COMMERCIAL, GOVERNMENT, AND INDUSTRIAL
SOLUTION SECTOR (CGISS)

ELECTROMAGNETIC EXPOSURE (EME)
TESTING LABORATORY

SAR TEST REPORT

October 19, 1999

Prepared by

Kim Uong, Lead Engineer

1.0 Environmental Evaluation for Occupational RF Exposure -- Pursuant 47 CR2.1093(d)(2)

1.1 General Information

FCC ID: AZ489FT4838

Device category: Portable radio

RF exposure environment: Controlled

Test method: Measurement

The test results included herein demonstrate that the SAR levels are well within the FCC limit of 8.0 W/kg, per the requirements of 47 CFR 2.1093(d)(2).

1.2 Antenna Description

Antenna type: monople (x) dipole ( ) Helix (x) Patch ( ) Other ( )
1/4 wave whip 1/4 wave

Antenna Location on Device: Left ( ) Right (x) Top (x) Bottom ( ) Front (Back ( )

Antenna Dimensions:		
	Length (extended)	16.6 cm
	Diameter (at tip of antenna)	0.76 cm
	Diameter (at middle of antenna)	0.57 cm
	Diameter (at base of antenna)	1.44 cm

Antenna configuration: Fixed ( ) Retractable ( ) External (x) Other ( )

Antenna Gain: Antenna Gain: -3 to -1 (dBi) in the 403-520 MHz operating frequency range.

1.3 Test Signal

Test signal source: Test mode (x) Base Station ( ) Simulator ( ) Other ( )

Signal Modulation: C.W. (x) TDMA ( ) Other ( )

1.4 **Output Power**

Output power measurement conditions: Free Space radiated ( )
SAR test configuration ( )
Conducted (x)

Output power measured with: Power meter (x)
Base Station Simulator ( )
Spectrum Analyzer ( )

Output power were measured with fully charged battery, and no battery changes made during SAR runs:

	Transmit Frequency (MHz)	**Initial Power (W)**	**End Power**
Face	490.051	4.0	3.22 W @ 20 min.
Abdomen	490.051	4.0	3.22 W @ 20 min.
Shoulder	490.051	4.0	3.19 W @ 22 min.

1.5 **Test Position**

The following describes the three test positions used to perform SAR measurements on the portable radio:

1. Face - The portable radio with affixed leather carry case is positioned the right hand of a full body phantom and the radio's normal speaking area is aligned with the center of the phantom's mouth.

2. Abdomen - The portable radio is positioned in a carry case accessory with belt clip beneath the abdomen of the full body phantom with the back of the radio facing the abdomen, the keypad/display facing the floor and the antenna is made to be as parallel as possible to the phantom.

3. Shoulder – The portable is positioned in a chest pack beneath the chest of the full body phantom with the back of the radio facing the chest, and the keypad/display facing the floor.

Reference figures: 1, 2, and 3 for portable radio antenna orientation and distances relative to phantoms.

1.6 Measurement Uncertainty

The table below list an estimate of the possible errors that are associated with the measurement system.

	Error (%)	Distribution	Divisor	Standard Uncertainty
Measurement of the conductivity of tissue simulated	+/- 3	Normal	2	1.5
Temperature rise calibration of probe	+/- 5	Rectangular	1.732	2.89
Measurement of thermal capacity of tissue simulated	+/- 5	Normal	2	2.5
Accuracy of a repeatable radio position	+/- 1	Normal	2	0.5
Probe isotropic response	+/- 12	Normal	2	6

With a coverage factor of k=2, providing a level of confidence of approximately 95%, the Uncertainty for SAR testing is 14.6%.

1.7 Measurement System and Phantom Description

Description of Measurement System and Performance:
The measurement system used to evaluate the portable radio SAR consist of a small diameter isotropic electric field probe, multiple axis probe positioning system, differential amplifiers, high impedance cables connecting the probes to the differential amplifiers and the amplifier output to a computer, IDX FLEXWARE software version 3.58, robotics arm with its extension, a custom probe holder, and supporting equipment to calibrate the probe and characterize the simulated tissue material. The measurement system has sensitivity of 10 micro-Watt/g. Linear response up to 20 mW/g. The system is calibrated using thermal measurements of SAR in muscle and brain simulated tissue at the frequency band of interest.

Description of Positioning System and Performance:
The Intelledex Microsmooth Model 660 six-axis robotics arm is used to position a small diameter isotropic electric field probe inside a human shaped phantom with a solution that mimics the electrical characteristics of human brain or muscle tissue. Communication with the robot is by a hand held controller and over an RS-232 link. Reference Intelledex MicroSmooth 660 Operation Manual. The positioning system performance is based on a 1 mm positioning repeatability.

Overall System Performance Verification Procedure:
Established procedures within the Motorola Worldwide CGISS (formerly LMPS) EME Lab are routinely followed to verify the overall system performance. They consist of calibrating the electric field probe together with the system instrumentation for each frequency band of interest and measuring the simulated tissue conductivity and dielectric constant to ensure that they are within established specs.

RF Susceptibility Verification Results:
No change is produced in the voltage offsets of the measurement system instrumentation amplifiers

as a result of positioning a transmitting radio around the amplifiers and cables or when the transmitting radio is moved around the lab. The radio used to cause RF interference to the measurement system is made to transmit in the same band and with comparable output power as the radio to be tested by the measurement system. The measurement system immunity to unwanted RF exposure is accomplished by providing the probe leads that connect to the instrumentation amplifiers with shielded EMI cables, enclosing the instrumentation amplifiers in a shielded housing, connecting the instrumentation amplifiers to the computer equipment with high impedance cables, using RF absorbing cones throughout the lab to minimize reflections, providing enough distance between the computer equipment, positioning system and probe to eliminate unwanted coupling.

System Verification Results:
Overall system results are verified by performing SAR measurements with a reference radio, at the frequency band of interest, and then comparing the results to previously measured data using the same reference radio.

Description of phantom:
Human shaped, solid shell device made of Fiberglas and mounted on a non metallic base or stand. The phantoms used in the Motorola EME Labs are the half body or torso (left and right ear version, no arms) and a laydown full body (6 feet tall).

Phantom Types: Full body (x)

Abdomen Thickness: 0.15 cm

Face Thickness: 0.15 cm

1.8 **Simulated Tissue Properties**

Type of simulated tissue used: Muscle (x) [Full Body] Brain ( ) [Torso]

Simulated tissue composition (% by weight) for : Muscle (x)

Di-Water:	55.40%
Sugar:	42.0%
Salt:	1.5%
HEC:	1.00%
Dowicil 75:	0.10%

Note: HEC (HYDROXYETHYL CELLULOSE) is a gelling agent and Dowicil 75 is anti-bacterial compound.

Characterization of Simulated tissue materials and ambient conditions:
Simulated tissue prepared for SAR measurements are measured at room temperature and

verified to be in spec prior to actual SAR measurements by filling a coaxial slotted line with the tissue and probing the amplitude and phase changes versus distance in the simulated tissue. A HP8753D Network Analyzer is used to perform the measurements.

Measured simulated tissue dielectric constant and conductivity used in SAR runs as of 10/12/99

Simulated tissue dielectric constant: Muscle: 58.6
Simulated tissue conductivity: Muscle: 1.04 S/m
Simulated tissue density: Muscle 1.2 g/cubic cm

Note: Simulated tissue dielectric constant and conductivity have been rounded off to one and two significant digits after the decimal point respectively, to take into account the tissue measurement uncertainty.

1.9 **Electric Field Probe Descriptions and Calibration**

Electric Field Probe Description and Performance

The electric field probe is a three channel device used to measure RF electric fields. The probe sensors consist of three mutually orthogonal dipoles, each 2.5 mm in length. Located at the center of each of the three dipoles is a Schottky diode detector. For each channel of the probe, the dipole and two high impedance lines are vapor deposited on a quartz substrate. The three substrates are mounted on a non conductive RF transparent support which has a I-beam cross section. Along the support are three pairs of high impedance lines which connect the substrate to a single output connector. The probe is enclosed in a protective sleeve to avoid contact with the corrosive elements
of the simulated tissue. The total length of the probe is approximately 25 cm. The electric field probe is isotropic and its performance is such that no significant field perturbation from the probe occurs during measurements.

Probe type: Electric Field (x) Magnetic ( ) Other ( )

Probe S/N: p020 (Muscle)

Electric Field Probe Calibration Procedure:

The SAR measurement system is calibrated as a single unit and is performed in two steps.

1) Correlation of the measured free space electric field and the measured electric field in the medium to temperature rise in a dielectric medium.

   a. A RF transparent thermistor based temperature probe (Vitek Electrothermia Monitor #101) and an isotropic electric field probe are placed side by side in a planar phantom while both are exposed to RF energy from a half wave dipole antenna located below the phantom.

   b. The location (hot spot) of maximum electric field concentration on the phantom's surface is determined. Then the electric field probe is moved sideways so that the temperature probe, while affixed to the electric field probe, is placed at the previous location of the electric field probe. Temperature changes for 30 second exposures at the same RF power levels used for the electric field measurements are recorded.

   c. The conversion factor, which scales the electric field in terms of the thermally derived SAR, is determined.

2) Determination of free space electric field from amplified probe outputs in a test RF (TEM cell) field.

   a. A RF signal generator is connected to the input of a TEM cell manufactured by IFI (Instruments For Industries) and the output of the cell to a RF HP 437B power meter. The RF signal generator is adjusted so that the power density inside the cell is 1 mW/sq-cm. For the IFI model CC-110, the corresponding power level is 271 mW.

   b. The probe is inserted through the side aperture of the TEM cell with the positioning system and the tip of the probe, where the probe detectors are located, is lowered 3.5 inches inside

the volumetric center of the cell. Once the prescribed probe position inside the cell is achieved, it must be maintained during the measurements.

c. The probe is rotated 360 degrees on its axis while the RF power level from the signal generator is maintained constant throughout the calibration.

d. Software indicators will show the maximum measured value on each of the three channels While the probe is being rotated through 360 degrees. The maximum measured values are referred to as amplifier settings and they are the factors necessary to adjust each channel of the measurement system so its indicated output can then be equated to the RF field.

Media and Frequency for E-Field Probe Calibration

Media: Air Frequency: 450 MHz
Media: Simulated Muscle tissue Frequency: 450 MHz

Probe Offset: 3 mm

Probe Isotropic Response: +/- 12% deviation from isotropy in tissue located in flat phantom.

E-Field Probe Calibration Factor Muscle: 0.613 mW/g

Probe Initial Thermal Derived SAR Calibration Date: 10/1/99
Next Due Date: 10/1/00
Probe Free Space Calibration Date Prior to SAR Measurement: 10/13/99.

1.10 **SAR Measurement Parameters, Procedures and Results:**

SAR test frequencies: 490.051 MHz

The radio is marketed as a handheld transceiver capable of operating as a traditional two-way (dispatch) radio.

All SAR measurements performed with the radio positioned in the described test positions and user modes were done while the radio was operating with a 100% duty cycle.

Several accessories marketed as separate items are available which influence possible operating conditions of this handheld transceiver. These include some body-worn items such as chest pack, a leather carry case with belt clip which is intended to be attached to a user's belt, and peripheral devices such as a remote speaker microphone. The combination of carrying case and audio accessory devices permits the handheld transceiver to be operated as a two-way while worn on the body.

Description of coarse scan region (for highest measured SAR values obtained per test

position):

A coarse scan of the radio was performed to determine the hot spot location with the radio positioned in the face, abdominal, and shoulder test position, described in the coarse scan region plot for runs 99101426_AREA.VLT, 99101410_AREA.VLT, and 99101502_AREA.VLT, respectively.

Coarse Scan Area (Face Position): x = 15 cm, y = 6 cm, z = 0 cm Scan resolution: 1 cm
Coarse Scan Area (Abdomen Position): x = 23 cm, y = 5 cm, z = 0 cm Scan resolution: 1 cm
Coarse Scan Area (Shoulder Position): x = 19cm, y = 6 cm, z = 0 cm Scan resolution: 1 cm

Description of fine scan region (for highest measured SAR values obtained per test position):

Subsequent to and based on the above coarse scan regions, a finer scan region centered around each of the peak SAR locations were scanned, to determine the one gram average SAR. Reference the plots for runs 99101426_ZOOM.VLT, 99101410_ZOOM.VLT, and 99101502_ZOOM.VLT.

Fine Scan Area (Head Position): x = 2 cm, y = 2 cm, z = 0 cm Scan resolution: 0.25cm
Fine Scan Area (Face Position): x = 2 cm, y = 2 cm, z = 0 cm Scan resolution: 0.25cm
Fine Scan Area (Abdomen Position): x = 2 cm, y = 2 cm, z = 0 cm Scan resolution: 0.25cm

Note: The 0,0 location of the face, abdomen, and shoulder scan areas was chosen to be at the radio/antenna interface.

Identification of peak SAR location:
Reference the contour plot (run # 99101502_AREA.VLT) for the highest measured peak SAR location on the radio.

Highest peak SAR (W/kg) and its test configuration:
1) Highest measured peak SAR = 5.9896 mW/g and it occurs at the surface of the phantom when the radio is in the shoulder position. Reference the field attenuation (SAR scan) curve for run # 99101502_ZOOM.VLT.

2) Highest measured one-gram averaged peak SAR (W/kg):
The measured 1-gram averaged peak SAR = 4.7154 mW/g but, will be rounded to 4. 72 mW/g.
The 1-gram averaged peak SAR was measured at the 490.051 MHz.
Reference run # 99101502_ZOOM.VLT.

The calculated maximum 1 gram averaged SAR value is determined by scaling up the SAR by the same ratio as the maximum power delivered to the radio antenna connector under any conditions of permissible tuning, frequency, voltage and temperature. For this reason, the radio Maximum Calculated 1gram averaged SAR becomes:

Maximum Calculated 1 gram Averaged SAR = [(A / B) x (C x D)]

A = Maximum power delivered to the antenna connector under any conditions of permissible tuning, frequency, voltage and temperature.

B = Lowest measured power (at 490.051 MHz) at end of SAR.

C = Measured 1 gram averaged peak SAR at 100% duty cycle.

D = D1 x D2

D1 is the transmission mode duty cycle, i.e., the ratio of the user requested transmission and the the tested mode.

D2 is the Push To Talk duty cycle. For two-way radio (dispatch) = 0.5

Max. Calc. 1-gram Avg Peak SAR = [(6 W/3.19 W x 4.72 mW/g x 100%/100% x 0.5) = 4.44 mW/g

Refer to table 1on the following page for other SAR test positions and measured 1-gram Averaged Peak SAR values.

SAR Distribution of Worse Case Test Results:

Refer to table 1 for variation of test frequency and position relative to the phantom; and, based on the description for scaling up the measured SAR 1-gram averaged peak value, to table 2 for the highest calculated SAR values by expected operating conditions.

TABLE 1

MEASURED SAR MATRIX

RADIO SERIAL NO.	ANTENNA POSITION	TRANSMIT FREQUENCY (MHz)	SAR (mW/g)		
			FACE	ABDOMEN	SHOULDER
422TZQ0378	FIXED	490.051	2.77	2.23	4.72

NOTES: 1) Highest SAR result at the face were performed with battery kit # PMNN4021A .

2) Highest SAR result at the abdomen and shoulder were performed with battery kit # PMNN4017A .

TABLE 2

Maximum Calculated SAR by Expected Operating Position and Conditions

MEASUREMENT POSITION	HIGHEST MEASURED SAR DEPOSITION	MAXIMUM OPERATIONAL DUTY CYCLE AND MODE	OPERATIONAL MAXIMUM CALCULATED SAR
Face: with soft leather carry case	2.77 mW/g	100% - 2-way dispatch	2.58 mW/g
Abdomen: with belt clip (minimal body spacing) and audio accy.	2.23 mW/g	100% - 2-way dispatch	2.08 mW/g
Shoulder: with chest pack	4.72 mW/g	100% - 2-way dispatch	4.44 mW/g

Description of procedures used to extrapolate SAR to phantom surface:

The highest local SAR occur at the surface of the phantom. There is a 3 mm probe offset from the physical end of the probe to the probe detectors. The probe offset make it necessary to extrapolate to the peak surface SAR from the SAR measured at a short distance from the surface.

At the measurement point on the phantom surface where the highest probe voltage is recorded (a.k.a. hot-spot), 11 probe voltage measurements are performed starting as close as possible to the phantom surface and every 0.5 cm thereafter along a path normal to the probe axis (+z - axis) for a distance of 5 cm. An exponential decay of the energy density with depth is calculated using the first three probe voltage measurements nearest the surface. The extrapolated peak surface voltage is calculated from the following relation:

Peak Surface Voltage = (V1) x (Exponential Decay)

where: V1 is the first voltage measurements along a path normal to the probe axis.

Exponential Decay = e{Ln (Slope) x (Offset / Spacing)}

Slope = [(V1/V2) + (V2/V3)] / 2

where: V1, V2 and V3 are the first, second and third voltage measurements along a path normal to probe axis, respectively. Reference the first three measured voltage values from run # 99101502_ZOOM.VLT.

Offset = Distance from center of probe dipoles to outside of probe case

Spacing = Distance between measurement points (in +z-axis)

The peak SAR, at the surface, is calculated as follows:

Peak SAR (at surface) = Peak Surface Voltage x (Probe Calibration Factor / Sensor Factor)

where: Sensor Factor = 10.8 mV/mW/sq-cm

Description of 1-gram average procedures, highest SAR gradient at peak location (W/kg/mm):

1-gram avg SAR=(Peak Surface Voltage + 1 cm Voltage)/2 x Probe Calibration Factor/Sensor Factor

Peak Surface Voltage is described above and the 1 cm Voltage is an interpolated voltage, Representative of the voltage 1 cm above the surface of the phantom.

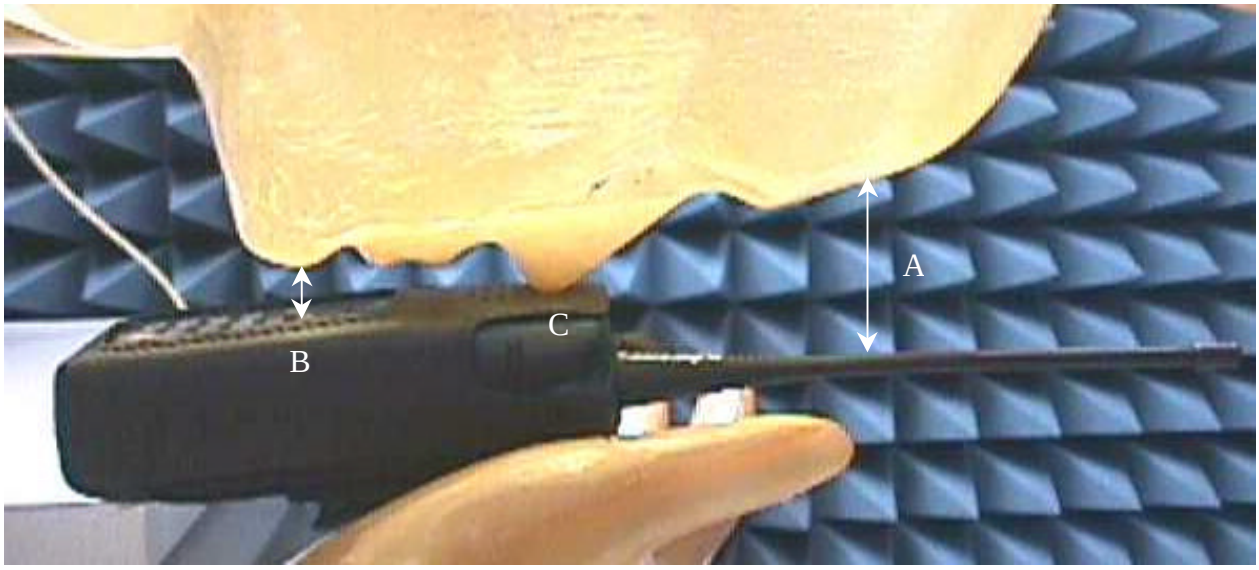
The derivative of the peak SAR is the gradient at the peak location.

Gradient (at peak SAR location) = [Ln (slope) x Peak SAR] / Spacing

Gradient (at peak SAR location) is 0.035 W/Kg/mm. The calculation was determined using the Measured values from run # 99101502_ZOOM.VLT.

FIG. 1 FACIAL POSITION

<== Toward Phantom's feet (+ x axis) Toward phantom's head (-x axis) ==>



Radio in phantom's palm

DIM A = Distance from center of phantom's forehead to antenna is = 48 mm.

DIM B = Closest distance between phantom's chin and radio surface = 13 mm

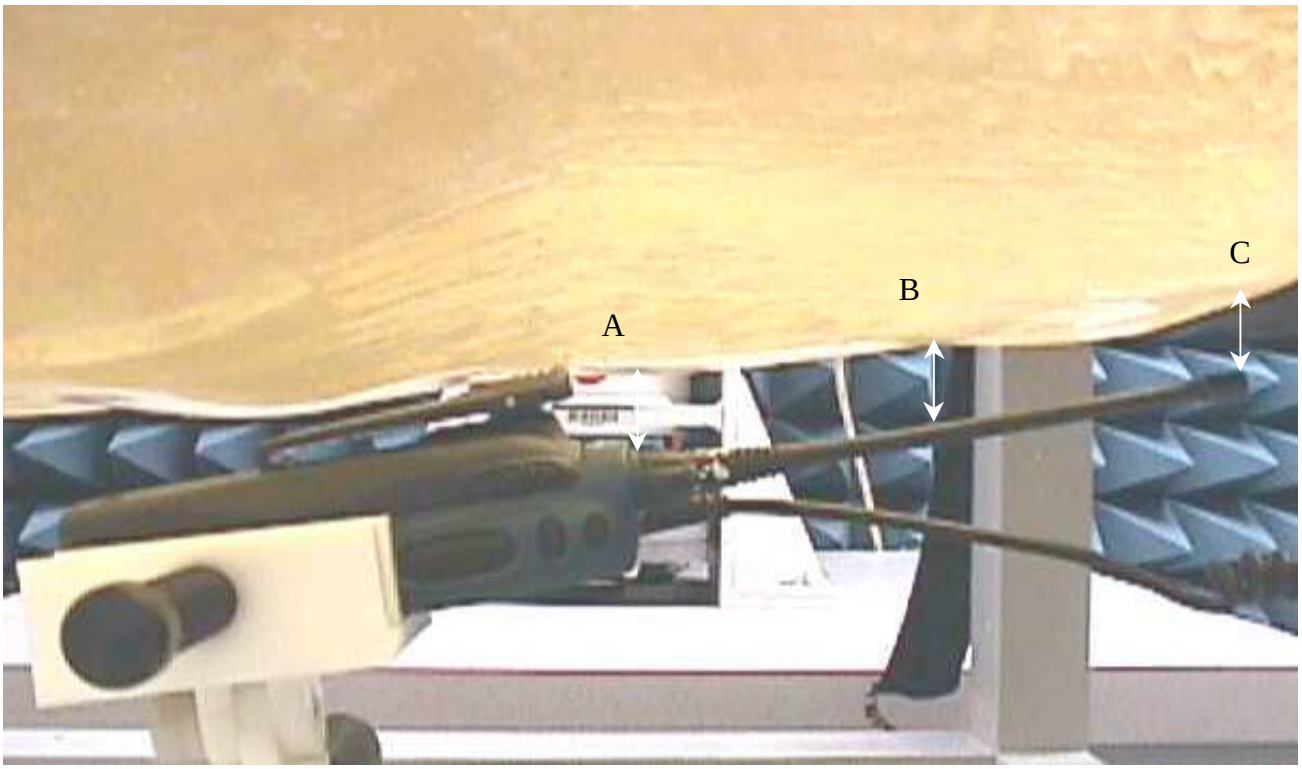
DIM C = Closest distance between phantom's nose tip and radio surface = 0 mm

Legend: Lay down full body phantom filled with simulated muscle tissue on non RF support fixture and radio in phantom's palm.

(+y) direction is out of the page, toward viewer and (-y) direction is into the page, away from viewer.

FIG. 3 ABDOMINAL POSITION

<== Toward Phantom's feet (+ x axis) Toward phantom's head (-x axis) ==>



DIM A = Distance from surface of antenna base to phantom surface = 22 mm

DIM B = Distance from center of antenna surface to phantom surface = 22 mm

DIM C = Distance from surface of antenna tip to phantom surface = 22 mm

Legend: Lay down full body phantom filled with simulated muscle tissue on non RF support fixture and radio affixed to phantom's abdomen.

(+y) axis is out of the page, toward viewer and (-y) axis is into the page, away from viewer.

FIG. 3 SHOULDER POSITION

<== Toward Phantom's feet (+ x axis) Toward phantom's head (-x axis) ==>

DIM A = Distance from surface of antenna base to phantom surface = 19 mm

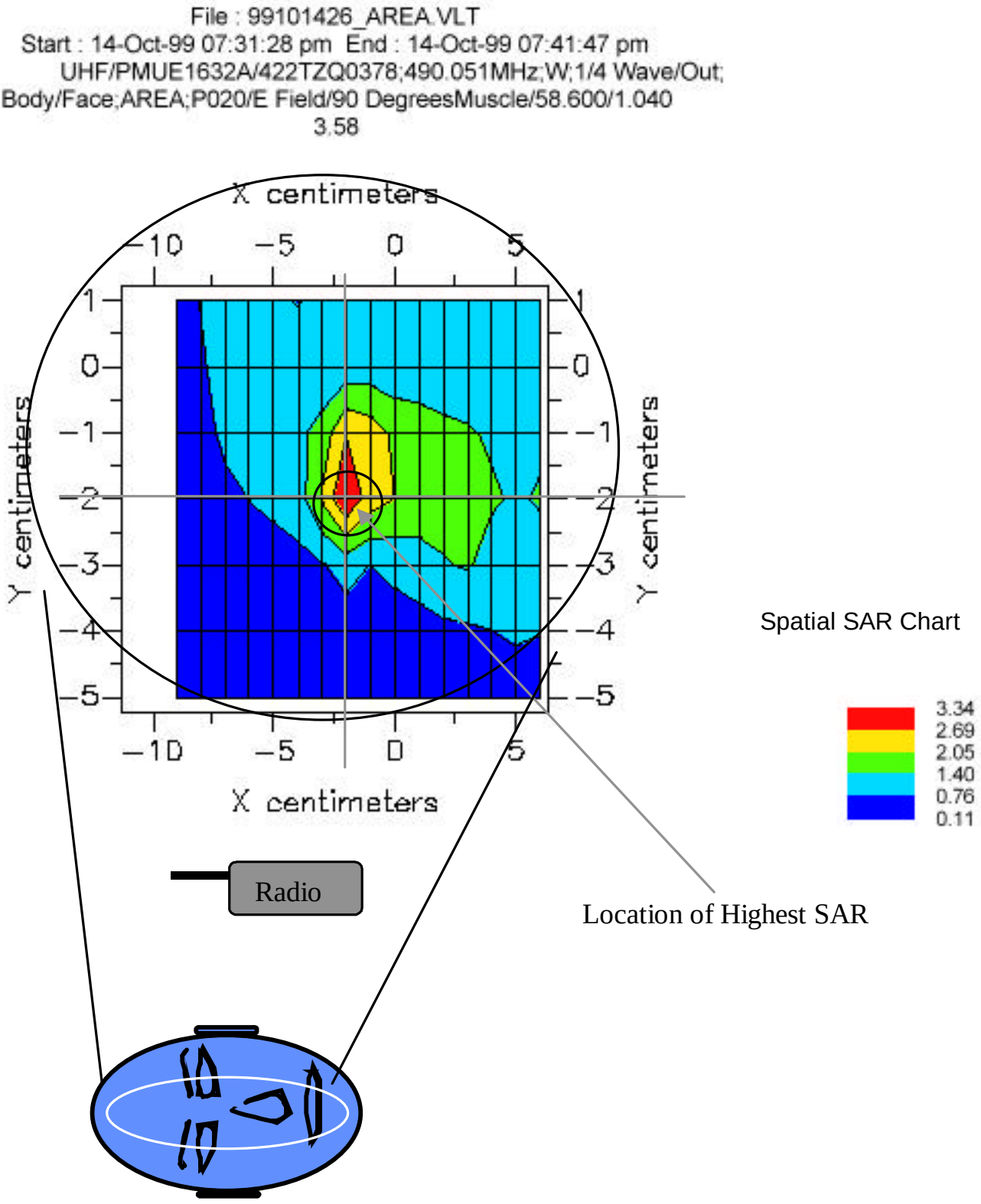
DIM B = Distance from center of antenna surface to phantom surface = 16 mm

DIM C = Distance from surface of antenna tip to phantom surface = 14 mm

Legend: Lay down full body phantom filled with simulated muscle tissue on non RF support fixture and radio affixed to phantom's chest.

(+y) axis is out of the page, toward viewer and (-y) axis is into the page, away from viewer.

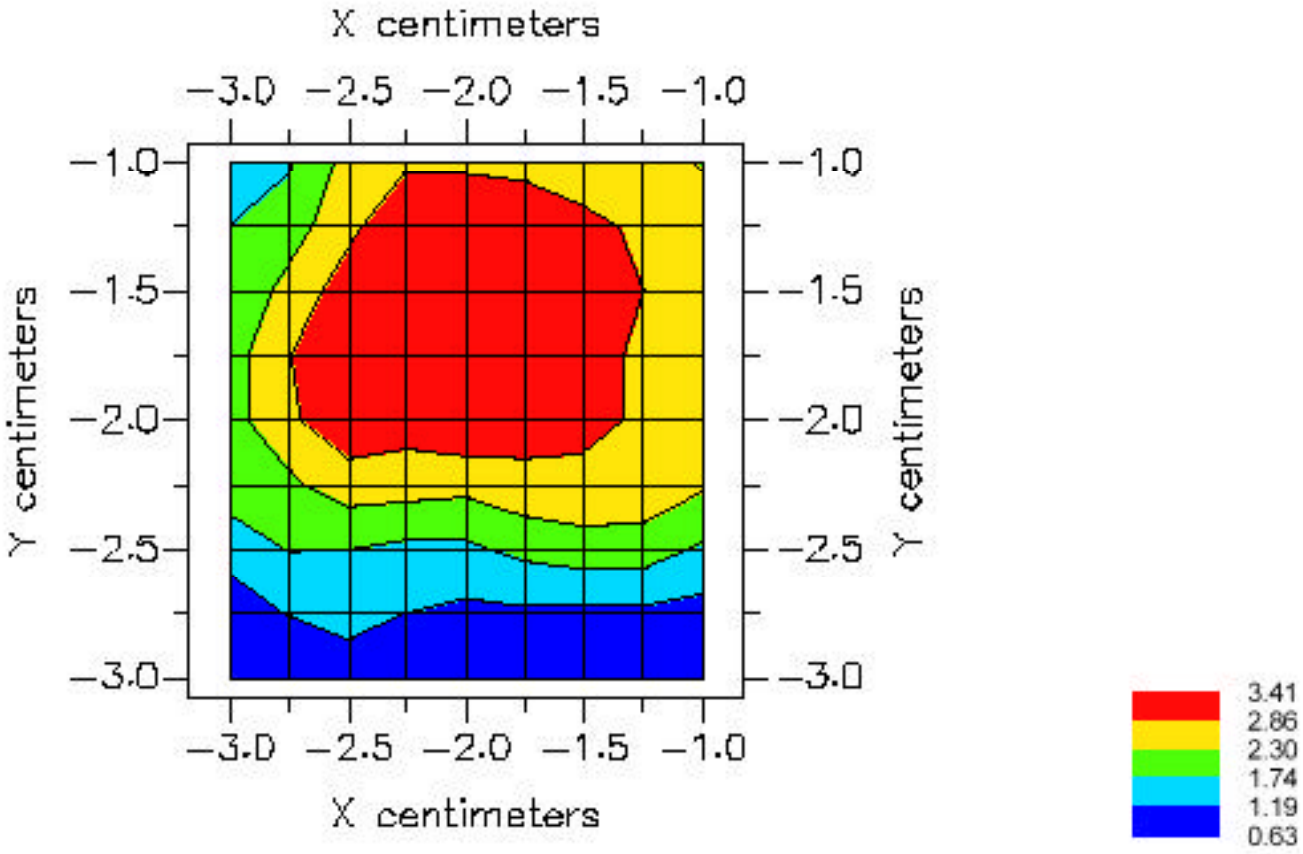
Facial Position Coarse Scan Region



Partial View of Full Body Phantom
As Viewed From Tissue Side

Facial Position Fine Scan Region

File : 99101426_ZOOM.VLT
Start : 14-Oct-99 07:41:48 pm End : 14-Oct-99 07:50:38 pm
UHF/PMUE1632A/422TZQ0378;490.051MHz;W;1/4 Wave/Out;
Body/Face;ZOOM/SAR;P020/E Field/90 DegreesMuscle/58.600/1.040
3.58

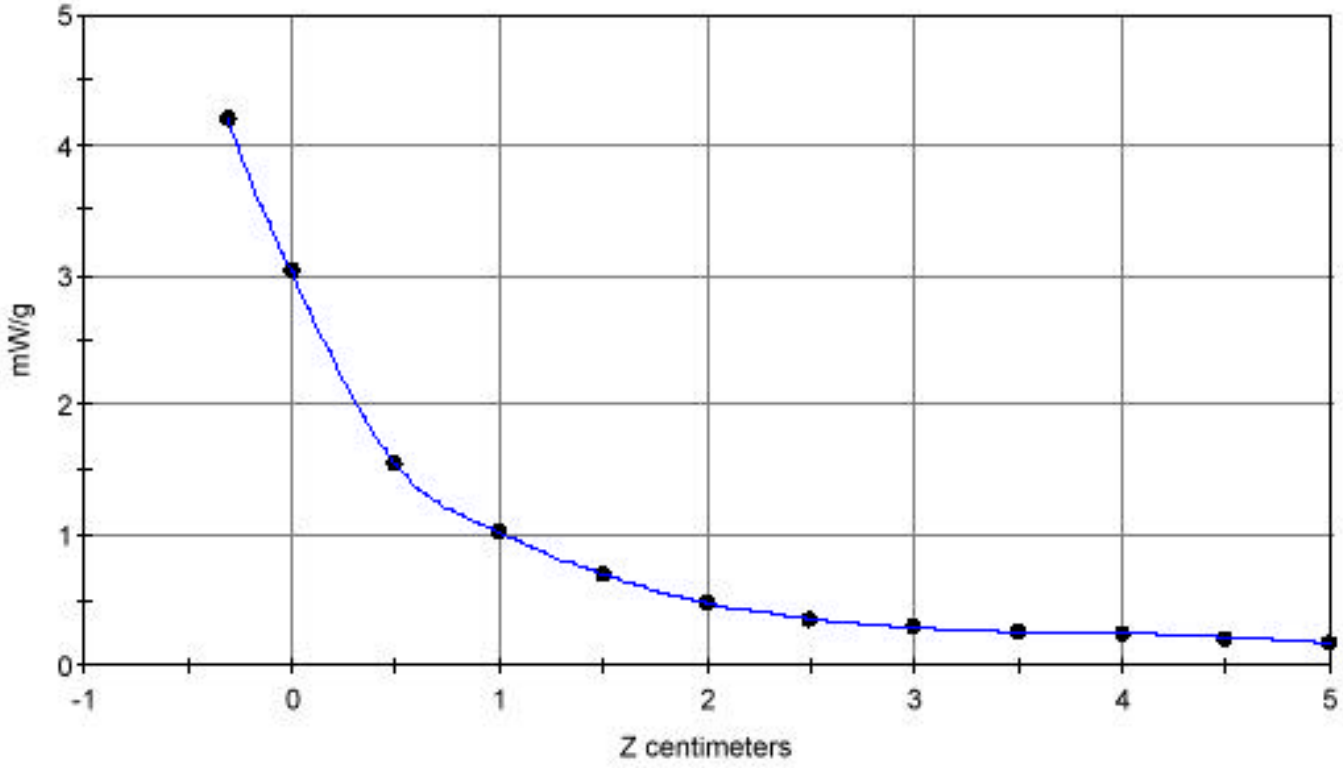


Facial Position SAR Data

File : c:/idx3/SYSTEM/SARMEAS3/data/Normal/99101426_ZOOM.VLT
Start : 14-Oct-99 07:41:48 pm End : 14-Oct-99 07:50:38 pm
Ver : 3.58
Radio Type : UHF
Model Number : PMUE1632A
Serial Number : 422TZQ0378
Frequency : 490.051 MHz
Peak Trans. Pwr : 6.000 W
Start Trans. Pwr: 4.000 W
Antenna Type : 1/4 Wave
Antenna Posn. : Out
Phantom Type : Body
Phantom Posn. : Face
Scan Type : ZOOM/SAR
Probe Name : P020
Field Type : E Field
Orientation : 90 Degrees
Mixture Type = Muscle
Mixture Dielectric Constant = 58.600
Mixture Conductivity = 1.040
Comment :
Comment Line 1: Gain=20, Batt:PMNN4021A Ant: NAE6483A
Comment Line 2: Leather Carry Case RLN4871A
Comment Line 3:
Robot : ROBOT
Probe Offset = 0.30 cm
Sensor Factor = 0.0108
Conversion Factor = 0.613
P020 Amplifier Channel Settings : 0.213 0.176 0.182
Diode Coefficients:
Channel 1 An=-18.148 Bn=67.983 Cn=30.893 Dn=-0.001 Mn=0.031 Yn=0.000
Channel 2 An=-30.825 Bn=81.456 Cn=30.333 Dn=0.004 Mn=0.031 Yn=0.000
Channel 3 An=-8.781 Bn=37.259 Cn=15.728 Dn=-0.002 Mn=0.058 Yn=0.000
Max Location : X = -2.500, Y = -1.750, Z = 0.000 (cm) Value = 60.105
Measured Values (volts) =
5.325E-002 2.718E-002 1.809E-002 1.222E-002 8.393E-003 6.252E-003
5.094E-003 4.545E-003 4.159E-003 3.656E-003 2.944E-003
Calc. Voltage @ Surface (Vs) = 0.0740
Voltage @ 1.00 cm (Vt) = 0.0235
Ave. Voltage (Vs+Vt)/2 = 0.0488
Ave. SAR over 1 g (mW/g) = 2.7683

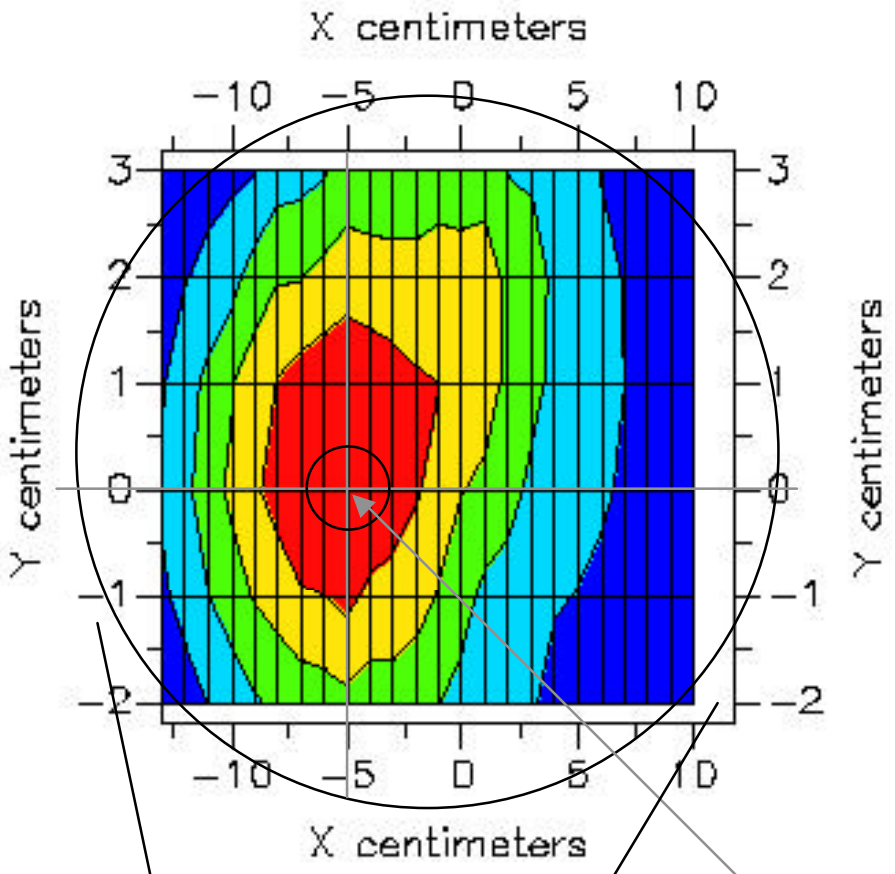
Facial Position SAR Curve

SAR Scan
File : 99101426_ZOOM.VLT
Start : 14-Oct-99 07:41:48 pm End : 14-Oct-99 07:50:38 pm
UHF/PMUE1632A/422TZQ0378;490.051MHz;W;1/4 Wave/Out;
Body/Face;ZOOM/SAR;P020/E Field/90 DegreesMuscle/58.600/1.040
3.58

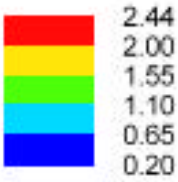


Abdominal Position Coarse Scan Region

File : 99101410_AREA.VLT
Start : 14-Oct-99 01:37:14 pm End : 14-Oct-99 01:49:28 pm
UHF/PMUE1632A/422TZQ0378;490.051MHz;W;1/4 Wave/Out;
Body/Abdomen;AREA;P020/E Field/90 DegreesMuscle/58.600/1.040
3.58

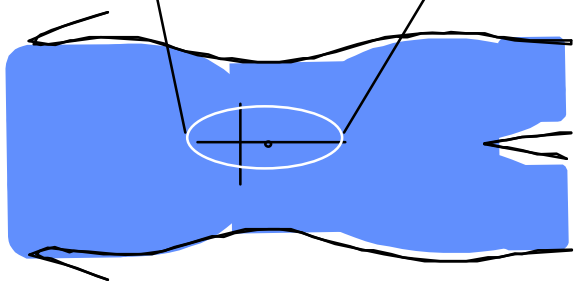


Spatial SAR Chart



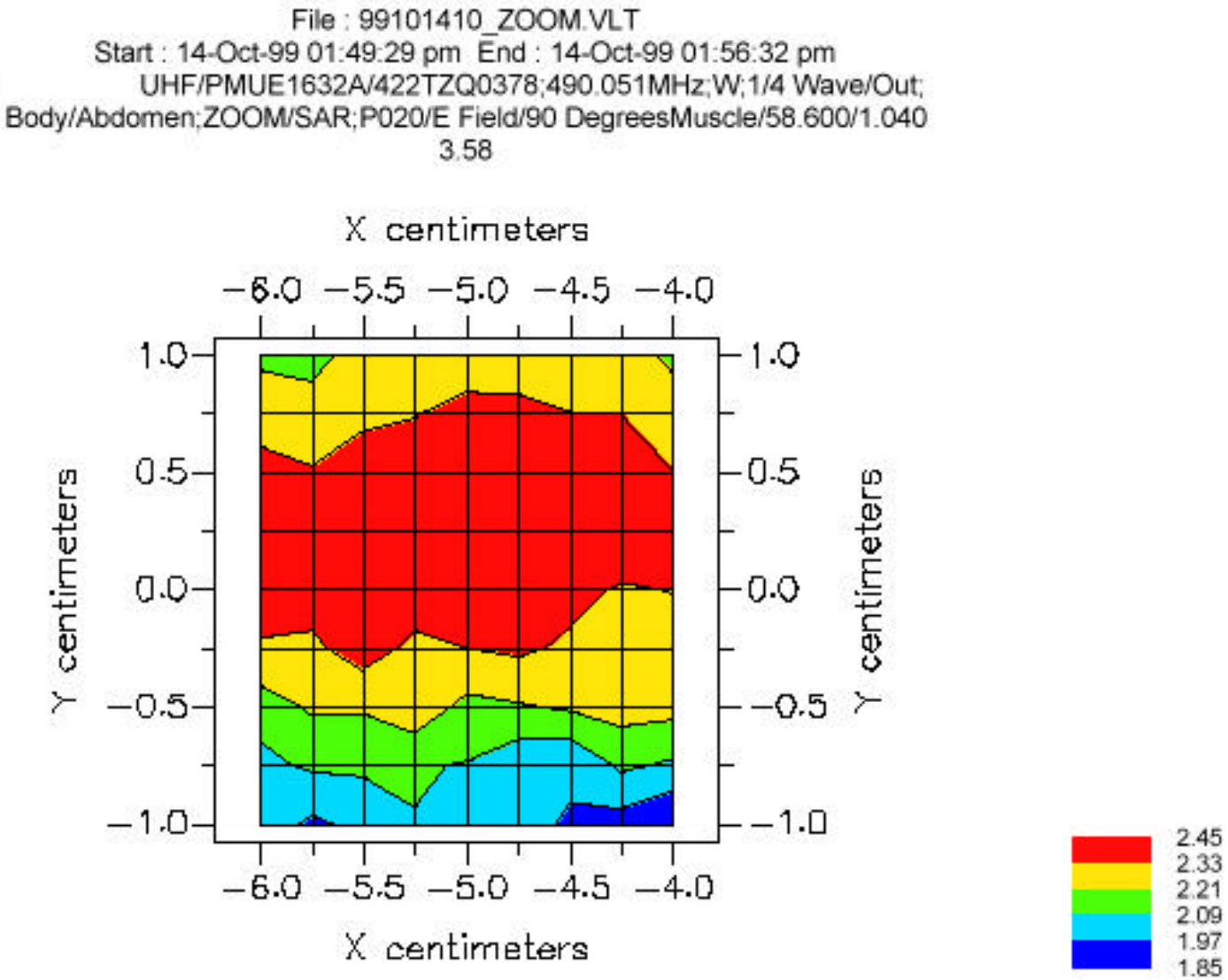
Location of Highest SAR

Radio



Partial View of Full Body Phantom
As Viewed From Tissue Side

Abdominal Position Fine Scan Region

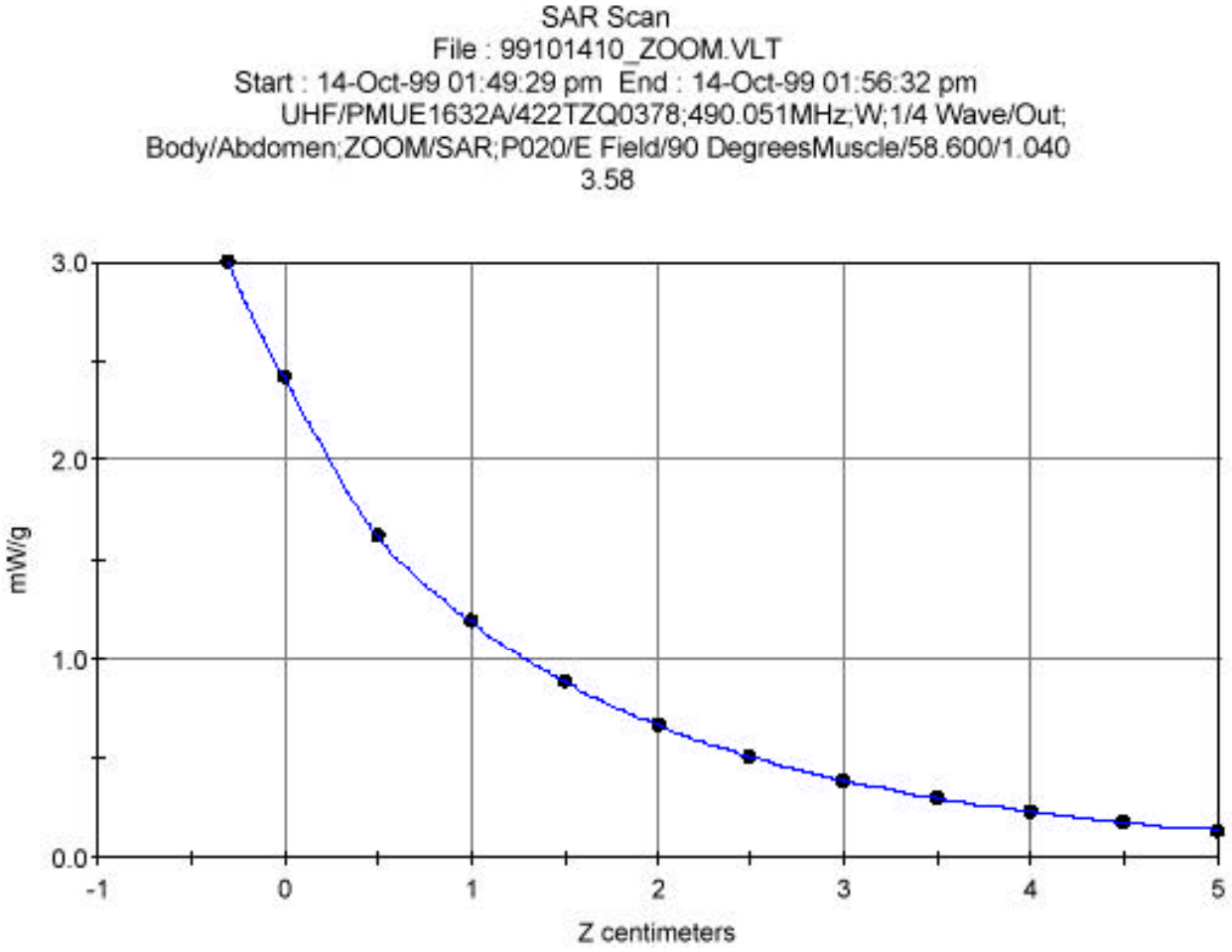


Abdominal Position SAR Data

File : c:/idx3/SYSTEM/SARMEAS3/data/Normal/99101410_ZOOM.VLT
Start : 14-Oct-99 01:49:29 pm End : 14-Oct-99 01:56:32 pm
Ver : 3.58

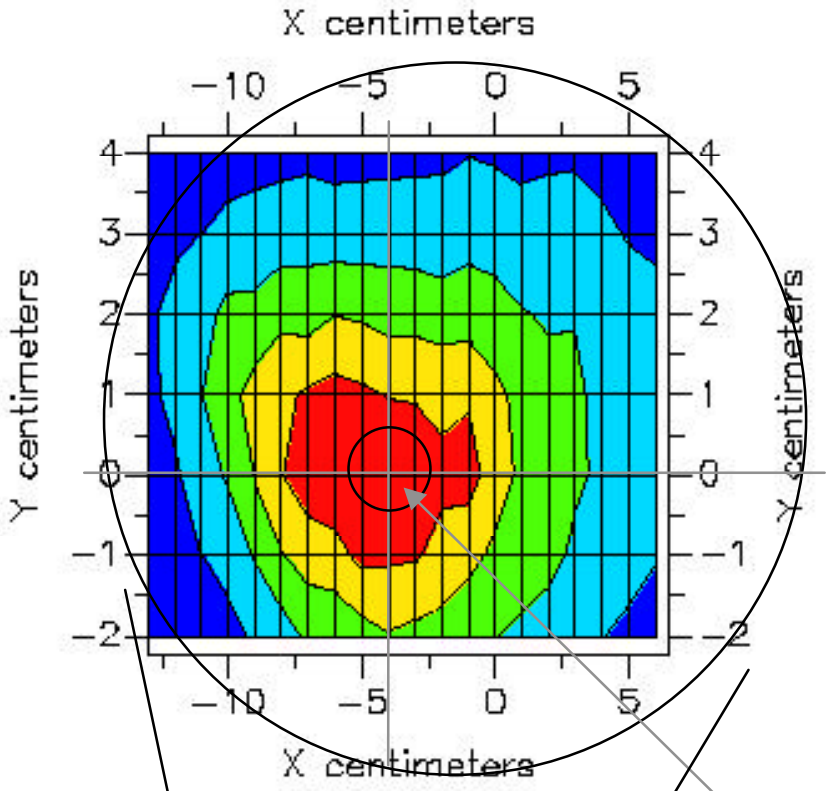
Radio Type : UHF
Model Number : PMUE1632A
Serial Number : 422TZQ0378
Frequency : 490.051 MHz
Peak Trans. Pwr : 6.000 W
Start Trans. Pwr: 4.000 W
Antenna Type : 1/4 Wave
Antenna Posn. : Out
Phantom Type : Body
Phantom Posn. : Abdomen
Scan Type : ZOOM/SAR
Probe Name : P020
Field Type : E Field
Orientation : 90 Degrees
Mixture Type = Muscle
Mixture Dielectric Constant = 58.600
Mixture Conductivity = 1.040
Comment :
Comment Line 1: Gain=20, Batt:PMNN4017A Ant: NAE6483A
Comment Line 2: Beltclip: HLN9844A. RSM: PMMN4004A
Comment Line 3:
Robot : ROBOT
Probe Offset = 0.30 cm
Sensor Factor = 0.0108
Conversion Factor = 0.613
P020 Amplifier Channel Settings : 0.213 0.176 0.182
Diode Coefficients:
Channel 1 An=-18.148 Bn=67.983 Cn=30.893 Dn=-0.001 Mn=0.031 Yn=0.000
Channel 2 An=-30.825 Bn=81.456 Cn=30.333 Dn=0.004 Mn=0.031 Yn=0.000
Channel 3 An=-8.781 Bn=37.259 Cn=15.728 Dn=-0.002 Mn=0.058 Yn=0.000
Max Location : X = -5.000, Y = 0.250, Z = 0.000 (cm) Value = 43.138
Measured Values (volts) =
4.268E-002 2.864E-002 2.099E-002 1.563E-002 1.173E-002 8.892E-003
6.777E-003 5.206E-003 4.027E-003 3.088E-003 2.354E-003
Calc. Voltage @ Surface (Vs) = 0.0528
Voltage @ 1.00 cm (Vt) = 0.0256
Ave. Voltage (Vs+Vt)/2 = 0.0392
Ave. SAR over 1 g (mW/g) = 2.2253

Abdominal Position SAR Curve

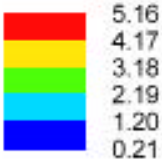


Shoulder Position Coarse Scan Region

File : 99101502_AREA.VLT
Start : 15-Oct-99 10:30:30 am End : 15-Oct-99 10:43:24 am
UHF/PMUE1632A/422TZQ0378;490.051MHz;W;1/4 Wave/Out;
Body/Shoulder;AREA;P020/E Field/90 DegreesMuscle/58.600/1.040
3.58

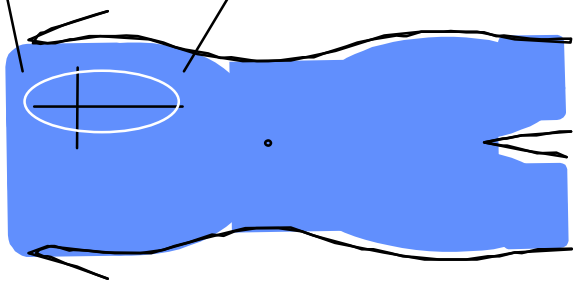


Spatial SAR Chart



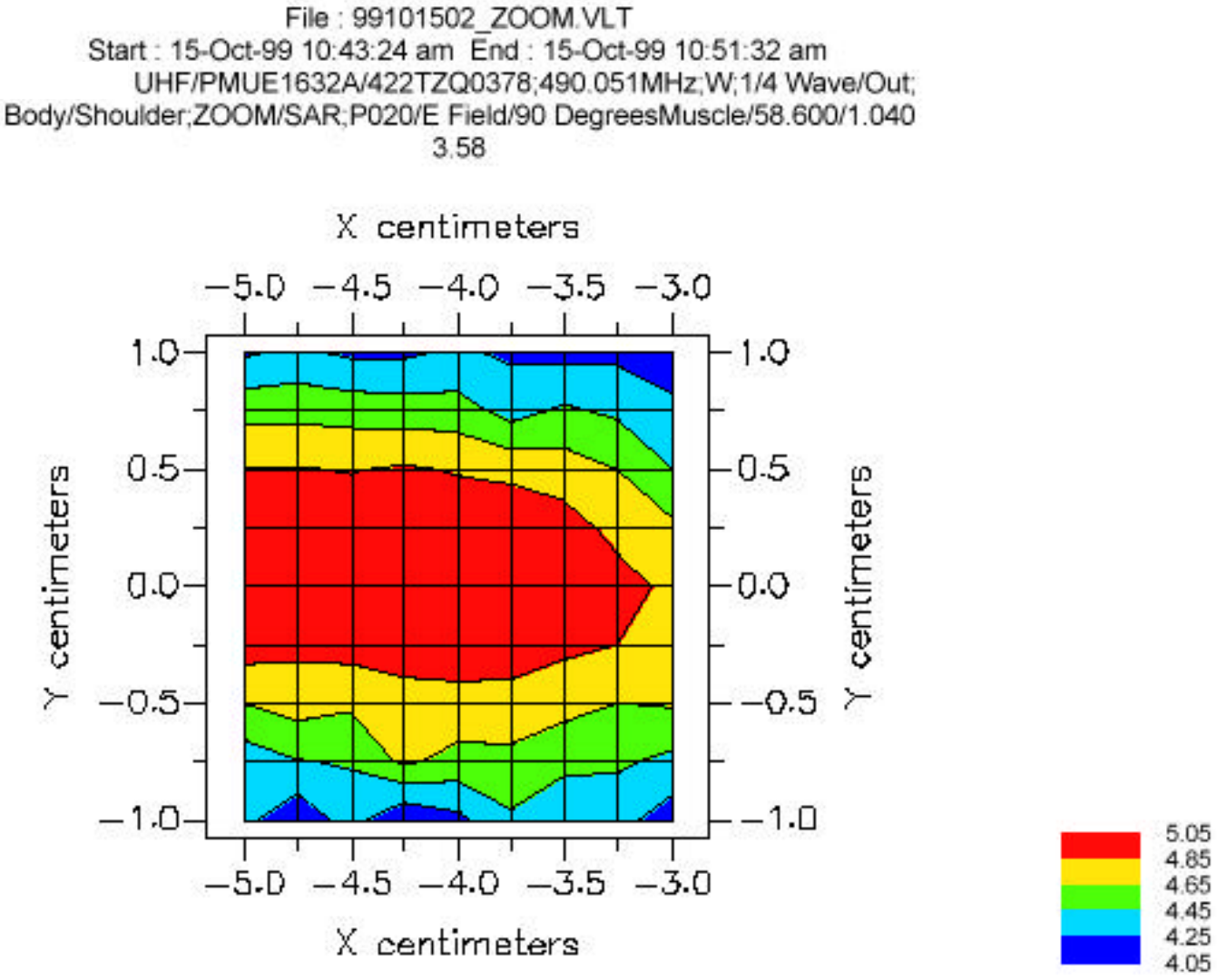
Radio

Location of Highest SAR



Partial View of Full Body Phantom
As Viewed From Tissue Side

Shoulder Position Fine Scan Region



Abdominal Position SAR Data

File : c:/idx3/SYSTEM/SARMEAS3/data/Normal/99101502_ZOOM.VLT
Start : 15-Oct-99 10:43:24 am End : 15-Oct-99 10:51:32 am
Ver : 3.58
Radio Type : UHF
Model Number : PMUE1632A
Serial Number : 422TZQ0378
Frequency : 490.051 MHz
Peak Trans. Pwr : 6.000 W
Start Trans. Pwr: 4.000 W
Antenna Type : 1/4 Wave
Antenna Posn. : Out
Phantom Type : Body
Phantom Posn. : Shoulder
Scan Type : ZOOM/SAR
Probe Name : P020
Field Type : E Field
Orientation : 90 Degrees
Mixture Type = Muscle
Mixture Dielectric Constant = 58.600
Mixture Conductivity = 1.040
Comment :
Comment Line 1: Gain=20, Batt: PMNN4017A Ant:NAE6483A
Comment Line 2: Chest Pack HLN6602
Comment Line 3:
Robot : ROBOT
Probe Offset = 0.30 cm
Sensor Factor = 0.0108
Conversion Factor = 0.613
P020 Amplifier Channel Settings : 0.213 0.176 0.182
Diode Coefficients:
Channel 1 An=-18.148 Bn=67.983 Cn=30.893 Dn=-0.001 Mn=0.031 Yn=0.000
Channel 2 An=-30.825 Bn=81.456 Cn=30.333 Dn=0.004 Mn=0.031 Yn=0.000
Channel 3 An=-8.781 Bn=37.259 Cn=15.728 Dn=-0.002 Mn=0.058 Yn=0.000
Max Location : X = -3.750, Y = 0.000, Z = 0.000 (cm) Value = 89.030
Measured Values (volts) =
8.868E-002 6.792E-002 4.969E-002 3.778E-002 2.899E-002 2.215E-002
1.691E-002 1.255E-002 9.526E-003 7.337E-003 5.940E-003
Calc. Voltage @ Surface (Vs) = 0.1055
Voltage @ 1.00 cm (Vt) = 0.0606
Ave. Voltage (Vs+Vt)/2 = 0.0831
Ave. SAR over 1 g (mW/g) = 4.7154

Shoulder Position SAR Curve