DECLARATION OF COMPLIANCE
SAR EVALUATION

Test Lab

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Applicant Information

KENWOOD USA CORPORATION
3975 John Creek Court, Suite 300
Suwanee, GA 30024

Rule Part(s):	**FCC 47 CFR §2.1093; IC RSS-102 Issue 1 (Provisional)**
Test Procedure(s):	**FCC OET Bulletin 65, Supplement C (01-01)**
FCC ID:	**ALH46413110**
Model:	**TK-2160**
EUT Type:	**Portable VHF PTT Radio Transceiver**
Modulation:	**FM (VHF)**
Tx Frequency Range:	**136 - 174 MHz**
Max. RF Output Power Tested:	**5.33 Watts (Conducted)**
Antenna P/N(s):	**KRA-26M3 (136-150 MHz)** **KRA-26M (146-162 MHz)** **KRA-26M2 (162-174 MHz)** **KRA-22M3 (136-150 MHz)** **KRA-22M (146-162 MHz)** **KRA-22M2 (162-174 MHz)** **KRA-25 (148-162 MHz)**
Battery Type(s):	**7.2V NiMH, 2000mAh (P/N: KNB-26N)**
Body-Worn Accessories:	**Belt-Clip, Speaker-Microphone (P/N: KMC-17)**
Max. SAR Measured:	**0.840 W/kg - Face-held (50% Duty Cycle)** **0.895 W/kg - Body-worn (50% Duty Cycle)**

Celltech Labs Inc. declares under its sole responsibility that this device was found to be in compliance with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093 and Health Canada's Safety Code 6. The device was tested in accordance with the measurement standards and procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01) and Industry Canada RSS-102 Issue 1 (Provisional) for the Occupational / Controlled Exposure environment.

I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc. The results and statements contained in this report pertain only to the device(s) evaluated.

Russell W. Pipe
Senior Compliance Technologist
Celltech Labs Inc.

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1.0 INTRODUCTION

This measurement report demonstrates compliance of the Kenwood USA Corp. Model: TK-2160 Portable VHF PTT Radio Transceiver FCC ID: ALH46413110 with the RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada Safety Code 6 (see reference [2]) for the Occupational / Controlled Exposure environment. The test procedures described in FCC OET Bulletin 65, Supplement C (Edition 01-01) (see reference [3]) and IC RSS-102 Issue 1 (Provisional) (see reference [4]), were employed. A description of the product and operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used, and the various provisions of the rules are included within this test report.

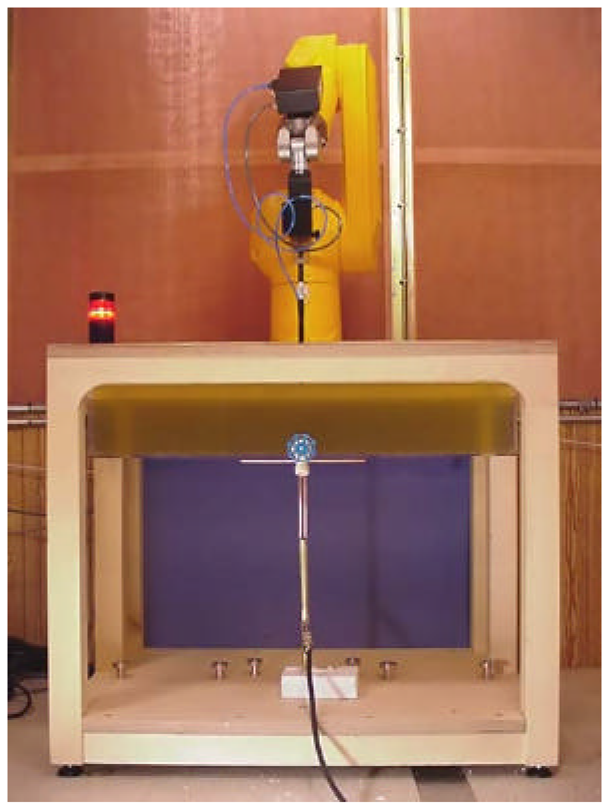
2.0 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

FCC Rule Part(s)	FCC 47 CFR §2.1093
IC Rule Part(s)	RSS-102 Issue 1 (Provisional)
Test Procedure(s)	FCC OET Bulletin 65, Supplement C (Edition 01-01)
Device Type	Portable VHF PTT Radio Transceiver
FCC ID	ALH46413110
Model No.	TK-2160
Serial No.	Pre-production unit
Modulation	AMPS
Tx Frequency Range	136 - 174 MHz
Max. RF Output Power Tested	5.33 Watts (Conducted)
Battery Type(s)	7.2V NiMH, 2000mAh (P/N: KNB-26N)
Antenna Type(s)	KRA-26M3 (136-150 MHz) Length: 168 mm KRA-26M (146-162 MHz) Length: 168 mm KRA-26M2 (162-174 MHz) Length: 168 mm KRA-22M3 (136-150 MHz) Length: 112 mm KRA-22M (146-162 MHz) Length: 112 mm KRA-22M2 (162-174 MHz) Length: 112 mm KRA-25 (148-162 MHz) Length: 252 mm
Body-Worn Accessories Tested	Belt-Clip, Speaker-Microphone (P/N: KMC-17)

3.0 SAR MEASUREMENT SYSTEM

Celltech Labs SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY system is comprised of the robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and various planar phantoms for brain and/or body SAR evaluations. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card. The DAE3 utilizes a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe-mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

DASY3 SAR Measurement System with Planar Phantom



DASY3 SAR Measurement System with validation phantom

4.0 MEASUREMENT SUMMARY

The measurement results were obtained with the EUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the EUT are reported in Appendix A.

SAR EVALUATION RESULTS

Freq. (MHz)	Chan.	Measured Conducted RF Output Power			Antenna P/N	Sep. Dist. (cm)	Accessory Type	Test Type	Measured SAR 1g (W/kg)		Max. Power Drift (dB)	Scaled SAR 1g (W/kg)	
		Before (W)	After (W)	Drift (dB)					100% Duty Cycle	50% Duty Cycle		100% Duty Cycle	50% Duty Cycle
136.00	Low	5.24	4.68	-0.49	KRA-26(M3)	2.5			0.269	0.135	-0.49	0.301	0.151
155.00	Mid	5.33	4.88	-0.39	KRA-26(M)	2.5			1.37	0.685	-0.49	1.53	0.765
174.00	High	5.20	4.80	-0.35	KRA-26(M2)	2.5			1.68	0.840	-0.49	1.88	0.940
136.00	Low	5.22	4.69	-0.47	KRA-22(M3)	2.5	--	Face	0.186	0.093	-0.49	0.208	0.104
155.00	Mid	5.31	4.79	-0.45	KRA-22(M)	2.5			1.35	0.675	-0.49	1.51	0.755
174.00	High	5.16	4.67	-0.44	KRA-22(M2)	2.5			1.04	0.520	-0.49	1.16	0.580
155.00	Mid	5.30	4.97	-0.28	KRA-25	2.5			1.57	0.785	-0.49	1.76	0.880
136.00	Low	5.13	4.85	-0.24	KRA-26(M3)	0.9			0.837	0.419	-0.49	0.937	0.469
155.00	Mid	5.26	4.97	-0.25	KRA-26(M)	0.9			0.692	0.346	-0.49	0.775	0.388
174.00	High	5.15	4.79	-0.32	KRA-26(M2)	0.9			1.79	0.895	-0.49	2.00	1.00
136.00	Low	5.25	4.75	-0.43	KRA-22(M3)	0.9	Belt-Clip & Speaker-Mic	Body	0.860	0.430	-0.49	0.963	0.482
155.00	Mid	5.28	4.75	-0.46	KRA-22(M)	0.9			0.709	0.355	-0.49	0.794	0.397
174.00	High	5.13	4.72	-0.36	KRA-22(M2)	0.9			1.07	0.535	-0.49	1.20	0.600
155.00	Mid	5.18	4.75	-0.37	KRA-25	0.9			1.45	0.725	-0.49	1.62	0.810

ANSI / IEEE C95.1 1992 - SAFETY LIMIT
BRAIN / BODY: 8.0 W/kg (averaged over 1 gram)
Spatial Peak - Controlled Exposure / Occupational

Mixture Type	150MHz Brain		150MHz Body	
Dielectric Constant ε_r	IEEE Target	Measured	IEEE Target	Measured
	52.3 (± 5%)	53.6	**61.9 (± 5%)**	60.5
Conductivity σ (mho/m)	IEEE Target	Measured	IEEE Target	Measured
	0.76 (± 5%)	0.75	**0.80 (± 5%)**	0.78
Ambient Temperature	23.3 °C		23.3 °C	
Fluid Temperature	22.6 °C		21.9 °C	
Fluid Depth	≥ 15 cm		≥ 15 cm	
Phantom Type	Planar		Planar	
Relative Humidity	44 %		44 %	
Atmospheric Pressure	101.4 kPa		101.4 kPa	
ρ (Kg/m^3)	1000		1000	

5.0 DETAILS OF SAR EVALUATION

The Kenwood USA Corp. Model: TK-2160 Portable VHF PTT Radio Transceiver FCC ID: ALH46413110 was found to be compliant for localized Specific Absorption Rate (Occupational / Controlled Exposure) based on the test provisions and conditions described below. The detailed test setup photographs are shown in Appendix F.

1. The EUT was evaluated in a face-held configuration with the front of the radio placed parallel to the outer surface of the planar phantom. A 2.5 cm separation distance was maintained between the front side of the EUT and the outer surface of the planar phantom for the duration of the tests.
2. The EUT was evaluated in a body-worn configuration with the back of the radio placed parallel to the outer surface of the planar phantom. The attached belt-clip was touching the planar phantom and provided a 0.9 cm separation distance between the back of the EUT and the outer surface of the planar phantom. The EUT was tested for body-worn SAR with the speaker-microphone accessory connected.
3. The conducted power levels were measured before and after each test according to the procedures described in FCC 47 CFR §2.1046. The power drift measured after each test was > 5% than the initial power measured before each test. A SAR versus time evaluation was subsequently performed over a twenty-minute period for the test configuration in which the highest power drift was measured (face-held, low-channel, whip antenna KRA-26M3), with the radio in a “cold” state and no turn-on delay. The SAR versus time evaluation measured a lower drift (dB) than the highest measured conducted power drift, therefore the highest measured conducted power drift (dB) was added to the measured SAR values to show worst-case results (see measured and scaled SAR values in the test data table on page 5). The SAR versus time evaluation plot is shown in Appendix A (SAR Test Plots).
4. The EUT was tested in unmodulated continuous transmit operation (Continuous Wave mode at 100% duty cycle) with the transmit key constantly depressed. For a push-to-talk device the 50% duty cycle compensation reported assumes a transmit/receive cycle of equal time base.
5. The EUT was tested with a fully charged battery.
6. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluation. The temperatures listed were consistent for all measurement periods.
7. The dielectric properties of the simulated tissue mixtures were measured prior to the evaluation using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters).
8. Due to the size of the EUT, a Plexiglas planar phantom was used in place of the SAM phantom. There is currently no approved phantom available that is twice the dimensions of this device.
9. A stack of low-density, low-loss dielectric foamed polystyrene was used in place of the device holder.

6.0 EVALUATION PROCEDURES

a. (i) The evaluation was performed in the applicable area of the phantom depending on the type of device being tested. For devices held to the ear during normal operation, both the left and right ear positions were evaluated in accordance with FCC OET Bulletin 65, Supplement C (Edition 01-01) using the SAM phantom.
(ii) For body-worn and face-held devices a planar phantom was used.
b. The SAR was determined by a pre-defined procedure within the DASY3 software. Upon completion of a reference and optical surface check, the exposed region of the phantom was scanned near the inner surface with a grid spacing of 20mm x 20mm.
c. Based on the area scan data, the area of maximum absorption was determined by spline interpolation. Around this point, a volume of 40 x 40 x 35 mm (fine resolution volume scan, zoom scan) was assessed by measuring 5 x 5 x 7 points.
d. The 1g and 10g spatial peak SAR was determined as follows:
1. The first step was an extrapolation to find the points between the dipole center of the probe and the surface of the phantom. This data cannot be measured, since the center of the dipoles is 2.7 mm away form the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm (see probe calibration document in Appendix D). The extrapolation was based on a least square algorithm [W. Gander, Computermathematik, p.168-180] (see reference [6]). Through the points in the first 3 cm in all z-axis, polynomials of the fourth order were calculated. This polynomial was then used to evaluate the points between the surface and the probe tip.
2. The next step used 3D-spline interpolation to get all points within the measured volume in a 1mm grid (35000 points). The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition [W. Gander, Computermathematik, p.141-150] (x, y and z -direction) [Numerical Recipes in C, Second Edition, p.123ff] (see reference [6]).
3. The maximal interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-spline interpolation algorithm. 8000 points (20x20x20) were interpolated to calculate the average.

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EVALUATION PROCEDURES (Cont.)

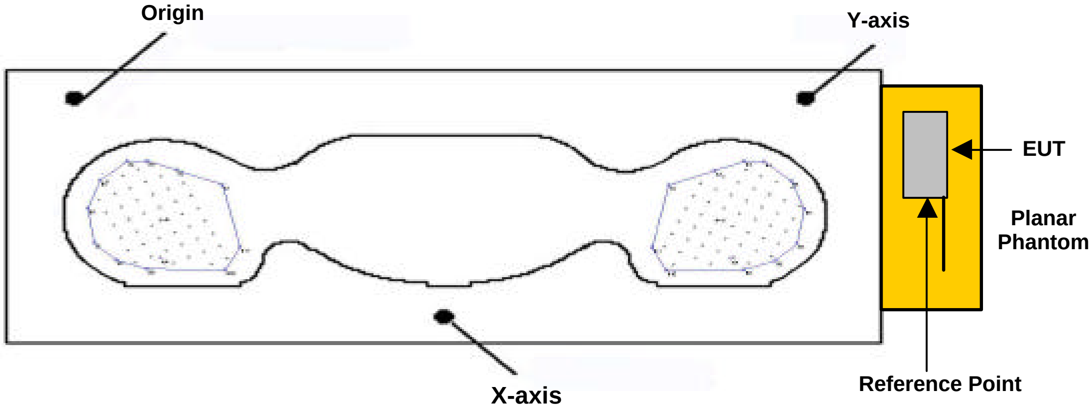

Figure 1. Phantom Reference Point & EUT Positioning
Face-Held Configuration

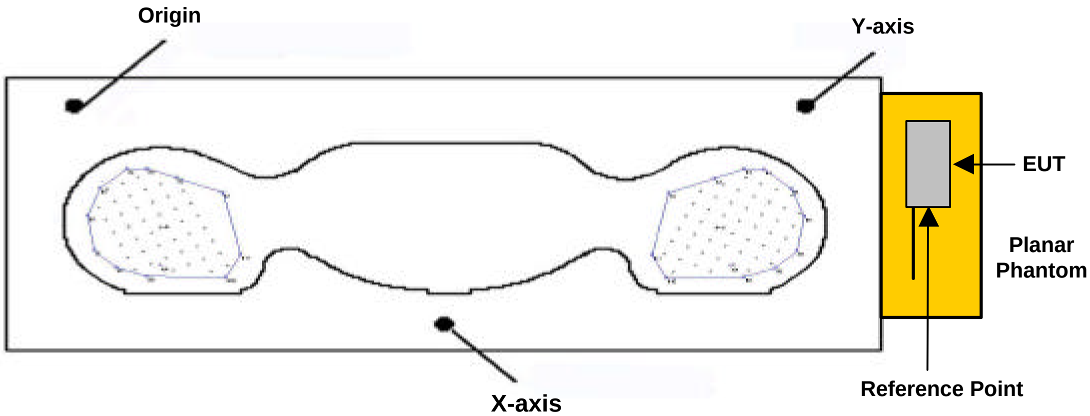

Figure 2. Phantom Reference Point & EUT Positioning
Body-Worn Configuration

7.0 SYSTEM PERFORMANCE CHECK

Prior to the evaluation a system check was performed using a planar phantom with a 300MHz dipole (see Appendix C for system validation procedure). The dielectric parameters of the simulated tissue fluid were measured prior to the system check using an 85070C Dielectric Probe Kit and an 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters). A forward power of 250mW was applied to the dipole and the system was verified to a tolerance of ±10% (see Appendix B for system check test plot).

SYSTEM PERFORMANCE CHECK											
Test Date	300MHz Equiv. Tissue	SAR 1g (W/kg)		Dielectric Constant ε_r		Conductivity σ (mho/m)		ρ (Kg/m³)	Ambient Temp.	Fluid Temp.	Fluid Depth
		IEEE Target	Measured	IEEE Target	Measured	IEEE Target	Measured				
05/05/03	Brain	0.750 (±10%)	0.794	45.3 ±5%	45.5	0.87 ±5%	0.89	1000	23.3 °C	22.8 °C	≥ 15 cm

Note(s):
1. The ambient and fluid temperatures were measured prior to, and during, the fluid electric parameter check and the system performance check. The temperatures listed in the table above were consistent for all measurement periods.

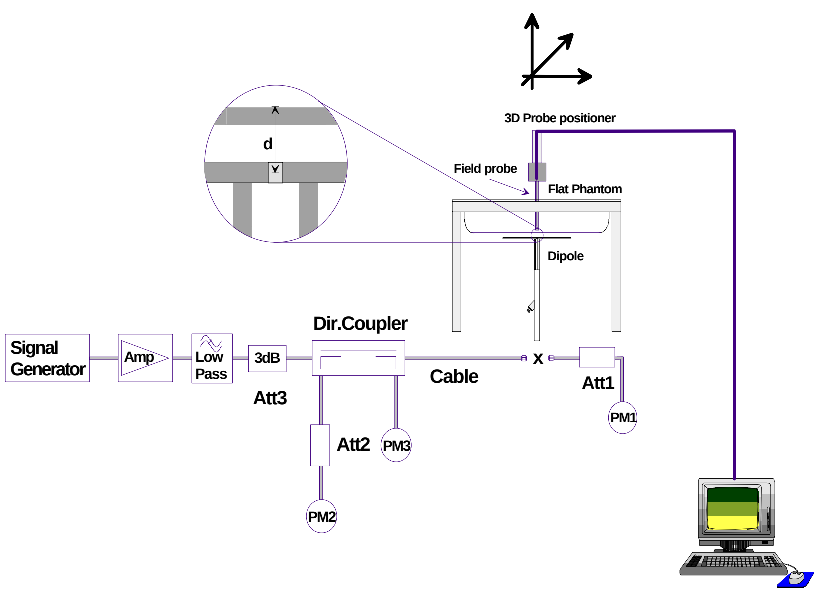

Figure 3. 300MHz System Check Setup Diagram

300MHz System Check Dipole Setup

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8.0 SIMULATED TISSUES

The brain and body simulated tissue mixtures consist of a viscous gel using hydroxethylcellulose (HEC) gelling agent and saline solution. Preservation with a bactericide is added and visual inspection is made to ensure air bubbles are not trapped during the mixing process. The fluid was prepared according to standardized procedures and measured for dielectric parameters (permittivity and conductivity).

TISSUE MIXTURES			
INGREDIENT	**300MHz Brain (%) (System Check)**	**150MHz Brain (%) (EUT Evaluation)**	**150MHz Body (%) (EUT Evaluation)**
Water	37.56	38.35	46.6
Sugar	55.32	55.5	49.7
Salt	5.95	5.15	2.6
HEC	0.98	0.9	1.0
Bactericide	0.19	0.1	0.1

9.0 SAR SAFETY LIMITS

EXPOSURE LIMITS	**SAR (W/kg)**	
	(General Population / Uncontrolled Exposure Environment)	**(Occupational / Controlled Exposure Environment)**
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10g)	4.0	20.0

Notes:
1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

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10.0 ROBOT SYSTEM SPECIFICATIONS

Specifications

POSITIONER:	Stäubli Unimation Corp. Robot Model: RX60L
Repeatability:	0.02 mm
No. of axis:	6

Data Acquisition Electronic (DAE) System

Cell Controller

Processor:	Pentium III
Clock Speed:	450 MHz
Operating System:	Windows NT
Data Card:	DASY3 PC-Board

Data Converter

Features:	Signal Amplifier, multiplexer, A/D converter, and control logic
Software:	DASY3 software
Connecting Lines:	Optical downlink for data and status info. Optical uplink for commands and clock

PC Interface Card

Function:	24 bit (64 MHz) DSP for real time processing Link to DAE3 16-bit A/D converter for surface detection system serial link to robot direct emergency stop output for robot

E-Field Probe

Model:	ET3DV6
Serial No.:	1387
Construction:	Triangular core fiber optic detection system
Frequency:	10 MHz to 6 GHz
Linearity:	± 0.2 dB (30 MHz to 3 GHz)

Evaluation Phantom

Type:	Planar Phantom
Shell Material:	Plexiglas
Bottom Thickness:	2.0 mm ± 0.1mm
Dimensions:	Box: 36.5cm (L) x 22.5cm (W) x 20.3cm (H); Back Plane: 25.3cm (H)

Validation Phantom (£ 450MHz)

Type:	Large Planar Phantom
Shell Material:	Plexiglas
Bottom Thickness:	6.2 mm ± 0.1mm
Dimensions:	86.0cm (L) x 39.5cm (W) x 21.8cm (H)

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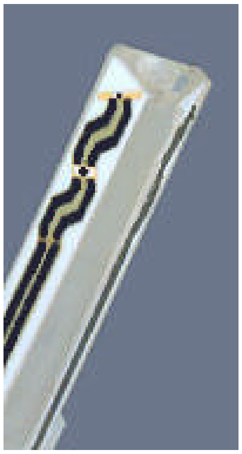
11.0 PROBE SPECIFICATION (ET3DV6)

Construction:	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g. glycol)
Calibration:	In air from 10 MHz to 2.5 GHz In brain simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy ± 8%)
Frequency:	10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Directivity:	± 0.2 dB in brain tissue (rotation around probe axis) ± 0.4 dB in brain tissue (rotation normal to probe axis)
Dynamic Range:	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Surface Detect.:	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions:	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application:	General dosimetry up to 3 GHz Compliance tests of mobile phone


ET3DV6 E-Field Probe

12.0 PLANAR PHANTOM

The planar phantom is constructed of Plexiglas material with a 2.0 mm shell thickness for face-held and body-worn SAR evaluations. The planar phantom is mounted onto the outside left head section of the DASY3 system.


Planar Phantom

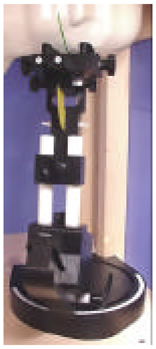
13.0 VALIDATION PLANAR PHANTOM

The validation planar phantom is constructed of Plexiglas material with a 6.0 mm shell thickness for SAR validations at 450MHz and below. The validation planar phantom is mounted in the DASY3 compact system in place of the SAM phantom.


Validation Planar Phantom

14.0 DEVICE HOLDER

The DASY3 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections.


Device Holder

15.0 TEST EQUIPMENT LIST

SAR MEASUREMENT SYSTEM		
TEST EQUIPMENT	**SERIAL NO.**	**CALIBRATION DATE**
Schmid & Partner DASY3 System	-	-
-Robot	599396-01	N/A
-ET3DV6 E-Field Probe	1387	Feb 2003
-300MHz Validation Dipole	135	Oct 2002
-450MHz Validation Dipole	136	Oct 2002
-900MHz Validation Dipole	054	June 2001
-1800MHz Validation Dipole	247	June 2001
-2450MHz Validation Dipole	150	Oct 2002
-SAM Phantom V4.0C	N/A	N/A
-Planar Phantom	N/A	N/A
-Validation Planar Phantom	N/A	N/A
HP 85070C Dielectric Probe Kit	N/A	N/A
Gigatronics 8651A Power Meter	8650137	April 2003
Gigatronics 8652A Power Meter	1835267	April 2003
Power Sensor 80701A	1833542	Feb 2003
Power Sensor 80701A	1833699	April 2003
HP E4408B Spectrum Analyzer	US39240170	Dec 2002
HP 8594E Spectrum Analyzer	3543A02721	Feb 2003
HP 8753E Network Analyzer	US38433013	Feb 2003
HP 8648D Signal Generator	3847A00611	Feb 2003
Amplifier Research 5S1G4 Power Amplifier	26235	N/A

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16.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION						
Error Description	**Uncertainty Value ±%**	**Probability Distribution**	**Divisor**	**c_i 1g**	**Standard Uncertainty ±% (1g)**	**v_i or v_{eff}**
Measurement System						
Probe calibration	± 4.8	Normal	1	1	± 4.8	∞
Axial isotropy of the probe	± 4.7	Rectangular	√3	$(1-c_p)$	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	√3	(c_p)	± 3.9	∞
Spatial resolution	± 0.0	Rectangular	√3	1	± 0.0	∞
Boundary effects	± 5.5	Rectangular	√3	1	± 3.2	∞
Probe linearity	± 4.7	Rectangular	√3	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	√3	1	± 0.6	∞
Readout electronics	± 1.0	Normal	1	1	± 1.0	∞
Response time	± 0.8	Rectangular	√3	1	± 0.5	∞
Integration time	± 1.4	Rectangular	√3	1	± 0.8	∞
RF ambient conditions	± 3.0	Rectangular	√3	1	± 1.7	∞
Mech. constraints of robot	± 0.4	Rectangular	√3	1	± 0.2	∞
Probe positioning	± 2.9	Rectangular	√3	1	± 1.7	∞
Extrapolation & integration	± 3.9	Rectangular	√3	1	± 2.3	∞
Test Sample Related						
Device positioning	± 6.0	Normal	√3	1	± 6.7	12
Device holder uncertainty	± 5.0	Normal	√3	1	± 5.9	8
Power drift	± 5.0	Rectangular	√3		± 2.9	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	√3	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid conductivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Combined Standard Uncertainty					**± 13.3**	
Expanded Uncertainty (k=2)					**± 26.6**	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-200X (Draft - see reference [5])

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MEASUREMENT UNCERTAINTIES (Cont.)

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION						
Error Description	**Uncertainty Value ±%**	**Probability Distribution**	**Divisor**	**c_i 1g**	**Standard Uncertainty ±% (1g)**	**v_i or v_{eff}**
Measurement System						
Probe calibration	± 4.8	Normal	1	1	± 4.8	∞
Axial isotropy of the probe	± 4.7	Rectangular	√3	$(1-c_p)$	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	√3	(c_p)	± 3.9	∞
Spatial resolution	± 0.0	Rectangular	√3	1	± 0.0	∞
Boundary effects	± 5.5	Rectangular	√3	1	± 3.2	∞
Probe linearity	± 4.7	Rectangular	√3	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	√3	1	± 0.6	∞
Readout electronics	± 1.0	Normal	1	1	± 1.0	∞
Response time	± 0.8	Rectangular	√3	1	± 0.5	∞
Integration time	± 1.4	Rectangular	√3	1	± 0.8	∞
RF ambient conditions	± 3.0	Rectangular	√3	1	± 1.7	∞
Mech. constraints of robot	± 0.4	Rectangular	√3	1	± 0.2	∞
Probe positioning	± 2.9	Rectangular	√3	1	± 1.7	∞
Extrapolation & integration	± 3.9	Rectangular	√3	1	± 2.3	∞
Dipole						
Dipole Axis to Liquid Distance	± 2.0	Rectangular	√3	1	± 1.2	∞
Input Power	± 4.7	Rectangular	√3	1	± 2.7	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	√3	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid conductivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Combined Standard Uncertainty					**± 9.9**	
Expanded Uncertainty (k=2)					**± 19.8**	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-200X (Draft - see reference [5])

17.0 REFERENCES

[1] Federal Communications Commission, "Radiofrequency radiation exposure evaluation: portable devices", Rule Part 47 CFR §2.1093: 1999.

[2] Health Canada, "Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz", Safety Code 6.

[3] Federal Communications Commission, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields", OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.

[4] Industry Canada, "Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields", Radio Standards Specification RSS-102 Issue 1 (Provisional): September 1999.

[5] IEEE Standards Coordinating Committee 34, Std 1528-200X, "DRAFT Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques".

[6] W. Gander, *Computermathematick*, Birkhaeuser, Basel: 1992.

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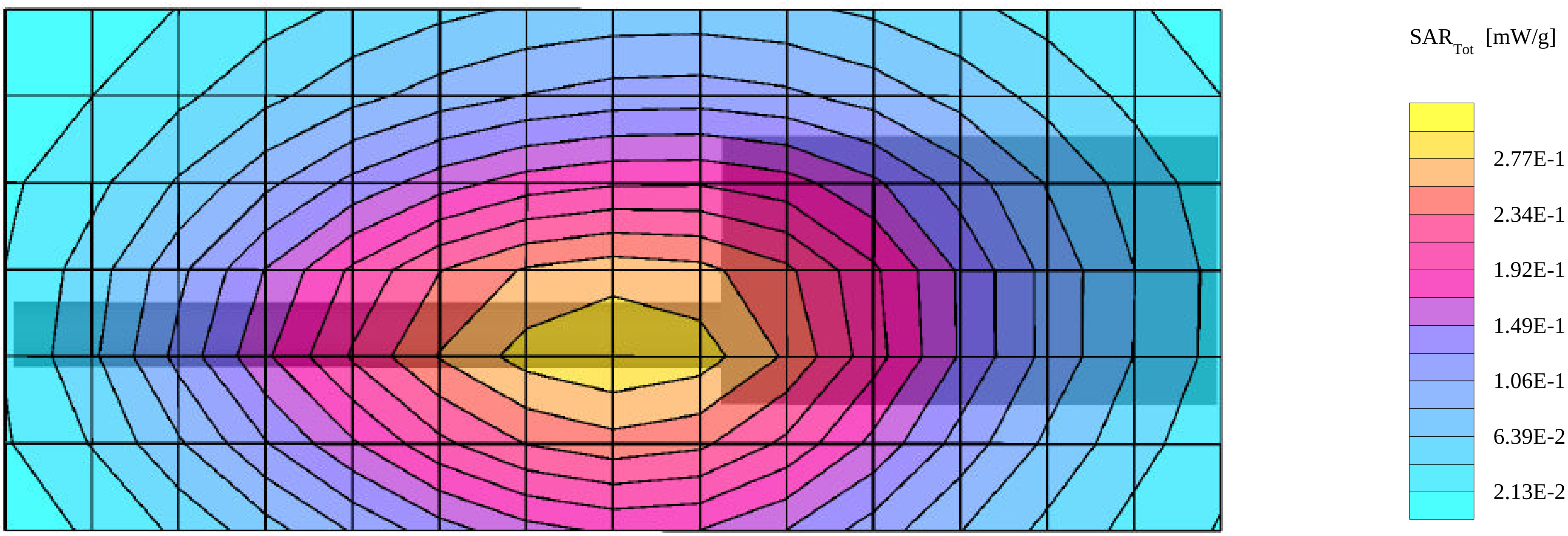
APPENDIX A - SAR MEASUREMENT DATA

Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section; Position: (90°,0°)
Probe: ET3DV6 - SN1387; ConvF(9.10,9.10,9.10); Crest factor: 1.0
150 MHz Brain : σ = 0.75 mho/m ε_r = 53.6 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 0.269 mW/g, SAR (10g): 0.203 mW/g

Face-Held SAR with 2.5 cm Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
Antenna P/N: KRA-26(M3)
NiMH Battery (KNB-26N)
Continuous Wave Mode
Low Channel [136.00 MHz]
Conducted Power: 5.24 Watts
Ambient Temp 23.3 °C; Fluid Temp 22.6 °C
Date Tested: May 5, 2003

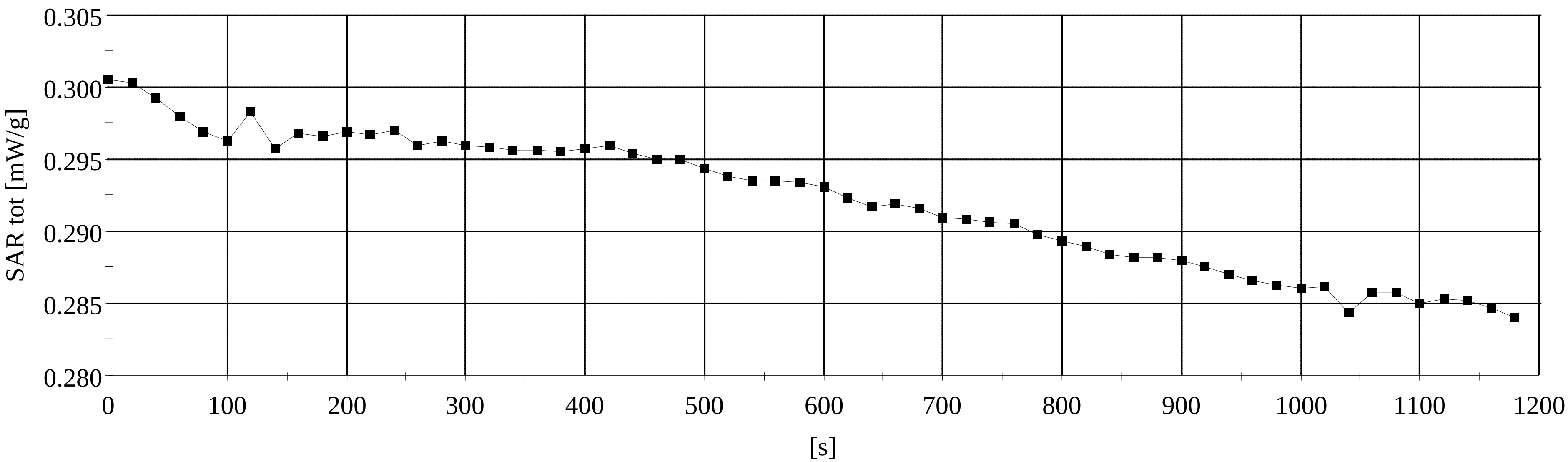


Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section
Probe: ET3DV6 - SN1387; ConvF(9.10,9.10,9.10); Crest factor: 1.0
150 MHz Brain : σ = 0.75 mho/m ε_r = 53.6 ρ = 1.00 g/cm^3
Time Sweep

SAR VERSUS TIME (20 minutes)

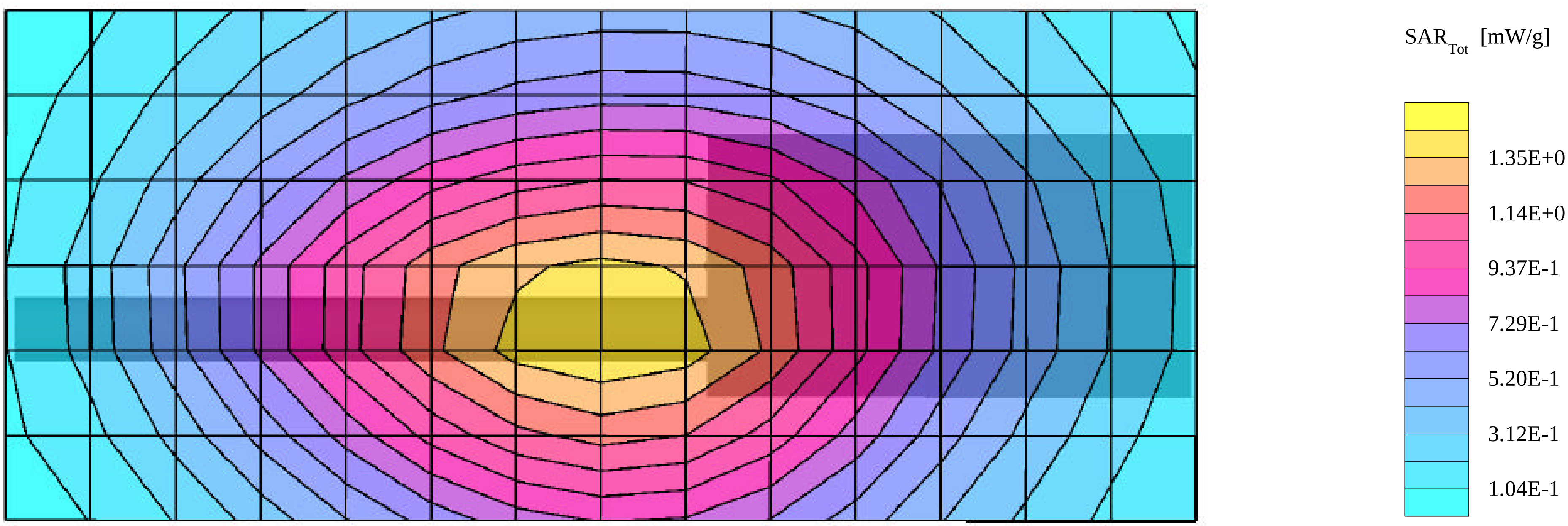
Face-Held SAR with 2.5 cm Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
Antenna P/N: KRA-26(M3)
NiMH Battery (KNB-26N)
Continuous Wave Mode
Low Channel [136.00 MHz]
Conducted Power: 5.24 Watts
Ambient Temp 23.3 °C; Fluid Temp 22.6 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section; Position: (90°,0°)
Probe: ET3DV6 - SN1387; ConvF(9.10,9.10,9.10); Crest factor: 1.0
150 MHz Brain : σ = 0.75 mho/m ε_r = 53.6 ρ = 1.00 g/cm³
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 1.37 mW/g, SAR (10g): 1.03 mW/g

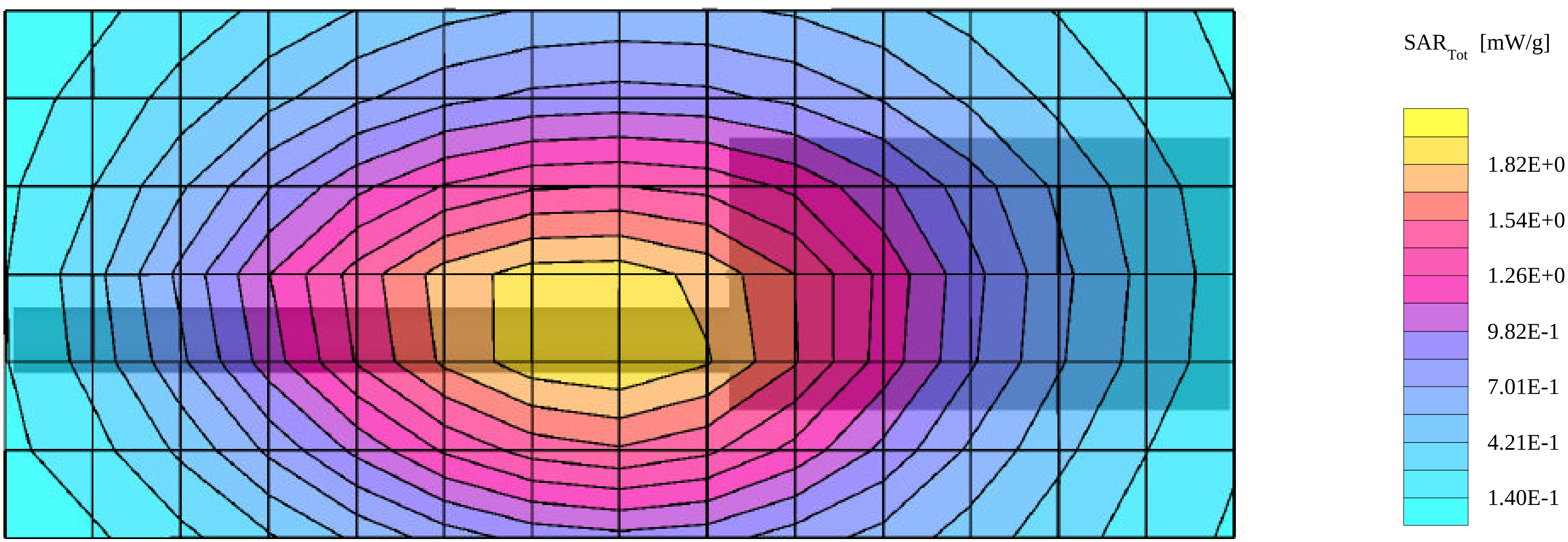
Face-Held SAR with 2.5 cm Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
Antenna P/N: KRA-26(M)
NiMH Battery (KNB-26N)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 5.33 Watts
Ambient Temp 23.3 °C; Fluid Temp 22.6 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section; Position: (90°,0°)
Probe: ET3DV6 - SN1387; ConvF(9.10,9.10,9.10); Crest factor: 1.0
150 MHz Brain : σ = 0.75 mho/m ε_r = 53.6 ρ = 1.00 g/cm³
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 1.68 mW/g, SAR (10g): 1.25 mW/g

Face-Held SAR with 2.5 cm Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
Antenna P/N: KRA-26(M2)
NiMH Battery (KNB-26N)
Continuous Wave Mode
High Channel [174.00 MHz]
Conducted Power: 5.20 Watts
Ambient Temp 23.3 °C; Fluid Temp 22.6 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

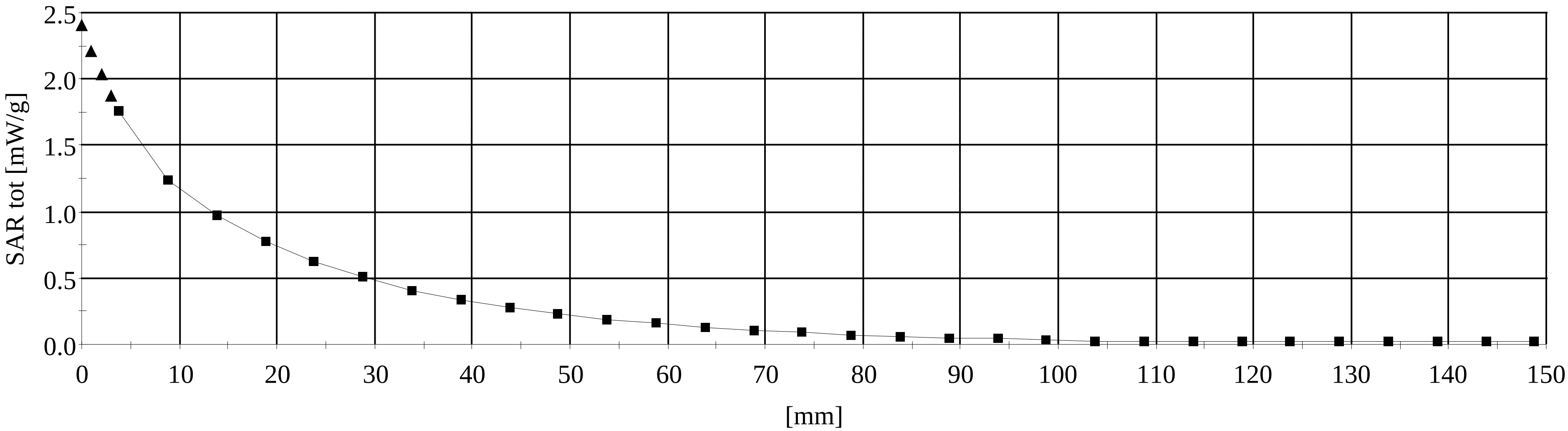
Small Planar Phantom; Planar Section

Probe: ET3DV6 - SN1387; ConvF(9.10,9.10,9.10); Crest factor: 1.0;

150 MHz Brain : σ = 0.75 mho/m ε_r = 53.6 ρ = 1.00 g/cm^3

Z-Axis Extrapolation at Peak SAR Location

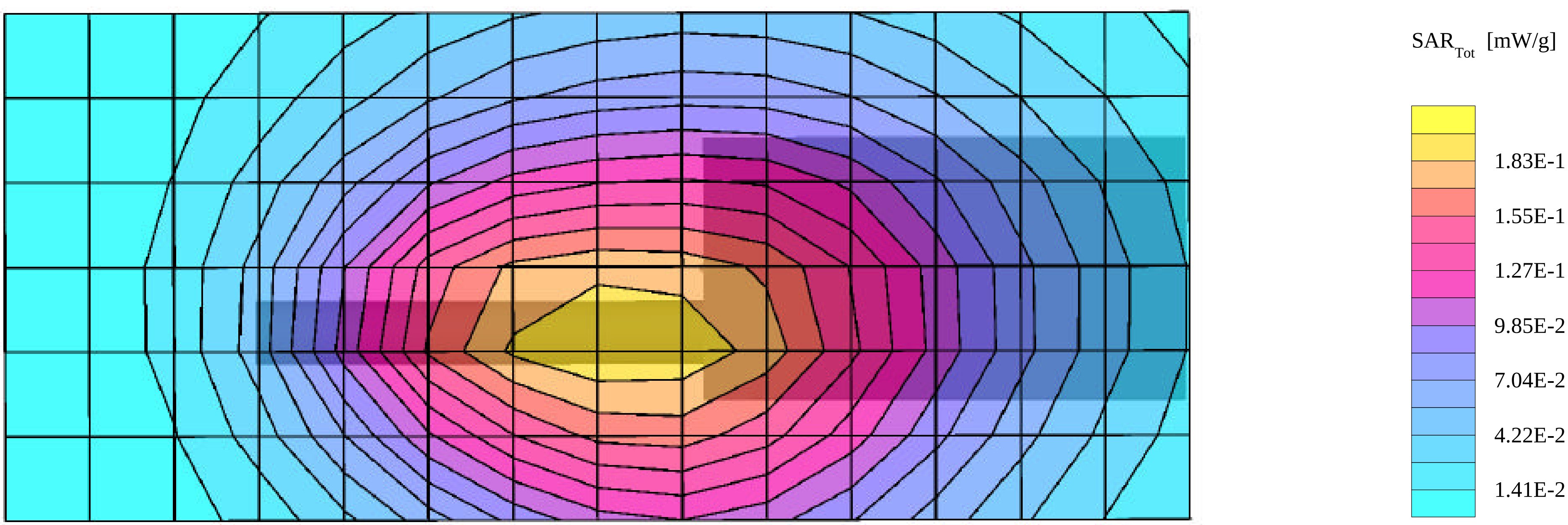
Face-Held SAR with 2.5 cm Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
Antenna P/N: KRA-26(M2)
NiMH Battery (KNB-26N)
Continuous Wave Mode
High Channel [174.00 MHz]
Conducted Power: 5.20 Watts
Ambient Temp 23.3 °C; Fluid Temp 22.6 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section; Position: (90°,0°)
Probe: ET3DV6 - SN1387; ConvF(9.10,9.10,9.10); Crest factor: 1.0
150 MHz Brain : σ = 0.75 mho/m ε_r = 53.6 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 0.186 mW/g, SAR (10g): 0.140 mW/g

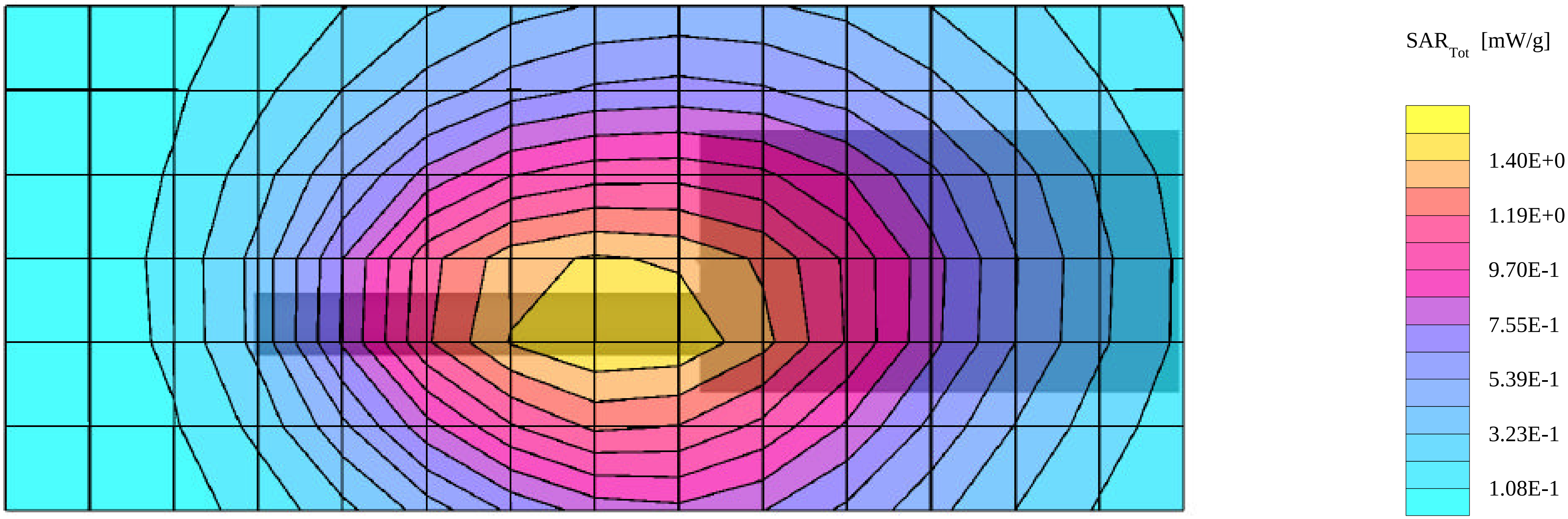
Face-Held SAR with 2.5 cm Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
Antenna P/N: KRA-22(M3)
NiMH Battery (KNB-26N)
Continuous Wave Mode
Low Channel [136.00 MHz]
Conducted Power: 5.22 Watts
Ambient Temp 23.3 °C; Fluid Temp 22.6 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section; Position: (90°,0°)
Probe: ET3DV6 - SN1387; ConvF(9.10,9.10,9.10); Crest factor: 1.0
150 MHz Brain : σ = 0.75 mho/m ε_r = 53.6 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 1.35 mW/g, SAR (10g): 1.01 mW/g

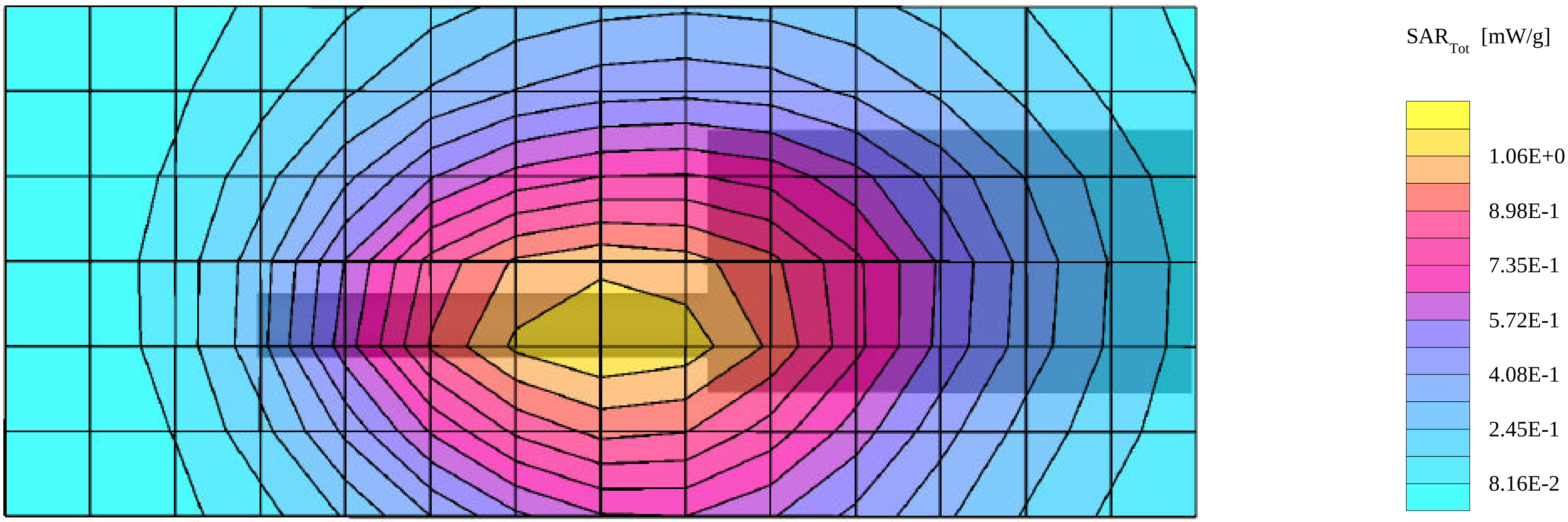
Face-Held SAR with 2.5 cm Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
Antenna P/N: KRA-22(M)
NiMH Battery (KNB-26N)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 5.31 Watts
Ambient Temp 23.3 °C; Fluid Temp 22.6 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section; Position: (90°,0°)
Probe: ET3DV6 - SN1387; ConvF(9.10,9.10,9.10); Crest factor: 1.0
150 MHz Brain : σ = 0.75 mho/m ε_r = 53.6 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 1.04 mW/g, SAR (10g): 0.775 mW/g

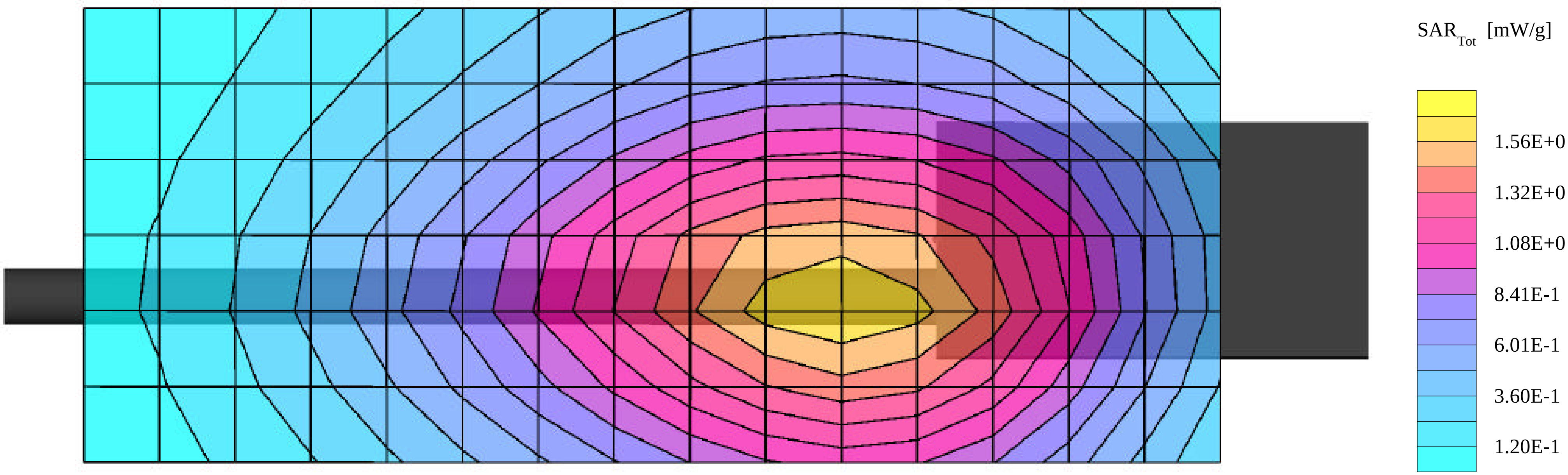
Face-Held SAR with 2.5 cm Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
Antenna P/N: KRA-22(M2)
NiMH Battery (KNB-26N)
Continuous Wave Mode
High Channel [174.00 MHz]
Conducted Power: 5.16 Watts
Ambient Temp 23.3 °C; Fluid Temp 22.6 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section; Position: (90°,0°)
Probe: ET3DV6 - SN1387; ConvF(9.10,9.10,9.10); Crest factor: 1.0
150 MHz Brain : σ = 0.75 mho/m ε_r = 53.6 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 1.57 mW/g, SAR (10g): 1.18 mW/g

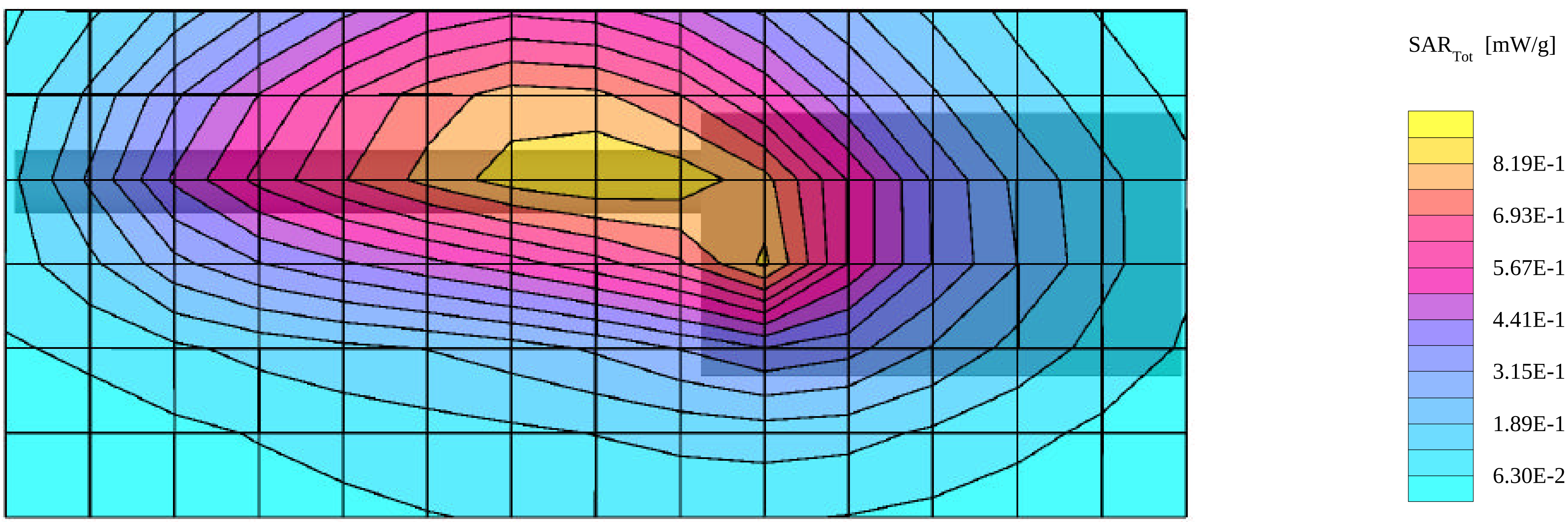
Face-Held SAR with 2.5 cm Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
Antenna P/N: KRA-25
NiMH Battery (KNB-26N)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 5.30 Watts
Ambient Temp 23.3 °C; Fluid Temp 22.6 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.78 mho/m ε_r = 60.5 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 0.837 mW/g, SAR (10g): 0.613 mW/g

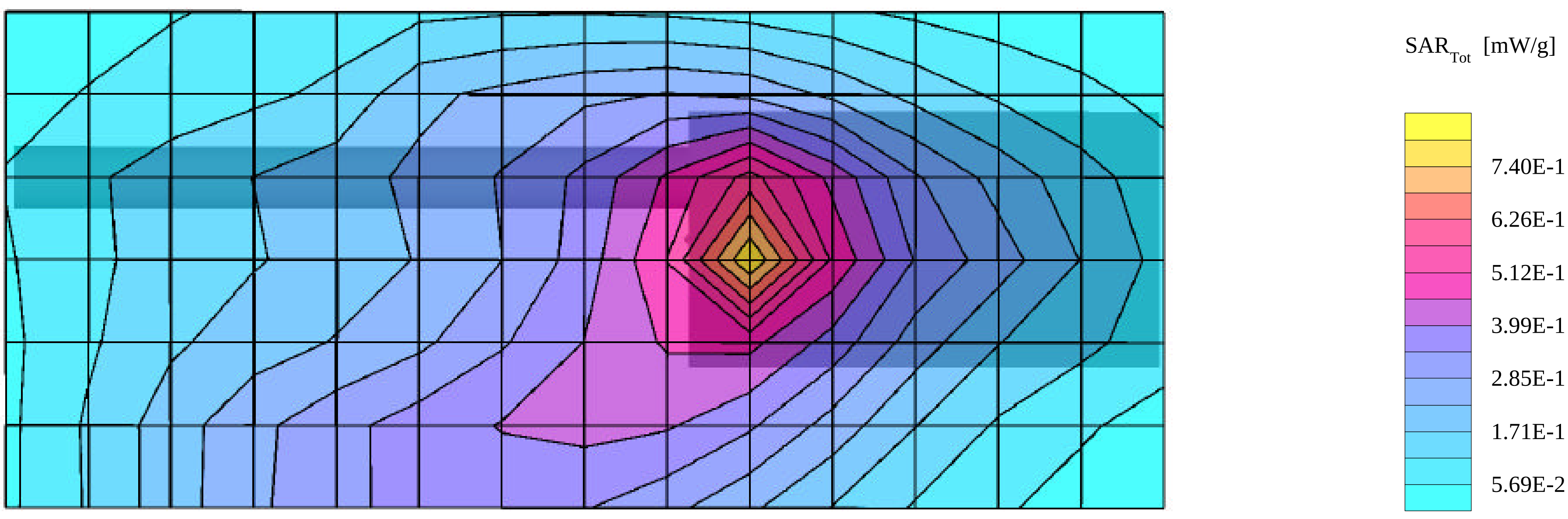
Body-Worn SAR with 0.9 cm Belt-Clip Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
with Speaker-Microphone Accessory (KMC-17)
Antenna P/N: KRA-26(M3)
NiMH Battery (KNB-26N)
Continuous Wave Mode
Low Channel [136.00 MHz]
Conducted Power: 5.13 Watts
Ambient Temp 23.3 °C; Fluid Temp 21.9 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.78 mho/m ε_r = 60.5 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 0.692 mW/g, SAR (10g): 0.436 mW/g

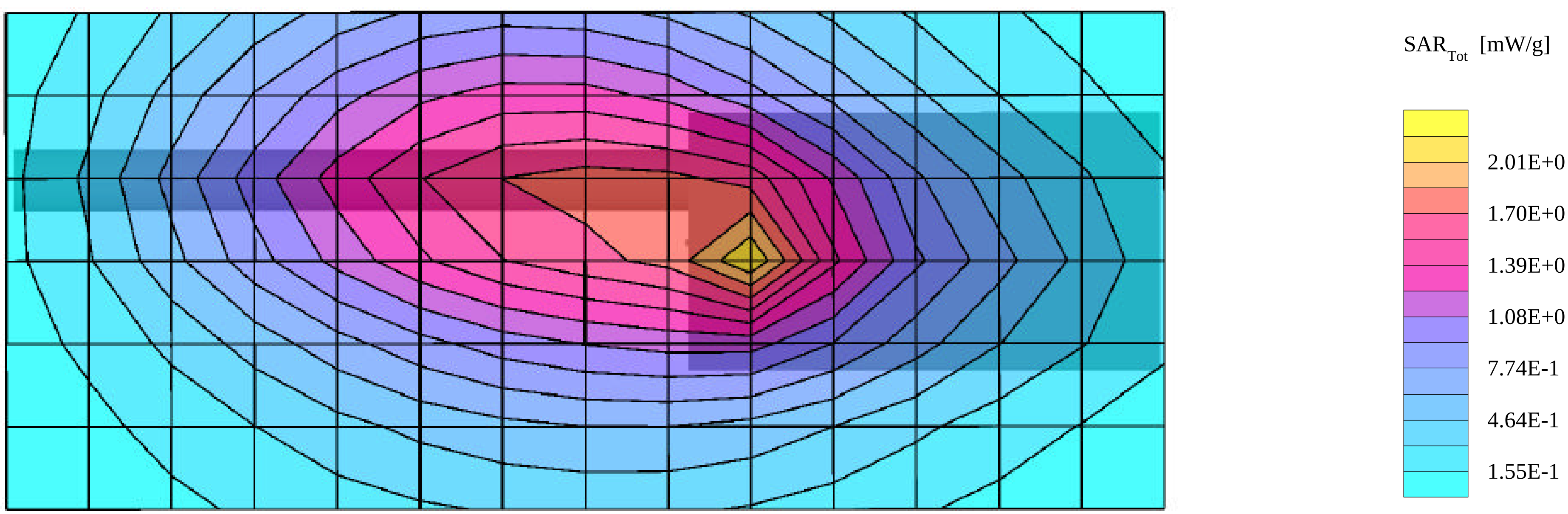
Body-Worn SAR with 0.9 cm Belt-Clip Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
with Speaker-Microphone Accessory (KMC-17)
Antenna P/N: KRA-26(M)
NiMH Battery (KNB-26N)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 5.26 Watts
Ambient Temp 23.3 °C; Fluid Temp 21.9 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.78 mho/m ε_r = 60.5 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 1.79 mW/g, SAR (10g): 1.21 mW/g

Body-Worn SAR with 0.9 cm Belt-Clip Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
with Speaker-Microphone Accessory (KMC-17)
Antenna P/N: KRA-26(M2)
NiMH Battery (KNB-26N)
Continuous Wave Mode
High Channel [174.00 MHz]
Conducted Power: 5.15 Watts
Ambient Temp 23.3 °C; Fluid Temp 21.9 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

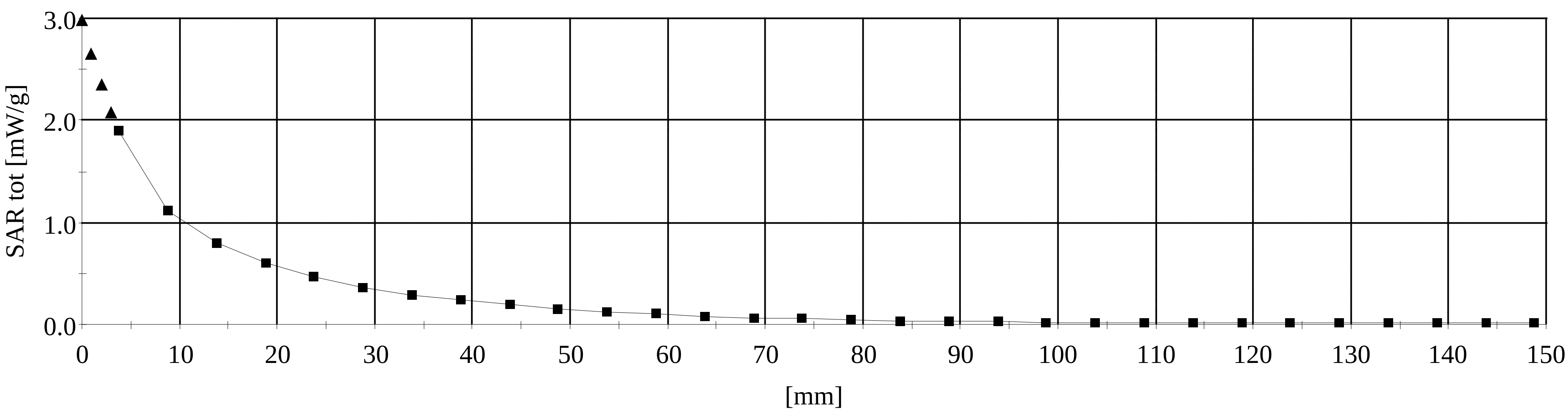
Small Planar Phantom; Planar Section

Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0

150 MHz Muscle: σ = 0.78 mho/m ε_r = 60.5 ρ = 1.00 g/cm^3

Z-Axis Extrapolation at Peak SAR Location

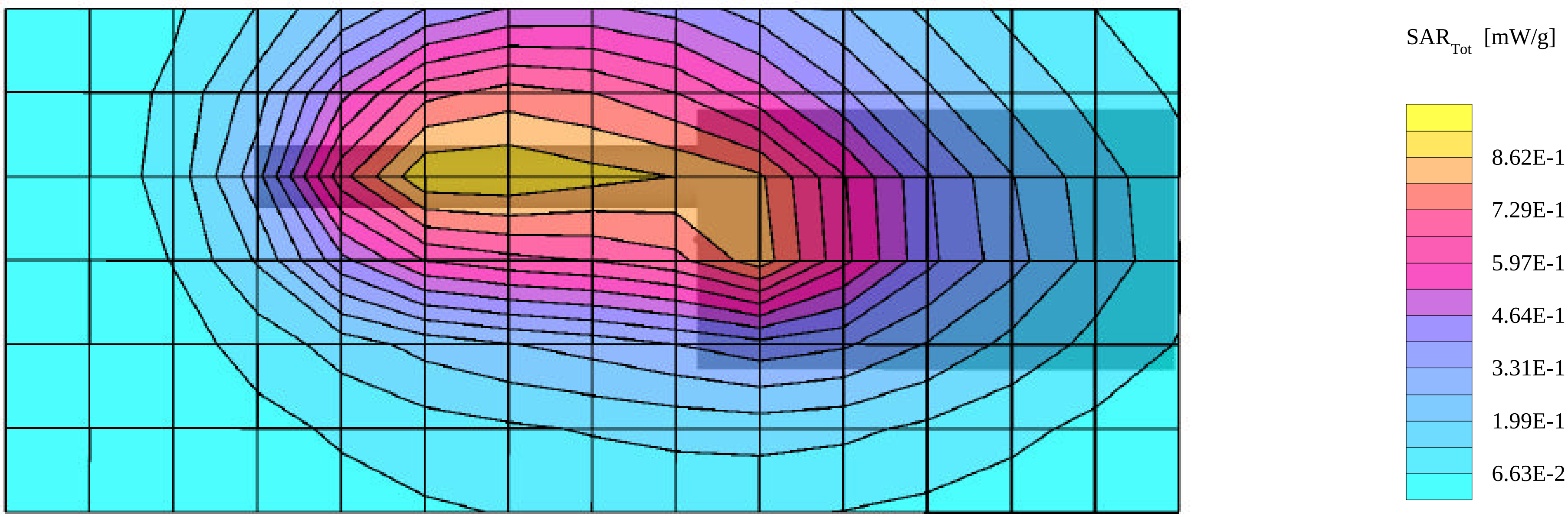
Body-Worn SAR with 0.9 cm Belt-Clip Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
with Speaker-Microphone Accessory (KMC-17)
Antenna P/N: KRA-26(M2)
NiMH Battery (KNB-26N)
Continuous Wave Mode
High Channel [174.00 MHz]
Conducted Power: 5.15 Watts
Ambient Temp 23.3 °C; Fluid Temp 21.9 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.78 mho/m ε_r = 60.5 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 0.860 mW/g, SAR (10g): 0.587 mW/g

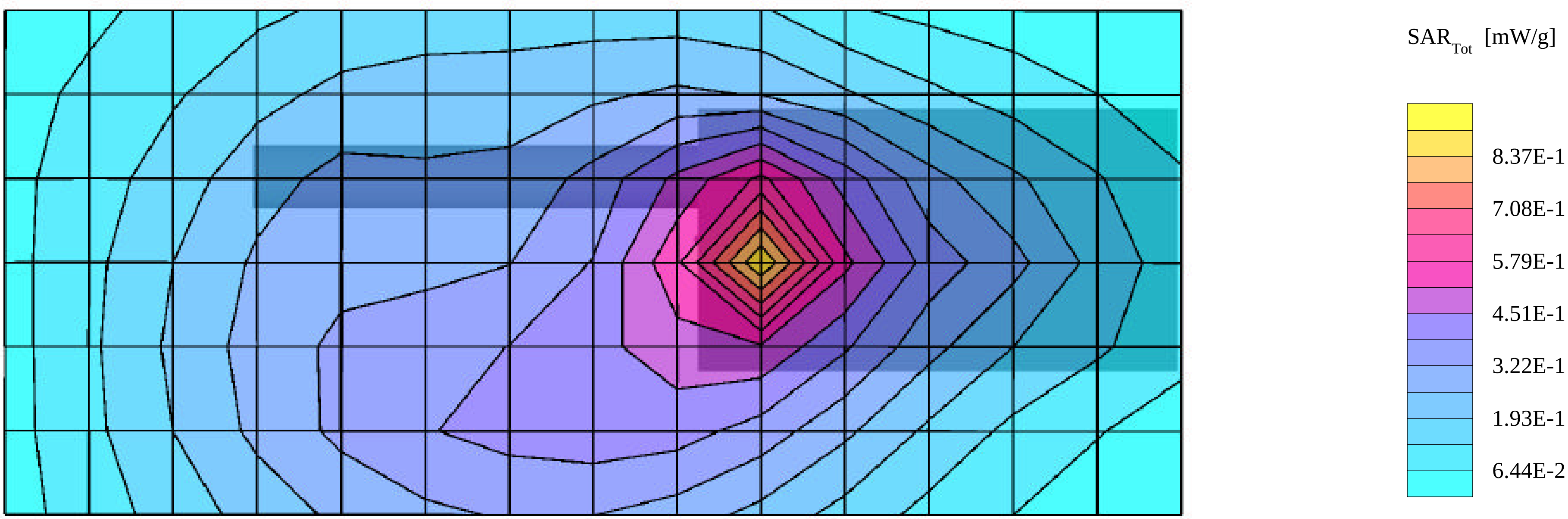
Body-Worn SAR with 0.9 cm Belt-Clip Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
with Speaker-Microphone Accessory (KMC-17)
Antenna P/N: KRA-22(M3)
NiMH Battery (KNB-26N)
Continuous Wave Mode
Low Channel [136.00 MHz]
Conducted Power: 5.25 Watts
Ambient Temp 23.3 °C; Fluid Temp 21.9 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.78 mho/m ε_r = 60.5 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 0.709 mW/g, SAR (10g): 0.439 mW/g

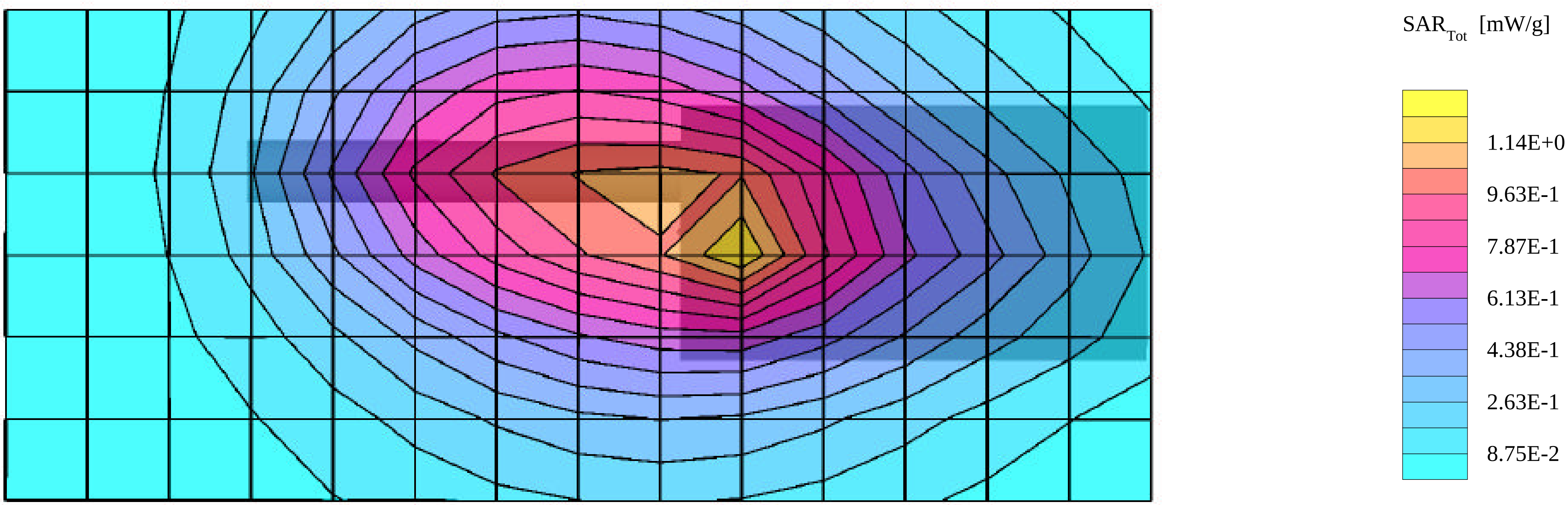
Body-Worn SAR with 0.9 cm Belt-Clip Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
with Speaker-Microphone Accessory (KMC-17)
Antenna P/N: KRA-22(M)
NiMH Battery (KNB-26N)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 5.28 Watts
Ambient Temp 23.3 °C; Fluid Temp 21.9 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.78 mho/m ε_r = 60.5 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 1.07 mW/g, SAR (10g): 0.743 mW/g

Body-Worn SAR with 0.9 cm Belt-Clip Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
with Speaker-Microphone Accessory (KMC-17)
Antenna P/N: KRA-22(M2)
NiMH Battery (KNB-26N)
Continuous Wave Mode
High Channel [174.00 MHz]
Conducted Power: 5.13 Watts
Ambient Temp 23.3 °C; Fluid Temp 21.9 °C
Date Tested: May 5, 2003



Kenwood USA Corporation FCC ID: ALH46413110

Small Planar Phantom; Planar Section; Position: (270°,180°)
Probe: ET3DV6 - SN1387; ConvF(8.80,8.80,8.80); Crest factor: 1.0
150 MHz Muscle: σ = 0.78 mho/m ε_r = 60.5 ρ = 1.00 g/cm^3
Coarse: Dx = 20.0, Dy = 20.0, Dz = 10.0
Cube 5x5x7
SAR (1g): 1.45 mW/g, SAR (10g): 0.882 mW/g

Body-Worn SAR with 0.9 cm Belt-Clip Separation Distance
TK-2160 Portable VHF PTT Radio Transceiver
with Speaker-Microphone Accessory (KMC-17)
Antenna P/N: KRA-25
NiMH Battery (KNB-26N)
Continuous Wave Mode
Mid Channel [155.00 MHz]
Conducted Power: 5.18 Watts
Ambient Temp 23.3 °C; Fluid Temp 21.9 °C
Date Tested: May 5, 2003