A. INTRODUCTION

The following data are submitted in connection with this request for type acceptance of the MX-1009 transceiver in accordance with Part 2, Subpart J of the FCC Rules.

The MX-1009 is a hand-held portable, dual-mode, analog/CDMA transmitter/receiver combination intended for cellular land mobile applications in the 824-849 MHz and 869-894 MHz bands. It is configured for portable applications. Rated ERP output power is 0.56 W.

NOTE: SAR data is included as Appendix 9.

B. GENERAL INFORMATION REQUIRED FOR TYPE ACCEPTANCE (Paragraph 2.983 of the Rules)

1. Name of applicant: Maxon America, Inc.

2. Identification of equipment: FCC ID: F3JMX1009.

   a. The equipment identification label is shown in Appendix 1.
   b. Photographs of the equipment are included in Appendix 2.

3. Quantity production is planned.
4. Technical description:

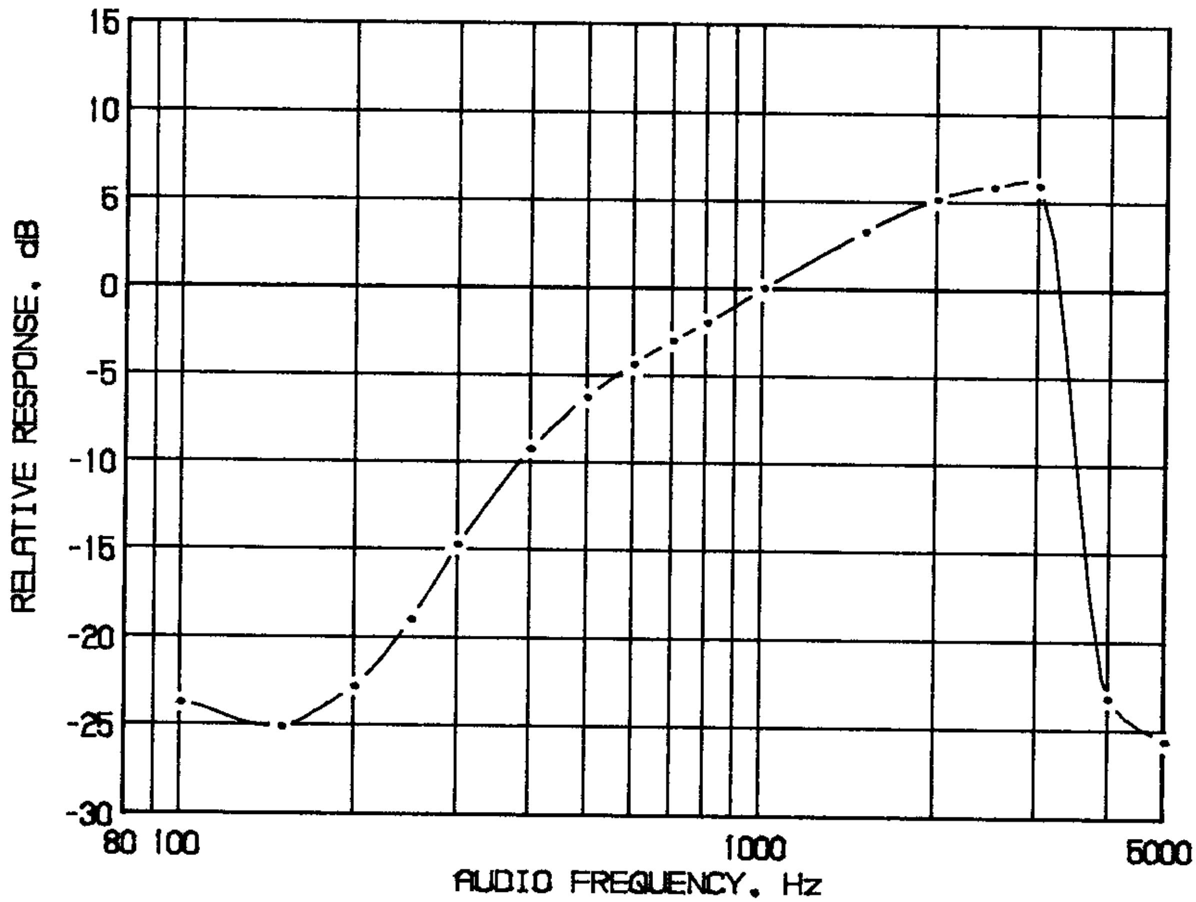
   a. 40K0F8W, 40K0F1D and 1M31F9W emissions
   b. Frequency range: 869-894 MHz (Receiver)
824-849 MHz (Transmitter)
   c. Operating power of the transmitter is dynamically set to one of six power levels via cellular base station command. The ERP levels range from 6 mW to 0.56 W in approximate 4 dB steps.

   d. Maximum power permitted under Part 22.904 of the FCC rules is 7 watts effective radiated power and the MX-1009 fully complied with the power limitation.
   e. The dc voltage and dc currents at final amplifier: 3.4 V @ 780 mA (MAC 010).
   f. Function of each active semiconductor device: See Appendix 3.
   g. Complete circuit diagram is included in Appendix 4
   h. A draft instruction book is submitted as Appendix 5.
   i. The transmitter tune-up procedure is included in Appendix 6.
   j. A description of circuits for stabilizing frequency is included in Appendix 7.
   k. A description of circuits and devices employed for suppression of spurious radiation and for limiting modulation is included in Appendix 8.

5. Data for 2.985 through 2.997 follow this section B.

FIGURE 1

MODULATION FREQUENCY RESPONSE

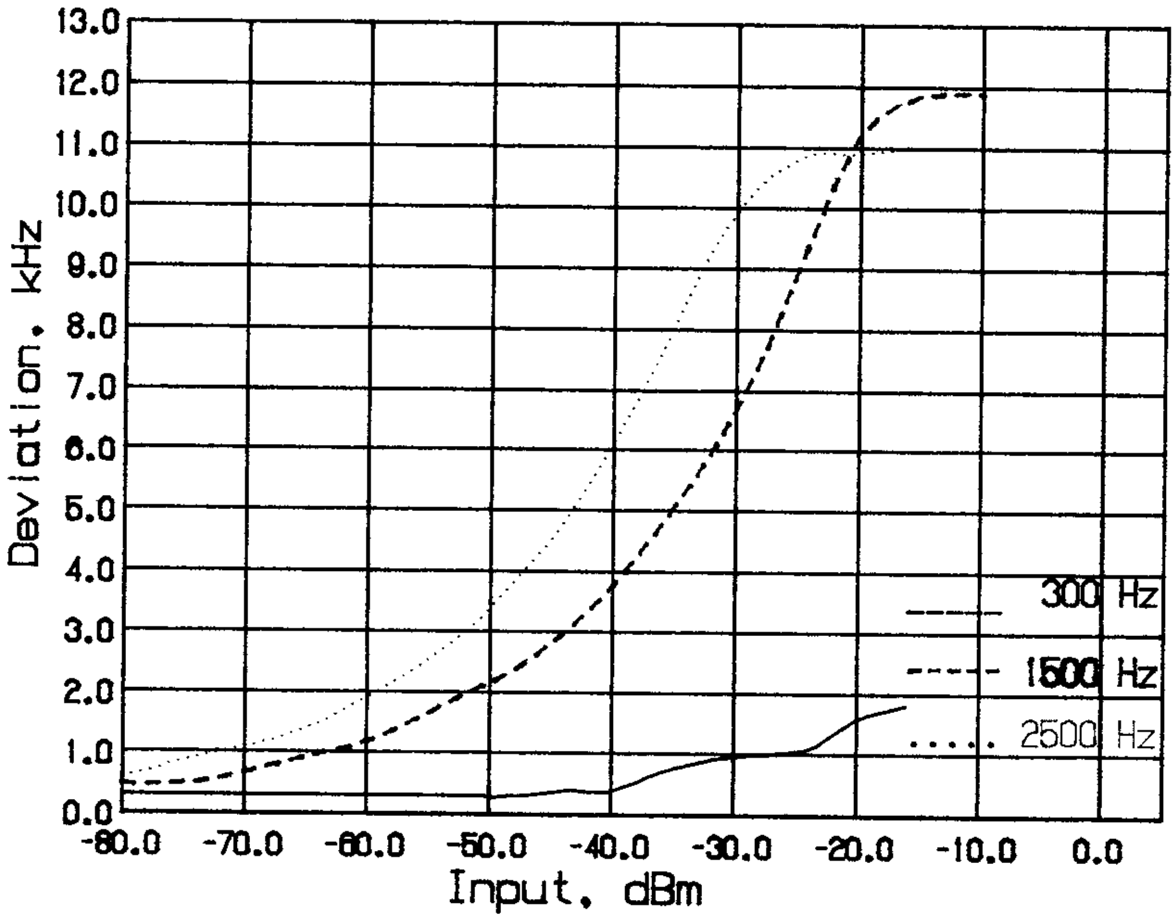


MODULATION FREQUENCY RESPONSE
FCC ID: F3JMX1009

FIGURE 1

FIGURE 2

AUDIO LIMITER CHARACTERISTICS

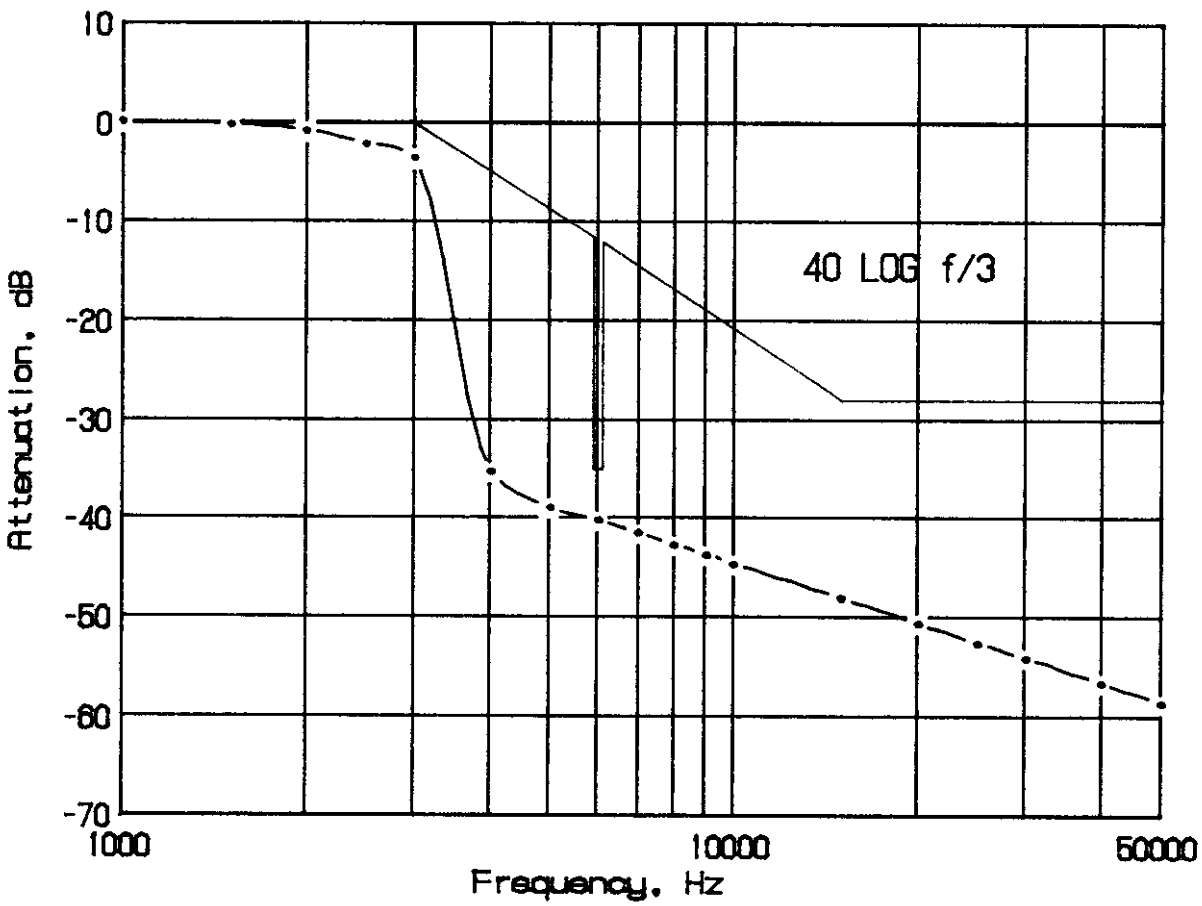


AUDIO LIMITER CHARACTERISTICS
FCC ID: F3JMX1009

FIGURE 2

FIGURE 3

AUDIO LOW PASS FILTER RESPONSE



AUDIO LOW PASS FILTER RESPONSE
FCC ID: F3JMX1009

FIGURE 3

F. OCCUPIED BANDWIDTH (Paragraph 2.989 of the Rules)

The reference level of each following plot was the unmodulated transmitter carrier.

Figure 4A is a plot of the sideband envelope of the transmitter taken with a Advantest R3361A spectrum analyzer. Modulation corresponded to conditions of 2.989(c)(1) and consisted of 2500 Hz tone at an input level 16 dB greater than that necessary to produce 50% modulation at 2675 Hz, the frequency of maximum response. **Measured deviation under these conditions was 10.8 kHz.** The plot shows the emissions within the limits imposed by Paragraph 22.907 for voice F3 modulation. The horizontal scale, frequency, is 10kHz per division and the vertical scale, amplitude, is a logarithmic presentation equal to 10dB per division.

Figure 4B is a plot of the sideband envelope of the transmitter internally modulated with a DTMF tone pair, digit "9", the worst case. **Deviation under this condition was 10.1 kHz.** The photograph shows the emissions within the limits imposed by Paragraph 22.907 for DTMF F3 modulation. The horizontal scale, frequency, is 10 kHz per division and the vertical scale, amplitude, is a logarithmic presentation equal to 10dB per division.

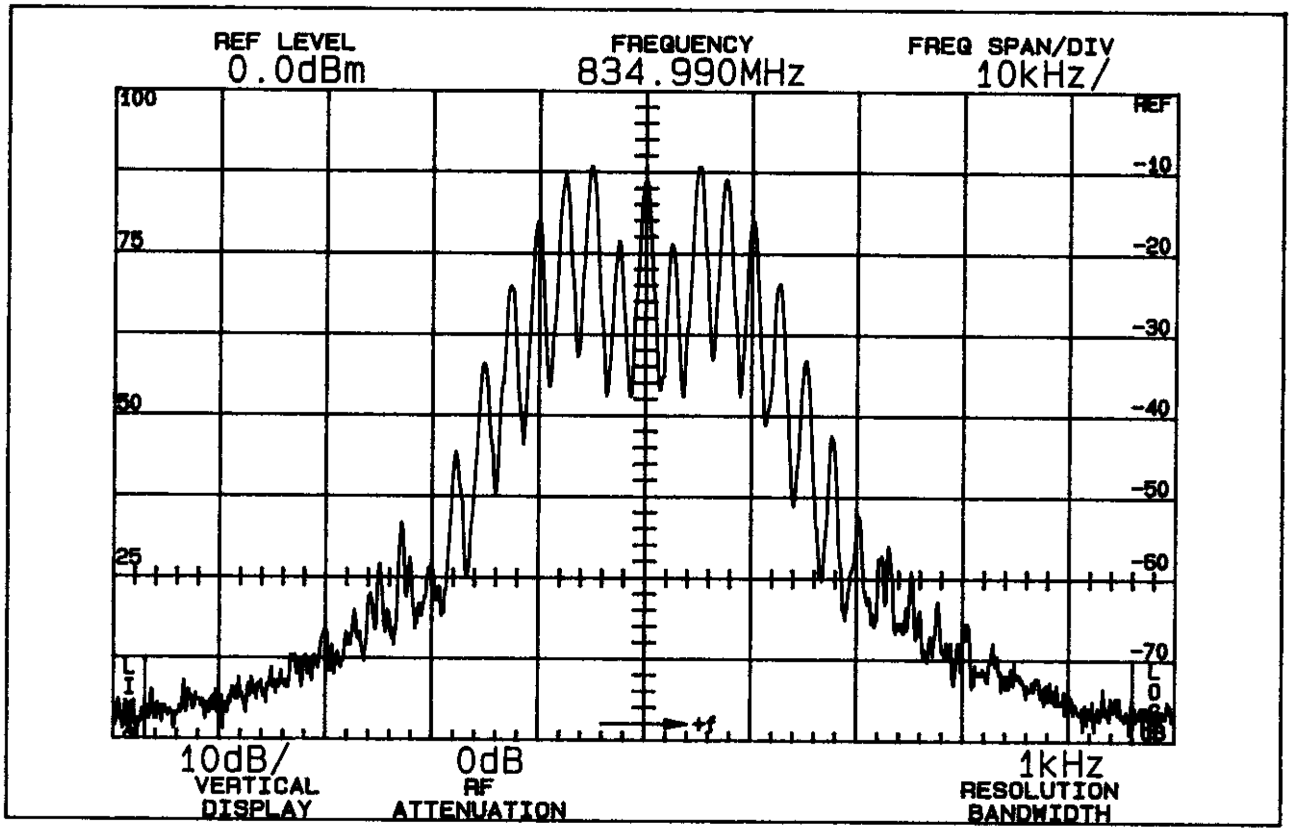
Figure 4C is a plot of the sideband envelope of the transmitter internally modulated with the signaling tone, ST. **Deviation under this condition was 8.0 kHz.** The plot shows the emissions within the limits imposed by Paragraph 22.907 for ST modulation. The horizontal scale, frequency, is 20 kHz per division and the vertical scale, amplitude, is a logarithmic presentation equal to 10dB per division.

Figure 4D is a plot of the sideband envelope of the transmitter internally modulated with the supervisory audio tone, SAT. **Deviation under this condition was 2.0 kHz.** The plot shows the emissions within the limits imposed by Paragraph 22.907 for SAT modulation. The horizontal scale, frequency, is 10 kHz per division and the vertical scale, amplitude, is a logarithmic presentation equal to 10dB per division.

Figure 4E is a plot of the sideband envelope of the transmitter internally modulated with wideband data. **Measured deviation under this condition was 8.6 kHz.** The modulation for the test was a pseudo-random sequence. The plot shows the emissions within the limits imposed by Paragraph 22.907 for wideband data modulation. The horizontal scale, frequency, is 10 kHz per division and the vertical scale, amplitude, is a logarithmic presentation equal to 10dB per division.

A:\MAXTDA.OBM

FIGURE 4A

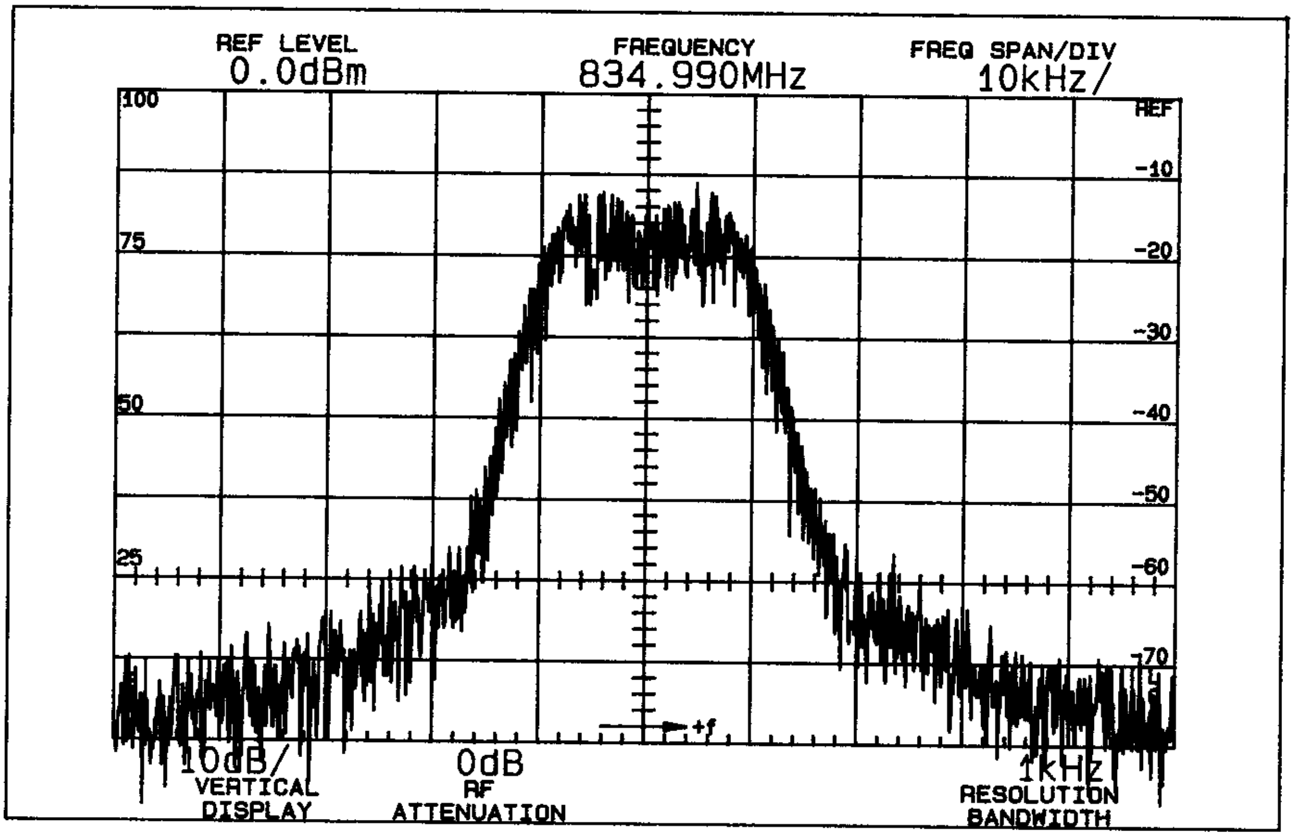


	Attenuation in dB Below Mean Output Power Required
On any frequency removed from the carrier frequency by greater than 20 kHz up to and including 45 kHz	26
On any frequency removed from the carrier frequency by greater than 45 kHz	43+10LogP=41 (P=0.56W)

OCCUPIED BANDWIDTH - 2500 Hz
FCC ID: F3JMX1009

FIGURE 4A

FIGURE 4B



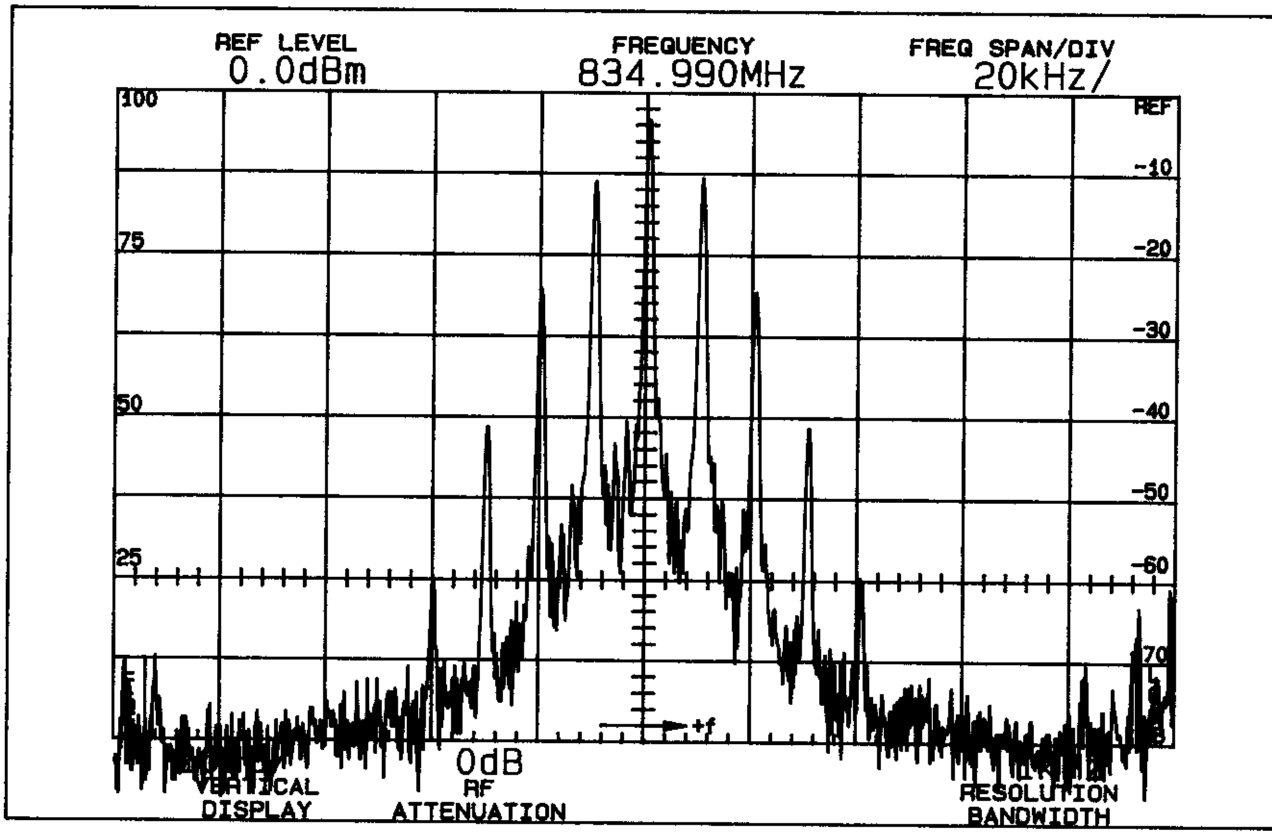
	Attenuation in dB Below Mean Output Power Required
On any frequency removed from the carrier frequency by greater than 20 kHz up to and including 45 kHz	26
On any frequency removed from the carrier frequency by greater than 45 kHz	43+10LogP=41 (P=0.56W)

OCCUPIED BANDWIDTH - DTMF
FCC ID: F3JMX1009

FIGURE 4B

A:\MAXODO.OBW

FIGURE 4C



	Attenuation in dB Below Mean Output Power Required
On any frequency removed from the carrier frequency by greater than 20 kHz up to and including 45 kHz	26
On any frequency removed from the carrier frequency by greater than 45 kHz up to and including 90 kHz	45
On any frequency removed from the carrier frequency by more than 90 kHz up to $2f_c$	43+10LogP=41 (P=0.56W)

OCCUPIED BANDWIDTH - ST
FCC ID: F3JMX1009

FIGURE 4C

A:\MAXODD.OBH

FIGURE 4D

FCC ID: F3JMX1009

C. RF POWER OUTPUT (Paragraph 2.985(a) of the Rules)

RF power output at the antenna port* was measured with a HP 432/478A power meter/sensor and Narda 765-20 attenuator as a 50 ohm dummy load. (The transmitter was tuned by the factory according to the procedure in Appendix 4.) Maximum power of 0.47 watts was measured with a supply voltage 3.6 Vdc. The available power levels, listed by Mobile Attenuation Code, were measured per 2.985 and found to comply with the Mobile Station Power Class III schedule of OST 53 (July 83):

CDMA power, measured using a broadband power meter, was essentially the same as analog mode.

TABLE 1
RF POWER OUTPUT
Supply Voltage 3.6 Vdc

MAC	Conducted* RF Power Output watts	Conducted* RF Power Output dBW	OST 53 Limit Class III dBW (ERP)	Calc. [1] ERP dBW
000	N/A			
001	N/A			
010	0.473	- 3.2	- 2	- 2.5
011	0.207	- 6.8	- 6	- 6.1
100	0.086	-10.7	-10	- 9.9
101	0.037	-14.4	-14	-13.6
110	0.013	-18.8	-18	-18.1
111	0.005	-23.1	-22	-22.4

[1] Radiated power was calculated from the measured radiated field intensity (see TABLE 3, page 23) as follows:

$$P = \frac{(E*d)^2}{30*G}$$

where

P = power in watts

E = electric field in uV/m (from TABLE 3)

d = distance in meters

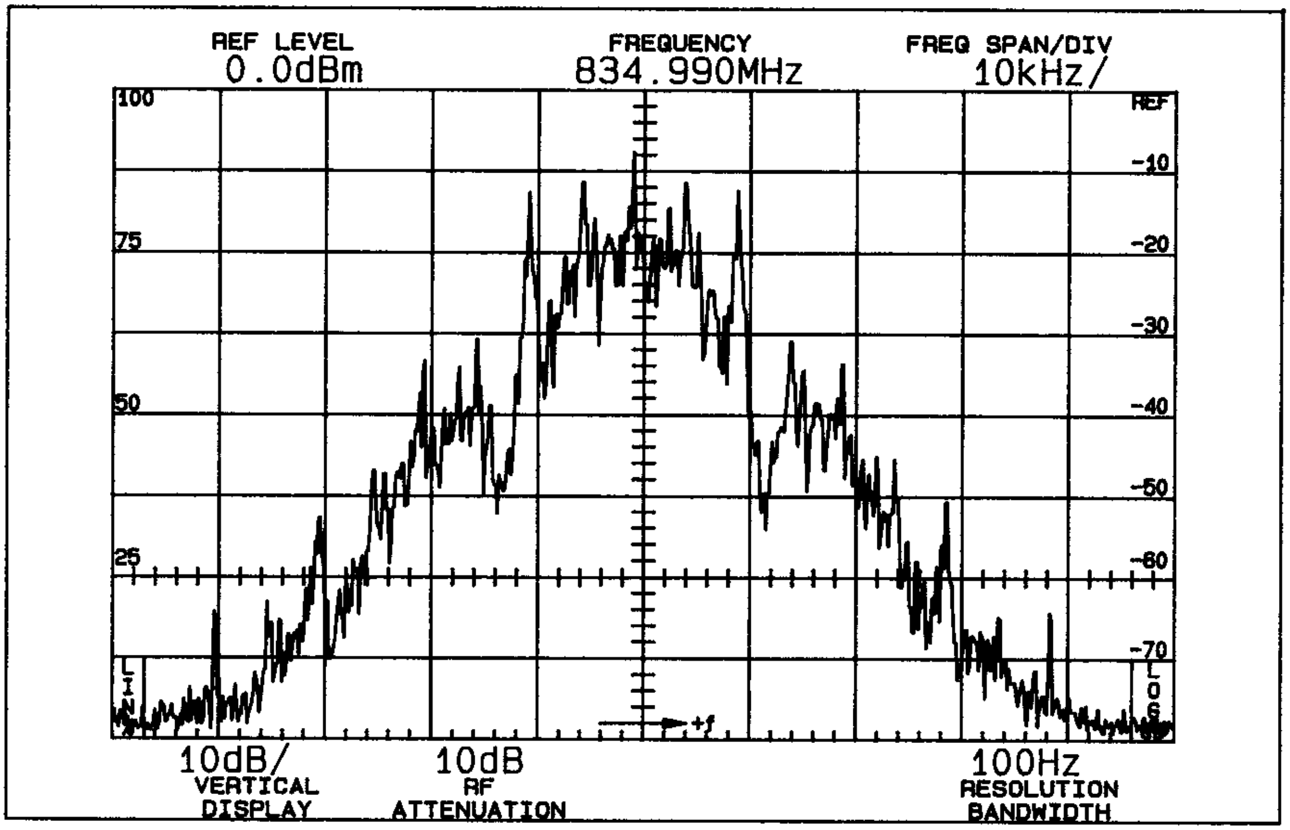
G = gain of antenna over an isotropic radiator

$$P = \frac{(1.927*3)^2}{30*2}$$

$$= 0.56 \text{ watts}$$

A:\MAXOCC.OBW

FIGURE 4E



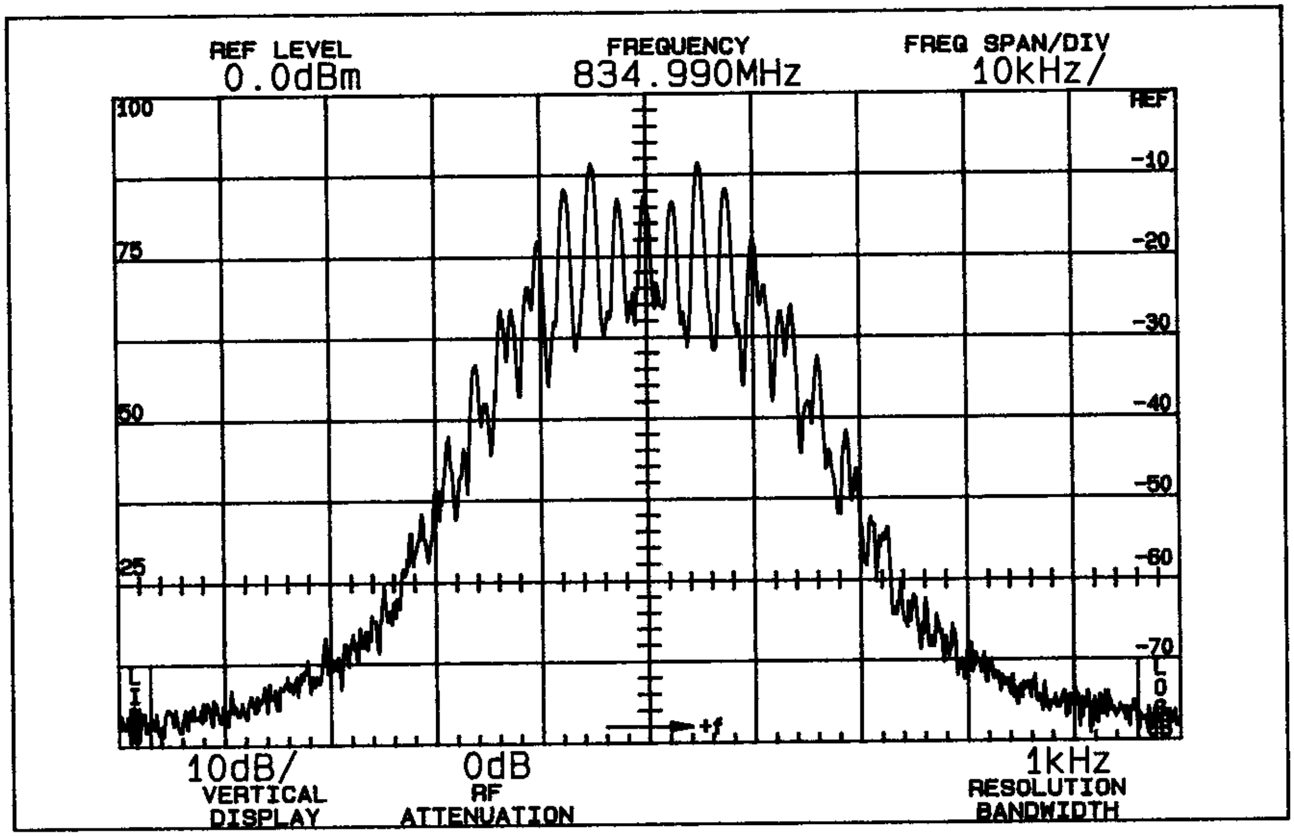
	Attenuation in dB Below Mean Output Power Required
On any frequency removed from the carrier by greater than 20 kHz up to and including 45 kHz	26
On any frequency removed from the carrier frequency by greater than 45 kHz up to and including 90 kHz	45
On any frequency removed from the carrier frequency by greater than 90 kHz up to $2f_c$	43+10LogP=41 (P=0.56W)

OCCUPIED BANDWIDTH - WIDEBAND DATA
FCC ID: F3JMX1009

FIGURE 4E

A:\MAXODF.OBW

FIGURE 4F



	Attenuation in dB Below Mean Output Power Required
On any frequency removed from the carrier frequency by greater than 20 kHz up to and including 45 kHz	26
On any frequency removed from the carrier frequency by greater than 45 kHz up to and including $2f_c$	43+10LogP=41 (P=0.56W)

OCCUPIED BANDWIDTH - 2500 Hz/SAT
FCC ID: F3JMX1009

FIGURE 4F

D. SAR SUMMARY (APPENDIX 9)

Freq. MHz	Conducted Power watts	Ant Position	SAR w/kg.
825	.471	Out	1.12
825	.471	In	0.88
837	.463	Out	1.26**
837	.463	In	1.05
849	.395	Out	1.09
849	.395	In	0.94

**Maximum; X-Y coordinate sketch in Appendix 9.

E. MODULATION CHARACTERISTICS (Paragraph 2.987 of the Rules)

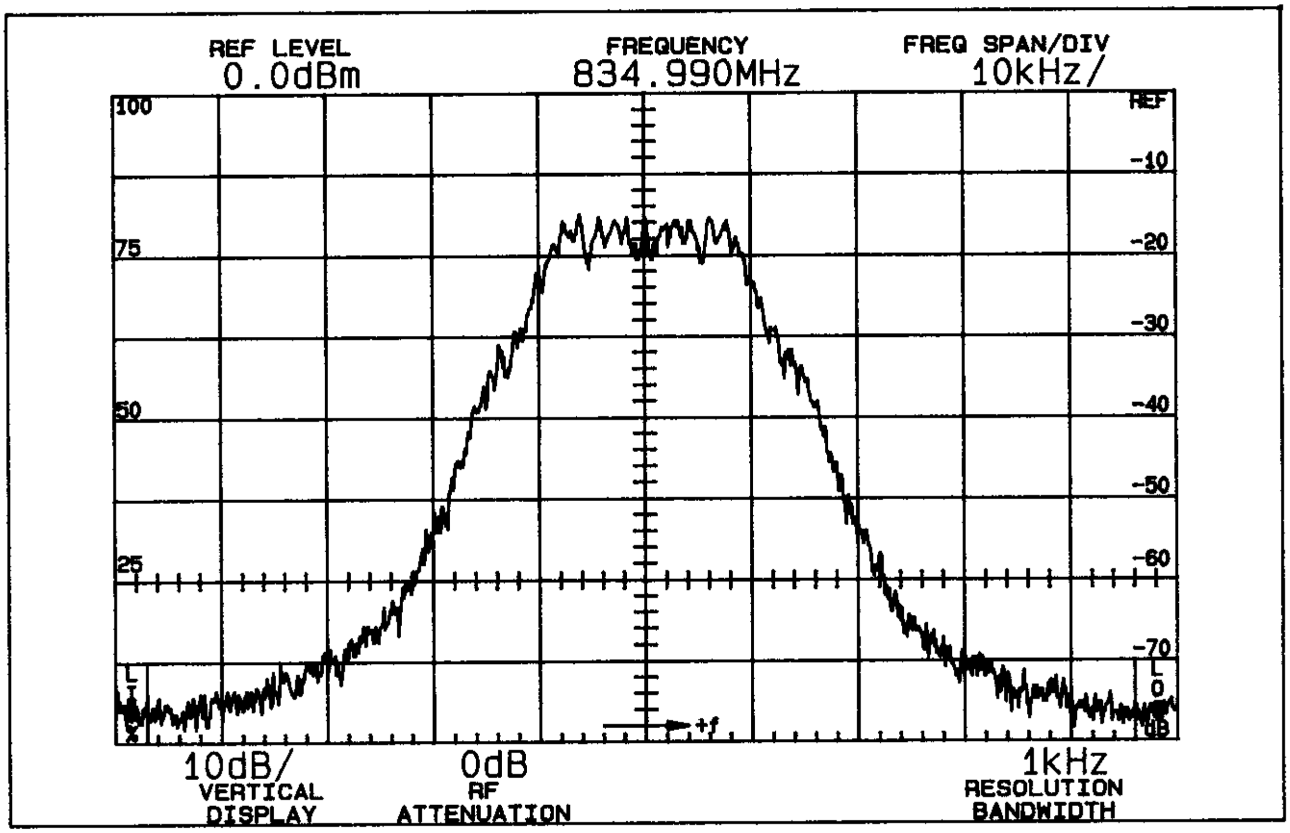
1. A curve showing frequency response of the transmitter is shown in Figure 1. Reference level was a 1 kHz audio signal from a Boonton 8220 modulation meter with two kHz deviation. Audio output was measured with an Audio Precision System One integrated test system.

2. Modulation limiting curves are shown in Figure 2, using a Boonton 8220 modulation meter. Signal level was established with an Audio Precision System One integrated test system. The curves show compliance with paragraphs 2.987(b) and 22.906(a).

3. Figure 3 is a graph of the post-limiter low pass filter which meets the requirements of paragraph 22.907(a) in providing a roll-off of 40Logf/3 dB where f is audio frequency in kHz. Measurements were made following EIA RS-152B with an Audio Precision System One integrated test system on the Boonton 8220 modulation meter output.

A:\MAXOD8.OBW

FIGURE 4G



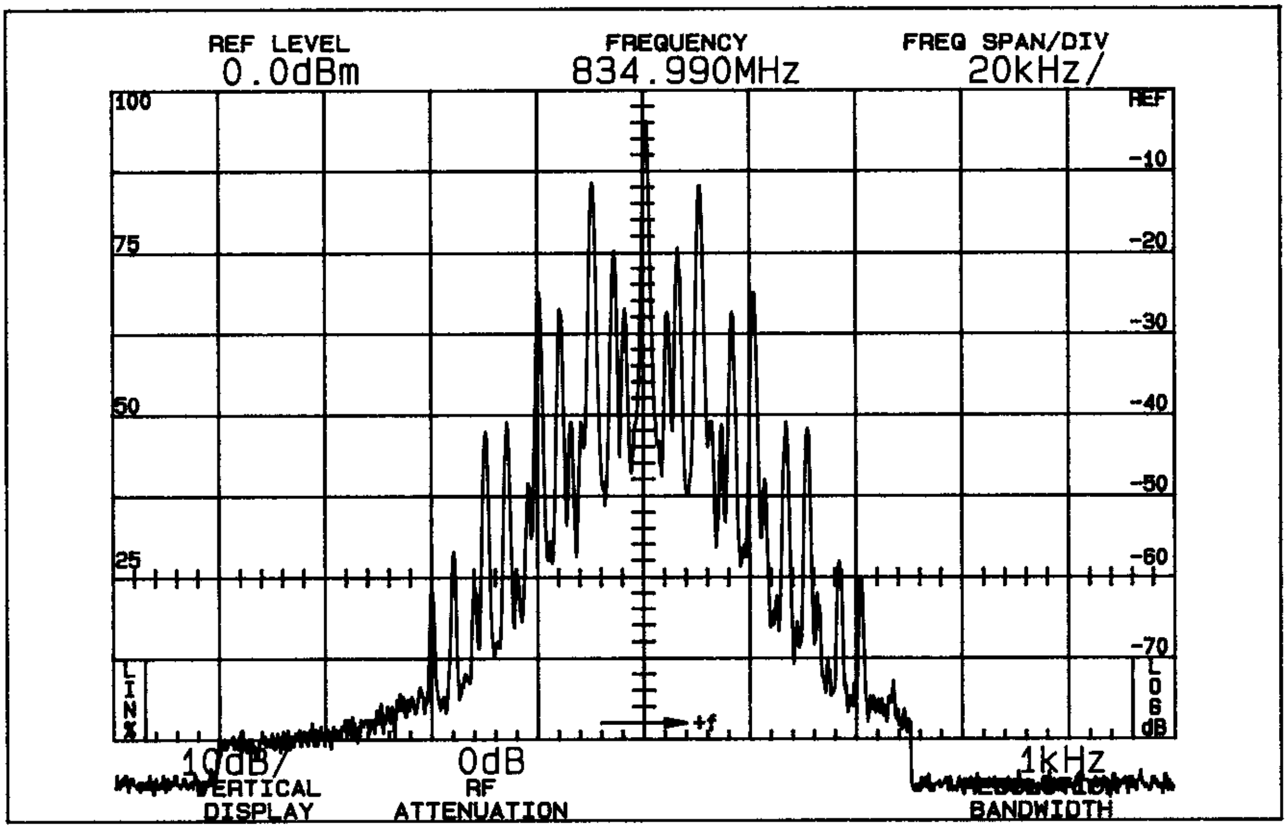
	Attenuation in dB Below Mean Output Power Required
On any frequency removed from the carrier frequency by greater than 20 kHz up to and including 45 kHz	26
On any frequency removed from the carrier frequency by greater than 45 kHz up to and including $2f_c$	43+10LogP=41 (P=0.56W)

OCCUPIED BANDWIDTH-DTMF/SAT
FCC ID: F3JMX1009

FIGURE 4G

A:\MAXODM.OBW

FIGURE 4H

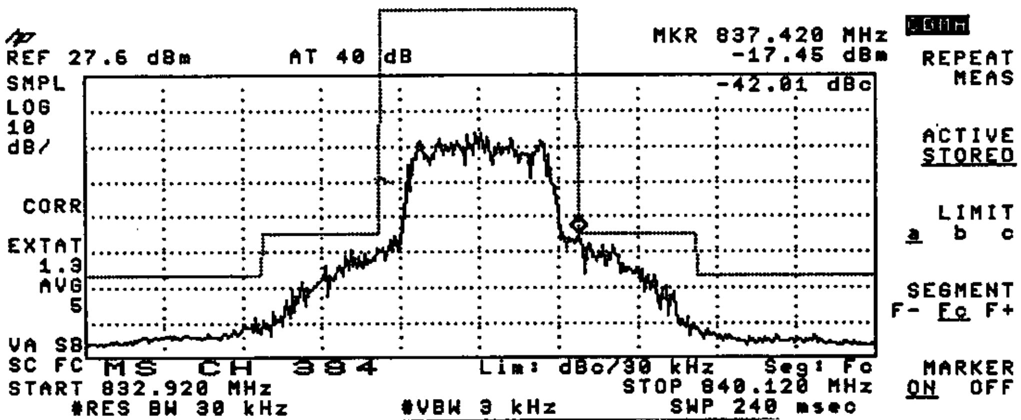


	Attenuation in dB Below Mean Output Power Required
On any frequency removed from the carrier by greater than 20 kHz up to and including 45 kHz	26
On any frequency removed from the carrier frequency by greater than 45 kHz up to and including 90 kHz	45
On any frequency removed from the carrier frequency by greater than 90 kHz up to $2f_C$	43+10LogP=41 (P=0.56W)

OCCUPIED BANDWIDTH ST/SAT
FCC ID: F3JMX1009

FIGURE 4H

FIGURE 4I



OCCUPIED BANDWIDTH
CDMA MODE
FCC ID: F3JMX1009

FIGURE 4I

G. SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS (Paragraph 2.991 of the Rules)

1. Spurious Emissions Other Than 870 - 890 MHz.

The MX-1009 transmitter was tested for spurious emissions at the antenna terminals while the equipment was internally modulated with wideband data, the worst case modulation mode.

Measurements were made with a Tektronix 494P spectrum analyzer coupled to the transmitter output terminals through a Narda 765-20 50 ohm power attenuator. A wave trap was used at the junction of the attenuator output and spectrum analyzer input to provide a 35 dB attenuation of the carrier test frequency, 837.03 MHz. (The wave trap was used to improve the dynamic range of the spectrum analyzer.) During the tests, the transmitter was terminated in the Narda attenuator. Supply was 3.6 Vdc throughout the tests.

Spurious emissions were measured throughout the RF spectrum from 14.4 MHz (lowest frequency generated in the transmitter) to 8.4 GHz. Any emissions that were between the required attenuation and the noise floor of the spectrum analyzer were recorded. Each spurious emission was measured with 2500 Hz (2.989(c)(1)) modulation, with wideband data modulation and with no modulation. Each reported emission level was the worst case modulation condition. Data are shown in Table 2 and are corrected for the effect of the wavetrap.

TABLE 2
TRANSMITTER CONDUCTED SPURIOUS
Other than 869 - 894 MHz
837.03 MHz, 3.6 Vdc

Spurious Frequency, MHz	dB below carrier reference for highest and lowest conducted power 0.47W	0.005W
837.030	98	>102
1674.060	>102	>101
2511.090	98	>102
3348.120	>101	>104
4185.150	>102	>102
5022.180	>100	>104
5859.210	>102	>102
6696.240	>100	>97
7533.270	>97	>100
8370.300	>97	>100
Required: 43+10Log(P)	40	21

G. SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS (Cont'd)

All other emissions were more than 95 dB below the carrier reference.

2. Spurious Emissions 870-890 MHz

Measurements were made with a Tektronix 494P spectrum analyzer. Between the MX-1009 antenna terminal and the spectrum analyzer was a Narda 765-20 50-ohm power attenuator, a wave trap, a General Radio 1602-P1 stub wave trap and an HP-8447D amplifier. The transmitter was terminated in the Narda attenuator. The 834.99 MHz carrier was notched out 82dB with the stub wave traps to achieve a -100 dBm measurement on the spectrum analyzer without front end saturation.

(The amplifier was necessary to make up the loss of the attenuator to achieve a -100 dBm measurement at the antenna terminal. The 869 - 894 MHz effect of the attenuator/traps/amplifier network between the transmitter antenna terminal and the spectrum analyzer.)

The network was calibrated using a Boonton 102F signal generator swept from 870 MHz to 890 MHz while set for -30 dBm input to the network. The network exhibited -5dB loss at 870 MHz to +2dB at 890 MHz.

No spurious emissions were detected above the -102 dBm noise floor at any of the applicable MAC power levels from 870 MHz to 890 MHz thereby complying with the -80 dBm limit of 22.907(f).

H. FIELD STRENGTH MEASUREMENTS OF SPURIOUS RADIATION (Paragraph 2.993(a),(b)(2) of the Rules)

Field intensity measurements of radiated spurious emissions from the MX-1009 were made with a Tektronix 494P spectrum analyzer using Singer DM-105A calibrated test antennas below 1 GHz, Polarad CA-L from 1 - 2.4 GHz, Polarad CA-S from 2 - 4.6 GHz, Polarad CA-M from 4.3 - 7.8 GHz and Polarad CA-X from 7 - 10 GHz, or EMCO 3115 horn, 1 - 10 GHz. The transmitter and dummy load were located in an open field 3 meters from the test antenna. Supply voltage was a power supply with a terminal voltage under load of 3.6 Vdc.

The transmitter and test antennas were arranged to maximize pickup. Both vertical and horizontal test antenna polarization were employed.

Operating frequency was selected as that of worst-case SAR; 837.03 MHz.

Reference level for the spurious radiation was taken as the measured field intensity in uV/m @ 3m (See TABLE 3).

Effective radiated power was calculated from:

$$ERP = \frac{(Fs*D)^2}{30*G}$$

Where F is Field Intensity in uV/m.

D is Distance in Meters.

G is antenna gain over isotropic(*)

$$ERP = \frac{(1,927,524 \times 10^{-6}*3)^2}{30*2}$$

$$= 0.56 \text{ watts}$$

Measurements were made from the lowest frequency generated within the unit, or 14.4 MHz, to 10 times operating frequency, 8.4 GHz. Data after application of antenna factors and line loss corrections are shown in TABLE 3.

(*) Antenna gain, a 1/2 wave center-loaded whip, has been established as 2.0 over isotropic.

H. FIELD STRENGTH MEASUREMENTS...(Continued)

TABLE 3

TRANSMITTER RADIATED SPURIOUS
837.030 MHz; 3.6 Vdc; 0.56 watts ERP

Spurious Frequency, MHz	F.I. @ 3m uV/m	dB Below[1] Carrier Reference
837.030	1,927,524	0
1674.060		43V
2511.090		69V*
3348.120		>84H*
4185.150		>86V*
5022.180		>75H*
5859.210		>63H*
6696.240		>76H*
7533.270		>72V*
8370.300		>69V*

Required: $43+10\text{Log}(0.56) = 41$

1. Worst-case polarization, H-horizontal, V-vertical.

* Reference data; more than 20 dB below FCC limit.
** Reference data; noise floor

All other spurious from 14.4 - 8400 MHz were 20 dB or more below FCC limit.

I. FREQUENCY STABILITY
(Paragraph 2.995(a)(1) and 22.101 of the Rules)

Measurement of frequency stability versus temperature was made at temperatures from $-30^{o}C$ to $+50^{o}C$. At each temperature, the unit was exposed to test chamber ambient a minimum of 60 minutes after indicated chamber temperature ambient had stabilized to within $\pm 2^{o}$ of the desired test temperature. Following the 1 hour soak at each temperature, the unit was turned on, keyed and frequency measured within 2 minutes. Test temperature was sequenced in the order shown in Table 4, starting with $-30^{o}C$.

I. FREQUENCY STABILITY .....(Continued)

A Thermotron S1.2 temperature chamber was used. Temperature was monitored with a Keithley 871 digital temperature probe. The transmitter output stage was terminated in a Narda 765-20 power attenuator. Primary supply was 3.6 volts. Frequency was measured with a HP 5385A (0.1 ppm) digital frequency counter connected to the transmitter through a power attenuator. Measurements were made at 834.99 MHz. No transient keying effects were observed.

TABLE 4
FREQUENCY STABILITY vs. TEMPERATURE
834.99 MHz, 3.6 Vdc

Temperature, °C	Output Frequency, MHz	p.p.m.
-30.1	834.990734	0.9
-20.0	834.990294	0.4
- 9.7	834.990115	0.1
0.2	834.990077	0.1
10.0	834.990070	0.1
20.3	834.990040	0.0
30.3	834.989873	-0.2
39.9	834.989478	-0.6
50.5	834.988978	-1.2

Maximum frequency error: 834.988978
834.990000

\- .001022 MHz

Rule 22.101(a) specifies .00025% a maximum of ±.002087 MHz, which corresponds to:

High Limit	834.992087 MHz
Low Limit	834.987913 MHz

J. FREQUENCY STABILITY AS A FUNCTION OF SUPPLY VOLTAGE (Paragraph 2.995(d)(2) of the Rules)

Oscillator frequency as a function of power supply voltage was measured with a HP 5385A digital frequency counter as supply voltage provided by a HP 6264B variable dc power supply was varied ±15% from the nominal 3.6 volt rating. A Keithley 197 digital voltmeter was used to measure supply voltage at transmitter primary input terminals. Measurements were made at 20°C ambient.

J. FREQUENCY STABILITY...(Continued)

TABLE 5

FREQUENCY STABILITY vs. SUPPLY VOLTAGE
834.99 MHz, 3.6 Vdc

Supply Voltage		Output Frequency, MHz	p.p.m.
4.14	(115%)	834.990044	0.1
3.96	(110%)	834.990042	0.1
3.78	(105%)	834.990040	0.0
3.60	(RATED)	834.990040	0.0
3.42	(95%)	834.990041	0.0
3.24	(90%)	834.990041	0.0
3.06	(85%)	834.990042	0.1
2.88	(*)	834.990042	0.1

Maximum frequency error: 834.990044
834.990000
+ .000044 MHz

FCC Rule 22.101(a) specifies .00025% or a maximum of ±.002087 MHz, corresponding to:

High Limit	834.992087 MHz
Low Limit	834.987913 MHz

*Rated battery end-point.

K. CDMA FREQUENCY STABILITY
(MS Loopback)

TEMP. °C	ERROR, Hz
-30	7
-20	5
-10	- 1
0	4
+10	2
+20	- 4
+25	- 8
+30	- 9
+40	- 7
+50	- 6
+60	2

Error as a function of supply voltage @ 25°C did not exceed -8 Hz.

APPENDIX 6

TRANSCEIVER ALIGNMENT

EIGHT (8) PAGE TEST PROCEDURE FOLLOWS THIS SHEET

Section 8 Measurement and Inspection

1. Mobile Station Phone Tests

1.1 Basic Inspection

1.2 Manual Test Using the HP 8924C

1.2.1 Measuring Method in CDMA Receiving Mode
1.2.2 Measuring Method in CDMA Transmitting Mode
1.2.3 Sound Modulation Measuring Method
1.2.4 Radiation Measuring Method
1.2.4 Soft Handoff Measuring Method

1. Mobile Station Phone Tests

1.1 Basic Inspection

a. After performing an inspection of the outside of the phone, make sure that the battery is fully charged and press the POWER key.

b. If the phone does not turn on, change the battery pack and if still not registering, check the battery connectors.

c. After the phone is turned on, check to make sure the beeps sound and MAXON CDMA DIGITAL is displayed on the LED. Here, if the backlight does not turn on, perform inspection after selecting MENU

d. When keypad buttons are pressed, if the DTMF/TONE sounds are not emitted look at the KEY BEEP in the menu and check the BUZZER and SPEAKER.

e. If NO SERVICE is displayed: Replace the retractable antenna, as it is either broken or bent.
Correct the SID when there is an error in NAM program.

f. When the phone does not ring, check the RINGER in the menu.

g. When calls can not be received, replace the antenna and check to see if there is an error in the MIN or ESN program.

h. When calls can not be made, check the menu to see if the lock device is activated.

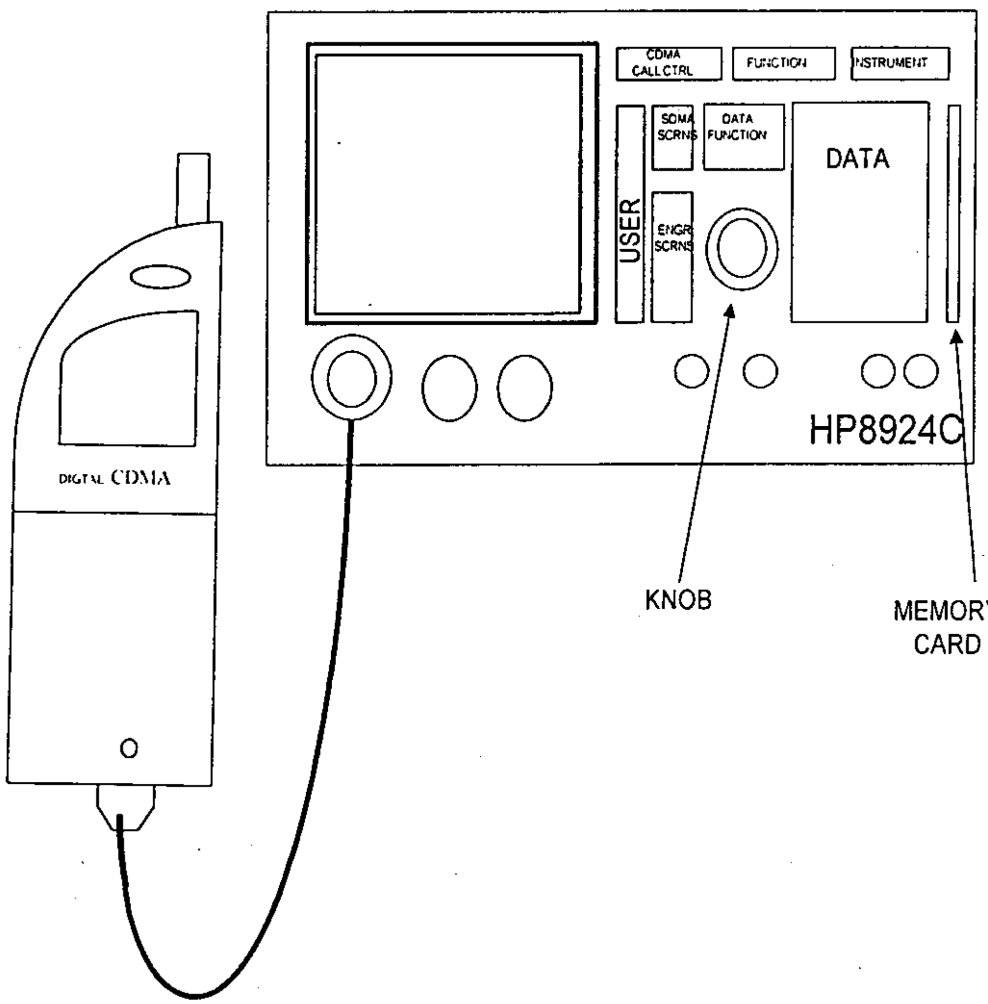
i. When sound transmitting is not possible, inspect the module audio logic section or the MIC.

j. When transmitting power does not rise, replace the battery and check the power module.

1.2 Manual Test Using the HP 8924C

First, visually inspect the phone and make sure the battery is completely charged. Before beginning the test, match, as close as possible, sound modulation and distortion of each SAT + ST to the listed requirements. Excluding sound modulation, which is externally applied, wide-band data, SAT, ST and all other tones, and all operation modes are adjusted using test adjustment devices as test software is unable to be used here for adjustment.

General modes with regard to modulation are VOICE, WIRF POWER OUTPUT DEBAND, DARA, ST, SAT, SAT+VOICE, AND SAT+DTMF.



<Figure 10.1> Test Connection Diagram

1.2.1 Measuring Method in CDMA Receiving Mode

(1) Receiving Calls in CDMA Mode

a. If the NAM program has been input in the MX-1009 phone, identically match this data and cell items of 8924C.

b. Press the 8924C registering key and perform initial registering.

c. After the above step, press the "CALL" key on the measuring instrument to send a call message. After a connection has been made, the phone bell will ring.

d. To complete the call, press the SEND key and an echo sound should be heard.

(2) Setup For Measuring CDMA Reception Sensitivity

a. Press the END CALL key on the measuring instrument to finish Service Option 1.

b. If the CDMA call control screen appears, change the Traffic Data mode to Service Option 2. Set Sector A power to -95 dBm/1.23MHz (this value must be adjusted taking into account cable and path loss).

c. Press the CALL button of the measuring instrument to display Indicator, which displays the call state.

(3) Reception Sensitivity Measurement

a. In a state where Service Option 2 is connected, go to the RX TEST screen.

b. The variable showing CDMA reception sensitivity is the Frame Error Rate. Max Frame, Confidence and FER Spec are needed to perform FER measurement.

c. Set Max Frame filde to 10,000 and select 95% for Confidence.

d. Set FER Spec to 0.5% and select YES for the Display Interim Results.

e. Select Arm Field using the 8924C nob.
Three results can appear when FER is measured:
1) Passed : matches standard Specs
2) Failed : does not match standard Specs
3) Max Frames : FER has neither passed nor failed

1.2.2 Test in CDMA Transmitting Mode

If the 8924C measuring instrument is connected to a resistive coaxial offset device, having general impedance, output power which can not be modulated by the RF power meter can be measured. Transmitting output power for more than one sideband. independent side, and carrier radio telephone in a control state can be measured at the RF terminal. During this measurement, slight cable loss due to output terminal load must be considered.

(1) CDMA Transmitting Measurement
a. Enter the CDMA RX Test Screen.
b. Turn off Confidence Interval Testing
c. The FER measurement is displayed at the RX Test screen. Next, go the TX test screen.
d. If Meas CNTL is set to continuous mode, TX measurement is possible.
Measurements : Average Power, Max Power, Opn Loop Power control, Waveform Quality, Frequency Error, Amplitude, and Phase Error.

(2) FER Measurement Including AWGN
a. Perform input using the same method during reception sensitivity measurement.
b. Set Sector A Power to -75dBm/ 1.23MHz and AWGN Power to -74dBm/ 1.23MHz (this is 16.6dB below
the call channel noise level).
c. At 0.5% FER and 95% Confidence, re-select the Meas Cntl Arm.
d. During the measurement of other data rates, set the data rate and traffic level to match the specifications and repeat.

1.2.3 Sound Modulation Measuring Method
(1) Sound Modulation Circuit and Low Band Filter Modulation Frequencies
a. Connect a signal generator to the audio input terminal. Adjust the audio signal input to 50% modulation at 1KHz. The input level at all frequencies has should have a low limit value. Adjust the sound signal generator between 100Hz and 50KHz.

b. Transmit the curved line. which displays the sound modulation circuit frequency response over a 100-500Hz range. and the data identical to this

c. LPF frequency response, needed in audio LPF. and the curved line, showing all circuitry states, positioned between the modulation limiter and modulation states, must be shown.

(2) Modulation Limiting

a. Measure the modulation response value for each of the three tones. Change the input level from 30% modulation to the saturation point of over 20dB and measure the +/- modulation value.

b. Prepare the equipment for limiting modulation. More than one curved line, which shows the relationship between the modulation ratio and modulation input voltage, must be satisfied.

c. This information indicates the modulation limit in a range of modulation frequency and the input modulation signal level. 10.3.3 Occupied Bandwidth (***isn't this "occupied frequency bandwidth?****)

a. The sound signal generator is adjusted to have frequencies allowing maximal response and to attain a correct output level matching ±6KHz deviation and 50% modulation.
   Set the level to a regular state, match the frequencies to 6KHz, and after increasing the signal level to 16dB, measure the bandwidth.
b. When the above is different to single sideband, modulate using 2500Hz with regard to a 16dB input level which is over a level needed to produce 50% modulation.
   The input level must be measured in the maximal response frequencies of the sound modulation circuit.

1.2.4 Radiation Test

(1) Radiation Measuring Conditions

a. Connect the unit to a signal analyzer. Set the non-modulation carrier waves to a 0dB level, and when using a connecting wire in the S/A, the 30dB offseter and notch filter must compensate the initial spurious value generated internally from the S/A.

b. In the FID wide-band data, the average radiation power emitted from the transmitting frequencies are as follows.

*Frequency band removed from carrier frequencies of over 20KHz including 45KHz: over 26dB
*Frequency band removed from carrier frequencies of over 45KHz including 90KHz: over 45dB
*Frequency band removed from carrier frequencies from the first mixer of carrier frequencies to over 90KHz: over 60dB and over 43+log10dB

c. The average radiation power from the transmitter operating in this type of service must be offset below average output of non-modulation carrier waves two times over any frequency band and over 2 times a standard frequency.

d. Average radiation power, generated from base station frequencies from the terminal transmitter, must not pass -80dB in the antenna terminal.

(2) Spurious Radiation from the Antenna Terminal

a. Connect the phone to the signal analyzer.

b. Measure modulation between 45KHz to 10KHz when the maximum and minimum output is bad.

c. When operating in the F3F radio telephone mode or the F3D monitor audio tone mode:

* emissions of under 45KHz with removed carrier waves: 300Hz
* emissions of under 45KHz with removed carrier waves: 3KHz

d. When operating in the FID wide band data mode or the F3D ST mode:

* emissions of under 60KHz with removed carrier waves: 300Hz
* emissions of under 45KHz with removed carrier waves: 3KHz

(3) Spurious Emission

a. Under normal operating conditions, perform testing after cutting off spurious, which is directly emitted from the interface circuit element. power terminal, control circuit, and cabinet.

b. For this test, single sideband. independent sideband. and the carrier wave transmission device are appropriately modulated according to the stipulated conditions.

c. When wanting to perform an outside electric field test using the measuring device, operating in a frequency of under 890MHz. a measuring device antenna operating at a distance from all test frequencies must be used.

When it is not possible to perform the outside electric field strength test, the measurement is performed using the installed equipment. This test should be performed after reading the explanation concerning testing area.

The exhibited data, under the premise that all electric wave emission is realized from the half-wave dipole antenna, indicates the state of each spurious emission based on rating transmission output.

d. The above measurement explanation is tested using the following measurement instruments:
spurious emission must be over 60dB in transmitter average power.
measurement instrument must operate in frequency of over 25MHz.
measurement instrument which can be directly connected to the transmitter and matched with the antenna.

1.2.4 Soft Handoff Test

a. Two sector local station functions are supported in 8924C.
   The RX TEST screen is finished for this measurement.
b. MS FER Report Interval is set to 40 frames at the Module Reporting screen.
   Turn MS FER Report by # frames ON (this indicates the number of bad frames received).
c. Adjust Sector B power to -80dBm/1.23MHz.
d. When the phone is operating, the pilot strength message is sent to the measuring instrument.
   This message appears on the screen as PN Offset, Strength, and Keep states.

APPENDIX 7

CIRCUITS FOR ESTABLISHING AND STABILIZING CARRIER FREQUENCY

Frequency stabilization is achieved with a temperature compensated crystal oscillator (TCXO) as a reference oscillator. The reference oscillator maintains the output frequency of 19.68 MHz within ±1.5 ppm, and PLL.

The crystal oscillator consists of a crystal element, transistor oscillation circuitry, and a temperature compensation network. The network provides the equivalent capacitance deviation for temperature change.

APPENDIX 8

CIRCUITS TO SUPPRESS SPURIOUS EMISSIONS, LIMIT MODULATION AND ESTABLISH OUTPUT POWER LEVEL

A. TRANSMITTER SPURIOUS SUPPRESSION

A ceramic duplexer (DUP101) is employed between the power amplifier and the antenna.

B. CIRCUITS OR DEVICES EMPLOYED FOR LIMITING MODULATION:

Audio processors, IC403 and IC406, perform the following functions:

- Microphone pre-amplifier
- 2:1 compressor
- Pre-emphasis (+6 dB/octave)
- Limiter (used to define the maximum transmit modulation deviation in FM mode)
- 3 KHz low pass filter
- DTMF generator, used to generate transmitted DTMF when in FM mode.
- TX data and TX SAT filters

C. DIGITAL MODULATION (AMPS)

Transmitted data is a 10 kHz Manchester encoded data stream. It passes a 4th order Butterworth low-pass filter with a 20 kHz 3 dB cut-off frequency to filter out sharp transitions and is fed to the FSK modulator.

D. DIGITAL MODULATION (CDMA)

A complete description of the baseband ASIC (2 pages) follows this Appendix.

(APPENDIX 8 CONT.)

Baseband Circuit

Baseband ASIC

The baseband ASIC is the interface component between the RF and digital sections, it performs the following major functions:

-Final down conversion of RX IF signal into I and Q (phase quadrature) paths.
-Channel filtering performed by 630 KHz low pass filters in above RX I and Q paths for received signal in CDMA mode.
-Analog to digital conversion of these I and Q paths for CDMA mode (4 bit wide digital I and Q outputs) with automatic DC offset compensation provided by MSM device (I Offset and Q Offset).
-Digital to analog conversion of TX IF signal for CDMA and FM modes (digital I/Q inputs, 130 MHz output to transmitter RF circuit).

In addition to the major functions (above), the baseband ASIC also performs other functions as follows:

-Analog to digital input, this is multiplexed by IC53 to provide measurements of FM mode RSSI, phone temperature, battery temperature, RF PA detect voltage, and battery voltage.
-Synthesizer lock detect input (shuts down transmitter on detection of out of luck synthesizer).
-Divider for 19.68 MHz TCXO reference, providing reference signals TCXO/4 and CHIPX8.

In operation, the final down-conversion from 85.38 MHz RX IF to zero frequency I and Q channels is performed in the baseband ASIC using two mixers with 85.38 MHz local oscillators in phase quadrature. These local oscillator signals are derived from a single reference at 170.76 MHz, using the principle of division by 2 and exclusive or combination. The 170.76 MHz signal is produced by a phase locked loop, with the VCO active device being contained in the baseband ASIC, with external tank circuit and external fixed frequency synthesizer device IC43. This PLL uses the voltage controlled TCXO as frequency reference.

Transmitter IF signal generation at 130.38 MHz is performed by combining digitally generated I and Q signals. The two phase quadrature local oscillators are derived from a 260.76 MHz phase locked loop in a similar manner to the receive section, however in this case all of the PLL circuitry except for the tank circuit is contained in the baseband ASIC. During operation in FM mode, modulation is applied directly to the varicap tuned circuit of the 260.76 MHz VCO.

(APPENDIX 8 CONT.)

Mobile Station Modem (MSM) Section

The functions of this section are as follows:

-The CDMA core, which has data bus interfaces to the A to D and D to A converters in the baseband ASIC for RX and TX I and Q data, and performs CDMA coding, decoding, Pilot acquisition, data interleaving and de-interleaving, RX AGC control, TX AGC control and frequency control.
-Microprocessor core, with external interfaces for memory devices (FLASH and SRAM).
-Vocoder core, performing voice processing for both transmit and receive, with 8 Kbits/s data rate,
-RF interface.
-General purpose interface (keyboard and buzzer)
-Serial data port for external serial EEPROM memory.
-Interface to separate audio and data processors for FM mode IC19 and IC18 respectively).

The MSM has it's own 27 MHz clock, using crystal X2, this is divided by 2 in the MSM as it's main clock source.

APPENDIX 9

SAR TEST DATA

FIFTY-FIVE (55) PAGE SAR TEST REPORT
FOLLOWS THIS SHEET

NOTE:

a) Test frequency of 837.03 MHz represented worst-case channel.

b) Page 28 shows the worst-case coordinates marked on the device outline.

Product Compliance
SAR Test Report

Product :	Maxon
Model :	MX-1009
FCC ID :	F3JMX1009
Reference no.:	10028

3D-EMC Laboratory,Inc.
for NEAR FIELD MEASUREMENTS

TABLE OF CONTENT

SAR Test Report

To: Maxon

Date: 04/02/99

Re: 10028

Radio Information

Radio Type : Cellular Phone

Model Number : MX-1009

Serial Number : AR10302011810000081

Frequency Band(MHz) 800

Frequency Tested(MHz) 837

Nominal Output Power:(W) 0.600 pk / av

Antenna Type : Monopole

Antenna Position : OUT

Signal Type : CW

Duty Cycle : -

Simulated Tissue

Type of Tissue : brain

Measured Dielectric Constant: 43.8

Measured Conductivity : 0.86

Conditions

Robot : 6 Axis

Scan Type : SAR

Measured Field : E

Measured Power(W): 0.463

(Compensated for Cable Loss)

Phantom Type : head

Phantom Position: left ear

Room Temperature °C: 25.0

Distance Antenna-Shell: 24 mm

Probe

Probe Name : E

Probe Orientation: -

Probe Offset(mm): 3.0

Sensor Factor : 10.8

Conversion Factor: 0.61

Calibration Date : 3/24/99

Results

Maximum Fields Location: X : 10 Y : -30

Peak Voltage (mv): 30.69

1cm Voltage (mv): 14.38

SAR (averaged over 1 gram of tissue) W/kg: 1.26 (Antenna OUT), 1.05 (Antenna IN)

Comments @ 825 MHz, Power 0.471 W = SAR 0.88 (Antenna IN) and 1.12 (Antenna OUT)

@ 849 MHz, Power 0.395 W = SAR 0.94 (Antenna IN) and 1.09 (Antenna OUT)

Insertion loss of adapter cable = 0.5 dB (Measured by manufacturer)

Product Compliance Test Report

Re: 10028

Manufacturer	:	MAXON
Address	:	SEOUL, KOREA
Product Description:		Cellular Phone
Product Classification:		UNCONTROL

Based on the above information and the test results shown in attached test report, of the aforementioned product, the undersigned states that ;

> *Tests were performed to establish the maximum value of the **SAR** (Specific Absorption Rate) in a person holding the product as specified in the user's manual. The **D.U.T.** was found to be in compliance with the limits established in the **FCC 96-326** document.*

Name : OSCAR GARAY

Signed : [signature] Date : 4/2/99

2 Applicable Documents

2.1 Guidelines

The Guidelines of the following documents were considered in the performance of this test :

1) NCRP report 1986,
2) ANSI C95.1 - 1982,
3) IEEE C95.1 - 1991,
4) FCC rules 96 - 326
5) OET Bulletin 65

Location of test

All tests were performed at the **3 D-EMC Laboratory, Inc.** for Near Field Measurements located on 5440 NW, 33rd Avenue, Suite 109, Fort-Lauderdale, Florida, 33309.

2.2 Measurement System Specifications

Positioner	**Probe**
Type : 3D Near Field Scanner Location Repeatability : 0.1mm Speed 180°/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)

2.3 Test Description

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, an attenuation versus depth scan will be accomplished by the measurement system to calculate the SAR value.

2.4 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.

2.5 Simulated Tissue

1) 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 contains salt. Also, at these frequencies, D.I. water and alcohol is preferred.

2) Tissue Density : Approximately 1.25 g/cm^3

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 °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.

2.6 Measurement of Electrical Characteristics of Simulated Tissue

1) Network Analyzer HP8753C or others

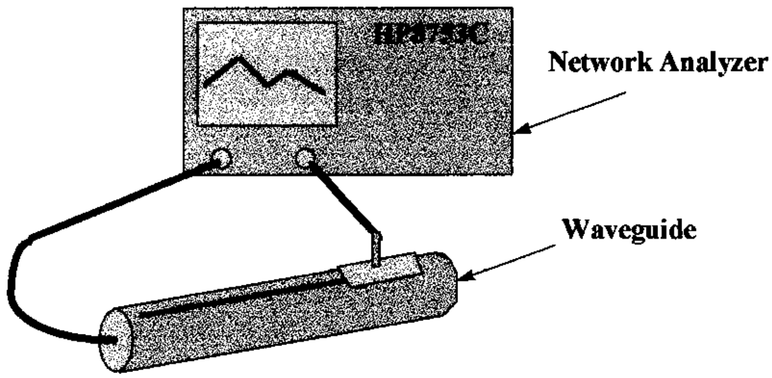
2) Slotted Coaxial Waveguide

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



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

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

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

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

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

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

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

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

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

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

2.7 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 $1 mW/cm^2$ 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 :

$\Delta t =$ exposure time (30 seconds),

$C =$ heat capacity of tissue (brain or muscle),

$\Delta T =$ 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 ΔT / Δt, 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)

2.8 Data Extrapolation

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 extrapolation method to obtain the peak surface SAR from the SAR 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 5 mm. along the ' Z ' axis for a distance of 50 mm. An average slope is obtained from the three data points nearest the surface and used to define an exponential decay of the energy density with depth using the following relations

$$Slope = \frac{\frac{E_{tot\_Z1}}{E_{tot\_Z2}} + \frac{E_{tot\_Z2}}{E_{tot\_Z3}}}{2}$$

$$\exp = \ln(slope) \cdot \frac{offset}{spacing}$$

$$E_{tot\_Z0} = E_{tot\_Z1} \cdot e^{\exp}$$

2.9 Interpolation and Gram Averaging

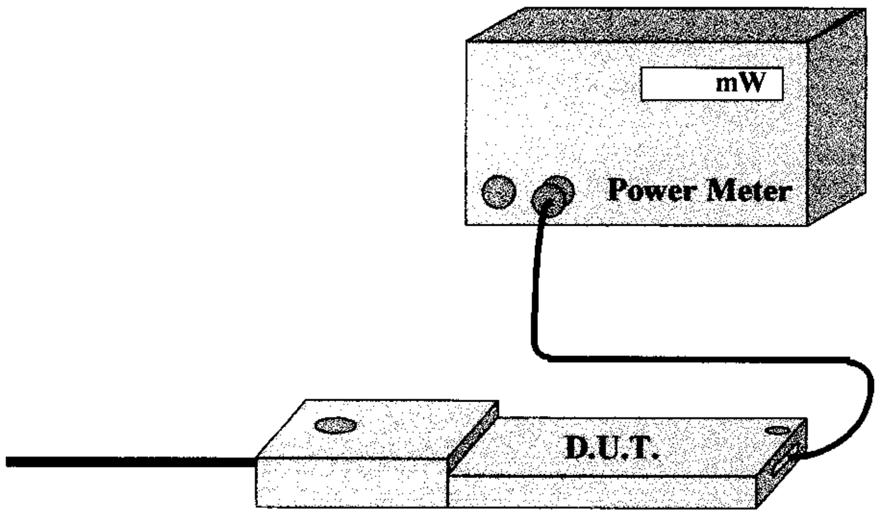
The voltage, 1 cm above the phantoms surface (E_{tot} 1 cm), is needed to calculate the exposure of one gram of tissue. The SAR value that estimates the average over 1 gram cubes is obtained from the extrapolated value. $E_{tot}Z_0$ and interpolated value, E_{tot} 1 cm, is obtained by interpolation;

$$SAR(mW \cdot g) = \frac{E_{tot\_Z0} + E_{tot\_1cm}}{2} \cdot \frac{CF}{SensorFactor}$$

2.10 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 circuits 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.



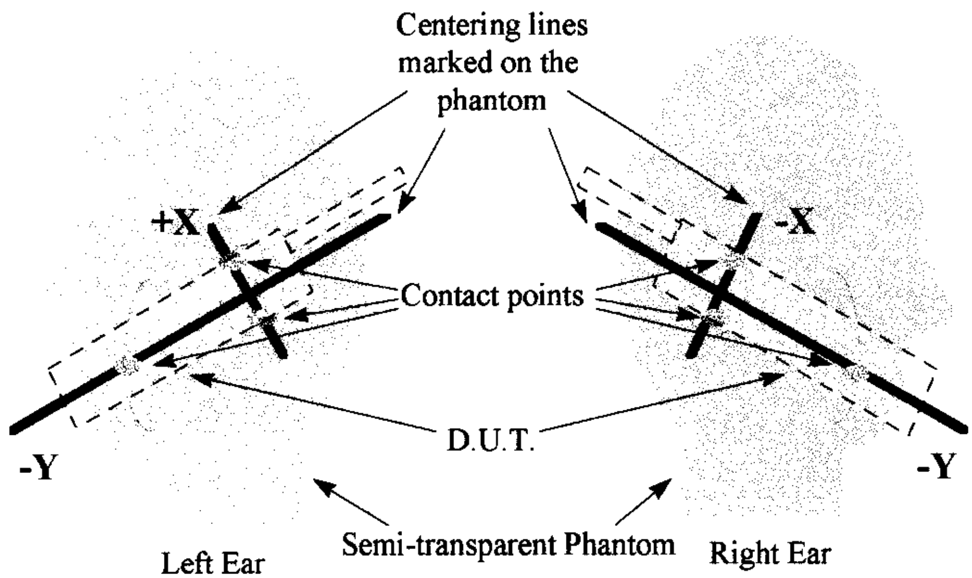
Measured Power ≈ Measured Power + Cable and Switching Mechanism Loss

2.11 Positioning of D.U.T.

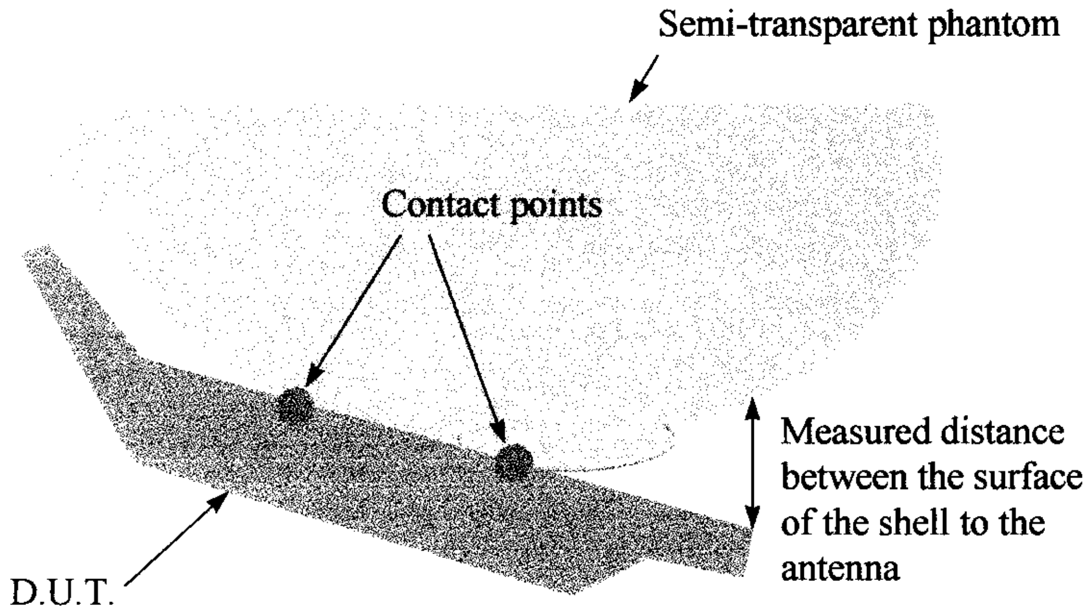
The clear fiberglass phantom shell have been previously marked with a highly visible line, so can easily be seen through the liquid simulated tissue. In the case of testing a cellular phone, this line is connecting the ear channel with the corner of the lips. The D.U.T. is then placed by centering the 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.

Positioning of the D.U.T.



Side View



Test Information

Date : 4/2/99
Time : 3:41:07 PM

Ref. : 10028

Product	: Cellular Phone	**Test**	: SAR
Manufacturer	: Maxon	**Frequency (MHz)**	: 825
Model Number	: MX-1009	**Nominal Output Power (W)**	: 0.600
Serial Number	: AR10302011810000081	**Antenna Type**	: Monopole
FCC ID Number	: F3JMX1009	**Signal**	: CW

Phantom	: Head - Left Ear	**Dielectric Constant**	: 43.8
Simulated Tissue	: Brain	**Conductivity**	: 0.86

Probe	: E	**Antenna Position**	: OUT
Probe Offset (mm)	: 3.0	**Measured Power (W) (conducted)**	: 0.420
Sensor Factor (mV)	: 10.8		
Conversion Factor	: 0.61	**Cable Insertion Loss (dB)**	: 0.5
Calibrated Date	: 3/24/99	**Compensated Power (W)**	: 0.471

Amplifier Setting :

Channel 1 : .00387   Channel 2 : .00373   Channel 3 : .00296

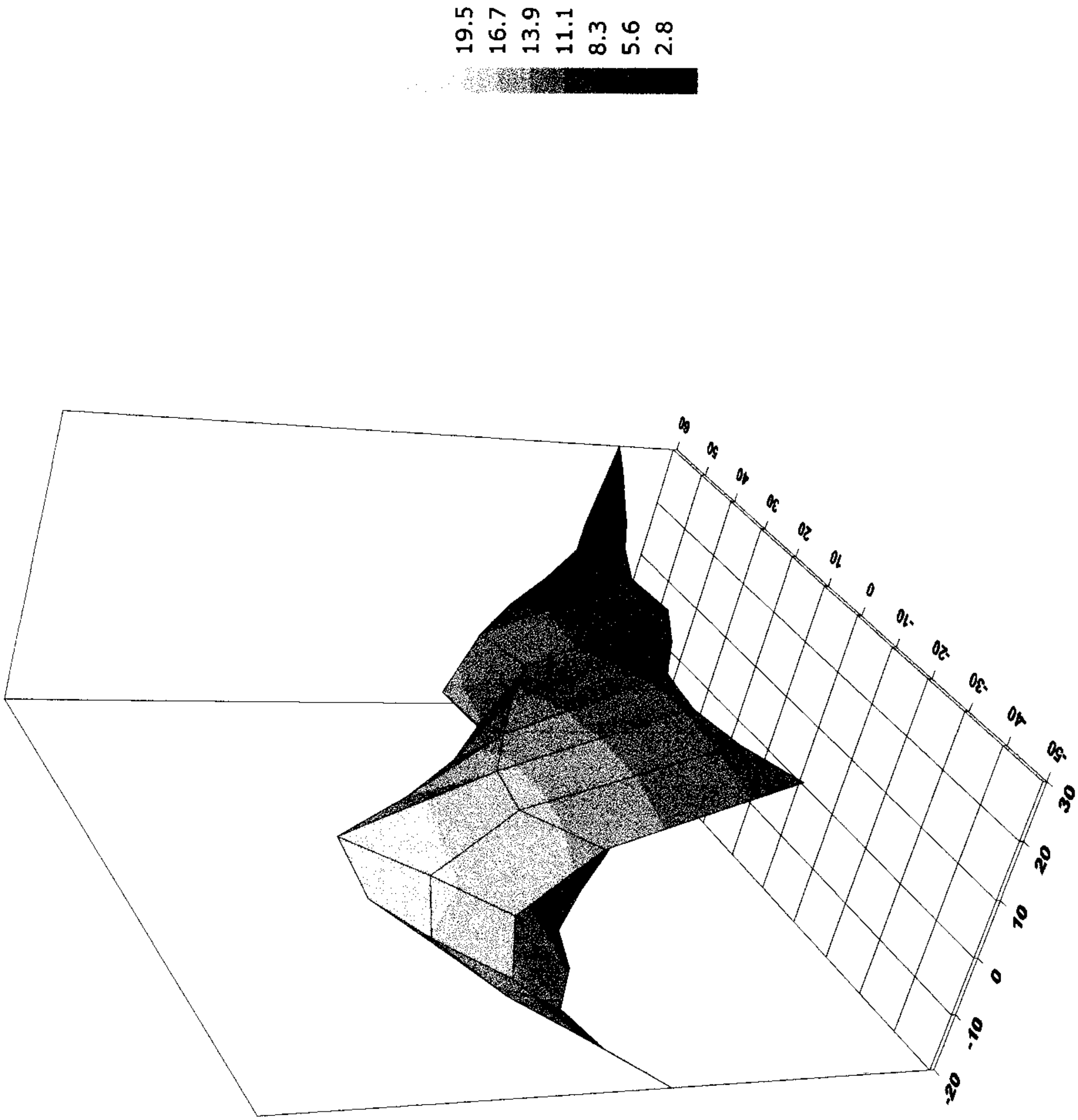
Location of Maximum Field :

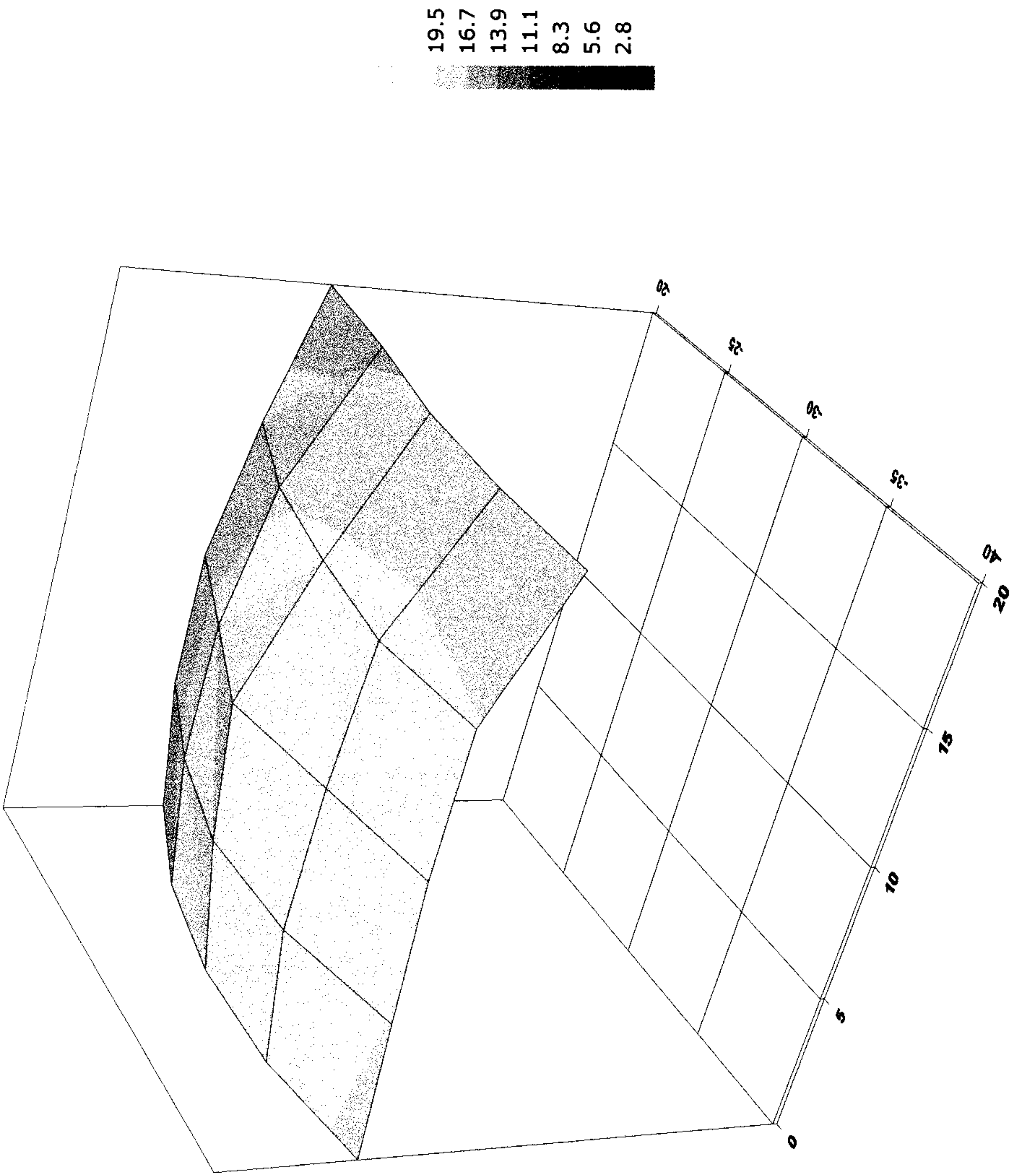
X = 10   Y = -30

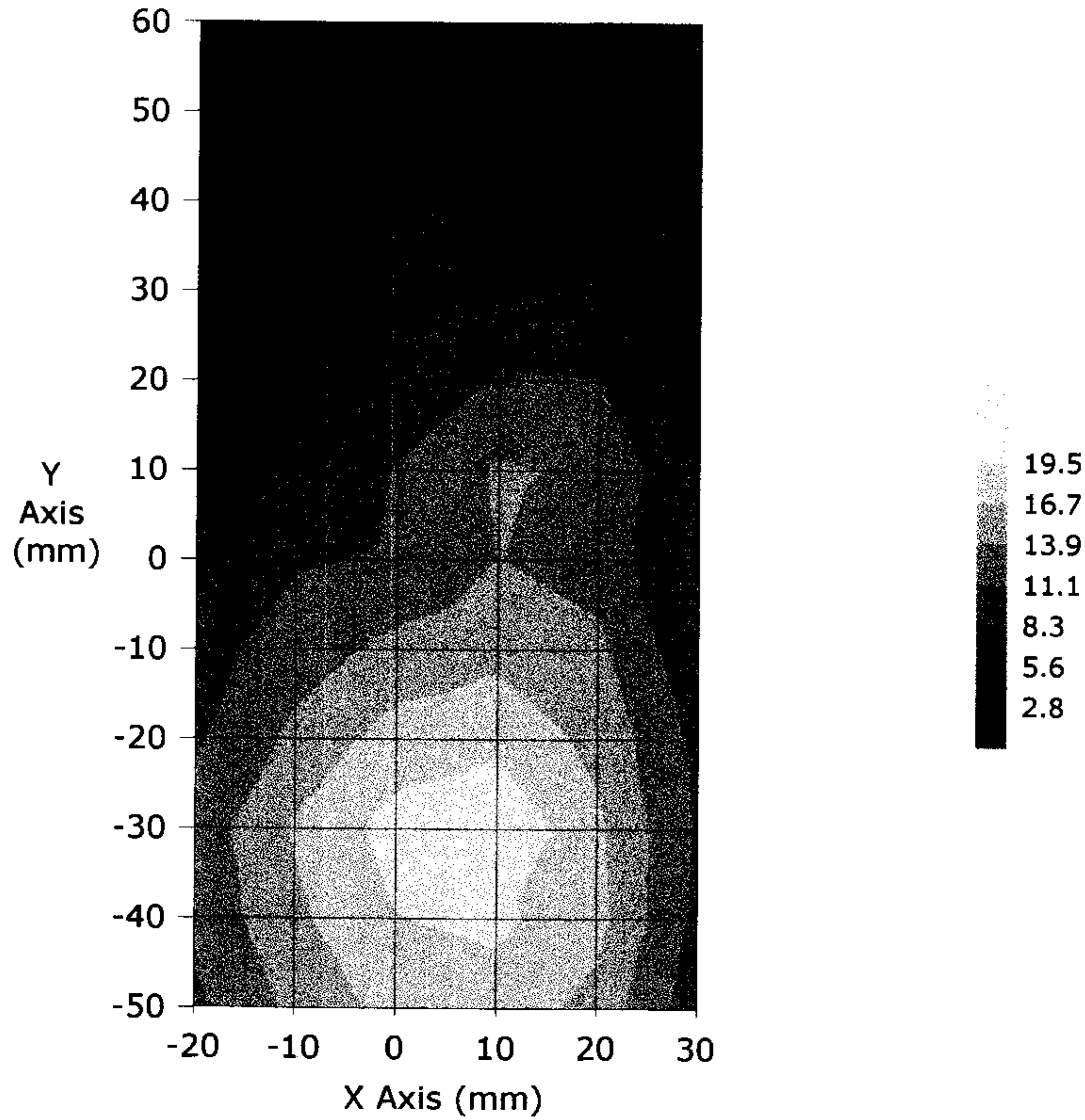
Measured Values (mV) :

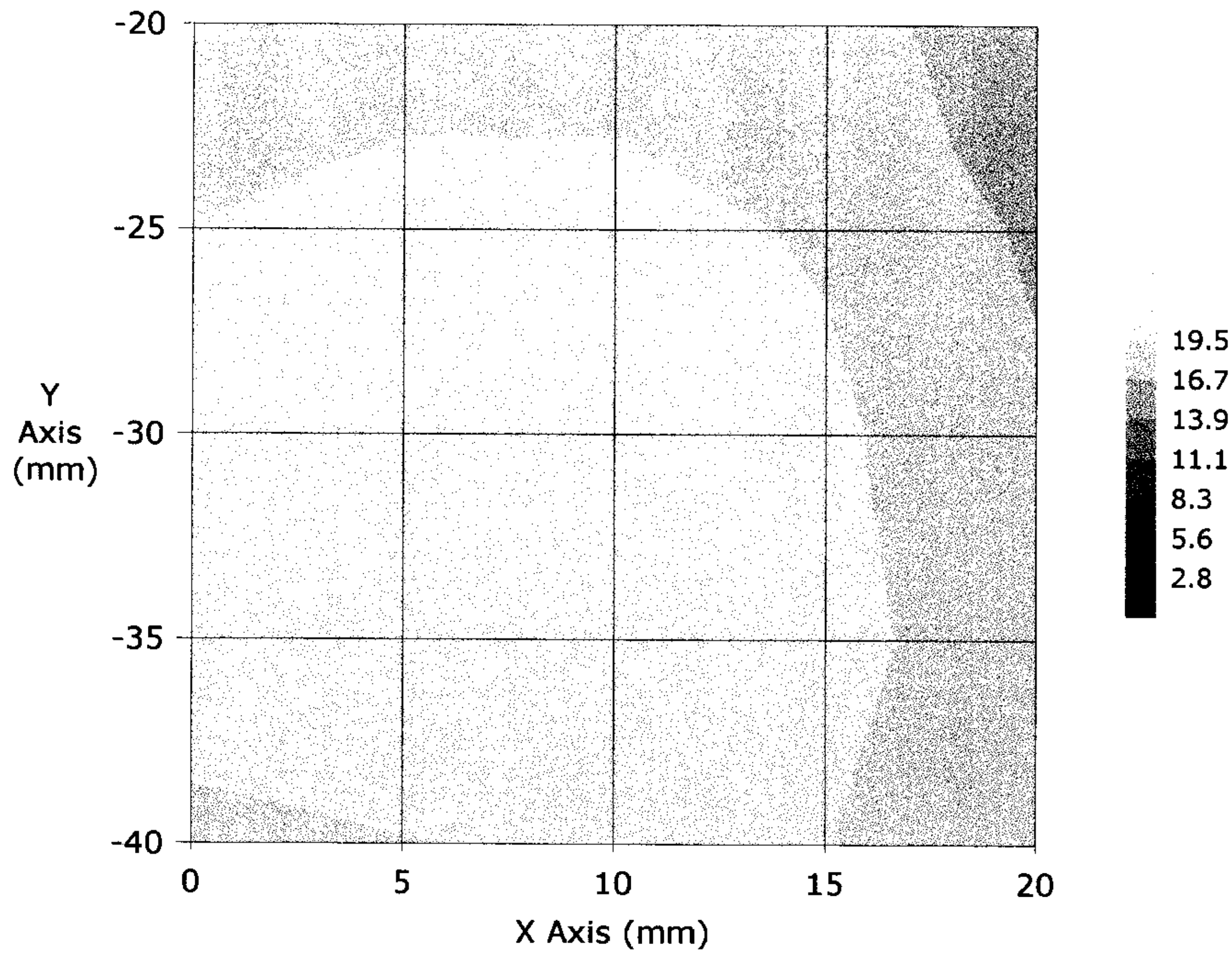
22.09	14.50	10.83	8.35	6.64	5.39
4.33	3.35	2.51	2.00	1.79	

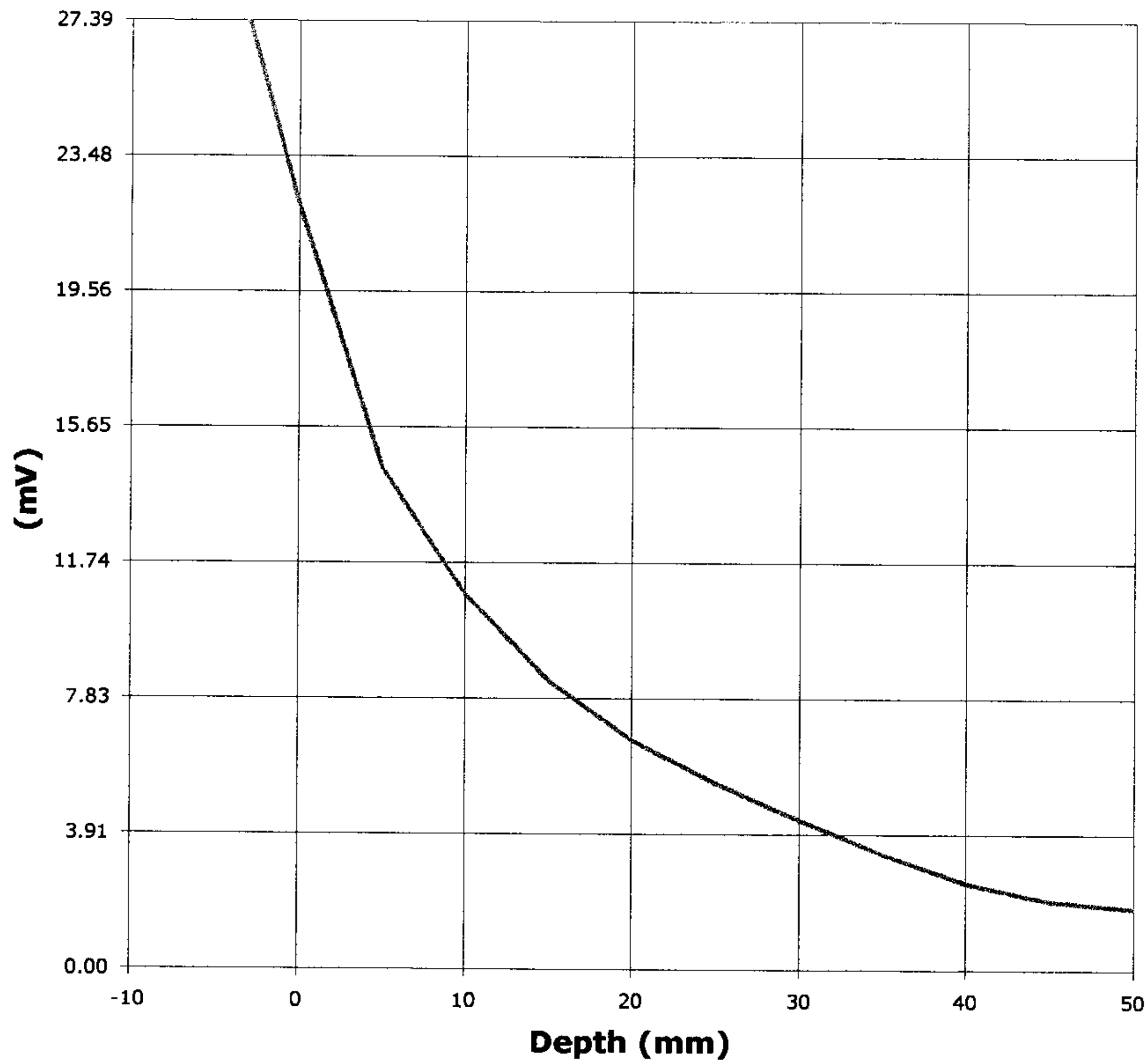
Peak Voltage (mV) : 27.39   **1 Cm Voltage (mV)** : 12.54   **SAR (W/Kg)** : 1.12

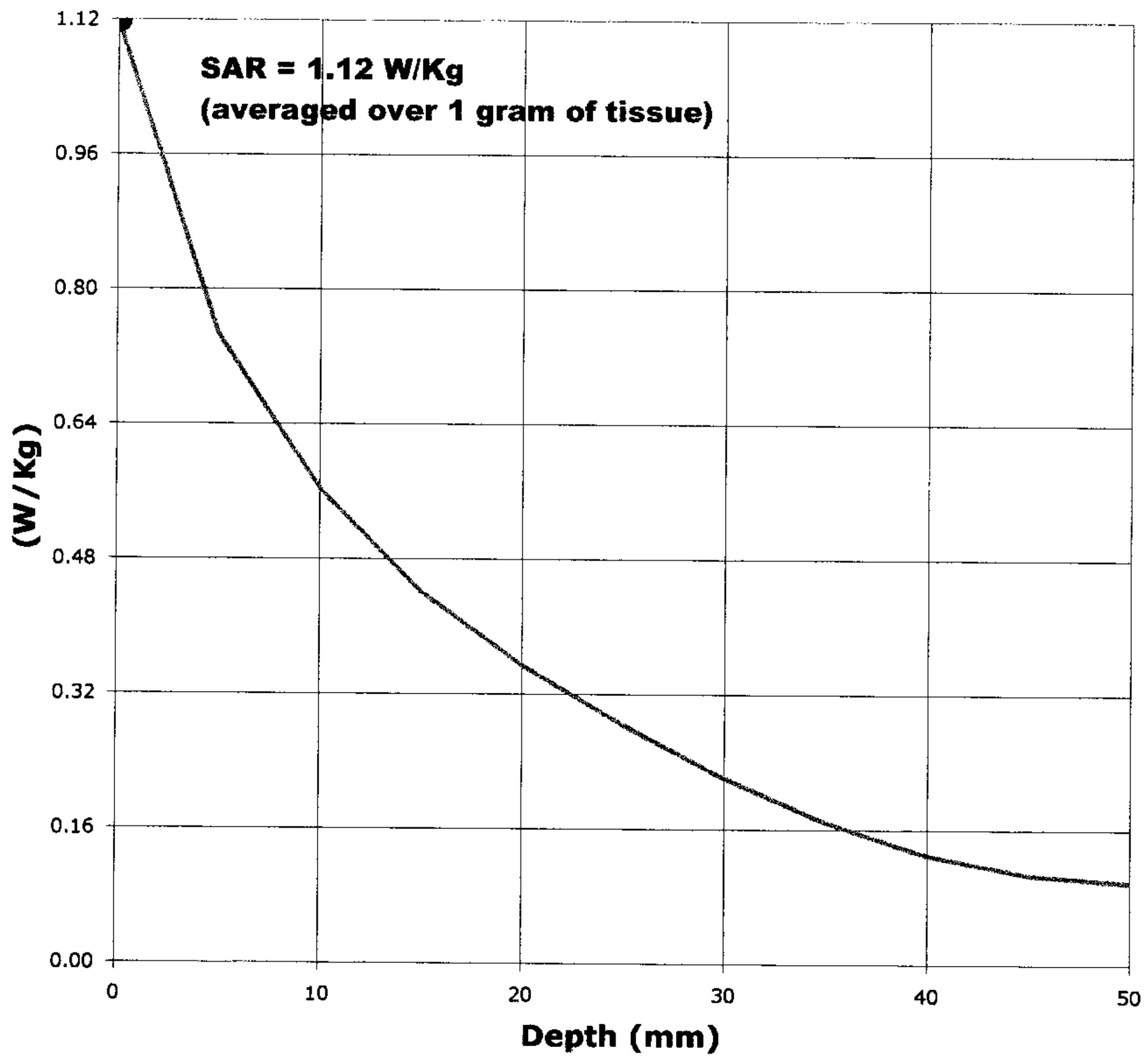

19.5
16.7
13.9
11.1
8.3
5.6
2.8
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
30
20
10
0
-10
-20


19.5
16.7
13.9
11.1
8.3
5.6
2.8
20
25
30
35
40
0
5
10
15
20


Y
Axis
(mm)
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-20
-10
0
10
20
30
X Axis (mm)
19.5
16.7
13.9
11.1
8.3
5.6
2.8


-20
-25
-30
-35
-40
Y
Axis
(mm)
0
5
10
15
20
X Axis (mm)
19.5
16.7
13.9
11.1
8.3
5.6
2.8


27.39
23.48
19.56
15.65
11.74
7.83
3.91
0.00
(mV)
-10
0
10
20
30
40
50
Depth (mm)


SAR = 1.12 W/Kg
(averaged over 1 gram of tissue)
(W/Kg)
1.12
0.96
0.80
0.64
0.48
0.32
0.16
0.00
0
10
20
30
40
50
Depth (mm)

Test Information

Date : 4/2/99
Time : 3:21:20 PM

Ref. : 10088

Product	: Cellular Phone	**Test**	: SAR
Manufacturer	: Maxon	**Frequency (MHz)**	: 825
Model Number	: MX-1009	**Nominal Output Power (W)**	: 0.600
Serial Number	: AR10302011810000081	**Antenna Type**	: Monopole
FCC ID Number	: F3JMX1009	**Signal**	: CW

Phantom	: Head - Left Ear	**Dielectric Constant**	: 43.8
Simulated Tissue	: Brain	**Conductivity**	: 0.86

Probe	: E	**Antenna Position**	: IN
Probe Offset (mm)	: 3.0	**Measured Power (W) (conducted)**	: 0.420
Sensor Factor (mV)	: 10.8	**Cable Insertion Loss (dB)**	: 0.5
Conversion Factor	: 0.61	**Compensated Power (W)**	: 0.471
Calibrated Date	: 3/24/99		

Amplifier Setting :

Channel 1 : .00387 Channel 2 : .00373 Channel 3 : .00296

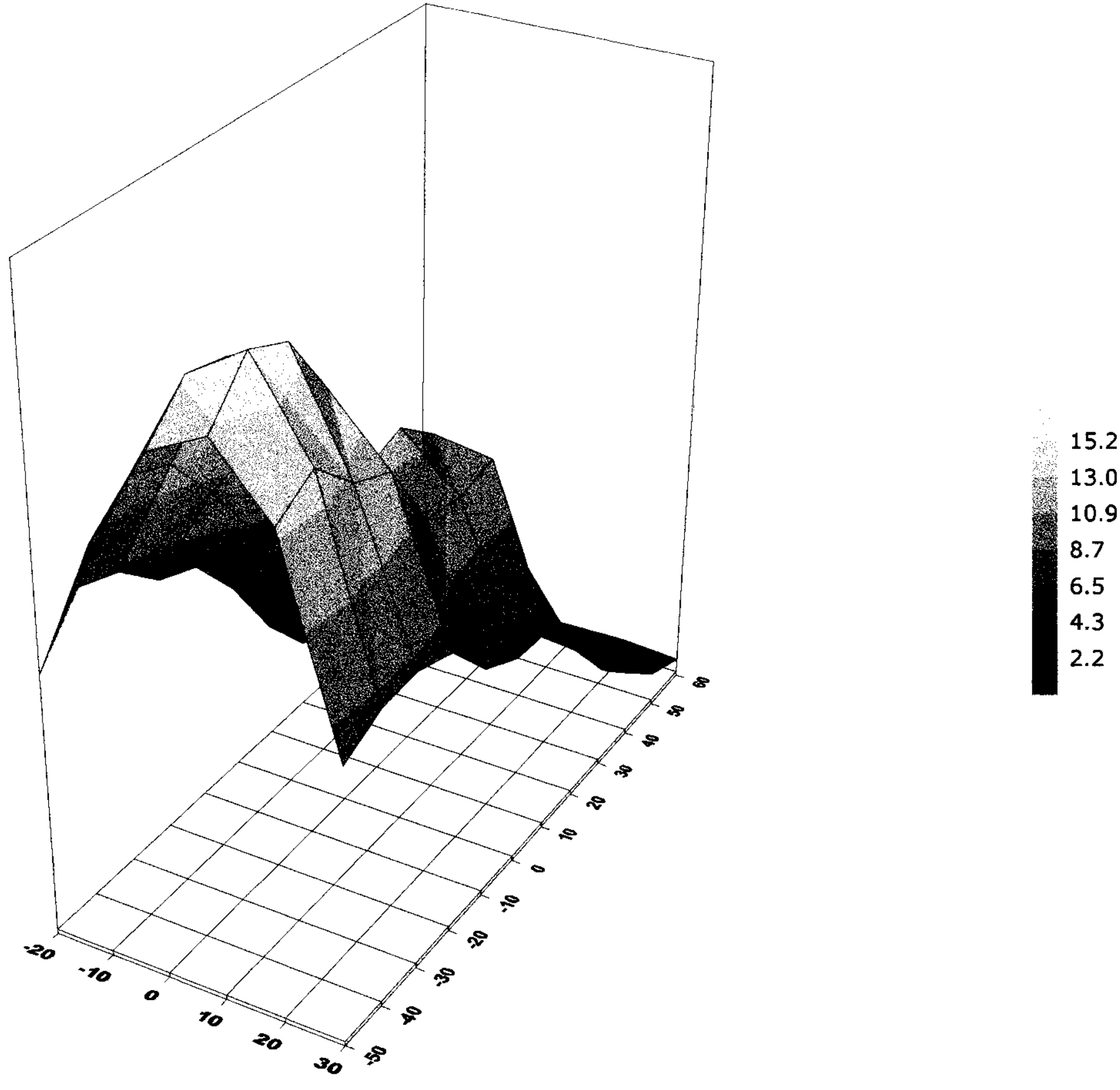
Location of Maximum Field :

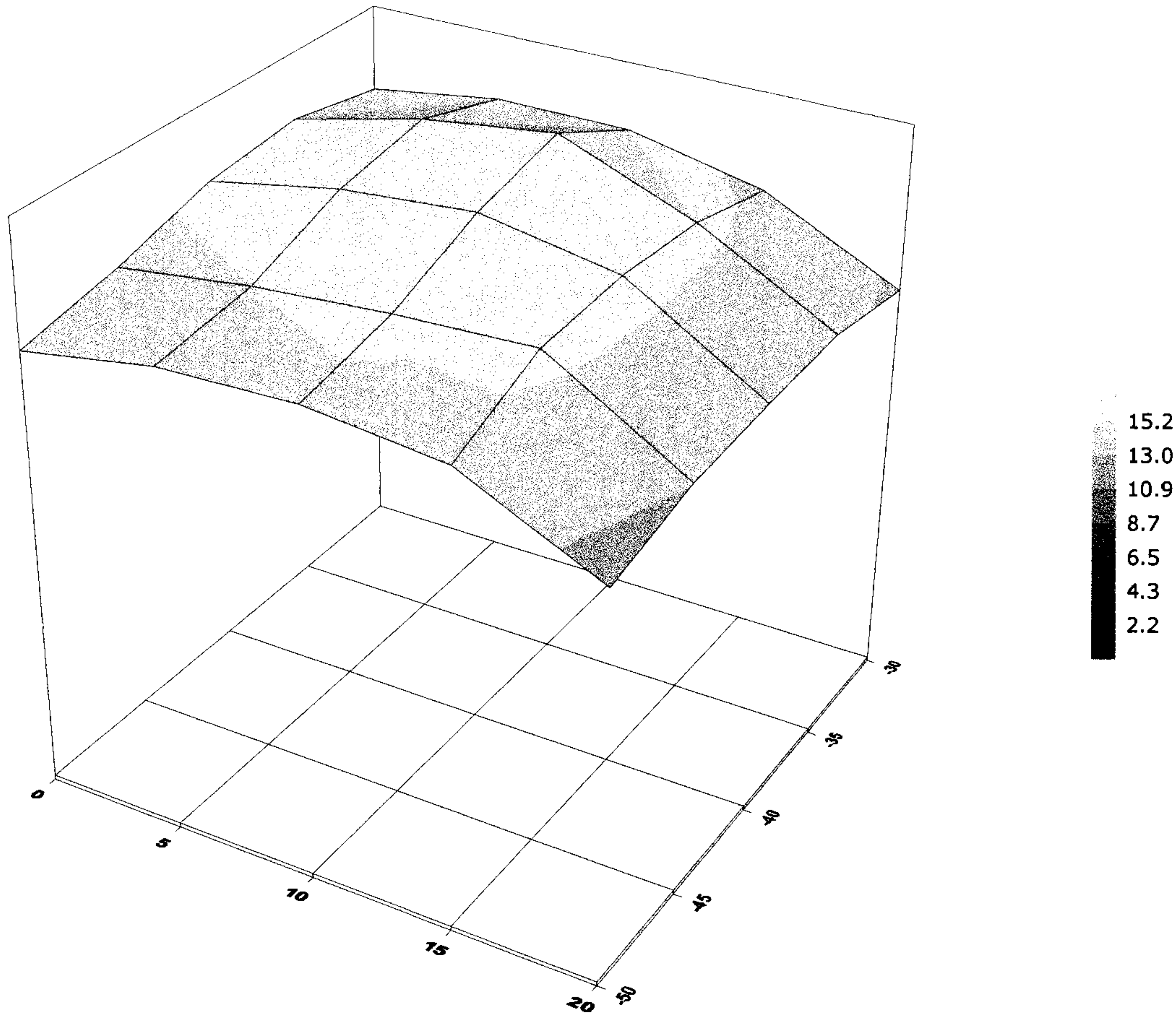
X = 10 Y = -35

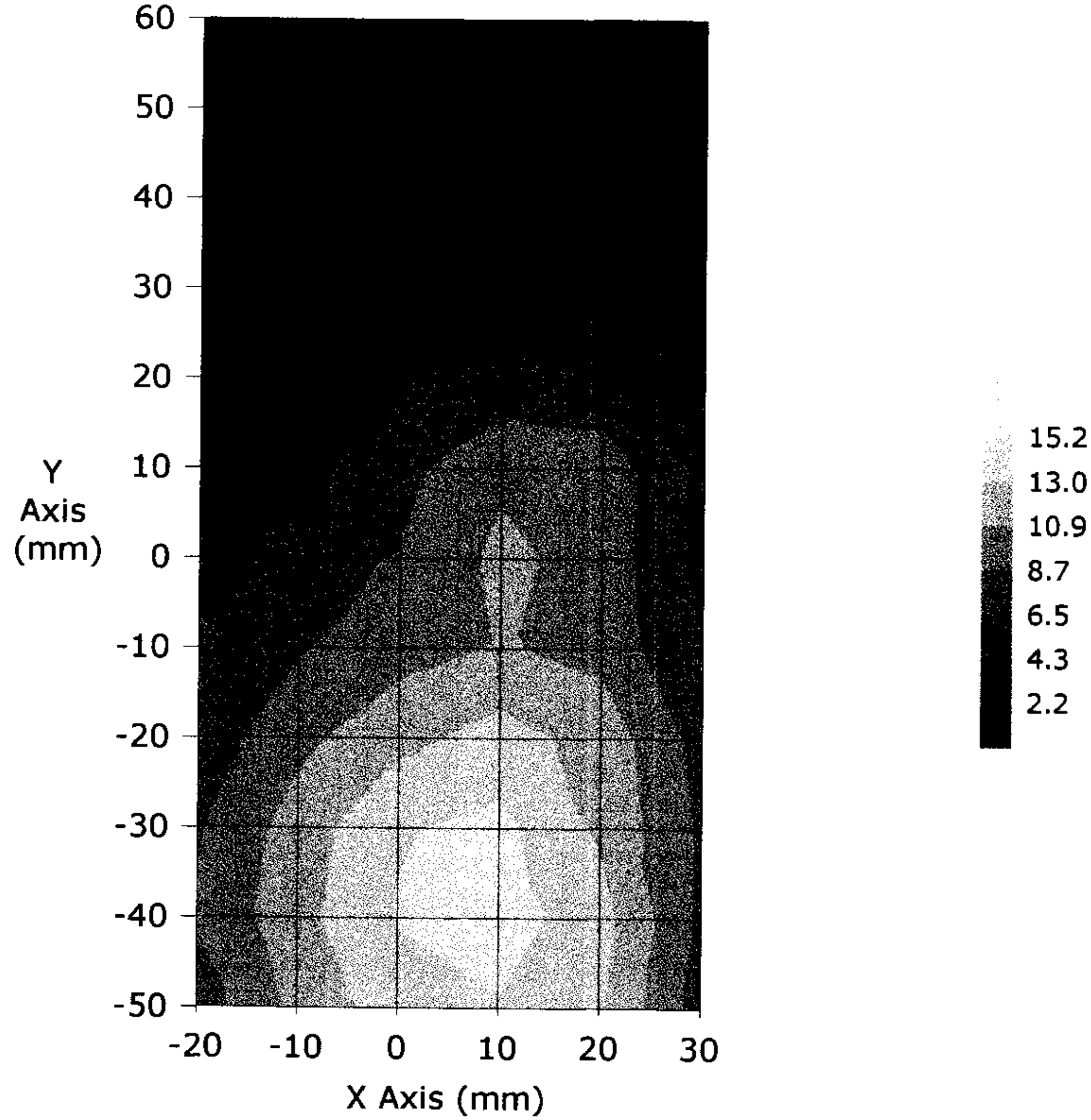
Measured Values (mV) :

17.25	11.42	8.48	6.48	5.14	4.17
3.34	2.53	1.85	1.46	1.30	

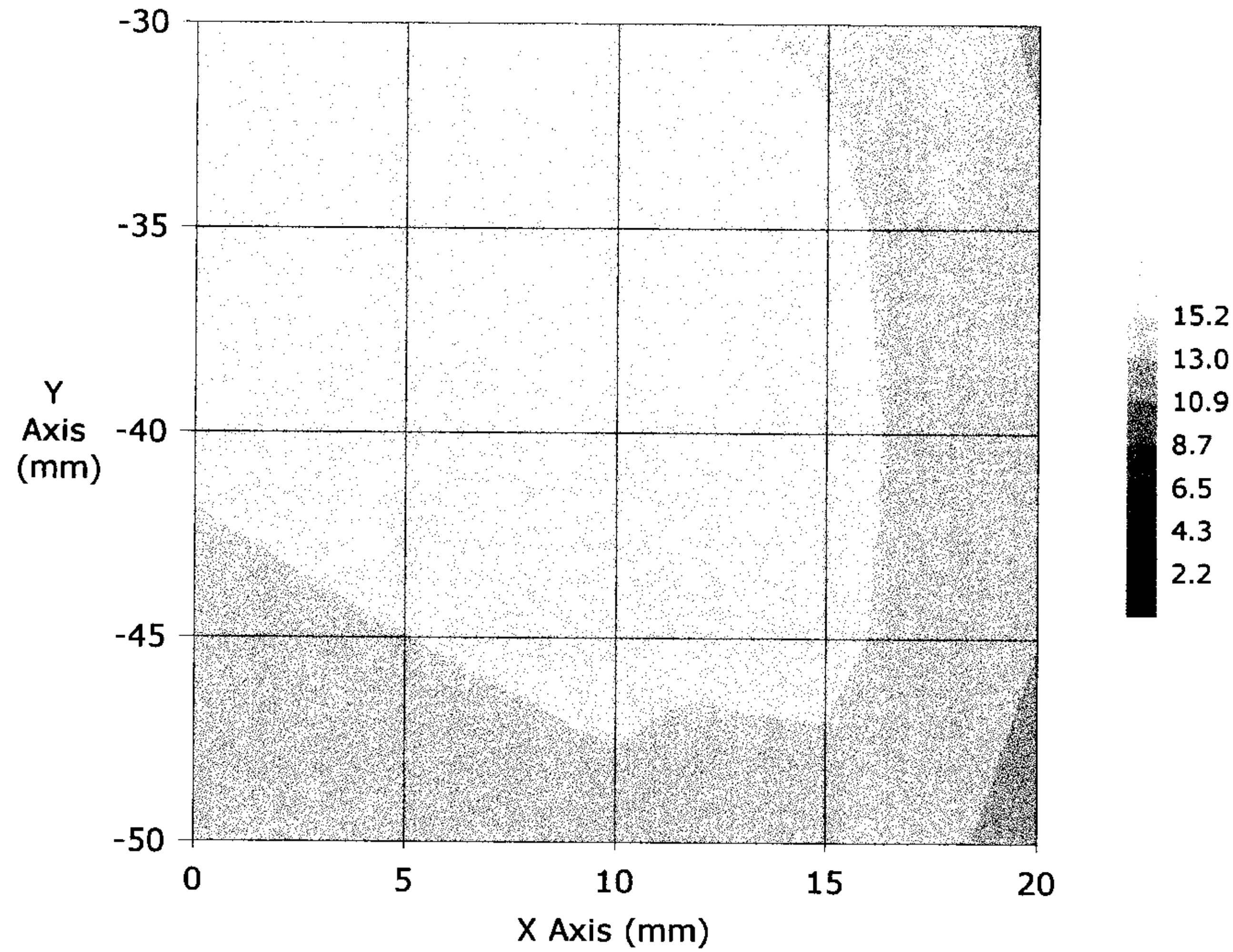
Peak Voltage (mV) : 21.37 **1 Cm Voltage (mV)** : 9.86 **SAR (W/Kg)** : 0.88

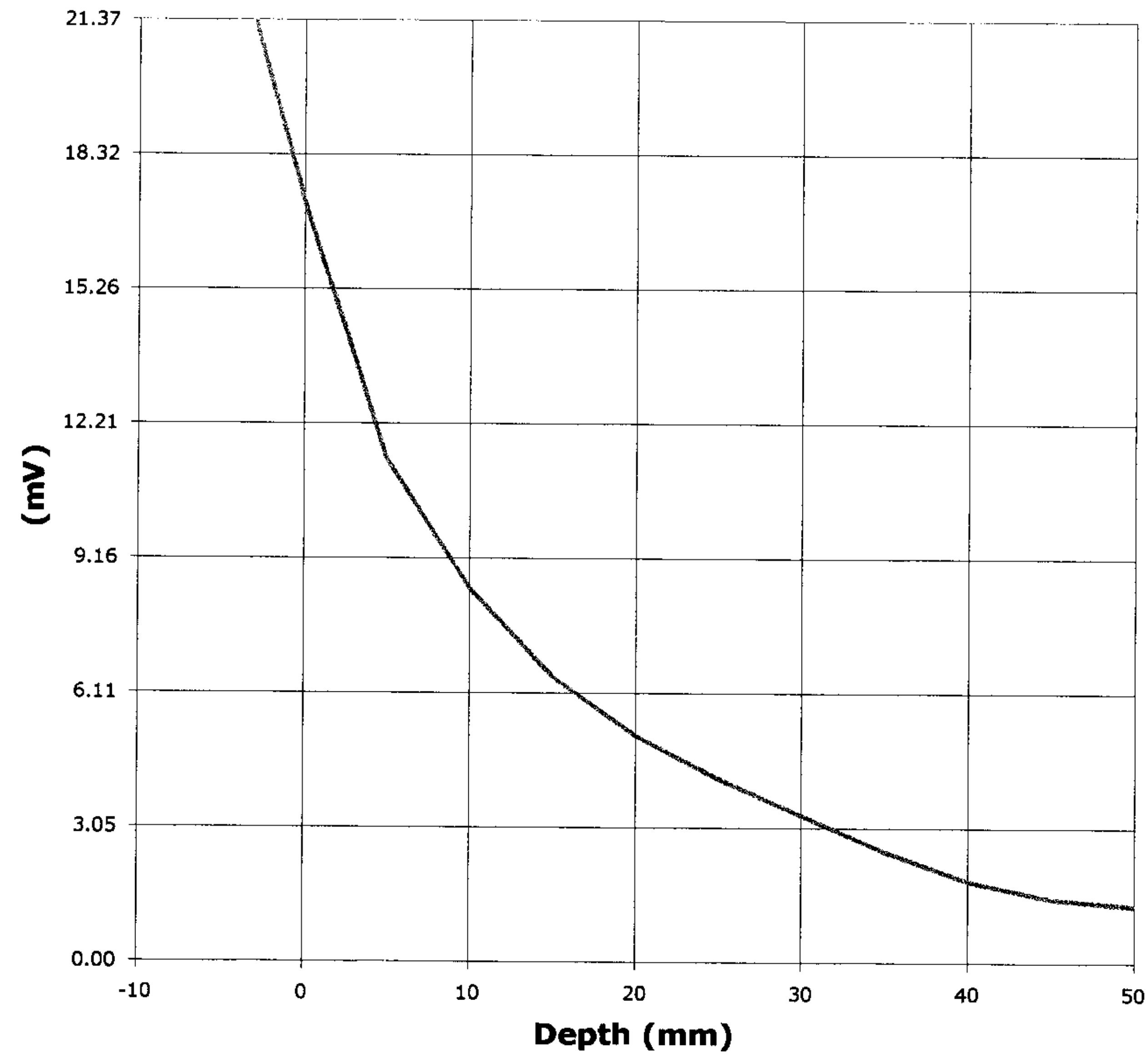

15.2
13.0
10.9
8.7
6.5
4.3
2.2
-20
-10
0
10
20
30
-50
-40
-30
-20
-10
0
10
20
30
40
50
60


15.2
13.0
10.9
8.7
6.5
4.3
2.2
0
5
10
15
20
30
35
40
45
50



Y Axis (mm)
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-20
-10
0
10
20
30
X Axis (mm)
15.2
13.0
10.9
8.7
6.5
4.3
2.2


-30
-35
-40
-45
-50
Y Axis (mm)
0
5
10
15
20
X Axis (mm)
15.2
13.0
10.9
8.7
6.5
4.3
2.2



21.37
18.32
15.26
12.21
9.16
6.11
3.05
0.00
(mV)
-10
0
10
20
30
40
50
Depth (mm)

SAR = 0.88 W/Kg
(averaged over 1 gram of tissue)
(W/Kg)
0.88
0.75
0.63
0.50
0.38
0.25
0.13
0.00
0
10
20
30
40
50
Depth (mm)

Test Information

Date : 4/2/99
Time : 4:24:52 PM

Ref. : 10022

Product : Cellular Phone
Manufacturer : Maxon
Model Number : MX-1009
Serial Number : AR10302011810000081
FCC ID Number : F3JMX1009

Test : SAR
Frequency (MHz) : 837
Nominal Output Power (W) : 0.600
Antenna Type : Monopole
Signal : CW

Phantom : Head - Left Ear
Simulated Tissue : Brain

Dielectric Constant : 43.8
Conductivity : 0.86

Probe : E
Probe Offset (mm) : 3.0
Sensor Factor (mV) : 10.8
Conversion Factor : 0.61
Calibrated Date : 3/24/99

Antenna Position : OUT
Measured Power (W) (conducted) : 0.413
Cable Insertion Loss (dB): 0.5
Compensated Power (W) : 0.463

Amplifier Setting :

Channel 1 : .00387 Channel 2 : .00373 Channel 3 : .00296

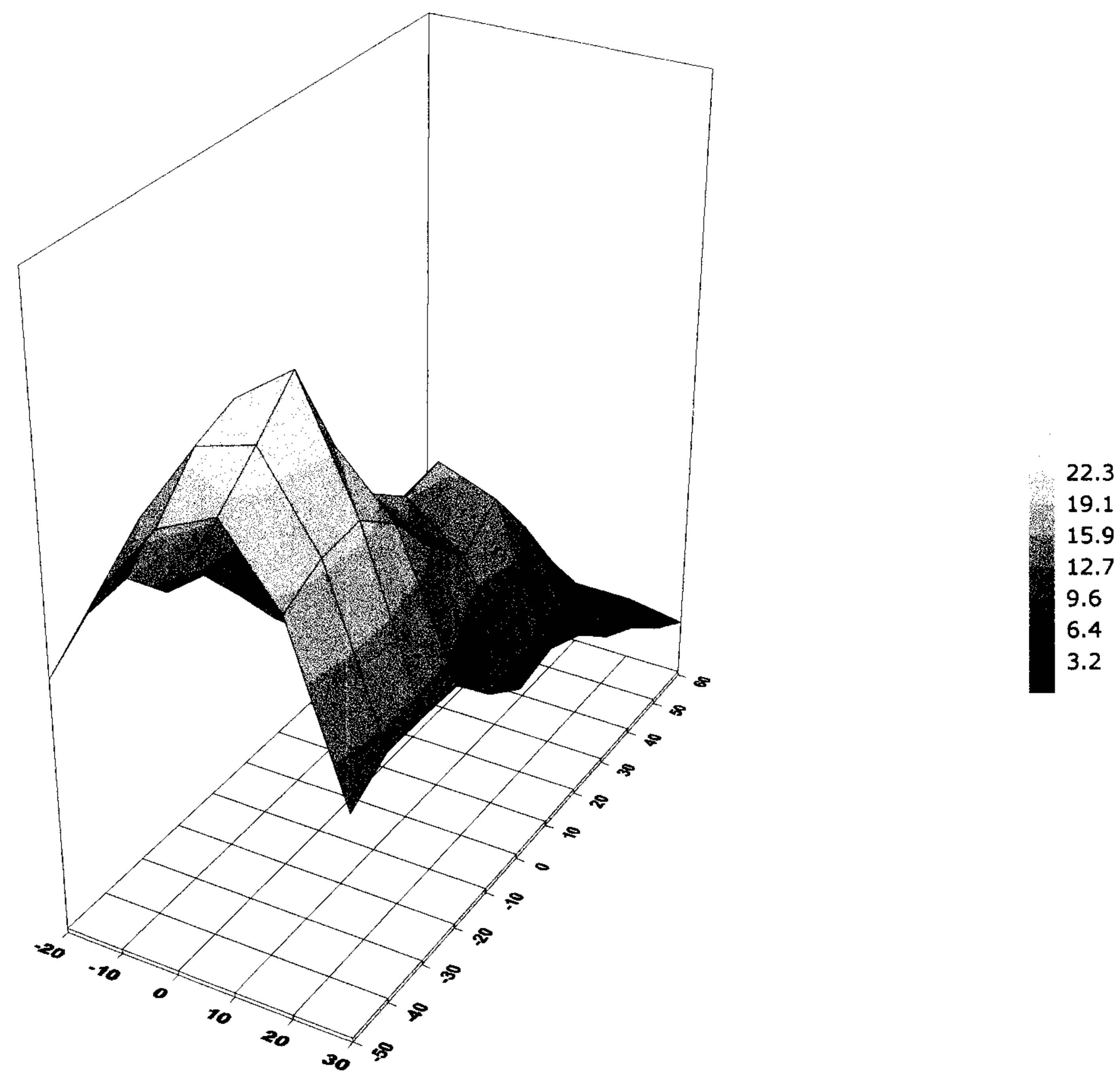
Location of Maximum Field :

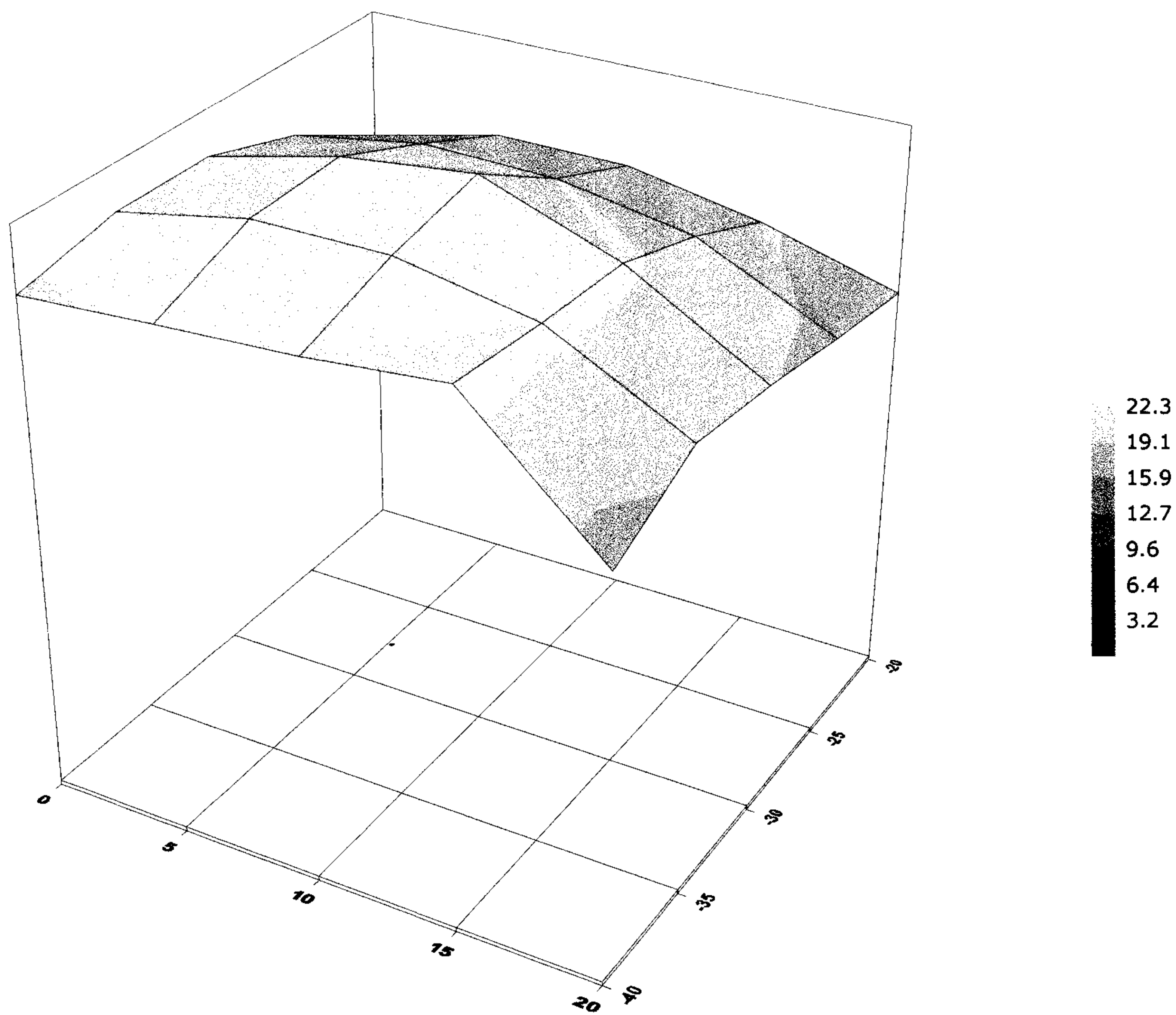
X = 10 Y = -30

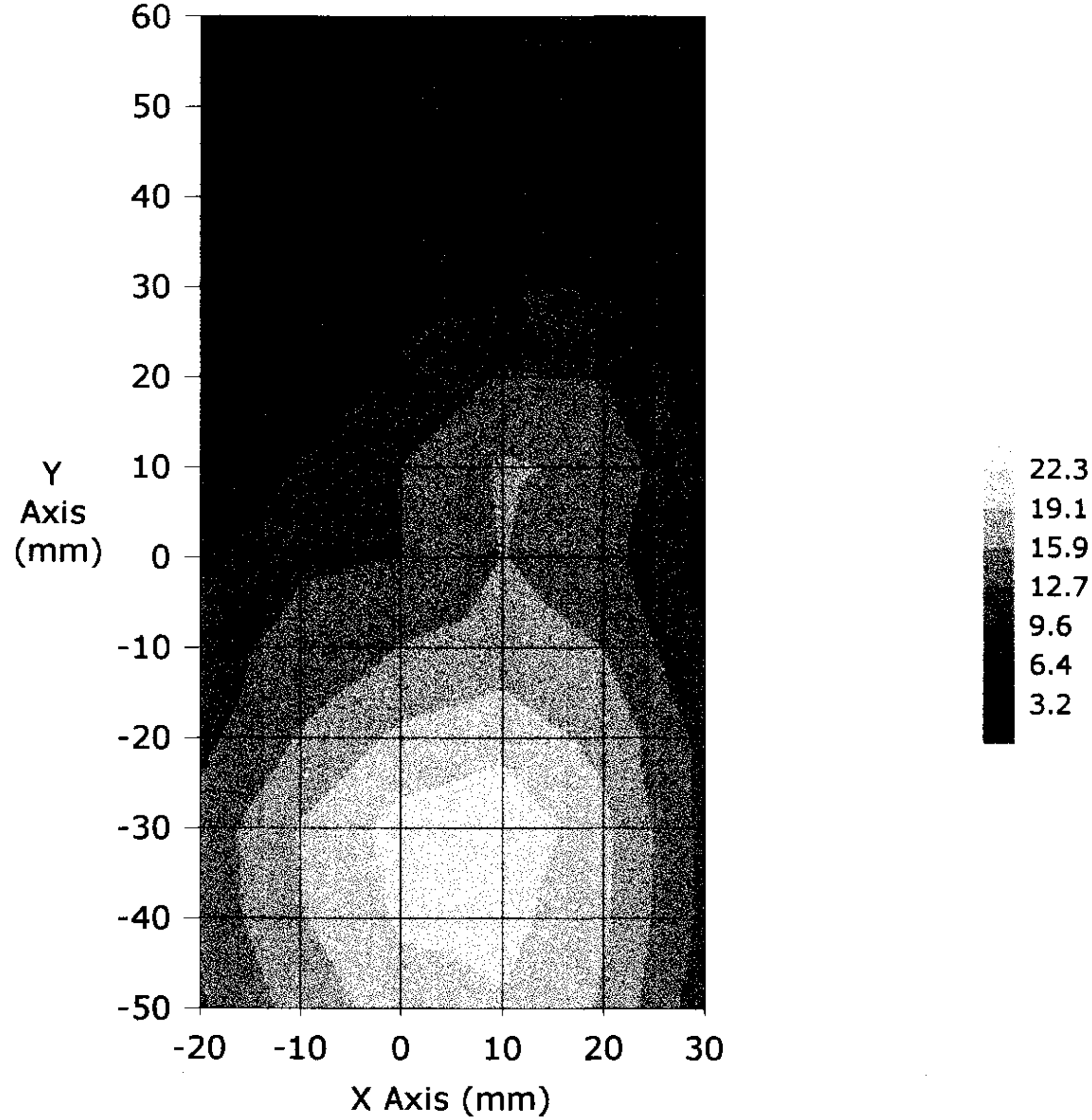
Measured Values (mV) :

24.86	16.54	12.36	9.44	7.47	6.03
4.87	3.75	2.82	2.19	1.90	

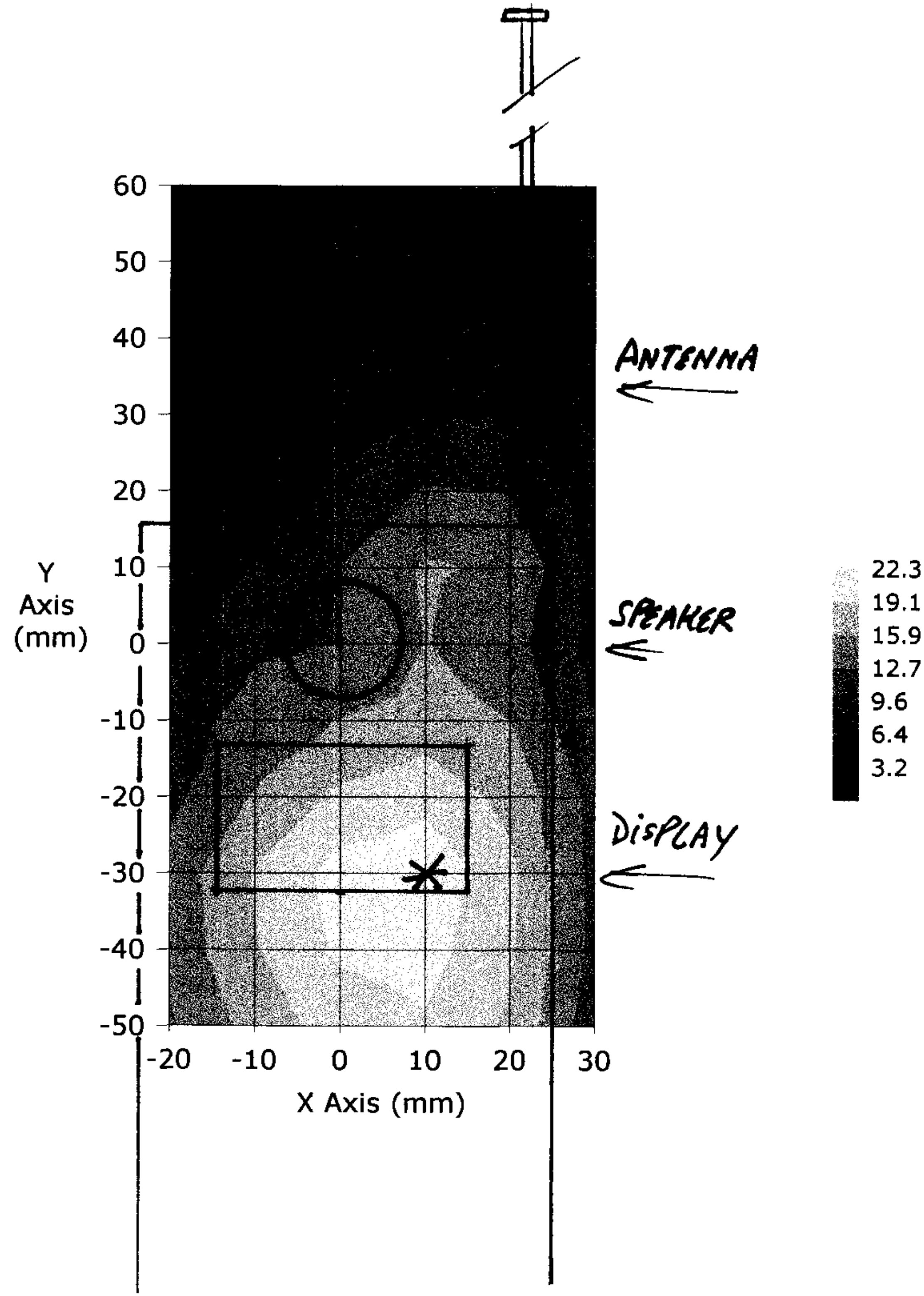
Peak Voltage (mV) : 30.69 **1 Cm Voltage (mV)** : 14.38 **SAR (W/Kg)** : 1.26


22.3
19.1
15.9
12.7
9.6
6.4
3.2
-20
-10
0
10
20
30
-50
-40
-30
-20
-10
0
10
20
30
40
50
60

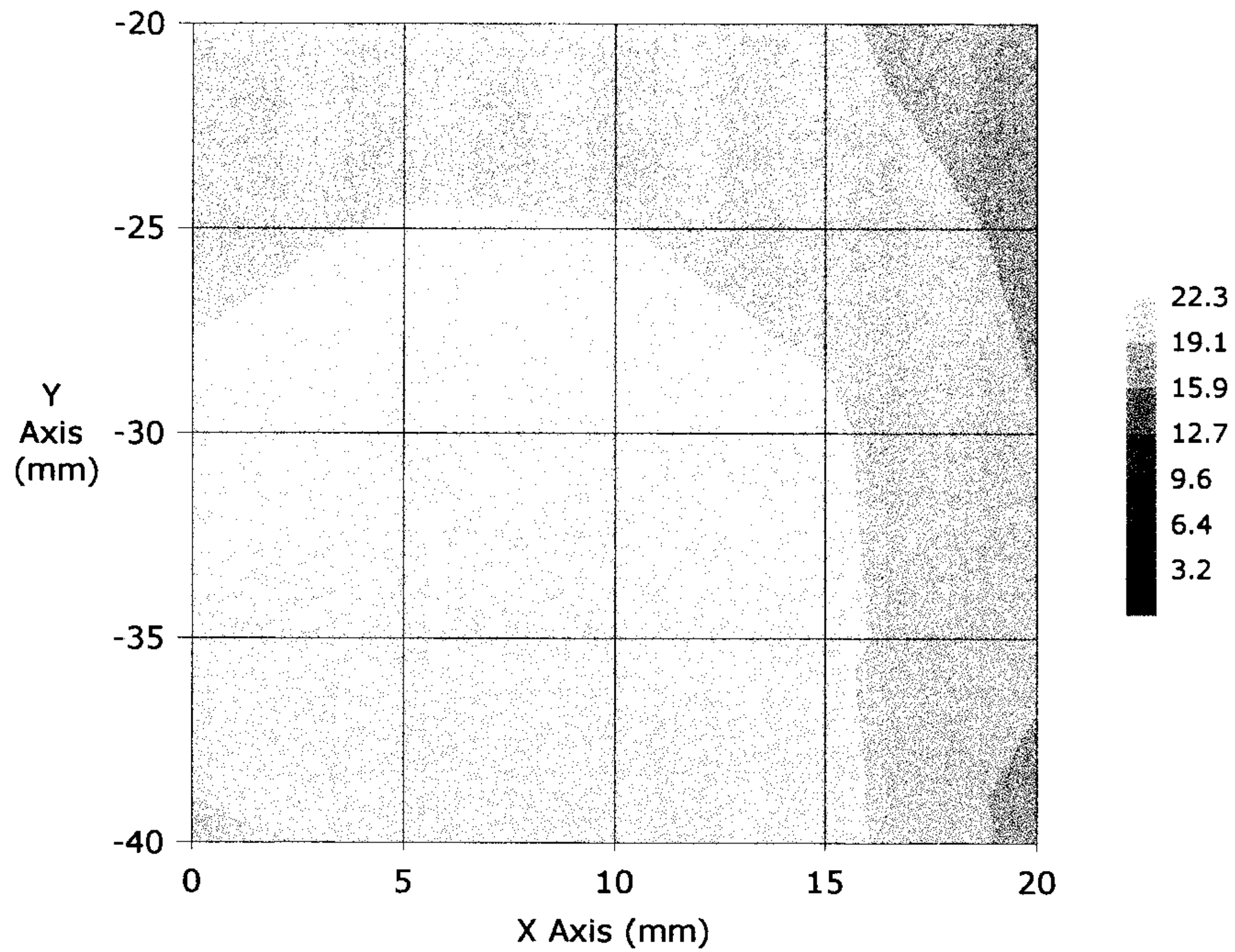

22.3
19.1
15.9
12.7
9.6
6.4
3.2
0
5
10
15
20
-20
-25
-30
-35
40

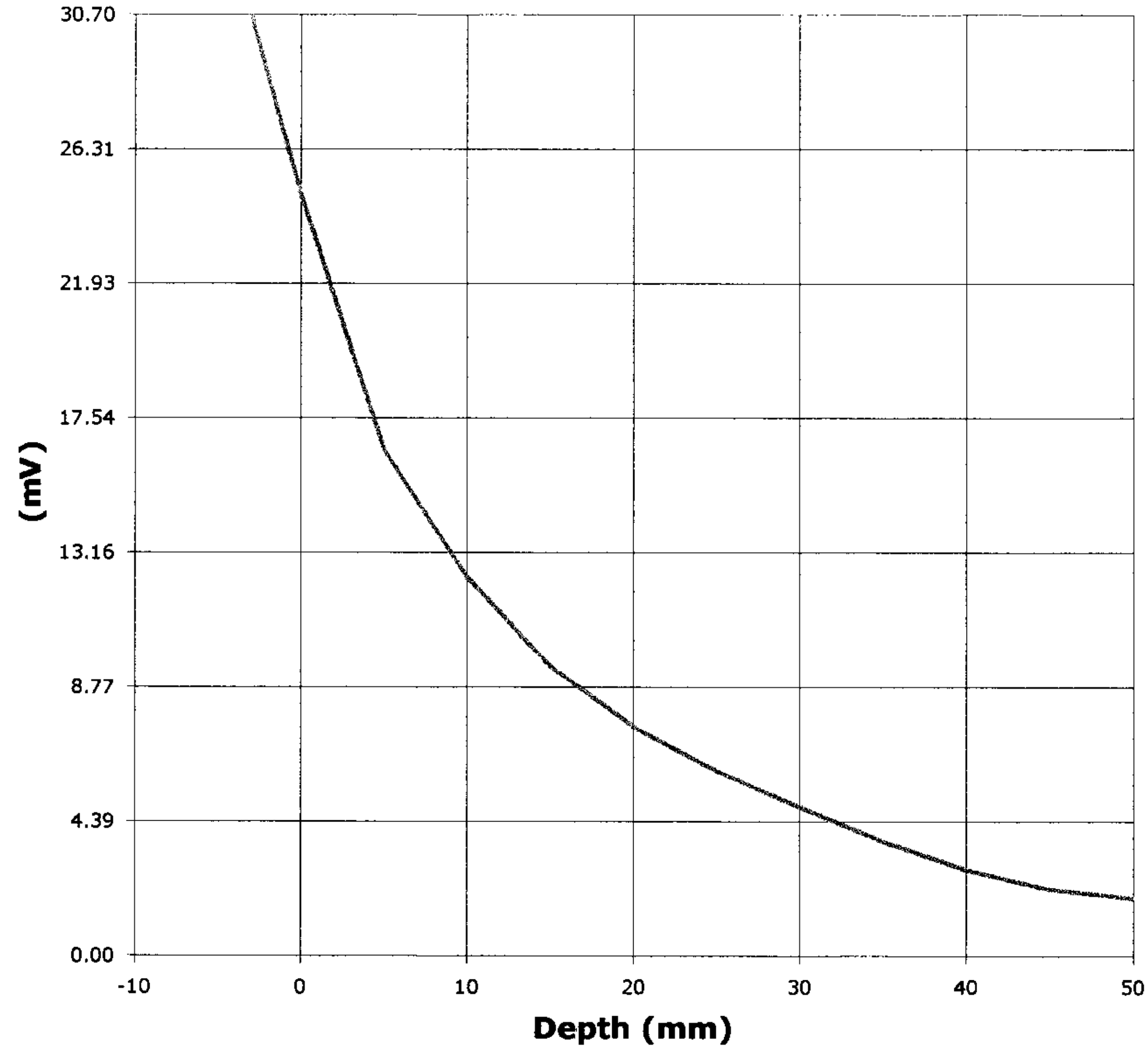


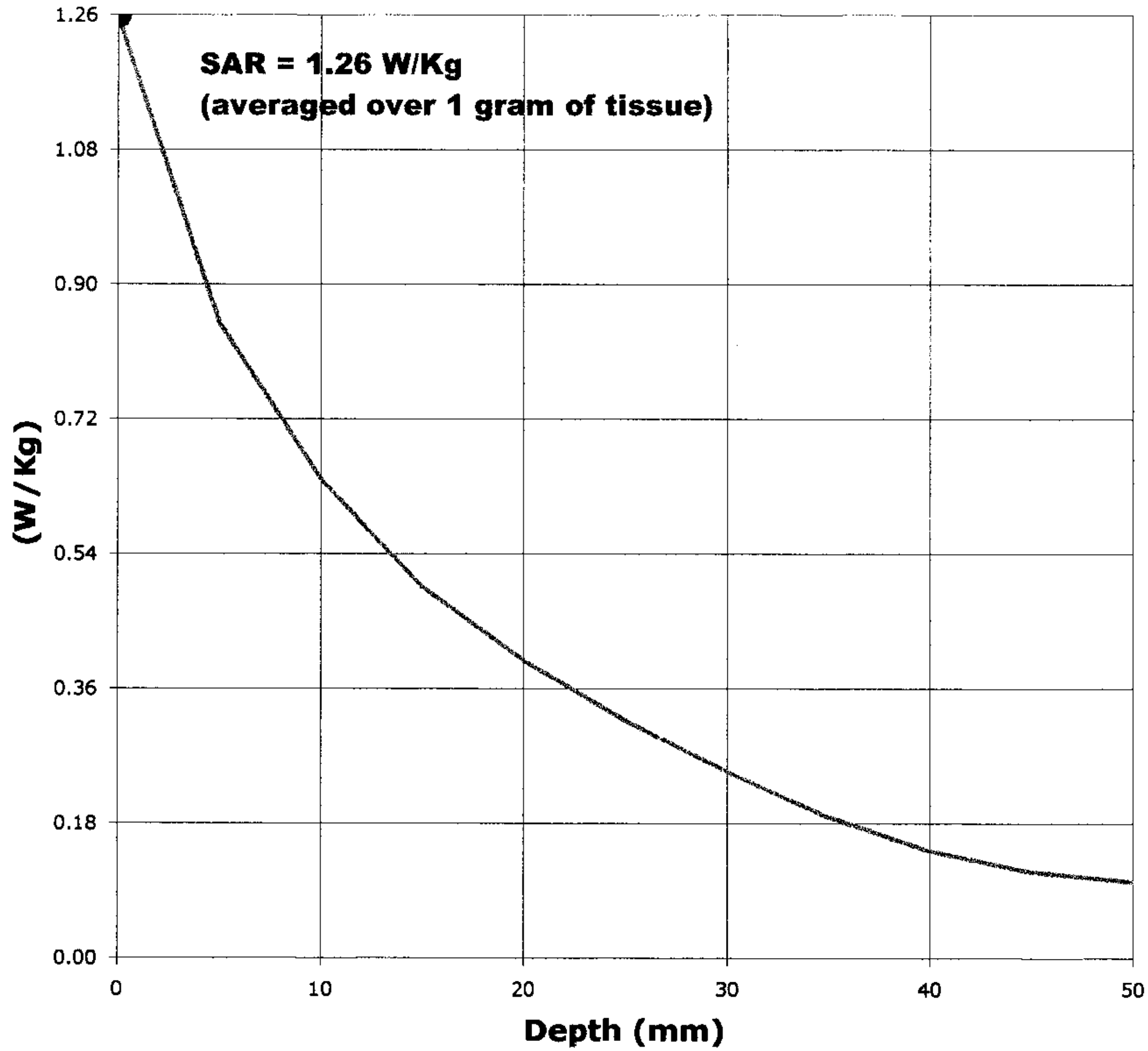
Y
Axis
(mm)
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-20
-10
0
10
20
30
X Axis (mm)
22.3
19.1
15.9
12.7
9.6
6.4
3.2


ANTENNA
SPEAKER
DISPLAY
22.3
19.1
15.9
12.7
9.6
6.4
3.2
Y Axis (mm)
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-20
-10
0
10
20
30
X Axis (mm)

32


-20
-25
-30
-35
-40
Y
Axis
(mm)
0
5
10
15
20
X Axis (mm)
22.3
19.1
15.9
12.7
9.6
6.4
3.2


30.70
26.31
21.93
17.54
13.16
8.77
4.39
0.00
(mV)
-10
0
10
20
30
40
50
Depth (mm)


SAR = 1.26 W/Kg
(averaged over 1 gram of tissue)
1.26
1.08
0.90
0.72
0.54
0.36
0.18
0.00
(W / Kg)
0
10
20
30
40
50
Depth (mm)

Test Information

Date : 4/2/99
Time : 3:58:31 PM

Ref. : 10028

Product	: Cellular Phone	**Test**	: SAR
Manufacturer	: Maxon	**Frequency (MHz)**	: 837
Model Number	: MX-1009	**Nominal Output Power (W)**	: 0.600
Serial Number	: AR10302011810000081	**Antenna Type**	: Monopole
FCC ID Number	: F3JMX1009	**Signal**	: CW

Phantom	: Head - Left Ear	**Dielectric Constant**	: 43.8
Simulated Tissue	: Brain	**Conductivity**	: 0.86

Probe	: E	**Antenna Position**	: IN
Probe Offset (mm)	: 3.0	**Measured Power (W) (conducted)**	: 0.413
Sensor Factor (mV)	: 10.8	**Cable Insertion Loss (dB)**	: 0.5
Conversion Factor	: 0.61	**Compensated Power (W)**	: 0.463
Calibrated Date	: 3/24/99		

Amplifier Setting :

Channel 1 : .00387   Channel 2 : .00373   Channel 3 : .00296

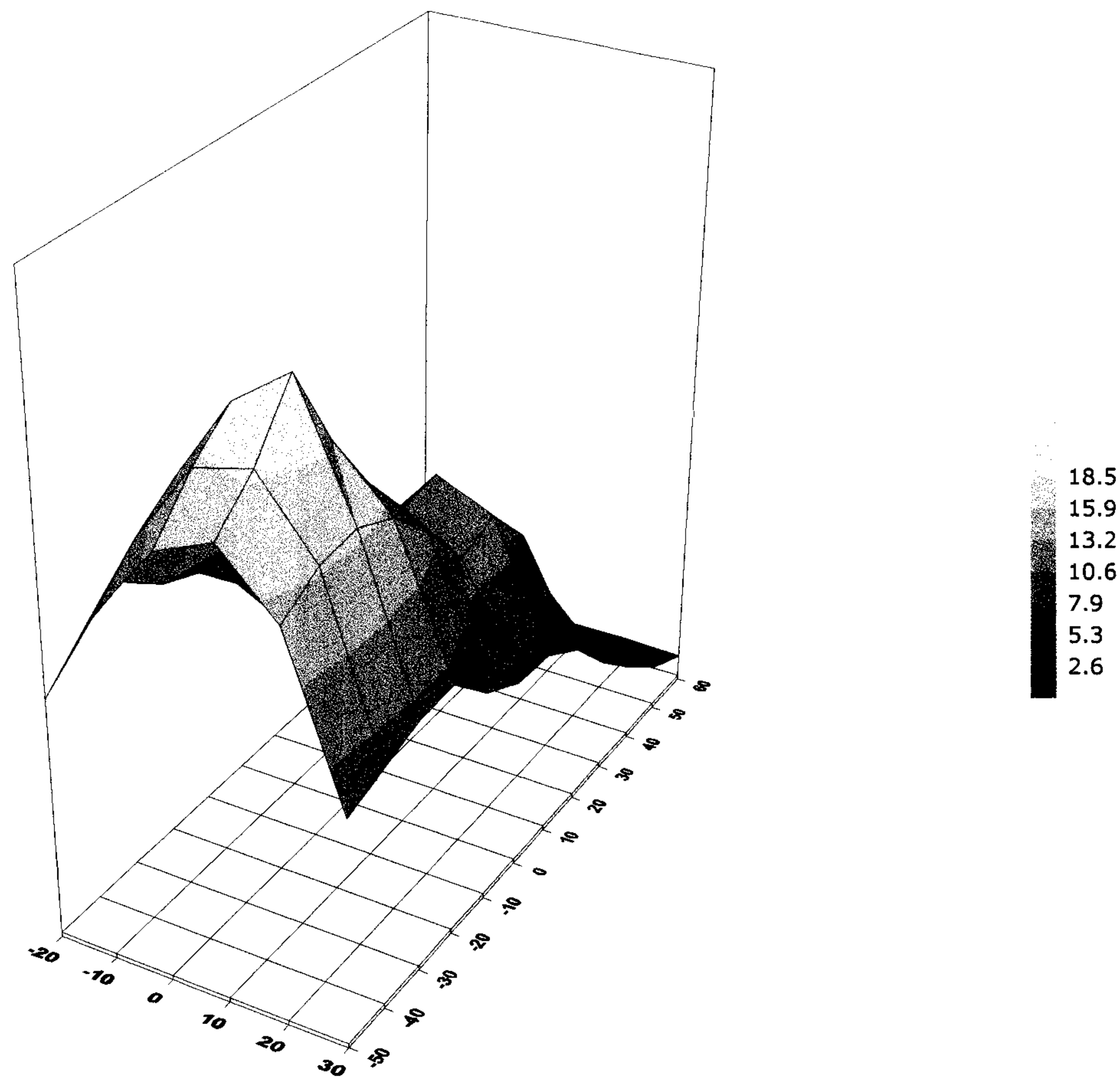
Location of Maximum Field :

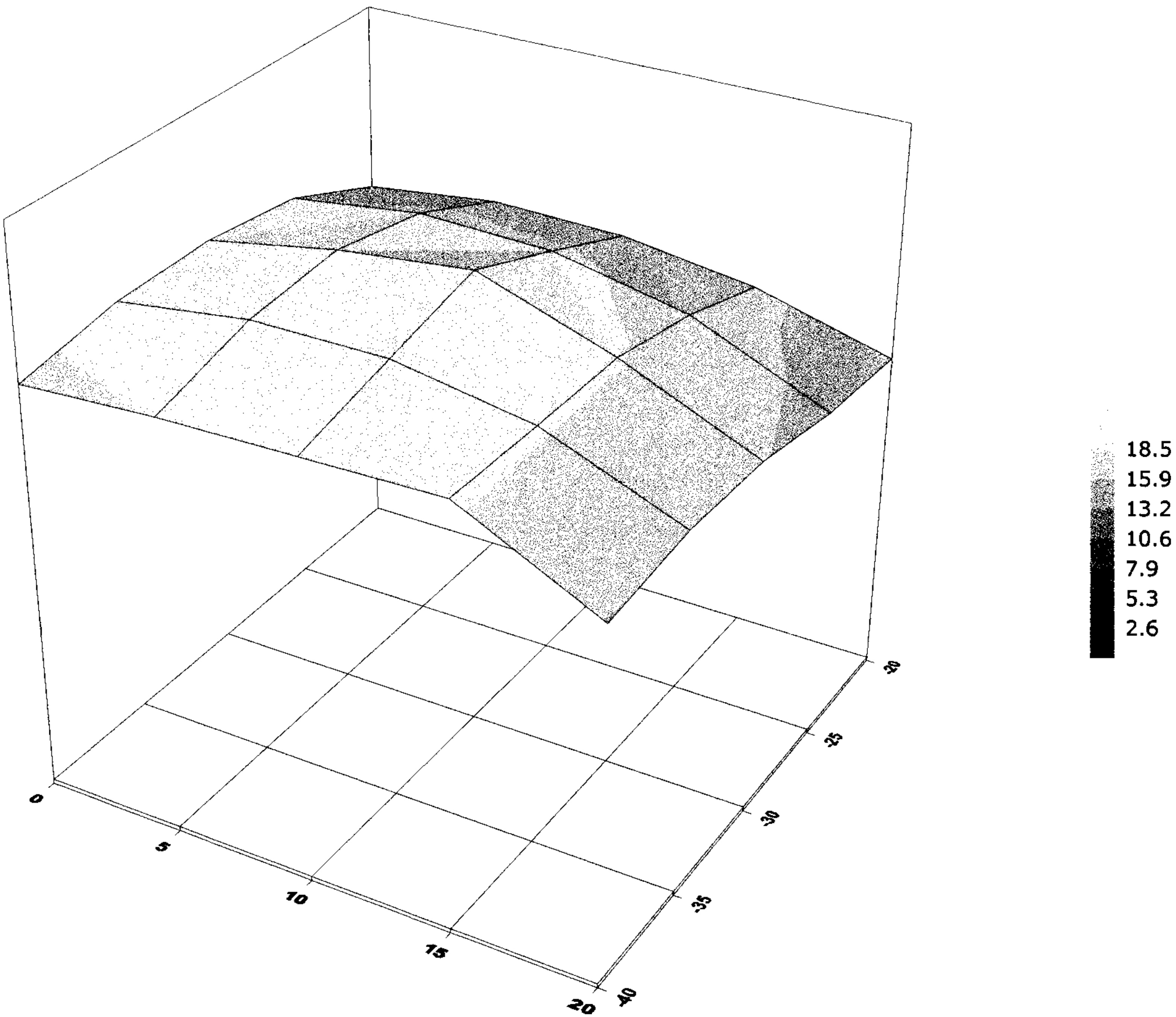
X = 10   Y = -30

Measured Values (mV) :

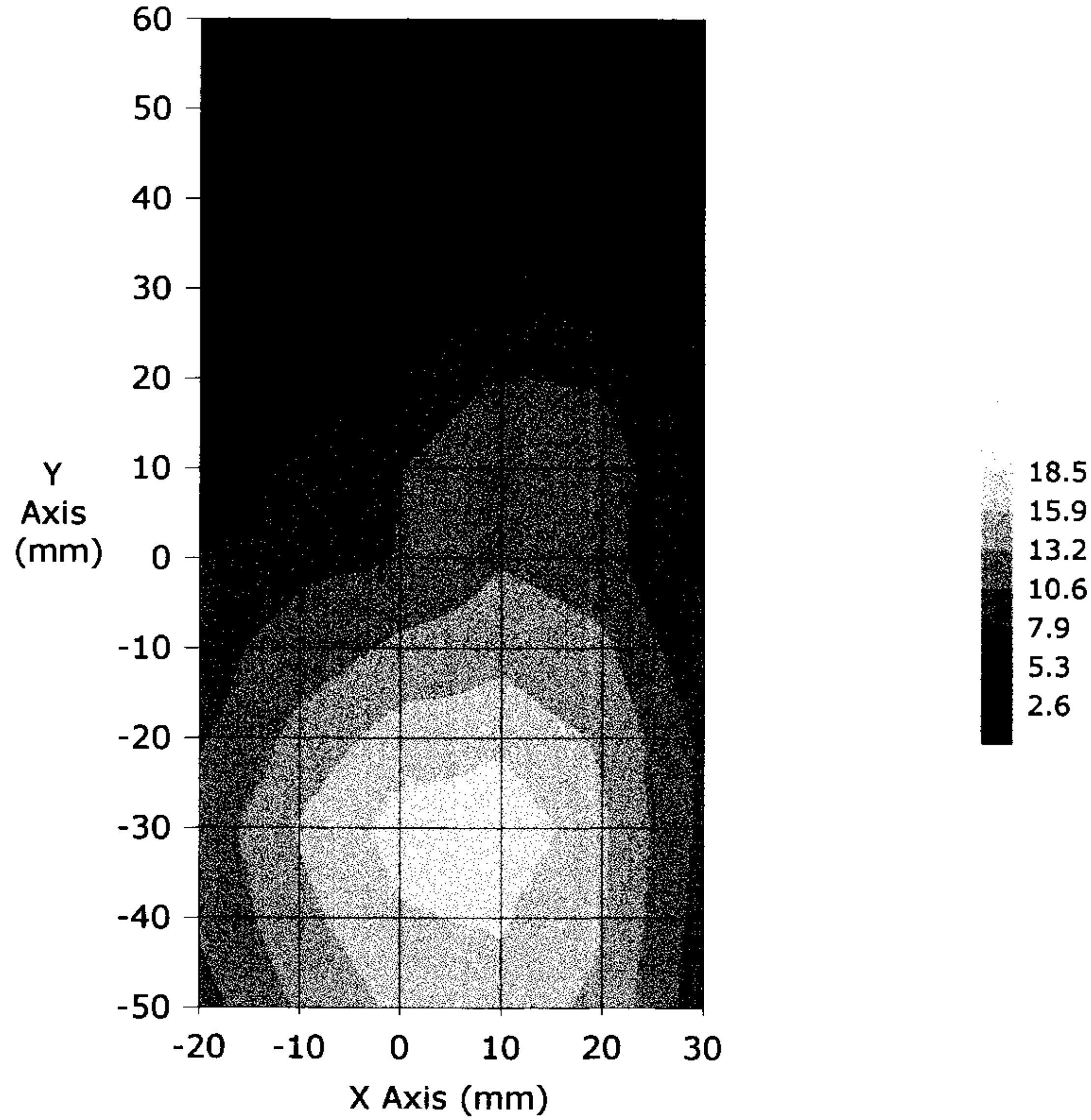
20.69	13.79	10.33	7.93	6.26	5.12
4.16	3.22	2.37	1.84	1.62	

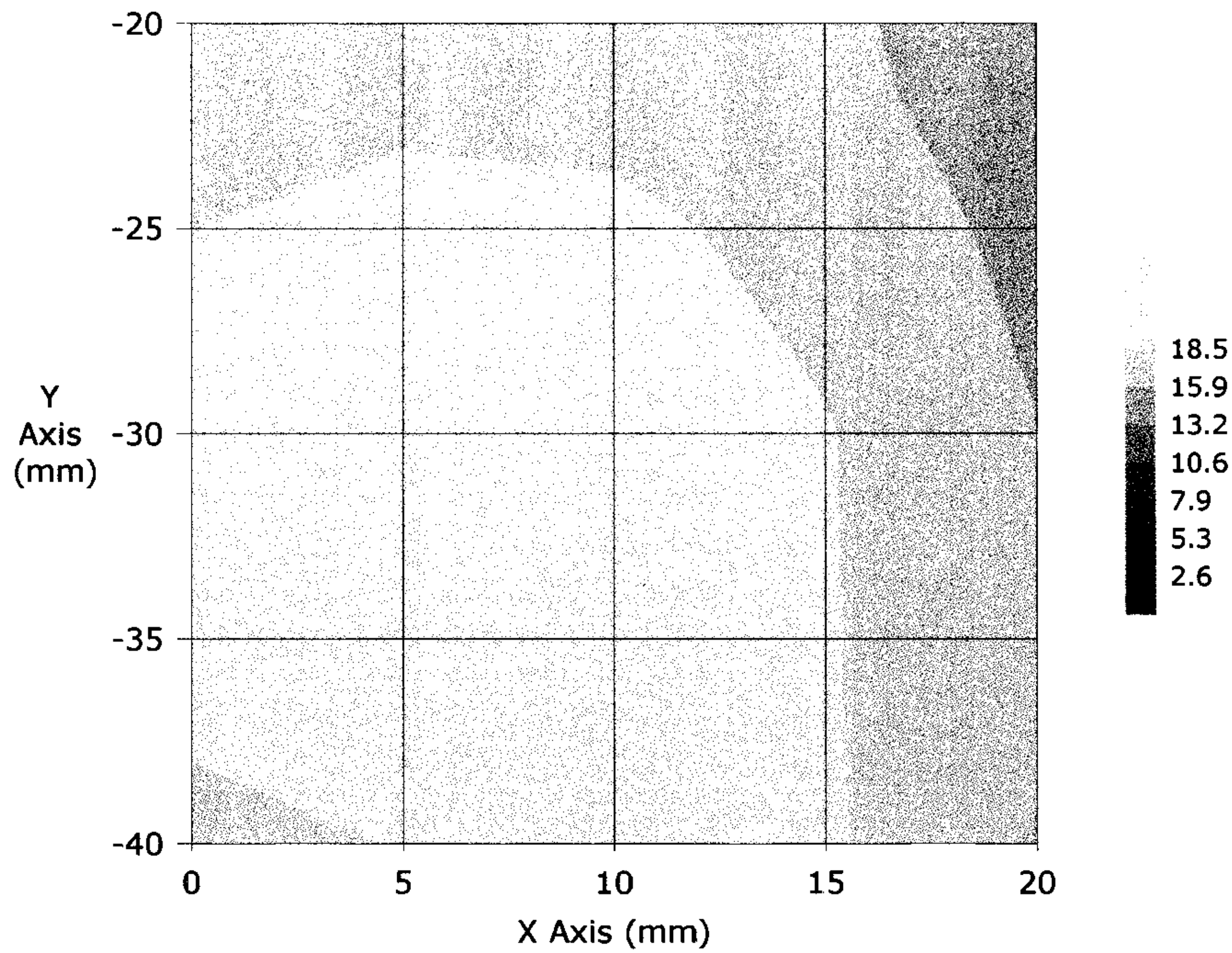
Peak Voltage (mV) : 25.51   **1 Cm Voltage (mV)** : 12.01   **SAR (W/Kg)** : 1.05


18.5
15.9
13.2
10.6
7.9
5.3
2.6
-20
-10
0
10
20
30
-50
-40
-30
-20
-10
0
10
20
30
40
50
60

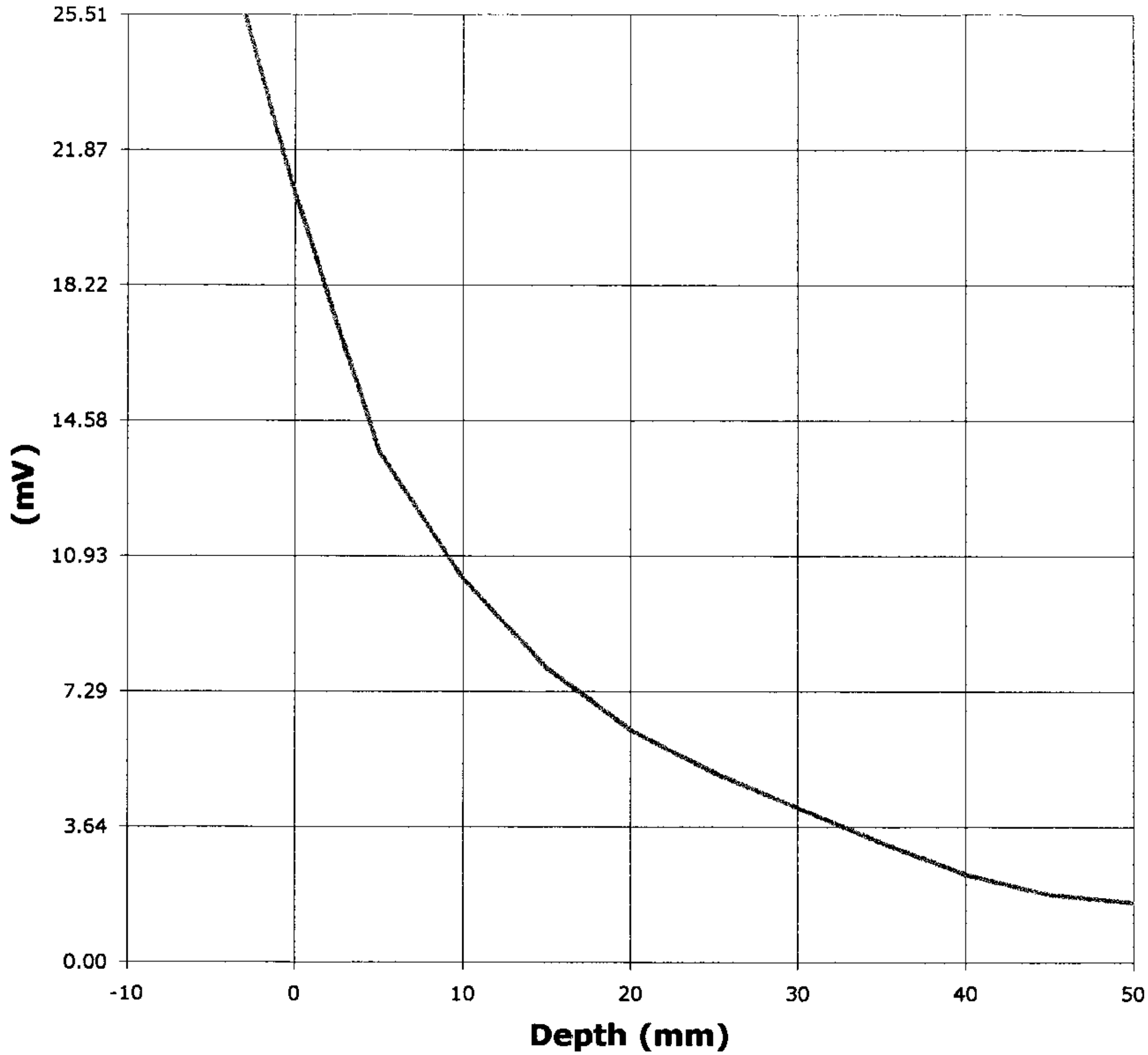


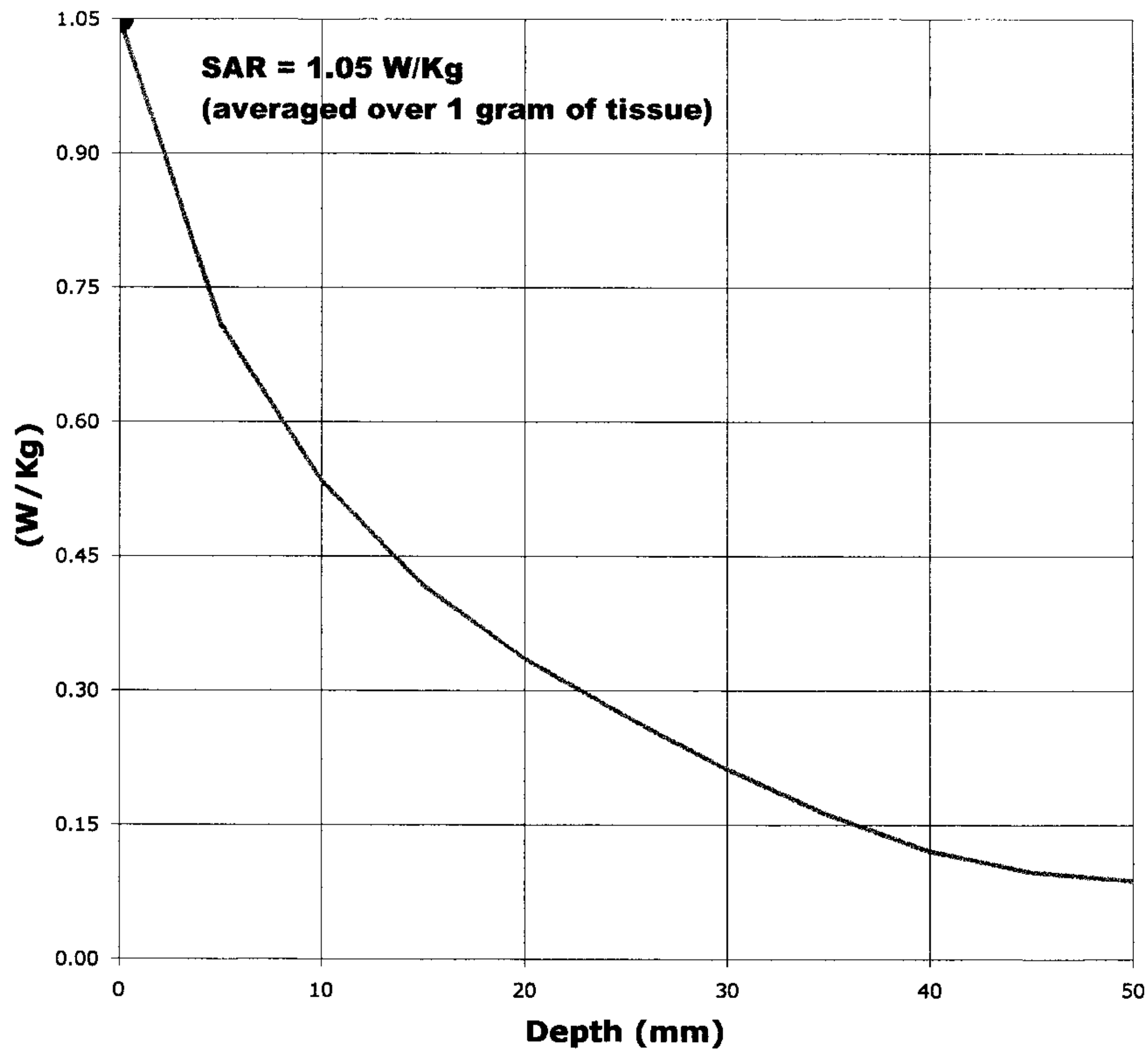
18.5
15.9
13.2
10.6
7.9
5.3
2.6
0
5
10
15
20
20
25
30
35
40


60
50
40
30
20
10
0
-10
-20
-30
-40
-50
Y Axis (mm)
-20
-10
0
10
20
30
X Axis (mm)
18.5
15.9
13.2
10.6
7.9
5.3
2.6



-20
-25
-30
-35
-40
Y
Axis
(mm)
0
5
10
15
20
X Axis (mm)
18.5
15.9
13.2
10.6
7.9
5.3
2.6


25.51
21.87
18.22
14.58
10.93
7.29
3.64
0.00
(mV)
-10
0
10
20
30
40
50
Depth (mm)


SAR = 1.05 W/Kg
(averaged over 1 gram of tissue)
(W/Kg)
1.05
0.90
0.75
0.60
0.45
0.30
0.15
0.00
0
10
20
30
40
50
Depth (mm)

Test Information

Date : 4/2/99
Time : 4:53:03 PM

Ref. : 10028

Product : Cellular Phone
Manufacturer : Maxon
Model Number : MX-1009
Serial Number : AR10302011810000081
FCC ID Number : F3JMX1009

Test : SAR
Frequency (MHz) : 849
Nominal Output Power (W) : 0.600
Antenna Type : Monopole
Signal : CW

Phantom : Head - Left Ear
Simulated Tissue : Brain

Dielectric Constant : 43.8
Conductivity : 0.86

Probe : E
Probe Offset (mm) : 3.0
Sensor Factor (mV) : 10.8
Conversion Factor : 0.61
Calibrated Date : 3/24/99

Antenna Position : IN
Measured Power (W) (conducted) : 0.352
Cable Insertion Loss (dB): 0.5
Compensated Power (W) : 0.395

Amplifier Setting :
Channel 1 : .00387 Channel 2 : .00373 Channel 3 : .00296

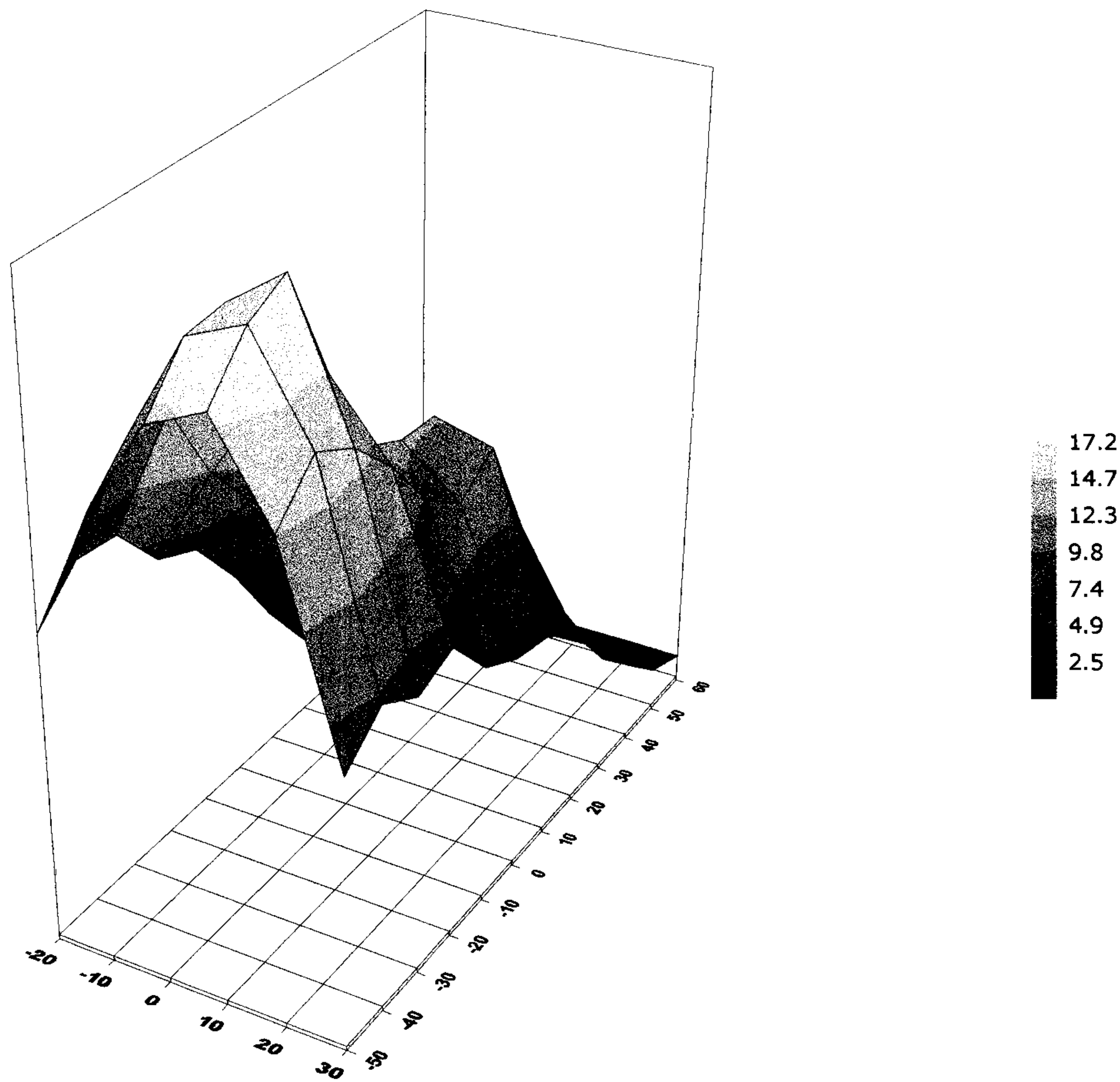
Location of Maximum Field :

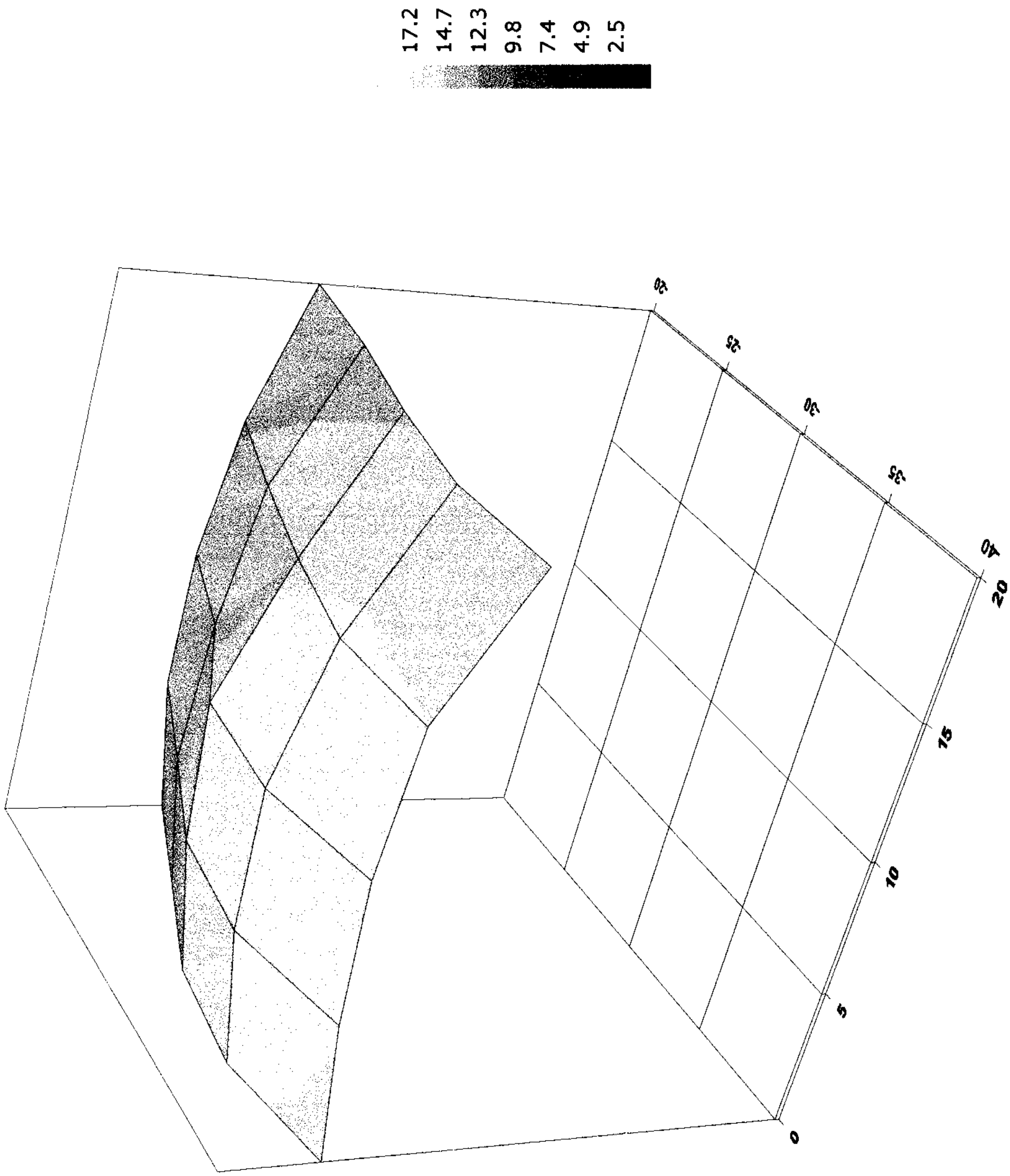
X = 10 Y = -35

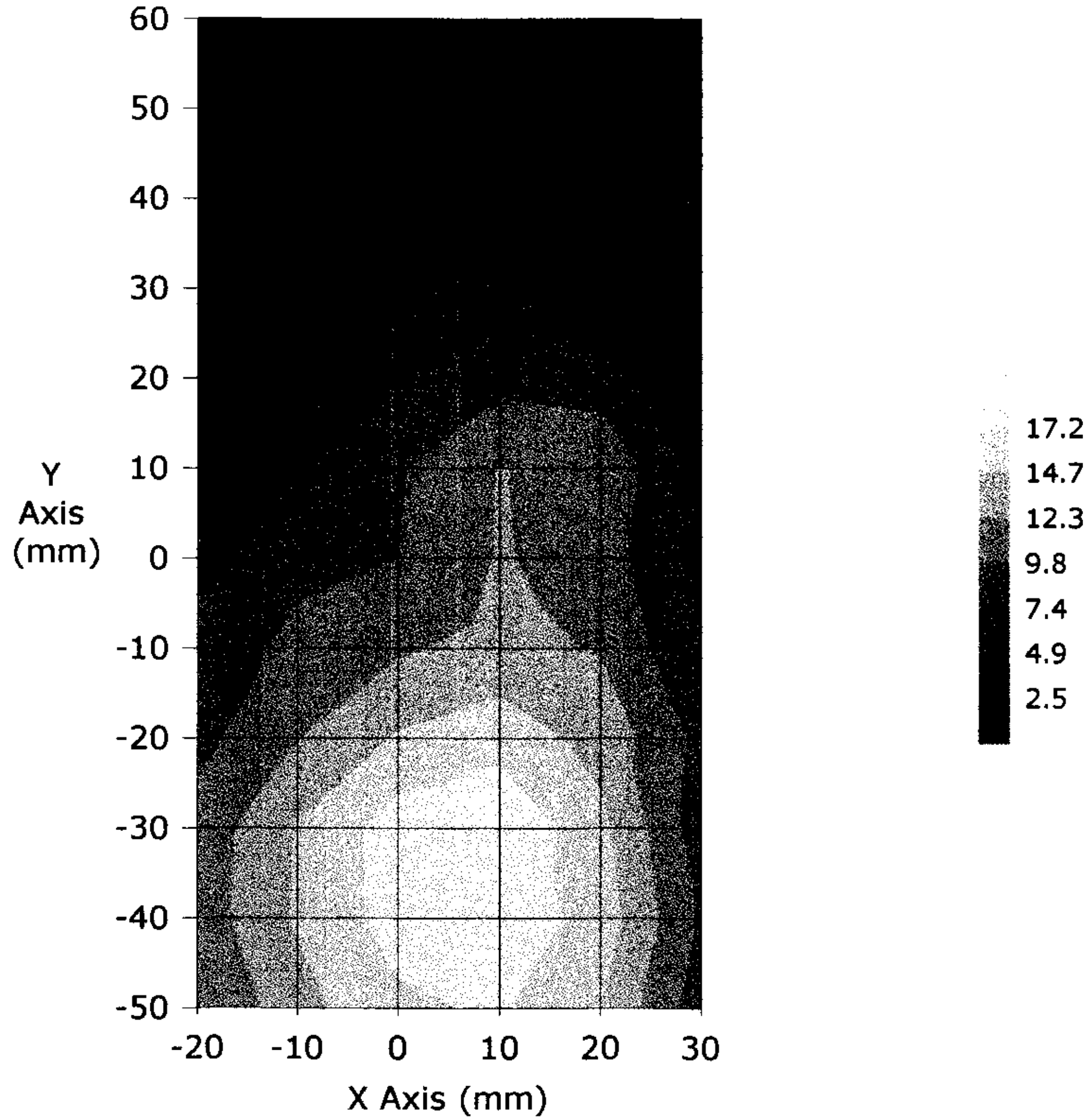
Measured Values (mV) :

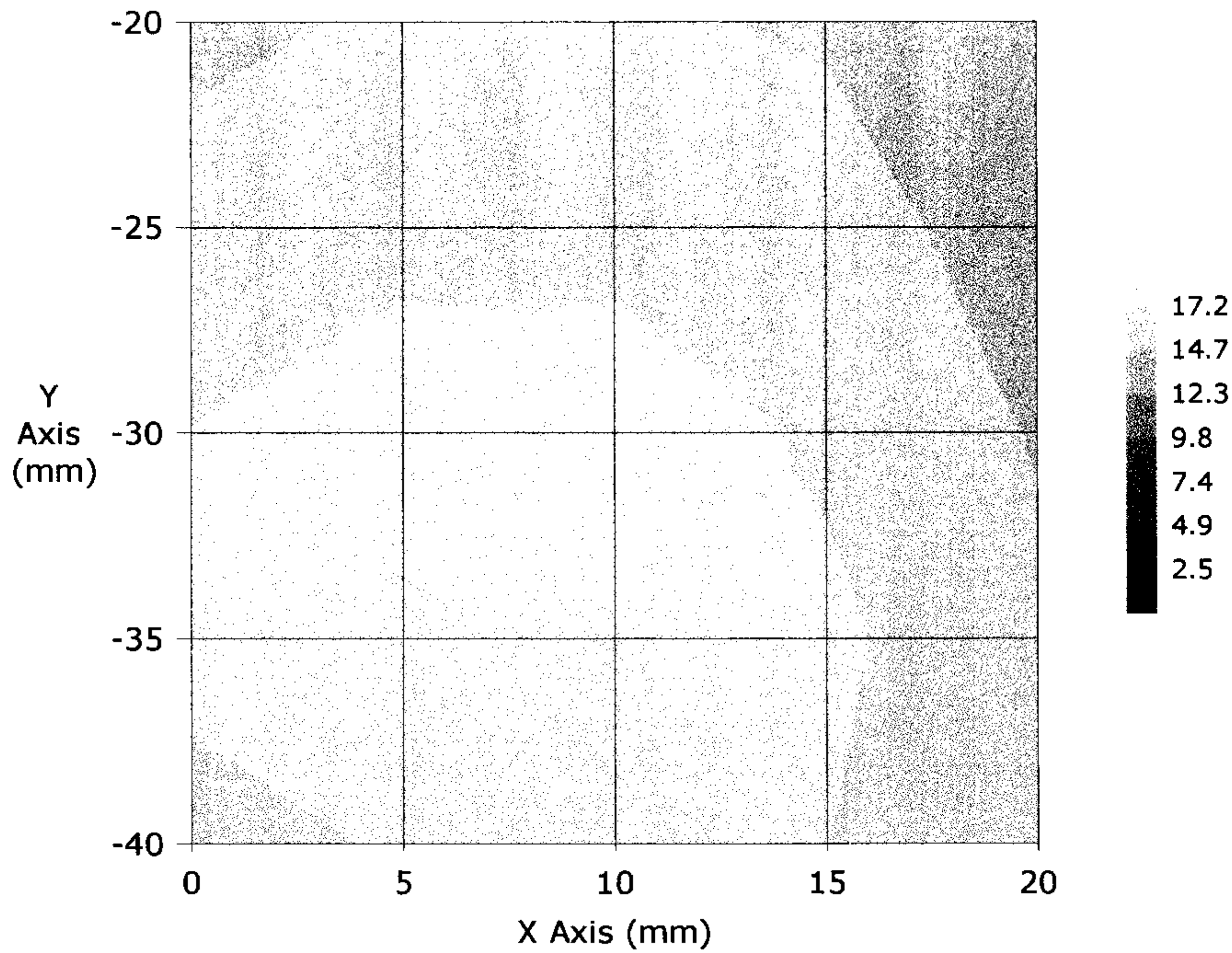
18.51	12.48	9.42	7.23	5.71	4.66
3.76	2.90	2.14	1.67	1.47	

Peak Voltage (mV) : 22.69 **1 Cm Voltage (mV)** : 10.95 **SAR (W/Kg)** : 0.94

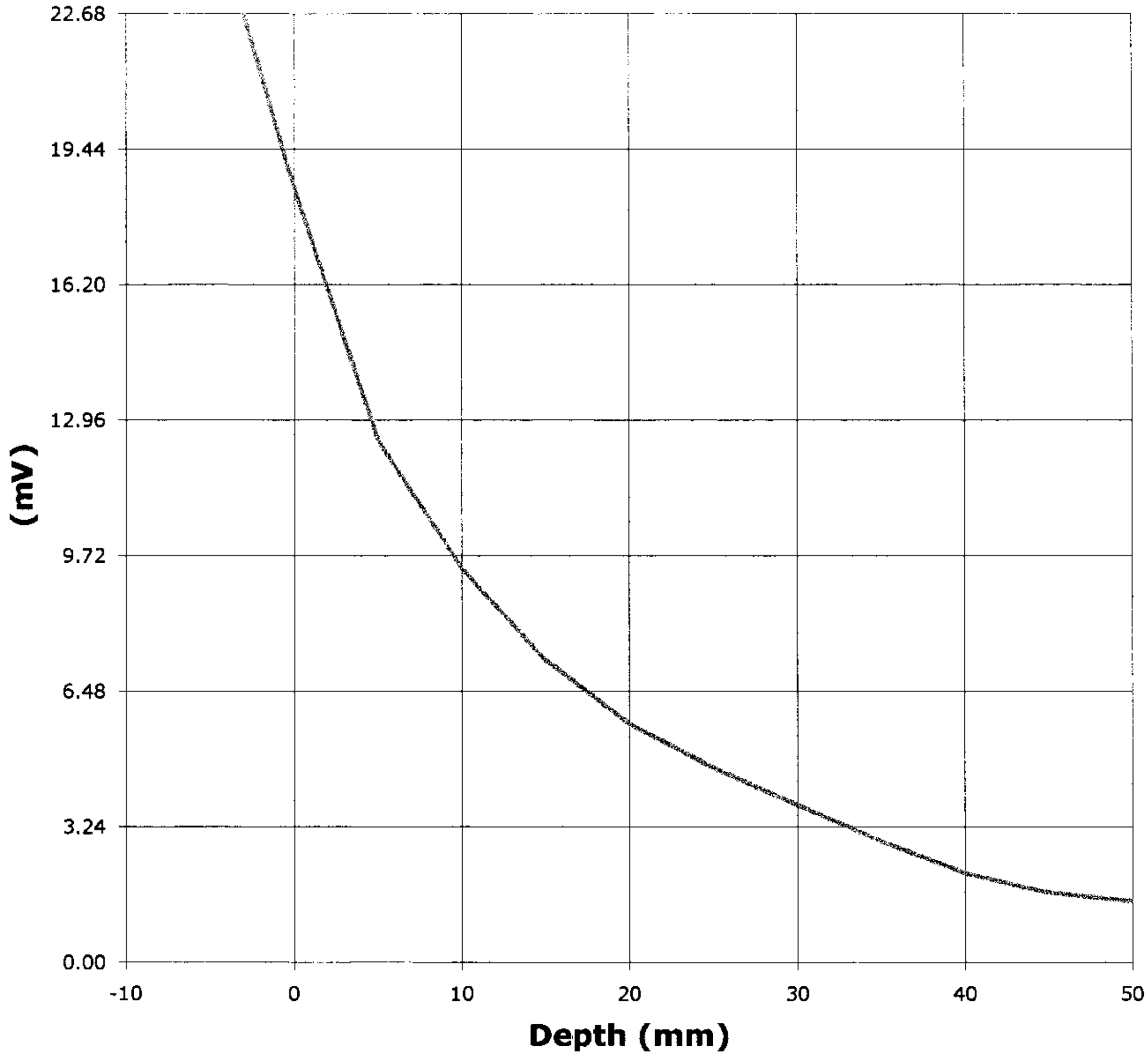

17.2
14.7
12.3
9.8
7.4
4.9
2.5
-20
-10
0
10
20
30
-50
40
-30
-20
-10
0
10
20
30
40
50
60

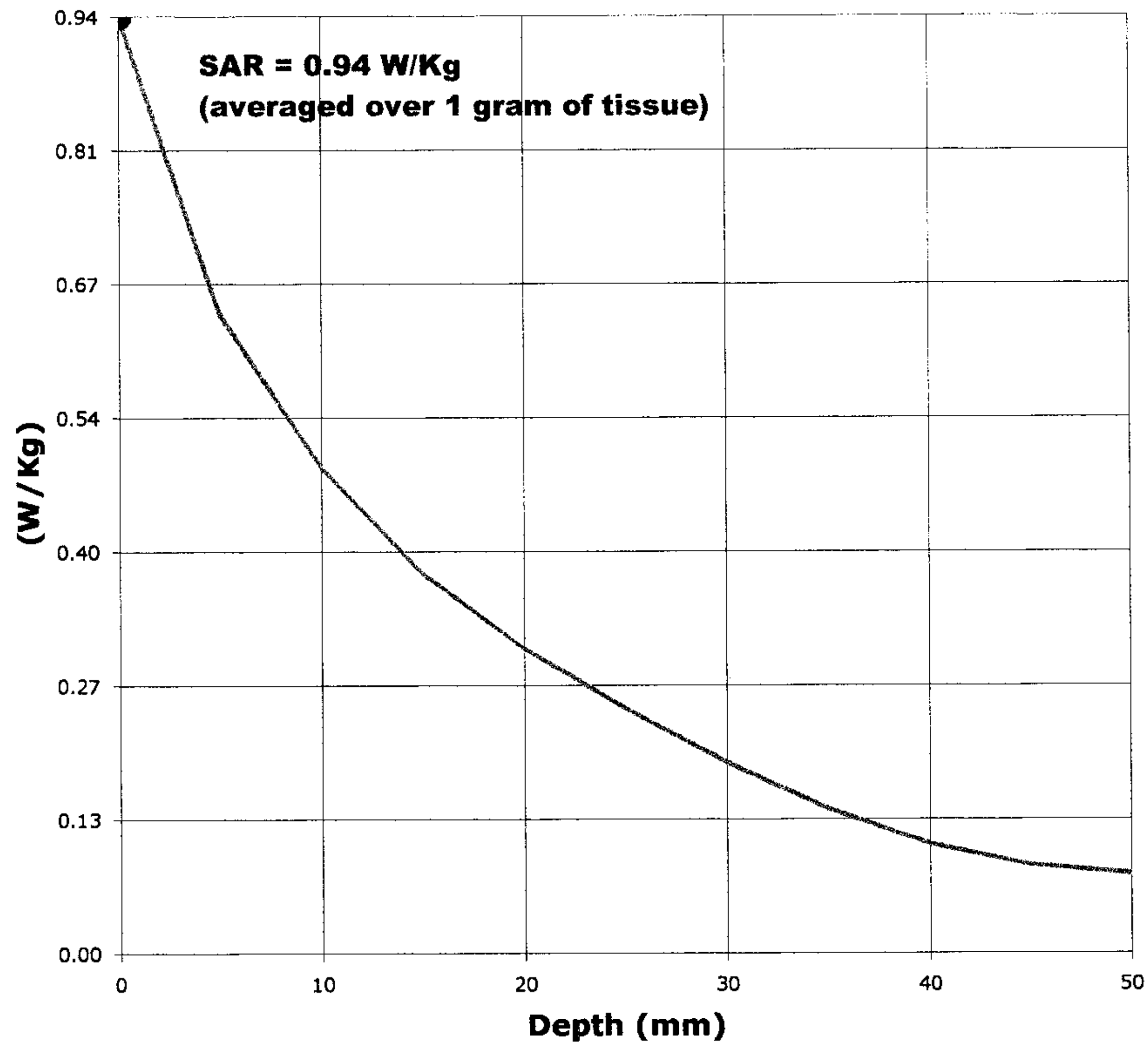

17.2
14.7
12.3
9.8
7.4
4.9
2.5
0
5
10
15
20
20
25
30
35
40


60
50
40
30
20
10
0
-10
-20
-30
-40
-50
Y Axis (mm)
-20
-10
0
10
20
30
X Axis (mm)
17.2
14.7
12.3
9.8
7.4
4.9
2.5



-20
-25
-30
-35
-40
Y
Axis
(mm)
0
5
10
15
20
X Axis (mm)
17.2
14.7
12.3
9.8
7.4
4.9
2.5


22.68
19.44
16.20
12.96
9.72
6.48
3.24
0.00
(mV)
-10
0
10
20
30
40
50
Depth (mm)


SAR = 0.94 W/Kg
(averaged over 1 gram of tissue)
0.94
0.81
0.67
0.54
0.40
0.27
0.13
0.00
(W/Kg)
0
10
20
30
40
50
Depth (mm)

Test Information

Date : 4/2/99
Time : 5:10:03 PM

Ref. : 10028

Product	: Cellular Phone	**Test**	: SAR
Manufacturer	: Maxon	**Frequency (MHz)**	: 849
Model Number	: MX-1009	**Nominal Output Power (W)**	: 0.600
Serial Number	: AR10302011810000081	**Antenna Type**	: Monopole
FCC ID Number	: F3JMX1009	**Signal**	: CW

Phantom	: Head - Left Ear	**Dielectric Constant**	: 43.8
Simulated Tissue	: Brain	**Conductivity**	: 0.86

Probe	: E	**Antenna Position**	: OUT
Probe Offset (mm)	: 3.0	**Measured Power (W) (conducted)**	: 0.352
Sensor Factor (mV)	: 10.8	**Cable Insertion Loss (dB)**	: 0.5
Conversion Factor	: 0.61	**Compensated Power (W)**	: 0.395
Calibrated Date	: 3/24/99		

Amplifier Setting :

Channel 1 : .00387 Channel 2 : .00373 Channel 3 : .00296

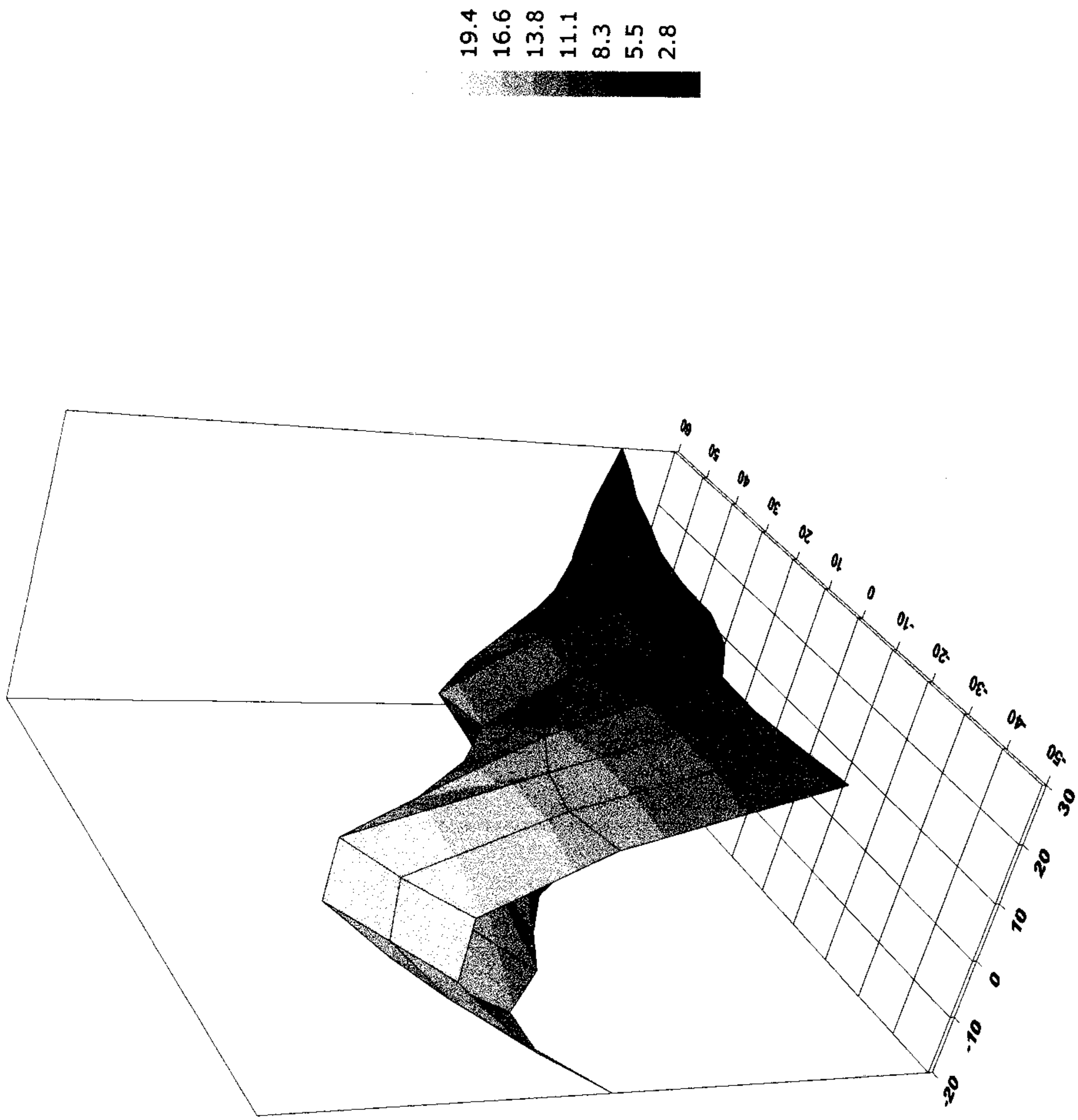
Location of Maximum Field :

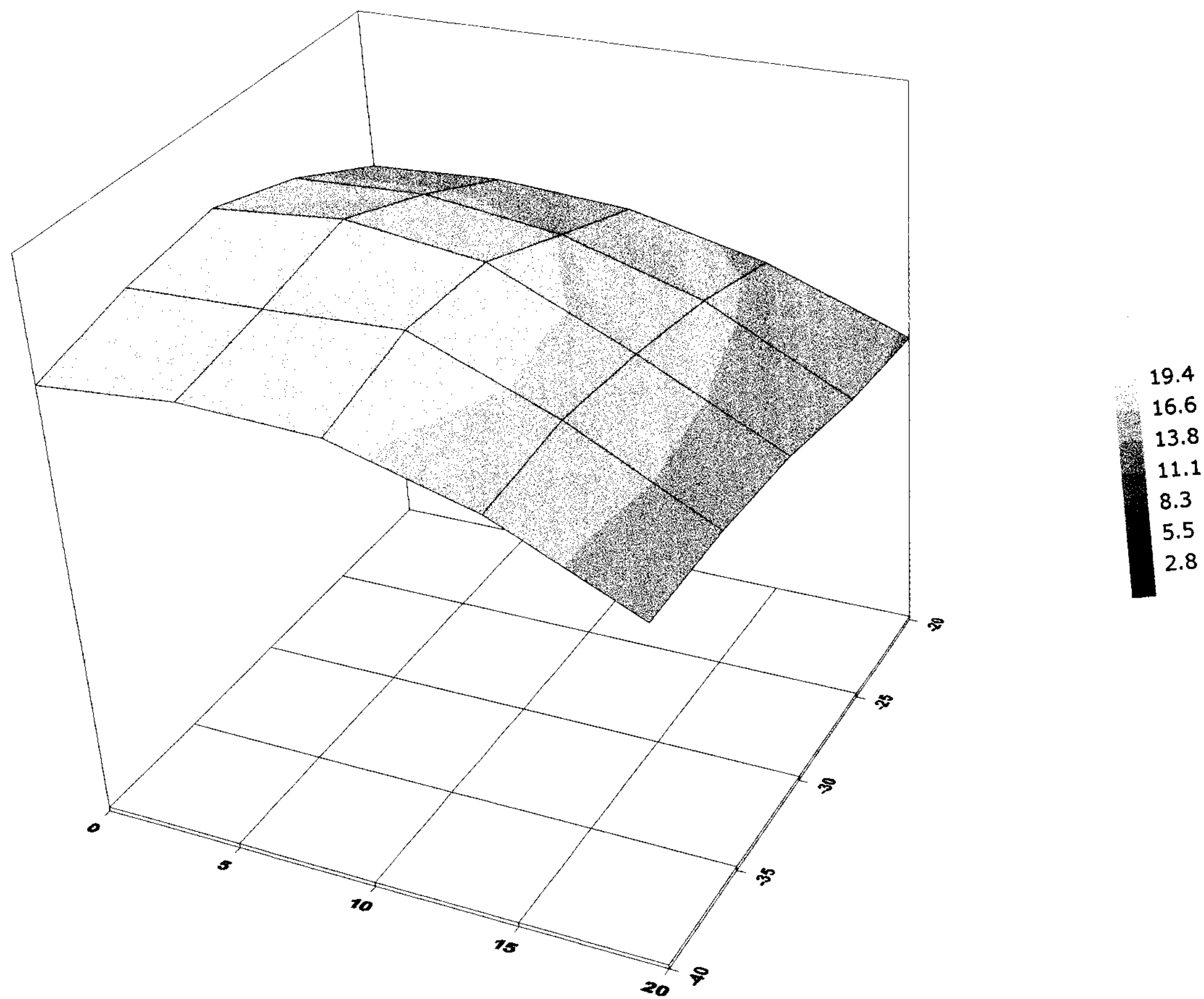
X = 5 Y = -30

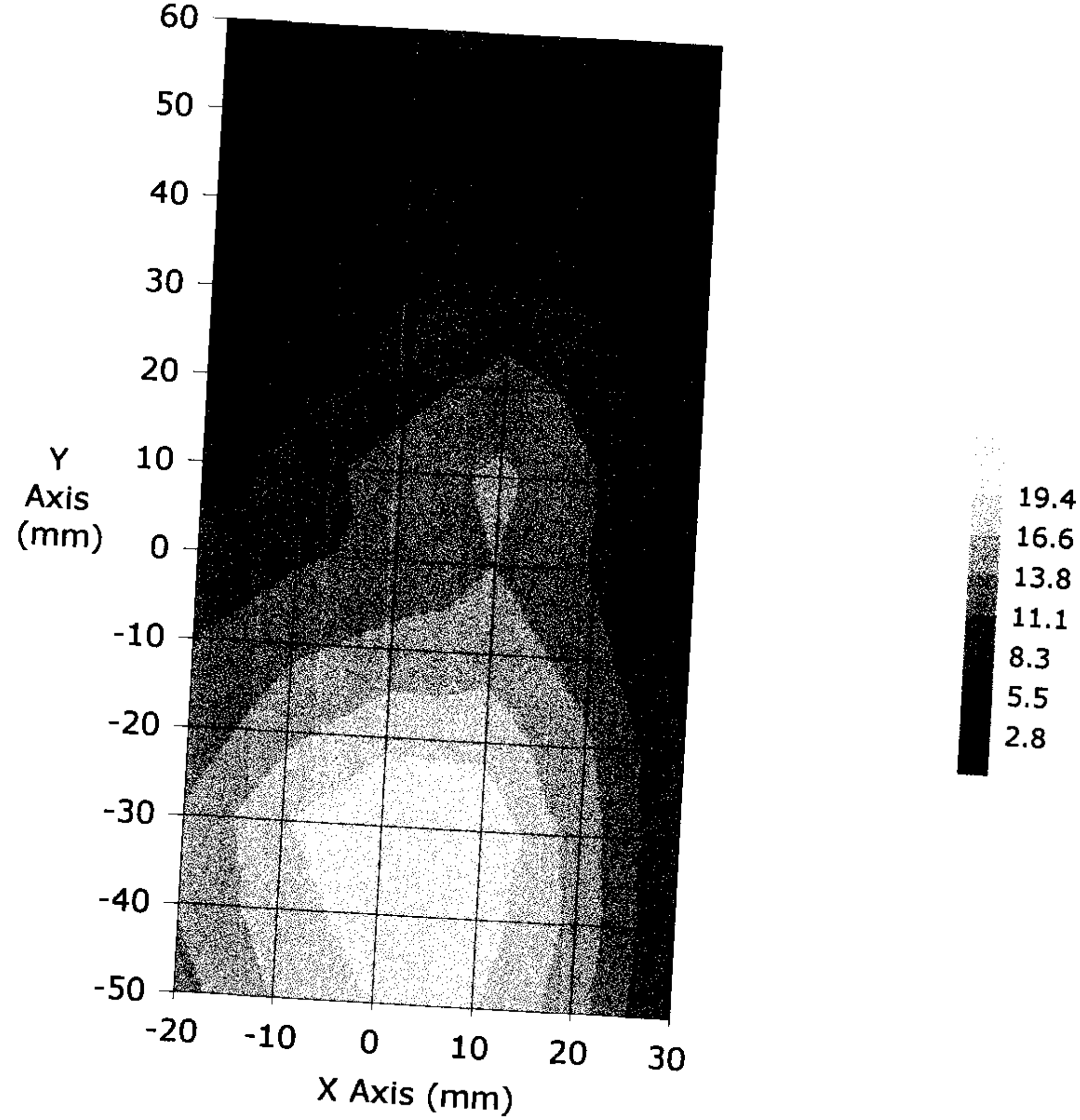
Measured Values (mV) :

21.32	14.71	11.14	8.59	6.78	5.49
4.38	3.36	2.49	1.94	1.70	

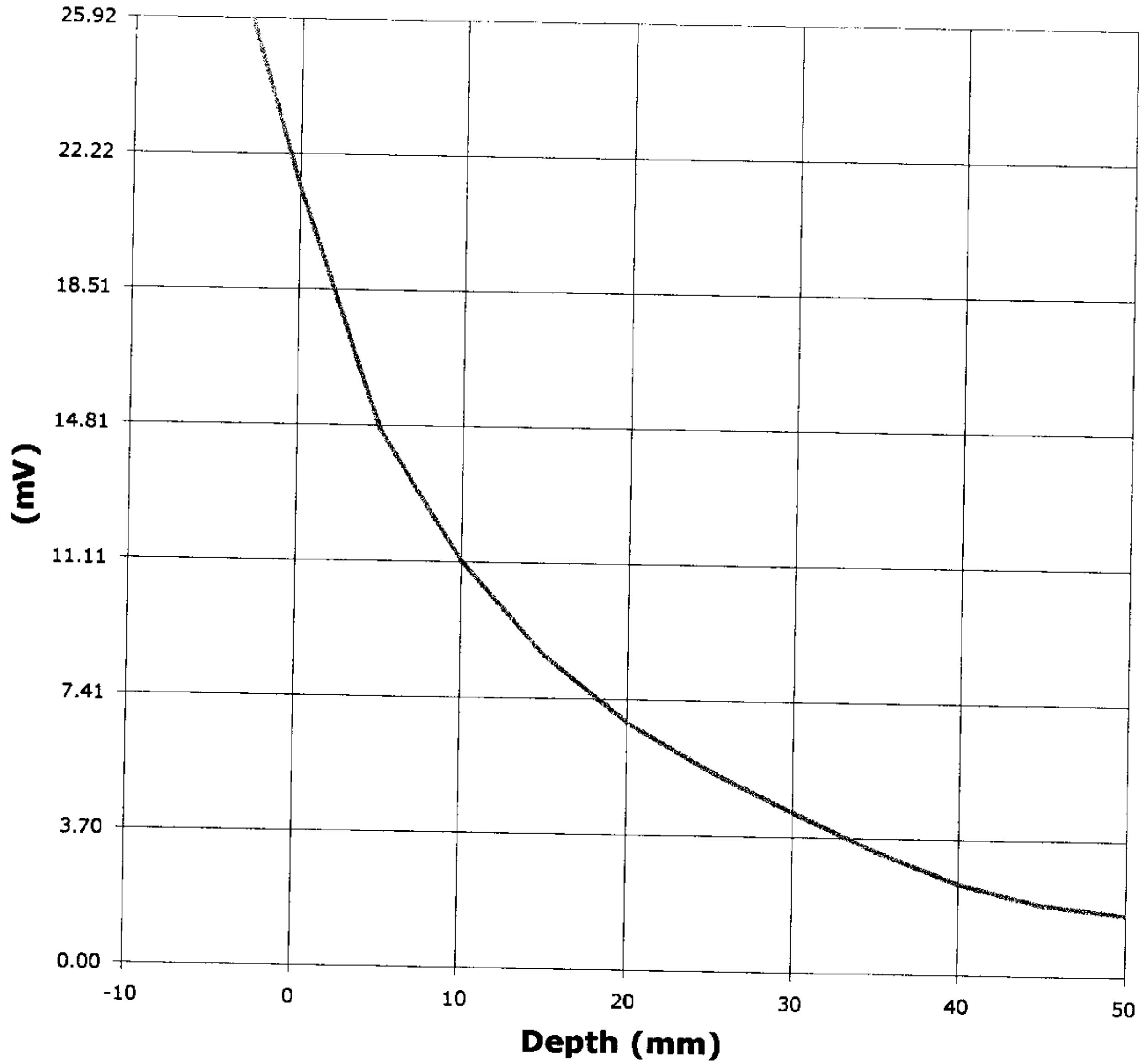
Peak Voltage (mV) : 25.92 **1 Cm Voltage (mV)** : 12.93 **SAR (W/Kg)** : 1.09

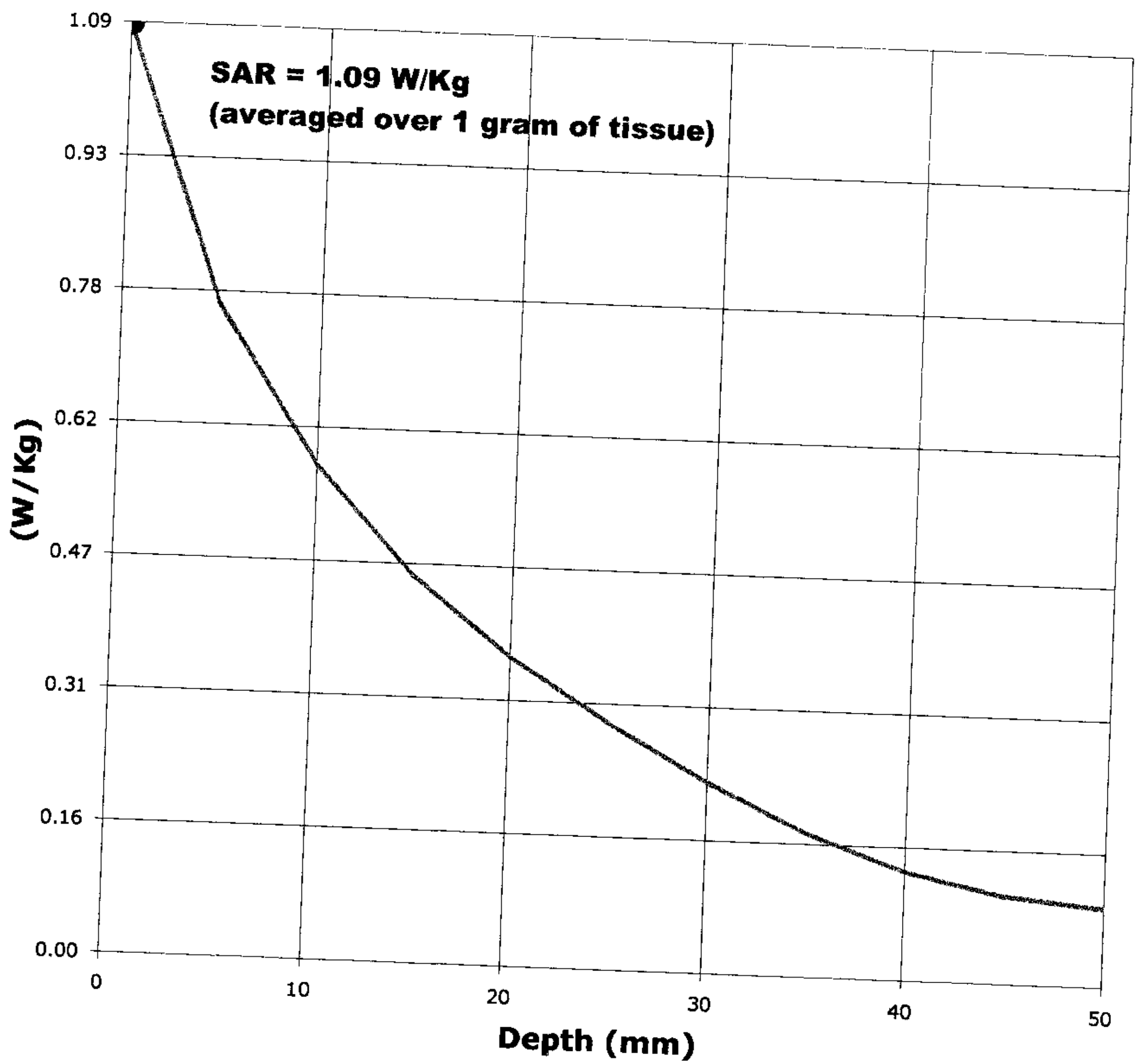

19.4
16.6
13.8
11.1
8.3
5.5
2.8
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
30
20
10
0
-10
-20


19.4
16.6
13.8
11.1
8.3
5.5
2.8
0
5
10
15
20
20
25
30
35
40



Y
Axis
(mm)
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-20
-10
0
10
20
30
X Axis (mm)
19.4
16.6
13.8
11.1
8.3
5.5
2.8


25.92
22.22
18.51
14.81
11.11
7.41
3.70
0.00
(mV)
-10
0
10
20
30
40
50
Depth (mm)


SAR = 1.09 W/Kg
(averaged over 1 gram of tissue)
(W/Kg)
1.09
0.93
0.78
0.62
0.47
0.31
0.16
0.00
0
10
20
30
40
50
Depth (mm)