FCC ID: ESD-SA824894S3

Exhibit 11

RF Exposure Information
Sar Report

CERTIFICATION REPORT

Subject:	**Specific Absorption Rate (SAR) Experimental Analysis**
Product:	Wireless Handheld Computer
Model:	Sidearm with an incorporated Sierra Wireless SB300 CDPD radio modem
Client:	Melard Technologies, Inc.
Address:	28 Kaysal Court Armonk, NY 10504 U.S.A.
Project #:	MELB-Sierra Wireless CDPD Sidearm-3588
Prepared by	APREL Laboratories 51 Spectrum Way Nepean, Ontario K2R 1E6

Telecommunications Approval Board - Spectrum Sciences Institute - SAR Certified APREL Laboratories A0B4-Sidearm SC

Approved by: _____ Date: 16/02/2001
Stuart Nicol
Director Product Development a Dosimetric R&D

Submitted by: _____ Date: Feb. 16, 2001
Jay Sarkar
Technical Director of Standards & Certification

Released by: _____ Date: Feb 16/01
Dr. Jacek J. Wojcik, P. Eng.

REGISTERED PROFESSIONAL ENGINEER J. J. Wojcik PROVINCE OF ONTARIO

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FCC ID: ESD-SA824894S3
Applicant: Melard Technologies, Inc.
Equipment: Wireless Handheld Computer
Model: Sidearm with an incorporated Sierra Wireless SB300 CDPD radio modem
Standard: FCC 96 –326, Guidelines for Evaluating the Environmental Effects of Radio-Frequency Radiation

ENGINEERING SUMMARY

This report contains the results of the engineering evaluation performed on a Melard Sidearm wireless handheld PC with an incorporated Sierra Wireless SB300 CDPD radio modem. The measurements were carried out in accordance with FCC 96-326. The Sidearm with a Sierra Wireless SB300 CDPD radio modem was evaluated for its maximum power level (nominally, 600mW / 27.8dBm), with 100% duty factor.

The Sidearm with a Sierra Wireless SB300 CDPD radio modem was tested at low, middle and high channels for the keyboard up, keyboard down, right, left and top sides. The maximum 10g SAR (1.63 W/kg) was found to coincide with the peak performance RF output power of channel 799 (high, 848.97 MHz) for the top side of the device. (The hot spot is located on the antenna). Test data and graphs are presented in this report.

At a separation distance of 4 cm from the antenna of the device, the maximum 1g SAR is 0.16 W/kg. The manual will have a warning to keep bystanders, and parts of the user's body other than extremities, at least 4 cm away from the antenna.

The antenna of the device can be positioned with the antenna pointing up directly away from the keyboard, with the antenna pointing up directly away from the top edge, and with the antenna folded against the top edge. The antenna configuration has no effect on SAR results for this device. During use, the antenna is in the upright verticle position (see page 16 of manual).

Based on the test results and on how the device will be marketed and used, it is certified that the product meets the requirements as set forth in the above specifications, for uncontrolled RF exposure environment.

(The results presented in this report relate only to the sample tested.)

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1. INTRODUCTION

Tests were conducted to determine the Specific Absorption Rate (SAR) of a sample of a Melard Sidearm wireless handheld PC with an incorporated Sierra Wireless SB300 CDPD radio modem. These tests were conducted at APREL Laboratories' facility located at 51 Spectrum Way, Nepean, Ontario, Canada. A view of the SAR measurement setup can be seen in Appendix A Figure 1. This report describes the results obtained.

2. APPLICABLE DOCUMENTS

The following documents are applicable to the work performed:

1) FCC 96-326, Guidelines for Evaluating the Environmental Effects of Radio-Frequency Radiation

2) ANSI/IEEE C95.1-1999, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

3) ANSI/IEEE C95.3-1992, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave.

4) OET Bulletin 65 (Edition 97-01) Supplement C (Edition 97-01), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields".

3. DEVICE UNDER INVESTIGATION

- Melard Sidearm wireless handheld PC with an incorporated Sierra Wireless SB300 CDPD radio modem, s/n 1001016, received on 16 October, 2000.

The Melard Sidearm wireless handheld PC with an incorporated Sierra Wireless SB300 CDPD radio modem will be called DUI (Device Under Investigation) in the following.

The DUI is intended to be used with the antenna vertically upright. The antenna of the DUI is an 8.5' half-wavelength dipole antenna. The DUI nominally transmitted at 100% duty factor in the band of 824 MHz - 849 MHz. See the manufacturer's submission documentation for drawings and more design details.

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4. TEST EQUIPMENT

- APREL Triangular Dosimetric Probe Model E-009, s/n 115, Asset # 301420
- CRS Robotics A255 articulated robot arm, s/n RA2750, Asset # 301335
- CRS Robotics C500 robotic system controller, s/n RC584, Asset # 301334
- APREL F-2, flat manikin, s/n 002
- Tissue Recipe and Calibration Requirements, APREL procedure SSI/DRB-TP-D01-033
- HP 8920A 0.4 – 1000 MHz RF Communications Test Set , Asset # 301290
- HP 83201A Dual Mode Cellular Adapter, Asset # 301290
- Anritsu MS2667C Spectrum Analyzer (9KHz - 30GHz)
- Dipole antenna model D-835S S/N 101

5. TEST METHODOLOGY

1. The test methodology utilised in the certification of the DUI complies with the requirements of FCC 96-326 and ANSI/IEEE C95.3-1992.
2. The E-field is measured with a small isotropic probe (output voltage proportional to E^2).
3. The probe is moved precisely from one point to the next using the robot (10 mm increments for wide area scanning, 5 mm increments for zoom scanning, and 2.5 mm increments for the final depth profile measurement).
4. The probe travels in the homogeneous liquid simulating human tissue. Appendix A contains information about the properties of the simulated tissue used for these measurements.
5. The liquid is contained in a manikin simulating a portion of the human body.
6. The DUI is positioned with the surface under investigation against the phantom.

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7. All tests were performed with the highest power available from the sample DUI under transmit conditions.

   More detailed descriptions of the test method is given in Section 6 when appropriate.

6. TEST RESULTS

6.1. TRANSMITTER CHARACTERISTICS

The battery-powered DUI will consume energy from its batteries, which may affect the DUI's transmission characteristics. In order to gage this effect the output of the transmitter is sampled before and after each SAR run. In the case of this DUI, the conducted power was sampled. The following table shows the conducted RF power sampled before and after each of the eight sets of data used for the worst case SAR in this report.

Scan		Power Readings (dBm)		D	Battery #
Type	Height (mm)	Before	After	(dB)	
Area	2.5	24.60	24.30	-0.3	A48
Area	12.5	24.08	24.20	0.12	B227
Zoom	2.5	24.15	23.70	-0.45	A179
Zoom	7.5	22.40	24.00	1.6	B84
Zoom	12.5	24.32	23.15	-1.17	B253
Zoom	17.5	24.30	23.60	-0.7	B227
Zoom	22.5	24.40	23.90	-0.5	A47
Depth	2.5 – 22.5	24.51	24.13	-0.38	B194

Table 1. Sampled Conducted RF Power

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6.2. SAR MEASUREMENTS

1) RF exposure is expressed as a Specific Absorption Rate (SAR). SAR is calculated from the E-field, measured in a grid of test points as shown in Appendix A Figure 1. SAR is expressed as RF power per kilogram of mass, averaged in 10 grams of tissue for the extremities and 1 gram of tissue elsewhere.

2) The DUI was put into test mode for the SAR measurements using manufacturer supplied keypad commands to control the channel and maximum operating power (nominally 600mW / 27.8dBm). The duty factor was 100%.

3) Figure 2 in Appendix A shows a contour plot of the SAR measurements for the DUI (channel 799, high, 848.97 MHz, top side, 600mW / 27.8dBm). It also shows an overlay of the DUI's outlines, superimposed onto the contour plot. The presented values were taken 2.5mm into the simulated tissue from the flat phantom's solid inner surface. Figure 1 shows the flat phantom used in the measurements. For the top side measurements, the botom edge of the DUI was aligned with x=-4, and the antenna, with y=0.

   A different presentation of the same data is shown in Appendix A Figure 3. This is a surface plot, where the measured SAR values provide the vertical dimension, which is useful as a visualisation aid.

4) Wide area scans were performed for the low, middle and high channels on the keyboard up, keyboard down, right, left and top sides of the DUI. The DUI was operating at maximum output power (600mW / 27.8dBm) and 100% duty factor. The peak single point SAR for the scans were:

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TYPE OF EXPOSURE	DUI side	Antenna distance to phantom (mm)	Channel			Peak Local SAR (W/kg)
			L/M/H	#	Freq (MHz)	
Hand Exposure	keyboard up side	17	middle	367	836.01	1.26
	keyboard down side	32	middle	367	836.01	0.34
	left side	220	middle	367	836.01	0.03
	Right side	**13**	middle	367	836.01	1.65
			low	991	824.04	1.95
			high	**799**	**848.97**	**1.98**
Bystander Exposure	Top side	0	middle	367	836.01	3.17
			low	991	824.04	2.64
			high	799	848.97	2.38

Table 2. SAR Measurements

7. USER'S HAND EXPOSURE

All subsequent testing for hand exposure was performed on channel 799 (high, 848.97 MHz), with the top side of the DUI facing up against the bottom of the phantom and the antenna 13 mm away from the phantom. This relates to the positition and frequency found to provide the maximum measured SAR value.

5) Channel 799 (high, 848.97 MHz) was explored on a refined 5 mm grid in three dimensions. The SAR value averaged over 10 grams was determined from these measurements by averaging the 125 points (5x5x5) comprising a 2 cm cube. The maximum SAR value measured averaged over 10 grams was determined from these measurements to be 1.11 W/kg.

6) To extrapolate the maximum SAR value averaged over 10 grams to the inner surface of the phantom a series of measurements were made at five (x,y) co-ordinates within the refined grid as a function of depth, with 2.5 mm spacing. The average exponential coefficient was determined to be (-0.0801 ± 0.0008) / mm.

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7) The distance from the probe tip to the inner surface of the phantom for the lowest point is 2.5 mm. The distance from the probe tip to the tip of the measuring dipole within the APREL Triangular Dosimetric Probe Model E-009 is 2.3 mm. The total extrapolation distance is 4.8 mm, the sum of these two.

Applying the exponential coefficient over the 4.8 mm to the maximum SAR value averaged over 10 grams that was determined previously, we obtain the **maximum SAR value at the surface averaged over 10 grams**, 1.63 W/kg.

8. BYSTANDER / NON EXTREMITIES EXPOSURE

All subsequent testing for bystander exposure was performed on channel 367 (middle, 836.01 MHz), with the top side of the DUI facing up against the bottom of the phantom and the antenna touching the phantom. This relates to the positition and frequency found to provide the maximum measured SAR value.

1) Channel 367 (middle, 836.01 MHz) was then explored on a refined 5 mm grid in three dimensions. The SAR value averaged over 1 gram was determined from these measurements by averaging the 27 points (3x3x3) comprising a 1 cm cube. The maximum SAR value measured averaged over 1 gram was determined from these measurements to be 2.07 W/kg.

2) To extrapolate the maximum SAR value averaged over 1 gram to the inner surface of the phantom a series of measurements were made at five (x,y) co-ordinates within the refined grid as a function of depth, with 2.5 mm spacing. The average exponential coefficient was determined to be (-0.0801 ± 0.0008) / mm.

3) The distance from the probe tip to the inner surface of the phantom for the lowest point is 2.5 mm. The distance from the probe tip to the tip of the measuring dipole within the APREL Triangular Dosimetric Probe Model E-009 is 2.3 mm. The total extrapolation distance is 4.8 mm, the sum of these two.

Applying the exponential coefficient over the 4.8 mm to the maximum SAR value averaged over 1 gram that was determined previously, we obtain the **maximum SAR value at the surface averaged over 1 gram, 3.18 W/kg**.

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4) Wide area scans were then performed for channel 367 (middle, 836.01 MHz) versus DUI separation from the bottom of the phantom. The peak single point SAR for the scans were:

DUI to phantom separation (mm)	Highest Local SAR (W/kg)
30	0.58
40	0.14
50	0.05

Table 3. SAR versus DUI-Phantom Separation

The measurements of highest local SAR versus separation of the DUI from the bottom of the phantom can be used to determine the SAR exposure of the bystander during operation of the DUI.

If the data for Figure 4 is fitted to an exponential equation we get:

$$\text{Peak Local SAR} = 4.95\, e^{-0.0815 * (\text{separation})}$$

A similar equation will exist for the maximum 1g SAR versus separation:

$$\text{Maximum 1g SAR} = k\, e^{-0.0815 * (\text{separation})}$$

Using this equation with the previous data:

Maximum 1g SAR at the surface = 3.18 W/kg
Tissue to DUI separation = 3 mm,

results in a k = 4.05 W/kg, which corresponds to the maximum 1g SAR when the separation is 0 mm. A conservative maximum 1g SAR of 1.23 W/kg (1.6 W/kg reduced by our measurement uncertainty, 23.3%) would occur for a separation of 14.7 mm from the antenna of the DUI.

At a standard separation distance of 4 cm, the maximum 1g SAR would be 0.16 W/kg.

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9. CONCLUSIONS

The maximum Specific Absorption Rate (SAR) averaged over 10 grams, determined at 848.97 MHz (high channel, 799, top side, 600mW / 27.8dBm) of the Melard Sidearm wireless handheld PC with an incorporated Sierra Wireless SB300 CDPD radio modem is 1.63 W/kg. The overall margin of uncertainty for this measurement is ±23.3 % (Appendix B). The SAR limit given in the FCC 96-326 Safety Guideline is 4 W/kg for uncontrolled hand exposure for the general population.

For a bystander or user exposing a part of the body other than the extremities, at a separation distance of 4 cm from the device, the maximum Specific Absorption Rate (SAR) averaged over 1 g is 0.16 W/kg. The SAR limit given in the FCC 96-326 Safety Guideline is 1.6 W/kg for uncontrolled partial body exposure of the general population. The minimum separation distance that will ensure that the limit minus the measurement uncertainty (1.6 - 23.3% = 1.23 W/kg) is not exceeded is 14.7 mm.

The product under investigation will be used in a general population / uncontrolled exposure environment. The user manual will have a warning to keep bystanders, and parts of the body other than extremities, at least 4 cm away from the antenna.

Considering the above, this unit as tested, and as it will be marketed and used, is found to be compliant with the FCC 96-326 requirement.

Tested by _____ Date FEB 16, 2001

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APPENDIX A. Measurement Setup, Tissue Properties and SAR Graphs

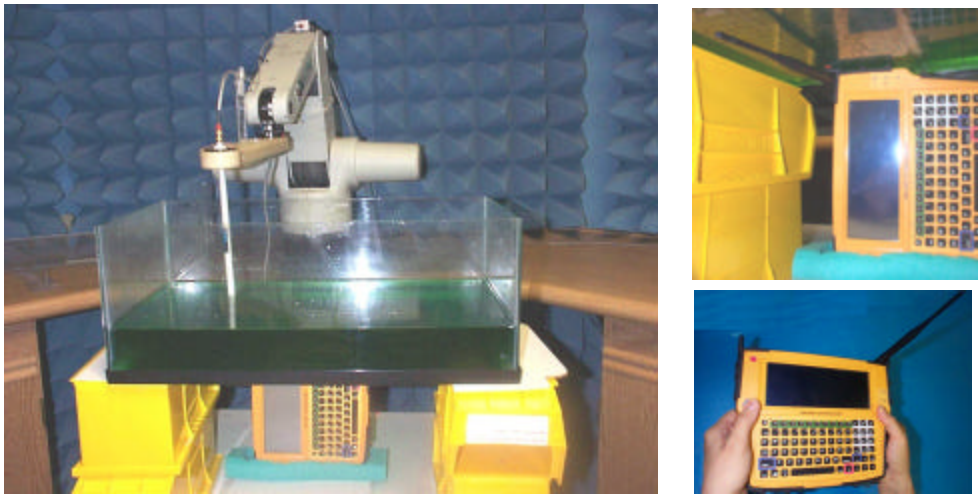

Figure 1. Setup

Simulated Muscle Tissue Material and Calibration Technique

The mixture used was based on that presented SSI/DRB-TP-D01-033, "Tissue Recipe and Calibration Requirements". The density used to determine SAR from the measurements was the recommended 1040 kg/m^3 found in Appendix C of Supplement C to OET Bulletin 65, Edition 97-01).

Dielectric parameters of the simulated tissue material were determined using a Hewlett Packard 8510 Network Analyser, a Hewlett Packard 809B Slotted Line Carriage, and an APREL SLP-001 Slotted Line Probe.

	APREL	OET 65 Supplement	Δ (%) (OET)
Dielectric constant, ε_r	56.0	56.11	-0.3%
Conductivity, σ [S/m]	1.05	0.946	10.9%
Tissue Conversion Factor, γ	9.0	-	-

Table 4. Dielectric Properties of the Simulated Muscle Tissue at 835 MHz

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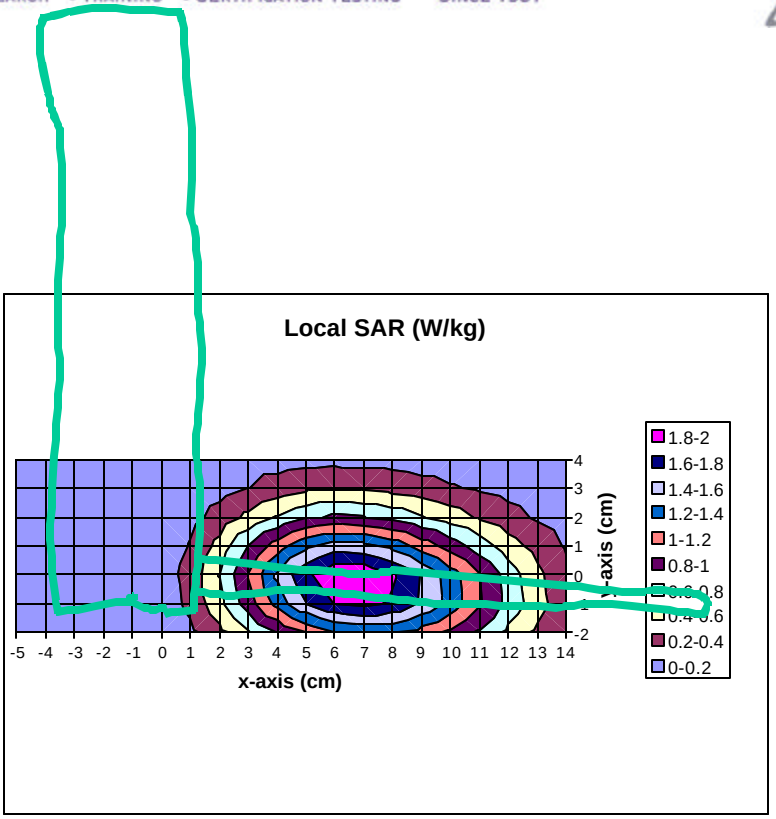

Figure 2. Contour Plot of the Area Scan 2.5mm Above Phantom Surface

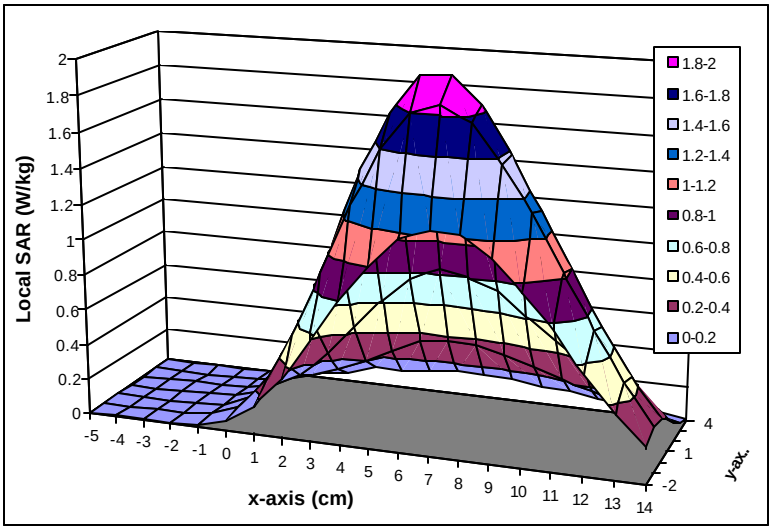

Figure 3. Surface Plot of the Area Scan 2.5mm Above Phantom Surface

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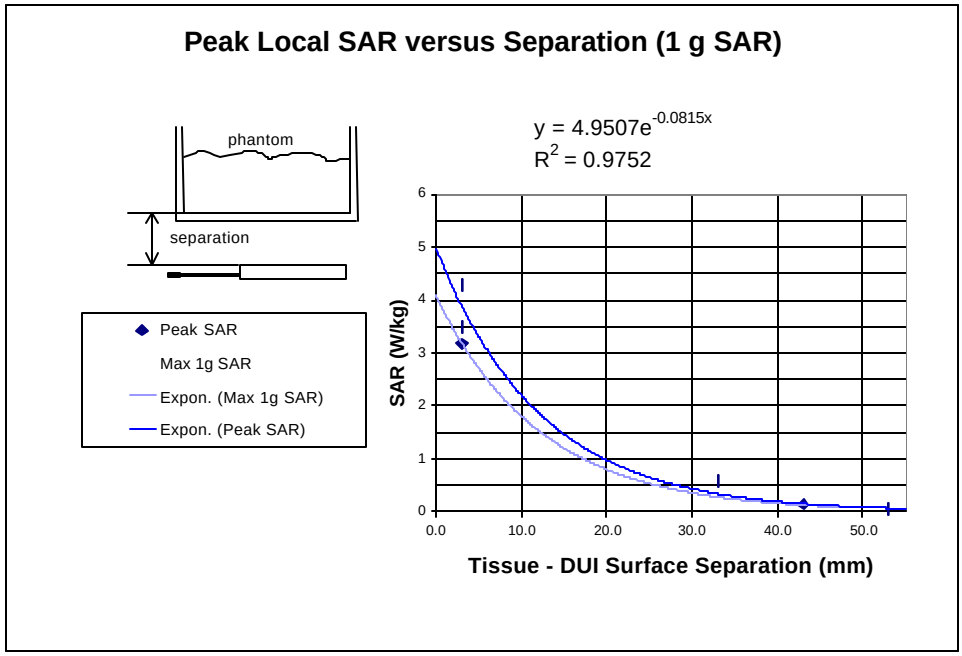

Figure 4. Peak Local SAR versus DUI Separation

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APPENDIX B. Uncertainty Budget

Uncertainties Contributing to the Overall Uncertainty			
Type of Uncertainty	**Specific to**	**Uncertainty**	
Power variation due to battery condition	DUI	20.2%	
Extrapolation due to curve fit of SAR vs depth	DUI & Setup	2.1%	
Extrapolation due to depth measurement	setup	3.9%	
Conductivity	setup	6.0%	
Density	setup	2.6%	
Tissue enhancement factor	setup	7.0%	
Voltage measurement	setup	3.1%	
Probe sensitivity factor	setup	3.5%	
		23.3%	**RSS**

Table 5. Uncertainty Budget

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APPENDIX C. Validation Scan on a Flat Phantom

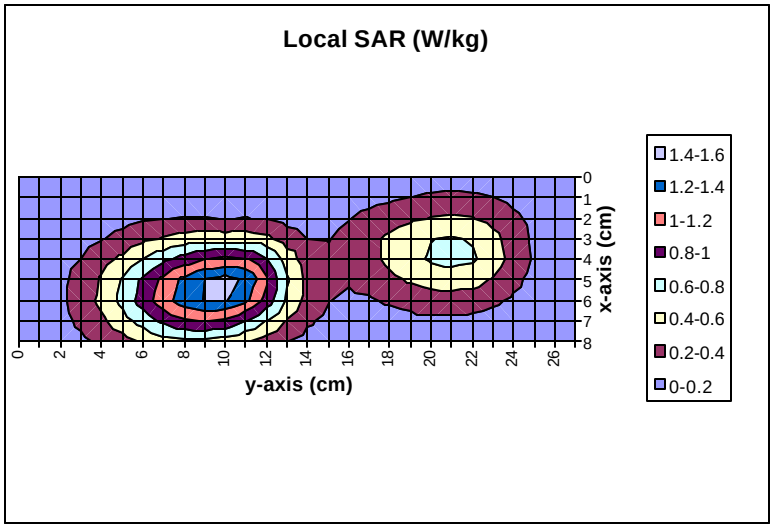

Figure 5. Contour Plot of the Reference Area Scan 2.5mm Above Phantom

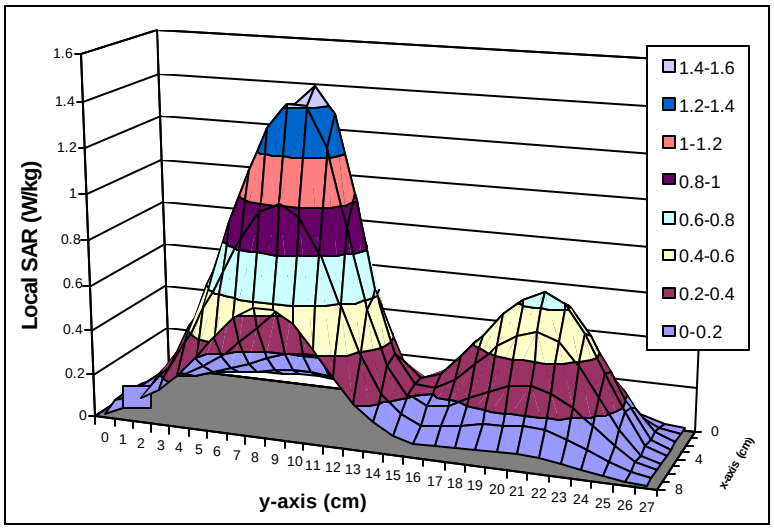

Figure 6. Surface Plot of the Reference Area Scan 2.5mm Above Phantom

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APPENDIX D. Probe Calibration

NCL CALIBRATION LABORATORIES

Calibration File No.: 301420

CERTIFICATE OF CALIBRATION

It is certified that the equipment identified below has beer calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to NRC/NIST.

Equipment: Miniature Isotropic RF Probe

Manufacturer: APREL Laboratories/IDX Robotics Inc
Model No : E-009
Serial No.: 115

Customer. APREL
Asset No.:301420

Calibration Procedure: SSI/DRB-TP-001-032

Cal. Date: 9 November, 2000 Cal. Due Date: 8 November, 2001
Remarks: None

Calibrated By _____

NCL CALIBRATION LABORATORIES

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