

**Position 4, Whole Antenna, Middle of Laptop 2**

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)

**Position 4, Whole Antenna, Middle/Area Scan (61x61x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.020 mW/g

**Position 4, Whole Antenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement

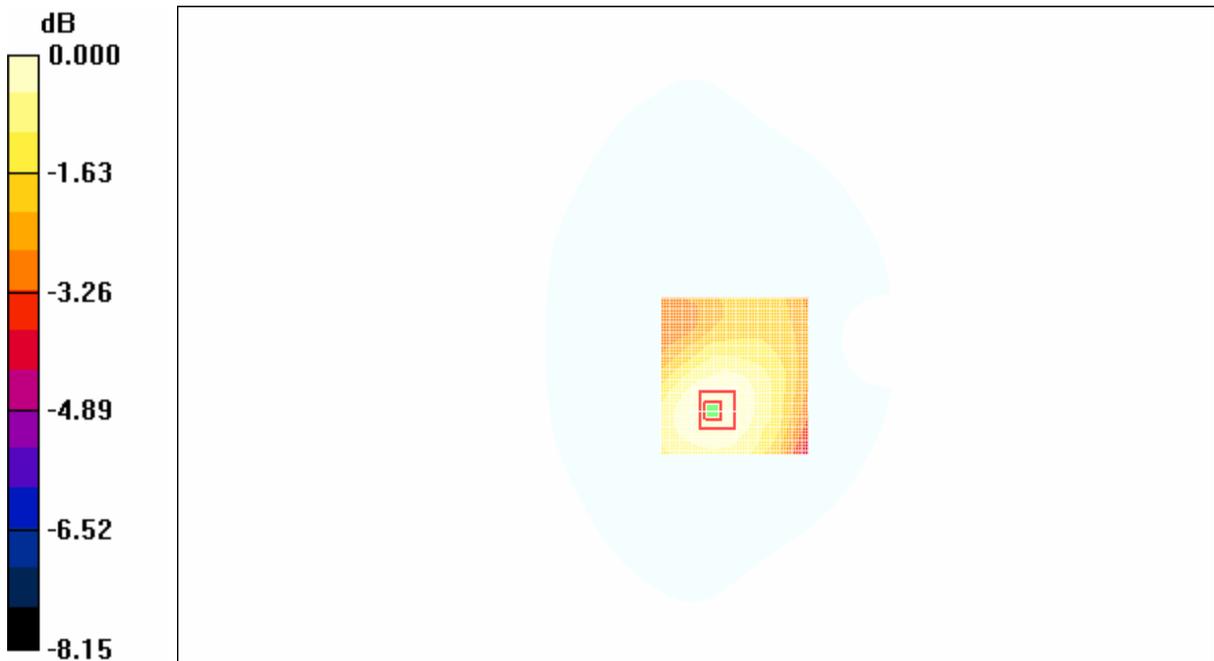
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.02 V/m; Power Drift = -0.045 dB

Peak SAR (extrapolated) = 0.024 W/kg

**SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.014 mW/g**

Maximum value of SAR (measured) = 0.020 mW/g



0 dB = 0.020mW/g

Fig. 29 Laptop 2, Test Position 4, whole Antenna, CH384

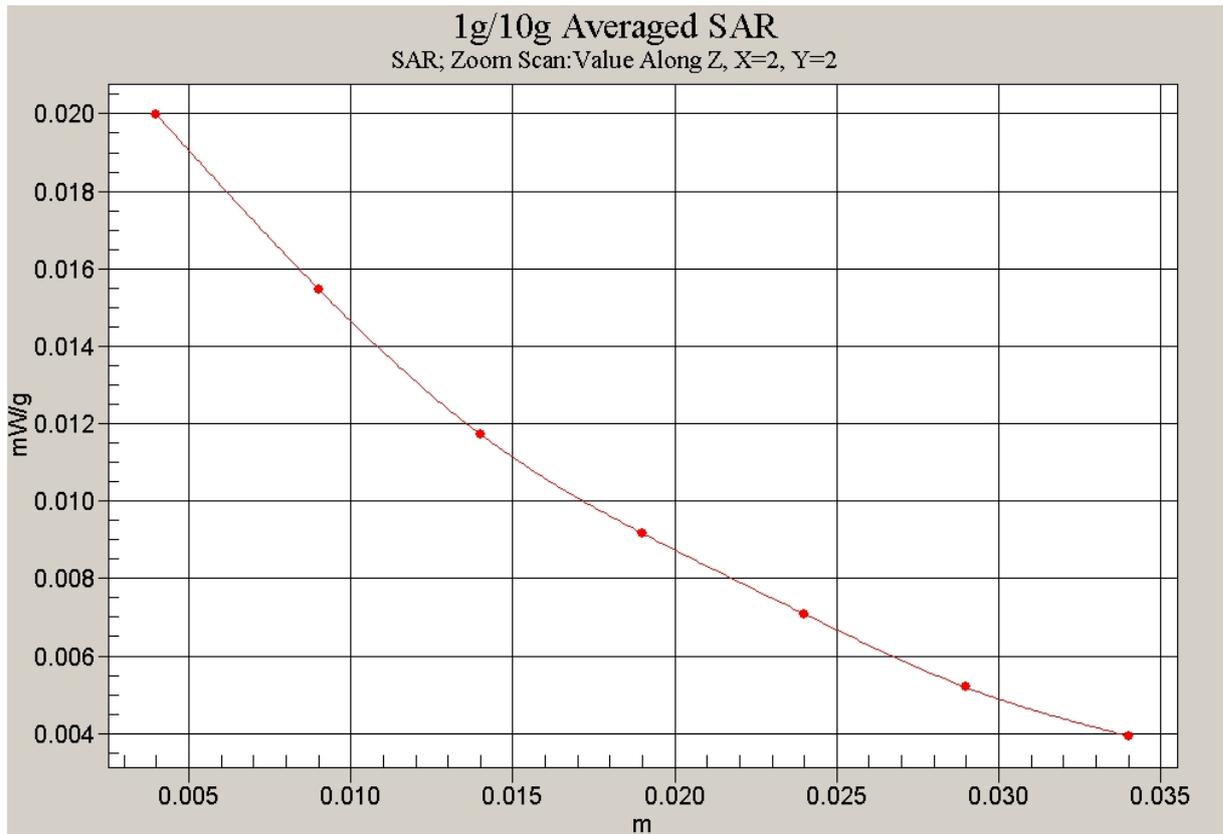


Fig. 30 Z-Scan at power reference point  
(Laptop 2, Test Position 4, whole Antenna, CH384)

**Position 5, Whole Antenna, Middle of Laptop 2**

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)

**Positon 5, Whole Anenna, Middle/Area Scan (61x71x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.094 mW/g

**Positon 5, Whole Anenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:

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

Reference Value = 9.88 V/m; Power Drift = -0.165 dB

Peak SAR (extrapolated) = 0.119 W/kg

**SAR(1 g) = 0.086 mW/g; SAR(10 g) = 0.063 mW/g**

Maximum value of SAR (measured) = 0.092 mW/g

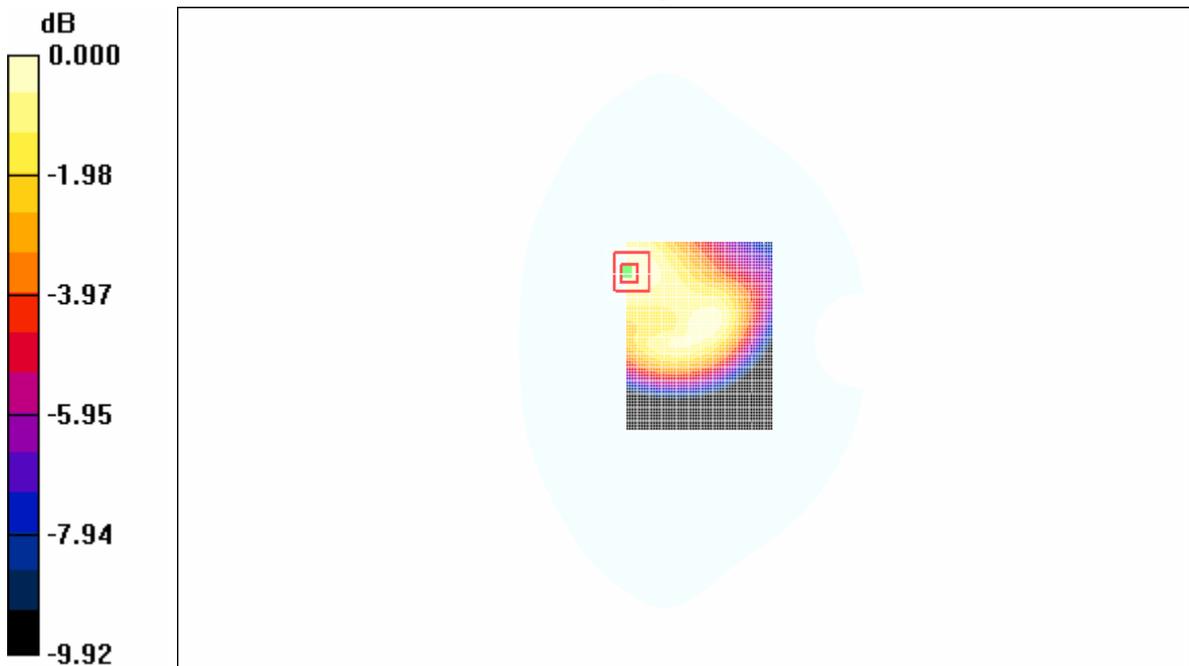


Fig. 31 Laptop 2, Test Position 5, whole Antenna, CH384

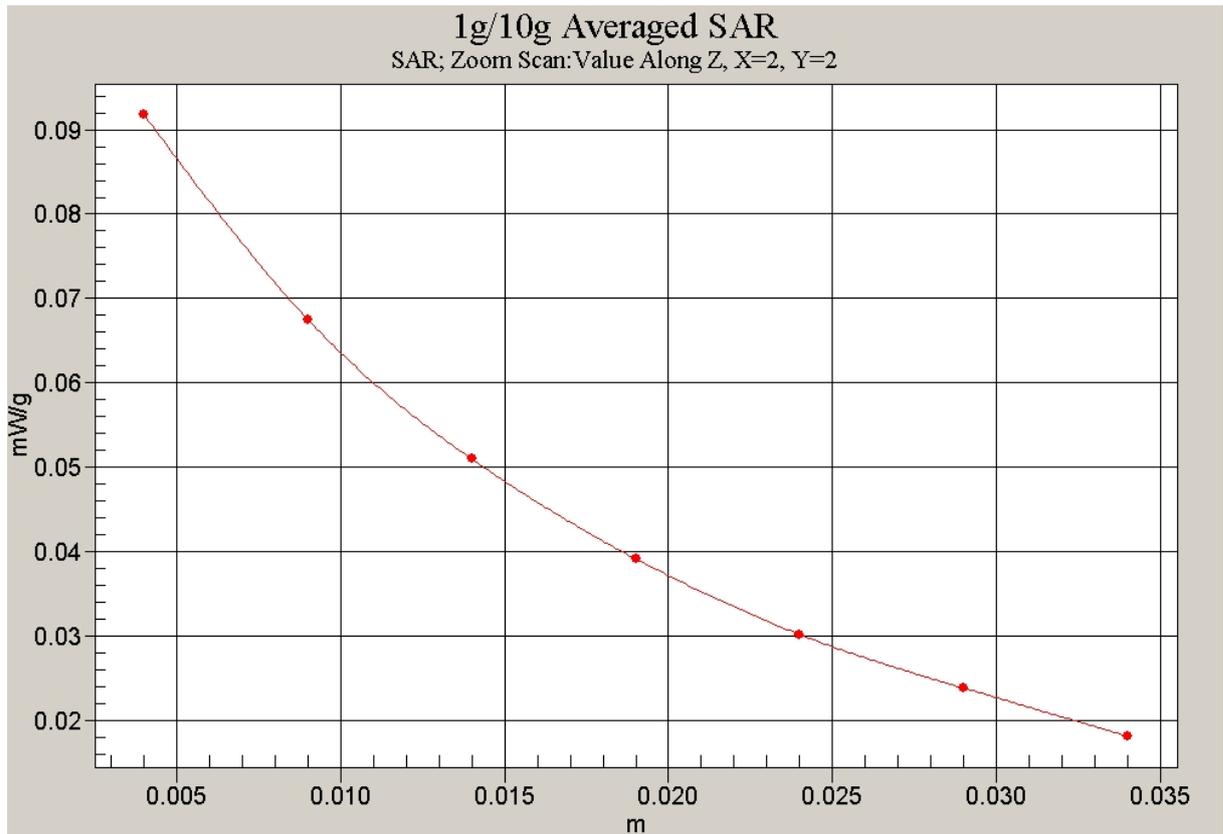


Fig. 32 Z-Scan at power reference point  
(Laptop 2, Test Position 5, whole Antenna, CH384)

**Position 6, Whole Antenna, Middle of Laptop 6**

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)

**Positon 6, Whole Antenna, Middle/Area Scan (61x61x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.145 mW/g

**Positon 6, Whole Antenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:

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

Reference Value = 6.56 V/m; Power Drift = -0.134 dB

Peak SAR (extrapolated) = 0.189 W/kg

**SAR(1 g) = 0.126 mW/g; SAR(10 g) = 0.079 mW/g**

Maximum value of SAR (measured) = 0.133 mW/g

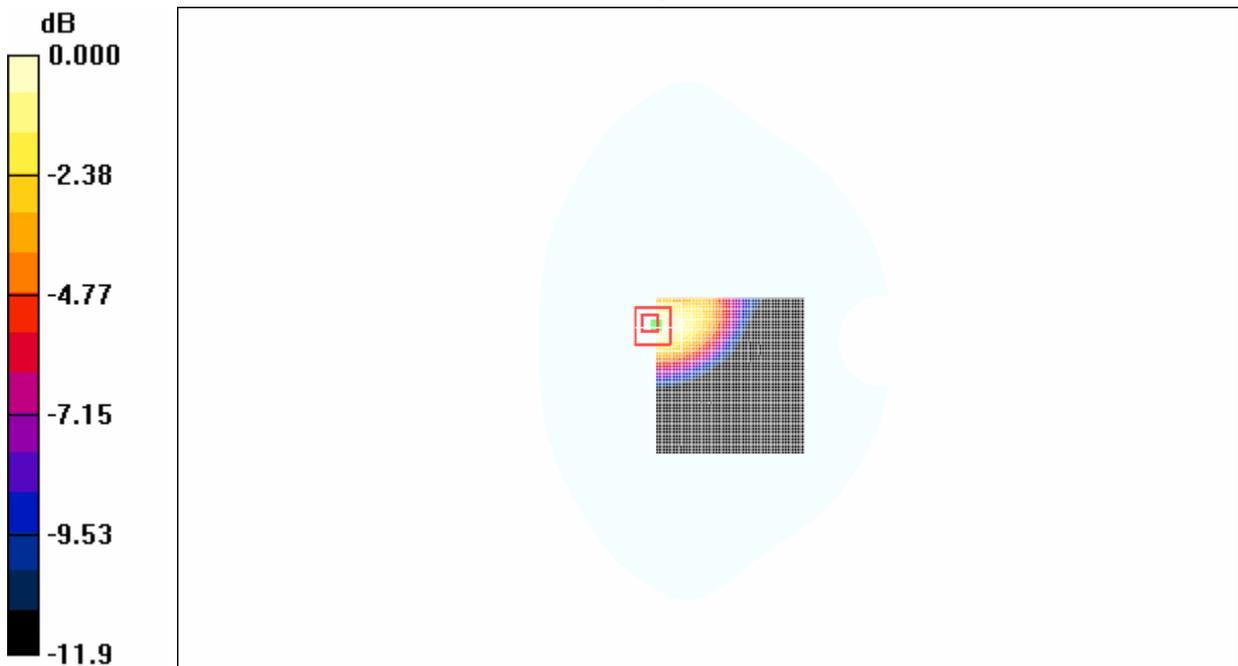
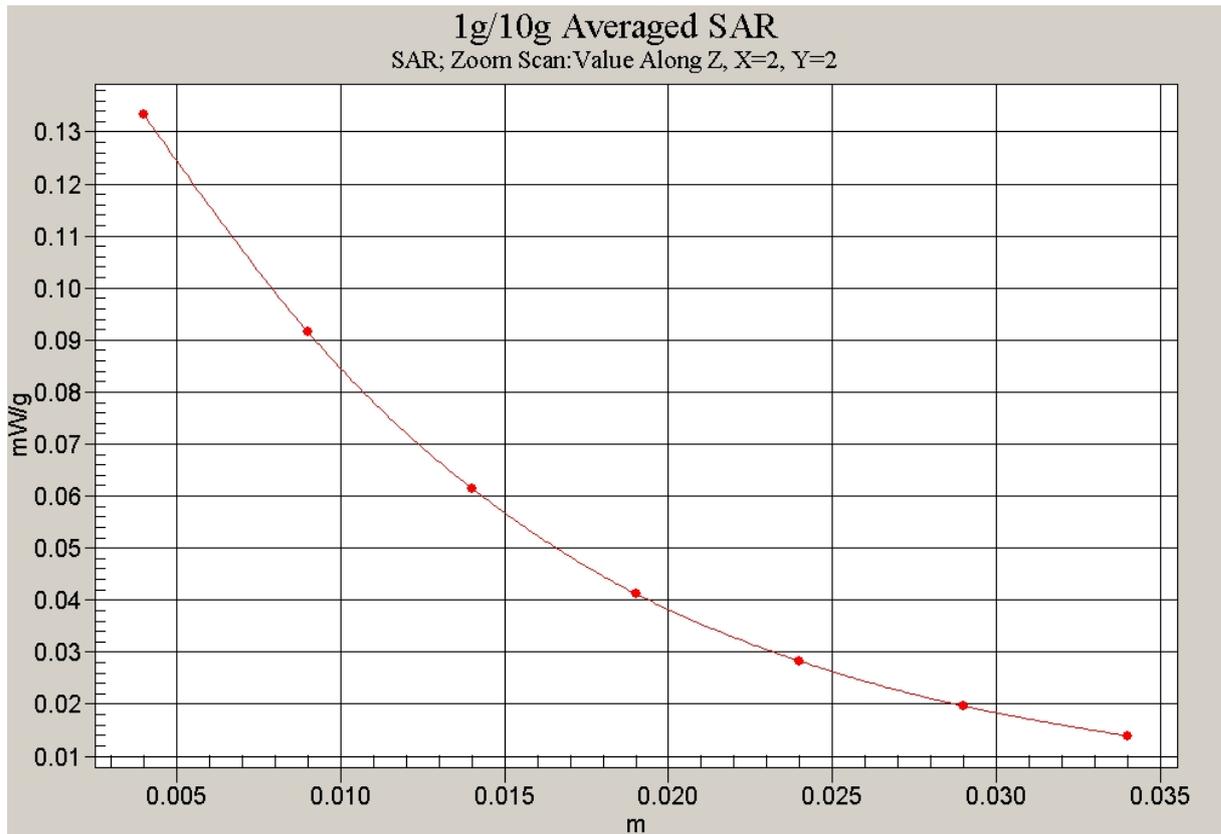


Fig. 33 Laptop 2, Test Position 6, whole Antenna, CH384



**Fig. 34 Z-Scan at power reference point  
(Laptop 2, Test Position 6, whole Antenna, CH384)**

**Position 7, Whole Antenna, High of Laptop 2**

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)

**Position 7, Whole Antenna, High/Area Scan (61x61x1):** Measurement grid:  
dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.329 mW/g

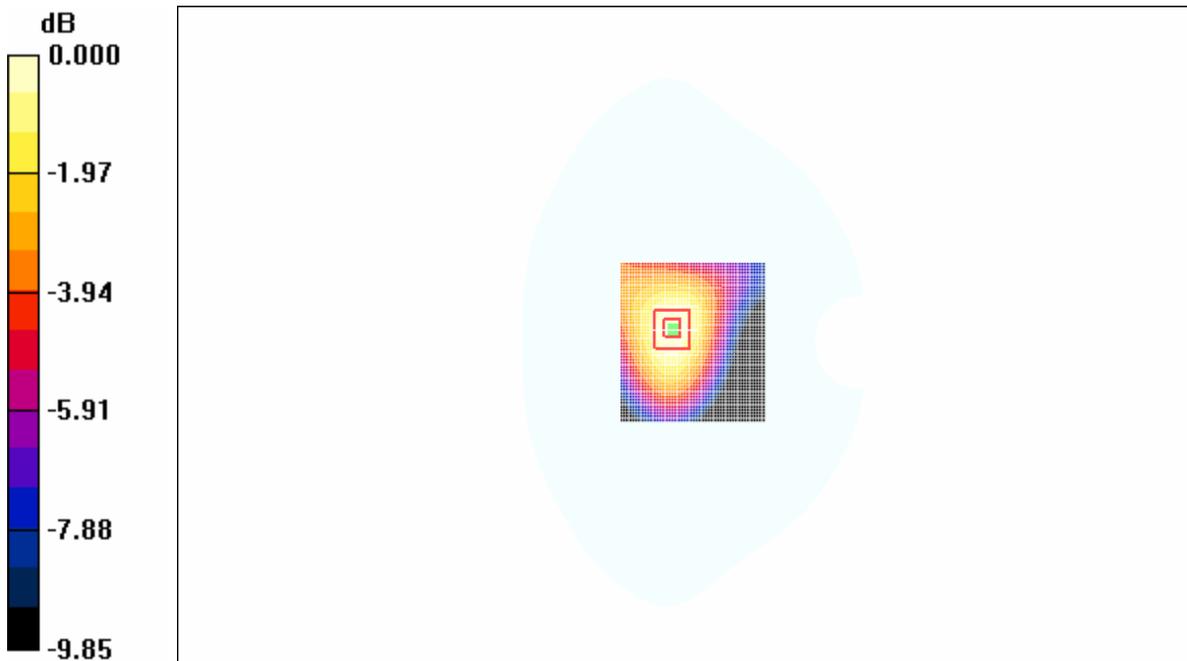
**Position 7, Whole Antenna, High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  
dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.4 V/m; Power Drift = 0.054 dB

Peak SAR (extrapolated) = 0.417 W/kg

**SAR(1 g) = 0.304 mW/g; SAR(10 g) = 0.207 mW/g**

Maximum value of SAR (measured) = 0.326 mW/g



0 dB = 0.326mW/g

**Fig. 35 Laptop 2, Test Position 7, whole Antenna, CH777**

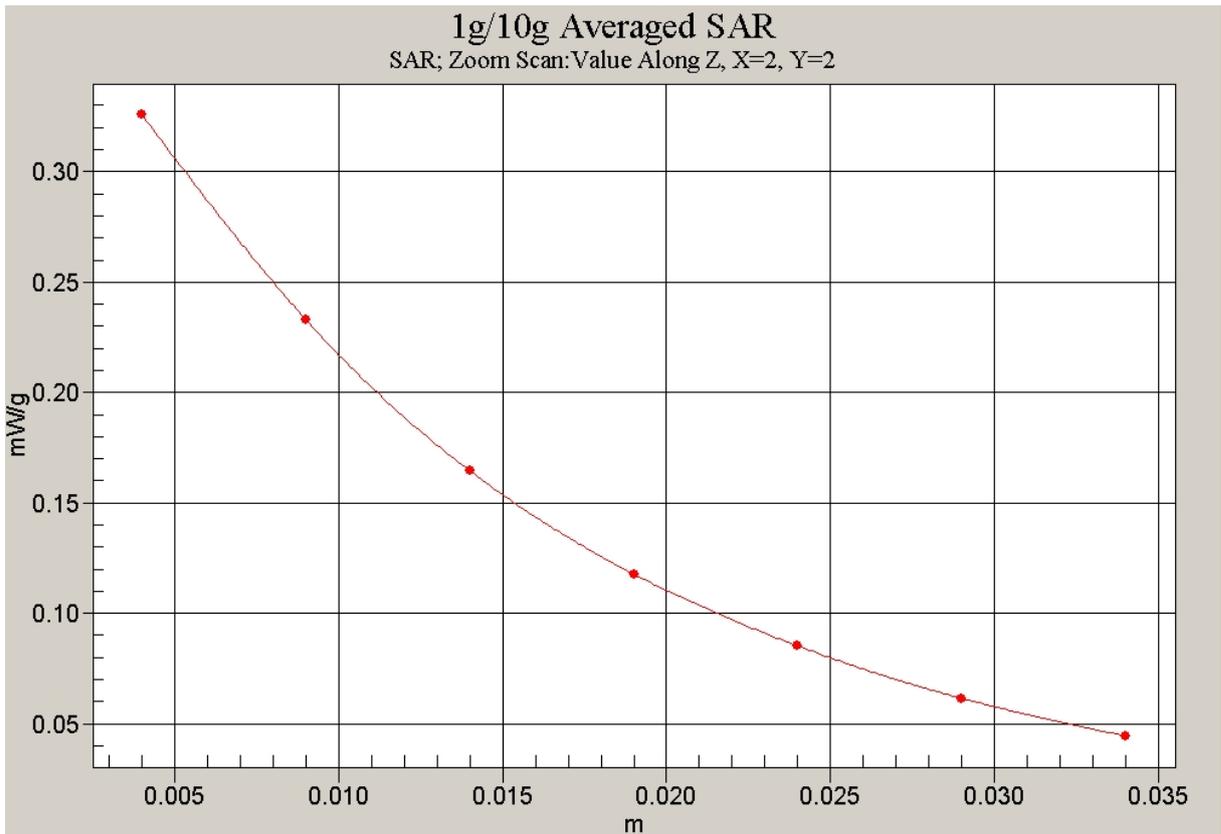


Fig. 36 Z-Scan at power reference point  
(Laptop 2, Test Position 7, whole Antenna, CH777)

**Position 7, Whole Antenna, Middle of Laptop 2**

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)

**Positon 7, Whole Antenna, Middle/Area Scan (61x61x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.478 mW/g

**Positon 7, Whole Antenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:

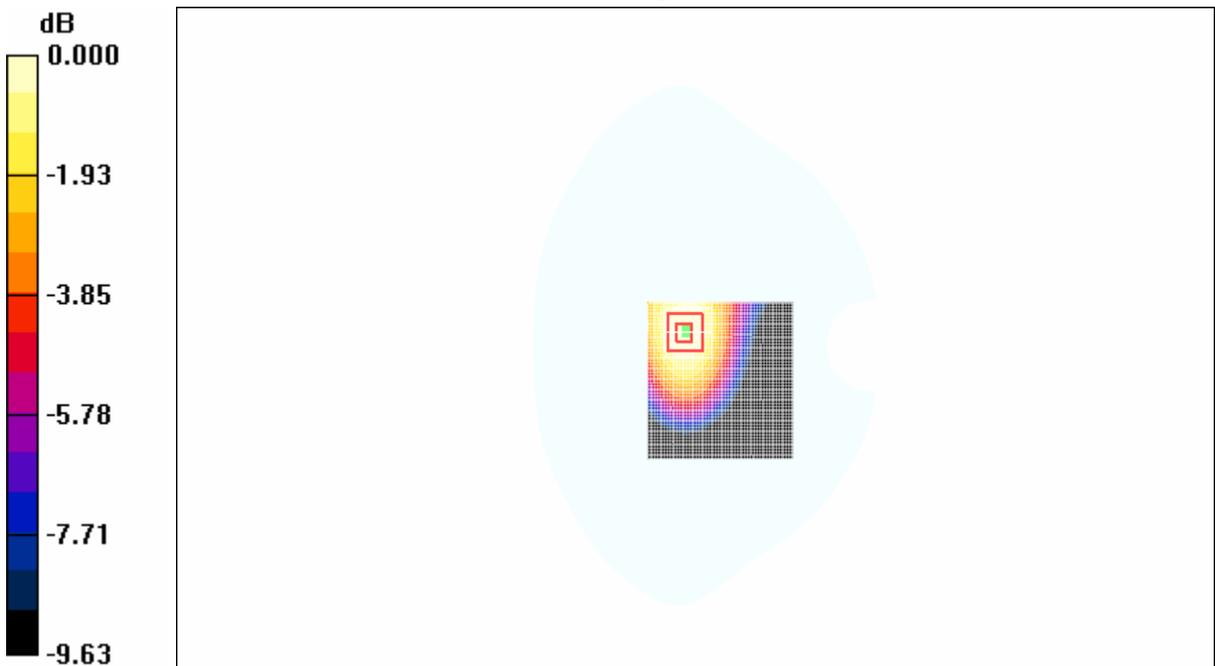
dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.3 V/m; Power Drift = 0.114 dB

Peak SAR (extrapolated) = 0.562 W/kg

**SAR(1 g) = 0.415 mW/g; SAR(10 g) = 0.285 mW/g**

Maximum value of SAR (measured) = 0.440 mW/g



0 dB = 0.440mW/g

Fig. 37 Laptop 2, Test Position 7, whole Antenna, CH384

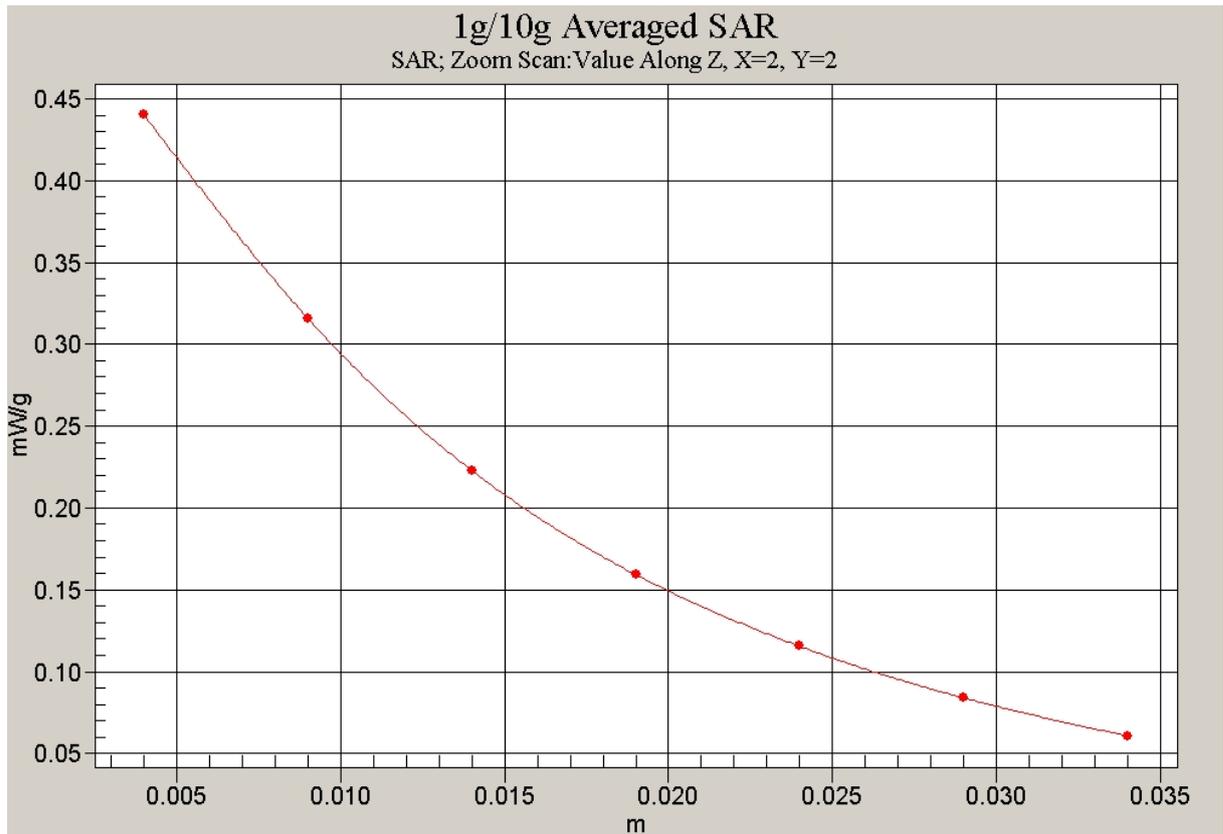


Fig. 38 Z-Scan at power reference point  
(Laptop 2, Test Position 7, whole Antenna, CH384)

**Position 7, Whole Antenna, Low of Laptop 2**

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)

**Low Antenna Out Position 7/Area Scan (61x61x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.388 mW/g

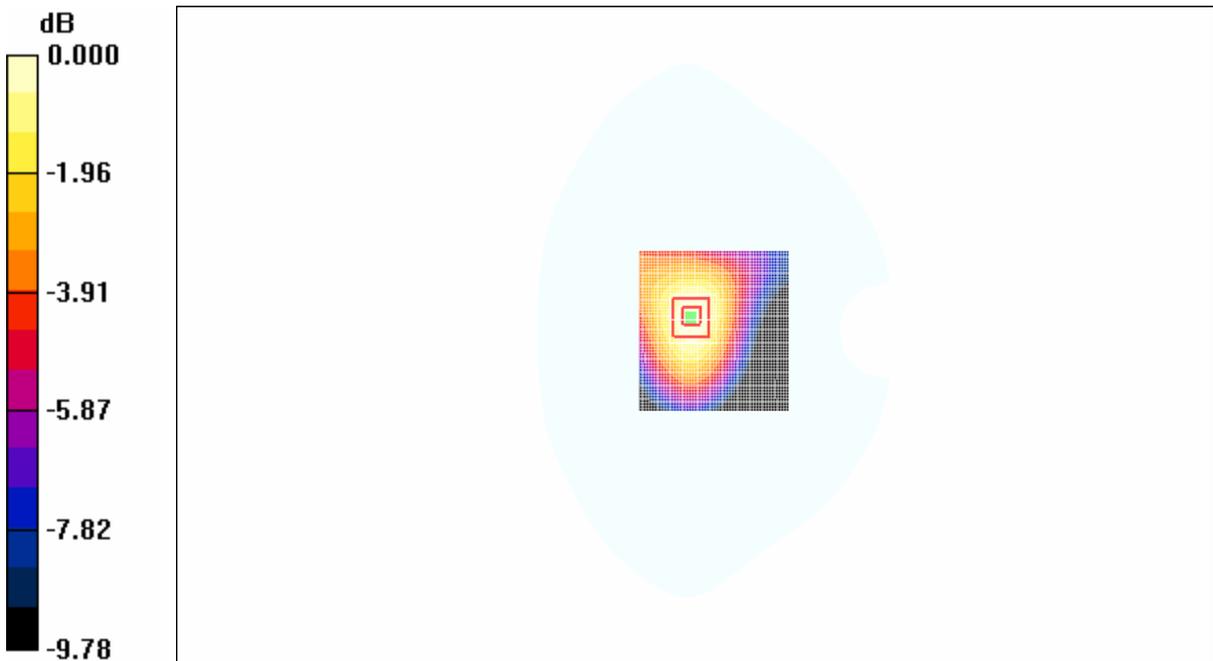
**Low Antenna Out Position 7/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.5 V/m; Power Drift = 0.200 dB

Peak SAR (extrapolated) = 0.494 W/kg

**SAR(1 g) = 0.362 mW/g; SAR(10 g) = 0.247 mW/g**

Maximum value of SAR (measured) = 0.388 mW/g



0 dB = 0.388mW/g

**Fig. 39 Laptop 2, Test Position 7, whole Antenna, CDMA CH1013**

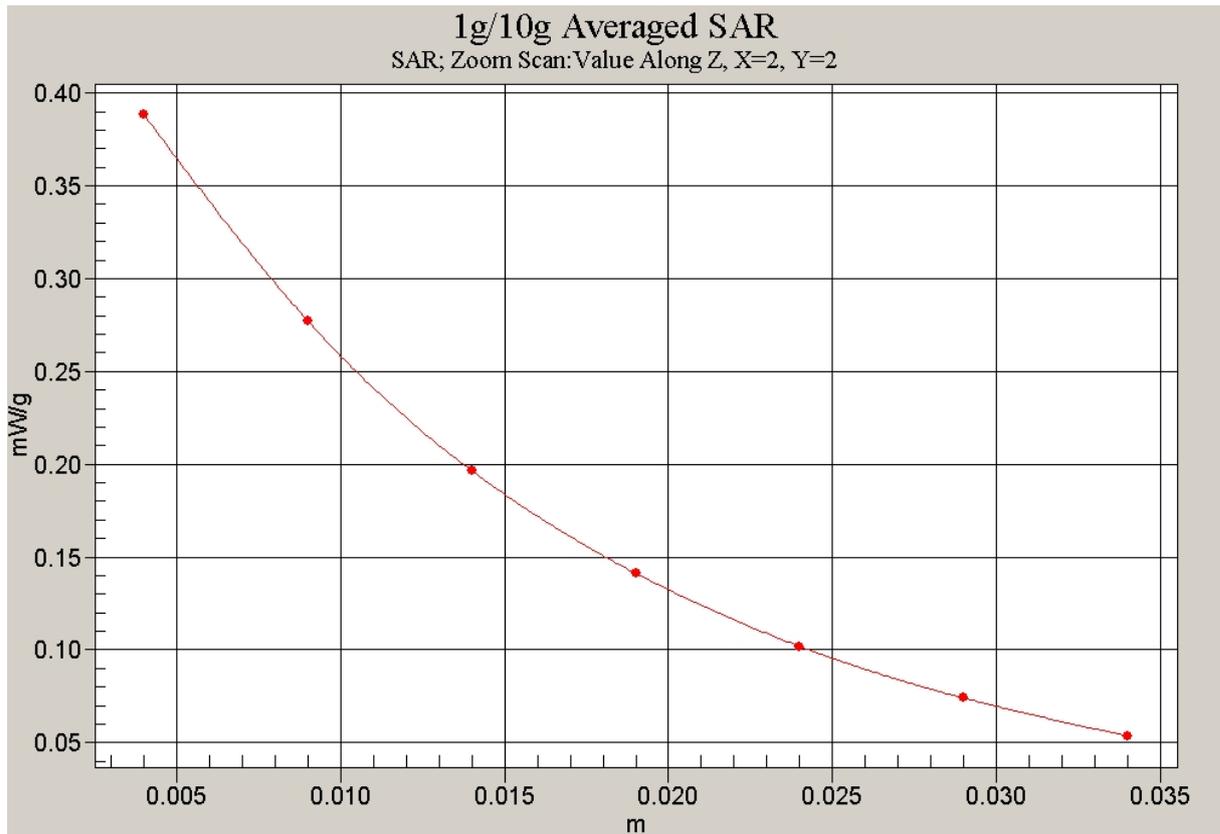


Fig. 40 Z-Scan at power reference point  
(Laptop 2, Test Position 7, whole Antenna, CDMA CH1013)

**Position 7, Half Antenna, Middle of Laptop 2**

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)

**Position 7, Half Antenna, Middle/Area Scan (61x61x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.429 mW/g

**Position 7, Half Antenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:

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

Reference Value = 20.5 V/m; Power Drift = -0.200 dB

Peak SAR (extrapolated) = 0.528 W/kg

**SAR(1 g) = 0.376 mW/g; SAR(10 g) = 0.252 mW/g**

Maximum value of SAR (measured) = 0.402 mW/g

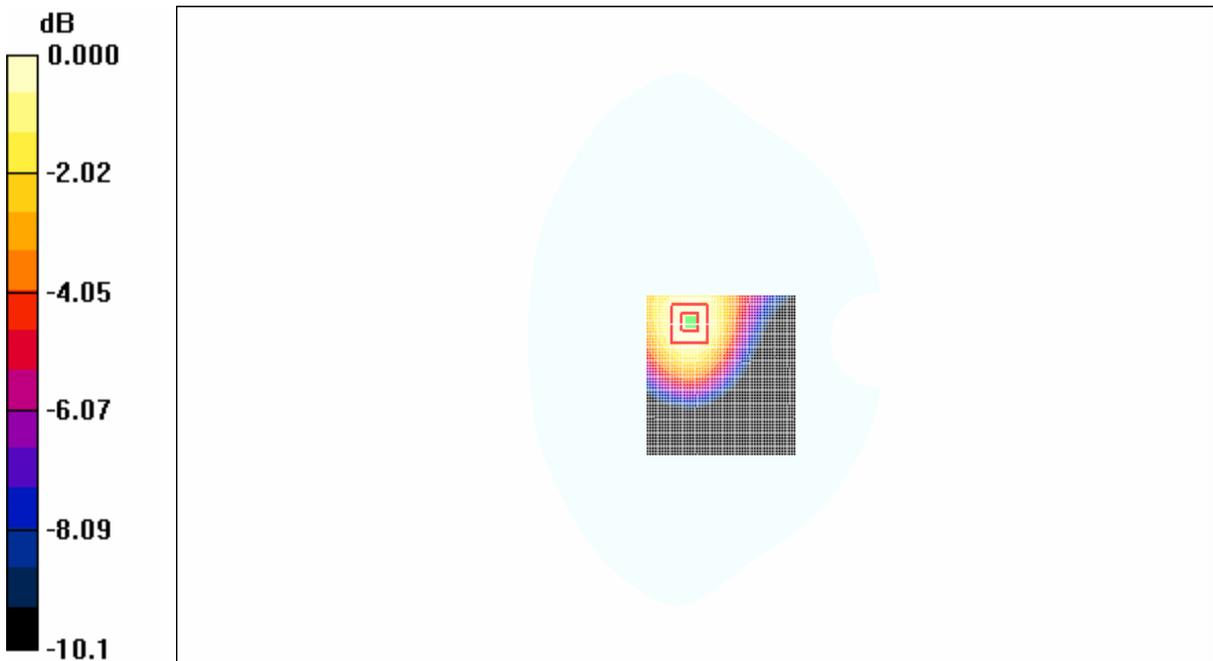


Fig. 41 Laptop 2, Test Position 7, Half Antenna, CDMA CH384

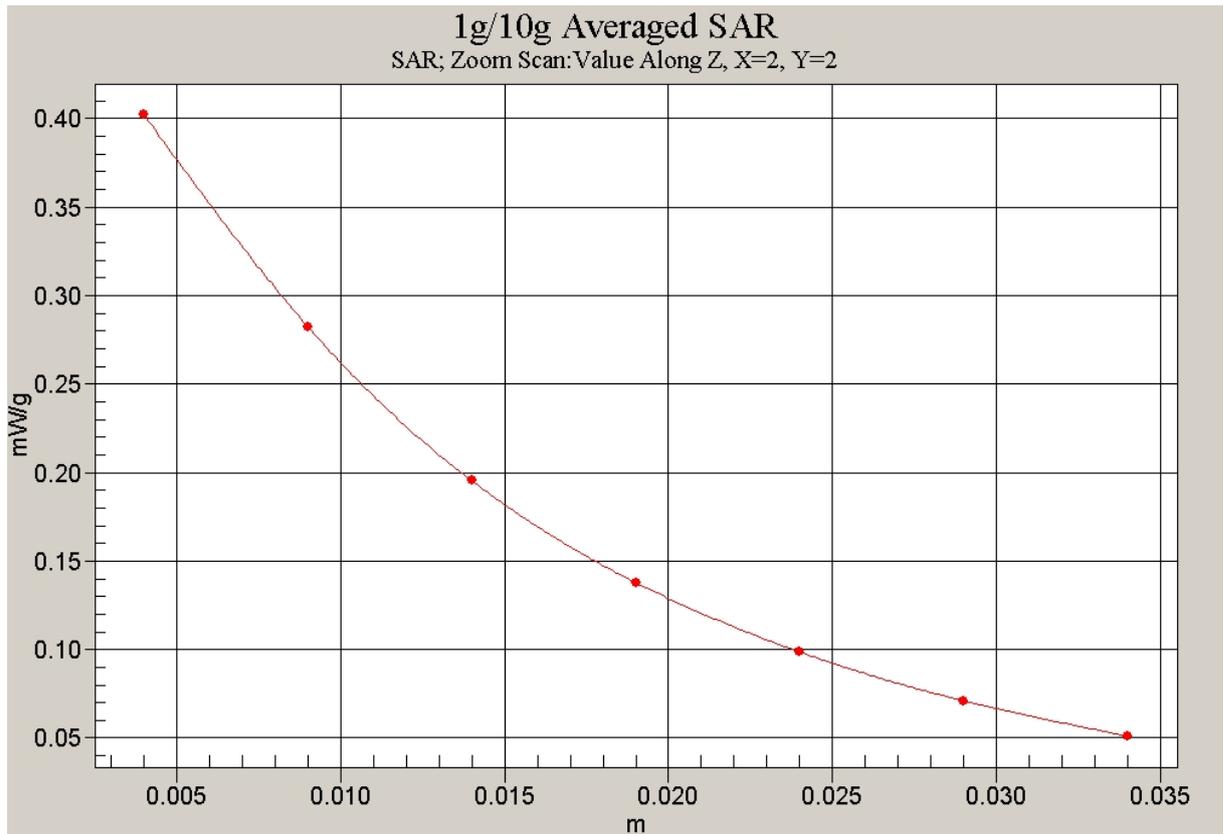


Fig. 42 Z-Scan at power reference point  
(Laptop 2, Test Position 7, Half Antenna, CH384)

**Position 8, Whole Antenna, Middle of Laptop 2**

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)

**Positon 8, Whole Antenna, Middle/Area Scan (61x71x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.101 mW/g

**Positon 8, Whole Antenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:

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

Reference Value = 10.5 V/m; Power Drift = -0.048 dB

Peak SAR (extrapolated) = 0.133 W/kg

**SAR(1 g) = 0.094 mW/g; SAR(10 g) = 0.063 mW/g**

Maximum value of SAR (measured) = 0.099 mW/g

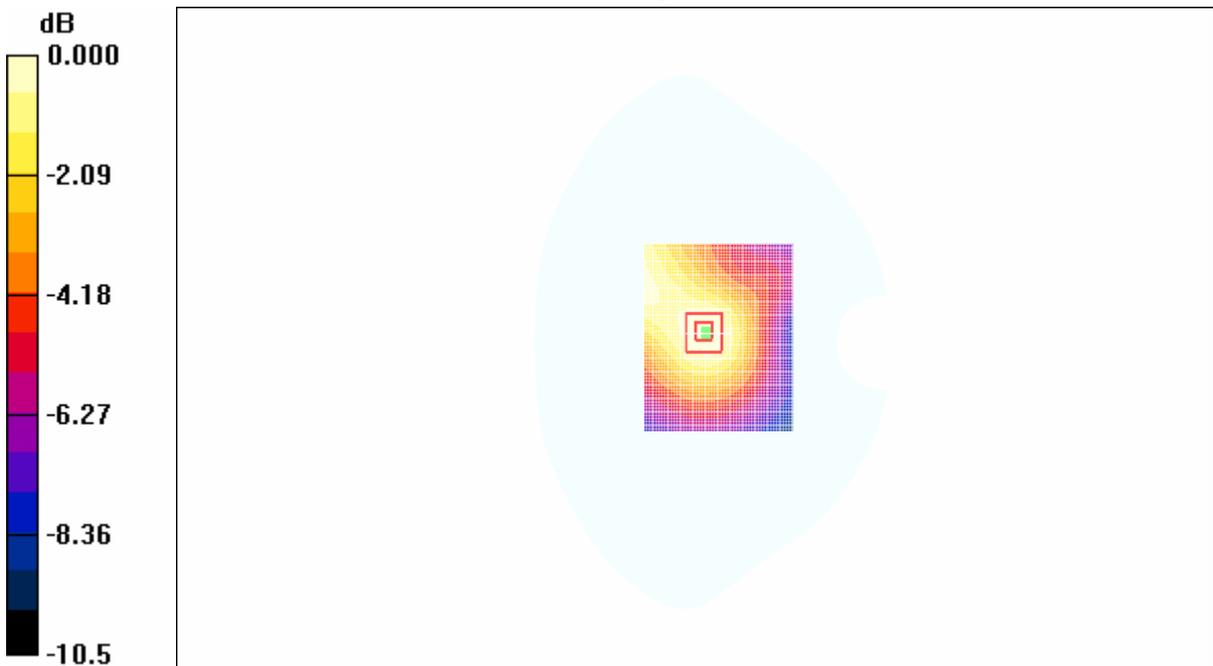


Fig. 43 Laptop 2, Test Position 8, Whole Antenna, CH384

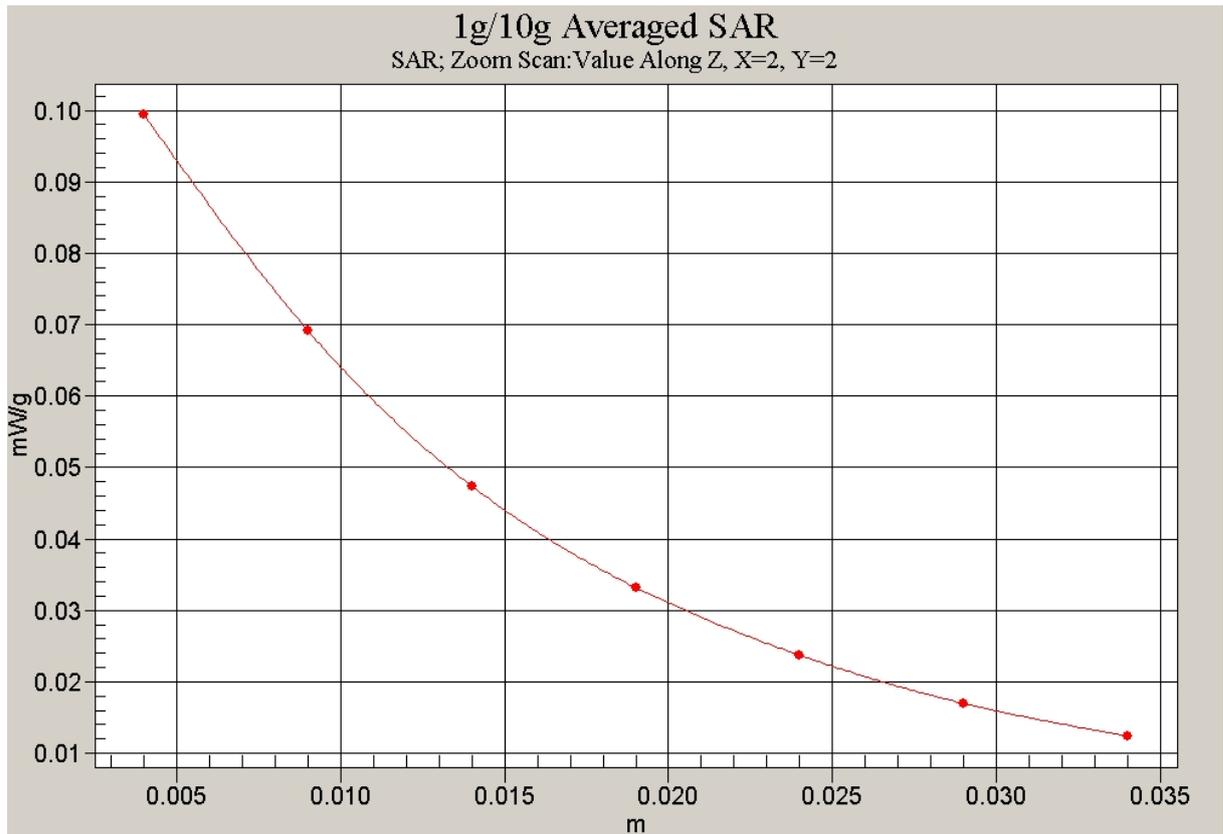


Fig. 44 Z-Scan at power reference point  
(Laptop 2, Test Position 8, Whole Antenna, CH384)

**Position 1, Whole Antenna, Middle of Laptop 3**

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)

**Position 1, Whole Antenna, Middle/Area Scan (61x71x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.080 mW/g

**Position 1, Whole Antenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement

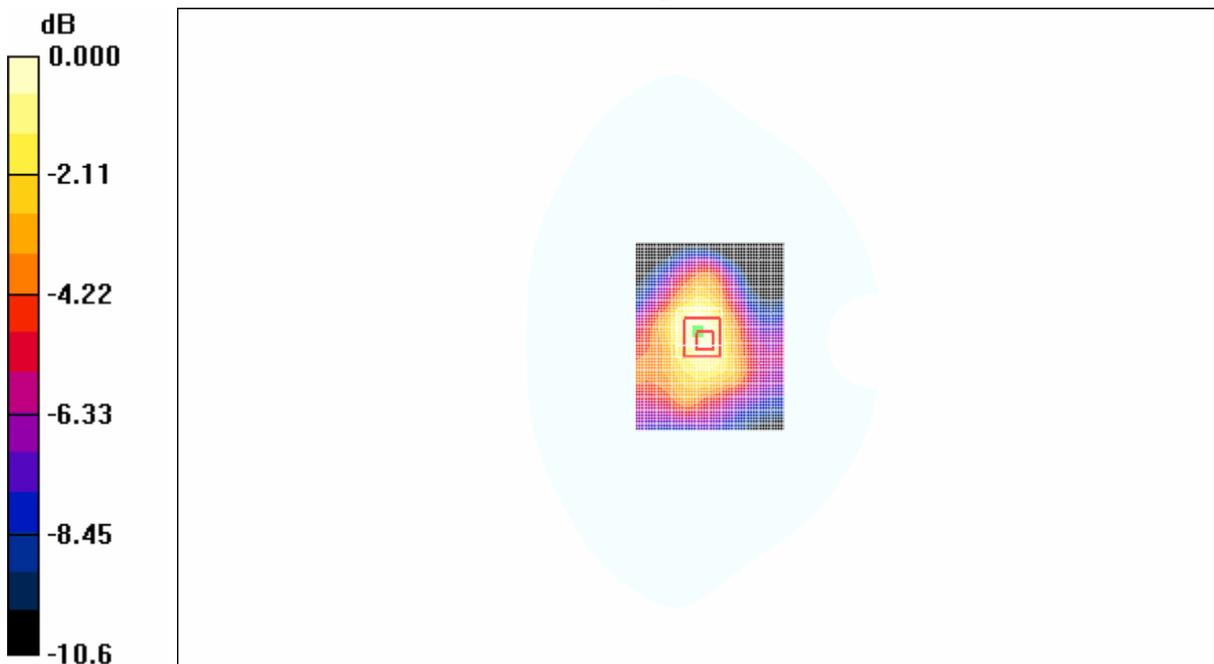
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.09 V/m; Power Drift = 0.156 dB

Peak SAR (extrapolated) = 0.117 W/kg

**SAR(1 g) = 0.069 mW/g; SAR(10 g) = 0.047 mW/g**

Maximum value of SAR (measured) = 0.076 mW/g



0 dB = 0.076mW/g

**Fig. 45 Laptop 3, Test Position 1, Whole Antenna, CH384**

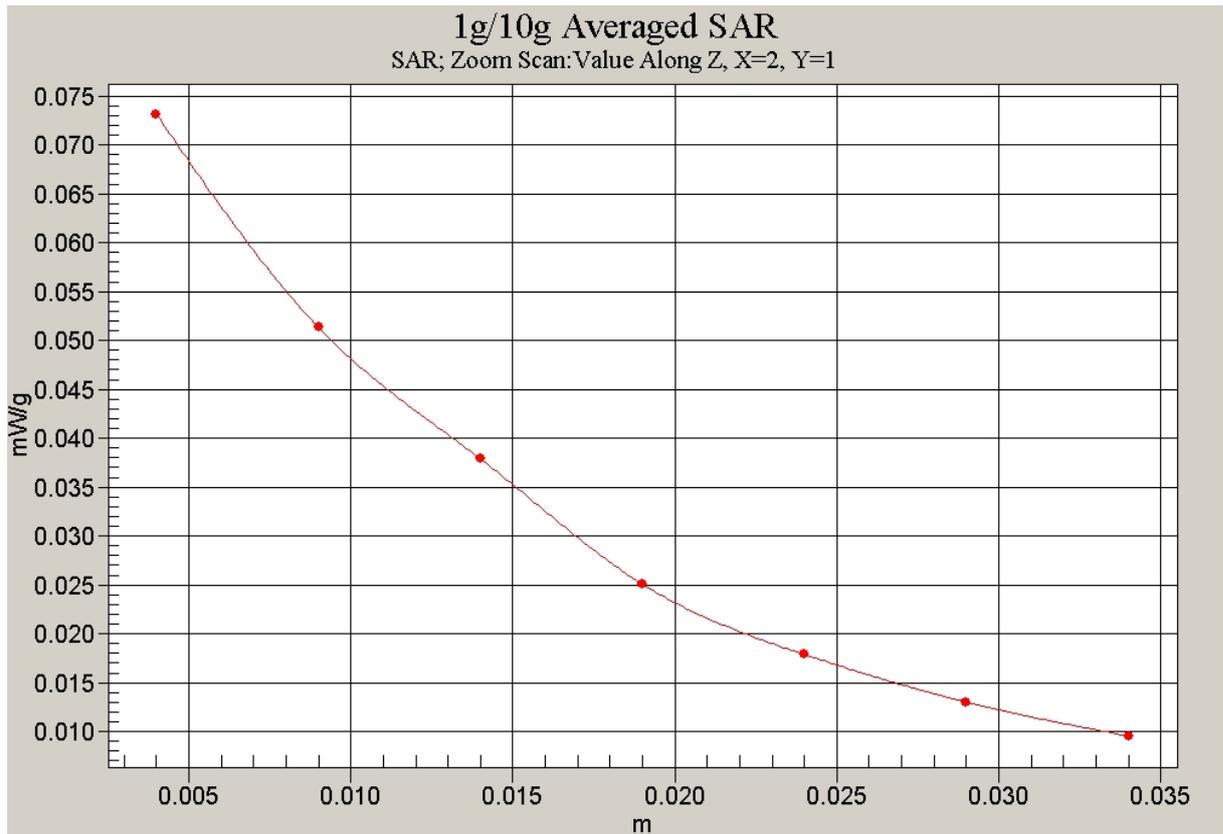


Fig.46 Z-Scan at power reference point  
(Laptop 3, Test Position 1, Whole Antenna, CH384)

**Position 2, Whole Antenna, Middle of laptop 3**

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)

**Position 2, Whole Antenna, Middle/Area Scan (61x71x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.051 mW/g

**Position 2, Whole Antenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement

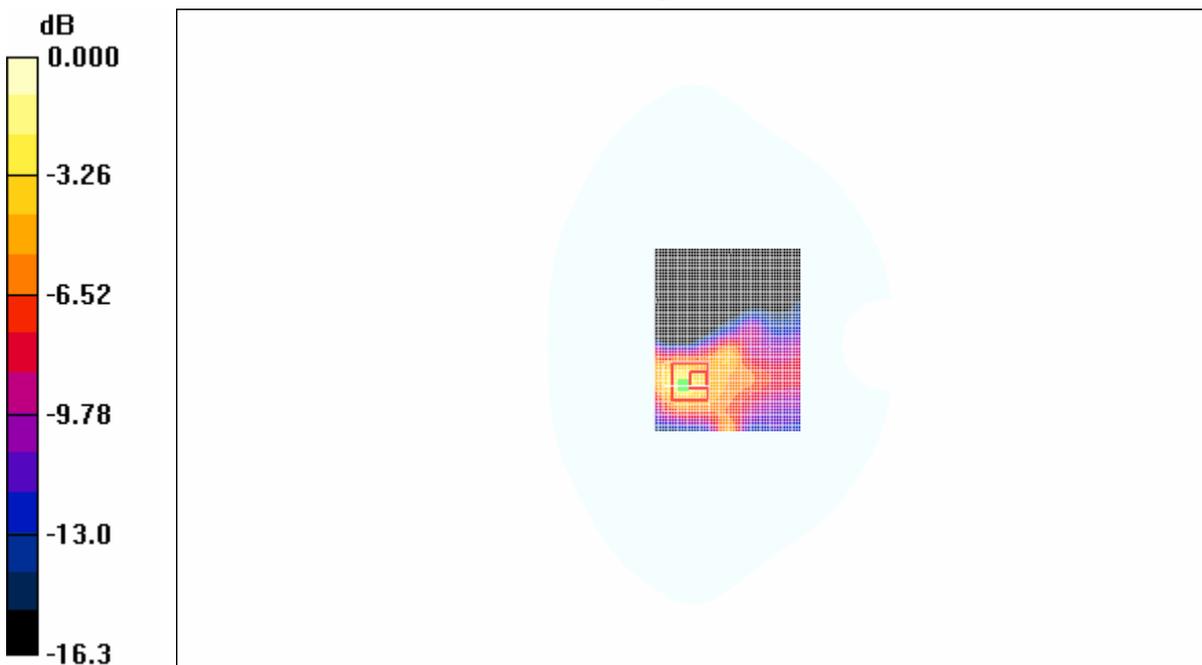
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.19 V/m; Power Drift = 0.200 dB

Peak SAR (extrapolated) = 0.113 W/kg

**SAR(1 g) = 0.046 mW/g; SAR(10 g) = 0.024 mW/g**

Maximum value of SAR (measured) = 0.083 mW/g



0 dB = 0.083mW/g

**Fig.47 Laptop 3, Test Position 2, Whole Antenna, CH384**

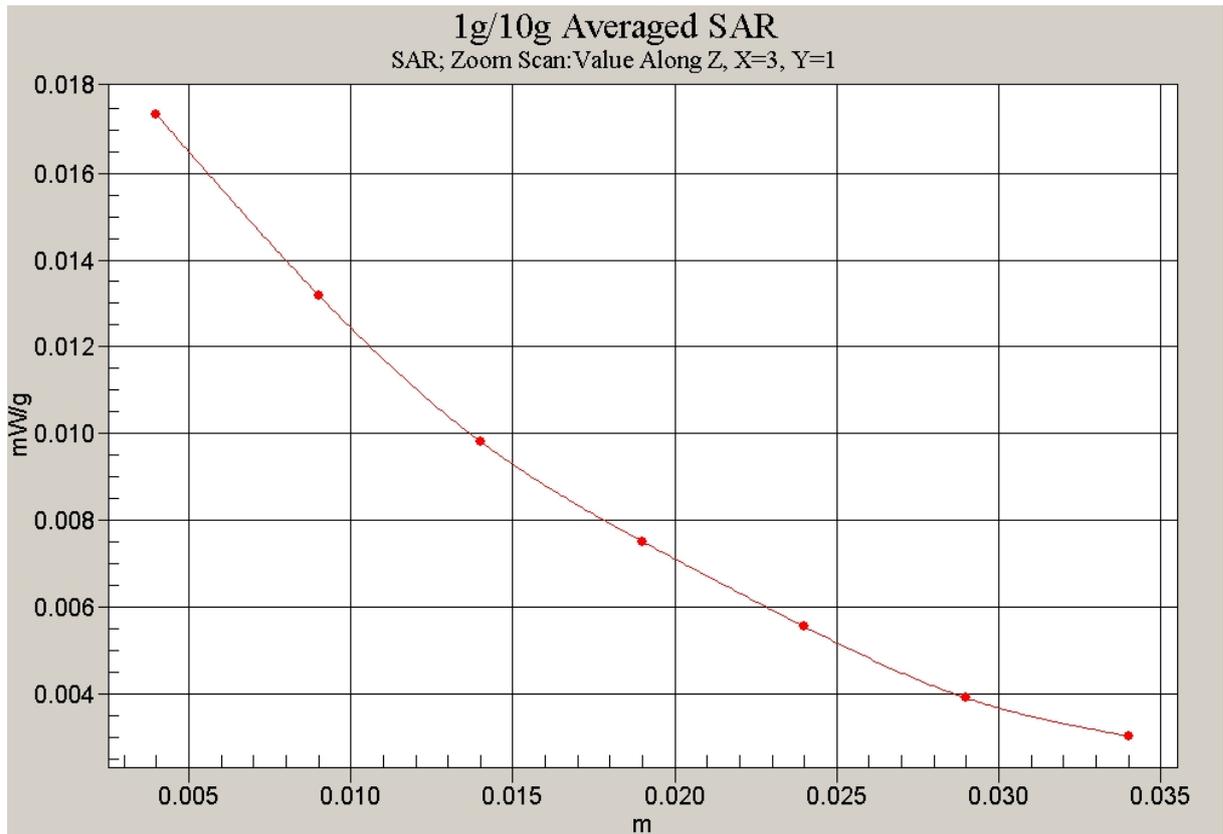


Fig. 48 Z-Scan at power reference point  
(Laptop 3, Test Position 2, Whole Antenna, CH384)

**Position 3, Whole Antenna, Middle of Laptop 3**

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)

**Position 3, Whole Antenna, Middle/Area Scan (61x61x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.113 mW/g

**Position 3, Whole Antenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement

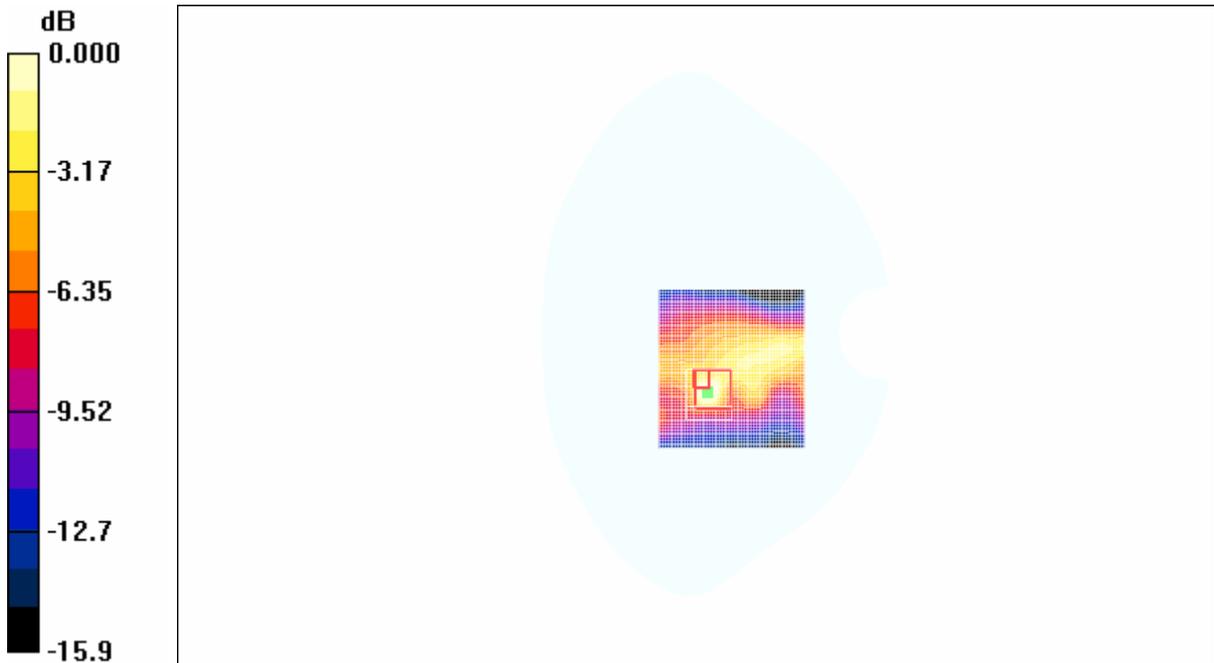
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.68 V/m; Power Drift = 0.044 dB

Peak SAR (extrapolated) = 0.076 W/kg

**SAR(1 g) = 0.030 mW/g; SAR(10 g) = 0.018 mW/g**

Maximum value of SAR (measured) = 0.068 mW/g



**Fig. 49 Laptop 3, Test Position 3, Whole Antenna, CH384**

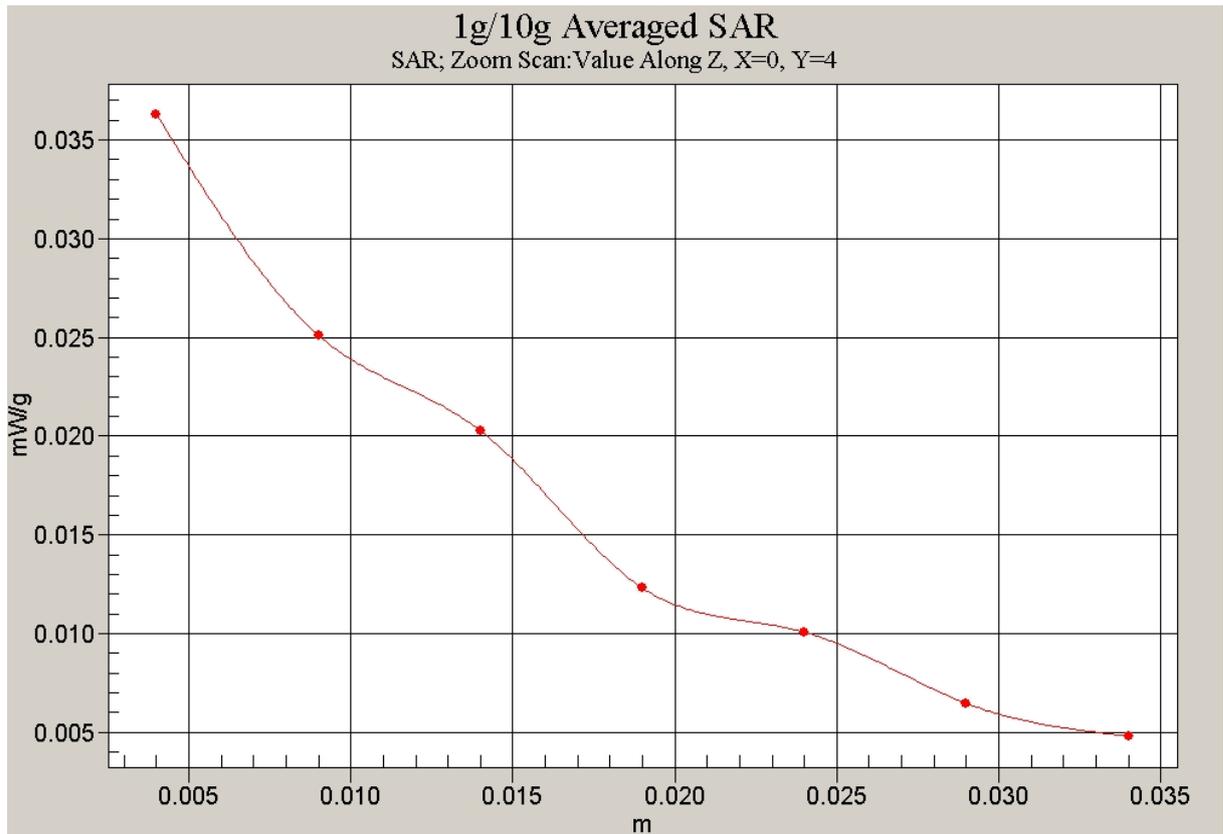


Fig. 50 Z-Scan at power reference point  
(Laptop 3, Test Position 3, Whole Antenna, CH384)

**Position 4, Whole Antenna, Middle of Laptop 3**

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)

**Position 4, Whole Antenna, Middle/Area Scan (61x61x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.019 mW/g

**Position 4, Whole Antenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement

grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.64 V/m; Power Drift = 0.102 dB

Peak SAR (extrapolated) = 0.275 W/kg

**SAR(1 g) = 0.048 mW/g; SAR(10 g) = 0.013 mW/g**

Maximum value of SAR (measured) = 0.052 mW/g

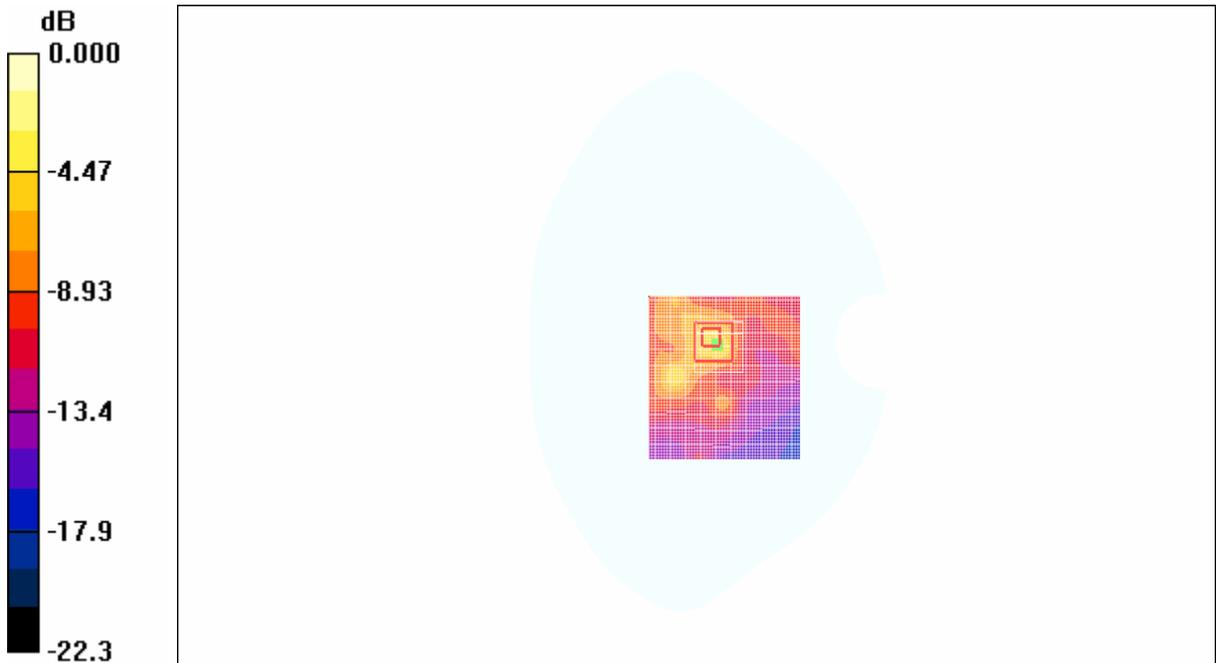


Fig. 51 Laptop 3, Test Position 4, Whole Antenna, CH384

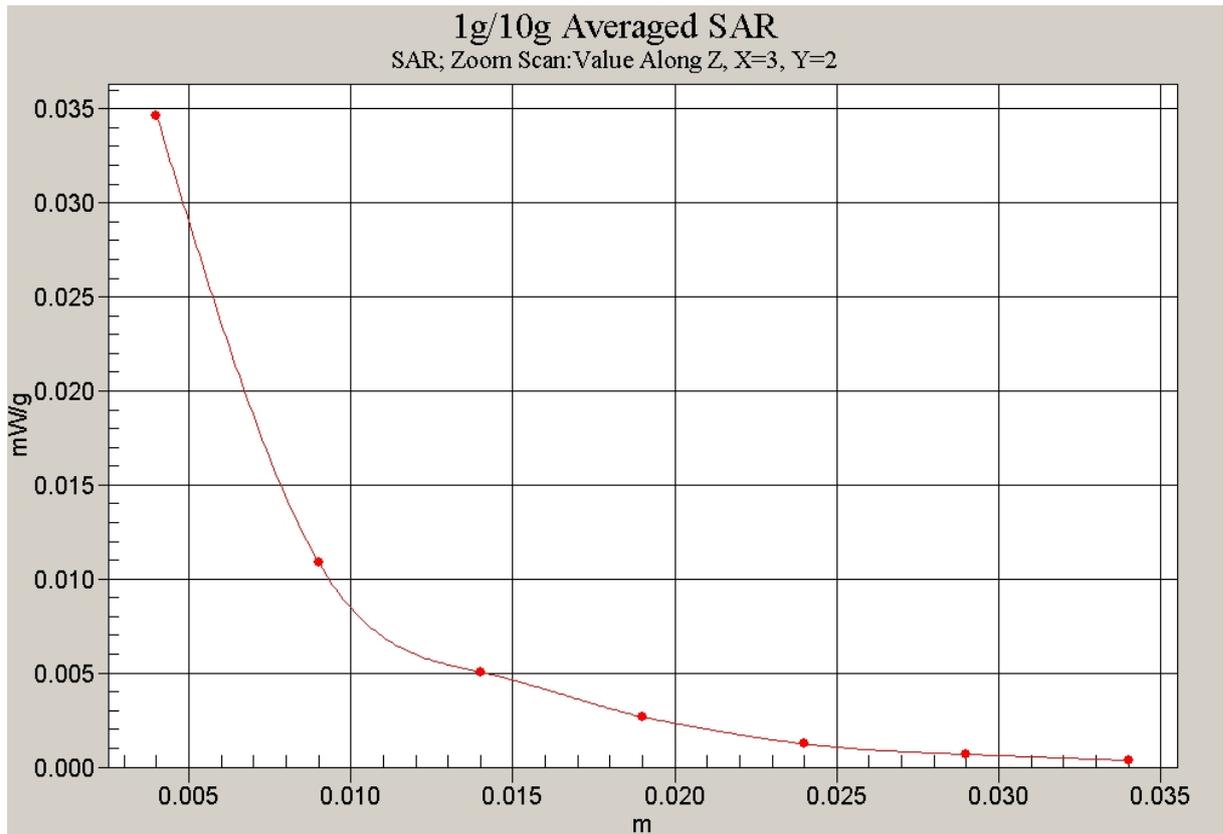


Fig. 52 Z-Scan at power reference point  
(Laptop 3, Test Position 4, Whole Antenna, CH384)

**Position 5, Whole Antenna, Middle of Laptop 3**

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)

**Position 5, Whole Antenna, Middle/Area Scan (61x71x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.388 mW/g

**Position 5, Whole Antenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement

grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.2 V/m; Power Drift = -0.141 dB

Peak SAR (extrapolated) = 0.513 W/kg

**SAR(1 g) = 0.341 mW/g; SAR(10 g) = 0.215 mW/g**

Maximum value of SAR (measured) = 0.374 mW/g

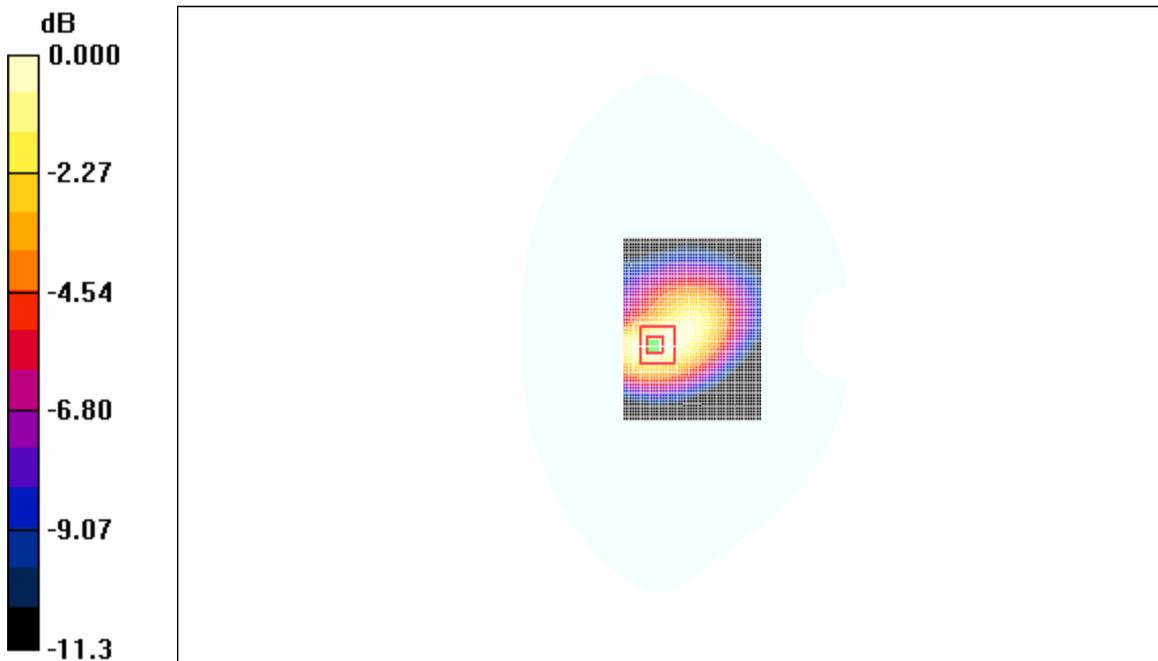


Fig. 53 Laptop 3, Test Position 5, Whole Antenna, CH384

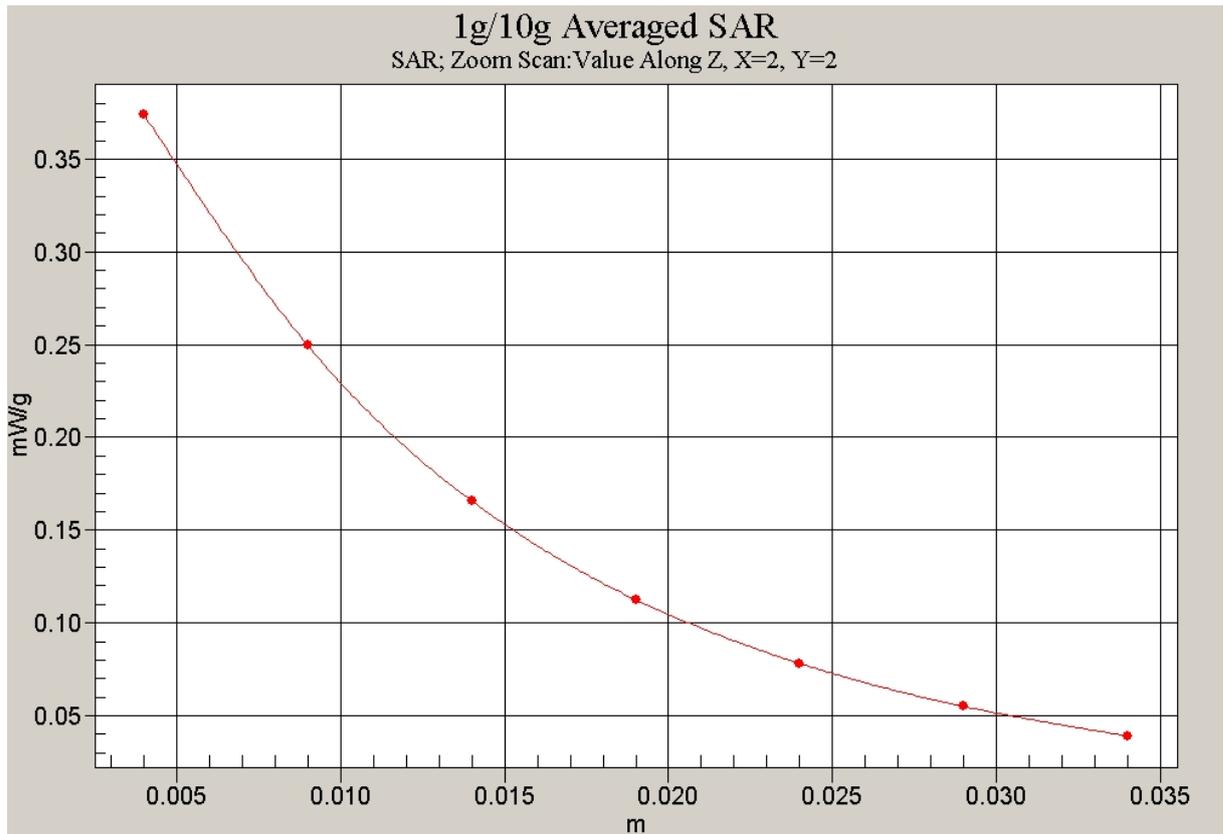


Fig. 54 Z-Scan at power reference point  
(Laptop 3, Test Position 5, Whole Antenna, CH384)

**Position 6, Whole Antenna, Middle of Laptop 3**

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)

**Position 6, Whole Antenna, Middle/Area Scan (61x61x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.356 mW/g

**Position 6, Whole Antenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement

grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.7 V/m; Power Drift = -0.200 dB

Peak SAR (extrapolated) = 0.495 W/kg

**SAR(1 g) = 0.332 mW/g; SAR(10 g) = 0.211 mW/g**

Maximum value of SAR (measured) = 0.363 mW/g

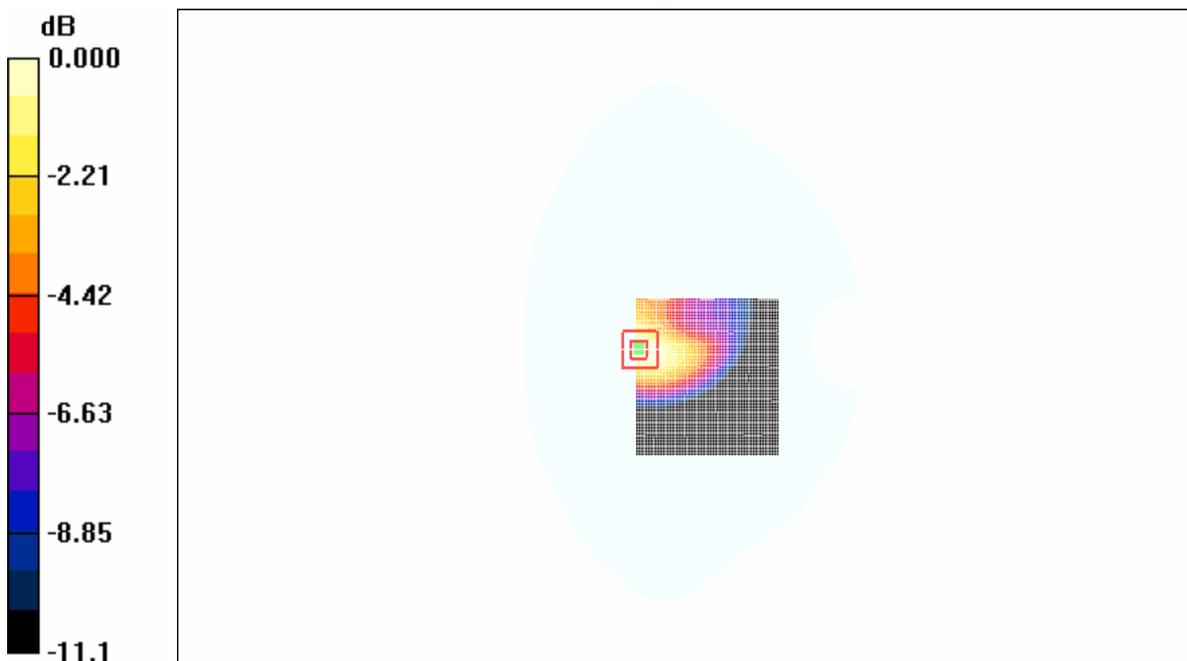


Fig.55 Laptop 3, Test Position 6, Whole Antenna, CH384

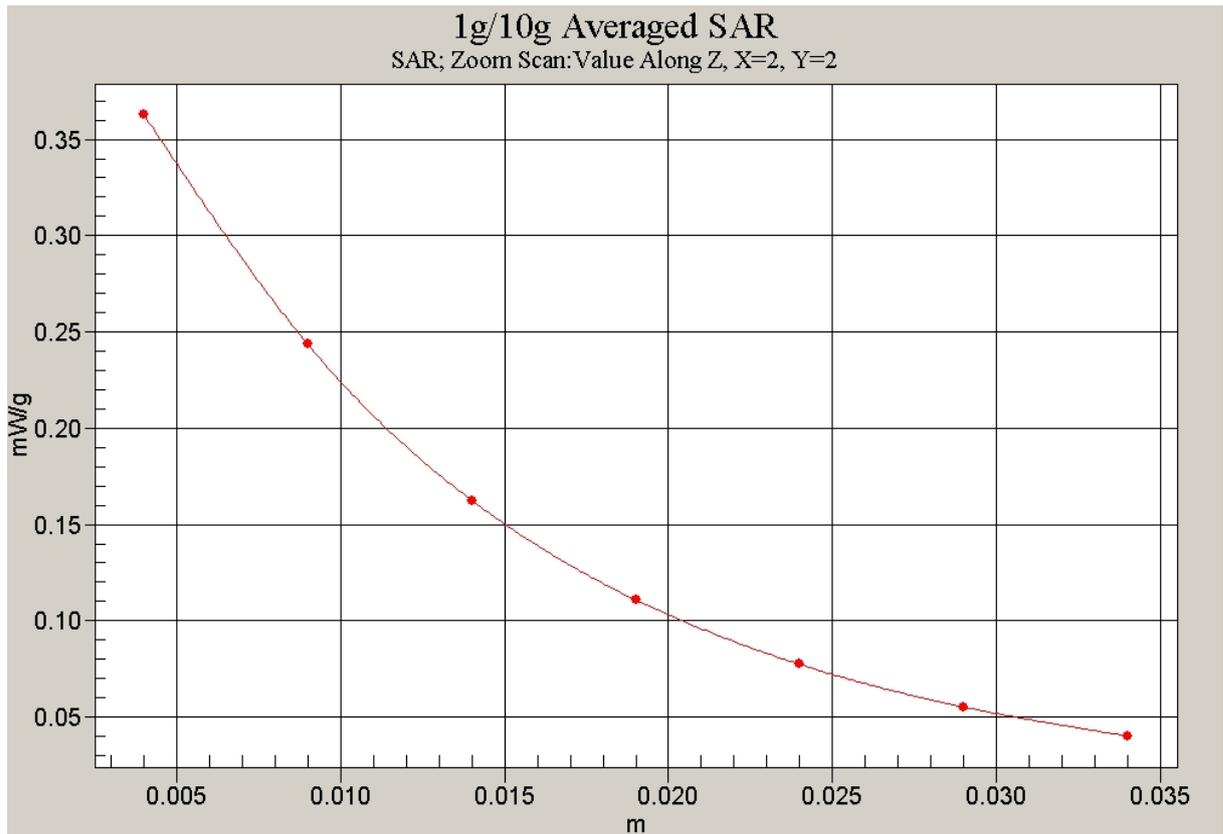


Fig. 56 Z-Scan at power reference point  
(Laptop 3, Test Position 6, Whole Antenna, CH384)

**Position 7, Whole Antenna, High of Laptop 3**

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)

**Position 7, Whole Antenna, High/Area Scan (61x61x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.824 mW/g

**Position 7, Whole Antenna, High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:

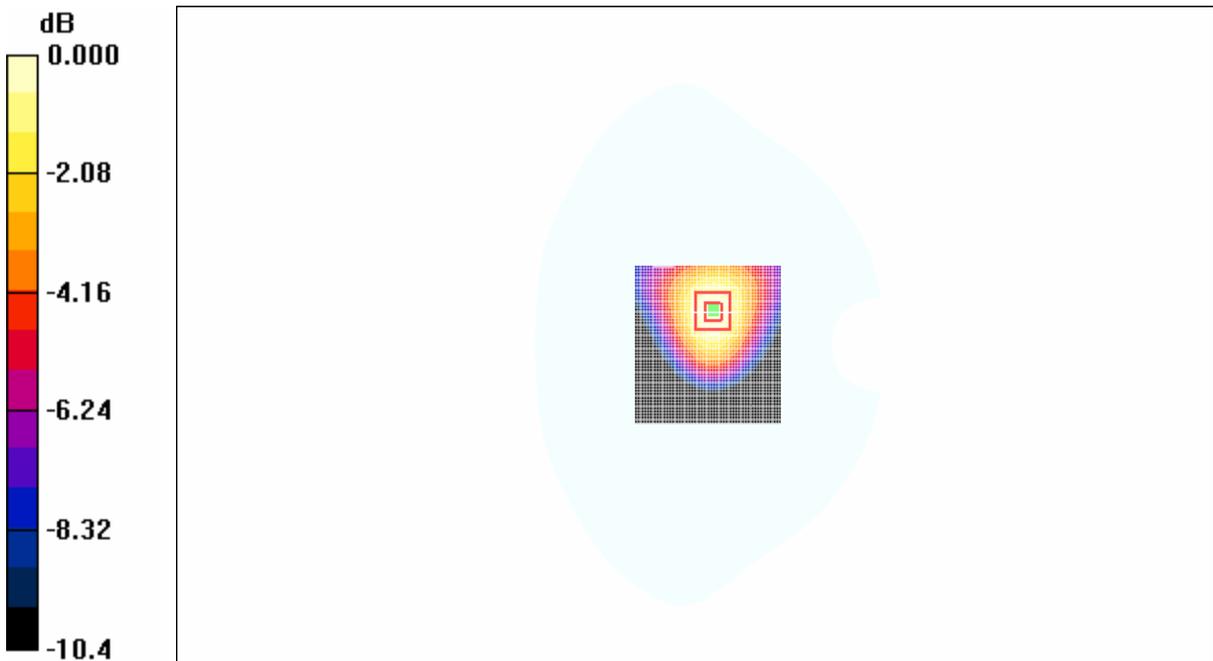
dx=5mm, dy=5mm, dz=5mm

Reference Value = 25.2 V/m; Power Drift = -0.071 dB

Peak SAR (extrapolated) = 1.06 W/kg

**SAR(1 g) = 0.749 mW/g; SAR(10 g) = 0.494 mW/g**

Maximum value of SAR (measured) = 0.808 mW/g



**Fig. 57 Laptop 3, Test Position 7, Whole Antenna, CH777**

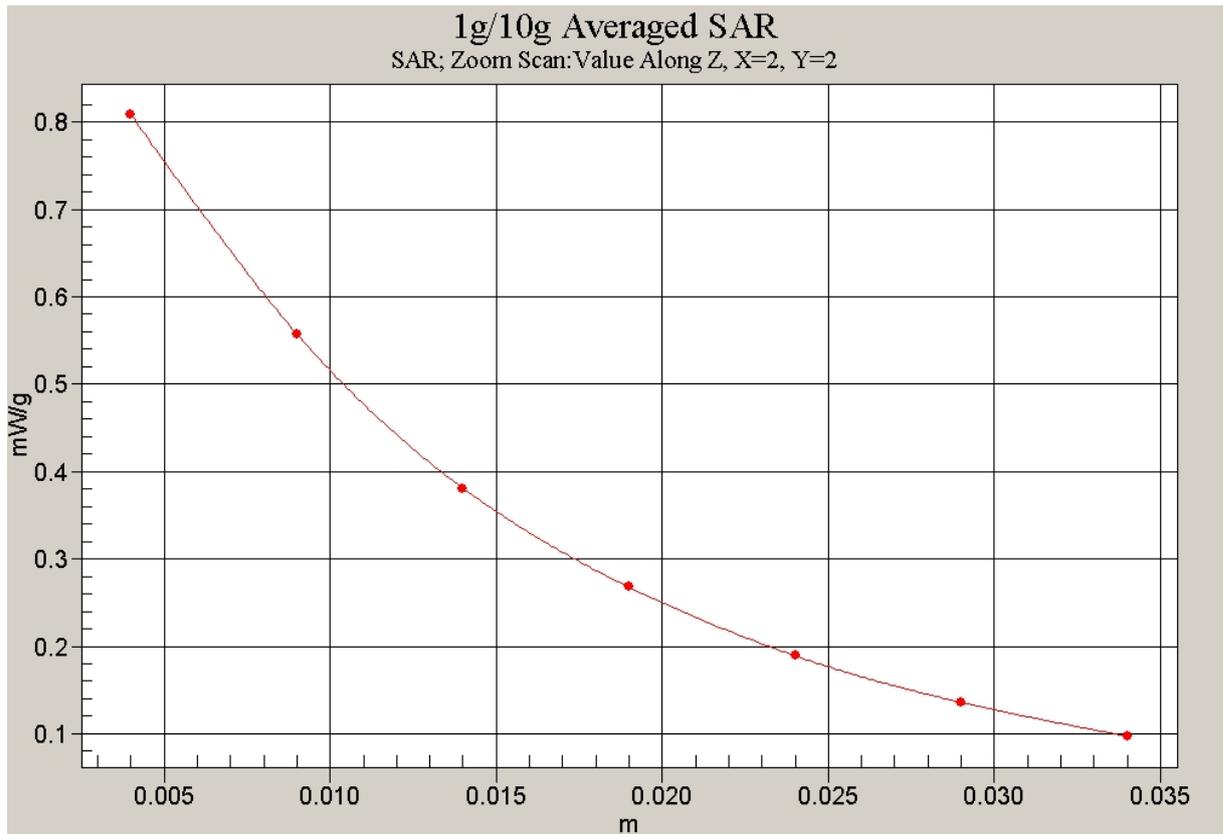


Fig. 58 Z-Scan at power reference point  
(Laptop 3, Test Position 7, Whole Antenna, CH777)

**Position 7, Whole Antenna, Middle of Laptop 3**

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)

**Position 7, Whole Antenna, Middle/Area Scan (61x61x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.940 mW/g

**Position 7, Whole Antenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement

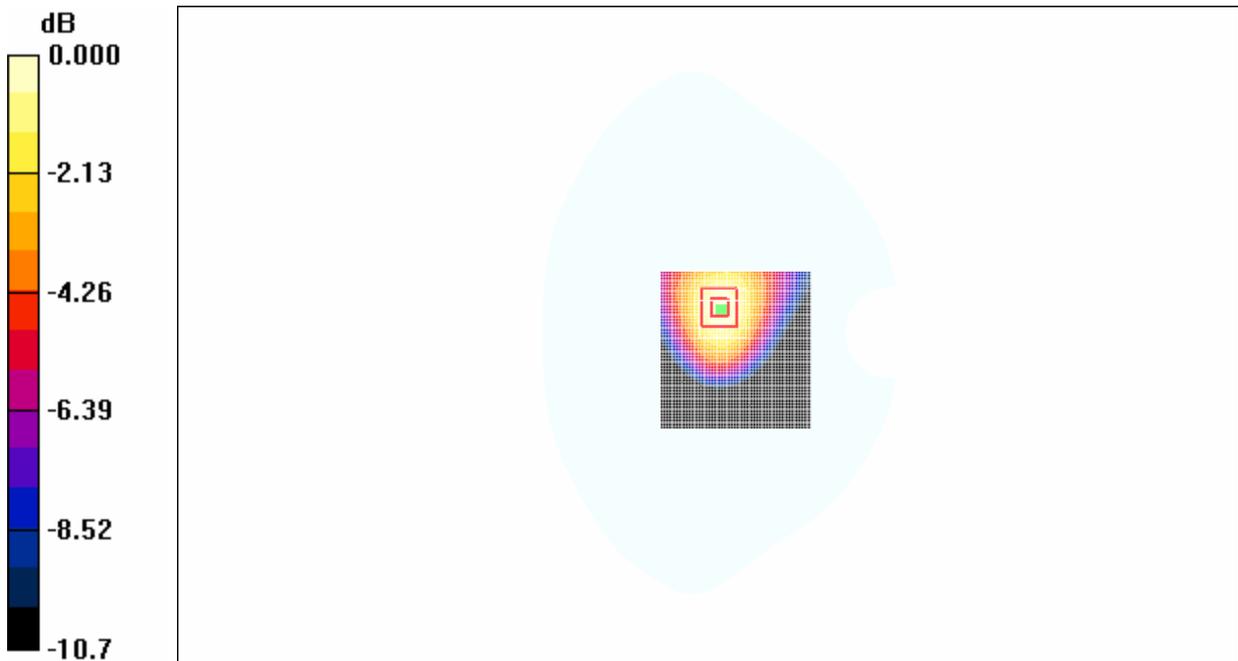
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30.7 V/m; Power Drift = 0.050 dB

Peak SAR (extrapolated) = 1.25 W/kg

**SAR(1 g) = 0.883 mW/g; SAR(10 g) = 0.582 mW/g**

Maximum value of SAR (measured) = 0.942 mW/g



0 dB = 0.942mW/g

**Fig.59 Laptop 3, Test Position 7, Whole Antenna, CH384**

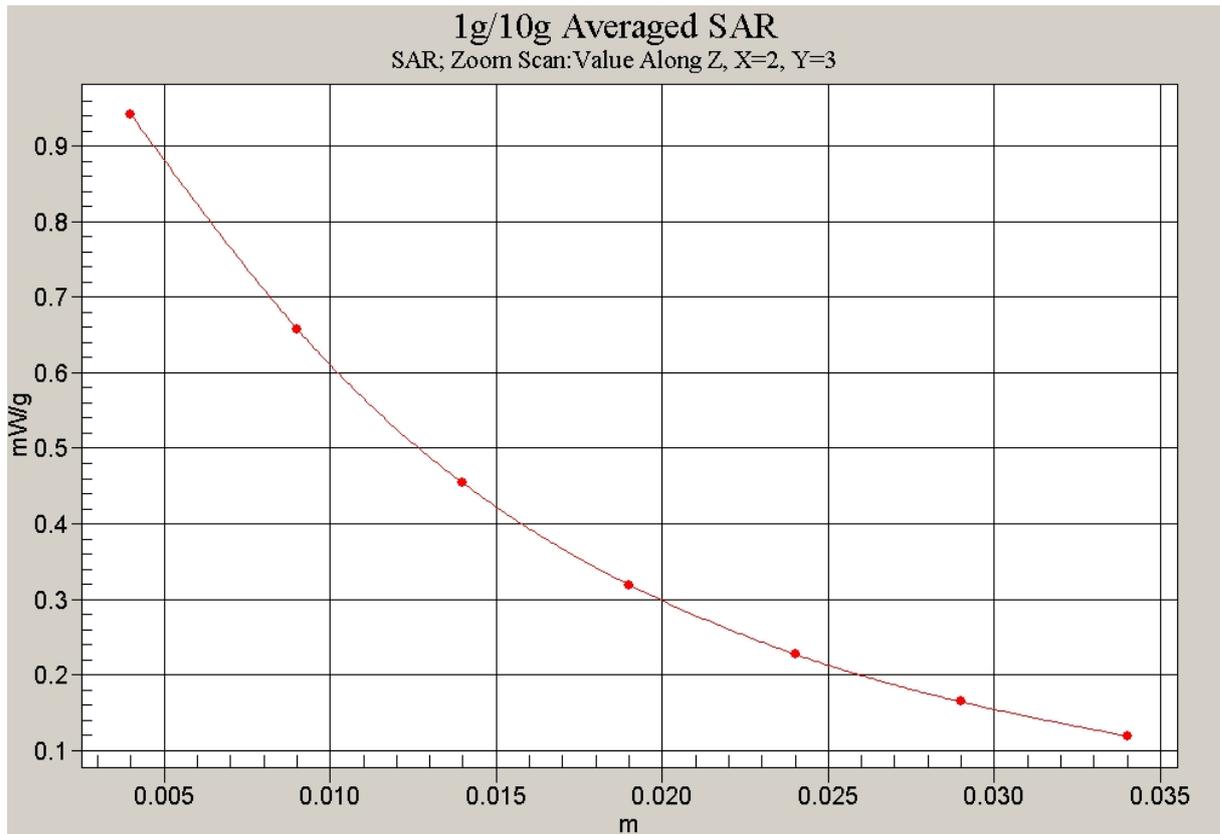


Fig. 60 Z-Scan at power reference point  
(Laptop 3, Test Position 7, Whole Antenna, CH384)

**Position 7, Whole Antenna, Low of Laptop 3**

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)

**Position 7, Whole Antenna, Low/Area Scan (61x61x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.773 mW/g

**Position 7, Whole Antenna, Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:

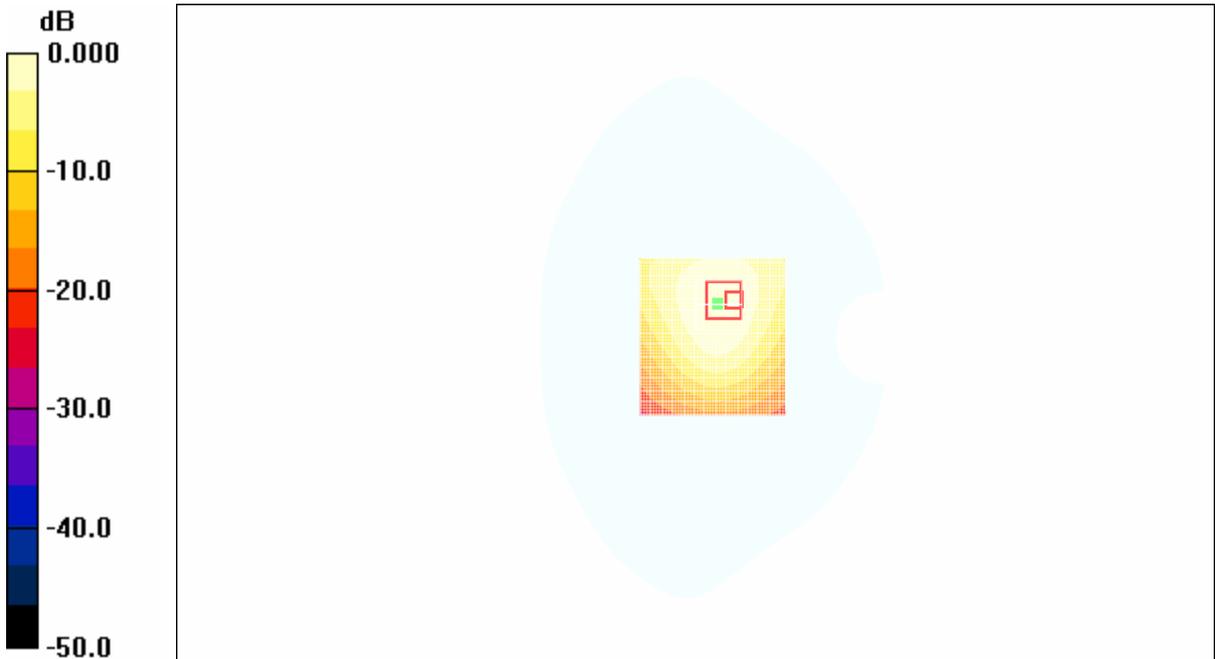
dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.8 V/m; Power Drift = -0.200 dB

Peak SAR (extrapolated) = 2.44 W/kg

**SAR(1 g) = 0.868 mW/g; SAR(10 g) = 0.255 mW/g**

Maximum value of SAR (measured) = 0.684 mW/g



0 dB = 0.684mW/g

Fig. 61 Laptop 3, Test Position 7, Whole Antenna, CH1013

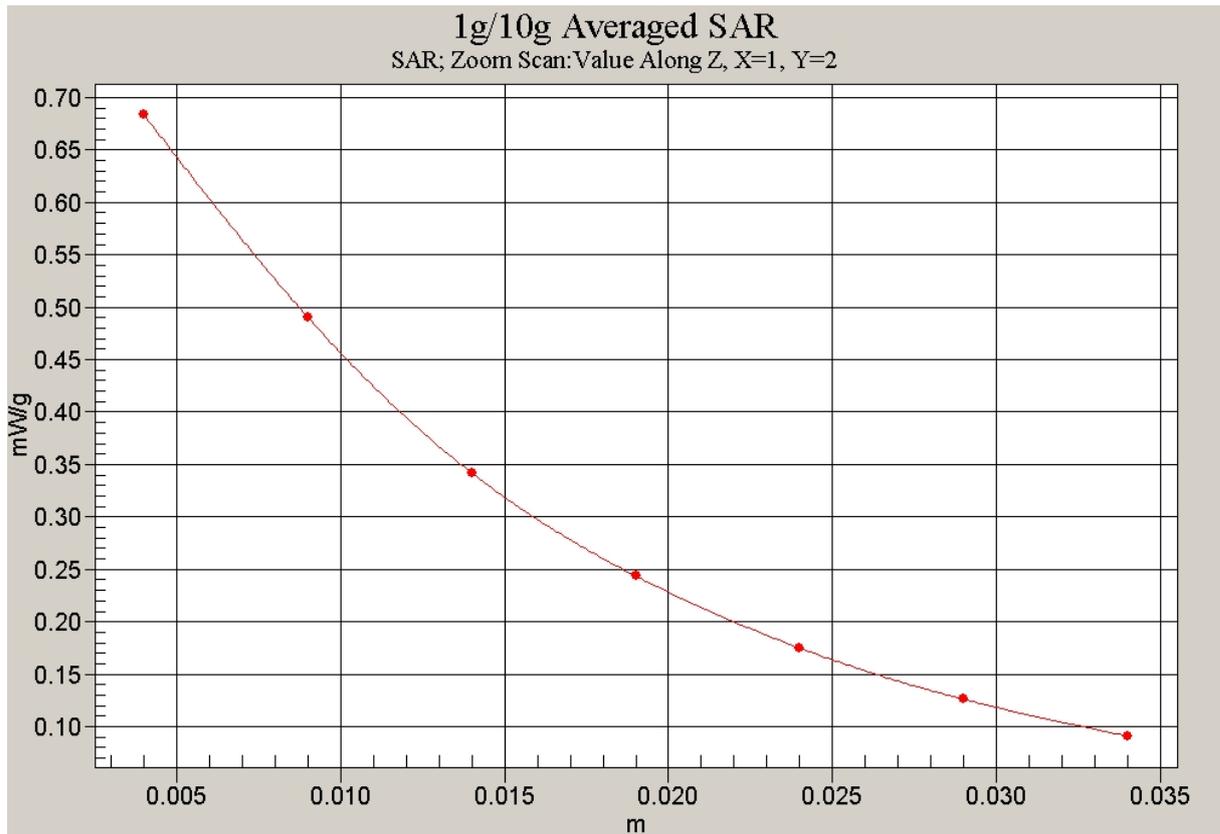


Fig. 62 Z-Scan at power reference point  
(Laptop 3, Test Position 7, Whole Antenna, CH1013)

**Position 7, Half Antenna, Middle of Laptop 3**

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)

**Position 7, Half Antenna, Middle/Area Scan (61x61x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.747 mW/g

**Position 7, Half Antenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid:

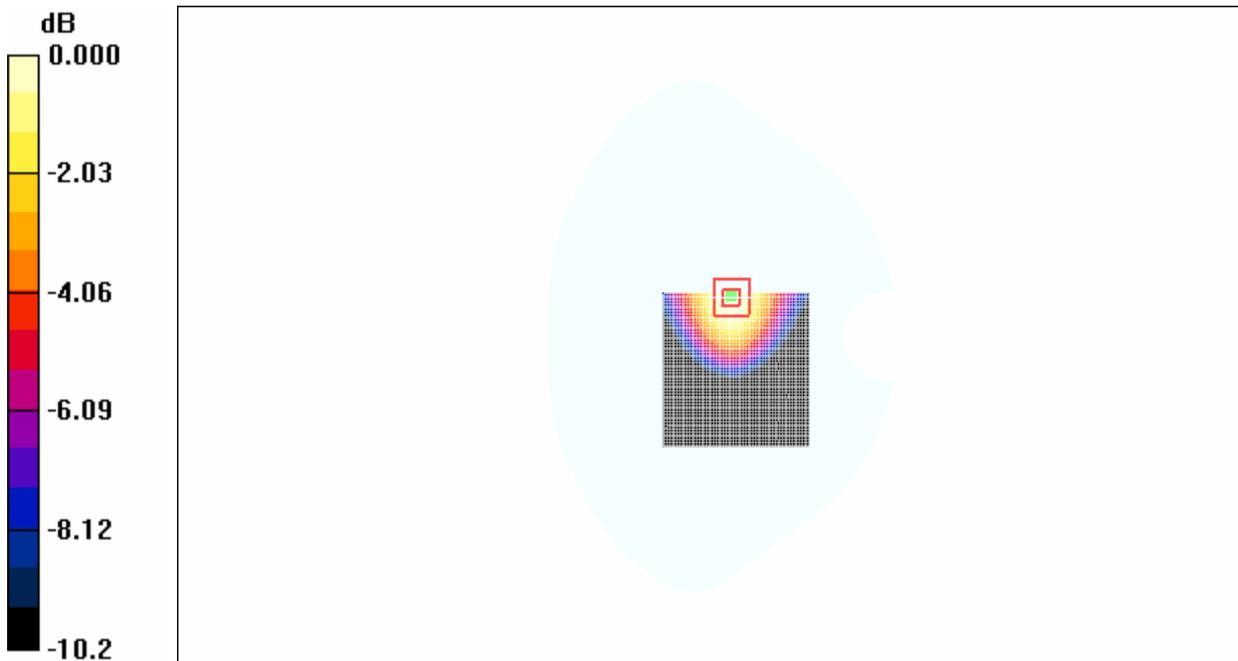
dx=5mm, dy=5mm, dz=5mm

Reference Value = 21.6 V/m; Power Drift = -0.087 dB

Peak SAR (extrapolated) = 0.955 W/kg

**SAR(1 g) = 0.681 mW/g; SAR(10 g) = 0.454 mW/g**

Maximum value of SAR (measured) = 0.735 mW/g



0 dB = 0.735mW/g

Fig. 63 Laptop 3, Test Position 7, Half Antenna, CH384

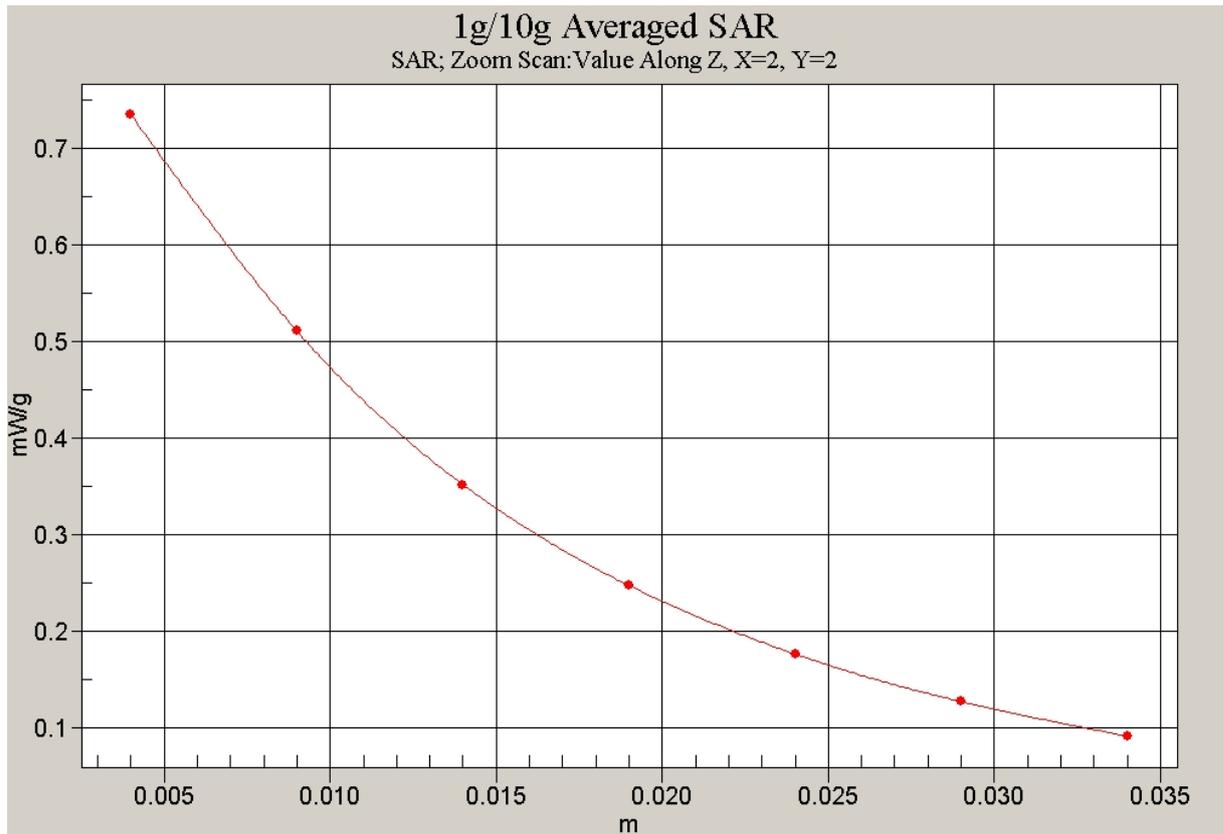


Fig. 64 Z-Scan at power reference point  
(Laptop 3, Test Position 7, Half Antenna, CH384)

**Position 8, Whole Antenna, Middle of Laptop 3**

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)

**Position 8, Whole Antenna, Middle/Area Scan (61x71x1):** Measurement grid:

dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.253 mW/g

**Position 8, Whole Antenna, Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement

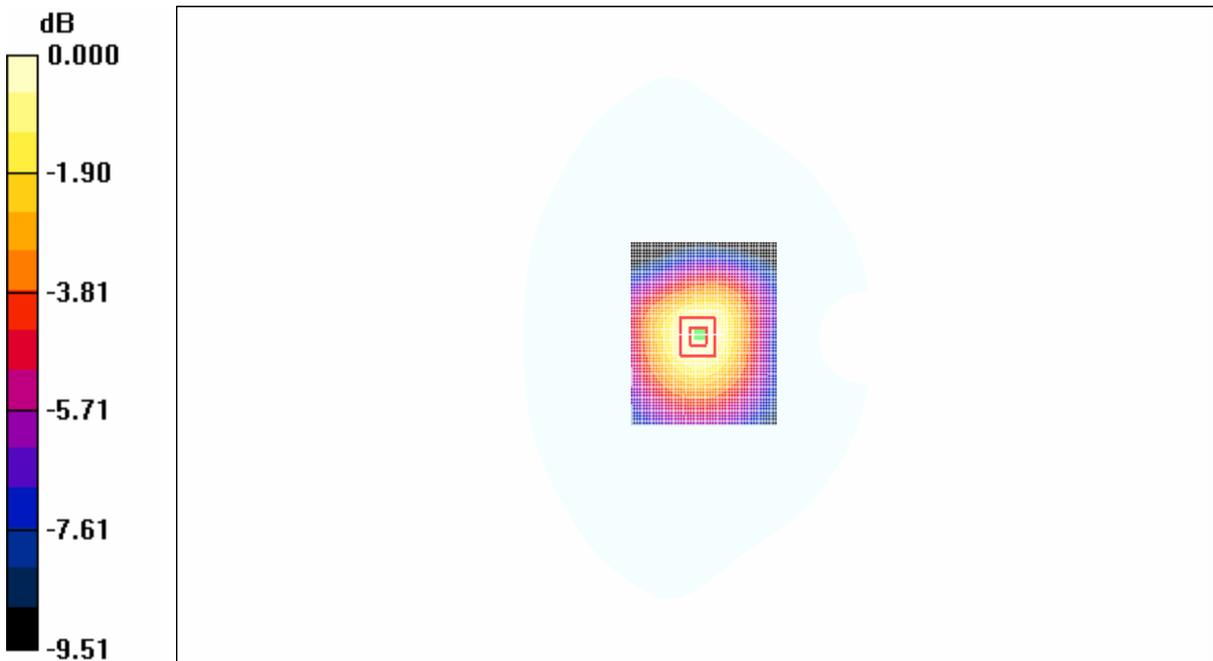
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.4 V/m; Power Drift = -0.067 dB

Peak SAR (extrapolated) = 0.322 W/kg

**SAR(1 g) = 0.232 mW/g; SAR(10 g) = 0.159 mW/g**

Maximum value of SAR (measured) = 0.248 mW/g



0 dB = 0.248mW/g

Fig. 65 Laptop 3, Test Position 8, Whole Antenna, CH384

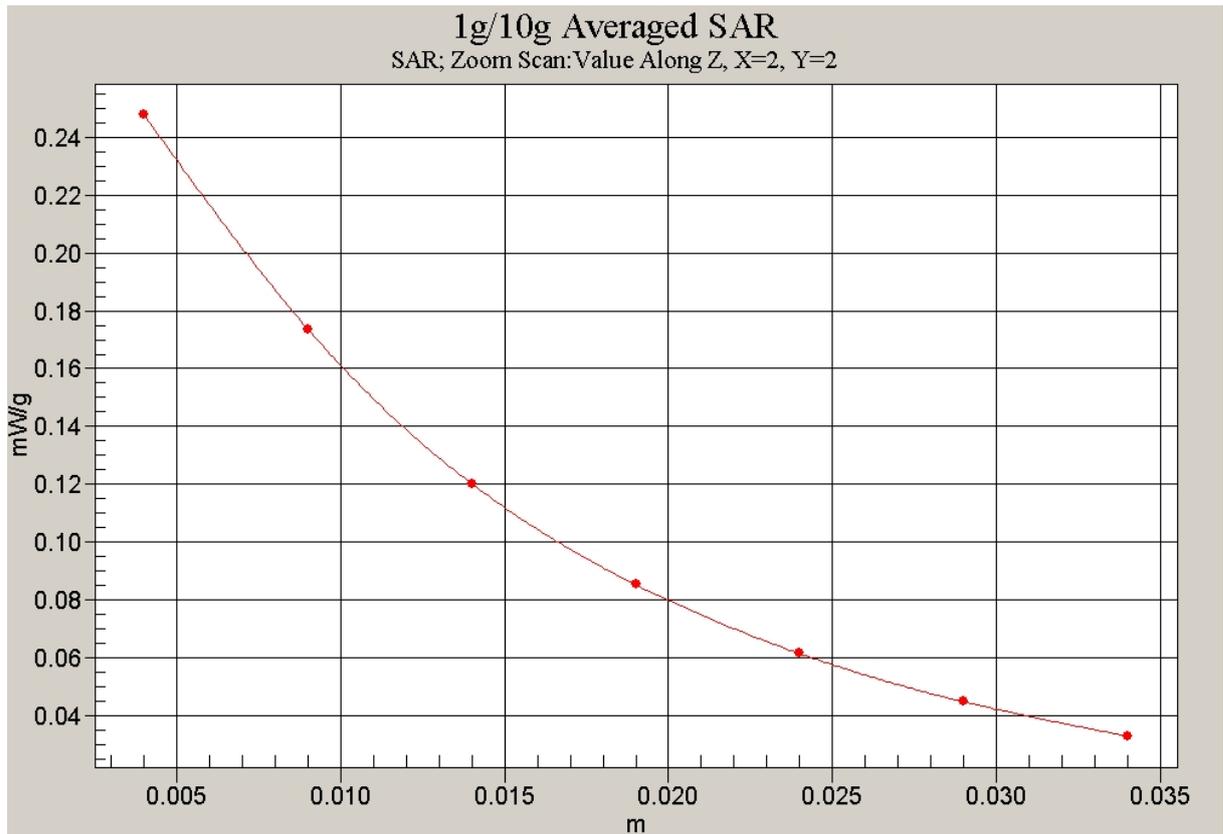


Fig. 66 Z-Scan at power reference point  
(Laptop 3, Test Position 8, Whole Antenna, CH384)

**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

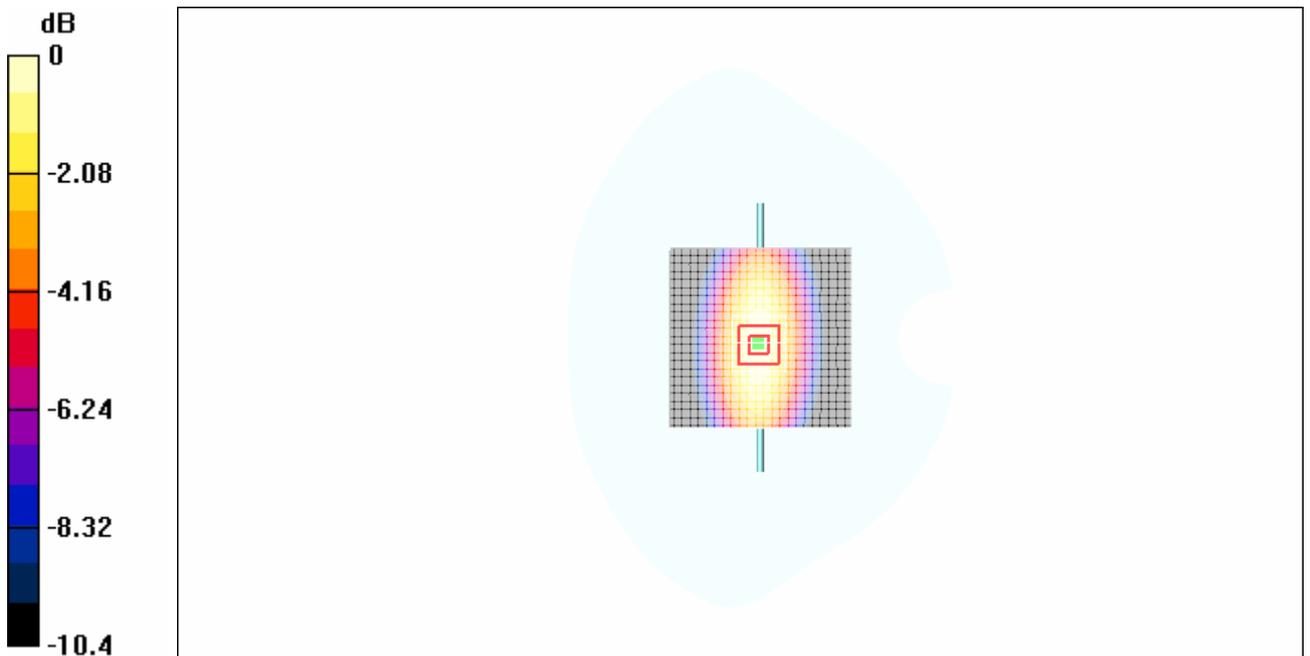
**835MHz/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

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.67 validation 835MHz 250mW**

**Telecommunication Metrology Center  
of Ministry of Information Industry**

No. 2005E00355-1

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**ANNEX E: CALIBRATION CERTIFICATE of E-FIELD PROBE**

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



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

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

Accreditation No.: SCS 108

Client **TMC-Auden**

Certificate No: ET3-1736\_Nov04

**CALIBRATION CERTIFICATE**

Object: **ET3DV6 - SN:1736**

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

Calibration date: **November 25, 2004**

Condition of the calibrated item: **In Tolerance**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-04 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe ES3DV2	SN:3013	8-Jan-04 (SPEAG, No. ES3-3013_Jan04)	Jan-05
DAE4	SN: 617	29-Sep-04 (SPEAG, No. DAE4-617_Sep04)	Sep-05
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-03)	In house check: Nov 04

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

Issued: November 25, 2004

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 <sub>x,y,z</sub>	sensitivity in free space
ConF	sensitivity in TSL / NORM <sub>x,y,z</sub>
DCP	diode compression point
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\vartheta$	$\vartheta$ 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<sub>x,y,z</sub>*: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). *NORM<sub>x,y,z</sub>* are only intermediate values, i.e., the uncertainties of *NORM<sub>x,y,z</sub>* does not effect the  $E^2$ -field uncertainty inside TSL (see below *ConvF*).
- NORM(f)<sub>x,y,z</sub>* = *NORM<sub>x,y,z</sub>* \* *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<sub>x,y,z</sub>*: 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<sub>x,y,z</sub>* \* *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  $\pm 50$  MHz to  $\pm 100$  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

November 25, 2004

# Probe ET3DV6

## SN:1736

Manufactured:	September 27, 2002
Last calibrated:	December 9, 2002
Repaired:	November 15, 2004
Recalibrated:	November 25, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

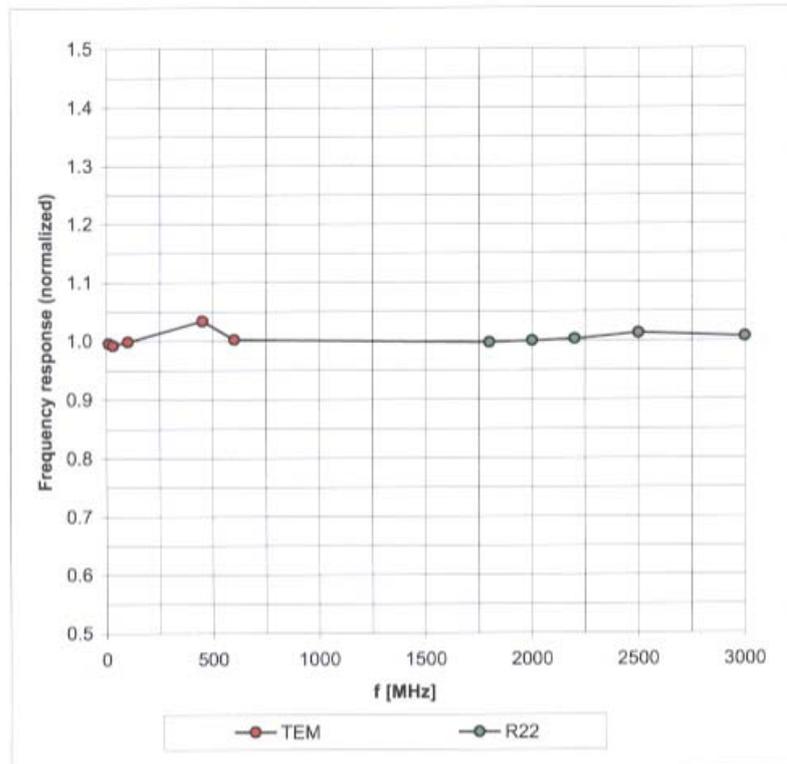


ET3DV6 SN:1736

November 25, 2004

### Frequency Response of E-Field

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

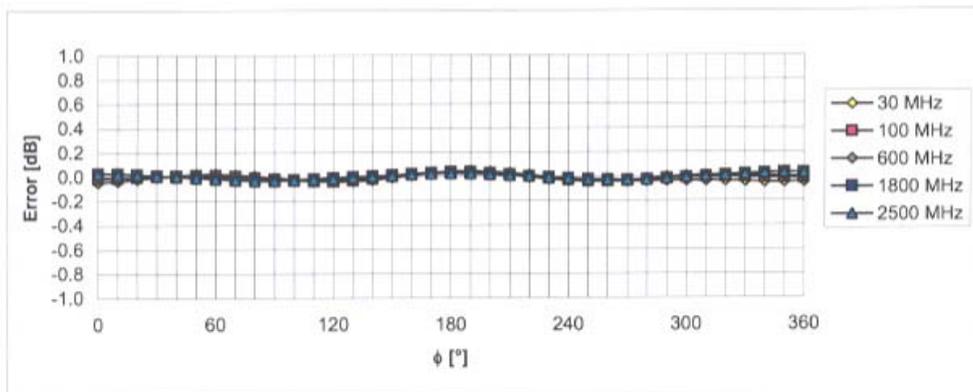
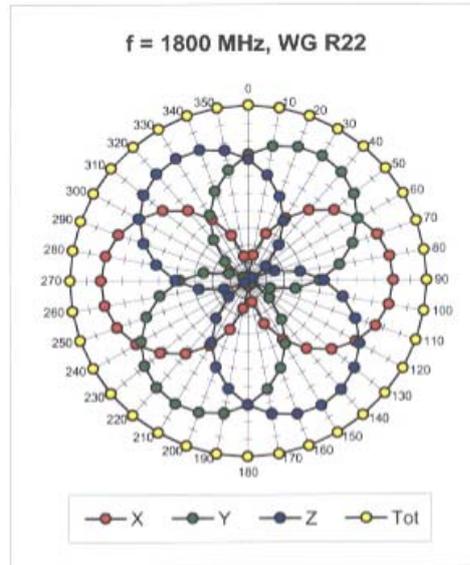
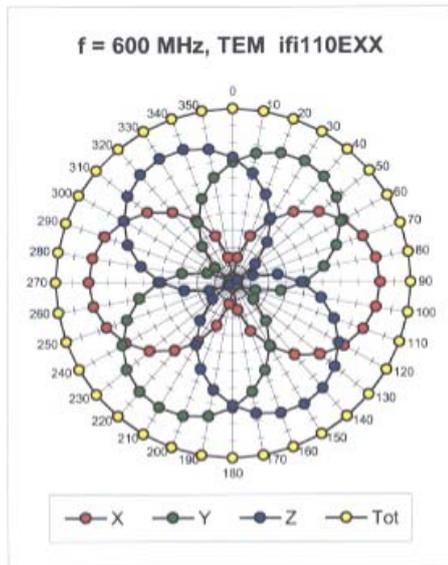


Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

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



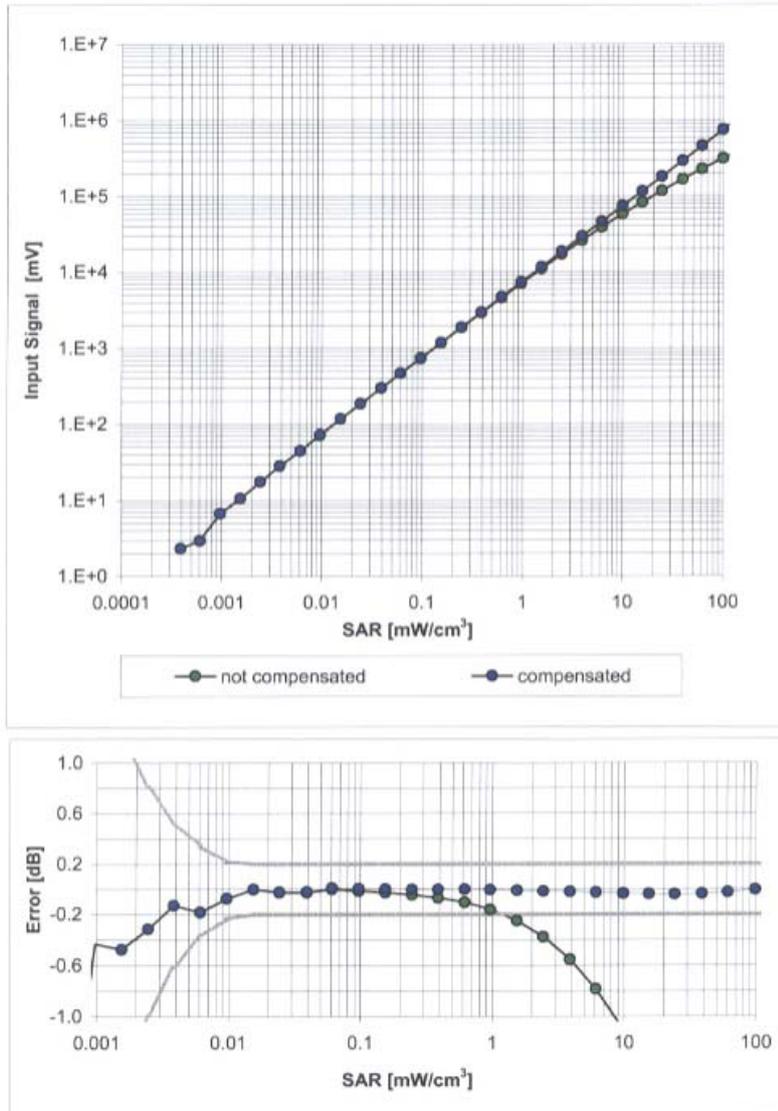
**Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )**

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### Dynamic Range $f(\text{SAR}_{\text{head}})$

(Waveguide R22,  $f = 1800 \text{ MHz}$ )

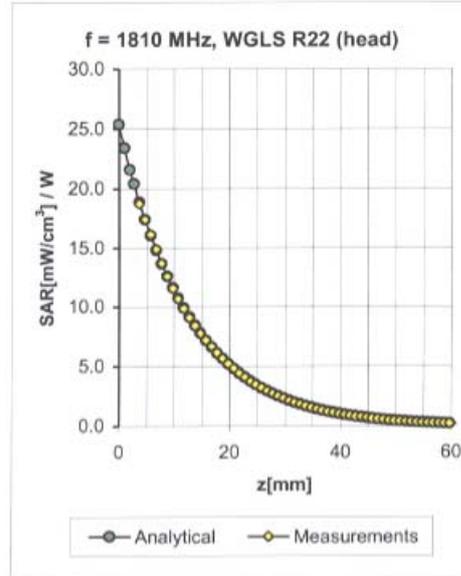
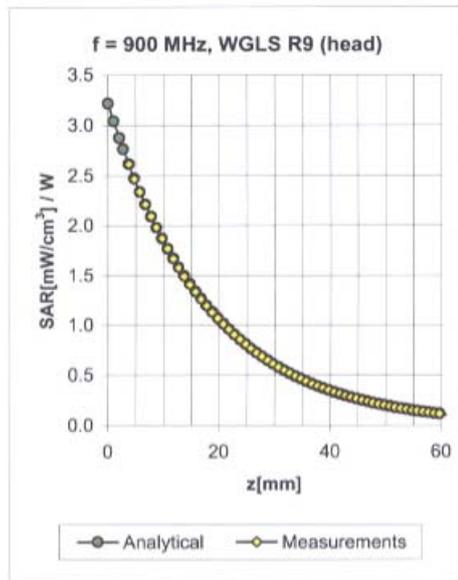


Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

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November 25, 2004

### Conversion Factor Assessment



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

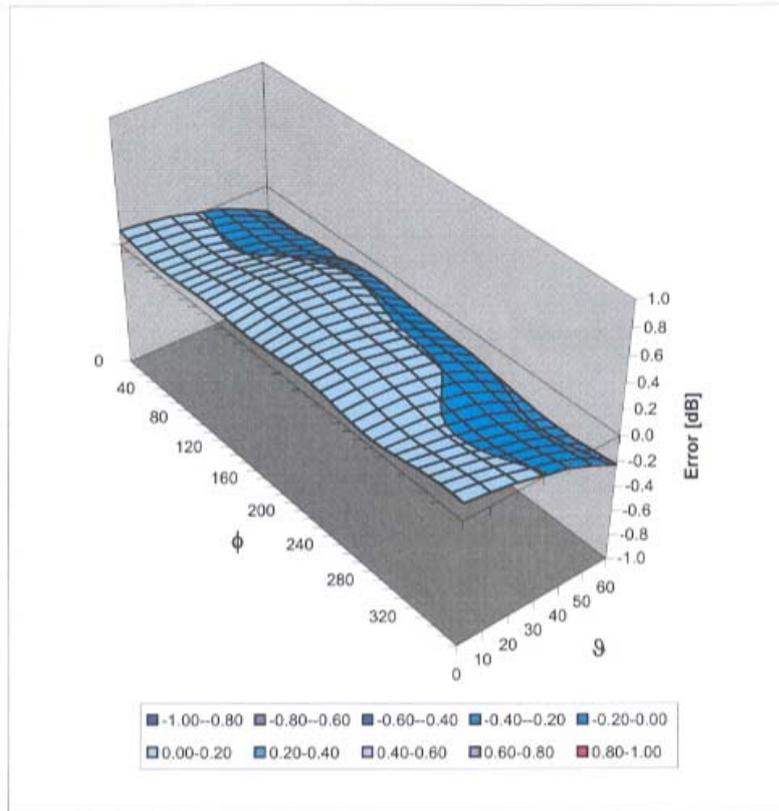
<sup>c</sup> The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

ET3DV6 SN:1736

November 25, 2004

### Deviation from Isotropy in HSL

Error ( $\phi$ ,  $\theta$ ),  $f = 900$  MHz



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