

Exhibit 10

MIST Freedom II-C

Wireless Point of Sale Device

FCC ID: O3JF2NRM6832C1

SAR Report
(With Test Set-up Photographs)



Certification Report on

Specific Absorption Rate (SAR)
Experimental Analysis

MIST Inc.

Freedom II-C

Test Date: 13 April, 2000



MISB-Freedom II CDPD-3418

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CERTIFICATION REPORT

Subject: Specific Absorption Rate (SAR) Experimental Analysis

Product: Wireless Point of Sale Terminal using a Novatel NRM-6832 Expedite Wireless IP Modem (CDPD Network)

Model: MIST Freedom II-C

Client: MIST Inc.

Address: 703 Evans Ave., Suite 500
Toronto, Ontario, M9C 5E9
Canada

Project #: MISB-Freedom II CDPD-3418

Prepared by: APREL Laboratories
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Tested by Paul G. Cardinal Date: 27 June 00
Dr. Paul G. Cardinal
Director, Laboratories

Submitted by Paul G. Cardinal Date: 27 June 00
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Director, Laboratories

Approved by Jacek J. Wojcik Date: June 29/2000
Dr. Jacek J. Wojcik, P. Eng.



FCC ID: O3JF2NRM6832-C-1
Applicant: MIST Inc.
Equipment: Wireless Point of Sale Terminal
Model: MIST Freedom II-C using a Novatel NRM-6832 Expedite Wireless IP Modem (CDPD Network)
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 MIST Freedom II-C Point of Sale Terminal operating with a built in Novatel NRM-6832 Expedite wireless IP modem (CDPD Network). The measurements were carried out in accordance with FCC 96-326. The Point of Sale Terminal was evaluated at its maximum nominal power level, 600mW (28 dBm).

The MIST Freedom II-C was tested at high, middle, and low frequencies on the keyboard, battery, and both sides of the device, with the antenna extended and retracted. The maximum SAR was found to coincide with the peak performance RF output power of channel 991 (low, 824 MHz) for front side up position with the antenna extended. Test data and graphs are presented in this report.

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

The manual for this unit will require a warning to keep the base of the antenna at least 33 mm away from any part of the body other than the extremities of either users or bystanders.

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 MIST Freedom II-C Point of Sale Terminal, which incorporates a Novatel NRM-6832 Expedite Wireless IP 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 C95.1-1992, 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. EQUIPMENT UNDER TEST

- MIST Freedom II-C, SER: ENG00370, received on April 10, 2000

The Point of Sale Terminal will be called DUT (device under test) in the following.

The antenna is an extendible $\frac{1}{4}$ wavelength helical over $\frac{1}{4}$ wavelength whip type with no specified gain. A photograph of the DUT and antenna can be found in Appendix B. See the manufacturer's submission documentation for drawings and more design details.



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
- R&S NRVS power meter, s/n 864268/017, Asset # 100851
- R&S NRV-Z7 power sensor, s/n 862 509/006, Asset # 100852
- APREL F-1, flat manikin, s/n 001
- Tissue Recipe and Calibration Requirements, APREL procedure SSI/DRB-TP-D01-033
- Toshiba Laptop computer Satellite Pro 400CS (supplied by APREL Laboratories to setup the device via RS232 port)

5. TEST METHODOLOGY

1. The test methodology utilised in the certification of the DUT 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 D contains information about the recipe and 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 DUT is positioned in such a way that it touches the bottom of the phantom with its top, its bottom, or its side.
7. All tests were performed with the highest power available from the sample DUT, 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 DUT will consume energy from its batteries, which may affect the DUT’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 DUT, the radiated power was sampled. A power meter was connected to an antenna adjacent to a fixture to hold the transmitter in a reproducible position. The following table shows the radiated RF power sampled before and after each of the eight sets of data used for the worst case SAR in this report.

| Scan | | Relative Radiated Power Readings (dBm) | | D (dB) | Battery # |
|-------|-------------|--|-------|--------|-----------|
| Type | Height (mm) | Before | After | | |
| Area | 2.5 | -3.2 | -3.8 | -0.6 | 2 |
| Area | 12.5 | -3.5 | -3.3 | 0.2 | 4 |
| Zoom | 2.5 | -3.8 | -3.4 | 0.4 | 5 |
| Zoom | 7.5 | -3.8 | -3.4 | 0.4 | 5 |
| Zoom | 12.5 | -3.8 | -3.4 | 0.4 | 5 |
| Zoom | 17.5 | -3.4 | -3.8 | -0.4 | 7 |
| Zoom | 22.5 | -3.6 | -3.4 | 0.2 | 1 |
| Depth | 2.5 – 22.5 | -3.8 | -3.3 | 0.5 | 4 |



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 2. 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 DUT was put into test mode for the SAR measurements via communications software supplied by the radio manufacturer running on a PC to control the channel and maximum operating power (nominally 28 dBm).
- 3) Figure 3 in Appendix A shows a contour plot of the SAR measurements for the DUT (991, 824 MHz, L). The presented values were taken 2.5 mm into the simulated tissue from the flat phantom's solid inner surface. Figures 1 and 2 in Appendix A show the phantom used in the measurements. A grid is shown inside of the phantom indicating the orientation of the x-y grid used, with the co-ordinates 0,0 on the top left (orange dot). The y-axis is positive towards the right and the x-axis is positive towards the bottom. In this position the antenna is located on top of the DUT.

A different presentation of the same data is shown in Appendix A Figure 4. This is a surface plot, where the measured SAR values provide the vertical dimension, which is useful as a visualisation aid.

Similar data was obtained 12.5 mm into the simulated tissue. These measurements are presented as a contour plot in Appendix A Figure 5 and surface plot in Figure 6.

Figures 12 a and b in Appendix A show overlays of the DUT's outline superimposed onto the contour plots of the local SAR for both front side up and left side up.

Figures 3 through 6 in Appendix A show that there is a dominant peak, in the contour plots, that diminishes in magnitude with depth into the tissue simulation.

- 4) Wide area scans were performed for the low (991, 824 MHz), middle (383, 836 MHz) and high (799, 849 MHz) channels for the DUT facing up, down,



and both sides, with the antenna both extended and retracted. The peak single point SAR for the scans were:

| Channel | | | Antenna position | Orientation | Highest SAR [W/kg] |
|---------|-----|-----------------|------------------|--------------------|--------------------|
| | # | Frequency [MHz] | | | |
| Middle | 383 | 836 | out | Left (ant) side up | 0.99 |
| Middle | 383 | 836 | out | Right side up | 0.72 |
| Middle | 383 | 836 | out | Battery side up | 1.31 |
| Middle | 383 | 836 | out | Front side up | 2.12 |
| Middle | 383 | 836 | in | Battery side up | 0.97 |
| Middle | 383 | 836 | in | Front side up | 1.30 |
| Low | 991 | 824 | out | Front side up | 2.46 |
| High | 849 | 901 | out | Front side up | 1.62 |

All subsequent testing was performed on the low channel (991, 824 MHz) with the front side of the device against the phantom, with the antenna out.

- 5) Wide area scans were also performed for the low (991, 824 MHz) channel versus separation. The peak single point SAR for the scans were:

| Channel | | | Antenna axis to phantom's inner surface separation mm | Highest local SAR W/kg |
|---------|-----|-----|--|---------------------------|
| | # | MHz | | |
| Low | 991 | 824 | 28 | 2.46 |
| | | | 30.5 | 2.18 |
| | | | 37 | 1.39 |
| | | | 40 | 0.78 |

Figure 14 in Appendix A shows the data plotted as a function of separation and the exponential curve fit to them.

- 6) The low channel (991, 824 MHz) SAR peak was then explored on a refined 0.5 mm grid in three dimensions. Figures 7, 8, 9, 10 and 11 show the measurements made at 2.5, 7.5, 12.5, 17.5, and 22.5 mm, respectively. 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 1.105 W/kg.

- 7) To extrapolate the maximum SAR value averaged over 10 grams to the inner surface of the phantom a series of measurements were made at a few (x,y) coordinates within the refined grid as a function of depth, with 2.5 mm spacing. Figure 13 in Appendix A shows the data gathered and the exponential curves fit to them. The average exponential coefficient was determined to be $(-0.066 \pm 0.002) / \text{mm}$.

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 of 1.518 W/kg.**

7. BYSTANDER

The measurements from the previous section can be used to determine the bystander exposure during operation.

The SAR value averaged over 1 gram was determined from the 2.5, 7.5, and 12.5 mm zoom scans (section 6.2.6) by averaging the 27 points (3x3x3) comprising a 1 cm cube. The maximum measured SAR valued averaged over 1 gram was determined from these measurements to be 1.49 W/kg.

Applying the exponential coefficient over the 4.8 mm (section 6.2.7) to the maximum SAR value averaged over 1 gram determined above, we obtain **the maximum SAR value at the surface averaged over 1 gram of 2.04 W/kg.**

The measurements of highest local SAR versus separation of the antenna housing from the bottom of the phantom (Section 6.2.5) will enable the peak 1g SAR for a separation of 25 mm to be interpolated for other separations.



If the data for Figure 14 is fitted to an exponential equation we get:

$$\begin{aligned} \text{Peak Local SAR} &= 23.758 e^{-0.0815 * (\text{separation})} \\ \text{Maximum 1g SAR} &= k e^{-0.0815 * (\text{separation})} \end{aligned}$$

Using this equation with the data earlier in this section:

Maximum 1g SAR at surface = 2.04 W/kg
Tissue – antenna axis separation = 28 mm

results in a $k = 19.99$ W/kg, which corresponds to the peak 1g SAR when the separation is 0 mm. A conservative peak 1g SAR of 1.37 W/kg (1.6 W/kg reduced by our measurement uncertainty) would occur for a separation of 32.9 mm from the antenna axis.



8. CONCLUSIONS

The maximum Specific Absorption Rate (SAR) averaged over 10 g, determined at 824 MHz (low channel, 991), of the MIST Freedom II-C Point of Sale Terminal, which incorporates a Novatel NRM-6832 Expedite Wireless IP radio modem, is 1.52 W/kg. The overall margin of uncertainty for this measurement is $\pm 14.5\%$ (Appendix C). 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, the maximum Specific Absorption Rate (SAR) averaged over 1g is 2.04 W/kg. The overall margin of uncertainty for this measurement is $\pm 14.5\%$ (Appendix C). The SAR limit given in the FCC 96-326 safety guideline is 1.6 W/kg for uncontrolled partial body exposure for the general population.

The product under investigation will be used in a general population/uncontrolled exposure environment. Considering the above, this unit as tested, and as it will be marketed and used (with a warning in the manual to keep bystanders at least 33 mm away from the antenna) is found to be compliant with these requirements.



APPENDIX A

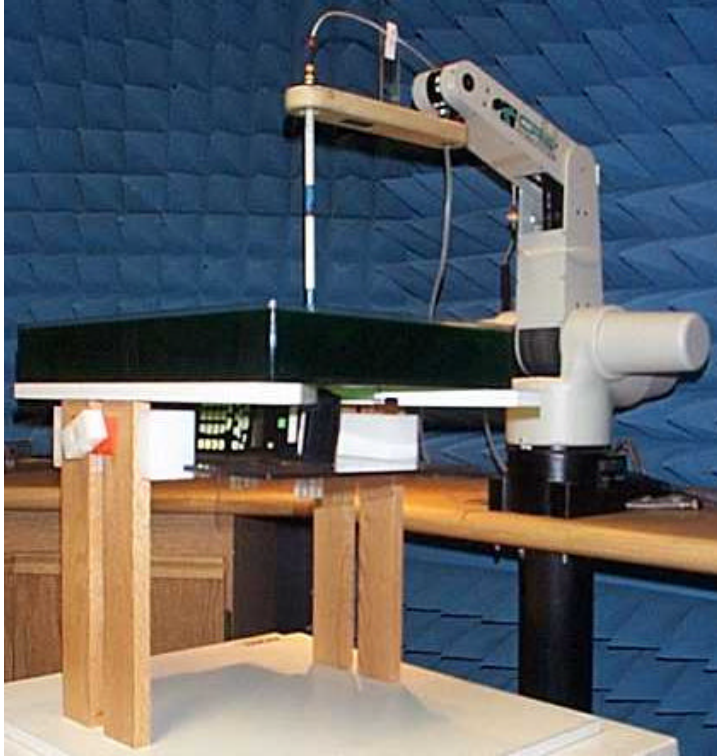


Figure 1

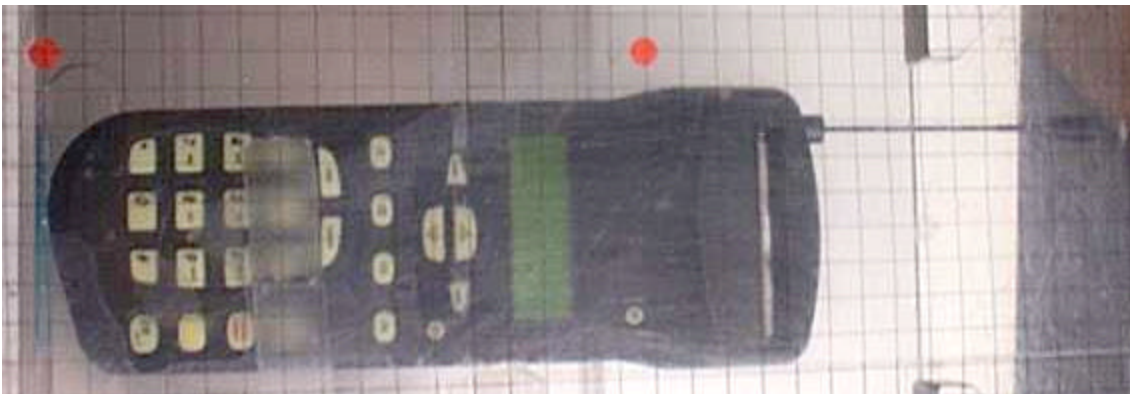


Figure 2



Local SAR (W/kg) 2.5 mm Above Surface - Front Side Up

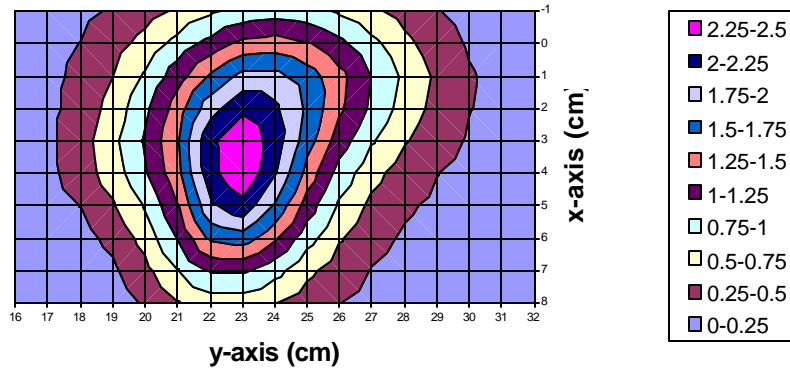


Figure 3

Local SAR (W/kg) 2.5 mm Above Surface - Front Side Up

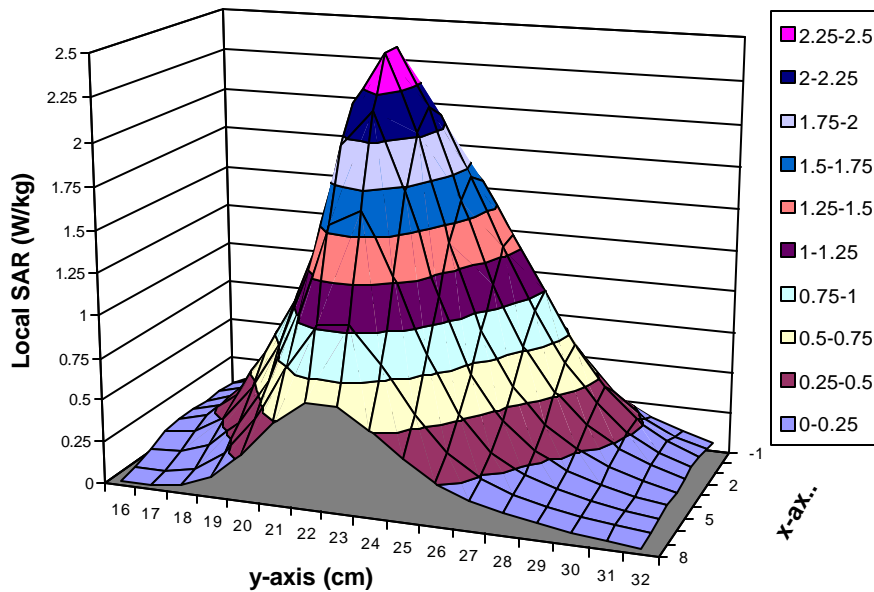


Figure 4



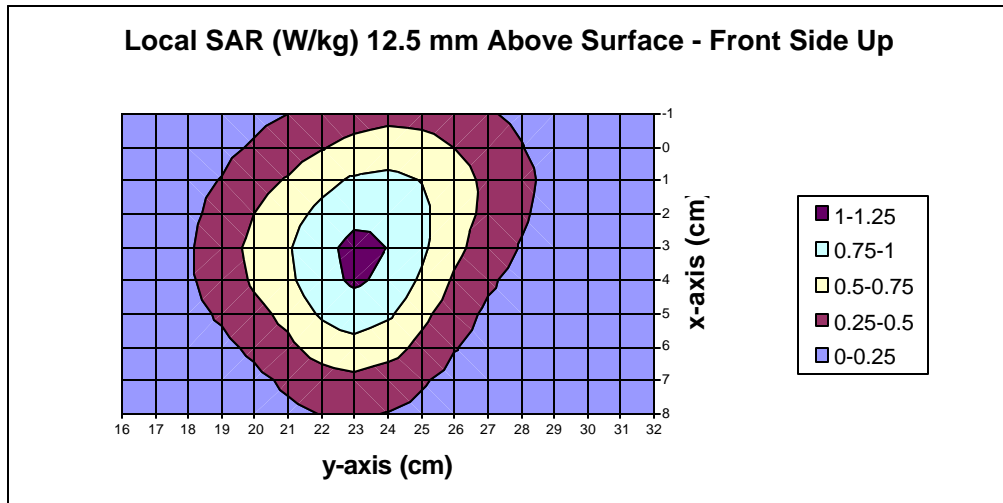


Figure 5

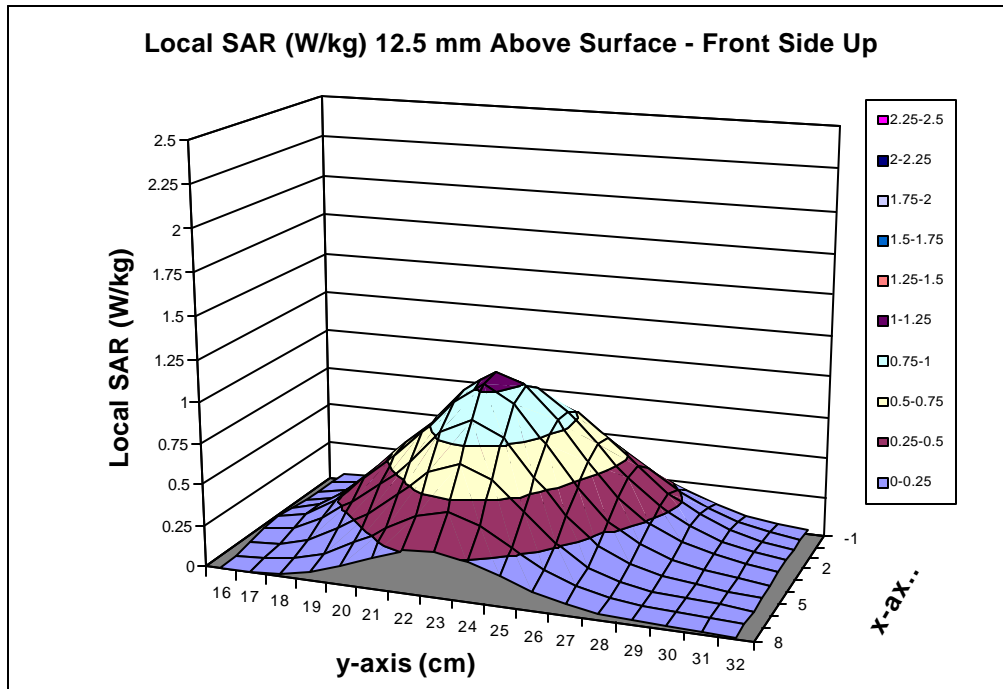


Figure 6



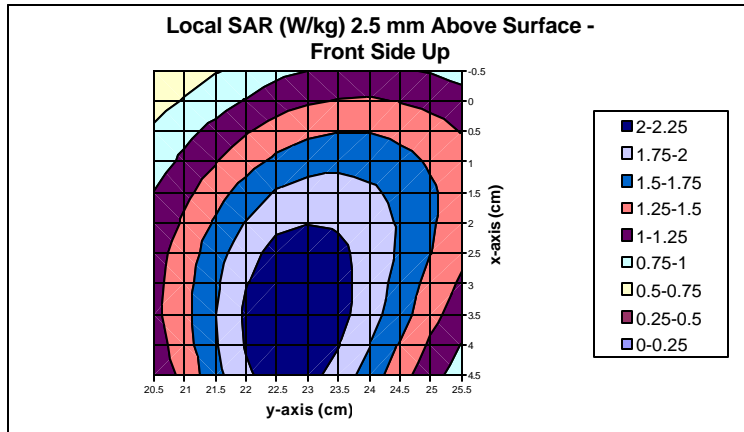


Figure 7

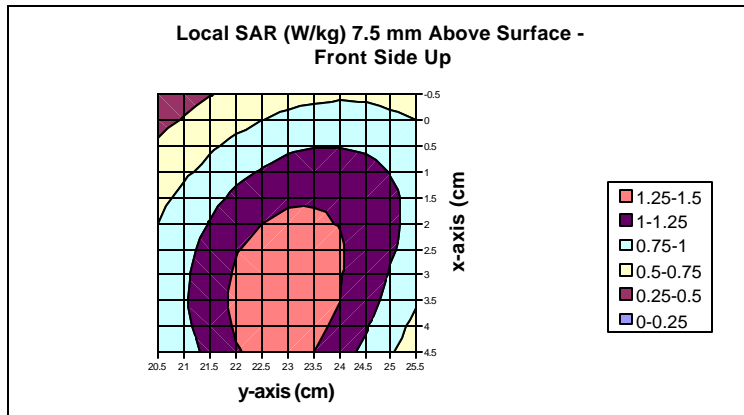


Figure 8

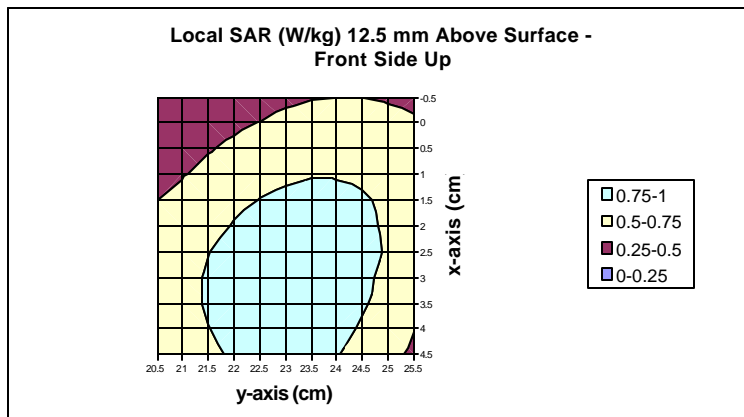


Figure 9



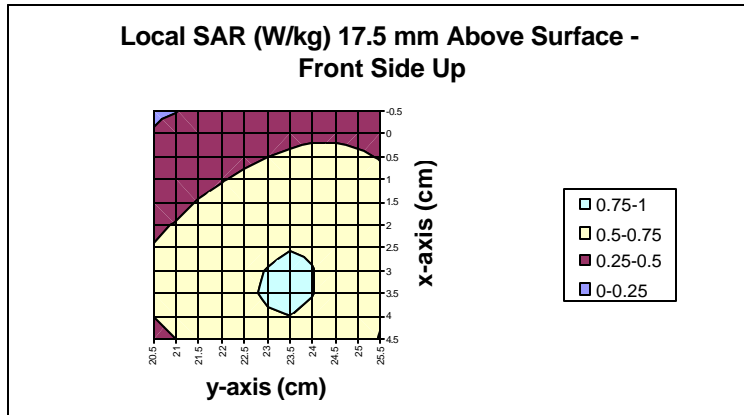


Figure 10

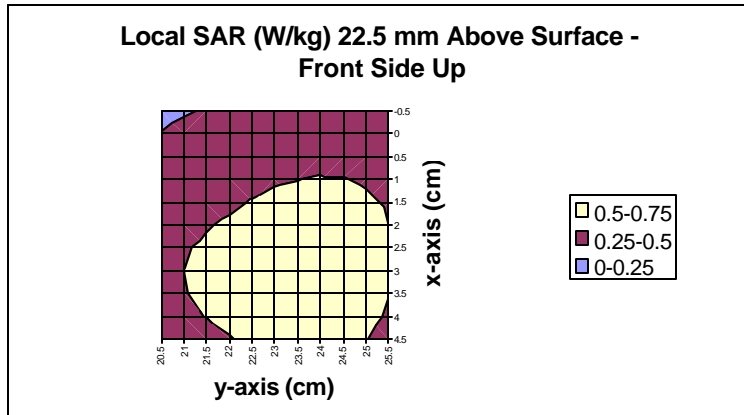


Figure 11



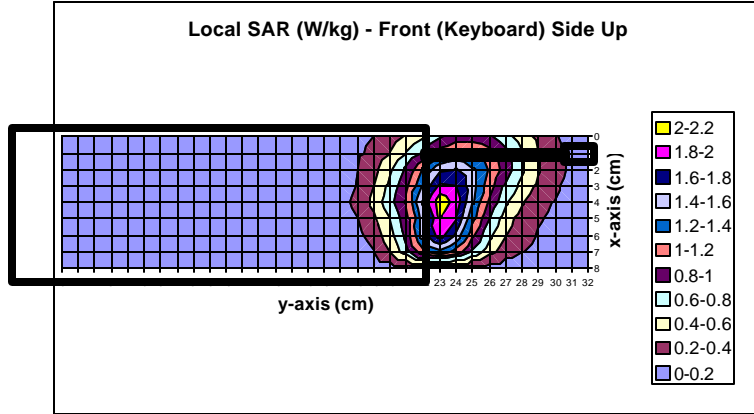


Figure 12 - a

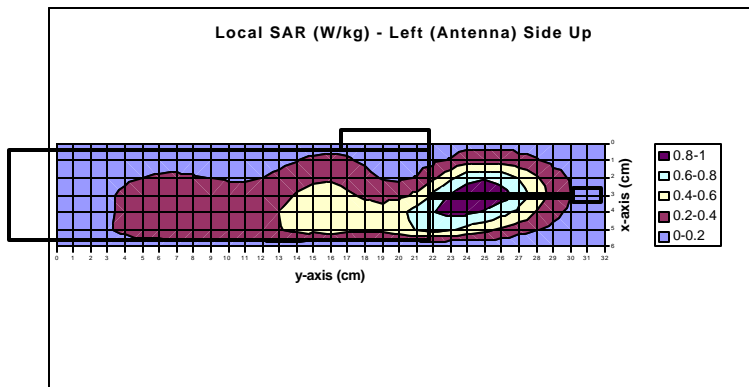


Figure 12 - b

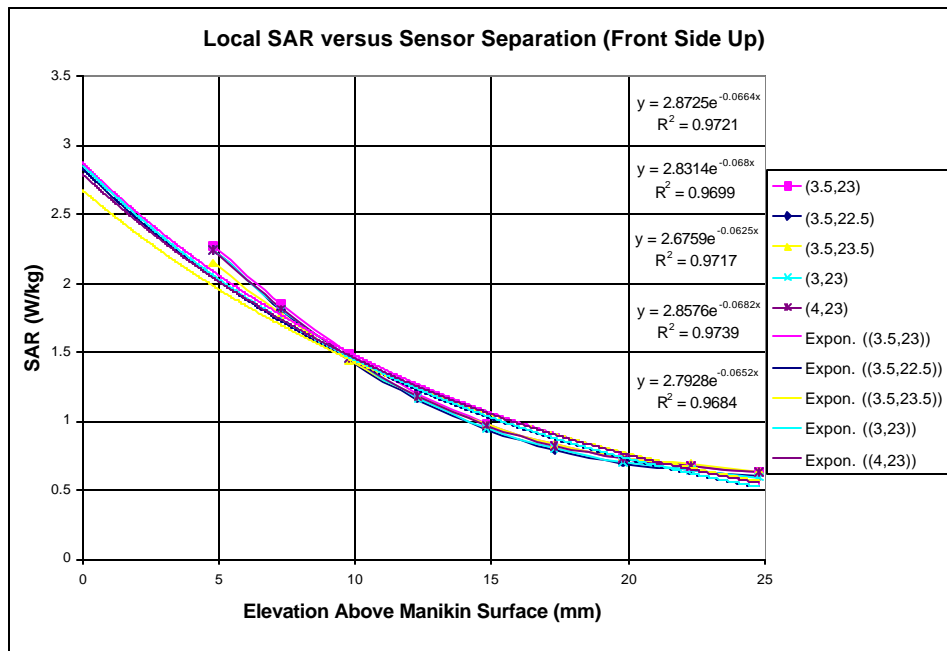


Figure 13



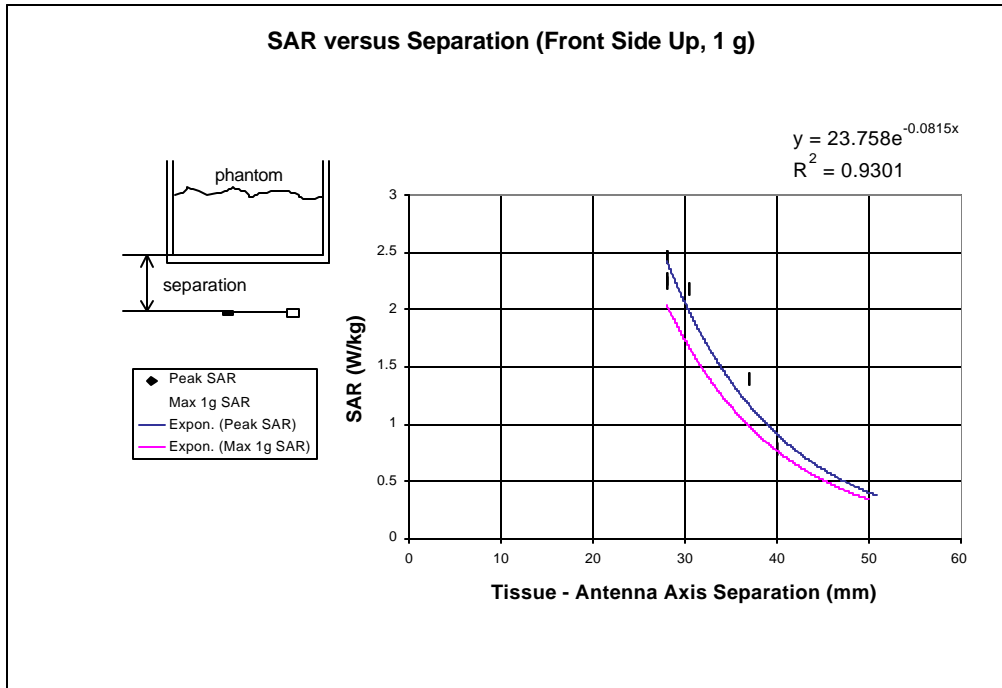


Figure 14



APPENDIX B

Manufacturer's Antenna Specifications



(See manufacturer's submission documentation for drawings and more design details)



APPENDIX C

Uncertainty Budget

| <u>Uncertainties Contributing to the Overall Uncertainty</u> | | |
|--|-------------|----------------------------------|
| Type of Uncertainty | Specific to | Uncertainty |
| Power variation due to battery condition | phone | 6.7% |
| Extrapolation due to curve fit of SAR vs depth | phone | 7.0% |
| Extrapolation due to depth measurement | setup | 3.2% |
| Conductivity | setup | 6.0% |
| Density | setup | 2.6% |
| Tissue enhancement factor | setup | 7.0% |
| Voltage measurement | setup | 1.0% |
| Probe sensitivity factor | setup | 3.5% |
| | | <u>145%</u> <u>RSS</u> |



APPENDIX D

Simulated Tissue Material and Calibration Technique

The mixture used was based on that presented SSI/DRB-TP-D01-033, “Tissue Recipe and Calibration Requirements”.

| | |
|------------------|--------|
| De-ionised water | 52.8 % |
| Sugar | 45.3 % |
| Salt | 1.5 % |
| HEC | 0.3 % |
| Bactericide | 0.1 % |

Mass density, ρ 1.30 g/ml
 (The density used to determine SAR from the measurements was the recommended 1040 kg/m³ 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.

The dielectric properties are:

| | APREL | OET 65 Supplement | Δ / % (OET) |
|------------------------------------|-------|-------------------|--------------------|
| Dielectric constant, ϵ_r | 45.2 | 56.11 | -19.4% |
| Conductivity, σ / [S/m] | 0.958 | 0.946 | 1.27% |
| Tissue Conversion Factor, γ | 7.8 | | |



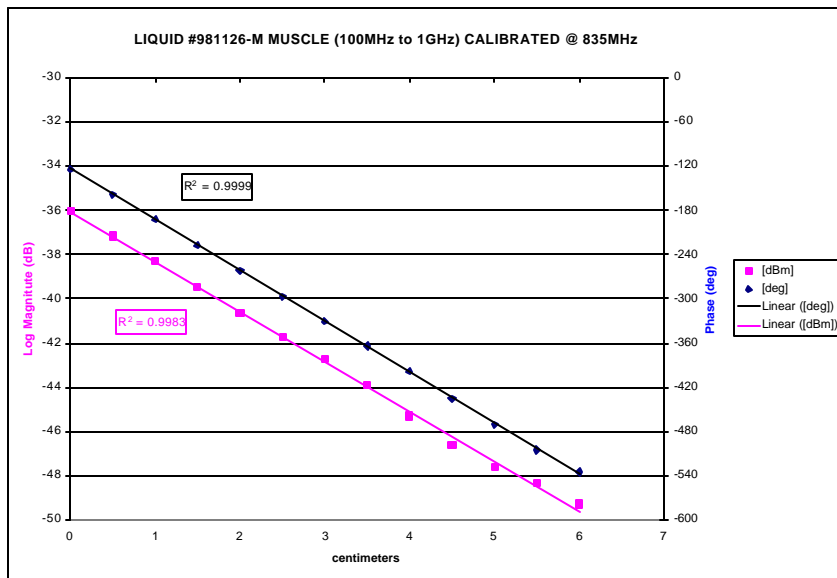
SIMULATION FLUID # 981126-M
 CALIBRATION DATE 14-Apr-00
 CALIBRATED BY Paul Cardinal
 Frequency Range 100MHz-1GHz
 Frequency Calibrated 835 MHz
 Tissue Type Muscle

| Position [cm] | Amplitude [dBm] | Phase [deg] | Phase [deg] |
|---------------|-----------------|-------------|-------------|
| 0 | -36.01 | -123.55 | -123.55 |
| 0.5 | -37.145 | -158.22 | -158.22 |
| 1 | -38.266 | 168.05 | -191.95 |
| 1.5 | -39.484 | 132.66 | -227.34 |
| 2 | -40.633 | 98.75 | -261.25 |
| 2.5 | -41.744 | 63.13 | -296.87 |
| 3 | -42.73 | 29.45 | -330.55 |
| 3.5 | -43.91 | -4.21 | -364.21 |
| 4 | -45.293 | -39 | -399 |
| 4.5 | -46.617 | -75.117 | -435.117 |
| 5 | -47.602 | -110.79 | -470.79 |
| 5.5 | -48.355 | -145.2 | -505.2 |
| 6 | -49.291 | -175.36 | -535.36 |

| | | | |
|---|-------------|---|--------------|
| ΔdB_1 | -6.72 | Δdeg_1 | -207 |
| ΔdB_2 | -6.765 | Δdeg_2 | -205.99 |
| ΔdB_3 | -7.027 | Δdeg_3 | -207.05 |
| ΔdB_4 | -7.133 | Δdeg_4 | -207.777 |
| ΔdB_5 | -6.969 | Δdeg_5 | -209.54 |
| ΔdB_6 | -6.611 | Δdeg_6 | -208.33 |
| ΔdB_7 | -6.561 | Δdeg_7 | -204.81 |
| ΔdB_{AVG} [dB] | -6.83 | $Ddeg_{AVG}$ [deg] | -207.2138571 |
| dB_{AVG} ($^{\circ}_{AVG}$) [dB/cm] | -2.28 | deg_{AVG} ($^{\circ}_{AVG}$) [deg/cm] | -69.07128571 |
| $(^{\circ}_{AVG})$ [NPl/cm] | -0.26197936 | $(^{\circ}_{AVG})$ [rad/cm] | -1.205521354 |

| | |
|---------------------|-------------|
| f [Hz] | 8.35E+08 |
| μ [H/cm] | 1.25664E-08 |
| ϵ_0 [F/cm] | 8.854E-14 |

ϵ_r **45.2**
 $S_{effective}$ **0.958** **S/m**



835 MHz Data (Heike & Tony) Muscle with E-115

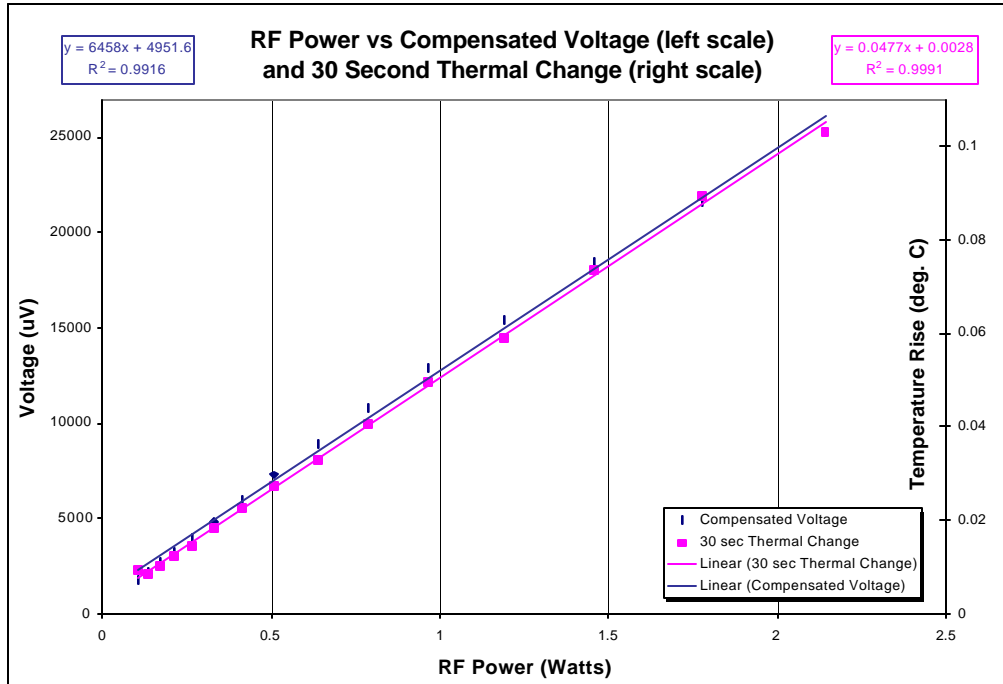
| RF Power | | | Ch0 | Ch1 | Ch2 | delta T | Sum | Thermal |
|----------|-------|--------|------|-------|-------|---------|--------|---------|
| W | dBm | R&S | uV | uV | uV | 30 sec | Vt/Et | SAR |
| | | | | | | deg. C | | W/kg |
| 0.10666 | 20.28 | -25.61 | 391 | 1196 | 2954 | 0.009 | 1792.7 | 0.86 |
| 0.133352 | 21.25 | -24.64 | 439 | 1440 | 3638 | 0.009 | 2178 | 0.80 |
| 0.169044 | 22.28 | -23.61 | 513 | 1782 | 4517 | 0.01 | 2689 | 0.94 |
| 0.210863 | 23.24 | -22.65 | 586 | 2173 | 5542 | 0.013 | 3276.6 | 1.16 |
| 0.263027 | 24.2 | -21.69 | 684 | 2661 | 6787 | 0.015 | 3999.1 | 1.36 |
| 0.328095 | 25.16 | -20.73 | 830 | 3247 | 8276 | 0.019 | 4875.7 | 1.71 |
| 0.412098 | 26.15 | -19.74 | 1001 | 4028 | 10205 | 0.023 | 6012.4 | 2.10 |
| 0.509331 | 27.07 | -18.82 | 1196 | 4932 | 12402 | 0.027 | 7312.8 | 2.53 |
| 0.639735 | 28.06 | -17.83 | 1440 | 6079 | 15137 | 0.033 | 8940.6 | 3.06 |
| 0.787046 | 28.96 | -16.93 | 1733 | 7397 | 18188 | 0.041 | 10780 | 3.75 |
| 0.966051 | 29.85 | -16.04 | 2100 | 8960 | 21680 | 0.05 | 12918 | 4.58 |
| 1.188502 | 30.75 | -15.14 | 2515 | 10815 | 25806 | 0.059 | 15441 | 5.48 |
| 1.458814 | 31.64 | -14.25 | 3052 | 13086 | 30640 | 0.074 | 18455 | 6.81 |
| 1.778279 | 32.5 | -13.39 | 3662 | 15503 | 35718 | 0.089 | 21652 | 8.26 |
| 2.142891 | 33.31 | -12.58 | 4395 | 18335 | 41528 | 0.103 | 25349 | 9.54 |

Directional Coupler factor **25.89** dB (Asset 100251 cal file data (Janusz, 21 Jul)
 Additional inline attenuation **20** dB

Sensitivity (e) **1.658 1.721 1.68** - Sensor Sensitivity in mV/ (mV)
 $\eta = 1.50 \text{ e } 2.487 \ 2.582 \ 2.52$

Density 1.3 g/cm³ 1300 kg/m³ -Tony, summer
 Conductivity **10.8** mS/cm 1.08 S/m -Heike 8-Jul-95
 Heat Capacity (c) 2.775 J/C/g 2775 J/C/kg
 Exposure Time 30 seconds 30 seconds
 Slope of Measure Voltage (m_v) 11722 uV/W 0.012 V/W
 - standard error or m_v 182.1 uV/W 2E-04 V/W 1.6%
 Slope of Measure Temp Change (m_T) 0.048 C/W 0.048 C/W
 - standard error or m_T 4E-04 C/W 4E-04 C/W 0.8%

Tissue Conversion Factor (#) 7.8



APPENDIX E

Validation Scans

