

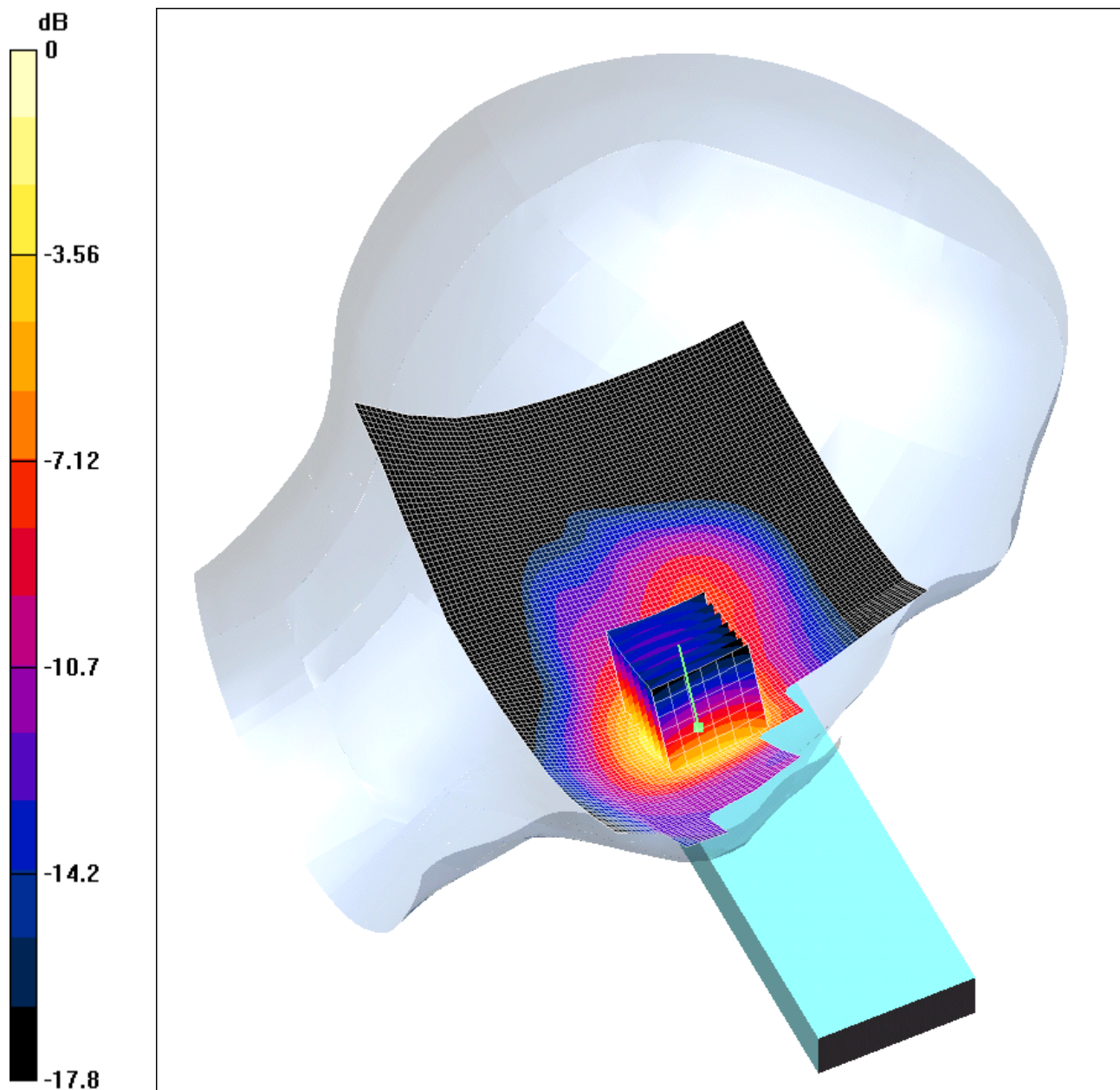
Date: 10/12/04

70944_05_006

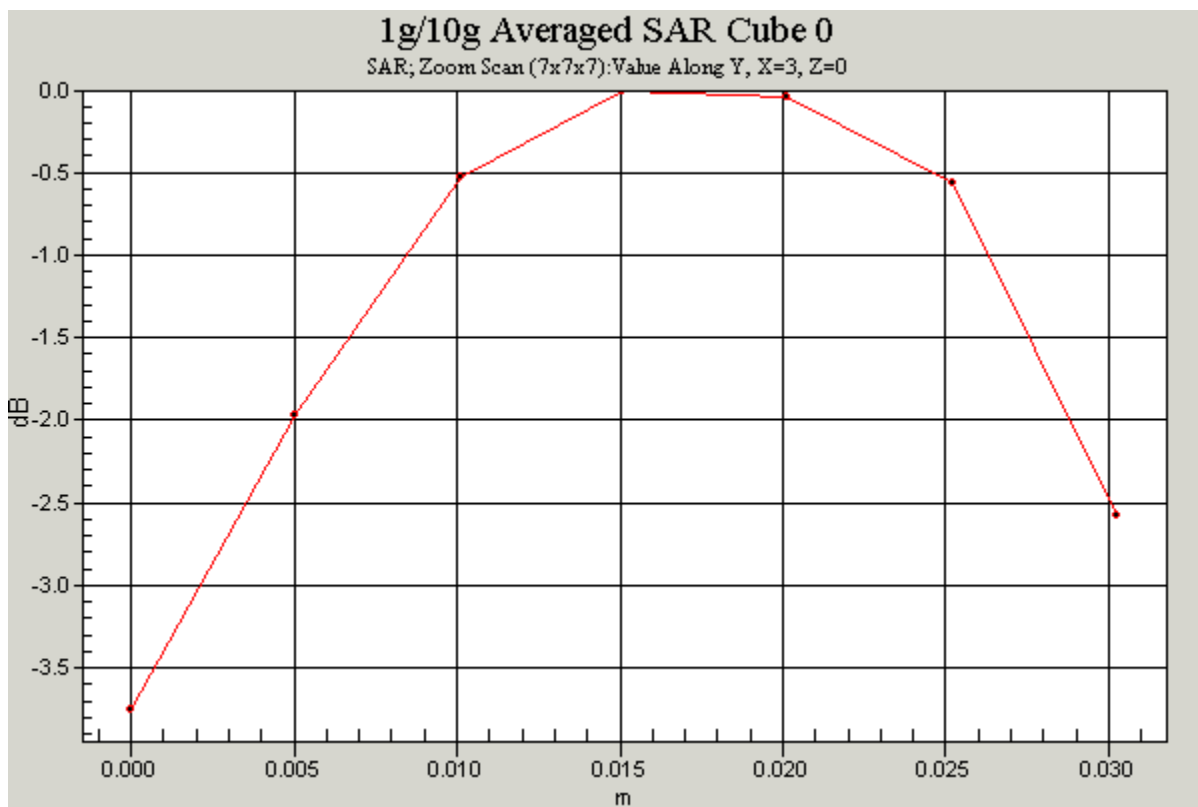
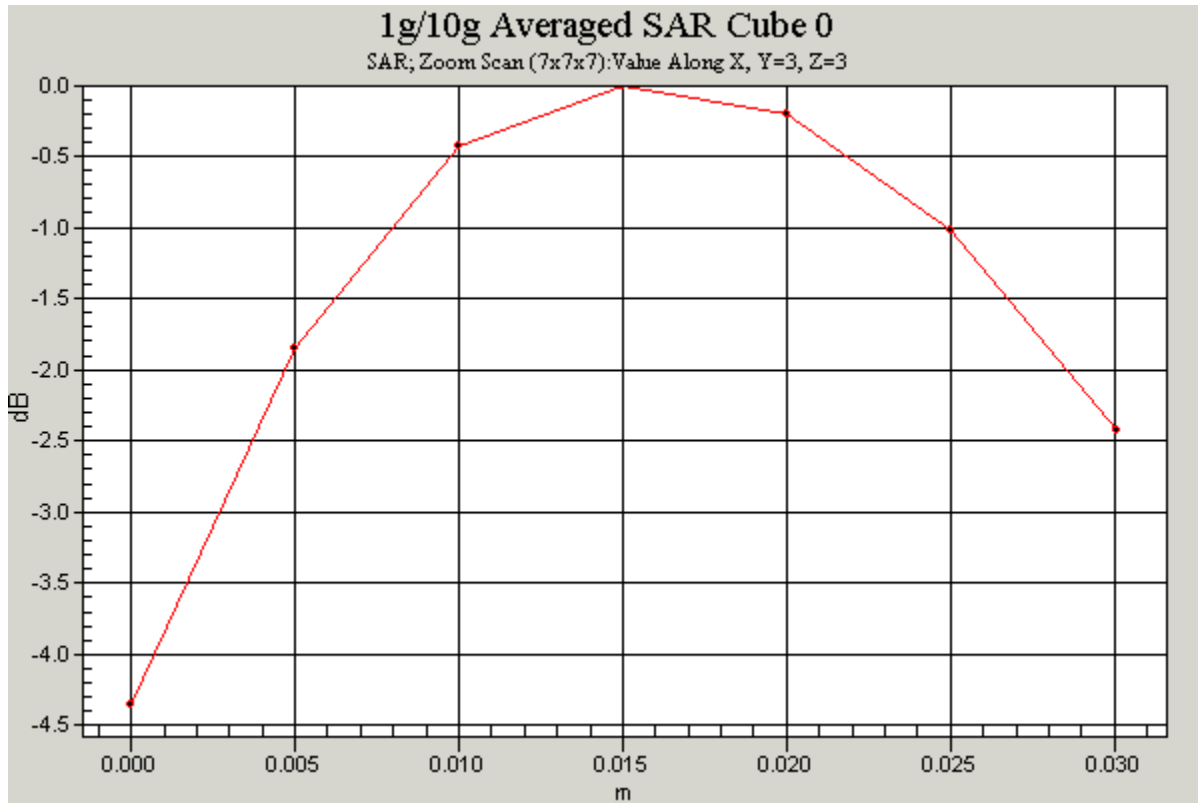
Test Laboratory: RFI GLOBAL SERVICES LTD.

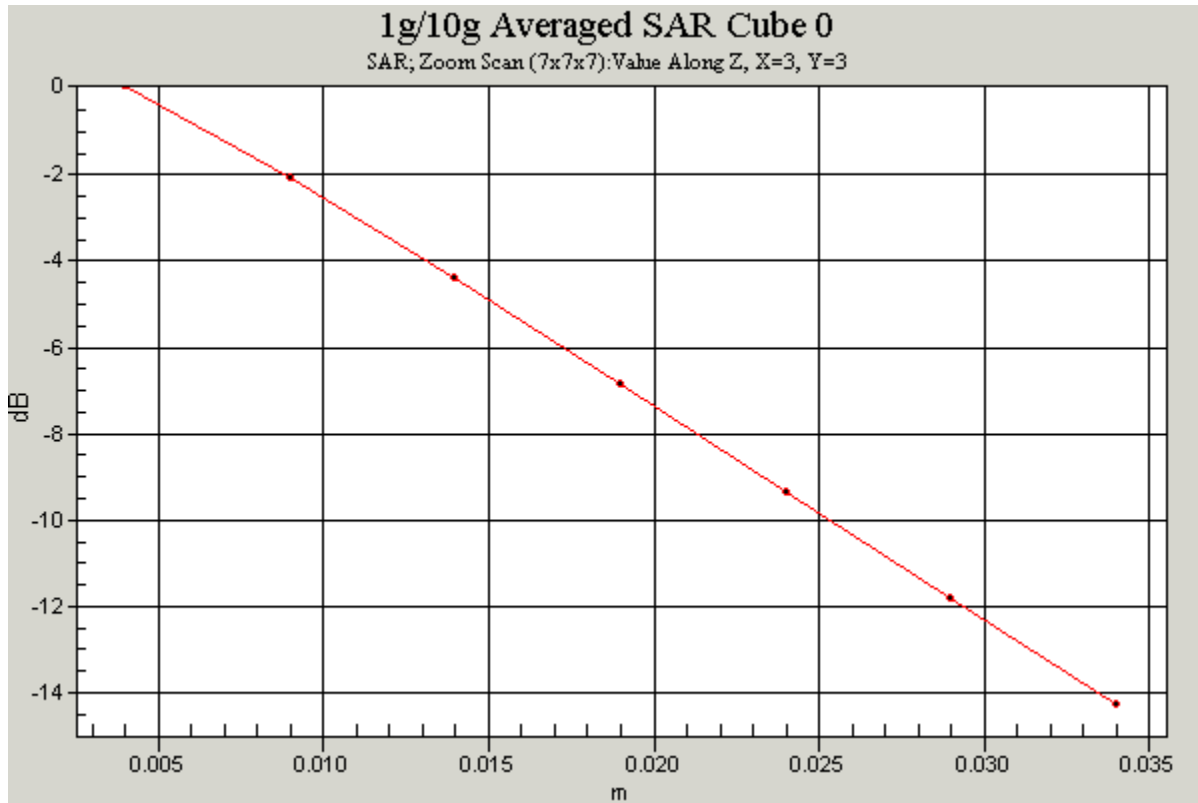
70944_JD05_006_Touch_Left_810

DUT: Panasonic; Type: X800; Serial: 004400000227163



0 dB = 0.801mW/g





Communication System: DCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium: 1900 MHz HSL Medium parameters used (interpolated): $f = 1909.8$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 38.6$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1529; ConvF(4.9, 4.9, 4.9); Calibrated: 10/06/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 16/06/2004
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Touch position with Memory Card - Middle/Area Scan (81x161x1): Measurement grid:

$dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.795 mW/g

Touch position with Memory Card - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

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

Reference Value = 3.99 V/m; Power Drift = -0.0 dB

Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.742 mW/g; SAR(10 g) = 0.404 mW/g

Maximum value of SAR (measured) = 0.801 mW/g

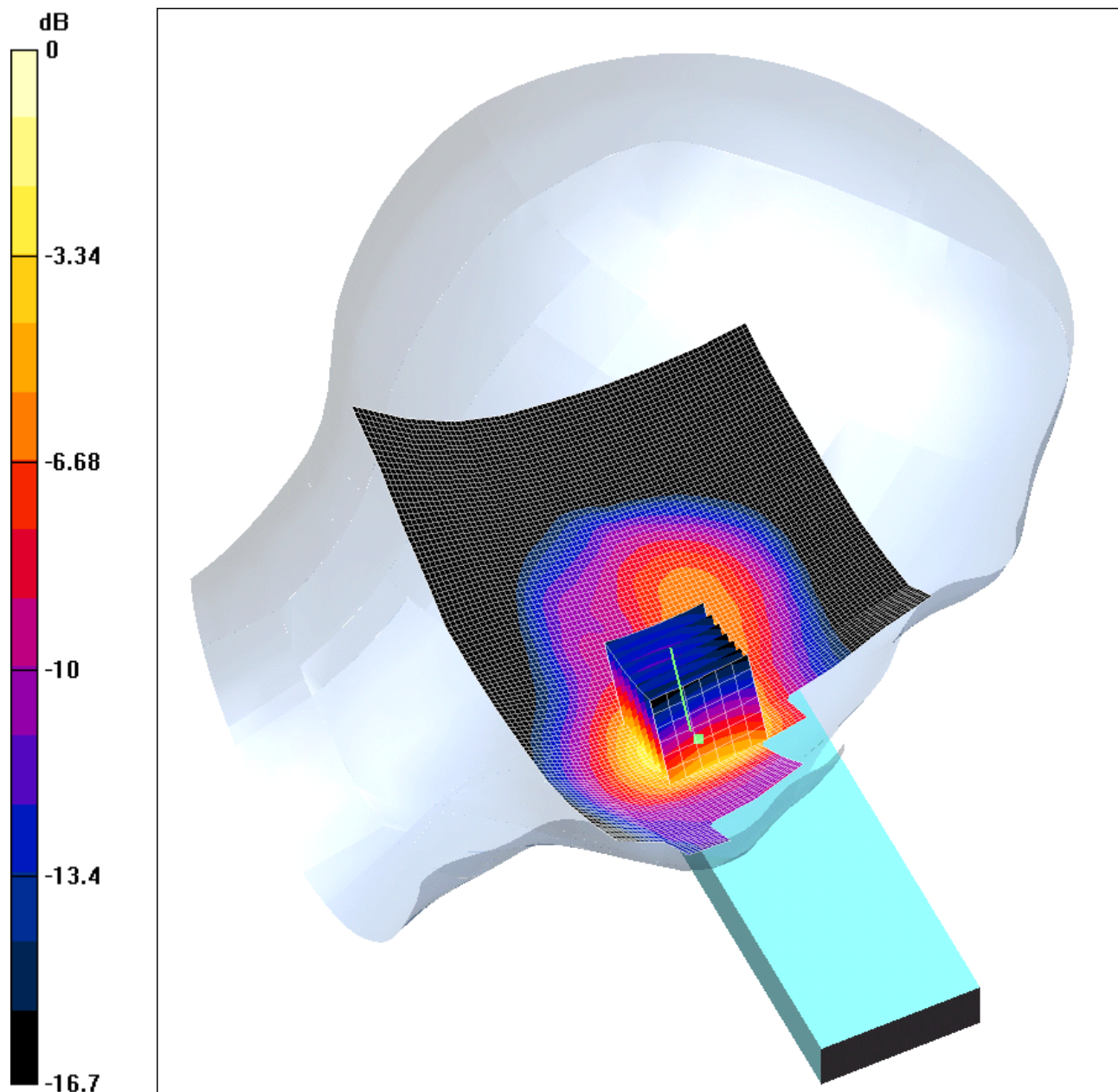
Date: 10/12/04

70944_05_007

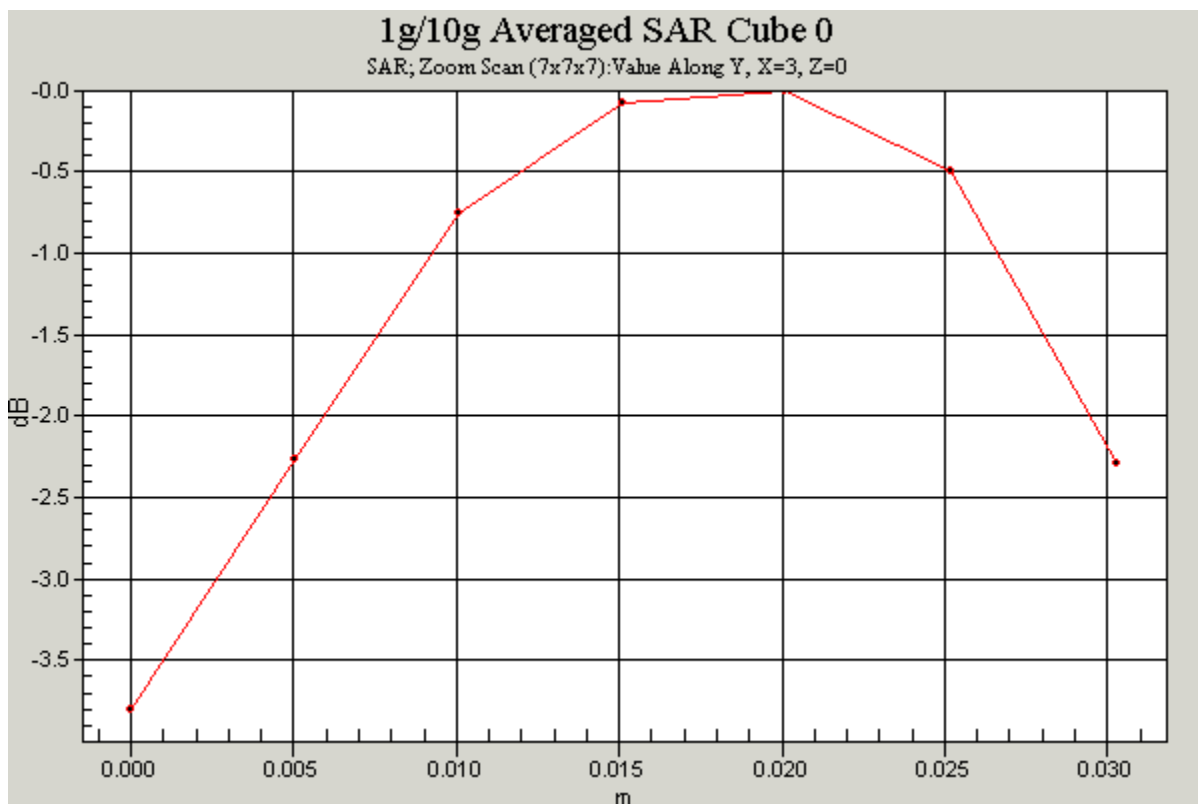
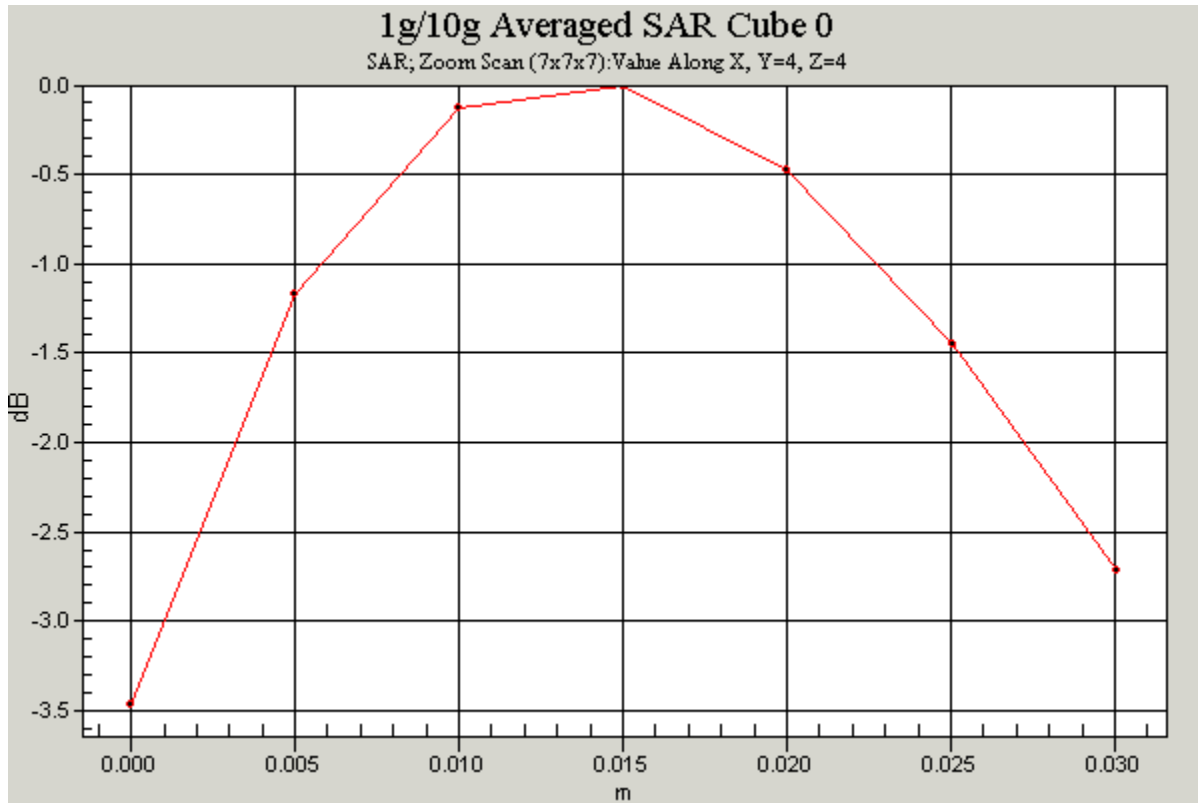
Test Laboratory: RFI GLOBAL SERVICES LTD.

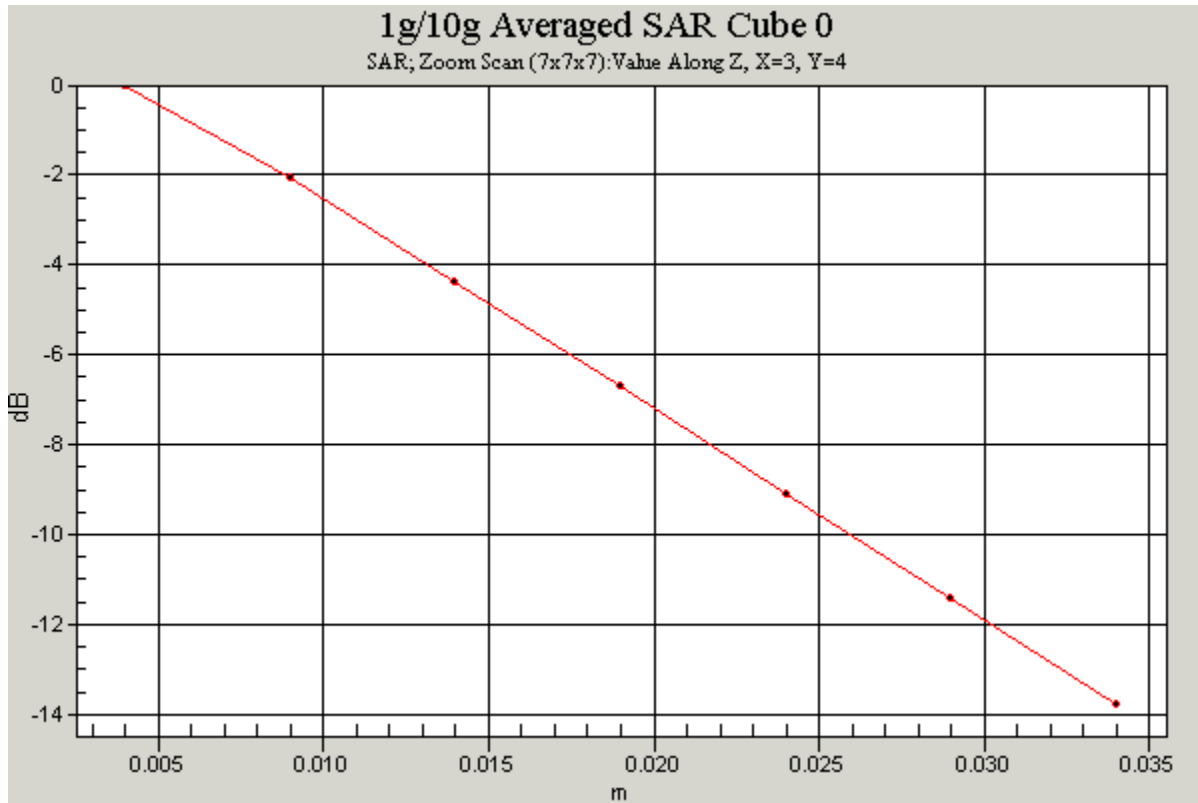
70944_JD05_007_Touch_Left_512

DUT: Panasonic; Type: X800; Serial: 004400000227163



0 dB = 0.753mW/g





Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: 1900 MHz HSL Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1529; ConvF(4.9, 4.9, 4.9); Calibrated: 10/06/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 16/06/2004
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Touch position without Memory Card- Middle/Area Scan (81x161x1): Measurement grid:

$dx=15$ mm, $dy=15$ mm

Maximum value of SAR (interpolated) = 0.736 mW/g

Touch position without Memory Card- Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

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

Reference Value = 5.94 V/m; Power Drift = -0.2 dB

Peak SAR (extrapolated) = 1.13 W/kg

SAR(1 g) = 0.695 mW/g; SAR(10 g) = 0.382 mW/g

Maximum value of SAR (measured) = 0.753 mW/g

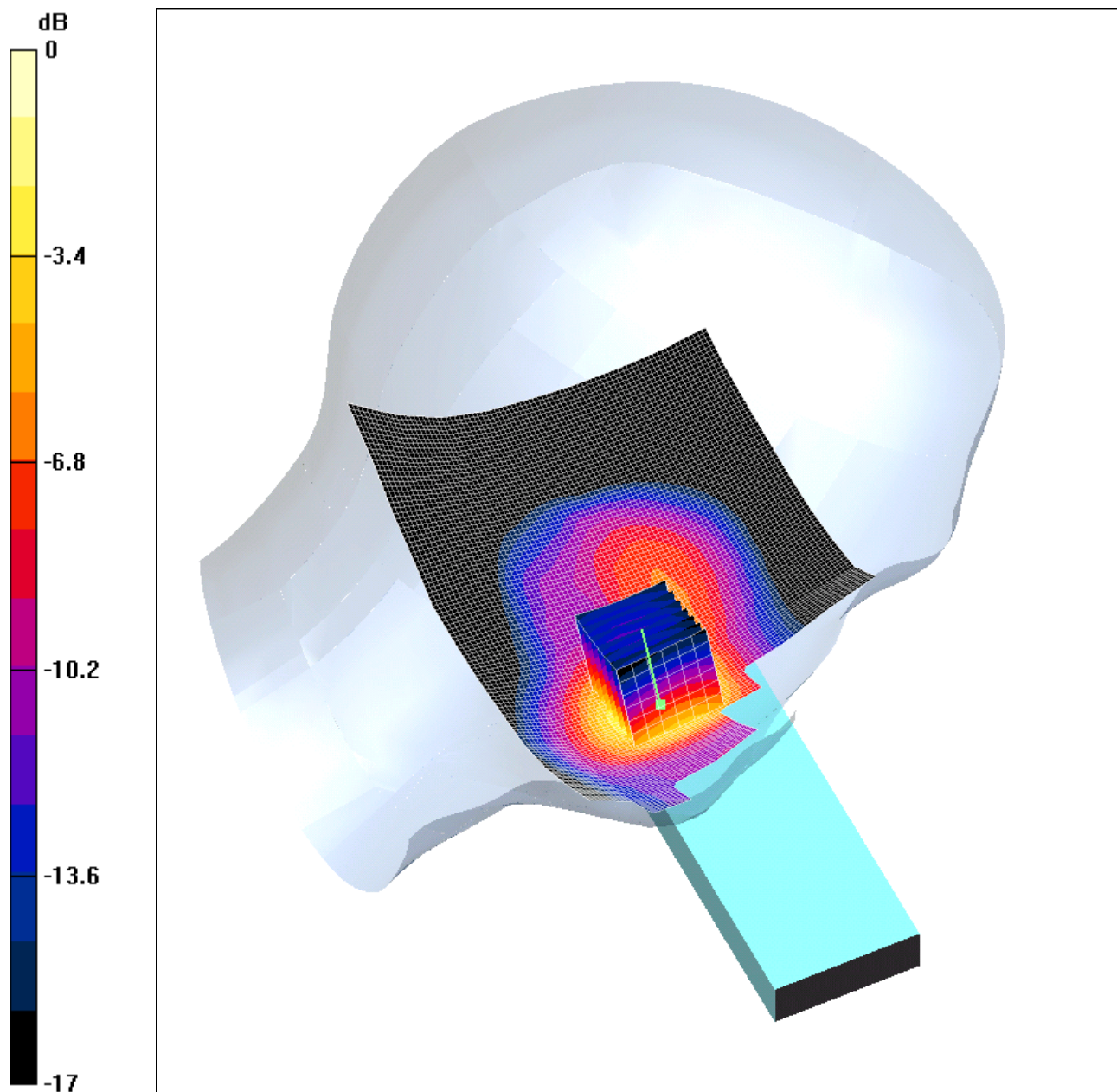
Date: 13/12/04

70944_05_008

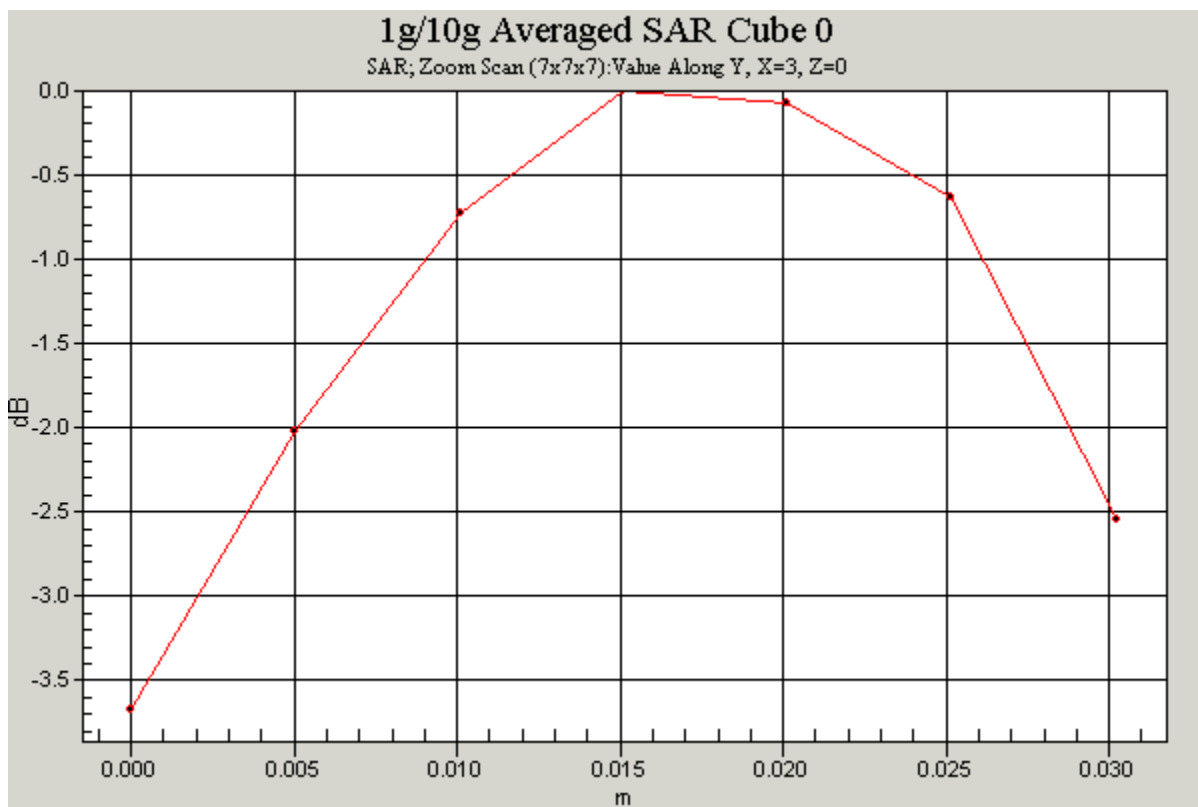
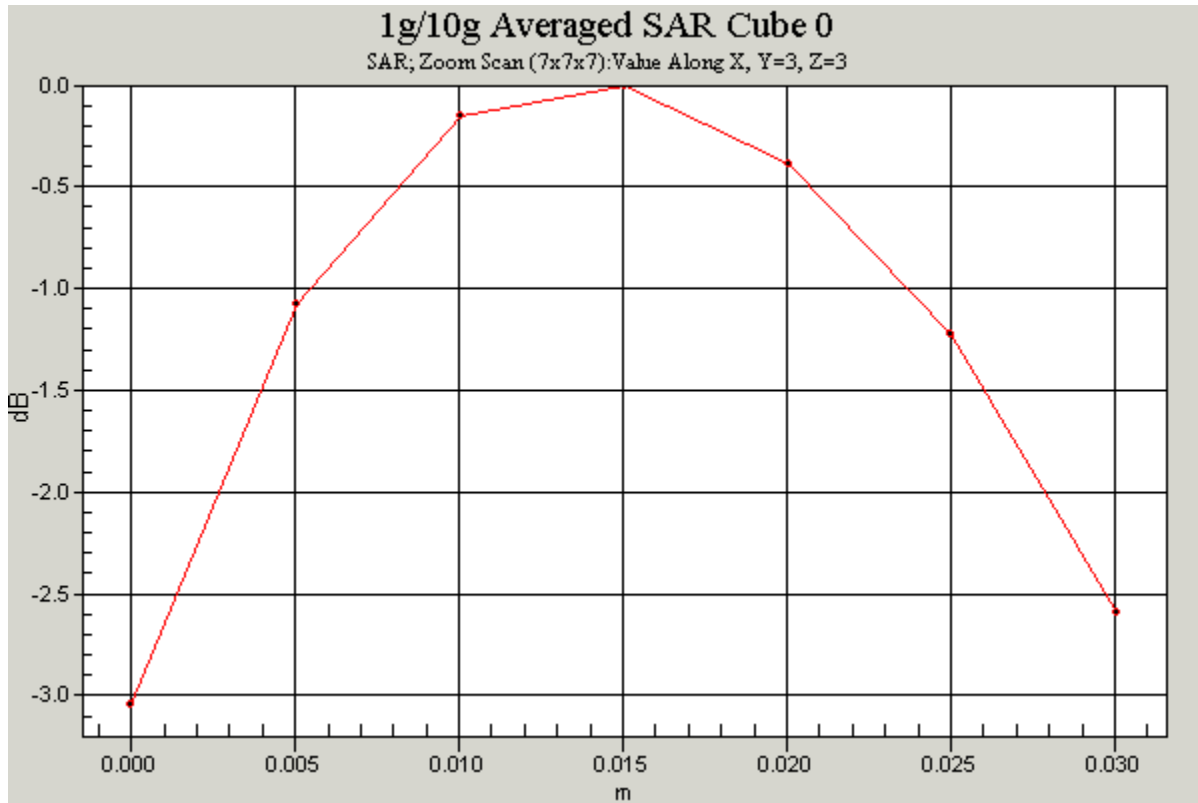
Test Laboratory: RFI GLOBAL SERVICES LTD.

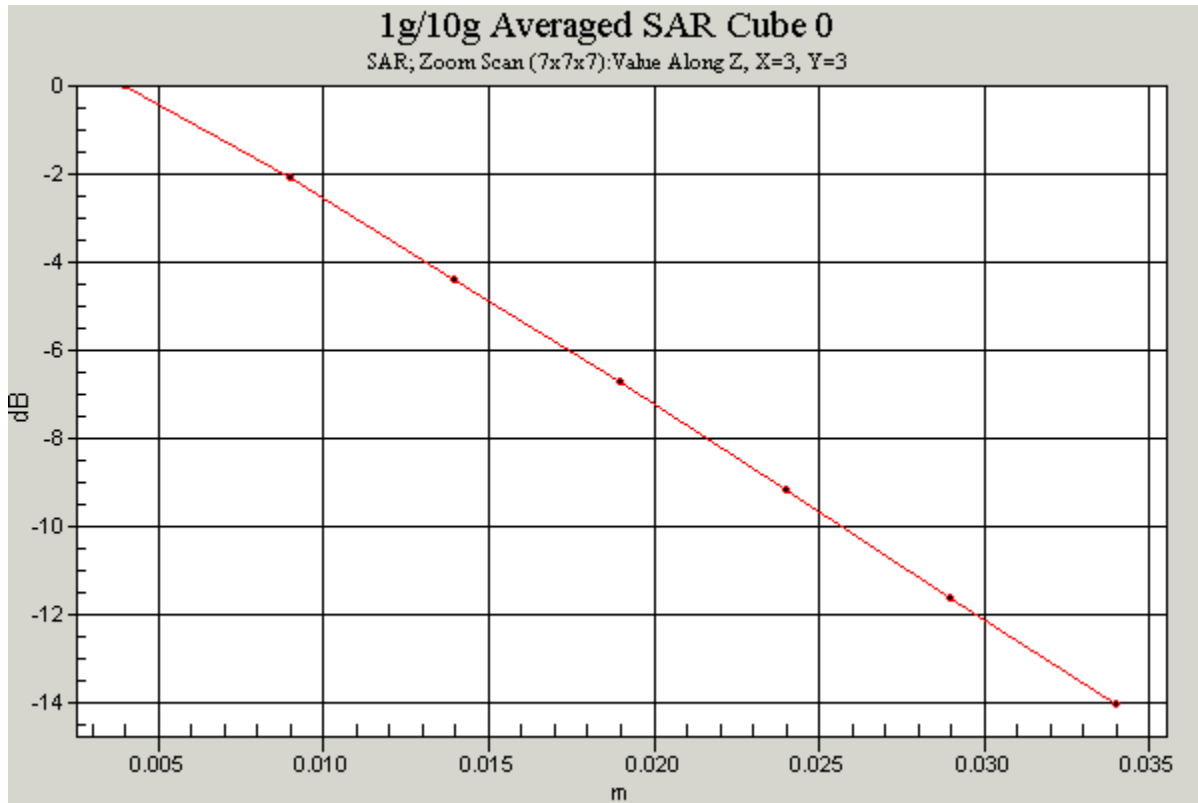
70944_JD05_008_Touch_Left_512 (With Bluetooth Enabled)

DUT: Panasonic; Type: X800; Serial: 004400000227163



0 dB = 0.839mW/g





Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: 1900 MHz HSL Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1529; ConvF(4.9, 4.9, 4.9); Calibrated: 10/06/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 16/06/2004
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Touch position with Bluetooth Enabled - Middle/Area Scan (81x161x1): Measurement grid:
dx=15mm, dy=15mm

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

Touch position with Bluetooth Enabled - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

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

Reference Value = 6.25 V/m; Power Drift = -0.2 dB

Peak SAR (extrapolated) = 1.27 W/kg

SAR(1 g) = 0.778 mW/g; SAR(10 g) = 0.428 mW/g

Maximum value of SAR (measured) = 0.839 mW/g

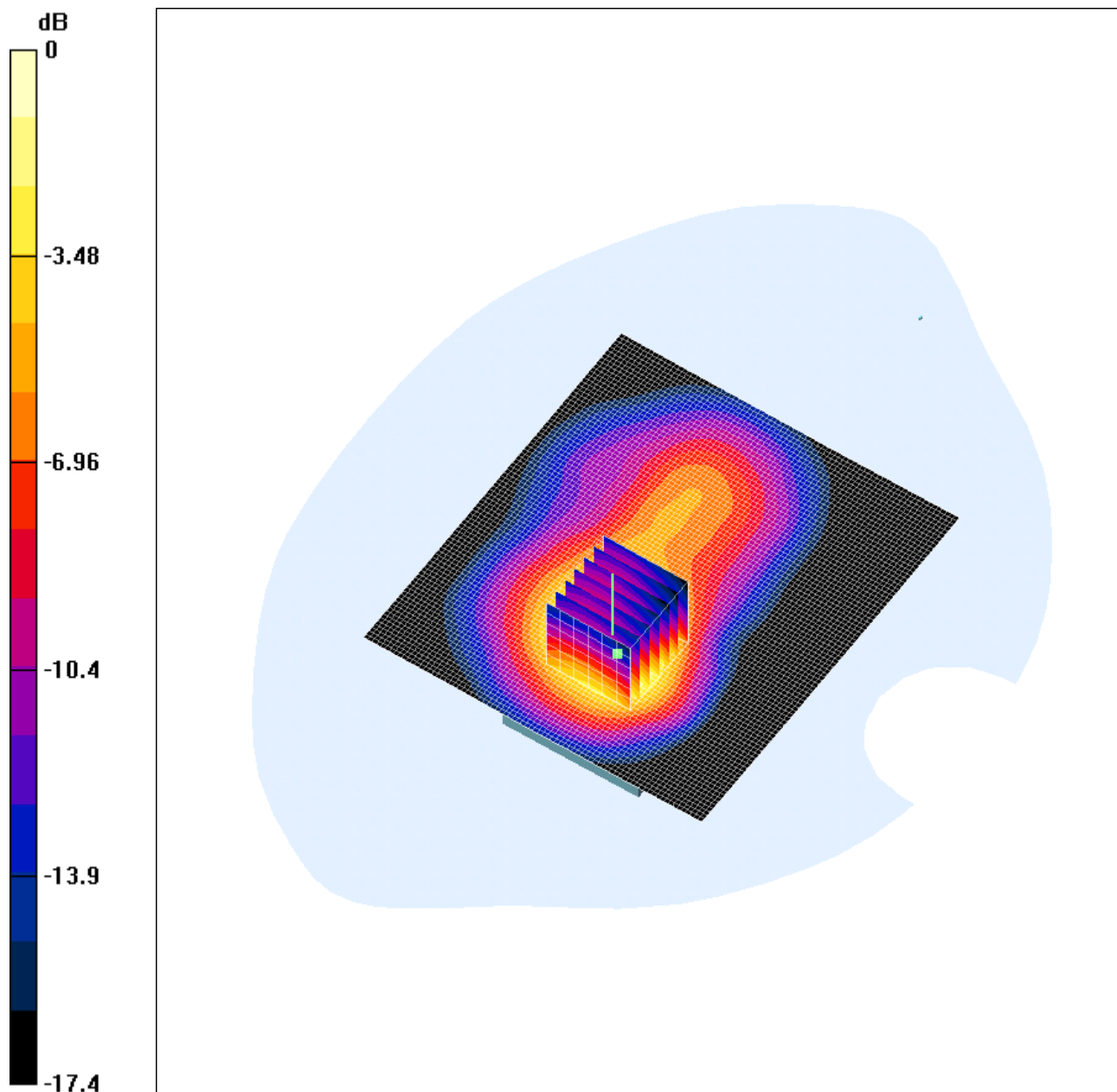
Date: 13/12/04

70944_05_009

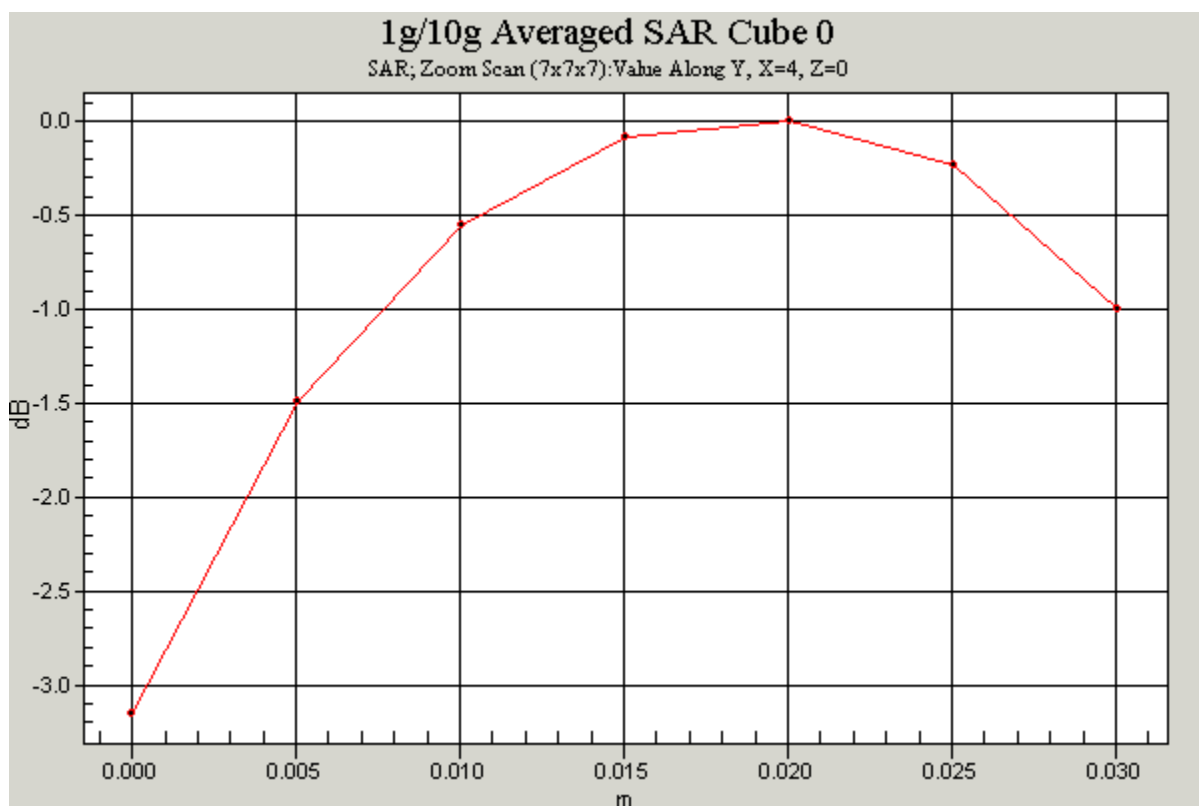
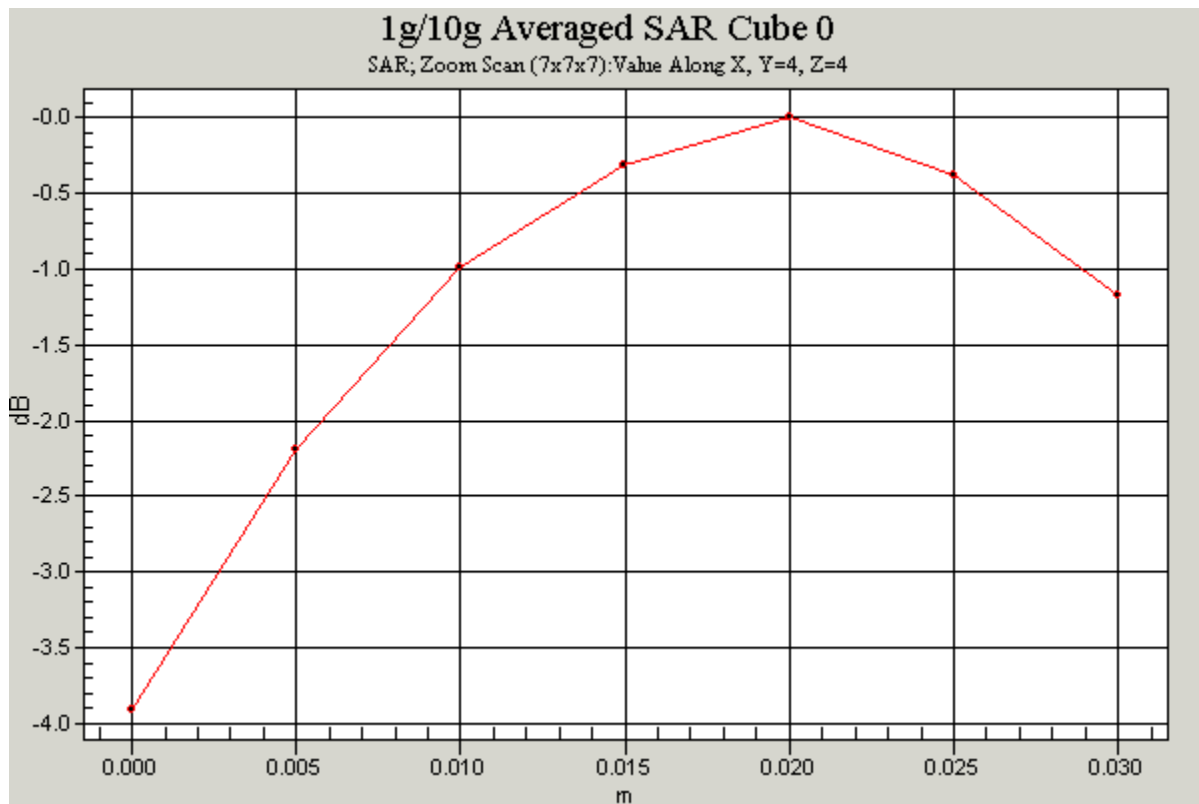
Test Laboratory: RFI GLOBAL SERVICES LTD.

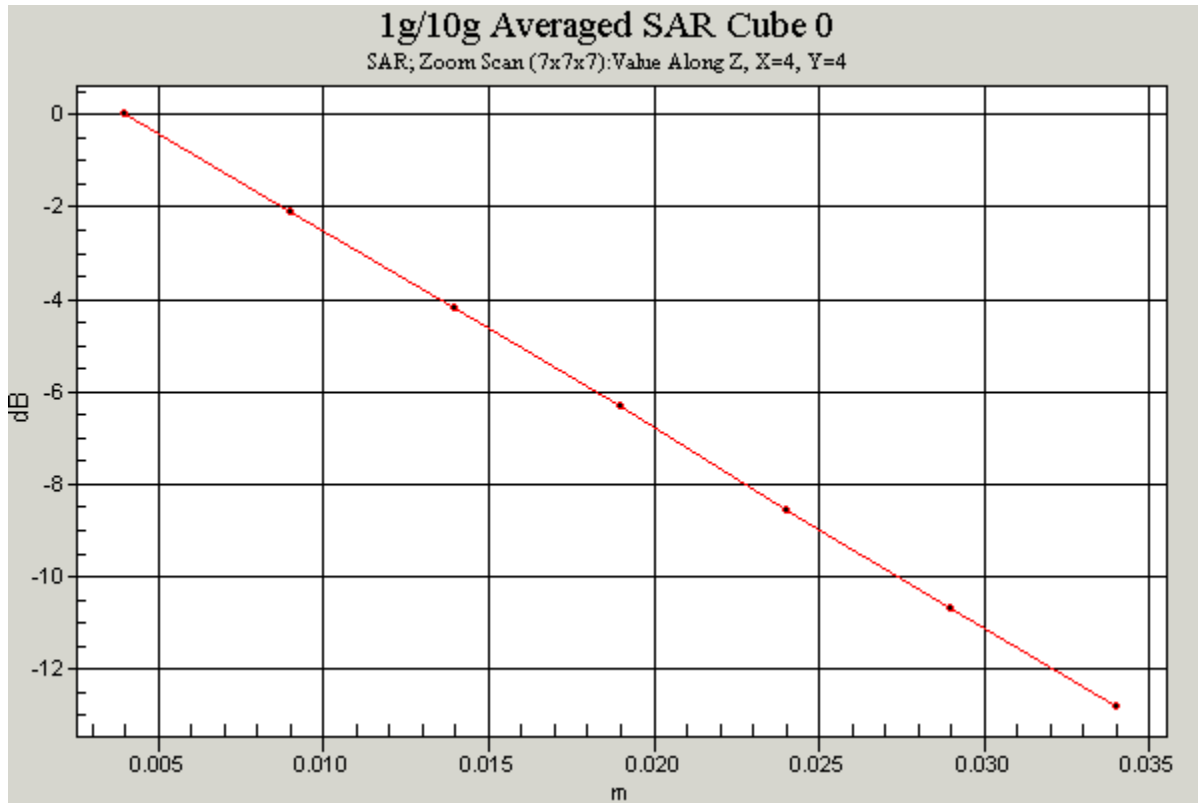
70944_JD05_009_Rear of Closed EUT with PHF_660

DUT: Panasonic; Type: X800; Serial: 004400000227163



0 dB = 0.755mW/g





Communication System: DCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
 Medium: 1800 MHz MSL Medium parameters used (interpolated): $f = 1909.8$ MHz; $\sigma = 1.71$ mho/m; $\epsilon_r = 51.9$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1529; ConvF(4.38, 4.38, 4.38); Calibrated: 10/06/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 16/06/2004
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Rear of Closed EUT with PHF - Middle/Area Scan (81x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.812 mW/g

Rear of Closed EUT with PHF - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.2 V/m; Power Drift = -0.1 dB

Peak SAR (extrapolated) = 1.09 W/kg

SAR(1 g) = 0.687 mW/g; SAR(10 g) = 0.404 mW/g

Maximum value of SAR (measured) = 0.755 mW/g

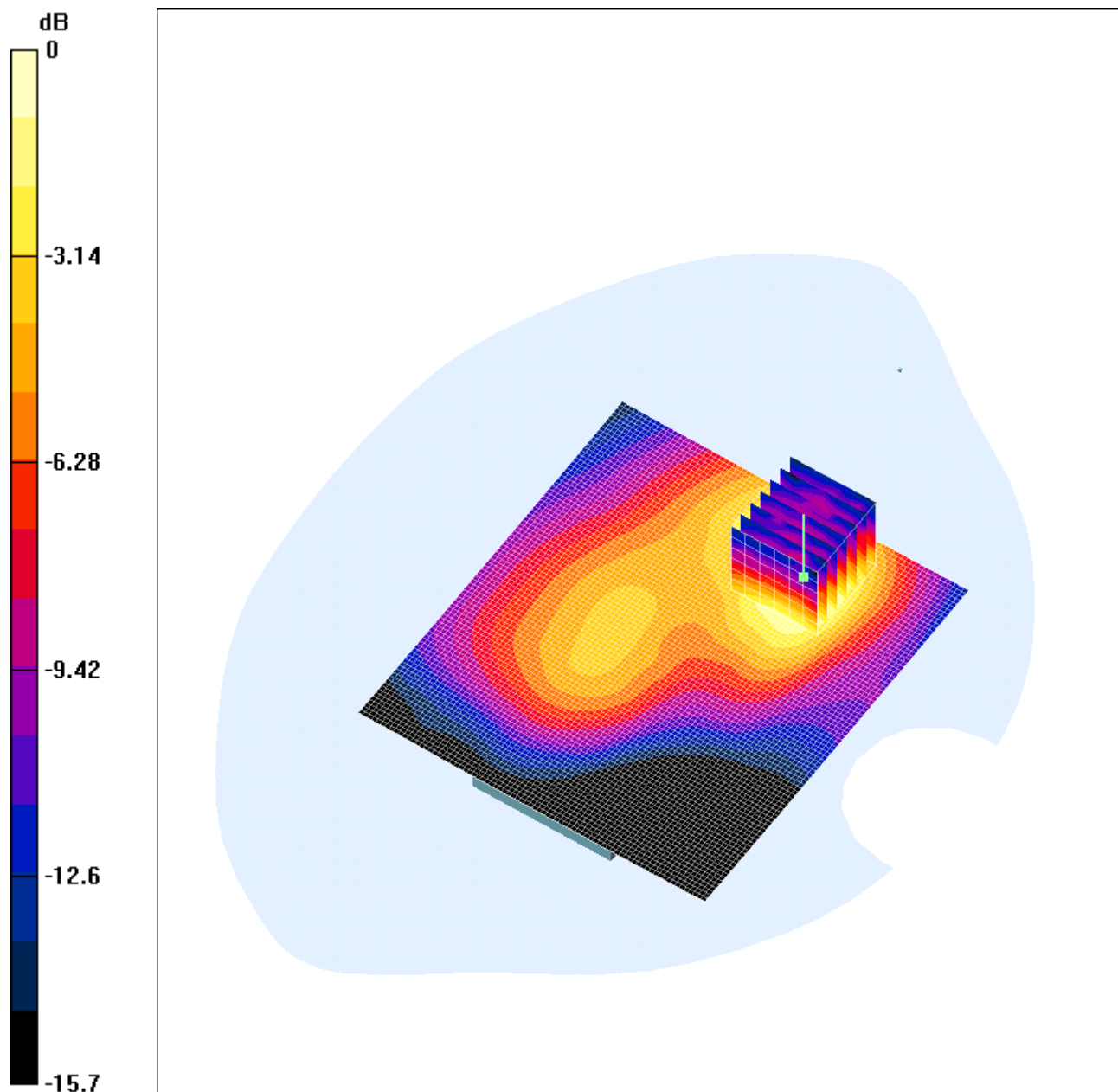
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70944_05_010

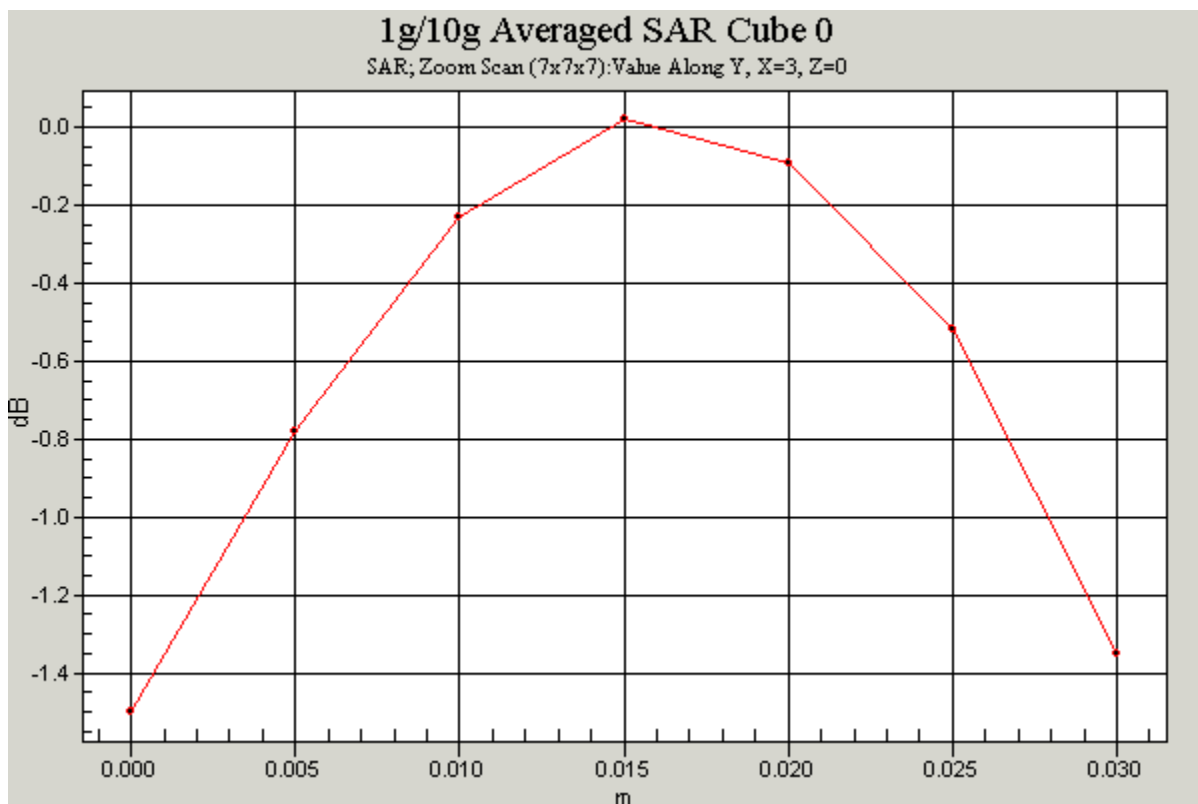
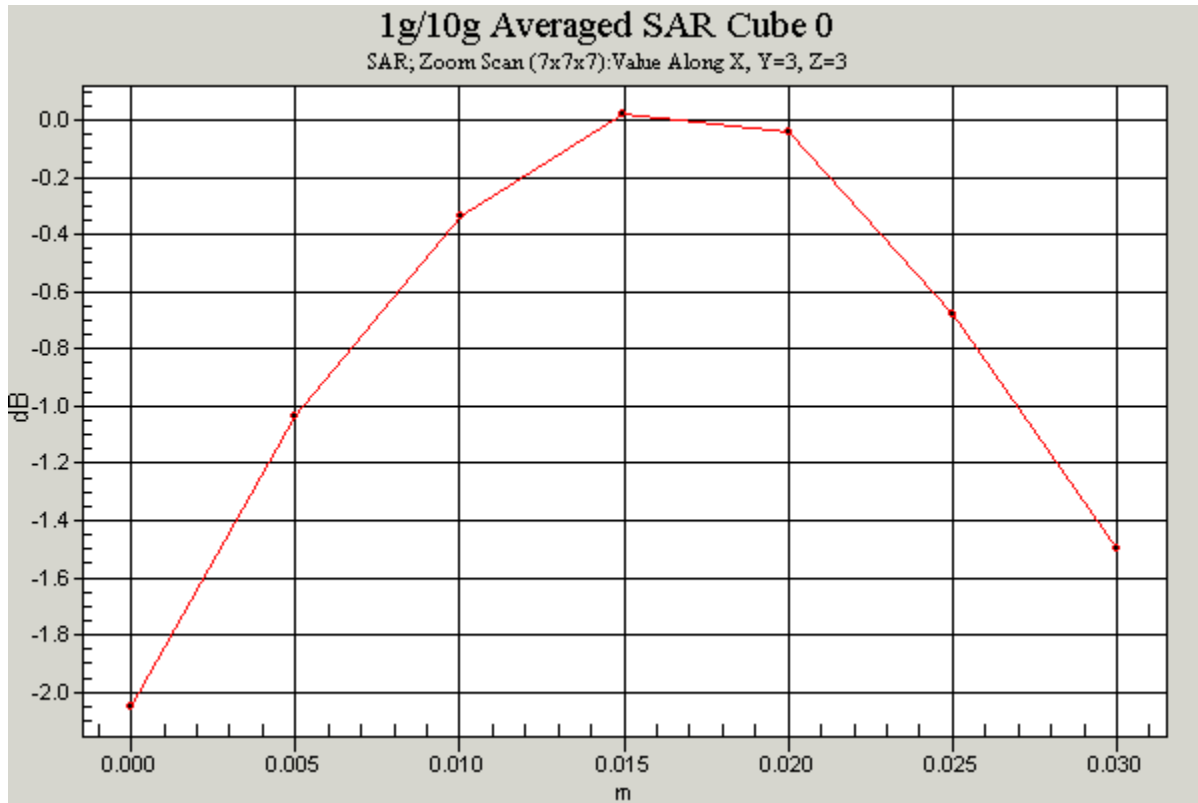
Test Laboratory: RFI GLOBAL SERVICES LTD.

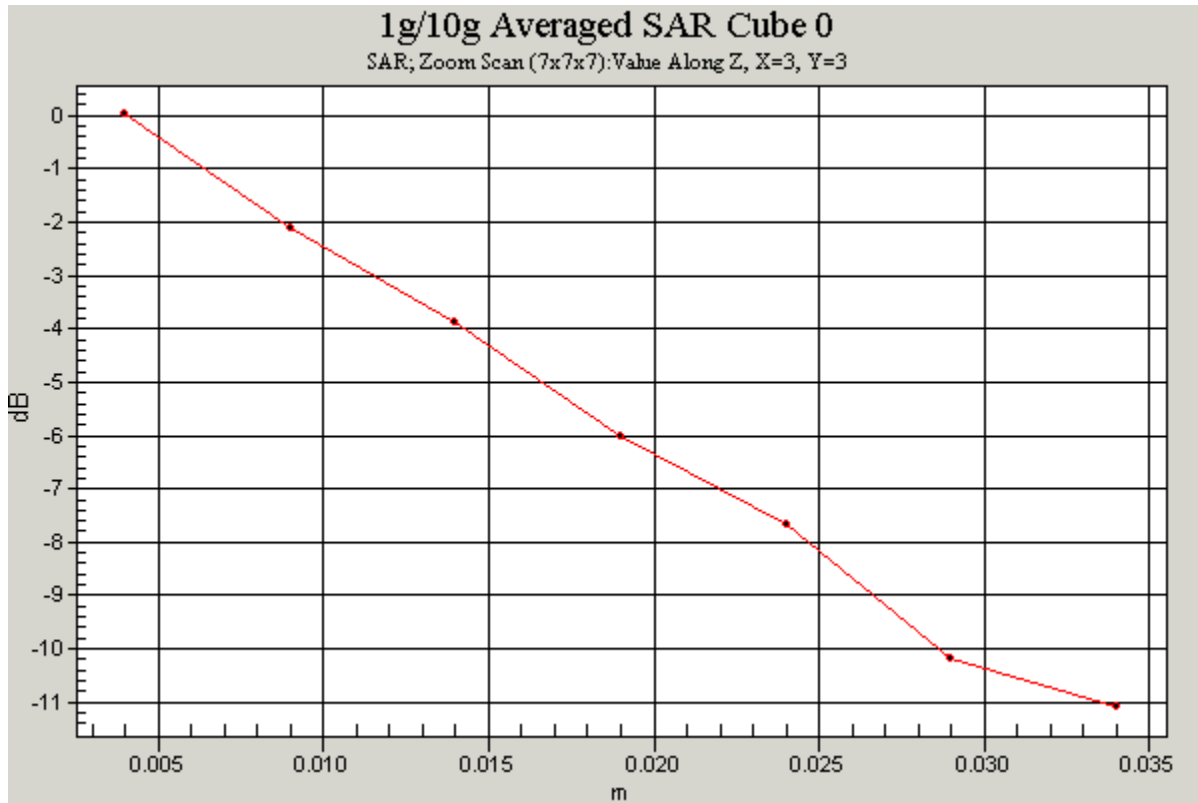
70944_JD05_010_Front of Closed EUT with PHF_660

DUT: Panasonic; Type: X800; Serial: 004400000227163



0 dB = 0.100mW/g





Communication System: DCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
 Medium: 1800 MHz MSL Medium parameters used (interpolated): $f = 1909.8$ MHz; $\sigma = 1.71$ mho/m; $\epsilon_r = 51.9$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1529; ConvF(4.38, 4.38, 4.38); Calibrated: 10/06/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 16/06/2004
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Front of Closed EUT with PHF - Middle/Area Scan (81x91x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.105 mW/g

Front of Closed EUT with PHF - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.27 V/m; Power Drift = -0.4 dB

Peak SAR (extrapolated) = 0.162 W/kg

SAR(1 g) = 0.094 mW/g; SAR(10 g) = 0.056 mW/g

Maximum value of SAR (measured) = 0.100 mW/g

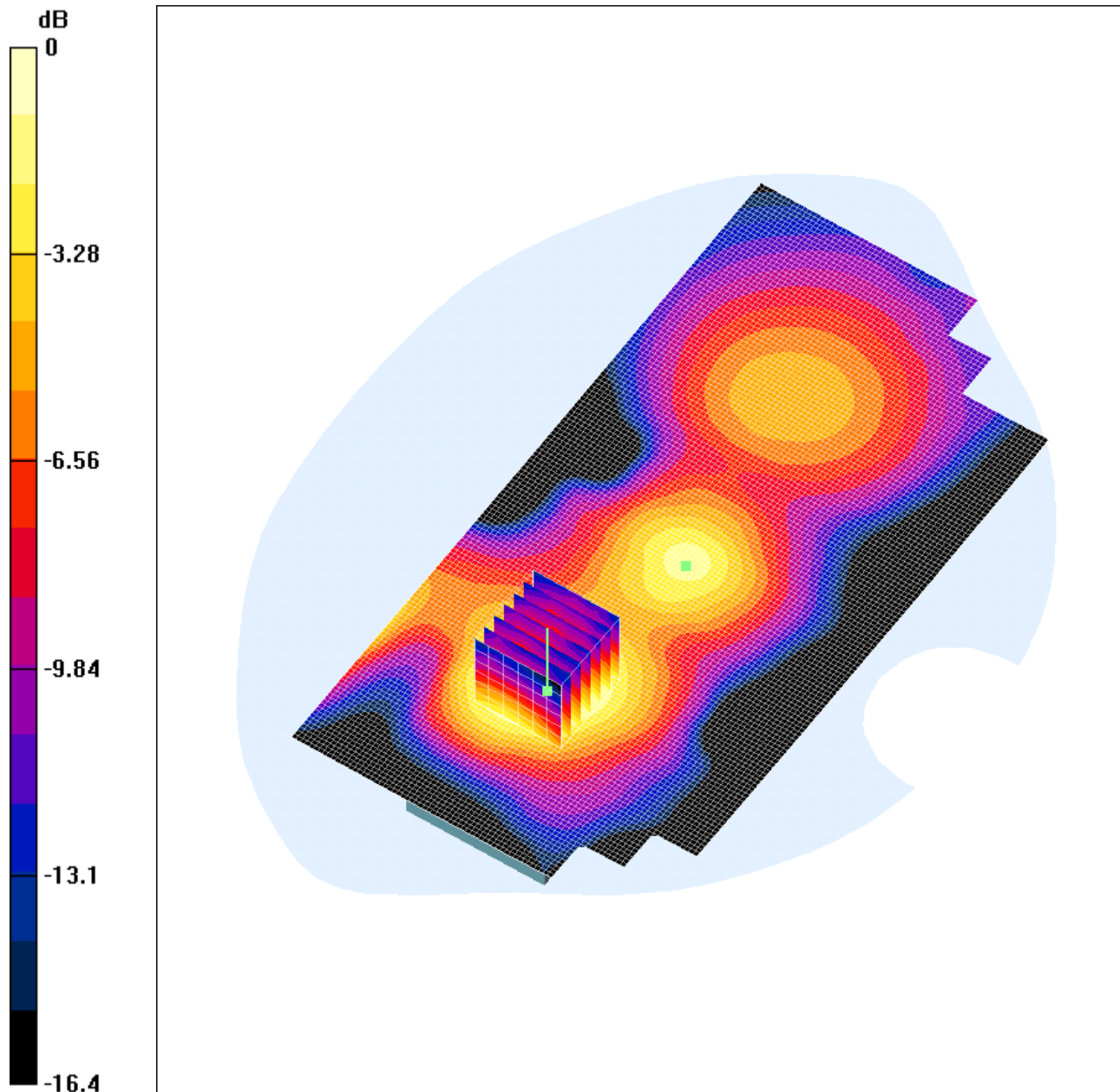
Date: 13/12/04

70944_05_011

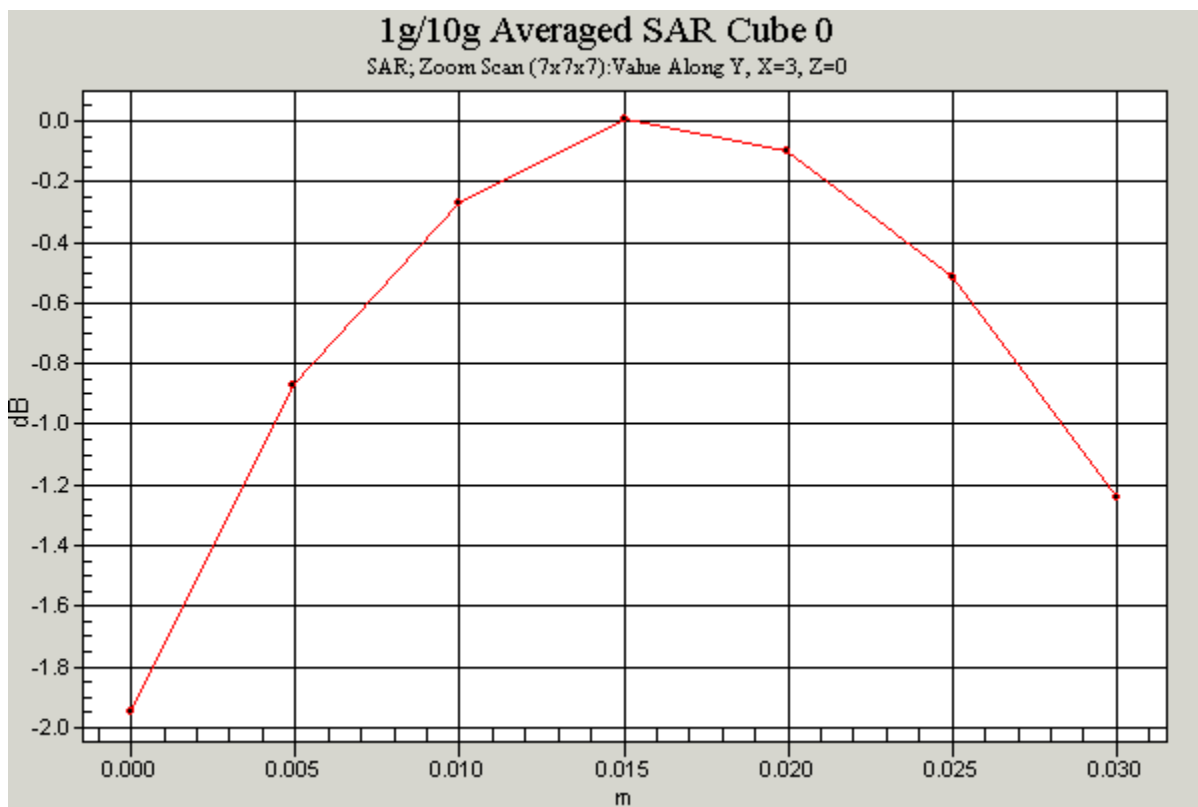
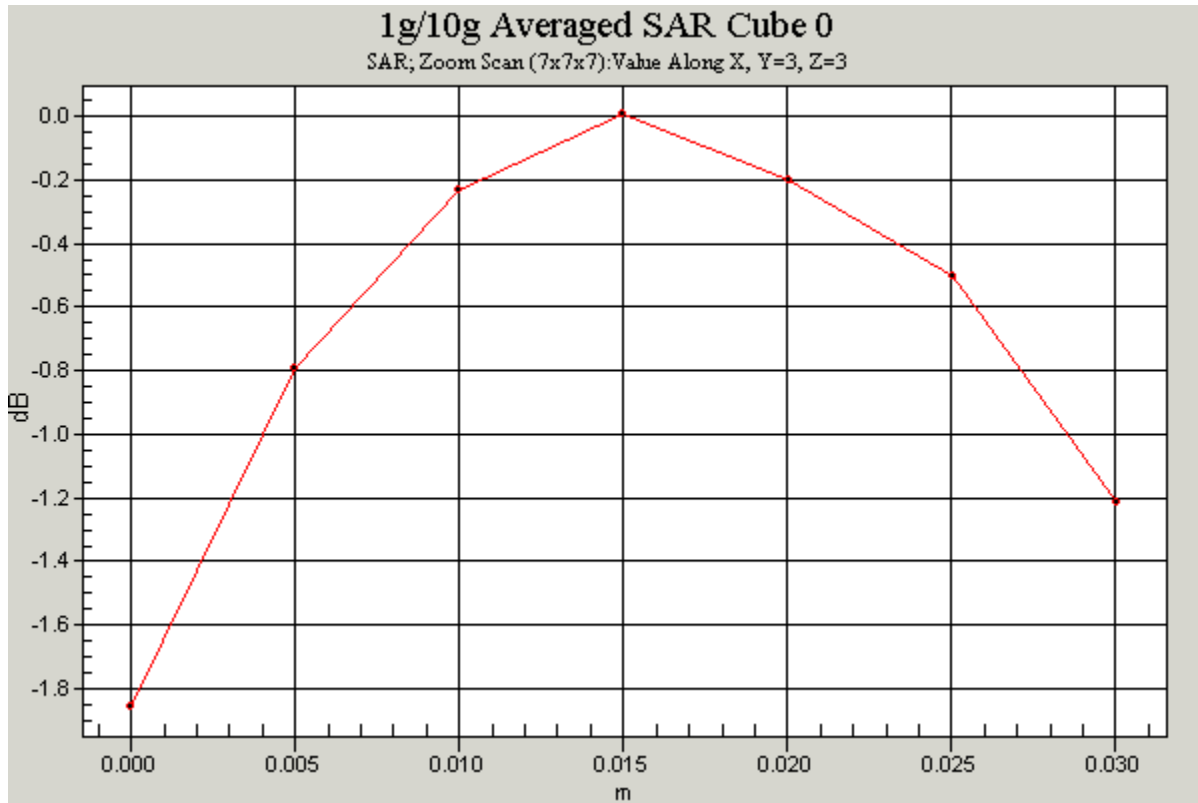
Test Laboratory: RFI GLOBAL SERVICES LTD.

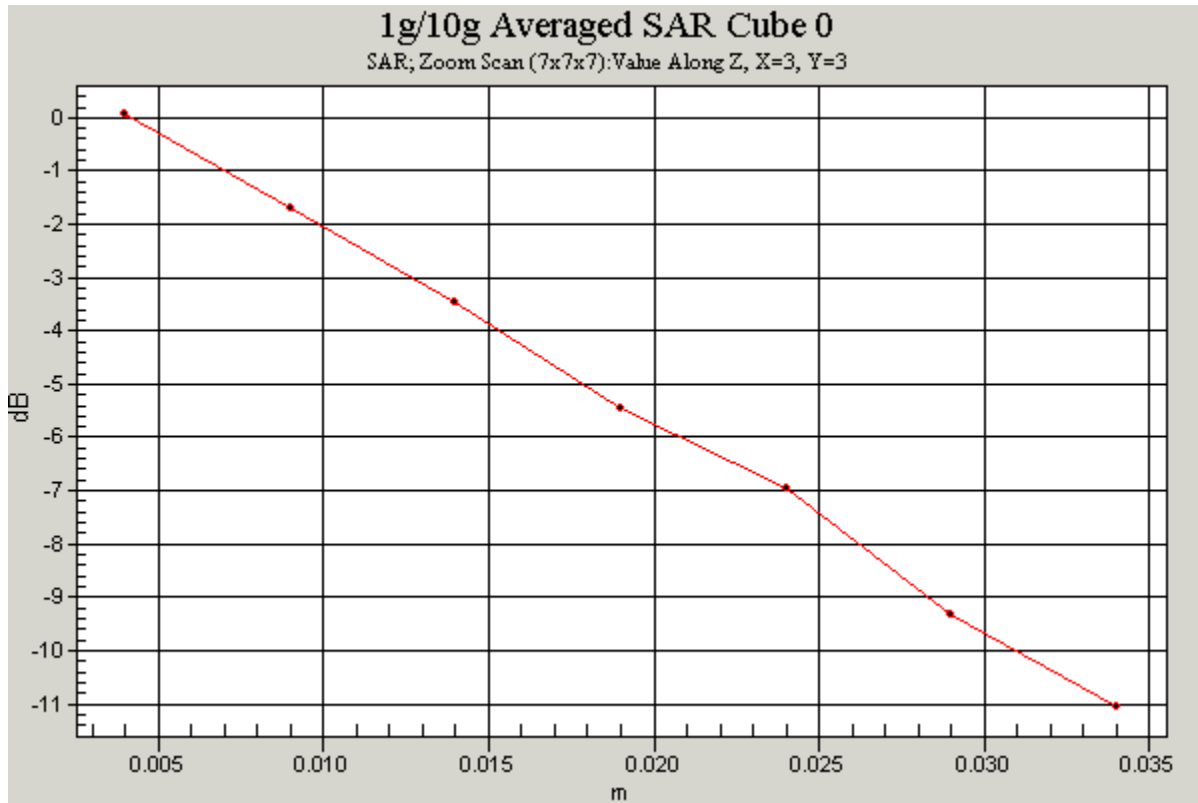
70944_JD05_011_Rear of Open EUT with PHF_660

DUT: Panasonic; Type: X800; Serial: 004400000227163



0 dB = 0.178mW/g





Communication System: DCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
 Medium: 1800 MHz MSL Medium parameters used (interpolated): $f = 1909.8$ MHz; $\sigma = 1.71$ mho/m; $\epsilon_r = 51.9$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1529; ConvF(4.38, 4.38, 4.38); Calibrated: 10/06/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 16/06/2004
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Rear of Open EUT with PHF - Middle/Area Scan (81x161x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.181 mW/g

Rear of Open EUT with PHF - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.67 V/m; Power Drift = -0.1 dB

Peak SAR (extrapolated) = 0.243 W/kg

SAR(1 g) = 0.164 mW/g; SAR(10 g) = 0.103 mW/g

Maximum value of SAR (measured) = 0.178 mW/g

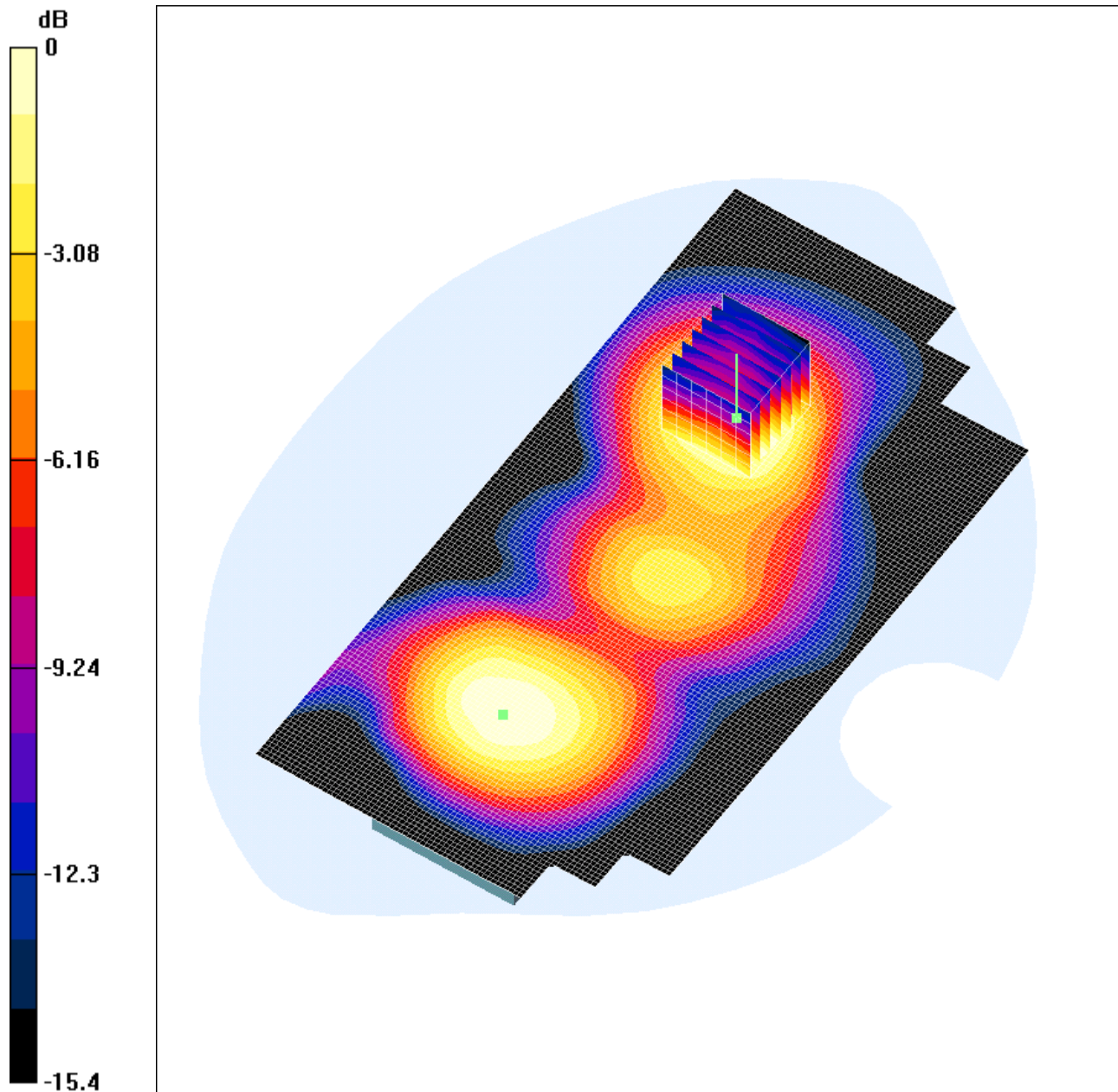
Date: 13/12/04

70944_05_012

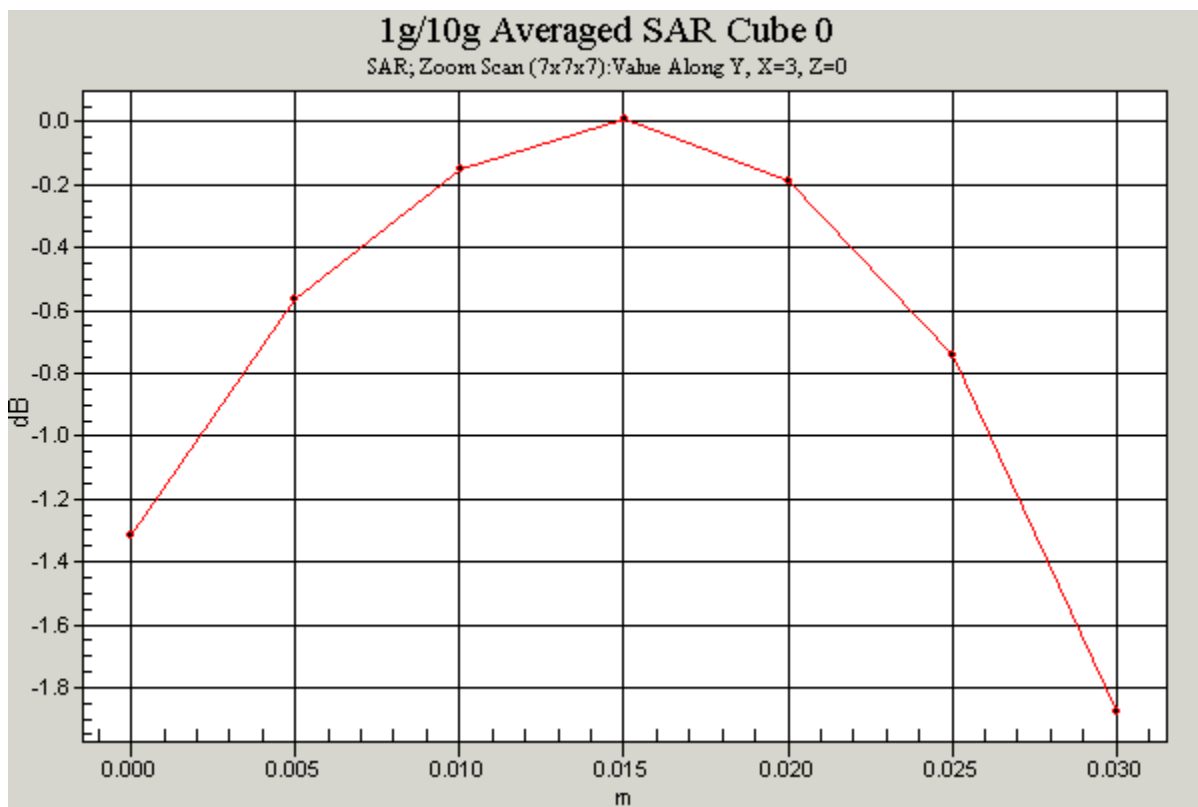
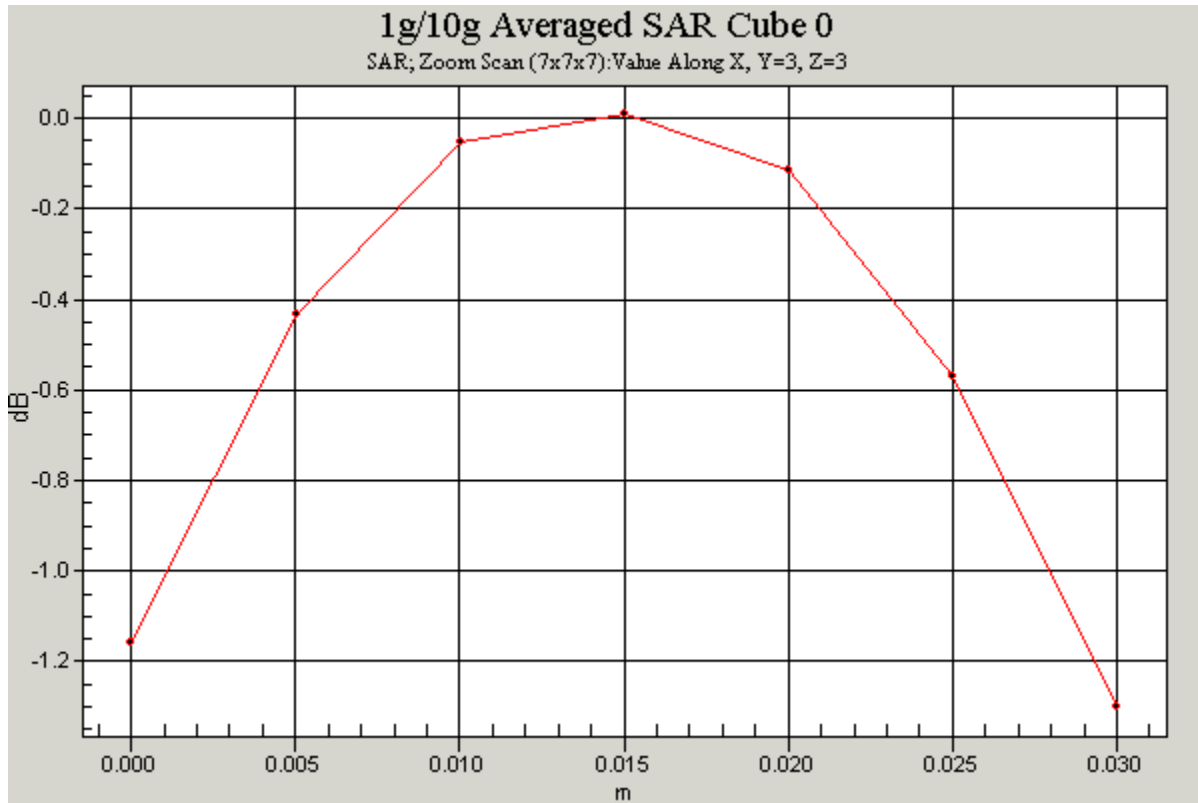
Test Laboratory: RFI GLOBAL SERVICES LTD.

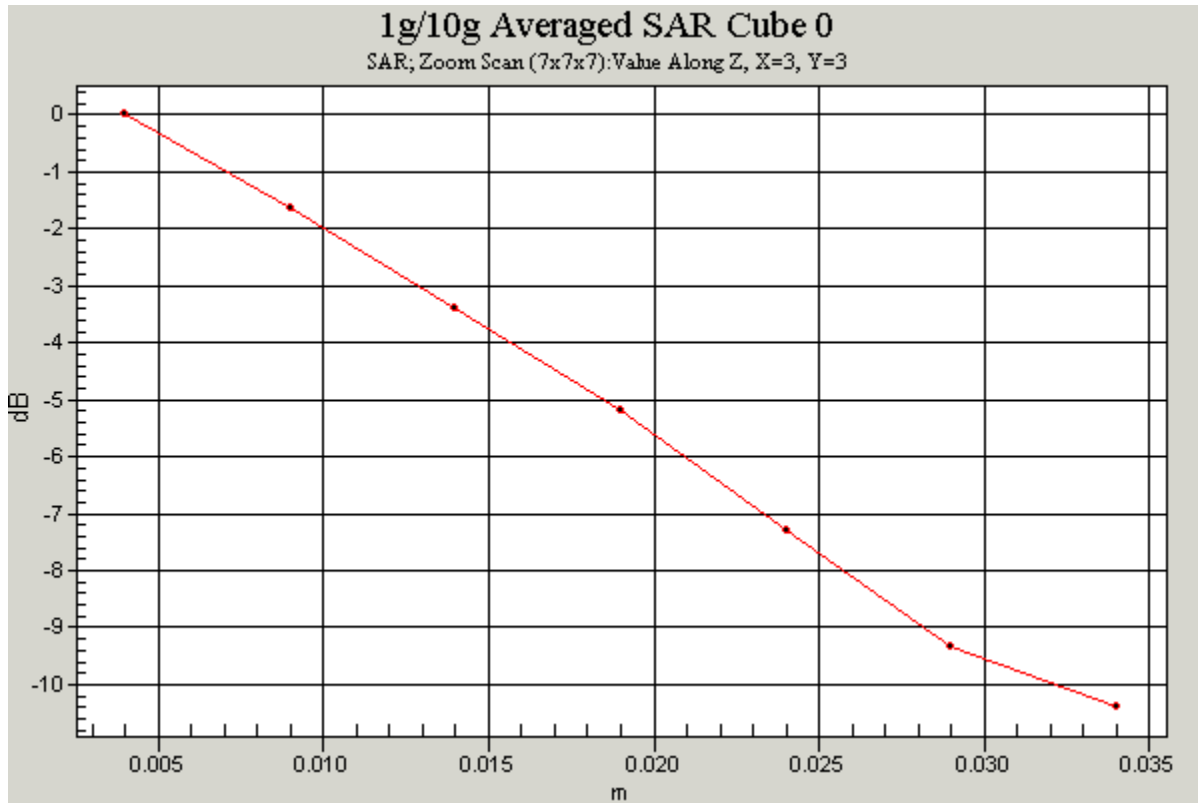
70944_JD05_012_Display of Open EUT with PHF_660

DUT: Panasonic; Type: X800; Serial: 004400000227163



0 dB = 0.274mW/g





Communication System: DCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
 Medium: 1800 MHz MSL Medium parameters used (interpolated): $f = 1909.8$ MHz; $\sigma = 1.71$ mho/m; $\epsilon_r = 51.9$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1529; ConvF(4.38, 4.38, 4.38); Calibrated: 10/06/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 16/06/2004
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Display of Open EUT with PHF - Middle/Area Scan (81x161x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.285 mW/g

Display of Open EUT with PHF - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.91 V/m; Power Drift = -0.1 dB

Peak SAR (extrapolated) = 0.368 W/kg

SAR(1 g) = 0.255 mW/g; SAR(10 g) = 0.161 mW/g

Maximum value of SAR (measured) = 0.274 mW/g

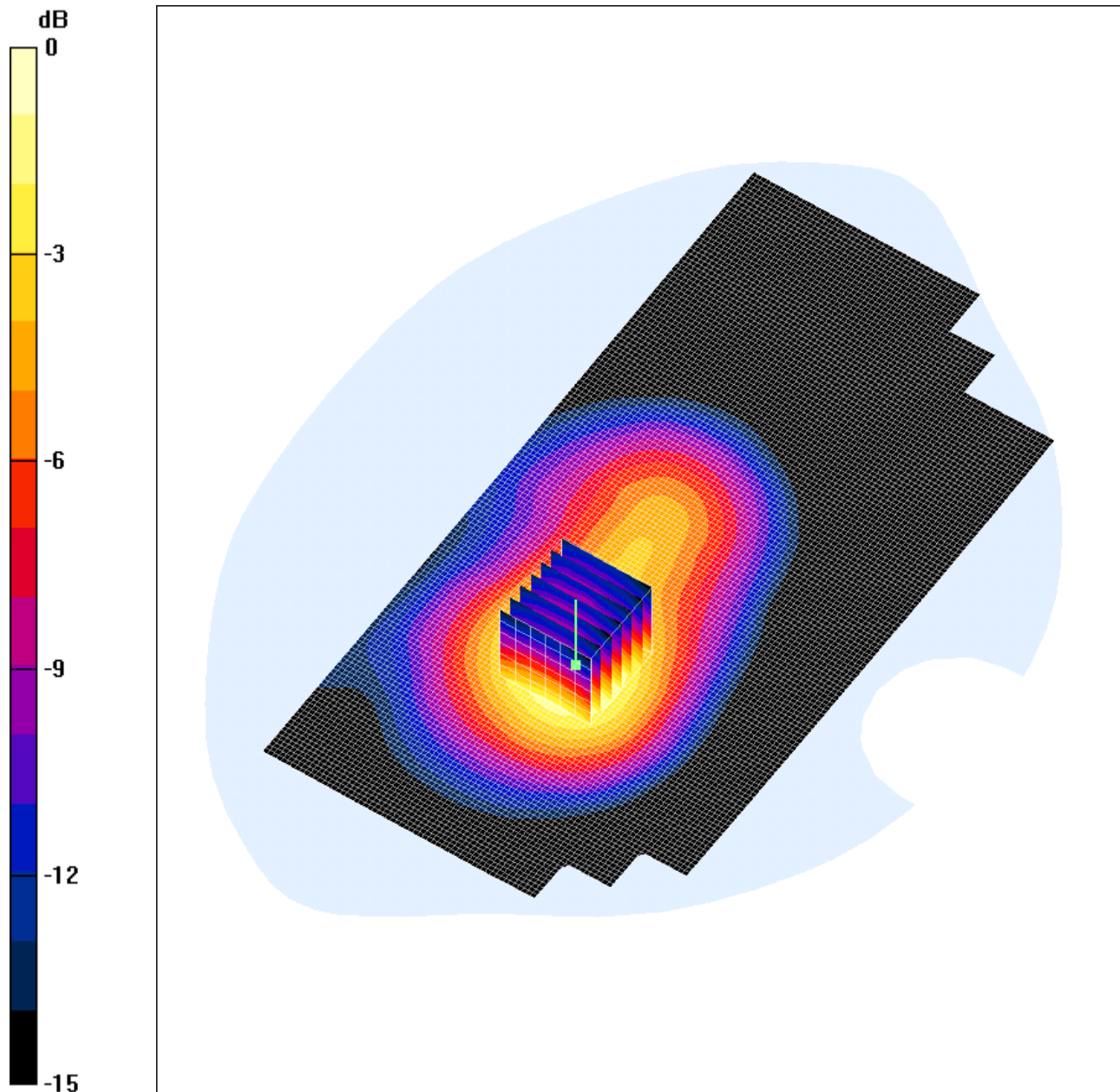
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70944_05_013

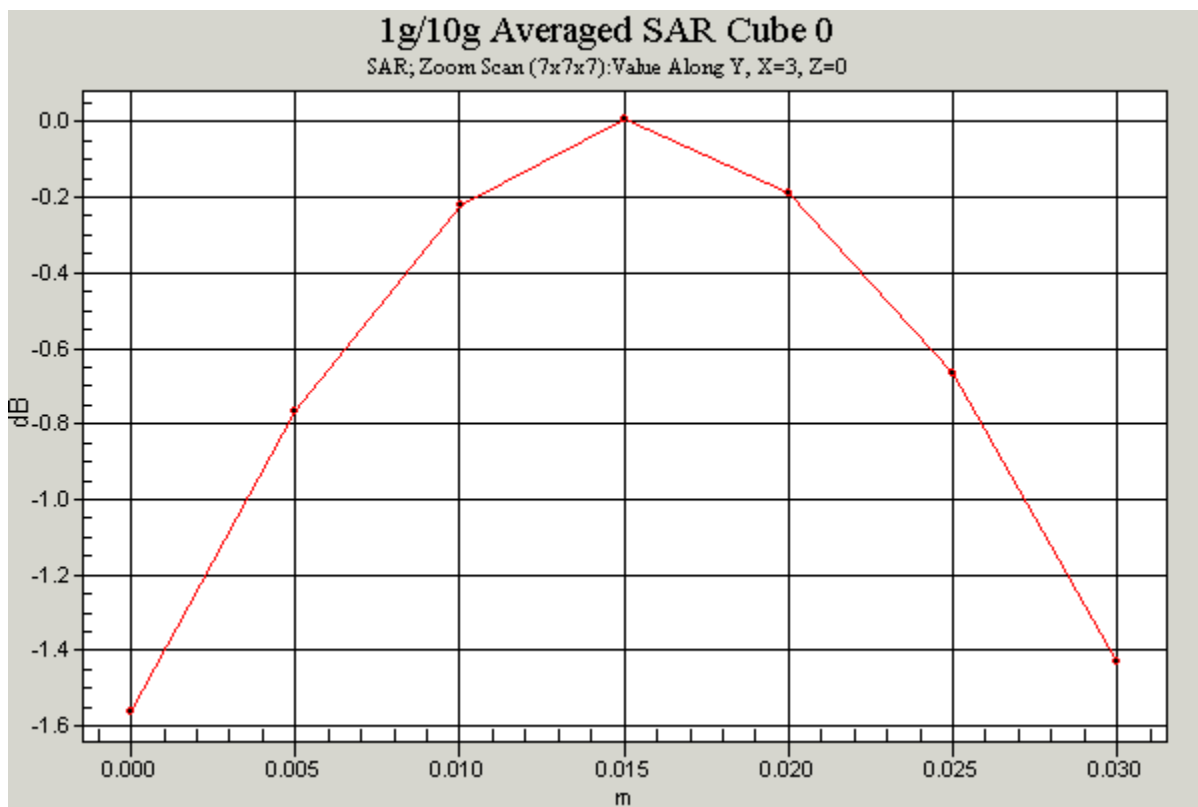
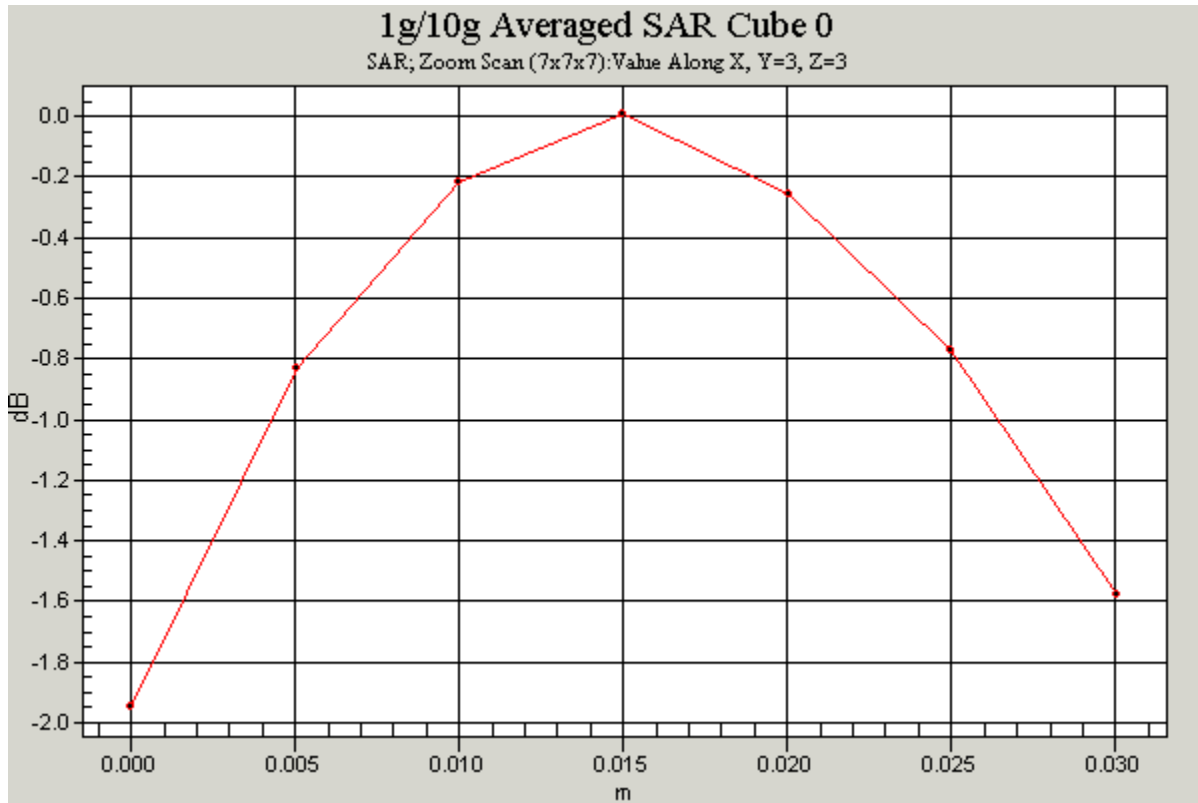
Test Laboratory: RFI GLOBAL SERVICES LTD.

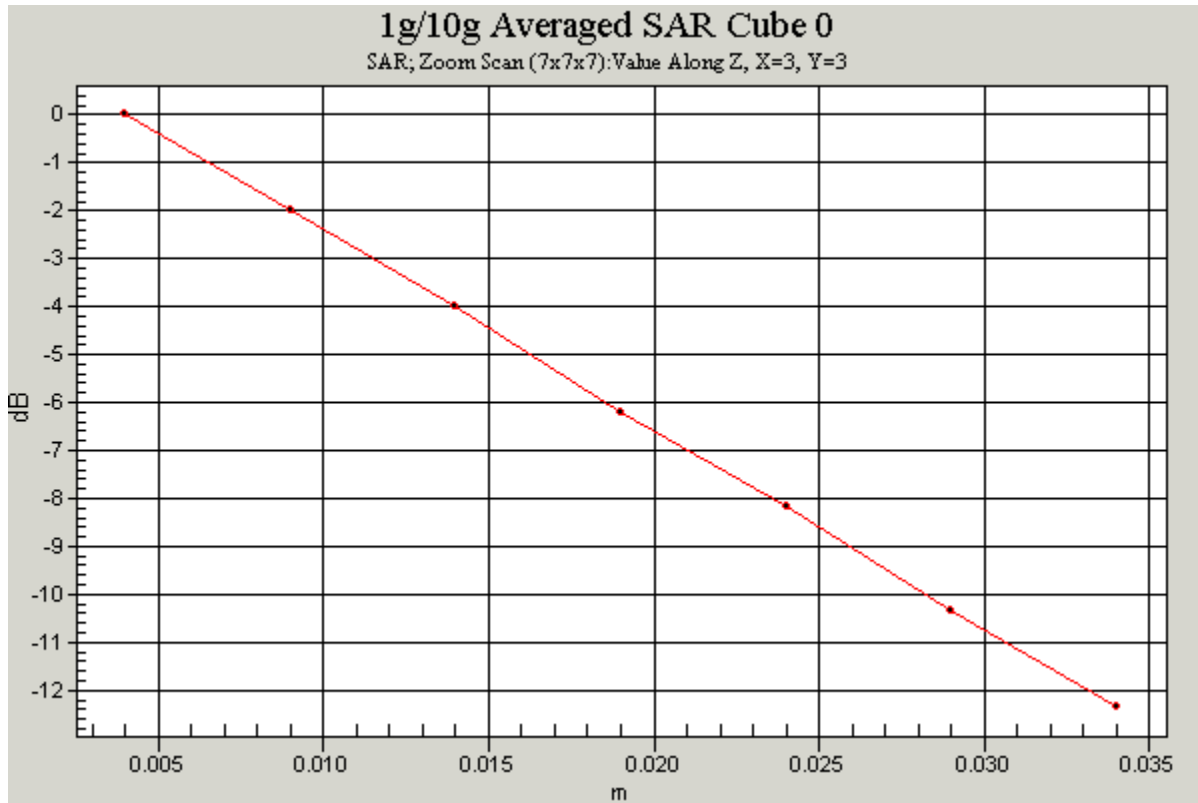
70944_JD05_013_Rear of Closed EUT with PHF_512

DUT: Panasonic; Type: X800; Serial: 004400000227163



0 dB = 0.355mW/g





Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: 1800 MHz MSL Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.64$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1529; ConvF(4.38, 4.38, 4.38); Calibrated: 10/06/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 16/06/2004
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Rear of Closed EUT with PHF - Middle/Area Scan (81x161x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.357 mW/g

Rear of Closed EUT with PHF - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.85 V/m; Power Drift = 0.0 dB

Peak SAR (extrapolated) = 0.515 W/kg

SAR(1 g) = 0.324 mW/g; SAR(10 g) = 0.196 mW/g

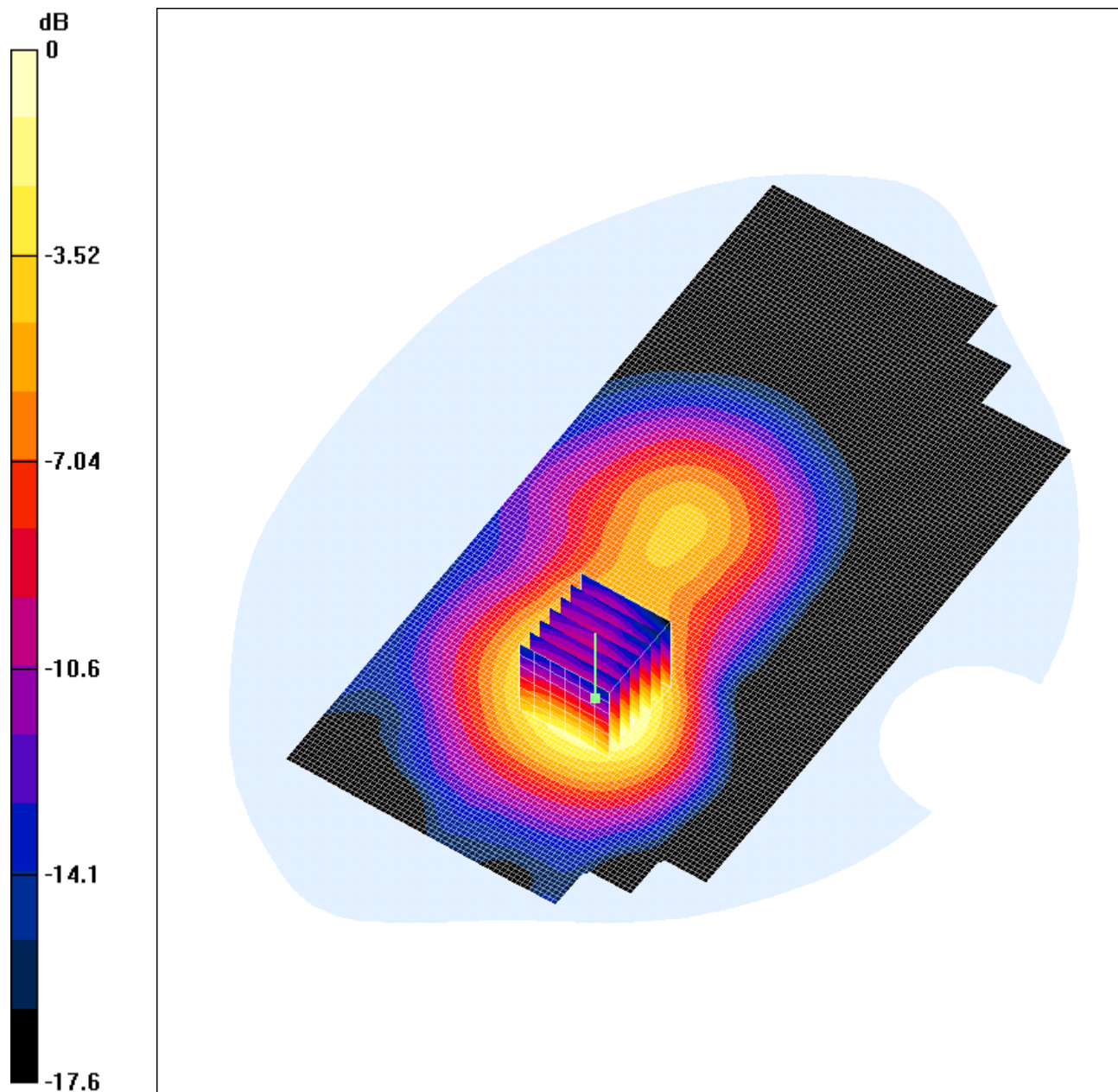
Maximum value of SAR (measured) = 0.355 mW/g

Date: 13/12/04

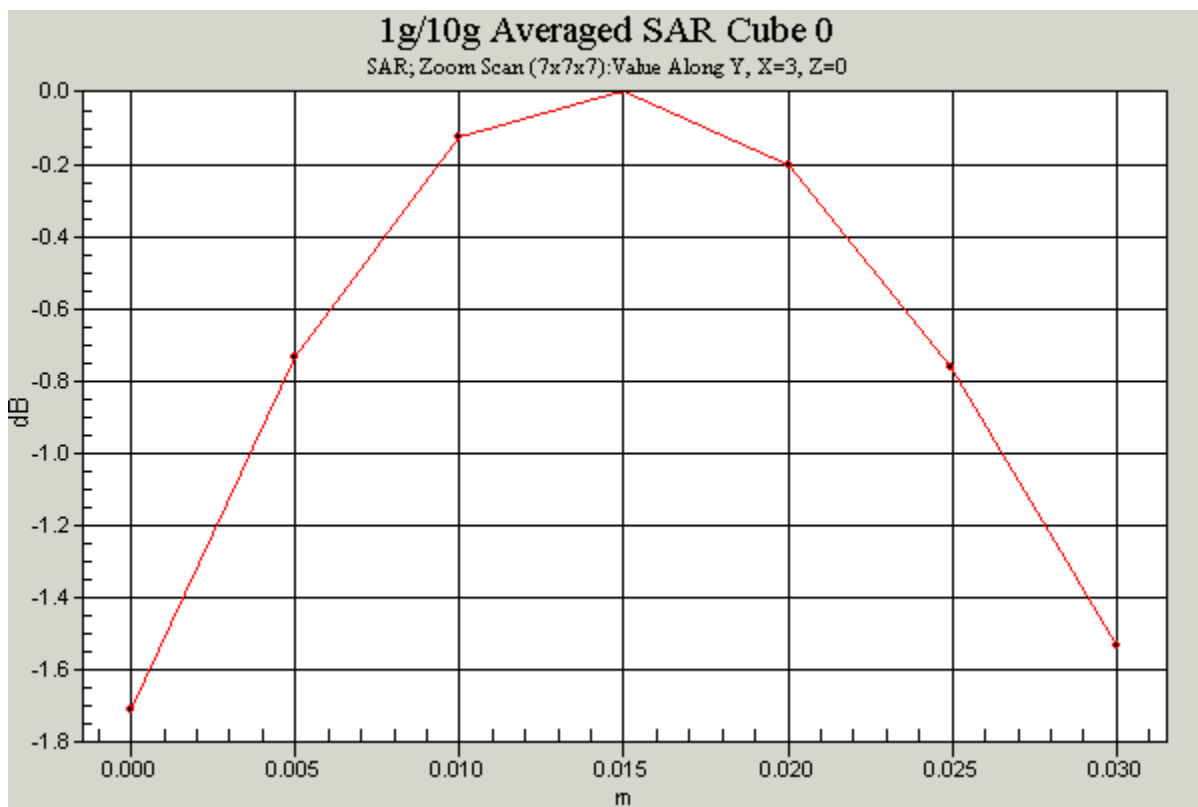
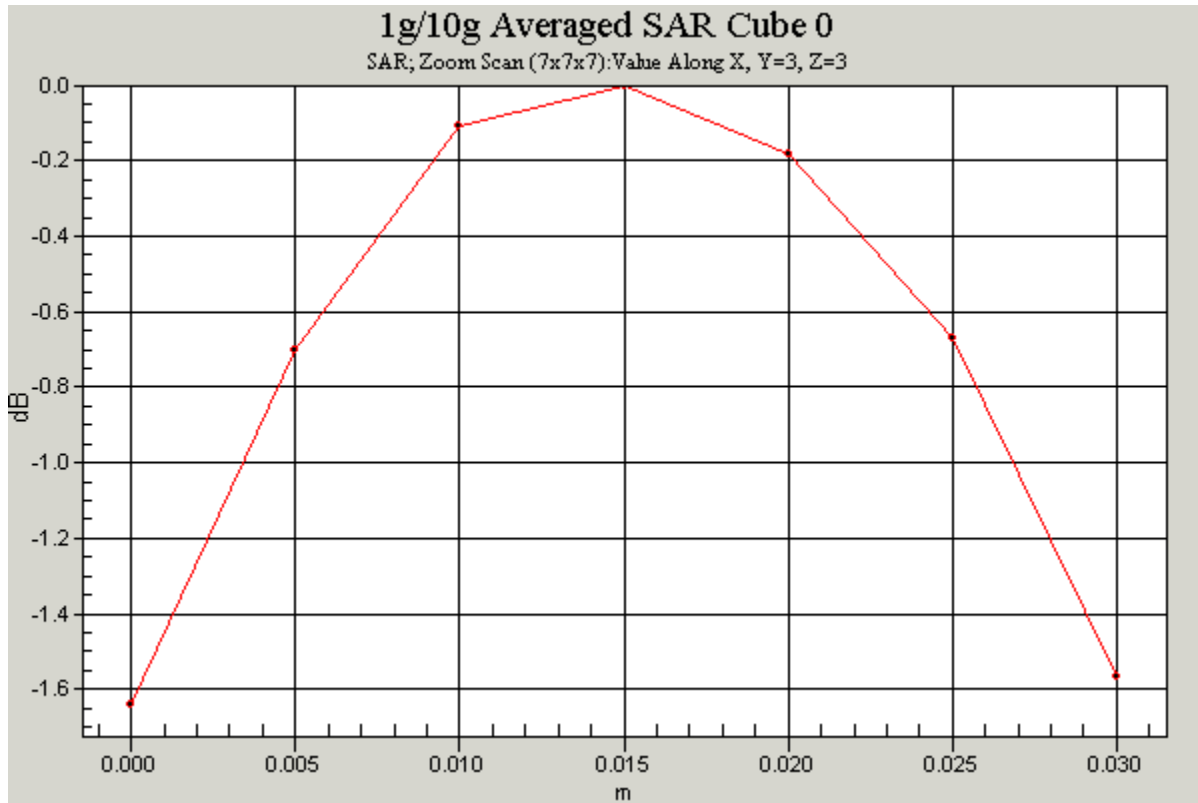
Test Laboratory: RFI GLOBAL SERVICES LTD.

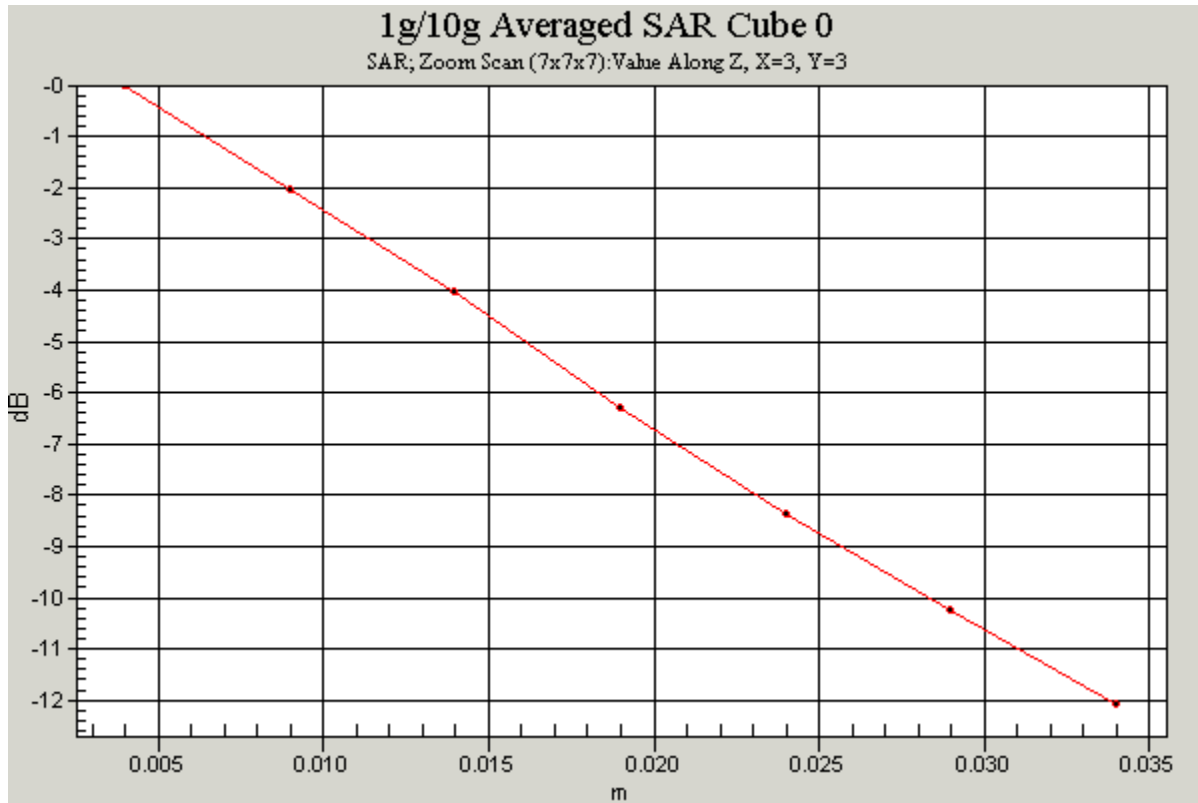
70944_JD05_014_Rear of Closed EUT with PHF_810

DUT: Panasonic; Type: X800; Serial: 004400000227163



0 dB = 0.346mW/g





Communication System: DCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
 Medium: 1800 MHz MSL Medium parameters used (interpolated): $f = 1909.8$ MHz; $\sigma = 1.71$ mho/m; $\epsilon_r = 51.9$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1529; ConvF(4.38, 4.38, 4.38); Calibrated: 10/06/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 16/06/2004
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

Rear of Closed EUT with PHF - Middle/Area Scan (81x161x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.351 mW/g

Rear of Closed EUT with PHF - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.61 V/m; Power Drift = -0.0 dB

Peak SAR (extrapolated) = 0.509 W/kg

SAR(1 g) = 0.319 mW/g; SAR(10 g) = 0.191 mW/g

Maximum value of SAR (measured) = 0.346 mW/g

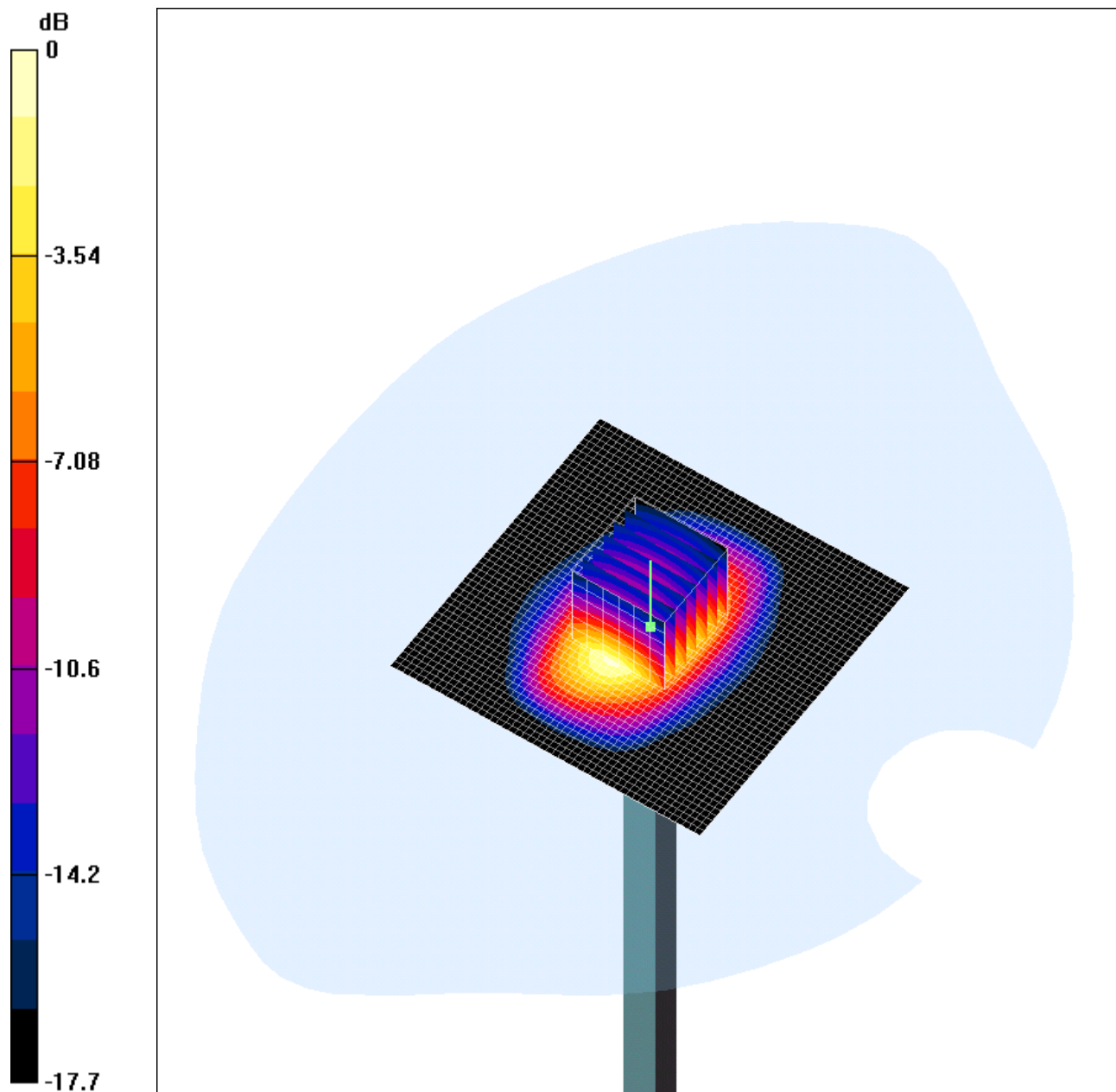
Date: 10/12/04

70944_05_Validation_001

Test Laboratory: RFI GLOBAL SERVICES LTD.

System Performance Check-D1900 10 12 04

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN540



0 dB = 11mW/g

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 MHz HSL Medium parameters used: $f = 1900$ MHz; $\sigma = 1.46$ mho/m; $\epsilon_r = 38.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1529; ConvF(4.9, 4.9, 4.9); Calibrated: 10/06/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 16/06/2004
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

d=10mm, Pin=250mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 14.6 mW/g

d=10mm, Pin=250mW/Zoom Scan 7x7x7 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.3 V/m; Power Drift = 0.1 dB

Peak SAR (extrapolated) = 16.7 W/kg

SAR(1 g) = 9.81 mW/g; SAR(10 g) = 5.16 mW/g

Maximum value of SAR (measured) = 11 mW/g

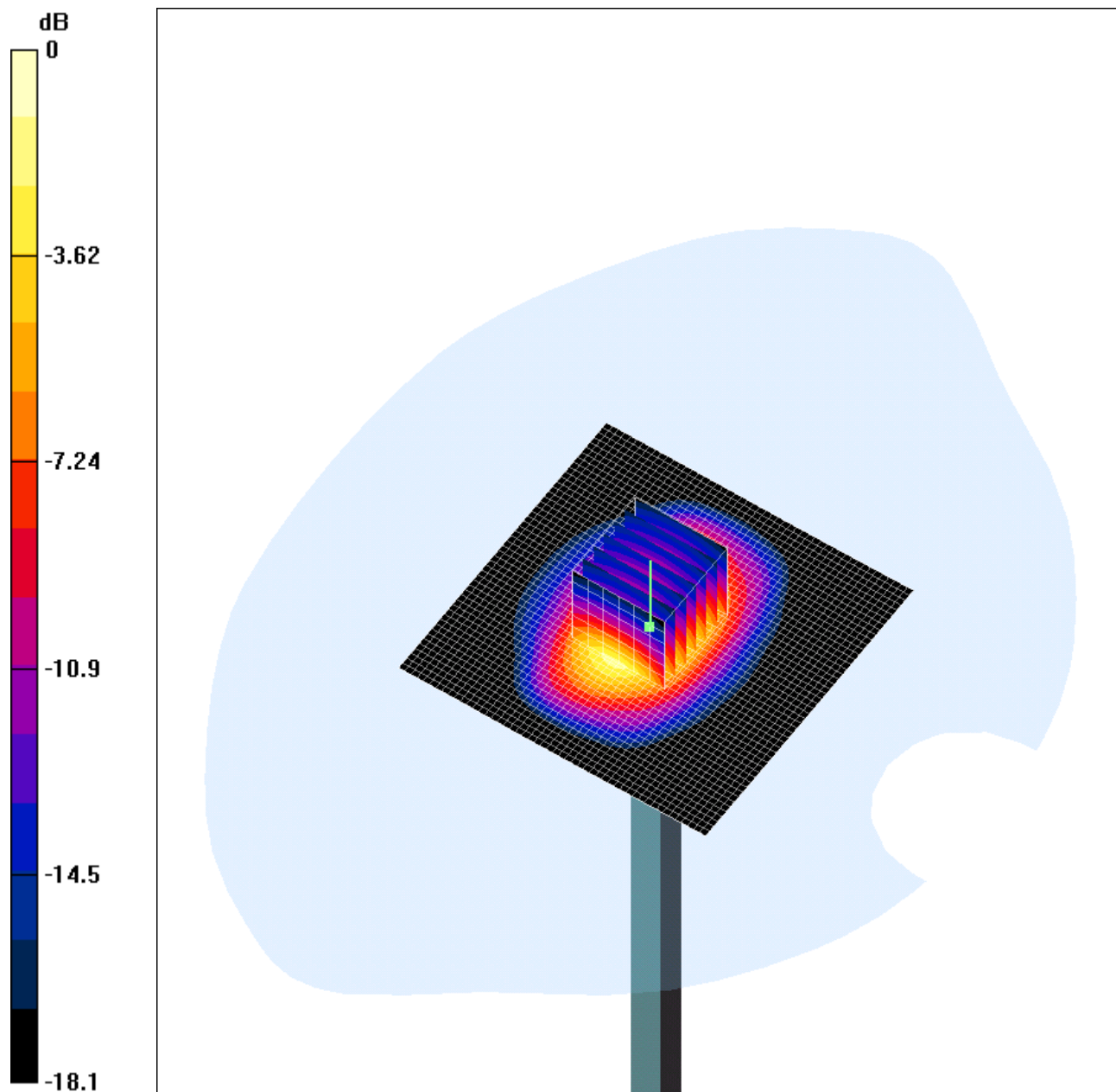
Date: 13/12/04

70944_05_Validation_002

Test Laboratory: RFI GLOBAL SERVICES LTD.

System Performance Check-D1900 13 12 04

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN540



0 dB = 11.5mW/g

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1

Medium: 1900 MHz HSL Medium parameters used: $f = 1900$ MHz; $\sigma = 1.46$ mho/m; $\epsilon_r = 38.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1529; ConvF(4.9, 4.9, 4.9); Calibrated: 10/06/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection) Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 16/06/2004
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

d=10mm, Pin=250mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 14.7 mW/g

d=10mm, Pin=250mW/Zoom Scan 7x7x7 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 91.6 V/m; Power Drift = 0.0009 dB

Peak SAR (extrapolated) = 17.7 W/kg

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.26 mW/g

Maximum value of SAR (measured) = 11.5 mW/g

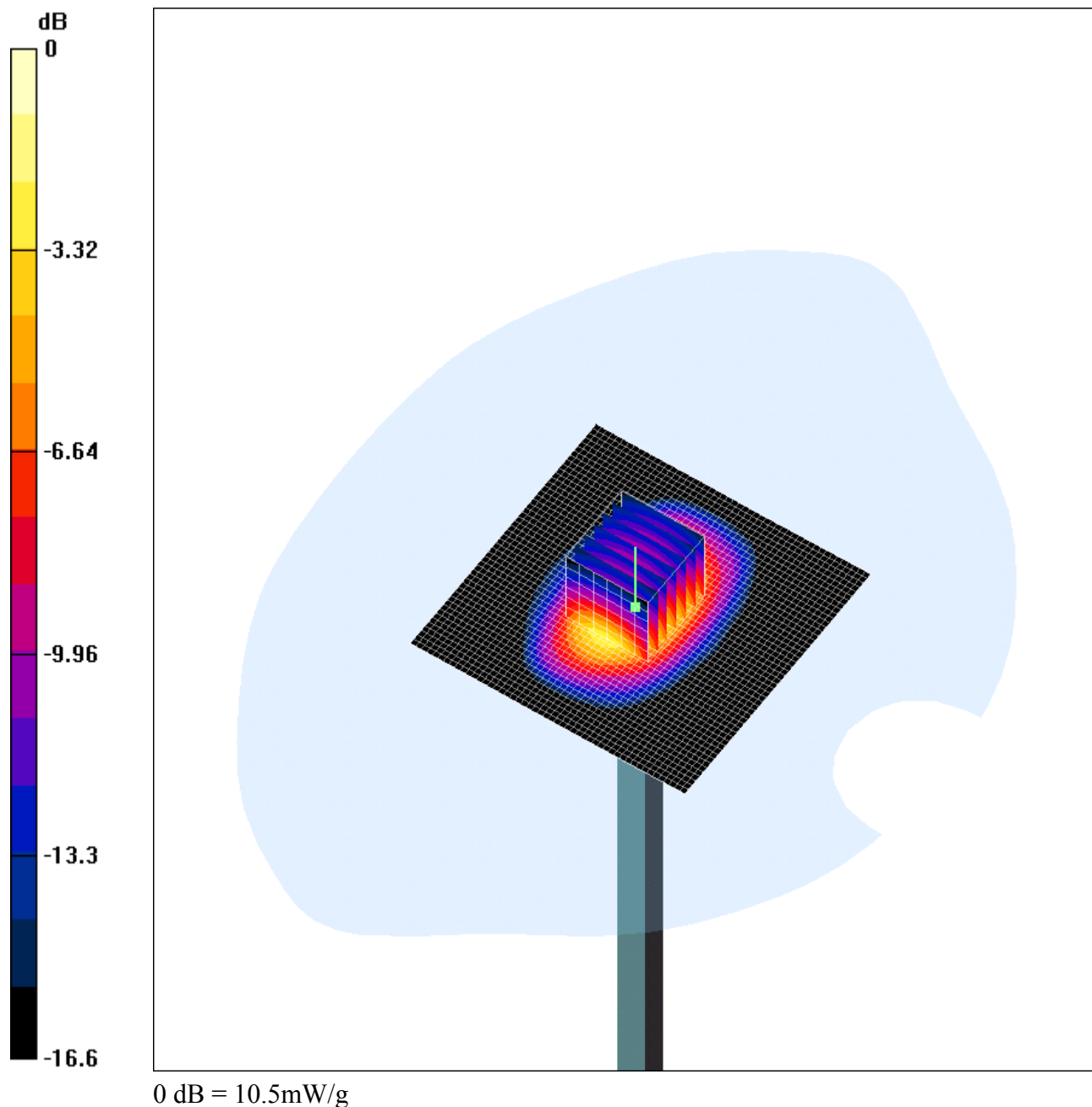
Date: 13/12/04

70944_05_Validation_003

Test Laboratory: RFI GLOBAL SERVICES LTD.

System Performance Check-D1800 13 12 04

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: 264



Communication System: CW; Frequency: 1800 MHz;Duty Cycle: 1:1

Medium: 1800 MHz MSL Medium parameters used: $f = 1800$ MHz; $\sigma = 1.57$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1529; ConvF(4.58, 4.58, 4.58); Calibrated: 10/06/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn450; Calibrated: 16/06/2004
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1197
- Measurement SW: DASY4, V4.4 Build 3; Postprocessing SW: SEMCAD, V1.8 Build 130

d=10mm, Pin=250mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 13.1 mW/g

d=10mm, Pin=250mW/Zoom Scan 7x7x7 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 85.5 V/m; Power Drift = -0.0 dB

Peak SAR (extrapolated) = 15.2 W/kg

SAR(1 g) = 9.18 mW/g; SAR(10 g) = 4.91 mW/g

Maximum value of SAR (measured) = 10.5 mW/g

Test Of: Panasonic Mobile Communications Development of Europe
X800 Mobile Station with Personal Handsfree Accessory
To: OET Bulletin 65 Supplement C: (2001-01)

Appendix 3. Test Configuration Photograph

This appendix contains the following photograph(s):

Photograph Reference Number	Title
PHT/SAR_Configuration	Test configuration for the measurement of Specific Absorption Rate (SAR)

Test Of: Panasonic Mobile Communications Development of Europe
X800 Mobile Station with Personal Handsfree Accessory
To: OET Bulletin 65 Supplement C: (2001-01)

PHT/SAR_Configuration



Test Of: Panasonic Mobile Communications Development of Europe
X800 Mobile Station with Personal Handsfree Accessory
To: OET Bulletin 65 Supplement C: (2001-01)

Appendix 4. Calibration Data

This appendix contains the calibration data and certificates.

Asset Number	Date	Title
A1237	04/06/03	D1900V2 – SN: 540
A1190	15/04/04	D1800V2 – SN: 264
A1186	10/06/04	ET3DV6 – SN: 1529

RFI GLOBAL SERVICES LTD

TEST REPORT

S.No. RFI/SARE2/RP70944JD05A

Page 36 of 64

Issue Date: 01 Feburary 2005

Test Of: Panasonic Mobile Communications Development of Europe

X800 Mobile Station with Personal Handsfree Accessory

To: OET Bulletin 65 Supplement C: (2001-01)

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A1237

Handwritten signature
Checked
11/06/03

Client **RF**

CALIBRATION CERTIFICATE

Object(s) **D1900V2 - SN:540**

Calibration procedure(s) **QA CAL-05 v2
Calibration procedure for dipole validation kits**

Calibration date: **June 4, 2003**

Condition of the calibrated item **In Tolerance (according to the specific calibration document)**

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
Power sensor HP 8481A	US37292783	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Power meter EPM E442	GB37480704	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03

	Name	Function	Signature
Calibrated by:	Judith Mueller	Technician	<i>Judith Mueller</i>
Approved by:	Katja Pokowc	Laboratory Director	<i>Katja Pokowc</i>

Date issued: June 4, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

DASY

Dipole Validation Kit

Type: D1900V2

Serial: 540

Manufactured: July 26, 2001

Calibrated: June 4, 2003

1. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with head simulating solution of the following electrical parameters at 1900 MHz:

Relative Dielectricity	38.8	$\pm 5\%$
Conductivity	1.44 mho/m	$\pm 5\%$

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 5.2 at 1900 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 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 7x7x7 fine cube was chosen for cube integration.

The dipole input power (forward power) was $250 \text{ mW} \pm 3\%$. The results are normalized to 1W input power.

2. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 1. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ET3DV6 SN:1507 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	41.2 mW/g $\pm 16.8\%$ (k=2)¹
averaged over 10 cm^3 (10 g) of tissue:	21.2 mW/g $\pm 16.2\%$ (k=2)¹

¹ validation uncertainty

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: **1.196 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: $\text{Re}\{Z\} = 50.3 \Omega$

$\text{Im}\{Z\} = 3.8 \Omega$

Return Loss at 1900 MHz **-28.5 dB**

4. Handling

Do not apply excessive force to the dipole arms, because they might bend. Bending of the dipole arms stresses the soldered connections near the feedpoint leading to a damage of the dipole.

5. Design

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.

Small end caps have been added to the dipole arms in order to improve matching when loaded according to the position as explained in Section 1. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

6. Power Test

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

Date/Time: 06/04/03 18:39:25

Test Laboratory: SPEAG, Zurich, Switzerland
 File Name: SN540_SN1507_HSL1900_040603.da4

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN540
Program: Dipole Calibration

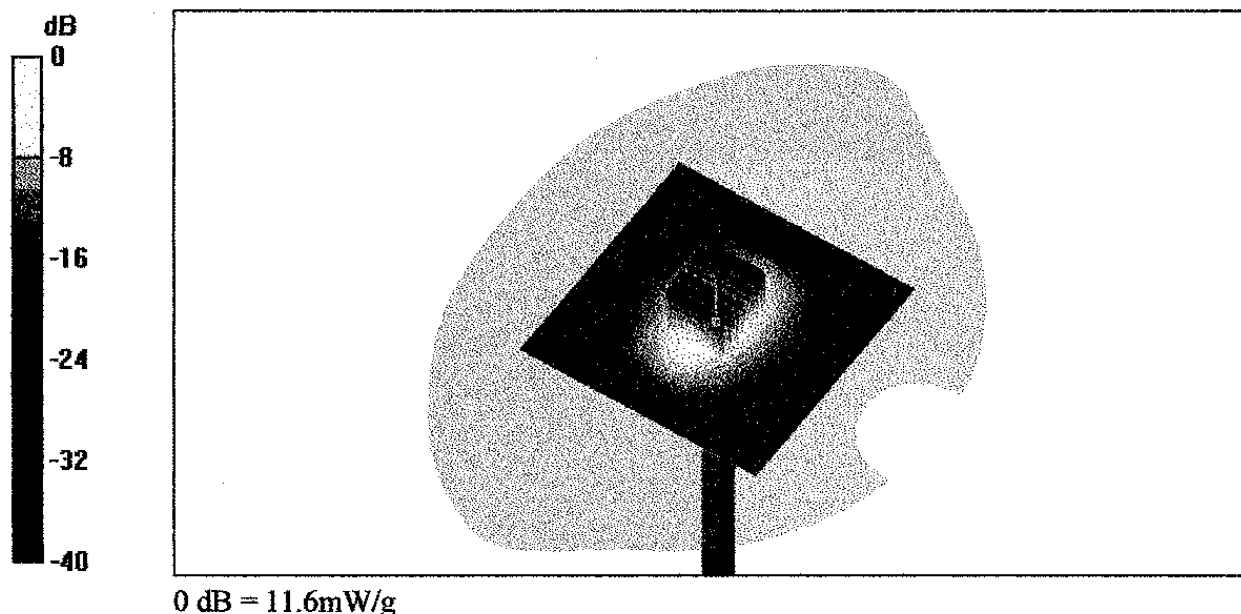
Communication System: CW-1900; Frequency: 1900 MHz; Duty Cycle: 1:1
 Medium: HSL 1900 MHz ($\sigma = 1.44$ mho/m, $\epsilon_r = 38.78$, $\rho = 1000$ kg/m³)
 Phantom section: Flat Section
 Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(5.2, 5.2, 5.2); Calibrated: 1/18/2003
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 - SN411; Calibrated: 1/16/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
 Reference Value = 94.4 V/m
 Power Drift = 0.01 dB
 Maximum value of SAR = 11.4 mW/g

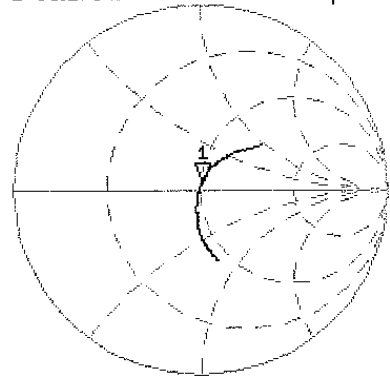
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Peak SAR (extrapolated) = 18 W/kg
 SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.29 mW/g
 Reference Value = 94.4 V/m
 Power Drift = 0.01 dB
 Maximum value of SAR = 11.6 mW/g



4 Jun 2003 16:31:50

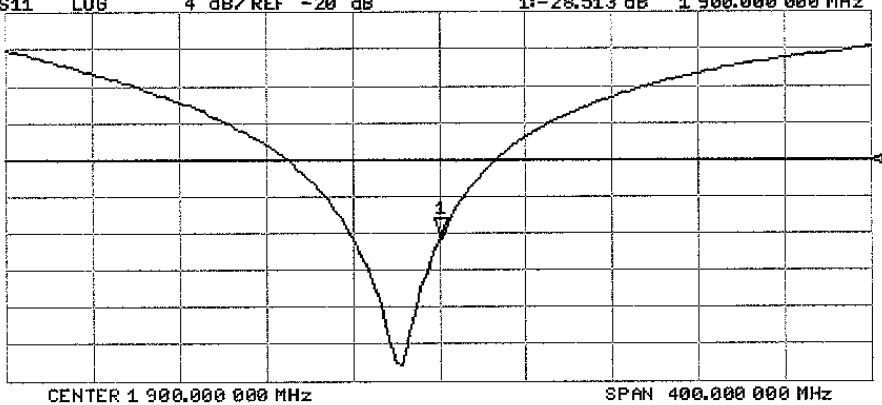
CH1 S11 1 U FS 1: 50.270 Ω 3.7538 Ω 314.94 μ H 1 900.000 000 MHz

Del
Cor
Avg
16
↑



CH2 S11 LOG 4 dB/REF -20 dB 1:-28.513 dB 1 900.000 000 MHz

Del
Cor
↑



CENTER 1 900.000 000 MHz SPAN 400.000 000 MHz

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

Handwritten signature: Schmid
07/09/04

Client

RFI

CALIBRATION CERTIFICATE

Object(s) **D1800V2 - SN:264**

Calibration procedure(s) **QA CAL-05.v2
Calibration procedure for dipole validation kits**

Calibration date: **April 15, 2004**

Condition of the calibrated item **In Tolerance (according to the specific calibration document)**

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E442	GB37480704	6-Nov-03 (METAS, No. 252-0254)	Nov-04
Power sensor HP 8481A	US37292783	6-Nov-03 (METAS, No. 252-0254)	Nov-04
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-03)	In house check: Oct 05

	Name	Function	Signature
Calibrated by:	Judith Mueller	Technician	<i>Judith Mueller</i>
Approved by:	Katja Pokovic	Laboratory Director	<i>Katja Pokovic</i>

Date issued: April 21, 2004

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

DASY

Dipole Validation Kit

Type: D1800V2

Serial: 264

Manufactured: March 5, 2000

Calibrated: April 15, 2004

1. Measurement Conditions

The measurements were performed in the flat section of the SAM twin phantom filled with **head simulating solution** of the following electrical parameters at 1800 MHz:

Relative Dielectricity	40.6	$\pm 5\%$
Conductivity	1.36 mho/m	$\pm 5\%$

The DASY4 System with a dosimetric E-field probe ET3DV6 (SN:1507, Conversion factor 5.08 at 1800 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 10mm from dipole center to the solution surface. The included distance spacer was used during measurements for accurate distance positioning.

The coarse grid with a grid spacing of 15mm was aligned with the dipole. The 7x7x7 fine cube was chosen for cube integration.

The dipole input power (forward power) was $250 \text{ mW} \pm 3\%$. The results are normalized to 1W input power.

2. SAR Measurement with DASY4 System

Standard SAR-measurements were performed according to the measurement conditions described in section 1. The results (see figure supplied) have been normalized to a dipole input power of 1W (forward power). The resulting averaged SAR-values measured with the dosimetric probe ET3DV6 SN:1507 and applying the advanced extrapolation are:

averaged over 1 cm^3 (1 g) of tissue:	37.2 mW/g $\pm 16.8\%$ (k=2)¹
averaged over 10 cm^3 (10 g) of tissue:	19.9 mW/g $\pm 16.2\%$ (k=2)¹

¹ validation uncertainty

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN264

Communication System: CW-1800; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: HSL 1800 MHz;

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.36$ mho/m; $\epsilon_r = 40.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DAS4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(5.08, 5.08, 5.08); Calibrated: 1/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn411; Calibrated: 11/6/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006;
- Measurement SW: DAS4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 90.6 V/m; Power Drift = 0.0 dB

Maximum value of SAR (interpolated) = 10.6 mW/g

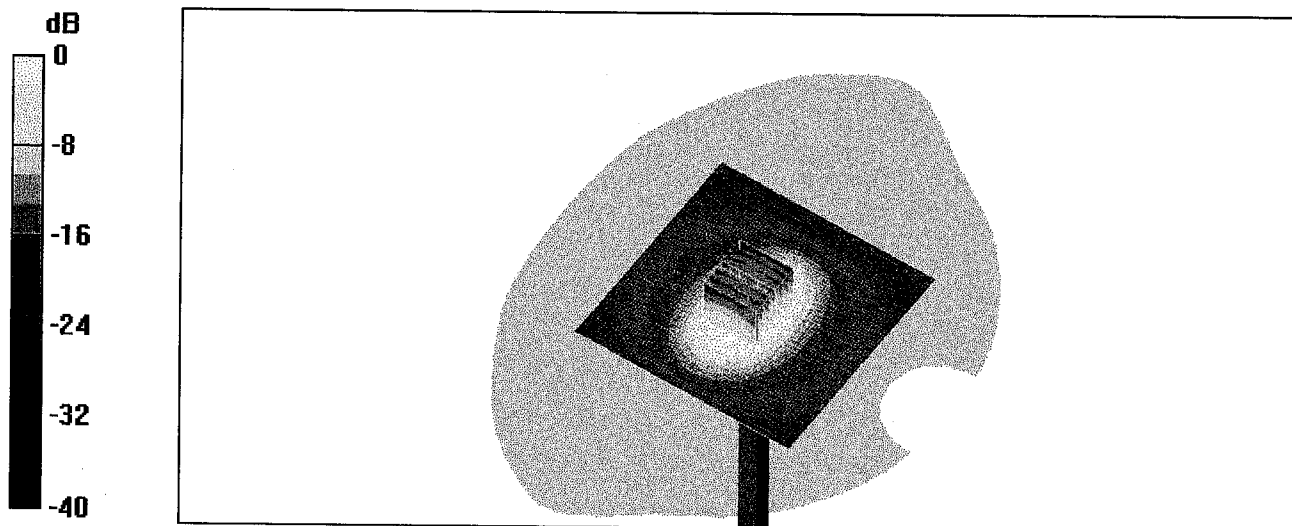
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.6 V/m; Power Drift = 0.0 dB

Maximum value of SAR (measured) = 10.5 mW/g

Peak SAR (extrapolated) = 16.3 W/kg

SAR(1 g) = 9.31 mW/g; SAR(10 g) = 4.98 mW/g



0 dB = 10.5mW/g

264
Hod

15 Apr 2004 08:46:49

CH1 S11 1 U FS

1: 46.924 Ω -5.8965 Ω 14.995 pF

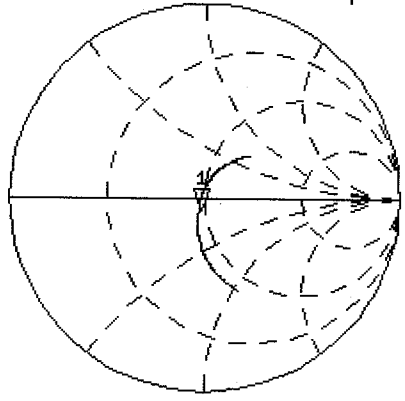
1 800.000 000 MHz

Del

Cor

Avg
16

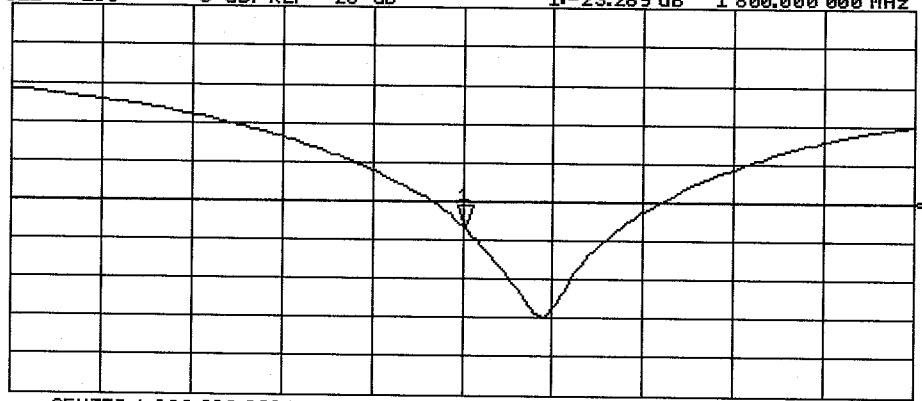
↑



CH2 S11 LOG 5 dB/REF -20 dB 1:-23.289 dB 1 800.000 000 MHz

Cor

↑



CENTER 1 800.000 000 MHz

SPAN 400.000 000 MHz

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN264

Communication System: CW-1800; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Muscle 1800 MHz;

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.49$ mho/m; $\epsilon_r = 52.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ET3DV6 - SN1507; ConvF(4.61, 4.61, 4.61); Calibrated: 1/23/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn411; Calibrated: 11/6/2003
- Phantom: SAM with CRP - TP1006; Type: SAM 4.0; Serial: TP:1006;
- Measurement SW: DASY4, V4.2 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 112

Pin = 250 mW; d = 10 mm/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm

Reference Value = 87.5 V/m; Power Drift = 0.0 dB

Maximum value of SAR (interpolated) = 10.5 mW/g

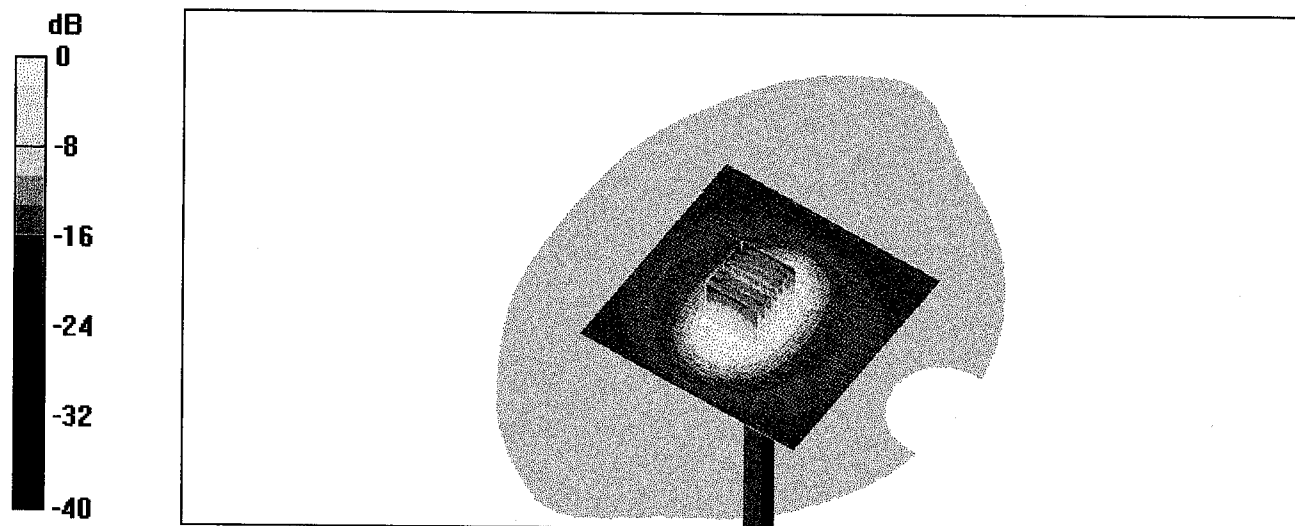
Pin = 250 mW; d = 10 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 87.5 V/m; Power Drift = 0.0 dB

Maximum value of SAR (measured) = 10.5 mW/g

Peak SAR (extrapolated) = 15.4 W/kg

SAR(1 g) = 9.25 mW/g; SAR(10 g) = 5 mW/g



264
Body

14 Apr 2004 10:07:36

CH1 S11 1 U FS

1: 44.342 Ω -5.7285 Ω 15.435 pF

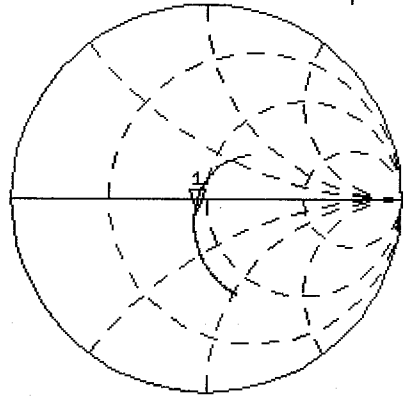
1 800.000 000 MHz

De1

Cor

Avg
16

↑



CH2 S11 LOG

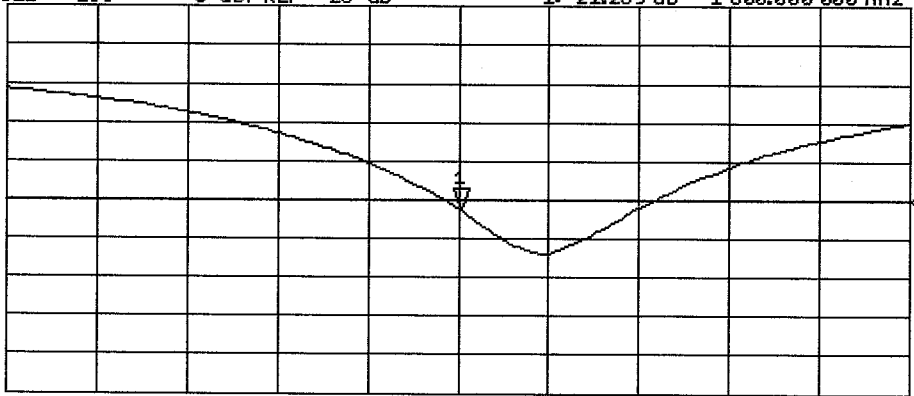
5 dB/REF -20 dB

1:-21.259 dB

1 800.000 000 MHz

Cor

↑



CENTER 1 800.000 000 MHz

SPAN 400.000 000 MHz