
	<u>Date(s) of Evaluation</u> August 29-30, 2006	<u>Test Report Serial No.</u> 082406ALH-T769-S90U	<u>Report Revision No.</u> Revision 1.0	
	<u>Report Issue Date</u> September 15, 2006	<u>Description of Test(s)</u> RF Exposure - SAR	<u>RF Exposure Category</u> Occupational/Controlled	

## RF EXPOSURE EVALUATION

## SPECIFIC ABSORPTION RATE

## **SAR TEST REPORT**

FOR

## **KENWOOD USA CORPORATION**

**PORTABLE FM UHF PTT RADIO TRANSCEIVER**

**MODEL(S): TK-5310-K4, TK-5310-K5, TK-5310-K6**

<b>IDENTIFIER(S)</b>	<b>FCC ID: ALH39913120</b>	<b>IC: 282D-39913120</b>
<b>Test Standard(s) and Procedure(s)</b>	<b>FCC OET Bulletin 65, Supplement C (01-01)</b>	
	<b>Industry Canada RSS-102 Issue 2</b>	

Test Report Serial No.

**082406ALH-T769-S90U**

Test Report Revision No.

**Revision 1.0 (Initial Release)**


Test Location



**Celltech Compliance Testing & Engineering Lab  
(Celltech Labs Inc.)  
1955 Moss Court  
Kelowna, BC  
Canada  
V1Y 9L3**



Certificate No. 2470.01

<u>Test Report Prepared By:</u> <b>Cheri Frangiadakis</b> Test Report Writer Celltech Labs Inc.	<u>Test Report Reviewed By:</u> <b>Jonathan Hughes</b> General Manager Celltech Labs Inc.
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<b>Company:</b>	<b>Kenwood USA Corporation</b>	<b>FCC ID:</b>	<b>ALH39913120</b>	<b>IC ID:</b>	<b>282D-39913120</b>	
<b>Model(s):</b>	<b>TK-5310-K4, -K5, -K6</b>	<b>Type:</b>	<b>Portable FM UHF PTT Radio Transceiver</b>	<b>380 - 470 MHz</b>		
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	<u>Date(s) of Evaluation</u> August 29-30, 2006	<u>Test Report Serial No.</u> 082406ALH-T769-S90U	<u>Report Revision No.</u> Revision 1.0	 Certificate No. 2470.01
	<u>Report Issue Date</u> September 15, 2006	<u>Description of Test(s)</u> RF Exposure - SAR	<u>RF Exposure Category</u> Occupational/Controlled	

## DECLARATION OF COMPLIANCE SAR RF EXPOSURE EVALUATION

<u>Test Lab and Location</u>  <b>CELLTECH LABS INCORPORATED</b> Testing and Engineering Services 1955 Moss Court Kelowna, B.C. Canada V1Y 9L3 Phone: 250-448-7047 Fax: 250-448-7046 e-mail: info@celltechlabs.com web site: www.celltechlabs.com		<u>Company Information</u>  <b>KENWOOD USA CORPORATION</b> 3975 John Creek Court, Suite 300 Suwanee, GA 30024 United States	
<b>FCC IDENTIFIER:</b> ALH39913120 <b>IC IDENTIFIER:</b> 282D-39913120 <b>Model(s):</b> TK-5310-K4, TK-5310-K5, TK-5310-K6			
<b>Test Requirement(s):</b> <b>Test Procedure(s):</b>		FCC 47 CFR §2.1093; Health Canada Safety Code 6 FCC OET Bulletin 65, Supplement C (Edition 01-01) Industry Canada RSS-102 Issue 2	
<b>Device Description:</b> <b>Modulation Type:</b> <b>Transmit Frequency Range(s):</b> <b>Max. RF Output Power Tested:</b> <b>Antenna Type(s) Tested:</b>  <b>Battery Type(s) Tested:</b>		Portable FM UHF PTT Radio Transceiver FM (UHF) 380 - 470 MHz 3.90 Watts (35.91 dBm) Conducted (425 MHz) Stubby 440 - 490 MHz (P/N: KRA-23M) Whip 400 - 450 MHz (P/N: KRA-27M3) Whip 440 - 490 MHz (P/N: KRA-27M) Whip 380 - 430 MHz (P/N: KRA-29) Li-ion 7.5 V, 1700 mAh (P/N: KNB-33L) NiCd 7.5 V, 1700 mAh (P/N: KNB-31A) NiMH 7.5 V, 2500 mAh (P/N: KNB-32N) NiMH 7.5 V 2500 mAh Intrinsically Safe (P/N: KNB-41NC) Duracell Procell Alkaline 2850 mAh 1.5 V AA x6 (Battery Case P/N: KBP-6)	
<b>Body-Worn Accessories Tested:</b> <b>Audio Accessories Tested:</b>		Plastic Belt-Clip with Metal Spring (P/N: J29-0710-XX) Speaker-Microphone (P/N: KMC-25)	
<b>Max. SAR Level(s) Evaluated:</b>		Face-Held: 1.88 W/kg (1g) - 50% duty cycle Body-Worn: 3.46 W/kg (1g) - 50% duty cycle	

Celltech Labs Inc. declares under its sole responsibility that this wireless portable device has demonstrated 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 2 for the Occupational / Controlled Exposure environment. All measurements were performed in accordance with the SAR system manufacturer recommendations.


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.



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**Test Report Approved By:**


**Sean Johnston**  
**SAR Lab Manager**  
**Celltech Labs Inc.**



<b>Company:</b>	<b>Kenwood USA Corporation</b>	<b>FCC ID:</b>	<b>ALH39913120</b>	<b>IC ID:</b>	<b>282D-39913120</b>	
<b>Model(s):</b>	<b>TK-5310-K4, -K5, -K6</b>	<b>Type:</b>	<b>Portable FM UHF PTT Radio Transceiver</b>	<b>380 - 470 MHz</b>		
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	<u>Report Issue Date</u> September 15, 2006	<u>Description of Test(s)</u> RF Exposure - SAR	<u>RF Exposure Category</u> Occupational/Controlled	

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<b>Company:</b>	<b>Kenwood USA Corporation</b>	<b>FCC ID:</b>	<b>ALH39913120</b>	<b>IC ID:</b>	<b>282D-39913120</b>	
<b>Model(s):</b>	<b>TK-5310-K4, -K5, -K6</b>	<b>Type:</b>	<b>Portable FM UHF PTT Radio Transceiver</b>	<b>380 - 470 MHz</b>		
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	<u>Report Issue Date</u> September 15, 2006	<u>Description of Test(s)</u> RF Exposure - SAR	<u>RF Exposure Category</u> Occupational/Controlled	



## 1.0 INTRODUCTION

This measurement report demonstrates that the Kenwood USA Corporation Models: TK-5310-K4, -K5, -K6 Portable FM UHF PTT Radio Transceiver FCC ID: ALH39913120 complies with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada's 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 2 (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 provisions of the rules are included within this test report.

## 2.0 DESCRIPTION OF DEVICE UNDER TEST (DUT)

<b>RF Exposure Test Requirement(s)</b>	FCC Rule Part 47 CFR §2.1093			
	Health Canada Safety Code 6			
<b>Test Procedure(s)</b>	FCC OET Bulletin 65, Supplement C (01-01)			
	Industry Canada RSS-102 Issue 2			
<b>Device Description</b>	Portable FM UHF PTT Radio Transceiver			
<b>RF Exposure Category</b>	Occupational / Controlled Environment			
<b>FCC IDENTIFIER</b>	ALH39913120			
<b>IC IDENTIFIER</b>	282D-39913120			
<b>Model(s)</b>	TK-5310-K4	TK-5310-K5	TK-5310-K6	
<b>Test Sample Serial No.</b>	None		Identical Prototype	
<b>Modulation Type</b>	FM (UHF)			
<b>Transmit Frequency Range(s)</b>	380 - 470 MHz			
<b>Max. RF Output Power Tested</b>	3.86 Watts	35.87 dBm	Conducted	380 MHz
	3.90 Watts	35.91 dBm	Conducted	425 MHz
	3.85 Watts	35.85 dBm	Conducted	470 MHz
<b>Antenna Type(s) Tested</b>	Stubby	440 - 490 MHz	P/N: KRA-23M	Length: 83 cm
	Whip	440 - 490 MHz	P/N: KRA-27M	Length: 152 cm
	Whip	400 - 450 MHz	P/N: KRA-27M3	Length: 173 cm
	Whip	380 - 430 MHz	P/N: KRA-29	Length: 173 cm
<b>Battery Type(s) Tested</b>	Li-ion	7.5 V	1700 mAh	P/N: KNB-33L
	NiCd	7.5 V	1700 mAh	P/N: KNB-31A
	NiMH	7.5 V	2500 mAh	P/N: KNB-32N
	NiMH Intrinsically Safe	7.5 V	2500 mAh	P/N: KNB-41NC
	Alkaline Duracell Procell	9 V	2850 mAh	P/N: KBP-6 (Battery Case)
<b>Body-Worn Accessories Tested</b>	Plastic Belt-Clip (with Metal Spring)			P/N: J29-0710-XX
<b>Audio Accessories Tested</b>	Speaker-Microphone			P/N: KMC-25

<b>Company:</b>	Kenwood USA Corporation	<b>FCC ID:</b>	ALH39913120	<b>IC ID:</b>	282D-39913120	
<b>Model(s):</b>	TK-5310-K4, -K5, -K6	<b>Type:</b>	Portable FM UHF PTT Radio Transceiver	380 - 470 MHz		
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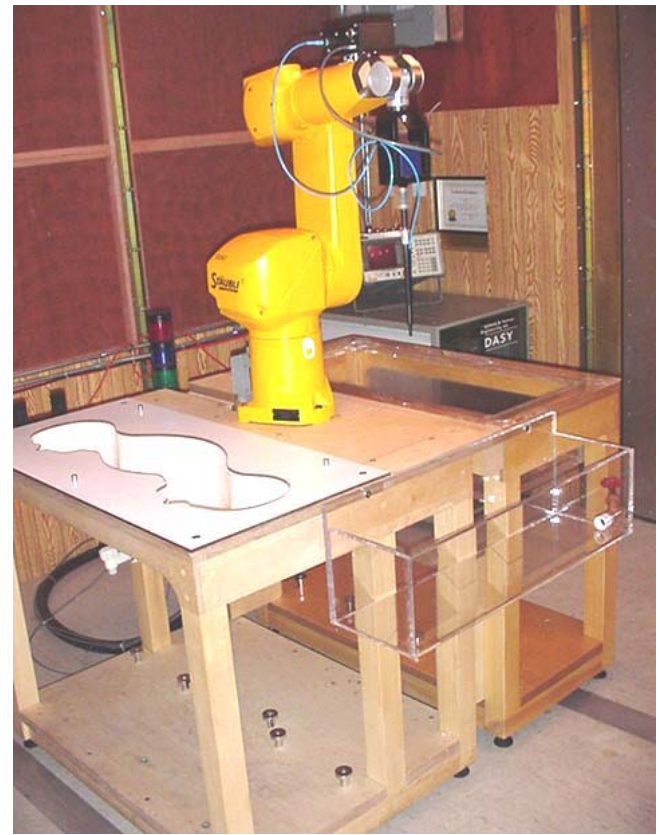
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### 3.0 SAR MEASUREMENT SYSTEM

Celltech Labs Inc. SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 measurement system is comprised of the measurement server, 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 DASY4 measurement server. The DAE4 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 DASY4 measurement server 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. The sensor systems are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.



DASY4 SAR Measurement System with Plexiglas validation phantom



DASY4 SAR Measurement System with Plexiglas side planar phantom

<b>Company:</b>	<b>Kenwood USA Corporation</b>	<b>FCC ID:</b>	<b>ALH39913120</b>	<b>IC ID:</b>	<b>282D-39913120</b>	
<b>Model(s):</b>	<b>TK-5310-K4, -K5, -K6</b>	<b>Type:</b>	<b>Portable FM UHF PTT Radio Transceiver</b>	<b>380 - 470 MHz</b>		
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## 4.0 MEASUREMENT SUMMARY

### FACE-HELD SAR EVALUATION RESULTS

Freq. (MHz)	Chan.	Test Mode	Antenna		Battery		Separation Distance to Planar Phantom cm	Cond. Power Before Test Watts	Measured SAR 1g (W/kg)		SAR Drift During Test dB	Scaled SAR with droop 1g (W/kg)			
			Type	P/N	Type	P/N			Duty Cycle			100%	50%	Duty Cycle	
									100%	50%				100%	50%
425	Mid	CW	Whip	KRA-27M3	NiCd	KNB-31A	2.5	3.90	2.65	1.33	-0.479	2.96	1.48		
425	Mid	CW	Whip	KRA-27M3	NiMH	KNB-32N	2.5	3.90	2.28	1.14	-0.426	2.51	1.26		
425	Mid	CW	Whip	KRA-27M3	Li-ion	KNB-33L	2.5	3.90	2.50	1.25	-0.277	2.66	1.33		
425	Mid	CW	Whip	KRA-27M3	NiMH IS	KNB-41NC	2.5	3.90	2.03	1.02	-0.355	2.20	1.10		
425	Mid	CW	Whip	KRA-29	NiCd	KNB-31A	2.5	3.90	2.58	1.29	-0.526	2.91	1.46		
380	Low	CW	Whip	KRA-29	NiCd	KNB-31A	2.5	3.86	3.69	1.85	-0.0722	3.75	1.88		
470	High	CW	Stubby	KRA-23M	NiCd	KNB-31A	2.5	3.85	2.63	1.32	-0.216	2.76	1.38		
470	High	CW	Whip	KRA-27M	NiCd	KNB-31A	2.5	3.85	2.49	1.25	-0.172	2.59	1.30		
<b>ANSI / IEEE C95.1 1999 - SAFETY LIMIT</b>					<b>BRAIN: 8.0 W/kg (averaged over 1 gram)</b>				<b>Spatial Peak Controlled Exposure / Occupational</b>						
<b>Test Date</b>		August 30, 2006					<b>Relative Humidity</b>		35				%		
<b>Measured Fluid Type</b>		450 MHz Brain					<b>Atmospheric Pressure</b>		101.1				kPa		
<b>Dielectric Constant <math>\epsilon_r</math></b>		<b>IEEE Target</b>		<b>Measured</b>	<b>Deviation</b>	<b>Ambient Temperature</b>		23.9				°C			
		43.5	± 5%	42.8	-1.6%	<b>Fluid Temperature</b>		23.2				°C			
<b>Conductivity <math>\sigma</math> (mho/m)</b>		<b>IEEE Target</b>		<b>Measured</b>	<b>Deviation</b>	<b>Fluid Depth</b>		≥ 15				cm			
		0.87	± 5%	0.84	-3.4%	<b><math>\rho</math> (Kg/m<sup>3</sup>)</b>		1000							
<b>Note(s)</b>		1.	The measurement results were obtained with the DUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.												
		2.	If the scaled SAR levels evaluated at the mid channel (50% duty cycle) were ≥ 3 dB below the SAR limit, SAR evaluation for the low and high channels was optional per FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [3]).												
		3.	The area scan evaluation was performed with a fully charged battery. After the area scan was completed the radio was cooled down to room temperature and the battery was replaced with a fully charged battery prior to the zoom scan evaluation.												
		4.	The power droops measured by the DASy4 system for the duration of the SAR evaluations were added to the measured SAR levels to report scaled SAR results as shown in the above test data table.												
		5.	The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluations. The temperatures reported were consistent for all measurement periods.												
		6.	The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluations using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C).												
		7.	The SAR evaluations were performed within 24 hours of the system performance check.												

<b>Company:</b>	Kenwood USA Corporation	<b>FCC ID:</b>	ALH39913120	<b>IC ID:</b>	282D-39913120	
<b>Model(s):</b>	TK-5310-K4, -K5, -K6	<b>Type:</b>	Portable FM UHF PTT Radio Transceiver	380 - 470 MHz		
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## MEASUREMENT SUMMARY (CONT.)

### BODY-WORN SAR EVALUATION RESULTS

Freq. (MHz)	Chan.	Test Mode	Antenna		Battery		Accessories		Separ. Distance to Planar Phantom	Cond. Power Before Test	Measured SAR 1g (W/kg)		SAR Drift During Test	Scaled SAR with droop 1g (W/kg)				
			Type	P/N	Type	P/N	Body-worn	Audio			cm	Watts		Duty Cycle		dB	Duty Cycle	
														100%	50%		100%	50%
425	Mid	CW	Whip	KRA-27M3	NiCd	KNB-31A	Belt-Clip	Spkr-Mic	2.0	3.90	5.46	2.73	-0.390	5.97	2.99			
425	Mid	CW	Whip	KRA-27M3	NiMH	KNB-32N	Belt-Clip	Spkr-Mic	2.0	3.90	5.00	2.50	-0.282	5.34	2.67			
425	Mid	CW	Whip	KRA-27M3	Li-ion	KNB-33L	Belt-Clip	Spkr-Mic	2.0	3.90	P	4.55	2.28	-0.400	P	4.99	2.49	
											S	4.76	2.38		S	5.22	2.61	
425	Mid	CW	Whip	KRA-27M3	NiMH IS	KNB-41NC	Belt-Clip	Spkr-Mic	2.0	3.90	P	4.53	2.27	-0.570	P	5.17	2.58	
											S	3.68	1.84		S	4.20	2.10	
425	Mid	CW	Whip	KRA-29	NiCd	KNB-31A	Belt-Clip	Spkr-Mic	2.0	3.90	P	5.47	2.74	-0.509	P	6.15	3.08	
											S	4.62	2.31		S	5.19	2.60	
380	Low	CW	Whip	KRA-29	NiCd	KNB-31A	Belt-Clip	Spkr-Mic	2.0	3.86	P	6.67	3.34	-0.158	P	6.92	3.46	
											S	5.31	2.66		S	5.51	2.75	
470	High	CW	Stubby	KRA-23M	NiCd	KNB-31A	Belt-Clip	Spkr-Mic	2.0	3.85	P	4.77	2.39	-0.263	P	5.07	2.53	
											S	4.63	2.32		S	4.92	2.46	
470	High	CW	Whip	KRA-27M	NiCd	KNB-31A	Belt-Clip	Spkr-Mic	2.0	3.85	4.72	2.36	-0.181	4.92	2.46			

ANSI / IEEE C95.1 1999 - SAFETY LIMIT


BODY: 8.0 W/kg (averaged over 1 gram)

Spatial Peak: Controlled Exposure / Occupational

Test Date	August 29, 2006			Relative Humidity	33	%
Measured Fluid Type	450 MHz Body			Atmospheric Pressure	101.5	kPa
Dielectric Constant $\epsilon_r$	IEEE Target	Measured	Deviation	Ambient Temperature	23.7	°C
	56.7	± 5%	55.3	-2.5%	Fluid Temperature	23.0
Conductivity $\sigma$ (mho/m)	IEEE Target	Measured	Deviation	Fluid Depth	≥ 15	cm
	0.94	± 5%	0.91	-3.2%	$\rho$ (Kg/m <sup>3</sup> )	1000

**Note(s)**

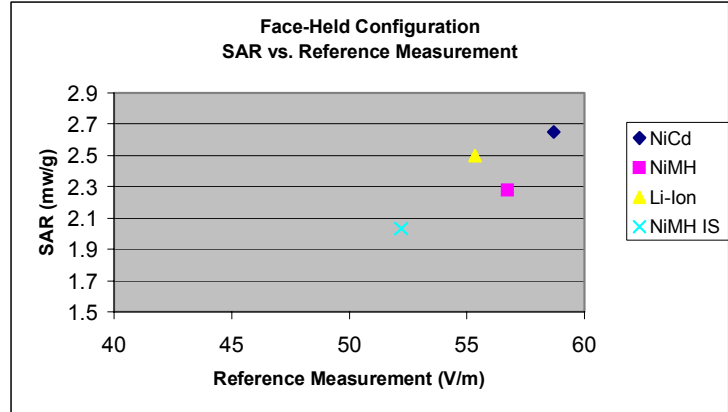
1. The measurement results were obtained with the DUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.
2. If the scaled SAR levels evaluated at the mid channel (50% duty cycle) were  $\geq 3$  dB below the SAR limit, SAR evaluation for the low and high channels was optional per FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [3]).
3. The area scan evaluation was performed with a fully charged battery. After the area scan was completed the radio was cooled down to room temperature and the battery was replaced with a fully charged battery prior to the zoom scan evaluation.
4. Secondary peak SAR levels measured within 2 dB of the primary were reported (P = Primary, S = Secondary).
5. The power droops measured by the DASY4 system for the duration of the SAR evaluations were added to the measured SAR levels to report scaled SAR results as shown in the above test data table.
6. A SAR-versus-Time power droop evaluation was performed in the test configuration that reported the maximum-scaled SAR level. See Appendix A (SAR Test Plots) for SAR-versus-Time power droop evaluation plot.
7. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluations. The temperatures reported were consistent for all measurement periods.
8. The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluations using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C).
9. The SAR evaluations were performed within 24 hours of the system performance check.

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Model(s):	TK-5310-K4, -K5, -K6	Type:	Portable FM UHF PTT Radio Transceiver	380 - 470 MHz		
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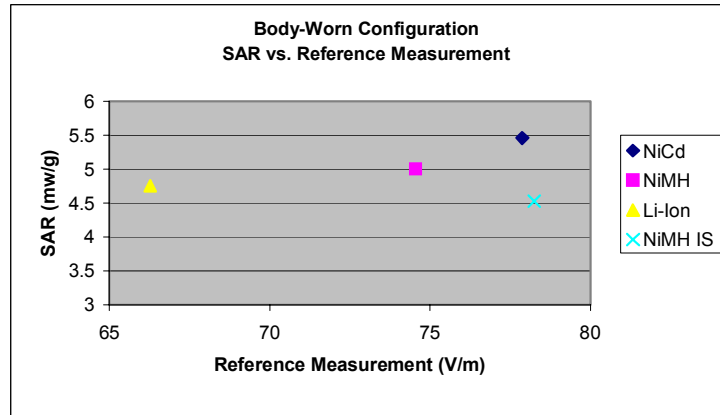
## MEASUREMENT SUMMARY (CONT.)

### TK- 5310- K6 Alkaline SAR Prediction based on Comparing Reference Values

Face-Held Configuration		
KRA-27M3 Antenna		
Battery Type	Reference Value V/m	SAR mW/g
NiCd	58.68	2.65
NiMH	56.74	2.28
Li-Ion	55.35	2.50
NiMH IS	52.2	2.03
Alkaline	45.14	



Body-Worn Configuration		
KRA-27M3 Antenna		
Battery Type	Reference Value V/m	SAR mW/g
NiCd	77.88	5.46
NiMH	74.56	5.00
Li-Ion	66.28	4.76
NiMH IS	78.26	4.53
Alkaline	65.5	





#### Purpose of Evaluation:

Reference measurements only were performed for the DUT with alkaline battery configuration due to the fact that the radio was not capable of transmitting continuously for the duration of the zoom scan evaluation.

#### Summary of Evaluation:

A reference measurement was taken at the beginning of each SAR evaluation. Based on the above results the trend shows that the higher the reference value the higher the SAR value. Therefore the conclusion was drawn that since the alkaline battery has a lower reference level than the other battery configurations, the SAR with alkaline battery would be lower than the SAR levels measured for the other battery configurations.



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## 5.0 DETAILS OF SAR EVALUATION

The Kenwood USA Corporation Model(s): TK-5310-K4, -K5, -K6 Portable FM UHF PTT Radio Transceiver FCC ID: ALH39913120 was 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 D.

- The DUT 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 of the DUT and the outer surface of the planar phantom.
- The DUT was tested 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 accessory was touching the planar phantom and provided a 2.0 cm separation distance from the back of the DUT to the outer surface of the planar phantom. The DUT was evaluated for body-worn SAR with the speaker-microphone audio accessory connected to the audio port.
- The conducted power levels of the DUT were measured prior to the SAR evaluations using a Gigatronics 8652A Universal Power Meter according to the procedures described in FCC 47 CFR §2.1046.
- The area scan evaluation was performed with a fully charged battery. After the area scan was completed the radio was cooled down and the battery was replaced with a fully charged battery prior to the zoom scan evaluation.
- The power drift of the DUT during the SAR evaluations was measured by the DASY4 system.
- The DUT 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.
- The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluations. The temperatures reported were consistent for all measurement periods.
- The dielectric parameters of the simulated tissue mixtures were measured prior to the SAR evaluations using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C).
- The SAR evaluations were performed within 24 hours of the system performance check.

## 6.0 EVALUATION PROCEDURES


- (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 using the SAM phantom.  
(ii) For body-worn and face-held devices a planar phantom was used.
- The SAR was determined by a pre-defined procedure within the DASY4 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 15mm x 15mm.



An area scan was determined as follows:

- Based on the defined area scan grid, a more detailed grid is created to increase the points by a factor of 10. The interpolation function then evaluates all field values between corresponding measurement points.
- A linear search is applied to find all the candidate maxima. Subsequently, all maxima are removed that are >2 dB from the global maximum. The remaining maxima are then used to position the cube scans.

A 1g and 10g spatial peak SAR was determined as follows:

- Extrapolation is used 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 from the tip of the probe and the distance between the surface and the lowest measuring point is 1.4 mm (see probe calibration document in Appendix F). The extrapolation was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.
- Interpolated data is used to calculate the average SAR over 1g and 10g cubes by spatially discretizing the entire measured cube. The volume used to determine the averaged SAR is a 1mm grid (42875 interpolated points).
- A zoom scan volume of 32 mm x 32 mm x 30 mm (5 x 5 x 7 points) centered at the peak SAR location determined from the area scan is used for all zoom scans for devices with a transmit frequency < 800 MHz. Zoom scans for frequencies ≥ 800 MHz are determined with a scan volume of 30 mm x 30 mm x 30 mm (7 x 7 x 7) to ensure complete capture of the peak spatial-average SAR.

<b>Company:</b>	<b>Kenwood USA Corporation</b>	<b>FCC ID:</b>	<b>ALH39913120</b>	<b>IC ID:</b>	<b>282D-39913120</b>	
<b>Model(s):</b>	<b>TK-5310-K4, -K5, -K6</b>	<b>Type:</b>	<b>Portable FM UHF PTT Radio Transceiver</b>	<b>380 - 470 MHz</b>		
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## 7.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluations a system check was performed using a Plexiglas planar phantom and 450MHz dipole (see Appendix E for system validation procedures). The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using an ALS-PR-DIEL Dielectric Probe Kit and HP 8753ET Network Analyzer (see Appendix C). A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of  $\pm 10\%$  (see Appendix B for system performance check test plots).

### SYSTEM PERFORMANCE CHECK EVALUATION

Test Date	Equiv. Tissue	SAR 1g (W/kg)			Dielectric Constant $\epsilon_r$			Conductivity $\sigma$ (mho/m)			$\rho$ (Kg/m <sup>3</sup> )	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
		IEEE Target	Meas.	Dev.	IEEE Target	Meas.	Dev.	IEEE Target	Meas.	Dev.						
8/29/06	Brain	1.23 $\pm 10\%$	1.22	-0.8%	43.5 $\pm 5\%$	43.0	-1.1%	0.87 $\pm 5\%$	0.85	-2.3%	1000	23.7	23.0	$\geq 15$	33	101.5
	450															
8/30/06	Brain	1.23 $\pm 10\%$	1.26	+2.4%	43.5 $\pm 5\%$	42.8	-1.6%	0.87 $\pm 5\%$	0.84	-3.4%	1000	23.9	23.2	$\geq 15$	35	101.1
	450															
Note(s)		The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the system performance check. The temperatures listed in the table above were consistent for all measurement periods.														

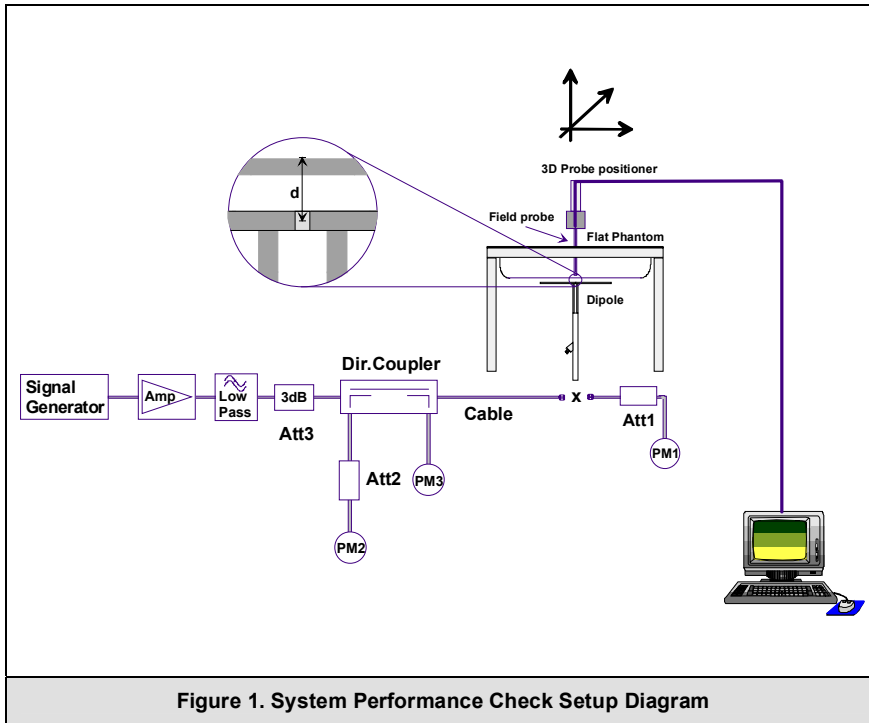


Figure 1. System Performance Check Setup Diagram



450 MHz Dipole Setup

Company:	Kenwood USA Corporation	FCC ID:	ALH39913120	IC ID:	282D-39913120	
Model(s):	TK-5310-K4, -K5, -K6	Type:	Portable FM UHF PTT Radio Transceiver	380 - 470 MHz		
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## 8.0 SIMULATED EQUIVALENT TISSUES

The 450MHz 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).

SIMULATED TISSUE MIXTURES		
INGREDIENT	450 MHz Brain	450 MHz Body
	System Check & DUT Evaluation	DUT Evaluation
Water	38.56 %	52.00 %
Sugar	56.32 %	45.65 %
Salt	3.95 %	1.75 %
HEC	0.98 %	0.50 %
Bactericide	0.19 %	0.10 %

## 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 1 g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0
Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.		
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.		



<b>Company:</b>	Kenwood USA Corporation	<b>FCC ID:</b>	ALH39913120	<b>IC ID:</b>	282D-39913120	
<b>Model(s):</b>	TK-5310-K4, -K5, -K6	<b>Type:</b>	Portable FM UHF PTT Radio Transceiver	380 - 470 MHz		
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## 10.0 ROBOT SYSTEM SPECIFICATIONS

<b>Specifications</b>	
<b>Positioner</b>	Stäubli Unimation Corp. Robot Model: RX60L
<b>Repeatability</b>	0.02 mm
<b>No. of axis</b>	6
<b>Data Acquisition Electronic (DAE) System</b>	
<b>Cell Controller</b>	
<b>Processor</b>	AMD Athlon XP 2400+
<b>Clock Speed</b>	2.0 GHz
<b>Operating System</b>	Windows XP Professional
<b>Data Converter</b>	
<b>Features</b>	Signal Amplifier, multiplexer, A/D converter, and control logic
<b>Software</b>	Measurement Software: DASYS4, V4.7 Build 44
	Postprocessing Software: SEMCAD, V1.8 Build 171
<b>Connecting Lines</b>	Optical downlink for data and status info.; Optical uplink for commands and clock
<b>DASY4 Measurement Server</b>	
<b>Function</b>	Real-time data evaluation for field measurements and surface detection
<b>Hardware</b>	PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM
<b>Connections</b>	COM1, COM2, DAE, Robot, Ethernet, Service Interface
<b>E-Field Probe</b>	
<b>Model</b>	ET3DV6
<b>Serial No.</b>	1387
<b>Construction</b>	Triangular core fiber optic detection system
<b>Frequency</b>	10 MHz to 6 GHz
<b>Linearity</b>	±0.2 dB (30 MHz to 3 GHz)
<b>Phantom(s)</b>	
<b>Evaluation Phantom</b>	
<b>Type</b>	Side Planar Phantom
<b>Shell Material</b>	Plexiglas
<b>Bottom Thickness</b>	2.0 mm ± 0.1 mm
<b>Outer Dimensions</b>	75.0 cm (L) x 22.5 cm (W) x 20.5 cm (H); Back Plane: 25.7 cm (H)
<b>Validation Phantom (≤ 450MHz)</b>	
<b>Type</b>	Planar Phantom
<b>Shell Material</b>	Plexiglas
<b>Bottom Thickness</b>	6.2 mm ± 0.1 mm
<b>Outer Dimensions</b>	86.0 cm (L) x 39.5 cm (W) x 21.8 cm (H)

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<b>Model(s):</b>	TK-5310-K4, -K5, -K6	<b>Type:</b>	Portable FM UHF PTT Radio Transceiver	380 - 470 MHz		
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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, 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 $\pm 8\%$ )
Frequency:	10 MHz to > 6 GHz; Linearity: $\pm 0.2$ dB (30 MHz to 3 GHz)
Directivity:	$\pm 0.2$ dB in brain tissue (rotation around probe axis) $\pm 0.4$ dB in brain tissue (rotation normal to probe axis)
Dynamic Range:	5 $\mu$ W/g to > 100 mW/g; Linearity: $\pm 0.2$ dB
Surface Detect:	$\pm 0.2$ 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 SIDE PLANAR PHANTOM

The side planar phantom is constructed of Plexiglas material with a 2.0 mm shell thickness for face-held and body-worn SAR evaluations of portable radio transceivers. The side planar phantom is mounted on the side of the DASY4 compact system table.



Plexiglas Side Planar Phantom

## 13.0 VALIDATION PLANAR PHANTOM

The validation planar phantom is constructed of Plexiglas material with a 6.0 mm shell thickness for system validations at 450MHz and below. The validation planar phantom is mounted to the table of the DASY4 compact system.




Validation Planar Phantom

## 14.0 DEVICE HOLDER

The DASY4 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

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## 15.0 TEST EQUIPMENT LIST

USED	TEST EQUIPMENT	ASSET NO.	SERIAL NO.	DATE CALIBRATED		CALIBRATION DUE DATE
	DESCRIPTION					
x	Schmid & Partner DASY4 System	-	-	-	-	-
x	-DASY4 Measurement Server	00158	1078	N/A	N/A	N/A
x	-Robot	00046	599396-01	N/A	N/A	N/A
x	-DAE4	00019	353	21Jun06		21Jun07
	-DAE3	00018	370	08Feb06		08Feb07
x	-ET3DV6 E-Field Probe	00016	1387	16Mar06		16Mar07
	-EX3DV4 E-Field Probe	00125	3547	14Feb06		14Feb07
	-300MHz Validation Dipole	00023	135	25Oct05		25Oct06
x	-450MHz Validation Dipole	00024	136	25Oct05		25Oct06
	-835MHz Validation Dipole	00022	411	Brain	28Mar06	28Mar07
				Body	27Mar06	27Mar07
	-900MHz Validation Dipole	00020	054	Brain	06Jun06	06Jun07
				Body	06Jun06	06Jun07
	-1640MHz Validation Dipole	00211	0180	Brain	07Aug06	07Aug07
	-1800MHz Validation Dipole	00021	247	Brain	08Jun06	08Jun07
				Body	09Jun06	09Jun07
	-1900MHz Validation Dipole	00032	151	Brain	09Jun06	09Jun07
				Body	12Jun06	12Jun07
	-2450MHz Validation Dipole	00025	150	Brain	20Sep05	20Sep06
				Body	24Apr06	24Apr07
	-5800MHz Validation Dipole	00126	1031	Brain	15Mar06	15Mar07
	-SAM Phantom V4.0C	00154	1033	N/A		N/A
	-Barski Planar Phantom	00155	03-01	N/A		N/A
x	-Plexiglas Side Planar Phantom	00156	161	N/A		N/A
x	-Plexiglas Validation Planar Phantom	00157	137	N/A		N/A
x	ALS-PR-DIEL Dielectric Probe Kit	00160	260-00953	N/A		N/A
	Gigatronics 8652A Power Meter	00110	1835801	12Apr06		12Apr07
x	Gigatronics 8652A Power Meter	00007	1835272	03Feb06		03Feb07
	Gigatronics 80701A Power Sensor	00011	1833542	03Feb06		03Feb07
	Gigatronics 80701A Power Sensor	00012	1834350	12Sep05		12Sep06
x	Gigatronics 80701A Power Sensor	00013	1833713	03Feb06		03Feb07
x	Gigatronics 80701A Power Sensor	00014	1833699	07Sep05		07Sep06
x	HP 8753ET Network Analyzer	00134	US39170292	18Apr06		18Apr07
x	HP 8648D Signal Generator	00005	3847A00611	N/A		N/A
	Rohde & Schwarz SMR40 Signal Generator	00006	100104	06Apr06		06Apr07
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	N/A		N/A


<b>Company:</b>	<b>Kenwood USA Corporation</b>	<b>FCC ID:</b>	<b>ALH39913120</b>	<b>IC ID:</b>	<b>282D-39913120</b>	<b>KENWOOD</b>
<b>Model(s):</b>	<b>TK-5310-K4, -K5, -K6</b>	<b>Type:</b>	<b>Portable FM UHF PTT Radio Transceiver</b>		<b>380 - 470 MHz</b>	
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## 16.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	Uncertainty Value ±% (1g)	V <sub>i</sub> or V <sub>off</sub>
<b>Measurement System</b>						
Probe calibration	4.0	Normal	1	1	4.0	∞
Axial isotropy of the probe	4.7	Rectangular	1.732050808	0.7	1.9	∞
Spherical isotropy of the probe	9.6	Rectangular	1.732050808	0.7	3.9	∞
Spatial resolution	0	Rectangular	1.732050808	1	0.0	∞
Boundary effects	1	Rectangular	1.732050808	1	0.6	∞
Probe linearity	4.7	Rectangular	1.732050808	1	2.7	∞
Detection limit	1	Rectangular	1.732050808	1	0.6	∞
Readout electronics	0.3	Normal	1	1	0.3	∞
Response time	0.8	Rectangular	1.732050808	1	0.5	∞
Integration time	2.6	Rectangular	1.732050808	1	1.5	∞
RF ambient conditions	3	Rectangular	1.732050808	1	1.7	∞
Mech. constraints of robot	0.4	Rectangular	1.732050808	1	0.2	∞
Probe positioning	2.9	Rectangular	1.732050808	1	1.7	∞
Extrapolation & integration	1	Rectangular	1.732050808	1	0.6	∞
<b>Test Sample Related</b>						
Device positioning	2.9	Normal	1	1	2.9	12
Device holder uncertainty	3.6	Normal	1	1	3.6	8
Power drift	5	Rectangular	1.732050808	1	2.9	∞
<b>Phantom and Setup</b>						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	∞
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	∞
Liquid conductivity (measured)	2.5	Normal	1	0.64	1.6	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	2.5	Normal	1	0.6	1.5	∞
<b>Combined Standard Uncertainty</b>					<b>9.88</b>	
<b>Expanded Uncertainty (k=2)</b>					<b>19.77</b>	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])


<b>Company:</b>	<b>Kenwood USA Corporation</b>	<b>FCC ID:</b>	<b>ALH39913120</b>	<b>IC ID:</b>	<b>282D-39913120</b>	
<b>Model(s):</b>	<b>TK-5310-K4, -K5, -K6</b>	<b>Type:</b>	<b>Portable FM UHF PTT Radio Transceiver</b>	<b>380 - 470 MHz</b>		
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## MEASUREMENT UNCERTAINTIES (Cont.)

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	Uncertainty Value ±% (1g)	V <sub>i</sub> or V <sub>eff</sub>
<b>Measurement System</b>						
Probe calibration	4.0	Normal	1	1	4.0	∞
Axial isotropy of the probe	4.7	Rectangular	1.732050808	1	2.7	∞
Spherical isotropy of the probe	0	Rectangular	1.732050808	1	0.0	∞
Spatial resolution	0	Rectangular	1.732050808	1	0.0	∞
Boundary effects	1	Rectangular	1.732050808	1	0.6	∞
Probe linearity	4.7	Rectangular	1.732050808	1	2.7	∞
Detection limit	1	Rectangular	1.732050808	1	0.6	∞
Readout electronics	0.3	Normal	1	1	0.3	∞
Response time	0	Rectangular	1.732050808	1	0.0	∞
Integration time	0	Rectangular	1.732050808	1	0.0	∞
RF ambient conditions	3	Rectangular	1.732050808	1	1.7	∞
Mech. constraints of robot	0.4	Rectangular	1.732050808	1	0.2	∞
Probe positioning	2.9	Rectangular	1.732050808	1	1.7	∞
Extrapolation & integration	1	Rectangular	1.732050808	1	0.6	∞
<b>Test Sample Related</b>						
Dipole Positioning	2	Normal	1.732050808	1	1.2	∞
Power & Power Drift	4.7	Normal	1.732050808	1	2.7	∞
<b>Phantom and Setup</b>						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	∞
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	∞
Liquid conductivity (measured)	2.5	Normal	1	0.64	1.6	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	2.5	Normal	1	0.6	1.5	∞
<b>Combined Standard Uncertainty</b>					<b>7.93</b>	
<b>Expanded Uncertainty (k=2)</b>					<b>15.87</b>	


Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])



<b>Company:</b>	<b>Kenwood USA Corporation</b>	<b>FCC ID:</b>	<b>ALH39913120</b>	<b>IC ID:</b>	<b>282D-39913120</b>	
<b>Model(s):</b>	<b>TK-5310-K4, -K5, -K6</b>	<b>Type:</b>	<b>Portable FM UHF PTT Radio Transceiver</b>	<b>380 - 470 MHz</b>		
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	<u>Report Issue Date</u> September 15, 2006	<u>Description of Test(s)</u> RF Exposure - SAR	<u>RF Exposure Category</u> Occupational/Controlled	

## 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: 1999.
- [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 - "Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", Radio Standards Specification RSS-102 Issue 2: November 2005.
- [5] IEEE Standard 1528-2003 - "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques": December 2003.



<b>Company:</b>	<b>Kenwood USA Corporation</b>	<b>FCC ID:</b>	<b>ALH39913120</b>	<b>IC ID:</b>	<b>282D-39913120</b>	
<b>Model(s):</b>	<b>TK-5310-K4, -K5, -K6</b>	<b>Type:</b>	<b>Portable FM UHF PTT Radio Transceiver</b>		<b>380 - 470 MHz</b>	
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	<u>Report Issue Date</u> September 15, 2006	<u>Description of Test(s)</u> RF Exposure - SAR	<u>RF Exposure Category</u> Occupational/Controlled	

**APPENDIX B - SYSTEM PERFORMANCE CHECK DATA**

<b>Company:</b>	<b>Kenwood USA Corporation</b>	<b>FCC ID:</b>	<b>ALH39913120</b>	<b>IC ID:</b>	<b>282D-39913120</b>	<b>KENWOOD</b>
<b>Model(s):</b>	<b>TK-5310-K4, -K5, -K6</b>	<b>Type:</b>	<b>Portable FM UHF PTT Radio Transceiver</b>	<b>380 - 470 MHz</b>		
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	<u>Report Issue Date</u> September 15, 2006	<u>Description of Test(s)</u> RF Exposure - SAR	<u>RF Exposure Category</u> Occupational/Controlled	

Date Tested: 08/29/2006

## System Performance Check (Brain) - 450 MHz Dipole

**DUT: Dipole 450 MHz; Model: D450V2; Serial: 136; Validation: 10/25/2005**

Ambient Temp: 23.7°C; Fluid Temp: 23.0°C; Barometric Pressure: 101.5 kPa; Humidity: 33%

Communication System: CW  
Forward Conducted Power: 250mW  
Frequency: 450 MHz; Duty Cycle: 1:1  
Medium: HSL450 ( $\sigma = 0.85 \text{ mho/m}$ ;  $\epsilon_r = 43.0$ ;  $\rho = 1000 \text{ kg/m}^3$ )

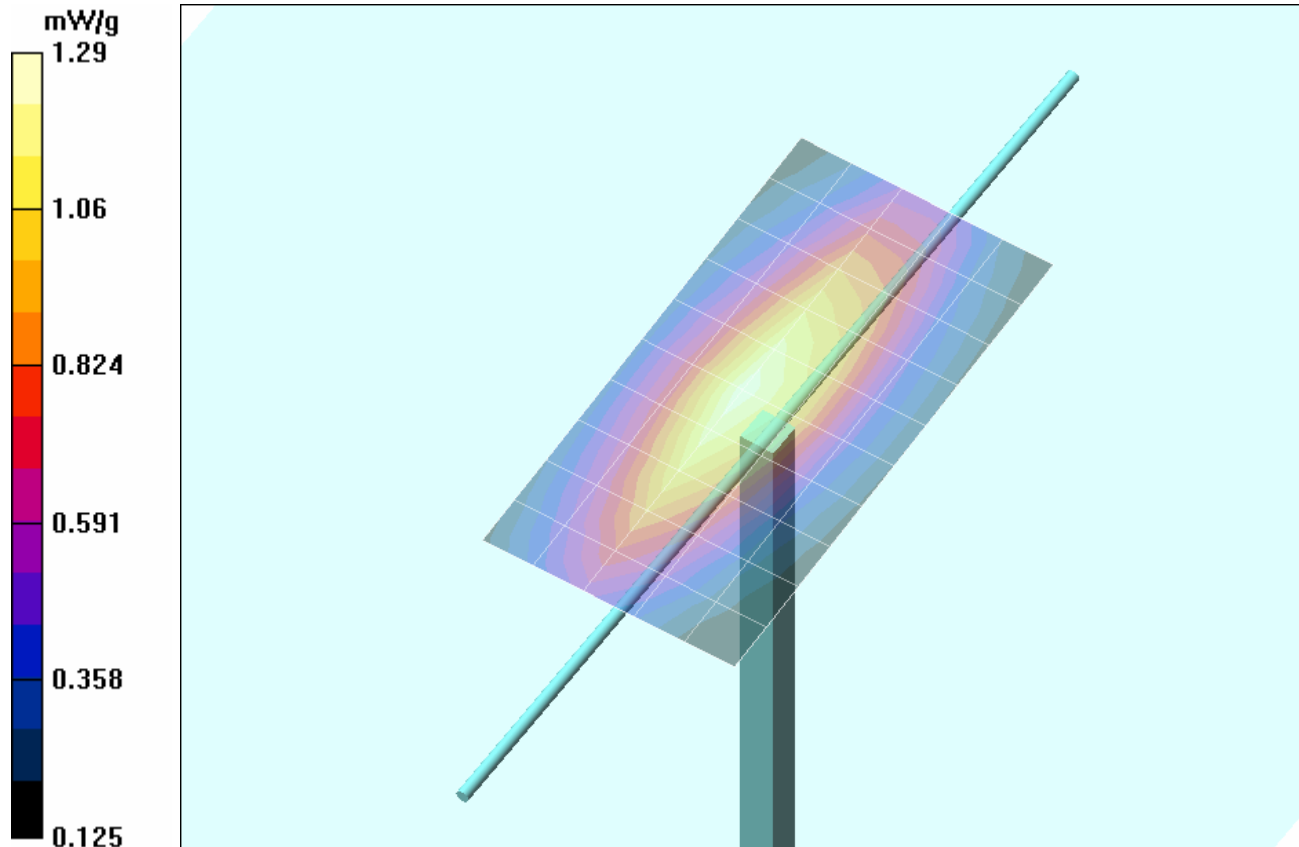
- Probe: ET3DV6 - SN1387; ConvF(7.4, 7.4, 7.4); Calibrated: 16/03/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 21/06/2006
- Phantom: Validation Planar; Type: Plexiglas; Serial: 137
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171


### 450 MHz Dipole - System Performance Check/Area Scan (6x11x1):

Measurement grid: dx=15mm, dy=15mm

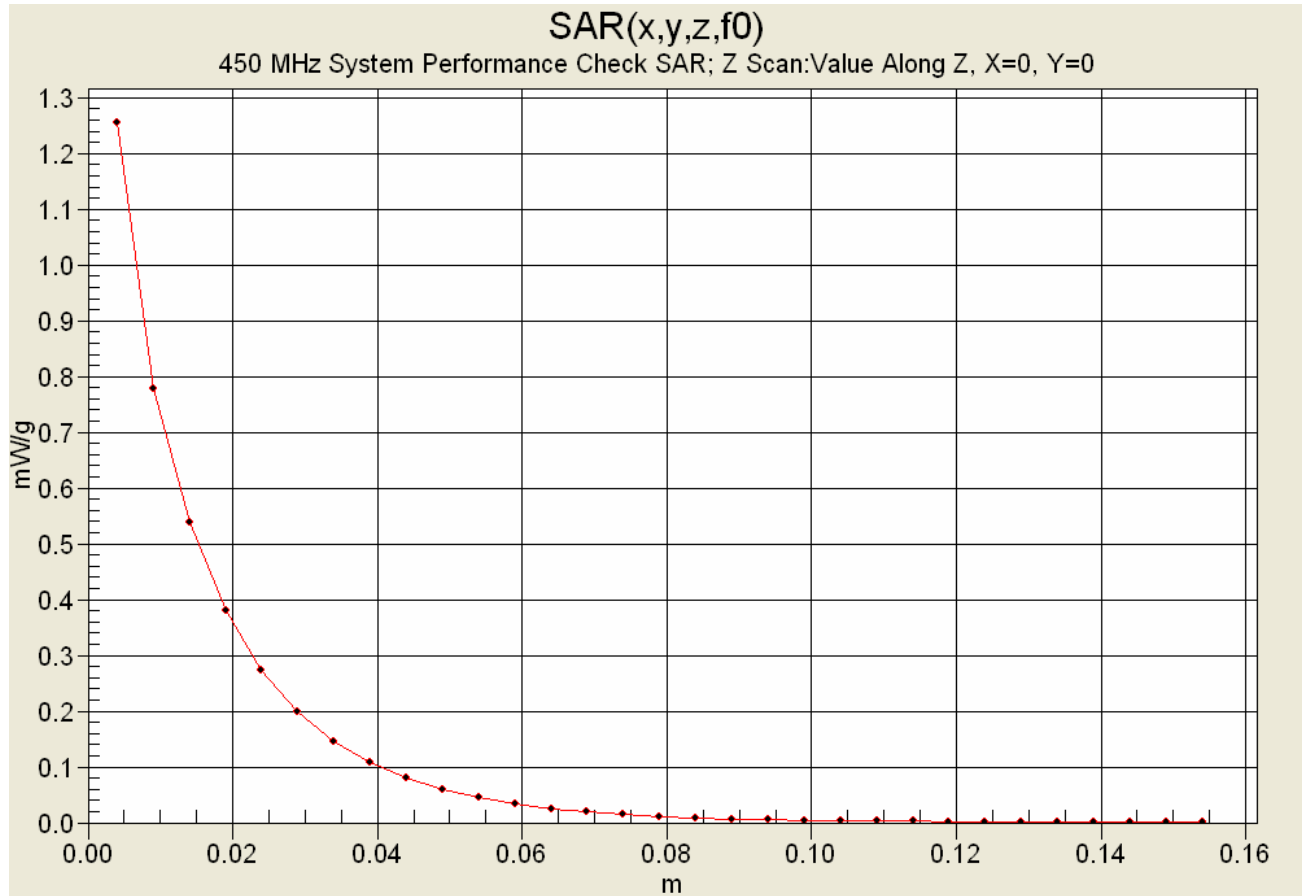
### 450 MHz Dipole - System Performance Check /Zoom Scan (5x5x7)/Cube 0:



Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm  
Reference Value = 38.7 V/m; Power Drift = -0.036 dB  
Peak SAR (extrapolated) = 2.14 W/kg  
**SAR(1 g) = 1.22 mW/g; SAR(10 g) = 0.782 mW/g**



<b>Company:</b>	Kenwood USA Corporation	<b>FCC ID:</b>	ALH39913120	<b>IC ID:</b>	282D-39913120	
<b>Model(s):</b>	TK-5310-K4, -K5, -K6	<b>Type:</b>	Portable FM UHF PTT Radio Transceiver	380 - 470 MHz		
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**Z-Axis Scan**



	<u>Date(s) of Evaluation</u> August 29-30, 2006	<u>Test Report Serial No.</u> 082406ALH-T769-S90U	<u>Report Revision No.</u> Revision 1.0	 Certificate No. 2470.01
	<u>Report Issue Date</u> September 15, 2006	<u>Description of Test(s)</u> RF Exposure - SAR	<u>RF Exposure Category</u> Occupational/Controlled	

Date Tested: 08/30/2006

## System Performance Check (Brain) - 450 MHz Dipole

**DUT: Dipole 450 MHz; Model: D450V2; Serial: 136; Validation: 10/25/2005**

Ambient Temp: 23.9°C; Fluid Temp: 23.2°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW  
Forward Conducted Power: 250 mW  
Frequency: 450 MHz; Duty Cycle: 1:1  
Medium: HSL450 ( $\sigma = 0.84$  mho/m;  $\epsilon_r = 42.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>)

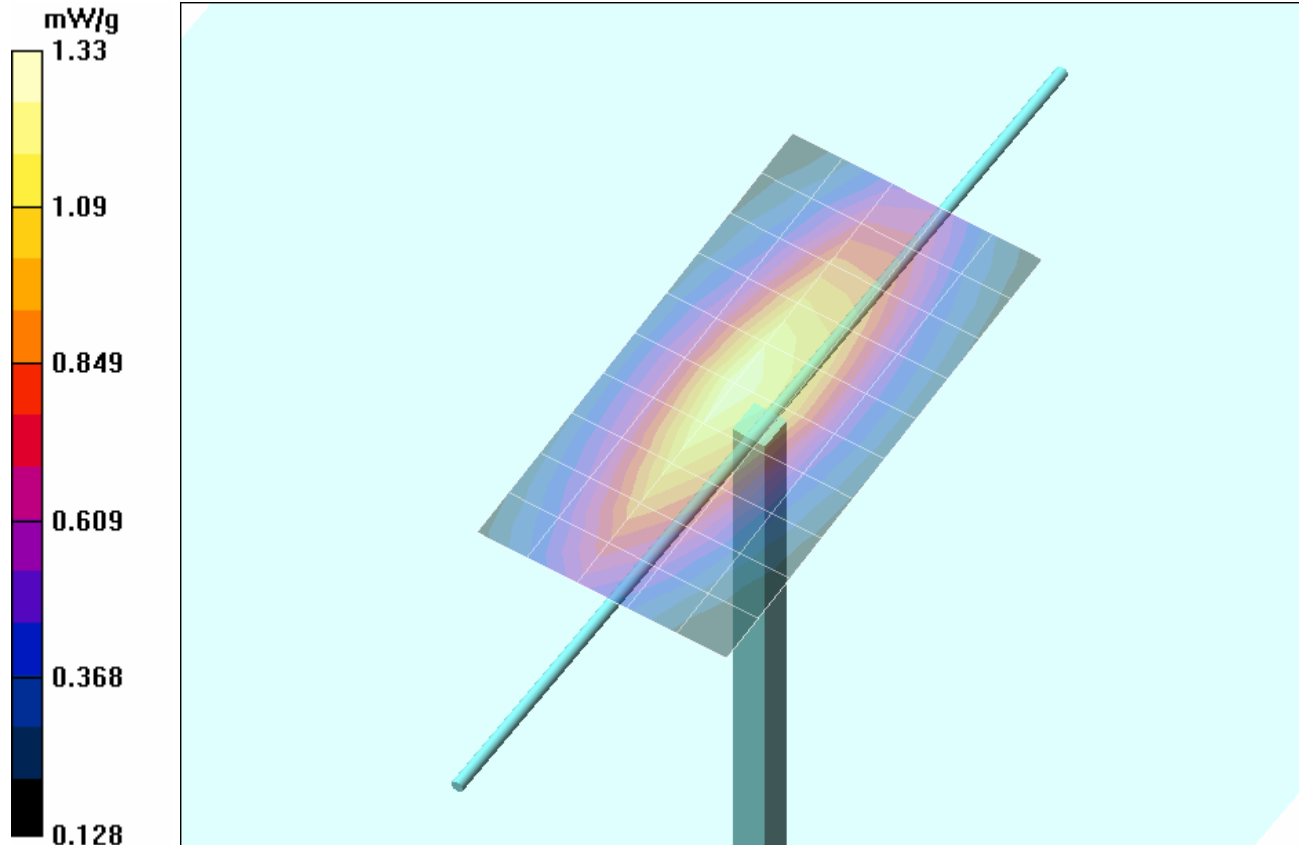
- Probe: ET3DV6 - SN1387; ConvF(7.4, 7.4, 7.4); Calibrated: 16/03/2006
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 21/06/2006
- Phantom: Validation Planar; Type: Plexiglas; Serial: 137
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171


### 450 MHz Dipole - System Performance Check/Area Scan (6x11x1):

Measurement grid: dx=15mm, dy=15mm

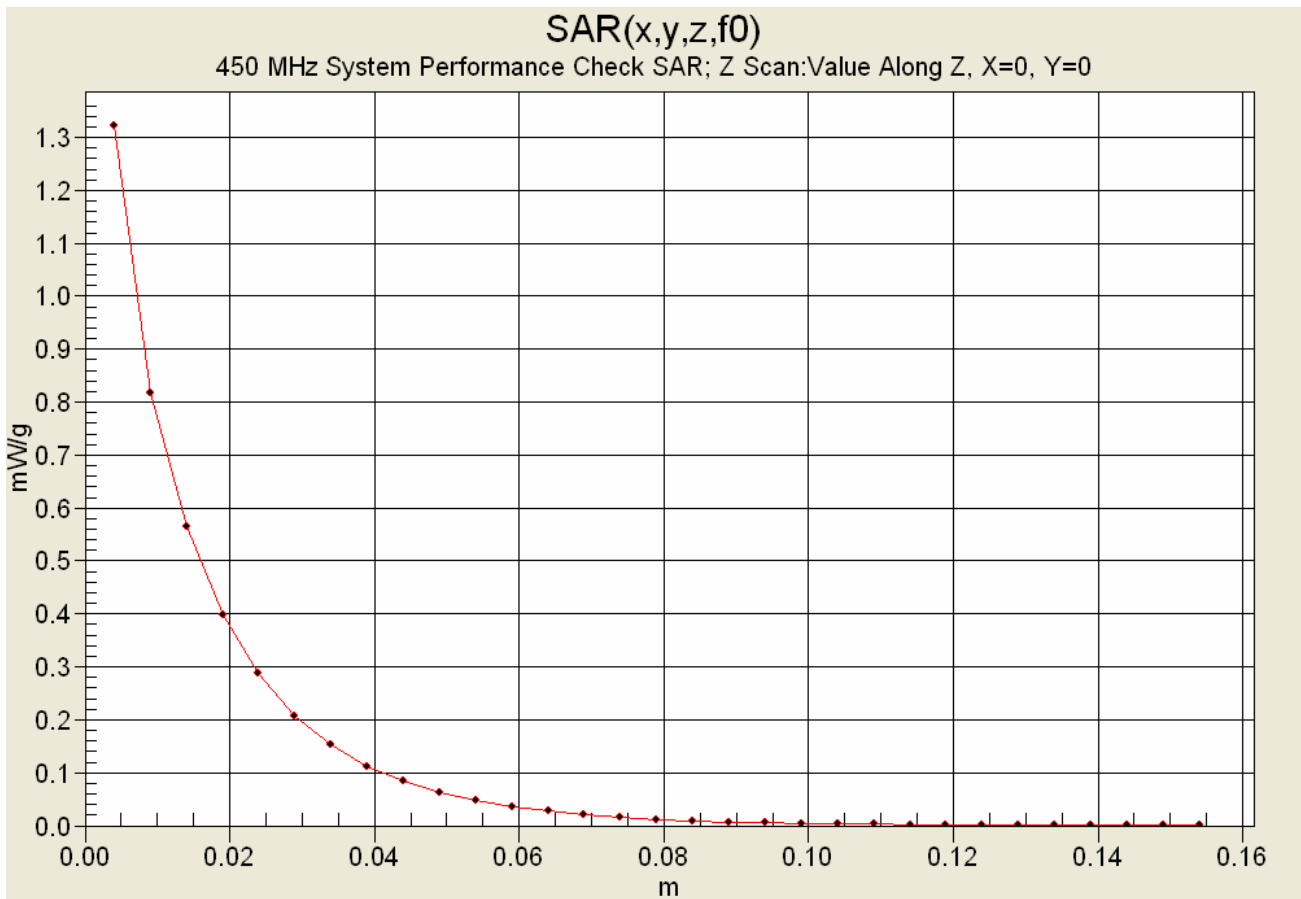
### 450 MHz Dipole - System Performance Check/Zoom Scan (5x5x7)/Cube 0:



Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm  
Reference Value = 39.7 V/m; Power Drift = -0.028 dB  
Peak SAR (extrapolated) = 2.21 W/kg  
**SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.814 mW/g**



<b>Company:</b>	Kenwood USA Corporation	<b>FCC ID:</b>	ALH39913120	<b>IC ID:</b>	282D-39913120	
<b>Model(s):</b>	TK-5310-K4, -K5, -K6	<b>Type:</b>	Portable FM UHF PTT Radio Transceiver	380 - 470 MHz		
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### Z-Axis Scan





	<u>Date(s) of Evaluation</u> August 29-30, 2006	<u>Test Report Serial No.</u> 082406ALH-T769-S90U	<u>Report Revision No.</u> Revision 1.0	
	<u>Report Issue Date</u> September 15, 2006	<u>Description of Test(s)</u> RF Exposure - SAR	<u>RF Exposure Category</u> Occupational/Controlled	

**APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS**

<b>Company:</b>	<b>Kenwood USA Corporation</b>	<b>FCC ID:</b>	<b>ALH39913120</b>	<b>IC ID:</b>	<b>282D-39913120</b>	<b>KENWOOD</b>
<b>Model(s):</b>	<b>TK-5310-K4, -K5, -K6</b>	<b>Type:</b>	<b>Portable FM UHF PTT Radio Transceiver</b>		<b>380 - 470 MHz</b>	
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	<u>Report Issue Date</u> September 15, 2006	<u>Description of Test(s)</u> RF Exposure - SAR	<u>RF Exposure Category</u> Occupational/Controlled	


### 450 MHz System Performance Check (Brain)



\*\*\*\*\*

Celltech Labs Inc,  
Test Result for UIM Dielectric Parameter  
Tue 29/Aug/2006  
Frequency (GHz)  
FCC\_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon  
FCC\_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma  
Test\_e Epsilon of UIM  
Test\_s Sigma of UIM

\*\*\*\*\*

Freq	FCC_eHFCC_sH	Test_e	Test_s
0.3500	44.70	0.87	45.51
0.3600	44.58	0.87	45.06
0.3700	44.46	0.87	44.87
0.3800	44.34	0.87	44.53
0.3900	44.22	0.87	44.14
0.4000	44.10	0.87	44.03
0.4100	43.98	0.87	43.73
0.4200	43.86	0.87	43.76
0.4300	43.74	0.87	43.40
0.4400	43.62	0.87	43.03
0.4500	43.50	0.87	43.04
0.4600	43.45	0.87	42.68
0.4700	43.40	0.87	42.66
0.4800	43.34	0.87	42.25
0.4900	43.29	0.87	42.27
0.5000	43.24	0.87	41.92
0.5100	43.19	0.87	41.70
0.5200	43.14	0.88	41.48
0.5300	43.08	0.88	41.61
0.5400	43.03	0.88	41.44
0.5500	42.98	0.88	40.95

<b>Company:</b>	Kenwood USA Corporation	<b>FCC ID:</b>	ALH39913120	<b>IC ID:</b>	282D-39913120	
<b>Model(s):</b>	TK-5310-K4, -K5, -K6	<b>Type:</b>	Portable FM UHF PTT Radio Transceiver	380 - 470 MHz		
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	<u>Date(s) of Evaluation</u> August 29-30, 2006	<u>Test Report Serial No.</u> 082406ALH-T769-S90U	<u>Report Revision No.</u> Revision 1.0	 Certificate No. 2470.01
	<u>Report Issue Date</u> September 15, 2006	<u>Description of Test(s)</u> RF Exposure - SAR	<u>RF Exposure Category</u> Occupational/Controlled	


### 450 MHz Device Evaluation (Body)



\*\*\*\*\*

Celltech Labs Inc.  
 Test Result for UIM Dielectric Parameter  
 Tue 29/Aug/2006  
 Frequency (GHz)  
 FCC\_eHFCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon  
 FCC\_sHFCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma  
 FCC\_eB FCC Limits for Body Epsilon  
 FCC\_sB FCC Limits for Body Sigma  
 Test\_e Epsilon of UIM  
 Test\_s Sigma of UIM

\*\*\*\*\*

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.3500	57.70	0.93	57.04	0.82
0.3600	57.60	0.93	56.78	0.83
0.3700	57.50	0.93	56.69	0.84
0.3800	57.40	0.93	56.40	0.84
0.3900	57.30	0.93	56.00	0.85
0.4000	57.20	0.93	56.10	0.86
0.4100	57.10	0.93	55.88	0.87
0.4200	57.00	0.94	55.77	0.87
0.4300	56.90	0.94	55.70	0.89
0.4400	56.80	0.94	55.32	0.89
0.4500	56.70	0.94	55.26	0.91
0.4600	56.66	0.94	55.12	0.92
0.4700	56.62	0.94	54.92	0.92
0.4800	56.58	0.94	54.85	0.93
0.4900	56.54	0.94	54.70	0.94
0.5000	56.51	0.94	54.49	0.94
0.5100	56.47	0.94	54.55	0.95
0.5200	56.43	0.95	54.41	0.96
0.5300	56.39	0.95	54.32	0.97
0.5400	56.35	0.95	54.13	0.97
0.5500	56.31	0.95	54.02	0.99

<b>Company:</b>	<b>Kenwood USA Corporation</b>	<b>FCC ID:</b>	<b>ALH39913120</b>	<b>IC ID:</b>	<b>282D-39913120</b>	
<b>Model(s):</b>	<b>TK-5310-K4, -K5, -K6</b>	<b>Type:</b>	<b>Portable FM UHF PTT Radio Transceiver</b>	<b>380 - 470 MHz</b>		
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	<u>Date(s) of Evaluation</u> August 29-30, 2006	<u>Test Report Serial No.</u> 082406ALH-T769-S90U	<u>Report Revision No.</u> Revision 1.0	 Certificate No. 2470.01
	<u>Report Issue Date</u> September 15, 2006	<u>Description of Test(s)</u> RF Exposure - SAR	<u>RF Exposure Category</u> Occupational/Controlled	


### 450 MHz System Performance Check and Device Evaluation (Brain)

\*\*\*\*\*

Celltech Labs Inc.  
Test Result for UIM Dielectric Parameter  
Wed 30/Aug/2006  
Frequency (GHz)  
FCC\_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon  
FCC\_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma  
Test\_e Epsilon of UIM  
Test\_s Sigma of UIM

\*\*\*\*\*

Freq	FCC_eHFCC	sHFCC	Test_e	Test_s
0.3500	44.70	0.87	45.33	0.76
0.3600	44.58	0.87	44.89	0.77
0.3700	44.46	0.87	44.93	0.78
0.3800	44.34	0.87	44.54	0.78
0.3900	44.22	0.87	44.12	0.80
0.4000	44.10	0.87	44.11	0.81
0.4100	43.98	0.87	43.98	0.81
0.4200	43.86	0.87	43.61	0.82
0.4300	43.74	0.87	43.46	0.83
0.4400	43.62	0.87	43.03	0.83
0.4500	43.50	0.87	42.79	0.84
0.4600	43.45	0.87	42.55	0.86
0.4700	43.40	0.87	42.48	0.86
0.4800	43.34	0.87	42.09	0.87
0.4900	43.29	0.87	42.15	0.88
0.5000	43.24	0.87	41.86	0.88
0.5100	43.19	0.87	41.82	0.90
0.5200	43.14	0.88	41.56	0.90
0.5300	43.08	0.88	41.42	0.91
0.5400	43.03	0.88	41.18	0.91
0.5500	42.98	0.88	40.92	0.92

<b>Company:</b>	<b>Kenwood USA Corporation</b>	<b>FCC ID:</b>	<b>ALH39913120</b>	<b>IC ID:</b>	<b>282D-39913120</b>	
<b>Model(s):</b>	<b>TK-5310-K4, -K5, -K6</b>	<b>Type:</b>	<b>Portable FM UHF PTT Radio Transceiver</b>	<b>380 - 470 MHz</b>		
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