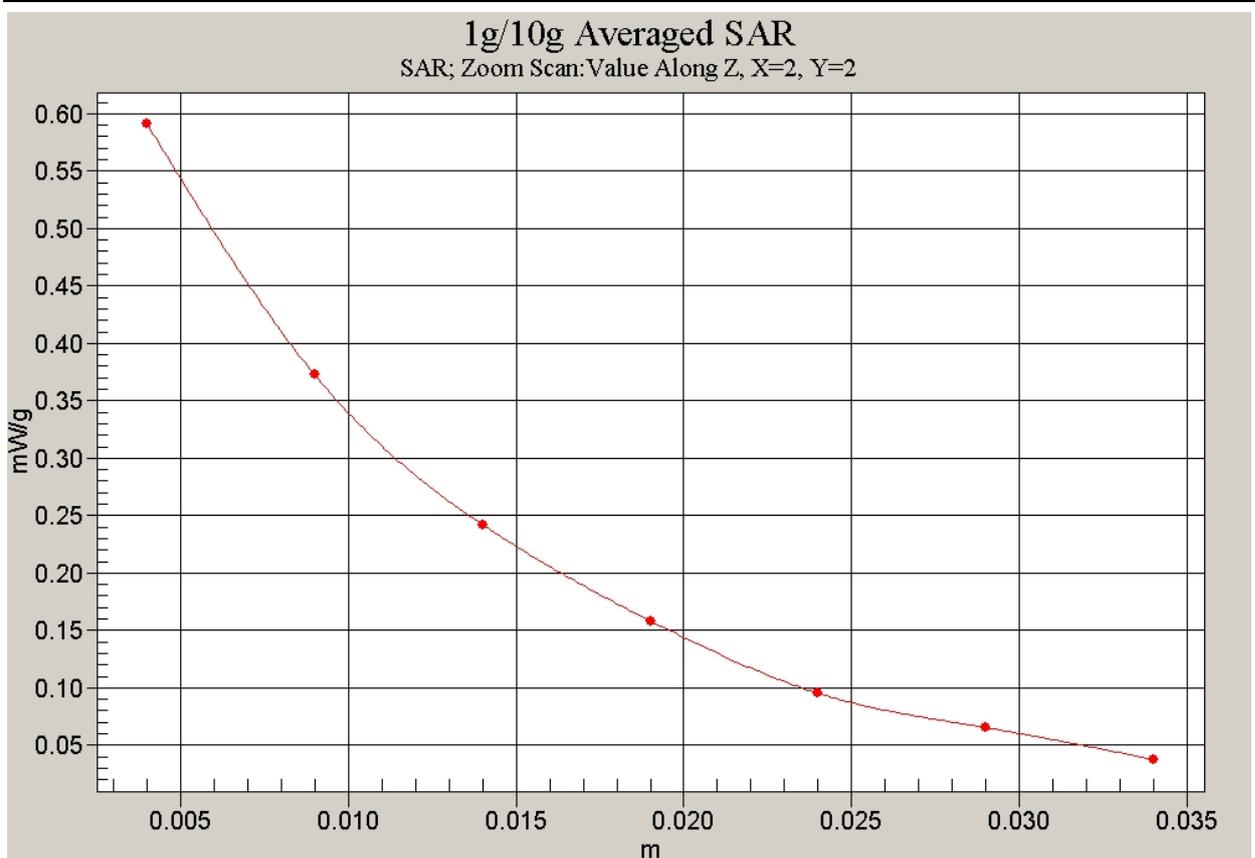
Fig. 34 Z-Scan at power reference point (CDMA 1900MHz, Body, Towards Ground, CH600)

CDMA 1900 Body Toward Ground Low

Date/Time: 2007-3-23 8:36:18

Electronics: DAE3 Sn536

Medium: Body 1900

Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.52 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C

Communication System: CDMA 1900 Frequency: 1851.25 MHz Duty Cycle: 1:1

Probe: ET3DV6 - SN1736 ConvF(4.88, 4.88, 4.88)

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

Maximum value of SAR (interpolated) = 0.389 mW/g

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

Reference Value = 9.85 V/m; Power Drift = -0.114 dB

Peak SAR (extrapolated) = 0.551 W/kg

SAR(1 g) = 0.344 mW/g; SAR(10 g) = 0.213 mW/g

Maximum value of SAR (measured) = 0.368 mW/g

0 dB = 0.368mW/g
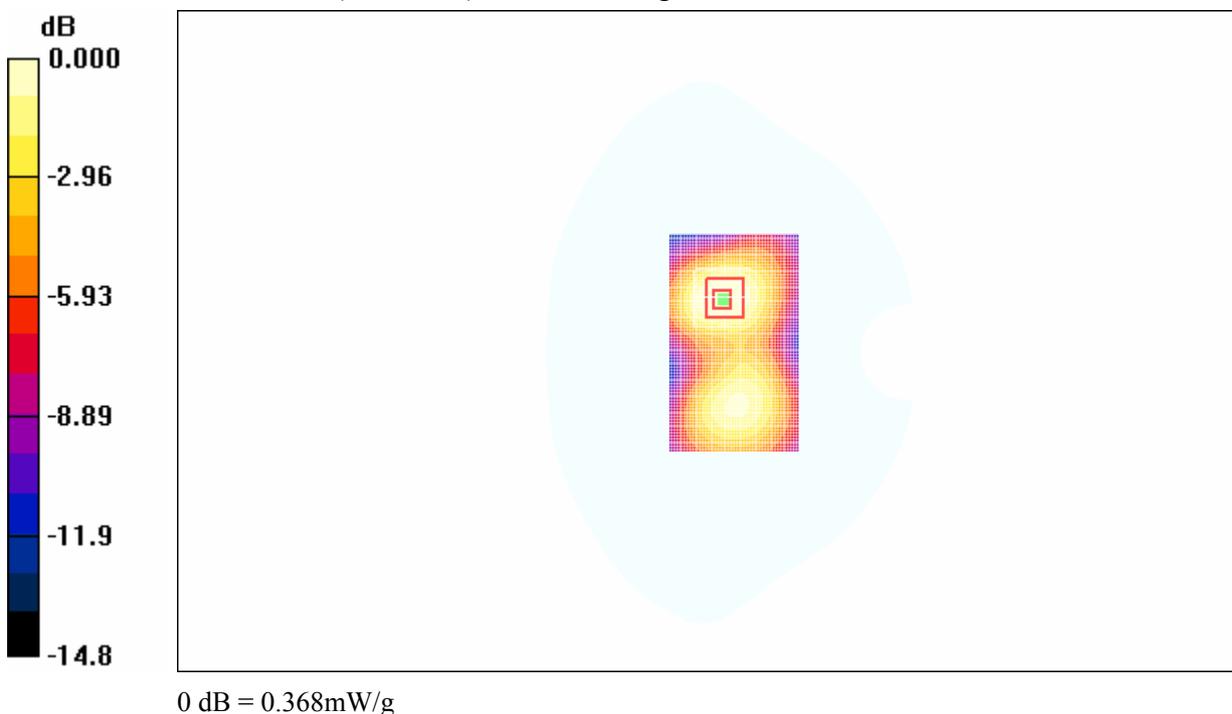
Fig. 35 CDMA 1900MHz, Body, Towards Ground, CH25
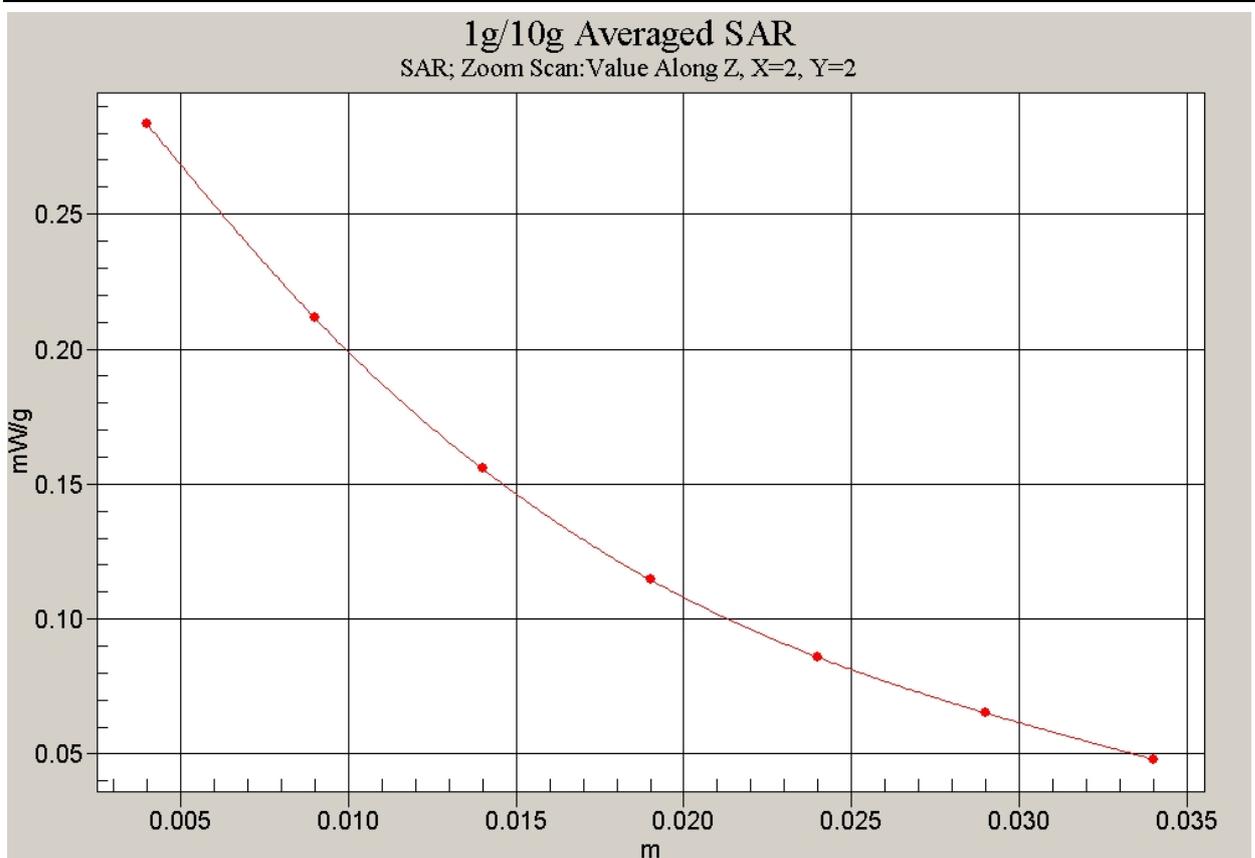
Fig. 36 Z-Scan at power reference point (CDMA 1900MHz, Body, Towards Ground, CH25)

ANNEX D SYSTEM VALIDATION RESULTS

1900MHzDAE589Probe1736

Date/Time: 2007-3-23 7:12:38
Electronics: DAE3 Sn536
Medium: Head 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.39 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3
Ambient Temperature:23.3^{o}C   Liqiud Temperature: 22.5^{o}C
Communication System: CW Frequency: 1900 MHz Duty Cycle: 1:1
Probe: ET3DV6 - SN1736 ConvF(5.4, 5.4, 5.4)

System Validation/Area Scan (101x101x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 11.2 mW/g

System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.1 V/m; Power Drift = 0.1 dB
Peak SAR (extrapolated) = 16.9 W/kg
SAR(1 g) = 9.91 mW/g; SAR(10 g) = 5.27 mW/g
Maximum value of SAR (measured) = 11.3 mW/g

0 dB = 11.3mW/g

Fig.37 validation 1900MHz 250mW
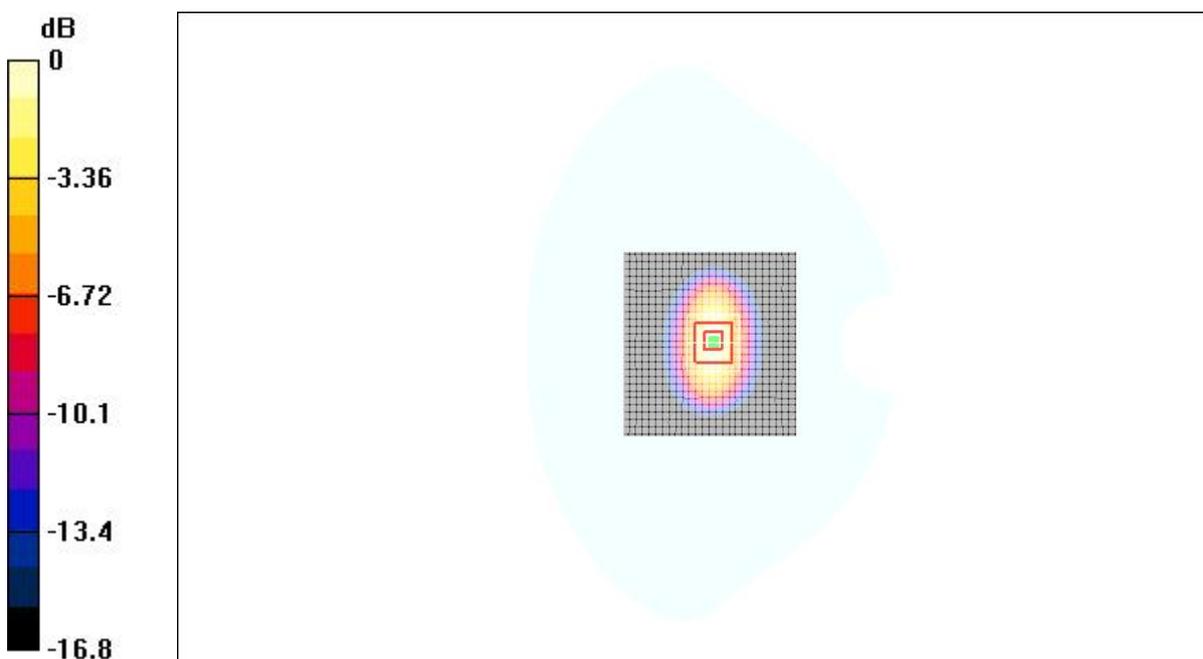
ANNEX E PROBE CALIBRATION CERTIFICATE

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

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 China

Certificate No: ET3DV6-1736_Dec06

CALIBRATION CERTIFICATE

Object	**ET3DV6-SN: 1736**

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

Calibration date:	**December 1, 2006**

Condition of the calibrated item	**In Tolerance**

This calibration certify documents the traceability to national standards, which realize the physical units of measurements(SI).
All calibrations have been conducted at an environment temperature $(22\pm3)^0$C and humidity<70%

Calibration Equipment used (M&TE critical for calibration)

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

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

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Laboratory Technician	*[signature]*
Approved by:	Katja Pokovic	Technical Director	*[signature]*

Issued: December 1, 2006

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

Certificate No: ET3DV6-1736_Dec06   Page 1 of 9

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

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

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

Accreditation No.: **SCS 108**

Glossary:

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

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

Methods Applied and Interpretation of Parameters:
  - *NORMx,y,z*: Assessed for E-field polarization $\vartheta = 0$ (f $\leq$ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConF*).
  - *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 *ConF*.
  - *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.
  - *ConF 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 * ConF whereby the uncertainty corresponds to that given for *ConF*. A frequency dependent *ConF* 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   December 1, 2006

Probe ET3DV6

SN: 1736

Manufactured: September 27, 2002

Last calibrated: November 25, 2005

Recalibrated: December 1, 2006

Calibrated for DASY System

ET3DV6 SN: 1736   December 1, 2006

DASY - Parameters of Probe: ET3DV6 SN:1736

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

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

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL   900 MHz   Typical SAR gradient: 5 % per mm

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

TSL   1810 MHz   Typical SAR gradient: 10 % per mm

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

Sensor Offset

Probe Tip to Sensor Center   **2.7** mm

ET3DV6 SN: 1736   December 1, 2006

Frequency Response of E-Field

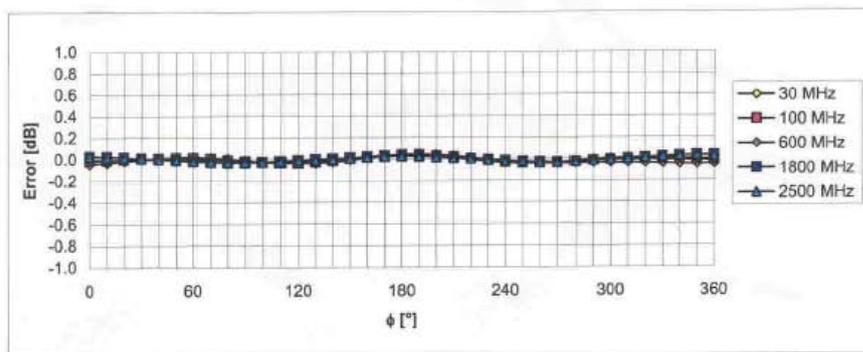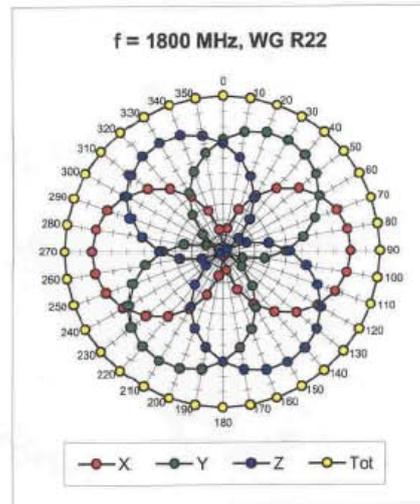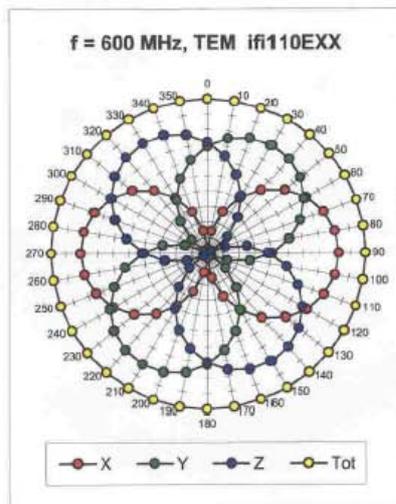### (TEM-Cell:ifi110 EXX, Waveguide: R22)
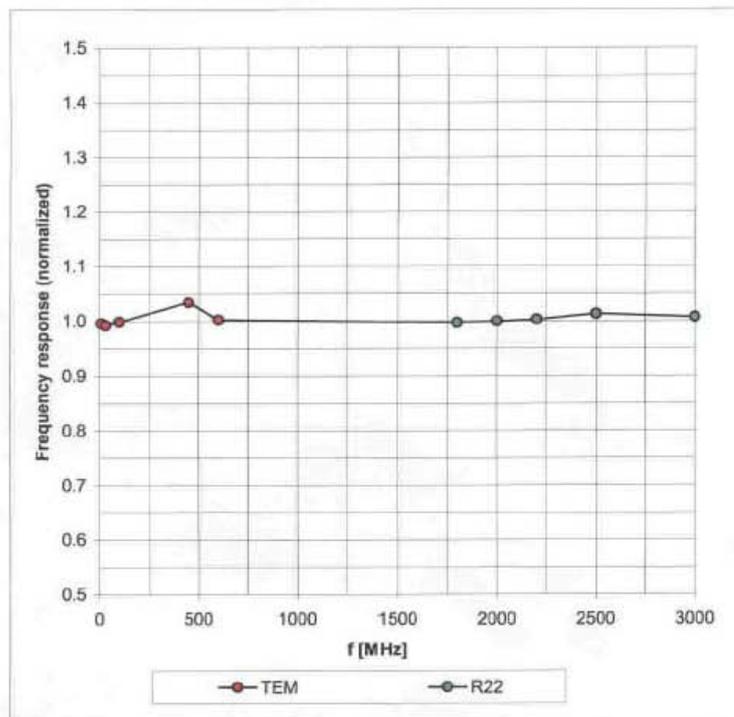
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

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Receiving Pattern (φ), ϑ = 0°

f = 600 MHz, TEM ifi110EXX

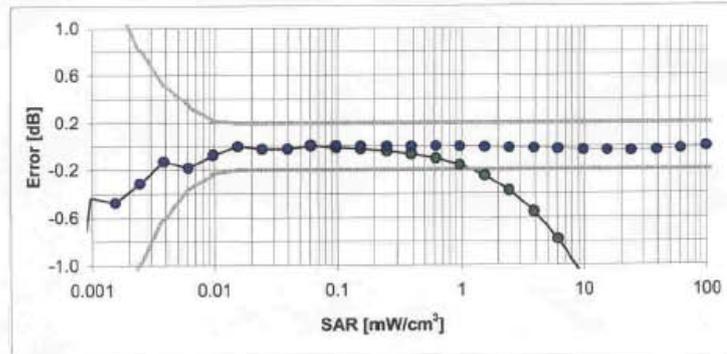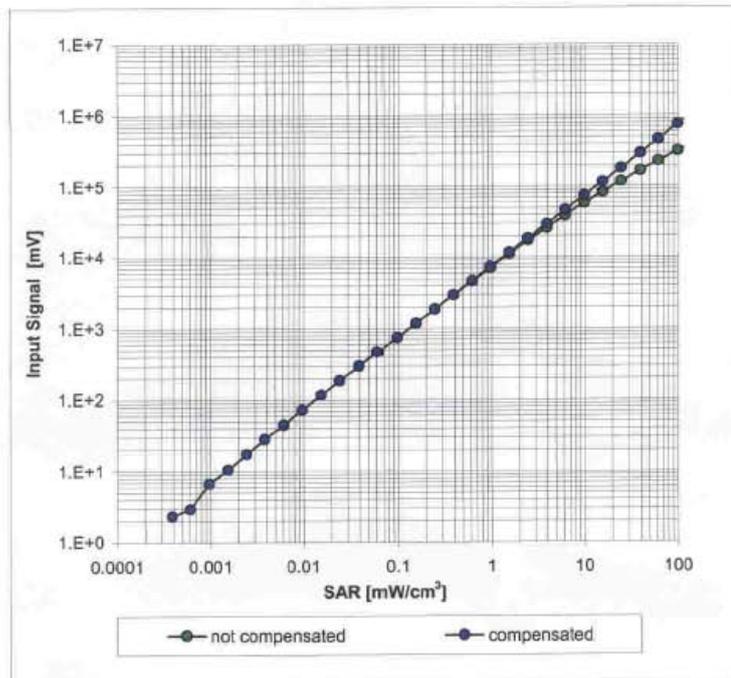f = 1800 MHz, WG R22

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

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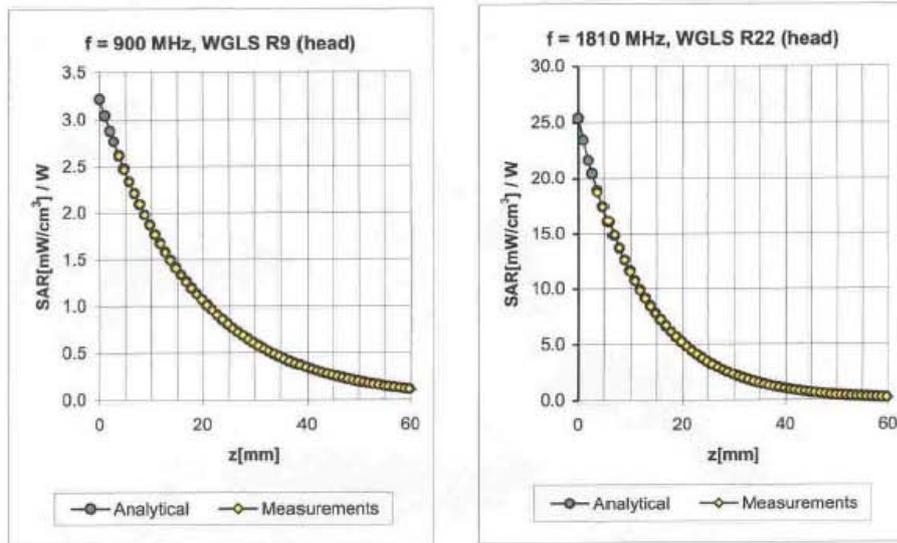## Dynamic Range f(SAR_head)
(Waveguide R22, f = 1800 MHz)

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

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Conversion Factor Assessment

f = 900 MHz, WGLS R9 (head)

f = 1810 MHz, WGLS R22 (head)

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

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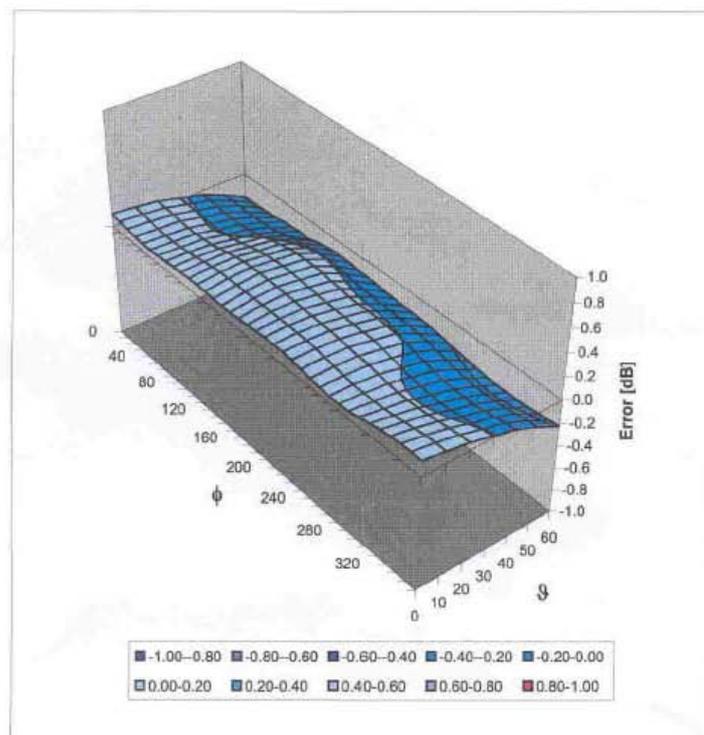
Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

ANNEX F DIPOLE CALIBRATION CERTIFICATE

Y351

Schmid & Partner
Engineering AG

受控文件

009

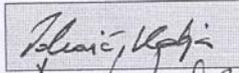Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Calibration Certificate

1900 MHz System Validation Dipole

Type:	D1900V2
Serial Number:	541
Place of Calibration:	Zurich
Date of Calibration:	September 1, 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

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

DASY4

Dipole Validation Kit

Type: D1900V2

Serial: 541

Manufactured: July 26, 2001
Calibrated: September 1, 2005

1.   **Measurement Conditions**

The measurements were performed in the flat section of the new generic twin phantom filled with brain simulating sugar solution of the following electrical parameters at 1900 MHz:

Relative permitivity	**39.5**	± 5%
Conductivity	**1.47 mho/m**	± 10%

The DASY3 System (Software version 3.1c) with a dosimetric E-field probe ET3DV6 (SN:1507, conversion factor 5.57 at 1800 MHz) was used for the measurements.

The dipole feedpoint was positioned below the center marking and oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10mm 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 head phantom according to the measurement conditions described in section 1. The results (see figure) 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:	**41.6 mW/g**
averaged over 10 cm^3 (10 g) of tissue:	**21.4 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. The estimated sensitivities of SAR-values and penetration depths to the liquid parameters are listed in the DASY Application Note 4: 'SAR Sensitivities'.

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: **1.214 ns**   (one direction)
Transmission factor: **0.993**   (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 1900 MHz: $Re\{Z\} = $ **45.4 Ω**

                                                                       $Im\{Z\} = $ **-9.8 Ω**

Return Loss at 1900 MHz   **- 19.0 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.
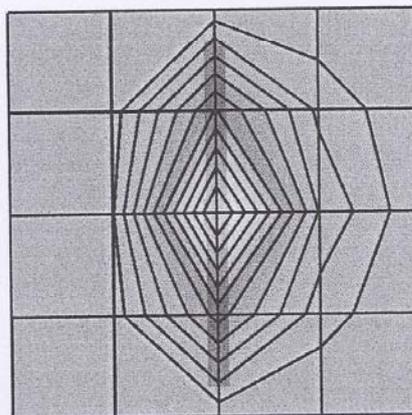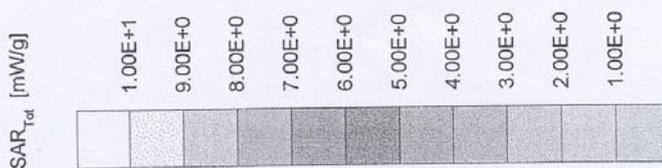
Do not apply excessive force to the dipole arms, because they might bend. If the dipole arms have to be bent back, take care to release stress to the soldered connections near the feedpoint; they might come off.

After prolonged use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

09/01/05

Validation Dipole D1900V2 SN:541, d = 10 mm

Frequency: 1900 MHz; Antenna Input Power: 250 [mW]
SAM Phantom; Flat Section; Grid Spacing: Dx = 20.0, Dy = 20.0, Dz = 10.0
Probe: ET3DV6 - SN1507; ConvF(5.57,5.57,5.57) at 1800 MHz; IEEE1528 1900 MHz ; σ = 1.47 mho/m ε$_r$ = 39.5 ρ = 1.00 g/cm^3
Cubes (2): Peak: 19.8 mW/g ± 0.00 dB, SAR (1g): 10.4 mW/g ± 0.02 dB, SAR (10g): 5.36 mW/g ± 0.03 dB, (Worst-case extrapolation)
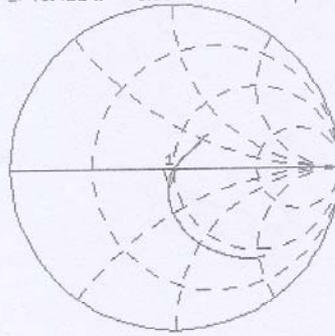Penetration depth: 8.2 (7.8, 9.2) [mm]
Powerdrift: -0.05 dB

SAR$_{Tot}$ [mW/g]

1.00E+1
9.00E+0
8.00E+0
7.00E+0
6.00E+0
5.00E+0
4.00E+0
3.00E+0
2.00E+0
1.00E+0