UltraTech
Group of Labs

July 18, 2000

Matsushita Electric Industrial Co., Ltd.
1006, Oaza, Kadoma
Kadoma, Osaka
Japan, 571

Attn.: **Mr. Michihito Miyazaki**

Subject: **Verification Testing 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)

Product: **Wireless Phone**
Model: **KX-TD7895**

Dear Mr. Miyazaki

The product sample has been tested in accordance with **SAR (Specific Absorption Rate) requirements using guidelines established in IEEE C95.1-1991, FCC OET Bulletin 65 (Supplement C) and Industry Canada RSS-102 (Issue 1),** and the results and observation were recorded in the engineering report, Our File No.: PAN02_SAR.

Enclosed you will find a copy of the engineering report. If you have any queries, please do not hesitate to contact us.

Yours truly,

Tri Minh Luu, P.Eng
Vice President - Engineering

Encl.

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

Telephone (905) 829-1570
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CERTIFICATE OF COMPLIANCE

July 18, 2000 File No.: PAN02_SAR

Matsushita Electric Industrial Co., Ltd.
1006, Oaza, Kadoma
Kadoma, , Osaka
Japan571

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:	**Matsushita Electric Industrial Co., Ltd.**
PRODUCT UNDER TEST:	**Wireless Phone**
MODEL NO.:	**KX-TD7895**
FCC ID:	**NOT APPLICABLE**
APPLICABLE STANDARDS:	**SAR (Specific Absorption Rate) requirements using guidelines established in IEEE C95.1-1991, FCC OET Bulletin 65 (Supplement C) and Industry Canada RSS-102(Issue 1)**
EQUIPMENT TYPE:	**900 MHz Direct Sequence Spread Spectrum Transceiver**

- *Assessed by ITI (UK) Competent Body, NVLAP (USA) Accreditation Body & ACA/AUSTEL (Australia)*
- *Recognized/Listed by FCC (USA) & IC (Canada)*
- *All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)*

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

UltraTech

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ENGINEERING TEST REPORT

Wireless Phone
Model No.: KX-TD7895

Tested For

Matsushita Electric Industrial Co., Ltd.
1006, Oaza, Kadoma
Kadoma, , Osaka
Japan571

In Accordance With

SAR (Specific Absorption Rate) Requirements using guidelines established in IEEE C95.1-1991, FCC OET Bulletin 65 (Supplement C) and Industry Canada RSS-102(Issue 1)

UltraTech's File No.: PAN02_SAR

This Test report is Issued under the Authority of Tri M. Luu, Professional Engineer, Vice President of Engineering UltraTech Group of Labs ……. Date: ……	
Report Prepared by: Mike Tom ……..	Tested by: Jaewook Choi, SAR Engineer ……..
Issued Date: July 18, 2000	Test Dates: July 11, 2000

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).
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 show 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	[X] 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
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
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

EXHIBIT 2. STATEMENT OF CERTIFICATION

TESTIMONIAL AND STATEMENT OF CERTIFICATION

THIS IS TO CERTIFY:

1) *THAT the Engineering Test Report was prepared either by, or under the direct supervision of the undersigned.*

2) *THAT the measurement data supplied with the Test Report was taken under my direction and supervision.*

3) *THAT the data was obtained on representative production units.*

4) *THAT, to the best of my knowledge and belief, the facts set forth in this Test Report and accompanying technical data are true and correct.*

Certified by:

_____

Tri Minh Luu, P. Eng.
V.P., Engineering

DATE: July 18, 2000

EXHIBIT 3. PERFORMANCE ASSESSMENT

3.1. CLIENT AND MANUFACTURER INFORMATION

APPLICANT:	
Name:	Matsushita Electric Industrial Co., Ltd.
Address:	1006, Oaza, Kadoma Kadoma, , Osaka Japan, 571
Contact Person:	Mr. Michihito Miyazaki Phone #: +81-92-477-1405 Fax #: +81-92-477-1487 Email Address: pan44784@pios.kme.mei.co.jp

MANUFACTURER:	
Name:	Kyushu Matsushita Electric Co., ltd.
Address:	4-1-62 Minoshima, Hakata-ku Fukuoka Japan, 812-8531
Contact Person:	Mr. Michihito Miyazaki Phone #: +81-92-477-1407 Fax #: +81-92-477-1487 Email Address: pan44784@pios.kme.mei.co.jp

3.2. DEVICE UNDER TEST (DUT) DESCRIPTION

The following information are supplied by the applicant.

Trade Name	Wireless Phone
Type/Model Number	KX-TD7895
Serial Number	Pre-Production Sample
Type of Equipment	900 MHz Direct Sequence Spread Spectrum Transceiver
Frequency of Operation	903.75 - 926.25 MHz
Rated RF Power	100 mW
Modulation Employed	Frequency Shift Keying (FSK)
Emissions Designation	F1E
Antenna Type	5/8 Wave-Length Helical
External Power Supply	3.6 Vdc Ni-MH Battery Pack (Handset)
Primary User Functions of DUT:	Voice Radio Communication Through Air

3.3. LIST OF DUT'S ACCESSORIES:

1. Telephone Cord with modular RJ11 plugs
2. Battery Charger/Cradle
3. AC Adapter

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

None

3.5. ANCILLARY EQUIPMENT

None

3.6. GENERAL TEST CONFIGURATIONS

3.6.1. 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.

3.6.2. 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.

3.7. SPECIFIC OPERATING CONDITIONS

Not specified.

3.8. BLOCK DIAGRAM OF TEST SETUP

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

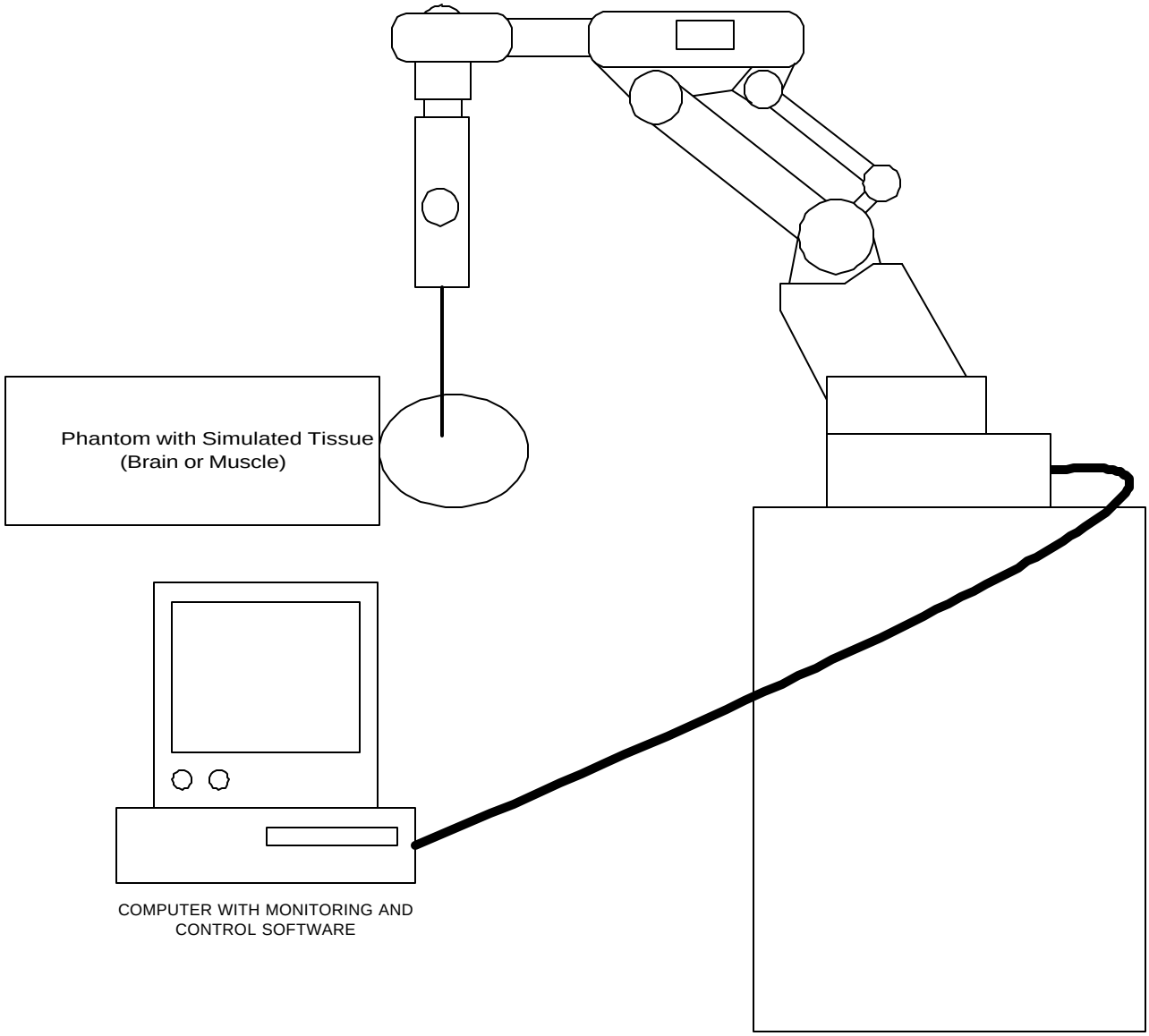


EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. LOCATION OF TESTS

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

3000 Bristol Circle, Oakville, Ontario, Canada.

4.2. APPLICABILITY & SUMMARY OF SAR RESULTS

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).	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).	N/A

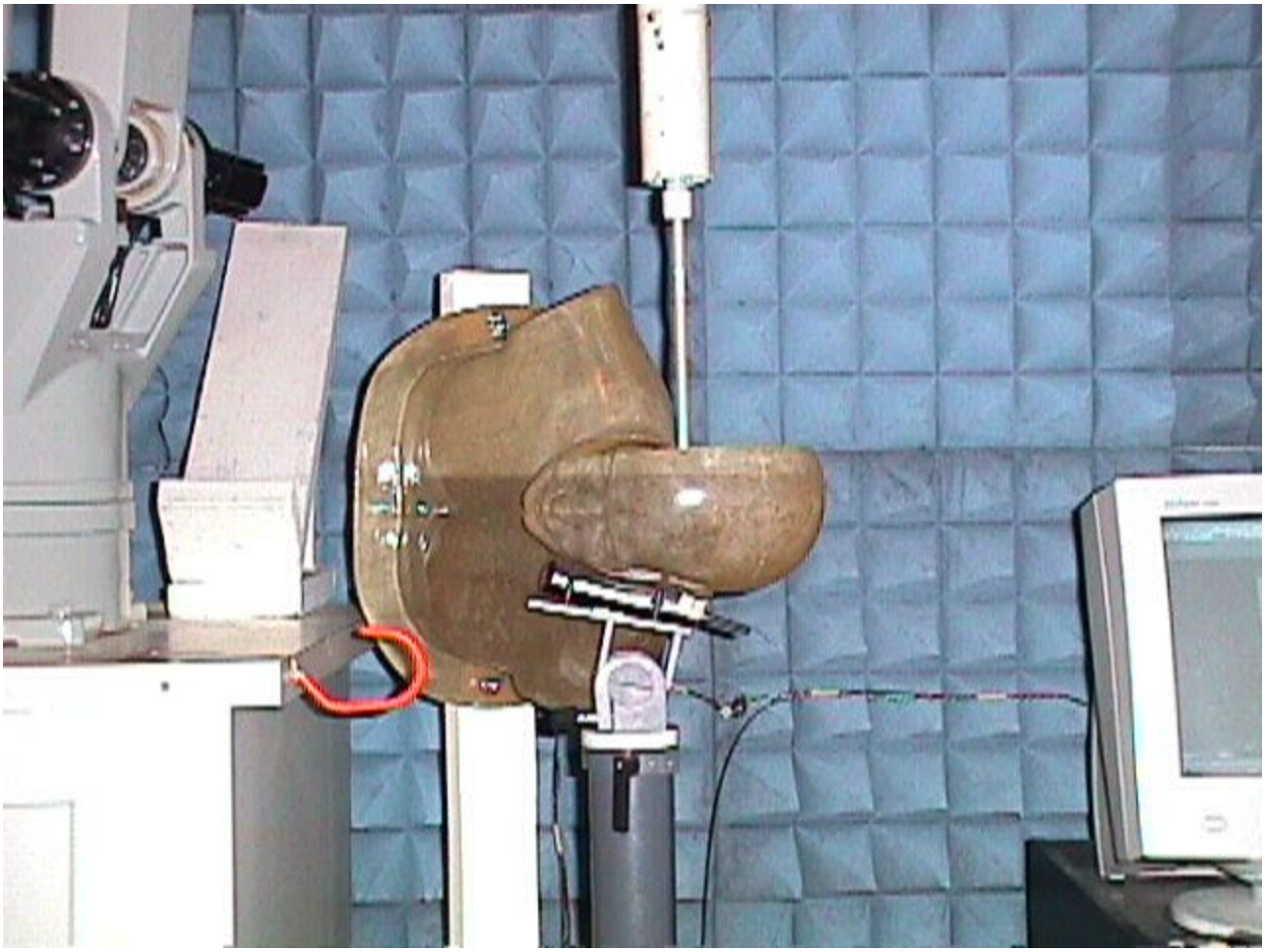
EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA

5.1. TEST SETUP

EUT Information		Condition	
Radio Type	Direct Sequence Spread Spectrum	**Robot Type**	6 Axis
Model Number	KX-TD7895	**Scan Type**	SAR
Serial Number	Pre-Production Sample	**Measured Field**	E
Frequency Band (MHz)	903.75 - 926.25	**Phantom Type**	Open Back Full Body, Head Right Ear
Frequency Tested (MHz)	903.75 914.25 926.25	**Phantom Position**	Waist, left Ear
Nominal Output Power (W)	100 mW	**Room Temperature**	24 ± 1 °C
Antenna Type	1. Fixed ½Wavelength Helical.		
Signal Type	Frequency Shift Keying (FSK)		
Duty Cycle	50%		

Type of Tissue	**Brain**	**Muscle**
Target Frequency (MHz)	835	835
Target Dielectric Constant	46.1	56.1
Target Conductivity (S/m)	0.74	0.95
Composition (by weight)	Tap Water (43.69%) Sugar (56.25%) HEC (0.05%) Bactericide (0.01%)	Tap Water (53.49 %) Sugar (45.80 %) Salt (0.60%) HEC (0.10 %) Bactericide (0.01%)
Measured Dielectric Constant	44.4	53.6
Measured Conductivity (S/m)	0.76	0.98
Probe Name	E	E
Probe Orientation	Isotropic	Isotropic
Probe Offset (mm)	3.0	3.0
Sensor Factor	10.8	10.8
Conversion Factor	0.61	0.72
Calibration Date (MM/DD/YY)	03/24/99	03/24/99

5.2. PHOTOGRAPHS OF EUT POSITION



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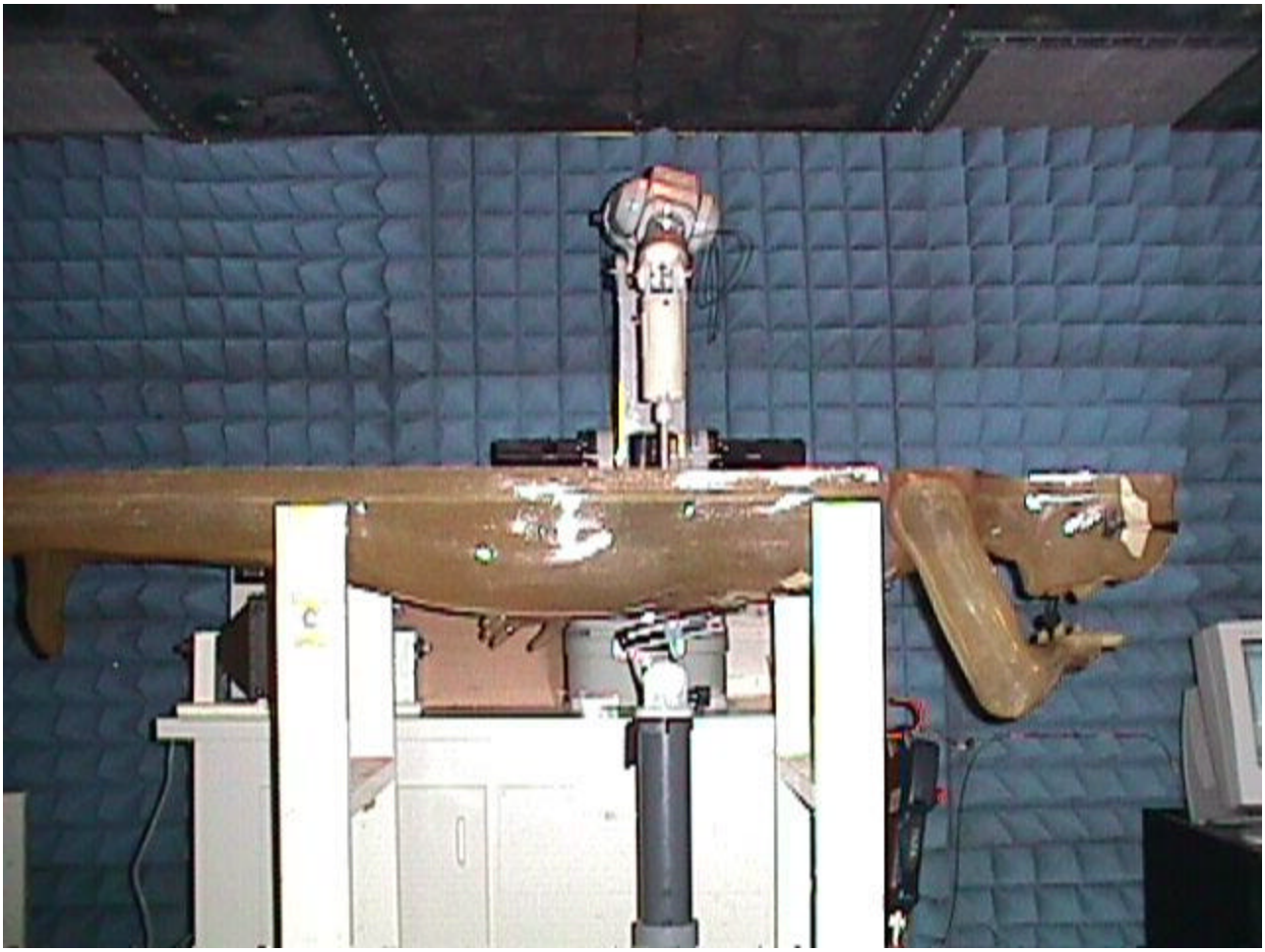

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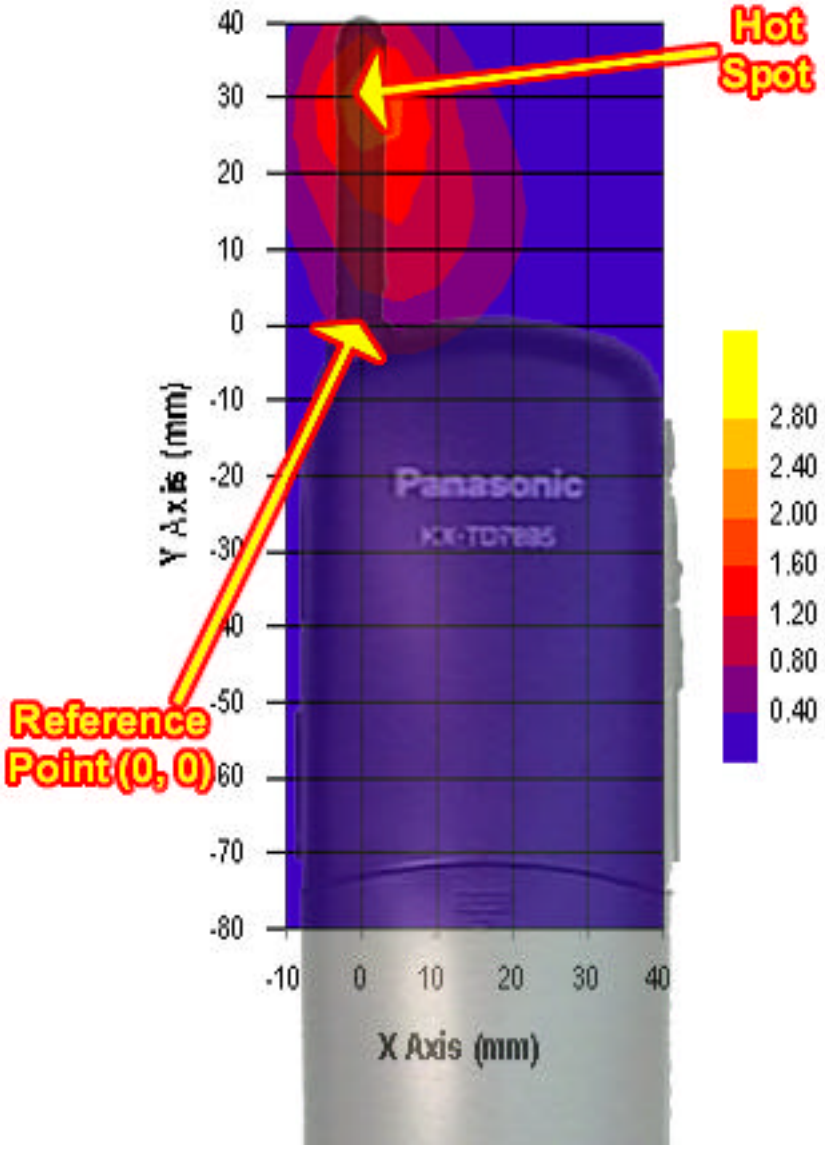
5.3. MAXIMUM FIELD LOCATION



5.4. TEST DATA

Maximum Field at (0 , 30)				
DUT Positioning	Frequency (MHz)	Measured Power (W)	SAR (W/Kg)	DUT Configuration
Waist	904	--	0.13	With Headset, w/o Belt Clip

DUT Positioning	Frequency (MHz)	Measured Power (W)	SAR (W/Kg)	DUT Configuration
Head – Left Ear	903.95	--	0.01	Base of ANT to Phantom: 18 mm Bottom of EUT to Phantom: N/A
	914.25	--	0.01	
	926.25	--	0.01	

DUT Positioning	Frequency (MHz)	Measured Power (W)	SAR (W/Kg)	DUT Configuration
Waist w/ Headset Without Belt Clip	904	--	0.13	Base of ANT to Phantom: 3 mm Bottom of EUT to Phantom: 18 mm Tip of ANT to Phantom: Touch
	914	--	0.01	
	926	--	0.03	

EXHIBIT 6. SAR SYSTEM CONFIGURATION & TEST METHODOLOGY

6.1. MEASUREMENT SYSTEM SPECIFICATIONS

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

6.2. 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.

6.3. 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.

6.4. 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/cm^3

6.4.1. Preparation

We determine the volume needs and carefully measure all components. A clean container is used were the ingredients will be mixed. A stirring paddle and a hand drill is used to stir the mixture. First we heat the DI water to about 40 ^{o}C to help the ingredients to 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.

6.5. MEASUREMENT OF ELECTRICAL CHARACTERISTICS OF SIMULATED TISSUE

1) Network Analyzer HP8753C or others

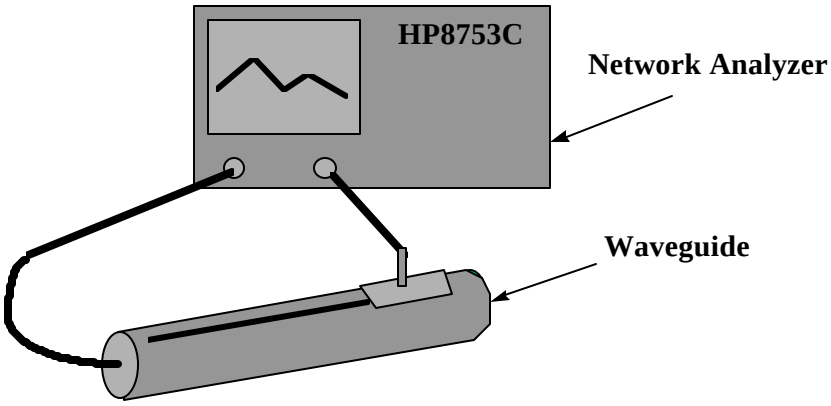
2) Slotted Coaxial Waveguide

6.5.1. Description of the slotted coaxial waveguide

The cylindrical waveguide is constructed with copper tube of about 30 to 40 cm of 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 almost the two third of the tube length. The outer edge of the slotted tube is marked in centimeters (10 to 12) every 1 centimeter, 0.5 if 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, 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 results dielectric constant and conductivity within 5 % of published data.

Electrical Characteristics Measurement Setup



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

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

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

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

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

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

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

$$\varepsilon_r = \frac{\varepsilon_{re}}{\sqrt{(1 + S^2)}}$$

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

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

6.6. 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 1mW/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 joules/^{0}C/g and 3.0 joules/^{0}C/g for muscle.

SAR is proportional to T / 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 g/cm^3 for simulated tissue)

6.7. DATA EXTRAPOLATION (CURVE FITTING)

There is a distance from the center of the sensor (diode) to the end of the protective tube called '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.

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

6.8. INTERPOLATION AND GRAM AVERAGING

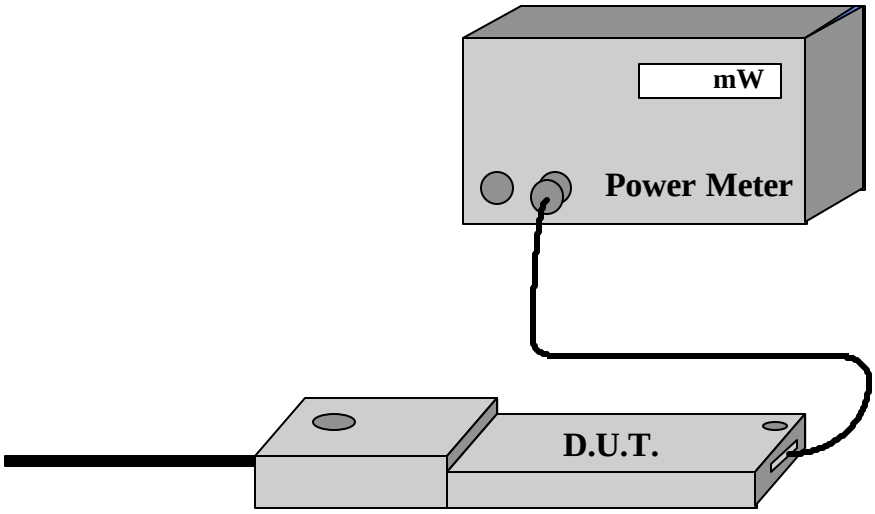
The voltage, (1 cm) above the phantoms surface (E_{tot} 1 cm), is needed to calculate the exposure over one gram of tissue. This SAR value that estimates the average over 1 gram of tissue, is obtained by taking the integral over 1 cm^2 surface of the measured field along the exponential decay curve of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

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

6.9. POWER MEASUREMENT

When ever 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 for the time of test. A difference in output power would determinate a need for battery replacement and repetition the SAR test.



Measured Power Measured Power + Cable and Switching Mechanism Loss

6.10. POSITIONING OF D.U.T.

The clear fiberglass phantom shell have been previously marked with a highly visible line, so 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.

ANNEX A: 903.95 MHz SAR MEASUREMENT

Test Information

Date : 7/11/00
Time : 3:46:03 PM

Product	: Cordless Phone	**Test**	: SAR
Manufacturer	: Panasonic	**Frequency (MHz)**	: 904
Model Number	: KX-TD7895	**Nominal Output Power (W)**	: 0.1
Serial Number	: Pre Product	**Antenna Type**	: Helix
FCC ID Number	: ACJ96NKX-TD7895	**Signal**	: Spread Spectrum

Phantom	: Head - Left Ear	**Dielectric Constant**	: 46.6
Simulated Tissue	: Brain	**Conductivity**	: 0.79

Probe	: E	**Antenna Position**	: FIX
Probe Offset (mm)	: 3.00		
Sensor Factor (mV)	: 10.8		
Conversion Factor	: 0.66		
Calibrated Date	: 3/24/99		

Amplifier Setting :

Channel 1 : .00416 Channel 2 : .00401 Channel 3 : .00313

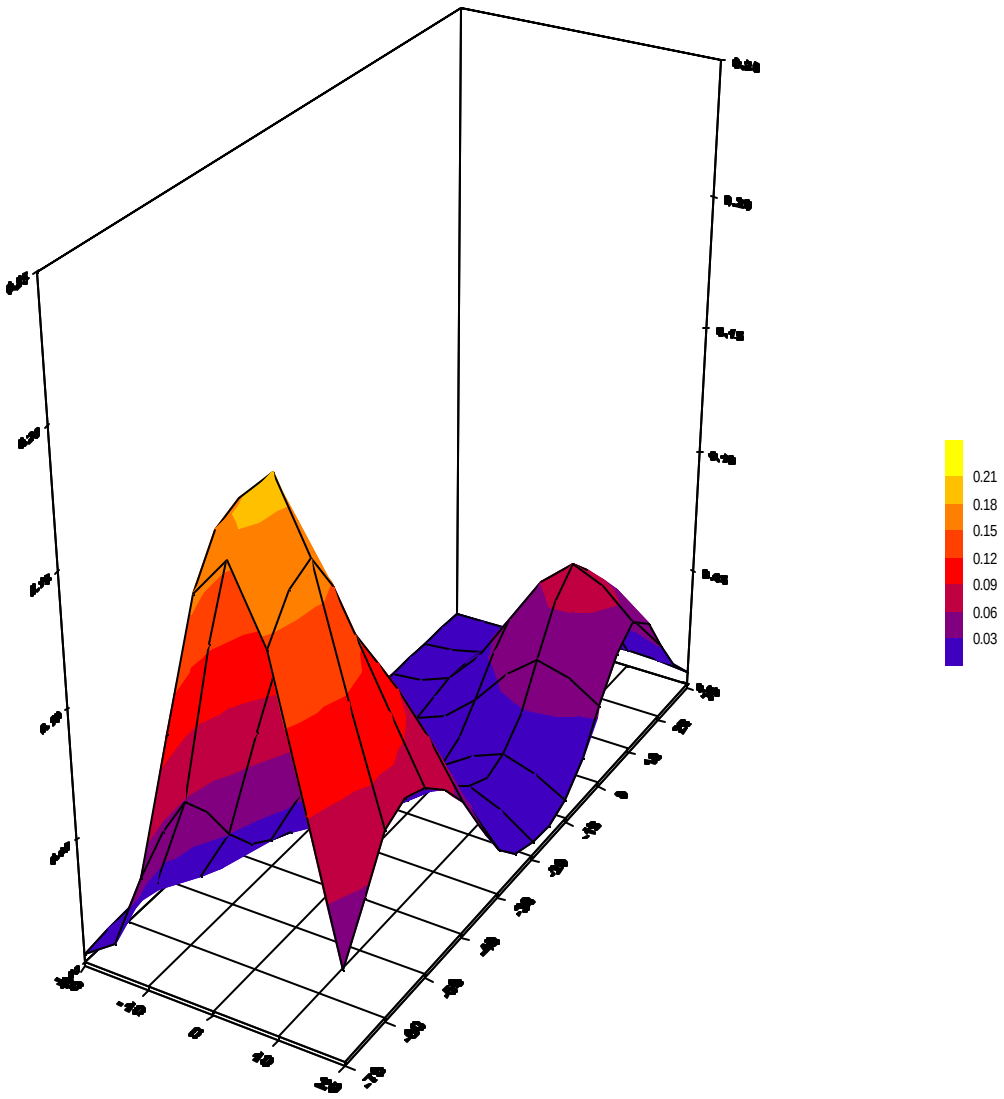
Location of Maximum Field :

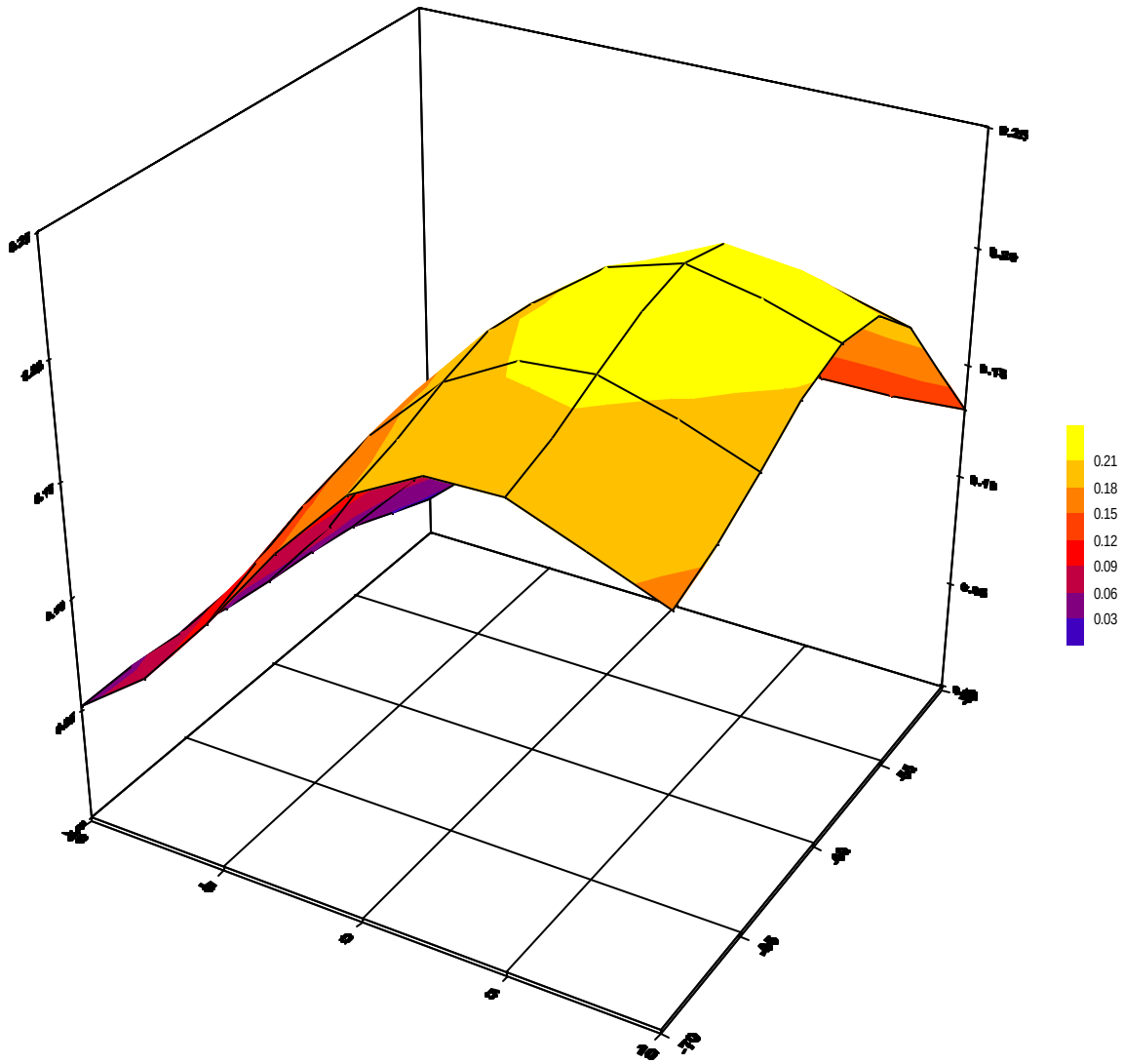
X = 5 Y = -60

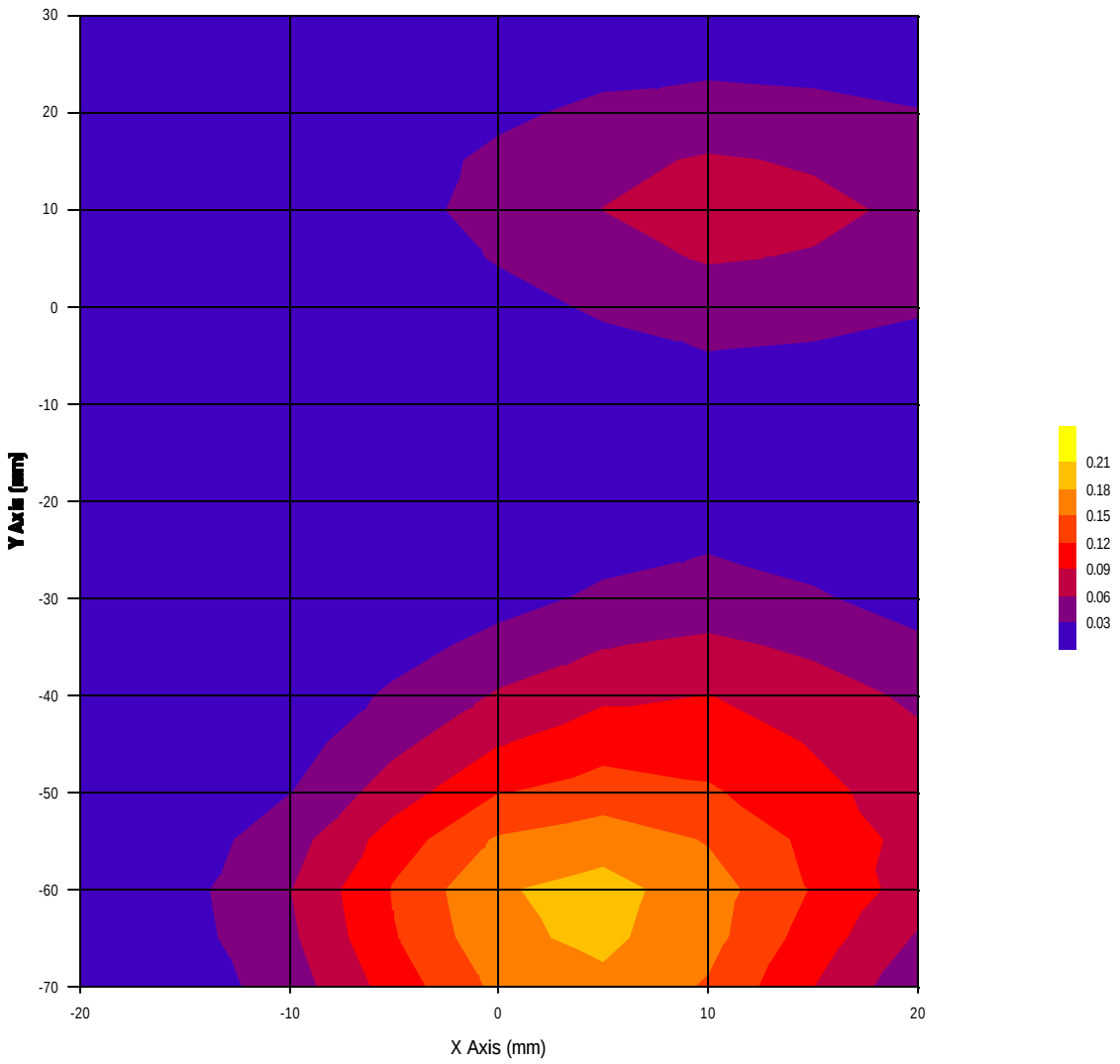
Measured Values (mV) :

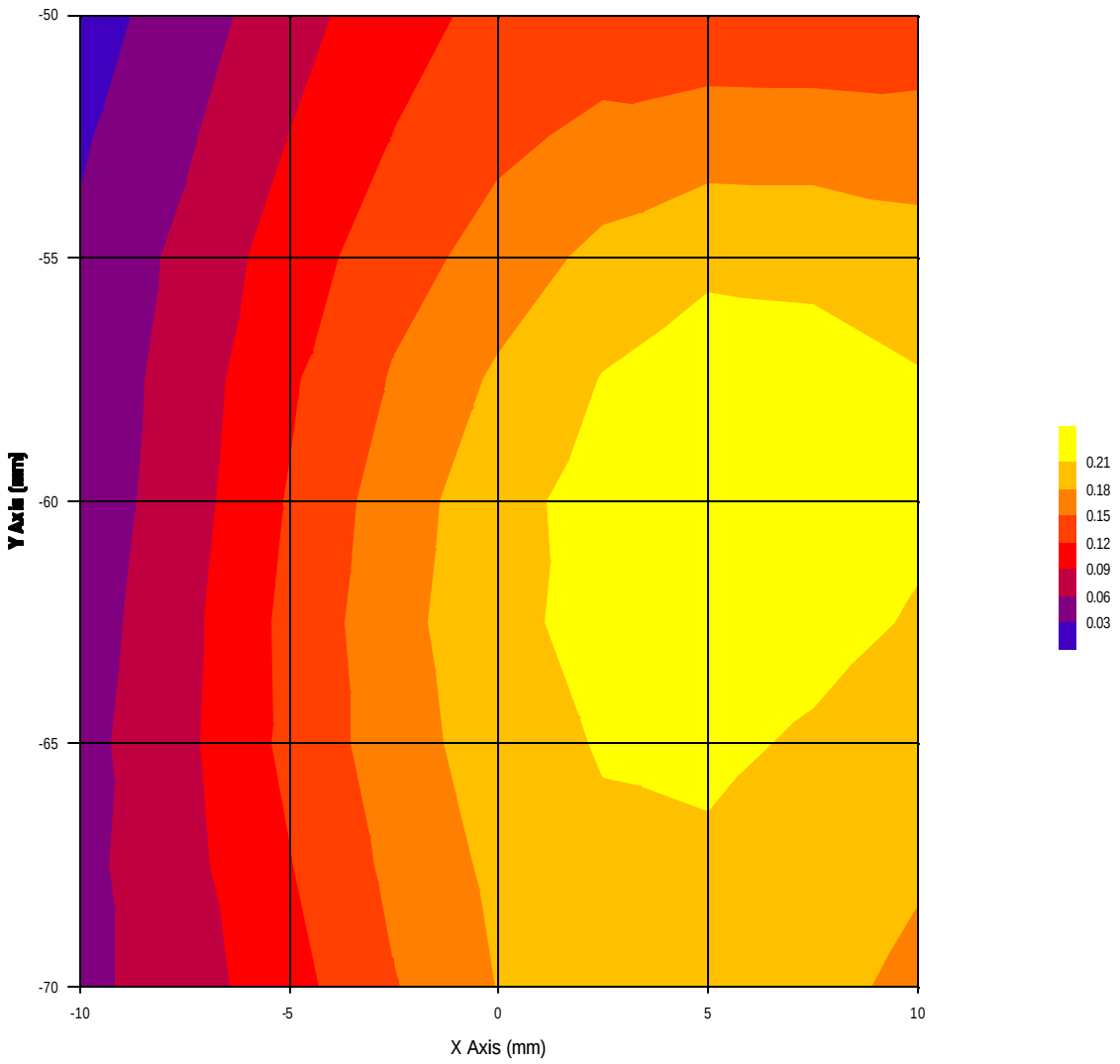
0.24	0.19	0.16	0.11	0.07	0.06
0.04	0.03	0.02	0.01	0.01	

Peak Voltage (mV) : 0.54 **1 Cm Voltage (mV)** : 0.04 **SAR (W/Kg)** : 0.01

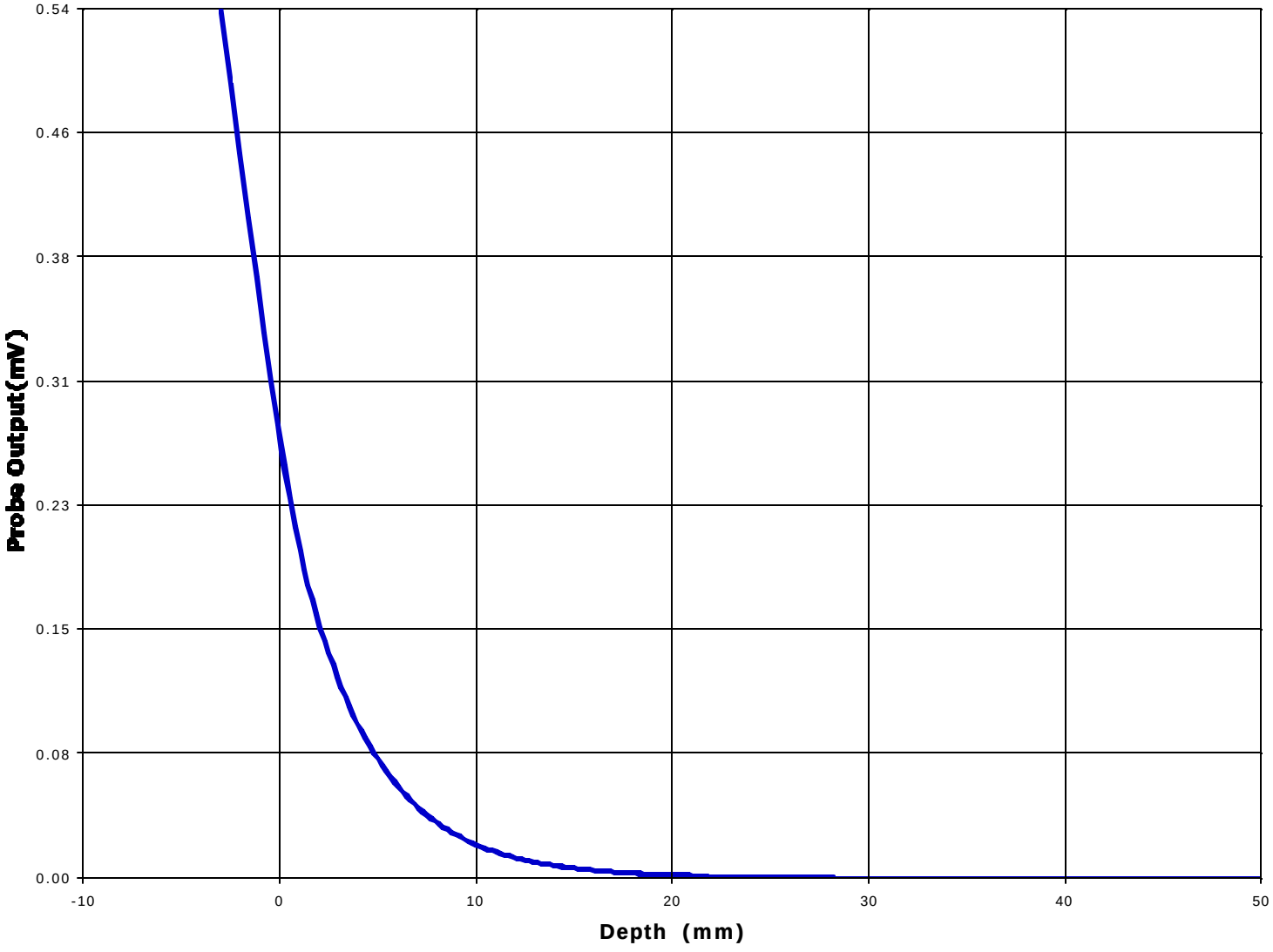

0.21
0.18
0.15
0.12
0.09
0.06
0.03


0.21
0.18
0.15
0.12
0.09
0.06
0.03


30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Y Axis (mm)
-20
-10
0
10
20
X Axis (mm)
0.21
0.18
0.15
0.12
0.09
0.06
0.03


-50
-55
-60
-65
-70
Y Axis (mm)
-10
-5
0
5
10
X Axis (mm)
0.21
0.18
0.15
0.12
0.09
0.06
0.03

0.03
0.03
0.02
0.02
0.01
0.01
0.00
0.00
Local SAR(W/Kg)
0
10
20
30
40
50
Depth (mm)


0.54
0.46
0.38
0.31
0.23
0.15
0.08
0.00
Probe Output(mV)
-10
0
10
20
30
40
50
Depth (mm)

Test Information

Date : 7/11/00
Time : 7:19:14 PM

Product	: Cordless Phone	**Test**	: SAR
Manufacturer	: Panasonic	**Frequency (MHz)**	: 904
Model Number	: KX-TD7895	**Nominal Output Power (W)**	: 0.1
Serial Number	: Pre Production	**Antenna Type**	: Helix
FCC ID Number	: ACJ96NKX-TD7895	**Signal**	: Spread Spectrum

Phantom	: Waist	**Dielectric Constant**	: 54.9
Simulated Tissue	: Muscle	**Conductivity**	: 1.02

Probe	: E	**Antenna Position**	: FIX
Probe Offset (mm)	: 3.00		
Sensor Factor (mV)	: 10.8		
Conversion Factor	: 0.77		
Calibrated Date	: 3/24/99		

Amplifier Setting :

Channel 1 : .00416 Channel 2 : .00401 Channel 3 : .00313

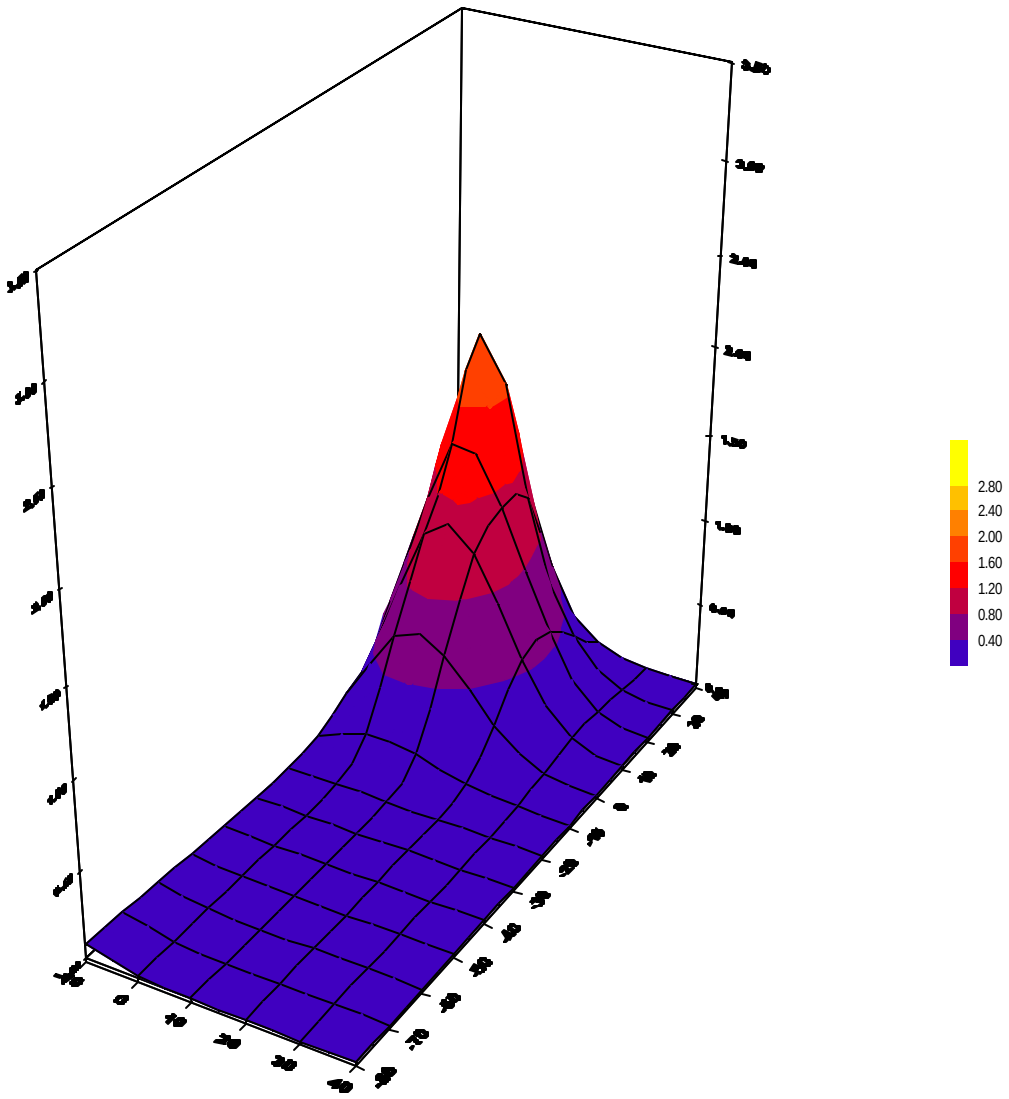
Location of Maximum Field :

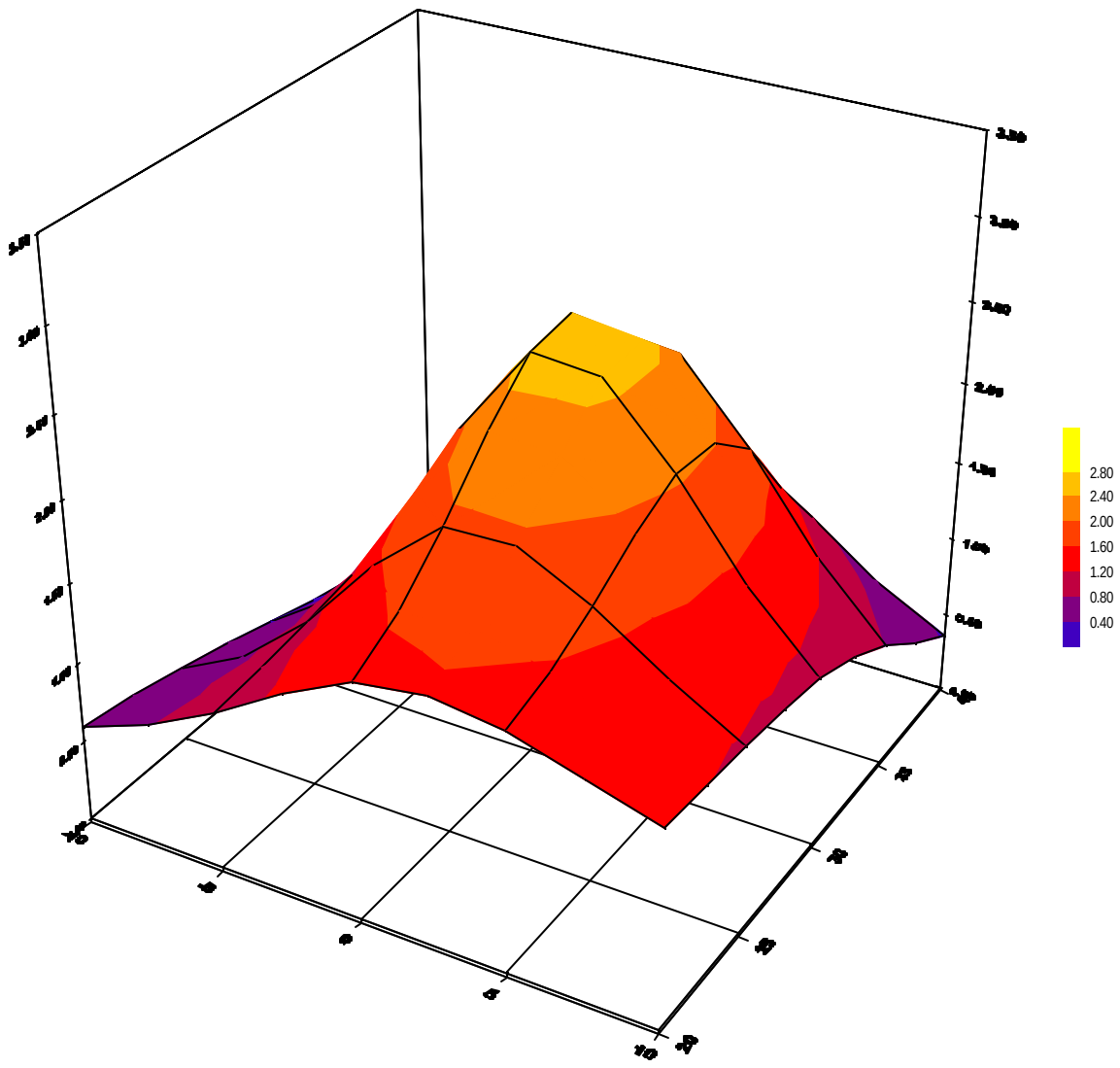
X = 0 Y = 30

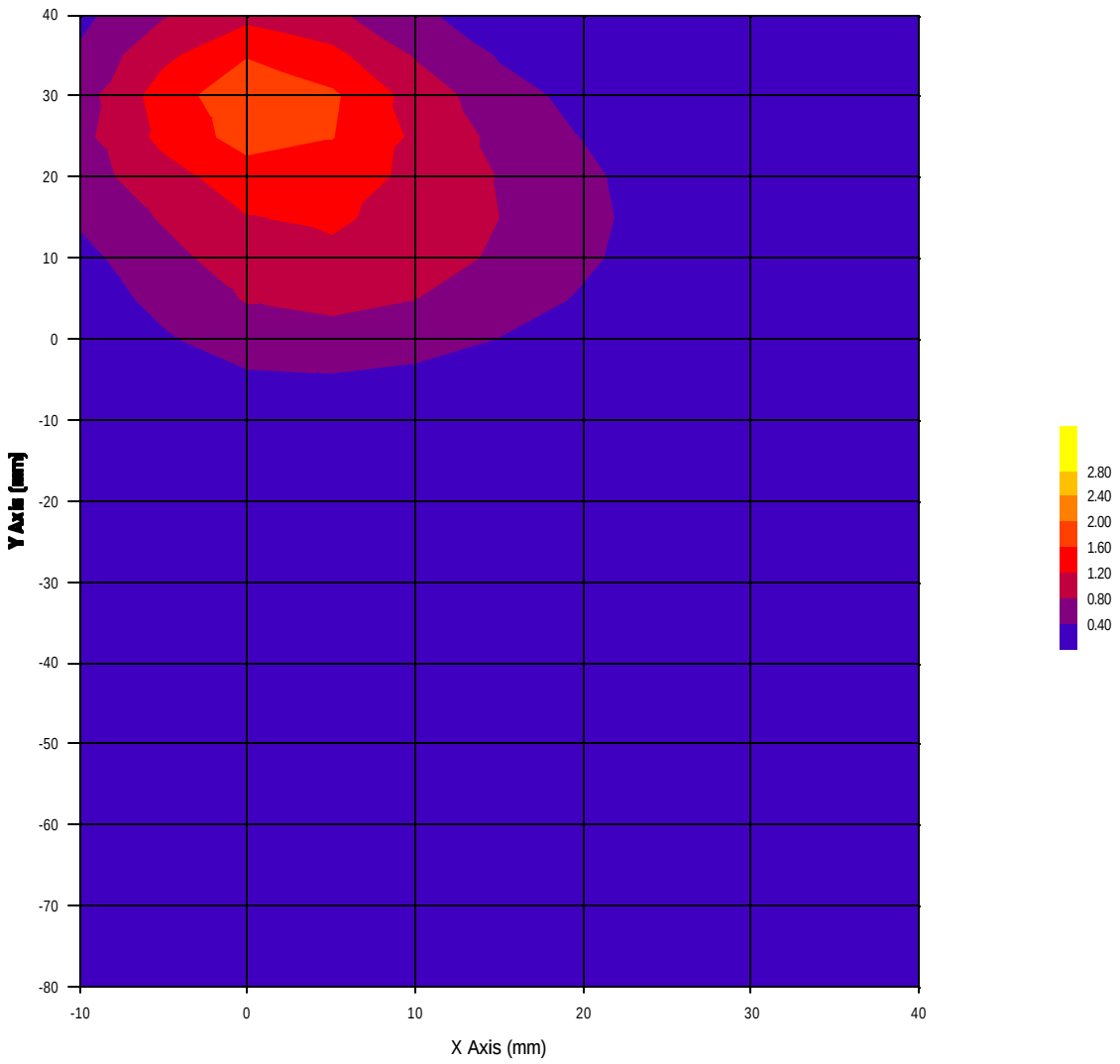
Measured Values (mV) :

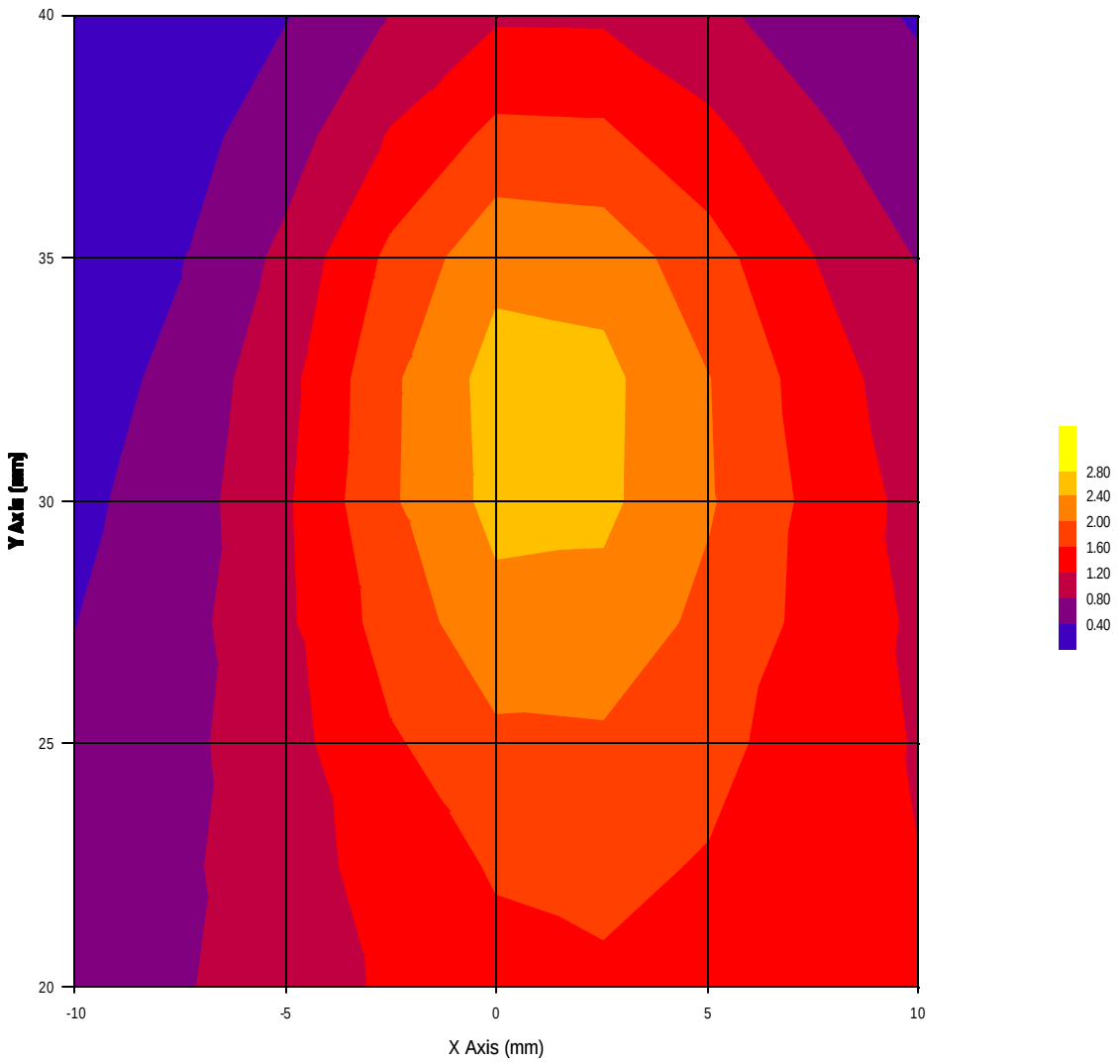
3.22	1.85	1.14	0.80	0.54	0.39
0.30	0.25	0.21	0.18	0.14	

Peak Voltage (mV) : 9.25 **1 Cm Voltage (mV)** : 0.18 **SAR (W/Kg)** : 0.13

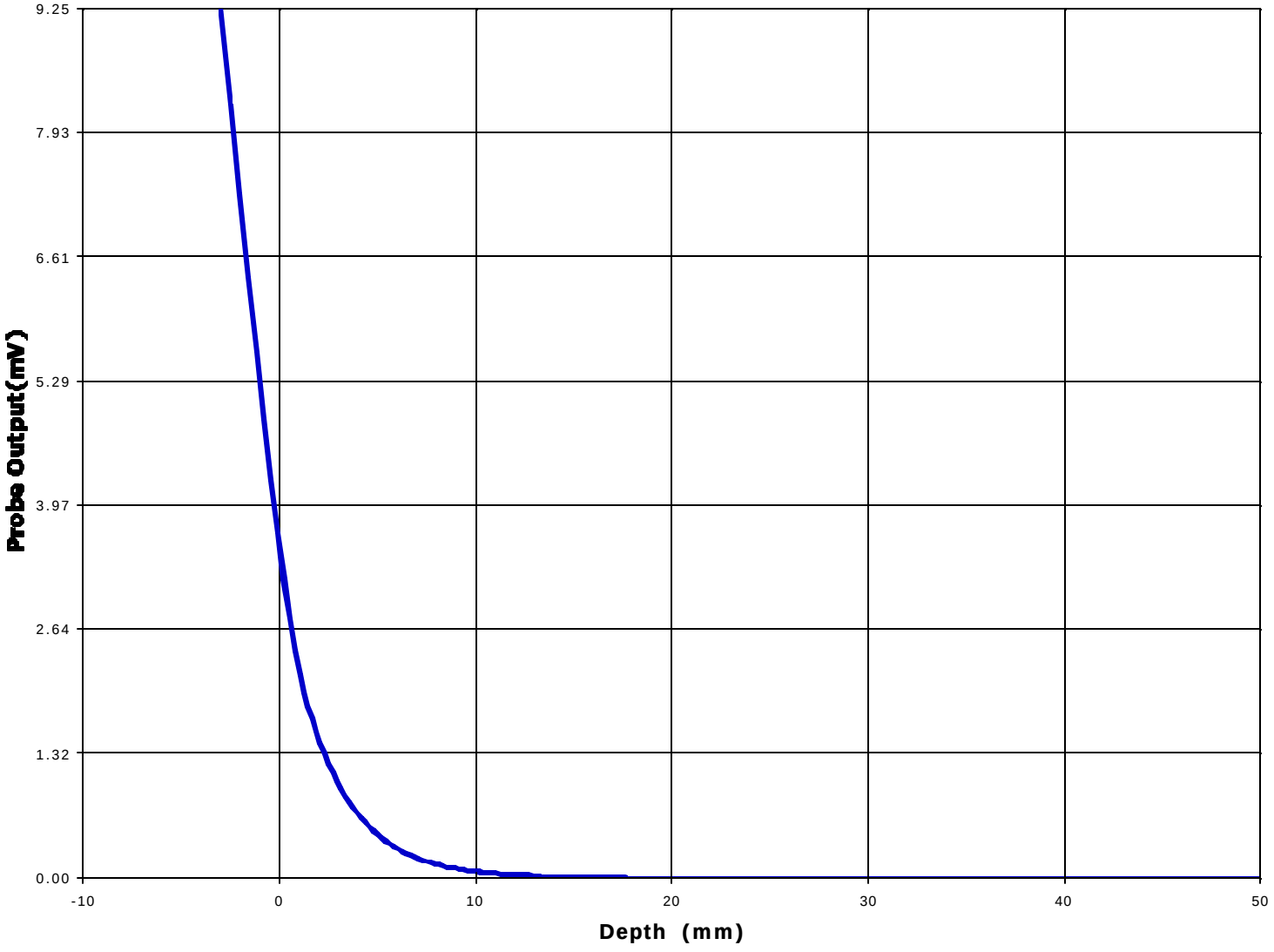

2.80
2.40
2.00
1.60
1.20
0.80
0.40


2.80
2.40
2.00
1.60
1.20
0.80
0.40


40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Y Axis (mm)
-10
0
10
20
30
40
X Axis (mm)
2.80
2.40
2.00
1.60
1.20
0.80
0.40


40
35
30
25
20
Y Axis (mm)
-10
-5
0
5
10
X Axis (mm)
2.80
2.40
2.00
1.60
1.20
0.80
0.40

0.66
0.56
0.47
0.38
0.28
0.19
0.09
0.00
Local SAR(W/Kg)
0
10
20
30
40
50
Depth (mm)


9.25
7.93
6.61
5.29
3.97
2.64
1.32
0.00
Probe Output(mV)
-10
0
10
20
30
40
50
Depth (mm)

ANNEX B: 914.25 MHz SAR MEASUREMENT

Test Information

Date : 7/11/00
Time : 2:47:36 PM

Product	: Cordless Phone	**Test**	: SAR
Manufacturer	: Panasonic	**Frequency (MHz)**	: 914
Model Number	: KX-TD7895	**Nominal Output Power (W)**	: 0.1
Serial Number	: Pre Production	**Antenna Type**	: Helix
FCC ID Number	: ACJ96NKX-TD7895	**Signal**	: Spread Spectrum

Phantom	: Head - Left Ear	**Dielectric Constant**	: 46.6
Simulated Tissue	: Brain	**Conductivity**	: 0.79

Probe	: E	**Antenna Position**	: FIX
Probe Offset (mm)	: 3.00		
Sensor Factor (mV)	: 10.8		
Conversion Factor	: 0.66		
Calibrated Date	: 3/24/99		

Amplifier Setting :

Channel 1 : .00416 Channel 2 : .00401 Channel 3 : .00313

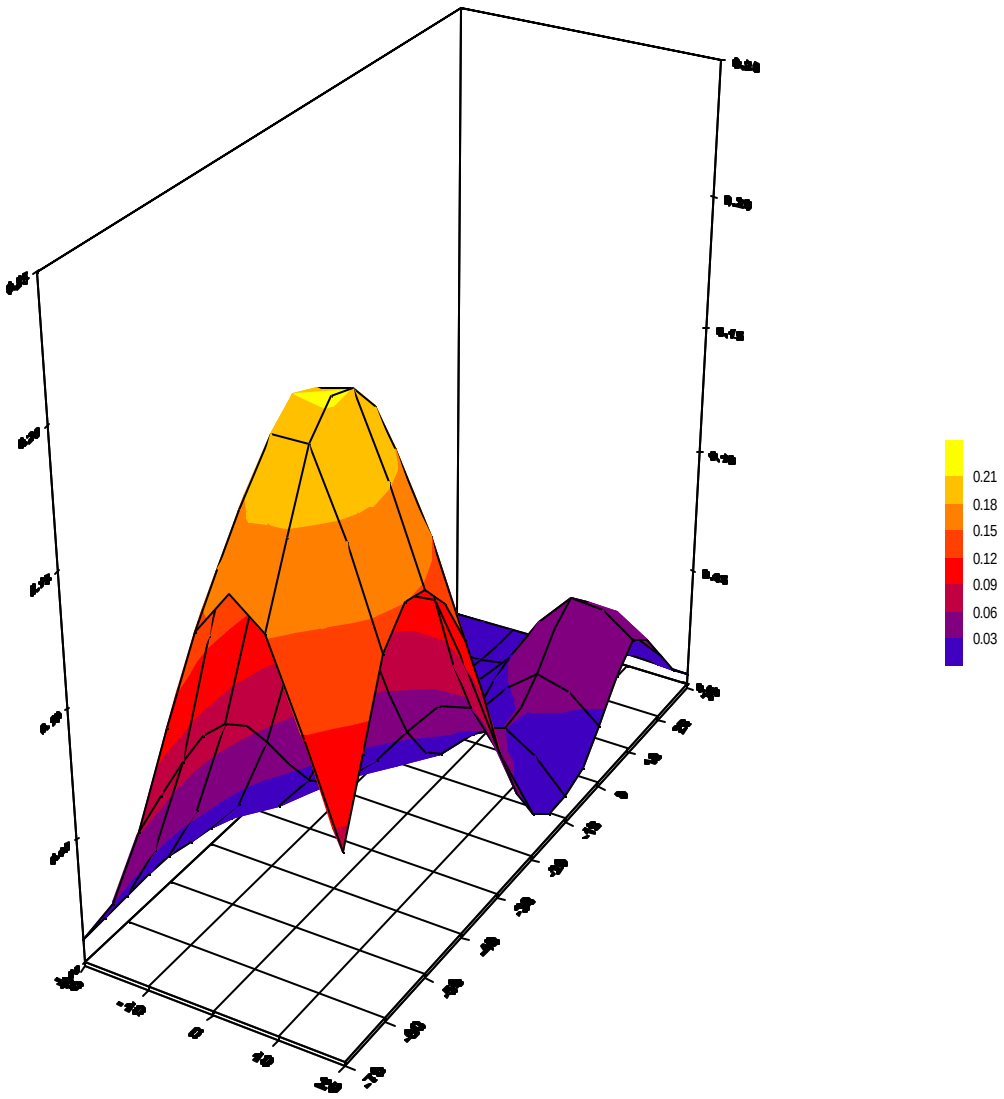
Location of Maximum Field :

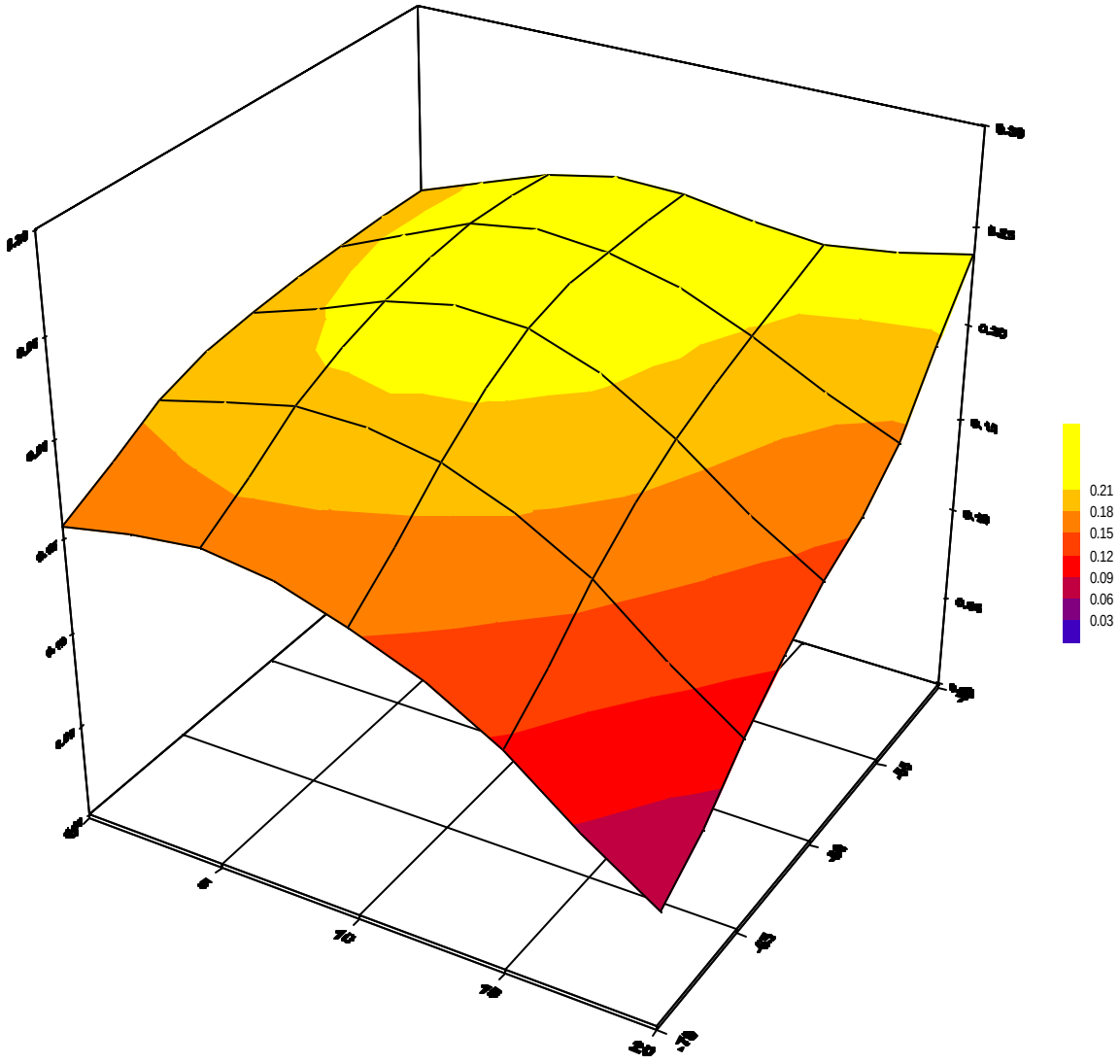
X = 20 Y = -50

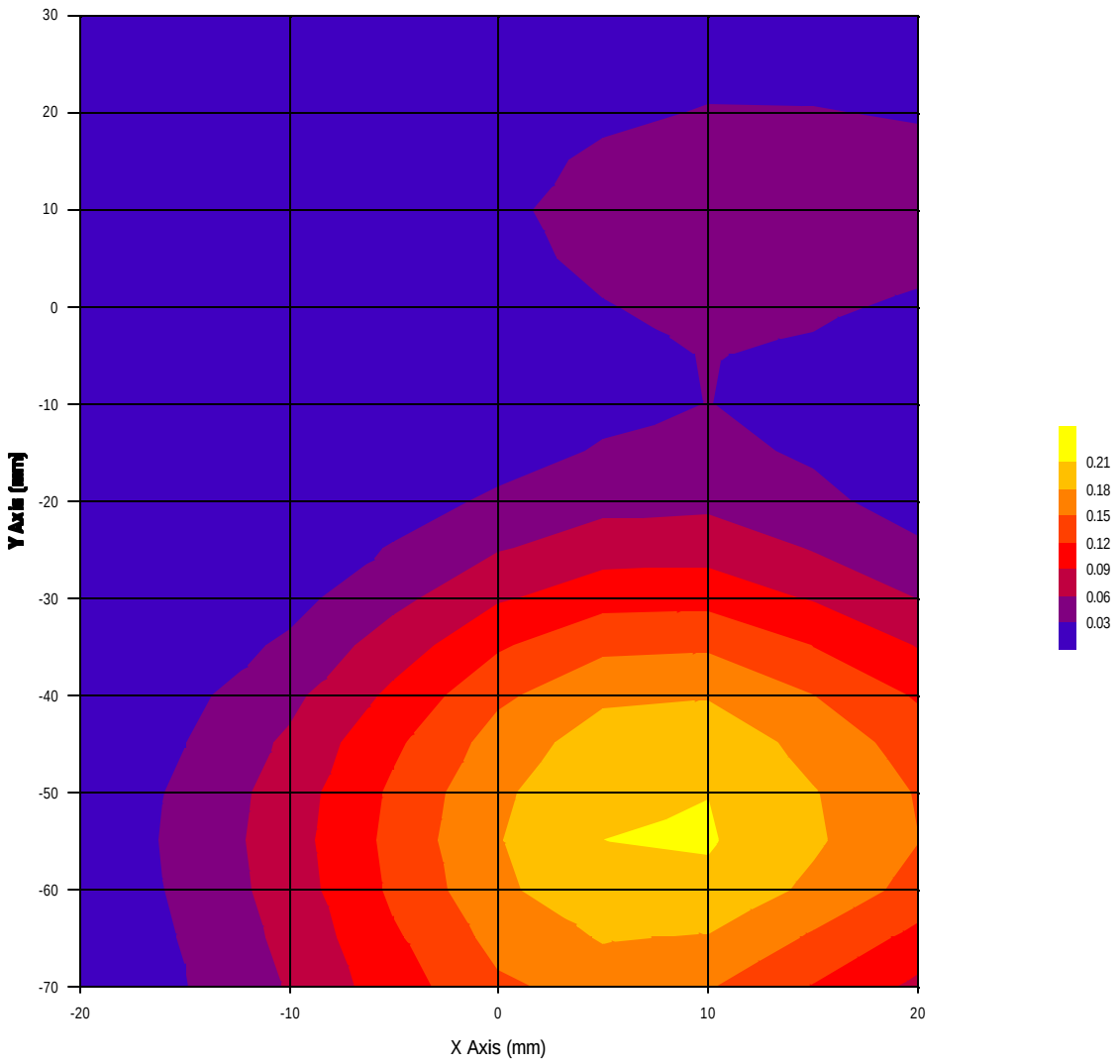
Measured Values (mV) :

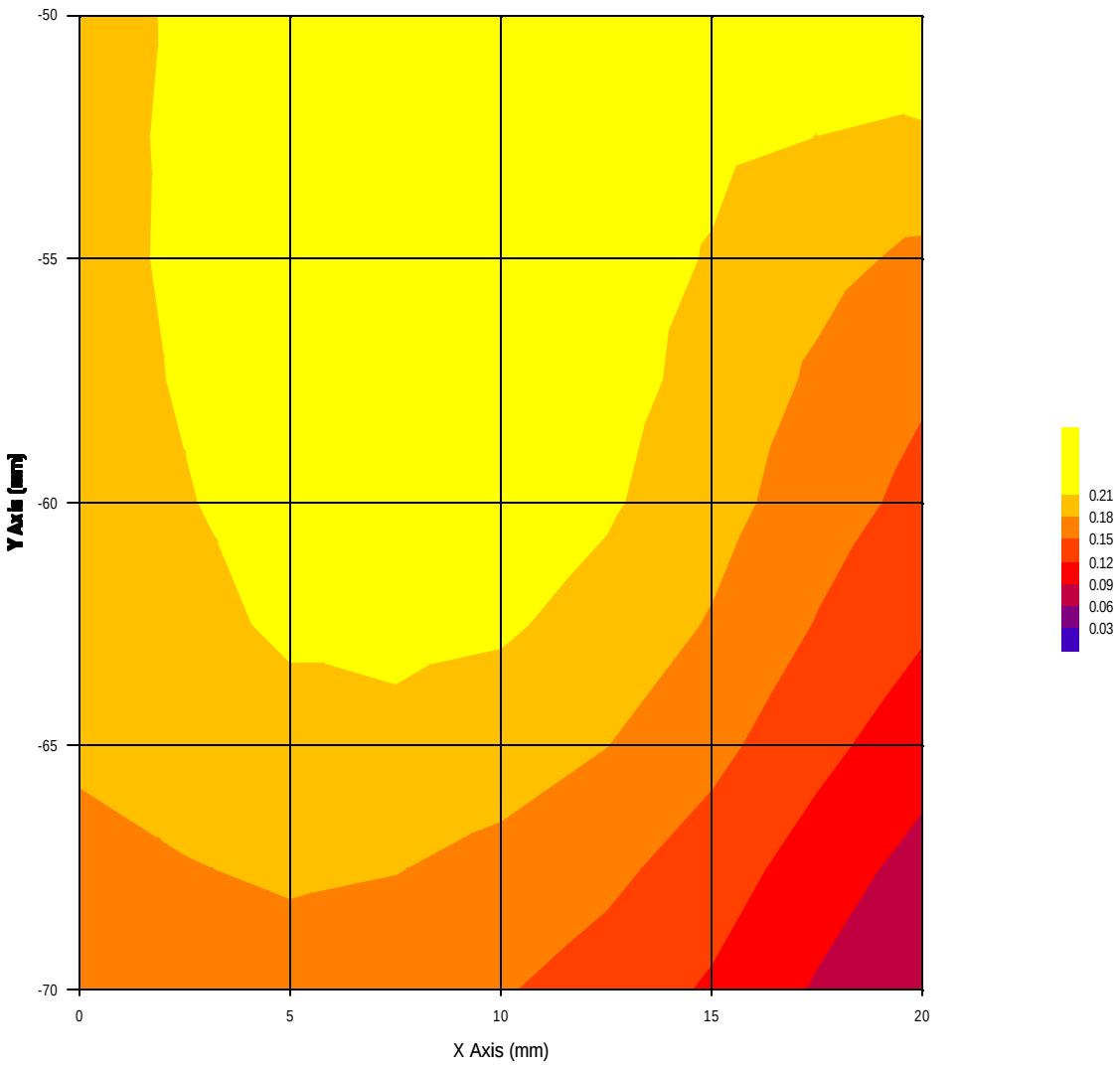
0.14	0.09	0.07	0.06	0.04	0.03
0.03	0.02	0.01	0.00	0.00	

Peak Voltage (mV) : 0.34 **1 Cm Voltage (mV)** : 0.01 **SAR (W/Kg)** : 0.01

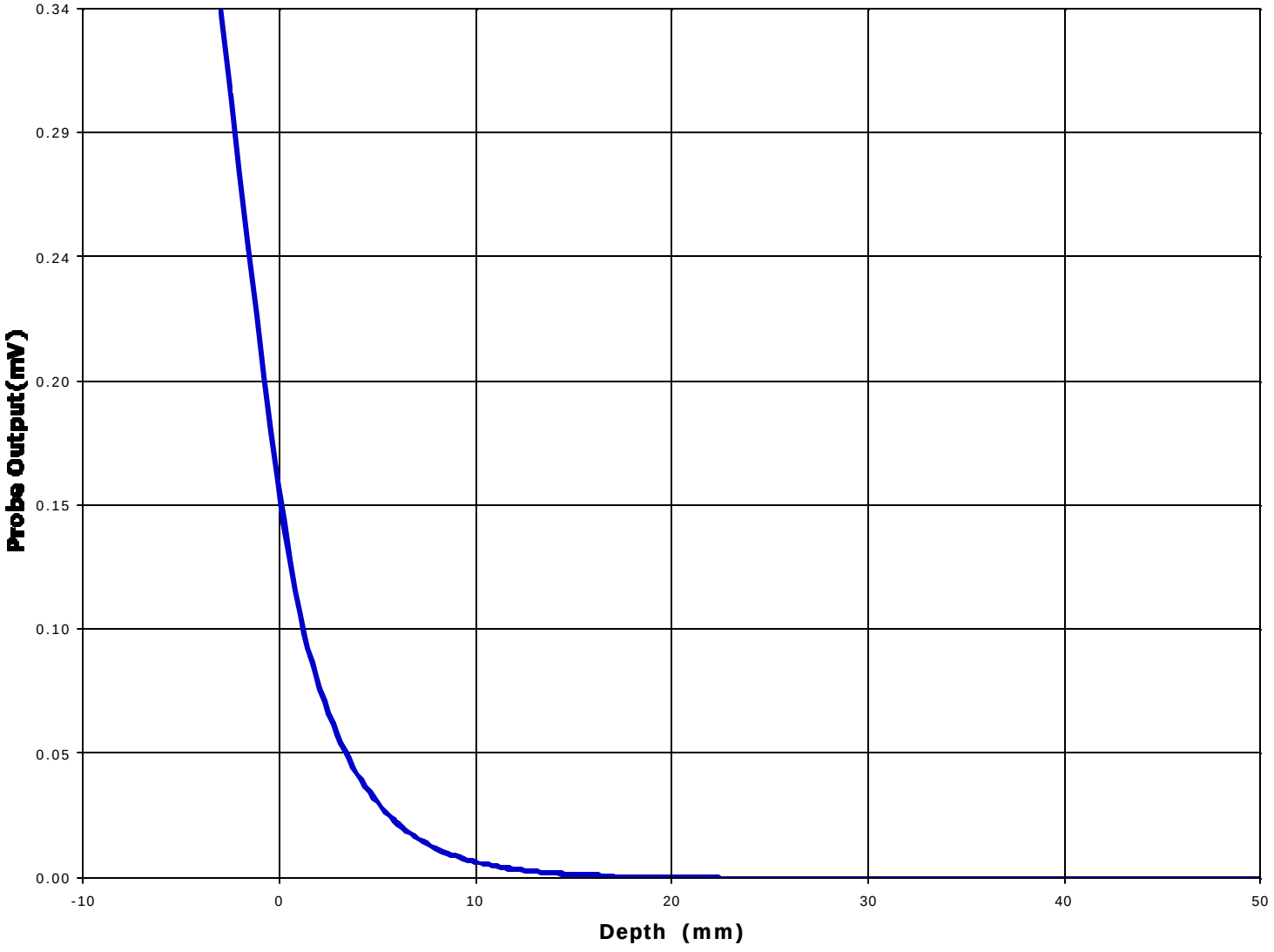

0.21
0.18
0.15
0.12
0.09
0.06
0.03


0.21
0.18
0.15
0.12
0.09
0.06
0.03


30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Y Axis (mm)
-20
-10
0
10
20
X Axis (mm)
0.21
0.18
0.15
0.12
0.09
0.06
0.03


-50
-55
-60
-65
-70
Y Axis (mm)
0
5
10
15
20
X Axis (mm)
0.21
0.18
0.15
0.12
0.09
0.06
0.03

0.02
0.02
0.01
0.01
0.01
0.01
0.00
0.00
Local SAR(W/Kg)
0
10
20
30
40
50
Depth (mm)


0.34
0.29
0.24
0.20
0.15
0.10
0.05
0.00
Probe Output(mV)
-10
0
10
20
30
40
50
Depth (mm)

Test Information

Date : 7/11/00
Time : 9:07:33 PM

Product	: Cordless Phone	**Test**	: SAR
Manufacturer	: Panasonic	**Frequency (MHz)**	: 914
Model Number	: KX-TD7895	**Nominal Output Power (W)**	: 0.1
Serial Number	: Pre Production	**Antenna Type**	: Helix
FCC ID Number	: ACJ96NKX-TD7895	**Signal**	: Spread Spectrum

Phantom	: Waist	**Dielectric Constant**	: 54.9
Simulated Tissue	: Muscle	**Conductivity**	: 1.02

Probe	: E	**Antenna Position**	: FIX
Probe Offset (mm)	: 3.00		
Sensor Factor (mV)	: 10.8		
Conversion Factor	: 0.77		
Calibrated Date	: 3/24/99		

Amplifier Setting :

Channel 1 : .00416 Channel 2 : .00401 Channel 3 : .00313

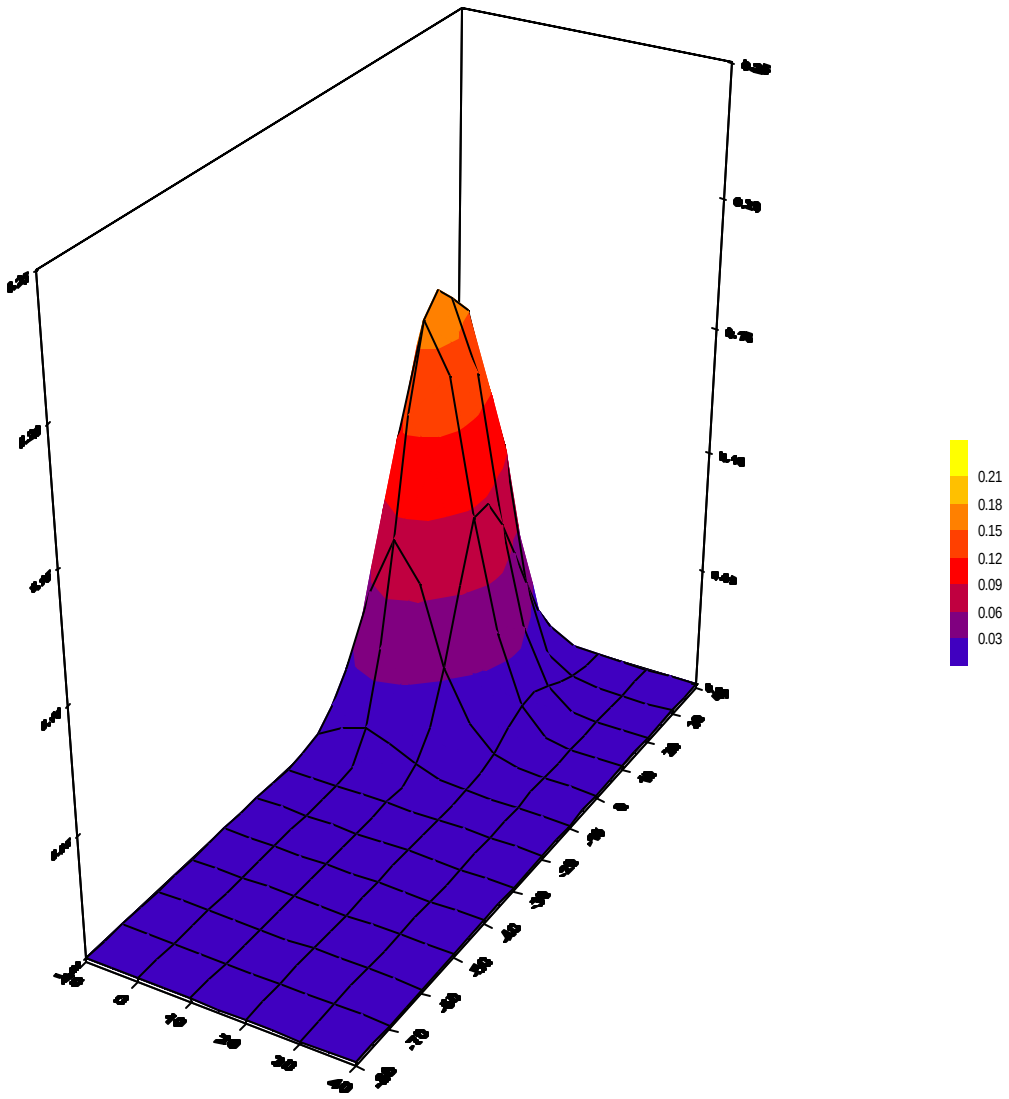
Location of Maximum Field :

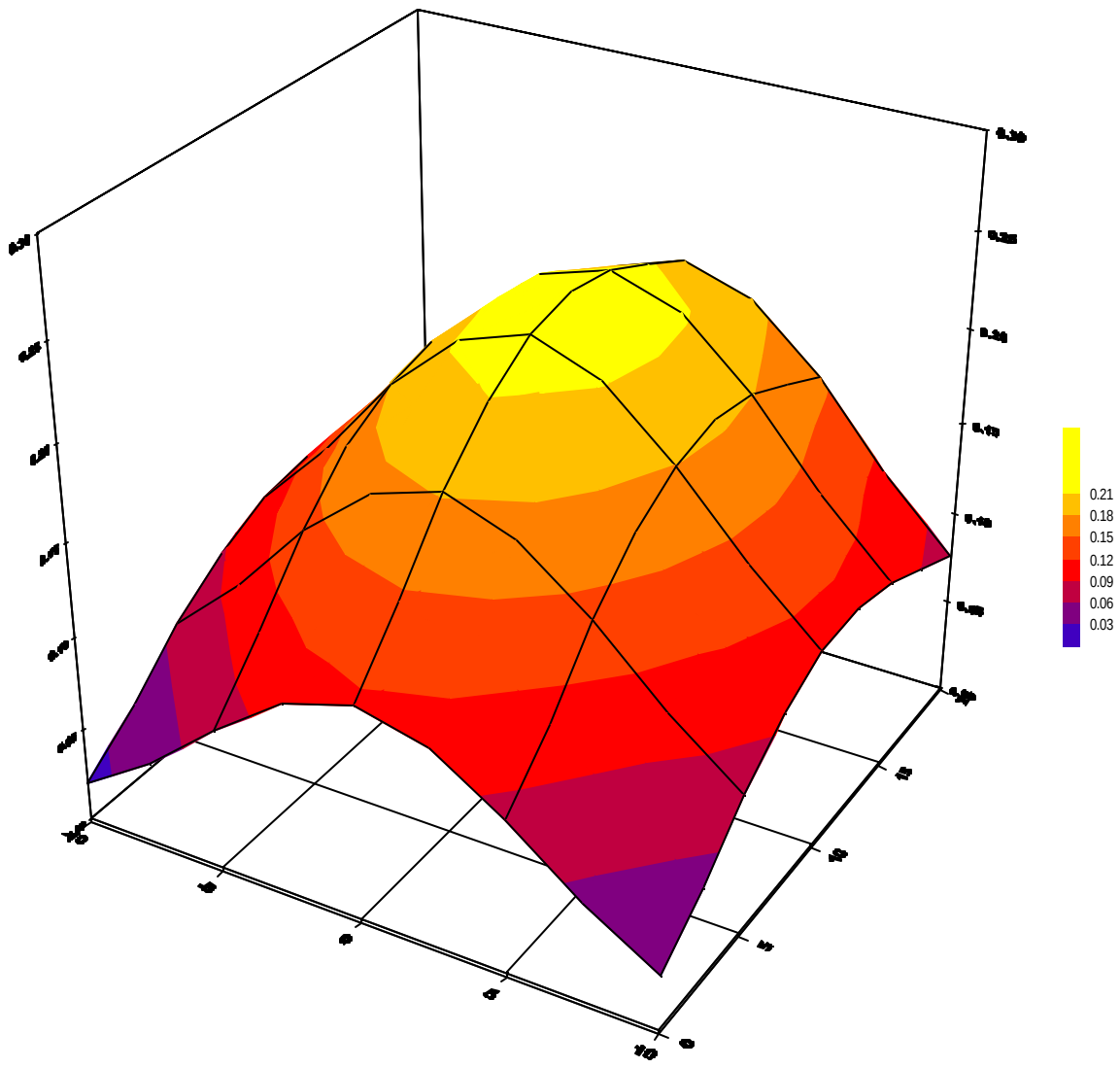
X = 0 Y = 10

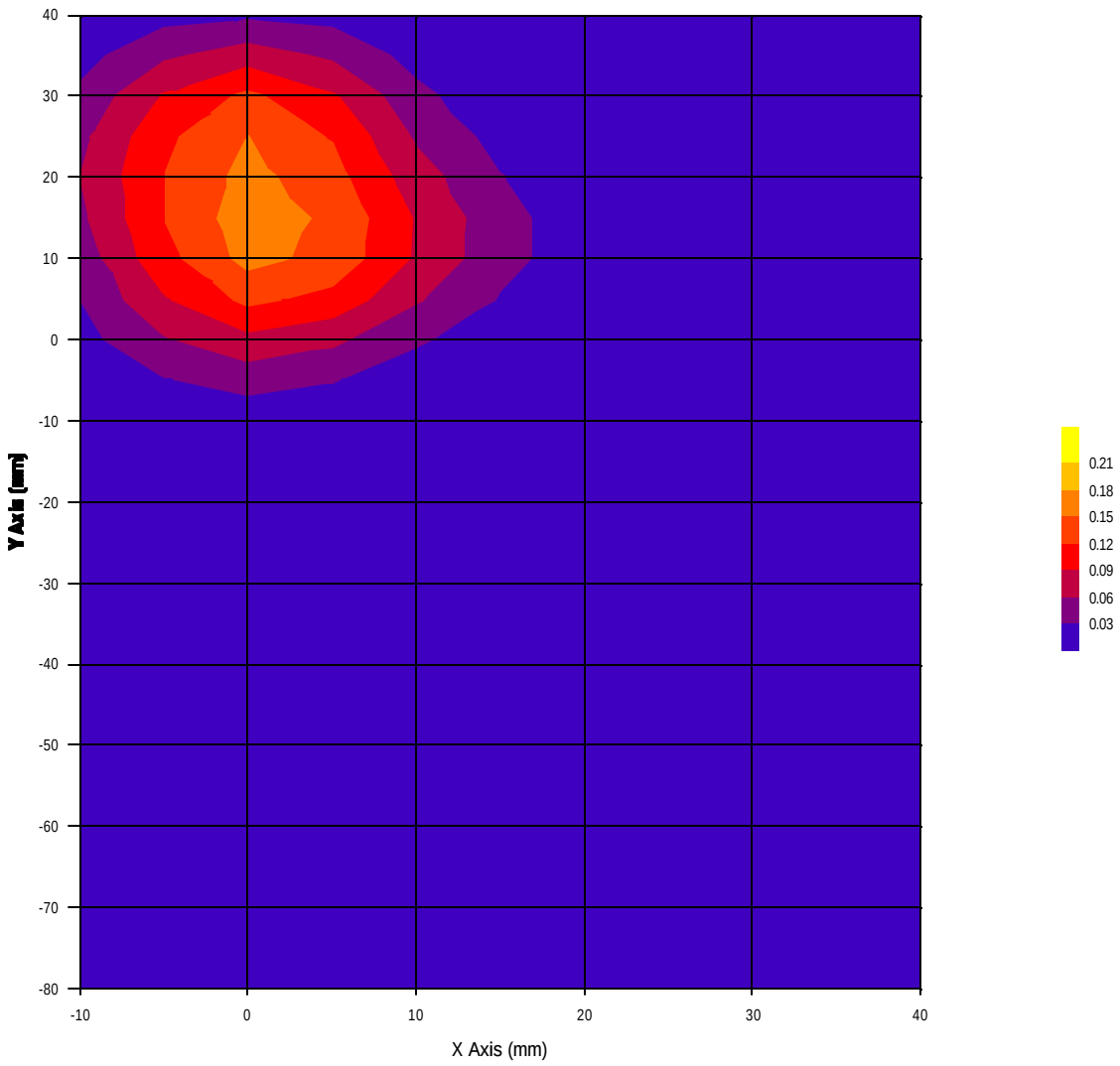
Measured Values (mV) :

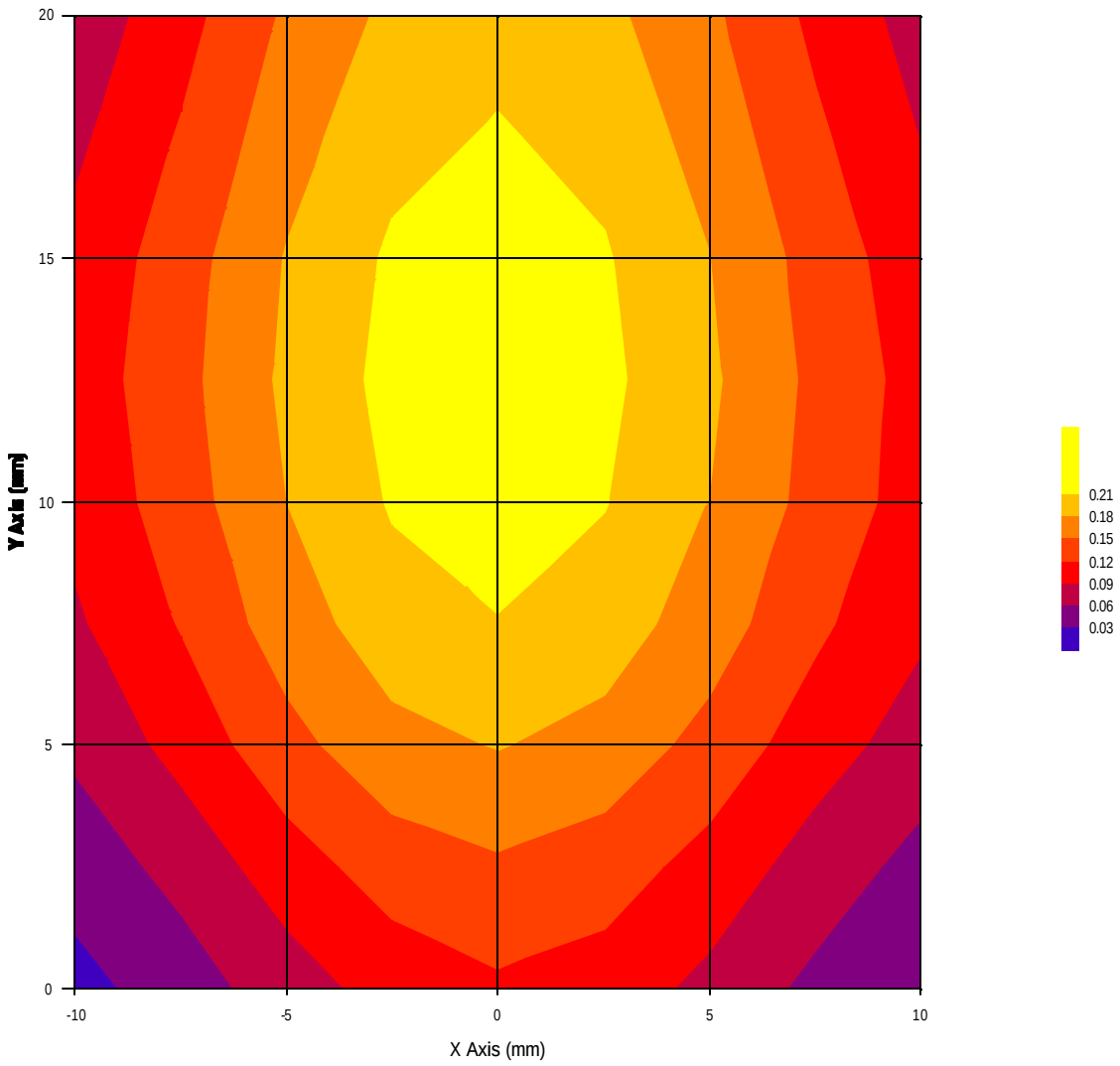
0.24	0.21	0.17	0.14	0.10	0.08
0.06	0.04	0.02	0.01	0.00	

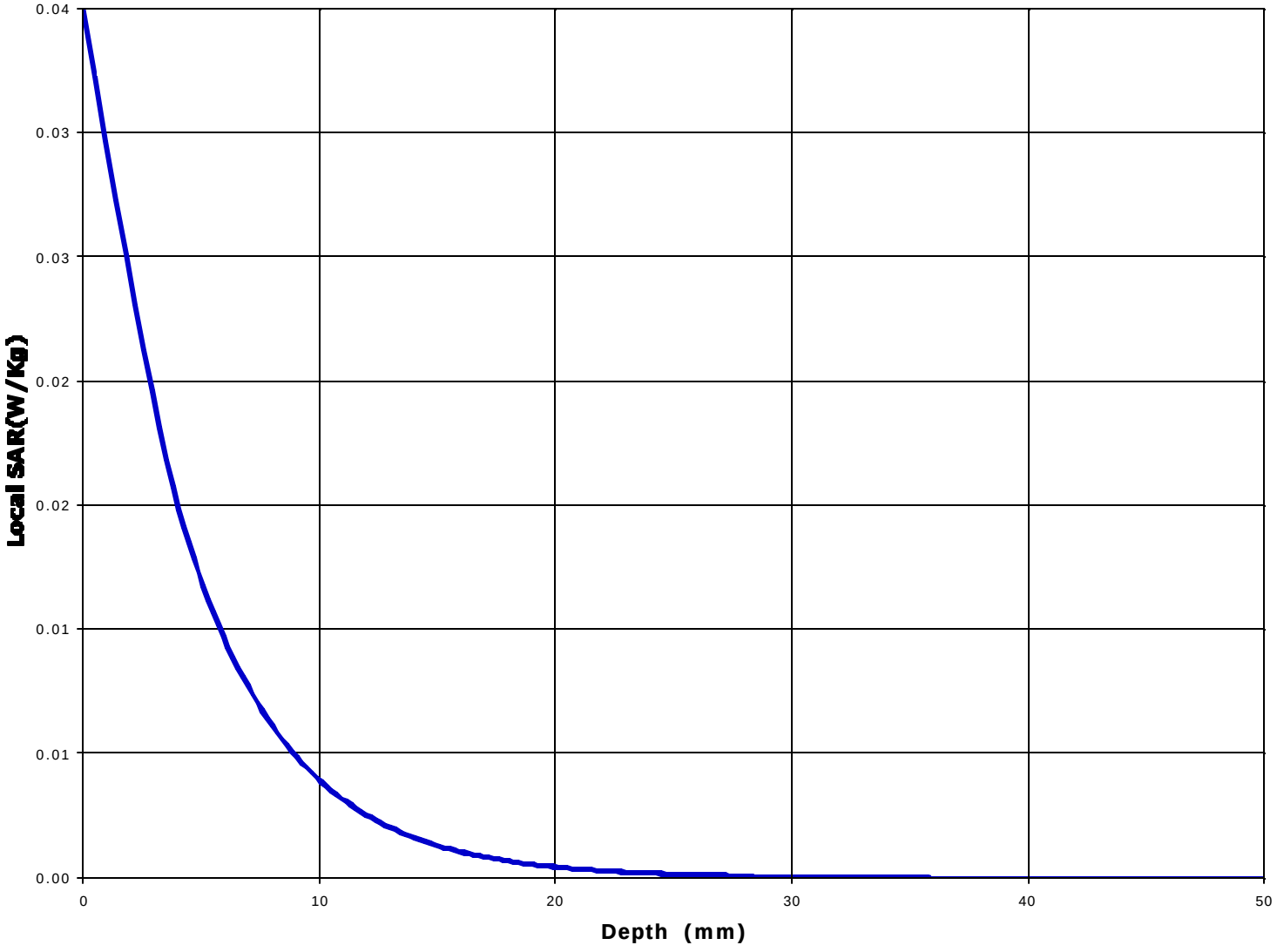
Peak Voltage (mV) : 0.49 **1 Cm Voltage (mV)** : 0.05 **SAR (W/Kg)** : 0.01

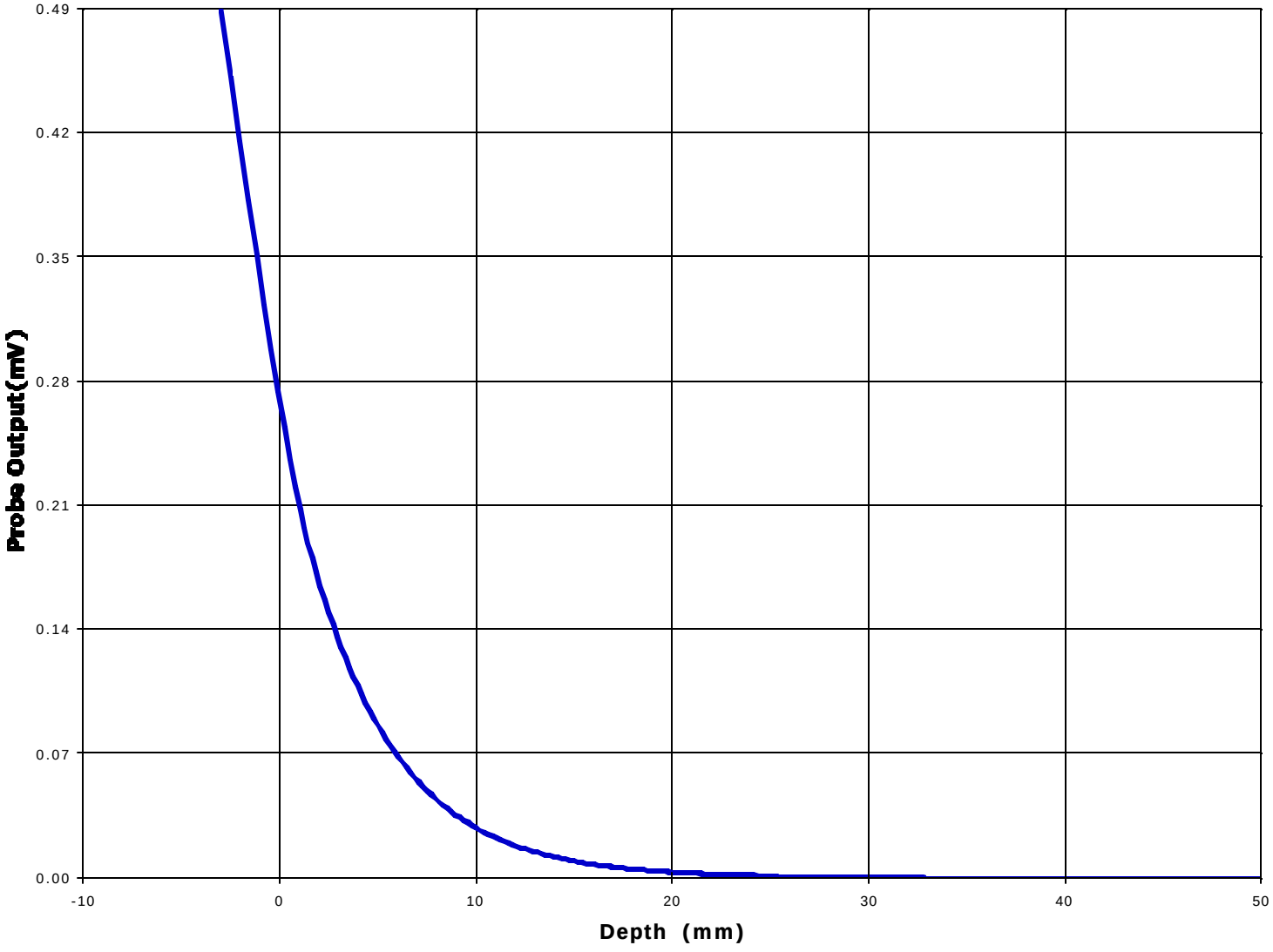

0.21
0.18
0.15
0.12
0.09
0.06
0.03


0.21
0.18
0.15
0.12
0.09
0.06
0.03


40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Y Axis (mm)
-10
0
10
20
30
40
X Axis (mm)
0.21
0.18
0.15
0.12
0.09
0.06
0.03


20
15
10
5
0
Y Axis (mm)
-10
-5
0
5
10
X Axis (mm)
0.21
0.18
0.15
0.12
0.09
0.06
0.03


0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
Local SAR(W/Kg)
0
10
20
30
40
50
Depth (mm)


0.49
0.42
0.35
0.28
0.21
0.14
0.07
0.00
Probe Output(mV)
-10
0
10
20
30
40
50
Depth (mm)

ANNEX C: 926.25 MHz SAR MEASUREMENT

Test Information

Date : 7/11/00
Time : 3:04:39 PM

Product	: Cordless Phone	**Test**	: SAR
Manufacturer	: Panasonic	**Frequency (MHz)**	: 926
Model Number	: KX-TD7895	**Nominal Output Power (W)**	: 0.1
Serial Number	: Pre Production	**Antenna Type**	: Helix
FCC ID Number	: ACJ96NKX-TD7895	**Signal**	: Spread Spectrum

Phantom	: Head - Left Ear	**Dielectric Constant**	: 46.6
Simulated Tissue	: Brain	**Conductivity**	: 0.79

Probe	: E	**Antenna Position**	: FIX
Probe Offset (mm)	: 3.00		
Sensor Factor (mV)	: 10.8		
Conversion Factor	: 0.66		
Calibrated Date	: 3/24/99		

Amplifier Setting :

Channel 1 : .00416 Channel 2 : .00401 Channel 3 : .00313

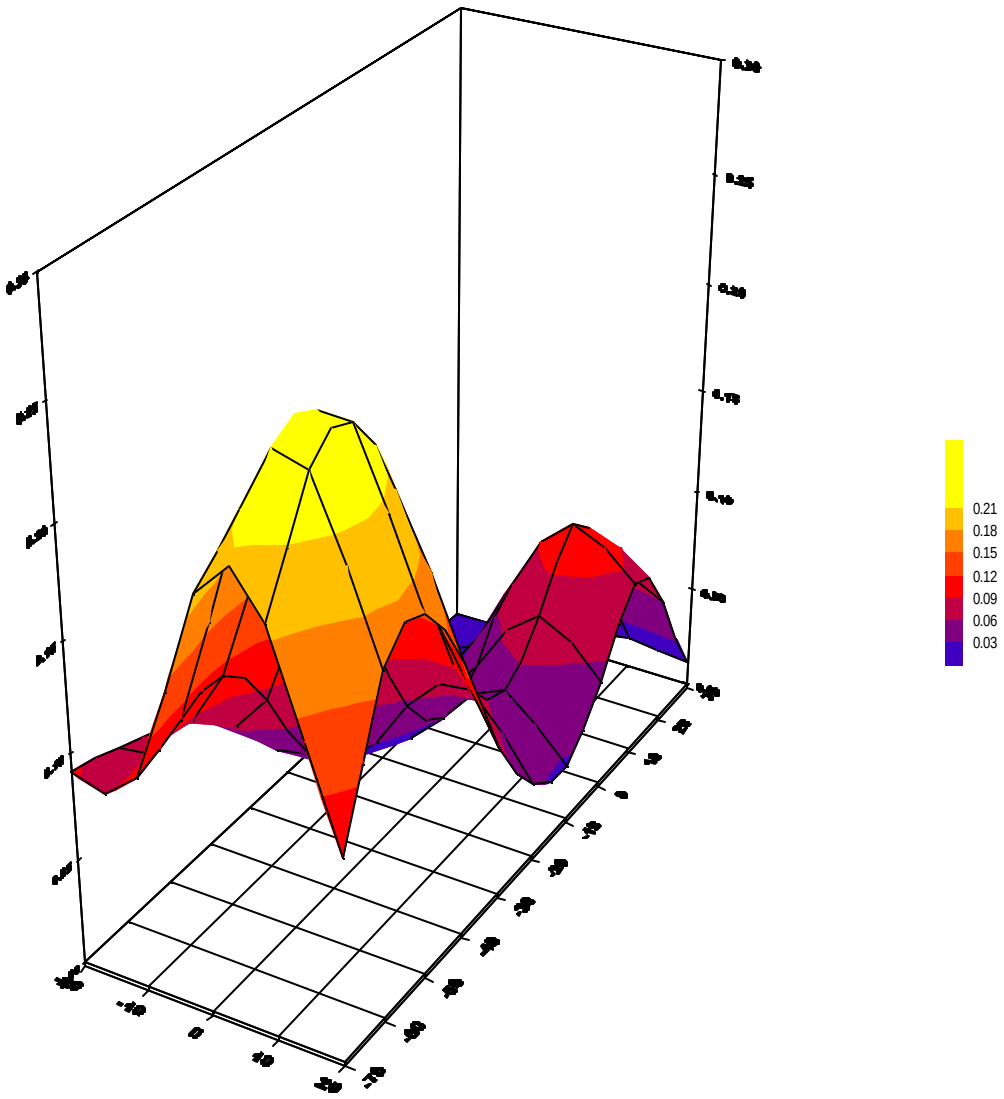
Location of Maximum Field :

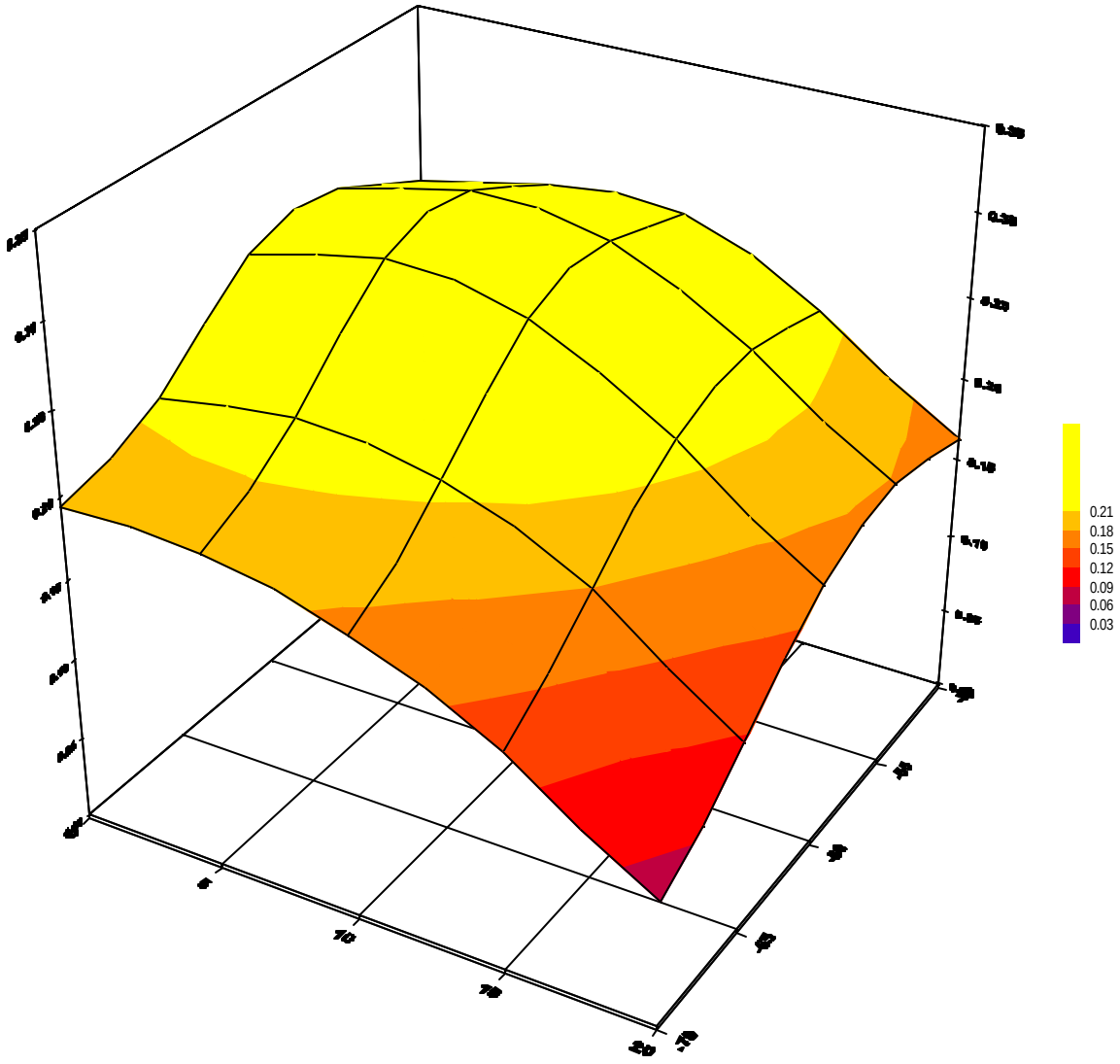
X = 5 Y = -55

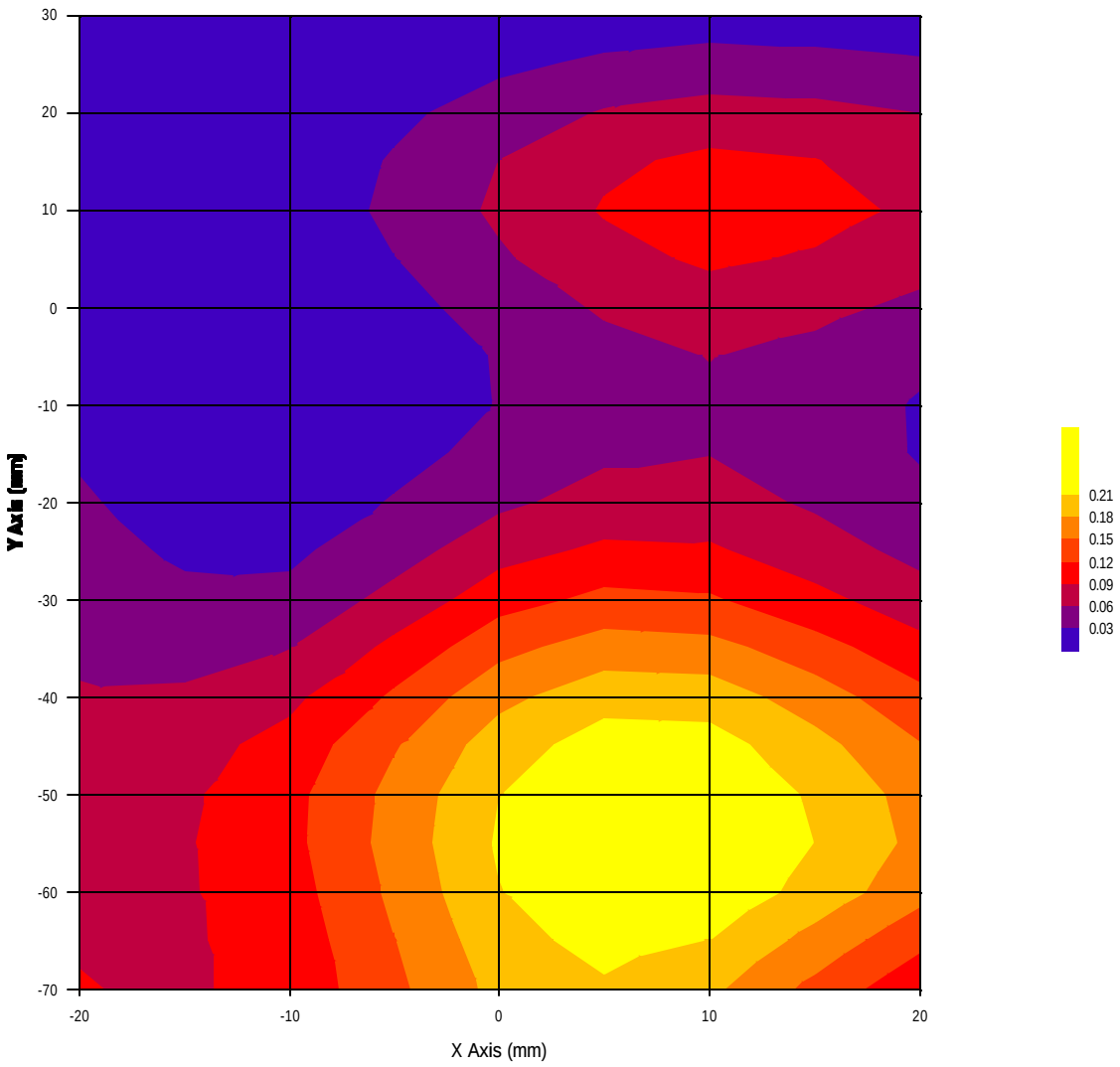
Measured Values (mV) :

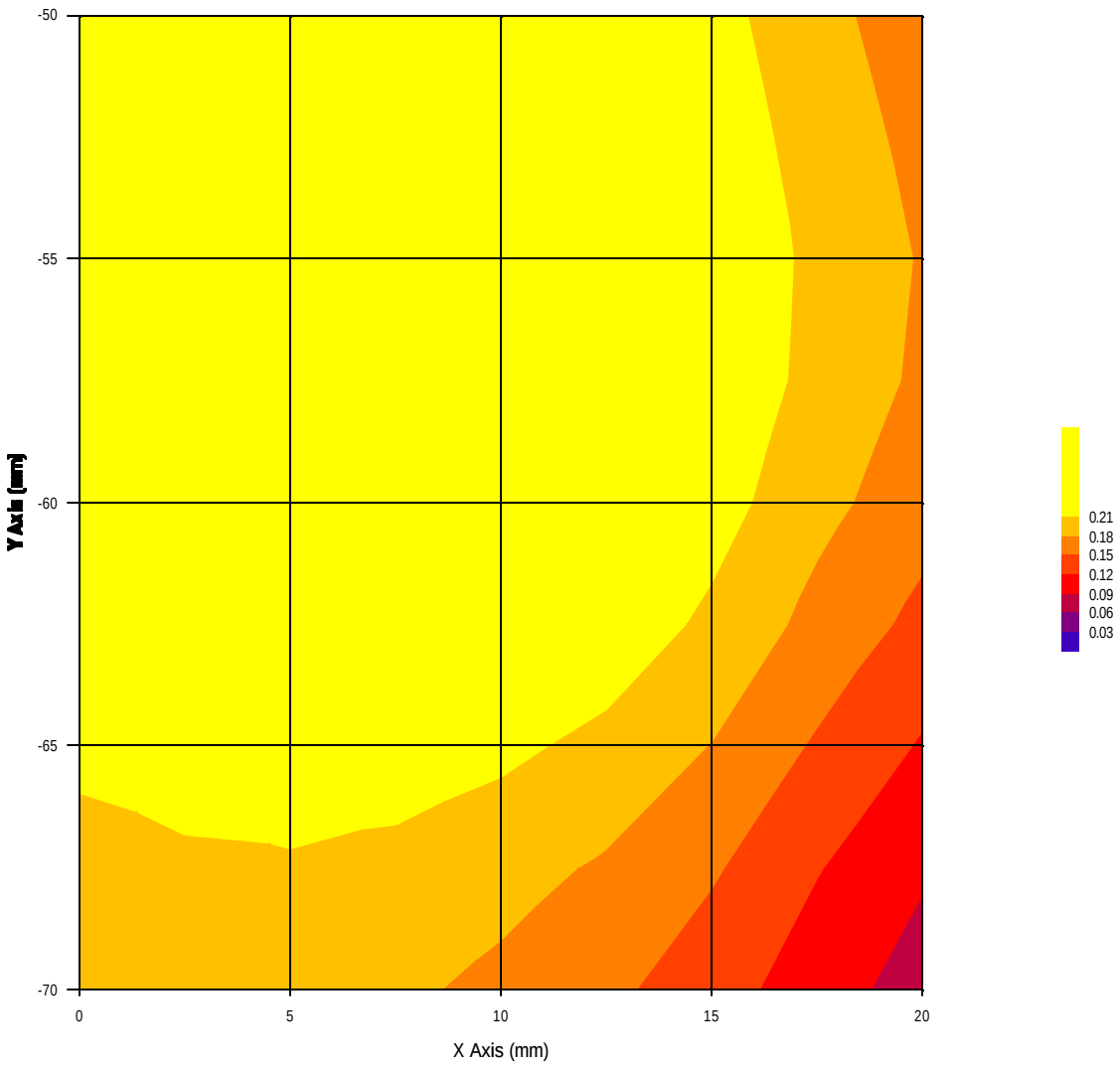
0.26	0.24	0.21	0.19	0.18	0.16
0.15	0.14	0.13	0.12	0.11	

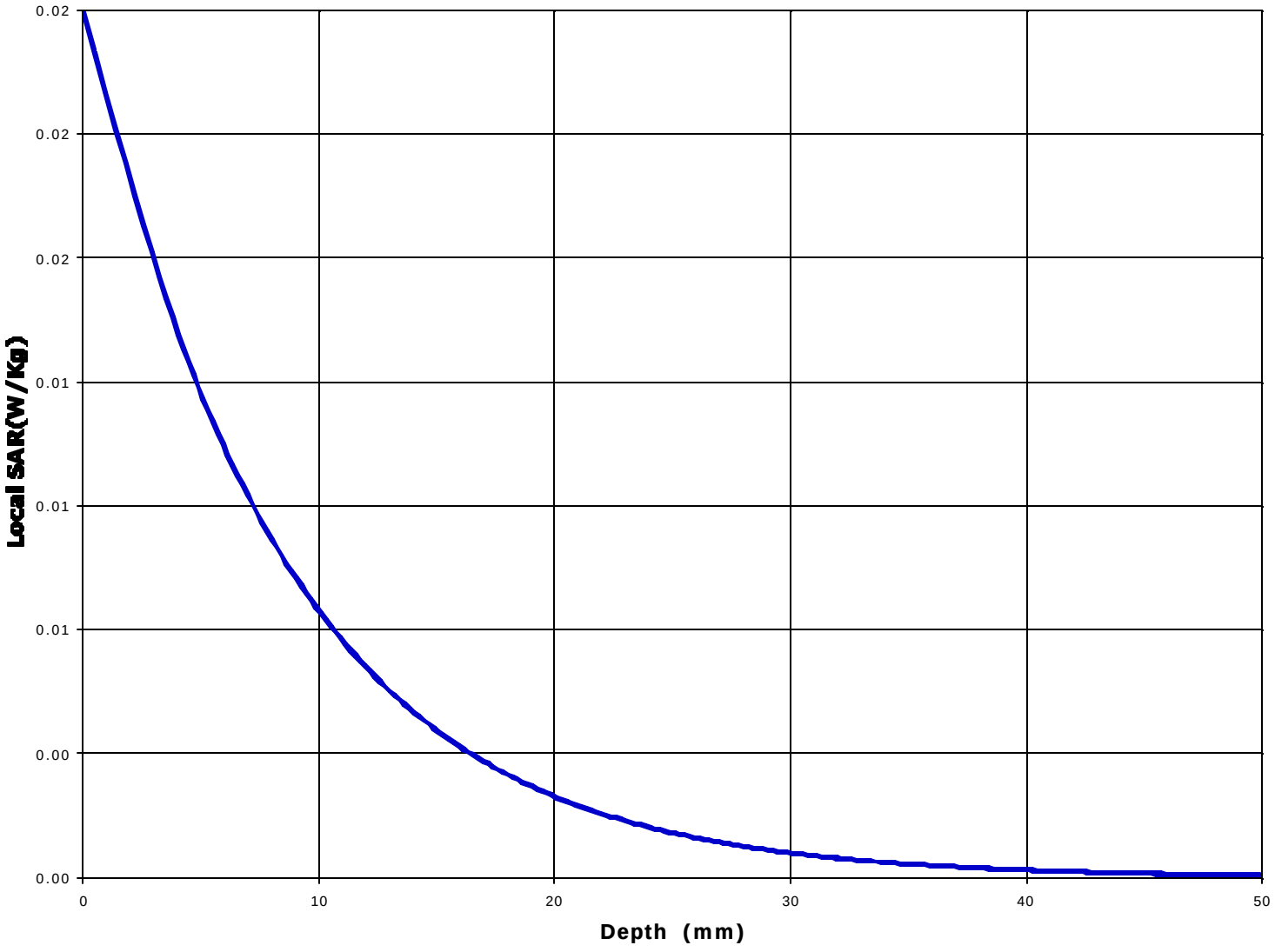
Peak Voltage (mV) : 0.38 **1 Cm Voltage (mV)** : 0.12 **SAR (W/Kg)** : 0.01

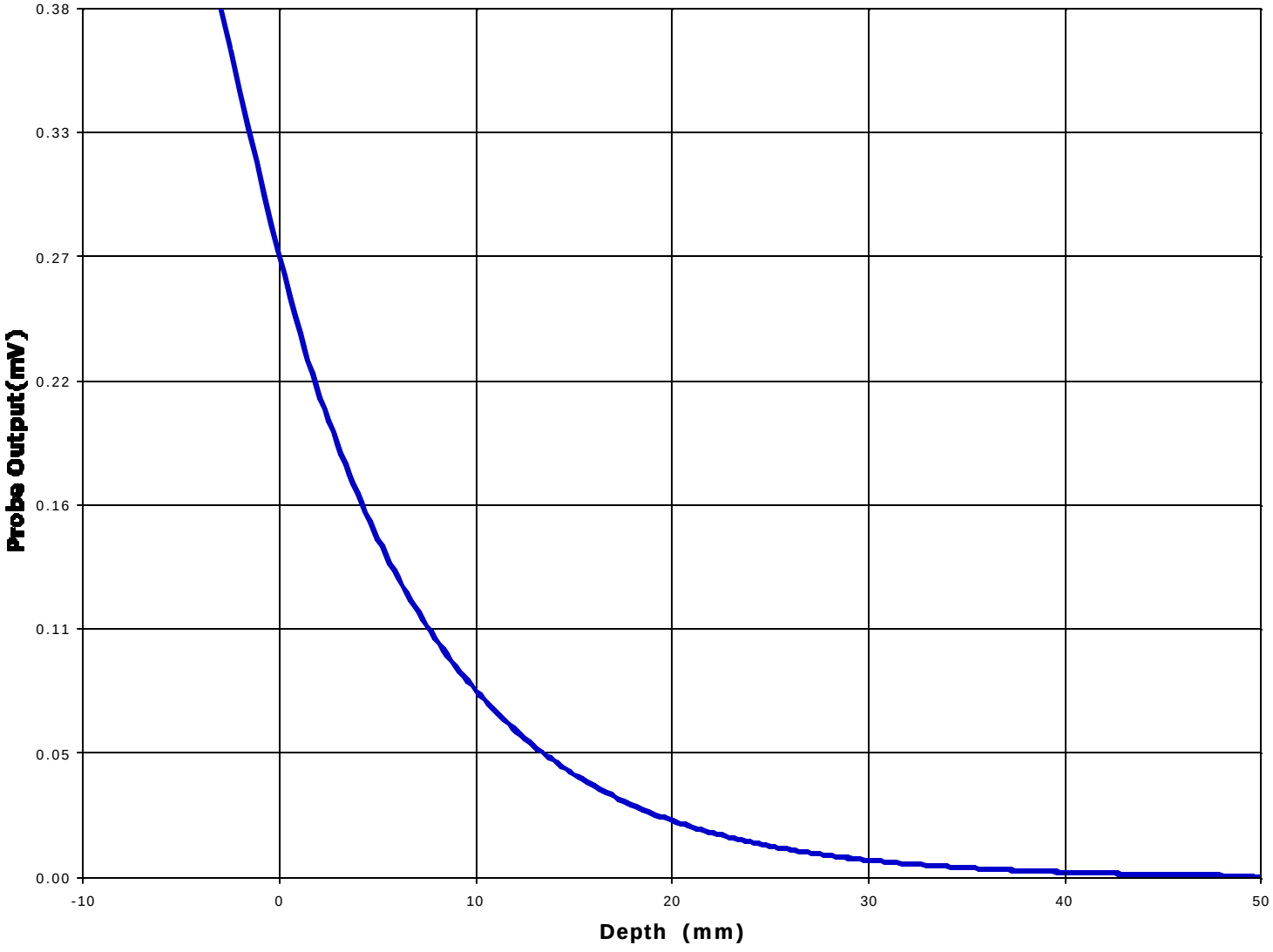

0.21
0.18
0.15
0.12
0.09
0.06
0.03


0.21
0.18
0.15
0.12
0.09
0.06
0.03


30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Y Axis (mm)
-20
-10
0
10
20
X Axis (mm)
0.21
0.18
0.15
0.12
0.09
0.06
0.03


-50
-55
-60
-65
-70
Y Axis (mm)
0
5
10
15
20
X Axis (mm)
0.21
0.18
0.15
0.12
0.09
0.06
0.03


0.02
0.02
0.02
0.01
0.01
0.01
0.00
0.00
Local SAR(W/Kg)
0
10
20
30
40
50
Depth (mm)


0.38
0.33
0.27
0.22
0.16
0.11
0.05
0.00
Probe Output(mV)
-10
0
10
20
30
40
50
Depth (mm)

Test Information

Date : 7/12/00
Time : 9:36:02 AM

Product	: Cordless Phone	**Test**	: SAR
Manufacturer	: Panasonic	**Frequency (MHz)**	: 926
Model Number	: KX-TD7895	**Nominal Output Power (W)**	: 0.1
Serial Number	: Pre Production	**Antenna Type**	: Helix
FCC ID Number	: ACJ96NKX-TD7895	**Signal**	: Spread Spectrum

Phantom	: Waist	**Dielectric Constant**	: 54.9
Simulated Tissue	: Muscle	**Conductivity**	: 1.02

Probe	: E	**Antenna Position**	: FIX
Probe Offset (mm)	: 3.00		
Sensor Factor (mV)	: 10.8		
Conversion Factor	: 0.77		
Calibrated Date	: 3/24/99		

Amplifier Setting :

Channel 1 : .00416 Channel 2 : .00401 Channel 3 : .00313

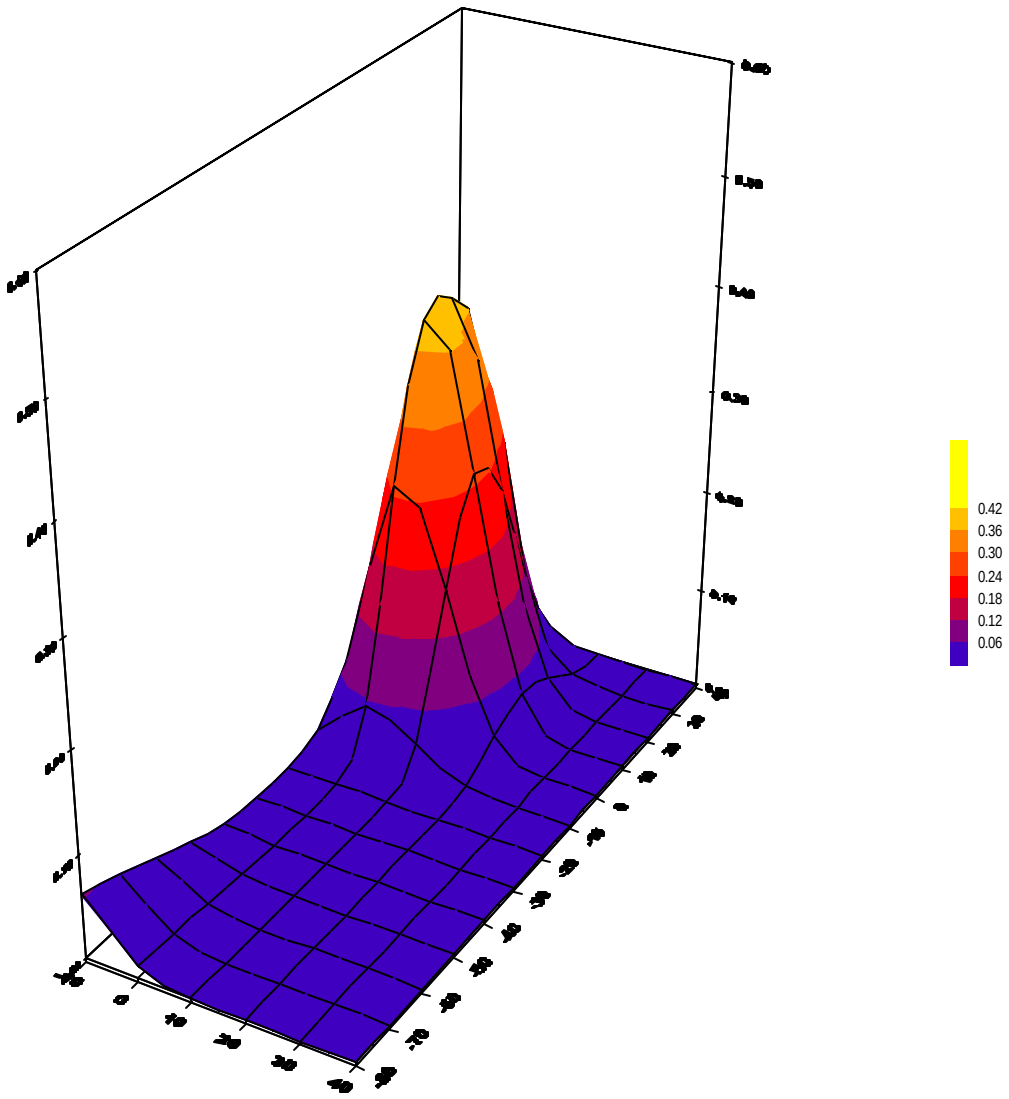
Location of Maximum Field :

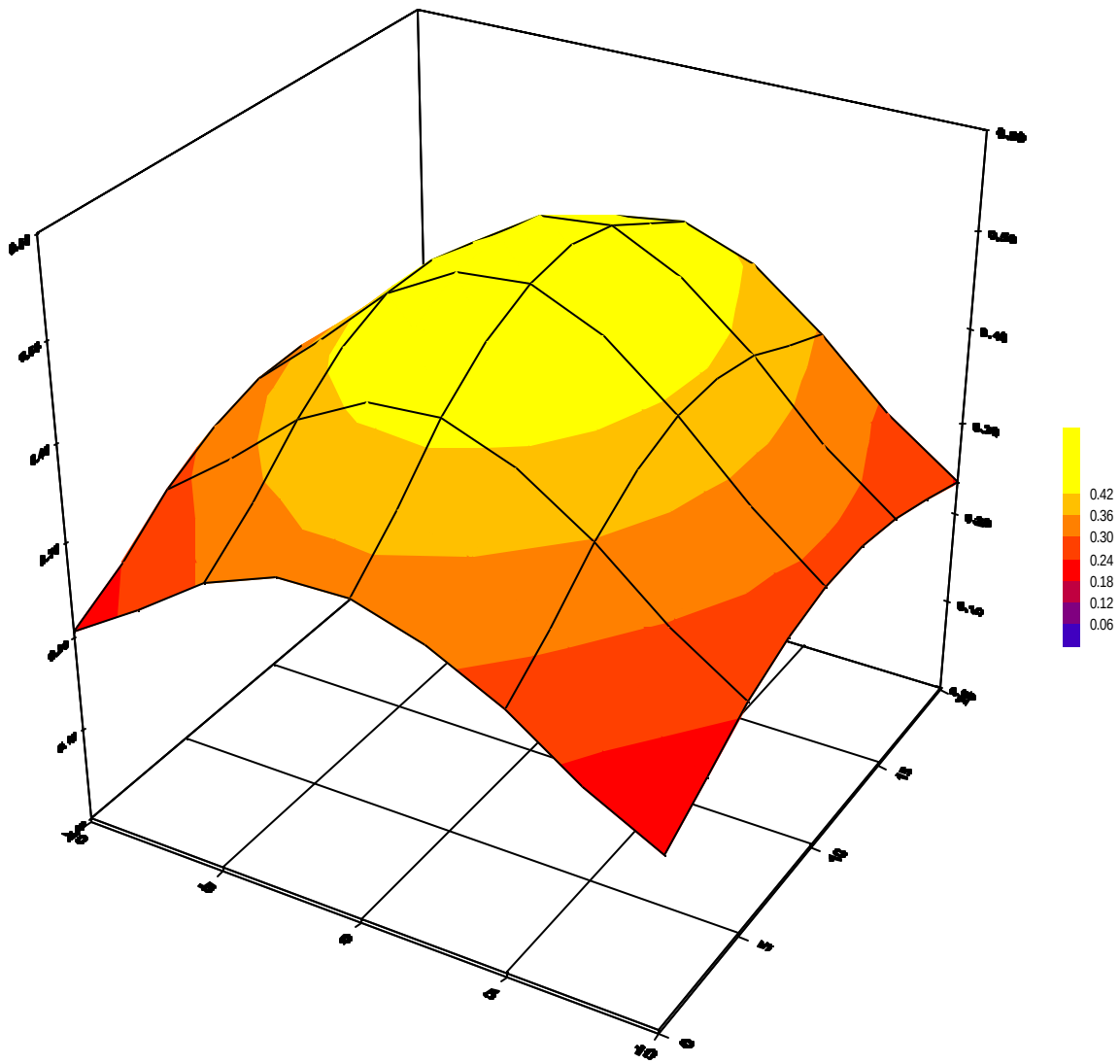
X = 0 Y = 15

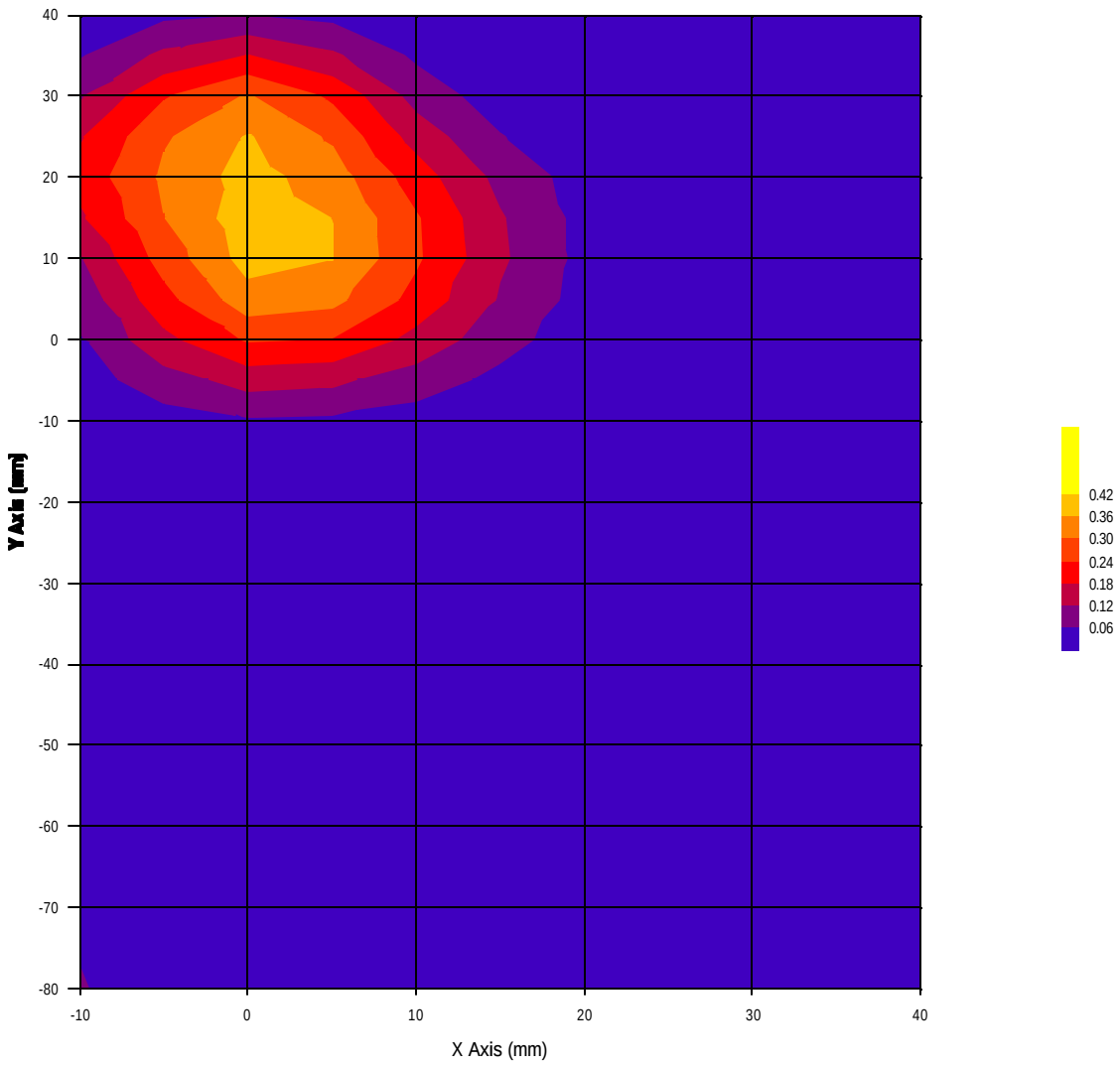
Measured Values (mV) :

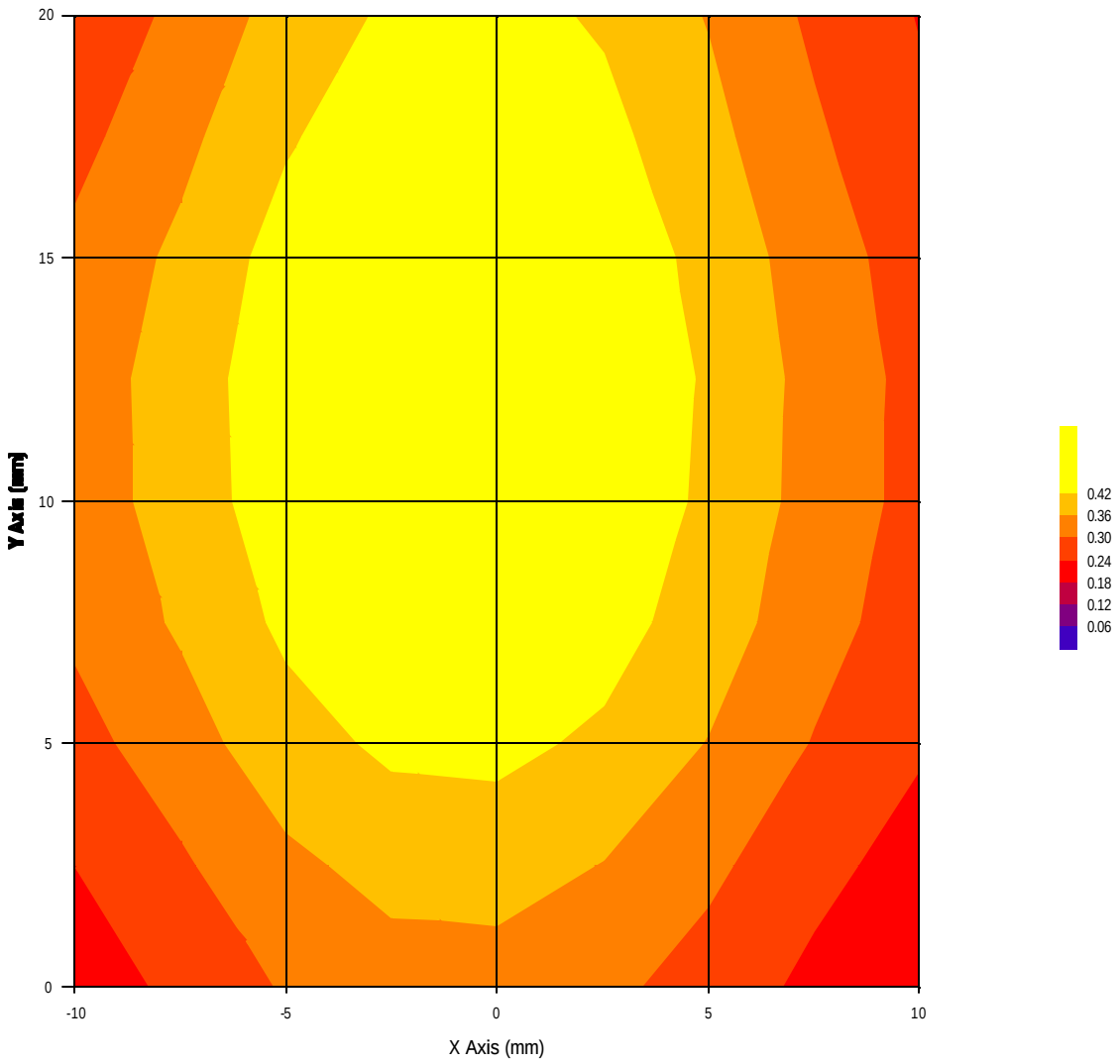
0.53	0.46	0.39	0.34	0.29	0.25
0.22	0.18	0.16	0.13	0.10	

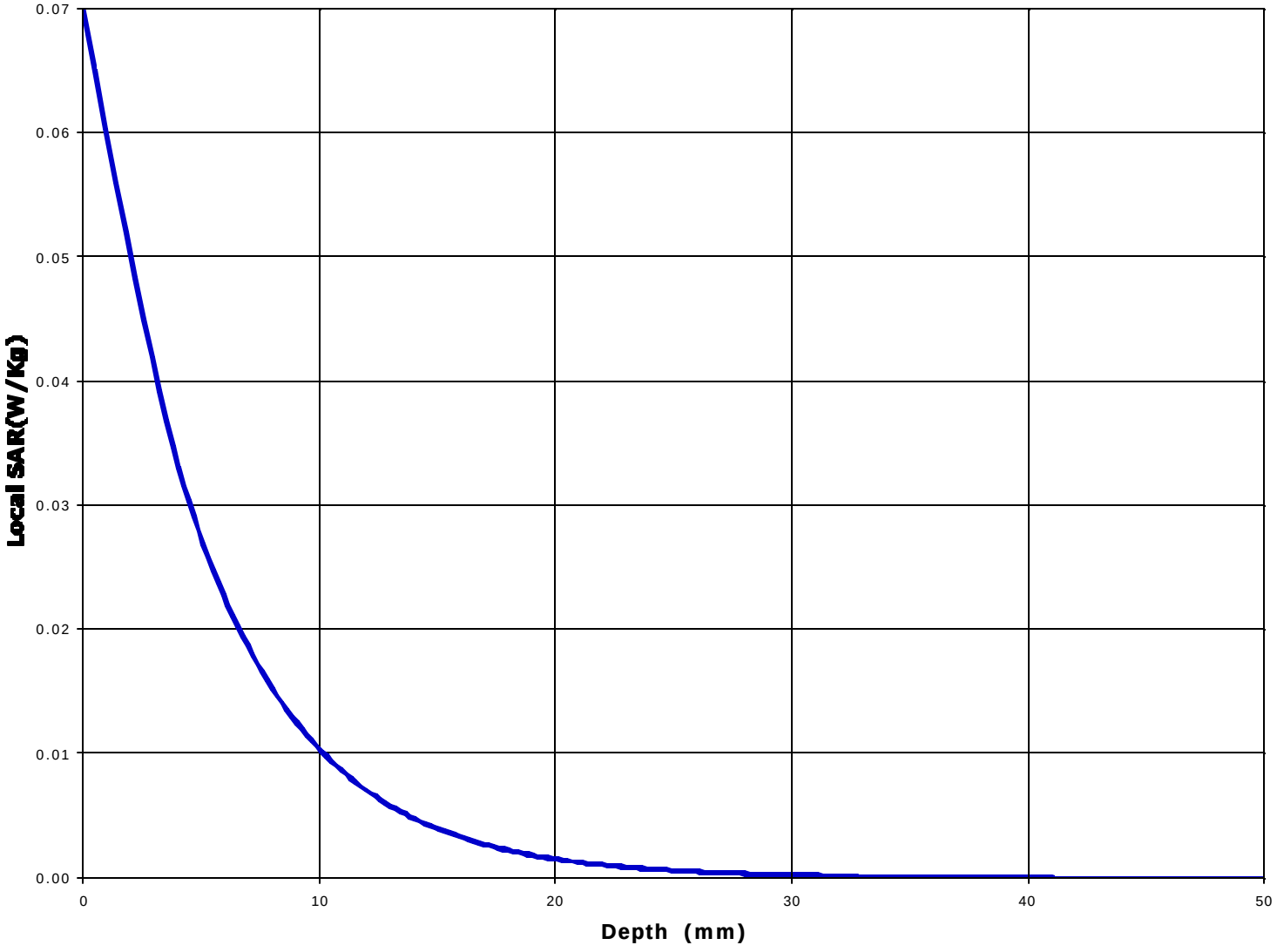
Peak Voltage (mV) : 0.98 **1 Cm Voltage (mV)** : 0.14 **SAR (W/Kg)** : 0.03

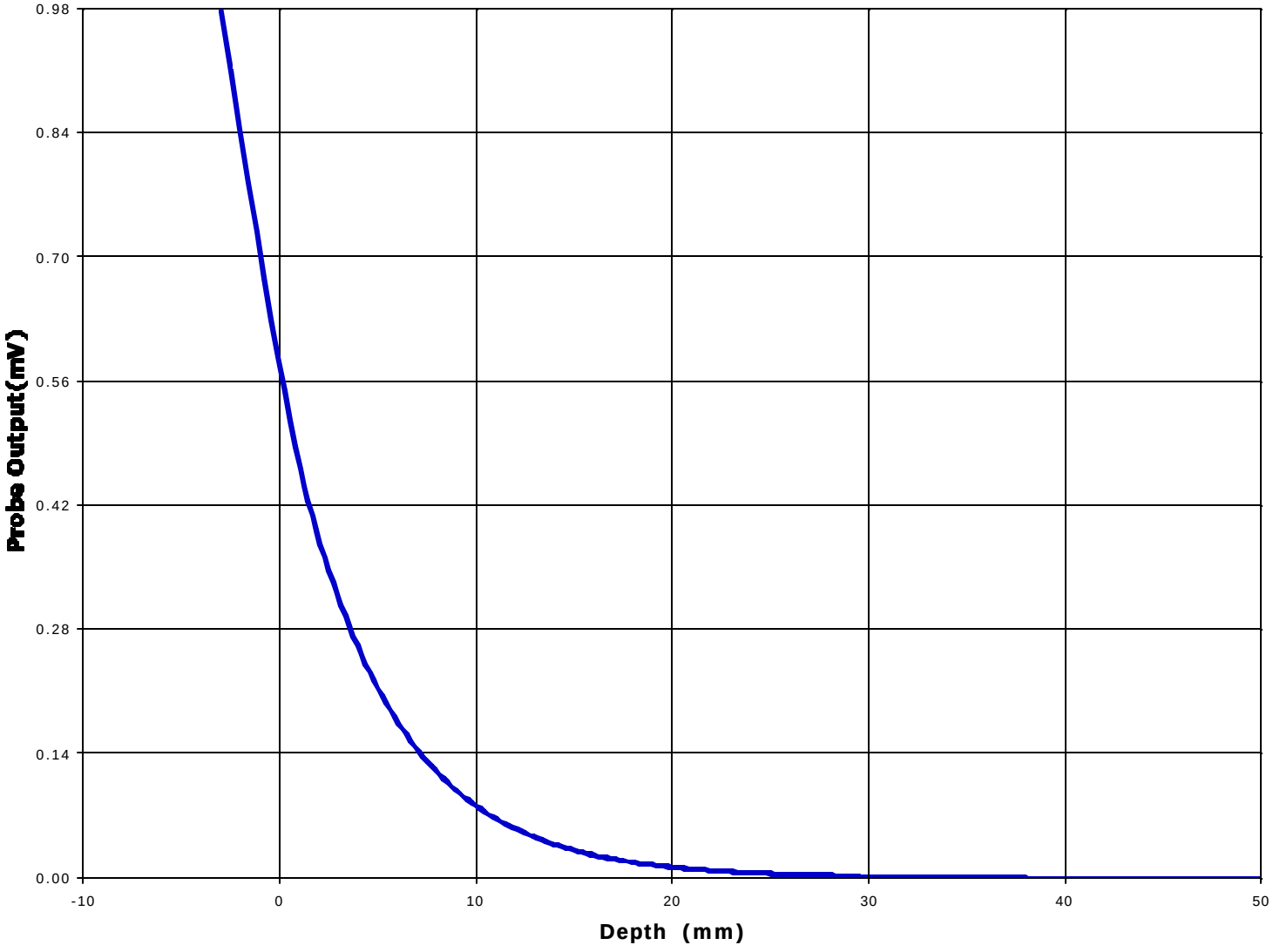

0.42
0.36
0.30
0.24
0.18
0.12
0.06


0.42
0.36
0.30
0.24
0.18
0.12
0.06


40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Y Axis (mm)
-10
0
10
20
30
40
X Axis (mm)
0.42
0.36
0.30
0.24
0.18
0.12
0.06


20
15
10
5
0
Y Axis (mm)
-10
-5
0
5
10
X Axis (mm)
0.42
0.36
0.30
0.24
0.18
0.12
0.06


0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Local SAR(W/Kg)
0
10
20
30
40
50
Depth (mm)


0.98
0.84
0.70
0.56
0.42
0.28
0.14
0.00
Probe Output(mV)
-10
0
10
20
30
40
50
Depth (mm)

ANNEX D: TISSUE CALIBRATION

Ultratech Lab.

Date: 7/4/00

Frequency: 915 MHz

Composition					
Tap Water(%)	DI Water(%)	Sugar(%)	Salt(%)	HEC(%)	Bactericide(%)
0.00	43.98	55.96	0.00	0.05	0.01

Mixture: Brain ('Brain' or 'Muscle')

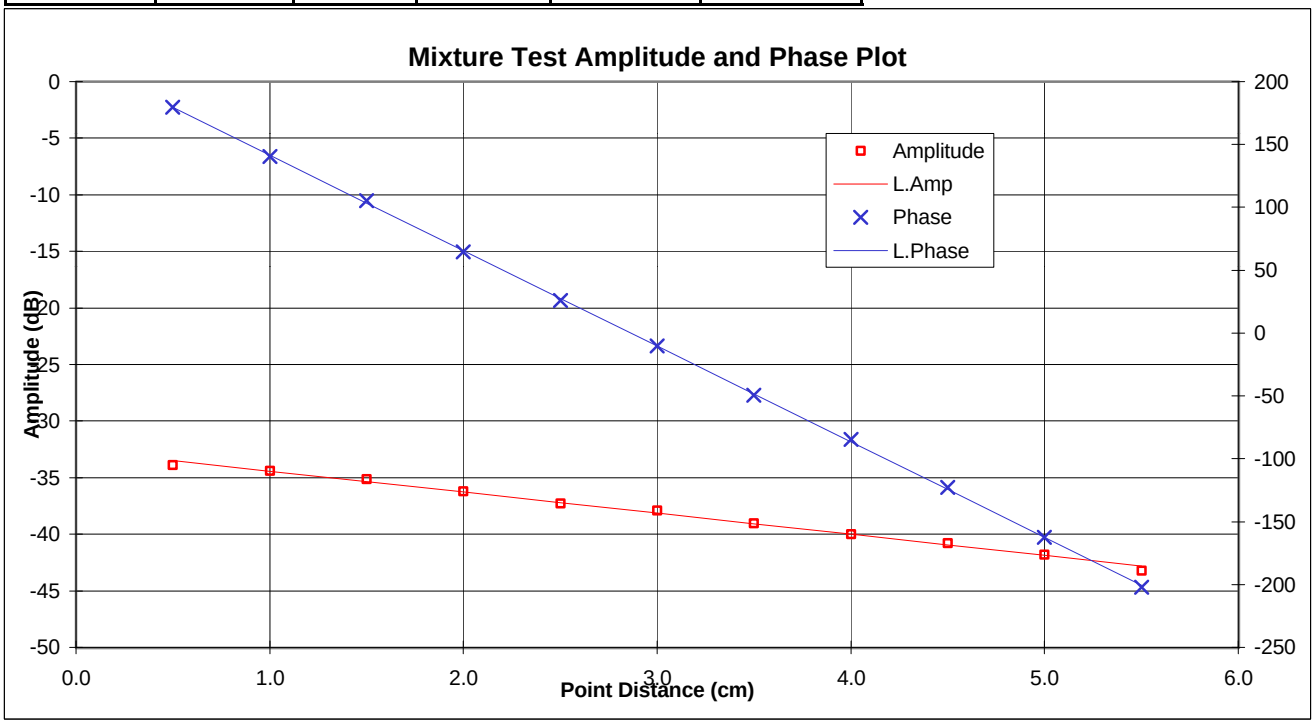
# of Points: 11 **Point Dist:** 0.5 cm. Room Tem 25

Point	Amplitude	Phase
1	-33.90	179.80
2	-34.40	140.30
3	-35.10	105.30
4	-36.20	64.70
5	-37.30	26.10
6	-37.90	-10.00
7	-39.00	-49.50
8	-40.00	-84.40
9	-40.80	-122.60
10	-41.80	-162.60
11	-43.20	157.60

-49.9	
-51.6	-1.863636364
-53.5	-32.55454545
-55.3	-76.00181818
-56.9	217.5236364

Omega:	5749114556	rad/sec
Epsilon 0:	8.85E-14	F/m
mu:	1.26E-08	H/m
alpha avg:	-0.214559065	Np/cm
beta avg:	-1.326481965	rad/cm

Results:		Target	Low Limit	High Limit	% Off Target
D. Const:	**46.6**	45.7	43.45795	48.032469	1.84
Cond:	**0.79**	0.77	0.733395	0.8105948	2.04



Ultratech Lab.

Date: 7/4/00

Frequency: 915 MHz

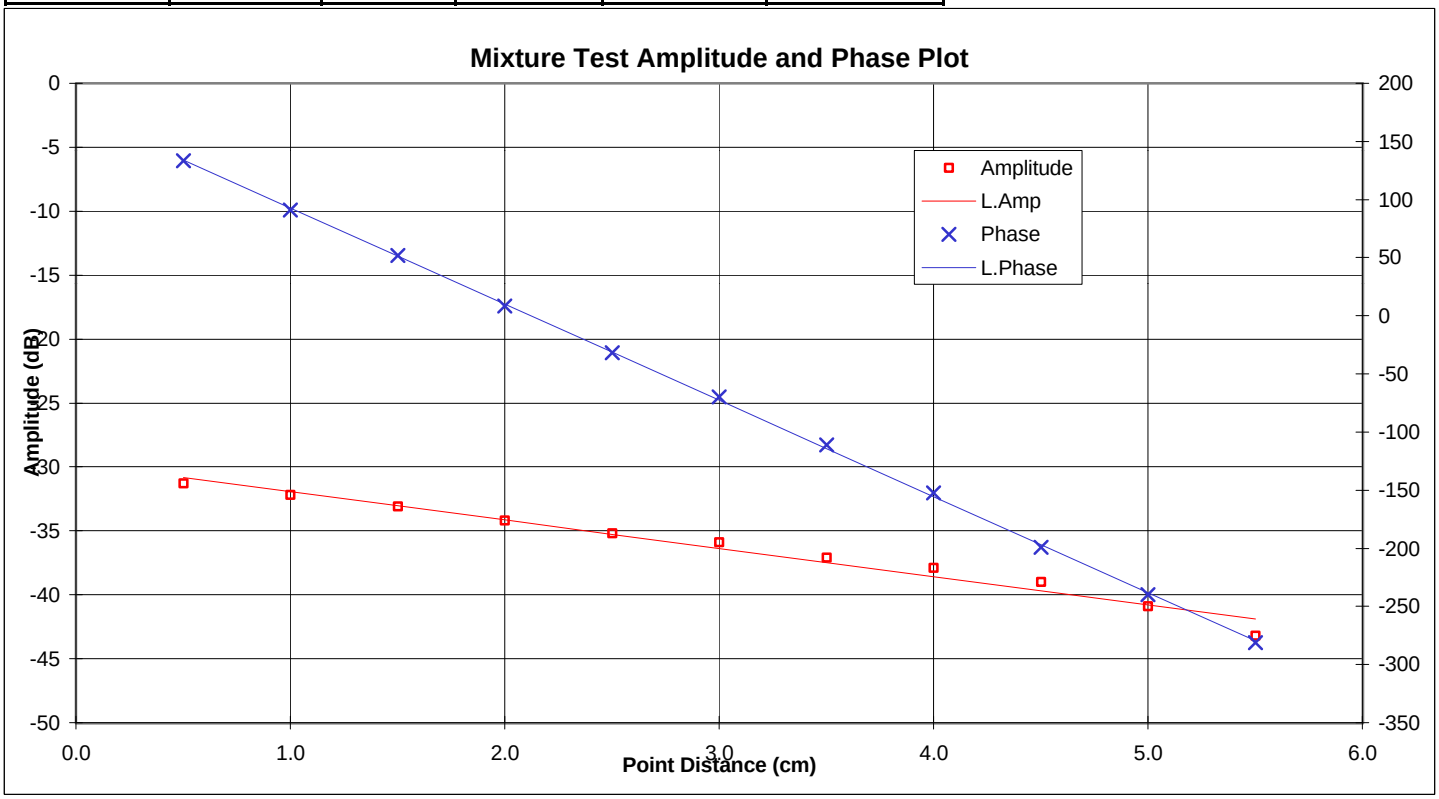
Composition					
Tap Water(%)	DI Water(%)	Sugar(%)	Salt(%)	HEC(%)	Bactericide(%)
0.00	53.34	45.80	0.80	0.05	0.01

Mixture: Muscle ('Brain' or 'Muscle')

# of Points: 11 **Point Dist:** 0.5 cm. Room Temp 25

Point	Amplitude	Phase
1	-31.30	133.40
2	-32.20	90.90
3	-33.10	51.80
4	-34.20	8.30
5	-35.20	-31.60
6	-35.90	-69.60
7	-37.10	-111.30
8	-37.90	-152.20
9	-39.00	160.90
10	-40.90	119.90
11	-43.20	78.80

-49.9	
-51.6	-2.205454545
-53.5	-29.74727273
-55.3	-82.73454545
-56.9	175.4127273

Omega:	5749114556	rad/sec
Epsilon 0:	8.85E-14	F/m
mu:	1.26E-08	H/m
alpha avg:	-0.253912338	Np/cm
beta avg:	-1.443990223	rad/cm

Results:		**Target**	**Low Limit**	**High Limit**	**% Off Target**
D. Const:	**54.9**	55.9	53.105	58.695	-1.72
Cond:	**1.02**	0.97	0.9215	1.0185	4.54