Certification Report on

Specific Absorption Rate (SAR)
Experimental Analysis in Front of Face

Com-Net Ericsson Critical Radio Systems

Jaguar 700P
900 MHz trunking radio

Test Date: 28 July, 2000

CNEB-JAGUAR 700P-3497

51 Spectrum Way Nepean ON K2R 1E6
Tel: (613) 820-2730 Fax: (613) 820-4161
email: info@aprel.com

CERTIFICATION REPORT

Subject: **Specific Absorption Rate (SAR) Experimental Analysis in Front of the Face**

Product: 900 MHz trunking radio

Model: Jaguar 700P

Client: Com-Net Ericsson Critical Radio Systems

Address: 3315 Old Forest Road
Lynchburg, VA 24501
U.S.A.

Project #: CNEB-JAGUAR 700P-3497

Prepared by: APREL Laboratories
51 Spectrum Way
Nepean, Ontario
K2R 1E6

Telecommunications Approval Board - Spectrum Sciences Institute
SAR Certified
APREL Laboratories
A076 - Jaguar 700P

Tested by ______ Date: Aug 2/00
Ken O'Donnell and Delia M. Zapata
Engineering Staff

Submitted by ______ Date: 01 Sep 2000
Dr. Paul G. Cardinal
Director, Laboratories

Approved by ______ Date: Sept 8/2000
Dr. Jacek J. Wojcik, P. Eng.

51 Spectrum Way
Nepean, Ontario K2R 1E6

Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

FCC ID: OWDTR0007-E
Applicant: Com-Net Ericsson Critical Radio Systems
Equipment: 900 MHz trunking radio
Model: Jaguar 700P
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 Com-Net Ericsson Jaguar 700P trunking radio used in front of the face (for SAR Analysis on body and hand, see Project # CNEB-JAGUAR 700P-3498). The measurements were carried out in accordance with FCC 96-326. The trunking radio was evaluated at its nominal high power level (2W / 33dBm) and 100% duty factor.

The trunking radio was tested on the keyboard side of the handset and front side of the speaker-microphone with antenna port, using a quarter-wavelength end-fed antenna and a half-wavelength centre-fed whip antenna, at low, middle and high channels of the transmit band, and low, middle and high channels of the talk-around band, in "CONV 1" personality, 30 mm away from the phantom (Table 2, Appendix B).

The maximum SAR was found to coincide with the peak performance RF output power of the transmit band low channel (1, 896.0125 MHz), when using the quarter-wavelength centre-fed whip antenna and holding the speaker/microphone with antenna port in front of the face. 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 partial body exposure in an occupational /controlled RF exposure environment.

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

51 Spectrum Way
Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

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51 Spectrum Way
Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

1. INTRODUCTION

Tests were conducted to determine the Specific Absorption Rate (SAR) in Front of the Face of a sample of a Com-Net Ericsson Jaguar 700P trunking radio. (See Project # CNEB-JAGUAR 700P-3498 for SAR Analysis on Body and Hand). 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 INVESTIGATION

- Com-Net Ericsson Jaguar 700P trunking radio, S/N H1 900N05 (T19-1018), received on 14 July 2000.

The 900 MHz trunking radio will be called DUI (Device Under Investigation) in the following.

This is a Push-To-Talk (PTT) device that can operate in the frequency range 896-901 MHz transmit band and the 935-940 MHz talk-around band with a maximum output

51 Spectrum Way
Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

power setting of 2W / 33dBm. One of two whip antennas may be attached to the right side of the device. One of the antennas is a quarter-wavelength end-fed whip antenna, 90 mm long, 900 MHz (KRE 101 1223/02), while the other is a half-wavelength centre-fed whip antenna, 215 mm long, 900 MHz (EXE-902MD). The device was tested using Com-Net Ericsson 7.5V nickel cadmium high capacity batteries (1700 mAh), BKB 191 210/3. A photograph of the DUI and accessories 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
- APREL F-1, flat manikin, s/n 001
- Tissue Recipe and Calibration Requirements, APREL procedure SSI/DRB-TP-D01-033
- HP 438A power meter, s/n 2502A01684, Asset # 301417
- HP 8482A power sensor, s/n 2652A1512B, Asset # 301418
- HP 8340 Synthesized Sweeper 10MHz - 26.5 GHz, s/n 2819A00926, Asset # 100955

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).

51 Spectrum Way
Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

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 DUI is positioned with its keyboard and speaker-microphone with antenna port 30 mm away from the phantom.

7. All tests were performed with the highest power available from the sample DUI (2W / 33dBm) 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 six sets of data used for the worst case SAR in this report.

Table 1. Sampled Conducted RF Power

Scan		Power Readings (dBm)		D (dB)	Battery #
Type	Height (mm)	Before	After		
Area	2.5	7.93	7.90	-0.03	6
Area	12.5	7.96	7.94	-0.02	3
Zoom	2.5	7.98	7.89	-0.09	4
Zoom	7.5	7.93	7.91	-0.02	5
Zoom	12.5	7.94	7.91	-0.03	4
Depth	2.5 – 22.5	8.00	7.88	-0.12	5

51 Spectrum Way
Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

NOTE: These readings were taken at the antenna port of the speaker microphone, and do not include the 23dB of attenuation, not the adapter losses.

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 DUI was put into test mode for the SAR measurements by turning it on and rotating a dial beside the antenna to control the channel. The power could be set to two levels using keyboard buttons and was set to it highest power level (nominally 2W).

3) Figure 3 in Appendix A shows a contour plot of the SAR measurements for the DUI (transmit band low channel, 1, 896.0125 MHz, quarter-wavelength centre-fed whip antenna, speaker/microphone with antenna port, 2W / 33dBm). The presented values were taken 2.5mm into the simulated tissue from the Universal Head-Arm's (UH-a) solid inner surface. Figures 1 and 2 in Appendix A show the UH-a used in the measurements. A grid is shown inside the phantom indicating the orientation of the x-y grid used. The x-axis is positive towards the left and the y-axis is positive towards the bottom. In this position, the top edge of the speaker-microphone is aligned with x = 0, while the red dot (on the top edge of the speaker-microphone) is located at (0,0).

   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.

   Figure 10 in Appendix A shows an overlay of the DUI’s outlines, superimposed onto the contour plot previously shown as Figure 3.

51 Spectrum Way
Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

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) For the SAR analysis in Front of the Face (Table 2), wide area scans were performed on both the keyboard side of the handset and the front side of the speaker-microphone with antenna port, with the DUI operating at maximum output power (2W / 33dBm) and 100% duty factor, for the middle channel of the two bands (channels 2 and 5), using the two antenna types (quarter-wavelength end-fed whip antenna and half-wavelength centre-fed whip antenna).

   Then, wide area scans were performed on the keyboard side of the handset, with the antenna generating the highest SAR (quarter-wave length end-fed whip antenna) at the other four channels (1,3,5,6).

   Wide area scans were also performed on the front side of the speaker-microphone with antenna port, with the antenna generating the highest SAR (quarter-wave length end-fed whip antenna) on the other four channels (1,3,5,6). The peak single point SAR for the scans were:

DUI side	Speaker mic SWA/S*	Ant	Channel				Highest SAR (W/kg)
			Band	L/M/H	#	Frequency (MHz)	
keyboard	none	λ/4	transmit	M(1)	2	899.0000	0.940
keyboard	none	λ/4	talk-around	M(2)	5	938.0000	0.744
keyboard	none	λ/2	transmit	M(1)	2	899.0000	0.401
keyboard	none	λ/2	talk-around	M(2)	5	938.0000	0.381
SWA speaker (front side)	SWA	λ/4	transmit	M(1)	2	899.0000	1.015
SWA speaker (front side)	SWA	λ/4	talk-around	M(2)	5	938.0000	0.993
SWA speaker (front side)	SWA	λ/2	transmit	M(1)	2	899.0000	0.496
keyboard	none	λ/4	transmit	L(1)	1	896.0125	0.909
keyboard	none	λ/4	transmit	H(1)	3	901.9875	0.867
keyboard	none	λ/4	talk-around	L(2)	4	935.0125	0.809
keyboard	none	λ/4	talk-around	H(2)	6	940.9875	0.746
SWA speaker (front side)	**SWA**	**l/4**	**transmit**	**L(1)**	**1**	**896.0125**	**1.055**
SWA speaker (front side)	SWA	λ/4	transmit	H(1)	3	901.9875	0.996
SWA speaker (front side)	SWA	λ/4	talk-around	L(2)	4	935.0125	0.822
SWA speaker (front side)	SWA	λ/4	talk-around	H(2)	6	940.9875	0.843

51 Spectrum Way
Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

Table 2. SAR Measurements in Front of the Face
*S: speaker/microphone; *SWA: speaker/microphone with antenna port

All subsequent testing was performed on the transmit band low channel (1, 896.0125 MHz), with the speaker/microphone with antenna port and the quarter-wavelength centre-fed whip antenna.

5) The transmit band low channel (1, 896.0125 MHz) was then explored on a refined 5 mm grid in three dimensions. Figures 7, 8 and 9 show the measurements made at 2.5, 7.5 and 12.5 mm, respectively. 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 0.93 W/kg.

6) To extrapolate the maximum SAR value averaged over 1 gram to the inner surface of the phantom a series of measurements were made at a few (x,y) co-ordinates within the refined grid as a function of depth, with 2.5 mm spacing. Figure 11 in Appendix A shows the data gathered and the exponential curves fit to them. The average exponential coefficient was determined to be (-0.058 ± 0.001) / mm.

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 1 gram that was determined previously, we obtain the maximum SAR value at the surface averaged over 1 gram, 1.22 W/kg.

7. DISCUSSION

The factory tolerance for setting the power level of the 900 MHz trunking radio is 2W ± 5 %. The DUI could then have an absolute maximum power of 2.1 W. Then, it is determined by proportional scaling of the maximum power (2.1 W) that the device would produce an estimated maximum 1 gram SAR of 1.28 W/kg.

51 Spectrum Way
Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

The most appropriate nose protrusion to use for SAR measurements is an open question. The DOD Handbook 743A defines Nose Protrusion as "the maximum anterior protrusion of the nose"; it is their dimension 137. In Table 137b they show the percentiles in centimetres for various series of measurements, a portion of which is included in the following table:

No.	Series	Percentiles in Centimetres		
		5^{th}	95^{th}	99^{th}
1	US Army Men (1988)	1.5	2.3	2.4
2	USAF Basic Trainees (1965)	1.8	2.8	3.0
3	US Navy Aviators (1964)	1.9	2.7	3.0
4	USAF Flying Personnel (1950)	1.8	2.7	3.0
5	CWS Face Study (1945)	1.7	2.6	2.8
6	US Army Women (1988)	1.5	2.2	2.4

Table 3. Nose Protrusion Percentiles

The SAR measurements reported herein have used a 30 mm separation between the face simulating phantom and the DUT. This actually corresponds to 32.5 mm between the DUT and the liquid head simulation when the phantom's shell thickness of 2.5 mm is included (see Figure 12). This would be equivalent to 1 cm in front of the tip of the nose for the average of the most recent 1988 US Army 95^{th} percentile data, series 1 and 6.

A series of wide area SAR scans were performed on the worst channel (transmit band low, 1, 896.0125 MHz) versus the separation between the DUT and the tissue simulation. These will enable the maximum 1g SAR for a separation of 32.5 mm to be interpolated for other separations between the plane of the face simulation and the surface of the DUT. The peak single point SAR for each scan were:

DUT – tissue simulation separation (mm)	Highest local SAR (W/kg)
12.5	2.88
22.5	2.11
32.5	1.01

Table 4. SAR versus Separation

Figure 13 in Appendix A shows the data plotted as a function of separation and the curves fit to them. Note that the data obtained from the area, zoom and depth scans for the worst channel and worst antenna, reported elsewhere in this report, are also included in the figure. The 5^{th} and 95^{th} percentile nose protrusions from the DOD-Handbook data for the 1988 US Army (average of men and women) are indicated of

51 Spectrum Way
Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

the figure.

If the data for Figure 13 is fitted to an exponential equation we get:

$$\text{Peak Local SAR} = 5.676\, e^{-0.0494 * (\text{separation})}$$

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

$$\text{Maximum 1g SAR} = k\, e^{-0.0494 * (\text{separation})}$$

Using this equation with:

Maximum 1 g SAR determined above = 1.28 W/kg
Tissue simulation – DUT separation = 32.5 mm

results in a k = 6.389 W/kg, which corresponds to the maximum 1 g SAR when the separation is 0 mm. The estimated maximum 1 g SAR at a separation corresponding to the DUT touching a 5th percentile nose from the 1988 US Army data would be 3.05 W/kg, which is well below the FCC partial body limit of 8.0 W/kg for occupational or controlled exposure.

51 Spectrum Way
Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

8. CONCLUSIONS

The maximum Specific Absorption Rate (SAR) averaged over 1 gram, determined at 896.0125 MHz (transmit band low, 1, speaker/microphone with antenna port, quarter-wavelength centre-fed whip antenna, 2W / 33dBm) of a Com-Net Ericsson Jaguar 700P trunking radio, is 1.28 W/kg. Since this is a PTT device, its maximum efective duty factor is 50%, resulting in an effective maximum 1 gram SAR of 0.64 W/kg. The overall margin of uncertainty for this measurement is ±11.4 % (Appendix C).

The SAR limit given in the FCC 96-326 safety guideline is 8 W/kg for partial body occupational /controlled RF exposure.

Considering the above, this unit as tested, and as it will be marketed and used (with user training), is found to be compliant with this requirement.

51 Spectrum Way
Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

APPENDIX A. Measurement Setup and SAR Graphs

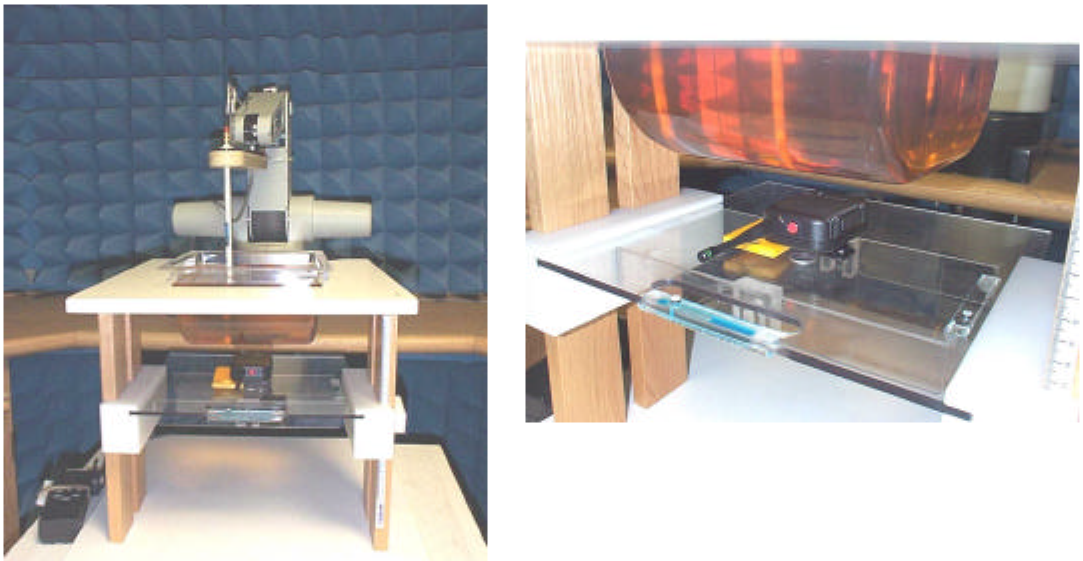

Figure 1. Setup and Close up of Setup

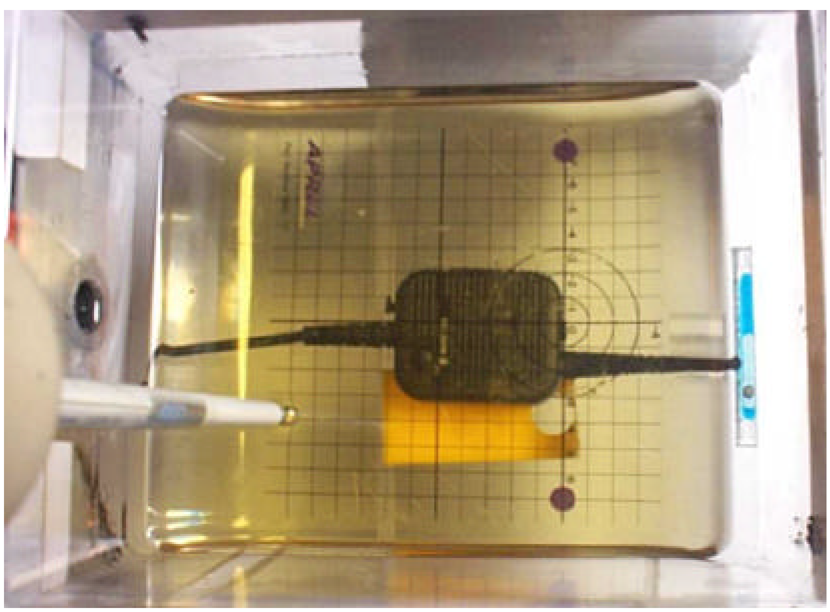

Figure 2. Grid inside the Phantom

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Nepean, Ontario, K2R 1E6
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Fax (613) 820 4161
e-mail: info@aprel.com

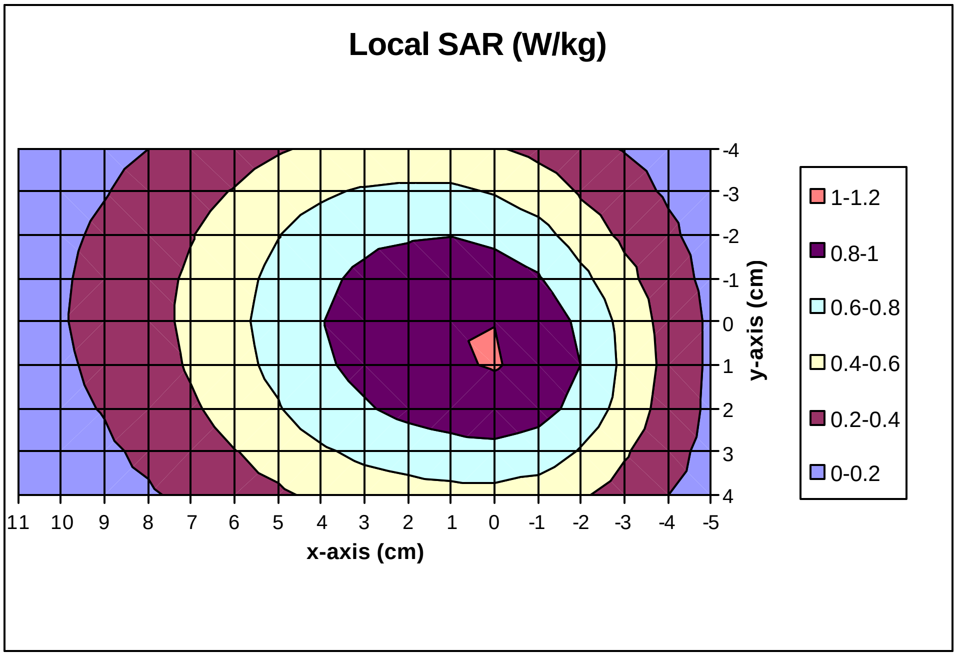

Figure 3. Contour Plot of the Area Scan 2.5mm Above Phantom Surface

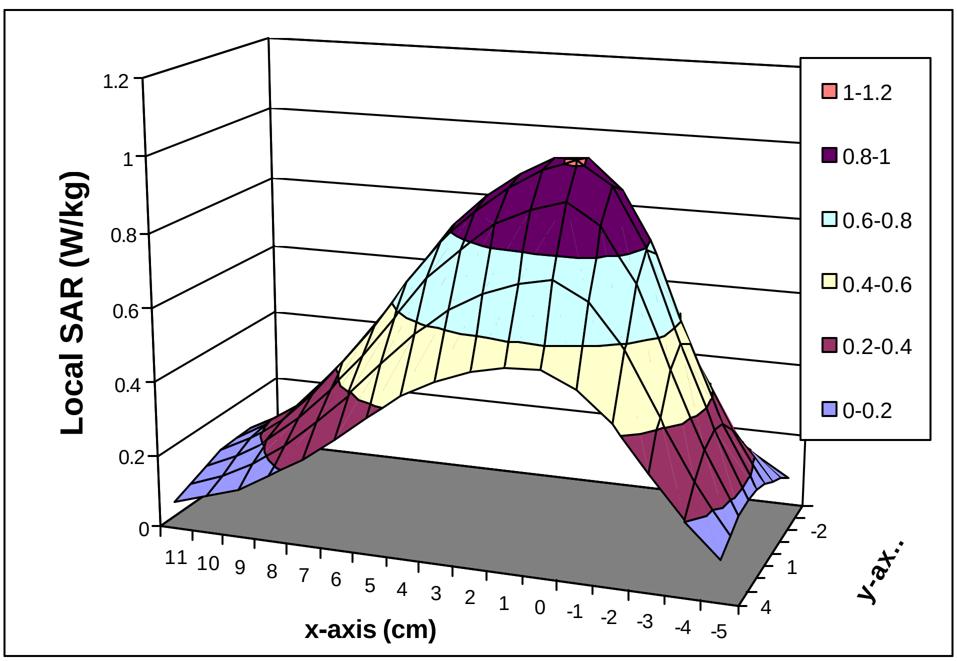

Figure 4. Surface Plot of the Area Scan 2.5mm Above Phantom Surface

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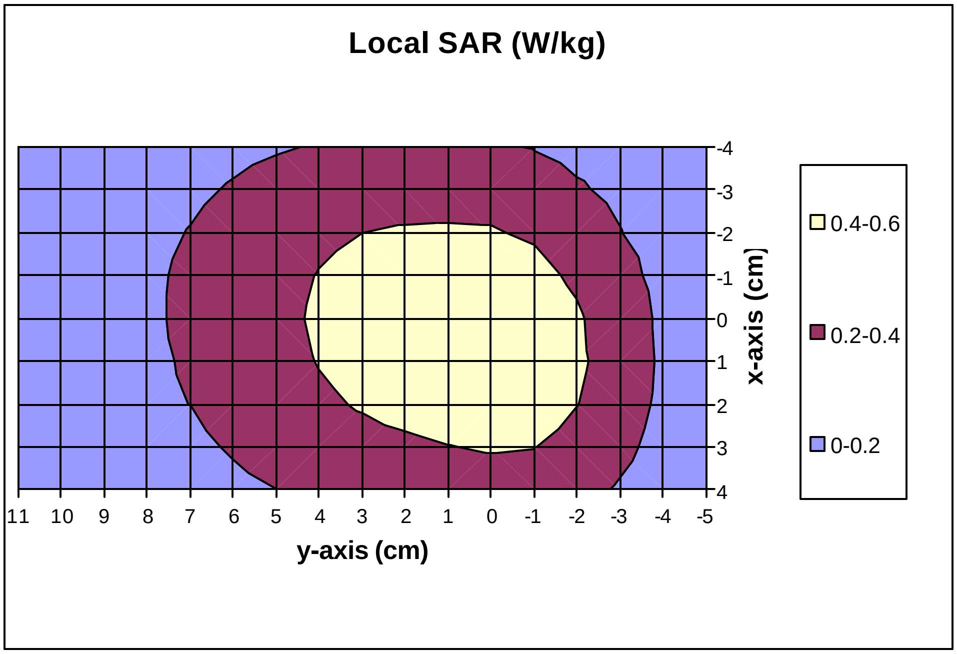

Figure 5. Contour Plot of the Area Scan 12.5mm Above Phantom Surface

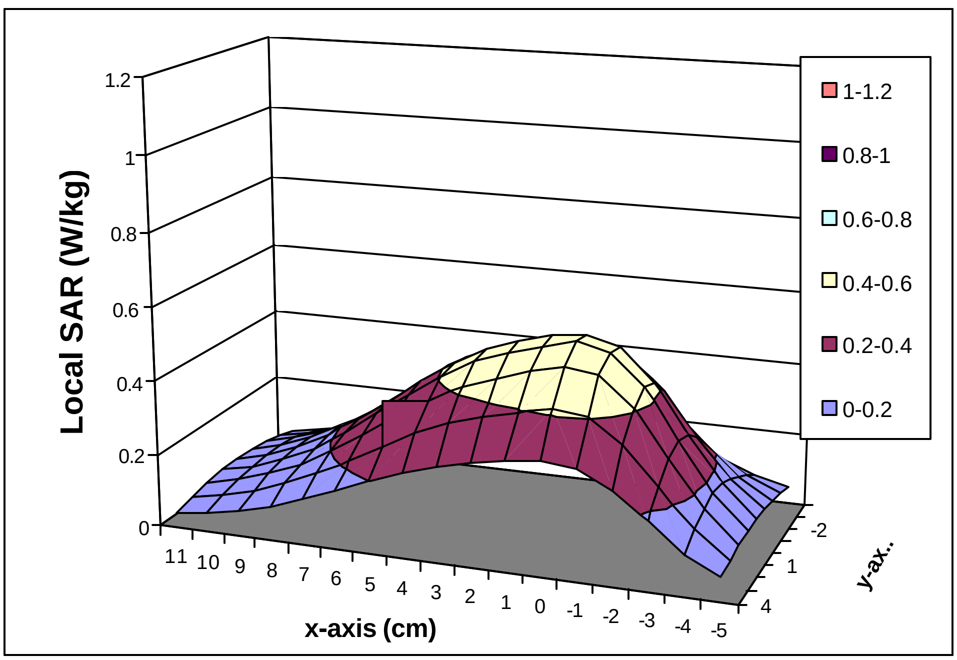

Figure 6. Surface Plot of the Area Scan 12.5mm Above Phantom Surface

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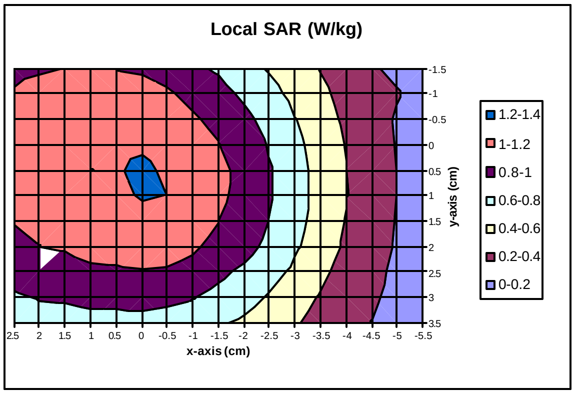

Figure 7. Zoom Scan 2.5mm Above Phantom Surface

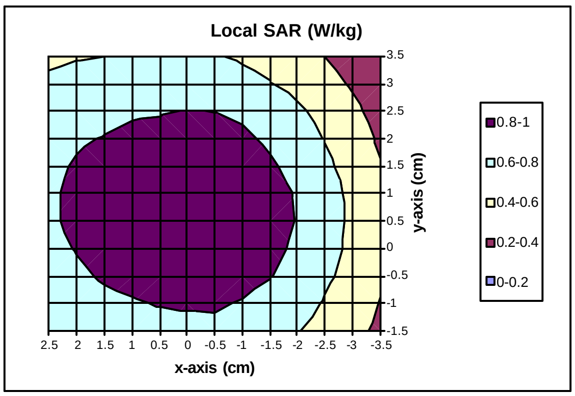

Figure 8. Zoom Scan 7.5mm Above Phantom Surface

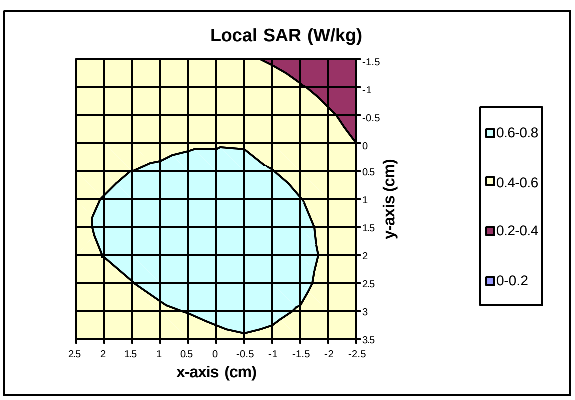

Figure 9. Zoom Scan 12.5mm Above Phantom Surface

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Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

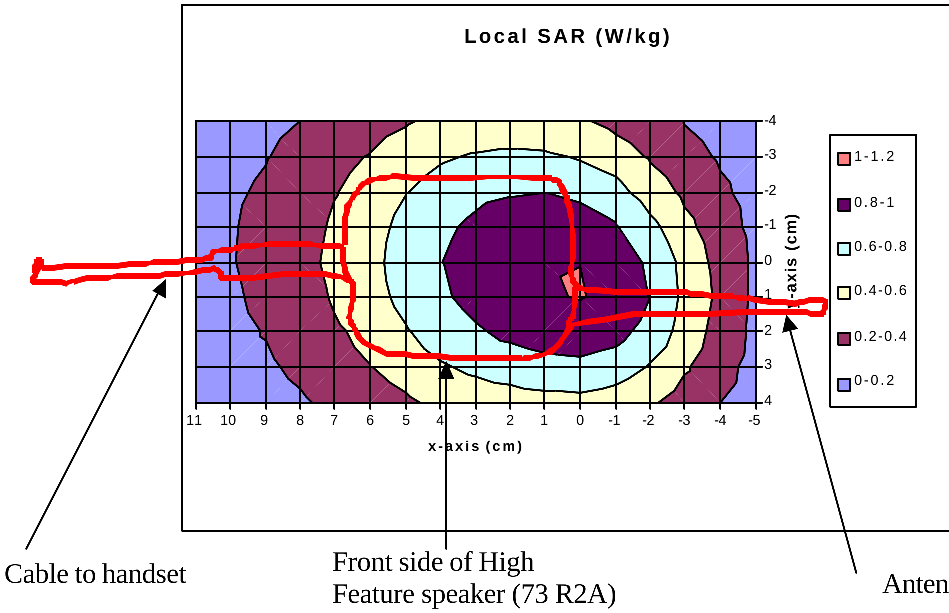


Figure 10. Overlay of the DUI's Outlines Superimposed onto the Area Scan

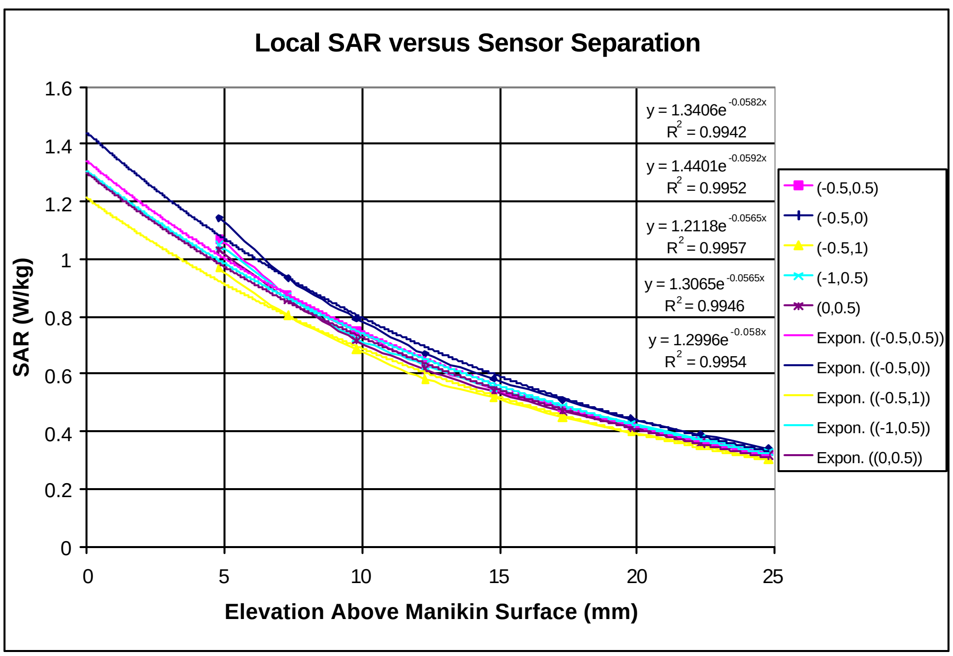


Figure 11. Local SAR versus Sensor Separation

51 Spectrum Way
Nepean, Ontario, K2R 1E6

Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

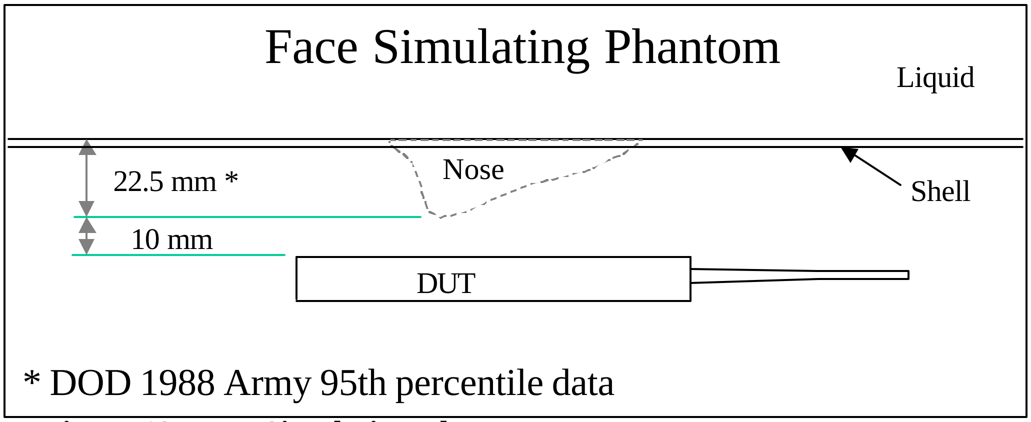


Figure 12. Face Simulating Phantom

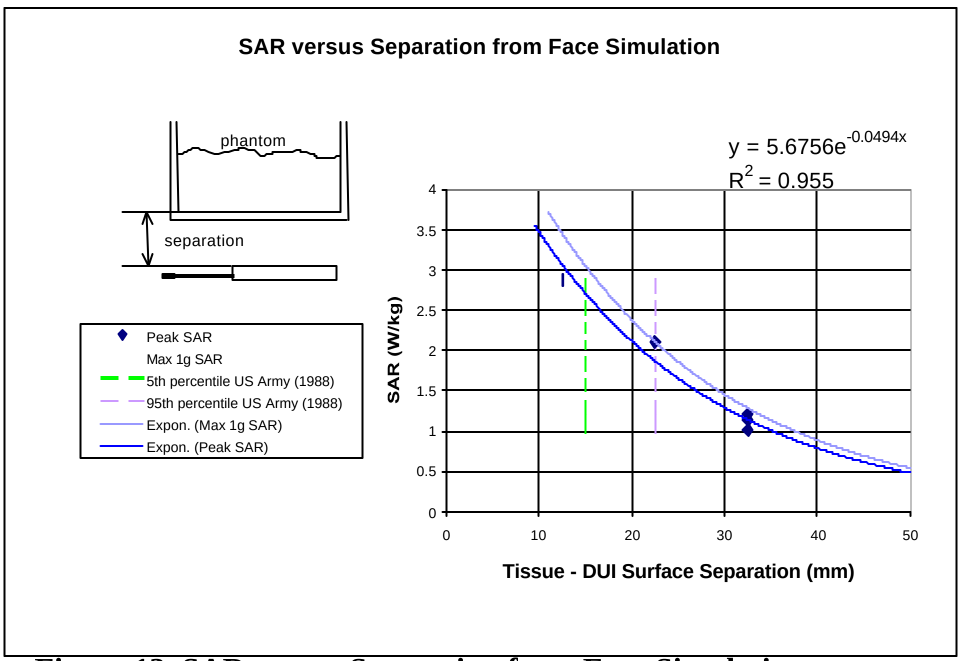


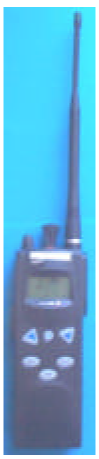
Figure 13. SAR versus Separation from Face Simulation

51 Spectrum Way
Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

APPENDIX B. Manufacturer's Specifications

speaker/microphone with antenna port, black, Com-Net Ericsson, CSA/FM KRY 101 1617/84 (left)

speaker/microphone, black, Com-Net Ericsson, CSA/FM KRY 101 1617/83 (right)



half-wavelength centre-fed whip antenna, 215 mm long, 900 MHz (EXE-902MD) (left)

quarter-wavelength end-fed whip antenna, 90 mm long, 900 MHz (KRE 101 1223/02) (right)

Com-Net Ericsson 7.5V nickel cadmium high capacity batteries (1700 mAh), BKB 191 210/3

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

51 Spectrum Way
Nepean, Ontario, K2R 1E6

Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

APPENDIX C. Uncertainty Budget

Uncertainties Contributing to the Overall Uncertainty

Type of Uncertainty	**Specific to**	**Uncertainty**	
Power variation due to battery condition	DUI	1.4%	
Extrapolation due to curve fit of SAR vs de	DUI & setuן	4.1%	
Extrapolation due to depth measurement	setup	2.8%	
Conductivity	setup	6.0%	
Density	setup	2.6%	
Tissue enhancement factor	setup	7.0%	
Voltage measurement	setup	0.4%	
Probe sensitivity factor	setup	3.5%	
		11.4%	**RSS**

51 Spectrum Way
Nepean, Ontario, K2R 1E6

Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

APPENDIX D. Simulated Brain 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	40.6 %
Sugar	58.0 %
Salt	1.0 %
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 1030 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.

The dielectric properties at 918 MHz are:

	APREL	OET 65 Supplement	Δ / % (OET)
Dielectric constant, ε_r	47.0	45.73	2.7%
Conductivity, σ [S/m]	1.02	0.77	32.7%
Tissue Conversion Factor, γ	10.0[1]	-	-

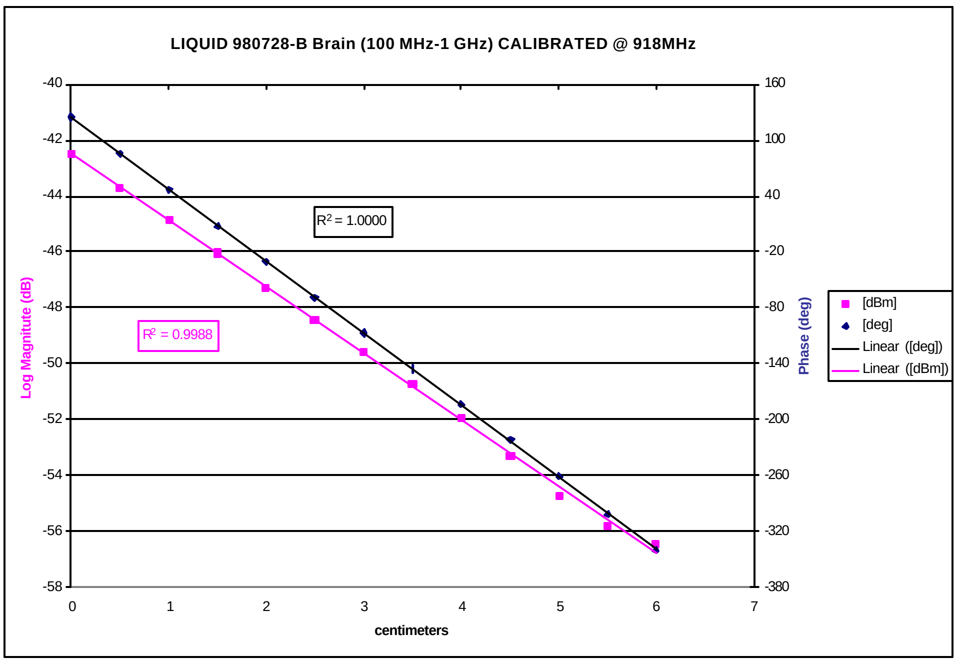
[1] the tissue conversion factor for brain tissue at 918MHz was estimated from calibrations of brain tissue at 835MHz and muscle tissue at 835 and 899MHz (see following table) by proportional scaling.

Frequency	Brain Tissue Conversion Factor, g	Muscle Tissue Conversion Factor, g
835	8.0	7.8
899	9.8	-

51 Spectrum Way
Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

SIMULATION FLUID #**980728-B Brain (100 MHz-1 GHz)**
CALIBRATION DATE **17-Jul-00**
CALIBRATED BY **Ken O'Donnell**
Frequency Range **100 MHz-1 GHz**
Frequency Calibrated **918MHz**
Tissue Type **Brain**

Position [cm]	Amplitude [dBm]		Phase [deg]	[deg]
0	-42.49		124.79	124.79
0.5	-43.69		85.61	85.61
1	-44.84		46.38	46.38
1.5	-46.03		7.68	7.68
2	-47.27		-30.27	-30.27
2.5	-48.46		-68.47	-68.47
3	-49.58		-106.71	-106.71
3.5	-50.75		-145.43	-145.43
4	-51.93		175.76	-184.24
4.5	-53.27		138.59	-221.41
5	-54.76		98.33	-261.67
5.5	-55.8		57.87	-302.13
6	-56.44		20.12	-339.88
ΔdB_1	-7.09		Δdeg_1	-231.5
ΔdB_2	-7.06		Δdeg_2	-231.04
ΔdB_3	-7.09		Δdeg_3	-230.62
ΔdB_4	-7.24		Δdeg_4	-229.09
ΔdB_5	-7.49		Δdeg_5	-231.4
ΔdB_6	-7.34		Δdeg_6	-233.66
ΔdB_7	-6.86		Δdeg_7	-233.17
ΔdB_{AVG} [dB]	-7.17		Δdeg_{AVG} [deg]	-231.4971429
dB_{AVG} (α_{AVG}) [dB/cm]	-2.39		deg_{AVG} (β_{AVG}) [deg/cm]	-77.16571429
(α_{AVG}) [NP/cm]	-0.275049272		(β_{AVG}) [rad/cm]	-1.346795784
f [Hz]	9.18E+08			
μ [H/cm]	1.25664E-08			
ε_0 [F/cm]	8.854E-14			
			FCC	Δ
ε_r	**47.0**		45.73	2.7%
$\sigma_{effective}$	**1.02**	S/m	0.77	32.7%



51 Spectrum Way
Nepean, Ontario, K2R 1E6
Project #: CNEB-JAGUAR 700P-3497
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

899 MHz Data (Tony & Heike) MUSCLE with E-115

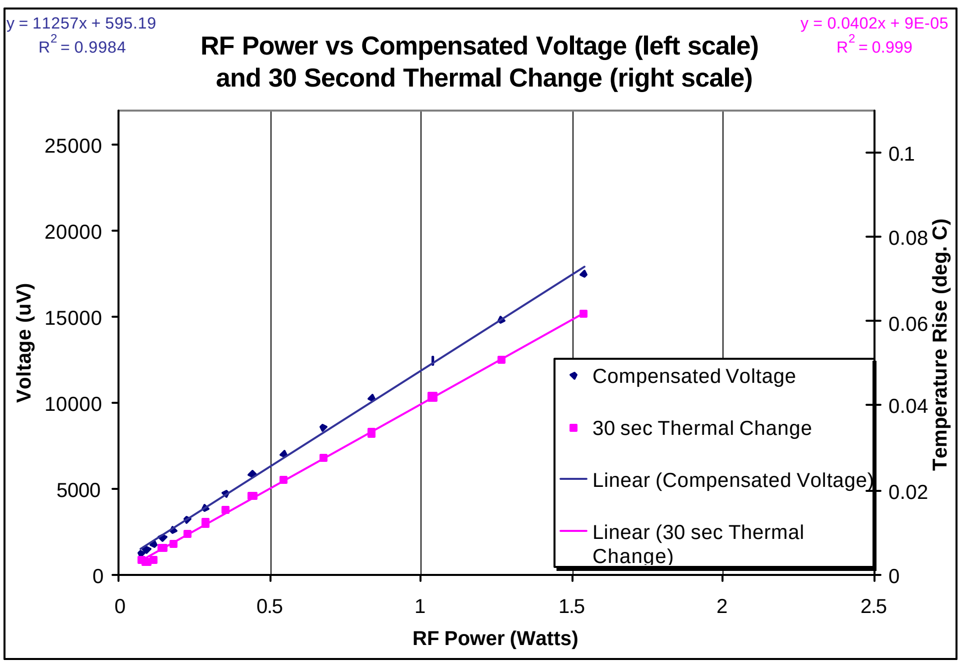
						delta	Sum	Thermal
RF Power			**Ch0**	**Ch1**	**Ch2**	**0 sec**	**Vi/Ei**	**SAR**
W	dBm	R&S	uV	uV	uV	deg. C		W/kg
0.07261	18.61	-26.74	317	708	1831	0	1174	0.31
0.09099	19.59	-25.76	342	830	2246	0	1405	0.26
0.11535	20.62	-24.73	391	1001	2808	0	1726	0.31
0.14355	21.57	-23.78	439	1221	3418	0	2087	0.56
0.17989	22.55	-22.8	513	1465	4224	0	2549	0.66
0.22491	23.52	-21.83	610	1807	5225	0	3140	0.89
0.28379	24.53	-20.82	732	2222	6421	0	3853	1.13
0.35318	25.48	-19.87	854	2710	7861	0	4695	1.39
0.44259	26.46	-18.89	1025	3345	9717	0	5789	1.70
0.54828	27.39	-17.96	1221	4077	####	0	6993	2.08
0.67764	28.31	-17.04	1489	5005	####	0	8517	2.54
0.83753	29.23	-16.12	1782	6079	####	0	10263	3.09
1.03753	30.16	-15.19	2173	7422	####	0	12409	3.89
1.26474	31.02	-14.33	2612	8936	####	0.1	14767	4.71
1.53815	31.87	-13.48	3149	10693	####	0.1	17485	5.71

Directional Coupler factor 25.35 dB (Asset 100251 cal file data)
Additional inline attenuation 20 dB

Sensitivity (e) 1.619 1.633 1.62 - Sensor Sensitivity in mV/ (mW/cm^2): 899 MHz cal
η = 1.50 e2.429 2.45 2.43

Density	1.3	g/cm^3	###	kg/m^3	
Conductivity	11.7	mS/cr	1.2	S/m	
Heat Capacity (c)	2.775	J/C/g	###	J/C/kg - average of Balzano (2.7) and Kuster (2.85)	
Exposure Time	30	seconc	30	seconds	
Slope of Measure Voltage (m_V)	11257	uV/W	0	V/W	
- standard error or m_V	126.2	uV/W	0	V/W	1.1%
Slope of Measure Temp Change (m	0.04	C/W	0	C/W	
- standard error or m_T	3E-04	C/W	0	C/W	0.9%

Tissue Conversion Factor (γ) 9.6



51 Spectrum Way
Nepean, Ontario, K2R 1E6

Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com

APPENDIX E. Validation Scans on a Head Simulation Phantom

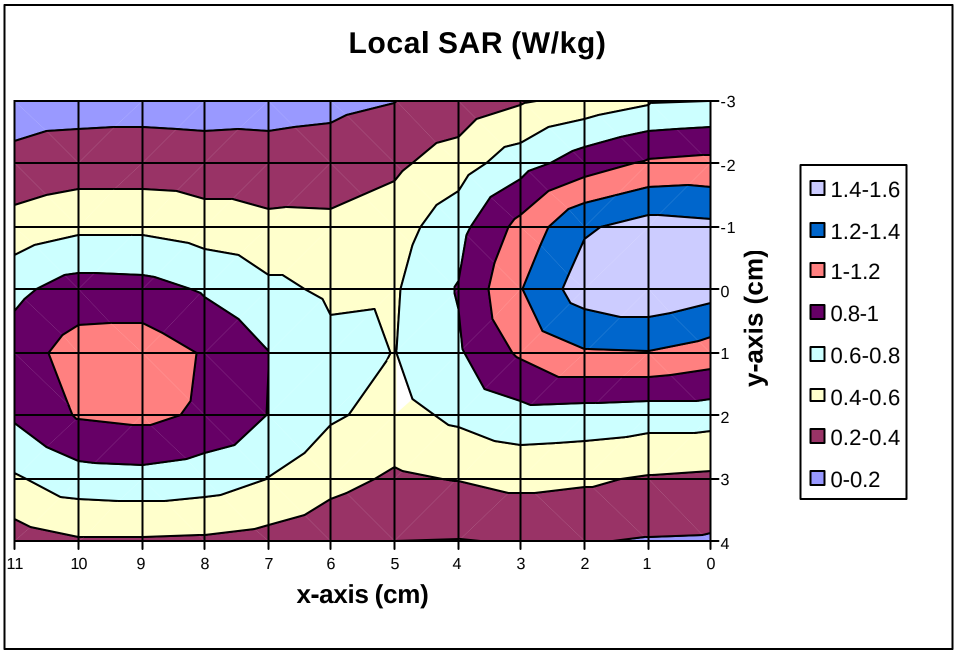


Figure 14. Contour Plot of the Reference Area Scan 2.5mm Above Phantom

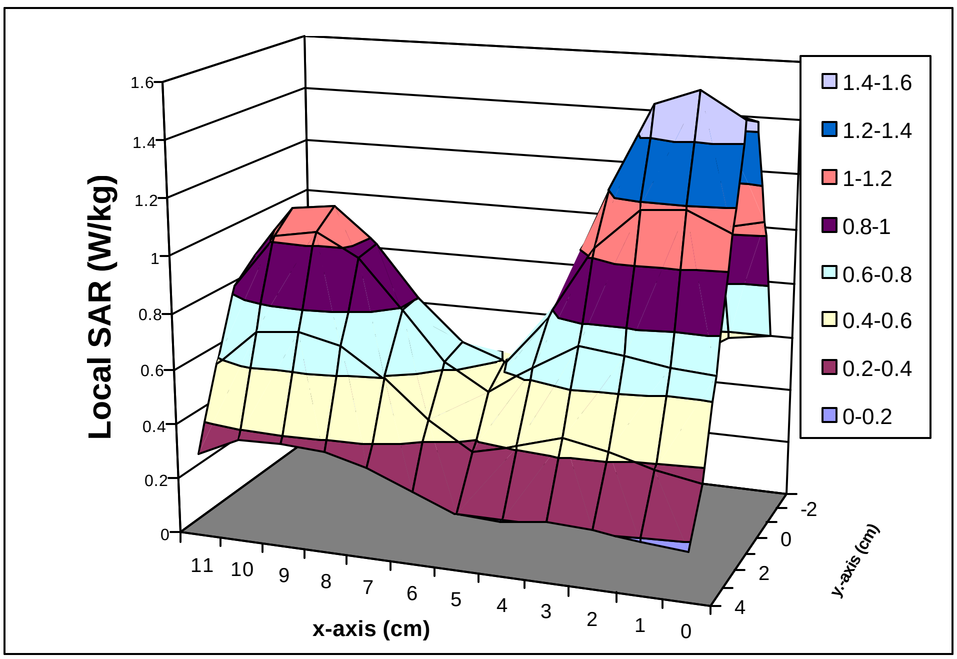


Figure 15. Surface Plot of the Reference Area Scan 2.5mm Above Phantom

51 Spectrum Way
Nepean, Ontario, K2R 1E6
Tel. (613) 820-2730
Fax (613) 820 4161
e-mail: info@aprel.com