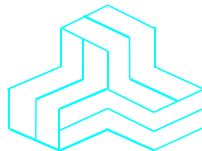


CERTIFICATE OF COMPLIANCE



September 21, 2001

File No.: LIP7-SAR

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

NOT TRANSFERABLE

This Verification Certificate is hereby issued to the named GRANTEE and is VALID ONLY for the equipment identified hereon for use under the rules and regulations listed below:

GRANTEE'S NAME:	Lipman USA, Inc.
PRODUCT UNDER TEST:	Point of Sale Device
MODEL NO.:	NURIT 8000 RIM
FCC ID:	O2SNURIT8000RI
OPERATING FREQUENCY RANGE:	896 – 901 MHz
NOMINAL RF OUTPUT POWER:	2 Watts Conducted, 1.23 Watts ERP
MAXIMUM S.A.R.:	0.944 Watts/Kg (1g average) at 1.5cm separation and 25% Duty Cycle

APPLICABLE STANDARDS: SAR (Specific Absorption Rate) requirements using guidelines established in IEEE C95.1-1991, FCC OET Bulletin 65 (Supplement C), Industry Canada RSS-102(Issue 1) and ACA Radiocommunications (Electromagnetic Radiation – Human Exposure) Amendment Standard 2000 (No. 1)

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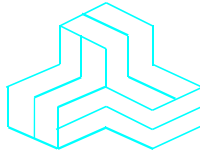


**Approved by: Tri M. Luu, P.Eng.
V.P. – Engineering**

UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4
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ENGINEERING TEST REPORT



Point of Sale Device Model No.: NURIT 8000 RIM

Tested For

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

In Accordance With

**SAR (Specific Absorption Rate) Requirements
Using Guidelines Established in IEEE C95.1-1991,
FCC OET Bulletin 65 (Supplement C),
Industry Canada RSS-102(Issue 1) and
ACA Radiocommunications (Electromagnetic Radiation – Human Exposure)
Amendment Standard 2000 (No. 1)**

UltraTech's File No.: LIP7-SAR

This Test report is Issued under the Authority of
Tri M. Luu, Professional Engineer,
Vice President of Engineering
UltraTech Group of Labs



Date: September 21, 2001

Report Prepared by: Dan Huynh

Tested by: Wayne Wu

Issued Date: September 21, 2001

Test Dates: September 6-12, 2001

The results in this Test Report apply only to the sample(s) tested, which has been randomly selected.

UltraTech

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	SAR (Specific Absorption Rate) Requirements IEEE C95.1-1991, FCC OET Bulletin 65 (Supplement C) Industry Canada RSS-102 (Issue 1). ACA Radiocommunications (Electromagnetic Radiation – Human Exposure), Amendment Standard 2000 (No. 1)
Title:	Safety Levels with respect to human exposure to Radio Frequency Electromagnetic Fields Guideline for Evaluating the Environmental Effects of Radio Frequency Radiation
Purpose of Test:	To verify compliance with Federal regulated SAR requirements in Canada and the US.
Method of Measurements:	IEEE C95.1-1991, FCC OET Bulletin 65 (Supplement C) and Industry Canada RSS-102 (Issue 1)
Exposure Category:	☒ General population, uncontrolled exposure ☐ Occupational, controlled exposure

1.2. REFERENCES

The methods and procedures used for the measurements contained in this report are details in the following reference standards:

Publications	Year	Title
IEEE Std. 1528-2001 Draft	2001	Draft Recommended practice for determining the Peak Spatial-Average Specific Absorption rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.
Industry Canada RSS102	1999	"Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields"
ACA	2000	ACA Radiocommunications (Electromagnetic Radiation – Human Exposure) Amendment Standard 2000 (No. 1)
NCRP Report No.86	1986	"Biological Effects and Exposure Criteria for radio Frequency Electromagnetic Fields"
FCC OET Bulletin 65	1997	"Evaluating Compliance with FCC Guidelines for Human Exposure to radio Frequency Fields"
ANSI/IEEE C95.3	1992	"Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave"
ANSI/IEEE C95.1	1992	"Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300GHz"
AS/NZS 2722.1	1998	Interim Australian/New Zealand Standard. "Radiofrequency fields, Part 1:Maximum exposure levels - 3kHz to 300GHz "

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EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT AND MANUFACTURER INFORMATION

APPLICANT	
Name:	Lipman USA, Inc.
Address:	50 Gordon Dr. Syosset, NY USA, 11791
Contact Person:	Mr. John Carpino Phone #: 516-484-9898

MANUFACTURER	
Name:	Lipman Electronic Engineering, Ltd.
Address:	11 Haamal St Park Afek Rosh Haayin 48092 Israel
Contact Person:	Amit Chhabra Phone #: 1 800 454 7626 X2300 516-484-9898 X2300

2.2. DEVICE UNDER TEST (DUT) DESCRIPTION

The following is the information provided by the applicant.

Trade Name:	Point of Sale Device
Type/Model Number:	NURIT 8000 RIM
Serial Number:	Test Sample
Type of Equipment:	Licensed Non-Broadcast Station Transmitter
Frequency of Operation:	896 - 901 MHz
Rated RF Power:	2 Watts (at antenna terminal) 1.23 Watts (ERP)
Modulation Employed:	FM Data
Emissions Designation:	12K8F1D
Antenna Type:	Patch
External Power Supply:	Lipman USA Inc., Power Supply/Charger Model No.: TRF00050
Primary User Functions of DUT:	Wireless hand held POS/EDC terminal for credit, debit and ERT transactions

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Point of Sale Device, Model No.: NURIT 8000 RIM**FCC ID: O2SNURIT8000RI****2.3. LIST OF DUT'S ACCESSORIES**

- Lipman USA Inc., Power Supply/Charger, Model No.: TRF00050

2.4. SPECIAL CHANGES ON THE DUT'S HARDWARE/SOFTWARE FOR TESTING PURPOSES

None

2.5. ANCILLARY EQUIPMENT

- IBM Laptop, Type 2625-DEF, Serial No. 78-WWM48 96/05

2.6. GENERAL TEST CONFIGURATIONS**2.6.1. Equipment Configuration**

Power and signal distribution, grounding, interconnecting cabling and physical placement of equipment of a test system shall simulate the typical application and usage in so far as is practicable, and shall be in accordance with the relevant product specifications of the manufacturer.

The configuration that tends to maximize the DUT's emission or minimize its immunity is not usually intuitively obvious and in most instances selection will involve some trial and error testing. For example, interface cables may be moved or equipment re-orientated during initial stages of testing and the effects on the results observed.

Only configurations within the range of positions likely to occur in normal use need to be considered.

The configuration selected shall be fully detailed and documented in the test report, together with the justification for selecting that particular configuration.

2.6.2. Exercising Equipment

The exercising equipment and other auxiliary equipment shall be sufficiently decoupled from the EUT so that the performance of such equipment does not significantly influence the test results.

2.7. SPECIFIC OPERATING CONDITIONS

Not specified.

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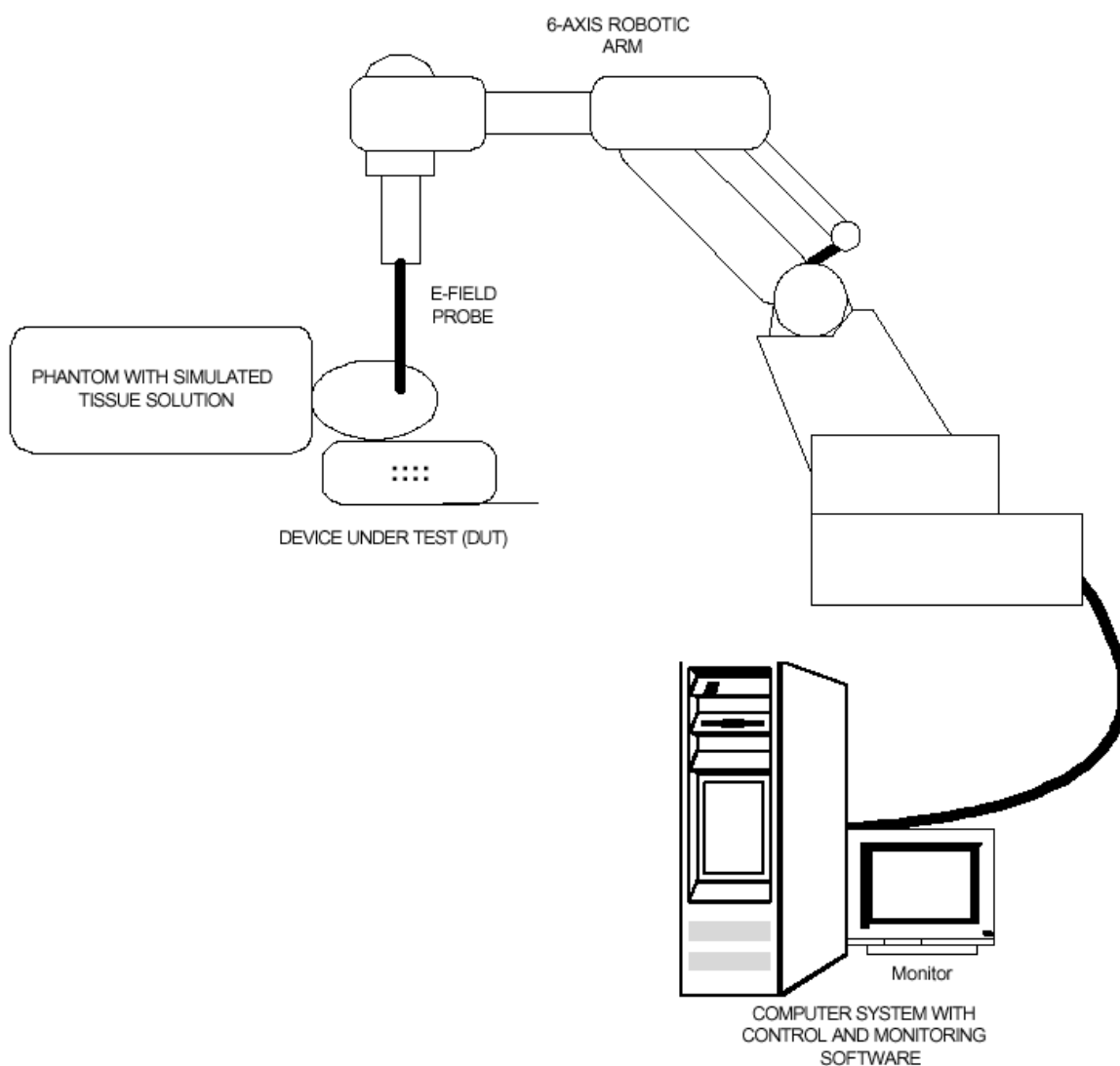
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2.8. BLOCK DIAGRAM OF TEST SETUP

The EUT was configured as normal intended use. The following block diagram shows a representative equipment arrangement during tests:



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EXHIBIT 3. SUMMARY OF TEST RESULTS

3.1. LOCATION OF TESTS

All of the measurements described in this report were performed at UltraTech Group of Labs located at:

3000 Bristol Circle, in the city of Oakville, Province of Ontario, Canada.

All measurements were performed in UltraTech's shielded chamber, 24' x 16' x 8'.

3.2. APPLICABILITY & SUMMARY OF SAR RESULTS

The peak spatial - average SAR measured was found to be **0.944 Watts/Kg (1g average) at 1.5cm separation** (25 % duty cycle)

SAR Limits	Test Requirements	Compliance (Yes/No)
General population/Uncontrolled exposure 0.08W/kg whole body average and spatial peak SAR of 1.6W/kg, averaged over 1gram of tissue Hands, wrist, feet and ankles have a peak SAR not to exceed 4 W/kg, averaged over 10 grams of tissue.	Requirements using guidelines established in IEEE C95.1-1991 FCC OET Bulletin 65 (Supplement C) Industry Canada RSS-102 (Issue 1). ACA Radiocommunications (Electromagnetic Radiation – Human Exposure) Amendment Standard 2000 (No. 1)	Yes
Occupational/Controlled Exposure 0.4W/kg whole body average and spatial peak SAR of 8W/kg, averaged over 1gram of tissue Hands, wrist, feet and ankles have a peak SAR not to exceed 20 W/kg, averaged over 10 grams of tissue.	Requirements using guidelines established in IEEE C95.1-1991 FCC OET Bulletin 65 (Supplement C), Industry Canada RSS-102 (Issue 1) ACA Radiocommunications (Electromagnetic Radiation – Human Exposure) Amendment Standard 2000 (No. 1)	N/A

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EXHIBIT 4. MEASUREMENTS, EXAMINATIONS & TEST DATA

4.1. TEST SETUP

EUT Information		Condition	
Radio Type	Point of Sale	Robot Type	6 Axis
Model Number	NURIT 8000 RIM	Scan Type	SAR - Area/Zoom
Serial Number	Test Sample	Measured Field	E
Frequency Band (MHz)	896 - 901 MHz	Phantom Type	Open Back Full Body
Frequency Tested (MHz)	896 and 901	Phantom Position	Waist
Nominal Output Power (W)	2 (at antenna terminal)	Room Temperature	24°C
Antenna Type	1. Integrated pcb mount	Room Humidity	35%
Signal Type	25% CW	Tissue Temperature	23°C
Duty Cycle	25%		

Type of Tissue	Muscle
Target Frequency (MHz)	896
Target Dielectric Constant	55.9
Target Conductivity (S/m)	0.97
Composition (by weight)	Tap Water (53.42 %) Sugar (45.20 %) Salt (0.80%) HEC (0.53 %) Bactericide (0.05%)
Measured Dielectric Constant	56.1
Measured Conductivity (S/m)	0.99
Probe Name	E
Probe Orientation	Isotropic
Probe Offset (mm)	2.25
Sensor Factor	10.8
Conversion Factor	0.880
Calibration Date (MM/DD/YY)	14/06/2001

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4.2. PHOTOGRAPH OF EUT WITH ALL ACCESORIES



<Front View>

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SPECIFIC ABSORPTION RATIO (SAR)

IEEE C95.1-1991, FCC OET Bulletin 65 (Supplement C), Industry Canada RSS-102 (Issue 1) and ACA Radiocommunications (Electromagnetic Radiation – Human Exposure) Amendment Standard 2000 (No. 1)

Page 8

Point of Sale Device, Model No.: NURIT 8000 RIM

FCC ID: O2SNURIT8000RI



<Back View>

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Point of Sale Device, Model No.: NURIT 8000 RIM

FCC ID: O2SNURIT8000RI



<Front View – Showing Internal Integral Antenna>

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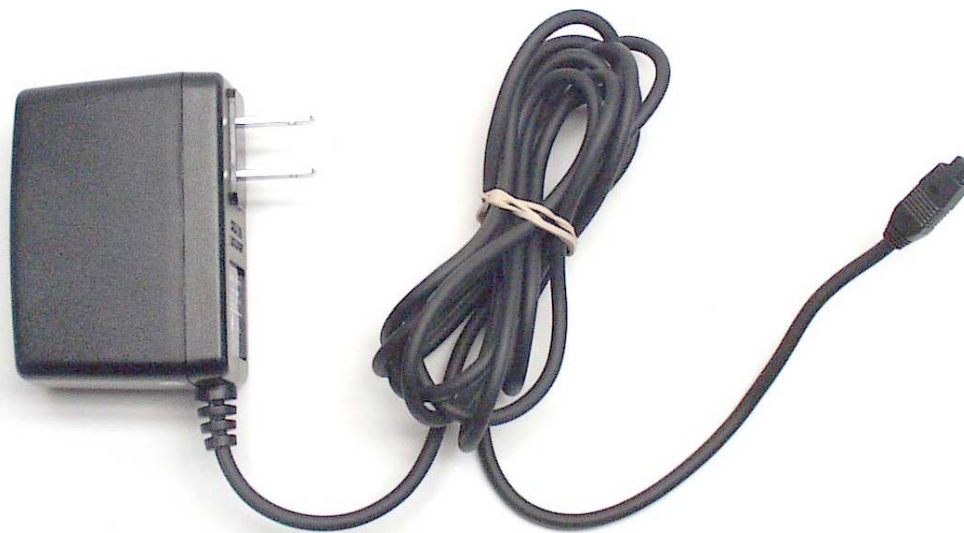
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Point of Sale Device, Model No.: NURIT 8000 RIM

FCC ID: O2SNURIT8000RI



<Side View - Lipman USA Inc., Power Supply/Charger, Model No.: TRF00050>



<Rear View - Lipman USA Inc., Power Supply/Charger, Model No.: TRF00050>

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Point of Sale Device, Model No.: NURIT 8000 RIM

FCC ID: O2SNURIT8000RI



<Front View – Lipman USA, Inc. Li-ion Battery Pack, Model BAT00021, 7.2V, 1450mAh>



<Rear View – Lipman USA, Inc. Li-ion Battery Pack, Model BAT00021, 7.2V, 1450mAh>

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4.3. PHOTOGRAPHS OF EUT POSITION (BODY)



< Back surface of EUT parallel to the phantom waist – Overview >

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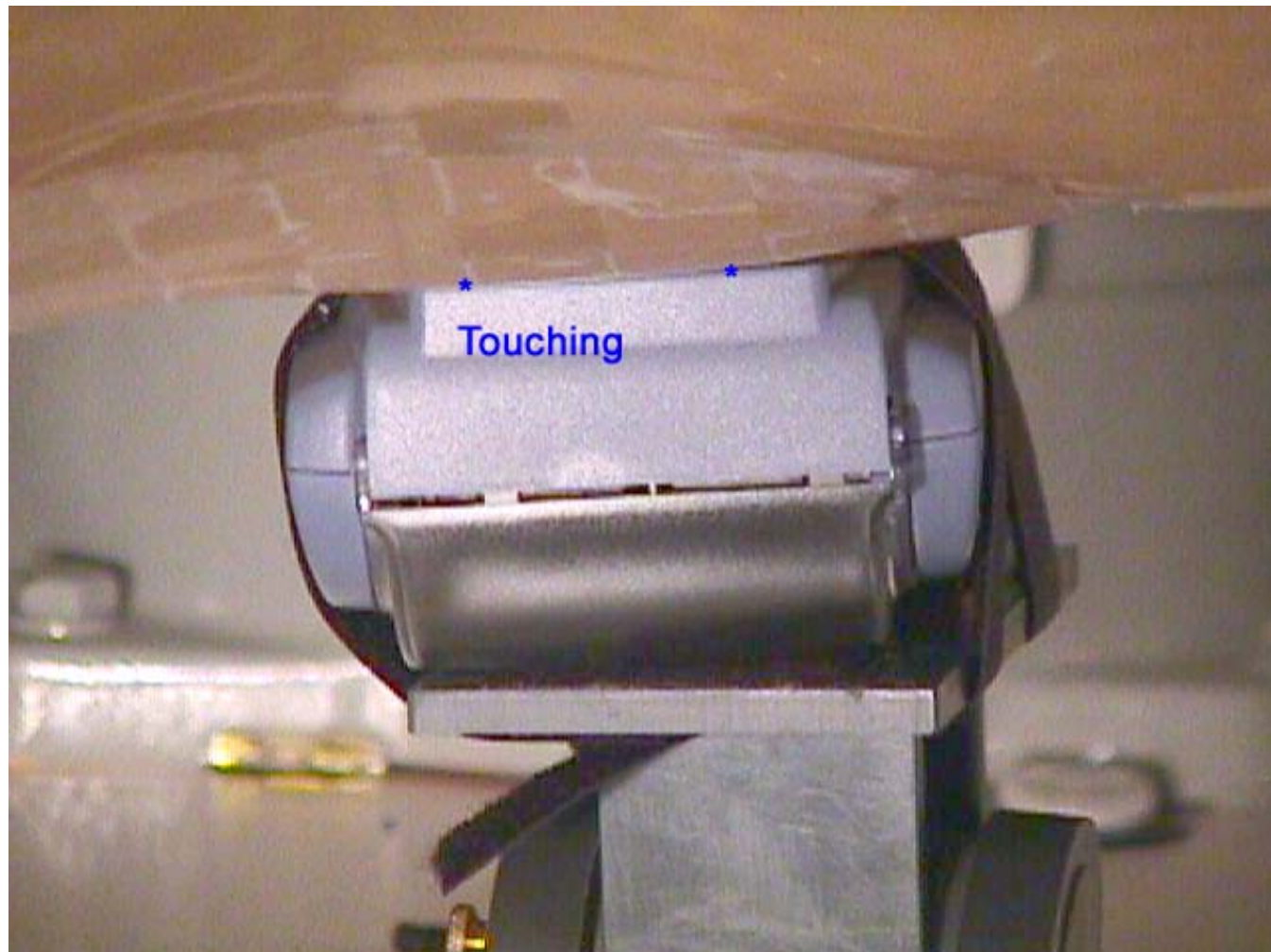
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Point of Sale Device, Model No.: NURIT 8000 RIM

FCC ID: O2SNURIT8000RI



< Back surface of EUT parallel and in contact to the phantom waist – Close-Up View >

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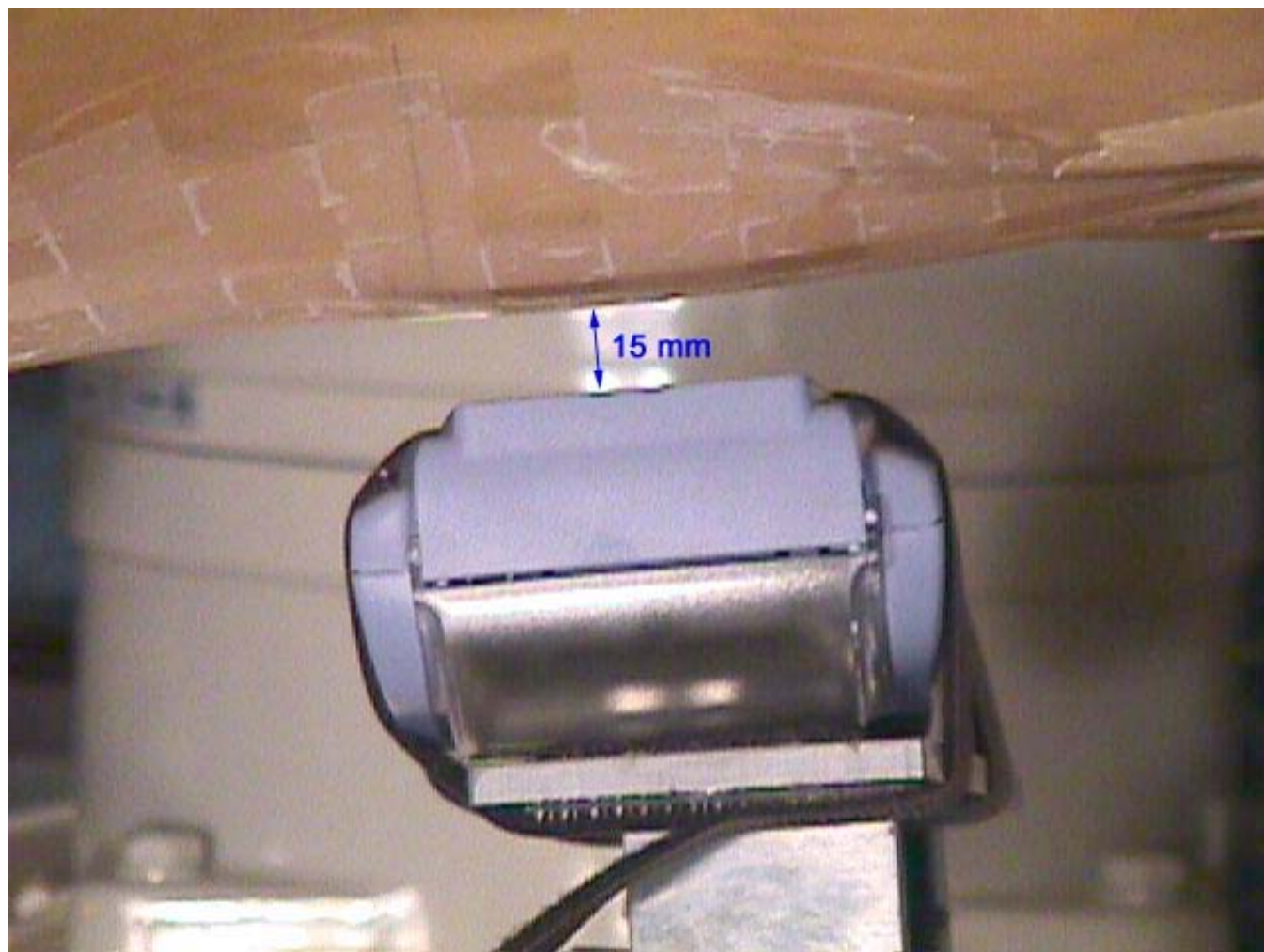
SPECIFIC ABSORPTION RATIO (SAR)

IEEE C95.1-1991, FCC OET Bulletin 65 (Supplement C), Industry Canada RSS-102 (Issue 1) and ACA Radiocommunications (Electromagnetic Radiation – Human Exposure) Amendment Standard 2000 (No. 1)

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Point of Sale Device, Model No.: NURIT 8000 RIM

FCC ID: O2SNURIT8000RI



< Back surface of EUT parallel and 15 mm away from the phantom waist – Close-Up View >

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FCC ID: O2SNURIT8000RI



< Back surface of EUT parallel and 25 mm away from the phantom waist – Close-Up View >

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< Top surface of EUT parallel to the phantom waist – Overview >

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< Top surface of EUT parallel and in contact to the phantom waist – Close-Up View >

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< Top surface of EUT parallel and 15 mm away from the phantom waist – Close-Up View >

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< Top surface of EUT parallel and 25 mm away from the phantom waist – Close-Up View >

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4.4. MAXIMUM FIELD LOCATION (BODY)

The maximum field was found to be located at (-15, 25) with the test configuration as described below:

- ◆ Waist position
- ◆ The Back of EUT in contact with the phantom

Complete area Pre-scans on all faces of the EUT were conducted to determine the location of the highest SAR and the device was repositioned to allow the identified hot-spots to be orientated with as large an area around the hot-spots to come into contact with the phantom surface. This procedure ensured that the maximum SAR readings would be obtained from the hot-spot areas identified.



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4.5. PEAK SPATIAL-AVERAGE SAR MEASURED (25% DUTY CYLCE)

Phantom Configurations	Device Test Positions	Antenna Position	SAR (W/kg) Frequency & Output
			901 MHz, 1905 mW (at antenna terminal)
Waist	Back of EUT with 15mm separation from the phantom	Internal Integral	0.944

4.6. SAR MEASUREMENT DATA (25% DUTY CYCLE)

4.6.1. Prescan Test Results at 896MHz with EUT Face in contact with phantom surface

EUT Face scanned	Maximum SAR Observed (W/Kg)	Location of hot spot
Back	3.372	Antenna Feed area
Top	0.700	Antenna Feed area
Front	0.332	Antenna Feed area
Left	0.692	Antenna Feed area
Right	0.342	Antenna Feed area

4.6.2. Detailed SAR Results with EUT relocated for maximum contact with phantom surface

EUT Configurations	EUT separation distance to phantom (mm)	Antenna Position	SAR (W/kg) Device Test Frequency & Output	
			896 MHz 1950 mW (at antenna terminal)	901 MHz 1905 mW (at antenna terminal)
Back surface of EUT parallel to phantom waist	0	Internal	3.391	3.961
	15	Internal	0.842	0.944
	25	Internal	0.410	0.308
Top surface of EUT parallel to phantom waist	0	Internal	0.769	0.687
	15	Internal	0.079	0.077
	25	Internal	0.004	0.000

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EXHIBIT 5. SAR SYSTEM CONFIGURATION & TEST METHODOLOGY

5.1. MEASUREMENT SYSTEM SPECIFICATIONS

Positioning Equipment	Probe
Type : 3D Near Field Scanner	Sensor : E-Field
Location Repeatability : 0.1mm	Spatial Resolution : 0.1 cm ³
Speed 180 °/sec	Isotropic Response : ± 0.25 dB
AC motors	Dynamic Range : 2 μ W/g to 100 mW/g
Computer	Phantom
Type : 166 MHz Pentium	Tissue : Simulated Tissue with electrical characteristics similar to those of the human at normal body temperature.
Memory : 32 Meg. RAM	Shell : Fiberglass human shell shaped (1.5 mm thick)
Operating System : Windows NT	
Monitor : 17" SVGA	

5.2. TEST PROCEDURES

In the SAR measurement, the positioning of the probes must be performed with sufficient accuracy to obtain repeatable measurements in the presence of rapid spatial attenuation phenomena. The accurate positioning of the E-field probe is accomplished by using a high precision robot. The robot can be taught to position the probe sensor following a specific pattern of points. In a first sweep, the sensor is positioned as close as possible to the interface, with the sensor enclosure touching the inside of the fiberglass shell. The SAR is measured on a grid of points, which covers the curved surface of the phantom in an area larger than the size of the DUT. After the initial scan, a high-resolution grid is used to locate the absolute maximum measured energy point. At this location, attenuation versus depth scan will be accomplished by the measurement system to calculate the SAR value.

5.3. PHANTOM

The phantom used in the evaluation of the RF exposure of the user of the wireless device is a clear fiberglass enclosure 1.5 mm thick, shaped like a human head or body and filled with a mixture simulating the dielectric characteristics of the brain, muscle or other types of human tissue. The maximum width of the cranial model is 17 cm, the cephalic index is 0.7 and the crown circumference of the cranial model is 61 cm. The ear is 6 mm above the outer surface of the shell.

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5.4. SIMULATED TISSUE

Simulated Tissue: Suggested in a paper by George Hartsgrove and colleagues in University of Ottawa Ref.: Bioelectromagnetics 8:29-36 (1987)

Ingredient	Quantity
Water	40.4 %
Sugar	56.0 %
Salt	2.5 %
HEC	1.0 %
Bactericide	0.1 %

Table. Example of composition of simulated tissue.

This simulated tissue is mainly composed of water, sugar and salt. At higher frequencies, in order to achieve the proper conductivity, the solution does not contain salt. Also, at these frequencies, D.I. water and alcohol is preferred.

Tissue Density: Approximately 1.25 g/cm³

5.4.1. Preparation

We determine the volume needs and carefully measure all components. A clean container is used where the ingredients will be mixed. A stirring paddle mounted to a drill press is used to stir the mixture. First we heat the DI water to about 40 °C to help the ingredients dissolve and then we pour the salt and the bactericide. We stir until all the ingredients are completely dissolved. We continue stirring slowly while adding the sugar. We avoid high RPM from the mixing device to prevent air bubbles in the mixture. Later on, we add the HEC to maintain the solution homogeneous. Mixing time is approximately 30 to 40 min.

5.5. MEASUREMENT OF ELECTRICAL CHARACTERISTICS OF SIMULATED TISSUE

- 1) Network Analyzer HP8753C or others
- 2) Slotted Coaxial Waveguide

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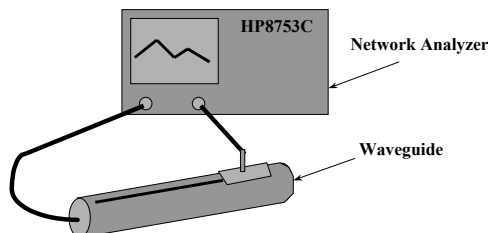
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5.5.1. Description Of The Slotted Coaxial Waveguide

The cylindrical waveguide is constructed with copper tube of about 30 to 40 cm in length, generally 12.5 mm diameter, with connectors at both ends. Inside of this tube, a conductive rod about 6.3 mm is coaxial supported by the two ends connectors (radiator). A slot 3 mm wide start at the beginning of the tube to approximately two thirds of the tube length. The outer edge of the slotted tube is marked in increments of 1 centimeter (10 to 12), and 0.5 centimeter for higher frequencies. A saddle piece containing the sampling probe is inserted in the slot so the tip of the probe is close but not in contact with the inner conductor (radiator).

To measure the electrical characteristics of the liquid simulated tissue, we fill the coaxial waveguide with the mixture, select CW frequency and measure amplitude and phase with the Network Analyzer for every point in the slot (typically 11). An effort is made to keep the resultant dielectric constant and conductivity within 5 % of published data.

Electrical Characteristics Measurement Setup



$$c = 3 \cdot 10^8 \text{ m/s}$$

$$A = \frac{\Delta A}{20} \ln_{10} \frac{1}{m}$$

$$\theta = \frac{\Delta \theta \cdot 2\pi}{360}$$

$$\lambda = \frac{c}{f} \cdot \frac{100}{2.54} \text{ inches}$$

$$\epsilon_{re} = \frac{(A^2 + \theta^2) \cdot \lambda^2}{4\pi^2}$$

$$\theta' = \left| \frac{|A| \cdot \lambda}{4\pi \sqrt{\epsilon_{re}}} \right|$$

$$S = \tan(2\theta')$$

$$\epsilon_r = \frac{\epsilon_{re}}{\sqrt{(1 + S^2)}}$$

$$\sigma = S \cdot 2\pi \cdot f \cdot 8.854 \cdot 10^{-12} \cdot \epsilon_r \text{ (S/m)}$$

Where:

ΔA is the amplitude attenuation in dB

$\Delta \theta$ is the phase change in degrees for 5 cm of wave propagation in the slotted line

f is the frequency of interest in Hz.

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5.6. SYSTEM DESCRIPTION

The measurement system consists of an E-field probe, instrumentation amplifiers, RF transparent cable connecting the amplifiers to the computer, the robotics arm with its extension and proximity sensors, a phantom with simulated tissue and a radio holder to support the device under test. The E-field probe is a three channel device used to measure RF electric fields in the near vicinity of the source. The three sensors are mutually orthogonal positioned dipoles, and are constructed over a quartz substrate. Located in the center of the dipole is a Schottky diode. High impedance lines are connecting the sensor to the amplifier and then optically linked to the computer. The probe has an isotropic response and is transparent to the RF fields.

Calibration is performed by two steps:

- 1) Determination of free space E-field from amplified probe outputs in a test RF field. This calibration is performed in a TEM cell when the frequency is below 1 GHz and in a waveguide or some other methodologies above 1 GHz. For the free space calibration, we place the probe in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. This reading equate to $1\text{mW}/\text{cm}^2$ if that power density is available in the correspondent cavity.
- 2) Correlation of the measured free space E-field, to temperature rise in a dielectric medium. E-field temperature correlation calibration is performed in a planar phantom filled with the appropriate simulated tissue.

For temperature correlation calibration, a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe. First, the location of the maximum E-field close to the phantom's inner surface is determined as a function of power into the RF source; in this case, a dipole. Then, the E-field probe is moved sideways so that the temperature probe, while affixed to the E-field probe is placed at the previous location of the E-field probe. Finally, temperature changes for 30 seconds exposure at the same RF power levels used for the E-field measurement are recorded. The following equation relates SAR to initial temperature slope:

$$SAR = C \frac{\Delta T}{\Delta t}$$

where: Δt = exposure time (30 seconds),
 C = heat capacity of tissue (brain or muscle),
 ΔT = temperature increase due to RF exposure.

The heat capacity used for brain simulated tissue is $2.7 \text{ joules}^0/\text{C}/\text{g}$ and $3.0 \text{ joules}^0/\text{C}/\text{g}$ for muscle.

SAR is proportional to $\square T / \square t$, the initial rate of tissue heating, before thermal diffusion takes place. Now, it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E-field;

$$SAR = \frac{|E|^2 \cdot \sigma}{\rho}$$

where: σ = Simulated tissue conductivity
 ρ = Tissue density ($1.25 \text{ g}/\text{cm}^3$ for simulated tissue)

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5.7. DATA EXTRAPOLATION (CURVE FITTING)

The distance from the center of the sensor (diode) to the end of the protective tube is called the ‘probe offset’. To compensate we use an exponential curve fitting method to obtain the peak surface value from the voltages measured at the distance from the inner surface of the phantom. At the point where the highest voltage was recorded, the field is measured as close as possible to the phantom’s surface and every 1mm along the ‘Z’ axis for a distance of 50 mm. The appropriate exponential curve is obtained from all the points measured and used to define an exponential decay of the energy density versus depth.

$$E(z) = E_0 \cdot e^{-z/\delta} \text{ (mV)}$$

5.8. INTERPOLATION AND GRAM AVERAGING

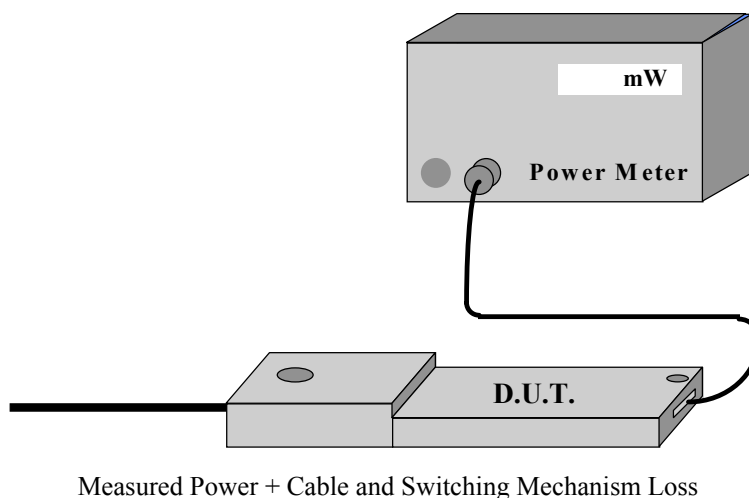
The voltage, (1 cm) above the phantoms surface (E_{tot} 1 cm), is needed to calculate the exposure over one gram of tissue. This SAR value that estimates the average over 1 gram of tissue, is obtained by taking the integral over 1 cm^2 surface of the measured field along the exponential decay curve of the energy density with depth.

$$SAR(mW/g) = \int_{v=1g} SAR(\bullet) dv = \int_{s=1\text{cm}^2} \int_0^{1\text{cm}} E(z) \cdot \frac{CF}{\text{SensorFactor}} dz ds$$

5.9. POWER MEASUREMENT

Whenever possible, a conducted power measurement is performed. To accomplish this, we utilize a fully charged battery, a calibrated power meter and a cable adapter provided by the manufacturer. The data of the cable and related circuit losses are also provided by the manufacturer. The power measurement is then performed across the operational band and the channel with the highest output power is recorded.

Power measurement is performed before and after the SAR to verify if the battery was delivering full power at the time of testing. A difference in output power would determine a need for battery replacement and to repeat the SAR test.



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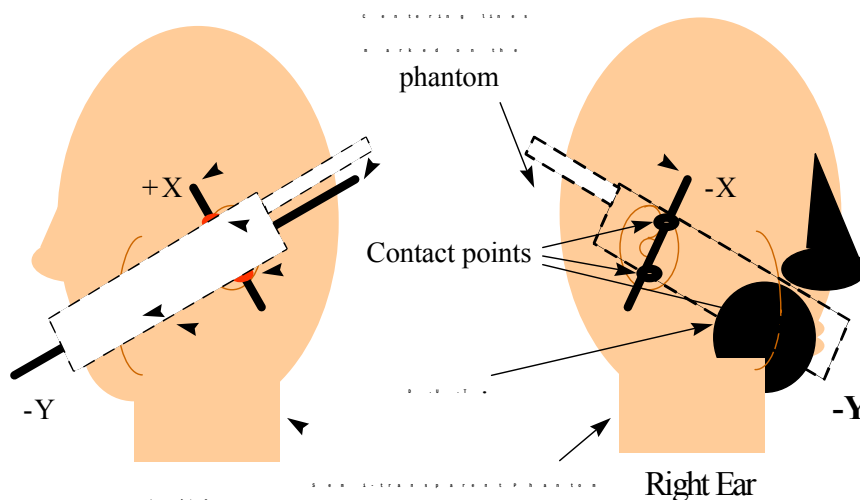
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5.10. POSITIONING OF D.U.T.

The clear fiberglass phantom shell have been previously marked with a highly visible line, so it can easily be seen through the liquid simulated tissue. In the case of testing a cellular phone, this line is connecting the ear channel with the corner of the lips. The D.U.T. is then placed by centering the speaker with the ear channel and the center of the radio width with the corner of the mouth. At the same time the surface of the D.U.T. is always in contact with the phantoms shell. Three points contact; two in the ear region and one on the chin in addition to the previously describe alignment will assure repeatability of the test.

For HAND HELD devices (push-to-talk), or any other type of wireless transmitters, the D.U.T. will be positioned as suggested by manufacturer operational manuals.

Positioning of the D.U.T.



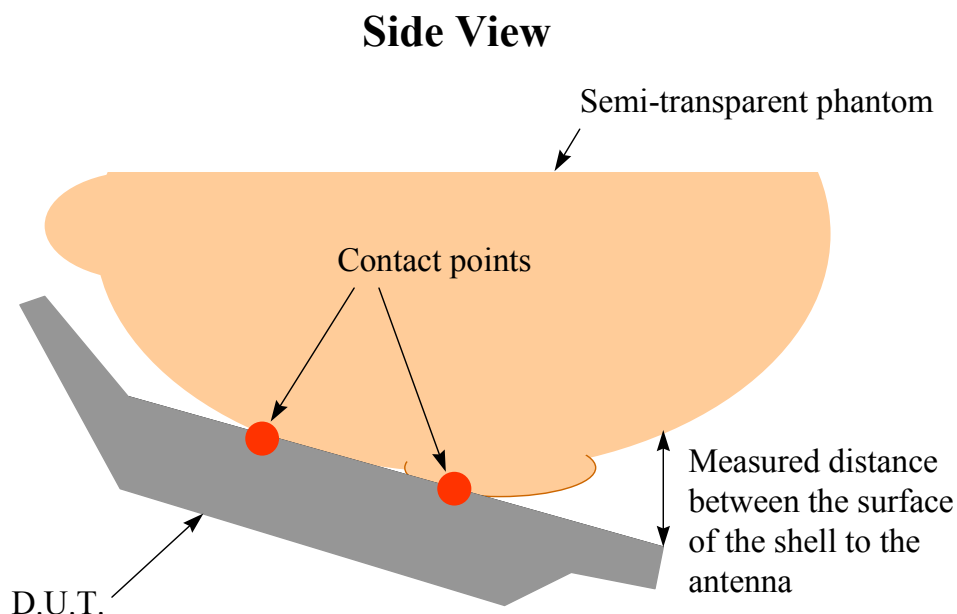
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5.11. SAR MEASUREMENT UNCERTAINTY

This uncertainty analysis covers the 3D-EMC Laboratory test procedure for Specific Absorption Rate (SAR) associated with wireless telephones and similar devices.

Standards Covered Are:

WGMTE 96/4 - Secretary SC211/B

FCC 96-326, ET Docket No. 93-62

Industry Canada RSS 102

ACA Radiocommunications (Electromagnetic Radiation – Human Exposure) Amendment Standard 2000 (No. 1)

The laboratory test procedure, and this uncertainty analysis, may be used to cover all standards above. It is based on test equipment and procedures specified by 3D-EMC Laboratories, Inc. located in Ft. Lauderdale, Florida.

Measurement Uncertainty:

Table I. Estimated SAR Measurement Uncertainty

Contribution	Error (±dB)	Probability Distribution	Type Evaluation	Standard Uncertainty (±dB)
A. Field Measurement Errors:		Rectangular	Type B	
Isotropy in Phantom BTS Liquid	0.8			0.46
Frequency Response	0.2			0.12
Linearity	0.2			0.12
Probe Calibration Error (rss)	0.7			0.40
Duty Factor Variability	0.2			0.12
B. Spatial Peak SAR Errors:		Normal	Type A	
Extrapolation & Interpolation, and Position	0.2			0.20
Integration & Search Routine	0.1			0.10
Cube Shape	0.2			0.20
C. Additional Errors:		Rectangular	Type B	
Solution Variability (Worst-Case SAR)	0.21			0.12
D. Combined Standard Uncertainty, u_c :		Normal	-	0.52
E. Expanded Uncertainty, U :		Normal (k=2)	-	1.04
		95% Confidence	-	27.14%

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File #: LIP7-SAR
September 21, 2001

- Assessed by ITI (UK) Competent Body, NVLAP (USA) Accreditation Body & ACA/AUSTEL (Australia), VCCI (Japan)
- Accredited by Industry Canada (Canada) under ACC-LAB (Europe/Canada MRA and APEC/Canada MRA)
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Point of Sale Device, Model No.: NURIT 8000 RIM**FCC ID: O2SNURIT8000RI**

EXHIBIT 6. BODY WORN CONFIGURATION INFORMATION

FCC OET 65 Supplement C Requirements

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. Devices with a headset output should be tested with a headset connected to the device. The EUT was placed against the phantom and tested in its appropriate holster as would normally be used by the end user. If the SAR measured at the middle channel for each test is at least 2.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

If the transmission band of the test device is less than 10 MHz, testing at the high and low frequency channels is optional

When multiple accessories that do not contain metallic components are supplied with the device, the device may be tested with only the accessory that dictates the closest spacing to the body. When multiple accessories that contain metallic components are supplied with the device, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (e.g., the same metallic belt-clip used with different holsters with no other metallic components), only the accessory that dictates the closest spacing to the body must be tested.

Body-worn accessories may not always be supplied or available as options for some devices that are intended to be authorized for body-worn use. **A separation distance of 1.5 cm between the back of the device and a flat phantom is recommended for testing body-worn SAR compliance under such circumstances.** Other separation distances may be used, but they should not exceed 2.5 cm. In these cases, the device may use body-worn accessories that provide a separation distance greater than that tested for the device provided however that the accessory contains no metallic components..

Equipment permutation investigated for each orientation

The manufacturer does not include a body-mounting device for this device and it is not intended to be used as a body worn device. An investigation for bystander SAR effects were carried out using the body worn requirements as a guideline. As such, a preliminary scan on all faces of the EUT were carried out to determine the potential hot spot locations. A more detailed investigation into the peak spatial SAR was carried out on two faces of the EUT that demonstrated the hottest spots and this was determined to be where the integrated PCB antenna was located. The separation distance to the phantom was varied to determine at what separation distance the device would safely meet the 1.6W/kg requirements for general population use for body worn devices.

All tests were carried out using 25% duty cycle which the worst case duty cycle as limited on the network the radio modem is designed to be used in.

Comments on non-tested configurations

Head positions were not investigated as this is considered abnormal use. No other configurations considered abnormal use, were investigated.

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Recommended Caution Statements to be included in Users Manual

In order for users to be aware of the body-worn operating requirements for meeting RF exposure compliance, operating instructions and caution statements should be included in the manual. The information should allow users to make informed decisions on the type of body-worn accessories and operating configurations that are appropriate for the device. The following are *examples* of typical statements that provide end-users with the necessary information about body-worn accessories:

1. For a product that has the potential to be used in a body worn configuration and has been tested and certified with a specific accessory device(s):

“For body worn operation, this device has been tested and meets the FCC RF exposure guidelines when used with the (*manufacturer name*) accessories supplied or designated for this product. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.”

2. For a product that has the potential to be used in a body worn configuration and has not been certified with a specific accessory device(s):

“For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with an accessory that contains no metal and that positions the device a minimum of 1.5cm from the body. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.”

3. For a product that has the potential to be used in a body worn configuration with future manufacturer designed accessories:

“For body worn operation, this device has been tested and meets the FCC RF exposure guidelines when used with a (*manufacturer name*) accessory designated for this product or when used with an accessory that contains no metal and that positions the handset a minimum of (specified distance) from the body.”

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EXHIBIT 7. PRESCAN TO DETERMINED WORST CASE SAR MEASUREMENT

The EUT were pre-scanned to determined location of the hot spot locations where the highest SAR would be located. The prescans were conducted on the waist of a full body open back phantom and the EUT was operating at 896 MHz with a 25% duty cycle. Prescans were performed in the following configurations:

1. Back of EUT in contact and parallel to phantom
2. Top of EUT in contact and parallel to phantom
3. Front of EUT in contact and parallel to phantom
4. Left side of EUT in contact and parallel to phantom
5. Right side of EUT in contact and parallel to phantom

The previous scans made on the 5 faces indicated that the hot-spots is located near the antenna PCB assembly at the top of the EUT. The Base of the EUT was therefore not scanned as all scans indicated very low emissions in this area.

The following prescans test data results in their respective order indicates that test configuration #1 and #2 are the two worst-case, complete test will be performed in those configurations.

Prescan Test Results at 896MHz with EUT Face in contact with phantom surface

EUT Face scanned	Maximum SAR Observed (W/Kg)	Location of hot spot
Back	3.372	Antenna Feed area
Front	0.332	Antenna Feed area
Top	0.700	Antenna Feed area
Left	0.692	Antenna Feed area
Right	0.342	Antenna Feed area

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Test Information

Date : 03/10/2001

Time : 3:36:15 PM

Product : Nurit 8000 RIM moden
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 896
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Back Face
Measured Power (W) : 1.95
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.950

Amplifier Setting :

Channel 1 : 0.0056

Channel 2 : 0.0053

Channel 3 : 0.0066

Location of Maximum Field :

X = 0

Y = 50

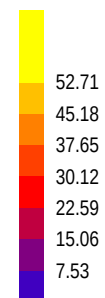
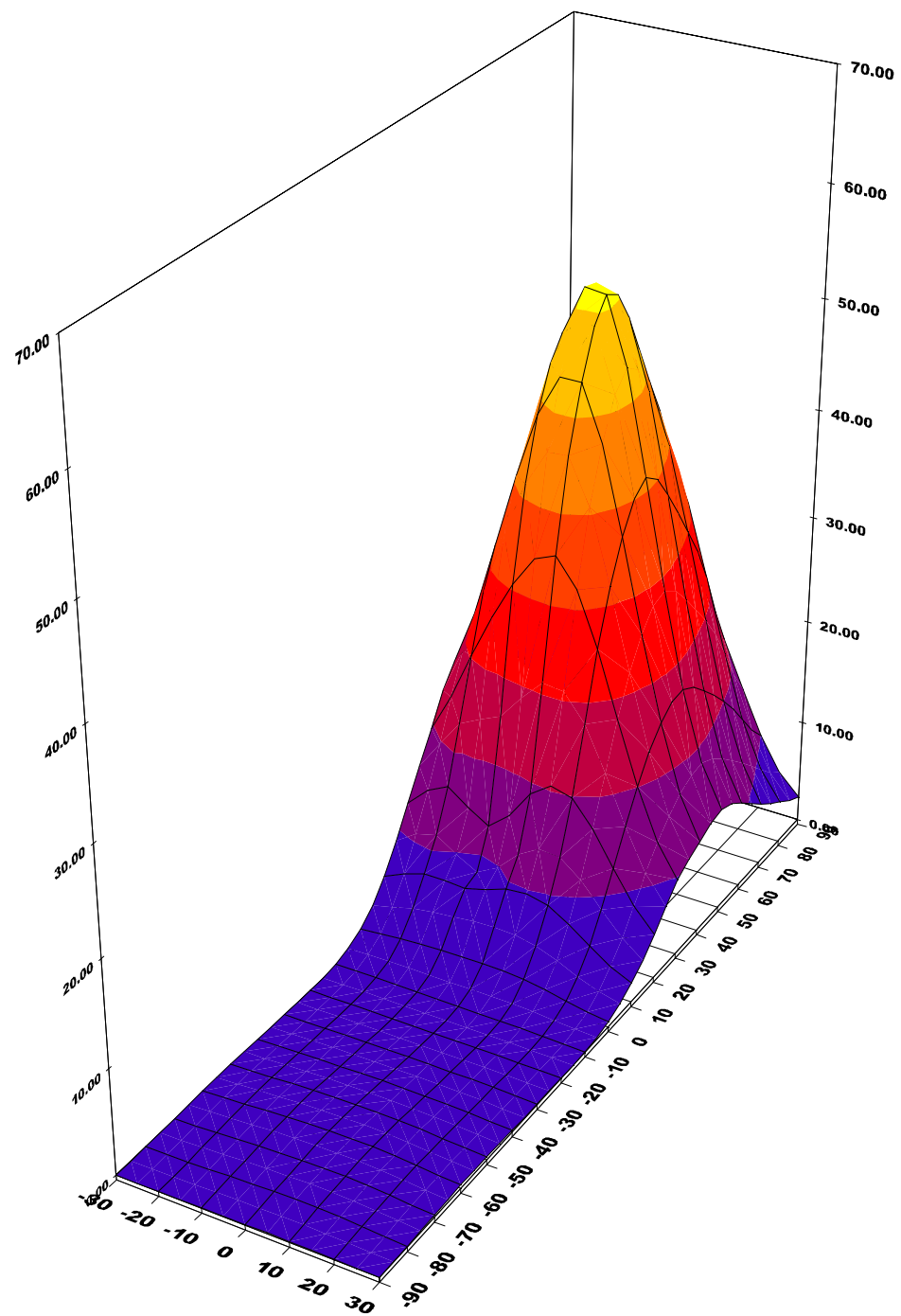
Measured Values (mV) :

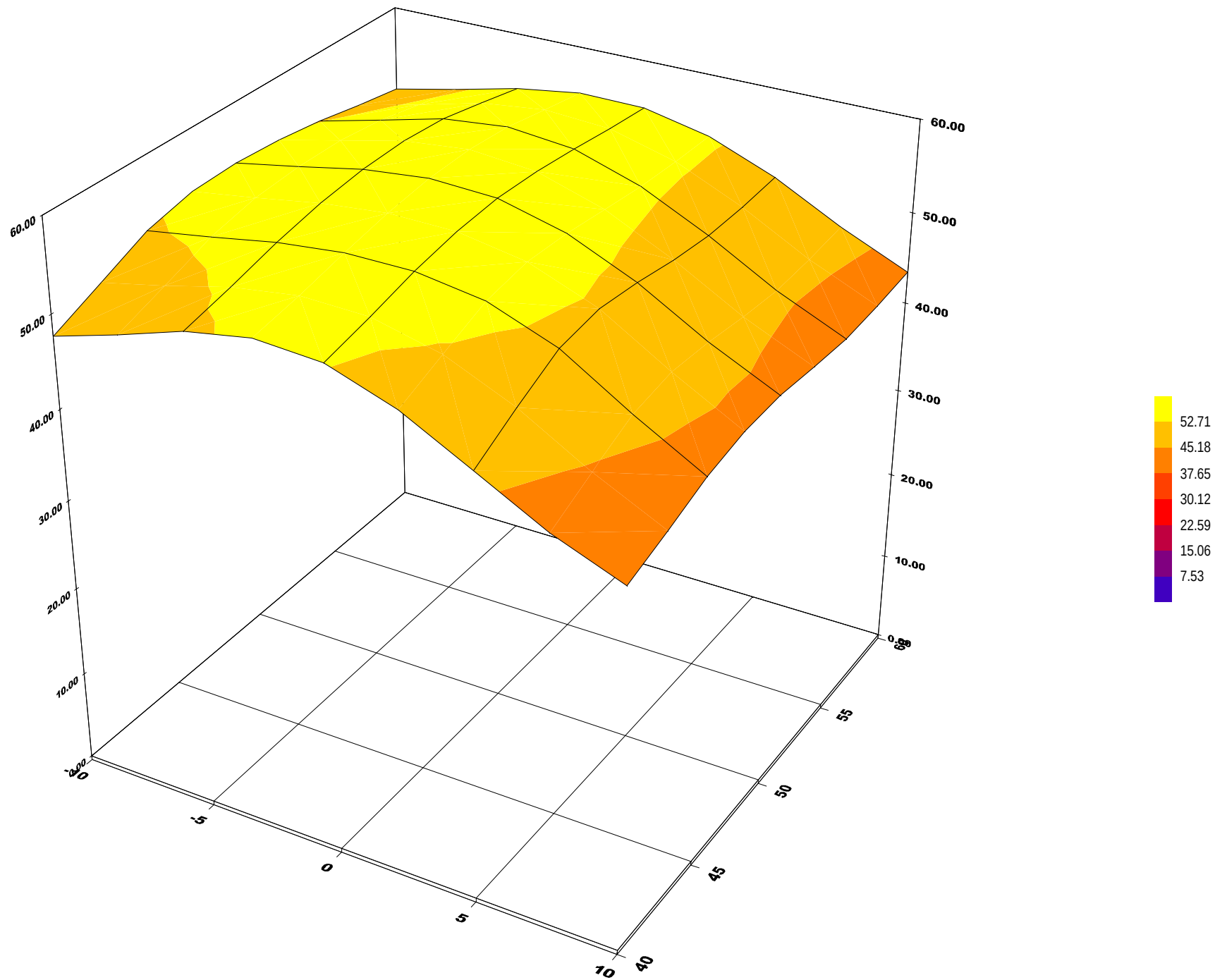
56.132	55.017	56.506	52.724	50.032	49.086
45.003	42.019	39.769	37.511	35.136	

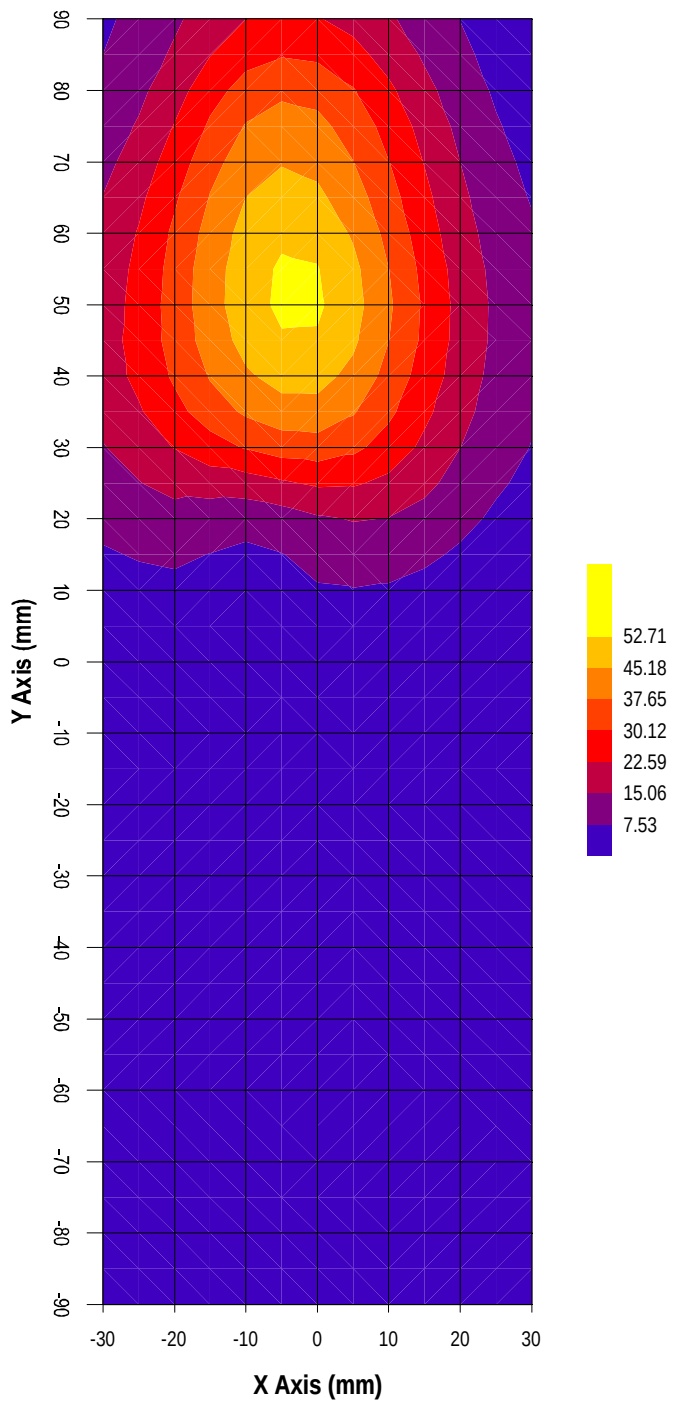
Peak Voltage (mV) : 64.109

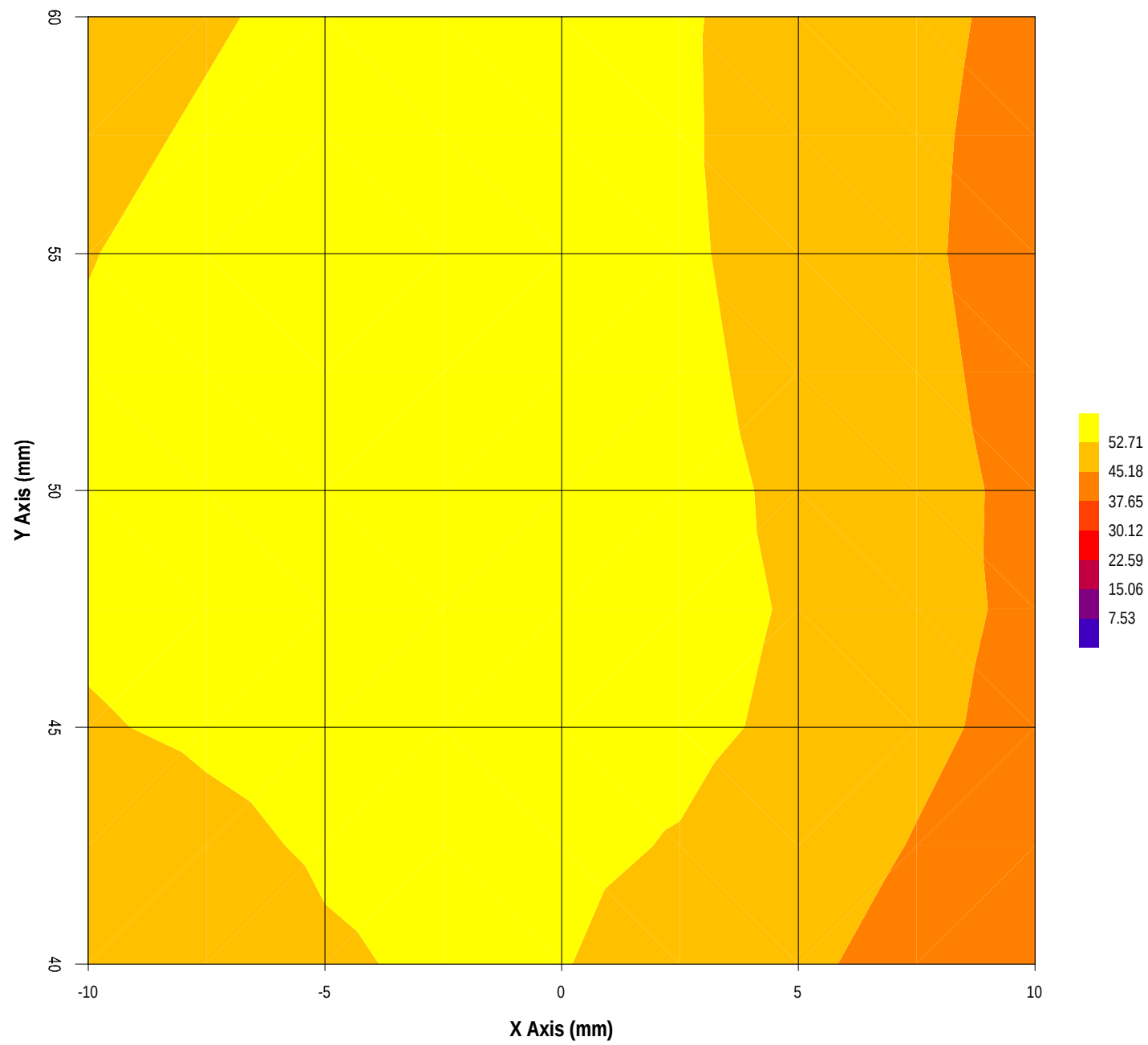
1 Cm Voltage (mV) : 36.609

SAR (W/Kg) : 3.372









Test Information

Date : 04/10/2001
Time : 10:27:24 AM

Product : Nurit 8000 RIM moden
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 896
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Front Face
Measured Power (W) : 1.95
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.950

Amplifier Setting :

Channel 1 : 0.0056 Channel 2 : 0.0053 Channel 3 : 0.0066

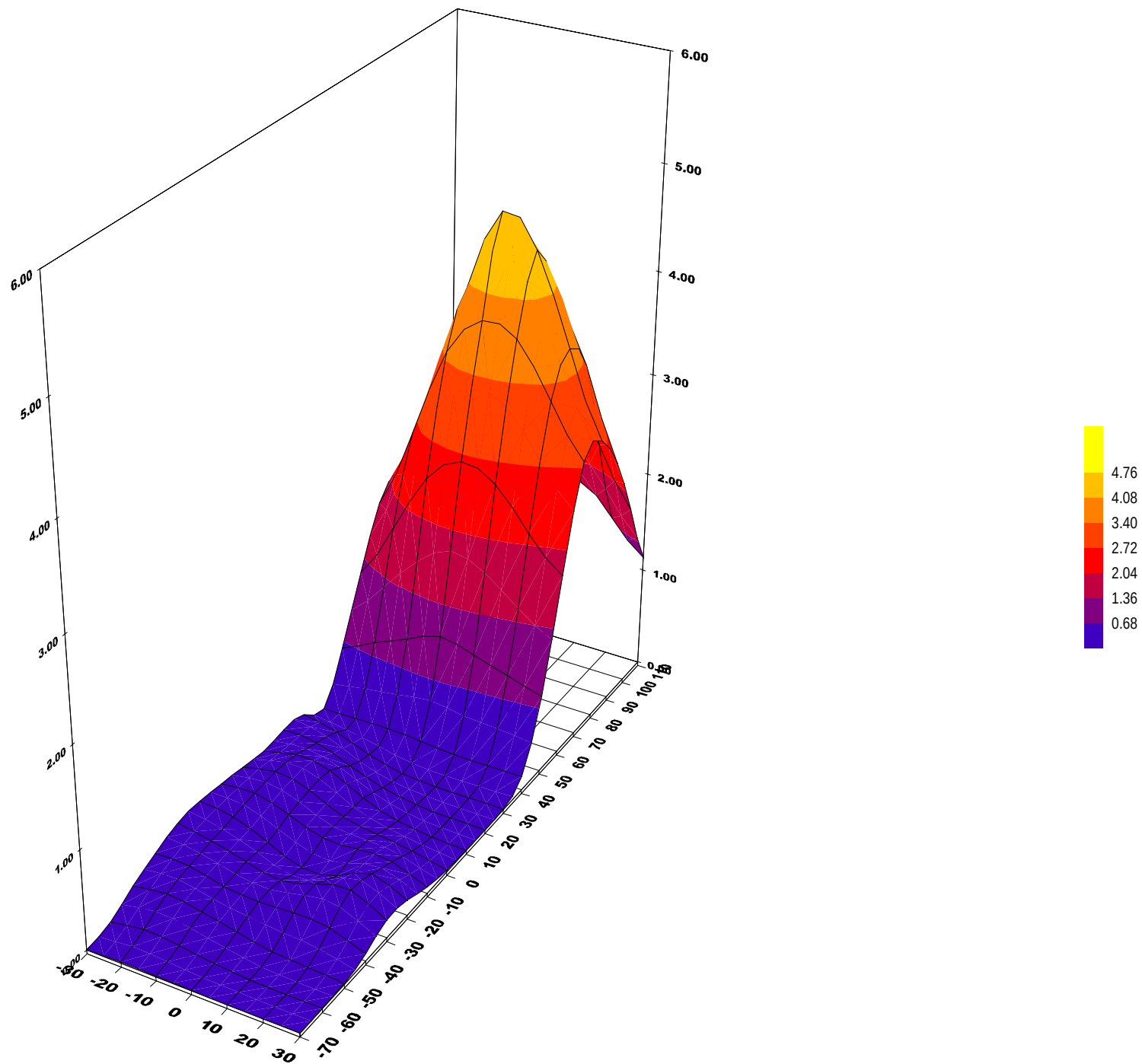
Location of Maximum Field :

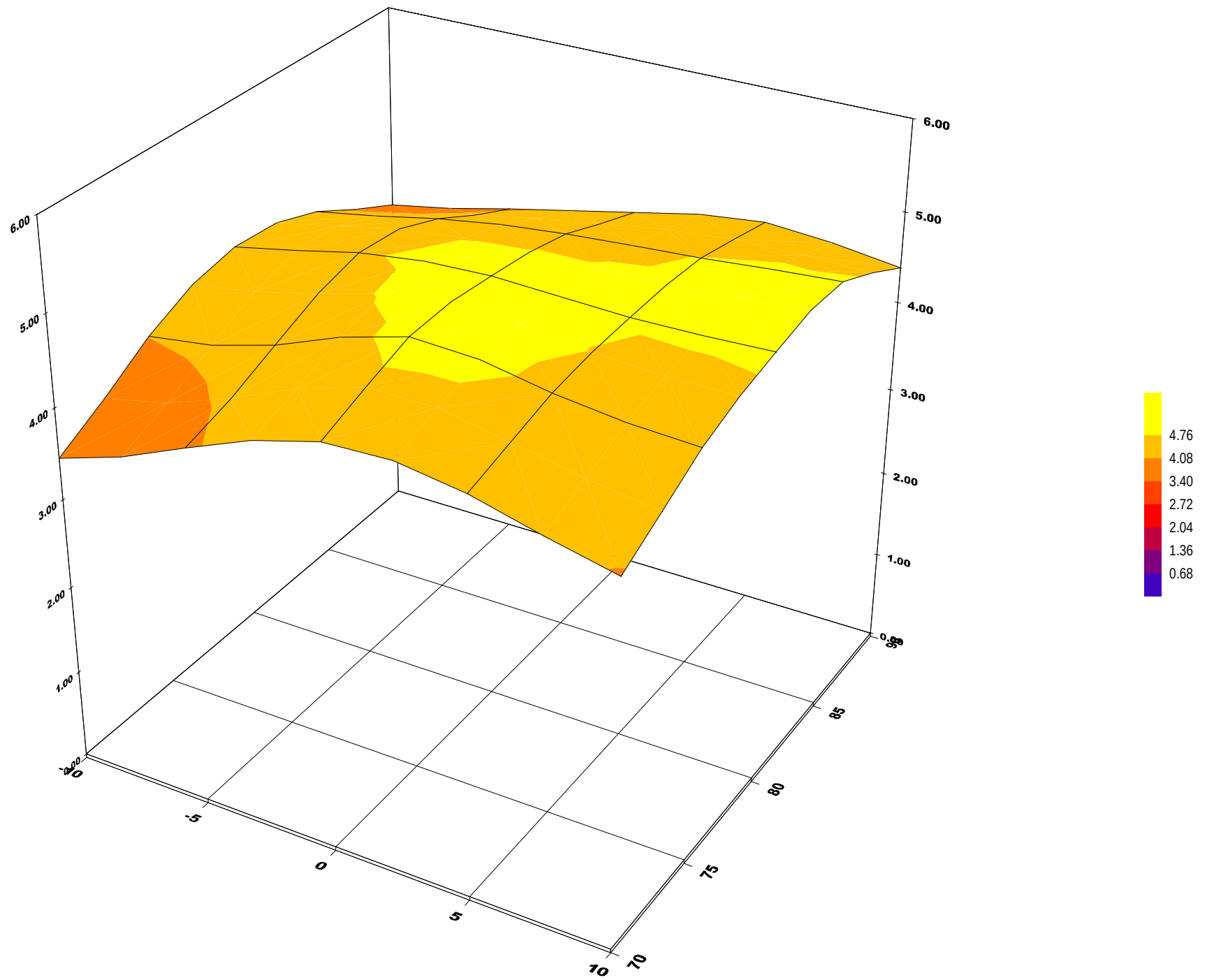
X = 0 Y = 75

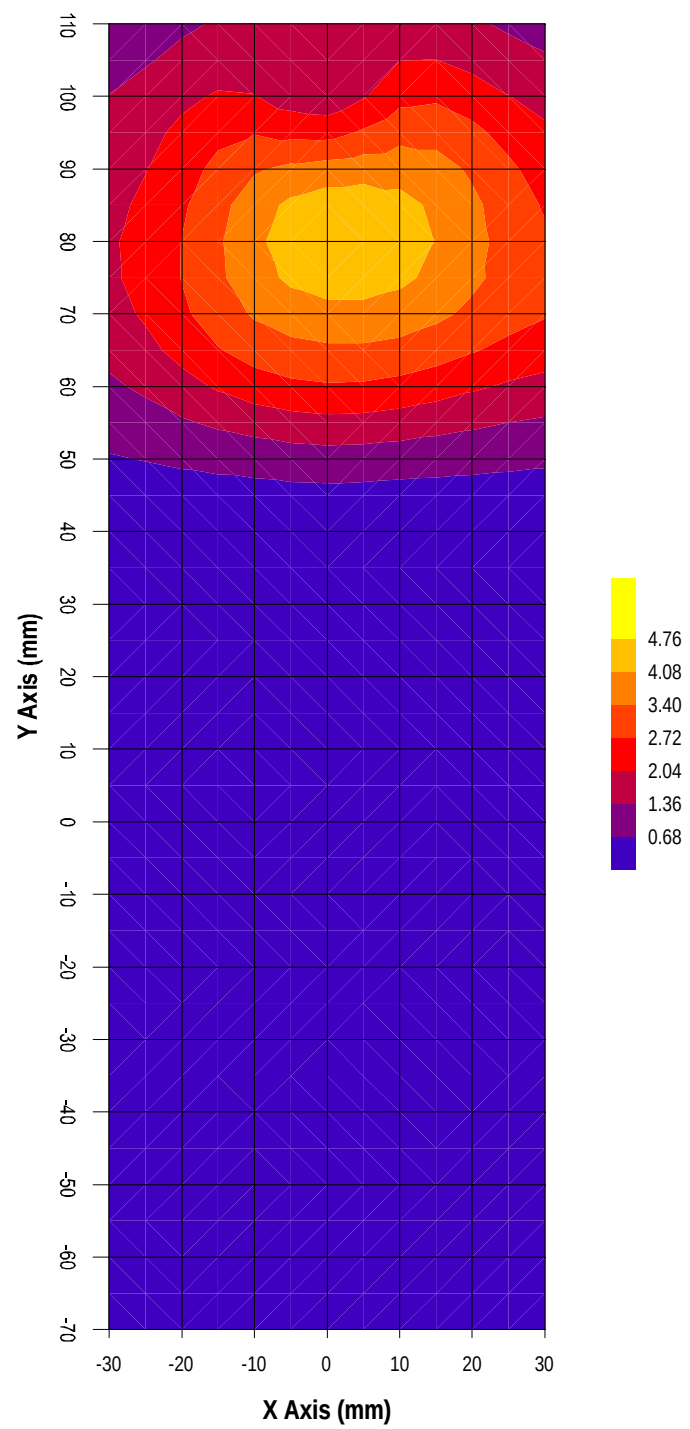
Measured Values (mV) :

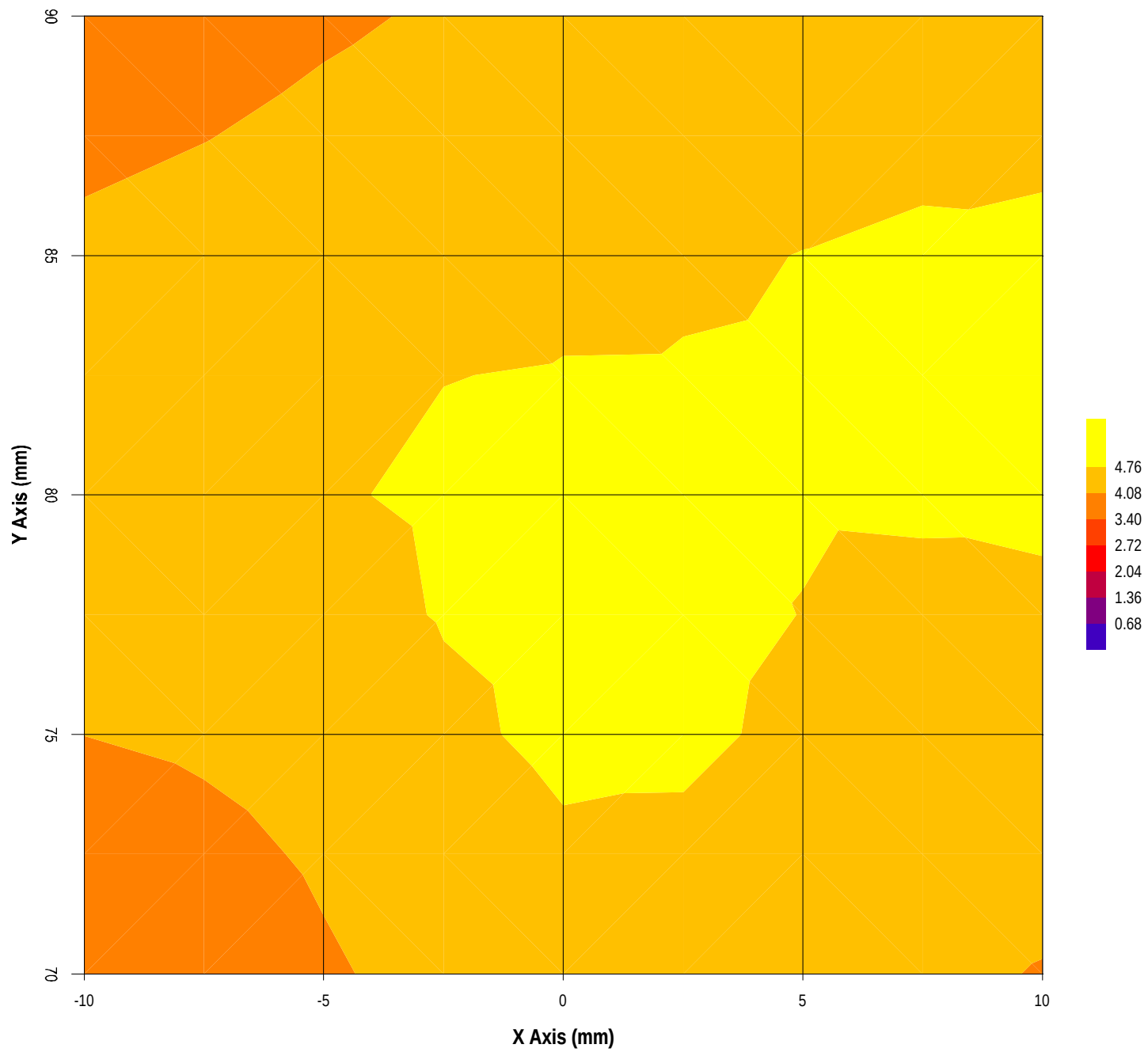
4.686	4.558	4.553	4.125	4.207	4.005
3.655	3.292	2.973	2.814	2.601	

Peak Voltage (mV) : 5.431 1 Cm Voltage (mV) : 2.746 SAR (W/Kg) : 0.332









Test Information

Date : 04/10/2001
Time : 12:42:28 PM

Product : Nurit 8000 RIM moden
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 896
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Top Face
Measured Power (W) : 1.95
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.950

Amplifier Setting :

Channel 1 : 0.0056 Channel 2 : 0.0053 Channel 3 : 0.0066

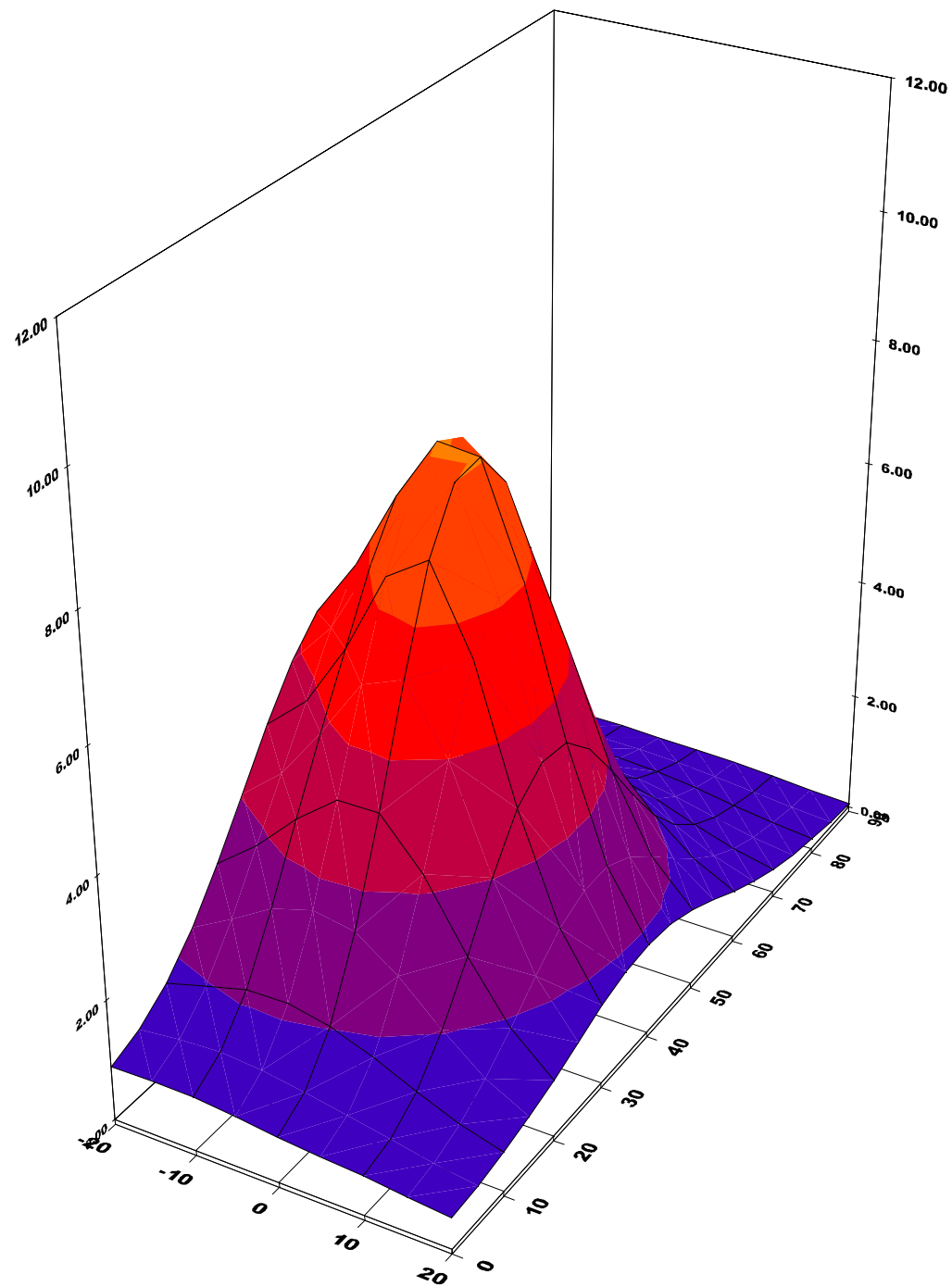
Location of Maximum Field :

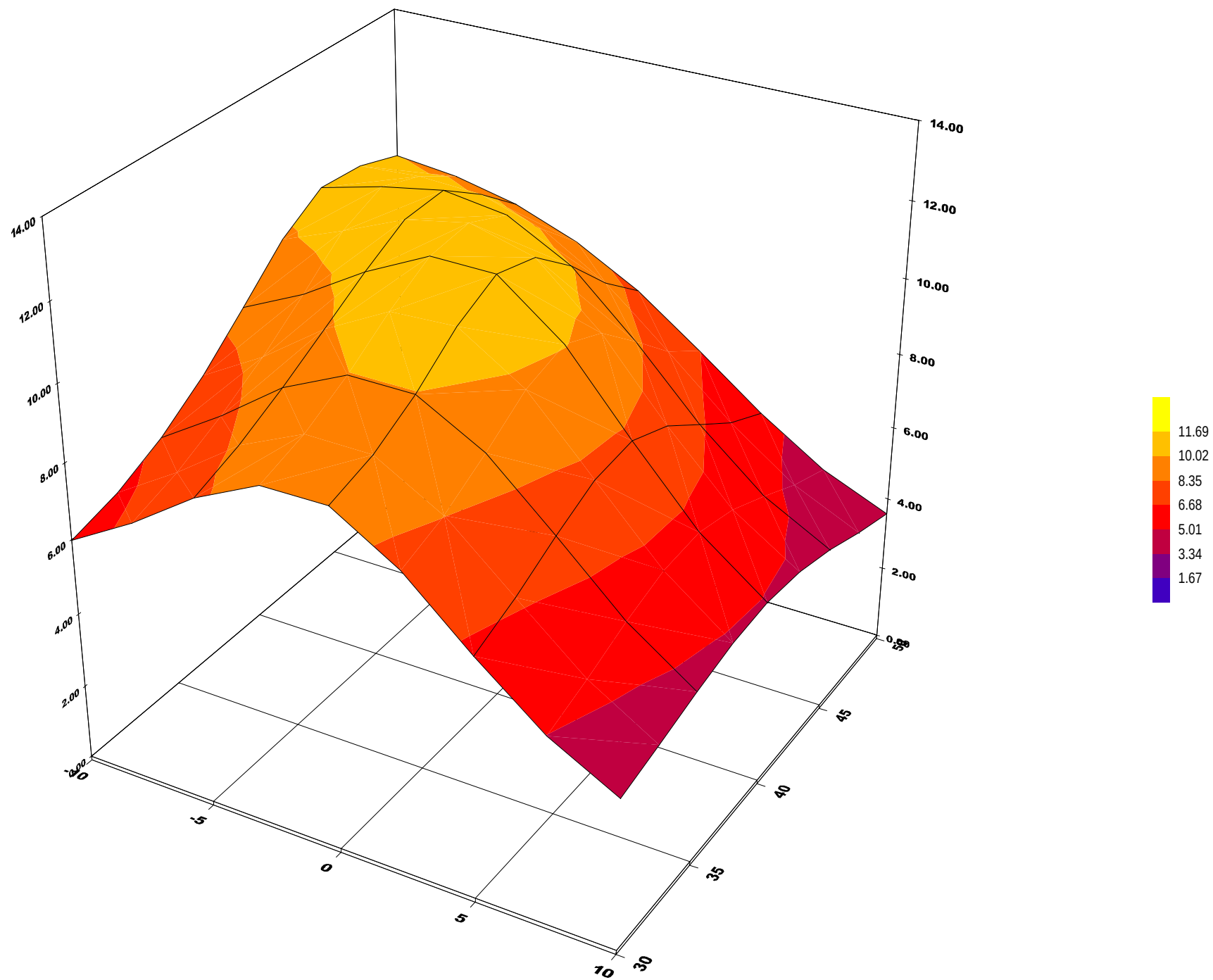
X = 0 Y = 40

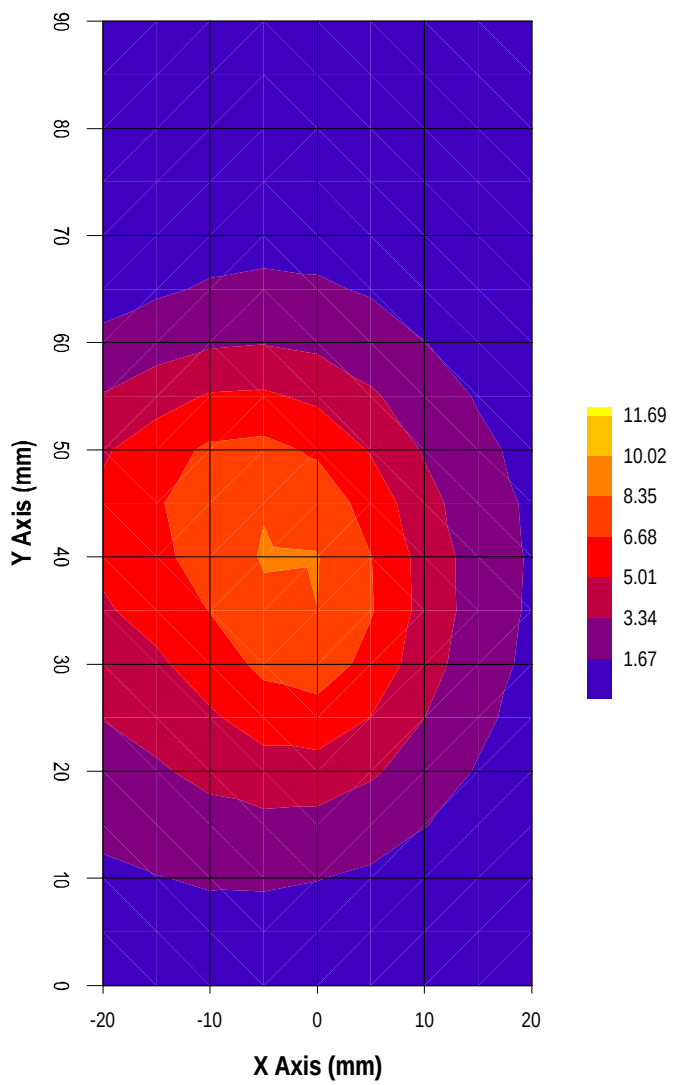
Measured Values (mV) :

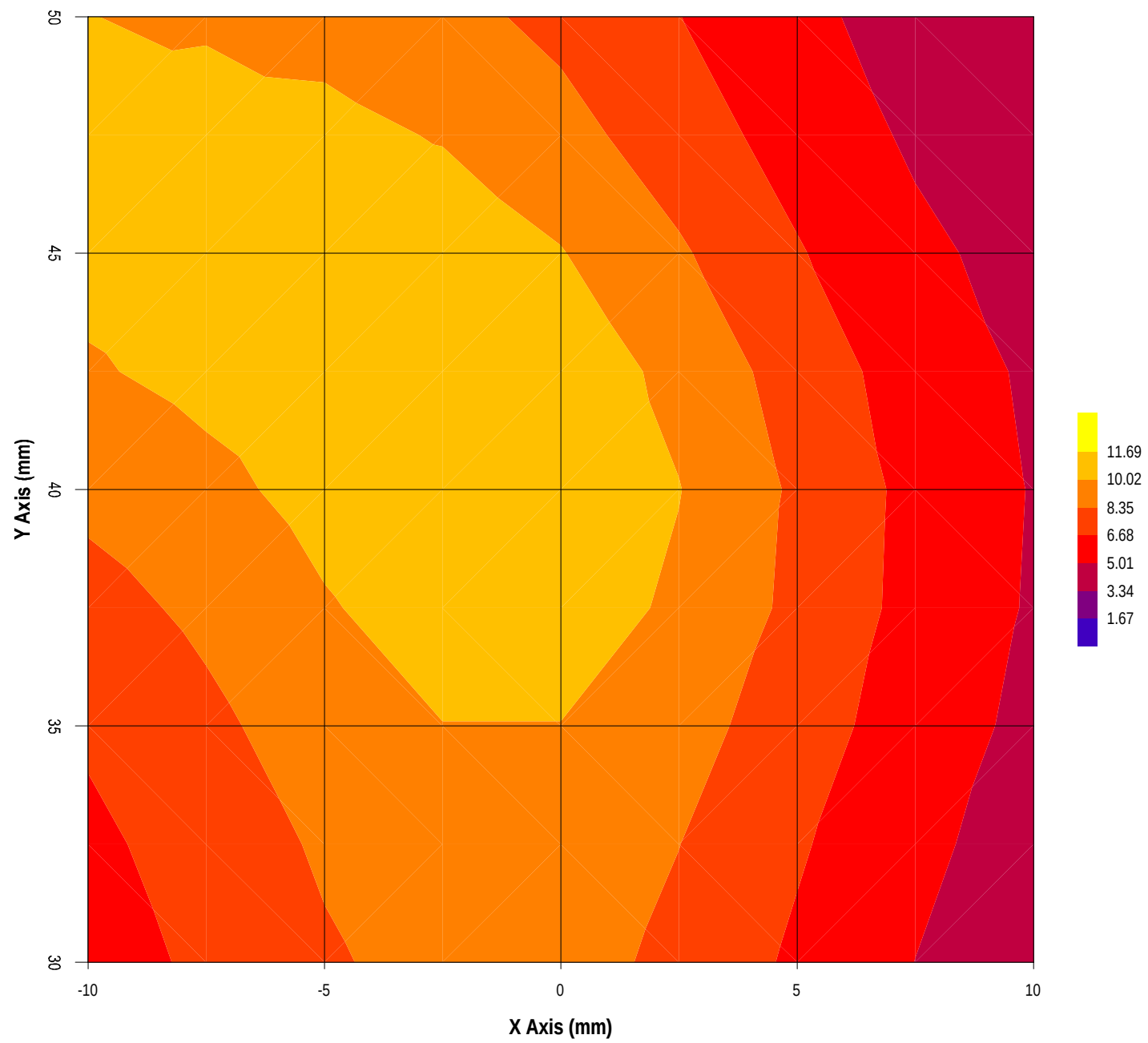
12.731	12.754	12.223	10.904	9.978	8.675
7.674	6.858	5.803	5.165	4.493	

Peak Voltage (mV) : 15.692 1 Cm Voltage (mV) : 5.632 SAR (W/Kg) : 0.700









Test Information

Date : 04/10/2001
Time : 11:19:28 AM

Product : Nurit 8000 RIM moden
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 896
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Right Face
Measured Power (W) : 1.95
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.950

Amplifier Setting :

Channel 1 : 0.0056 Channel 2 : 0.0053 Channel 3 : 0.0066

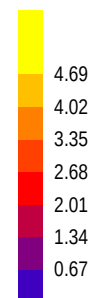
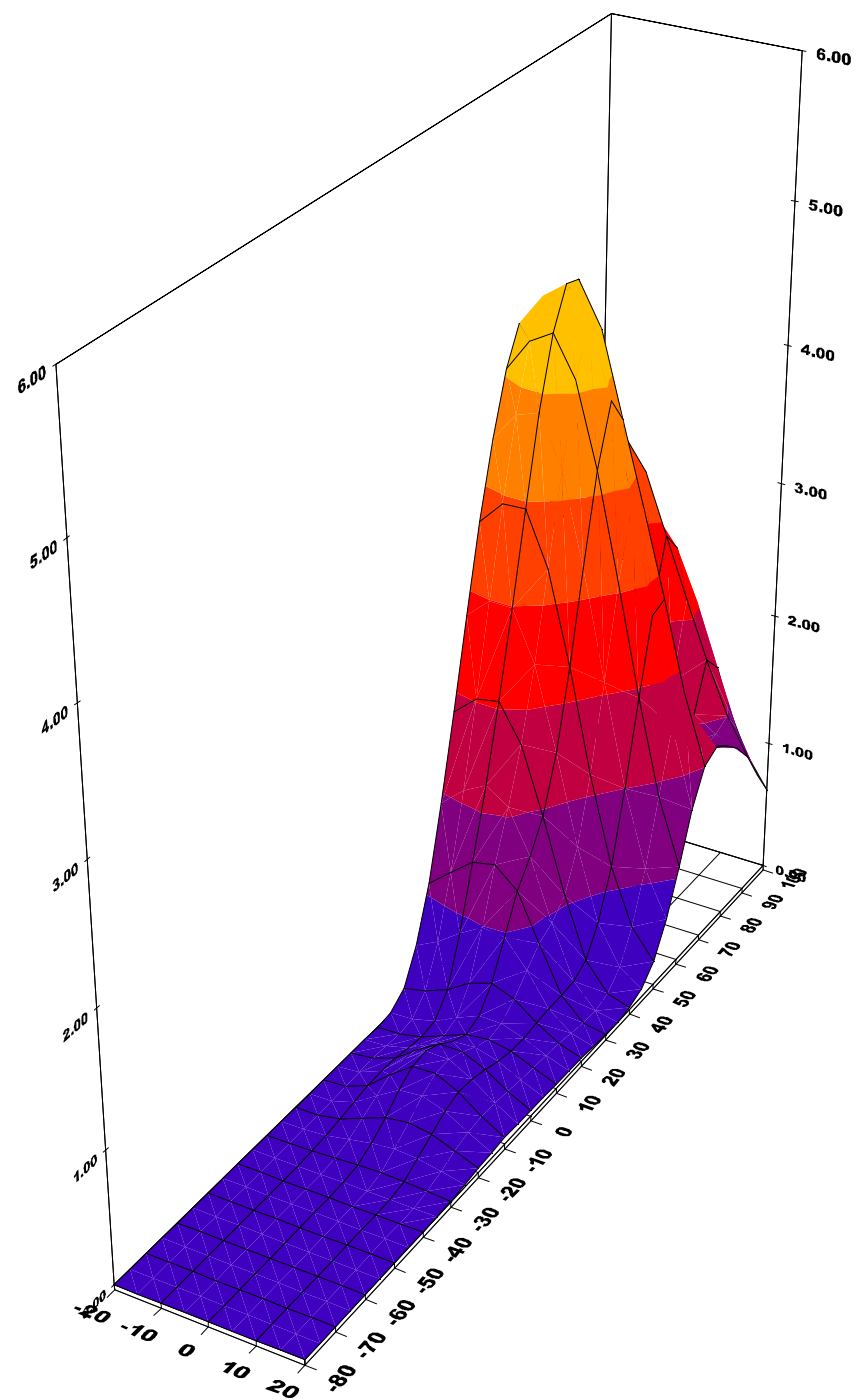
Location of Maximum Field :

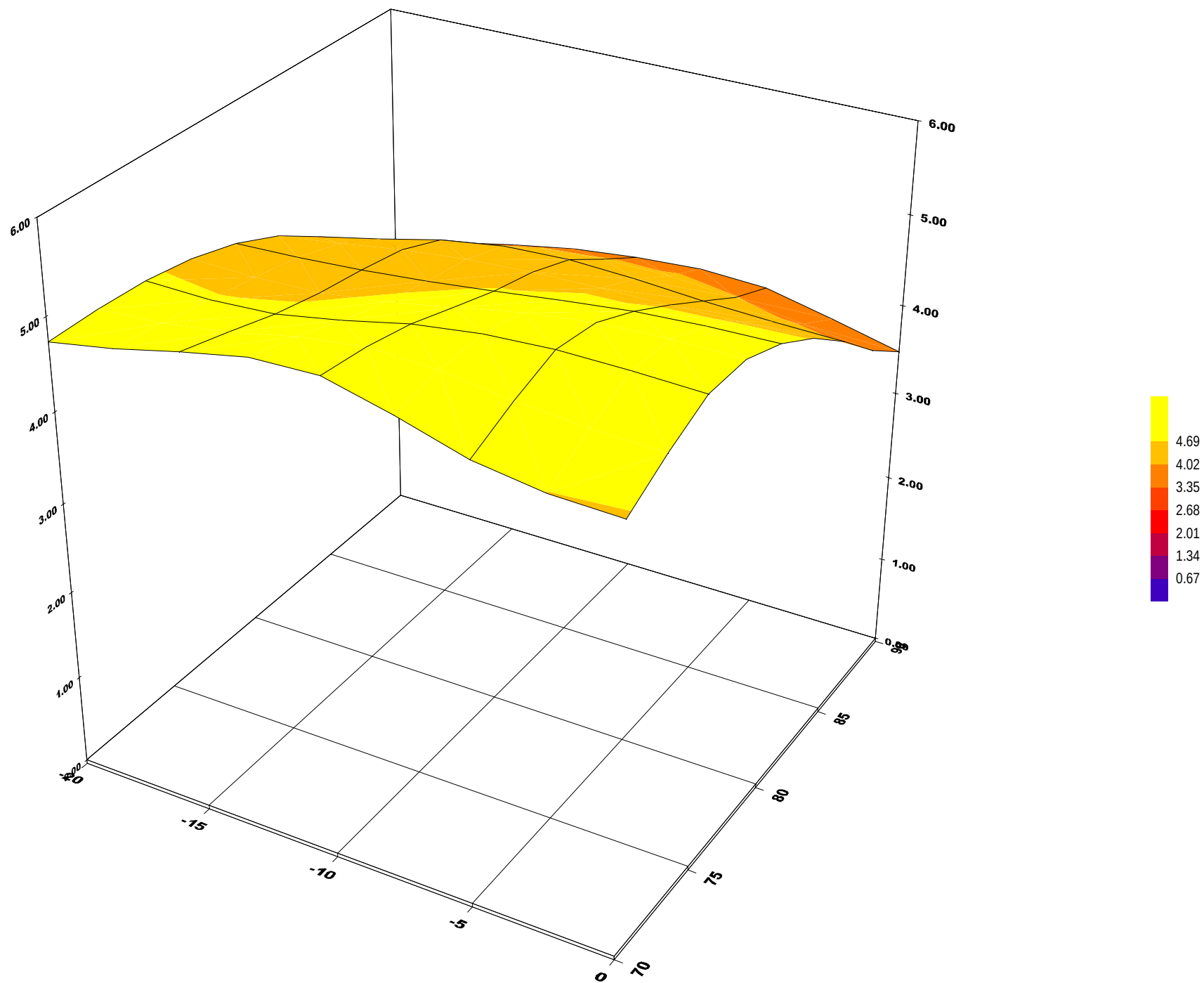
X = -5 Y = 75

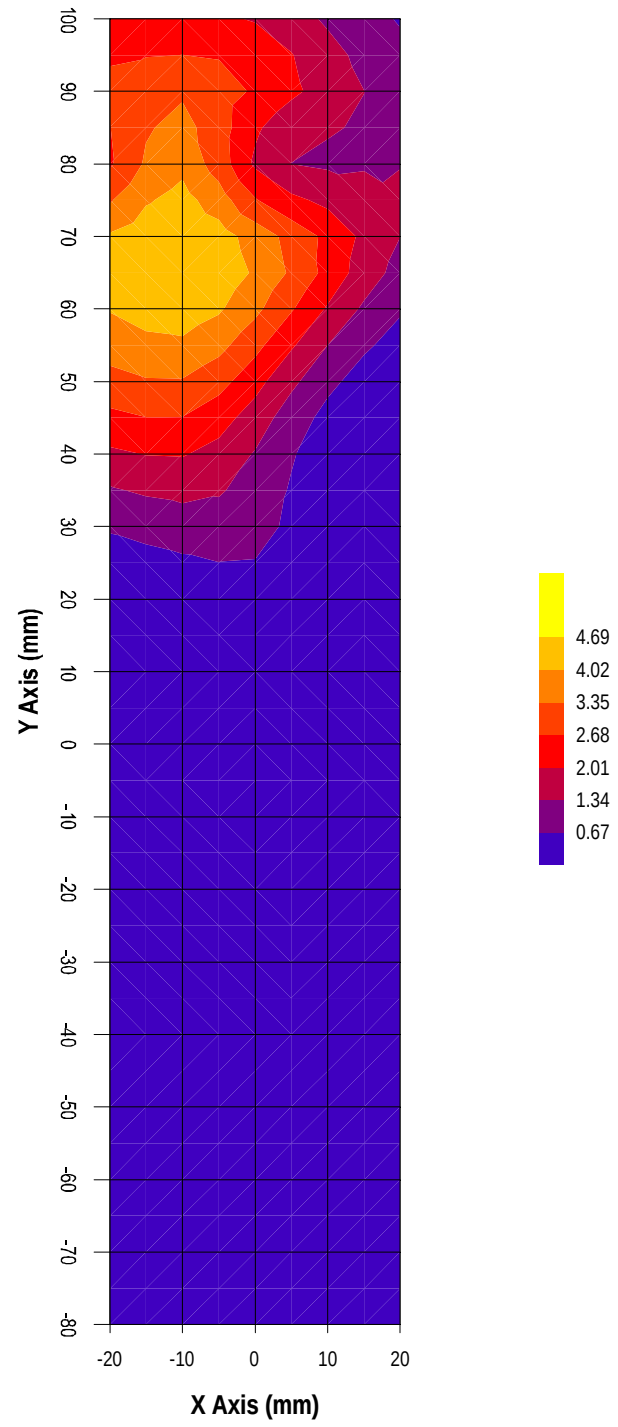
Measured Values (mV) :

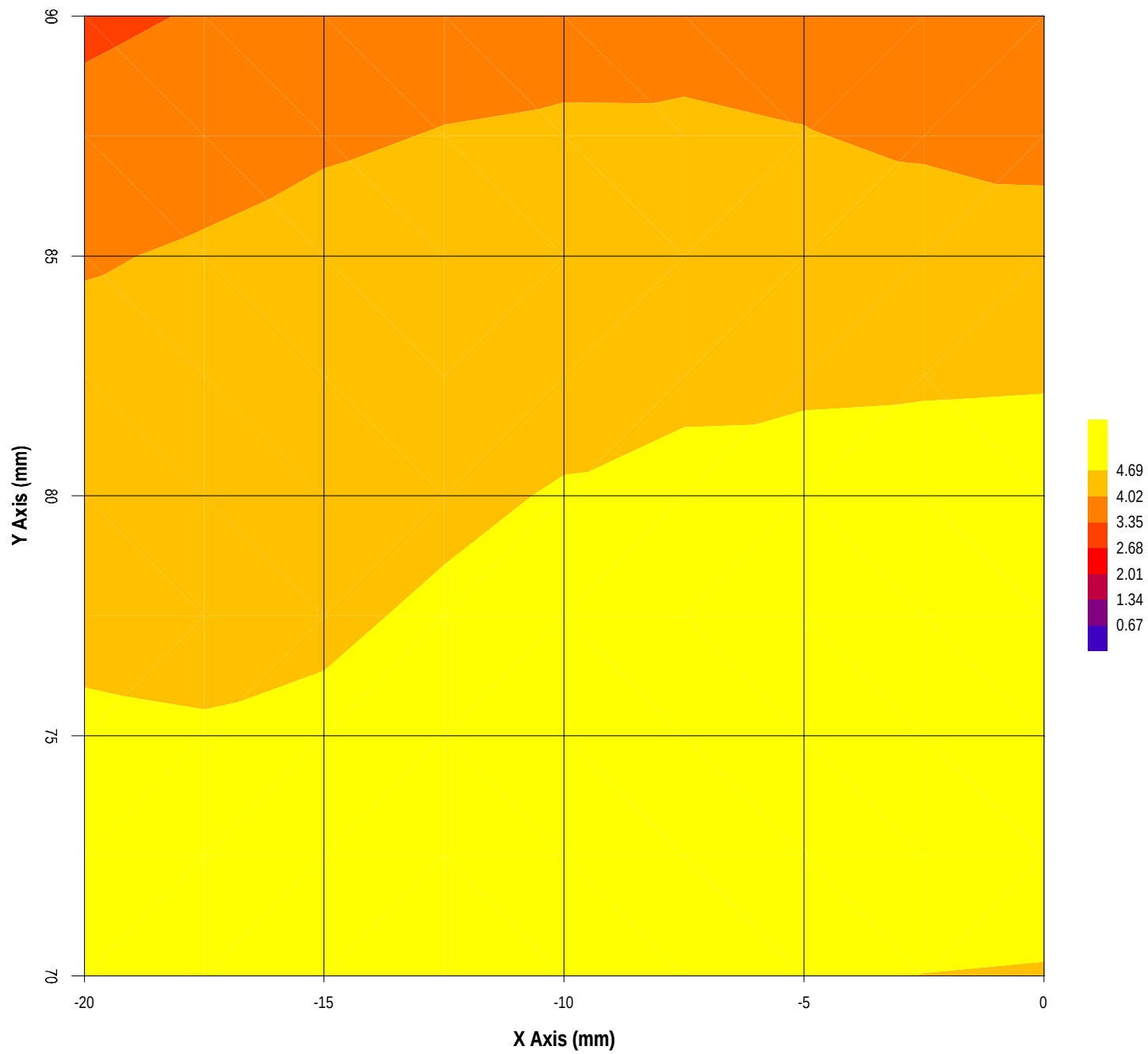
4.529	4.974	4.824	4.688	4.500	4.148
3.818	3.544	3.196	2.751	2.383	

Peak Voltage (mV) : 5.280 1 Cm Voltage (mV) : 2.509 SAR (W/Kg) : 0.342









Test Information

Date : 04/10/2001
Time : 12:00:22 PM

Product : Nurit 8000 RIM moden
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 896
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Left Face
Measured Power (W) : 1.95
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.950

Amplifier Setting :

Channel 1 : 0.0056 Channel 2 : 0.0053 Channel 3 : 0.0066

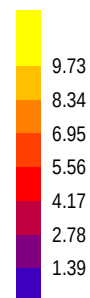
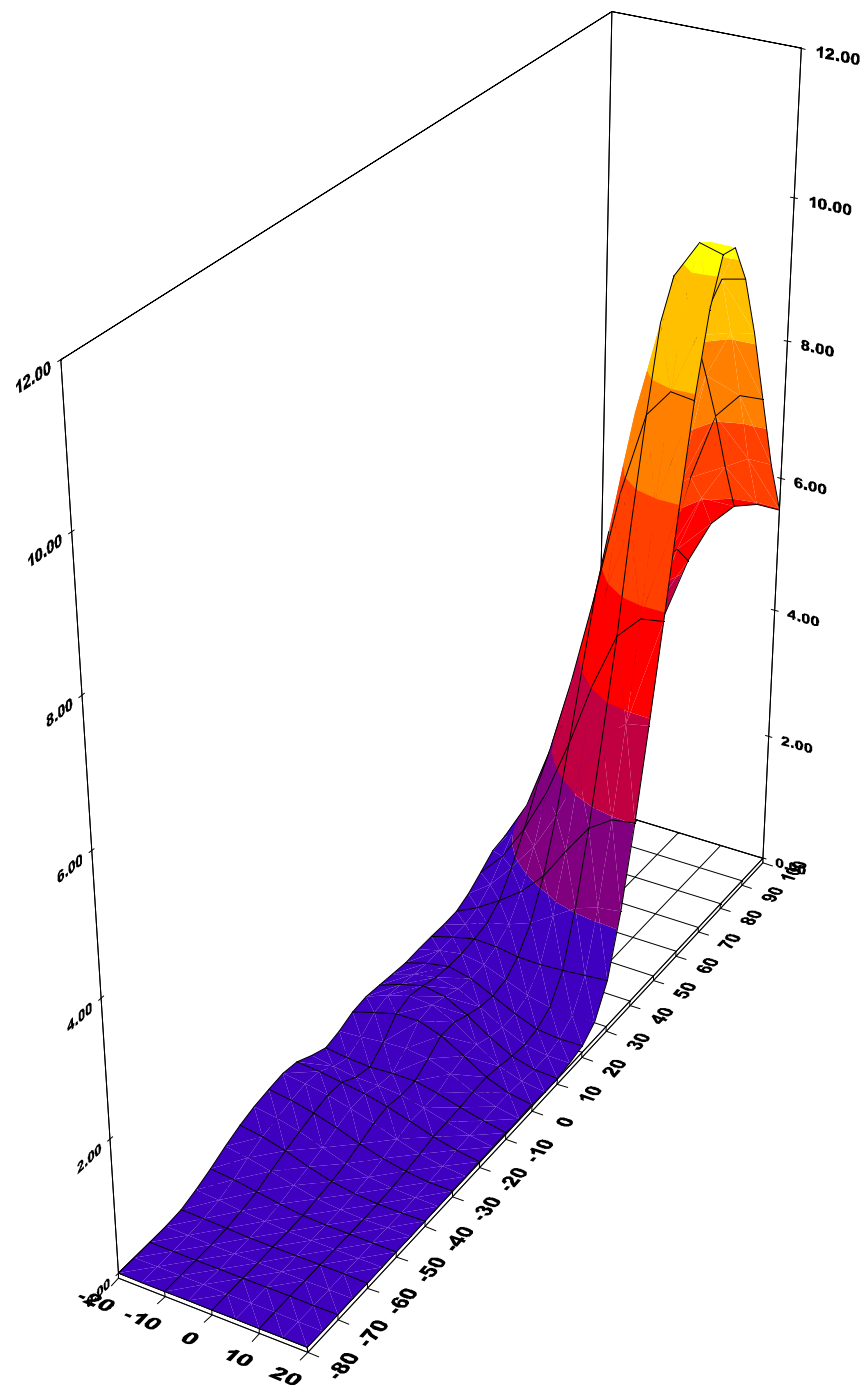
Location of Maximum Field :

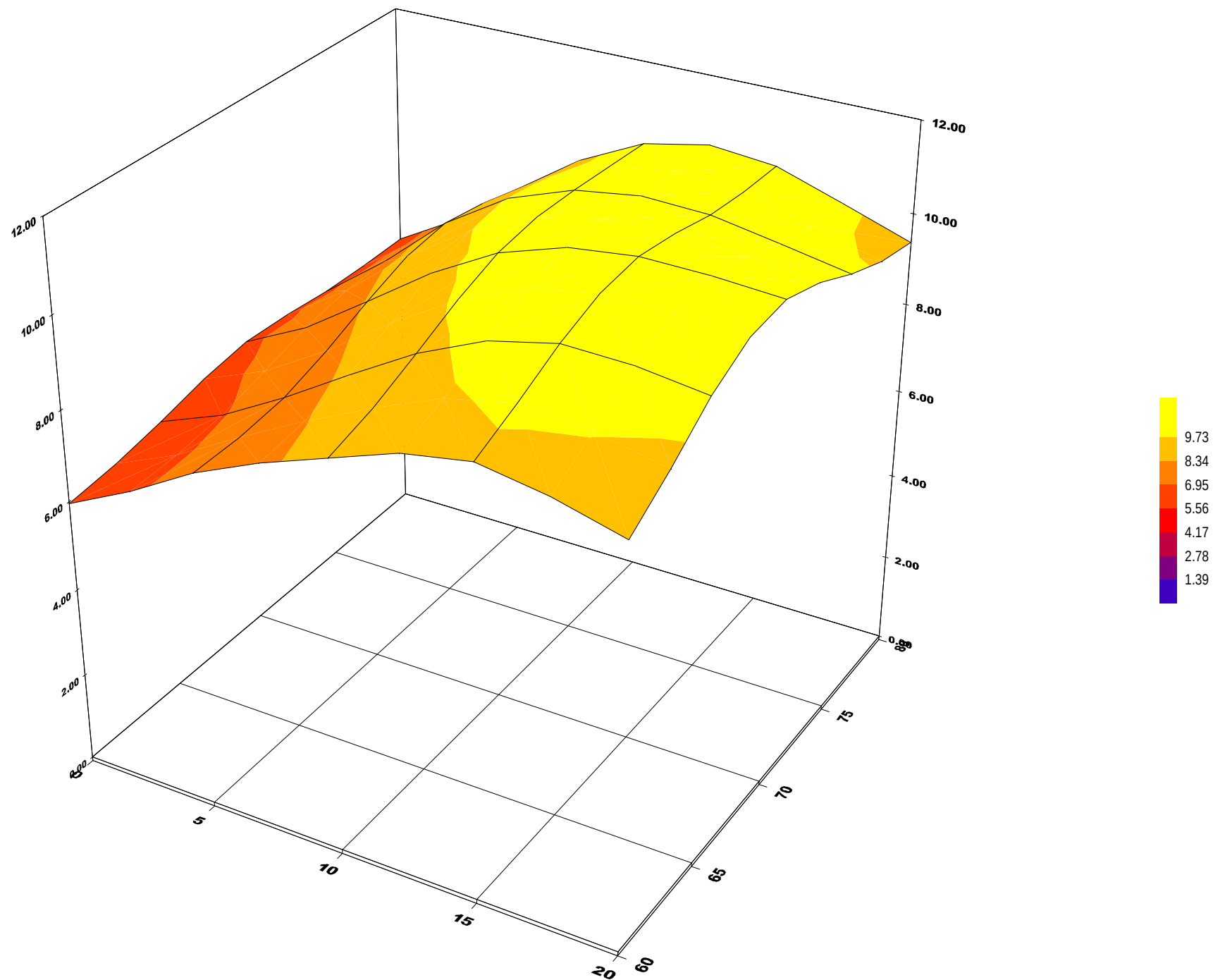
X = 15 Y = 70

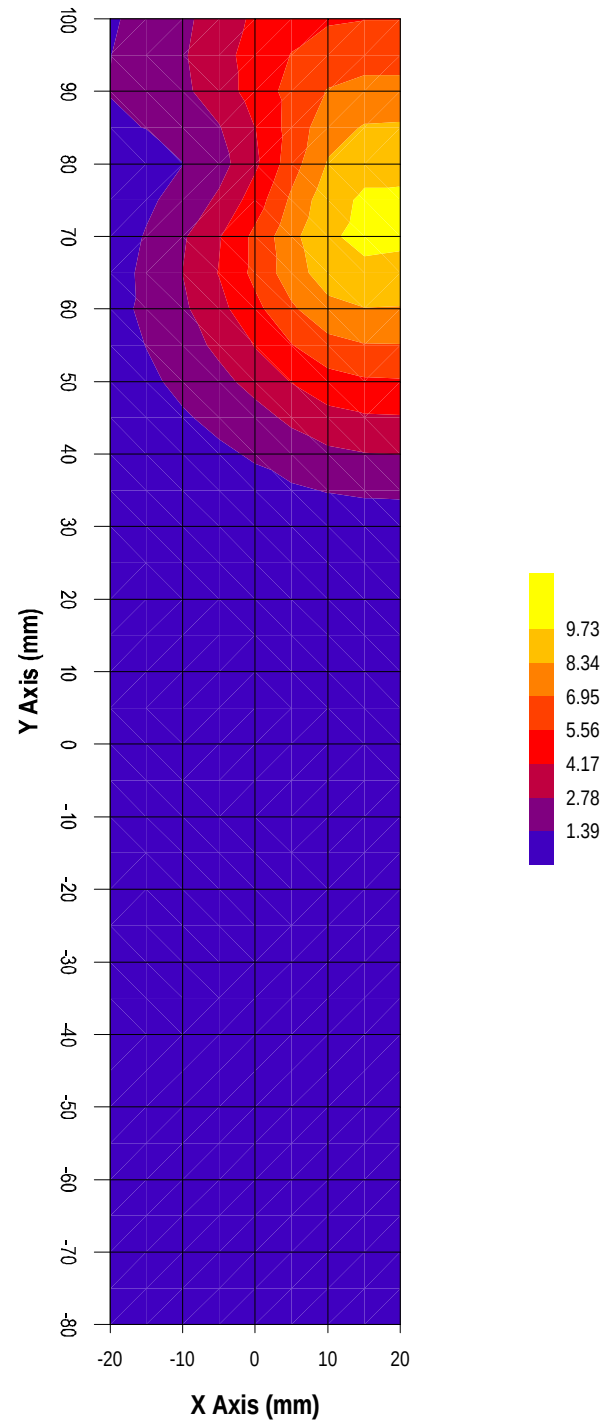
Measured Values (mV) :

9.588	10.654	10.430	9.948	9.311	9.002
8.144	7.477	6.865	6.365	5.831	

Peak Voltage (mV) : 11.168 1 Cm Voltage (mV) : 5.875 SAR (W/Kg) : 0.692







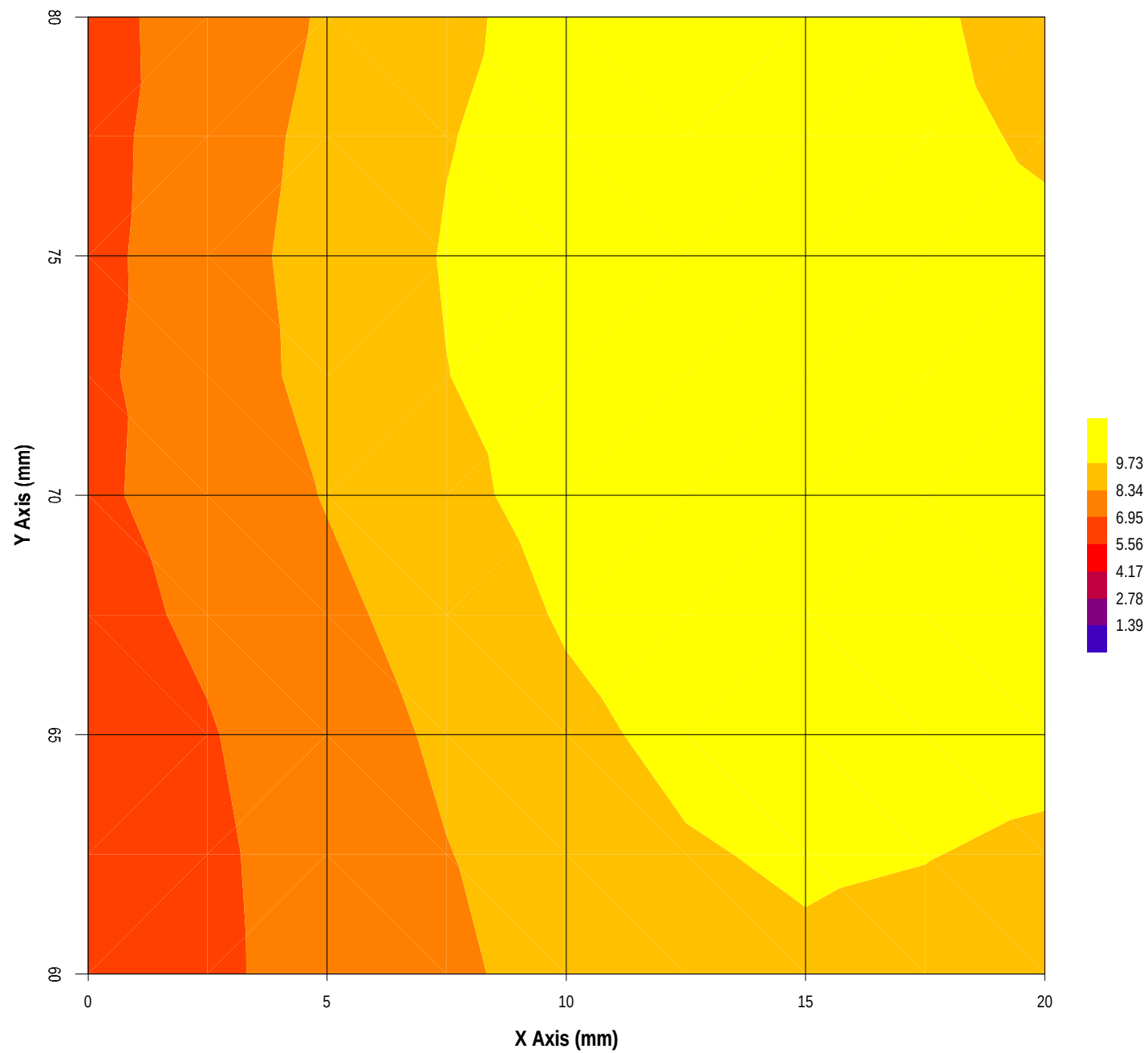


EXHIBIT 8. 896 MHz SAR MEASUREMENT

Test data for 896 MHz SAR measurements are presented in following order:

Back surface of EUT parallel to phantom waist:

- ▶ In contact with phantom
- ▶ 15 mm away from phantom
- ▶ 25 mm away from phantom

Top surface of EUT parallel to phantom waist:

- ▶ In contact with phantom
- ▶ 15 mm away from phantom
- ▶ 25 mm away from phantom

Detailed SAR Results with EUT relocated for maximum contact with phantom surface

EUT Configurations	EUT separation distance to phantom (mm)	Antenna Position	SAR (W/kg) Device Test Frequency & Output
			896 MHz 1950 mW (at antenna terminal)
Back surface of EUT parallel to phantom waist	0	Internal	3.391
	15	Internal	0.842
	25	Internal	0.410
Top surface of EUT parallel to phantom waist	0	Internal	0.769
	15	Internal	0.079
	25	Internal	0.004

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Test Information

Date : 06/09/2001

Time : 3:16:30 PM

Product : Nurit 8000 & RIM moden module
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 896
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Back Face
Measured Power (W) : 1.95
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.950

Amplifier Setting :

Channel 1 : 0.0056

Channel 2 : 0.0053

Channel 3 : 0.0066

Location of Maximum Field :

X = -10

Y = 20

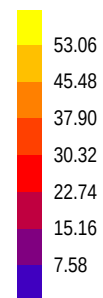
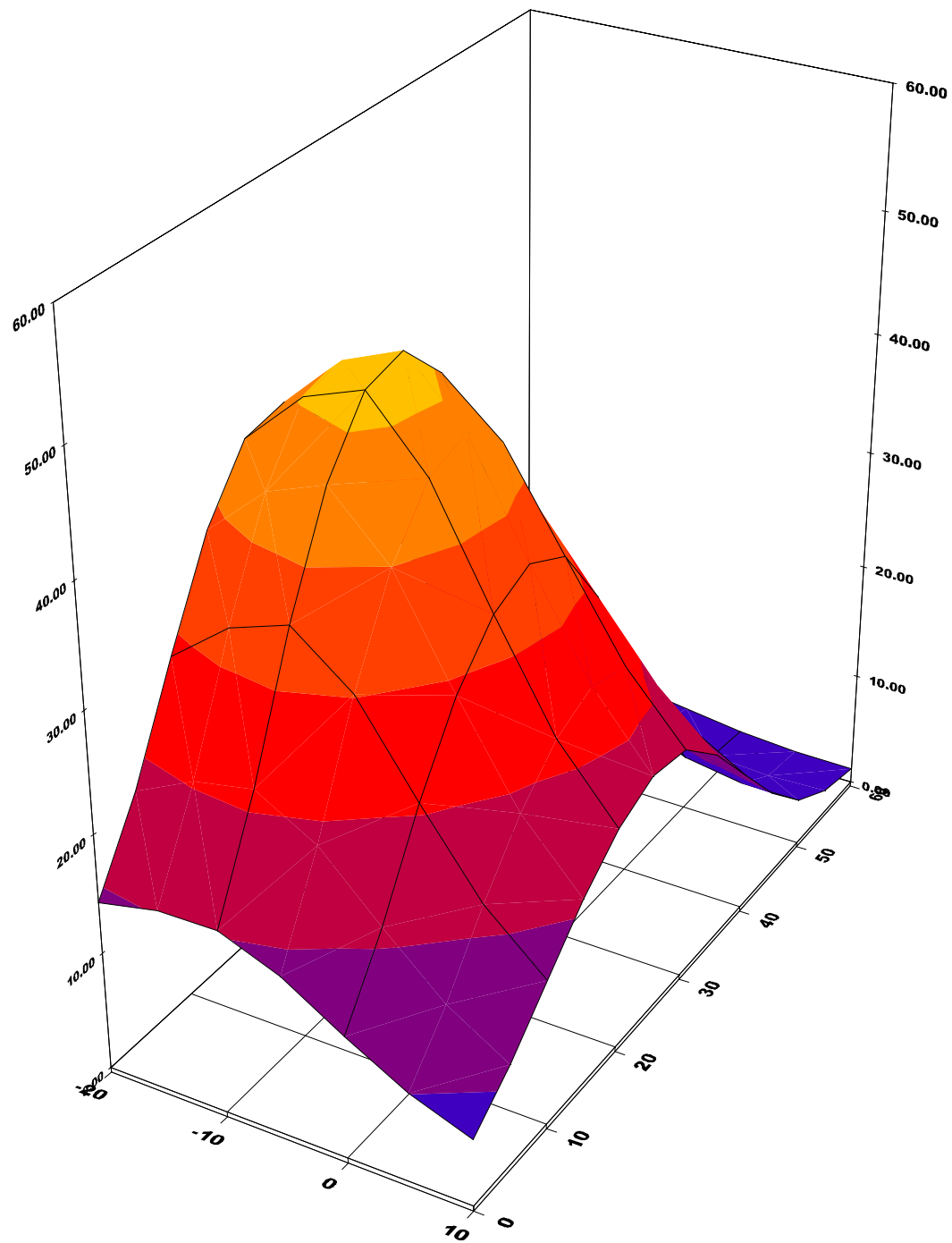
Measured Values (mV) :

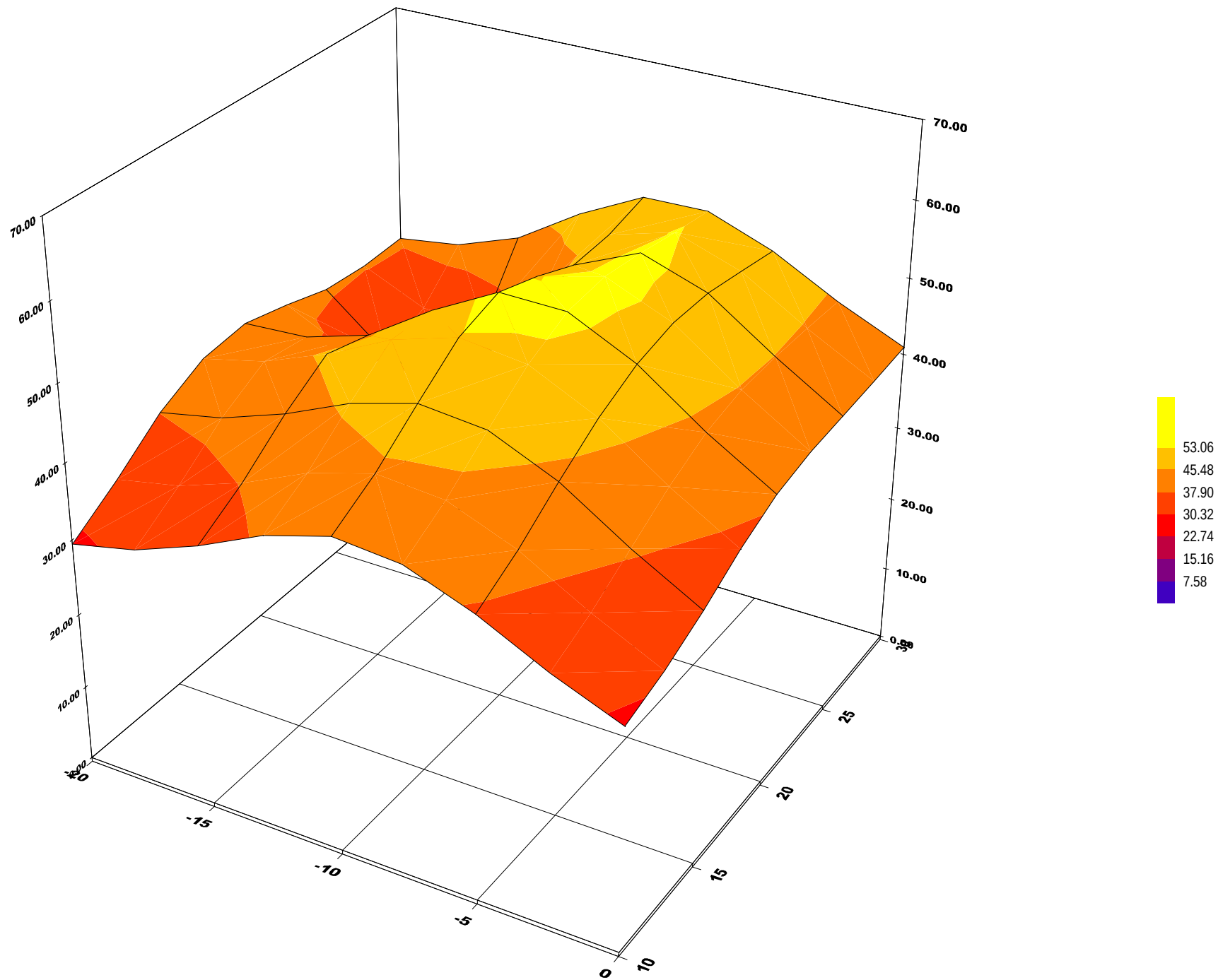
55.523	53.046	53.159	51.230	46.520	42.946
40.041	36.184	31.431	28.174	25.828	

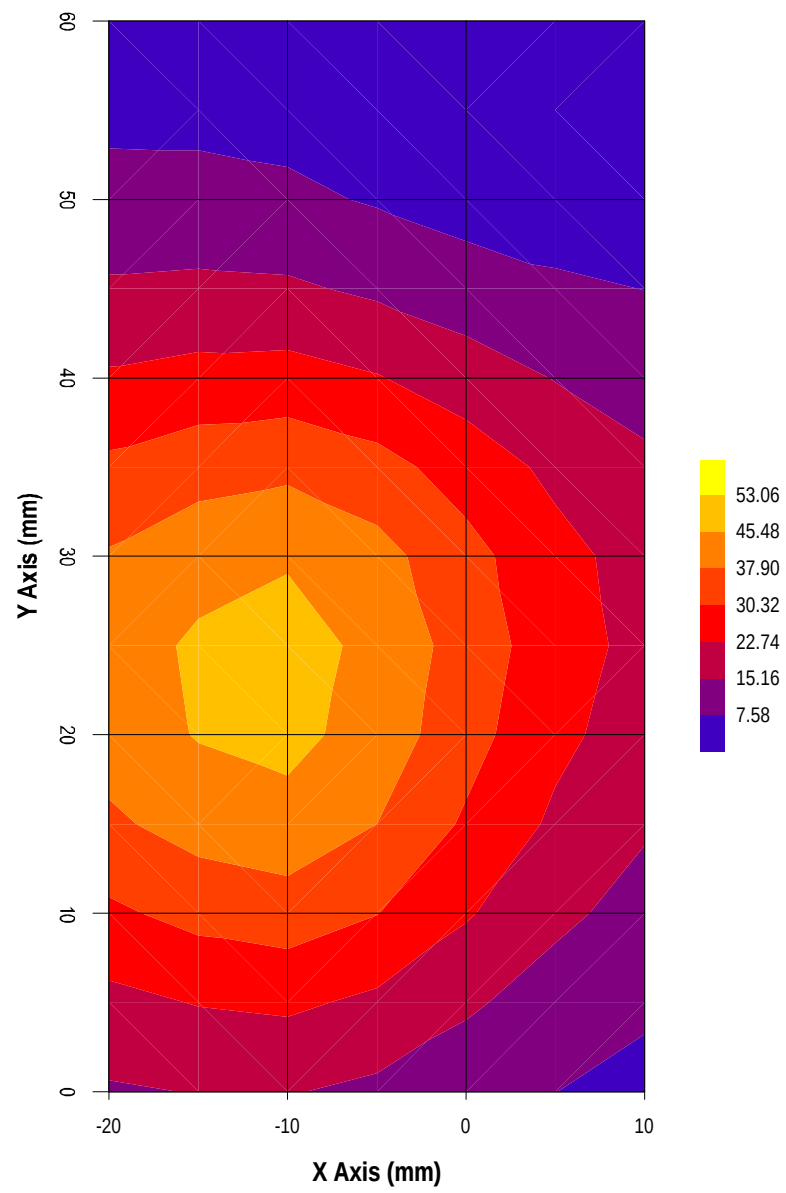
Peak Voltage (mV) : 64.972

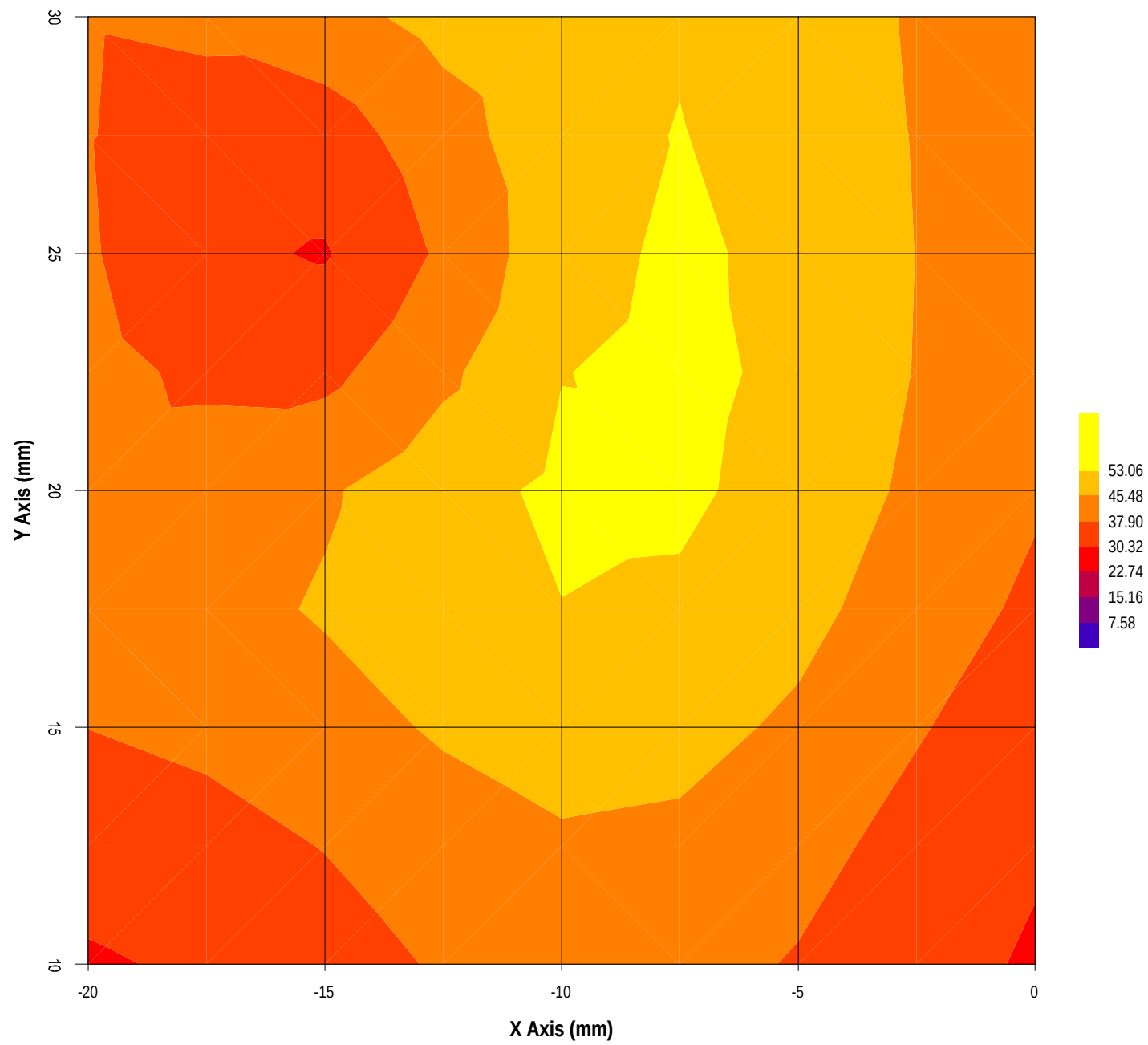
1 Cm Voltage (mV) : 30.482

SAR (W/Kg) : 3.391









Test Information

Date : 12/09/2001

Time : 3:15:06 PM

Product : Nurit 8000 & RIM moden module
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 896
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Back Face
Measured Power (W) : 1.95
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.950

Amplifier Setting :

Channel 1 : 0.0056

Channel 2 : 0.0053

Channel 3 : 0.0066

Location of Maximum Field :

X = -25

Y = 25

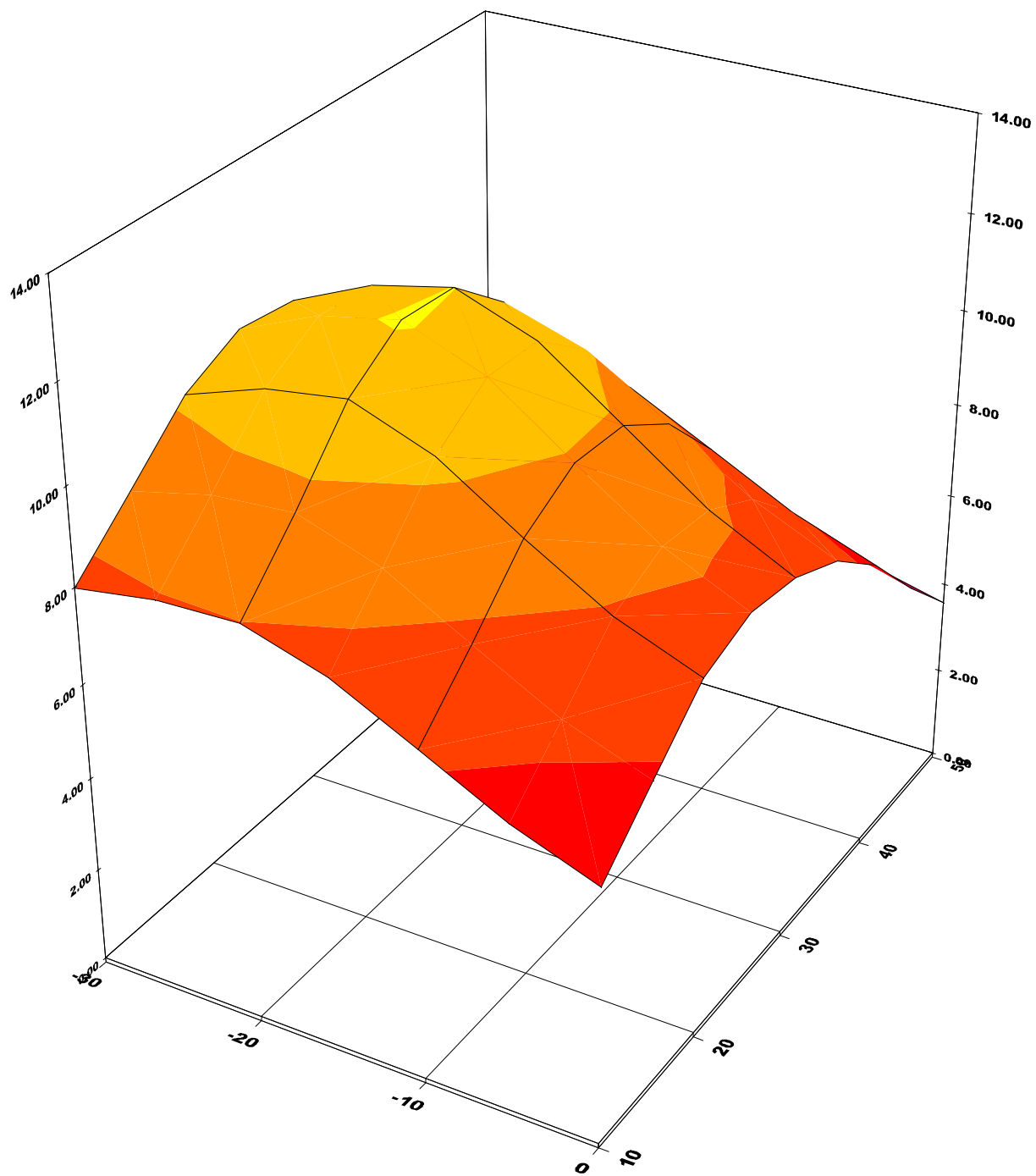
Measured Values (mV) :

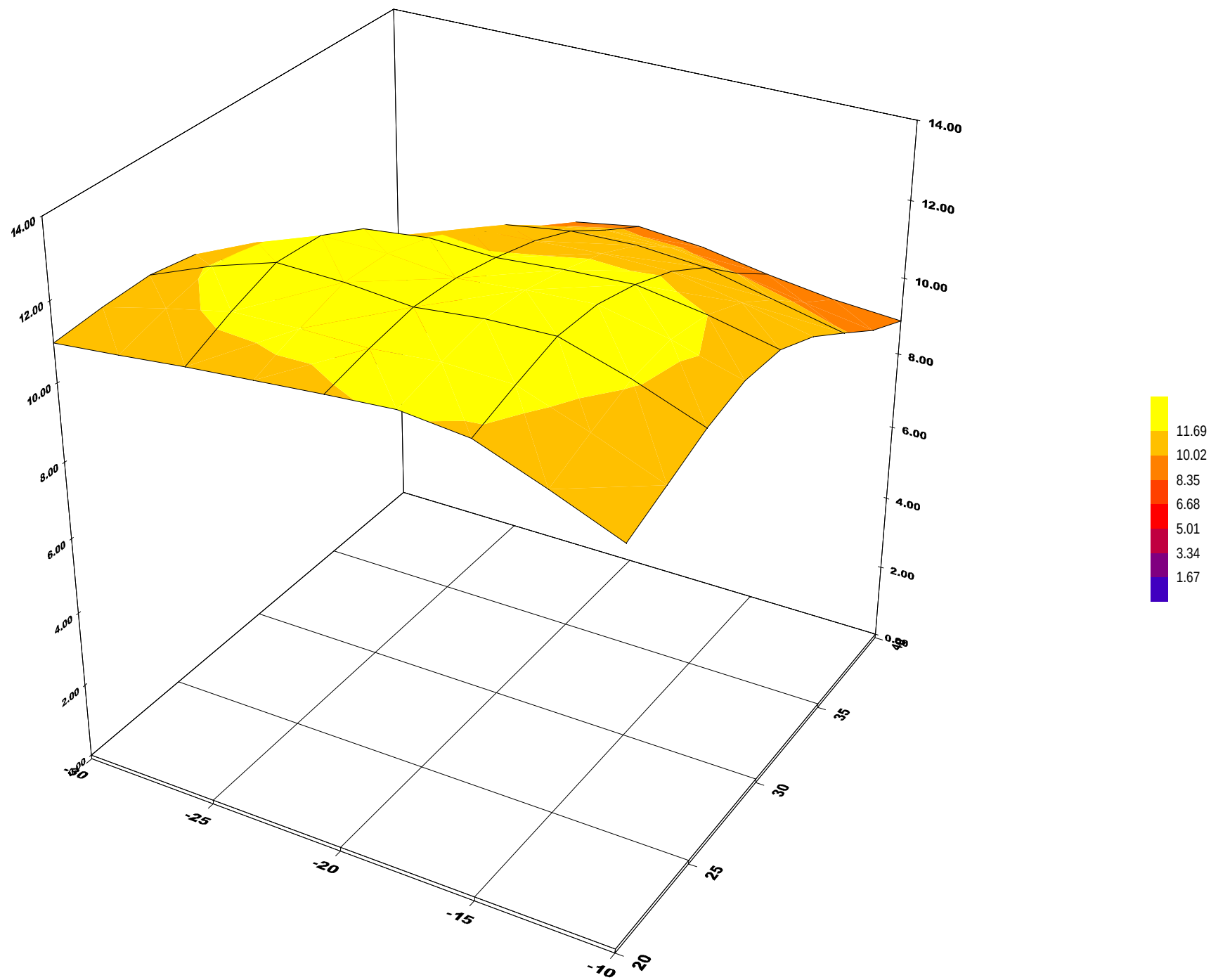
11.491	11.531	10.810	10.749	10.439	9.926
8.758	7.966	7.716	7.123	6.600	

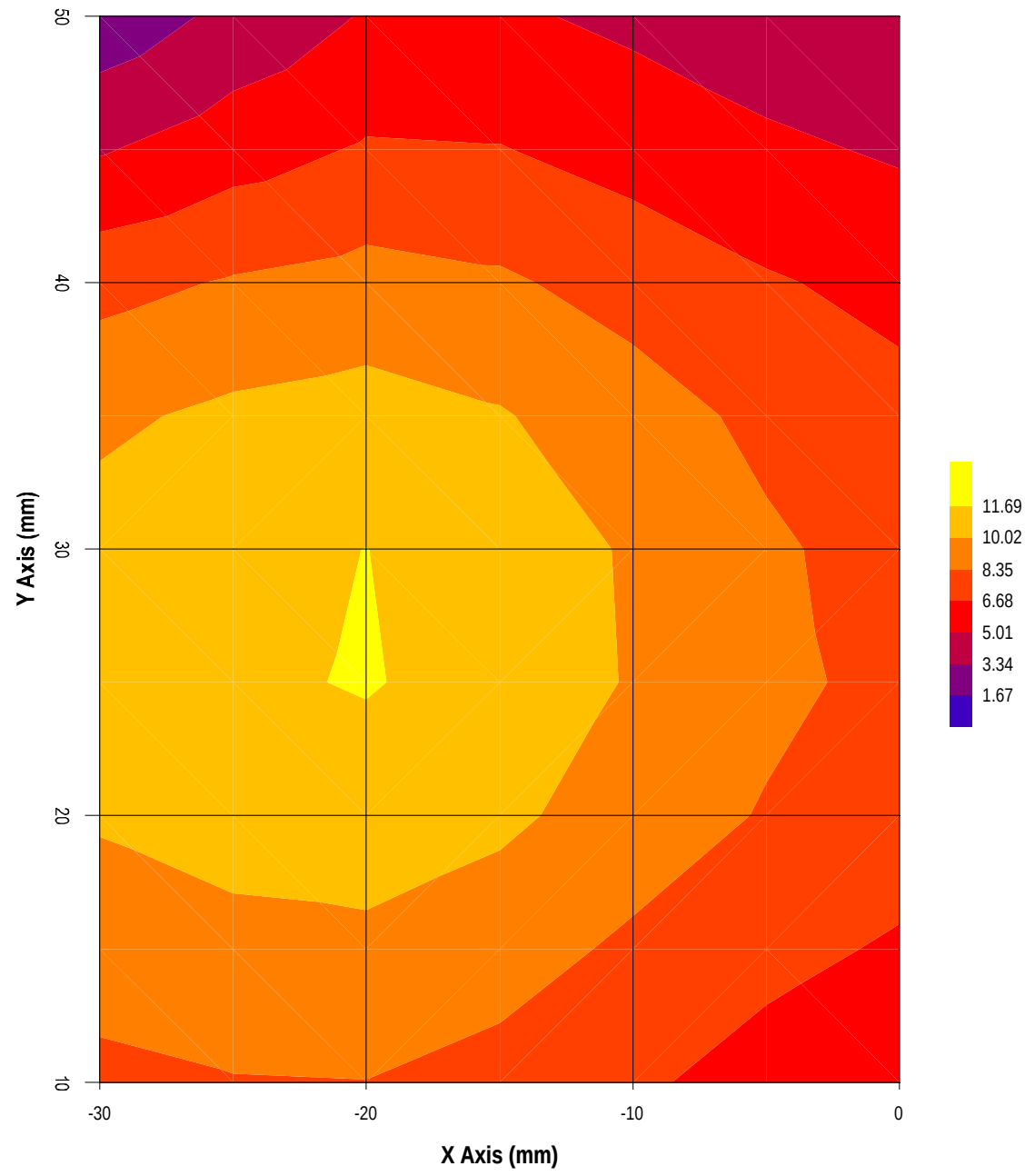
Peak Voltage (mV) : 13.199

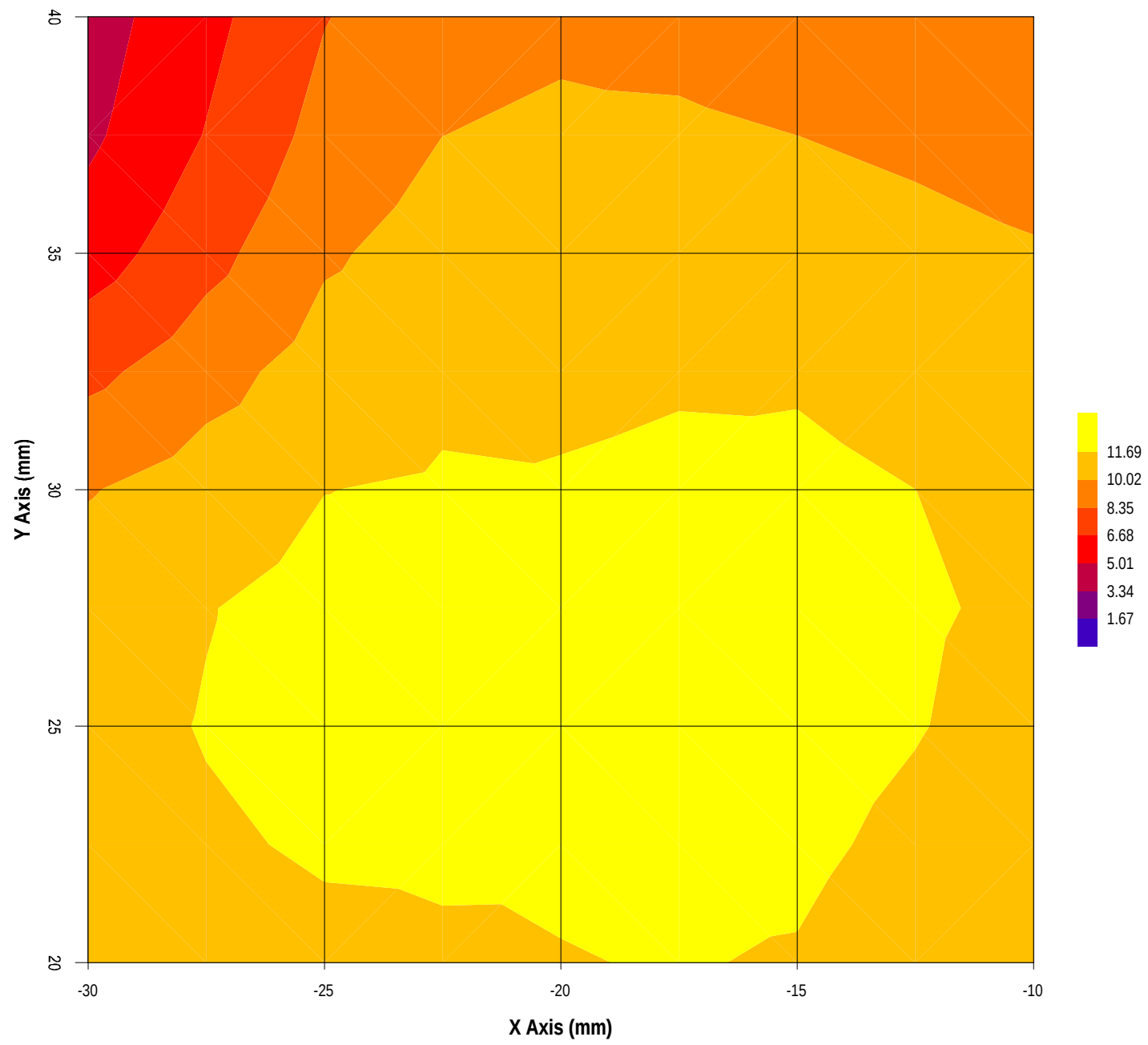
1 Cm Voltage (mV) : 6.874

SAR (W/Kg) : 0.842









Test Information

Date : 12/09/2001

Time : 2:39:18 PM

Product : Nurit 8000 & RIM moden module
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 896
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Back Face
Measured Power (W) : 1.95
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.950

Amplifier Setting :

Channel 1 : 0.0056

Channel 2 : 0.0053

Channel 3 : 0.0066

Location of Maximum Field :

X = -20

Y = 30

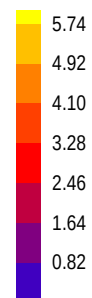
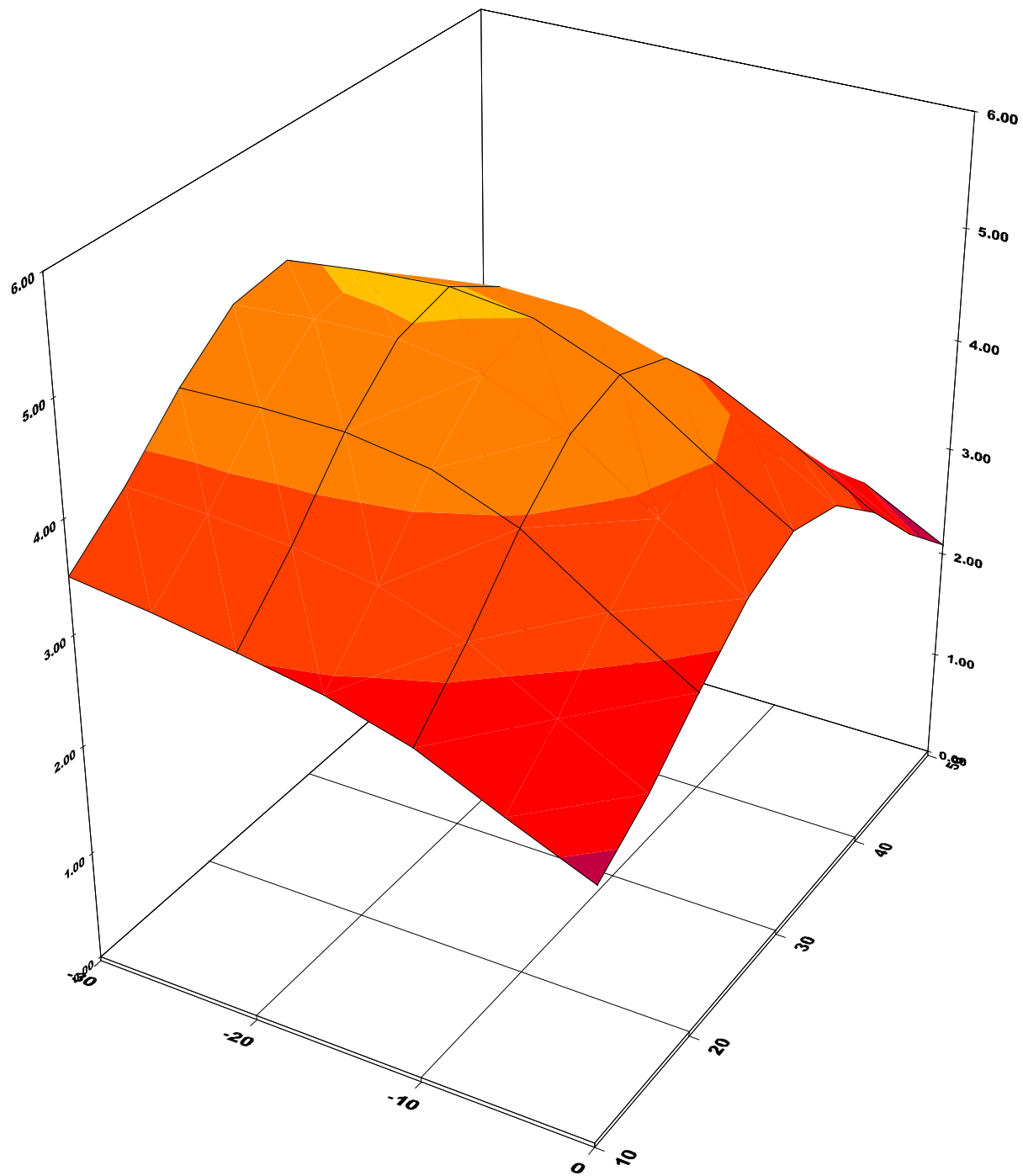
Measured Values (mV) :

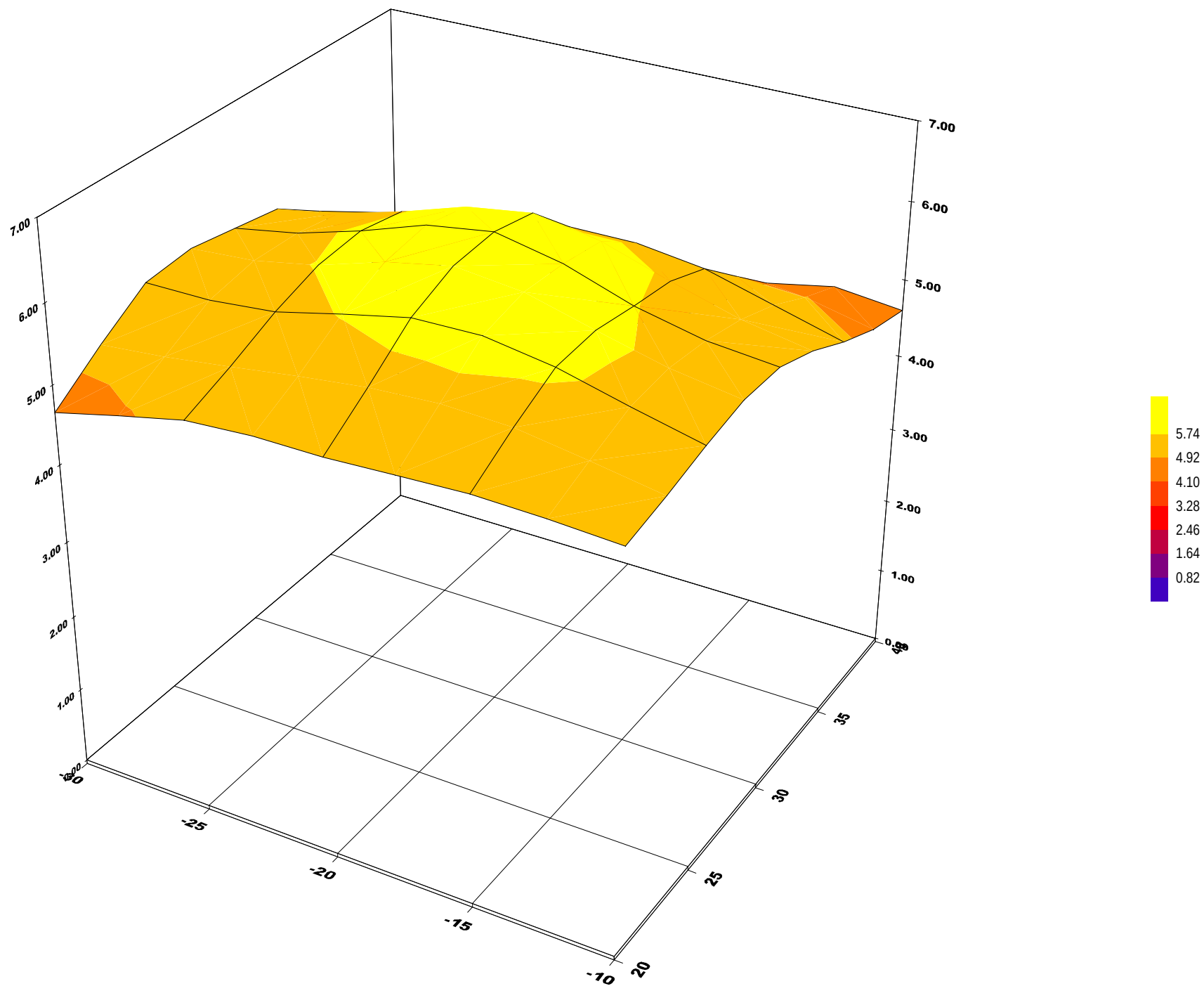
6.222	6.180	5.964	5.866	5.242	4.851
4.477	4.082	3.696	3.296	2.925	

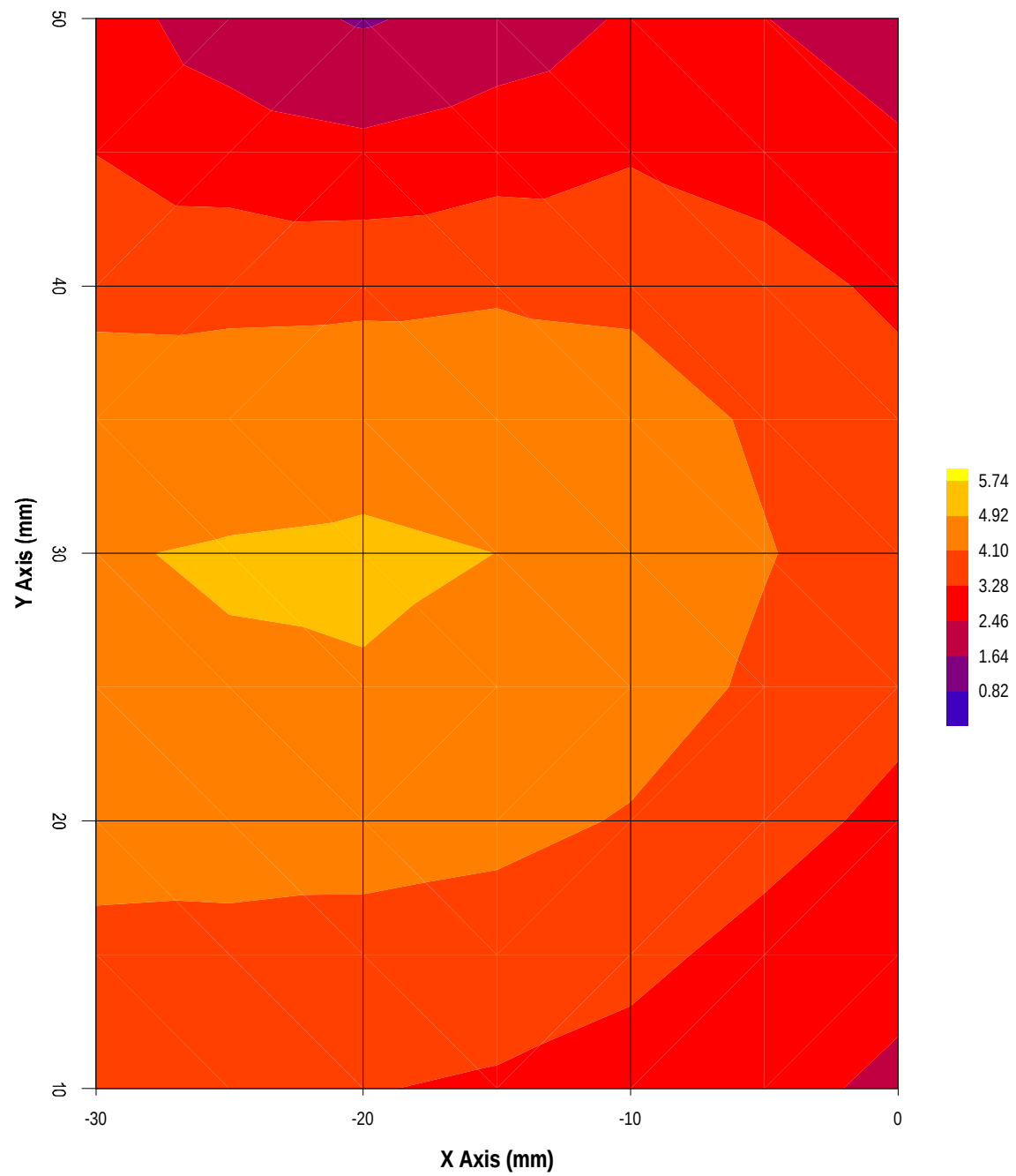
Peak Voltage (mV) : 7.334

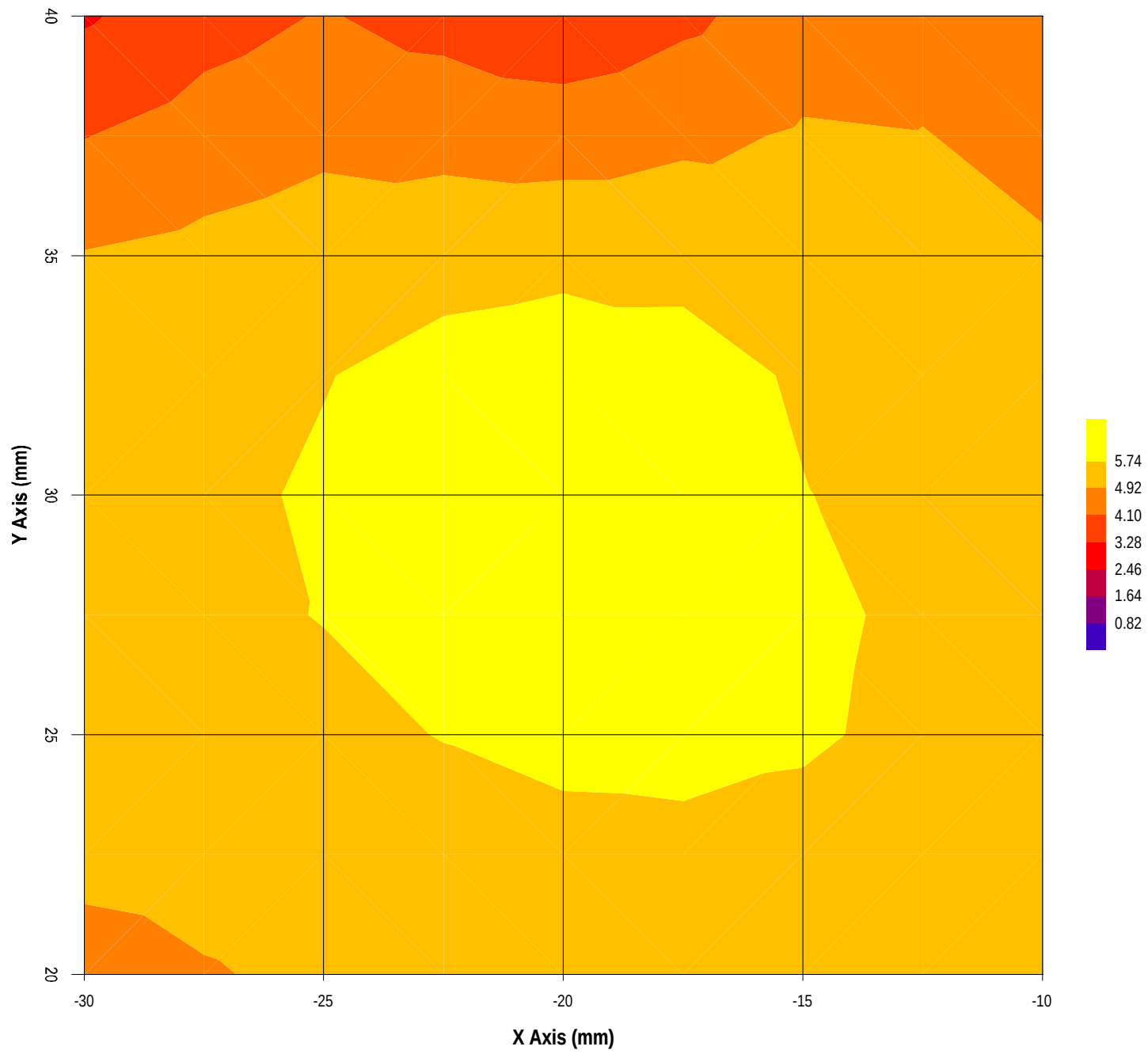
1 Cm Voltage (mV) : 3.377

SAR (W/Kg) : 0.410









Test Information

Date : 06/09/2001

Time : 2:45:51 PM

Product : Nurit 8000 & RIM moden module
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 896
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Top Face
Measured Power (W) : 1.95
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.950

Amplifier Setting :

Channel 1 : 0.0056

Channel 2 : 0.0053

Channel 3 : 0.0066

Location of Maximum Field :

X = -5

Y = 40

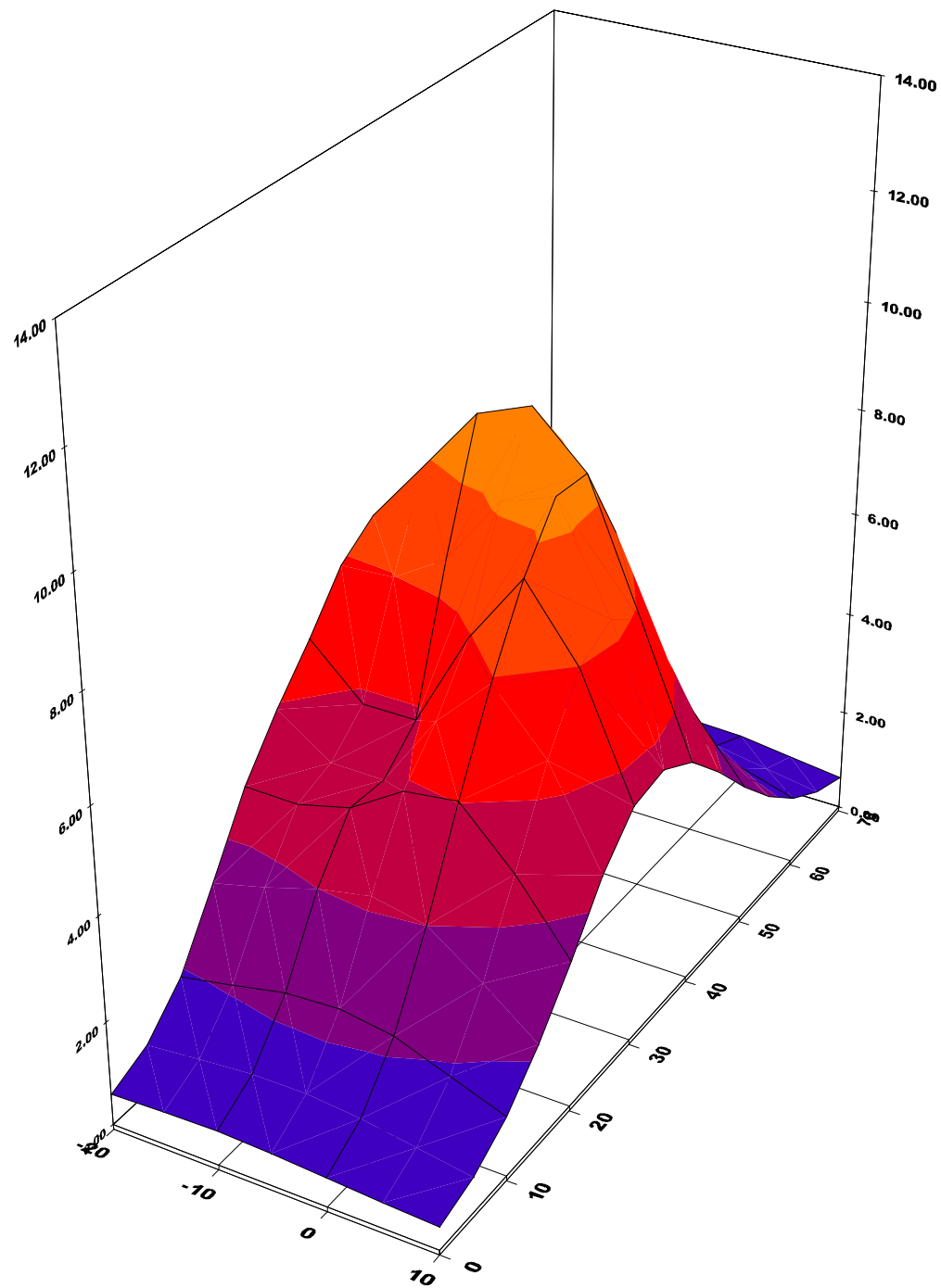
Measured Values (mV) :

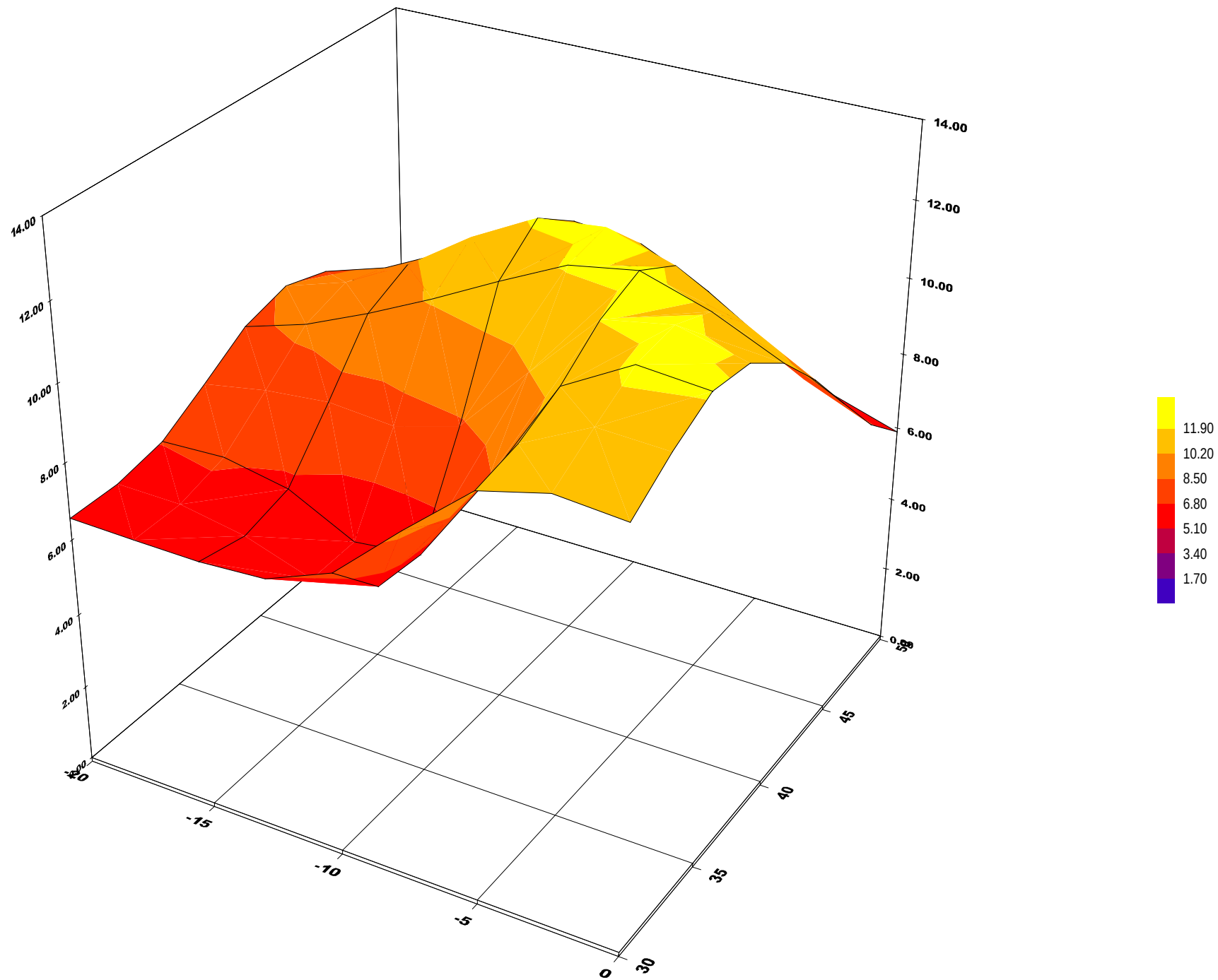
12.635	13.292	13.235	12.211	10.740	9.311
8.379	7.409	6.383	5.136	4.357	

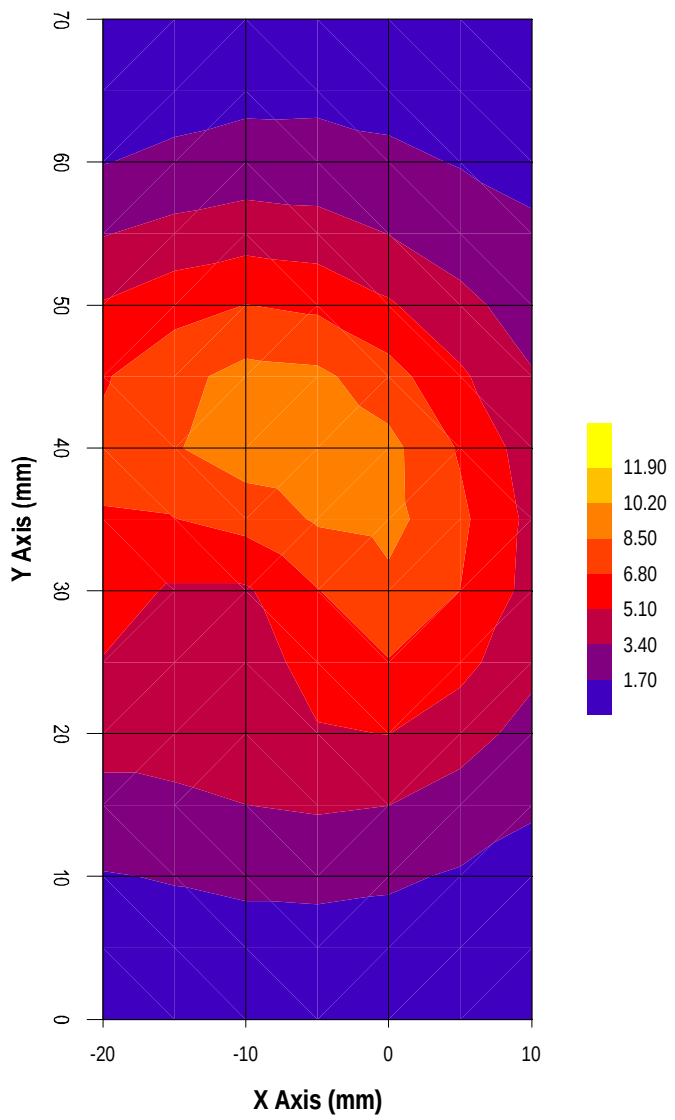
Peak Voltage (mV) : 15.278

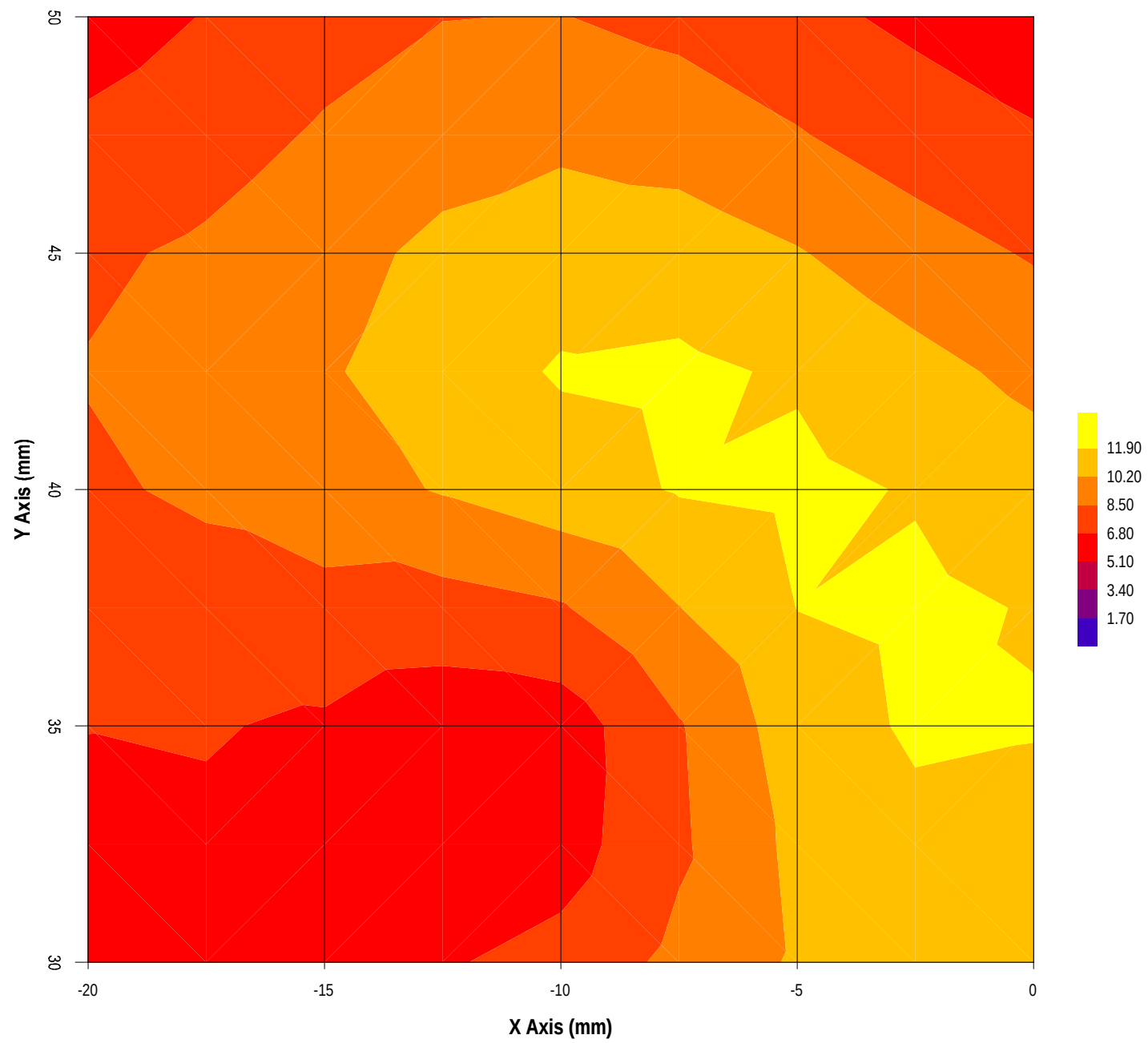
1 Cm Voltage (mV) : 5.835

SAR (W/Kg) : 0.769









Test Information

Date : 12/09/2001

Time : 4:39:05 PM

Product : Nurit 8000 & RIM moden module
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 896
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Top Face
Measured Power (W) : 1.95
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.950

Amplifier Setting :

Channel 1 : 0.0056

Channel 2 : 0.0053

Channel 3 : 0.0066

Location of Maximum Field :

X = -5

Y = 40

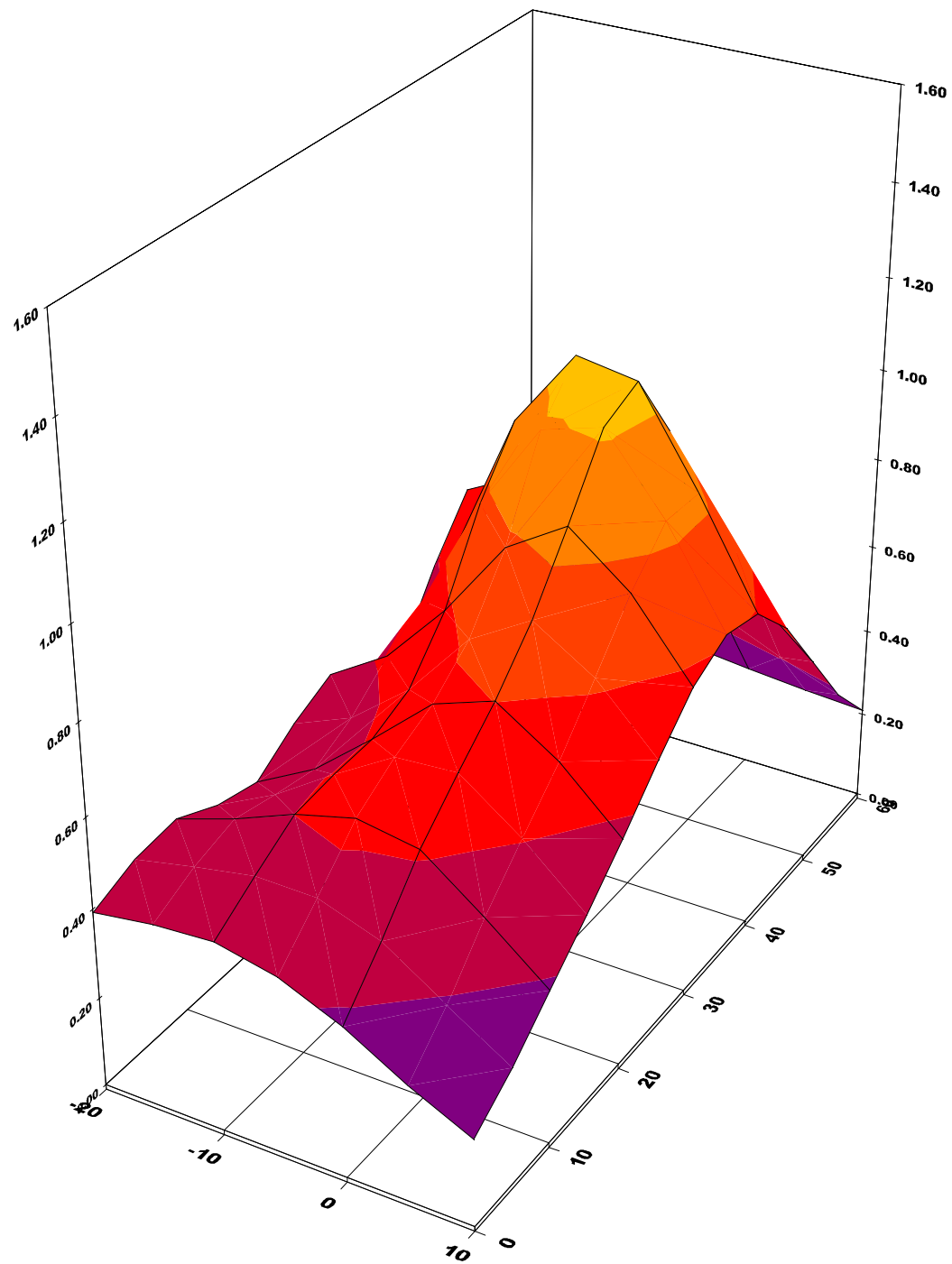
Measured Values (mV) :

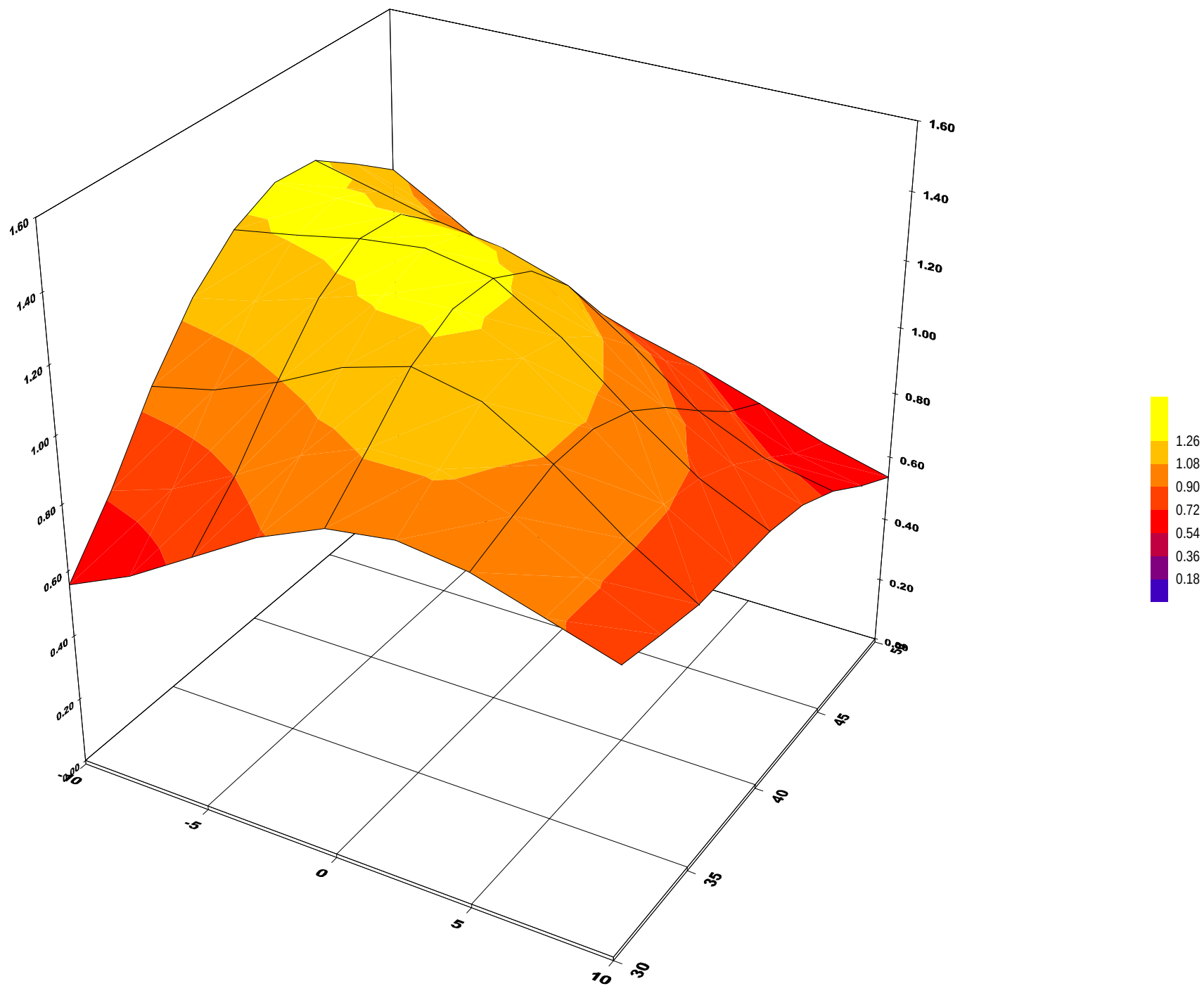
1.612	1.664	1.522	1.391	1.187	1.014
0.858	0.640	0.521	0.392	0.332	

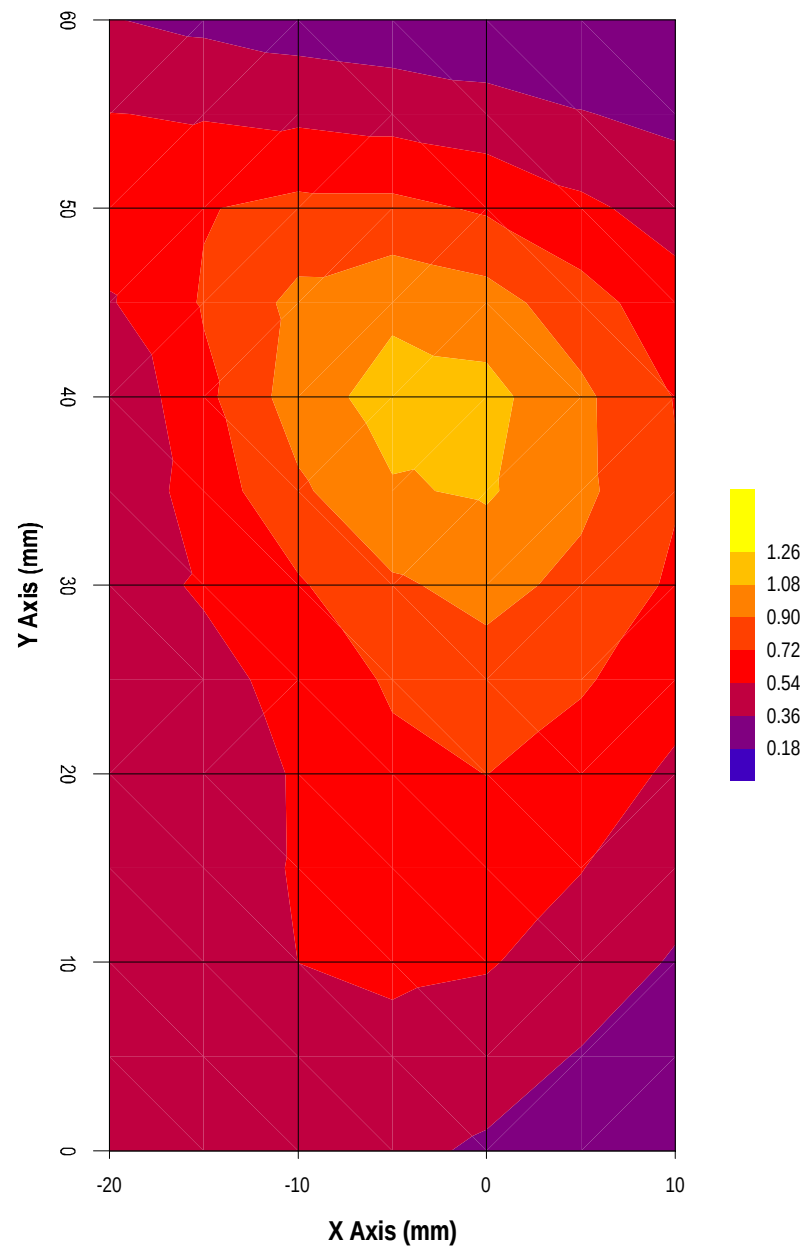
Peak Voltage (mV) : 2.062

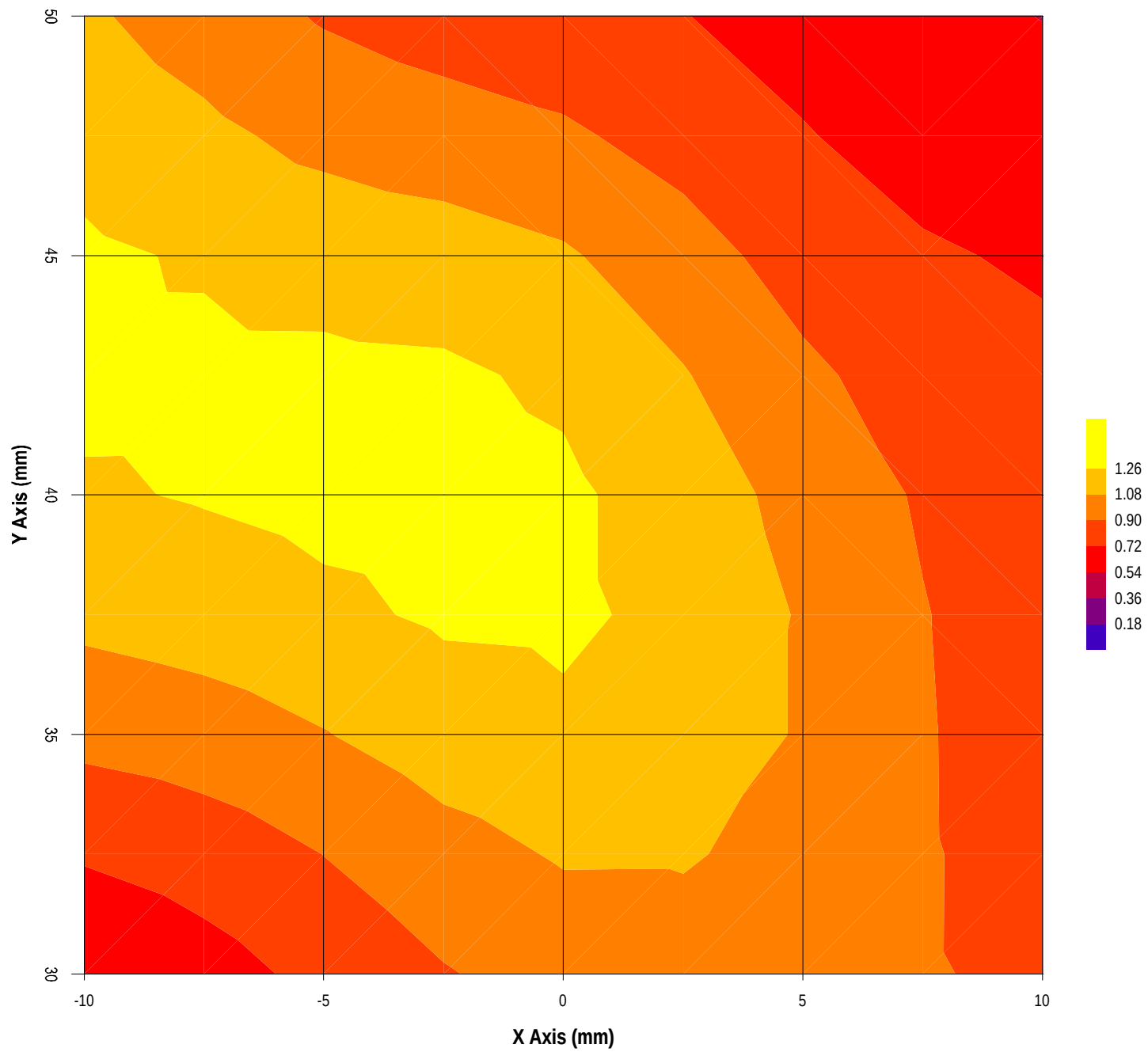
1 Cm Voltage (mV) : 0.587

SAR (W/Kg) : 0.079









Test Information

Date : 12/09/2001
Time : 11:13:22 AM

<u>Product</u>	: Nurit 8000 & RIM moden module	<u>Test</u>	: SAR
<u>Manufacturer</u>	: LIPMAN USA	<u>Frequency (MHz)</u>	: 896
<u>Model Number</u>	: 8000	<u>Nominal Output Power (W)</u>	: 2
<u>Serial Number</u>	:	<u>Antenna Type</u>	: Patch
<u>FCC ID Number</u>	:	<u>Signal</u>	: 25%

<u>Phantom</u>	: Waist	<u>Dielectric Constant</u>	: 50.9
<u>Simulated Tissue</u>	: Muscle	<u>Conductivity</u>	: 1.40

<u>Probe</u>	: UT-ETR-0200-1(c)	<u>Antenna Position</u>	: Top Face
<u>Probe Offset (mm)</u>	: 2.250	<u>Measured Power (W)</u>	: 1.95
<u>Sensor Factor (mV)</u>	: 10.8	<u>(conducted)</u>	
<u>Conversion Factor</u>	: 0.880	<u>Cable Insertion Loss (dB)</u>	: 0
<u>Calibrated Date</u>	: 14/06/2001	<u>Compensated Power (W)</u>	: 1.950

Amplifier Setting :
Channel 1 : 0.0056 Channel 2 : 0.0053 Channel 3 : 0.0066

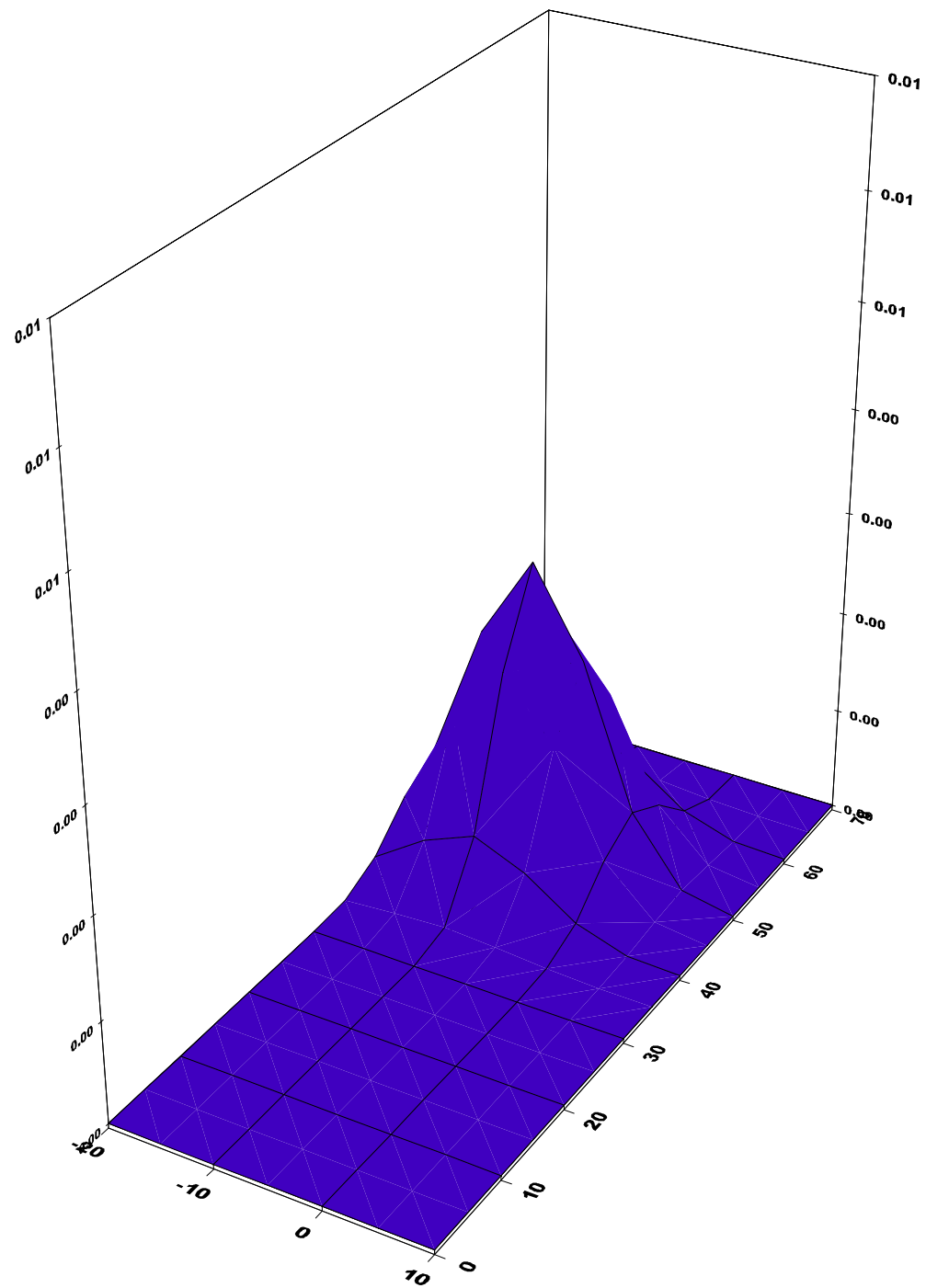
Location of Maximum Field :

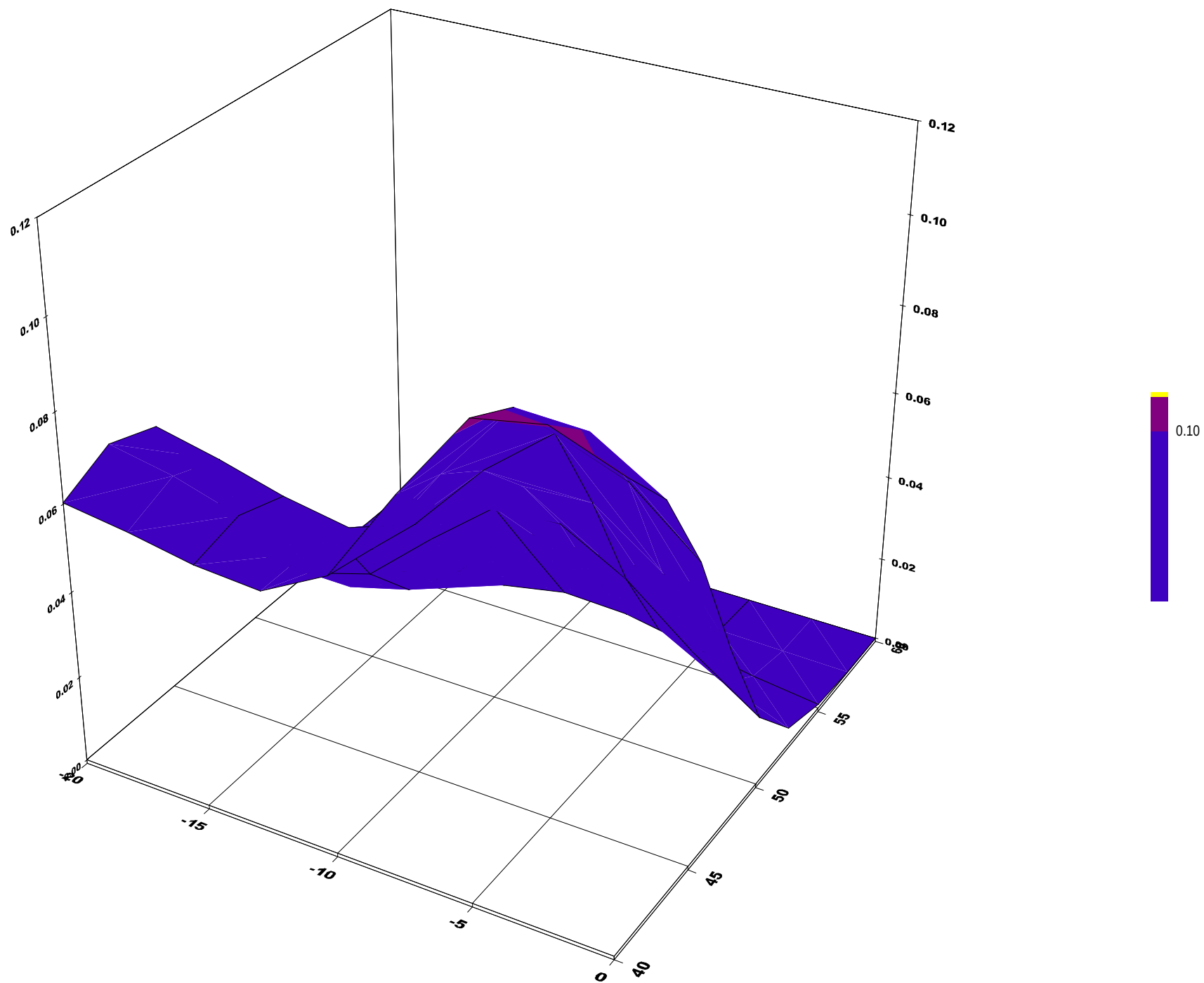
X = -5 Y = 40

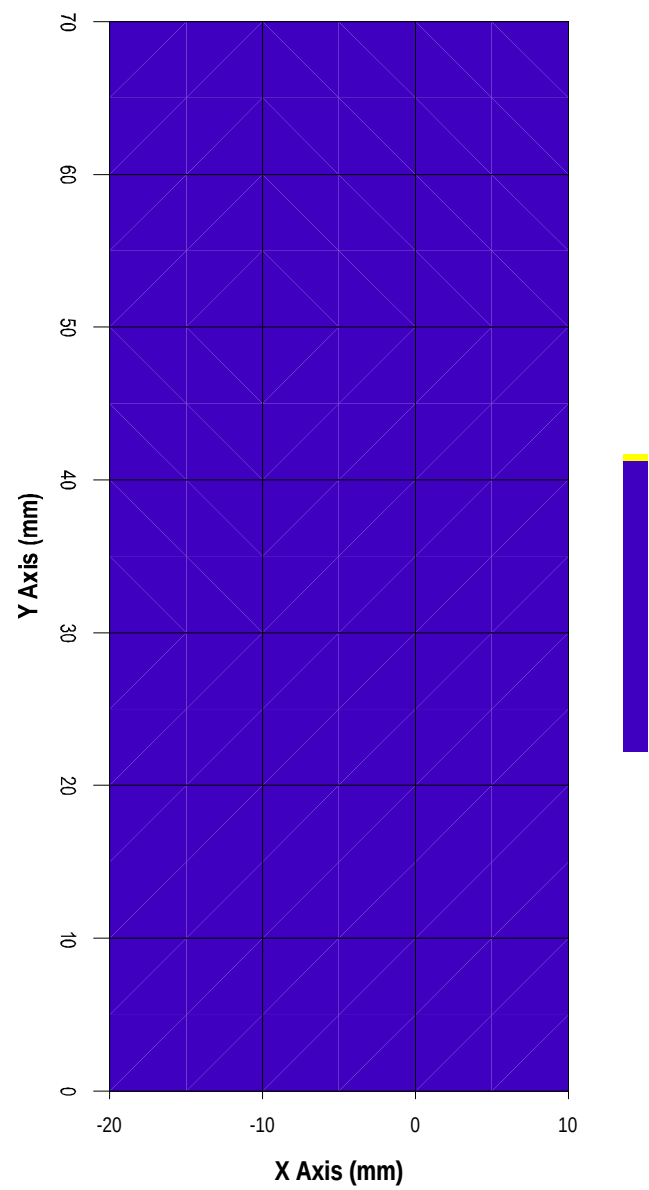
Measured Values (mV) :

0.113	0.093	0.086	0.066	0.046	0.000
0.000	0.000	0.000	0.000	0.000	

<u>Peak Voltage (mV)</u>	: 0.188	<u>1 Cm Voltage (mV)</u>	: 0.021	<u>SAR (W/Kg)</u>	: 0.004
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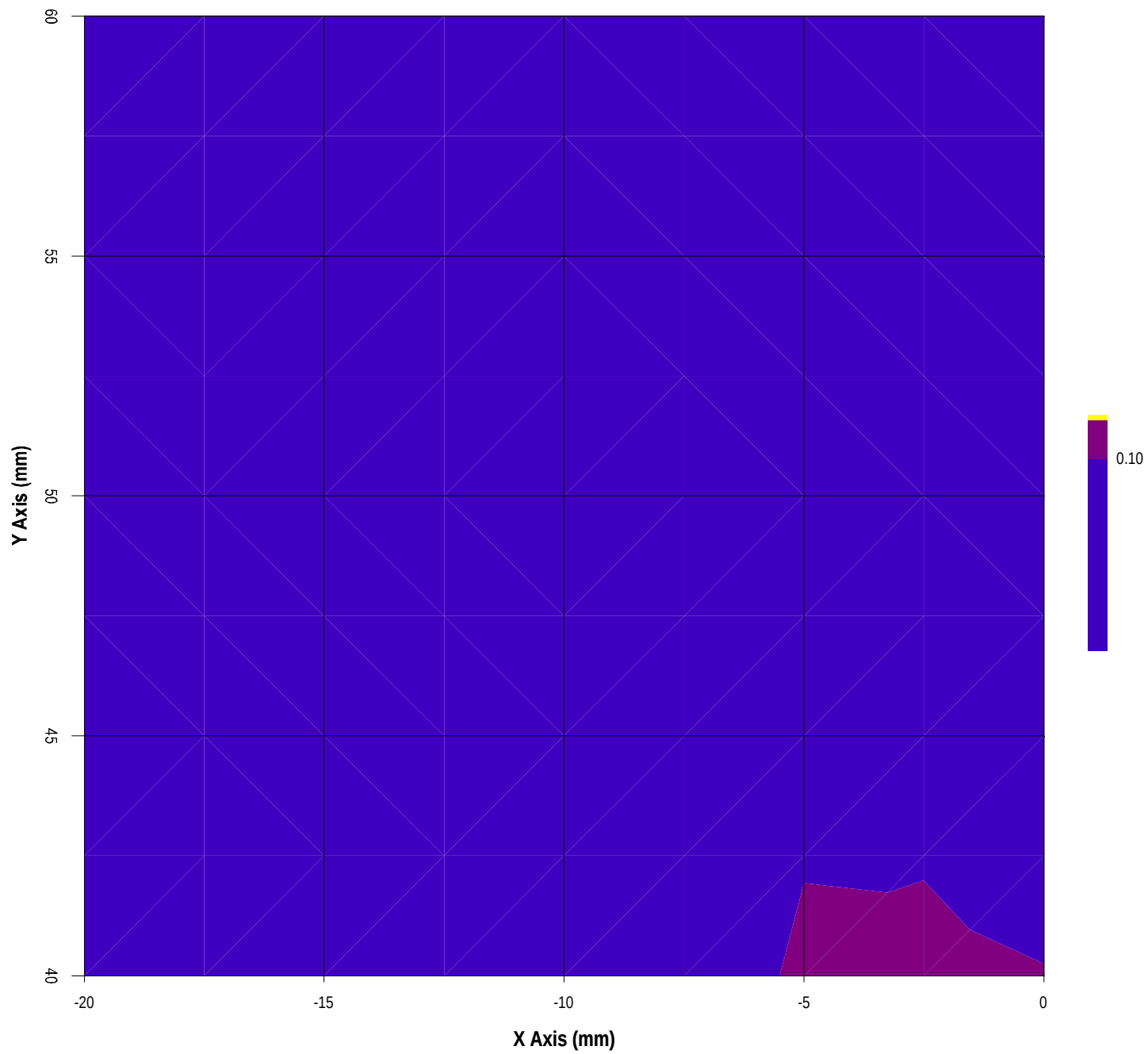


EXHIBIT 9. 901 MHz SAR MEASUREMENT

Test data for 901 MHz SAR measurements are presented in following order:

Back surface of EUT parallel to phantom waist:

- ▶ In contact with phantom
- ▶ 15 mm away from phantom
- ▶ 25 mm away from phantom

Top surface of EUT parallel to phantom waist:

- ▶ In contact with phantom
- ▶ 15 mm away from phantom-
- ▶ 25 mm away from phantom

Detailed SAR Results with EUT relocated for maximum contact with phantom surface

EUT Configurations	EUT separation distance to phantom (mm)	Antenna Position	SAR (W/kg) Device Test Frequency & Output
			901 MHz 1905 mW (at antenna terminal)
Back surface of EUT parallel to phantom waist	0	Internal	3.961
	15	Internal	0.944
	25	Internal	0.308
Top surface of EUT parallel to phantom waist	0	Internal	0.687
	15	Internal	0.077
	25	Internal	0.000

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File #: LIP7-SAR
September 21, 2001

- Assessed by ITI (UK) Competent Body, NVLAP (USA) Accreditation Body & ACA/AUSTEL (Australia), VCCI (Japan)
- Accredited by Industry Canada (Canada) under ACC-LAB (Europe/Canada MRA and APEC/Canada MRA)
- Recognized/Listed by FCC (USA)
- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

Test Information

Date : 06/09/2001

Time : 3:41:45 PM

Product : Nurit 8000 & RIM moden module
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 901
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Back Face
Measured Power (W) : 1.91
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.910

Amplifier Setting :

Channel 1 : 0.0056

Channel 2 : 0.0053

Channel 3 : 0.0066

Location of Maximum Field :

X = -15

Y = 25

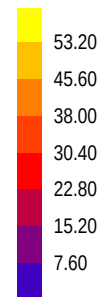
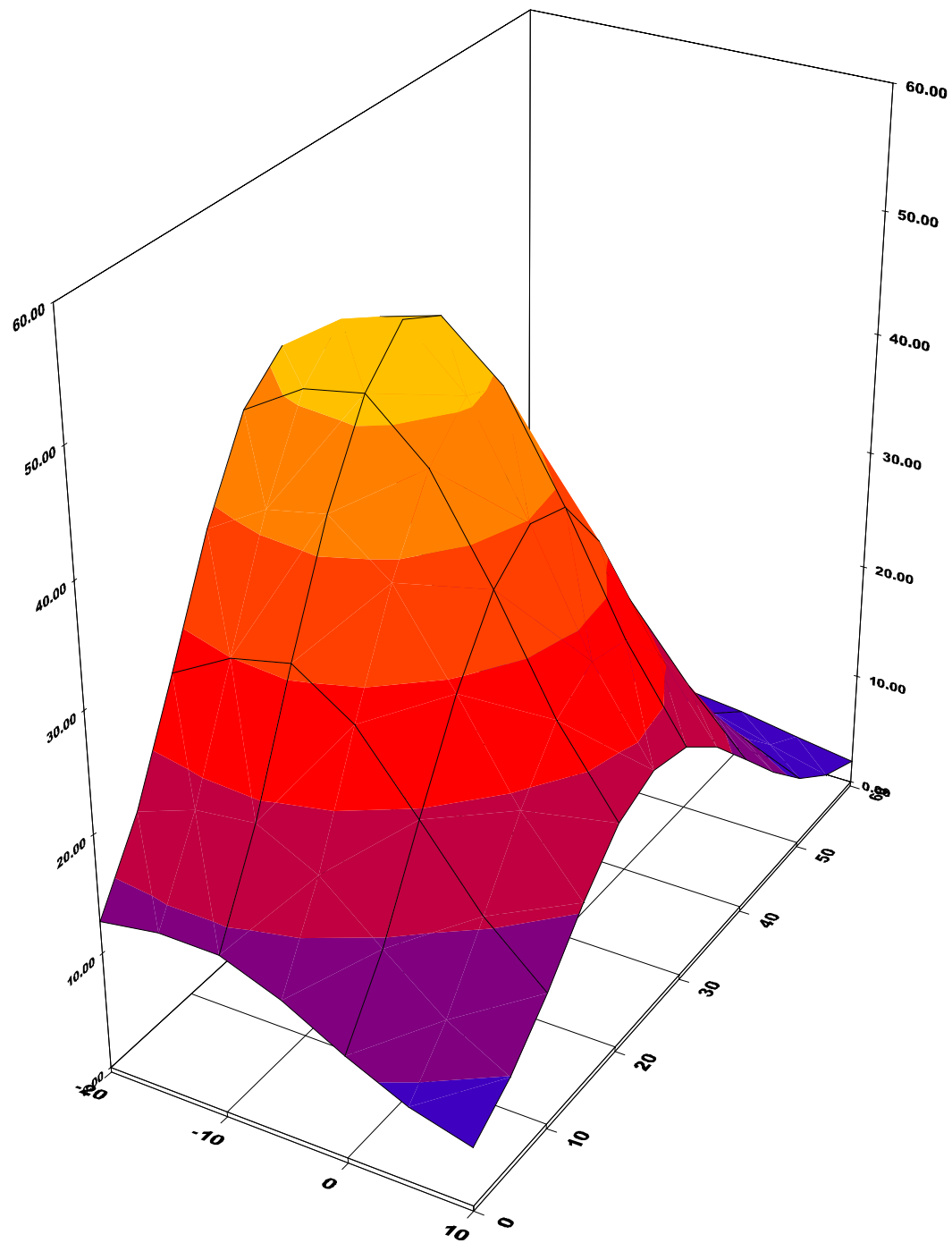
Measured Values (mV) :

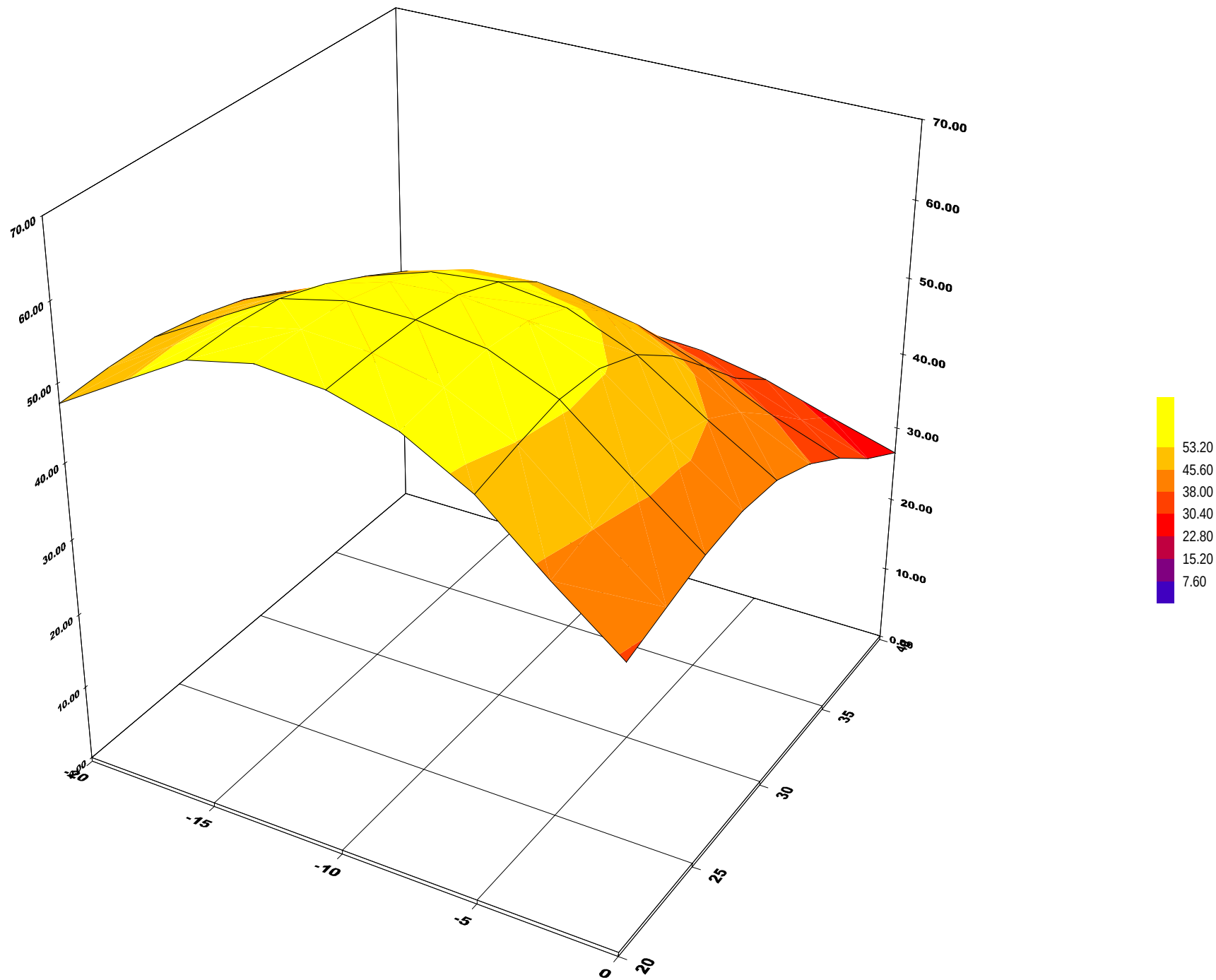
60.927	58.471	58.062	53.767	50.954	47.085
43.033	39.773	36.677	32.969	30.050	

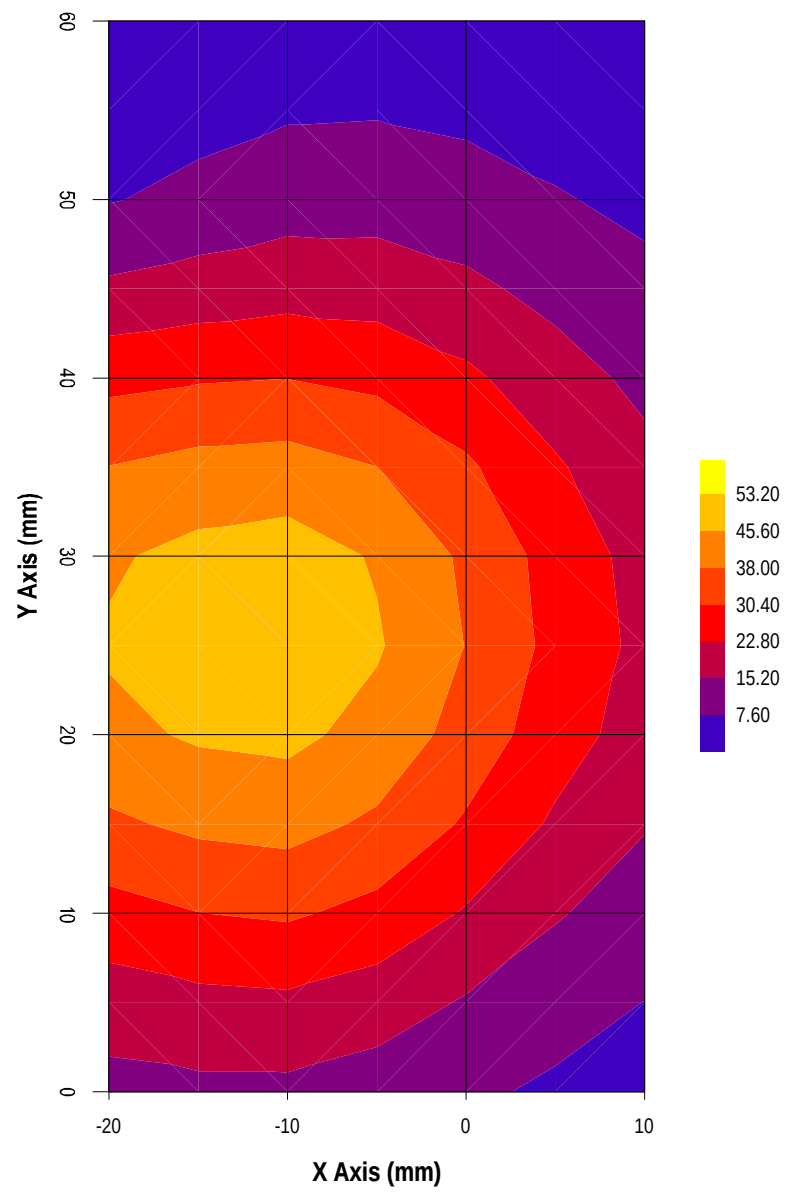
Peak Voltage (mV) : 71.473

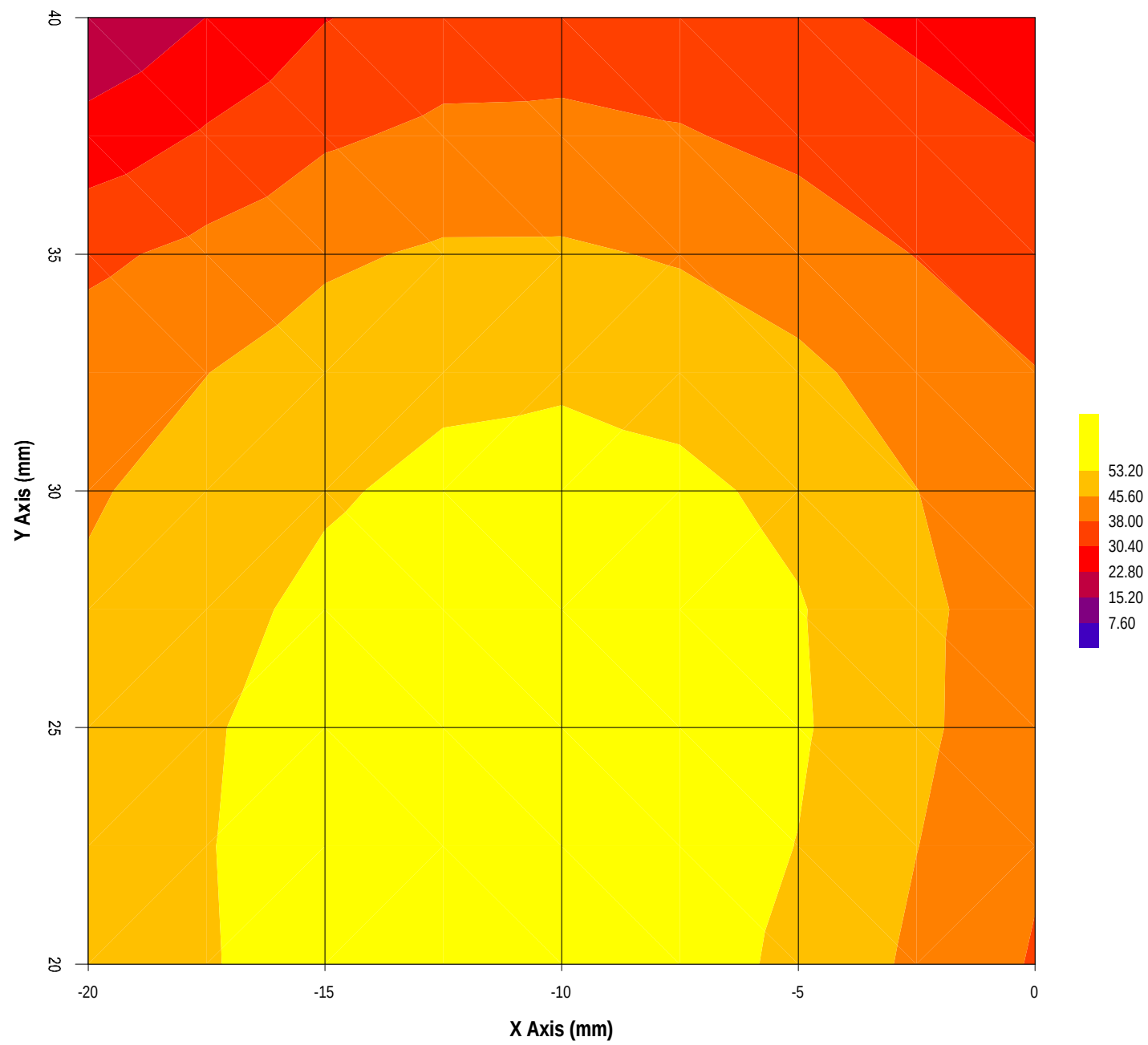
1 Cm Voltage (mV) : 34.175

SAR (W/Kg) : 3.961









Test Information

Date : 12/09/2001

Time : 3:38:52 PM

Product : Nurit 8000 & RIM moden module
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 901
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Back Face
Measured Power (W) : 1.91
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.910

Amplifier Setting :

Channel 1 : 0.0056

Channel 2 : 0.0053

Channel 3 : 0.0066

Location of Maximum Field :

X = -25

Y = 25

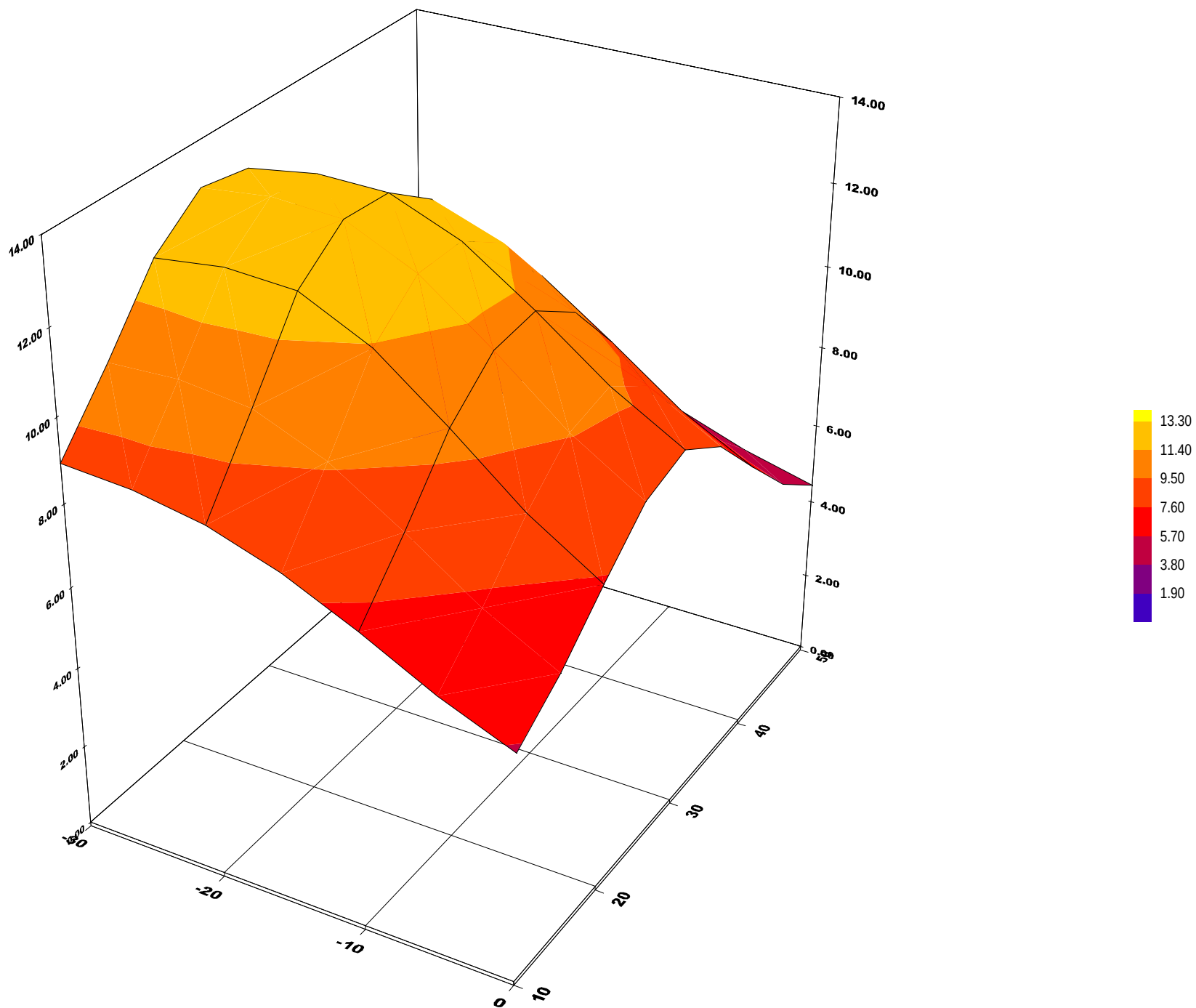
Measured Values (mV) :

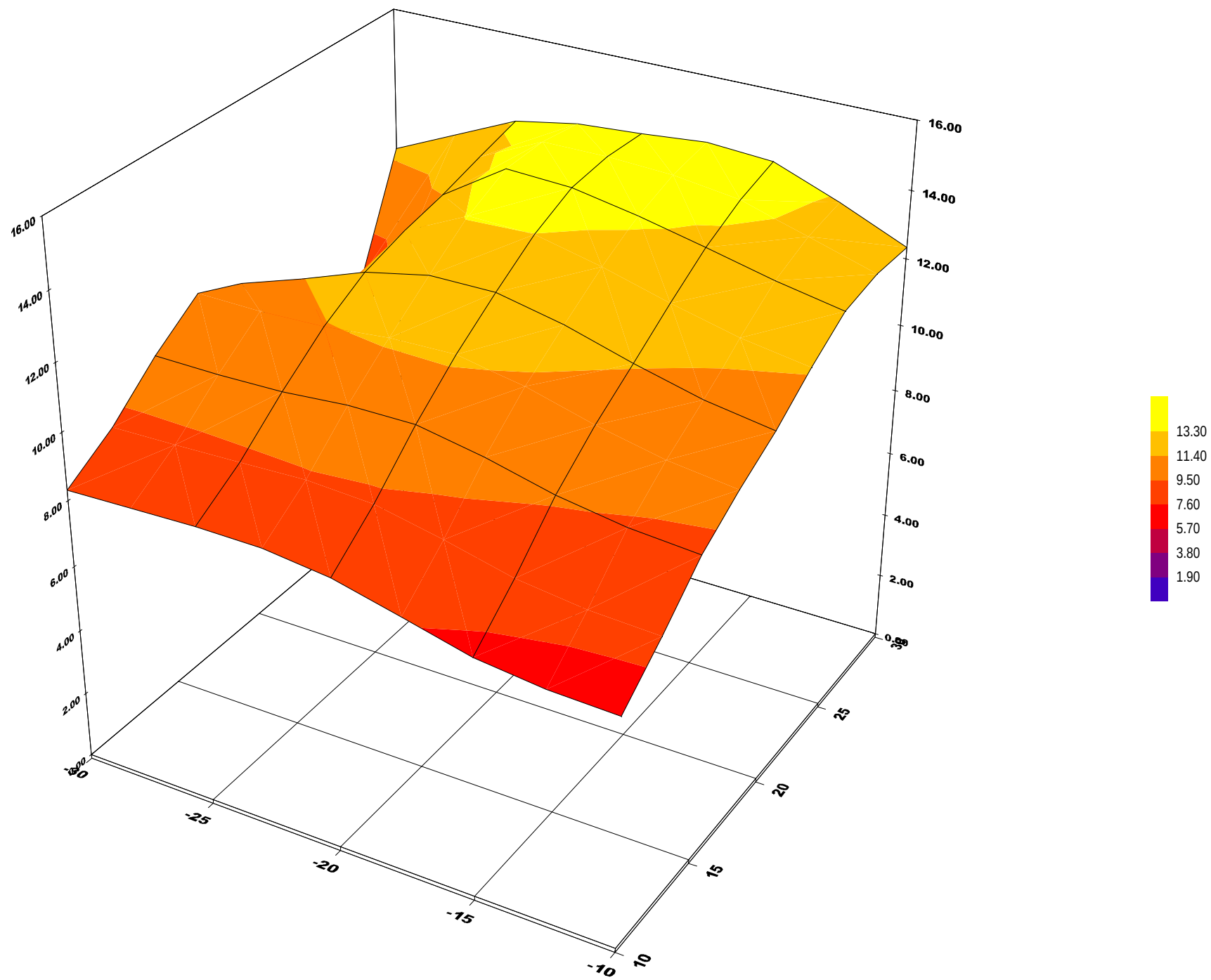
14.314	13.534	13.246	13.099	12.262	12.130
10.611	9.978	9.149	8.579	8.000	

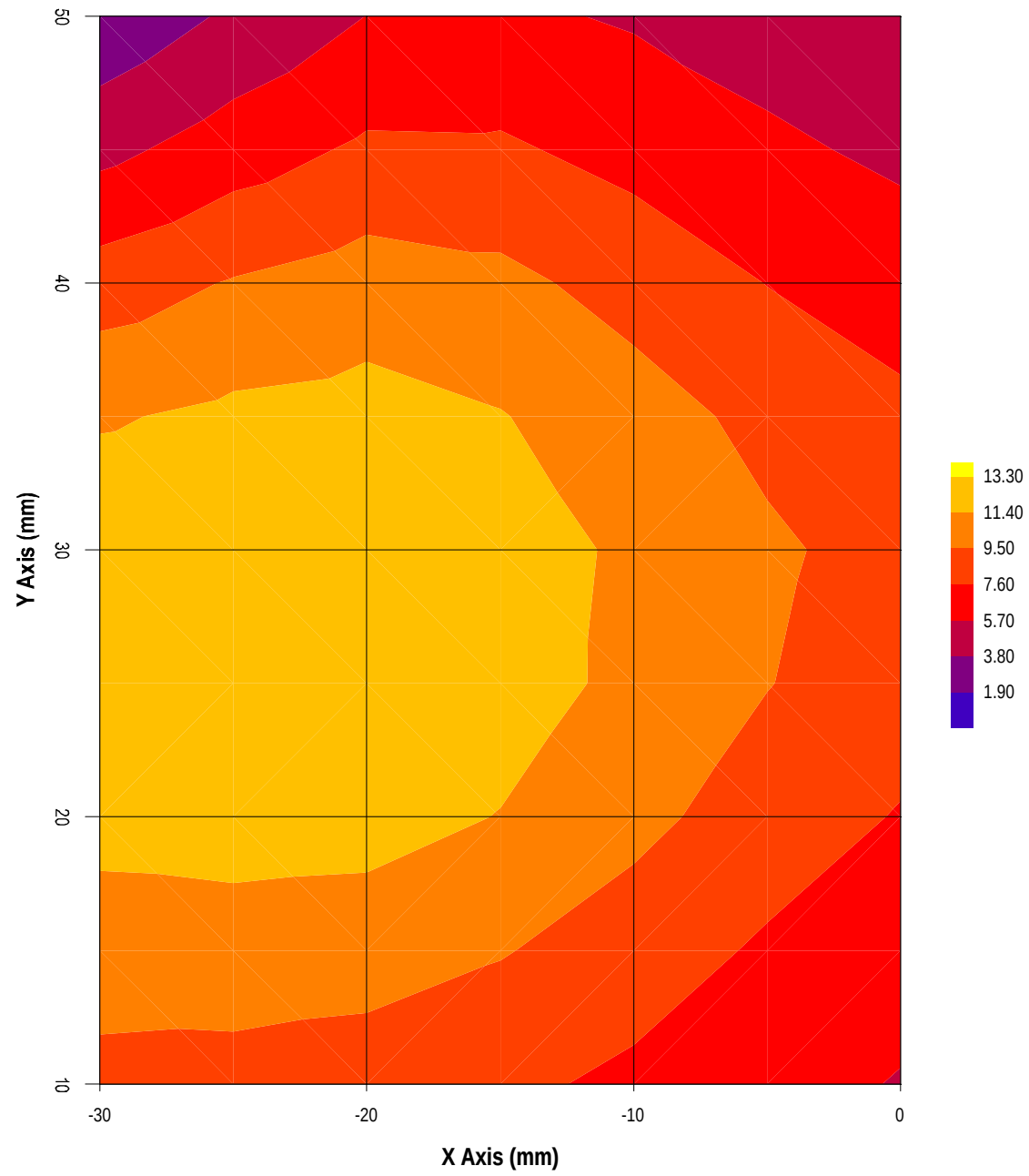
Peak Voltage (mV) : 16.580

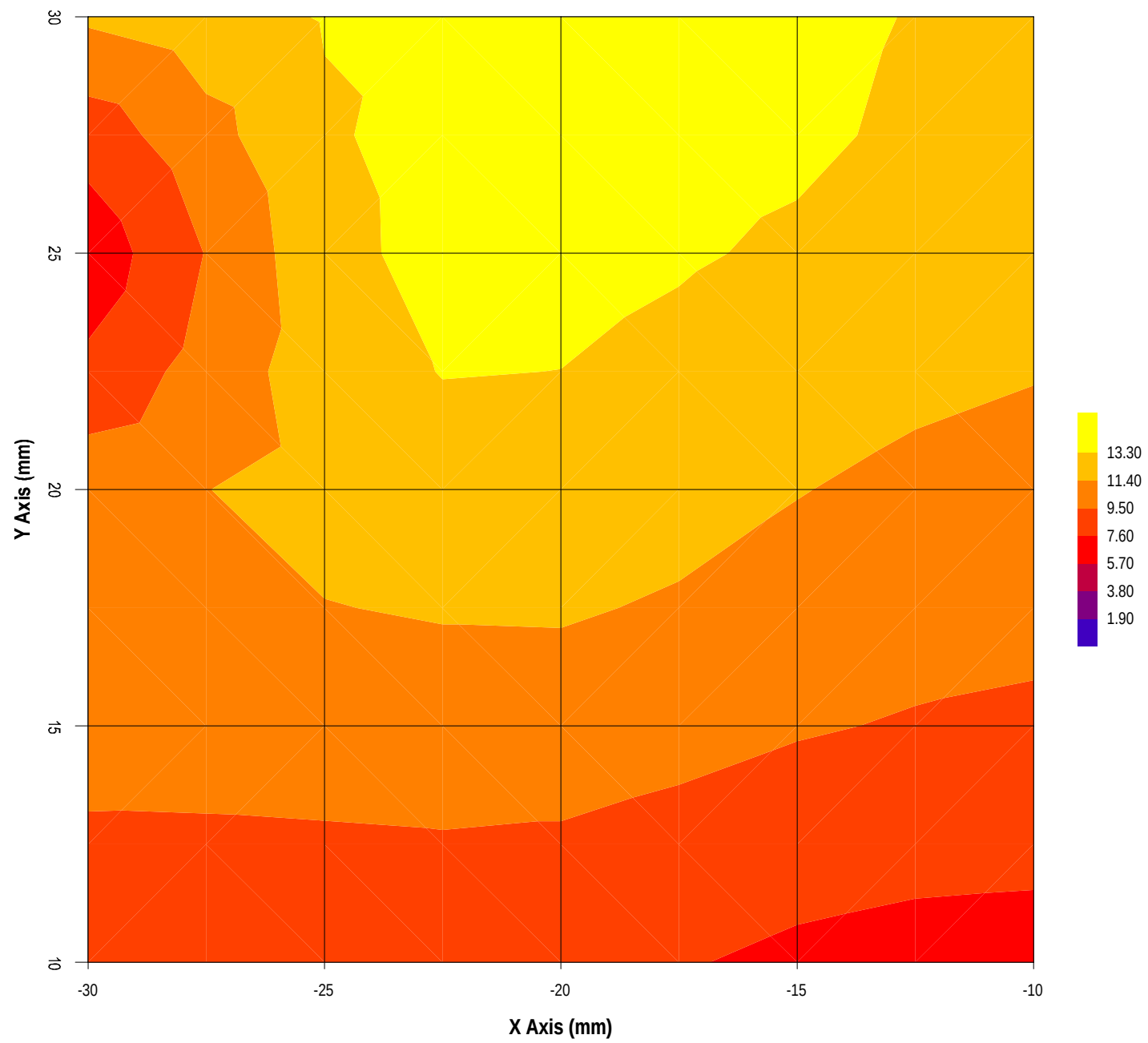
1 Cm Voltage (mV) : 8.668

SAR (W/Kg) : 0.944









Test Information

Date : 12/09/2001

Time : 1:29:38 PM

Product : Nurit 8000 & RIM moden module
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 901
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Back Face
Measured Power (W) : 1.91
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.910

Amplifier Setting :

Channel 1 : 0.0056

Channel 2 : 0.0053

Channel 3 : 0.0066

Location of Maximum Field :

X = -15

Y = 20

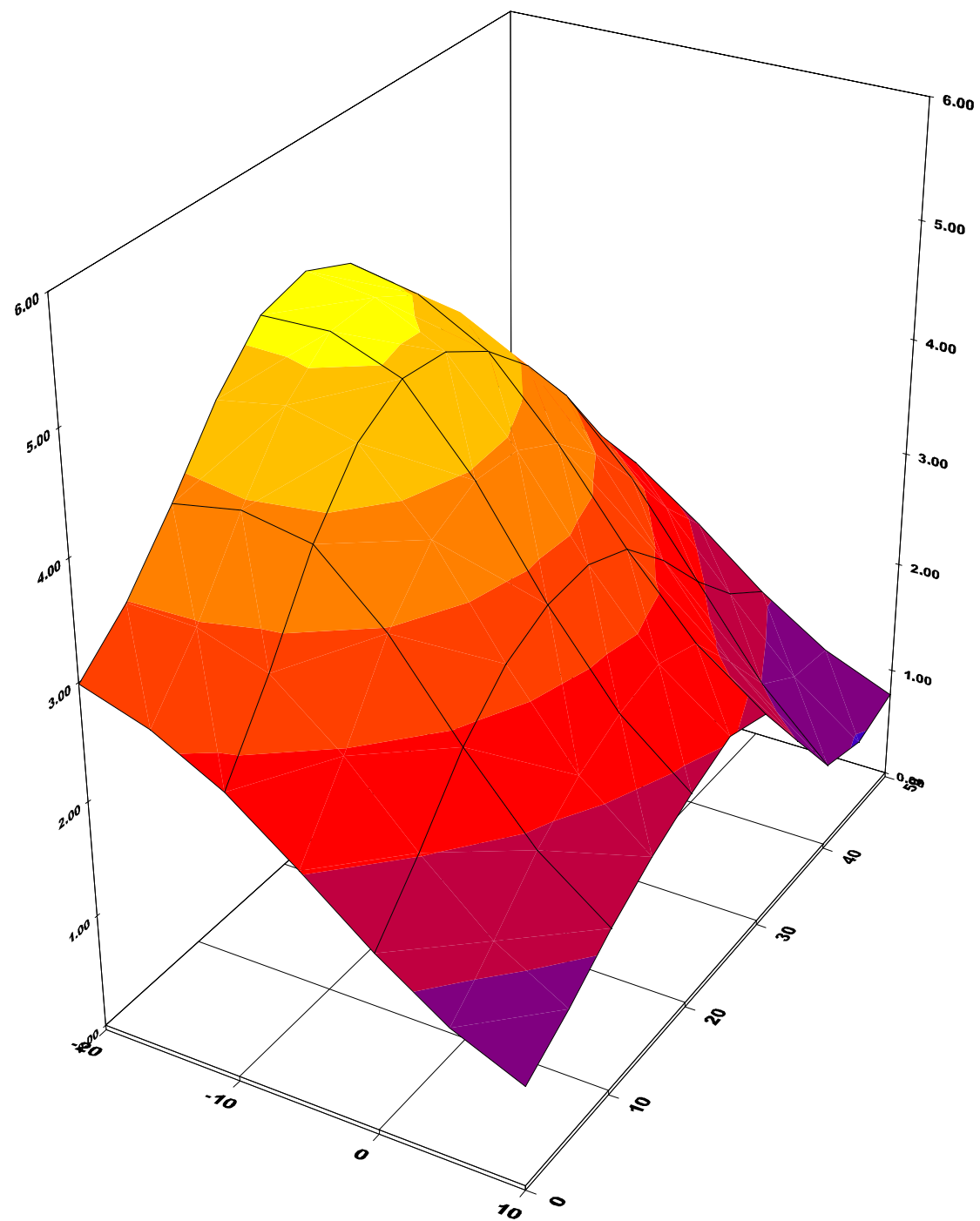
Measured Values (mV) :

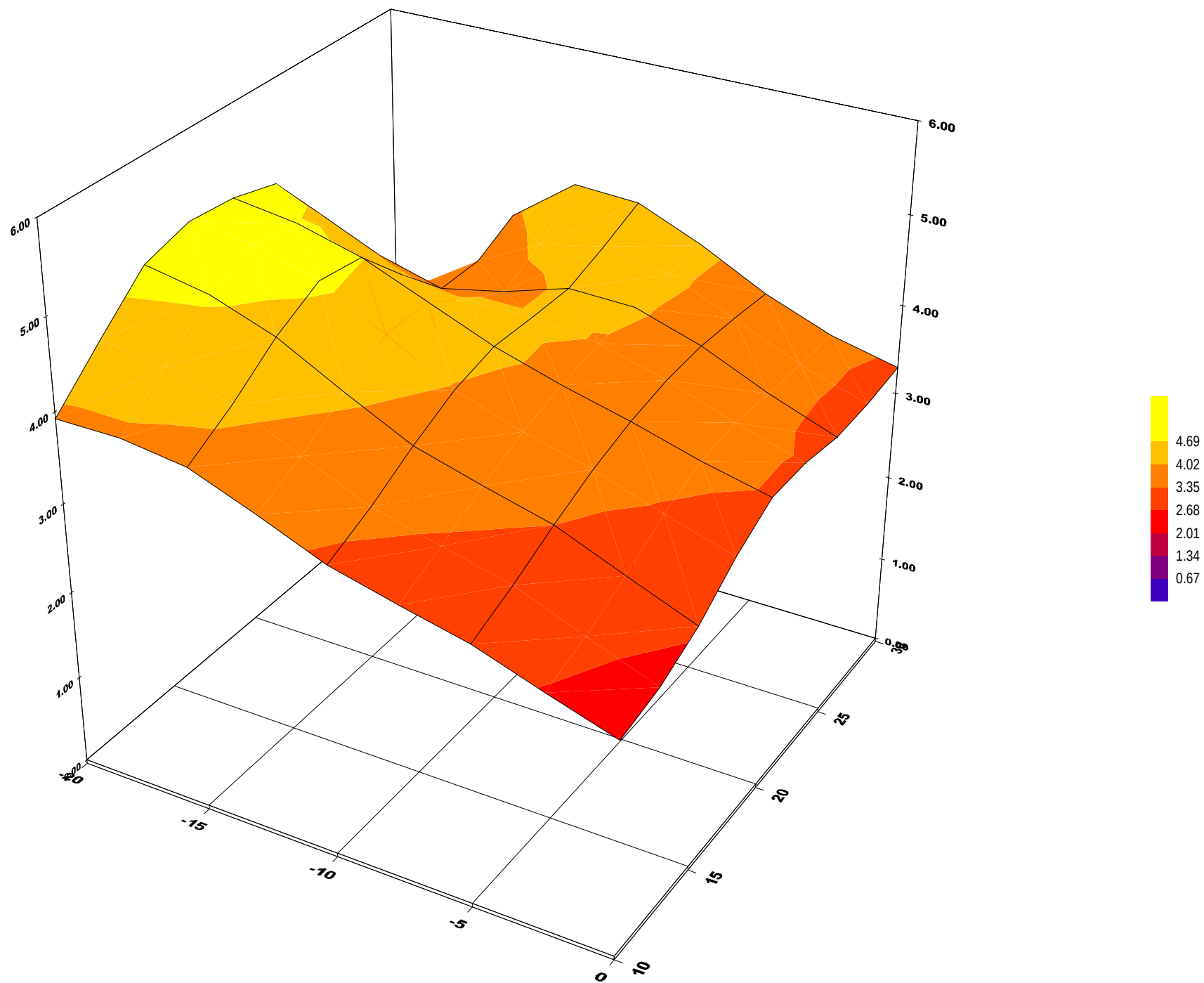
4.387	4.803	4.809	4.494	4.053	3.575
3.206	3.010	2.813	2.530	2.241	

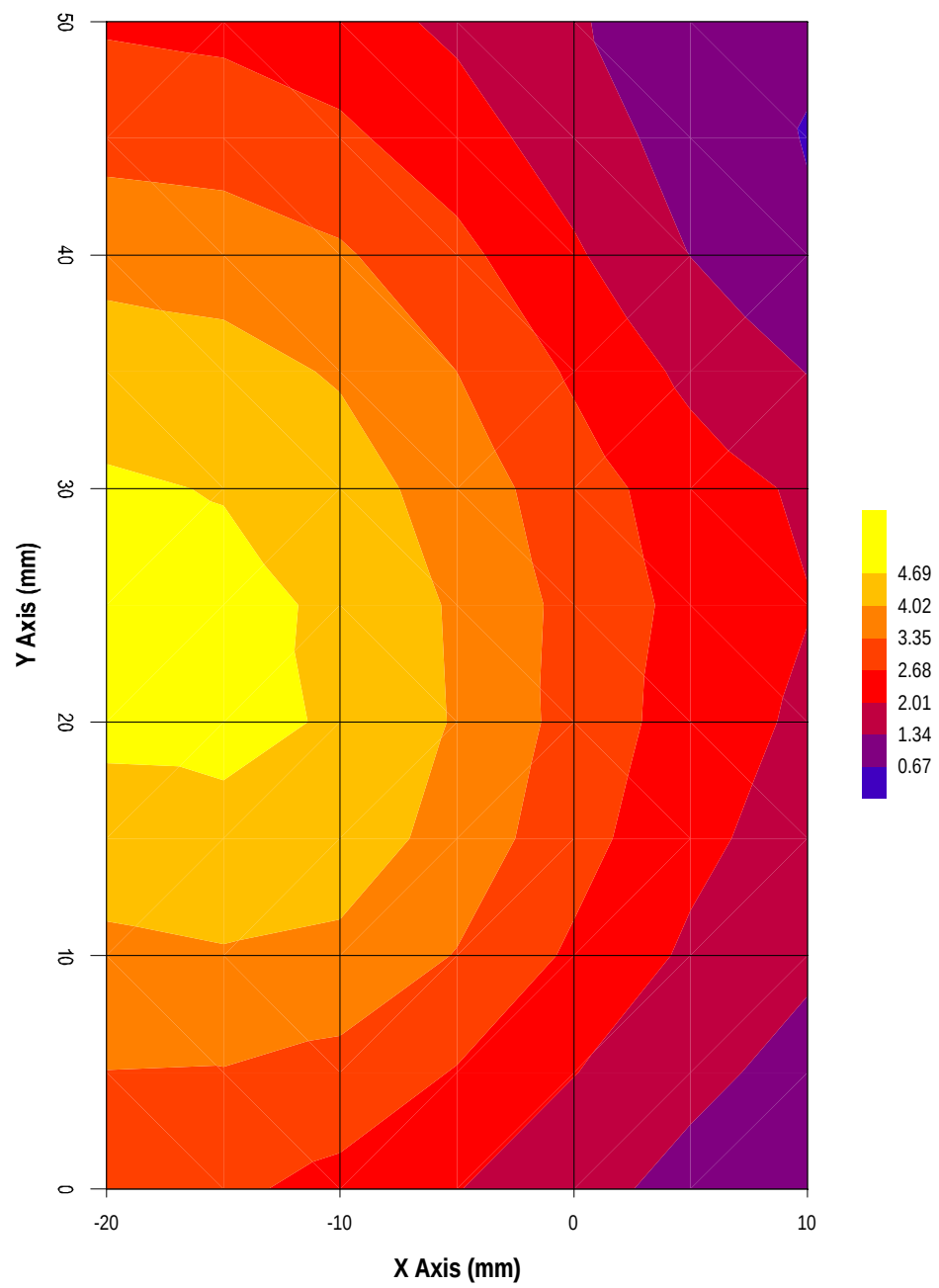
Peak Voltage (mV) : 5.110

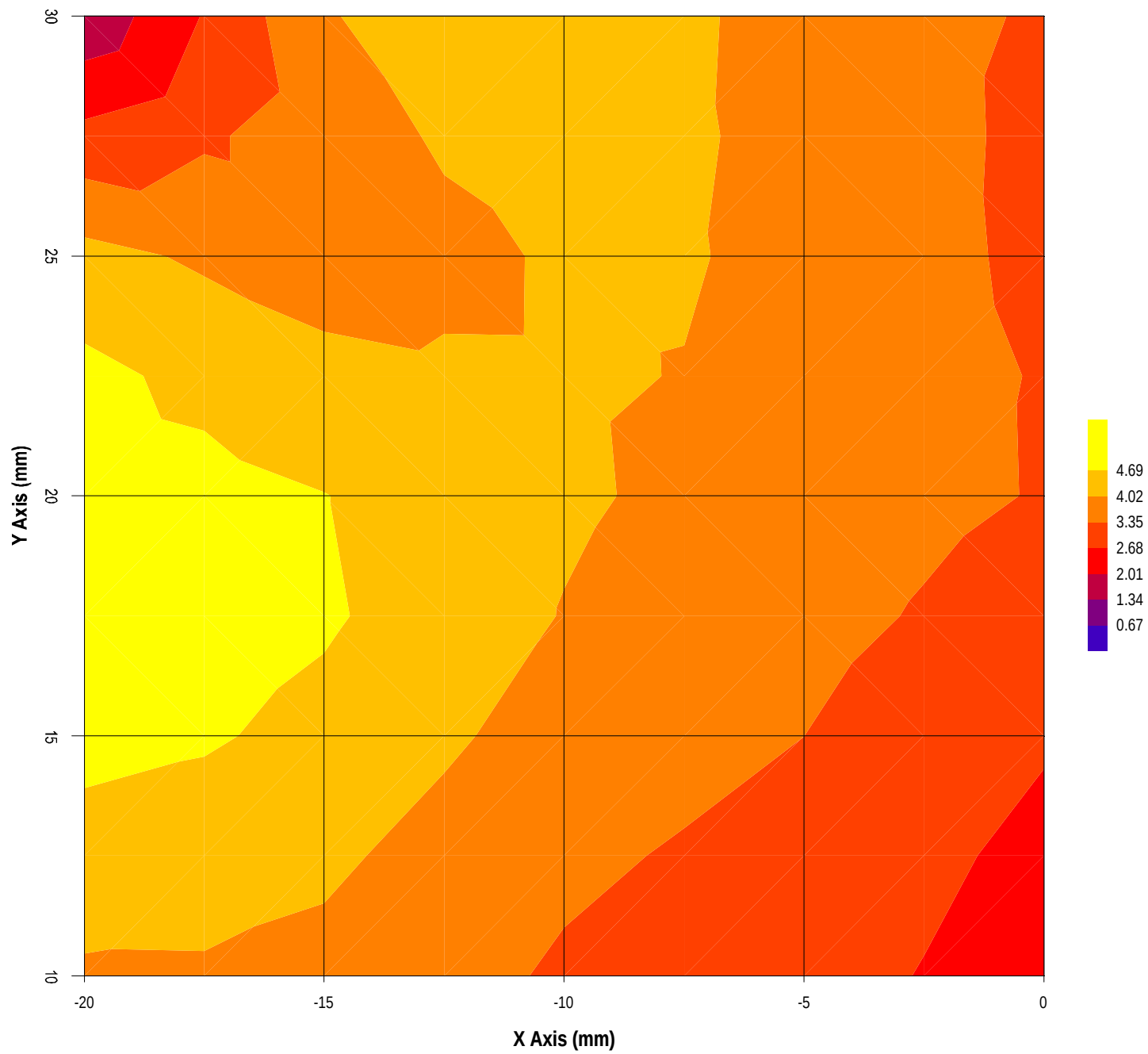
1 Cm Voltage (mV) : 2.461

SAR (W/Kg) : 0.308









Test Information

Date : 06/09/2001

Time : 4:45:32 PM

Product : Nurit 8000 & RIM moden module
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 901
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Top Face
Measured Power (W) : 1.91
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.910

Amplifier Setting :

Channel 1 : 0.0056

Channel 2 : 0.0053

Channel 3 : 0.0066

Location of Maximum Field :

X = 0

Y = 35

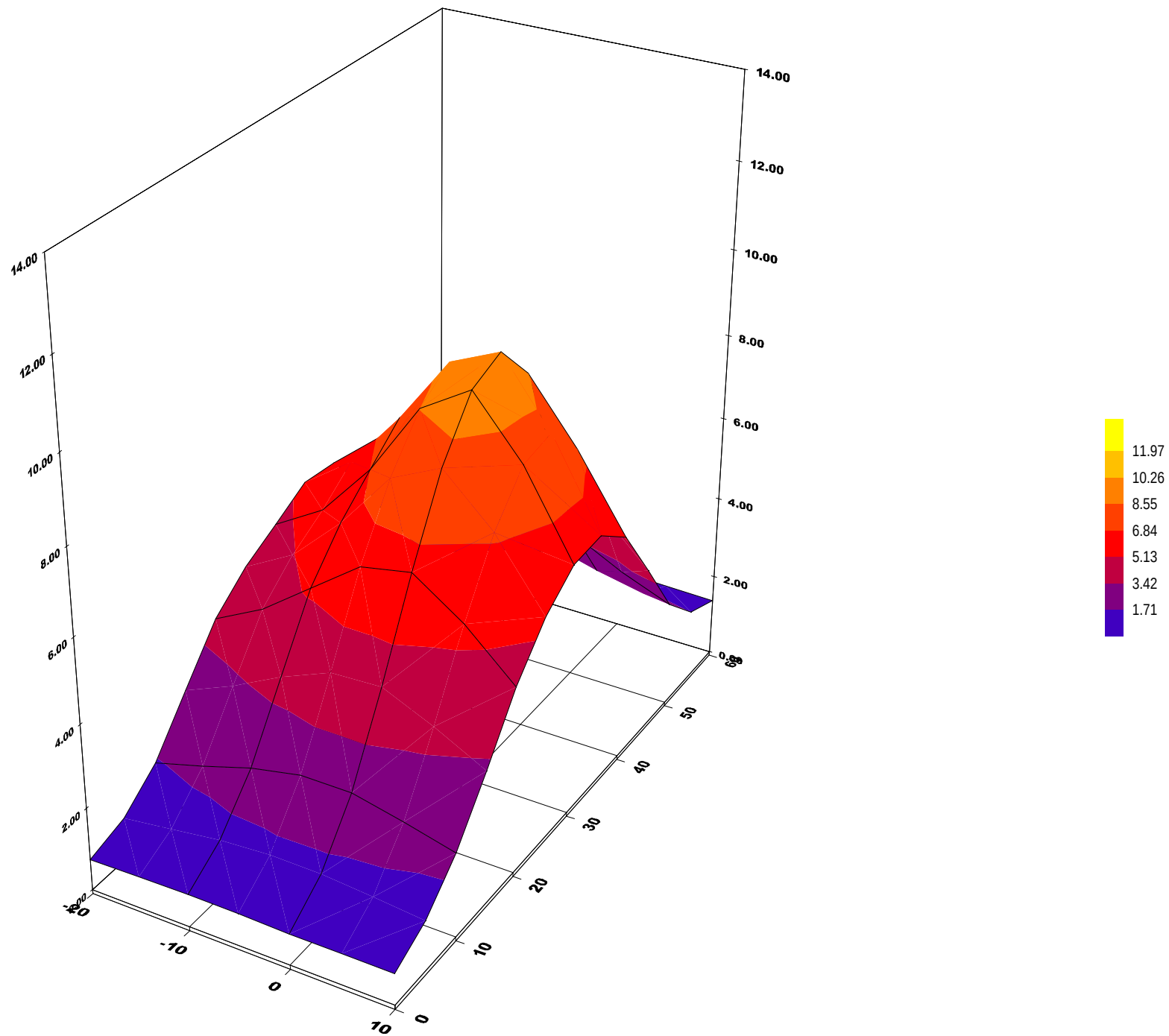
Measured Values (mV) :

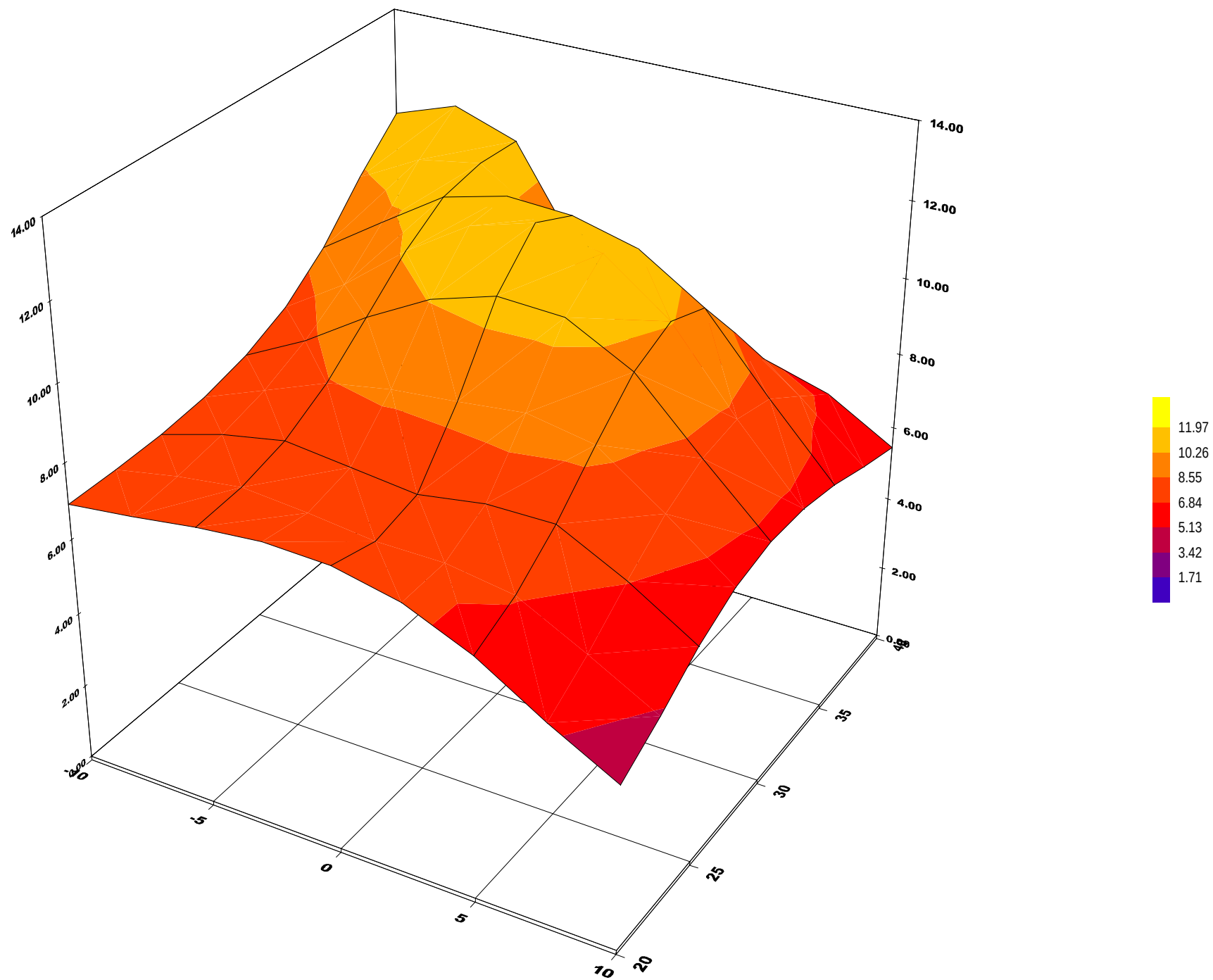
12.888	12.981	12.026	10.613	9.790	8.514
7.441	6.324	5.343	4.735	4.181	

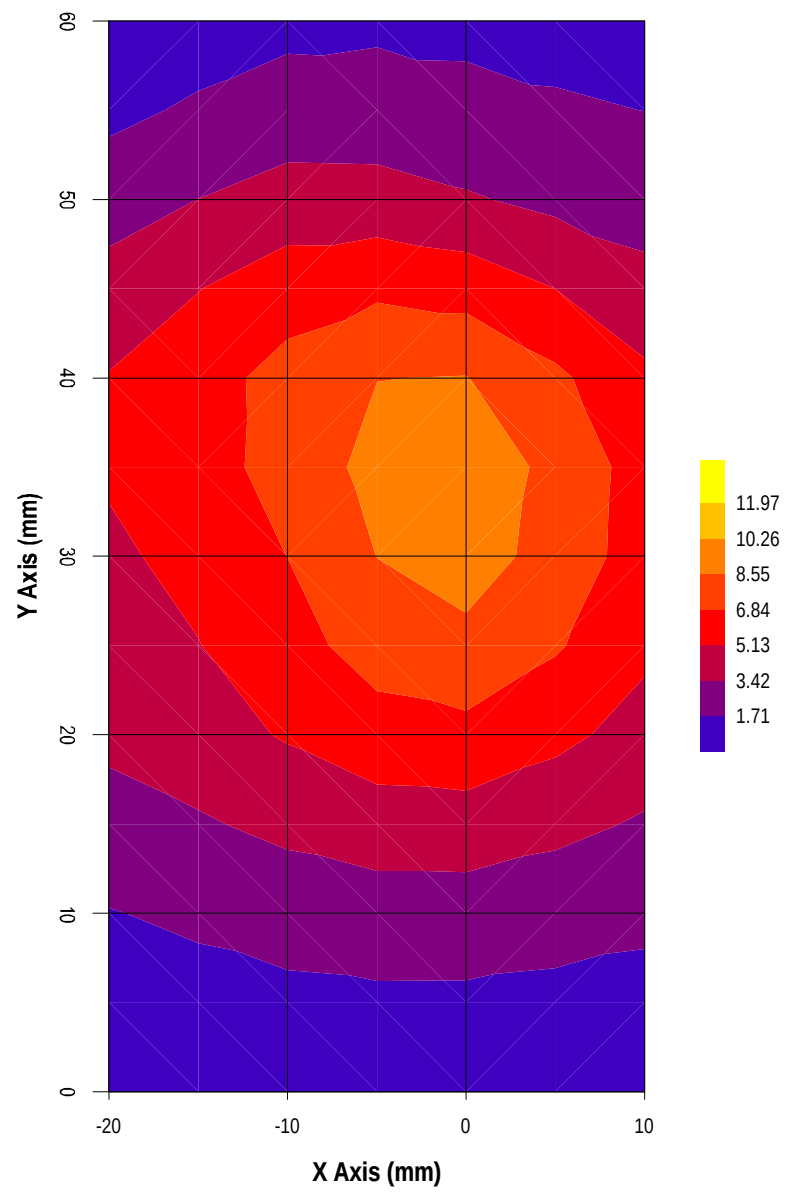
Peak Voltage (mV) : 16.063

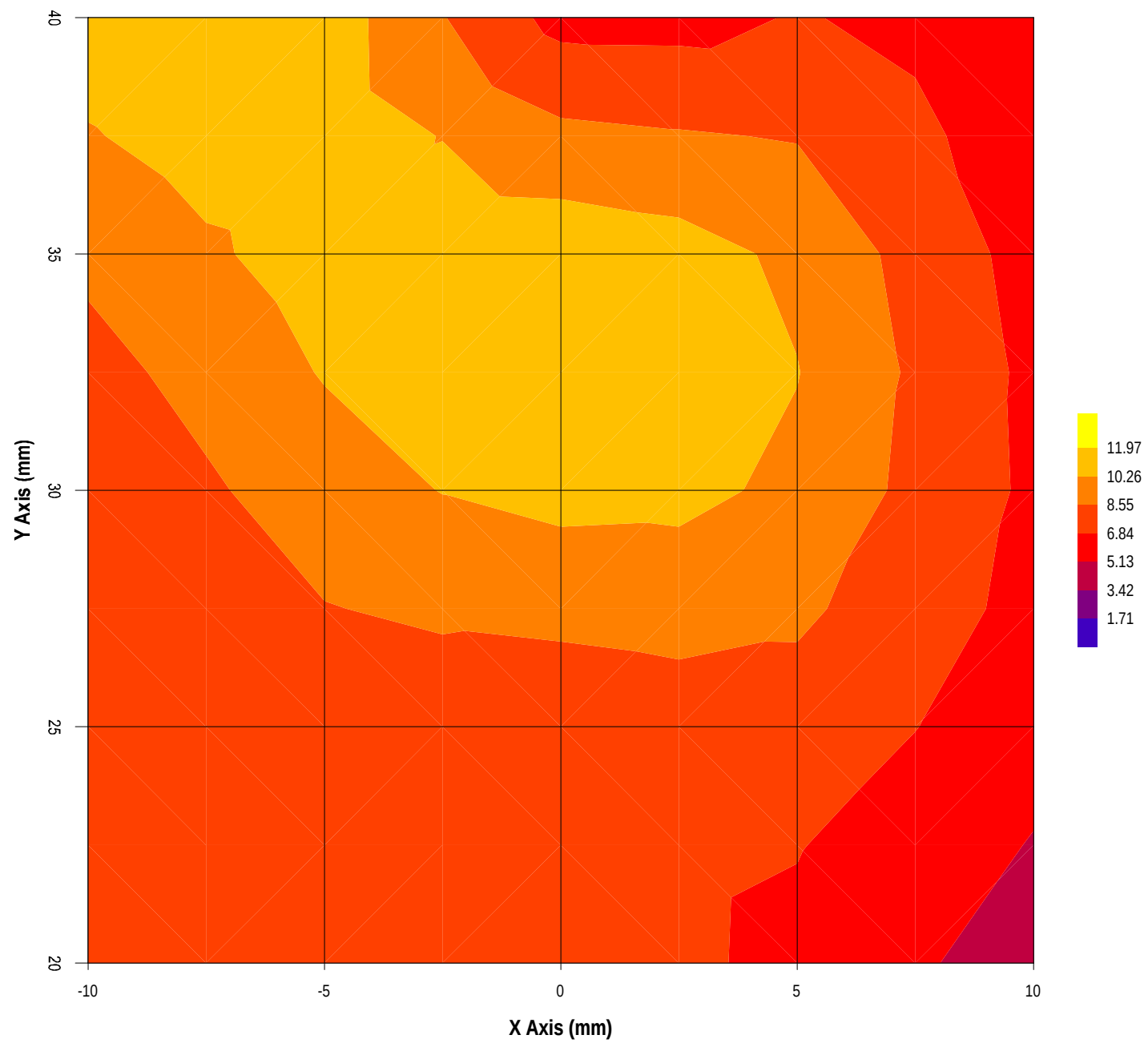
1 Cm Voltage (mV) : 5.402

SAR (W/Kg) : 0.687









Test Information

Date : 12/09/2001

Time : 4:11:50 PM

Product : Nurit 8000 & RIM moden module
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 901
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Top Face
Measured Power (W) : 1.91
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.910

Amplifier Setting :

Channel 1 : 0.0056

Channel 2 : 0.0053

Channel 3 : 0.0066

Location of Maximum Field :

X = -5

Y = 40

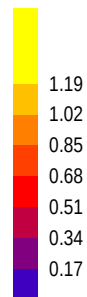
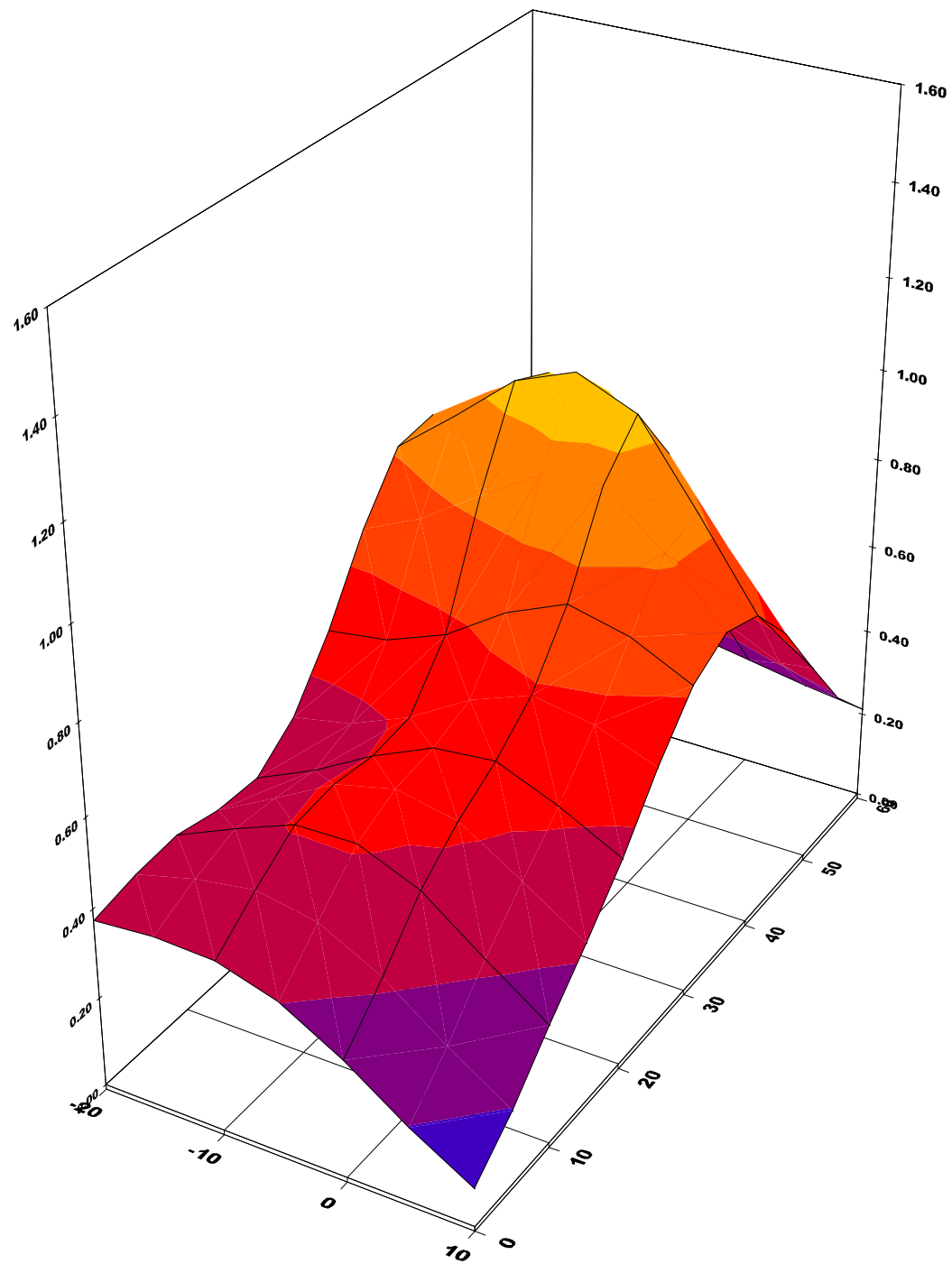
Measured Values (mV) :

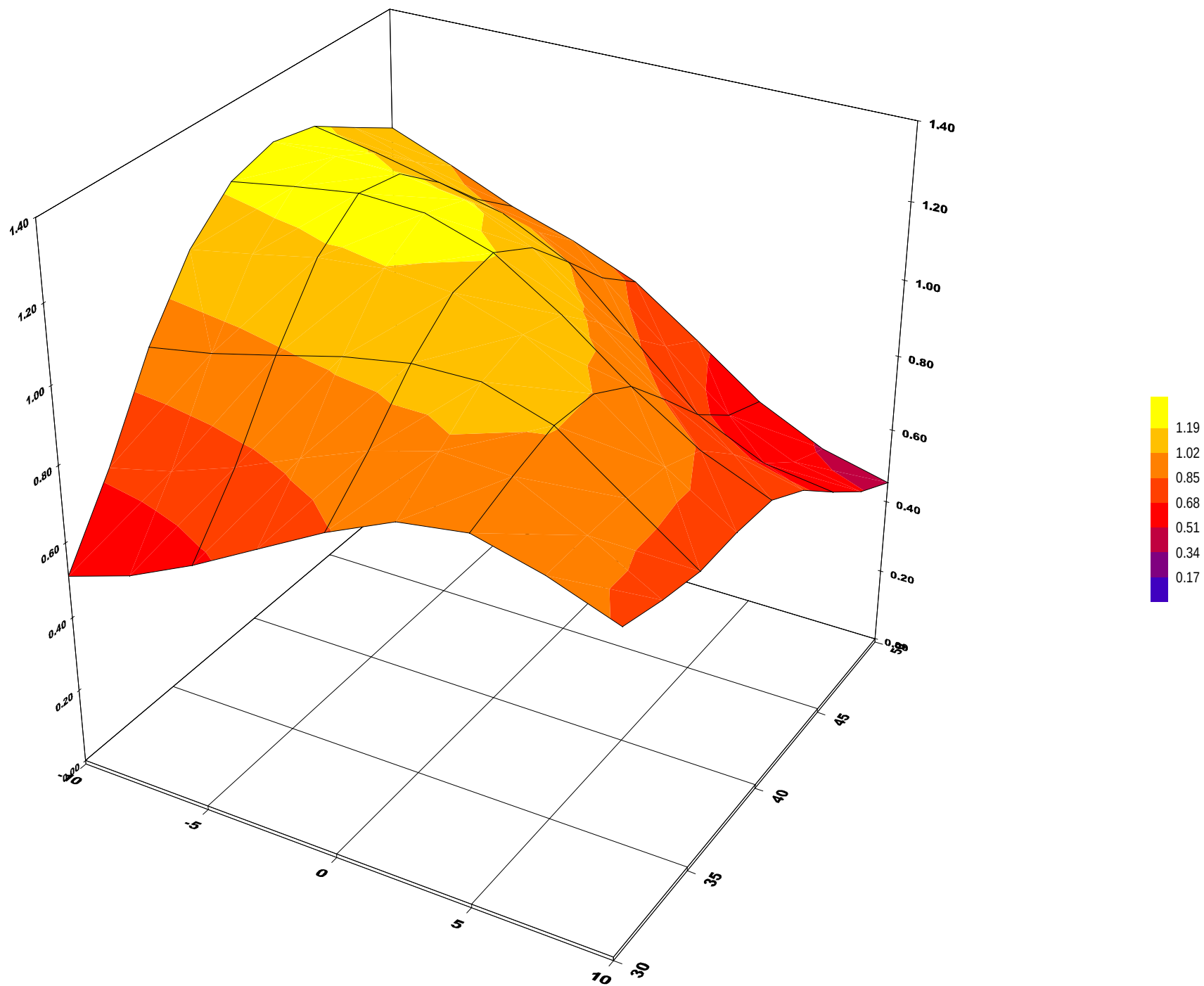
1.403	1.495	1.401	1.256	1.137	0.926
0.723	0.617	0.483	0.405	0.325	

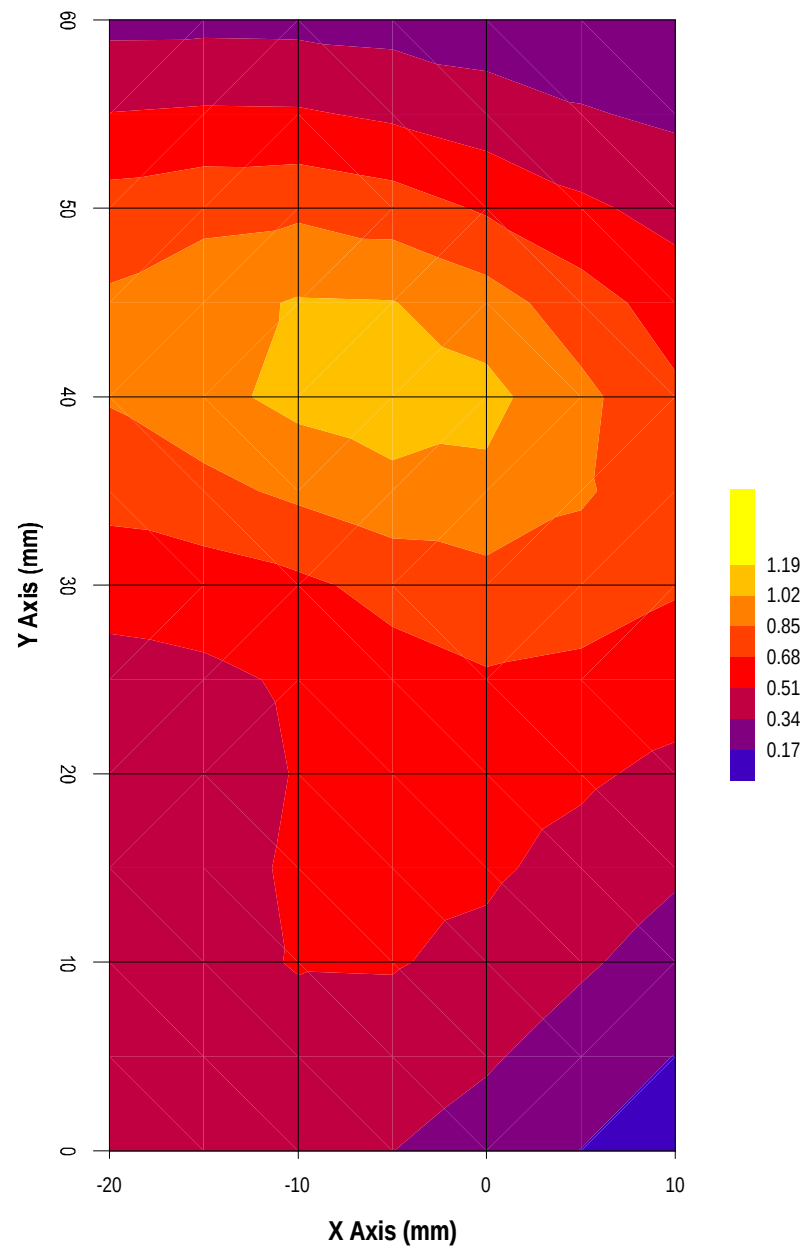
Peak Voltage (mV) : 1.710

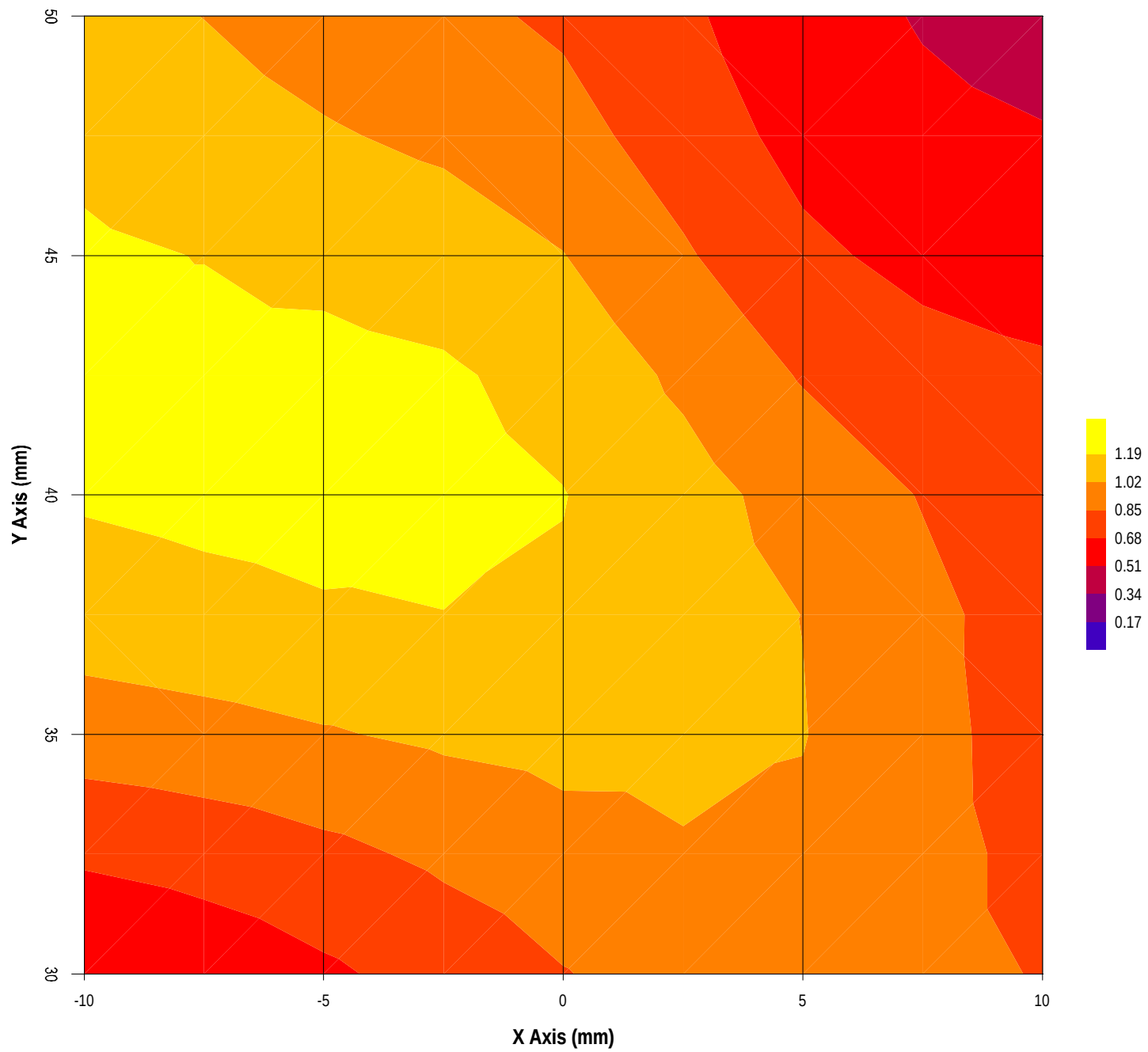
1 Cm Voltage (mV) : 0.564

SAR (W/Kg) : 0.077









Test Information

Date : 12/09/2001
Time : 11:43:41 AM

Product : Nurit 8000 & RIM moden module
Manufacturer : LIPMAN USA
Model Number : 8000
Serial Number :
FCC ID Number :

Test : SAR
Frequency (MHz) : 901
Nominal Output Power (W) : 2
Antenna Type : Patch
Signal : 25%

Phantom : Waist
Simulated Tissue : Muscle

Dielectric Constant : 50.9
Conductivity : 1.40

Probe : UT-ETR-0200-1(c)
Probe Offset (mm) : 2.250
Sensor Factor (mV) : 10.8
Conversion Factor : 0.880
Calibrated Date : 14/06/2001

Antenna Position : Top Face
Measured Power (W) : 1.91
(conducted)
Cable Insertion Loss (dB) : 0
Compensated Power (W) : 1.910

Amplifier Setting :

Channel 1 : 0.0056 Channel 2 : 0.0053 Channel 3 : 0.0066

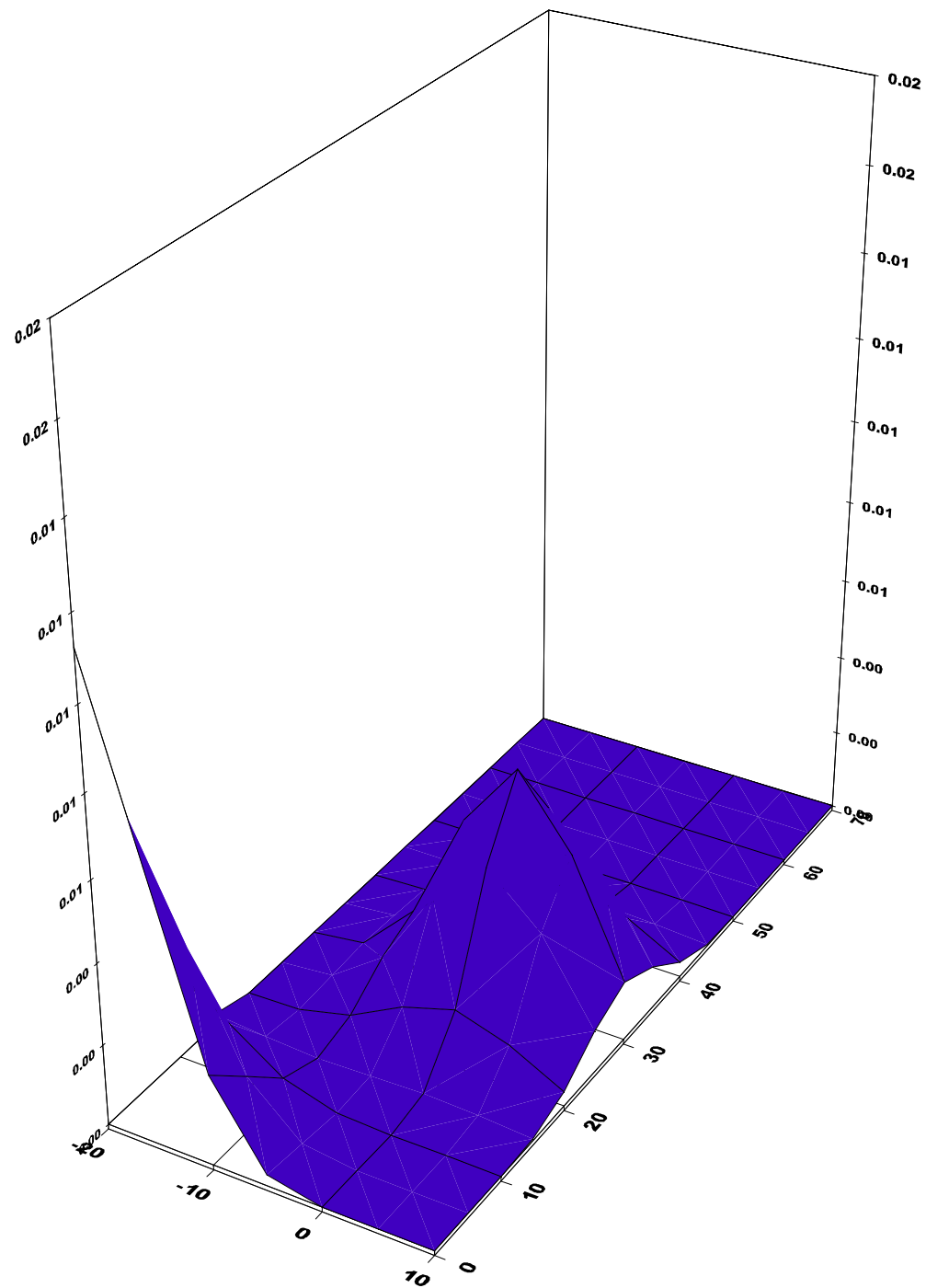
Location of Maximum Field :

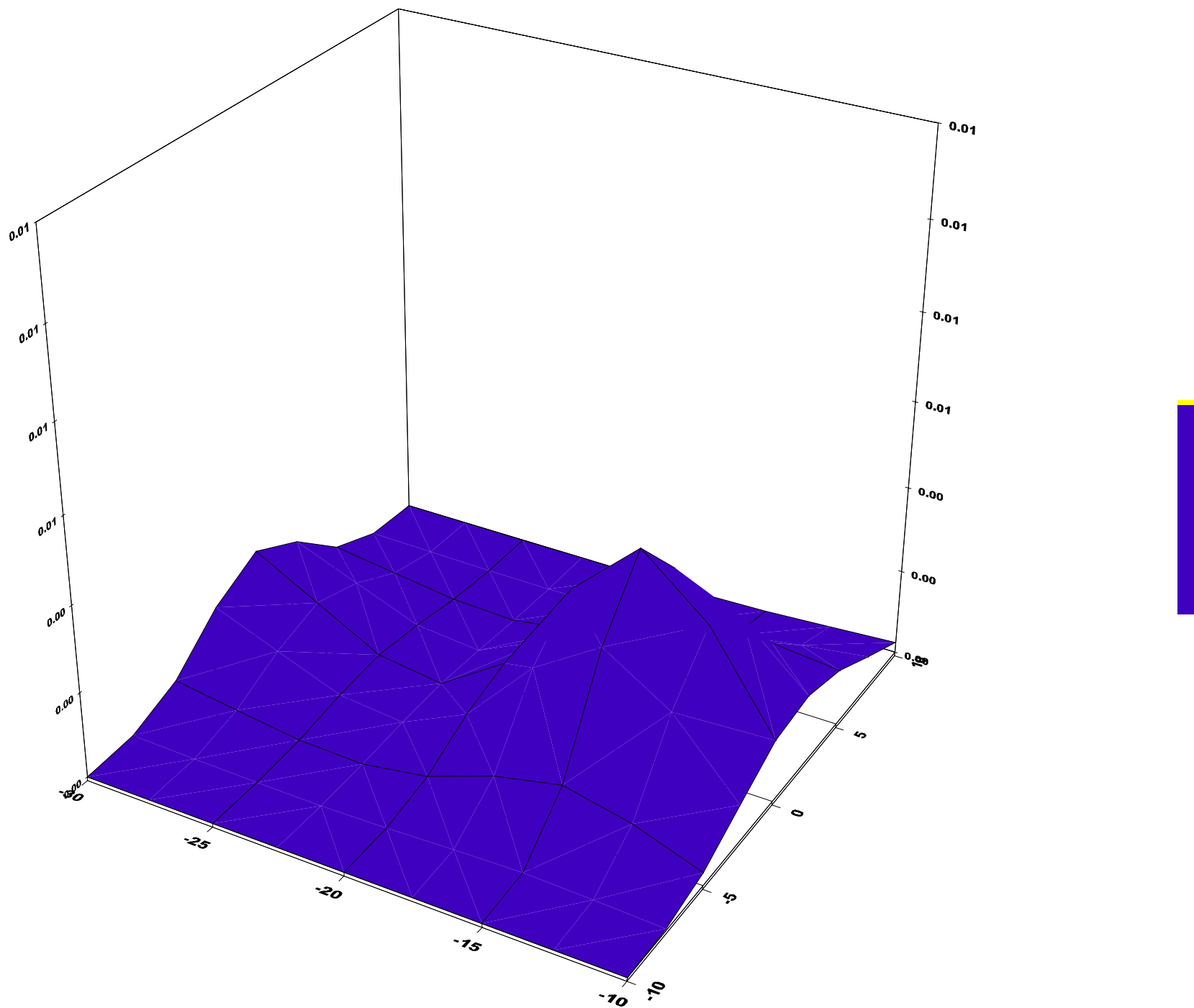
X = -15 Y = 0

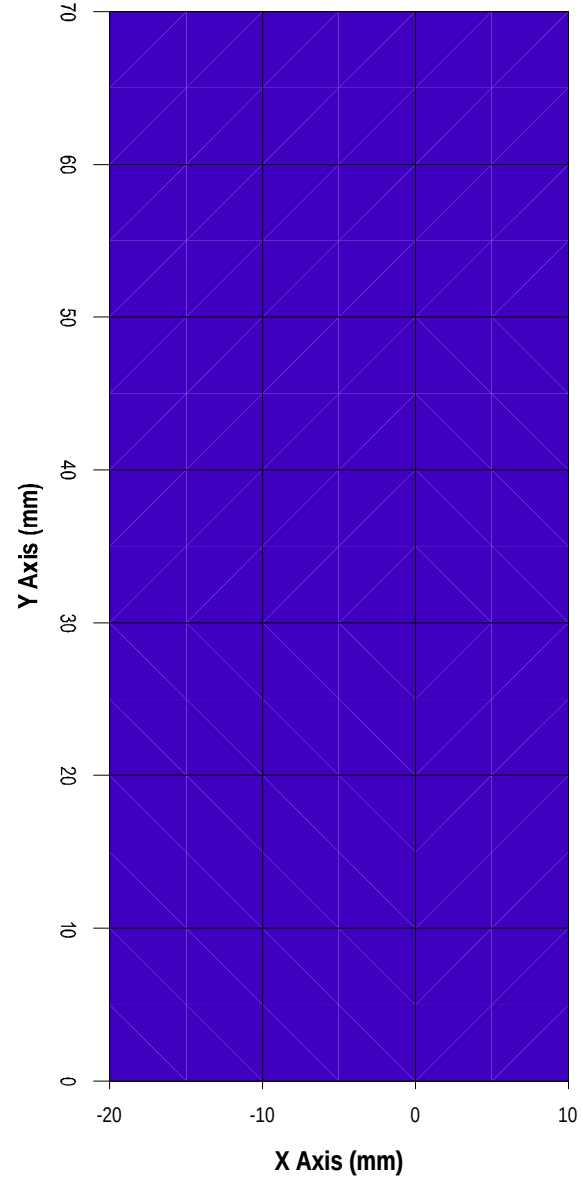
Measured Values (mV) :

0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	

Peak Voltage (mV) : 0.000 1 Cm Voltage (mV) : 0.000 SAR (W/Kg) : 0.000







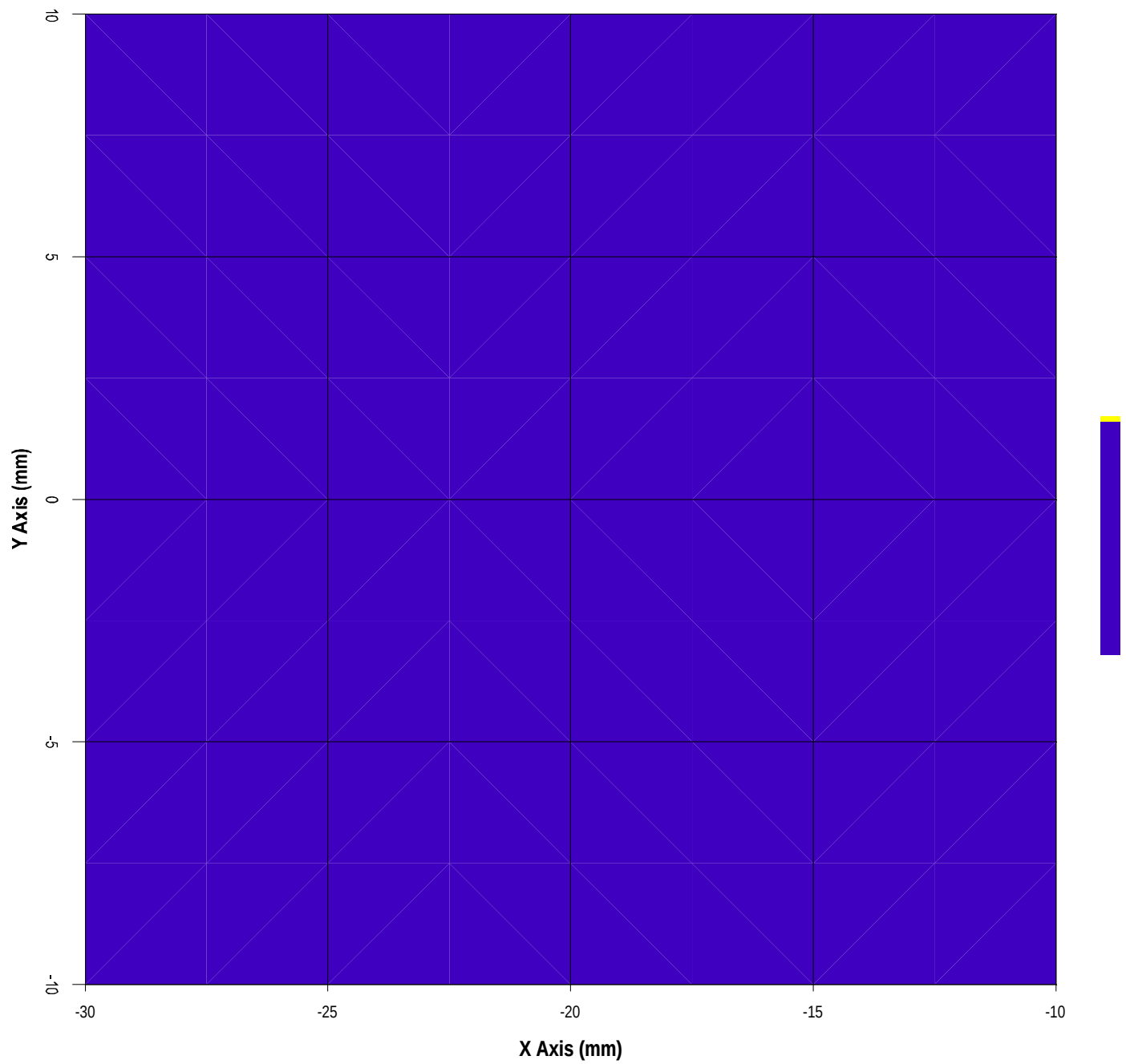


EXHIBIT 10. DUTY CYCLE INFORMATION

ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4

Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: yhk.ultratech@sympatico.ca, Website: <http://www.ultratech-labs.com>

**File #: LIP7-SAR
September 21, 2001**

- Assessed by ITI (UK) Competent Body, NVLAP (USA) Accreditation Body & ACA/AUSTEL (Australia), VCCI (Japan)
- Accredited by Industry Canada (Canada) under ACC-LAB (Europe/Canada MRA and APEC/Canada MRA)
- Recognized/Listed by FCC (USA)
- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)



Research In Motion Limited
295 Phillip Street
Waterloo, Ontario
Canada N2L 3W8
+1 519 888 7465, fax +1 519 888 6906
E-mail: info@rim.net

Sept. 14, 2001

Federal Communications Commission
Equipment Authorization Division
Application Processing Branch
7435 Oakland Mills Rd.
Columbia, Md. 21046

To whom it may concern,

RIM has implemented and tested a duty factor limiting algorithm for the RIM 902M radio modem module (FCC ID L6AR902M-2-O). 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 25% before the next uplink (transmit) transaction is initiated. This ensures that the duty factor is limited to 25% over all times.

This algorithm will be permanently integrated with the radio firmware and installed at the time of manufacture in the production facility. The algorithm cannot be modified or disabled by the user.

Should you have any questions, please do not hesitate to contact our Senior Certification Engineer, Masud Attayi, at (519) 888-7465 x2442 or by email at mattayi@rim.net.

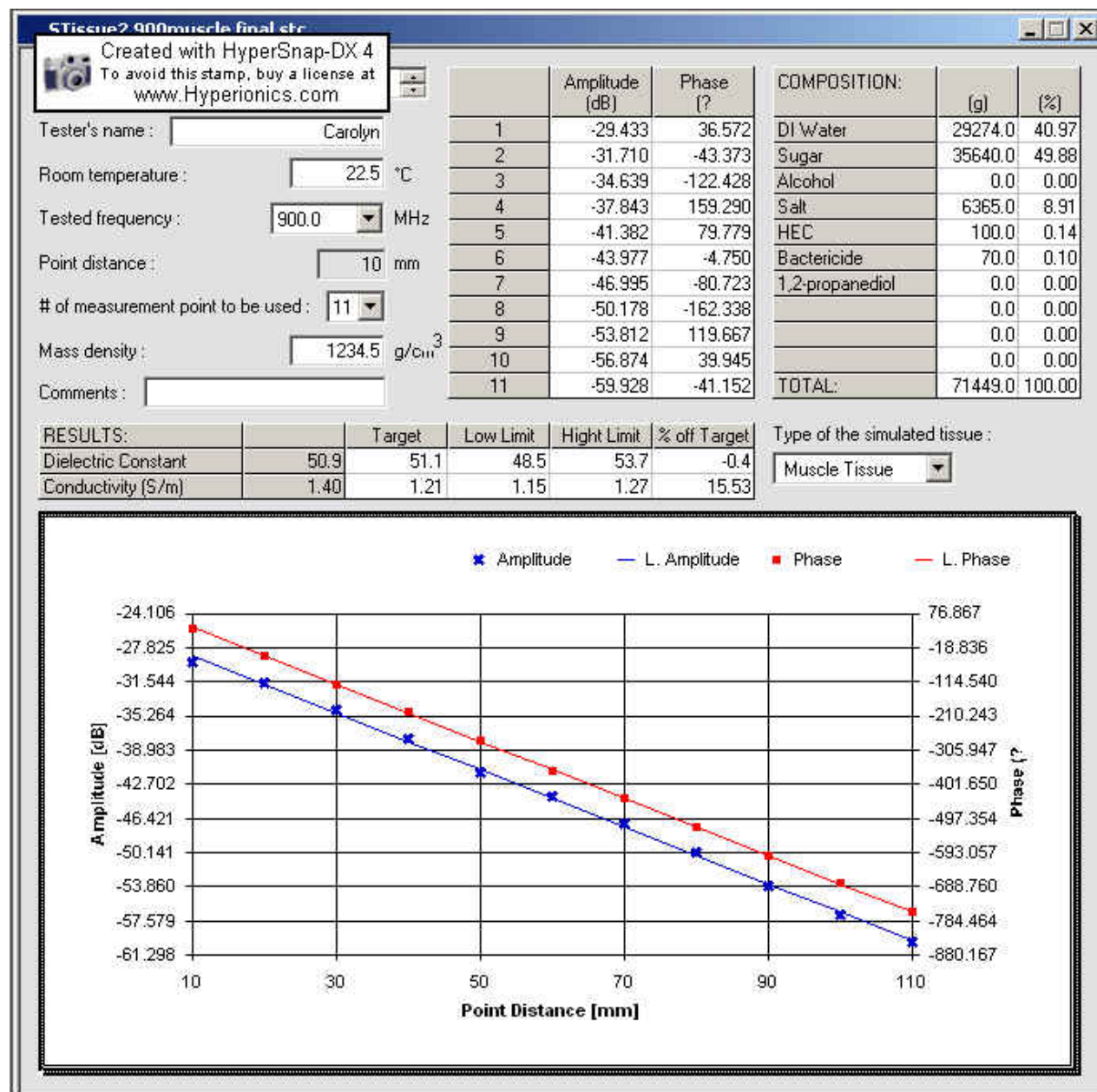
Yours truly,

A handwritten signature in black ink, appearing to read 'Andy Clipsham'.

Andy Clipsham
OEM Product Manager
Research In Motion Limited
+1-519-888-7465 x2482
aclipsham@rim.net

EXHIBIT 11. TISSUE CALIBRATION

The tissue conductivity was calibrated in accordance with IEEE Std 1528-200X, Draft 6.1 November 14, 2000, Sponsor IEEE SCC 34.



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EXHIBIT 12. PROBE CALIBRATION FREE SPACE

ULTRATECH GROUP OF LABS

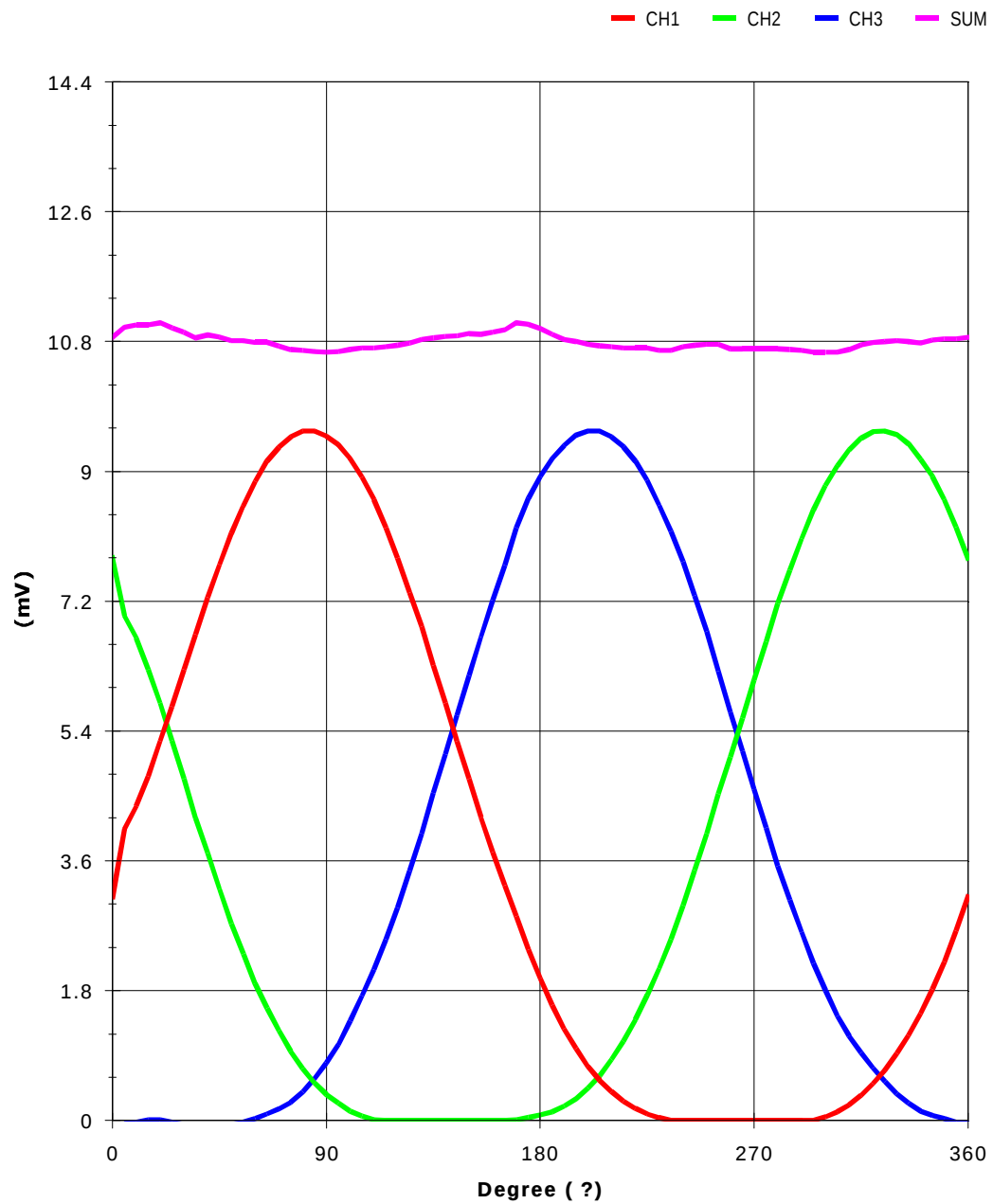
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4

Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: yhk.ultratech@sympatico.ca, Website: <http://www.ultratech-labs.com>

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Probe Name : UT-ETR-0200-1(C)
Type : E-field (Triangular beam), Offset(mm) : 2.25
Frequency(MHz) : 898
Amplifier Setting : 0.00567075, 0.00538748, 0.00663621
Calibrated Date : 05/09/2001 4:25:33 PM



CH1 CH2 CH3 SUM

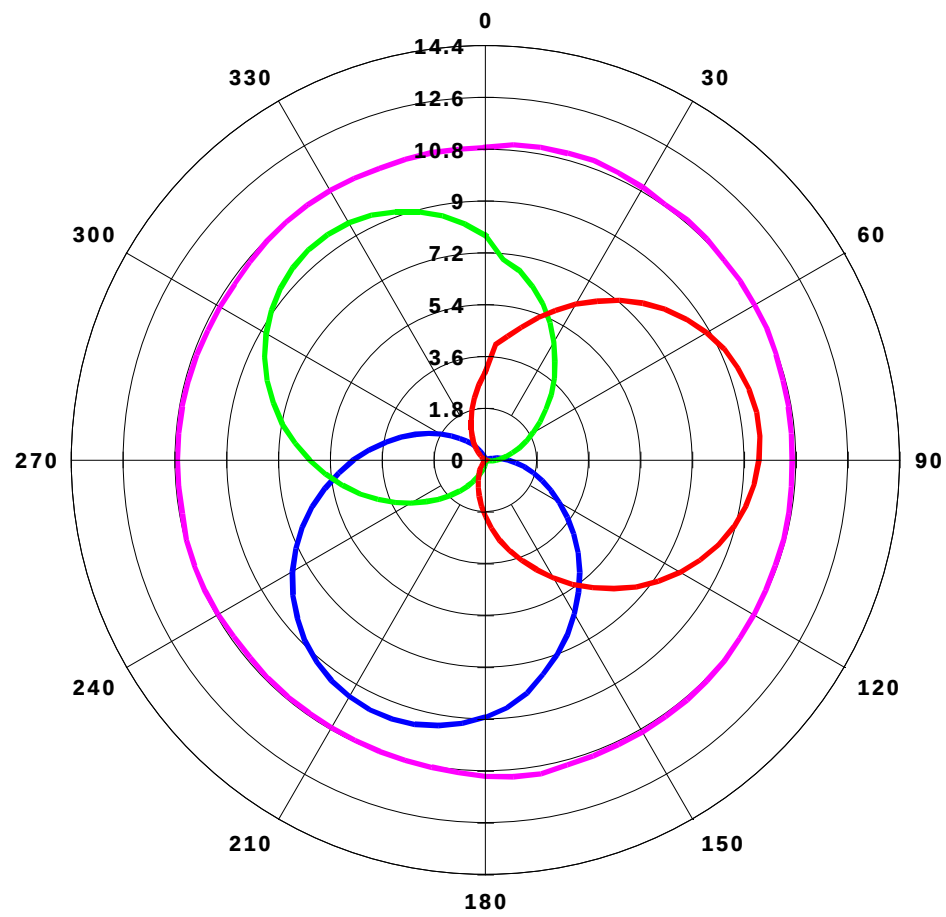


EXHIBIT 13. PROBE TEMPERATURE TRANSFER CALIBRATION

ULTRATECH GROUP OF LABS

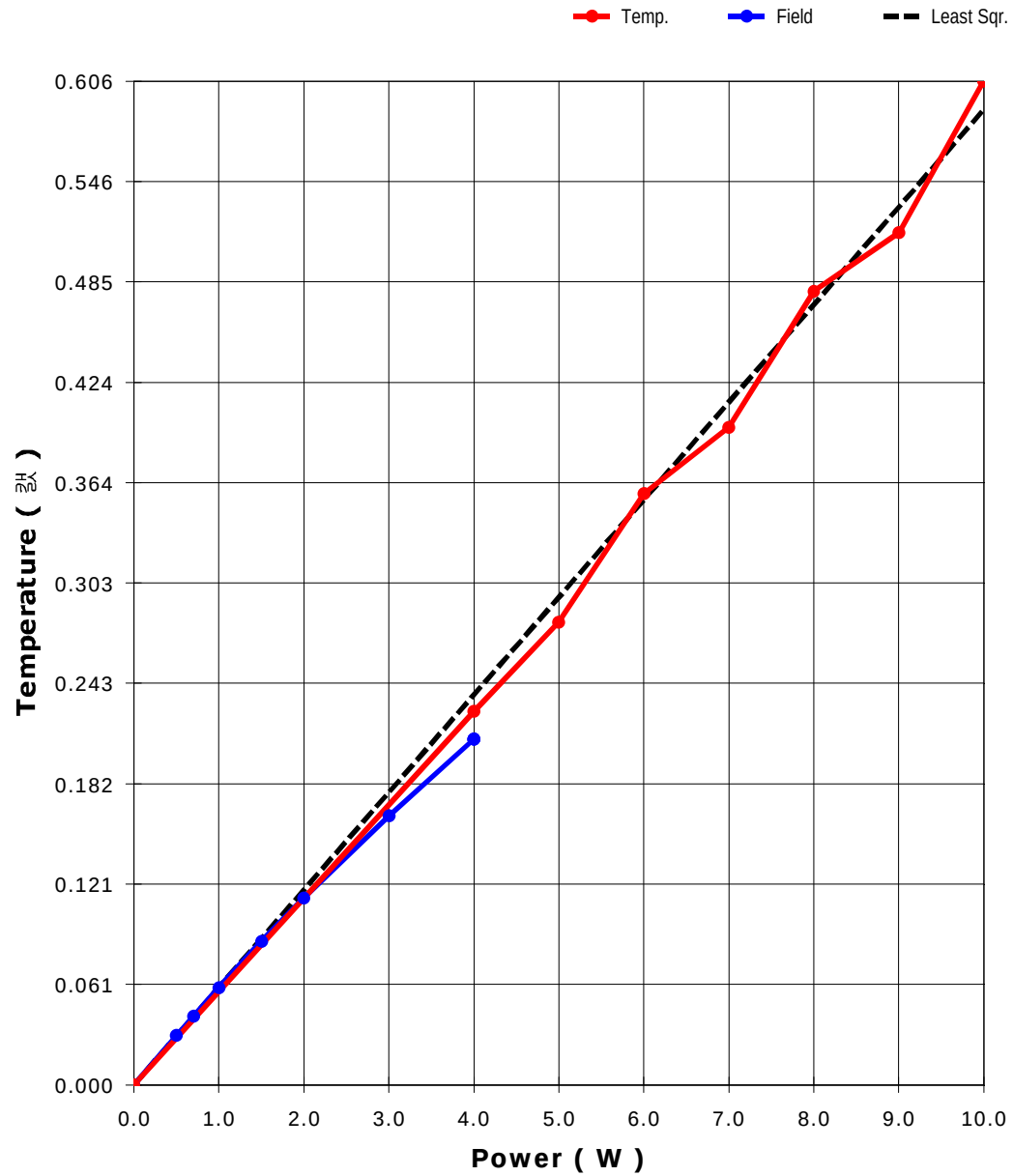
3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4

Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: yhk.ultratech@sympatico.ca, Website: <http://www.ultratech-labs.com>

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Probe Name : UT-ETR-0200-1
Type : E-field (Triangular beam), Offset(mm) : 2.25
Frequency(MHz) : 835, Conversion Factor : 0.8801
Simulated Tissue Type : Muscle
Dielectrical Const. : 54.6, Conductivity : 1.33
Temperature of Simulated Tissue(℃) : 20.3, Room : 22.0
Calibrated Date : 14/06/2001 10:56:16 PM



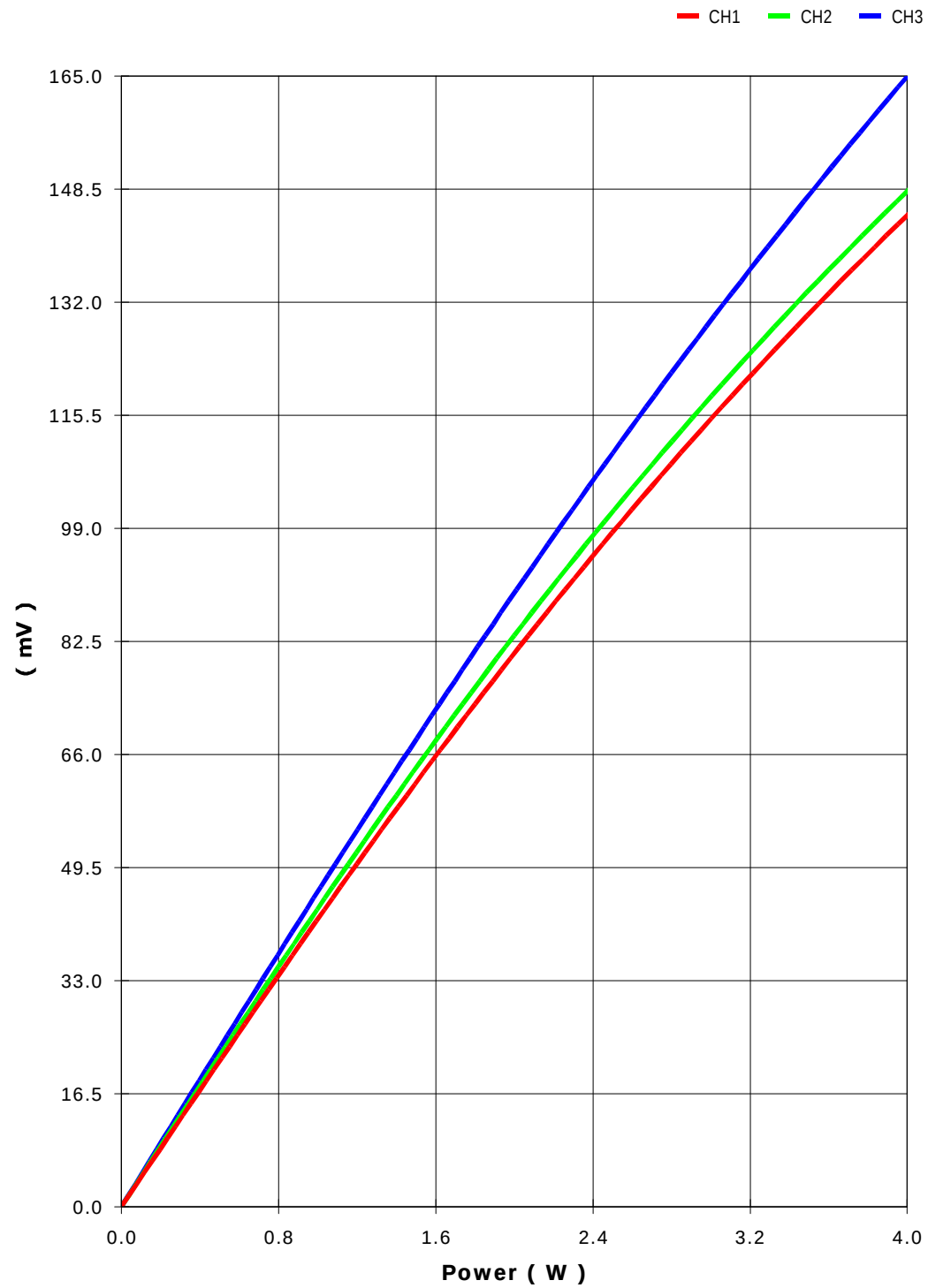


EXHIBIT 14. ANTENNA SPECIFICATIONS

ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4

Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: yhk.ultratech@sympatico.ca, Website: <http://www.ultratech-labs.com>

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Features

- Small and lightweight
- No tuning components
- Available in tape and reel or tray packing for automatic mounting

Electrical

Frequency Range	880 – 960 MHz
Peak Gain ⁽¹⁾	0 dBi
VSWR ⁽¹⁾	less than 2.3:1
Polarization	linear
Azimuth Beamwidth	omnidirectional
Power Handling	10 Watt cw
Feed Point Impedance	50 Ohms unbalanced

Note (1) Figures dependent on ground plane size

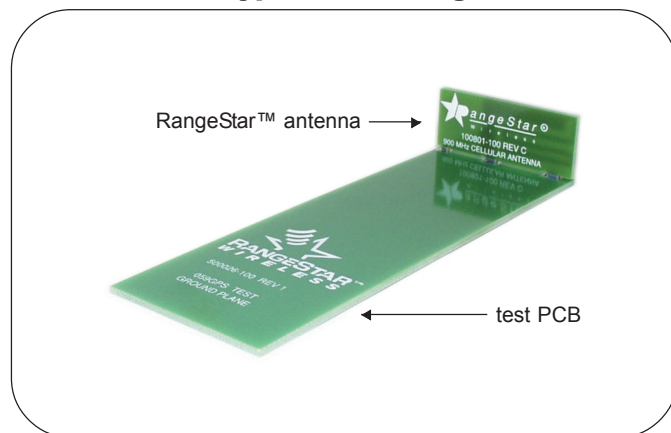
Mechanical

Size	38.1 x 15.3 x 1.6 mm
Weight	1 g
Mounting	tab mounted with plated through holes

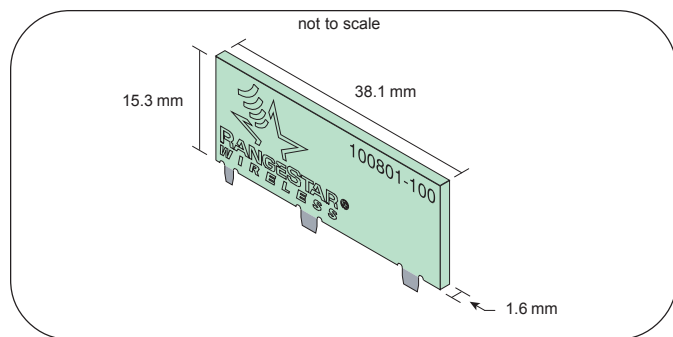
Performa™ Series Antennas

This small embedded antenna provides the most reliable, easy-to-use, and adjustment-free antenna technology for handling during assembly and implementation by developers.

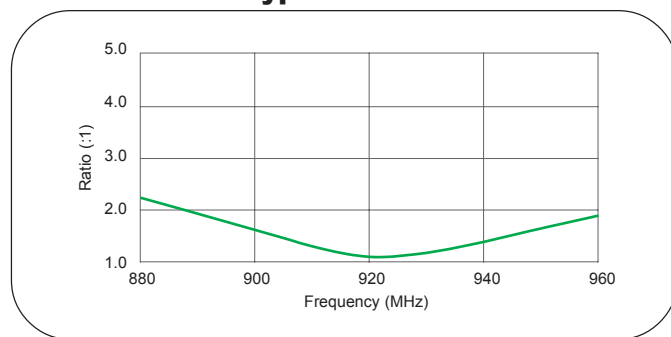
Typical Mounting



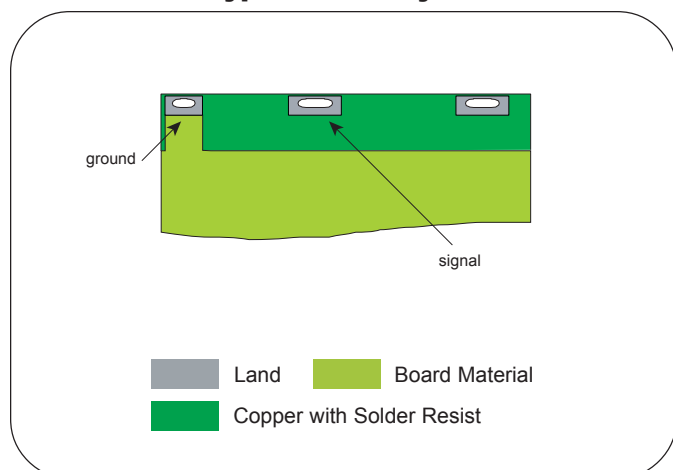
Dimensions



Typical VSWR



Typical Pad Layout



Typical Pattern

