FCC ID: O2SNURIT3010R

Exhibit 11

RF Exposure Information
Sar Report

CERTIFICATION REPORT

Subject: **Specific Absorption Rate (SAR) Experimental Analysis**

Product: Wireless POS EDC Terminal

Model: Nurit 3010 with a RIM Mobitex R902M-2-0 modem

Client: Lipman USA Inc.

Address: Lipman USA Inc.
50 Gordon Dr.
Syosset, NY
11791

Project #: LPMB-Nurit 3010 POS-3621

Prepared by APREL Laboratories
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Nepean, Ontario
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SAR Certified — Telecommunications Approval Board - Spectrum Sciences Institute — APREL Laboratories A002-Nurit 3010

Approved by ______________ Date: 7/FEBRUARY/2001
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Submitted by ______________ Date: Feb 7, 2001
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FCC ID: 02SNURIT3010R
Applicant: Lipman USA Inc.
Equipment: Wireless POS EDC Terminal
Model: Nurit 3010 with a RIM Mobitex R902M-2-0 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 Lipman Nurit 3010 EDC point of sale terminal which incorporates a RIM Mobitex R902M-2-0 modem. The measurements were carried out in accordance with FCC 96-326. The wireless desktop device was evaluated for its maximum power level (ERP 2.344W). The duty factor of the radio modem is intrinsically restricted to 25% (See Appendix E).

The wireless desktop device was tested at low, middle and high channels for the left, right, and keyboard up sides, with the antenna at 0, 90, and 180 degree positions. The maximum 10g SAR (0.50 W/kg) was found to coincide with the peak performance RF output power of channel 0880 (high, 901 MHz) for the left side of the device, with the antenna at the 90 degree position (The hot spot is located on the antenna). At a separation distance of 0 cm from the antenna of the device, the maximum 1g SAR is 0.83 W/kg. Test data and graphs are presented in this report.

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 an 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) for a sample of a Lipman Nurit 3010 EDC point of sale terminal which incorporates a RIM Mobitex R902M-2-0 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

- Lipman Nurit 3010 EDC point of sale terminal, s/n 86U03-5913018, which incorporates a RIM Mobitex R902M-2-0 modem received on 28 November, 2000.

The Lipman Nurit 3010 EDC point of sale terminal will be called DUI (Device Under Investigation) in the following.

The DUI is intended to be used as a desktop device which operates in the frequency band of 896 MHz - 901 MHz. The antenna of the DUI is a center fed half wave dipole. The DUI nominally transmitted with a 25% duty factor. 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
- Aritsu spectrum analyser MS2667C Asset # 301436
- Double ridged guide horn antenna

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 radiated power was sampled. 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		**Power Readings (dBm)**		**D**	**Battery #**
Type	**Height (mm)**	**Before**	**After**	**(dB)**	
Area	2.5	-19	-19	0	3
Area	12.5	-18.4	-18.4	0	2
Zoom	2.5	-18.15	-18.15	0	2
Zoom	7.5	-19.04	-19.04	0	5
Zoom	12.5	-20.7	-20.7	0	3
Zoom	17.5	-18.4	-18.4	0	5
Zoom	22.5	-19.8	-19.8	0	3
Depth	2.5 – 22.5	-19	-19	0	2

Table 1. Sampled Radiated 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 via communications software supplied by the radio manufacturer running on a PC to control the channel and maximum operating power (ERP 2.344W). The duty factor was 25%.

3) Figure 3 in Appendix A shows a contour plot of the SAR measurements for the DUI (channel 0880, high, 901 MHz, left side, antenna extended at 90 degrees). 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. Figures 1 and 2 show the flat phantom used in the measurements. For the left side measurements, the antenna of the DUI was aligned with Y=2 and the bottom edge of the DUI, with X=10.

   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 left, right, and keyboard up sides of the DUI, with the antenna in the 0, 90, and 180 degree positions. The DUI was operating at maximum Tx output power (ERP 2.344W) and 25% duty factor. The peak single point SAR for the scans were:

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TYPE OF EXPOSURE	DUI side	Antenna Position in degrees	Antenna distance to phantom (mm)	Channel			Peak Local SAR (W/kg)
				L/M/H	#	Freq (MHz)	
Hand and Bystander	Left side	90	0	Low	0480	896	0.79
	Left side	**90**	**0**	**High**	**0880**	**901**	**1.19**
	Left side	90	0	middle	0720	899	0.75
	Left side	0	0	High	0880	901	0.92
	Left side	0	0	Middle	0720	899	0.84
	Left side	0	0	Low	0480	896	1.19
	Left side	180	0	Low	0480	896	1.14
	Left side	180	0	Middle	0720	899	1.18
	Left side	180	0	High	0880	901	0.85
	Right side	N/A	N/A	High	0880	901	0.01
	keyboard up side	N/A	N/A	High	0880	901	0.01

Table 2. SAR Measurements

7. USER'S HAND EXPOSURE

All subsequent testing for user's hand exposure was performed at channel 0880 (high, 901 MHz), with the left side of the DUI facing up against the bottom of the phantom and the antenna touching the phantom at the 90 degree position. This relates to the positition and frequency found to provide the maximum measured SAR value.

1) Channel 0880 (high, 901 MHz) was then 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 0.30 W/kg.

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2) 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 (-0.109 ± 0.012) / 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 10 grams that was determined previously, we obtain the **maximum SAR value at the surface averaged over 10 grams**, 0.50 W/kg.

8. BYSTANDER EXPOSURE

1) Channel 0880 (high, 901 MHz) was also 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 0.49 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 (-0.109 ± 0.012) / 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, 0.83 W/kg**.

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9. CONCLUSIONS

The maximum Specific Absorption Rate (SAR) averaged over 10 grams, determined at 901 MHz (high channel, 0880, left side, ERP 2.344W) of the Lipman Nurit 3010 EDC point of sale terminal, which incorporates a RIM Mobitex R902M-2-0 modem is 0.50 W/kg. The overall margin of uncertainty for this measurement is ±29 % (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. This SAR limit reduced by the measurement uncertainty (4.0 - 29%) is 2.84 W/kg.

For a bystander or user exposing a part of the body other than the extremities, at a separation distance of 0 cm from the device, the maximum Specific Absorption Rate (SAR) averaged over 1g is 0.83 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. This SAR limit reduced by the measurement uncertainty (1.6 - 29%) is 1.14 W/kg.

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 K B Date FEB, 07, 2001

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A002-Nurit 3010

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APPENDIX A. Measurement Setup, Tissue Properties and SAR Graphs

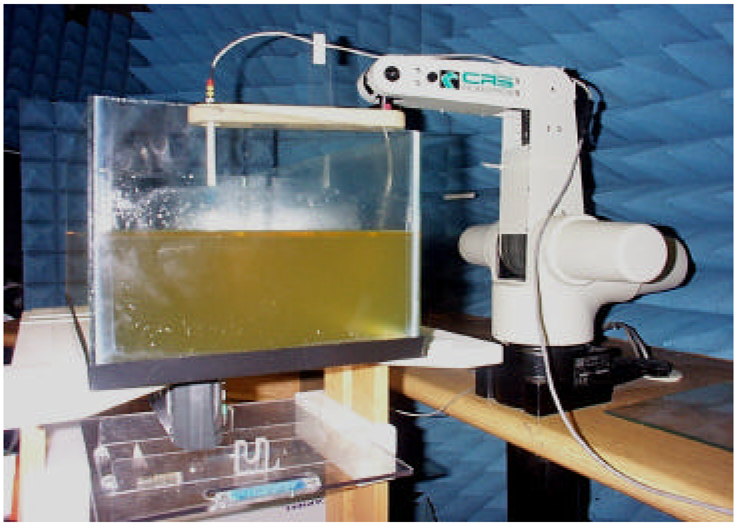

Figure 1. Setup

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	51.6	55.96	-7.8%
Conductivity, σ [S/m]	10.1	9.69	4.2%
Tissue Conversion Factor, γ	6.7	-	-

Table 3. Dielectric Properties of the Simulated muscle Tissue at 899 MHz

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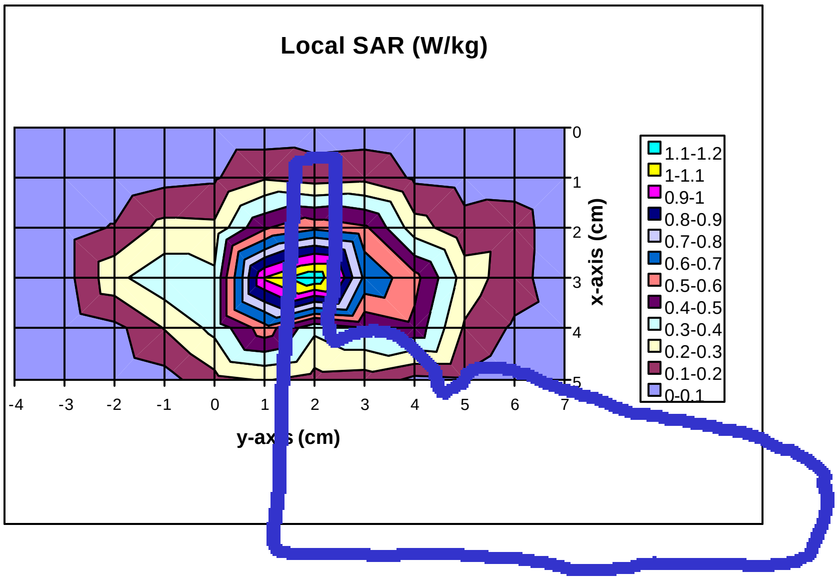

Figure 2. Contour Plot of the Area Scan 2.5mm Above Phantom Surface

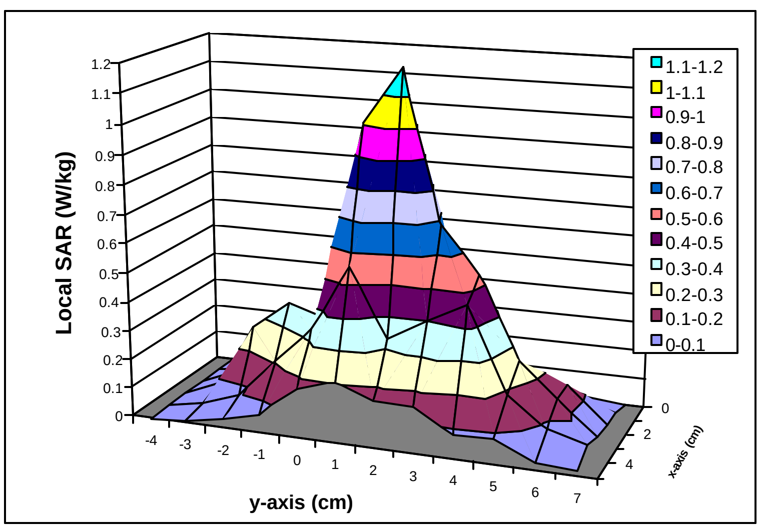

Figure 3. Surface Plot of the Area Scan 2.5mm Above Phantom Surface

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APPENDIX B. Uncertainty Budget

Uncertainties Contributing to the Overall Uncertainty			
Type of Uncertainty	**Specific to**	**Uncertainty**	
Power variation due to battery condition	DUI	0.0%	
Extrapolation due to curve fit of SAR vs depth	DUI and Setup	23.3%	
Extrapolation due to depth measurement	setup	5.3%	
Conductivity	setup	6.0%	
Density	setup	2.6%	
Tissue enhancement factor	setup	7.0%	
Voltage measurement	setup	13.0%	
Probe sensitivity factor	setup	3.5%	
		29.0%	**RSS**

Table 4. Uncertainty Budget

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APPENDIX C. Validation Scan on a Flat Phantom

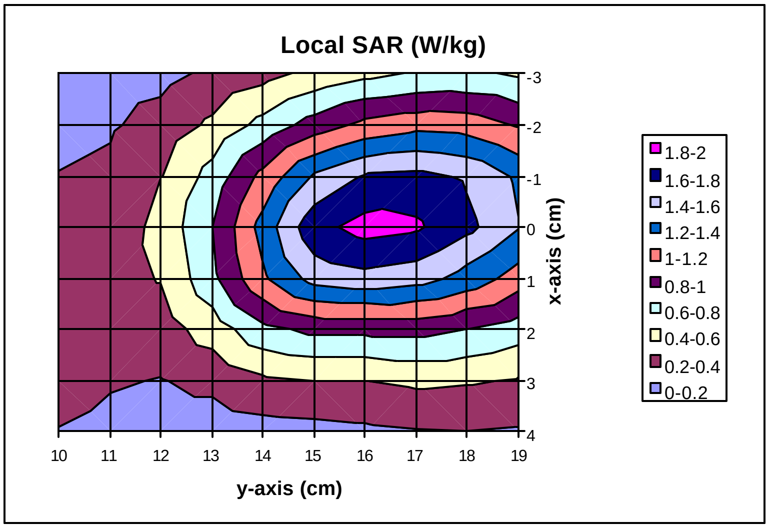

Figure 4. Contour Plot of the Reference Area Scan 2.5mm Above Phantom

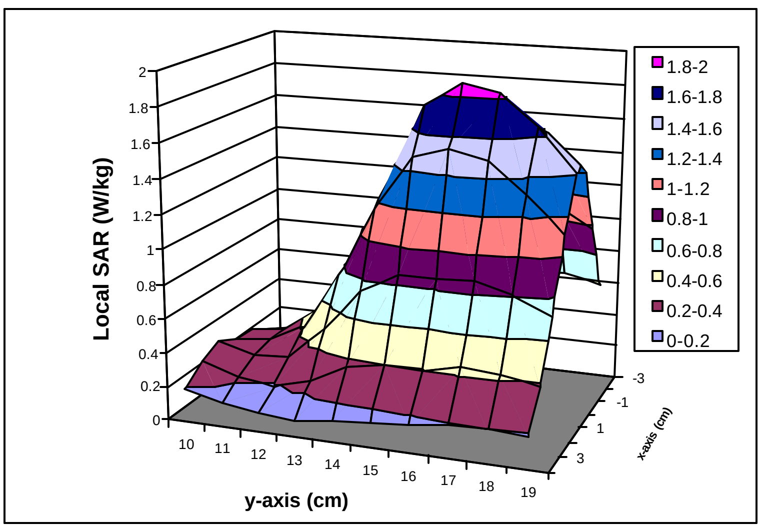

Figure 5. Surface Plot of the Reference Area Scan 2.5mm Above Phantom

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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 been 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-D01-032

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

Calibrated By: ____________ ____________ ____________

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APPENDIX E. Duty Factor Limiting Algorithm for the OEM Radio Module R902M-2-O

The duty factor limiting algorithm for the OEM radio module R902M-2-O is a firmware algorithm that directly inhibits the radio firmware that generates transmit pulses. This algorithm will be permanently integrated with the radio firmware and installed at time of manufacture in the production facility. The algorithm cannot be modified or disabled by the user.

The radio module operates on a packet data network. The network controls the timing of most aspects of the radio signalling protocol. The shortest transmit event over which the mobile device has timing control is an entire uplink (transmit) transaction which is a series of transmit pulses. From the perspective of the mobile device this in an “atomic” event, i.e. the network controls the timing of the signalling within the transaction and the transaction can not be broken into smaller independent sub-parts.

Research in Motion Ltd. has implemented and tested a duty factor limiting algorithm for the radio module to comply with the requirement for limiting the duty factor at all times. To limit the duty factor at all times the algorithm controls the timing of when uplink (transmit) transactions are initiated. When an uplink (transmit) transaction occurs the algorithm accrues the actual transmit time. The algorithm ensures that the idle (transmitter off) time is sufficient to ensure the duty factor is less than the limit (25%) before the next uplink (transmit) transaction is initiated. This ensures that the duty factor is limited to the maximum allowable over all times.

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